

PRELIMINARY ECONOMIC ASSESSMENT CABALLO BLANCO GOLD HEAP LEACH, VERACRUZ, MEXICO

PREPARED FOR:

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**Document No. Q443-04-028
Project No. 443-04
7 May 2012**

(Re-Addressed as of 31 October 2016)

NOTICE TO READER

This technical report was originally prepared for Goldgroup Mining Inc. ("Goldgroup"). It has been re-addressed to Candelaria Mining Corp. ("Candelaria"). On December 24, 2014, Molimentales Del Noroeste, S.A. de C.V. ("Molimentales") acquired 100% of the Caballo Blanco Gold Project, which is the subject of this report, from Goldgroup pursuant to an asset purchase agreement. Pursuant to an asset purchase agreement dated May 11, 2016, Molimentales' interest in the Caballo Blanco Gold Project was acquired by Grupo Minero Candelaria, S.A.P.I. de C.V., a subsidiary of Candelaria. At the request of Candelaria, the report has been re-addressed to Candelaria in order to support its own disclosure. All information in this report is effective as of the effective date, May 7, 2012, and the re-addressed report does not contain any new information.

A typographic error on the footer date on some pages was also corrected.



CERTIFICATE of AUTHOR

This certificate applies to the technical report entitled "*Preliminary Economic Assessment Caballo Blanco Gold Heap Leach, Veracruz, Mexico*" readdressed to Candelaria Mining Corp., on October 31, 2016, with an effective date as of May 7, 2012 (the "**Technical Report**").

I, Joseph M. Keane, P.E. do hereby certify that:

1. I am an Independent Mineral Process Engineering Consultant and contributed to the above referenced Report as an associate of the following organization:

K D Engineering (now SGS North America Inc.)
3845 N. Business Center Drive
Tucson, Arizona 85705
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Fax: 520-579-7045
E-Mail: Joseph.Keane@sgs.com

2. I graduated with a degree of Bachelor of Science in Metallurgical Engineering from the Montana School of Mines in 1962. I obtained a Master of Science in Mineral Processing Engineering in 1966 from the Montana College of Mineral Science and Technology. In 1989 I received a Distinguished Alumni Award from that institution. I am a member of the Society for Mining, Metallurgy, and Exploration, Inc. (SME #1682600) and am a registered professional metallurgical engineer in Arizona (#12979) and Nevada #5462). I have worked as a mineral processing engineer for a total of 53 years since my graduation from university.
3. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
4. I visited the Caballo Blanco project site in November 2011 for a period of 3 days.
5. I am responsible for a portion of the report contents, specifically Sections 2, 3, 13, 17, 18, 19, 22 and 23 and also the process portions of Section 1, 21, 24, 25, 26, 27 and 28.



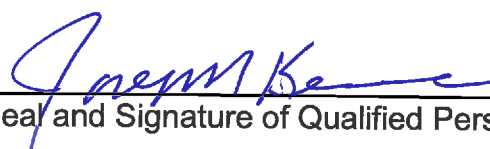
Certificate of Author
Joseph M. Keane, P.E.

6. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.
7. I have not had prior involvement with the property that is the subject of the Technical Report.
8. I have read National Instrument 43-101 and Form 43-101F1, and the portions of the Technical Report for which I am responsible have been prepared in compliance with that instrument and form.
9. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of October, 2016

Joseph M. Keane (Signed and Sealed)

Joseph M. Keane, P.E.
Print Name of Qualified Person


Seal and Signature of Qualified Person



CERTIFICATE

This certificate applies to the technical report entitled “*Preliminary Economic Assessment Caballo Blanco Gold Heap Leach, Veracruz, Mexico*” readdressed to Candelaria Mining Corp. on October 31, 2016, with an effective date as of May 7, 2012 (the “**Technical Report**”). Further, this certification applies specifically to the environmental sections, Chapter 20.0 – Environmental Studies, Permitting and Social or Community Impact.

I, Brent C. Bailey, hereby certify that:

- 1) I am a Civil Engineering Consultant specializing in environmental engineering, environmental policy and management, with an address of 6455 S. Yosemite St., Ste 900, Greenwood Village, CO 80111-4954.
- 2) Qualifications
 - a) Education:
 - i) Masters of Environmental Policy and Management (M.E.P.M.), University of Denver
 - ii) M.S., Civil Engineering (Environmental), University of Utah
 - iii) B. S., Civil Engineering, University of Utah
 - b) Professional registrations and affiliations:
 - i) Registered Professional Engineer – Colorado (No. 22867)
 - ii) National Registry of Environmental Professional, Certified Environmental Auditor (No. 9825) (certification voluntarily allowed to expire in 2016)
 - c) Experience:
 - i) Environmental Manager of an underground gold mining operation.
 - ii) Consultant - prepared Plans of Operations, Spill Prevention Control and Countermeasure plans, emergency response plans, reclamation and closure plans and cost estimates for mining operations. Additionally, I have conducted environmental audits, International Cyanide Management Institute Cyanide Code audits, and environmental Due Diligence for potential property acquisitions.
 - iii) Vice-president of Environmental and Governmental Affairs for a Canadian Gold Mining Company where my activities focused on permitting a mine in southern California and preparing a company environmental auditing program.
 - iv) Director of Environmental Affairs with a Canadian Mining Corporation where I conducted mine permitting, prepared Plans of Operations, evaluated baseline study programs, conducted environmental audits and due diligence studies.
 - v) I have provided approximately 30 years of environmental services to the mining industry. Approximately 35% of my time has been spent with gold mining operations. This experience includes permitting, evaluation of minerals processing operations, evaluation and development of waste treatment and disposal facilities, and preparation of reclamation and closure programs.
- 3) I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI

43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

- 4) ERM was my employer at the time studies were conducted in conjunction with preparation of Chapter 20.0 – Environmental Studies, Permitting and Social or Community Impact. Representatives of ERM visited the property and prepared the reports as required to accurately and fairly complete the work. I reviewed Chapter 20.0, and although I did not conduct the studies, I believe them to be fair and accurate..
- 5) I am independent of Candelaria Mining Corp. as described in section 1.5 of NI 43-101.
- 6) I have no prior involvement with the property that is the subject of the Technical Report.
- 7) I have read NI 43-101, and the portions of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
- 8) As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of October, 2016.


Brent C. Bailey, Professional Engineer

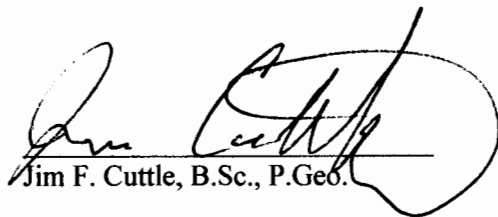
CERTIFICATE

This certificate applies to the technical report entitled "*Preliminary Economic Assessment Caballo Blanco Gold Heap Leach, Veracruz, Mexico*" readdressed to Candelaria Mining Corp. on October 31, 2016, with an effective date as of May 7, 2012 (the "**Technical Report**").

I, Jim Cuttle, hereby certify that:

1. I am a consulting geologist with an office at 86 Cloudburst Road, Black Tusk Village, Whistler, British Columbia, Canada, V0N 1B1.
2. I am a graduate of the University of New Brunswick (1980) with a Bachelor of Science Degree in Geology. I have practiced my geological profession continuously for over 34 years in the capacity of exploration and consulting geologist. I specialize in precious and base metal exploration and have experience in different types of epithermal mineralization similar to mineralization at Caballo Blanco.
3. I remain a registered member in good standing since 1992 of The Association of Professional Engineers and Geoscientists of the Province of British Columbia (#19313).
4. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I last visited the property on January 6, 2012.
6. I am a co-author of this Technical Report and responsible for the preparation of Sections 4 through 12 of the Technical Report.
7. I am independent of Candelaria Mining Corp. as described in section 1.5 of NI 43-101.
8. I have previously worked on this property, co-authoring a NI 43-101 report in 2010.
9. I have read NI 43-101, and the portions of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
10. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of October, 2016.



Jim F. Cuttle, B.Sc., P.Geo.

CERTIFICATE

This certificate applies to the technical report entitled "*Preliminary Economic Assessment Caballo Blanco Gold Heap Leach, Veracruz, Mexico*" readdressed to Candelaria Mining Corp. on October 31, 2016, with an effective date as of May 7, 2012 (the "**Technical Report**").

I, G.H. Giroux, of 982 Broadview Drive, North Vancouver, British Columbia, do hereby certify that:

1. I am a consulting geological engineer with an office at 982 Broadview Drive, North Vancouver, British Columbia.
2. I am a graduate of the University of British Columbia in 1970 with a B.A. Sc. and in 1984 with a M.A. Sc., both in Geological Engineering.
3. I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
4. I have practiced my profession continuously since 1970. I have had over 40 years' experience estimating mineral resources. I have previously completed resource estimations on a wide variety of precious metal deposits both in B.C. and around the world, including La Colorada, La Jojoba and Livia de Oro, La India and Kisladag.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I have made a site visit the property on Nov. 7 to 9, 2011.
7. I am the co-author of this Technical Report and responsible for the preparation of Section 14 on the resource estimations completed in Vancouver during 2012.
8. I am independent of Candelaria Mining Corp. as described in section 1.5 of NI 43-101.
9. I have previously worked on this property, completing a resource estimate in 2010.
10. I have read NI 43-101, and the portions of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of October, 2016.


G. H. Giroux, P.Eng., M.A.Sc.



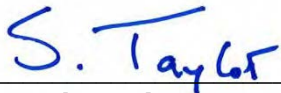
CERTIFICATE

This certificate applies to the technical report entitled “*Preliminary Economic Assessment Caballo Blanco Gold Heap Leach, Veracruz, Mexico*” readdressed to Candelaria Mining Corp. on October 31, 2016, with an effective date as of May 7, 2012 (the “**Technical Report**”).

I, Stephen John Taylor, hereby certify that:

1. I am a civil engineer, at Picacho Associates, LLC, with an address of 522 West State Avenue, Phoenix, Arizona, 85021.
2. I graduated with a Bachelor's of Science degree in Civil Engineering from the University of the Witwatersrand in 1984, and a Master's of Science in Applied Mathematics from the University of Colorado in 1997. I have been employed as an engineer for 27 years.
3. I am a registered Professional Engineer in the State of Arizona (#45940).
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I visited the property in November 2011 for 2 days.
6. I am a co-author of this Technical Report and responsible for the preparation of Sections 24.1, 24.2, 24.3, 24.4, parts of 26 and Appendices 7, 8 and 9 of the Technical Report.
7. I am independent of Candelaria Mining Corp. as described in section 1.5 of NI 43-101.
8. I have no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the portions of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
10. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of October, 2016.



Stephen John Taylor, PE

CERTIFICATE

This certificate applies to the technical report entitled “**Preliminary Economic Assessment Caballo Blanco Gold Heap Leach, Veracruz, Mexico**” readdressed to Candelaria Mining Corp. on October 31 2016, with an effective date as of May 7, 2012 (the “**Technical Report**”).

I, Dino Pilotto, hereby certify that:

1. I am a Mine Engineering Lead, at JDS Energy & Mining Inc., with an address of Suite 860, 625 Howe Street, Vancouver BC, Canada.
2. I am a graduate of the University of British Columbia with a B.Sc. in Mining and Mineral Process Engineering (1987). I have practiced my profession continuously since June 1987. I have been involved with mining operations, mine engineering and consulting covering a variety of commodities at locations in North America, South America, Africa, and Eastern Europe.
3. I am a Professional Mining Engineer (P.Eng. #14782) registered with the Association of Professional Engineers and Geologists of Saskatchewan. I am also a registered Professional Mining Engineer in Alberta and the Northwest Territories.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I have personally inspected the subject project on November 7, 2011.
6. I am the co-author of this Technical Report and responsible for the preparation of Sections 15 and 16 and open pit mining aspects of Sections 1, 21, 25, 26 and 27.
7. I am independent of Candelaria Mining Corp. as described in section 1.5 of NI 43-101.
8. I have has no prior involvement with the subject property of the Technical Report.
9. I have read NI 43-101, and the portions of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.
10. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of October, 2016.



Dino Pilotto, P.Eng.
Mine Engineering Lead

TABLE OF CONTENTS

1.0	SUMMARY	1-1
2.0	INTRODUCTION	2-1
3.0	RELIANCE ON OTHER EXPERTS	3-1
4.0	PROPERTY DESCRIPTION AND LOCATION	4-1
5.0	ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE &PHYSIOGRAPHIC	5-1
6.0	HISTORY	6-1
7.0	GEOLOGICAL SETTING AND MINERALIZATION	7-1
8.0	DEPOSIT TYPES	8-1
9.0	EXPLORATION	9-1
10.0	DRILLING	10-1
11.0	SAMPLE PREPARATION, ANALYSIS AND SECURITY	11-1
12.0	DATA VERIFICATION	12-1
13.0	MINERAL PROCESSING AND METALLURGICAL TESTING.....	13-1
14.0	MINERAL RESOURCE ESTIMATES	14-1
15.0	MINERAL RESERVE ESTIMATES	15-1
16.0	MINING METHODS	16-1
17.0	RECOVERY METHODS	17-1
18.0	PROJECT INFRASTRUCTURE	18-1
19.0	MARKET STUDIES AND CONTRACTS	19-1
20.0	ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT	20-1

TABLE OF CONTENTS (Continued)

21.0	CAPITAL AND OPERATING COSTS	21-1
22.0	ECONOMIC ANALYSIS	22-1
23.0	ADJACENT PROPERTIES	23-1
24.0	OTHER RELEVANT DATA AND INFORMATION	24-1
25.0	INTERPRETATION AND CONCLUSIONS	25-1
26.0	RECOMMENDATIONS	26-1
27.0	REFERENCES	27-1
28.0	APPENDICES	28-1

Appendix 1	Process Plant Design Criteria
Appendix 2	Process Plant Drawings
Appendix 3	Process Plant Equipment List
Appendix 4	Process Plant Capital Cost Estimate
Appendix 5	Electrical Load Study & Single Line
Appendix 6	Leach Pad, Waste Dumps and Ancillary Facility Drawings
Appendix 7	Meteorological Solutions Inc., Precipitation and Evaporation Estimates for Caballo Blanco
Appendix 8	Opinion of Probable Costs: Leach Pad, Ponds, and Waste Stockpile Construction
Appendix 9	List of Drill Holes & Semivariograms

LIST OF TABLES

Table 1.1	NSR Parameters
Table 1.2	Resources Planned to be Extracted in LOM Plan
Table 1.3	LOM Production Schedule
Table 1.4	Total Initial And Future Sustaining Project Costs For Two Stage Crushing Option
Table 1.5	Summary Process Plant Cost - 2-Stage Crushing
Table 1.6	Operating Cost Estimate
Table 1.7	Economic Summary
Table 1.8	Economic Evaluation
Table 1.9	Summary of Key Financial Parameters (Sensitivity to Gold Price)
Table 4.1	Mineral Claim Details
Table 4.2	The “El Cobre Joint Venture” Boundaries
Table 10.1	Areas drilled in 2010/2011 by Goldgroup (holes 10CBRC-43 to 11CBN-184)
Table 10.2	Comparison - Reverse Circulation / Diamond drill twinned holes - La Paila area
Table 10.3	All drill collar locations - 2010/2011 (NAD 27 Mex, zone 14)
Table 12.1	Assay checks by Author, Nov, 2009
Table 13.1	Caballo Blanco (La Paila Zone) Preliminary ‘in-house’ Bottle Roll Tests by Goldgroup - 2009
Table 13.2	Column Leach Test Samples
Table 13.3	Column Leach Test Parameters
Table 13.4	Column Leach Test Results
Table 13.5	Column 1-10 Reaction Equation Parameters
Table 13.6	Operating Parameters
Table 14.1	Assay statistics for Au and Ag inside and outside Mineralized Solid - La Paila
Table 14.2	Summary of Gold Populations Present in Mineralized Solid
Table 14.3	Cap levels for Gold and Silver - La Paila
Table 14.4	Assay Statistics for Capped Gold & Silver Inside and Outside Mineralized Solid - La Paila
Table 14.5	Statistics for Gold & Silver - 5 meter Composites
Table 14.6	Summary of Semivariograms for Gold & Silver
Table 14.7	Summary of Kriging Parameters
Table 14.8	Indicated Resource within the Mineralized Solid - La Paila
Table 14.9	Inferred Resource within the Mineralized Solid - La Paila
Table 14.10	Indicated Resource within Total Blocks
Table 14.11	Inferred Resource within Total Blocks
Table 16.1	NSR Parameters used in the Whittle Optimization Model
Table 16.2	Cut-off Grade
Table 16.3	Operating Costs and Geotechnical Parameters used for Optimization
Table 16.4	Whittle Optimization Results - La Paila
Table 16.5	Resources Planned to be Extracted in the LOM Plan
Table 16.6	Resources Planned to be Extracted by Classification
Table 16.7	Major Open Pit Mining Equipment
Table 16.8	La Paila Phase Tonnages and Grades
Table 16.9	Proposed LOM Production Schedule

LIST OF TABLES (Continued)

Table 1.1	Environmental Permits 1
Table 20.2	Expected Exploration and Mining Operations Environmental Impacts
Table 20.3	Risk Assessment Summary Table
Table 20.4	Mitigation Measures
Table 20.5	Surrounding Communities
Table 20.6	Development Agreements
Table 21.1	Process Plant Operating Cost Estimate - Summary
Table 21.2	Operating Cost Estimate Heap Leach Power & Energy
Table 21.3	Operating Cost Estimate - Plant Labor
Table 21.4	Operating Cost Estimate - General Administration Labor
Table 21.5	Operating Cost Estimate - Heap Leach Consumables
Table 21.6	Wear Material Cost Estimates
Table 21.7	Water
Table 21.8	Summary Process Plant Cost - 2 Stage Crushing
Table 21.9	Summary Process Plant Cost - 3 Stage Crushing
Table 22.1	Economic Analysis Summary (Two Stage Crushing)
Table 22.2	Economic Analysis Summary - US\$ Pre-Income Tax Cash Flow (Two Stage Crushing)
Table 22.3	Cash Flow Schedule (Two Stage Crushing)
Table 22.4	Rate of Return Sensitivity (Two Stage Crushing)
Table 22.5	NPV Sensitivity (US\$ X 1000) (Two Stage Crushing)
Table 22.6	Economic Analysis Summary (Three Stage Crushing)
Table 22.7	Economic Analysis Summary - US\$ Pre-Income Tax Cash Flow (Three Stage Crushing)
Table 22.8	Cash Flow Schedule (Three Stage Crushing)
Table 22.9	Rate of Return Sensitivity (Three Stage Crushing)
Table 22.10	NPV Sensitivity (US\$ X 1000) (Three Stage Crushing)
Table 24.1	Leach Pad Design Criteria used for the Pond Sizing Calculation
Table 24.2	Resource Properties
Table 24.3	Estimated Average Precipitation and Evaporation at Caballo Blanco (per MSI)
Table 24.4	Operation Scenarios Considered in the Water Balance Simulations
Table 24.5	Results of Water Balance Simulations
Table 24.6	Sulfide Waste Stockpile Criteria and Results

LIST OF FIGURES

Figure 4.1	Country Location Map
Figure 4.2	Veracruz State Location Map
Figure 4.3	Claim Tenure Map
Figure 7.1	Regional Geology Map
Figure 7.2	Property Geology Map
Figure 7.3	North Zone Geology Map
Figure 7.4	La Paila Geology Map
Figure 8.1	Typical Alteration of High-Sulphidation Epithermal Deposits
Figure 9.1	New Induced Polarization Resistivity Survey - North Zone Area
Figure 9.2	New Induced Polarization Resistivity - Highway Zone Area
Figure 10.1	2010-2011 Drill Collar Locations by Goldgroup - Northern Zone
Figure 13.1	Column Test Gold Extraction versus Time
Figure 13.2	Modified Leach Curve
Figure 13.3	Gold Extraction versus Crush Size
Figure 13.3	Gold Extraction versus Crush Size
Figure 14.1	Gold Extraction versus Crush Size
Figure 14.2	Isometric View Looking East Showing the Mineralized Solid, Drill Traces and Surface Topography at La Paila
Figure 14.3	Scatter Plot Showing Gold versus Specific Gravity
Figure 14.4	Isometric View Looking NW Showing Classified Blocks
Figure 14.5	Swath Plot for Gold by Northing, Slices of 40 meters
Figure 14.6	Swath Plot for Gold by Easting Slices of 40 meters
Figure 14.7	Swath Plot for Gold by Elevation Slices of 10 meters
Figure 14.8	Block Model Comparison, 2009 to 2012
Figure 16.1	Whittle Optimization Results - La Paila
Figure 16.2	Incremental Whittle Value Results - La Paila
Figure 16.3	Incremental Whittle Tonnage Results - La Paila
Figure 16.4	Ultimate Shell Limits - La Paila
Figure 16.5	Typical Long Section (looking north-west) - La Paila
Figure 16.6	La Paila Stage Summary - Overall
Figure 16.7	Stage Summary - Recovered Metal
Figure 16.8	Ultimate and Stage Isometric View (looking North West)
Figure 16.9	Ultimate and Stage Typical Long Section (looking North West)
Figure 16.10	LOM Overall Summary
Figure 16.11	Phase Summary
Figure 16.12	Recovered Metal
Figure 17.1	PLS, ILS, and Events Pond Operation Schematic
Figure 22.1	Minera Cardel Gold Project Pre-Tax Sensitivity IRR
Figure 22.2	Minera Cardel Gold Project Pre-Tax Sensitivity NPV@5%
Figure 22.3	Minera Cardel Gold Project Pre-Tax Sensitivity IRR
Figure 22.2	Minera Cardel Gold Project Pre-Tax Sensitivity NPV@5%
Figure 24.1	Estimated Monthly Precipitation Depths at the Caballo Blanco Site
Figure 24.2	Schematic for Leach Pad Water Balance

LIST OF PHOTOS

Photo 7.1	Looking west at La Paila and the broad alteration haloes, Northern Zone
Photo 7.2	Typical 'vuggy silica' Alteration with Gold Mineralization - La Paila Area, Northern Zone
Photo 7.3	Alteration Haloes at the Highway Zone
Photo 9.1	New Underground Development at La Paila - January 2012
Photo 12.1	Core Storage Facilities Near Arroyo Agrio, Caballo Blanco Project - 2009
Photo 12.2	Typical 'Cement Carne' used to Identify Drill Hole Collar Locations, Caballo Blanco Project -2009
Photo 12.3	Typical 'Cement Carne' used to Identify Drill Hole Collar Locations, Caballo Blanco Project - 2012
Photo 20.1	Mobile Medical Unit
Photo 20.2	Vermicompost Pile
Photo 20.3	Demonstration Plot
Photo 20.4	Building of a Dam as Part of the "Infrastructure" Program
Photo 20.5	Installation of a Water Well in El Ojital Community

Glossary

Alternating Current.....	AC
Amp	A
Atomic Absorption	AA
Celsius	C
Centimeter	cm
Day	d
Days per year (annum)	dpa
Degree	°
Dollar	\$
Dry metric ton	dmt
Gram	g
Gram per liter	g/L
Grams per ton	gpt
Hectare	ha
Hertz	Hz
Horsepower	hp
Hour	h
Hours per day	h/d
Kilograms	kg
Kilometers	km
Kilotonne	kt
Kilo Watts	kW
Kilo Volts	kV
Liter	L
Life of Mine	LOM
Meter	m
Meters above sea level.....	masl
Metric ton (tonne)	t
Metric ton per day.....	tpd
Metric ton per hour.....	tph
Micrometer	µm
Millimeter	mm
Million	M
Minute (time)	min
Ounce	oz
Parts per billion.....	ppb
Parts per million.....	ppm
Percent	%
Second (time)	s
Volt	V
Watt	W
Year (annum)	a

1.0 SUMMARY

Goldgroup Mining Inc. (Goldgroup) has engaged K D Engineering (KDE), an independent engineering firm located in Tucson, Arizona, to prepare a Preliminary Economic Assessment (PEA) of the Caballo Blanco Gold Heap Leach Project. The KDE study was prepared to standards pursuant to Canada's National Instrument 43-101 (NI 43-101) and was based on the following:

- KDE site visit conducted on 7 November 2011
- NI 43-101 Technical Report dated February 2012 by Cuttle and Giroux
- SRK completed the mining portion of the work including capital and operating costs
- KDE review of metallurgical testing by Goldgroup
- KDE design and estimates for the crushing and gold recovery plant facilities
- Heap leach pad, waste dump, and solution pond designs and cost estimates by MWH Americas, Inc. (MWH)
- Environmental and Social Impact scoping study report by ERM.

1.1 Property Location and Description

The Caballo Blanco property is located next to the Gulf of Mexico approximately sixty five kilometers by paved road north northwest of the city of Veracruz in the state of Veracruz, Mexico. The property consists of fourteen mineral claims covering an area of 54,732 hectares centered at Longitude 96° 27' 30" West and Latitude 19° 40' 44" North.

In October, 2011 Goldgroup completed the acquisition of the remaining 30 percent interest in the Caballo Blanco property held by Almaden Minerals Ltd. (Almaden). Goldgroup currently owns 100 percent of the Caballo Blanco Project.

1.2 Geology and Exploration

The Caballo Blanco property lies at the eastern end of the Trans Mexican Volcanic Belt and is underlain by sub-aerial basalts, andesites and diorite dykes of Miocene age covered by a sequence of felsic quartz tuffs, andesitic 'dome' complexes, volcanoclastics and younger intrusive dacitic plugs. Capping this volcanic package are Pliocene alkaline basalt flows that are commonly well preserved as small flat highland plateaus.

A variety of geophysical, geochemical and geological surveys have been extremely useful in identifying drill targets throughout the property; most importantly, airborne magnetics, induced polarization resistivity anomalies, clay alteration haloes identified by TerraSpec[®] spectrometry, mineralized surface rock geochemistry and detailed geological and structural mapping. These surveys will remain an integral part of any future exploration program at Caballo Blanco.

Two large areas of epithermal gold mineralization have been discovered within the current Caballo Blanco property, referred to as the Northern Zone and Highway Zone. Both are prominent high-sulphidation epithermal gold prospects that occur within extensive areas of clay and silica alteration.

The discovery of gold mineralization at La Paila in the Northern Zone is relatively new for this region of Mexico. The gold is very fine and occurs within a vuggy and brecciated silica alteration of an original andesite host rock in the upper levels of the surrounding epithermal system. The elongate and silicified gold rich mineralization at La Paila likely formed from fluid rising along a north trending fault structure well above a deeper intrusive 'heat source'. Similar silica and clay alteration zones have been recognized at La Cruz and the Highway Zone that lie along a north-south linear trend over a distance greater than nine kilometers. La Paila, located on the north end of this trend, contains significant gold mineralization with drill intercepts of 2.194 grams per tonne gold over 89.91 meters (08CDN-04) and 0.584 grams per tonne gold over 216.41 meters (07CBN-02).

1.3 Mineral Resources

The basis of this study is the mineral resource estimate by Gary Giroux of Giroux Consultants contained in the NI 43-101 Technical Report compiled by Cuttle and Giroux in February 2012. The resource estimate is based on the constraints of a geological solid surrounding the mineralized sections of a silica breccia. It follows up an initial estimate completed by Cuttle and Giroux, March 2010. The resource estimate is based on 145 diamond drill holes completed since the discovery of the La Paila mineralized zone. The drill hole density is not sufficient to establish any blocks in the measured category and all blocks are considered either indicated or inferred. Below is the resource available if one could mine to the limits of the mineralized solid. It includes no edge dilution. Estimations using a cut-off of 0.2 grams per tonne (g/t) gold can be separated into the following categories for La Paila:

- Indicated - 28,890,000 tonnes, 0.62 g/t gold, 2.32 g/t silver or 575,000 ounces gold and 2,150,000 ounces silver
- Inferred - 24,020,000 tonnes, 0.54 g/t gold, 2.50 g/t silver or 419,000 ounces gold and 1,930,000 ounces silver

1.4 Mining Methods

It is proposed that the La Paila deposit is amenable to be developed as an open pit mine. Mining of the deposit is planned to produce a total of 49.3 million tonnes (Mt) of heap leach feed and 81.8 Mt of waste (1.7:1 overall strip ratio) over a seven and a half year mine operating life. The current life of mine (LOM) plan focuses on achieving consistent heap leach feed production rates, mining of higher grade material early in schedule, and balancing grade and strip ratios.

Mine design for the La Paila deposit commenced with the development of a net smelter return ("NSR") model. The model included estimates of metal prices, exchange rate, mining dilution, leach recovery, smelting and refining payables and costs, freight and marketing costs and royalties (see Table 1.1 below). The NSR model was based on a 20 m x 20 m x 5 m block size.

Table 1.1 NSR Parameters		
Item	Unit	Assumptions
Metal Prices		
Gold	US\$/oz	1,150
Silver	US\$/oz	21.00
Recovery to Doré		
Silver	%	30%
Gold	%	80%
Smelter Payables		
Gold in doré	%	99.9%
Gold deduction in doré	g/t in conc	0.0%
Silver in doré	%	98.0%
Silver deduction in doré	g/t in conc	0.0%
Off-site costs		
Au refining/transportation charge	US\$/oz pay Au	5.50
Ag refining/transportation charge	US\$/oz pay Ag	-
Other Parameters		
Grade factor	%	90%
Royalties	%	1.90%
Operating Costs		
Waste mining Cost	US\$/waste tonne	\$1.60
Resource Mining Cost	US\$/resource tonne	\$2.40
G&A/Sustaining Cost	US\$/milled tonne	\$080
Heap Leach Processing Cost	US\$/milled tonne	\$2.24
CostP		\$3.04
Heap Leach Processing rate	t/day leached	20,000
Pit Slope Angles w/ ramps	overall °	40
Heap Leach Processing rate	Mt/yr leached	7.00
Discount Rate	%	8%

Gemcom Whittle™ - Strategic Mine Planning™ (“Whittle™”) software was then used to determine the optimal mining shell with an assumed preliminary overall slope angle of 40 degrees. Preliminary phases were selected and preliminary mine planning and scheduling was then conducted on these selected optimal shells. The mineable resources for the La Paila deposit are presented in Table 1.2.

Indicated and inferred resources were used in the LOM plan, with inferred resources representing approximately 40 percent of the material planned to be processed.

Table 1.2		
Resources Planned to be Extracted in LOM Plan		
Description	Unit	Caballo PEA 2012
Diluted Mineralized Tonnage	(Mt)	49.3
Mine Life	(yrs)	7.5
Diluted Grades		
Gold	(g/t)	0.54
Silver	(g/t)	2.31
Contained Metal		
Gold	(koz)	854
Silver	(koz)	3,667
Recovered Metal		
Gold	(koz)	683
Silver	(koz)	1,100
Waste Tonnage	(Mt)	81.8
Total Tonnage	(Mt)	131.1
Total Material Mined (avg.)	(t/day)	45,000
Strip Ratio	(t:t)	1.66

The mining sequence was divided into a number of stages designed to maximize grade, reduce pre-stripping requirements in the early years and maintain the heap leach at full production capacity. The LOM mine production schedule is shown in Table 1.3. The mining is envisioned to be undertaken by a mining contractor.

Table 1.3
LOM Production Schedule

Item	Unit	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Diluted Mineralized Tonnage	(Mt)	49.3	4.3	7.0	7.0	7.0	7.0	7.0	7.0	3.0
Diluted Grades										
Gold	(g/t)	0.54	0.55	0.55	0.51	0.53	0.55	0.53	0.52	0.61
Silver	(g/t)	2.31	2.42	3.04	2.53	2.87	2.25	1.76	1.76	1.39
Contained Metal										
Gold	(koz)	853	76	124	115	119	124	119	117	58
Silver	(koz)	3,664	336	683	569	645	506	396	395	133
Recovered Metal										
Gold	(koz)	682	61	99	92	95	99	96	94	47
Silver	(koz)	1,099	101	205	171	193	152	119	119	40
Waste Tonnage	(Mt)	82.0	2.1	9.0	15.3	10.3	10.9	18.0	13.7	2.7
Total Tonnage	(Mt)	131.3	6.4	16.0	22.3	17.3	17.9	25.0	20.7	5.6
Strip Ratio	(t:t)	1.7	0.5	1.3	2.2	1.5	1.6	2.6	2.0	0.9
Avg. Material Mined	(t/day)	45,000	18,000	44,000	61,000	47,000	49,000	68,000	57,000	15,000

Mineral resources that are not mineral reserves do not have demonstrated economic viability. There is no certainty that all or any part of the mineral resources will be converted into mineral reserves. Mineral reserves can only be estimated as a result of an economic evaluation as part of a preliminary feasibility study or a feasibility study of a mineral project. Accordingly, at the present level of development there are no mineral reserves at the Caballo Blanco Project.

1.5 Mineral Processing and Metallurgical Testing

The calculated gold extraction from each cell under leach, assuming the sample used accurately reflects the resource, is 81 percent. Analysis was based on data provided by Minera Cardel. Extraction curves were calculated from column data where adequate particle distributions were available.

Selection of secondary open-circuit crushing was based on initial run-of-mine (ROM), data provided by Minera Cardel and modeled using Bruno© software. The ROM distribution curve was generated from simulation software.

1.6 Recovery Methods

Material from the La Paila pit is reduced to 80 percent passing 40 mm using a secondary open-circuit crushing system. Haul trucks bring ROM to the primary crushing plant area and direct dump fresh material into a dump hopper. ROM in the hopper is fed to a jaw crusher. The primary crusher product has an 80 percent passing size of 140 mm. Primary crushed material is fed to a conveyor where pebble lime is added from

a lime silo. The primary crushed product is fed to a double deck secondary screen. Screen oversize is fed to a secondary cone crusher. The secondary screen undersize and the secondary cone crusher product are combined as the final crushed product reporting to a stockpile. The stockpile has a nominal capacity of 6,700 tonnes.

Fine material is loaded into trucks using a front-end loader and hauled to the leach pad where it is stacked in 6 meter lifts forming leach cells. After a cell is filled, a dozer rips the surface to mitigate compaction from the loading process.

The heap leach pad has both barren and intermediate irrigation circuits. Barren solution from the adsorption, desorption, recovery, (ADR), plant is used to irrigate the previously leached material. The drainage from this portion of the heap reports to an intermediate leach solution (ILS) pond. The ILS pond and pumps recirculate the ILS solution to irrigate newly completed fresh cell material. The areas under leach with the fresh barren solution and the ILS are equal, allowing the total flow to be split in half with half the solution reporting to the heap and half reporting to the ADR plant.

The carbon adsorption system consists of one train of five columns in series. Solution flows from each adsorption stage to the next stage by gravity. Carbon is advanced countercurrent to the solution flow by a common carbon advance pump. Barren solution discharging from adsorption is adjusted with cyanide and lime to achieve specified concentrations before reporting to a barren pond or tank.

Loaded carbon is desorbed using the Zadra process. Carbon is first acid washed, rinsed, and then loaded into the Zadra column where gold is stripped from the carbon forming an electrolyte. Carbon is regenerated and returned to the carbon adsorption plant.

The electrolyte solution advances to the refinery where precious metal is recovered. Solutions exiting the electro-winning process report to the barren-solution tank. The electrowon gold is removed batch-wise by high pressure water and the precious metal sludge slurry flows to a pressure filter. The filter cake is dried in a retort to volatilize and recover mercury prior to smelting. The dried cake is fluxed and smelted in an induction furnace and poured into 500 oz doré ingots.

1.7 Infrastructure

The project area is 65 kilometers northwest of Veracruz in the state of Veracruz Mexico. There is access by paved road to the project area. There is significant electrical infrastructure provided by the nuclear power plant located at Laguna Verde and the project may be able to negotiate accessing this grid at a future date. Communications are well established in terms of phone lines and high speed internet. Water in the area is generally from local wells, there are no major water reservoirs in the area. Well water is the supply method used by the local population

There is good infrastructure surrounding the Caballo Blanco Gold Heap Leach and equipment can be shipped to the ports of Veracruz then trucked to the Caballo Blanco project site.

Community relation issues are currently handled by Goldgroup and a community liaison officer and a good understanding of local issues and sensitivities has been established.

1.8 Environmental and Social Impact.

The environmental and regulatory framework for mining activities is well defined by Mexican law. Environmental permits have been issued to Minera Cardel for exploration activities, development of an exploration tunnel and use of explosives. A comprehensive Environmental Impact Assessment has been completed and was submitted in December 2011 to SMARNAT (Regulatory Authority) and is currently being evaluated. Part of this submission includes a baseline environmental study, which addressed climatology, land use, hydrology, geology, flora, fauna and landforms. The Environmental Impact Assessment addressed mine waste, heap leach processing, water management, and monitoring programs.

The Environmental Risk Assessment addressed hazardous components such as gasoline, diesel, explosives, sodium cyanide and hydrochloric acid. Minera Cardel has addressed issues related to the ERA and has proposed mitigation measures to meet Mexican Regulatory requirements. Sociological baseline studies were completed and will implement appropriate sociological programs appropriate to the local and regional landscape.

1.9 Project Capital Costs

Unless otherwise noted, all costs in this report are in 2012 US dollars.

A summary of the 2-stage crushing, process plant and associated infrastructure capital costs is shown in Table 1.3. The table includes direct costs, indirect costs, and a contingency. These are factored capital cost estimates and are based on equipment costs multiplied by factors to include installation costs. The capital costs estimate does not include sunk costs such as drilling and prior studies undertaken to date.

Capital costs for the project were developed from a mix of first principles, reference projects, and experience. The annual capital costs by major category are shown in Table 1.4. No open pit mining fleet capital costs are included since contract mining is assumed and the contractor will be responsible for supplying an adequate mining fleet.

Table 1.4 Total Initial And Future Sustaining Project Costs For Two Stage Crushing Option			
Item	Initial Cost US\$	Sustaining Cost US\$	Total US\$
Mining Cost	4,500,000	-	4,500,000
Process Plant Total Cost	55,338,555	-	55,338,555
Leach Pads	24,926,368	31,138,957	56,065,325
Closure and Reclamation		22,348,113	22,348,113
Total Initial and Future Sustaining Project Cost	84,764,923	53,487,070	138,251,993

The process costs are shown below in more detail.

Table 1.5 Summary Process Plant Cost 2-Stage Crushing	
	Cost (US\$)
Plant Direct Costs	
Process & Crushing Plant	17,676,832
Project Infrastructure	8,145,183
Total Direct & Infrastructure Costs	25,822,015
Plant Indirect Costs	9,784,566
Total Direct And Indirect	35,606,581
30% Contingency	10,681,974
Owners Cost	9,050,000
Total Process Costs	55,338,555

Owner's costs were included in the estimate and were provided by Minera Cardel. An allowance of US\$ 9.05 million dollars includes the following list of items:

	US\$
▪ Water Source and supply to site	1,200,000
▪ Mine Workshops	360,000
▪ Administration and engineering Offices	50,000
▪ Mobile Equipment	1,200,000
▪ Laboratory Equipment and building Upgrade	80,000
▪ Communications	50,000
▪ Plant Warehouse	270,000
▪ Septic Systems	40,000
▪ Fire Water Distribution System	100,000
▪ Land Cost	1,500,000
▪ Working Capital	<u>4,200,000</u>

Total Owners Cost \$9,050,000

1.10 Operating Costs

Operating costs for the project are summarized in Table 1.6. All costs are in US dollars. The open pit mining operating costs assume contract mining including drilling/blasting.

Table 1.6 Operating Cost Estimate		
	Unit	Value
Mining Cost	\$/tonne	5.36
Processing	\$/tonne	3.26
Impacted Water Treatment/Management	\$/tonne	0.72
General & Administration	\$/tonne	1.22
Royalties	\$/tonne	0.38
Total Operating Cost	\$/tonne	10.94

1.11 Economic Analysis

The preliminary economic highlights (base case two stage crushing) are summarized in Table 1.7.

Table 1.7 Economic Summary		
	Unit	Values
Average gold grade	g/t	0.538
Average annual gold production	oz	85,962
Life of Mine from production start	Yr	8
IRR Pre tax	%	66.4
NPV Pretax (5% discount rate)	\$M	283.8
Payback period from start of production	Yr	1.5
NPV Pretax (0% discount rate)	\$M	386.3
Initial Capital Cost	\$M	84.8
Total Capital Cost	\$M	138.3
Cash Operating Cost	\$/oz	784.0
Pre-Income Tax Cash Flow	\$/oz	508.97
Metallurgical Recovery, Au	%	80.7
Total Mined Gold to Leach Pad	Moz	852,689

The financials for the base case mining options are summarized in Table 1.8.

