

**Cerro Casale Project  
Northern Chile  
NI 43-101 Technical Report**

**Prepared for:  
Kinross Gold Corporation**

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## **APPENDICES**

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Appendix 1: List of Mineral Claims



## 1.0 SUMMARY

Kinross Gold Corporation (Kinross) has prepared a Technical Report (the Technical Report) for the Cerro Casale gold–copper deposit, (Cerro Casale Project), located in northern Chile, South America. The Project is part of the Aldebarán property.

The Cerro Casale Project is a joint venture between Kinross and Barrick Gold Corporation (Barrick), collectively the Owners. Barrick holds a 75% interest and is operator; Kinross holds the remaining 25% interest. The companies use a joint venture vehicle for the project, known as Compañía Minera Casale (CMC).

Kinross will be using this Technical Report in support of disclosure and filing requirements with the Canadian Securities Regulators. The report has an effective date of 18 February 2010, and summarizes the results of a feasibility study completed on the Cerro Casale deposit during 2009–2010.

### 1.1 Principal Outcomes

- The proposed Project consists of a large open pit with a strip ratio of 2:1, a process plant of 160,000 t/d, and an heap leach operation of 100,000 t/d production throughput. The Project is planned to generate 16.8 Moz of payable gold, 4,832 Mlb of payable copper and 36.5 Moz of payable silver in three saleable products: copper concentrate, gold doré, and SART copper concentrate.
- Proposed mine life based on the current mineral reserve is 20 years;
- Proven and Probable Mineral Reserves estimated for 23.2 Moz contained gold and 5.8 Mlb contained copper:
  - Proven Mineral Reserves: 231.6 Mt at 0.64 g/t Au (4.8 Moz contained gold), 1.88 g/t Ag (14 Moz contained silver), and 0.19% Cu (963 Mlb Cu);
  - Probable Mineral Reserves: 981.3 Mt at 0.58 g/t Au (18.4 Moz contained gold), 1.42 g/t Ag (44.7 Moz contained silver), and 0.22% Cu (4,819 Mlb Cu);
- Initial capital cost of the project has been estimated at US\$4,184 million with average by-product life-of-mine (LOM) cash costs of US\$277 per oz gold payable;
- The financial analysis indicated that the Project had a positive net cash flow and an acceptable internal rate of return and supports declaration of mineral reserves.

## **1.2 Project Setting, Location and Access**

The Aldebarán gold–copper property, which incorporates the Cerro Casale deposit, is located in Region Three (Atacama) of northern Chile. The city of Copiapo is 145 km northwest of the deposit, and the international border separating Chile and Argentina is approximately 20 km to the east.

Access to the Project is 180 km by road from Copiapó. The initial southbound 25 km is paved highway, which connects to a 155 km gravel road running southeast to the Project site. The nearest commercial airport is located close to Copiapó. Chilean airlines have daily flights to and from Santiago.

Planned infrastructure to support proposed mining operations will include, in addition to the future plant site at the mine, an airstrip, construction of major receiving, storage, and transfer facilities at different locations in Chile en-route to the mine, and mine access road upgrades and development.

Proposed off-site infrastructure includes the Piedra Pómez well field and a 120 km water pipeline; a 220 km concentrate pipeline; a concentrate filtration plant and storage and transfer system at the port of Caldera; and three transmission lines (2 x 220 kV, 135 km line from Cardones substation to Cerro Casale site; 1 x 110 kV, 67 km line from La Coipa Mine tap-off to Piedra Pómez; and 1 x 23 kV, 7 km line from the local distribution system to the concentrate filter plant at Caldera).

Topography in the area varies from 3,500 m in the valley bottoms to over 5,800 m at the headwaters of the Rio Nevado. The Project area is sparsely populated, hence direct impacts on inhabitants will be minimal. Project operation is generally possible all year round. Both regional and federal governments are expected to continue to support the Project, but no direct governmental investment in required infrastructure is assumed or expected.

## **1.3 Mineral Tenure**

CMC owns 32 mining exploitation concessions that total 20,111 ha in area. Some of these claims partially overlap reducing the actual ground covered by all exploitation claims to an area of 20,000 ha. All claims have been surveyed by a licensed surveyor. The mine, plant, and ancillary facilities, not including concentrate pipeline and port or warehouse, will be entirely located on these concessions.

CMC also has mining exploration concessions to a limestone deposit covering an area of 2,500 ha. The limestone deposit is located near the main access road about 60 km from the proposed Cerro Casale mine site. In addition, CMC has 112,600 ha of mining

exploration concessions in other sectors such as where the proposed camp is planned to be located, where proposed water wells are located, and along the proposed fresh water and concentrate pipeline routes for Cerro Casale project.

#### **1.4 Royalties**

A 3% net smelter return royalty is payable annually to Minera Anglo American Chile Limitada (Anglo) and other Anglo affiliates on gold production from the Cachito and Nevado mining concessions, which contain the Cerro Casale deposit. The royalty is capped at US\$3 million.

#### **1.5 Surface Rights and Land Use**

The surface land where the Project is part of a larger lot owned by the state, managed and represented by the Ministerio de Bienes Nacionales (the Ministry of Public Lands).

At present, CMC is requesting the renewal of leases for 2,467 ha of land from the Ministerio de Bienes Nacionales for two lots in the Cerro Casale area, and leases for 280 ha of land for various lots in the Piedra Pómez area. Lease agreements for these lots of land are renewable annually. The lease agreement for the Cerro Casale area is currently under negotiation with the Ministerio de Bienes Nacionales. The lease agreement for the Piedra Pómez area expires on December 1, 2010.

CMC has developed acquisition plans for surface rights to allow Project development. A total of 10,786 ha of surface land will have to be acquired or rights-of-way granted for the various facilities. This can be broken down as 4,700 ha for the mine site (mine, process plant, tailings storage facility, and waste rock facility), 1,486 ha for the fresh water system (production wells, booster pump station, and pipelines), 2,450 ha for the concentrate pipeline, 1,980 ha for the power lines, and 170 ha for the camp.

There are no legal impediments to the granting of rights-of-way and other easements necessary to access the property, to develop production water, and to build the proposed water and concentrate pipelines. However, on the concentrate pipeline route, around 20 km of the route runs through lands belonging to the Colla indigenous communities, and negotiations with the Colla will be required to obtain rights of way.

Total water rights granted to the Project, and currently registered, amount to 1,236.6 L/s. All these rights are for permanent and continuous water use and consumption.

## **1.6 Permits**

Mining projects in Chile require both environmental approval and numerous sectorial permits prior to construction. Cerro Casale received environmental approval under the name of Aldebarán in early 2002, but the project was subsequently deferred due to poor economic conditions, and many of the necessary sectorial permits were not obtained. Sectorial permits for the project are not all required at the same time, and approvals times for different permit preparation and approval will vary. It is expected that permits will be prioritized and those on the critical path (requiring a long period for preparation or for approval, or required early in project development) will be given priority.

## **1.7 Environmental**

Ongoing environmental studies for Cerro Casale were initiated by CMC in 1998, and included archaeology, meteorology, land use, geology, geotechnical and geomorphology risk evaluation, hydrology, flora and fauna studies, socio-economics, infrastructure and landscape. Engineering assessments, impact evaluations and development of environmental management plans also formed part of environmental studies developed for the Project.

These studies led to the preparation of the EIA that was presented to the Government of Chile's responsible authority, on March 12, 2001. On 31 January 2002, the Corema issued EIA approval resolution (RCA) No. 014 in Copiapó. Since the original EIA was developed there have been major changes in the Chilean regulatory process for new mines.

Two alternatives were identified for obtaining the necessary regulatory approvals to proceed with Project development:

- Submit one EIA, documenting changes to the original Project definition;
- Submit a new EIA for the entire updated project.

Which approach is used for the Project will depend on outcomes of consultations with the Chilean Government.

Existing Project environmental liabilities are limited to those associated with an exploration-stage property, and would involve removal of the exploration camp and some limited well closure. These costs are not expected to exceed \$600,000 and would be shared with Barrick.

The total closure cost estimated for the proposed Project is US\$135 million, the majority (82%) of which is associated with water treatment, closure of the tailings impoundment, waste rock facility and general and administrative (G&A) costs.

## **1.8 Geology and Mineralization**

The Cerro Casale gold–copper deposit is located in the Aldebarán sub-district of the Maricunga Volcanic Belt in northern Chile. The Maricunga belt is made up of a series of coalescing composite, Miocene andesitic to rhyolitic volcanic centres that extend for 200 km along the western crest of the Andes. Reverse faults parallel to the axis of the Andes have uplifted hypabyssal intrusive rocks beneath the extrusive volcanics, exposing porphyry-hosted gold-copper deposits in the Aldebarán area. In addition to Cerro Casale, the Aldebarán property is host to several, less-explored, satellite deposits including Zona de Vetas, Eva, Cerro Roman, Estrella, Anfiteatro, Jotabeche, and Romancito Sur.

At Cerro Casale, gold–copper mineralization occurs in quartz–sulphide and quartz–magnetite–specularite veinlet stockworks developed in the dioritic to granodioritic intrusives and in adjacent volcanic wall rocks. Stockworks are most common in two dioritic intrusive phases, particularly where intrusive and hydrothermal breccias are developed. Mineralization has been encountered to at least 1,450 m vertically and 850 m along strike. The strike of mineralization follows west–northwest fault and fracture zones, and is open at depth along this strike. The main zone of mineralization pinches and swells from 250 m to 700 m along strike, and down dip steeply to the southwest. The highest grade mineralization is coincident with well-developed quartz–sulphide stockworks in strongly potassic-altered intrusive rocks.

Oxidation resulting from weathering and/or high oxygen activity in the last phase of hydrothermal alteration overprints sulphide mineralization in the upper portion of the Cerro Casale deposit. Copper oxides are not common. Oxidation locally extends deeply along fault zones or within steeply-dipping breccia bodies.

The Cerro Casale deposit is considered to be an example of a primary gold–copper porphyry system, with strong affinities to high sulphidation, volcanic-hosted gold systems.

## **1.9 History and Exploration**

Exploration programs have been undertaken by a number of companies, including Anglo, Bema, Arizona Star, Placer Dome, Kinross and Barrick. Work completed during 1989–2009 comprised property-wide geological mapping, interpretation of Landsat imagery, ground and airborne geophysical surveys, rock-chip and

geochemical sampling, including bulk leach extractable gold (BLEG) and -80 mesh stream sediment, soil, talus, road-cut and grab sampling, trenching, reverse circulation (RC) and core drilling, metallurgical testwork, and studies to support pre-feasibility and feasibility-level Project assessment. A number of petrological, mineralogical, microscopy and fluid inclusion studies have been completed on areas within the Aldebarán Project.

A first-time pre-feasibility level study was completed in 1993; and a feasibility study was underway in 1997 to assess the economics of the oxide portion of the Cerro Casale deposit when sulphide mineralization was discovered. A pre-feasibility study for an oxide-sulphide operation and a scoping study for development of deep sulphides were subsequently completed. In 2000, a feasibility study was completed; this study established that mining the Cerro Casale deposit was technically feasible as a large-scale open pit gold-copper operation. Capital and operating costs were updated in March 2004, and in 2005. In 2006, processing alternatives were evaluated using elements from previous studies and incorporating revised equipment and operating cost estimates, scale-up factors, and escalation.

From 2007 to 2008, work on the Project consisted of a pre-feasibility study, with associated trade-off studies. A feasibility study on the Project commenced immediately following pre-feasibility study completion. The results of the 2009–2010 feasibility study form the basis of this Report.

## **1.10 Drilling**

Drilling on the Project has been undertaken in a number of core and RC campaigns from 1989 to 2009 totalling 350 RC and core holes (149,703 m). No drilling on prospects or deposits other than Cerro Casale has occurred since 2000. Drill programs have been completed primarily by contract drill crew, supervised by geological staff of the Project operator at the time.

Most RC and core holes were drilled from the southwest to the northeast, and inclined at -60° to -70° to intersect the steeply south-dipping stockwork zones at the largest possible angle. Drill orientations at Cerro Casale are appropriate for the style and orientation of the mineralization.

RC drilling was used principally to test the shallow oxide portion of the deposit on the north side of Cerro Casale and to pre-collar deeper core holes. RC holes have a range in depth from 23 to 414 m and a mode of 100 m. The average RC hole depth is 187 m. Core holes range from 30 to 1,473 m in depth, with an average depth of 752 m and a mean and median depth of about 850 m. Core drilling was generally used to test mineralization at depths >200 m.



Drill hole spacing varies with depth. Drill hole spacing in shallow oxide mineralization is approximately 45 m. Average drill hole spacing in the core of the deposit at elevations between 3,700 and 4,000 m is about 75 m. Drill hole spacing increases with depth as the number of holes decrease and holes deviate apart. Average spacing at the base of the ultimate reserve pit is about 100 m.

All drill holes have been geologically logged and record lithology, alteration, structure, texture, mineralization, alteration minerals and intensity, and veins. Geotechnical logging has also been performed.

Drill collars have been picked up using geodetic-grade, global positioning system (GPS) instruments. In early 2009, all data were converted to the WGS-84 coordinate system.

Several different down hole survey techniques and devices have been used to measure down hole azimuth and dip, including Tropari<sup>®</sup>, Sperry Sun<sup>®</sup>, and gyroscopic instruments. Declination corrections were applied to the downhole survey data as required. Downhole surveys have been performed on approximately 66% of the RC and core drill holes that were used to support mineral resource and mineral reserve estimations. A total of 151 drill holes out of 364 holes do not have surveys. These holes are primarily RC holes that are <200 m deep that were drilled in oxide mineralization.

Recoveries are acceptable for both drilling types.

Sample collection and handling of RC drill cuttings and core was done in accordance with industry standard practices, with procedures to limit sample losses and sampling biases. The sampling has been undertaken over a sufficient area to determine deposit limits, and the data collected adequately reflects deposit dimensions, true widths of mineralization, and the style of deposit. The samples are representative of the mineralization, and respect the geology of the deposit.

RC samples intervals were typically 2 m to 3 m. Samples were primarily collected using a Gilson riffle splitter. In wet areas (<1% of the samples), a rotary wet splitter was used. Drill core was sampled on 2 m intervals. Core was split during 1996 and 1997 into  $\frac{2}{3}$  and  $\frac{1}{3}$  portions with a diamond saw; all other core drill programs have produced  $\frac{1}{2}$  splits. Half and one-third core retained after sampling for all holes is presently stored in permanent metal buildings at the Project site. Cores from metallurgical holes were consumed and are not available for inspection.

Sample security was not generally practiced at Cerro Casale during the drilling programs, due to the remote nature of the site. Sample security relied upon the fact

that the samples were always attended or locked in the on-site sample dispatch facility.

Density determinations were collected primarily in the period 1994–2000 using water-immersion methods. Degree of oxidation appears to be the main control to bulk density followed by lithology. Average densities were 2.64 g/cm<sup>3</sup> for sulphide material, 2.48 g/cm<sup>3</sup> for mixed material and 2.44 g/cm<sup>3</sup> for oxide material.

Entry of information into databases utilized a variety of techniques and procedures to check the integrity of the data entered. Early geological data were double-data entered; subsequent logging was performed directly using computers. With the exception of one period of drilling, assays were received electronically from the laboratories and imported directly into drill hole database spreadsheets.

### 1.11 Sample Preparation and Analysis

The majority of the sample preparation for Cerro Casale has been performed by an independent laboratory, Bondar Clegg (now ALS Chemex), in Copiapó, Chile. A number of analytical laboratories have performed analyses on core or RC samples from the Cerro Casale deposit. However, ACME, in Santiago, has been the primary analytical laboratory, and has performed the majority of the analyses to date. The typical analytical suite has been:

- Gold via fire assay with an AA finish;
- Copper and silver via AA after an aqua regia digestion.

During 2007, deleterious element concentrations were analyzed at ACME, using an inductively-coupled plasma method that determined 34 elements.

Duplicate samples, blank samples and geochemical standards have regularly been inserted in the sample streams for quality control and quality assurance (QA/QC) purposes. The number of QA/QC samples and the procedures for submitting them has varied, but typically has been in the order of one standard and one duplicate per 15–20 samples, and one blank per 20–40 samples.

Standard reference materials prepared from mineralization at Cerro Casale were used to monitor the performance of gold and copper analysis. Duplicate samples were used to monitor the reproducibility of the analyses. Overall, the results were good, and considered sufficiently precise to support mineral resource estimation.



Blank samples, consisting of coarse gravel-sized, non-mineralized crushed rock, were used to monitor sample contamination during sample preparation. In general, sample preparation was found to be free of contamination.

A major check assay program was performed during 2007 and indicated no significant biases in the original assay data against the check assays.

## 1.12 Data Verification

An extensive program of data verification was part of the development of the Project, and included:

- An audit of the topographic control base of the Project; there is a uniform offset of coordinates that was resolved by a high-precision resurvey program completed in 2008;
- Drill relogging of two selected cross sections was performed in 2008 for lithology, alteration, stockwork, and internal structure. The geological model was revised with respect to the definition of hydrothermal breccias versus other breccias;
- Drill collar coordinates and elevations were reviewed for a number of drill holes against their plotted position on topography. No drill holes were noted with discrepancies greater than the accuracy of the topographic survey;
- Review of RC sample weights for drilling prior to 1996, which found no relationship between copper grades and recovery and no relationship between gold grades and recovery in oxide intervals;
- Downhole survey data were checked and generally concluded to be reasonable and suitable to support mineral resource estimates;
- Review of QA/QC for assay data from 1994–2000 indicated sampling, preparation, and analytical procedures were adequate for obtaining acceptable analytical results for gold and copper;
- Review of data and QA/QC from the 2008 infill drill campaign was reviewed by CMC and determined to be suitable for use in mineral resource estimation; and
- Database validation in 2009, consisting of audits of geological and assay attributes against geological logs, check assays, and original assay certificates, showed that the database was acceptably free of errors.

QA/QC data for silver are limited, but a re-assay program of 7% of the sample pulps by Geovectra showed that there is no bias in the data relative to the original analyses.

The reviews indicated that the assay and geological databases are suitable to support the resource estimates. Overall errors are within acceptable ranges.

### **1.13 Metallurgical Testwork**

A number of programs of metallurgical testwork were completed on the Cerro Casale deposit in the period 1992–2009, including:

- Mapping tests on assay coarse rejects from drill core;
- Mineralogical studies
- Bond work index testing;
- Determination of JKTech grinding parameters;
- Assessment of high pressure grinding roll (HPGR) amenability;
- Pilot plant testwork on composite materials that simulate the material that would be mill feed for the first five years of production;
- Assessment of dewatering and settlement characteristics;
- Concentrate pumping and filtration tests;
- Flotation testwork on various ore types;
- Sulphidization–acidification–recycling–thickening testwork
- Cyanidation and cyanide destruction tests;
- Coarse and fine column feed heap leach testwork; and
- Trade-off studies.

Testwork interpretation has determined an average life-of-mine (LOM) recovery of 90.5% for copper and 77.9% for gold and 81.9% for silver can be expected from the processing of sulphide ore with average LOM concentrate grades of 27.4% Cu, 52.7 g/t Au and 136.5 g/t Ag. Lower recoveries (at 84.2% for Cu, 63.1% for Au, 65.6% for Ag) and lower concentrate grades (at 25.8% Cu) are projected for the first five years of operation, due mostly to the high proportion of low-grading diorite porphyry ore, which has a lower metallurgical response.

### **1.14 Mineral Resource Estimate**

Geological interpretations were updated in 2009 to include drilling completed in 2007, 2008 and 2009 and extended to cover the full extent of the proposed pit area. Estimation domains were defined using lithology and the presence or absence of

stockwork veins and/or potassic alteration, which are the main controls on mineralization.

Assays were capped for extreme grades of gold, copper, and silver and composited into 16 m lengths prior to estimation. Gold, copper, and silver grades were interpolated into the block model using an inverse-distance-squared (ID2) interpolation methodology run as a series of passes with progressively increasing search distances and/or decreasing criteria for the minimum number of holes required to calculate an estimate. Search distances were derived from omni-directional correlograms for each element.

Classification into Measured, Indicated, and Inferred categories was derived from the estimation pass and minimum number of drill holes used to derive the gold estimate in each block. Once the resource classification was assigned to each block, a routine was run to identify isolated blocks, which were reclassified as required. Approximately 1% of the blocks in the model were reclassified.

Mineral resources are defined within a Whittle optimized pit shell that incorporated the following parameters:

- Gold price: US\$900/oz;
- Copper price: US\$2.25/lb;
- Silver price: \$14.50/oz;
- Mining cost: US\$1.521/t mined;
- Stockpile re-handling cost: US\$0.80/t re-handled;
- Plant operating cost: US\$5.502/t milled;
- Heap leach cost: US\$2.50/t leached;
- G&A cost: US\$0.720/t milled;
- Royalty: US\$0.003/t milled.

The mineral resources for Cerro Casale are based on zero NSR cut-off on a block-by-block basis and are summarized in Table 1-1. Mineral resources have an effective date of 31 December 2009 and are classified in accordance with the 2005 CIM Definition Standards for Mineral Resources and Mineral Reserves. Mineral resources are exclusive of mineral reserves and do not include dilution. Readers are cautioned that Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.

## **1.15 Mineral Reserve Estimation**

The proposed mine plan envisages a bulk-mining open pit scenario, and a production rate of 57.6 Mt/a, from a nominal mining rate of 225 Mt/a. The estimated mine life is 20 years. The amount of dilution at Cerro Casale is projected to be small (less than 1%) due to the large, low-grade, disseminated nature of the mineralization.

Mill ore economic cut-off grades vary by ore types based on different recoveries. Gold economic cut-off grades range from 0.31–0.37 g/t Au and copper economic cut-off grades range from 0.19–0.23% Cu, assuming no contribution from other metals. Actual cut-off is based on zero NSR estimations applying all revenues and costs. Heap leach oxide economic cut-off grade is 0.20 g/t Au, with only material categorized as oxide considered as heap leach feed.

Mineral Reserves for Cerro Casale included only mineralization classified as Measured and Indicated Mineral Resources and are presented in Table 1-2. Included in this total is a sulphide Mineral Reserve of 1,034 Mt grading, 0.61 g/t Au, 1.48 g/t Ag, and 0.24% Cu and heap-leachable oxide mineral reserves of 178.9 Mt grading 0.49 g/t Au, 1.68 g/t Ag, and 0.07% Cu. Mineral Reserves are estimated using a US\$800/oz gold price, a US\$12.50/oz silver price, and US\$2.00/lb Cu price, and an economic function that includes variable operating costs and metallurgical recoveries. The effective date for the Mineral Reserves is 31 December 2009.

**Table 1-1: Measured, Indicated, and Inferred Mineral Resources**

| Mineral Resource Category | Tonnage (kt)   | Grades      |             |              | Contained Metal |              |              |
|---------------------------|----------------|-------------|-------------|--------------|-----------------|--------------|--------------|
|                           |                | Gold (g/t)  | Copper (%)  | Silver (g/t) | Gold (koz)      | Copper (Mlb) | Silver (koz) |
| Measured                  | 14,694         | 0.33        | 0.16        | 1.27         | 158             | 51           | 597          |
| Indicated                 | 202,771        | 0.39        | 0.19        | 1.05         | 2,571           | 829          | 6,849        |
| <b>Total M+I</b>          | <b>217,465</b> | <b>0.39</b> | <b>0.18</b> | <b>1.06</b>  | <b>2,730</b>    | <b>880</b>   | <b>7,447</b> |
| Inferred                  | 443,878        | 0.37        | 0.19        | 1.07         | 5,139           | 1,873        | 15,214       |

Notes:

1. Mineral resources are exclusive of mineral reserves and do not include dilution;
2. Mineral resources that are not mineral reserves do not have demonstrated economic viability;
3. Mineral resources are reported to a gold price of US\$900/oz, a silver price of US\$14.50, and a copper price of US\$2.25/lb;
4. Mineral resources are defined with a Lerchs-Grossman pit shell;
5. Tonnages are rounded to the nearest 1,000 tonnes, grades are rounded to two decimal places for Au and Cu, grades for Ag are rounded to one decimal place;
6. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
7. Tonnage and grade measurements are in metric units. Gold ounces are reported as troy ounces, copper pounds as US imperial pounds.

**Table 1-2: Proven and Probable Mineral Reserves**

| Mineral Reserve Category | Tonnage (kt)     | Grades      |             |              | Contained Metal |              |               |
|--------------------------|------------------|-------------|-------------|--------------|-----------------|--------------|---------------|
|                          |                  | Gold (g/t)  | Copper (%)  | Silver (g/t) | Gold (koz)      | Copper (Mlb) | Silver (koz)  |
| Proven                   | 231,551          | 0.64        | 0.19        | 1.88         | 4,766           | 963          | 13,977        |
| Probable                 | 981,334          | 0.58        | 0.22        | 1.42         | 18,403          | 4,819        | 44,752        |
| <b>Total</b>             | <b>1,212,885</b> | <b>0.59</b> | <b>0.22</b> | <b>1.51</b>  | <b>23,170</b>   | <b>5,782</b> | <b>58,728</b> |

Note:

1. Mineral reserves are estimated using a US\$800/oz gold price, US\$12.50/oz silver price, and a US\$2.00/lb Cu price, and an economic function that includes variable operating costs and metallurgical recoveries.
2. Au and Cu cut-off grades above are estimated assuming no contribution from the other metal, whereas the actual cut-off is based on zero NSR estimations on a block-by-block basis applying all revenue and associated costs.
3. Mineral reserves are reported using an economic function that includes variable operating costs and variable metallurgical recoveries;
4. Tonnages are rounded to the nearest 1,000 tonnes, grades are rounded to two decimal places for Au and Cu, grades for Ag are rounded to one decimal place;
5. Rounding as required by reporting guidelines may result in apparent differences between tonnes, grade and contained metal content;
6. Tonnage and grade measurements are in metric units. Gold ounces are reported as troy ounces, copper pounds as US imperial pounds.

## 1.16 Proposed Mine Plan

Mine design and production schedules were developed for a nominal mining rate of 225 Mt/a, smoothed for truck requirements. Mine production and processing facilities will operate 24 h/d, 7 d/wk, 365 d/a.

The optimized Cerro Casale final pit limit was divided into a sequence of nine pit phases of decreasing profitability in order to facilitate an efficient mining schedule and realize the highest project NPV. The last two of these phases were split into east and west sub-phases in order to defer waste mining and keep the peak mining rate as low as possible.

Considerable pre-stripping will be required to access the deeper, more profitable sulphide ore in the early stages of production. The primary crusher is located 500 m south of the ultimate pit limit, although a 2 km haul road is required out of the Stage 1 pit around the east side of Cerro Casale. Waste dumps and low-grade stockpiles are located within 500 m of the pit entrance.

All mining will be carried out on 16 m benches, with final pit wall berms at 32 m intervals. The overall wall slope angles vary from 34° to 47°. Haulage ramps are designed to a maximum grade of 10% and to a width of 40 m.

Open pit mining will be carried out with haul trucks and a combination of electric shovels, hydraulic excavators, and large front-end loaders. All rock will require drilling for sampling and blasting purposes.

Dates discussed in the proposed mine plan that follows are for illustrative purposes only, as a decision to proceed with mine construction still requires regulatory approval, and approval of CMC and the Owners.

Mine road construction will begin in the last quarter of 2011. Pre-stripping of Cerro Casale will commence in the last quarter of 2012, two years before to the initial start-up of the heap leach, with quantities of sulphide ore sent to stockpile. Oxide ore heap leaching will begin in the last quarter of 2013, a year prior to the initial start-up of the sulphide plant. Initial pre-stripping of 83 Mt of waste material is required before the start of gold production from the oxide ore. The heap leach pad will receive run-of-mine (ROM) oxide feed over a six-year period.

The sulphide concentrator is planned to come on stream during the fourth quarter of 2014 and will build-up to its full production rate of 160,000 t/d (57.6 Mt/a) by the fourth quarter of 2015, assuming a pre-stripping start during the last quarter 2012.

Significant groundwater will not be encountered in the pit until it penetrates below the interpreted water table elevation in 2017. A phased program of deep dewatering well construction will be initiated to dewater the pit in advance of mining.

### **1.17 Planned Process Route**

The design of the Cerro Casale processing facilities is based on the most current technologies, in terms of process circuit design and selection of individual equipment.

Sulphide ore will be processed in a 160,000 t/d flotation plant facility designed to recover a copper/gold flotation concentrate, followed by dewatering and then dispatch via pipeline to a filtration plant adjacent to a port facility. Filtered concentrate will be loaded into sea-going vessels and shipped to smelters overseas. Additional gold metal will be recovered by submitting the flotation cleaner tailings to a cyanide leaching stage.

The proposed comminution configuration includes two primary crushers, eight secondary cone crushers, six HPGRs, and six ball mills. The flotation process consists of six lines of eight rougher cells, concentrate cleaning in 2<sup>nd</sup> and 3<sup>rd</sup> cleaner cells, followed by cyanide leaching of the cleaner flotation tailings and gold recovery. An alternate, more traditional, SAG milling circuit has low comminution efficiency due to the hard and competent nature of the Cerro Casale ore and tradeoff study economics confirmed that the HPGR selection was the preferred choice.

Oxide ore will be processed through a run-of-mine (ROM) heap leach facility. The leach solution is treated in a carbon-in-column (CIC) circuit for recovery of the gold content. A nominal tonnage of 100,000 t/d of fresh ore will be placed under leach (the actual deposition rate onto the heap from the mine may exceed this figure).

A SART circuit (sulphidization, acidification, recycling, and thickening) is included to reduce cyanide consumption in the leach circuits. Heap leach and CIL solutions will be treated to remove copper as a sulphide precipitate and cyanide will be recycled to the leach. Cyanide recycling allows the leach circuits to be operated at higher cyanide levels, maximizing metal recovery and minimizing copper deportment to the gold electro-winning circuit.

Gold-loaded carbon from the heap leach facility, as well as carbon originating from the processing of the cleaner tailings in a carbon-in-leach (CIL) circuit, will be stripped of gold in an elution circuit. The elution solution will be processed through an electro-winning circuit to produce a sludge. The gold-laden sludge will be retorted for mercury removal and then refined and poured as doré bars.



### **1.18 Waste Disposal**

Approximately 2,231 Mt of waste will be mined over the 20 year life of the mining operation. Of this total, 170 Mt of waste rock has been scheduled for tailings dam construction over the mine life. The Rio Nevado Valley east and southeast of the planned open pit is well situated, able to contain the open pit waste, and was the only waste rock facility (WRF) considered in the 2010 feasibility study.

The tailings storage facility (TSF) design has been developed in accordance with World Bank, IFC and international standards. The TSF will be located within the Rio Nevado drainage, which ranges in elevation between 3,600 and 5,800 m. The TSF was designed to store 930 Mt of rougher tailings and 97 Mt of cleaner tailings. Tailings production will begin, for illustrative purposes, in the fourth quarter 2014, and continue until 2033 providing a 20 year period of TSF operation.

### **1.19 Marketing and Sales**

Cerro Casale will produce and sell copper/gold concentrate, gold dore and SART copper sulphide concentrate to generate revenue for the project. Over the life of the mine the flotation plant will produce 8.2 million tonnes of concentrate containing 13.44 M oz payable gold and 4,832 Mlbs payable copper. The CIL and heap leach plants will produce dore containing 3.35 Moz gold and the SART copper sulphide concentrate will contain 73Mlbs payable copper.

The relatively high gold grade of the Cerro Casale concentrate and the presence of minor penalty elements will limit the number of smelters capable of competitively treating the Project concentrate. During 2008–2009, meetings were held with 13 of the world's major custom copper smelters, many of which specialize in treating copper concentrate containing high levels of gold. At these meetings CMC was able to prove an aggregate market interest in off-take agreements well above Cerro Casale's annual forecast production level of 476,000 dmt/a. The collective interest confirmed by the smelters was between 660,000 and 820,000 dmt/a. This interest level is approximately 39% to 72% above the average annual sales requirements anticipated for the project.

Doré bars produced from the CIL circuit will be shipped off-site for further refining and the refiner will credit CMC's precious metal accounts with the returnable ounces of gold.

The relatively small quantity of high grade copper sulphide precipitate (+60% Cu) from the SART circuit will be marketed either as a separate product or mixed with the copper/gold concentrate to sweeten the copper grade.



## 1.20 Financial Analysis

The results of the economic analysis represent forward-looking information that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

The initial capital cost has been estimated at US\$4,184 million including contingency at a P<sub>73</sub> level of confidence and excluding escalation. Sustaining capital cost is US\$369 million. The average annual operating cost is estimated at US\$778.3 million. The estimated Life-of-mine cash operating costs including silver and copper credits are US\$14,774 million. Average cash operating cost is US\$277 per oz gold payable.

The financial analysis indicated that the Project had a positive net cash flow and an acceptable internal rate of return and supports declaration of mineral reserves. The financial analysis indicated that the Project could support progression to mine development.

**Table 1-3: Summary of Key Financial Analysis Results**

**Net Cash Flow After Tax (M\$)**

| Gold Price<br>(\$/oz) | Copper Price (\$/lb) |           |           |           |           |           |           |
|-----------------------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
|                       | \$1.60               | \$2.00    | \$2.40    | \$2.80    | \$3.20    | \$3.60    | \$4.00    |
| \$ 640                | \$ (683)             | \$ 1,190  | \$ 2,892  | \$ 4,344  | \$ 5,828  | \$ 7,350  | \$ 8,870  |
| \$ 800                | \$ 1,922             | \$ 3,564  | \$ 5,011  | \$ 6,457  | \$ 7,939  | \$ 9,459  | \$ 10,978 |
| \$ 960                | \$ 4,157             | \$ 5,677  | \$ 7,121  | \$ 8,566  | \$ 10,048 | \$ 11,568 | \$ 13,087 |
| \$ 1,120              | \$ 6,266             | \$ 7,785  | \$ 9,230  | \$ 10,675 | \$ 12,157 | \$ 13,677 | \$ 15,196 |
| \$ 1,280              | \$ 8,375             | \$ 9,894  | \$ 11,339 | \$ 12,784 | \$ 14,266 | \$ 15,785 | \$ 17,305 |
| \$ 1,440              | \$ 10,484            | \$ 12,003 | \$ 13,448 | \$ 14,893 | \$ 16,375 | \$ 17,894 | \$ 19,414 |
| \$ 1,600              | \$ 12,593            | \$ 14,112 | \$ 15,557 | \$ 17,002 | \$ 18,484 | \$ 20,003 | \$ 21,523 |

**IRR (%)**

| Gold Price<br>(\$/oz) | Copper Price (\$/lb) |        |        |        |        |        |        |
|-----------------------|----------------------|--------|--------|--------|--------|--------|--------|
|                       | \$1.60               | \$2.00 | \$2.40 | \$2.80 | \$3.20 | \$3.60 | \$4.00 |
| \$ 640                | -                    | 2.0%   | 4.4%   | 6.3%   | 8.1%   | 9.7%   | 11.2%  |
| \$ 800                | 3.2%                 | 5.5%   | 7.3%   | 9.0%   | 10.6%  | 12.0%  | 13.4%  |
| \$ 960                | 6.4%                 | 8.3%   | 9.9%   | 11.4%  | 12.8%  | 14.2%  | 15.4%  |
| \$ 1,120              | 9.2%                 | 10.9%  | 12.3%  | 13.6%  | 14.9%  | 16.2%  | 17.3%  |
| \$ 1,280              | 11.7%                | 13.2%  | 14.5%  | 15.7%  | 16.9%  | 18.0%  | 19.1%  |
| \$ 1,440              | 14.0%                | 15.3%  | 16.5%  | 17.6%  | 18.7%  | 19.8%  | 20.8%  |
| \$ 1,600              | 16.1%                | 17.3%  | 18.4%  | 19.5%  | 20.5%  | 21.5%  | 22.5%  |

## **1.21 Recommendations**

In order to advance the Project to development and future production, CMC should engage in discussions with the appropriate regulatory authorities to determine what requirements remain to be addressed for the Project to advance to development (two years, approximate cost US\$100,000).

CMC should continue with Project development activities as detailed in the 2010 feasibility study that are expected to reduce project technical risk, allow improved detailed engineering design and improve operational performance in a commercial mine (four years, approximate cost US\$96 million)

CMC should continue with infrastructure-related activities such as land acquisition and right of way agreements, installation of the construction camp and water supply/management infrastructure, purchase of purchasing mining equipment to facilitate pre-stripping and construction earthwork, and access road construction/upgrading (four years, approximate cost US \$337 million).

## **2.0 INTRODUCTION**

Kinross Gold Corporation (Kinross) has prepared a Technical Report (the Technical Report) for the Cerro Casale gold–copper project, (Cerro Casale Project), located in northern Chile, South America (Figure 2-1). The project is part of the Aldebaran property.

This Technical Report presents a summary of a feasibility study completed in February 2010 on the Cerro Casale deposit within the Project.

The Project is a joint venture between Kinross and Barrick Gold Corporation (Barrick). Barrick holds a 75% interest and is operator; Kinross holds the remaining 25% interest. The companies use a Chilean contractual mining company as the joint venture vehicle for the Project, known as Compañía Minera Casale (CMC). CMC is a contractual mining company incorporated under the laws of the Republic of Chile and owns the Project.

Kinross will be using this Technical Report in support of disclosure and filing requirements with the Canadian Securities Regulators.

Where the terms “we”, “us”, “our” or “Kinross” are used in this Report, the terms mean Kinross Gold Corporation.

All measurement units used in this Technical Report are metric, and currency is expressed in US dollars unless stated otherwise.

The exchange rate as of the feasibility study completion date of 18 February 2010 was approximately \$US1 equal to 533 Chilean pesos.

**Figure 2-1: Project Location Map**



## 2.1 Qualified Persons

Robert Henderson, P. Eng. and Senior Vice President, Technical Services for Kinross serves as the qualified person for this Technical Report as defined in National Instrument 43-101, *Standards of Disclosure for Mineral Projects*, and in compliance with Form 43-101F1. Mr. Henderson participated in the feasibility study and has visited the Project site on numerous occasions, most recently in October 2008.

During the site visits, Mr. Henderson inspected core and surface outcrops, drill platforms and sample cutting and logging areas; discussed geology and mineralization with Project staff; reviewed geological interpretations with staff; and viewed potential locations of major infrastructure.

## **2.2 Information Sources**

Information used to support this Technical Report was derived from previous technical reports on the property, and from the reports and documents listed in the References section of this Technical Report.

The Technical Report is also based on the feasibility study report completed by the CMC Project team and the author would like to acknowledge the following individuals or groups:

- Darby Fletcher, Kinross Gold Geology;
- Benjamin Sanfurgo, Barrick Gold Mineral Resource Estimate;
- Mike Mutchler, CMC Mineral Reserve Estimate;
- Ricardo Mena-Patri, CMC Metallurgy and Mineral Processing;
- Eric Schwartz, Barrick Gold Geotechnical;
- Rob Vallis, Barrick Gold Financial Modelling;
- Jim Robertson, Barrick Gold Environment Health and Safety;
- Ron Annesley, Barrick Gold Concentrate Marketing.

## **2.3 Effective Dates**

Several effective dates (cut-off dates for the information prepared) are appropriate for information included in this Technical Report.

The effective date for the Mineral Resources and Mineral Reserves is 31 December 2009. The feasibility study completion date, and date of change of ownership percentages was 18 February 2010.

The effective date for the Report is therefore taken to be 18 February 2010.

There were no material changes to the information on the Project between the effective date and the signature date of the Report.

## **2.4 Previous Technical Reports**

Kinross has previously filed Technical Reports for the Cerro Casale Project as follows:

*Henderson, R.D., 2009: Cerro Casale Project, Northern Chile, NI 43-101 Technical Report: unpublished technical report prepared on behalf of Kinross Gold Corporation, effective date 31 December 2008*

*Smith, L.B., and Tilley, W.A., 2006: Cerro Casale Project, Northern Chile, NI 43-101 Technical Report: unpublished technical report prepared for Bema Gold Corporation, readdressed to Kinross Gold Corporation, effective date 22 August, 2006.*

Bema Gold Corporation, prior to the take-over by Kinross, had also filed a Technical Report:

*Smith, L.B., 2005: Technical Report and Qualified Persons Review, Cerro Casale Project, Chile: unpublished technical report prepared for Bema Gold Corporation, effective date 22 March 2004.*

## **2.5 Technical Report Sections and Required Items under NI 43-101**

Kinross has followed Instruction 6 of the Form 43-101 Technical Report in compilation of this Technical Report. Instruction 6 notes:

*"The technical report for development properties and production properties may summarize the information required in the items of this Form, except for Item 25, provided that the summary includes the material information necessary to understand the project at its current stage of development or production."*

Table 2-2 relates the sections as shown in the contents page of this Technical Report to the Prescribed Items Contents Page of NI 43-101.

**Table 2-1: Contents Page Headings in Relation to NI 43-101 Prescribed Items—Contents**

| NI 43-101 Item Number | NI 43-101 Heading                                                                                 | Report Section Number | Report Section Heading                                                                            |
|-----------------------|---------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------|
| Item 1                | Title Page                                                                                        |                       | Cover page of Report                                                                              |
| Item 2                | Table of Contents                                                                                 |                       | Table of contents                                                                                 |
| Item 3                | Summary                                                                                           | Section 1             | Summary                                                                                           |
| Item 4                | Introduction                                                                                      | Section 2             | Introduction                                                                                      |
| Item 5                | Reliance on Other Experts                                                                         | Section 3             | Reliance on Other Experts                                                                         |
| Item 6                | Property Description and Location                                                                 | Section 4             | Property Description and Location                                                                 |
| Item 7                | Accessibility, Climate, Local Resources, Infrastructure and Physiography                          | Section 5             | Accessibility, Climate, Local Resources, Infrastructure and Physiography                          |
| Item 8                | History                                                                                           | Section 6             | History                                                                                           |
| Item 9                | Geological Setting                                                                                | Section 7             | Geological Setting                                                                                |
| Item 10               | Deposit Types                                                                                     | Section 8             | Deposit Types                                                                                     |
| Item 11               | Mineralization                                                                                    | Section 9             | Mineralization                                                                                    |
| Item 12               | Exploration                                                                                       | Section 10            | Exploration                                                                                       |
| Item 13               | Drilling                                                                                          | Section 11            | Drilling                                                                                          |
| Item 14               | Sampling Method and Approach                                                                      | Section 12            | Sampling Method and Approach                                                                      |
| Item 15               | Sample Preparation, Analyses and Security                                                         | Section 13            | Sample Preparation, Analyses and Security                                                         |
| Item 16               | Data Verification                                                                                 | Section 14            | Data Verification                                                                                 |
| Item 17               | Adjacent Properties                                                                               | Section 15            | Adjacent Properties                                                                               |
| Item 18:              | Mineral Processing and Metallurgical Testing                                                      | Section 16            | Mineral Processing and Metallurgical Testing                                                      |
| Item 19               | Mineral Resource and Mineral Reserve Estimates                                                    | Section 17            | Mineral Resource and Mineral Reserve Estimates                                                    |
| Item 20               | Other Relevant Data and Information                                                               | Section 19            | Other Relevant Data and Information                                                               |
| Item 21               | Interpretation and Conclusions                                                                    | Section 20            | Interpretation and Conclusions                                                                    |
| Item 22               | Recommendations                                                                                   | Section 21            | Recommendations                                                                                   |
| Item 23               | References                                                                                        | Section 22            | References                                                                                        |
| Item 24               | Date and Signature Page                                                                           | Section 23            | Date and Signature Page                                                                           |
| Item 25               | Additional Requirements for Technical Reports on Development Properties and Production Properties | Section 18            | Additional Requirements for Technical Reports on Development Properties and Production Properties |
| Item 26               | Illustrations                                                                                     |                       | Incorporated in Report under appropriate section number                                           |



### **3.0 RELIANCE ON OTHER EXPERTS**

This section is not relevant to the Report as expert opinion was sourced from Kinross or CMC experts in the appropriate field as required.



## **4.0 PROPERTY DESCRIPTION AND LOCATION**

### **4.1 Location**

The Aldebarán property, which incorporates the Cerro Casale gold–copper deposit, is located in Region Three (Atacama) of northern Chile. The city of Copiapo is 145 km northwest of the deposit (see Figure 2-1).

The approximate geographic centre coordinates of the project are 27°47' S and 69°17' W. The international border separating Chile and Argentina is approximately 20 km to the east.

### **4.2 Tenure History**

Anglo American plc (Anglo) through its subsidiary Minera Anglo American Chile Limitada, initially acquired tenure in the Cerro Casale area during the 1980s.

In 1991, Anglo conveyed its interests in the Cerro Casale property to Compañía Minera Estrella de Oro Limitada (CMEO) and Compañía Minera Aldebarán (CMA), two companies owned by Bema Gold Corporation (Bema) and Arizona Star Resources Corporation (Arizona Star). Bema and Arizona Star formed a legal entity at that time, the Bema Shareholders Group. The ownership percentages of Cerro Casale at the time were 51% Arizona Star, and 49% Bema.

In 1998, Placer Dome Inc. (Placer) joint-ventured into the property and could earn a 51% interest. Placer through its subsidiary Placer Aldebarán (Cayman) Limited and the Bema Shareholders Group established Compañía Minera Casale (CMC) as the joint venture vehicle.

In December 2005, Placer agreed to sell its 51% interest in the Aldebarán Project to Bema and Arizona Star. Prior to completion of the transaction, Placer was acquired by Barrick. Arizona Star subsequently entered into definitive agreements on June 16, 2006 with Bema and Barrick for the acquisition by Arizona Star and Bema of Barrick's 51% interest in CMC.

During November 2006, Kinross announced acquisition of Bema, with Bema subsequently being acquired and becoming a subsidiary company of Kinross (East West Gold Corporation). As a result of its acquisition on March 12, 2008 of Arizona Star Resources Corporation (Arizona Star), with whom it subsequently amalgamated, Barrick Gold Corporation (Barrick) indirectly acquired a 51% interest in CMC.

These acquisitions resulted in the Aldebarán Project and Cerro Casale deposit being owned 51% by Barrick, and 49% by Kinross. Kinross and Barrick subsequently implemented a shareholders' agreement to govern the joint venture which conferred on each partner an equal 50% ownership; this ownership structure was used in feasibility study considerations.

On February 18, 2010, Barrick and Kinross signed an agreement pursuant to which Kinross agreed to sell 25% of its 50% share to Barrick for total consideration of approximately US\$475 million. The sale closed on March 31, 2010. As a result, at the effective date of this Technical Report, Barrick holds 75% of the Project, and Kinross holds 25%.

### **4.3 Property and Title in Chile**

Chile's mining policy is based on legal provisions that were enacted as part of the 1980 constitution. These were established to stimulate the development of mining and to guarantee the property rights of both local and foreign investors. According to the law, the state owns all mineral resources, but exploration and exploitation of these resources by private parties is permitted through mining concessions, which are granted by the courts.

#### **4.3.1 Mineral Tenure**

The concessions have both rights and obligations as defined by a Constitutional Organic Law (enacted in 1982). Concessions can be mortgaged or transferred and the holder has full ownership rights and is entitled to obtain the rights of way for exploration (pedimentos) and exploitation (mensuras). In addition, the concession holder has the right to defend ownership of the concession against state and third parties. A concession is obtained by a claims filing and includes all minerals that may exist within its area. Mining rights in Chile are acquired in the following stages:

- **Pedimento:** A pedimento is an initial exploration claim whose position is well defined by UTM coordinates which define north-south and east-west boundaries. The minimum size of a pedimento is 100 ha and the maximum is 5,000 ha with a maximum length-to-width ratio of 5:1. The duration of validity is for a maximum period of two years; however, at the end of this period, and provided that no overlying claim has been staked, the claim may be reduced in size by at least 50% and renewed for an additional two years. If the yearly claim taxes are not paid on a pedimento, the claim can be restored to good standing by paying double the annual claim tax the following year. New pedimentos are allowed to overlap with pre-existing ones, however the underlying (previously staked) claim always takes precedent, providing the claim holder avoids letting the claim lapse due to lack of

payments, corrects any minor filing errors, and converts the pedimento to a manifestacion within the initial two year period;

- **Manifestacion:** Before a pedimento expires, or at any stage during its two year life, it may be converted to a manifestacion. Within 220 days of filing a manifestacion, the applicant must file a “Request for Survey” (Solicitud de Mensura) with the court of jurisdiction, including official publication to advise the surrounding claim holders, who may raise objections if they believe their pre-established rights are being encroached upon. A manifestation may be also be filed on any open ground without going through the pedimento filing process;
- **Mensura:** Within nine months of the approval of the “Request for Survey” by the court, the claim must be surveyed by a government licensed surveyor. Surrounding claim owners may be present. Once surveyed, presented to the court, and reviewed by the National Mining Service (Sernageomin), the application is adjudicated by the court as a permanent property right (a mensura), which is equivalent to a “patented claim”.

At each of the stages of the claim acquisition process, several steps are required (application, “publication”, “inscription payments”, notarization, tax payments, “patente payment”, lawyers fees, publication of the extract, etc.) before the application is finally converted to a “declaratory sentence” by the court constituting the new mineral property. A full description of the process is documented in Chile’s mining code.

Many of the steps involved in establishing the claim are published in Chile’s official mining bulletin for the appropriate region (published weekly). At the manifestacion and mensura stages a process for opposition from conflicting claims is allowed. Most companies in Chile retain a mining claim specialist to review the weekly mining bulletins and ensure that their land position is kept secure.

Legislation is being considered that seeks to further streamline the process for better management of natural resources. Under the new proposed law, mining and exploration companies will have to declare their reserves and resources and report drilling results. The legislation also aims to facilitate funds for mining projects across the country. In addition to the mining law, the Organic Constitutional Law on Mining Concessions (1982) and the Mining Code of 1983 are the two key mechanisms governing mining activities in Chile.

#### **4.3.2 Surface Rights**

Concession owners do not necessarily have surface rights to the underlying land; however, they do have the right to explore or exploit the concession. Mining rights are dominant to surface rights and the Mining Code grants the owner of the mineral estate

liberal rights to use the surface subject to the payment of reasonable compensation to the surface rights owner.

#### **4.3.3 Water Rights**

In Chile, water is considered to be a public domain resource. Private persons may obtain rights to use public water pursuant to the Water Code of 1981. According to the Water Code, such right shall be expressed as the right to use a specified volume per unit of time; typically litres per second (L/s). Groundwater encountered in underground mining operations belongs to the mining property owner.

#### **4.3.4 Environmental**

The following summary is based upon Chile's Environmental Law 19.300 and the Regulations regarding environmental impact studies, as posted on the web site of Chile's Regional Commission for the Environment (Conama) (<http://www.conama.cl/portal/1255/channel.html>).

Chile's environmental law (Law N° 19.300), which regulates all environmental activities in the country, was first published on March 9, 1994. Previously, an exploration project or field activity could not be initiated until its potential impact to the environment was carefully evaluated. This is documented in Article 8 of the environmental law and is referred to as the Sistema de Evaluación de Impacto Ambiental (SEIA). However, in regulations for SEIA, published on 7 December 2002, an amendment to the law was passed (Article 3, section i) whereby work described as "Exploration" for minerals was exempted from the filing of either a Declaración de Impacto Ambiental (DIA), or an Evaluación de Impacto Ambiental (EIA). The definition of exploration in the context of this regulation is, "actions or works leading to the discovery, characterization, delimitation and estimation of the potential of a concentration of mineral substances which may eventually lead to a mine development project."

The SEIA is administered and coordinated on both regional and national levels by the Comisión Regional del Medio Ambiente (Corema) and Conama, respectively. The initial application is generally made to Corema, in the corresponding region where the property is located, however in cases where the property might affect various regions the application is made directly to the Conama.

Various other Chilean government organizations are also involved with the review process; however, most documentation is ultimately forwarded to Conama, who are the final authority on the environment and are the organization that issues the final environmental permits.

There are two types of environmental review, DIA and EIA. As defined in the SEIA, one of these must be prepared prior to starting any mining and/or development project (including coal, building materials, peat or clays) or processing and disposal of tailings and waste.

A DIA is prepared in cases when the applicant believes that there will be no environmental impact as a result of the proposed activities. The potential impacts include areas such as health risks, contamination of soils, air and/or water, relocation of communities or alteration of their ways of life, proximity to “endangered” areas or archaeological sites, alteration of the natural landscape, and/or alteration of cultural heritage sites. The DIA will include a statement from the applicant declaring that the project will comply with the current environmental legislation, and a detailed description of the type of planned activities, including any voluntary environmental commitments that might be completed during the project.

An EIA will be required if any one of the above “potential impacts” is affected. The EIA report is much more detailed and includes a table of contents, an executive summary, a detailed description of the upcoming exploration program or study, a program for compliance with the environmental legislation, a detailed description of the possible impacts and an assessment of how they would be dealt with and repaired, a baseline study, a plan for compensation (if required), details of a follow-up program, a description of the EIA presentation made to Corema or Conama, and an appendix with all of the supporting documentation.

Once an application is made, the review process by Corema or Conama will take a maximum of 120 days. If it is approved, an environmental permit is awarded and the exploration or development can commence. If, however, Corema or Conama comes back with additional questions or deficiencies an equal period of time is granted to the applicant to make the appropriate corrections or additions. Once re-submitted and a 60 day period has elapsed, if no further notification from Corema or Conama is received, the application is assumed to be approved.

In July 2008, the government proposed the creation of a new Ministry of Environment. The proposal plans to “*create an adequate integration among information and incentives*” for the various agencies involved in environmental issues. The proposal will rationalize the environmental responsibilities of various agencies, place environmental policy in one place with specific responsibilities, integrate environmental legislation, end the fragmented supervision of environmental issues, and generate a sound system of accountability. The new Ministry of Environment will have the main functions currently exercised by Conama (National Commission for the Environment) except for environmental impact study approval and supervision. The proposal eliminates the Council of Ministries which is responsible for deciding environmental

policies, this function being taken over by the new Ministry of Environment. Included in this legislation is a proposal to limit the validity period of EIAs to three years that is under discussion.

#### **4.4 Project Agreements**

CMC is a contractual mining company incorporated under the laws of the Republic of Chile. CMC owns the Project.

In contemplation of entering the purchase agreement to acquire the 51% interest in CMC from Placer Dome, Bema and Arizona Star entered into a letter agreement dated June 19, 2006 to govern the operation of CMC (the 2006 Agreement). Pursuant to the purchase agreement, Bema and Arizona Star agreed to jointly and severally pay to Barrick (the Promises to Pay) either:

- (a) US\$10 million upon a decision to construct a mine at Cerro Casale and the cash equivalent of 190,000 troy ounces of gold payable in
  - (i) five annual payments of the cash equivalent of 10,000 troy ounces of gold, based on the gold price on each such payment date, payable on each anniversary of the date gold is first produced in commercial quantities (the production date) commencing on the first anniversary of the production date, and
  - (ii) seven annual payments of the cash equivalent of 20,000 troy ounces of gold, based on the gold price on each such payment date, payable on each anniversary of the production date commencing on the sixth anniversary of the production date; or
- (b) at the payors' election, US\$80 million on the date of the decision.

In February 2007, Kinross completed its acquisition of Bema and, in March 2008, Barrick completed its acquisition of Arizona Star.

On September 21, 2009, certain subsidiaries of Barrick (as successor to Arizona Star) and certain subsidiaries of Kinross (as successor to Bema) entered into a new agreement to replace the 2006 Agreement and govern the operation of CMC as a 50-50 joint venture (the 2009 Agreement). On the same date, to reflect Barrick's acquisition of Arizona Star and the new ownership structure under the 2009 Agreement, the parties amended the Promises to Pay to limit Kinross' obligations to 50% of the amounts due.

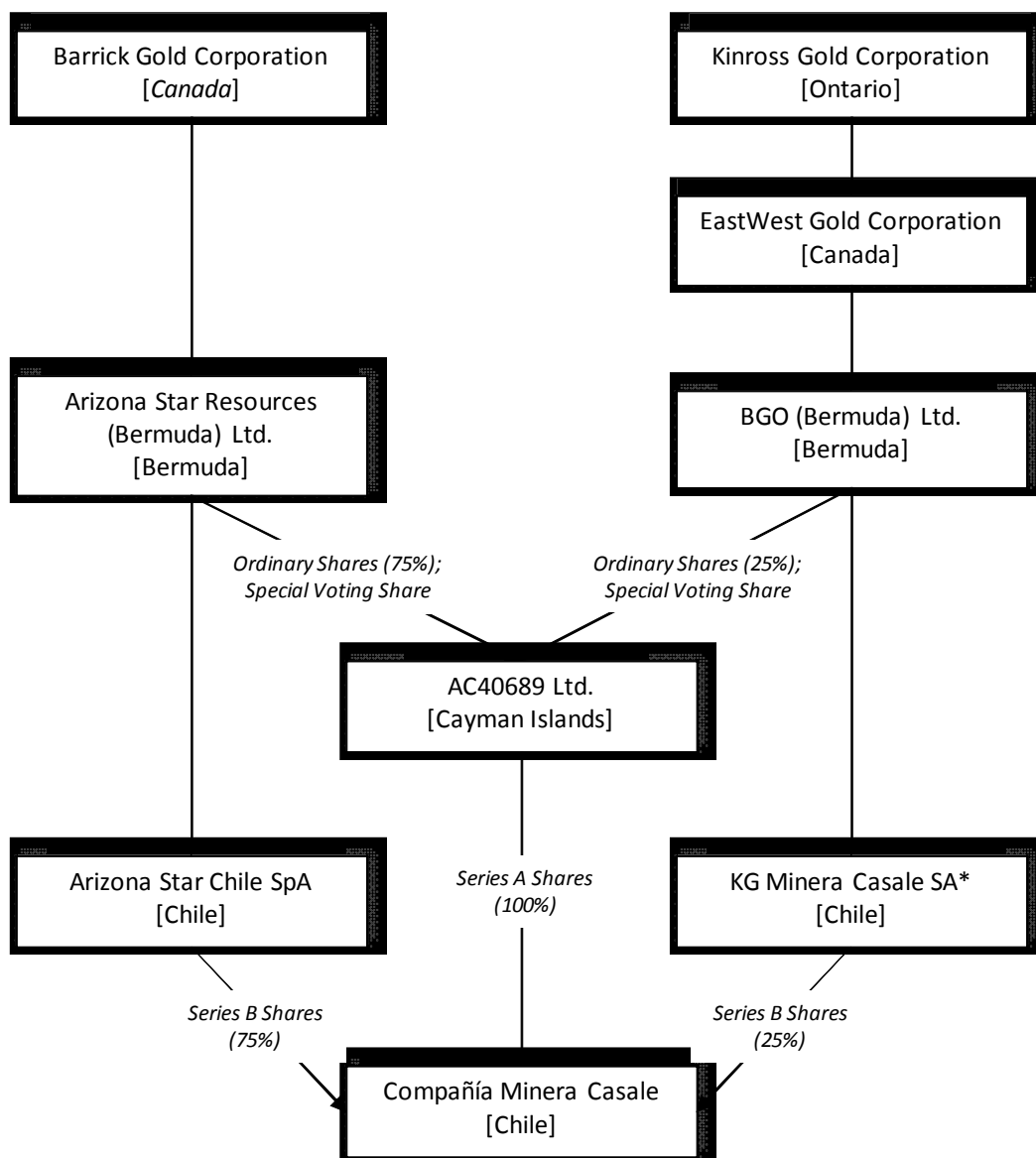
On February 17, 2010, Kinross agreed to sell half of its 50% interest in CMC to Barrick. On March 31, 2010, the parties completed that transaction and the 2009 Agreement was amended and restated to reflect the new ownership interests of the



parties. In addition, with effect as of the same date, the Promises to Pay were further amended to limit Kinross' obligations to 25% of the amounts due.

Kinross (25%) and Barrick (75%) hold their interests through the ownership structure of CMC shown below in Figure 4-1.

Figure 4-1: Corporate Ownership Structure



\* As of Owned by February 28, 2010, BGO (Bermuda) Ltd. (~86%), Macaines Mining Properties Limited [Cayman Islands] (~13.8%) and MDO Holdings Ltd. (~0.2%), all wholly-owned Kinross subsidiaries.

The purpose of CMC is as follows:

- To explore and, if deemed appropriate, develop, construct facilities for, and operate one or more copper, gold or other mines on the Project, or the Aldebarán sector, and any adjacent area in the Atacama Region of the Republic of Chile;
- To smelt, refine, market, and sell the copper, gold, and other minerals obtained from the Project and/or other mining concessions within such area; and
- To engage in such other activities considered by shareholders of CMC deemed to be necessary or desirable in connection with the foregoing.

