FORM 6_K
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C., 20549

Report of Foreign Private Issuer

Pursuant to Rule 13a-16 or 15-d-16
Of the Securities Exchange Act of 1934

For the Month of May 2003

SAMEX MINING CORP.

301 – 32920 Ventura Avenue, Abbotsford, BC, Canada, V2S 6J3

Indicate by check mark whether the registrant files or will file annual reports under cover Form 20-F or Form 40-F.

Form 20-F _X Form 40-F

Indicate by check mark whether the registrant by furnishing the information contained in this Form is also thereby furnishing the information to the Commission pursuant to Rule 12g3-2(b) under the Securities Exchange Act of 1934.

Yes No X

If "Yes" is marked, indicate below the file number assigned to the registrant in connection with Rule 12g3-2(b): 82-______________.

FORM 43-101F1
TECHNICAL REPORT

CERRO ESKAPA PROJECT

ENRIQUE BALDEVIESO PROVINCE, DEPARTMENT OF POTOSI, BOLIVIA

By

ROBERT E. KELL B.S. Geological Sciences

April 30, 2003

Prepared For:

SAMEX Mining Corp.
#301 – 32920 Ventura Avenue
Abbotsford, BC
V2S 6J3

2.0.0 <u>TABLE OF CONTENTS</u>

ILLUSTRATIONS

TEXT TABLES – included at the end of the report

TEXT FIGURES – included at the end of the report

PLATE ILLUSTRATIONS
(The following Engineering Scale Drawings and Maps are available for viewing at the Corporate Office of SAMEX Mining Corp.)

APPENDICES
(The following are available for viewing at the Corporate Office of SAMEX Mining Corp.)

Geochemical Tables for Surface Samples, Check Analyses and Drill Holes

Project Technical Reports and Memorandums

To: SAMEX Mining Corp.

3.0.0 SUMMARY

(1) SAMEX Mining Corp. (301-32920 Ventura Avenue, Abbotsford, BC, Canada V2S 6J3), through its Bolivian subsidiary, EMIBOL S.A., holds a 99% interest in any mining operations which may be established on the 3,000 hectare Eskapa property which consists of the "Eskapa" concession and two enclosed small concessions located in the Enrique Baldevieso Province, Department of Potosi, Bolivia. The company has held these rights since 1995. The Eskapa concession is centered over the eroded-out core zone of the extinct Cerro Eskapa stratovolcano which is situated in the southwestern part of Bolivia, approximately 48 airline kilometers east of the frontier with Chile and 55-airline kilometers southeast of Ollague, Chile. The property is readily accessible from Uyuni, Bolivia or Calama, Chile. SAMEX explored the property in sporadic fashion from 1995 to 1998 and carried out a ten-hole core drilling program in 1999. Additional exploration work was conducted during two time periods in 2001 and included drilling six core holes. SAMEX has expended over a million dollars exploring the Eskapa property with cumulative Deferred Exploration Costs since 1995 totaling CDN$1,210,027 at February 28, 2003.

(2) The region, where the Cerro Eskapa prospect is situated, is part of the Cordillera Occidental which consists of numerous extinct or dormant late-Tertiary to early quaternary, andesite-dacite stratovolcanoes positioned on a high plateau (3500 meters mean elevation) of mid- to late-Tertiary volcanic and sedimentary rocks. The Cerro Eskapa stratovolcano is uniquely considerably eroded such that strong alteration and silver-lead-antimony sulfosalt-mineralized zones are exposed over a large 2 km. by 3 km. area of the core zone. The stratovolcano core zone had, up until 1995, surprisingly not been explored during modern times. Colorful chrysocolla mineralization on the lower north flank of the stratovolcano was worked in pre-historic times by indigenous people. In the stratovolcano core zone, Spanish Colonial-era prospectors explored silver-mineralized vuggy silica-barite outcrops with minor production from shallow irregular workings. An unknown Chilean mining concern sank a 45 meter-deep shaft near one of the Spanish workings in the late-1870's (?) just before the outbreak of the War of the Pacific; there is no indication of any production. The geologic setting, extensive hydrothermal alteration, presence of silver-lead-antimony sulfosalt mineralization, accessible location, and lack of any previous exploration drilling made the area attractive to SAMEX for acquisition.

(3) The strong argillic, advanced-argillic, and vuggy silica alteration are focused on porphyritic dacite and hydrothermal breccia which occupy the stratovolcano core zone. The nature of the alteration and widespread abundant pyrite are characteristic of the high-sulfidation-type of precious-metal mineralizing system, which occur in the Cordillera Occidental of South America (i..e Yancocha, Pierina, Choquelimpie, El Indio-Tambo, Pascua, and Valerdero). At Cerro Eskapa, silver-lead-antimony sulfosalt-mineralization occurs, at the surface of the eroded-out stratovolcano core zone, in linear/steeply dipping zones of vuggy silica-barite strongly controlled along west-northwest-trending faults. The zones range from 1 to 3 meters in width and several can be traced for up to several thousands of meters. Based on SAMEX sampling, grades of this mineralization in dump and rock-chip samples are variable, but typically contain high amounts of silver (>69.3 ppm to 2260 ppm (g/mt), lead (>144 ppm to 23100 ppm) and antimony (165 ppm to 25800 ppm) with anomalous mercury 1140 ppb (to 90000 ppb), but with very low gold values (<5 ppb). Surrounding clay-pyrite-altered porphyritic dacite contains anomalous amounts of mercury, arsenic, and antimony, and low values in gold and silver. The mineralized zones appear to represent the leakage up from more substantial mineralization at depth.

(4) SAMEX exploration of the stratovolcano core zone (1995-1999) included: considerable road building for access, geologic mapping, considerable rock-chip sampling and running IP surveys over long lines. The data from these efforts showed that silver-lead-antimony sulfosalt/sulfide mineralization is tightly restricted to the zones of vuggy silica-barite and no indication could be found of a shallow bulk-tonnage type of deposit. The IP surveys generally detected the high-resistivity expression of the zones and demonstrated a depth extent in excess of the 250-meter search depth limit. The first attempt in 1999 to core drill the zones (March-June, 1999) produced mixed results. Some holes were unfortunately not properly located and aimed, and missed making the intended down-dip intersection. However, two drill holes (DDH-EK-99-02 and -04) did make interesting intersections confirming that the vuggy silica-barite rock does continue to depth, but silver grades were disappointing. DDH-EK-99-02 intersected a thick vuggy silica-barite zone of 13.0 meters true width containing 41.8 ppm (g/mt) silver with low detectible gold (7 ppb) and anomalous copper, lead, antimony with anomalous mercury. However, the intersection was considerably affected by a late oxidation alteration of sulfosalt/sulfide minerals producing abundant limonitic minerals. This suggested that the metal values were much reduced in the intercept due to possible leaching of silver and base and pathfinder metals. Hence, the intersection was not representative of mineralization elsewhere along strike or at depth along the zone. The other intersection (DDH-EK-99-04) was located at high elevations at the east end of the same zone and was complicated by faulting. The recovered fault-bounded sliver of the vuggy silica rock contained 109.2 ppm (g/mt) silver over a 0.30 meter true width. No funding was available to pursue follow-up drilling and consequently, no exploration work was carried out from June, 1999 to December, 2000.

(5) In November 2000, SAMEX granted International Chalice Resources ("Chalice") an option to earn up to a 40% joint venture interest in mineral operations on the Eskapa property by making payments totaling US $500,000 by November 15, 2003. Later, SAMEX and Chalice agreed to amend certain terms of the agreement by reducing total option payments required, to US $461,137.98, by an earlier date, February 28, 2002. Chalice completed option payments totaling US $461,137.98 by February 28, 2002 and thereby earned the right to receive, upon formation of a joint venture, a 40% joint venture interest with respect to mineral operations on the property. However, in October 2002, SAMEX negotiated an agreement to restore its original 99% interest in the Eskapa property by purchasing-back the rights earned by Chalice under the Eskapa Property Option/Joint Venture Agreement. SAMEX arranged to purchase-back this right to a 40% interest from Chalice by:

a) paying Chalice CDN $50,000 cash ($25,000 on signing and $25,000 by October 3, 2003);

b) issuing 200,000 shares of SAMEX Mining Corp. to Chalice (issued November 4, 2002);

c) granting Chalice a US $2,000,000 cash royalty, to be paid out of production on the property in eight equal quarterly payments of US $250,000 beginning after the ninth month of continuous commercial mining operations on the property.

Pursuant to the buy-back agreement, the Eskapa Property Option/Joint venture Agreement with Chalice terminated and SAMEX now holds a 99% interest in any mining operations which may be established on the property, subject to Chalice's US $2,000,000 cash royalty.

The option payments from Chalice provided SAMEX with the funding to resume exploration on the Eskapa property in 2001 to identify and drill new targets for precious-metal mineralization. Compilation of previous SAMEX exploration data outlined ten (I-X) prospective mineralized zones within the stratovolcano core zone, but exploration attention was instead focused in the

Breccia Area to the southwest where considerable breccia was found and then evaluated using geologic mapping, rock-chip sampling, and running IP surveys. These zones could be interpreted as the fault-offset continuation of those found in the stratovolcano core zone. However, although the breccia zones contain anomalous mercury and, locally, antimony, arsenic, and zinc, no values for gold or silver are present. The only attempt at drilling in the Breccia Area encountered faulting and no indication of precious-metal mineralization was intersected. Exploration for a concealed significant copper deposit related to the oxide-copper-mineralized pebble breccia bodies of the Copper Zone also did not yield positive results from drill testing one of the IP chargeability targets. A cored intersection through one of the pebble breccia bodies (DDH-EK-01-1C) yielded a 1.0 meter true width of 5% copper and 10 ppm (g/mt) silver. The decision was made to locate a deep drill test of one of the vuggy silica-barite zones (Zone III) in the stratovolcano core zone. The test (DDH-EK-01-11) was sited toward the far southeast end of Zone III, using DDH-EK-99-02 as control, and made a complete drill intersection through the vuggy silica target at a depth between 392.70 to 457.10 meters depth. The intersection revealed toward the footwall of the zone, the vuggy silica-barite rock is cut by massive veins/veinlets of gold-bearing, high-grade copper-silver-antimony-bismuth sulfosalt/sulfide mineralization. The analytical results, solely on the recovered part of one of the veins (0.20 meters apparent width), give a glimpse of the tenor of the mineralization which might be more extensive elsewhere along this and similar mineralized zones. This vein sample contains 1890 ppm (g/mt) silver, 6.1% copper, 4.18% antimony, and 2.93% bismuth with 1.180 ppm (g/mt) gold and occurs in an interval (0.75 meters true width) of vuggy silica-barite (445.45 to 446.95 meters) which contains 0.583 ppm (g/mt) gold, 331 ppm (g/mt) silver, 1.04% copper, 0.71% antimony, and 0.43% bismuth. Toward the top of the interval is a silica-barite veinlet interval with 1.280 ppm (g/mt) gold and 89.0 ppm (g/mt) silver and low copper, antimony, and bismuth. This veinlet is relatively gold-rich and is considered different perhaps reflecting late-stage, secondary gold veins or gold deposition. The style and tenor of the gold-bearing copper-silver-antimony-bismuth sulfosalt-sulfide mineralization appears to be similar in character to the gold-bearing copper-silver veins described for El Indio (Jannas and others, 1999). Although the deep intersection revealed that the mineralizing system below the stratovolcano core zone becomes auriferous and could contain high-grade copper-silver-antimony-bismuth mineralization, no funding was available to continue follow-up drilling elsewhere along the numerous prospective zones.

(6) When the results of DDH-EK-01-11 are combined with those from DDH-EK-99-02, the cross section demonstrates that the vuggy silica rock and contained precious-metal mineralization of Zone III are surrounded by outlying coherent/well-developed haloes of argillic and advanced-alteration and anomalous base- and pathfinder-metal zoning. The spatial relationship of the alteration and base and pathfinder metal zoning in cross section importantly provides a "guide" to the position of the centrally positioned vuggy silica rock and deeper seated gold-silver-copper-antimony-bismuth mineralization. From the cross section, the outlying haloes of pathfinder and base metals surround the target zone and show that, at high levels in the system, anomalous values in outcrop samples, especially for silver, base and pathfinder metals (i.e. mercury, antimony, and arsenic) are the shallow expression of deep-seated, gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide mineralization. Extrapolated to the other nine mineralized zones in the stratovolcano core zone, whose surface expressions are also marked by anomalous pathfinder metals, suggests that the deep-seated, gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide mineralization may likely be widely distributed at depth within various zones. The ten zones can be traced confidently across the floor of the eroded stratovolcano core zone for 11.5 kilometers of mapped cumulative strike-length distance. Another 2.5 kilometers of cumulative strike length can be inferred in areas of cover and where zones are open ended. The remaining potential for discovery of substantial amounts of vein, veinleted, and breccia-hosted gold-bearing, high-grade, copper-silver-antimony-bismuth mineralization is considered very good and should be pursued in the future with a

rigorous drill testing. The exploration objective is to discover a cumulative resource containing +25M metric tons in the range of +2 to +8 g/mt gold, +1500 g/mt silver, 5% to 8% copper, 2% to +4% antimony, and 2% to 4% bismuth. This target is postulated to occur along parts of the mineralized zones and would be accessible for selective underground mining methods via level tunnels driven underneath the stratovolcano core zone. A drill program totaling 4,500 meters of core drilling in up to 12 holes is proposed to test at depths of up to 400 meters along Zones I-II, III, IV, V, IX, and X at a cost of approximately US $1,000,000.

4.0.0 INTRODUCTION AND TERMS OF REFERENCE

4.1.0 Terms of Reference – I (Robert Kell) prepared this report for SAMEX Mining Corp. who holds a 99% interest in any mining operations which may be established on the Cerro Eskapa exploration project in Bolivia. I have served as Vice President of Exploration of SAMEX for seven years (1996-present). I originally visited the Cerro Eskapa property on behalf of the company in 1994, recommended its acquisition, and was overall responsible for exploration activities there between the years 1995 to present. I have spent much time on the property and, with this experience, am probably the most-qualified person to put this report together.

4.2.0 Purpose of the Report – This technical report was prepared to be submitted to the British Columbia Securities Commission as a disclosure of technical information for the Cerro Eskapa precious-metal exploration project (Bolivia) and follows the guidelines for technical reports set forth in Canadian Securities Form 43-101F1. This report contains a compilation and evaluation of all project data and exploration results including basic geological, geochemical, and geophysical data and drilling results.

4.3.0 Sources of Information and Data – The information and data presented in this report are from SAMEX company project files housed in La Paz, Bolivia and Abbotsford, British Columbia. Cerro Eskapa had largely gone unexplored via modern methods until initiation of SAMEX's efforts in 1995 and all information/data presented is essentially solely from our exploration efforts. Very little useful technical information from government-sponsored geologic investigations pertaining to Cerro Eskapa exists, but what there is, is utilized or referred to in appropriate sections of this report. All of the maps, cross sections, and most diagrams presented in this report represent up-to-date compilations from the several periods of exploration activity. The efforts of all company-employed field geologists who participated in the surveying, mapping, sampling, and core logging are credited on the maps and in Table 4.

4.4.0 Extent of Author's Field Involvement – I have spent much time on-site on the Cerro Eskapa property and have been present for and participated in, or directed, much of the exploration work carried out by SAMEX. I visited Cerro Eskapa as a consultant geologist to SAMEX Mining Corp. in May, 1994 and conducted reconnaissance geologic traverses and outcrop rock-chip and dump sampling. I returned to Cerro Eskapa in early 1995 with a small crew consisting of a staff Bolivian geologist (Carlos Espinoza), consultant U.S. geologist (Greg Minnick), and consultant U.S. geophysicist (Gary Carlson, Gradient Geophysics). For a six-week period we carried out further reconnaissance exploration field work over a part of the eroded-out stratovolcano core zone where prominent silver-mineralized chimneys of vuggy silica outcrop and were locally prospected in Spanish Colonial time. I returned to Cerro Eskapa in 1996 with SAMEX staff land man/surveyor Eduardo Martinez to observe establishing permanent concession monuments and survey control points. During this visit, I visited many old prospect workings and collected bulk dump samples of mineralized rock. In late-1998, an exploration program was initiated in the eroded-out stratovolcano core zone and led to setting up and carrying out a ten-hole core drilling program. While this program was headed by Bolivian SAMEX staff geologist Carlos Espinoza and utilized Bolivian geologists/personnel, I did stay on the project site for numerous extended periods of time to help out with geologic mapping, rock-chip sampling, planning IP lines, core logging and reviewing work of the project geologic staff. The project remained essentially dormant from mid-June, 1999 to December, 2000. During this period, I did visit Cerro Eskapa on two occasions; once in late June/early July, 1999 with consultant geologist Jerry Rayner (Vancouver, BC), and then in September, 1999 with Newmont Gold senior geologist Bruce Harvey. These visits were focused on carefully reviewing drill core and outcrop geologic relationships to evaluate the results of the first drilling program. Bolivian geologists, David Montano and Mario Barragan were sent to Cerro Eskapa in December, 1999 to briefly spend time examining/sampling breccia exposures and sinking pits down through thin cover into bedrock in search of concealed mineralized breccia. I reviewed the results of their work in the field with geochemical analytical results in-hand. With the signing of the option agreement with International Chalice Resources in November, 2000, I took over as project leader and directed/carried out the drilling project work of January-February and September-October, 2001. I conducted all core logging and sampling. I also supervised and helped David Montano and Mario Barragan with the geologic mapping and rock-chip outcrop sampling in the Breccia Area.; and also walked out all IP lines with pseudosection profiles in hand. All previous geologic mapping of the stratovolcano core zone and Copper Zone was re-evaluated in detail and large parts were completely re-mapped. The mapping work was conducted pairing myself with one of the Bolivian geologists on an alternating daily basis. During this project work, I walked out all of the 1999 and 2000-2001 IP lines and carefully reviewed outcrop in the areas for each of the 1999 drill holes. Hence, I have spent much time on site and have traversed over essentially the entire property position. I am most familiar with geologic outcrop relationships, what was intersected in the drill holes, and findings/likely geologic significance of the IP surveys. A special effort was made to evaluate the large geochemical analytical data base on rock-chip surface and drill core samples.

5.0.0 <u>DISCLAIMER</u> – I have not relied upon any outside reports or opinions of other geologists in writing this report. Where, in the text, I have introduced or referred to opinions and interpretations expressed in published articles, the source is sited and is listed in the References section at the end of the report. Jim Baughman geologist for MK Gold visited the property in 1997 before any systematic exploration work had been initiated and made favorable comparisons of geologic setting/features at Cerro Eskapa to the Pierina deposit (Peru). Two geologists, Jerry Rayner (consultant) and Bruce Harvey (Newmont Gold), who separately visited Cerro Eskapa not long after the 1999 drilling program, certainly were both very helpful with their constructive criticism of the project work and provided some great insights and ideas, which were especially incorporated in considering further exploration work, and are incorporated, as much is possible, in this report. Where their ideas are utilized, their in-put is acknowledged. The accuracy, thoroughness, and objectiveness of this report, as are any shortcomings or omissions, are my sole responsibility.

6.0.0 <u>PROPERTY DESCRIPTION AND LOCATION</u>

6.1.0 <u>Location</u> - The Cerro Eskapa property is located in the southwestern part of Bolivia (Cordillera Occidental) in Provincia Enrique Baldivieso, Departmento of Potosi, and 48-kilometers east from the Chilean frontier and some 55-airline kilometers southeast of Ollague, Chile (Figure 1). The property is logistically well-situated with excellent access. The Bolivian railroad trunk line to the coastal port city of Antofagasta, Chile passes within 28-road kilometers of the property. The nearby villages of Copacabana and San Augustin, the provincial capital, are located six and 12 kilometers from the property, respectively.

6.2.0 **<u>Property Description and Ownership</u>** – The Eskapa property covers approximately 3,000 hectares and consists of the "Eskapa" concession (concession #4717), a principal 2885-hectare exploitation concession which covers most of the west half of the Cerro Eskapa stratovolcano. This large concession encompasses two smaller concessions, "Estrella" /"Mi Morena" (concession #4763) which together cover 115 hectares. (Figure 2, Plates 1A, 1B, 1C). The dimensions of the concessions are six kilometers (east-west) by five kilometers (north-south).

The concessions are owned by Empresa Minera El Roble S.A. ("El Roble"), a company controlled by a Bolivian national, Patricio Kyllmann, who is a Director of SAMEX. SAMEX's Bolivian subsidiary, Emibol S.A. (Empresa Minera Boliviana S.A.) earned a 99% interest in any mining operations which may be established on the concessions pursuant to an agreement dated April 16, 1996 and as amended November 23, 1998 with El Roble. Emibol S.A. paid all costs for the staking of these concessions and under the agreement, Emibol S.A. is required to make all expenditures on the concessions in exchange for a 99% interest in any mining operations which may be established on the concessions while El Roble is required to continue to hold title to the concessions and is entitled to a 1% interest in such operations. Final title to mining rights was awarded to El Roble S.A. by SETMIN (Bolivian government agency regulating mining concessions) in April, 1999.

The property is subject to a net smelter royalty of an aggregate of 0.6 % payable to Robert Kell, Front Range Exploration Corp., and El Roble S.A., and to a US $2,000,000 cash royalty payable to International Chalice Resources Inc., to be paid out of production on the property in eight equal quarterly payments of US $250,000 beginning after the ninth month of continuous commercial mining operations on the property.

Patent fees of approximately (depends upon US$/Boliviano exchange rate) US $2.00 per hectare must be paid annually to the Bolivian government in order to maintain the mining concessions. This patent payment of approximately US$6,000.00 annually is the only obligation that must be met to maintain ownership of the property for the foreseeable future.

6.3.0 **<u>Legal Survey and Land Conflicts</u>** - The UTM co-ordinates along the boundary lines of the Eskapa concession are: north boundary - 7651700.58 N; south boundary - 7646700.59 N, east boundary – 635789.34 E; and west boundary – 629789.34 E. These co-ordinates and those of all corners of the concessions, property monuments, and permanent survey reference points established by SAMEX were determined by the Servicio Technico De Minas (SETMIN) of the Bolivian Government during an official field inspection of the property in 1999. This government inspection work comprises a legal survey of the property position. Several pre-existing small nuisance concessions of dubious standing in the stratovolcano core zone were acquired through legal actions by El Roble S.A. between 1997 and 1999. A 1999 legal challenge to part of the Eskapa concession by COMIBOL (Bolivian Government mining company) was deemed to not have merit was dismissed by the Bolivian Courts in 2000 (see SAMEX news releases 15-99 and 7-00). As of the date of this report, there are no other ownerships of mineral properties nearby, adjacent to, or in conflict with the three concessions. Cerro Eskapa is an isolated mineralized center which is remote from mining centers and mineral belts in Bolivia. Without significant mineral production, Cerro Eskapa had escaped notice by national mining companies. Expansive surrounding pampa to the Cerro Eskapa stratovolcano comprises flat or gentle terrain suitable for development of large mining infrastructure. The Eskapa exploration concession does not cover much of this area which is owned by the Bolivian government. The surface rights to this land could be made available to SAMEX for mining infrastructure should a discovery be developed into a mine.

6.4.0 <u>Position of Mineralized Zones and Surface Disturbances Within Concession Boundaries</u> - The principal concession block (Eskapa) is positioned over a large area in the eroded-out stratovolcano core zone of altered and iron-oxide-stained rocks and locally outcropping silver mineralization which occurs in "east-west"-trending zones of vuggy silica and breccia (Plate 1C). Currently, ten spaced, linear zones, which are prospective for deeper seated gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide mineralization, have been identified. These zones comprise a prospective area approximately 3-km. long by 1.5-km. across which is centrally positioned well within the Eskapa concession boundaries. What may prove to be the fault-offset and down-dropped, western continuation of these breccia zones is also covered by this concession (text figure 3). No significant mining has taken place on the property. Piques (irregular shafts) and prospect pits dating from the Spanish Colonial era (late-1500's (?)) are scattered around the stratovolcano core zone and are typically positioned on/near outcropping vuggy silica-hosted silver mineralization and likely yielded only very meager production. A more-modern 45-m.-deep shaft was sunk by an unknown Chilean mining company reportedly just before the War of the Pacific (late 1870's). On the lower north flank of the stratovolcano, colorful oxide-copper minerals (chrysocolla) have been mined from pits and tunnels, of limited extent, sporadically since pre-historic times by indigenous peoples (Incas). In the stratovolcano core zone, an extensive network of roads, many drill pads, and five trenches were constructed by bulldozer by SAMEX to allow ready access over all parts of the prospective area. The position of the old mine/prospect workings and surface disturbance by SAMEX, relative to the outside boundary of the Cerro Eskapa, is shown on Plate 1A.

6.5.0 <u>Environmental Liabilities</u> - There are no known environmental liabilities. The exploration work by SAMEX is limited to road building, shallow trenches, surface geological mapping/sampling, and surface geophysical surveys, and core drilling. The only surface disturbance are the roads and scattered drill platforms. No reclamation is required on these surface disturbances. Old (Spanish Colonial-era) mine workings are shallow and of limited extent and none encountered or produce water.

6.6.0 <u>Permitting</u> - No permits are required for the exploration work so far carried out, or planned for the future, at Cerro Eskapa.

7.0.0 <u>ACCESSIBILITY CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY</u>

7.1.0 <u>Physiography</u> - Cerro Eskapa property is located in the Cordillera Occidental physiographic province along the western edge of South America. The province runs along the Bolivian-Chilean frontier and is characterized by numerous extinct or dormant, large, andesite-dacite stratovolcanos which are built over a high-standing, weakly dissected platform of Tertiary volcanic and sedimentary rocks. The mean elevation of the plateau along the frontier is approximately 3600 meters and the altitudes of the stratovolcanoes range from 5000 to nearly 6000 meters (Picture 1). At Cerro Eskapa, the subdued terrain of the prospective area of the eroded-out stratovolcano core zone is at elevations roughly between 4200 to 4400 meters. The sparsely vegetated region of the Cordillera Occidental is arid/high desert with sporadic heavy thunderstorm rain showers possible from December into February (30 mm/year average precipitation). A rare heavy snow storm may hit some years during winter months (July-August). Mean temperatures average probably 17^{o} C in summer and 7^{o} C in winter. Lows at night in winter are subfreezing (minimum temperatures to -12^o C). The climate is not severe and mining operations could be carried all-year long. A potential outside gold or copper heap-leach operation could be affected by extended periods of winter cold weather. The near-by large copper mines of Quebrada Blanca and Collahuasi in Chile (130-airline kilometers to the west-northwest) are at approximately the same elevation as Cerro Eskapa and operate all year long. The area of exploration interest (prospective area) is situated in subdued terrain perched up in the eroded-out core zone of the Cerro Eskapa stratovolcano. The subdued terrain and soft altered rock facilitate ease of putting in roads and drill pads using a bulldozer. The prospective area is approximately 3000 meters long (west-northwest) and up to 2000 meters across. The amount of relief between the surrounding pampa (base of the stratovolcano) and the prospective area surface is between 400 to 500 meters. Hence, the relief would allow level tunnel/decline access for any underground mining operation and also provide an advantage should shallow, bulk-tonnage, open-pit mineralization be discovered. More-than adequate suitable flat areas suitable for infrastructure needed for a large mining operation are present in expansive pampa to the north and northeast of the prospective area. The surface/subsurface rights are owned by the Bolivian government and could be available for any mining operation at Cerro Eskapa.

7.2.0 **<u>Accessibility and Routes of Access</u>** – The property is readily accessible by four-wheel drive vehicle via several different routes from both Bolivia and Chile. No high mountain ranges or rugged areas are crossed. The normal Bolivian access to Cerro Eskapa is from the city of Uyuni, via 150 kilometers of unimproved dirt road and includes crossing part of the Salar de Uyuni when passable (March-December). Cerro Eskapa is also accessible from the major mining city of Calama, Chile (Chuquicamata, El Abra) which is 270 kilometers distance (five hours driving time) from the property. Calama is a large industrial city which has regular airline service from Santiago, and is well connected by a paved road system and railroad. To reach Cerro Eskapa, requires taking the paved highway from Calama northeast to El Abra or east to Chu-Chu and then improved dirt roads northeast to Ollague. Crossing the border requires processing of paperwork on the vehicle and getting through the usual immigration and police procedures. The Bolivian railroad trunk line from Uyuni to the major Chilean coastal port city of Antofagasta passes within 28-road kilometers of the property at the Chiguana military outpost. The train does stop to pick up or discharge passengers at Chiguana. During excessive rainy periods, SAMEX would send vehicles, supplies, drilling equipment via railroad to Chiguana.

7.3.0 **<u>Proximity to Population Centers</u>** - Nearby villages of Copacabana and San Augustin, the provincial capital of Provincia Enrique Baldevieso, are six and 12 kilometers, respectively, from the property. These communities are very small and poor; probably 500 to 600 people total live in the immediate region. Most inhabitants are campesinos (peasants) who subsist by herding sheep and llamas, growing quinua (grain) in areas close to the villages, and many work seasonal jobs (during winter) in larger cities. An exploration camp has been built at the village of Copacabana which is at an elevation of approximately 3800 meters. Supplies are available in Uyuni, Bolivia, which is a four-hour drive when the Salar de Uyuni is passable (generally eight to nine months of the year) and a six- to eight-hour drive through Rio Grande, Julaca, and San Augustin during the wet season (January-March). Calama, Chile (270 kilometers) is five hours driving distance via roads which are passable all year long. The region is arid/high desert with heavy rain showers possible from late-December into February and rare winter (July-August) snow storms (30 mm/year average precipitation). Laborers for manual tasks are available, but skilled workers would have to be bought in from Potosi and La Paz, Bolivia and Calama, Chile. Relationships with both near-by villages have been good as work during periods of SAMEX exploration has been spread out between the two and the employment has been greatly appreciated.

7.4.0 Infrastructure – The Cerro Eskapa property is remote and far from established modern infrastructure of high-tension electrical lines and paved roads. Electric power would have to be bought in likely from Kilpani, or Yura, (Bolivia) hydroelectric plants which are owned by COMIBOL (Bolivian government owned mining company) and located approximately 230-airline kilometers distance. Alternatively, electric power might also be available from the vicinity of Chuquicamata, Chile (270 kilometers distance). Apex Silver announced in 2002 that they had come to an agreement to bring in electric power from Chile should their San Cristobal project be put into production. The route of the high-power lines would pass through/near Chiguana. Also, Apex Silver committed to improving the road access from Calama to their property. Adequate water for a mining operation would have to be developed from well fields tapping into the extensive aquifers beneath the surrounding low-lying pampa in the broad intermountain areas. This is the method used to obtain sufficient water for the very large mining operations at Collahuasi and Quebrada Blanca. At present, Bolivia does not have laws which govern the acquiring of rights to aquifer water.

8.0.0 PROJECT HISTORY

8.1.0 Acquisition History 1994-95 – In early 1994, South America Mining and Exploration Corporation (private precursor company to SAMEX Mining Corp.) had initiated an exploration program focused on Bolivia to generate precious-metal prospects. Attention to Cerro Eskapa was attracted by a brief description by Richter and others (1992) included in the comprehensive volume on the mineral potential of the Bolivian Altiplano and Cordillera Occidental published in 1992 as USGS Bulletin 1975. The article described a large area of clay alteration in the stratovolcano core zone and listed geochemical analytical results for surface samples with anomalous gold (to 200 ppb) and silver (to 400 ppm) accompanied by anomalous amounts of antimony (to 7700 ppm), arsenic (to 790 ppm), and lead to 3400 ppm (Richter and others, 1992). They also reported a high copper content of 15% with 30 ppm silver, 1200 ppm lead, and 190 ppm antimony from a sample of mineralization from the Eskapa copper mines on the lower part of the north flank of the stratovolcano. Open-file field notes, maps, and geochemical results of this Cerro Eskapa investigation were made available to SAMEX for examination and discussion with Dr. Norman Page and Dr. Keith Long during a January, 1994 visit to the USGS Latin America Minerals Investigation office in Tucson, Arizona (now closed). The study did not outline any specific precious-metal targets, but did recommend that the large altered area of the eroded-out, stratovolcano core zone highly warranted further exploration efforts for bulk-tonnage, precious-metal deposits. Their research had led them to the Anaconda Minerals Company geological archives housed at the University of Wyoming (Laramie, Wyoming) where they came across the short company report by geologist H.G. Officer who visited the Cerro Eskapa property in 1917 on behalf of Andes Exploration, once a subsidiary of Anaconda Mining Company. In the report, Officer obtained a very high value of gold (5.54 oz./short ton) and silver (40 oz./short ton) on one dump sample which, unfortunately, was taken from an unspecified "open-pit" location in the eroded-out stratovolcano core zone. According to the USGS-GEOBOL report and unpublished notes (dated 1990-92), no indication was given of any ownership of the property or recent exploration activity.

Cerro Eskapa became of greater exploration interest during/after a follow-up reconnaissance visit to the region on behalf of South America Mining and Exploration (precursor private company to SAMEX Mining Corp.) later in March, 1994. The conspicuous, large, prospective-appearing area of strongly clay-pyrite-altered rocks nested within the eroded-out core of the stratovolcano and scattered occurrences of numerous, silver-rich, vuggy silica outcrops, which were prospected and exploited during the Spanish Colonial era, seemed favorable indicators for the possible presence of significant precious-metal mineralization. Occurrences of high-grade, oxide-copper mineralization cutting the lower north flank of the stratovolcano, although another intriguing geologic feature, were not visited. During the 1994 field visit, the lack of road access from Copacabana into the large area of alteration and mineralized outcrop showings and no evidence of drilling or other modern exploration activity such as trenching or geophysical lines were surprising and taken to indicate that Cerro Eskapa had somehow gone unnoticed by major and junior mining companies. No evidence of existing mining concession monuments could be found and was considered encouraging. The lack of modern exploration activity was even more surprising in light of spectacular color anomaly visible from a great distance to the north and the relatively good road access connecting all the nearby communities. Old surface sampled locations and chip lines, marked by painted numbers on outcrop, were observed during the 1994 visit and determined, from questioning villagers at Copacabana, to be from the German-sponsored government field geologic investigation carried out during 1992-93. The results of this more-detailed technical investigation of Cerro Eskapa would be released the next year (1995) as an obscure open-file report with GEOBOL (Servicio Geologico de Bolivia; now SERGEOMIN) (Rios and Heredia, 1995).

After the visit, a recommendation was given to South American Mining and Exploration Corp. to attempt to acquire the ground as quickly as possible without further work because of the on-coming high level of exploration activity of competitor major mining and junior resource companies. Multimin S.A. (La Paz) had acquired a +/-2000 hectare concession over the eroded-out core zone of the Cerro Eskapa stratovolcano in May, 1995. SAMEX was able to obtain, in April, 1996, an agreement to rights to any mining operation on the property with Multimin S.A. with the stipulation that SAMEX would fund all exploration and development costs to earn a 99% interest in the property. Multimin S.A. retained a 1% carried interest. In November, 1998, the agreement was amended when Multimin S.A. ownership and carried interest were transferred to a new company El Roble S.A., a company controlled by Patricio Kyllmann, a director of SAMEX.

Importantly, at the time the property was first visited and recommendation given to attempt to acquire the ground in the eroded-out stratovolcano core zone, the geologic nature of the mineralizing system and exploration potential were not understood. The report by Richter and others (1992) was general and vaguely descriptive and did not delve much into speculating on the type and potential of mineralizing system present at Cerro Eskapa. The large altered area and widespread scattered silver-mineralized outcrop showings suggested that the eroded-out core zone might be prospective for epithermal-types of silver-gold deposits of significant size. Hence, the property was considered as a “grassroots” exploration play and it was realized much work would be needed to identify targets and advance the property to the point of possibly making a “world class”-sized precious-metal ore body discovery. Had the property already been with a history of modest or significant gold or silver production, the ground would likely not have been available to acquire.

8.2.0 Land Status History - 1997-2000 With passage of the new Bolivian mining code in March, 1997, Multimin S.A. re-staked and re-filed a new larger concession (Eskapa) well before the December 31, 1997 deadline to comply with the new regulations. During the process of staking and filing of the new Eskapa concession with SETMIN (Bolivian Government agency overlooking mining concessions), the existence of several small “nuisance” concessions was disclosed in their files. The two concessions were differently owned; overlapped over top of each other, and covered a small, but important, part of the prospective area in the stratovolcano eroded-out core zone. No evidence had ever been observed in the field of permanent monuments indicating that either of these concessions existed. One of these exploration concessions (Mi Morena) was found to be clearly delinquent on patent payments for several years and, for practical purposes, abandoned. Multimin S.A. went through the legal process of disqualifying this concession without any confrontation and clear title to it was promptly awarded to them in 1997. The other concession (La Estrella) had been owned by COMSUR S.A. since 1991 and they were contacted by Multimin S.A. several times during 1995 about the possibilities of joint venturing or optioning to-sell this concession. The inquiries were declined although COMSUR had never conducted much, if any, exploration on the ground at Cerro Eskapa. Their disinterest became apparent when the validity of their La Estrella concession was challenged because they had become delinquent when patent payments in 1997 were not made by the deadline, omissions were discovered in their original filed paperwork, and lack of surface improvement/exploration or development work as required by law on their land holding. In addition, COMSUR had staked their La Estrella concession to significantly overlap with the pre-existing Mi Morena concession, which had been now awarded to Multimin S.A. without challenge. As they had not cleared up this conflict before and had not challenged Multimin S.A. obtaining Mi Morena, Mi Morena, being older, had the better right over La Estrella and now split the latter concession into two widely separated illegal small parts. In light of these errors, the La Estrella concession was deemed invalid in the Bolivian judicial system by a series of rulings in 1997-98. After a lengthy series of appeals by COMSUR through higher courts, their concession was ruled to be invalid by the Bolivian Supreme Court in Sucre in early 1999. This final decision up-held all previous decisions of lower courts and the ground was awarded to Multimin S.A. The property boundary markers put in by SAMEX were inspected by SETMIN in April, 1999 who conveyed legal mining rights on the concession to El Roble S.A. who now held the title to the concession.

Another challenge to part of the Eskapa concession arose in April, 1999 when COMIBOL (Bolivian Government mining agency) filed an action with the Bolivian judicial system that they had two pre-existing and long-standing exploitation concessions which were still valid over a significant part of Cerro Eskapa. These two contiguous concessions were in conflict with the northeast part of the Eskapa concession and together covered a large area from the oxide-copper pebble breccia occurrences on the lower north flank of the stratovolcano to south over much of the prospective area of the eroded stratovolcano core zone. COMIBOL had never conducted any exploration or development work on the ground nor filed required yearly affidavits of the work and expenditures. No monuments existed either to indicate that COMIBOL had ever placed concessions in the area. Because of these shortcomings, their assertions of controlling the two concessions over the ground were consistently denied by a series of favorable court rulings to El Roble S.A. between mid-1999 and early 2000 and after exhausting all courses of legal actions, COMIBOL dropped their efforts (see SAMEX news releases 15-99 and 7-00). The integrity of the El Roble S.A. ownership of the large Eskapa concession was again upheld by the Bolivian legal system and the company was also awarded unspecified punitive damages as retribution against COMIBOL (which were never pursued).

8.3.0 **<u>SAMEX-International Chalice Eskapa Option/Joint-Venture Agreement - 2000-2001</u>** – International Chalice Resources (Vancouver, BC) approached SAMEX in October, 2000 with the proposal to acquire an option to earn a joint venture interest in the Eskapa property. The property had an interesting geologic setting of a high-sulfidation system with numerous zones highly prospective for precious-metal mineralization which had not been well tested by the 1999 drilling. Also, possible new targets were starting to be identified in the Breccia Area and could also be advanced to readiness for drill testing. The well-situated location of the property for possible mine development was also a positive feature.

In November, 2000, SAMEX granted International Chalice Resources ("Chalice") an option to earn up to a 40% joint venture interest in mineral operations on the Eskapa property by making payments totaling US $500,000 by November 15, 2003 (see news release 22-00). Later, SAMEX and Chalice agreed to amend certain terms of the Eskapa Property Option/Joint Venture Agreement by reducing total option payments required, to US $461,137.98, by an earlier date, February 28, 2002. Chalice completed option payments totaling US $461,137.98 by February 28, 2002 and thereby earned the right to receive, upon formation of a joint venture, a 40% joint venture interest with respect to mineral operations on the property (see news release 4-02).

The option payments from Chalice provided SAMEX with the funding to resume exploration on the Eskapa property. Exploration work pursuant to the option/joint venture agreement would be aimed at defining and testing drill targets at both the new prospective breccia zones (Breccia Area) and copper-mineralized pebble breccia bodies (the Copper Zone) on the lower part of the north flank of the Cerro Eskapa stratovolcano. This exploration work was carried out on the property during several periods: December, 2000 to March, 2001; and August, 2001 to October, 2001, and included drilling six core holes (approximately 1500 meters total) and for an expenditure of approximately $410,000 (U.S.).

Several holes completed in the Copper Zone during September-October 2001 did not encounter anything to support a nearby sulfide-mineralized source to the oxide-copper pebble breccia occurrences. The results of the deep, last, drill hole (DDH-EK-01-11), which was attempted in the eroded-out stratovolcano core zone in September-October, 2001, proved to be geologically most interesting, but did not provide an overwhelming success (only a narrow width of gold-bearing, high-grade, silver-copper-antimony-bismuth sulfosalt/sulfide mineralization).

A re-evaluation of all of the project data was conducted during 2002. With the new and technically valuable geologic information provided by DDH-EK-01-11, comprehensive new maps of geologic setting, character and extent of alteration and mineralized zones, patterns of distribution of anomalous levels of pathfinder metal, and geophysical data were prepared for the prospective area of the eroded-out stratovolcano core zone. Importantly, all old drill holes were re-evaluated in light of the new drilling information and new cross sections were constructed which revealed that very little of the target zones in the eroded-out stratovolcano core zone had been actually tested by the 1999 drilling program. The geologic setting of Cerro Eskapa now appeared to possibly be a less-eroded example of an El Indio-Tambo and/or Choquelimpie type of high-sulfidation/acid-sulfate alteration/mineralization system which contain gold-bearing/copper-silver-rich sulfosalt-sulfide mineralization as veins and hosted in hydrothermal breccia. With the appearance, for the first time, of strongly anomalous gold in DDH-EK-01-11, the possibility of encountering much-better, high grades remains a real possibility elsewhere at depth. High-priority drill sites have been chosen for testing, at greater depth, segments of five of the identified ten mineralized zones in the eroded-out core stratovolcano core zone. Several major companies (Newmont Gold, Goldfields) were approached on behalf of SAMEX/Chalice with the basic results of the re-evaluation of the data and new precious-metal target possibilities at Cerro Eskapa, but neither showed more than a "passing" interest. Both companies appeared, at the time, to have limited exploration budgets for 2002 and wanted to wait until a discovery drill intersection is made (i.e. high-grade silver(+copper) mineralization with exceptional gold content over a significant width) before they could possibly justify entertaining a joint-venture proposal on Cerro Eskapa. Both companies though expressed a strong interest to send geologic crews to visit the property. SAMEX decided that, in light of modestly rising gold prices especially during the second half of 2002, the remaining target ideas at Cerro Eskapa still warranted drilling and that funding could be successfully sought to carry out such a program.

8.4.0 – <u>SAMEX Buys-Back 40% Joint Venture Interest From Chalice – October 2002</u>

In October, 2002, SAMEX negotiated an agreement to restore its original 99% interest in the Eskapa property by purchasing-back the rights earned by Chalice under the Eskapa Property Option/Joint venture Agreement. SAMEX arranged to purchase-back this right to a 40% interest from Chalice by:

d) paying Chalice CDN $50,000 cash ($25,000 on signing and $25,000 by October 3, 2003);

e) issuing 200,000 shares of SAMEX Mining Corp. to Chalice (issued November 4, 2002);

f) granting Chalice a US $2,000,000 cash royalty, to be paid out of production on the property in eight equal quarterly payments of US $250,000 beginning after the ninth month of continuous commercial mining operations on the property.

Pursuant to the buy-back agreement, the Eskapa Property Option/Joint Venture Agreement with Chalice terminated and SAMEX now holds a 99% interest in any mining operations which may be established on the property, subject to Chalice's US $2,000,000 cash royalty (see news release 11-02).

8.5.0 Summary of Exploration History

8.5.1 Pre-SAMEX Mining and Exploration – Prior to SAMEX initiating a concerted effort to explore Cerro Eskapa, very little amount of mining and exploration appears to have taken place. Only vague summaries are given in the meager published reports (Richter and others, 1992; Rios and Heredia, 1995). Chrysocolla for jewelry/ornamental stone had been pre-historically produced from shallow pits by the Incas, but this could not have amounted to any significant production. These old copper workings on the lower north flank of the stratovolcano were then advanced into the copper-mineralized breccia bodies as several tunnels and deeper pits by villagers from San Augustin in the late-1970's to early 1980's. The villagers mining methods were crude and perhaps several small shipments of hand-cobbed/high-grade oxide-copper ore (chrysocolla-tenorite) were shipped to Calama (?) for processing. Numerous scattered piques (irregular shafts) dating back to Spanish Colonial-era (late-1500's to 1600's) are located on scattered, silver-mineralized, vuggy silica outcrops across the eroded-out core zone of the stratovolcano. These workings do not go deep and not much production is evident. The silver-lead-antimony sulfosalt minerals are encapsulated in silica and not much enriched high-grade silver-oxide mineralization was produced by supergene processes. Although the miners encountered mineralized rock with values to thousands of grams/metric ton silver, they could not process the ore by simple grinding and a crude direct roasting. No methods were available at the time for the miners to treat a sulfide-sulfosalt silver ore. Old ruins of the stone cabins and buildings from the Spanish Colonial-era activity still remain standing at the head of the Rio Huailla Uno valley. The property apparently lay idle for over several hundred years until an unknown Chilean mining concern sank a 4.0 by 4.0-meter square shaft to a depth of 45-meters. This shaft was sunk in strongly clay-pyrite and advanced-argillic altered breccia adjacent to outcropping silver-mineralized vuggy silica. Whether drifts extend off of the shaft is unknown. No production appears to have occurred as the large dump is composed mostly of pyritiferous vuggy silica rock with low, but anomalous, silver values. After this time, the property appears to have lain idle for over a hundred years. It is uncertain when the Mi Morena concession was filed (pre-1980 (?)). No indication of any exploration effort is visible and the owner, who could never be found, never paid annual patents and essentially allowed the concession to lapse. Geologists of Comsur S.A., a long-established, Bolivian lead-zinc-silver mining company visited the property in 1990-92 and staked/filed the peculiar, small, La Estrella concession at that time. Other than surface chip sampling in a few places, they never pursued conducting any significant exploration work at Cerro Eskapa such as putting in roads, trenching, drilling, running surface geophysical surveys. Hence, there was no mineral resource or reserve defined prior to SAMEX acquiring the ground.

8.5.2 Early SAMEX Exploration Work And Results - 1995-98 - From early 1995 through most of 1998, the Cerro Eskapa area was only sporadically explored in reconnaissance fashion. Work in February-March, 1995 by South American Mining and Exploration (precursor private company to

SAMEX Mining Corp.) was in-part, due-diligence in nature and included: geologic mapping, rock-chip sampling, and reconnaissance geophysical IP survey, and was limited to the central part of the prospective area of the eroded-out stratovolcano core zone where a cluster of chimneys of silver-mineralized vuggy silica rock occur. Within the time frame, the area examined amounted to approximately 1500-meters long by 800-meters across and represented only part of the prospective area. A generalized, sketch, geologic map (1:10000) was produced; 107outcrop samples were collected and sent to the Bondar-Clegg laboratory in Oruro, Bolivia for gold assays and geochemical analysis for silver, copper, lead, zinc, antimony, arsenic, mercury, and molybdenum; and four lines/approximately 5700 line meters of IP were run with some supplementary ground magnetics surveys over the same lines. Between 1996 and 1998, the property was re-visited on several occasions while conducting survey work to put in legally required concession monuments. Some additional rock-chip/dump sampling was also carried out during one of these visits in 1996 and the samples were sent to the Bondar-Clegg laboratory in Oruro, Bolivia for geochemical analyses for gold, silver, and base- and pathfinder metals. The slow pace and limited amount of this exploration effort over this time period was, in part, dictated by the lengthy time needed to resolve various disputes concerning legality of ownership of the two nuisance concessions which were encompassed by the large Eskapa concession. Also, the small exploration geologic staff was completely occupied during this time period (i.e. 1995-98) on Bolivian drilling projects at Santa Isabel, Yaretani, and Walter and conducting generative work elsewhere in the country. The limited 1995 exploration work at Cerro Eskapa, however, provided encouraging due-diligence results for justifying acquisition and found that (a) dump and outcrop samples of vuggy silica rock contain up to 388.3 (ppm) grams/metric ton silver, >1.0% lead with highly anomalous amounts of pathfinder elements: antimony (to 4.02%), arsenic (to >1000 ppm), and mercury (to >5000 ppb), locally anomalous copper (to 920 ppm), but negligible amounts of gold (most <5 ppb, few 7 up to 37 ppb); and (b) surrounding clay-pyrite altered rock consistently contains weakly to moderately anomalous values of pathfinder metals with negligible (below detection limits) values of gold and silver. The IP surveys along four widely spaced lines (5700 line-meters total/150-meter "a"-spacing) showed that the clay-pyrite alteration (low-resistivity/high-chargeability) and silicified/silver-mineralized rock (high-resistivity/mixed-chargeability) persist to great depths of likely over 300 meters. During the period 1995-98, the oxide-copper-mineralized pebble breccias on the lower north flank of the stratovolcano did not receive attention and were considered, at the time, to be more of a geologic curiosity and not likely related to precious-metal mineralization. No news releases were published concerning the 1995 reconnaissance exploration activities as South American Mining and Exploration was not publicly listed on the Vancouver Stock Exchange and did not have an intact agreement to acquire rights to mining operations on the property.

8.5.3 <u>Initial Geologic Interpretations/Target Concepts - 1995</u> - The first reconnaissance geologic mapping (1995) at Cerro Eskapa by South American Mining and Exploration geologists had interpreted that altered rocks of the eroded-out core zone of the stratovolcano to be mostly dacitic intrusive rocks. Dominant porphyritic textures, weak flow fabric (poorly aligned mafic phenocrysts), lack of thin-layered volcanic (surface) flow or pyroclastic units, no real discernable variation in phenocryst mineral content/abundance (composition) or rock textures, and local areas of domal exfoliation suggested hypabyssal intrusive rocks – perhaps as multiple intrusions as coalesced resurgent domes. Large blocks (roof pendants (?)) of dacite-andesite flows of the stratovolcano are locally preserved, but too are typically clay-pyrite altered around their margins. Strong clay-pyrite alteration and surface (supergene) weathering over a widespread area made confidently identifying rock types in many places difficult. Hydrothermal breccia was observed to be present in several areas, but the geologic nature and spatial extent of these occurrences were not worked out. Important west-northwest- and later north-northeast-trending fault zones were also recognized. The faults were observed locally to offset bodies of vuggy silica-barite rock and show indications of post-mineral/alteration movement. The clay-pyrite alteration of rocks in the eroded core of the stratovolcano is centered roughly over the intersection of these major fault directions, but appeared to be more-elongated in the direction of (perhaps controlled by) the later (?) west-northwest direction of faulting. No indication of an exposed or very shallow, large (bulk-tonnage-type) target of precious-metal mineralization was immediately evident within the limited area examined and sampled, and this somewhat dampened enthusiasm for the property. The lack of any significant (anomalous/>100 ppb) gold values in any surface samples suggested that either the system is silver rich or, if present, gold mineralization was perhaps preserved somewhere at greater depth. The presence, nearly everywhere sampled, of anomalous amounts of mercury and elevated to low-level anomalous antimony, and arsenic plus their very high values in many vuggy silica rock samples was thought to be a positive indicator that gold mineralization could and should be present somewhere within the altered area – perhaps in sectors not covered by the 1995 reconnaissance field investigation. Possible significant targets of precious-metal mineralization were concluded to be concealed and perhaps could occur as veins, stockwork veinlet/disseminated in silicified intrusive rocks and also hosted in hydrothermal breccia. High-grade vein mineralization was also considered a target possibility as the vuggy silica rock had been determined to be a fault-controlled and to cross cut the clay-pyrite-altered dacite rock.

Interestingly, the open-file report on Cerro Eskapa of Rios and Heredia (1995) was obtained in late-1995 and their geologic map of the entire Cerro Eskapa stratovolcano outlined the entire prospective, clay-pyrite-altered area in the eroded-out stratovolcano core zone to be 3000-meters long by 700- to 1700-meters across. They interpreted much differently that the eroded-out stratovolcano core zone is underlain by flat-lying, 500 meter-thick sequence of clay- and alunite-altered, thinly layered, volcanic flow and pyroclastic rocks which are cut by steep, barite-silica vein-like, silver-mineralized silica/altered zones. The mineralized zones were described to strike in a principal west-northwest direction and a subordinate north-northeast direction. Their x-ray work on alteration mineral assemblages identified alunite and a simple assemblage of clay minerals (kaolinite, montmorillonite). No exposed/shallow-positioned part of a large, bulk-tonnage-type, precious-metal target (i.e. mantos) was outlined or hinted at by their work, but their interpretation of thick-layered pyroclastic rocks occupying the eroded-out stratovolcano core zone was in much conflict with **S**outh **A**merican **M**ining and **Ex**ploration reconnaissance mapping which had interpreted the same rocks to be intrusive dacite-rhyodacite – possibly as coalesced flow domes. If Heredia and Rios (1995) were correct, this opened the possibility that mantos-replacement type of precious-metal ore bodies could be present along favorable volcanic stratigraphic interval(s).

8.5.4 <u>Jim Baughman Visit - 1997</u> - Jim Baughman, during employment as an MK Gold Corporation (Salt Lake City, UT) geologist, was invited to visit the property in September, 1997 before any systematic exploration program had been initiated by SAMEX. The visit was in-part to test whether there might be interest from gold exploration companies to joint-venture exploring the property at this early "grassroots" stage. During the two-day, hike-in visit, he pointed out features of the geologic setting at Cerro Eskapa which he considered to be comparable to those of the high-sulfidation/acid-sulfate-type system of the, then recently discovered, large, Pierina gold-silver deposit (Peru). He had, the previous year, evaluated the Pierina prospect for MK Gold before the Barrick Gold stock buy-out of owner Arequipa Resources (July, 1996) to acquire the deposit. The most prominent of the similar geologic features included: widespread and strong clay-pyrite alteration of dacitic rocks (flows) in an eroded stratovolcano (?) setting, and scattered, chimney-like outcrops of sulfide/oxidized-mineralized, vuggy silica-barite with associated advanced-argillic alteration. The Pierina deposit upon production start-up in 1999 is reported to have contained approximately +/-112.5 million metric tons of +/-2.0 grams/metric ton gold and +/-16 grams/metric ton silver (approximately 7M oz. Au and 56M oz. Ag). Most of these reserves are hosted as a gently dipping, silicified mantos replacement within a thick, permeable, tuff unit concealed at shallow to not-too-great (open-pit) depths beneath clay-pyrite-altered dacite flows. The encouraging comparison of similar surface geologic features in the eroded stratovolcano core zone of Cerro Eskapa with Pierina made by J. Baughman and the report of Rios and Heredia (1995), which interpreted the eroded-out stratovolcano core zone to be underlain by a thick sequence of layered pyroclastic units, would later strongly influence the SAMEX exploration staff to first search for a similar concealed volcanic pyroclastic (tuff) unit which might be replaced with gold-silver-mineralized vuggy silica as a mantos layer and positioned at shallow depth. The data from the reconnaissance 1995 IP survey was made available to MK Gold who had consultant geophysicist Frank Fritz (Denver, CO) evaluate and model the data. A copy of his report and the modeling diagrams were eventually sent in July, 1998 to the SAMEX office in Abbotsford, BC. Although Jim Baughman himself was encouraged about the exploration possibilities for finding a large precious-metal deposit at Cerro Eskapa, he could not convince his management to commit to a joint-venture offer at such an early exploration stage, and MK Gold declined any immediate interest in the property.

8.5.5 SAMEX Exploration Activities/Results - late-1998 - After several legal decisions in favor of SAMEX concerning their challenge to the nuisance claims (i.e. La Estrella/Comsur S.A.), financing to initiate systematic evaluation of the property was obtained in late-1998 with the objective of advancing the Cerro Eskapa property to justify carrying out an exploration core drilling program tentatively set for March-April, 1999. SAMEX exploration staff returned to Cerro Eskapa in December, 1998 and first began putting in road access from the Copacabana village to, and throughout, the prospective area of the eroded-out stratovolcano core zone (approximately nine kilometers of bulldozer-prepared road). Systematic survey work was started to produce a detailed topographic map (1:2000) of the prospective area and included putting in many control points for later use in geologic mapping, locating surface rock-chip samples, and laying out IP geophysical lines. Sampling at the end of 1998 was first focused on mineralized vuggy silica-barite outcrop showings and dumps of the Spanish Colonial-era mine and prospect workings and also included taking continuous sample chip channels across fresh outcrop variably clay-pyrite-altered dacite in new road cuts. Some 72 samples were collected and sent to the Bondar-Clegg laboratory in Oruro, Bolivia for gold assay and geochemical analyses for base and pathfinder metals. Outcrop and dump samples (26) of mineralized vuggy silica rock, commonly with coarse- bladed barite, were found to carry high amounts of silver (to 599.6 ppm), lead (to 2.31%), antimony (to 2.58%), and highly anomalous levels of arsenic (to 4798 ppm) and mercury (to 208000 ppb), but generally very low amounts of gold. These analytical results appeared in SAMEX news release 2-99. Two-thirds of the silver-mineralized samples contain gold values of <5 ppb (lower detection limit) and a third of them contain detectible to elevated levels of gold (6 to 48 ppb). Anomalous amounts of copper (102 to 920 ppm) were also found to be present in many of the vuggy silica rock samples. Although the averaged analytical values for silver + antimony + lead do not approach being possibly of economic value, especially in consideration of the relatively small size of the mineralized barite-silica rock exposures (typical widths of one to three meters), they were thought to reflect possible leakage from deeper seated, more-substantial, precious-metal mineralization. Most samples of surrounding clay-pyrite-altered rock were found to contain variable elevated (sub-anomalous) to moderately anomalous values of pathfinder metals (arsenic - 25 to 186 ppm, antimony – 14 to 180 ppm, and mercury - 25 to 2802 ppb) and several base metals (lead - 7 to 68 ppm), zinc - 4 to 108 ppm, and copper - 4 to 21 ppm). Values for silver (typically <0.2 ppm) and gold (typically <5 ppb) in clay-pyrite-altered dacite rock are very low. These initial results indicated that, for the areas sampled, high silver and pathfinder metal values are tightly restricted to vuggy silica rock and do not extend outward for any appreciable distance into clay-pyrite-altered rocks.

8.5.6 Exploration Activities – 1999-2000 – The exploration program initiated in early1999 was aimed at identifying precious-metal-mineralized targets for drilling. The work was principally conducted by a three-man Bolivian geologic staff who carried out surveying and making a detailed topographic map of the entire prospective area of the eroded-out, stratovolcano core zone, road building, and considerable outcrop rock-chip sampling. An IP survey was also run by Geoexploraciones (Santiago). Due in part to limited funds and time constraints, the project did suffer from inadequate geologic mapping and especially compiling and integrating the geologic, geochemical, and geophysical data into an interpretable cohesive picture with respect to drilling targets.

8.5.7 <u>Exploration Work And Results – Early 1999</u> - After the Christmas-1998/New Years-1999 Holiday break, road access was extended over the entire prospective area in early January, 1999. The entire road network on the property now totaled over 18 kilometers and, although considerable, was deemed necessary for facilitating survey work, geologic mapping and future ease of moving equipment for carrying out planned geophysical IP surveys, and as a bonus, created much new good outcrop exposure useful for delineating geologic relationships and for rock-chip sampling. To further aid geologic mapping and sampling, a set of five, widely spaced, bulldozer trenches totaling 2250 meters were cut across the central part of the prospective area. During January and into March, 1999, an additional 347 rock-chip samples were collected mostly from along the new road-cut and trench exposures. These samples were sent to the Bondar-Clegg laboratory in Oruro, Bolivia for gold assay and the pulps forwarded to their North Vancouver, BC facility for geochemical analyses of silver, copper, lead, zinc, molybdenum, antimony, arsenic, mercury, and thallium.

