



MINE DEVELOPMENT ASSOCIATES

MINE ENGINEERING SERVICES

Technical Report Update on the Las Cristinas Project, Bolivar State, Venezuela



Prepared for

CRYSTALLEX INTERNATIONAL CORPORATION

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1.0 EXECUTIVE SUMMARY

1.1 Introduction and Property Location

Crystallex International Corporation (“Crystallex”) is exploring and developing the Las Cristinas project in southeastern Venezuela. Since 2003, Mine Development Associates (“MDA”) has been engaged to estimate and update the mineral resources and reserves for the property and was engaged in July 2007 to prepare this updated Technical Report for the purpose of reporting the most recent updated resources and reserves. The current report updates the 2003 Feasibility Study by SNC-Lavalin Engineers and Constructors Inc. (“SNC-Lavalin”) and their subsequent 2005 Technical Report. The total resource at Las Cristinas as reported herein represents a significant increase since the resource estimate reported in 2005.

The Las Cristinas property is located in southeastern Venezuela in the State of Bolivar. The project site is about 670km southeast of Caracas and 370km by road south-southeast of the city of Puerto Ordaz at approximately N 006° 12’ Latitude and W 061° 29’ Longitude. The village of Las Claritas lies 6km east of the property.

The Las Cristinas project consists of 3,885.6 hectares in four concessions: Cristina 4, 5, 6, and 7. On September 17, 2002, Crystallex and the public entity Corporación Venezolana de Guayana (“CVG”) signed a Mining Operation Agreement (“MOA”) for the development of a mine on the Cristina 4, 5, 6 and 7 concessions. The MOA provides Crystallex with the exclusive right to explore, design and construct facilities, exploit, process, and sell gold from Las Cristinas but does not transfer property rights to Crystallex. The term of the MOA is 20 years, subject to extension for up to 20 more years in two 10-year renewal terms. At a processing rate of 20,000 tonnes per day and current proven and probable reserve estimates, the expected mine life is 64 years. However, Crystallex has completed a study and intends to increase the capacity to 40,000 tonnes per day as soon as practicable, at which rate the current reserves would be depleted in about 32 years.

The Las Cristinas project consists of a large moderately dipping set of tabular mineralized gold zones. The project is designed for open-pit development at 20,000 t/d with planned expansion to 40,000 t/d. Metallurgical recovery of the gold is by cyanide-leach. There are four main mineralized areas at Las Cristinas: the Conductor area (including the Cuatro Muertos, Potaso and Conductor zones), the Mesones-Sofia area (including both the Mesones and the Sofia zones), the Morrocoy area and the Cordova area.

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1.2 Geology and Mineralization

Las Cristinas is located in a Proterozoic granite-greenstone terrain of eastern Venezuela, with stratigraphy in the district consisting of a west-dipping sequence of lower Proterozoic supracrustal metavolcanic and metasedimentary rocks. Mineralization at Las Cristinas is hosted by a mafic to intermediate-composition volcanic sequence. Three phases of intrusive rocks, including diorite stocks, an aplite dike, and diorite sills, occur on the Las Cristinas property. The diorite stocks and aplite dike are thought to be pre-mineralization, while the diorite sills appear to post-date mineralization.

A near-pervasive foliation (S_1) occurs in the Las Cristinas area where it varies in intensity up to very strong. The S_1 foliation is sub-parallel to bedding (S_0). Mapping of the orientation of foliation and bedding reveals the presence of a fold hinge whose axial trace strikes northeast with a plunge to the southwest, coinciding with the axial trace of a regional synform. A northeast-striking fault, located in the axial zone of the regional synform, passes between the Mesones and Sofia mineralized centers. This fault is believed to have cut through a single mineralized breccia complex and resulted in the displacement of the Mesones component of that body approximately 200m to the southwest of the Sofia remnant.

Weathering has had a critical effect on copper distribution at Las Cristinas and will have an impact on mine development. The copper has been leached from the oxide saprolite and redeposited in the sulfide saprolite.

The two most important types of gold mineralization at Las Cristinas in terms of the identified resource are stratiform bodies such as Conductor, Morrocoy, and Cordova and hydrothermal quartz-tourmaline breccias exemplified by Mesones-Sofia. About 95% of the identified gold resource comes from the stratiform deposits and 5% from the breccias. Mineralization in Mesones-Sofia is concentrated in the quartz-tourmaline-sulfide-calcite vein breccias and extends laterally into the adjacent country rocks. Pyrite and chalcopyrite occur as aggregates up to 5cm in diameter, as semi-massive replacements in the matrix of the quartz-tourmaline breccias, and as disseminations both in the breccias (in the matrix and in breccia clasts) and in the enclosing country rocks. In the Conductor-type stratiform mineralization, distribution of mineralization is controlled by the permeability of the host rocks – gold grade and alteration intensity typically decrease abruptly at the contact between permeable volcanoclastic units and impermeable lava layers. Pyrite and chalcopyrite are, again, the main sulfides. The majority of the gold resource at Las Cristinas is located within biotite alteration facies, and to a lesser extent within the tourmaline zone, while the distal chlorite-epidote-calcite alteration facies is essentially barren of significant gold mineralization.

1.3 Exploration Concept

The Las Cristinas mineralization has a number of features in common with porphyry gold-copper deposits, including hydrothermal quartz-tourmaline breccias at the core of the mineralized system, alteration zoning, and the metal association of gold with copper and minor molybdenum. However, unlike typical porphyry systems, there is no evidence of either a closely related porphyry intrusion or abundant quartz veins at Las Cristinas.



There is a strong relationship between mineralization and structure at Las Cristinas. Specifically most of the mineralization lies parallel to the foliation and is influenced by the stretching orientation defined by a mineral lineation. This structural information is consistent with mineralization being coeval with shearing over an interval in excess of a kilometer in width.

Recent drilling at Las Cristinas has been focused on extension of resources both laterally and down dip with more of a development focus rather than an exploration focus.

1.4 Exploration and Historic Resource Estimates

Most of the exploration work at Las Cristinas has been performed by Placer Dome Inc. (“Placer”), who worked on the property from 1991 to 2001. Placer completed line cutting, mapping, rock and soil sampling, geophysics, trenching, and drilling. Since acquiring the property in 2002, Crystallex has focused its exploration on drilling, with particular attention paid to the studies of the alteration, stratigraphy and structure of the deposit to define the controls on mineralization so as to improve confidence in the validity of correlating mineralized zones between adjacent drill-hole intersections.

The current database for Las Cristinas has 189,026m of trench and drill-hole samples from 108 individually named trenches and 1,321 drill holes. There are a total of 187,226 gold assays, 168,020 copper assays, 43,830 cyanide-soluble copper assays, and 145,021 silver assays. Drilling alone totals 187,165m. The average drill spacing over the entire modeled area at Conductor is roughly 70m, dropping to about 30m in the core area where economic mineralization is shallowest and where mining is planned to commence. The Mesones-Sofia area has an average drill spacing of 55m, while Morrocoy, a newly estimated deposit lying between Cordova and Mesones-Sofia, has a drill spacing of about 85m.

Placer drilled 1,174 drill holes for a total of 158,738m and excavated all of the 108 trenches; 77% of the holes had at least one down-hole survey. Placer tried several different drilling techniques in order to overcome the challenges of drilling in an intensely weathered tropical environment and chose triple-tube diamond drilling. They found that PQ tools provided the best recovery in saprolite, with HQ in bedrock. NQ was used systematically in bedrock during the infill-drilling phase and occasionally in difficult drilling situations. Placer’s drilling was conducted in essentially three phases – shallow drilling to test saprolite, bedrock drilling and infill drilling in saprolite, and finally infill drilling of the pit area. Placer had a quality control program in place evaluating sampling and sub-sampling procedures and results.

Crystallex drilled 90 holes for a total of 28,427m from 2003 through early 2007, generally using HQ tools for saprolite and NQ for bedrock. Crystallex’s 2003 drilling twinned selected Placer holes to independently evaluate a portion of the Placer drill-hole database and assay data. Crystallex’s twin holes were drilled with smaller diameter core than Placer’s had been, and Crystallex sampled with 2m continuous sample intervals in contrast to Placer’s 1m sample intervals. Crystallex’s subsequent drilling, conducted from 2004 through 2007, focused on increasing the reserve and resource through infill drilling, drilling down-dip extensions of the stratiform mineralized zone, and exploring strike extensions of the deposit. This drilling used blanks and pulp standards for quality control, and for their 2006-2007 drilling. Crystallex also conducted check assaying with a second assay lab. Checks on Placer’s sample data verified the general tenor of grades reported by Placer.



Issues of variability and biased-low samples were addressed in a heterogeneity study. The high variability must be addressed prior to and during production to avoid massive misclassifications of ore and waste rock during production. This material heterogeneity or grade variability has negatively impacted the ability to make any resource estimate precisely reflect local estimated grades. Importantly, the style of mineralization and its natural variability are the likely causes of the underlying difference in grades between Placer data and Crystallex data, where Crystallex samples are both smaller and slightly lower grade than Placer's samples. It has been demonstrated that this is likely due to sample size. Taking this further, the entire sample database might be understating the mean grade of the deposit, even Placer's data. While this appears possible, there is no way to quantify this potential underreporting of grade or any way to incorporate this into the database or resource model.

1.5 Metallurgy

Several samples of saprolite oxide ("SAPO"), saprolite sulfide ("SAPS"), carbonate-leached bedrock ("CLB") and carbonate-stable bedrock ("CSB") ore from the planned Conductor pit area were examined in bench tests and pilot plant operations by SGS Lakefield Research ("Lakefield") from April 2003 through mid-2004. Samples of waste from the Conductor pit and four samples of Mesones ore were also studied. Sub-samples of Conductor ore were sent to McGill University for gravity recovery test work. Outokumpu Mintec Canada Ltd. ("Outokumpu") conducted pilot-plant settling tests on several samples. The various test programs were designed to confirm relevant data generated by Placer, determine the gold recovery and reagent requirements for the proposed gravity-leach flowsheet, and generate plant design data.

Grinding data are generally in accordance with data generated by Placer. Pilot-scale gravity concentration tests at Lakefield on Conductor ore show about 30% gold recovery from both a SAPO-CSB blend and a SAPO-SAPS-CLB-CSB blend at mass concentration ratios of about 4000:1. Preliminary data for Mesones show an even better response. Intensive cyanidation of the concentrates from Conductor gave ~99% leach recovery. Tests at McGill to determine the gravity-recoverable gold ("GRG") content of Conductor SAPO and CSB samples showed 39% and 46% GRG, respectively, which would translate into practical recoveries of about 25%.

Thirty-six hour bottle-roll leach tests on Conductor gravity tailings confirm that SAPO leaches very well to give about 99% overall (gravity + leaching) extraction and a 0.02 g Au/t tailing. With a 24 h leach time, tailings were 0.03 g Au/t corresponding to 98% extraction. CSB gives about 85% overall extraction (0.17 g Au/t tailing). Cyanide additions for SAPO and CSB have been less than 1 kg/t ore. Pure SAPS samples with cyanide soluble copper ("CN₂Cu") levels of 370 ppm or less have been tested and gave 85 to 88% extraction, albeit with cyanide additions of 1.7 to 1.9 kg/t. Mixtures containing SAPO, SAPS and CSB gave 85 to 90% overall extraction provided that sufficient NaCN was present. The NaCN addition varied with the CN₂Cu level in the ore.

An initial gravity-leach test on each of the four Mesones samples showed an average 85% overall gold extraction and modest reagent consumption. It is believed that higher extraction could be obtained with optimization of the leach conditions.



Duplicate bench-scale tests on a series of samples containing 20% CLB and 80% CSB and between 1 and 2 g Au/t yielded an average of 88.7% overall gold recovery (gravity and leaching) with no measurable dependency on head grade.

A 2 kg/h pilot plant was operated for three weeks in which batch-ground/gravity concentrated Conductorora ore was subjected to carbon-in-leach (“CIL”) processing. During the first 13 days (PP1), a blend of 20% SAPO and 80% CSB was leached with an addition of 0.7 kg/t of cyanide (0.3 kg/t consumed) to give a final overall gold extraction of 89.6% (tailings average of 0.15 g Au/t). A SAPO-SAPS-CLB-CSB blend was processed for the last week (PP2). The plant tailing was 0.15 g Au/t for an extraction of 89.3% with a cyanide addition of 0.8 kg/t (0.3 kg/t consumed).

Viscosity measurements by Lakefield indicated nothing problematical in the mixtures that will be handled in the Las Cristinas plant.

Outokumpu conducted high-rate thickening tests on nine sample blends, ranging from pure SAPO to pure bedrock, using its pilot-scale thickener. At 50% solids in the underflow, all blends containing 50% SAPO or less could be processed at 0.46 t/m²/h or greater. Allowing for a 15% scale-up, the data showed that a 50m diameter thickener would give at least 47% solids in the underflow when processing up to 20,000 t/d of a 50% SAPO, 50% CSB mixture.

Natural degradation tests and continuous INCO Air/SO₂ cyanide destruction tests have been performed on pilot plant tailings. Natural degradation under Lakefield climatic conditions reduced weak-acid dissociable cyanide (“CNWAD”) to below 20 ppm in about 40 d for pilot plant tailings from PP1 and 100 d for PP2 tailings. The INCO process then reduced CNWAD to <0.3 ppm and Cu to about 1 ppm under industry-typical operating conditions. INCO tests on naturally degraded PP2 tailings solution gave <0.1 ppm CNWAD and <0.5 ppm Cu.

1.6 Resource and Reserve Estimation

The total resource at Las Cristinas as reported herein represents a significant increase since the previous resource reported in 2005 and since Crystallex initially obtained the rights to production in 2002. The increase is the result of drilling that expanded Conductorora (inclusive of Cuatro Muertos and Potaso) down dip, drilling that expanded and allowed for inclusion of Morrocoy, and the first-time inclusion of Cordova resources, located west of Mesones-Sofia, and Morrocoy.

The mineralized zones at Conductorora were defined in 2002, but Crystallex’s exploration and geological studies have yielded new insight into the gold distribution. The controls on mineralization are lithological with the more-favorable units having more primary porosity and permeability. In addition to lithology, alteration and sulfide content also correlate with the mineralization. Higher-grade zones can be visually identified by lithology, alteration, and sulfides.

Table 1.1 and Table 1.2 show the updated Measured and Indicated resources and Inferred resources, respectively, for the entire Las Cristinas project area. These resources are inclusive of the areas a) Conductorora-Cuatro Muertos-Potaso (“Conductorora”), b) Mesones-Sofia, c) Morrocoy, and d) Cordova. The deposit is bounded at the south by a property boundary and ends at Mesones-Sofia, Cordova and



Morrocoy in the north. The deposit is open at depth. This report is the first to disclose a resource estimate for Morrocoy and Cordova, the latter of which is classified as Inferred only.

Table 1.1 Las Cristinas Total Measured and Indicated Resources
(Including Reserves*)

Las Cristinas Measured and Indicated				(rounded)				
Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces	Silver (g/t)	Copper (ppm)	CNSolCu (ppm)	Silver Ounces	Copper Kilograms
0.2	1,168,496,000	0.71	26,578,000	0.44	1,017	119	16,613,000	1,116,751,000
0.4	794,119,000	0.91	23,109,000	0.47	1,068	136	11,926,000	848,297,000
0.5	629,383,000	1.03	20,761,000	0.48	1,122	145	9,755,000	706,343,000
0.6	493,098,000	1.16	18,377,000	0.49	1,178	155	7,841,000	580,939,000
0.7	386,720,000	1.30	16,177,000	0.51	1,238	167	6,322,000	478,680,000
0.8	312,241,000	1.43	14,400,000	0.52	1,282	177	5,219,000	400,345,000
0.9	261,622,000	1.55	13,032,000	0.53	1,316	186	4,458,000	344,359,000
1.0	226,823,000	1.64	11,977,000	0.54	1,341	193	3,928,000	304,272,000
1.5	120,348,000	2.01	7,769,200	0.57	1,428	225	2,190,700	171,816,000
2.0	47,045,000	2.45	3,709,900	0.59	1,574	298	897,700	74,042,000
2.5	15,625,000	2.96	1,488,900	0.63	1,796	424	318,800	28,063,000
3.0	5,178,000	3.48	579,000	0.70	2,118	570	117,000	10,967,000
3.5	1,650,000	4.10	218,000	0.81	2,716	736	43,000	4,482,000
4.0	633,000	4.74	96,000	0.88	3,430	920	18,000	2,171,000
5.0	158,000	5.96	30,000	0.74	3,642	507	4,000	574,000

Note: inconsistencies between grade, tonnes, and ounces are due to rounding

*Note: Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability.

Table 1.2 Las Cristinas Total Inferred Resources
(Including Reserves*)

Las Cristinas Inferred				(rounded)				
Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces	Silver (g/t)	Copper (ppm)	CNSolCu (ppm)	Silver Ounces	Copper Kilograms
0.2	626,333,000	0.51	10,334,000	0.29	666	54	5,869,000	398,760,000
0.4	322,410,000	0.73	7,594,000	0.29	680	54	3,051,000	219,361,000
0.5	229,626,000	0.85	6,276,000	0.30	691	52	2,206,000	158,773,000
0.6	167,940,000	0.96	5,194,000	0.30	707	50	1,641,000	118,772,000
0.7	121,631,000	1.08	4,240,000	0.31	721	48	1,219,000	87,746,000
0.8	89,339,000	1.21	3,467,000	0.33	748	46	954,000	66,848,000
0.9	64,278,000	1.35	2,788,000	0.37	783	45	758,000	50,337,000
1.0	49,247,000	1.47	2,334,000	0.39	815	44	617,000	40,115,000
1.5	17,659,000	1.98	1,126,700	0.48	918	43	270,700	16,215,000
2.0	5,718,000	2.53	464,900	0.42	918	46	78,100	5,247,000
2.5	1,636,000	3.37	177,300	0.30	880	46	15,600	1,439,000
3.0	548,000	4.72	83,000	0.21	765	30	4,000	419,000
3.5	288,000	6.07	56,000	0.15	687	24	1,000	198,000
4.0	192,000	7.25	45,000	0.04	672	6	-	129,000
5.0	122,000	8.82	35,000	0.05	649	7	-	79,000

Note: inconsistencies between grade, tonnes, and ounces are due to rounding

*Note: Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability.

It is important to note that since the first estimate was made of the Las Cristinas deposit resources by Crystallex in 2003, all new drilling done in 2004 (18 holes), 2005 (14 holes), and 2006-2007 (46 holes) has supported the model in that the defined zones needed little modification even at a drill-hole spacing of over 100m, i.e., the high-grade/high-sulfide and low-grade/low-sulfide zone gradational contacts



needed only minor changes to fit the new drill-hole data. This fact is a testament to the predictability of the Las Cristinas deposit in general, but Conductorá particularly, where most of the drilling took place.

The economic and design criteria used to determine the reserves in this report were derived from existing reports. MDA believes that there is enough information in prior reports concerning the appropriate mining, processing, economic and other factors to support Proven and Probable reserves. The work undertaken by MDA in 2007 consisted of updating mining costs using factors and estimates provided by Crystallex, developing Lerchs-Grossmann (“LG”) ultimate pits using current economics, redesigning the ultimate pits, and reporting reserves. Because the updated economic data have not been rigorously verified by MDA, the 2007 work should be considered pre-feasibility level. The Proven and Probable mineral reserve estimates by area are given in Table 1.3. Along with the reserves reported, within the boundaries of the pit design there are an additional 1.6M contained ounces of Inferred material. These are shown in Table 1.4 below.

Table 1.3 Las Cristinas Gold Reserve Estimate

Summary of Proven Reserves (Tonnes, Grams, and Ozs in Thousands)							
	Total Ore						
	Tonnes	gAu/t	Grams Au	Ounces Au			
Conductorá	112,761	1.24	139,423	4,483			
Mesones/Sofia	-	-	-	-			
Morrocóy	-	-	-	-			
Total Proven	112,761	1.24	139,423	4,483			
Summary of Probable Reserves (Tonnes, Grams, and Ozs in Thousands)							
	Total Ore						
	Tonnes	gAu/t	Grams Au	Ounces Au			
Conductorá	317,662	1.10	349,906	11,250			
Mesones/Sofia	27,556	1.10	30,216	971			
Morrocóy	6,383	0.77	4,910	158			
Total Probable	351,601	1.10	385,032	12,379			
Summary of Proven & Probable Reserves (Tonnes, Grams, and Ozs in Thousands)							
	Total Ore				Total Waste	Total Tonnes	Strip Ratio
	Tonnes	gAu/t	Grams Au	Ounces Au			
Conductorá	430,423	1.14	489,329	15,732	595,380	1,025,803	1.38
Mesones/Sofia	27,556	1.10	30,216	971	34,624	62,180	1.26
Morrocóy	6,383	0.77	4,910	158	9,915	16,298	1.55
Total Probable	464,362	1.13	524,455	16,862	639,919	1,104,281	1.38

Table 1.4 Las Cristinas Inferred Gold within Pit Design

In Pit Inferred Summary (Tonnes, Grams, and Ozs in Thousands)				
	Total Ore			
	Tonnes	gAu/t	Grams Au	Ounces Au
Conductorá	46,985	0.97	45,569	1,465
Mesones/Sofia	1,651	0.65	1,080	35
Morrocóy	3,103	0.73	2,252	72
Total Proven	51,739	0.95	48,901	1,572



1.7 Development and Production

It is estimated that the total capital cost of the project has increased from \$293 million dollars as reported in 2005 to approximately \$356 million in the third quarter of 2007 (Table 1.5). Crystallex has spent, through August 2007, approximately \$112 million on items included in the revised cost estimate of US\$356 million.

Table 1.5 Comparison of 2005 Estimate and 2007 Update

DESCRIPTION	2005	2007	% Increase
Total Direct Costs	218.7	238.3	8.9%
Indirect Costs	30.4	66.4	118.4%
Owner's Costs	24.9	27.5	10.4%
Contingency	19.0	23.8	25.3%
TOTAL PROJECT COST	293.0	356.0	21.5%

In addition, operating costs have changed since 2005 as shown in Table 1.6.

Table 1.6 Operating Cost Estimates

Item	Operating Cost/t Ore (Aug 2005)	Operating Cost/t Ore (Oct 2007)	Operating Cost /oz Gold (Aug 2005)	Operating Cost /oz Gold (Oct 2007)
Mining	\$2.68	\$3.22	\$72	\$101
Processing	\$4.45	\$5.86	\$119	\$183
G & A	\$0.52	\$0.72	\$13	\$22
TOTAL	\$7.66	9.80	\$204	\$306

Note: Does not include any off-site costs or royalties

Since the 2005 update to the 2003 feasibility study, there have also been some changes in plans for mining and processing.

The increase of reserves is the result of additional drilling defining additional resources down dip. The consequence is a larger and deeper ultimate pit design. The current 2007 ultimate pit is designed to be approximately 1,250m wide, 3,100m long, and up to 490m deep. Mining is planned using truck and shovel methods. Current plans include processing 20,000 t/d with a variable strip ratio averaging 1.38 and ranging from 0.30 to 3.29 tonnes of waste per tonne of ore mined.

Water flow into the pit has been determined to be greater than what was estimated in the 2005 study. MDA has not addressed the potential flow increase in detail, but given the significance of dewatering to the project, more detailed analyses and engineering are needed. Dewatering costs are estimated at \$0.185 per tonne mined, and the dewatering cost estimate is thought to be within accuracy for pre-feasibility work. Nevertheless, MDA cautions that the practical aspects of dealing with the extra volume of water will be challenging. If these costs increase significantly, the economics of the deeper reserves may be affected.



There has also been a change with regard to cyanide destruction. The cyanide destruction process is air/SO₂ using sodium metabisulphite as the source of SO₂. Originally it was envisioned that the excess reclaim water from the tailings management facility (“TMF”) would be treated; however, it is now Crystallex’s intent to treat the entire stream of CIL tailings.

Delays in acquiring the environmental permits allowing construction to commence have impacted the overall project startup. It is now expected that project start up completion will be achieved approximately 24 months following the receipt of the full permits and the mobilization of the early works-construction contractors.

1.8 Conclusions and Recommendations

Since signing the MOA for Las Cristinas, Crystallex has successfully increased both the estimated resources and reserves. Las Cristinas presents a well-defined resource that has undergone extensive engineering and economic studies. The project is waiting for government permitting to begin production of the defined reserves.

At this stage, while waiting for final government permission to begin construction, multiple tasks in differing disciplines should be accomplished to optimize expected production. Crystallex should continue with at least a) exploration, b) geological studies, c) sub-sampling evaluation for production samples, d) metallurgical testing, e) water flow studies, f) detailed engineering work, and g) optimizing the production schedule.

Analysis of the drilling results has further defined controls on mineralization in the various portions of the property and will aid in future exploration. To potentially continue the expansion of reserves, MDA recommends that two areas deserve attention in the near term. Infill drilling is needed immediately south of the Sofia area, beneath the Quebrada Amarilla, to upgrade the Inferred resource there. It is recommended that three holes totaling about 1,200m be drilled in this area. The second area with an Inferred resource that needs to be upgraded is Cordova. A lack of continuity of gold zones demonstrated by Placer’s drilling may actually reflect intense folding. Detailed stratigraphic analysis, perhaps combined with lithogeochemistry to attempt to distinguish volcanic units, should be followed by about 1,500m of drilling in five holes.

MDA is not reporting copper resources or reserves because CVG, who has granted mining rights to Crystallex, currently only has the rights to the gold in Las Cristinas. Since copper has a negative effect on cyanide recovery of gold in the saprolite sulfide material, MDA has modeled copper.

MDA believes that the single most important factor influencing mining will be the amount of water entering the pit. As the detailed engineering stage of project development proceeds, MDA recommends an aggressive program of testing under the guidance of groundwater hydrologists. Capturing as much water as practical on upper benches and channeling it to sumps in the upper elevations of the pit can reduce pit-pumping requirements.

The acid-generating material management plans require mining of saprolite-sulfide waste material which must be encapsulated within waste dumps to prevent the production of acid drainage, requiring



detailed short-term planning to ensure that potential acid-generating material being dumped is properly managed.

Due to the increase in reserves, additional work is needed for the increased dump size and TMF. It is strongly recommended that a geotechnical investigation program be carried out to confirm the subsurface conditions under the proposed new dump location and stability analysis undertaken to verify design recommendation provided above. Should the option to expand the TMF footprint be carried forward, substantial dam alignment optimization and geotechnical field investigation would be required for the detail design and due to the height increase to about 100 m, additional field investigation and tests are required to confirm the analysis. Recommendations presented in 2005 design report regarding site preparation, construction and monitoring should be still followed.

The expanded pit, which is a result of the increase in reserves, is now within about 30m of the project's primary crusher. Consideration should be made to minor relocation of the crusher. This would provide a cushion against any future modifications to pit designs based on slope reconfigurations or further expansion of reserves.



2.0 INTRODUCTION

2.1 Introduction

Crystallex International Corporation (“Crystallex”) is exploring and developing the Las Cristinas project in southeastern Venezuela. Mine Development Associates (“MDA”) has been engaged in estimating and updating the mineral resource and reserves for the property since 2003. In July 2007, MDA was contracted to prepare this Technical Report for the purpose of reporting the most recent updated resources and reserves. This report also describes the property as known by prior exploration and provides an update on the 2006-2007 drilling, new information gained from that exploration, and results of continuing data verification. The 2006-2007 drilling that has led to the updated mineral resource and reserve estimates in this report was designed to bring the Morrocoy area into a defined resource and to increase resources and reserves down dip in the Conductor area. It was successful in both tasks. This most recent update also includes the first time reporting of Inferred resources at Cordova. The current report updates the 2003 Feasibility Study by SNC-Lavalin Engineers and Constructors Inc. (“SNC-Lavalin”) and their subsequent Technical Report (SNC-Lavalin, 2005a). The total resource at Las Cristinas as reported herein represents a significant increase since the previous resource reported in 2005 (Ristorcelli, 2005; SNC-Lavalin, 2005a). The current reported reserve has a production rate of 20,000 t/d with an option to expand to 40,000 t/d.

