PIEDRAS VERDES Cu-Zn SKARN DISTRICT, CHIHUAHUA, MEXICO

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Prepared for:

Dia Bras Exploration & Dia Bras Mexicana

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EXECUTIVE SUMMARY

The Piedras Verdes Skarn District lies along the northeastern/eastern contact of the Piedras Verdes Stock, an outlier of the Coastal Batholith of northern Mexico, and impure calcareous sediments of Cretaceous age. The mineralized skarn is continuous over at least 3 Km, from the Bolivar mine, at the north, to El Val, and open further to the southeast. This same zone is overprinted by epithermal gold silver mineralization of presumably mid-Tertiary or younger age, represented by the Cieneguita and El Sauzal mines. Except for cursory examination of the gold mineralization, my study was oriented to the earlier skarn deposits. These deposits belong to the Cu-Zn skarn class of ore deposits (Meinert, 2005)

A large contact metamorphic aureole formed by the intrusion of the Laramide Piedras Verdes granodiorite into the calcareous fine-grained clastic sediments and overlying andesitic volcanic rocks of early-Tertiary age (?). The sedimentary rocks were converted to calc-silicate hornfels and the lower andesite beds were converted to black (pyroxene?) hornfels, whereas limestone and dolostone beds were converted to marble. Except for marble, these rocks were dense and non-reactive and unfavorable as mineralization hosts.

Metasomatic replacement skarn alteration converted marble to garnet-pyroxene+/-magnetite skarn along structures such as the Fernandez, Rosario-Rodolfo and Breccia Linda trends (R. Banda, Pers. Comm., 2006). Later hydrothermal solutions followed these same structural conduits and deposited sphalerite and chalcopyrite in either skarn or marble as replacement “bolsadas”. Dia Bras is currently producing 300 T/D from these moderate-size replacement deposits of very high grade Zn and Cu.

Keys to maintaining and increasing that production involve aggressive drilling and underground development with the knowledge and experience of R. Banda, who has worked many years at Bolivar. Two drills are currently working in the mine area.

Dia Bras is implementing a second strategy under direction of Exploration Manager Jacques Marchand, to develop and drill test extensions of the Bolivar deposit, looking for new high-grade ore. This program is already meeting with success in the Bolivar Sur - El Gallo area, and the idea is to transfer management of these areas to Banda for ore definition and mine planning.

A third strategy involves exploring new, potential skarn environments that are either peripheral to drilling and/or covered by volcanic rocks or inert calc-silicate hornfels. This work emphasizes mapping and rock sampling to develop drill targets. I am encouraged by my observations, and perceive that ore environments continue at least to the El Val area, under the hornfels and extending to the northeast below the lower andesite and perhaps upper rhyolite volcanic packages.

Robyn (Pers. Comm., 2006) and Meinert (2005) have noted that porphyry copper systems often accompany skarn Cu-Zn deposits. Part of my work was to assess this potential, and although it’s premature to say much, I noted that the Val area looks promising with: 1)

intense skarn development, 2) presence of a NE-trending felsite dike swarm, 3) strong fracturing and 4) presence of a quartz porphyry dike.

RECOMMENDATIONS

My recommendation for Dia Bras is to continue with what has become a successful strategy, but with the following considerations (note, although these recommendations are mine, they are substantially in sync with those of Meinert (2005):

1) More useful data should be gleaned from the core. On a fast moving program, it is important to coordinate well between geologists and the data collected. This becomes increasingly important with the use of young geologists and changes in the geological staff. Someone with skarn experience should guide this process.
2) I believe that careful evaluation of the sedimentary rock package by an experienced geologist will permit identification of marker beds and creation of a stratigraphic section, which will permit estimates of depth to ore-host strata.
3) Mapping, sampling and interpretation should be pushed out in front of drilling to help guide the positioning and orientation of drill holes.
4) Detailed study should be oriented to defining igneous species, their timing and relation to ore deposition. At present we have the equigranular granodiorite of the PV stock (believed to be related in time and genesis to ore formation), felsite dikes and apophyses (with unknown ore association) and andesite (believed to be post-mineral in age). Particular care should be given to identify late-granodiorite porphyry phases that may be closely related to skarn and possibly porphyry copper mineralization.
5) Drilling is one of Dia Bras' successes, but with the company owning and running 3-4 drills in the Bolivar area, it's important that geology leads the drilling rather than vice versa.