As more-detailed geologic mapping progressed in early 1999, laminated and thin-layered textures were discovered in exposures of strongly fractured and clay-pyrite-altered dacitic rocks in the vicinity of the old Colonial Spanish-era quarry located near the confluence of the three prominent quebradas within the eroded stratovolcano core zone. These dacitic rocks were considered to be a possible candidate for a water-lain, volcanic (welded (?)) tuff unit which was covered in surrounding higher areas by younger, thick, dacite flow units. Other than weakly anomalous amounts of mercury and arsenic, the thin-layered dacite rock did not give any indication of being precious-metal mineralized. Perhaps, proximal to the vuggy silica ("feeder") zones, this volcanic unit could be replaced with silicification and precious-metal mineralization. Geochemical analytical results of vuggy silica-barite rock from new sample locations elsewhere continued to yield high values of silver (up to 2255.9 ppm), lead (up to 6.53%) and highly anomalous values of pathfinder metals (i.e. mercury), but mostly less-than detectible amounts of gold (<5 ppb) (see SAMEX news release 6-99). However, the sampling, now covering a very widespread area of clay-pyrite-altered dacitic rock, still did not divulge any possibly precious-metal mineralized areas other than those restricted to/collected from the vuggy silica. The clay-pyrite altered dacitic rocks were found to generally contain weakly to moderately anomalous values of mercury (>100 ppb) and elevated to low anomalous levels of arsenic, antimony, and thallium. An IP geophysical survey consisting of six long lines (using 100-meter-"a"-spacing) which total 14,100 meters was completed over the prospective area during March, 1999 by Geoexploraciones (Santiago, Chile). The IP response of the rocks allowed for the interpretive delineation of the sub-surface extent (to the limit of the +/-250-meters search depth) of strongly clay-pyrite altered rock (low-resistivity/high-chargeability), mineralized vuggy silica rock (high-resistivity/mixed chargeability), fresh to weakly altered stratovolcano andesite-dacite lavas and intrusive rocks (moderate to high resistivity/low chargeability), and oxidized clay-pyrite altered rock (low resistivity/low chargeability). Although numerous, shallow to deeper seated, "interesting" chargeability and resistivity anomalies were identified by the Geoexploraciones project geophysicist, they could not be easily related to one of the envisioned, bulk tonnage-type, precious-metal targets (i.e. concealed/shallow mantos-hosted mineralization). The 1999 geophysical IP data was also reviewed and re-modeled by Jan Klein (geophysical consultant, Burnaby, BC, Canada) who also rigorously evaluated the quality of both the IP survey work and the data generated and put forth his own list of geophysical-defined proposed drill targets.

8.5.8 Geologic Interpretations/Target Concept – Early 1999 – Although the geologic setting was considered permissive for concealed Pierina-like mantos-type target (see news release 2-99 and 4-99), this target concept became questionable as direct indication of a well-defined, shallow, bulk-tonnage mineralized layer target did not materialize from the geologic, geochemical, and geophysical investigations carried out at the end of 1998 and into early 1999. IP surveys run over strongly altered rocks of the eroded-out stratovolcano core zone did not detect or outline the possible presence of an exposed or shallow (concealed), silicified/precious-metal mineralized mantos (flat-lying tabular/high resistivity body). Despite the extensive new road cut outcrops over the entire prospective area and large number of rock-chip samples collected, no indication of a mineralized mantos layer or other possibly types of exposed or shallow, bulk-tonnage mineralization were found and sub-anomalous (>50 ppb) to anomalous gold values (>100 ppb) are completely absent in the geochemical analytical results. The low gold content of the vuggy silica rock chimneys suggested the possibility that the Cerro Eskapa alteration/mineralization system, at least at/near the surface level, could be only silver rich and made suspect the previously published anomalous to very high gold values reported in Richter and others (1992). However, these negative findings did not completely negate the Pierina-influenced primary target concept. Pyritiferous, clay-altered dacite flows, which cap the ore body at Pierina, are also largely devoid of detectible levels (>5 ppb) of gold and silver (>0.2 ppm) except in very close proximity to the gold-silver-mineralized vuggy silica mantos ore body and narrow, cross-cutting, silicified structures (veins) (Barrick geologic staff, PDAC Core Shack presentation, Toronto, 1999). The pyritiferous/clay-altered dacitic flows (cap rock) at Pierina were shown to contain similarly elevated to anomalous amounts of mercury, arsenic, and antimony as found in altered dacite at Cerro Eskapa. Perhaps mineralized mantos layers if present at Cerro Eskapa were deeper and somehow electrically masked by the pyrite-rich cap rock. The possible tuff unit outcropping in and near the Spanish Colonial era quarry might become mineralized proximal to the various vuggy silica chimneys which could be feeders. However, with no discernable, shallow, bulk-tonnage target having immerged, how to best to conduct the funded drilling program at Cerro Eskapa became an urgent concern. No time and funds were available to carry out further geologic investigations such as PIMA clay analyses, thin-section petrographic work, conduct more surface geologic/sampling/geophysical work, or obtain help from a consultant geologist with expertise in high-sulfidation systems, which might help in re-thinking the exploration targets and new strategy. A decision was made to start the drilling with the first holes aimed down across the vuggy silica rock in the stratovolcano eroded-out core zone area at locations where the highest silver values had been found to see if high-grade silver (+/-gold) mineralization could be intersected over an appreciable width. A conceptual model of precious-metal deposition in epithermal systems by Buchanan (1981) suggested that silver-sulfosalt mineralization without gold might be present above deeper levels of gold deposition. The possibility was thus considered that significant gold values could therefore still appear at depth. The drill holes would also search for possibly bulk-tonnage, disseminated/veinlet, and mantos type, precious-metal mineralization hosted in altered porphyritic dacite wall rock positioned proximal to the vuggy silica rock and which was not detected by the IP surveys.

8.5.9 Core Drilling Program/Basic Results - 1999 – Funding was raised for exploration core drilling at Cerro Eskapa in early 1999 to attempt ten to twelve holes – each of moderate depth (200 to 300 meters). The drilling was planned to start in late-March, 1999 and a contract had been signed with Exploration Core Drilling S.R.L.-FJT ("Fujita Drilling" - La Paz) earlier in the year to carry out the job. The first holes were designed to be inclined and aimed to test the down-dip continuation of the vuggy silica bodies/veins and cross a significant width of the surrounding clay-pyrite altered wall rock. This strategy was applied for most holes; only DDH-EK-99-04 and -08 however would be oriented vertically. The core drilling program (10 holes – HQ diameter) was then carried out from March through June, 1999. Drilling of all holes progressed rapidly as the clay-pyrite-altered, porphyritic dacite rock proved to be soft, easily penetrated, but also competent with excellent core recovery. Most holes did not encounter any significant faulting or highly fractured/broken-up intervals of long length. Thus, core recovery was generally excellent (>95%) throughout most holes. All holes were logged at 1:100, split entirely with a diamond-bladed saw, and continuously sampled at variable lengths (0.5 to 3.0 meters) dependent on geologic and mineralized features. Samples of split core from the holes were sent to Bondar-Clegg laboratory in Oruro, Bolivia for sample preparation procedures and gold assay analyses; pulps were then forwarded to their North Vancouver, BC facility for geochemical analysis (atomic absorption) of silver. Only split core from DDH-EK-99-01, -02, -03, and -08 was geochemically analyzed for the useful suite of base (copper, lead, zinc, and molybdenum) and pathfinder (antimony, arsenic, mercury, and thallium) metals. From observations during core logging, the project geologist interpreted that most of the holes had successfully penetrated through and tested the intended down-dip targeted interval of mineralized vuggy silica rock. The geochemical analytical results for these holes show that anomalous to high silver values are restricted only to the vuggy silica rock in DDH-EK-99-02 and a narrow interval of sulfidic silicification of hydrothermal breccia in DDH-EK-99-01. No significantly anomalous silver values appear in core samples from DDH-EK-99-03. Although abundant pyrite is present throughout these holes, careful follow-up re-examination of the core could not find any silver sulfide/sulfosalt minerals other than within the above two mentioned restricted occurrences. DDH-EK-99-04 was planned to test a high-chargeability/high resistivity IP anomaly after a recommendation by Jan Kline and indeed made an intersection through silver-mineralized vuggy silica rock, but at a very high elevation. DDH-EK-99-08 penetrated through numerous intervals of spectacular-appearing hydrothermal breccia, but without interesting precious-metal values. None of the other holes intersected silver-mineralized vuggy silica or sulfidic-silicified rock.

The results of the 1999 drilling program were overall disappointing as no indication of a shallow (<100-meters deep), large, precious-metal mineralized mantos or stockwork/silicified types of bulk-tonnage targets were found proximal to any of the vuggy silica-barite rock in areas tested (see SAMEX news releases 8-99 and 9-99). Also, the several drill intersections obtained through mineralized vuggy silica are too low grade for silver to consider economic and lacked any significant gold content. Wall rock proved to be massive, pyritiferous, variably clay-altered porphyritic dacite with weak flow textures and was interpreted to represent very thick flow (volcanic) units. Long lengths of this rock in all of the holes are barren of any precious-metal content. Hydrothermal breccia was intersected in DDH-EK-99-05, -07, and -08, but did not contain any precious-metal values. Overall, the drilling was interpreted by the project geologist to show that the zones of vuggy silica rock and related strong alteration, in many places, necked down or pinched out completely by vertical depths of 150 to 200 meters and did not contain any silver and/or gold mineralization where intersected. Silver-rich mineralization, which was intersected in DDH-EK-99-01, -02, and -04, is shown by analytical results of short-interval samples to be tightly held within relatively narrow to moderately wide intervals (3.5 to 11.0 meters, true width) of vuggy silica/sulfidic-silicification within structurally controlled vein-like zones or hydrothermal breccia and with associated advanced-argillic alteration (i.e. crystalline bright pink alunite and white clay minerals). In comparison, the average silver content of samples of vuggy silica-barite rock collected from the surface/shallow mine workings is 367.3 grams/metric ton; while the intersections of around 150 meters (hole depth) in DDH-EK-99--01 and -02 average only 42.0 grams/metric ton-silver. This silver mineralization was found via examination of a few polished sections by an ore petrologist SERGIMIN (La Paz, Bolivia) in both surface and core un-oxidized samples (from DDH-EK-99-02) to be stephanite and possibly other (unspecified) silver-antimony-lead sulfosalt minerals typically as late-stage in-fillings of vug sites and along fractures (oral communication, 1999). The silver mineralization thus appeared to be introduced after vuggy silica alteration. The surface samples of vuggy silica with high-grade silver, which were also examined, did not show much effects of supergene alteration or enrichment and suggested the sulfosalt mineralization was also hypogene. Hence, the drilling results seem to show that silver values within the vuggy silica bodies diminish downwards but with a corresponding discernable increase of some base metals (i.e. copper).

Very weak indication of possibly deeper or nearby gold mineralization was suggested by the appearance of numerous detectible/sub anomalous gold values in several holes (i.e. DDH-EK-99-02 and -08). Such subtle, low-elevated values of gold were seldom found in surface samples of silver-mineralized vuggy silica collected from outcrops or mine dumps near these drill-hole locations. These surface samples all typically ran less-than detectible amounts (<5 ppb) of gold. Despite the "great-looking" appearance of silica-flooded/altered breccia with abundant, disseminated, fine-grained pyrite, and intervals of pyrite-silica veinlets intersected in DDH-EK-99-01, -03, -05, -07, and especially -08, the geochemical analytical results for silver and gold were well below levels considered to be anomalous and interesting (>1.0 ppm and >100 ppb, respectively), and thus were very disappointing. In many holes, (DDH-EK-99-01, -03, -04, -05, -06, -07, and -09), the targeted mineralized vuggy silica rock and advanced-argillic alteration halo were not intersected and were interpreted by the project geologist to simply pinch out before or be extremely narrow in the projected depth interval where they should have been crossed. However, in early June, 1999, during a geologic staff review of outcrop relationships near DDH-EK-99-05, -06, and -07 with IP results and geologic cross sections in-hand, it was subsequently determined that these holes were likely inclined in the same direction as the dip of the vuggy silica rock body targets and could not possibly have intersected their projected down-dip continuation.

Exhaustion of allocated funding caused the drilling project to come quickly to a halt at the end of June, 1999. The lack of funding prohibited compiling the data properly together, further critically evaluating the results (i.e. thorough review of all core logging/cross-section interpretations), and immediately attempting to drill a few new holes in an opposite direction to several of those which failed because of being poorly located/oriented. A possible review of all of the drilling and IP information may have led to defining new targets for some follow-up drill testing. The drilling results as they stood seemed to be quite negative. Though demonstrating the presence at depth of moderately high silver values, appearance of low-level (detectible) gold with highly anomalous values of pathfinder metals and copper in the vuggy silica rock intersection by DDH-EK-99-02; and presence of some interesting elevated gold values/highly anomalous mercury and zinc in DDH-EK-99-08, precious-metal mineralization seemed to be erratic, to narrow or pinch out with depth, and to be too low-grade for silver and without even anomalous levels of gold. This suggested perhaps only the silver-bearing, more base metal-rich root zone part of the mineralizing system is preserved. These results of the first round of drilling were perceived, not surprisingly, very negatively by investors, and were of no help in trying to seek additional exploration funds in the second half of 1999 to continue the project and attempt re-drilling or deeper drilling of the target zones.

8.5.10 <u>Evaluation Of Copper-Mineralized Area And Results - 1999</u> - As part of the exploration work carried out in 1998-99, road access was extended down into to a group of small mine workings on the upper showings of oxide-copper mineralization positioned on the north flank of the Cerro Eskapa stratovolcano. The copper mineralization is comprised of in-fillings of chrysocolla and tenorite in irregular, discontinuous/unconnected (?), series of narrow bodies of pebble breccia and along fractures and faults. The oxide-copper mineralization infilling open space between breccia clasts shows fine/delicate banding and botryoidal textures. When split open, many clasts are observed to be pervasively replaced/altered (silica-clay) and are also well-mineralized with disseminated tenorite and chrysocolla. A limited number of rock-chip and dump samples (10) were collected and sent to Bondar-Clegg (Oruro) for gold assay and geochemical analyses of silver, base and pathfinder metals. The analytical results indicated an estimated average grade of the breccia-zone ore material to be 6.82% copper with a minor silver content (14.4 ppm) and also found highly anomalous amounts of mercury (to 25980 ppb). No gold was detected (>5 ppb) in any of the samples. Widths of the pebble breccia bodies at/near the surface range from a half to one meter, and their individual lengths traceable along the surface for 100 to 200 meters. The bodies comprise a curving "north-striking" trend that could be traced northward for +700 meters before disappearing below Quaternary cover. Over this distance northward with decreasing surface elevation, the pebble breccia bodies increase in width with depth to over two meters and become more-strongly oxide-copper mineralized. These dimensions roughly suggested approximately 350,000 metric tons of oxide-copper ore pre-mining resource (target) with an average grade of 5% to 7% copper might be present down to the pampa level (elevation) of the Quaternary cover. In a southward direction and increasing surface elevation up the ridge and toward the eroded stratovolcano core zone, the pebble breccia bodies disappear, but oxide-copper mineralization is present in places along multiple directions of fractures and faults. This might suggest that the fracture-controlled mineralization is a high-level expression of the continuation as deeper seated, oxide-copper mineralized, pebble-breccia bodies. Alteration over a large area in the vicinity of the pebble breccias appears as a subtle color change and oxidation effect in dacite flows which has produced hematitic iron-oxide minerals from alteration of biotite and hornblende, clay minerals and weak bleaching/silicification. Proximal to the pebble breccia, clay alteration and silicification (as chrysocolla) along fractures increase. Lack of a strong clay alteration and no stockwork veining in surrounding rocks suggests the pebble breccia is a (very) high-level feature and does not necessarily indicate close proximity of a possible source (ex. porphyry copper intrusion). The botryoidal and delicate banding textures of the oxide-copper mineralization are more characteristic of epigenetic deposition via hot springs-like, aqueous fluids/vapors migrating up and into/along the pebble breccia zones. Hence, the copper mineralization was perceived as possibly being derived via late-stage hydrothermal scavenging and remobilization from a more-distal (?) porphyry copper source. Pebble breccias are typically associated with porphyry copper deposits (ex. El Salvador, Chile) (Gustafson and Hunt, 1975). The pebble breccias at El Salvador commonly are associated with later latite dikes, which are interpreted to have encountered connate waters causing explosive (steam) flashing to produce the brecciation, and importantly are tourmalinized. They represent a high-level feature from late-stage, "de-gassing" of deep-seated, post-ore (?), porphyry intrusion(s). No late intrusive dikes or tourmalinization have been observed associated with the pebble breccias at Cerro Eskapa, but their presence and mineralized nature raise questions concerning the source of the copper and possible relationships to the high-sulfidation system emplaced into the stratovolcano core zone.

8.5.11 <u>Property Visit And Drilling Program Evaluation/Jerry Rayner – 1999</u> – Consultant geologist Jerry Rayner (Vancouver, BC) visited the Cerro Eskapa property during the end of June, 1999 for a three-day period to review both the drilling results and the geologic setting/surface mineralized exposures of the eroded-out stratovolcano core zone. The last hole DDH-EK-99-10 had just been completed, when he arrived on the property. A general field review was completed in one day and he was very impressed with the surface mineralized features (i.e. vuggy silica rock and oxide copper-mineralized pebble breccia) and large spatial extent of the clay-pyrite alteration in the eroded-out core zone at Cerro Eskapa. The alteration system appeared to him to be very large and highly prospective for precious-metal mineralization, but at a high level in the system. Split core of many of the drill holes was laid out for his review and some spot samples were taken by him for geochemical re-analysis and ore microscopic examination in Vancouver. He also pointed out that something was possibly amiss with the geologic interpretation in cross section for some drill holes (i.e. DDH-EK-99-05, -06, and -07) and concurred that these may not have tested the intended vuggy silica rock target. His opinion was based, in-part, on the doubt that such thick vuggy silica rock and associated wide advanced-argillic alteration halo, as exposed at the surface, would abruptly pinch out over such a short depth extent. A peculiar oxidation of parts of the thick vuggy silica intercept in DDH-EK-99-02, which locally converted all sulfide minerals to iron oxide, was observed. This possibly reflected a late-stage, low-temperature, hypogene alteration event which could have scavenged some/most of the silver content in the affected areas and explained the diminishment in silver values of the vuggy silica intercept. He felt that SAMEX should not be discouraged by the initial drilling results and that further exploration work was warranted and that many more holes might be needed to successfully penetrate down across the various vuggy silica rock and breccia bodies before a precious-metal deposit(s) would be discovered. The published report (Richter and others, 1992) of the sample with high-grade gold mineralization attracted his curiosity and some time was spent examining the Spanish Colonial-era cantera (quarry) and surrounding area near DDH-EK-99-08. This seems to be the only "open pit" which would seem to possibly match the vague description of Officer (1917) given in Richter and others (1992) for the location of the dump sample with the reported exceptionally high gold content. Jerry Rayner speculated that for such an excavation, the prospectors had encountered something of great interest and recommended that a back-hoe shovel be bought in to clean out the floor of the pit and then channel samples be taken across the new exposures. None of SAMEX surface samples, or those by investigative survey studies, from the quarry walls and nearby quebrada exposures contain more than very low-level detectible gold values (>5 ppb). The highly fractured and clay-pyrite altered rock and local presence of cross-cutting silica-breccia veins and micro-breccia could maybe indicate one of the narrow silica-breccia structures is uniquely (?) high-grade, gold-bearing and that the prospecters tore up the area trying to follow it and search for others. However, additional sampling of outcrops around the quarry walls and from the dump with Mr. Rayner did not yield a gold value greater than 10 ppb. A brief time was also spent with Mr. Rayner examining the oxide-copper mineralized pebble breccias. He suggested that perhaps consideration should be given to exploring them via drilling and also IP surveys to determine if a possibly larger, more-significant and extensive, high-grade, copper oxide and/or sulfide mineralization could be found. After the visit, the camp facilities were immediately closed and all exploration work ceased at Cerro Eskapa. Mr. Rayner later gave a verbal follow-up of polished-section/petrographic examination of some samples which tentatively identified stephanite, a tennantite-like mineral, and possibly other complex silver-bearing sulfosalt minerals. No further diagnostic x-ray or chemical analyses of these minerals were undertaken.

8.5.12 <u>Property Evaluation/Bruce Harvey Visit - 1999</u> - A four day-long visit to the property in October, 1999 with Bruce Harvey (Newmont Gold), who is currently chief geologist at Yanacocha (Mining) District (Peru), was helpful in better interpreting the drilling results at Cerro Eskapa with respect to the geologic setting and nature of the mineralizing/alteration system. The visit came about after a summary technical report of the Cerro Eskapa exploration 1999 drilling program had been forwarded to him in approaching Newmont Gold about any possible interest they might have in Cerro Eskapa and other SAMEX gold exploration projects in Bolivia. Newmont Gold had acquired the Kori Khollu open-pit mine near Oruro, Bolivia when they took over Battle Mountain Gold Company in 1999. Hence, Newmont Gold controlled an on-going mining operation and might be interested in gold exploration projects in Bolivia. Bruce Harvey is a corporate senior geologist, long-employed by Newmont Gold, and is very experienced in gold exploration in the high-sulfidation/acid-sulfate geologic settings and systems. He had spent several years participating in exploring and drilling out ore reserves and exploring Yanacocha District and has visited many of the important gold deposits of the Cordillera Occidental in Peru, Chile, and Argentina. At the time, Bruce Harvey was looking for investment opportunities with junior exploration companies for Newmont Gold and he accepted the invitation to visit Cerro Eskapa. Preparing for his visit provided the opportunity to start to better organize the surface geologic map and drilling data and begin to better evaluate both the geochemical analytical results for surface sampling and drilling. Important points and ideas derived from observations and discussions during Bruce Harvey's visit to Cerro Eskapa are presented below in list form.

(1) <u>Geologic Setting</u> - The geologic setting of the eroded-out stratovolcano core was demonstrated from features in outcrop and core of most drill holes to be dominantly porphyritic, hornblende-biotite dacite/rhyodacite intrusive rocks as initially mapped/interpreted by SAMEX in 1994-95. Such hypabyssal porphyritic intrusive rocks are commonly emplaced as flow domes during late-stage, resurgent igneous activity in the throat area of the stratovolcano. No layered, volcanic (tuff or flow)

rocks could be confidently identified in drill core or anywhere in outcrop, including the area of the old Spanish Era quarry near where drill hole: DDH-EK-99-08 is located. The laminated porphyritic rocks at this latter location could be shown without doubt to be porphyritic, flow-textured, hypabyssal intrusion. Much doubt was therefore cast on the geologic map/cross sections of Rios and Heredia (1995) which show a 500-meter-thick, layered sequence of tuffaceous pyroclastic rocks to occupy the eroded-out stratovolcano core zone. If any tuffaceous or pyroclastic/fragmental rocks had been deposited related to the resurgent emplacement of the dacite flow domes, they were now long eroded off. Some capping late volcanic flows of unaltered porphyritic dacite or andesite are locally preserved, as are blocks of unaltered andesite flows of the stratovolcano. Hydrothermal breccia was observed in core and outcrop to cross cut the intrusive rocks and to be steeply dipping suggesting likely structurally controlled along faults. Breccia and multi-breccia reflected at least several, closely spaced, explosive eruptive events. Later replacement by vuggy silica rock and sulfidic silicification with high silver content and anomalous amounts of base and pathfinder metals indicate that the breccias were emplaced pre-mineralization. Clay-pyrite alteration affects a widespread area and was found to increase in intensity toward zones of advanced-argillic alteration and vuggy silica development. Porphyritic dacite in some areas is little altered and plagioclase and mafic phenocrysts remain fresh, although considerable disseminated pyrite may still be present. Several directions of major faults were observed in the field and are well-defined by physiographic features (valleys, saddles) on the topographic map. The two principal fault directions are conspicuously north-northeast-striking/westward and west-northwest-striking/northward (?)-dipping. The distribution of faults on the geologic map reflects these two directions, but also suggests an almost fan-like/half-radial pattern from almost north-south to southeast direction. Hydrothermal breccia and silver-mineralized vuggy silica rock appear to occur only along the west-northwest-trending structures. The offset of the various mineralized zones suggests an episode of faulting along north- to northeast-trending structures is later. Importantly, some of the structures trending east-northeast are also the focus of clay-alteration, silicification, and highly anomalous amounts of mercury.

(2) Nature of Mineralizing System - The likely high-sulfidation/acid-sulfate character of the alteration/mineralizing system at Cerro Eskapa was thought to be the correct interpetation based on the haloes of strong advanced-argillic alteration with pink and white alunite, development of silver-mineralized, vuggy silica-barite rock, and widespread presence of abundant pyrite in both clay-and advanced-argillic altered rocks. No enargite (-family) minerals diagnostic of acid-sulfate system have yet to be identified in sulfide-mineralized vuggy silica rock, but these could certainly prove to be present at greater depth. The widespread presence of anomalous values of mercury, arsenic, and elevated to anomalous levels of antimony and thallium in samples of clay-pyrite altered rocks, and high-silver and strongly anomalous values of mercury, antimony, lead, copper, and arsenic in vuggy silica-barite rock and some of the hydrothermal breccia demonstrate the potentially strongly precious-metal mineralized and large size of the system. The silver: gold ratio of high-sulfidation/acid-sulfate deposits can range from very high (ex. La Coipa Ag:Au 98:1), high (ex. Choquelimpie Ag:Au = 25:1) to low (ex. El Indio Ag:Au 8:1) to nil (ex. Tambo Ag:Au 1:1) (Davidson, 1991). Both separate gold-rich and silver-rich ore bodies can be present within the same district (ex. La Coipa). With surface sample geochemical analytical results in hand, Cerro Eskapa was thought, at the time of the B. Harvey visit, to maybe represent a silver-rich (deeper part of (?)) high-sulfidation/acid-sulfate system with possible gold and copper credits at greater depth. This would make Cerro Eskapa the only substantiated example of this highly sought after type of alteration/mineralization system, with potential to host significant precious-meal mineralization, in the Cordillera Occidental of Bolivia.

(3) Significance of Vuggy Silica Chimneys - Similar outcropping vuggy silica-barite chimneys at Pierina were described by Bruce Harvey as occurring along faults and at fault intersections of more-extensive linear mineralized/silicified zones. The chimneys at Pierina are interpreted differently by

geologists to occur below and/or above the position of the mantos ore body depending on erosional level. Hence, in structurally down-dropped parts of the deposit, chimneys are above the ore body and represent leakage upward from a deeper interval of ore deposition related mantos replacement by silica with deposition of precious-metal sulfide mineralization. Geologists of Barrick Gold, at the 1998 PDAC meeting in Toronto displayed pictures of vuggy silica chimneys identical in appearance to those at Cerro Eskapa. They also presented geologic cross sections of the Pierina ore body which depicted all of the vuggy silica-barite chimneys to consistently be positioned above the mantos ore body; and that a feeder zone of different (veined and brecciated (?)) character was situated underneath the mantos. According to Henry Marsden former exploration geologist for Newcrest Gold in South America (personal communication, 1999), some chimneys in up-thrown structural blocks at Pierina are, to him, possibly below the projected position of the mantos ore body which would be eroded away in these areas. Hence, some chimneys could represent deeper seated structural pathways (feeder zones) below the mantos. Based on the lack of gold, high silver, lead, and antimony values plus presence of anomalous copper, Bruce Harvey thought that the vuggy silica chimneys at Cerro Eskapa are below the level of any possible mantos layer or other type of gold-mineralized body and must represent a deeper seated feature, possibly as relict, silver/base metal-rich, feeder zones.

(4) Importance of Hydrothermal Breccia - The nature of hydrothermal breccia outcropping as clay-pyrite-altered bodies, vuggy silica chimneys and also intersected in some of the drill holes was considered very interesting. Bruce Harvey pointed out the similar textural character of the breccia from place to place in outcrop and in different drill intercepts over the prospective area; and suggested they all formed from the same explosive volcanic event(s). In many, but not all, places, silver-mineralized vuggy silica rock was shown to have replaced the hydrothermal breccia. Thus, the observed relationships suggested that the explosive phreatic events that produced the hydrothermal breccia were followed by the invasion of fluids and vapors which produced vuggy silica rock and associated advanced-argillic/argillic alteration envelopes, and introduced mineralization. The hydrothermal breccia was considered to possibly be an important host rock at depth for precious-metal mineralization because of its permeable and porous nature (i.e. conduit for invading mineralizing solutions and favorable host rock) and potential for hosting larger, bulk-tonnage, precious-metal ore bodies. Hence, perhaps future thinking by SAMEX should be directed along the lines of evaluating the breccia bodies for outlining exploration drill targets.

(5) Spatial Relationships Of Alteration and Distribution of Pathfinder/Base Metals In Core – Specific time was first spent on reviewing the split core in the drill hole DDH-EK-99-02 with core logs and geochemical analytical results in hand. DDH-EK-99-02 made the best (and a complete) intersection through mineralized vuggy silica/sulfidic-silicified rock. The vuggy silica rock in the intersection is hosted in clay-pyrite altered, massive porphyritic dacite and is surrounded by a distinct advanced-argillic alteration selvage with appearance of pinkish alunite that extends outward in the hangingwall and footwall for approximately ten meters. Geochemical analytical values over long core lengths of clay-pyrite-altered wallrock for arsenic, mercury, lead, and zinc are at anomalous levels, and antimony and thallium are at distinctly elevated to low-anomalous levels. Values for silver, lead, copper, and barium, in addition to mercury, arsenic, antimony abruptly attain high (anomalous) levels within the vuggy silica rock. The distribution of pathfinder and base metals in drill core might importantly reflect a characteristic, coherent, geochemical zoning (halo) in clay-pyrite-altered porphyritic dacite which is concentric to the vuggy silica rock. Anomalous levels of some pathfinder and base metals in the halo are typically higher in core (i.e. lead, zinc, and arsenic) and suggest supergene depletion of these metals at/near the surface. Values of pathfinder and base-metal elements tend to stay strongly anomalous levels to the bottom of the drill hole (to depths of +200 meters) and do not suggest proximity to the lower part of or being below the mineralizing system. The distribution of pathfinder and base metals also suggested their introduction into wall

rock is related to the same mineralizing event(s) which emplaced the high amounts of silver, lead, antimony, and mercury into the vuggy silica rock. Unfortunately, budget limitations had prohibited analyzing core for most holes (DDH-EK-99-03, -4, -05, -06, -07, -09 and -10) for the potentially useful pathfinder elements and base metals. However, in comparison to DDH-EK-99-02 and DDH-EK-99-08, analytical results of base and pathfinder metals for DDH-EK-99-01 suggested this hole and nearby DDH-EK-99-03 were drilled entirely in the footwall parallel and distal to the intended silver-mineralized, vuggy silica rock target.

(6) Re-Interpretation of First-Round Drilling Results – The split core of many of the other holes was also laid out for examination and comparison with geochemical analytical results, core logs, and interpretative geologic cross sections of the holes. One glaring possibility that became quickly apparent was, that those holes, which did not intersect mineralized vuggy silica rock because the zone had been interpreted to pinch out or narrow drastically with depth, were likely oriented/inclined in the same down-dip direction of the target and could not have made the intended intersection as depicted on original cross sections. These holes included: DDH-EK-99-01, -03, -05, -06, -07, and -10. This conclusion arose from DDH-EK-99-02, which shows that the width of vuggy silica and outward extent of advanced-argillic and strong clay-pyrite alteration gradually increases with depth, and is surrounded by a wide halo of anomalous pathfinder and base metals. A faulted-up intersection through mineralized vuggy silica rock (similar to DDH-EK-99-02) was also made by DDH-EK-99-04 which also supported down-dip continuation. Review of IP results found that the high-resistivity expression of vuggy silica rock near many of the holes (i.e. DDH-EK-99-01, -03, -05, -06, and -07) persists to great depth without pinching out and should have been intersected if the hole had been properly located and oriented. Errors were found in logging the core which contributed further to misinterpreting the drilling results. In drill holes DDH-EK-99-05 and nearby DDH-EK-99-07, the contact between hydrothermal breccia and clay-pyrite dacite was observed to irregularly run nearly parallel (in and out) to the core axis indicating a steep northeasterly dip in nearly the same inclination and direction as the hole. Field review found that the surface outcrops of vuggy silica/breccia indeed might dip northeastward; yet the drill logs/cross section of DDH-EK-99-05 and nearby -07 incorrectly depicted the vuggy silica to dip southwesterly cutting multiple, gently dipping layers of breccia. Hence, these holes were drilling down the outer margin of the hydrothermal breccia and could not have intersected the silver-mineralized, vuggy silica-barite rock (target) occupying the central (core) area of the breccia. Other cross sections may have also incorrectly interpreted the drilling results (i.e. DDH-EK-99-01, -03, -06, -08, and -10). One discrepancy noted was that numerous intervals of hydrothermal breccia intersected in vertical drill hole DDH-EK-99-08 were found to be steeply dipping (acute-angle contacts preserved in split core) and not gently dipping stratigraphic units as interpreted in the drill logs and presented in cross section. Hence, it became apparent that some of the drill holes had not tested the intended target and had been misinterpreted in geologic cross sections prepared by the project geologist.

(7) Geochemical Relationships - Rock-Chip Sampling - During Bruce Harvey's field visit, maps showing spatial distribution of geochemical analytical results for pathfinder elements (mercury, arsenic, and antimony) content of surface rock-chip samples were started for the prospective zone of the eroded stratovolcano core zone. Only the map of mercury values was completed via hand plotting during the time of his visit and could be reviewed. A map interpretive pattern for distribution of anomalous mercury emerged with widespread areas of anomalous values (>100 ppb) in clay-pyrite-altered rock which are transected by at least nine, long, linear zones with very anomalous (>1000 ppb) to extremely high values (>10000 ppb). Geologically, the very high values of mercury occur in (a) silver-lead-antimony mineralized, vuggy silica-barite zones and associated surrounding advanced-argillic alteration halos, (b) variably clay-pyrite to silicified hydrothermal breccia bodies in the west-central part of the prospective area, and (c) silica-clay-pyrite-altered porphyritic dacite as east-northeast to north striking zones in the north part of the prospective area.

The map distribution of highly anomalous mercury values appears to form linear zones which fan out in a north-northeast to dominantly southeast direction. A west-northwest-trending linear orientation is most pronounced and suggests that faulting in this direction may be the most important structural control in the south part of the prospective area. Many of the linear zones of highly anomalous mercury are also well-defined by a strong high resistivity/mixed chargeability response on pseudo-sections where crossed by IP survey lines. The linear zones were numbered using Roman numerals from I to X from south to north direction. Several of the zones have demonstrable strike lengths of more than two kilometers. Of note, linear areas of low or much-depleted values of mercury in altered dacitic rocks appear to correlate to the position of post-mineral fault zones and may be caused by preferential strong supergene leaching along zones of intense fracturing/shearing. The results of this effort suggested that plotting other pathfinder metals (i.e. arsenic and antimony) was also warranted to compare to the mercury map. The maps for arsenic and antimony distribution were completed later after Bruce Harvey's visit and they show essentially identical locations of the linear patterns of high values which correlate to the position of vuggy silica-barite zones and to a lesser extent hydrothermal breccia.

(8) <u>Target Concepts</u> - Within context of the better understanding of the geologic setting from reviewing the drilling data and surface geologic relationships, possible precious-metal target/deposit types postulated to search for include: large breccia pipes/bodies replaced with vuggy silica and sulfidic silicification, stockwork silica-sulfide veining, and structurally controlled linear-trending sulfide veins and sulfide-mineralized breccia zones. The newly defined linear zones, anomalous in mercury, arsenic, and antimony, coincide with alignment of scattered outcrops of vuggy silica rock, which locally also contain high silver and lead, mark structurally controlled mineralized zones perhaps still worthy of deeper drill testing. The possibility of preserved mantos-hosted mineralization in layered volcanic rocks (similar to Pierina) was firmly dismissed as not a possibility at Cerro Eskapa. If a gold-mineralized mantos ever existed (which is doubtful), it would have occurred in higher level volcanic pyroclastic rocks which are no longer present having been eroded off and the vuggy silica rock chimneys would represent deeper seated feeder zones positioned below the level of possible gold deposition. This, to Bruce Harvey, would satisfactorily explain the low gold and high silver and base-metal content of the vuggy silica rock as being indicative of a more deep-seated feature of the mineralizing system. This interpretation implied that the eroded out stratovolcano core zone would not be prospective for gold-bearing deposits and would cause SAMEX to re-think their exploration strategy and force considering searching other parts of the property position for areas where higher level geologic setting prospective for gold mineralization might still be preserved.

(9) <u>Summary – New Geologic/Target Model</u> - The picture that evolved from these observations and discussions (1 through 8) is that the Cerro Eskapa stratovolcano was the focus of late-stage, resurgent intrusive activity with emplacement of a dacite-rhyodacite flow dome(s) and explosive formation of considerable hydrothermal breccia along west-northwest structures. The breccia zones provided the principal pathways for the invasion of early acid fluids/vapors which produced the widespread clay-pyrite alteration, zones/bodies of vuggy silica rock and advanced-argillic alteration, and later deposited silver-lead-antimony sulfosalt-sulfide mineralization. These geologic events probably occurred in close succession. The half-radial map pattern of structures defined by the vuggy silica rock and hydrothermal breccia along west-northwest- to northeast-trending structures combined with the alteration/silicification along the northeast-trending faults suggested the fluids/vapors might have emanated upward/outward from a central focal point (possibly a breccia pipe (?) and/or related deeper seated, mineralized, porphyry-copper intrusion (see Gammons and Williams-Jones, 1997)). At the level of surface exposures, the breccia and fault zones tightly control the vuggy silica, advanced-argillic alteration and silver-rich, lead-antimony-copper-mercury-arsenic sulfide mineralization. Away from the zones, alteration and anomalous levels of pathfinder metals gradually

decrease, but silver/base-metal values drop off very abruptly. The widespread extent of the hydrous alteration, pyritization, and anomalous levels of pathfinder and base-metal elements, and downward increase in copper content of vuggy silica zones, suggest a possible deeper seated porphyry copper intrusion source. The strong mercury, arsenic, lead, and zinc content of the clay-pyrite altered rock may comprise the outlying (distal) metalliferous halo to this porphyry-style copper mineralization which could occur as possibly thick, high-grade, copper sulfide (enargite-chalcopyrite) veins and disseminated/veinleted host rock of altered porphyry intrusion and hydrothermal breccia (Gammons and Williams-Jones, 1997). The latter interpretation is supported by copper values in vuggy silica, which at the surface are commonly only weakly to moderately anomalous, typically between 140 to 560 ppm (locally up to 920 ppm/+/-200 ppm, average); while at depth in DDH-EK-99-02, the vuggy silica intercept averages 1370 ppm over the 11.0 meter true width - a six-fold increase in the average copper content. A six-meter sub-interval (156.0 to 162.0 meters) of 4.75 meters true width in DDH-EK-99-02 averages 3477 ppm copper (with 46 grams/metric ton silver and trace detectible amounts of gold). Well-mineralized porphyry copper intrusions have been found with deep drilling beneath Yanacocha (see Newmont Gold news releases) and are said to be spatially associated with the Pierina (David Lowell, personal communication, 1998) and possibly are present below the El Indio-Tambo District deposits (Jannas and others, 1999). Hence, the remaining target possibilities within the prospective area of the stratovolcano eroded core zone at Cerro Eskapa were reduced to whether appreciable amounts of high-grade, copper-silver-sulfosalt/sulfide mineralization with important gold content occur at greater depth along the numerous mineralized vuggy silica and hydrothermal breccia zones. Any possibility for a shallow/open-pit, bulk-tonnage-type target in the eroded-out stratovolcano core zone appeared to be certainly eliminated.

(10) Other Target Possibilities On The Property - Bruce Harvey stated that the large size and extent of the alteration/mineralization system at Cerro Eskapa certainly warranted continued exploration for precious-metal deposits especially in new areas. The results obtained by the exploration work were, so far, disappointing because no evidence (surface sampling and drill intersections) was obtained which demonstrate the system might be significantly auriferous and shallow-depth targets might be present. He proposed that perhaps the prospective area explored in the eroded stratovolcano core zone is up-thrown by faulting and vuggy silica chimneys represent the roots/feeder zones to higher level, more-extensive, gold (?) and silver-rich, mineralization (now eroded away). A full day was spent by Bruce Harvey and his Peruvian geologist traversing the area of "agglomerate" and hydrothermal breccia at lower elevations along the north face of the ridge running along the south side of the central drainage leading into the eroded-out core zone of the stratovolcano. The observed geologic relationships to him indicated that perhaps the level of alteration in the system in this area is much higher and little eroded. Thus, the area of altered "agglomerate"/breccia deserved further exploration attention for evaluating whether possible silver-gold ore bodies (targets) are present at not-too-great depths.

(11) Opinion of SAMEX Exploration Efforts - Bruce Harvey was complimentary and thought that the small SAMEX staff had completed a considerable amount of exploration work in advancing the large property and carrying out the initial drill testing - especially considering the relatively low amount of project expenditures. To evaluate and define drill targets on such a large area as Cerro Eskapa would normally, for a major company such as Newmont, be a larger-expenditure/better-staffed/long-term exploration undertaking. The lack of technical experience of project exploration staff specific to high-sulfidation types of precious-metal systems/deposits was a draw back. Not having the time/funds to be able to critically better evaluate surface geologic features, geochemical analytical results on surface samples, and properly incorporate IP survey findings made carrying out a successful first-round drilling project more difficult. The incorrect locating/aiming of drill holes could perhaps have been avoided with more careful planning, or curbed with correct geologic interpretations as holes were being completed. Had all of the holes been properly oriented and

intersected the vuggy silica rock target zones, the first-round drilling results may have turned out much differently.

(12) Conclusions - After the review, Bruce Harvey recommended to Newmont Gold to decline any interest in the property, but implied they might monitor or welcome being informed about any future exploration results. The widespread distribution of significantly anomalous base and pathfinder metals in the eroded-out stratovolcano core zone did not sufficiently impress him. From his experience and knowledge, he could remember only a few drilling discoveries of significant gold deposits in hot springs- and Carlin-types of geologic environments (i.e. Nevada) where only strongly anomalous levels of pathfinder elements (i.e. mercury, arsenic, and antimony) with no gold were found in rock-chips from outcrops over top/lateral to the discovered ore body. However, in his re-called examples, gold was usually known to occur in nearby mines or mining districts of the region. Not to be deterred by his comments, at least several of the gold and silver ore bodies at La Coipa (Chile), for example, are documented to be blind deposits (i.e. do not outcrop) (Oviedo and others, 1991). The highly altered capping silicified rock at Pierina (Peru) and Tambo (Chile) are also reported to be barren of gold values. At the time, the only encouragement he could give for continued exploration efforts at Cerro Eskapa: is that if a new sufficiently large-sized target(s) with auriferous character could be identified elsewhere on the property, then Newmont Gold would likely have an immediate interest in taking a look. He thought there is plenty of untested "room" in which to make a discovery, but would take considerable drilling to accomplish. He reframed from giving specific advice on where to perhaps focus exploration attention to define and test new targets. During his visit, Bruce Harvey and his fellow Newmont geologist collected numerous rock-chip samples for geochemical analysis, but have never provided SAMEX with a copy or indication of the results as required in the confidentiality agreement.

8.5.13 Check Gold And Silver Analyses On Split Core Samples - 1999 - The possibility that there could have been analytical errors in gold assay analyses (and also possibly for silver) was raised by SAMEX's Cerro Eskapa project geologist. He thought that, with the spectacular-appearing pyritized breccia and altered-silicified porphyritic dacite, important anomalous levels of gold might be present and certainly higher silver values should have been found especially in split core from the 1999 drilling program (i.e. DDH-EK-99-01, -02, and -03). Perhaps the silica-encapsulated and fine-grained nature of the sulfide-sulfosalt mineralization inhibited accurate detection using routine sample preparation and analytical methods. Bondar-Clegg routinely conducted in-house check gold assay and atomic absorption analyses for silver on approximately ten percent of all surface or core sample lots submitted from the Cerro Eskapa project during the time period of 1998-99. These check analyses all seemed to agree closely with their original results and nothing seemed amiss with gold assays or silver analyses. In May, 1999, the project geologist re-sampled 21 intervals of vuggy silica, sulfidic-silicified breccia, and clay-pyrite altered intervals from holes DDH-EK-99-01 and -02, and sent them to the Chemex laboratory in North Vancouver, BC for assay analyses of both gold and silver. With the exception of one silver value which proved to be markedly higher, these check analytical results matched very close for gold and silver to those values of the original results of Bondar-Clegg. However, because the lower detection limit for silver assay procedures used by Chemex was relatively high (3 ppm), only the samples with greater values than this could be compared with the earlier Bondar-Clegg results whose analytical procedure had a 0.1 ppm lower detection limit. No detectible gold (>7 ppb/lower detection limit) was found in any of the re-sampled intervals by Chemex and most silver values are low (<3 ppm). Of four samples with relatively high silver values, the analytical results between Chemex and Bondar-Clegg compared closely for three. At the same time, a suite of rejects from 26 sampled intervals from holes DDH-EK-99-01 and -02 was sent to the Alfred Knight laboratory (La Paz, Bolivia) for gold assay and geochemical silver analyses. Their assay results for gold are very low (generally <0.005 ppm/<5 ppb) with two samples containing barely detectible levels (0.007 and 0.012 ppm, respectively). The silver values, though, all came out high (typically 2.000 to 18.0 ppm) for samples in which Bondar-Clegg had found to be very low (>0.100 to 0.300 ppm) to less-than-detectible levels (<0.100 ppm). There were also a few discrepancies for samples with higher silver content; generally Alfred Knight Laboratory conversely gave markedly lower results. This suggested that Alfred Knight might have trouble with analyses of samples with both low- and high-levels of silver, but the gold results were all close to those by Bondar-Clegg and Chemex. Six samples of quartered core from DDH-EK-99-01 and -02 were also submitted to the BAREMSA laboratory (Oruro, Bolivia) for silver analyses in their in-house laboratory (Itos Heap-Leach Silver Project). Their analytical results were also higher (5 to 16 ppm) for silver values in sampled intervals which had been found previously to be low (<0.200 ppm) by Bondar-Clegg and did not match well (markedly lower) for one sample which Bondar-Clegg had returned a higher silver content. These results suggested that the BAREMSA laboratory also had in-house analytical problems for samples with low-level silver. This problem of higher silver values and the discrepancy between results on the one higher grade sample were not explained. The check results from the two laboratories (i.e. Chemex and Alfred Knight) did not point to any glaring problems of the earlier (original) gold assays on first submitted split HQ core, thus confirming the gold analytical results of Bondar-Clegg. Hence, no gold was found to be present with the exception of certain intervals of vuggy silica (DDH-EK-99-02) where only trace (barely detectible) amounts of gold are present. The Chemex and Bondar-Clegg results also indicated that less-than detectible to only very low silver values (typically </=0.2 ppm) are present in the long intervals of clay-pyrite altered rock. The elevated to higher silver values found by Alfred Knight and BAREMSA are believed to be incorrect.

8.5.14 <u>Metallurgical Investigations Of Gold And Silver Content Of Core Samples – 1999-2000</u> - In August, 1999, the project geologist decided to retrieve coarse rejects from storage for certain previously sampled intervals in drill holes DDH-EK-99-01, -02, -04, and -08, and send them to the Elizabeth Vargas metallurgical laboratory in Oruro, Bolivia to have sulfide concentrates produced and these assayed/analyzed for gold and silver. The lack of any significant gold and the much lower than anticipated silver values (especially for the first three holes) had the project geologist still scrambling for an explanation of his "observed" strong silver mineralization in the first drill holes. He still felt that perhaps there were significant analytical errors by the Bondar-Clegg laboratory and that maybe higher silver and low-level anomalous gold are present, but somehow missed by their analyses. This opinion was held to in light of the check analytical results from Chemex and Alfred Knight laboratories which, with the exception of the vuggy silica and sulfidic-silicified breccia intervals, indicated no gold and only very low silver values are present in most of the core which is variably affected by clay-pyrite alteration. The metallurgical procedures employed by the Vargas lab consisted of grinding reject samples to -200 mesh followed by standard flotation techniques to produce a sulfide concentrate and non-float (tailings). The weight of sulfide concentrate produced varied from 0.255 to 3.3 kilograms per sample. The sulfide concentrate was then sent to Bondar-Clegg laboratory (Oruro, Bolivia) for gold assay and silver atomic absorption analyses. The non-float was put through a cyanidization leaching (48 hours) and this solution was also submitted for separate gold and silver analyses. No analyses were carried out for base or pathfinder metal suites on sulfide concentrate, non-float tails, or "impregnated" cyanide solution. This set of new analytical results was then used in a back-calculation to see what the original sample "should" contain in gold and silver and compare these to original analytical results on earlier submitted split core. This approach of a finer grind in sample preparation, producing sulfide concentrate, and assaying the sulfide concentrate was thought to ensure that if gold and higher grades of silver were present, they would be found. Results and ensuing problems are briefly summarized below.

(1) Four groups of reject samples from DDH-EK-99-01, -02, -4, and -08 were first sent. These were combined from continuous sample intervals to meet the minimum sample weight that could be

metallurgically processed to produce sufficient amount of concentrate. Analytical results were then used in a back-calculation to produce a value that for three of the sample suites of rejects for DDH-EK-99-02, -04, and -08 came out reasonably close for both gold and silver to those of the original analyses on the split HQ core. However, the back-calculated gold assay result for the sample submitted from DDH-EK-99-01 indicated the weighted average value of this sample should contain 0.4065 g/mt (ppm) gold whereas the weighted average value of original analyses for the split core indicated a value of <0.005 g/mt (ppm). The back-calculated silver value for this sample was close to that of the original average weighted value. The discrepancy between the original assay result and the back-calculated gold value obtained from sulfide concentrate could not be outright explained and sent up a red flag as to possible gold analytical problems with the Bondar-Clegg laboratory. Several intervals comprising this sample in DDH-EK-99-01 are from part of the intercept of sulfidic-silicified breccia material with highly anomalous silver and highly anomalous mercury and arsenic with anomalous lead, copper, and barium, but no detectible gold (all values <5 ppb). The highly anomalous silver and pathfinder metal content of this sulfidic-silicified breccia was thought permissive of a possibly analytically missed gold content giving some credence to the new back-calculated gold value. A third interval inexplicably used to comprise this sample is from clay-pyrite-altered porphyritic dacite in the footwall (below) the sulfidic-silicified breccia intercept and, although pyrite-rich, does not contain in original analytical results even-detectible gold (<5 ppb), nor the highly anomalous levels of mercury and arsenic, and only low-level, anomalous silver, and zinc. Hence, this thicker sample interval was believed to have maybe significantly diluted the higher back-calculated gold value by a factor of three and perhaps indicated the sulfidic-silicified breccia interval actually carried 1.2 g/mt or more of gold.

(2) The appearance of the one high gold value in sulfide concentrate from the interval in DDH-EK-99-01 forced sending a second suite of rejects from six other sample intervals of DDH-EK-99-01, -02, -03, and -08 to Elizabeth Vargas laboratory to undergo similar metallurgical procedures and analyses. This sample submittal included the rejects from the omitted part of the possibly gold-bearing, sulfidic-silicified breccia interval in DDH-EK-99-01. The results of the second set again showed reasonable closeness between back-calculated versus original analytical results for silver, but now numerous discrepancies between back-calculated and original results for gold. All of the original weighted averages for gold of the split core for the sample suite contained less-than detectible levels of gold (all <5 ppb/<0.005 ppm), but the back-calculated values for gold are distinctly higher and ran between 0.0365 to 5.3138 ppm (from seven to 1000 times higher). The highest sample again came from DDH-EK-99-01, but from an interval far below the sulfidic-silicified breccia, and which is clay-pyrite altered dacite with mildly anomalous mercury and arsenic, and elevated antimony. No detectible gold or silver values appear in the original analyses. This interval did not appear to have the visible characteristics (only moderately clay-pyrite altered and not silicified or comprised of vuggy silica) to expect to possibly be gold-mineralized. Also, all of the other back-calculated values for gold for the submittal showed that three of these intervals should have been found to have contained markedly anomalous values of gold (0.1555 to 0.2247 ppm). The other part of the sulfidic-silicified breccia interval of DDH-EK-99-01, which had given the previously back-calculated highly anomalous gold value, contains a back-calculated value of gold at only a weakly anomalous level (0.1555 ppm). This value is much lower than the anomalous value (0.4065 ppm) found in the first submittal. The unexpected appearance of the high gold value from the clay-pyrite-altered interval lower in DDH-EK-99-01 and anomalous gold from the other intervals further fueled suspicions of possible contamination during processing, but did not dismiss the possibility of gold analytical problems on the split core submittals.

(3) A sample of the concentrate, which had given the very high gold value from an interval in DDH-EK-99-01 (second submittal), was sent to the Schurer and Fuchs Metallurgical Laboratory in Reno, Nevada for reflecting ore microscopic examination and electron microscope investigations. Gold

grains were found and noted to occur in a gangue of pyrite and iron-oxide minerals. Stibnite, diaspore, and an iron-antimony oxide mineral are also present. The gold grains were considered to be coarse, determined to be of very pure composition, and interpreted to have the form possibly of alluvial origin or derived from a weathering environment – suggesting to the laboratory researcher that the gold particles were not from the relatively deep intersection of the drill hole, but were added to, or incorporated, via contamination during metallurgical processing of the sample. Some gold grains were observed to have fine textural features, concentric growth zoning, and to be connected to, or partially enclosed within, fresh subhedral pyrite and iron-oxide minerals which seemed to contrarily suggest (to this author) not much weathering, erosion, and transport. The presence of stibnite and an iron-antimony oxide mineral in the concentrate was considered unusual because all analyses of the core samples from this sulfidic-silicified breccia interval and clay-pyrite-altered rock in DDH-EK-99-01 contain low analytical values for antimony. Also unusual, no minerals (i.e. sulfide or sulfosalt) were apparently found, or identified in the concentrate which would explain the presence of high amounts of silver, or highly anomalous levels of lead, mercury, and arsenic. These observations did not help resolve whether there had been a gold analytical problem at the Bondar-Clegg laboratory, now shed doubt that the gold found in concentrates was from the core/rejects of DDH-EK-99-01, and left many other unanswered questions. Elizabeth Vargas stoutly denied that there could have been any contamination or salting of gold during the metallurgical processing procedures in her laboratory and claimed, if either of these had happened, then they occurred later during sample preparation at the Bondar-Clegg laboratory. In addition, questions came up whether there could have been sample identification mix up during metallurgical processing and/or sample preparation/analytical procedures in the Vargas or Bondar-Clegg facility, respectively.

(4) A third sample batch of rejects comprising five sample suites was then sent to the Elizabeth Vargas laboratory for similar processing. Personnel from Kappes-Cassidy (Reno, Nevada) were present to oversee all of the metallurgical and analytical procedures carried out on this sample submittal. All of these sample suites were from drill hole DDH-EK-99-01 and specifically from the interval of clay-pyrite alteration with moderately anomalous mercury, arsenic, and antimony which had given the very high, back-calculated gold value of 5.313 ppm (g/mt) in the second submittal. Hangingwall and footwall intervals to this interval were also sent and these contain low, sub-anomalous levels of the pathfinder metals. Original gold and silver values in split core samples for all of these intervals is low (<0.005 ppm – gold and <0.2 ppm – silver). The analytical results of the prepared sulfide concentrates gave back-calculated values of weakly anomalous gold (0.1049 to 0.1160 ppm) for two intervals and detectible/sub-anomalous gold (0.0467 to 0.0913 ppm) for the other three intervals. Silver analyses were not run on these sulfide concentrates. The low-anomalous values of gold seemed more in line with the clay-pyrite altered nature of the rock, were not too dissimilar from the original gold assay results, and cast a suspicion on the earlier high gold value obtained in the second submittal. These results suggested low (sub-anomalous, >5 to 100 ppb) levels of gold might be present in some sulfidic-silicified and clay-pyrite-altered intervals of core and were missed by the Bondar-Clegg laboratory, but the procedure of producing a concentrate and then back-calculating to reach gold values left some doubt about the validity of the procedure, the re-calculated gold values, and whether weakly anomalous gold is actually present. The Kappes-Cassidy representative, who scrutinized the processing of these samples, thought that the laboratory performed to high standards, and did not feel there was any possibility of gold contamination for these particular sample runs. His conclusions seem supported by the low level of gold in all back-calculated values for all samples of this third submittal.

(5) Two large bulk composite samples of sulfide-mineralized, vuggy silica rock were then sent to the Elizabeth Vargas laboratory. One bulk sample is from the dump to the Chilean shaft with anomalous silver/highly anomalous mercury and arsenic; and the other is from a dump to a nearby Spanish Colonial Era prospect working and of different character with high silver content and highly

anomalous amounts of mercury, arsenic, antimony, and lead. The sulfide and sulfosalt minerals in both of the bulk samples occur as fine grains encapsulated in silica. A split of the rejects produced from coarse grinding these two bulk samples was run for gold and silver and found to both contain barely detectible levels of gold (0.006 and 0.013 ppm, respectively) and low (4.4 ppm) to moderately high (210.8 ppm) silver, respectively. The back-calculated values from the sulfide concentrates gave higher detectible to sub-anomalous gold values (0.0747 and 0.0954 ppm) and one similar (3.3 ppm) and one marked greater (414.2 ppm) silver value. These results perhaps pointed to the possibility of some past silver analyses not being representative (too low (?)), suggested (geochemically important) low (subanomalous) levels of gold could be present and better picked up by processing the samples to produce sulfide concentrates, and likely no significant amounts of gold are present in silver-mineralized samples from surface/relatively shallow-depths of the mine workings. An evaluation of the metallurgical work and analytical results for this sample submittal by Kappes-Cassidy again yielded their conclusion that the laboratory facility was clean and the work conducted to high standards. They thought that the earlier reported high, back-calculated gold values for two intervals of DDH-EK-99-01 could therefore possibly reflect a nugget effect (erratic distribution of coarse gold) and that the gold was missed in the split taken for the original fire assay, or that the gold was present in a small veinlet missed by the way/orientation that the core was originally split. However, the latter conclusion could be dismissed as only rejects were used to produce concentrate.

(6) With the suspicion that the two Vargas-obtained, back-calculated, anomalous gold values could be erroneous and because other anomalous gold values did not turn up in samples from subsequent metallurgical processing of similar material, it was decided, that when funding was available, the remaining core would be re-sampled and turned over to a reputable laboratory for further analysis. This was eventually completed by Lakefield Research Limited (Ontario, Canada) as detailed in section 8.5.27

8.5.15 <u>Exploration Activities/Results – Late-1999</u> – SAMEX Bolivian geologists returned to Cerro Eskapa in December, 1999 and carried out limited reconnaissance geologic mapping and rock-chip sampling. The purpose of the work was to try to define new targets that might preserve higher level, precious-metal (auriferous) mineralization and that would attract new exploration funding and/or joint-venture partner with a major company. Specifically, the covered area of the focus of the outward radiating breccia and mineralized zones was to be first examined to determine if a concealed large "central" breccia pipe might be present. However, hand-dug pits, albeit few and far apart, which were sunk through the unconsolidated cover, encountered only variably clay-pyrite-altered, porphyritic dacite bedrock and failed to find evidence for a centrally located, large, hydrothermal breccia pipe or body being positioned in the "focal area" and this target idea was abandoned. The nature of the altered dacitic rock is similar to that between various prospective mineralized vuggy silica zones. Reconnaissance mapping/rock-chip sampling then was shifted to the southwest part of the property to the ridge area of strongly clay (-pyrite)-altered "agglomerate" and hydrothermal breccia where Bruce Harvey had spent extra time traversing road-cut outcrops. The term agglomerate had been used by Heredia and Rios (1995) to describe the outcrops containing coarse boulder-sized clasts. The initial mapping of this Breccia Area was carried out from the ridge down a southwest-running quebrada where much "agglomerate" and hydrothermal breccia of different character were found locally outcropping and as float for a several kilometer distance. This reconnaissance-type map (interpreted) showed the breccia to be a contiguous, single, large body with a southwest-trending long axis (open-ended) with a width of several hundred meters across. The breccia body outline was restricted to the quebrada as a southwestward-trending body cutting across the westward-dipping dacite/andesite lava flows of the lower west flank of the stratovolcano. The idea arose that this breccia body was possibly the down-thrown and offset (southward) along a major north-northeast-trending fault from the envisioned centrally located breccia pipe. Outcrop and soil samples (shallow pits) were collected at locations spaced at 20 to up to 50 meters along two "tape and brunton" lines of approximately 1000-meter length each. Both lines are oriented west-northwest and one is obliquely down along the steep north-facing ridge slope and the second is along the ridge crest. The lines are separated by approximately 200 meters. A second group of samples was collected from scattered locations southwest down the quebrada. Many of these are from pits up to two meters deep which were dug down through shallow cover and into bedrock. Some 88 samples were collected and sent to Bondar-Clegg laboratory in Oruro, Bolivia for sample preparation and gold assays. Pulps of the samples were then forwarded to their North Vancouver, BC facility for silver and base/pathfinder metal analyses.

Analytical results on this group of rock-chip samples of breccia are similar to those collected from the north part of this same area in 1998-99. The sample line along the ridge crest of mostly outcrop is now known to be along or close to the trace over a long strike length of a silicified hydrothermal breccia zone and many of these samples contain anomalous to highly anomalous levels of mercury (105 to 8771 ppb), arsenic (110 to 1051 ppm), zinc (135 to 556 ppm), and locally anomalous thallium (to 28.9 ppm). Lead values are typically elevated (to 42 ppm). Antimony values are all low (typically <5 ppm). Low-level (barely detectible) silver (0.3 to 1.0 ppm) is also present in many of these samples, but all gold values are low (<5 ppb). Samples from the other line and numerous scattered locations down the quebrada generally contain anomalous to highly anomalous mercury (many between 126 ppb to 5935 ppb). Anomalous values of arsenic (112 to 529 ppm) appear in a few samples and values for gold (most <5 ppb) and silver (most <0.2 ppm) are always very low. No indication of outcropping or near-surface precious-metal mineralization was found. The hydrothermal breccia and "agglomerate" material was interpreted as maybe a single body which could be the envisioned "central" breccia pipe which was fault offset to the south and down-dropped from its original position. The absence of any significant gold and silver values was disappointing and the many samples with anomalous mercury suggest, if present, precious-metal mineralization could be positioned a greater depth. The results of the evaluation of the breccia outcrops was put out in SAMEX news release 11-00. No further exploration work was attempted on the Cerro Eskapa property from January into November, 2000.