Crystallex is a Canadian corporation listed on the Toronto Stock Exchange (“TSX”) and the American Stock Exchange (“AMEX”). This report was written in compliance with disclosure and reporting requirements set forth in the Canadian Securities Administrators’ National Instrument 43-101, Companion Policy 43-101CP, and Form 43-101F1. The mineral resources and reserves reported in Section 17.0 were classified to the standards and requirements stipulated in Canadian National Instrument 43-101. It is intended that this report may be submitted to those Canadian stock exchanges and regulatory agencies that may require it. It is further intended that Crystallex may use it for any lawful purpose to which it is suited.

MDA prepared two previous 43-101 Technical Reports on the Las Cristinas project for Crystallex (Ristorcelli, Hardy, and Prens, 2002; Ristorcelli and Hardy, 2003) as well as reports that were not filed. The 2002 report described historic work on the property and results from previous operators. The 2003 report presented the first resource and reserve estimations of Crystallex’s tenure on the property, which are included in this report in the section on historic resources and reserves (Section 6.4.2). These reports form the basis for much of this report to which more recent information has been added, principally from new co-authors.

2.2 Terms of Reference

The resource estimates for this report have been prepared by Steven Ristorcelli, P. Geo, Principal Geologist, Mine Development Associates, principal author of the report. Thomas Dyer, P. Eng., Mine Development Associates was responsible for mine design, planning and mineral reserve estimates, and Dyer was assisted by MDA associate Scott Hardy, P.Eng. Richard Spencer, PhD, P. Geo., of Crystallex provided updated information on geology, mineralization, and exploration by Crystallex, ran the exploration at Las Cristinas and had overall supervision and planning responsibility for those programs, and had significant input to this report. Mr. John Goode, P.Eng., independent metallurgist, has been



involved with Las Cristinas and Crystallex since 2003 and has written, compiled and interpreted the metallurgical data for this project. Mr. David Evans, P. Eng., of SNC-Lavalin, was heavily involved in previous feasibility work on this project and has taken the lead role in this recent work on behalf of SNC-Lavalin, principally in coordinating SNC-Lavalin's work on capital and operating costs. Ms. Ljiljana Josic, P.Eng, of SNC-Lavalin, was responsible for the geotechnical study of the deepened open pit. Mr. Henri Sangam, P. Eng, was responsible for evaluating the geotechnical aspects of the tailings management facility and waste dumps. Ms. Helen Jackson, P. Geol, was responsible for the mine dewatering section. Each of these co-authors is a qualified person under Canadian Securities Administrators' National Instrument 43-101 for their area of responsibility. Certificates of these qualified persons are provided in Section 24.0.

2.3 Sources of Information

MDA has relied almost entirely on data and information derived from work completed by Placer Dome Inc. ("Placer") and given to MDA by Crystallex. Crystallex acquired the Placer database in electronic form and received ~99% of the known drill data. Hard copies of the assay data and drill logs are not available. This is one aspect of the project that may never be able to be audited or checked. Validation drilling and re-assaying of pre-existing samples permit MDA to present a conclusion under Data Verification of adequacy, reasonableness and accuracy for the underlying database. Furthermore, an additional 12 twin drill holes completed in 2003, 18 drill holes completed in 2004, 14 drill holes drilled in 2005, and 46 drill holes in 2006-2007 have further verified the location and tenor of the mineralization. Though MDA has reviewed much of the available data, made site visits and taken independent samples, these tasks and data validate only a portion of the entire data set. MDA therefore has made judgments about the general reliability of the underlying data. Where deemed either inadequate or unreliable, the data were either eliminated from use or procedures were modified to account for lack of confidence in that specific information. Underlying this assessment on data quality and integrity is a level of confidence instilled in the project data and work completed because of the technical ability of the company involved with the project during the 1990s. In general, Placer's work appears to meet or exceed industry standards.

In addition, the scope of this study included a review of pertinent technical reports and data provided to MDA by Crystallex relative to the general setting, geology, project history, exploration activities and results, methodology, quality assurance, interpretations, drilling programs, and metallurgy. For this report, MDA relied heavily for background information on its prior technical reports described above and on the feasibility report and its updates by SNC-Lavalin described above. Prior reports that the authors used in preparation of this report are listed in Section 22.0. In addition to the company data and documents, public domain information has been gathered from a number of sources. The authors have also had numerous conversations with employees and management of Crystallex, who have provided information used in this report.

2.4 Personal Inspection by the Authors

MDA's mandate required on-site inspections at Las Cristinas and to that end Mr. Ristorcelli has visited the property on numerous occasions since 2002. In addition, MDA associate, Mr. Greg Maynard, has been to the site, and Mr. Trevor Nicolson of Nicholson Analytical Consulting, independent sampling



consultant, spent 29 days on the project during the 72-day 2006 and 2007 drilling campaign. Mr. David Evans and Henri Sangam have been to the project site but only in relation to their specific endeavors.

2.5 Effective Date

The resource and reserve estimates reported here were completed in August and September 2007, respectively. The results of these estimates were made public on September 24, 2007. The date of this report as shown on the cover page and in the authors' certificates is the date on which writing of the report was completed and is the effective date of this report.

2.6 Note on Language, Terminology and Definitions

Unless otherwise indicated, all references to dollars (\$) in this report refer to currency of the United States. This is a technical report, and the use of some technical terms is unavoidable.

2.7 Definitions

Some frequently used acronyms and abbreviations that appear in this report are listed below.

AA	atomic absorption spectrometry
Ag	silver
Au	gold
CIM	Canadian Institute of Mining, Metallurgical, and Petroleum
Conductora	Used to denote the entire Conductora-Cuatro Muertos-Potaso deposit
Cu	copper
DMT	dry metric tonnes
d	day
FA/AA	fire assay with an atomic absorption finish
gpm	gallons per minute
g/t	grams per tonne
kg	kilograms
km	kilometer
kPa	kilopascal
kVA	kilovolt-ampere
kWh/t	kilowatt-hours per tonne
lb	pound (2000 lbs to 1 ton, 2204.6 lbs to 1 tonne)
MDA	Mine Development Associates, Inc., the authors of this technical report
m	meters
mm	millimeters
µm	micrometers
m/s	meters per second
MW	megawatt
NSR	net smelter return
oz	Troy ounce (12 oz to 1 pound, 1 troy oz = 31.10348 grams)
QA/QC	quality assurance and quality control
RC	reverse-circulation drilling method



RQD rock-quality designation
SNC-Lavalin SNC-Lavalin Engineers and Constructors Inc.
tonne metric ton
tpd metric tonnes per day
tph metric tonnes per hour



3.0 RELIANCE ON OTHER EXPERTS

The authors wish to make clear that they are qualified persons only in respect of areas in this report identified in their Certificates of Qualified Persons submitted with this report to the Canadian Securities Administrators. The authors have relied, and are unaware of any reason not to have relied upon the following individuals and companies who have contributed the sample quality control, engineering, legal, environmental, administration, taxation and financial information stated in this report, as noted below:

Mr. Trevor Nicholson, Independent Consultant, 2006-2007 drill program data and sample quality control and reliability;

Mr. Scott Hardy, P. Eng., associate to MDA, engineering for reserves;

SNC-Lavalin for historic work on feasibility study issues and environmental; and

Crystallex staff and legal counsel on environmental issues, permitting, taxation, finance and contract rights.

Crystallex has provided its opinions and opinions of its legal counsel regarding the status of mining rights to the property. MDA is not qualified for assessing the validity of these issues and therefore presents its opinions for completeness and without comment. The classification of reserves is given by MDA from a technical standpoint, while Crystallex's legal work for mining rights and contractual issues provides the information for contractual rights' obligations for resource and reserve classification.

MDA did not investigate the environmental issues associated with the property, and none of the authors is qualified for environmental issues in Venezuela. However, Crystallex did address environmental and permitting issues updating historic work.

MDA is of the opinion that each of the other contributors to this report represented as a Qualified Person ("QP") is a QP with respect to the work for which such QP is taking responsibility. Except as may be stated in this report, none of the QPs coauthoring this Technical Report has taken steps to verify data identified as having been prepared by or under the supervision of another QP identified in this report. The reason for not verifying such data is that another QP has stated that it was prepared by or under the supervision of that QP.



4.0 PROPERTY DESCRIPTION AND LOCATION

All information in this Section 4.0 is derived from others, and MDA has relied entirely on Crystallex to update the environmental Section 4.4 (unless otherwise specifically noted) from SNC-Lavalin (2005a). Crystallex is entirely responsible for Sections 4.2 and 4.3. MDA is not qualified to assess mineral rights, contract law, or environmental law or regulations in Venezuela and therefore cannot and does not give any opinion on the information given in Section 4.0 but presents this information to fulfill requirements of Canadian Instrument 43-101.

4.1 Location

The Las Cristinas property is located in the southeastern part of Venezuela in the Municipality of Sifontes in the State of Bolivar. Bolivar is the largest of the three states comprising the Guyana Region, the remaining states being the Amazonas and Delta Amacuro. The project site is located approximately 670km directly southeast of Caracas, 30km west of the border with Guyana, and 200km north of the border with Brazil (Figure 4.1). The property is 6km west of the village of Las Claritas. The project's approximate geographical coordinates are N 006° 12' Latitude and W 061° 29' Longitude.

The name "KM 88" for the district came from the area being located near kilometer 88 marker of the road linking El Dorado with the Brazilian border.

4.2 Land Area

The property consists of 3,885.6 hectares in four concessions (Table 4.1). Although Crystallex has not legally surveyed the property, the concession boundaries are presented in the underlying agreement between Crystallex and Corporación Venezolana de Guayana ("CVG") (Appendix A). Figure 4.2 shows the general outline of the concessions and includes an outline of mineralized areas. Details of these four concessions are given in Appendix A, including surface area and corner coordinates given in UTM (Universal Transversal Mercator) coordinates using the "Canoas" datum. There are four main mineralized areas at Las Cristinas: the Conductor area (including the Cuatro Muertos, Potaso and Conductor zones), the Mesones-Sofia area (including both the Mesones and the Sofia zones), the Morrocoy area and the Cordova area.

Table 4.1 List of Las Cristinas Concessions

Concession	Hectares
Cristina 4	1,000.0
Cristina 5	939.4
Cristina 6	944.2
Cristina 7	1,002.0
Total	3,885.6



Figure 4.1 Location of Las Cristinas Property

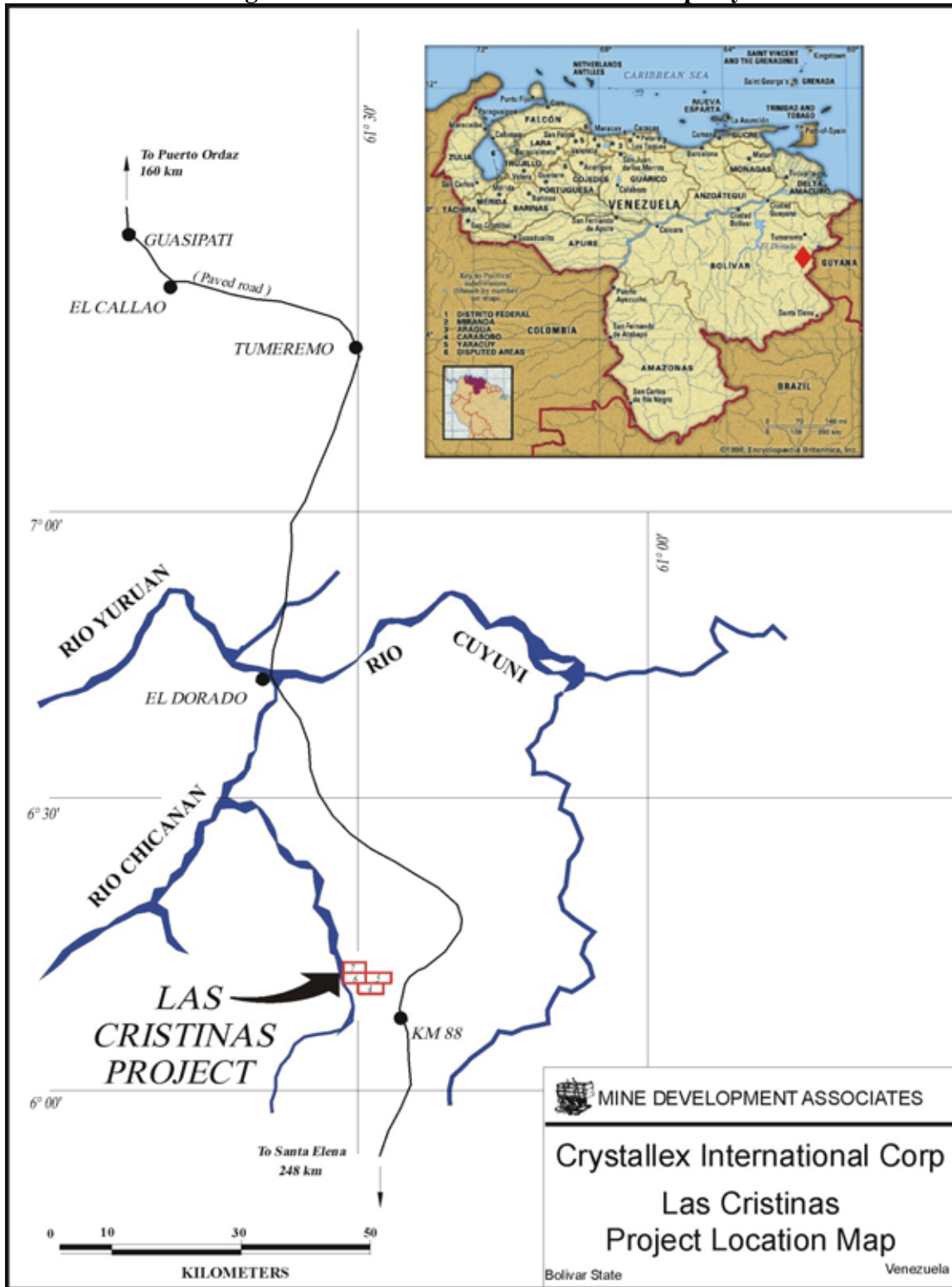
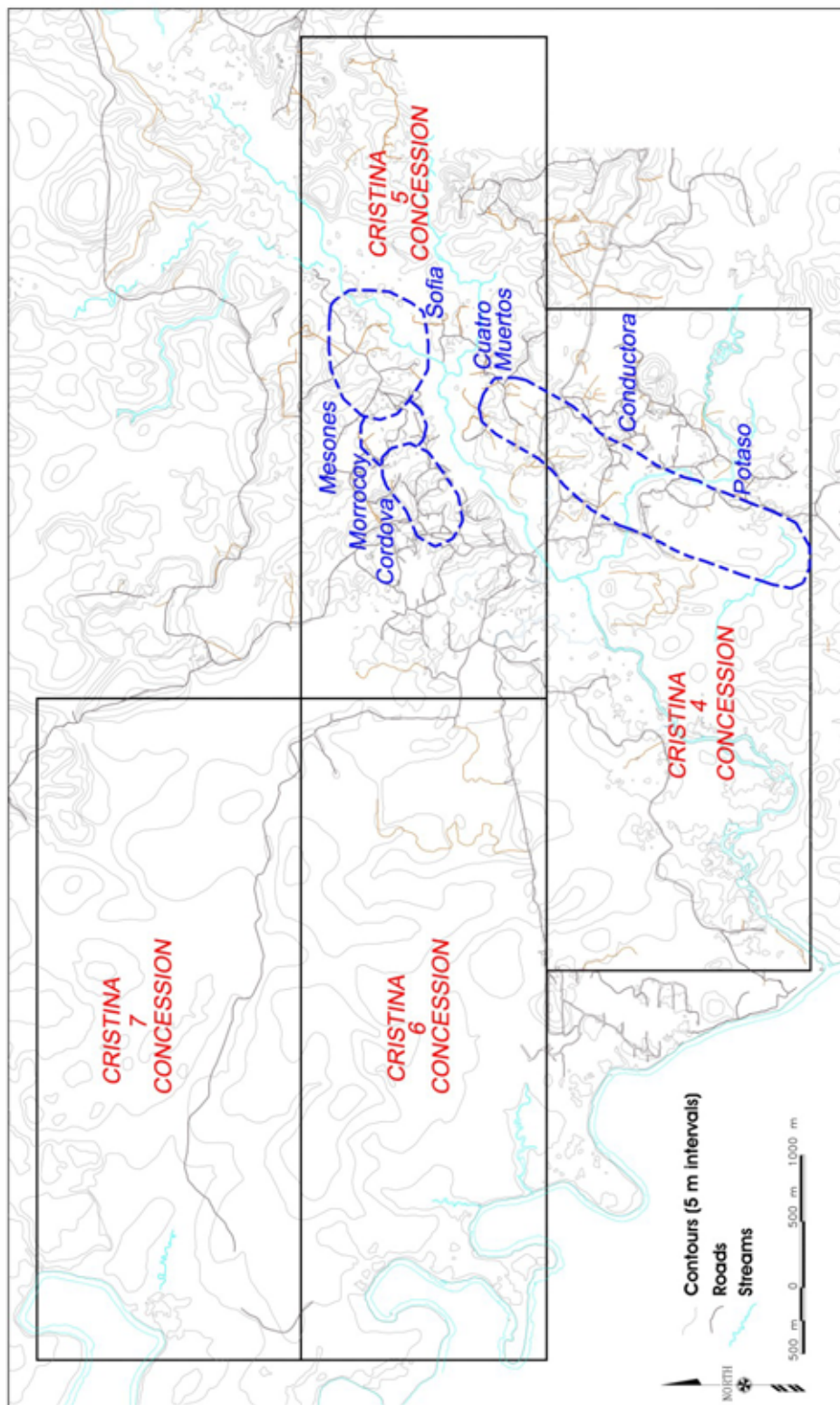




Figure 4.2 Las Cristinas Project Area Location and Concessions





4.3 Agreements and Encumbrances

Under the Venezuelan constitution, all hydrocarbon and mineral resources belong to the Republic. The Mining Law of 1999 (“VML”) regulates the exploration and exploitation of mineral resources (other than some industrial minerals not found on government lands). The Ministry of Basic Industries and Mining (“MIBAM”) (formerly, the Ministry of Energy and Mines) is responsible for administering the VML. The VML permits the exploration and exploitation of mineral resources in several ways, including concessionary exploration and exploitation by private companies pursuant to mineral concessions granted by the MIBAM and direct exploration and exploitation by the Government of Venezuela.

The Government of Venezuela may reserve for itself through a decree the right to directly explore and exploit specific areas or some or all of the minerals within specific areas. Direct exploration and exploitation may be carried out either by the Government itself through the MIBAM or by a public entity such as CVG. The effect of such a reservation is to prohibit the granting of mineral concessions within the reserve area to private parties. If the Government of Venezuela has reserved direct exploration and exploitation of minerals for itself, the MIBAM or the public entity may enter into operation agreements with third parties with respect to the exploration and exploitation of the reserved minerals.

Crystallex’s interests in the Las Cristinas deposits are derived from:

- a Presidential decree pursuant to which the Government of Venezuela reserved for itself, through the then Ministry of Energy and Mines, the direct exploration and exploitation of the gold located in the Las Cristinas deposits and granted to the Ministry of Energy and Mines the right to contract with CVG the activities required to carry out such exploration and exploitation;
- an agreement between the Ministry of Energy and Mines and CVG pursuant to which the Ministry of Energy and Mines granted to CVG the right to explore and exploit the gold mineral located in the Las Cristinas deposits and to enter into operations agreements with third parties for such purposes; and
- a mine operation agreement between CVG and Crystallex (Appendix A).

On September 17, 2002, Crystallex and CVG signed a Mining Operation Agreement (“MOA”) for the development of a mine on the Cristina 4, 5, 6 and 7 concessions. The MOA provides Crystallex with the exclusive right to explore, design and construct facilities, exploit, process, and sell gold from Las Cristinas but does not transfer property rights to Crystallex. An official translated version of the MOA is included as an appendix to the Crystallex Annual Information Form and is available at www.sedar.com and in Appendix A. A summary of the agreement is presented below (italicized) in its original text from Crystallex.

CRISTINAS MINING OPERATION AGREEMENT – EXECUTIVE SUMMARY

(September 30, 2002)

The Corporación Venezolana de Guayana and Crystallex International Corporation on September 17, 2002, entered into a mining operation agreement whereby Crystallex has been granted the exclusive right to develop the Las Cristinas 4, 5, 6 and 7 deposits. A point form summary of the agreement follows...



1. The agreement exclusively authorizes Crystallex “to make all the investments and works necessary to reactivate and execute in its totality the Mining Project of Cristina 4, Cristina 5, Cristina 6 and Cristina 7, design, construct the plant, operate it, process the gold material for its subsequent commercialization and sale, and return the mine and its installations to the Corporation (CVG) upon termination of the Contract”.
2. The agreement is for an initial term of twenty (20) years with two (2) renewal terms, each for ten (10) years.
3. Crystallex will complete and present for approval within one (1) year from the date of signature of the agreement a financial and technical Feasibility Study which addresses the objectives of the agreement for the benefit of both parties.
4. Crystallex will present for approval with the Feasibility Study an investment and financing plan which supports the Feasibility Study.
5. Crystallex shall prepare and present to the CVG for approval annual production plans as well as plans of exploitation for the life of the Project. The plans will include volume of production and other pertinent aspects of development including environmental protection and security.
6. Crystallex’s annual production commitment will be based upon the approved annual production plan.
7. Compensation to the CVG consists of an initial payment of US\$15,000,000 for delivery of reports, data and existing infrastructure and a royalty calculated against the value of gross monthly production as follows:
 - (i) when the US\$ troy ounce of gold is less than \$280, a royalty of 1%;
 - (ii) when the US\$ troy ounce of gold is equal to \$280 and less than \$350, a royalty of 1.5%;
 - (iii) when the US\$ troy ounce of gold is equal to \$350 and less than \$400, a royalty of 2%; and
 - (iv) when the US\$ troy ounce of gold is greater than \$400, a royalty of 3%.Crystallex will also pay to the Republic the Exploitation Tax established by the Law of Mines, currently 3%.
8. Crystallex will provide for the year 2002 and throughout the contract certain special programs whereby they will create employment for the region and provide training programs, provide technical assistance to small miners, improve community health care facilities and make various infrastructure improvements to water and sewage systems as well as to the access road to the Project site.
9. Crystallex will be the sole employer of personnel at the Project site and will be responsible for compliance with labor laws. Crystallex will participate jointly with the CVG in permitting for the Project including explosive permits and any municipal, state or national permits required for operation. The CVG will be responsible for environmental and mining permits and Crystallex will supply the necessary technical information to support its applications.
10. Crystallex will supply performance bonds related to construction, labor obligations and compliance with environmental requirements.
11. Crystallex will provide technical assistance to groups of Small Miners identified in the agreement and installed only within the limited areas of the Project approved by Crystallex.
12. Should Crystallex fail to fulfill the daily production or grade average contemplated by the annual production plan for reasons other than as contemplated by the agreement (example: force majeure), Crystallex is simply required to compensate the CVG for lost profits (royalties)



otherwise payable. The transition teams have been on site for the last several days completing inventory, reviewing data and finalizing the delivery of possession to Crystallex. The contract may be terminated unilaterally in the event of the inactivity of the Project for a period of one (1) year without just cause. Any breach by either party will require a written notice of breach invoking a ninety (90) day curative period.

13. The agreement contemplates the subsequent addition to the agreement of authorization for the “exploration, exploitation, commercialization and sale of the mineral of copper existent in the area Las Cristinas 4, 5, 6 and 7”.
14. The parties through their transition teams will settle “a detailed inventory of the installations, assets, and equipment property of the Republic” within thirty (30) working days of signature of the agreement.

The MOA has been entered into in accordance with applicable Venezuelan laws and under authority granted to CVG by the Ministry of Energy and Mines. A report in late February 2003 from the Commission of Energy and Mines of the National Assembly of Venezuela confirms the legal and administrative process by which the contract rights of MINCA, a previous partner with CVG, were terminated. The report also confirms the process by which the Republic of Venezuela acquired the related assets and by which the government, through CVG, entered into the MOA with Crystallex.

As described in the executive summary of the MOA, the term of the MOA is 20 years subject to extension by both parties for two renewal terms each of 10 years. At a processing rate of 20,000 tonnes per day (“tpd”) the expected mine life, based on the current proven and probable reserve estimate, is 64 years, which exceeds the term of the Mine Operation Agreement. However, the process plant has been designed to accommodate an expansion to 40,000 tpd, and Mr. Robert Crombie, Senior Vice President, Corporate Development, for Crystallex reports that Crystallex intends to increase the capacity as soon as practicable. SNC-Lavalin completed a full feasibility study for a 40,000 tpd project in 2004 (SNC-Lavalin, 2004a), followed by a pre-feasibility expansion study in October 2005, which contemplated expanding from an existing 20,000 tpd operation to a 40,000 tpd operation (SNC-Lavalin, 2005e). At a processing rate of 40,000 tpd, the current reserves would be depleted in approximately 32 years.

4.4 Environmental Reports and Liabilities

Information in the following section was modified from SNC-Lavalin’s (2005) development plan by Crystallex with updated information added where applicable. SNC-Lavalin has done no environmental work since their 2005 report.

Crystallex undertook an Environmental Impact Study (“EIS”) (SNC-Lavalin, 2004b) for Las Cristinas at the same time as the 2003 feasibility study and submitted the EIS to the Ministry of the Environment (whose acronym was “MARN” at the time and has now changed to “MinAmb”) for review in April 2004. The EIS was a new one, required as a result of the changes to the Las Cristinas project relating to Crystallex becoming the operator in 2002 and undertaking a fundamental re-design of the project. In addition, an Environmental Supervision Plan was prepared in September 2004. The EIS was formally accepted by MinAmb on May 16, 2007 in MinAmb document number 0000328.



4.4.1 Regulatory Framework

The Las Cristinas project is being designed to meet and exceed Venezuelan environmental laws and standards, as well as World Bank guidelines and targets. Together, these regulations and standards provide the framework for the environmental assessment and environmental design for the Las Cristinas project. Venezuelan Decree No. 1257 defined the environmental assessment requirements for the Las Cristinas gold-copper project development as envisioned by Placer. These requirements were modified somewhat by MinAmb as a result of changes in the scope of the project planned by Crystallex, such as the project now being gold only. The EIS that was submitted to MARN addressed the requirements defined in Decree 1257 as well as the additional requirements in various addenda to the original EIS document.

4.4.2 Existing Environment

As described in Section 5.0, the Las Cristinas site is located within the sub-equatorial tropical zone in a flat area with minor undulations, parts of which, under normal conditions, are subject to flooding. Although much of the site has been previously disturbed by small-scale mining, the area can generally be characterized as tropical rain forest with a distinct rainy season between May and September and a drier period from January to April. Despite the fact that the Las Cristinas area has been designated as a mining district, it lies within the boundaries of the Imataca Forest Reserve and therefore is subjected to more stringent environmental controls than areas outside of the Imataca Reserve.

A significant portion of the concession area (approximately 34% of total area of the concessions, and 53% of area required to develop the project) has been intensely disturbed by previous mining activities. Although the surficial laterite soils are not very productive, vegetation grows very quickly, and biological diversity of the area is high. Crystallex has updated air quality, soil, flora and fauna baseline studies of the area and continues to monitor water quality within the project area.

Ethnically the population is divided between indigenous and “*criollos*” (individuals of mixed blood). According to a national census in 2001, approximately 57% of inhabitants in the project’s zone of influence are indigenous. *Artisanal* or small-scale mining is considered the most economically important activity in the area.

