
Prepared for
Mega Capital Investments Inc.

November 19, 2002
9355.00c
The Geology and Exploration Potential of the Guigui Silver, Lead, Zinc Project
Santa Eulalia District, Chihuahua, Mexico
Technical Report

Prepared for
Mega Capital Investments, Inc.

November 19, 2002
9355.00c

Prepared by
Pincock, Allen & Holt

Clancy J. Wendt, P.G.
Principal Geologist
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1.0 EXECUTIVE SUMMARY

The Santa Eulalia Mining District is the largest of a number of important Ag-Pb-Zn-Cu-Au Carbonate Replacement Deposits that occur along the intersection of the Laramide-aged Mexican Thrust Belt and the Tertiary volcanic plateau of the Sierra Madre Occidental (Megaw and others, 1988). Santa Eulalia and comparable districts form a spectrum ranging from stock contact skarns, through dike and sill contact skarns, and massive sulfides, to massive sulfide chimneys and mantos (Megaw and others, 1988). The entire spectrum may be manifested on a district scale in highly elongated systems, or a significant portion of the spectrum may be displayed by single orebodies in highly telescoped systems (Ruiz and Barton, 1985; Megaw and others, 1988). Santa Eulalia is a highly elongated system in which the distal (mantos to dike and sill contact skarns) parts of the spectrum have been encountered and exploited. The proximal, stock-related portions of the spectrum have never been found, and exploration for them is the basis for the exploration at Guigui. Given the importance of the distal mineralization, it is not unreasonable to infer similarly important proximal mineralization.

The East and West Camps of the Santa Eulalia District contain continuous, zoned mineralization and alteration concentrated on the east and west flanks of a southerly-plunging anticline. Mineralization in both camps occurs in the same stratigraphic interval in close temporal and spatial relationship to distinctive felsite sills and dikes. Although the mineralization in the two camps does not overlap in space, both appear to have resulted from the evolution of persistent, pulsating, hydrothermal systems. West Camp mineralization is characterized by highly elongate (up to 4 km long) mantos and chimneys dominantly composed of massive Ag-Pb-Zn-Fe sulfides. These are clearly related in time and space to a series of felsite sills that thicken and coalesce to the southeast. Only in the deepest, most proximal southeastern part of the West Camp has any garnet skarn been encountered. In contrast, East Camp mineralization is dominated by tabular mineralized garnet-pyroxene skarn chimneys developed along the margins of a series of felsite dikes. The skarn chimneys combine to form a composite skarn orebody up to 1,000 meters high and 2,000 meters long flanked by peripheral massive sulfide pods and mantos. However, despite the sharp differences in mineralization style and gangue mineralogy, the sulfide mineralogy, temperatures of formation, fluid salinities, and sulfur isotopic characteristics of the two camps are virtually identical, indicating that these are different manifestations of the same hydrothermal system. The morphology of the ore-related felsites of both camps, coupled with mineralogical, metals content, metal ratios, sulfur isotope, and mineralization style, strongly indicates a common hydrothermal source. This source appears to lie between the two camps, immediately north of the Santo Domingo Caldera in the Guigui Claim area (Megaw, 1990).

Exploration efforts to test these concepts have included reconnaissance and detailed geologic and alteration mapping, geochemical sampling, and Gravity, Magnetics and Audio Magnetotellurics (CSAMT and NSAMT) surveys. This work indicates that the inferred intrusive center lies concealed under altered pre-mineral volcanic cover within the Guigui Claims. Host limestones crop out sparsely in this area and geophysics indicates that the volcanic cover is less than 200 meters thick.
so depth to consistent favorable host rocks is not prohibitive. The volcaniclastic rocks are pervasively argillically altered in the target area and are locally cut by structures with anomalous metals values, indicating an underlying hydrothermal center. The geophysical data for the area show strong conductive anomalies within limestone at 300 to 500 meter depth and their geometry strongly resembles Megaw’s (1990) district geologic model showing an intrusion surrounded by mineralized skarn.

These geologic and geophysical results were the basis for permitting a 6-12 hole-drilling program in 1998. However, a combination of changing objectives for Coralillo’s, a subsidiary of Minera Cascabel, corporate partners, and a poor exploration market in the late 1990s left these targets untested. These drill targets still merit drilling and the drilling permits remain valid. However, a significant additional area (>400 hectares in the Guigui 2, 3 and 4 Claims) has been recently added to the claim package and it is recommended to advance the newly acquired ground to the same level of knowledge as Guigui prior to drilling. This should include detailed geologic outcrop mapping with particular attention to the areas between Guigui and the known West Camp mining areas and the approximately 1 km long portion of the San Antonio Graben that lies within Guigui 2. This mapping should be accompanied by geochemical sampling of all mineralized and altered outcrops. Additional NSAM T and/or CSAM T geophysical lines should be run over targets identified by the above geologic mapping and consideration should be given to geophysically refining the previously identified targets within Guigui prior to drilling.

Following the above considerations, it is recommended that a first exploration phase focus on mapping, sampling and geophysics in the Guigui 2, 3 and 4 claims and adjoining portions of Guigui. This should take 6 to 8 months and cost an estimated C$281,250.

Combining the existing targets within the original Guigui area with anticipated new targets within Guigui 2, 3, and 4 will justify 4,250 meters of drilling at an estimated cost of C$1,098,250. Drilling can commence at any time within Guigui, but minor permit expansion and refiling will be necessary for Guigui 2, 3, and 4. Roadwork and environmental remediation are included in the estimate.

Consideration should be given to reducing drilling costs by collaring the drill holes with reverse circulation to the base of the volcanic capping (200 to 250 meters), the capacity of the equipment (about 300 meters), or any point where mineralization is encountered. Diamond core drilling should proceed from here to maximize geologic information. Down-hole geophysics should also be planned.
2.0 INTRODUCTION AND TERMS OF REFERENCE

PAH visited the site on September 9, 2002 and completed a field and information review at the Minera Cascabel office in Chihuahua. The main objective is intended to summarize prior exploration results and propose a drilling program for the Guigui Claim Group, Santa Eulalia District, Chihuahua, Mexico optioned by Mega Capital Investments from Minera Coralillo S.A. de C.V. of Hermosillo, Sonora, Mexico. The principals of Minera Cascabel S.A. de C.V. of Hermosillo, Sonora, and Chihuahua, Chihuahua, Mexico own Minera Coralillo S.A. de C.V. Details of the exploration option-to-purchase agreement are on file with the TSXV.

2.1 Terms and Definitions

COR refers to Minera Coralillo S.A. de C.V., MCII refers to Mega Capital Investments Inc., PAH refers to Pincock Allen and Holt, Guigui refers to the carbonate replacement high grade silver project located near Chihuahua, Mexico, Lagartos refers to Minera Lagartos S.A. de C.V., m refers to meters, mm refers to millimeters, km means kilometers, C refers to Centigrade, TSXV is the Toronto Stock Exchange Venture, CSAMT refers to Source Audio Magneto Tellurics, NSAMT refers to Natural Source Audio Magneto Tellurics, AMT refers to Audio Magneto Tellurics, K/Ar means Potassium/Argon, U/Pb is Uranium /Lead, cm is centimeter, mt is metric tons, CRD is Carbonate Replacement Deposit, AMOM stands for Argentiferous Manganese Oxide Mineralization and Fm is formation.

2.2 Geographic Orientation

The following geographic areas and features are briefly described for orientation with respect to the text and Figures 2 through 10.

The Santa Eulalia District is divided into two portions called the West and East Camps, based on a combination of geography, production, and style of mineralization (Figures 2 and 3). The West Camp lies on the western flank of the range. Grupo Mexico’s “Buena Tierra Mine” and MINAMEX’s “Potosi Mine” were the principal producers from the West Camp until its closure in the early 1990s. The East Camp lies on the eastern fringe of the range and is dominated by Grupo Mexico’s “San Antonio Mine.” The San Antonio Mine is currently on care and maintenance but has significant reserves. The 2.5 km wide intervening zone is known as the Middle Camp. The Middle Camp has numerous mineralized showings and small mines, but has not been systematically explored. The Guigui claims cover the entire area south of the East and West Camps and a significant portion of the southeastern Middle Camp.

2.3 Units

All units are in metric except where noted and all monetary values are in Canadian dollars (C$) unless otherwise stated.
3.0 DISCLAIMER

All information and the conclusions are based on the author’s knowledge and hands-on exploration of the Guigui Project. Where possible, historic data have been verified and only those previous data believed to be accurate have been included. Figures are from previous reports and have been modified to fit the present work. PAH has not reviewed the legal title of the land holdings of Mega Capital or the joint venture agreements.
4.0 PROPERTY DESCRIPTION AND LOCATION

The Guigui Project comprises four exploration and three exploitation claims covering 4,553 hectares between, and south of, the East and West Camps of the historic Santa Eulalia Mining District in central Chihuahua State (Figures 1 through 3) (Table 4-1). Minera Cascabel S.A. de C.V. originally filed the Guigui claim in 1992, with additional claims acquired subsequently. All the Guigui claims were transferred to Minera Cascabel affiliate, Minera Coralillo S.A. de C.V., in 2000. On August 1, 2002, Mega Capital Investments Inc. announced their purchase of 98 percent of Minera Lagartos S.A. de C.V., and on November 18, 2002 announced the execution of an exploration option-to-purchase agreement with Minera Coralillo S.A. de C.V. for their combined Guigui Properties.

TABLE 4-1
Mega Capital Investments, Inc.
Guigui Silver, Lead, Zinc Project
Concession Summary

<table>
<thead>
<tr>
<th>Claim Name</th>
<th>Conc. Type</th>
<th>Application Number</th>
<th>Title Number</th>
<th>Issue Date</th>
<th>Expiration Date</th>
<th>Size In Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINERA CORALILLO, S.A. DE C.V.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GUIGUI</td>
<td>X</td>
<td>16/ 1-1.3/938</td>
<td>217493</td>
<td>16-Jul-2002</td>
<td>15-Jul-2052</td>
<td>4,009.03</td>
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<tr>
<td>EL FAISAN</td>
<td>X</td>
<td>16/ 1-1.3/1182</td>
<td>214631</td>
<td>26-Oct-2001</td>
<td>25-Oct-2051</td>
<td>16.00</td>
</tr>
<tr>
<td>LOS ARENALES</td>
<td>X</td>
<td>16/ 1-1.3/ 1011</td>
<td>214622</td>
<td>26-Oct-2001</td>
<td>25-Oct-2051</td>
<td>18.00</td>
</tr>
<tr>
<td>GUIGUI 2</td>
<td>E</td>
<td>16/ 27991</td>
<td>Pending</td>
<td></td>
<td></td>
<td>489.13</td>
</tr>
<tr>
<td>GUIGUI 3 FRACTION 1</td>
<td>E</td>
<td>16/ 29944</td>
<td>Pending</td>
<td></td>
<td></td>
<td>17.02</td>
</tr>
<tr>
<td>GUIGUI 3 FRACTION 2</td>
<td>E</td>
<td>16/ 29944</td>
<td>Pending</td>
<td></td>
<td></td>
<td>1.52</td>
</tr>
<tr>
<td>GUIGUI 4</td>
<td>E</td>
<td>16/ 30320</td>
<td>Pending</td>
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<td>3.00</td>
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<tr>
<td><strong>TOTAL</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>4,553.70</strong></td>
</tr>
</tbody>
</table>

NOTE: X = Exploitation; E = Exploration.
The description of the mineral titles is not a legal opinion, but is based on written information provided by Minera Cascabel S.A. de C.V.