CMC owns mineral and water concessions within the Cerro Pampa sector, district of Diego de Almagro, province of Chanaral, Atacama Region, and has applied for additional mineral and water concessions in the region.

#### 4.5 Project Royalties

Pursuant to a Sales Contract dated June 22, 1995 between Bema and Minera Anglo American Chile Limitada and other Anglo affiliates (collectively, Anglo), Anglo holds a royalty on net smelter returns (NSR) from gold production from the Cachito and Nevado mining concessions, which contain the entire current Cerro Casale mineral reserve and mineral resource estimates. The royalty is capped at \$3 million and, indexed to the gold price, calculated as a percentage of NSR as follows:

| Gold Price<br>(\$ per oz.) | Royalty<br>(%) |
|----------------------------|----------------|
| < \$425                    | 0              |
| 425-474                    | 1              |
| 475-524                    | 1.5            |
| 525-574                    | 2              |
| 575-599                    | 2.5            |
| ≥ 600                      | 3              |

At the metal prices used to support mineral resource and mineral reserve estimation in this Report, a 3% NSR royalty is applicable.



#### **4.6 Project Mineral Tenure**

CMC owns 32 mining exploitation concessions that total 20,111 ha in area. The claim groups are summarized in Appendix 1. Some of these claims partially overlap reducing the actual ground covered by all exploitation claims to an area of 20,000 ha. Figure 4-2 provides an overview of CMC exploitation claims. All mineral rights are protected according to Chilean law by payment of a mining patent. As part of the mineral patenting process, all claim monuments are surveyed by a licensed Chilean mining surveyor. The mine, plant, and ancillary facilities, not including concentrate pipeline and port or warehouse, will be entirely located on these concessions.

CMC also has mining exploration concessions to a limestone deposit covering an area of 2,500 ha. The limestone deposit is located near the main access road about 60 km from the proposed Cerro Casale mine site.



In addition, CMC has 112,600 ha of mining exploration concessions in other sectors such as where the proposed camp is planned to be located, where proposed water wells are located, and along the proposed fresh water and concentrate pipeline routes for Cerro Casale project. Existing and planned infrastructure locations are discussed in Section 5 of this Report.

The breakdown of the total mining exploration concession area is:

- 15,000 ha to protect the northern deep well water source close to the Salar de Pedernales plus an estimated pipeline route to connect these wells with the proposed fresh water line that runs from the Piedra Pómez well field to the conceptual plant site;
- 27,200 ha to protect the Piedra Pómez deep well water source and the routing of the proposed fresh water pipeline to the conceptual plant site;
- 5,000 ha to protect the area where the construction and permanent camp facilities are planned;
- 21,000 ha to protect the area for the proposed powerline; and
- 44,500 ha to protect the routing of the planned concentrate pipeline from the proposed plant site to the port in Caldera, with approximately 4,000 ha thereof overlapping prior-established third parties' areas of interest or covering sections that may be required for the proposed concentrate pipeline routing when detail design of this line is completed.

The location of minor surface infrastructure in areas where third-parties control surface land rights is not anticipated to be an issue.

## **4.7 Surface Rights**

The surface land where the Project is part of a larger lot owned by the state, managed and represented by the Ministerio de Bienes Nacionales (the Ministry of Public Lands).

At present, CMC is requesting the renewal of leases for 2,467 ha of land from the Ministerio de Bienes Nacionales for two lots in the Cerro Casale area, and leases for 280 ha of land for various lots in the Piedra Pómez area. These lots include the areas for the tailings storage facility, waste rock facility, and future camp areas but do not cover the open pit and future plant site areas. Lease agreements for these lots of land are renewable annually. The lease agreement for the Cerro Casale area is currently under negotiation with the Ministerio de Bienes Nacionales. The lease agreement for the Piedra Pómez area expires on December 1, 2010.

CMC has developed acquisition plans for surface rights to allow Project development as follows:

- Area 1 lands: cover the area of the Mineral Resources, and the area of the proposed process plant. These lands are proposed to be acquired from the Ministry of Public Assets, a process which may take as long as 18 months. CMC may apply for mining easements to permit land development in the interim;
- Area 2 lands: cover lands that are currently leased. CMC proposes to obtain these lands outright. This process may again take as long as 18 months, and mining easement applications may be lodged to preserve CMC's ability to secure use of the lands;
- Area 3 lands: located in the "Piedra Pómez Sector" and overlay CMC's existing water rights and are currently being leased by CMC. Mining easement applications may be lodged;
- Area 4 lands: lands on which CMC plans to construct pipelines or powerlines. Mining easement applications may be lodged.

CMC has benchmarked acquisition costs to similar land acquisitions for other projects in Region III, and these costs are included in the Owner's costs in the financial evaluation.

#### **4.7.1 Water Rights**

Total water rights granted to the Project, and currently registered, amount to 1,236.6 L/s. All these rights are for permanent and continuous water use and consumption.

In the Cerro Casale area, CMC owns surface water rights located at the La Gallina River that amount to 52 L/s. Due to out-of-ordinary water shortage conditions existing in the Río Copiapó basin, there is no assurance that the authority will allow CMC to fully exercise its water rights. Consequently mitigating measures may be required.

In the Piedra Pómez area, 120 km north of Cerro Casale, CMC owns groundwater rights for a total amount of 1,236.6 L/s at 17 well sites. A number of the wells are planned to be developed as production wells that will be the prime source of water for the Project. In the Cerro Pampa area next to the Salar de Pedernales, 170 km north of Piedra Pómez, CMC owns additional groundwater rights for a total amount of 510 L/s at seven well sites. This groundwater source is not currently expected to be developed, but will be maintained as backup for the Project if additional water is required later in the planned mine life.

An application for a total 180 L/s of surface water rights in the Cerro Casale area at two locations along the Nevado River was made in 1998. An additional 33.19 L/s of groundwater rights were applied for at wells named PA-18 and M-3 located along the Nevado River and PA-11 at Pircas Negras 25 km south of Cerro Casale. The applications have been subject to legal dispute, and the submissions are pending a decision from the DGA.

None of these outstanding applications for water rights are essential for the Project; the Piedra Pómez well field covers all the required needs for the Project operations, and the surface water source close to the mine site at the Río La Gallina will provide sufficient water for the construction period. On that basis, the request for the Río La Gallina intake is planned to be submitted in 2010.

In order to comply with the water management plan (WMP), which has been committed to and approved in the EIA for the tailings storage facility, a special permit will be required from the DGA to capture natural water flows within the tailings impounding area plus the groundwater that will be pumped back from the seepage collection system to the process plant. This submission is pending with the DGA.

#### **4.7.2 Conveyance Rights-of-Way**

There are no legal impediments to the granting of rights-of-way and other easements necessary to access the property, to develop production water, and to build the proposed water and concentrate pipelines.

However, on the concentrate pipeline route, around 20 km of the route runs through lands belonging to the Colla indigenous communities. Negotiations to obtain these rights of way could take a significant time to complete.

A total of 10,786 ha of surface land will have to be acquired or rights of way obtained for development of the project facilities. The following is an approximate break-down of planned land use:

- 4,700 ha for the mine site – mine, process plant, tailings disposal, and waste dumps;
- 1,486 ha for the fresh water system – production wells, booster pump station, and pipelines;
- 2,450 ha for the concentrate pipeline;
- 1,980 ha for the power lines;
- 170 ha for the camp.

The estimated cost of acquiring such lands and/or easements is included in the Owner's costs in the financial analysis.

#### **4.8 Permits**

Mining projects in Chile require both environmental approval and numerous sectorial permits prior to construction. Cerro Casale received environmental approval under the name of Aldebarán in early 2002 (see Section 4.10), but the Project was subsequently deferred due to poor economic conditions, and many of the necessary sectorial permits were not obtained. Sectorial permits for the Project are not all required at the same time, and approvals times for different permit preparation and approval will vary. It is expected that permits will be prioritized and those on the critical path (requiring a long period for preparation or for approval, or required early in project development) will be given priority.

#### **4.9 Environmental**

Ongoing environmental studies for Cerro Casale were initiated by CMC in 1998. Engineering assessments, impact evaluations and development of environmental management plans also form part of environmental studies developed for the Project.

The study area covered the location of all Project components including the proposed water supply well field located in the Piedra Pomez sector, the water pipeline from Piedra Pomez to Cerro Casale, mine site components (open pit, waste rock dump, tailings impoundment, support infrastructure and camp) in the Cerro Casale sector, the concentrate pipeline from Cerro Casale to the proposed port site at Punta Padrones and the proposed port site itself.

The scope of these studies included baseline assessments of the main environmental components comprising:

- Archaeology: site assessments for the proposed water pipeline, tailings, mine and waste rock dump, concentrate pipeline, camp, and port installation were carried out. All the sites require a mitigation or rescue plan under Chilean legislation;
- Meteorology: wind speed and direction, temperature, relative air humidity, and net solar radiation were monitored for the areas of the Nevado and La Gallina Rivers, proposed mine/plant area and water sources at Piedra Pómez. Rainfall data were collected at the Nevado and La Gallina Rivers and Piedra Pómez;
- Air Quality: The air quality baseline was developed in two parts. The first program monitored sediment-like particulate matter, whereas the second program monitored PM-10 and SO<sub>2</sub>;



- Geology, geomorphology, and geotechnical risks: the proposed water pipeline corridor, Cerro Casale site, concentrate pipeline corridor and camp were evaluated for volcanic events, avalanches and mass movements, and rainfall events;
- Land use: The land use baseline study consisted of literature research. Land areas of the water pipeline corridor and Cerro Casale were not registered for agriculture or cattle grazing. For the area where the concentrate pipeline is planned, there are different classifications based on the vegetation present and the potential agricultural use. After the EIA was submitted, land titles were given by the government to the indigenous community along part of the concentrate pipeline route in the Jorquera River area;
- Hydrology, hydrogeology and water quality: A surface and groundwater characterization study was carried out, specifically in Piedra Pómez where the proposed well field is located and close to the conceptual mine and camp at Cerro Casale to predict seepage from the planned tailings area and waste dumps;
- Flora and vegetation: The baseline study included a literature review and three field visits to determine the presence of vegetation in the areas of the proposed water pipeline corridor, concentrate pipeline corridor and the planned Cerro Casale mine area;
- Fauna: The objective was to determine the richness, distribution, singularity, endemism, and conservation status in the same areas as had been subject to the flora study;
- Socio-economics: areas evaluated included: the main economic activities for the area; workforce, types of employment; unemployment rates; poverty; information about the indigenous people that live in the region; demographic characteristics; regional investments; educational levels; and cultural activities;
- Infrastructure availability;
- Landscape.

These studies led to the preparation of the EIA that was presented to the Government of Chile's responsible authority, on March 12, 2001. On 31 January 2002, the Corema issued EIA approval resolution (RCA) No. 014 in Copiapó. Since the original EIA was developed there have been major changes in the Chilean regulatory process for new mines.

Two alternatives were identified for obtaining the necessary regulatory approvals to proceed with Project development:



- Submit one EIA, documenting changes to the original Project definition. Once approved, obtain the necessary sectorial permits and move forward with Project development; or
- Submit a new EIA for the entire updated Project, and then apply for sectorial permits required before construction start-up.

CMC will discuss these options with the appropriate authorities.

The proposed closure plan for the Project as envisaged in the 2010 feasibility study is discussed in Section 18.8.2 of this Report.

CMC does not have any environmental policy in place at present and has not implemented a formal environmental management system (EMS). However, as a joint venture entity, CMC is committed to operating in accordance with the policies of its Owners, and both of them operate with stated principles of Environment, Health, and Safety (EHS) and Corporate Social Responsibility (CSR). CMC will develop its own policies and procedures in accordance with the principles of its Owners.

Existing Project environmental liabilities are limited to those associated with an exploration-stage property, and would involve removal of the exploration camp and some limited well closure. These costs are not expected to exceed \$600,000 and would be shared with Barrick.

#### **4.9.1 Environmental Permitting**

The environmental approval granted to the Project through “Resolución Exenta N° 014” outlines environmental commitments and requirements applicable to the Project as a result of the EIS review process. Among other things, this document considers observations formulated by the public as well as to those expressed by regulatory authorities involved in the Project environmental review. The nature and scope of commitments and requirements outlined in the Project’s environmental authorization originate from programs and measures described in the EIS document and its addendums. The Project’s development plans and future activities must therefore focus on compliance with specifications outlined in this environmental approval.

The next stage of legislative compliance process is outstanding and will require the Project to seek sectorial permits granted by the various agencies that have authority over environmental resources and construction, operation and closure of the Project’s infrastructure.



The regional committee contains members of each applicable national Ministries and these members report to their national heads. Once Corema approves the environmental plan for the Project, permits for each operational area must be obtained from the relevant government agencies.

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

### **5.1 Accessibility**

Access to the Project is 180 km by road from Copiapó. The initial southbound 25 km is paved highway, which connects to a 155 km gravel road running southeast to the Project site. Currently, total driving time from Copiapó to site is approximately 3½ hours. The main dirt road serves as a regional transportation route to Argentina and is being gradually upgraded. A major portion of the route was upgraded as part of construction of Kinross' Maricunga Mine, located north of Cerro Casale.

The nearest commercial airport is located close to Copiapó. Chilean airlines have daily flights to and from Santiago.

### **5.2 Climate**

Moderate temperatures and dry conditions characterize the climate at Cerro Casale. During the summer months, daytime temperatures can reach 23°C with night-time lows dropping to 5°C. Winter temperatures typically hover around the freezing point during the day and can be as low as -15°C at night. The wind chill factor may on occasion be equivalent to a low temperature of -33°C. Similar conditions prevail at the Piedra Pómez well field with temperatures ranging from -35°C to 18°C and a wind chill factor on occasion equivalent to a low temperature of -47°C.

Precipitation is generally limited to snowfall during the winter months (April to September). Rainfall is rare. The amount of snowfall during the winter can vary from minor, blowing snow to accumulations and drifting of up to 2 m. The higher peaks in the area are snow-covered year round.

Project operation will be possible year-round.

### **5.3 Local Resources and Infrastructure**

#### **5.3.1 Local Resources**

A skilled labour force is available in the Copiapó region and surrounding mining areas of northern Chile. Fuel and supplies are expected to be provided from nearby communities such as Copiapó.

### **5.3.2 Infrastructure**

Access to the Project is 180 km by road from Copiapó. The initial southbound 25 km is paved highway, which connects to a 155 km gravel road running southeast to the Project site. The nearest commercial airport is located close to Copiapó. Chilean airlines have daily flights to and from Santiago.

Accommodation on site is currently restricted to the exploration camp.

The terrain surrounding the Cerro Casale deposit is adequate for construction of administration, camp, mine, plant, tailings, and waste rock disposal facilities. CMC holds sufficient tenure within the Cerro Casale area that the required infrastructure can be built. Surface rights for the Project property are discussed in Section 4.7 of this Report.

Planned mine site infrastructure to support proposed operations will include, in addition to the future plant site at the mine, an airstrip, construction of major receiving, storage, and transfer facilities at different locations in Chile en-route to the mine, and mine access road upgrades and development.

Proposed off-site infrastructure includes the Piedra Pómez well field and a 120 km water pipeline; a 220 km concentrate pipeline; a concentrate filtration plant and storage and transfer system at the port of Caldera; and three transmission lines (2 x 220 kV, 135 km line from Cardones substation to Cerro Casale site; 1 x 110 kV, 67 km line from La Coipa Mine tap-off to Piedra Pómez; and 1 x 23 kV, 7 km line from the local distribution system to the concentrate filter plant at Caldera).

Details of planned infrastructure are presented in Section 18. The section outlines the proposed sources of water, power, personnel numbers, discusses the proposed waste and tailings storage areas, and potential leach and process plant sites.

## **5.4 Physiography**

The Project is located in the northern Chilean Andes within an area of high relief. The Río Nevada valley immediately east of the present exploration camp is at an elevation of 3,800 m. The top of Cerro Casale, in the middle of the deposit, is at 4,450 m. Other mountains rise to the north and east. The top of Volcan Jotabeche, 10 km north of Cerro Casale, is approximately 5,800 m.

Vegetation is sparse comprising small plants that are situated mostly along streambeds and river courses. Wildlife includes guanaco, vicuña, foxes, rabbits, ground squirrels, hawks, condors, and small reptiles.

## 5.5 Seismicity

The Cerro Casale project area is located in a tectonically active area within Chilean Seismic Zone 2. A seismic risk evaluation conducted by Arcadis Geotechnica (Arcadis, 2008) indicates that several very large subduction-type earthquakes with magnitudes of greater than M 8.3 have occurred within 170 km of the site since the early 1800s. Probabilistic analysis by Arcadis indicates the expected peak ground accelerations and return periods as shown in Table 5-2:

**Table 5-1: Expected Peak Ground Accelerations and Return Periods**

| Return Period (Years) | Peak Ground Acceleration PGA (g) | Probability of Exceedance   |
|-----------------------|----------------------------------|-----------------------------|
| 72                    | 0.229                            | 50% in 50 Years             |
| 475                   | 0.341                            | 10% in 50 Years             |
| 949                   | 0.384                            | 10% in 100 Years            |
| 10,000                | 0.540                            | Maximum Credible Earthquake |

The probabilistic maximum credible earthquake (MCE) agrees well with the deterministic MCE value of 0.460 PGA. The deterministic value was derived to validate the probabilistic MCE value using historic events and attenuation factors accepted in industry. For the purposes of the 2010 feasibility study, a peak design seismic acceleration of 0.384 g was assumed for events during operations and 0.540 g was assumed for closure of the waste rock facility (Arcadis, 2008).

## **6.0 HISTORY**

The Project's ownership changes are discussed in Section 4.4 of this Report. Discussions in this section are restricted to summaries of the work performed on the Project, in particular advanced-level studies. No mineral resources, mineral reserves or financial analyses are reported for any of the advanced studies, as they have been superseded by the mineral resources, mineral reserves and financial analyses discussed in Sections 17 and 19 of this Report. The Project property is at a development stage, and no production has occurred, either historically or currently.

Anglo first explored the Aldebarán area in the 1980s, drill testing alteration anomalies exposed in the rugged terrain. Two holes were drilled into the Cerro Casale deposit in 1989.

After acquiring the property from Anglo, Bema and Arizona Star proceeded in a comprehensive regional exploration program that included interpretation of Landsat imagery, geological mapping, surface rock-chip sampling, surface geophysical surveys and RC and core drilling.

CMA, on behalf of the Bema Shareholders Group, conducted exploration drilling at Cerro Casale from 1991 through 1997, targeting both oxide and sulphide gold–copper mineralization. A first-time pre-feasibility level study was completed in 1993. In 1997, Mineral Resource Development Inc. (MRDI) commenced a feasibility study on behalf of Bema for development of oxide gold–copper mineralization; this program was partially completed by the end of 1996 when a large gold–copper porphyry system was intersected by drilling under the oxide mineralization (MRDI 1997a). A pre-feasibility study for an oxide–sulphide operation and a scoping study for development of deep sulphides were subsequently completed (MRDI 1997b, 1997c). This work has since been superseded.

Regional exploration work conducted by Placer Dome in 1998 to 2000 included property-wide geological mapping, ground and airborne magnetic surveys and Audio Frequency Magnetic Telluric surveys (AMT). No additional regional-scale exploration has been performed since early 2000.

Placer Dome continued drilling at Cerro Casale in 1998 and 1999, leading to completion of a feasibility study in 2000. The 2000 feasibility study was undertaken to investigate the technical, environmental and economic aspects of the Cerro Casale Project. At the time, a project base case was selected and sensitivities were evaluated with variations in capital costs, operating costs and metal prices. The 2000 feasibility study established that the Cerro Casale deposit was technically feasible as a large-

scale open pit gold–copper operation using the parameters selected in the study. Results of the study have been superseded.

Capital and operating costs were updated by Placer Dome for studies completed in March 2004, and in 2005. The 2004 and 2005 studies were more conceptual, incorporating design improvements and updated cost estimates, and have been superseded.

During 2005, a technical report that estimated mineral resources and mineral reserves, compliant with NI 43–101 was prepared by AMEC on behalf of Bema (Smith, 2005).

In 2006, Mine and Quarry Engineering Services, Inc. (MQes) evaluated processing alternatives using elements from previous studies and incorporating revised equipment and operating cost estimates, scale-up factors, and escalation. The study was based on a flowsheet that incorporated open pit mining, heap leaching of oxides at 75,000 t/d, SAG milling, and flotation of mixed and sulphide ores, at a conceptual production rate of 150,000 t/d.

During 2006, a second technical report was prepared (Smith and Tilley, 2006) for Bema, and subsequently re-addressed to Kinross, which included reviews of technical and economic aspects of a proposed combined open pit and heap leach operation such as mine plans, processing concepts, and economic parameters. The 2006 report financial parameters updated the 2000 feasibility study and the March 2004 cost update.

From 2007 to 2008, work on the Project consisted of a pre-feasibility study, with associated trade-off studies, and core drilling of 16 holes to provide metallurgical samples. Results of the pre-feasibility study were disclosed by Kinross in a 2009 technical report (Henderson, 2009). Mineral resources and mineral reserves were declared for the Project based on third-quarter 2008 economic, mining and processing parameters from the pre-feasibility study. These data were superseded by the mineral resources and mineral reserves discussed in Section 17 of this Report, and the financial data included in Section 18. After the completion of the pre-feasibility study, an infill core drilling campaign that had commenced during the study was finalized.

A feasibility study on the Project commenced immediately following pre-feasibility study completion. The results of the 2010 feasibility study form the basis of the remainder of this Report.



## **7.0 GEOLOGICAL SETTING**

### **7.1 Regional Geology**

The Cerro Casale gold–copper deposit is located in the Aldebarán sub-district of the Maricunga Volcanic Belt (Figure 7-1). The Maricunga belt is made up of a series of coalescing composite, Miocene andesitic to rhyolitic volcanic centers that extend for 200 km along the western crest of the Andes. The volcanic rocks are host to multiple epithermal gold and porphyry-hosted gold–copper deposits, including Cerro Casale, and Kinross’ Maricunga, Lobo-Marte, and La Coipa deposits, as well as numerous other smaller mineral prospects. The volcanic rocks overlie older sedimentary and volcanic rocks of Mesozoic and Palaeozoic age.

Reverse faults that strike parallel to the axis of the Andes have uplifted hypabyssal intrusive rocks beneath the extrusive volcanics exposing porphyry-hosted gold–copper deposits in the Aldebarán area such as Cerro Casale, Eva, Jotabeche, Estrella and Anfiteatro (refer to Figure 7-1). Composite volcanic centers are still preserved in the immediate Cerro Casale area at Volcan Jotabeche and Cerro Cadillal.

Structural interpretations from regional geological mapping and Landsat imagery show major fault systems cutting Palaeozoic, Mesozoic, and Tertiary units. The oldest set of faults strike north-westerly and extend in this direction for 50 km to 60 km. These most likely are extension structures perpendicular to the direction of plate subduction. Major, through-going lineaments trend north-easterly and appear to mark boundaries between major lithological domains in basement rocks.

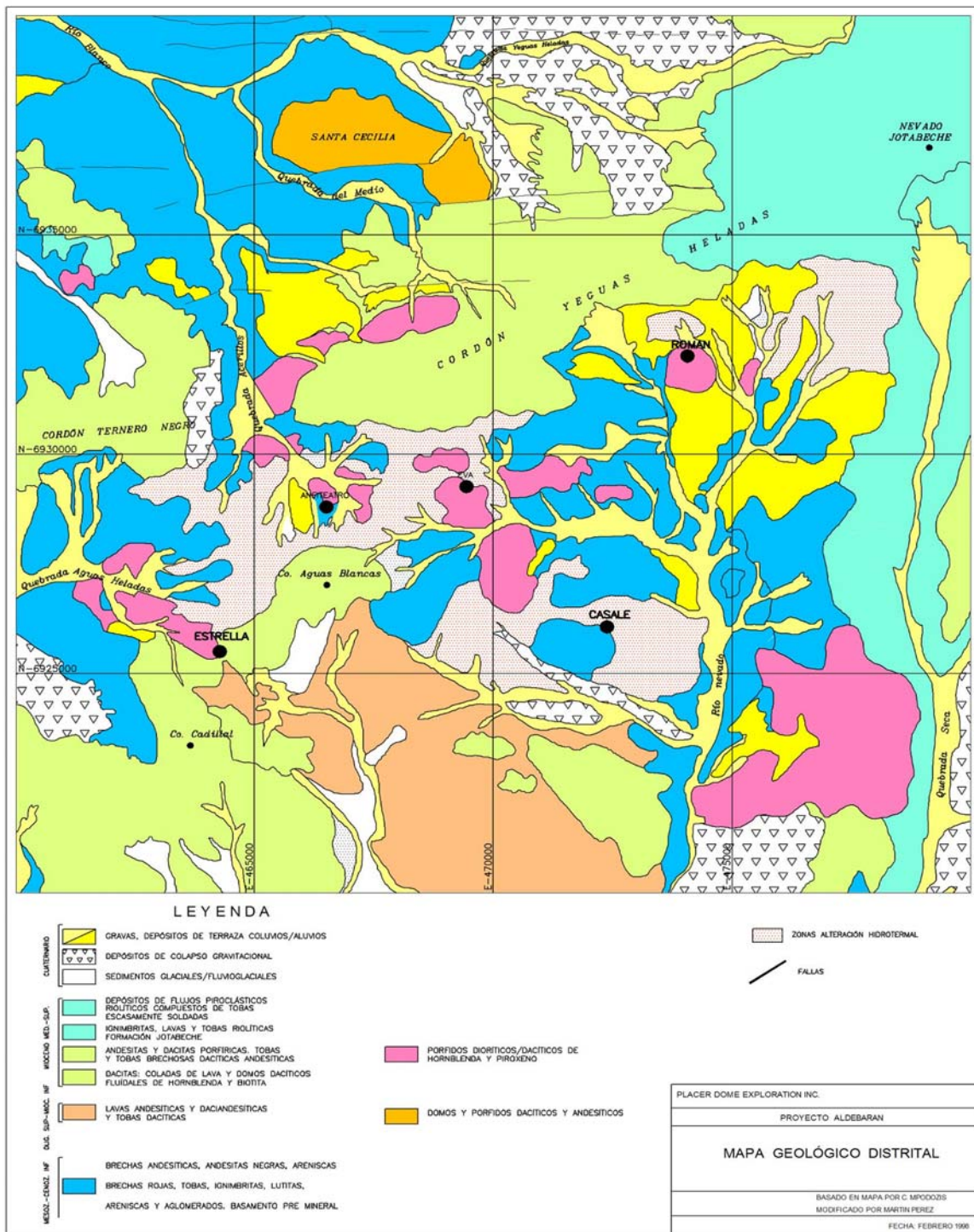
Younger lineaments and faults cut Tertiary and Quaternary volcanic rocks. These strike north, 040°, 310°, and east. Mineralization in individual deposits is generally aligned along one or more of these structural trends.

Major alteration zones and gold and gold–copper mineralization in the Maricunga Volcanic Belt are coincident with subvolcanic intrusive rocks of diorite and granodiorite composition. Intrusives generally occur at the intersection of major structural lineaments.

### **7.2 District Geology**

The Aldebarán area is underlain by extensive dacitic to andesitic volcanic and volcanoclastic rocks derived from Volcan Jotabeche and Cerro Cadillal. Numerous dioritic to granodioritic subvolcanic plutons related to the volcanic rocks crop out at Cerro Casale, Roman, Eva, Estrella, and Anfiteatro (refer to Figure 7-1).

Figure 7-1: Geology of the Maricunga Volcanic Belt



Note: Figure from Placer Dome (2000)

Extensive hydrothermal alteration consisting of quartz–feldspar veinlet stockworks, biotite–potassium feldspar, quartz–sericite, and chlorite occurs in these intrusive centers. Gold–copper mineralization is principally associated with intense quartz–sulphide stockworks, potassic alteration, and phyllic alteration.

## **7.3 Cerro Casale Deposit Geology**

### **7.3.1 Introduction**

The Cerro Casale deposit is exposed in a hill of approximate 700 m of vertical relief and 1 km in diameter. Mineralization is related to a series of dacitic to dioritic intrusives, which were emplaced into Miocene andesites and volcanoclastic sedimentary rocks. The Miocene volcanic rocks overlie Oligocene conglomerates, which in turn, overlie Eocene basaltic andesites and rhyolite pyroclastic flows.

Gold–copper mineralization occurs in quartz–sulphide and quartz–magnetite–specularite veinlet stockworks developed in the dioritic to granodioritic intrusives and adjacent volcanic wall rocks. Stockworks are most common in two dioritic intrusive phases, particularly where intrusive and hydrothermal breccias are developed. Mineralization extends at least 1,450 m vertically and 850 m along strike. The strike of mineralization follows west–northwest-trending (310°) fault and fracture zones. The main zone of mineralization pinches and swells in width from 250 m to 700 m along strike and along dip steeply to the southwest. The highest-grade mineralization is coincident with well-developed quartz–sulphide stockworks in strongly potassically-altered intrusive rocks.

### **7.3.2 Lithology**

Rocks underlying Cerro Casale are dominantly multi-phase porphyries and related breccias that intrude flat-lying volcanic and volcanoclastic rocks. Rock units listed in Table 7-1 are relevant as mineralization controls for domains in resource estimation. For metallurgical purposes, the rock units were further grouped into eight categories, summarized in Table 7-2. Figure 7-2 shows the distribution of the rock units in Table 7-1 at surface and Figure 7-3 presents a typical geological section through the deposit, looking northwest.

**Table 7-1: Major Lithological Units at Cerro Casale**

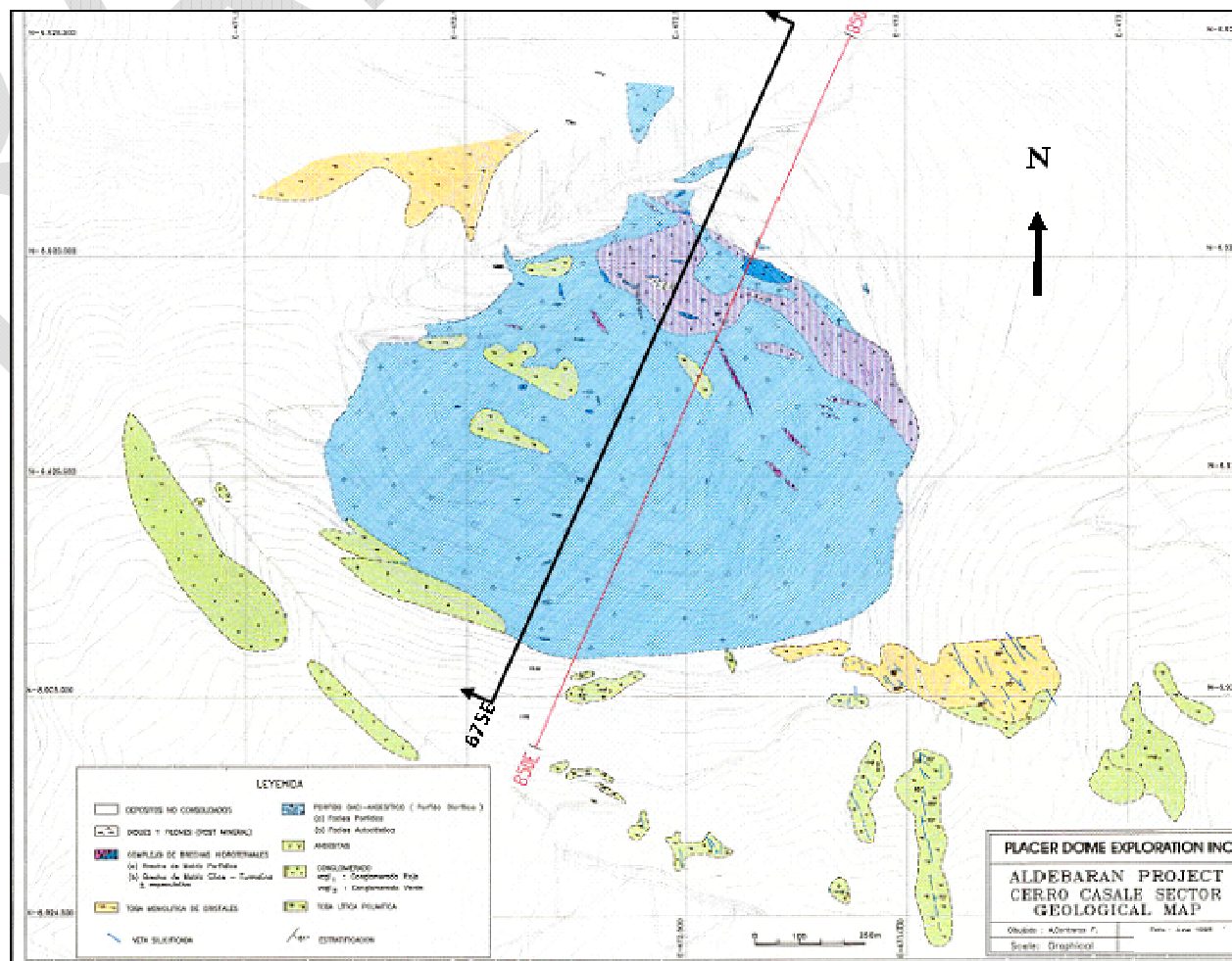
| Major Category             | Lithological Unit                | Code |
|----------------------------|----------------------------------|------|
| Intrusive-Related Breccias | Hydrothermal breccia             | HBX  |
|                            | Catalina breccia                 | CBX  |
|                            | Microdiorite breccia             | MDBX |
| Intrusive Porphyry Units   | Biotite porphyry                 | BP   |
|                            | Granodiorite                     | GD   |
|                            | Diorite porphyry                 | DP   |
| Volcanic-Sedimentary Units | Conglomerate (red beds)          | VCGL |
|                            | Volcaniclastic breccia           | VBX  |
|                            | Felsic tuff                      | VPF  |
|                            | Mafic volcanic flows (andesitic) | MVF  |
|                            | Rhyolite pyroclastic flows       | RPF  |

**Table 7-2: Metallurgical Rock Category Groups at Cerro Casale**

| Block Code | Ore Type | Description                               | Destination  |
|------------|----------|-------------------------------------------|--------------|
| 100        | GRD      | Granodiorite/Biotite Sulphides            | Concentrator |
| 200        | DP       | Includes Upper and Lower Diorite Sulphide | Concentrator |
| 400        | VCGL     | Volcanic Conglomerate                     | Concentrator |
| 500        | VO       | Volcanic Flows                            | Concentrator |
| 600        | OX       | Oxide                                     | Heap Leach   |
| 700        | MMDBX    | Mixed Microdiorite Breccia                | Concentrator |
| 800        | SMDBX    | Sulphide Microdiorite Breccia             | Concentrator |

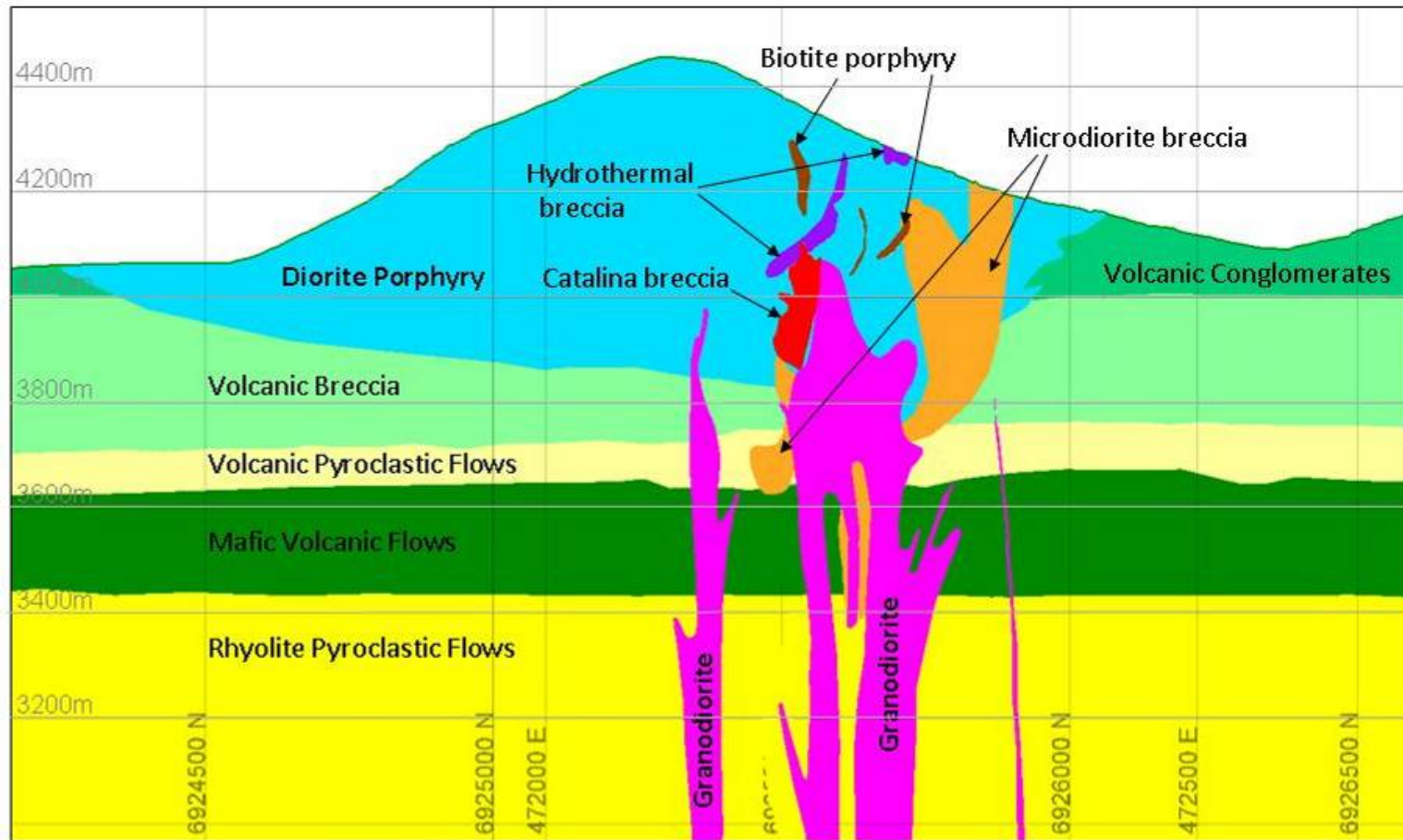


**Figure 7-2: Surface Geological Map of Cerro Casale**



Note: Figure from Placer Dome (2000)

**Figure 7-3: Cross Section 675E – Looking Northwest**



The volcanic–sedimentary sequence is split into five units (youngest to oldest):

- Volcaniclastic conglomerate;
- Volcaniclastic rocks;
- Felsic air-fall tuff;
- Mafic flow; and
- Rhyolite pyroclastic flow.

The oldest unit in the volcanic–sedimentary sequence is a thick section of rhyolite pyroclastic flows (RPF) showing welded, eutaxitic structures. This unit extends below the deepest drill holes, which end at an elevation of about 3,000 m.

The pyroclastic flows are overlain by amygdaloidal andesite flows (MVF), which occur between about 3,400 and 3,650 m elevations. The andesites are strongly altered near later dioritic intrusions and are composed mostly of biotite, apatite, and plagioclase.

The mafic flows are overlain by well-bedded, felsic air-fall tuffs (VPF) totalling about 100 m in thickness. The top of the sequence consists of volcaniclastic breccia (VBX) overlain by conglomerate (VCGL). The VBX unit is about 200 m thick and consists of poorly-sorted, polymictic, angular to subrounded clasts up to 10 cm across, in a matrix of rock and crystal fragments. Hydrothermal biotite is typically abundant. The conglomerate forms the uppermost unit in the sequence and is generally found above about 3,950 m. It is made up of heterolithic, sub-rounded to rounded cobbles and may represent the upper reworked horizon of VBX. Locally the conglomerate occurs as red beds.

The intrusive porphyry units are dominated by an early-stage, laccolith-shaped body of diorite porphyry, which forms the bulk of the Cerro Casale topographic high. The laccolith extends over an area of approximately 4 km x 1.8 km in plan view and down to the 3,800 m elevation. The porphyry is composed of approximately 40% plagioclase phenocrysts within a fine-grained plagioclase matrix. The diorite porphyry is a host to gold–copper mineralization where quartz–sulphide stockworks are developed and around later granodiorite and microdiorite porphyry bodies and breccias.

A near-vertical, tabular series of at least three granodiorite bodies cut the diorite porphyry along a west–northwest trend. The intrusive rocks extend for at least 1 km along strike and are typically 50 m to 300 m wide. The granodiorite is composed of 40% crowded phenocrysts of plagioclase, potassium feldspar, hornblende, and biotite. Phenocrysts are subhedral to euhedral. The groundmass is a fine-grained mixture of



orthoclase, biotite, and minor quartz. The unit shows a range in alteration from weak sericitization of feldspars and biotite replacement of amphiboles, to intense potassium feldspar flooding of the groundmass with >20% quartz vein stockworks.

Biotite porphyry is minor by volume but is closely related to mineralization in the upper portion of the deposit. This porphyry is characterized by coarse subhedral to euhedral biotite phenocrysts, and may be a potassically-altered phase of the granodiorite.

Breccia bodies dip steeply to the south and are strongly elongated west–northwest. The breccias are developed principally in the diorite porphyry along the north side of Cerro Casale, but also formed in the granodiorite. The highest gold-copper grades are generally associated with the breccias.

Microdiorite breccia is a fine-grained, intrusive breccia that contains a variable percentage of angular to sub-rounded fragments of volcanic rocks. The microdiorite component is finely porphyritic with phenocrysts of plagioclase supported in a fine-grained matrix of orthoclase, biotite, anhydrite, magnetite/specularite, and minor quartz. The breccia is strongly altered in all locations and cuts the diorite porphyry along the upper north side of Cerro Casale.

The Catalina breccia (CBX) is adjacent to the microdiorite breccia and is thought to be a sulphide-rich phase of the latter. The Catalina breccia forms a small, cone-shaped body in the centre of the mineral deposit, and is characterized by its matrix of anhydrite, gypsum, barite, tourmaline, rhodochrosite, dolomite, chalcopyrite, pyrite, galena, and sphalerite. In small restricted areas, the breccia contains very high-grade stockwork; grades may reach as much as 13% Cu and 200 g/t Au.

Hydrothermal breccias are common at contacts between diorite porphyry and microdiorite breccia. These are porphyritic with intense quartz–sulphide stockworks, open spaces and framework-supported rock fragments set in a matrix of quartz–sericite–specularite. The hydrothermal breccias generally occur high in the deposit and grade outward to pebble dykes.

Limited overburden occurs in the immediate area of Cerro Casale where bedrock is covered by a thin veneer of residual soils. Colluvium and alluvium up to 30 m thick are present in the Río Nevado valley.

### 7.3.3 Structure

Major fault and fracture zones trend to the northeast and the west–northwest within the Aldebarán district. Cerro Casale and the other mineral occurrences in the Aldebarán

area occur at the intersection of these structural zones, showing a structural control to the emplacement of the subvolcanic intrusive rocks and associated mineralization.

Within each deposit and in particular within Cerro Casale, gold-copper bearing quartz–sulphide stockwork zones are strongly elongated along azimuths ranging from 110° to 140° and dip vertically to steeply south. This elongation is coincident with the geometry of the intrusive granodiorite and with the enclosing alteration zone. The alteration zone is up to 1 km wide and 6 km long.

Topographic lineaments suggest the presence of a third, steeply dipping fault and fracture system on the north side of Cerro Casale that trends 35° to 50°. The Catalina breccia is located at the intersection of this structure and the west–northwest-oriented stockwork zones.

#### **7.3.4 Weathering and Oxidation**

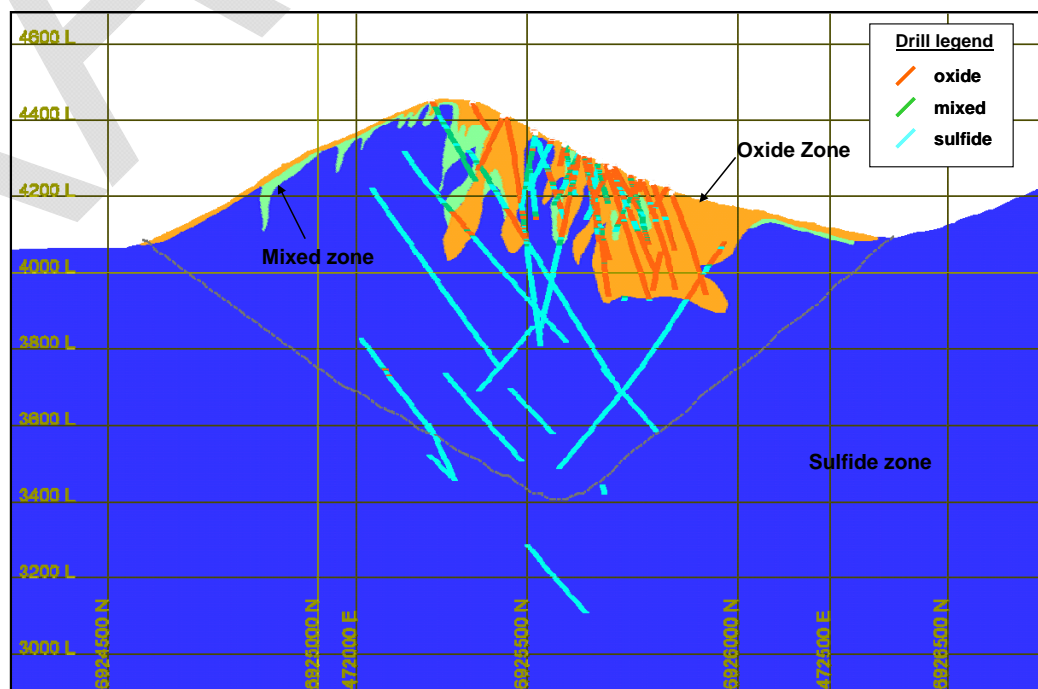
Oxidation resulting from weathering and/or high oxygen activity in the last phase of hydrothermal alteration overprints sulphide mineralization in the upper portion of the Cerro Casale deposit. Oxidation locally extends deeply along fault zones or within steeply dipping breccia bodies. Three types of oxidation states were mapped:

- Zones where  $\geq 90\%$  of the original sulphides are preserved (sulphide);
- Zones where between 10% and 90% of the original sulphide is preserved (mixed);
- Zones where  $< 10\%$  of the original sulphides remain (oxide).

The depth of oxidation is dependent on the permeability of the altered rock and the presence of high-angle structures. Oxidation generally goes no deeper than 15 m where vertical structures are absent. Oxide is present in linear oxidation zones as deep as 300 m along major fault and fracture zones, or as pendants along the intersection of multiple fault zones (Figure 7-4). Locally there are large blocks of less permeable sulphide material within the oxide zones.

Relogging of core by Geovectra (2008) determined that the oxidation zone corresponds mainly to iron oxide and that the secondary copper enrichment zone is present in patinas. These observations indicate that the remobilization of copper by climatic effect is rare to non-existent.

**Figure 7-4: Redox Units – Section 675E (drill holes are shown 25 m either side of section)**

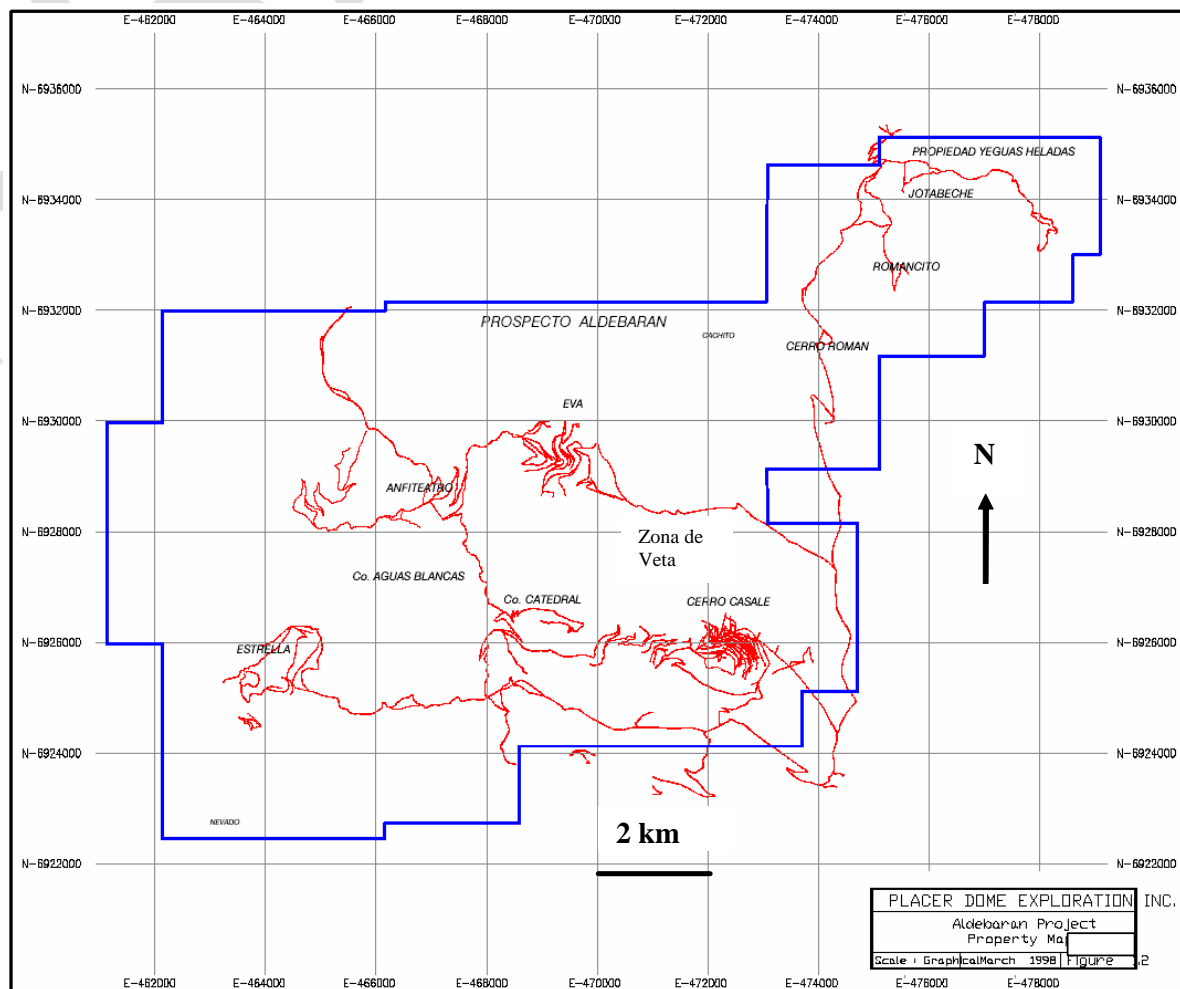


## 7.4 Prospects and Other Deposits

Mineralization at Cerro Casale is discussed in Section 9 of this Technical Report; the geology and mineralization of the other known prospects and deposits are discussed below. Prospects and deposits that are the subject of this subsection are included for completeness; none of the following prospects or deposits have Mineral Resource or Mineral Reserve estimates or are currently included in the proposed mine plan for Cerro Casale. No work has been undertaken on the prospects and deposits since 2000, and no additional work is planned for the areas subsequent to the feasibility study on Cerro Casale.

Gold–copper mineralization associated with Tertiary volcanic rocks and subvolcanic plutons is present in at least eight sites within the Aldebarán district. From the northeast, these include Jotabeche, Romancito, Cerro Roman, Eva, Anfiteatro, Cerro Catedral, Estrella, and Cerro Casale. Cerro Casale is the largest deposit and has been the primary target of exploration to date. Figure 7-5 shows the major gold–copper occurrences on the Aldebarán property.

**Figure 7-5: Major Gold-Copper Occurrences in the Aldebarán Property**



Note: Red lines on plan indicate tracks; blue outline is property boundary. Grids on plan are 2 km x 2 km squares. Figure from Placer Dome (2000)

#### **7.4.1 Eva**

The Eva deposit is located 5 km northwest of Cerro Casale at a surface elevation of between 4,600 m and 4,900 m. Gold–copper mineralization identified to date is developed in two west-trending zones, Eva Norte and Eva Sur. These zones are 500 m apart. Both extend approximately 800 m west and 200 m north.

Westward-elongated bodies of quartz monzonite, intruded by later biotite and amphibole-rich dacite porphyry are the focus of alteration and mineralization. The quartz monzonite and dacite porphyry intrude relatively flat-lying andesitic to dacitic flows and volcanic breccias. Hydrothermal breccias, occurs in the dacite porphyry and are comprise dacite porphyry fragments and quartz veins set in a fine-grained matrix of quartz, sericite, and chlorite. Pebble dikes are locally present.

Gold and copper values increase where the dacite porphyry, quartz monzonite, and volcanic wall rocks are strongly silicified either as replacement of groundmass, or as development of quartz–sulphide stockworks. Disseminated magnetite is common. Potassic alteration is generally present as fine-grained biotite in silicified and sericitized rock, and is only rarely present in the form of secondary potassium feldspar.

Gold mineralization generally increases with the frequency of quartz–sulphide stockworks, but can be anomalous in zones with disseminated sulphides.

#### **7.4.2 Cerro Roman**

The Cerro Roman prospect contains porphyries and breccias intruding andesitic to dacitic volcanic rocks in a setting that is similar to Cerro Casale. The plutons include an early diorite porphyry, followed by quartz diorite porphyry, and then dacite porphyry. The plutons are elongated along west and west–northwest-trending fracture patterns, showing active extensional structures at the time of their emplacement. Late-stage intrusive breccias occur along the margins of the central quartz diorite porphyry. Hydrothermal brecciation occurs in all intrusive units and in volcanic wall rocks.

Alteration consists of a zone of potassic alteration centered on the porphyries, surrounded by a marginal potassic zone and an outer propylitic zone. The entire alteration system is about 500 m x 700 m in plan and extends to the vertical limit of current drilling at 360 m. The central potassic zone contains well-developed quartz–sulphide veinlets with biotite and potassium feldspar replacement of mafic minerals and plagioclase, respectively. The marginal potassic zone is developed mostly in andesitic wall rocks and is expressed by development of pyroxene, biotite, and magnetite. Propylitic alteration is developed chiefly in volcanic wall rocks and comprises quartz and chlorite.

Gold–copper mineralization is directly related to the frequency of quartz–magnetite–sulphide veinlet stockworks developed in the intrusive units and adjacent andesite wall rocks. Sulphides include pyrite, chalcopyrite, and bornite. The highest grades occur where dense veinlet stockworks occur along the margins of the central quartz diorite and in breccias. Mineralization occurs within an area that is 600 m long in the east–west direction, and 300 m wide in the north–south direction. Within this area, individual zones of >0.8 g/t Au are present, separated by envelopes of lower-grade mineralization. Three zones of the higher-grade mineralization are as much as 120 m to 350 m long and 60 m to 150 m wide.

Copper grades are generally low, averaging <0.2%.

#### **7.4.3 Estrella**

The Estrella prospect is underlain by relatively flat-lying volcanic rocks and flow breccias of intermediate composition, and by irregular, sill-like porphyry intrusions. The volcanic rocks are andesite and dacite. The sub-volcanic sills are coeval with the volcanic rocks and vary from dacite to andesite porphyry. Hydrothermal breccias composed of andesite and dacite fragments set in a matrix of quartz, magnetite, and sulphides are developed along high-angle structures that strike north–northwest.

Other hydrothermal breccias are flat-lying and are made up of fragments of andesite and dacite in a matrix of gypsum.

Fault and fracture systems are well developed along four directions. Small-scale faults and fractures strike 350° and 70°. The north–northwest set appears to influence the development of vertical hydrothermal breccias. More dominant faults trending 50° and 120° cut the smaller features.

Alteration related to gold mineralization consists of pervasive silicification and quartz veining in hydrothermal breccias. Sub-parallel veins strike north–northwest and northeast. Quartz veins contain magnetite, pyrite, and locally chalcopyrite.

Interpretation of the limited drilling to date suggests that gold mineralization is restricted to relatively narrow, sheeted, quartz vein systems.

#### **7.4.4 Anfiteatro**

Flat-lying dacitic to andesitic volcanic flows and flow breccias underlay the Anfiteatro area. The volcanic rocks are intruded by a series of andesitic to dacitic porphyries. The intrusives are composed of plagioclase, quartz, and amphibole phenocrysts set in a microcrystalline matrix of plagioclase, secondary biotite, potassium feldspar,



amphiboles, and quartz. Within the porphyries are intrusive and hydrothermal breccias. Intrusive breccias are comprised of fragments of andesite or dacite porphyry set in a fine-grained matrix altered to chlorite and epidote. Hydrothermal breccias are made up of fragments of porphyry and volcanic rocks in a matrix of quartz, potassium feldspar, pyrite, gypsum, and locally sphalerite.

Fault and fracture systems are dominated by fracture zones and quartz veins that strike 060°.

Potassic alteration manifested by secondary biotite and local quartz, potassium feldspar and chlorite is present within the porphyries. Gold mineralization is associated with potassic alteration and stockwork veins of quartz, potassium feldspar, biotite, sericite, pyrite, chalcopyrite, and magnetite. The Stockwork Zone within Anfiteatro is an area of stockwork veining 600 m long x 250 m wide in dacitic to andesitic volcanic flows. Veinlets are dominantly quartz, magnetite, and specularite. Mineralization in the Ojo de Buey dacite porphyry is comprised of quartz-magnetite veinlets with limonite and copper oxides.

Soil geochemistry shows average surface gold values of 0.25 and 0.10 g/t in the Stockwork and Ojo de Buey areas, but drilling to date has been relatively negative with the best intercept being 150 m of 0.46 g/t Au in the Stockwork Zone in CMA hole ANF-02. Soil sampling has outlined as much as 0.46 g/t Au in an area 100 m x 150 m at Anfiteatro Zona, and as much as 0.26 g/t Au in an area 120 m x 300 m at Anfiteatro Alto. These soil geochemical anomalies have not been drill tested.

#### **7.4.5 Romancito Sur**

Intermediate intrusive porphyry cuts a sequence of intermediate volcanic breccias at Romancito Sur. The volcanic breccias dip 30° to the south. The porphyry strikes west and appears to have followed district-scale fracture zones. Hydrothermal breccias cross-cut the volcanics and porphyry and are composed of fragments of volcanic rocks set in a fine-grained, silicified matrix. Quartz-sulphide veins and stockworks strike east-northeast, following the trend of the intermediate porphyry.

Porphyry and volcanic rocks are variably silicified, with alteration increasing with proximity to individual quartz veins and stockworks. Silicified rocks also show chloritization of mafic minerals, sericitization of plagioclase and disseminated magnetite and pyrite. Anomalous gold values are associated with the most intensely silicified and veined zones where sulphides are present.

Faults are strongly argillized but this alteration is late and does not appear to be associated with gold mineralization. Potassic alteration is rare.



Gold mineralization  $>0.5$  g/t Au is associated with a 20 m to 30 m wide zone of quartz–sulphide veins and stockworks that strikes at  $70^\circ$  across the centre of the prospect. Rock chip samples collected from trenches in this area returned gold values up to 2.12 g/t Au. One-third of 247 samples grade  $>0.5$  g/t Au. Two core holes drilled within this zone, however, returned relatively narrow and discontinuous gold intercepts.

#### **7.4.6 Other Areas**

Surface sampling and drilling at Jotabeche, Zona de Vetas, and Cerro Catedral by Anglo and Bema revealed weak zones of gold–copper mineralization that did not warrant additional drilling. Placer Dome did not continue exploration in these areas after 1998 because of negative results, and no additional work is planned.

## 8.0 DEPOSIT TYPES

The Cerro Casale deposit is considered to be an example of a primary gold–copper porphyry system, with strong affinities to high sulphidation, volcanic-hosted gold systems.

Porphyry deposits in general are large, low- to medium-grade deposits in which primary (hypogene) sulphide minerals are dominantly structurally-controlled and which are spatially and genetically related to felsic to intermediate porphyritic intrusions (Kirkham, 1972). The large size and structural control (e.g., veins, vein sets, stockworks, fractures, 'crackled zones' and breccia pipes) serve to distinguish porphyry deposits from a variety of deposits that may be peripherally associated, including skarns, high-temperature mantos, breccia pipes, peripheral mesothermal veins, and epithermal precious metal deposits. Secondary minerals may be developed in supergene-enriched zones in porphyry Cu deposits by weathering of primary sulphides. Such zones typically have significantly higher Cu grades, thereby enhancing the potential for economic exploitation (Sinclair, 2006).