Updates to the Acid base accounting (“ABA”) and humidity-cell tests was done by SNC-Lavalin. ABA and humidity-cell tests were conducted by SGS Lakefield Research Ltd. (“Lakefield”) to determine the balance between acid-generating and acid-consuming components of mine waste as described in (SNC-Lavalin, 2005d). In March 2004, 103 samples containing ore and waste were submitted for ABA testing (SNC-Lavalin, 2005d). After the initial assessment of the ABA results, nine waste-rock samples and one ore sample were prepared for 21-week humidity-cell testing, of which five of the waste-rock samples were tested for additional time; four of the five were also submitted for net acid generation (“NAG”) tests. Through the ABA, NAG, and humidity-cell testing, “*it was confirmed that waste rock samples of SAPO and CSB-C had very low potential for acid generation and actually they were acid consuming, whereas waste rock samples of CLB-C, SAPRK-CM, CSB-M and CLB-M had high potential to generate acid. Special attention will be focused on these samples during the operation to reduce or eliminate the acid leachate generation by implementing best management practices*” (SNC-Lavalin, 2005d). In addition, two tailings samples were also subjected to 25-week humidity-cell testing, which indicated that the sulfides in the samples were depleted at a much faster rate than the neutralizing



materials, while maintaining neutral pH and low metal concentrations in the leachate. No concentrations of any elements in the leachate were measured at values higher than the limits specified by Venezuelan regulation or World Bank guidelines (SNC-Lavalin, 2005d).

4.4.3 Analysis of Alternatives

A comparative analysis was carried out to rank alternatives for infrastructure components, based on environmental, socio-economic, constructability and other technical issues, permitting, cost, and where applicable, safety. Briefly, the analysis determined:

Diversion Channel

Three alternatives were assessed to divert the watercourses that cross the project area. The alternative that diverts the waters through the southern border of the Las Cristinas concessions and discharges them into the Quebrada Amarilla channel (approved by MARN for the original project) was chosen for the following reasons:

- This would minimize the potential biophysical impact;
- Water would be contained within one watershed and would only affect either previously disturbed areas or areas planned for development of the mine;
- This would provide flooding protection up to a 1-in-200 year flood event;
- This does not require approval of third parties for its construction, operation and maintenance;
- It represents the shortest channel length and therefore the lowest impact to soils (less excavation and movement of soil overall) and vegetation; and
- The flow of the water within the channel makes use of the topography and the natural slope of the terrain, and therefore the water does not have to be pumped.

Since the completion of the feasibility study in 2003 (SNC-Lavalin, 2003), the design of the diversion channel has been modified and its length reduced from approximately 8.5 km to 6.9 km, as the Morrocoy Creek will no longer be included in the initial development of the channel. This current design emphasizes the reasons that made this route the best alternative. A change has recently been made to the southern part of the route to accommodate the layback of the designed pit on the adjacent Brisas del Cuyuni deposit.

Power Transmission Line

From two alternatives, the most direct power transmission line route from the existing CVG-Edelca substation at Kilometer 86 to the process plant location was selected over the alternative route that would have followed the national highway, Troncal 10, to Las Claritas, and from there continued past the villages of Santo Domingo and Nuevas Claritas. The cross-country route was selected because of its shorter distance, lower cost and lower impact on local residents, and favorable topography, despite greater loss of forest vegetation.



Tailings Management Facility Location

The tailings management facility (“TMF”) was located in the only area large enough within the concession boundaries that would not be used for mining or processing. The location suitable for the TMF is further restricted by the location of areas currently assigned to *artisanal* mining activities in the eastern part of the Cristinas 5 concession.

Mine Access Road

From three alternatives, each along existing roads, the preferred mine access road from Troncal 10 to the process plant is the northerly route, exiting Troncal 10 at Kilometer 84. Despite its greater length (19 km) and associated costs, it is the only alternative that avoids local communities, providing greater safety and minimal impacts of noise and dust to the residents. This access route was constructed in 2005-2006.

Plant Site

No alternatives were examined for the plant site, as, for efficiency reasons, it will be located on the highest land with the most stable underlying soils, in proximity to the open pit mines and TMF.

4.4.4 Assessment of Impacts to the Bio-Physical Environment

The project’s potential, direct and indirect, positive and negative impacts, impact duration, probability, and reversibility, mitigation, and net effects have been assessed. Overall, it is expected that the environmental impact of the development of the Las Cristinas project can be minimized through the implementation of best management practices, responsible design and operations, and monitoring. It is of particular importance that the project is operated to protect the environmental quality of the Imataca Forest Reserve. This will be achieved by protecting water quality, minimizing erosion and geomorphological processes, protecting air quality, limiting clearing, controlling noise and dust, and ensuring that the site is closed responsibly once mining is completed, including re-vegetation and reforestation.

Construction Phase

During the construction phase, environmental impacts can result from site preparation including deforestation, clearing and earthworks, and construction of the mine facilities. The impacts from construction of the mine facilities may involve the initial footprint of the pit, initial construction of the TMF, watercourse diversions, waste rock storage area footprints and the site drainage management system, site access roads, power lines, process plant, ancillary facilities, warehouses, and concrete plant.

Surface-water impacts from erosion and sediment transport will be minimized through a properly designed and maintained site-drainage management system, including collection ditches and runoff-collection ponds. Potential contamination of surface and ground waters and soils by spills or improper storage, handling, or use of fuel, lubricants, and other chemicals will be minimized by spill-contingency and response-measures training, on-site clean-up kits, hazardous-materials management procedures, and containment systems and by using designated equipment refueling and maintenance areas.



Apart from the creation of two artificial lakes, the impacts to the physical environment are generally anticipated to be reversible and not significant with proper implementation of control measures.

From a terrestrial, biological perspective, the site, which has been previously disturbed, does not represent habitat that is not readily available or unique from the habitat adjacent to the site. It is also noteworthy that many of the previously disturbed areas of the site have naturally recovered over time. Regardless, lost forest habitat will be replaced through site and environmental rehabilitation at closure. Reclamation will include conversion of the open pits into lakes. Overall, impacts to biological resources are not expected to be significant or permanent as a result of construction.

An Environmental Supervision Plan (“ESP”) has been developed for implementation during construction, as described in Section 4.4.6. The ESP provides direction for proper management of construction activities to minimize environmental effects, prescribes mitigation measures, and provides an organizational framework for implementation and reporting to the authorities.

Operations Phase

Many of the mitigation measures implemented during construction will also be applied during operations, including sediment and erosion controls and prevention of contamination. Runoff from on-site facilities will be directed to a series of runoff collection ponds and monitored for compliance prior to release to the environment. Rock facing on the downstream face of the TMF dam and a collection ditch at the toe of the dam will also be provided, with runoff and seepage being pumped back to the tailings basin.

ABA tests to date indicate that there is low potential for acid mine drainage from waste-rock dumps or temporary ore stockpiles adversely affecting surface-water quality. Potentially acid-generating rock will be encapsulated or buffered by acid-neutralizing rock within the dumps. Runoff and seepage from all waste-rock dumps and temporary stockpiles will be collected in perimeter ditches, directed to a runoff pond, and monitored. Effluent that does not meet acceptable discharge standards will be pumped to the cyanide-destruction plant.

The cyanide concentration in the tailings basin are expected to meet Venezuelan and World Bank standards because all the effluent will be treated in a cyanide-destruction plant prior to its disposal in the TMF. All sanitary waste from on-site buildings will be directed to the proposed wastewater treatment plant for treatment, and effluent from the treatment plant will be discharged to the polishing pond. Impacts on wildlife and vegetation and impacts of dust, noise and vibration will be minimized through special blasting procedures (e.g., low-frequency and low-shock blasting techniques); hunting will be prohibited within the concession lands and adjacent natural areas.

Overall impacts to the biophysical environment resulting from operations of the mine are anticipated to be reversible and not significant with the implementation of controls and mitigation measures.



Closure

During closure it is intended to return the site as close as possible to pre-project conditions consistent with the objectives of the Imataca Forest Reserve Plan. Active monitoring, inspection, and intervention will continue until acceptable chemical, physical, and biological stability has been achieved.

4.4.5 Assessment of Impacts to the Socio-Economic Environment

The socio-economic impact assessment for the Las Cristinas Project is based on historic information developed in 1996, plus a 2004-updated characterization and analysis conducted by the Venezuelan firm ProConsult C.A. (“ProConsult”). SNC-Lavalin has edited the information provided by ProConsult for content and consistency with the format of the report.

Overall, ProConsult expects that the project will result in many positive benefits at the national, regional, and local levels, such as: generation of a dynamic effect on the economy, contribution to the gross domestic product, increase of tax collection, creation of jobs, inclusion of workers into the social security system and improved work conditions, improvement of infrastructure and implementation of social strengthening and job plans, technical assistance to small-scale miners, and improvement in health conditions of population and quality of life.

Negative impacts are also expected as a result of introducing a large-scale industrial project into a stable, rural community. These negative impacts include accelerated migration, drastic changes in the labor market and local economy, risk of social conflicts, increased lack of public security, potential for inflation, impacts to cultural traditions and cultural landscapes, synergic increase in loss of cultural values among the indigenous population, and impact on the demand for public and social services.

However, it is also recognized by ProConsult that some or all of these impacts may already have been experienced due to the rapid influx of thousands of small-scale miners over the course of 2003. The recent significant reduction in the number of these small-scale miners reported by Crystallex has resulted in many positive improvements, such as reduced demand on community services, increased community stability, and reduced crime rates. In addition, Crystallex has already implemented a number of programs to add benefits to the local communities, including: the construction of 30 houses; construction of three water treatment plants and piped-water supply systems for eight communities; construction of a sewage collection system for three communities and is currently constructing a sewage treatment system; monthly medicine supply and improvements to a local health center; the sponsoring of two doctors; and the training of up to 25 university and college graduates on an annual basis. Crystallex has been instrumental in working with the State in the control of malaria, the incidence of which was increasing exponentially. With the implementation of mobile clinics and frequent testing of the local population, the number of diagnosed malaria cases has declined significantly.

Crystallex has indicated that additional mitigation measures will be implemented over the course of the construction and operations period to minimize socio-economic impacts. These measures will include training programs; technical assistance to local communities in the area of waste management and administrative management; continued technical assistance to the authorized small-scale miners; and continuation of the company and community liaison program to ensure that community issues are identified and addressed.



In the opinion of ProConsult, the Las Cristinas project can be developed in a manner that minimizes impacts to the socio-economical environment.

4.4.6 Environmental Supervision Plan

Crystallex has prepared an ESP for the construction phase of the Las Cristinas mining project, with the purpose of providing an overall plan for the supervision and management of construction activities to minimize the environmental effects, both biophysical and socio-economic, and to ensure compliance with regulatory requirements and environmental commitments made during the environmental planning process. The ESP includes comprehensive environmental protection procedures and guidelines for execution during a range of typical and emergency conditions; organizational structure and reporting requirements; personnel training requirements; and an environmental follow-up (monitoring) plan. The ESP intended to develop the environmental mitigation measures identified for the construction phase in the EIS into a comprehensive plan and framework for implementation by personnel who will work in the field during this phase.

4.4.7 Site Closure and Rehabilitation

Preliminary objectives and general concepts for a Closure and Rehabilitation Plan were developed as part of the EIS prepared in 2004. The overall strategy of the closure plan is to comply with the project's environmental obligations so that the facility can achieve acceptable chemical, physical, and biological stability by meeting all regulatory requirements and standards without human intervention.

Crystallex and CVG will maintain an active presence at the site for an interim period following termination of mine production. During this interim period they will continue to actively operate the site water-management system, monitor for contamination, and intervene as required to ensure compliance with applicable standards and regulations. The interim period will end once the physical stability of all remaining structures is demonstrated and site drainage meets regulatory discharge standards and can be released directly to the environment without treatment.

4.4.8 Conclusions

Based on all of the above, Crystallex believes that the Las Cristinas project can be developed in a manner that minimizes impacts to the biophysical environment. Main projected measures include:

- The waste-rock dumps will be designed to ensure that potentially acid-generating waste is placed over the low-permeability saprolite soils and covered/buffered by non-acid-generating or net-acid-consuming waste.
- A cyanide destruction plant will treat the entire discharge from the gold processing facility. The cyanide-free slurry will then be pumped from the cyanide destruction plant for deposition in the TMF.
- Treated effluent from the sewage treatment plant will be discharged to the polishing pond. Leachate collected from the sanitary landfill will be transferred to the TMF.



- The TMF dam is designed with appropriate standards and safety factors to guarantee its stability and is also designed to contain a 24-hour Probable Maximum Precipitation (“PMP”) event. The Las Cristinas site area is in a zone with the lowest possible risk of seismic activity.
- The entire tailings basin is founded on a low-permeability saprolite soil layer, providing a competent containment barrier to contaminant migration, as demonstrated by contaminant transport modeling (SNC-Lavalin, 2005b). Crystallex and CVG will maintain an active presence at the site for an undefined interim period following termination of mine production and prior to their leaving the site permanently.
- Proposed measures to prevent, mitigate or compensate socio-economic impacts, as recommended in the Detailed Evaluation of Socio-economic Impacts of Las Cristinas Project, prepared by Proconsult C.A., 2004, and submitted to the MARN as Addendum #3 to the EIS, will be implemented [MDA has not reviewed this report].



5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, PHYSIOGRAPHY

5.1 Accessibility

The Las Cristinas project area lies 370km by road south-southeast of the city of Puerto Ordaz. The first 55km of this highway, called Troncal 10, is a four-lane road between Puerto Ordaz and Upata; the highway continues as a well-maintained two-lane paved road to the border with Brazil at Santa Helena de Uairén. The Las Cristinas project can be accessed via two alternative routes from Troncal 10. The shortest access is westwards via a 6km unpaved road from the village of Las Claritas, through which Troncal 10 runs. The alternative route, which was designed to bypasses the local villages, is an upgraded, unpaved 19km access road from the highway at Kilometer 84. Under normal conditions, the drive from Puerto Ordaz to the camp takes about five hours. The Las Cristinas camp is located in the sub-Amazon rainforest of the Imataca Forest Reserve.

Puerto Ordaz is a port city on the Orinoco River, which flows into the Atlantic Ocean. The city of Puerto Ordaz is served by three airlines, with numerous daily flights to Caracas and other major Venezuelan cities. The nearest commercial airstrips to Las Cristinas are at El Dorado, 80km and approximately one hour by highway north of the camp, and at Luepa, 80km to the south. A charter flight from Puerto Ordaz to El Dorado takes about one hour. A 980m-long air strip with 6m-wide asphalt paving at Las Cristinas allows for the landing of small aircraft.

5.2 Climate

The climate at Las Cristinas is tropical and humid, with wet and dry seasons. The monthly temperature average rises to a 26.3°C peak in March and 25.7°C in September. In February and July the temperature reaches minimums of 24.3°C and 24.5°C respectively. The seasonal climate variation results from fluctuations in the location of the Inter-Tropical Convergence Zone (“ITCZ”) throughout the year, between summer and winter solstices. The overriding atmospheric circulation in this location causes the winds to be from the northeast.

Precipitation falls as tropical showers that are mainly short-term events of a few hours duration or less. Data obtained from the Las Cristinas weather station between 1992 and 2000 and from December 2003 until present indicate that the project area experiences a dry season (lower than average monthly rainfall, 273mm) that extends from January to April, and a wet season (higher than average rainfall) that extends from May to September, with a transitional period between October and December. The area receives an annual average of 3,283mm of rainfall. Monthly averages reach a maximum of 454.8mm and 437.8mm in June and July respectively, and a minimum of 76.6mm and 120.1mm in March and April respectively.

The average regional evaporation is equivalent to 58% of average annual precipitation. This results in an estimate of average annual evaporation at the Las Cristinas site of 1,904mm (=3,283mm x 0.58).

The average annual relative humidity on site is 81% with maximums in June, July and August (84%) and minimums in April and October (78.2 and 75.6% respectively). The average wind speed is



consistent through the year and overall is determined to be 0.90m/s. The wind category of 0.5 - 2.1m/s is rarely exceeded.

Operations can be conducted year round.

The site is located in Seismic Zone 1 with a LOW Seismic Hazard in accordance with the recent Venezuelan Code.

5.3 Physiography

Las Cristinas lies in the physiographic region known as the Guyana Shield, a natural peneplain characterized by flat topography which is crossed by streams and rivers and, under normal conditions, is subject to flooding. The most prominent local topographic features are isolated hillocks or ranges of low hills that rise up to a maximum of about 80m above the peneplain; these features correspond to the location of diorite intrusions.

The geomorphological features of the Las Cristinas area are influenced by topography, slope, vegetation, soil, hydrography and climate, combined with anthropogenic physiographic disturbances resulting from years of small-scale gold mining activity. Climatology, hydrology and vegetation are considered the most important factors that control and regulate morphodynamic processes, especially erosion, weathering, sedimentation and flooding. Disturbed areas are particularly susceptible to erosion primarily due to the exposure of the clayey layers of the soil resulting from the removal of the uppermost, organic layer.

The most comprehensive report on anthropogenic disturbances of the area was provided in a study spanning the 1992-1994 period (cited in SNC-Lavalin, 2005a; MDA has neither seen nor reviewed this report, and this is provided for information purposes only). Since this study was conducted, small-scale mining activity has increased significantly, although the extent of the additional area affected is not expected to have increased significantly as most of the activities are focused in the areas of the main deposits of Mesones and Conductor.

There is very little topographic relief within the concession area. The average elevation is 130m above sea level, with small rounded hills reaching a maximum elevation of 160m above sea level. Four streams flow through the property: Amarilla, Las Claritas, Sofia and Morrocoy. These streams are wide and shallow, and occasionally flood during the rainy season. Much of the project area has been deforested and hydraulically mined by itinerant miners. As a result, there are numerous water-filled pits and large areas of tailings material. Some areas of poorly consolidated tailings are unstable and cannot support the weight of a vehicle, making access to some areas difficult.

Las Cristinas is contained within the sub-equatorial tropical zone. Although small-scale mining has previously disturbed much of the site, the area can generally be characterized as tropical jungle with distinct rainy and dry seasons. The surficial laterite soils, which are typical of tropical habitats, are not very productive, containing very low percentages of organic material and nutrients, but vegetation grows very quickly and biological diversity of the area is high.



Undisturbed primary vegetation is typical of the Sub-Amazon type rain forest. Large trees dominate the forest, with their canopy up to 30m above the ground. The forest floor is relatively open. Secondary vegetation, which has now invaded the mined or otherwise disturbed areas, consists of small “weed” trees, bushes, creeping vines and various grasses. This secondary growth is often quite dense and can be difficult to penetrate on foot.

5.4 Local Resources

The infrastructure in the region will require some improvement to support the proposed mining operation. The local population is not sufficient to fully operate the mine, and additional personnel will have to be brought in for construction and mining operations. Improvements to sewer, water and other local facilities will be made in order to accommodate the additional workers. There are sufficient water sources and land surface areas for mining, tailings disposal, and plant sites. Improvements have been made to the on-site airstrip.

Existing facilities include the exploration camp, whose electricity is supplied by a link to the national grid (there is a stand-by generator on site), sample preparation facilities, offices, dormitories, sample storage and seven core sheds.

The construction camp built by Placer Dome has been extensively refurbished. The camp consists of an office block, administration units, dormitory units, maintenance units, a kitchen and dining facility, gym, recreation center, a clinic permanently manned by a doctor, and outdoor basketball and mini-soccer courts. Catering is currently undertaken by contract with Universal Sodexo, and several hundred people can be fed at a time with little trouble. The camp is powered with electricity from the national grid, and two stand-by generators are located on site. A cell phone repeater station has also recently been constructed adjacent to the administration building, and thus the whole of the Las Cristinas project area now has cellular phone reception.

Significant power demands are required and will increase from an average of about 10 MW to 45 MW when the plant is in full production. Maximum demand could reach 55 MW. A 400 KVA power line has been installed near the project to supply power to Brazil. EDELCA, a State utility company, has installed a substation near the town of Las Claritas that is capable of supplying the electricity required by the project.



6.0 HISTORY

6.1 General History

General Fernandez Amparan first discovered gold in the Las Cristinas region in 1920, and gold mining at the site was initiated in the 1930s. During the 1940s, an underground mine was operated by New Goldfields de Venezuela, reportedly called “Mina Alto-Cuyuni,” whose shaft was in the vicinity of what is now the Hoffman pit (David Rogerson, personal communication, 2007). Mining continued sporadically on a minor scale until the early 1980s when a gold rush occurred. Some 5,000 to 7,000 small-scale miners worked alluvial and saprolite-hosted gold deposits using hydraulic mining techniques. Many square kilometers of jungle were stripped of soil and saprolite. This material was processed in sluices and small hammer mills. The amount of gold recovered is unknown, and much of the area of the concessions is now covered with tailings.

After extensive exploration, Placer Dome Inc. (“Placer”) announced commencement of construction of the Las Cristinas mine on August 2, 1997. The inauguration took place at the site with officials of Placer, CVG, and representatives of the Venezuelan government present. On January 20, 1998, Placer announced that its operating company in Venezuela, Minera Las Cristinas C.A., had decided to suspend construction. Construction resumed in May 1999 but was again suspended on July 15, 1999 due to uncertainty with respect to gold prices and title. Up until that time, Placer had reportedly spent US\$168 million on the project.

CVG took possession of the property in 2001 and in 2002 signed a mine operating agreement (MOA) whereby Crystallex is required to explore, mine, and produce gold at Las Cristinas.

6.2 Ownership History

An outline of the history of property ownership was described by Crystallex on its website (2002), and the following was copied from that source:

- *May 1986 – Inversora Mael, C.A. receives rights to Las Cristinas property (4&6) from Mr. Ramon Torres. Mr. Torres received the titles one month earlier from Ms. Dot Culver de Lemon who was granted the title for Cristina 4 in February 1964 and Cristina 6 in August of that same year. (Notices of the transfers were recorded on the Registry, but not published in the Official Gazette of Venezuela as required under the Venezuelan mining law).*
- *November 1988 – Following various refusals by the Ministry of Energy and Mines (MEM) to publish notice of the transfers of the concessions, Mael commences lawsuit seeking invalidation of MEM action.*
- *January 1989 – Mael files petition with MEM to renew Cristinas 4 concession, which MEM denies.*
- *February 1989 – MEM purports to extinguish Cristinas 4 concession.*
- *March 1989 – MEM purports to extinguish Cristinas 6 concession.*
- *May 1991 – The Supreme Court of Venezuela rules that the transfer from Ms. de Lemon to Mr. Torres, then from Mr. Torres to Inversora Mael, C.A. was “perfectly valid.” The court orders MEM to publish the notice of the transfers in the Official Gazette.*
- *June 1991 – Corporación Venezolana de Guayana (CVG), a state-owned corporation, awards Placer Dome a contract for the right to form a corporation (MINCA) to explore and mine Las*



Cristinas 4, 5, 6 and 7. [Placer stated in its 1996 feasibility study (Placer Dome Technical Services Ltd., March 1996) that Las Cristinas was controlled by two Venezuelan companies, which were formed in 1992: Minera Las Cristinas, C.A. (“MINCA”), 70% owned by Placer Dome de Venezuela, C.A. (“PDV”) and 30% owned by Corporación Venezolana Guyana (“CVG”), a state-owned resource company, and Relaves Mineros Las Cristinas, C.A. (“Reminca”), 51% owned by PDV and 49% by CVG.]

- *July 1991 – CVG and Mael enter into a settlement agreement in relation to the actions of the MEM which were ruled illegal in the May 1991 court decision.*
- *October 1996 – Supreme Court again confirms the validity of the transfers to Mael of the Cristinas 4 & 6 gold concessions and requests that MEM publish the required notice of the transfers.*
- *March 1997 – Crystallex acquires Inversora Mael for US\$30 million based upon multiple legal opinions and two Supreme Court decisions that Inversora Mael has valid claim to Las Cristinas 4 and 6.*
- *April 1997 – The Supreme Court takes the extraordinary step of directly ordering the publication of the notice of transfer between Mr. Ramon Torres and Inversora Mael in the Official Gazette.*
- *April 1997 – Mael commences an action to declare various MEM actions invalid and requiring MEM to recognize Mael’s ownership.*
- *May 1997 – Supreme Court publishes notice of transfers to Mael of Cristinas 4 and 6 concessions in Official Gazette.*
- *January 1998 – Placer suspends construction at Las Cristinas, citing a need to ensure it gets the best possible terms to finance the rest of the project; and again in August 1999, blaming low gold prices.*
- *June 1998 – Venezuela’s Supreme Court rules that Mael does not have status to assert ownership rights over Cristinas 4 and 6 concessions and declines to proceed with Mael’s April 1997 lawsuit.*
- *August 1999 – Crystallex files new actions for its claim on Las Cristinas 4 and 6 seeking to nullify (i) the CVG MINCA joint venture agreement and (ii) the effect of the July 1991 settlement agreement.*
- *September 1999 – Admission chamber of Supreme Court refuses to admit Mael’s action seeking to nullify CVG/MINCA joint venture agreement.*
- *September 1999 – Venezuela enacts new mining law which calls into question the legality of mining contracts issued by CVG.*
- *February 2000 - Admission chamber of Supreme Court refuses to admit Mael’s action to nullify the July 1991 settlement agreement. Mael appeals.*
- *May 2000 – The Supreme Court grants Mael’s appeal and in June 2000 re-admits Mael’s claim in relation to the 1991 settlement agreement. Decision confirms Mael’s legal standing.*
- *July 2001 – Placer Dome sells its interest in MINCA to Vanessa Ventures Ltd. [On July 13, 2001 Placer sold 100% of the issued and outstanding shares in Placer Dome de Venezuela C.A to Vanessa Ventures Ltd. (Placer press release dated July 13, 2001), retaining an interest in the gold and copper revenue generated by Las Cristinas and under certain circumstances having the right to reacquire the shares in Placer Dome de Venezuela C.A.]*
- *November 2001 – CVG terminates its mining contract with MINCA and subsequently takes possession of the property.*
- *March 2002 – MEM cancels the MINCA copper concessions.*



- April 2002 – By Presidential Decree, Venezuela reserves for the MEM the direct exercise of the mining rights over Las Cristinas, through decree 1757 published in the Official Gazette #37,437 dated May 7th, 2002.
- May 2002 – Through Agreement entered during May 2002 between MEM and CVG, MEM granted mining rights over Las Cristinas to CVG.
- September 2002 – Crystallex and Venezuela(CVG) to develop Las Cristinas

6.3 Previous Work

Placer conducted essentially all of the modern exploration on Las Cristinas prior to acquisition of the property by Crystallex. During their tenure on the property from 1991 to 2001, Placer completed line cutting, mapping, rock and soil sampling, geophysics, and drilling. These are described in Section 10.1.

Golder and Associates (“Golder”) was contracted by Placer to collect drill core and surface geotechnical data in the spring of 1993, culminating in a preliminary draft report covering pit slope stability, availability of construction aggregates, tailings disposition, and waste disposal. Bruce Geotechnical Service from Vancouver completed complementary studies in 1994. Water Management Consultants (Denver, Co.) and Hay and Co. (Vancouver, B.C.) completed hydrological and hydrogeological studies (pumping test, mine dewatering, *etc.*) during 1996. MDA has not reviewed any of these reports. Placer completed a comprehensive feasibility study on the project in 1996 that was updated in 1998, which MDA has reviewed (Placer Dome Exploration and/or Placer Dome Technical Services Ltd., 1996a-f; 1998a, b).

After acquiring the property, Crystallex engaged MDA to review the geology at Las Cristinas, estimate resources and reserves, and provide a mine plan (Ristorcelli, Hardy, and Prenn, 2002; Mine Development Associates and Kappas, Cassidy and Associates, 2003; Ristorcelli and Hardy, 2003; Ristorcelli and Hardy, 2004a and Ristorcelli and Hardy, 2004c; Ristorcelli, 2005; Hardy, 2006; Hardy, 2007). The 2002 technical report prepared by MDA (Ristorcelli, Hardy, and Prenn, 2002) described the historic work and results of that work done by previous operators and discussed the adequacy of that data. Because the work, data, and studies were from others, the recommendations made in MDA’s 2002 report were aimed at validating the previous work and revising the engineering studies culminating in a feasibility study of the project. Based on Placer’s descriptions, MDA concluded that their exploration and sampling procedures conformed to or exceeded industry standards, but because all prior exploration had essentially been done by only one company and because hard copies of assay data were not available, substantial data verification was necessary. Placer had extensive checks and quality assurance/quality control (“QA/QC”) protocols incorporated throughout the process and had noted no major problems. Placer reported minor biases in the laboratory results on the order of 5% to 10%, but believed that these were not material and that the groups of samples used often compensated for each other. Preliminary sampling by Crystallex verified the presence of gold and copper. Though inconclusive because of their small number, MDA’s sampling found some grade differences, which they thought needed to be addressed during the then-upcoming validation program. MDA recommended that this validation program twin drill holes, conduct infill drilling, and take additional check samples on core splits, coarse rejects and pulps. During this program, Crystallex planned to assess sample preparation procedures and conduct a heterogeneity study to determine gold distribution in the rock and appropriate sample and sub-sample preparation procedures.