8.5.16 <u>Re-Sampling Of Mineralized Intervals Of Core – DDH-EK-99-01 and -02 - 2000</u> - With lingering doubts about the validity of the anomalous to high gold values obtained on sulfide concentrate produced by the Vargas laboratory from processing rejects of several intervals from DDH-EK-99-01, and the unlikely possibility of a mix up of sample numbering (i.e. gold-bearing samples could actually be from some other drill hole/interval due to mix-up of bag numbers), a decision was made to quarter the remaining half core of specific intervals which could be possibly significantly gold-bearing. These samples would be sent to a reputable metallurgical laboratory for careful re-analysis of gold and silver to resolve the uncertainties around the importance of anomalous to high gold values found in the sulfide concentrate. Sample criteria for intervals chosen included: sulfide-mineralized features in core (i.e. in vuggy silica-barite and sulfidic-silicified rock), alteration assemblage (advanced-argillic), and presence of anomalous to high silver values and/or strongly anomalous amounts of base and pathfinder metals. The two intervals of clay-pyrite-altered dacite in DDH-EK-99-01 from which high gold values were obtained in sulfide concentrate were obviously to be also included as part of this re-sampling. A total of nine samples comprised of core carefully cut from remaining pieces for various prospective intervals was taken from DDH-EK-99-01 (four samples) and DDH-EK-99-02 (five samples) in September, 2000. The samples were then shipped to SAMEX Abbotsford, BC office. However, no funds were then available to carry out the proposed work and, though warranted, further laboratory investigations were postponed and samples were stored away.

8.5.17 <u>Strategy/Exploration Work Plan – SAMEX-International Chalice JV Program - 2000</u> - At the time of the option/joint venture agreement with International Chalice in November, 2000, no discrete drill targets had been yet identified in either the Breccia Area or Copper Zone on the Cerro Eskapa property. The most urgent goal of the joint-venture work plan was therefore to attempt to investigate the Breccia Area and quickly as possible outline a precious-metal drill target(s) within what was perceived as a large single breccia body. Priority was placed on exposing much breccia and altered rock in outcrop via constructing road access down into the southwest-trending quebrada (where breccia and agglomerate material is locally exposed over a wide area), conducting considerable rock-chip sampling, and carrying out IP surveys across the trend of the prospective area of breccia and agglomerate. The geologic mapping in the Breccia Area would establish the spatial extent of prospective hydrothermal breccia and perhaps help give an idea of the geometric attitude of the breccia body and contained targets. Rock-chip sampling would be carried out and geochemical analyses of the samples would be run for gold, silver, base- (copper, lead, zinc) and pathfinder (arsenic, antimony, mercury, and thallium) metals. Perhaps the analytical results would also help further outline prospective mineralized areas. IP surveys were run specifically to search for high-resistivity/mixed chargeability responses that might directly mark the presence of deeper seated, sulfidic-silicified zones/bodies prospective for precious-metal mineralization. The IP data might also help in mapping out beneath covered areas and defining the dip direction of the breccia body. Ideally, the geologic, geochemical, and geophysical data would, together, vector correctly identifying drill targets marked by favorable surface geologic features and anomalous geochemical values for precious and pathfinder metals. The Copper Zone would be similarly explored with the oxide-copper mineralized pebble breccias being mapped and an attempt to trace their northward continuation beneath pampa unconsolidated cover by also running IP lines aligned east-west. Lastly, work plan would also address the possible problems of original analyses for gold and silver and importantly resolve this before carrying out further sampling of outcrop and core. If anomalous amounts of gold were present in core samples and somehow missed or incorrectly determined due to incorrect analytical procedures, then this would be important to know and to be able to choose appropriate sample preparation and analytical procedures to alleviate the problem(s).

8.5.18 **Exploration Activities – Breccia Area – December, 2000** - The exploration project work on the Breccia Area began in early December, 2000. A bulldozer was bought in to the property and 9500- meters total of new roads were constructed to give access down along the southwest-trending quebrada of the Breccia Area where breccia outcrop and float had been found in scattered areas. Five IP lines, of which four are oriented mostly northwest-southeast, and one north-south (6200 line-meters total), were completed by Geoexploraciones (Santiago, Chile). Geologic mapping was started first as quick reconnaissance coverage over the Breccia Area while survey work for constructing a detailed topographic map and putting in control points and triangulation survey monuments was also underway. Some 337 rock chip samples were collected and sent to Bondar-Clegg laboratory (Oruro, Bolivia) for sample preparation and gold (30-gram) assay analyses. Pulps were forwarded to the Bondar-Clegg laboratory in North Vancouver, BC for analyses of silver, copper, lead, zinc, arsenic, antimony, mercury, thallium, and molybdenum. With completion of the some geologic mapping and IP results and pseudosections in-hand, several possible drill targets were chosen and three drill pads and short access roads to them were also constructed by the bulldozer before it broke down. Geochemical analytical results would not be received until mid-January, 2001.

8.5.19 **Geologic Relationships/Interpretations And Initial Target Concepts - Breccia Area** - Geologic mapping (December, 1999 and early December, 2000) had outlined a larger than-anticipated area with scattered outcrops of prospective breccia. The lack of good exposure continued to allow the interpretation that the scattered outcrops comprise a single breccia body with what appeared to be an upper diatreme part (chaotic, large boulder-sized fragments, matrix-supported) and a lower hydrothermal breccia part (angular smaller clasts/clast-supported). The body outline appeared to be elongated in a west-southwest direction. Exposures along the ridge and to the southwest down the quebrada are comprised of mostly rounded boulders/cobbles of dacite/andesite lava in a clay-altered/locally silicified matrix. At progressively lower elevations further to the southwest, scattered outcrops are dominantly hydrothermal breccia characterized by angular clasts/clast supported. This gave the impression that the upper parts of the breccia were diatreme and/or agglomerate-like material (ejecta) which caps deeper collapsed hydrothermal breccia. Alteration of the "agglomerate" is focused on the matrix leaving boulders and cobbles of fresh andesite-dacite flow rock (commonly with only a thin alteration rind). The hydrothermal breccia is everywhere strongly clay or clay-pyrite altered and moderately to strongly iron-stained where oxidized. Locally, the hydrothermal breccia is replaced by silicification, sulfidic-silicification, or vuggy silica. Some areas of hydrothermal breccia, in detail, are multi-breccia with several generations of brecciation being expressed by coarser breccia veined by later cross-cutting, finer silicified breccia. Rock-chip samples of both the coarse ("agglomerate") and hydrothermal breccia returned anomalous to highly anomalous values of mercury (to 86000 ppb), arsenic (to 3160 ppm), zinc (to 1217 ppm), and few anomalous lead values (to 259 ppm). Elevated levels of antimony (to 90 ppm) and thallium (to 62.8 ppm) are also present. A small percentage of samples were found to contain detectible gold (>5 ppb to 39 ppb) and silver (>0.2 to 2.1 ppm). Very high values (i.e. mercury and arsenic) consistently occur in samples of strongly clay-altered hydrothermal breccia, especially where silicified and containing extremely fine-grained disseminated sulfide (pyrite). Perhaps influenced by the mapped outline of the breccia body, sample locations of anomalous levels of mercury, arsenic, thallium, and zinc were roughly contoured (connected) to define anomalous zones with a southwest to northeast trend (parallel to the long axis of the breccia body). Without anomalous gold or silver in surface samples, the breccia body target was perceived as perhaps containing a deeper seated, precious-metal target surrounded and capped by clay-alteration, silicification, and a geochemical halo containing anomalous amounts of mercury, arsenic, zinc, lead (locally), and thallium.

Follow-up re-mapping the breccia body in more detail was initiated in December, 2000 and time allowed for the northeast half of the body to be examined where much coarse boulder diatreme/agglomerate material and cover are exposed along the ridge and its southwest slope. A west-northwest-trending, silicified hydrothermal breccia zone (angular clasts) of relatively narrow width and surrounded by agglomerate/diatreme material was traced out. The significance (more-westerly strike-direction) of this hydrothermal breccia was not immediately appreciated. This hydrothermal breccia was thought perhaps to be of younger generation cutting across the larger northeast-trending breccia body of large rounded clasts. Analytical results from previous sampling efforts (1998-99) show this narrow breccia to contain exceptionally anomalous levels of mercury with anomalous arsenic and elevated antimony, but no gold or silver.

8.5.20 IP Surveys – Breccia Area - In December, 2000, five, northwest-southeast-oriented lines of IP (6200 meters total) were run across the position of the breccia zone prospective area. The line position/orientation/length was dictated by the outline of the breccia body on the earlier prepared geologic map. The first four lines are numbered 1- B to 4 - B in a south to north direction. Line 5 – B was placed midway between Lines 1-B and 2-B which were separated by a large distance. The lines are spaced at 400 to 600 meters apart and a 100 meter "a"-spacing was used. The IP results along lines 2-B, 3-B, and 4-B detected high-chargeability zones (8 to 23 milliseconds) (pyritiferous) with low-resistivity responses (15 to 100 ohm-m) ((clay alteration) which appeared to readily correlate between IP pseudo-sections. The outlined pyritiferous, clay-altered body (breccia) was interpreted to be north-westward dipping at a skewed gentle apparent dip. Southwest-most line 1-B found interesting high resistivity responses to 457 ohm-m within the high-chargeability zone. The fifth line (L-5B) was then positioned midway between lines 1 - B and 2 – B to further define this latter high-resistivity IP response association. Without good geologic map control and the interpretation of a single large breccia body, the high-chargeability/low-resistivity anomalies could be directly correlated between the IP lines in pseudosection. The correlation seemed to perfectly outline a single, northeast-striking and westward (?)-dipping body of pyrite-bearing, clay-altered breccia with increasing silicification at depth (to the southwest).

8.5.21 Target Concept – Breccia Area - The target picture in the southwest part of the property that emerged from the geologic mapping and IP surveys of December, 2000 was that of northeast-trending/(north) westward-dipping single, large breccia body with strong clay-alteration and high pyrite content. At the much lower elevations further southwest in the quebrada, the appearance of high resistivity responses suggested the appearance of strong silicification which in pseudosection profile indicated also a persistent down-dip extent. Reconnaissance geologic mapping generally seemed to confirm the correlation of rock types, intensity of clay alteration, and abundance of pyrite content as interpreted from the IP survey. The surface position of the high-chargeability/low-resistivity responses also coincided well with irregular areas of high mercury, arsenic, zinc, and lead, and elevated thallium and antimony content in rock-chip samples. Because no samples contain anomalous amounts (most <5 ppb) of gold and the amount of vertical relief over which the samples were taken is over 200 meters, any precious metal deposition would have to be fairly deep seated. An interpretation of the IP survey results was made that the high-resistivity responses likely reflect sulfidic-silicification/vuggy silica replacement of breccia and examples of these were locally found in surface float and outcrop at low elevations in the vicinity of lines 1-B and 5-B. Hence, a possibly precious metal-mineralized target was outlined consisting of exposed deeper seated silicification with variable sulfide content, and with an overlying halo of anomalous mercury, arsenic, zinc, lead, and elevated antimony and thallium. The comparable nature/geometry (westward-dipping) of the IP chargeability anomaly from line to line (although widely spaced) gave the impression of a single causative (breccia) body. However, this correlation from line to line to define one large breccia body would prove to be incorrect. Before leaving for Christmas break, sites were chosen, mostly based on IP results, from which to drill test the breccia body/IP anomaly on four of the five IP lines; and access roads/platforms to drill eastward down across the "breccia body" were constructed with the bulldozer.

8.5.22 Exploration Activities/Results - Copper Zone – December, 2000 – Time in December, 2000 was also spent further evaluating and the area of the oxide-copper mineralized pebble breccia bodies on the lower north flank of the Cerro Eskapa stratovolcano. This work included surveying to produce a topographic map and put in control points for geologic mapping and rock-chip sampling, and also carrying out IP surveys along east-west-oriented, long lines across the projected northward trace of the pebble breccia concealed beneath pampa colluvial/alluvial cover. The pebble breccias, though with spectacular-looking mineralization of good copper grade, were found, by geologic mapping, to be maybe discontinuous, relatively narrow bodies without alteration features indicating the presence of more widespread, significant associated bulk-tonnage mineralization. The pebble breccia bodies were determined to be controlled along an irregular, northeast- to northwest-trending structure positioned well west of and in the hangingwall above the northeast-trending/west-dipping, major San Augustin fault. Sampling of old stockpiles of hand-cobbed ore showed that copper values in high-graded samples approach 15% copper with up to 59.1 gram/metric ton silver content and anomalous mercury (to >50.00 ppm). However, because of their small, irregular size, the breccia bodies could not host much of an ore resource. They, therefore, were not considered to be a drilling target, but perhaps they indicated an important source rock from which the copper was re-mobilized (i.e. copper oxide/sulfide-mineralized and altered porphyry intrusion) could be found concealed in the nearby area.

8.5.23 IP Survey – Copper Zone And Eroded-Out Stratovolcano Core Zone Area - 2000 – Three, long, IP lines were run using a 100-meter "a"-spacing and spaced approximately 150 meters apart (8300 line meters total) were run across the pampa across the northward projected trace of the pebble breccias. The IP line 2C, which crossed over the lowest mine working failed to detect the pebble breccia body, perhaps because of the oxide nature of the copper mineralization and lack of much chargeability or resistivity contrast with surrounding rock, and/or wide 100-meter "a" spacing compared to the narrow, two-meter width of the zone. Widespread outcrops of weakly altered, thin-layered dacite lava flows/pyroclastic rocks, through which the breccia cuts, appear on pseudo-sections of the three IP lines as high-resistivity/low-chargeability response. With depth, the high-resistivity readings gradually diminish and then abruptly become very low indicating an important change in rock character (strong clay alteration). A corresponding increase in chargeability with depth occurs and significant chargeability responses ranging from14 to 22 milliseconds were detected along the eastern part of line – 1C and - 3C toward the lower search depths. The outline in pseudosection of the low-resistivity and high-chargeability responses implied increasing alteration with depth with nested sulfide-mineralized body. The top of the chargeability anomaly is positioned at vertical depths ranging between 100 to 150 meters. The magnitude of the chargeability response, especially at depth, suggested important "disseminated"(?) sulfide minerals of unknown nature. The most-prominent chargeability response extended open-ended north-south (+400 meters) with a width of up to three hundred meters. Other outlying similar chargeability responses of unknown full spatial extent were also found along the west parts of lines. Several interpretations were speculated concerning the cause and exploration significance of the high-chargeability/low-resistivity responses concealed at depth. Beneath the hard/dacite volcanic flows including: young sulfide-mineralized/altered intrusion, old eroded porphyry copper intrusion with enriched blanket, mantos copper mineralization in Tertiary sediments, and pyritiferous Paleozoic shale. Because the chargeability anomaly is associated with very low resistivity responses, the possibility of sulfide mineralization in a highly altered environment was considered a possibility. The chargeability anomaly positioned at pampa The drilling depth to test the anomaly As the bulldozer had broken down, the drill pad and access road were constructed via hand labor on the sand-covered pampa on line -1C, 40 meters west of station 300 E over the strongest chargeability response for a vertical hole drill test.

An IP survey was also carried out along two short lines (2000 line-meters total) in the eroded-out stratovolcano core zone. One of these lines (L-8) was run oriented "east-west" over the projected northward continuation of interesting high-chargeability anomalies outlined previously and to check for the possible occurrence beneath shallow cover of a breccia target (high-resistivity). The second line (L-9) was run oriented "north-south" across the southeastward projected trace of breccia zones IV and V where a marked high-resistivity/high-chargeability anomaly had been earlier defined. These IP surveys were carried out to help possibly better define other drill targets to consider testing if the holes planned for the Breccia Area and Copper Zone did not give good results.

8.5.24 <u>Resumption Of Exploration Work – Breccia Area And Copper Zone – January-February, 2001</u> – The SAMEX exploration crew returned to Cerro Eskapa promptly after the New Year, 2001 with the plan to start core drilling, as soon as possible, the best target defined in the Breccia Area which, at the time, was interpreted to be the high-resistivity body positioned along the northwest part of IP line - 5B and coinciding with areas of outcropping hydrothermal breccia with high mercury content. Because the IP survey along line -5B was completed at the end of the December, 2000 work period, no time was available to repair the broken-down bulldozer and then build road access and the pad at this proposed drill test location. Hence, the first work in January, 2001 would be directed towards putting in the road access and drill pad to test this target after the bulldozer was repaired. However, while the bulldozer repair was taking place, further geologic review of the Breccia Area revealed that the planned hole would likely not be a good drill test because the breccia body was divulged to be actually a swarm of breccia zones striking westward and typically spaced up to a hundred meters or more apart. The planned drill pad location was found to be too close to one breccia and too far away from another to make the intended down-dip intersection at the desired depth. So, bulldozer construction work was cancelled. Time would be needed to continue geologic mapping and decide where to locate and attempt a better drill test of one of the breccia zones. To keep the bulldozer busy, a new road into the Breccia Area to allow a direct (shorter) and quicker access was started because, with heavy rains, the old road access used required driving a long distance up into the eroded stratovolcano core zone and then back down into the Breccia Area. This circuitous route not only took a long time to drive, but was constantly being washed out in places requiring constant bulldozer and "pick and shovel" maintenance after unusually heavy deluges with frequent, powerful afternoon thunderstorms.

8.5.25 <u>Drilling Program – Breccia Area And Copper Zone – January-February, 2001</u> - The new drill site in the Breccia Area was chosen from which to make an inclined, "point blank" drill test (DDH-EK-01-1B) of a prominently outcropping breccia body. The crews of Fujita Drilling arrived on the project on January 12, 2001, but drilling of this Breccia Area target would have to be delayed by the time needed for the bulldozer to complete the access road and platform. Drilling was finally started on the target as a southeastward-inclined drill hole (DDH-EK-01-1B) which progressed to 256.90 meters depth when stopped. This hole intersected a major normal fault which is interpreted to dip shallowly to the southeast and to have displaced the targeted down-dip continuation of the breccia to the north, perhaps to a position almost directly beneath the drill pad. Hence, the hole overshot the intended target, penetrated mostly little-altered dacite-andesite flows of the stratovolcano, and with poor rock conditions of the fault zone, was deemed risky and not worth trying to continue to attempt what would be a deep intersection into the next breccia body which lay several hundred meters to the south. The drill was then moved to the Copper Zone to attempt a vertical test (DDH-EK-01-1C) of the IP chargeability target in low resistivity rocks positioned at not-too great depth beneath a cap of highly resistive deformed dacite flows. This hole penetrated through the cap rock and intersected highly clay-altered, xenolithic intrusive porphyry but without any sulfide mineralization to explain the strong chargeability response. The poor (soft) rock conditions and difficulty turning the drilling rods due to the expanding clay minerals caused the hole to be abandoned at a depth of 260.25 meters. Some completely oxidized veins with anomalous geochemical analytical values for copper, silver, zinc, molybdenum, and pathfinder metals were intersected, but no indication of a possible nearby stockwork veinleted, porphyry copper type of intrusion was observed. The nature of the strong clay alteration suggested some type of late-stage, strong, hypogene (?) oxidizing event, perhaps related to circulating hot connate waters, had pervasively affected an immense area.. A second, short, hole (DDH-EK-01-2C) was then attempted inclined eastward across the down-dip projection of the oxide-copper pebble breccia exploited by the lowest and largest mine working. This hole successfully intersected approximately one-meter true thickness of mineralized breccia which averages 5% copper and 10 grams/metric ton silver. The intersection of DDH-EK-01-2C was deemed to narrow and low-grade to warrant follow-up drilling along the oxide-copper-mineralized pebble breccia bodies.

8.5.26 <u>IP Surveys And Surface Exploration Work In The Breccia Area And Copper Zone/Results – March, 2001</u> - Three long IP lines spaced apart by 500 meters and oriented "north-south" were completed in the Breccia Area across the mapped westward continuation of various breccia zones. The lines (L-6B, -7B, and -8B) used a 100-meter "a"-spacing and total 8200 line meters. The IP lines did outline some mildly interesting anomalies of high resistivity/mixed chargeability which could be correlated to the surface trace of several silicified breccia bodies. An unexplained, strong chargeability anomaly was also outlined across the north end of the lines (i.e. L-7B). However, the geochemical analytical results on rock-chip samples of breccia collected from over the area covered by the IP survey did not outline any type of high-priority target and yielded variably, weakly to strongly, anomalous values of mercury (>100 to 2830 ppb), arsenic (>100 to 1060 ppm), and barium (110 to 425 ppm) from scattered locations on hydrothermal breccia outcrop. No detectible values of silver (>1 ppm) or gold (>5 ppb) were found in the samples. The geologic mapping and geophysical data together demonstrated that breccia zones certainly continue westward for several kilometers and are likely the fault offset continuation of the breccia zones now well-defined in the eroded-out stratovolcano core zone. The geochemical analytical results for base and pathfinder metals (i.e. mercury) on rock-chip samples seemed to indicate that the breccia zones might conceivably contain very (?) deep-seated, precious-metal mineralization. This conclusion about depth is based on the several hundred meters of relief over which breccia samples were collected without disclosing any anomalous gold or silver values. Also, the strength of breccia development and associated alteration features seemed to be gradually diminishing westward suggesting progressively further distance from the "heart" of the mineralizing system. Hence, no indications of exposed or near-surface, precious-metal mineralization were found after the initial pass over the Breccia area. It was concluded, that if present, in the Breccia Area, precious-metal mineralization would be at depths too deep to justify attempting further drill holes at this time and forced reconsidering the exploration potential of the deeper level of exposure of the eroded-out stratovolcano core zone.

A final IP survey and electrical soundings were carried out in the Copper Zone in early March, 2001 duplicating the earlier IP survey run along Line 1C in December, 2000. The resistivity responses and pseudo-sections between the two IP surveys for Line 1C did prove to be very similar. However, the repeat IP survey surprisingly did not detect any anomalous chargeability responses where earlier disclosed below the eastern part of line 1C which was the drill target tested by vertical core hole DDH-EK-01-1C. The results of the repeat IP survey did seem to identify an interesting strong chargeability anomaly positioned at depth along the west part of line 1C which was missed by the earlier (December, 2000) IP survey. The results of the duplicate IP survey also appeared to fit the geologic picture provided by the two core holes (DDH-EK-01-1C and -2C) and explained the lack of even trace amounts of sulfide minerals (i.e. pyrite) in strongly clay-altered rock intersected at depth in the first drill hole. The operator of the repeat IP survey believed he had determined that there were either machine and/or operator problems in taking chargeability readings during all IP surveys run by his firm (Geoexploraciones) in December, 2000 and this made suspect all chargeability values of the IP work carried out in that month/year (Lines – 1B, -2B, -3B, -4B, and -5B, and -7N).

The results of the three completed core holes in the Breccia Area and Copper Zone were disappointing. With no funds available to carry out a detailed evaluation of the exploration results or to attempt drilling other untested targets (especially in the eroded-out stratovolcano core zone), the project work came to a halt; the camp was closed, and Bolivian exploration employees were sent home. The severely depressed mining industry and low price of gold and other metal commodities during this time period made raising funds essentially impossible.

8.5.27 <u>Check Analytical Investigations – Lakefield Research – February-March, 2001</u> – Lakefield Research Limited, a metallurgical laboratory in Lakefield, Ontario, Canada had been contacted in November, 2000 concerning the possible problems and uncertainties in previous results for gold and silver analyses of mineralized vuggy silica core samples from the 1999 drilling program. They had proposed an investigative approach on the re-sampled core including pulverizing >95% of the entire sample to -150 mesh, separating into ten splits, fusing, and assaying each for gold and silver. A weighted average of the analytical results for the splits would then be calculated to determine sample gold and silver content. With funds in place, a decision was made by the SAMEX-International Chalice JV in January, 2001 to carry out the proposed analytical work. The earlier split core samples from DDH-EK-99-01 and EK-99-02, which were held in Abbotsford, BC, were then shipped in February, 2001 to Lakefield Research to be processed and assayed according to proposed procedures. They also were instructed to carry out geochemical analyses for base and pathfinder metals on each sample. Lakefield Research concluded their investigation at the end of March, 2001. They did not find detectible levels of gold (>0.02 grams/metric ton (>20 ppb) in most of the samples. Only eight of ten splits from one sample interval from DDH-EK-99-02 were found to contain barely detectible (0.020 grams/metric ton) amounts of gold and which are reasonably close to the low-detectible range of gold values found by Bondar-Clegg for this same interval. The results of Lakefield Research supported the original gold assay work by Bondar-Clegg and check assays run on some of the sample intervals by the Chemex Laboratory. Silver values tended to be also close to the original Bondar-Clegg results except for three intervals which were found by Lakefield Research to contain slightly lower values. The analytical results for base and pathfinder metals also matched up reasonably well between the Bondar-Clegg and Lakefield Research. Lakefield Research concluded that there were no gold or previous analytical problems. The possibility of coarse gold with irregular distribution ("nugget effect") was ruled out in the intervals sampled and significant/low-level amounts of gold (>20 ppb) were not missed by the original analyses. They indicated that standard sample preparation and 30-gram assay procedures used by Bondar-Clegg and Chemex should pick up the gold, if present, in the sulfide-mineralized vuggy silica rock. Hence, the significant amounts of gold found in two of the sulfide concentrates produced by the Vargas laboratory were deemed to be spurious and likely introduced via contamination.

8.5.28 <u>Re-Evaluation of IP Survey Results Of December, 2000/February, 2001</u> - Jan Kline, geophysical consultant (Vancouver, BC), was given the geophysical data (reports and chargeability and resistivity field readings) to evaluate the IP survey results for the surveys carried out in December, 2000 and February-March, 2001. He computer-processed and modeled the data and determined that there was likely operator error in obtaining chargeability readings during the December, 2000 survey. This error produced overstated chargeability values and false chargeability anomalies as depicted in pseudo-sections handed over to SAMEX in the field as the IP surveys were being carried out and in later formal reports. Mr. Kline also was critical of the geophysical equipment used (especially possible inadequate power source of the generator), manner in which the data was manipulated and presented in report form, and the interpretations of the data provided for both (December, 2000 and March, 2001) IP surveys. Because of the poor quality of the IP field surveys, Jan Kline thought that there was also a rapid deterioration of data quality with depth and that all deeper chargeability readings and deep-seated anomalies (below n>3) should be viewed, at best, with suspicion. This conclusion made questionable the new chargeability anomaly identified by the February-March, 2001 IP survey along the west part of line L-1C in the Copper Zone. The findings of Jan Kline significantly lowered the magnitude of all chargeability readings of the December, 2000 survey and this diminished the apparent importance of, or eliminated, many of the IP targets identified in the Breccia Area and Copper Zone.

8.5.29 <u>Re-Evaluation of Exploration Results And Proposals For New Drilling Program – June-July, 2001</u> – In May, 2001, SAMEX began an in-house review of the exploration results with the purpose of defining several high-priority targets that, if drill tested, might give positive results. In reviewing the exploration data from the 1998 to 2001 time period, the similar comparisons of the geologic setting and mineralization/alteration features of Cerro Eskapa to the gold-silver-copper vein deposits of the Laurani Mining District, Bolivia came into consideration. The background and implications of this comparison were instrumental in developing a proposal to attempt to drill several deep (to 400 meters), core holes down across two of the mineralized vuggy silica zones with the eroded-out stratovolcano core zone. This proposal was based on the idea that perhaps the zones of vuggy silica/barite rock at Cerro Eskapa, like Laurani, also lead down into copper-rich and significantly gold- and silver-bearing sulfosalt-sulfide ore at depth. Another idea for an additional possibly significant target, which is related to the questionable IP chargeability anomaly in the Copper Zone, was also developed from the data review. The newly identified IP chargeability anomaly at depth beneath the west part of Line-1C in the Copper Zone could be fit to a geologic cross-section interpretation that suggested the oxide-copper pebble breccia may have been fault-displaced downward and to the east from a position above the chargeability anomaly. This interpretation implied perhaps the chargeability anomaly represents the root zone of copper sulfide-mineralized breccia and/or highly altered porphyritic intrusion; and a second, moderate-depth (to 250 meters), core hole was proposed to test this idea.

By the end of August, 2001, funding was available for one of the proposed deep drill holes in the eroded-out stratovolcano core zone and a second hole to test the IP chargeability anomaly beneath the west part of line 1C in the Copper Zone. The cost to carry out a two-hole program was estimated at approximately $135,000 (U.S.).

8.5.35 <u>Drilling Program And Results – Stratovolcano Core Zone And Copper Zone - September-October 2001</u> – A site in the eroded-out stratovolcano core zone from which to conduct a deep 400-meter test with the greatest chance of successfully making the desired deep intersection was chosen near previous hole DDH-EK-99-02. The latter hole had successfully completed a shallow intercept through mineralized vuggy silica rock (Zone III) that could be used as control to project the downward position and dip of target to plan the deeper test (i.e. properly locate and aim the drill hole). Finding a suitable location from which to drill the IP target in the Copper Zone proved problematic because of difficult rocky terrain and areas of deep sandy/boulder cover. In addition, the geologic interpretation predicted that several fault-bounded slabs of broken-up, unaltered dacite-andesite would have to be penetrated to reach the chargeability target in low-resistivity (clay-altered) rocks of the footwall block.

The exploration camp at the Copacabana village was re-opened and a bulldozer was bought in to the property in mid-September, 2001 and platforms/access roads to the two sites were completed. Drilling (DDH-EK-01-3C) first commenced on the Copper Zone IP target. The hole proved difficult to advance as bad ground and failure to cement resulted in continuous cave-in problems after setting casing and forced abandoning the first attempt at a depth of 165.30 meters. A second attempt from the same site (moving the drill several meters) immediately encountered the same problems and was abandoned at perhaps 70-meters depth. The problem of advancing holes from this site appeared to be caused by the highly broken up nature of rock in the hangingwall blocks above several anticipated major faults which needed to be penetrated through to reach the IP target in the footwall block. To try another drill hole would require finding another suitable site and time to construct a new platform and road access by slow hand labor since the budgeted bulldozer hours had been used up and the bulldozer had been sent back to La Paz. The drill was immediately moved from the Copper Zone to attempt the deep test of Zone III in the eroded-out stratovolcano core zone. This hole (DDH-EK-01-11) was advanced rapidly but did not encounter the hangingwall advanced-argillic alteration halo and first of numerous intervals of vuggy silica rock of the target (Zone III) until a depth of 330 meters. An intersection through the target interval was not completed until a depth of 480 meters and the hole was then stopped at 500.25 meters. The unexpected added depth (+/-100 meters) to successfully complete the intersection proved mostly to be the result of the drill hole gradually deviating in inclination (upper part of hole steepened) and direction (lower part of hole flattened and drifted to the right). Although a wide interval of sheeted strands of vuggy silica rock was intersected, gold-bearing, high-grade copper-silver-antimony-bismuth mineralization was restricted to one interval of narrow, massive sulfosalt-sulfide veins. While DDH-EK-01-11 was being drilled, an access road and new platform from which to attempt to drill test the IP chargeability anomaly in the Copper Zone was completed by hand labor using local villagers. After completion of DDH-EK-01-11, the drill was moved back to the Copper Zone, but this attempt (DDH-EK-01-4C) too was made difficult by caving due to broken-up bedrock and the hole was lost at a depth of approximately 250 meters when over one hundred meters of HQ rods became permanently stuck. No indication (especially altered rock or presence of sulfide minerals) was intersected in the hole that might have supported the presence of a nearby copper-sulfide mineralized target as geologically interpreted to possibly explain the IP chargeability anomaly. This would seem to support the earlier conclusion of geophysical consultant, Jan Kline, who expressed that this chargeability anomaly should be viewed at best as suspect. The possibility remains, though, that the hole: DDH-EK-01-4C was not drilled quite deep enough to cross major faults into the prospective altered footwall block (low-resistivity/altered and high-chargeability target) as suggested by the interpretive cross section/resistivity pseudosection. No funds were available to perhaps further evaluate the validity of the IP chargeability anomaly with other geophysical surveys.

8.5.36 **<u>Exploration Activities – December, 2001 – October, 2002</u>** - Investor interest was not much stimulated by the November, 2001 news release of the technical success provided by the drilling results of DDH-EK-11, likely because of the narrow width, relatively low gold grade (although a pronounced improvement), and the great depth of the intersection through the high-grade, copper-silver-antimony-bismuth sulfide vein (see SAMEX news release 25-01). No funding could be found at the time to attempt follow-up drilling to search for similar mineralization of greater width, better gold grade, and perhaps positioned at more shallow depths. Pulling the data together to demonstrate the promising geologic setting and prospective nature of numerous untested mineralized zones was proposed. It would require preparing new map/cross section diagrams and an accompanying report to promote the considerable remaining exploration potential for precious metals in the eroded-out stratovolcano core zone. The diagrams and report would also be used to approach major mining companies to seek possible joint venture interest. In December, 2001, it was agreed to make an attempt with limited staffing to compile all the Cerro Eskapa project geological, geochemical and geophysical data together into a set of maps and cross sections with the aim of documenting the remaining target possibilities in the eroded-out stratovolcano core zone, and producing an up-to-date technical report summarizing the exploration work and results. The compilation work would formidably require the organization and evaluation of an immense body of geochemical analytical results for both surface and core samples, translating/summarizing core log descriptions into more-easily useable form, constructing new cross sections of all the drill holes, producing up-to-date geologic map and cross sections of the eroded-out stratovolcano core zone and Breccia Area, and attempting to better integrate the geochemical and geophysical data into a cohesive exploration picture. The compilation work and generating new maps and cross sections was carried out between January-April, 2002 and then report writing continued on a sporadic basis during late-July-August and October, later the same year.

The evaluation first focused on DDH-EK-99-02 and DDH-EK-01-11 which would provide a model cross-section picture from the surface to great depth of the relationships between geologic features, alteration zoning, distribution of precious-metal mineralization, and geochemical patterns of pathfinder and base metals. The cohesive picture in cross section, which resulted from integrating these various types of data together for these two holes, was then used to better interpret and depict results of 1999 program drill holes. The new cross section interpretations explain why many of the holes of the 1999 program had failed to intersect the intended vuggy silica rock target, and also show how some of these targets remain important and should be drill tested in the future. The new drill cross sections also helped prepare the surface maps of the bedrock geologic setting, draw the long cross section across the eroded out stratovolcano core zone and depict the distribution of anomalous pathfinder and base metals, and interpretation of IP survey results as a series of overlays. The maps/overlays demonstrate that, within the eroded-out stratovolcano core zone, ten prospective zones (I-X) are present, of which all have the potential to host, at depth, gold-bearing, high-grade, copper-silver-antimony-bismuth mineralization. Except for DDH-EK-01-11 on the east end of Zone III, none of prospective zones have been drill tested at depths greater than 150 meters vertical below the surface. High-priority drill targets along the prospective zones have been identified in hydrothermal breccia environment and specific site locations have been selected to attempt moderate to deep holes. Oral presentations of the preliminary results and interpretations of these remaining target possibilities were given to Odin Christensen of Newmont Gold and Nate Brewer of Goldfields in 2002, and both individuals indicated they would like to visit the property and review the prospective area and drill core as soon as this could be accommodated by SAMEX.

8.5.37 **<u>Importance Of DDH-EK-01-11</u>** – The drill intersection of DDH-EK-01-11 through Zone III demonstrates that the mineralization/alteration system is, with depth, increasing in strength and becomes gold-bearing in association with the appearance of veins and veinlets of high-grade, silver-copper-antimony-bismuth sulfosalt-sulfide mineralization. A thick (approximately 80-meters across) interval comprised of three thick and numerous thinner, closely spaced strands of pyritiferous, vuggy silica rock within an associated wide envelope of pervasive advanced-argillic alteration was intersected and substantiates a dramatic increase in width compared to relatively narrow surface exposures. Although abundant fine-grained pyrite is commonly present, most of the strands of the vuggy silica rock intersected did not prove to contain anomalous gold or silver values. However, a 0.2 meter-recovered thickness of a massive, sulfosalt-sulfide vein with halo of disseminated sulfosalt-sulfide minerals of similar polymetallic character was intersected toward the footwall of the wide interval of sheeted vuggy silica rock strands. The vein is a later feature, which cross cuts the vuggy silica rock, and was found to contain high-grade values of copper (6.1%), silver (1890 grams/metric ton), antimony (4.18%), and bismuth (2.93%) with an interesting gold content (1.18 grams/metric ton). The gross value of the precious- and base-metal content of this high-grade copper-rich vein is approximately $650 (U.S.). A second, narrow, silica-barite vein interval (0.10 meters thick), intersected slightly higher in the hole, is curiously of different character/generation (?) and contains 1.28 grams/metric ton gold, but with markedly lower (only moderately anomalous) amounts of copper, silver, antimony, and bismuth. The results of DDH-EK-01-11successfully demonstrated the validity of the geologic model behind the target concept. Indeed, gold-bearing, high-grade copper-silver-antimony-bismuth-rich sulfide mineralization occurs at depth along the prospective Zone III of vuggy silica rock within the eroded-out stratovolcano core zone. Importantly, low-level, detectible values (>5 ppb/<50 ppb) of gold are scarce in samples from surface outcrop and core from the 1999 drill program, whereas numerous anomalous values (222 to 1280 ppb) were found in all intervals of DDH-EK-01-11 where weak to high-grade copper sulfide mineralization was intersected. The range in gold values represents an x40 to x250 increase with depth. Hence, the gold-bearing part of the mineralization/alteration system at Cerro Eskapa is not eroded off as postulated earlier, but is entirely preserved at depth intact. Also, there is the reasonable possibility that gold values continue to increase, perhaps substantially, at depth and laterally (i.e. westward) to the drill intersection of DDH-EK-01-11. The depth to the top of where significant gold and high-grade copper-silver-antimony-bismuth mineralization appears in the eroded-out stratovolcano core zone cannot yet be pinned down by the one drill intersection. At El Indio, highly productive parts of gold-mineralized veins and breccia have a restricted 200 meters of down-dip (near-vertical) extent. Because the target interval of vuggy silica (Zone III) was intersected at much greater depth than planned, a highly prospective up-dip segment approximately 250 meters in length, between where Zone III was penetrated in DDH-EK-99-11 and DDH-EK-01-02, remains untested. Hence, the possibility remains that DDH-EK-01-11 penetrated to a depth below the vertical extent of best gold grade. Even, if the intersection represents the top of where significantly anomalous gold values appear and perhaps continue to increase with depth, the intercept in DDH-EK-01-11 is still well above the base of the stratovolcano and significant ore mineralization occurring at this level could be accessible via tunnels and declines.

Combined together in cross section view, the results of DDH-EK-99-02 and DDH-EK-01-11 disclose many features of the mineralizing system in the eroded-out stratovolcano core zone, which give justification and a positive outlook for further exploration drilling. The vuggy silica rock and associated advanced-argillic alteration envelope of Zone III were demonstrated to persist to great depth with a gradual, but significant, increase in width and number of prospective strands. The appearance at depth of veins, veinlets, disseminated, and fracture coatings of gold-bearing, high-grade copper-silver-antimony-bismuth sulfosalt-sulfide mineralization cutting the vuggy silica rock is most noteworthy. Well-developed, overlapping haloes of base (i.e. lead and zinc) and pathfinder metals (i.e. antimony, arsenic, mercury and thallium) surrounding the gold-bearing, polymetallic sulfosalt-sulfide vein and interval of vuggy silica rock strands were defined from the geochemical analytical data for the two drill holes and carried to the surface using analytical results on samples collected from outcrops nearby to the drill holes. The haloes of anomalous metals have obvious exploration significance by demonstrating both vertical and lateral coherent metal zoning patterns relative to the central position of vuggy silica rock and precious-metal-bearing, copper-rich, polymetallic sulfosalt/sulfide vein mineralization. In addition, the central interval of vuggy silica rock is the clearly the principal focus of precious-metal mineralization which changes from gold-poor, silver-antimony-lead (sulfosalt) with anomalous mercury and arsenic at high levels downward into gold-bearing, high-grade, copper-silver-antimony-bismuth (sulfide). Hence, based on the relationships in cross section, the appearance of advanced-argillic alteration in core and presence of anomalous amounts of base- and pathfinder metals indicates the near-by position (perhaps <60 meters) of potentially well-mineralized veined intervals of gold-bearing, high-grade copper-silver-antimony-bismuth sulfosalt-sulfide. Parts of similar haloes of anomalous base- and pathfinder metals are also defined to depth by geochemical analytical results for DDH-EK-99-08 suggesting proximity to mineralized Zone IV. Importantly, the analytical results suggest the latter hole passed through a long interval of detectible gold values suggesting the existence of a gold halo in this area.

8.5.38 **<u>Target Implications Of DDH-EK-99-02 and –EK-01-11</u>** – Extrapolating the relationships westward along Zone III and to the other nine prospective zones is re-enforced by their similar character (vuggy silica rock, silicified breccia), associated argillic and advanced-argillic alteration and metal haloes, locally strong silver-lead-antimony sulfosalt mineralization, and presence of anomalous pathfinder metals (i.e. mercury). These features suggest that gold-bearing, high-grade copper-silver-antimony-bismuth sulfide mineralization of unknown grade/thickness/character is likely also present at depth along all of the prospective zones. The gold-bearing, high-grade copper-silver-antimony-bismuth sulfosalt-sulfide vein intersections obtained in DDH-EK-01-11 appear to be narrow, but may not be, or likely are not, necessarily typical of widths of mineralization everywhere. The two holes (DDH-EK-99-02 and DDH-EK-01-11) are located on the far southeastern end of Zone III where "tight" massive porphyritic dacite is the host rock to Zone III. In the central and west parts of the eroded-out stratovolcano core zone, long strike lengths of Zone III and many of the other zones trend across an area underlain dominantly by pre-mineral, hydrothermal breccia which might be a more-favorable host rock for formation of thicker veins and wider amounts of veinlet and disseminated mineralization of better grade. The area of the hydrothermal breccias may also be more proximal to, or comprise, the more strongly mineralized central part of the system. In this area, the distribution of anomalous pathfinder metals (i.e. mercury) becomes much more extensive. While the gold grade is low in veins intersected in DDH-EK-01-11, the marked improvement in gold grade from generally less-than-detectible levels at the surface to greater than one gram/metric ton with depth, leaves open the possibility that perhaps the gold grade continues to substantially increase at depth, laterally, or even to higher levels. Again, the location of the vein intercept in DDH-EK-01-11, which was perhaps drilled too deep, could be distal to the central part of the system where gold grades are much higher. Lastly, the presence of apparently two types of gold-bearing veins intersected in DDH-EK-01-11: copper-sulfide and silica-barite (with low copper content), implies a separate gold-mineralizing event and further supports the possibility that untested areas exist with much-stronger gold mineralization. Considering the number of prospective zones, their cumulative long strike length and down-dip/depth extent, possibility of greater widths, and improvement in grade (i.e. gold), the exploration up-side still remains strong, especially in light of lack of drill testing. If only 40% of the cumulative strike-length of the prospective zones should be highly mineralized and using only a 4.0-meter average width, and 300-meter down-dip extent, would speculatively, but conservatively, suggest a significant resource of between 20M to 25M metric tons could be present.

8.5.39 **<u>Comparison Of Cerro Eskapa To Similar High-Sulfidation Precious-Metal Deposits Of the Cordillera Occidental</u>** - The data compilation work and interpretations naturally led to a comparison of Cerro Eskapa with other high-sulfidation/acid-sulfate, precious-metal mineralized systems along the Cordillera Occidental of South America. El Indio-Tambo District and Choquelimpie, Chile became two obvious and possibly best analogs to speculating on the style, grade, and resource size of gold-silver, gold-copper-silver-polymetallic mineralization possibly preserved at depth at Cerro Eskapa. Pertinent summaries of these two precious-metal/high sulfidation deposits are given below (see Table 3).

El Indio-Tambo – This review is mostly from the excellent summary of the El Indio-Tambo gold-copper deposits by Jannas and others (1999). The El Indio-Tambo District is located 180 kilometers east-northeast of La Serena in the Cordillera Occidental near the Argentina border. Surface elevations range from 4000 to just over 4500 meters. The El Indio and Tambo mined areas include: vein-, stockwork-veinlet, and breccia-hosted, gold and gold-bearing copper-sulfide (enargite) mineralization hosted in a succession of dacitic to rhyodacitic volcanic tuffs and volcaniclastic rocks. The volcanic host rocks are related to eruptive volcanic activity associated with emplacement of felsic domes in a structurally complicated region. Periods of important igneous/volcanic activity date at 23-27 Ma and 14.9-16.0 Ma and are superposed on an older upper Paleozoic to Jurassic sequence of felsic and minor mafic intrusive and volcanic rocks intruded by diorite intrusive rocks (30 to 36 Ma). Jannas and others (1999) noted that, regionally, current surface erosional levels at El Indio-Tambo are deeper than for same-aged intrusive/volcanic rocks to the north in the Maricunga Belt where, for example, gold and copper-gold deposits are preserved in a little-eroded stratovolcano geologic setting. Although andesite and dacite flows are common in the upper part of the preserved volcanic sequence, El Indio-Tambo does not appear to be associated with a stratovolcano setting. Two periods of hydrothermal alteration post date the igneous activity at 13.1-10.8 Ma and 7.5-6.9 Ma. The high-sulfidation system which produced the alteration and mineralization at El Indio and Tambo may have been initiated with the second period of alteration and continued in duration afterwards for several million years. The age span of the El Indio-Tambo alteration and mineralization events is pointed out by Jannas and others (1998) to be similar to El Teniente porphyry copper deposit (i.e. roughly between 4 to 10 Ma). This age bracket has been refined to 6.2 to 9.4 Ma by Bissag and others, (2002). The total area of alteration and mineralization encompasses eight-kilometers long by perhaps three-kilometers across and is reported to contain +/-10 million ounces of gold, 100 million ounces of silver, and one million metric tons of copper with most of these reserves presumably hosted mostly in the two deposits. At El Indio, two types of veins are described: one is gold- and silver-bearing/copper sulfide; the other is pyrite-silica with weaker copper and silver. Both vein types are structurally controlled by cymoid loop and master shear structures. Advanced-argillic and vuggy silica-barite alteration envelopes are associated with the veins. Pebble dikes and hydrothermal breccia are reported to present to have formed widely before and after mineralization. The alteration diminishes outward into propylitic or weak argillic, but where numerous veins are close together alteration coalesces and becomes pervasive. Very little boiling of mineralizing fluids is said to be associated with vein formation. The typical grade of copper sulfide-sulfosalt veins of El Indio is reported to be 6% to 10% copper, 120 g/t silver, and with a few g/t gold. They are composed principally of enargite-pyrite and some accessory sulfosalt minerals (i.e. tetrahedrite-tennantite), chalcopyrite, chalcocite-digenite, sphalerite, and galena. Anomalous to possibly important amounts of bismuth and antimony may be associated with the copper-gold-silver veins, but no values are given. Highly anomalous levels of mercury and arsenic are also said to be present in these veins. Productive "principal" copper veins, range in width from 3 to 10 m. (up to 20 m.), have strike lengths that can reach 1000 m., and depth extents in excess of 400 m. Hence, individual copper veins can host well-in excess of a million metric tons of copper-gold-silver ore. The gold veins of El Indio, which are younger than the copper veins, typically run several percent copper, 18 to 30 g/t gold, and 40 g/t silver. Values of gold greater than 1000 g/t are locally present and not uncommon; and productive ore shoots within veins can average >100 g/t gold. The width (typically 1-2 m/few cm. up to 5 m.), strike-length (150 to 500 meters) and productive depth extent of gold veins tend to be more limited than those dimensions of the earlier copper veins. Importantly, the productive dip extent of gold veins may be only several hundred meters (?)), but one important gold vein is shown to have a 400-meter down-dip extent. The production and reserves at El Indio into late-1999 were stated to amount to 23.2.Mt at 6.6 g/t Au, 50 g/t Ag, 4% Cu for copper-gold veins (gross metal value +/-$150 to +/-$165 (U.S.)/metric ton), and 0.5 M t of 121 g/t gold for bonanza grade gold veins (gross metal value +/-$1170 to +/-$1600 (U.S.)/metric ton). Thus production and reserves amount to nearly 5M oz. of gold, 37M oz. of silver, 2000M pounds of copper which should be noted to be from an area of approximately 500 by 150 meters. Apparently, the exhaustion of the high-grade gold vein ore and the insufficient grade against low metal prices of deeper parts of copper-gold-silver veins led to the decision by Barrick Gold to shut down the mine in 1998. The gold mineralization at Tambo is hosted in hydrothermal breccia as silicified fracture zones cemented by barite-alunite-quartz and also occurs along some minor enargite-bearing vein structures. Mineralizing fluids at Tambo were oxidized and widely boiling. Gold grades of the breccia-hosted ore are reported to vary from 4 to 10 g/t (up to 40 g/t) with 10 g/t silver and no significant copper content; veins at Tambo average 15 g/t gold and 30 g/t silver. Gold at Tambo is reportedly tightly controlled over 200 meters of vertical depth extent below which silver mineralization begins to dominate and gold content diminishes. The production grade of the small open pits at Tambo is stated to average 7.0 g/t gold (gross metal value $67 (U.S.)/metric ton). From the grade and map/cross section information presented in Jannas and others (1999), the ore reserves at Tambo are guessed to have amounted to between 20M to 30M cumulative metric tons. How much was mined and what was the average ore grade are uncertain. Speculatively, perhaps 10M to 15M metric tons were mined and maybe 1.5M to 2.8M oz. of gold were produced.

The vein systems of El Indio are exposed via erosion at the surface and an unknown, possibly significant amount of (gold-bearing) vein material must have been eroded off. The nature of the upper-most part of the El Indio vein system is not widely preserved and could not be well-documented and those features compared to Cerro Eskapa. Apparently, in an area of capping unaltered/little altered, pre-ore, andesite lava flows, the upper part of veins (Jalene area) were observed to horsetail into thin veinlets disappearing within 30 meters above the contact between tuff and capping andesite. The features and character of these veins from this level down into productive ore shoots are unfortunately not described (perhaps are unknown). A less significant part (only the side (?)) of the Tambo deposit appears to have also been eroded away and the upper part of the system above the gold ore bodies is preserved. This capping rock is described as being comprised of alunite-kaolinite (clay) blanket and underlying 20 meter-thick tabular, horizontal (?), silicified breccia layer – both are barren of gold mineralization.

Choquelimpie – This summary is largely derived from a company news release put out in September, 1998 by South American Gold and Copper Company (Toronto) (SAGC) and a technical paper by Grogger and others (1991). The Choquelimpie deposit is located in the Cordillera Occidental in the northern part of Chile approximately 45 kilometers northeast of Chungara which is close to the frontier with Bolivia. The mining history covers a span of 450 years dating back to Spanish Colonial period mostly as sporadic underground exploitation of higher grade gold-silver-copper veins. The prospective area of strongest alteration and gold-silver-copper mineralization is approximately five-square kilometers and is nested within a 12-square mile area of an eroded large stratovolcano of late-Miocene age. The surface elevations of the open pit-mined area are around 4600 meters. The alteration is focused on a dacite intrusion which is highly fractured and cut by a swarm of steep fault structures up to 40-meters wide. These structures trend west-northwest (N60oW) and controlled the emplacement of later hydrothermal breccia over an area of 3000-meters long by 1300-meters wide. Strong argillic-sericitic to advanced-argillic and vuggy silica-barite alteration are focused in along the breccia zones which contain pyrite-enargite+/-chalcopyrite mineralization. A joint-venture consortium led by Shell (Billiton) drilled out an oxide-gold, open-pit resource using closely spaced, vertical reverse-circulation holes (25-meter grid) drilled to shallow depth. A precious-metal resource of close to 1M troy ounces of gold and 23.5M troy ounces of silver was outlined by the drilling (Grogger and others, 1991). From 1992 to 1995, 7.7 M metric tons of ore, with a grade of approximately 2.0 grams/metric ton and 12.0 grams/metric ton silver, were produced from several open pits (398,904 oz. of gold, 2,192,062 oz. of silver). Between 1995 and 1998, an additional 30,000 ounces of gold were recovered during reprocessing of dumps and cleaning cyanide from leach stacks as part of environmental reclamation (see Kappes-Cassidy web site). In 1998, SAGC obtained a joint-venture option with the owner Sociedad Contractual Minera Vilacollo (SCMV) to explore and develop the property earning a 50% interest. Their initial exploration work consisted of horizontal sampling pit walls which found that gold mineralization was concentrated in specific steep breccia structures with widths ranging between 9 to 15 meters and with a precious metals content of 5.0 to 12.4 grams/metric ton gold equivalent. A 12-meter deep shaft had been sunk from the floor of one of the pits (Suri) by SCMV and they had drifted 282 meters along one of the breccia zones. Sampling by SAGC showed an average grade of 13.92 grams/metric ton gold, 72.1 grams/metric ton silver, and 2.04% copper over an average width of 6.4 meters (18.95 grams/metric ton gold equivalent) for a +70-meter-long (N60^{o}W trending) segment of the Suri breccia. Additional reverse-circulation drilling by SCMV increased this length to 144 meters. Another breccia located 35 meters west of the Suri breccia was drifted on by an old mine working positioned 115 meters lower than the level of the drift beneath the Suri pit floor. This breccia structure ranges 10 to 15 meters wide and samples gave an average of 17.5 grams/metric ton gold over a 4.2 meter width suggesting a possible significant and rapid grade increase with depth. SAGC concluded that (a) the breccia bodies were consistently precious-metal mineralized and comprise attractive exploration targets; and (2) the high-grade mineralized prospective nature of the breccias could not have been appreciated by the short vertical holes drilled by Shell to define the open-pit oxide resource. They determined that higher level alteration is typically argillic-sericitic with finely disseminated arsenopyrite, pyrite, barite, and erratically distributed orpiment and with a gold content of between 2 to 3 grams/metric ton. Although no information is given, high levels of pathfinder metals (i.e. mercury and arsenic) are likely present. Deeper level mineralization is associated with silicification, advanced-argillic alteration and vuggy silica and contains coarsely disseminated pyrite and enargite with a gold content which ranges from 3.5 to 17.5 grams/metric ton gold, 1.5% to 2% copper and 60 to 72 grams/metric ton silver. SAGC postulated that the mineralized breccia bodies of/near Suri pit host, to a depth of 200 meters, approximately 9 M metric tons of 5 grams/metric ton gold equivalent; and that to a depth of 500 meters this resource is increased to 22 M metric tons of same grade, but with a significant amount of higher grade ore running 8 to 10 grams/metric ton gold equivalent. A block of higher grade ore of 165,000 metric tons (proven (?)) and 182,000 metric tons (probable) with 11.43 grams/metric ton gold, 63 grams/metric ton silver, 1.77% copper), 7.8 meters average width, 144 meters in length, 52 depth extent was stated to be readily accessible for rapid development of a 500 metric tons/day at cash cost of $165 (U.S.)/ounce of gold equivalent. This grade has a gross metal value of $150 (U.S.)/metric ton [or $125 (U.S.)/metric ton recoverable value] and, based on El Indio, would seem to be at-best marginal to support an underground stope mining operation. SAGC also outlined considerable upside potential for finding additional high-grade, precious-metal-mineralized breccias and possibility for larger, low-grade (0.8 to 1.5 grams/metric ton gold) open-pit deposit. They compared the geologic setting, high-sulfidation system at Choquelimpie to the El Indio and Pascua precious-metal deposits in Chile and Cerro de Pasco and Morcocha in Peru. However, despite the encouraging results of their initial exploration effort, SAGC could not come up with the financing to meet requirements for the 50% earn-in and was forced to drop out of the agreement in November, 1998. A new joint-venture group led by SCMV has recently announced (November, 2002) intentions to raise $15M (U.S.) to put the Choquelimpie project into production with a late-2002/early 2003 start-up date at 1000 metric tons/day via sub-level-stope mining of established proven and probable reserves (giving 5-year mine life) and to also explore the potential of the other breccia targets on the property.

8.5.40 <u>Comparisons Of Alteration/Mineralization Features And Target Implications For Cerro Eskapa</u> – As expected, there is a common thread connecting similar geologic features common to high-sulfidation type of precious-metal deposits between the Cerro Eskapa prospect and El Indio/Tambo and Choquelimpie (Table 3). The stratovolcano geologic setting of Cerro Eskapa and Choquelimpie and presence of hydrothermal breccia would seem to make these two prospects most similar to each other. However, the nature of the deep gold-bearing, high-grade copper-silver-antimony-bismuth sulfide-sulfosalt vein intersection in DDH-EK-01-11 seems more akin to description and metal composition of gold-copper-silver veins of El Indio.

<u>Cerro Eskapa – Choquelimpie</u> - The comparisons of geologic setting and features between Cerro Eskapa and Choquelimpie seem most compelling. The geologic setting of Cerro Eskapa and Choquelimpie appears to be the most similar; both being eroded late-Miocene stratovolcanoes with dacite domes intruding the core zone which is affected by strong clay-pyrite alteration and crossed by structurally controlled, west-northwest-trending breccia swarm. The prospective areas, where alteration/mineralization is developed strongest, are similarly positioned, at both areas, in the stratovolcano core zone and with pronounced west-northwest structural control for emplacement of hydrothermal breccia. At Choquelimpie, hydrothermal breccia is the important host rock of gold-silver-copper mineralization. Scattered, outcropping chimneys of moderate- to high-grade, silver-lead-antimony-mineralized breccia replaced by vuggy silica-barite, and extensive areas of clay-pyrite-altered hydrothermal breccia with high mercury content, suggest similar potential for deeper seated, similar style of precious-metal mineralization at Cerro Eskapa. The prospective area of breccia zones at Cerro Eskapa may be slightly larger (approximately 3000-meters long by 2000-meters wide) and perhaps contains a greater number (ten) of principal altered/mineralized structures (zones) than at Choquelimpie. The level of erosion at Cerro Eskapa would seem to be slightly (?) higher in the system than that exposed at Choquelimpie and will necessitate deeper drilling to search for the breccia-hosted mineralization. The only drill hole at Cerro Eskapa, to so far test one of the mineralized zones at deeper depths, intersected a massive sulfide vein structure which has a very high silver, copper, antimony, and bismuth content, an interesting gold credit, and a higher gross metal value ($650 U.S./metric ton) than breccia-hosted, gold-silver-copper mineralization of Choquelimpie. The much-higher silver and copper values and presence of antimony and bismuth are markedly different and could reflect a more complex mineral assemblage compared to simpler (?) gold-silver-copper-sulfide mineralization described for Choquelimpie.

<u>Cerro Eskapa – El Indio/Tambo</u> - At first glance, the geologic setting (i.e. stratovolcano/resurgent rhyodacite-dacite intrusive domes versus rhyodacitic pyroclastic rocks (volcanic complex) and the age of Cerro Eskapa and El Indio-Tambo appears significantly different. The source for alteration/mineralization fluids/vapors is presumed at both areas to be a deep-seated, porphyry copper intrusion, which at Cerro Eskapa, was emplaced below an older stratovolcano setting, and at El Indio-Tambo into a layered volcanic sequence. While Cerro Eskapa is situated in a different geologic setting, is younger, and exposes a higher part of the system, aspects of the style and features of mineralization/alteration are similar. Vein zones at El Indio contain much vuggy silica (alteration) and are cut by copper-gold-silver sulfosalt-sulfide veins and later gold-silica-barite veins. Argillic and advanced-argillic alteration envelopes occur as selvages to the vuggy silica and the sulfide-sulfosalt veins. The similarity of the alteration types and relationship to the vuggy silica zones and

precious metal-bearing, sulfosalt-sulfide veins at Cerro Eskapa is strikingly identical. The complicated structural controls (cymoidal configuration of faulting) for productive veins for El Indio do not seem to be present at Cerro Eskapa. An important, west-northwest to northeast-trending structural control is conspicuous for the ten mineralized zones of hydrothermal breccia and vuggy silica in the eroded-out stratovolcano core zone at Cerro Eskapa. A more complex structural configuration may be present at deeper levels as suggested by the complex branching of numerous vuggy silica strands and appearance of sulfosalt-sulfide veins occurring within a much wider associated envelope of advanced-argillic alteration as encountered in the drill-hole intersection in DDH-EK-01-11. The gold-bearing, copper-silver-antimony-bismuth sulfosalt-sulfide veins intersected in DDH-EK-01-11 are more similar in character to the copper-gold veins at El Indio, but contain much higher silver and somewhat lower gold than is reported to be typical. A distinct set of later gold veins has not been clearly identified at Cerro Eskapa, but may be present as hinted by the occurrence of the gold-bearing, silica-barite vein interval with relatively low copper and silver content in drill hole DDH-EK-01-11. The much-greater, gross value of the metal content of the sulfide-sulfosalt vein at Cerro Eskapa is due to the exceptionally high silver and important amounts of antimony and bismuth. The antimony and bismuth contents of El Indio copper-gold sulfide ore are not available, but are not thought to be sufficiently high enough to be recoverable. The only intercept into the gold-bearing, copper-silver-antimony-bismuth sulfosalt-sulfide vein at Cerro Eskapa did not preserve the entire interval intact because of the friable nature of the massive material and shearing along the contact margins, but based on measured core recovery is likely still narrow – probably around 0.3-meters width. This width does not compare to the greater widths of meters to 20 meters for copper-rich, sulfosalt-sulfide veins at El Indio. However, many/most of the veins at El Indio are only centimeters to fraction of meters in width and only segments perhaps to 100's meters in length are thick enough to comprise principal productive veins. The area of sulfide veins occurrences at El Indio is approximately 2 km. by 2 km., but because of narrow widths and scattered vein distribution, production is mostly from the cymoidal fault loop area of 500 meters by 150 meters where vein abundance increases, marked vein thickening occurs, and gold is highly enriched (i.e. along master shears). The possibility that sulfide-sulfosalt veins at Cerro Eskapa increase to thick mineable widths over a substantial strike length and become especially gold-enriched cannot be yet demonstrated, but remains a distinct possibility and there is plenty of untested "room" to host importantly thick segments and complexly veined areas. Targets similar to the gold-mineralized hydrothermal breccia bodies of Tambo are also present at Cerro Eskapa and are demonstrated by outcropping vuggy-silica barite breccia chimneys (after breccia) which contain high-grade silver-lead-antimony and high mercury content.