The claims are “exploration claims” and “exploitation claims” as defined by the Mexican Mining Law and cover 100 percent of the target area. There are no claims internal to Guigui held by other parties. Titles for Guigui 2, 3, and 4 are pending. The Minera Coralillo/Guigui claim group is current with respect to both tax and "comprobaciones de obra" (annual work expenditures required under Mexican Mining Law) to the end of 2002. A complex array of claims belonging to Grupo Mexico (IMMSA) and Minerales Nacionales de Mexico (MINAMEX) adjoin the Guigui group to the north, east and west.
Various private owners all of whom have granted written permission to explore and drill, hold surface ownership in the area. There are no obligations to the surface owners other than a verbal commitment to give each 3 to 4 hours of bulldozer time to repair their roads and stock tanks when the equipment is on site to prepare drill roads. There are no known cultural restrictions on exploration activity. The Moritos Ejido (Ejidos are communal farms where individuals have title to specific plots of land, but most land-use decisions must be made by the community as a whole) owns the surface rights over the southern fringes of Guigui, but no drilling is contemplated for this area initially.

The Guigui area has seen sporadic small-scale prospecting over several hundred years, but has seen no production except from two small fluorite mines: Los Arenales and La Ventura in the 1950s. Minera Cascabel S.A. de C.V. (affiliate of Minera Coralillo) has undertaken systematic exploration with a series of partners on the property since 1988. Exploration records for all phases of this work are complete and in Minera Lagartos’ possession.
5.0 ACCESS, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The Santa Eulalia Mining District lies in central Chihuahua, Mexico at latitude 28° 35' N, longitude 105° 50' W, about 360 km south of El Paso, Texas and 23 km east of Chihuahua City (Figure 1). The district occupies the approximate center of the north-northwest elongate, fault-bounded Sierra Santa Eulalia (also called Sierra Santo Domingo) whose peaks rise up to 700 meters above the surrounding plains. Maximum elevations exceed 2,200 meters and the numerous deep canyons carved into the limestone and volcanic rocks of the range create a very rugged topography. The Guigui claims lie immediately south of the historic mining area in a volcaniclastic rock-covered area of rolling hills flanked by tall peaks. The cacti, greasewood, and thorny plants typical of the Chihuahuan Desert comprise most of the sparse vegetation, except after summer rains when grasses and wildflowers flourish briefly. Temperatures average 25 °C and range from -5 °C to 40 °C. Precipitation averages 1,000 mm per year, with the bulk of it falling during the summer rainy season. Light dustings of snow happen every few years. There is no surface water, but water is abundant at depth and water rights for mine development should attach to the mineral rights.

Mexican Highway 15, connecting Chihuahua City to Mexico City, runs along the west side of the range, within about 4 km of the western side of the Guigui claim. A two-lane paved road cuts off Highway 15 and leads to the town of Santa Eulalia (also known as Aquiles Serdan). Good quality paved and hard surfaced roads lead north and east from Santa Eulalia to the Buena Tierra, Potosi, and San Antonio mines, or south into Guigui. Guigui is crossed by a series of well-maintained ranch roads. Population centers in the area include the town of Santa Eulalia, on the western flank of the range; Santo Domingo (a.k.a. Francisco Portillo), surrounding the installations of the Potosi and Buena Tierra Mines, and San Antonio, a miners' community adjoining the San Antonio Mine. The remainder of the range is sparsely populated with isolated ranches.

Chihuahua City, the largest population center in the region lies immediately west of the district. Chihuahua City has a population of over 1,500,000 and is a major industrial and mining center. Professional, technical and manual labor is readily available. Chihuahua International Airport receives numerous daily flights from the USA and Mexico. Driving time from Chihuahua International Airport to the entrance to Guigui is about 25 minutes. ALS-Chemex Laboratories operate a drop facility in Chihuahua, from which they drive or fly samples to Hermosillo for preparation. Samples are then flown to Vancouver for analysis.
6.0 HISTORY

Santa Eulalia has been in continuous production for nearly 300 years (1703-2001) and ranks as one of Mexico's chief silver and base metal producers. The City of Chihuahua was built by Spanish pioneers on the riches emanating from Santa Eulalia over the first 100 years of mining.

District production, as determined from all available official records, has been 44.5 million metric tons (mt) of ore yielding 420 million troy ounces of silver, 2,989 thousand mt of lead, 2,288 thousand mt of zinc, 22,000 mt of copper, 4,000 mt of tin, 700 mt of vanadium, and one mt of gold (De La Fuente, 1969 updated to 2000). This translates to an average grade of 310g/mt Ag (10 troy ounces), 8.2 percent Pb, and 7.1 percent Zn. In the East Camp, tin grades locally reached 1.5 percent and copper averages 0.3 percent. About 30 percent of the district's total production came from the East Camp where approximately 10 million mt of ore reserves grading 112 g/mt silver; 2.7 percent lead; and 8.1 percent zinc are presently known in the San Antonio Mine.

Direct heading and underground diamond drilling have historically dominated district exploration. Since 1970, Grupo Mexico has undertaken a series of surface-based exploration campaigns throughout their holdings in the district. Their exploration south of the San Antonio mine has included drilling within a few hundred meters of the Guigui boundary.

There appears to have been little work done in the Guigui area prior to 1986, except for minor prospecting by unknown individuals.

The concepts for exploration in Guigui arose from Peter Megaw's (1990) doctoral studies in the district. This work included a regional study of the characteristics of localization of Santa Eulalia and related deposits (Titley and Megaw, 1985; Megaw and others, 1988), detailed underground and surface mapping, and zoning and geochemical studies (Megaw, 1990). This work resulted in a geologic model indicating that the probable intrusive center related to district mineralization lay concealed under volcanic cover adjacent to the historic mining centers. If emplaced into limestone, this intrusion could be the center of substantial additional stock contact mineralization of the style seen in deposits such as San Martin, Zacatecas (Rubin and Kyle, 1988). Ten years of subsequent exploration efforts focused on gaining geologic and geophysical data to locate this target (Table 6-1). A combination of changing objectives for Cascabel/Coralillo’s corporate partners and a poor exploration market in the late 1990s have left the defined drill targets untested. However, drill permits remain valid and a significant additional area has been added to the claim package.

Work completed between 1991 and 2002 included:

1. Detailed geologic mapping of the Guigui claim, with emphasis on mapping volcanic stratigraphy, structures cutting the volcanics and alteration. Geochemical samples were taken of all structures and mineralized outcrops. This was accomplished via Landsat image analysis, 1:40,000 black and white air-photo analysis, and 1:10,000 scale geologic outcrop mapping.
2. Geophysical surveys to locate the intrusive center and determine the thickness of the volcanic cover. The surveys included: gravimetrics, ground magnetics, CSAMT (Controlled Source Audio Magneto Tellurics) and NSAMT (Natural Source Audio Magneto Tellurics).

3. Defining and permitting of drilling targets based on geology, geochemistry, and geophysics. SEMARNAT (Secretaria de Medio Ambiente y Recursos Naturales which is the Secretary of the Environment and Natural Resources) approved 44 drilling sites, with permission for an initial 12-hole program in 1998. These permits have been renewed annually and remain in effect.

### TABLE 6-1
**Mega Capital Investments, Inc.**  
Guigui Silver, Lead, Zinc Project  
1999-2002 Work History Summary

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991:</td>
<td>Joint Venture established between BHP/Utah International and MINAMEX to explore Guigui. Guigui Claim filed by Minera Cascabel in Cascabel’s name at joint venture partners request.</td>
<td></td>
</tr>
<tr>
<td>1991:</td>
<td>Detailed geologic mapping and sampling for BHP.</td>
<td></td>
</tr>
<tr>
<td>1992:</td>
<td>Gravity and magnetics survey (250m centers) performed over Guigui for BHP. Work done by University of Texas, El Paso personnel.</td>
<td></td>
</tr>
<tr>
<td>1993:</td>
<td>BHP changed corporate target objectives, returned property to Cascabel. Cascabel optioned property to Teck Resources.</td>
<td></td>
</tr>
<tr>
<td>1993:</td>
<td>2 CSAMT lines run over western part of Guigui by Teck.</td>
<td></td>
</tr>
<tr>
<td>1995:</td>
<td>Teck changed corporate target objectives and returned the property to Cascabel.</td>
<td></td>
</tr>
<tr>
<td>1995:</td>
<td>Noranda executed Letter of Intent. Reprocessed gravity and magdata, designed AMT survey, brushed and surveyed 17 km of AMT lines.</td>
<td></td>
</tr>
<tr>
<td>1998:</td>
<td>Drilling permits filed and approved. Advanced underwrote application for liberated “El Tascate” Claim (360 hectare are that became Guigui 2).</td>
<td></td>
</tr>
<tr>
<td>2000:</td>
<td>Cascabel terminated option with AVJ. Claims transferred from Cascabel to Minera Coralillo S.A. de C.V., a Cascabel affiliate.</td>
<td></td>
</tr>
<tr>
<td>2000:</td>
<td>Cascabel won the government land lottery for Guigui 2 Claim.</td>
<td></td>
</tr>
<tr>
<td>2001-2002:</td>
<td>Guigui 3 and 4 claims obtained through uncontested filing.</td>
<td></td>
</tr>
</tbody>
</table>

### 6.1 Literature Resources

A substantial body of scientific literature exists on the Santa Eulalia District. This includes unpublished company reports, mining journal articles, guidebook articles, and scientific publications (see Megaw, 1990 for complete bibliography). Prescott (1916) is the earliest in-depth geologic treatment of the district. Prescott's observations at Santa Eulalia were combined with work at
related districts elsewhere in Mexico (including Naica and Mapimi) and resulted in his landmark 1926 paper *The Underlying Principles of the Limestone Replacement Deposits of the Mexican Province*. This paper describes the continuity of orebodies, their gradual diminishment, and their development from ascending and laterally migrating fluids. Fletcher's (1929) follow-up paper to Prescott (1926) proposed that these deposits are part of a spectrum ranging from proximal contact skarns to distal manto and chimney, and vein deposits. Santa Eulalia was his major example for the most distal position. This idea was expanded by Megaw and others (1988) in a comparison of the mineralization style, controls, and geochemistry of 17 Santa Eulalia-like deposits in Mexico. The relationship of Santa Eulalia to 18 carbonate-hosted districts in Chihuahua was treated in Megaw and others (1996).