ACKNOWLEDGEMENTS

Some key points characterize my visit and views of the Bolivar mine area. Dia Bras breaks one of my general views of the junior mining business, which is that there are good exploration companies who are not miners and some good exploitation companies who tend to fail as explorers, but very few that can do both well. Dia Bras is the exception in that they bring excellence to both exploration and exploitation.

Professionalism, an environment of cooperation and optimism, and the spirit of getting a job done and done well characterize the atmosphere of the Dia Bras camp at Cieneguita. I would like to extend my thanks to Tom Robyn, André St-Michel, Roberto Banda, Jacques Marchand, Hector Gonzales, Jocelyn Pelletier, and Jorge Hinostroza whose input greatly assisted my visit.

INTRODUCTION

As required by Canadian stock market regulations, Dia Bras Exploration and Dia Bras Mexicana have my permission to use this report and all associated figures and photos for their purposes and release to the public as they may choose.

I was invited to make a quick overview perusal of the exploration potential of the Piedras Verdes District with particular emphasis on the porphyry copper potential. I spent five days on the site (November 4-8, 2006) as follows:

Nov. 4. Flew to Cieneguita. Orientation with Roberto Banda. Afternoon field visit to Puerto Piedras Verdes area with Hector Gonzales to view felsic intrusions, upper agglomerate facies of the Lower Volcanic Series (andesite) zone of 3 g/T Au in andesite and structure near the contact of ignimbrite/andesite.

Nov. 5. Morning with R. Banda visit to Cieneguita gold mine and underground tour of level 6 and 7 of the Bolivar mine. Afternoon: log of DDH DIA-177-06 (El Gallo area) with Jacques Marchand and group.
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Nov. 6. Field tour of the Central Zone (El Gallo to El Val, with J. Marchand, Hector, Josh and Teo.

Nov. 7. Field tour of Bolivar Sur (magnetite zone), Piedras Verdes stock and checks of the Upper/Lower volcanics contact north of La Increible to Piedras Verdes with Oscar Gonzales and Josh.

Nov. 8. Field tour of the Aliso gold-silver vein zone, located south of El Val with Hector, Teo and Josh. Quick review of cores from La Increible area. Drafted diagrammatic cross section of El Val area.

MINING HISTORY

Skarn mines and workings occur almost continuously along a NW/SE trending zone of outcropping mineralization with a minimum 3Km strike length. From NW to SE, they are the Bolivar mine (divided into Bolivar NW with 0.5 MT @ 1% Cu/1% Zn; Bolivar, with three high-grade trends termed Fernandez, Rosario-Rodolfo and Breccia Linda; and Bolivar Sur, with indicated resources of magnetite-Cu), El Gallo, where drilling is presently in progress, La Increible, with Cu-Zn hosted by highly fractured and brecciated andesitic volcanic rocks (currently being drilled), La Montura, which has a couple drill holes and Area Central, La Pequeña, Arizona and El Val/Aliso. Except for Bolivar, where mining and drilling has been most extensive, these mines follow the outcrop trend of favorable beds above and NE of the Piedras Verdes Granodiorite. The zone is open to the southeast of El Val, where the potential is described as “little explored” (pers. comm., R. Banda).

My impression is that the Piedras Verdes region has only recently received serious attention and many projects in the region are being explored by Dia Bras and other junior and senior mining companies.

GEOLOGICAL SETTING

The Piedras Verdes Skarn District occurs along and is controlled by the northeast and east contact of the Piedras Verdes Granodiorite with Cretaceous calcareous siltstones. The Cretaceous sedimentary rocks are unconformably overlain by Lower Tertiary andesitic flows and agglomerates (Lower Series), which in turn are unconformably overlain by tuffs of Mid- to Upper Tertiary age (Upper Series). Because the beds dip to the northeast and topography climbs to the northeast, the mineralized horizons of skarn crop out as a sinuous northwest trend. But, this trend does not appear to reflect a NW structural control of mineralization and structural controls may take NE or E-W trend as we see in the Bolivar mine, where exploration extends a greater distance from the granodiorite contact. This permissive northeastward extension of favorable geology is the productive environment for exploration.