Summary - In conclusion, the implications of the comparison of Cerro Eskapa with El Indio-Tambo and Choquelimpie suggest the following:

(1) Cerro Eskapa is a precious-metal-mineralized, high-sulfidation system which bears many similarities to geologic setting and features to Choquelimpie and El Indio-Tambo.

(2) The level of exposure at Cerro Eskapa is higher than at either El Indio or Choquelimpie and precious-metal/copper-antimony-bismuth sulfosalt-sulfide mineralization is thus un-eroded and preserved intact at depth along well-defined, prospective mineralized zones.

(3) The size of the prospective altered/mineralized area and intensity of alteration/mineralization at Cerro Eskapa is similar in area to that at El Indio-Tambo and Choquelimpie. This implies that a well-developed and possibly potent/large precious-metal mineralized system is present at Cerro Eskapa.

(4) Both vein and breccia-hosted, precious-metal, sulfosalt-sulfide mineralization occur at Cerro

Eskapa and, based on the number and extent of prospective mineralized zones, could prove to comprise a significant resource for gold, silver, copper, antimony, and bismuth..

(5) The possibility remains that considerably more-auriferous parts of the mineralization at Cerro Eskapa are present at depth along the mineralized zones especially in the west part of the prospective area.

(6) The range in grade and size of the targets at Cerro Eskapa might be bracketed by El Indio-Tambo and Choquelimpie examples of high-sulfidation, precious-metal mineralized systems. With approximately 14.0 kilometers of cumulative strike length and precious-metal-copper mineralization being preserved at depth intact leads to following speculation of the possible resources present (to be explored for) at Cerro Eskapa. Vein systems at Cerro Eskapa could cumulatively amount to 20M to 30M metric tons containing an average grade in the range of 4% to 10% copper, 1000 to 2000 g/mt silver, 2% to 4% antimony, and 1% to 2% bismuth with a gold credit between 2 to 30 g/mt (or more). Breccia zones possibly could be expected to contain more-disseminated style of mineralization of lower grade, but over greater widths suggesting 10M to 50M cumulative metric ton resource with perhaps a grade ranging between 2% to 4% copper, 400 to 1000 g/mt silver, and 2 to 10 g/mt gold.

8.5.41 Target Ideas Developed For Proposed Future Drill Testing – After the detailed review of exploration data for Cerro Eskapa and comparisons made with precious-metal mineralized, high-sulfidation systems of El Indio-Tambo and Choquelimpie, the long segments of mineralized zones at Cerro Eskapa appear to have tremendous potential for moderate- to high-grade precious-metal and copper mineralization and these have yet to be tested by drilling. The location of the only deep drill test (DDH-EK-01-11) was perhaps sited too far to the southeast and distal from the principal area of mineralization, but does give a glimpse of the existence of gold-bearing, high-grade, silver-copper-antimony-bismuth sulfosalt-sulfide veins and disseminations, and encouragingly demonstrates the vuggy silica-barite/advanced-argillic alteration are, with depth, increasing with width and not showing signs of pitching out. The important question which arises is what will be the nature of mineralization where host rocks are hydrothermal breccia and especially where located more proximal to the central part of the system. A drill program involving 4,500 meters of core drilling in up to 12 holes is proposed to test at depths of up to 400 meters down across well-defined targets along mineralized zones I, II, III, IV, V, IX, and X. Most of the holes are positioned to test silver-mineralized, vuggy silica-barite developed in hydrothermal breccia which could lead downward into gold-bearing, high-grade, copper-silver sulfosalt-sulfide mineralization. Several of the proposed holes are located to test hydrothermal breccia bodies which are silicified and with highly anomalous mercury and arsenic content. One hole is designed to test a strong IP chargeability anomaly/resistivity low associated with highly anomalous mercury, arsenic and antimony values within Zone IX. The cost to carry out the 4,500 meter drilling program is estimated to be approximately US $1,000,000 and would take six months to complete.

9.0.0 GEOLOGIC SETTING

9.1.0 Regional Geologic Setting- The Cerro Eskapa property is located within the Cordillera Occidental which, in this region of South America, is a broad belt of late-Tertiary to Quaternary andesitic/dacitic stratovolcanoes which stand in high-relief over a weakly dissected plateau of outboard lava flows, mid- to late-Tertiary pyroclastic volcanic rocks, and sedimentary rocks. The regional geologic map shows that the belt of abundant stratovolcanoes is separated from very thick Tertiary and Cretaceous continental sedimentary rocks of the Bolivian Altiplano to the east by a fundamental crustal break presumed to be a major, fault structure (Marsh and others, 1992). Only a few widely scattered stratovolcanoes occur east of the line. The thick Tertiary continental clastic and volcanic rocks which overlie and mostly conceal basement of deformed Paleozoic sedimentary rocks in the Altiplano appear to be much thinner or largely missing in the Cordillera Occidental. Basement of deformed, undifferentiated Paleozoic sedimentary rocks, which underlie this region west of Cerro Eskapa, are shown on the geologic map to be exposed in erosional windows through outboard andesite-dacite lava flows and thick ignimbrite deposits at locations 7 km. and 15 km. southwest of the property. SAMEX geologists visited one of the window locations nearest the property and found lead-zinc-silver sulfide veins hosted in Ordovician (?), highly cleaved and folded, thin-bedded, black shale and siltstone. The Tertiary sedimentary section in the terrane to the east is dominated by red- to yellow-colored interlayered sandstone, siltstone, and shale and a thick, pyroclastic blanket of air-fall tuff. Some volcaniclastic units are also present. The fault (?), which separates the two terranes, is interpreted to be north-northwest-trending and to perhaps pass through or just to the west of the Cerro Eskapa stratovolcano. The nature/history of fault displacement is unknown, but is presumed to have allowed the east block to have been down-dropped, perhaps syn-depositionally, during the early to mid-Tertiary. Other important crossing lineaments, San Augustin, Cortadera and Chiguana, and a north-trending anticlinal arch in Tertiary sedimentary and volcanic rocks are shown by Heredia and Rios (1995) to pass near the property.

9.2.0 <u>Regional Metallogenic Settng</u>

9.2.1 <u>Introduction</u> - Cerro Eskapa is not located within or close to other known mining districts or important mineralized areas or belts in Bolivia (see Figure 5). Hydrothermal alteration (clay-sulfoteric) is commonly located at the high-altitude upper reaches of the vent area of most nearby late-Tertiary to Quaternary stratovolcanoes of the Cordillera Occidental, and some have been prospected for small deposits of native sulfur with meager production. The sulfoteric-altered, upper-part of Cerro Eskapa stratovolcano has been long eroded off. One altered area situated high on the little-eroded, Cerro Cachi Laguna stratovolcano, located 50 kilometers south of Cerro Eskapa, was explored by EMICRUZ (now defunct joint-venture exploration group of COMSUR and RTZ) in the mid- to late-1990's for epithermal gold-silver deposits with rumored encouraging results of narrow, but high-grade (?) intercepts of gold-silver mineralization in several drill holes. Geologic details concerning the setting and nature (vein/breccia-hosted (?)) of the precious-metal occurrences at Cerro Cachi Laguna are not available. Apparently the occurrences of precious-metal mineralization are restricted and small and no appreciable resource could be found. While the mineralization and alteration, which were explored at Cachi Laguna, are apparently more limited and restricted to the high-elevation, upper regions of the stratovolcano, Cerro Eskapa has been much-more eroded to expose a deeper part of the stratovolcano core zone and prospective alteration is intense and widespread over a large, readily accessible area. Of possible interest, Cerro Eskapa is positioned on a west-northwest-trending alignment of unique copper-mineralized intrusive centers of likely similar late-Tertiary age including from southeast to northwest: Esmoraca (W-Cu-Au), Santa Isabel (Cu-Au/Zn-Pb-Ag), and Escala (Cu-Au/Zn-Pb-Ag). Escala may also be positioned within a deeply eroded stratovolcano setting (Richter and others, 1992)). No fault zone has been yet demonstrated on regional geologic and airborne magnetic maps along the alignment of these deposits. The common theme between these deposits is the presence of important amounts of copper and gold, zoning expressed by outlying distal lead-zinc-silver mineralization central to a copper(-gold) core, general lack of tin, principal west-northwest structural control of important veins and mineralized structures, and similar age range for intrusive/volcanic rocks. The west-northwest-trending structures are the dominant control of mineralized vuggy silica-barite zones within the Cerro Eskapa stratovolcano core zone and also the principal vein and vein zone directions at Esmoraca, Santa Isabel and Escala. Interestingly, these three deposits in Bolivia all have an unusual copper-gold component and a continent-ward porphyry copper intrusion with strong base-metal (lead-zinc-silver) halo is postulated to maybe underlie Santa Isabel Further northwest (+/-110 airline km.) along the line, are the immense late-Eocene, porphyry copper deposits of Collahuasi and Quebrada Blanca. These two deposits are much older and may be fortuitous that they fall along the west-northwest line connecting the much younger Bolivian deposits. Another west-northwest-trending control of deposits also is well defined for Cholorque (Zn-Ag-Pb-Sn), Tasna (W-Au), and Ubina (W-Au). Another possible line can be drawn to connect Cerro Eskapa east through San Cristobal (Zn-Ag-Pb) and then Atocha-Chloroque (Zn-Ag-Pb-Sn), but there is very little in similarity between geologic features and type/style of mineralization between these deposits. A third, north-northeast-trending, line connects Cerro Eskapa with Pulacayo (Ag-Pb-Zn) and Cerro Rico (Potosi) (Ag-Pb-Zn-Sn) which lie to the northeast, but these are more typical of Bolivian-type polymetallic vein deposits. There are almost no similarities of geologic features, style and types of mineralization, and age similarities between these deposits and Cerro Eskapa. The strong, north-northeast-trending faults (San Augustin) which cross the Cerro Eskapa property, displace and appear younger than, the west-northeast mineralized zones of vuggy silica and breccia.

9.2.2 <u>Differences Between San Cristobal and Cerro Eskapa</u> - The highly publicized, San Cristobal zinc-silver-lead prospect (Apex Silver) is located 55 airline kilometers to the east-northeast of Cerro Eskapa in the Bolivian Altiplano. Sulfide mineralization and alteration at San Cristobal are reported to occur in a collapsed caldera geologic setting of intrusive dacitic domes (+/- 8 Ma) which were emplaced into folded Tertiary continental sedimentary and volcaniclastic rocks (Richter and others, 1992). San Cristobal mineralization and alteration are not situated in a stratovolcano setting. The sulfide ore deposits at San Cristobal comprise very large reserves of disseminated and veinlet mineralization (pyrite-sphalerite-galena) which are hosted in Tertiary volcaniclastic and lacustrine sediments, breccia bodies, and sericite-clay-altered intrusive domes. The deposits are zinc-rich and also contain an important silver and minor lead credit (+/-240 million metric tons of mostly proven reserves averaging – 1.67% zinc, 62 g/mt silver, and 0.58% lead). No significant copper is apparently present (Richter and others, 1992). The geologic setting and nature of the alteration and mineralization at San Cristobal could be a variation of a large sericite-adularia alteration/base-metal mineralizing system associated with hypabyssal intrusions that breached upward into a lake-filled, collapsed caldera (Buchanan, 1999 – oral presentation at PDAC, Toronto). Hence, perhaps deep circulation of hot connate waters is an important mechanism in alteration and deposition of zinc-silver-lead mineralization at San Cristobal. In comparison, silver-lead-antimony sulfosalt mineralization at Cerro Eskapa is hosted in vuggy silica-barite rock in an environment of widespread clay-pyrite alteration and locally strong silicification/clay-alunite-pyrite (advanced-argillic) alteration and is hosted in dacite-rhyodacite hypabyssal flow dome intrusions in a stratovolcano core zone. No appreciable zinc-sulfide mineralization is present. The nature of the alteration and the geochemical signature suggests Cerro Eskapa is the upper-most level of a high-sulfidation system developed, in part, from release of mostly magmatic fluids/vapors during the emplacement of a deep-seated, porphyry copper(-molybdenum) intrusion beneath a stratovolcano. Isotopic age dating indicates also that Cerro Eskapa (6.3 +/-0.1 Ma) is distinctly younger than dacite domes at San Cristobal (8.0 +/-0.1 Ma) (Table C-1 in USGS Geological Survey Bulletin 1975). Hence, the two prospect areas are much different from the standpoint of geologic setting, type of alteration/mineralization system, and age.

9.2.3 <u>Relationships To Magmatic And Metallogenic Belts Of The Cordillera Occidental Of South America</u> - On a grand scale, Cerro Eskapa falls broadly into an inboard north-trending long magmatic belt of mid- to late Miocene igneous intrusive/volcanic activity that extends from perhaps Ecquador southwards through Peru and into Chile and Argentina (Davidson and Mpodozis, 1991). The late-Miocene magmatic belt lies to the east of the Eocene-Early Oligocene porphyry copper belt and is superposed over earlier Oligocene-Miocene volcanic and intrusive rocks which host the largest number of precious-metal deposits (i.e. Yanacocha, Pierina, El Indio-Tambo, Veladero, Pascua, Nevada, La Pepa, Lobo, Marte, and La Coipa). Deposits are associated with argillic and advanced-argillic altered centers in intrusive/volcanic complexes; some however do occur in stratovolcano geologic settings. The main alteration/mineralization events were typically initiated at around 23 Ma and continued sporadically to approximately 8 Ma or slightly younger. The overprinting by late-Miocene magmatism occurred along segments where the Benioff zone remained steep and intrusive/volcanic rocks are typically intermediate in composition, comprised mostly of andesite and dacite, and occur as composite stratovolcanoes, calderas and subvolcanic intrusions. One of these segments is positioned northward from latitude 27°S and includes the area along the Bolivia and Chile frontier in which Cerro Eskapa is located. Widespread argillic and advanced-argillic hydrothermal alteration with native sulfur deposits are common to the stratovolcanoes and intrusive/volcanic complexes in this region. Although precious-metal deposits are sparse, these features are believed to represent a shallowly eroded epithermal environment. One important gold-silver deposit is Choquelimpie (Chile) which is late-Miocene in age and occurs in an exposed stratovolcano core zone. Cerro Eskapa is another new example of precious-metal mineralization hosted in a similar geologic environment and is very likely of similar age.

9.3.0 <u>Property Geologic Setting And Features</u>

9.3.1<u>Introduction</u> – Geologic mapping was carried out over a six-year time span on the Cerro Eskapa property in three different sectors: Stratovolcano Core Zone, Breccia Zone, and Copper Zone. Geological staffing for each year for who carried out the mapping is listed in Table 4. The current generalized geologic map of the eroded-out stratovolcano core zone (Plate 3) and long cross section (Plate 8) represent and summarize the compilation of mapping efforts including: brief reconnaissance "due-diligence" investigation (1:50,000) (1995-96)[a,b], detailed (1:2000) mapping effort over entire prospective area (1998-99)[c], and field review/corrections (1:2000) of previous detailed mapping (2000-2001)[d,e]. Geologic mapping and rock-chip sampling of the Copper Zone was carried out in January-February, 1999[c]. IP survey and drilling results helped better resolve distribution of geologic features (i.e. rock types and alteration). An effort was made to relate shallow IP responses to outcrop and float and, with drill hole control in some areas, allowed bedrock geologic relationships to be better interpreted especially in covered areas and in constructing cross sections. Parts of the Breccia Area were mapped in December, 1999[c] and then resumed from December, 2000 through February, 2001[d,e]. Budget and time constraints though did not allow for mapping of the Breccia Area to be as thorough as that carried out for the Stratovolcano Core Zone. For the Stratovolcano Core Zone and the Copper Zone, with the detailed survey control, outcrop locations were easily located and plotted on overlays to topographic map field sheet (1:2000). Other overlays were used to denote presence/type of sulfide and oxide minerals, alteration minerals and intensity, and plot structural features. Hence, the mapping of these two areas is considered overall adequate and accurate, but more time could still be spent tracing out various mineralized zones (especially where open ended) and conducting outcrop rock-chip sampling. Geologic mapping for the Breccia Area used the same approach, but was not as thorough because of lack of widespread outcrop exposure and time available to carry out the mapping. Uncertainties exist on the identification, position and correlation of some mineralized zones in the Breccia Area especially where fault complications may likely be present. IP survey results were used as much as possible in attempting to make interpretations on bedrock geologic features in covered areas. Mapping here was focused on road cuts and some ridge areas with outcrop, plus walking out all IP lines. The map data for the three areas was then transferred onto a smaller-scale, more-simplified 1:10000 base map for ease of use with this report. None of the mapping has been supplemented with thin-section observations, x-ray or PIMA clay analyses to determine alteration mineral assemblages, whole-rock wet chemical major element analyses, or other mineralogic investigative studies (reflecting ore or other x-ray/microprobe diagnostic techniques). Hence, the geologic maps represent the best field interpretations of rock types and general alteration assemblages using hand lens and binocular microscope examination.

ICP major-element analyses for sampled core from DDH-EK-01-11 do provide some useful information on geochemical relationships concerning effects of hypogene alteration. Some petrographic descriptions, whole-rock major element/oxide analyses, and clay analysis work are available in Rios and Heredia (1995). Results of IP surveys in the three areas are of some use in interpreting spatial and depth extent of various rock units and alteration especially where drill holes allow the detected electrical response to be related to rock type and alteration/mineralization features of the rock.

9.3.2 Geologic Features of the Cerro Eskapa Stratovolcano

9.3.2a Overview – The Cerro Eskapa stratovolcano is approximately 10-kilometers across and with an altitude of 5145 meters for the highest point. The details of mapped geologic relationships are displayed on Plates 3 and 28. Long cross-section interpretations are shown on Plates 8 and 31. The stratovolcano is composed of andesite and dacite lava flows and includes a core zone of intrusive flow domes of hypabyssal porphyritic dacite-rhyodacite. Strong hydrothermal alteration and considerable hydrothermal breccia are developed mostly restricted to the hypabyssal dacitic intrusive rocks in the core zone. Because of complex faulting, associated fracturing and, with additional "softening" effects of hydrothermal alteration, the core zone is extensively eroded. This much-eroded state of Cerro Eskapa compared to all the other stratovolcanoes in the surrounding region is a unique feature. The age of the Cerro Eskapa stratovolcano is not-well bracketed by isotopic age dating. The only K-Ar date by Richter and others (1992) gives an upper Tertiary age of 6.1 Ma on biotite from dacite flows (flow dome intrusion (?)) in the vicinity of the oxide-copper-mineralized pebble breccia bodies. Without much elaboration, an estimated older age of 10 to 12 Ma was assigned to the Cerro Eskapa stratovolcano by Rios and Heredia (1995) and this date is considered to be very speculative and likely incorrect (too old). From examining the 1:50,000 topographic map and high-altitude photographs, the stratovolcano has lost some of its characteristic circular/cone-shaped form and is now more horseshoe-shaped because the core zone is deeply eroded along a four kilometer-long, west-northwest valley direction of Rio Huailla Unu. This has left a steep west-facing wall which curves in open semi-circular fashion around the east side of the low-lying floor of the core zone/head of the valley. Compared to nearby stratovolcanoes presumed to be of similar age, Cerro Eskapa is not as high, is much-more eroded, and may have collapsed considerably. When viewing the stratovolcano from a distant vantage point in outlying pampa, the possible collapse is more apparent as outward-dipping lava flows can be observed to be now broken into large blocks which are rotated and displaced outward/downward away from (off of) the core zone. Some of these displacements appear to have occurred along/close to the contract to the intrusive flow dome(s). This gives the impression that the stratovolcano was once of massive size and height, but collapsed during and after additional resurgent (?) dacitic igneous intrusive activity/hydrothermal alteration events in the core zone. The topographic drainage expression clearly outlines prominent west-northwest- and north-northeast-trending lineaments that can be traced as part of regional fault systems. Importantly, several of the north-northeast-trending faults may be related to the regional San Augustin northeast-trending lineament. One of these faults is interpreted to be westward dipping and with combined normal and right-lateral displacement which has down-dropped and offset the west part of the breccia zones in the stratovolcano core zone to a position 1000-meters distance further to the southwest. The stratovolcano location is centered over the intersection of these two lineament directions suggesting this structural junction may have exerted some control on the position of stratovolcano and later hypabyssal igneous intrusive activity. Intersection of the igneous intrusive breccia by DDH-EK-01-1C and 4C in the Copper Zone suggests that late intrusive igneous rocks are positioned over a widespread area at depth beneath the base of the stratovolcano.

9.3.2b Rock Types - Introduction - The Cerro Eskapa stratovolcano is comprised of gently outward dipping, massive to layered, andesitic to dacitic flows which surround and cap hypabyssal porphyritic intrusion(s) of dacitic to rhyodacitic composition nested in the core zone (Plate 3). The only other rocks types present are hydrothermal breccia of variable textural character and, locally preserved, fresh, porphyritic lava flows of perhaps younger age than the flows comprising the stratovolcano. An outboard xenolithic porphyritic dacite intrusion, which is highly clay altered, was intersected beneath thick, capping dacite-andesite lava flows by drill holes DDH-EK-01-1C and -4C.

Volcanic Flows of Intermediate Composition – The dominant rock type of Cerro Eskapa are the voluminous andesite-dacite volcanic flows built up around the vent area of the stratovolcano. A map with plotted attitudes of the lava flows by Rios and Heredia (1995) shows a gentle outward dip of the lava flows which is still roughly concentric to the core zone. In detail, dominant attitudes of flow layering can change abruptly from one place to another because some blocks have been considerably rotated from faulting and collapse of the stratovolcano. The lava flows have not been examined in great detail and no effort has been made to attempt to define a stratigraphic sequence based on composition and/or rock types. Rios and Heredia (1995) give petrographic descriptions and whole-rock, major element analyses of stratovolcano flows/volcanic rocks which demonstrate a range in composition from andesite to dacite, but with a notable high potassium content which placed many of their samples into the rhyodacite and K (potassic)-andesite composition field. Cursory examination during our mapping found in outcrop that the flows are dark-green or dark-grey in color and are massive to locally flow- and/or compositionally banded with porphyritic textures. Phenocrysts of hornblende, biotite, and plagioclase are fine to medium grained and commonly show weakly to strongly dimensional alignment in an aphanitic (de-vitrified) matrix. K-feldspar phenocrysts may also be present in sparse amounts, but are difficult to confidently recognize with a hand lens. Abundant, accessory fine-grained magnetite is ubiquitous. Flows and hypabyssal intrusions of more-dacitic composition contain sparse resorbed phenocrysts of quartz. DDH-EK-01-1B made a long intersection in the stratovolcano flows and revealed that the lavas tend to be thick-layered (one to +22 meters) and consist of massive, flow-banded, xenolithic or near-contact fragmental units. Xenoliths are small (2 to 20 cm. diameter), rounded, and mostly porphyritic dacite of intrusive origin; diabase, and hornfelsed sedimentary rock (Paleozoic (?)) are also locally present. Fractures in the drill core of andesite-dacite lava flows are coated with gypsum, native sulfur, and botryoidal, clear, opaline silica (cristobalite). Chrysocolla is locally common, in addition, as finely banded/botryoidal coatings along fractures of dacite flows intersected by DDH-EK-01-1C and -2C in the area of the Copper Zone.

Hypabyssal Intrusive Rocks – The stratovolcano core zone is intruded by porphyritic dacite to rhyodacite as a single, large flow dome or group of coalesced flow domes with a spatial extent of perhaps six square kilometers. The porphyritic dacite-rhyodacite is distinctly more silicic and massive character than the darker, thinner bedded/banded flows of the stratovolcano, contains sparse quartz phenocrysts, and also lacks accessory magnetite in fresh/unaltered rock. Hydrothermal alteration is focused on and variably affects this rock type making difficult, at first, discerning primary textures and minerals to confidently identify in outcrop whether the rock is intrusive or volcanic in origin. However, the drill holes distributed over a wide area did not intersect any layered, volcanic-textured rocks characteristic of tuff or fragmental pyroclastic rocks and everywhere penetrated massive, porphyritic dacite-rhyodacite with local bodies of cross-cutting hydrothermal breccia. The porphyritic dacite is massive with little textural variation and no visible change in silicate mineral content and abundance over long lengths of core for even the deepest holes. Locally, flow textures of poorly to moderately well aligned phenocrysts of hornblende and biotite are discernable. No layering features suggestive of surface volcanic flows are present. A few intervals of stronger flow textures were observed in DDH-EK-99-02 and DDH-EK-01-11, which are 7 to 14 meters thickness of thin-banded layering. The thin-layered zones show features of ductile-like, plastic flow suggestive of contact zones between major intrusive domal flow units or separate sill-like intrusions. Measurements of flow layering in core show distinct change in attitudes across the thin-layered intervals. The attitude of flow banding in drill core suggests a low to moderate dip angle. The dacite-rhyodacite is composed of abundant medium- to coarse-grained phenocrysts of plagioclase with conspicuous finer grained hornblende and biotite and sparse quartz eyes in a finer grained matrix. A few phenocrysts of K-feldspar may also be distinguishable and are typically slightly larger size than the plagioclase. Pyrite is abundant as disseminated fine grains and is present where the dacite is not much affected by hydrothermal alteration suggesting some/much pyrite is a primary accessory mineral. No magnetite has been observed to be present in fresh or argillic- and advanced-argillic-altered porphyritic dacite. The hornblende and biotite, and to a lesser extent plagioclase, can show weak to moderately strong dimensional alignment. Scattered, small, rounded xenoliths typically of porphyritic dacite or more-mafic igneous rock, Paleozoic hornfelsed sedimentary rock are common. Based on whole-rock major element/oxide analyses in Rios and Heredia (1995), the core zone rocks are dominantly of dacite or rhyodacite in composition. Distinctly elevated amounts (2% to 3%) of potassium are characteristic in major element ICP analyses on split core samples (DDH-EK-01-11) of little-altered dacite. The ICP analyses of these less-altered dacite samples also show the following typical range in the amount of major elements: sodium (1.3%-1.6%), calcium (1.2% - 1.5%), Mg (0.6% to 0.8%), iron (2.4% to 2.6%), aluminum (6.5%), and sulfur (2%). With increasing hydrothermal alteration toward vuggy silica rock, the amounts of potassium, calcium, sodium, and magnesium diminish to low depleted values. No systematic change in attitudes of flow banding can yet be demonstrated to outline one single or multiple domal intrusions. When viewing the surface of the stratovolcano core zone, exfoliation-like features are locally present which are suggestive of multiple, coalesced domes or irregular form in a single intrusion. Rios and Heredia (1995) interpreted the stratovolcano core zone rocks to be a thick sequence of inter-layered pyroclastic tuffs and volcanic lava flows of dacitic to rhyodacitic composition. However, no pyroclastic volcanic rocks were anywhere encountered by core drilling in areas where these rocks were mapped. Their interpretations of volcanic rock types in the stratovolcano core zone are considered to be in great error and, although thin-section work was carried out as part of their investigation, may have resulted from misidentifying original rock types from highly altered/oxidized-stained surface outcrops and hand samples.

Igneous Intrusive Breccia - A strongly altered igneous intrusive breccia underlying the Copper Zone was intersected in drill hole DDH-EK-01-1C from 206.35 meters to the final depth of 260.25 meters; and also in the bottom of DDH-EK-01-4C. This rock intrudes capping andesitic to dacitic volcanic or intrusive, flow-layered rocks of the Cerro Eskapa stratovolcano and has nowhere been observed to outcrop although a dike was also intersected between depths of 79.30 to 85.55 meters in DDH-EK-01-1C. The rock is composed of mostly clast-supported, rounded to sub-angular fragments of porphyritic dacite within a fine-grained igneous matrix; some clasts of hornfelsed (Tertiary (?)) sedimentary rock are also present. The contact is faulted and is at a 35^{o} angle to the core axis to the vertical hole. The matrix of the rock is pervasively clay-altered and soft/friable. Clasts are fresh or variably affected by the alteration. Of note, clasts of pervasively sericite-altered dacite (?) were intersected and suggest a deeper seated sericite-altered porphyritic intrusive rock is present. The xenolithic character suggests the igneous intrusive breccia represents the outer border zone phase of a deeper porphyritic intrusive body.

Hydrothermal Breccia – Three types of hydrothermal breccia occur in the eroded-out stratovolcano core zone. The breccia is more abundant toward the west and appears to finger out eastwards into narrow zones extending along west-northwest-trending structures which are replaced by vuggy silica, sulfidic silicification, and strong argillic to advanced-argillic alteration. Three or more textural types of breccia are noted in general. One type (matrix breccia) is composed mostly of clay-pyrite-altered, fine-grained matrix and with only scattered, un-sorted, sub-angular to rounded, polylithic clasts of clay-pyrite-altered porphyritic dacite. Clasts of angular-fragment (clast-supported) breccia have been also observed. A second breccia type (angular-clast breccia) is composed of pervasively clay-altered/silicified, angular to sub-angular, monolithic (porphyritic dacite) clasts, typically in-part or mostly clast-supported and generally strongly clay-altered and replaced by cryptocrystalline silica or converted to vuggy silica. White clay minerals and pink alunite fill the vugs and open fracture spaces in advanced-argillic and vuggy silica alteration zones. In places, the angular-clast breccia is complexly cut by veins of later hydrothermal breccia of similar character, but with much-smaller fragments. To the south of the central west-northwest valley, a coarse boulder breccia is present. This breccia was interpreted by Rios and Heredia (1995) to be erosional remnants of volcanic agglomerate draped over a paleosurface to the west and southwest of the eroded-out stratovolcano core zone. This breccia is chaotic/unsorted and composed of large, rounded to sub-rounded clasts, to boulder size of andesite-dacite flows, and is matrix to clast supported. The clasts are mostly fresh with an outer thin rind of clay alteration. The matrix is pervasively clay-altered and silicified and locally contains drusy crystalline native sulfur and gypsum along fractures. The map distribution seems to show a distribution which flanks various zones of west-northwest-trending, hydrothermal breccia and is hence, believed to be a border phase of breccia dominated by wallrock clasts of andesite-dacite flow rock. The boulder breccia could also be an upper diatreme part of the breccia bodies and/or expelled material deposited on the surface (agglomerate). The dimensions of the various breccia bodies at the surface vary from tens to hundreds of meters in width and have been traced, with local fault-offsets, for up to several kilometers in length. No actual circular, pipe-like breccia body has been found. Most of the breccias appear to be controlled along west-northwest-trending swarm of structures. Restoring the offset breccia zones (Breccia Area) to those of the eroded-out stratovolcano core zone would outline an area of spaced hydrothermal breccia bodies with original dimensions of +4.5-km. long by up to 2.0-km. across. The breccia development dies out in an east-southeast direction, but the structural zones continue for an unknown distance westward. The breccia bodies have been affected by clay (argillic), silicification, advanced-argillic and vuggy silica alterations. In places, silver-mineralized, vuggy silica chimneys clearly replace angular-clast hydrothermal breccia. Everywhere sampled, the various types of breccia contain highly anomalous amounts of mercury and, more locally, elevated to anomalous amounts of arsenic, zinc, lead, thallium, and antimony. Hence, the breccias were emplaced before and during mineralization and alteration (?) and are all interpreted to have formed at the same time during explosive volcanic activity. The long linear map trace and interpretation of IP resistivity profiles indicate that the breccia bodies are moderately to steeply dipping - some to the north (east) and others to the south (west) depending on which body and location. Microbreccia comprised of black, aphanitic rock with minute scattered fractures has been observed in outcrop and drill core. The microbreccia occurs in exposures in a quebrada running to the west of, and below, the Spanish cantera and along the central ridge west of the Chilean shaft. The microbreccia is typically a few to tens centimeters wide and steeply dipping, but does not comprise a mapable feature.

Young Lava Flows – In the stratovolcano core zone on the middle ridge and south of the Spanish cantera is a down-faulted block with fresh lava flows of andesitic (?) composition. The thickness of the flows is approximately 40 meters. The rock is grey with a siliceous (devitrified) matrix and coarse-grained phenocrysts of plagioclase, hornblende, and biotite. The phenocryst size is distinctly larger than that typically found in andesite-dacite flows of the stratovolcano or dacitic porphyritic intrusive rocks. The lavas overlie clay-altered, porphyritic dacite and are interpreted to possibly be a younger post-alteration flow. No contact is exposed, but very near altered porphyritic dacite the lavas are fresh and show no alteration effects. The fresh lava flows could also be interpreted simply as an unaltered roof pendant (?) incorporated in the porphyritic dacite intrusion.

9.3.2c <u>Structural Features</u> - Introduction – The prominent structural features at Cerro Eskapa are the dominant west-northwest and north-northeast fault systems (see Figure 4). The Cerro Eskapa stratovolcano is centered over the intersection of these two fault systems. In detail, faulting is complicated perhaps with multiple pre- and post-alteration/mineralization periods of movement. The faults have offset and displaced the zones of prospective vuggy silica rock and breccia as well as the oxide-copper-mineralized pebble breccia. The typical form of the stratovolcano has also been modified by displacement and rotation of large blocks. Major strike-slip and normal movement is interpreted to have occurred along a northeast-trending/west-dipping fault that may correlate to the regional San Augustin lineament. This displacement is interpreted to have offset (southward) and down-dropped the westward continuation of the swarm of prospective hydrothermal breccia bodies of the Breccia Area.

Layering Attitude of Volcanic Flows - The geologic map of Rios and Heredia (1995) better displays, in general fashion, the attitude of layering of andesite-dacite flows from place to place around the Cerro Eskapa stratovolcano. While the overall outward dip away from to the stratovolcano core zone (vent area) can be discerned, the attitudes are no longer everywhere perfectly concentric to define the characteristic outward-dipping circular pattern. Locally across the trace of faults, the strike of flow layering can be almost right angles and be accompanied by a significant change (i.e. steepening) in dip. These irregularities likely reflect rotation and translation of different blocks along both west-northwest- and northeast-trending faults. Other directions of more-localized faults may also have rotational movement. Carefully documenting the attitudes of flow layering and attempting to break out some stratigraphic relationships of flow-units would probably help provide clues to locations and sense/amount of displacements along various faults. In the Copper Zone, the dip of thin-layered intervals of volcanic flows low on the north flank of the Cerro Eskapa stratovolcano changes abruptly from place to place between outcrops and this suggests possible localized folding from forceful (?) intrusion of hypabyssal bodies.

Flow-Layering Attitude of Intrusive Rocks – In the stratovolcano core zone, a poorly to moderately flow layering is present in massive porphyritic hypabyssal intrusive rocks and is defined by poorly dimensionally aligned mafic phenocrysts and to a less extent plagioclase phenocrysts. Variations in the attitude of this weak flow-layering in the dacite-rhyodacite intrusive (domal) rocks have been noted in a few outcrops and in many drill holes, but the number and distribution of measurements are insufficient to confidently outline if the core zone is a single intrusion or comprised of a (coalesced) cluster intrusions. Attitudes in drill DDH-EK-99-02 and DDH-EK-01-11 suggest an eastward gentle dip, while in the west part of the stratovolcano core zone; the attitude of flow layering in outcrops appear to be westward dipping.

Faulting - Two dominant directions of important fault structures – northeast and west-northwest can be readily discerned from the 1:50000 topographic map and can be related important structural features mapped in the Copper Zone, eroded-out stratovolcano core zone and Breccia area (Figure 4 and Plates 3 and 8). The relative timing of movement between the two directions is not fully understood and the latest period of displacement appears to have occurred along the west-northwest-trending faults. Faults which are not affected by hypogene alteration by providing feeders for development of vuggy silica and advanced-argillic alteration are considered to likely be post-mineralization and alteration. The faulting picture may likely prove with more-detailed mapping to be more complicated than presented here.

Northwest-trending Faults - The west-northwest structural direction (N60^{o}W) is comprised of at least three, closely spaced, major faults which cut through the stratovolcano core zone. Deep erosion along the three faults has produced a long valley of Rio Huailla Unu which drains to the west northwest and exposes considerable, clay-pyrite-altered, porphyritic dacite intrusion(s) and hydrothermal breccia. The west-northwest structural direction is also the principal control of emplacement of hydrothermal breccia and development of silver-lead-antimony-mineralized vuggy silica rock. Tracing out several of the mineralized, vuggy silica rock zones to the east found that they gradually curve from a west-northwest to an east-west or slightly northeast direction. Drilling toward the east end of Zone III shows that west-northwest faults may curve with depth changing direction of steep dip, be rotated by later faulting, or prove to simply dip steeply in different directions from place to place. The displacement along the west-northwest faults seems to be north block down and perhaps with some (right (?)) lateral offset. The cross section through drill hole DDH-EK-99-05 and using the interpretation of pseudosection for IP line-1E displays how vuggy silica rock (Zone IV) has been segmented and upper parts displaced and down-dropped to the north. Hence, there may be multiple episodes of fault movement as the breccia bodies and mineralized vuggy silica rock zones are emplaced along, but then later cut and displaced in complex fashion by renewed movement along west-northwest-trending faults.

Northeast-trending Faults – The surface expression of perhaps five, spaced northeast-trending faults can be discerned from the topographic map (1:50000). Their strike appears to curve in a northward direction from N45^{o}E to N5^{o}E. Mapping shows that the mineralized zones of the stratovolcano core zone are offset by the northeast-trending faults. Some of the northeast-trending faults in the core zone are, in-turn, offset by late movement along the northwest-trending faults. Based on the surface trace, a westward, moderate to steep dip with normal displacement is interpreted for most of the northeast-trending faults. The sense of displacement is not readily apparent along most of the structures, but is suspected to be normal with the (west) hangingwall block down. This is based on offset of the swarm of breccia structures of the Breccia Area which appear to be possibly the westward continuation of the mineralized structures of the stratovolcano core zone. Hence, the Breccia Area structural block is interpreted to have been displaced southward (left-lateral) and down-dropped to the west. This would further suggest post-breccia/mineralization/alteration movement. However, one of the prospective hydrothermal breccia bodies (Zone X) in the eroded-out stratovolcano core zone and the oxide-copper-mineralized pebble breccias (Copper Zone) may have been emplaced along the northeast direction of faulting. The prominent silica-crowned hill in the south-central part of the stratovolcano core zone is also formed via chalcedonic silica replacing tectonic or hydrothermal (?) breccia developed along a northeast-trending steep fault. The chalcedony-flooded breccia is geochemically "dead" containing no detectible values of gold or silver and low (non-anomalous) values of pathfinder metals. Several of the northeast-trending faults can be traced into Copper Zone and these may comprise the San Augustin lineament. The surface trace of these faults suggests a moderate to steep westward dip with normal displacement (west-block down). One interpretation, based on the results of re-running IP line - 1C, suggested that the position of the oxide copper-mineralized pebble breccia zone is segmented and displaced eastward by gently east-dipping/north-northeast striking normal faults. This interpretation could not be substantiated based on drilling (DDH-EK-01-3C and 4C). If displacement of the pebble breccia bodies conforms to that indicated for the offset of the breccia zones, then it could also be to the west in the down-thrown hangingwall block to one of the northeast-trending faults. Understanding the faulting picture better in the Copper Zone may help resolve from where the oxide-copper pebble breccia bodies were displaced and encourage resumption of exploration drilling in that sector for the mineralized source rock.

9.2.3d <u>Alteration Effects</u>

<u>Introduction</u> - From geologic mapping and core logging, the picture of hydrothermal alteration features and distribution seems fairly simple and straightforward in the eroded-out stratovolcano core zone, Breccia Area, and Copper Zone (Plates 4, 9, 29, and 32). The dacitic-rhyodacitic intrusive rocks of the **eroded-out stratovolcano core zone** have been affected by argillic (clay-pyrite), advanced-argillic (clay-alunite-pyrite), and vuggy silica types of hypogene alteration. A weak (deuteric (?)) propylitic alteration locally affects surrounding andesite-dacite flows of the stratovolcano. The highly visible color anomaly of bright red-brown- to yellow-colored iron-oxide staining on the surface of white (bleached) clay-altered and silicified rock is the result of supergene alteration of pyritiferous rocks which produced widespread secondary clays and iron-oxide minerals coating the outcrop surface. Although visually spectacular, the affected rock is barren of precious- or base-metal mineralization and much of the color anomaly is developed on porphyritic dacite which is only weakly to moderately clay-pyrite (hypogene) altered. Most-intense hypogene alteration, which produced vuggy silica rock and spatially associated envelope of advanced-argillic minerals, is importantly related as a precursor to, and overlapping with, deposition of silver-lead-antimony (shallow) and gold-bearing silver-copper-antimony-bismuth (deeper) sulfosalt/sulfide mineralization hosted in veins, veinleted rock, and disseminations. This alteration is strongly controlled along west-northwest faults and breccia zones. Other than scattered chimneys of vuggy silica, rocks affected by intense hypogene alteration do not outcrop. An unusual, dark green-colored, propylitic alteration (chlorite-magnetite) pervasively affecting porphyritic dacite was uniquely intersected at the bottom of drill hole DDH-EK-99-04. In the **Breccia Area**, hypogene alteration is shown in IP pseudo-sections to be present beneath extensive covered areas as low-resistivity responses which are interpreted to be strong clay alteration of breccia and volcanic rocks without much associated pyrite. Scattered zones of high resistivity can be related to locally outcropping silicified breccia and little-altered screens (blocks) of andesite-dacite lava flows. Where exposed, the clay alteration is restricted to coarse-boulder and angular-clast breccia, but the IP results would seem to indicate that this alteration must, at depth, be more widespread and affect other (?) rock types. Outcropping conspicuous hypogene alteration in the **Copper Zone** is restricted to the chrysocolla silicification and clay alteration along the various pebble breccia bodies. This alteration does not extend outward far from the breccia body margins. At depth, beneath capping lava flows, IP pseudo-sections show a widespread low-resistivity response which was penetrated into by DDH-EK-01-1C and discovered to be strong hypogene clay alteration. The widespread clay alteration concealed at depth in outlying areas to the stratovolcano core zone suggest the presence of immense circulatory convection cells of hydrothermal fluids perhaps related to/generated by the emplacement of hypabyssal intrusive rocks.

Clays and other hydrous-aluminum-silicate minerals commonly produced by hypogene and supergene alteration in the high-sulfidation geologic setting of Cerro Eskapa have not yet been identified and systematically studied using x-ray methods, PIMA or other geochemical analytical techniques. Results of some limited x-ray work are presented in Rios and Heredia (1995) who documented the presence and relative abundance of kaolin, montmorillonite, alunite, and cristobalite in their samples, but do not give much information on their occurrence, likely origin (i.e. hypogene versus supergene), zoning patterns, and relationship to silver-lead-antimony mineralization for the alteration. As a result, the descriptions of alteration and patterns of spatial distribution are simplistic and rely upon hand lens and binocular microscope examination of outcrop samples and core.

Hypogene Alteration – Hypogene alteration effects are most pronounced in the eroded-out stratovolcano core zone, but are also developed in outlying areas on hydrothermal breccia bodies (Breccia Area) and oxide-copper mineralized pebble breccias (Copper Zone). The alteration within the eroded-out stratovolcano core zone is focused along west-northwest fault structures and strongly affects intrusive porphyritic dacite producing much clay, silica, and pyrite. Argillic alteration with silicification and sulfidic silicification also affects to weaker extent/intensity the breccia zones of the Breccia Area. In outlying areas of the Breccia Area and Copper Zone, an extensive clay alteration is of different character generally not containing much if any pyrite. The latter clay alteration is capped by unaltered to little altered andesite-dacite flows. This alteration may have been produced by hydrothermal alteration as part of large circulation cell of heated connate waters through intrusive and volcanic rocks below the base level of the stratovolcano.

Hypogene Alteration - Eroded-Out Stratovolcano Core Zone - Interpretations of the hypogene alteration relationships in the eroded-out stratovolcano core zone are displayed in the alteration map (plate 4), long cross section (Plate 9) and in more detail in the cross section of DDH-EK-99-02 and

DDH-EK-01-11 (Plate 12b). The hypogene alteration features are exposed, from place to place, in surface outcrops, but the alteration patterns are considerably masked by supergene weathering effects and limited exposures. Four types of hypogene alteration have been identified and include, in order of increasing intensity: propylitic, argillic, advanced-argillic, and vuggy silica. Their identification and interpreted patterns of distribution are based, in part, on hand-lens and binocular microscope examination of samples collected during outcrop geologic mapping and logging of drill core. Hence, only a simple descriptive criterion has been developed. Results of 1999 IP surveys along Lines -1E, -2N, -3N, -4N, -5E, and -6N help give a good idea of the extensive depth and spatial distribution of the various hypogene alteration types. The clay-pyrite (argillic) alteration shows up as a marked anomalous chargeability response (>8 to 26 mV/V) with low resistivity (typically 20 to 80 ohm-m); where porphyritic dacite rock is less-altered, or silicified, resistivity readings can be markedly elevated (100 to >250 ohm-m). Areas affected by strong supergene alteration (oxidation destruction of pyrite) can have much reduced or low chargeability values. Weak propylitic altered andesite-dacite lavas appear as low-chargeability/high-resistivity responses. The vuggy silica alteration and surrounding halo of advanced-argillic alteration are marked by a high-resistivity anomaly (>200 to 500 ohm-m) with associated moderately (6 to 12 mV/V) to highly (>12 to 20 mV/V) anomalous chargeability readings (except where affected by supergene oxidation and sulfide minerals are destroyed). The IP survey interpretations on distribution of hypogene alteration are well supported in areas where core drilling has been carried out. A large area in the stratovolcano core zone of 5 km^2 is affected by hypogene alteration. Because the hypogene alteration is strongly structurally controlled and diminishes outward, only approximately 40% volume of rock is estimated to actually be strongly affected at the surface level of the eroded-out stratovolcano core zone. Basic descriptions and discussion of alteration types are listed below.

(1) Propylitic alteration was intersected in DDH-EK-99-04 at the very bottom of the hole (depth interval: 229.70 to 231.10 m.) after a fault was passed below the footwall interval of advanced-argillic- and argillic-altered porphyritic dacite. The propylitically altered rock is dark-green color and composed of chlorite-magnetite with quartz and sparse disseminated pyrite. The alteration is pervasive in nature replacing porphyritic dacite or andesite (intrusion (?)). An argillic alteration overprint is also expressed by local clay alteration and silicification as fracture veinlets with pyrite which cross cut the propylitically altered rock. This strong propylitic alteration is unique to the one drill-hole intersection and has not been observed in outcrop or in other drill holes. A weaker propylitic alteration of different nature is present in dacite-andesite flows over a widespread area. The alteration is characterized by pale-green color and may consist of epidote-clinozoisite minerals, clay, and calcite (?)). This latter type of propylitic alteration cannot be yet shown to intensify or change proximal to the argillic alteration and may simply reflect a late-stage deuteric effect unrelated to hypogene alteration activity of the eroded-out stratovolcano core zone. The IP response over the weak propylitic rocks is typically moderate to high resistivity and very low chargeability.

(2) Argillic (clay-pyrite) alteration is widespread, but variably developed, and can be subdivided according to the degree that mafic phenocryst minerals are affected. Where weakly to moderately developed, white to pale-green, clay minerals (+/-pyrite) replace the rock groundmass and partially to completely replace plagioclase phenocrysts; K-feldspar phenocrysts appear less or little affected. Biotite and hornblende phenocrysts typically remain fresh or with partial minor replacement by pyrite and clay or possibly chlorite/sericite minerals. As the intensity of argillic alteration increases, biotite and hornblende phenocrysts become completely destroyed and replaced by pyrite and clay minerals; all feldspar phenocrysts are converted to clay minerals + variable amounts of pyrite. The groundmass too is pervasively replaced by clay minerals and pyrite and may be sulfidic-silicified (i.e. replaced by grey cryptocrystalline silica with encapsulated disseminated very fine-grained pyrite and

other sulfide/sulfosalt minerals). Hydrothermal breccia in the eroded-out stratovolcano core zone can be variably argillic altered and is typically comprised of pervasively clay-pyrite-altered matrix and partially to completely replaced fragments. Where partially clay-altered, the breccia fragments consistent mostly of a core of fresh porphyritic dacite or andesite with a surrounding rind of weak clay alteration. The overall abundance of pyrite increases with increasing intensity of argillic alteration in both porphyritic dacite and hydrothermal breccia. The appearance of cross-cutting veinlets of white clay minerals and/or pink alunite with very fine-grained sulfide (mostly pyrite) signals the near-by proximity to advanced-argillic alteration. The 1999 IP survey shows that clay-pyrite-altered rocks vary in electrical response from low-resistivity/high chargeability (strongly affected) to higher resistivity/mixed chargeability (less affected). Where strong sulfidic-silicification is present, the resistivity response may increase and be difficult to distinguish from less-altered pyritiferous porphyritic dacite. Results of DDH-EK-99-02 and -01-11 suggest that the argillic alteration gradually diminishes away from the feeder zone of intense argillic, advanced-argillic, and vuggy silica and, by 40 or 50 meters, is weakly developed only along fractures.

(3) Advanced-argillic alteration **in drill core** is marked by the conspicuous appearance of vivid-pink alunite replacing feldspar phenocrysts and groundmass, white clay minerals, and grey sulfidic silicification of the groundmass and is pervasively developed as a halo surrounding a core of vuggy silica rock. Biotite and hornblende phenocrysts are completely obliterated. Fine-grained pyrite appears to be intimately associated with the alunite, clay minerals, and silicification and also commonly coats crystalline alunite/clay minerals as minute, later, euhedral crystals. Other hydrous aluminosilicate minerals, diagnostic or common to advanced-argillic alteration, may also likely be present. For example, diaspore was reported by the Schurer & Fuchs Laboratory (Reno, NV) to be present as gangue in sulfide concentrate produced from coarsely crushed core (reject) samples from DDH-EK-99-01 (Fuchs, 2000). DDH-EK-99-02 and -01-11 show that pervasive, advanced-argillic alteration comprises a halo of several to tens of meters thick surrounding a central core of vuggy silica rock. In DDH-EK-01-11 numerous strands of vuggy silica are separated by pervasively advanced-argillic altered porphyritic dacite. Few spaced veinlets of pink alunite and grey silica-clay-pyrite cross cut clay-pyrite-altered porphyritic dacite for 10 to 15 of meters outward from the contact into the zone of pervasive advanced argillic alteration. The advanced-argillic alteration does not outcrop, but based on dump samples, was encountered in the Chilean shaft. Typically, at the surface the area affected by advanced-argillic and intense argillic alteration comprises a "kill" zone with no vegetation.

(4) Vuggy silica rock (alteration) formed via replacement of both porphyritic dacite and hydrothermal breccia along the principal fault zones and breccia bodies which served as the conduits for ascending acidic vapors/aqueous solutions. Discernable, primary porphyritic, xenolithic, and breccia textural features are preserved although the rock has been completely converted to grey, sulfidic, cryptocrystalline silica. Vugs mark locations where porphyritic phenocrysts and rock clasts have been dissolved and removed. Related veins of grey sulfidic silica, but not of vuggy character, are locally present cutting advanced-argillic- and clay-pyrite-altered porphyritic dacite. The vugs in the vuggy silica are open spaces commonly lined or filled with later pink alunite and white clay plus finely disseminated crystalline pyrite, orpiment, native sulfur, and black to red-black sulfosalt-sulfide minerals. These minerals can also occur along cross-cutting fractures/joints. Late-stage, bladed barite in crystals to 10 cm. across, are also commonly locally abundant and occur as coarse druses in larger open spaces. The drill section DDH-EK-99-02 and DDH-EK-01-11 shows that the vuggy silica alteration affects a width of rock that significantly increases downward. Also, the vuggy silica bifurcates from a single thick zone to three principal (thick) and numerous thin strands

separated by pervasively advanced-argillic altered rock. Importantly, the vuggy silica rock at depth is locally cut by gold-bearing, copper-silver-bismuth-antimony sulfide/sulfosalt veinlets and hosts disseminations, vug-infillings, and fracture coatings of similar mineralization. Silver-rich, lead-antimony sulfosalt mineralization occurs as vug-infillings and along fractures at shallow levels. The observed textural relationships indicate that the polymetallic mineralization was introduced at the waning stages and after the development of vuggy silica rock.

(5) Other Types of Hypogene Alteration - In drill core (ex. DDH-EK-99-01, -02, -08, and -01-11), minor, spaced, fracture veinlets of pyrite + silica +/-sulfosalt-sulfide minerals, are locally present and abundant (few to 30 veinlets per meter of core), and commonly are surrounded by narrow (millimeters thickness) alteration envelopes of greenish sericite-like mineral, white clay minerals, plus pyrite. The veinlets/alteration envelopes are best developed where porphyritic dacite is not-much affected by argillic alteration. The veinlets/alteration halos are interpreted to be an outlying expression/effect related to the more-intense argillic and advanced-argillic alteration.

Discussion – The observed features and relationships of alteration in the eroded-out stratovolcano core zone allow for the following interpretive conclusions to be drawn.

(1) With depth, the cumulative horizontal width of rock affected by strong argillic, advanced-argillic, and vuggy silica alteration for Zone III increases from 30 meters (near-surface) to 50 meters across at 150-meters vertical depth in drill hole DDH-EK-99-02. At greater depth (400 meters vertical) in DDH-EK-01-11, this horizontal width increases to 80 meters. At the surface, the width of the single vuggy silica strand varies from one to three meters (surface) and is surrounded on either side by 10- to 15-meters of strong-argillic and advanced-argillic alteration. In DDH-EK-99-02, the width of single vuggy silica strand has increased to 15 meters and is surrounded by an envelope of strong argillic and advanced-argillic alteration that has expanded outward to nearly 10 meters on either side of the vuggy silica. At markedly greater depth (+/-400 meters vertical) in drill hole DDH-EK-01-11, a much greater width of porphyritic dacite is affected by strong argillic, advanced-argillic and vuggy silica alteration. Of the 80-meters total width, approximately 13-meters cumulative width is comprised of the three principal strands of vuggy silica rock; with addition of numerous narrower strands the cumulative width is increased to 16 meters. Approximately 27-meters cumulative width of advanced-argillic alteration is present between and outside of the strands. Some 40-meters cumulative width of outlying strong argillic alteration surrounds the core of intense alteration. The argillic and advanced-argillic alterations appear to be slightly wider on the hangingwall side of the interval containing the principal three strands of vuggy silica rock. These two drill intersection indicate that the intensity of hypogene alteration and width of rock affected is increasing with depth and this relationship likely holds for the other prospective zones of the stratovolcano core zone.

(2) The hypogene alteration affects gradually diminish outward from both fault-controlled feeder structures and breccia bodies to the point that the porphyritic dacite, although pyritiferous, hardly appears affected based on the fresh appearance of the ground mass and plagioclase and mafic phenocrysts. Andesitic flows of the stratovolcano do not seem much affected by hypogene alteration anywhere.

(3) A rough estimation, based on the drilling and interpretive cross section/map of alteration, suggests, at the level of surface exposures in the eroded-out stratovolcano core zone, that only

a few volume percent of the rock (<3%) is affected by vuggy silica alteration, +/-6% (or slightly less) is affected by advanced-argillic alteration, and +/-35% is affected by moderate to strong clay-pyrite (argillic) alteration. Hence, although the eroded-out stratovolcano core zone comprises a spectacular, highly visible color anomaly produced by supergene alteration of all pyritiferous rocks to form iron-oxide/secondary clay minerals, strong hypogene alteration probably only affects just over 40% of the eroded-out stratovolcano core zone and is distributed along pre-existing dominantly west-northwest-trending structures. Drilling section through DDH-EK-99-02 and DDH-EK-01-11 does suggest that, at depth, the total amount of rock affected by strong hypogene alteration may expand outward to affect greater than 60% volume of rock.

(4) The close-spatial association of late-stage, silver-lead-antimony sulfosalt/sulfide (at shallow levels) and gold-bearing, high-grade, silver-copper-antimony-bismuth sulfosalt/ sulfide (at depth) with hypogene vuggy silica/advanced-argillic alteration suggests that they are related to the same event(s). The hypogene alteration though may be largely a precursor to deposition at the waning (?) stages of sulfosalt/sulfide veins, veinlets, and disseminations of ore mineralization. Pathfinder elements (i.e. mercury, arsenic, and antimony) are also at elevated to highly anomalous levels within the vuggy silica rock and surrounding argillic to advanced-argillic alteration haloes. Anomalous amounts of mercury may be present in even weakly clay-altered dacite for great distances from the feeder structures and core zone of vuggy silica rock. This suggests that introduction of pathfinder metals occurred during the sulfosalt-sulfide mineralization and therefore also overlapped/ continued after hypogene alteration. In a gross sense, increasing values of pathfinder metals typically parallel an increase in intensity of hypogene alteration.

Hypogene Alteration in the Breccia Area – Hypogene alteration in the Breccia Area **at the surface** appears to be restricted to various types of hydrothermal breccia which were emplaced along widely spaced, west-southwest- to west-northwest-trending structures and does appear to not much affect the inter-breccia screens of andesite-dacite flows of the stratovolcano. The types of hypogene alteration recognized include: clay, clay-pyrite, and silicification. No outcrop features indicative of advanced-argillic alteration have been observed suggesting the alteration in the Breccia Area is less intense and of different character compared to the eroded-out stratovolcano core zone. The effects of alteration vary somewhat in intensity and character depending on the rock type affected. The dominantly matrix-supported breccia with scattered clasts is pervasively clay-pyrite altered with little or no silicification. The coarse boulder breccia (agglomerate), which is appears to be a border zone phase flanking a central core of angular-clast hydrothermal breccia, or expelled agglomeratic material, shows strong argillic alteration and silicification replacement of matrix with little effect on the large clasts. The matrix is typically replaced by cryptocrystalline silica and clay minerals. Some crystalline native sulfur and gypsum may be present coating open spaces between clasts and along fractures. Alteration increases toward centrally positioned, angular-clast breccia which is replaced by strong clay alteration and silicification, locally pyritic. Where the coarse breccia is altered, only the very outer part (rind) of the clasts of andesite-dacite flow rock is replaced by clay and clay-pyrite and the matrix is pervasively replaced by clay. Elevated to anomalous values of pathfinder metals (i.e. mercury) and zinc are found in breccia samples affected by the clay- and clay-pyrite-alteration or silicification; and hint that hypogene eprecious-metal mineralization may be present at greater depths. The clay and clay-pyrite alteration gives a low-resistivity response which shows readily on IP lines L-1B, -2B, -3B, and -4B. Central areas of resistivity highs appear along Lines-1B and -5B and further to the west on Lines -6B, -7B, and -8B.

Hypogene Alteration in the Copper Zone – Obvious alteration at the surface of the Copper Zone is restricted to the zones of oxide-copper mineralized pebble breccia and along the border zone with surrounding dacite wallrock. The alteration consists of pervasive silicification of pebble breccia clasts with chrysocolla (and tenorite) with replacement of plagioclase by clay minerals and calcite or aragonite. The silicification is similar to the intra-clast infillings of botryoidal, finely banded, chrysocolla which appears to be deposited by hot springs-like aqueous solutions. A non-cupiferous silicification and clay alteration appears to extend strongly outward into wall rock for up to 10 meters and is accompanied by appearance of considerable hematitic iron-oxide minerals from destruction of hornblende, biotite, and magnetite, replacement of plagioclase phenocrysts. The rock within this halo tends to have a fine-porous, slightly vuggy character. Further outward, the hematitic and silicified character diminishes and the rock returns to compact/hard character and a dark-grey color. The IP lines run across the Copper Zone indicate that at depths of tens to over 150 meters (typically >100 meters), the rock has a low-resistivity character and is strongly clay-altered. The boundary between capping high-resistivity rocks to underlying low-resistivity (altered) rocks is abrupt. Drill hole DDH-EK-01-1C divulged that indeed the low-resistivity responses are strongly clay-altered xenolithic intrusive rocks, which proved to be devoid of any sulfide mineralization. The controls of the alteration in the Copper Zone are not fully yet understood. The IP surveys would suggest this alteration is very extensive beneath the cap rock and that it comes to the surface along the zone of pebble breccia bodies. Hence, the alteration may be related to the fluid circulation that deposited the oxide-copper mineralization in the pebble breccia bodies. No sulfide minerals are present and sulfide veins and disseminations in intrusive rocks are completely converted to oxide minerals. The alteration is believed to reflect a low-temperature, hot springs-like activity over a widespread area which deposited botryoidal opaline silica (cristobalite) commonly along fractures. The considerable amount of clay alteration is surprising and the expanding nature of the clay minerals forced abandoning drill hole DDH-EK-01-1C at a depth of 260 meters.

Supergene Alteration – General Statement – The pyritiferous rocks of weakly to strongly altered porphyritic dacite and hydrothermal breccia in the eroded-out core zone area and Breccia Area have been affected by supergene alteration. The alteration has produced white clay and red to yellow or brown, iron-oxide minerals which stain/coat rock surfaces and fractures. The depth to which rocks are affected is typically shallow (centimeters to meters) and fresh rock with pyrite can be broken at some outcrops especially where porphyritic dacite is little altered or sulfides are encapsulated in silicified rock or vuggy silica. The supergene alteration effects can extend to greater depths along fault zones as suggested in some IP profiles. The drill holes in the eroded-out core zone generally passed oxidation effects by depths ranging between 10 to 20 meters. A possible supergene oxidation effect which converted pyrite and silver-bearing sulfosalt/sulfide minerals to limonitic iron-oxide minerals was intersected in vuggy silica rock of drill hole DDH-EK-99-02 between drilling depths of 162 to 176 meters. One effect of the supergene alteration is, that where strongly present, the elevated to anomalous silver, base (zinc, copper, lead), and pathfinder (antimony, arsenic)-metal content of clay-pyrite and advanced-argillic altered rock is lowered or removed (leached out). Hence, the full extent of anomalous geochemical haloes for these metals outward into argillic altered rock could not be confidently determined from analytical results on the surface sampling. Mercury does not seem much affected by the supergene alteration/weathering effects. Vuggy silica outcrops show variable effects of supergene alteration and some parts may be bleached and strongly leached with no sulfide minerals left present. Others parts are dark-grey with abundant encapsulated very fine-grained pyrite and silver-lead-antimony sulfosalt minerals .