Hewitt's (1940, 1943, and 1951) doctoral study of the San Antonio mine remains the only comprehensive study of the oxidized portions of the San Antonio skarns. He also documented the relationship between mineralization and the en echelon San Antonio felsite dikes. He proposed a zonal model for the deposit and a paragenesis to explain the transition from silicate to sulfide to tin-oxide mineralization.

Hewitt followed his San Antonio publications with a detailed report on the West Camp (1968). This publication is a synthesis of all the detailed stratigraphic, structural, and mineralogical studies done in the district to 1964. This paper also includes exploration information and speculations about the relationships between the felsite intrusions and mineralization. De la Fuente's (1969) thesis on the district followed Hewitt's (1968) paper closely but included more detailed information on the Potosi Mine than Hewitt had access to.

Detailed studies of mineralogy, geochemistry, and metals zonation are widely represented in company reports and unpublished theses but only a few are published. These include: Lees (1969); Clanton (1975); Walter (1985); Bond (1987); Megaw (1988); Aguirre (1988); Megaw (1997) and Lueth and others, (2001).

Megaw's (1990) doctoral study on the district had a strong exploration emphasis. It includes the first district-wide geologic mapping and detailed geologic, mineralization and alteration maps of the mineralized zone, plus voluminous geochemical and isotopic data regarding the genesis and zoning of the mineralized system. The Guigui exploration target is a direct outgrowth of this study.
7.0 GEOLOGICAL SETTING

Figure 4 shows the general Mexico geology, mineral occurrences and Guigui location. A stratigraphic section is presented in Figure 5. Figure 6 shows the Guigui geology.

7.1 Regional Geology

Northern Mexico and the Western USA contain many Ag-Pb-Zn (Cu, Au) Carbonate Replacement Deposits (CRDs) in Phanerozoic sedimentary-volcanic sequences (Prescott, 1926; Titley and Megaw, 1985; Megaw and others, 1988) (Figure 4). The CRDs of the western US and Mexico all lie in orogenic belts underlain by continental crust (Titley and Megaw, 1985; Megaw and others, 1988) and the biggest deposits appear to lie along inferred deep crustal structures (Megaw and others, 1996; Megaw, 1998). These structures have long-term multi-phase histories and at various times act to: control sedimentation and distribution of favorable carbonate host rocks; act as conduits for ore-related intrusions; and affect the development of structural ore-fluid controls (Megaw and others, 1988; 1996).

The Guigui Project/Santa Eulalia CRD District lies in central Chihuahua Terrane. The Chihuahua Terrane is underlain by Precambrian continental crust (Campa and Coney, 1983; Sedlock et al., 1993) overlapped by Lower Cretaceous sedimentary rocks and Tertiary volcanic rocks (Moran-Zenteno, 1994). Santa Eulalia lies on the western margin of the Chihuahua Trough, a northwest-trending extensional marine embayment (800 km x 150 km) formed as a result of the opening of the proto-Atlantic Ocean in Jurassic Time (Megaw and others, 1996). This elongate basin accumulated a basal sequence of redbeds, evaporites, and shale overlain by a thick sequence of limestones during the mid-Cretaceous. These were subsequently deformed into NNW-trending folds and thrusts during development of the Chihuahua Tectonic Belt, the NNW-trending, northwestern most segment of the Mexican Thrust Belt, during compression related to the late Cretaceous-early Tertiary Laramide Orogeny (Campa, 1985; Megaw and others, 1988; 1996). These folds were later dissected by extensional faulting during the mid to late Tertiary (Price and Henry, 1993). Mid-Tertiary intrusions punctuate the deformed sedimentary rocks and co-eval volcanic rocks that blanket the irregular topographic surface developed on the sedimentary rocks after deformation. Lastly, the region was affected by Late Tertiary extension that created the Mexican Basin and Range Province.

7.2 District Geology

Sierra Santa Eulalia is a horst block bounded by steeply dipping normal faults on both the east and west sides of the range (Figure 6). The body of the range is composed of lower Cretaceous limestone and underlying evaporites, which were folded into a broad doubly plunging anticline with a NNW-SSE trending axis and gentle dips. Limestone outcrops throughout the northern portion of the range but becomes covered by an increasingly continuous blanket of lower Tertiary volcanic and volcaniclastic rocks towards the south. Erosional windows of limestone are locally exposed
FIGURE 5
Schematic Stratigraphic Section for the Santa Eulalia District and Guigui Area.

<table>
<thead>
<tr>
<th>Formation Name</th>
<th>Local Name</th>
<th>Age</th>
<th>Thickness in meters</th>
<th>Lithotype</th>
<th>Mineralization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent</td>
<td></td>
<td>0-30</td>
<td></td>
<td>Alluvium</td>
<td>None</td>
</tr>
<tr>
<td>Santo Domingo</td>
<td></td>
<td>32 Ma</td>
<td>0-600</td>
<td>Rhyolite welded tuffs, basalt flows</td>
<td>None</td>
</tr>
<tr>
<td>Capping Series</td>
<td></td>
<td>39-42 Ma</td>
<td>0-600</td>
<td>Fanglomerates, andesite and rhyolite tuffs</td>
<td>Veins, Sulfide replacements, Mn-oxides, fluorite</td>
</tr>
<tr>
<td>Finlay</td>
<td>Fossiliferous Limestone</td>
<td>L. Cretaceous</td>
<td>370</td>
<td>Micritic and fossiliferous Limestone</td>
<td>Sulfide mantos</td>
</tr>
<tr>
<td>Lagrima</td>
<td>Blue Limestone</td>
<td>L. Cretaceous</td>
<td>510</td>
<td>Micritic Limestone</td>
<td>Sulfide, Skarn Chimneys &amp; Mantos</td>
</tr>
<tr>
<td>Benigno</td>
<td>Blue Limestone</td>
<td>L. Cretaceous</td>
<td>105</td>
<td>Micritic Limestone</td>
<td>Sulfide, Skarn Chimneys &amp; Mantos</td>
</tr>
<tr>
<td>Cuchillo</td>
<td>Evaporites</td>
<td>L. Cretaceous</td>
<td>285</td>
<td>Anhydrite, black shale</td>
<td>None</td>
</tr>
<tr>
<td>Quartz Monzonite</td>
<td></td>
<td>37.8 Ma</td>
<td>&gt;202</td>
<td>medium-grained intrusion</td>
<td>Minor dispersed sulfides</td>
</tr>
</tbody>
</table>

(Modified from Hewitt, 1968 and Megaw, 1990)
through these volcanic rocks. The lower Tertiary section continues southward until it becomes buried under a thick package of mid-Tertiary ash-flow tuffs and basalts, erupted from the resurgent Santo Domingo Caldera, which occupies the southern half of the range. This southern portion of the sierra consists almost entirely of intracaldera volcanic rocks.

### 7.2.1 Stratigraphy

Figure 5 shows the schematic stratigraphic section for the Santa Eulalia District and Guigui Area.

**Cretaceous Sedimentary Rocks**

The Cuchillo formation is the oldest unit known in the Sierra Santa Eulalia and contains no known mineralization. Its full thickness is unknown because it is cut out by a quartz monzonite stock, but it is at least 1,000 meters thick elsewhere in Chihuahua (Megaw, 1990). It consists of coarse-grained, clean anhydrite that grades upward into dark, organic-rich calcareous shale and black, carbonaceous, fetid limestone which contains up to 5 percent pyrite. The Cuchillo formation grades rapidly, but conformably, into the dark non-fossiliferous limestones of the Benigno formation.

The Benigno formation conformably overlies the Cuchillo formation and grades upwards into the Lagrima formation. Both the Benigno and Lagrima formations are generally monotonous, clean limestone and have historically been referred to as part of the Aurora formation (or Group) (Prescott, 1926) or the “Blue Limestone” (Hewitt, 1968). These units host the major skarn orebodies in the San Antonio area and the largest chimneys in the West Camp (Hewitt, 1968; Megaw, 1990). The Benigno formation is 105 meters thick and the Lagrima formation is 510 meters thick.

The Finlay formation conformably overlies the Lagrima formation and is known as the "Fossiliferous Limestone" in the district (Spurr, 1911; Hewitt, 1968). The Finlay formation has three members with a combined thickness of 375 meters. The upper and lower members contain the majority of the elongate mantos in the West Camp, and the elongate manto, tin orebodies, and high-level skarns in the East Camp. Efforts to determine why these specific strata were more receptive to mineralization than the middle member of this formation have revealed no consistent physical or chemical differences (Megaw, 1990).

A pronounced unconformity showing over 250 meters of relief separates the Finlay limestone from the overlying Tertiary rocks. Comparison with nearby, complete Cretaceous sections suggest that this unconformity represents the removal of several thousand meters of post-Finlay Cretaceous sediments (Megaw, 1990).

**Tertiary Deposits**

Tertiary rocks of the Sierra Santa Eulalia consist of a lower Tertiary tuff and volcaniclastic sediment-dominated package, termed the "Capping Series" (Prescott, 1916; and Hewitt, 1968), separated by a slight angular unconformity from a welded ash-flow tuff and basalt succession erupted from the mid-
Tertiary Santo Domingo caldera (Figure 6) (Megaw, 1990). Despite the presence of minor mineralization, it was formerly held that the Capping Series was post-mineral and of no importance to ore genesis. However, it has been demonstrated that the Capping Series is pre-mineral and appears to have exerted important controls on mineralization (Megaw, 1990).

The Capping Series consists of a 500 to 900 meters thick succession of conglomerates, tuffs, volcanioclastic sediments, and welded ash-flows. The thickness of the lowermost members varies considerably, reflecting burial of the rugged underlying surface; the thickest sections occupy paleovalleys and any of the three lowermost units may directly overlie limestone or be locally absent. The succeeding units become relatively continuous sheets above the level of the highest paleo-hills. Rhyolite cobbles from the basal conglomerate in the West Camp yielded U/Pb zircon dates of 42 Ma, and welded ash-flow tuffs higher in the section yielded dates of 39 and 37 Ma (Megaw and others, 1994).