Porphyry deposits are the world's most important source of Cu, Mo and Re, and are major sources of Au, Ag and Sn; significant by-product metals include W, In, Pt, Pd and Se. Porphyry deposits account for about 50–60% of world Cu production (Sinclair, 2006).

Porphyry deposits occur throughout the world in a series of extensive, relatively narrow, linear metallogenic provinces. They are predominantly associated with Mesozoic to Cainozoic orogenic belts in western North and South America and around the western margin of the Pacific Basin, particularly within the South East Asian Archipelago. However, major deposits also occur within Palaeozoic orogens in Central Asia and eastern North America and, to a lesser extent, within Precambrian terranes (Sinclair, 2006).

Porphyry deposits are large and typically contain hundreds of millions of tonnes of mineralization, although they range in size from tens of millions to billions of tonnes. Grades for the different metals vary considerably but generally average less than 1%. In porphyry Cu deposits, Cu grades range from 0.2% to more than 1% Cu; Mo content ranges from approximately 0.005% to about 0.03% Mo; Au contents range from 0.004 g/t Au to 0.35 g/t Au; and Ag content ranges from 0.2 g/t Ag to 5 g/t Ag (Sinclair, 2006).

Cerro Casale is considered to be an example of a gold–copper porphyry system based on the following:

- Hosted in a Mesozoic orogenic belt;
- Gold–copper mineralization at Cerro Casale formed during emplacement of multiple phases of diorite and granodiorite intrusions into a coeval sequence of intermediate to felsic volcanic rocks;
- Mineralization appears to be most closely related to strong potassic to phyllic alteration of the latest phases of intermediate to felsic intrusives and associated intrusive and hydrothermal breccias;
- Mineralization is focused in well-developed quartz–sulphide stockworks; veins, crackle and breccia zones are also present;
- Large tonnage but low grade.

## 9.0 MINERALIZATION

A discussion of the mineralization styles and related depth, width (thickness), orientation and continuity is presented for the deposit in Section 7 of this Technical Report. The discussion in this section of the Technical Report relates to the mineralization type, character, and mineralogy of the Cerro Casale deposit. Other deposits and prospects within the Project area are discussed in Section 7.4.

### 9.1 Mineralization

Gold and copper mineralization is most directly associated with quartz–sulphide–magnetite stock work veins and veinlets in potassically-altered rocks. Mineralization extends from the surface of the north side of Cerro Casale at an elevation of 4,200 m to the base of existing drilling at 3,000 m, and has not been drilled out at depth.

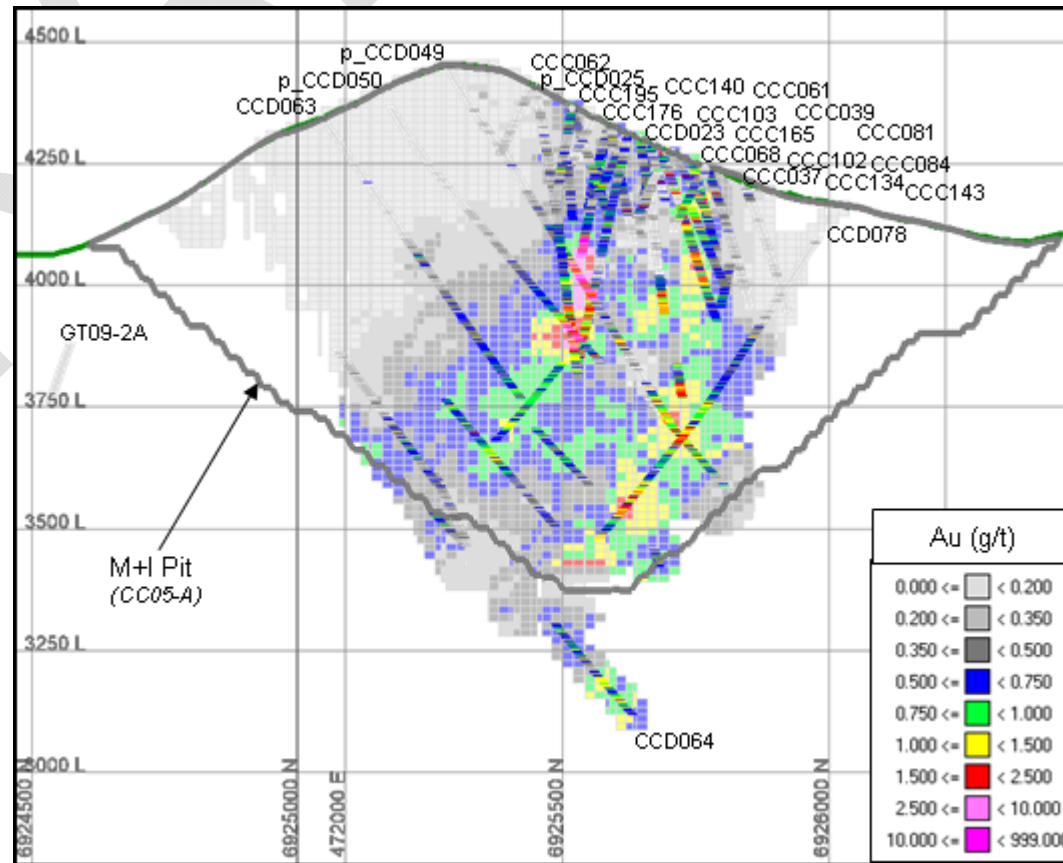
Mineralization extends for about 850 m along strike to the west–northwest, dips vertically to 75° south, and is from 150 m to 700 m wide. The widest portion of the mineralization is at the 3,800 m elevation. Figure 9-1, Figure 9-2, and Figure 9-3 show a cross section of the gold, silver, and copper grades at 850 east, across the centre of the deposit.

Gold and copper grades generally show a high spatial correlation. Typically, higher copper grades occur in the lower parts of the deposit. Gold occurs in association with copper in the lower parts of the deposit, but at shallow levels gold is present without associated copper. Figure 9-4 displays the average Au:Cu and Cu:Au relationships in the deposit by elevation.

Information from the 2000 Placer Dome feasibility study on cross-cutting relationships with host rocks suggest a maximum age of 13.5 Ma (Placer Dome, 2000, accuracy limits not stated). Fluid inclusion work suggests a temperature of formation close to 500°C. Limited petrographic work suggests that a large portion of the gold is free and present along the margins of pyrite grains. Gold particles found in the Catalina breccia (the highest-grade unit) range from 1 µm to 145 µm, with a mean of 39 µm.

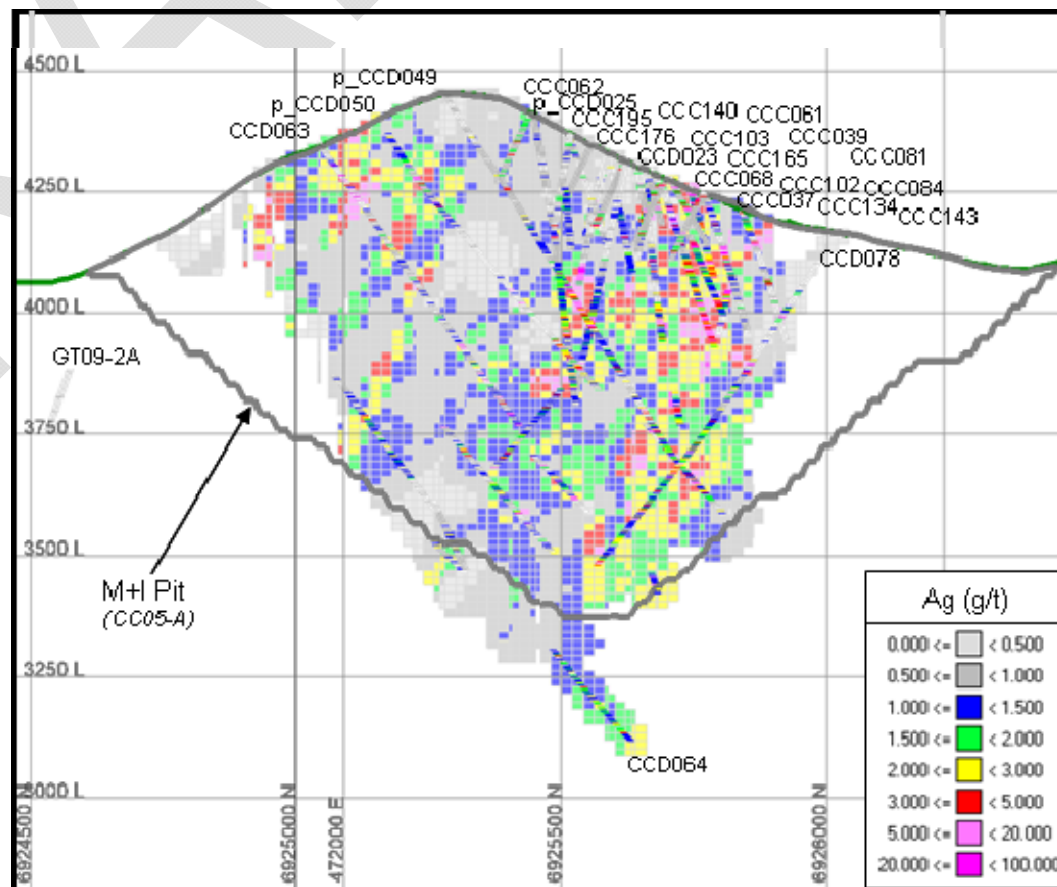
Hypogene copper minerals include chalcopyrite, bornite, and chalcocite–djurleite (Cu<sub>2</sub>S) and minor copper silicate minerals. Secondary copper minerals in the oxide and mixed zones include chalcocite, digenite, covellite, chrysocolla, malachite, and minor copper silicates. Most copper sulphides are in stockwork veinlets rather than disseminated in wall rocks. Locally disseminated chalcopyrite is present in the granodiorite. Disseminated copper zones are low in gold. Bornite increases with depth, corresponding to the highest copper grades below the 3,800 m elevation.

**Figure 9-1: Block Model Gold Grades, Cross Section 850 E, Looking Northwest**



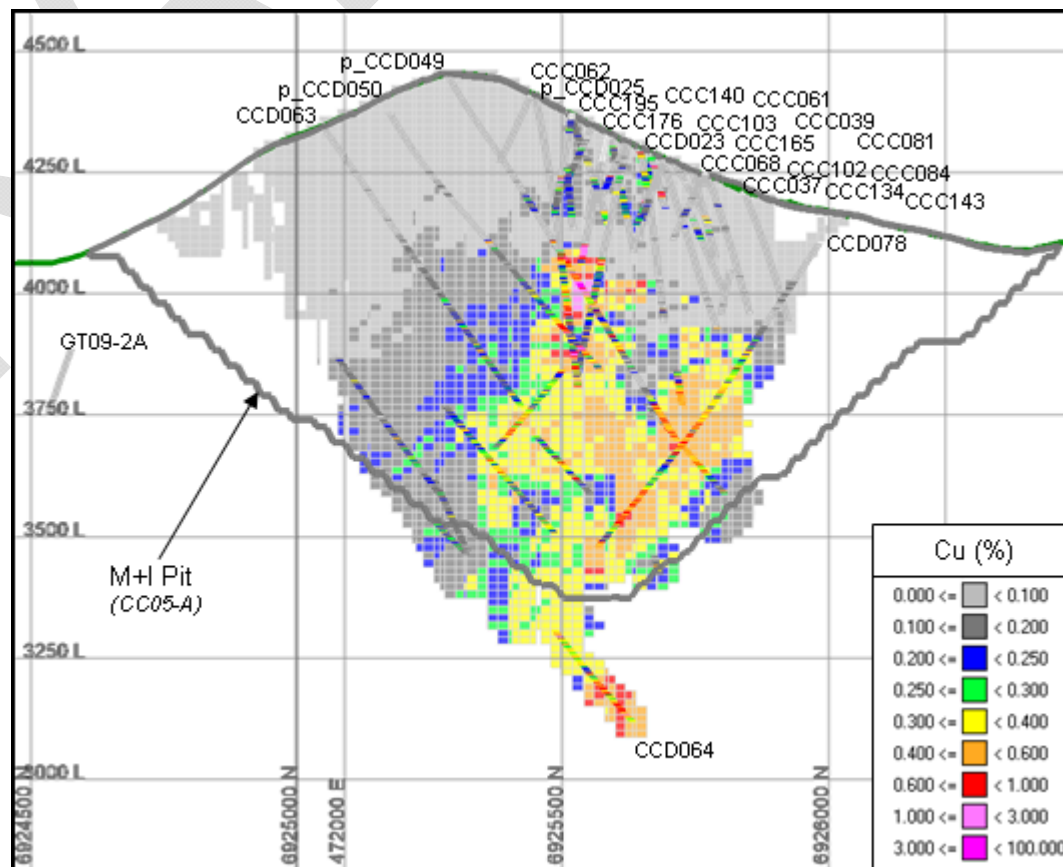
Grids on the section are 500 m x 200 m squares. Drill hole and block model intercepts are color-coded to reflect gold assay values, as shown in key. Grey outline is that of the 2010 feasibility study ultimate open pit. Pit limits are based on a gold price of \$800/oz, copper price of \$2.00/lb and silver price of \$12.50/oz. Only Measured and Indicated blocks are shown in the figure.

Figure 9-2: Silver Grades, Cross Section 850 E, Looking Northwest



Drill hole and block model intercepts are color-coded to reflect silver assay values, as shown in key. Grey outline is that of the 2010 feasibility study ultimate open pit. Pit limits are based on a gold price of \$800/oz, copper price of \$2.00/lb and silver price of \$12.50/oz. Only Measured and Indicated blocks are shown in the figure.

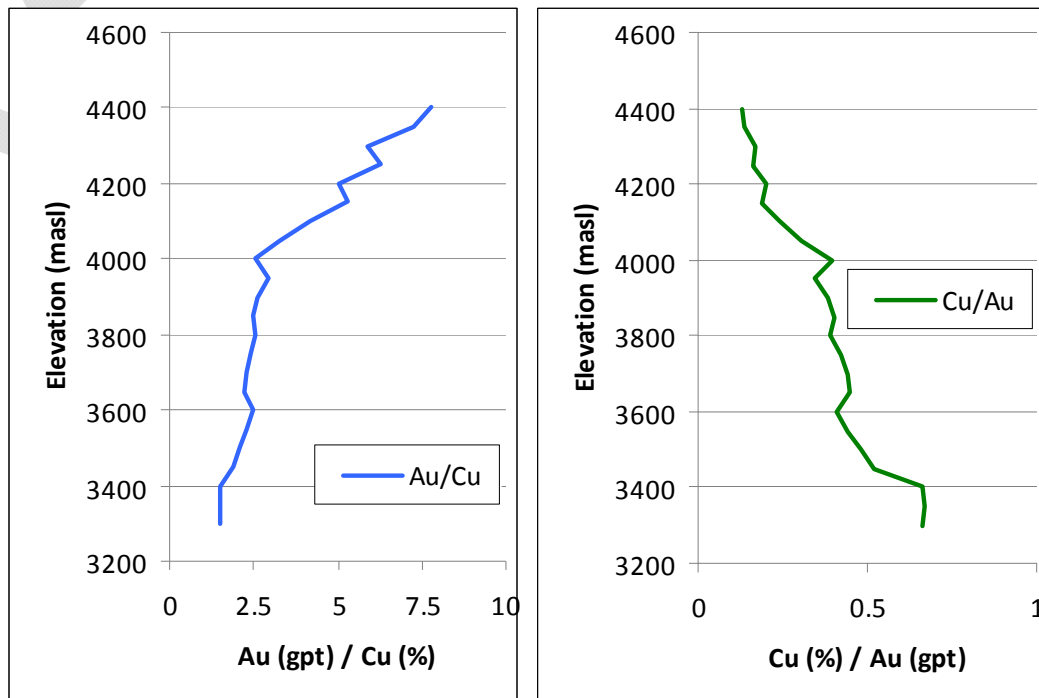
**Figure 9-3: Copper Grades, Cross Section 850 E, Looking Northwest**



Drill hole and block model intercepts are color-coded to reflect copper assay values, as shown in key. Grey outline is that of the 2010 feasibility study ultimate open pit. Pit limits are based on a gold price of \$800/oz, copper price of \$2.00/lb and silver price of \$12.50/oz. Only Measured and Indicated blocks are shown in the figure.



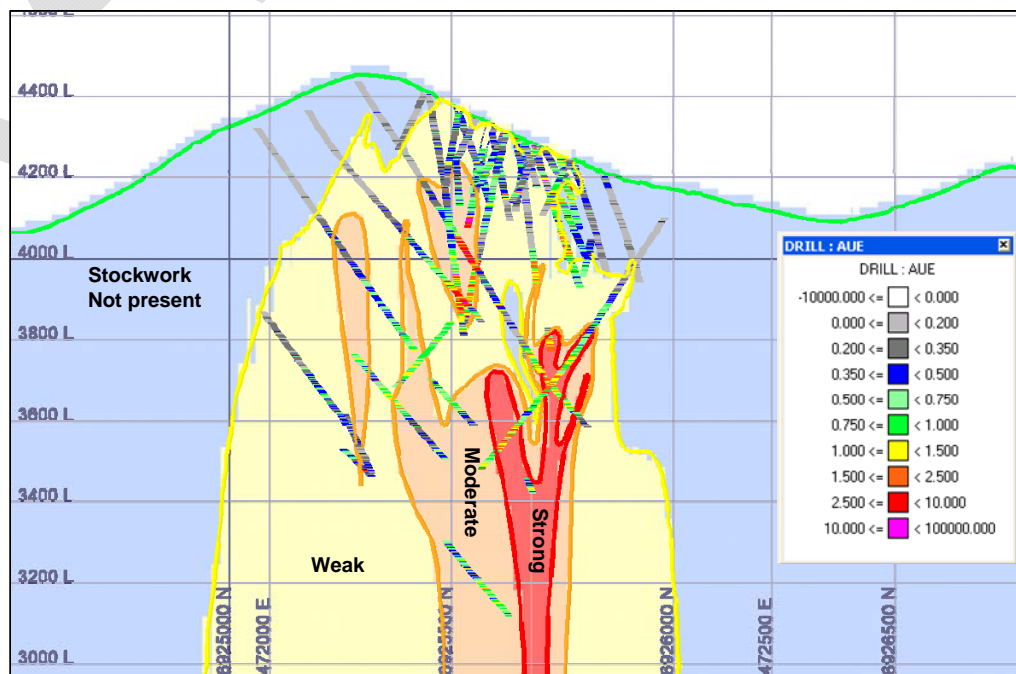
**Figure 9-4: Average Au/Cu and Cu/Au Ratios by Elevation**



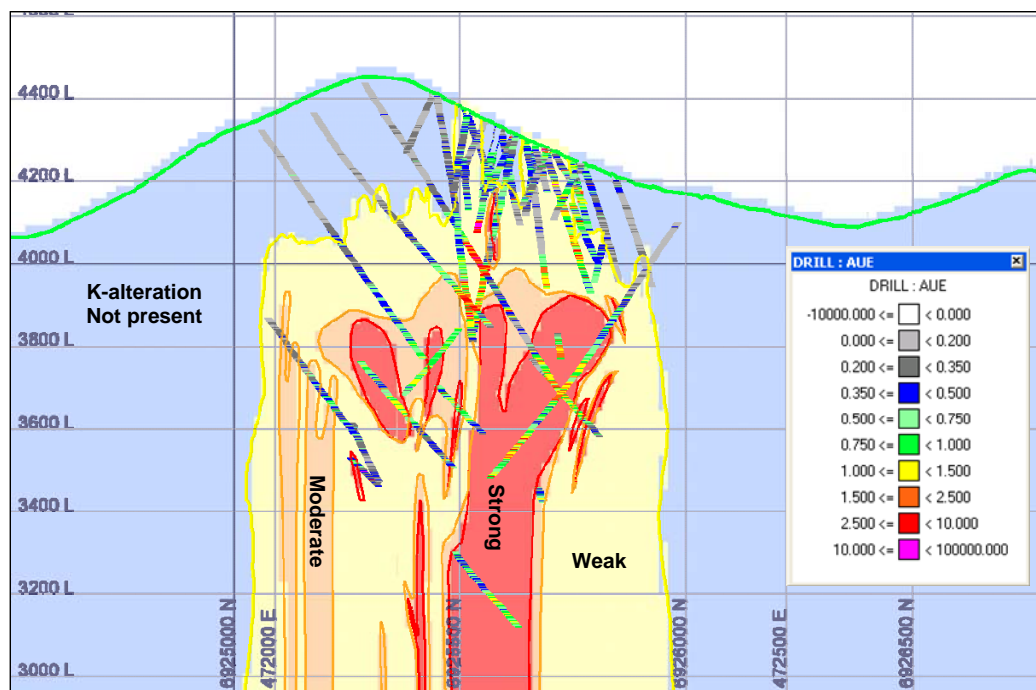
Gold distribution does not appear to be impacted in the oxide zone, and copper mineralization mainly occurs below the oxidation zone.

Gold–copper–silver mineralization is strongly related to the presence of diorite, granodiorite, breccia units, and the intensity of stockwork veining and potassic alteration. Mineralization intensity is related to moderate to strong stockwork veining and moderate to strong potassium feldspar alteration. Distribution of stockwork veining is presented in Figure 9-5, whereas the distribution of the potassic alteration is shown in Figure 9-6.

**Figure 9-5: Intensity of Stockwork Veining – Section 675E**



**Figure 9-6: Potassium Feldspar Alteration – Section 675E**



## **9.2 Mineralogy**

X-ray diffraction scans showed that the most common minerals were, in decreasing order, quartz, feldspar, mica, chlorite, gypsum, pyrite, chalcopyrite, and bornite.

Copper and gold are strongly correlated. Copper is found mainly in chalcopyrite but also in bornite and, to a lesser extent in chalcocite, digenite, covellite, chrysocolla. Malachite also occurs occasionally. The bornite to chalcopyrite ratio is found to increase at depth, with very little bornite above the 4,000 m elevation. The average copper grade increases approximately 25% below the 4,000 m elevation. Chalcocite, covellite, chrysocolla, and malachite are found at the oxide/sulphide boundary.

Pyrite:chalcopyrite ratios are likely to play a role with respect to the achievable final concentrate copper grade produced (as perceived from some Placer Dome tests). The upper portions of the orebody, where the higher copper-grading bornite mineral is less abundant, should represent the most challenging ore at high pyrite to chalcopyrite ratios.

Gold mineralogy was not defined by any specific mineralogical work. Gold content has a tendency to follow copper content, as long as copper is present in stockwork-controlled chalcopyrite or bornite. The correlation does not hold for disseminated copper occurrences.

Silver is present at an average 4:1 ratio to gold, suggesting that the gold is present as electrum. Electrum may be present in fine grains (as seen by modal analysis of flotation products) within the fluid matrix that deposited the copper minerals, and/or as solid inclusions within these minerals. Modal analysis demonstrated (except for GS) that up to 85% of the gold content is associated specifically with chalcopyrite and less than 1% is found with pyrite. However, petrographic examination of high grade CBX material showed that 85% of the gold was present as exposed grains along pyrite grain boundaries. An average gold grain size of 39 µm, within a range of 7 µm to 145 µm, was obtained from the analysis of a sample of CBX with 31 grains observed.

## **9.3 Alteration**

Alteration consists of a zoned, sub-circular pattern surrounding the centre of the most pervasively altered diorite porphyry, granodiorite, and intrusive breccias. The outer portion of the system is propylitic alteration in diorite porphyry and volcanic wall rocks characterized by quartz, chlorite, pyrite, sericite, clay, and minor epidote. Mafic minerals are replaced by chlorite and minor magnetite and plagioclase is altered to sericite and clay.

Phyllic alteration is present in most of the diorite porphyry and granodiorite. At least two phases of phyllic alteration may be present. Plagioclase and mafic minerals are replaced with sericite and quartz. Disseminated specularite is locally present. Deep in the deposit there is an early phase of phyllic alteration after which sericitized plagioclase phenocrysts are surrounded with secondary potassium feldspar. In the upper portion of the deposit the phyllic alteration is more extensive, converting most of the diorite porphyry, Catalina Breccia and granodiorite to quartz, sericite, pyrite, and tourmaline.

The centre of the alteration system is coincident with gold–copper mineralization and is comprised of intense potassium silicate alteration. Biotite replaces hornblende as aggregates of biotite books and magnetite.

The biotite zone forms a 200 m diameter halo around a core zone of strong potassium feldspar alteration. Potassium feldspar halos in quartz-sulphide veinlets become more frequent towards the centre of the system where all plagioclase is totally replaced by secondary orthoclase. Primary textures are obliterated. Argillic alteration is restricted to base metal veins peripheral to Cerro Casale at Zona de Veta and Cerro Catedral. The argillic alteration forms halos to quartz, alunite, kaolinite, and pyrite veins. The top of Cerro Catedral appears to represent the original lithocap top of the alteration system, with abundant alunite, kaolinite, chalcedonic silica, and complex eruptive breccias.

Gold–copper mineralization is most commonly associated with quartz–limonite/hematite, quartz–specularite–pyrite, potassium feldspar–quartz–sulphide, quartz–magnetite–sulphide and quartz–anhydrite–sulphide veinlets. Veinlets are from 1 mm to 10 mm wide. Sulphides occur disseminated in the vein matrix or along vein margins. Veinlet frequency ranges from none in the latest intrusive phases to in excess of 35% by volume around the contacts between the granodiorite, microdiorite breccia, and diorite porphyry.

## 10.0 EXPLORATION

Exploration commenced on the Aldebarán Project in the 1980s, and continued to 2000. Exploration has primarily been undertaken by CMA and CMC on behalf of the various joint venture partners, or by contractors (e.g. airborne geophysical surveys, hydrological surveys and geotechnical studies). An exploration summary table is presented in Table 10-1.

### 10.1 Grids and Surveys

Between 1983 and 1993, information on surveying is lacking. Bema, Anglo and CMA are known to have performed surveys. These different surveys produced different coordinates for several drill hole collars and other features in the Aldebarán Project area. The differences were on the order of 50 m north–south and east–west and a few metres vertically, but were not consistent throughout the area so no correction factor could be used to correct the data sets.

As a result, all of the drill hole collar locations and roads in the Aldebarán district were surveyed in 1994 by Luis Contreras, a private surveyor in Copiapó, Chile (Contreras, 1994). Contreras used a total station EDM for the surveying. Triangulation was based on elevations and coordinates of the 1956 National Topographical Survey's survey of major peaks in northern Chile.

Since 1994, surveys have been conducted using global positioning system (GPS) instruments. Geovectra (2008) audited the topographic control base of the project and concluded that there is a uniform offset of coordinates by +36.14 m north, -20.97 m east, and +3.45 m elevation.

In May 2008, CMC made the decision to conduct all future surveying work at Cerro Casale using the WGS-84 (World Geodetic System 1984) datum. This was accomplished by using a standard coordinate transfer formula provided by the Chilean Institution Geographical Militar (IGM) to convert from the PSAD-56 coordinate system to the WGS-84 system. This formula provided the correction of an error in the PSAD-56 CHXIV-6 reference point used for Cerro Casale surveying prior to 2008.

During the application of this correction factor, CMC's surveying contractor, Geocen, discovered an additional error in the PSAD56 Lomas de Cuevitas reference point. Although the IGM transformation formula was corrected for the additional error, CMC elected to have all the drill collars at Cerro Casale resurveyed by Geocen to ensure accuracy.

**Table 10-1: Exploration Summary**

| Company                               | Duration  | Work Performed                                                                                                                                                                                                                                                                                                  |
|---------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Anglo                                 | 1983–1990 | Geochemical soil sampling on a 40 m x 40 m grid; geological mapping and sampling over approximately 5 km of roads and trenches; 4 core holes (1,225 m); 17 RC holes (2,475 m); ground magnetics geophysical survey; thin section petrology                                                                      |
| Bema/CMA                              | 1991–1993 | Geological mapping and rock sampling; trenching; 55 RC holes (6,350 m); 6 core holes (463 m); mineral resource estimate; metallurgical testwork, pre-feasibility study                                                                                                                                          |
| Arizona Star/Bema/CMA                 | 1993–1994 | Geochemical sampling including BLEG, -80 mesh stream sediment samples, soil/talus fines samples, and rock samples; geological mapping; 62 RC holes (8,560 m); metallurgical sampling and testwork                                                                                                               |
| Placer Dome/Arizona Star/Bema/CMA     | 1994–2005 | Cerro Casale: 80 core holes (52,543 m, drilled for metallurgical, geotechnical, geostatistical twins, and exploration purposes); 138 RC holes (32,450 m); feasibility study; metallurgical sampling and testwork; supporting studies for environmental impact assessment; geotechnical and hydrological studies |
| Kinross/ Placer Dome/Arizona Star/CMC | 2005–2006 | No work performed.                                                                                                                                                                                                                                                                                              |
| Kinross/Barrick/CMC                   | 2006–2008 | Cerro Casale: 12 core holes (7,890 m) drilled to obtain additional metallurgical samples. 7 infill holes (7,295 m) and due diligence of the existing data completed for the pre-feasibility study; pre-feasibility study, metallurgical sampling and testwork; geotechnical and hydrological studies            |
| Kinross/Barrick/CMC                   | 2009      | Cerro Casale: Geotechnical drilling (13 holes, 7,257 m); feasibility study, metallurgical sampling and testwork; geotechnical and hydrological studies                                                                                                                                                          |

A comprehensive high precision resurvey of the entire Project area was conducted to include the planned mine and infrastructure area, the proposed concentrate pipeline, the proposed waterline from Piedra Pómez, and the access highway.

## 10.2 Topographic Surveys

For the 2010 feasibility study, Geocen conducted detailed aerial survey restitution of the Project and generated 1 m contours for the topography. This current topographic model is referenced to datum WGS-84 (SIRGAS).

Topography used previously was based on datum PSAD-56 and developed by Placer Dome using satellite imagery (PDTs, 2000) to create AutoCAD drawing files with 2 m contour intervals in the area of the ultimate pit and at 10 m contours outside the design pit.

Earlier topography was produced by GenCen of Santiago, Chile using 1:8,000 aerial photographs flown in 1994. Topographic contours at 2 m intervals were produced for the pit area after matching contours to drill roads and trenches surveyed by Contreras Topografía Ltda. of Copiapó. A larger map was produced with 5 m contours to cover a 4 km<sup>2</sup> area around the proposed pit area.



### **10.3 Geological and Structural Mapping**

Geological mapping in the Cerro Casale area is primarily at regional scales, including 1:250,000, 1:100,000, and 1:25,000. Geomorphology and geohazards mapping has also been completed at 1:100,000 and 1:25,000 scales. Local cryo-geological mapping at 1:25,000 scale was undertaken for the upper Rio Nevado basin. Support for ground truthing was obtained from colour aerial photographs, Landsat false colour images, and a Google Earth composite with Ikonos and Landsat images

The mapping programs established the regional stratigraphy and structure, identified areas of surface outcrop and alteration, identified areas of potential geohazards within the Rio Nevado basin.

The structural model for Cerro Casale was proposed by Geovectra (2008) based on drill data and surface mapping. A set of 22 cross sections oriented at N24°E was used for the interpretation. Geovectra concluded that the Cerro Casale pit area is characterized by northwest-trending structures dipping steeply to the west, which are associated with low-angle structures dipping to the east.

### **10.4 Structural Analysis**

Structural fabric data were compiled into three databases: surface mapping of outcrops and road cuts conducted by Piteau in 1996, 1998, 1999, and 2008 (938 structures), clay imprint oriented core from the 1998–1999 geotechnical field program (3,499 structures), and ACT oriented core validated by ATV/OTV geophysical surveys from the 2008–2009 geotechnical drill program (1,829 structures).

A review of the regional and deposit scale structural geology was carried out by Earth Resource Survey Inc. (ERSi) in July and August 2009. Their review was based on available literature, geological models, satellite imagery, and geomechanical and structural information from drillholes. One of the main objectives of ERSi's review was to rank the interpretations of major faults (Geovectra, 2009) according to a confidence rating system, and to validate structural domain boundaries for analysis of structural fabric data.

### **10.5 Geochemistry**

Geochemical sampling was completed as part of the initial, first-pass exploration programs, and at Cerro Casale, has been superseded by data obtained from drilling. Samples collected included bulk leach extractable gold (BLEG) and -80 mesh stream sediment, soil, talus, rock chip, road-cut and grab sampling, primarily during the period 1983–1993. The geochemical sampling programs successfully outlined areas of



anomalous gold and copper values that were typically associated with zones of stockwork veining or potassic alteration.

## **10.6 Geophysics**

The Aldebarán Project area has been subject to both airborne and ground geophysical surveys, including interpretation of Landsat imagery, ground and airborne magnetic surveys and audio frequency magnetic telluric surveys. Surveys defined structures, outlined zones of anomalous geophysical response that provided targets for exploration drilling and were used to help further refine areas for additional drilling.

## **10.7 Pitting and Trenching**

Costeans and trenches were dug to supply additional profile information on oxide mineralization, and to better expose lithologies in areas of surficial cover or poor outcrop. Information gained from the exposures was used to support geological interpretations.

## **10.8 Drilling**

Drilling on the Cerro Casale property is discussed in Section 11 of this Report.

## **10.9 Bulk Density**

Bulk density determinations are discussed in Section 12 of this Report.

## **10.10 Petrology, Mineralogy and Other Research Studies**

A number of petrological, mineralogical, microscopy and fluid inclusion studies have been completed on areas within the Aldebarán Project. Petrological and mineralogical studies have primarily been completed to quantify mineralization for use in designing appropriate process routes for the Cerro Casale mineralization.

Microscopy studies were performed to analyze clay and chlorite components of mill feed. Modal analysis studies were performed on various mineralization types to determine mineral species locking and appropriate grind sizes.

Two theses have been completed on the Cerro Casale deposit as follows:

*Rivas, P. 1999: Geoquímica de cristales de oro del depósito Cerro Casale, Franja Maricunga, Norte de Chile: M.Sc. thesis, Department of Geology, Univ. de Chile, Santiago, Chile.*

*Sepulveda, F., 1999: Control de las variables intensivas y termodinámicas de los fluidos hidrotermales en la composición química del oro en el depósito Cerro Casale, Norte de Chile: M.Sc. thesis, Univ. de Chile, Santiago, Chile.*

The deposit has also been the subject of a number of published refereed papers and conference presentations.

### **10.11 Geotechnical and Hydrological Studies**

A number of geotechnical and hydrological studies have been completed in support of mining, feasibility, and environmental reports for Cerro Casale in the period 1997 to 2008. Work has included geotechnical assessment of infrastructure locations such as the proposed plant, waste dump and tailings sites, groundwater exploration, hydrogeological studies of the proposed Piedra Pómez well field and of Cerro Pampa in Pedernales, drainage assessments, and water and contaminant studies.

The geotechnical model for the Cerro Casale deposit is reasonably established, and is based on drill data, rock mass classification, and stability modeling carried out during the two previous feasibility studies in 1997 and 2000.

The hydrological model is based on drill data.

### **10.12 Exploration Potential**

Prior to cessation of regional exploration in 2000, CMC had outlined eight major prospects and deposits, one of which is Cerro Casale. These are more fully discussed in Section 7.4.

Exploration potential at Cerro Casale is primarily in the satellite bodies such as Cerro Roman, Eva, Jotabeche and other low-grade targets on the Aldebarán property. These prospects lack detailed geological knowledge and drilling.

At Cerro Roman, mineralization was primarily intersected in the upper 200 m of drilling. Typically the first 100 m are oxidation material and the next 50 m are mixed oxide and sulphide. The dimensions of the mineralized body are 700 m x 300 m x 200 m. The deposit is drilled on an irregular grid with a spacing of approximately 100 m x 200 m, totalling 8,556 m in 46 drill holes.

At Eva the mineralized body is about 500 m x 200 m x 100 m, defined by 44 drill holes (7,169 m). The mineralized body at Jotabeche is about 400 m x 200m x 100 m, defined by 22 drill holes (4,400 m).



Some exploration potential remains within the 2010 feasibility study pit design. Two drill holes from the 2009 geotechnical drill program returned significant gold grades outside of the area for which Mineral Resources are currently estimated.

## **11.0 DRILLING**

Drilling on the Project has been undertaken in a number of core and RC campaigns from 1989 to 2009 totalling 350 RC and core holes (149,703 m). No drilling on prospects or deposits other than Cerro Casale has occurred since 2000. A drill summary for the Cerro Casale deposit is included as Table 11-1. Drill hole collar locations, coded by program, are shown in Figure 11-1. The distribution of RC, core, and holes pre-collared by RC drilling and completed with core is shown in Figure 11-2.

Drill programs have been completed primarily by contract drill crew, supervised by geological staff of the Project operator at the time. Where programs are referred to by company name, that company was the Project manager at the time of drilling and was responsible for data collection.

RC drilling was used principally to test the shallow oxide portion of the deposit on the north side of Cerro Casale and to pre-collar deeper core holes. RC holes have a range in depth from 23 to 414 m and a mode of 100 m. The average RC hole depth is 187 m. Core holes range from 30 to 1,473 m in depth, with an average depth of 752 m and a mean and median depth of about 850 m. Core drilling was generally used to test mineralization at depths >200 m.

Drill hole spacing varies with depth. Drill hole spacing in shallow oxide mineralization is approximately 45 m. Average drill hole spacing in the core of the deposit at elevations between 3,700 and 4,000 m is about 75 m. Drill hole spacing increases with depth as the number of holes decrease and holes deviate apart. Average spacing at the base of the ultimate reserve pit is about 100 m.

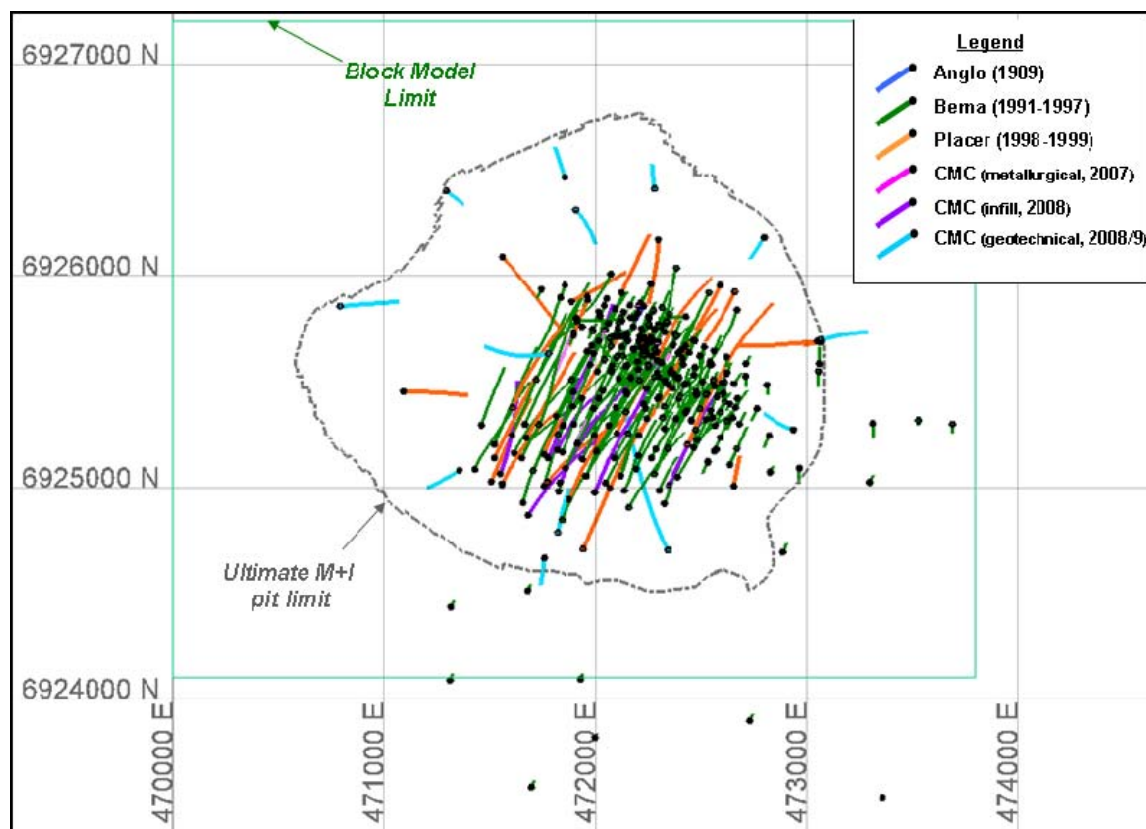
Most RC and core holes were drilled from the southwest to the northeast, and inclined at -60° to -70° to intersect the steeply south-dipping stockwork zones at the largest possible angle.

Examples of drilled width intersections with corresponding assay composite grades are included in the deposit cross-sections in Section 9 of this Report.

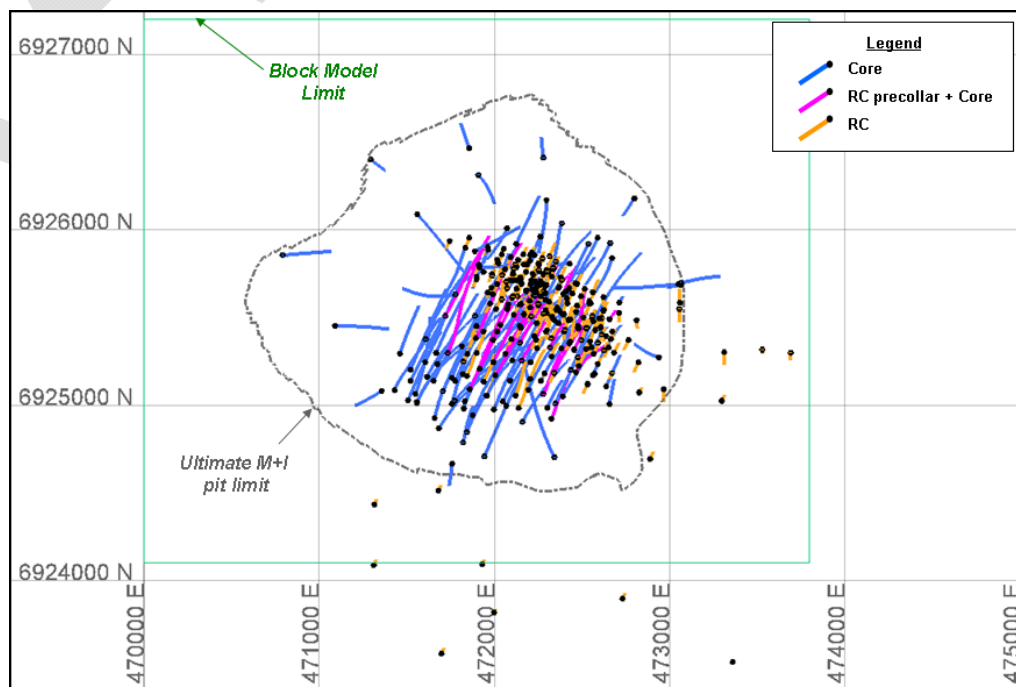
**Table 11-1: Drill Summary Table, Cerro Casale Deposit**

| Holes Drilled      |           |            |                | Drill Holes Excluded from Mineral Resource Estimate |               |                                                                        |                  |
|--------------------|-----------|------------|----------------|-----------------------------------------------------|---------------|------------------------------------------------------------------------|------------------|
| Company            | Type      | #          | Metres         | #                                                   | Metres        | Name                                                                   | Comment          |
| Anglo American     | Core      | 2          | 601            | 1                                                   | 301           | ALC002                                                                 | Location suspect |
| Bema Gold          | Core      | 61         | 43,615         | 9                                                   | 1,342         | CCD001, CCD002, CCD003, CCD004, CCD005, CCD006, CCD066, CCD084, CCD085 | No assays        |
| Bema Gold          | RC        | 182        | 33,062         | 1                                                   | 116           | CCC083                                                                 | Location suspect |
| Bema Gold          | RC + Core | 28         | 22,266         | 0                                                   |               |                                                                        |                  |
| Bema Gold          | RCD       | 15         | 3,860          | 1                                                   | 300           | CCC219                                                                 | Location suspect |
| Placer Dome        | Core      | 30         | 23,856         | 1                                                   | 167           | 98GT02                                                                 | Geotechnical     |
| Kinross 2007       | Core      | 12         | 7,890          | 12                                                  | 7,890         | All (DDH*)                                                             | Metallurgical    |
| CMC 2008           | Core      | 7          | 7,295          | 0                                                   |               |                                                                        |                  |
| CMC 2008-2009      | Core      | 13         | 7,257          | 13                                                  | 7,257         | All (GT08*, GT09*)                                                     | Geotechnical     |
| <b>Totals:</b>     | Core      | 125        | 90,514         | 36                                                  | 16,957        |                                                                        |                  |
|                    | RC        | 197        | 36,922         | 2                                                   | 416           |                                                                        |                  |
|                    | RC + Core | 28         | 22,266         |                                                     |               |                                                                        |                  |
| <b>Grand Total</b> |           | <b>350</b> | <b>149,703</b> | <b>38</b>                                           | <b>17,373</b> |                                                                        |                  |

**Figure 11-1: Cerro Casale Drill Hole Location Plan**



**Figure 11-2: Distribution of Drill Holes by Drill Type (plan)**



## 11.1 Drilling Methods and Equipment

Drill contractors and equipment used are summarized in Table 11-2.

All RC drilling was performed dry unless water injection became necessary to stabilize the drill hole. A large number of the RC holes drilled in 1995 and 1996 were pre-collar intervals for deeper core holes. The RC portions of these holes were sampled and assayed where mineralized.

Transport of core boxes to the core shed was done by personnel from the company that was managing the drill program, or the drilling supervisor. Core handling logs were completed that included details for all persons involved in any step during the logging and sampling procedures.

## 11.2 Geological Logging

Logging of RC drill cuttings and core, followed procedures first introduced by Bema Gold, modified somewhat by CMA, and later by Placer Dome. CMA used standard logging forms and entered information by hand on paper forms. These were transferred to database technicians in Copiapó where the information was transferred by hand to an electronic database. This practice was followed from 1991 to 1997.

Placer Dome geologists from 1998 to 2000 used an electronic Geolog<sup>®</sup> system (GLS) and entered logged information directly into a database. Geolog<sup>®</sup> was developed by International Geosystems Inc. and subsequently modified by Placer Dome. The integrity of database entries was investigated by Placer Dome using proprietary “Geocheck” software, which examined the database for unique codes, mismatching hole depths in collar files and overlapping “from” and “to” intervals.

CMC holes in 2007, 2008 and 2009 were logged onto standard paper logging forms. These data were entered into Excel<sup>®</sup> using validated fields and subsequently transferred digitally to Access<sup>®</sup>.

The basic logging framework of lithologies, alteration, mineralization, and stockwork veining was retained in each campaign. Only parameters to represent the intensity of attributes such as alteration and veining were modified. Ultimately, lithology and stockwork veining intensity were used as identification of ore controls for domains in resource estimation.

#### **11.2.1 RC Chip Logging**

CMA geologists logged cuttings from each 2 m interval at the drill site using a hand lens. Color, silicification argillization, chloritization, limonite, jarosite, manganese oxides, pyrite, stockwork intensity, and magnetite were logged in 1991 through 1995. Potassium feldspar alteration, biotite alteration, chalcopyrite, specularite, copper oxides, and hematite were added in 1995 and 1996. Sericite, bornite, chalcocite, enargite/sulfosalts, dolomite, anhydrite, barite, kaolinite, and igneous textures were added to the logging in 1996 and 1997.

Geologists also logged rock type, grain size, oxide/sulphide ratio, and the estimated percentage of fines and clays in the sample before washing.

All RC drill cuttings were re-logged with a binocular microscope by CMA in 1996 to improve the confidence in logging of oxide/sulphide ratio, oxidation state, rock type, stockwork intensity, and alteration type.

#### **11.2.2 Core Logging**

Between 1993 and 1997, CMA first photographed core at a core shack on site, then logged the core for geotechnical parameters and geology.

Placer Dome logged 1998 and 1999 core at site using Geolog<sup>®</sup>. Data entry integrity was checked by using Placer Dome’s Geocheck<sup>®</sup> subroutine, which examined the data for improper codes and mismatched intervals.



**Table 11-2: Drill Contractor Summary Table**

| Drill Contractor        | Years on Site             | Equipment                               | Drilling Method | Comment                                                                                                  |
|-------------------------|---------------------------|-----------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------|
| Harris y Cía.           | 1991                      | Schramm 685                             | RC              | face-return hammer bits                                                                                  |
| Geotec Boyles Brothers  | 1992, 1993                | CSR-1000<br>Ingersoll Rand<br>TH-75     | RC              | face-return hammer bits                                                                                  |
|                         | 1993                      | Joy 22                                  | Core            | NC (61 mm) core tools                                                                                    |
| Bachy-Franco Chileno    | 1994, part of<br>1995     | unknown                                 | RC              | tricone                                                                                                  |
| Terra Services          | 1995                      | Longyear Drilltech<br>D40K              | RC              | combination of hammer and tricone bits;<br>equipped with 5¼ inch (13.3 cm) and 5⅝ inch<br>(13.0 cm) bits |
| Geotech Boyles Brothers | 1995                      | Longyear 44,<br>Boytec Universal<br>650 |                 | triple tube HQ-3 (61 mm) and NQ-3 (45 mm),<br>conventional double tube HX (63 mm)                        |
| Connors Drilling        | 1996, 1997,<br>1998, 1999 | 40HH, 56A                               |                 | HQ, reduced as necessary to NQ                                                                           |
| Boart Longyear          | 2007, 2008, 2009          | 40HH                                    |                 | HQ-3                                                                                                     |

Placer Dome used the same geological codes as CMA. Major intervals of lithology, alteration, and stockwork intensity could not exceed 15 m (but could be repeated). Core was photographed both conventionally and digitally.

Placer Dome modified logging of stockwork intensity in 1998 by excluding gypsum veinlets in the estimation. This was done by selectively relogging core and RC cuttings from the central portion of the deposit and by incorporating results from detailed surface mapping. Veinlet stockwork intensity (minus gypsum veinlets) was combined with lithology to produce the final domains for resource estimation.

In 2007 and 2008, CMC contracted geologists from Sam S.A. to log the drill core. Drill core was photographed and logged at site. Logs were entered onto standardized paper forms and transferred to into Excel® format. Each geologist entered his or her log and locked the datasheet to prevent inadvertent changes. The Excel® logging forms were constructed as lists of validated fields in order to avoid entry errors and limit the codes that could be used.

Subsequently, the database administrator checked the logs, validated field entries and dates, and then digitally transferred the data into an Access® database that had the same format setup as the historical drill logs. Core was logged at a scale of 1:100 with a minimum logging interval of 0.2 m.

### **11.2.3 Geotechnical Logging**

Geotechnical logging prior to 1998 was performed only on select holes. Vector Engineering logged lithology, core recovery, rock quality description (RQD), joint frequency, joint condition, degree of breakage, degree of weathering and alteration, and hardness for holes CCD007, CCD008, CCD009, CCD011, CCD012, and CCD013. CMA personnel logged RQD, core recovery and fracture frequency for CCD062 to CCD088.

Placer Dome logged all 1998 and 1999 core for core recovery, degree of breakage, RQD, and magnetic susceptibility. Geotechnical holes GT-001 to GT-006 were also logged for degree of hardness, weathering, and alteration index, fracture conditions, joint conditions, number of fractures, and number of veins. Data were evaluated by Piteau Associates Engineering Ltd. (Piteau) to provide guidance for pit designs.

Geotechnical holes drilled by CMC in 2008 and 2009 were logged for rock type, core recovery, degree of breakage, rock quality designation (RQD), International Society for Rock Mechanics (ISRM) field hardness, weathering, alteration index, fracture conditions, joint conditions, number of fractures and number of veins. In addition, point load index (PLI) testing was conducted on site to determine unconfined compression strengths (UCS). Diametral and axial PLI tests were conducted at approximately 3 m and 10 m intervals, respectively.

Samples of core were sent to Mecánica de Rocas Ltda. (MDRL) for laboratory rock mechanics testing. Testing included 52 simple (without deformation) uniaxial compression tests, 44 simple triaxial tests, and 22 five-stage direct shear tests. Structural discontinuities were oriented using the Reflex<sup>®</sup> ACT core orientation system.

In addition, downhole acoustic and optical televiewer (ATV-OTV) surveys were conducted to obtain structural information. Data were again evaluated by Piteau to provide guidance for pit designs.

### **11.2.4 Metallurgical Logging and Sampling Practices**

Several metallurgical sampling campaigns were completed. In 2007, Kinross drilled 12 large diameter core (LDC) holes for provision of fresh core samples. Samples were logged by rock type, with logging codes reduced to six units (five for sulphide mineralization and one for oxide mineralization).

Intercepts were selected for dispatch of individual samples to various test laboratories for providing measurements of grinding parameters, flotation behaviour, mineralogical characterization, high pressure grinding roll data, dewatering equipment sizing

parameters, rheological characteristics, SART circuit design, as well as column cyanide leach testwork for the oxide material.

### **11.3 Core and RC Recovery**

Core recovery and RC sample weights were not discussed in the 2000 feasibility study. Core recovery values and RC sample weights were not routinely added to the digital drill hole database. However, drilling contracts required in excess of 90% recovery for payment.

MRDI (1997a) reviewed RC sample weights for holes drilled through 1996 and found no relationship between copper grades and recovery. Similarly, gold showed no relationship to recovery in oxide intervals. The average grade of gold in sulphide mineralization, however, increases with recovery below 75%. The number of samples (654) of sulphide mineralization with less than 75% recovery is approximately 3% of the RC sample intervals; therefore, this bias does not materially affect resource estimates.

AMEC (2005) randomly inspected drill logs and noted generally high core recoveries (>95%) in mineralized intervals. Core randomly inspected in both Placer Dome and CMA core storage facilities at the Project site showed high recoveries and infrequent intervals of broken core.

### **11.4 Drill Hole Collar Surveys**

Drill hole collars are clearly marked with rebar or wooden posts cemented in the top of the hole, with metal drill hole identification tags. Markers for a moderate number of holes were destroyed by construction of additional drill roads on steep hillsides after the original holes were surveyed. Contreras Topografía Limitada surveyed each hole from 1993 to April 1996 using a theodolite. CMA acquired a Wild T2 theodolite and Wild D13000 laser distance meter in 1996 and surveyed the remaining hole collars. The survey reference datum is the 1956 Preliminary South American Ellipsoid (PSAD56) and the Canoa datum. Control was extended by third-order triangulation from a Chilean military post 15 km south of the Project.

CMA acquired an Ashtech SCA12, geodetic-grade GPS in 1993, and used this to survey drill holes and roads. All holes after CC221 and DD043 were surveyed with this GPS.

MRDI (1997b) checked all drill collar coordinates and elevations against their plotted position on topography and found no drill holes with discrepancies greater than the accuracy of the topographic survey.

Placer Dome surveyed holes drilled in 1998 and 1999 with a GPS, but there is no record as to whether the GPS was a geodetic-grade instrument or a less accurate GPS unit.

In August 2008, EGV Geomensura was subcontracted by Geovectra to independently survey all of the drill hole collars available in the project. They surveyed 183 drill hole collars and observed a global offset for all the collars of approximately 40 m as consistent with the global discrepancy in the overall topographic base. In addition to the global offset of the 183 drill collars that were resurveyed, nine holes showed a difference >1 m relative to their original survey coordinates. All but two of these drill holes were resurveyed in 2009.

In early 2009, all data were converted to the WGS-84 coordinate system. To ensure accuracy, Geocen was contracted to resurvey the drill collars, and was able to locate and resurvey 223 drill holes. The location of these drill holes provided the basis for a new transformation formula that was used to transfer the coordinates of the remaining 142 drill holes that could not be located due to disturbance from drill access road construction. Of the nine holes showing a discrepancy in the 2008 survey, only two were not resurveyed in 2009.

The drill hole survey coordinates used in this Report and to generate the mineral resource and mineral reserve estimates are the corrected WGS-84 survey coordinates.

## **11.5 Downhole Surveys**

Downhole survey data are summarized in Table 11-4. Declination corrections were applied to the downhole survey data as required.

## **11.6 Geotechnical Drilling**

About 28 geotechnical and hydrological drill holes have been completed. Holes were drilled in the period 1995 to 1999, and in 2009 to provide raw data for the hydrological and geotechnical portions of the 2010 feasibility study.

To increase the confidence level of the design criteria for ultimate slopes to current feasibility-level standards, CMC and Piteau undertook a supplementary geotechnical and hydrogeological investigation program in 2008–2009. The completed program



included 13 diamond drillholes, totalling 7,257 m that were distributed around the periphery of the proposed ultimate pit.

**Table 11-3: Downhole Survey Data**

| Year | Survey Company                     | Instrument                        | Comment                                                      |
|------|------------------------------------|-----------------------------------|--------------------------------------------------------------|
| 1993 |                                    |                                   | Drill holes not originally surveyed                          |
| 1994 |                                    |                                   | Drill holes not originally surveyed                          |
| 1995 | unknown                            | Tropari®,                         | Accessible holes checked using Sperry Sun® multi-shot camera |
| 1996 | unknown                            | Tropari®                          | Accessible holes checked using Sperry Sun® multi-shot camera |
|      | Silver State Surveys, Elko, Nevada | north-seeking gyroscope           | 46 accessible holes checked                                  |
| 1997 | Silver State Surveys, Elko, Nevada | north-seeking gyroscope           |                                                              |
|      | Comprobe Surveys, Santiago         | north-seeking gyroscope           |                                                              |
|      | Connors Drilling                   | Sperry Sun® single shot camera    | 6 holes surveyed                                             |
| 1998 | Comprobe Surveys, Santiago         | gyroscope                         |                                                              |
| 1999 | Comprobe Surveys, Santiago         | gyroscope                         |                                                              |
| 2007 | Comprobe Surveys, Santiago         | digital gyroscopic down-hole tool | 25% of metallurgical program holes surveyed                  |
| 2008 | Comprobe Surveys, Santiago         | digital gyroscopic down-hole tool |                                                              |
| 2009 | Comprobe Surveys, Santiago         | digital gyroscopic down-hole tool |                                                              |

The drilling program was initiated on September 24, 2008, but was suspended on October 10, 2008 pending resolution of issues related to environmental permitting. The drilling program resumed on April 22, 2009 and was completed on July 9, 2009.

Deviation, acoustical and optical televiewer (ATV/OTV) surveys were conducted by Comprobe Ltda. (Comprobe) in each hole. In addition, core was oriented using the ACT® core orientation system to obtain structural fabric information. All core was geomechanically logged in detail to evaluate rock mass competency, strength and variability. A limited amount of surface structural fabric mapping was already available from Piteau's 1996 and 1998/1999 field programs, and additional mapping that targeted outcrops and road cuts in the vicinity of new geotechnical boreholes was conducted during the 2008 field campaign. Point Load Index (PLI) testing was conducted in the field at regular intervals in the geotechnical cores to help evaluate intact rock strength.

The bulk of the geomechanical core logging, core orientation, and PLI testing were conducted by geotechnicians contracted by South American Management S.A. (SAMSA). These personnel were trained and supervised by Piteau field engineers who were on-site on a rotational basis throughout the drilling program. SAMSA geology and support personnel also provided logistical and technical support throughout the field program, and compiled lithologic logs of all geotechnical drillholes.