In DDH-EK-99-02, and to a lesser extent in DDH-EK-99-01, intersections of sulfosalt-sulfide mineralized vuggy silica and silicification are locally strongly oxidized to iron-oxide minerals perhaps importantly leaching out some/much of the silver, antimony, lead, and copper content. The great depth of this oxidation effect (+/-150 meters) and lack of such effects in wallrock of advanced-argillic- and argillic-altered porphyritic dacite would seem difficult to relate this alteration to supergene activity. The oxidation effects are thought to perhaps represent a late-stage, low-temperature, hypogene effect or "hot" supergene effect. Whatever the cause, this alteration likely resulted in an originally higher silver content in sulfosalt minerals being leached and mobilized from the vuggy silica intercept in DDH-EK-99-02 explaining the lower than anticipated grades.

10.0.0 DEPOSIT TYPES

10.1.0 Introduction – The Cerro Eskapa property displays features of several different deposit types with regard to origin and metals present. The mineralization in each area is believed to be deposited at the nearly the same time, but may involve different mechanisms. The geologic setting, presence of strong alteration and widespread pyrite in the stratovolcano core zone are characteristic of a high-sulfidation, precious-metal mineralized system (Figure 6). The alteration and mineralization features of Breccia Area and Copper Zone are different, but can probably be genetically related as more distal features.

10.2.0 Stratovolcano Core Zone - The mineralized zones of the eroded-out stratovolcano core are structurally controlled and at shallow depth are comprised of silver-lead-antimony sulfosalt minerals and at greater depth change to gold-bearing copper-silver-antimony-bismuth sulfosalt/sulfide minerals (Plates 5, 7, and 10). The nature of the hypogene alteration and especially ubiquitous abundance of pyrite in altered porphyritic dacite indicates that this mineralization belongs to the high-sulfidation system. Although enargite has not yet been identified, the nature of the mineralization especially that intersected in DDH-EK-01-11 is typical of the acid-sulfate type. The geologic setting and alteration and mineralization features have been shown to be similar to other high-sulfidation type precious-metal deposits along the Cordillera Occidental (i.e. El Indio/Tambo and Choquelimpie). This suggests that the mineralization may be largely the result of dominantly magmatic, highly acidic solutions/vapors being released from a deep-seated porphyry copper intrusion source and ascending along structures (feeders) to alter and facilitate mineralizing activity. Because of the strong structural control, mineralization occurs as elongate/narrow tabular like bodies (veins/veined zones) which might widen appreciably where hosted by more permeable/porous hydrothermal breccia. The depth to the top of gold-bearing, high-grade, copper-silver-antimony-bismuth veins mineralization is below 150 vertical meters and above 400 meters as loosely constrained by the only drill hole intersection made by DDH-EK-01-11. This depth constraint would suggest that no shallow (open-pit), precious-metal deposits will be present and that, if discovered, mineralized bodies will be mined via underground selective methods using tunnel/level access. The results of DDH-EK-99-02 and DDH-EK-01-11 in cross section provide a "Rosetta Stone" for understanding that high-level anomalous amounts of pathfinder metals (mercury, antimony, arsenic) and local concentrations of silver-antimony-lead are the upper-level expression of the gold-bearing, high-grade copper-silver-antimony-bismuth mineralization at depth. This suggests that with ten prospective zones and 11.5 kilometers of mapped cumulative strike length, the potential for cumulatively large tonnages remains the impetus behind continuing deep exploration drilling.

10.3.0 Breccia Area - The mineralized breccia zones of the Breccia Area, though considered to be the fault displaced westward continuation of mineralized zones of the Stratovolcano Core, appear to be different (Plate 30). They do locally have core zones of sulfidic silicification and some vuggy silica with associated intense clay alteration. Toward the east, abundant pyrite (oxidized at/near the surface to limonitic minerals) and anomalous pathfinder metals and zinc also are present in outcrop samples of silicification and strong clay alteration. The samples contain low values (less-than-detectible) of gold and silver. However, over much of the area and strike length to the west, the breccia zones lack development of vuggy silica core zones, indication of proximal advanced-argillic halos, and widespread disseminated pyrite in surrounding clay-altered rocks. IP results (very low resistivity responses) suggest that to the west, widespread/pervasive strong clay alteration is present, but is not accompanied by much, if any, pyrite. Over the western continuation only anomalous amounts of mercury without arsenic and antimony are present. This suggests that perhaps altering fluids in a westward direction became less acidic (near neutral (?)) and that perhaps reflects an influx or domination by connate waters in the alteration process in a position distal, but related, to the intrusive activity, alteration, and breccia development in the core zone.

10.4.0 Copper Zone – The oxide-copper mineralization in the pebble breccias is not associated with any sulfide mineralization or strong alteration features (Plates 4 and 5). The silicification and deposition of chrysocolla and tenorite as finely laminated/banded, botryoidal infillings and replacement with calcite suggest a type of hot-springs like activity of low-acidic (near-neutral (?)) waters/vapors. The outlying, widespread clay alteration at depth which is without any hint of pyrite may be similar in character to that in the Breccia Area. This suggests circulating connate waters may have scavenged copper from a deeper seated source and remobilized it to deposition in a shallow oxidizing environment. Based on the nature of occurrence and association of anomalous silver and highly anomalous mercury, the oxide-copper mineralization is considered to be low-temperature hypogene and not from supergene oxidation of previous copper sulfide mineralization. The mineralized breccia bodies are positioned distal to the intrusive activity, intense high-sulfidation system, and breccia development in the stratovolcano core zone. Whether the oxide copper mineralization becomes more sizeable at depth or can lead into a copper-sulfide mineralized body (source) is not known. The bodies are tabular, elongate with relatively narrow widths and are not considered to be a high-priority exploration target, though of fairly high grade, because of limited tonnage potential. No indication of any related, shallow or deep-seated more extensive breccia-hosted mineralization or copper-sulfide-mineralized source rock can be demonstrated to be nearby to the pebble breccia bodies.

11.0.0 MINERALIZATION

11.1.0 Mineralized Zones of the Cerro Eskapa Property – Introduction – The surface exposures of mineralization at Cerro Eskapa are restricted to scattered outcrops of silver-lead-antimony sulfosalt minerals in vuggy silica-barite rock in the Stratovolcano Core Zone and the oxide-copper-bearing pebble breccia bodies low on the north flank of the stratovolcano in the Copper Zone (Plate 7). Mineralized rock is not well exposed in either area and only a few locations exist where sampling can be carried out across the width of a particular zone. Sampling of dumps to shallow workings was mainly relied upon to obtain an idea of the tenor of the mineralized zones and was supplemented where possible by outcrop sampling. The presence of anomalous mercury in breccia zones of the Breccia Area may be the shallow expression of deep-seated precious-metal mineralization.

11.2.0 Use of Geochemical Analytical Results – All of the dump and surface rock-chip samples were analyzed for gold, silver, a base-metal suite of copper, lead, zinc, and pathfinder metals (arsenic, antimony, and mercury). No attempt has been made to evaluate the results with a rigorous statistical treatment. The following breakdown summarizes significance of levels of values of precious, base, and pathfinder metals.

(1) Background Geochemical Values - Drill holes intersections and outcrop sampling of unaltered to weakly argillic-altered porphyritic dacite show that the following are typical levels for gold (<5 ppb), silver (<0.2 ppm), copper (<5 ppm to <10 ppm), lead (>10 ppm to <20 ppm), zinc (>10 ppm to <40 ppm), bismuth (<5 ppm), antimony (< 5 ppm to <10 ppm), arsenic (>10 ppm to <30 ppm), and mercury (<20 ppb). These low ranges of values are considered to be background.

(2) Anomalous Geochemical Values - Based on experience, the lower threshold for anomalous values in a high-sulfidation type of epithermal system are considered as follows gold (>100 ppb),

silver (>1 ppm), copper (>100 ppm), lead (>100 ppm), zinc (>100 ppm), antimony (>25 ppm), arsenic (>100 ppm), and mercury (>100 ppb). Sub-anomalous, elevated values for these metals which appear in weakly argillic-altered porphyritic dacite and rocks affected by supergene alteration effects can signal proximity to increasingly pervasive alteration surrounding the mineralized zones.

(3) Elevated Geochemical Values - Elevated values for base and pathfinder metals are in the range of two to three times the typical background levels and are used as follows copper (>30 ppm to <100 ppm), lead (>40 ppm to <100 ppm), zinc (>60 to <100 ppm), antimony (>25 ppm to <100 ppm), arsenic (>50 ppm to <100 ppm), and mercury (>50 ppb to <50 ppb). Above-detectible levels of gold and silver have only been found in vuggy silica rock and adjacent (proximal) advanced-argillic alteration halo. Hence, when gold appears in outcrop or core samples at values >5ppb (to 47 ppb), the values are considered to be elevated and of exploration interest. Similarly, silver values between the range of >0.2 to <1.0 ppm are also considered to be elevated and of interest.

(4) Distribution of Anomalous Geochemical Values - The nature of the high-sulfidation/acid-sulfate mineralizing system is such that ore grades of gold and silver and very high levels of lead, copper, and antimony are generally tightly constricted to vuggy silica structures and replaced breccia or volcanic units, and do not extend out into surrounding advanced-argillic- and argillic-altered rock. Also, gold typically has a limited vertical range (200 to 300 meters) where it is deposited in ore-grade amounts. Mineralized zones above the top of where gold begins to appear in appreciable amounts may be barren or contain only very minute amounts of gold. In the eroded-out Stratovolcano Core Zone area at Cerro Eskapa, the intersection of DDH-EK-99-02 and DDH-EK-01-11 show that within the vuggy silica rock, gold values are now established to be low at shallow levels (most, <5 ppb), with depth increase to detectible/elevated levels (>5 ppb to 47 ppb), and at greater depth start to be present in highly anomalous values (>500 ppb). Anomalous levels of mercury, antimony, arsenic, zinc, and lead extend for great distances outward in altered rock from a mineralized vuggy silica zone and this too is well demonstrated in cross sections for DDH-EK-99-02 and DDH-EK-01-11, DDH-EK-99-01 and DDH-EK-99-08. The peripheral well-developed haloes of anomalous base and pathfinder metals are devoid of any gold or silver content. There is a general correlation between increasing intensity of alteration and presence of anomalous values of base and pathfinder metals. From inspection of core, the anomalous values of base and pathfinder metals likely reflects minute amounts of very fine-grained sulfide-sulfosalt mineralization along fractures, fracture veinlets, and disseminated in clay and alunite replacing feldspar phenocryst and groundmass. Anomalous arsenic values could reflect disordered arsenian pyrite and/or arsenopyrite, or orpiment. The latter sporadically occurs as yellow masses in-filling open spaces in the vuggy silica intersection in DDH-EK-01-11. Mercury values may be from the presence of native mercury, mercury minerals (cinnabar (?)), or substitution in sulfosalt/sulfide minerals. No mercury minerals have yet been observed via hand lens and binocular microscope examination. Such well organized base and pathfinder metal haloes to the silicified breccia zones of the Breccia Area cannot be yet be defined and may not exist or are poorly developed.

11.3.0 Eroded-Out Stratovolcano Core Zone – Ten zones have been identified which are considered prospective for deep-seated, gold-bearing, high-grade, silver-copper-antimony-bismuth sulfosalt-sulfide mineralization (Plates 5 and 10). Silver-bearing sulfide/sulfosalt mineralization with high amounts of mercury occurs at the surface in vuggy silica-barite rock of Zones III, IV, V, and VI. Values of silver can range from hundreds to several thousand ppm (grams/metric ton), may be erratic in distribution, are tightly restricted to vuggy silica rock, and do not extend out to any extent in advanced-argillic alteration haloes which, in drill core, contain anomalous levels of silver and lead with arsenic, antimony, and mercury. At greater depth, DDH-EK-01-11 demonstrated that the shallow, silver-lead-antimony sulfosalt mineralization changes with depth to gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt/ sulfide mineralization. Highly anomalous amounts of silver have not yet been found in outcrops or float over Zones I, II, VII-X. These zones, though, are highly anomalous in mercury and to a less extent in antimony and arsenic. The presence of the anomalous pathfinder metals (i.e. mercury) is interpreted to be the high-level expression of silver-gold-copper mineralization at greater depth. No grade/width information or inferred geologic resource for the zones can be presented because of limited surface sampling and only a few drill intersections. No shallow resource of possible high-grade silver mineralization within narrow zones of vuggy silica can yet be demonstrated. At the surface level of exposure, the mineralized zones are considered geochemical anomalies (upper expression) to possible extensive high-grade precious-metal mineralization at depth – the future focus of exploration drilling.

Identifying and tracing out the zones in the stratovolcano core zone utilized a combination of geologic mapping, geochemical analytical results for pathfinder metals on surface outcrop samples, and geophysical IP surveys. Some zones are confidently identified, can be correlated across where fault offset, and their segments can be traced over long distances (i.e. Zones III, IV, V, VI, VII, and VII and X). Others are more poorly exposed or concealed beneath shallow cover, which makes tracing them difficult, and forces some correlations across fault displacements to be considered tenuous (i.e. Zones I and II). Several of the mineralized zones contain moderate to high amounts of silver with lead and antimony plus high amounts of mercury in vuggy silica-barite outcrop (i.e. Zones III, IV, and V). Other zones do not contain high silver-lead-antimony sulfosalt mineralization in outcrop, but are highly anomalous in mercury with elevated to anomalous amounts of arsenic and antimony which are interpreted to comprise a halo above precious-metal and copper mineralization at greater depth (i.e. Zones I, II, VI, VII, VIII, IX, and X) (Plates 5, 6, 7 and 10).

11.3.1 Zone I – The <u>western segment</u> of Zone I occurs in sporadic outcrop over a 1100-meter distance as hydrothermal (angular clast-supported) and multi-breccia which is silicified, with associated strong clay alteration. The breccia zone trends N40^{o}W and dips steeply northward. It cross cuts or comprises the core zone to coarse boulder breccia. The width of the zone and strong alteration effects is probably 15 to 20 meters across. This width includes a strongly (sulfidic-) silicified core zone of several meters, a outer zone of silicification and clay alteration. The zone is commonly strongly stained by iron-oxide minerals from supergene alteration effects on pyrite content. Outcrop chip samples from place to place typically contain >1000 ppb mercury, elevated antimony (to 26 ppm).. Anomalous zinc (to 434 ppm) and lead (to 111 ppm) and elevated thallium (to 2.6 ppm) are also locally found in samples from along the zone. Both silver values (all <0.2 ppm) and gold values (all < 5 ppb) are found in the samples. The zone is marked on the resistivity profiles of IP lines L-3N and L-4B as a distinct resistivity anomaly (>200 to >/=500 ohm-m) and a moderate chargeability anomaly of 10 to <20 mV/V. The resistivity profile supports a steep northward dip and suggests the zone is continuous with depth to >250 meters (IP search depth). Line L-5E was not extended far enough south to cross the zone. To the southeast along strike, Zone I is interpreted to be offset by a northeast-trending fault and to continue as a <u>central segment</u> for another 1000 meters mostly beneath a thin veneer of unconsolidated cover (scree). The zone is marked over this length by common float of bleached vuggy silica. Over this strike-length segment and near the projected trace of the zone, scattered outcrops of clay (-pyrite)-altered porphyritic dacite contain highly anomalous amounts of mercury (>200 to <1000 ppb) without anomalous amounts of arsenic or antimony or detectible gold or silver. IP line L-1N was not extended far enough south to adequately obtain an electical response of the zone. Where the zone is projected to cross the line between stations 1200 S to 1300 S, the resistivity and chargeability responses are low and typical of clay-altered porphyritic dacite. Hence, Zone I becomes ill-defined in a southeast direction and could lie further south than interpreted on the geologic map. Zone I is open-ended to the southeast and may prove to continue for a long unknown distance in this direction. Thus, the 1000-meter long, southeast projected segment of Zone I is not included in the mapped strike length of the zone.

Several locations along the western segment have been chosen for proposed drill tests which may also penetrate Zone II.

11.3.2 Zone II – The western segment of Zone II lies 100 meters north of and trends +/-N40^{o}W parallel to Zone I. Zone II can be traced to the southeast along the steep outcrop and bluffs along the south side of Rio Huailla Unu for approximately 1000 meters and is presumed to dip steeply north. Zone II is of similar character to Zone I and is composed of a core zone of angular, clast-supported, hydrothermal breccia and multi-breccia which is strongly silicified and up to several meters thick. This central part of the zone may be a later phase of breccia emplaced along the core of the coarse boulder breccia. Hypogene alteration is strong silicification and clay-pyrite which is most intense in the angular-clast-supported breccia. Supergene alteration has produced much oxide-iron minerals after pyrite. Outcrop samples from and around the zone contain anomalous amounts of mercury (>1000 ppb) and locally anomalous amounts of antimony (>100 to <1000 ppm), and arsenic (>100 to <1000 ppm). The IP expression along the western extent may be expressed along line L-3 (800 W to 900 W) and is moderate to higher resistivity (200 to +400 ohm-m) and moderate chargeability (>10 to <15mV/V). Zone II is interpreted to be offset along a northeast-trending fault and may actually be displaced to the north in a position above Zone III (possibly the "HW" Zone III). The zone is inferred to be marked by surface outcrop chip samples with anomalous amounts of mercury (>200/<1000 ppb), antimony (>20/<100 ppm and >100 to <1000 ppm), and arsenic (>100 ppm to <500 ppm). The continuation of Zone II to the southeast is in an area of few exposures and is inferred to trend down from the silica-crowned hill toward the drill pad of DDH-EK-01-11. The area is covered in large blocks of chalcdonic silica interpreted to be from a once more-extensive cap to the feeder northeast fault of the Silica Hill. Along the projected trace of this central segment, few sampled outcrop locations consistently carry anomalous arsenic (>100 ppm to <500 ppm) and antimony (>100 ppm to <1000 ppm), but without the presence of anomalous mercury. The position of the zone, though, appears to be surrounded by broad areas with anomalous mercury (>200 ppb to <1000 ppb). Where Line 6N crosses the projected trace of Zone II (400 W to 600 W), the chargeability values are moderate to low (4.5 to 9.2 mV/V) as are the resistivity responses (50 to 90 ohm-m). These chargeability and resistivity values are more similar to weakly silicified, clay-pyrite-altered porphyritic dacite. Because the evidence for the eastward continuation/segment of Zone II is currently weak; other interpretations are possible and this segment is not included in the mapped strike length. The western segment of Zone II can also be interpreted to be the offset westward continuation of Zone III and this, with further work, may prove to be the correct correlation. Several proposed drill hole locations have been chosen along the western segment from which to drill test both Zone II and Zone I.

11.3.3 Zone III – Zone III can be traced confidently along a west-northwest strike for a distance of +2400 meters and is marked by scattered outcrops of vuggy silica-barite which were locally exploited by Spanish Colonial-era piques to shallow depths. In a westward direction, Zone III is cut off and displaced in right-lateral fashion by a northeast-trending fault. To the west of the fault, Zone III does not outcrop and is interpreted to continue without offset for another 600 meters. The eastern segment of Zone III is >1500 meters long, curves from a west-northwest (N50^o to 70^{o}W) to an east-northeast (N70^{o}E) strike direction and is open-ended to the east. A similar bend in the surface trace is seen for Zones IV through VI to the north. A central segment can be readily traced in an N70^{o}E strike direction for approximately 900 meters and was heavily prospected with pits and piques during Spanish Colonial era. The presence and position of the western segment is mostly inferred on highly anomalous levels of mercury, antimony, and arsenic in outcrop chip samples from this area. The steep dip direction of the zone changes along strike from northeast to northwestward (eastern segment) to southwestward (western segment). A parallel narrow zone of sulfidic silicification and some vuggy silica along breccia and brecciated porphyritic dacite, for now called "HW" or "FW" Zone III, occurs 100 meters to the south of the Zone III. Along the eastern segment, where Zone III dips northward, “FW” reflects a footwall position. The central and part of the eastern segment of Zone III dips southward and “HW” is used to denote a hangingwall position. Where exposed along the central and eastern segments, the vuggy silica rock is two to three meters wide and is typically bleached with grey-colored areas where relict disseminated very fine-grained sulfide (pyrite) and sulfosalt minerals encapsulated in the silica. Along the western segment, vuggy silica and silicification are replacing hydrothermal breccia. Over the eastern segment, vuggy silica is developed after porphyritic dacite. Dump samples of vuggy silica rock are commonly dark grey and contain abundant, disseminated, fine-grained, sulfide-sulfosalt minerals. Some black sulfosalt minerals (i.e. stephanite) occur as vug infillings and along cross-cutting fractures. Druses of coarse-bladed barite are commonly present. The vuggy silica zone is surrounded by a proximal halo to tens of meters width of advanced-argillic alteration including pink crystalline alunite, white clay minerals, and sulfidic silicification. The advanced-argillic alteration is best observed in drill core and does not outcrop. An outlying halo of intense clay-pyrite extends for tens of meters outward and diminishes gradually away from the vuggy silica and advanced-argillic alteration. Samples of vuggy silica rock from shallow-depth workings from dump and outcrop samples along a segment of the southeast part of the zone (G-314 to G-318) were found to contain anomalous to high amounts of silver (60.8 to 2260.0 ppm) and highly anomalous amounts of lead (579 to 65300 ppm), antimony (24 to 3380 ppm), and exceptionally high mercury (4880 to 82000 ppb); plus anomalous amounts of arsenic (117 to 269 ppm) and copper (128 to 366 ppm). To the west, high amounts of silver (58.5 to 599.6 ppm), lead (336 to 23100 ppm), antimony (165 to 25800 ppm), arsenic (104 to 4798 ppm), mercury (1562 to 90000 ppb) are present in dump and outcrop samples (G-127 to G-130) from along Zone III. In areas of outcrop over the entire strike length falls within a broad mercury anomaly (>100/<200 ppb) and elevated antimony (>20 ppm/<100 ppm) which forms the halo to concentrations of mercury (>200 to >10000 ppb), antimony (>100 to >1000 ppm), and arsenic (>100 ppm) which occur along and close to the vuggy silica core. Samples with high silver and antimony with relatively low lead are believed to likely contain predominately stephanite which was identified in polished section. The anomalous mercury and arsenic content suggests possible presence of fettelite. Samples which contain considerable lead in addition reflect the presence of a complex silver-antimony-lead-mercury sulfosalt mineral of currently unknown identity. DDH-EK-99-02 made a shallow intersection through Zone III and encountered a 6.00-meter true width of vuggy silica at a vertical depth of 140 meters which averages 30.4 ppm silver, 0.23% copper, 0.10% lead, and 0.16% antimony with 5480 ppm mercury, and contains some detectible gold values. Subintervals with slightly better silver values are present. The intersection proved to contain values of silver, lead, and antimony far less than that from surface samples. Much of the vuggy silica core was observed to be affected by strong oxidation which produced limonitic/jarositic minerals and much of the silver, lead, and antimony is suspected to have been leached out greatly reducing the geochemical values. In the same location, a deeper intersection by DDH-EK-01-11 at a vertical depth of approximately 445 meters, intersected a great width containing sheeted vuggy silica rock and strong advanced argillic alteration with massive polymetallic copper-silver-rich sulfosalt/sulfide veins were intersected. The broad interval of veining averages 0.583 ppm gold, 331 ppm silver, 1.04% copper, 0.71% antimony, and 0.43% bismuth with highly anomalous mercury (22396 ppb) over a 0.75 meter true width. A 0.20 meter width of an individual sulfosalt/sulfide vein was recovered in DDH-EK-01-11 and the lower part was broken up and an unknown amount of core was lost. Based on core recoveries across the interval, the width could have been perhaps several tenths of a meter greater. The vein was sampled separately and found to average 1.180 ppm gold, 1890 ppm silver, 6.01% copper, 4.18% antimony, and 2.93% bismuth with 68800 ppb mercury. These values are suggestive that the bright red and black massive metallic sulfosalt-sulfide vein is comprised of luzonite-famatinite and tetrahedrite (freibergite) type minerals. DDH-EK-99-04 made an intersection down across faulted up vuggy silica rock at the east end of Zone III and at a much higher level compared to DDH-EK-99-02. This intersection of vuggy silica is 0.35 meters width and averages 109.2 ppm silver and <5ppb gold. No analyses were run for base and pathfinder metals. The surface outcrop of “FW” Zone III near DDH-EK-99-01 (G-322) was sampled and found to contain 948 ppm silver with 3.88% lead and highly anomalous mercury (26165 ppb). The halo of anomalous geochemical values for pathfinder metals related to Zone III appears to expand out and cover a much larger area in a westward direction and suggests an increase in width and intensity of mineralization and alteration related to Zone III. Drill holes: DDH-EK-99-01, -03, and -06 were poorly sited/oriented and missed making any intersection through Zone III. DDH-EK-99-02 and DDH-EK-01-11 both made complete intersections through Zone III nearly within the same vertical section and show that the vuggy silica bifurcates into many strands which are developed over a 40 meters width. The width of intense argillic and advanced-argillic alteration also increase considerably with depth. The only deep intersection in DDH-EK-01-11 clearly shows that, at depth, mineralization becomes rich in copper (to 6.1 %), antimony (to 4.18%), and bismuth (to 2.93%) and with high silver (to 1890 ppm), and the appearance of significantly anomalous amounts of gold (to 1.280 ppm). This mineralization occurs as massive, black-red, sulfosalt-sulfide veins and fracture veinlets which cross cut the vuggy silica rock and also as localized disseminations. The recovered width of the sulfosalt/sulfide vein is narrow (0.2 meters), but cannot yet be construed to be representative. Of interest, DDH-EK-01-11 also intersected a "blind", narrow, mineralized vuggy silica vein interval which is positioned in the footwall perhaps six meters from the principal mineralized intercept. The 0.25 meters-thick intercept contains anomalous gold (0.767 ppm), copper (8200 ppm), antimony (4880 ppm), and exceptionally high mercury (54800 ppb). The results of DDH-EK-99-02 and EK-01-11 together show that there is a well-developed halo of anomalous base and pathfinder metals which surrounds the central core of vuggy silica and advanced-argillic alteration. DDH-EK-99-04 also made an intersection through Zone III, but from a platform at high elevation and toward the far-east end of the zone. Because of the difference in elevation, the intersection depth is equivalent to a shallow intersection level approximately 100 meters above that made by DDH-EK-99-02. The intersection in DDH-EK-99-04 included 0.35 meters true width of 109.2 ppm silver and no detectible gold (<5 ppb). DDH-EK-99-01 made a 2.5 meter (true width) intersection through the "FW" Zone III which is comprised of sulfidic-silcified hydrothermal breccia and carried 14.9 to 31.5 ppm silver with anomalous arsenic (388 to 686 ppm), and mercury (717 to 1608 ppb) with no detectible gold. Interestingly, a similar "mini-version" of the halo of anomalous base and pathfinder metals surrounds the sulfidic-silicified core of "FW" Zone III. Where crossed by IP lines L-1E and L-6N, Zone III appears as a distinct zone of high resistivity values (>100 to 500 ohm-m) and moderate to high chargeability values (>12 to 22 mV/V) with depth continuity to greater than the 250-meters search depth. Of course, DDH-EK-01-11 demonstrated that Zone III is strongly developed and must persist to very great depths.

Of importance, based on drilling (DDH-EK-99-02 and EK-01-11), the halos for anomalous pathfinder metals (i.e. mercury) at shallow levels point to the presence, at depth in Zone III, of possibly significant amounts of high-grade gold-silver-copper-bismuth-antimony mineralization in veins, veinleted rock and breccia. The width and intensity of alteration effects (i.e. vuggy silica and advanced-argillic) increase with depth and veining may become more complex with three or more principal mineralized structures. Zone III has only been drilled tested at depth at one location and the long western segment where the zone is developed in hydrothermal breccia highly invites future drill testing. Zone III is envisioned as possibly comprising a well-mineralized zone at depth which could comprise a significant resource of two million to three million metric tons of vein- and breccia-hosted high-grade copper-silver-gold ore. A location has been chosen along the central segment to attempt a shallow-angled, but deep, intersection near DDH-EK-99-06. This segment is characterized by strong silver mineralization in vuggy silica which replaces hydrothermal breccia. The intriguing setting of possible breccia-hosted precious-metal mineralization perhaps warrants a second drill test further west of the one planned.

11.3.4 Zone IV - A 1200-meter-long eastern segment of Zone IV nearly coincides with IP line L-3N (stations 400 E to 1600 E). The IP expression is a well-developed response of coincident high resistivity (>200 to >500 ohm-m) and high chargeability (>12 to >24 mV/V) which is open ended below the 250-meter search depth. Along this segment, the zone does not outcrop well for a long distance. Along or nearby to the projected trace vuggy silica float is occasionally found and there is a broad "kill" zone barren of much plant growth. Outcrops in the vicinity of the zone are silicified brecciated porphyritic dacite. Abundant fracture veinlets of silica with pyrite are locally present. The eastern end of the zone occurs in a broad mercury anomaly (>100 ppb to <200 ppb) with a core zone of higher values (>200 to <1000 ppb) and anomalous antimony (>100 ppm to <1000 ppm) in outcrop rock chip samples. Further west, no sampling has yet been conducted. The eastern long segment of Zone IV is tentatively correlated with a 250 meter-long central segment of vuggy silica-barite with several outcropping chimneys on the central ridge. Here, a wide area of strong clay-pyrite and advanced-argillic alteration comprise a broad "kill' zone devoid of plant growth. The pits in the area from Spanish Colonial-era attempted to prospect part of this zone. The vuggy silica is developed after hydrothermal breccia and is two to four meters thick and can be traced for 250 meters. Samples of dump material from the pits (G-120 series) carry high silver (88.6 to 281.8 ppm) with anomalous antimony (106 to 3000 ppm), arsenic (52 to 388 ppm), and mercury (to 26840 ppb). Gold values are low (less-than-detectible/<5 ppb). The Zone IV vuggy silica occurs in a broad area of anomalous mercury (>100 to <200 ppb) in rock-chip samples. Strongly anomalous values of mercury (>1000 ppb), antimony (>100 to <1000 ppm), and arsenic (>100 to <500 ppm) are found in outcrop samples of strongly silicified and clay-altered breccia and porphyritic dacite close to and within the vuggy silica rock. The location of this central segment is juxtaposed across a west-northwest-trending fault close to Zone V. The proximity of the two zones lends a degree of uncertainty whether this segment is part of Zone IV or V. The IP expression in Line 1E across the area of Zones IV and V is high resistivity (>120 to 300 ohm-m) and moderately high chargeability (11 to 14 mV/V). The westward continuation of Zone IV is not known and, if displaced, 250 meters in left-lateral fashion across the west-northwest fault should be displaced to area where elevated antimony (>100 to <1000 ppm) and broad mercury (>100 ppb to <200 ppb) appear in outcrop samples of silicified and clay-pyrite-altered porphyritic dacite. No indication of vuggy silica has been observed in road cuts although cross-cutting veins of microbreccia are present.

A drill hole has been planned to drill test the east segment of Zone IV based on the strong IP chargeability and coincident resistivity anomaly.

11.3.5 Zone V – The central segment of Zone V is marked by bold chimneys and outcrop of vuggy silica-barite which replaces the central part of a thick zone of hydrothermal breccia. During the Spanish Colonial-era, this segment was prospected with piques and pits. A 45-meter deep shaft was later sunk by an unknown Chilean mining concern in the late 1870's (?). The central segment can be traced along a N35^{o}W-strike direction for approximately 400 meters. Along this segment, the zone dips steeply northeastward. The two northeast-inclined attempts (DDH-EK-99-05 and -07) to drill test the segment both failed because the steep northeast dip was not appreciated. Width of the vuggy silica-barite is two to three meters and surrounding advanced-argillic and strong argillic alteration extend outwards for tens of meters in hydrothermal breccia and porphyritic dacite. The alteration halo comprises a extensive "kill" zone devoid of plants. The vuggy silica is smoky colored with abundant disseminated fine-grained sulfosalt and sulfide minerals (mostly pyrite) and coarsely bladed barite is commonly very abundant. The tall chimneys show variable effects of supergene leaching and where bleached white are devoid of sulfide minerals and contain low geochemical values for silver and base and pathfinder metals. Samples of vuggy silica rock (series G-116 and G-137, G-138 and G-139) from outcrop and dumps to Spanish-era piques and pits carry high amounts of silver (73.7 to 462.9 ppm) with anomalous amounts of antimony (283 to 1572 ppm), arsenic (113 to 299 ppm) and highly anomalous mercury (1140 to 16140 ppb). Lead values tend to be subanomalous (<100 ppm) and suggest that the prominent silver-antimony sulfosalt mineral is likely stephanite. Gold values are generally at less-than-detectible levels (<5 ppb). The two segments of vuggy silica rock which are positioned northeast of the central segment of Zone V are interpreted to be the fault offset along west-northwest trending/north-dipping normal faults. The IP profile (Line 1E) supports this interpretation showing the two vuggy silica segments do not continue to depth. Hence, the two segments may represent upper parts of Zone V. Their high-level in the system may explain why the silver, lead, antimony, and mercury values are relatively low for the samples of vuggy silica rock from dumps (series G-136) to the Chilean shaft and outcrops along the segments (series G-135). The IP expression shows that the central segment of Zone V continues to great depth (>250 meters search depth) and is strongly developed as a resistivity high (208 to >300 ohm-m) and mixed (low to moderate) chargeability (7.3 to 14 mV/V). The resistivity suggests that perhaps the vuggy silicification increases significantly in width at depths below level n=4. To the southeast, the central segment of Zone V is interpreted to be offset by a west-northwest-trending fault in left-lateral fashion and eastern segment displaced 250 meters to the east. Minor (?) displacement along a northeast-trending/west-dipping normal fault also crossing this area further complicates the map pattern. The eastern segment of Zone V can be traced along the surface for +1000 meters and crosses IP line L-2N at an acute angle between 900 E to +1000 E where high values for resistivity (150 to 257 ohm-m) and coincident chargeability (11 to 16 mV/V) were detected. Along 300 meters of the western part of this trace, a narrow <1.0 m.-width of vuggy silica and surrounding halo of silicification and strong clay alteration (advanced-argillic and argillic) is locally exposed in shallow prospect pits. Samples (series G-407 to G-411) from the vicinity of the zone carry anomalous mercury (144 to 1292 ppb) and one detectible gold (8 ppb), but low silver, (<0.2 ppm), lead, zinc, copper, antimony, and arsenic. The eastern segment of Zone V occurs in a broad mercury anomaly (>100 ppb to <200 ppb) in rock-chip samples of variably argillic-altered porphyritic dacite. A central core of stronger mercury values (>200 to <1000 ppb) trends N65^{o}W is believed to geochemically mark the trace of the zone. Vuggy silica/silicified brecciated porphyritic dacite was found exposed in scattered prospect pits, but is mapped to not be aligned along/fall exactly within the highest mercury values. A curved trace of the zone was mapped, mostly based on float, to trend N40^{o}W to N10^{o}E and crosses the west part of the mercury anomaly and lies to the south of the east part. The curved trace is conformable with the curved traces in this area of Zones III, IV, and VI. However, the discrepancy of the mapped position of the zone versus the position of the strong mercury anomaly cannot be yet resolved and may require more-detailed grid soil and outcrop sampling plus another review of surface geologic relationships. The sample locations are all surveyed and the position of the mercury anomaly is considered more reliable. The geologist though insisted that the zone trends off the anomaly as shown on the geologic map (Plate 3). The IP resistivity and chargeability expression along the east part of line L-2 (stations 500 E to +1000 E) can be interpreted to suggest that Zone V lies close and trends nearly parallel to the line direction. What happens to Zone V to the west of the central segment is not understood. The western segment of the zone is projected to trend N40^{o}W to a position 100 meters north of DDH-EK-99-08. This 400 meters of projected continuation is not yet well supported by IP or geochemical sampling although few outcrops across this mostly covered area are anomalous in mercury (>100 ppb to <200 ppb). The results of DDH-EK-99-08 though suggest that this vertical hole penetrated through the footwall part of a gold, base- and pathfinder-metal halo to a mineralized zone which must lie not far to the north. DDH-EK-99-08 also intersected numerous steeply dipping, narrow zones of hydrothermal breccia and strong clay-pyrite (argillic) alteration and silicification.

In summary, the central and west segments of Zone V can be traced with reasonable confidence over a 800- meter cumulative strike length and are similar to features and geochemical character of Zone III and IV. The strong silver mineralization of the central segment and appearance of numerous detectible gold values in DDH-EK-99-08, perhaps related to the westward segment, give justice to planning and completing two drill holes to explore Zone V at depth. With further field work, Zone V may be found to have a cumulative strike length in excess of 1400 meters and as much as 2200 meters. If so, the resource potential should a discovery be made could contribute two million to three million metric tons of high-grade vein and moderate grade breccia-hosted gold-bearing, copper-silver-antimony-bismuth sulfosalt-sulfide ore.

Several drill holes are planned to test Zone V. One is positioned to drill southwestward down beneath beneath the Chilean shaft and into the strong resistivity/chargeability anomaly which correlates upward into the silver-mineralized outcrops of vuggy silica-barite. The IP suggests the zone is continuous to great depth. A second hole is planned to drill across the projected westward segment positioned north of DDH-EK-99-08.

11.3.6 Zone VI – The eastern segment of Zone VI is well defined over a 900-meter distance by surface outcrop of vuggy silica rock along the west section and results of the IP survey (line L-4N) along the east section. The trend of the vuggy silica zone is N45^{o}W and the mapping shows that it crosses the southern part of a hydrothermal breccia body and argillic-altered porphyritic dacite. Alteration associated with the zone is argillic (clay-pyrite) and likely advanced-argillic along the margin to the vuggy silica core (although not exposed). In an eastward direction, the surface trace of Zone VI is concealed beneath shallow cover (scree), but has a strong IP resistivity and chargeability expression. Zone VI appears to cross the IP line L-4 in two places – between stations 0 to 200 W and between stations 700 E to 800 E. Resistivity values are high (107 ohm-m to 236 ohm-m) and chargeability responses are moderately strong (from 9.2 mV/V to 15.0 mV/V). The pattern of the resistivity and chargeability responses in pseudosection profile (broad/open "U" shaped form) suggests that the zone lies to the south of the IP line, is curved from an +/-N40oW to slightly northeast strike direction and is steeply northward dipping. The IP expression also shows that Zone VI continues to depth and is open ended below the 250-meter search depth. The only sampling of the zone is from a 1.0 meter-wide vuggy silica outcrop and dumps to a nearby Spanish Colonial-era pique (sample series G-102, G-103). These show anomalous silver (1.2 ppm to 18.6 ppm), lead (139 ppm to 4365 ppm), arsenic (227 to 305 ppm), antimony (101 ppm to 579 ppm), and high mercury (6988 ppb to 18160 ppb). Zone VI occurs within a broad mercury anomaly (>100 ppb to <200 ppb) and weak antimony (>5 ppm to <28 ppm) in outcrop samples of argillic-altered porphyritic dacite. Closer to zone VI, values of mercury (>200 ppb to <1000 ppb) and antimony (>100 ppm to <1000 ppm) both increase. Zone VI is similar in character and geochemical analytical values for silver and pathfinder metals to down-faulted parts of the central segment of Zone V which lie to the south. The high mercury and lower, but anomalous amounts of silver, lead, arsenic, and antimony in vuggy silica suggest perhaps that the exposures of Zone VI are at a higher level in the mineralizing and alteration system. The character of the IP response suggests that Zone VI is strongly silicified and sulfide-sulfosalt mineralized with a long strike length and to greater than the +/-250-meter search depth. The zone is open-ended to the east, but in a westward direction appears to be truncated by an east-northeast-trending fault. No indication from geologic mapping, geochemical analytical results on outcrop rock-chip samples, or IP surveys completed has yet been found to suggest that Zone VI has a significant western continuation.

11.3.7 Zone VII – Zone VII is a narrow mineralized zone identified by anomalous mercury values (>200 ppb to <1000 ppb) in outcrop samples and was crossed at an acute angle by Trench 1. The zone is slightly curved and trends "east-west" to N70oE for over a 600-meters distance. The zone is open-ended to the east-northeast and appears to converge somehow with/into Zones VI and VIII to the west. In outcrop, the area of the zone is marked by brecciated and sulfidic-silicified, clay-pyrite-altered, porphyritic dacite. The width of the zone is not well-constrained because of poor exposure and is estimated to be between 15 to 20 meters across. The zone occurs within a broad mercury anomaly (>100 ppb to <200 ppb) in outcrop rock-chip samples and is defined by the highly anomalous mercury values. Anomalous antimony values (>100 ppm to <1000 ppm) are present in outcrop samples toward the west end of the zone. Perhaps the high values for resistivity (from 181 ohm-m to 373 ohm-m) and chargeability (from 15 mV/V to 25 mV/V) between stations 400 N to

800 N on IP Line L-1E reflect the strong sulfidic-silicification in the area of Zones VII and VIII. Zone VII is interpreted as a fault-controlled leakage of highly anomalous mercury above possible deeper seated precious-metal mineralization.

11.3.8 Zone VIII – Zone VIII is a broad zone of sulfidic-silicification and clay alteration affecting a wide 50- to 180-meters wide area of porphyritic dacite and is well-defined by a strong mercury anomaly (>200 ppb to <1000 ppb) in outcrop samples. The zone trends N65oE and gradually widens in an northeastward direction. The 600-meters trace is open-ended to both the northeast and southwest; perhaps another 200 meters of strike length exists to the northeast. A strong IP expression shows high resistivity and chargeability values which relate to the sulfidic silicification. Zone VIII occurs within a broad mercury anomaly (>100 ppb to <200 ppb) within clay-pyrite and silicified porphyritic dacite. Locally, thin stockwork (fracture) veinlets of silica-pyrite are observed in outcrop. The high mercury values and sulfidic silicification which are diagnostic of Zone VIII occur within a broader lower-level mercury anomaly (>100 ppb to <200 ppb). Zone VIII is interpreted to be an upper-level expression of deeper seated, precious-metal mineralization.

11.3.9 Zone IX – Prospective Zone IX is a 1000 meters-long zone of strong clay-pyrite alteration and sulfidic silicification which trends N45^{o}E and is locally exposed in Trench 5. The zone is marked by strong geochemical anomaly for pathfinder metals in outcrop samples for mercury (>200 ppb to <1000 ppb), arsenic (>100 to <500 ppm), and antimony (>100 ppm to <1000 ppm; with one area of >1000 ppm). The nature and spatial extent of Zone IX is not well exposed and is currently interpreted as a 200- to 400-meter wide zone. The zone is interpreted to cross IP line L-5E between stations 100 N to 500 N and appears as a strong chargeability anomaly (13 to 21mV/V) and a shallow high-resistivity anomaly (>112 to 206 ohm-m). Very low resistivity values (31 to 60 ohm-m) are present at depth. A similar IP expression of high chargeability (from 12 mV/V to 22 mV/V) and very low resistivity (28 to 54 ohm-m) are also observed between stations 800 W to 400 W on Line L-4N. The latter IP expression suggests very strong clay alteration sulfide (pyrite) mineralization without much if any silicification that extends as a wide tabular body to great depth (>250 meters). A similar high-chargeability/low-resistivity IP expression was defined along Lines L-3B and L-4B in the Breccia Area where strong clay-pyrite alteration and deeper level silicification are focused on hydrothermal breccia bodies. One drill hole is proposed to test Zone IX and the IP anomaly.

11.3.10 Zone X – Zone X is exposed at relatively high elevations (4700 to 4800 meters) across the west-facing steep wall and can be traced along a N15^{o}W strike direction for an 800-meter distance. The zone is opened ended to the south, but appears to pinch out in a northward direction. The true width of the zone is approximately 40 to 50 meters across. The apparent wide width on the map is due to the westward moderate to steep dip in the same direction as the steep slope. In outcrop, Zone X is a hydrothermal breccia composed of chalcedonic and vuggy silica and is strongly clay alteration of clasts/vug in-fillings and iron-oxide minerals (supergene effects). The breccia is clast to locally matrix supported and is composed of sub-angular to angular fragments of clay-altered dacite-andesite flows and porphyritic dacite. The clasts are largely destroyed leaving small to large, open or clay-filled vugs. The few samples of the breccia body all contain anomalous amounts of mercury (>100 ppb to <1000 pbb) and low levels of other pathfinder metals, silver (<0.2 ppm), and gold (<5 ppb). No IP lines cross the hydrothermal breccia body. The zone is interpreted to be prospective for precious-metals at depth and the anomalous mercury content is believed to be a high-level expression of this mineralization. The strong nature of vuggy silica alteration and favorable breccia host rock make the large body an intriguing target to drill test at depth. Fortunately, because the westward dip direction is slightly steeper than the slope, a drill hole is planned to test the down-dip continuation at a depth interval between 4000 to 4200 meters.

11.4.0 Mineralized Zones of the Breccia Area

11.4.1 **Introduction** - Six mineralized zones (Is to VIs) have been identified in the Breccia Area (Plates 28, 29, 30, and 31). The level of understanding of them is not nearly as advanced as for the mineralized zones of the eroded-out stratovolcano core zone. The exposure over the Breccia Area is poor and outcrop exposures are not sufficient to everywhere confidently unravel the relationships between possible agglomerate (breccia ejecta (?)) and several textural types of hydrothermal breccia. Eight lines of IP were run across the zones to attempt help map their spatial distribution/correlation and to give an idea of subsurface bedrock relationships in covered areas. Where the breccia zones appear in IP pseudosection profile, typically as high resistivity responses, their depth extent is open ended to greater than the 250-meter search limit of the IP survey. One drill hole (DDH-EK-01-1B) was attempted to test one of the Zones (IVs), but encountered a major fault and did not intersect the intended target providing no information on the geologic features and geochemical analytical values within the breccia zones at depth. Considerable more work, including reviewing and evaluating geochemical results of outcrop rock-chip samples, further surface mapping and field study of outcrop relationships, and perhaps attempting several more drill holes to obtain an idea of the character of the zones at depth would be required to obtain an idea if the zones could be prospective for precious metals at depth. The zones are silicified/clay-altered breccia locally with fine-grained disseminated sulfide (pyrite (?)) and, based on rock-chip sample geochemical analytical results, comprise mercury anomalies without any hint of values of silver or gold. Base and other pathfinder metals may locally be present in a few samples and abundant samples with anomalous zinc are present in outcrop of breccia bodies toward the east end of the Zones Is, IIs, and IIIs. As understood, the trend of the breccia zones is similar to that of the eroded-out stratovolcano core zone and they may be the fault offset westward continuation of Zones I through VI. The fault offset has moved structural block of the Breccia Area to the south (apparent left lateral movement) and also was accompanied by perhaps considerable normal displacement (west block down). Other complicated faulting may likely be present and other interpretations are possible. The down-dropped fault displacement and likelihood the zones are exposed at much higher levels than the zones in the stratovolcano core zone is perhaps supported by the presence in outcrop samples of anomalous mercury, general absence of greater-than-detectible levels of gold and silver, and widespread lack of anomalous levels of base and pathfinder metals. Anomalous levels of base and pathfinder metals do appear in the eastern part of the breccia zones and perhaps reflect deeper level and/or closer proximity to the center of mineralization. Hence, at this time, the breccia zones (Is through VIs) of the Breccia Area are not considered highly prospective though outcrop chip samples from them do contain highly anomalous amounts of mercury and locally anomalous amounts of zinc, arsenic, and thallium. They generally lack any gold, silver, antimony, and lead values. To date, not much effort and time has been put into exploring the mineralized zones of the Breccia Area and they are treated in much-less detail here.

11.4.2 Zone Is – Zone Is can be traced along an N80oW to N70oE strike direction for approximately 2400 meters. The core of the zone is an angular-clast hydrothermal breccia which is strongly silicified and clay altered. The core zone angular-clast breccia cross cuts or is developed in coarse boulder breccia. The eastern segments of the zone appear in IP profile as a resistivity-low values and elevated chargeability. This IP character reflects clay alteration and variable amounts of pyrite partially supergene altered to iron-oxide minerals. Further west, the silicified core appears as a distinct resistivity high in IP profile of lines L-1B and L-5B and reflects the strong silicification. This suggests that at depth in the zones, sulfidic-silicification appears and is exposed in scattered outcrop at deeper erosional levels along the zone. The IP also suggest that Zone Is dips steeply northward (?). No anomalous or interesting elevated values of gold or silver appear in any surface samples.

11.4.3 Zone IIs – Zone IIs is less-well defined and can be traced for 1600 meters from west to east where it appears to be cut off by a fault. Any eastern continuation has not been yet found. The zone is similar in character to Zone Is being composed of silicified angular-clast hydrothermal breccia surrounded by boulder breccia. The zone also strikes N70^{o}E to E-W and is interpreted to dip steeply northward. No greater-than-detectible values of gold and silver appear in outcrop samples.

11.4.4 Zone IIIs – An eastern segment of Zone IIIs can be traced for approximately 1300 meters and is composed clay-altered/weakly silicified angular-clast hydrothermal breccia emplaced in coarse boulder breccia or agglomerate. The zone strikes N65^{o}W to N75^{o}W and is interpreted to dip northward. In IP profile, the zone appears as a resistivity low and coincident chargeability values (to16 mV/V) suggesting silicification is not significant to the 250-meter search depth. Zone IIIs could not be followed to the west and appears to be offset a great distance along a northeast-trending fault. Several segments (Zone IIIsa and IIIsb) in scattered locations are perhaps the faulted-up continuation of Zone III.

11.4.5 Zone IVs – Several segments of Zone IVs have traced over 1800-meter cumulative strike length. The segments trend N60^{o}W to E-W and are interpreted to dip northward.. The zone is well exposed on a ridge and is composed of coarse boulder breccia with a central silicified core of clast-supported hydrothermal breccia which is clay altered and is weakly to strongly silicified. DDH-EK-01-1B was sited "point-blank" to make moderate depth intercept through the east end of the central segment to Zone IVs, but encountered a major normal (?) fault zone and did make an intersection through the zone. Zone IVs appears on the IP profiles as an area of low-resistivity with a central part of high resistivity and no significant chargeability expression.

11.4.6 Zone Vs – Several short segments of clay-altered/weakly silicified angular-clast breccia within boulder breccia with traceable strike lengths of approximately 100 meters are assigned to Zone Vs. The segments strike N70^{o}W and their dip direction is uncertain.

11.4.7 Zone VIs – Zone VIs does not outcrop occurring as rubble crop float of breccia. The zone is believed to be the cause of the strong IP expression toward the north end of L-7B (stations 400 N to 800 N) which is a marked chargeability anomaly with pants-leg pattern pseudosection profile suggesting a steeply dipping causative body. The unusually strong IP expression may warrant drilling in the future as part of a program focused on deeper testing of targets in the Stratovolcano Core Zone.

11.4.8 Summary of Geochemical Character – Mineralized Zones Breccia Area - At present, a brief review of results of rock-chip samples from the Breccia Area have been completed. For the eastern part of the area (Zones Is, IIs, IIIs, and IVs) sample suite (BC-00) shows almost all samples are highly anomalous in mercury (184 ppb to 44320 ppb), arsenic (108 ppm to 3160 ppm), and with many elevated antimony values (15.0 ppm to 51.3 ppm). A few samples show barely detectible gold values (>5 ppb to 9 ppb). Almost all silver values are less-than-detectible (<0.2 ppm); a few contain up to 2.1 ppm. Zinc values are also locally highly anomalous (152 ppm to 907 ppm) in several groups of samples. Anomalous levels of lead appear only in a few samples (to 227 ppm) and these do not correlate to samples with low-level detectible silver. Elevated (>0.5 ppm) to anomalous (to 62.8 ppm) thallium is also commonly present. Of interest many of the samples contain between 1% to almost 7% sulfur and suggest the presence of sulfide minerals (pyrite (?) encapsulated in silica (?)). Native sulfur and gypsum have also been observed in drill core (DDH-EK-01-1B), but not in any surface samples submitted for analyses. These analytical results though disappointing for direct indication of near-surface gold or silver deposits do suggest that the zones are mineralized and, at not-too-great (?) depth, could be precious-metal bearing. Further to the west, geochemical analytical results on rock-chip samples (suite BO) show more-subdued, but similar, analytical results -

anomalous values of mercury (>100 ppb to 8760 ppb) with anomalous arsenic (105 ppm to 1060 ppm) in many samples. Some samples also contain anomalous zinc (106 ppm to 251 ppm) and elevated amounts of antimony (24 ppm to 96 ppm). A few samples contain up to 276 ppm antimony. Gold and silver values are all below lower detection limits. The lower level of anomalous values for mercury, and fewer anomalous analytical values for zinc, antimony, and arsenic suggest either the exposures of altered hydrothermal breccia are even higher in the system and/or that the mineralizing system is gradually becoming weaker away from the Stratovolcano Core Zone.

11.5.0 Mineralized Zones of the Copper Zone – An end-to-end cluster of small narrow pebble breccia bodies occur on the lower part of the north flank of the Cerro Eskapa stratovolcano (Plates 5, 7, and 33). Individual bodies are traceable along the surface for 100 to 200 meters. The bodies comprise a curving "north-striking" trend in outcrop for a +700 meters distance. Northward with decreasing surface elevation, the pebble breccia bodies increase in width to over two meters and become more-strongly oxide-copper mineralized. These dimensions roughly suggested approximately 350,000 metric tons of oxide-copper mineralization (target) with an average grade of 5% to 7% copper might be present down to the pampa level (elevation) of the Quaternary cover. In a southward direction and increasing surface elevation up the ridge and toward the eroded stratovolcano core zone, the pebble breccia bodies disappear, but oxide-copper mineralization is present in places along multiple directions of fractures and faults. This might suggest that the fracture-controlled mineralization is a high-level expression of the continuation as deeper seated, oxide-copper mineralized, pebble-breccia bodies. A limited number of rock-chip and dump samples (10) were collected and sent to Bondar-Clegg (Oruro) for gold assay and geochemical analyses of silver and base and pathfinder metals. The analytical results indicated an estimated average grade of the breccia-zone ore material to be 6.82% copper with a minor silver content (14.4 ppm, average) and also found highly anomalous amounts of mercury (to 25980 ppb). No gold was detected (>5 ppb) in any of the samples. A decision was made to drill test the pebble breccia out of curiosity to determine if there was any significant increase in width with depth and to obtain an intersection so that the average grade could be obtained. DDH-EK-01-2C successfully intersected approximately one-meter true thickness of mineralized pebble breccia which averages 5.01% copper and 10 grams/metric ton silver. The intersection is approximately 100 meters below the level of the pampa surface. While the copper grade certainly is interesting and proved close to that estimated from the surface and dump samples, the narrow width though was disappointing and suggests only a small resource could be likely be present above the pampa level.

12.0.0 EXPLORATION

12.1.0 Introduction – The Cerro Eskapa property has been explored in four time periods by SAMEX. The earliest exploration activity in February, 1995 was reconnaissance in nature and limited to the eroded-out Stratovolcano Core Zone Area. This work provided a geologic due diligence to justify acquiring an agreement for mining rights to the ground. The company returned to the property in December, 1998 and carried out a more-intensive exploration program in the Stratovolcano Core Zone Area that led to a ten-hole core-drilling project which was started in March, 1999 and ended in June, 1999. A surface evaluation of the Copper Zone was also included in this work. A small amount of field work was carried out in December, 1999. With the option/joint-venture agreement between SAMEX and International Chalice in effect, exploration work resumed in late-November, 2000 and continued to March, 2001. This effort was focused on evaluating the Breccia Area and Copper Zone with the objective of identifying and drill testing targets in both areas. Exploration at Cerro Eskapa resumed in September, 2001 to attempt a deep drill intersection through Zone III in the eroded-out Stratovolcano Core Zone Area and a drill test of an IP chargeability anomaly in the Copper Zone. The drilling was completed at the very end of October, 2001 and no further exploration work on the property has been conducted.

12.2.1 <u>Exploration Activity -1995</u> - Work in February-March, 1995 was in-part, due-diligence in nature and included: geologic mapping, rock-chip sampling, and reconnaissance geophysical IP survey, and was limited to the central part of the prospective area of the eroded-out Stratovolcano Core Zone Area where a cluster of chimneys of silver-mineralized vuggy silica rock occur. Within the time frame, the area examined amounted to approximately 1500-meters long by 800-meters across and represented only part of the prospective area. A generalized, sketch, geologic map (1:10000) was produced; 107 outcrop samples were collected and sent to the Bondar-Clegg laboratory in Oruro, Bolivia for gold assays and geochemical analysis for silver, copper, lead, zinc, antimony, arsenic, mercury, and molybdenum; and four lines/approximately six-total line kilometers of IP were run with some supplementary ground magnetics surveys over the same lines. The limited 1995 exploration work at Cerro Eskapa, however, provided encouraging due-diligence results for justifying acquisition and found that (a) dump and outcrop samples of vuggy silica rock commonly contain >100 (ppm) grams/ metric ton silver, >1.0% lead with highly anomalous amounts of pathfinder elements: antimony (to 4.02%), arsenic (to >1000 ppm), and mercury (to >5000 ppb), locally anomalous copper (to 920 ppm), but negligible amounts of gold (most <5 ppb, few from 7 ppb up to 37 ppb); and (b) surrounding clay-pyrite altered rock consistently contains weakly to moderately anomalous values of pathfinder metals with negligible (below detection limits) values of gold and silver. The IP surveys along four widely spaced lines (5700 line-meters total/150-meter "a"-spacing) showed that the clay-pyrite alteration (low-resistivity/high-chargeability) and silicified/silver-mineralized rock (high-resistivity/mixed-chargeability) are widespread and persist open-ended below the +/- 300-meters search depth.

12.2.2 <u>Interpretations</u> - Altered rocks of the eroded-out core zone of the stratovolcano were considered to be mostly dacitic intrusive rocks. Dominant porphyritic textures, weak flow fabric (poorly aligned mafic phenocrysts), lack of thin-layered volcanic (surface) flow or pyroclastic units, no real discernable variation in phenocryst mineral content/abundance (composition) or rock textures, and local areas of domal exfoliation suggested hypabyssal intrusive rocks – perhaps as multiple intrusions as coalesced resurgent domes. Large blocks (roof pendants (?)) of dacite-andesite flows of the stratovolcano are locally preserved, but too are typically clay-pyrite altered around their margins. Strong clay-pyrite alteration and surface (supergene) weathering over a widespread area made confidently identifying rock types in many places difficult. Hydrothermal breccia was observed to be present in several areas, but the geologic nature and spatial extent of these occurrences were not worked out. Important west-northwest- and later north-northeast-trending fault zones were also recognized. The faults were observed locally to offset bodies of vuggy silica-barite rock and show indications of post-mineral/alteration movement. The clay-pyrite alteration of rocks in the eroded core of the stratovolcano is positioned centered roughly over the intersection of these major fault directions, but appeared to be more-elongated in the direction of (perhaps controlled by) the later (?) west-northwest direction of faulting. No indication of an exposed or very shallow, large (bulk-tonnage-type) target of precious-metal mineralization was immediately evident within the limited area examined and sampled, and this somewhat dampened enthusiasm for the property. The lack of any significant (anomalous/>100 ppb) gold values in any surface samples suggested that either the system is silver rich or, if present, gold mineralization was perhaps preserved somewhere at greater depth. The presence, nearly everywhere sampled, of anomalous amounts of mercury and elevated to low-level anomalous antimony, and arsenic plus their very high values in many vuggy silica rock samples was thought to be a positive indicator that gold mineralization could and should be present somewhere within the altered area – perhaps in sectors not covered by the 1995 reconnaissance field investigation. Possible significant targets of precious-metal mineralization were concluded to be concealed and perhaps could occur, at depth, as veins, stockwork veinlet/disseminated in silicified intrusive rocks and also hosted in hydrothermal breccia. High-grade vein mineralization was also considered a target possibility as the vuggy silica rock had been determined to be a fault-controlled alteration feature and to cross cut the clay-pyrite-altered dacite rock.

12.2.3 <u>SAMEX Personnel</u> - The two-month 1995 exploration work was carried out by two SAMEX geologists (Robert Kell and Carlos Espinoza) with the help of U.S. contract geologist Gregg Minnick. The IP surveys were conducted by contractor Gerry Carlson of Gradient Geophysics (Missoula, Montana).

12.2.4 <u>Discussion of Data</u> - The data collected in 1995 was reconnaissance in nature and was collected to attempt to verify that the Cerro Eskapa stratovolcano justified exploring for precious-metal deposits. The project was always initially thought as a "grassroots"-type of exploration play and the objectives of the 1995 exploration effort were to simply demonstrate the existence of a large altered area and prospective nature for precious-metal mineralization. The work certainly outlined a large clay-pyrite altered area, presence of interesting silver-lead-antimony sulfosalt mineralization in vuggy silica-barite, and widespread anomalous levels of pathfinder metals in altered rocks. No direct indication of an outcropping or near-surface bulk-tonnage type of precious-metal ore body was found. The absence of any anomalous gold values in mineralized vuggy silica-barite rock was disappointing, but with high pathfinder metals, the geologic setting was deemed permissive of significant gold possibly occurring on the property. The IP surveys showed that clay-pyrite altered rocks and resistive bodies (vuggy silica/silicification) persist to great depths leaving open the possibility of defining deeper seated drill targets. These results are considered to be reliable especially in light of subsequent work.