The Capping Series are separated by a slight angular unconformity from a thick section of variably welded mid-Tertiary silicic ash-flow tuffs erupted from the Santo Domingo caldera that lies at the south end of the Sierra Santa Eulalia (Megaw, 1990). The Santo Domingo caldera is resurgent and consists of a 10 km diameter, 900 meters thick section of intracaldera rhyolite ash-flow tuffs consisting of five major cooling units of moderately to densely-welded, lithic and crystal-rich ash flow tuffs. These range from pumice-crystal tuffs to lithic-rich, crystal-poor tuffs. The youngest ash-flow erupted from the caldera yielded a K/Ar date of 31.7 Ma (Megaw, 1990). The ring-fracture zone is well defined and deeply enough eroded to expose the Capping Series rocks that floor the caldera. Several autobrecciated rhyolite flow domes and dikes occur within, and just north of the ring-fracture zone. The outflow sheets are best exposed to the south and northwest of the resurgent dome. They are generally only moderately welded and range up to about 100 meters in thickness. Vesicular basalt flows overlie the outflows along the western and southwestern margins of the caldera. No Santo Domingo caldera-related volcanic rocks directly overlie mineralized areas. However, a possible genetic relationship between the caldera and mineralization is suggested by the 31.7 Ma date for the youngest ash-flow and the 32 Ma date for late intramineral lamprophyre dikes (see below).

7.2.2 Intrusive Igneous Rocks

Eleven intrusive igneous rocks are found within the district. Crosscutting relationships indicate that two are pre-mineral, three are pre- or intra-mineral, and the remaining six are indeterminable.

Quartz Monzonite: Four deep diamond drill holes under the West Camp penetrated up to 65 meters into a greenish, medium-grained, equigranular holocrystalline quartz monzonite (Hewitt, 1968). The rock yielded a potassium-argon plagioclase date of 37.8 Ma, which is probably a minimum age (Megaw, 1990). The only alteration that appears to have been caused by the quartz monzonite is a 10 cm thick zone of massive vesuvianite that replaced the enclosing anhydrite. There is no evidence for endoskarn development in any of the four holes.
Basic dikes and sills: Dikes and sills of greenish, fine to medium-grained, aphanitic to porphyritic basic intrusive rock are widely exposed in both the West and East Camp mines and in limited outcrops west of the San Antonio graben. K/Ar dating of plagioclase from two members of this group from the West Camp yielded dates of 37.5 Ma (Clark and others, 1979). Although this date is very close to the 37.8 Ma date obtained from the quartz monzonite, the differences in whole rock analyses suggest that they are probably not co-magmatic.

Felsite sills and dikes: A complex series of flatly inclined felsite dikes and sills underlie, and occur within, mineralization throughout the depths of the West Camp. Some of these felsites are mineralized whereas others cut across ore and earlier felsites. A group of similar mineralized felsite dikes occupies the core of the bilaterally symmetrically zoned East Camp skarns. No post-mineral felsites are known in the East Camp. Intrusive breccias associated with these felsites in both camps appear to have been emplaced during mineralization. The close temporal and spatial relationship of many of these felsites to mineralization throughout the district suggests a close link between them (Hewitt, 1968). All the felsites show highly contorted, fine-scale, flow-banding. K/Ar potassium-feldspar whole-rock dates from two West Camp felsites yielded dates of 26.6 Ma (Clark and others, 1979), but the felsites are cut by lamprophyre dikes that yield single mineral K/Ar dates of 32 Ma, indicating the felsite whole-rock age is reset. East and West Camp felsites have nearly identical chemical compositions and REES patterns, suggesting that the two suites are probably co-magmatic (Megaw, 1990).

Numerous drill holes and mine workings, allowing an accurate picture of their morphology, have cut the West Camp felsites. They coalesce towards the southeast and form a single body underneath the Bastilles Trend (Hewitt, 1968). An additional felsite body occurs below the Jubilate Orebody in the southeastern West Camp, which is evidently separate from those in the main part of the West Camp (Figure 7). The felsite dikes of the East Camp are a series of southwest to northeast en echelon bodies 4 to 10 meters in width, which overlap by up to 40 meters, and are referred to collectively as the "San Antonio Dike" (Hewitt, 1943). These dikes have an overall strike length of over 1.5 km and trend parallel to the strike of the San Antonio graben (Figure 5). The principal ore-related members of this group cut across the graben's West Fault at depth, follow it for several hundred meters, and then cut into the center of the graben. The terminations of all the felsite dikes exposed within the San Antonio Mine pitch north at 45 to 60 degrees. Coupled with the southwest to northeastern echelon overlap, suggests emplacement from the south and west (Hewitt, 1943).

Lamprophyre dikes: The Potosi and Mina Vieja dikes are N60E-trending lamprophyre dikes with steep westerly dips that crop out in the south and north parts of the West Camp, respectively. The lamprophyres cut across the diabase and felsite sills and the intrusive breccias, and are mineralized or altered where they abut the orebodies (Hewitt, 1968; de la Fuente, 1969). K/Ar dating of hornblende and plagioclase from the Potosi Dike yielded a date of 32.2 +/- 0.4 Ma (Megaw, 1990).

Other Intrusives: Several other felsites and related porphyritic intrusive rocks occur in the West and Middle Camps. Most are not known to be associated with mineralization but several display
features that may be very important to unraveling the timing and genesis of the ore-related felsites (see Megaw, 1990).

### 7.2.3 Sierra Santa Eulalia Structure

The Sierra Santa Eulalia is a single, roughly NNW-trending elongate horst block, bounded by post-mineral Basin and Range normal faults. The sierra is composed of five principal structural elements.

1) **Santa Eulalia Anticline:** The Cretaceous strata of the district are warped into a broad, doubly plunging NNW-SSE-trending anticline or elongate dome. Dips to the east and west are generally less than 15 degrees. All of the district mineralization occurs in the southerly-plunging end of the dome.

2) **Tilted and Warped Capping Series Rocks:** The Capping Series is generally tilted 5 to 20 degrees to the southwest or west, but is locally horizontal or east-dipping along the west side of the San Antonio graben. This tilting is generally discordant in both strike and dip to the folding of the Cretaceous rocks.

3) **Santo Domingo caldera:** The curvilinear ring fracture zone faults of the Santo Domingo caldera are well exposed along the northern, western, and southern parts of the caldera.

4) **Moritos Block:** The principal area of Santo Domingo caldera outflow facies lies along the western limits of Guigui. This area is a large normal fault block dropped down to the west along the Moritos fault. Magnetic and AMT surveys indicate that this fault has at least 500 meters of displacement.

5) **East Camp Block:** The eastern side of the Sierra Santa Eulalia anticline is truncated by a number of interconnected N55W, N70-75W, and N20E-trending normal faults with tens to hundreds of meters of displacement. These include the faults of the San Antonio and Dinamita grabens. Most of the offset occurred along the NW-trending faults and these cut the Santo Domingo caldera ring-fracture zone faults.
8.0 DEPOSIT TYPES

8.1 Carbonate Replacement Deposits (CRDs)

Santa Eulalia is the largest of a number of similar Carbonate Replacement Deposits (CRDs) that define a belt running from Hidalgo to near the Chihuahua-U.S.A. border (Megaw, 1988; Megaw and others, 1988). Chihuahua is very well endowed with CRDs (Megaw and others, 1996) and mining of these has been nearly continuous since the mid-16th Century. The largest CRDs of the Chihuahua region, currently active or active during the 20th Century, are presented in Table 8-1.

<table>
<thead>
<tr>
<th>Deposit Name</th>
<th>Size/Grade</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Santa Eulalia</strong></td>
<td>45,000,000 – 310g/T Ag, 7.1% Zn, 8.2% Pb</td>
<td>Grupo Mexico</td>
</tr>
<tr>
<td>Naica</td>
<td>26,000,000 – 213g/T Ag, 5.6% Zn, 5.9% Pb, 0.4% Cu</td>
<td>Peñoles</td>
</tr>
<tr>
<td>Bismark</td>
<td>8,500,000 – 55g/T Ag, 8.5% Zn, 0.6% Pb, 0.5% Cu</td>
<td>Peñoles</td>
</tr>
<tr>
<td><strong>Sierra Mojada</strong>*</td>
<td>8,000,000 – 384 g/T Ag, 9.6% Zn, 7.9% Pb, 1% Cu</td>
<td>Peñoles</td>
</tr>
<tr>
<td>Plomosas</td>
<td>3,000,000 – 55 g/T Ag, 16% Zn, 8.0% Pb</td>
<td>Grupo Mexico</td>
</tr>
<tr>
<td><strong>La Encantada</strong>*</td>
<td>3,000,000 – 250 g/T Ag, 7.0% Zn, 5.0% Pb</td>
<td>Peñoles</td>
</tr>
<tr>
<td><strong>Shafter, Texas</strong>*</td>
<td>2,000,000 – 500 g/T Ag, 3.0% Zn, 1.5% Pb</td>
<td>Silver Standard</td>
</tr>
<tr>
<td>San Pedro Corralitos</td>
<td>1,000,000 – 219 g/T Ag, 7.0% Zn, 7.0% Pb</td>
<td>Minera Namiquipa</td>
</tr>
<tr>
<td><strong>Rio Tinto</strong>*</td>
<td>225,000 – 250 g/T Ag, 10% Zn, 10% Pb, 2.2% Cu</td>
<td>Summo Mining</td>
</tr>
</tbody>
</table>

* Dominantly produced oxide ores from which zinc was not recovered

The deposits in **bold** are in active production as of this writing. The deposits in *italics* are undergoing active exploration. The remainder are currently inactive.