Table 1.8 Economic Evaluation			
	\$ x 1000	\$/t Resource	\$/oz Gold
Mine Gate Value of All Resource Net of Transportation and Refining	1,063,704	21.58	1,546.77
Mining Operating Cost	(264,302)	(5.36)	(384.33)
Processing Cost	(160,707)	(3.26)	(233.69)
Impacted Water Treatment/Management	(35,379)	(0.72)	(51.45)
General & Administration	(60,142)	(1.22)	(87.45)
Royalties	(18,615)	(0.38)	(27.07)
Cash Operating Cost	(539,145)	(10.94)	(783.99)
Cash Operating Cash Flow	524,560	10.64	762.78
Capital Cost including Pre-Production Development	(138,252)	(2.80)	(201.04)
Pre-Income Tax Cash Flow	386,308	7.84	561.74

Metal price scenarios were used in the pre-tax model to evaluate the sensitivity on NPV, IRR, and payback. The results for the base case mining options are shown in Table 1.9.

Table 1.9 Summary of Key Financial Parameters (Sensitivity to Gold Price)						
Gold Price, \$/oz	1,150	1,300	1,400	1,500	1,600	1,700
Pre-Tax NPV@ 5%, (000's)	93,856	180,041	231,920	283,800	335,679	387,558
IRR, Pre-Taxes	30.03%	47.71%	57.29%	66.41%	75.20%	83.73%
Payback, Operating Years	3.3	2.0	1.7	1.5	1.4	1.3

1.12 Recommendations

It is recommended that the project be advanced to the preliminary feasibility study stage, following a definition drilling program that will attempt to convert inferred resources into indicated or measured resources. The cost of the definition drilling program, pre-feasibility study (PFS) and associated field and lab work is estimated to be US\$ 4 to US\$ 6 million.

The PFS should include the optimization investigations into:

- Additional drilling to enhance classification and extension of mineral resources.
- Owner operated mining versus contract mining.
- Leasing vs. Direct Capital Purchase of Owner Fleet.

- In pit crushing-conveying versus remotely located crushing plant.
- Metallurgical optimization on representative sample to fix design criteria and costs to BFS standards and to enhance silver recovery.
- International ESIA compliance work.
- Plans for project operating and project execution.
- Risk and Opportunity assessments.

Metallurgical characterization studies on drilled samples and sample composites are also recommended. The minimal estimated cost for additional testwork is US\$ 300,000.

1.13 Conclusions

Industry standard mining, process design, construction methods and economic evaluation practices have been used to assess the Caballo Blanco Project and there is adequate geological and other pertinent data available to generate a PEA.

Based on current knowledge and assumptions, the results of this study show that the project has positive economics, within preliminary parameters of a PEA, and should be advanced to the next level of study by conducting the work indicated in the recommendations section of this report.

As with almost all mining ventures, there are a large number of risks and opportunities that can affect the outcome of the Caballo Blanco Project. Most of these risks and opportunities are based on uncertainty, such as lack of scientific information such as test results, drill results, etc., or the lack of control over external factors, such as metal prices, exchange rates, and the like.

Subsequent higher-level engineering studies will be required to further refine these risks and opportunities, identify new risks and opportunities and define strategies for risk mitigation or opportunity implementation.

The study has achieved its original objective of providing a preliminary review of the potential economic viability of the Caballo Blanco Project.

2.0 INTRODUCTION

This Technical Report has been prepared by Mr. Joseph M. Keane, P.E. of K D Engineering (KDE) located in Tucson, Arizona, USA. The report includes details of the updated Mineral Resource Evaluation (MRE) completed for the Caballo Blanco Gold Heap Leach Project and preliminary engineering design information for the proposed mine plan and mineral beneficiation facilities along with capital and operating cost information. The report is written to comply with the requirements of the National Instrument 43-101, "Standards of Disclosure for Mineral Properties", as part of Goldgroup's ongoing continuous disclosure obligations regarding the company's exploration activities and property development.

The following individuals are Qualified Persons (QP's) as defined by the CIM Definition Standards 22 November 2005 and Section 5.1 of National Instrument 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 and Companion Policy 43-101CP.

Mr. Joseph M. Keane, P.E., of K D Engineering has responsibility for the report contents and specifically Sections 2, 3, 13, 17, 18, 19, 22 and 23 and also the process portions of Section 1, 21, 24, 25, 26, 27 and 28. Mr. Keane visited the property November 2011 and is the Qualified Person for matters relating to the design and costs of the processing facility. He has relied upon other experts for specific information in the report as mentioned subsequently.

Mr. Jim Cuttle visited the property 21 May to 24 May 2009 and 6 January 2012 and is the QP for Sections 4 through 12.

Mr. Gary Giroux visited the property 7 to 9 November 2011 and is the QP for Section 14.

Mr. Dino Pilotto from SRK, visited the property in November 2011 and is the qualified person on all matters relating to the mining methods. Mr. Pilotto is responsible for Sections 15 and 16 and the mining portions of Section 1, 21, 25, 26, and 27.

Mr. Stephen Taylor of MWH, visited the property in November 2011, and is the Qualified Person for all matters relating to the leach pad/pond design, portions of Sections 17 and 18 and the geotechnical portions of Section 1, 21, 25, 26 and 27.

Mr. Brent C. Bailey, P.E. from ERM has responsibility for the report contents related to Environmental and Social Impact Assessment. ERM visited the property in January 2012. Mr Bailey has reviewed and certified the contents of Section 20 and portions of 1, 21, 25, 26 and 27 and is the QP for all matters relating to the Environmental and Social Impact Assessment.

As noted above all Qualified Persons contributed to Sections 1, 21, 25, 26 and 27.

This independent Report has been prepared following resource development activities over the project during 2010 and the first six months of 2011. The following information has been utilized during the preparation of this report. Post-December 2009 technical data, documents, reports and information supplied by Goldgroup, including:

- NI 43-101 Technical Report - Caballo Blanco Project and a Resource Estimate at the La Paila Zone, Veracruz State, Mexico, prepared by Cuttle and Giroux, 22 March 2010
- NI 43-101 Technical Report - Caballo Blanco Project Resource Update at the La Paila Zone, prepared by Cuttle and Giroux, 10 February 2012
- Process engineering preliminary designs completed in March 2012 to support this report by KDE.
- "Geotechnical Field Investigation for the Leach Pad Design at the Caballo Blanco Project" by GeoQuality, Mexico, dated 4 October 2011, "Monthly Precipitation, Monthly Pan Evaporation, and 100 year/24 hour precipitation Return Period for the Minera Cardel Mine Site Located in the State of Veracruz, Mexico", by Meteorological Solutions Inc., October 2011.
- Preliminary mining leach pad, waste stockpile, water treatment and process capital and operating cost estimates produced by SRK KDE, and MWH.
- Reports and data in the public domain.

3.0 RELIANCE ON OTHER EXPERTS

The authors of this report have obtained and interpreted information concerning Minera Cardel's Caballo Blanco Project from several sources, including the following experts:

- Mineral Resource estimates - Giroux Consultants
- Geophysics - Mexican Geophysical Department - Mexico City and SJ Geophysics - Vancouver, B.C.
- Geological - Richard Sillitoe, 2008
- Geochemical - Barry Smee and Associates.
- Analytical - ALS Global and Inspectorate Labs, Vancouver, B.C.
- SGM (Servicio Geológico Mexicano)
- Mining Methods - SRK Consulting
- Environmental Studies - ERM, Environmental Resources Management
- Project Infrastructure - MWH
- Metallurgical Processing - K D Engineering

K D Engineering and the Qualified Persons have followed standard procedures in preparing this report that is based, in part, on details, information, and assumptions provided by others and some by data provide by Minera Cardel. Neither K D Engineering, nor the Qualified Persons, can guarantee the correctness of all information but to the extent of this investigation and within the scope of the assignment, assumptions, conditions, and qualifications, it is believed that this report is substantially correct.

Mineral reserve estimates for the Caballo Blanco deposit are forward-looking statements and may differ from the actual amount of saleable minerals recovered in mining operations. Principle deviation may result from grade variations within the deposit, metallurgical response of the mineralization, market prices, and operating cost levels achieved by the operator.

4.0 PROPERTY DESCRIPTION AND LOCATION

The Caballo Blanco Property covers a horizontal surface area of 54,732.4120 hectares (547.32 square kilometers) and is centered next to the Gulf of Mexico at Longitude 96° 27' 30" W, Latitude 19° 40' 44" N, or 65 kilometers by paved road north northwest of the city of Veracruz in Veracruz State, Mexico.

As of 7 February 2012 the property comprised fourteen mining claims as described below.

Table 4.1 Mineral Claim Details					
	CLAIM NAME	TITLE #	RECORDED	HECTARES	COSTS -2011
1	Caballo Blanco	216694	17-May -02	600	MXN 75,864.00
2	Reduccion Caballo Blanco II	224414	4-May -05	504.8125	MXN 63,828.00
3	Caballo Blanco IV	218176	11-Oct-02	1,634.00	MXN 206,603.00
4	Reduccion Caballo Blanco VI	224415	4-May -05	1,014.17	MXN 64,136.00
5	Caballo Blanco VII	223282	23-Nov -04	231.7764	MXN 14,657.60
6	Caballo Blanco VIII (Div)	223360		48.4557	MXN 1532.17
7	Reyna Negra Fraccion 3	221374	3-Feb-04	1,061.75	MXN 67,144.00
8	Caballo Blanco IX Fraccion 1 (Div)	Pending	Pending	7,409.07	MXN 0
9	Caballo Blanco IX Fraccion 2	234277	10-Jun-09	663.1832	MXN 10,080.40
10	Caballo Blanco IX Fraccion 3	234278	10-Jun-09	233.395	MXN 3,457.60
11	C.B.2	234324	12-Jun-09	244.0336	MXN 3,709.40
12	C.B.6	Pending	Pending	396.29	MXN0
13	C.B.11	236991	8-Oct-10	5,400.00	MXN 54,864.00
14	C.B.12 (Div)	237441	16-Dec-10	35,273.78	MXN 363,158.63
TOTALS MXN Pesos (\$1Can = 12.78 MXN, Feb 7, 2012)				54,732.41	MXN 929,124.80

Title to each of the above mineral claims is held by Minera Gavilán S.A. de C.V., a wholly-owned subsidiary of Almaden. Each of the mineral claims is currently in the process of being transferred from Minera Gavilán to Candymín S.A. de C.V., a wholly-owned subsidiary of Goldgroup Mining Inc. in connection with the Goldgroup's acquisition of Almaden's remaining 30 percent interest in the project. As of the date of this report, information obtained from Goldgroup indicates the claims remain in good standing. This claim status was not independently confirmed by the authors.

Under terms of the original Share Purchase Agreement, Goldgroup Resources Inc. (currently Goldgroup Mining Inc.) agreed to buy 100 percent interest in Minera Cardel S.A. de C.V., a wholly owned subsidiary of NGEx Resources Incorporated. Minera Cardel S.A. de C.V. holds an option to acquire a 70 percent interest in the Caballo Blanco Project from a subsidiary of Almaden Minerals Ltd. The share purchase agreement called for payments by Goldgroup to NGEx totaling CDN\$ 15 million,

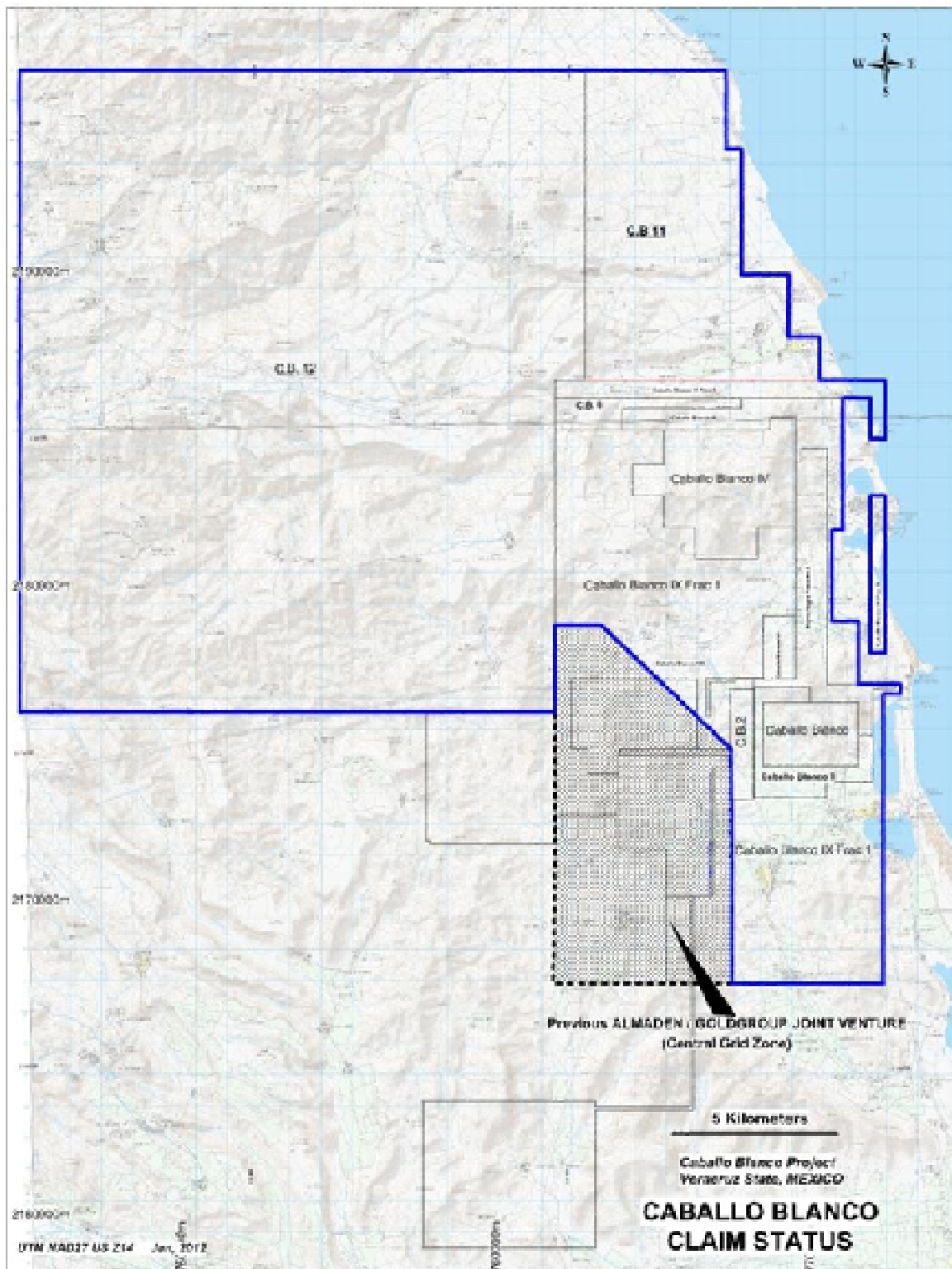
comprised of staged cash payments totaling CDN\$ 6 million and nine million shares of Goldgroup at a deemed price of CDN\$ 1.00 per share. NGEx Resources will receive a 1.5 percent net smelter royalty and, upon commercial production, a onetime advance royalty payment in the amount of CDN\$ 5 million.



Figure 4.1 - Country Location Map (Cuttle, 2012)



Figure 4.2 - Veracruz State Location Map
(modified by Cuttle from Mexican Road Map, Ver 2)



Pursuant to a memorandum of agreement among Almaden Minerals Ltd., the Company and NGEx Resources Inc. dated 5 February 2010, the area defined in Table 4.2 was transferred to a new entity (the “El Cobre Joint Venture”) owned 60 percent by Almaden Minerals and 40 percent by the Company. The new entity holds a 100 percent interest in the area and is operated by Almaden Minerals.

Table 4.2		
The “El Cobre Joint Venture” Boundaries		
Corner Point	East UTM - Nad 27	North UTM - Nad 27
1	761525	2179000
2	763000	2179000
3	767000	2175000
4	767000	2167172
5	761525	2167172

In October, 2011 Goldgroup completed the acquisition of the remaining 30 percent interest in the Caballo Blanco Project held by Almaden Minerals Ltd. (Almaden). Goldgroup now owns 100 percent of the Caballo Blanco Project.

The aggregate consideration paid by Goldgroup to Almaden in connection with the transaction consisted of: US\$ 2,500,000 in cash; 7,000,000 Goldgroup common shares at closing; the right to receive up to an additional 7,000,000 Goldgroup common shares upon the achievement of certain project milestones (1,000,000 common shares upon commencement of commercial production, 2,000,000 common shares upon measured and indicated resources, including cumulative production, reaching 2,000,000 ounces of gold, 2,000,000 common shares upon measured, indicated and inferred resources, including cumulative production, reaching 5,000,000 ounces of gold and 2,000,000 common shares upon measured, indicated and inferred resources, including cumulative production, reaching 10,000,000 ounces of gold); a 1.5 percent net smelter return royalty; and the transfer of the Company's 40 percent interest in the El Cobre property.

Since the last qualifying report in March, 2010 on Caballo Blanco, Goldgroup has purchased surface rights from eight land owners, signed rental agreements with five land owners and is in the process of buying or leasing four other land parcels. These areas lie within the Northern Zone area including La Paila.

Originally, NGEx Resources Inc., through its wholly owned subsidiary Minera Cardel S.A de C.V had signed ‘land entry’ agreements with at least five private individuals that claim legal title to surface rights inside the Caballo Blanco claim block. These agreements include a yearly payment for access to their lands as well as additional compensation for any disturbance the company may cause from the Company's geological surveying, road building and/or drilling activity. Legal rights to these lands have not been verified by the authors however it is understood these agreements remain in good standing for the Goldgroup's ongoing exploration and

development work during and beyond 2012. There are no environmental liabilities known to the authors on the Caballo Blanco property.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY

5.1 Accessibility

Veracruz is a major port and is well connected with daily flights to Mexico City and other national and international destinations. The property is reached by driving north from Veracruz to Villa Rica, using the Pan American Highway which transects the eastern portion of the claim block. From here a network of dirt roads access most of the current areas of interest. New drill roads have been constructed to support recent drill campaigns, particularly in the Northern Zone areas.

The nearest supply center is Cardel, a town of 20,000 located approximately 30 kilometers south of the Caballo Blanco claim block. The town offers an abundant supply of mining personnel. On the northeastern edge of the property sits Mexico's only nuclear power plant at Laguna Verde. Its location allows easy access to the Mexican electrical power grid. Water is relatively abundant in small creeks at elevations below 200 meters, throughout most of the year.

A well-organized field office and villa style accommodations house a small crew at the coastal community of Villa Rica. Many other villas are currently empty and likely available for rent.

The topography is semi-rugged with elevations from sea level up to 700 meters on the higher mountain tops. The climate is semi-tropical with a distinct rain season from June to November.

5.2 Infrastructure

The design of the ancillary facilities is based upon information extracted from the prefeasibility economic evaluation, data provided by third party qualified persons and assumptions. The infrastructure required for the Caballo Blanco project includes; site roads (access and haul roads), electrical power, fuel, lubrication storage and dispensing, explosives storage, reagent storage, warehousing, administration offices, water supply, potable water, sewage, power distribution and telecommunications. There will be no on site camp or accommodation as it is expected that workers will be bused to and from site each day.

5.3 Existing Regional Infrastructure

The project area is 65 kilometers northwest of Veracruz in the state of Veracruz Mexico. There is excellent access by paved road to the project area, in addition there is significant electrical infrastructure provided by the nuclear power plant Laguna Verde. Communications are well established in terms of phone lines and high speed internet. Water in the area is generally from local wells, there are no major water reservoirs in the area. Well water is the supply method used by the local population.

6.0 HISTORY

The first record of gold in the Caballo Blanco claim area dates back to 1995 when Charlie Warren of Whitehorse, Yukon sampled a small quartz vein outcrop in a road cut along the Pan American Highway. Through his Mexican wife, he staked several mineral claims to cover what is known today as the Highway Zone.

The property was subsequently optioned to Almaden Minerals Ltd. in 1997 (Minera Gavilán S.A. de C.V.) who staked additional claims to cover the two other areas known as the Central Grid Zone and Northern Zone. Almaden completed a variety of geophysical, geochemical and geological surveys and drilled 17 reverse circulation drill holes in the Central Grid Zone 'porphyry' target.

In 2001, Almaden optioned the property to Noranda who drilled nine core holes in the Highway and Central Grid zones and returned the property to Almaden later that year. Results were not encouraging.

In December, 2002, Almaden signed a joint-venture agreement with Comaplex Minerals Corp. proposing to spend US\$ 2 million over four years to explore the Caballo Blanco claims. Comaplex carried out a variety of geological work throughout the property, targeting the Central Grid Zone, the Highway Zone and the Northern Zone. From 2004 through 2006 Comaplex drilled ten core holes, and in 2005 discovered wide low grade gold mineralization in drill hole CB05-03 at La Paila in the Northern Zone. Comaplex completed the required expenditures of the joint venture agreement and went on to earn a 60 percent interest in the property. In February 2007, Almaden purchased Comaplex Minerals Corp's 60 percent interest for a cash payment of US\$ 1.25 million.

In April 2007 Almaden optioned Caballo Blanco to Canadian Gold Hunter Corp. of Vancouver, B.C who in turn completed a variety of surveys and additional drilling in the Northern Zone and Central Grid areas under its Mexican subsidiary, Mineral Cardel S.A de C.V. From 2007 to 2009, 42 core holes were drilled, with at least 30 holes targeting the new gold area at La Paila discovered by Comaplex in 2005.

In September 2009, Canadian Gold Hunter Corp changed its name to NGEx Resources Inc. and later in November signed a 'share purchase agreement' allowing Goldgroup Resources to earn a 70 percent interest in the Caballo Blanco Project.

Pursuant to a memorandum of agreement among Almaden Minerals Ltd., the Company and NGEx Resources Inc. dated 5 February 2010, the area defined in Section 4.0, Table 4.2 was transferred to a new entity (the "El Cobre Joint Venture") owned 60 percent by Almaden Minerals and 40 percent by the Company.

In October, 2011 Goldgroup completed the acquisition of the remaining 30 percent interest in the Caballo Blanco project held by Almaden Minerals Ltd. (Almaden) and transferred to Almaden the Company's remaining 40 percent interest in the El Cobre property. Goldgroup now owns 100 percent of the Caballo Blanco Project.

6.1 Resource History

One previous resource estimate has been completed on the Caballo Blanco Property and is detailed in a 43-101 Technical Report by Cuttle and Giroux, dated 20 March 2010.

For that report Gary Giroux of Giroux Consultants was retained to estimate a resource for the La Paila zone, based on the constraints of a geological solid surrounding the mineralized sections of a silica breccia. The drill hole density was not sufficient to establish any blocks in the measured category and all blocks were considered either Indicated or Inferred. Estimations in that report using a cut-off of 0.2 grams per tonne gold identify a total of 139,000 ounces gold in the indicated category and 517,000 ounces gold in the inferred category at La Paila:

- Indicated - 6,710,000 tonnes, 0.645 g/t gold, or 139,000 ounces gold
- Inferred - 27,600,000 tonnes, 0.583 g/t gold, or 517,000 ounces gold

7.0 GEOLOGIC SETTING AND MINERALIZATION

7.1 Regional Geology

During the visit to the Caballo Blanco property the author had a limited amount of time to become familiar with geological interpretations of the regional and local geology. As a consequence he has relied on summary reports from other sources, specifically summaries and descriptions by Richard Sillitoe (Sillitoe, R.H. 2008) and geologists for Canadian Gold Hunter (internal report by, Téliz, F., Hernandez, H., Mehner, D., and Christoffersen, J., 2008). Descriptions from the latter follow:

“The Caballo Blanco project is located at the intersection of the Trans-Mexican Volcanic Belt (at its eastern extremity) and the NNW-SSE trending Eastern Alkaline Province. Regionally the area is located over a tectonic high known as the Teziutlan Massif, which has a Palaeozoic (metamorphic-intrusive0-metasedimentary) basement. This massif divides the Tampico-Misantla Basin and the Veracruz Basin, respectively to the north and south. Such basement underlies marine Mesozoic rocks (Gómez-Tuena, et al., 2003).

The Trans-Mexican Volcanic Belt (TMVB) has been defined as a continental magmatic arc formed by more than 8,000 volcanic edifices and a few intrusive bodies that extends from the Pacific to the Gulf coast in Central Mexico (1,000 km long and up to 230 km wide), with a general E-W orientation. The TMVB is controlled by a complex extensional tectonic regime, whose volcanic products are underlain by basements with widely different ages, compositions and thicknesses. Calc-alkaline and alkaline rocks are distributed all along the TMVB; however alkaline rocks (Na-K) tend to be more abundant at both the west and east ends of the TMVB (Orozco-Esquivel, et al., 2007).

The evolution of the TMVB is considered to be related to the reorientation of the magmatic arc and directly associated with the change in the general composition from felsic (Sierra Madre Occidental) to intermediate and mafic. This change has been considered as being related to the re-organization of the subduction system associated with large-scale tectonism during the early Miocene. In the middle Miocene (17-12 Ma), the volcanic arc extended to the east, to the coast of the Gulf of México (Ferrari, et al., 1999).

The Eastern Alkaline Province (EAP) was considered as an independent Cenozoic magmatic province with alkaline rocks, related to extensional faulting parallel to the Gulf of México coast, extending from the state of Tamaulipas in the north southward to the Los Tuxtlas Range in the State of Veracruz (Demant and Robin, 1975 in Orozco-Esquivel, et al., 2007). Originally, the EAP was interpreted as a progressively southward migration of alkaline volcanism from the Oligocene-Eocene in Tamaulipas to the Quaternary in Los Tuxtlas. However, based on recent data (dating and geochemistry), such kind of migration model is not likely nor is the mafic volcanism in Tamaulipas considered to be directly linked to magmatism in the Caballo Blanco area. Based on new data (Orozco-Esquivel, et al., 2007), the volcanism near the Caballo

Blanco project area is linked to the evolution of the TMVB and not really to intra-plate tectonism of the EAP. Several geological episodes have been distinguished during the time evolution of the TMV B (Orozco Esquivel, et al., 2007 and Ferrari, et al., 2005). These episodes are well represented around the Caballo Blanco property:

- *Middle to late Miocene episode: This stage is defined by the emplacement of plutonic and sub-volcanic bodies of gabbroic to dioritic, calc-alkaline composition (15-11 Ma), with an adakitic geochemical signature (implying partial fusion of a subducted slab during a period of sub-horizontal to shallow-dipping subduction) (Gomez-Tuena, et al., 2003). In this way, the earliest magmatic activity around the Caballo Blanco project was strongly influenced by melting of the subducted oceanic crust. At the end of the adakitic period, there followed a regional uplift, correlated to an episode of sub-volcanic and intrusion emplacement (Gomez-Tuena, et al., 2003).*

The intrusive rocks are described as micro-porphyritic to microcrystalline (hypabyssal), found with sulfides, propylitic alteration and normally cut by mafic dikes. These rocks have been dated as 17 Ma (Laguna Verde microdiorite, NE corner of the property), 14.6 Ma (Plan de las Hayas, north of the project) and 13-11 Ma (El Limón, western edge of the property) for some gabbros. This initial phase of magmatism in the area resulted in some products being emplaced to the east within the present Gulf of Mexico (Ferrari, et al., 2005).

- *Late Miocene episode: Mafic volcanic rocks were emplaced as fissure basaltic flows, commonly forming plateaus or mesas, with ages reported in the area between 7.5 to 6.5 Ma (López-Infanzón, 1991; Ferrari et al., 2005). Intermediate, sub-alkaline, subduction-related volcanism changed at about 7.5 Ma to mafic alkaline volcanism in the area (Chiconquiaco– Palma Sola volcanic fields to the north of Caballo Blanco). Such an abrupt change in the nature of the volcanism has been ascribed to a sudden change in the magma source (Orozco-Esquivel, et al., 2007).*

An unconformity, associated with several tens of meters of volcanidastic rocks is reported between the Middle to late Miocene intrusions and late Miocene lava flows. Dating done by Cantagrel and Robin (1979) (in Gómez-Tuena, 2007) has reported ages of 6.5 Ma and 7.5 Ma for dacite domes in Cerro Metates (eastern part of the property) and Cerro Cantera (SE zone of the claim block). A dioritic intrusion has been dated as 7.3 Ma (Zempoala, 20 km to the south of the property). This intrusion is considered as hypabyssal magmatism, the time equivalent to the basaltic plateau volcanism in the area (Ferrari, et al., 2005).

- *Early–Late Pliocene bimodal volcanism episode: The magmatic products around the Caballo Blanco area derive from the partial fusion of a relatively deeper mantle with the geochemical signature of an enriched mantle wedge*

(Orozco-Esquivel, et al., 2007). Ages of 4.0 and 3.1 Ma were obtained for plateau basalt to the north of the property (Plan de Hayas). A few kilometers to the south of the property (Actopan and Alto Lucero), highly potassic younger volcanic rocks overlying the plateau succession have been dated at 2.24 to 1.97 Ma. d) Late Pliocene to Quaternary episode: Basaltic to andesitic volcanic products of alkaline composition occur in the Palma Sola region (north edge of the Caballo Blanco property). The most recent volcanic rocks do not show signs of the subducted oceanic crust but have been influenced by contamination with the local continental crust (Orozco-Esquivel, et al., 2007). Quaternary volcanic rocks reach a thickness of up to 800 meters (to the west of the property area), abruptly thinning to the east to tens of meters in the coastal zone (Ferrari, et al., 2005)".

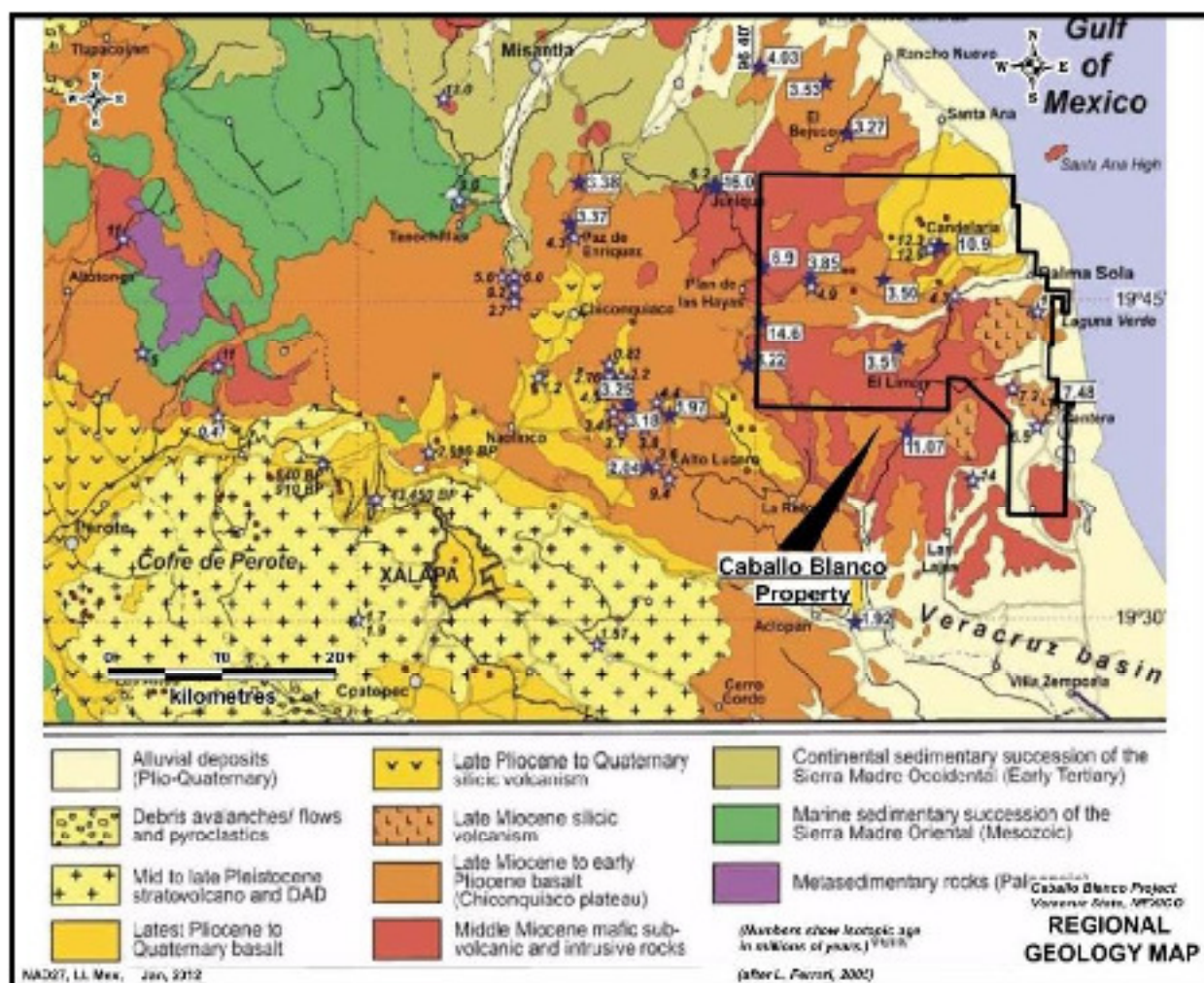


Figure 7.1 - Regional Geology Map (modified by Cuttle after L. Ferrari, 2005)

7.2 Property Geology

The Caballo Blanco property lies at the eastern end of the Trans Mexican Volcanic Belt and is underlain by sub-aerial basalts, andesites and diorite dykes of Miocene age that are in turn covered by a sequence of felsic quartz tuffs, andesitic 'dome' complexes, volcanoclastics and younger intrusive dacitic plugs. Capping the volcanic package are Pliocene alkaline basalt flows that are commonly well preserved as small flat highland plateaus.

At least two large areas of epithermal precious metal occur within the current Caballo Blanco property, referred to as the Northern Zone and Highway Zone. Mineralization is confined to altered varieties of upper Miocene andesitic domes and dacitic intrusives.

7.2.1 Northern Zone High-Sulphidation Epithermal Gold Target

Geological mapping, rock chip sampling, geophysical surveying and core drilling have identified a large area of silica and associated silica clay alteration within an andesitic dome complex along the northern portion of the property. Altered feldspar andesites that host gold mineralization are spread over an area of 5 by 4 kilometers and occur in close association to a prominent magnetic ring structure with at least five prominent silica caps forming distinct 600 meter high hilltops. Rock exposures in these areas include mixtures and overprints of classic vuggy, brecciated and or massive silica with associated and flanking haloes of advanced argillic to argillic alteration. These diverse clay alteration zones have been identified and mapped in part using a TerraSpec[®] spectrometer. Drill testing at three of these 'silica cap' features, La Paila, Bandera and La Cruz, suggest that acid leaching from hydrothermal fluids extend to depths of over 300 meters. The Red Valley target lies at lower elevations on the outside fringe of the circular ring feature and has been identified with soil geochemistry.

Gold mineralization at La Paila is very fine and occurs within vuggy and brecciated silica alteration of the original andesitic flows and domes. The resource is clean and has little if any mercury or arsenic signatures. Drill core intervals contain significant gold mineralization with assays up to 2.19 g/t gold over 89.91 meters.

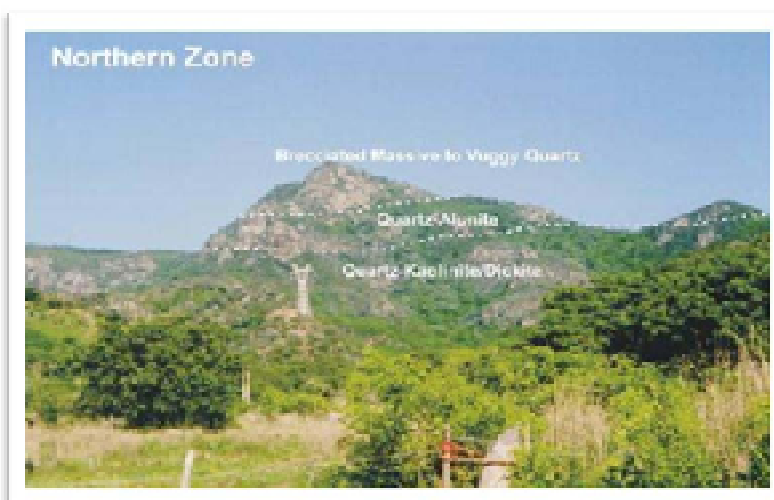


Photo 7.1 - Looking west at La Paila and the broad alteration haloes, Northern Zone
(Photo -Almaden Minerals)



Photo 7.2 - Typical 'vuggy silica' alteration with gold mineralization – La Paila area, Northern Zone
(Photo -Cuttle)

7.2.2 Highway Zone High-Sulphidation Epithermal Gold Target

This area is roughly 3 kilometers by 4 kilometers in size and is located along the eastern edge of the Caballo Blanco Property where road cuts for the Pan American Highway first exposed strong argillic alteration and small quartz veins that form part of the original discovery in 1995.

Alteration of the local dacitic tuffs and volcanoclastic host rock is very similar to the Northern Zone, located approximately 10 kilometers to the north northwest. Various

geophysical and geochemical surveys suggest that high resistivity anomalies combined with extensive silica and silica-clay alteration coincide with the inner 'haloes' of a high-sulphidation epithermal system.

Several areas of vuggy silica alteration have been identified by geophysical and geological means in the southern area of the Highway Zone however the area is large and remains a valid exploration target for the future. Encouraging drill core assays from a hole collared in 'flanking' clay alteration zones intersected several gold bearing zones grading up to 1.42 g/t gold over 6 meters at the bottom of the hole. Examples like these and other isolated resistivity anomalies approximately two kilometers to the north of this drilling suggest significant potential remains open for additional work.



Photo 7.3 - Alteration Haloes at the Highway Zone (Photo -Almaden Minerals)

7.3 Property Mineralization and Alteration

In the Northern Zone and Highway Zone, gold mineralization is associated with vuggy silica breccia surrounded by large and distinct haloes of various mixtures of clay alteration including alunite, dickite, and pyrophyllite. The elongate and silicified gold rich mineralization at La Paila likely formed from fluid rising along a north trending fault structure well above a deeper intrusive 'heat source'. It is interesting that similar silica and clay alteration zones and or soil anomalies have been recognized at La Cruz, Red Valley and Highway Zone, all of which lie along a north-south linear trend greater than nine kilometers in length.