12.3.1<u>Exploration Activity – 1996</u> - The property was re-visited briefly on several occasions while conducting survey work to put in legally required concession monuments. Some additional rock-chip/dump sampling was also carried out during one of these visits in 1996 and the ten (10) samples were sent to the Bondar-Clegg laboratory in Oruro, Bolivia for geochemical analyses for gold, silver, and base- and pathfinder metals. Samples collected in 1995 which contained higher values than the upper detection for silver, lead, and antimony were not further assayed to determine their precise amounts. The sampling in 1996 was to provide a small suite of vuggy silica-barite samples to check the earlier results and assay those (i.e. with >100 ppm silver) to determine precise amounts. These results showed that the highest silver values range between 296.5 ppm to 388.3 ppm, but with lower-than expected lead and antimony values.

12.3.2 <u>Interpretations</u> – The assay results confirmed that silver content locally in vuggy silica-barite rock does approach 400 ppm as determined by Richther and others (1992).

12.3.3 <u>SAMEX Project Personnel – 1996</u> – The sampling was conducted by SAMEX geologist Robert Kell. Locating and putting in concession monuments and permanent survey control points was conducted by SAMEX Bolivian land man Eduardo Martinez.

12.3.4 <u>Discussion of Data – 1996</u> – The results showed that there is potential for high silver content in the vuggy silica-barite rock. Gold values are low although five of the samples did contain detectible levels (>5 ppb to 20 ppb). The high levels of mercury (to 25000 ppb) and anomalous amounts of antimony (to 2700 ppm) and arsenic (to 2792 ppm) suggested that higher gold might be present somewhere in the mineralizing system. Models for epithermal precious-metal systems by Buchanan (1981) suggested in some instances that low-temperature silver-sulfosalt mineralization might be present above the level where gold would be deposited and be associated with anomalous levels of antimony, arsenic, and mercury. This left open the possibility of gold still be present at depth along the zones. The reliability of the results is considered good especially in light of the subsequent exploration results.

12.4.0 Exploration Work – late-1998 into early 1999

12.4.1 Introduction – December - 1998 - SAMEX exploration staff returned to Cerro Eskapa in December, 1998 and first began putting in road access from the Copacabana village to, and throughout, the prospective area of the eroded-out stratovolcano core zone (approximately nine kilometers of bulldozer-prepared road). At the same time, core logging and storage facility and exploration office was constructed in the Copacabana village. Systematic survey work was started to produce a detailed topographic map (1:2000) of the prospective area and included putting in many control points for later use in geologic mapping, locating surface rock-chip samples, and laying out IP geophysical lines. Sampling at the end of 1998 was first focused on mineralized vuggy silica-barite outcrop showings and dumps of the Spanish Colonial-era mine and prospect workings and also included taking continuous sample chip channels horizontally across fresh outcrop variably clay-pyrite-altered dacite in new road cuts. Some 72 samples were collected and sent to the Bondar-Clegg laboratory in Oruro, Bolivia for gold assay and geochemical analyses for base and pathfinder metals. Detailed geologic mapping was completed over most of the prospective area in the eroded-out stratovolcano core zone. Outcrop and dump samples (26) of mineralized vuggy silica rock, commonly with coarse- bladed barite, were found to carry high amounts of silver (to 599.6 ppm), lead (to 2.31%), antimony (to 2.58%), and highly anomalous levels of arsenic (to 4798 ppm) and mercury (to 208000 ppb), but generally very low amounts of gold. These analytical results appeared in SAMEX news release 2-99. Two-thirds of the silver-mineralized samples contain gold values of <5 ppb (lower detection limit) and a third of them contain above-detectible to elevated levels of gold (6 to 48 ppb). Anomalous amounts of copper (102 to 920 ppm) were also found to be present in many of the vuggy silica rock samples. Although the averaged analytical values for silver + antimony + lead do not approach being possibly of economic value, especially in consideration of the relatively small size of the mineralized barite-silica rock exposures (typical widths of one to three meters), they were thought to reflect possible leakage from deeper seated, more-substantial, precious-metal mineralization. Most samples of surrounding clay-pyrite-altered rock were found to contain variable elevated (sub-anomalous) to moderately anomalous values of pathfinder metals (arsenic - 25 to 186 ppm, antimony – 14 to 180 ppm, and mercury - 25 to 2802 ppb) and several base metals (lead - 7 to 68 ppm), zinc - 4 to 108 ppm, and copper - 4 to 21 ppm). Values for silver (typically <0.2 ppm) and gold (typically <5 ppb) in clay-pyrite-altered dacite rock are very low.

12.4.2 Interpretations – December – 1998 - Because of the influence of the published report by Rios and Heredia (1995), the altered rocks in the eroded-out core zone were mapped as layered volcanic flows and tuffaceous rocks of dacitic composition and which were strongly clay-pyrite altered and locally sulfidic silicified. The possibility of a Pierina-like mantos target was thought to be a possibility and that clay-altered volcanic flows with anomalous pathfinder metal content might cap and conceal such a zone. The geochemical analytical results indicated that, for the areas sampled, high silver and pathfinder metal values are tightly restricted to vuggy silica rock and do not extend outward for any appreciable distance into clay-pyrite-altered rocks. The vuggy silica-barite rock was considered leakage along structural pathways from a not-too-deep, precious-metal mineralized mantos interval.

12.4.3 SAMEX Project Personnel – December - 1998 – The detailed surveying work was carried out by SAMEX staff geologist Mario Barragon who also drew the superb detailed topographic map (1:2000). Geologic mapping was conducted by SAMEX staff geologists Carlos Espinoza and David Montano. Both geologists also supervised the sampling along the newly created outcrops in road cuts.

12.4.4 Discussion of the Data – December - 1998 – The results continued to show that high amounts of silver with anomalous to high amounts of lead, antimony, arsenic, and mercury are restricted to vuggy silica-barite rock and do not extend outward from these occurrences. No anomalous gold values were found and only a few vuggy silica samples contain detectible levels (>5 ppb). The surrounding clay-pyrite altered rock though contains anomalous to highly anomalous amounts of arsenic, antimony, and mercury, but low (generally less-than-detectible) amounts of silver and gold. No surface evidence could be found to suggest that a precious-metal mantos target is exposed or very near to the surface; hence, if present, is concealed beneath barren altered cap rock. The results of the geochemical sampling are considered reliable, but interpretation of a layered volcanic tuff and flow sequence underlying the eroded-out stratovolcano core zone was questionable and was influenced by the German-government sponsored investigation of the geologic setting and mineral potential at Cerro Eskapa (Rios and Heredia, 1995).

12.5.0 Exploration Activities – January-March - 1999

12.5.1 Introduction -The exploration program initiated in early 1999 was aimed at identifying precious-metal-mineralized targets for drilling slated to start in March, 1999. The work was principally a continuation of that started at the end of 1998. Surveying and making a detailed topographic map of the entire prospective area of the eroded-out, stratovolcano core zone, road building, and considerable outcrop rock-chip sampling were carried out and completed. An IP survey consisting of six long lines (using a 100-meter-"a"-spacing) which total 14,100 meters was completed over the prospective area during March, 1999 by Geoexploraciones (Santiago, Chile). The entire road network on the property now totaled over 18 kilometers and, although considerable, was deemed necessary for facilitating survey work, geologic mapping and future ease of moving equipment for carrying out planned geophysical IP surveys, and as a bonus, created much new good outcrop exposure useful for delineating geologic relationships and for rock-chip sampling. To further aid geologic mapping and sampling, a set of five, widely spaced, bulldozer trenches totaling 2250 meters were cut to only shallow depth across widely spaced parts of the central part of the prospective area. During January and into March, 1999, an additional 347 rock-chip samples from the eroded Stratovolcano Core Zone area were collected mostly from along the new road-cut and trench exposures. These samples were sent to the Bondar-Clegg laboratory in Oruro, Bolivia for gold assay and the pulps forwarded to their North Vancouver, BC facility for geochemical analyses of silver, copper, lead, zinc, molybdenum, antimony, arsenic, mercury, and thallium. Geologic mapping was now completed over the entire prospective area (six kilometers^2) and showed a gently west-dipping sequence of layered volcanic rocks and intrusive porphyry which is strongly clay-pyrite altered. Parts of several zones (Zones III, IV, and V) of west-northwest-trending, silver-mineralized vuggy silica rock were also outlined. Laminated and thin-layered textures were discovered in exposures of strongly fractured and clay-pyrite-altered dacitic rocks in the vicinity of the old Colonial Spanish-era quarry located near the confluence of the three prominent quebradas within the eroded stratovolcano core zone. These dacitic rocks were considered to be a possible candidate for a water-lain, volcanic (welded (?)) tuff unit which was covered in surrounding higher areas by younger, thick, dacite flow units. Geochemical analytical results of vuggy silica-barite rock from new sample locations elsewhere continued to yield high values of silver (up to 2255.9 ppm), lead (up to 6.53%) and highly anomalous values of pathfinder metals (i.e. mercury), but mostly less-than detectible amounts of gold (<5 ppb) (see SAMEX news release 6-99). However, the sampling, now covering a very widespread area of clay-pyrite-altered dacitic rock, still did not divulge any possibly precious-metal mineralized areas other than those restricted to the vuggy silica rock. The clay-pyrite altered dacitic rocks were found to generally contain weakly to moderately anomalous values of mercury (>100 ppb) and elevated to low anomalous levels of arsenic, antimony, and thallium. The IP survey delineated the widespread spatial distribution and depth extent (to the limit of the +/-250-

meters search depth) of strongly clay-pyrite altered rock (low-resistivity/high-chargeability). Locally, other rock types could be distinguished and include: mineralized vuggy silica rock (high-resistivity/mixed chargeability), fresh to weakly altered stratovolcano andesite-dacite lavas and intrusive rocks (moderate to high resistivity/low chargeability), and oxidized clay-pyrite altered rock (low resistivity/low chargeability). Road access was extended down into to a group of small mine workings on the upper showings of oxide-copper mineralization positioned on the north flank of the Cerro Eskapa stratovolcano. The copper mineralization is comprised of in-fillings of chrysocolla and tenorite in irregular, discontinuous/unconnected (?), series of narrow bodies of pebble breccia and along fractures and faults. The oxide-copper mineralization infilling open space between breccia clasts shows fine/delicate banding and botryoidal textures. When split open, many clasts are observed to be pervasively replaced/altered (silica-clay) and are also well-mineralized with disseminated tenorite and chrysocolla. Widths of the pebble breccia bodies at/near the surface range from a half to one meter, and their individual lengths were traced during geologic mapping along the surface for 100 to 200 meters. The bodies were found to comprise a curving "north-striking" trend that could be traced northward for +700 meters before disappearing below Quaternary cover. Over this distance northward with decreasing surface elevation, the pebble breccia bodies increase in width with depth to over two meters and become more-strongly oxide-copper mineralized. In a southward direction toward the stratovolcano core zone and rapidly increasing surface elevation, the pebble breccia bodies disappear, but oxide-copper mineralization is present in places along multiple directions of fractures and faults. This might suggest that the fracture-controlled mineralization is a high-level expression of the continuation as deeper seated, oxide-copper mineralized, pebble-breccia bodies. Alteration over a large area in the vicinity of the pebble breccias appears as a subtle color change and oxidation effect in dacite flows which has produced hematitic iron-oxide minerals from deeper clay-alteration of biotite and hornblende, clay minerals and weak bleaching/silicification. Proximal to the pebble breccia, clay alteration and silicification (as chrysocolla) along fractures is present. A limited number of rock-chip and dump samples (10) were collected and sent to Bondar-Clegg (Oruro) for gold assay and geochemical analyses of silver and base and pathfinder metals. The analytical results indicated an estimated average grade of the pebble breccia ore material to be 6.82% copper with a minor silver content (14.4 ppm), and also found highly anomalous amounts of mercury (to 25980 ppb). No gold was detected (>5 ppb) in any of the samples.

12.5.2 <u>Interpretations – Exploration Results – January-March -1999</u> – Rock units in the eroded-out Stratovolcano Core Zone were interpreted to reflect a gently dipping sequence of dacitic volcanic flows and tuff units. The north part of the core zone was interpreted to be underlain mostly by porphyritic dacite intrusive rock. Importantly, the possible tuff unit exposed in the Spanish Colonial-era quarry was found to not be silicified or replaced by vuggy silica. Other than weakly anomalous amounts of mercury and arsenic, this thin-layered dacite rock did not give any indication of being precious-metal mineralized. Perhaps, proximal to the vuggy silica ("feeder") zones, this volcanic unit could be replaced with silicification and precious-metal mineralization. Otherwise the only precious-metal target identified were the parts of three zones of vuggy silica-barite rock. Although numerous, shallow to deeper seated, "interesting" chargeability and resistivity anomalies were identified by the Geoexploraciones project geophysicist, they could not be easily related to one of the envisioned, bulk tonnage-type, precious-metal targets (i.e. concealed/shallow mantos-hosted mineralization). The 1999 geophysical IP data was also reviewed and re-modeled by Jan Klein (geophysical consultant, Burnaby, BC, Canada) who also rigorously evaluated the quality of both the IP survey work and the data generated and put forth his own list of geophysical-defined proposed drill targets based mostly on coincident high chargeability/high-resistivity anomalies. In his review, only a few areas of high resisitivity and chargeability might correspond to a mantos-type replacement body. The pebble breccia bodies were determined to be relatively narrow and their dimensions roughly suggested approximately 350,000 metric tons of oxide-copper ore pre-mining resource (target) with an average grade of 5% to 7% copper might be present down to the pampa level (elevation) of the Quaternary cover. Lack of a strong clay alteration and no stockwork veining in surrounding rocks suggests the pebble breccia is a (very) high-level or distal feature and does not necessarily indicate close proximity of a possible source (ex. porphyry copper intrusion). The botryoidal and delicate banding textures of the oxide-copper mineralization are more characteristic of epigenetic deposition via hot springs-like, aqueous fluids/vapors migrating up and into/along the pebble breccia zones. Hence, the copper mineralization was perceived as possibly being derived via late-stage hydrothermal scavenging and remobilization from a porphyry copper source. Pebble breccias are typically associated with porphyry copper deposits (ex. El Salvador, Chile) (Gustafson and Hunt, 1975). The pebble breccias at El Salvador commonly are associated with later latite dikes, which are interpreted to have encountered connate waters causing explosive (steam) flashing to produce the brecciation, and importantly are tourmalinized. They represent a high-level feature from late-stage, "de-gassing" of deep-seated, post-ore (?), porphyry intrusion(s). No late intrusive dikes or tourmalinization have been observed associated with the pebble breccias at Cerro Eskapa, but their presence and mineralized nature raise questions concerning the source of the copper and possible relationships to the high-sulfidation system emplaced into the stratovolcano core zone.

12.5.3 SAMEX Project Personnel – 1999 – The survey work was carried out by SAMEX staff geologist Mario Barragon who also helped with geologic mapping and outcrop chip sampling. SAMEX staff geologists Carlos Espinoza and David Montano continued to conduct all principal geologic mapping and also supervised/carried out all rock-chip sampling. The progress of the project work was reviewed in the field by Robert Kell during several periods of January and February, 1999. The IP surveys were conducted on a contract basis by Geoexploraciones, a geophysical contractor and consulting firm out of Santiago, Chile.

12.5.4 Discussion – Exploration Results – January-March – 1999 - Although the geologic setting of the eroded-out Stratovolcano Core Zone at Cerro Eskapa was considered permissive for concealed Pierina-like mantos-type target (see news release 2-99 and 4-99), this target concept became questionable as direct indication of a well-defined, shallow, mineralized layer target did not materialize from the geologic, geochemical, and geophysical investigations carried out at the end of 1998 and first two months of 1999. IP surveys run over strongly altered rocks of the eroded-out stratovolcano core zone did not detect or outline the possible presence of an exposed or shallow (concealed), silicified/precious-metal mineralized mantos (flat-lying tabular/high resistivity body). Despite the extensive new road cut outcrops over the entire prospective area and large number of rock-chip samples collected, no indication of a mineralized mantos layer or other possibly types of exposed or shallow, bulk-tonnage mineralization were found and sub-anomalous (>50 ppb) to anomalous gold values (>100 ppb) are completely absent in all of the geochemical analytical results. The low gold content of the vuggy silica rock chimneys suggested the possibility that the Cerro Eskapa alteration/mineralization system, at least at/near the surface level, could be only silver rich and made suspect the previously published anomalous to very high gold values reported in Richter and others (1992). However, these findings did not completely negate the Pierina-influenced primary target concept. Pyritiferous, clay-altered dacite flows, which cap the ore body at Pierina, are also largely devoid of detectible levels (>5 ppb) of gold and silver (>0.2 ppm) except in very close proximity to the gold-silver-mineralized vuggy silica mantos ore body and narrow, cross-cutting, silicified structures (veins) (Barrick geologic staff, PDAC Core Shack presentation, Toronto, 1999). The pyritiferous/clay-altered dacitic flows (cap rock) at Pierina were shown to contain similarly elevated to anomalous amounts of mercury, arsenic, and antimony as found in altered dacite at Cerro Eskapa. Perhaps mineralized mantos layers if present at Cerro Eskapa were deeper and somehow electrically masked by the pyrite-rich cap rock. The possible tuff unit outcropping in and near the Spanish Colonial era quarry might become silicified and mineralized proximal to the various vuggy silica chimneys which could be feeders. However, with no discernable, shallow, bulk-tonnage target having immerged, how to best to conduct the funded drilling program at Cerro Eskapa became an urgent concern. A decision was made to start the drilling with the first holes aimed down across the vuggy silica rock in the stratovolcano eroded-out core zone area at locations where the highest silver values had been found to see if high-grade silver (+/-gold) mineralization could be intersected over an appreciable width. A conceptual model of precious-metal deposition in epithermal systems by Buchanan (1981) suggested that silver-sulfosalt mineralization without gold might be present above deeper levels of gold deposition. The possibility was thus considered that significant gold values could therefore still appear at depth and might be intersected. The drill holes would also search for possibly bulk-tonnage, disseminated/veinlet, and mantos type, precious-metal mineralization hosted in altered porphyritic dacite wall rock positioned proximal to the vuggy silica rock and which was not detected by the IP surveys. The rock-chip sampling data and IP surveys are considered to have given good reliable results. The geologic interpretation of layered volcanic rocks underlying the eroded-out stratovolcano core zone became increasingly suspect and the possibility of a mantos target seemed unlikely.

12.6.0 <u>Exploration Activity – March-June - 1999</u>

12.6.1 <u>Introduction</u> - Sufficient funds were raised in early 1999 to attempt ten to twelve holes – each of moderate depth (200 to 300 meters) to test targets in the eroded-out Stratovolcano Core Zone. The drilling was planned to start in late-March, 1999 and a contract had been signed with Exploration Core Drilling S.R.L.-FJT (" Fujita Drilling" - La Paz) earlier in the year to carry out the job. The first holes were designed to be inclined and aimed to test the down-dip continuation of the vuggy silica bodies/veins and cross a significant width of the surrounding clay-pyrite altered wall rock. This strategy was applied for most holes; only DDH-EK-99-04 and -08 however would be oriented vertically. The core drilling program (10 holes – HQ diameter) was then carried out from March through June, 1999 ant totaled 1889.60 meters. Drilling of all holes progressed rapidly as the clay-pyrite-altered, porphyritic dacite rock proved to be soft, easily penetrated, but also competent with excellent core recovery. Most holes did not encounter any significant faulting or highly fractured/broken-up intervals of long length. Thus, core recovery was generally excellent (>95%) throughout most holes. All holes were logged at 1:100, split entirely with a diamond-bladed saw, and continuously sampled at variable lengths (0.5 to 3.0 meters) dependent on geologic and mineralized features. Samples of split core from the holes were sent to Bondar-Clegg laboratory in Oruro, Bolivia for sample preparation procedures and gold assay analyses; pulps were then forwarded to their North Vancouver, BC facility for geochemical analysis (atomic absorption) of silver. Only split core from DDH-EK-99-01, -02, -03, and -08 was geochemically analyzed for the useful suite of base (copper, lead, zinc, and molybdenum) and pathfinder (antimony, arsenic, mercury, and thallium) metals. From observations during core logging, the project geologist interpreted and reported that most of the holes had successfully penetrated through and tested the intended down-dip targeted interval of mineralized vuggy silica rock. He also noted that DDH-EK-99-01, -02, and -03 had all made spectacular long intersections through sulfide mineralization disseminated as abundant fine grains and in veinleted intervals in clay-pyrite-altered dacite. However, the geochemical analytical results for these holes would prove to show that anomalous to high silver values are restricted only to the vuggy silica rock of Zone III (DDH-EK-99-02) and a narrow interval of sulfidic silicification of hydrothermal breccia of "FW" Zone III (DDH-EK-99-01). No significantly anomalous silver values appear in core samples from DDH-EK-99-03. Although abundant pyrite is present throughout these holes, careful follow-up re-examination of the core could not find any silver sulfide/sulfosalt minerals other than within the above two mentioned restricted occurrences. This silver mineralization was found via examination of a few polished sections by an ore petrologist SERGIMIN (La Paz, Bolivia) in both surface and core un-oxidized samples (from DDH-EK-99-02) to be stephanite and possibly other (unspecified) silver-antimony-lead sulfosalt minerals typically as late-stage in-fillings of vug sites and along fractures (oral communication, 1999). The silver mineralization thus appeared to be introduced after vuggy silica alteration. The surface samples of vuggy silica with high-grade silver, which were also examined, did not show much effects of supergene alteration or enrichment and suggested the sulfosalt mineralization was clearly hypogene in origin. DDH-EK-99-04 was planned to test a high-chargeability/high resistivity IP anomaly after a recommendation by Jan Kline and indeed made an intersection through silver-mineralized vuggy silica rock toward the far-east end of Zone III, but at a very high elevation. DDH-EK-99-08 was located near the Spanish Colonial era quarry and penetrated through numerous intervals of spectacular-appearing hydrothermal breccia cutting porphyritic dacite; no tuff units were intersected. The upper part of the intercept in DDH-EK-99-08 did include a sequence of numerous detectible gold values and the core was found to contain anomalous mercury, arsenic, and zinc, but without anomalous silver values. None of the other holes intersected silver-mineralized vuggy silica or sulfidic-silicified rock. A thorough review of the drilling results was conducted in April and June of 1999

12.6.2 <u>Interpretations</u> – Most of the drill holes had mostly been located and aimed to drill test the down-dip continuation of vuggy silica rock at seven locations to search for precious-metal mineralization. DDH-EK-99-04 and -09 were aimed to test IP resistivity/chargeability anomalies related to mineralized vuggy silica rock and sulfidic-silicified zones. DDH-EK-99-08 was sited as a "stratigraphic" drill test near the Spanish Colonial-era quarry. All of the drill holes intersected long lengths of variably clay-pyrite (argillic)-altered dacitic rock which the geologist interpreted as thick-bedded volcanic flows. Hydrothermal breccia was intersected in DDH-EK-99-01, -03, -05, -07, and -08, but was shown on cross sections to be gently dipping, bedded, fragmental or volcanic breccia stratigraphic units. DDH-EK-99-01 may have intersected an interval (sill (?)) of intrusive igneous breccia. Vuggy silica rock was intersected in DDH-EK-99-02 and -04. DDH-EK-99-01 did intersect at very acute angle a narrow mineralized interval of advanced-argillic alteration and sulfidic silicification replacing hydrothermal breccia. This interval is not similar in appearance and character to the intended vuggy silica rock target (intersected in nearby DDH-EK-99-02). In many other holes (DDH-EK-99-03, -05, -06, -07), vuggy silica rock target was interpreted to pinch out with depth before the projected interval of intersection. . Silver-rich mineralization, which was intersected in DDH-EK-99-01, -02, and -04, is shown by analytical results of short-interval samples to be of low grade (50.2 ppm silver average grade in DDH-EK-99-02) and tightly held within relatively narrow to moderately wide intervals (3.5 to 11.0 meters, true width) of vuggy silica/sulfidic-silicification. These intercepts occur within structurally controlled vein-like zones and hydrothermal breccia and associated with conspicuous advanced-argillic alteration (i.e. crystalline bright pink alunite and white clay minerals). In comparison, the average silver content of samples of vuggy silica-barite rock collected from the surface/shallow mine workings is 367.3 grams/metric ton; while the two intersections of around 150 meters (hole depth) in DDH-EK-99--01 and -02 together average only 42.0 grams/metric ton-silver. This suggested silver grades are dropping off rapidly with shallow depth.

12.6.3 <u>Project Personnel – March-June, 1999</u> – The drilling project was staffed by Bolivian geologists Carlos Espinoza, David Montano, and Mario Barragan. The planning of drill holes, core logging, and core sampling were conducted mostly by Carlos Espinoza. DDH-EK-99-04 was logged and sampled by Robert Kell and DDH-EK-99-05 was logged and sampled by Mario Barragan. David Montano continued some geologic map work and ran the exploration camp. Mario Barragan helped with the mapping and was also responsible for surveying new access roads, drill pads, and drill hole collar locations. The drilling progress and results were reviewed in April-May and June, 1999 by Robert Kell. The time spent on the project in June, 1999 reviewing the drilling, geologic mapping, and IP survey results was spent accompanied by Gerry Rayner consultant geologist (Vancouver, BC).

12.6.4 Discussion – March-June, 1999 Exploration Results – The results of the 1999 drilling program were overall disappointing as no indication of a shallow (<100-meters deep), large, precious-metal mineralized mantos or stockwork/silicified types of bulk-tonnage targets were found proximal to any of the vuggy silica-barite rock in areas tested (see SAMEX news releases 8-99 and 9-99). The several drill intersections obtained through mineralized vuggy silica (i.e. DDH-EK-99-02 and -04) were too low grade for silver to consider economic and lacked any significant gold content. Wall rock proved to be massive, pyritiferous, variably clay-altered porphyritic dacite with weak flow textures and was interpreted to represent very thick flow (volcanic) units. No rock units which could be even construed as volcanic tuff or other type of pyroclastic rock was observed in any of the drill holes. Long lengths of clay-pyrite-altered rock in all of the holes proved to be barren of any precious-metal content. Overall, the drilling was interpreted by the project geologist to show that the zones of vuggy silica rock and related strong alteration, in many places tested (DDH-EK-99-01, -05, -06, and -07), necked down or pinched out completely by vertical depths of 150 to 200 meters and did not contain any anomalous values of silver and/or gold mineralization where intersected. Hence, the drilling results seem to show that silver values within the few vuggy silica rock drill intersections are diminished compared to surface sample results and suggested perhaps loss of silver grade with depth. A corresponding discernable increase of some base metals (i.e. copper) was apparent in the analytical results for DDH-EK-99-02. A very weak indication of possibly deeper or nearby gold mineralization was suggested by the appearance of numerous detectible/sub anomalous gold values in several holes (i.e. DDH-EK-99-02 and -08). Such subtle, low-elevated values of gold were seldom found in surface samples of silver-mineralized vuggy silica collected from outcrops or mine dumps near these drill-hole locations. These surface samples all typically ran less-than detectible amounts (<5 ppb) of gold. Despite the "great-looking" appearance of silica-flooded/altered breccia with abundant, disseminated, fine-grained pyrite, and intervals of pyrite-silica veinlets intersected in DDH-EK-99-01, -03, -05, -07, and especially -08, the geochemical analytical results for silver and gold were well below levels considered to be anomalous and interesting (>1.0 ppm and >100 ppb, respectively), and thus were very disappointing. In many holes, (DDH-EK-99-01, -03, -04, -05, -06, -07, and -09), the targeted mineralized vuggy silica rock and advanced-argillic alteration halo were not intersected and were interpreted by the project geologist to simply pinch out before or be extremely narrow in the projected depth interval where they should have been crossed. However, in early June, 1999, these interpretations came into question. During a geologic staff review of outcrop relationships near DDH-EK-99-05, -06, and -07 with IP results and geologic cross sections in-hand, it was determined that these holes were likely inclined in the same direction as the dip of the vuggy silica rock body targets and could not possibly have intersected their projected down-dip continuation.

Exhaustion of allocated funding caused the drilling project to come quickly to a halt at the end of June, 1999. The lack of funding prohibited compiling the data properly together, further critically evaluating the results (i.e. thorough review of all core logging/cross-section interpretations), and immediately attempting to drill a few new holes in an opposite direction to several of those which failed because of being poorly located/oriented. A possible review of all of the drilling and IP information may have led to defining new targets for some follow-up drill testing. The drilling results as they stood seemed to be quite negative. Though demonstrating the presence at depth of interesting silver values, appearance of low-level (detectible) gold with highly anomalous values of pathfinder metals and copper in the vuggy silica rock intersection by DDH-EK-99-02; and presence of some interesting elevated gold values/highly anomalous mercury and zinc in DDH-EK-99-08, precious-metal mineralization seemed to be erratic, to narrow or pinch out with depth, and to be too low-grade for silver and without even anomalous levels of gold. This suggested perhaps only the silver-bearing, more base metal-rich root zone part of the mineralizing system is preserved.

The reliability of the geochemical analytical results in drill core are considered good. The core logging and geologic interpretations of the drill hole results proved to be poor and misleading. These problems though were identified in reviewing the program in June, 1999 and in October, 1999. It became apparent that five of the holes (DDH-EK-99-01, -03, -05, -06, and -07) had not tested the vuggy silica rock targets.

12.7.0 Exploration Activity – December, 1999

12.7.1 Introduction – SAMEX Bolivian geologists returned to Cerro Eskapa in December, 1999 and carried out limited reconnaissance geologic mapping and rock-chip sampling. The purpose of the work was to try to define new targets that might preserve higher level, precious-metal (auriferous) mineralization and that would attract new exploration funding and/or joint-venture with a major company. Specifically, the covered area of the focus of the outward radiating breccia and mineralized zones was to be first examined to determine if a concealed large "central" breccia pipe might be present. This was approached by digging pits to three meters deep until bedrock was encountered and could be sampled. However, the 10 pits, albeit far apart, which were sunk through the unconsolidated cover, encountered only variably clay-pyrite-altered, porphyritic dacite bedrock and failed to find evidence for a centrally located, large, hydrothermal breccia pipe or body being positioned in the "focal area" and this target idea was abandoned. The nature of the altered dacitic rock is similar to that exposed over the widespread area between various prospective mineralized vuggy silica zones. Reconnaissance mapping/rock-chip sampling then was shifted to the southwest part of the property to the ridge area of strongly clay (-pyrite)-altered "agglomerate" and hydrothermal breccia. The term agglomerate had been used by Heredia and Rios (1995) to describe the outcrops containing coarse boulder-sized clasts. The initial mapping of this Breccia Area was carried out from the ridge down a southwest-running quebrada where much "agglomerate" and hydrothermal breccia of different character were found locally outcropping and as float for a several kilometer distance. Another 11 pits were sunk and encountered hydrothermal breccia in many places. This reconnaissance-type map (interpreted) showed the breccia to perhaps be a contiguous, single, large body with a southwest-trending long axis (open-ended) with a width of several hundred meters across. The "agglomerate" (boulder breccia) appeared in places to be positioned above and cap the hydrothermal breccia perhaps representing breccia ejecta deposited on the surface. In other places the boulder breccia was observed to be cut by hydrothermal breccia. Outcrop and soil samples (shallow pits) were collected at locations spaced at 20 to up to 50 meters along two "tape and brunton" lines of approximately 1000-meter length each. Both lines are oriented west-northwest and one is obliquely down along the steep north-facing ridge slope and the second is along the ridge crest. The lines are separated by approximately 200 meters. A second group of samples was collected from scattered locations southwest down the quebrada. Many of these are from pits up to two meters deep which were dug down through shallow cover and into bedrock. Some 88 samples were collected and sent to Bondar-Clegg laboratory in Oruro, Bolivia for sample preparation and gold assays. Pulps of the samples were then forwarded to their North Vancouver, BC facility for silver and base/pathfinder metal analyses. Analytical results on this group of rock-chip samples of breccia are similar to those collected from the north part of this same area in 1998-99. The sample line along the ridge crest of mostly outcrop is now known to be along or close to the trace over a long strike length of a silicified hydrothermal breccia zone and many of these samples contain anomalous to highly anomalous levels of mercury (105 to 8771 ppb), arsenic (110 to 1051 ppm), zinc (135 to 556 ppm), and locally anomalous thallium (to 28.9 ppm). Lead values are typically elevated (to 42 ppm). Antimony values are all low (typically <5 ppm). Low-level (barely detectible) silver (0.3 to 1.0 ppm) is also present in many of these samples, but all gold values are low (<5 ppb). Samples from the other line and numerous scattered locations down the quebrada generally contain anomalous to highly anomalous mercury (many between 126 ppb to 5935 ppb). Anomalous values of arsenic (112 to 529 ppm) appear in a few samples and values for gold (most <5 ppb) and silver (most <0.2 ppm) are always very low. No indication of outcropping or near-surface precious-metal mineralization was found.

12.7.2 <u>Interpretations</u> - The breccia body outline was interpreted to be restricted to the quebrada as a southwestward-trending body cutting across the westward-dipping dacite/andesite lava flows of the lower west flank of the stratovolcano. The idea arose that this breccia body was possibly the down-thrown and offset (southward) along a major north-northeast-trending fault from the envisioned centrally located breccia pipe. The strong argillic (clay-pyrite and clay) alteration and local silicification were considered to be at a higher level in the system than that exposed in the stratovolcano core zone. The hydrothermal breccia and "agglomerate" material was interpreted as maybe a single body which could be the envisioned "central" breccia pipe which was fault offset to the south and down-dropped from its original position. The absence of any significant gold and silver values was disappointing and the many samples with anomalous mercury suggest, if present, precious-metal mineralization would be positioned at great depth. The results of the evaluation of the breccia outcrops was put out in SAMEX news release 11-00. No exploration work was conducted on the Cerro Eskapa property from January into November, 2000.

12.7.3 <u>Project Personnel – December, 1999</u> – The month-long exploration work in late 1999 was carried out by SAMEX Bolivian staff geologists David Montano and Mario Barragan. The work was briefly reviewed in the field over a week time period before the Christmas-New Years break by SAMEX geologists Robert Kell. and Carlos Espinoza who helped complete some of the rock-chip sampling and mapping.

12.7.4 <u>Discussion</u> – The geologic mapping and sampling work seemed to show that on the west side of the eroded-out Stratovolcano Core Zone (west of the northeast-trending faults) that no central breccia target exists. Bedrock encountered in the pits consistently was clay-pyrite-altered porphyritic dacite with anomalous amounts of mercury and arsenic. In the area of "agglomerate" to the south of Rio Huailla Unu, silicified hydrothermal breccia was found and samples returned highly anomalous values of mercury, arsenic, and zinc. These results were taken to indicate that the mineralizing system persists in breccia host rocks to the southwest of the eroded-out Stratovolcano Core Zone Area. The work was reconnaissance in nature, but expanded the size of the prospective area and justified further exploration work. The geochemical data generated from outcrop sampling is considered reliable. The geologic interpretations bear some uncertainties because of poor exposure and confusing outcrop relationships in areas of outcropping boulder breccia/"agglomerate".

12.8.0 <u>Exploration Activities – December, 2000</u>

12.8.1 <u>Introduction</u> – Exploration work on the Breccia Area began in early December, 2000. A decision had been made to evaluate the Breccia Area with the objective of defining precious-metal targets in hydrothermal breccia for drill testing. A bulldozer was bought in to the property and 9500-meters total of new roads were constructed to give access down along the southwest-trending quebrada of the Breccia Area where breccia outcrop and float had been found in scattered areas. Surveying was carried out to make a detailed topographic map of the area (1:2000) and put in control points for use in geologic mapping. The geologic mapping showed outcropping hydrothermal breccia, coarse boulder breccia cutting the west-dipping, layered andesite-dacite flows of the lower west flank of the Cerro Eskapa stratovolcano. A west-northwest-trending, silicified hydrothermal breccia zone (angular clasts) of relatively narrow width and surrounded by agglomerate/diatreme material was also traced out. Alteration of the "agglomerate" is focused on the matrix leaving boulders and cobbles of fresh andesite-dacite flow rock (commonly with only a thin alteration rind). The hydrothermal breccia is everywhere strongly clay or clay-pyrite altered and moderately to strongly iron-stained where oxidized. Locally, the hydrothermal breccia is replaced by silicification, sulfidic-silicification, or vuggy silica. Some areas of hydrothermal breccia, in detail, are multi-breccia with several generations of brecciation being expressed by coarser breccia veined by later cross-cutting, finer silicified breccia. Some 337 rock chip samples were collected and sent to Bondar-Clegg laboratory (Oruro, Bolivia) for sample preparation and gold (30-gram) assay analyses. Pulps were forwarded to the Bondar-Clegg laboratory in North Vancouver, BC for analyses of silver, copper, lead, zinc, arsenic, antimony, mercury, thallium, and molybdenum. Rock-chip samples of both the coarse ("agglomerate") and hydrothermal breccia returned anomalous to highly anomalous values of mercury (to 86000 ppb), arsenic (to 3160 ppm), zinc (to 1217 ppm), and few anomalous lead values (to 259 ppm). Elevated levels of antimony (to 90 ppm) and thallium (to 62.8 ppm) are also present. A small percentage of samples were found to contain detectible gold (>5 ppb to 39 ppb) and silver (>0.2 to 2.1 ppm). Very high values (i.e. mercury and arsenic) consistently occur in samples of strongly clay-altered hydrothermal breccia, especially where silicified and containing extremely fine-grained disseminated sulfide (pyrite). Five IP lines, of which four are oriented mostly northwest-southeast, and one north-south (6200 line-meters total), were completed by Geoexploraciones (Santiago, Chile). The IP results seemed to show a single, low-resistivity/high chargeability body which could be traced between the lines for 2200 meters in a southwest direction. The body covered the area mostly underlain by argillic (clay-pyrite)-altered and locally silicified hydrothermal breccia and "agglomerate". Several locations were chosen from which to attempt to drill test the IP anomaly/breccia body at depth and access roads and drill pads were constructed by bulldozer.

Time in December, 2000 was also spent further evaluating and the area of the oxide-copper mineralized pebble breccia bodies on the lower north flank of the Cerro Eskapa stratovolcano. This work was aimed at evaluating whether a more important (larger) target of high-grade copper mineralization might exist. Perhaps, the breccia-hosted, oxide-copper mineralization had been scavenged from a sulfide-mineralized source rock which is concealed beneath Quaternary cover of the outlying pampa to the north. This work included surveying to produce a topographic map and put in control points for geologic mapping and rock-chip sampling, and also carrying out IP surveys along east-west-oriented, long lines across the projected northward trace of the pebble breccia concealed beneath pampa colluvial/alluvial cover. The pebble breccias, though with spectacular-looking mineralization of good copper grade, were found, by geologic mapping, to be maybe discontinuous, relatively narrow bodies without alteration features indicating the presence of more widespread, significant associated bulk-tonnage mineralization. The pebble breccia bodies were determined to be controlled along an irregular, northeast- to northwest-trending structure positioned well west of and in the hangingwall above the northeast-trending/west-dipping, major San Augustin fault. This suggested that the pebble breccia bodies were displaced and rotated by the movement along the fault. IP surveys divulged that at not too great depth (50 to 180 meters), the rock was likely strongly altered (low resistivity response) beneath resistive outcropping dacite-andesite flows and interesting chargeability anomalies appeared in places at depth. The chargeability anomalies could be correlated between the lines and suggested a sulfide-bearing body, dissected by faulting, existed at depth.

12.8.2 Interpretations – A much larger than-anticipated area with scattered outcrops of prospective breccia was outlined in the Breccia Area. The lack of good exposure continued to allow the interpretation that the scattered outcrops comprise a single breccia body with what appeared to be an upper diatreme part (chaotic, large boulder-sized fragments, matrix-supported) and a lower hydrothermal breccia part (angular smaller clasts/clast-supported). The body outline appeared to be elongated in a west-southwest direction. Exposures along the ridge and to the southwest down the quebrada are comprised of mostly rounded boulders/cobbles of dacite/andesite lava in a clay-altered/locally silicified matrix. At progressively lower elevations further to the southwest, scattered outcrops are dominantly hydrothermal breccia characterized by angular clasts/clast-supported. This gave the impression that the upper parts of the breccia were diatreme and/or agglomerate-like material (ejecta) which caps deeper collapsed hydrothermal breccia. Perhaps influenced by the mapped outline of the breccia body, distribution of outcrop sample locations of anomalous levels of mercury, arsenic, thallium, and zinc could be interpreted to roughly define anomalous zones with a southwest to northeast trend (parallel to the long axis of the breccia body). Without anomalous gold or silver in surface samples, the breccia body target was perceived as perhaps containing a deeper seated, precious-metal target surrounded and capped by clay-alteration, silicification, and a geochemical halo containing anomalous amounts of mercury, arsenic, zinc, lead (locally), and thallium. In the Copper Zone, an expansive area of possible clay-alteration was outlined at depth and appeared to contain, at depth, anomalous chargeability response suggestive of sulfide-bearing rock (maybe intrusive in nature). This IP expression in the vicinity of the oxide-copper-mineralized pebble breccia could represent some type of copper-mineralized source rock.

12.8.3 <u>Project Personnel – December – 2000</u> – The exploration work was carried out by SAMEX staff of Bolivian geologists David Montano and Mario Barragan. The detailed survey work and constructing the topographic map was conducted by Mario Barragan. David Montano supervised the bulldozer work and outcrop sampling and started the geologic mapping. The mapping effort was supplemented by Robert Kell.

12.8.4 <u>Discussion</u> - The target picture in the southwest part of the property (Breccia Area) that emerged from the geologic mapping and IP surveys of December, 2000 was that of northeast-trending/(north) westward-dipping single, large breccia body with strong clay-alteration and high pyrite content. At the much lower elevations further southwest in the quebrada, the appearance of high resistivity responses outlined the appearance of strong silicification which in pseudosection profile indicated also a persistent down-dip extent. Reconnaissance geologic mapping generally seemed to confirm the correlation of rock types, intensity of clay alteration, and abundance of pyrite content as interpreted from the IP survey. The surface position of the high-chargeability/low-resistivity responses also coincided well with irregular areas of high mercury, arsenic, zinc, and lead, and elevated thallium and antimony content in rock-chip samples. Because no samples contain anomalous amounts (most <5 ppb) of gold and the amount of vertical relief over which the samples were taken is over 200 meters, any precious-metal deposition would have to be fairly deep seated. An interpretation of the IP survey results could be made that the high-resistivity responses likely reflect sulfidic-silicification/vuggy silica replacement of breccia and examples of these were locally found in surface float and outcrop at low elevations in the vicinity of lines 1-B and 5-B. Hence, a possibly precious metal-mineralized target was outlined consisting of exposed deeper seated silicification with variable sulfide content, and with an overlying halo of anomalous mercury, arsenic, zinc, lead, and elevated antimony and thallium. The comparable nature/geometry (westward-dipping) of the IP chargeability anomaly from line to line (although widely spaced) gave the impression of a single causative (breccia) body. The target picture which emerged warranted a few drill holes to test the large zone of breccia and anomalous base- and pathfinder metals with the coincident IP anomaly which was open-ended at depth. Similarly, the IP anomaly defined near the oxide-copper-mineralized pebble breccia in the Copper Zone also justified several drill holes.

The geochemical analytical results on outcrop samples are considered reliable. The IP results would be later shown to have given good resistivity responses, but greatly overstated chargeability readings. This would cause false chargeability IP anomalies to be identified. One drill hole (DDH-EK-01-1C) would be wasted testing one of the bogus IP chargeability targets.

12.9.0 <u>Exploration Work – January-March, 2001</u>

12.9.1 Exploration Activities - The SAMEX exploration crew returned and a new drill site in the Breccia Area was chosen from which to make an inclined, "point blank" drill test (DDH-EK-01-1B) of a prominently outcropping breccia body (Zone IVs). The crews of Exploration Core Drilling S.R.L. – FJT ("Fujita Drilling") arrived on the project on January 12, 2001, and drilled a southeastward-inclined core drill hole (DDH-EK-01-1B) which advanced to a depth of 256.90 meters depth. This hole intersected a major normal fault which is interpreted to dip shallowly to the southeast and to have displaced the targeted down-dip continuation of the breccia to the north, perhaps to a position almost directly beneath the drill pad. Hence, the hole overshot the intended target, penetrated mostly little-altered dacite-andesite flows of the stratovolcano, and with poor rock conditions of the fault zone, was deemed risky and not worth trying to continue to attempt what would be a deep intersection into the next breccia body which lay several hundred meters to the south. The drill was then moved to the Copper Zone to attempt a vertical test (DDH-EK-01-1C) of the IP chargeability target in low resistivity rocks positioned at not-too great depth beneath a cap of highly resistive deformed dacite flows. This hole penetrated through the cap rock and intersected highly clay-altered, xenolithic intrusive porphyry but without any sulfide mineralization to explain the strong chargeability response. The poor (soft) rock conditions and difficulty turning the drilling rods due to the expanding clay minerals caused the hole to be abandoned at a depth of 260.25 meters. Some completely oxidized veins with anomalous geochemical analytical values for copper, silver, zinc, molybdenum, and pathfinder metals were intersected, but no indication of a possible nearby stockwork veinleted, porphyry copper type of intrusion was observed. A second, short, hole (DDH-EK-01-2C) was then attempted inclined eastward across the down-dip projection of the oxide-copper pebble breccia exploited by the lowest and largest mine working. This hole successfully intersected approximately one-meter true thickness of mineralized breccia which averages 5% copper and 10 grams/metric ton silver. With cessation of drilling, geologic mapping and rock-chip outcrop sampling was carried out in the Breccia Area. Three long IP lines spaced apart by 500 meters and oriented "north-south" were completed in the Breccia Area across the mapped westward continuation of various breccia zones. The lines (L-6B, -7B, and -8B) used a 100-meter "a"-spacing and total 8200 line meters. The IP lines did outline some mildly interesting anomalies of high resistivity/mixed chargeability which could be correlated in a few locations to the surface trace of several silicified breccia bodies. An unexplained, strong chargeability anomaly was also outlined across the north end of the lines (i.e. L-7B). The geochemical analytical results on rock-chip samples of breccia collected from over the area covered by the IP survey did not outline any type of high-priority target and yielded variably, weakly to strongly, anomalous values of mercury (>100 to 2830 ppb), arsenic (>100 to 1060 ppm), and barium (110 to 425 ppm) from scattered locations on hydrothermal breccia outcrop. No detectible values of silver (>1 ppm) or gold (>5 ppb) were found in the samples. A final IP survey and electrical soundings were carried out in the Copper Zone in early March, 2001 duplicating the earlier IP survey run along Line 1C in December, 2000. The resistivity responses and pseudo-sections between the two IP surveys for Line 1C did prove to be very similar. However, the repeat IP survey did not detect any anomalous chargeability responses where earlier disclosed below the eastern part of line 1C which was the drill target tested by vertical core hole DDH-EK-01-1C. The results of the repeat IP survey did seem to identify an interesting new strong chargeability anomaly positioned at depth along the west part of line 1C which was missed by the earlier (December, 2000) IP survey.

12.9.2 Interpretations - The geologic mapping and geophysical data together demonstrated that for the Breccia Area, the breccia zones certainly continue westward for several kilometers and may be the fault offset continuation of the breccia zones now well-defined in the eroded-out stratovolcano core zone. The geochemical analytical results show that anomalous amounts of base and pathfinder metals (i.e. mercury, arsenic and zinc) in rock-chip samples could indicate that the breccia zones might conceivably contain very (?) deep-seated, precious-metal mineralization. The presence of anomalous zinc and arsenic does not extend far to the west and mercury values, though remaining anomalous, diminish in this direction. The strength of breccia development and associated alteration features seemed to be gradually diminishing westward suggesting progressively further distance from the "heart" of the mineralizing system. No indications of exposed or near-surface, precious-metal mineralization were found after the initial pass over the Breccia area. If present, in the Breccia Area, precious-metal mineralization was concluded to be at depths too deep to justify attempting further drill holes at this time and forced reconsidering the exploration potential of the deeper level of exposure of the eroded-out stratovolcano core zone. The results of DDH-EK-01-1B did not provide any information concerning the possible character of the breccia zones at depth. The drilling results of DDH-EK-01-1C in the Copper Zone led to questioning the chargeability anomalies, but did encounter the predicted strong clay alteration. The nature of the strong clay alteration suggested some type of late-stage, strong, hypogene (?) oxidizing event, perhaps related to circulating hot connate waters, had pervasively affected an immense area. The intersection of DDH-EK-01-2C though the pebble breccia zone was deemed to narrow to warrant follow-up drilling elsewhere along the zone. . The results of the duplicate IP survey also appeared to fit the geologic picture provided by the two core holes (DDH-EK-01-1C and -2C) and explained the lack of even trace amounts of sulfide minerals (i.e. pyrite) in strongly clay-altered rock intersected at depth in the first drill hole. The operator of the repeat IP survey believed he had determined that there were either machine and/or operator problems in taking chargeability readings during all IP surveys run by his firm (Geoexploraciones) in December, 2000 and this made suspect all chargeability values of the IP work carried out in that month/year (Lines – 1B, -2B, -3B, -4B, and -5B, and -7N). The new chargeability anomaly identified toward the west end of IP line L-1C though was considered to be a good response.

12.9.3 <u>Project Exploration Personnel</u> - The exploration work of January-March, 2001 was conducted by SAMEX staff including geologist Robert Kell and Bolivian geologists David Montano and Mario Barragan. The planning of drill holes, core logging and core sampling was conducted by Robert Kell. International Chalice Resources' geologist, Philip Southam, also assisted in core logging/sampling, mapping and sampling in the Breccia Zone and Copper Zone, and re-mapping geology in the Core Zone. Mario Barragan did the surveying and also helped with the geologic mapping and core sampling. David Montano conducted much of the geologic mapping in the Breccia Area and was joined by Robert Kell in this effort after drilling had ceased. IP survey work was carried out by geophysical contractor Geoexploraciones (Santiago, Chile).

12.9.4 <u>Discussion</u> – The results of the Breccia Area, though of geologic interest, did not define any possible shallow precious-metal targets. General lack of any anomalous or high silver values, absence of detectible gold, and lower level of anomalous values for pathfinder metals (i.e. mercury) suggests that the breccia zones are too high and distal in the mineralizing system. However, future drilling should be considered in the eastern part of the breccia zones where the IP anomaly (high chargeability) is strong and outcrops contain highly anomalous amounts of mercury, arsenic, and zinc. The IP chargeability anomaly defined toward the north end of IP line L-7B is also recommended for drill testing. The Copper Zone drilling results made suspect the IP chargeability anomalies defined by the December, 2000 survey. The re-run of IP line L-1C did identify a new chargeability anomaly not far west of the oxide-copper mineralized pebble breccia and this target was also recommended for a possible drill test despite concerns.

The geochemical analytical data is considered good. The IP survey over the Breccia Area and re-running line L-1C in the Copper Zone are believed to have given good results with respect to resistivity readings, but uncertainties exist whether the chargeability readings/anomalies are real.

12.9.0 Exploration Activities – September-October – 2001

12.9.1 Introduction - From an in-house review of all the exploration results, several high-priority targets were chosen that, if drill tested, might give the kind of positive results the project needed. In reviewing the exploration data from the 1998 to 2001 time period, the similar comparisons of the geologic setting and mineralization/alteration features of eroded-out stratovolcano core zone to the gold-silver-copper vein deposits of the Laurani Mining District, Bolivia came into consideration. The background and implications of this comparison were instrumental in developing a proposal to attempt to drill several deep (to 400 meters), core holes down across two of the mineralized vuggy silica zones within the eroded-out stratovolcano core zone. This proposal was based on the idea that perhaps the zones of vuggy silica/barite rock at Cerro Eskapa, like Laurani, also lead down into copper-rich and significantly gold- and silver-bearing sulfosalt-sulfide ore at depth. Another idea for an additional possibly significant target, which is related to the questionable IP chargeability anomaly in the Copper Zone, was also developed from the data review. The newly identified IP chargeability anomaly at depth beneath the west part of Line-1C in the Copper Zone could be fit to a geologic cross-section interpretation that suggested the oxide-copper pebble breccia may have been fault-displaced downward and to the east from a position above the chargeability anomaly. This interpretation implied perhaps the chargeability anomaly represents the root zone of copper sulfide-mineralized breccia and/or highly altered porphyritic intrusion; and a second, moderate-depth (to 250 meters), core hole was proposed to test this idea. A site along Zone III in the eroded-out stratovolcano core zone from which to conduct a deep 400-meter test with the greatest chance of successfully making the desired deep intersection was chosen near previous hole DDH-EK-99-02. The latter hole had successfully completed a shallow intercept through mineralized vuggy silica rock (Zone III) that could be used as control to project the downward position and dip of target to plan the deeper test (i.e. properly locate and aim the drill hole). Finding a suitable location from which to drill the IP target in the Copper Zone proved problematic because of difficult rocky terrain and areas of deep sandy/boulder cover. In addition, the geologic interpretation predicted that several fault-bounded slabs of broken-up, unaltered dacite-andesite would have to be penetrated to reach the chargeability target in low-resistivity (clay-altered) rocks of the footwall block.

The exploration camp at the Copacabana village was re-opened and a bulldozer was bought in to the property in mid-September, 2001 and platforms/access roads to the two sites were completed. Drilling (DDH-EK-01-3C) first commenced on the Copper Zone IP target. The hole proved difficult to advance as bad ground and failure to cement resulted in continuous cave-in problems after setting casing and forced abandoning the first attempt at a depth of 165.30 meters. A second attempt from the same site (moving the drill several meters) immediately encountered the same problems and was abandoned at perhaps 70-meters depth. The problem of advancing holes from this site appeared to be caused by the highly broken up nature of rock in the hangingwall blocks above several anticipated major faults which needed to be penetrated through to reach the IP target in the footwall block. To try another drill hole would require finding another suitable site and time to construct a new platform and road access by slow hand labor as the budgeted cat hours were used up and the bulldozer had been sent back to La Paz. The drill was immediately moved from the Copper Zone to attempt the deep test of Zone III in the eroded-out stratovolcano core zone. This hole (DDH-EK-01-11) was advanced rapidly but did not encounter the hangingwall advanced-argillic alteration halo and first of numerous intervals of vuggy silica rock of the target (Zone III) until a depth of 330 meters. An intersection through the target interval was not completed until a depth of 480 meters and the hole was then stopped at 500.25 meters. The unexpected added depth (+/-100 meters) to successfully complete the intersection proved mostly to be the result of the drill hole gradually deviating in inclination (upper part of hole steepened) and direction (lower part of hole flattened and drifted to the right). A wide interval of sheeted strands of vuggy silica rock was intersected and gold-bearing, high-grade copper-silver-antimony-bismuth mineralization was found restricted to one interval of narrow, massive sulfosalt-sulfide veins. The recovered part of this vein (0.2 meters thick) contains 1.18 ppm gold, 6.10% copper, 1890 ppm silver, 4.18% antimony, and 2.93% bismuth and is of different character and mineral content than the shallow level silver-rich mineralization. While DDH-EK-01-11 was being drilled, an access road and new platform from which to attempt to drill test the IP chargeability anomaly in the Copper Zone was completed by hand labor using local villagers. After completion of DDH-EK-01-11, the drill was moved back to the Copper Zone, but this attempt (DDH-EK-01-4C) too was made difficult by caving due to broken-up bedrock and the hole was lost at a depth of approximately 250 meters when over one hundred meters of HQ rods became permanently stuck. No indication (especially altered rock or presence of sulfide minerals) was intersected in the hole that might have supported the presence of a nearby copper-sulfide mineralized target as geologically interpreted to possibly explain the IP chargeability anomaly. During the drilling, parts of the eroded-out stratovolcano core zone were re-mapped with the emphasis of tracing out the various mineralized zones and correcting the previous geologic maps.

12.9.2 Interpretation – The results of the deep drill test (DDH-EK-01-11) demonstrated that a whole new “world” exists at depth in the Stratovolcano Core Zone Area. The vuggy silica rock (Zone III) was found to be continuous to great depth and the mineralization was found to change from silver-lead-antimony down into gold-bearing copper-silver-antimony-bismuth. These changes are accompanied by an increase in width of rock affected by both vuggy silica and advanced-argillic alteration. The conceptual Laurani model was, more or less, shown to be correct. Re-mapping in the eroded-out stratovolcano core zone allowed for the ten prospective zones to be identified and their spatial distribution/along-strike extent to be better documented. The results of attempts to test the IP anomaly in the Copper Zone beneath the west end of IP line L-1C proved futile and no indication of a mineralized body was found. This would seem to support the earlier conclusion of geophysical consultant, Jan Kline, who expressed that this chargeability anomaly should be viewed at best as suspect. The possibility remains, though, that the hole: DDH-EK-01-4C was not drilled quite deep enough to cross major faults into the prospective altered footwall block (low-resistivity and high-chargeability target) as suggested by the interpretive cross section/resistivity pseudosection.

12.9.3 Project Personnel – September-October, 2001 – The drilling was planned by Robert Kell who also logged and sampled the core from all of the holes. Surveying work and geologic mapping in the stratovolcano core zone was carried out by SAMEX staff geologists David Montano and Mario Barragan.

12.9.4 Discussion – The results of DDH-EK-01-11 demonstrated that an exploration model (high-sulfidation/acid- sulfate mineralizing/alteration system) based on the Laurani analogy is correct. Anomalous gold values do appear at depth and are associated with high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide veins, fracture-veinleted intervals and disseminations. Hence, the mineralizing system is preserved intact at depth beneath the eroded-out stratovolcano core zone and does become auriferous. The upper part of the mineralizing is expressed as the silver-lead-antimony sulfosalt-mineralized vuggy silica and sulfidic-silicified zones with highly anomalous amounts of mercury and arsenic. The ten mineralized zones have been identified and comprise an, essentially untested, +11-kilometer cumulative length. The IP target on the west end of line L-1C could not be substantiated by drilling (DDH-EK-01-3C and -4C).

The geochemical data generated is considered reliable and the geologic interpretations from drilling DDH-EK-01-11 and re-mapping in the eroded-out stratovolcano core zone are fairly solid. Some of the prospective mineralized zones are projected through covered areas and may not everywhere be correlated correctly where significantly displaced across fault zones. However, segments of the mineralized zones, where uncertainties exist, are not included in the +11 kilometers of cumulative strike length.

12.10.0 Exploration Activities – 2002 – In 2002, all of the exploration data was evaluated and compiled into up-to-date maps and cross sections which incorporate an embracive geologic picture of the Cerro Eskapa property. The geologic setting can be demonstrated to be a high-sulfidation/acid-sulfate system with similarities to precious-metal deposits at El Indio-Tambo and Choquelimpie (Chile). The only completed deep drill intersection (DDH-EK-01-11) is believed to give only a glimpse of the prospective mineralized zones. Based on the compilation work, a drill program involving 4,500 meters of core drilling in up to 12 holes is proposed to test at depths of up to 400 meters along Zones I-II, III, IV, V, IX, and X at a cost of approximately US $1,000,000.

13.0.0 DRILLING

13.1.0 Introduction – Core drilling was carried out in March-June, 1999, January-March, 2001, and September-October, 2001. A total of fifteen (15) holes have been completed and total 3575.85 meters. Of these, eleven holes were located in the eroded-out stratovolcano core zone, one is in the Breccia Area, and four are in the Copper Zone. Exploration Core Drilling S.R.L. – FJT ("Fujita Drilling") (La Paz, Bolivia) was the contractor for all three programs.

13.2.0 Procedures – All holes are HQ diameter core. Only drill hole DDH-EK-01-11 was reduced to NQ diameter core. Drill core was logged at a scale of 1:100 and logs for DDH-EK-99-01 through 99-10 are in Spanish. Logging included measuring the recoveries of every core run. The logs for DDH-EK-01-11 and the drill holes in the Breccia Area and Copper Zone are in English. With the exception of DDH-EK-01-11, all of the holes in the eroded-out stratovolcano core zone were split using a diamond saw and continuously sampled for the entire length of the drill hole. Individual samples intervals can be variable in length depending on geologic features and especially presence of mineralization. Typically, clay-pyrite-altered core was sampled at long lengths of 2 to 3 meters; and mineralized or possibly mineralized intervals were sampled using shorter intervals. Sampling breaks were chosen where possible at contacts between different rock types, changes in intensity of alteration, and, where present, at contacts to vuggy silica intervals. Only selected intervals were sampled in the drill holes completed in the Breccia Area and Copper Zone. All sampling of core was carried out by the project geologist who logged the hole. Wooden boxes are used to store the core and sample intervals are marked and labeled on the dividers. Samples were bagged and shipped to the Bondar-Clegg sample preparation and laboratory in Oruro, Bolivia for core from drilling in 1999. All the split core samples from the two 2001 drilling programs were sent to the ALS Chemex laboratory in Antofagasta, Chile. Core was analyzed for gold (30-gram assay) and silver (AA). Drill Holes DDH-EK-99-01, -02, -08, and DDH-EK-01-11 were also analyzed for a suite of base and pathfinder metals. These included: Cu, Pb, Zn, Mo, As, Sb, Hg, Tl, and Bi. An ICP package was also run on the core from DDH-EK-01-11 which provided results on major and minor elements. The split half of the remaining core is stored in SAMEX's core storage facility near the property. With the exception of DDH-EK-01-11, none of the drill holes were surveyed for deviation. This is because no survey instrument was available in Bolivia or could be acquired at reasonable cost from outside the country during the drilling. Based on DDH-EK-01-11, which was surveyed, not too much deviation (drift) could be expected with the HQ rods for holes to depths of 300 meters or less. The survey of DDH-EK-01-11 indicates approximately 2^o/100 meters depth in steepened inclination and 3^o/100 meters depth in lateral drift for the part of the hole drilled with HQ diameter rods to a depth of 333.60 meters. The deeper NQ diameter part of DDH-EK-01-11 (333.60 to 500.25 meters) deviated considerably by flattening and increased drift away from the intended drill-hole direction. All of the drill holes were found to have excellent core recoveries that, for the entire hole, average above 95%. Locally, in broken-up areas and pulverized/gouge rock of fault zones, recoveries can be much lower. The vuggy silica intervals tend to yield good core recoveries. However, some minor

(?) core loss occurred in the interval of interesting gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt/sulfide mineralized vein.