Crystallex undertook drilling to confirm results of the previous operator prior to their first resource estimate. Crystallex drilled 12 holes totaling 2,199m in 2003 to confirm the tenor of mineralization presented in the pre-existing database and also assayed check samples as described in Section 10.2. The drill holes were designed to twin existing drill holes as a check of the Placer drilling data. MDA's analysis (Ristorcelli and Hardy, 2003) of the twin holes indicated that while the comparison of location of gold grades was found to be reasonable, analyses on a hole-by-hole basis yielded highly variable results. Overall, the average gold grades for Crystallex's drilling were 15% lower than the Placer results, with more similarity in the twin-hole-sample assays in Conductorá in general than in Mesones-Sofía. For additional confirmation, Crystallex re-assayed 262 pre-existing pulps, 200 pre-existing coarse rejects, and 342 pre-existing quarter-core samples. Although mean grades are similar for both datasets, there is a large variance in grade between individual pairs of Placer's core assays and Crystallex's core check samples. As expected, the variance is lower in the pulp and coarse reject checks. MDA evaluated the relationship between metal grades and core recovery and found a bias in the saprolite gold data, most prevalent in low-grade samples. This bias was not found in bedrock, which makes up the majority of the resource and reserve. MDA (Ristorcelli and Hardy, 2003) concluded, "*The bias should not materially affect the global estimated gold and silver grades; however within the saprolite in areas where core recovery is low, grades may be lower than predicted.*" Overall, based on the 2003 program, MDA (Ristorcelli and Hardy, 2003) concluded that "*The Las Cristinas database can be used for feasibility-level study and resource estimation. Having said this, all future work must be cognizant of the underlying difference in grades between Placer data and the Crystallex verification drilling and the difference must be explained. It cannot be stated which is the more accurate at this time but the data remains sufficiently accurate for further use. Negligible contamination during sample preparation may have occurred during sample preparation of the Crystallex samples. The larger concern is the high variance noted in check assays, which should not affect the global metal estimate but could affect local estimates. This concern can be mitigated by completing a heterogeneity study of gold in the rock.*" Crystallex's work corroborated the general tenor of gold mineralization reported by Placer. MDA completed a resource model at the conclusion of this work (Ristorcelli and Hardy, 2003) that is discussed in Section 6.4.2.

Crystallex completed an 18-hole, 7,131m drill program in 2004 and an additional 5,419m in 14 drill holes in 2005. Drilling in these two programs was focused in the western and southern parts of the modeled Conductorá – Cuatro Muertos pit shell. The objective of these programs was to infill drill those poorly drilled areas to upgrade resource classification and ultimately increase the reserve. MDA took independent samples from the 2004 drill program, which verified the general tenor of mineralization. When the resource was evaluated in 2003, a difference in mean grades had been noted between Placer's data and Crystallex's initial verification drilling, and during the 2004 drilling and resource estimation, a similar difference in global mean grades ranging between 6% and 8% was noted, although differences are not statistically significant due to the small number of Crystallex drill holes (30) compared to over 1,000 Placer drill holes (Ristorcelli and Hardy, 2004a). These mean grade differences, though not statistically significant, were thought (Ristorcelli and Hardy, 2004a) to potentially indicate a sampling and sub-sampling issue related to heterogeneity of Las Cristinas, raising the possibility of a difference in mean grade of the deposit, possibly even higher grade than is presently noted. The 2004 drilling showed that while local grades were difficult to predict, the general form and continuity of the deposit was very predictable.



The objective of the 14-hole drill program in 2005 in the Conductor area was to increase material in the Measured and Indicated categories. During the course of the drill data verification and the resource expansion drilling, it was noted (Ristorcelli, 2005) that some biases existed between Crystallex and Placer data, the latter of which represent by far the bulk of the exploration data. A heterogeneity study was undertaken to better understand the grade biases noted, to define more appropriate sub-sampling procedures and protocol, and to maximize the efficiency of the upcoming grade-control program during mining operations. A report by Francis Pitard (2005) suggested that the grade bias of Crystallex grades being lower than Placer grades likely was due to the difference in size of the core samples. He further pointed out that the samples taken by Placer also could be understating the global grade of the Las Cristinas deposit.

Crystallex completed a 46-hole drill program in February 2007. Drilling during this campaign was done down dip of the Conductor - Cuatro Muertos deposit and along strike into the Morrocoy area, which lies between Cordova and Mesones-Sofia. The objective of this program was to better delineate the Morrocoy area into a defined resource and to increase resources and reserves down dip along the Conductor area. The results of this drilling are incorporated into the resource estimation in this technical report.

Crystallex commissioned a feasibility study by SNC-Lavalin that was completed in September 2003 (SNC-Lavalin, 2003) and updated in 2004 and 2005 (SNC-Lavalin, 2004a, 2005). These studies are more fully described in Section 6.5.2.

6.4 Historical Mineral Resource and Mineral Reserve Estimates

6.4.1 Estimates by Placer

Placer completed its most recently reported resource for Conductor-Cuatro Muertos and Mesones-Sofia in 1997, summarized in its 1998 Feasibility Study Update (Placer Dome Exploration and Placer Dome Technical Services, 1998a). MDA cannot verify that the calculations for Placer's resource and reserve estimates met NI 43-101 standards; these resources and reserves are provided here for historic perspective only. Placer first reported Measured and Indicated resources for the property in 1993, although the Mesones and Sofia areas were not included in the totals until 1997. Table 6.1 is a summary of the Placer resources completed prior to 1997. Table 6.2 summarizes the 1997 Placer's Measured and Indicated Las Cristinas resources, and Table 6.3 is a summary of the 1997 reported Inferred resource.



Table 6.1 Placer Dome 1993-1996 Measured and Indicated Resource Estimates for Conductor-a-Cuatro Muertos Only
(From Ristorcelli and Hardy, 2003)

Date	Cutoff	Tonnes	Grade	Grade	Contained	Contained
	Au g/t	('000s)	Au g/t	Cu %	Au oz ('000s)	Cu lbs ('000s)
June 1993	0.8	45,157	1.65	0.18	2,396	179,197
Sep 1993	0.7	164,375	1.29	0.13	6,818	471,100
Nov 1993	0.7	189,664	1.26	0.13	7,684	543,578
Sep 1994	0.7	214,305	1.25	0.12	8,613	566,481
Jan 1996	0.7	214,699	1.25	0.12	8,628	567,522

Table 6.2 Placer Dome 1997 Measured and Indicated Resource Estimate for Conductor-a-Cuatro Muertos-Potaso
(From Ristorcelli and Hardy, 2003)

	Cutoff	Tonnes	Au Grade	Cu Grade	Au Ounces	Cu Pounds
	(g Au/t)	('000s)	(g Au/t)	(%Cu)	('000s)	('000s)
Co/CM	0.5	347,318	1.12	0.11	12,507	815,475
Mesones/Sofia	0.5	41,598	1.08	0.33	1,444	299,334
TOTAL		388,916	1.12	0.13	13,951	1,114,809

Table 6.3 Placer Dome 1997 Inferred Resource Estimate for Conductor-a-Cuatro Muertos-Potaso
(From Ristorcelli and Hardy, 2003)

Area	Cutoff	Tonnes	Au Grade	Cu Grade	Au Ounces	Cu Pounds
	(g Au/t)	('000s)	(g Au/t)	(%Cu)	('000s)	('000s)
Co/CM*	0.5	110,929	1.12	0.10	3,994	234,186
Mesones/Sofia	0.5	21,992	0.79	0.12	559	56,473
TOTAL		132,921	1.07	0.10	4,554	290,658

MDA reviewed the modeling methodology of the resources reported in Placer's 1998 feasibility study update. While MDA believes that Placer has done careful work from the fieldwork to database quality control and believes that the resource is reliable, MDA has neither audited nor checked Placer's reported resources. They are reported here only for historic perspective.

Placer also calculated reserves for Las Cristinas, but again MDA cannot verify that these calculations met NI 43-101 standards; they are provided here for historic perspective only. The results of these studies, conducted between 1996 and 1999 and presented in Table 6.4, were taken from the public domain (annual reports and press releases). The March 1996 calculation did not include the Mesones-Sofia deposit, but all later calculations did. The 1996 calculations were based on a \$375 per ounce gold price and a \$1.00 per pound copper price. The 1999 reserves were based on a lower gold price of \$325 per ounce and \$1.00 per pound copper price, hence the drop in reserve. Placer did not report its reserves broken out by Proven and Probable as is now required by National Instrument 43-101.



Table 6.4 Placer Dome Reserve Estimates for Las Cristinas

Date	Tonnes (‘000s)	Au Grade (g Au/t)	Cu Grade (%Cu)	Au Ounces* (‘000s)	Cu Pounds* (‘000s)
Mar-96	181,064	1.28	0.13	7,463	506,955
Aug-96	232,619	1.21	NA	9,027	NA
Dec-97	326,288	1.13	0.14	11,802	1,007,077
Dec-98	323,253	1.13	0.14	11,702	983,457
Dec-99	276,717	1.19	0.14	10,614	860,179

*In-situ contained metal

Grill (1999) reported several geological resource estimates for other mineralization on the Las Cristinas concessions; MDA cannot confirm this information, but it is presented for historical perspective. With regard to a low-grade gold model for the Cantera-Cordoba area, Grill (1999) reported “*the recompilation and reinterpretation of geologic data from Cantera-Cordoba did not yield a geologic model significantly different from the 1995 model which is estimated to contain 20.7 Mt grading 1.30 g/t at a 0.6 g/t cut-off,*” and no updated resource was estimated in 1999. A “rough polygonal resource estimate for high-grade gold” was also made for the Cantera-Cordoba area, where selective mining of high-grade vein material by underground methods may be possible, according to Grill (1999). The study estimated a total of 569,000 tonnes of mineralized material grading 5.11 g Au/t, for a total of 93,400 ounces of gold, based on a model in which gold is concentrated in tabular veins and/or stockwork-like layers (Grill, 1999).

In the South Cantera (near the Hoffman) areas, Grill (1999) reported that, based on a manual resource estimate using data from 24 diamond drill holes, the area is “roughly estimated” to contain 3.22 million tonnes of mineralized material grading 1.46 g Au/t for a total of 149,000 oz of gold. Grill (1999) noted that “*full development of the South Cantera resource would require further plant design modifications as the approximate pit limit would significantly overlap the area currently occupied by the high grade stockpile, located on the southeast side of the plant site.*”

Based on limited, widely spaced diamond drilling, Grill (1999) reported that using a manual resource estimate, the main mineralized parts of the Morrocoy zone were “*roughly estimated to contain 9.12 million tons of mineralized material grading 1.36 g/t Au for a total of 411,000 ounces of gold*” but noted that the overall drill-hole density in the Morrocoy area was very low in some parts. Data from 20 diamond drill holes and 13 trenches were used in this estimate.

Grill (1999) reported that based on data from 31 drill holes, a manual polygonal resource estimate for the Potaso area yielded a gold resource of 6.2 million tonnes of combined saprolite and bedrock resource material, with an average grade of 1.04 g Au/t at a 0.5 g Au/t cutoff for a total of 206,000 oz of gold.

6.4.2 Estimates by MDA

MDA has been contracted by Crystallex since 2002 to estimate resources and reserves for and report on the Las Cristinas project. Following the initial estimate, updates have been completed each year warranted by new drill data and/or changing economics.



2003

In 2003, Crystallex commissioned MDA to estimate a resource and a reserve for Las Cristinas, which were reported in a technical report (Ristorcelli and Hardy, 2003). This represented the first work by Crystallex in estimating a resource and reserve for the property. The following discussion is taken from that technical report.

MDA classified the resource by a combination of distance to the nearest sample, the number of samples used to estimate a block, and the number of drill holes used to estimate a block. As gold is the dominant metal from a value standpoint, all blocks were classified based on a modified distance calculated during gold estimation. A resource was estimated for the Conductor and Mesones-Sofia areas. The estimated resource for Conductor does not represent the entire body of mineralization at Conductor but does represent the most prolific of the resources and best understood and defined. The deposit is open ended at depth but is bounded at the south by a property boundary and the north by Mesones-Sofia. Combined resources are given in Table 6.5.

MDA noted that Placer's estimates of resources represented material inside an "optimistic-floating-cone" pit (MDA had no information defining their term "optimistic"). Placer's method of resource definition results in fewer tonnes at higher grades than an *in situ* method. The Placer methodology eliminates lower-grade resources outside an optimized pit shell but above cutoff that would become available for conversion to reserves with reasonable changing economics, metallurgy or economics. MDA's resources are tabulated by a cutoff close to economic so as to also report material that could become economic with reasonable technological and economic changes.

The principal resources outside of Conductor (including Cuatro Muertos and Potaso) and Mesones-Sofia lie in the Cordova and Morrocoy areas, which had not been estimated in 2003. In their 2003 report, Ristorcelli and Hardy remarked that these latter areas would require geological and data compilation prior to any estimation, but they do represent areas deserving of work. These areas are reported in the current report for the first time.



Table 6.5 Total Estimated Resources at Conductorora and Mesones – Sofia (2003)

(Including Reserves*)
(From Ristorcelli and Hardy, 2003)

CO & M/S Measured and Indicated

Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces
0.2	862,680,000	0.71	19,800,000
0.4	557,646,000	0.95	17,010,000
0.5	438,931,000	1.09	15,327,000
0.6	354,171,000	1.22	13,842,000
0.7	285,709,000	1.35	12,426,000
0.8	235,022,000	1.48	11,217,000
0.9	197,459,000	1.61	10,202,000
1.0	169,467,000	1.72	9,354,000
1.5	84,231,000	2.22	6,007,900
2.0	39,693,000	4.26	5,434,300
2.5	17,976,000	3.48	2,010,200
3.0	9,738,000	4.13	1,293,000
3.5	5,855,000	4.74	892,000
4.0	3,670,000	5.36	632,000
5.0	1,941,000	6.15	384,000

Conductorora and Mesones/Sofia Inferred

Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces
0.2	471,685,000	0.59	8,895,000
0.4	287,897,000	0.78	7,205,000
0.5	207,889,000	0.91	6,064,000
0.6	144,999,000	1.07	4,966,000
0.7	97,673,000	1.27	3,992,000
0.8	70,884,000	1.47	3,354,000
0.9	55,924,000	1.64	2,951,000
1.0	47,726,000	1.76	2,703,000
1.5	24,311,000	2.28	1,779,700
2.0	11,887,000	4.16	1,591,600
2.5	5,094,000	3.77	617,200
3.0	3,380,000	4.31	468,000
3.5	2,490,000	4.70	376,000
4.0	1,823,000	5.05	296,000
5.0	853,000	5.76	158,000

Reserves were developed from the Measured and Indicated resources by establishing the ultimate economic pit limits using Medsystem Lerchs-Grossman ultimate pit software. This optimized pit outline was used as a template for the ultimate pit design. The economic calculations were based on a gold price of US\$325 per ounce and a breakeven copper-mining cost (assuming that Crystallex is compensated for all costs associated with copper production, but receives no profit from the recovered copper). Operating costs, recoveries and design criteria were based on Placer's feasibility studies. The reserves are summarized in Table 6.6.



Table 6.6 Crystallex's Total Las Cristinas Proven and Probable Reserves - 2003
(From Ristorcelli and Hardy, 2003)

Deposit	Category	Tonnes	Gold (g/t)	Gold Ounces	Strip Ratio
Conductora	Proven	34,133,000	1.43	1,569,000	1.3:1
	Probable	167,955,000	1.31	7,073,000	
Mesones/Sofia	Probable	21,860,000	1.28	900,000	1.89:1
Total	Proven	34,133,000	1.43	1,569,000	1.34:1
	Probable	189,815,000	1.31	7,973,000	
Total	Proven & Probable	223,948,000	1.33	9,542,000	1.34:1

Pit design parameters were taken directly from the 1996 feasibility study, except for the ramp width, which was increased to 30m to accommodate larger haul trucks. Inter-ramp angles are 45° in bedrock and 35° in saprolite. There is an area in the southern portion of the Conductora pit that has been designed at 25° in accordance with Placer's noting of a shallow-dipping fault, but this has since been studied and deemed to not be material.

Mining was planned to be conducted in two distinct, but concurrent, operations. The first would be mining of the saprolite, which was planned to be done by a contractor using one equipment fleet, and the second was mining of the bedrock, which was planned to be done by Crystallex, using a separate set of equipment. Different equipment fleets would be required because of the significantly different characteristics of saprolite and bedrock. Drilling and blasting will not be required in the majority of saprolite but will be necessary in the bedrock.

While the mining contractor would select the actual equipment to be used, it was expected that the saprolite mining fleet would consist of all-wheel-drive articulated haul trucks and hydraulic excavators. Scrapers would be the preferred choice under certain conditions. Bedrock mining was planned to be conducted using excavators and conventional haul trucks. Haul roads in the saprolite portions of the deposits need to be designed and constructed to handle the appropriate-sized equipment (150-tonne trucks), which means that road-base material needed to be available from bedrock-waste areas of the pit.

Based upon the initial production phase, the reserves produce a mine life in excess of 25 years, depending upon operating schedule, at a planned production rate of 20,000 ore-tonnes per day. Because ore is exposed at the surface, or just below the overburden, it will not be necessary to perform pre-stripping to access ore. Initial ore production is entirely from saprolite, with the ability to begin bedrock mining as early as the second year, depending upon the mining schedule. Once sufficient bedrock is exposed and enough working room provided, production will be from both saprolite and bedrock ores.

In the subsequent September 2003 feasibility study (SNC-Lavalin, 2003), reserves were reported as summarized in Table 6.7.



Table 6.7 Las Cristinas Reserves 2003 Update
(From SNC-Lavalin, 2003)

Deposit	Category (applies to ore only)	Ore	Grade	Contained	Waste	Strip
		kt	(Au g/t)	Au oz x1000	kt	Ratio
Conductora	PROVEN	36,620	1.38	1,625		1.33:1
	Bedrock	26,147	1.37	1,150	Total 296,962	
	Saprolite	10,743	1.41	475	Bedrock 240,433	
					Saprolite 56,529	
Mesones/Sophia	PROBABLE	187,117	1.27	7,669		1.44:1
	Bedrock	144,358	1.30	6,025		
	Saprolite	42,759	1.20	1,644	Total 31,537	
					Bedrock 15,286	
Total	PROVEN	36,620	1.38	1,625		1.34:1
	Bedrock	26,147	1.37	1,150	Total 328,499	
	Saprolite	10,473	1.41	475	Bedrock 255,719	
					Saprolite 72,780	
Total	PROBABLE	209,039	1.27	8,540		1.34:1
	Bedrock	157,112	1.30	6,567		
	Saprolite	51,927	1.18	1,973	Total 328,499	
					Bedrock 255,719	
Total	PROVEN & PROBABLE	245,659	1.29	10,165		1.34:1
	Bedrock	183,259	1.31	7,717	Bedrock 255,719	
	Saprolite	62,400	1.22	2,447	Saprolite 72,780	

2004

In 2004, after an 18-hole drill program, Crystallex requested an update to the resources and reserves. The 2004 drilling showed that while local grades were difficult to predict, the general form and continuity of the deposit were very predictable. MDA checked the modeling procedures and parameters and the model results. The model was checked for bias against the composites from which it was estimated. Multiple runs were made to assess sensitivity to modeling parameters. An independent geostatistician (Sandefur, 2004) was commissioned to perform a review of the geostatistical aspects of modeling. In the end, few changes were made to the estimation procedures.

Resources (Table 6.8) again calculated by MDA were updated and reported in a second feasibility report (SNC-Lavalin, 2004a), in which it was noted that copper and silver resources were not reported because Crystallex had not been granted the right to receive revenue from these metals and the SNC-Lavalin feasibility study was based on a gold-only project. The updated reserves in 2004 are given in Table 6.9.



Table 6.8 Total Estimated Resources at Conductor and Mesones – Sofia (2004)

(Including Reserves*; from Ristorcelli and Hardy, 2004a)

Total Las Critinas Measured and Indicated Resources (rounded)								
Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces	Silver (g/t)	Copper (ppm)	CNSolCu (ppm)	Silver Ounces	Copper Kilograms
0.2	910,846,000	0.71	20,893,000	0.50	1,031	137	14,628,000	939,014,000
0.4	581,370,000	0.96	17,915,000	0.54	1,167	165	10,095,000	678,642,000
0.5	462,328,000	1.09	16,220,000	0.56	1,222	177	8,306,000	565,193,000
0.6	375,367,000	1.22	14,695,000	0.57	1,270	188	6,924,000	476,840,000
0.7	303,106,000	1.35	13,203,000	0.59	1,319	200	5,734,000	399,918,000
0.8	251,819,000	1.48	11,976,000	0.60	1,349	211	4,860,000	339,684,000
0.9	212,368,000	1.60	10,911,000	0.61	1,377	221	4,172,000	292,397,000
1.0	183,140,000	1.70	10,020,000	0.62	1,404	229	3,638,000	257,164,000
1.5	92,436,000	2.18	6,468,200	0.65	1,498	278	1,931,300	138,437,000
2.0	44,566,000	2.67	3,822,500	0.66	1,605	329	946,700	71,530,000
2.5	19,783,000	3.24	2,061,900	0.67	1,729	401	423,400	34,199,000
3.0	9,601,000	3.80	1,173,000	0.67	1,788	421	206,000	17,162,000
3.5	4,616,000	4.45	660,000	0.67	1,886	444	100,000	8,705,000
4.0	2,492,000	5.10	409,000	0.66	1,870	417	53,000	4,661,000
5.0	1,047,000	6.09	205,000	0.59	1,559	252	20,000	1,632,000

Total Las Critinas Inferred Resources (rounded)

Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces	Silver (g/t)	Copper (ppm)	CNSolCu (ppm)	Silver Ounces	Copper Kilograms
0.2	435,122,000	0.54	7,500,000	0.41	761	65	5,715,000	330,999,000
0.4	246,696,000	0.73	5,780,000	0.43	812	67	3,436,000	200,201,000
0.5	172,417,000	0.85	4,719,000	0.45	830	65	2,473,000	143,163,000
0.6	117,957,000	0.99	3,768,000	0.46	858	65	1,744,000	101,172,000
0.7	76,026,000	1.19	2,906,000	0.47	894	63	1,153,000	67,969,000
0.8	53,390,000	1.38	2,367,000	0.48	889	61	828,000	47,463,000
0.9	41,328,000	1.54	2,041,000	0.48	895	59	639,000	36,985,000
1.0	34,792,000	1.65	1,843,000	0.47	903	57	530,000	31,419,000
1.5	17,332,000	2.09	1,166,300	0.47	908	51	260,800	15,745,000
2.0	8,182,000	2.48	653,400	0.43	946	53	112,300	7,738,000
2.5	2,235,000	3.23	232,000	0.38	867	80	27,300	1,938,000
3.0	878,000	4.04	114,000	0.35	853	105	10,000	749,000
3.5	487,000	4.79	75,000	0.32	813	117	5,000	396,000
4.0	350,000	5.15	58,000	0.36	823	122	4,000	288,000
5.0	215,000	5.64	39,000	0.29	781	137	2,000	168,000

Table 6.9 Las Cristinas Reserves 2004

(From SNC-Lavalin, 2004a)

Deposit	Category (applies to ore only)	Ore kt	Grade (Au g/t)	Contained Au oz x1000	Waste kt	Strip Ratio
Conductor	PROVEN	42,671	1.27	1,739	Total	1.04:1
	Bedrock	31,204	1.24	1,247	Bedrock	
	Saprolite	11,467	1.33	491	225,593	
	PROBABLE	227,793	1.15	8,441	Saprolite	
Mesones/Sophia	Bedrock	176,991	1.17	6,667	Total	1.03:1
	Saprolite	50,802	1.09	1,774	Bedrock	
	PROBABLE	26,396	1.11	944	12,731	
	Bedrock	15,308	1.20	589	Saprolite	
Total	Saprolite	11,088	0.99	355	Total	1.04:1
	PROVEN	42,671	1.27	1,739	Bedrock	
	Bedrock	31,204	1.24	1,247	238,324	
	Saprolite	11,467	1.33	491	Saprolite	
Total	PROBABLE	254,189	1.15	9,384	Total	1.04:1
	Bedrock	192,299	1.17	7,256	Bedrock	
	Saprolite	61,890	1.07	2,129	238,324	
	PROVEN & PROBABLE	296,860	1.17	11,123	Saprolite	
Total	Bedrock	223,503	1.18	8,503	Total	1.04:1
	Saprolite	73,357	1.11	2,620	Bedrock	
					238,324	



2005

MDA was requested by Crystallex to update the Conductorra resource model to include data from 14 new drill holes drilled by Crystallex in 2005. The objective of the 14-hole drill program in 2005 was to increase material in the Measured and Indicated categories. MDA used the same modeling procedures as were used in the 2004 resource. The updated 2005 Conductorra resource estimate is given in Table 6.10.

Table 6.10 Total Estimated Resources at Conductorra and Mesones – Sofia (2005)
(Including Reserves*; from Ristorcelli, 2005)

2005								
Total Las Critinas Measured and Indicated Resources (rounded)								
Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces	Silver (g/t)	Copper (ppm)	CNSolCu (ppm)	Silver Ounces	Copper Kilograms
0.2	998,163,000	0.71	22,876,000	0.49	1,004	117	15,593,000	1,001,926,000
0.4	632,610,000	0.96	19,532,000	0.52	1,142	143	10,671,000	722,590,000
0.5	500,657,000	1.10	17,661,000	0.54	1,202	153	8,729,000	602,020,000
0.6	406,499,000	1.23	16,011,000	0.56	1,251	162	7,267,000	508,691,000
0.7	330,868,000	1.36	14,445,000	0.57	1,298	170	6,037,000	429,478,000
0.8	276,976,000	1.48	13,164,000	0.58	1,327	177	5,146,000	367,495,000
0.9	234,450,000	1.59	12,008,000	0.59	1,354	184	4,422,000	317,426,000
1.0	202,367,000	1.70	11,033,000	0.59	1,382	190	3,852,000	279,626,000
1.5	102,514,000	2.16	7,123,200	0.62	1,466	226	2,043,500	150,280,000
2.0	48,347,000	2.66	4,127,400	0.64	1,572	273	988,200	75,994,000
2.5	20,806,000	3.25	2,171,600	0.66	1,710	338	438,900	35,578,000
3.0	10,180,000	3.80	1,245,000	0.66	1,776	342	216,000	18,083,000
3.5	5,027,000	4.42	714,000	0.67	1,858	350	108,000	9,340,000
4.0	2,810,000	4.98	450,000	0.64	1,821	309	58,000	5,116,000
5.0	1,044,000	6.02	202,000	0.60	1,528	159	20,000	1,595,000
2005								
Total Las Critinas Inferred Resources (rounded)								
Cutoff (g Au/t)	Tonnes	Gold (g/t)	Gold Ounces	Silver (g/t)	Copper (ppm)	CNSolCu (ppm)	Silver Ounces	Copper Kilograms
0.2	436,092,000	0.53	7,425,000	0.39	775	49	5,531,000	337,810,000
0.4	239,045,000	0.73	5,620,000	0.42	845	51	3,240,000	201,971,000
0.5	163,046,000	0.87	4,537,000	0.44	874	47	2,285,000	142,577,000
0.6	113,940,000	1.01	3,682,000	0.45	906	44	1,639,000	103,192,000
0.7	77,557,000	1.18	2,933,000	0.45	950	37	1,111,000	73,666,000
0.8	59,002,000	1.31	2,492,000	0.44	967	31	842,000	57,063,000
0.9	46,481,000	1.44	2,154,000	0.44	993	27	661,000	46,147,000
1.0	38,362,000	1.55	1,908,000	0.44	1,019	24	548,000	39,081,000
1.5	16,415,000	1.99	1,052,300	0.46	1,000	18	244,400	16,423,000
2.0	6,428,000	2.39	494,500	0.44	995	16	90,100	6,395,000
2.5	1,340,000	3.07	132,100	0.41	891	18	17,800	1,194,000
3.0	450,000	3.80	55,000	0.41	887	11	6,000	399,000
3.5	188,000	4.63	28,000	0.33	840	2	2,000	158,000
4.0	123,000	5.06	20,000	0.25	862	-	1,000	106,000
5.0	75,000	5.39	13,000	0.41	840	-	1,000	63,000

In its August 2005 update to the 2003 feasibility report (SNC-Lavalin, 2005a), MDA re-estimated the reserves. The calculated reserves are shown in Table 6.11.