Packer testing was conducted by Piteau in the geotechnical drillholes to obtain data on in-situ hydraulic conductivity of the rock mass. Vibrating wire piezometers were

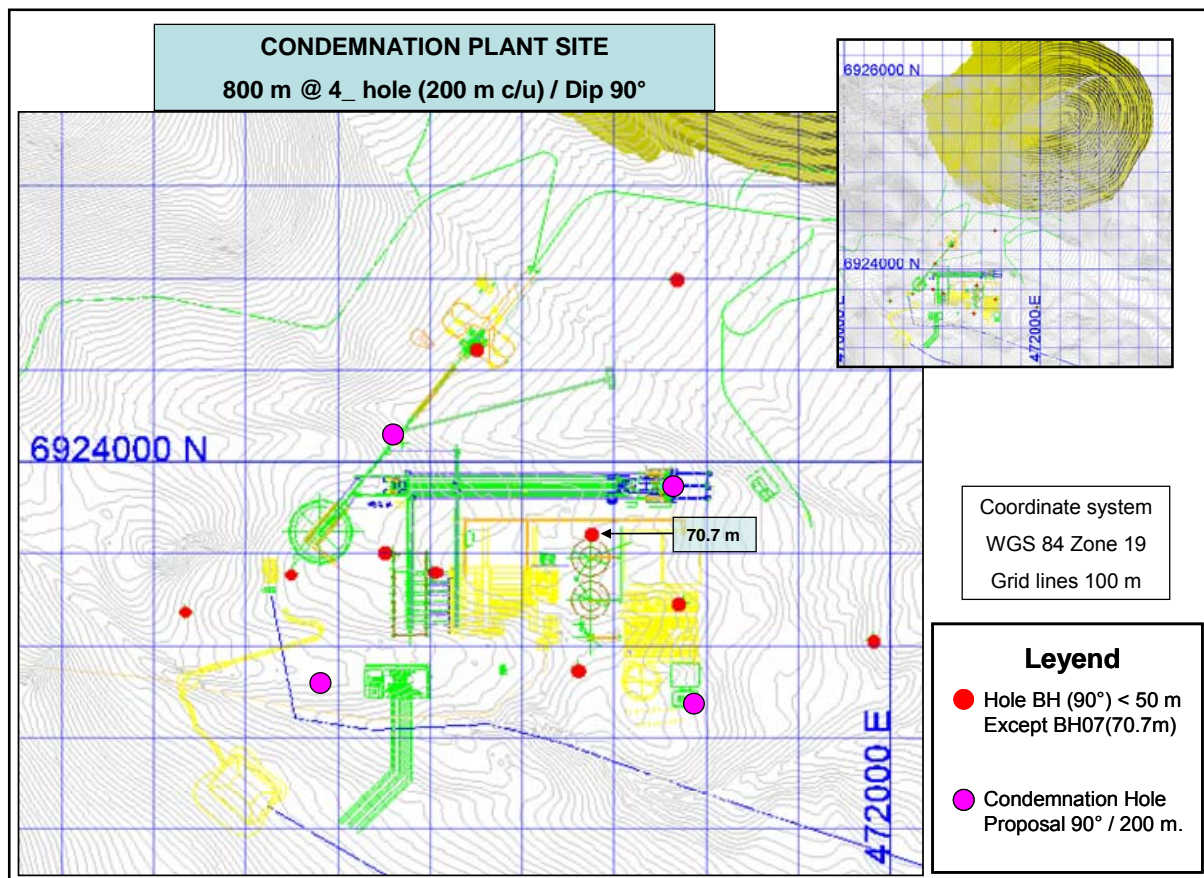


installed in each geotechnical drill hole. Piezometric pressures in all piezometers were monitored throughout the field program by Piteau staff.

## 11.7 Condemnation Drilling

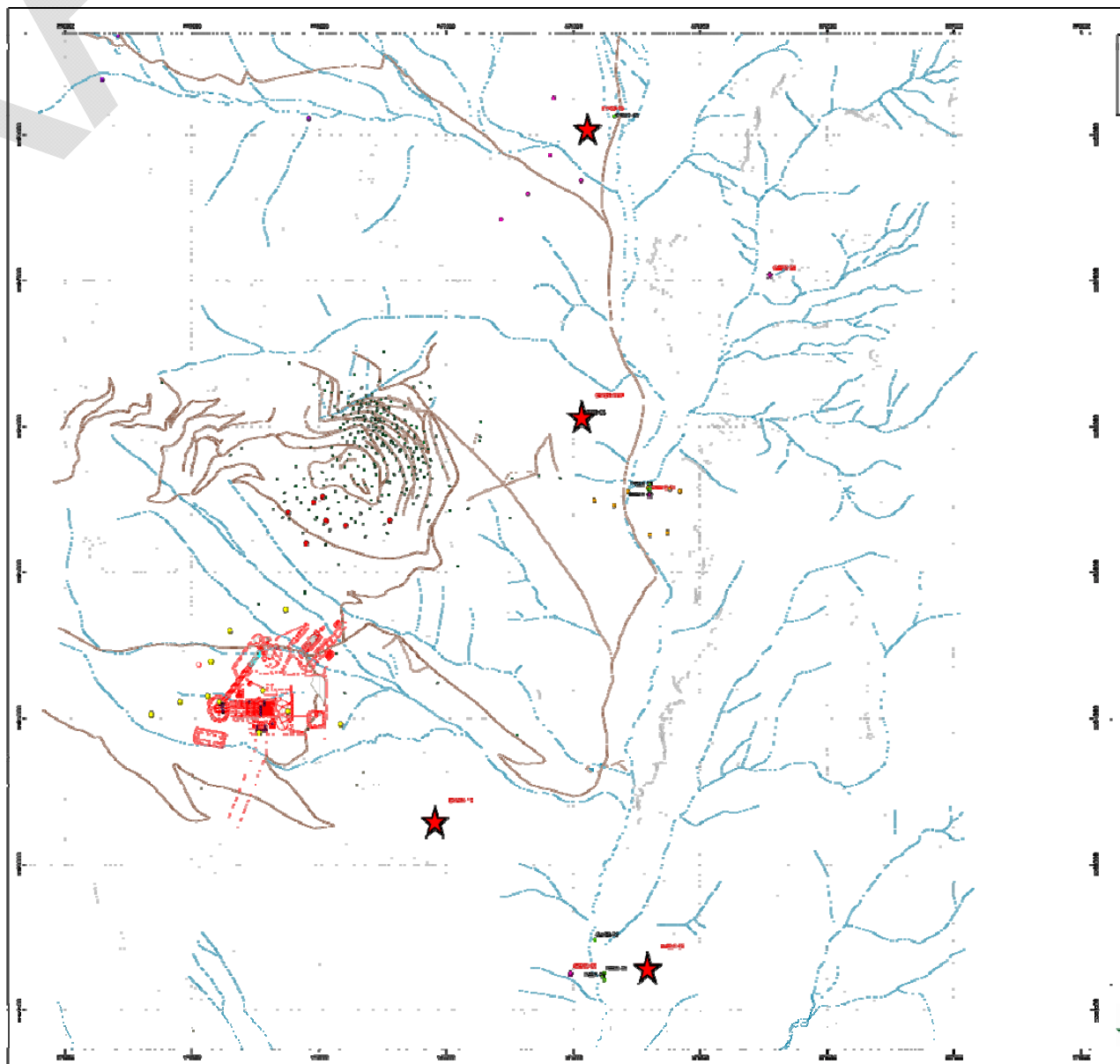
The 2009 condemnation drill program tested two main areas, the plant and the waste dump site. In the plant site area, 785.8 m of diamond drilling was completed in four vertical holes. In the dump area, three 250 m deep reverse circulation holes and one 220 m deep RC hole were drilled. No significant Au, Ag, or Cu results were returned from any of these drill holes. Drill hole locations for these holes are included as Figure 11-4 and Figure 11-5.

**Figure 11-3: Condemnation Drilling in the Proposed Plant Site Area**





**Figure 11-4: Condemnation Drilling in the Proposed Dump Site Area**



## 11.8 Comment on Drill Programs

Figures 7-3, 7-4, 9-1, 9-2 and 9-3 are drill sections, oriented northwest, through the thicker portion of the deposit at 675 E and 850E. On these sections, the bulk, low-grade nature of the deposit is well illustrated. Figure 9-5 and Figure 9-6 display the association of higher gold and copper grades with alteration intensity.

The sections also display typical drill hole orientations for the deposits, show summary assay values using colour ranges for assay intervals that include areas of non-mineralized and very low grade mineralization, and outline areas where higher-grade intercepts can be identified within lower-grade sections. The sections confirm that sampling is representative of the gold and copper grades in the deposits, reflecting areas of higher and lower grades.

Drill orientations at Cerro Casale are appropriate for the mineralization style, and have been drilled at orientations that are optimal for the orientation of mineralization for the bulk of the deposit area. Drill orientations are shown in the above sections, and can be seen to appropriately test the mineralization. Depending on the dip of the drill hole, and the dip of the mineralization, drill intercept widths are typically greater than true widths.

Figure 11-1 displays the locations of the drill holes within the Cerro Casale deposit. The size of the sampled area is representative of the distribution and orientation of the mineralization. No factors were identified with the data collection from the drill programs that could affect mineral resource or mineral reserve estimation for the Cerro Casale deposit.

## **12.0 SAMPLING METHOD AND APPROACH**

As regional exploration data such as geochemical and trench data are not used to support the mineral resource estimation at Cerro Casale, sampling methods and approaches for these data are not discussed.

All collection, splitting, and bagging of RC and core samples were carried out by Placer Dome, CMA, or CMC personnel.

### **12.1.1 RC Drill Sampling**

A variety of sample collection equipment and procedures were used. Drilling was done dry unless water injection was necessary for hole-conditioning. From 1991 to 1995, a double cyclone system was used. A primary sample was obtained by running the discharge from the primary cyclone through a Gilson splitter. The discharge from the secondary cyclone was then added to the primary sample using the same Gilson splitter. One discharge hopper on the Gilson splitter was then split again until a final sample from 4 kg to 6 kg was obtained. This sample was placed in a numbered plastic bag and designated for assay or for a metallurgical split. Metallurgical splits were stored in Copiapó.

RC drilling in 1996 and 1997 used a single cyclone and a Gilson splitter. Final sample weight was 4 kg to 6 kg.

Two metre sample intervals were used in 1991 to 1994, which resulted in sample intervals crossing rod changes when Imperial 20 ft drill rods were used, or matching intervals when 6 m drill rods were used. After 1994, 5 ft sample intervals were used with 20 ft drill rods, and 2 m intervals were used with 6 m drill rods.

CMA measured weight recovery based on the final sample weight and number of splits.

A rotary wet splitter was used when water injection was required because of perched water zones or hole conditions. The rotary splitter was adjusted to produce a 4 kg to 6 kg final sample, which was discharged into a porous, olefin bag. MRDI (1997b) noted that <1% of samples were collected wet. Weight recovery was not measured for wet samples.

### **12.1.2 Core Sampling**

Core drilled in 1993 (6 holes) was obtained for metallurgical sampling and was not assayed for resource estimation. Cores drilled in 1995 and early 1996 (11 holes) were placed in covered, wooden boxes at the drill rig by CMA personnel and moved to a

covered, secure logging facility at the project camp. Core was logged and marked into 2 m lengths for sampling. Select samples approximately 5 cm long were removed for density measurements.

Core obtained in 1995 and 1997 by Bema was cut in  $\frac{2}{3}$  and  $\frac{1}{3}$  portions with a diamond saw. The  $\frac{2}{3}$  portion was placed in double plastic bags with a stapled sample number ticket and then sent by truck to Bondar Clegg (now ALS Chemex) in Copiapó for preparation. Samples were delivered to Copiapó two to three times per week. Samples weighed from 12 kg to 14 kg. The  $\frac{1}{3}$  portion was retained in wood core boxes for reference. AMEC inspected these cores at the camp and found them to be in good condition on organized core racks and with appropriate, permanent labelling.

These procedures were continued for the remainder of CMA core drilling in 1996 and 1997; except that core was transported in open boxes to the camp logging and cutting facility.

Placer Dome used similar procedures for core drilled in 1998 and 1999. Core was delivered to a core and storage facility at the project camp in covered, wooden boxes. The core was marked in 2 m intervals after being photographed and logged, and then was cut in half with a diamond saw. One half-core was sent to Bondar Clegg in Copiapó for sample preparation and assaying. The other half was used as metallurgical samples or retained in the original core box. A majority of second splits of mineralized intervals in 1998 and 1999 core was sent as metallurgical samples and hence was not available for reference. Core transport and shipment of samples to Bondar Clegg was done by Placer Dome personnel.

Core from the 2008 infill drilling and 2009 geotechnical drilling programs was sampled systematically at 2 m intervals. Core was delivered to the onsite core and storage facility at the project camp in covered wooden or metal core boxes. The core was marked in 2 m intervals after being photographed and logged, and then sawed in half lengthwise with a diamond saw. One half was sent to Acme Analytical in Santiago for sample preparation and assaying. The other half was retained in the original core box. Intermittent duplicate samples were cut from the remaining half-core (half of the half), similarly sawed lengthwise and submitted blindly to the laboratory.

## **12.2 Bulk Density/Specific Gravity**

Measurements of bulk density were carried out during the 1995 and 1996 core drilling campaign by E.C. Rowe and Associates using American Standard Testing Materials (ASTM) Method C97 (MRDI 1997a), Kappes, Cassiday and Associates (KCA) using the natural density method on non-sealed samples during the 1996 and 1997 deep sulphide core drilling campaign, and by Placer Dome in 1998 using water-immersion

techniques. In 2008, an additional 771 density measurements were obtained by Geovectra using the ASTM C97 procedure to validate the earlier work.

A total of 1,815 density measurements have been obtained from drill core of mineralized and waste units. Density values used in block modelling are summarized in Table 12-1.

**Table 12-1: Density Values Assigned in the Block Model**

| Definition                           | Variables in the Block Model |        |        |      |
|--------------------------------------|------------------------------|--------|--------|------|
|                                      | UG                           | S_MINE | S_LITO | SG   |
| Catalina Breccia – Mixed or Sulphide | 1                            |        |        | 2.57 |
| Catalina Breccia – Oxide             | 1                            | 1      |        | 2.54 |
| Breccia – Oxide                      | 2                            | 1      |        | 2.44 |
| Breccia – Mixed                      | 2                            | 2      |        | 2.44 |
| Breccia – Sulphide                   | 2                            | 3      |        | 2.61 |
| Altered Intrusive – Oxide            | 3                            | 1      |        | 2.46 |
| Altered Intrusive – Mixed            | 3                            | 2      |        | 2.48 |
| Altered Intrusive – Sulphide         | 3                            | 3      |        | 2.63 |
| Fresh Intrusive – Oxide              | 4                            | 1      |        | 2.44 |
| Fresh Intrusive – Mixed              | 4                            | 2      |        | 2.52 |
| Fresh Intrusive – Sulphide           | 4                            | 3      |        | 2.55 |
| Altered Volcanic – Oxide             | 5                            | 1      |        | 2.43 |
| Altered Volcanic – Mixed             | 5                            | 2      |        | 2.43 |
| Altered Volcanic – Sulphide          | 5                            | 3      |        | 2.67 |
| Altered Mafic Flows – Sulphide       | 5                            | 3      | 6      | 2.81 |
| Fresh Volcanic – Oxide               | 6                            | 1      |        | 2.36 |
| Fresh Volcanic – Mixed               | 6                            | 2      |        | 2.36 |
| Fresh Volcanic – Sulphide            | 6                            | 3      |        | 2.57 |
| Fresh Mafic Flows – Sulphide         | 6                            | 3      | 6      | 2.82 |

Note: UG = Domain number; S\_MINE = level of oxidation where 1 = oxide, 2 = mixed, 3 = sulphide; S\_LITO = lithology code, where 6 = Mafic Flows

### 12.3 Comment on Sampling

All collection, splitting, and bagging of RC and core samples were carried out by either CMA or CMC personnel.

Sampling has been performed using industry standard methods, and undertaken in accordance with industry standard practices. The sampling has been undertaken over a sufficient area to determine deposit limits, and the data collected adequately reflects deposit dimensions, true widths of mineralization, and the style of deposit. The samples are representative of the mineralization, and respect the geology of the deposit.

No sampling bias has been identified in any of the drill programs. The QP is not aware of any drilling, sampling or recovery factors that could materially impact the accuracy and reliability of the analytical results based on the sampling programs.

The sample intervals are considered to be adequately representative of the true thicknesses of mineralization and are considered to be adequate for use in mineral resource and mineral reserve estimation.

Drill sample representivity, widths and grades are validated by twin and infill drilling as discussed in Sections 11 and 14.

A description of the geology and mineralization of the deposit, which includes lithologies, geological controls and widths of mineralized zones, is given in Section 7 and Section 9.

A description of the sampling methods, location, type, nature, and spacing of samples collected on the Project is included in Section 10 and Section 12.

A description of the drilling programs, including sampling and recovery factors, are included in Section 11 and Section 12.

## **13.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY**

### **13.1 Laboratories**

All laboratories used for sample preparation and analysis of samples from the Cerro Casale deposit have been independent of Project operators. No sample preparation has been undertaken by any of the joint venture partners or operating companies, with the exception of the period 1998 to 2000, when some check assays were performed by Placer Dome's internal research laboratory.

At the time of analysis and preparation in the early 1990s, the certifications held by the Chilean operations of Bondar Clegg Laboratories (Bondar Clegg) and SGS Laboratories (SGS), and by Monitor Geochemical Laboratory (Monitor) are unknown. Later in the decade, the Chilean laboratories of Bondar Clegg and SGS held ISO-9000 certification, and have subsequently achieved ISO-17025 certification. Acme Laboratories (Acme) is ISO-9000 certified. Bondar Clegg was purchased by ALS Chemex in late 2001.

Table 13-1 summarizes the laboratories used for the various exploration and drilling programs.

### **13.2 Sample Preparation**

#### **13.2.1 RC Samples**

RC samples submitted to analytical facilities (after sub-sampling) were approximately 4 kg to 6 kg for all drilling campaigns.

RC samples collected in 1991 to 1994 were sent to Bondar Clegg in Copiapó for preparation. Bondar Clegg dried each sample, and then crushed the entire sample in a Links mill to between -60 and -80  $\mu\text{m}$ . A 150 g split obtained from a riffle splitter was pulverized to 100% passing 150  $\mu\text{m}$  in a Tema mill. Assaying of sample pulps was done by Monitor.

In 1995, RC samples were shipped to Acme in Santiago where the entire sample was dried and weighed prior to being crushed to -10  $\mu\text{m}$ . Specifications for the crushing are not documented. A 1 kg split was pulverized to -150  $\mu\text{m}$  in a ring and puck mill. Specifications for percent passing 150  $\mu\text{m}$  are not documented. Acme performed the assays in Santiago.



**Table 13-1: Analytical Laboratories**

| Year of Drill Program | Type | Preparation                                                                                                     | Assays                                       |
|-----------------------|------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 1991 – 1994           | RC   | Bondar Clegg Laboratories, Copiapó, Chile                                                                       | Monitor Geochemical Laboratory, Elko, Nevada |
| 1995                  | RC   | Acme Laboratories, Santiago, Chile                                                                              | Acme Laboratories, Santiago, Chile           |
| 1996 – 1997           | RC   | Bondar Clegg Laboratories, Copiapó, Chile (61% of samples)<br>SGS Laboratories, Copiapó, Chile (39% of samples) | Acme Laboratories, Santiago, Chile           |
| 1996 – 1997           | Core | Bondar Clegg Laboratories, Copiapó, Chile (80% of samples)<br>SGS Laboratories, Copiapó, Chile (20% of samples) | Acme Laboratories, Santiago, Chile           |
| 1998                  | Core | Bondar Clegg Laboratories, Copiapó, Chile                                                                       | Acme Laboratories, Santiago, Chile           |
| 1999                  | Core | Bondar Clegg Laboratories, Copiapó, Chile                                                                       | Bondar Clegg Laboratories, La Serena, Chile  |
| 2007                  | Core | Acme Laboratories, Santiago, Chile                                                                              | Acme Laboratories, Santiago, Chile           |
| 2008                  | Core | Acme Laboratories, Santiago, Chile                                                                              | Acme Laboratories, Santiago, Chile           |
| 2009                  | Core | Acme Laboratories, Santiago, Chile                                                                              | Acme Laboratories, Santiago, Chile           |

In 1996 and 1997, RC samples were delivered to either Bondar Clegg or SGS in Copiapó for preparation. Bondar Clegg was the principal preparation laboratory and SGS handled overflow work (39% of the samples).

All the samples were dried and weighed then crushed in a Rhino jaw crusher to -10 µm. The percent passing this specification is not known. One kilogram of material was pulverized to -140 µm in a ring and puck mill. This product was blended and split into four 200 g samples. Three pulps were stored and one was sent to Acme for assay.

### 13.2.2 Core Samples

CMA and Placer Dome sampled core on nominal 2 m intervals, making a 12 to 14 kg sample for the CMA core ( $\frac{2}{3}$  core) and a 9 to 12 kg sample for the Placer Dome core ( $\frac{1}{2}$  core).

Core samples from drilling in 1995 and 1996 were shipped to Bondar Clegg in Copiapó. The entire sample was weighed, dried, and crushed to -10 µm in a Rhino jaw crusher. The entire sample was then further crushed in 1 kg batches to -80 µm in a 1.5 kg ring and puck pulverizer. These were homogenized and then a 250 g split was obtained with a riffle splitter. This split was pulverized to -150 µm in a smaller ring and puck mill. Specifications for percent passing each mesh size are not documented. Standards and duplicates were prepared by Bondar Clegg personnel and were included in shipments of pulps to Acme.

In 1996 and 1997, core samples were prepared by Bondar Clegg or SGS in Copiapó. SGS handled overflow (about 20% of core samples). Samples were crushed to -10 µm in a Rhino jaw crusher, blended, and split to 1 kg. The split was pulverized to -140 µm in a 1.5 kg capacity ring and puck mill. Four samples of 200 g each were split

from the pulp. One pulp was sent to Acme for assay. The other three pulps were stored in Copiapó at CMA facilities.

Placer Dome core samples in 1998 were prepared at Bondar Clegg in Copiapó. The entire sample was weighed on an electronic scale and dried at 100°C to 120°C. The entire sample was then crushed to 100% passing 10 µm in a Rhino jaw crusher. The entire sample was crushed in 1 kg lots to 100% passing 80 µm in an LM-2 ring and puck pulverizer. The samples were homogenized and split to 260 g using a riffle splitter. The final split was pulverized to -160 µm in a LM-2 ring and puck mill. Reject was stored. Pulps were sent to Acme for assay.

In 1999, Bondar Clegg prepared samples in Copiapó and sent pulps for assay at their facility in La Serena. Sample preparation consisted of drying the entire sample at 60°C, then crushing it to 75% passing 10 µm in a Rhino jaw crusher. A 1 kg split was then obtained using a Jones riffle splitter. This was pulverized to 95% passing 150 µm in a LM-2 ring and puck mill. Two pulps of approximately 250 g each were split from the pulp. One pulp was sent for assay, the other pulp was stored.

With the exception of core preparation in 1999, the methods for contamination control in sample preparation are not documented. In 1999, it is reported that the preparation laboratory cleaned the jaw crusher and ring and puck pulverizer with compressed air between each sample and with quartz after every 10 samples. Sieve specifications were checked every 20<sup>th</sup> sample. However, assays of blanks for the eight core holes drilled in 1999 show evidence of contamination.

Sample preparation protocols generally conform to industry standard practices although the final sample aliquot for RC samples in 1991 to 1994 (150 g) is very small for a gold deposit. A review of assay QA/QC by MRDI (1997a) shows that in this period the precision was worse than subsequent years when a larger sample pulp was prepared. This affected 86 shallow RC holes. The subsequent protocol of crushing of at least 1 kg to -150 µm is more appropriate.

For the 2007 and 2008 drilling campaigns CMC personnel collected the samples. Core was sawed in half lengthwise, sampled by CMC personnel on site, and shipped in sealed, double, olefin bags to Acme in Santiago for preparation. Sample preparation consisted of drying the entire sample at 60°C and crushing all to -10 mesh in a standard jaw-crusher. The entire -10 mesh sample was riffle-split down to a 500 kg split, which was pulverized in counter-rotation ("Bikotype") steel disk pulverizer, to 95% -150 mesh. This 500 g pulp was homogenized and split to produce a 200 g pulp which was saved in a single envelope, and the analytical splits were taken from this 200 g envelope. Both pulps and rejects were recovered from the laboratory. The preparation procedures conform to industry standard practices.

### 13.2.3 Assaying

Monitor performed assays of RC samples in the period 1991–1994. Gold and silver were determined by fire assay (FA) with a one assay-ton (29.166 g) sample and gravimetric finish. Copper assays were completed on an unspecified sample weight (possibly 1 g) with atomic absorption spectrometry (AA) after an aqua regia digestion. Detection limits are not documented, although the gold and silver fire assay method should have a lower detection limit of  $\geq 0.02$  g/t Au.

Acme Laboratories in Santiago performed assays from 1995 to 1998. Gold was determined on a one assay-ton sample by FA with an AA finish. Samples exceeding 3 g/t Au were re-assayed with a gravimetric finish. Gravimetric results were reported to CMA for samples re-assayed after initial AA analyses. Copper and silver were determined by AA after an aqua regia digestion of a 1 g sample. The lower detection limit for Au was 0.01 g/t.

Gold was determined by Bondar Clegg during 1999, using FA of a one assay-ton sample with an AA finish. Copper and silver was determined by AA after aqua regia digestion of 1 g of pulp. The lower detection limit for gold was 0.01 g/t.

Assays from the metallurgical drill campaign in 2007, the infill drilling campaign in 2008, and the 2009 geotechnical campaign were analyzed by Acme in Santiago. Gold was determined on a one assay-ton sample by FA with an AA finish. Silver was analyzed by AA after digestion of a 0.5 g sample in 10 ml of aqua regia solution. Copper was analyzed by AA after aqua regia digestion of a 1 g sample in 100 ml of solution. Cyanide soluble gold and copper were analyzed by AA. An additional quantitative ICP analysis (1DX) was used to determine levels of other elements from the metallurgical and infill programs, including determination of Mo, Cu, Pb, Zn, Ag, Ni, Co, Mn, Fe, As, U, Au, Th, Sr, Cd, Sb, Bi, V, Ca, P, La, Cr, Mg, Ba, Ti, B, Al, Na, K, W, Hg, Sc, Tl, S, Ga, Se). Additional 1DX analysis of 8 m composites from the geotechnical holes is proposed for 2009–2010.

## 13.3 Assay Quality Assurance and Quality Control

### 13.3.1 RC Programs

Duplicate samples and geochemical certified reference materials (CRMs) have been inserted into the sample series since the inception of CMA's RC drill programs in 1993. The number of quality assurance and quality control (QA/QC) samples and the submittal procedures varied by program.

Approximately one in ten samples submitted to laboratories for drill holes CCC001 to CCC086 were control samples (one CRM and one rig duplicate per run of 20).

From 1991 to 1994 (86 holes or 25% of drilling), Monitor inserted CRMs internally and CMA submitted RC rig duplicates for second analyses. From 1994 on, CRMs and duplicates were added to sample shipments at the sample preparation facilities in Copiapó and arrived blind to the analytical laboratory. Drill holes CCC087 to CCC224 contained one CRM or blank, and one duplicate per 15 samples. Preparation and assaying were handled by the same laboratory for drill holes CCC087 to CCC184.

Although Acme ultimately inserted the QA/QC samples into the sample stream, the laboratory was unaware of which of four CRMs or blanks was being utilized at any time. Duplicate samples were inserted at site and therefore were blind to Acme. All CRMs, duplicates, and blanks were inserted by CMA personnel in Copiapó for drill holes CCC185 to CCC224 and were therefore blind to Acme. In all cases, the QA/QC samples were submitted either at random within a specific number of samples, or at specific intervals based on meterage.

### 13.3.2 Core Programs

Core holes CCD001 to CCD006 were not assayed, but were evaluated as metallurgical samples. All subsequent drill core programs were subject to QA/QC procedures. Approximately one in 10 samples was submitted for QA/QC for drill holes CCD007 to CCD017 (one CRM and one duplicate per 20 samples). Two sample tags were attached to the sample intended for duplication as a guideline for the preparation facilities and CMA provided the CRM and blank. All QA/QC samples arrived at the analytical laboratory blind, as they were inserted into the sample stream by the preparation facility in Copiapó.

Sample streams for drill holes CCD018 to CCD088 contained one CRM and one duplicate per 15 samples, and one in 40 samples was a field blank. Duplicates were identified to the preparation facility by attaching two sample tags to one sample bag. CMA personnel inserted the field blanks and CRMs into the sample stream. The blanks were inserted before preparation, but the CRMs were inserted after CMA received all prepared samples from the preparation facility. The location of the QA/QC samples within the sample series remained hidden from the analytical laboratory. In all cases, the QA/QC samples were submitted either at random within a specific number of samples or at specific intervals based on meterage.

Three QA/QC samples (one blank, one CRM, and one duplicate) were inserted on site by Placer Dome personnel in each batch of 20 samples for drill holes CCD089 to CCD103 and holes GT-001 and GT-002. The control samples were inserted on a random basis within the sample batch. Drill holes CCD104 to CCD111 and GT-003 to GT-004 received two CRMs, two duplicates, and two blanks for each batch of 40

samples. As before, the QA/QC samples were submitted on site in random order by Placer Dome personnel.

For the 2007 and 2008 drilling campaigns, CRMs were inserted every 12 samples, and duplicates and blanks were inserted every 20 samples.

### **13.3.3 Standards**

CMA prepared CRMs and blanks and submitted them routinely in the sample stream with an insertion rate of 3.6% to 11.6%. Acme's performance on inserted CRMs can be characterized as good; there is no significant drift over time.

For the 2008 infill drilling campaign, four CRMs were purchased from CDN Laboratories (CDN) of Vancouver and inserted along with duplicates and blanks into the stream of routine drill samples. The CRMs are certified for gold and copper, but not for silver.

### **13.3.4 Blanks**

Field blanks, consisting of coarse gravel-sized, non-mineralized crushed rock were inserted into the sample stream at the Cerro Casale site during the period 1991 to 1997. These field blanks were blind to the assay laboratory, and were subjected to the entire sample preparation and analytical procedure.

The blanks used in the 1998 and 1998 QA/QC programs were of two types. One was a prepared blank and the other was a field blank of unmineralized volcanic rock obtained from exposures south of the project area.

Material submitted for analysis of blanks during the infill campaign in 2008 was collected from an outcrop of rhyodacite tuff with weak illite-smectite alteration and patchy, fine sericite, located south of the Carrizalillo and San Miguelito hills, in the Quebrada Carrizalillo.

For the geotechnical drill program completed in 2009, blanks were obtained from an outcrop of Pascua Granite (blank used at Pascua). Two blanks were inserted for every 69 assay samples.

## **13.4 Databases**

Database data entry utilized a variety of techniques and procedures to check the integrity of the data entered. During the 1991 to 1993 period, geological data were entered into spreadsheets in a single pass by CMA personnel in Copiapó. The 1994

geological information were entered twice and corrected by MRDI in San Mateo, California. CMA staff in Copiapó used dual entry of data in 1995 to 1997. Placer Dome converted all databases to Geolog<sup>®</sup> format and then entered all geological logs directly into this system without generating a paper log.

With the exception of one period of drilling, assays were received electronically from the laboratories and imported directly into drill hole database spreadsheets. Historical databases include detailed geological and geotechnical logging, assays and density measurements. The data are stored in CMC's Copiapó office.

The historical database (1989 to 1999) is maintained in an Access<sup>®</sup> database. Data from the 2007 metallurgical drill program, the 2008 infill drill program, and the 2009 geotechnical program were entered into separate Access<sup>®</sup> databases. Logging from the 2007, 2008 and 2009 programs was entered directly into Excel<sup>®</sup> spreadsheets, validated and subsequently imported to Access<sup>®</sup>. Assay results were provided in digital format by Acme and imported directly into the Access<sup>®</sup> database.

For mineral resource estimation in Vulcan<sup>®</sup>, all data from the three Access databases<sup>®</sup> were combined into a single Vulcan<sup>®</sup> database.

### **13.5 Sample Security**

Due to the remote nature of the site, sample security relied upon the fact that the samples were always attended or locked in a sample dispatch facility. Sample collection and transportation have always been undertaken by company or laboratory personnel using company vehicles. Chain-of-custody procedures consisted of filling out sample submittal forms that were sent to the laboratory with sample shipments to make certain that all samples were received by the laboratory.

For the 2007, 2008, and 2009 drilling campaigns, CMC maintained custody of all sample materials at the on-site project facility, and all analytical samples were delivered directly into the custody of the analytical laboratory. Acme sent a vehicle to the Cerro Casale site to pick up samples on a routine basis. Similarly, the rejects and pulps were returned by the laboratory via their trucks and were received by CMC personnel for subsequent storage onsite. No third parties had custody of the samples at any time.

### **13.6 Comment on Sample Preparation, Analyses and Security**

Steps taken to verify the sampling and analytical data are discussed in Section 14 of this Report. As a result of the verification, the QP is of the opinion that the quality of



the gold, silver and copper analyses is reliable, and able to support mineral resource and mineral reserve estimation. Sample preparation, analytical and QA/QC procedures have been undertaken by independent laboratories over the duration of the drilling programs. The only exception is check analyses that were performed by Placer Dome's internal research laboratory in 1998 and 1999.

Data incorporated in databases have been checked for errors, and the database is considered sufficiently error-free to support Mineral Resource and Mineral Reserve estimation.

Although drill campaigns from 1989 to 2000 were completed prior to current sample security standards, the QP is of the opinion that no sample or database tampering has occurred. Sample security procedures for the 2008 and 2009 drilling were in accordance with industry norms.



## **14.0 DATA VERIFICATION**

### **14.1 Assay Verification**

#### **14.1.1 MRDI (1997)**

MRDI audited a portion of the geological attributes and assays for the 1991 to 1997 drill campaigns (MRDI 1997a; 1997b). Database errors were within acceptable limits.

#### **14.1.2 AMEC (2004, 2006)**

A review of geological entries for 13 pre-1998 drill holes indicated no database errors for those drill holes. Downhole surveys for gyroscope surveys of 1998 and 1999 holes were checked, and database entries agreed with these documents. Survey files for pre-1998 holes were not available for review. An inspection of drill core from randomly-selected drill holes indicated observed rock quality was high and that there were few intervals of broken or ground-up core.

AMEC (2006) checked all gold and copper assays for two drill holes and found no errors for the 1,558 entries associated with the drill holes. This represented a check of 4.5% of the total 1998 to 1999 database. AMEC did not independently sample drill core and obtain commercial assays of check samples. This was not considered necessary, given the extent of historical blind QA/QC undertaken by CMA and Placer Dome and the level of independent auditing of sampling and assaying by MRDI from 1994 through 1997.

#### **14.1.3 Geovectra and CMC (2008)**

In 2008, the pulps of drill holes on two section lines, totalling 4,773 samples, were re-assayed by Geovectra for gold, copper (total and soluble), and silver at Activation Laboratories (Actlabs) by using the same analytical methods as described in Section 13 for the original assays in order to cross-check these values with those contained in the database. Before cross-checking, QA/QC of both data sets was analyzed.

For all the campaigns, Geovectra concluded that the accuracy of the chemical assays is good, with bias within tolerance for both gold and copper. Precision of gold assays, however, based on results of duplicate samples assayed by the same laboratory, has always been an issue, displaying relative errors near to or above tolerance ranges. Precision for copper has been typically good; however, silver was not monitored.

Quality control parameters of the samples re-assayed by Geovectra mirror the behaviour of the historical data set. Accuracy was found to be within tolerance for the three elements, with global bias 3.6% for gold, 0.8% for copper, and 0.7% for silver.

Precision levels for gold, copper, and silver returned respectively 70.9%, 98.3%, and 63.3% of the assays with relative error <10%, with only copper being within tolerance level. The blank control indicated there was no contamination in the process.

Original and re-assayed population results showed no bias for practical purposes for the three elements. After eliminating a maximum of 10 outliers per element, the global biases, using the RMA technique, were 0.6%, -0.5%, and 0% for gold, copper, and silver, respectively. Precision levels for gold, copper, and silver returned respectively 64.3%, 88.6%, and 24.3% of the assays with relative error <10%. The precision level of gold in the cross check does not drop substantially with respect to the gold monitored by QA/QC (70.9% to 64.4%). Copper correlation is good, especially taking into consideration that re-assays occurred in a different laboratory; this implies a higher tolerance. The high relative error for silver reflects both the poor reproducibility of the silver assays and changes in the analytical methods over time.

CMC and Geovectra considered the gold, copper, and silver assays in the Cerro Casale database for this time period to be reliable.

#### **14.1.4 Geovectra (2008)**

CMC commissioned Geovectra to conduct a complete review of the assay and geological data used to support the mineral resource estimate in Section 17. Geovectra reviewed historical data (see Section 14.1.3) and collected additional data using defined procedures as follows:

- Revision of the existing topographic network;
- Revision of the borehole collars location, strike, and dip;
- Inventory of core samples and pulps;
- Borehole database revision, including consistency of down-hole surveys, assays, and drill logs;
- Re-logging drill core (14,600 m) on two selected sections (NE-600 and NE-450);
- Re-interpretation of the geology on the two selected sections and comparison with the original interpretation;
- Review of historical QA/QC;
- Re-assaying pulps of the selected sections (5,649 pulps including QA/QC);
- Cross check re-assayed pulps with original assays;
- Specific gravity measurement of 872 samples and comparison with the values reported in the block model;

- Review of existing rock hardness studies; and
- Review of previous studies on contaminant elements.

Geovectra (2008) reviewed 120 original assay certificates, representing 27.7% of the total database analyses. The reported error rate was 0.013% for gold and copper analyses and slightly higher for silver – 0.66%. Overall errors are within acceptable ranges, and the silver contributes minimally to the overall resource value at Cerro Casale.

Geovectra systematically re-logged drill holes on two cross sections (450NE and 600NE) through the main orebody where there were comparatively high concentrations of drill holes, to verify the logged lithology, alteration, stockwork, and internal structures. Modifications were made to the definition of hydrothermal breccias versus other breccias, as the contacts are commonly diffuse and the definition of breccia types is often ambiguous. These redefinitions do not affect the geological model. Geovectra also noted that the definition of oxide in the geological and resource models was determined principally by the presence of iron oxides (not necessarily oxidized copper or other oxide products), and that there is only minor remobilization of secondary supergene copper minerals, principally chalcocite.

#### **14.1.5 RMI (2008)**

As part of a 2009 audit of mineral resources, Mike Lechner of Resource Modeling Inc. (RMI) reviewed all assay certificates from the 2008 infill drilling campaign and found that four out of 3,648 gold values in the database did not match the assay certificates. These differences were due to precision or rounding in the database values, which were 0.001 g/t lower than the certificate values. This difference was not considered to be significant.

### **14.2 QA/QC Verification**

#### **14.2.1 Assay Data Generated Prior to 1995**

QA/QC results for the first 86 RC holes were evaluated by MRDI (1994). Rig duplicate samples were collected and analyzed. Overall, the results of these duplicates indicated sampling, preparation, and analytical procedures were adequate for obtaining reproducible ( $\pm 20\%$ ) results for gold and copper.

#### **14.2.2 Assay Data Generated 1995–1996**

Assay data for a total of 109 drill holes (32% of the drilling at the time) were checked by reviewing rig duplicates, standard performance and check assays. Rig duplicate

data indicated that gold and copper assays were acceptable. Standard performance was acceptable; there was no significant drift over time.

Check assays were performed by Bondar Clegg on the original Acme pulps. Laboratory agreement was acceptable, with Acme returning a mean grade 5.3% higher than Bondar Clegg. Subsequent comparisons to standards revealed that Bondar Clegg was biased low relative to standards and therefore the Acme values are more acceptable. Check assays for copper show an 11% high bias in the Acme results relative to those from Bondar Clegg. MRDI (1996) noted that Bondar Clegg was actually biased low in Cu relative to standards; therefore, the apparent high bias of Acme was not of concern.

Gold and copper assays from the 1995 and 1996 drilling campaigns were considered suitable to support mineral resource estimates.

#### **14.2.3 Assay Data Generated 1996–1997**

Check assays, performed by Bondar Clegg, were undertaken on a total of 3,033 diamond drill core samples (Au, Cu), 1,136 RC samples (Au), and 711 RC samples (Cu). Data were considered to be within acceptable tolerances (MRDI, 1997a).

Rig duplicate data indicated acceptable precision for copper and gold. Kinross considered that the overall precision of sampling and analysis for the Cerro Casale core drilling in 1996 and 1997 is excellent for both copper and gold. This is similar to conclusions from studies by Smee (1997) and MRDI (1997a).

Blank samples showed that potential levels of contamination were low. Laboratory contamination, monitored using a synthetic standard pulp, was also low.

#### **14.2.4 Assay Data Generated 1998**

The 1998 assay data were reviewed by AMEC (Smith, 2005). Reviews comprised checks of the six standards submitted with samples, duplicate pulp analytical results and check assay data. No significant errors or issues were noted with the review.

#### **14.2.5 Assay Data Generated 1999**

Blank samples indicated little to no contamination issues. Standard values were generally within acceptable error ranges with the exception of STD19. Gold assays from duplicate sample pulps indicated a relatively high error rate for the type of project; copper assays were acceptable. The gold error rate could be due to either the small number of data, but may also be due to sample contamination by the sample preparation equipment, an interpretation supported by unusual values for STD19.

Samples were randomly selected from the sample pulps for check assaying at the Placer Dome Research Centre in Vancouver, BC, Canada. A random 10% selection of samples (359 samples) was taken from the assay database. The data suggest a 5% to 10% high bias for the Bondar Clegg gold assays in comparison to the Placer Dome Research Centre gold assays. Copper check assays show good agreement with little bias. Based on the summary statistics, the Placer Dome assessment that Bondar Clegg exhibits a high gold bias and little or no copper bias for the 1999 drilling program is appropriate.

With the exception of potentially-contaminated analytical batches 135 to 224 in 1999, all assaying is of suitable accuracy and precision to support resource estimates.

#### **14.2.6 Assay Data Generated 2008**

The QA/QC program for assaying of the 2008 infill drill program consisted of routine insertion of control samples into the sample stream before preparation and assay. The total number of control samples is close to the percentage of the assay samples (exclusive of control samples) recommended for good QA/QC practices.

Data and QA/QC from the 2008 infill drill campaign was reviewed by CMC and determined to be suitable for use in mineral resource estimation. Generally, results from the CRMs are within limits for Au and Cu; however some CRMs show periods of consistently positive or negative bias in Cu, which should be investigated. Blanks generally reported grades below the threshold value and indicate that contamination is not observed. Duplicates generally show good replication. Samples falling outside error limits may be the product of possible errors in handling of samples. Check assays comprise less than 5% of the pulps; it was therefore recommended that additional checks be run.

Field blanks used during the drill campaign were collected from a rhyodacite tuff unit. Three blank submissions exceeded thresholds for Au, Cu and Ag respectively. The sample lot associated with the blank that exceeded the Au threshold was reanalyzed. This low level of potential contamination is deemed acceptable.

Six CRMs, certified for Au and Cu, but not Ag, sourced from CDN were used to determine accuracy of the analytical data in the 2008 diamond drilling campaign. In general, results were within acceptable limits; however two of the standards showed a positive bias for Cu and one standard showed a negative bias for Cu during the latter half of the program.

Samples in lots which failed QA/QC limits were re-assayed. A total of 106 samples were reanalyzed for Au, 47 were reanalyzed for Ag, and 74 for Cu. The original and re-assayed results are consistent.

Results of field duplicates indicated that duplicate assays were within  $\pm 20\%$  precision. No significant dispersion outside the error lines were observed in duplicate–duplicate plots, although some erratic samples were noted to fall outside the limits. These discrepancies could be due to possible errors in handling of samples.

#### **14.2.7 2008 Re-Assay Program**

Following analysis of 4,773 original drill hole pulps by Acme, Geovectra concluded that Au, Ag, and Cu assay results were unbiased.

### **14.3 Database Validation**

Entry of information into databases utilized a variety of techniques and procedures to check the integrity of the data entered.

Data from all periods up to the completion of the first oxide–sulphide pre-feasibility study in late 1997 were combined by MRDI in San Mateo and audited. MRDI (1997b) checked 5% of the data added in 1996 and 1997 and found an error rate of 0.294%. Data were considered acceptable for use in mineral resource estimation.

AMEC reviewed the 1997 and 1998 data in 2005 (Smith, 2005). No significant errors were noted with the data audited.

Geovectra audited data collected between 1998 and 2008 (Geovectra, 2008), as follows:

- Reviewed 120 original assay certificates, representing 27.7% of the total database analyses. Geovectra concluded that the overall errors are within acceptable ranges;
- Recalculated check assay values for the merged 1998–1999 campaigns. Geovectra concluded that the accuracy of the chemical assays is good and bias was within tolerance for both gold and copper.

At the completion of the work CMC accepted the audited 2008 database as suitable to support mineral resource estimation.

### **14.4 Comment on Data Verification**

The process of data verification for the Project has been performed by external consultancies. Kinross considers that a reasonable level of verification has been completed, and that no material issues would have been left unidentified from the programs undertaken.



The QP, who relies upon this work, has reviewed the appropriate reports, and is of the opinion that the data verification programs undertaken on the data collected from the Project adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in mineral resource and, mineral reserve estimation, and in the 2010 feasibility study, on which the financial analysis presented in Section 18 is based.





## **15.0 ADJACENT PROPERTIES**

There are no properties immediately adjacent the Aldebarán Project that are at the same state of development as the Cerro Casale deposit.

## **16.0 MINERAL PROCESSING AND METALLURGICAL TESTING**

### **16.1 Metallurgical Testwork**

Over the project history, a number of metallurgical testwork campaigns have been undertaken (Table 16-1); refer to Table 7-2 for the list of metallurgical rock types.

The Cerro Casale orebody was extensively tested by Bema and Placer Dome, with most of the work completed by Placer Dome Technological Services, Placer's in-house laboratory in Vancouver, from 1997 to 2000. Up to this point the property was considered mostly for its potential as a gold deposit; cyanide leaching of the oxide cap was investigated at Intec Chile (Intec) from 1994 to 1997.

Further drilling uncovered significant hypogene mineralization below the leached cap and the focus of the testwork shifted to integrate the sulphides into a common processing approach.

Placer Dome completed two preliminary economic studies in September 1998 and January 1999. Multiple composite samples of ten rock types were prepared to define the metallurgical response of the deposit. Four phases of flotation testwork were undertaken.

Modifications to the intended process for the sulphide and oxide materials rendered a fair proportion of this historical database irrelevant, and hence it did not provide all the required design parameters. Additionally, CMC found these past sampling campaigns were inconsistent and not comprehensive enough.

A metallurgical sampling campaign was undertaken in 2007, comprising the drilling of 12 PQ core holes to provide fresh core samples. The samples were logged by rock type and intercepts were selected for dispatch of individual samples to various test laboratories for providing measurements of grinding parameters, flotation behavior, mineralogical characterization, high-pressure grinding roll data, dewatering equipment sizing parameters, rheological characteristics, SART circuit design, as well as column cyanide-leach testwork for the oxide material. Of the original 20 lithologies defined by Placer Dome, a block model reinterpretation led to consolidation into six rock types.

**Table 16-1: Metallurgical Testwork Summary**

| Composite Name | Ore Type                                                                                                                                                                                            | Testing Laboratory         | Year of Testing Program | Testing                                                                        |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------------------------------------------------------------------------|
| V1-V4          | Low-grade Year 1-2:<br>Year 1-0.15% Cu<br>Year 1-0.1% Cu<br>Year 2-0.15% Cu<br>Year 2-0.1% Cu                                                                                                       | SGS Lakefield Research     | 2009                    | Flotation:<br>Timed Rougher<br>Cleaner Batch<br>Locked-Cycle                   |
| CC1-CC25       | Various (mapping composite samples) categorised by ore type and head grade:<br>High As and Hg<br>High Cu Head<br>Medium Cu Head<br>Low Cu Head<br>Very Low Cu Head<br>DP<br>MDBX Sul<br>GRD<br>VCGL | SGS Lakefield Research     | 2009                    | Flotation:<br>Timed Rougher<br>Cleaner Batch<br>Locked-Cycle<br>Modal Analysis |
| DP             | Diorite Porphyry                                                                                                                                                                                    | SGS Lakefield Research     | 2009                    | Flotation:                                                                     |
| GRD            | Granodiorite Sulphide                                                                                                                                                                               |                            |                         | Timed Rougher                                                                  |
| MDBX Mix       | Microdiorite Breccia Mixed Sulphide/Oxide                                                                                                                                                           |                            |                         | Cleaner Batch                                                                  |
| MDBX Sul       | Micro Diorite Breccia Sulphide                                                                                                                                                                      |                            |                         | Locked-Cycle                                                                   |
| VCGL           | Volcanic Conglomerate                                                                                                                                                                               |                            |                         | Modal Analysis                                                                 |
| DP             | Diorite Porphyry                                                                                                                                                                                    | G&T Metallurgical Services | 2008                    | Flotation:                                                                     |
| GRD            | Granodiorite Sulphide                                                                                                                                                                               |                            |                         | Timed Rougher                                                                  |
| MDBX Mix       | Microdiorite Breccia Mixed Sulphide/Oxide                                                                                                                                                           |                            |                         | Cleaner Batch                                                                  |
| MDBX Sul       | Micro Diorite Breccia Sulphide                                                                                                                                                                      |                            |                         | Locked-Cycle                                                                   |
| VCGL           | Volcanic Conglomerate                                                                                                                                                                               |                            |                         |                                                                                |
| Year 1-5       | Weighted rock type mix representing indicated mining period                                                                                                                                         | SGS Lakefield Research     | 2008                    | Flotation:<br>Timed Rougher<br>Cleaner Batch                                   |
| Year 6-10      | Weighted rock type mix representing indicated mining period                                                                                                                                         |                            |                         | Locked-Cycle<br>Pilot plant                                                    |
| DSU            | Diorite Sulphide Upper                                                                                                                                                                              | 2000 Feasibility Study     | 1999                    | Flotation:                                                                     |
| DSL            | Diorite Sulphide Lower                                                                                                                                                                              | G&T Metallurgical Services |                         | Timed Rougher                                                                  |
| GS             | Granodiorite Sulphide                                                                                                                                                                               |                            |                         | Cleaner Batch                                                                  |
| VS             | Volcanic Sulphide                                                                                                                                                                                   |                            |                         | Locked-Cycle                                                                   |
| MDBX           | Microdiorite Breccia                                                                                                                                                                                |                            |                         | Thickener Settling Test                                                        |
| AO             | Oxide                                                                                                                                                                                               |                            |                         | Cyanidation Bottle Roll                                                        |

In 2008, a program of infill drilling was completed by CMC, and drill cores from this program were made available for preparation of a mapping testwork program. Three bulk composite samples were prepared by blending the individual rock types according to the relative weight proportions expected in the mine life periods from start-up to Year 5 (Year 1–5), Year 6 to 10 (Year 6–10), and Year 11 to the end of the mine life. The first two bulk composites were used for pilot flotation testwork, SART testwork, and other environmental/hydrometallurgical testwork.

#### **16.1.1 Mineralogy**

The Cerro Casale mineralization is associated with quartz vein stockwork containing sulphides and magnetite, as well as a potassic-feldspar alteration. X-ray diffraction scans indicated that the most common minerals are in decreasing order: feldspar, quartz, mica, chlorite, gypsum, pyrite, chalcopyrite, and bornite.

Copper is found mainly in chalcopyrite and bornite. To a lesser extent chalcocite, digenite, covellite, enargite, chrysocolla and malachite also occur. The bornite to chalcopyrite ratio increases at depth, with very little bornite above the 4,000 m elevation (the mountain of Cerro Casale included within the pit limits peaks at 4,450 m). The average copper grade encountered also gradually increases at depth, of the order of 25%.

The supergene zone is made up of a leached cap extending to the oxide/sulphide boundary, and of oxidized ore found along fractures at depth, where chalcocite, covellite, chrysocolla, and malachite are mainly found.

Gold content has a tendency to track copper content, as long as copper is present in stockwork-controlled chalcopyrite or bornite. The correlation does not hold for disseminated copper occurrences. Optical microscope analysis indicates that microscopic gold tends to be native gold. Based on SIMS analysis, sub-microscopic gold is associated with the sulphide minerals and iron oxide minerals.

Silver is typically found with gold, with a grade ratio to gold averaging 1.6, within a range of 0.7 to 3.3. It may either be present in fine grains (as seen by modal analysis of flotation products) within the fluid matrix that deposited the copper minerals, and/or as solid inclusions within these minerals. Modal analysis demonstrated (except for GS (now GRD), and the non-significant CBX) that up to 85% of the gold content is associated specifically with chalcopyrite and less than 1% is found with pyrite. Petrographic examination of high grade CBX material indicated that 85% of the gold content was found as exposed grains along pyrite grain boundaries. An average gold grain size of 39 µm, with a range of 7 µm to 145 µm, was obtained from the analysis of a sample of CBX with 31 grains observed.

### 16.1.2 Lithological Characterization

Of the original 20 lithologies defined by Placer Dome, a block model reinterpretation led to consolidation into six rock types. These are the main mineralized lithologies present at Cerro Casale. The drilling and sampling campaign targeted these for the metallurgical samples. Table 16-2 indicates the rock type designations adopted and associated abbreviations. The sampling campaign completed with the metallurgical drill holes targeted the oxides in order to meet specific testwork requirements for this type of material for heap leach with cyanide. Composite samples were prepared for this testwork.

**Table 16-2: Major Rock Types of the Cerro Casale Deposit**

| Domain – Lithology                        | Abbreviation             | Percentage of Mine Plan Reserves (%) |
|-------------------------------------------|--------------------------|--------------------------------------|
| Oxides                                    | OX                       | 14.7                                 |
| Diorite Porphyry Sulphide                 | DP                       | 25.0                                 |
| Granodiorite Sulphide                     | GRD                      | 14.1                                 |
| Microdiorite Breccia Sulphide             | MDBX sul                 | 10.7                                 |
| Microdiorite Breccia Mixed Oxide-Sulphide | MDBX mix                 | 0.3                                  |
| Volcanic Conglomerate Sulphide            | VCGL                     | 16.8                                 |
| Volcanics – Other Sulphides               | VO (VPF+MF) <sup>2</sup> | 18.3                                 |

Note: <sup>1</sup> Per Mine Plan FSU V\_2 wsp, for combined oxide and sulphide zones

<sup>2</sup> VPF stands for fine-grained volcanics; MF stands for mafic flows

### 16.1.3 Comminution Tests

The grinding testwork done during 2008 was limited to measurements on rock type composite samples and laboratory scale trials with HPGR suppliers. The grindability measurements were used to generate grinding simulation scenarios, involving SAG milling, using the JKSimMet software. The HPGR trials were used to establish the design and operating conditions for a circuit replacing SAG milling with a three stage crushing plant.

Table 16-3 presents the JKTech grinding parameters measured for each rock type and the resulting values derived from these for the mining period composites. The Year 1–5 composite hardness profile was adopted as the design ore for the design criteria applied to the grinding circuit. This composite exhibited a high hardness, per the low value of the A\*b parameter (linked to SAG milling amenability) and high Bond ball mill work index (BMWi).

The Cerro Casale ore can be described as very hard to hard, with less than 1% of all the samples tested for JKTech grinding parameters determination registering a lower value of A\*b than DP or the less abundant MDBX Sul rock types.

**Table 16-3: Grinding Parameters for JKSImMet Simulations**

| Testing           | Unit             | Composite                |                           |                            |            |       |       |       |       |
|-------------------|------------------|--------------------------|---------------------------|----------------------------|------------|-------|-------|-------|-------|
|                   |                  | SGS                      |                           | Not Tested                 | MacPherson |       |       |       |       |
|                   |                  | Year <sup>1</sup><br>1–5 | Year <sup>1</sup><br>6–10 | Year <sup>1</sup><br>11–18 | DP         | GRP   | Mix   | Sul   | VCGL  |
| JKTech Parameters |                  |                          |                           |                            |            |       |       |       |       |
| A                 | -                | 93.25                    | 94.28                     | 97.61                      | 93.7       | 94.40 | 79.70 | 96.80 | 100.0 |
| B                 | -                | 0.21                     | 0.21                      | 0.22                       | 0.20       | 0.23  | 0.30  | 0.18  | 0.22  |
| A x b             | -                | 19.2                     | 20.1                      | 21.8                       | 18.70      | 21.70 | 23.90 | 17.40 | 22.0  |
| Ta                | -                | 0.3                      | 0.29                      | 0.24                       | 0.30       | 0.24  | 0.40  | 0.33  | 0.22  |
| Mia               | kWh/t            | 30.41                    | 30.36                     | 30.86                      | 30.90      | 32.00 | 23.00 | 30.30 | 30.7  |
| BMWi              | kWh/t            | 16.94                    | 16.67                     | 16.09                      | 17.00      | 16.50 | 15.60 | 18.30 | 15.8  |
| SG                | t/m <sup>3</sup> | 2.62                     | 2.65                      | 2.72                       | 2.62       | 2.66  | 2.56  | 2.62  | 2.76  |
| Rod Mill Wi       | kWh/t            | -                        | -                         | -                          | 19.30      | 18.80 | 22.10 |       | 19.3  |

Note: <sup>1</sup> Indicated parameters for the mining period composites are calculated values, based on the rock type proportions expected in these periods

The A\*b parameter, which is below 25, is indicative that the Cerro Casale ore is a good candidate for processing with HPGR crushing, rather than employing SAG mills coupled with pebble crushers. The trade-off study completed at the end of the pre-feasibility stage and updated during the 2010 Feasibility Study stage demonstrated the economic viability of this approach, retained as the selected comminution option to develop the 2010 Feasibility Study.

Table 16-4 presents the HPGR-related sizing parameters measured on the design Year 1–5 ore, as measured on the composite sample, as well as values derived from testing rock type composite samples.

**Table 16-4: Testwork and Design Parameters from HPGR Testwork**

| Parameters                | Specific Throughput (t*s/m <sup>3</sup> *h) | % -6 mm in HPGR Product | HPGR (kWh/t) | Ball Mill Wi (kWh/t) | JKTech Axb | Impact Work Index (kWh/t) |
|---------------------------|---------------------------------------------|-------------------------|--------------|----------------------|------------|---------------------------|
| DP                        | 203                                         | 68.1                    | 1.73         | 17.0                 | 18.7       | 10.4                      |
| MDBX mix                  | 189                                         | 69.5                    | 1.71         | 16.5                 | 23.9       | 9.2                       |
| MDBX sul                  | 203                                         | 70.3                    | 1.77         | 15.6                 | 17.4       | 9.2                       |
| GRD                       | 209                                         | 66.1                    | 1.74         | 18.3                 | 21.7       | 14.6                      |
| VCGL                      | 213                                         | 66.5                    | 1.69         | 15.8                 | 22.0       | 10.5                      |
| VO                        | 214                                         | 66.7                    | 1.68         | -                    | -          | -                         |
| Composite                 | 212                                         | 65.5                    | 1.70         | 16.6                 | 19.5       | 11.2                      |
| Deviation (%)             | 3                                           | 2                       | 1            | 4                    | 10         | 13                        |
| Design criteria for Plant | 225                                         | 54.9                    | 1.80         | 16.9                 | N/A        | 13.0                      |

#### 16.1.4 Flotation Testwork

Representative core samples of the five main sulphides were selected and prepared as individual rock type composites from the 12 metallurgical drill holes to complete the 2008 flotation testwork program. These individual rock type samples were targeted for metallurgical characterization, providing the material for the preparation of composite samples for the major rock types as well as composites representative of the mining periods defined as Year 1–5 and Year 6–10. These samples were revisited in the 2009 testwork program and complemented by others taken mostly from cores retrieved from infill drill holes completed in late 2008.

The design of the flotation plant was primarily based on the SGS Year 1–5 composite testwork. This composite has a high content (81%) of DP ore type, which tends to be slower floating and produces lower metallurgical results than most other ore types. DP is the most common rock type in the mine reserves at 37.9%. An overall concentrate grade of >25% Cu at an overall recovery of copper to the flotation concentrate of 82.8% was achieved in pilot-plant testing of the Year 1–5 composite.

The metallurgical performance of the Year 6–10 composite gave an overall copper concentrate grade of 25.1% Cu with a recovery of copper to concentrate of 88.5%. This was achieved without cellulose addition. Locked-cycle flotation tests were performed on the Year 11+ composite. Results from the standard test were for a copper concentrate grading 30% Cu with 89.5% of the copper recovered. Use of site water reduced the final concentrate grade to 26% Cu at the same recovery.

In 2009 low-grade copper composites from production Years 1 and 2 were tested to determine processing requirements to achieve upgrading to a minimum target concentrate grade. The testwork also allowed validation of the recovery projection equations for the DP ore type at these low grades, not previously encountered with this rock type or Year 1–5 composites.

In 2009, a variability testing (mapping) program was undertaken to determine the effect of variable copper head grades, and higher levels of potential concentrate contaminants in the feed on the metallurgical performance of the various ore types.

Other testwork results included:

- Grind fineness has an impact on both the copper and gold metallurgical results. Both copper and gold metallurgical performance suffer at a coarse grind (288 µm compared to 150 µm) with a decrease of about 15% for both copper and gold recoveries. A trade off study demonstrated that a primary grind size P<sub>80</sub> of 120 µm was optimal for ores processed in years 1-10 and thereafter a reduction to 150 µm provided the best economic benefits.