13.3.0 **Stratovolcano Core Zone** – Eleven holes were drilled in the eroded-out stratovolcano core zone. All geochemical analytical results on split core and summary of drill logs are given in tables of respective drill holes in the Appendix. With the exception of DDH-EK-99-08 all were located and aimed with the intention of drilling the down-dip depth continuation of silver-lead-antimony-mineralized vuggy silica rock and sulfidic silicification. DDH-EK-99-08 represents a vertical "stratigraphic" drill test. Review of the results suggests that only DDH-EK-99-02 and -04; and DDH-EK-01-11 successfully intersected the targets. The other holes, which were aimed to drill test the vuggy silica zones, are concluded to have been poorly located and aimed in essentially the same dip direction of the target zone to explain why they missed. These holes include: DDH-EK-99-01, -03, -05, -06 and -07. The geochemical patterns for distribution of gold, silver, base and pathfinder metals in relationship to vuggy silica bodies and gold-bearing, high-grade copper-silver-antimony-bismuth sulfosalt/sulfide mineralization as determined for the composite section for DDH-EK-99-02/DDH-EK-01-11are projected on a series of interpretive cross sections to these holes that missed their targets. These projections are loosely tied by surface sample geochemical results and give an idea of where the high-grade mineralization might be positioned and in relationship to the halos of alteration and anomalous base and pathfinder metals and how to correctly position and orient a drill hole to properly test the drill target. Three of the proposed drill holes are designed to attempt a correct follow-up to original holes which missed.

(1) DDH-EK-99-01is located toward the east end of mineralized Zone III. The hole is aligned in an N80^{o}E direction inclined at -65^{o} (Plates 11a-11e). The hole was located and aligned to test the down-dip continuation of silver-mineralized vuggy silica rock of Zone III which was presumed to dip steeply west-southwestward. The vuggy silica zone is positioned 120-meters distance northeast of the drill hole. A small pit not far north of the drill pad and drill-hole collar exposes a narrow, silver-mineralized, sulfidic-silicified/vuggy silica breccia body which is in a footwall ("FW") position to the main vuggy silica body of Zone III. The hole was drilled to a depth of 251.30 meters and the entire length of core was split sampled. Geochemical analyses of the split core included: gold assay and analyses for silver, copper, lead, zinc, molybdenum, antimony, arsenic, mercury, and thallium. The results of the drill hole are shown on Plates 11a – 11e. Geologically, the hole drilled down through clay-pyrite altered porphyritic dacite. Four intervals of hydrothermal breccia and a narrow interval of sulfidic-silicified breccia with minor amounts of disseminated black sulfosalt minerals and pyrite. A tight halo of intense argillic alteration (clay-pyrite) and advanced-argillic alteration (pink alunite/white clay/silicification) surround the sulfidic-silicified intercept. The mineralized interval (174.00 to 179.30 meters/1.70 meters true width) averages 22.81 ppm silver with anomalous arsenic (388 ppm to 686 ppm) and mercury (717 ppb to 1608 ppb). Gold is not present in detectible levels (all <5 ppb) and copper, lead and antimony values are low. Importantly, much of the hole contains anomalous levels of zinc and arsenic with elevated to anomalous amounts of antimony and thallium, and locally anomalous lead. The pattern of the anomalous base and pathfinder metals is interpreted to reflect zoning concentric to the sulfidic-silicified breccia zone. The drill hole is interpreted to have missed the intended main strand of the vuggy silica rock of Zone III. The latter zone was intersected in near-by DDH-EK-99-02 which showed it to be thick and surrounded by a wide halo of advanced-argillic alteration and to contain highly anomalous amounts of copper, antimony, and lead. The dip direction of Zone III is interpreted to reverse to the north between the two drill holes and was not reached by DDH-EK-99-01. It is also noted that the direction of DDH-EK-99-01 is not perpendicular to the strike direction of Zone III (off by +/- 20^{o}) which would also increase the drilling distance to reach the target.

(2) DDH-EK-99-02 is located toward the east end of mineralized Zone III. The hole is positioned 100 meters north-northwest of DDH-EK-99-01 and is aligned N55oE and inclined at -65° (see Plates 12a through 12e). The hole is well-aligned perpendicular to the down-dip continuation of Zone III which is outcrops 90 meters northeast of the drill-hole collar. The hole was drilled to a depth of 208.70 meters. The entire length of core was split and sampled. Geochemical analyses of the split core included: gold assay and analyses for silver, copper, lead, zinc, molybdenum, antimony, arsenic, mercury, and thallium. The results of the drill hole are shown on Plates 12a – 12e. The hole penetrated clay-pyrite-altered porphyritic dacite and a thick interval of vuggy silica-barite rock with a marked and wide alteration halo of advanced-argillic alteration (pink alunite/white clay/sulfidic silicification). No hydrothermal breccia was intersected. The mineralized interval of vuggy silica rock (140.00 to 166.00 meters) is approximately 13.0 meters true width and is composed iron-oxide minerals and vuggy silica rock locally with coarse-bladed barite. The contacts with wallrock strongly altered porphyritic dacite are between 25° to 35° to the core axis. Locally sections and patches contain fresh pyrite and black sulfosalt minerals, the latter as in-fillings of vugs and along fractures. The entire mineralized interval averages 42.8 ppm silver, 1370 ppm copper, 849 ppm lead, 2354 ppm antimony, 269 ppm arsenic, and 4879 ppm mercury. Gold is present in many samples of vuggy silica rock (+/-7 ppb average). Higher grade intervals (i.e. for silver and copper) are present within the vuggy silica rock. The presence of considerable limonitic and jarositic minerals point to effects of a supergene or low-temperature/late-stage hypogene alteration event which may have resulted in diminishment (leaching) of some or a considerable amount of the silver, copper, and base/pathfinder metals. A halo of anomalous values for zinc, lead, arsenic, antimony, and mercury are well developed in clay-pyrite-altered porphyritic dacite surrounding the vuggy silica-barite rock and are more extensive outward into the hangingwall.

(3) DDH-EK-99-03 is located 100 meters south of DDH-EK-99-01 and was located and aimed N80°E to make a third inclined (-65°) intersection into the N30°E-striking eastern segment of the silver-mineralized vuggy silica-barite rock of Zone III (Plates 13a - 13e). The drill-hole collar is 150 meters west of the target zone. The hole was drilled to a depth of 250.30 meters and was continuously sampled, but the split core was only analyzed for gold and silver. The hole intersected clay-pyrite-altered porphyritic dacite and a sulfidic-silicified and brecciated interval (185.00 to 196.00 meters) which contains anomalous amounts of silver (0.8 ppm to 5.5 ppm) but no detectible amounts of gold. The acute angle (-25o to the core axis) of the intercept suggests this zone is interpreted to be the "FW" footwall zone which was also intersected in DDH-EK-99-01. A similar alteration halo of intense argillic and advanced-argillic alteration is developed as a tight envelope to the weakly mineralized interval. No hydrothermal breccia zones were intersected and support that those encountered in DDH-EK-99-01 are perhaps steeply dipping and do not strike through the area of DDH-EK-99-03. Based on the results, DDH-EK-99-03 is in the footwall block and did not come close to the intended target interval of Zone III which is interpreted to dip steeply northeast away from the drill hole collar.

(4) DDH-EK-99-04 is located toward the far-east end of Zone III, 550 meters east-southeast of DDH-EK-99-01 and at high collar elevation of 4414 meters. The hole was planned as a vertical drill test of the well-defined IP coincident chargeability and resistivity (high) anomaly between stations 350 E to 700 E. The drill-hole collar is very near station 500 E. At the time, the nearby positoin of the surface trace of Zone III, some 70 meters to the south of the drill-hole collar, was not known (Plates 14a – 14e). The hole was drilled to a depth of 231.10 meters. The drill hole intersected thick, massive, flow units of porphyritic dacite which is variably argillic-(clay-pyrite) altered. No hydrothermal breccia was encountered. A faulted-up intersection through vuggy silica rock was made between 204.70 to 205.40 meters depth. This interval contains 109.2 ppm silver, but no detectible value for gold for over a 0.20 meter true width (?). The vuggy silica is surrounded by a 7 to 10 meter-wide hangingwall and a 3 meter-wide footwall intervals both comprised of strongly clay-

pyrite and advanced-argillic (pink alunite/sulfidic silicification) which contains anomalous silver (1.2 ppm to 21.5 ppm), but generally no detectible levels of gold. At 229.7 meters depth, an unusual intense propylitically altered andesite rock was intersected. The propylitic alteration assemblage is dark-green, is composed of chlorite and magnetite and is cross cut by veinlets quartz-pyrite with thin clay-pyrite alteration envelopes. DDH-EK-99-04 clearly shows that the eastern segment traced from DDH-EK-99-01 is steeply north-northeast dipping.

(5) DDH-EK-99-05 is located on the middle ridge in the upper part of the Rio Huailla Unu drainage and 90 meters west-southwest of a bold/tall vuggy silica-barite rock chimney of Zone V which was the target of the hole. The Chilean shaft is 220 meters to the east-northeast. The IP expression in line L-1E (stations 0 to 150 S) suggests that the vuggy silica body target persists without fault interruption to depths in excess of the 250-meter search depth. DDH-EK-99-05 was aimed in a N75^{o}E direction with a -75^{o} inclination and was stopped at a depth of 209.70 meters (see Plate 15a through 15e). The entire hole was split and sampled. Core was analyzed only for gold and silver. The hole penetrated in and out of what is interpreted to be the same contact between argillic (clay-pyrite) altered dacite and clay-altered/pyritiferous silicified hydrothermal breccia (Plate 15a). The breccia is the same as that which outcrops of the body which trends across this area. The breccia contacts are preserved in core and run parallel to very acute angles to the core axis. The breccia is clast to matrix supported and no textural variation was noted suggesting only the margin of a single breccia body was penetrated. Analytical results did not show any elevated amounts of gold (most >5 ppb/few detectible values) or silver (all <0.2 ppm) for both altered breccia and porphyritic dacite. The vuggy silica rock and wide halo of advanced-argillic alteration were not intersected and led to the interpretation that this central segment of Zone V dips steeply to the northeast away from the drill-hole location. No significant faults were encountered to maybe explain missing the target. The samples of vuggy silica rock from dump samples to Spanish Colonial-era piques typically contain high values of silver with antimony, lead, and mercury and IP results suggest that vuggy silica interval may significantly widen with depth. A deep core-drill hole through the vuggy silica-barite body is proposed from a location to the northeast to attempt again to test this central segment of Zone V.

(6) DDH-EK-99-06 is located on the lower northern slope to the silica-crowned hill and above the ruins of the Spanish Colonial-era camp at the head of Rio Huailla Unu. The hole was an attempt to make a point-blank drill intersection through the central segment of Zone III which was located only 70 meters to the south (see Plates 16a through 16e). At the location, Spanish Colonial-era piques exploited vuggy silica-barite/breccia rock with high values of silver, lead, and antimony and highly anomalous amounts of mercury. The hole was aimed southward (S15^{o}W) and inclined at -65^{o} and drilled to a depth of 160.80 meters. The entire hole was split and continuously sampled. Samples were only analyzed for gold and silver. The drill hole intersected only argillic (clay-pyrite)-altered porphyritic dacite and did penetrate nearly down a narrow interval (64.00 to 95.00 meters) of strong argillic alteration and sulfidic silicification. This interval contained numerous values of weakly anomalous silver (0.6 to 3.4 ppm) and one elevated gold value (29 ppb). This zone does not have the character of the well-mineralized vuggy silica-barite/breccia and is interpreted to be the upper expression of a footwall minor zone. The IP expression in line L-1E (stations 650 S to 750 S) shows a good resistivity (high) response and mixed chargeability response that suggests Zone III is continuous to great depth and might dip to the south. Returning to the outcrops found contacts to the vuggy silica rock exposed and displaying a steep southward dip. Thus, the interpretation that DDH-EK-99-06 missed intersecting the target zone because the hole was located and drilled in nearly the same down-dip direction of the zone. A proposed new hole at a much flatter angle from further to the north is proposed to attempt another (deep) intersection through Zone III.

(7) DDH-EK-99-07 is located 170 meters southeast of DDH-EK-99-05 and 75 meters southwest of outcropping chimneys and silica ridge running along the central segment of Zone V (Plates 171 – 17e). The hole was a second attempt to obtain an intersection through Zone V. Outcrops above the drill site on the ridge crest are vuggy silica with considerable amounts of very coarse-bladed barite. Pits and piques from the Spanish Colonial era exploited the vuggy silica rock for silver. Dump samples were found to contain good silver values with high amounts of lead, antimony, and mercury. The hole was aimed N55^{o}E and inclined at -65^{o} and drilled to a final depth of 151.40 meters. Core from the entire hole was split and sampled and analyzed only for gold and silver. The hole was unfortunately oriented in the same direction/inclination as DDH-EK-99-05 and on the south side of the vuggy silica rock, thus did not hit the intended target (see Plate 17a through 17e). The irregular contact between clay-pyrite-altered porphyritic dacite and hydrothermal breccia was penetrated right down the hole. Geochemical values are similar to those of DDH-EK-99-05 and did not show any anomalous values for gold (<5 ppb) or silver (</= 0.2 ppm). The drill hole is interpreted to have been drilled down the same dip direction as the target zone. Because high amounts of silver are tightly held within vuggy silica-barite rock, or sulfidic-silicified breccia/brecciated rock, the lack of even low-level anomalous values of silver in sampled core was not considered surprising.

(8) DDH-EK-99-08 is located 50 meters east-northeast of the Spanish Colonial-era cantera (quarry) near the confluence of several tributaries to Rio Huailla Unu. The quarry is in clay-pyrite-altered, faintly laminated porphyritic dacite which, in the area, is cross cut in places by narrow, steeply dipping hydrothermal breccia and microbreccia. DDH-EK-99-08 was drilled as a vertical hole to a depth of 162.00 meters to investigate the stratigraphic make-up of rocks in the vicinity of the quarry (see Plate 18a through 18e). The hole intersected numerous intervals of hydrothermal breccia cutting porphyritic dacite; both are strongly clay-pyrite altered and the breccia matrix is silicified with pyrite. The angle of the contact between the breccia and porphyritic dacite is preserved in the remaining split core and was observed to be at a very acute angle (10^{o} to 20^{o}) to the core axis. The contact relationships demonstrate that the breccia zones are steeply dipping and based on constraints of area outcrop likely strike west-northwest. The analytical results on the split core samples proved very interesting. Numerous sample intervals (but not all) in the upper part of the drill hole (4.00 to 116 meters) contain low-level detectible gold values (5 ppb to 12 ppb). Silver values are all low (below detection limit of <0.2 ppm). Over this long interval of weak gold values, numerous samples contain anomalous amounts of zinc arsenic, and mercury and elevated amounts of antimony. The mercury values are increasing especially in core samples from the lower part of the hole. The detectible gold and anomalous base and pathfinder metals occur in intervals of both breccia and porphyritic dacite. The pattern of the distribution in cross section is interpreted to suggest that DDH-EK-99-08 penetrated down through the footwall base- and pathfinder-metal halo to one of the west-northwest-trending, mineralized zones (Zone IV or V (?)). The zone is thought to perhaps lie to the north of DDH-EK-99-08 and be concealed beneath thick cover. A south-directed, inclined drill hole is proposed to test this target at depth and continue to beneath the quarry.

(9) DDH-EK-99-09 is located low at the west end of the ridge running along the south side of Rio Huailla Unu. The ridge is clay-altered "agglomerate"/boulder breccia cut by zones of hydrothermal breccia. The drill was positioned to test a chargeability/resistivity anomaly which is located between stations 800 W to 1000 W on line L-3N and which appears to correlate to Zone I (Plate 19). The drill-hole collar is approximately 170-meters north of Zone I and the hole is aimed in an S80^{o}W direction inclined at -65^{o}. Unfortunately, the hole was stopped, for unclear reasons, at a shallow depth of 53.20 meters and far short of possibly making an intersection through the intended target. Core from the entire hole was split, sampled, and analyzed for gold, silver, and copper. The hole was collared in boulder breccia/"agglomerate" which was penetrated to a depth of 42.40 meters and marks the contact into weakly (?) propylitically altered porphyritic dacite flows. The nature/orientation of the contact is not well-documented in logs and is interpreted to be at an acute

angle to the core axis indicating a steep dip to the boulder breccia. This interpretation is used for Plate 19. Another permissible interpretation is that the contact is at a large angle to the core axis and is actually nearly flat-lying suggesting the boulder breccia comprises agglomerate cover. The geochemical analyses show that no detectible values of gold in any samples (all <5ppb), trace amounts of silver, and low values of copper. The hole should have been allowed to proceed to 200 meters depth into the target. Several holes are proposed to be located to the east of the DDH-EK-99-09 to attempt to make deep intersections through Zones I and II.

(10) DDH-EK-99-10 is located on the west side of the silica-crowned hill at the head of the main Rio Huailla Unu drainage. The hole was positioned to test the down-dip continuation of the bold outcrops of chalcedonic silica replacing hydrothermal and fault breccia (Plates 20a-20b). Samples of the outcrops do not contain anomalous silver, base or pathfinder metals and was ignored by Spanish Colonial-era prospectors. Outcrop samples of the argillic-altered hydrothermal breccia and porphyritic dacite around the hill do contain low-level anomalous values of mercury and arsenic. The drill-hole collar is approximately 110 meters west of the silica outcrops and was aimed in an S70^{o}E direction and inclined at -60^{o}. The hole was drilled to a depth of 211.00 meters and core from the entire hole was split, sampled, and analyzed for only gold and silver. Variably argillic (clay-pyrite)-altered porphyritic dacite and one interval of xenolithic porphyritic dacite was intersected. Several broken-up faulted intervals were also encountered. No hydrothermal breccia or chalcedonic/vuggy silica was intersected. Also, no hint of stronger argillic or advanced-argillic alteration was observed to suggest the hole was close to possible precious-metal mineralized zones of vuggy silica rock. Geochemical analyses show that the core is barren of gold (all samples <5 ppb) and locally barely detectible values of silver. The hole is interpreted to have missed the target because of fault complications and/or the dip of the silicified breccia is to the east. Consideration might be given in the future for attempting a similar drill test from a position on the west side of the silica-crowned hill.

(11) DDH-EK-01-11 is located 100 meters to the southwest of DDH-EK-99-02 and 185 meters from the outcropping vuggy silica-barite body of Zone III. The drill hole was located to attempt a deeper drill test (+/-300 to 350 meters depth) of the down-dip continuation of the silver-mineralized vuggy silica rock. DDH-EK-99-02, which had made a complete intersection through the vuggy silica rock, was used as control to plan how to place and aim DDH-EK-01-11 (Plates 12a-12f). Compared to surface outcrop and dump samples, the vuggy silica intersection in DDH-EK-99-02 was noticed to be much thicker, be surrounded by a wider halo of advanced-argillic alteration, and to contain elevated levels of gold and much-more anomalous amounts of copper. These differences suggested that perhaps the mineralizing/alteration system was increasing in intensity and may become gold-copper rich with depth, and this idea deserved drill testing. The hole is aimed in the same direction (N55^{o}E) and inclination (-65$^{o)}$ as DDH-EK-99-02 and is presented in the same cross section (see Plate 12a through 12g). The total depth of DDH-EK-01-11 proved to be 500.25 meters which was approximately 100 meters deeper than intended, but was necessary to complete a successful intersection through vuggy silica rock of Zone III. A down-hole survey showed the drill hole gradually steepened and drifted to the right with depth; when reduced to NQ diameter rods at 341.00 meters, the hole then began to flatten and deviation to the right increased. The lower (NQ) part of the hole through the vuggy silica zone was continuously sampled (326.00 to 500.25 meters) as was a veinleted interval higher in the hole (8.20 to 56.55 meters). The long un-sampled interval (56.55 to 326.00 meters) is weakly to moderately argillic-altered porphyritic dacite without any features of mineralization. Sampling this interval though might have helped provide a more-complete picture of the anomalous halo of base and pathfinder metals and alteration. The drill core was analyzed for gold, silver, base and pathfinder metals, and an ICP multi-element package that included major elements. The hole intersected variably argillic (clay-pyrite)-altered porphyritic dacite. In the upper part of the hole, a few narrow breccia intervals and clay-pyrite veinleted rock was intersected and

may be the outlying expression to the "FW" zone or to Zone II. Over much of the hole, argillic alteration is weakly to moderately developed and disseminated pyrite is abundant. Argillic alteration increases in intensity downward into advanced-argillic alteration selvage to the thick interval of vuggy silica rock. The vuggy silica rock occurs as multiple strands showing that the Zone III bifurcates and widens with depth. Abundant pyrite and more locally, accessory amounts of orpiment, native sulfur, and traces of sulfosalt minerals occur as vug in-fillings and along fractures are present. Massive veins and fracture veinlets/disseminations of black to red, sulfosalt-sulfide mineralization were intersected between 445.45 to 446.95 meters. The veins cross cut the vuggy silica rock and are oriented at 30^{o} to the core axis. This orientation suggests a steep westward or near-vertical dip. A narrower similar zone was intersected six meters deeper in the footwall. The bottom of the "best" vein intercept is broken and friable and suggests that an unknown amount (tens of centimeters) of material was likely ground up or lost. The analytical results, solely on the recovered part of one of the veins (0.20 meters apparent width), give a glimpse of the tenor of the mineralization which might be more extensive elsewhere along this and similar mineralized zones. This vein sample contains 1890 ppm (g/mt) silver, 6.1% copper, 4.18% antimony, and 2.93% bismuth with 1.180 ppm (g/mt) gold and occurs in an interval (0.75 meters true width) of vuggy silica-barite (445.45 to 446.95 meters) which contains 0.583 ppm (g/mt) gold, 331 ppm (g/mt) silver, 1.04% copper, 0.71% antimony, and 0.43% bismuth. Toward the top of the interval is a silica-barite veinlet interval with 1.280 ppm (g/mt) gold and 89.0 ppm (g/mt) silver and low copper, antimony, and bismuth. This veinlet is relatively gold-rich and is considered different perhaps reflecting late-stage, secondary gold veins or gold deposition. The style and tenor of the gold-bearing copper-silver-antimony-bismuth sulfosalt-sulfide mineralization appears to be similar in character to the gold-bearing copper-silver veins described for El Indio (Jannas and others, 1999).

Significance of DDH-EK-01-11 - When the results of DDH-EK-01-11 are combined with those from DDH-EK-99-02, the cross section demonstrates that the vuggy silica rock and contained precious-metal mineralization are surrounded by outlying coherent/well-developed haloes of argillic and advanced-alteration and anomalous base- and pathfinder-metal zoning. The spatial relationship of the alteration and base and pathfinder metal zoning in cross section importantly provides a "guide" to the position of the centrally positioned vuggy silica rock and deeper seated gold-silver-copper-antimony-bismuth mineralization. From the cross section, the outlying haloes of pathfinder and base metals surround the target zone and show that, at high levels in the system, anomalous values in outcrop samples, especially for silver, base and pathfinder metals (i.e. mercury, antimony, and arsenic) are the shallow expression of deep-seated, gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide mineralization. Extrapolated to the other nine mineralized zones in the stratovolcano core zone, whose surface expressions are also marked by anomalous pathfinder metals, suggests that the deep-seated, gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide mineralization may likely be widely distributed at depth within various zones. The ten zones can be traced confidently for 11.5 kilometers of mapped cumulative strike-length distance and another 2.5 kilometers of cumulative strike length can be inferred in areas of cover and where zones are open ended. The remaining potential for discovery of substantial amounts of vein, veinleted, and breccia-hosted gold-bearing, high-grade, copper-silver-antimony-bismuth mineralization is considered very good and should be pursued in the future with a rigorous drill testing.

13.4.0 Breccia Area – Only one core drill hole was attempted in the Breccia Area and unforeseen fault complications were encountered which displaced the target.

(1) DDH-EK-01-1B was located to make a "point-blank" drill test of outcropping boulder breccia (agglomerate) and core zone of silicified hydrothermal breccia of Zone IVs. The drill-hole collar is 150 meters from the center of the zone. The hole was aimed in an S10^{o}W direction/inclined at -65^{o}

and drilled to a depth of 256.90 meters without encountering the target zone (see Plate 21). Only the interval from 180.95 to 221.80 meters was split, sampled, and sent for analyses for gold, silver, base and pathfinder metals plus a multi-element ICP package.

Beneath thick cover, the hole penetrated through 120 meters (18.0 to 138.00 meters) of little-altered, dacite-andesite flows of the Cerro Eskapa stratovolcano. A major fault zone of broken and pulverized rock was encountered to a depth of 174.00 meters. Below the fault, the hole encountered strongly clay- and hematitie-altered dacite with interval (199.45 to 214.25 meters) of possible coarse breccia or possibly fragmental units within the volcanic stratigraphic sequence. The alteration is much different than observed at the surface in the boulder and hydrothermal breccia body and no sulfide minerals were noted. Geochemical analytical results of the sampled interval show no detectible gold or silver and low amounts of base and pathfinder metals. These analytical results indicate that the hole is not close to possible epithermal mineralization. The angle of the fault zone to the core axis suggests that the fault is gently south to southeast dipping. The displacement is interpreted to be normal (south block down) such that the hole penetrated through the fault gap and the target actually lies at depth just to the north of the drill hole. The amount of displacement is not well constrained, but is shown to be at least 170 meters of dip-slip movement. No recommendation can be given to attempt further drilling of Zone IVs in the area where DDH-EK-01-1B was attempted.

13.5.0 Copper Zone – Four holes have been drilled in the Copper Zone and three were attempts to test concealed IP chargeability anomalies which might have reflected copper-sulfide mineralized source intrusive rock not far from the oxide-copper-mineralized pebble breccia zones. Only one hole has been completed through the pebble breccia zone. Core drilling in the Copper Zone proved difficult in all holes as the capping dacite-andesite lavas are hard and broken and made penetrating them difficult (loss of circulation, bit wear, caving). Also, when intersected, the clay-altered rock at depth would swell and bind the rods. One long string of HQ rods was twisted off and lost in DDH-EK-01-4C due to this problem.

(1) DDH-EK-01-1C is a vertical hole located toward the east end of IP line L-1C not far west of station 300 E. The hole was located to make a test through the strongest expression of a large and strong IP chargeability anomaly (16 mV/V to 22 mV/V) defined in December, 2000 to be at depth range of 130 to +250 meters (Plate 22). The chargeability anomaly occurs in rocks of low resistivity (<300 ohm-m) which are interpreted to be strongly (clay) altered and capped by overlying thick un-altered dacite-andesite lava flows.. The hole was drilled to a depth of 260.25 and slightly deeper than the limit of the IP search depth. Only selected intervals of core for the hole were split, sampled, and analyzed for gold, silver, and base and pathfinder metals plus a multi-element ICP package. The hole penetrated through 35 meters of unconsolidated overburden and then 110 meters of hard, layered andesite-dacite volcanic flows which locally show a hematitic/silica/clay alteration. In places, opaline silica, chrysocolla, and native sulfur coat and in-fill along open spaces and fractures in the volcanic rock. At a depth of +/-150-meters, the contact into strong clay alteration was encountered as predicted by the IP resistivity responses for the area. At +/-206.00 meters depth, an intrusive igneous breccia and xenolithic porphyritic intrusion were intersected. Minor veining of iron- and manganese-oxide mineralization oriented at 25^{o} to 35^{o} to the core axis was also encountered between depths of 180.00 to 187.00 meters. The veins appeared to perhaps have been sulfide which had, with clay alteration of the host rock, also been thoroughly converted to oxide minerals. Of interest, some clasts in the igneous breccia are strongly sericite-altered. No sulfide was observed in the drill hole and sulfur values are extremely low. Nothing was intersected to explain the IP chargeability anomaly whose high values, based on experience, should have reflected the presence of sulfide mineralization. The oxide-veined intervals do contain anomalous amounts of copper (222

to 301 ppm), antimony (172 ppm), arsenic (296 to 627 ppm), mercury (100 to 200 ppb), and elevated amounts of molybdenum (27 ppm) and bismuth (12 to 43 ppm). One sample contained detectible gold (20 ppb) and silver (2 ppm). Samples of the altered igneous intrusive breccia are weakly anomalous in zinc (101 ppm to 111 ppm) and one sample contains anomalous copper (232 ppm). DDH-EK-01-1C demonstrated the presence of the upper part/contact zone of porphyritic intrusion beneath the lava cap rock. Also, strong clay alteration was encountered as predicted by the IP survey, but no cause was intersected which could explain the IP chargeability anomaly target. Minor veining with weakly anomalous base and pathfinder metals was intersected and is interpreted to be replaced sulfide minerals. The common presence of opaline silica in overlying lavas suggest that the clay alteration reflects a near-neutral, hot springs-like, alteration effect and may be related to the re-mobilization and deposition of oxide-copper mineralization in the pebble breccia bodies.

(2) DDH-EK-01-2C was attempt to obtain an intersection at not-too-great depth (+/-100 meters) through the down-dip continuation of the oxide copper-mineralized pebble breccia. The location chosen is the west of the lowest mine tunnel and sizeable dump. The drill hole is located midway between stations 100 W and 200 W on IP line L-2C and is aimed due-east and inclined at -55^{o} (Plate 23). There is no chargeability expression of the pebble breccia on the IP pseudosection because of the (oxide) nature of the copper mineralization Only core from the intersection through the pebble breccia body was split, sampled, and analyzed for gold, silver, base and pathfinder metals, and a multi-element ICP suite of elements. The hole was drilled to a final depth of 167.15 meters and intersected the oxide-copper mineralized pebble breccia between 144.60 to 146.20 meters (see Plate 23). The pebble breccia cross-cuts thick-layered, dacitic flows which are variably altered to hematitic iron-oxide with weak silicification and very weak propylitic alteration. No strong clay-altered rock was encountered. The contacts to the pebble breccia are not well-preserved in core and are estimated to be close to 30^{o} to the core axis. Assuming this orientation would suggest that the pebble breccia may dip steeply to the east. The pebble breccia is of identical character (clast-supported/packed round fragments) to that exposed at the surface/shallow mine workings and contains considerable chrysocolla and some tenorite as finely banded/botryoidal infillings of open space between breccia fragments and replacing the fragments and nearby wallrock. The intersection through mineralization averages 5.02% copper and 11.1 ppm (g/mt) silver. For copper, this result is slightly lower than that estimated from dump and outcrop sampling. Recovery through the zone is good, but some material may have been lost. The narrow subinterval of low copper (7010 ppm) may be part of the wallrock erroneously misplaced and included in the intercept. The results of DDH-EK-01-02C demonstrate the down-dip/depth continuation of the mineralized pebble breccia zone, but the true width (0.8 meters) is narrow and could indicate the zone is pinching with depth. The intercept did not prove sufficiently interesting to pursue with further drill testing.

(3) DDH-EK-01-3Ca and -3Cb represent two attempts from the same location to drill test a deep IP chargeability anomaly identified between stations 400 W to 700 W during re-running the IP survey over line L-1C in late-February, 2001 (Plate 24). The strong anomaly (20 to 32 mV/V) was outlined at a depth greater than n=4 and occurs within a low-resistivity response below high resistivity cap rock. The magnitude of the chargeability anomaly suggested a strong concentration of sulfide mineralization. A geologic interpretation, incorporating several near-by (displaced (?)) weaker chargeability anomalies, suggested that the pebble breccia body is down faulted to the east from above the chargeability anomaly target (see Plate 33). The IP shows that the northward projection of the pebble breccia body falls between stations 100 w to 150 W where the low-resistivity expression surfaces, but without a chargeability response. The interpretation suggested that the faulting had juxtaposed barren andesite-dacite lavas above a possibly mineralized target zone. No further IP or other geophysical electrical surveys could be run to further evaluate the anomaly and a decision was made to try to drill into the anomaly to obtain an idea of its significance. DDH-EK-01-3Ca is positioned 150 meters south of the anomaly and was aimed N15^{o}E at an inclination of -65^{o}. The

hole was lost at a depth of 165.30 meters and 70 meters shy of entering the outer part of the chargeability anomaly. The hole intersected broken up, fresh to weakly hematitic/silicified/clay-altered dacite-andesite volcanic flows. The problems with caving ground binding the rods forced the hole to be abandoned. No indication of copper mineralization was observed and no core sampling was conducted. A second attempt from the same pad location aimed/inclined in the same direction met the same fate at a shallow depth of 70.0 meters. The highly broken nature of the rock suggested proximity to fault zones and/or that the block was detached and displaced with collapse of the stratovolcano. The idea of trying to drill the anomaly from the location was abandoned.

(4) DDH-EK-01-4C was located to attempt another drill test down into the IP chargeability anomaly at depth between stations 400 W to 700 W on line L-1C. The hole was collared on the IP line near station 400 W and aimed S80^{o}W at an inclination of -60^{o} (Plate 25). With great difficulty the hole was advanced to a final depth of 266.40 meters. A string of new HQ rods, approximately 200-meter long, was twisted off and left stuck in the bottom of the hole (see Plate 25). The drill hole penetrated high broken up and weakly to strongly altered dacite-andesite volcanic flows. The alteration was encountered at 40-meters depth and this boundary corresponds to the top of the low-resistivity response. The hole encountered a broad fault zone of pulverized/broken rock between 170- to 220-meters depth and below this entered increasingly altered igneous intrusive breccia similar to that intersected in DDH-EK-01-1C. This rock was drilled until the hole was lost at 266.40 meters. The drill hole did not intersect any hint of oxide or sulfide copper mineralization. The lower part of the hole from 159.65 to 266.40 meters was split, sampled and sent for geochemical analyses of gold, silver, base and precious metals, and a multi-element ICP package. All values are low for gold, silver, and copper. There is some uncertainty whether the drill hole was advanced deep enough to penetrate through the faults and into the footwall block where the chargeability target is positioned – especially if the hole deviated substantially.

14.0.0 SAMPLING METHODS AND APPROACH

14.1.0 Surface Sampling

14.1.1 Introduction – The surface sampling in the Stratovolcano Core Zone, Breccia Area, and Copper Zone focused on bedrock outcrop and utilized new road cut exposures as much as possible (see Plate 2). Geochemical results and sample descriptions are listed in tables in the Appendix.

14.1.2 Stratovolcano Core Zone - An effort was made to collect numerous spot outcrop samples from over a widespread area of the eroded-out stratovolcano core zone. Outcrop is irregularly distributed and influences sample distribution to an extent. With the exception of scattered chimneys and outcrops of vuggy silica rock, the mineralized zones and surrounding envelopes of advanced-argillic alteration do not outcrop well and they comprise a small percentage of the sample population. Bulk samples from dumps were used to attempt to get an understanding of the precious- base- and pathfinder-metal tenor of the zones. In addition, attempting to collect spot or chip samples from hard, massive silica outcrop proved to be a daunting, sometimes impossible task. Most of the samples from the eroded-out stratovolcano core zone are variably clay-pyrite-altered dacite from between the mineralized zones. For spot, rock-chip outcrop locations, the samples are typically fist-sized to slightly larger. This sampling was conducted to help search for possible subtle zones with prospective anomalous levels of precious-metals. Also, anomalous levels of base and pathfinder metals might help define their zoning and relationship to the position of mineralized zones. Sampling was also focused on all new road outcrop exposures. Two types of chip lines were collected along the road cut exposures. Channel samples were taken as continuous horizontal chips through relatively soft clay-pyrite-altered porphyritic dacite and breccia as a cut of three - to ten-centimeters wide is chiseled to lengths of 1 to 10 meters. In some areas where alteration is weak, a spaced series of spot samples was collected. The roads cross diagonally across the prospective area in a north-south orientation and across the trend of the mineralized zones. Five long bulldozer trenches were completed, but were marginally successful in exposing bedrock. The "east-west" orientation of four of the trenches represents an attempt to cut down slope across possible gently dipping stratigraphic units. This orientation, unfortunately, ensured that very little of the mineralized zones would be intersected or exposed. Sampling was carried out as continuous chip lines in the floor of the trench where rock was strongly altered and spaced sequence of spot chip samples where alteration is weak.

The sampled area of the eroded-out stratovolcano core zone is approximately 3 km. by 2 km. Some 532 total samples of spot outcrop, road cut exposures, and trenches were collected (see Plate 2B). An additional 75 outcrop and pit samples into bedrock were collected in breccia outcrops on the southeast end of the Breccia Area. Outcrop sample density varies from 15 samples/400 meters^2 to maybe two samples/400 meters^2. Samples were analyzed for gold, silver, and base and pathfinder metals. The density of rock-chip sampling was sufficient to practically use to show the useful map spatial distribution of pathfinder metals (i.e. mercury, arsenic, and antimony) (see Plate 5). While the picture is not totally complete, because of cover and some areas are not well sampled or are lacking samples, parts of the various mineralized zones are well defined geochemically and the size and extent of anomalous pathfinder metals out into the clay-altered rocks can also be discerned. These results combined with those drill holes, which also were analyzed for base and pathfinder metals, display the relationships of pathfinder metal halos (zoning) to prospective mineralized zones. The surface sample density is sufficient that no large prospective, outcropping/near-surface, precious-metal-mineralized areas could have been missed. Only the covered northwestern part of the prospective area (north of the Rio Huailla Unu valley) may still contain concealed mineralized zones/targets. However, such targets do not appear to have been disclosed by the IP lines completed over the area (i.e lines L-2N and L-7N).

14.1.3 <u>Breccia Area</u> – The Breccia Area is not well exposed and outcrop sampling is scattered over a large area (3 km. by 2 km.). Considerable roads were constructed and some outcrop was created in places. The road-cut sampling was carried out as spaced chip samples and the few sulfidic-silicified hydrothermal breccia bodies exposed were sampled across the width of the zone. Some 460 samples were collected and most are clay-altered and silicified coarse boulder breccia (agglomerate) and hydrothermal breccia. The sample locations are concentrated mostly along road cuts. For outcrop areas the sample density varies from 0 to 5 samples/400 meters^2. The samples were all analyzed for gold, silver and base and pathfinder metals plus a multi-element ICP suite. The data has not been rigorously evaluated and no attempt has been yet made to make similar map plots of distribution of anomalous pathfinder metals. None of the samples contain anomalous gold or silver and the prospective zones are not currently considered of high exploration priority.

14.1.4 <u>Copper Zone</u> – There is considerable bold outcrop over the area of the oxide-copper-mineralized pebble breccia bodies. The outcrop is un-mineralized, unaltered to weakly hematite-clay-silica altered and does not warrant sampling. Mineralization is tightly restricted to the pebble breccia zones and these are of very limited extent and do not outcrop well. Sampling was conducted across the width of a few existing mineralized exposures and dumps were bulk and selectively sampled. Of the total of 12 samples, four are from outcrops. No further sampling is deemed necessary.

14.2.0 <u>Drilling Sampling and Recoveries</u>

14.2.1 Drilling Sampling – For all of the holes from the eroded-out stratovolcano core zone, the HQ core was split and sampled in continuous fashion. Only a long segment of weakly clay-pyrite-altered core without mineralized features in DDH-EK-01-11 was not sampled. The core was always correctly oriented when veined intervals were being cut. The sampling of split core was carefully carried out by the geologist who logged the hole. Some sulfide-sulfosalt/pyrite material is washed out of the core when cut by the diamond saw. Analyses of the sludge show enrichment in silver, base and pathfinder metals that is in excess of that found in the core geochemical analyses. Perhaps some mineralized material is being preferentially liberated with core cutting and some levels are slightly understated for silver, base and pathfinder metals for strongly altered and vuggy silica rock intervals.

14.2.2 Core Recoveries - Before cutting and sampling, the core was logged in detail (1:100) and recoveries between blocks marking drilling runs were measured. With few exceptions core recoveries for the drill holes averages 95% or better. Areas of core loss generally occur in broken zones and pulverized rock of fault zones. The mineralized vuggy silica rock intercepts in DDH-EK-99—01, 02, and -04 all gave good recoveries (>95%). Similar good recoveries were recorded for the width of vuggy silica rock strands intersected in DDH-EK-01-11. However, the intercept through the high-grade massive sulfosalt-sulfide vein likely involved some core loss. The upper and lower part of the intercept was broken up and some of the friable vein material may have been ground up. When the hard silica is being penetrated with much bit pressure and then a soft massive sulfide vein is suddenly encountered, the result is grinding up of the vein material. The amount of core loss for this important intercept could be several tens of centimeters, but not substantially more. Core recoveries through intervals of massive veins will be scrutinized in detail for future drilling projects.

14.2.3 Sample Quality - The sample quality is good and representative. There are no sample biases. The surface picture of pathfinder metal distribution, especially for the eroded-out stratovolcano core zone, could be improved (filled in) with more sampling. But budget constraints prohibit consideration of carrying out this low-priority work.

14.3.0 Description of Sampling Parameters – Stratovolcano Core Zone - Drill core is continuously sampled into, through, and out of mineralized intervals. Whether mineralized or not, core was sampled over the entire length of all the drill holes (exception DDH-EK-01-11). For weakly to moderately clay-pyrite-altered rock, the length of sampled intervals varied from 1 to 3 meters, rarely longer. Every effort was made to put sample breaks at important changes in rock type and alteration and when mineralized features appeared. The carefulness of the sampling can be seen in the geochemical results by the abrupt change (increase) in silver and base and pathfinder metal content when a mineralized interval is encountered. The high amounts of silver, copper, antimony and other base and pathfinder metals, which are of exploration interest, are tightly held within vuggy silica-barite rock. In detail, the sulfosalt-sulfide mineralization occurs as vug open space infillings, coating fractures, disseminated or as discrete narrow veins and fracture veinlets within the vuggy silica rock. This type of high-grade mineralization does not extend outward for any distance from vuggy silica host rock. Adjacent advanced-argillic-altered wallrock may contain anomalous levels of silver and base and pathfinder metals (i.e. mercury), but further away in clay-pyrite-altered rock, these diminish to low values. As noted, outlying haloes of anomalous values of base and pathfinder metals reflect metal zoning which surrounds the core zone of vuggy silica-barite. Four holes (DDH-EK-99-01, -02, and -04; and DDH-EK-01-11) have completed intersections through mineralized intervals of silver-mineralized vuggy silica and sulfidic silicification (see Tables 5 and 6). Copper Zone – The oxide copper-mineralized pebble breccia was intersected in one drill hole (DDH-EK-01-2C). Only the obvious intercept of chrysocolla mineralization and slightly altered/mineralized adjacent hangingwall and footwall were split and sampled. No other mineralized intervals were observed above or below the one interval and no further sampling was warranted.

15.0.0 SAMPLE PREPARATION ANALYSES AND SECRUITY

15.1.0 <u>Sample Collection/Preparation</u> – <u>On-Site</u> – There was no sample preparation carried out on the property. Drill core was cut using a diamond saw on site and the sampling was carried out only by the geologist who logged the drill hole. All sample intervals are permanently marked on the dividers to the wooden core boxes for future reference. The samples, both core and rock chip, were then shipped directly to assay laboratories of Bondar-Clegg (Oruro, Bolivia) (1995-1999) or ALS Chemex (Calama, Chile) (2001). The direct shipping ensured that the samples could not be tampered with. The sludge produced from core cutting was also sent for geochemical analysis to help evaluate if significant amounts of mineralization was being washed from clay-alunite-altered rock. Other than cutting and bagging core, no sample preparation procedures have ever been carried out on the project site.

15.2.0 <u>Sample Preparation and Laboratory Analytical Procedures</u>

15.2.1 <u>Introduction</u> – All geochemical analyses for rock-chip and drill core samples from Cerro Eskapa were carried out by two major laboratories: Bondar-Clegg (1995-1999) and ALS Chemex (2001). These two laboratories are considered to be two of the best and, although once competitors, they have recently merged (2002). During the years of exploration activity at Cerro Eskapa, both laboratories provided excellent service and accurate analytical results.

15.2.2 <u>Bondar-Clegg (1995-1999)</u> – All rock-chip and drill core samples were dried, coarse-crushed (-10 mesh), split (250 grams), and the split pulverized (-150 mesh). Gold was analyzed via standard fire assay of 30-gram split with aqua regia digestion and atomic absorption finish. Silver was analyzed via aqua regia digestion/extraction and atomic absorption method. Copper, lead, zinc, molybdenum, and thallium were all analyzed by atomic absorption techniques. Pathfinder metals arsenic and antimony were determined by ICP methods. Mercury values were all determined using a cold-vapor atomic absorption method. All sample preparation and gold and silver analyses were carried out at the Bondar-Clegg facility in Oruro, Bolivia and pulps were sent to their North Vancouver laboratory for analyses of base and pathfinder metals. From 1996 to 1999, samples which contain above upper-detection limits for silver and base and pathfinder metals were re-assayed by appropriate technique to determine precise amounts. Bondar-Clegg routinely conducted check analyses for all precious, and base and pathfinder metals on 10% of the samples in any submittal. These check analyses never divulged any problems with the analytical procedures for gold, silver and base and precious metals. No standards or blanks were submitted by SAMEX with any of the sample shipments. Bondar-Clegg maintained their internal quality control of analytical procedures.

15.2.3 <u>ALS Chemex (2001)</u> - All rock-chip and drill core samples were dried, coarse-crushed (-10 mesh), split (250 grams), and the split pulverized (-150 mesh). Gold was analyzed via standard fire assay of 30-gram split with aqua regia digestion and atomic absorption finish. For DDH-EK-01-11, gold for mineralized intervals was assayed using a 50-gram split. Silver and base and pathfinder metals plus a multi-element package were analyzed using ICP methods. Check analyses were run on approximately 10% of the samples for any one submittal. A blank (quartz) and a standard were also routinely analyzed for each sample submittal. Above upper-detection-limit values for silver, base, and pathfinder metals were re-assayed using appropriate techniques (usually atomic absorption) to determine precise amounts.

15.2.4 <u>Check Analyses</u> – Selected samples of twenty (20) mineralized intervals and clay-pyrite altered core from DDH-EK-99-01 and DDH-EK-99-02 were sent to Chemex laboratory (North

Vancouver) to check the original Bondar-Clegg analyses. The check analyses are discussed above in section 8.5.13. The results supported earlier analytical results that no significant gold is present. All but one of the silver values between the original and check analyses matched. The results for check analyses for base and pathfinder metals did not disclose any serious discrepancies with the original results. A second set of rejects and split core from mineralized intervals was sent to the Alfred Knight laboratory (La Paz), check analyses again showed no detectible gold, but values of silver tended to be higher than determined by Bondar-Clegg and Chemex. It was concluded that the Alfred Knight laboratory had in-house problems with silver analyses. In 1999, rejects of seventeen (17) sampled mineralized intervals in drill holes DDH-EK-99-01, -02, and -08 were sent to the Elizabeth Vargas Laboratory (Oruro, Bolivia). A more in-depth summary of the Vargas work can be found above in section 8.5.14. The large samples were ground to a finer -200 mesh and a sulfide concentrate was produced. The non-float was put through a cyanidation leaching process. The concentrate and solution were then assayed for gold and silver and a back-calculation was utilized to determine what the sample should have assayed. Comparisons between the original and back-calculated results show a reasonably close match between the silver values. However, consistently low-level anomalous to two surprisingly high values of gold appeared in the back-calculated values. These overall higher results for gold suggested that perhaps the original (Bondar-Clegg) and check (Chemex) assays gave too low results or that there was contamination of gold in the Vargas laboratory during preparing the sulfide concentrate. Core from nine (9) mineralized intervals in DDH-EK-99-01 and EK-99-02 was quartered and the samples shipped, in 2001, to Lakefield Laboratory (Lakefield, Ontario). Their exhaustive assay procedures did not find any gold and matched closely to the original and check analyses (see above sections 8.5.16 and 8.5.27). The Lakefield Laboratory analytical results for silver and base and pathfinder metals also proved to be reasonably close to the original values. It was concluded that except for the few low (near-detectible) values, no gold is present in the submitted core samples from all the 1999 drill holes and the Vargas gold results are spurious. Analysis via routine assay techniques of either a 30- or 50-gram split should provide adequate first-pass results for gold. Lack of funds prohibited investigating the geochemical analytical results of core samples from the 2001 drilling program.

15.2.5 Opinion on Sampling and Analytical Procedures – For an exploration project at the early stage of Cerro Eskapa and within the budgetary constraints which existed, the sampling, sample preparation, and analytical procedures have been very adequate both for surface rock chip and drill core. The samples were sent to reputable quality geochemical analytical laboratories. Various check procedures have not uncovered any discrepancies to raise suspicion of possible errors for original gold assays and silver analyses by either Bondar-Clegg or ALS Chemex.

16.0.0 DATA VERIFICATION

(1) No discovery of an ore body has yet occurred at Cerro Eskapa and the project is in the early (drill discovery) exploration phase where in light of past budget and personnel constraints, results have not justified rigorous control measures and data verification procedures (other than that reviewed above).

(2) The author has reviewed the geochemical analytical results and the various check analytical results. Because the author conducted much geologic mapping, inspection of mineralized showings, rock-chip sampling, core logging and sampling, and review of supportive IP geophysical data, there is no need, at this time, for carrying out secondary verification of geochemical analytical results. The combination of the surface and core samples amounts to over 1000 samples submitted to laboratories. These considerable analytical results have been evaluated and compiled to depict a coherent picture relating geochemical analytical results to rock type, type/intensity of alteration, and presence/amount of precious-, base-, and pathfinder-metals in mineralized intervals.

(3) No additional sampling of rock outcrops or drill core for carrying out analytical procedures was deemed necessary to verify the analytical results presented here. The large geochemical data base and the several check geochemical analyses of certain mineralized and un-mineralized drill core intervals which utilized reputable laboratories (i.e. Chemex and Lakefield Laboratory) serves as sufficient verification of data at this stage.

(4) No need to verify the geochemical analytical data was deemed necessary in preparing this report.

17.0.0 ADJACENT PROPERTIES – There are no mineral exploration properties adjacent to the Eskapa concession which more-than adequately covers the prospective eroded-out stratovolcano core zone and Breccia Area.

18.0.0 MINERAL PROCESSING AND METALLURGICAL TESTING – No mineral processing or metallurgical testing has been attempted to determine possible metal recoveries on mineralized rock from Cerro Eskapa. The sulfide concentrate obtained by the Vargas Laboratory was prepared as part of an analytical procedure to check gold assay results on drill core. The preparation and analytical results do not possibly reflect anything about potential of gold or silver recoveries from mineralized rock at Cerro Eskapa.

19.0.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES – The Cerro Eskapa property is without a known body of commercial ore and the Company's activities to date have been exploratory in nature.

20.0.0 OTHER RELEVANT DATA AND INFORMATION – This report includes a comprehensive summary of all basic exploration results at Cerro Eskapa. The appendices include all geochemical analytical results for rock-chip and core samples from the Stratovolcano Core Zone, Breccia Area, and Copper Zone. Technical reports detailing results of the IP surveys, additional information concerning reports and memorandums from geophysical consultants concerning the IP work, and also reports and data pertaining to the check geochemical analytical work by Vargas Laboratory and Lakefield Laboratory are listed in the Appendices under Project Technical Reports and Memorandums.

21.0.0 INTERPRETATIONS AND CONCLUSIONS

(1) The geologic setting of the eroded-out stratovolcano core zone at Cerro Eskapa represents a high-sulfidation system with similar alteration and mineralization features as found at significant gold-silver deposits along the Cordillera Occidental in Peru, Chile, and Argentina. These gold-silver deposits include: Yanacocha (Peru), Pierina (Peru), Choquelimpie (Chile), La Coipa (Chile), El Indio-Tambo (Chile), Pascua Lama (Argentina), and Valedero (Argentina). In comparison, the prospective area of the stratovolcano core zone at Cerro Eskapa is similarly large, but erosion has not reached gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide mineralization which is preserved intact at depth.

(2) The principal mineralized zones in the eroded-out, stratovolcano core are controlled along west-northwest-trending/steeply dipping structural zones that, to the west, are comprised of hydrothermal breccia. At the surface, some of the zones (i.e. III, IV, V, and VI) are marked by vuggy silica-barite

rock and sulfidic silicification and locally contain high concentrations of silver-lead-antimony sulfosalt mineralization, but very low (generally less-than-detectible) gold values. Very high anomalous amounts of mercury and anomalous amounts of antimony and arsenic are also present. Other zones (i.e. I, II, VII, VIII, IX, and X), do not have such well-developed vuggy silica rock, but are marked by sulfidic-silicification, brecciation, and highly anomalous amounts of mercury locally accompanied with anomalous antimony and arsenic. These zones are believed to be exposed at higher levels in the system.

(3) The results of drill holes DDH-EK-99-02 and DDH-EK-01-11 show that surface/shallow mineralization of vuggy silica-barite-hosted, silver-lead-antimony sulfosalt, barren of gold, transforms with depth to gold-bearing, high-grade copper-silver-antimony-bismuth sulfosalt-sulfide. The depth to the top of the high-grade mineralization is not yet constrained by drilling and appears to be likely between 200 to 300 meters deep. Also, with depth, the width of rock affected by strong advanced-argillic and vuggy silica alteration widens considerably. The massive, sulfosalt-sulfide, veins cross cut the vuggy silica as a late-stage feature. Similar sulfosalt-sulfide minerals are present along fractures and open vug infillings and as disseminations in vuggy silica rock.

(4) The interval of the mineralized intercept in DDH-EK-01-11 is hosted in a thick strand toward the footwall of the vuggy silica altered zone. The entire interval (444.90 to 448.60 meters) contains 0.288 ppm gold, 0.44% copper, 0.30% antimony, and 0.18% bismuth over a 3.70 meter apparent width (approximately 1.85 meters true width). The grade of this interval is mostly contained in a gold-bearing, high-grade, copper-silver-antimony-bismuth sulfosalt-sulfide massive vein which is 0.20 meters apparent width (approximately 0.10 meters true width). This vein intersection contains high-grades of 1890 ppm (g/mt) silver, 6.10% copper, 4.18% antimony, and 2.93% bismuth with 1.180 ppm (g/mt) gold. A second narrow silica-barite vein of different character contains 1.280 ppm (g/mt) gold and 89.0 ppm (g/mt) silver, but only anomalous levels of copper, antimony, and bismuth. Importantly, the vein is thought to perhaps give a glimpse of the nature and metal tenor of vein-hosted mineralization elsewhere at depth beneath the eroded-out stratovolcano core zone.

(5) The style of the massive, sulfosalt-sulfide vein mineralization and related geologic features (i.e. structural control and alteration assemblage) in DDH-EK-01-11 are similar to the copper veins described for the El Indio deposit, Chile. There, the copper veins range in width from centimeters to ten meters, and typically contain 6% to 10% copper, 120 ppm (g/mt) silver, and a few ppm gold (Jannas and others, 1999). Principal gold mineralization at El Indio was introduced later with deposition of gold and quartz along previously veined structures and new structures. Grades are stated to be 121 g/mt average grade for gold with lower amounts of copper (2.5%) and silver (40 ppm (g/mt)). The only deep vein intersection at Cerro Eskapa would seem to be a silver-rich analog to the El Indio copper veins. Likely recoverable gross metal value of the Cerro Eskapa vein would be between U.S. $350 to $400/metric ton compares favorably to El Indio veins - U.S. $122.71/metric ton for copper veins and U.S. $1300/metric ton for gold veins.

(6) Exploration targets for El Indio vein style of mineralization along and close to the well-defined prospective mineralized zones should be the priority of exploration drilling at Cerro Eskapa. The possibility that the width of vein mineralization significantly increases along the structures and could become much-more auriferous deserves drill testing. The cumulative 11.5 kilometers of mapped strike length gives considerable up-side exploration potential to Cerro Eskapa. The target beneath the eroded-out stratovolcano core zone is envisioned to consist of substantial strike-length segments of gold-rich copper-silver-antimony-bismuth veins with sufficient width to host important amounts of mineralization. The drilling should be designed to test between vertical depth-range of between the 4200 to 3900 meters elevation. This elevation interval is above the base of the stratovolcano and any discovered ore could be accessible via level tunnels. The exploration goal should be to discover

high-grade veins, veinleted rock, and breccia-hosted mineralization cumulatively amounting to >25M metric tons of +1500 g/mt silver, +5% copper, +3% antimony, +1.5% bismuth and with an average gold content of >5 g/mt. At this grade tenor, the ore should be sufficiently valuable to justify development by underground methods.

(7) Considering the amount of exposure, surface sampling and drilling results, the possibility of a shallow open-pit-type gold-silver resource occurring within the eroded-out stratovolcano core zone can be eliminated from consideration as a possible exploration target. Similarly, the lack of any anomalous gold or silver values in vuggy silica and sulfidic silicified hydrothermal breccia in the Breccia Area, especially in consideration of the +200 meters of vertical relief, indicates no shallow targets of precious-metal mineralization are likely present. Also, if present, precious-metal mineralization could be at considerable depth. No further exploration work is proposed for the Breccia Area for the foreseeable future.

(8) The oxide-copper-mineralized pebble breccia bodies in the Copper Zone are an intriguing geologic feature because they may indirectly indicate the presence of porphyry copper intrusion source positioned at depth beneath the Cerro Eskapa stratovolcano and suggest the possibility of existence of a concealed, more substantially sized, copper-mineralized target not far away. The bodies themselves are too narrow and of limited extent, as currently understood, to comprise a possibly significant copper resource. First drilling attempts to search beneath capping lavas and unconsolidated pampa cover failed to encounter any hint of near-by porphyry-or larger breccia-hosted copper mineralization.

22.0.0 <u>RECOMMENDATIONS</u>

(1) An attempt should be made to drill test down into the prospective zones of the eroded-out stratovolcano core zone for El Indio-style, high-grade, gold-bearing, copper-silver-antimony-bismuth sulfosalt-sulfide veins. Drill holes should test at depths of up to 400 meters. Different strike-length segments of the zones are specifically proposed for drill testing and most locations are to the west of DDH-EK-01-11 where increasing amounts of hydrothermal breccia are present. A drill program involving 4,500 meters of core drilling in up to 12 holes is proposed to test at depths of up to 400 meters along Zones I-II, III, IV, V, IX, and X at a cost of approximately US $1,000,000 (see Plates 7, 26a and 26b). The proposed drill holes have been carefully planned using the previous drilling results to ensure the best chance of completing successful intersections. Most of the targeted segments selected for testing are along Zones III, IV, V, and VI which, at the surface, contain silver-lead-antimony sulfosalt mineralization. Several holes are proposed to test sulfidic-silicified zones with highly anomalous mercury (Zones I-II and X). Several IP anomalies are also included in the proposed program. Many other proposed drill-hole locations could also be chosen to test other segments of less-well defined zones.

(2) No exploration work is currently recommended for the Breccia Area. If extra drilling money should be present, testing the IP chargeability/resistivity anomaly toward the far north end of IP line L-7B should be considered. Also, the eastern part of Zones Is and IIs, which are comprised of silicified hydrothermal breccia, could be considered for a drill test (s). These proposed holes are considered very low priority and are not included in proposed drilling listed in (1) above, and would seem only justified if positive results from drilling are obtained in the eroded-out stratovolcano core zone.

(3) No further exploration is proposed at this time for the Copper Zone.

23.0.0 REFERENCES

Bissig, T, Clark, A.H., Lee, J.K.W., 2002, Miocene landscape evolution and geomor-phologic controls on epithermal processes in the El Indio-Pascua Au-Ag-Cu, Belt, Chile and Argentina, Economic Geology, vol. 97, p. 971-996.

Bonham, H.F., 1988, Models for volcanic-hosted epithermal precious metal deposits, in Bulk-Mineable Precious Metal Deposits of The Western United States, Symposium Proceedings, The Geologic Society of Nevada, edited by: Schafer, R.W., Cooper, J.J., and Vikre, P.G., p. 259-271. Note: Includes good generalized summary and diagrammatic geologic cross section of high-sulfidation/acid-sulfate precious- metal mineralized system.

Buchanan, L.J., 1981, Precious-metal deposits associated with volcanic environments in the southwest: in Relations of Tectonics to Ore Deposits in the southern Cordillera, Dickerson, W.R., and Payne, W.D., editors, Arizona Geological Survey Digest, vol. 14.

Davidson, J., 1991, Regional geologic setting of epithermal gold deposits, Chile: Economic Geology, v. 86, 1174-1186.

Gammons, C.H. and Williams-Jones, A.E., 1997, Chemical mobility of gold in the porphyry-epithermal environment: Economic Geology, v. 92, p. 45-59.

Garzon, D., 1990, Laurani, Un yacimiento epitermal asociado al emplazamiento de un domo volcanico, Boletin 25 de Sociedad Geologica Boliviana, Sociedad Geologica Boliviana (La Paz), p. 25 – 37.

Gropper, H., Calvo, M., Crespo, H., Bisso, C.R., Cuadra, W.A., Dunkerly, P.M, Aguirre, E., 1991, The epithermal gold-silver deposits of Choquelimpie, Chile: Economic Geology, v. 86, 1206-1221.