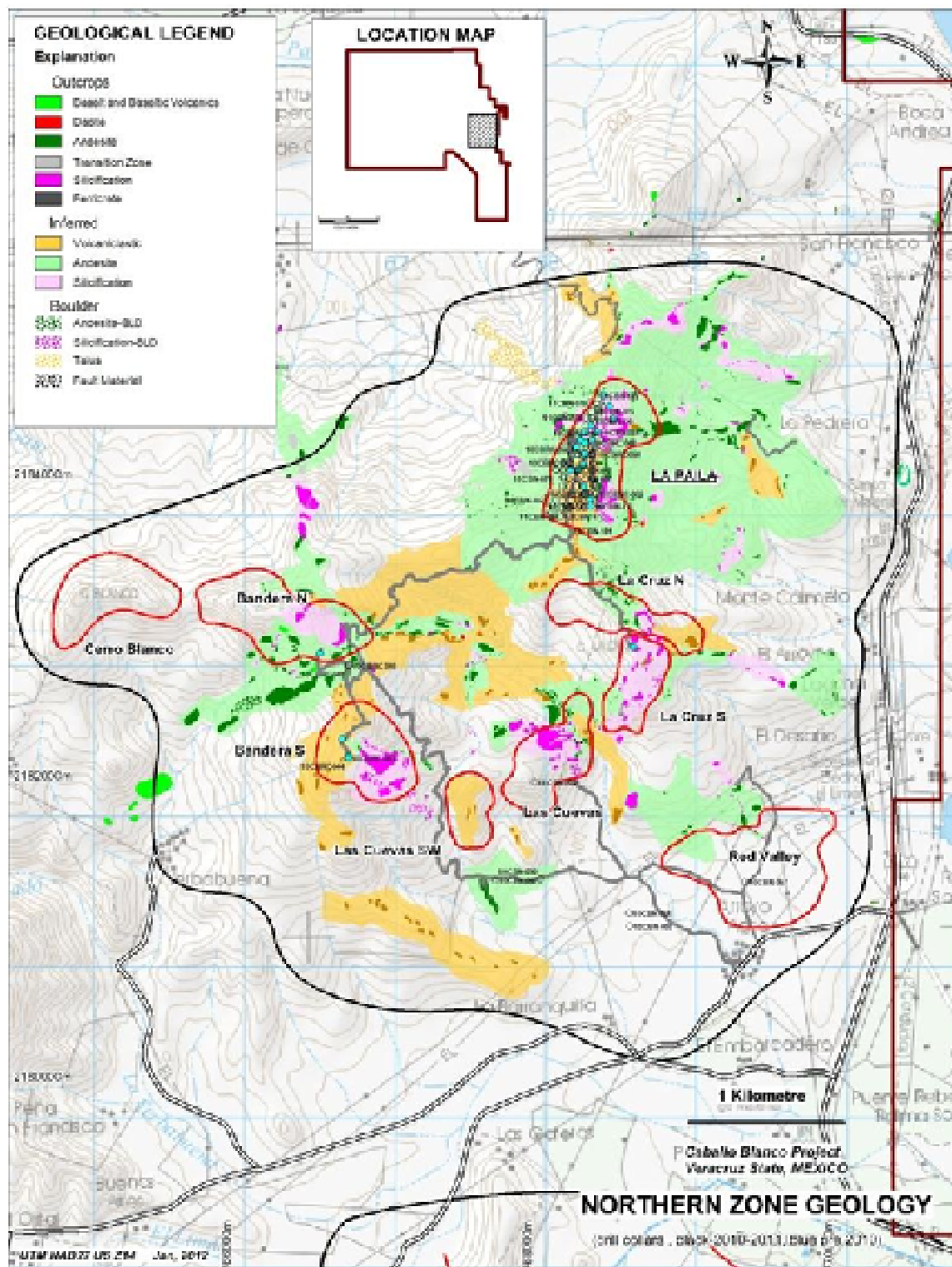


Figure 7.3 - North Zone Geology Map
(after Goldgroup, 2010)

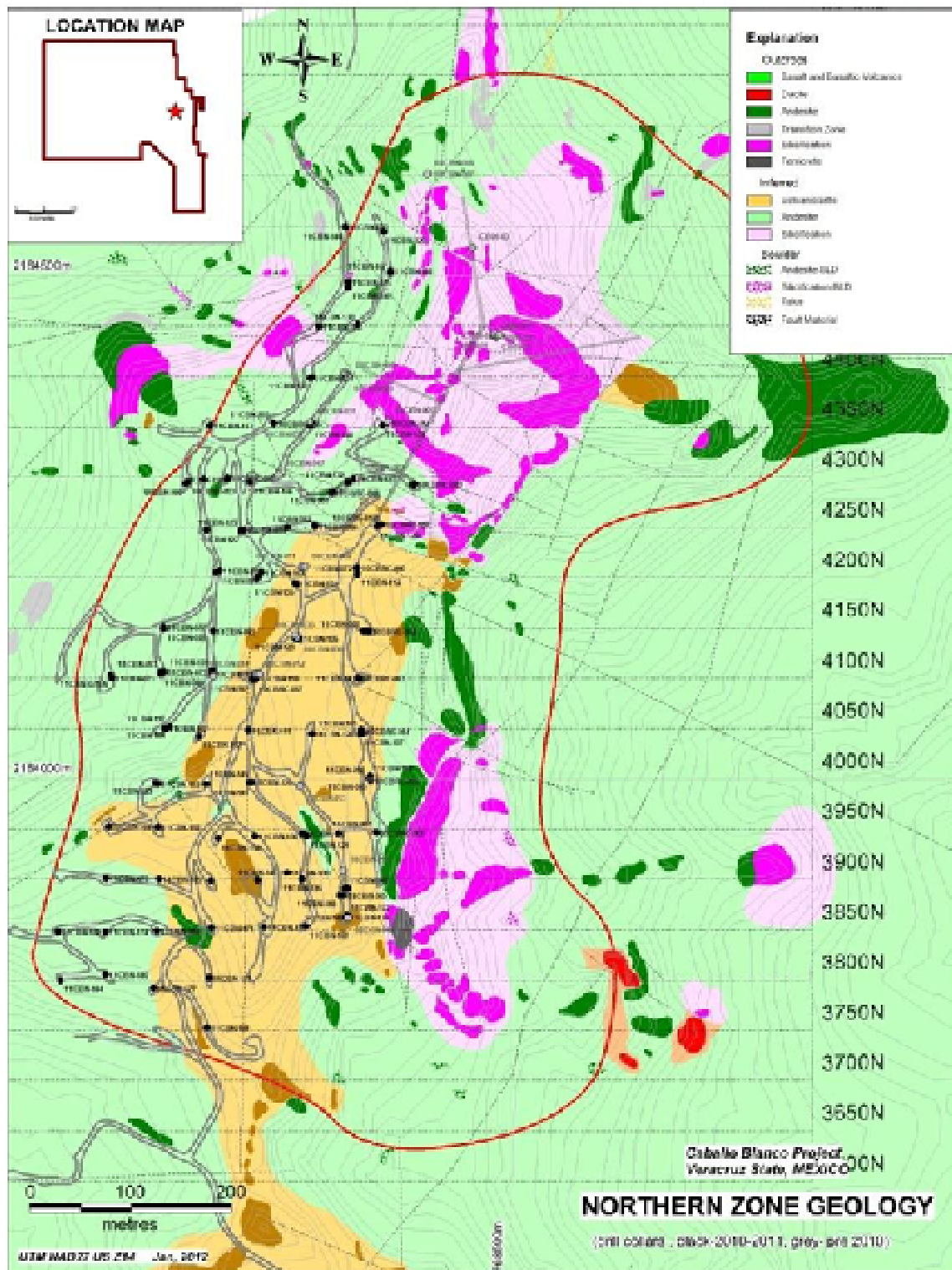


Figure 7.4 - La Paila Geology Map
(after Goldgroup, 2012)

8.0 DEPOSIT TYPES

The Caballo Blanco property and Almaden Minerals neighboring El Cobre property includes at least two distinct deposit types, defined as high-sulphidation epithermal gold and porphyry copper gold respectively. The Central Grid Zone (Porphyry) is located to the south of the Caballo Blanco Property and was part of the El Cobre Joint Venture between Almaden Minerals and Goldgroup before the Company transferred its 40 percent remaining interest back to Almaden.

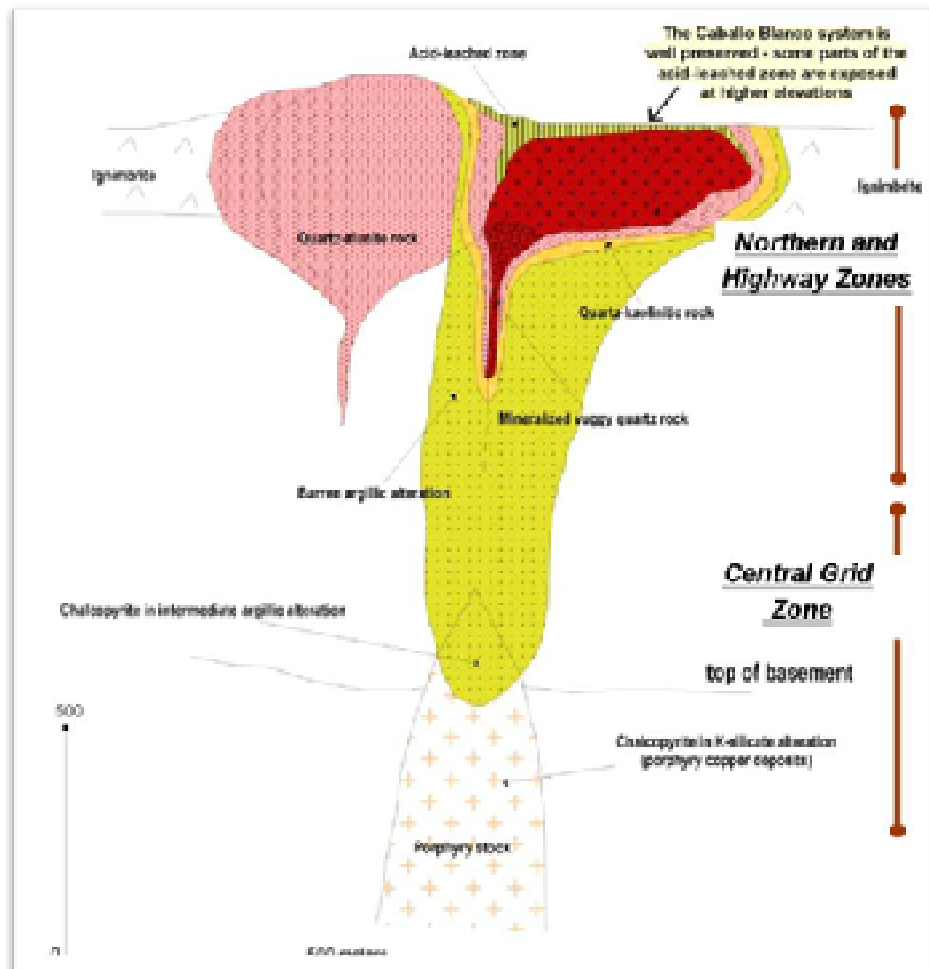


Figure 8.1 - Typical Alteration of High-Sulphidation Epithermal Deposits

9.0 EXPLORATION

Work on the original Caballo Blanco property had outlined at least three large areas of interest since the initial discovery of gold at the Highway Zone in 1995. In the north and central part of the property, two large areas of high-sulphidation epithermal alteration have been discovered, locally named the Northern Zone (4 by 5 kilometers in area) and the Highway Zone (4 by 2 kilometers in area). In the southwest of the property and currently not part of Goldgroup's claim holdings, the Central Grid area hosts what appear to be at least two porphyry copper-gold prospects (Pedrero, Porvenir). These two porphyry prospects likely formed similar 'high level' argillic and silicic haloes and caps to the Northern and Highway zones. The degree of erosion here is deeper, and likely reveals the underlying porphyry intrusive plugs with stock-work copper-gold mineralization and associated alteration in the host rock.

From 1995 to 2005 Almaden Minerals Ltd, Noranda and Comaplex Minerals (all through Minera Gavilán) conducted a variety of surveys including an airborne magnetic / radiometric survey in 1997 (by Aerodat), extensive geochemical soil and rock sampling, induced polarization resistivity and chargeability (by Marc Beaupre Geophysics) and detailed geological mapping surveys (in house consultants). Follow up on anomalies developed from these surveys led to the drilling of 34 holes (6446 meters) in all three areas described above. Contractors for this drilling were Minera Gavilán and Energold de Mexico.

More recently from 2006 to 2009 Canadian Gold Hunter through Minera Cardel completed an aerial photographic survey on the northern two-thirds of the Caballo Blanco property and during 2008, the geophysics department of the Servicio Geológico de Mexico (SGM) completed a helicopter-borne magnetic and radiometric survey (60 meter instrument terrain clearance) over the northern half of the property. The survey overlapped by three kilometers an earlier airborne magnetic, and radiometric survey completed by Aerodat over the southern half of the claims from 1997. Minera Cardel continued to collect soil and rock samples and also improve upon previous geological mapping that now covers most of the property area.

New road construction was completed to gain access to Cerro La Paila as well as the northern portion of the Central Grid Zone to support on-going ground surveys and drilling and up-grading old roads to access El Porvenir area. Minera Cardel drilled a total of 42 core holes, concentrating primarily on testing for epithermal gold mineralization at La Paila, Bandera and La Cruz areas in the Northern Zone as well as testing for porphyry mineralization twelve kilometers to the southwest at Pedrero and Porvenir areas in the Central Grid Zone. Drill contractors included Minera Gavilán, Energold de Mexico and Major Drilling de Mexico.

Since the last NI 43-101 report by Cuttle and Giroux in March, 2010 Goldgroup has drilled an additional 142 holes (19 RC, 123 core), including holes 10CBRC-43 through 11CBN-184. The Company has also completed detailed 3 dimensional induced

polarization (IP) surveys as infill and extensions to previous surveys previously completed by Almaden and Comaplex Minerals and at the time of this report has driven a 123 meter long 3 meters by 3 meters underground access route into the north central portion of the La Paila mineralized body.

The complete database since 1995 is summarized in point form below:

- **Stream Sediments** - 308 stream sediment samples have been collected sporadically on the property and each analyzed for gold by fire assay and 41 additional elements by ICP methods. Results show 66 samples are above the 80 percentile threshold of 8 ppb gold with a range up to a high of 205 ppb gold. The anomalous zones are generally confined to the three areas (Northern, Highway, and Central Grid Zones) but also include two other areas, one 4 kilometers southwest of Bandera (Northern Zone) and 2.3 kilometers west of Pedrero (Central Grid Zone) as seen in Fig. 17 in Cuttle and Giroux, 2010.
- **Rocks** - 2441 rock grab samples have been taken from many surface locations throughout the property, however most come from the Northern, Highway and Central Grid Zones. Approximately 492 samples (20 percent) are above the 80 percentile of 88 ppb gold and many of these general areas; particularly along east trending ridges at La Paila that are indicative of low grade epithermal mineralization (0.5 to 1.5 g/t gold) have yet to be drill tested. Other isolated and higher grade gold samples (up to 14.6 g/t gold) occur outside the three main areas of interest and are located two and four kilometers southwest of Bandera and four kilometers south of the Highway Zone (refer to Fig. 17 and Fig. 21 in Cuttle and Giroux, 2010).
- **Soils** - 8578 soil samples have been collected over 3 general areas in the Northern Zone, Highway Zone and the Central Grid Zone, covering a total of over 52 square kilometers. All samples were analyzed by fire assay for gold and 41 additional elements by ICP methods. The grid spacing is dominantly 200m by 50m however local infill sampling has improved grid density in specific interest areas to 100m by 50m and 50m by 50m spacing. Geochemically positive correlation from soils over the high sulphidation epithermal prospects in the Northern and Highway Zones includes Ag, As, Bi, Sb, Pb and lesser Mo, Sn. In the porphyry environment of the Central Grid Zone, Au, Cu, Mo, Pb, Zn, and Sn. Results for gold in soils identify several anomalous areas that have in some but not all cases been followed up by drill testing. Several local anomalies above an 80 percentile threshold of 22 ppb gold remain valid exploration targets. Strong acid soil PH anomalies are located one kilometer west of La Paila and may be indicative of acid leaching from an undiscovered or blind epithermal system (refer to Fig. 16 in Cuttle and Giroux, 2010).

- **Geophysics** - Ninety percent of the property has been covered with two stages of airborne magnetics, and radiometrics with flight line spacing of 200 meters. On the ground, approximately 34 square kilometers of area (Northern Zone, Highway Zone and Central Grid Zone) has been surveyed with IP resistivity and chargeability on a grid line spacing of generally 200 meters. Local step outs on 400 meter spaced lines and infill spaced lines at 100 meters isolate some areas of interest or known gold mineralization. It is reasonable to suggest with the large volumes of silica alteration and associated gold mineralization in a deeply oxidized environment such as La Paila in the Northern Zone, high resistivity anomalies have been instrumental in defining specific drill targets. Deeper un-oxidized rocks that contain primary sulfide and possible higher grade gold feeder zones may be represented by chargeability high anomalies underlying resistivity high anomalies found closer to surface (refer to Fig. 18 in Cuttle and Giroux, 2010).

In 2010, Goldgroup contracted SJ Geophysics to complete approximately 100 line kilometers of 3D IP over the Northern Zone and Highway Zone at Caballo Blanco. The surveys were completed on 100 meter and 200 meter line separation. Modeling of the resistivity and chargeability data has since helped refine new and improved targets for further drill testing.

- **Lithogeochemistry** - 1065 surface rock specimens have been collected and analyzed for clay alteration products using a company owned Terra Spec[®] spectrometer. These data are critical in defining distinct alteration haloes around mineralization and will help to vector exploration targets in the future.
- **Drilling** - One hundred and eighty one core holes and thirty six reverse circulation holes have been drilled since the discovery of gold at Caballo Blanco (Northern Zone and Highway Zone) including the neighboring Central Grid Zone which, as of October 2011, is owned 100 percent by Almaden Minerals. Due to small open cavities and intense alteration and oxidation to at least 300 meters, reverse circulation (RC) drilling and diamond drilling at Caballo Blanco was at times problematic and consequently several holes were either lost, had poor recovery, or never attained their projected depths. When comparing the two drilling methods, diamond drill core recoveries were consistently higher. The author believes that the many methods of collecting and presenting the historical data obtained by various companies since 1995 have been thorough and of high caliber.
- **Underground Development** - As of 4 January 2012 Goldgroup had driven a 123 meter long 3 meter by 3 meter underground access drift into the north central portion of the La Paila mineralized body. This is a portion of the planned underground development which is designed to give more detailed geological information on mineralization controls and also to provide more material for large ongoing column leach tests. At the time of Cuttle's visit, the

walls of this new underground access had been chip sampled, however assay results for these samples and corresponding geological mapping were not complete.



Photo 9.1 - New underground development at La Paila - January 2012
(Photo -Cuttle)

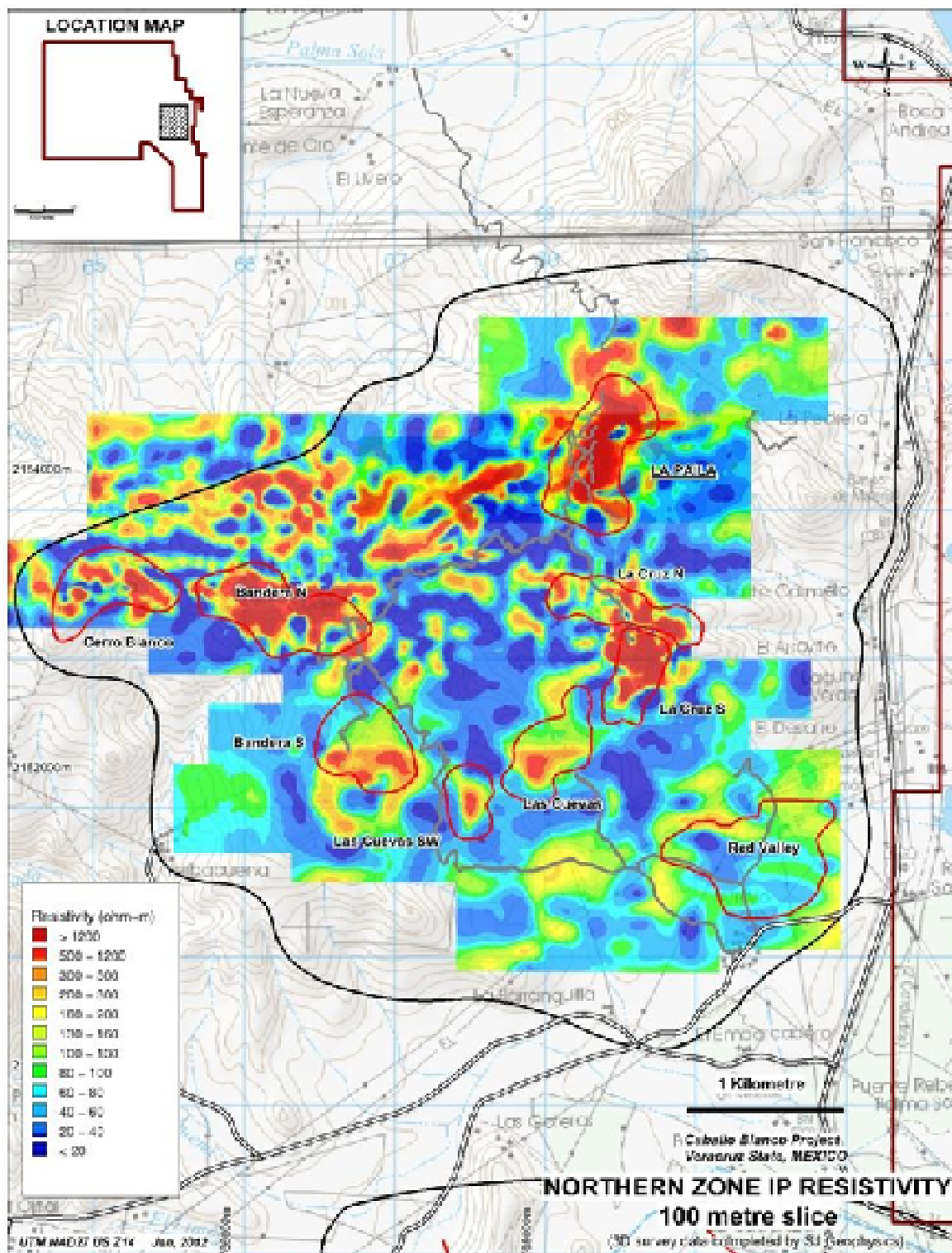


Figure 9.1 - New Induced Polarization Resistivity Survey - North Zone Area
(modified from SJ Geophysics 2011)

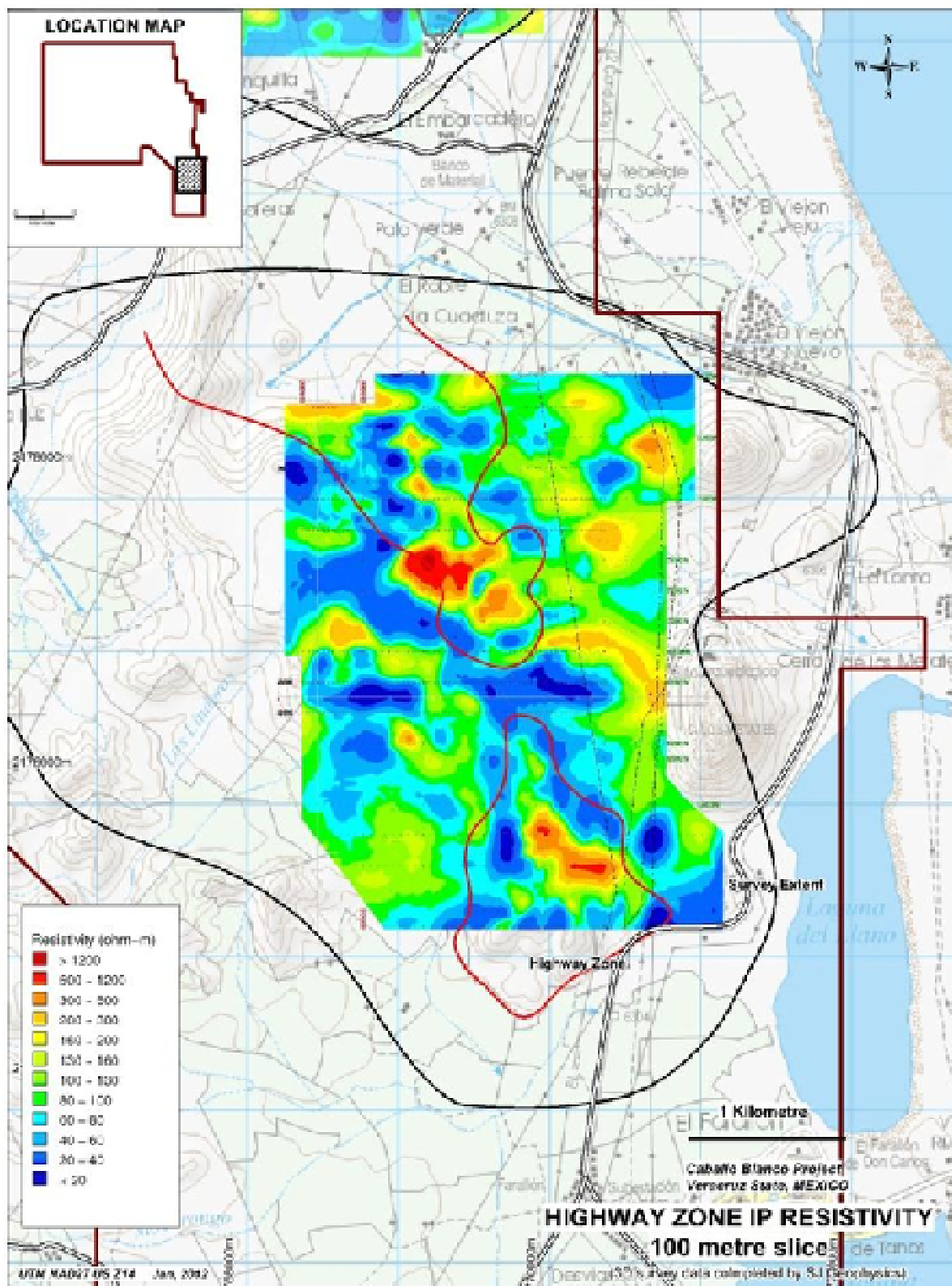


Figure 9.2 - New Induced Polarization Resistivity - Highway Zone Area
(modified from SJ Geophysics)

10.0 DRILLING

One hundred and eighty one core holes and thirty six reverse circulation holes have been drilled since the discovery of gold at the Caballo Blanco Property (Northern Zone and Highway Zone). This includes the neighboring Central Grid Zone which is part of the El Cobre project sold by Goldgroup to Almaden Minerals.

Due to small open cavities and intense alteration and oxidation to at least 300 meters, drilling has been at times problematic and consequently several drill holes were either lost or never attained their projected depths. However, drill core recovery is generally good (80%+) and the authors believe that the many methods of collecting and presenting the historical data obtained by various companies since 1995 have been thorough and of high caliber.

Previous drill testing throughout the Caballo Blanco Property has identified many areas with gold mineralization, however the La Paila prospect in the Northern Zone, among other areas, is considered the most significant area of gold mineralization found to date and is detailed below. Descriptions of other mineralized locations are described in the previous NI 43-101 report by Cuttle and Giroux, 2010.

10.1 Pre 2010 Drilling - La Paila

Besides the mineralized rock chip samples and extensive alteration assemblages found on the top and along the upper slopes of Cerro La Paila, the first real significant gold mineralization associated with this alteration was intersected in drill hole CB05-03 by Comaplex Minerals in 2005. The discovery hole cut 58 meters grading 1.772 g/t gold and is located at relatively shallow depths along the north end of an irregular northerly trending body of vuggy silica breccia.

Holes were drilled, targeting the extents of the low-grade bulk mineable gold at La Paila. These drill holes were collared along 50 and 100 meter sections extending over a horizontal distance of 800 meters to the north, 280 meters east and extend to vertical depths of 200 meters above sea level. The principal unit hosting the gold mineralization outcrops at surface in the north ends of the property and may plunge gently to the south. It is not clear however if this perceived plunge of the gold zone at La Paila is the direct result of local block faulting or subject to insufficient drill data. True widths were not calculated for any composites at Caballo Blanco.

10.2 Goldgroup Drilling - 2010/2011

In 2010/2011 Goldgroup targeted seven specific areas within the Northern Zone of the Caballo Blanco Property. This report includes maps that locate and identify 142 holes new holes (10CBRC-43 to 11CBN184). Three additional holes were drilled at La Paila (11CBN-185 to 187); however assays for these holes as well as holes 11CBN-179

to 11CBN-181 and 11CBN-183 had not been received and are not included in resource estimations by Giroux at the time of writing this report.

Table 10.1 Areas drilled in 2010/2011 by Goldgroup (holes 10CBRC-43 to 11CBN-184)			
Zone	Area	Total Meterage	Holes
Northern	La Paila	33459.63	130
Northern	Bandera N/S	1022	4
Northern	Las Cuevas SW	612.1	2
Northern	Red Valley	612.1	3
Northern	Cerro Blanco	250.5	2
Northern	Las Cuevas	600	1
		36556.33	142

The 2010/2011 drill program commenced with a reverse circulation percussion rig contracted from Layne Drilling in Hermosillo. Hard abrasive conditions and intense fracturing encountered in the siliceous alteration lead to very poor sample recoveries of less than 50 percent, in the mineralized assemblage. The reverse circulation program was abandoned after 19 holes due to the poor recoveries and the inability to complete holes to their target depths because of the difficult drilling conditions.

The program was changed to all diamond core with two rigs, one supplied by Corebeil and the other by Landdrill. As the program progressed another rig was added by Corebeil and two more by Landdrill bringing the total to 5 machines in July of 2011, for the remainder of the program. All of the original 14 reverse circulation holes drilled at La Paila were later twinned with diamond core and table of comparative results is shown in Table 10.2 below. None of the reverse circulation drill holes have been included in the resource estimation.

Table 10.2
Comparison - Reverse Circulation / Diamond drill twinned holes - La Paila area

RC Hole	From (m)	To (m)	Interval (m)	Au grade (g/t)	DIAMOND HOLE	From (m)	To (m)	Interval (m)	Au grade (g/t)
10 CBRC 48	42	174	132	0.57	11 CBN 68	37	171	134	0.61
10 CBRC 49	22	150	128	0.4	11 CBN 70	22	151.5	129.5	0.49
10 CBRC 52	80	86	6	0.33	11 CBN 110	89.5	94.3	4.8	0.17
and	92	96	4	0.26					
10 CBRC 53	60	68	8	0.26	11 CBN 99	65.85	69.85	4	0.41
and	76	82	6	0.38	and	79.85	83.3	3.45	0.52
10 CBRC 56	88	94	6	0.23	11 CBN 115	87.05	93.76	6.71	0.2
and	164	174	10	0.27	and	163.1	173.1	10	0.2
and	180	192	12	0.24	and	179.1	197.1	18	0.3
10 CBRC 58	30	186	156	0.42	11 CBN 69	29.8	203.8	175	0.45
10 CBRC 59	26	140	114	0.6	11 CBN 120	13.75	140	126.25	0.69
10 CBRC 60	56	170	114	0.58	11 CBN 72	56	178	122	0.8
10 CBRC 62	48	58	10	0.34	11 CBN 90	48.3	54.3	6	0.22
and	84	146	62	0.68	and	86.3	134.3	48	0.77
10 CBRC 63	94	104	10	0.22	11 CBN 97	88.3	104.3	16	0.25
and	112	174	62	0.35	and	110.3	172.3	62	0.37
10 CBRC 64	46	110	64	0.59	11 CBN 101	43.78	109.74	65.96	0.85
and	146	176	30	0.68	and	139.74	189.95	50.21	0.41
and	188	194	6	0.28					
10 CBRC 65	102	128	26	0.75	11 CBN 95	85.15	101.15	20	0.83
					and	111.15	163.35	52.2	0.31
10 CBRC 66	38	144	106	0.71	11 CBN 91	38.15	112.5	74.35	0.6
10 CBRC 67	92	96	4	0.71	11 CBN 100	97.5	109.5	12.05	0.34
and	106	126	20	0.35	and	143.55	157.55	14	0.7
and	154	170	16	0.35	and	233.55	281.55	48	0.51

All diamond drill holes were collared with either PQ or HQ size rods and reduced from there to HQ or NQ as drilling conditions dictated. The majority of the core is HQ size. A total of 117 core holes were completed at La Paila (10 CBN 54, 61 and 11 CBN 68-88, 90, 91, 93-102, 104, 105 and 107-184). All drill holes were surveyed using a Reflex EZ shot.

The 2010/2011 drill program continued to identify the extents of the low-grade bulk mineable gold at La Paila and other areas in the Northern Zone. The drill holes at La Paila were collared along 50 and 100 meter sections extending over a horizontal distance of 900 meters to the north, 380 meters east and extend to vertical depths of close to 100 meters above sea level.

A variety of geophysical, geochemical and geological surveys continue to be extremely useful in identifying drill targets in and around the Northern Zone; most importantly airborne magnetic, IP resistivity high anomalies, clay alteration haloes identified by a TerraSpec[®] spectrometer, location of mineralized surface rock geochemistry and detailed geological and structural mapping. These surveys have not only been used successfully to outline a classic zonation of clay minerals representative

of a large epithermal system but they have most importantly been useful in defining zones of silica flooding and associated gold mineralization. These surveys should remain principle exploration tools for future work at Caballo Blanco.

The Table 10.3 below lists all drill hole data collected by Goldgroup in 2010 and 2011 from seven different areas of the Northern Zone These collar locations include 19 reverse circulation holes and 123 diamond drill holes for a total of 36,556 meters of drilling. None of the nineteen reverse circulation drill holes have been included in the resource estimation due to low recovery.

Table 10.3 All drill collar locations - 2010/2011 (NAD 27 Mex, zone 14)									
HOLE_ID	East_27/14	North_27/14	Elev m	LENGTH m	AZI	DIP	AREA	YEAR	TYPE
10CBRC-043	766724.85	2182193.94	591.18	334	0	-90	BANDERA S	2010	RC
10CBRC-044	766728.31	2182193.83	591.04	224	90	-65	BANDERA S	2010	RC
10CBRC-045	766730.31	2182803.17	577.35	214	270	-80	BANDER N	2010	RC
10CBRC-046	766728.91	2182802.97	577.43	250	260	-50	BANDERA N	2010	RC
10CBN-047	767702.48	2181378.69	133.12	301.5	180	-45	LAS CUEVAS SW	2010	DDH
10CBRC-048	768322.06	2184284.76	520.9	218	90	-80	LA PAILA	2010	RC
10CBRC-049	768404.9	2184292.79	523.27	202	80	-50	LA PAILA	2010	RC
10CBN-050	768004.81	2181387.29	114.82	301.5	140	-50	LAS CUEVAS SW	2010	DDH
10CBN-051	768587.72	2181159.07	45.54	301.5	310	-50	RED VALLEY	2010	DDH
10CBRC-052	768218.96	2184299.28	496.73	124	110	-80	LA PAILA	2010	RC
10CBRC-053	768178.77	2184295.04	476.43	256	0	-90	LA PAILA	2010	RC
11CBN-095	768360.37	2184001.07	487.96	320.04	90	-60	LA PAILA	2011	DDH
11CBN-096	768155.28	2184148.98	479.76	301.5	135	-50	LA PAILA	2011	DDH
11CBN-097	768349.68	2184099.35	489.08	271.8	90	-65	LA PAILA	2011	DDH
11CBN-098	768359.13	2184000.97	488.03	219.98	0	-90	LA PAILA	2011	DDH
11CBN-099	768177.95	2184293.34	476.37	162.2	0	-90	LA PAILA	2011	DDH
11CBN-100	768278	2183907.16	513	370.5	90	-70	LA PAILA	2011	DDH
11CBN-101	768352.03	2184046.98	484.17	273.49	0	-90	LA PAILA	2011	DDH
11CBN-102	768157.16	2184050.37	495.52	186.2	0	-90	LA PAILA	2011	DDH
11CBN-103	763596.04	2181619.02	391	132	0	-90	CERRO BLANCO	2011	DDH
11CBN-104	768160.53	2184052.35	495.4	377.85	90	-60	LA PAILA	2011	DDH
11CBN-105	768286.74	2184140.06	499.54	310.5	0	-90	LA PAILA	2011	DDH
11CBN-106	763573.04	2182630.02	379	118.5	0	-90	CERRO BLANCO	2011	DDH
11CBN-107	768352.01	2184045.23	484.17	14.21	180	-50	LA PAILA	2011	DDH
11CBN-108	768351.76	2184048.07	484.31	237.98	90	-60	LA PAILA	2011	DDH
11CBN-109	768328.99	2183945.47	496.31	252	90	-70	LA PAILA	2011	DDH
11CBN-110	768218.08	2184297.47	496.7	211.3	90	-80	LA PAILA	2011	DDH
11CBN-111	768239.73	2184048.23	520.03	334.5	0	-90	LA PAILA	2011	DDH

Table 10.3
All drill collar locations - 2010/2011 (NAD 27 Mex, zone 14)

HOLE_ID	East_27/14	North_27/14	Elev.m	LENGTH m	AZI	DIP	AREA	YEAR	TYPE
11CBN-112	768348.51	2184203.93	481.8	200.44	0	-90	LA PAILA	2011	DDH
11CBN-113	768201.78	2184351.94	489.11	170.4	90	-65	LA PAILA	2011	DDH
11CBN-114	768195.39	2184297.99	483.02	182.2	0	-90	LA PAILA	2011	DDH
11CBN-115	768263.99	2184354.99	494.13	256.3	90	-75	LA PAILA	2011	DDH
11CBN-116	768293.97	2183945.82	512.53	240.3	0	-90	LA PAILA	2011	DDH
11CBN-117	768160.53	2184052.35	495.4	340.4	90	-70	LA PAILA	2011	DDH
11CBN-118	768348.09	2184203.3	482.1	351	90	-80	LA PAILA	2011	DDH
11CBN-119	768247.92	2184099.8	510.6	340.5	90	-80	LA PAILA	2011	DDH
11CBN-120	768366.76	2184250.83	487.37	193.7	90	-45	LA PAILA	2011	DDH
11CBN-121	768297.43	2183943.36	512.3	235.5	90	-80	LA PAILA	2011	DDH
11CBN-122	768233.82	2184246.68	504.72	260.5	90	-76	LA PAILA	2011	DDH
11CBN-123	768289.36	2184139.77	499.49	272.3	90	-80	LA PAILA	2011	DDH
11CBN-124	768240.71	2183997	515.05	332.5	0	-90	LA PAILA	2011	DDH
11CBN-125	768231.94	2184247.15	504.81	215.7	270	-80	LA PAILA	2011	DDH
11CBN-126	768293.3	2183899.95	517.86	214.5	0	-90	LA PAILA	2011	DDH
11CBN-127	768344.22	2184298.87	519.82	299.6	90	-63	LA PAILA	2011	DDH
11CBN-128	768302.5	2184045.44	496.25	310.5	0	-90	LA PAILA	2011	DDH
11CBN-129	768373.67	2184544.52	499.36	3.2	0	-90	LA PAILA	2011	DDH
11CBN-130	768348.69	2184451.73	511.96	290.17	90	-45	LA PAILA	2011	DDH
11CBN-131	768286.04	2184194.84	496.47	251.4	270	-72	LA PAILA	2011	DDH
11CBN-132	768338.67	2184294.8	519.99	373.8	180	-50	LA PAILA	2011	DDH
11CBN-133	768336.51	2183862.75	496.98	247.5	0	-90	LA PAILA	2011	DDH
11CBN-134	768302.62	2184044.89	496.43	274.5	180	-70	LA PAILA	2011	DDH
11CBN-135	768288.91	2184194.32	496.34	284.6	90	-85	LA PAILA	2011	DDH
11CBN-136	768246.71	2183942.81	530.46	308.2	0	-90	LA PAILA	2011	DDH
11CBN-137	768302.87	2184399.52	497.49	305.71	90	-50	LA PAILA	2011	DDH
11CBN-138	768354.13	2184045.59	484.22	224	90	-75	LA PAILA	2011	DDH
11CBN-139	768203.49	2184108.01	497.92	291.5	270	-80	LA PAILA	2011	DDH
11CBN-140	768336.04	2183891.47	497.39	241.5	90	-70	LA PAILA	2011	DDH
11CBN-141	768197.91	2183994.79	536.32	338	0	-90	LA PAILA	2011	DDH
11CBN-142	768360.88	2184003.05	487.88	256.5	90	-75	LA PAILA	2011	DDH
11CBN-143	768349.98	2184100.1	489.17	250.5	90	-45	LA PAILA	2011	DDH
11CBN-144	768336.71	2184548.49	476.64	284.68	90	-60	LA PAILA	2011	DDH
11CBN-145	768243.36	2183997.14	514.83	268.5	90	-75	LA PAILA	2011	DDH
11CBN-146	768248.79	2183899.76	543	319.5	0	-90	LA PAILA	2011	DDH
11CBN-147	768243.92	2184098.83	510.75	290.5	90	-60	LA PAILA	2011	DDH
11CBN-148	768301.38	2184351.18	504.89	314.5	90	-65	LA PAILA	2011	DDH
11CBN-149	768338.05	2183862.59	497.49	253.5	90	-60	LA PAILA	2011	DDH

Table 10.3
All drill collar locations - 2010/2011 (NAD 27 Mex, zone 14)