Carbonate Replacement Deposits are Phanerozoic, high-temperature (>250 °C) deposits that comprise major pod, lens, and pipe-shaped Pb-Zn-Ag-Cu-Au-sulfide orebodies that cut across their host carbonate rocks. They are dominantly composed of a simple assemblage of galena, sphalerite, chalcopyrite, arsenopyrite, pyrite and/or pyrrhotite with subordinate carbonate, sulfate, fluorite and quartz gangue. Calc-silicate or iron-calcic zinc or copper skarn deposits (Einaudi et al. 1981) may or may not be present in any given system. Both sulfide and skarn contacts with carbonate host rocks are razor sharp and evidence for replacement greatly outweighs evidence for open-space filling or syngenetic deposition (Titley & Megaw 1985). CRDs are intrusion-centered systems, and sulfur, oxygen, carbon and lead isotope studies indicate a significant magmatic component to proximal CRD ore fluids. Sedimentary, basin brine and meteoric source signatures become increasingly dominant with increased distance from the intrusive source (Megaw and others, 1988; 1996; Meinert 1998). Mineralization is associated with polyphase intrusions that evolve from early intermediate phases towards late, highly evolved felsic intrusions and related extrusive phases; the intrusions most closely related to mineralization are usually the most evolved phases. These are not exposed in many districts, but are often encountered when the system is explored to depth.
Limestone, dolomite and dolomitized limestones are the major hosts with minor deposits in other calcareous sedimentary rocks.

Regionally, CRDs dominantly occur within deformed miogeoclinal carbonate rocks in tectonostratigraphic terranes underlain by ancient continental rocks (Albers 1983; Campa & Coney 1983; Megaw et al. 1988; Titley 1993), and they tend to occur in clusters that often correspond to major sedimentary depositional basins (Graybeal et al. 1986; Smith 1996; Titley 1996). Many CRDs are located along platform margins or basement highs and along structures cutting basins (Megaw 1988; Megaw et al. 1988; Titley & Megaw 1995; Smith 1996). CRDs generally occur in thick carbonate sequences, generally near the bottom of the section relative to the major ore-related intrusions (Prescott 1926; Titley 1993). Typically, mineralization occurs across a large portion of the local stratigraphic sequence, cutting a variety of facies, with exceptional development in certain beds or groups of beds. Deposits close to basement or intrusions tend to be Cu-Zn (Au) rich, whereas deposits high in the section tend to be Ag-Pb-Mn rich (Titley 1993). Volcanic rocks that are contemporaneous with the deposit-related intrusions commonly cap the deposits. Resurgent calderas may be genetically related to some CRDs (Megaw et al. 1988; Megaw 1990).

The evolution of CRD-skarn systems in time and space, and the gradations seen in single orebodies or districts suggests that the various manifestations of the deposit type can be considered part of a spectrum (Einaudi et al. 1982; Megaw et al. 1988; Titley 1993; Megaw et al. 1996) ranging from:

- Stock contact skarns: formed against either barren or productive stocks.
- Dike and sill contact skarns
- Dike and sill contact massive sulfide deposits
- Massive sulfide chimneys
- Massive sulfide mantos
- Epithermal veins (in some cases)

This conceptual framework allows examination of the mineralization, alteration, intrusion types, host rock and other characteristics of a given deposit and determining where it lies within the spectrum (Megaw, 1998). This framework can also help filter out similar systems that occur in the same region, but which are not CRDs. This can be a powerful tool to guide exploration for additional mineralization in a given system, as it highlights constraints on the likelihood of additional mineralization and determination of the probable direction of fluid movement. Transitions of orebody morphology and mineralogy and alteration zoning can be used to determine if mantos have been traced into chimneys, or sulfides to skarn. Examination of the composition, geometry and controls on intrusion emplacement is essential to determining district zoning and level of exposure. Perhaps most importantly, understanding of the host rock tectono-stratigraphy can allow rapid determination of the potential for more mineralization in the host section at depth or laterally in the known favorable beds, or in previously unconsidered host units.
The major Mexican companies, Peñoles and Grupo Mexico (formerly IMMSA and ASARCO Mexicana) and a few North American companies are applying this model in their current explorations for Carbonate Replacement Deposits in this regional geological environment, and some significant discoveries are being made.

8.2 Santa Eulalia Deposit Types

The Santa Eulalia District is the largest known Carbonate Replacement Deposit in Mexico. The West Camp is dominated by elongate manto and chimney bodies localized by a complex interplay of lithology, structures, and intrusive bodies. The individual orebodies are elongate ribbon or pipe-like bodies up to 4 kilometers long and up to 1,200 meters in vertical extent (Hewitt, 1968; Megaw, 1990). These bodies were composed almost exclusively of massive sulfide ores, but small amounts of mineralized calc-silicate skarn were encountered in the deepest, southeastern most portions of the Potosi Mine (Megaw, 1990). In contrast, the East Camp is characterized by tabular, calc-silicate dominated, zinc sulfide-rich chimneys that are zoned across the dike from a calc-silicate skarn to massive sulfide ores. Smaller lead-rich massive sulfide manto bodies cut off this chimney at several levels, and several unusual tin-bearing carrot-shaped chimneys occur near the top of the system.

The East and West Camps contain continuous, zoned mineralization and alteration closely associated in time and space to groups of apparently identical felsite intrusions. Although the mineralization in the two camps does not overlap in space, both appear to have resulted from the evolution of persistent, pulsating, hydrothermal systems. The morphology of the felsites coupled with mineralogical, metals content, metal ratios, sulfur isotope, and mineralization style, strongly indicates a common hydrothermal source for the two camps. This source appears to lie between the two camps, immediately north of the Santo Domingo caldera (Megaw, 1990).
9.0 MINERALIZATION AND ALTERATION

9.1 West Camp

West Camp mineralization occurs in a roughly elliptical zone approximately 4 km long from north to south, and 2 km wide, east to west. The fringes of the camp are marked by numerous thoroughly oxidized near-surface orebodies; the deeper ores are sulfides. The majority of West Camp orebodies are elongated tubular or tabular manto and chimney bodies localized by a complex interplay of lithology, structures, and intrusive bodies. These occur along near-vertical, laterally continuous, but vertically discontinuous linear zones referred to as "trends." The trends are variably marked along their courses by discrete faults, obscure fractures, or apparently non-structure-specific elongate orebodies (Prescott, 1916; Hewitt, 1968). The N10W-N10E (referred to as N-S for simplicity) trends are the most important and host the majority of the camp's orebodies. Two N60E-oriented trends also host significant orebodies (Prescott, 1916; Hewitt, 1968). Notably, structures defining these trends are readily observed in the limestones, but can generally only be traced into the Capping Series volcanics for short distances.

The overwhelming bulk of West Camp mineralization consists of massive galena, sphalerite, pyrrhotite and/or pyrite with lesser arsenopyrite and chalcopyrite in a minor (<5%) carbonate and fluorite gangue. Grain size ranges from 1 mm to 5 cm and varies widely on local and orebody-wide scales. Large-scale, coarse banding, consisting of nearly mono-mineral sulfide layers that apparently cut across other sulfide layers, is common in mantos but is much less common in the chimneys (Hewitt, 1968). Fine-scale mineralogical banding is common in both mantos and chimneys. Although this banding is locally parallel to the walls of the orebody, especially in mantos, on a stope-wide scale the banding in both mantos and chimneys is highly complex and bears no relation to the enclosing wall rocks (Hewitt, 1968).

A small body of calc-silicate skarn occurs in the base of the Matona Chimney, one of a group of intrusion breccia-hosted orebodies in the deepest, southeastern most part of the West Camp. The Matona skarn is composed of tremolite, actinolite, diopside, and garnet, with a gangue of manganoan-calcite, and fluorite. Gold grades in the Matona skarn and nearby orebodies reach 2-5 g/mt, which is the only significant gold values outside the distal jasperoid halo (Megaw, 1990).

Overall, West Camp orebodies form an interconnected network of mineralization that shows systematic changes of morphology, mineralogy, structural controls, and stratigraphic localization, upward and outward from the felsite sills that occur throughout the depths of the camp. From the deep southern parts of the Potosi Mine to the northernmost fringes of the camp the overall orebody-structure sequence is: mineralization hosted in deep breccia bodies; sill contact mantos; fissure-related mantos; tabular and tubular chimneys; and elongate mantos. The connectedness of mineralization throughout the West Camp indicates that the ore-fluids migrated along a remarkably well-integrated percolation network that extended from the deepest to the shallowest parts of the camp (Megaw, 1990).
9.2  East Camp

East Camp mineralization occurs in a N-S elongate zone roughly 1.5 km wide and 4 km long centered on the San Antonio graben. This is a NNE trending feature with over 250 meters of displacement affecting both the Cretaceous carbonates and Tertiary volcanic rocks. The graben was repeatedly intruded before and during mineralization by a series of felsic dikes geochemically indistinguishable from those associated with ore in the West Camp. Mineralization is dominantly in the form of a tabular, calc-silicate dominated, zinc-rich chimney that is zoned across the dike from a skarn assemblage to massive sulfide ores. Smaller lead-rich massive sulfide manto bodies cut off this chimney at several levels, and several unusual tin-bearing carrot-shaped chimneys occur near the top of the system.

The skarn is zoned from proximal epidote-chlorite endoskarn affecting the felsite, to garnet-hedenbergite skarn, to an outermost hedenbergite-dominant exoskarn (Hewitt, 1943; Megaw, 1990). These skarns may have a sharp outer contact with limestone or grade into pods of normal sulfide ores. Pods of nearly pure sulfides are also common within the skarn and garnet locally replaces sphalerite along fractures in these pods. The contact between both skarn and normal sulfides with the enclosing limestone is either razor-sharp with some minor extensions along fractures or bedding planes, or marked by a narrow bleached and re-crystallized selvage less than 5 cm wide.

The skarn ores typically show banding parallel to the felsite dike margins in the epidote-chlorite skarn, but banding in the garnet-pyroxene skarn tends to be parallel to the enclosing limestone contact. Large blocks of unmineralized limestone occur within the skarn, and locally have concentrically banded sulfides and silicates surrounding them (Bond, 1987). Large areas of contorted banding are also common.

The East Camp shows metal zonation with respect to the West Fault of the San Antonio graben and the San Antonio dike. Comparable variations occur, at different scales, both horizontally and vertically (Bond, 1987). Within the skarn-sulfide ores there is a downward increase in Cu, Zn, In, Bi, Co, F, As, and Mo and an upward increase in Pb, Ba, S, Sb, W, Cd, Hg, V, and Ni (Bond, 1987). The small orebodies along the southern San Antonio graben apparently contained more copper and gold than the remainder of the East Camp. The former presence of felsite is inferred for other areas where this epidote-chlorite assemblage is found.

9.3  District Scale Mineralization Paragenesis and Zoning

Both camps show transitions from continuous skarn and normal sulfide mineralization to concentric alteration halos over vertical distances of over 1 km and horizontal distances of up to 5 km. These transitions can be combined with the metals and metals ratio data to define the following overall zonation patterns for the two camps: (from depth, upward and outward).
These are typical metal zonation patterns for many base metal deposits, especially skarns (Einaudi and others, 1981) and high-temperature, carbonate-hosted Pb-Zn-Ag-Cu deposits (Titley and Megaw, 1985; Megaw and others, 1988). The peripheral manganese halo is comparable to that noted for Irish-type systems and other Ag-Pb-Zn deposits. The consistency of the pattern suggests that it reflects primary metals dispersion from a single large, pulsating hydrothermal system (Megaw, 1990).