Table 6.11 Las Cristinas Reserves 2005
(From SNC-Lavalin, 2005a)

Deposit	Category (applies to ore only)	Ore kt	Grade (Au g/t)	Contained Au oz x1000	Waste kt	Strip Ratio
Conductora	PROVEN	40,681	1.41	1,840	Total 429,385 Bedrock 346,346 Saprolite 83,039	1.55:1
	Bedrock	31,026	1.39	1,385		
	Saprolite	9,655	1.47	455		
	PROBABLE	235,660	1.30	9,881		
	Bedrock	197,996	1.31	8,370		
	Saprolite	37,664	1.25	1,511		
Mesones/Sophia	PROBABLE	18,489	1.27	754	Total 33,369	1.8:1
	Bedrock	11,819	1.36	516	Bedrock 17,807	
	Saprolite	6,670	1.11	238	Saprolite 15,562	
Total	PROVEN	40,681	1.41	1,840	Total 462,754 Bedrock 364,153 Saprolite 98,601	1.57:1
	Bedrock	31,026	1.39	1,385		
	Saprolite	9,655	1.47	455		
	PROBABLE	254,149	1.30	10,635		
	Bedrock	209,815	1.32	8,886		
	Saprolite	44,334	1.23	1,749		
Total	PROVEN & PROBABLE	294,830	1.32	12,475	Total 462,754	1.57:1
	Bedrock	240,841	1.33	10,271	Bedrock 364,153	
	Saprolite	53,989	1.27	2,204	Saprolite 98,601	

Saprock included with bedrock

2006

At the request of Crystallex, MDA provided a revised estimate of reserves as of January 1, 2006, that reflected a gold price of US\$400 per ounce (Hardy, 2006). The same pit design and other physical parameters and costs as used in the 2005 revision (SNC-Lavalin, 2005a) were used in the 2006 revision, with no new work undertaken. Table 6.12 shows the revised 2006 Las Cristinas reserves.



Table 6.12 Las Cristinas Reserves 2006
(From Hardy, 2006)

Deposit	Category (applies to ore only)	Ore kt	Grade (Au g/t)	Contained Au oz x1000	Waste kt	Strip Ratio
Conductora	PROVEN	47,824	1.29	1,984	Total 378,102 Bedrock 317,208 Saprolite 60,894	1.15:1
	Bedrock	35,975	1.28	1,475		
	Saprolite	11,849	1.34	509		
	PROBABLE	279,800	1.19	10,706		
	Bedrock	230,640	1.21	8,973		
	Saprolite	49,160	1.10	1,733		
Mesones/Sophia	PROBABLE	25,661	1.10	903	Total 26,198	1.02:1
	Bedrock	14,997	1.19	574	Bedrock 12,845	
	Saprolite	10,664	0.96	330	Saprolite 13,353	
Total	PROVEN	47,824	1.29	1,984	Total 404,300 Bedrock 330,053 Saprolite 74,247	1.14:1
	Bedrock	35,975	1.28	1,475		
	Saprolite	11,849	1.34	509		
	PROBABLE	305,461	1.18	11,610		
	Bedrock	245,637	1.21	9,547		
	Saprolite	59,824	1.07	2,063		
Total	PROVEN & PROBABLE	353,285	1.20	13,594	Total 404,300	1.14:1
	Bedrock	281,612	1.22	11,023	Bedrock 330,053	
	Saprolite	71,673	1.12	2,571	Saprolite 74,247	

Saprock included with bedrock

January 2007

An updated estimate of reserves as of January 1, 2007 was also prepared for Crystallex by MDA (Hardy, 2007). This estimate used a gold price of US\$450 per ounce. The same pit design and other physical parameters and costs used in the 2005 and 2006 revisions were used in the 2007 update, with no new work undertaken. Table 6.13 shows the updated 2007 Las Cristinas reserves.

Table 6.13 Las Cristinas Reserves 2007
(From Hardy, 2007)

Deposit	Category (applies to ore only)	Ore kt	Grade (Au g/t)	Contained Au oz x1000	Waste kt	Strip Ratio
Conductora	PROVEN	50,613	1.25	2,031	Total 355,523 Bedrock 298,281 Saprolite 57,242	1.02:1
	Bedrock	38,271	1.23	1,513		
	Saprolite	12,342	1.30	518		
	PROBABLE	299,590	1.14	11,028		
	Bedrock	247,403	1.16	9,253		
	Saprolite	52,187	1.06	1,776		
Mesones/Sophia	PROBABLE	28,243	1.04	947	Total 23,616	0.84:1
	Bedrock	16,371	1.13	595	Bedrock 11,472	
	Saprolite	11,872	0.92	351	Saprolite 12,144	
Total	PROVEN	50,613	1.25	2,031	Total 379,139 Bedrock 309,753 Saprolite 69,386	1:1
	Bedrock	38,271	1.23	1,513		
	Saprolite	12,342	1.30	518		
	PROBABLE	327,833	1.14	11,975		
	Bedrock	263,774	1.16	9,848		
	Saprolite	64,059	1.03	2,127		
Total	PROVEN & PROBABLE	378,446	1.15	14,006	Total 379,139	1:1
	Bedrock	302,045	1.17	11,361	Bedrock 309,753	
	Saprolite	76,401	1.08	2,645	Saprolite 69,386	

Saprock included with bedrock



6.5 Historic Feasibility Studies

6.5.1 Placer Dome Studies

Placer, through Placer Dome Exploration and Placer Dome Technical Services Limited, completed a comprehensive feasibility study on Las Cristinas in 1996 that was updated in 1998 (Placer Dome Exploration and/or Placer Dome Technical Services Ltd., 1996 a-f; 1998a, b). MDA cannot verify that the calculations for Placer's resource and reserves estimates met NI 43-101 standards; these resources and reserves are provided here for historic perspective only.

The 1996 feasibility study (Placer Dome Exploration and/or Placer Dome Technical Services Ltd., 1996a) reported an estimated Kriged geostatistical resource for the Conductor-Cuatro Muertos-Potaso zone of 9.55 million ounces of gold contained in 255.4 million tonnes grading 1.16 g Au/t and 0.12% Cu at a 0.6 g Au/t cutoff. The deposit was reported to be open at depth and along strike to the south. The study also reported an estimated Kriged geological resource for the Cordova zone of 20.7 million tonnes grading 1.30 g Au/t at a 0.6 g Au/t cutoff but noted "*An economic evaluation of the Cordova deposit has shown that it is of marginal importance to the project because of the high waste/ore strip ratio and the complex, erratic nature of the high grade gold mineralization. Due to the lack of a suitable site for the metallurgical facilities, within reasonable distance of the mineralized zones, the metallurgical plant site has been located adjacent to the Cordova zone...*"

The 1996 feasibility study (Placer Dome Exploration and/or Placer Dome Technical Services Ltd., 1996b) was based on operation of a 14.6 million ton-per-year cyanide leach and flotation plant. Mineable reserves in the Conductor-Cuatro Muertos-Potaso zone were estimated at 48,340,000 tonnes of saprolite ore grading 1.254 g Au/t and 0.126% total copper and 156,477,000 tonnes of bedrock ore grading 1.206 g Au/t and 0.122% total copper. A total of 6.5 million ounces of gold and 168.4 kt of copper would be produced over the mine life (Placer Dome Exploration and/or Placer Dome Technical Services Ltd., 1996f). The overall strip ratio is 0.88. Mine life was estimated to be 14.5 years, including two years of low-grade ore stockpile recovery starting in year 13. Open-pit production was planned with haul truck and hydraulic excavator mining equipment.

Construction costs before financing were estimated to be US\$525.5 million, with post-construction capital costs during production life estimated at \$120.8 million (Placer, 1996f). Throughput was estimated at 20,000 t/d for oxide saprolite, 40,000 t/d for sulfide saprolite, and 40,000 t/d for bedrock ore. Total operating costs were estimated to average \$298/oz of gold over the mine life, assuming a gold price of US\$400/oz and a copper price of US\$1.15/lb (Placer Dome Exploration and/or Placer Dome Technical Services Ltd., 1996f).

Mine dewatering will be an ongoing process and expense requiring a sophisticated system of perimeter wells and full-time in-pit pumping. The water table is near the topographic surface, and the Conductor ultimate pit bottoms at -120m abs (120m below sea level).

Placer's 1996 feasibility study was updated in July 1998 (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1998a). Additional drilling in 1997 led to recalculation of the Kriged geostatistical Measured and Indicated resource for the Conductor and Cuatro Muertos zone to 12.5 million ounces of gold contained in 347.3 million tonnes grading 1.12 g Au/t and 0.11% copper at a 0.5



g Au/t cutoff. The 1997 deep drilling demonstrated the down-dip continuity of the Conductor zone, but both the Conductor and Cuatro Muertos zones remained open at depth and along strike to the south.

The July 1998 feasibility update pointed out that the deep drilling at Conductor had introduced a new problem for resource classification because some of the deep estimates were below a limit that could likely be mined in the future. Taking this concern into consideration, a limiting envelope was developed using an optimistic optimized pit, whose resulting pit shell provided a good indication of what material had potential to be mined in the future. This optimistic pit limit was used to prevent any unwanted extrapolation of the resource to depth (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1998a).

Following the 1997 drilling program in the Mesones-Sofia area, Placer estimated a Measured and Indicated geostatistical resource of 1.4 million ounces of gold in 41.6 million tonnes grading 1.08 g Au/t and 0.33% copper at a 0.5 g Au/t cutoff (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1998a). The estimation used ordinary Kriging. The combined Measured and Indicated geological resource for the Conductor-Cuatro Muertos and Mesones-Sofia zones totaled 13.9 million ounces of gold in 388.9 million tonnes grading 1.12 g Au/t and 0.13% copper at 0.5 g Au/t cutoff.

6.5.2 Crystallex Studies

In January 2003, Mine Development Associates and Kappes, Cassidy and Associates completed an internal prefeasibility study for Las Cristinas based on data provided by CVG (Mine Development Associates and Kappes, Cassidy and Associates, 2003). As noted in that report, this study was “*entirely based upon Placer’s Las Cristinas resource estimates and reserve calculations and supporting engineering work.*” Most of the infrastructure, mine dewatering, processing capital and operating cost estimates were derived from Placer’s documents, updated based on suppliers’ quotations. Since MDA did not have access to the underlying data, it could not corroborate the Proven or Probable reserve for public reporting. However, assuming that the underlying data and conclusions were correct, MDA recommended that the results could be used for internal corporate decisions. MDA reported that the saprolite oxide material would be treated in an oxide carbon-in-pulp circuit to produce doré containing gold and silver, while the remaining ore types would be processed in a flotation/carbon-in-leach plant to produce gold and silver doré and copper concentrate.

In September 2003, SNC-Lavalin completed a 20,000 t/d feasibility study for Crystallex that incorporated reserve estimates by MDA (Table 6.7) (SNC-Lavalin, 2003). The study found that reserves totaled 246 million tonnes at an average grade of 1.29 g Au/t for 10.2 million ounces of gold. With a gold metallurgical recovery of 89.0%, 9.1 million ounces of gold would be recovered. Operating cost was estimated to be US\$6.70/t, and capital costs were estimated to be \$243 million (without VAT) with sustaining capital costs of \$160 million (without VAT).

Mining would be by trucks and shovels, with conventional gravity and carbon-in-leach processing for a mine life of 34 years. The strip ratio would be 1.34:1.

At a gold price of \$325/oz, the project was estimated to have an IRR of 14.5% (before VAT and taxes), cash flow of \$742.4 million (before taxes), NPV at 5% of \$238.5 million (before taxes), and a payback



before taxes of five years. Environmental risks of effluent discharge, tailings dam failure, and closure challenges were thought to be low, while acid-generation potential was low to marginal.

This feasibility study reported that SGS Lakefield Research (“Lakefield”) had conducted extensive metallurgical test work in which a one-tonne sample derived from representative drill core was run through a 50 kg/day, bench-scale carbon-in-leach (CIL) plant for 21 days. Sub-samples were sent to McGill University for gravity recovery testing.

In October 2003, SNC-Lavalin was asked to prepare a feasibility study for a 40,000 t/d operation rate (SNC-Lavalin, 2004a). Reserves (conforming to 43-101 and CIM definition) were reported as 297 million tonnes at an average grade of 1.17g Au/t for 11.12 million ounces of contained gold. At a gold recovery of 89.0%, 9.9 million ounces of gold would be recovered. Operating cost dropped from the earlier feasibility study to \$5.964/t. Capital cost rose to \$365.4 million (without VAT), and sustaining capital rose to \$169.5 million without VAT. The strip ratio would have been 1.04:1, and mine life would be 20 years. At this operation rate and assuming a gold price of \$325/oz, the project was estimated to have a before-tax IRR of 17.7% (also before VAT), net cash flow of \$746 million, and payback in four years.

In August 2005, SNC-Lavalin completed a 43-101 Technical Report updating the September 2003 feasibility study (SNC-Lavalin, 2005a). As cited in the 2005 report, the following are the key changes made in 2005 compared to 2003:

- *Mineral resources and mining reserves, following two in-fill drilling program;*
- *Investigation of a suspected low fault angle in the open pit ;*
- *TMF design, following an extensive field investigation program and third party review;*
- *Foundation and waste dump designs, following an extensive field investigation program;*
- *Water Management Plans following completion of hydrological field work.*
- *Mining plans that originally envisaged a contractor mining the saprolite and Crystallex mining hard rock. Now it is planned that Crystallex will do all the mining with its own mining fleet based on the practical experience on a similar operation.*
- *Environmental factors, following completion of an Environmental Impact Assessment (EIA) and much consultation with the CVG, MARN and MEM.*
- *Capital and Operating Cost Estimates, following significant progress on the award of purchase orders for equipment, the award of contracts for construction and an extensive review of operating costs.*
- *Changes to the project schedule, resulting from permitting activities.*

The August 2005 update to the 2003 feasibility report estimated Proven and Probable reserves at 294.8 million tonnes with an average grade of 1.32 g Au/t for a total of 12.475 million ounces of gold. At a rate of 88.7% gold recovery, 11.05 million ounces would be recovered with an annual gold production, averaged over the life of the mine, of 270,730 oz of gold. Over the life of the mine, the average operating cost was estimated to be \$7.66 per tonne. Capital cost was now estimated to be \$293 million (excluding VAT), and sustaining capital was estimated at \$284 million (excluding the VAT). The revised mine life was estimated to be 41 years with a strip ratio of 1.57:1.



At a gold price of \$350/oz, the project was estimated (SNC-Lavalin, 2005a) to have the following results:

	<u>Before Tax</u>	<u>After Tax</u>
IRR	12.5%	8.4%
Net Cash Flow	\$814million	\$547million
NPV at 5%	\$217million	\$ 98 million
Payback	5.1 years	8.5 years

The August 2005 report modified the expected acid generation potential, from “low to marginal” in 2003 to “low and will be mitigated” in 2005. The 2005 report indicated that the seismic hazard zone was “low.”



7.0 GEOLOGY

Placer has been the principal operator at Las Cristinas. While Placer collected much of the original data and performed the earliest geological interpretations, Richard Spencer of Crystallex has recompiled and reinterpreted the geology. This section of the report is an outgrowth of that effort and is written by Mr. Spencer.

7.1 Regional Geology

The Las Cristinas concessions are located in a poorly understood part of the Archean to early Proterozoic granite-greenstone terrain of the Guyana Shield. The Guyana Shield underlies the eastern part of Venezuela, Guyana, Surinam, French Guiana and parts of northern Brazil. Tentative correlations have been made with the granite-greenstone terrains of the West African Shield.

Three major geological subdivisions have been established for the Guyana Shield. Archean rocks older than 2.5 billion years consist of metamorphic high-grade gneiss, local charnockite (a hypersthene-bearing granite), and widespread granitoid bodies. Structurally separate from the Archean silicic crust are metasedimentary and metavolcanic rocks of early Proterozoic age. Early Proterozoic rocks have undergone compressional tectonism and are metamorphosed and intruded by syn-orogenic granites of the Trans-Amazonian Orogeny. Unconformably overlying the early Proterozoic rocks are mid-Proterozoic continental clastic units of the Roraima Formation.

The rocks of the Guyana Shield have undergone intense tropical weathering. The tropical weathering process has produced a lateritic profile 30m to 100m thick, as a result, basic geological information about the Guyana Shield is limited due to the paucity of outcrops in the Las Cristinas area.

7.2 Local Geology

7.2.1 Lithology and Stratigraphy

Las Cristinas is located in a Proterozoic granite-greenstone terrain of eastern Venezuela. Stratigraphy the Kilometer 88 district consists of a west-dipping sequence of lower Proterozoic supracrustal metavolcanic and metasedimentary rocks. Upward or westward younging directions have been confirmed in graded volcanosedimentary sequences cut in recent drilling.

Mineralization at Las Cristinas is hosted by a mafic to intermediate-composition volcanic sequence. The stratigraphy is conspicuously layered with fragmental volcanoclastic facies interpreted as autobreccias, lapilli tuffs of mafic to intermediate composition, interlayered with basalt and andesite lava flows. Regional mapping by the Venezuelan Geological Survey shows the Las Cristinas project lying within the Caballape Formation of the Botanamo Group. The Caballape Formation is described as consisting largely of graded wackes and other sedimentary facies with minor andesitic to rhyodacitic volcanic intercalations. This description contrasts with the dominantly mafic to intermediate-composition volcanic nature of the sequence that hosts the mineralization at Las Cristinas. The host sequence at Las Cristinas is now considered to constitute part of the Carichapo Group of the Pastora Supergroup (Table 7.1).



Table 7.1 Regional Stratigraphy and Broad Description of Lithology for Greenstone Rocks of the Guyana Shield in Venezuela

(from Day, et. al., 1995)

		Unit	Lithology	Age	
Pastora Province	Intrusive	Supamo Complex	Granite, tonalite, trondjemite, granodiorite, quartz monzonite, gneiss & migmatite.		
		Botanamo Group	Los Caribes Formation	Intercalation of grey and green phyllites that grade to red phyllite that are intercalated with red sandstones and polymictic conglomerates with minor felsic tuff.	
	Caballape Formation		Graded graywacke, siltstones & conglomerates (80%) with minor tuffs, breccias and pyroclastic flows of andesitic to rhyodacitic composition.		
	Pastora Supergroup	Yuruari Formation	Epiclastic rocks (phyllite, schist. Slate and quartzite). Local tuff breccias and dacitic lavas. Regional metamorphism (greenschist facies) and local thermal metamorphism (cordierite-hornblende facies).	2131 +/-10 (Day et al. 1995) U-Pb date on zircon separates from the Yuruari Formation	
					Carichapo Group
		Cicapra Formation	Submarine tuffs, graywacke turbidites and volcanic siltstones, lithic tuffs, tuff breccias, agglomerates, and the upper part contain green chert and porphyroblastic schist.		
		Florinda Formation	Pillow basalts of tholeiitic to komatiitic composition.		



Exploration drilling at Las Cristinas provides intercepts over an approximately 1,000m stratigraphic interval. The stratigraphic sequence at Las Cristinas is mafic to intermediate-composition, with the majority of rocks ranging from basaltic to andesitic. There is some evidence for a change from dominantly basaltic compositions in the lower part of the sequence to dominantly andesitic rocks in the middle to upper part of the volcanic pile. Metavolcanic rocks range from homogeneous lavas, some of which have preserved amygdales, to fine-grained tuff and fine-grained volcanic sand, to fragmental facies. By far the majority of the fragmental rocks are monolithic in which the clasts have a similar composition to the matrix, with polyolithic fragmental units constituting a very small part the stratigraphy.

Monolithic fragmental rocks range from those in which the clasts are clearly differentiated from the typically fine-grained volcanic matrix (lapilli tuffs) to those in which the margins of the fragments are not easily distinguished from the matrix. A common andesitic facies is that in which monolithic porphyritic fragments (plagioclase phenocrysts) are supported by a porphyritic matrix in which the plagioclase phenocrysts are of a similar size and have a similar distribution to that of the clasts. The monolithic fragmental rocks in which the matrix is similar in texture and composition to the fragments are interpreted as autobreccias.

Polyolithic facies typically contain angular to subrounded clasts of similar size, supported in a fine- to medium-grained matrix. These units tend to be graded with both upward-fining and upward-coarsening components. These rocks may be pyroclastic in origin, although metamorphism and pervasive cleavage development make the identification of shards difficult.

Sedimentary units occur throughout the sequence but constitute a higher proportion of the stratigraphy in the upper part of the sequence drilled at Las Cristinas. The most common facies might be termed graywacke: volcanic sand-gritstone interlayered with mudstone-siltstone, which is laminated in some intersections. Some intervals show that the coarser facies grade upward into siltstone and mudstone.

Conglomerate facies are confined to the upper part of the stratigraphy at Las Cristinas. Polyolithic conglomerates with poorly sorted clasts that range from cobbles to pea-sized granules are matrix supported; the matrix ranges from coarse sandstone to mudstone. The clasts are typically rounded to well rounded. Some of the conglomerate units fine upwards into muddy sandstones and siltstone layers. Conglomerate facies are interpreted as mass-flow deposits.

The very upper part of the stratigraphy intersected in drilling at Las Cristinas is dominated by fine-grained sedimentary or volcanosedimentary rocks. This siltstone- and mudstone-dominated sequence contains some jasperitic chert layers. It is not clear whether these are true chert beds, or whether they were formed from the pervasive silicification of mudstone facies.

Drill holes collared in the vicinity of the diorite stock in the Potaso area described below intersected a medium- to coarse-grained, phaneritic dacite body. The dacite is characterized by the presence of quartz phenocrysts, and the majority of the feldspar phenocrysts are more square than oblong which is consistent with a more potassic composition. Drill-hole intercepts show that the body has an inverted saucer-shape with a relatively flat lower surface. The intrusive body had a maximum thickness of 50m. The lower and upper contacts of the homogenous-textured igneous body typically consist of monolithic breccias that are interpreted as autobreccias. Similar monolithic breccias extend beyond the limits of the



igneous body and become interlayered with laminated sandstone and siltstone-mudstone units that contain clasts of dacite as well as equant feldspar crystals reminiscent of the form of square feldspars found in the dacite. The dacite and related breccias and sedimentary rocks are interpreted as a central dome with proximal autobreccias that grade outwards into a series of mass-flow deposits whose matrix is sandy in more proximal situations and more muddy in areas distal to the central dome. The stratigraphic position of the apron of autobreccias and mass-flow deposits ties the extrusion of the dacite dome to the lower part of the volcanosedimentary pile in the Las Cristinas area.

Three phases of intrusive rocks, including diorite stocks, an “aplite dike” and diorite sills, occur on the Las Cristinas property. Porphyritic diorite stocks have been intersected in drilling in two parts of the Las Cristinas property. The interior of the diorite stocks is medium to coarse grained and is homogeneous to porphyritic in texture. The margins of the stocks are generally finer grained and contain xenoliths grading to monolithic “fragmental” rocks, in which fragments are enclosed in a matrix of similar composition and texture. These fragmental rocks are interpreted as autobreccias in which the fragments are xenoliths.

Hornblende in the diorite is pervasively altered to chlorite, while some of the plagioclase is altered to epidote and calcite. Potassium-silicate alteration, consisting principally of secondary biotite, is locally developed. Pyrite and chalcopyrite occur in shear zones and veinlets. The occurrence of sparse mineralization with the same sulfide species and similar alteration assemblages as the principal deposit is consistent with the diorite stocks being pre-mineralization in age.

The largest and best-defined stock reaches surface, in the saprolite, in a northeast-trending zone in the Potaso area on the south edge of the Las Cristinas deposit. The diorite, located north of the Potaso area, is asymmetric in a north-south section: it has a sub-vertical northwest face while its roof is shallowly inclined, dipping south at an angle of approximately 30° beneath the northern edge of the Brisas de Cuyuni deposit. This diorite stock occupies the gap in economic mineralization between the Las Cristinas and Brisas de Cuyuni deposits.

The second diorite stock is located in the northern part of the Las Cristinas property, where it occupies the gap in mineralization between the Mesones and Morrocoy areas.

A flat-lying intrusion termed “aplite” by Placer’s exploration team occurs in the northwestern part of the Las Cristinas deposit in the Mesones, Morrocoy, and Cordova areas. This sill varies between 5m and 35m thick with an average of about 12m. Although the intrusive body is flat lying, it is near-perpendicular to the steep-dipping stratigraphy, and therefore it may have been intruded as a dike prior to tilting of the stratigraphy, as opposed to being intruded as a sill after tilting of the stratigraphy. The “aplite” is medium grained, and relict textures suggest that the original rock was homogenous. The intrusion typically shows well-developed chilled margins against the country rock. The intrusion is pervasively altered to a muscovite-calcite assemblage with minor tourmaline. Its original composition, therefore, appears to have been dominated by plagioclase with minor mafic minerals while being devoid of free quartz, implying an original composition closer to that of monzonite.

Three-dimensional modeling of gold-grade shells shows that gold mineralization related to the breccia complex at Mesones passes through an oval-shaped hole in the “aplite” intrusion, which is consistent with the breccia complex having punched through the intrusive body. This implies that the intrusive



body is pre-mineralization in age, which is consistent with the intense, pervasive muscovite-calcite (\pm tourmaline) assemblage to which the intrusive body has been altered. Similar muscovite-calcite alteration is common to the upper parts of the Mesones breccia complex. Despite the evidence for the intrusive body being pre-mineralization in age, it is devoid of gold and copper mineralization.

Mafic sills of gabbroic to dioritic composition occur throughout the Las Cristinas area. The sills strike northeast and dip to the southeast at an average of about 20°. They are arranged in upward-stepping *en echelon* sets, and the sills generally increase in number and thickness from south of the Conductor area to the Mesones-Sofia-Morrocroy area in the northern part of the deposit. These sills cut the “aplite” intrusive body described above and maintain their orientation irrespective of the dip of the stratigraphy, which is consistent with intrusion post-tilting. The sills are barren with respect to gold and copper and are partially altered or metamorphosed to a chlorite-epidote-calcite assemblage. These sills are considered to be post-mineralization, and the conclusion drawn from regional mapping is that the sills are Proterozoic in age.

7.2.2 Structure

A near-pervasive foliation (S_1) occurs in the Las Cristinas area where it varies in intensity from strong to absent. The S_1 foliation is sub-parallel to bedding (S_0). The intensity of foliation development is largely controlled by the nature of the rock, with massive beds, such as lava units, exhibiting the weakest cleavage development and fine-grained and fragmental rocks displaying the most intense foliation. A stretching lineation (L_1) is evident in the S_1 foliation and rakes to the southwest at an average plunge of 54° on a bearing of 213° (Gordon, 2005). The association of the stretching lineation with the planar S_1 foliation is consistent with the fabrics having developed under conditions of simple shear, with the shear plane orientated sub-parallel to bedding. Graded bedding on core indicates that stratigraphy is right-way-up on the Las Cristinas property.

Bedding and the S_1 cleavage strike north and dip moderately (30°-45°) to the west in the southern part of the property through the Conductor and Sofia areas. North and west of Sofia, the dip of bedding and the S_1 foliation change orientation abruptly to an overall northwest strike, and dips to the southwest are steeper (30°-70°). This change in orientation of bedding and S_1 cleavage defines a fold hinge whose axial trace strikes northeast with a plunge to the southwest (Gordon, 2005) and coincides with the axial trace of a regional synform delineated in mapping of the district. The generally northwest-striking limb of this fold contains a number of 100m-500m long N- and NW-striking limbs that constitute smaller-scale folds that have a similar geometry to the main synform. In contrast, the N-striking south limb (Conductor to Sofia) of the regional synform does not contain smaller-scale folds.