HOLE_ID	East_27/14	North_27/14	Elevm	LENGTH m	AZI	DIP	AREA	YEAR	TYPE
11CBN-150	768338.84	2184489.21	481.33	318.21	90	-60	LA PAILA	2011	DDH
11CBN-151-A	768305.01	2184251.3	503.03	347.5	90	-60	LA PAILA	2011	DDH
11CBN-152	768149.28	2183994.62	527.44	277.5	0	-90	LA PAILA	2011	DDH
11CBN-153	768372.47	2184351.8	544.08	257	90	-57	LA PAILA	2011	DDH
11CBN-154	768209.08	2183940.55	536.22	321	0	-90	LA PAILA	2011	DDH
11CBN-155	768147.51	2183996.87	527.5	201.5	270	-80	LA PAILA	2011	DDH
11CBN-156	768374.18	2184544.12	499.47	300.42	135	-45	LA PAILA	2011	DDH
11CBN-157	768190.49	2184042.65	508.87	308.4	270	-84	LA PAILA	2011	DDH
11CBN-158	768149.29	2183952.45	535.73	274	0	-90	LA PAILA	2011	DDH
11CBN-159	768277.68	2184249.94	503.5	311	90	-80	LA PAILA	2011	DDH
11CBN-160	768202.58	2183898.75	522.22	233	0	-90	LA PAILA	2011	DDH
11CBN-161	768380.93	2184505.2	508.26	302.67	90	-45	LA PAILA	2011	DDH
11CBN-162	768197.76	2184247.63	484.84	305.4	270	-80	LA PAILA	2011	DDH
11CBN-163	768252.55	2184205.32	501.31	356.4	180	-50	LA PAILA	2011	DDH
11CBN-164	768100.73	2183952.85	527.4	299	0	-90	LA PAILA	2011	DDH
11CBN-165	768150.35	2183900.01	510.35	367	0	-90	LA PAILA	2011	DDH
11CBN-166	768241.29	2184294.79	505.94	317.35	90	-75	LA PAILA	2011	DDH
11CBN-167	768380.73	2184502.2	508.54	281.33	130	-45	LA PAILA	2011	DDH
11CBN-168	768148.9	2183849.2	499.98	363.7	0	-90	LA PAILA	2011	DDH
11CBN-169	768296.61	2183853.24	514.52	299.78	0	-90	LA PAILA	2011	DDH
11CBN-170	768255.53	2183852.07	536.48	299.62	0	-90	LA PAILA	2011	DDH
11CBN-171	768203.11	2183851.32	505.58	322.5	0	-90	LA PAILA	2011	DDH
11CBN-172	768338.05	2183863.96	497.48	278.7	90	-75	LA PAILA	2011	DDH
11CBN-173	768098.43	2183900.87	511.38	358	0	-90	LA PAILA	2011	DDH
11CBN-174	768097.82	2183848.11	502.1	361.49	0	-90	LA PAILA	2011	DDH
11CBN-175	768200.51	2183801.55	495.94	301.5	0	-90	LA PAILA	2011	DDH
11CBN-176	768339	2183863.16	497.46	249.9	90	-50	LA PAILA	2011	DDH
11CBN-177	768144.85	2183791.83	484.93	388	0	-90	LA PAILA	2011	DDH
11CBN-178	768336.42	2183891.45	497.36	301.5	0	-90	LA PAILA	2011	DDH
11CBN-179	768337.6	2183891.54	497.24	320.3	90	-81	LA PAILA	2011	DDH
11CBN-180	768097.5	2183805.69	486.19	396.42	0	-90	LA PAILA	2011	DDH
11CBN-181	768198.41	2183752.88	484.35	262.5	0	-90	LA PAILA	2011	DDH
11CBN-182	768050.13	2183847.97	501.99	298.5	0	-90	LA PAILA	2011	DDH
11CBN-183	768337.6	2183891.54	497.24	281	90	-50	LA PAILA	2011	DDH
11CBN-184	768053	2183800.16	487	200	0	-90	LA PAILA	2011	DDH

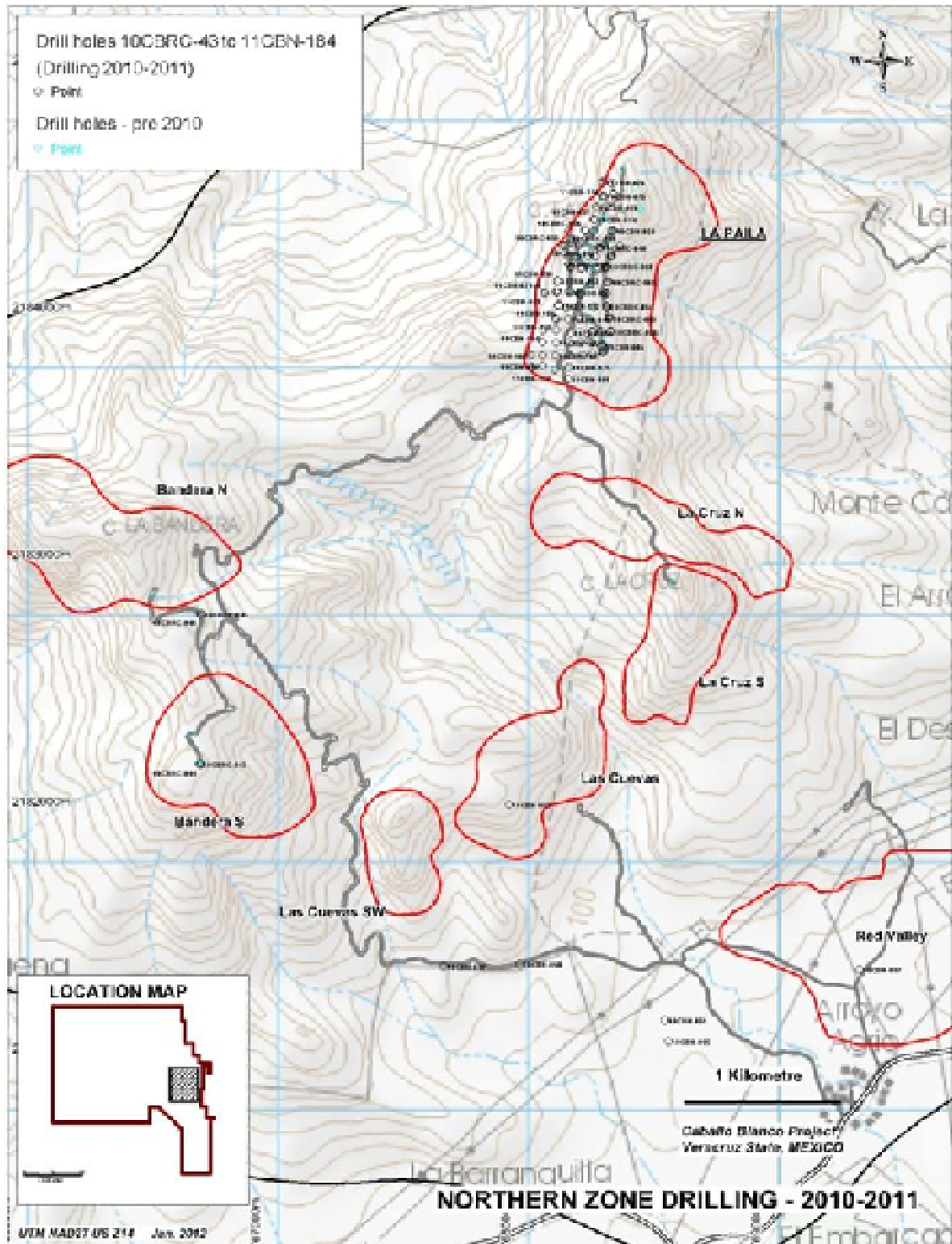


Figure 10.1 - 2010-2011 Drill Collar Locations by Goldgroup - Northern Zone
(Cuttle, 2012)

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

Prior to Goldgroup drill 2010/2011, at least four different Companies have completed drill programs at Caballo Blanco. Early reverse circulation drilling by Almaden Minerals (through Minera Gavilán S.A de C.V.) in 1998 concentrated on the Central Zone 'Porphyry' target, and in 2002, Noranda and Almaden drilled nine holes in the Central Grid and Highway Zones. More recently, Comaplex Minerals and Canadian Gold Hunter (through Minera Cardel S.A de C.V.) completed an additional fifty two core holes, principally targeting the Northern Zone area at or near La Paila and to a lesser extent at the Central Grid and Highway Zones in the central and southern part of the claims.

Sampling methods used by Canadian Gold Hunter (Minera Cardel) geologists on 32 of the 38 drill holes in the Northern Zone are described in the following paragraph. Sampling methods by Comaplex for the other six holes in the Northern Zone are unknown at this time; however check assays by Minera Cardel on mineralized core intercepts from three of these core holes suggest no significant differences in assay results.

11.1 Sample Preparation and Analysis - 2009

The core samples were sent to ALS Chemex preparation Lab in Guadalajara, Mexico where they were dried and crushed to minus 150 mesh and the pulps were then air couriered to ALS Chemex Laboratories in North Vancouver, BC, Canada (ISO 17025 accredited). Each were then dissolved in an aqua regia leach and analyzed for gold by fire assay methods and 35 other trace elements by ICP - MS methods (inductively coupled plasma with mass spectroscopy).

11.2 Quality Assurance / Quality Control (QA/QC) - 2009

The three different standard reference materials used in this drilling campaign were purchased from CDN Resource Laboratories Ltd. in Vancouver, Canada by Minera Cardel. Control charts suggest most all of the assay data on these three different standards fall within two standard deviation of the norm. Specific outliers exist just outside 2SD, however these are not considered influential to the overall data package.

- Standard P1 - 6% or 3 samples out of 49 - above / below 2SD
- Standard 3C - 4% or 2 samples out of 48 - above / below 2SD
- Standard P7A - 4% or 2 samples out of 46 - above / below 2SD

Source material for the 48 blanks inserted into the assays in the Northern Zone comes from two locations. Inserts into assay shipments for drill holes CB06-01 to CB-06-03 and 07CBN-01 to 08CBN-05 used local blank gravel and inserts for holes 08CBN-06 to 09CBN-042 used previously drilled core from barren andesite in the

Northern Zone. Exact location and the average reference analysis of the barren andesite inserts and local gravels are unknown; however assay data on the blanks generally vary from minimum detection of less than 5 parts per billion (ppb) of gold to 44 ppb gold with 3 samples above two standard deviation of 31 ppb gold. The authors do not considered these outliers to be problematic.

Although three outlier samples from 141 duplicates show abnormal results, the duplicate assaying program reflects an acceptable degree of correlation. The author believes sample preparation, security and general analytical procedures to be adequate for the core drilling at Caballo Blanco. A list of relevant composite intervals from core drilling at La Paila is itemized in Appendix V. True widths were unknown.

11.3 Sample Security - 2009

A variety of HQ, NQ and / or BQ size drill core was delivered daily from the drill rig to the Company's on-site core logging and storage facility near the small community of Arroyo Agrio in the north-eastern part of the claim block. Geotechnical and geological data was then recorded by company geologists, including recovery, specific gravity, rock quality designation (RQD), alteration defined by spectrometer readings and specific geological rock type. Core samples were selected and marked by the same geologists, with company technicians later using a diamond saw to half the core and secure each half sample with self-locking clips. Sample lengths varied generally from 1 to 3 meters long and up to 6 meters in length and were chosen primarily along on recognized alteration or lithological boundaries. Three different standard reference samples, as well as locally derived 'blank' material and core duplicates were inserted into each lab shipment in regular frequency; generally a different standard reference material every 20 samples, a blank every 80 samples and core duplicates every 20 to 30 samples. A complete library of split core remains protected inside a fenced compound near the small village of Arroyo Agrio (Photo 12-1).

11.4 Sample Preparation and Analysis - 2010/2011

During the 2010/2011 drilling campaign conducted by Goldgroup samples of half core and riffle split reverse circulation percussion chips from drill holes 10CBRC43 to 11CBN113 were collected from site by Inspectorate and taken to their Durango preparation facility where they were dried, crushed and a 250g split was pulverized to - 75 microns. The rejects were returned to site while the pulps were air couriered to Inspectorate's Richmond, BC, Canada facility and analyzed for gold by fire assay with Atomic Absorption (AA) finish. In addition, a 30 element Inductively Coupled Plasma (ICP) analysis (aqua regia digest) was conducted on all samples.

Samples of half core from drill holes 11CBN114 to 11CBN184 were collected from site by ALS Global and taken to their Guadalajara preparation facility where they were dried, crushed and a 250 gram split was pulverized to minus 75 microns. The rejects were returned to site while the pulps were air couriered to their Vancouver facility

and analyzed for gold by fire assay with AAS finish. In addition, a 35 element ICP analysis was conducted on all samples.

11.5 Quality Assurance -Quality Control (QA-QC) - 2010/2011

The three different standard reference materials used in this drilling campaign were prepared by CDN Resource Laboratories Ltd. in Vancouver, Canada from mineralized material from the La Paila deposit supplied by Minera Cardel. Control charts suggest most all of the assay data on these three different standards fall within two standard deviation of the norm. Specific outliers exist outside 2SD, however these are not considered influential to the overall data package.

- Standard GS-1E -2% or 3 samples out of 163 - above / below 2SD
- Standard GS-P8 - 2% or 3 samples out of 161 - above / below 2SD
- Standard CGH-1 -1% or 2 samples out of 167 - above / below 2SD

One standard, one blank or one duplicate was inserted per group of 10 samples sent to the laboratory.

11.6 Sample Security - 2010/2011

A variety of HQ and/or NQ size drill core was delivered daily from the drill rig to the Company's on-site core logging and storage facility near the small community of Arroyo Agrio in the north-eastern part of the claim block. Geotechnical and geological data were then recorded by company geologists, including recovery, specific gravity, rock quality designation (RQD), alteration defined by spectrometer readings and specific geological rock type.

Core samples were selected and marked by the same geologists, with company technicians later using a diamond saw to halve the core and secure each half sample with self-locking clips. Sample lengths varied generally from 1 to 3 meters long and up to 6 meters in length and were chosen primarily along on recognized alteration or lithological boundaries. The samples were sealed and shipped via ALS Global to ALS Chemex Preparation Laboratories in Guadalajara (holes 11CBN114 to 11CBN184) or picked up by Inspectorate Labs and driven to their preparation laboratories in Durango State (holes 10CBRC43 to 11CBN113).

It is the author's opinion that sample preparation, security and analytical procedures are adequate and have been completed to industry standard.

12.0 DATA VERIFICATION

12.1 Site Visit - 2009

Cuttle completed an on-site field visit to the Caballo Blanco Project area was from 1 November to 3 November 2009, as a guest of Keith Piggott, CEO of Goldgroup, Kevin Sullivan, VP Exploration, Fernando Téliz, Project Manager, Minera Cardel, and Humberto Hernández Senior Geologist, Minera Cardel.

During the field visit the author was able to collect rock and drill core samples from La Paila (Northern Zone), verify drill hole collar locations as well as visit the core logging / storage facilities near Arroyo Agrio and the geological field offices at Villa Rica. The author did not visit the Highway and Central zones on the Caballo Blanco property.



Photo 12.1 - Core Storage Facilities Near Arroyo Agrio, Caballo Blanco Project - 2009
(Photo -Cuttle)



Photo 12.2 - Typical 'Cement Carne' used to Identify Drill Hole Collar Locations, Caballo Blanco Project -2009
(Photo -Cuttle)

Five rock samples were collected by the author, one rock chip sample from surface exposure of the gold zone at La Paila and four rock samples from mineralized intervals in four drill holes at La Paila. The rocks were later hand delivered to Acme Labs of Vancouver for analysis (*ISO 9001:2008 accredited*).

The five check assays show good correlation to previous assays obtained by Canadian Gold Hunter (Minera Cardel) as shown in the table below and the author verifies that gold mineralization does exist at 'point' locations in drill core and surface exposures at the La Paila Area. No other samples were taken by the author outside the La Paila area at the Caballo Blanco property.

Table 12.1 Assay checks by Author, Nov, 2009					
Sample	Location La Paila	Length	Original Assay g/t Au	Check Assay g/t Au	Comments
JCCB-1	La Paila area	1.5m chip	Not relevant	3.246	1.5m surface chip, along o/c of vuggy silica gold zone. 768415E, 2184513N
JCCB-2	DDH CB05-03 120m-122m	2.0m	0.36	0.34	¼ core was cut by rock saw during field visit
JCCB-3	DDH 07CBN 02 146.7-148.44m	1.74m	0.266	0.5	¼ core was cut by rock saw during field visit
JCCB-4	DDH 08CBN 11 150.26-151.79m	1.53m	1.01	1.013	¼ core was cut by rock saw during field visit
JCCB-5	DDH 08CBN 18 105.16-106.68m	1.52m	0.701	0.653	¼ core was cut by rock saw during field visit

12.2 Site Visit - January 2012

Cuttle visited the Caballo Blanco Property a second time on 6 January 2012 in the company of Kevin Sullivan, VP Exploration of Goldgroup Mining.

During the field trip the author was able to visit the La Paila prospect in the Northern Zone and verify new drill hole collar locations as well as visit the Company's core logging / storage facilities and column leach pads near Arroyo Agrio, and the geological field offices at Villa Rica.

No additional samples were taken during this site visit, however Cuttle was able to verify that exploration work and drill testing at La Paila was ongoing by Goldgroup.



**Photo 12.3 - Typical 'Cement Carne' used to Identify Drill Hole Collar Locations,
Caballo Blanco Project - 2012**
(Photo -Cuttle)

In the opinion of the authors the data base provided is adequate to estimate a resource and is up to industry standards.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

The first metallurgical investigations conducted for the Caballo Blanco project were bottle roll leach tests. These tests were presented and interpreted in the February 2012 NI43-101. Section 13.1 is extracted from this report.

13.1 Metallurgical Testing in 2009/2010 - Goldgroup

As part of Goldgroup's 2009 due diligence work at Caballo Blanco, the Company cut eight samples from previously split drill core from the La Paila Zone. These samples were taken to represent different ore characteristics from low grade (<0.5 g/t Au), to medium grade (0.5 to 1.5 g/t Au) and high grade material (>1.5g/t Au).

The samples were crushed to -1/2 inch and were leached for 144 hours by standard 'bottle roll' with cyanide solutions at the Company's in-house facility. Results show that the five samples with head grades below 1 gram gold gave high recoveries within 24 to 48 hours, while three samples above 1 gram gold gave slower recovery after the 144 hours. The three higher grade samples were then crushed to -1/4 inch and run for a further 48 hours improving their recoveries to 74.5%, 89% and 91%. Recoveries for the low grade material were close to 100%.

Mining engineers from Goldgroup concluded; "These initial bottle rolls indicate that the ore is highly amenable to leaching. The gold ore is totally oxidized to at least 300 meters depth and is benign in leaching since there appears to be no other minerals or deleterious materials present. This indicates low reagent consumption in the commercial heap leach process."

The authors caution that the initial 'bottle roll' test work described in this section for La Paila is preliminary in nature and may not be representative of true recoveries obtained in the future.

Table 13.1 Caballo Blanco (La Paila Zone) Preliminary 'in-house' Bottle Roll Tests by Goldgroup -2009							
SAMPLE	INITIAL FIRE ASSAY g/t	RECOVERED GOLD g/t	TAILS ASSAY g/t	CALCULATED HEAD GRADE g/t	% RECOVERY	LEACH TIME hrs	CRUSH SIZE
CBN-1	0.78	1.1			141	144	-1/2"
CBN-2	2.79	2.83	0.97	3.8	74.5	196	-1/2", -1/4"
CBN-3	0.46	0.45			98	144	-1/2"
CBN-4	0.25	0.22			88	144	-1/2"
CBN-5	0.47	0.5			106	144	-1/2"
CBN-6	1.32	1.6	0.185	1.79	89	196	-1/2", -1/4"
CBN-7	0.27	0.32			118	144	-1/2"
CBN-8	1.21	1.37	0.125	1.5	91	196	-1/2", -1/4"

All samples were run for an initial 144 hrs, at which time samples 2, 6 and 8 showed recoveries of 59%, 78% and 79% respectively. Samples 2, 6 and 8 were again dried and re-crushed to minus 1/4" and leached for another 48 hrs and gave additional recoveries.

13.2 Column Testwork

Column testwork for the Caballo Blanco Project began in 2010 and is ongoing. Over fifty column leach tests have either been completed or are in progress. A majority of this testwork was accomplished by Goldgroup. In late 2011 METCON Research Inc. has been supporting some of the testwork with analyses, procedures and test program designs. The samples subjected to column testing include reverse circulation drill cuttings, sample preparation coarse rejects, surface rock chip samples and, recently, bulk sample from tunneling.

The column test database used for this PEA is limited to twelve of these columns, ten for calculation of the leach curve and two for estimation of crush size. Final results from the underground bulk sample are not available. Results from the drill cuttings do not represent industrial heap leaching due to particle size distributions finer than P₈₀ of 3 millimeter. One rock chip sample was tested at a P₈₀ 3 inch size distribution but the test is of limited value as no other tests were conducted on the sample and no other samples were tested at a P₈₀ 3 inch.

13.2.1 Leach Curve

Metallurgical interpretation to determine leach rate and reagent consumption is based on ten column leach tests. These tests were conducted on five rock chip composite samples at viable size distributions ranging from a P₈₀ 3/8 inch to a P₈₀ 3/4 inch.

Table 13.2 Column Leach Test Samples					
Column ID	Sample	Feed P80, in	Head Assay, g/t		
			Au	Ag	Cu
CL-01	LPM-04	0.70	0.81	2.0	46
CL-02	LPM-04	0.70	0.81	2.0	46
CL-03	LPM-04	0.70	0.81	2.0	46
CL-04	LPM-01	0.37	0.55	2.5	24
CL-05	LPM-02	0.35	3.53	2.0	23
CL-06	LPM-03	0.35	0.68	0.9	33
CL-07	LPM-05	0.84	0.63	2.6	23
CL-08	LPM-05	0.84	0.63	2.6	23
CL-09	LPM-05	0.84	0.68	2.7	36
CL-10	LPM-03	0.36	0.67	0.7	24

The column tests were operated in closed cycle with activated carbon to extract precious metal from solution. Average column irrigation rates ranged from 10 to 19 l/h/m². The columns were terminated after leach cycles varying between 41 and 68 days.

Calcium oxide was blended into the samples prior to loading the columns at dosages varying between 4 and 6 kg/t. Pregnant leach solution pH values ranged between 10 and 12 though excursions below pH 10 and above pH 12 did occur with resultant lime additions to the recirculating leach solution. Initial loaded column heights varied between 1.3 and 5.5 meters. Sodium cyanide concentration in the feed solution varied between 50 and 300 ppm.

Table 13.3 Column Leach Test Parameters					
Test No	Feed, P₈₀, mm	Initial Height, m	Average Flow, l/h/m²	Feed NaCN, ppm	Initial Bulk Density, t/m³
CL-01	18	2.3	19	100	1.6
CL-02	18	2.0	19	200	1.5
CL-03	18	2.3	18	300	1.5
CL-04	9	2.3	18	100	1.6
CL-05	9	2.3	19	200	1.7
CL-06	9	2.3	18	300	1.5
CL-07	21	5.2	13	100	1.3
CL-08	21	5.5	13	50	1.3
CL-09	21	4.7	13	150	1.2
CL-10	9	2.3	18	50	1.6

The leached residues were assayed for gold and silver and extractions were determined on calculated head assays. Cyanide consumptions were based on titration values. Calcium oxide consumptions are assumed to be based on pH levels as no titration data were presented.

A summary of the metallurgical recoveries achieved, quantity of leach solution applied, leach time and reagent consumption is presented in Table 13.4. This data forms the basis of calculation of leach curves for the samples.

Table 13.4								
Column Leach Test Results								
Test No	Calc. Head Assay, g/t		Leach Cycle,		Extraction, %		Consumption, kg/t	
	Au	Ag	days	kl_{PLS}/t	Au	Ag	NaCN	CaO
CL-01	0.98	2.4	41	5.4	93	5	0.15	5.2
CL-02	0.96	2.0	41	6.1	94	9	0.25	6.1
CL-03	0.92	1.9	41	5.5	94	7	0.33	5.6
CL-04	0.67	2.7	40	5.2	93	11	0.08	4.8
CL-05	3.25		68	8.3	89	8	0.25	4.3
CL-06	0.83	0.6	40	4.6	88	19	0.22	4.3
CL-07	0.84		52	2.4	94	4	0.06	4.3
CL-08	0.81	3.4	52	2.2	93	3	0.04	4.3
CL-09	0.84		44	2.5	92	2	0.18	4.3
CL-10	0.78		40	5.1	85	29	0.09	4.8

Extraction from the columns was compared versus time. The data represents each column leach curve from the actual data recorded by Minera Cardel.

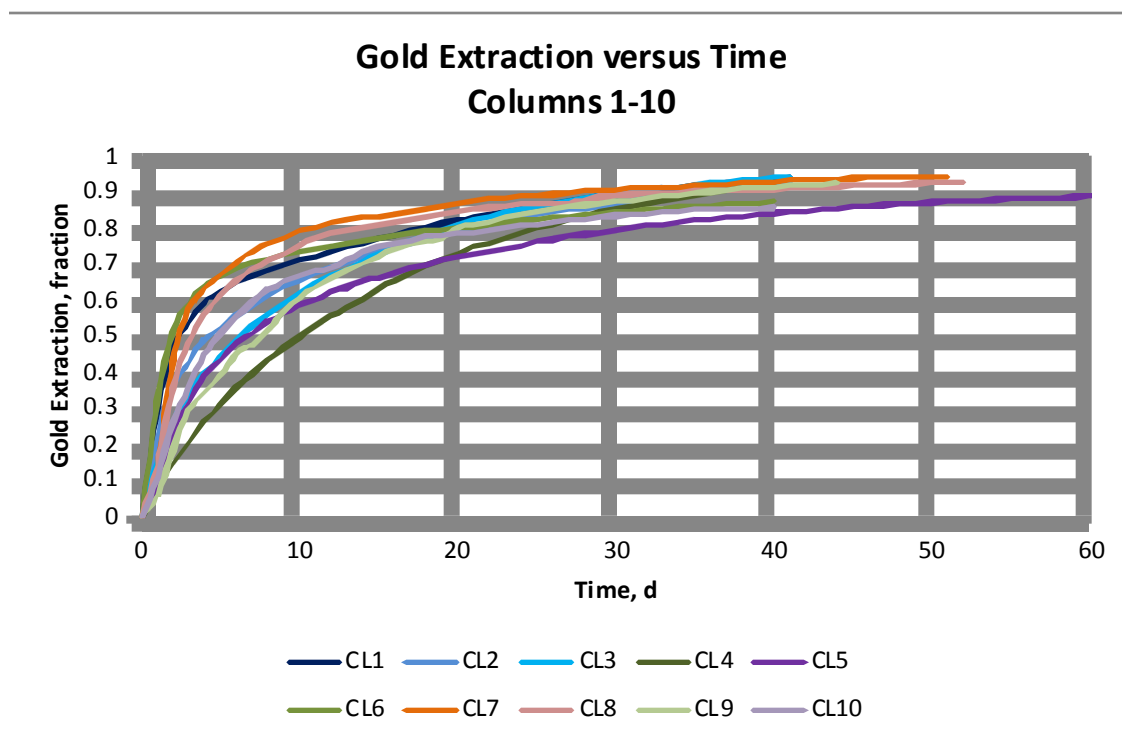


Figure 13.1 - Column Test Gold Extraction versus Time

To interpret this data, a calculated leach curve was constructed by “normalizing” each column data set vs. its solution application rate. Normalizing the data makes each column test comparable for solution application rates at any given time. Results are expressed in mathematical form as a curve. This curve, called a “Leach Extraction Curve”, conforms to the equation:

$$\text{Extraction} = A1 * 1-(1-R1)^t + A2 * 1-(1-R2)^t$$

The “A” values are the weight fractions of the material that reacts at rate “R” at a cumulative solution application of “t” in kl/tonne of material. Once the A and R values for each column are known, it is possible to average the data to produce an equation that normalizes the ten column tests, assuming that the ten columns equally represent the resource.

To use the Extraction curve for predicting heap leach performance, design parameters are selected. These parameters are the basis for calculating the cumulative solution application rate “t”.

Table 13.5 Column 1-10 Reaction Equation Parameters	
A1	0.395
R1	0.968
A2	0.557
R2	0.432

Table 13.6 Operating Parameters	
Lift Height	6 m
Bulk Density	1.45 t/m ³ , dry
Solution Application Rate	12 l/h/m ²
Daily Solution/Solids Ratio	0.033 kl/t/d
Crushing	20,000 tpd
Leach Cycle	60 days
Area under leach	138,000 m ²
Solution flow	1,655 m ³ /h
Solution applied/cycle	2,383,000 m ³ /cycle
Total Tons under leach	1,200,000 Tons/cell
Cumulative Solution to Solids Ratio	2.0 kl/ton Solids

Typical heap leach solution applications are expressed in liters/hour/square meter of area under leach for a given cell. A cell size is based on the height of the lift, the material bulk density, and the tonnage placed each day. The solution application rate is converted to kl/t by calculating the number of tons under leach in each cell and the total solution applied each day. The total amount of solution seen by the material over the specified leach cycle is shown as the "Solution to Solids" ratio.

The daily solution to solids ratio is summed over the leach cycle to arrive at the cumulative solution to solids ratio shown in Table 13.6.

The leach reaction curve is calculated from the original column data and reflects the solution application rate, tonnage, and leach cycle. A lab-to-field scale-up factor of minus 10 percent is applied. This factor is an estimate that takes into account stacking methods, internal heap leach conditions such as channeling and migration of fines, and operational conditions not reflective in laboratory data. The modified leach curve is shown in Figure 13.2.

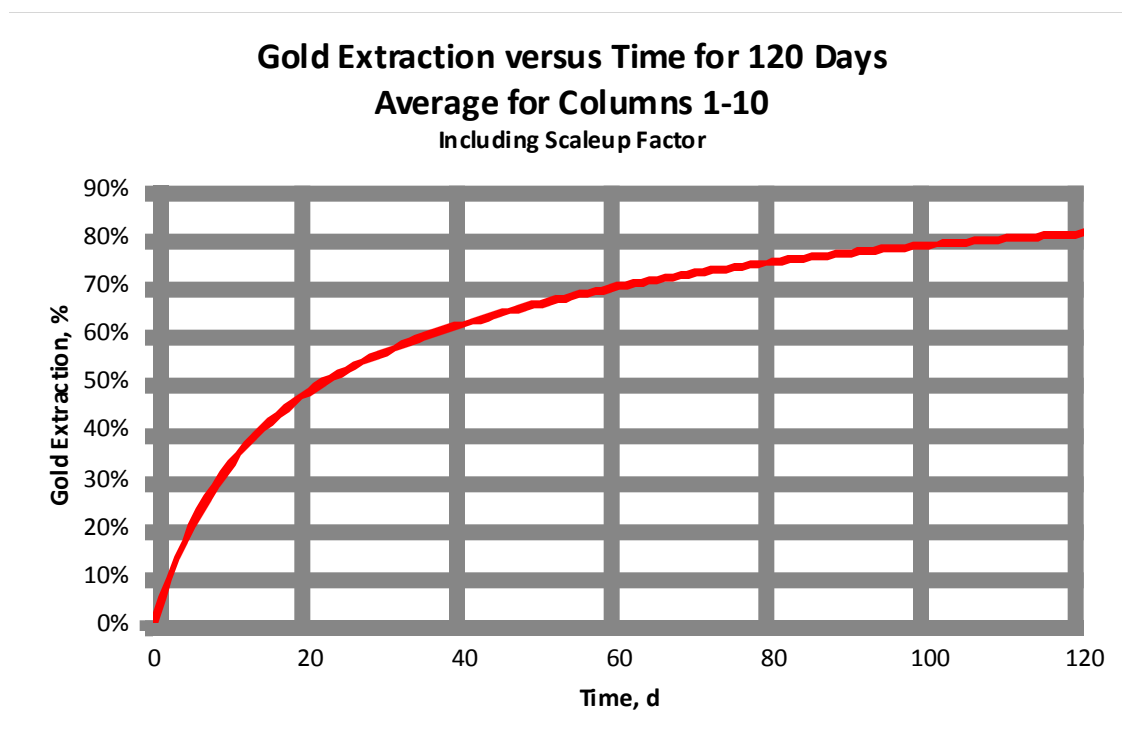


Figure 13.2 - Modified Leach Curve

The calculated extraction from each cell under leach, assuming the sample used accurately reflects the resource, is 81 percent.

13.3 Crush Size

Crush size interpretation used two column tests (CL-36, CL-37) conducted by Goldgroup. These tests appeared to be conducted on similar materials and had sufficient differences between particle sizes to be used for this interpretation. Extraction was estimated by using solution to solids ratios to normalize the column data.

To estimate extraction differences, the particle size P_{80} is plotted against gold extraction results from two test columns. Extraction from each column is scaled by 10 percent, as discussed previously, and plotted against particle size. A simple trend line is used to produce the equation shown on Figure 13.3. This equation is the basis for estimating the leach extraction from different crush size P_{80} 's produced by different crushing circuits. Calculated extractions for each crusher circuit configuration are shown in Table 13.7.

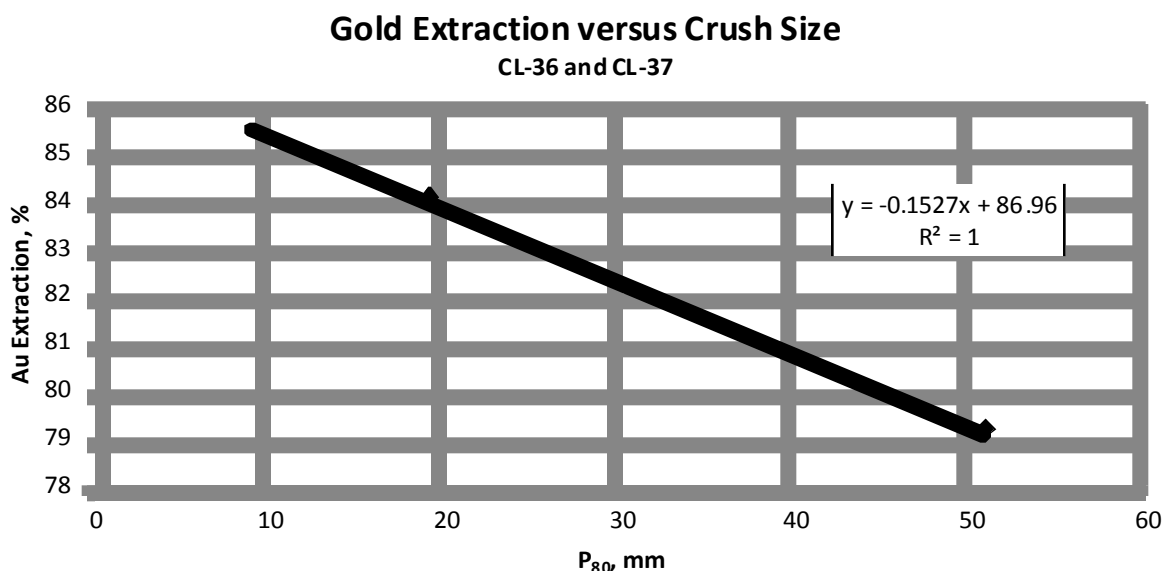


Figure 13.3 - Gold Extraction versus Crush Size

Table 13.7 Column Test Crush Size Correlation					
Test/Condition	Solution/Solids kl/t	Au Test Extraction %	Feed, P80, mm	Au Extraction, % Scale-up = 0.9	Calculated Au Extraction %
CL-36	1.2	93.4	19.1	84.1	
CL-37	1.3	88.0	50.8	79.2	
Secondary Open			38.0		81.2
Tertiary Open			18.0		84.2
Tertiary Closed			9.5		85.5

Column testwork performed does not appear to have specifically address particle size vs. extraction because of the variations in test parameters, including column height, solution to ore ratio, and cyanide concentration. Additional testwork is recommended.

A Bruno© crusher simulation was performed to determine the size and type of primary crushing unit and secondary units. Feed to the crushing simulation used ROM distributions provided by Minera Cardel which were also generated from a simulation program run by OVIDEO Explosives. The blasting simulation assumed 3.5 meter hole spacing, a 3 meter burden and 0.64 kilogram of explosive charge for each cubic meter of material. Actual ROM particle size data were not available. No other physical data was provided.

In the opinion of the responsible QP the data provided by Minera Cardel should be corroborated during the next phase of study by further metallurgical testing designed to confirm extraction results, reagent consumptions, optimum particle size, and leach time, on composite samples representative of the mineral resource. Variations in the extraction from particle size, as indicated by bottle-roll testwork, should be investigated in detail. Additional testing to provide physical data relevant to crusher selection, crushing performance, and crusher wear computations, should also be performed. A list of metallurgical testwork recommended is provided in Section 26.

14.0 MINERAL RESOURCE ESTIMATES

At the request of Goldgroup Mining a resource estimate for the La Paila zone was completed on the Caballo Blanco property in Mexico by Giroux Consultants Ltd. This follows up an initial estimate completed by Cuttle and Giroux, March, 2010. The update is based on an additional 112 drill holes completed since the last estimate with an effective date for this update of 17 January 2012.

G.H. Giroux is the qualified person responsible for the resource estimate. Mr. Giroux is a qualified person by virtue of education, experience and membership in a professional association. He is independent of both the issuer and the vendor applying all of the tests in Section 1.5 of National Instrument 43-101. Mr. Giroux visited the Caballo Blanco property on 7 to 9 November 2011.

The authors are not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing or political factors that could materially affect this mineral resource estimate.

14.1 Data Analysis

Although collars and surveys were supplied for 152 drill holes, assays were available only up to hole 11CBN-178, then 11CBN-182 and 11CBN-184. As of the effective date for this update of 16 January 2011, 145 drill holes had 13,527 assays for gold and silver. A combined 36,691 m was assayed as of the effective date for this update. See Appendix 10 for listing of drill holes used in the resource estimate.

Two hundred and fifteen gold assays reported as -1.0 were set to 0.001 g/t gold and 215 silver assays reported as -1.0 were set to 0.1 g/t silver. Two gaps in the assay record were found and values of 0.001 g/t gold and 0.1 g/t silver were inserted.

Project geologist, Omar Felix Saavedra, has created a three dimensional solid model based on the mineralized silica breccia as identified in drill logging. La Paila is considered a high sulphidation epithermal system with fine gold hosted within a massive silica breccia alteration of an andesitic host. The solid is shown below.

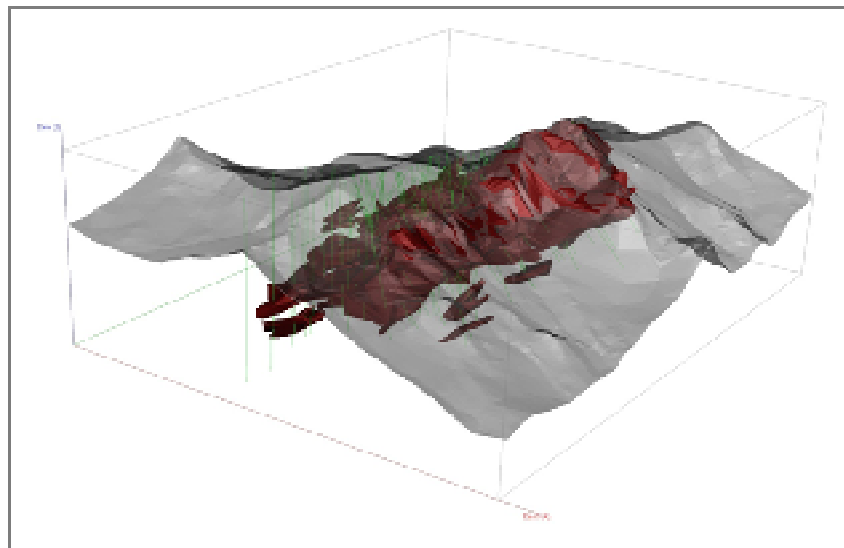


**Figure 14.1 - Gold Extraction versus Crush Size
(Giroux, 2012)**

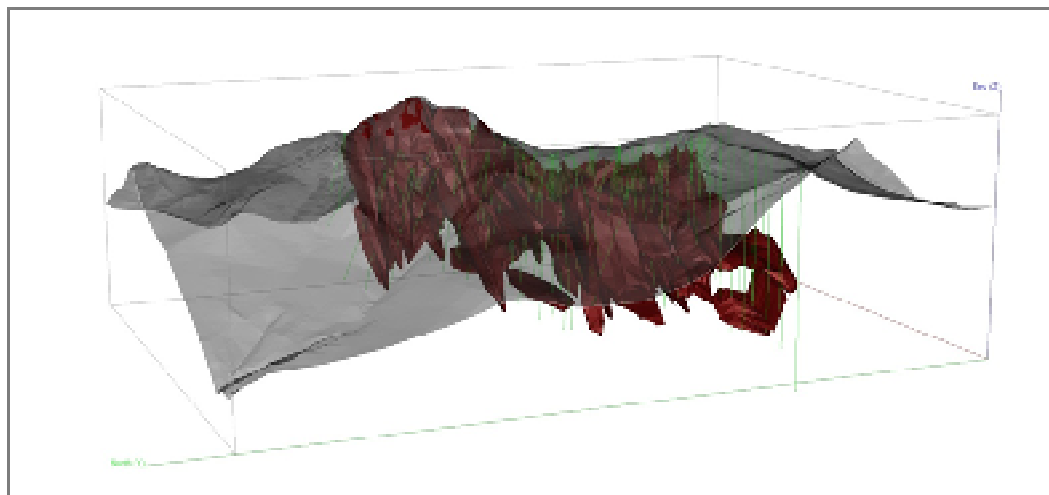


**Figure 14.2 - Isometric View Looking East Showing the Mineralized Solid, Drill Traces
And Surface Topography at La Paila
(Giroux, 2012)**

Drill hole assays were back tagged if inside or outside this solid. The statistics for gold and silver inside and outside the mineralized solid are tabulated below.