**9.4 Alteration**

Alteration including manganese-oxide mineralization, re-crystallization, bleaching, silicification, jasperoid development, fluorite alteration, and calcite veining affects virtually all pre-mineral rock types in the district to some degree. Although most of the alteration types were originally identified by previous workers (Prescott, 1916; Hewitt, 1968) none was comprehensively mapped throughout the range before Megaw, 1990. His mapping showed that several types of alteration are widely developed and, combined with AMOM distribution, define zoned alteration halos that extend several kilometers around the West and East Camps. These halos do not overlap (Megaw, 1990), but both extend into Guigui.

**9.4.1 AMOM**

The mineralized areas of the East and West Camps are surrounded by non-overlapping, discontinuous halos of Argentiferous Manganese-Oxide Mineralization, referred to as "AMOM" (Megaw, 1990). Limestone-hosted AMOM locally has high silver grades (>50 ppm) and has been mined as smelter flux (Hewitt, 1968; Megaw, 1990). Widespread areas of low-silver AMOM lie
beyond the mineable zones so AMOM can best be considered transitional between mineralization and alteration (Megaw, 1990).

The best developed AMOM occurs almost exclusively in the Finlay Limestone adjacent to, above, and/or below oxidized normal sulfide mantos and chimneys, silicate bodies, and skarns that lie within 400 meters of the surface (Hewitt, 1968; Megaw, 1990). However, minor amounts of AMOM have been found in the San Antonio Mine adjacent to unoxidized ores hosted by the Lagrima Formation and oxide ores in the basal limestone Capping Series conglomerate (Bond, 1987).

AMOM is also widely developed in the Capping Series throughout the West and East Camps. It principally overlies zones of major orebodies. Its development is more spatially restricted than that of limestone-hosted AMOM, and it dominantly occurs as narrow fillings and coatings on NE-trending fractures. It has been mined in several places where the fillings exceed 0.5m in width.

### 9.4.2 Fluorite Alteration

Fluorite replacement of limestone; open-space fillings of solution-rubble, and breccia voids; and impregnations volcanic rocks, occurs atop paleo-hills along the contact between limestone, or the basal limestone conglomerate, and overlying Capping Series rocks. Fluorite alteration is best developed along the southern and western portions of the San Antonio graben, and around the northern and eastern edges of the Middle Camp. Discontinuous outcrops of fluorite alteration also occur between the southern Middle Camp and the abandoned fluorite prospects around Los Arenales within Guigui and at the Ventura prospect. The Ventura prospect lies in the southeastern corner of Guigui and encompasses a breccia body consisting entirely of very angular limestone fragments replaced by, and cemented with, clear yellow and purple fluorite. This occurs along the contact between massive limestone and a rhyolite plug that was intruded along the intersection of the ring-fracture zone of the Santo Domingo caldera, and the central fault of the San Antonio graben.

### 9.4.3 Re-crystallization

Fine to medium-grained re-crystallization is the most common carbonate alteration type throughout the range. Substantial zones of discontinuous and variably developed re-crystallized limestone lie adjacent to many orebodies, but there is no consistent halo of re-crystallization or marmorization surrounding ore in any part of the district (Hewitt, 1968). The sparse limestone outcrops within Guigui are strongly re-crystallized and infused with iron-oxides.

### 9.4.4 Silicification

Silicified limestone, consisting of complete crypto crystalline quartz replacements with no addition of iron or other metals, is locally present adjacent to orebodies in the West and East Camps.
(Prescott, 1916; Hewitt, 1968; Bond, 1987). None of these areas is volumetrically important, nor can they be considered halos surrounding ore.

9.4.5 Jasperoid

Two types of jasperoid, consisting of interlocking mosaics of fine-grained quartz replacing limestone, occur in the district. One is tan to gray in color and is found only as isolated brecciated outcrops with no geochemical signature (Megaw, 1990). The other jasperoid is a bright red, iron-rich (8 to 16 percent Fe), ore metal-bearing variety that is generally highly brecciated. The red variety occurs within the mineralized zone, and also appears to define a discontinuous halo peripheral to mineralization. The physical and geochemical similarities of the red jasperoids suggest that all had the same origin (Megaw, 1990).

9.4.6 Calcite Veining

Barren calcite veining is prominent throughout the district. The veins range from 1 mm to 3 meters in width, and cut ore, limestone, and the Capping Series. The largest are a series of 1 to 3 meters wide veins that fill large open fractures in the limestone throughout the northern part of the Sierra Santa Eulalia. These contain no significant amounts of metals (Megaw, 1990).

9.4.7 “Argillic” Alteration

The Capping Series volcanic rocks are locally clay-altered, bleached and chloritized throughout the district. This alteration appears to be most pervasive around the mineralized centers of the West and East Camps and in the central part of Guigui. The degree of alteration of a given Capping Series unit is strongly dependent on its composition, competence, thickness, and position relative to the underlying volcanic units and limestone. Thus, the competent rhyolite welded ash-flow tuffs and pumiceous tuffs closest to the limestone contact and below the lowermost andesitic tuff bed are more pervasively altered than the units above it. This tuff appears to have been an effective barrier to all types of ascending altering and mineralizing fluids.

Within Guigui, the Tw3 welded tuff (Figure 6) and underlying units are moderately to pervasively argillically altered. This includes the volcaniclastic conglomerates, but it is largely the matrix of these that is altered rather than the limestone fragments. On a cut surface, the argillic alteration is obvious, but on a rubbly residual accumulation surface it is not. The central part of Guigui, where the majority of the AMT lines were run, is the most pervasively altered which shows up strongly on satellite images.
10.0 EXPLOREATION

10.1 Recent District Exploration Activity by Grupo Mexico and Sand River Resources/Spokane Resources

Grupo Mexico (IMMSA division), operators of the San Antonio Mine in the East Camp and holders of all the mining concessions between Guigui and the San Antonio Mine have intermittently explored the district, including recent exploration drilling to the south of the San Antonio Mine along the San Antonio graben. Reportedly, some of their holes have hit significant mineralization along dike contacts in the western footwall of the graben (Terrazas, oral communication to P. Megaw of Minera Coralillo). Drill pads are located within 150 meters of the northeastern most limit of the Guigui properties.

Sand River Resources (now Rio Fortuna Exploration TSXV: RFT), in joint venture with Spokane Resources (TSXV:SKN), optioned the claims southeast of the Potosi Mine from MINAMEX in the late 1990s. They performed a gradient IP survey and drilled three holes near the San Antonio Chico Mine before dropping their option. Copies of their press releases are available on their websites and in Exchange archives.

10.2 Minera Cascabel/Coralillo Guigui Exploration

Minera Cascabel’s (now Minera Coralillo) exploration of the district with BHP/Utah International, Teck Resources, and Advanced Projects Limited has been predicated on the exploration concepts for the district arising from Megaw’s (1990) doctoral studies in the district. Megaw performed the entire mapping and sampling, designed and directed the geophysics, and defined the drill targets described here. Megaw’s model is based on observations that:

1. Mineralization in the two camps appears to have resulted from the evolution of persistent, pulsating, hydrothermal systems, which he regards as signs of a large long-lived system (Megaw, 1998).

2. The East and West Camps contain continuous, zoned mineralization and alteration but comparison to related deposits in the region and elsewhere indicates that significant zones have not been encountered (Stock contact skarn in the case of the East Camp and both dike and stock contact skarns in the case of the West Camp).

3. Mineralization in both camps is closely associated in time and space to groups of apparently identical felsite intrusions.

4. The morphology of the ore-related felsites coupled with mineralogical, metals content, metal ratios, sulfur isotope, and mineralization style, strongly indicates a common hydrothermal source for the two camps.
5. This source appears to lie between the two camps, in the Guigui claim immediately north of the Santo Domingo caldera in an area covered by volcanic rocks of the Capping Series.

6. If this source intrusion was emplaced into limestone, it could be the center of stock contact mineralization of the style seen in deposits such as San Martin, Zacatecas.

7. If this proximal mineralization exists, it should be large given the size of the known parts of the system.

PAH concurs with this interpretation of the mineralized system and the ideas expressed above.

10.2.1 Geologic Mapping

Cascabel’s exploration work began with 1:10,000 outcrop geologic mapping of the Guigui claim, expanding on 1:50,000 reconnaissance mapping done previously (Megaw (1990). This was accomplished via Landsat image analysis, 1:40,000 Black and White air-photo analysis, and 1:10,000 scale geologic mapping. Megaw (1990) included the areas of Guigui 2, 3, and 4 in his 1:10,000 detailed mapping of the mineralized zone, but the detail is not as complete as his outcrop mapping of the original Guigui claim.

10.2.2 Geochemistry

Forty-three rock chip outcrop and selected prospect dump geochemical samples have been taken throughout Guigui [24] (Megaw, 1992) and the adjoining parts of the district [19] (Megaw, unpublished data). The Guigui samples were prepared and assayed by conventional AA and multi-element ICP geochemical techniques at American Assay Laboratories in Reno, Nevada USA (see below for protocols). The district samples were taken during Megaw’s (1990) dissertation mapping. These prepared and assayed with conventional AA and Fire Assay at Grupo Mexico’s on-site laboratory at the San Antonio Mine. Samples show weak to moderate anomalies in Ag, Pb, and Zn, with locally strong anomalies of Mn.

10.2.3 Geophysics

Four separate geophysical surveys have been run over the Guigui claim (including Faisan and Arenales) to locate the inferred source stock beneath the Capping Series volcanic cover that blankets the claim. The goals included:

1) Determining the depth to the stock,

2) The level of emplacement of the stock in the stratigraphic section,

3) Determining the thickness of the Capping Series, and
4) Locating mineralization and/or alteration directly. The surveys include Gravity, Magnetics, and two CSAMT and CSAMT/NSAMT surveys. The AMT survey lines were located on the basis of the gravity and magnetic surveys, using two different interpretations based on two different organizations processing the data. No surveys have been performed over the Guigui 2, 3, or 4 claims.