Gustafson, L.B. and Hunt, J.P., 1975, The porphyry copper deposits at El Salvador, Chile: Economic Geology, v. 70, p. 857-912.

Jannas, R.R., Boweres, T.S., Petersen, U., Beane, R.E., 1999, High-sulfidation deposit types in the El Indio District, Chile, in Geology and Ore Deposits of the Central Andes, Special Publication Number 7, Society of Economic Geologists, Skinner, S.J., editor, p. 219-279. note: technical paper on geologic and geochemical investigations of the El Indio and Tambo copper-gold deposits.

Long, K., editor, 1992, Geology and mineral resources of the Altiplano and Cordillera Occidental, Bolivia: U.S. Geological Survey and Servicio Geologico de Bolivia; USGS Bulletin 1975, with a section on Application of economic evaluations to deposit models by Donald I. Bleiwas and Robert G. Christiansen, 365 p.

Ludington, S. and du Bray E.A., 1992, Laurani area: in Geology and Mineral resources of the Altiplano and Cordillera Occidental, Bolivia, USGS Bulletin 1975, p.189-191.

Marsh, S. P., Richter, D.H., Ludington, S., Soria-Escalante, E., and Escobar-Diaz, A., 1992, Geology of the Altiplano and Cordillera Occidental, Bolivia: map in Geology and Mineral Resources of the Altiplano and Cordillera Occidental, Bolivia, Long, K., editor; one plate.

Oviedo, L., Foster, N., Tschischow, N., Ribba, L, Zuccone, A., Crez E., and Aguilar, A., 1991, General geology of La Coipa precious-metal deposit, Atacama, Chile, Economic Geology, v. 86, p. 1287-1300.

Richter, D.H., Brooks, W.E., Ludington, S., Hinojosa-Velasco, A., Escobar-Diaz, A., McKee, E.H., and Shew, N., 1992, San Cristobal District: in Geology and Mineral Resources of the Altiplano and Cordillera Occidental, Bolivia, USGS Bulletin 1975, p. 153-156.

Richter, D.H., Brooks, W.E., Cox, D.P., Shew, N., Bailey, E.A., Hinojosa-Velasco, A., and Escobar-Diaz, A., 1992, Escala District: in Geology and Mineral Resources of the Altiplano and Cordillera Occidental, Bolivia, USGS Bulletin 1975, p. 159-161.

Richter, D.H., Brooks, W.E., Shew, N., Hinojosa-Velasco, A., and Escobar-Diaz, A., 1992, Cerro Eskapa: in Geology and mineral resources of the Altiplano and Cordillera Occidental, Bolivia, USGS Bulletin 1975, p.189-191, p. 116-118.

Rios, M.H. and Heredia, B.A., 1995, Prospeccion basica en la zona de Cerro Eskapa (Prov. E. Baldivieso, Dpto. Potosi), Cooperacion Geologica Bloiviano-Alemana, Open-File Report SERGEOMIN (La Paz, Bolivia), 38 p.

Ruggieri, G., Lattanzi, P, Luxoro, S.S., Dessi, R., Benvenuti, M., and Tanelli, G., 1997, Geology, mineralogy, and fluid inclusion data of the Furtei high-sulfidation gold deposit, Sardinia, Italy: Economic Geology, v. 92, no.1, p. 1-19.

Sillitoe, R.H., 1991, Gold metallogeny of Chile – an introduction: Economic Geology, v. 86, p. 1187-1205.

24.0.0 <u>CERTIFICATE – SIGNING PAGE</u>

I, Robert E. Kell, of Missoula, Montana, United States of America hereby certify that:

(a) I am a consulting geologist and reside at 3255 Rodeo Road, Missoula, Montana, 59803 USA.

(b) I am a "qualified person" for the purposes of this Form 43-101FI technical report which I have written concerning the Cerro Eskapa property. I have worked as an exploration geologist for 26 years. I have a B.S. in Geological Sciences from Virginia Polytechnic Institute and State University (1974). I am a member in good standing, and have been qualified and authorized as a Certified Professional Geologist by the American Institute of Professional Geologists (Certificate Number 10724). I am also a member of the Geological Society of America and of the Society of Economic Geologists. I have also served, from 1996 until present, as Vice-President of Exploration for SAMEX Mining Corp., 301-32920 Ventura Ave., Abbotsford, British Columbia, Canada V2S 6J3.

(c) I have worked on the Cerro Eskapa property over a six-year time period 1995 to 2001 and last visited/worked at the property from early September until the end of October, 2001 (two month time period). No exploration activity has taken place since this visit.

(d) I am responsible for the entire contents of this technical report.

(e) I am not aware of any material fact or material change with respect to the subject matter of this technical report which is not reflected in this technical report.

(f) I am not independent of the issuer, being an officer, director, and shareholder of the issuer, SAMEX Mining Corp. I am also entitled to a 0.2% NSR on the Cerro Eskapa Property.

(g) I visited the Cerro Eskapa property for a two-day period as a consultant geologist to Newmont Overseas Exploration (Denver, CO) in July, 1991.

(h) I have read the Instrument and Form 43-101F1 and this technical report has been prepared in compliance with this Instrument and Form 43-101F1.

(i) To Security Regulatory Authorities – I Robert E. Kell consent to the filing of this technical report and to the written disclosure of the technical report and to extracts from or summary of the technical report in the written disclosure being filed here within. I hereby also consent to the use of this report by SAMEX Mining Corp. in submissions to the regulatory bodies and to distribute all or parts of the report to shareholders or other parties, provided that the meaning is not altered by partial quotes.

"Robert E. Kell"

____

Robert E. Kell
April 30, 2003

SEAL: *"American Institute Of Professional Geologists*
Certificate Number 10724
Robert E. Kell - Certified Professional Geologist"

ILLUSTRATIONS

APPENDICES

(The following are available for viewing at the Corporate Office of SAMEX Mining Corp.)

Geochemical Tables for Surface Samples, Check Analyses and Drill Holes

Project Technical Reports and Memorandums:

Alarcon, R., 1999, Geophysical Study, Eskapa Project, Copacabana Area, Bolivia, internal contractor report from Geoexploraciones (Santiago, Chile) to SAMEX Mining (March, 1999), 24 p., 10 figures, 2 map plates., appendix of listed raw IP data.

Alarcon, R., 2001, Geophysical Study, Eskapa Project, Breccia and Copper Areas, Bolivia, internal contractor report from Geoexploraciones (Santiago, Chile) to SAMEX Mining Corp. (January, 2001), 26 p., 16 figures.

Alarcon, R., 2001, Geophysical Study, Eskapa Project, Breccia and Copper Areas, Bolivia, internal contractor report from Geoexploraciones (Santiago, Chile) to SAMEX Mining (April, 2001), report of February-March, 1999 IP surveys, 25 p., 14 figures.

Carlson, G., 1995, Eskapa project geophysical report, internal contractor report from Gradient Geophysics (Missoula, Montana) to SAMEX Mining (April, 1995), 2 p, 1 map, 5 figures.

Fritiz, F., 1999, Eskapa Prospect, Bolivia IP interpretation, internal consulting report to MK Gold (Salt Lake City) (July, 1998), 5 p. 3 map plates.

Fuchs, W.A., 2000, Mineralogical analysis – Bolivian Gold Project: internal memorandum from Schurer & Fuchs Laboratory to Daniel Kappes of Kappes-Cassidy and Assoc. (Reno, Nevada), 2 p., 6 plates.

Kappes, D.W., 2000, Memo to Minera Samex Patcicio Kyllmann, summary memorandum from Kappes, Cassidy and Assoc. (Reno, Nevada) of metallurgical processing/analyses to evaluate gold content of samples from Eskapa project, internal memorandum (La Paz, Bolivia- February 18, 2000), 2 p., with appendices of data/notes - 7 p.

Kell, R.E., 2000, Summary report of possible gold analytical problems – Eskapa Gold-Silver Exploration Project, Provincia Enrique Baldivieso, Bolivia, internal report, SAMEX Mining Corp. (Abbotsford, BC), 42 p.

Kline, J., 1999, Review of Induced Polarisation and Resistivity, Eskapa project, Bolivia, internal consulting report to SAMEX Mining from Jan Kline Consulting Geophysicist (Burnaby, BC) (April 27, 1999), 7 p., 7 figures.

Kline, J., 2001, Memo to SAMEX Mining Corp., Differences and discrepancies between IP data sets collected 1999, 2000, and 2001 by Geoexploraciones, from Jan Kline Consulting Geophysicist (Burnaby, BC) (August, 2001), 6 p., 14 figures.

TEXT TABLES

TABLE 1

ESTIMATION OF CERRO ESKAPA PROJECT EXPENDITURES – 1995-2002

	1995	1996	1998	1999	2000	2001	2002
drilling and sub-contracts			62,434	264,776	60	360,464	
field supplies	1,030[e]			3,496	8,023	8,685	
food and lodging	425[e]		867	9,455	7,386	27,520	
fuel	670[e]		651	6,284	1,119	9,792	
geologic mapping, sampling, and surveys	22,050[e]	5,850[e]	5,375	133,118	52,815	153,052	68,000[e]
legal			1,977	6,857	1,512	1,329	
concession fees	3,200[e]	3,200[e]	5,889	1,812	4,753	3,134	
repairs and maintenance	450[e]		1,429	8,452	4,746	3,508	
site administration			620	5,217	376	3,240	
travel	6,100[e]		1,065	25,233	7,992	8,321	1,370[e]
mineral interest			88				
subtotals	36,050[e]	9,050[e]	80,395	464,700	88,782	579,045	69,370[e]

Total Approx. Expenditure (1995-2002) = (CA) $1,327,392.

[e] - estimated

TABLE 2 – DRILL HOLE SUMMARY – CERRO ESKAPA

	target	utm	utm	elev.	bearing	inclination	core	started	stopped	depth	geologist
no.	area	coord. N.	coord. E	m.	degrees	degrees	size	d/m/y	d/m/y	m.	
DDH-EK-99-01	Zone III –ECZ	7,648,167	634,329	4,415	80	65	HQ	16/04/99	04/22/99	251.30	C. Espinoza L.
DDH-EK-99-02	Zone III-ECZ	7,648,263	634,295	4,421	55	65	HQ	26/04/99	30//04/99	208.70	C. Espinoza L.
DDH-EK-99-03	Zone III-ECZ	7,648,068	634,339	4,410	80	65	HQ	03/05/99	06/05/99	250.30	C. Espinoza L.
DDH-EK-99-04	Zone III-ECZ	7,648,025	634,884	4,572		90	HQ	08/05/99	22/06/99	231.10	R. Kell/ M. Barragon E.
DDH-EK-99-05	Zone IV-ECZ	7,645,011	633,972	4,407	75	70	HQ	26/05/99	29/05/99	209.70	M. Barragon E./ C. Espinoza L.
DDH-EK-99-06	Zone III-ECZ	7,648,871	633,861	4,374	195	65	HQ	31/05/99	03/06/99	160.80	C. Espinoza
DDH-EK-99-07	Zone IV-ECZ	7,649,071	634,061	4,418	55	65	HQ	05/06/99	09/06/99	151.40	C. Espinoza/ M. Barragon E.
DDH-EK-99-08	Zone IV-ECZ	7,649,598	633,686	4,320		90	HQ	11/06/99	15/06/99	162.00	C. Espinoza
DDH-EK-99-09	Zone II-ECZ	7,649,367	632,773	4,223	260	65	HQ	17/06/99	18/06/99	53.20	C. Espinoza
DDH-EK-99-10	Zone III-ECZ	7,648,480	636,637	4,487	110	60	HQ	23/06/99	26/06/99	211.10	C. Espinoza
DDH-EK-01-11	Zone III-ECZ	7,648,206	634,214	4,405	55	65	HQ/ NQ	10/01/01	17/10/01	500.25	R. Kell
DDH-EK-01-1B	Zone IV-BA	7,649,048	631,309	4,085	190	65	HQ	24/01/01	01/31/01	256.90	R. Kell
DDH-EK-01-1C	IP-L-1-CZ	7,652,390	635,375	4,102		90	HQ	05/02/01	12/02/01	260.25	R. Kell
DDH-EK-01-2C	PB-CZ	7,652,233	634,970	4,132	90	55	HQ	19/02/01	26/02/01	167.15	R. Kell
DDH-EK-01-3Ca	IP-L-1-CZ	7,652,238	634,529	4,194	15	65	HQ	18/09/01	26/09/01	165.30	R. Kell
DDH-EK-01-3Cb	IP-L-1-CZ	7,652,239	634,527	4,194	15	65	HQ	27/09/01	29/09/01	70.00	R. Kell
DDH-EK-01-4C	IP-L-1-CZ	7,652,403	634,712	4,135	260	60	HQ	19/10/01	26/10/01	266.40	R. Kell
total										3,575.85	

ECZ – Eroded-out Stratovolcano Core Zone Area
BA – Breccia Area
CZ – Copper Zone
PB – pebble breccia – Copper Zone
IP – IP line chargeability anomaly

TABLE 3 -COMPARISON OF EL INDIO-TAMBO, CHOQUELIMPIE, AND CERRO ESKAPA

	El Indio-Tambo	**Choquelimpie**	**Cerro Eskapa**
Geologic setting	Volcanic complex; pyroclastic, flows and hypabyssal intrusive rocks of rhyodacitic composition.	Eroded stratovolcano of andesite-dacite lavas; hypabyssal dacite flow dome in core zone.	Eroded stratovolcano of andesite-dacite lavas; hypabyssal dacite-rhyodacite flow dome(s) in core zone.
Age of volcanic and intrusive host rocks.	21.9 to 16.9 Ma and18.2 to 13.3 Ma (Lower to Middle Miocene)	Upper Miocene	6.3 Ma (Upper Miocene)
Type Of Mineralization/ Alteration System	High-sulfidation/ acid-sulfate.	High-sulfidation/ acid-sulfate.	High-sulfidation/ acid-sulfate.
Age of alteration and mineralization	13.1 to 10.8 Ma and 7.5 to 6.9 Ma; continued to perhaps 4.0 Ma (Upper Miocene)	Upper Miocene to early Pliocene (?)	Upper Miocene to early Pliocene (?)
Size of prospective area	El Indio – 2 km. x 2 km.; most production from veined area 500 m. x 150 m. Tambo – scattered deposits in 3 km. x 2 km. Note: two areas occur in NNW-altered zone 8 km. long x 2 km. across.	Clay-py. Altered zone - 5 km. sq. approximately 3 km. long by 1.5 km. wide.	Eroded Core Zone area – 3 km. long by 2 km. across. Breccia Area – 2.5 km. long by 2 km. across.
Style of mineralization	El Indio – veins- two types: gold and copper-gold-silver. El Tambo – breccia and minor veins.	Breccia-hosted (principally) and some minor (?) veins	Vuggy silica- hosted, veins and breccia-hosted.
Geometry and Controls of mineralization	Copper-gold-silver and gold veins steep to moderately dipping veins. Controlled by NE-trending faults in cymoid-loop configuration. Breccia – dipping, pipelike to slightly elongate.	Breccia – tabular/ elongate, steep zone, controlled along swarm of WNW-structures cutting across eroded-out core zone of stratovolcano.	Vuggy silica – steep, tabular, elongate. Sulfide veins-steeply dipping. Breccia – steep, tabular, elongate, steep zones; typically 40 to 80 m.; up to 250 m. All controlled along a swarm of WNW-trending structures cutting across eroded-out core zone of stratovolcano.
Widths of mineralization	Copper-gold-silver: few cms. to up to 20 m.; typically 3 to 10 m. Gold veins – few mms. To 5 m.; typically 1 to 2 m. Breccia – 100 to 200 m.; up to 300 m. across.	Breccia – typically 6 to 15 m.; up to 40 m. thick.	Vuggy silica – 5 to 12 m. Sulfide Veins – 0.3 m. in only drill intercept. Breccia – typically 40 to 80 m..
Length of mineralization	Copper-gold-silver veins – typically 100's m.; up to 1000 m. Gold veins – 150 to 500 m. Breccia – to 500 m.	Breccia – 100's m.	Vuggy silica zones – 1500 to 3000 m. long. Sulfide veins – unknown. Breccia – 1000 m.
Ore zone minerals	Copper-gold-silver veins: enargite, pyrite,tetrahedrite, tenantite, chalco-pyrite, chalcocite, digenite, sphalerite, galena. Gold veins: native gold, calaverite, enargite, tenantite, pyrite, galena, sphalerite, telluride mins., huebnerite. Note: bladed barite.	Pyrite, enargite, arsenopyrite. Note: barite.	Vuggy silica – pyrite-stephanite-other lead-silver-antimony sulfosalt minerals. Note: coarse-bladed barite. Vein – enargite-luzonite(?),tetrahedrite (?), bismuthenite (?), pyrite, other silver sulfosalt minerals (?).

	El Indio-Tambo	Choquelimpie	Cerro Eskapa
Grades/Gross metal values	Copper-gold-silver veins: avg. grade few g/t Au, 120 g/t Ag, 6% to 10% Cu ($160 (U.S.)/metric ton). Gold veins: 18 to 30 g/t Au typical ($175 to $300 (U.S.)/metric ton); up to >1000 g/t Au in productive ore shoots – avg. 121 g/mt Au ($1200 (U.S.)/metric ton.) Breccia: typical 4 to 10 g/t Au; 10 g/t Ag ($40 to $100 (U.S.)/metric ton).	Oxide open-pit ore: – 2 g/t Au, 12 g/t Ag ($21 (U.S.)/ metric ton). Sulfide breccia- hosted sulfide ore: 14.0 g/t Au, 72.1 g/t Ag, 2.04% Cu ($177 (U.S.).	Vuggy silica rock (surface): Avg. grade - 226 g/t Ag. Sulfide vein in DDH-EK-01-11:1890 g/t Ag, 6.1% Cu, 4.2% Sb, 2.9% Bi, 1.20 g/t Au ($670 U.S.)/metric ton). Silica-barite vein intersection in DDH-EK-01-11– 1.28 g/t Au, 89 g/t Ag, 0.33% Cu ($25 (U.S.)/metric ton).
Production And Reserves	Copper-gold-silver veins: 23.2 Mt of 6.6 g/t Au, 50 g/t Ag, 4% Cu. Gold vein: 0.5 Mt of 121 g/t. Breccia: estimated at 15 Mt of 7.0 g/t Au (?). total production through 1999 - 7 M oz. Au, 37 M oz. Ag, and 0.9 M t. Cu.	Open pit – oxide ore – production 1992-95: 7.7 Mt of 2.0 g/t Au, 12.0 g/t Ag. Breccia: 350,000 t proven/probable of 11.43 g/t Au, 63 g/t Ag, 1.77% Cu.	No modern production.
Alteration	Copper-gold-silver and gold veins: selvage of advanced-argillic (alunite-clay-pyrite), vuggy silica-barite, argillic. Breccia: silicification, argillic and advanced-argillic with barite-alunite-clay. Outer areas: propylitic and clay-pyrite (argillic).	Breccia: upper levels: argillic-sericitic with aspy., py., orpiment, and barite. Lower levels: silicification and advanced-argillic. Outer areas: propylitic and clay-pyrite (argillic).	Widespread clay-pyrite alteration. Vuggy silica rock and sulfide veins: silicification with enveloping argillic-advanced argillic (alunite-clay-pyrite).
Important Pathfinder Metals	As, Hg, Sb, Te	unknown	As, Hg, Sb, Tl, Te
Important Accessory Base Metals	Pb, Zn, Bi, Mo (?)	Pb, Zn	Pb, Zn, Bi, Sb, Mo
Per Oz. Cash Cost	El Indio: Range of per oz. Au costs of $156 (U.S.)/oz. for 1999; increases to nearly $200 (U.S.)/ oz. for 2000. Tambo: $189 (U.S.)/oz. for 1999.	Unknown for open-pit operation. Projected at $165 (U.S.)/oz. Au equivalent (=$130 (U.S.)/oz. Au (?)).	Not applicable.
Exploration Targets	Unknown; believe reserves remain in El Indio – copper-gold-silver veins; Tambo - gold-min. in breccia.	Open pit: +/- 50 Mt of 0.8 to 1.5 g/t Au. Underground: breccia swarm +22.5 Mt of 5 g/t Au include significant amount of 8 to 10 g/t Au.	Underground: breccia swarm and veins; >30Mt of 5% Cu, >1600 g/t Ag, >5 to 10 g/t Au, >4% Sb, > 2% Bi.

Table 4 - **Geologic Staffing – Cerro Eskapa Project1994-2001 – Crew Leader Listed First**

time period	personnel	area mapped	scale	type
1994-95	Robert Kell Greg Minnick Carlos Espinoza	central part of the Stratovolcano Core Zone	1:10000	reconnaissance
1996	Robert Kell Carlos Espinoza	central part of the Stratovolcano Core Zone	1:10000	reconnaissance
1998-99	Carlos Espinoza David Montano Mario Barragan	entire Stratovolcano Core Zone and Copper Zone	1:2000	detailed outcrop
2000	David Montano Mario Barragan	Breccia Area and Copper Zone	1:2000	detailed outcrop
2001	Robert Kell Philip Southam David Montano Mario Barragan	Breccia Area; review and remapping of parts of Stratovolcano Core Zone	1:2000	detailed outcrop

TABLE 5 - GEOCHEMICAL ANALYTICAL RESULTS- DDH-EK-99-02
VUGGY SILICA ROCK INTERCEPT
SPLIT HQ CORE

sample	interval	width	Au	Ag	Cu	Pb	Zn	Sb	Tl	As	Hg
no.	m.	m.	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
EK-99-02-52	140.00 - 143.00	3.00	<5	21.3	233	484	21	400	<0.2	94	2002
EK-99-02-53	143.00 - 144.00	1.00	17	37.5	1130	1428	131	1700	<0.2	156	6942
EK-99-02-54	144.00 - 146.00	2.00	8	128.8	137	730	43	1770	<0.2	206	7040
EK-99-02-55	146.00 - 148.00	2.00	<5	40.7	342	480	30	870	<0.2	112	3019
EK-99-02-56	148.00 - 150.00	2.00	<5	30.9	411	339	64	498	<0.2	76	1757
EK-99-02-57	150.00 - 152.00	2.00	7	17.5	1455	630	78	999	0.6	208	2249
EK-99-02-58	152.00 - 154.00	2.00	7	16.8	954	1996	39	955	0.5	230	4504
EK-99-02-59	154.00 - 156.00	2.00	<5	10.5	1223	443	37	846	0.3	195	2110
EK-99-02-60	156.00 - 158.00	2.00	9	40.1	3179	880	110	3010	1.3	475	6962
EK-99-02-61	158.00 - 160.00	2.00	7	28.5	2910	968	75	2000	1.2	390	6080
EK-99-02-62	160.00 - 162.00	2.00	12	69.5	4349	1097	199	2690	1.3	559	10973
EK-99-02-63	162.00 - 164.00	2.00	5	18.4	402	1312	60	806	0.5	235	3169
EK-99-02-64	164.00 - 166.00	2.00	24	91.5	1277	725	151	15700	0.2	211	9093

GRADE/WIDTH INTERVALS

grade/width	interval	width	Au	Ag	Cu	Pb	Zn	Sb	Tl	As	Hg
no.	m.	m.	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
1	140.00 - 150.00	10.00	5	50.2	413	598	47	919	<0.20	123	3658
2	150.00 - 162.00	12.00	7	30.4	2345	1002	90	1583	0.83	370	5480
3	162.00 - 166.00	4.00	14	54.9	839	1018	105	8253	0.35	328	6131

TABLE 6 - GEOCHEMICAL ANALYTICAL RESULTS - DDH-EK-01-11
FOOTWALL INTERVAL - SULFIDE-VEINED, VUGGY SILICA/ALTERED ROCK
SPLIT NQ CORE

sample	interval	width	Au	Ag	Cu	Pb	Zn	Sb	Bi	As	Hg
no.	m.	m.	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
EK-01-11-119	444.90 - 445.45	0.55	222	4	71	89	284	110	10	59	1320
EK-01-11-120A	445.45 - 445.55	0.10	1280	89	3270	138	1040	2130	1280	264	33800
EK-01-11-120B	445.55 - 446.00	0.45	380	5	74	124	327	88	28	46	1060
EK-01-11-121	446.00 - 446.25	0.25	409	6	90	90	115	61	13	71	1270
EK-01-11-122	446.25 - 446.35	0.10	836	524	16200	326	3100	11200	3650	840	55800
EK-01-11-123	446.35 - 446.55	0.20	1180	1890	61000	1380	9730	41800	29300	972	68800
EK-01-11-124	448.55 - 446.95	0.40	134	134	3510	87	748	2210	329	255	25200

GRADE/WIDTH INTERVALS

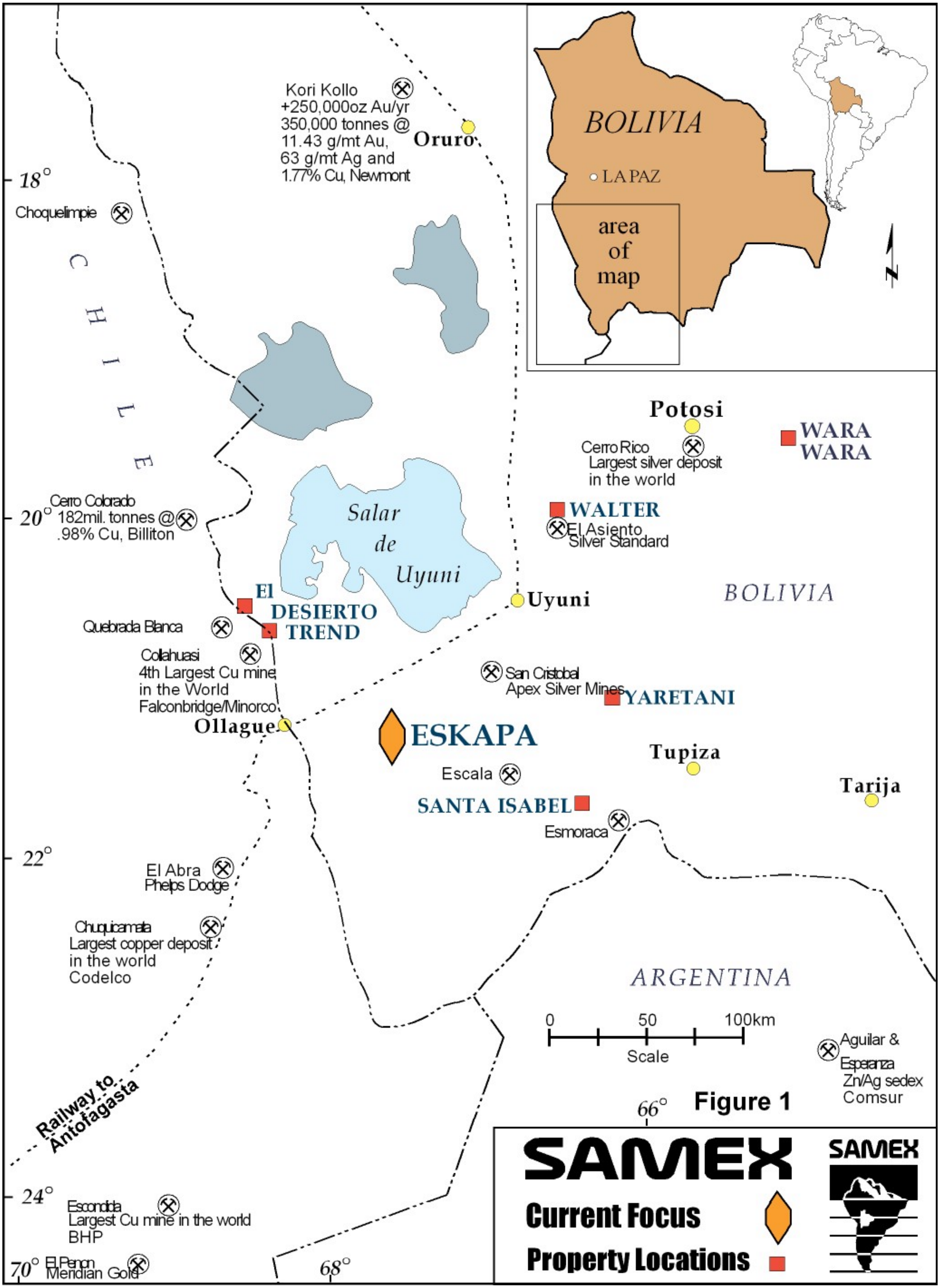
grade/width	interval	width	Au	Ag	Cu	Pb	Zn	Sb	Bi	As	Hg
no.	m.	m.	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
1	444.90 - 448.60	3.70	288	140	4373	153	849	2995	1821	169	10401
2	445.45 - 446.95	1.50	583	331	10405	290	1890	7088	4335	297	22396
3	446.25 - 446.55	0.30	1065	1435	46067	1029	7520	31600	20750	928	64467

TABLE 7 - SUMMARY OF MINERALIZED ZONES

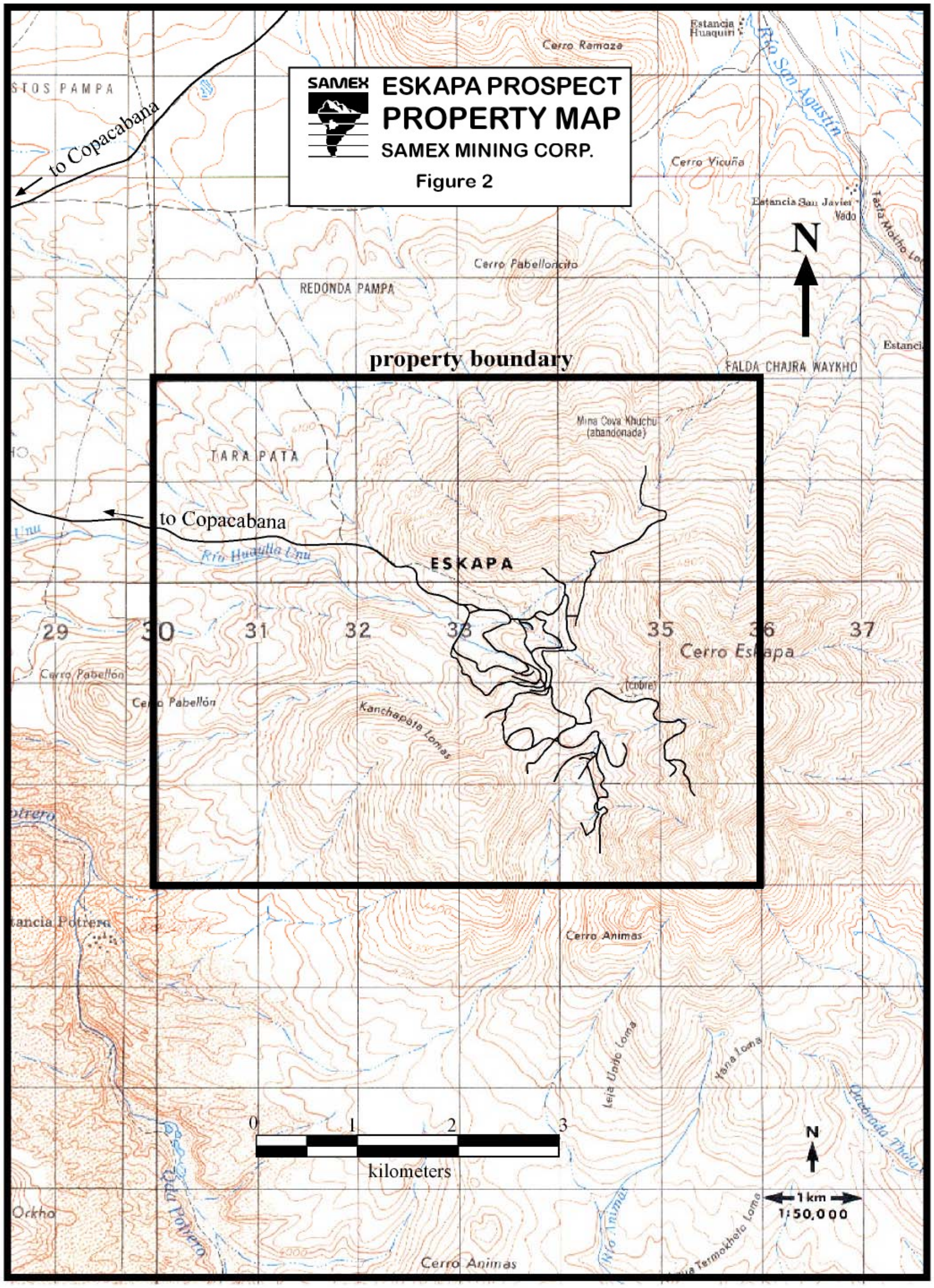
ERODED-OUT STRATOVOLCANO CORE ZONE - CERRO ESKAPA

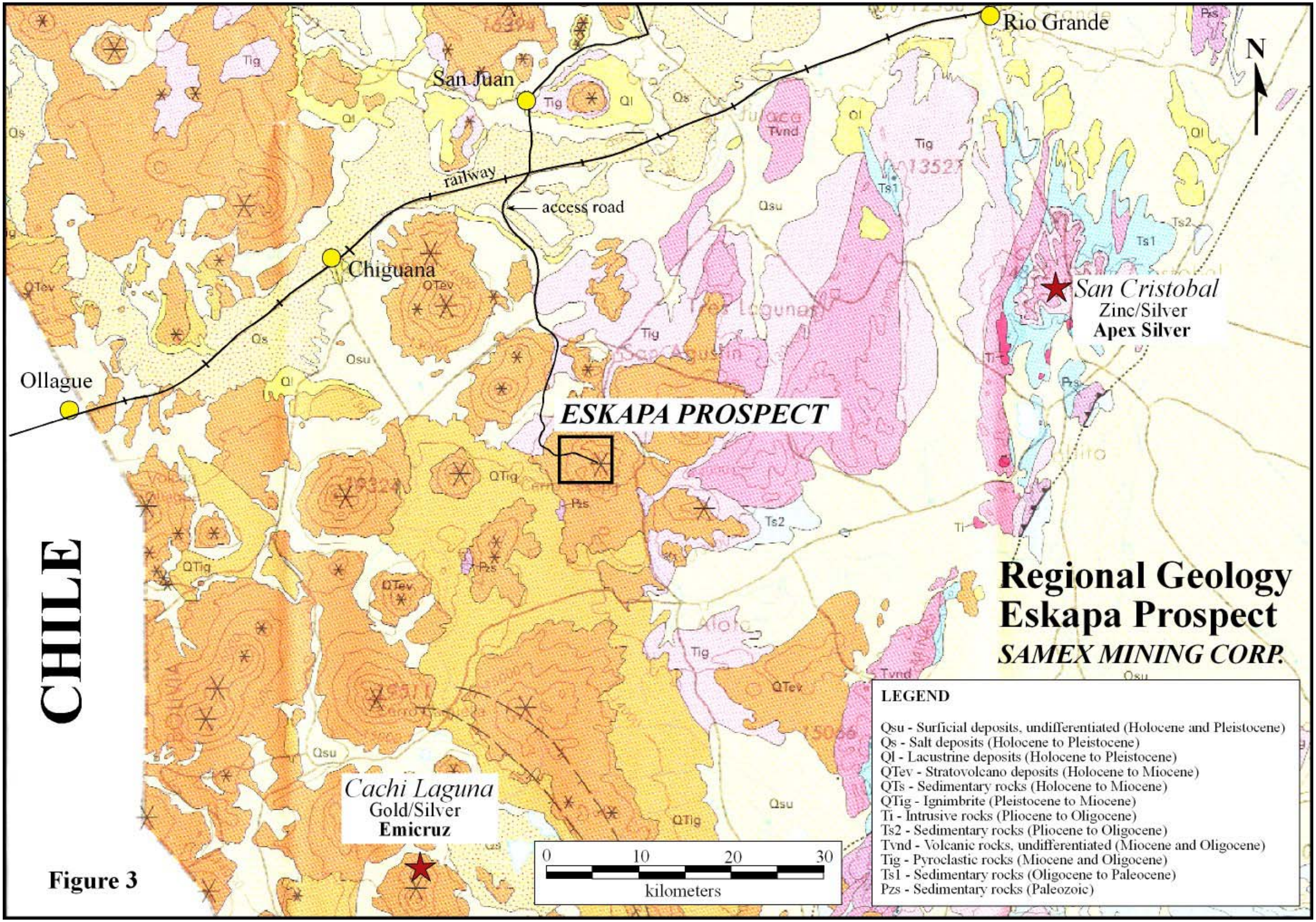
	Mapped	
	Strike-Length	
Mineralized Zone	m.	Description/notes
I	1100	southeast end poorly exposed, vuggy silica rock float, open-ended. 1000 meters inferred additional strike length.
II	1000	strong mercury anomaly along breccia zone, locally with erosional remnants of silica cap.
III	2400	silver-mineralized, vuggy silica-barite rock outcrops, west-half emplaced in pre-mineral hydrothermal breccia, strong pathfinder element content, advanced-argillic alt. halo. +500 meters inferred additional strike length
IV	1700	silver-mineralized, vuggy silica-barite rock outcrops, west-half emplaced in pre-mineral hydrothermal breccia, strong pathfinder element content, advanced-argillic alt.. halo. 500 meters inferred additional strike length.
V	1400	silver-mineralized, vuggy silica-barite rock outcrops, west-half emplaced in pre-mineral hydrothermal breccia; strong pathfinder element content, advanced-argillic alt. halo. 550 meters inferred additional strike length.
VI	900	ill-defined, locally marked by silver-mineralized, vuggy silica-barite rock outcrops, full strike-length extent unknown, open-ended eastwards and westwards..
VII	600+	silicified zone with weaker anomalous levels of pathfinder elements.
VIII	600	silicification with weaker anomalous levels of pathfinder elements. 200 meters inferred additional strike length.
IX	1000	strong clay-pyrite alteration, high levels of mercury, arsenic, and antimony.
X	800	hydrothermal breccia body, strong silicification, anomalous mercury, steep westward dipping, exposed at high levels/elevations.
	11500	total cumulative meters of mapped strike lengths

TEXT FIGURES



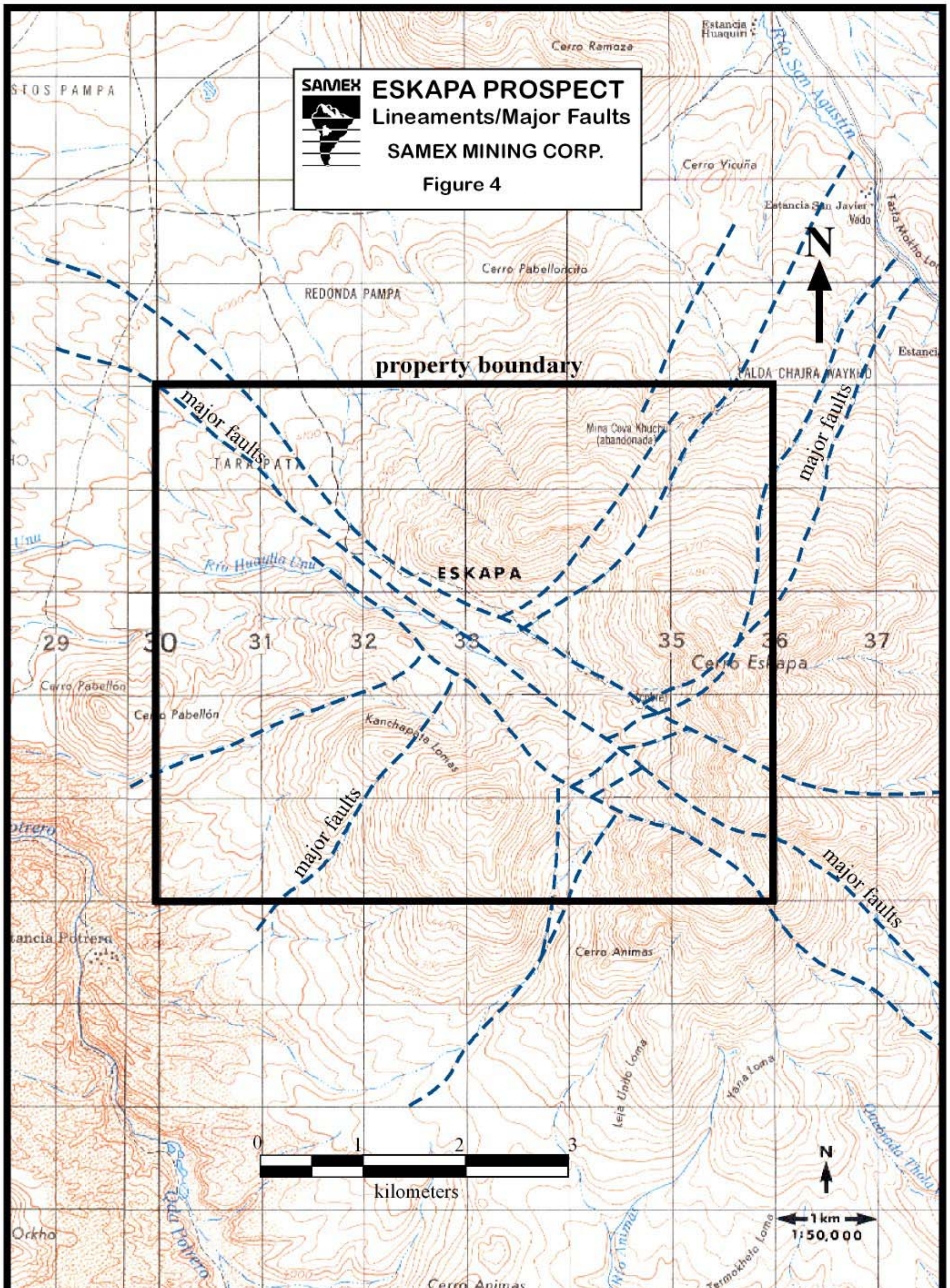
Kori Kollo
+250,000oz Au/yr
350,000 tonnes @
11.43 g/mt Au,
63 g/mt Ag and
1.77% Cu, Newmont
Oruro
18°
Choquelimpie
CHILE
BOLIVIA
LA PAZ
area of map
Potosi
WARA WARA
Cerro Rico
Largest silver deposit
in the world
Cerro Colorado
182mil. tonnes @
.98% Cu, Billiton
20°
Salar de Uyuni
WALTER
El Asiento
Silver Standard
El DESIERTO TREND
Uyuni
BOLIVIA
Quebrada Blanca
Collahuasi
4th Largest Cu mine
in the World
Falconbridge/Minorco
San Cristobal
Apex Silver Mines
YARETANI
Ollague
ESKAPA
Tupiza
Escala
Tarija
SANTA ISABEL
Esmoraca
22°
El Abra
Phelps Dodge
Chuquicamata
Largest copper deposit
in the world
Codelco
ARGENTINA
0
50
100km
Scale
Aguilar &
Esperanza
Zn/Ag sedex
Comsur
Railway to Antofagasta
66°
Figure 1
SAMEX
Current Focus
Property Locations
SAMEX
24°
Escondida
Largest Cu mine in the world
BHP
70°
El Penon
Meridian Gold
68°


SAMEX
ESKAPA PROSPECT
PROPERTY MAP
SAMEX MINING CORP.
Figure 2
to Copacabana
property boundary
to Copacabana
ESKAPA
Cerro Ramaze
Cerro Vicuña
Cerro Pabelloncito
REDONDA PAMPA
FALDA CHAJRA WAYKHO
Mina Cova Khuchu
(abandonada)
TARA PATA
Río Huaylla Unu
29
30
31
32
33
35
36
37
Cerro Eskapa
Cerro Pabellón
Kanchapata Lomas
(cobre)
Cerro Animas
Yana Loma
Río Animas
Cerro Animas
N
0
1
2
3
kilometers
1 km
1:50,000



Rio Grande
N
San Juan
railway
access road
Chiguana
Ollague
ESKAPA PROSPECT
San Cristobal
Zinc/Silver
Apex Silver
CHILE
Regional Geology
Eskapa Prospect
SAMEX MINING CORP.
LEGEND
Qsu - Surficial deposits, undifferentiated (Holocene and Pleistocene)
Qs - Salt deposits (Holocene to Pleistocene)
Ql - Lacustrine deposits (Holocene to Pleistocene)
QTev - Stratovolcano deposits (Holocene to Miocene)
QTs - Sedimentary rocks (Holocene to Miocene)
QTig - Ignimbrite (Pleistocene to Miocene)
Ti - Intrusive rocks (Pliocene to Oligocene)
Ts2 - Sedimentary rocks (Pliocene to Oligocene)
Tvnd - Volcanic rocks, undifferentiated (Miocene and Oligocene)
Tig - Pyroclastic rocks (Miocene and Oligocene)
Ts1 - Sedimentary rocks (Oligocene to Paleocene)
Pzs - Sedimentary rocks (Paleozoic)
Cachi Laguna
Gold/Silver
Emicruz
0
10
20
30
kilometers

Figure 3



SAMEX
ESKAPA PROSPECT
Lineaments/Major Faults
SAMEX MINING CORP.
Figure 4
property boundary
major faults
major faults
major faults
major faults
ESKAPA
Cerro Ramoza
Cerro Vicuña
Cerro Pabelloncito
REDONDA PAMPA
TARASPATA
Mina Cova Khuchu (abandonada)
Río Huaylla Unu
Cerro Eskapa
Cerro Pabellón
Kanchapata Lomas
Cerro Animas
Yana Loma
Río San Agustín
Estancia San Javier
Estancia Huaquiri
Estancia Potrero
N
0
1
2
3
kilometers
29
30
31
32
33
35
36
37
1 km
1:50,000

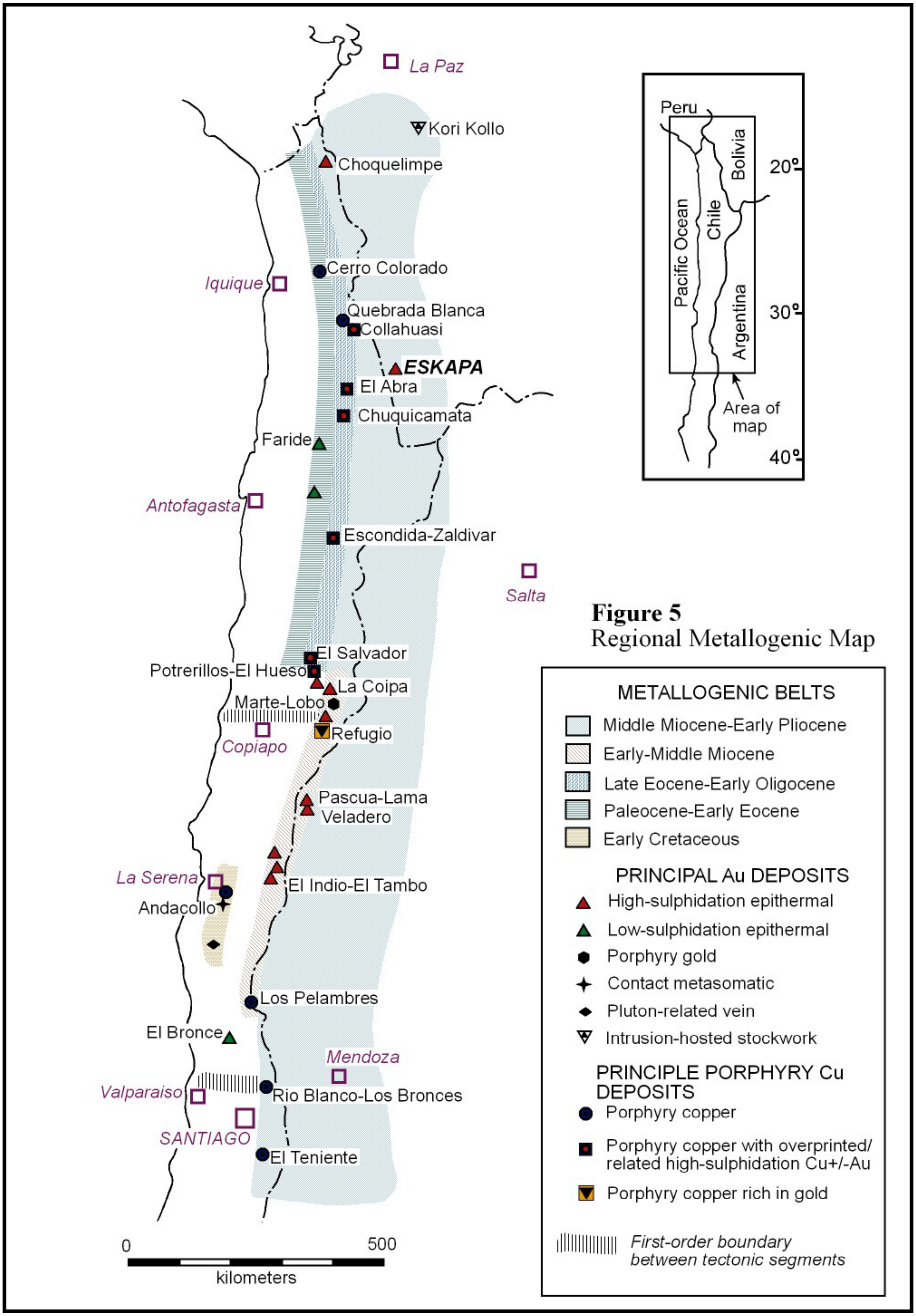


Figure 5
Regional Metallogenic Map

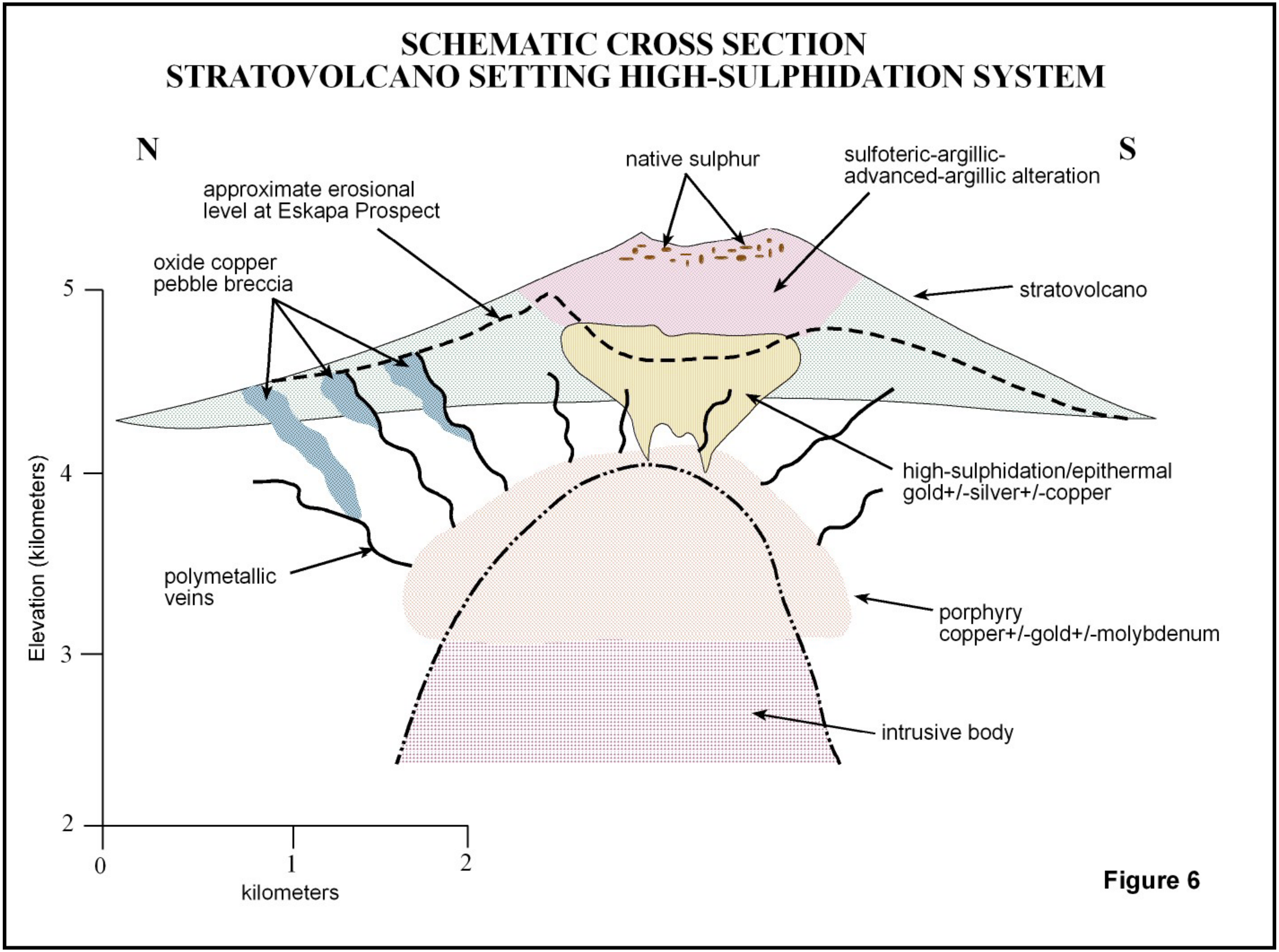

SCHEMATIC CROSS SECTION
STRATOVOLCANO SETTING HIGH-SULPHIDATION SYSTEM
N
S
native sulphur
sulfoteric-argillic-
advanced-argillic alteration
approximate erosional
level at Eskapa Prospect
oxide copper
pebble breccia
stratovolcano
high-sulphidation/epithermal
gold+/-silver+/-copper
polymetallic
veins
porphyry
copper+/-gold+/-molybdenum
intrusive body
Elevation (kilometers)
5
4
3
2
0
1
2
kilometers

Figure 6

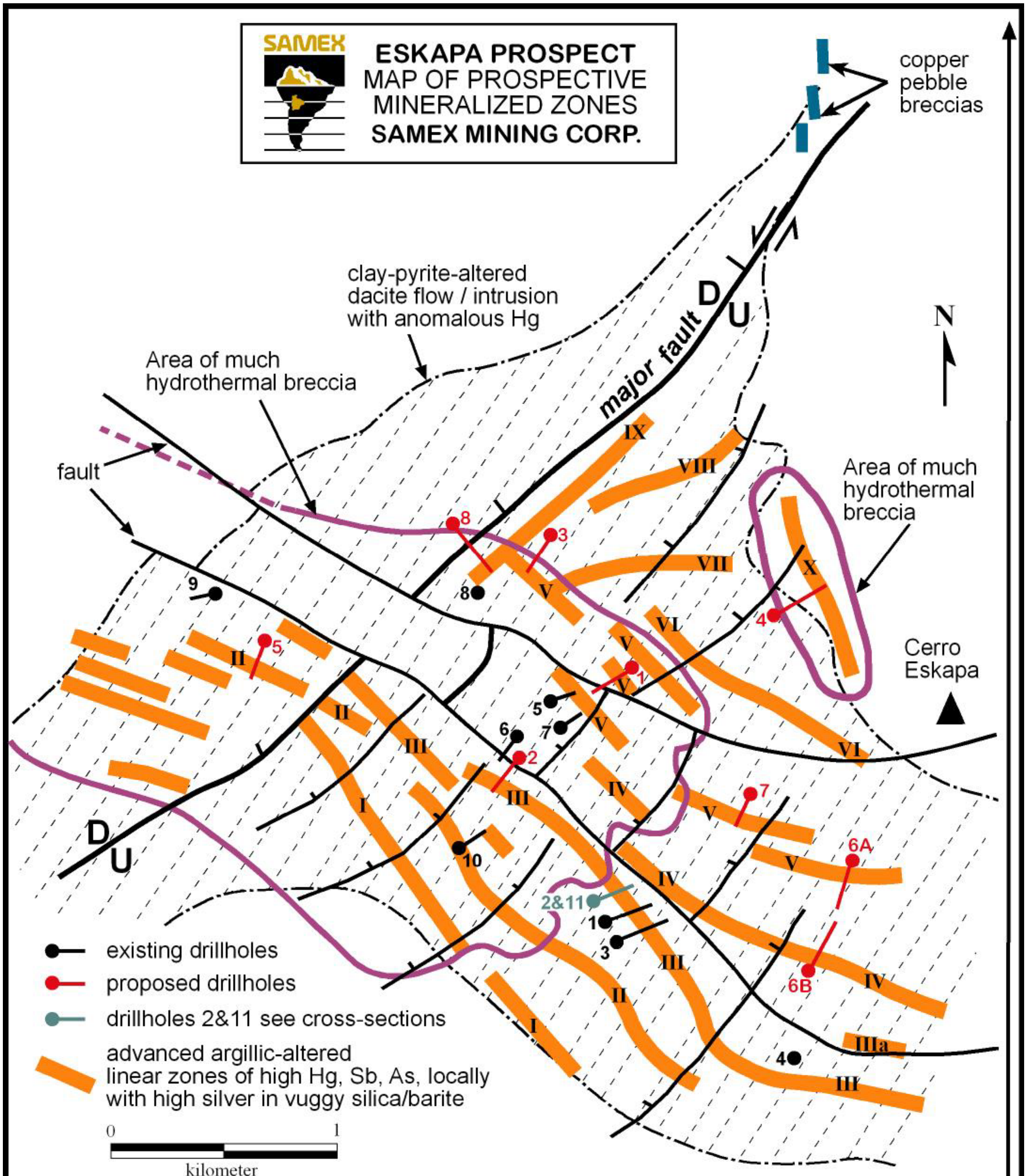
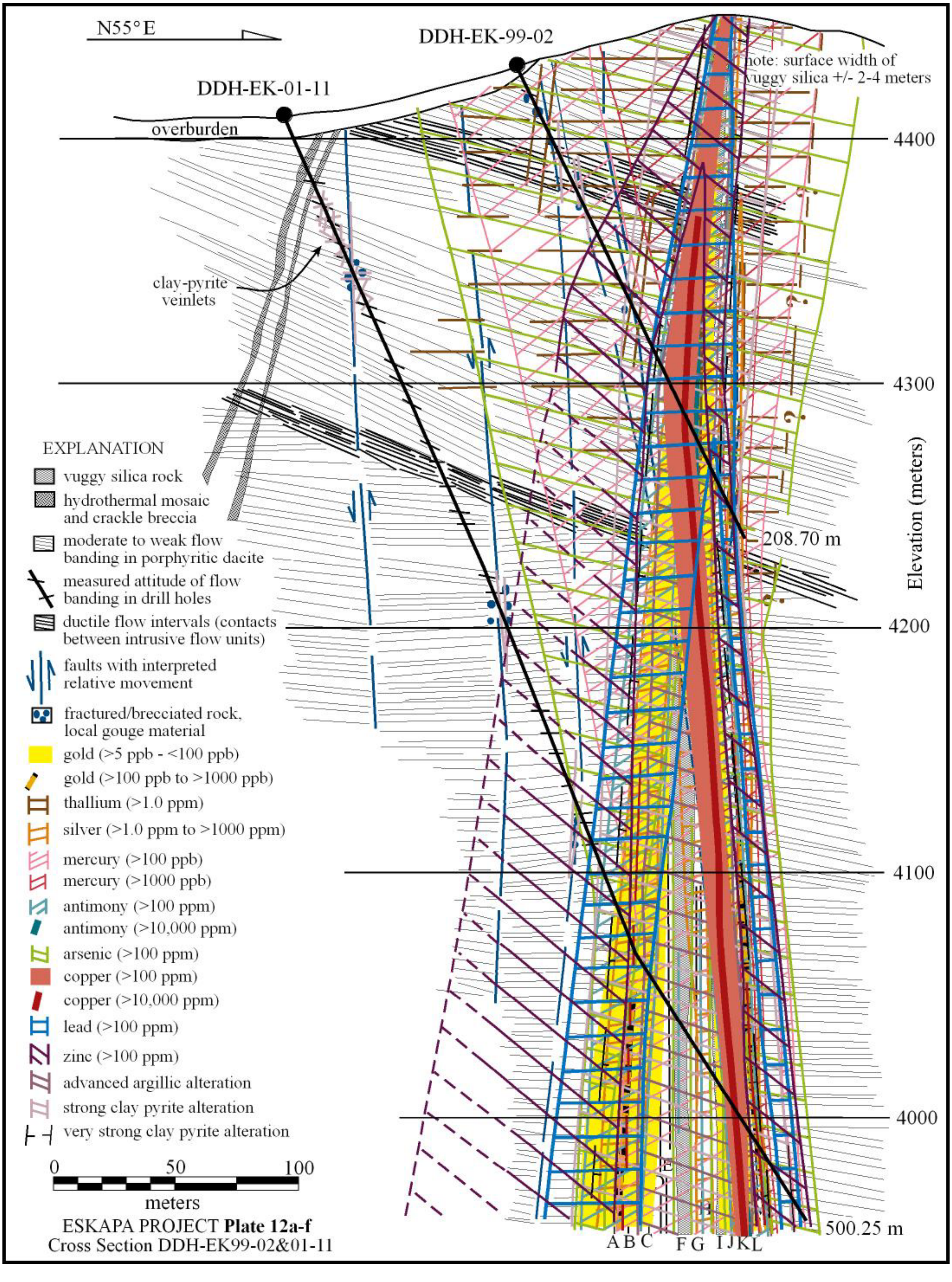


Plate 7. (mini) Mineralized Zones/Targets and Location of Proposed Drill Holes
Eroded Stratovolcano Core Zone



ESKAPA PROJECT **Plate 12a-f**
Cross Section DDH-EK99-02&01-11

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused the report to be signed on its behalf by the undersigned, thereto duly authorized.

SAMEX MINING CORP. (Registrant)

By: *"Larry D. McLean"*

Larry D. McLean, Vice President
Operations