Table 14.1				
Assay statistics for Au and Ag inside and outside Mineralized Solid - La Paila				
	Inside Mineralized Solid		Outside Mineralized Solid	
	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)
Number of Assays	5,097	5,097	8,430	8,430
Mean Value	0.596	2.67	0.056	1.03
Standard Deviation	0.705	18.69	0.090	18.26
Minimum Value	0.001	0.05	0.001	0.05
Maximum Value	11.10	1106.0	3.22	1085.0
Coefficient of Variation	1.18	7.00	1.62	17.75

The grade distributions for gold and silver were examined both inside and outside the mineralized solid. Lognormal cumulative frequency plots were used to evaluate the distribution of metals. In each case for each variable multiple overlapping lognormal populations were found. The populations are summarized below.

Table 14.2			
Summary of Gold Populations Present in Mineralized Solid			
Population	Mean Au (g/t)	Percentage of Total Data	Number of Assays
1	6.98	0.31 %	16
2	2.78	2.20 %	112
3	0.44	83.84 %	4,264
4	0.27	7.73 %	393
5	0.07	4.18 %	213
6	0.009	1.75 %	89

Population 1 representing 0.31 percent of the total data had a mean of 6.98 g/t gold and represents erratic outliers. These samples are widely distributed through the deposit and should be capped. An effective cap would be two standard deviations above the mean of population 2. Using a cap of 6.0 g/t gold a total of 10 gold assays were capped. A similar procedure was used to assess silver in the mineralized solid and both gold and silver in waste. The cap levels are summarized below.

Table 14.3			
Cap levels for Gold and Silver - La Paila			
Zone	Variable	Cap Level	Number Capped
Mineralized Solid	Au	6.0 g/t	10
	Ag	70.0 g/t	7
Waste	Au	0.26 g/t	173
	Ag	20.0 g/t	20

The results from capping are shown in Table 14.4. Mean values are slightly lower but so are standard deviations and coefficients of variation which make the results more suitable, for resource estimation.

Table 14.4 Assay Statistics for Capped Gold & Silver Inside and Outside Mineralized Solid - La Paila				
	Inside Mineralized Solid		Outside Mineralized Solid	
	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)
Number of Assays	5,097	5,097	8,430	8,430
Mean Value	0.594	2.28	0.052	0.66
Standard Deviation	0.684	4.21	0.060	1.66
Minimum Value	0.001	0.05	0.001	0.05
Maximum Value	6.00	70.00	0.26	20.00
Coefficient of Variation	1.15	1.85	1.15	2.53

14.2 Composites

Uniform down hole composites, 5 meters in length, were produced for La Paila that honored the mineralized solid. Small intervals near the solid boundary were combined with adjoining samples if less than 2.5 meters in length. Those greater than or equal to 2.5 meters were left alone. As a result the composite produced were of uniform support 5 ± 2.5 meters. The data outside the breccia solid were also composited in a similar manner. The statistics for 5 meter composites are tabulated below.

Table 14.5 Statistics for Gold & Silver - 5 meter Composites				
	Inside Mineralized Solid		Outside Mineralized Solid	
	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)
Number of Assays	2,009	2,009	3,529	3,529
Mean Value	0.588	2.25	0.033	0.47
Standard Deviation	0.596	3.35	0.050	1.24
Minimum Value	0.001	0.05	0.001	0.05
Maximum Value	5.47	53.97	0.589	19.43
Coefficient of Variation	1.01	1.49	1.49	2.65

14.3 Variography

Pairwise relative semivariograms were produced for gold and silver from composites within the mineralized solid. The four principal horizontal directions were modeled first: azimuth 90° , 0° , 45° and 135° . The directions with the longest continuity (range) were at 0° and 45° so azimuths between 0° and 45° were modeled. The direction of longest continuity in both gold and silver was found to be along azimuth 05° . The vertical plane perpendicular to azimuth 05° was then examined and the longest range for gold and silver was found along azimuth 95° dip -78° . In all cases nested spherical models were fit to the data. The nugget to sill ratio was 30 percent for gold and 31 percent for silver showing reasonable sampling variability.

Next the composites outside the mineralized solid were modeled and for both gold and silver isotropic nested structures were indicated.

The semivariogram parameters are summarized below with the semivariograms attached as Appendix 10.

Table 14.6							
Summary of Semivariograms for Gold & Silver							
Zone	Variable	Az / Dip	C₀	C₁	C₂	Short Range (m)	Long Range (m)
Mineralized Solid	Au	05° / 0°	0.15	0.25	0.10	25	110
		275° / -12°	0.15	0.25	0.10	10	20
		095° / -78°	0.15	0.25	0.10	36	250
	Ag	05° / 0°	0.20	0.22	0.22	26	160
		275° / -12°	0.20	0.22	0.22	30	40
		095° / -78°	0.20	0.22	0.22	40	140
Waste	Au	Omni Directional	0.12	0.40	0.28	46	100
	Ag	Omni Directional	0.08	0.24	0.14	40	100

14.4 Bulk Density

A total of 267 specific gravity measurements were made on drill core using the wt. in water/wt. in air method (see Appendix III for listing of data). Samples were taken from holes 08CBN003 to 09CBN041 and from a variety of mineralized and waste lithologies. The results can be sorted by rock type into mineralized units and waste. Samples, from within the mineralized solid, numbered 148 with a minimum of 1.73, maximum of 2.73 and an average specific gravity of 2.39. A total of 119 samples from outside the mineralized solid had a minimum of 1.61, a maximum of 3.13 and an average of 2.38.

The specific gravity measurements were compared to gold grades to see if a relationship between grade and density existed. A scatter plot between gold and specific gravity (SG) is shown below and it is clear there is no relationship between grades and density with a correlation coefficient of 0.0109.

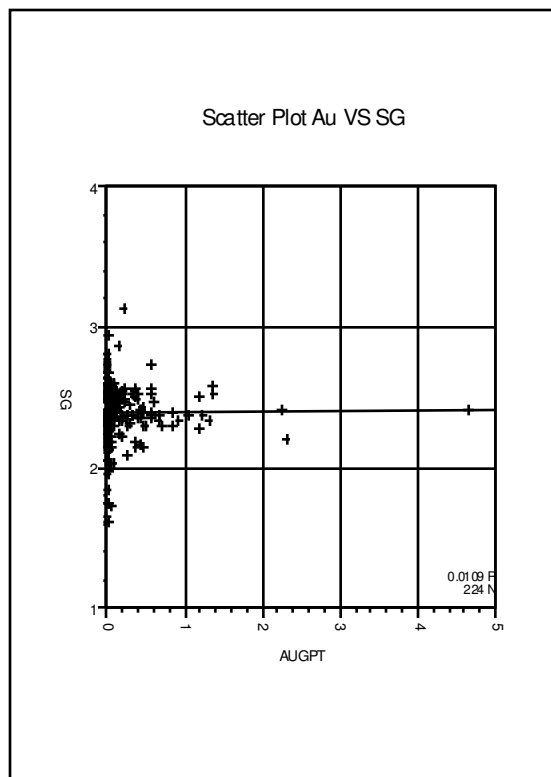


Figure 14.3 - Scatter Plot Showing Gold versus Specific Gravity

As a result the average specific gravity of 2.39 was applied to material within the mineralized solid and 2.38 to material outside the solid. Blocks straddling the contact were given a weighted average.

14.5 Block Model

A block model consisting of blocks 20 x 20 x 5 meters in dimension was superimposed over the drill hole data and 3D solids. Within each block the percentage of material below surface topography and within the breccia solid was recorded. The block model origin was as follows:

Lower Left Corner

767980 E
2183940 N

Column size = 20 m
Row size = 20 m

36 columns
44 rows

Top of Model

605 Elevation

Level size = 5 m

94 levels

No Rotation

14.6 Grade Interpolation

Grades for Au and Ag were interpolated into all blocks with some percentage within the mineralized solid by ordinary kriging. Kriging within the mineralized solid was completed in 4 passes with the search ellipse for each pass oriented in the principal directions of continuity as defined by the semivariograms and the ellipse dimensions a function of the semivariogram range. For the first pass a minimum of 4 composites were required from within a search ellipse with dimensions equal to 1/4 of the semivariogram range. For blocks not estimated in Pass 1, a second pass with the search ellipse expanded to 1/2 the semivariogram range was completed. A third pass using the full range and a fourth pass using twice the range completed the kriging exercise. Only composite within the mineralized zone were used for this estimate. In all passes a maximum of 12 composites were allowed and if more than 12 were found the closest 12 were used. In all passes a maximum of 3 composites from any one hole were allowed thereby assuring that a minimum of 2 drill holes were always used.

For blocks estimated within the mineralized zone but containing some percentage of waste a second kriging run was made using only composites outside the mineralized solid. These blocks were estimated in a similar manner using the semivariograms for gold and silver in waste. Blocks containing both a mineralized grade and waste grade were given the weighted average.

The kriging parameters are summarized below, with the search direction and distances as well as the number of blocks estimated, given for each pass.

Table 14.7
Summary of Kriging Parameters

Zone	Variable	Pass	Number Estimated	Az/Dip	Dist. (m)	Az/Dip	Dist. (m)	Az/Dip	Dist. (m)
Mineralized Solid	Au	1	1,182	05 / 0	27.5	275/ -12	5.0	95/-78	62.5
		2	8,414	05 / 0	55.0	275/ -12	10.0	95/-78	125.0
		3	8,143	05 / 0	110.0	275/ -12	20.0	95/-78	250.0
		4	2,529	05 / 0	220.0	275/ -12	40.0	95/-78	500.0
	Ag	1	2,066	05 / 0	40.0	275/ -12	10.0	95/-78	35.0
		2	10,712	05 / 0	80.0	275/ -12	20.0	95/-78	70.0
		3	6,109	05 / 0	160.0	275/ -12	40.0	95/-78	140.0
		4	1,381	05 / 0	320.0	275/ -12	80.0	95/-78	280.0
Waste	Au	1	1,551	Omni Directional			25.0		
		2	7,763	Omni Directional			50.0		
		3	4,784	Omni Directional			100.0		
		4	1,127	Omni Directional			200.0		
	Ag	1	1,551	Omni Directional			25.0		
		2	7,763	Omni Directional			50.0		
		3	4,784	Omni Directional			100.0		
		4	1,127	Omni Directional			200.0		

14.7 **Classification**

Based on the study herein reported, delineated mineralization at La Paila Deposit is classified as a resource according to the following definitions from National Instrument 43-101 and from CIM (2005):

"In this Instrument, the terms "mineral resource", "inferred mineral resource", "indicated mineral resource" and "measured mineral resource" have the meanings ascribed to those terms by the Canadian Institute of Mining, Metallurgy and Petroleum, as the CIM Definition Standards on Mineral Resources and Mineral Reserves adopted by CIM Council, as those definitions may be amended."

The terms Measured, Indicated and Inferred are defined by CIM (2005) as follows

"A Mineral Resource is a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge."

"The term Mineral Resource covers mineralization and natural material of intrinsic economic interest which has been identified and estimated through exploration and sampling and within which Mineral Reserves may subsequently be defined by the consideration and application of technical, economic, legal, environmental, socio-economic and governmental factors. The phrase 'reasonable prospects for economic extraction' implies a judgement by the Qualified Person in respect of the technical and economic factors likely to influence the prospect of economic extraction. A Mineral Resource is an inventory of mineralization that under realistically assumed and justifiable technical and economic conditions might become economically extractable. These assumptions must be presented explicitly in both public and technical reports."

Indicated Mineral Resource

"An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed."

“Mineralization may be classified as an Indicated Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such as to allow confident interpretation of the geological framework and to reasonably assume the continuity of mineralization. The Qualified Person must recognize the importance of the Indicated Mineral Resource category to the advancement of the feasibility of the project. An Indicated Mineral Resource estimate is of sufficient quality to support a Preliminary Feasibility Study which can serve as the basis for major development decisions.”

Inferred Mineral Resource

“An ‘Inferred Mineral Resource’ is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, workings and drill holes.”

“Due to the uncertainty that may be attached to Inferred Mineral Resources, it cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration. Confidence in the estimate is insufficient to allow the meaningful application of technical and economic parameters or to enable an evaluation of economic viability worthy of public disclosure. Inferred Mineral Resources must be excluded from estimates forming the basis of feasibility or other economic studies.”

Geologic continuity has been established through drill core logging and geologic mapping both on surface and underground. The geologic solid is used to constrain the resource estimate. Grade continuity can be quantified by the semivariogram for each variable. By tying the search ellipse to the semivariogram range, the blocks estimated during pass 1 and pass 2 with up to 1/2 the semivariogram range used are considered Indicated. The drill hole density is not sufficient to establish any blocks at measured at this time. All other blocks were considered Inferred. The resource is tabulated below at a range of gold cut-offs. No economic studies have been completed at this time so a true economic cut-off is unknown. A cut-off of 0.2 g/t gold has been highlighted as a possible open pit cut-off. The resource is presented in two sets of tables. The first Tables 14.8 and 14.9 show the resource for the portion of blocks within the mineralized solid. This is the resource available if one could mine to the limits of the mineralized solid and includes no edge dilution. The second set of tables (Tables 14.10 and 14.11) show the resource if one mined the entire 20 x 20 x 5 meter blocks. This includes the edge dilution around the extremities of the solid. The achievable resource is somewhere between these two extremes as one could never mine to the limits of the mineralized solids and with decent grade control one wouldn't take all the dilution built in to the Total Block estimate.

Table 14.8					
Indicated Resource within the Mineralized Solid - La Paila					
Au Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade> Cut-off		Contained Metal	
		Au (g/t)	Ag (g/t)	Au (ozs)	Ag (ozs)
0.10	29,510,000	0.61	2.30	579,000	2,180,000
0.15	29,350,000	0.61	2.31	578,000	2,180,000
0.20	28,890,000	0.62	2.32	575,000	2,150,000
0.25	27,700,000	0.64	2.33	566,000	2,080,000
0.30	25,670,000	0.67	2.33	549,000	1,920,000
0.40	20,800,000	0.74	2.32	494,000	1,550,000
0.50	15,860,000	0.83	2.38	422,000	1,210,000
0.60	11,710,000	0.93	2.48	349,000	930,000
0.70	8,210,000	1.05	2.65	276,000	700,000
0.80	5,900,000	1.16	2.87	221,000	540,000
0.90	4,290,000	1.28	3.11	177,000	430,000
1.00	3,110,000	1.41	3.24	141,000	320,000
1.10	2,170,000	1.57	3.41	109,000	238,000
1.20	1,710,000	1.68	3.47	92,000	191,000
1.30	1,390,000	1.78	3.54	80,000	158,000

Table 14.9					
Inferred Resource within the Mineralized Solid - La Paila					
Au Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade> Cut-off		Contained Metal	
		Au (g/t)	Ag (g/t)	Au (ozs)	Ag (ozs)
0.10	24,160,000	0.54	2.49	420,000	1,930,000
0.15	24,090,000	0.54	2.50	420,000	1,940,000
0.20	24,020,000	0.54	2.50	419,000	1,930,000
0.25	23,440,000	0.55	2.53	415,000	1,910,000
0.30	21,900,000	0.57	2.55	401,000	1,800,000
0.40	16,240,000	0.64	2.65	336,000	1,380,000
0.50	10,420,000	0.76	2.88	254,000	960,000
0.60	6,930,000	0.86	2.89	192,000	640,000
0.70	4,670,000	0.97	3.22	145,000	480,000
0.80	3,160,000	1.07	3.26	109,000	330,000
0.90	2,220,000	1.17	3.46	83,000	250,000
1.00	1,490,000	1.27	3.40	61,000	160,000
1.10	1,010,000	1.38	2.65	45,000	90,000
1.20	600,000	1.54	2.27	30,000	40,000
1.30	390,000	1.70	2.31	21,000	30,000

Table 14.10					
Indicated Resource within Total Blocks					
Au Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade> Cut-off		Contained Metal	
		Au (g/t)	Ag (g/t)	Au (ozs)	Ag (ozs)
0.10	40,730,000	0.46	1.90	605,000	2,490,000
0.15	36,010,000	0.51	2.01	586,000	2,330,000
0.20	32,350,000	0.54	2.08	566,000	2,160,000
0.25	28,920,000	0.58	2.14	541,000	1,990,000
0.30	25,440,000	0.62	2.19	510,000	1,790,000
0.40	19,340,000	0.71	2.26	442,000	1,410,000
0.50	14,100,000	0.81	2.37	366,000	1,070,000
0.60	9,940,000	0.92	2.51	293,000	800,000
0.70	6,900,000	1.04	2.68	230,000	590,000
0.80	4,960,000	1.15	2.89	184,000	460,000
0.90	3,580,000	1.27	3.13	146,000	360,000
1.00	2,510,000	1.40	3.23	113,000	260,000
1.10	1,750,000	1.56	3.34	87,000	188,000
1.20	1,340,000	1.68	3.33	73,000	143,000
1.30	1,080,000	1.79	3.51	62,000	122,000

Table 14.11					
Inferred Resource within Total Blocks					
Au Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade> Cut-off		Contained Metal	
		Au (g/t)	Ag (g/t)	Au (ozs)	Ag (ozs)
0.10	40,930,000	0.35	1.78	461,000	2,340,000
0.15	33,770,000	0.40	1.96	432,000	2,130,000
0.20	28,410,000	0.44	2.12	402,000	1,940,000
0.25	24,350,000	0.48	2.26	373,000	1,770,000
0.30	20,200,000	0.52	2.41	336,000	1,570,000
0.40	12,880,000	0.61	2.70	254,000	1,120,000
0.50	7,790,000	0.73	3.00	182,000	750,000
0.60	4,720,000	0.84	3.15	128,000	480,000
0.70	3,130,000	0.94	3.63	95,000	370,000
0.80	2,080,000	1.04	3.75	70,000	250,000
0.90	1,390,000	1.13	4.19	51,000	190,000
1.00	900,000	1.23	4.03	36,000	120,000
1.10	550,000	1.35	3.11	24,000	50,000
1.20	250,000	1.60	2.53	13,000	20,000
1.30	190,000	1.72	2.41	11,000	10,000

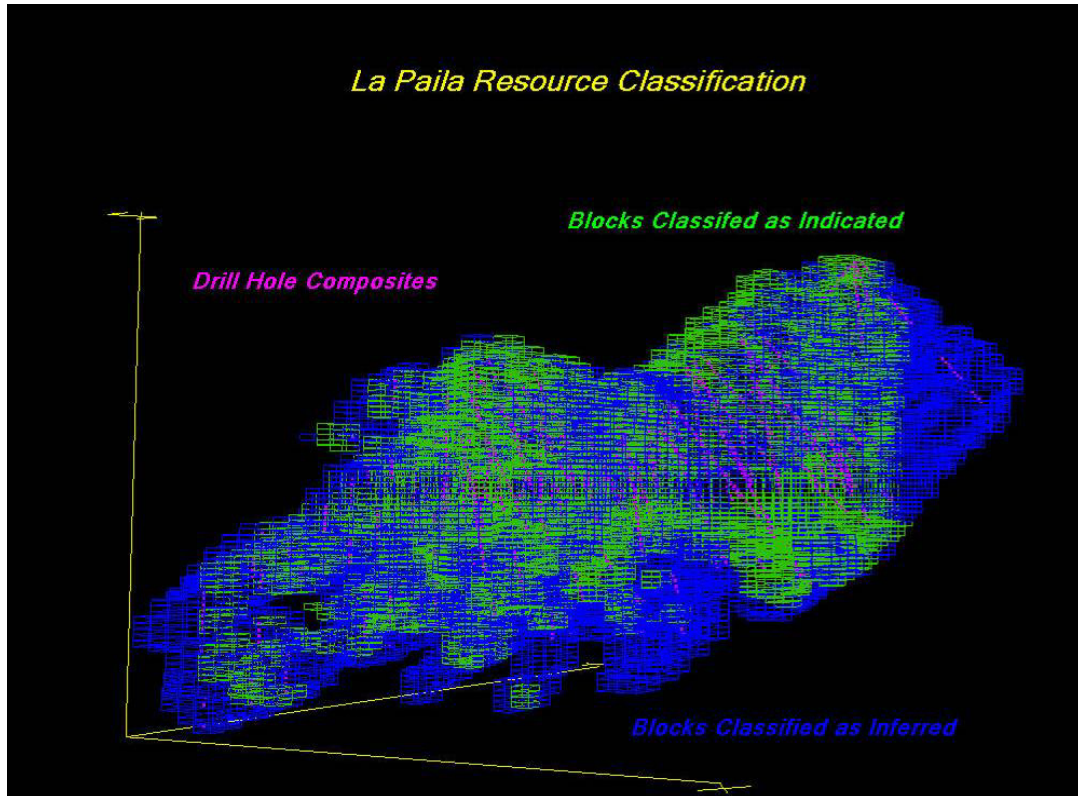


Figure 14.4 - Isometric View Looking NW Showing Classified Blocks
(Giroux, 2012)

14.8 Model Verification

The block model estimation was verified by swath plots. These are slices through the deposit in three directions N-S (40 m slices), E-W (40 m slices) and Vertical (10 m slices) where the average grade from composites is calculated and plotted against the average grade for estimated blocks. The shape of the relative curves should be similar.

In general the agreement is good with composite grades spiking above and below the estimates in some areas with fewer composites. There is no bias indicated and the resource seems reasonable.

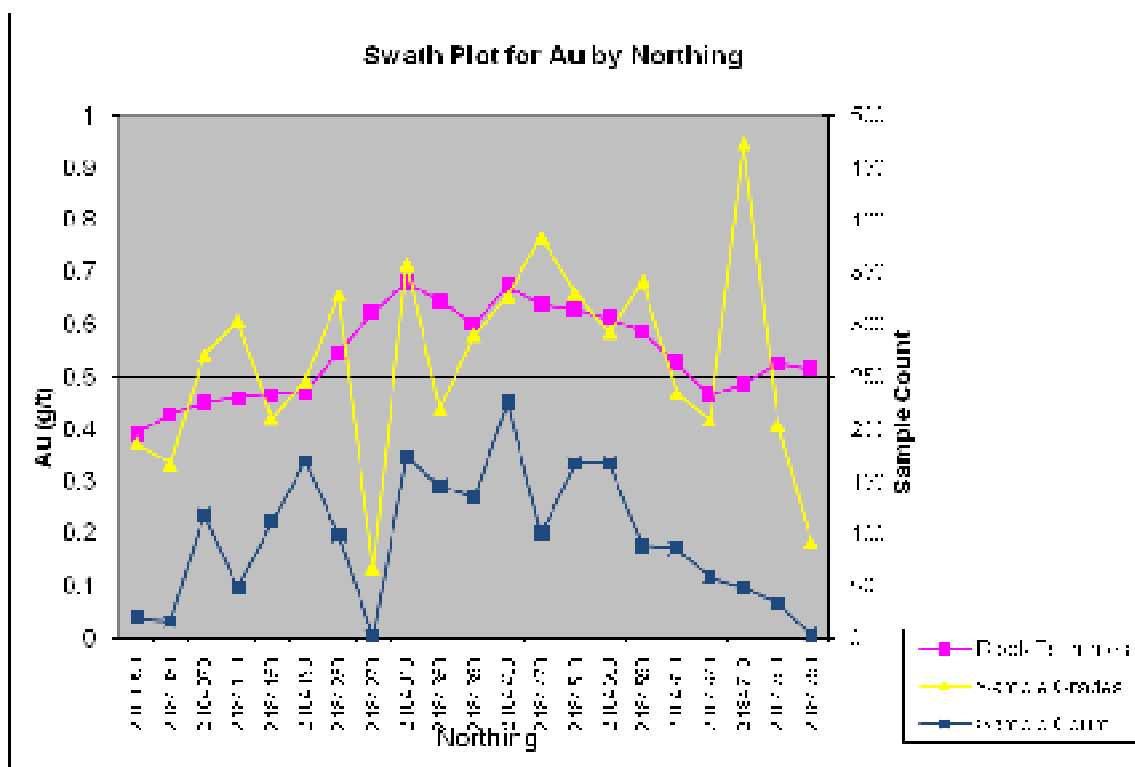


Figure 14.5 - Swath Plot for Gold by Northing, Slices of 40 meters

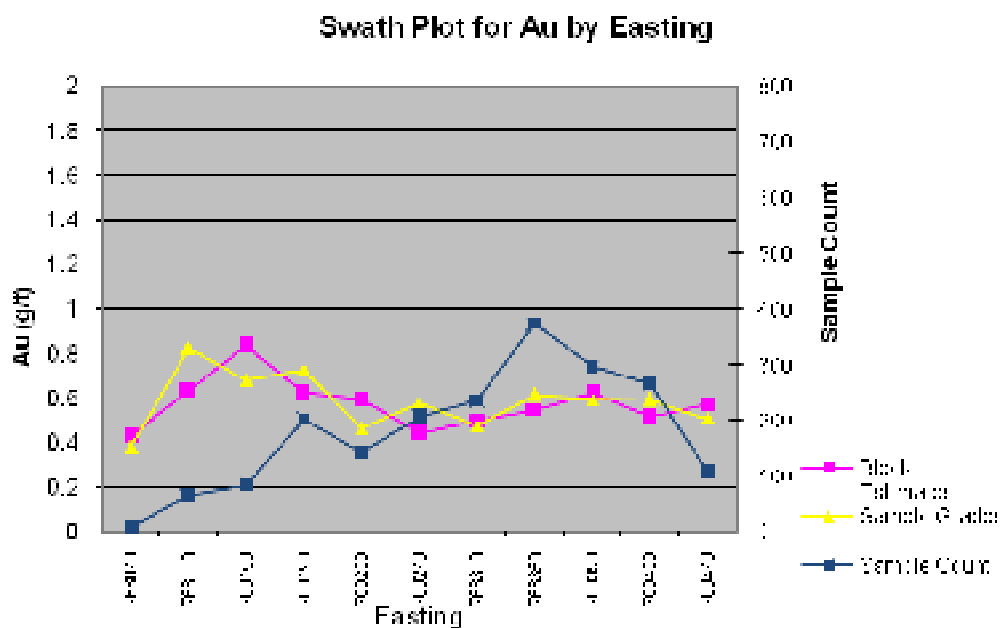


Figure 14.6 - Swath Plot for Gold by Easting Slices of 40 meters

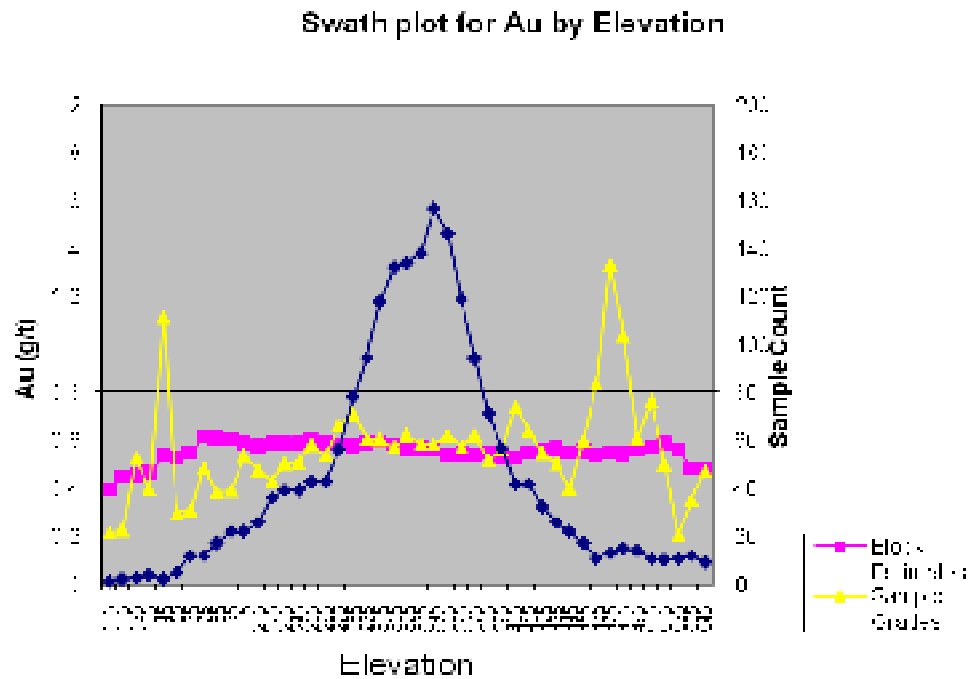




Figure 14.8 - Block Model Comparison, 2009 to 2012
(Cuttle, 2012)

15.0 MINERAL RESERVE ESTIMATES

Mineral resources that are not mineral reserves do not have demonstrated economic viability. There is no certainty that all or any part of the mineral resources will be converted into mineral reserves. Mineral reserves can only be estimated as a result of an economic evaluation as part of a preliminary feasibility study or a feasibility study of a mineral project. Accordingly, at the present level of development there are no mineral reserves at the Caballo Blanco Project

16.0 MINING METHODS

16.1 Mining Operations

Whittle™ Shell Optimization

16.1.1 Net Smelter Return Model

The 3D mineral resource block models as developed by Cuttle and Giroux were used as the basis for deriving the economic shell limits for the La Paila deposit. The block dimensions were 20m x 20m x 5m. A number of calculations were performed on the model in order to determine the net smelter return ("NSR") of each individual block. These parameters are summarized in Table 16.1 and were used to determine the ultimate mining shape.

The NSR calculations considered the following factors:

- Mineralized Zone grades (Au, Ag) thus taking into account the variability in the metal content of the deposit;
- Mineralized percentage within each block;
- Heap leach process recoveries;
- Operating costs;
- Contained metal;
- Deductions and Payable Metal Value;
- Metal prices;
- Freight costs (trucking, rail, shipping, insurance);
- Smelting and refining charges (TC/RC); and
- Royalty charges.

Table 16.1		
NSR Parameters used in the Whittle Optimization Model		
Item	Unit	Assumptions
<i>Metal Prices</i>		
Gold	US\$/oz	1,150
Silver	US\$/oz	21.00
<i>Recovery to Doré</i>		
Silver	%	30%
Gold	%	80%
<i>Smelter Payables</i>		
Gold in doré	%	99.9%
Gold deduction in doré	g/t in conc	0.0%
Silver in doré	%	98.0%
Silver deduction in doré	g/t in conc	0.0%
<i>Off-site costs</i>		
Au refining/transportation charge	US\$/oz pay Au	5.50
Ag refining/transportation charge	US\$/oz pay Ag	-
<i>Other Parameters</i>		
Grade factor	%	90%
Royalties	%	1.90%
<i>Operating Costs</i>		
Waste mining Cost	US\$/waste tonne	\$1.60
Resource material Mining Cost	US\$/tonne	\$2.40
G&A/Sustaining Cost	US\$/milled tonne	\$0.80
Heap Leach Processing Cost	US\$/milled tonne	\$2.24
CostP		\$3.04
Pit Slope Angles w/ ramps	overall °	40
Heap Leach Processing rate	t/day leached	20,000
Heap Leach Processing rate	Mt/y r leached	7.00
Discount Rate	%	8%

16.1.2 Economic Pit Limit

The ultimate economic shell limits for La Paila were based on Whittle™ optimization evaluations of the resources in the NSR model. This evaluation included the aforementioned NSR calculations as well as geotechnical parameters and mining/milling costs. The economic shell limits included indicated and inferred mineral resources. Inferred mineral resources are considered too speculative geologically to have the economic considerations applied to them to be categorized as mineral reserves, and there is no certainty that the inferred resources will be upgraded to a higher resource category.

16.1.3 Cut-off Grade

The economic parameters in Table 16.1 were used to calculate NSR cut-off value for the La Paila deposit and to determine the ultimate mining shape. The incremental cut-off value incorporates all operating costs except mining. This cut-off is applied to material contained within an economic shell where the decision to mine a given block was determined by the Whittle™ optimization.

Table 16.2 below summarizes the cut-off calculation. It should be noted that the gold cut-off grades are for comparative purposes only, as the NSR cut-off was used for Whittle optimization and mineral inventory estimates. The incremental NSR cut-off value of US\$ 4.48 per tonne was applied to all of the mineral inventory estimates that follow for La Paila. This equates to an equivalent incremental gold cut-off grade of approximately 0.11 g/t gold.

Table 16.2 Cut-off Grade			
Item	Unit	Gold Cut-off	
		Res. COG	Incr. COG
Revenue, smelting & refining			
Gold Price (US\$)	US\$/oz	\$ 1,150	\$ 1,150
Payable metal	%Au	99.9%	99.9%
Refining/transport	US\$/oz	\$ 5.50	\$ 5.50
Royalties % of NSR	US\$/oz	\$ 21.72	\$ 21.72
Net gold price	US\$/oz	\$ 1,121.63	\$ 1,121.63
Net gold price	US\$/g	\$ 36.06	\$ 36.06
OPEX estimates			
OP Mining Cost (avg)	US\$/t mined	\$1.90	\$ -
Strip Ratio (estimated)	t:t	1.7	
OP Mining Cost (avg)	US\$/t processed	\$ 5.13	\$ -
Heap Leach Cost	US\$/t processed	\$2.24	\$ 2.24
G&A	US\$/t processed	\$0.80	\$ 0.80
Total Site Cost	US\$/t processed	\$ 8.17	\$ 3.04
Process and Mining Losses			
Process Recovery	%	80%	80%
Dilution	%	10%	10%
O/P Cut-off Grade			
In-situ Cut-off Au grade	g/t Au	0.31	0.12
Silver contribution (est.)	% of Au value	2%	2%
In-situ Cut-off Au grade (equivalent)	g/t Au	0.31	0.11
Geotechnical Parameters			
Slope Angles (Overall)	°	40	40
Heap Leach throughput	tpd	20,000	20,000

16.1.4 Optimization Parameters and Results

The preliminary pit slope parameters as well as mining, heap leach processing and G&A costs are summarized in Table 16.3 for the La Paila deposit. No geotechnical analysis has been conducted to determine the pit slope parameters, as such, a typical overall slope angle has been assumed for this preliminary analysis. The projected topography as of mid-2011 was used as the starting surface for the optimization.

A series of Whittle™ shells were generated based on varying revenue factors. The results were analyzed with shells chosen as the basis for ultimate limits and preliminary phase selection.

Table 16.3		
Operating Costs and Geotechnical Parameters used for Optimization		
Area	Unit	Value
Open Pit Waste Mining	\$/t mined	\$1.60
	\$/t processed	\$4.32
Open Pit Resource Mining	\$/t mined	\$2.40
	\$/t processed	\$6.48
Heap Leach Processing	\$/t processed	\$2.24
General and Administration	\$/t processed	\$0.80
Overall Pit slope angles	degrees	40

The resources within the various pit shells were generated from the following 3D block model items:

- Block centroid coordinates;
- Gold grades;
- Silver Grade;
- Resource category (indicated, inferred);
- Rock code;
- Mineralized percentage;
- Topography percentage; and
- Specific gravity.

The results of the Whittle™ pit optimization evaluation on the La Paila deposit for varying revenue factors values are summarized in Table 16.3, and Figure 16.1 to Figure 16.4, for indicated and inferred resources.