A second foliation (S_2) occurs sporadically on the Las Cristinas property, where it varies in intensity from absent to moderate; it is never strongly developed. The S_2 foliation strikes southeast (average 111°) and has an average dip of 36° to the northeast. S_2 is best developed as an axial planar cleavage in areas of ten-meter scale folding, where it appears as a moderate crenulation of S_1 (Gordon, 2005).

A northeast-striking fault is located in the axial zone of the regional synform defined by the S_1 foliation. This fault has been intruded by a thick (up to 100m wide) mafic dike and passes between the Mesones and Sofia mineralized centers (Figure 4.2) This fault is believed to have cut through a single mineralized breccia complex and resulted in the displacement of the Mesones component of that body



200m to the southwest of the Sofia remnant. From Mesones-Sofia, the fault coincides roughly with the location of the Quebrada Amarilla stream.

Quartz-tourmaline-sulfide breccias are concentrated in the Mesones-Sofia areas in the northern part of the Las Cristinas deposit. Two other small pipe-like breccia bodies outcrop to the northwest of Mesones-Sofia. In detail, the Mesones and Sofia breccia bodies consist of concentrations of bundles of sub-parallel sheeted vein breccias. These planar, sheet-like entities are clustered in Mesones and Sofia such that they constitute two elongate, pipe-like bodies that consist of ~30% breccia. Both bodies contain two principal sets of sub-parallel sheeted vein breccias; these are subvertical and bedding sub-parallel. Steep-dipping, sub-vertical vein breccias have a preferred northeast strike, which results in Mesones and Sofia having roughly elliptical footprints. Many of the vein breccias observed in drill hole core are sub-parallel to bedding. Some core intervals show bedding-sub-parallel vein breccias branching off sub-vertical breccias suggesting that they extend outward in the country rock from the sub-vertical structures.

Structure has a very significant role in relationship to mineralization at Las Cristinas, which is described in detail in Section 9.0.

7.2.3 Weathering

Weathering, a critical control on copper distribution, will also affect mining at Las Cristinas. Placer categorized the rocks into pedolith, saprolith, and bedrock.

Pedolith: The uppermost interval of the geological profile has undergone a volume reduction due to the intense weathering and consequent destruction of original textures, potentially enriching and/or homogenizing the gold concentrations. Pedolith is broken down into three subgroups:

Laterite: Usually gold-bearing, this was the target of *garimpeiro* miners and is recognized by the presence of goethitic pisolites in red clay matrix. Laterite is occasionally covered by duricrust, consisting of quartz clasts and pisolites in iron oxide cement.

Mottled Zone: This unit is recognized by hematitic and/or kaolin patches in massive, ferruginous clay matrix. This is locally referred to as *tigrito* texture. Original textures have been destroyed.

Clay Zone: This unit is made up of white and green or iron-oxide--colored clays. It is defined by faint remnant texture to completely obliterated texture. This zone is best developed in kaolin-rich areas.

Saprolith: Saprolith has preserved textures, but with clay pseudomorphs and original volume unchanged. It is broken down into five subgroups based on oxidation and hardness (International Society for Rock Mechanics (“ISRM”)). The breakdowns are described below.

Oxide Saprolite (“SAPO”): This consists of white, green or iron-oxide--colored clays and silts. Relict textures/structures are generally preserved and nearly all sulfide minerals are oxidized.



This unit averages 30m in thickness, but ranges from 5 to 60m. ISRM hardness = S1-S6 (can be indented with fingernail).

Mixed Saprolite (“SAPM”): This interface between oxide and sulfide-stable saprolite can reach 20m in thickness and is defined by the presence of both oxide and sulfide minerals. ISRM hardness = S1-S6 (can be indented with fingernail).

Sulfide-Stable Saprolite (“SAPS”): This part of the saprolite that is located below the current redox front consists of green, gray, and white clay minerals and silt-size rock. Sulfide minerals and relict textures/structures are preserved. Supergene copper enrichment occurs in the upper part of this horizon. ISRM hardness = S1-S6 (can be indented with fingernail).

Saprock (“SAPR”): Saprock forms a one to 10m gradational contact between saprolite and bedrock; in places where it is absent, the contact between saprolite and bedrock is sharp. Saprock can consist of weathered rock fragments floating in a matrix of sulfide-stable saprolite and is defined as the first occurrence of material with an ISRM hardness = R1 (cannot be indented with fingernail but can be broken easily with a pocketknife).

Bedrock: The bedrock is divided into two main groups based on the stability of carbonate: carbonate-leached and carbonate-stable bedrock.

Carbonate-Leached Bedrock (“CLB”): The carbonate-leached bedrock is characterized by centimeter-sized vugs and voids caused by the leaching of carbonate veins and matrix. Porosity can reach 30% and the thickness of this zone ranges from 10 to 50m. ISRM hardness = R1-R6 (cannot be easily broken with a fingernail).

Carbonate-Stable Bedrock (“CSB”): The carbonate-stable bedrock has a gradational contact with the carbonate-leached bedrock over one to five meters. This unit is defined by the first occurrence of carbonate in veins or in matrix. Weathering is absent. ISRM hardness = R1-R6 (cannot be easily broken with a fingernail).



8.0 DEPOSIT TYPES

Three types of mineralization are evident at Las Cristinas (see Section 9.0 for more detail). These include:

- Mineralization associated with hydrothermal quartz-tourmaline breccias typical of the Mesones-Sofia area.
- Stratiform mineralization in which elevated gold and copper values are found within specific strata that are interbedded with strata that are poorly mineralized. Well-mineralized strata are typically volcanoclastic or sedimentary units that have a relatively high permeability. Poorly mineralized units are typically competent, such as homogeneous lava flows or intrusive rocks, whose permeability is relatively low. Stratiform mineralization is typical of the Conductor area (including Cuatro Muertos and Potaso), Morrocoy and Cordova areas.
- Discrete auriferous quartz veins are located adjacent to the Las Cristinas deposit. Such veins include the Los Rojas and Albino veins that lie approximately 1km to the east of the Conductor area, and the Hofman vein, which lies about 1km to the west of the Cordova area. These veins consist of quartz with gold mineralization associated with pyrite (there is no appreciable chalcopyrite). The veins have chlorite selvages about 50cm wide. Although gold mineralization in these veins does not constitute part of the Las Cristinas resource, they are considered to be genetically related, and peripheral, to the Las Cristinas deposit. This type of mineralization is not discussed further in this report.

In terms of classification, Las Cristinas has been assigned to shear zone-hosted systems by some geologists, and to a porphyry association by others; however, several key elements of the Las Cristinas deposit must be satisfied in any attempt to classify the deposit. These include:

- Hydrothermal quartz-tourmaline breccias are present at the core of the mineralized system. Although the quartz-tourmaline breccias contain less than 5% of the reserve at Las Cristinas, the concentric arrangement of alteration facies record a decrease in hydrothermal fluid temperatures away from the breccias, showing that these constituted the core of the hydrothermal system. The quartz-tourmaline breccias are features that cross-cut stratigraphy and are clearly not shear zone related. Similar breccias are common in porphyry environments, and some show alteration and metal zoning similar to that observed at Mesones-Sofia, such as secondary biotite at depth to quartz-sericite at shallower levels, as well as a decrease in chalcopyrite upwards within the breccias.
- Alteration zoning at Las Cristinas is similar to that associated with porphyry systems with proximal secondary biotite giving way to distal chlorite-epidote-calcite (propylitic) facies. Quartz-sericite alteration is superimposed on other alteration facies and is likely to have resulted from the draw-down of meteoric water as the prograde hydrothermal system collapsed.
- The metal association of gold with copper and minor molybdenum is reminiscent of porphyry systems and is not common in shear zone-related gold systems.

Despite these factors that are typical of porphyries, Las Cristinas clearly is not a classic porphyry system since mineralization is not contained within, or closely associated with, any porphyritic intrusive stock. Furthermore, the abundant quartz veining associated with most porphyries is largely absent from the Las Cristinas deposit.



The conclusion, based on these factors, is that Las Cristinas is a porphyry-*related* mineralized system: it may be classified as a mafic-volcanic-hosted porphyry-associated system in which mineralization is located relatively distal from the porphyry. However, the fact remains that the majority of the mineralization lies parallel to the foliation and is influenced by the stretching orientation defined by a mineral lineation. This structural information is consistent with mineralization being coeval with shearing over an interval in excess of a kilometer in width.

The setting for Las Cristinas mineralization, therefore, is intrusion of a porphyry system into a regional-scale shear zone.



9.0 MINERALIZATION

9.1 Mineralization and Alteration

Two distinct styles of mineralization account for the resource at Las Cristinas: that at Mesones-Sofia is associated with hydrothermal breccias, while that in the Conductor, Morrocoy and Cordova areas is stratiform. The breccia-hosted mineralization at Mesones-Sofia contains about 5% of the current gold reserves at Las Cristinas, with the vast majority of the gold contained in the adjacent stratiform mineralized zone.

Mineralization in Mesones-Sofia is concentrated in the quartz-tourmaline-sulfide-calcite vein breccias and extends laterally into the adjacent country rocks. The breccias are sufficiently closely spaced that the country rock between them also constitutes ore in the central part of Mesones-Sofia. Grades in the country rock on the periphery of the system become less consistent as the distance between the breccias increases.

Breccias consist of quartz, tourmaline, calcite and sulfides, and the country rock alteration assemblage consists of fine-grained quartz, muscovite (sericite), calcite, tourmaline and disseminated clots of sulfides. Silicification is variably developed, with pervasive silicification largely confined to the breccias where it encapsulates the sulfides. Muscovite gives way to secondary biotite in the deepest intercepts in Mesones-Sofia. The occurrence of relict laths of biotite within intensely sericitized zones, as well as relict biotite in the central parts of larger muscovite laths, provides evidence that muscovite replaced pre-existing secondary biotite in the upper parts of the Mesones-Sofia hydrothermal breccia system. Patchy potassium-feldspar alteration is evident in the central part of Mesones-Sofia.

Sulfides commonly occur in aggregates up to 5cm in diameter at Mesones-Sofia. Sulfides also occur as semi-massive replacements in the matrix of the quartz-tourmaline breccias and as disseminations both in the breccias (in the matrix and in breccia clasts) and in the enclosing country rocks. Sulfide content in primary, hard-rock ore is 5-10% with a pyrite/chalcocopyrite ratio of <5. Pyrite and chalcocopyrite are the only common sulfides in Mesones-Sofia; molybdenite is scarce, but where it does occur, it is associated with pyrite and chalcocopyrite. There is evidence that chalcocopyrite gives way to pyrite upwards in the breccia bodies. For example, breccia bodies at Morrocoy, located structurally 200m above Mesones-Sofia, have similar overall sulfide contents but contain only a minor proportion of chalcocopyrite. There is no appreciable difference in the nature and distribution of sulfides, sulfide species, or grade, between the muscovite- and biotite-dominated alteration assemblages. This implies that the majority of the mineralization was in place by the time that secondary biotite was overprinted by muscovite.

The Conductor (including Cuatro Muertos and Potaso), Morrocoy and Cordova areas contain over 95% of the gold resource at Las Cristinas. Mineralization in these zones (here called Conductor-style mineralization) is stratiform in nature and is concentrated in volcanoclastic units within the mafic-to intermediate-composition volcanoclastic host sequence. The distribution of mineralization is controlled by the permeability of the host rocks; gold grade and alteration intensity typically decrease abruptly at the contact between permeable volcanoclastic units and impermeable lava layers, for example. Pre-mineralization, altered dioritic intrusive stocks are largely devoid of significant gold mineralization due to their low permeability.



Mineralization occurs in a greater than three-kilometer long, north-trending zone that dips moderately (30° - 40°) to the west, sub-parallel to the volcanic stratigraphy and to the pervasive (S₁) cleavage. Gold mineralization is associated with a sulfide assemblage that consists essentially of pyrite and chalcopyrite.

Alteration mineral assemblages in Conductor are secondary biotite, minor potassium feldspar, calcite, chlorite and minor epidote and sericite. Calcite is ubiquitous, occurring mainly as disseminations but also in carbonate-sulfide veinlets, carbonate-only veinlets, and quartz-carbonate veinlets. Silicification is minimal in Conductor-type mineralization. Minor tourmaline disseminations occur in some parts of Conductor, but in much lower concentrations than in the Mesones-Sofia area. The most consistent gold mineralization occurs in zones in which secondary biotite is most intensely developed. Many sulfide clots within these biotite-dominated alteration zones are rimmed by a green chlorite alteration that has overprinted the secondary biotite.

Pyrite and chalcopyrite constitute the only sulfide species of significance in primary ore. The average pyrite/chalcopyrite ratio is >5. Sulfides occur principally as disseminations, but also in narrow veinlets 1-2mm wide. These veinlets are variable in composition ranging from sulfide-only to sulfide-calcite and sulfide-calcite-quartz. These veins have selvages of secondary biotite, chlorite or chlorite-epidote. Quartz-sulfide veins are rare, but where they do occur, they are in zones of intense secondary biotite development against which they have indistinct margins and are associated with multi-ounce gold values. Higher than average gold grades (>2 g/t) are associated with areas in which pyrite occurs as coarse clots up to 2cm in diameter in zones of intense secondary biotite alteration. Generally, however, the sulfides are fine-grained – much more so than in Mesones-Sofia.

Molybdenite is locally quite abundant, occurring in quartz-calcite-sulfide veinlets and disseminated with pyrite and chalcopyrite. The Potasso area, which constitutes the northern extremity of the adjacent Brisas deposit located adjacent to but off of the Las Cristinas property, contains disseminated molybdenite that appears to have no spatial relationship with pyrite and chalcopyrite on a hand-specimen scale.

9.2 Alteration and Metal Zoning

Alteration and metal zoning are interpreted such that the Mesones-Sofia breccia complex, whose tourmaline-bearing alteration assemblage defines the highest-temperature hydrothermal conditions on the Las Cristinas property, constitutes the core of the mineralized system about which the Conductor, Morrocoy, and Cordova zones are arranged. The Potaso area is separated from the Conductor deposit by an essentially barren, pre-mineralization intrusive stock. This dioritic intrusive body is weakly to moderately altered to a chlorite-epidote-calcite assemblage. Secondary biotite and associated mineralization are confined to shear zones that extend through the stock from the enclosing country rock. The spacing of the mineralized shear zones is relatively wide, resulting in the stock having generally low gold-copper grades. Mineralization at Potaso is in strata that are located above the southward-dipping roof of the diorite stock. Mineralization at Potaso constitutes the northern fringe of mineralization related to the Brisas de Cuyuni deposit, which lies immediately south of the Las Cristinas property. Hence, Brisas de Cuyuni and Las Cristinas are considered to be distinct and separate deposits located within the same mineral belt and separated by a pre-mineralization stock of dioritic composition.



Tourmaline-bearing assemblages have the smallest footprint of all of the alteration types. Tourmaline-bearing alteration, which is largely confined to the Mesones-Sofía area, passes outward into a secondary biotite zone whose distribution is asymmetric with respect to Mesones-Sofía: biotite alteration extends 2km to the south, through the Conductor area, while extending only several hundred meters to the north of Mesones-Sofía. Secondary biotite alteration gives way laterally to a chlorite-epidote-calcite assemblage. The majority of the gold reserve at Las Cristinas is located within biotite alteration facies, and to a lesser extent within the tourmaline zone, while the distal chlorite-epidote-calcite facies is essentially barren of significant gold mineralization.

Two alteration facies have been superimposed on the simple alteration zoning described above that ranges from proximal, high temperature tourmaline, through secondary biotite to lower temperature chlorite-epidote at the periphery of the system. The first is the muscovite alteration, which relict textures show was superimposed on secondary biotite, in the upper part of the Mesones-Sofía hydrothermal breccia system. The second is widespread, low-intensity chlorite – epidote - calcite alteration that occurs in the secondary biotite zone. Sulfides and some mineralization are associated with chlorite-epidote-calcite clots and veinlets. These minerals overgrow and overprint the secondary biotite and are interpreted to have developed from cooler fluids as the hydrothermal system collapsed in the waning stages of the mineralizing event.

The highest and most consistent copper grades at Las Cristinas occur in the Mesones-Sofía breccia complex, from which the grades decrease in all directions. Gold shows a different distribution than copper: it occurs in Mesones-Sofía, outwards from which the gold grade decreases before increasing significantly towards the peripheral, southern part of the deposit. The highest grade-thickness values for the deposit are located in the southern part of the Conductor area adjacent to the change from pervasive secondary biotite alteration to the distal chlorite-epidote-calcite assemblage.

9.3 Relationship between Structural Fabrics and Mineralization

Structural and fabric textures in sulfides provide some evidence for the timing of mineralization relative to the structural events described above.

Most of the pyrite and chalcopyrite grains at Las Cristinas are aligned within the S_1 foliation and many have calcite developed in pressure shadows adjacent to the grains. This spatial relationship may have resulted from preferential development of the sulfides in the cleavage planes, implying that mineralization was associated with cleavage formation, or alternatively, from the deformation and alignment of pre-existing sulfide grains in the cleavage. Some S_1 cleavage planes show sulfides aligned parallel to the stretching lineation. In addition, the majority of sulfide-bearing veinlets are also aligned in the S_1 foliation: again, there may have been pre-existing veinlets that were rotated into the foliation plane during cleavage development or, alternatively, they may have formed in that orientation during development of the foliation.

Despite the fact that the majority of veinlets are parallel to the S_1 fabric, some cross-cut the foliation and some of the disseminated sulfide grains overgrow the S_1 planar fabric. These relationships are consistent with the sulfides post-dating fabric development. In addition, some of the fragments in the Mesones-Sofía breccias have a pervasive S_1 cleavage whose orientation is different in each clast, which shows that brecciation occurred after the onset of cleavage development. Sulfides overgrow these fragments



and their contacts with the matrix of the breccia, showing that at least a component of mineralization occurred after breccia development, while the fact that the breccias contain significant mineralization implies that the majority of the mineralization was introduced during development of the breccia. Therefore, the conclusion drawn from these relationships between structural fabric and sulfides is that mineralization occurred during formation of S_1 and continued after the cessation of S_1 development.

The minimum relative age of mineralization is constrained by the fact that sulfides are intensely folded in crenulations typical of the S_2 fabric. Placer reported, from the mapping of trenches, that post-mineralization displacement of a few meters is found along northwest-trending structures dipping shallowly to the northeast. The orientation described is the orientation of small shear zones related to development of the S_2 fabric (Gordon, 2005).

9.4 Conductor-style Mineralization

The Conductor (including Cuatro Muertos and Potoso) and Morrocoy deposits occur within the previously mentioned main north-trending and west-dipping ductile-deformation zone that can be traced for 3.5km along strike from the southern boundary of the Cristina 4 concession northward to the northern part of the Cristina 5 concession. The deformation zone is characterized by an S_1 foliation that varies in intensity from absent to moderately strong. Some S_1 foliation planes contain a stretching lineation (L_1), which implies that the structural fabric was generated by simple shear. Although the S_1 foliation is developed in a stratigraphic interval of over 1000m, there is no central zone of pervasive, intense foliation development that can be defined as the central part of a regional shear zone. Hence, the Las Cristinas deposit either lies on the margin of a wide, regional shear zone, or in a >1000m wide corridor of moderate to weakly developed shear zones in which the center of each is defined by a zone of more intense S_1 foliation development.

Gold-copper mineralization is associated with pyrite-chalcopyrite disseminations, veinlets (sulfide-only and quartz-calcite-sulfide veinlets), and massive sulfide replacement blebs that are generally oriented parallel to the S_1 foliation. Total sulfide content ranges up to about 5% locally in Conductor-style mineralization with an average of about 2% sulfides. The pyrite/chalcopyrite ratio is typically >5. Sulfides are concentrated in zones of intense secondary biotite (+ calcite) alteration in the volcanoclastic units of the stratigraphy. These volcanoclastic units are generally characterized by more intense S_1 foliation development in comparison to massive volcanic or intrusive facies. Intrusive bodies and competent volcanic facies have a lower average sulfide content than adjacent volcanoclastic facies. Pyrite and chalcopyrite also occur in association with epidote-chlorite-calcite alteration facies, where it is superimposed on the secondary biotite-calcite facies. On a microscopic scale, gold can be found as free grains in quartz and as blebs and fracture filling in pyrite and/or chalcopyrite.

Geological cross sections throughout the length of the deposit show that the mineralization is found within alternating bands, up to tens of meters thick, of higher and low gold grades that correspond to lithology; lower gold grades typically occur in massive, competent volcanic facies while zones of elevated gold grade are commonly hosted by volcanoclastic units.

Geological mapping in trenches indicates that within the oxide saprolite at Conductor, well-defined sub-parallel zones of “high-grade” mineralization occur intermixed with lower-grade zones of



mineralization. Placer (Placer Dome Exploration and Placer Dome Technical Services, 1998a) states: “These ‘higher-grade’ zones range from a few meters to tens of meters in thickness and can be up to 50m in strike length in a north-south direction. The occurrence of abundant disseminated limonite appears to differentiate higher-grade mineralized zones from the lower-grade ones. Geological boundaries can be drawn based on the presence of disseminated limonite for the Conductor area.” Down-dip continuity is considered good to excellent. The overall true thickness of the gold mineralization envelope throughout the Conductor area reaches 500m. Individual higher-grade gold zones (>1 g Au/t) are up to 100m thick. Gold and copper mineralization identified to date occurs over a strike distance of over 3.5km, from the south end of Potaso to the north end of Morrocoy. Figure 9.1 is a general geological cross section.

Mineralization in the Cordova area, located west of Morrocoy, is similar to that of Conductor-style in being stratiform, but differs slightly in that it is not as laterally continuous, and the associated alteration assemblage is somewhat different from that typical of classic Conductor-style mineralization. Host rocks at Cordova consist of a volcanoclastic-dominated sequence with some massive volcanic units (some of which contain preserved amygdaloids) and matrix-supported polyolithic conglomerates.

The host rocks are intensely altered to widespread sericite-pyrite and chlorite-epidote-calcite alteration. The sulfide assemblage consists mainly of pyrite with minor chalcopyrite and occurs as heavy disseminations and massive sulfide replacements that constitute about 10% of the rock. The majority of the pyrite occurs within the S₁ foliation with a small proportion overgrowing this S₁ cleavage. Gold grades are associated with zones of higher pyrite content.

The distribution of gold in the saprolite developed on Conductor-style mineralization is essentially the same as in the bedrock. In contrast, the distribution of copper in the saprolite has been affected by the intense tropical weathering, which resulted in the leaching of copper from the oxide saprolite and its precipitation as secondary copper minerals such as covellite, chalcocite and bornite below the paleo-water table in the sulfide-stable saprolite. The enriched, secondary copper zone located in the sulfide saprolite is analogous to a poorly developed, incipient “copper blanket” similar to those that are commonly associated with porphyry copper deposits in climates with fluctuating water tables. The copper-enriched zone within the sulfide saprolite is sub-horizontal at Las Cristinas, while the primary copper mineralization that occurs in the hard rock below is stratiform and lies sub-parallel to stratigraphy that is inclined to the west at 30° - 40°. Figure 9.2 is a cross section of the copper model.

9.5 Mesones-Sofia

The Mesones-Sofia deposits, located 200m north of the Cuatro Muertos area of Conductor, consist of two mineralized hydrothermal centers. Figure 9.3 is a general geological cross section through the Mesones-Sofia deposits. These centers each have a diameter of 400m – 500m and are separated by a northeast-striking, steep southeast-dipping, dioritic dike that is up to 100m wide.

Each center consists of a concentration of planar, quartz-tourmaline-calcite-sulfide breccia veins. Gold and copper mineralization is generally highest in these vein breccias. Sulfide content, metal grade, silicification and the intensity of tourmaline development generally decrease away from the margins of vein breccias, although a small proportion of the breccias have insignificant gold and copper



mineralization. Local stratigraphic control on mineralization is evident where volcanoclastic lithologies are better mineralized than adjacent massive volcanic strata in the vicinity of the breccias. A section showing copper zones in Mesones-Sofia is presented in Figure 9.4.

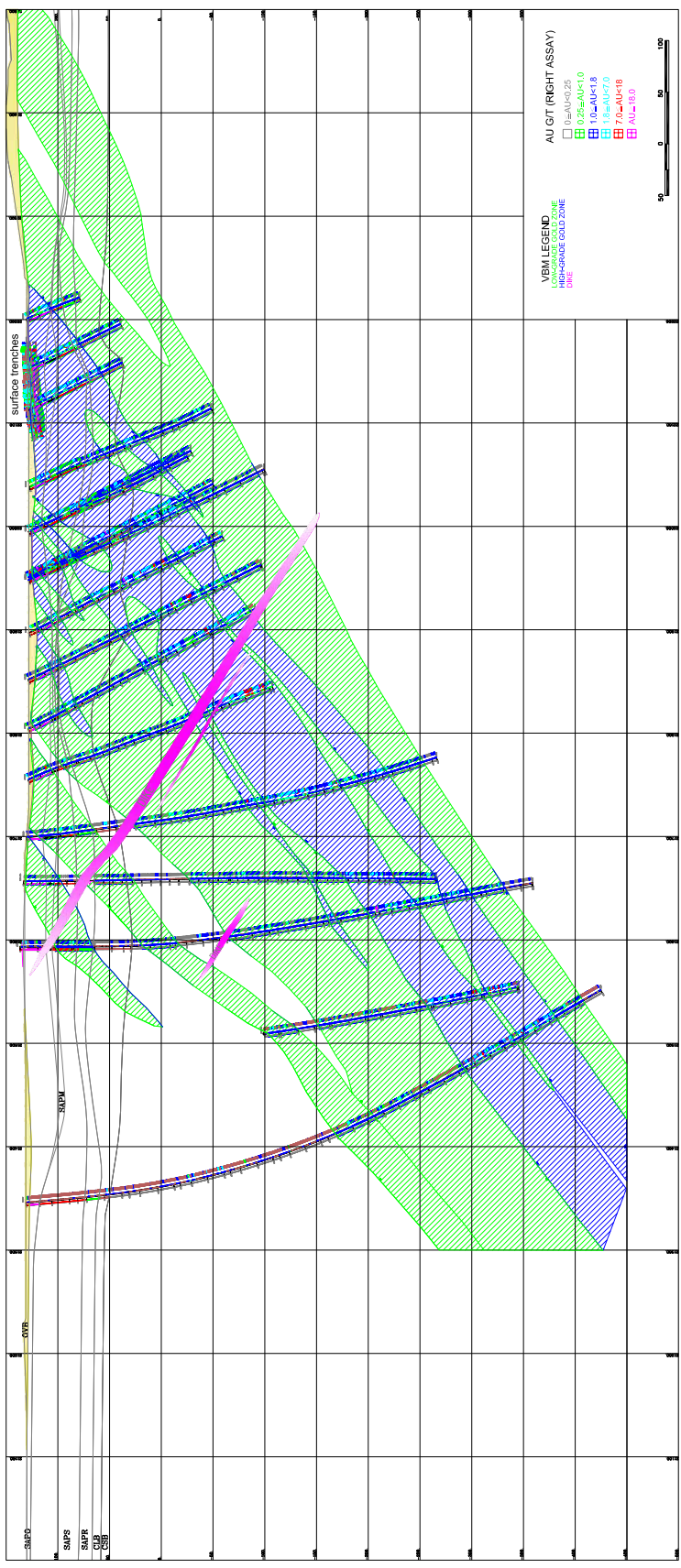
The concentration of sulfides and corresponding elevated gold-copper grades in the hydrothermal breccias is consistent with mineralization being coeval with breccia development. Many of the sulfides are intergrown with, or directly rim, tourmaline clusters in the breccias and in the enclosing country rocks. In addition, pyrite and chalcopyrite occur disseminated through the breccia, having the same concentration in the matrix as in the clasts, with some sulfide grains overgrowing the contact between breccia matrix and fragments which shows that a component of Mesones-Sofia – style mineralization post-dated, or continued after, brecciation ceased.