- Intensive regrinding improves the metallurgical performance.. The targeted concentrate grind size ( $P_{80}$ ) is set at 80% passing 25  $\mu\text{m}$ ,
- Improvements in recoveries for Au and Cu were noted with increasing rougher pH;
- Rougher flotation test results indicated that for the more difficult ores to float (i.e. Year 1–5 composite, mostly DP ore type) 15 minutes of laboratory flotation time is sufficient for recovery of the copper. With a scale-up factor of 2.1, the required retention time for the full scale plant is calculated at 31.5 minutes;
- Pilot plant cell-by-cell analysis showed that 40 minutes of retention time was required to achieve the required recovery. The rate of recovery between 15 minutes and 30 minutes was lower than would be expected, suggesting that with improvements in reagent addition and froth extraction (i.e. froth crowders or cross launders), an optimum recovery could be achieved within 40 minutes;
- For the Year 6–10 composite, a retention time of 20 to 25 minutes was sufficient to achieve copper recovery. Gold recovery still increased significantly after 25 minutes. As the gold not recovered will go to the cyanidation circuit, the retention time is set by the requirements of the copper flotation;
- Indications from kinetics batch flotation tests performed on GRD, VO, VCGL, MDBX Sul, and MDBX Mix ore types were that a scale-up factor of 3.5 was required;
- Analysis of locked-cycle flotation tests from the SGS 2009 Variability Testing Program show that for most ore types and head grades, three stages of cleaning is sufficient. A concern remains that three stages of cleaning may be insufficient for the lower grade DP ore; additional locked-cycle tests should be performed with the cleaner circuit feed being provided from multiple rougher tests;
- The VCGL, GRD, and MDBX Sul ore types give the best copper flotation metallurgy. The DP ore metallurgy is significantly worse and the MDBX Mix gave the poorest copper metallurgy. Gold recovery is best with GRD and DP ore types and MDBX Mix yields the lowest gold recovery.

Copper smelters generally charge penalties for mercury levels above 5 g/t Hg in copper concentrate and may refuse concentrate if the mercury content is above 20 g/t Hg. The arsenic penalty begins at a level of 0.2% (2,000 g/t As).

Analysis of copper concentrate from various composites shows high levels of mercury for MDBX Sulphide, and in the Year 1 and 2 low copper head grade composites, mostly comprising DP. Arsenic levels are elevated in GRD, VCGL and some MDBX Sulphide samples but below levels at which smelters impose penalties.

Calculations indicate that in most years As in concentrate should not exceed penalty levels. The mercury assay of the concentrate will vary from 3.5 g/t Hg to 6 g/t Hg. For short periods during years with an average content below the 5 g/t smelter penalty threshold (depending on the mix of ore types processed) the Hg content of the concentrate will exceed this limit. For most of the years with an average content above 5 g/t Hg the mercury content will exceed the limit and will incur smelter penalties. The extent of these periods may be managed by introducing modified mining sequences and by blending high-contaminant concentrate production at the port site with product bearing less contaminant.

#### **16.1.3 Dewatering**

Testwork performed by Outotec evaluated the settling characteristics of samples from the pilot plant trials conducted at SGS Lakefield late in 2008. Static and dynamic settling tests were performed on two samples from each of the rougher tailings, final concentrate, and 1<sup>st</sup> cleaner scavenger tailings (carbon-in-leach (CIL) circuit feed) streams. The material tested in the pilot plant trials was selected to represent composites of the Year 1–5 and Year 6–10 expected mill feed. Although not optimal, results were considered conservative, and acceptable when extrapolated for the sizing of the rougher tailings and cleaner scavenger tailings thickeners. Based on an inability to achieve required overflow clarity during high-rate thickening testwork, the concentrate thickener was specified as a conventional thickener, sized using the high-rate thickening test results and a scale-up factor of 60% applied to the solids loading rate.

#### **16.1.4 Filtration Testwork**

Batch filtration tests were conducted on pilot plant concentrate and tailings streams samples. Only concentrate testing is relevant for the flowsheet selected for Cerro Casale as deposition of filtered tailings is not considered. Identical tests were conducted on each of two concentrate samples derived from the pilot plant testing on the Year 1–5 and Year 6–10 metallurgical composites at SGS Lakefield. The tests were conducted on aged samples with a pH of 7.0 to 7.1 (significantly lower than the expected operating pH in this section of the flotation circuit, of 10 to 10.5). The average dry cake density was 2.19 t/m<sup>3</sup> and the average cake thickness was 42 mm.

A unit filtration rate of 494 kg/m<sup>2</sup> per operated hour is calculated. Two 84 m<sup>2</sup> units were selected for this duty, providing a capacity of 590 kg/m<sup>2</sup>/h, capable of handling peak requirements that may arise following discharge of the pipeline inventory at the port site. The filter frame selected allows for further upgrading of the filtration capacity by adding additional plates up to a total installed area of 96 m<sup>2</sup> per filter, using the same ancillaries provided with the initial machines.

#### 16.1.4 Heap Leaching

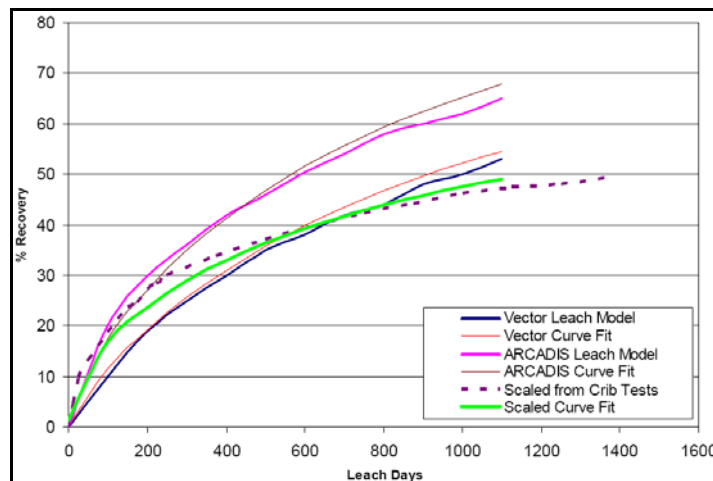
In 1994–1995, Intec performed leach tests on material gathered from two test pits. Results were very good for leaching relatively coarse material, with a gold recovery of between 74% and 82% obtained in a leaching period of about 500 days.

McClelland performed a testwork campaign in 2008 on samples representative of the whole oxide ore envelope. The outcome of these leach tests was not as positive as the earlier testwork in terms of gold recovery. Despite the finer crush size used for the leach columns, average recoveries of 60.9% for gold together with 17.7% for Cu were calculated. This is much lower than for the non-representative samples used earlier in the coarser crib leach tests.

Two programs were commissioned in 2009 at McClelland by CMC: one using the same composite samples tested during the 2008 program, and the other with a series of coarse, near-surface samples extracted from a trench dug with a backhoe.

The recovery expectations from operating a run-of-mine (ROM) heap leach (HL) facility have been derived from column leach tests on stage-crushed material completed by McClelland in 2008 on composite samples of oxide ore prepared from the 12 metallurgical drill holes. The final projections of gold, and copper production based on an extrapolation of the results from the leach column, at a nominal -50 mm to ROM equivalent, are indicative of a dissolution of 50% for gold, and 10% for copper, along a gradual leach curve profile over time. Simulations of individual leach cells placed under irrigation over time have been completed by considering the mine plan schedule as well as the leaching kinetic curve presented in Figure 16-1.

**Figure 16-1: Gold Leach Kinetic Curve for ROM Heap Leaching**



### 16.1.5 Flotation Tailings Cyanidation Testwork

Cyanidation tests were conducted to assess the amenability of flotation cleaner tailings to cyanidation for the recovery of the precious metal content.

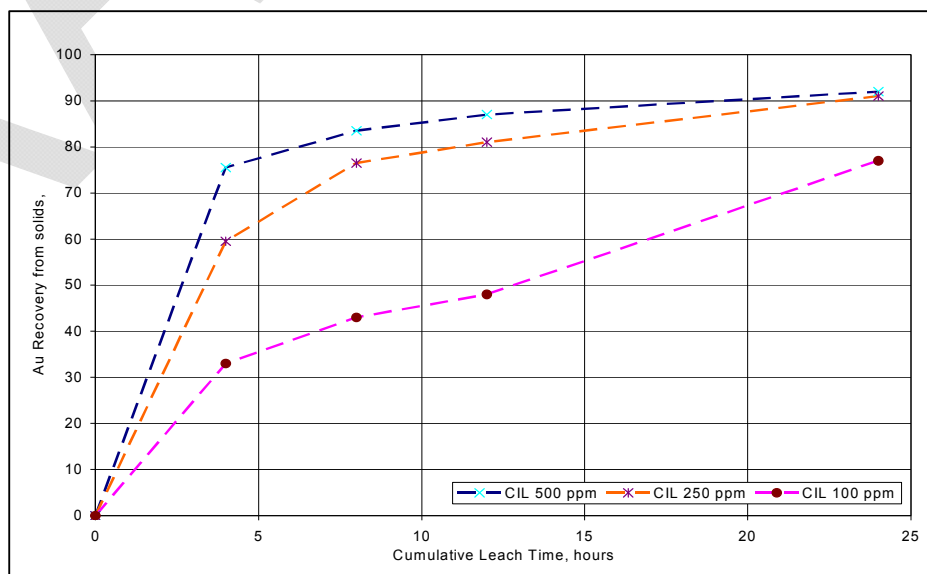
McClelland Laboratories tested the amenability of flotation tailings products to cyanidation in 1997. Cleaner and rougher tailings from locked-cycle flotation tests were supplied to McClelland from G&T Metallurgical Services. Gold extractions ranging from 85% to 91% were achieved with the cleaner tailings. Residue gold grades of 0.10 g/t to 0.07 g/t were determined through fire assaying. Cyanide and lime were consumed at rates of 1.3 kg/t and 2.5 kg/t respectively. Copper dissolution was measured at 44.8%, 46.2%, and 51.3% for the three tests (proportional to the gold extraction trend). Gold dissolution was clearly still trending upwards after 24 hours, indicating the potential for higher extractions at extended leach times.

Rougher tailings samples were also amenable to cyanidation, with gold extractions averaging approximately 50% and cyanide consumption rates of 0.5 kg/t. The testwork also showed that an increase in the leach solution cyanide strength, varying between 100 ppm to 500 ppm, enhanced both the leach kinetics and final gold recovery.

Cyanidation testing was performed on a flotation cleaner composite of various ore type composite samples at G&T. Increasing the sodium cyanide concentration improved leach kinetics as well as the ultimate gold recovery for both the CIL and the standard cyanidation tests. The addition of activated carbon had a beneficial effect on gold extraction, especially at lower cyanide concentration levels. These observations may be indicative of some form of gold particle surface passivation or the presence of a preg-robbing ore constituent affecting leach kinetics.

The carbon-in-leach (CIL) circuit recoveries are based on recent testwork data obtained from leaching of pilot plant cleaner tails of the Year 1-5 and Year 6-10 composites, as well as cleaner tailings of rock type composites obtained from locked cycle tests. These results indicate a dissolution of at least 85% for gold and 35% for copper (with DP, other rock types indicating 50%) after a 20-hour leach cycle. Figure 16-2 presents the gold dissolution achieved on a composite sample of cleaner flotation tailings generated from locked cycle trials involving the major rock types in the orebody.

**Figure 16-2: Rate of Gold Dissolution in CIL Cyanidation Test of LOM Composite**



#### 16.1.6 Sulphidization–Acidification–Recycling–Thickening Testwork

SART testwork was conducted on leach solutions from both oxide and sulphide ore types. Oxide ore was represented by leach solutions from McClelland’s 2008 column leach tests (“P” solution samples), sulphide ore was represented by leached cleaner tailings solutions from SGS flotation tests (“CN” samples).

Tests were conducted at 100% and 120% stoichiometric addition of sodium hydrosulphide (NaSH). For the 100% stoichiometric addition, copper recovery ranged from 77% to 90%, and weak acid-dissociable cyanide ( $CN_{WAD}$ ) conversion to free cyanide ( $CN_{FREE}$ ) ranged from 87% to 102%. For 120% stoichiometric addition, copper recovery ranged from 88% to 100%, and  $CN_{WAD}$  conversion ranged from 93% to 106%. A stoichiometric ratio of 120% was selected for NaSH addition in the mass balance

SART circuit design parameters were derived for both oxide and sulphide ore leach solutions using the average values provided by the valid tests completed.

#### 16.1.7 Cyanide Destruction

The cyanide destruction tests confirm that Cerro Casale leach residues can achieve a low level of cyanide using the  $SO_2$ -Air process. To achieve  $<0.1$  mg/L  $CN_{WAD}$ , 4.7 g  $SO_2$  and 2.6 g lime per g  $CN_{WAD}$  are required.

## 16.2 Trade-off Studies

Six trade-off studies were considered to evaluate alternatives to the base case sulphide flotation scenario. These included:

- Flotation plant throughput rationalization with SAG milling (pre-feasibility stage). Simulations with the JKSimMet software indicated that a throughput of 24 kt/d could be reached with the addition of a fourth grinding line and associated upstream and downstream equipment required to meet the design criteria established for each unit process for the base case scenario of 150 kt/d nominal throughput;
- Replacement of the SAG milling and pebble crushing stages with a secondary crushing circuit followed by tertiary crushing with HPGR (pre-feasibility stage). A second throughput rationalization, undertaken during the feasibility evaluation, reviewed a circuit with a HPGR option instead of SAG milling. .;
- Impact of removing the SART circuit from the processing part of the leached cleaner tailings solution (pre-feasibility stage). This was assessed to verify that the associated incremental costs for the combined circuit in the base case scenario were warranted by the recovered cyanide available for reuse on the heap and by the recovery of the copper units;
- Flotation plant throughput rationalization with HPGR (feasibility stage). The data established for the HPGR versus SAG mill trade-off study were used to complete a throughput rationalization exercise at rates of 100 kt/d, 150 kt/d, and 200 kt/d. The study recommendation was to stay with the 150 kt/d. Later optimization of the plant increased the design throughput to 160 kt/d. A flexible circuit design with multiple parallel operating lines was developed for the 2010 feasibility study. The lines will be kept as independent as possible to ensure that an equipment failure in one line would not affect the rest of the circuit. An intermediate stockpile between the secondary and tertiary crushing stages should allow for decoupling of the equipment availabilities in each of these circuits;
- Regrinding with VertiMills versus conventional ball mills (feasibility stage). The option of equipping the regrinding circuit with VertiMills, instead of conventional ball mills, provided a slight net present value (NPV) advantage for the VertiMill option, despite a higher capital cost. Upon review, conventional ball mills were recommended, based on small ball size, competitive bidding, and improved financial benefit to the Project.
- Grinding to provide a flotation feed P<sub>80</sub> of 120 µm instead of 150 µm to improve metal recovery. A trade off study demonstrated that a primary grind size P<sub>80</sub> of



120 µm was optimal for ores processed in years 1–10 and thereafter an increase in particle size to 150 µm provided the best economic benefits.

Three trade-off studies were considered to evaluate alternatives to the base case oxide heap leach scenario:

- ROM versus crushed ore leaching (pre-feasibility stage). For the latter option, the alternatives of stacking the ore onto the heap with trucks or by a system of reclaim and mobile conveyors were also evaluated. The higher costs associated with the crushed ore leach options did not improve the economics for a ROM leach system, despite the better gold recovery;
- Impact of implementing the HL facility on the project economics, site water balance, and permitting issues (pre-feasibility stage). With this process option the loaded carbon stripping, carbon regeneration and attritioning, gold elution, electro-winning, mercury retorting, gold refining, and SART circuits which are all currently sized to deal with the loaded carbon from both the CIC and CIL circuits, would be reduced to handle only the requirements from the CIL circuit operation; and
- Potential benefits related to changing the heap irrigation rate (feasibility stage). Such a change would require resizing of the associated circuits such as CIC, gold recovery, and SART circuit to match the higher deposition rate of oxide ore on the heap. The study looked at the differential economic basis for 75 kt/d, 100 kt/d, and 150 kt/d of fresh ore placed under irrigation.

### 16.3 Metal Recoveries

At the completion of metallurgical testwork, the planned process design comprised two separate plants to treat sulphide and oxide material.

The sulphide ore will be ground, floated, and dewatered to produce a concentrate for shipment to a smelter. This flotation-based process plant is complemented by a CIL circuit on the cleaner tailings of the flotation circuit, to recover gold in doré bars. The flotation, SART, and cleaner tailings leaching testwork data led to the derivation of the metallurgical projections outlined in Table 16-5.



**Table 16-5: Metallurgical Projections Data from Interpretation of Flotation Testwork**

| Ore Type                      | Flotation Concentrate |                |      |      | CIL and SART Circuits                 |                 |                 | Total Recovery  |                 |                 |
|-------------------------------|-----------------------|----------------|------|------|---------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                               | Conc. Grade           | Recoveries (%) |      |      | Partial Recoveries <sup>1,5</sup> (%) |                 |                 |                 |                 |                 |
|                               |                       | %Cu            | Cu   | Au   | Ag                                    | Cu <sup>2</sup> | Au <sup>3</sup> | Ag <sup>4</sup> | Cu <sup>2</sup> | Au <sup>3</sup> |
| Diorite (DP)                  | 25.0                  | 79.2           | 58.5 | 53.9 | 1.3                                   | 15.4            | 10.3            | 80.5            | 73.9            | 64.2            |
| Granodiorite (GRD)            | 30.2                  | 92.2           | 70.1 | 83.3 | 0.3                                   | 6.2             | 8.9             | 92.5            | 76.7            | 92.2            |
| Sulphide Breccia (MDBX Sul)   | 27.0                  | 93.2           | 73.6 | 89.2 | 0.7                                   | 7.0             | 5.7             | 93.9            | 80.6            | 94.9            |
| Mixed Breccia (MDBX Mix)      | 20.9                  | 74.4           | 57.4 | 24.0 | 0.6                                   | 18.8            | 33.7            | 75.0            | 76.2            | 57.7            |
| Volcanic Conglomerates (VCGL) | 27.4                  | 93.2           | 71.1 | 74.7 | 1.1                                   | 8.8             | 8.4             | 94.3            | 79.9            | 83.1            |
| Projected Life-of-Mine        | 27.3                  | 89.4           | 67.8 | 72.9 | 0.9                                   | 9.9             | 8.7             | 90.4            | 77.7            | 81.6            |
| Year 1-5                      | 25.4                  | 80.3           | 59.0 | 60.1 | 1.1                                   | 14.4            | 10.7            | 81.4            | 73.4            | 70.8            |

Notes: <sup>1</sup> Cu dissolution in CIL circuit pegged at 35% for DP and 50% for other rock types Au dissolution at 80% for all rock types.

<sup>2</sup> From dissolution of 35% of feed units to CIL, SART applied on 44.1% / 39.3% of CIL tails solution with/without HL in operation, and 95% Cu recovery from SART.

<sup>3</sup> From dissolution of 85% of feed units to CIL and 99.5% recovery in gold circuit.

<sup>4</sup> From dissolution of 60% of feed units to CIL and 99.5% recovery in gold circuit.

<sup>5</sup> Per mass balance, at indicated average feed grade per rock type in mine plan.

The oxide ore, which does not respond well to flotation and contains lower copper values, is subjected to HL for the recovery of the gold content by dissolution. The interpreted results indicate a gross leaching recovery of 50% for gold and 10% for copper. The net recoveries are reduced by the shorter leach time which is curtailed by the need to convert the area into part of the waste rock facility (WRF). An anticipated gold recovery in the refinery of 99.5% and of copper recovery in the SART circuit of 85% are also applied. A bleed of solutions from the CIL circuit tailings and the HL system will be treated through a SART circuit, to remove copper. The copper is precipitated as a sulphide and is dried, bagged, and transported by trucks for sale to smelters. Approximately 1% of the total contained copper is recovered to SART concentrate.

## **17.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES**

The mineral resource estimates were prepared under the direction of Benjamin Sanfurgo, Senior Ore Reserve Specialist, Barrick Gold Corporation. Mineral reserve estimates were prepared by AMEC under the direction of Mike Mutchler, an employee of CMC. The Qualified Person for the estimates is Robert Henderson, P.Eng., a Kinross employee.

The Mineral Resource estimate has an effective date of 31 December 2009. The effective date of the Mineral Reserves is also 31 December 2009.

### **17.1 Database**

The cut-off date for assays in the database was August 15, 2009. The database includes all samples collected from the 2008–2009 geotechnical drill program.

### **17.2 Mineral Resources**

#### **17.2.1 Geological Models**

Three dimensional solid wire-frames were created for intrusive rocks, breccias, stockwork intensity, K-feldspar alteration intensity, and oxidation intensity. Planar surfaces were generated to define contacts between stratiform volcanic units.

Based on field observations and review of the completed geologic models, CMC concluded that the Cerro Casale gold and copper model would be best represented by a combined lithological–stockwork intensity and potassic alteration model. Kinross concurred with the approach.

A block size of 20 m x 20 m x 16 m was used.

#### **17.2.2 Estimation Domains**

Six estimation domains were determined: Catalina breccia, hydrothermal and microdiorite breccia, stockwork and/or potassic-altered intrusive and volcanic rocks, unaltered intrusive and volcanic rocks, and unaltered volcanic rocks.

Boundaries between breccias, altered intrusive, and altered volcanic rocks were found to be soft with respect to gold and were therefore grouped into a single domain for gold estimation. Breccias and altered intrusive rocks were grouped into a single domain for copper and silver estimation, but altered volcanic rocks were treated as a separate domain. Boundaries between each of the gold, copper and silver estimation domains were treated as hard boundaries for estimation purposes.

### 17.2.3 Grade Capping

Outlier grades of gold, copper, and silver were examined using histograms and cumulative frequency distribution plots for each domain. Caps were applied to raw assays prior to compositing. The global reduction in metal due to capping gold and copper is less than 1%, and about 13% for silver. Caps are summarized in Table 17-1.

**Table 17-1: Grade Caps**

| Description             | Au Cap (g/t) | Cu Cap (%) | Ag Cap (g/t) |
|-------------------------|--------------|------------|--------------|
| Catalina Breccia        | 19.0         | 4.0        | 20           |
| Breccia + Altered Rocks | 3.0          | 1.3        | 200          |
| Fresh Intrusive         | 2.0          | 0.7        | 50           |
| Fresh Volcanic          | 0.6          | 0.9        | 50           |
| Undefined               | 0.2          | 0.4        | 10           |
| All Zones               | 19.0         | 4.0        | 10           |

### 17.2.4 Composites

Raw assays were composited prior to estimation to place the assay data on near constant support. Composites were created down each hole at 16 m intervals using capped raw assays.

After compositing, the grade distribution was compared to the original underlying samples to determine if there was any bias. In six drill holes, the last composite grade at the end of the hole was found to have gold grades higher than in surrounding samples. These six composites were manually adjusted to grades consistent with nearby samples in order to minimize smearing grade in those areas.

Dilution attributed to compositing to 16 m, using a 0.25 g/t Au cut-off, is 8%, with an attendant ore loss of 2.1%.

### 17.2.5 Variography

Omni-directional variograms and correlograms were developed for gold, copper, and silver to determine grade continuity of these elements. Gold and copper have long ranges with low nugget effects, whereas silver has a high nugget effect.

Ranges for Au were found to be 180 m at 90% of the sample variance, 100 m at 80% of the sample variance, and 40 m at 60% of the sample variance. For gold, breccias, altered intrusive rocks, and altered volcanic rocks were grouped together into a single domain for estimation, as they have similar grade distributions and matching contact profiles. This domain accounts for 77% of the composite data and demonstrates the greatest continuity of mineralization.

Ranges for Cu were found to be 330 m at 90% of the sample variance, 200 m at 80% of the sample variance, and 80 m at 60% of the sample variance.

Silver correlograms have a high nugget effect; near 60% of sill variance using a 1 g/t indicator variogram and near 80% of sill variance using an omni-directional correlogram. This observed difference could be the result of modelling the continuity of low silver values or of the analytic technique used to determine silver grade. It should be noted, however, that the results indicate an unbiased population in the validation study.

#### **17.2.6 Bulk Density**

Density (SG) values in the block model were assigned based on bulk density measurements as described in Section 12. Assigned values were applied by domain, oxide code, and lithology using a script.

#### **17.2.7 Estimation Methodology**

Gold, copper, and silver grades were modeled using grade interpolation by inverse distance weighting to the second power ( $ID^2$ ) interpolation. Capped grades were composited into 16 m composite intervals and used for grade interpolation. Nearest neighbour (NN) polygonal estimation and ordinary kriging (OK) were also interpolated for confirmatory validation purposes.

Grade estimation was run as a series of estimation passes with progressively increasing search distances and/or decreasing criteria for the minimum number of holes required to calculate an estimate. Once an estimate was successfully calculated within a given block, subsequent passes could not overwrite the estimated value. The first pass for all elements was a box search with search radii set to half the size of one block in the model. The radii of the subsequent search ellipsoids correspond to the ranges at 60%, 80%, 90%, and 100% of the sample variance on the omni-directional correlogram for each metal. The ellipsoids are oriented to conform to geological trends and correspond to the orientation of sub-parallel breccias and stockwork zones.

#### **17.2.8 Validation**

The block model was validated by a series of steps including: inspection of the estimation run files, visual inspection of the block model against the drill data, review of grade variability, checks for bias, swath plots, comparison against the 2008 pre-feasibility study results, and comparison of two interpolation techniques ( $ID^2$  and kriging) both globally and by pit phase.

## **17.2.9 Mineral Resource Classification**

The mineral resources of the Project were classified into Measured, Indicated, and Inferred mineral resource categories by CMC.

Designation of classification category was derived from gold variography. Ranges derived from omni-directional correlograms for gold were used to define the distance to the nearest hole for each classification category. In addition to this distance, the number of holes used to estimate a block was also considered. The distance applied for the Measured component of the resource is consistent with the range at 60% of the sill; 80% of the sill was used for Indicated resources, and 90% of the sill was used for Inferred resources. Resource classifications were assigned as shown in Table 17-2.

Once the resource classification was assigned to each block, a routine was run to identify isolated Inferred blocks surrounded by Measured and Indicated blocks as well as isolated Measured and Indicated blocks surrounded by Inferred or unclassified blocks. In the first case, the routine counted the number of Measured and Indicated blocks that surrounded each Inferred block on each bench. If six or more of the eight adjacent blocks were classified as Measured or Indicated, the block was reclassified as Indicated. Similarly, the routine counted the number of Inferred and unclassified blocks surrounding each Measured or Indicated block on each bench. If six or more of the eight adjacent blocks were classified as Inferred, or lower, the block was downgraded to the Inferred category. Approximately 1% of the blocks in the model were reclassified using this method.

The current resource model was visually validated against drill data in plan and section. In addition, spatial statistical work and validation were completed by CMC to support this classification scheme.

## **17.2.10 Assessment of Reasonable Prospects of Economic Extraction**

Mineral resources are defined within a Whittle optimized pit shell that used the parameters summarized in Table 17-3.

## **17.2.11 Mineral Resource Statement**

The Mineral Resources for Cerro Casale at a zero net smelter return (NSR) cut-off are summarized in Table 17-4. Mineral Resources have an effective date of 31 December 2009. Mineral Resources are classified in accordance with the 2005 CIM Definition Standards for Mineral Resources and Mineral Reserves. Mineral Resources are exclusive of Mineral Reserves and do not include dilution. Readers are cautioned that Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.

**Table 17-2: Resource Classification Criteria**

| Category  | Criteria                           |
|-----------|------------------------------------|
| Measured  | 1 hole in 10 m<br>2 holes in 40 m  |
| Indicated | 2 holes in 100 m<br>1 hole in 45 m |
| Inferred  | 2 holes in 180 m                   |

**Table 17-3: Whittle Optimized Pit Shell Parameter Data**

| Parameter                  | Amount and Unit     |
|----------------------------|---------------------|
| Gold price                 | \$900/oz            |
| Copper prices              | \$2.25/lb           |
| Silver prices              | \$14.50/oz          |
| Mining cost                | \$1.52/t mined      |
| Stockpile re-handling cost | \$0.80/t re-handled |
| Processing cost            | \$5.50/t milled     |
| HL cost                    | \$2.50/t leached    |
| G&A cost                   | \$0.72/t milled     |
| Royalty                    | \$0.003/t milled    |

**Table 17-4: Measured, Indicated, and Inferred Mineral Resources**

| Mineral Resource Category | Tonnage (kt)   | Grades      |             |              | Contained Metal |              |              |
|---------------------------|----------------|-------------|-------------|--------------|-----------------|--------------|--------------|
|                           |                | Gold (g/t)  | Copper (%)  | Silver (g/t) | Gold (koz)      | Copper (Mlb) | Silver (koz) |
| Measured                  | 14,694         | 0.33        | 0.16        | 1.27         | 158             | 51           | 597          |
| Indicated                 | 202,771        | 0.39        | 0.19        | 1.05         | 2,571           | 829          | 6,849        |
| <b>Total M+I</b>          | <b>217,465</b> | <b>0.39</b> | <b>0.18</b> | <b>1.06</b>  | <b>2,730</b>    | <b>880</b>   | <b>7,447</b> |
| Inferred                  | 443,878        | 0.37        | 0.19        | 1.07         | 5,139           | 1,873        | 15,214       |

Notes:

1. Mineral resources are exclusive of mineral reserves and do not include dilution;
2. Mineral resources that are not mineral reserves do not have demonstrated economic viability;
3. Mineral resources are reported to a gold price of US\$900/oz, a silver price of US\$14.50, and a copper price of US\$2.25/lb;
4. Mineral resources are defined with a Lerchs-Grossman pit shell;
5. Tonnages are rounded to the nearest 1,000 tonnes, grades are rounded to two decimal places for Au and Cu, grades for Ag are rounded to one decimal place;
6. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
7. Tonnage and grade measurements are in metric units. Gold ounces are reported as troy ounces, copper pounds as US imperial pounds.

### 17.3 Mineral Reserves

Mineral Reserves were estimated using metal prices of US\$800/oz gold, US\$12.50/oz silver, and US\$2/lb copper.

A nominal mining rate of 225 Mt/a, smoothed for truck requirements, is required to provide the nominal 57.6 Mt/a of sulphide mill feed. It is assumed that the swell factor would be 40% and the moisture content 2.5%.

#### 17.3.1 Cut-off Grades

The geological block model breaks the Mineral Resources into eight ore types each with unique metallurgical parameters.

Ore and waste determination is based on the estimation of a net economic benefit that considers metal prices, recoveries, and operating and selling costs. The estimated surface of oxidation will be used to segregate heap leach feed from mill feed. This surface can be updated as mining progresses and more information is available to better define its location. In addition to the rehandle required at the end of the mine life due to the elevated cut-off used during the first five years of mining, operational rehandling of 5% is included during the mine life to account for unplanned down time at the crushers.

Mill ore economic cut-off grades vary by ore types based on the different recoveries. Gold economic cut-off grades range from 0.31–0.37 g/t Au and copper economic cut-off grades range from 0.19% to 0.23% Cu, assuming no contribution from other metals. Actual cut-off is based on zero NSR estimations applying all revenue and cost. Heap leach oxide economic cut-off grade is 0.20 g/t gold with only material categorized as oxide considered as heap leach feed. The ore cut-off grades are variable by ore type.

Cut-off grades are summarized in Table 17-5. Process plant throughput is not expected to be significantly impacted by the variation in rock types.

#### 17.3.2 Dilution

Mining loss and dilution will consist of lateral and vertical dilution. The amount of dilution at Cerro Casale is projected to be small (less than 1%), due to the large, low-grade, disseminated nature of the mineralization.



**Table 17-5: Estimated Economic Cut-Off Grade by Ore Type**

| Parameter<br>Ore Type            | 100<br>GRD | 200<br>DP | 300<br>MDBX | 400<br>VCGL | 500<br>VO | 600<br>Oxide |
|----------------------------------|------------|-----------|-------------|-------------|-----------|--------------|
| Au Price (US\$/oz)               | 800        | 800       | 800         | 800         | 800       | 800          |
| Au refining Cost (US\$/oz)       | 6.5        | 6.5       | 6.5         | 6.5         | 6.5       | 6.5          |
| Cu Price (US\$/lb)               | 2.00       | 2.00      | 2.00        | 2.00        | 2.00      | 2.00         |
| Cu Price Participation (US\$/lb) | 0.025      | 0.025     | 0.025       | 0.025       | 0.025     | 0.025        |
| Cu Selling Cost (US\$/lb)        | 0.280      | 0.339     | 0.319       | 0.310       | 0.310     | 0.339        |
| Processing Cost (US\$/t)         | 5.502      | 5.502     | 5.502       | 5.502       | 5.502     | 0.231        |
| G&A Cost (US\$/t)                | 0.72       | 0.72      | 0.72        | 0.72        | 0.72      | —            |
| Royalty (US\$/t)                 | 0.003      | 0.003     | 0.003       | 0.003       | 0.003     | —            |
| Au Recovery (%)                  | 79.1       | 66.4      | 71.8        | 71.5        | 72.5      | 49.8         |
| Cu Recovery (%)                  | 87.2       | 75.9      | 87.5        | 86.3        | 86.3      | 9.5          |
| Au Cut-off Grade (g/t)           | 0.31       | 0.37      | 0.34        | 0.34        | 0.34      | 0.20         |
| Cu Cut-off Grade (%)             | 0.19       | 0.23      | 0.19        | 0.20        | 0.20      | —            |

Note: Au and Cu cut-off grades above are estimated assuming no contribution from the other metal, whereas the actual cut-off is based on zero NSR estimations on a block-by-block basis applying all revenue and associated costs

### 17.3.3 Pit Optimization Parameters

The parameters used for Mineral Reserve pit optimization are shown in Table 17-6 and Table 17-7.

**Table 17-6: Processing Costs and Recoveries used in Pit Optimization**

| Parameter                         | Value Used in<br>2008 Pre-feasibility Study | Value Used in<br>2010 Feasibility Study |
|-----------------------------------|---------------------------------------------|-----------------------------------------|
| Au Price (US\$/oz)                | 750                                         | 800                                     |
| Au refining Cost (US\$/oz)        | 6.50                                        | 6.5                                     |
| Cu Price (US\$/lb)                | 2.00                                        | 2                                       |
| Cu Price Participation (US\$/lb)  | 0.025                                       | 0.025                                   |
| Cu Selling Cost (DP) (US\$/lb)    | 0.394                                       | 0.339                                   |
| Cu Selling Cost (GRD) (US\$/lb)   | 0.394                                       | 0.28                                    |
| Cu Selling Cost (MMDBX) (US\$/lb) | 0.394                                       | 0.319                                   |
| Cu Selling Cost (SMDBX) (US\$/lb) | 0.394                                       | 0.319                                   |
| Cu Selling Cost (VCGL) (US\$/lb)  | 0.394                                       | 0.31                                    |
| HL Processing Cost (US\$/t)       | 2.861                                       | 2.504                                   |
| Sulphide Processing Cost (US\$/t) | 5.901                                       | 5.502                                   |
| G&A Cost (US\$/t)                 | 0.626                                       | 0.72                                    |
| Royalty(*) (US\$/t)               | -                                           | 0.003                                   |
| Au Recovery (**) (DP) (%)         | 76.3                                        | 66.4                                    |
| Au Recovery (**) (GRD) (%)        | 66.6                                        | 79.5                                    |
| Au Recovery (**) (MMDBX)          | 69.6                                        | 71.8                                    |
| Au Recovery (**) (SMDBX)          | 69.6                                        | 70.5                                    |
| Au Recovery (**) (VCGL) (%)       | 64.7                                        | 71.5                                    |
| Au Recovery (Oxide) – HL (%)      | 50.0                                        | 49.8                                    |
| Cu Recovery (**) (DP) (%)         | 81.1                                        | 75.9                                    |
| Cu Recovery (**) (GRD) (%)        | 84.9                                        | 87.2                                    |
| Cu Recovery (**) (MMDBX)          | 85.9                                        | 87.5                                    |
| Cu Recovery (**) (SMDBX)          | 85.9                                        | 72.1                                    |
| Cu Recovery (**) (VCGL) (%)       | 80.1                                        | 86.3                                    |
| Cu Recovery (Oxide) – HL (%)      | 10.9                                        | 9.5                                     |

(\*) 3 MU\$ per year

(\*\*) For 2010 feasibility study recoveries are variable by grade with the average value stated here. The 2008 pre-feasibility recoveries were constant values regardless of grade.

**Table 17-7: Mining Costs used in Pit Optimization**

| Mining Cost                                                | Value Used in<br>2008 Pre-feasibility<br>Study | Value Used in<br>2010 Feasibility<br>Study |
|------------------------------------------------------------|------------------------------------------------|--------------------------------------------|
| Base Mining Cost (ore and waste) (US\$/t) – 16 m benches   | 1.04                                           | 1.283                                      |
| Pit Entrance Elevation (m)                                 | 4,078                                          | 4078                                       |
| Incremental Cost per Bench Above 4078 m Elevation (US\$/t) | 0.012                                          | 0.014                                      |
| Incremental Cost per Bench Below 4078 m Elevation (US\$/t) | 0.024                                          | 0.028                                      |

### 17.3.4 Mineral Reserve Statement

Mineral Reserves for Cerro Casale included only mineralization classified as Measured and Indicated Mineral Resources and are presented in Table 17-8. Included in this total is a sulphide mineral reserve of 1,034 Mt grading, 0.61 g/t Au, 1.48 g/t Ag, and 0.24% Cu and heap-leachable oxide mineral reserves of 178.9 Mt grading 0.49 g/t Au, 1.68 g/t Ag, and 0.07% Cu.

Mineral Reserves are estimated using a US\$800/oz gold price, a US\$12.50/oz silver price, and US\$2.00/lb Cu price, and an economic function that includes variable operating costs and metallurgical recoveries. The effective date for the Mineral Reserves is 31 December 2009.

**Table 17-8: Proven and Probable Mineral Reserves**

| Mineral Reserve<br>Category | Tonnage<br>(kt)  | Grades        |               |                 | Contained Metal |                 |                 |
|-----------------------------|------------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
|                             |                  | Gold<br>(g/t) | Copper<br>(%) | Silver<br>(g/t) | Gold<br>(koz)   | Copper<br>(Mlb) | Silver<br>(koz) |
| Proven                      | 231,551          | 0.64          | 0.19          | 1.88            | 4,766           | 963             | 13,977          |
| Probable                    | 981,334          | 0.58          | 0.22          | 1.42            | 18,403          | 4,819           | 44,752          |
| <b>Total</b>                | <b>1,212,885</b> | <b>0.59</b>   | <b>0.22</b>   | <b>1.51</b>     | <b>23,170</b>   | <b>5,782</b>    | <b>58,728</b>   |

Note:

1. Mineral reserves are estimated using a US\$800/oz gold price, US\$12.50/oz silver price, and a US\$2.00/lb Cu price, and an economic function that includes variable operating costs and metallurgical recoveries.
2. Au and Cu cut-off grades above are estimated assuming no contribution from the other metal, whereas the actual cut-off is based on zero NSR estimations on a block-by-block basis applying all revenue and associated costs.
3. Mineral reserves are reported using an economic function that includes variable operating costs and variable metallurgical recoveries;
4. Tonnages are rounded to the nearest 1,000 tonnes, grades are rounded to two decimal places for Au and Cu, grades for Ag are rounded to one decimal place;
5. Rounding as required by reporting guidelines may result in apparent differences between tonnes, grade and contained metal content;
6. Tonnage and grade measurements are in metric units. Gold ounces are reported as troy ounces, copper pounds as US imperial pounds.

## **18.0 ADDITIONAL REQUIREMENTS FOR TECHNICAL REPORT ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES**

Dates discussed in this section are for illustrative purposes only, as a decision to proceed with mine construction still requires regulatory approval, and approval by CMC, Barrick and Kinross.

### **18.1 Planned Mining Operations**

The Cerro Casale project area is located in high, mountainous terrain with elevations ranging from 3,800 to 4,400 m. Ore grade material exists on or close to the surface. Considerable pre-stripping will be required to access the deeper, more profitable sulphide ore in the early stages of production. The primary crusher is located 500 m south of the ultimate pit limit, although a 2 km haul road is required out of the Stage 1 pit around the east side of Cerro Casale. Waste dumps and low grade stockpiles are located within 500 m of the pit entrance. The Rio Nevado valley will be used to store waste rock. The northern edge of the waste rock dump will form the buttress for the tailings dam. The dumps will be built up to the 4,075 m pit entrance elevation. All mining will be carried out on 16 m benches, with final pit wall berms at 32 m intervals.

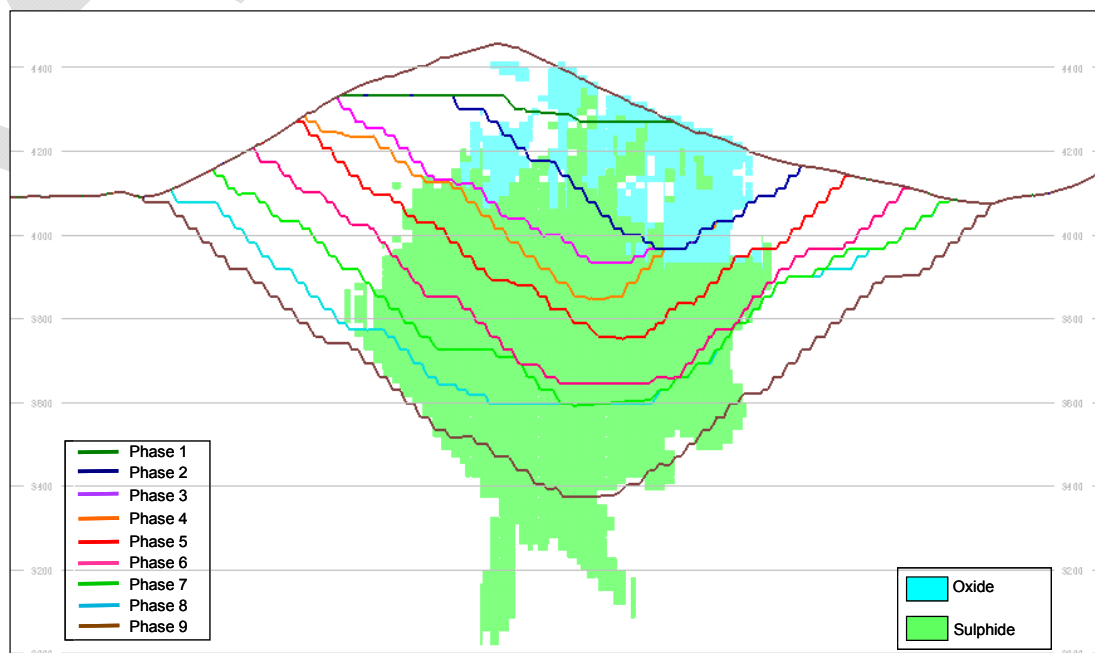
The Cerro Casale Mineral Reserve has been divided into a sequence of nine pit phases of decreasing profitability in order to facilitate an efficient mining schedule and realize the highest project net present value (NPV). The last two of these phases were split into east and west sub-phases in order to defer waste mining and keep the peak mining rate as low as possible.

Figure 18-1 shows the proposed pit phases. Table 18-1 summarizes the production by pit phase.

Mine design and production schedules were developed for a nominal mining rate 225 Mt/a, smoothed for truck requirements, is required to provide the nominal 57.6 Mt/a of sulphide mill feed. Mine production and processing facilities will operate 24 h/d, 7 d/wk, 365 d/a.

Various mine plan scenarios were analyzed prior to selecting an option to operate the mine at a slightly higher cut-off grade during the first five years of mining, and stockpile the marginal grade sulphide ore produced during this period. This would result in a 43 Mt low-grade sulphide stockpile that would be re-handled at the end of the mine life.

**Figure 18-1: Cerro Casale Mining Phases**



**Table 18-1: Quantities by Mining Phase**

| Phase        | Total Material (Mt) | Oxide Ore (Mt) | Sulphide Ore (Mt) | Au Rec. (koz) | Cu Rec. (Mlb) | Ag Rec. (koz) | Strip Ratio | Profit per oz Au (\$) | Profit per lb Cu (\$) | Profit per t of Ore (\$) | Profit per t of Material (\$) |
|--------------|---------------------|----------------|-------------------|---------------|---------------|---------------|-------------|-----------------------|-----------------------|--------------------------|-------------------------------|
| 1            | 188.8               | 71.7           | 41.0              | 1,130         | 129           | 175           | 0.68        | 344                   | 3.0                   | 3.5                      | 2.1                           |
| 2            | 177.8               | 74.4           | 55.0              | 1,398         | 213           | 296           | 0.37        | 486                   | 3.2                   | 5.2                      | 3.8                           |
| 3            | 161.9               | 17.1           | 60.8              | 874           | 265           | 383           | 1.08        | 540                   | 1.8                   | 6.1                      | 2.9                           |
| 4            | 280.2               | 9.5            | 110.2             | 1,739         | 574           | 858           | 1.34        | 674                   | 2.0                   | 9.8                      | 4.2                           |
| 5            | 307.2               | 7.4            | 125.5             | 1,914         | 560           | 1,461         | 1.31        | 621                   | 2.1                   | 8.9                      | 3.9                           |
| 6            | 497.8               | 0.2            | 189.8             | 3,117         | 983           | 1,433         | 1.62        | 686                   | 2.2                   | 11.3                     | 4.3                           |
| 7            | 505.6               | 0.0            | 109.8             | 1,342         | 500           | 729           | 3.60        | 285                   | 0.8                   | 3.5                      | 0.8                           |
| 8            | 448.8               | 0.0            | 124.2             | 1,914         | 562           | 820           | 2.61        | 510                   | 1.7                   | 7.9                      | 2.2                           |
| 9            | 876.0               | 0.0            | 237.3             | 3,529         | 1,161         | 1,693         | 2.69        | 499                   | 1.5                   | 7.4                      | 2.0                           |
| <b>Total</b> | <b>3,444.1</b>      | <b>180.3</b>   | <b>1,053.5</b>    | <b>16,957</b> | <b>4,948</b>  | <b>7,849</b>  | <b>1.79</b> | <b>540</b>            | <b>1.9</b>            | <b>7.4</b>               | <b>2.7</b>                    |

### 18.1.1 Pit Design

The Whittle<sup>®</sup> pit optimizer produces a series of nested pits at a range of revenue factors, with revenue factor 1 being equal to the defined economic parameters that were included in Table 17-5 and Table 17-6. Sustaining capital allowances were not added to either the processing or mining costs. No discounting was applied; either in the form of direct bench discounting or NPV analysis or scheduled nested shells. Revenue factor 1.0 shells were chosen for ultimate pit design guidance. Following

review of the pit shells, and comparison of the no discounting scenario with 10% and 5% discount alternatives, Pit Shell 61 was chosen as the base case.

Sensitivity runs were performed on the base case. The pit limit, in terms of contained metal, was insensitive to the following variables:

- Mining and processing costs ( $\pm 10\%$ );
- Slope angles ( $\pm 4^\circ$ );
- Metal prices ( $\pm 10\%$ );
- Inclusion of heap leaching; and
- Inclusion of silver.

The pit optimization was based on the profitability of the in-situ blocks, and on the ability of each block of ore to cover the cost of stripping waste to access the ore block. Since the mining phases are relatively large, minimum mining width is not expected to be a significant concern with the exception of some isolated areas. The optimized pit shell from Whittle® was smoothed for operability and ramps were added for access.

Haulage ramps internal to the final pit limit are designed to a maximum grade of 10% and to a width of 40 m. Haulage ramps are designed to accommodate the removal of material (ore and waste) from the mining phases described above. Due to the east–west split of the mining phases into sub-phases, designed to minimize peak mine capacity, a separate but interconnecting system of main ramps is required. This double ramping system does not affect overall slope angles or total pit volume, since geotechnical berms are required in any event to limit the inter-ramp slope heights to the recommended maximum of 238 m (224 m for 16 m benches). Haulage ramps external to the pit limit have been designed to a maximum grade of 10% and to a width of 40 m width.

### 18.1.2 Equipment

The selected mining equipment includes the largest proven class of each equipment type to keep overall mining costs as low as possible and to maximize production rates with the fewest possible number of units.

Open pit mining will be carried out with haul trucks and a combination of electric shovels, hydraulic excavators, and large front-end loaders.

The initial production fleet will consist of:

- Fifty-five 360 t trucks (increasing to 57 between 2022 and 2023);

- Five 1,200 t class electric shovels;
- Two 700 t class hydraulic shovels;
- Two 40 m<sup>3</sup> rubber-tired loaders

During the PFS, it was determined that the truck fleet could be augmented by a trolley-assist system in 2022 as the majority of mining progresses below the pit entrance elevation of 4,078 m. Once installed, trolley lines could account for more than half (59%) of the uphill haulage due to the relatively high permanence of trolley lines installed on the in-pit haulage ramps. Higher diesel and lower electricity costs favour trolley-assisted haulage. However, due to a technology change, trolley-assisted haulage requires additional engineering to bring it to a feasibility level, and was not incorporated in the 2010 feasibility study.

### **18.1.3 Drill and Blast**

All rock will require drilling for sampling and blasting purposes. A fleet of seventeen 200 mm diesel-powered blasthole drills will perform this function for ore. Three 311 mm electric-drive blasthole drills (increasing to nine between 2016 and 2021) will be required for waste. Penetration rate assumptions will require more detailed investigation during the basic and detailed engineering stage of this Project since drill quantities are sensitive to assumptions made.

The bulk mining approach chosen for Cerro Casale will require the ability to accurately predict the contact between the different material types (ore and waste). Blasthole patterns will be designed by the drill and blast engineers for optimal digability, cost, and fragmentation for ore areas. Consideration will be given to spacing requirements for assay density, since all blast holes in ore will be sampled and assayed for ore control purposes. Additionally, one in twenty waste drill holes will be selected for waste characterization. Blasthole sampling will generate approximately 200–250 samples per day. Blast hole data will be used to construct

Mining polygons, adjusted for blast movement, will be displayed with their pertinent ore or waste properties on the production mine plans, and uploaded to the GPS systems on the loading and support equipment. The use of the GPS system will eliminate the operator's reliance on the traditional survey staked control which will be difficult to establish and maintain at high altitude and in cold weather.

### **18.1.4 Work Rosters**

Work rosters for mine operations were assumed to rotate on 7-days-in/7-days-out which is typical for this type of isolated mining project with camp accommodations. The work roster for staff was assumed to be an 8-days-in/6-days-out rotation to allow

for one day of overlap at each shift change for transfer of information. Management were assumed to work 4-days-in/3-days-out with a rotating weekend coverage assignment.

## **18.2 Proposed Production Plan and Schedule**

Mine road construction will begin in the last quarter of 2011. Pre-stripping of Cerro Casale will commence in the last quarter of 2012, two years before to the initial start-up of the sulphide plant, with quantities of sulphide ore sent to stockpile. Oxide ore heap leaching will begin in the last quarter of 2013, a year prior to the initial start-up of the sulphide plant. Initial pre-stripping of 83 Mt of waste material is required before the start of gold production from the heap leach. The heap leach pad will receive ROM oxide feed over a six-year period.

The sulphide concentrator is planned to come on stream during the fourth quarter of 2014 and will build-up to its full production rate of 160,000 t/d (57.6 Mt/a) by the fourth quarter of 2015, assuming a pre-stripping start during the last quarter 2012.

The mine life of the current mineral reserve is 20 years. Sulphide ore stockpiled during the pre-stripping period will be reclaimed partly during the first year of production.

Table 18-2 presents the proposed life-of-mine sulphide mill feed. Table 18-3 presents the envisaged HL production schedule.





**Table 18-2: Projected Yearly Metal Production – Sulphide Ore**

| Year  | Projected Recovery<br>to flotation conc. |       |       | Projected Grades<br>to flotation conc. |        |        | Conc.<br>Tonnage<br>(kt) | Projected Recoveries |                     |                     | Total Recovery |        |        | Metal Production |            |            |
|-------|------------------------------------------|-------|-------|----------------------------------------|--------|--------|--------------------------|----------------------|---------------------|---------------------|----------------|--------|--------|------------------|------------|------------|
|       |                                          |       |       |                                        |        |        |                          | to SART              | to doré<br>from CIL | to doré<br>from CIL |                |        |        | Cu               | Au         | Ag         |
|       | Cu                                       | Au    | Ag    | %Cu                                    | g/t Au | g/t Ag |                          | Cu (%)               | Au (%)              | Ag (%)              | Cu (%)         | Au (%) | Ag (%) | (Mlb)            | (oz)       | (oz)       |
| 2014  | 78.1%                                    | 56.8% | 54.6% | 25.4                                   | 60.9   | 94.4   | 13.1                     | 1.23%                | 18.2%               | 12.2%               | 79.3%          | 75.0%  | 66.8%  | 7.4              | 33,903     | 48,665     |
| 2015  | 75.6%                                    | 54.4% | 53.5% | 25.2                                   | 62.2   | 143.4  | 269.5                    | 1.26%                | 19.7%               | 12.2%               | 76.9%          | 74.2%  | 65.7%  | 152.3            | 734,237    | 1,525,914  |
| 2016  | 83.5%                                    | 63.8% | 65.5% | 25.5                                   | 49.3   | 126.1  | 451.6                    | 1.06%                | 11.3%               | 10.4%               | 84.5%          | 75.0%  | 75.9%  | 257.4            | 842,407    | 2,121,170  |
| 2017  | 87.2%                                    | 68.5% | 71.9% | 25.7                                   | 45.2   | 105.0  | 545.2                    | 0.92%                | 8.4%                | 8.4%                | 88.1%          | 76.9%  | 80.3%  | 311.9            | 888,975    | 2,054,995  |
| 2018  | 88.3%                                    | 68.1% | 72.4% | 26.4                                   | 53.8   | 90.3   | 552.7                    | 0.91%                | 11.1%               | 9.0%                | 89.2%          | 79.2%  | 81.4%  | 324.7            | 1,111,027  | 1,804,933  |
| 2019  | 82.2%                                    | 58.8% | 64.7% | 25.7                                   | 57.4   | 160.0  | 373.4                    | 1.07%                | 16.4%               | 10.5%               | 83.3%          | 75.2%  | 75.2%  | 214.4            | 882,064    | 2,231,044  |
| 2020  | 90.6%                                    | 69.9% | 78.0% | 26.5                                   | 52.1   | 177.9  | 504.8                    | 1.03%                | 8.6%                | 7.2%                | 91.6%          | 78.5%  | 85.2%  | 298.8            | 950,040    | 3,153,160  |
| 2021  | 89.0%                                    | 65.5% | 73.9% | 26.7                                   | 56.2   | 162.2  | 402.3                    | 0.95%                | 10.4%               | 7.1%                | 89.9%          | 76.0%  | 81.0%  | 239.2            | 842,941    | 2,299,025  |
| 2022  | 92.0%                                    | 70.3% | 78.0% | 27.8                                   | 53.9   | 136.2  | 501.0                    | 0.98%                | 9.9%                | 7.6%                | 93.0%          | 80.1%  | 85.7%  | 310.2            | 991,101    | 2,409,466  |
| 2023  | 92.9%                                    | 72.1% | 83.0% | 31.0                                   | 55.2   | 152.9  | 591.9                    | 0.89%                | 9.4%                | 6.5%                | 93.8%          | 81.5%  | 89.5%  | 408.2            | 1,188,177  | 3,138,384  |
| 2024  | 91.8%                                    | 69.7% | 75.8% | 26.9                                   | 46.5   | 145.4  | 421.0                    | 0.76%                | 5.8%                | 8.0%                | 92.6%          | 75.4%  | 83.9%  | 251.3            | 681,077    | 2,175,891  |
| 2025  | 92.7%                                    | 69.5% | 72.2% | 26.3                                   | 50.5   | 110.1  | 419.5                    | 0.84%                | 7.9%                | 10.1%               | 93.6%          | 77.4%  | 82.3%  | 245.0            | 758,381    | 1,691,294  |
| 2026  | 92.9%                                    | 71.2% | 78.7% | 28.4                                   | 55.1   | 132.6  | 493.4                    | 0.79%                | 8.2%                | 8.4%                | 93.7%          | 79.5%  | 87.1%  | 311.6            | 975,666    | 2,327,672  |
| 2027  | 92.9%                                    | 72.6% | 79.8% | 29.1                                   | 53.9   | 143.1  | 499.2                    | 0.87%                | 7.8%                | 7.8%                | 93.8%          | 80.4%  | 87.6%  | 323.4            | 958,078    | 2,521,255  |
| 2028  | 92.9%                                    | 69.8% | 76.8% | 26.0                                   | 49.1   | 145.2  | 418.0                    | 0.84%                | 7.4%                | 8.4%                | 93.7%          | 77.2%  | 85.2%  | 241.6            | 729,609    | 2,165,084  |
| 2029  | 93.0%                                    | 70.3% | 80.4% | 28.4                                   | 58.2   | 154.4  | 477.7                    | 0.98%                | 10.2%               | 7.0%                | 94.0%          | 80.5%  | 87.5%  | 302.5            | 1,024,374  | 2,579,467  |
| 2030  | 92.9%                                    | 73.4% | 75.3% | 28.2                                   | 54.3   | 119.5  | 472.1                    | 0.79%                | 7.3%                | 9.4%                | 93.7%          | 80.7%  | 84.7%  | 296.4            | 905,850    | 2,040,238  |
| 2031  | 92.8%                                    | 74.7% | 77.6% | 29.0                                   | 48.7   | 126.1  | 497.6                    | 0.68%                | 4.8%                | 9.4%                | 93.5%          | 79.4%  | 86.9%  | 320.7            | 828,764    | 2,260,652  |
| 2032  | 79.2%                                    | 56.2% | 52.3% | 27.7                                   | 49.0   | 148.3  | 279.1                    | 0.56%                | 12.5%               | 10.5%               | 79.7%          | 68.7%  | 62.8%  | 171.6            | 537,629    | 1,599,261  |
| 2033  | 64.8%                                    | 43.3% | 40.2% | 24.5                                   | 45.6   | 179.2  | 1.3                      | 0.51%                | 19.0%               | 11.3%               | 65.3%          | 62.3%  | 51.5%  | 0.7              | 2,813      | 9,851      |
| TOTAL | 89.6%                                    | 68.0% | 73.2% | 27.4                                   | 52.7   | 136.5  | 8,184                    | 0.90%                | 9.9%                | 8.6%                | 90.5%          | 77.9%  | 81.9%  | 4,989            | 15,867,112 | 40,157,419 |

Note: Years discussed in this table are for illustrative purposes only, as a decision to proceed with mine construction still requires regulatory approval, and approval of CMC and the Owners. Totals may vary due to rounding.

**Table 18-3: Projected Yearly Metal Production – Oxide Ore**

| Year  | Cu from SART(k lb) | Au from CIC (oz) |
|-------|--------------------|------------------|
| 2014  | 1,442              | 112,638          |
| 2015  | 2,938              | 188,493          |
| 2016  | 3,883              | 240,790          |
| 2017  | 4,658              | 261,108          |
| 2018  | 4,855              | 244,750          |
| 2019  | 3,305              | 162,185          |
| 2020  | 1,711              | 78,804           |
| TOTAL | 22,792             | 1,288,768        |

### 18.3 Geotechnical

CMC's geological model was used to subdivide the rock mass into ten Geotechnical Units within which the strength, competency and behaviour of the rock mass is expected to be relatively consistent. The rock mass was first divided into two major geotechnical units based on the two main lithological groupings (i.e., Intrusives and Volcanics). These were further subdivided on the basis of lithology and rock mass quality into 10 geotechnical units.

Results of geomechanical core logging indicate that rock mass competency generally increases with depth. With the exception of the breccia geotechnical unit, rock mass ratings (RMRs) ranged from about 66 to 79 overall, which according to Bieniawski (1976) corresponds to "good rock". A mean RMR of 89.5 (i.e., "very good rock") was calculated for the breccia geotechnical unit.

Geomechanical parameters obtained from core and the results of laboratory testing were used to define discontinuity and rock mass shear strength parameters input into subsequent stability analyses. Design discontinuity shear strengths derived for kinematic analyses of benches and inter-ramp slopes ranged from  $\Phi' = 23.5^\circ$ ,  $c' = 0$  for faults to  $\Phi' = 37^\circ$ ,  $c' = 0$  for joints.