GEOLOGY

I have reviewed reports by Meinert (April, July and December 2005) and generally concur with his interpretations and recommendations, yet mine may vary somewhat in detail, emphasis or recommendation. Rather than repeat that which has been amply described by Meinert, I will choose some areas for emphasis.

Host Rocks (measurements are based on Hole DIA-177-06)

The Cretaceous sedimentary rock protolith was dominantly a calcareous siltstone, exhibiting abundant shallow-water sedimentary structures such as worm burrows and wavy stratification, etc. This lithology was converted to fine-grained, dense calc-silicate hornfels with the preservation of the sedimentary structures. The hornfels was dense and impermeable, hence it resisted later invasion by hydrothermal solutions. This protolith is dominant for the upper 133 meters.

About 133 meters below the andesite contact in hole DIA-177-06 (for a width of about 13.5 m) occurs a laterally persistent bed that was altered to magnetite-chalcopyrite skarn. Meinert (2005) suggests that the protolith of this bed was dolomitic, as dolomite produces magnetite skarns. The bed crops out at Bolivar Sur (Fig. 1) and is observed in all the drill holes in this area. The grade averages about 20-30% Fe and 1% Cu. The base of this bed occurs 17 m above the granodiorite contact in hole 177.

Between 40-100 meters below the unconformity, DDH 177 cut a couple beds of coarse-grained garnet skarn interpreted to be products of metasomatism of limestone beds. Similarly, at Bolivar Level 6, outcrops of strongly mineralized skarn overlie calc-silicate hornfels (Fig. 2) and exhibit replacement front with white marble (Fig. 3). These skarn beds are metasomatic products of original limestone and form the hosts of high-grade Cu-

Zn ore at the Bolivar mine. Their coarse granularity and high permeability coupled with the presence of calcite and adjacent marble made these beds favorable for metal deposition from low-pH chloride-rich hydrothermal solutions.

Underground at Bolivar, two types of replacement ore are observed. Skarn replacement ore occurs as early skarn alteration of marble followed by deposition of chalcopyrite and sphalerite. The skarn forms as a replacement front against marble (Figs. 3 and 4). Sphalerite-chalcopyrite replacement bodies, characterized by semi-massive sulfide and a paucity of calc-silicate minerals occur near the skarn bodies (Figs 5 and 6). These two deposit types also occur at the giant Antamina skarn deposit in Peru, except there is more separation of the more proximal Zn-Cu skarn and distal replacement Zn-Pb-Ag deposits.

The depths, thicknesses and interpretations given above are general and affected by the fact that the upper contact with andesite is erosional, the lower contact with granodiorite is intrusive, and the descriptions are general and without assays or other back-up data. I present this as an example of the type of data that the geologists should obtain during core logging.

Zoning

Dr. Meinert and others note that typical zoning for Cu-Zn skarns is higher Zn:Cu, change in garnet color from red to green, increasing pyroxene/amphibole:garnet and change from skarn replacement to limestone replacement are peripheral indicators of the skarn environment. These features are all present at Bolivar, but appear in close proximity and lack systematic change or predictability (Banda, pers. comm.).

I expect that higher Zn would be distal to higher Cu, and the replacement deposits would occur distal to and probably later than the skarn bodies. I suspect that the reason that zoning has not been observed at Bolivar relates to the small and pod-like form of the deposits and telescoping of one deposit type over another, such that zoning does not provide a useful guide. Still, it may be useful to look at gross production or widespread data points (such as DDHs) to show a zonation that might help guide exploration.

Igneous Contact

Near the Bolivar mine, the igneous contact with sedimentary rocks is steep and cross-cutting. At Bolivar Sur, the contact appears to be nearly conformable, but it cuts the sedimentary bedding in detail. Interpretations from drill data from the El Gallo and Central Area show a relatively flat contact of intrusion sub-conformable to the bedding (Marchand, Pers. Comm., 2006). This sub-conformable contact puts the granodiorite contact at reasonable depths projected to the northeast of mapped contact. Further southeast in the El Val area, the basically conformable nature of the contact of the Piedras Verdes stock with sedimentary rocks is apparent in Figure 7. The shallow NE dipping igneous contact is also apparent in photos of the El Gallo area (Fig. 8).