**Gravity**

BHP/Utah International contracted Dr. Randy Keller of the University of Texas at El Paso (UTEP) to perform a combined gravity and ground magnetic survey of the Guigui claim in 1992. The work was executed by graduate students who covered the claim and extended a single line across the San Antonio graben to the east of the Guigui claim limits. A total of 493 gravity stations were read. They appear to have taken their readings competently, but did not take the readings on a 250-meter grid pattern as instructed (Beasley, 1993). They followed an irregular pattern that caused significant problems in data processing, but nonetheless resulted in a usable gravity map of the claim. Data reduction and terrain corrections were performed in the Geophysics Laboratory at UTEP. The data show significant gravity variations dominated by a broad elongate gravity high running through the center of the Guigui claim with flanking lows. The lows encompass several local highs. The San Antonio graben also shows up as a strong anomaly. The data were interpreted by UTEP as indicating the presence of an intrusive body in the center of Guigui (the high) surrounded by limestone and variable thicknesses of volcanic rocks (Beasley, 1993).

Noranda geophysicists subsequently reprocessed and reinterpreted the UTEP gravity data (Noranda, 1996). Their maps show substantially similar overall gravity patterns, but with a significant eastward shift in the location of anomalies. Noranda's interpretations were quite different from the UTEP/BHP interpretations. They interpreted the elongate central high as reflecting limestone comprising the axis of the Santa Eulalia Anticline, and the flanking lows as variable thicknesses of Capping Series rocks and/or possible intrusion centers.

**Magnetics**

BHP/Utah International contracted Dr. Randy Keller of the UTEP to perform a combined gravity and differential ground magnetic survey of the Guigui claim in 1992. The initial goal was to have a coordinated gravity and magnetic survey on 250-meter grid spacings across the property, but the two were run separately. The magnetic survey was done with a hip chain on N-S compass lines with magnetic readings taken every 250 meters. A total of 518 readings were taken. A single line was run across the San Antonio graben to the east of the Guigui claim limits. Despite the different sampling patterns, many magnetic stations coincide with gravity stations. The magnetic survey was performed competently in accord with instructions (Beasley, 1993). Noranda reprocessed the magnetic data at the same time they processed the gravity data. Because these data were collected on a more regular pattern, there is much less difference in the two versions of the magnetic processing than between the two groups and their processing of the gravity data.
The data show a number of local magnetic highs and lows as well as dipole anomalies. There are strong positive anomalies associated with the San Antonio graben and the westernmost area of downfaulted Guadalupe Block caldera outflow facies volcanic rocks is a very well defined magnetic high. The central part of Guigui contains a number of magnetic highs and dipole anomalies. The most notable group of magnetic highs and dipole anomalies define a roughly circular string of anomalies about 1.5 km in diameter. These were interpreted as magnetic mineralization lying to the west of an intrusion (inferred from the gravity data) (Keller, 1992; Beasley, 1993) and as magnetic mineralization surrounding an intrusion center (Noranda, 1996).

Teck Audio Magneto Tellurics

Teck Resources contracted Zonge Engineering of Tucson, Arizona to run two lines of CSAMT over a combination of features interpreted from the UTEP/BHP gravity and magnetic data processing (Zonge, 1993) (Figures 2, 6). The lines were oriented NNE-SSW and were run across the westernmost cluster of magnetic anomalies adjoining the gravity feature interpreted as a possible intrusion. Line 1 was 3,375 meters long and ran from the west side of the Guadalupe Fault to the flanks of Cerro La Campana. Line 2 was located 500 meters farther east and ran 3,300 meters from the Guadalupe fault to a point 500 meters of the Los Arenales Fluorite mine.

The lines showed a thin surface conductor, interpreted to be Capping Series volcanic rocks less than 200 meters thick, overlying a broad nearly unbroken resistor, interpreted to be the underlying limestone (Zonge, 1993) (Figure 8). The Guadalupe fault shows up exceptionally well and shows that volcanic rocks to the west of this fault are at least 500 meters thick. A few vertical discontinuities occur along the lines, but only the northeastern most end of Line 2 shows strong conductors associated with these discontinuities. There is no feature resembling a possible intrusion revealed by these lines.

The Zonge Engineering final report of August 1993 contains full details of the layout, data collection and interpretation, and sections. All work appears to have been done to industry standards.

Advanced Projects Audio Magneto Tellurics

Advanced Projects contracted Zonge Engineering of Tucson, Arizona to run combined CSAMT and NSAMT surveys over routes recommended by Noranda after their reprocessing of the UTEP/BHP gravity and magnetic data (Noranda, 1996). A total of 15,000 m were run in four lines (Figures 2, 6). Results are summarized below. The study included incorporation and reprocessing of the CSAMT data obtained for Teck’s Lines 1 and 2 farther to the west. The Zonge Engineering final revised report of February 17, 1998 contains full details of the layout, data collection and interpretation, and sections. All work appears to have been done to industry standards.

The results correlate well with surface map able features and indicate several buried drill targets. Line details and major features are:
**Line A:** 2,750 meters long and oriented NNE-SSW, nearly parallel to Teck Line 2, but 500 meters farther east. Runs from center of Guigui, across Los Arenales Fluorite Mine, and into the southern end of the Middle Camp (at the former northern limit of Guigui claim group). Line shows thin (<200m thick) surface conductor interpreted as the Capping Series volcanics and a series of vertical discontinuities with associated conductors. The Arenales fault is one of these features and a moderate conductor roughly coincides with the Los Arenales Fluorite Mine.

**Line B:** 5,250 meters long and oriented NESW, lies south and east of Line A. Runs from 400 meters east of the southern end of Line 2 across the center of the gravity-inferred intrusion and two of the surrounding magnetic anomalies to the eastern flank of the San Antonio graben. Line shows thin (<200m thick) surface conductor interpreted as the Capping Series volcanics and a series of vertical discontinuities with associated conductors. One discontinuity roughly coincides with the second strongest conductor on Line D, but is not as conductive. In one place, highly resistive rocks reach almost to the surface on Line B. This lies 20 meters from a surface exposure of limestone confirming the utility of using the AMT data to determine the thickness of the Capping Series. The strongest combined vertical discontinuities and conductors occur along the western flanks of the San Antonio graben and have been interpreted as being faults parallel to this major feature. The Dinamita graben (Megaw, 1990) is the surface expression of one of these parallel structures and is well marked with alteration and mineralization where limestone is exposed on the surface 2 km farther north along this trend.

**Line C:** 3,900 meters long and oriented ENE-SSW, running from the northeastern end of Line B across the San Antonio graben. Line shows thin (<200m thick, thickening to 350 meters under large hill composed of Capping Series volcanics) surface conductor interpreted as the Capping Series volcanics. Shows several combined vertical discontinuities and conductors occur along the western flanks of the San Antonio graben in the area where it crosses Line B (see above). The San Antonio graben faults proper do not appear, as their topographic expressions are cliffs over which the survey could not be run.

**Line D:** 3,200 meters long and oriented NNW-SSE parallel to the main axis of West Camp mineralization and geologic vectors. Run across the center of the gravity-inferred intrusion and 4 magnetic highs lying along the eastern flank of this feature. Essentially parallel to schematic long-section from West Camp to Santo Domingo Caldera shown in Megaw (1990) (Figures 7, 8, 9). Line shows thin (<200m thick) surface conductor interpreted as the Capping Series volcanics. Shows vertical discontinuity at caldera ring-fracture zone and in several other places north of this. The most prominent feature on the line is a strong cluster of conductors from 200 to 600 meters beneath the surface that form a bell-shaped anomaly. An additional strong conductor lies on a vertical discontinuity 500 meters farther north, just past where Line B crosses Line D. These combined features can be interpreted as a stock surrounded by conductive mineralization and bear remarkable resemblance to the schematic geologic long-section (Figures 7, 8, 9).

Zonge (1998) combined the results of the six AMT lines into a series of depth slices that show the location of vertical discontinuities and conductors to depth. These also indicate to which side of the
line a conductive anomaly may lie; an important feature given the ability of strong off-line conductors to influence AMT results. Zonge (1998) recommended several of the AMT anomalies as principal drill targets. Chief among these are the features on Line D that resemble the conceptual target, and the anomalies associated with the western side of the San Antonio graben (Lines B and C) that may reflect continuation of East Camp mineralization along the graben and related structures.

10.2.4 Environmental Surveys

The only environmental surveys done on the Guigui property to date are those required for drill permitting. These include inventories of floral and faunal species and an assessment of the impact of road building for drilling. Drilling permits were granted to Minera Cascabel in 1998 by SEMARNAT on the basis of these studies. These permits have been renewed annually and are fully in force.

The only surface disturbances in the claim are small prospect pits from which there has been no production and three old fluorite workings. There are no inherited environmental liabilities from these disturbances.
11.0 DRILLING

No drilling has been done within Guigui proper. However, the 12 initial targets permitted for Advanced Projects remain to be drilled. The permits are in the name of Minera Cascabel and have been renewed annually.
12.0 FIELD SAMPLING METHODS AND APPROACH

Forty-three rock chip and dump samples of altered and mineralized materials were taken throughout the Guigui and adjoining areas during Peter Megaw’s doctoral mapping study (Megaw, 1990) and subsequent reconnaissance and detailed mapping phases. Field samples were located on 1:10,000 topographic maps, bagged and tagged for shipping. Samples were stored under lock and key in Minera Cascabel’s Chihuahua field office and periodically shipped to Tucson, Arizona for assay by American Analytical Laboratories. Complete sample descriptions, locations, and assay results for Guigui samples are presented in Megaw (1992). The work was done to industry standards.
13.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

Samples were hand delivered to American Assay Laboratory’s Tucson preparation facility. American prepared the samples by crushing, homogenizing, splitting, grinding and final splitting for analytical pulps. Pulps were flown to Reno, Nevada for atomic absorption analysis for Au, Ag, Pb, Zn, Cu, As, Sb, Mn.