Table 16.4
Whittle Optimization Results - La Paila

Final Pit	Revenue Factor	Mine Life	Total Mineralized Diluted					Waste (Mt)	Strip Ratio	Total (Mt)
			(Mt)	Au (g/t)	Ag (g/t)	Au (koz)	Ag (koz)			
1	0.30	0.2	1.2	0.81	2.64	32	103	0.1	0.08	1.3
2	0.32	0.5	3.3	0.67	2.33	72	250	0.7	0.21	4.0
3	0.34	0.6	4.3	0.65	2.35	90	327	1.0	0.23	5.3
4	0.36	1.4	10.0	0.59	2.69	190	862	3.0	0.30	13.0
5	0.38	1.8	13.3	0.58	2.83	248	1,212	4.8	0.36	18.1
6	0.40	2.0	14.8	0.58	2.88	275	1,371	5.9	0.40	20.7
7	0.42	2.4	17.4	0.57	2.91	318	1,631	7.5	0.43	24.9
8	0.44	3.2	23.1	0.56	2.93	416	2,179	13.1	0.57	36.2
9	0.46	3.3	24.2	0.56	2.90	433	2,252	14.0	0.58	38.2
10	0.48	3.4	25.0	0.56	2.88	447	2,318	14.9	0.60	40.0
11	0.50	4.3	31.3	0.55	2.67	558	2,684	25.3	0.81	56.6
12	0.52	4.4	32.0	0.55	2.66	569	2,732	26.3	0.82	58.3
13	0.54	4.5	33.1	0.55	2.62	589	2,788	28.5	0.86	61.6
14	0.56	4.6	33.8	0.55	2.60	599	2,830	29.3	0.87	63.1
15	0.58	4.7	34.6	0.55	2.59	611	2,883	30.6	0.88	65.2
16	0.60	4.8	35.2	0.55	2.58	622	2,921	32.0	0.91	67.2
17	0.62	4.9	35.6	0.55	2.57	627	2,947	32.5	0.91	68.2
18	0.64	4.9	36.0	0.55	2.57	632	2,967	33.2	0.92	69.2
19	0.66	5.0	36.7	0.54	2.55	642	3,014	34.5	0.94	71.2
20	0.68	5.1	37.0	0.54	2.54	646	3,022	35.0	0.95	71.9
21	0.70	5.6	40.5	0.55	2.46	716	3,208	49.9	1.23	90.4
22	0.72	5.6	41.1	0.55	2.45	729	3,245	52.6	1.28	93.7
23	0.74	5.9	43.2	0.54	2.41	757	3,357	57.3	1.32	100.5
24	0.76	6.0	43.7	0.54	2.41	764	3,385	58.6	1.34	102.3
25	0.78	6.0	43.8	0.54	2.41	766	3,391	59.1	1.35	102.9
26	0.80	6.2	44.9	0.54	2.38	780	3,440	61.7	1.37	106.6
27	0.82	6.3	46.3	0.54	2.36	803	3,510	67.3	1.45	113.6
28	0.84	6.4	46.8	0.54	2.35	813	3,538	69.9	1.49	116.7
29	0.86	6.5	47.1	0.54	2.35	818	3,554	71.1	1.51	118.2
30	0.88	6.5	47.8	0.54	2.33	829	3,586	74.0	1.55	121.8
31	0.90	6.6	48.1	0.54	2.33	834	3,604	75.5	1.57	123.7
32	0.92	6.6	48.3	0.54	2.32	837	3,612	76.4	1.58	124.7
33	0.94	6.6	48.5	0.54	2.32	841	3,623	77.3	1.59	125.9
34	0.96	6.7	48.8	0.54	2.32	844	3,637	78.6	1.61	127.3
35	0.98	6.7	48.9	0.54	2.32	847	3,645	79.3	1.62	128.2
36	1.00	6.8	49.3	0.54	2.31	854	3,667	81.8	1.66	131.1
37	1.02	6.8	49.4	0.54	2.31	855	3,671	82.2	1.67	131.6
38	1.04	6.8	49.4	0.54	2.31	855	3,672	82.3	1.67	131.7
39	1.06	6.8	49.7	0.54	2.31	860	3,687	83.9	1.69	133.6
40	1.08	6.8	49.8	0.54	2.31	861	3,693	84.5	1.70	134.3
41	1.10	6.8	49.8	0.54	2.31	862	3,693	84.7	1.70	134.5
42	1.12	6.8	49.9	0.54	2.30	863	3,695	84.9	1.70	134.8

Table 16.4
Whittle Optimization Results - La Paila

Final Pit	Revenue Factor	Mine Life	Total Mineralized Diluted					Waste (Mt)	Strip Ratio	Total (Mt)
			(Mt)	Au (g/t)	Ag (g/t)	Au (koz)	Ag (koz)			
43	1.14	6.9	50.0	0.54	2.30	865	3,700	86.1	1.72	136.2
44	1.16	6.9	50.2	0.54	2.30	867	3,708	86.9	1.73	137.1
45	1.18	7.0	51.2	0.54	2.29	886	3,762	95.1	1.86	146.3
46	1.20	7.0	51.3	0.54	2.28	888	3,769	95.8	1.87	147.1
47	1.22	7.0	51.4	0.54	2.28	889	3,772	96.3	1.87	147.7
48	1.24	7.1	51.5	0.54	2.28	890	3,775	96.7	1.88	148.2
49	1.26	7.1	51.5	0.54	2.28	891	3,777	97.1	1.88	148.6
50	1.28	7.1	51.7	0.54	2.28	893	3,780	97.9	1.89	149.5
51	1.30	7.1	51.8	0.54	2.27	894	3,785	98.7	1.91	150.4

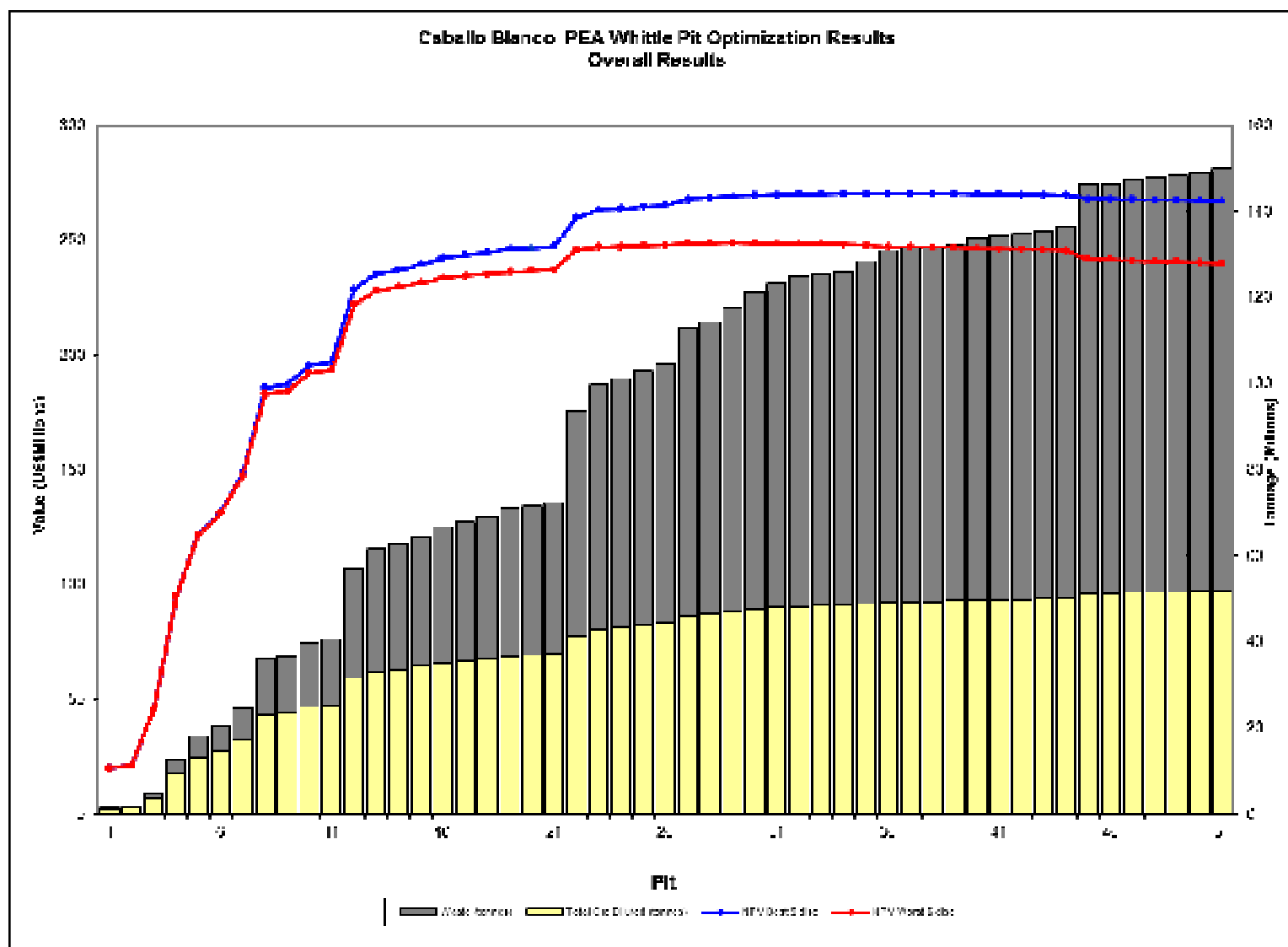


Figure 16.1 - Whittle Optimization Results - La Paila

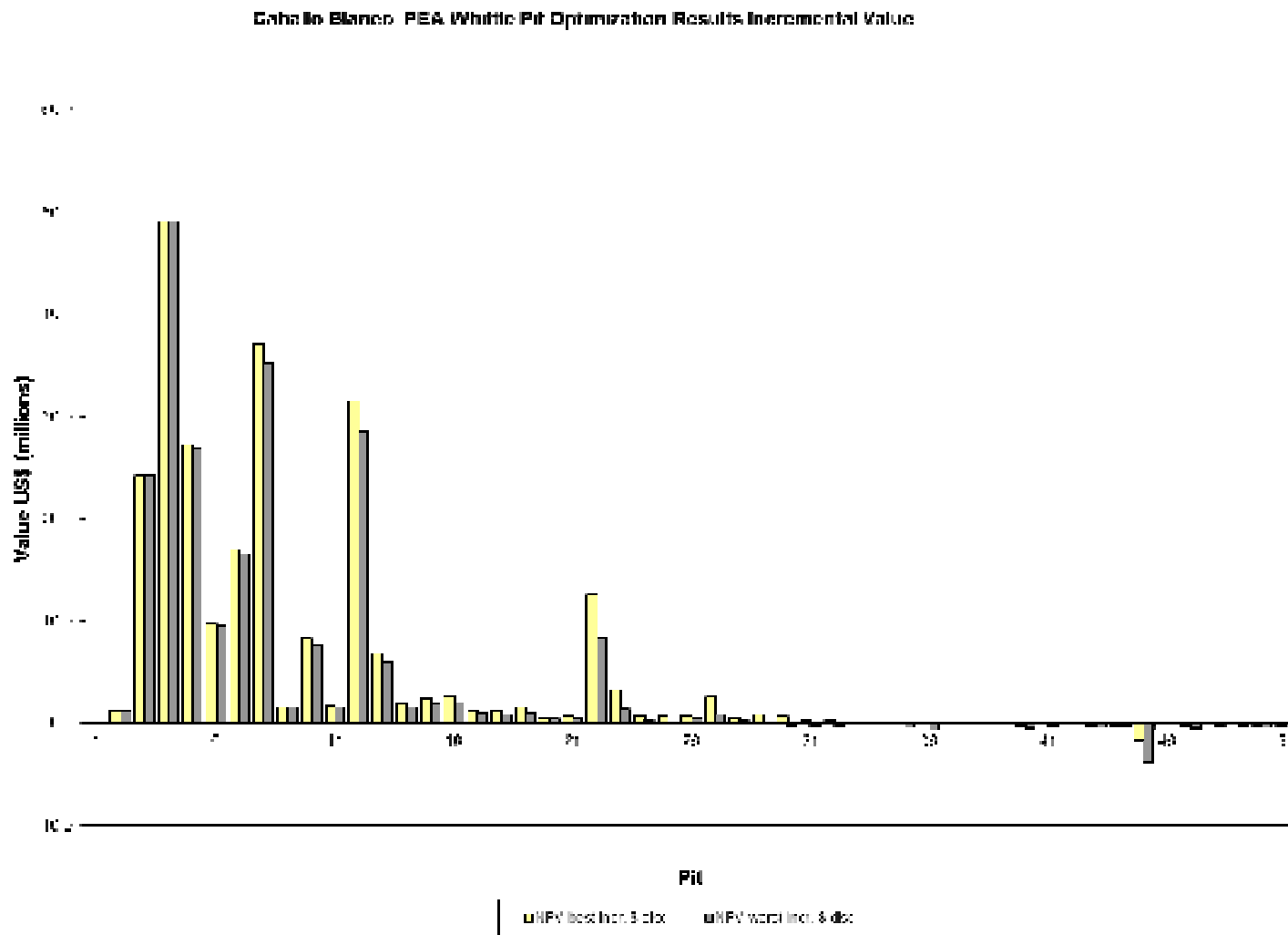


Figure 16.2 - Incremental Whittle Value Results - La Paila

Caballo Blanco PEA Whittle Pit Optimization - Incremental Ore Tonnage and Strip Ratio

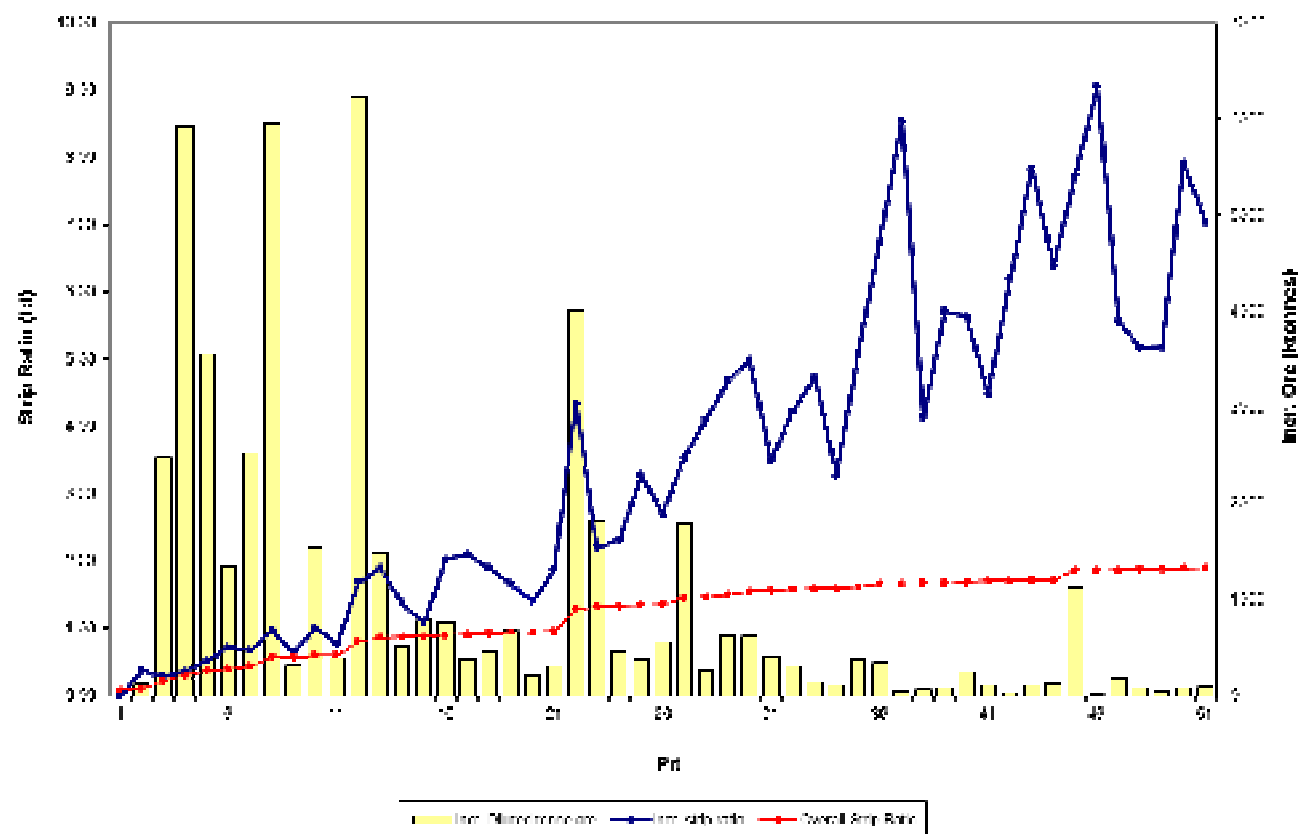


Figure 16.3 - Incremental Whittle Tonnage Results - La Paila

For the La Paila deposit, shells beyond 27 add mineralized rock and waste tonnages to the overall pit but have higher incremental strip ratios with minimal impact on the NPV.

To better determine the optimum Whittle™ shell on which to base the phasing and scheduling, and to gain a better understanding of the deposit, the shells were analyzed in a preliminary schedule. The schedule assumed a maximum heap leach capacity of 7.0 Mt/yr. No stockpiles were used in the analysis and no capital costs were added.

Whittle™ produces both “best case” (i.e. mine out shell 1, the smallest shell, and then mine out each subsequent shell from the top down, before starting the next shell) and “worst case” (mine each bench completely to final limits before starting next bench) scenarios. These two scenarios provide a bracket for the range of possible outcomes. The shells were produced based on varying revenue factors (0.3 through to 1.4 of base case) to produce a series of nested shells with the NPV results shown in Figures 16.1 through Figure 16.3. The NPV values noted here are based on a gold price of US\$ 1,150/oz, do not include capital costs and were used only to determine the mining shapes.

Based on the analysis of the Whittle™ shells and preliminary schedule, Whittle™ shell 36 (or revenue factor 1 shell) was chosen as the base case shell for further phasing and scheduling for the La Paila deposit, as this shell maximises the best case NPV of the deposit. This shell contains 49.3 million tonnes of mineralized material above cut-off with an average gold grade of 0.54 g/t and 854 koz of contained gold, along with 3,667 koz of silver. The total waste tonnage in the shell is 81.8 Mt for a strip ratio of 1.7:1.

Table 16.5 summarizes the tonnages and grades contained within the shell limits (using the incremental cut-off value of \$3.04/t). Table 16.6 further summaries the resources by classification.

Table 16.5 Resources Planned to be Extracted in the LOM Plan		
Description	Unit	Caballo PEA 2012
Diluted Mineralized Tonnage	(Mt)	49.3
Mine Life	(yrs)	7.5
Diluted Grades		
Gold	(g/t)	0.54
Silver	(g/t)	2.31
Contained Metal		
Gold	(koz)	854
Silver	(koz)	3,667
Recovered Metal		
Gold	(koz)	683
Silver	(koz)	1,100
Waste Tonnage	(Mt)	81.8
Total Tonnage	(Mt)	131.1
Total Material Mined (avg.)	(t/day)	45,000
Strip Ratio	(t:t)	1.66

Table 16.6 Resources Planned to be Extracted by Classification							
Category	PEA 2012 - La Paila						
	Mtonnes	Au (g/t)	Ag (g/t)	Contained Au (oz)	Contained Ag (oz)	Recovered Au (oz)	Recovered Ag (oz)
Indicated	30.0	0.56	2.15	544	2,073	435	622
Inferred	19.3	0.50	2.57	310	1,595	248	478

16.2 Mine Design

Mine planning for the La Paila deposit was conducted using a combination of software packages, including Mintec Inc., MineSight™, Gemcom GEMS™, and Whittle™. The base 3D block models, along with subsequent NSR modeling were analyzed using GEMS™. The phase selection and production scheduling was undertaken with the use of MineSight™ and Whittle™ software.

For the La Paila deposit, the ultimate shell limits, along with the associated phasing, were based on the Whittle™ shell analysis described in this report. Preliminary waste dumps were then designed to account for the material produced in each mining phase and shell.

Whittle™ shell 36(revenue factor 1 shell) was chosen as the mining shape limit for the La Paila deposit. Figure 16.4 represents a plan view of the shell for the La Paila Whittle™ shell.

A typical long section (looking North West) of the La Paila deposit is shown in Figure 16.5 with existing topography, selected Whittle™ shell, and NSR value block model outlines shown.

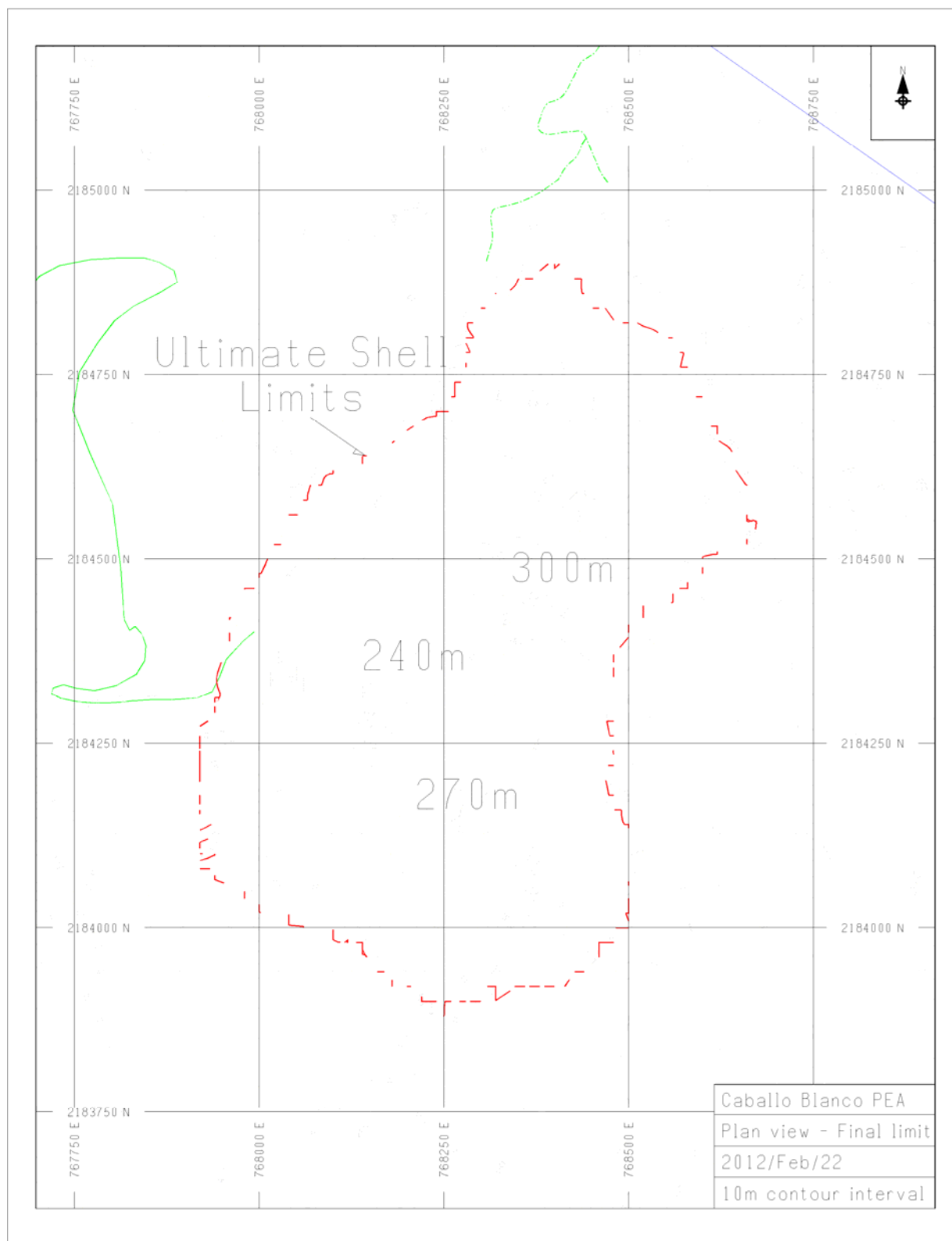


Figure 16.4 - Ultimate Shell Limits - La Paila

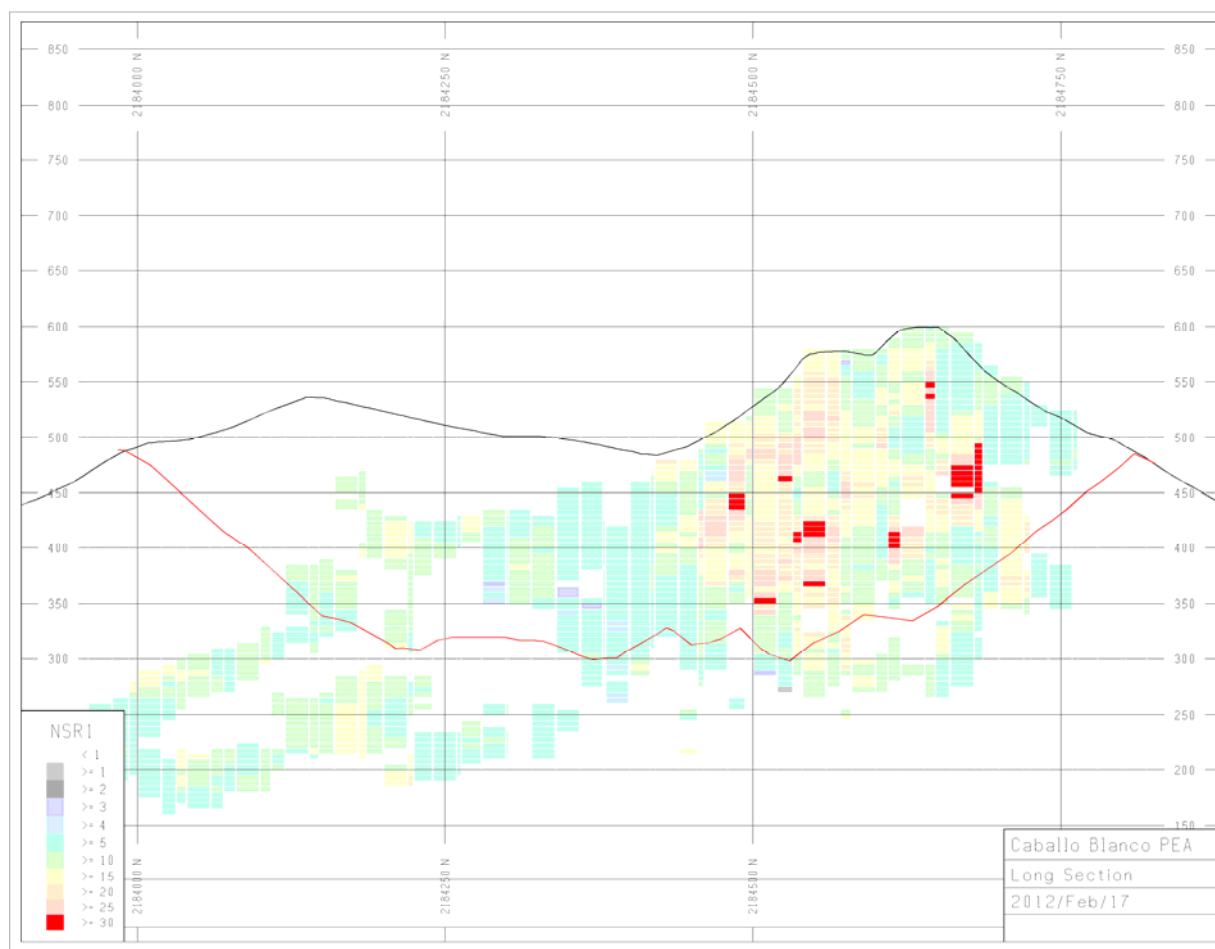


Figure 16.5 - Typical Long Section (looking north-west) - La Paila

16.2.1 Mine Operation

The open pit mining activities for the Caballo Blanco pit were assumed to be primarily undertaken by a mining contractor as the basis for this preliminary economic assessment. A unit mining cost of US\$ 1.60/t of waste material mined for pit and dump operations, road maintenance, mine supervision and technical services, and US\$ 2.70/t for heap leach material was assumed in the project economics. The cost estimate was based on costs built from first principles as well as on experience of similar sized open pit operations. An operating bench of 10 meters was assumed for the preliminary mine planning.

Equipment

Although the mining contractor will ultimately decide on equipment requirements, Table 16.7 summaries equipment requirements based on similar sized open pit operations. The proposed heap leach processing rate of 7.0 Mtpa was used, along with deposit and shell geometry constraints, to estimate the mining equipment fleet needed.

The fleet has an estimated maximum capacity of 70,000 t/d total material, which will be sufficient for the life-of-mine ("LOM") plan.

Table 16.7 Major Open Pit Mining Equipment	
Equipment Type	No. of units
D10-class Dozer	3
15 m ³ Front Shovel (diesel)	2
12 m ³ Wheel Loader (diesel)	1
90 t Haul Truck	10
Cat 16H-class Grader	2
250 mm dia. Rotary, Crawler Drill	2
165 mm dia. Rotary, Crawler Drill	2
90 t Water Truck	1

Unit Operations

Two hundred and fifty millimeter diameter blast hole drills are planned to perform the majority of the production drilling in the mine (both mineralized and waste rock), with the 165 millimeter diameter hydraulic drill to be used for secondary blasting requirements and may be used on the tighter spaced patterns required for pit development blasts. The main loading and haulage fleet is planned to consist of 90 tonne haul trucks, loaded primarily with the diesel-powered 15 m³ hydraulic front shovels or a 12 m³ wheel loader, depending on pit conditions.

As pit conditions dictate, the D10-class dozers are planned to rip and push material to the excavators, as well as maintaining the waste dumps and heap leach pad.

The additional equipment listed in Table 16.6 is planned to be used to maintain and build access roads, and to meet various site facility requirements, (including stockpile maintenance, and further exploration development).

The open pit work schedule is based on two twelve hour shifts per day, seven days per week, 365 days per year.

16.2.2 Production Schedule

Mine Sequence/Phasing

The preliminary Whittle shell for La Paila was divided into four phases for the mine plan development to maximize the grade in the early years, reduce the pre-stripping requirements in the early years, and to maintain the heap leach facility at full production capacity.

The shell tonnages, grades and metal recoveries of the preliminary phases are summarized in Table 16.8.

Table 16.8						
La Paila Phase Tonnages and Grades						
Description	Unit	LaPaila Phase 1	LaPaila Phase 2	LaPaila Phase 3	LaPaila Phase 4	LaPaila Total
Whittle Shell Number	(#)	5	11	21	36	36
Diluted Mineralized Tonnage	(Mt)	13.3	18.0	9.2	8.8	49.3
Mine Life	(yrs)	1.9	2.6	1.3	1.3	7.0
Diluted Grades						
Gold	(g/t)	0.58	0.54	0.53	0.49	0.54
Silver	(g/t)	2.83	2.55	1.77	1.63	2.31
Contained Metal						
Gold	(koz)	248	310	158	138	854
Silver	(koz)	1,212	1,472	524	459	3,667
Recovered Metal						
Gold	(koz)	199	248	127	110	683
Silver	(koz)	364	442	157	138	1,100
Waste Tonnage	(Mt)	4.8	20.5	24.6	32.0	81.8
Total Tonnage	(Mt)	18.1	38.5	33.8	40.8	131.1
Strip Ratio	(t:t)	0.4	1.1	2.7	3.6	1.7

Figures 16.6 to 16.9 further summarize the phase designs for La Paila, with tonnes, grades, recovered metal and preliminary phase layout and ultimate shell outlines shown.

The phases were based on the Whittle™ shells #5, #11 and #21. Shells selected provide reasonable pushback widths (~90m) with mining advancing in a general trend from the northeast to the southwest.

The waste will be placed into a waste rock facility (“WRF”) to the west of the final shell limits. All mineralized material will be hauled to the heap leach facility to the south west of the deposit.

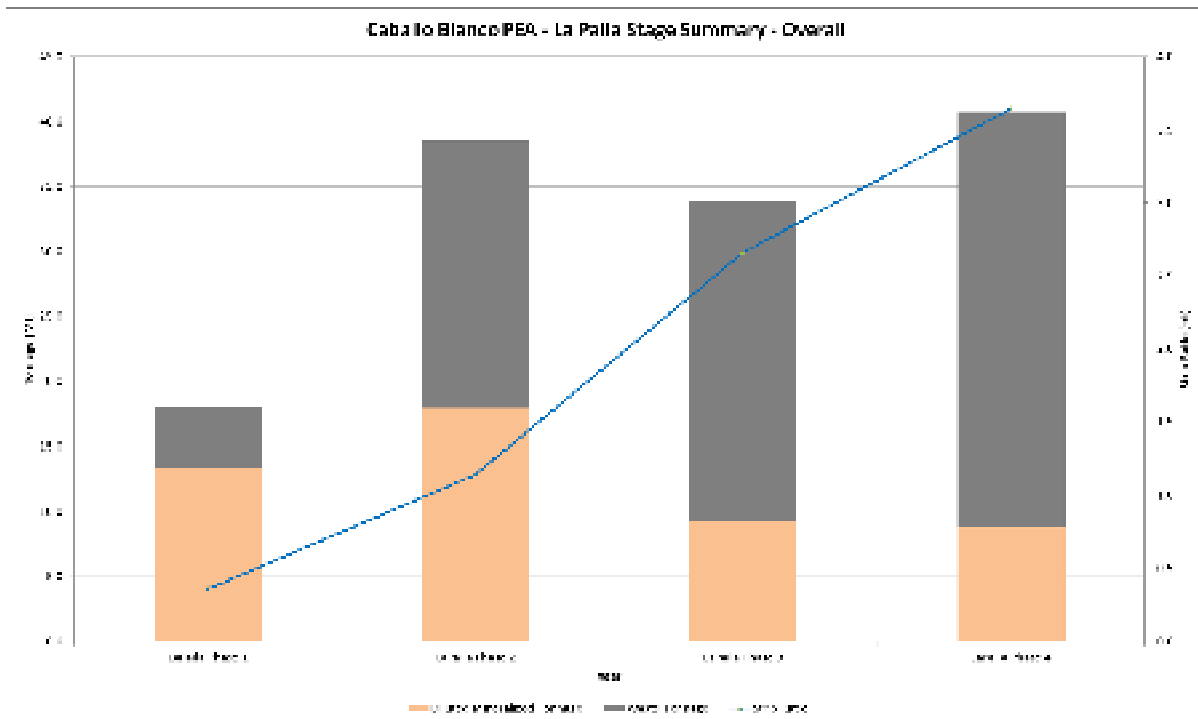


Figure 16.6 - La Paila Stage Summary - Overall

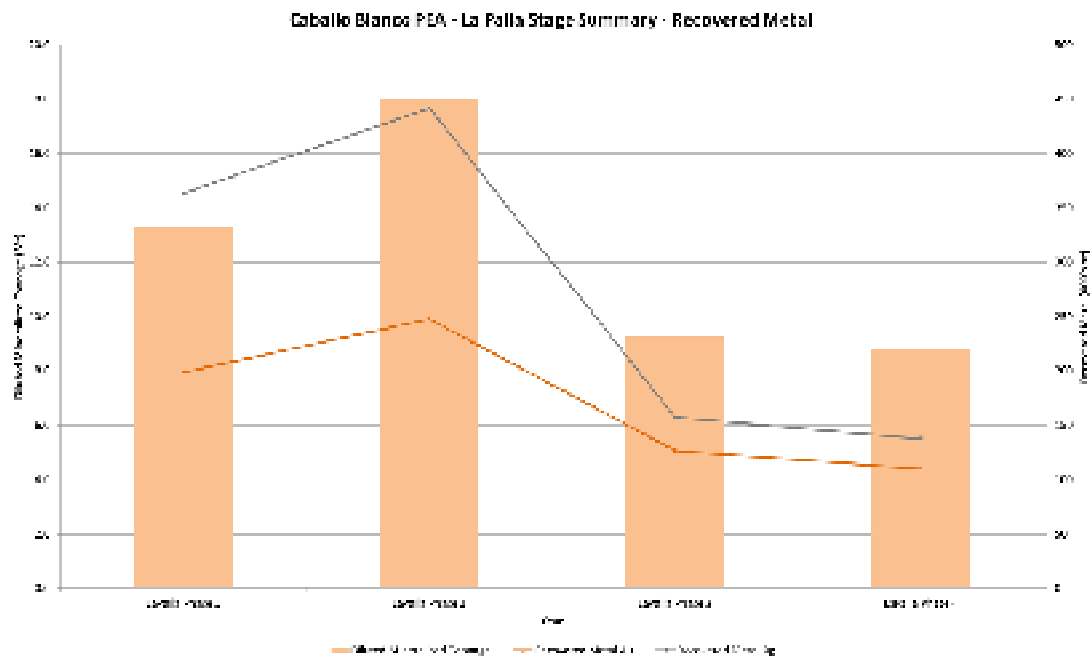


Figure 16.7 - Stage Summary - Recovered Metal

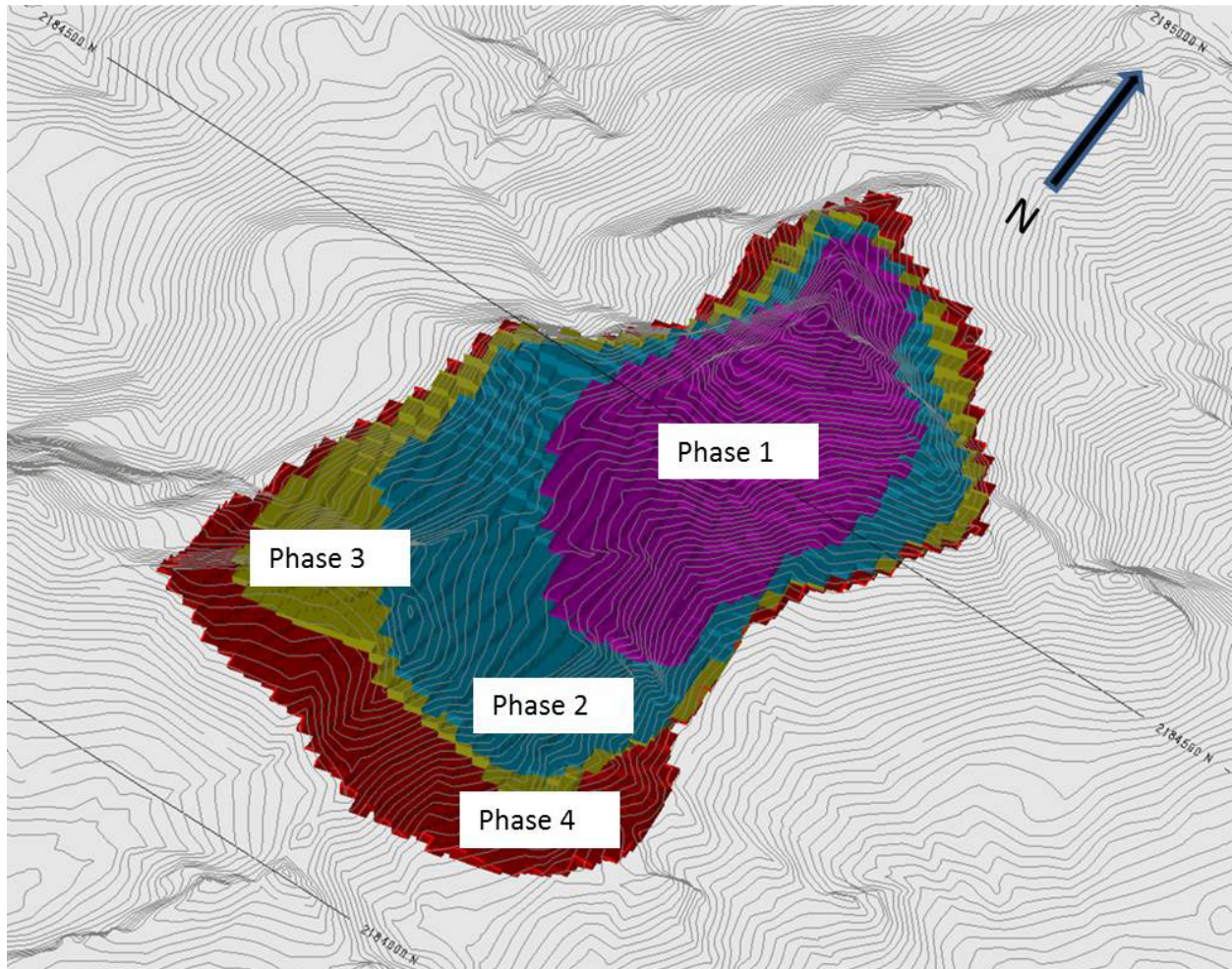


Figure 16.8 - Ultimate and Stage Isometric View (looking North West)

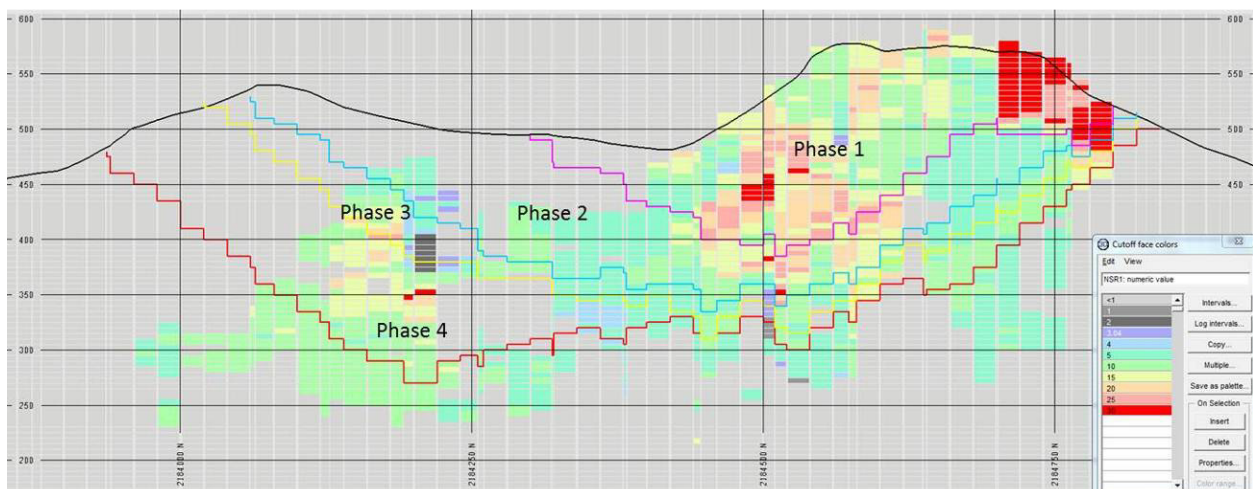


Figure 16.9 - Ultimate and Stage Typical Long Section (looking North West)

Mine Production Schedule

The production schedule for the Caballo Blanco La Paila deposit was developed with the aid of Whittle™ and MineSight™ software, and incorporated the various phases mentioned above.

The proposed heap leach processing rate of 7.0 Mtpa (350 days/yr.) was used, along with deposit and shell geometry constraints, to estimate the mining equipment fleet needed (mining contractor will determine final fleet requirements). The fleet has an estimated maximum capacity of 70,000 tpd of total material, which will be sufficient for LOM plan.

Due to limited pre-stripping requirements, with the mineralized material near surface at La Paila, Year 1 represents the commencement of heap leach processing. The LOM maximum planned amount of total material to be moved is approximately 70,000 t/d. The average total mining rate was planned to be 45,000 t/d. The maximum vertical bench advance rate was set to 10 benches per annum (allows for bench development and reasonable mine sequence).

Indicated and inferred resources were used in the LOM plan, with inferred resources representing approximately 40 percent of the material planned to be processed. Inferred mineral resources are considered too speculative geologically to have the economic considerations applied to them to be categorized as mineral reserves, and there is no certainty that the inferred resources will be upgraded to a higher resource category.

Table 16.9 is a summary of total material movement by year for the LOM production schedule (both as totals, as well as by each phase).