The near conformable contact of granodiorite with Cretaceous sediments bodes well for exploration northeast of the stock. Figures 9 and 10 show the positive implication of this contact interpretation as compared with an earlier interpretation (Fig. 11).

Igneous Species

Meinert (2005) recommends a study of the igneous systematics of the Piedras Verdes district with radiometric age dating. I agree with this recommendation and add the application of petrographic study and good visual descriptions done during mapping and logging of igneous rock types and their temporal relation to each other and mineralization/alteration.

The objective is to define a late, more differentiated phase of the granodiorite. In other skarn districts (e.g., Tintaya, Peru; Las Bambas, Peru; Duquesne, Ariz.; Santa Rita, New Mexico, etc) skarn and porphyry style mineralization are spatially and genetically related to the later, more porphyritic phase of batholiths. This correlation may apply to the Piedras Verdes district and should certainly be looked for.

Structure

Structure is probably the best guide to explore for blind ore deposits, but perhaps the most difficult to identify. Structural trends, such as the Fernandez (ENE), Rosario-Rodolfo (NNE) and Breccia Linda (ENE) have been useful guides to discover new ore bodies (Banda, Pers. Comm.). But, these structures are difficult to define except in areas of extensive workings or drilling.

La Increible Breccia is clearly a structural deposit, but the structure is not yet well defined as witnessed by the difficulty in locating the breccia at depth. At surface, the breccia appears to be a crackle/mosaic breccia zone preparing andesite host rocks for Cu-Zn mineralization (Fig. 12). The crackle breccia is probably caused by intersecting faults, with N70E being the main fracture direction (Fig. 13). The intense fracturing here has provided a plumbing system for metal transport through the more reactive sedimentary rock package below into the andesite. Understanding this structure and its attitude should yield an attractive drill target in the reactive beds below the andesite.

Structure is important in the El Val mine area and to the east. NNW structures control a swarm of felsite dikes in the El Val area (Fig. 7). Further to the northeast, the rock is intensely fractured and cut by a dike of quartz porphyry.

A fault has been hypothesized to form the contact between Upper Series and Lower Series volcanic rocks. We did not see evidence in the field for this fault, but a major fault would influence exploration. This fault is shown Figure 11 cross sections and I recommend that a few holes be drilled to test if this fault does exist and if it does, what is the displacement.

Timing

With the absence of radiometric age dates, interpreted ages are related to regional interpretations and geological relationships.

The Piedras Verdes granodiorite is widely interpreted as late Cretaceous (Laramide) in age. The calcareous sedimentary rocks are clearly older and probably of lower to middle Cretaceous age. The Lower Series Andesite sits unconformably on the sedimentary rocks and is probably nearly contemporaneous in age to emplacement of the granodiorite. It is altered and mineralized in the La Increible area and clearly pre-mineralization in age. A best guess for the age of andesite is early Tertiary.

An erosional unconformity separates the Upper Series tuffs from the Lower Series andesite. Neither Cu-Zn mineralization nor skarn alteration is known in the tuffs, but epithermal gold mineralization is present. The tuff sequence is interpreted as post-skarn mineralization, pre-northeast regional tilting and probably mid-Tertiary in age.

El Val / Aliseo Area

The El Val area lies at the SE limit of the area visited, with Aliseo situated SW and below the El Val skarn prospects. Only parts of two days were spent in the El Val and Aliseo areas, so it is premature to make conclusions, but the area seems to have some special aspects that deserve more detailed study:

1) The skarn development appears to be intense with strong copper stain in the El Val area (Fig 14).
2) The El Val skarn is cut by a swarm of NNW striking felsite dikes (Fig 7).
3) Teo reports high-grade Cu, low Zn with about 7 g/T Au from the lower Val working.
4) NE of El Val, near the end of a drill road, the rock exhibits strong N-S fracturing and crackle brecciation and bleaching of the rock (probably andesite).
5) An altered dike (?) of feldspar-quartz porphyry crops out along the east side of the drill access road.
6) Granodiorite of the Piedras Verdes stock forms the country rock at Aliseo. It is cut by NE striking crustified epithermal quartz veins grading 1-30 g/T gold with silver at numerous locations, many of which have been worked informally (Fig. 15.

These observations taken collectively are encouraging indications for a porphyry copper system, but stockwork quartz veining and phyllic alteration were not noted. Detailed field work is recommended for this area.