Slope stability analyses conducted for Cerro Casale first involved the assessment of kinematically possible failure modes involving geologic structural discontinuities that could result in failure of individual benches and inter-ramp slopes. The first step in this analysis was to subdivide the proposed ultimate pit into structural domains. Structural domains were further subdivided based on the distribution of the two major geotechnical units: Intrusives and Volcanics. Within a given structural domain and major geotechnical unit, common wall orientations were identified based on average slope azimuths to define kinematic sectors. Stereographic, limit equilibrium, and statistical analyses were then conducted to assess the potential for development of kinematically possible failures involving discontinuity sets (faults and joints) on

benches and inter-ramp slopes. Separate inter-ramp slope design criteria were then developed for each kinematic sector. Results of these assessments were used in conjunction with assessments of rock mass quality to develop provisional inter-ramp slope design criteria.

The recommended inter-ramp slope angles (IRAs) range from 39° to 56° with double (32 m high) benches in most areas of the proposed open pit. A maximum inter-ramp slope height of 224 m is also recommended to provide stress de-coupling and operational flexibility to remediate inter-ramp instabilities should they occur. Where no ramps are present, equivalent step-outs should be placed in the design at nominally 224 m vertical intervals. A nominal ramp/step-out width of 35 m has been assumed for this design.

Incorporation of the geotechnical design criteria into the ultimate mine has been completed (Piteau 2010b). This is an iterative process whereby the mine planners develop a revised pit configuration that considers the geotechnical design criteria and the shape of the orebody, and incorporates a logical ramp system. The revised pit geometry is then reviewed to confirm compliance with the geotechnical criteria, and if required, additional revisions are recommended, triggering an additional iterative cycle.

The recommended slope design criteria are considered to be appropriate for evaluation of the economics and sensitivity of the project for feasibility assessment purposes. For most feasibility-level studies, there is a common expectation that the recommended slope angles will generally be accurate to within about  $\pm 2^\circ$  to  $\pm 3^\circ$ . However, in cases such as Cerro Casale, where the available information is insufficient to support this level of accuracy, rather than broadening the confidence limits, Piteau adopted a conservative approach in which the recommended slope angles were adjusted to limit the potential down-side to about 2° to 3°.

#### **18.4 Hydrological Considerations**

A conceptual groundwater model was developed. The interpreted equi-potentials are more subdued than the surface topography, but follow the general trend of the surface, which is typical of groundwater flow regimes in mountainous terrain. Recharge occurs on the valley slopes, while discharge is limited to the valley bottoms. A low hydraulic gradient interpreted in the eastern portion of the pit indicates the rock mass in this area is more permeable than the rock mass in the western portion of the pit and beneath the lower valley slopes, where much higher hydraulic gradients are indicated.

Analysis of hydrogeological data from the geotechnical investigations for the open pit and data from hydrogeological investigations for the overall project demonstrate that

the ore body is hosted in a relatively low permeability rock mass that will limit the quantity of groundwater seepage into the pit.

The conceptual groundwater model was rationalized against the site water balance model for the Upper Rio Nevado basin that was developed by BGC. Based on this model, an average annual groundwater recharge rate of 24 mm/year, equivalent to a mean groundwater baseflow of 0.76 L/s/km<sup>2</sup>, is estimated for the basin. The site water balance divided the basin into three elevation zones with differing recharge rates, based on changes in precipitation with elevation. Infiltration rates of 17 mm/a, 21.5 mm/a and 32.1 mm/a were estimated for the 3500–4000 m, 4000–4500 m and >4500 m elevation bands.

The water balance model and interpreted flow regime were used to calibrate a Modflow® 3D groundwater numerical model.

The pit will not penetrate the interpreted water table elevation until 2017. After that time, groundwater inflows are predicted to increase from about 2 L/s to 10 L/s, to between 40–60 L/s by the end of mining. Seepage inflows in this range can be managed with in-pit sumps.

Requirements for pit water management were therefore limited to operational issues. A deep well dewatering system was recommended to help reduce wet blast hole conditions in sinking cuts and demands on sinking cut sumps, once mining has reached the water table. In-pit sumps will also be required to manage surface water runoff and any groundwater seepage not intercepted by wells, and to relay dewatering well flows from the pit.

A phased series of 19 dewatering wells was designed for the Cerro Casale pit. Wells would be installed around the perimeter of the pit starting in 2016, and would then be installed on final ramps in the pit as they are constructed.

In addition to groundwater control, it will be important to direct surface water around and through the pit in a controlled manner. A diversion channel can be constructed on the 4094 m elevation bench in 2025, to divert a 140 ha area around the pit and into the tailings storage facility. An area of 350 ha will continue to runoff into the pit. Prior the diversion, catchments areas that will report to the pit sump will vary up to 490 ha. Surface runoff inflows of up to 1.1 m<sup>3</sup>/s have been estimated for a 1:100 year event, but total volumes that will accumulate in the pit are not predicted to exceed about 22,000 m<sup>3</sup>. A pumping capacity of only 80 L/s is required to remove this volume from a pit bottom sump over a period of three days.

Surface water control will consist of temporary excavated sumps in sinking cuts and on large interim benches, movable box sumps on temporary ramps, and staged permanent sumps on the final ramp. Sumps will relay water to a mine dewatering pond located near the plant site. Water from the mine dewatering pond will decant to either the process water pond or to the TSF.

The design flow for the temporary excavated sumps and box sumps is 100 L/s, sufficient to remove the mean year storm runoff flow over about a five-day period. Permanent sumps on the final ramps are designed for 135 L/s as they will also relay dewatering well discharge from the pit.

Only one diversion is included in the 2010 feasibility study for the pit. Located on the 4094 bench on the northwest high wall, it will divert runoff water from a 140 ha area located above this bench. The design flow for this diversion is 171 L/s which is the flow estimated for the 1:100 year flood.

## **18.5 Waste Dumps**

Approximately 2,231 Mt of waste will be mined over the 20 year life of the proposed mining operation. Of this total, approximately 170 Mt of waste rock were scheduled for tailings dam construction over the mine life. It is proposed to mine waste rock by a conventional truck and shovel operation using 360 t end-dump trucks. The average peak waste dump production rate is about 475,000 t/d.

The Rio Nevado Valley east and southeast of the open pit is well situated and able to contain the open pit waste. Valley floor elevations range from 3,820 m in the north to 3,725 m in the south end of the dump area. The waste will be contained between the eastern and western edges of the valley. The north face of the WRF will form the downstream backing for the tailings storage facility (TSF). Only the south side of the WRF is open through a relatively narrow gap in the valley walls through which the Rio Nevado flows.

The layout and configuration of the Main WRF envisage that the Main WRF would be constructed as a valley fill with lifts at the 3806, 3875, 3975, and 4075 m elevations. An impact/toe berm with a crest elevation of 3825 would be completed before construction of the Main WRF, and would buttress the toe of the WRF.

Development would begin with the construction of an impact/toe berm at the downstream toe. The purpose of the impact/toe berm would be to contain debris from potential sliver failures and constrain failure lobes from extending as far downstream as the seepage interception facility. Once construction of the impact/toe berm has been completed, a valley bottom confining lift would be placed to encapsulate fine-

grained lacustrine soils. Subsequent construction of the Main WRF in a series of repose-angle lifts up to 100 m high is proposed. Inter-lift (i.e. crest to crest) and overall (i.e., crest to toe) slope angles would be no steeper than 2:1.

The south WRF consists of the tailings dam at the northern limit followed by several dumping lifts, the final being at 4075 m. The waste dumps will be constructed giving first priority to the construction of the tailings dams (rougher and cleaner), and then balancing waste between the various lifts to balance haul truck requirements as much as possible. The tailings dam will be completed by 2020 which is a requirement prior to the development of the upper 4075 m waste lift.

Average one-way haul distances for waste start at 7 km when the haulage must reach the valley bottom for the initial dump lifts and reduce to 3 km, with the exception of the last five years when the pit reaches its maximum depth. The longer hauls at the end of the mine life are offset by the potential trolley-assisted haulage system and the reduced waste mining requirements.

Rock drains are incorporated into the WRF design to convey any flows that are adjacent to the WRF beneath the structure. They are designed to prevent the water from contacting potentially reactive waste rock. Closure design flows assume that a storage pond is constructed in the plant site area during closure to attenuate storm run-off flows from the 10 km<sup>2</sup> catchment area above the plant site.

Seepage from the waste dump will be contained in the seepage water recovery system located downstream of the Rio Nevado, and will be transported to a water treatment plant (WTP) for reuse in the process plant.

The waste dump will be built according to the Sernageomin mining safety regulation (D.S. No. 72/1985, modified by D.S. No. 132/2004) that governs the stability and application of safety measures for this type of facility during construction and operation.

## **18.6 Infrastructure Considerations**

### **18.6.1 Access**

The initial 25 km from Copiapó is paved highway while the next 95 km is a two-lane, unpaved road, 9 m wide. There are some steep sections and sharp corners (hairpin bends) at the Cuesta Castaños pass on this unpaved section. The road then winds along the narrow canyon of the Jorquera and Turbio rivers, crossing the rivers several times. The last 57 km of road has been improved by the Government as part of a new international road to Argentina, but it will require additional upgrading to support the expected traffic during planned mine construction and operations. The last 22.2 km of



road to the proposed Cerro Casale camp and mine site will be constructed as part of Project development.

The Project plans to use the Candelaria port facilities (shiploader and dock) for concentrate shipment. Port facilities are located beside Punta Padrones Port, 7 km from Caldera city, accessible from Copiapó by a 70 km two-lane highway. Access to the port would be by a combination of an existing public road and a proposed new 1 km road.

The Piedra Pómez well field site is accessible from Copiapó by a 230 km long public road, which is part of the international road connecting with Argentina. The first 118 km of this road are also used to access Kinross' La Coipa mine, 20 km are paved and another 60 km have a special dust-seal surface finish. Piedra Pómez is also accessible by road from El Salvador.

The closest commercial airport to Cerro Casale is Desierto de Atacama, 50 km to the west of Copiapó and 237 km from the site. A potential site for a private airstrip to service the planned operation was selected at Cuevitas, 1 km from the Pircas Negras border control, 5 km from the camp, and 25 km from the mine site, at 3,270 masl. Runway design is based on a Twin Otter, two engine, STOL (short take-off and landing) aircraft manufactured by De Havilland of Canada. The aircraft can carry as many as 22 persons including crew. The strip as designed is a granular layer design, non-paved runway, 900 m long x 30 m wide. No passenger facilities are included.

#### **18.6.2 Accommodation**

Operations staff will be accommodated in a permanent 2,048 bed camp with up to 1,147 persons in residence at any time. The construction camp will provide 5,024 beds with the capacity to upgrade to 6,000 beds. Construction will utilise a further 1,000 available from the operations camp during this period. The operations and construction camps will share common facilities. At the completion of construction the construction dining facilities will be converted to recreational facilities for the ongoing operations.

##### ***Water***

Suitable water supply is available from the presently permitted Piedra Pomez well field that is located 121 km north of the Project (refer to Figure 4-3).

##### ***Planned Facilities***

- Cerro Casale Plant Site: Located 187 km by road from Copiapó at 4,100 masl. The mine, process plant, and tailings storage facilities are proposed to be located



here together with on-site facilities including offices, emergency response facilities, truckshop, warehouse, fuel storage and distribution facilities, reagent storage, and other service facilities to support construction and operations.

- **3400 Camp Facilities:** Located 20 km from the plant site at 3,400 masl. Accommodation facilities were designed to provide for up to 5,000 construction workers and 2,000 permanent workers and staff. The site also includes provision for the gate house, security, CMC administration, and construction facilities for laydown, workshops, and warehousing to support pre-assembly and pre-fabrication of plant and equipment.
- **Cardones Substation & 220 kV Transmission Line:** This substation is part of the public power grid (SIC Sistema Interconectado Central), and is located near Copiapó. Power supply to the Casale site is planned via a 220 kV transmission line, 135 km long, which was designed with two circuits to provide up to 310 MVA.
- **Port Facilities:** The Cerro Casale concentrate filter plant and storage facilities are planned to be located at the Punta Padrones port facilities, owned by Candelaria. This site will include a 60,000 t concentrate storage building, an integrated building with offices, laboratory, change house, and dining room, gate house, shop and warehouse.
- **23 kV Distribution Line Caldera to Port:** A 23 kV transmission line was designed to supply electrical power from the Caldera substation (close to Caldera) to the port facilities. The planned line is 6.6 km long, and was designed with one circuit to provide 2.5 MVA.
- **Piedra Pómez Water Well Field:** Will include a water well field and fresh water pumping station and pipeline to provide up to 900 L/s of water to the mine and process plant operation.
- **La Coipa Tap-off Substation:** Located 6 km from the La Coipa mining operation. This substation will be connected to the existing 220 kV Carrera Pinto to La Coipa transmission line, and will be equipped with one 220/110 kV, 30 MVA distribution transformer. The substation is located 75 km northwest of the Piedra Pómez well field and will provide electrical power to the well field equipment via a new 67 km, 110 kV overhead power line to supply up to 18 MVA for the well field pumping system.
- **Nantoco (Copiapó):** Located 22 km from Copiapó. This site will encompass two areas of infrastructure – CMC's offices and a marshalling/staging yard and security gate located 12 km from the offices.

The locations of planned Project site and off-site infrastructure are shown in Figure 18-2 and Figure 18-3 respectively.

Figure 18-2: Proposed Site Infrastructure Location Map

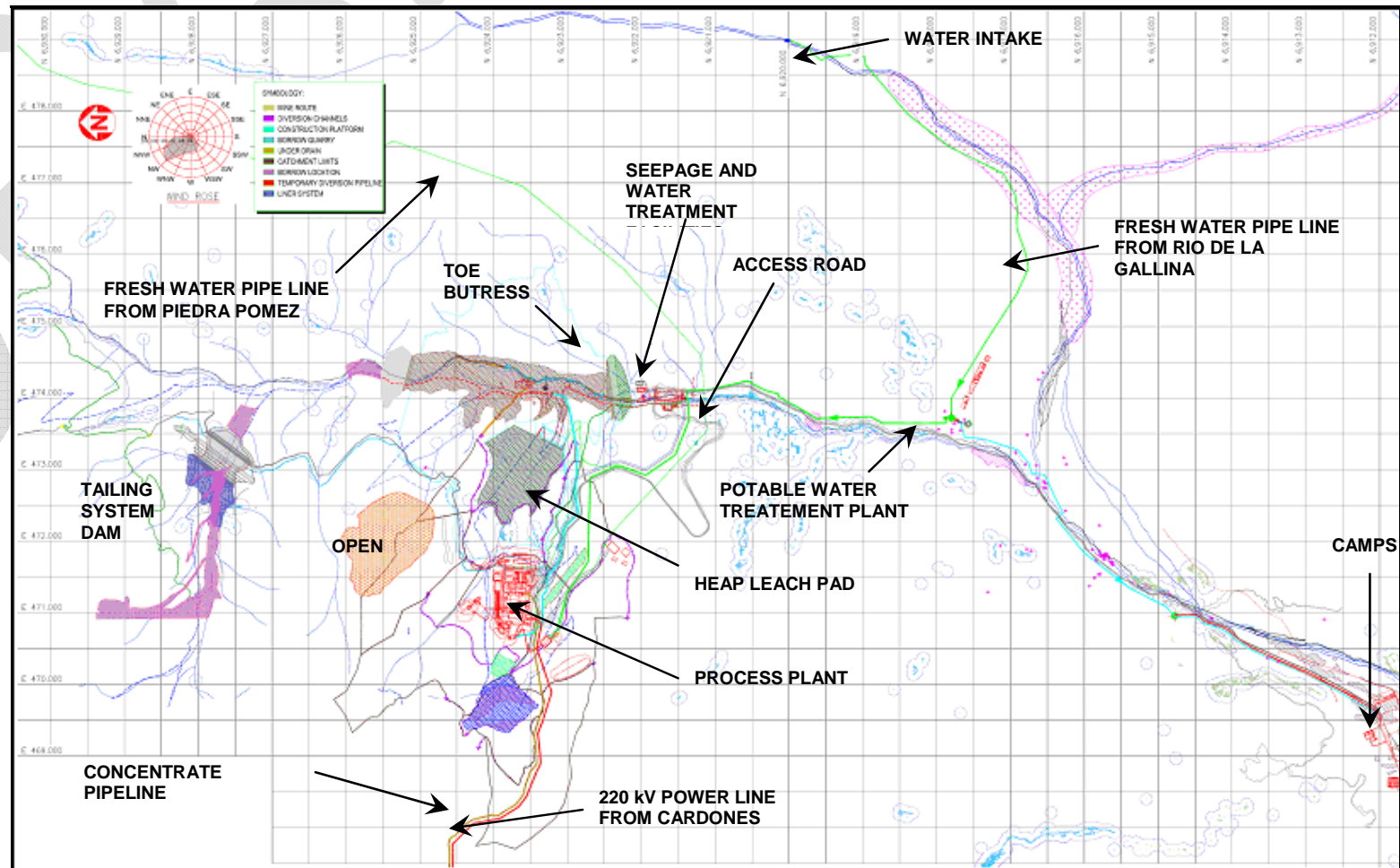
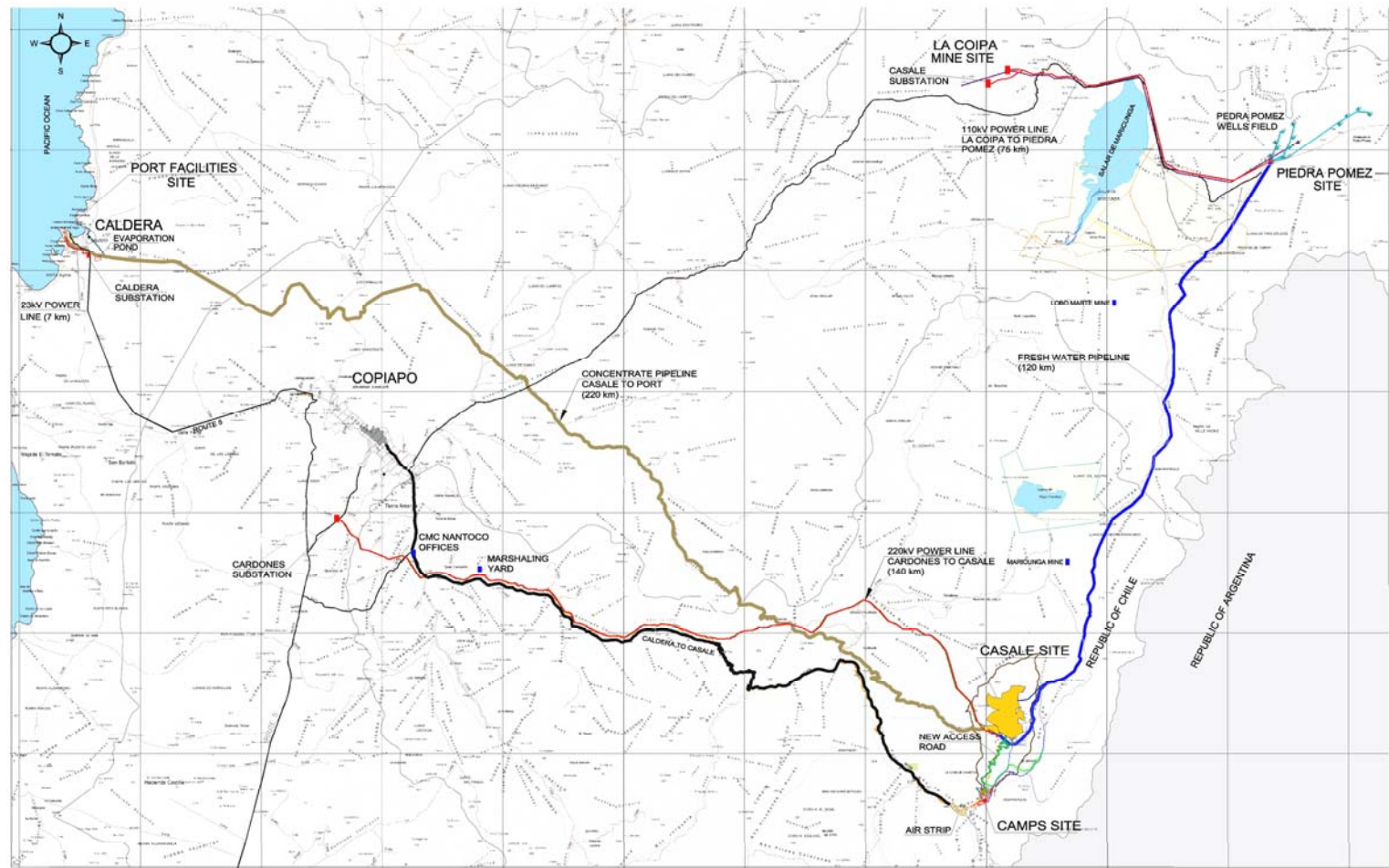


Figure 18-3: Proposed Off-site Infrastructure Location Map



Note: grid squares on map are 20 km x 20 km

### 18.6.3 Power

The primary objectives for power supply to the Cerro Casale project were low cost and high availability. The confirmed availability of power from the Sistema Interconectado Central (SIC) caused CMC to focus on low operating and low capital cost options for power supply with sufficient backup to minimize risk.

As a result, the 2010 feasibility study assessed two power supply options. The first was long-term power purchase agreements with third-party generation companies, based on new or expanded generation in the SIC system. The second comprised power purchase agreements with generation companies operating in the SIC system that were based on spot market power purchases.

The proposed Project power system was based on the first option. The second option was considered suitable for early requirements, or other short-term or backup requirements. Self generation of the entire Project requirements was not considered as a primary option due to the very high capital requirements and the availability of capable power suppliers operating in the competitive environment of Chile's SIC.

The planned electrical energy for Cerro Casale will be delivered from the nearest acceptable point(s) on the Central Interconnected System (SIC) transmission grid. The power required will vary as the mine develops. Currently, the SIC market is experiencing a shortage of low-cost supply, and high prices, due, partly to curtailments of natural gas imported into Chile from Argentina. This situation will be eased over time with the construction of new capacity fuelled with coal, hydro, or LNG replacing natural gas.

The maximum and average demands, as well as the annual consumption for the three main sites of the Project are summarized in Table 18-4.

**Table 18-4: 2010 Feasibility Study Projected Power Demand**

| Site                   | Maximum Demand (kW) | Average Demand (kW) | Annual Energy Consumption (MWh) |
|------------------------|---------------------|---------------------|---------------------------------|
| Cerro Casale Mine Site | 249,616             | 205,570             | 1,800,792                       |
| Piedra Pómez           | 14,341              | 9,937               | 87,049                          |
| Port                   | 2,201               | 1,345               | 11,785                          |
| <i>Total</i>           | <i>266,158</i>      | <i>216,852</i>      | <i>1,899,626</i>                |

These are based on an assumed 20 year mine life, and a 18 year life for the process plant. The total average annual consumption of electricity for the three sites is estimated to peak at approximately 1,900 GWh per year in 2016. The estimated overall average cost of power (inclusive of energy, renewable energy component, capacity, system costs, and transmission cost) for the project is US\$92/MWh,

delivered to the Project sites, but not including capital costs, on-site substations, transformers, or distribution.

Construction and stand-by power would be provided using diesel generators sited at various Project sites. The Piedra Pomez well field and the Cerro Casale site would be connected to the SIC transmission system. The Caldera port facilities would be connected to the local distribution system. On-site substations and power distribution systems were designed to receive power supply from off-site sources, and provide power distribution to the main load centres as required.

#### **18.6.4 Transport**

The Project matériel logistics system will include:

- Materials and equipment procured offshore will be imported through ports in Northern Chile. Puerto Angamos, the general cargo terminal at Mejillones, about 60 km north of Antofagasta, will be designated the primary port of entry for materials and equipment procured offshore. The port was selected for a number of reasons, including availability of container and break-bulk liner and tramp services, the well-equipped and modern port operation, ready access to the main highway system, and land being available adjacent to the port and terminal operations for a marshalling area;
- Caldera will be the main port of entry for equipment and materials transported using chartered vessels. It was selected because of its proximity to Copiapó and the availability of land close to the port for a staging area for pipe and structural steel. Materials and equipment imported through Caldera will be stored at a local marshalling area until required on-site;
- Materials and equipment imported through Mejillones and Antofagasta for mine site facilities will be delivered to Area 3400 which will serve as the central storage and laydown area for the mine site;
- A marshalling/staging yard will be developed and operated at Nantoco (southeast of Copiapó). The Nantoco yard will be the logistics and traffic control centre for vehicles travelling between Nantoco and Area 3400;
- Diesel fuel for the site is planned to be trucked. A maximum of 12 tanker loads per day may be required;
- Concentrate will be transported from the mine site to Caldera via pipeline; and
- Water will be transported to the mine site from the well field via pipeline.



Proposed personnel transport will include:

- Air charter service between Santiago (and other locations) and Copiapó, for all personnel;
- Bus service between Nantoco and Area 3400 for CMC and CM prime contractor personnel; and
- Bus service between Area 3400 and the mine site.

## **18.7 Workforce**

The planned mine will be headed by the Mine Manager who will report to the Operations Manager. There will be three departments comprising Operations, Maintenance, and Technical Services, together with permanent contractors, resulting in a workforce of a total 2,030 people at peak production in 2016, then stabilizing at 1,950 from 2018 to the end of mine life.

## **18.8 Planned Process Route**

### **18.8.1 Summary**

The design of the Cerro Casale processing facilities is based on current technologies, in terms of process circuit design and selection of individual equipment.

Sulphide ore will be processed in a 160,000 t/d flotation plant facility designed to recover a copper/gold flotation concentrate, followed by dewatering and then dispatch via pipeline to a filtration plant adjacent to a port facility. Filtered concentrate will be loaded into sea-going vessels and shipped to smelters overseas. Additional gold metal will be recovered by submitting the flotation cleaner tailings to a cyanide leaching stage.

Oxide ore will be processed in a 100,000 t/d ore heap leaching facility treating run-of-mine material.

Gold-loaded carbon from the heap leach facility, as well as carbon originating from the processing of the cleaner tailings will be processed to produce gold doré bars for shipment and final treatment off site.

### **18.8.2 Flotation Plant**

Two parallel gyratory crushers will reduce the ROM material to a product with 80% of the ore passing (P80) 180 mm. The crushed product will be deposited onto a covered stockpile with a live capacity of 75,000 t.

The primary crushing circuit equipment will be designed for a circuit utilization of 75%, accounting for maintenance requirements as well as truck waiting time. The rest of the flotation plant circuits located at the mine site will be designed with a utilization rate of 92%.

The comminution circuit is completed by two additional stages of crushing, with the secondary stage including eight cone crushers operated in closed circuit with four dry screens featuring a cut-size of 45 mm. This is followed by the tertiary crushing stage, featuring six HPGR units operated in closed-circuit with 12 wet vibrating screens with a cut-size of 10 mm. A 30,000 t live capacity fine ore stockpile is used to increase the grinding circuit utilization despite HPGR maintenance.

The grinding circuit comprises six parallel ball mills to handle the oversize from each pair of wet screens and the cyclone underflow.

The comminution circuit is designed to process 160,000 t/d of the design ore, corresponding to the Year 1–5 composite crushing and grinding characteristics, delivering material to the flotation circuit at a P80 of 120  $\mu\text{m}$ .

The six parallel cyclone overflow streams gravitate into six parallel lines of eight 300 m<sup>3</sup> rougher flotation cells, producing an intermediate concentrate feeding the flotation cleaning circuit.

The cleaning circuit comprises three stages of flotation to upgrade the concentrate to a minimum grade of 25% Cu and one cleaner scavenger stage to increase the cleaning circuit recovery. The cleaner circuit also includes a regrinding step featuring two parallel conventional ball mills, used to reduce the rougher concentrate down to a P80 of 25  $\mu\text{m}$ . The final concentrate is thickened, and pumped via a pipeline to the filtration plant at the port facilities.

At the port, the concentrate is re-thickened to a higher slurry density and then fed to two pressure filters reducing the residual moisture to 9% for storage of the filtered product in a 60,000 t capacity storage shed. The concentrate is reclaimed from there for loading ships delivering the concentrate to overseas customers. The thickener overflow water is sand-filtered and most of it directed to a lined evaporation pond.



The cleaner scavenger stage tailings are brought to a cyanide leaching circuit for recovery of gold values. The tailings are first thickened before being diluted with cyanide solution recovered from the SART circuit and then introduced into a CIL circuit featuring two parallel trains of five tanks each, providing a 20-hour retention time.

The rougher tailings are thickened prior to flowing by gravity to the TSF (first 10 years).

The CIL tailings are diluted with reclaimed water from the cleaner tailings facility and then thickened to recover a higher solution volume to the thickener overflow, for diversion as feed to the SART circuit, where it is combined with flow inputs from the heap leaching and gold recovery circuits.

The thickened CIL tailings then proceed to a cyanide destruction circuit using the Inco  $\text{SO}_2$ /Air process before being discharged into their dedicated lined tailings facility.

### **18.8.3 Heap Leaching and Gold Recovery Circuits**

The heap leach facility comprises a lined pad in a valley where the topography will be modified to provide a wider base by filling the low areas on either side of an existing ridge and retain a gentle sloping base to enable outflow of the leach solution at this end of the pad. Above the liner, a series of French drains (the solution collection system) will be set in a protective layer of crushed material. These will discharge into collection piping set externally to the heap which will direct the collected solution into two pregnant leach solution (PLS) tanks.

The oxide ROM ore will be deposited by mine trucks on top of the heap in 15 m lifts. The material will be bulldozed and once a cell is complete, the irrigation distribution system will be laid out. The emitters, delivering 5,250 m<sup>3</sup>/h of leach solution (at a unit rate of 12 L/h/m<sup>2</sup>) are buried to prevent freezing under winter conditions. New ore irrigation is set at 100,000 t/d, although ore placement rate from the mine will periodically reach 150,000 t/d.

The PLS passes through four parallel trains of six activated carbon-loaded contacting columns each. The exiting barren solution will be returned to a pair of barren solution tanks where reagent make-up, as cyanide and milk-of-lime, is added before the solution is pumped back as irrigation solution for leaching. The retained moisture in the heap on fresh ore and evaporative losses are made-up in the barren leach solution system by bringing cyanide-laced water returning from the SART circuit.

The carbon handling area for the loaded carbon will consist of an acid wash circuit and a modified pressure Zadra circuit for stripping carbon. There is one acid wash column

followed by two parallel elution columns. Carbon will be reactivated in an electric kiln. These facilities are used both for stripping the CIC and CIL circuits carbon loads.

The gold is recovered as a sludge in two parallel banks of two EW cells each. The sludge from EW is dried and processed in a mercury retort, before being melted in an induction furnace to produce gold doré bars for shipment and final treatment off site.

#### **18.8.4 SART Circuit**

The SART circuit (sulphidization, acidification, recycling, and thickening) is a relatively recent commercialized process that allows recovery of copper dissolved by cyanide and the recycling of cyanide.

The SART circuit is fed from CIL tailings thickener overflow as well as from the ambient strip step used in the elution process whenever the copper content of the pregnant strip solution is elevated, and from a bleed stream from the barren leach solution, to contain dissolved copper to less than 450 ppm in the barren leach solution.

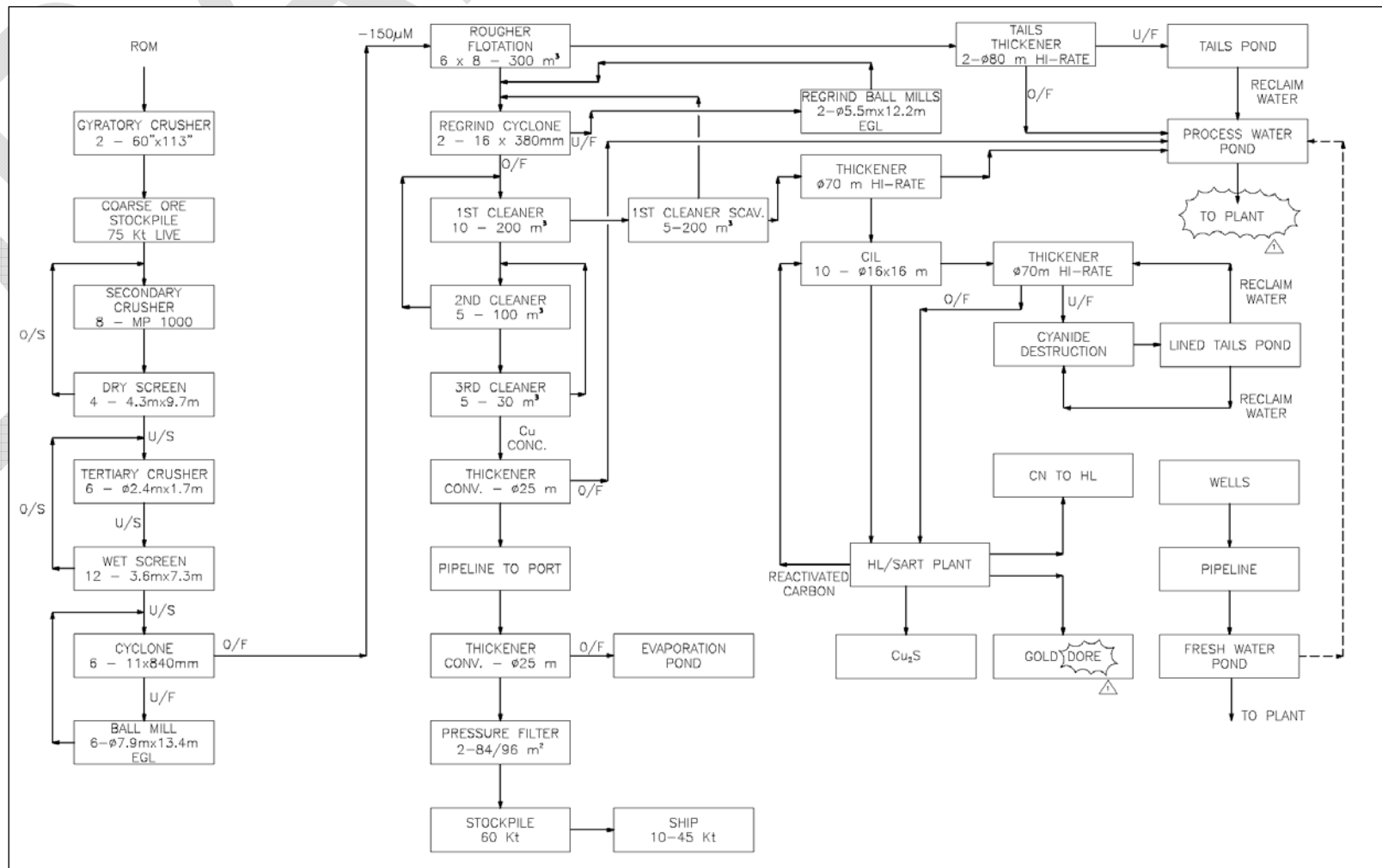
The solutions enter a reactor where acidulation effects the dissociation of copper from the cyanide ions. The copper then precipitates as a sulphide, with the addition of sodium hydrosulphide.

The copper precipitate is then separated from the solution in a clarifier using a large re-circulating load from the underflow to seed the feed stream and produce larger precipitate particles. A fraction of the clarifier underflow is bled to a filter for displacement of additional cyanide in the solution and delivery of the precipitate to a dryer and bagging system, permitting shipment of this product to clients.

The SART clarifier overflow is transferred to a neutralization tank where lime addition causes the precipitation of excess calcium as gypsum. The neutralization circuit clarifier then separates the gypsum precipitate, with an operational approach similar to that used for the copper precipitate. The SART tails solids are disposed of in the CIL tailings deposition facility, but only after destruction of the residual cyanide. The overflow solution of the neutralization clarifier, which contains the free cyanide recovered through the SART process, is recycled back to the users, namely to the head of the CIL circuit and to the barren solution tanks.

Figure 18-4 presents a schematic flowsheet of the proposed process.

**Figure 18-4: Schematic Process Flowsheet Block Diagram**



## 18.9 Tailings

The tailings storage facility (TSF) design has been developed in accordance with World Bank, IFC and international standards. The design of the TSF has been improved since the approval granted in 2002 (Exempt Resolution RCA No. 014/2002) with the separation of the rougher and cleaner tailings into two facilities. A general layout of the TSF, located in the Rio Nevada drainage, was presented in Figure 5-1. The WRF will completely cover the heap leach facility at closure.

Processing of the sulphide ore will generate two tailings streams; a rougher tailings and a cleaner tailings after cyanidation. The rougher tailings will constitute approximately 90% by weight of the total and the remaining 10% is the cleaner tailings. The cleaner tailings will be processed through the Inco SO<sub>2</sub>/Air cyanide destruction process prior to transporting to the cleaner TSF. Cyanide will only be present in the cleaner tailings at levels between 1 to 5 mg/L CN<sub>T</sub> after cyanide destruction.

The rougher tailings will be coarser and settle significantly quicker than the cleaner tailings and are predicted to be non-acid generating (NAG). The potential leachable contaminants are aluminium, molybdenum, copper, and chromium. Only the molybdenum may leach at neutral pH levels and the other metals are expected to remain immobile within the rougher tailings. Cleaner tailings are expected to be acid-generating. Arsenic, molybdenum, and antimony may leach from the cleaner tailings at neutral pH levels and aluminium, copper, chromium, and lead may leach if acid rock drainage (ARD) commences.

The TSF has been designed to store 930 Mt of rougher tailings and 97 Mt of cleaner tailings. Tailings production will begin in Q4 2014 and continue until 2033 providing a 20 year period of TSF operation. The cleaner impoundment is designed as an emergency storage pond during the period between HL facility start of operation (Q2 2013) and concentrator start of operation (Q4 2014). This emergency storage pond has been designed to contain 3 Mm<sup>3</sup>.

During the initial years of operation, water will be reclaimed from the cleaner impoundment and used in the HL process. After the end of operation of the HL process, cleaner tailings water will be accumulated in the impoundment and allowed to evaporate. Cleaner tailings water inventory will be controlled by means of turbomisters. Alternatively, the supernatant water could be pumped back to the plant and processed through a CN carbon bed treatment before being reused in the process plant.

Non-contact water will be collected only among the main drainages upstream of the tailings impoundments and conveyed to a discharge downstream of the waste rock

facility (WRF) and cut-off wall. This surface water diversion system is designed to convey the maximum flow equivalent to the 50-year snowmelt event.

Seepage waters from the rougher impoundment will be collected in the WRF underdrain system and conveyed to the seepage recovery system located downstream of the WRF. Underdrains will be located immediately beneath the upstream toe of the rougher tailings containment structure to avoid the risk of groundwater flowing up into the WRF. Negligible seepage is expected from the cleaner impoundment. Potential seepage will be captured by underdrains located beneath the cleaner liner. Monitoring wells will be implemented downstream of the cleaner impoundment to monitor water quality and detect potential cleaner tailings seepage.

Both TSFs are designed to ensure physical stability during operation and closure. The rougher impoundment is located immediately behind the WRF generating a very stable tailings containment structure. The cleaner tailings are contained by a dam buttressed by the rougher tailings. Both structures are designed not to fail under the maximum credible earthquake (MCE).

Debris flow containment structures will be installed in the main drainages upstream of the cleaner impoundment to protect the liner and minimize tailings operations disruptions.

## **18.10 Environmental Considerations**

### **18.10.1 Emission Control**

CMC's emission control philosophy is to comply with Chilean regulations on emissions and minimize their generation. The objective of emission control is to mitigate or reduce the risks and impact to the environment, workers, and general public safety. In addition to the above, CMC will also apply IFC standards for the control of emissions to the environment; for example, Tier II compliance<sup>1</sup> will be a criterion for selection of mine equipment.

This management plan will be updated as the EIA development identifies new opportunities to control emissions. Specific rates for these emissions are not available to date. In order to estimate these rates, updated baseline information is required on air quality, meteorology, noise, vibrations, and ARD analysis. Emissions models will be developed for the EIA using updated baseline data in order to estimate emissions rates and dispersion flows.

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<sup>1</sup> "The Tier 2 Vehicle and Gasoline Sulfur program is part of a series of major initiatives that will reduce emissions from passenger vehicles, highway trucks and buses, and off-road diesel equipment. The result will be reduced emissions, cleaner air, and improved human health." U.S. Environmental Protection Agency, <http://www.epa.gov/tier2/>.

### 18.10.2 Proposed Mine Closure Plan

The total closure cost estimated for the Cerro Casale Project is US\$135.33 M, the majority (approximately 76%) of which is associated with water treatment, closure of the tailings impoundments, WRF and G&A costs. The cost of post-closure activities such as maintenance and monitoring will be funded by a trust fund. The trust fund will be established during operations such that this fund will be adequate at closure to fund all closure and post-closure activities. This will allow all of the post-closure activities to be performed without additional cash flow after closure.

The project closure plan complies with current Chilean Closure Regulation (D.S. 72/2004) in addition to complying with air, water, and other emissions control regulations and design criteria derived from commitments of the EIA approved in 2002 during closure and post-closure phases. Objectives of the closure plan reflect compliance with current national regulations, the obligations register, and international best management practices and guidance.

The primary environmental conditions that affect the conceptual closure plan are the remoteness of the site, high altitude, arid conditions, and precipitation (mainly as snow) and wind that occur during the winter months. The objective at closure will be to create a stable site that maintains adequate flows in the Rio Nevado, minimizes risks of poor quality discharges to surface and groundwater, and minimizes the potential for dust to be transported from the site by high winds.

The primary components of the closure approach include:

- Placement of a rock cover on the tailings impoundment surfaces to control blowing dust from the impoundments;
- Re-sloping of WRF lifts to approximately 2.5H:1V to achieve an overall slope of 22°;
- Monitor HL drainage after it is covered by WRF and collect any drainage for treatment, as necessary, during the closure and post-closure period;
- Provision to treat water collected in the seepage recovery system after closure. high density sludge and reverse osmosis water treatment plant will be constructed at the end of closure and will operate during post-closure in perpetuity;
- Groundwater intersected by the pit will form a lake with poor water quality, but no surface discharge. Screening level risk assessment after the completion of a pit lake study will be required to define risks;

- Buildings and equipment associated with the project will be decontaminated, demolished and hauled to the pit for disposal. Some of the equipment and structures may have value for reuse or salvage; however the closure cost estimate assumes zero salvage value for steel and equipment;
- All roads, power lines, pipelines, fences and other site facilities not needed for post-closure water treatment, monitoring and maintenance, or alternative use of the infrastructure will be removed and/or reclaimed at closure. As the operation matures, opportunities to salvage or donate infrastructure will be evaluated. Port facilities will be decontaminated and transferred or sold to a third party;
- Following closure, the site will be monitored throughout the closure period at the same level as during operations;
- Surface water from the drainage systems will be conveyed across the top of the tailings facilities to the closure spillway via the surface water channels and treated, if necessary, before release to the environment;
- The water supply system will be closed progressively during the closure period; and
- Pit safety berms will be placed around the perimeter of the pit and across the ramp into the pit to restrict vehicular access.

Current water management studies have concluded that during closure there will be no deficit of water when compared with the average historic flow in the Rio Nevado at surface water monitoring point SW-04 (102 L/s).

The closure plan assumes that, the amount of seepage from the waste rock and tailings storage facilities reporting to the seepage recovery system at closure will be negligible. The plan also assumes that a perpetual high density sludge and reverse osmosis water treatment system will be needed to treat all of the water leaving the site in order to maintain natural conditions in the Rio Nevado at surface water monitoring point SW-04.



## 18.11 Markets

Cerro Casale will produce and sell copper/gold concentrate, gold dore and SART copper sulphide concentrate to generate revenue for the project. Over the life of the mine the flotation plant will produce 8.2 million tonnes of concentrate containing 13.44 M oz payable gold and 4,832 Mlbs payable copper. The CIL and heap leach plants will produce dore containing 3.35 Moz gold and the SART copper sulphide concentrate will contain 73Mlbs payable copper.

The relatively high gold grade of the Cerro Casale concentrate and the presence of minor penalty elements will limit the number of smelters capable of competitively treating the Project concentrate. Typical concentrate specifications are shown below.

**Table 18-5: Typical Concentrate Specifications**

| Element | Unit | Year 1 – 5 | Year 6 – 18 | LOM   |
|---------|------|------------|-------------|-------|
| Copper  | %    | 25.8       | 28.0        | 27.4  |
| Gold    | g/t  | 52.4       | 52.8        | 53.1  |
| Silver  | g/t  | 119.7      | 142.7       | 139.9 |
| Mercury | ppm  | 3.0        | 3.0         | 3.0   |
| Arsenic | %    | 0.078      | 0.110       | 0.101 |

During 2008–2009, meetings were held with 13 of the world's major custom copper smelters, many of which specialize in treating copper concentrate containing high levels of gold. At these meetings CMC was able to prove an aggregate market interest in off-take agreements well above Cerro Casale's annual forecast production level of 476,000 dmt/a. The collective interest confirmed by the smelters was between 660,000 and 820,000 dmt/a. This interest level is approximately 39% to 72% above the average annual sales requirements anticipated for the project.

The recommended treatment charges (TC) and refining charges (RC) used for the Feasibility Study financial analysis are shown in Table 18.6. These terms are based on the updated Cerro Casale concentrate specifications from the pilot plant testwork carried out during the prefeasibility stage from July to September 2008, and during the feasibility stage from March 2009 to January 2010. The terms reflect the expected smelter returns for Cerro Casale quality of concentrate in the market over the life of mine based on a gold price of \$800/oz, a copper price of \$2.00/lb and a silver price of \$12.50/oz. These terms take into account market contracts currently in place, historical long-term market terms and conditions, current available forecasts for market terms, and forecast concentrate supply/demand balance from independent sources. Total realisation costs for the concentrate over the life of mine equate to approximately \$1.33 per tonne of ore processed.

**Table 18-6: Projected Refining and Treatment Charges**

| Item                                                                       | Unit        | Amount                                                                                                                                                                         | US\$/dmt |
|----------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <i>Payables</i>                                                            |             |                                                                                                                                                                                |          |
| Au Payable                                                                 | %           | 97                                                                                                                                                                             | 1,324.31 |
| Cu Deduction                                                               | -           | pay 96.5%, subject to minimum deduction of 1.0 unit                                                                                                                            | 1,164.83 |
| Ag Payable                                                                 | %           | 90                                                                                                                                                                             | 50.62    |
| <i>Total Payables</i>                                                      |             |                                                                                                                                                                                | 2,539.76 |
| Treatment Charge                                                           | US\$/dmt    | 80                                                                                                                                                                             | 80.00    |
| <i>Refining Charges</i>                                                    |             |                                                                                                                                                                                |          |
| Cu                                                                         | US\$/pay lb | 0.08                                                                                                                                                                           | 46.59    |
| Au                                                                         | US\$/pay oz | 6.50                                                                                                                                                                           | 10.76    |
| Ag                                                                         | US\$/oz     | 0.40                                                                                                                                                                           | 1.62     |
| Insurance                                                                  | % of value  | 0.03                                                                                                                                                                           | 0.72     |
| Loss in Transit                                                            | %           | 0.1                                                                                                                                                                            | 2.33     |
| Cu RC PP                                                                   | -           | 5% >US\$2.0/lb capped at US\$0.05/lb                                                                                                                                           | 14.56    |
| Penalty Charges                                                            | US\$/dmt    | 1.00                                                                                                                                                                           | 1.00     |
|                                                                            |             | 46.74 (average rate of US\$43/wmt at 8% moisture content)                                                                                                                      |          |
| Ocean Freight                                                              | US\$/dmt    | (Rates from Simpson Spence and Young Ocean Freight study conducted for Cerro Casale)                                                                                           | 46.74    |
| Port Handling                                                              | US\$/dmt    | 7.00 (draft survey, sampling, and representation included)                                                                                                                     | 7.00     |
|                                                                            |             | 90% provisional payment 10 days after vessel arrival at discharge port.                                                                                                        |          |
| Payment Terms                                                              | -           | Balance ~10% to be paid when all final information is available. This payment is estimated on average to be approximately 120 days after vessel arrival at the discharge port. |          |
|                                                                            |             | Timing of average provisional payment estimated at 7 weeks after vessel sails from the loading port.                                                                           |          |
| <i>Total Smelter Costs, Transport Costs including Insurance and Losses</i> |             |                                                                                                                                                                                | 211.32   |
| <i>Total Net Smelter Return (basis filter plant at port)</i>               |             |                                                                                                                                                                                | 2,328.44 |

Doré bars produced from the CIL circuit will be stamped, numbered, and weighed before shipping off-site for further refining. On arrival at the refinery, all the bars will be check-weighed and scheduled for processing. The refinery will melt the doré bars and draw four pin samples from the doré during the melt to determine the final settlement metal contents. Under the terms of a negotiated commercial agreement, the refiner will credit CMC's precious metal accounts with the returnable ounces of gold from the processing of CMC's doré.

The relatively small quantity of high grade copper sulphide precipitate (+60% Cu) from the SART circuit will be marketed either as a separate product or mixed with the copper/gold concentrate to sweeten the copper grade. The base case is that the copper sulphide will be marketed as a separate product. The SART circuit includes a filter press, dryer and bagging system that will allow shipment of copper precipitate in 1 tonne tote bags on trucks to domestic smelters.

## **18.12 Taxation**

Chilean companies are subject to a statutory income tax rate of 35% on its taxable income. However, that rate is applicable as a 17% tax on income accrued at company level, and the 18% balance is applied when the company distributes profits to a foreign parent company by way of dividends. This tax on dividends, or second tier tax, may be deferred indefinitely as long as (i) dividends are paid to local shareholder company, or (ii) if the foreign parent immediately reinvests the dividends in another Chilean company.

The asset model used to analyze the economics of the Cerro Casale deposit does not include the impact of the second tier tax.

On top of the regular income tax, there is a 5% mining tax which is calculated on operative net income (earnings before interest and taxes (EBIT) with regular rather than accelerated depreciation).

The financial model incorporates a blend of funding from the Owners by way of equity and internal debt, optimized based on thin capitalization rules in the Chilean tax laws.

## **18.13 Capital Costs**

The initial capital cost has been estimated at US\$ 4,184 million using second-quarter 2009 dollars. The total sustaining cost is US\$369 million. The accuracy of the capital cost estimate for the project, taking into account the current state of design and procurement is within  $\pm 15\%$  of final project costs at the summary level. The level of engineering detail for the capital cost estimate meets or exceeds the requirements of the Association for the Advancement of Cost Engineering International (AACE) standard for feasibility studies and CMC's scope of work document dated 11 March 2008.

The capital cost was based on a complete re-design of the Project at feasibility level. Capital estimating used detail quantity take-offs and budgetary quotations for equipment and services based on the feasibility-level design. Price proposals selected for the 2010 feasibility study capital cost estimate were principally from Chilean-based suppliers. Price proposals accounted for 88% of all mechanical and electrical equipment pricing. Whether quotes were received in US dollars or local currency the quotes were adjusted at the project exchange rates and tracked to the country of origin.

Where design was not sufficient in detail to prepare material take-offs (MTOs) and obtain pricing for equipment and services, the estimate was completed using factors or allowances. This accounted for less than 10% of the estimate.

Bulk earthworks for the pioneering, site preparation, and major cut and fill will be performed by CMC's pioneer equipment fleet.

Contingency was evaluated using @Risk™ software. CMC elected to use a contingency based on the P<sub>73</sub> value.

The US\$4.2 billion capital cost estimate includes approximately \$319 million that is expensed in the financial model as incurred (costs not eligible for capitalization under USGAAP), in accordance with US generally accepted accounting principles (US GAAP). These costs include Project expenditures prior to classification of mineralization as Mineral Reserves, start-up costs such as training and recruiting, and community development costs.

The total initial capital cost for the project is summarized in Table 18-6 and the total sustaining costs are summarized in Table 18-7. The annual expenditure schedule for initial capital cost is shown in Table 18-8 and the life-of-mine sustaining capital expenditure is shown in Table 18-9.

**Table 18-5: Initial Capital Cost Summary**

| Description                                              | Area | Cost<br>(US\$000's) |
|----------------------------------------------------------|------|---------------------|
| Direct Cost                                              |      |                     |
| Open Pit Mine                                            | 11   | 808,764             |
| Ore Handling                                             | 31   | 579,884             |
| Processing Plant                                         | 41   | 596,100             |
| Tailings/Reclaim & Water Treatment Facilities            | 51   | 103,026             |
| On-Site Infrastructure                                   | 61   | 220,084             |
| Off-Site Infrastructure                                  | 71   | 529,644             |
| Total Direct Cost                                        |      | 2,837,502           |
| Total Owners' Cost                                       | 81   | 319,787             |
| Indirect Cost                                            | 91   |                     |
| EPCM Cost                                                | 911  | 310,101             |
| Temporary Installations                                  | 912  | 33,491              |
| Temporary Services                                       | 913  | 58,247              |
| Environmental, Sustainability, Safety, & Health Supplies | 915  | 17,188              |
| Temporary Camp                                           | 916  | 37,072              |
| Freight/Traffic & Logistics                              | 917  | 127,870             |
| Commissioning                                            | 918  | 15,223              |
| Total Indirect Cost & Owner's Cost                       |      | 918,9801            |
| Total Direct, Indirect Cost, & Owner's Cost              |      | 3,756,482           |
| Contingency                                              | PP1  | 428,000             |
| Total Provisions                                         |      | 428,000             |
| <b>Total Capital Cost</b>                                |      | <b>4,184,482</b>    |

Note: The \$4.2 billion capital cost estimate includes approximately \$319 million that is expensed in the financial model as incurred, in accordance with US generally accepted accounting principles (US GAAP). These costs include project expenditures prior to classification of mineralization as proven and probable reserves; start-up costs such as training & recruiting; and community development costs

**Table 18-6: Sustaining Capital Cost Summary**

| Description                          | Cost<br>(US\$000's) |
|--------------------------------------|---------------------|
| Direct Cost                          |                     |
| Sustaining Capital – Mine            | 184,540             |
| Sustaining Capital – Process         | 160,591             |
| Sustaining Capital – Infrastructure  | 24,273              |
| <i>Total Sustaining Capital Cost</i> | <i>369,404</i>      |

**Table 18-7: Initial Capital Expenditure Schedule (US\$000's)**

| Project Capital          | Years          |                |                  |                  |                |               | Total            |
|--------------------------|----------------|----------------|------------------|------------------|----------------|---------------|------------------|
|                          | 2010           | 2011           | 2012             | 2013             | 2014           | 2015          |                  |
| Mine                     | 1,445          | 101,176        | 318,935          | 244,956          | 142,253        | 0             | 808,764          |
| Process inc. HL and SART | 21,688         | 134,267        | 609,850          | 413,801          | 99,404         |               | 1,279,010        |
| Infrastructure           | 4,975          | 34,030         | 573,849          | 128,258          | 8,616          | 0             | 749,728          |
| Owner's Costs            | 47,576         | 51,119         | 66,621           | 73,575           | 35,515         | 10,476        | 284,523          |
| Indirect Cost            | 43,391         | 138,266        | 261,722          | 92,455           | 95,355         | 3,268         | 634,457          |
| Contingencies            | 8,814          | 50,263         | 217,498          | 108,415          | 42,607         | 403           | 428,000          |
| <i>Subtotal by Year</i>  | <i>127,889</i> | <i>509,122</i> | <i>2,048,115</i> | <i>1,061,460</i> | <i>423,750</i> | <i>14,147</i> | <i>4,184,482</i> |

Note: For this table spares and first fills are excluded from Owner's cost and are included in the indirect cost.

**Table 18-8: Life of Mine Sustaining Capital Expenditure Schedule (US\$000's)**

| Project Capital                     | Production Years |               |               |               |              |               |               |               |               |
|-------------------------------------|------------------|---------------|---------------|---------------|--------------|---------------|---------------|---------------|---------------|
|                                     | 2014             | 2015          | 2016          | 2017          | 2018         | 2019          | 2020          | 2021          | 2022          |
| Sustaining Capital – Mine           | -                | 5,877         | 12,139        | 9,831         | 1,441        | 5,367         | 26,874        | 40,379        | 20,872        |
| Sustaining Capital – Plant          | 19,240           | 34,231        | 20,464        | 6,633         | 3,754        | 16,067        | 4,450         | 31            | 4,346         |
| Sustaining Capital – Infrastructure | -                | 7,500         | 8,649         | -             | 3,240        | 685           | 370           | -             | 325           |
| <i>Subtotal Sustaining Capital</i>  | <i>19,240</i>    | <i>47,608</i> | <i>41,253</i> | <i>16,464</i> | <i>8,435</i> | <i>22,120</i> | <i>31,694</i> | <i>40,410</i> | <i>25,543</i> |

| Project Capital                     | Production Years |               |              |              |               |               |               |            |              |
|-------------------------------------|------------------|---------------|--------------|--------------|---------------|---------------|---------------|------------|--------------|
|                                     | 2023             | 2024          | 2025         | 2026         | 2027          | 2028          | 2029          | 2030       | 2032         |
| Sustaining Capital – Mine           | 14,898           | 21,075        | 2,510        | 1,308        | 2,569         | 18,446        | 607           | 347        | -            |
| Sustaining Capital – Plant          | 17,850           | 198           | 4,177        | -            | 14,253        | 2,209         | 10,897        | -          | 1,787        |
| Sustaining Capital – Infrastructure | 1,998            | -             | 1,506        | -            | -             | -             | -             | -          | -            |
| <i>Subtotal Sustaining Capital</i>  | <i>34,746</i>    | <i>21,274</i> | <i>8,193</i> | <i>1,308</i> | <i>16,882</i> | <i>20,655</i> | <i>11,504</i> | <i>347</i> | <i>1,787</i> |

## 18.14 Operating Costs

All operating costs have been estimated from first principles and benchmarked against other operations.

The average estimated overall operating costs for Cerro Casale are presented in Table 18-10. These costs use mid-2009 pricing with a processed sulphide ore stream at the nominal plant throughput and HL of oxide ore at the nominal throughput. The sulphide ore was assumed to exhibit LOM average characteristics in terms of ore abrasiveness, hardness, grades, and rock type proportions. Yearly fluctuations from these values will result in annual deviations away from the average costs.

The LOM average mine operating cost was estimated to be US\$1.63 per tonne mined. This estimated operating cost varies between average costs of approximately US\$1.44/t over the first ten years of the mine life progressively increasing to average costs of US\$1.90/t over the last ten years, due mainly to long uphill hauls from the bottom of the pit.

The average electrical energy cost (or power cost) assumed for the 2010 feasibility study is US\$0.0910/kWh. Based on the average annual electrical energy demand of 1,888 GWh over the LOM, the average annual power cost for Cerro Casale will be US\$171.8 million.

A oil price of US\$75/bbl WTI was assumed resulting in a unit diesel price of US\$0.71/L delivered on site.

**Table 18-9: Average Estimated Direct Operating Costs (based on nominal throughput Rate)**

| Component                    | Cost (US\$/a)      | Cost per tonne per Indicated Type (US\$/t) | Percentage of Overall Cost (%) |
|------------------------------|--------------------|--------------------------------------------|--------------------------------|
| Mining                       | 286.0              | 1.63/t of mined rock                       | 37                             |
| Processing – Flotation Plant | 350.1 <sup>1</sup> | 6.08/t of sulphide ore                     | 45                             |
| Processing – HL              | 93.0 <sup>1</sup>  | 2.58/t of oxide ore                        | 12                             |
| G&A                          | 49.2               | 0.76/t ore processed                       | 6                              |
| Total                        | 778.3              |                                            | 100                            |

Note: Annual processing costs based on nominal throughput.

The LOM average process operating cost per tonne for sulphide ore processing was estimated to be US\$6.08. Over 85% of the flotation operating costs are related to power, wear steel, and reagents.

The overall costs derived for the heap leach and gold recovery circuit with all ancillary carbon circuits and the SART circuit are US\$2.58/t. Over 70% of the HL operating costs are associated with the leach pad operations, including reagents.

G&A operating costs on an LOM annual average basis are estimated to be US\$0.72/t ore processed.



## 18.15 Financial Analysis to Support Declaration of Mineral Reserves

The results of the economic analysis represent forward-looking information that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

The project will generate 16.8 million payable ounces of gold, 4,832 million pounds of payable copper, and 36.6 million ounces of payable silver in three saleable products: copper concentrate, gold doré, and a high grade copper sulphide precipitate (SART concentrate). Mine life is approximately 20 years.

The initial capital cost has been estimated at US\$4,184 million including contingency at a P<sub>73</sub> level of confidence and excluding escalation, with life-of-mine (LOM) average cash costs of US\$277 per oz gold payable. The total sustaining cost is US\$369 million. The estimated LOM cash operating costs including silver and copper credits are US\$14,774 million. The annual operating cost is estimated at US\$778.3 million.