The percentage of sulfides in the mineralized zones in Mesones-Sofia is higher than at Conductorá, ranging to a maximum of 30% locally. The average chalcopyrite content of Mesones – Sofia is ~1%, and the average total sulfide content is approximately 5%. Gold and copper mineralization at Mesones-Sofia occurs as disseminations, clots, blebs, and veinlets of pyrite-chalcopyrite with minor covellite and bornite. The clots and blebs of sulfide are coarser than those typical of the Conductorá-style, reaching diameters of up to 5 cm. In contrast with Conductorá-style mineralization, the majority of the sulfides in Mesones-Sofia are encapsulated in quartz. Crushing of coarser sulfide accumulations and their liberation from quartz encapsulation would lead to a relatively high proportion of newly fractured surfaces on sulfide grains that may account for the higher efficiency achieved in floatation tests of Mesones-Sofia material over ore typical of the Conductorá-style.

As in Conductorá-style mineralization, copper is depleted in the oxide saprolite and enriched in the sulfide-stable saprolite. The precipitation of copper in the sulfide saprolite generated copper-enriched zones that are sub-horizontal, parallel to the paleo-water table. This sub-horizontal distribution is significantly different from the distribution of primary copper in the bedrock, where copper grades are controlled by the location of breccia veins.

DATE	13-Sep-07	DRAWN BY	S Risorcelli	CHECKED BY	MDA	SCALE	as shown
Crystallex International Corp. Las Cristinas Conductor Geologic Model Section 9150 Au Bolivar State Venezuela							
MINE DEVELOPMENT ASSOCIATES Nevada							
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FIGURE NO.
9.1

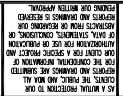


Crystallex International Corp.
 Las Cristinas
 Conductor Geologic Model
 Section 9150 Cu

FIGURE NO.
 9.2

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 SCALE: as shown

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 Venezuela

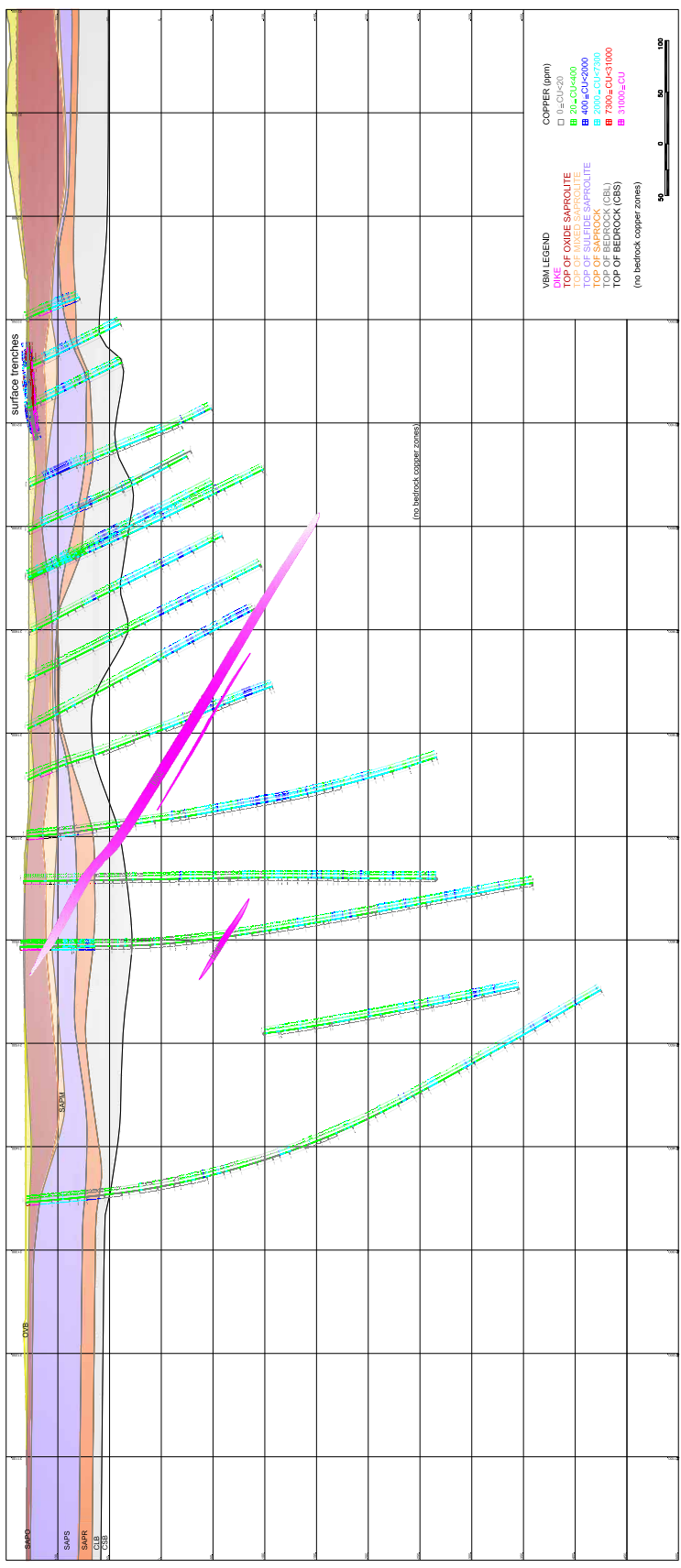
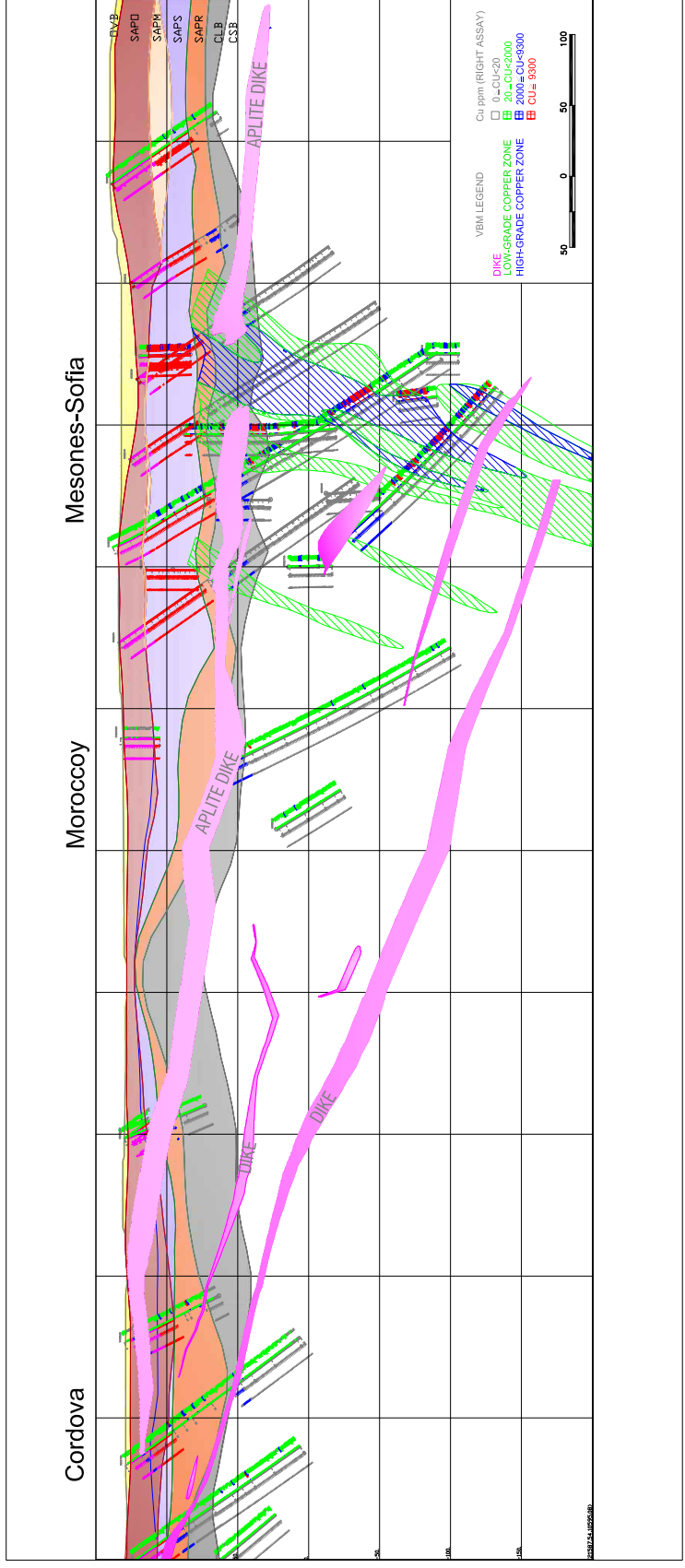


FIGURE NO. 9.4

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 Mesones-Sofia, Moroccoy and Cordova
 Bolivar State
 Venezuela

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 Nevada

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DATE: 9/13/2007



10.0 EXPLORATION

The following section describes non-drilling exploration completed on the property. Exploration at Las Cristinas is dominated by drilling, and that drilling is described in Section 11.0.

10.1 Exploration by Placer

Exploration done by Placer prior to Crystallex's involvement at Las Cristinas included the following:

- Line cutting. Parallel lines were cut through the vegetation at 100m and 200m intervals, and were sampled at a spacing of 50m.
- Mapping. Geological mapping was done at scales of 1:5,000 and 1:500. Due to the paucity of exposure as a result of extensive weathering, mapping was largely conducted in trenches.
- Rock sampling. Over 1,200 samples were collected, mainly from the sides of trenches.
- Soil sampling: About 3,700 samples were taken from the upper part of the saprolite on grids of 50m by 100m or 50m by 200m. Analysis was by fire assay for gold plus, reportedly, 17 other elements by ICP. In addition about 1,100 samples were collected and assayed from 95 shallow auger holes. MDA did not use this data because it does not impact the defined resource, but the information will be of value in future exploration.
- Geophysics. Ground magnetometer, induced polarization ("IP"), radiometry, airborne magnetic survey, and transient electromagnetic geophysical surveys were done. Magnetic and electromagnetic methods have proven the most effective in defining the altered zone associated with the principal areas of mineralization. MDA did not review this data.
- Tailings evaluation. An evaluation of the tailings as a resource was completed in 1993, but results were not available.
- Drilling. Completion of 1,174 drill holes for a total of 158,738m of drilling. This work is described in the following sections of this report.
- Hydrologic studies. Groundwater and surface water studies were completed, most done by North American independent contractors.

Based on Placer's documentation and descriptions, Placer's work conforms to, or exceeds, industry standards.

Placer undertook extensive trenching in several different programs at Las Cristinas as follows:

- In 1994, a close-spaced surface trenching and mapping program was conducted to augment data collected in the close-spaced drill program and to provide detailed geological information used principally to assess the continuity of mineralization between close-spaced drill-hole intercepts. Four areas were selected for these studies in the Conductor area. These areas were stripped with a bulldozer to expose *in situ* saprolite. The areas were then washed with a hydraulic pump to highlight relic geological features and textures in the saprolite and were subsequently mapped at a scale of 1:100. Three of the four areas trenched measured 25m wide (perpendicular to foliation) by 40m long (parallel to foliation). Continuous trench samples were collected at a 1.5m spacing across the width of the areas (perpendicular to S₁ foliation) with a line spacing of 1.5m. The fourth grid area was smaller, measuring 25m by 25m, but the same sample spacing was used. In addition, six east-west trenches were dug to a depth of 3m and sampled with



continuous 1.5m channel samples, both horizontally (along the trench face) and vertically (down the trench face). Additional 1.5m square blocks were sampled in 0.5m square panels.

- The 1995 test area straddles the eastern edge of the planned location of the Conductor pit. A series of trenches, spaced at 10m intervals, were oriented in an east-west direction (perpendicular to foliation), with one trench cut north-south parallel to the S_1 foliation. A bulldozer was used to prepare and access the sites, and a backhoe was used to dig the one-meter-wide trenches. Water was pumped from the flooded existing Conductor pit made by the small-scale miners, to allow access into much of the test area.

The trenches excavated in 1994 and 1995 have depths ranging from one meter to four meters, depending upon the local amount of overburden and tailings. Every trench exposed a minimum of one meter of fresh oxide saprolite. These trench data were plotted on cross section and used to support and define mineral zone boundaries, but the data were not used for modeling. Trenching was done in both the Conductor and Cuatro Muertos target areas that measured 200m by 400m and 200m by 100m respectively. A total of 1,862m was excavated in 108 trenches in 1995, and a total of 1,840 one-meter samples were taken from these trenches.

- During 1998, 36 surface trenches were excavated in the Cantera-Cordova and Morrocoy areas to test the vertical and lateral continuity of high-grade gold mineralization in drill core projected to the surface and to test other occurrences of strong surface mineralization along strike (Grill, 1999). A total of 1,546 channel samples were collected from 1,625m of trenching. Most trenches were oriented in a northeast direction, perpendicular to foliation that strikes northwest in that area. The geology of all trenches was mapped at a scale of 1:100 and professionally surveyed.

As noted, exploration assay data from Las Cristinas includes surface samples of rock and saprolite, trench samples of saprolite, and drill samples of overburden, saprolite and rock. As MDA's work did not utilize any surface geochemical samples and only used the trench samples to support zone definition in modeling, further discussions in this report will concentrate on the drilling.

Topographic data were modeled from an aerial survey conducted by Eagle Mapping Services Ltd. in 1995.

10.2 Exploration by Crystallex

Exploration work by Crystallex focused initially (in 2003) on verifying the presence and tenor of mineralization at Las Cristinas. Further drill campaigns carried out in 2004, 2005 and 2006-2007 focused on increasing the reserve and resource through infill drilling, drilling down-dip extensions of the stratiform mineralized zone, and exploring strike extensions of the deposit. Particular attention has been paid to the studies of the alteration, stratigraphy and structure of the deposit in order to define the controls on mineralization so as to improve confidence in the validity of correlating mineralized zones between adjacent drill-hole intersections. Details of these drill campaigns are provided in Section 11.0 to Section 13.0. Particular attention was paid to sampling issues during these drill campaigns as



described in Section 14.0. These drill campaigns also provided the opportunity to investigate the distribution of gold and gold heterogeneity.

Crystallex undertook a detailed drill program to determine the optimal means of sampling of the oxide saprolite for grade-control purposes for application when mining is started. The area selected for this study straddles the eastern edge of the planned Conductor pit at which there is a change from ore to waste. The objective of study was to compare the consistency of gold grade samples generated from reverse circulation (“RC”) and conventional hammer drilling; to determine the sampling method which yielded the most consistent and repeatable assays; and to determine the consistency with which waste could be distinguished from low-grade ore.

This drilling simulated bench-scale drilling with two east-west orientated lines of drill holes 6m apart, and the same was done with shorter drill lines orientated north-south, parallel to the edge of the planned pit, forming an “L”-shaped drill pattern. Conventional drilling was done at 6m spacing along the lines spaced 6m apart, forming a square drill-hole pattern (40 conventional holes were drilled). The conventional drilling seldom exceeded 10m due to the technical difficulties with the drilling of saprolite below the current water table. Drill holes in the north-south orientated lines and alternate holes in the east-west orientated lines were twinned with RC drilling to a depth of 25m to simulate the sampling of four benches (24 RC holes were drilled). Since the planned bench height in the saprolite is 6m, each 6m interval was collected as a separate sample. Six-meter long samples were taken where possible from the conventional drill holes, while the size of subsequent sample intervals depended on the total depth to which the conventional rig penetrated. For example, a hole that reached 15m depth would have generated two 6m samples and the third sample would be from the lowest 3m interval of the hole. Assay results of this study, from which a sample protocol for grade control will be established, were not available at the time of writing of this report.



11.0 DRILLING

The average drill spacing over the entire modeled area at Conductorá (Figure 11.1) is roughly 70m. In the more intensely drilled areas, drill spacing decreases to 50m, and in the core of the deposit where economic mineralization is shallowest and where mining is planned to commence, the drill spacing is 25 to 35m. The entire modeled area at Mesones-Sofía (Figure 11.1) has an average drill spacing of 55m, while Morrocoy has wider drill spacing of approximately 85m. Figure 11.1 shows drill-hole locations for holes drilled by Placer and Crystallex at Las Cristinas.

The database presently has 189,026m of trench and drill-hole samples with a total of 187,226 gold assays, 168,020 copper assays, 43,830 cyanide-soluble copper assays, and 145,021 silver assays in 1,372 drill holes and/or trenches. Within this total are 108 individually named trenches and 1,264 drill holes. The drilling component of the database includes a total of 179,930m of drilling with 185,373 gold assays, 168,000 copper assays, 43,830 cyanide-soluble copper assays, and 145,001 silver assays.

11.1 Drilling by Placer

Placer drilled 1,174 holes at Las Cristinas between 1994 and 1997. Once early exploration drilling had determined the approximate location and strike direction of mineralization, most later drilling was undertaken on section lines orientated perpendicular to that trend (Figure 11.1).

According to historic documentation of procedures (Placer Dome Exploration and/or Placer Dome Technical Services, 1996a), drill-hole locations were established using a prismatic or Brunton compass and adjusted into position with a Brunton compass. After completion, each hole was fitted with a collar pipe, and a cement collar block was inscribed with the drill-hole number. Final drill-hole collar locations were then surveyed in UTM coordinates by Surco, C.A., an independent professional surveyor, and translated into local grid coordinates and entered into a GEOLOG database. As an aside, the same surveying company is presently involved with surveying. Down-hole survey readings, generally taken about every 50m, were completed using a Sperry Sun single-shot survey camera or a Pajari compass. Shallow holes (typically 30m to 50m deep) were surveyed by acid tests (dip deflections only). A total of 907 of the 1,174 holes (77%) have at least one down-hole survey.

Crystallex's Placer drill database was obtained from CVG and is summarized in Table 11.1; the drill plan map is shown in Figure 11.1. The database has detailed geological descriptions, geological codes, check assay data, specific gravity data, core recovery and rock quality designation ("RQD") data, and some trace element geochemical data. Through 1997, Placer reported that 1,167 holes and 155,370m of drilling had been completed on the Las Cristinas property (Placer Dome Exploration and Placer Dome Technical Services, 1998a).



Table 11.1 Placer's Drill Database Description

Data	Number
Drill holes	1,174
Meters of drilling*	160,600
Gold assays	162,806
Copper assays	145,547
Copper CN Soluble assays	40,655
Silver assays	145,221
Trenches	108

*Includes trenches

Drilling in an intensely weathered tropical environment presented challenges and, consequently, several different drilling techniques were attempted by Placer before choosing triple tube diamond drilling. Other methods tested include Vibracore, auger, and reverse circulation rotary drilling, none of which produced acceptable results. Up to seven hydraulic diamond-drill rigs were used simultaneously to complete the drilling. The best recovery was achieved with PQ tools (85 mm diameter) in saprolite, and with HQ tools (61 mm diameter) in bedrock. HQ was also used to drill some of the saprolite, as not all rigs were equipped to handle PQ (85 mm diameter) core. NQ (47.6 mm diameter) was used systematically in bedrock during the infill drilling phase within the Stage I pit area and occasionally in difficult drilling situations. The saprolite interval was drilled uncased until casing could be set in bedrock. Sample lengths ranged from 0.1 to 8.0m, with most being ~1.0m. Drilling was done in essentially three phases:

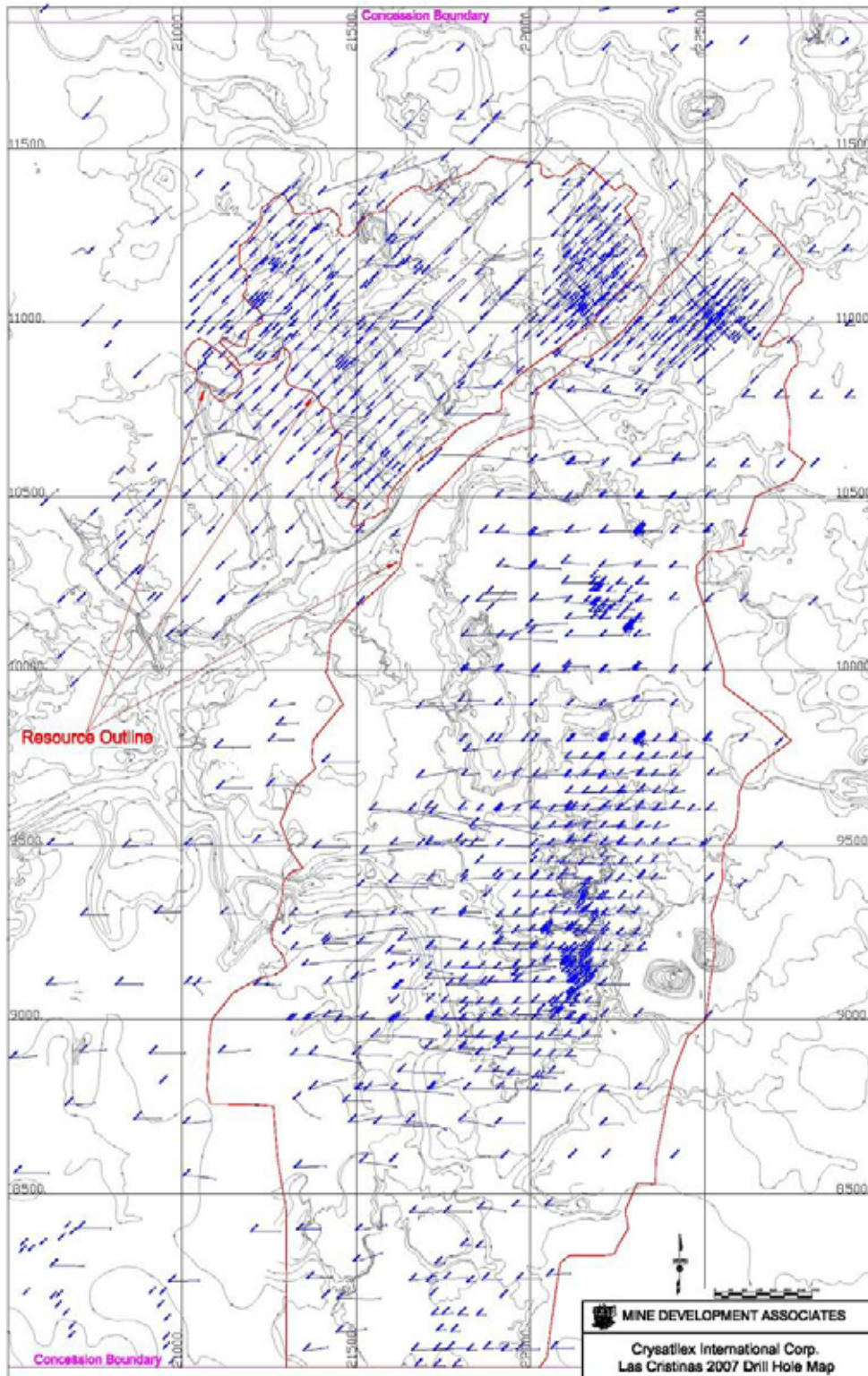
- Phase 1 Dominated by shallow drilling to test saprolite (drill spacing of ~90m);
- Phase 2 Dominated by bedrock drilling and filling gaps in the saprolite drill pattern (drill spacing of ~90m); and
- Phase 3 Infill drilling of the pit areas (drill spacing of ~50m).

Majortec Drilling, of Moncton, New Brunswick, undertook the majority of Placer's drilling at Las Cristinas.

Drill core was logged for rock type, alteration, mineralization, structure, and magnetic susceptibility. In addition, RQD, core recovery, rock strength, and joint roughness and coating were logged. If core recovery in the saprolite averaged less than 80%, the hole was re-drilled at the contractor's expense; global average core recovery in saprolite was between 85% and 90%. Hard-rock core recovery was above 95%. Oriented core was drilled in selected areas using a down-hole "crayon test" for determining the true orientation of foliation, bedding and lineation, as well as the orientation of veins and veinlets. This information was made available to Crystallex in the drilling database.



Figure 11.1 Drill Hole Location Map





11.2 Drilling by Crystallex

11.2.1 2003 Drilling

In 2003, Crystallex drilled 2,198.5m in 12 diamond drill holes (including one re-drilled hole), six of which were located in the Mesones-Sofía area and six in the Cuatro Muertos - Conductor zone. A total of 1,079 samples were collected from these holes. Drilling was conducted by Majortec Drilling under contract to Crystallex International. Majortec used an Acker MP-5 drill (an overpowered Longyear 44) mounted in a skid-mounted cargo container. A log skidder with rod sled completed the drill equipment roster.

The objective of this drill campaign was to twin selected holes drilled prior to 2003 in order to independently evaluate a portion of the Placer drill-hole database and assay data delivered to CVG, who delivered it to Crystallex. The sites of the proposed holes were located in the field by a geological technician and approved by the Project Geologist or the MDA representative. Spotting of holes involved identifying the collar location relative to drill holes being verified, and identifying the foresight/back-sight for correct azimuth and hole inclination. The collar position of the Crystallex hole was fixed within a 2m-5m radius of the collar of the existing hole. The selection of the actual collar position was influenced by ponds and unconsolidated tailings generated by the informal mining operations.

Drilling was conducted 24 hrs per day, excluding one-hour travel between shifts. The core was recovered every 1.5m for HQ drilling and every 3m for NQ drilling, unless drill conditions necessitated shorter intervals for improved core recovery. The inner tube was recovered by wireline. Water under pressure was used to expel saprolite from the inner tube while rock core fell from the inner tube without encouragement. Polymers were used liberally to maintain high core recovery, especially in saprolite.

Ideally, core was collected from the drill site twice a day, but occasionally core sat boxed at the drill site for over two days. Core was received at camp in sequential four-slot wooden core boxes. Approximately 1 box in 20 was incorrectly numbered by the drill crew but was corrected prior to logging. The hard-rock core was cleaned using water, and saprolite core was typically scraped with a spatula to remove the skin of wet or dried polymer.

Geotechnicians reoriented the core and “put it back together” by rotating core, minimizing gaps and fitting pieces back together. A trained geotechnician then used a cloth “*scalimetrica*” to measure core lengths, to mark down-hole depth in meters, and to measure recovered core.

A geologist logged geotechnical items such as the longest core piece, sum of core pieces greater than 10 cm, and fractures per meter. Sample intervals based on geology, such as intrusive rock and lithologic contacts, were identified with flagging in the core box and noted on logs. The geotechnicians used a digital camera to photograph three boxes at a time. Flagged sample intervals and geological contacts were included in the photo, as were a “header file” with hole number, down-hole depth and box numbers.

Sampling typically was on 2m intervals but honored geological boundaries. Sample intervals were noted with blue flagging in the core box; numbered rip-off tickets were inserted into the core box



immediately prior to sample bagging; and the core box was labeled. Irregular and significant quartz-tourmaline mineralization in the Mesones-Sofia area saprolite resulted in technical difficulties associated with sawing or cutting core, therefore it was decided to send all of the Mesones-Sofia saprolite for sample preparation. This material was not present in the Conductor area saprolite so that saprolite was cut (with a spatula or machete), and one half of the interval was submitted for preparation and analysis. Cloth bags were used for over ~90% of the samples and heavy translucent plastic bags were used for the remaining ~10%. Sample book rip-off tags with sample numbers were inserted into each bag. In 2003, all sampling and geology were overseen by Crystallex, while MDA had a representative on site for half of the program.

11.2.2 2004 and 2005 Drilling

Crystallex completed an 18-hole, 7,131m drill program in 2004 and an additional 5,419m in 14 drill holes in 2005. There are 5,993 and 5,419 gold assays for each drill program, respectively. Majortec Drilling was again the drilling contractor. Collar positions of the first four holes in Crystallex's 2004 drill campaign were located with compass and tape from the nearest identifiable drill-hole collar positions. The remaining 14 drill holes in this program were located directly by survey crews. Those drill holes completed in the 2005 program were all located with compass and tape from known collar positions. All of the collar positions of the drill holes drilled in Crystallex's 2003 and 2004 programs were subsequently surveyed by an independent contractor, Construcciones 2E-B C.A. Survey of the 2005 drill collar positions was done by Surco C.A. Down-hole surveys were done at 100m intervals, and these data, with that of the collar position, were incorporated into MDA's Medsystem® database.

Drilling in these two programs was focused in the western and southern parts of the modeled Conductor – Cuatro Muertos pit shell. The objective of these programs was to infill drill those poorly drilled areas to upgrade resource classification and ultimately increase the reserve. In 2004 and 2005, all sampling and geology were overseen by Crystallex.