Puerto Piedras Verdes Area

The upper part of the Lower Series andesite is an andesite agglomerate, which has been variously called conglomerate or agglomerate. It is monolithologic, composed of rounded pebbles and boulders of andesite in an andesitic groundmass. The facies is probably a debris flow or lahar unit, and may not be widespread, but at Cieneguita mine and Puerto Piedras Verdes area it is cut by NNW striking felsite dikes and contains gold in the plus ppm range (Fig. 15 and 16). I examined an outcrop reported to contain 3 g/T Au (Gonzales, Pers. Comm., 2006) and the only indication of mineralization was a red surface stain, but Silicification appears to be absent. Locally the felsite dikes are intensely fractured and altered. This area deserves detailed mapping and sampling to determine the geological relationships and if the gold is potentially exploitable.

Mapping/Drilling/Logging

Dia Bras has mobilized four company diamond drill rigs into the Piedras Verdes district, with two each dedicated to the mine area and exploration. Dia Bras has found that they can operate in-house more efficiently than using contract drilling firms, especially in these times of high demand. I was impressed by the quality of drilling by Dia Bras crews, and you do not want to change success, but this strategy presents challenges.

The important issue is to have sufficient capability to conduct mapping/sampling/ compilation and planning well in advance of drilling and with four rigs operating efficiently this demands experienced people. The other side is to log, sample and interpret drill results so as not to lose important data. The geology staff, at the time of my visit was stretched thin, but the company was in the process of looking for experienced geologists.

I recommend consideration of the following exploration strategy:

1) Begin mapping/sampling programs in front of drill programs so as to have the data plotted and interpreted to guide exploration drilling. Mapping variables should include protolith, metamorphism type, metasomatism type, ground preparation, hydrothermal alteration, veining and intrusion relationships.
2) Conduct exploration drilling programs in campaigns, with pauses of sufficient time to compile results and design the next program. This procedure requires either cessation of drilling or transfer of rigs and drillers to another program. With Cusi nearby, perhaps the drills could be transferred to this project for a while and vice versa.
3) Re-design the drill logs to put essential data in columns for quantitative estimation. Such data would include columns for sphalerite, chalcopyrite, pyrite, magnetite, garnet, diopside, wollastonite, protolith, alteration type (e.g., calc-silicate hornfels, biotite hornfels, prograde skarn, hydrothermal alteration type etc. I suggest that the log form has three graphic columns showing protolith lithology, alteration and mineralization. Sheet size of 11” X 17” would be ideal on good stock paper.

4) I recommend a training and mentoring program for existing and new geologists so that each is interpreting data the same.
5) I recommend that an experienced geologist put together a protolith stratigraphic column to guide exploration drilling.

CONCLUSIONS

The Piedras Verdes district is finally getting the exploration attention that it deserves. Dia Bras is already reaping success at the mine and I see excellent potential to achieve success in exploration for new ore zones. I have made various recommendations, as has Meinert (2005), basically designed to maximize the information gained from drilling and mapping to add to the understanding of this emerging district.

But, the basic strategy being implemented by Dia Bras of developing the mine and exploration potential concurrently appears correct to me. The benefit of using cash flow to fund exploration and the application of mine data directly into the exploration program are strong positives. And the incentive for exploration to advance and pass projects to operations is a great positive for the mine.

REFERENCES

Meinert, L.D, April, 2005, Observations on the Bolivar District; Unpublished Report Submitted to Dia Bras Exploration; 12p.

Meinert, L.D., July 2005, Skarn Mineralogy in the Bolivar District; Unpublished Report Submitted to Dia Bras Exploration; 6p.

Meinert, L.D., December 2005, New Observations on the Bolivar District; Unpublished Report Submitted to Dia Bras Exploration; 12p.

FIGURES

Figure 1. Prospect at Bolivar Sur of cupriferous magnetite skarn exposed in a small anticline about ten meters above the Tgd contact.

Figure 2. Bolivar Level 6 portal area, looking NNW at bedded calc-silicate hornfels lying below metasomatic garnet skarn, cut by a thin sill and dike of felsite. Note green Cuox stain coating the skarn.