Table 16.9 Proposed LOM Production Schedule										
Item	Unit	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Diluted Mineralized Tonnage	(Mt)	49.3	4.3	7.0	7.0	7.0	7.0	7.0	7.0	3.0
Diluted Grades										
Gold	(g/t)	0.54	0.55	0.55	0.51	0.53	0.55	0.53	0.52	0.61
Silver	(g/t)	2.31	2.42	3.04	2.53	2.87	2.25	1.76	1.76	1.39
Contained Metal										
Gold	(koz)	853	76	124	115	119	124	119	117	58
Silver	(koz)	3,664	336	683	569	645	506	396	395	133
Recovered Metal										
Gold	(koz)	682	61	99	92	95	99	96	94	47
Silver	(koz)	1,099	101	205	171	193	152	119	119	40
Waste Tonnage	(Mt)	82.0	2.1	9.0	15.3	10.3	10.9	18.0	13.7	2.7

Table 16.9
Proposed LOM Production Schedule

Item	Unit	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Total Tonnage	(Mt)	131.3	6.4	16.0	22.3	17.3	17.9	25.0	20.7	5.6
Strip Ratio	(t:t)	1.7	0.5	1.3	2.2	1.5	1.6	2.6	2.0	0.9
Avg. Material Mined	(t/day)	45,000	18,000	44,000	61,000	47,000	49,000	68,000	57,000	15,000
Phase 1										
Diluted Mineralized Tonnage	(Mt)	13.3	4.3	6.2	2.8	0.0				
Diluted Grades										
Gold	(g/t)	0.58	0.55	0.58	0.62	0.70				
Silver	(g/t)	2.83	2.42	3.12	2.85	1.98				
Contained Metal										
Gold	(koz)	248	76	115	55	1				
Silver	(koz)	1,211	336	618	254	3				
Recovered Metal										
Gold	(koz)	198	61	92	44	1				
Silver	(koz)	363	101	186	76	1				
Waste Tonnage	(Mt)	4.9	2.1	2.8						
Total Tonnage	(Mt)	18.2	6.4	9.0	2.8	0.0				
Strip Ratio	(t:t)	0.4	0.5	0.5						
Vertical bench advance	(#)	-	10	7	5	1				
Phase 2										
Diluted Mineralized Tonnage	(Mt)	18.0		0.8	4.0	6.5	5.4	1.3		
Diluted Grades										
Gold	(g/t)	0.53		0.32	0.44	0.54	0.60	0.67		
Silver	(g/t)	2.54		2.42	2.31	2.91	2.37	2.21		
Contained Metal										
Gold	(koz)	309		9	57	113	104	27		
Silver	(koz)	1,470		65	297	607	411	90		
Recovered Metal										
Gold	(koz)	247		7	45	90	83	22		
Silver	(koz)	441		20	89	182	123	27		
Waste Tonnage	(Mt)	20.5		6.2	11.7	2.3	0.2	0.1		
Total Tonnage	(Mt)	38.5		7.0	15.7	8.8	5.6	1.4		
Strip Ratio	(t:t)	1.1		7.4	2.9	0.4	0.0	0.1		
Vertical bench advance	(#)	-		7	5	4	3	4		

Table 16.9 Proposed LOM Production Schedule										
Item	Unit	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Phase 3										
Diluted Mineralized Tonnage	(Mt)	9.2			0.2	0.5	1.4	4.8	2.3	0.0
Diluted Grades										
Gold	(g/t)	0.53			0.40	0.35	0.39	0.52	0.70	0.97
Silver	(g/t)	1.77			2.40	2.32	1.80	1.64	1.83	1.43
Contained Metal										
Gold	(koz)	159			3	5	18	80	53	0
Silver	(koz)	524			17	35	82	253	137	0
Recovered Metal										
Gold	(koz)	127			2	4	14	64	42	0
Silver	(koz)	157			5	10	24	76	41	0
Waste Tonnage	(Mt)	24.6			3.6	5.9	6.4	7.2	1.5	0.0
Total Tonnage	(Mt)	33.8			3.8	6.3	7.8	11.9	3.9	0.0
Strip Ratio	(t:t)	2.7			16.0	12.6	4.5	1.5	0.7	0.1
Vertical bench advance	(#)	-			8	4	3	6	7	1
Phase 4										
Diluted Mineralized Tonnage	(Mt)	8.8				0.0	0.2	0.9	4.7	3.0
Diluted Grades										
Gold	(g/t)	0.49				0.25	0.37	0.40	0.43	0.61
Silver	(g/t)	1.63				3.08	2.18	1.77	1.72	1.39
Contained Metal										
Gold	(koz)	137				0	2	12	65	58
Silver	(koz)	459				1	13	54	258	133
Recovered Metal										
Gold	(koz)	110				0	2	10	52	47
Silver	(koz)	138				0	4	16	77	40
Waste Tonnage	(Mt)	32.0				2.1	4.3	10.8	12.2	2.7
Total Tonnage	(Mt)	40.8				2.1	4.5	11.7	16.8	5.6
Strip Ratio	(t:t)	3.6				288.6	22.4	11.3	2.6	0.9
Vertical bench advance	(#)	-				6	3	6	7	9

The La Paila deposit is planned to produce a total of 49.3 Mt of heap leach feed and 82 Mt of waste (1.7:1 overall strip ratio) over an eight year mine operating life. The current LOM plan focuses on achieving consistent heap leach feed production rates, mining of higher grade material early in schedule, balancing grade and strip ratios, while trying to maximize NPV. No blending of stockpiled material has been included in this

preliminary schedule. In order to achieve targets, up to three phases are active in any one year.

Figure 16.10 summarizes heap leach tonnes, waste tonnes, and strip ratios by period. Figure 16.11 illustrates the feed tonnes by phase, as well as overall gold grades, while Figure 16.12 illustrates annual recovered metal. During full production, the mine, on average, is envisioned to produce total recovered gold of 96 koz per year.

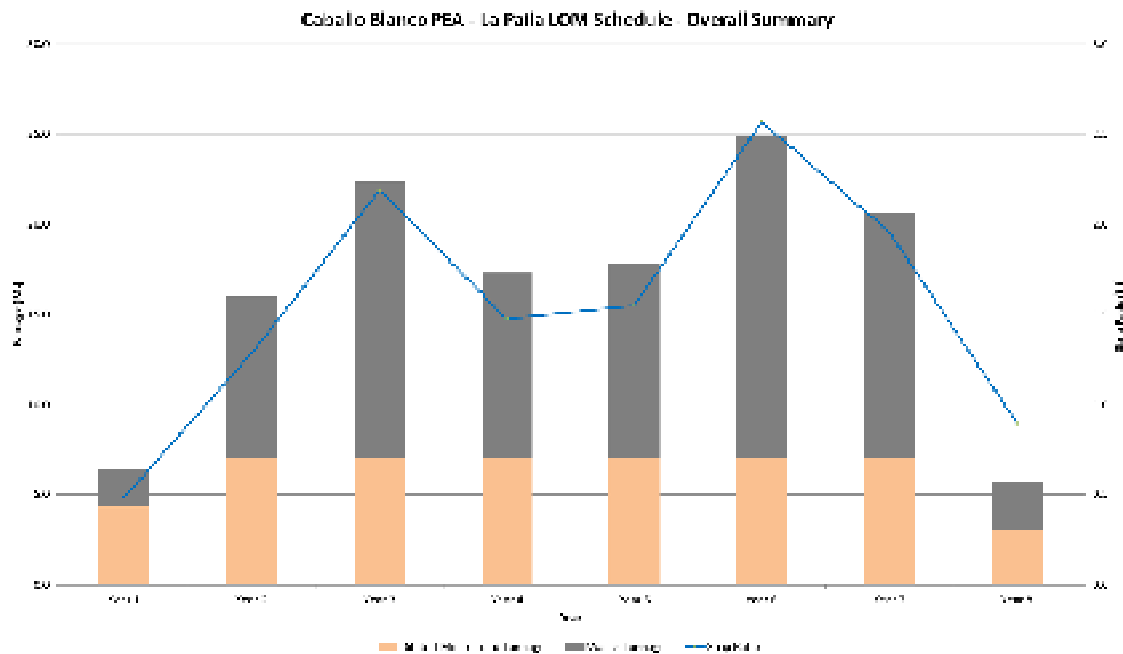


Figure 16.10 - LOM Overall Summary

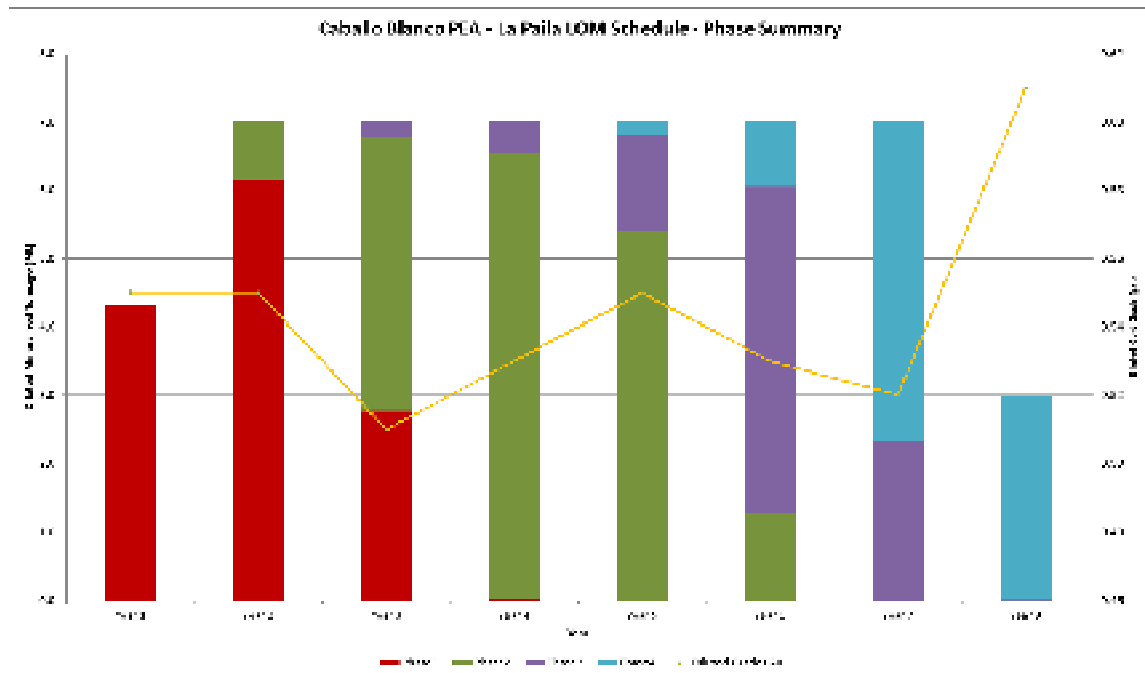


Figure 16.11 - Phase Summary

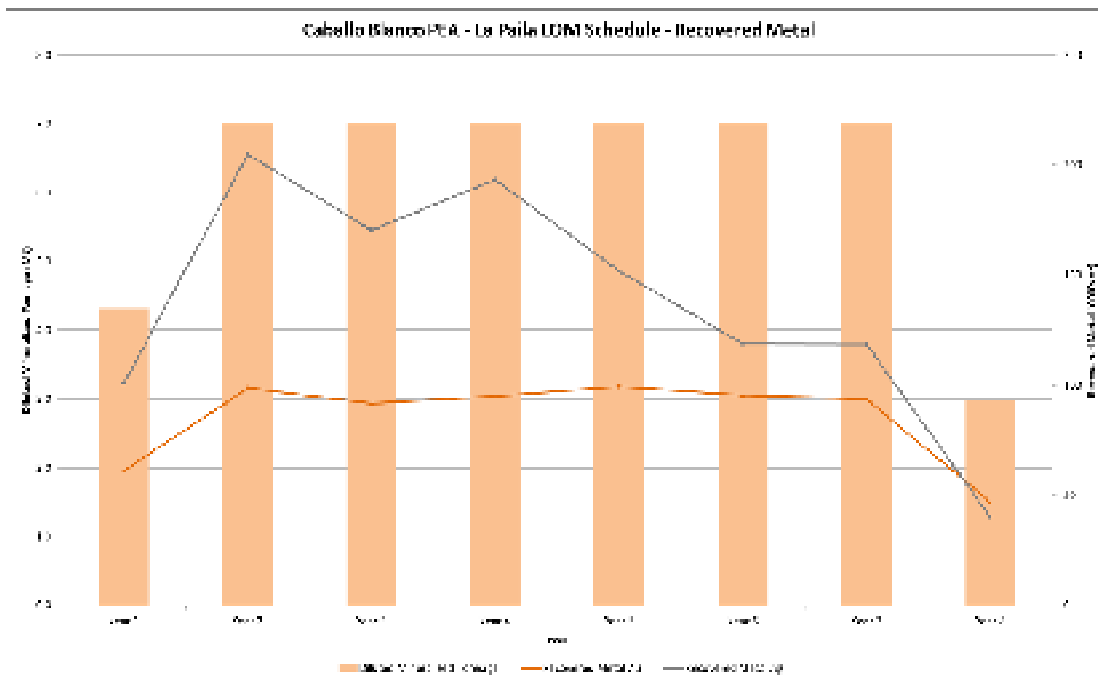


Figure 16.12 - Recovered Metal

Mine Development Schedule

Year 1: Development of the La Paila project commences with pre-stripping and mine production of Phase 1. Heap leaching is scheduled to begin in Year 1 as a result of the location of mineralized material being near surface leading to minimal pre-stripping requirements. A total of 4.3 Mt of heap leach feed (~60% of full production target) and 2.1 Mt of waste is scheduled. The average gold grade is estimated to be 0.55 g/t gold with an overall strip ratio of 0.5:1 (waste:heap leach feed).

Year 2: The 7.0 Mtpa target heap leach feed is envisioned to be attained with mining continuing at Phase 1, while mining commences in Phase 2. The average mine grades in Year 2 are estimated to be 0.55 g/t gold and 3.04 g/t silver. A total of 9.0 Mt of waste rock is scheduled at a mined strip ratio of 1.3:1.

Year 3: Heap leach feed production is scheduled to be maintained at the target of 7.0 Mtpa. Total waste planned to be mined from the three active phases (1, 2 and 3) is 15.3 Mt. The average gold grade is estimated to be 0.51 g/t gold. Stripping of push backs is planned to increase overall strip ratio to 2.2:1. Production rates are envisioned to average 61,000 t/d total materials.

Year 4: Mining of Phase 1 is scheduled to end with the remaining three phases continuing. Heap leach feed production is planned to be maintained at steady state of 7.0 Mt total delivered. 10.3 Mt of waste is planned to be mined at an overall strip ratio of 1.5:1. Production rates for the year are scheduled to average 48,000 t/d total materials.

Year 5: Mining is planned to continue in Phases 2, 3, and 4 with a total of 17.9 Mt of material mined with an overall strip ratio of 1.6:1. The average grades are expected to be 0.53 g/t gold and 2.87 g/t silver.

Year 6: Phase 2 mining is scheduled for completion, with mining continuing to advance in Phase 3 and Phase 4. The overall strip ratio is expected to increase to 2.6:1 (due to pushbacks required to reach mineralized material at depth) with 18 Mt of waste and 7.0 Mt of heap leach feed planned to be mined in the period. Average mining rate is scheduled to reach maximum for LOM plan of 68 ktpd.

Year 7: The final two pit phases are planned to be in operation producing 7.0 Mt of heap leach feed with average grades of 0.52 g/t gold and 1.76 g/t silver. Overall strip ratio estimated to be 2.0:1.

Year 8: Mining at the La Paila deposit scheduled for completion with overall strip ratio dropping to 0.9 as the bottom, lower strip ratio, benches are completed. The average estimated grades are 0.61 g/t gold. The remaining 3.0 Mt of leach feed is scheduled to be mined, for a total of 5.7 Mt of total material.

17.0 RECOVERY METHODS

17.1 Process Description

The crushing system is fed from 40 tonne end-dump haul trucks bringing run-of-mine (ROM) material from the pit. The haul distance is 3.4 km over 15 m wide haul, two-way traffic roads. A 1.2 km, 5.5 m wide, one-way traffic tunnel is cut through the mountain that separates the pit from the process, providing better access to the crushing circuit and leach pads which are located in close proximity to each other.

ROM is fed to the crushing plant by end-dumping material directly into a dump hopper or by reclaiming material to the dump hopper from a ROM crusher feed stockpile. The dump hopper is equipped with a belt feeder discharging into a vibrating grizzly screen fitted out with 150 mm gratings.

Screen oversize discharges to a primary jaw crusher with a closed-side setting of 125 mm. Crushed particles are combined with the grizzly screen undersize forming a coarse product stream. Eighty percent of these particles will pass through the primary system at minus 140 mm, or P_{80} 140 mm. The coarse product is moved to the next stage of crushing via conveyor belt.

The conveyor belt moves coarse material from the primary crusher to a coarse ore storage bin which feeds the secondary crusher circuit. Coarse material is drawn from the bin by an apron feeder that feeds a transfer conveyor. This conveyor discharges to a vibrating double deck screen. A double deck screen increases the surface area presented to moving particles to maximize separation efficiency. The top deck scalps off particles larger than 78 mm and the second deck removes middling materials with sizes between 78 and 34 mm. The oversize materials are fed to a secondary cone crusher with a closed-side setting of 34 mm. The screen undersize and the secondary cone crusher product discharge to a transfer conveyor feeding the product stockpile. Product size has a P_{80} of 38 millimeters. The stockpile has an 8-hour surge capacity of approximately 6,700 tonnes.

Pebble lime is added to the coarse material to control pH on the leach pad. The lime is added to the moving conveyor belt between the primary and secondary crushing circuits. The amount of lime is controlled using a rotary valve to regulate the amount of lime discharging from the silo to the conveyor belt.

Crushed material is transported from the stockpile to the leach pad by truck. Trucks are filled by a front-end loader that reclaims the crushed material from the stockpile. The initial lift is built by driving over a truck ramp built to accommodate the loading sequence. As the pad progresses, the truck ramp extends upwards to build subsequent lifts.

At the heap leach pad area, the haul trucks drive over the ramp and back up to a berm that marks the active edge of the leach pad cell. The trucks end-dump fresh material onto the heap leach pad. Bulldozers create the new lift by pushing the fresh material level, moving the berm out. Once the cell is built, the dozer rips the surface into furrows using a ripper attachment. Ripping the cell breaks up the compacted surface, reducing compaction caused by trucks.

The heap leach pad has both barren and intermediate irrigation circuits. Barren solution from the adsorption, desorption, recovery (ADR), plant is used to irrigate the previously leached material. The drainage from this portion of the heap reports to an intermediate leach solution (ILS) pond. The ILS pond and pumps recirculate the ILS solution to irrigate freshly stacked leach cells. Solution collected from new leach cells reports as pregnant leach solution (PLS) to the PLS pond. The area of the cells under leach using fresh barren solution are the same as the cells under leach using ILS solution, allowing the equal PLS and ILS flow rates.

Spray irrigation methods are preferred to promote evaporation. A large events pond and water treatment plant is provided to assist in managing storm events, especially during the wet season. In-heap storage is provided for the 100-year/24-hour storm event. PLS is collected via a piped drainage system installed at the base of the heap leach pad and directs solution to the PLS pond. PLS from the pond is pumped to carbon columns where gold is adsorbed onto the carbon surface. PLS flows through a series of five carbon columns by gravity and the carbon advances counter-current twice daily. Loaded carbon is stored in a bin until enough tonnage has been collected to begin the strip process. Regenerated carbon is advanced to the last carbon column. Barren solution discharging from adsorption flows across a safety screen, designed to catch fine carbon particles, then to a barren tank from which it is pumped back to the heap.

Cyanide addition and pH adjustment takes place at the barren solution tank. Cyanide is added to achieve a targeted concentration depending on metallurgical requirements, pH adjustments occur at the barren tank by adding slaked lime to the solution. Cyanide can also be added to the head of the carbon-column train.

Loaded carbon from the adsorption circuit is transferred from the storage bin to the acid wash vessel. The loaded carbon is washed using weak hydrochloric acid before stripping. The acid removes inorganic contaminants from the carbon surface, typically calcium. Once the acid-wash cycle is complete, the carbon is rinsed with fresh water to remove any excess acid residue and pumped to the elution vessel.

A pressurized Zadra process is used for gold elution. Hot caustic solution is circulated through the carbon elution vessel at low pressure to desorb the precious metals from the carbon surface, creating a rich electrolyte solution. Once stripping is complete, stripped carbon is pumped to a stripped carbon bin.

Stripped carbon can report to the carbon circuit or to the regeneration kiln. Regeneration is performed in a rotating kiln under reducing atmosphere to prevent burning the carbon. Carbon surfaces are re-activated during regeneration which removes organic accumulations. Organic contaminants can be indigenous but usually consist of hydraulic oils and fuel leakage from mechanical equipment.

The rich electrolyte solution from the elution vessel is pumped to the refinery where precious metal is recovered by electrowinning. Electrowinning is accomplished by inducing a current through the solution, reducing the metal ions which deposit onto stainless steel wool cathodes as sludge. The electrowinning process removes approximately 90 to 99 percent of metal from the electrolyte solution.

Lean, or barren, electrolyte reports to the barren-solution tank. Some of the barren solution is returned to the process and reused to strip carbon and some is bled back to the process. Refinery personnel will take electrowinning cells off line to remove deposited metal sludge by washing the cathodes using high pressure wash water.

The precious metal sludge slurry is collected in a holding tank and filtered using a plate and frame pressure filter. The filter cake is dried in a retort to volatilize and recover mercury that may have been collected during the leaching process. The dried metal sludge is mixed with fluxes and smelted in a high temperature furnace. The metal is poured into 500 ounce doré bars and the slag collected for further processing. The doré is shipped to commercial facilities for refining.

Reagent makeup systems for cyanide, hydrochloric acid and caustic soda are included in the process design.

In the opinion of the authors, the process description for Minera Cardel conforms to industry standard operations as a concept at the PEA level. Heap permeability testing has not been conducted to date. Such testing is recommended, especially if leach pad construction is done by truck loading. Compaction and permeability issues have resulted in poor leach pad performance and leach pad failure in similarly designed projects.

17.2 Leach Pad Design

17.2.1 Leach Pad Subgrade

The Caballo Blanco leach pad site is located on a relatively flat elevated mesa with heavy grass vegetation. The natural contours in the area of the leach pad provide for drainage to the north at an average slope of approximately 4 percent. This slope will provide adequate drainage of the heap to the storage ponds. The leach pad area is divided into two phases and nine cells (see MWH Drawings 2 and 3, Appendix 7).

Preliminary subsurface investigations performed by GeoQuality Mexico for Minera Cardel indicate that the subsurface in the area of the leach pad is organic topsoils to a depth of approximately 10 to 50 millimeters followed by a fat clay layer to a depth of approximately 85 to 130 millimeters below ground surface (bgs); below the clay is a thick hard rock basalt layer which has been estimated to be as thick as 40 meters from preliminary subsurface explorations.

From the information provided regarding the leach pad subgrade, the conditions are potentially good for construction of the leach pad. The topsoil layer will be stripped and stockpiled for use elsewhere, possibly for closure of the heap leach. Compaction of the in-place clay layer will provide a near impermeable layer beneath the leach pad liner. Disking of the clay layer may be required depending on the in-place moisture content of the clay. The clay will require compaction to reduce permeability and to create a smooth, unyielding leach pad subsurface. Preliminary geotechnical observations indicate that the clay is relatively low in strength. It is recommended that strength tests be performed on the clay material prior to final design so that the results can be analyzed for verification of the heap's sub-base stability. For the purposes of this study the clay was assumed to be sufficiently strong and that it does not require treatment other than some drying before construction.

17.2.2 Liner

The proposed (preliminary) liner system consists of (bottom to top) 300 mm of compacted clay liner, 80 mil high-density polyethylene (HDPE) or low-linear density polyethylene (LLDPE) liner (to be determined during a later design stage), and 600 mm layer of over liner.

The purpose of the clay liner is to provide a near impermeable secondary layer beneath the leach pad and to provide additional protection to the HDPE or LLPDE liner from puncturing by sharp rocks. The clay layer will be a minimum thickness of 300 mm immediately below the liner. The clay liner should be free from rocks and debris that could potentially protrude the surface and potentially damage the liner.

Similarly, the purpose of the over liner layer is to protect the geomembrane liner from coarse material as it is being loaded onto the heap. The over liner material will have a gradation that allows leach drainage and have a maximum particle size of approximately 37 mm. The over liner will be placed carefully in a 600 mm minimum thick layer over the HDPE or LLDPE liner with low-pressure equipment to prevent damage to the liner during placement.

The leach pad has been designed with the following criteria:

Loading Rate:	20,000 tonnes/day
Lift height:	6 meters

Overall Sideslope Inclination:	2.5H: 1V
Cycle Time:	60 days
Phase 1 Storage:	13.3 million tonnes (2 years of operation life)
Phase 1 heap height:	42 meters
Phase 2 Storage:	36.0 million tonnes (~6 years of operation life)
Phase 2 heap height (ultimate):	84 meters

Details of the leach pad liner system are shown on MWH Drawing 4, Appendix 7.

17.2.3 Leach Pad Collection Pipes and Leaching Cells

Leachate solution will be collected at the base of the heap by a network of perforated corrugated plastic tubing (CPT) collection pipes placed on top of the geomembrane. These secondary collection pipes have been sized to be 100 mm in diameter and spaced at every 15 meter. The estimated pipe size and spacing are largely dependent on the ability of the over liner to drain. Permeability testing of the over liner is recommended prior to final design in order to refine the collection piping system. A highly permeable over liner may result in reduction of the pipe size or increase in pipe spacing. Conversely, low permeability results may result in increased pipe diameters, reduced spacing between pipes, or the addition of drain gravel envelopes encasing the pipes placed on top of the low permeability over liner.

The secondary collection pipes gravity flow to the primary collection pipe at the low end of cells within the leach pad. The primary collection pipes will be approximately 200 mm diameter perforated CPT (or possibly solid-wall HDPE) pipes. The perforated pipes will transition to non-perforated at the base of adjacent cell berms to maintain separation of leach solutions from individual leaching cells. This will require booting the pipes through the leaching cell berms and liner to maintain a free-flowing pipe invert. To protect the integrity of the primary collector through the cell berms, the drain pipes will be encased in a higher diameter thick-walled HDPE pipe sleeve.

Ultimately, the leachate solution will leave the heap by gravity flow through the pipes and will be conveyed to the collection ponds through a series of 300 millimeter diameter HDPE collection pipe headers. Each collection header will be equipped with a stainless steel knife gate valve for the isolation and monitoring of each leaching cell.

The collection pipes will also convey storm water that falls onto the heap. The collection headers will have bypass pipelines upstream of the isolation valves to allow for the bypass of storm water around the process ponds and into the events pond during storm events. When the events pond approaches full, the events pond valve will be closed and the collected storm water will be evaporated or treated. In this condition, storage of additional storm water will be in-heap. A schematic flow diagram of the pond operation is shown in Figure 17.1 below. The Caballo Blanco heap leach pad collection

pipe plan is shown on MWH Drawing 3, Appendix 7 with pipe details on MWH Drawings 4 and 5, Appendix 7.

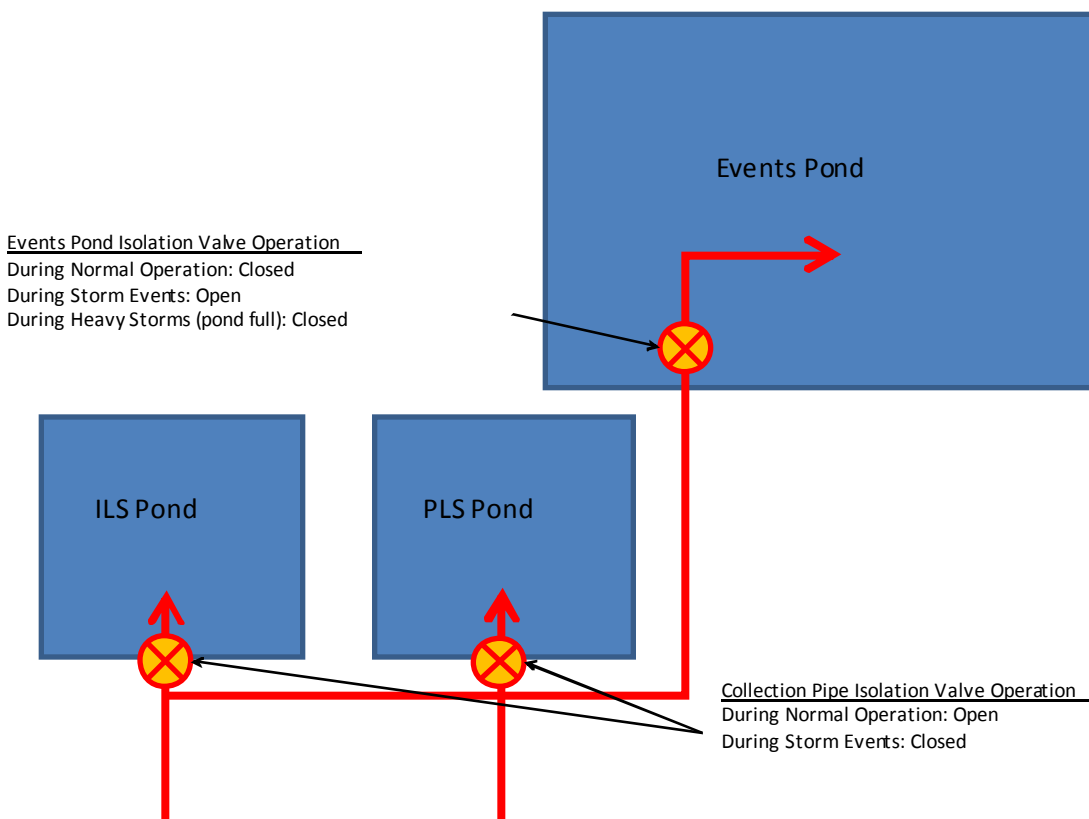


Figure 17.1 - PLS, ILS, and Events Pond Operation Schematic

Process and Events Ponds

The design of the process ponds and Events Pond is based on the water balance model presented in Section 24.1.4 of this report. The water balance considered the major water sources and sinks to the leach circuit and provides an estimate of the required pond sizes and water make-up and treatment requirements. The process ponds (PLS, ILS, and BS Ponds) were designed to allow for a nominal operational volume of 10,000 m³ and to be able to contain normal operational fluctuations. The Events Pond was designed to be able to contain water (solution) for the wettest season in the 33 year period of record (plus leachate solution) with a treatment capacity of 250-m³/hr. The sizes for the ponds are as follows:

- Process pond sizes (PLS, ILS, and BS Ponds) = 14,417 m³ (10,000 m³ operational volume + 4,417 m³ freeboard)
- Events pond size = 383,600 m³

The water balance calculations used to estimate the pond sizes also assume a water treatment capacity of 250 m³/hr.

The ponds are located just downstream of the heap leach. The design includes individual PLS and ILS ponds, which coupled with the leaching cells, will allow Minera Cardel to manage solution concentrations and optimize performance during the early years of pad operation. (Nine conceptual leaching cells on the leach pad are shown on MWH Drawing 3, Appendix 7).

The process ponds are a double-lined system consisting of (bottom to top): a secondary 80 mil HDPE or LLDPE liner (to be determined during a later design stage), a 250-mil geonet leachate collection and recovery system (LCRS) layer, and a primary 80-mil HDPE or LLDPE liner. Each process pond will have an LCRS sump between the primary and secondary liners. The LCRS sump consists of gravel encasing the base of an HDPE riser pipe. The riser pipe will extend up the side of the pond (between the liners) and be booted through the primary liner at the pond crest. The purpose of the LCRS sump is to allow for monitoring of leaks in the primary liner. Solution reporting to the LCRS sump can be pumped, by access through the riser pipe, onto the heap.

The Events Pond has a liner system consisting of a 150 mm layer of clay liner beneath an 80-mil HDPE or LLDPE liner. Water (and leachate solution) collected in the Events Pond will be monitored and treated to acceptable pH levels, as required. Since not much is known about the leachate at this time, additional studies will be required to verify the level and type of in-pond treatment required.

The process ponds and the Events Pond are shown on MWH Drawing 5, Appendix 7.

Material Loading and Permeability

During years one and two of operation at Caballo Blanco, material will be loaded onto the leach pad by haul truck. After year two, material loading may be by conveyor. Typically, haul truck traffic tends to compact the material, thus reducing its permeability more so than conveyor loading. This can also occur in the lower lifts due to the weight of the upper lifts. The extent that loading will affect the permeability of the material is currently unknown. Breakdown, or decrepitation, of the material can also reduce permeability. Preliminary observations indicate that the material may provide relatively good drainage through the heap, although this will require verification through laboratory testing in a later stage of design.

The material will be stacked in 6-meter lifts with overall side slopes of 2.5H: 1V with benching. The stability of the heap has not been evaluated. Static and dynamic stability analyses will need to be evaluated during a later stage in design. This will require material and sub-grade strength properties evaluated through lab testing.

Surface Water Control

Storm water runoff from the upgradient areas to the east and west of the leach pad will be collected in drainage swales that channel water to the north of the leach pad and discharge into natural drainages. The channels have been conceptually sized for the following flows (based on the 100-year, 24-hour storm):

East Diversion Channel: 13.4 m³/s

West Diversion Channel: 6.6 m³/s

To prevent erosion within the channels, the channels will be lined with riprap over coarse bedding material. The surface water control plan for the Caballo Blanco heap leach is shown in MWH Drawings 3 and 5, Appendix 7.

Storm water drainage from the side slopes of the heap will be captured within the leach pad perimeter berms and will eventually be collected by the leach pad collection pipes which flow to the Events Pond.

18.0 INFRASTRUCTURE

18.1 Infrastructure

The design of the ancillary facilities is based upon information extracted from engineering estimates, data provided by third party qualified persons and assumptions. The infrastructure required for the Caballo Blanco project includes; site roads (access and haul roads), electrical power, fuel, lubrication storage and dispensing, explosives storage, reagent storage, warehousing, administration offices, water supply, potable water, sewage, power distribution and telecommunications. There will be no on site camp or accommodation as it is expected that workers will be bused to and from site each day.

18.1.1 Existing Regional Infrastructure

The project area is 65 kilometers northwest of Veracruz in the state of Veracruz Mexico. There is excellent access by paved road to the project area, in addition there is significant electrical infrastructure provided by the nuclear power plant Laguna Verde. Communications are well established in terms of phone lines and high speed internet. Water in the area is generally from local wells, there are no major water reservoirs in the area. Well water is the supply method used by the local population.

18.1.2 Access Roads

Existing roads to the mine site and the proposed process heap leach area will need to be upgraded to support heavy vehicle traffic. This is likely to include widening, compaction, stabilization and installation of culverts. This cost has been included in the capital estimate.

Haul Roads

In pit haul roads will be built by the mining contractor including the haul road from the mine site to the crushing plant and continuing on to the heap leach facility. This haul road can also be used for the logistics of fuel, lubricants and explosives during specific allocated periods of the operations.

In Plant Roads

In plant roads will be constructed as part of the processing facility development.

18.1.3 Water

An extensive study of the water quality and quantity was submitted as part of the Environmental Impact Statement (MIA). There are significant flowing aquifers which are recharged by surface precipitation and discharge to the Gulf of Mexico. The selected

site for the supply of water will be in a major aquifer. Impact to this aquifer will be insignificant due to the size and flows observed during field measurements.

The selected water supply site will be to the north of the proposed processing facility. Water will be supplied to the processing facility at a rate of 3,000 m³/day (550 gpm) via a 5 kilometer pipeline. Several booster pump stations will be required and the electric power for these pumps will be diesel generator. Water will be stored at the plant in a 3000m³ storage pond.

Potable water will be obtained from the storage pond and treated before used for consumption.

Sewage generated on site will be discharged to septic systems.

18.1.4 Electrical Power

At the time of this report it has not been confirmed if electrical power will be available from the existing 115kV electrical power line grid originating from the nuclear power station. Therefore for this study it has been assumed that the mine will utilize 100 percent on-site diesel power generation for the electrical power requirements. It is the Owners intention to follow up with the local power company to determine if it is possible to connect into the local electrical power grid. This would significantly reduce the electrical operating costs.

Diesel generated power will be distributed to two substations, one for the crushing plant and the other for the process plant. Power will also be distributed to ancillary facilities. A total of 3.5 MW will be provided for the project, with the 2 stage crushing option, whereas a total of 6.5 MW will be provided for the 3 stage crushing option.

Power supply and distribution for mining and water supply will be separate and provided by others, contracted by the owner.

18.1.5 Fuel Storage

Diesel fuel storage will be required at the process facility and the mine operational areas. Fuel storage facilities will be supplied by a regional contractor experienced in these types of installations and have demonstrated their compliance to Mexican law.

Diesel will be stored in two tanks of 125,000 liters each, and gasoline will be stored in a 10,000 liter tank.

18.1.6 Lubricant Storage

The Mining Contractor will provide lubricants for the mining machinery at the mine operations site. The contractor will be required to store and dispose of lubricants in accordance with Mexican law and provide proof of correct handling to ensure environmental compliance.

18.1.7 Explosives Storage

Mineral Cardel currently stores and uses explosives on site as part of their ongoing exploration activities. The current facilities will be expanded to store bulk emulsion, high explosives and detonators separately.

18.1.8 Truck Wash Bay

A truck wash bay will be constructed at the mine site to accommodate high pressure wash down of the haul trucks and other mine equipment. The wash bay will also include a capture system for hydrocarbons and sediments. The wash bay is assumed to be 20m wide by 30m long.

18.1.9 Warehousing

A limited size warehouse is allowed for this project and it is primarily for storage of major spares. A separate secure area will be allocated within the warehouse area for storage of sodium cyanide. The warehouse will be a pre-engineered building 30m wide, 50m long and 8m high.

18.1.10 Administration offices

The contractor construction offices will be converted into administration offices. Sufficient office space for 50 staff is allowed for. Plant operators will have a clean room for meals and shared offices in the plant area.

18.1.11 Light Vehicle Maintenance

Light vehicle maintenance will be off site and contracted to a suitably qualified regional contractor.

18.1.12 Busing

Workers will be transported by bus to and from site each day. It is the intention to contract this out to a suitable Mexican contractor.

18.1.13 Laboratory Facilities

A laboratory for mine grade control and the process facility operations will be provided. It is anticipated that the laboratory will be modular and designed to handle all sample types expected from the overall project operations.

18.1.14 Communications

The overall communications infrastructure will be supplied to the process and mine site from the existing infrastructure of phone and fiber optic lines.

Plant equipment operations requirements will be minimized, specifically to ADR facilities and water pumping which will have some level of automation. The balance of the plant will be locally stopped and started.

Inter personnel communications will be via radios, the infrastructure for this already exists at the project site.

Closed circuit television and other security measures will be used for sensitive areas.

18.1.15 Accommodation

The area has significant accommodation facilities locally to support the additional construction labor requirements during the initial phase of the project. Operations personnel will be locally or regionally recruited hence accommodation for the personnel will be absorbed within the mine area.

18.2 Haul Roads and Conveyance

18.2.1 Haul Road

MWH, working closely with Minera Cardel, considered several haul road alternatives. MWH developed haul road design criteria based on environmental impact, cost, constructability, and safety. The initial (Manifestación de Impacto Ambiental) permitting application indicated a haul road that had significant environmental impact and costs. A combination of haul road and tunnel was determined to have the least environmental impact and lower overall cost. Criteria considered for the haul road alignment evaluation included:

- **Haul Road Width** - Per the U.S. Mine Safety and Health Administration (MSHA) guidelines, each lane of travel should provide clearance, on both sides, equal to one-half the width of the widest vehicle in use. This means that for two lanes of traffic, a haulage road should be at least 3.5 times the width of the widest vehicle using the road (MSHA). Minera Cardel intends to

use 40-tonne haul trucks for at least years one and two of operation. The operating width of a Caterpillar (CAT) 740 articulated haul truck (39.5-tonne nominal payload) is 3.52-meters (HOLT CAT) which would require a minimum road width of 12.3-meters. MSHA also requires that the outer earthen berms must be at least as high as the mid-axle height of the largest piece of equipment that uses the roadway (MSHA). This would add an additional width of 3 to 4 meters. Slopes cut into the inboard edge of the road create the need for a roadside storm water ditch (approximately 1-meter wide assumed). This would require a minimum haul road width of 16.3 meters. During years one and two, Minera Cardel intends to run the haul trucks in convoys with queuing of the trucks occurring at a tunnel located mid-alignment. MWH used a design haul road width of 15 meters.

- **Haul Road Length** - The terrain between the pit and the proposed heap leach pad is mountainous with steep ridges and valleys. A straighter haul road alignment shortens the haul distance which reduces hauling costs over the life of mine operations. Hauling costs during mine operations were a critical factor in the alignment evaluation. Several alignments were analyzed to find an efficient option. Typically, the longer alignments were eliminated due to environmental impact and the associated high hauling costs over the life of mine operations. The priced haul road alignment length is approximately 4.6 kilometers and includes a 1.2 kilometer tunnel to reduce haul length.
- **Slope and Bend Radius** - The steepness or grade of a roadway has a significant effect on the driver's ability to control a vehicle. Two important aspects are:
 - The grade needs to be compatible with the braking capabilities of the equipment;
 - The grade will affect a vehicle's stopping distance.

Some regulations limit the maximum grades on haul roads. Typically the maximum longitudinal grade is restricted to 10 percent (MSHA). Due to the very wet periods at the Caballo Blanco site, MWH assumed that the trucks will be operating for extended periods in slick conditions. MWH used a maximum longitudinal haul road slope of 8 percent (vertical versus horizontal distance).

Per MSHA standards, for a haul road with an assumed side friction coefficient of 0.17, haul trucks travelling at 20 to 30-miles per hour (32 to 48 kilometers per hour) require a minimum bend radius of approximately 50 to 110 meters, respectively (MSHA). MWH used a minimum bend radius of 60 meters (centerline).