Undiscounted and discounted cash flow techniques were used in the economic evaluation. For NPV or discounted cash flow purposes, the model is based from 1 January 2010. Estimates have been prepared for elements of cash revenue and cash operating expenditures for ongoing operations. Capital cost estimates were been prepared for project development and construction, ongoing operations (sustaining capital), and closure/post-closure obligations of the mine (see Section 18-13).

The following key economic assumptions were made:

- Metal prices were an Owner's consensus of prices, comprising gold at US\$800/oz, copper at US\$2.00/lb, and silver at US\$12.50/oz;
- \$US Exchange Rate. A rate of C\$1.15 = US\$1 and Chilean Peso \$550 = US\$1 were used;
- Pre-Production / Production. Cerro Casale has two key production starts one year apart with significant construction during this period: Q1 2014 is the start of oxide heap leach production and thus Cerro Casale production and operating costs; Q4 2014 is the start of sulphide concentrator production and thus the end of capital construction costs. The overlap between G&A operating costs starting Q1 2014 and Owner's Cost (capital) ending Q4 2015 is split using the ratio of operations manpower to total manpower (inclusive of construction manpower).
- Capitalized pre-stripping. Waste stripping costs are capitalized for the first five quarters of mining, Q4 2012 to Q4 2013 (inclusive) totalling US\$129 million, representing 82.7 Mt of waste. All costs associated with mining waste are



capitalized for the periods where the respective period stripping ratio is greater than 110% of the average LOM stripping ratio;

- By-product accounting has been applied in the calculation of the project cash cost;
- Inventory adjustment accounting was used to account for pre-production stockpiling, heap leach pad inventories, and in-circuit metal inventories in the process system;
- Depreciation was calculated using Chilean Internal Revenue Service-approved depreciation rates and defined depreciation classes. These results are used as a basis for the project tax calculation;
- The effective tax rate used in the analysis included the following:
  - Chilean corporate tax – 17%
  - Chilean mining tax – 5%
  - Withholding tax – 4% (on internal interest paid for internal debt financing);
- A 3% NSR royalty payable to Minera Anglo American Chile Limitada and its affiliates has been applied with a cumulative US\$3 million total cap. The 3% NSR payable to Placer Dome Latin America was not included;
- Closure costs of US\$135.3 million and post-closure annual costs of US\$111 million per year have been included;
- US\$4.55 million per year from the after-tax operating cash flow is paid annually throughout the 20 years of production into a closure fund compounding 7% annually. The total deposited into the fund over the life of operations will be US\$95.6 million; therefore, with the defined annual compounding interest, the required funding will be provided for closure and perpetual post-closure costs;
- Escalation/inflation has not been included in the financial analysis.

Using these parameters, the financial analysis indicated that the Project had a positive net cash flow and an acceptable internal rate of return and supports declaration of mineral reserves. The financial analysis indicated that the Project could support progression to mine development. Summary tables are presented overleaf.

Sensitivity analyses were performed on net cash flow, internal rate of return, gold price, copper price, operating costs and capital costs. The Project is most sensitive to changes in metal price followed in turn by operating costs and capital costs.. Kinross notes that a modest increase in metal prices has a significant impact on the Project's projected financial results. The long-term view of metal prices will drive the Project's projected financial results and thus the overall view of the Project's value.

**Table 18-10: Summary of Key Financial Analysis Results**

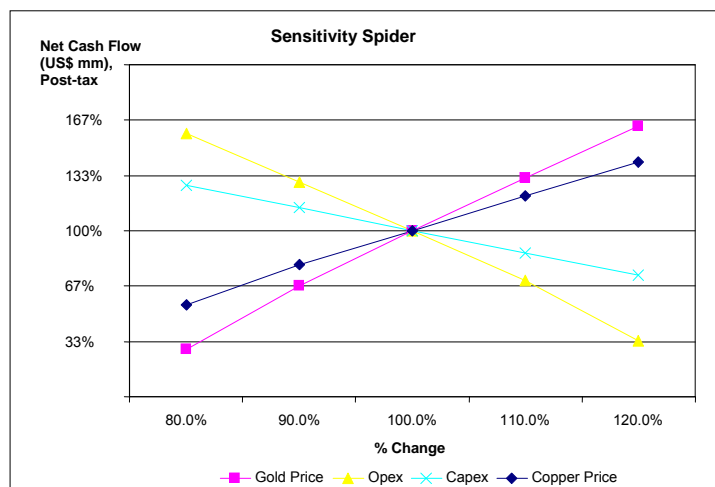
**Net Cash Flow After Tax (M\$)**

| Gold Price<br>(\$/oz) | Copper Price (\$/lb) |           |           |           |           |           |           |
|-----------------------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
|                       | \$1.60               | \$2.00    | \$2.40    | \$2.80    | \$3.20    | \$3.60    | \$4.00    |
| \$ 640                | \$ (683)             | \$ 1,190  | \$ 2,892  | \$ 4,344  | \$ 5,828  | \$ 7,350  | \$ 8,870  |
| \$ 800                | \$ 1,922             | \$ 3,564  | \$ 5,011  | \$ 6,457  | \$ 7,939  | \$ 9,459  | \$ 10,978 |
| \$ 960                | \$ 4,157             | \$ 5,677  | \$ 7,121  | \$ 8,566  | \$ 10,048 | \$ 11,568 | \$ 13,087 |
| \$ 1,120              | \$ 6,266             | \$ 7,785  | \$ 9,230  | \$ 10,675 | \$ 12,157 | \$ 13,677 | \$ 15,196 |
| \$ 1,280              | \$ 8,375             | \$ 9,894  | \$ 11,339 | \$ 12,784 | \$ 14,266 | \$ 15,785 | \$ 17,305 |
| \$ 1,440              | \$ 10,484            | \$ 12,003 | \$ 13,448 | \$ 14,893 | \$ 16,375 | \$ 17,894 | \$ 19,414 |
| \$ 1,600              | \$ 12,593            | \$ 14,112 | \$ 15,557 | \$ 17,002 | \$ 18,484 | \$ 20,003 | \$ 21,523 |

**IRR (%)**

| Gold Price<br>(\$/oz) | Copper Price (\$/lb) |        |        |        |        |        |        |
|-----------------------|----------------------|--------|--------|--------|--------|--------|--------|
|                       | \$1.60               | \$2.00 | \$2.40 | \$2.80 | \$3.20 | \$3.60 | \$4.00 |
| \$ 640                | -                    | 2.0%   | 4.4%   | 6.3%   | 8.1%   | 9.7%   | 11.2%  |
| \$ 800                | 3.2%                 | 5.5%   | 7.3%   | 9.0%   | 10.6%  | 12.0%  | 13.4%  |
| \$ 960                | 6.4%                 | 8.3%   | 9.9%   | 11.4%  | 12.8%  | 14.2%  | 15.4%  |
| \$ 1,120              | 9.2%                 | 10.9%  | 12.3%  | 13.6%  | 14.9%  | 16.2%  | 17.3%  |
| \$ 1,280              | 11.7%                | 13.2%  | 14.5%  | 15.7%  | 16.9%  | 18.0%  | 19.1%  |
| \$ 1,440              | 14.0%                | 15.3%  | 16.5%  | 17.6%  | 18.7%  | 19.8%  | 20.8%  |
| \$ 1,600              | 16.1%                | 17.3%  | 18.4%  | 19.5%  | 20.5%  | 21.5%  | 22.5%  |

**Figure 18-5: NCF Sensitivity Spider Graph**



## **19.0 OTHER RELEVANT DATA AND INFORMATION**

### **19.1 Compliance with Minimum Standards**

Studies undertaken as part of the feasibility stage have been compiled with the required minimum standard for such a study. Scoping and concept level studies, where approved for 2010 feasibility study design, were further developed to feasibility design level ( $\pm 15\%$ ). The exceptions to this were:

- Recovery of copper and gold from heap leaching of ROM oxide ore has not been established with a high level of accuracy due to the complexity of testing, but it has followed best industry practices;
- Pit slope design for the feasibility stage used geotechnical data from the 2008 pre-feasibility study and previously reported work. Discussions in Section 18 incorporate both the pre-feasibility study data and data from an updated geotechnical review completed mid-2009; and
- SART design is largely based on pilot plant testwork completed on solutions from the Kinross Maricunga ore.

### **19.2 Development Timeline**

A development timeline was prepared as part of the 2010 feasibility study, and used to establish the production schedules and cashflow analysis in Section 18. This timeline is provisional, as a decision to proceed with mine construction still requires regulatory approval, and approval of CMC and the Owners.

### **19.3 Risk and Opportunity Analysis**

The 2010 feasibility study developed a project development risk database to facilitate easier risk/opportunity tracking, action planning, follow-up, and faster reporting and analysis. Each risk deemed relevant had mitigation action plans developed with due dates and assigned responsible individuals. An opportunity management process was conducted in parallel to the risk assessment.

The management of risks and opportunities is an ongoing process of review and development through the various stages of the Project. Facilitated reviews were undertaken during the feasibility stage as general reviews with the project leads and Owners' representatives. Assuming Owner approval of mine development, such reviews would continue throughout basic engineering, detail design, and prior to construction.

### **19.3.1 Risks**

The probability of a risk happening and the impact on the project if the risk did happen were assessed for each risk. No risks were assigned the severest rating. Areas that will require ongoing management include:

- Permitting: impact of mining operations on waters in the Rio Nevado and Copiapó; impact of additional vehicular activity;
- Community and government: impact of additional vehicular traffic on local communities; impact of constructing a water extraction structure for the La Gallina water supply needed for Project construction; potential water impact of TSF; requirement for community engagement and a process of ongoing communication with the communities in the area of influence of the Project; indigenous community liaison;
- Project execution: price increases of equipment and materials due to increases in market activity; availability of engineering and construction resources in Chile; impact of altitude on safety; impact of additional vehicular activity; and
- Closure: increasing social expectations on closure over time; potential water deficit at the SW-04 monitoring point could lead to an impact on down-stream users post-closure.

### **19.3.2 Opportunities**

There are a number of opportunities for improvement to Project economics:

- Satellite deposits that could increase Project reserves;
- Trolley-assisted trucking for the later mine life that could reduce operating costs;
- Synergies with other Owner operations in Chile (e.g. use surplus construction equipment from Pascua Lama, use of old camp at Maricunga for water pipeline construction, use Maricunga for training mining staff, etc.);
- Potential conversion of additional Mineral Resources within the open pit to Mineral Reserves;
- Potential to exploit, using block caving, mineralization below the pit limit;
- Expansion of the processing plant beyond its current designed throughput;
- Steeper pit slopes.

These opportunities were not reflected in the 2010 feasibility study because they have not been developed to the appropriate level of engineering detail.

## **20.0 INTERPRETATION AND CONCLUSIONS**

### **20.1 Conclusions and Interpretations**

In the opinion of the QP:

- Information from legal experts supports that the mining tenure held is valid and is sufficient to support declaration of Mineral Resources and Mineral Reserves;
- CMC has sufficiently identified royalty obligations for the Project;
- Agreements between Kinross and Barrick, who are joint venture partners in CMC, are considered to be typical of such agreements within the mining industry, and do not present an impediment to the Project's development;
- CMC has commenced the process of acquisition of surface rights; ongoing surface rights negotiations will be required to support mining operations in the proposed mining area. A total of 10,786 ha of surface land will have to be acquired or rights of way obtained for development of the project facilities. CMC has benchmarked acquisition costs to similar land acquisitions for other projects in Region III, and these costs are included in the Owner's costs in the financial evaluation in Section 18;
- There are no legal impediments to the granting of rights-of-way and other easements necessary to access the property, to develop production water, and to build the proposed water and concentrate pipelines. On the concentrate pipeline route, around 20 km of the route runs through lands belonging to Colla indigenous communities;
- Kinross is not aware of any significant environmental, social or permitting issues that would prevent exploitation of the Cerro Casale deposit.
- CMC is aware that additional negotiations with the local communities will be required ahead of the Project's development;
- Total water rights granted to the Project, and currently registered, amount to 1,799.62 L/s. All these rights are for permanent and continuous water use and consumption. Water supplies are sufficient for current and planned development needs;
- Current permits have allowed exploration and associated supporting testwork to be conducted under appropriate laws. The Project will need to obtain sectorial permits that are granted by the various agencies that have authority over environmental resources, and construction, operation and closure of Project infrastructure;

- Cerro Casale received environmental approval under the name of Aldebarán in early 2002, but the project was subsequently deferred due to poor economic conditions, and many of the necessary sectorial permits were not obtained. Two alternatives were identified for obtaining the necessary regulatory approvals to proceed with Project development; CMC will discuss these alternatives with the relevant authorities;
- Exploration programs were conducted under the relevant permits for the programs;
- CMC has adequately assessed what permits will be required for the Project development, and which statutory entities are required to be notified and consulted such that proposed mining activities would be conducted within the regulatory framework required by the Chilean government;
- The information discussed for infrastructure and local resources supports the declaration of Mineral Resources and Mineral Reserves through documentation of the availability of staff, proposed or existing power, water, and communications facilities, the methods whereby goods are and will be transported to and from the proposed mine, and consideration of planned additions, modifications or supporting studies. Current site infrastructure is limited to an exploration camp;
- Exploration work conducted on the Project is appropriate to the style of mineralization. Results support the genetic and affinity interpretations for the known deposits and prospects;
- The geological understanding of the deposit settings, lithologies, and structural and alteration controls on mineralization is sufficient to support estimation of Mineral Resources and Mineral Reserves. The geological knowledge of the area is also considered sufficiently adequate to reliably inform feasibility-level studies;
- The mineralization style and setting is sufficiently well understood at the Cerro Casale deposit to support declaration of Mineral Resources and Mineral Reserves;
- The quantity and quality of the lithological, geotechnical, collar and downhole survey data collected in the exploration, and delineation drill programs are sufficient to support Mineral Resource and Mineral Reserve estimation
- Sampling methods are acceptable, meet industry-standard practice, and are adequate for Mineral Resource and Mineral Reserve estimation and 2010 feasibility study planning purposes
- The quality of the gold, silver, and copper analytical data is reliable and that sample preparation and analysis are generally performed in accordance with exploration best practices and industry standards;
- Sample security has relied upon the fact that the samples were always attended or locked in appropriate sample storage areas prior to dispatch to the sample

preparation facility. Chain-of-custody procedures consist of filling out sample submittal forms that are sent to the laboratory with sample shipments to make certain that all samples are received by the laboratory;

- Data verification programs undertaken on the data collected from the Project adequately support the geological interpretations and the database quality, and therefore support the use of the data in Mineral Resource and Mineral Reserve estimation, and in use in feasibility level Project design;
- Mineral Resources that have been estimated using RC and core drill data, have been performed to industry best practices, and conform to the requirements of CIM (2005);
- Mineral Reserve estimates have been performed to industry best practices, and conform to the requirements of CIM (2005). Declaration of Mineral Reserves has incorporated consideration of environmental, permitting, legal, title, taxation, socio-economic, marketing, and political factors and constraints;
- The conceptual mine plan is appropriate to the mineralization, and adequately reflects the deposit style, deposit dimensions, and host rock considerations;
- The metallurgical testwork completed on the Project has been appropriate to establish the optimal processing routes for oxide and sulphide ores;
- Metallurgical tests were performed on samples that were representative of the oxide and the sulphide mineralization;
- Metal recovery factors have been estimated for gold and copper that appear appropriate to the known mineralization styles and oxidation states;
- The major components of the flowsheet and process plant design of the Cerro Casale processing facilities are based on current technologies supported by pilot plant testwork;
- Ore hardness, reagent consumptions and process conditions have been appropriately determined to establish process operating costs;
- Sulphide concentrates have been adequately characterized and market-tested to assure amenability to smelters;
- The proposed mine plan envisages a conventional bulk-mining open pit scenario utilizing the largest proven class of each equipment type. The mine plan is achievable with the Mineral Reserves defined;
- Pit slopes have been designed using appropriate geotechnical engineering parameters based on testwork.
- Capital costs were defined with reference to direct cost, indirect cost, and Owners' Costs and were distinguished from operating costs and sustaining capital;



- Operating costs were considered to be representative of mid-2009 pricing and of a processed ore stream exhibiting the life-of-mine (LOM) average characteristics of ore abrasiveness, hardness, grades, and rock type proportions as outlined in the mine plan. Operating costs were estimated from first principles and benchmarked against other operations;
- The financial analysis indicated that the Project had a positive net cash flow and an acceptable internal rate of return, and could support declaration of mineral reserves. The financial analysis indicated that the Project could support progression to mine development
- The results of the 2010 Feasibility Study support the declaration of Mineral Reserves for the Cerro Casale Project.

In the opinion of the QP, the Project outlined in this Report has met its objectives. Mineral Resources and Mineral Reserves were estimated for the Project and a proposed plan for mining operations was outlined. This indicates data supporting the Mineral Resource and Mineral Reserve estimates were appropriately collected, evaluated and estimated.

Work programs completed have identified that gold–copper mineralization at the Cerro Casale deposit can support Project development using the parameters considered in the 2010 feasibility study.

## **21.0 RECOMMENDATIONS**

In order to advance the Project to development and future production, CMC should engage in discussions with the appropriate regulatory authorities to determine what requirements remain to be addressed for the Project to advance to development (estimated timeframe, two years, approximate cost US\$100,000).

CMC should continue with Project development activities as detailed in the 2010 feasibility study that are expected to reduce project technical risk, allow improved detailed engineering design and improve operational performance in a commercial mine (estimated timeframe, four years, approximate cost US\$96 million)

CMC should continue with infrastructure-related activities such as land acquisition and right of way agreements, installation of the construction camp and water supply/management infrastructure, purchase of purchasing mining equipment to facilitate pre-stripping and construction earthwork, and access road construction/upgrading (estimated timeframe, four years, approximate cost \$337 million).

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## **23.0 DATE AND SIGNATURE PAGE**

The effective date of this Technical Report, entitled "Kinross Gold Corporation, Cerro Casale Project, Northern Chile, NI 43-101 Technical Report" is 18 February 2010.

"signed and sealed"

Robert D. Henderson

Dated: \_\_\_\_\_



## Appendix 1: List of Mineral Claims

| Claim Number | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |      |          | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|--------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|------|----------|------------------------------|------------------------------------|
|              |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N°   | Date     |                              |                                    |
| TIN 18D      | 200       | 02-10-06         | 24-01-07             | 683                   | 610  | 03-11-06 | 244                                | 240  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 19D      | 200       | 02-10-06         | 24-01-07             | 685                   | 611  | 03-11-06 | 245                                | 241  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 20D      | 200       | 02-10-06         | 24-01-07             | 687                   | 612  | 03-11-06 | 246                                | 242  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 21D      | 200       | 02-10-06         | 24-01-07             | 689                   | 613  | 03-11-06 | 247                                | 243  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 22D      | 200       | 02-10-06         | 24-01-07             | 691                   | 614  | 03-11-06 | 248                                | 244  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 23D      | 200       | 02-10-06         | 24-01-07             | 693                   | 615  | 03-11-06 | 249                                | 245  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 24D      | 200       | 02-10-06         | 24-01-07             | 695                   | 616  | 03-11-06 | 250                                | 246  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 25D      | 200       | 02-10-06         | 24-01-07             | 697                   | 617  | 03-11-06 | 251                                | 247  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 26D      | 200       | 02-10-06         | 24-01-07             | 699                   | 618  | 03-11-06 | 252                                | 248  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 27D      | 200       | 02-10-06         | 24-01-07             | 701                   | 619  | 03-11-06 | 253                                | 249  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 28D      | 200       | 02-10-06         | 24-01-07             | 703                   | 620  | 03-11-06 | 254                                | 250  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 29D      | 200       | 02-10-06         | 24-01-07             | 705                   | 621  | 03-11-06 | 255                                | 251  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 30D      | 200       | 02-10-06         | 24-01-07             | 707                   | 622  | 03-11-06 | 256                                | 252  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| TIN 31D      | 200       | 02-10-06         | 24-01-07             | 709                   | 623  | 03-11-06 | 257                                | 253  | 26-04-07 | 23-01-09                     | \$ 147,464                         |
| VALLE 4C     | 200       | 02-10-06         | 20-02-07             | 1790v                 | 1483 | 13-10-06 | 1094                               | 918  | 20-06-07 | 19-02-09                     | \$ 147,464                         |
| VALLE 7C     | 200       | 02-10-06         | 20-02-07             | 1793v                 | 1486 | 13-10-06 | 1089                               | 915  | 20-06-07 | 19-02-09                     | \$ 147,464                         |
| VALLE 8C     | 300       | 02-10-06         | 20-02-07             | 1794v                 | 1487 | 13-10-06 | 1091                               | 916  | 20-06-07 | 19-02-09                     | \$ 221,196                         |
| VALLE 9C     | 200       | 02-10-06         | 20-02-07             | 1795v                 | 1488 | 13-10-06 | 1092v                              | 917  | 20-06-07 | 19-02-09                     | \$ 147,464                         |
| MALVA 1A     | 200       | 28-09-06         | 20-03-07             | 5708                  | 4383 | 11-10-06 | 4172v                              | 3258 | 18-07-07 | 19-03-09                     | \$ 147,464                         |
| MALVA 2A     | 200       | 28-09-06         | 20-03-07             | 5709v                 | 4384 | 11-10-06 | 4174                               | 3259 | 18-07-07 | 19-03-09                     | \$ 147,464                         |
| MALVA 3A     | 200       | 28-09-06         | 20-03-07             | 5711                  | 4385 | 11-10-06 | 4175v                              | 3260 | 18-07-07 | 19-03-09                     | \$ 147,464                         |
| MALVA 4A     | 300       | 28-09-06         | 20-03-07             | 5712v                 | 4386 | 11-10-06 | 4177                               | 3261 | 18-07-07 | 19-03-09                     | \$ 221,196                         |
| MALVA 6A     | 200       | 28-09-06         | 21-03-07             | 5715v                 | 4388 | 11-10-06 | 4180                               | 3263 | 18-07-07 | 20-03-09                     | \$ 147,464                         |
| VULCANO 5C   | 100       | 28-09-06         | 21-03-07             | 5750                  | 4411 | 11-10-06 | 4181v                              | 3264 | 18-07-07 | 20-03-09                     | \$ 73,732                          |
| MALVA 5A     | 200       | 28-09-06         | 22-03-07             | 5714                  | 4387 | 11-10-06 | 4178v                              | 3262 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| TIN 32D      | 200       | 28-09-06         | 22-03-07             | 5672                  | 4359 | 11-10-06 | 4189                               | 3269 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| TIN 53D      | 200       | 28-09-06         | 22-03-07             | 5691v                 | 4372 | 11-10-06 | 4190v                              | 3270 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| RODRIGO 1C   | 200       | 28-09-06         | 22-03-07             | 5745v                 | 4408 | 11-10-06 | 4192                               | 3271 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| PIRIGALLO 8C | 200       | 28-09-06         | 22-03-07             | 5729                  | 4397 | 11-10-06 | 4171                               | 3257 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| HUILLI 9B    | 200       | 28-09-06         | 22-03-07             | 5655v                 | 4348 | 11-10-06 | 4226v                              | 3294 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| PINGO 11D    | 100       | 28-09-06         | 22-03-07             | 5658v                 | 4350 | 11-10-06 | 4229v                              | 3296 | 18-07-07 | 21-03-09                     | \$ 73,732                          |
| CORAL 14D    | 100       | 28-09-06         | 22-03-07             | 5651                  | 4345 | 11-10-06 | 4231                               | 3297 | 18-07-07 | 21-03-09                     | \$ 73,732                          |
| CORAL 15D    | 200       | 28-09-06         | 22-03-07             | 5652v                 | 4346 | 11-10-06 | 4232v                              | 3298 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| TIN 33D      | 100       | 28-09-06         | 22-03-07             | 5673v                 | 4360 | 11-10-06 | 4246                               | 3307 | 18-07-07 | 21-03-09                     | \$ 73,732                          |
| TIN 34D      | 200       | 28-09-06         | 22-03-07             | 5675                  | 4361 | 11-10-06 | 4247v                              | 3308 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| TIN 35D      | 100       | 28-09-06         | 22-03-07             | 5676v                 | 4362 | 11-10-06 | 4249                               | 3309 | 18-07-07 | 21-03-09                     | \$ 73,732                          |
| TIN 36D      | 200       | 28-09-06         | 22-03-07             | 5678                  | 4363 | 11-10-06 | 4250v                              | 3310 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| TIN 48D      | 200       | 28-09-06         | 22-03-07             | 5685v                 | 4368 | 11-10-06 | 4258                               | 3315 | 18-07-07 | 21-03-09                     | \$ 147,464                         |



| Claim Number     | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |      |          | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|------------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|------|----------|------------------------------|------------------------------------|
|                  |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N°   | Date     |                              |                                    |
| TIN 49D          | 300       | 28-09-06         | 22-03-07             | 5687                  | 4369 | 11-10-06 | 4259v                              | 3316 | 18-07-07 | 21-03-09                     | \$ 221,196                         |
| HUILLI 8B        | 200       | 28-09-06         | 22-03-07             | 5654                  | 4347 | 11-10-06 | 4276                               | 3327 | 18-07-07 | 21-03-09                     | \$ 147,464                         |
| VULCANO 6C       | 200       | 28-09-06         | 23-03-07             | 5751v                 | 4412 | 11-10-06 | 4183                               | 3265 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| VULCANO 7C       | 200       | 28-09-06         | 23-03-07             | 5753                  | 4413 | 11-10-06 | 4184v                              | 3266 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| VULCANO 8C       | 200       | 28-09-06         | 23-03-07             | 5754v                 | 4414 | 11-10-06 | 4186                               | 3267 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| VULCANO 9C       | 200       | 28-09-06         | 23-03-07             | 5756                  | 4415 | 11-10-06 | 4187v                              | 3268 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| RODRIGO 2C       | 200       | 28-09-06         | 23-03-07             | 5747                  | 4409 | 11-10-06 | 4193v                              | 3272 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| RODRIGO 3C       | 200       | 28-09-06         | 23-03-07             | 5748v                 | 4410 | 11-10-06 | 4195                               | 3273 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| MAXIMILIANO 1C   | 200       | 28-09-06         | 23-03-07             | 5717                  | 4389 | 11-10-06 | 4196v                              | 3274 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| IGNACIA 1C       | 300       | 28-09-06         | 23-03-07             | 5706v                 | 4382 | 11-10-06 | 4198                               | 3275 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| CRISTÓBAL 1C     | 300       | 28-09-06         | 23-03-07             | 5705                  | 4381 | 11-10-06 | 4199v                              | 3276 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 1C     | 300       | 28-09-06         | 23-03-07             | 5718v                 | 4390 | 11-10-06 | 4201                               | 3277 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 2C     | 200       | 28-09-06         | 23-03-07             | 5720                  | 4391 | 11-10-06 | 4202v                              | 3278 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PIRIGALLO 3C     | 200       | 28-09-06         | 23-03-07             | 5721v                 | 4392 | 11-10-06 | 4204                               | 3279 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PIRIGALLO 4C     | 200       | 28-09-06         | 23-03-07             | 5723                  | 4393 | 11-10-06 | 4205v                              | 3280 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PIRIGALLO 5C     | 300       | 28-09-06         | 23-03-07             | 5724v                 | 4394 | 11-10-06 | 4207                               | 3281 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 6C     | 200       | 28-09-06         | 23-03-07             | 5726                  | 4395 | 11-10-06 | 4208v                              | 3282 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PIRIGALLO 7C     | 200       | 28-09-06         | 23-03-07             | 5727v                 | 4396 | 11-10-06 | 4210                               | 3283 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PIRIGALLO 10C    | 200       | 28-09-06         | 23-03-07             | 5732                  | 4399 | 11-10-06 | 4213                               | 3285 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PIRIGALLO 11C    | 200       | 28-09-06         | 23-03-07             | 5733v                 | 4400 | 11-10-06 | 4214v                              | 3286 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PIRIGALLO 12C    | 300       | 28-09-06         | 23-03-07             | 5735                  | 4401 | 11-10-06 | 4216                               | 3287 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 13C    | 300       | 28-09-06         | 23-03-07             | 5736v                 | 4402 | 11-10-06 | 4217v                              | 3288 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 14C    | 300       | 28-09-06         | 23-03-07             | 5738                  | 4403 | 11-10-06 | 4219                               | 3289 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 15C    | 300       | 28-09-06         | 23-03-07             | 5739v                 | 4404 | 11-10-06 | 4220v                              | 3290 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 16C    | 300       | 28-09-06         | 23-03-07             | 5741                  | 4405 | 11-10-06 | 4222                               | 3291 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 17C    | 300       | 28-09-06         | 23-03-07             | 5742v                 | 4406 | 11-10-06 | 4223v                              | 3292 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| PIRIGALLO 18C    | 200       | 28-09-06         | 23-03-07             | 5744                  | 4407 | 11-10-06 | 4225                               | 3293 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| PINGO 10D        | 100       | 28-09-06         | 23-03-07             | 5657                  | 4349 | 11-10-06 | 4228                               | 3295 | 18-07-07 | 22-03-09                     | \$ 73,732                          |
| RÍO SIETE C      | 200       | 28-09-06         | 23-03-07             | 5660                  | 4351 | 11-10-06 | 4234                               | 3299 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| RÍO OCHO C       | 200       | 28-09-06         | 23-03-07             | 5661v                 | 4352 | 11-10-06 | 4235v                              | 3300 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| RÍO DIECISIETE C | 100       | 28-09-06         | 23-03-07             | 5667v                 | 4356 | 11-10-06 | 4241v                              | 3304 | 18-07-07 | 22-03-09                     | \$ 73,732                          |
| RÍO DIECIOCHO C  | 100       | 28-09-06         | 23-03-07             | 5669                  | 4357 | 11-10-06 | 4243                               | 3305 | 18-07-07 | 22-03-09                     | \$ 73,732                          |
| TIN 50D          | 200       | 28-09-06         | 23-03-07             | 5688v                 | 4370 | 11-10-06 | 4261                               | 3317 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| TIN 51D          | 200       | 28-09-06         | 23-03-07             | 5690                  | 4371 | 11-10-06 | 4262v                              | 3318 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| TIN 89D          | 200       | 28-09-06         | 23-03-07             | 5693                  | 4373 | 11-10-06 | 4264                               | 3319 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| TIN 90D          | 300       | 28-09-06         | 23-03-07             | 5694v                 | 4374 | 11-10-06 | 4265v                              | 3320 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| TIN 93D          | 100       | 28-09-06         | 23-03-07             | 5699                  | 4377 | 11-10-06 | 4270                               | 3323 | 18-07-07 | 22-03-09                     | \$ 73,732                          |
| TIN 94D          | 300       | 28-09-06         | 23-03-07             | 5700v                 | 4378 | 11-10-06 | 4271v                              | 3324 | 18-07-07 | 22-03-09                     | \$ 221,196                         |
| TIN 95D          | 200       | 28-09-06         | 23-03-07             | 5702                  | 4379 | 11-10-06 | 4273                               | 3325 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| TIN 108D         | 200       | 28-09-06         | 23-03-07             | 5703v                 | 4380 | 11-10-06 | 4274v                              | 3326 | 18-07-07 | 22-03-09                     | \$ 147,464                         |
| RÍO DIECINUEVE C | 200       | 28-09-06         | 26-03-07             | 5670v                 | 4358 | 11-10-06 | 4244v                              | 3306 | 18-07-07 | 25-03-09                     | \$ 147,464                         |
| RÍO CATORCE C    | 100       | 28-09-06         | 27-03-07             | 5664v                 | 4354 | 11-10-06 | 4238v                              | 3302 | 18-07-07 | 26-03-09                     | \$ 73,732                          |
| RÍO DIECISEIS C  | 200       | 28-09-06         | 27-03-07             | 5666                  | 4355 | 11-10-06 | 4240                               | 3303 | 18-07-07 | 26-03-09                     | \$ 147,464                         |



| Claim Number | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |      |          | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|--------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|------|----------|------------------------------|------------------------------------|
|              |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N°   | Date     |                              |                                    |
| TIN 37D      | 100       | 28-09-06         | 29-03-07             | 5679v                 | 4364 | 11-10-06 | 4252                               | 3311 | 18-07-07 | 28-03-09                     | \$ 73,732                          |
| TIN 38D      | 100       | 28-09-06         | 29-03-07             | 5681                  | 4365 | 11-10-06 | 4253v                              | 3312 | 18-07-07 | 28-03-09                     | \$ 73,732                          |
| TIN 39D      | 200       | 28-09-06         | 29-03-07             | 5682v                 | 4366 | 11-10-06 | 4255                               | 3313 | 18-07-07 | 28-03-09                     | \$ 147,464                         |
| TIN 40D      | 100       | 28-09-06         | 29-03-07             | 5684                  | 4367 | 11-10-06 | 4256v                              | 3314 | 18-07-07 | 28-03-09                     | \$ 73,732                          |
| PIRIGALLO 9C | 300       | 28-09-06         | 12-04-07             | 5730v                 | 4398 | 11-10-06 | 4211v                              | 3284 | 18-07-07 | 11-04-09                     | \$ 221,196                         |
| RÍO NUEVE C  | 200       | 28-09-06         | 12-04-07             | 5663                  | 4353 | 11-10-06 | 4237                               | 3301 | 18-07-07 | 11-04-09                     | \$ 147,464                         |
| TIN 91D      | 300       | 28-09-06         | 12-04-07             | 5696                  | 4375 | 11-10-06 | 4267                               | 3321 | 18-07-07 | 11-04-09                     | \$ 221,196                         |
| TIN 92D      | 300       | 28-09-06         | 12-04-07             | 5697v                 | 4376 | 11-10-06 | 4268v                              | 3322 | 18-07-07 | 11-04-09                     | \$ 221,196                         |
| VALLE 5C     | 100       | 02-10-06         | 30-04-07             | 1791v                 | 1484 | 13-10-06 | 1217                               | 1027 | 29-06-07 | 29-04-09                     | \$ 73,732                          |
| VALLE 6C     | 100       | 02-10-06         | 30-04-07             | 1792v                 | 1485 | 13-10-06 | 1218v                              | 1028 | 29-06-07 | 29-04-09                     | \$ 73,732                          |
| PINGO A2     | 200       | 30-01-07         | 28-06-07             | 641                   | 503  | 02-02-07 | 6268                               | 4929 | 04-10-07 | 27-06-09                     | \$ 147,464                         |
| VOLCÁN 1D    | 200       | 30-01-07         | 22-08-07             | 221                   | 187  | 13-02-07 | 2746                               | 2392 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 2D    | 200       | 30-01-07         | 22-08-07             | 222                   | 188  | 13-02-07 | 2747v                              | 2393 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 3D    | 200       | 30-01-07         | 22-08-07             | 223                   | 189  | 13-02-07 | 2749                               | 2394 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 4D    | 300       | 30-01-07         | 22-08-07             | 224                   | 190  | 13-02-07 | 2750v                              | 2395 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 5D    | 200       | 30-01-07         | 22-08-07             | 225                   | 191  | 13-02-07 | 2752                               | 2396 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 6D    | 200       | 30-01-07         | 22-08-07             | 226                   | 192  | 13-02-07 | 2753v                              | 2397 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 7D    | 200       | 30-01-07         | 22-08-07             | 227                   | 193  | 13-02-07 | 2755                               | 2398 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 8D    | 300       | 30-01-07         | 22-08-07             | 228                   | 194  | 13-02-07 | 2756v                              | 2399 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 12D   | 200       | 30-01-07         | 22-08-07             | 229                   | 195  | 13-02-07 | 2758                               | 2400 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 13D   | 200       | 30-01-07         | 22-08-07             | 230                   | 196  | 13-02-07 | 2759v                              | 2401 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 14D   | 200       | 30-01-07         | 22-08-07             | 231                   | 197  | 13-02-07 | 2761                               | 2402 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 15D   | 200       | 30-01-07         | 22-08-07             | 232                   | 198  | 13-02-07 | 2762v                              | 2403 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 16D   | 200       | 30-01-07         | 22-08-07             | 233                   | 199  | 13-02-07 | 2764                               | 2404 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 17D   | 300       | 30-01-07         | 22-08-07             | 234                   | 200  | 13-02-07 | 2765v                              | 2405 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 18D   | 200       | 30-01-07         | 22-08-07             | 235                   | 201  | 13-02-07 | 2767                               | 2406 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 19D   | 200       | 30-01-07         | 22-08-07             | 236                   | 202  | 13-02-07 | 2768v                              | 2407 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 20D   | 200       | 30-01-07         | 22-08-07             | 237                   | 203  | 13-02-07 | 2770                               | 2408 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 21D   | 200       | 30-01-07         | 22-08-07             | 238                   | 204  | 13-02-07 | 2771v                              | 2409 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 22D   | 200       | 30-01-07         | 22-08-07             | 239                   | 205  | 13-02-07 | 2773                               | 2410 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 23D   | 200       | 30-01-07         | 22-08-07             | 240                   | 206  | 13-02-07 | 2774v                              | 2411 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 24D   | 300       | 30-01-07         | 22-08-07             | 241                   | 207  | 13-02-07 | 2776                               | 2412 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 25D   | 200       | 30-01-07         | 22-08-07             | 242                   | 208  | 13-02-07 | 2777v                              | 2413 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 26D   | 200       | 30-01-07         | 22-08-07             | 243                   | 209  | 13-02-07 | 2779                               | 2414 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 27D   | 200       | 30-01-07         | 22-08-07             | 244                   | 210  | 13-02-07 | 2780v                              | 2415 | 23-11-07 | 21-08-09                     | \$ 147,464                         |
| VOLCÁN 28D   | 300       | 30-01-07         | 22-08-07             | 245                   | 211  | 13-02-07 | 2782                               | 2416 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 29D   | 300       | 30-01-07         | 22-08-07             | 246                   | 212  | 13-02-07 | 2783v                              | 2417 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 30D   | 300       | 30-01-07         | 22-08-07             | 247                   | 213  | 13-02-07 | 2785                               | 2418 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 31D   | 300       | 30-01-07         | 22-08-07             | 248                   | 214  | 13-02-07 | 2787v                              | 2419 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 32D   | 300       | 30-01-07         | 22-08-07             | 249                   | 215  | 13-02-07 | 2789                               | 2420 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 33D   | 300       | 30-01-07         | 22-08-07             | 250                   | 216  | 13-02-07 | 2790v                              | 2421 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 34D   | 300       | 30-01-07         | 22-08-07             | 251                   | 217  | 13-02-07 | 2791-A                             | 2422 | 23-11-07 | 21-08-09                     | \$ 221,196                         |
| VOLCÁN 35D   | 300       | 30-01-07         | 22-08-07             | 252                   | 218  | 13-02-07 | 2792V                              | 2423 | 23-11-07 | 21-08-09                     | \$ 221,196                         |



| Claim Number    | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |      |          | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|-----------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|------|----------|------------------------------|------------------------------------|
|                 |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N°   | Date     |                              |                                    |
| PABLO 1D        | 200       | 14-06-07         | 15-11-07             | 3310v                 | 2629 | 21-06-07 | 1220v                              | 961  | 28-02-08 | 14-11-09                     | \$ 147,464                         |
| PABLO 2D        | 200       | 14-06-07         | 15-11-07             | 3312                  | 2630 | 21-06-07 | 1222                               | 962  | 28-02-08 | 14-11-09                     | \$ 147,464                         |
| PABLO 5D        | 200       | 14-06-07         | 15-11-07             | 3313v                 | 2631 | 21-06-07 | 1223v                              | 963  | 28-02-08 | 14-11-09                     | \$ 147,464                         |
| PABLO 6D        | 200       | 14-06-07         | 15-11-07             | 3315                  | 2632 | 21-06-07 | 1225                               | 964  | 28-02-08 | 14-11-09                     | \$ 147,464                         |
| PABLO 10D       | 300       | 14-06-07         | 15-11-07             | 3318                  | 2634 | 21-06-07 | 1226v                              | 965  | 28-02-08 | 14-11-09                     | \$ 221,196                         |
| ALERCE 1A       | 100       | 14-06-07         | 19-11-07             | 3273                  | 2604 | 21-06-07 | 1183                               | 936  | 28-02-08 | 18-11-09                     | \$ 73,732                          |
| CAMPO 1D        | 200       | 14-06-07         | 19-11-07             | 3279                  | 2608 | 21-10-07 | 1186                               | 938  | 28-02-08 | 18-11-09                     | \$ 147,464                         |
| CAMPO 3D        | 300       | 14-06-07         | 19-11-07             | 3280v                 | 2609 | 21-11-07 | 1187v                              | 939  | 28-02-08 | 18-11-09                     | \$ 221,196                         |
| CAMPO 6D        | 200       | 14-06-07         | 19-11-07             | 3282                  | 2610 | 21-12-07 | 1189                               | 940  | 28-02-08 | 18-11-09                     | \$ 147,464                         |
| CAMPO 7D        | 200       | 14-06-07         | 19-11-07             | 3283v                 | 2611 | 21-01-08 | 1190v                              | 941  | 28-02-08 | 18-11-09                     | \$ 147,464                         |
| CAMPO 8D        | 100       | 14-06-07         | 19-11-07             | 3285                  | 2612 | 21-02-08 | 1192                               | 942  | 28-02-08 | 18-11-09                     | \$ 73,732                          |
| CAMPO 9D        | 100       | 14-06-07         | 19-11-07             | 3286v                 | 2613 | 21-03-08 | 1193v                              | 943  | 28-02-08 | 18-11-09                     | \$ 73,732                          |
| CARO 5D         | 100       | 14-06-07         | 19-11-07             | 3292v                 | 2617 | 21-06-07 | 1184v                              | 937  | 28-02-08 | 18-11-09                     | \$ 73,732                          |
| EL SALVADOR 1C  | 200       | 14-06-07         | 26-11-07             | 3294                  | 2618 | 21-06-07 | 1210                               | 954  | 28-02-08 | 25-11-09                     | \$ 147,464                         |
| EL SALVADOR 2C  | 300       | 14-06-07         | 26-11-07             | 3295v                 | 2619 | 21-06-07 | 1211v                              | 955  | 28-02-08 | 25-11-09                     | \$ 221,196                         |
| EL SALVADOR 3C  | 300       | 14-06-07         | 26-11-07             | 3297                  | 2620 | 21-06-07 | 1213                               | 956  | 28-02-08 | 25-11-09                     | \$ 221,196                         |
| EL SALVADOR 7C  | 100       | 14-06-07         | 26-11-07             | 3301v                 | 2623 | 21-06-07 | 1214v                              | 957  | 28-02-08 | 25-11-09                     | \$ 73,732                          |
| EL SALVADOR 10C | 200       | 14-06-07         | 26-11-07             | 3306                  | 2626 | 21-06-07 | 1216                               | 958  | 28-02-08 | 25-11-09                     | \$ 147,464                         |
| EL SALVADOR 11C | 200       | 14-06-07         | 26-11-07             | 3307v                 | 2627 | 21-06-07 | 1217v                              | 959  | 28-02-08 | 25-11-09                     | \$ 147,464                         |
| EL SALVADOR 12C | 200       | 14-06-07         | 26-11-07             | 3309                  | 2628 | 21-06-07 | 1219                               | 960  | 28-02-08 | 25-11-09                     | \$ 147,464                         |
| TIN 74A         | 100       | 14-06-07         | 26-11-07             | 3327                  | 2640 | 21-06-07 | 1178v                              | 933  | 28-02-08 | 25-11-09                     | \$ 73,732                          |
| QUEBRADA 2A     | 200       | 14-06-07         | 27-11-07             | 3322v                 | 2637 | 21-06-07 | 1205v                              | 951  | 28-02-08 | 26-11-09                     | \$ 147,464                         |
| QUEBRADA 3A     | 300       | 14-06-07         | 27-11-07             | 3324                  | 2638 | 21-06-07 | 1207                               | 952  | 28-02-08 | 26-11-09                     | \$ 221,196                         |
| QUEBRADA 4A     | 300       | 14-06-07         | 27-11-07             | 3325v                 | 2639 | 21-06-07 | 1208v                              | 953  | 28-02-08 | 26-11-09                     | \$ 221,196                         |
| VERO 1D         | 200       | 14-06-07         | 27-11-07             | 3328v                 | 2641 | 21-06-07 | 1195                               | 944  | 28-02-08 | 26-11-09                     | \$ 147,464                         |
| VERO 2D         | 100       | 14-06-07         | 27-11-07             | 3330                  | 2642 | 21-06-07 | 1996v                              | 945  | 28-02-08 | 26-11-09                     | \$ 73,732                          |
| VERO 3D         | 200       | 14-06-07         | 27-11-07             | 3331v                 | 2643 | 21-06-07 | 1198                               | 946  | 28-02-08 | 26-11-09                     | \$ 147,464                         |
| VERO 4D         | 300       | 14-06-07         | 27-11-07             | 3333                  | 2644 | 21-06-07 | 1199v                              | 947  | 28-02-08 | 26-11-09                     | \$ 221,196                         |
| VERO 5D         | 200       | 14-06-07         | 27-11-07             | 3334v                 | 2645 | 21-06-07 | 1201                               | 948  | 28-02-08 | 26-11-09                     | \$ 147,464                         |
| VERO 6D         | 200       | 14-06-07         | 27-11-07             | 3336                  | 2646 | 21-06-07 | 1202v                              | 949  | 28-02-08 | 26-11-09                     | \$ 147,464                         |
| VERO 7D         | 200       | 14-06-07         | 27-11-07             | 3337v                 | 2647 | 21-06-07 | 1204                               | 950  | 28-02-08 | 26-11-09                     | \$ 147,464                         |
| PINGO A1A       | 200       | 06-06-07         | 06-12-07             | 3099                  | 2486 | 15-06-07 | 1181v                              | 935  | 28-02-08 | 05-12-09                     | \$ 147,464                         |
| TIN 79A         | 100       | 06-06-07         | 06-12-07             | 3097v                 | 2485 | 15-06-07 | 1180                               | 934  | 28-02-08 | 05-12-09                     | \$ 73,732                          |
| AÑAUCA 36D      | 200       | 14-06-07         | 13-12-07             | 3274v                 | 2605 | 21-07-07 | 1883v                              | 1530 | 27-03-08 | 12-12-09                     | \$ 147,464                         |
| AÑAUCA 37D      | 200       | 14-06-07         | 13-12-07             | 3276                  | 2606 | 21-08-07 | 1885                               | 1531 | 27-03-08 | 12-12-09                     | \$ 147,464                         |
| AÑAUCA 38D      | 200       | 14-06-07         | 13-12-07             | 3277v                 | 2607 | 21-09-07 | 1886v                              | 1532 | 27-03-08 | 12-12-09                     | \$ 147,464                         |
| CARO 3D         | 300       | 14-06-07         | 18-12-07             | 3289v                 | 2615 | 21-05-08 | 1888                               | 1533 | 27-03-08 | 17-12-09                     | \$ 221,196                         |
| CARO 4D         | 300       | 14-06-07         | 18-12-07             | 3291                  | 2616 | 21-06-07 | 1889v                              | 1534 | 27-03-08 | 17-12-09                     | \$ 221,196                         |
| EL SALVADOR 8C  | 300       | 14-06-07         | 18-12-07             | 3303                  | 2624 | 21-06-07 | 1891                               | 1535 | 27-03-08 | 17-12-09                     | \$ 221,196                         |
| EL SALVADOR 9C  | 300       | 14-06-07         | 18-12-07             | 3304v                 | 2625 | 21-06-07 | 1892v                              | 1536 | 27-03-08 | 17-12-09                     | \$ 221,196                         |
| EL SALVADOR 5C  | 300       | 14-06-07         | 27-03-08             | 3300                  | 2622 | 21-06-07 | 4431                               | 3603 | 23-07-08 | 27-03-10                     | \$ 221,196                         |
| QUEBRADA 1A     | 200       | 14-06-07         | 27-03-08             | 3321                  | 2636 | 21-06-07 | 3999v                              | 3239 | 03-07-08 | 27-03-10                     | \$ 147,464                         |
| VULCANO 4B-SUR  | 100       | 31-08-07         | 09-04-08             | 5656                  | 4396 | 06-09-07 | 4607v                              | 3738 | 30-07-08 | 09-04-10                     | \$ 73,732                          |



| Claim Number      | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |      |          | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|-------------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|------|----------|------------------------------|------------------------------------|
|                   |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N°   | Date     |                              |                                    |
| TIN 83 PRORROGADA | 100       | 06-06-05         | 16-04-08             | 2720                  | 2070 | 17-06-05 | 151v                               | 110  | 12-01-06 | 16-04-10                     | \$ 73,732                          |
| PABLO 7D          | 300       | 14-06-07         | 15-05-08             | 3316v                 | 2633 | 21-06-07 | 4606                               | 3737 | 30-07-08 | 15-05-10                     | \$ 221,196                         |
| PINGO 13D         | 100       | 14-06-07         | 15-05-08             | 3319v                 | 2635 | 21-06-07 | 4604v                              | 3736 | 30-07-08 | 15-05-10                     | \$ 73,732                          |
| CAMI 2A           | 300       | 28-12-07         | 15-07-08             | 237                   | 180  | 14-01-08 | 7360                               | 5801 | 22-10-08 | 15-07-10                     | \$ 221,196                         |
| EL SALVADOR 4C    | 300       | 14-06-07         | 04-08-08             | 3298v                 | 2621 | 21-06-07 | 8329v                              | 6543 | 02-12-09 | 04-08-10                     | \$ 221,196                         |
| DON QUIJOTE A     | 200       | 28-12-07         | 12-08-08             | 285                   | 212  | 14-01-08 | 8085                               | 6367 | 20-11-08 | 12-08-10                     | \$ 147,464                         |
| DULCINEA A        | 300       | 28-12-07         | 12-08-08             | 286v                  | 213  | 14-01-08 | 8423v                              | 6606 | 04-12-08 | 12-08-10                     | \$ 221,196                         |
| ROCINANTE A       | 200       | 28-12-07         | 12-08-08             | 288                   | 214  | 14-01-08 | 8083v                              | 6366 | 20-11-08 | 12-08-10                     | \$ 147,464                         |
| ARRECIFE 2D       | 300       | 28-12-07         | 30-09-08             | 220v                  | 169  | 14-01-08 | 87                                 | 68   | 09-01-09 | 30-09-10                     | \$ 221,196                         |
| ARRECIFE 3D       | 200       | 28-12-07         | 30-09-08             | 222                   | 170  | 14-01-08 | 88v                                | 69   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| ARRECIFE 4D       | 200       | 28-12-07         | 30-09-08             | 223v                  | 171  | 14-01-08 | 90                                 | 70   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| ARRECIFE 8D       | 200       | 28-12-07         | 30-09-08             | 229v                  | 175  | 14-01-08 | 91v                                | 71   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| ARRECIFE 9D       | 200       | 28-12-07         | 30-09-08             | 231                   | 176  | 14-01-08 | 93                                 | 72   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| ARRECIFE 10D      | 200       | 28-12-07         | 30-09-08             | 232v                  | 177  | 14-01-08 | 94v                                | 73   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| ARRECIFE 11D      | 300       | 28-12-07         | 30-09-08             | 234                   | 178  | 14-01-08 | 96                                 | 74   | 09-01-09 | 30-09-10                     | \$ 221,196                         |
| ARRECIFE 12D      | 300       | 28-12-07         | 30-09-08             | 235v                  | 179  | 14-01-08 | 97v                                | 75   | 09-01-09 | 30-09-10                     | \$ 221,196                         |
| CAMI 4A           | 200       | 28-12-07         | 30-09-08             | 240                   | 182  | 14-01-08 | 111                                | 84   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| CARO 2D           | 300       | 28-12-07         | 30-09-08             | 276                   | 206  | 14-01-08 | 78                                 | 62   | 09-01-09 | 30-09-10                     | \$ 221,196                         |
| CORAL 1D          | 200       | 28-12-07         | 30-09-08             | 277v                  | 207  | 14-01-08 | 79v                                | 63   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| CORAL 2D          | 200       | 28-12-07         | 30-09-08             | 279                   | 208  | 14-01-08 | 81                                 | 64   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| CORAL 3D          | 200       | 28-12-07         | 30-09-08             | 280v                  | 209  | 14-01-08 | 82v                                | 65   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| CORAL 4D          | 300       | 28-12-07         | 30-09-08             | 282                   | 210  | 14-01-08 | 84                                 | 66   | 09-01-09 | 30-09-10                     | \$ 221,196                         |
| CORAL 6D          | 300       | 28-12-07         | 30-09-08             | 283v                  | 211  | 14-01-08 | 85v                                | 67   | 09-01-09 | 30-09-10                     | \$ 221,196                         |
| PINGO 2A          | 200       | 28-12-07         | 30-09-08             | 289v                  | 215  | 14-01-08 | 99                                 | 76   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| PINGO 14E         | 200       | 28-12-07         | 30-09-08             | 291                   | 216  | 14-01-08 | 100v                               | 77   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| PINGO 15E         | 100       | 28-12-07         | 30-09-08             | 292v                  | 217  | 14-01-08 | 102                                | 78   | 09-01-09 | 30-09-10                     | \$ 73,732                          |
| TOMATILLO 1D      | 200       | 28-12-07         | 30-09-08             | 294                   | 218  | 14-01-08 | 109v                               | 83   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| VULCANO 10E       | 200       | 28-12-07         | 30-09-08             | 295v                  | 219  | 14-01-08 | 103v                               | 79   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| VULCANO 11E       | 200       | 28-12-07         | 30-09-08             | 297                   | 220  | 14-01-08 | 105                                | 80   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| VULCANO 14E       | 300       | 28-12-07         | 30-09-08             | 298v                  | 221  | 14-01-08 | 106v                               | 81   | 09-01-09 | 30-09-10                     | \$ 221,196                         |
| VULCANO 15E       | 200       | 28-12-07         | 30-09-08             | 300                   | 222  | 14-01-08 | 108                                | 82   | 09-01-09 | 30-09-10                     | \$ 147,464                         |
| CARO 1D           | 300       | 14-06-07         | 17-10-08             | 3288                  | 2614 | 21-04-08 | 76v                                | 61   | 09-01-09 | 17-10-10                     | \$ 221,196                         |
| RIO DIECINUEVE B  | 200       | 11-04-08         | 22-10-08             | 2509                  | 2060 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 147,464                         |
| RIO VEINTE B      | 100       | 11-04-08         | 22-10-08             | 2510v                 | 2061 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 73,732                          |
| CORAL 8A          | 300       | 11-04-08         | 22-10-08             | 2512                  | 2062 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 221,196                         |
| CORAL 10A         | 100       | 11-04-08         | 22-10-08             | 2513v                 | 2063 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 73,732                          |
| HUALLE A          | 100       | 11-04-08         | 22-10-08             | 2566                  | 2098 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 73,732                          |
| EL SALVADOR DOS A | 100       | 11-04-08         | 22-10-08             | 2567v                 | 2099 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 73,732                          |
| RIO B             | 100       | 11-04-08         | 22-10-08             | 2569                  | 2100 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 73,732                          |
| PINGO 9D          | 200       | 11-04-08         | 22-10-08             | 2570v                 | 2101 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 147,464                         |
| CALANDRIA 1D      | 300       | 11-04-08         | 22-10-08             | 2572                  | 2102 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 221,196                         |
| CALANDRIA 2D      | 300       | 11-04-08         | 22-10-08             | 2573v                 | 2103 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 221,196                         |
| MINERVA TRES A    | 100       | 11-04-08         | 22-10-08             | 2575                  | 2104 | 25-04-08 | PENDING                            |      |          | 22-10-10                     | \$ 73,732                          |





| Claim Number    | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |    |      | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|-----------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|----|------|------------------------------|------------------------------------|
|                 |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N° | Date |                              |                                    |
| TIN 85B         | 200       | 11-04-08         | 22-10-08             | 2576v                 | 2105 | 25-04-08 | PENDING                            |    |      | 22-10-10                     | \$ 147,464                         |
| TIN 109B        | 100       | 11-04-08         | 22-10-08             | 2578                  | 2106 | 25-04-08 | PENDING                            |    |      | 22-10-10                     | \$ 73,732                          |
| PABLO 7G        | 300       | 11-04-08         | 22-10-08             | 2582v                 | 2109 | 25-04-08 | PENDING                            |    |      | 22-10-10                     | \$ 221,196                         |
| PABLO 7H        | 300       | 11-04-08         | 22-10-08             | 2584                  | 2110 | 25-04-08 | PENDING                            |    |      | 22-10-10                     | \$ 221,196                         |
| ROBLE A         | 100       | 11-04-08         | 22-10-08             | 2585v                 | 2111 | 25-04-08 | PENDING                            |    |      | 22-10-10                     | \$ 73,732                          |
| LENGA A         | 100       | 11-04-08         | 22-10-08             | 2587                  | 2112 | 25-04-08 | PENDING                            |    |      | 22-10-10                     | \$ 73,732                          |
| MAÑO A          | 100       | 11-04-08         | 22-10-08             | 2588v                 | 2113 | 25-04-08 | PENDING                            |    |      | 22-10-10                     | \$ 73,732                          |
| CAMI ONCE A     | 100       | 11-04-08         | 30-10-08             | 2474v                 | 2037 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| NANTOCO 4D      | 100       | 11-04-08         | 30-10-08             | 2476                  | 2038 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| MINERVA B       | 100       | 11-04-08         | 30-10-08             | 2477v                 | 2039 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| BREA 1D         | 300       | 11-04-08         | 30-10-08             | 2479                  | 2040 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 221,196                         |
| BREA 2D         | 100       | 11-04-08         | 30-10-08             | 2480v                 | 2041 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| BREA 3D         | 200       | 11-04-08         | 30-10-08             | 2482                  | 2042 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| BREA 4D         | 300       | 11-04-08         | 30-10-08             | 2483v                 | 2043 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 221,196                         |
| BREA 5D         | 100       | 11-04-08         | 30-10-08             | 2485                  | 2044 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| BREA 6D         | 200       | 11-04-08         | 30-10-08             | 2486v                 | 2045 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| BREA 7D         | 100       | 11-04-08         | 30-10-08             | 2488                  | 2046 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| RÍO CINCO B     | 100       | 11-04-08         | 30-10-08             | 2492v                 | 2049 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| RÍO SIETE B     | 200       | 11-04-08         | 30-10-08             | 2494                  | 2050 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO OCHO B      | 200       | 11-04-08         | 30-10-08             | 2495v                 | 2051 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO NUEVE B     | 200       | 11-04-08         | 30-10-08             | 2497                  | 2052 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO DIEZ B      | 200       | 11-04-08         | 30-10-08             | 2498v                 | 2053 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO ONCE B      | 200       | 11-04-08         | 30-10-08             | 2500                  | 2054 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO DOCE B      | 200       | 11-04-08         | 30-10-08             | 2501v                 | 2055 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO TRECE B     | 200       | 11-04-08         | 30-10-08             | 2503                  | 2056 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO CATORCE B   | 100       | 11-04-08         | 30-10-08             | 2504v                 | 2057 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| RÍO QUINCE B    | 200       | 11-04-08         | 30-10-08             | 2506                  | 2058 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 147,464                         |
| RÍO DIECISEIS B | 100       | 11-04-08         | 30-10-08             | 2507v                 | 2059 | 25-04-08 | PENDING                            |    |      | 30-10-10                     | \$ 73,732                          |
| AÑAÑUCA 1D      | 100       | 11-04-08         | 11-11-08             | 2515                  | 2064 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| AÑAÑUCA 2D      | 200       | 11-04-08         | 11-11-08             | 2616v                 | 2065 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 3D      | 200       | 11-04-08         | 11-11-08             | 2618                  | 2066 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 4D      | 100       | 11-04-08         | 11-11-08             | 2519v                 | 2067 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| AÑAÑUCA 5D      | 200       | 11-04-08         | 11-11-08             | 2521                  | 2068 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 6D      | 200       | 11-04-08         | 11-11-08             | 2522v                 | 2069 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 7D      | 200       | 11-04-08         | 11-11-08             | 2524                  | 2070 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 8D      | 200       | 11-04-08         | 11-11-08             | 2525v                 | 2071 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 9D      | 200       | 11-04-08         | 11-11-08             | 2527                  | 2072 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 10D     | 200       | 11-04-08         | 11-11-08             | 2528v                 | 2073 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 11D     | 100       | 11-04-08         | 11-11-08             | 2530                  | 2074 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| AÑAÑUCA 12D     | 100       | 11-04-08         | 11-11-08             | 2531v                 | 2075 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| AÑAÑUCA 13D     | 200       | 11-04-08         | 11-11-08             | 2533                  | 2076 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| AÑAÑUCA 14D     | 300       | 11-04-08         | 11-11-08             | 2534v                 | 2077 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 221,196                         |
| AÑAÑUCA 15D     | 200       | 11-04-08         | 11-11-08             | 2536                  | 2078 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |



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|--------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|----|------|------------------------------|------------------------------------|
|              |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N° | Date |                              |                                    |
| ANAÑUCA 16D  | 100       | 11-04-08         | 11-11-08             | 2537v                 | 2079 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| ANAÑUCA 17D  | 100       | 11-04-08         | 11-11-08             | 2539                  | 2080 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| ANAÑUCA 18D  | 100       | 11-04-08         | 11-11-08             | 2540v                 | 2081 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| ANAÑUCA 19D  | 200       | 11-04-08         | 11-11-08             | 2542                  | 2082 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 20D  | 200       | 11-04-08         | 11-11-08             | 2543v                 | 2083 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 21D  | 300       | 11-04-08         | 11-11-08             | 2545                  | 2084 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 221,196                         |
| ANAÑUCA 22D  | 300       | 11-04-08         | 11-11-08             | 2546v                 | 2085 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 221,196                         |
| ANAÑUCA 23D  | 200       | 11-04-08         | 11-11-08             | 2548                  | 2086 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 24D  | 200       | 11-04-08         | 11-11-08             | 2549v                 | 2087 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 25D  | 200       | 11-04-08         | 11-11-08             | 2551                  | 2088 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 26D  | 300       | 11-04-08         | 11-11-08             | 2552v                 | 2089 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 221,196                         |
| ANAÑUCA 27D  | 300       | 11-04-08         | 11-11-08             | 2554                  | 2090 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 221,196                         |
| ANAÑUCA 29D  | 200       | 11-04-08         | 11-11-08             | 2555v                 | 2091 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 30D  | 200       | 11-04-08         | 11-11-08             | 2557                  | 2092 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 31D  | 200       | 11-04-08         | 11-11-08             | 2558v                 | 2093 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 32D  | 200       | 11-04-08         | 11-11-08             | 2560                  | 2094 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| ANAÑUCA 33D  | 100       | 11-04-08         | 11-11-08             | 2561v                 | 2095 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| ANAÑUCA 34D  | 100       | 11-04-08         | 11-11-08             | 2563                  | 2096 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 73,732                          |
| ANAÑUCA 35D  | 200       | 11-04-08         | 11-11-08             | 2564v                 | 2097 | 25-04-08 | PENDING                            |    |      | 11-11-10                     | \$ 147,464                         |
| TIN 41C-2    | 200       | 11-04-08         | 24-11-08             | 2468v                 | 2033 | 25-04-08 | PENDING                            |    |      | 24-11-10                     | \$ 147,464                         |
| TIN 90D      | 300       | 11-04-08         | 24-11-08             | 2470                  | 2034 | 25-04-08 | PENDING                            |    |      | 24-11-10                     | \$ 221,196                         |
| TIN 96D      | 200       | 11-04-08         | 24-11-08             | 2471v                 | 2035 | 25-04-08 | PENDING                            |    |      | 24-11-10                     | \$ 147,464                         |
| RÍO UNO B    | 200       | 11-04-08         | 24-11-08             | 2489v                 | 2047 | 25-04-08 | PENDING                            |    |      | 24-11-10                     | \$ 147,464                         |
| RÍO DOS B    | 100       | 11-04-08         | 24-11-08             | 2491                  | 2048 | 25-04-08 | PENDING                            |    |      | 24-11-10                     | \$ 73,732                          |
| CAMI 3A      | 100       | 28-12-07         | 29-12-08             | 238v                  | 181  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 5A      | 300       | 28-12-07         | 29-12-08             | 241v                  | 183  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| CAMI 8A      | 200       | 28-12-07         | 29-12-08             | 243                   | 184  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 9A      | 200       | 28-12-07         | 29-12-08             | 244v                  | 185  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 10A     | 200       | 28-12-07         | 29-12-08             | 246                   | 186  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 12A     | 200       | 28-12-07         | 29-12-08             | 247v                  | 187  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 13A     | 100       | 28-12-07         | 29-12-08             | 249                   | 188  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 14A     | 200       | 28-12-07         | 29-12-08             | 250v                  | 189  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 15A     | 200       | 28-12-07         | 29-12-08             | 252                   | 190  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 16A     | 100       | 28-12-07         | 29-12-08             | 253v                  | 191  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 17A     | 200       | 28-12-07         | 29-12-08             | 255                   | 192  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 18A     | 100       | 28-12-07         | 29-12-08             | 256v                  | 193  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 19A     | 100       | 28-12-07         | 29-12-08             | 258                   | 194  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 21A     | 100       | 28-12-07         | 29-12-08             | 261                   | 196  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 22A     | 100       | 28-12-07         | 29-12-08             | 262v                  | 197  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 23A     | 200       | 28-12-07         | 29-12-08             | 264                   | 198  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 24A     | 200       | 28-12-07         | 29-12-08             | 265v                  | 199  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 25A     | 300       | 28-12-07         | 29-12-08             | 267                   | 200  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| CAMI 26A     | 100       | 28-12-07         | 29-12-08             | 268v                  | 201  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |



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|----------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|----|------|------------------------------|------------------------------------|
|                |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N° | Date |                              |                                    |
| CAMI 27A       | 200       | 28-12-07         | 29-12-08             | 270                   | 202  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 28A       | 100       | 28-12-07         | 29-12-08             | 271v                  | 203  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| CAMI 29A       | 200       | 28-12-07         | 29-12-08             | 273                   | 204  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| CAMI 30A       | 300       | 28-12-07         | 29-12-08             | 274v                  | 205  | 14-01-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MALVILLA 1D    | 300       | 15-04-08         | 29-12-08             | 233                   | 210  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MALVILLA 2D    | 300       | 15-04-08         | 29-12-08             | 234                   | 211  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MALVILLA 4D    | 300       | 15-04-08         | 29-12-08             | 236                   | 213  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MALVILLA 5D    | 300       | 15-04-08         | 29-12-08             | 237                   | 214  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MALVILLA 6D    | 300       | 15-04-08         | 29-12-08             | 238                   | 215  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MALVILLA 7D    | 300       | 15-04-08         | 29-12-08             | 239                   | 216  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MALVILLA 8D    | 200       | 15-04-08         | 29-12-08             | 240                   | 217  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| MALVILLA 9D    | 200       | 15-04-08         | 29-12-08             | 241                   | 218  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| MALVILLA 10D   | 100       | 15-04-08         | 29-12-08             | 242                   | 219  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 73,732                          |
| PAMPA UNA A    | 200       | 15-04-08         | 29-12-08             | 243                   | 220  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| PAMPA DOS A    | 300       | 15-04-08         | 29-12-08             | 245                   | 221  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| PAMPA TRES A   | 300       | 15-04-08         | 29-12-08             | 246                   | 222  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| PAMPA CUATRO A | 200       | 15-04-08         | 29-12-08             | 247                   | 223  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 147,464                         |
| MALVILLA 3D    | 300       | 15-04-08         | 29-12-08             | 235                   | 212  | 25-04-08 | PENDING                            |    |      | 29-12-10                     | \$ 221,196                         |
| MARICUNGA A    | 100       | 06-06-08         | 12-01-09             | 3667                  | 2947 | 16-06-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| ARRECIFE 5D    | 200       | 28-12-07         | 16-01-09             | 225                   | 172  | 14-01-08 | PENDING                            |    |      | 16-01-11                     | \$ 147,464                         |
| ARRECIFE 6D    | 300       | 28-12-07         | 16-01-09             | 226v                  | 173  | 14-01-08 | PENDING                            |    |      | 16-01-11                     | \$ 221,196                         |
| ARRECIFE 7D    | 300       | 28-12-07         | 16-01-09             | 228                   | 174  | 14-01-08 | PENDING                            |    |      | 16-01-11                     | \$ 221,196                         |
| VULCANO 4B-1   | 300       | 11-04-08         | 20-01-09             | 2473                  | 2036 | 25-04-08 | PENDING                            |    |      | 20-01-11                     | \$ 221,196                         |
| ARRECIFE 1D    | 300       | 28-12-07         | PENDING              | 219                   | 168  | 14-01-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| CAMI 20A       | 100       | 28-12-07         | PENDING              | 259v                  | 195  | 14-01-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| APOSTOL 1B     | 200       | 11-04-08         | PENDING              | 2579v                 | 2107 | 25-04-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| APOSTOL 2C     | 200       | 11-04-08         | PENDING              | 2581                  | 2108 | 25-04-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| MALVA 1B       | 200       | 24-09-08         | PENDING              | 6627                  | 5259 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| MALVA 2B       | 200       | 24-09-08         | PENDING              | 6628v                 | 5260 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| MALVA 3B       | 200       | 24-09-08         | PENDING              | 6630                  | 5261 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| MALVA 4B       | 300       | 24-09-08         | PENDING              | 6631v                 | 5262 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| MALVA 5B       | 200       | 24-09-08         | PENDING              | 6633                  | 5263 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| MALVA 6B       | 200       | 24-09-08         | PENDING              | 6634v                 | 5264 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VULCANO 5D     | 100       | 24-09-08         | PENDING              | 6636                  | 5265 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| VULCANO 6D     | 200       | 24-09-08         | PENDING              | 6637v                 | 5266 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VULCANO 7D     | 200       | 24-09-08         | PENDING              | 6639                  | 5267 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VULCANO 8D     | 200       | 24-09-08         | PENDING              | 6640v                 | 5268 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VULCANO 9D     | 200       | 24-09-08         | PENDING              | 6642                  | 5269 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 32E        | 200       | 24-09-08         | PENDING              | 6643v                 | 5270 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 53E        | 200       | 24-09-08         | PENDING              | 6645                  | 5271 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RODRIGO 1D     | 200       | 24-09-08         | PENDING              | 6646v                 | 5272 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RODRIGO 2D     | 200       | 24-09-08         | PENDING              | 6648                  | 5273 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RODRIGO 3D     | 200       | 24-09-08         | PENDING              | 6649v                 | 5274 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |



| Claim Number     | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |    |      | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|------------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|----|------|------------------------------|------------------------------------|
|                  |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N° | Date |                              |                                    |
| MAXIMILIANO 1D   | 200       | 24-09-08         | PENDING              | 6651                  | 5275 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| IGNACIA 1D       | 300       | 24-09-08         | PENDING              | 6652v                 | 5276 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| CRISTÓBAL 1D     | 300       | 24-09-08         | PENDING              | 6654                  | 5277 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 1D     | 300       | 24-09-08         | PENDING              | 6655v                 | 5278 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 2D     | 200       | 24-09-08         | PENDING              | 6657                  | 5279 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 3D     | 200       | 24-09-08         | PENDING              | 6658v                 | 5280 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 4D     | 200       | 24-09-08         | PENDING              | 6660                  | 5281 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 5D     | 300       | 24-09-08         | PENDING              | 6661v                 | 5282 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 6D     | 200       | 24-09-08         | PENDING              | 6663                  | 5283 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 7D     | 200       | 24-09-08         | PENDING              | 6664v                 | 5284 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 8D     | 200       | 24-09-08         | PENDING              | 6666                  | 5285 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 9D     | 300       | 24-09-08         | PENDING              | 6667v                 | 5286 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 10D    | 200       | 24-09-08         | PENDING              | 6669                  | 5287 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 11D    | 200       | 24-09-08         | PENDING              | 6670v                 | 5288 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PIRIGALLO 12D    | 300       | 24-09-08         | PENDING              | 6672                  | 5289 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 13D    | 300       | 24-09-08         | PENDING              | 6673v                 | 5290 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 14D    | 300       | 24-09-08         | PENDING              | 6675                  | 5291 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 15D    | 300       | 24-09-08         | PENDING              | 6676v                 | 5292 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 16D    | 300       | 24-09-08         | PENDING              | 6678                  | 5293 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 17D    | 300       | 24-09-08         | PENDING              | 6679v                 | 5294 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| PIRIGALLO 18D    | 200       | 24-09-08         | PENDING              | 6681                  | 5295 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| HUILLI 9C        | 200       | 24-09-08         | PENDING              | 6682v                 | 5296 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| PINGO 10E        | 100       | 24-09-08         | PENDING              | 6684                  | 5297 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| PINGO 11E        | 100       | 24-09-08         | PENDING              | 6685v                 | 5298 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| CORAL 14E        | 100       | 24-09-08         | PENDING              | 6687                  | 5299 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| CORAL 15E        | 200       | 24-09-08         | PENDING              | 6688v                 | 5300 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RÍO SIETE D      | 200       | 24-09-08         | PENDING              | 6690                  | 5301 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RÍO OCHO D       | 200       | 24-09-08         | PENDING              | 6691v                 | 5302 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RÍO NUEVE D      | 200       | 24-09-08         | PENDING              | 6693                  | 5303 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RÍO CATORCE D    | 100       | 24-09-08         | PENDING              | 6694v                 | 5304 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| RÍO DIECISEIS D  | 200       | 24-09-08         | PENDING              | 6696                  | 5305 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| RÍO DIECISIETE D | 100       | 24-09-08         | PENDING              | 6697v                 | 5306 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| RÍO DIECIOCHO D  | 100       | 24-09-08         | PENDING              | 6699                  | 5307 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| RÍO DIECINUEVE D | 200       | 24-09-08         | PENDING              | 6700v                 | 5308 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 33E          | 100       | 24-09-08         | PENDING              | 6702                  | 5309 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| TIN 34E          | 200       | 24-09-08         | PENDING              | 6703v                 | 5310 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 35E          | 100       | 24-09-08         | PENDING              | 6705                  | 5311 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| TIN 36E          | 200       | 24-09-08         | PENDING              | 6706v                 | 5312 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 37E          | 100       | 24-09-08         | PENDING              | 6708                  | 5313 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| TIN 38E          | 100       | 24-09-08         | PENDING              | 6709v                 | 5314 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| TIN 39E          | 200       | 24-09-08         | PENDING              | 6711                  | 5315 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 40E          | 100       | 24-09-08         | PENDING              | 6712v                 | 5316 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| TIN 48E          | 200       | 24-09-08         | PENDING              | 6714                  | 5317 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |



| Claim Number | Area (ha) | Application Date | Notice of Grant Date | Inscripción Pedimento |      |          | Inscripción Sentencia Constitutiva |    |      | Rental Payment Due Date 2009 | Annual Rent Payment (Chilean Peso) |
|--------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|----|------|------------------------------|------------------------------------|
|              |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N° | Date |                              |                                    |
| TIN 49E      | 300       | 24-09-08         | PENDING              | 6715v                 | 5318 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| TIN 50E      | 200       | 24-09-08         | PENDING              | 6717                  | 5319 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 51E      | 200       | 24-09-08         | PENDING              | 6718v                 | 5320 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 89E      | 200       | 24-09-08         | PENDING              | 6720                  | 5321 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 90E      | 300       | 24-09-08         | PENDING              | 6721v                 | 5322 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| TIN 91E      | 300       | 24-09-08         | PENDING              | 6723                  | 5323 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| TIN 92E      | 300       | 24-09-08         | PENDING              | 6724v                 | 5324 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| TIN 93E      | 100       | 24-09-08         | PENDING              | 6726                  | 5325 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| TIN 94E      | 300       | 24-09-08         | PENDING              | 6727v                 | 5326 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| TIN 95E      | 200       | 24-09-08         | PENDING              | 6729                  | 5327 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 108E     | 200       | 24-09-08         | PENDING              | 6730v                 | 5328 | 30-09-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VALLE 4D     | 200       | 24-09-08         | PENDING              | 3092v                 | 2533 | 03-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VALLE 5D     | 200       | 24-09-08         | PENDING              | 3093v                 | 2534 | 03-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VALLE 6D     | 100       | 24-09-08         | PENDING              | 3094v                 | 2535 | 03-10-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| VALLE 7D     | 100       | 24-09-08         | PENDING              | 3095v                 | 2536 | 03-10-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| VALLE 8D     | 200       | 24-09-08         | PENDING              | 3096v                 | 2537 | 03-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| VALLE 9D     | 300       | 24-09-08         | PENDING              | 3097v                 | 2538 | 03-10-08 | PENDING                            |    |      | PENDING                      | \$ 221,196                         |
| TIN 18E      | 200       | 24-09-08         | PENDING              | 801                   | 673  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 19E      | 200       | 24-09-08         | PENDING              | 802                   | 674  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 20E      | 200       | 24-09-08         | PENDING              | 803                   | 675  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 21E      | 200       | 24-09-08         | PENDING              | 804                   | 676  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 22E      | 200       | 24-09-08         | PENDING              | 805                   | 677  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 23E      | 200       | 24-09-08         | PENDING              | 806                   | 678  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 24E      | 200       | 24-09-08         | PENDING              | 807                   | 679  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 25E      | 200       | 24-09-08         | PENDING              | 808                   | 680  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 26E      | 200       | 24-09-08         | PENDING              | 809                   | 681  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 27E      | 200       | 24-09-08         | PENDING              | 810                   | 682  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 28E      | 200       | 24-09-08         | PENDING              | 811                   | 683  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 29E      | 200       | 24-09-08         | PENDING              | 812                   | 684  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 30E      | 200       | 24-09-08         | PENDING              | 813                   | 685  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| TIN 31E      | 200       | 24-09-08         | PENDING              | 814                   | 686  | 06-10-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| HUILLI 8C    | 200       | 24-09-08         | PENDING              | 8983                  | 7022 | 31-12-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 1     | 100       | 23-10-08         | PENDING              | 7568v                 | 5972 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| BLANCO 2     | 200       | 23-10-08         | PENDING              | 7570                  | 5973 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 3     | 200       | 23-10-08         | PENDING              | 7571v                 | 5974 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 4     | 200       | 23-10-08         | PENDING              | 7573                  | 5975 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 5     | 200       | 23-10-08         | PENDING              | 7574v                 | 5976 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 6     | 200       | 23-10-08         | PENDING              | 7576                  | 5977 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 7     | 200       | 23-10-08         | PENDING              | 7577v                 | 5978 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 8     | 200       | 23-10-08         | PENDING              | 7579                  | 5979 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 9     | 200       | 23-10-08         | PENDING              | 7580v                 | 5980 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 10    | 200       | 23-10-08         | PENDING              | 7582                  | 5981 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 11    | 200       | 23-10-08         | PENDING              | 7583v                 | 5982 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |



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|--------------|-----------|------------------|----------------------|-----------------------|------|----------|------------------------------------|----|------|------------------------------|------------------------------------|
|              |           |                  |                      | Fs.                   | N°   | Date     | Fs.                                | N° | Date |                              |                                    |
| BLANCO 12    | 200       | 23-10-08         | PENDING              | 7585                  | 5983 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 13    | 100       | 23-10-08         | PENDING              | 7586v                 | 5984 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| BLANCO 14    | 200       | 23-10-08         | PENDING              | 7588                  | 5985 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 15    | 100       | 23-10-08         | PENDING              | 7589v                 | 5986 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 73,732                          |
| BLANCO 16    | 200       | 23-10-08         | PENDING              | 7591                  | 5987 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 17    | 200       | 23-10-08         | PENDING              | 7592v                 | 5988 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |
| BLANCO 18    | 200       | 23-10-08         | PENDING              | 7594                  | 5989 | 03-11-08 | PENDING                            |    |      | PENDING                      | \$ 147,464                         |

| Claim Name/Number           | Area (ha) | Application Date | Inscripción Manifestación |      |          | Survey Date | Fecha en que se Dicta Sentencia Constitutiva | Inscripción Sentencia Constitutiva y Mensura |     |      | Annual Rental Payment (Chilean peso) |
|-----------------------------|-----------|------------------|---------------------------|------|----------|-------------|----------------------------------------------|----------------------------------------------|-----|------|--------------------------------------|
|                             |           |                  | Fjs.                      | N°   | Date     |             |                                              | Fjs.                                         | N°  | Date |                                      |
| CACHITO 1 Y 3 AL 1298       | 6490      | 07-12-82         | 53V                       | 45   | 20-01-83 | 07-10-83    | 14-11-84                                     | 595                                          | 122 | 1984 | \$ 23,926,034                        |
| NEVADO 1 AL 840             | 4200      | 07-12-82         | 55V                       | 46   | 20-01-83 | 07-10-83    | 14-11-84                                     | 576                                          | 121 | 1984 | \$ 15,483,720                        |
| HORUS 1 AL 280              | 800       | 26-09-83         | 954V                      | 894  | 28-10-83 | 20-04-84    | 20-03-86                                     | 346                                          | 112 | 1986 | \$ 2,949,280                         |
| OLIMPO 1 AL 293             | 150       | 26-09-83         | 944V                      | 886  | 28-10-03 | 20-07-84    | 25-03-86                                     | 302                                          | 103 | 1986 | \$ 552,990                           |
| MARTE 1 AL 300              | 1500      | 26-09-83         | 949V                      | 890  | 28-10-83 | 20-07-84    | 25-03-86                                     | 382v                                         | 114 | 1986 | \$ 5,529,900                         |
| CHICO I 1 AL 80             | 400       | 09-10-95         | 4310V                     | 2743 | 18-10-95 | 10-05-96    | 27-05-97                                     | 878                                          | 149 | 1997 | \$ 1,474,640                         |
| CHICO II 1 AL 80            | 400       | 09-10-95         | 4311V                     | 2744 | 18-10-95 | 10-05-96    | 27-05-97                                     | 887                                          | 150 | 1997 | \$ 1,474,640                         |
| CHICO III 1 AL 40           | 200       | 09-10-95         | 4312V                     | 2745 | 18-10-95 | 10-05-96    | 21-02-97                                     | 456v                                         | 63  | 1997 | \$ 737,320                           |
| CHICO IV 1 AL 80            | 400       | 09-10-95         | 4313V                     | 2746 | 18-10-95 | 10-05-96    | 27-05-97                                     | 895v                                         | 151 | 1997 | \$ 1,474,640                         |
| CHICO V 1 AL 70             | 350       | 09-10-95         | 4314V                     | 2747 | 18-10-95 | 10-05-96    | 21-02-97                                     | 464                                          | 64  | 1997 | \$ 1,290,310                         |
| CHICO VI 1 AL 70            | 350       | 09-10-95         | 4315V                     | 2748 | 18-10-95 | 10-05-96    | 21-02-97                                     | 472v                                         | 65  | 1997 | \$ 1,290,310                         |
| CHICO VII 1 AL 120          | 600       | 09-10-95         | 4316V                     | 2749 | 18-10-95 | 10-05-96    | 27-05-97                                     | 904v                                         | 152 | 1997 | \$ 2,211,960                         |
| CHICO VIII 1 AL 80          | 400       | 09-10-95         | 4317v                     | 2750 | 18-10-95 | 10-05-96    | 16-06-97                                     | 1068v                                        | 176 | 1997 | \$ 1,474,640                         |
| CHICO IX 1 AL 30            | 150       | 09-10-95         | 4318v                     | 2751 | 18-10-95 | 10-05-96    | 16-06-97                                     | 1077                                         | 177 | 1997 | \$ 552,990                           |
| CHICO X 1 AL 20             | 100       | 09-10-95         | 4319v                     | 2752 | 18-10-95 | 10-05-96    | 21-02-97                                     | 481                                          | 66  | 1997 | \$ 368,660                           |
| CHICO XI 1 AL 40            | 200       | 09-10-95         | 4320v                     | 2753 | 18-10-95 | 10-05-96    | 27-05-97                                     | 914                                          | 153 | 1997 | \$ 737,320                           |
| CHICO 15 1 AL 60            | 300       | 27-11-95         | 4993v                     | 3210 | 05-12-95 | 25-06-96    | 16-06-97                                     | 1110                                         | 181 | 1997 | \$ 1,105,980                         |
| CHICO 16 1 AL 40            | 200       | 27-11-95         | 4995                      | 3211 | 05-12-95 | 25-06-96    | 16-06-97                                     | 1119                                         | 182 | 1997 | \$ 737,320                           |
| CHICO 18 1 AL 120           | 600       | 13-11-95         | 4767v                     | 3042 | 17-11-95 | 13-06-96    | 14-05-97                                     | 930v                                         | 155 | 1997 | \$ 2,211,960                         |
| RAHIL 1 AL 48               | 240       | 13-11-95         | 4766                      | 3041 | 1995     | 13-06-96    | 21-10-97                                     | 1742v                                        | 308 | 1997 | \$ 884,784                           |
| CADILLO 7 1 AL 40 (1 AL 20) | 100       | 24-05-96         | 2114                      | 1407 | 30-05-96 | 18-12-96    | 15-01-98                                     | 634                                          | 229 | 1998 | \$ 368,660                           |
| MARANCEL 1 AL 14            | 56        | 20-12-94         | 17V                       | 15   | 03-01-95 | 24-07-95    | 25-04-96                                     | 866                                          | 152 | 1996 | \$ 206,450                           |
| PACO 1 AL 60                | 300       | 22-05-97         | 2623                      | 1749 | 30-05-97 | 12-12-97    | 11-03-99                                     | 783v                                         | 167 | 1999 | \$ 1,105,980                         |
| LUIS 1 AL 40                | 200       | 30-05-97         | 2626                      | 1750 | 30-05-97 | 12-12-97    | 11-03-99                                     | 828                                          | 174 | 1999 | \$ 737,320                           |
| HUGO 1 AL 60                | 300       | 30-05-97         | 2621                      | 1748 | 30-05-97 | 12-12-97    | 11-03-99                                     | 776                                          | 166 | 1999 | \$ 1,105,980                         |
| MARANCEL 1 AL 40            | 190       | 21-04-97         | 2167v                     | 1474 | 29-04-97 | 17-11-97    | 16-12-98                                     | 252v                                         | 43  | 1999 | \$ 700,454                           |
| MARANCEL 2 1 AL 39          | 195       | 21-04-97         | 2168                      | 1475 | 29-04-97 | 17-11-97    | 16-12-98                                     | 259v                                         | 44  | 1999 | \$ 718,887                           |
| JUPITER 1 AL 190            | 190       | 15-07-97         | 4009                      | 2593 | 18-17-97 | 17-02-98    | 22-06-99                                     | 1119                                         | 218 | 1999 | \$ 700,454                           |



| Claim Name/Number          | Area<br>(ha) | Application<br>Date | Inscripción Manifestación |      |          | Survey<br>Date | Fecha en<br>que se Dicta<br>Sentencia<br>Constitutiva | Inscripción Sentencia<br>Constitutiva y Mensura |     |          | Annual<br>Rental<br>Payment<br>(Chilean<br>peso) |
|----------------------------|--------------|---------------------|---------------------------|------|----------|----------------|-------------------------------------------------------|-------------------------------------------------|-----|----------|--------------------------------------------------|
|                            |              |                     | Fjs.                      | N°   | Date     |                |                                                       | Fjs.                                            | N°  | Date     |                                                  |
| LLANO 3 1 AL 20            | 100          | 10-03-97            | 1319                      | 838  | 13-03-97 | 30-09-97       | 25-05-00                                              | 691                                             | 168 | 1999     | \$ 368,660                                       |
| VACA 8 1 AL 10             | 50           | 05-06-97            | 3045                      | 1982 | 17-06-97 | 10-01-98       | 15-06-99                                              | 1129                                            | 219 | 1999     | \$ 184,330                                       |
| VACA 10 1 AL 20            | 100          | 05-06-97            | 3047                      | 1984 | 17-06-97 | 10-01-98       | 25-05-00                                              | 685                                             | 167 | 2000     | \$ 368,660                                       |
| VACA 11 1 AL 60            | 300          | 05-06-97            | 3048                      | 1985 | 17-06-97 | 10-01-98       | 15-06-99                                              | 1134v                                           | 220 | 1999     | \$ 1,105,980                                     |
| TIN 42 1 AL 11             | 42           | 09-12-99            | 2620                      | 2086 | 15-12-99 | 12-07-00       | 06-07-01                                              | 407v                                            | 120 | 2001     | \$ 154,837                                       |
| TIN 43 1 AL 10             | 42           | 09-12-99            | 2622                      | 2087 | 15-12-99 | 12-07-00       | 06-07-01                                              | 414                                             | 121 | 2001     | \$ 154,837                                       |
| TIN 44 1 AL 11             | 47           | 09-12-99            | 2624                      | 2088 | 15-12-99 | 12-07-00       | 06-07-01                                              | 420v                                            | 122 | 05-09-01 | \$ 173,270                                       |
| TIN 45 1 AL 11             | 47           | 09-12-99            | 2626                      | 2089 | 15-12-99 | 12-07-00       | 06-07-01                                              | 426v                                            | 123 | 05-09-01 | \$ 173,270                                       |
| TIN 46 1 AL 10             | 45           | 09-12-99            | 2628                      | 2090 | 15-12-99 | 12-07-00       | 06-07-01                                              | 432v                                            | 124 | 05-09-01 | \$ 165,897                                       |
| TIN 70 1 AL 15             | 65           | 09-12-99            | 2632                      | 2092 | 15-12-99 | 12-07-00       | 06-07-01                                              | 438v                                            | 125 | 05-09-01 | \$ 239,629                                       |
| TIN 70A 1 AL 8             | 40           | 09-12-99            | 2634                      | 2093 | 15-12-99 | 12-07-00       | 06-07-01                                              | 445                                             | 126 | 05-09-01 | \$ 147,464                                       |
| TIN 71 1 AL 14             | 53           | 09-12-99            | 2636                      | 2094 | 15-12-99 | 12-07-00       | 06-07-01                                              | 450v                                            | 127 | 05-09-01 | \$ 195,390                                       |
| PINGO 10 1 AL 10           | 50           | 11-01-00            | 115V                      | 112  | 17-01-00 | 08-08-00       | 12-07-01                                              | 540                                             | 170 | 19-10-01 | \$ 184,330                                       |
| PINGO 11 1 AL 6            | 30           | 10-01-00            | 157v                      | 113  | 17-01-00 | 08-08-00       | 12-07-01                                              | 546                                             | 171 | 19-10-01 | \$ 110,598                                       |
| VENUS UNO 1 AL 40          | 200          | 11-03-00            | 712                       | 548  | 17-03-00 | 12-10-00       | 03-12-01                                              | 60                                              | 26  | 05-03-02 | \$ 737,320                                       |
| VENUS DOS 1 AL 40          | 200          | 11-03-00            | 714                       | 549  | 17-03-00 | 12-10-00       | 03-12-01                                              | 66                                              | 27  | 05-03-02 | \$ 737,320                                       |
| VENUS TRES 1 AL 40         | 200          | 11-03-00            | 716                       | 550  | 17-03-00 | 12-10-00       | 03-12-01                                              | 72                                              | 28  | 05-03-02 | \$ 737,320                                       |
| VENUS CUATRO 1 AL 40       | 200          | 11-03-00            | 718                       | 551  | 17-03-00 | 12-10-00       | 03-12-01                                              | 78                                              | 29  | 05-03-02 | \$ 737,320                                       |
| VENUS CINCO 1 AL 40        | 200          | 11-03-00            | 720                       | 552  | 17-03-00 | 12-10-00       | 03-12-01                                              | 84                                              | 30  | 05-03-02 | \$ 737,320                                       |
| VENUS SEIS 1 AL 40         | 200          | 11-03-00            | 722                       | 553  | 17-03-00 | 12-10-00       | 03-12-01                                              | 90                                              | 31  | 05-03-02 | \$ 737,320                                       |
| VENUS SIETE 1 AL 40        | 200          | 11-03-00            | 724                       | 554  | 17-03-00 | 12-10-00       | 03-12-01                                              | 96                                              | 32  | 05-03-02 | \$ 737,320                                       |
| VENUS OCHO 1 AL 40         | 200          | 11-03-00            | 726                       | 555  | 17-03-00 | 12-10-00       | 03-12-01                                              | 102                                             | 33  | 05-03-02 | \$ 737,320                                       |
| VENUS NUEVE 1 AL 40        | 200          | 11-03-00            | 728                       | 556  | 17-03-00 | 12-10-00       | 03-12-01                                              | 108                                             | 34  | 05-03-02 | \$ 737,320                                       |
| VENUS DIEZ 1 AL 40         | 200          | 11-03-00            | 730                       | 557  | 17-03-00 | 12-10-00       | 03-12-01                                              | 114                                             | 35  | 05-03-02 | \$ 737,320                                       |
| VENUS ONCE 1 AL 40         | 200          | 11-03-00            | 732                       | 558  | 17-03-00 | 12-10-00       | 03-12-01                                              | 120                                             | 36  | 05-03-02 | \$ 737,320                                       |
| VENUS DOCE 1 AL 40         | 200          | 11-03-00            | 734                       | 559  | 17-03-00 | 12-10-00       | 03-12-01                                              | 126                                             | 37  | 05-03-02 | \$ 737,320                                       |
| VENUS TRECE 1 AL 40        | 200          | 11-03-00            | 736                       | 560  | 17-03-00 | 12-10-00       | 03-12-01                                              | 132                                             | 38  | 05-03-02 | \$ 737,320                                       |
| VENUS CATORCE 1 AL 40      | 200          | 11-03-00            | 738                       | 561  | 17-03-00 | 12-10-00       | 03-12-01                                              | 138                                             | 39  | 05-03-02 | \$ 737,320                                       |
| VENUS QUINCE 1 AL 40       | 200          | 11-03-00            | 740                       | 562  | 17-03-00 | 12-10-00       | 29-04-02                                              | 532                                             | 122 | 13-08-02 | \$ 737,320                                       |
| VENUS DIECISÉIS 1 AL 40    | 200          | 11-03-00            | 742                       | 563  | 17-03-00 | 12-10-00       | 03-12-01                                              | 144                                             | 40  | 05-03-02 | \$ 737,320                                       |
| VENUS DIECISIETE 1 AL 40   | 200          | 11-03-00            | 744                       | 564  | 17-03-00 | 12-10-00       | 03-12-01                                              | 150                                             | 41  | 05-03-02 | \$ 737,320                                       |
| VENUS DIECIOCHO 1 AL 40    | 200          | 11-03-00            | 746                       | 565  | 17-03-00 | 12-10-00       | 03-12-01                                              | 156                                             | 42  | 05-03-02 | \$ 737,320                                       |
| VENUS DIECINUEVE 1 AL 60   | 300          | 11-03-00            | 748                       | 566  | 17-03-00 | 12-10-00       | 03-12-01                                              | 162                                             | 43  | 05-03-02 | \$ 1,105,980                                     |
| VENUS VEINTE 1 AL 40       | 200          | 11-03-00            | 750                       | 567  | 17-03-00 | 12-10-00       | 03-12-01                                              | 168                                             | 44  | 05-03-02 | \$ 737,320                                       |
| VENUS VEINTIUNO 1 AL 40    | 200          | 11-03-00            | 752                       | 568  | 17-03-00 | 12-10-00       | 29-04-02                                              | 538                                             | 123 | 13-08-02 | \$ 737,320                                       |
| VENUS VEINTIDÓS 1 AL 40    | 200          | 11-03-00            | 754                       | 569  | 17-03-00 | 12-10-00       | 03-12-01                                              | 174                                             | 45  | 05-03-02 | \$ 737,320                                       |
| VENUS VEINTITRÉS 1 AL 40   | 200          | 11-03-00            | 756                       | 570  | 17-03-00 | 12-10-00       | 03-12-01                                              | 180                                             | 46  | 05-03-02 | \$ 737,320                                       |
| VENUS VEINTICUATRO 1 AL 40 | 200          | 11-03-00            | 758                       | 571  | 17-03-00 | 12-10-00       | 03-12-01                                              | 186                                             | 47  | 05-03-02 | \$ 737,320                                       |
| VENUS VEINTICINCO 1 AL 40  | 200          | 11-03-00            | 760                       | 572  | 17-03-00 | 12-10-00       | 03-12-01                                              | 192                                             | 48  | 05-03-02 | \$ 737,320                                       |
| PINGO 7A 1 AL 20           | 100          | 14-03-01            | 561v                      | 419  | 19-03-01 | 16-10-01       | 23-09-02                                              | 697v                                            | 177 | 18-12-02 | \$ 368,660                                       |
| BREA 9B 1 AL 13            | 56           | 16-10-01            | 2145 v                    | 1764 | 19-10-01 | 22-05-02       | 13-06-03                                              | 507                                             | 187 | 01-09-03 | \$ 206,450                                       |
| CORAL 9 1 AL 60            | 300          | 16-10-01            | 2149                      | 1766 | 01-09-03 | 22-05-02       | 13-06-03                                              | 493                                             | 185 | 01-09-03 | \$ 1,105,980                                     |





| Claim Name/Number       | Area (ha) | Application Date | Inscripción Manifestación |      |          | Survey Date | Fecha en que se Dicta Sentencia Constitutiva | Inscripción Sentencia Constitutiva y Mensura |     |          | Annual Rental Payment (Chilean peso) |
|-------------------------|-----------|------------------|---------------------------|------|----------|-------------|----------------------------------------------|----------------------------------------------|-----|----------|--------------------------------------|
|                         |           |                  | Fjs.                      | N°   | Date     |             |                                              | Fjs.                                         | N°  | Date     |                                      |
| TIN 70B 1 AL 20         | 100       | 05-12-01         | 2505                      | 2083 | 01-07-03 | 05-07-02    | 24-09-03                                     | 501                                          | 186 | 01-09-03 | \$ 368,660                           |
| PIEDRA 1 AL 8           | 40        | 25-02-02         | 447                       | 379  | 05-03-02 | 30-09-02    | 24-09-03                                     | 754v                                         | 287 | 14-11-03 | \$ 147,464                           |
| PABLO A3 1 AL 20        | 200       | 26-06-03         | 1736v                     | 1469 | 27-06-03 | 19-01-04    | 26-10-04                                     | 8                                            | 4   | 12-01-05 | \$ 737,320                           |
| PABLO A4 1 AL 20        | 200       | 26-06-03         | 1738v                     | 1470 | 27-06-03 | 19-01-04    | 26-10-04                                     | 15v                                          | 5   | 12-01-05 | \$ 737,320                           |
| PABLO A8 1 AL 30        | 300       | 26-06-03         | 1740v                     | 1471 | 27-06-03 | 19-01-04    | 26-10-04                                     | 23                                           | 6   | 12-01-05 | \$ 1,105,980                         |
| PABLO A9 1 AL 30        | 300       | 26-06-03         | 1742v                     | 1472 | 27-06-03 | 19-01-04    | 26-10-04                                     | 30v                                          | 7   | 12-01-05 | \$ 1,105,980                         |
| NIEVE 2, 1 AL 10        | 50        | 28-02-04         | 943v                      | 795  | 13-12-05 | 01-10-04    | 23-09-05                                     | 843v                                         | 304 | 13-12-05 | \$ 184,330                           |
| NUBE 1 1 AL 20          | 100       | 02-03-04         | 947                       | 797  | 26-06-05 | 01-10-04    | 23-09-05                                     | 838                                          | 303 | 13-12-05 | \$ 368,660                           |
| TIN 41B 1 AL 20         | 100       | 16-04-04         | 1369                      | 1139 | 26-06-05 | 17-11-04    | 21-10-05                                     | 69v                                          | 20  | 12-01-06 | \$ 368,660                           |
| TIN 44B 1 AL 20         | 100       | 16-04-04         | 1370 v                    | 1140 | 26-06-05 | 17-11-04    | 21-10-05                                     | 75v                                          | 21  | 12-01-06 | \$ 368,660                           |
| TIN 96B 1 AL 20         | 100       | 20-07-04         | 2982                      | 2452 | 26-06-05 | 09-02-05    | 16-01-06                                     | 370                                          | 118 | 03-04-06 | \$ 368,660                           |
| TIN 47B 1 AL 40         | 200       | 02-08-04         | 3224                      | 2648 | 09-08-04 | 23-02-05    | 20-12-05                                     | 229                                          | 48  | 20-02-06 | \$ 737,320                           |
| TIN 52B 1 AL 40         | 200       | 02-08-04         | 3227v                     | 2650 | 09-08-04 | 23-02-05    | 20-12-05                                     | 235v                                         | 49  | 20-02-06 | \$ 737,320                           |
| VULCANO 4A, 1 AL 20     | 100       | 26-10-04         | 4235                      | 3399 | 05-11-04 | 30-05-05    | 08-11-06                                     | 240                                          | 63  | 01-03-07 | \$ 368,660                           |
| NIEVE 1, 1 AL 10        | 50        | 26-02-04         | 942                       | 794  | 26-06-05 | 01-10-04    | PENDING                                      |                                              |     |          | \$ 184,330                           |
| EL SALVADOR 14, 1 AL 40 | 200       | 03-08-05         | 3429v                     | 2665 | 01-08-85 | 27-01-06    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| CAMI 10, 1 AL 40        | 100       | 17-03-06         | 1652                      | 1175 | 24-03-06 | 19-10-06    | PENDING                                      |                                              |     |          | \$ 368,660                           |
| RÍO 2A, 1 AL 4          | 8         | 29-05-06         | 3265v                     | 2469 | 05-06-06 | 04-01-07    | PENDING                                      |                                              |     |          | \$ 29,493                            |
| AÑÁNUCA 4COP, 1 AL 13   | 55        | 29-05-06         | 3257                      | 2464 | 05-06-06 | 04-01-07    | PENDING                                      |                                              |     |          | \$ 202,763                           |
| BREA 3B, 1 AL 40        | 200       | 02-06-06         | 3310v                     | 2514 | 09-06-06 | 05-01-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| BREA 4B, 1 AL 60        | 300       | 02-06-06         | 3312                      | 2515 | 09-06-06 | 05-01-07    | PENDING                                      |                                              |     |          | \$ 1,105,980                         |
| VALLE 1B, 1 AL 20       | 100       | 17-08-06         | 1561 v                    | 1280 | 25-08-06 | 23-03-07    | PENDING                                      |                                              |     |          | \$ 368,660                           |
| VALLE 2B, 1 AL 20       | 100       | 17-08-06         | 1563                      | 1281 | 25-08-06 | 23-03-07    | PENDING                                      |                                              |     |          | \$ 368,660                           |
| VALLE 3B, 1 AL 20       | 100       | 17-08-06         | 1560                      | 1279 | 25-08-06 | 23-03-07    | PENDING                                      |                                              |     |          | \$ 368,660                           |
| CRISTÓBAL 1B 1 AL 60    | 300       | 13-10-06         | 6179                      | 4734 | 06-11-06 | 17-05-07    | PENDING                                      |                                              |     |          | \$ 1,105,980                         |
| RODRIGO 1B 1 AL 40      | 200       | 13-10-06         | 6169                      | 4729 | 06-11-06 | 17-05-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| RODRIGO 2B 1 AL 40      | 200       | 13-10-06         | 6171                      | 4730 | 06-11-06 | 17-05-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| RODRIGO 3B 1 AL 40      | 200       | 13-10-06         | 6173                      | 4731 | 06-11-06 | 17-05-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| MAXIMILIANO 1B 1 AL 40  | 200       | 13-10-06         | 6167                      | 4728 | 06-11-06 | 17-05-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| IGNACIA 1B 1 AL 60      | 300       | 13-10-06         | 6181                      | 4735 | 06-11-06 | 17-05-07    | PENDING                                      |                                              |     |          | \$ 1,105,980                         |
| PINGO 11C 1 AL 20       | 100       | 13-10-06         | 6177                      | 4733 | 06-11-06 | 17-05-07    | PENDING                                      |                                              |     |          | \$ 368,660                           |
| VALLE 5B 1 al 20        | 100       | 24-11-06         | 2194v                     | 1823 | 04-12-06 | 28-06-07    | PENDING                                      |                                              |     |          | \$ 368,660                           |
| VALLE 7B 1 al 40        | 200       | 24-11-06         | 2197v                     | 1825 | 04-12-06 | 28-06-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| MALVA 4 1 AL 60         | 300       | 07-12-06         | 7504                      | 5751 | 21-12-06 | 12-07-07    | PENDING                                      |                                              |     |          | \$ 1,105,980                         |
| VULCANO 4B 1 AL 30      | 150       | 07-12-06         | 7510                      | 5754 | 21-12-06 | 12-07-07    | PENDING                                      |                                              |     |          | \$ 552,990                           |
| TIN 53C 1 al 40         | 200       | 22-12-06         | 203v                      | 172  | 12-01-07 | 20-07-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| VOLCÁN 1C 1 AL 40       | 200       | 16-03-07         | 384                       | 344  | 23-03-07 | 19-10-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| VOLCÁN 6C 1 AL 40       | 200       | 16-03-07         | 391V                      | 349  | 23-03-07 | 19-10-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| VOLCÁN 13C 1 AL 40      | 200       | 16-03-07         | 397V                      | 353  | 23-03-07 | 19-10-07    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| ALERCE 1 1 AL 20        | 100       | 25-07-07         | 4695v                     | 3652 | 01-08-07 | 15-04-08    | PENDING                                      |                                              |     |          | \$ 368,660                           |
| CAMPO 1C 1 AL 40        | 200       | 10-08-07         | 5098                      | 3976 | 21-08-07 | 14-03-08    | PENDING                                      |                                              |     |          | \$ 737,320                           |
| CAMPO 2C 1 AL 60        | 300       | 10-08-07         | 5100                      | 3977 | 21-08-07 | 14-03-08    | PENDING                                      |                                              |     |          | \$ 1,105,980                         |



| Claim Name/Number       | Area<br>(ha) | Application<br>Date | Inscripción Manifestación |      |          | Survey<br>Date | Fecha en<br>que se Dicta<br>Sentencia<br>Constitutiva | Inscripción Sentencia<br>Constitutiva y Mensura |    |      | Annual<br>Rental<br>Payment<br>(Chilean<br>peso) |
|-------------------------|--------------|---------------------|---------------------------|------|----------|----------------|-------------------------------------------------------|-------------------------------------------------|----|------|--------------------------------------------------|
|                         |              |                     | Fjs.                      | N°   | Date     |                |                                                       | Fjs.                                            | N° | Date |                                                  |
| CAMPO 3C 1 AL 60        | 300          | 10-08-07            | 5102                      | 3978 | 21-08-07 | 14-03-08       | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| CAMPO 4C 1 AL 60        | 300          | 10-08-07            | 5104                      | 3979 | 21-08-07 | 14-03-08       | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| CAMPO 5C 1 AL 40        | 200          | 10-08-07            | 5106                      | 3980 | 21-08-07 | 14-03-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| CAMPO 6C 1 AL 40        | 200          | 10-08-07            | 5108                      | 3981 | 21-08-07 | 14-03-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| EL SALVADOR UNO 1 AL 20 | 100          | 09-11-07            | 7459                      | 5844 | 22-11-07 | 13-06-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| TIN 74 1 AL 20          | 100          | 09-11-07            | 7455                      | 5842 | 22-11-07 | 13-06-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| PABLO 2C 1 AL 40        | 200          | 10-01-08            | 420v                      | 321  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| PABLO 5C 1 AL 40        | 200          | 10-01-08            | 422v                      | 322  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| PABLO 7C 1 AL 60        | 300          | 10-01-08            | 426v                      | 324  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| PABLO 10C 1 AL 60       | 300          | 10-01-08            | 428v                      | 325  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| VERO 1C 1 AL 40         | 200          | 10-01-08            | 430v                      | 326  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| VERO 2C 1 AL 20         | 100          | 10-01-08            | 432v                      | 327  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| VERO 3C 1 AL 40         | 200          | 10-01-08            | 434v                      | 328  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| VERO 4C 1 AL 60         | 300          | 10-01-08            | 436v                      | 329  | 21-01-08 | 14-08-08       | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| AÑAÑUCA 36C 1 AL 40     | 200          | 30-01-08            | 990                       | 787  | 14-02-08 | 05-09-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| AÑAÑUCA 37C 1 AL 40     | 200          | 30-01-08            | 992                       | 788  | 14-02-08 | 05-09-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| AÑAÑUCA 38C 1 AL 40     | 200          | 30-01-08            | 994                       | 789  | 14-02-08 | 05-09-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| AÑAÑUCA TRES 1 AL 20    | 100          | 30-01-08            | 996                       | 790  | 14-02-08 | 05-09-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| MALVILLA TRES 1 AL 20   | 100          | 30-01-08            | 998                       | 791  | 14-02-08 | 05-09-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| QUEBRADA II 1 AL 40     | 200          | 30-01-08            | 1002                      | 793  | 14-02-08 | 05-09-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| SUSPIRO TRES 1 AL 20    | 100          | 30-01-08            | 1008                      | 796  | 14-02-08 | 05-09-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| PINGO 14D 1 AL 40       | 200          | 20-03-08            | 1998                      | 1624 | 02-04-08 | 24-10-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| PINGO 15D 1 AL 20       | 100          | 20-03-08            | 2000                      | 1625 | 02-04-08 | 24-10-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| VULCANO 10D 1 al 40     | 200          | 29-05-08            | 3525v                     | 2834 | 06-06-08 | 31-12-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| VULCANO 11D 1 al 40     | 200          | 29-05-08            | 3527v                     | 2835 | 06-06-08 | 31-12-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| VULCANO 14D 1 al 60     | 300          | 29-05-08            | 3529v                     | 2836 | 06-06-08 | 31-12-08       | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| VULCANO 15D 1 al 40     | 200          | 29-05-08            | 3531v                     | 2837 | 06-06-08 | 31-12-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| TOMATILLO 1C 1 al 40    | 200          | 29-05-08            | 3523v                     | 2833 | 06-06-08 | 31-12-08       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| PINGO DOS 1 AL 40       | 200          | 21-07-08            | 4583v                     | 3723 | 29-07-08 | 10-02-09       | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| CERRO 2C 1 AL 20        | 100          | 24-07-08            | 2415v                     | 1942 | 06-08-08 | 11-02-09       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| MALVILLA 1C 1 al 60     | 300          | 11-08-08            | 654                       | 544  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| MALVILLA 2C 1 al 60     | 300          | 11-08-08            | 656                       | 545  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| MALVILLA 3C 1 al 60     | 300          | 11-08-08            | 658                       | 546  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| MALVILLA 4C 1 al 60     | 300          | 11-08-08            | 660                       | 547  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| MALVILLA 5C 1 al 60     | 300          | 11-08-08            | 662                       | 548  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| MALVILLA 6C 1 al 60     | 300          | 11-08-08            | 664                       | 549  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| MALVILLA 7C 1 al 60     | 300          | 11-08-08            | 666                       | 550  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 1,105,980                                     |
| MALVILLA 8C 1 al 40     | 200          | 11-08-08            | 668                       | 551  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| MALVILLA 9C 1 al 40     | 200          | 11-08-08            | 670                       | 552  | 20-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 737,320                                       |
| MALVILLA 10C 1 al 20    | 100          | 11-08-08            | 672                       | 553  | 20-08-08 | 17-12-08       | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| CAMI ONCE 1 AL 20       | 100          | 14-08-08            | 5548v                     | 4491 | 26-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 368,660                                       |
| APOSTOL 1A 1 AL 40      | 200          | 22-08-08            | 5658v                     | 4567 | 27-08-08 | PENDING        | PENDING                                               |                                                 |    |      | \$ 737,320                                       |



| Claim Name/Number        | Area<br>(ha) | Application<br>Date | Inscripción Manifestación |      |          | Survey<br>Date | Fecha en<br>que se Dicta<br>Sentencia<br>Constitutiva | Inscripción Sentencia<br>Constitutiva y Mensura | Annual<br>Rental<br>Payment<br>(Chilean<br>peso) |
|--------------------------|--------------|---------------------|---------------------------|------|----------|----------------|-------------------------------------------------------|-------------------------------------------------|--------------------------------------------------|
|                          |              |                     | Fjs.                      | N°   | Date     |                |                                                       | Fjs. N° Date                                    |                                                  |
| APOSTOL 2B 1 AL 40       | 200          | 22-08-08            | 5660v                     | 4568 | 27-08-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| PABLO 7E 1 AL 60         | 300          | 22-08-08            | 5654v                     | 4565 | 27-08-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| PABLO 7F 1 AL 60         | 300          | 22-08-08            | 5656v                     | 4566 | 27-08-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| MARICUNGA 1 AL 20        | 100          | 22-08-08            | 5652v                     | 4564 | 27-08-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| NANTOCO 4C 1 AL 20       | 100          | 28-08-08            | 5956v                     | 4800 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| MINERVA A 1 AL 20        | 100          | 28-08-08            | 5958v                     | 4801 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| BREA 1C 1 AL 60          | 300          | 28-08-08            | 5960v                     | 4802 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| BREA 2C 1 AL 20          | 100          | 28-08-08            | 5962v                     | 4803 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| BREA 3C 1 AL 40          | 200          | 28-08-08            | 5964v                     | 4804 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| BREA 4C 1 AL 60          | 300          | 28-08-08            | 5966v                     | 4805 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| BREA 5C 1 AL 20          | 100          | 28-08-08            | 5968v                     | 4806 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| BREA 6C 1 AL 40          | 200          | 28-08-08            | 5970v                     | 4807 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| BREA 7C 1 AL 20          | 100          | 28-08-08            | 5972v                     | 4808 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| RÍO UNO A 1 AL 40        | 200          | 28-08-08            | 5974v                     | 4809 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO DOS A 1 AL 20        | 100          | 28-08-08            | 5976v                     | 4810 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| RÍO CINCO A 1 AL 20      | 100          | 28-08-08            | 5978v                     | 4811 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| RÍO SIETE A 1 AL 40      | 200          | 28-08-08            | 5980v                     | 4812 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO OCHO A 1 AL 40       | 200          | 28-08-08            | 5982v                     | 4813 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO NUEVE A 1 AL 40      | 200          | 28-08-08            | 5984v                     | 4814 | 05-09-08 | 07-10-08       | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO DIEZ A 1 AL 40       | 200          | 28-08-08            | 5986v                     | 4815 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO ONCE A 1 AL 40       | 200          | 28-08-08            | 5988v                     | 4816 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO DOCE A 1 AL 40       | 200          | 28-08-08            | 5990v                     | 4817 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO TRECE A 1 AL 40      | 200          | 28-08-08            | 5992v                     | 4818 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO CATORCE A 1 AL 20    | 100          | 28-08-08            | 5994v                     | 4819 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| RÍO QUINCE A 1 AL 40     | 200          | 28-08-08            | 5996v                     | 4820 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO DIECISEIS A 1 AL 20  | 100          | 28-08-08            | 5998v                     | 4821 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| RÍO DIECINUEVE A 1 AL 40 | 200          | 28-08-08            | 6000v                     | 4822 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| RÍO VEINTE A 1 AL 20     | 100          | 28-08-08            | 6002v                     | 4823 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| CORAL 8 1 AL 60          | 300          | 28-08-08            | 6004v                     | 4824 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| CORAL 10 1 AL 20         | 100          | 28-08-08            | 6006v                     | 4825 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAÑUCA 1C 1 AL 20       | 100          | 28-08-08            | 6008v                     | 4826 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAÑUCA 2C 1 AL 40       | 200          | 28-08-08            | 6010v                     | 4827 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 3C 1 AL 40       | 200          | 28-08-08            | 6012v                     | 4828 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 4C 1 AL 20       | 100          | 28-08-08            | 6014v                     | 4829 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAÑUCA 5C 1 AL 40       | 200          | 28-08-08            | 6016v                     | 4830 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 6C 1 AL 40       | 200          | 28-08-08            | 6018v                     | 4831 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 7C 1 AL 40       | 200          | 28-08-08            | 6020v                     | 4832 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 8C 1 AL 40       | 200          | 28-08-08            | 6022v                     | 4833 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 9C 1 AL 40       | 200          | 28-08-08            | 6024v                     | 4834 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 10C 1 AL 40      | 200          | 28-08-08            | 6026v                     | 4835 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAÑUCA 11C 1 AL 20      | 100          | 28-08-08            | 6028v                     | 4836 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAÑUCA 12C 1 AL 20      | 100          | 28-08-08            | 6030v                     | 4837 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |



| Claim Name/Number       | Area<br>(ha) | Application<br>Date | Inscripción Manifestación |      |          | Survey<br>Date | Fecha en<br>que se Dicta<br>Sentencia<br>Constitutiva | Inscripción Sentencia<br>Constitutiva y Mensura | Annual<br>Rental<br>Payment<br>(Chilean<br>peso) |
|-------------------------|--------------|---------------------|---------------------------|------|----------|----------------|-------------------------------------------------------|-------------------------------------------------|--------------------------------------------------|
|                         |              |                     | Fjs.                      | N°   | Date     |                |                                                       | Fjs. N° Date                                    |                                                  |
| AÑAUCA 13C 1 AL 40      | 200          | 28-08-08            | 6032v                     | 4838 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 14C 1 AL 60      | 300          | 28-08-08            | 6034v                     | 4839 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| AÑAUCA 15C 1 AL 40      | 200          | 28-08-08            | 6036v                     | 4840 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 16C 1 AL 20      | 100          | 28-08-08            | 6038v                     | 4841 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAUCA 17C 1 AL 20      | 100          | 28-08-08            | 6040v                     | 4842 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAUCA 18C 1 AL 20      | 100          | 28-08-08            | 6042v                     | 4843 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAUCA 19C 1 AL 40      | 200          | 28-08-08            | 6044v                     | 4844 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 20C 1 AL 40      | 200          | 28-08-08            | 6046v                     | 4845 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 21C 1 AL 60      | 300          | 28-08-08            | 6048v                     | 4846 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| AÑAUCA 22C 1 AL 60      | 300          | 28-08-08            | 6050v                     | 4847 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| AÑAUCA 23C 1 AL 60      | 200          | 28-08-08            | 6052v                     | 4848 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 24C 1 AL 40      | 200          | 28-08-08            | 6054v                     | 4849 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 25C 1 AL 40      | 200          | 28-08-08            | 6056v                     | 4850 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 26C 1 AL 60      | 300          | 28-08-08            | 6058v                     | 4851 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| AÑAUCA 27C 1 AL 60      | 300          | 28-08-08            | 6060v                     | 4852 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| AÑAUCA 29C 1 AL 40      | 200          | 28-08-08            | 6062v                     | 4853 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 30C 1 AL 40      | 200          | 28-08-08            | 6064v                     | 4854 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 31C 1 AL 40      | 200          | 28-08-08            | 6066v                     | 4855 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 32C 1 AL 40      | 200          | 28-08-08            | 6068v                     | 4856 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| AÑAUCA 33C 1 AL 20      | 100          | 28-08-08            | 6070v                     | 4857 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAUCA 34C 1 AL 20      | 100          | 28-08-08            | 6072v                     | 4858 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| AÑAUCA 35C 1 AL 40      | 200          | 28-08-08            | 6074v                     | 4859 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| HUALLE 1 AL 20          | 100          | 28-08-08            | 6076v                     | 4860 | 05-09-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| PAMPA UNA A 1 AL 40     | 200          | 08-09-08            | 765                       | 642  | 17-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| PAMPA DOS A 1 AL 60     | 300          | 08-09-08            | 767                       | 643  | 17-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| PAMPA TRES A 1 AL 60    | 300          | 08-09-08            | 769                       | 644  | 17-09-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| PAMPA CUATRO A 1 AL 40  | 200          | 08-09-08            | 771                       | 645  | 17-09-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| PINGO 9C 1 AL 40        | 200          | 06-10-08            | 7184V                     | 5654 | 16-10-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| EL SALVADOR DOS 1 AL 20 | 100          | 01-10-08            | 6965                      | 5510 | 08-10-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| RIO A 1 AL 20           | 100          | 01-10-08            | 6963                      | 5509 | 08-10-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| CALANDRIA 1C 1 AL 60    | 300          | 20-10-08            | 7420                      | 5845 | 24-10-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| CALANDRIA 2C 1 AL 60    | 300          | 20-10-08            | 7422                      | 5846 | 24-10-08 | PENDING        | PENDING                                               |                                                 | \$ 1,105,980                                     |
| TIN 85A 1 AL 40         | 200          | 20-10-08            | 7424                      | 5847 | 24-10-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |
| TIN 109A 1 AL 20        | 100          | 20-10-08            | 7426                      | 5848 | 24-10-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| TIN 41C-1 1 AL 20       | 100          | 21-10-08            | 7560                      | 5968 | 03-11-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| TIN 90C 1 AL 20         | 100          | 21-10-08            | 7562v                     | 5969 | 03-11-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| TIN 96C 1 AL 20         | 100          | 21-10-08            | 7564v                     | 5970 | 03-11-08 | PENDING        | PENDING                                               |                                                 | \$ 368,660                                       |
| MINERVA TRES 1 AL 40    | 200          | 23-10-08            | 7566V                     | 5971 | 03-11-08 | PENDING        | PENDING                                               |                                                 | \$ 737,320                                       |