Figure 3. Portal area of Bolivar 6 Level, looking south showing garnet skarn (brown) replacement front invading white marble (below). Strong Cuox coats the skarn.

Figure 4. Contact of cupriferous garnet skarn front (upper left corner) against white marble with islands of garnet occurring within the marble.

Figure 5. Underground photo from the Titanic area, level 7 Bolivar mine, showing replacement tongues of sphalerite-chalcopyrite (rt) invading white marble. The Pod in upper center of photo is coarse calcite.

Figure 6. Closeup of replacement Zn-Cu invading white marble, Titanic area, Bolivar mine.

Figure 7. NE View toward El Val area, showing Tgd, dipping NE below the Cretaceous sedimentary rocks that host skarn Cu-Zn deposits. This permissive environment for skarn deposits extends below the metasedimentary rocks to the NE.

Figure 8. Granodiorite contact with Cretaceous sedimentary rocks occurs at the point of origination of the water falls in lower left central part of the photo. Note green Cuox staining of skarn beds above the contact and presence of drill roads crossing the surface.

Figure 9. Diagrammatic cross section drawn through La Increible Breccia area showing prospective terrain and proposed DDHs

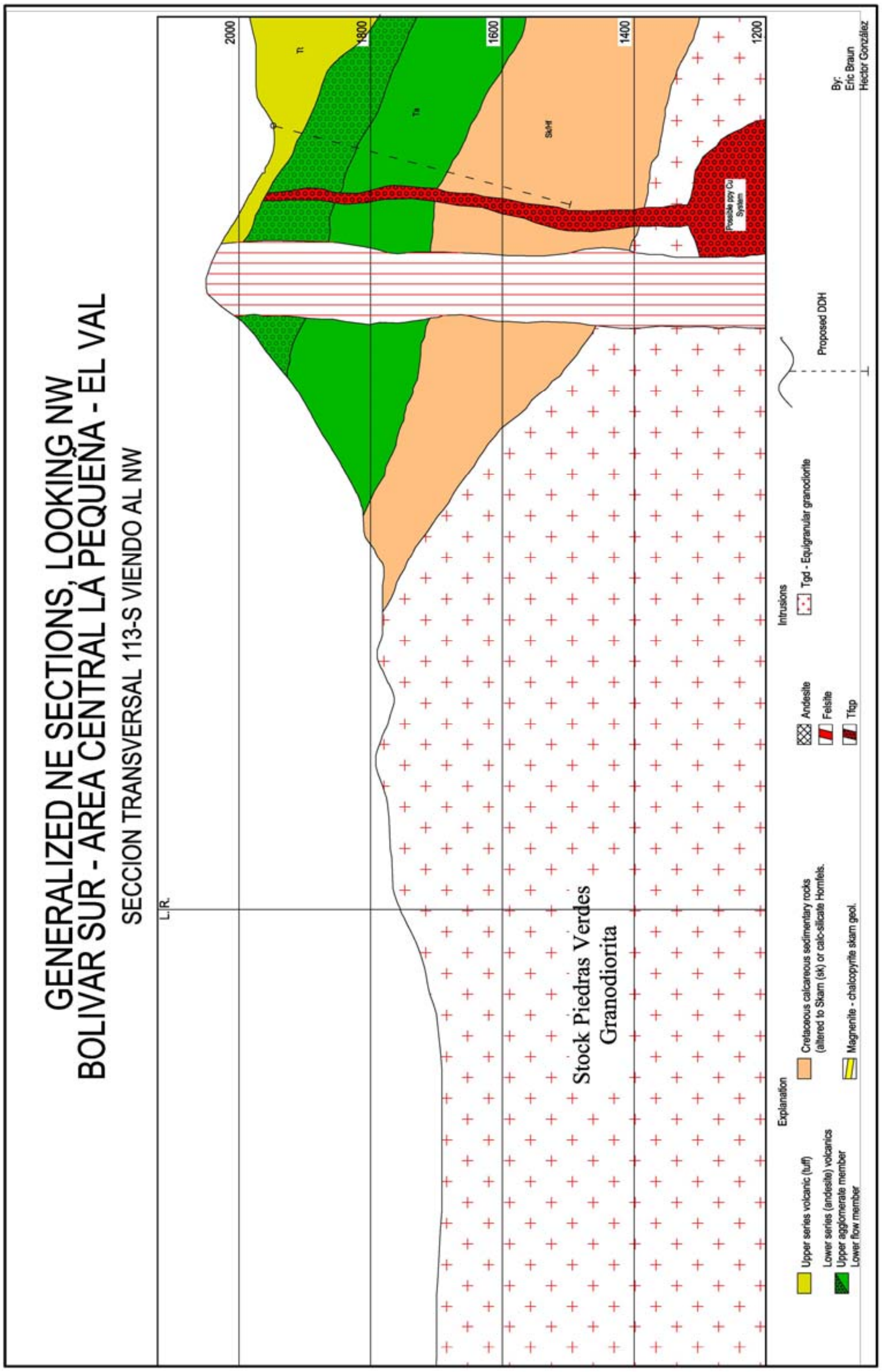

Figure 10. Diagrammatic cross section, looking NW through the Area Central, El Val area showing the prospective exploration terrain in the El Val area and proposed DDH.

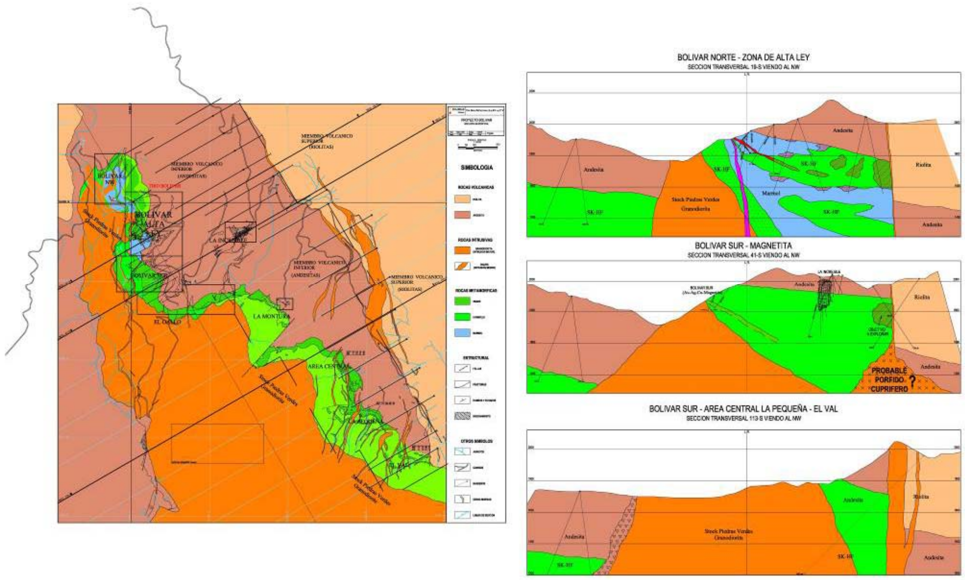