11.2.3 2006 and 2007 Drilling

Crystallex completed a 46-hole drill program started in November 2006 and completed in February 2007. Total meters drilled were 13,574m, producing 12,178 samples. Sampling typically was on one-meter intervals and honored geological boundaries. Diorite sills and a monzonite intrusive body (referred to as aplite by Placer) were not sampled in their entirety since all previous analyses had shown this material to be barren with respect to gold and copper. For control purposes, a one-meter sample was taken from each intrusion adjacent to its upper and lower contact with enclosing country rocks.

Majortec Drilling was again the drilling contractor. Collar positions of the holes in Crystallex's 2006-2007 drill campaign were located with GPS and then verified by compass and tape from the nearest identifiable collar positions of pre-existing drilling. All of the collar positions of the drill holes drilled in Crystallex's 2006-2007 program were subsequently surveyed by independent contractor, Mr. David Rogerson (Surco CA), the same contractor who had undertaken Placer's surveying. Down-hole surveys were done at 100m intervals and these data, with that of the collar position, were incorporated into MDA's Medsystem® database.



Drilling during this campaign was done down-dip of the Conductor - Cuatro Muertos deposit and along strike into the Morrocoy area, which lies in between Cordova and Mesones-Sofia. The objective of this program was to bring up the Morrocoy area into a defined resource and to increase resources and reserves down-dip along the Conductor area. In 2006 and 2007, all sampling and geology were overseen by Crystallex, while MDA did visit the site during the drill program and independent sampling consultant, Mr. Trevor Nicolson, was on site for about 40% of the drill program.



12.0 SAMPLING METHOD AND APPROACH

12.1 Sampling by Placer

Prior to Crystallex's involvement at Las Cristinas and according to Placer reports, standard drilling procedure was to collar all drill holes with PQ core (8.5cm diameter) through the saprolite and reduce to HQ core (6.35cm diameter) in the underlying bedrock. HQ core, with which the majority of the hard-rock intersections were made, yields a $\frac{1}{2}$ core sample volume of approximately $1,583\text{cm}^3$ for one meter of core. Samples were prepared under supervision on site at Las Cristinas. Entire drill holes were generally sampled on one-meter intervals or less, as dictated by geology. Technicians a) assigned sample numbers, b) photographed the core, c) split or sawed the core in half, and d) sent one half to the on-site sample preparation laboratory for processing. Sample preparation and analytical procedures are well described in Placer's reports.

12.2 Sampling by Crystallex

12.2.1 2003 Drilling Program

The holes drilled by Crystallex in 2003, which were designed to twin previously drilled holes, differed in core diameter from the prior drilling. Crystallex's drilling was collared with HQ core (6.35cm diameter), and this was reduced to NQ core (4.76cm diameter) in the hard rock beneath the saprolite. NQ core, with which most of the hard-rock intersections were made in Crystallex's drilling, yields a $\frac{1}{2}$ -core sample volume of approximately 890cm^3 per meter of core, which is 56% of the volume of samples derived from $\frac{1}{2}$ -HQ core from Placer's drilling. Crystallex's sampling protocol was two-meter continuous sample intervals in contrast to Placer's protocol that called for continuous 1m sample intervals through the principal mineralized zones.

Core loss and RQD data were measured by Crystallex technicians on site at Las Cristinas under the supervision of the MDA and Crystallex geologists. The core was subsequently marked in continuous 2m sample lengths by these geologists. Saprolite core was split with a spatula, and rock was cut with a diamond saw by technicians on site. The samples of half core were bagged, numbered, and stored in a "safe room" prior to transport to the laboratory.

Samples were transferred from the Las Cristinas camp to the independent commercial preparation laboratory owned and operated by Triad in Tumeremo, Bolivar State, Venezuela in a vehicle that belonged to Crystallex and was, for the first half of the program, driven by the MDA representative. Reception at Triad's preparation facility was by the lab manager or his assistant during normal business hours.

12.2.2 2004 Drilling Program

Core drilling in the 2004 program followed the same procedures as were used in the 2003 program, with HQ core diameter in saprolite reduced to NQ core diameter in hard rock. Digital photos were taken of sequential sets of three core boxes on delivery of the core at the exploration camp. Core loss and RQD data acquisition by Crystallex's geological technicians for the 2004 program followed the same procedures as described above for 2003. Crystallex geologists then marked the core for continuous



sampling of 1m and 2m intervals. The 2m sample intervals were used for the saprolite and the hanging wall of the main mineralized zone in 12 of the 18 holes. Continuous samples from core from the lower parts of these 12 holes and all core from the other 6 holes drilled in this program were sampled in continuous one-meter intervals. The core was cut as described for the 2003 program, and half core was logged by the Crystallex geologist on site.

Samples were bagged in suitable plastic bags and sequentially numbered. Blanks (half-core samples of barren mafic dikes) were inserted every 50 samples. The blanks were bagged and numbered in sequence with the drill samples and could not be identified without careful study of the rock. Pulps of standards were inserted into the sample sequence at intervals of every 30 samples. These samples are conspicuously different from the core samples. Sequential groups of 7 to 10 samples were placed in large nylon bags and transported to independent commercial preparation facilities in batches of 100 to 300 samples by a Crystallex-employed driver. Samples from 15 of the 18 holes were delivered to the preparation laboratory of SGS Minerals Services, Venezuela ("SGS") in Tumeremo, and pulps from these samples were then shipped by the laboratory for assay at SGS's analytical facility in Lakefield, Ontario. Core samples from the remaining three holes were sent to Triad Laboratories ("Triad") at La Camorra, Venezuela, for preparation and assay.

12.2.3 2005 Drilling Program

Core drilling in the 2005 program followed the same procedures as were used in the 2003 and 2004 programs. Eleven of the 14 drill holes were HQ core in saprolite with a reduction to NQ core in hard rock. Three drill holes were collared with PQ diameter, although the core recovered was HQ diameter. The PQ diameter hole was reduced to HQ diameter at the base of the saprolite.

Digital photos were taken of sequential sets of three core boxes once the sample intervals and sample numbers had been marked on the core boxes after delivery of the core to the exploration camp. Core loss and RQD data acquisition by Crystallex's geological technicians for the 2005 program followed the same procedures as described above for 2003 and 2004 programs. Crystallex geologists then marked the core for continuous sampling of 1m intervals. Intervals of poor core recovery were encountered in the upper parts of the saprolite in some of the drill holes. In these zones, a 1m core sample corresponds with a greater drilled length; in these cases the assay value obtained from the partial recovery is applied to the drilled sample length which is greater than one meter. The core was split or cut as described for the 2003 program, and half core was logged by the Crystallex geologist on site. A digital photo library of core that contains clear examples of vein types, lithology, and texture was developed to facilitate consistency in logging of the core.

Samples were bagged and sequentially numbered as described for the 2004 program. Blanks (1/2 core samples of barren mafic dikes) were inserted every 50 samples. The blanks were bagged and numbered in sequence with the drill samples and could not be identified without careful study of the rock. Pulps of standards were inserted into the sample sequence at intervals of every 20 samples. These samples are conspicuously different from the core samples. Sequential groups of 7 to 10 samples were placed in large nylon bags and transported to SGS's preparation facilities in Tumeremo in batches of 100 to 300 by a driver employed by Crystallex.



12.2.4 2006-2007 Drilling Program

Core drilling and sampling in the 2006 and 2007 program followed the same procedures as were used in the 2005 program. Core samples were numbered and sealed by Crystallex technicians under the direction of a geologist employed by Crystallex. Sample batches of 100 to 500 samples were delivered by SGS's preparation facility, which had been moved from Tumeremo to La Camorra since the previous drill program. Blanks, consisting of chips of mafic dike, were inserted in the sample sequence, and numbered empty sample bags were inserted in the positions at which standards were to be inserted in the sample sequence. The sequence of samples and blank sample material and empty, numbered sample bags was then delivered to the laboratory with appropriate preparation instructions that included a request to prepare a bar-coded pulp bag corresponding to each of the empty sample bags. Pulps and reject material from the prepared samples were then returned to Las Cristinas from the preparation laboratory. The sealed pulp bags, including the bar-coded and numbered empty pulp bags corresponding to the empty sample bags delivered to the lab, were laid out in sequence and pulverized certified standard material was added to the empty pulp bags. The standards were thus indistinguishable from the real, duplicate and blank sample pulps. A sample control spreadsheet was updated with the number of the standard inserted in each of the empty pulp bags. Mr. Trevor Nicolson, an independent consultant, was contracted by Crystallex to monitor sampling procedures, sample preparation and QA/QC procedures with *carte blanche* to interact with the laboratories. Mr. Nicholson directly oversaw the unpacking of the pulps, insertion of the certified standards, and repacking of the pulps for shipment during about 40% of the drill program. The pulps were repacked, and Crystallex shipped the samples to SGS's assay laboratory in Lima, Peru.

A set of pulp and 10-mesh duplicates from SGS's preparation facility at La Camorra was sent, after all assays had been received from SGS in Lima, to ALS-Chemex in Lima for preparation and assay in order to provide an independent check on SGS-Lima's reported assays.



13.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

13.1 Placer's Program

Although sample preparation and analytical procedures are well described in Placer's reports, it is not clear what special security procedures were in place at that time. Triad Labs of Tumeremo, Venezuela and Bondar Clegg, of Vancouver, Canada assayed all samples taken at Las Cristinas in 1992. Beginning in January 1993, Placer Research Center in Vancouver, Canada, assayed all core samples, while Monitor Geochemical Laboratory de Venezuela, C. A. ("Monitor") analyzed trench samples.

All samples were prepared on site. In 1993, staff from Placer Research Center reviewed and amended laboratory procedures to conform to Placer Dome standards. Figure 13.1 shows Placer's sample preparation procedures.

All samples were fire assayed for gold and "geochemically" analyzed for silver, molybdenum, copper and cyanide-soluble copper. Table 13.1 shows the assay techniques used on Las Cristinas samples by the Placer Research Center. Note that the term "geochem" was not explained.

Table 13.1 Summary of Placer's Assaying Procedures at Las Cristinas

Laboratory	Element	Method
Placer Research Center	Au	Fire Assay, AA finish ¹ , 25 g sample
Placer Research Center/Bondar Clegg/Triad	Ag	Geochem, AA finish ²
Placer Research Center/Bondar Clegg/Triad	Cu	Geochem, AA finish ³
MINEN	CNSCu ⁴	Cyanide Leach
Placer Research Center/Bondar Clegg/Triad	Mo	Geochem, AA finish ⁵

¹ Au > 3 g/t were re-analyzed with a gravimetric finish; ² Ag > 10 g/t were re-analyzed using same analytical procedures

³ Cu > 4,000 ppm were re-analyzed using same analytical procedures; ⁴ CNSCu is cyanide soluble copper

⁵ Mo > 1,000 ppm were re-analyzed using same analytical procedures

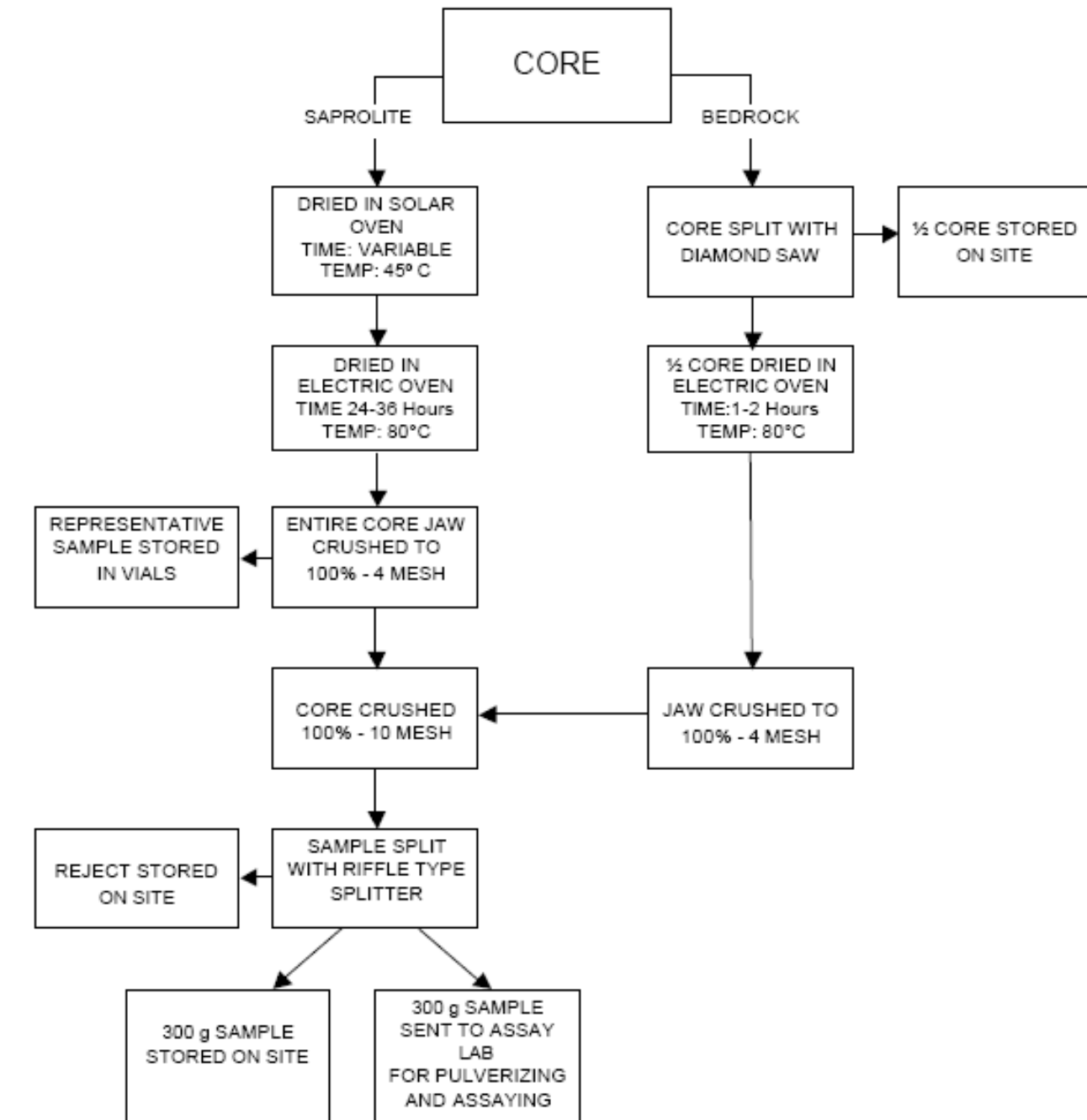
In addition to the above elements, core samples collected early in the program were analyzed for mercury, antimony, arsenic, zinc, and lead. Multi-element analysis was also performed on 3,700 surface samples. Additional multi-element analyses were completed on five-meter down-hole composites from ten holes drilled on cross-section 9,600N in the Conductor deposit.

In July 1993, R. Mohan Srivastava conducted an inter-laboratory bias analysis to compare Triad, Bondar Clegg, and Placer Research Center assay results (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1996a, 1998a). The study concluded that the Triad results tended to be biased on the low side, while some of the Bondar Clegg results tended to be biased on the high side. Consequently it was decided to re-assay all Triad and Bondar Clegg samples for gold-only at the Placer Research Center and to use only Placer's gold assays on drill core for the 1996 resource study.

Standards, duplicates, and blanks were used for quality control of the on-site sample preparation laboratory (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1996a). For every suite of 20 samples, there was one each of a duplicate, standard, and blank, which were submitted as blind samples to the assay lab.



Figure 13.1 Placer's Sample Preparation Procedures





Thirteen standards were prepared by the Placer Research Center representing a broad range of gold grades from Las Cristinas surface and core material. These were used to monitor accuracy of the assay lab as well as to detect potential contamination in sample preparation. Duplicates were taken from a split of the preceding sample and were used to test the precision of the assays and the homogeneity or nugget effect of the samples. Blanks were obtained from a nearby diorite quarry and were used to detect possible contamination during sample preparation as well as to verify sample order.

Standards, replicate samples on the same sample pulp, and blanks were also used for the quality control program for gold assays at the Placer Research Center. In each suite of 24 samples, one each was a replicate, standard, and a blank. According to Placer, quarterly statistical evaluations of the QA/QC data indicated that Placer's lab produced accurate and precise gold assay results. Results from a geochemical quality control program also indicated that the Placer Research Center's geochemical analyses for copper, silver, and molybdenum were highly accurate and precise, according to Placer.

In addition, 10% of the samples were sent to an outside lab for an independent check; the lab was the IPL laboratory of Vancouver, Canada. Of the 5,866 samples analyzed from 1993 to 1995, the two data sets were quite similar with minor differences between the two labs especially for gold grades less than 1.0 g Au/t, according to Placer's 1996 feasibility report. The average inter-laboratory bias appeared to be about 5 to 10%, with Placer's lab results being higher than IPL's. The Placer 1996 feasibility report (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1996a) noted that this grade range was important because the economic cutoff for the project is between 0.6 and 0.7 g Au/t. That report stated that *"It appears that the PDI [Placer Dome Inc.] laboratory is providing more reliable assays of the less than 1.0 g/t gold grades than is the IPL laboratory. IPL appears to be understating the gold grade of the less than 1.0 g/t Au grades by about 5 to 10%....From this analysis the PDI assay results can be considered appropriate for resource estimation."* MDA was unable to definitively analyze and compare the samples and check samples to verify Placer's above conclusion.

QA/QC information was also gathered on assay samples from the trenching program; these samples were assayed by Monitor Geochemical Laboratory de Venezuela, C.A. ("Monitor"). The Placer Research Center helped Monitor implement in-house standards and also completed a check assay program on samples sent to Monitor. A 1995 evaluation indicated that it appeared Monitor's assays were on average 5 to 10% higher than the expected means of the standards' values and that Monitor's mean gold grades were about 7% higher than Placer's mean gold grades on trench samples assayed by both labs. Placer's 1996 feasibility study (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1996a) concluded that *"The systematic bias in the Monitor assay results presented above is not thought to have a significant impact on the 1996 Conductora/Cuatro Muertos resource estimate because the trench data are only a small part of the data base used for resource estimation."* A similar check on Monitor's results from the 1998 trenching program showed that Placer results were about 3% lower than the Monitor results (Grill, 1999).

Monitor also assayed all the Mesones-Sofia drill core from the 1996 drilling, which represents about 55% of all the samples assayed in the Mesones-Sofia area. Placer's 1998 feasibility study (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1996a) reported that, as with the trench samples, Monitor's drill core assays appeared to be about 5 to 10% higher than check assays by Placer Research Center. This problem was to be studied further, but MDA is not aware of any further reported conclusions.



Diamond drilling in the intensely weathered environment, *i.e.*, saprolite, presented potential sample bias (Placer used the term “contamination” and considered it similar to that encountered in wet reverse circulation drilling; to be consistent with Placer’s terminology, the same wording will be used here). Crystallex and MDA noted that this was particularly apparent at Mesones-Sofia, where chunks of siliceous or tourmalinized hard rock were floating in the saprolitic clays. During drilling, water flowing around the core could wash out the clays, relatively increasing the amount of hard, possibly better-grade material.

Placer’s care for this aspect of sampling is reportedly excellent. While great effort was made to eliminate “contamination,” occasional contaminated intervals were unavoidable, according to Placer. Placer (Placer Dome Exploration and Placer Dome Technical Services Ltd., 1996a) stated that: *“Suspected contaminated intervals greater than 20 cm were sampled and logged as discrete intervals. If the contaminated interval was less than 20 cm the interval was marked and photographed in place and then removed prior to sampling. All sampled intervals were assayed for gold, copper and molybdenum in order to assess the potential for additional unrecorded down-hole contamination on a case by case basis. A total of 831 samples deemed to potentially be contaminated were eliminated from use by coding. The mean grade of these “contaminated” samples is 3.13 g Au/t with a maximum of 29.73 g Au/t. In addition, 32 trench samples deemed to potentially be contaminated were also eliminated from use in estimation”*

MDA evaluated the “contaminated” samples by selecting all samples lying within the area where “contaminated” samples exist. Descriptive statistics were calculated on all “contaminated” and “not-contaminated” samples. The results showed that there is a large discrepancy in mean grades between the two sets of data for gold, silver and copper. MDA capped the outlier samples to evaluate if the differences were caused by these few high-grade samples, but the results remained the same. Placer’s elimination of these “contaminated” samples was justified, and MDA continued with the practice of not using these samples.

13.2 Crystallex’s Program

13.2.1 2003 Drill Program

MDA’s representative, Mr. Maynard, was on site for the first three weeks of the six-week drilling program. To the extent possible, MDA had chain of custody of the samples, though some inadvertent breaches did occur. The protocol of picking up core from the drill rig in the morning and at night deviated with the availability of Crystallex vehicles for the two- to three-kilometer trip. There were two periods during weekends when core pickup occurred only on two to three day intervals. A potentially important point is that local small-scale miners were conducting their placer mining operations in the immediate vicinity of the drill rig 24 hours a day. Mr. Maynard never saw any interest in the drill core on the part of the small-scale miners, but he was not on the drill site 24 hours a day seven days a week. The protocol of leaving core spread out in the logging shed within the exploration camp for as little time as possible prior to cutting and bagging was stretched repeatedly, with core laid out for two to three days at a time prior to cutting and bagging. The exploration camp at Las Cristinas is enclosed by a 3m-high diamond-mesh security fence, and access to the camp is strictly controlled by security personnel.



These minor infrequent exceptions to the security were inadvertent and accidental, minimizing the probability of compromising the samples. There was never any indication of intent to compromise the samples, and MDA does not believe that during any of these times was there any interference with the samples.

Bagged and labeled samples were transferred to a safe room at the exploration camp at Las Cristinas, where they were stored prior to transport to the preparation facility at Tumeremo. People other than the MDA representative were in the room only on a “by invitation” or “by request” basis. There were minor infrequent exceptions to this security, but the inadvertent and accidental nature of these exceptions eliminated the probability of compromising the samples. The protocol of the MDA representative having the only set of keys to the safe room was compromised when the door to the safe room was found open one morning, and a floor mop was leaning against the wall. It is suspected that the cleaner was doing her job of cleaning office floors. The door’s lock was immediately changed, and the MDA representative retained the new set of keys. Overall, the MDA representative is confident that there was no breach of sample integrity, but due to certain uncontrolled, albeit minor and probably inadvertent infringements, cannot state that the samples were entirely in MDA’s control. It is believed that any exceptions are strictly the result of accident and disinterest.

Samples from the 2003 drill campaign were prepared by Triad at its laboratory in Tumeremo and analyzed by Chemex in Vancouver. Sample preparation procedures were as follows:

- Dry samples in a low temperature oven;
- Jaw crush the sample in its entirety to -2mm;
- Run material through a multi-roll crusher and crush to -1mm;
- Split out 250g and pulverize by ring and puck to -150 mesh and;
- Package the 250g pulp and ship to Chemex, Vancouver for analysis.

Dr. Luca Riccio (then Vice President Exploration, Crystallex) and Mr. Maynard (MDA’s site representative) found that Triad’s preparation lab was clean and appeared to be in good working order. However, Triad did not present data that demonstrated the effectiveness of laboratory QA/QC procedures at that time. Crystallex/MDA’s assessment of quality control is described later in this report.

Chemex procedures began with logging in the pulps. Their standard operating procedures included randomly checking for adequacy of pulverizing. Chemex required that the pulp was to meet 80% passing 200 mesh with a 66% pass ratio. In a few batches, additional pulverizing was necessary.

All samples were analyzed for gold and copper, and samples from the saprolite and underlying carbonate-leached bedrock were analyzed for cyanide soluble copper (“CNSCu”). Analyses for gold were by fire assay with an atomic absorption (“AA”) finish on one-assay-ton charges (30g aliquots). Any sample yielding grades over 10g Au/t was fire assayed with a gravimetric finish.

For copper analyses, *aqua regia* was added to 0.5g of pulp to achieve a total volume of 12.5ml per sample. This solution was analyzed for copper by AA. Samples with assays greater than 1% Cu were re-assayed with 0.4g of sample in 100ml of *aqua regia* and analyzed by AA.



Samples for CNSCu were prepared with 30ml of 0.5% cyanide solution added to 0.5g to 1.0g of pulp. The sample was shaken until homogenized, and the pH of the solution was then checked. Changes in the pH were corrected with the addition of calcium oxide to increase the pH to between 9 and 13. The bottle was then rolled for two hours. The leach solution was centrifuged until clear, and the pH of the solution was checked again; if the pH was below 9, the leach was repeated with calcium added to the sample. The solution was then analyzed by AA spectrometry.

During Crystallex's verification drilling program, blanks and standards were systematically inserted into the sample stream. The following details are taken from Ristorcelli and Hardy (2003):

Pulp Standards. Sample material used for standards was made by Crystallex's Revemin Laboratory. The Revemin pulp standards were inserted in the sample stream at a rate of 2 per 25, immediately prior to submission to Chemex. [Revemin is Crystallex's mine lab located in El Callao]

A mean difference of 11% exists in the low-grade results between the Crystallex standard and the sample results received from Chemex, with the Chemex results lower than the standard (38 assays, standard 0.91 g Au/t versus Chemex at 0.81 g Au/t). The high-grade standard results are similar to the Chemex results but are 2% lower (44 assays, standard 6.79 g Au/t versus Chemex at 6.91 g Au/t).

Coarse Rejects. Coarse rejects from previous Placer drilling were inserted into the sample stream, prior to submission to the Triad prep lab, at a rate of 2 per 25 samples. Coarse-reject material generally comprised 100% passing 10 mesh, 90% passing 100 mesh material. A similar relationship of Crystallex results and Placer results exists with Crystallex/Chemex being lower grade (Table 13.2).

Barren Core (blanks). Barren aplitic core was inserted into the front end of the sample stream with new drill samples. These blanks were given a new number in sequence with the standard samples. Blanks were inserted into the sample stream at a rate of 1 per 25.

Review of the blank sample grades showed that there was some contamination in the 2003 sampling program. Table 13.3 shows that the Crystallex assays on the "barren" Placer core returned grades over 2.5 times higher grade than the original Placer blank sample grades. It is not certain which data set is correct, though it is believed to be the Placer set. The implication is that there may have been some contamination in the sample preparation procedures at the laboratory (Triad) during the 2003 drill- sample-preparation procedures."



Table 13.2 Descriptive Statistics on Inserted Coarse Rejects
(From Ristorcelli and Hardy, 2003)

	Placer	Diff.	Crystallex	
Count	105		105	
Mean	1.26	11%	1.13	g Au/t
Std. Dev.	1.60	10%	1.45	g Au/t
CV	1.27	-1%	1.28	
Min.	0.01	400%	0.00	g Au/t
Max.	8.02	21%	6.65	g Au/t

Table 13.3 Descriptive Statistics on Inserted Barren Core
(From Ristorcelli and Hardy, 2003)

	Placer	Diff.	Crystallex	
Count	53		53	
Mean	0.02	-60%	0.06	g Au/t
Std. Dev.	0.05	-35%	0.08	g Au/t
CV	2.12	62%	1.31	
Min.	0.01	67%	0.00	g Au/t
Max.	0.30	-12%	0.34	g Au/t

13.2.2 2004 Drill Program

Core boxes were collected from the drill platform by the exploration geologists in the early morning and late afternoon each day. From there, the core was transported to the exploration camp by Crystallex's exploration geologists or geological technicians.

Sampling of split core was done at the exploration camp by Crystallex's geological technicians and geologists under the supervision of Dr. Luca Riccio. Samples from 15 of the drill holes were delivered to SGS's preparation facility in Tumeremo by Crystallex personnel. Samples from three drill holes (1145, 1146 and 1147) were delivered to Triad's preparation facility in Tumeremo for assay by Triad in Venezuela.

Sample preparation followed the same procedure as was used in the 2003 program described above. All samples were analyzed for gold by fire assay of a 30g aliquot with an AA finish as described for the 2003 program. Samples with grades over 10 g Au/t were fire assayed with a gravimetric finish. All samples were analyzed for copper by ICP, and samples from the sulfide saprolite and mixed sulfide-oxide saprolite from 14 of the 18 drill holes were analyzed for CNSCu using the procedure described for the 2003 program.