Bulk rejects and assay pulps were discarded in 1998.
14.0 DATA VERIFICATION

Analytical results from American Analytical were provided as written hardcopy and reviewed for quality and coherence. No clerical errors were found in laboratory reporting.
15.0 ADJACENT PROPERTIES

Guigui is adjoined on the northwest and northeast by major producing mines and numerous prospects of the West and East Camps. The Potosi and Zubiate mine complexes of MINAMEX are the closest on the northwestern side. The Zubiate was last worked prior to 1950, and the Potosi closed in 1991. MINAMEX has done no work on these properties since the Sand River-Spokane Resources Joint Venture abandoned their option in 1998. The San Antonio and Dinamita mines are the closest on the northeastern side. The Dinamita area was explored briefly by Grupo Mexico in the mid-1980s. The San Antonio Mine has been the most important producer in the district since the early 1980s and closed because of a strike in early 2001. Grupo Mexico continues to explore around the San Antonio mine and along the San Antonio graben to the southwest (R. Silva pers. Comm. to Peter Megaw, October 2002).
16.0 METALLURGICAL TEST WORK

No metallurgical studies have been undertaken.
17.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

The property remains at an early exploration stage. No data have yet been generated from which to estimate resources and reserves.
18.0 INTERPRETATION AND CONCLUSIONS

Mineralization is concentrated on the east and west flanks of a southerly-plunging end of the Santa Eulalia District anticline and shows striking similarities and differences between the East and West Camps. Mineralization occurs in the same stratigraphic interval in both camps, but extends into the basal part of the Tertiary section in the East Camp. Mineralization in both camps occurs in close temporal and spatial relationship to felsite bodies, but these felsites are sills in the West Camp and a series of dikes in the East Camp. West Camp mineralization is controlled by sill contacts at depth and higher by a series of fissures that become increasing obscure upwards. East Camp mineralization occurs along the contacts of dikes emplaced along faults related to a through going graben system that suffered intra-mineral movements. Mineralogical contrasts are strong between the two camps: West Camp mineralization is dominantly composed of massive sulfide ores, whereas East Camp mineralization is dominated by garnet-pyroxene skarn. However, despite the sharp differences in ore controls and gangue mineralogy, the sulfide mineralogy, temperatures of formation, fluid salinities, and sulfur isotopic characteristics are virtually identical, leading to the interpretation that these are different manifestations of the same hydrothermal system.

The East and West Camps of the Santa Eulalia District contain continuous, zoned mineralization and alteration closely associated in time and space to groups of apparently identical felsite intrusions. Although the mineralization in the two camps does not overlap in space, both appear to have resulted from the evolution of persistent, pulsating, hydrothermal systems. The morphology of the felsites coupled with mineralogical, metals content, metal ratios, sulfur isotope, and mineralization style, strongly indicates a common hydrothermal source for the two camps. This source appears to lie between the two camps, immediately north of the Santo Domingo caldera in the Guigui claim area.

It appears that the zones exposed in the two camps overlap: the West Camp has been explored downward from massive sulfides to calc-silicate skarn, whereas the East Camp has been traced outward from skarn to massive sulfides. Santa Eulalia and other high-temperature carbonate-hosted deposits have been interpreted as comprising a group of related deposits that define a spectrum that ranges from stock contact skarns, to dike and sill contact skarns, to dike and sill contact massive sulfides, to massive sulfide mantos and chimneys (Fletcher, 1929; Graybeal and others, 1986; Megaw and others, 1988). Entire deposits may display a single part of the spectrum, or single orebodies may cover a wide part of the spectrum (Ruiz and Barton, 1985, Megaw and others, 1988). Applying this model to Santa Eulalia suggests that the two camps are less different than they appear, and tracing East and West Camp mineralization back towards their inferred plutonic source is justified.

The work done to date at Santa Eulalia indicates that this probable intrusive center lies concealed under volcanic cover adjacent to the historic mining centers within the Guigui claims. If this intrusion reached sufficiently high into the stratigraphic section to reach the limestones, this
intrusion could be the center of substantial additional stock contact mineralization of the style seen in deposits such as San Martin, Zacatecas.
19.0 RECOMMENDATIONS

19.1 Existing Guigui Drill Targets

Six major targets have been identified and permitted within the original Guigui claim (Minera Cascabel, 1998). The overall program is based on projection into Guigui of the mineralization vectors from the known mining areas, the AMT data, and alteration distribution. The CSAMT data indicate that the tops of the conductors are not more than 350 meters deep, but they should be drilled to a depth of 450 to 500 meters. Further, if the CSAMT data do not reflect the depth to the tops of the conceptual targets (or if they’re altogether misleading), either hole 1 or 2 should be drilled to an 800 to 1,000-meter depth to determine if intrusive rocks with associated skarn exists in this geologically indicated target area. The hole locations are based on a combination of geology, CSAMT/AMT, magnetics, gravity (in that order remembering that the CSAM T was itself based on geology and magnetics/gravity work). The targets lie greater than 300 meters below the surface and are controlled by high angle features, which, combined with topography, means angle holes are required to test the targets effectively. Many appear to reflect multiple parallel structures so the exploration program was designed so that the holes will cut several of these structures which lengthens the drill hole depth. Sections for each hole have been generated.

The targets are:

1. [600m] To test major inferred stock-contact CSAM T target on Line D from the south.

2. [600m] To test major inferred stock-contact CSAM T target on Line D from the north. Either 1 or 2 should be drilled to 750 meters.

3. [650m] To test West fault of the San Antonio graben within Guigui. This is the major ore-hosting feature in the San Antonio Mine 2.5 km to the north and is the target of IMMSA drilling over the last few years.

4. [500m] To test strong AMT conductors and mag anomalies just west of San Antonio Graben (Hole 3) in area of Line B and C intersection. This may reflect mineralization similar to recently rumored high-grade bodies found by IMMSA drilling to the west of the San Antonio Graben.

5. [500m] To test the area under Los Arenales Fluorite Mine. This is the area most proximal to the West Camp, it is directly in line with projection of felsite source and is an area characterized by mineralization and alteration. AMT conductor exists also, but is weaker than for Holes 1-4.

6. [750m] To follow up best holes of 1-5 or new area(s) indicated by work in Guigui 2, 3, and 4.
Total of the exploration drilling needed to test the known targets 4,250 meters.

19.1.1 Drilling Program Recommendations

The following are recommended to reduce exploration costs and risks:

1. Collar the drill holes with reverse circulation at least to the base of the Capping Series (200-250m) if not the capacity of the equipment (about 300m). Drill core from this point down or at any point where mineralization is encountered. This will result in a substantial savings in drilling expenditures.

2. Consider additional NSAM T work. This method appears to have outlined structures with associated conductors quite well. Additional lines, especially in areas of indicated targets, might significantly improve target concepts cheaply.

19.2 Geology, Geochemistry and Geophysics in Guigui 2, 3 and 4

Prior to drilling within the original Guigui area, it is recommended to advance the Guigui 2, 3, and 4 claims to the same level of knowledge as Guigui. This should include:

1. Geologic outcrop mapping of the Middle Camp portions of Guigui 2, 3, and 4 at 1:10,000. This should yield improved understanding of both areas in a district context and potentially identify drill targets in areas between Guigui and the known West Camp mining areas. This should be accompanied by geochemical sampling of all mineralized and altered outcrops.

2. Geologic outcrop mapping of the portion of the approximately 1 km long portion of the San Antonio graben that lies within Guigui 2 at 1:10,000. This should include careful examination of the location of Grupo Mexico drill holes in this area and will probably yield immediate drill targets. This should be accompanied by geochemical sampling of all mineralized and altered outcrops

3. Additional NSAM T and/or CSAM T lines should be run over targets identified by the above geologic mapping. This should include the new targets and refinement of previously identified targets within Guigui.
20.0 RECOMMENDED WORK PROGRAM AND GENERAL BUDGET

Following the above considerations, it is recommended that the first exploration phase focus on mapping, sampling and geophysics in the Guigui 2, 3, and 4 claims and adjoining portions of Guigui. Drilling the best targets in the combined areas should follow this.

20.1 Phase 1 Exploration Budget Summary

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<th>Item</th>
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<td>Logistics and Support</td>
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<td>Field Mapping (2 man teams for 60 days)</td>
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<td>Sampling</td>
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Value Added Tax (IVA) @15% $36,750

20.2 Phase 2 Drilling

The Phase 2 program will build on the work done during Phase 1. The Phase 1 data will direct the exploration for Phase 2.

Testing the six proposed targets will require 4,250 meters of drilling at an estimated cost of C$850,000. Drilling can commence immediately within Guigui. Minor permit expansion and refiling will be necessary for Guigui 2, 3, and 4. The following general drilling budget is proposed:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost in C$</th>
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<tbody>
<tr>
<td>Logistics and Support</td>
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<td>Assaying</td>
<td>$20,000</td>
</tr>
<tr>
<td>Environmental Remediation and Review</td>
<td>$40,000</td>
</tr>
<tr>
<td>Final Report and Ongoing Quality Reporting</td>
<td>$20,000</td>
</tr>
<tr>
<td>Phase 2 Total</td>
<td>$955,000</td>
</tr>
<tr>
<td>Value Added Tax (IVA) @15%</td>
<td>$143,250</td>
</tr>
<tr>
<td>Total Phase 2 Exploration</td>
<td>$1,098,250</td>
</tr>
</tbody>
</table>
21.0 CERTIFICATE OF QUALIFICATION

I, Clarence J. Wendt, do hereby certify that:

1. I reside at 5004 East Albuquerque Road, Reno, Nevada, 89511.

2. I am a graduate of the San Diego State University in Geology with a degree of Bachelor of Science, in 1967, and the University of Arizona, with a Master of Science degree in Geology in 1978 and have practiced my profession continuously since that time.

3. I am a Non-Resident Professional Geoscientist in the Province of British Columbia (N1712), a Registered Geologist in the State of Arizona (18283), and a Registered Professional Geologist with the American Institute of Professional Geologists (4966).

4. I hold membership in the following mineral industry technical societies:
   - A.I.M.E. (Fellow),
   - Society of Economic Geologists (Fellow),
   - Chartered Professional Geologist AusIMM (Fellow)
   - American Association of Petroleum Geologists,
   - Geological Society of Nevada,
   - Arizona Geological Society, and
   - Northwest Mining Association.

5. I have practiced my profession continually for 30 years.

6. I have not received, nor do I expect to receive, any interest, directly or indirectly, from Mega Capital Investments Inc., any affiliate, or associate company and neither I nor any affiliation entity of mine, is at present, or under an agreement, arrangement or understanding expects to become, an insider, associate, affiliated entity of employee of Mega Capital Investments Inc. or any associated or affiliated entities.

7. Neither I nor any affiliated entity of mine own, directly or indirectly, nor expect to receive, any interest in the properties or securities of Mega Capital Investments Inc. or any associated or affiliated companies.

8. This report, as well as its conclusions and recommendations, are based on the examination of available data and discussions with involved geologists. The Author visited the Guigui property on September 8th, 2002 and examined the data supplied by Mega Capital Investments Inc. during that time.
9. Neither I nor any affiliated entity of mine, have earned the majority of our income during the preceding three years from Mega Capital Investments Inc. or any associated or affiliated companies.

10. I have read the NI 43-101 and Form 43-101F1 and have prepared the technical report in compliance with this NI 43-101 with generally accepted Canadian industry practice.

Clarence J. Wendt

Reno, Nevada
22.0 REFERENCES