Figure 11. Alternative hypothesis for the intrusive contact with the Cretaceous sedimentary rock package and fault contact of Trt (Upper Series Volcanics) with Lower Series Volcanics. Note: The lower two sections correspond with Figs. 9 and 10 where the intrusive contact is interpreted as conformable and the contact of Upper/Lower Volcanics is interpreted to be normal. The interpretation of Figs 9 and 10 enlarge the zone of ore-permissive geology significantly.

Figure 12. La Increible mine workings exposing the La Increible crackle and mosaic breccia with coarse crystalline quartz filling voids. Fault plane over Hector’s head is N54E, 29SE. Other structures are E-W, N60E and N20W.

Figure 13. La Increible crackle breccia, looking S70W along main fracture direction cutting andesite. Coarse crystalline quartz fills voids. Alteration is silica-epidote-chlorite, with strong limonite and Cuox staining.

Figure 14. Exploration geologists of the Bolivar District with Exploration Manager Jacques Marchand (with long-handled rock pick) at Prospect Pequeño, located on NW flank of El Val area. Note the strongly mineralized skarn beds dipping about 25 degrees NE.

Figure 15. Geologist Hector Gonzales standing at the contact of a NNW striking, dike of felsite, cutting the upper agglomerate facies of the Lower Series andesite.

Figure 16. View of the upper agglomerate facies andesite reportedly containing 3 g/T gold. The only indication of high gold here is a weak reddish Feox stain. This area deserves more study.