- **Maximum Cut Slope** - The maximum cut slope, with respect to slope stability, is critical in calculating the cut quantities. Due to the steep mountainsides, alignments requiring cuts into the mountainside will create tall, steep cuts into the inboard edges of the haul road (inboard is defined as the edge requiring cut into the landscape). Based on limited site observation and typical rock cut slopes used on similar projects, MWH assumed that the stable cut slope is likely in the range of 0.5H:1V (horizontal distance to vertical distance) and 1H:1V. Taking the mean of these two slope gradients, a cut slope of 0.75H:1V was chosen for our design criterion. Drilling and strength testing of the in-situ material along the chosen alignment is recommended prior to final design of the haul road so that the stability of cut slopes can be verified.
- **Minimum Fill Slope** - The minimum fill slope, with respect to slope stability, was also considered. Stability of fill slopes along the outboard side of the haul road (outboard is defined as the outer edge of the haul road) add to the safety of haul road traffic. Unstable slopes may fail beneath the road putting haul road traffic at risk. We assumed that larger-diameter angular rock will be available for the construction of the haul road. Larger-diameter angular rock typically has an angle of repose of 42 degrees (about 1.1H:1V). Using our best judgment with the information available, a fill slope of 1.5H:1V was used as our design criterion. The stability of the fill will require verification prior to haul road construction. We recommend determining the material properties of the fill once the source is determined. Material properties may alter the adequacy of the design fill slope which, in turn, would alter the fill quantities calculated.
- **Cut and Fill** - Locating the haul road over ridges and through valleys will require cuts along mountain ridges and mountainsides and fills through valleys or down mountainsides in order to achieve reasonable alignment grades and lengths. MWH evaluated several haul road alignments and tried to reduce large cuts and fills while maintaining the design criteria. We evaluated alternatives that balance cut and fill quantities in a manner that would reduce haul road construction costs and environmental impact. In addition, we considered discarding net cuts over the edges of the existing slopes. In the end, straighter and flatter alignments with reduced cuts and net fills were found to be the most cost effective. The intent is to use mine waste as haul road structural fill where practical and to the extent available. This waste will need to be hauled and dumped regardless. Thus, the cost for using waste as haul road fill is the cost for the additional haul length. Initial exploration of the mine pit indicates that non-acid-generating waste rock has been encountered near the pit surface. It is believed the waste rock characteristics and quantities will be adequate for use as fill for the haul road.

The earthwork quantities for construction of the haul road and tunnel (as shown on MWH Drawing 6, Appendix 7) are approximately as follows:

Cut:	430,000 m ³
Fill:	1,420,000 m ³
Net Fill:	1,000,000 m ³

These quantities were derived from design surfaces built in AutoCAD over the existing ground topography provided by Minera Cardel. The topography provided is in 5 meter contour intervals. We recommend evaluating the alignment and quantities against a 1 meter contour topography for increased accuracy at a later stage in design.

- **Stormwater Control** - Ditches, berms, sediment basins, energy dissipaters, culverts etc. will be required along the alignment to control runoff from watersheds adjacent to the haul road. A lump sum amount was included in the costing of the haul road to account for storm water control. A more detailed design of storm water control measures along the haul road will be required in a later design stage.

18.2.2 Conveyance Tunnel

Due to the mountainous terrain, a haul road that follows the existing landscape would add significant length and operational costs for the hauling of material over the life of the mine. A tunnel located approximately midway along the alignment would reduce the haul length considerably (see MWH Drawings 1 and 6, Appendix 7). While constructing a tunnel for future material conveyance may somewhat increase start-up costs, the tunnel alignment is expected to significantly reduce the life of mine costs for material conveyance.

A tunnel designed for two-way haul truck traffic would require a width of approximately 13 meters. The required width of a tunnel for a conveyor system would be much less, approximately 5.5 meters.

One-way traffic through the tunnel may reduce hauling efficiency due to down-time of haul trucks waiting on either side of the tunnel for on-coming traffic to clear. Preliminary studies conducted by Minera Cardel indicate queuing haul truck convoys will be able to achieve the target production rate for years one and two. This study needs to be refined at a later design stage.

The conditions of the tunnel walls (i.e. rock integrity and wall stability) are currently unknown. It is assumed that rock bolts and shotcrete will be required for tunnel stability. Additional support will likely be required at the tunnel entrances on either side. Entry supports will need to be evaluated during a later stage of design.

The conveyance plan and details can be seen on MWH Drawings 6 and 8, Appendix 7.

19.0 MARKET STUDIES AND CONTRACTS

A market study for sale of the doré has not been conducted.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Regulatory Framework Overview

The Mining Law (Ley Minera) regulates all mining activities in Mexico. In Article 62 from this law requires full compliance with all the environmental laws and regulations.

Mining activities in Mexico are regulated by the Ministry of Economy (Secretaría de Economía), through which the Undersecretary of Industry and Commerce (Subsecretaría de Industria y Comercio) coordinates the industrial and commercial sector. As part of the Undersecretary of Industry and Commerce, the General Mining Coordination (Coordinación General de Minería) and the General Mining Department (Dirección General de Minería) both regulate the mining sector in the country. These authorities require that all mining companies comply with all the Environmental and National Protection regulations, as presented below.

Exploration activities such as drilling need to be performed in accordance with the requirements stated in the Official Mexican Standard NOM-120-SEMARNAT-1997 that establishes the specifications of environmental protection for the activities of direct mining exploration in agricultural zones, livestock, or uncultivated lands and in zones with dry and mild climates with arid tropical scrub and tropical deciduous forest, and conifer or oaks forests.

Exploration activities that are broader than NOM-120-SEMARNAT-1997 are granted once an Environmental Impact Assessment (EIA) Resolution, is issued by the federal environmental agency, Ministry of Environment and Natural Resources (SEMARNAT). Therefore, exploration activities that require the use of explosives can be granted through an EIA Particular Modality. This type of EIA is site-specific oriented and is of limited scope, if a broader activity is required, a Regional modality of an EIA should apply.

Mexican regulations require several major permits for the establishment and operation of mining projects within Mexican territory. The main permits are the Mining Concessions, an Environmental Impact Assessment, A Risk Analysis, A Change of Soil Use Permit and a Use of Explosives Permit. These permits will cover mine development, facilities installation, and operation. An overview of the issuance of permits is presented below.

- Mining Concessions: The General Mining Department, which belongs to the Ministry of Economy, issues the Mining Concessions to the mine Owner.
- Environmental Impact Statement Permits

- Use of Explosives Permit: When explosives are to be used within the mine operation, specific authorization is needed from Ministry of National Defense (SEDENA), this permit is known as General authorization to buy, use and store explosive material for the mining industry - RFA-EX-004. Minera Cardel uses explosives, therefore this permit is required.

The Ministry of the Environment and Natural Resources (SEMARNAT) oversees the evaluation of the Environmental Impact Assessment (EIA), Land Use Change, Hazardous wastes, etc. The General Law of Ecological Equilibrium and Protection of the Environment (Ley General del Equilibrio Ecológico y Protección al Ambiente, LGEEPA) establishes the general regulatory framework for environmental compliance in Mexico.

There are several environmental permits and authorizations that are required for different phases of project development.

The major components of the EIA application are:

- Environmental Impact Assessment; Manifestación de Impacto Ambiental (MIA)
- A Technical Justification Assessment for Land Use Change (Estudio Técnico Justificativo para Cambio de Uso de Suelo, ETJ/CUS) resulting in a Change of Land Use.
- Risk Assessment; Evaluación de Riesgo Ambiental (ERA). Depending on the chemical substances and under which environment they will be managed, a different level of assessment is required from 1-4.
- Environmental Accident Prevention Plan. Programa para la Prevención de Accidentes (PPA);

Once in operation, a Sole Environmental License (Licencia Ambiental Única) is required for full mining operations consisting of mining and processing of the resource. This license is termed Particular Broad as it covers all aspects of a mining operation.

20.2 Environmental Permitting Status

The status of permitting by Minera Cardel under the authority of LGEEPA is as follows:

- Minera Cardel has been conducting exploration activities under NOM-120-SEMARNAT-1997 since 2007 under the various previous owners of the company and concessions.

- An EIA for specific exploration tunneling activities was issued by SEMARNAT on 13th April 2011.
- The National Security authorization for use of explosives was issued under RFA-EX-004 by SEDENA on the 19th April 2011 and was renewed on the 22th September 2011 with an expiration date marked in December 2012.
- An Environmental Baseline Study was conducted in 2010 / 2011, prior to the commencement of any mining operations and has been incorporated into the EIA.
- A comprehensive EIA, Regional Modality and ERA-Level 2 (ERA-2) has been prepared for mining operations which includes site preparation, construction, pre mining activities, mine operation, resource processing and mine closure. The EIA with ERA-2 and ETJ were prepared by consultants in conjunction with Minera Cardel and submitted for evaluation on the 15 and 16th December 2011 respectively. These documents are currently being evaluated by SEMARNAT.

Even though Minera Cardel presented impact mitigation measures in these documents, the resolution from SEMARNAT will include terms and conditions that need to be fulfilled (including additional specific mitigation measures) for all the project phases: site preparation, construction, operation and mine closure. These measures will be addressed in different environmental plans in order to create an Integral Management Program, currently under development.

The future mining activities will be authorized after the expected approval resolution of the EIA, ERA and ETJ submitted in December 2011 is issued by SEMARNAT.

In addition to the Environmental Impact Assessment the following permits indicated in Table 20.1 are required for mine operations to commence.

Table 20.1 Environmental Permits 1	
Permit	Agency
Water Quality Certification	General Water Subdirection, National Water Commission (Subdirección General de Aguas Comisión Nacional de Agua, CONAGUA)
Wastewater Discharge Permit	CONAGUA
Surface Water Rights	CONAGUA
Hazardous Waste Generator Registration	SEMARNAT
Special Waste Generator Registration	State Environmental Authorities (SEDEMA)
Operating Environmental License – (LAU)	SEMARNAT
Annual Operation Report - COA	SEDEMA

Non-environmental permits required prior to any operation activities include:

- INAH-00-017: Building Authorization in areas where archaeological vestiges may be or are located- National Anthropology and History Institute (Instituto Nacional de Antropología e Historia, INAH).
- General permit for purchase, storage and use of explosives by the mining industry-Secretariat of National Defense (Secretaría de la Defensa Nacional, SEDENA).

20.2.1 Exploration Phase

Exploration drilling is performed in accordance with Official Mexican Standard NOM-120-SEMARNAT-1997. Minera Cardel is currently developing an improved new system to maintain a detailed record of excavated land, and of flora and fauna species affected by this activity. Protected flora species affected by exploration activities are being recorded and relocated to an area with similar site characteristics. Additionally, measures such as fauna audio frightening and visual verification will be done. A Flora and Wildlife management plan is currently under development to ensure improvements in current practices.

An EIA, Particular modality for the development of six exploration tunnels was completed and submitted to SEMARNAT in 2010. The EIA included tunneling and portal construction, operation and closure of the exploration activities by Resolution SGPARN.02.IRA.1553/11. Minera Cardel was authorized on 13th April 2011 to conduct exploration activities at the six locations. In June 2011 a modification to the EIA was applied to move one of the tunnels to a more suitable location, this was granted in August 5, 2011 by Resolution SGPARN.02.IRA.2073/11 and currently this one tunnel is under development.

20.2.2 Mining Phase

An EIA, Regional modality (EIA-R) for the mine operation and extraction activities was submitted to SEMARNAT in December 15, 2011 and is currently under evaluation. When the EIA-R resolution is issued the mine can commence mine development, construction activities and subsequent mine extraction operations. Once in operation a Sole Environmental License will apply. Minera Cardel will follow specific environmental requirements stated in this Environmental License.

It is the intention of Minera Cardel to operate the mine for 8 years, if required an extension can be applied for. The overall mine development will be done under Minera Cardel's Mine Plan of Operations which includes the following major activities:

Construction consisting of:

- Site preparation for mine and process facilities
- Mine pre-production activities
- Haul roads and site roads
- Waste rock disposal areas
- Heap leach
- Activated Carbon Adsorption/Desorption/Recovery plant
- Maintenance buildings
- Administration buildings
- Assay laboratory
- General warehouse, etc.

Mining Operations will include:

- Mine production
- Waste rock mining and dumping
- Heap leach operations
- Gold recovery operations
- General services to support the mine and processing facilities

Reclamation and Closure includes:

- Mine pit
- Waste dumps
- Heap leach
- Removal of major equipment
- Demolition and removal of various structures

The most relevant environmental impacts expected during the exploration and mining phases are listed in Table 20.2 which addresses the phase, topic and potential impact.

Table 20.2 Expected Exploration and Mining Operations Environmental Impacts		
Stage	Subject	Impacted Environmental Issue
Exploration Activities		
Site Preparation and Construction	Soil Quality / Top soil	Top Soil Removal
		Rock Layer removal
	Erosion	Loss of soil by access mine pathways
	Stability	Potential slope failure
	Vegetation	Removal of trees and other local vegetation.
	Noise	Noise emissions
	Fauna	Fauna protected species
		Fauna distribution
		Fauna habits
Exploration Operation	Visual Impacts	Removal of top soil and change of landscape.
	Air Quality	Dust generation
	Visibility Impacts	Reduction of visibility due to dust emissions

Table 20.2 Expected Exploration and Mining Operations Environmental Impacts		
Stage	Subject	Impacted Environmental Issue
	Noise	Noise emissions
	Water quality	Activities involving surface water and runoff.
		No aquifer or underground stream is expected to be impacted due to the high impermeability of the underlying basalt mesa. No impact.
	Vegetation	Removal of trees and other local vegetation.
	Fauna	Land ecosystems and migration of species to adjacent areas.
Mining Operations		
Site Preparation and construction	Clearing	Soil type
		Land use
		Erosion process
		Fauna abundance
		Fauna Protected species
		Fauna distribution
		Fauna habits
		Flora biodiversity
		Flora protected species
		Flora distribution
		Flora habits
		Archeological vestiges found in the area
		Landscape quality
		Visibility
		Landscape fragility
		Relief
	Soil Moving	Natural Rainwater drainage
		Aquifer recharge
	Hazardous material handling	Visual quality
		Fire risk
	Waste and discharges	Air quality
		Water quality
		Spills and leaks
	Personal hiring	Basic services
Extraction and Operation	Material extraction	Type of soil
		Land use
		Erosion process
		Soil quality
		Landslide
		Relief
		Natural drainage for storm water
		Flooding areas
		Water quality
		Aquifer recharge
		Underground water quality
		Air quality
		Microclimate
		Noise
		Fauna Protected species
		Fauna distribution
		Archeological vestiges
		Landscape quality
		Landscape fragility
		Visibility
	Extraction plant	Relief
		Landscape quality
		Landscape fragility
		Visibility
		Spills and leaks
	Energy Generation	Water quality
		Air quality
		Air quality

Table 20.2 Expected Exploration and Mining Operations Environmental Impacts		
Stage	Subject	Impacted Environmental Issue
	Water consumption	Water quality
	Hazardous material handling	Air quality
		Noise
		Fire risk
		Explosion risk
		Spills and leaks
	Wastes and discharges	Noise
		Air quality
		Water quality
		Spills and leaks
		Landscape fragility
Closure	Restoration activities	Fauna abundance
		Fauna distribution
		Fauna protected species
		Flora distribution
		Flora abundance
		Flora protected species
	Energy Generation	Air quality
	Hazardous material handling	Fire risk
		Spills and leaks
	Wastes and discharges	Noise
		Air quality
		Water quality
		Spills and leaks

20.3 Environmental Baseline

Part of the preparation of the EIA includes an environmental and social baseline study. This study started in 2010 and completed in 2011, with the results of the environmental baseline included in the EIA. Information and data for the baseline study includes bibliographic and field observation characterization plus data from a Geographic Information System.

The following baseline was measured:

- The local temperature ranges between 18 to 37 °C.
- The site of interest is located in an area with hurricane risk and tropical rain.
- The site of interest is located on a low risk seismic zone, where some occasional tectonic events may occur.
- Previous geotechnical investigations have shown the evidence of two small geological fault systems within a 3 km radius from the project area, however the studies report that these faults do not affect the mine stability.
- There are reports of some minor landslides caused mainly by high rainfall events.

- The mine complex is located in an area with possible fluvial flooding events.
- The baseline studies showed that there is no evidence of industrial pollution in the bodies of water within the project area.
- The conclusion made after the EIA baseline was that there was not any geological or hydrological condition which would compromise the full operation of the mine exploitation activities.
- The vegetation on site is classified as middle low subtropical evergreen woods
- There are three different types of vegetation within the proposed mine area.
- Depending on location and elevation, different types of vegetation are identified:
 - Grassland and secondary vegetation permanent in the lower areas
 - Secondary vegetation and deciduous forests in the middle
 - Tropical Oak forest on the upper parts

The complete baseline study area (SA) comprises the complete environmental area in which the project is intended to be located (SA = 50,800 ha). Within this area is located the project area (PA) and the following natural areas:

- Two Bird Conservation Areas: AICA No. 149 Coast Investigation Center “La Mancha” and AICA No. 150 Veracruz Center (Area de Importancia para la Conservación de Aves, AICA) according to the National Commission for the Knowledge and Use of Biodiversity (Comision Nacional para el Conocimiento y Uso de la Biodiversidad, CONABIO).
- A Priority Terrestrial Region (RTP) No. 104-Tropical Deciduous Forest from Veracruz Plain Coast.
- A Priority Marine Region (RMP) No. 49 - Laguna Verde- Antón Lizardo.

Further details of the main environmental aspects recorded in the baseline study are characterized below.

20.3.1 Climatology

The SA weather is classified as tropical rainy with temperatures ranging from 18°C during the coldest month to 37°C during the warmest month. Historically, the temperature media range is between 22° to 27°; and the registered extreme events do not represent any risk for the proposed mining activities. Despite the fact that historic

registers do not present extreme weather conditions in the SA, the site needs to consider the possibility of hurricanes and their frequency.

20.3.2 Edaphology and Land Use

Twenty eight (28) soil samples were taken and analyzed which indicated presence of alluvial, luvisol and regosol types of soil.

The main use of land at the area is forestry and cattle grazing areas.

20.3.3 Geology

The SA is located within the Neovolcanic axis physiographical zone characterized by closed basins. Main topographic formations within the SA consist of: hillside mountains, low hills, and alluvial coastal plains. The SA is considered to be outside of classified volcanic, seismic or landslide risk areas.

20.3.4 Hydrology

The assessment showed that part of the rock has low permeability, which makes a strong dependency between the surface and underground water. Springs in the area depend on the infiltration of storm water; therefore, the mechanism that controls the flow from the springs is the lithological soil units. The area where the heap leach will be placed is named Rancho del Niño. It is reported that the majority of the rocks located in this area have low permeability except for the basaltic rock of medium permeability.

As part of the baseline study surface water was analyzed and compared with applicable standard NOM-127-SEMARNAT-1994 - quality of water for human use. A total of 27 samples were collected from wells located in the surrounding communities. Even though the natural pH present in the North part of the SA is between 3.3-6.5, all samples showed compliance with maximum permissible statutory limits.

From the four studied hydrological sub basins, (C1) has a groundwater flow towards the sea, with a flow of 179.44 lps.

20.3.5 Flora

The National Institute of Geography and Statistics (INEGI) and the National Commission for Natural Protected Zones (CONANP) have classified some of the local vegetation species as a Pleistocene relic which thus defines the SA as an area of importance. The vegetation is classified as low temperate deciduous forest, tropical oak forests of low and medium altitude, mangrove swamp, and coastal dune vegetation.

Due to a severe vegetation community fragmentation from agriculture and cattle raising, a high heterogeneity is present on the study area, 80 percent (Grasslands), 20

percent is secondary vegetation and composed natural vegetation of Oak forest, Deciduous forest, Cloud forest, Mangrove and Coast Dunes.

The study highlighted that most of the area has been impacted by agricultural activities, since some foreign vegetation has already been introduced and much of the site is being used for grazing fields. Currently the SA is 56 percent for cattle grazing, 19 percent of secondary vegetation, 5 percent of farmlands, 10 percent of deciduous forest, 7.24 percent of tropical oak forest, 1.03 percent of dune vegetation and 1.73 percent of mangrove swamp vegetation.

The study identified several potentially endangered species to be protected under the Mexican standard NOM-059-SEMARNAT-2010 Environmental Protection, Flora and Fauna Native Species.

The baseline studies indicate that 49 percent of the project would be located on grasslands while 51 percent in forested areas. Approximately 834 m³ of vegetation will be removed from this area. Topsoil is considered to be the first 0.3 m b.g.s. (below ground surface), the mine project estimates that approximately 472,480 m³ will be removed from the active mining site.

20.3.6 Fauna

The SA is located on the Coastal Environmental Corridor of the Gulf of Mexico, which is an important international bird migration route of 75 km wide, consequently the region is classified as an Important Bird Conservation Area (Area de Importancia para la Conservación de Aves, AICA No.149 & 150). Through the literature review was found that around 579 to 679 fauna species have been reported in the SA. Fieldwork observations identified 331 species from total literature reported species. The percentage of species found during the fieldwork is as follows: 54 percent of bird species, 69 percent of reptiles species and 62 percent of mammals species. From the total observed, 35 species are listed on NOM-059-SEMARNAT-2010 which establishes the Mexican native Wildlife species of Flora and Fauna. In total Birds (19 sp.), Reptiles (13 sp.) and Mammals (3 sp.) protected species were observed. From this species 95.5 percent have a wide distribution and 15.5 percent are endemic of Mexico.

20.3.7 Landscape

The SA consists of mostly ancient volcanic formations and downhill systems. Thirty landscape units were observed within the SA. All of these units have been influenced by the land use change to agriculture and cattle raising, for which it is common to find diverse types of natural vegetation such as Oak forest, Deciduous forest and Mangrove forest, besides to cultivated lands with sugar cane, mango and coffee tree.

However, according to the vulnerability analysis, the most significant impact will mostly be on native vegetation. The most vulnerable zone identified was the area known as "*La Paila*", as it is reported in the EIA as an area in a high conservation state and with ecosystem significance. "*La Paila*" is the area where the main extraction activities are proposed. Therefore, Minera Cardel is currently developing special measures to mitigate and compensate the impacts which may be derived out of these actions through management programs for the flora and fauna at this area.

20.4 Environmental Impact Assessment (EIA)

A comprehensive EIA has been prepared for mining operations which includes site preparation, construction, pre mining activities, mine operation, resource processing and mine closure. The EIA was prepared by consultants in conjunction with Minera Cardel and submitted for evaluation on the 15 December 2011; it is currently in the evaluation phase by SEMARNAT.

Even though Minera Cardel presented impact mitigation measures in these documents, the resolution from SEMARNAT will include terms and conditions that need to be fulfilled (including additional specific mitigation measures) for all the project phases: site preparation, construction, operation and mine closure. These measures will be addressed in different environmental plans in order to create an Integral Management Program, currently under development.

The future mining activities will be authorized after the expected approval resolution of the EIA, ERA and ETJ submitted in December 2011 is issued by SEMARNAT.

20.4.1 Mine Waste Rock and Heap Leach Extraction

Two main sources of residues are anticipated during the development and operation of the mine. Waste rock will be mined along with the resource and placed on a dedicated waste rock area; mined resource will be placed on the Heap Leach Pad for extraction of gold.

20.4.2 Waste Rock

It is expected that a total of 83,000,000 tonnes of waste rock will be generated during the life of mine. This material will be stored in a waste rock storage area with a total area of 96 ha located approximately 500m to the west of the open pit. The dump will have a maximum slope of 35° gradient. Additionally there will be channels to manage and control the runoff during the rainy seasons.

The design of the waste rock dump will facilitate controls during operations and during the mine closure. A drainage system will be constructed around the perimeter of the waste rock area to control up gradient run-off. The dumping zone will also have a

slight slope to avoid flooding areas. Where necessary waste that has acid drainage potential will be segregated and placed on a liner system designed to direct this contact water to a treatment facility. This will be part of the operating and closure plan.

20.4.3 Heap Leach Pad

The Phase 1 and Phase 2 heap leach pad capacity is 50,000,000 tonnes of material placed on 41 ha of lined pad. The material will be passively treated avoiding rinsing the heap and increasing its required capacity. Drainage channels will be installed around the leach pad to direct storm water away from the heap leach pad and the process ponds. The heap leach pad liner system consists of the following safety barriers to control solutions.

- Impermeable Clay layer (varies 0.5m 1.5 m).
- Impermeable HDPE Membrane (0.08 in);
- Internal Drainage systems

The overall leach pad is designed to international standards, which are industry norms. A specialist company will be contracted to design and then oversee the installation of the heap leach pad. Quality control will be strictly enforced and the main HDPE liner will be tested by vacuum and other membrane tests.

An erosion control program will be applied at the mine and heap leach areas during the construction phase. In areas with erosion risk stabilization can be by use of rock, drainage channels, culverts and other appropriate measures.

20.4.4 Other Waste

Waste generated during the operation such as maintenance waste, metal scrap, etc., will be handled according to Mexican regulations and the Waste Management Plan and Waste Reduction Program, both have already been submitted to SEMARNAT with the EIA.

Non-hazardous waste will be handled in accordance with the municipality contractors. The waste reduction program will include measures such as composting of organic wastes generated by the local canteen and the separation of recyclable materials.

20.4.5 Water Management

The overall mine water usage will require up to 3,000 m³/day for the mine operations, heap leach, and processing facilities. During the wet season approximately 650 m³/h of treatment for excess water from the leach heap and sulphide waste dump will be required. Usage varies according to seasonal precipitation as where practical water will be captured in the mine pit and reused. The mining operations will use water

for drilling and dust control. The heap leach facility will use fresh water to wet the resource and make-up for evaporation losses. Water used in the heap leach and processing facility will be recycled and will be contained within the lined heap leach and solution pond systems, or treated and discharged in accordance with the Mexican environmental and discharge standards (NOM-002-SEMARNAT-1996). A lined Events pond will be built to manage excess seasonal water from the heap leach system. Should there be a hurricane or 100 year maximum rainfall event this will be stored within the heap

Drainage systems will be installed at the mine to channel water away from the mine. Similarly that the heap leach and processing facility's storm water will be channeled away from these areas.

Water from offices and ablution facilities will be dealt with by installation of septic systems. Water from maintenance facilities that may contain contaminants will be captured, oils removed and the water reused in the maintenance facilities. In the event that it cannot be treated (very small quantities) this water can be removed from site and treated in accordance with waste treatment permitting requirements.

20.4.6 Monitoring Programs

A water-monitoring program will be developed and implemented based on the EIA resolution and specified requirements. Currently, the monitoring programs for each of the environmental mitigation measures are under evaluation by SEMARNAT as part of the EIA.

These programs include the following monitoring activities:

- Mine pit slope stability and heap leach material stability;
- Specific focus of the water monitoring program will be the detection and reporting of acidity or heavy metals from the waste dump, open pit and heap leach area;
- Vegetation will be observed, reporting will primarily be recording the species survival rate, the percentage of flora coverage and the ability of the new habitats to support local fauna;
- Erosion monitoring will be performed throughout the mine complex;
- Chronological register of reclamation activities;
- Monitoring of all the environmental mitigation measures; all the mentioned environmental measures will be reviewed and supervised by the mine environmental department.

20.5 Environmental Risk Assessment

As part of the EIA, an Environmental Risk Assessment (ERA) level 2, was prepared and submitted to SEMARNAT, as the mining operations include the use of substances considered high risk activity by SEMARNAT. The ERA covers the risk and safety handling procedures for the following hazardous substances:

- LP Gas
- Gasoline
- Diesel
- Explosives
- Sodium cyanide
- Hydrochloric acid

According to the information provided within the ERA, the activities classified as high risk were the hydrogen cyanide dispersion (dispersion of toxic gas), the LP Gas above ground storage tank (fire-leak), diesel storage (fire-leak), and explosive storage (explosion). The simulated scenarios showed that the maximum impact radius in the worst scenario (the explosion of the explosive storage) is less than 1 km. According to the ERA results, even though the affectation radius could extend beyond the mine complex boundaries, the area of impact will not extend to neighboring areas.

The environmental risk was assessed through risk modeling of the substances handled in larger volumes. The hydrochloric acid is considered in the risk analysis but was not modeled since it will be used in small volumes under the threshold limit,

A total of 22 different scenarios were simulated as part of the ERA, A complete summary table is included in the addendum of the ERA report. The following table shows those scenarios that could have the strongest consequences.

Table 20.3				
Risk Assessment Summary Table				
Risk Scenarios	Conditions	Risk Zone	Buffer Zone	Notes
No. 1 Toxic cyanide on cyanide solution preparation	Cyanide solution preparation - pH lower than 10.5	225 m with concentration 50 ppm	775 m – toxic gas disperse	
No. 2 Toxic cyanhydric acid	Heap leach - pH lower than 10.5	Not registered at soil level, while evaporating concentration 50 ppm	211 m – concentration 4.7 ppm	Buffer zone- 8 hrs. exposition tolerable
No. 3 Toxic cyanhydric acid	Acid wash column - pH lower than 10.5	Not registered at soil level, while evaporating concentration 50 ppm	94 m – 4.7 ppm	Buffer zone – 8 hrs. exposition tolerable
No. 4 Diesel leak exposed to ignition	20 % of the tube diameter leaking response in 15 min. Rupture of tube scenario – response 5 min.	11.58 m	16.45 m	Contained on emergency pond
No. 5 Gas LP – tanks exposed to an ignition	Not having relief valves in 5 000 L	235 m	435 m	
	Failure cooling system in a 42 000 L	462 m	854 m	
No. 6 Gasoline tank exposed to an ignition	-	386 m	713 m	
No. 7 Accidental infiltration of cyanide solution to natural soil	-	Low affectation-quick deactivation	Low affectation-quick deactivation	5 m in 24h, 15 m in 8,760 h
No. 8 Explosive storage	15.1 tons of explosives	372.77m	998.52 m	Pressure present at the moment of explosion of 0.5 psi

The results provided through the risk assessment were used by Minera Cardel for mine planning and design by incorporating the recommendations stated within this risk assessment to ensure performing this project in a safe environment.

20.6 Change of Land Use

For the Change of Land Use a Technical Justification Assessment for Land Use Change (ETJ/CUS) was prepared and submitted to SEMARNAT on 16 December 2012. Part of the mine is located in a forest area (51 percent - 170.63 ha of deciduous forest and tropical oak forest), the other part is agriculture and grassland (49 percent - 163.93 ha); therefore, only the forested area needs a land use change to an industrial mining land use classification. From the 51 percent of land that needs a land use change, 73.9 ha are currently owned by the company and for which the land use is being submitted to SEMARNAT. To prepare this assessment, a complete baseline study was performed along with an estimation of the number and type of the trees and bushes that will be removed to construct the project (including open pits and dumps).

The rest of the land that needs a land use change is currently under acquisition process (85%). The corresponding ETJ/CUS will be submitted to SEMARNAT evaluation, as soon as this area is acquired.

Some mitigation measures are recommended as remediation of the damage caused by the former land use, prior to the planned mining activities. The following are the mitigation measures proposed within the ETJ:

- Recovery actions for the damaged forest by the creation of biological corridors;
- Prepare environmental indicators to assess the environmental parameters such as: biodiversity and survival rate to ensure success in the proposed mitigation measures;
- Environmental training and awareness campaigns for mine employees;
- Environmental training and sustainable education to the nearby population on improvements and optimization of natural resources.
- Strict compliance with all applicable Mexican legislation.
- Design an informative program for current environmental and social conditions at the area and expected changes during the project life span.

20.7 Environmental Mitigation

The following plans and programs were proposed as indicated in table 20.4 as part of the mitigation measures to reduce the overall environmental impacts of the project and are currently in a preliminary stage.

Table 20.4 Mitigation Measures	
Subject	Mitigation Measure
Exploration Phase	
Erosion	Ditching and silt catchment
	Geomembrane coating
Stability	Stability mesh
	Concrete covering
Air Quality	Soil moistening by aspersion during dry weather
	A designated area for temporary storage of the top soil
	Machinery maintenance program
	Covering of material storage
Visibility Impacts	Soil moistening by aspersion during dry weather
Noise	Machinery maintenance program
	Explosives use only as required by Mexican regulations
	Accident Prevention Program
	Personal Protection Equipment for worker
Vegetation	Reuse of topsoil
	A designated area for temporary storage of the top soil
	Reforestation
Fauna	Rescue Program
	Continual training and environmental awareness program to the mine employees.
	Preventive H&S signage program
Visual Impacts	Nonhazardous, Special and Hazardous Waste Program
	Designated area for temporary storage of Top soil
	Best practices in housekeeping
	Hazardous waste storage in compliance with Mexican regulation
Mining Phase	
Erosion process	Soil Conservation Program
	Slope stability
Land Use	Environmental compensation program
	Remediation Plan
	Erosion control program
Fauna	Environmental compensation program
	Remediation Plan
	Program of Rescue and relocation of flora and fauna
	Environmental training
Flora	Erosion control program
	Remediation Plan
	Program of Rescue and relocation of flora and fauna
	Environmental training
Morphology	Environmental compensation program
	Remediation Plan
Aquifer/underground water	Environmental compensation program
	Remediation Plan
	Discharge management program
Storm water drainage	Environmental compensation program
	Remediation Plan
	Storm water natural drainage modification plan
Surface Water	Storm water natural drainage modification
	Discharge management program
	Water monitoring program
Soil	Erosion control program
	Remediation Plan
	Soil remediation plan
	Secondary containment pond in leaching process

Table 20.4 Mitigation Measures	
Subject	Mitigation Measure
Relief	Slope stability
	Erosion control program
	Remediation Plan
	Filling and embankment building program
	Slope stability
Air Quality	Dust control
	Meteorology monitoring program
	Maintenance program
Noise	Maintenance program
Fire and Explosion Risk	Accident Prevention Plan
Waste material disposal	Waste reduction program
	Waste rock disposal control program
Workers safety	H&S Signage Plan
	Transport strategy program
	Accident prevention plan

These are intended to preserve in the most feasible manner, the current natural state of the site and to reduce to a minimum the risks that could compromise worker health and safety. No conditions were observed by ERM during the site visit that would compromise the environment and worker safety. The mine has a very strong commitment to preserve natural resources and to improve the current social conditions at the area.

20.8 Social and Community Baseline

A community relations team which consists of an administrator, a Community Relations Manager (CRM) and a four-staff team composed of a biologist, a doctor, a human resources analyst, and a historian was set up in September 2011 to address community relations and mine impacts. An ongoing program of forums and information distribution is in progress to address concerns and provide an overview of the intended mine operations. This program has been presented to the local and greater communities resulting in one Community Development Agreement (CDA) being signed with a group within one of the communities of interest. The objective of the CDA is to foster a cooperative and synergistic relationship.

The social and community baseline study addresses the demographic and socioeconomic context of some of the existing communities. There were several legitimate concerns within the community, each of these have been addressed as part of the ongoing social and community work. There is popular support for the project locally, with minor dissent from a small population group.

20.8.1 Social Context

Minera Cardel has expended considerable effort in understanding the social context of the Project. A robust social baseline study, which highlights demographic and

socioeconomic data of the surrounding communities, has been compiled; and in-depth studies called Rural Participatory Studies (RPSs) have been undertaken in some of the communities identified as to be within the Area of Influence (AI). To a minor extent the RPS has extended beyond the AI. The communities identified by Minera Cardel to be within its AI are presented in Table 20.5 below:

Table 20.5 Surrounding Communities		
Alto Lucero	Atotonilco	54
	Yerbabuena	74
	El Limón	147
	Vainillas	189
	Potrero Alto	216
	Mesa de Veinticuatro	462
	Palma Sola	2,742
Alto Lucero's Total		3,884
Actopan	Alto Lucero's Total	
	El Caliche	Actopan
	Arroyo Agrio	
	Villa Rica	
	La Luz	
	El Ojital	
Actopan's Total		1,584
Total Population		5,468

Source: Data provided by Minera Cardel (2012)

20.8.2 Social Programs, Alliances, and Community Development Agreements

Minera Cardel has focused great effort in both designing and implementing socially-oriented programs and alliances by identifying relevant institutions and organizations with which agreements and alliances can be forged.

Social Programs

The design of the Social Program (SP) focuses on core issues relevant to the local communities, which are:

- Health;
- Training;
- Environment; and
- Infrastructure.

To address such issues, Minera Cardel has designed the following Social Programs.

Community Health - This program is provided by a doctor employed by Minera Cardel. The program consists of providing basic, free-of-charge medical attention to people whose communities lack government medical assistance. The program will provide first aid training to workers and is focused on preventative medicine

programs for the local population. A baseline health study is currently in progress to establish the surrounding communities' access to health care, preventative medicine and the overall health of the community. This would allow Minera Cardel to understand the current communities' health conditions and assess the way in which it changes through the Project's lifecycle. This intention would have to be communicated to community members. This has not been done as of yet. The Community Health program has been installed since January 2012. No CDA or alliance with any organization has been reached as part of this program.



Photo 20.1 - Mobile Medical Unit
Source: ERM (2012).

Culture and Traditions - This program is led by the community relations team historian. The “culture and traditions” program is designed to support the rescue and strengthening of both historical and culinary traditions. Specific goals have been designed such as: compilation of 13 local stories, elaboration of a recipe book of local meals, integration of 12 cultural committees, creation of a historical photographic log of the communities, and promotion of reading workshops. The implementation of this program with the community is in progress.

Internal Training - Even though there is no defined program particularly aimed at training workers, Minera Cardel has identified the Technical Training Institute of the State of Veracruz (ICATVER) as a potential alliance partner for training of local residents so that there are appropriately qualified for employment.

Environmental Corner - The programs included in this section aim at promoting environmental education.

- **School Gardens** - This program was designed as a result of some of the findings of the RPSs: (a) malnutrition in children, (b) deforestation concerns, (c) depletion of water bodies, (d) soil erosion, and (e) pollution of both air and water. The main goal of the program is to educate school children to manage handmade orchards. No CDA or alliance with any organization has been made as part of this program. No evidence related to the execution of this program has been reviewed.

- **Vermicompost** - The main goal of this program is to teach community members to make vermicompost out of organic residues and reuse it as agricultural input. This program arose as Minera Cardel found, through the RPSs, that rivers and other bodies of water are being polluted by manure. The “vermicompost” program would reuse manure as an input for making compost. Minera Cardel has an alliance with the Training Unit of Rural Development (UNCADER). Such alliance ensures that UNCADER will provide Minera Cardel with technical training regarding production systems in agricultural business. UNCADER has provided training to local landowners so that they can make their own compost by providing landowners with an initial quantity of worms. Successful farmers would pass on the worms to others. In this manner the program will experience organic growth. It is expected that this program will soon become official as a signed agreement between the parties



Photo 20.2 - Vermicompost Pile
Source: Provided by Minera Cardel (2012)

- **Demonstration Plot** - This program consists of an alliance with farmers and providing them with technical assistance to increase their lots' productivity based on improved agricultural techniques and minimization of natural resource use (i.e. water). There is abundant visual and anecdotal evidence of the program already being in place, but no formal CDA has been signed with farmers or local authorities.



Photo 20.3 - Demonstration Plot
Source: ERM (2012).

- **Intensive Forage** - This program consists of working with cattle ranchers to provide them with proper forage in an intensive manner so that the cost of traditional grazing is lowered. No CDA or alliance with any organization has been made as part of this program. No specific evidence related to the execution of this program has been reviewed.

Infrastructure - One of the key issues promoted by Minera Cardel is infrastructure building. As of January 2012, Minera Cardel has built several mini-dams to prevent floods and is currently working on installing a water well that will benefit members in 3 communities within the AI (El Ojital, El Caliche, and La Luz). No CDA or alliance with any organization has been made as part of this program. The work on infrastructure is expected continue and evidence of the effects should be more definitive in the future as to the effectiveness on sustainable development.



Photo 20.4 - Building of a Dam as Part of the "Infrastructure" Program
Source: Provided by Minera Cardel (2012)



Photo 20.5 - Installation of a Water Well in El Ojital Community
Source: ERM (2012)

Alliances and Community Development Agreements

The following alliances have been identified as relevant; the status of each alliance is shown in table 20.9.

Table 20.6 Development Agreements		
Organization (acronym in Spanish)	Alliance description	Status
Institute of Ecology (INECOL)	This is a renowned institution. Minera Cardel believes that being allied with it would give credibility to its environmental performance.	To be developed
National Institute of Forestry and Agricultural Investigations (INIFAP)	This is a renowned institution. Minera Cardel believes that being allied with it would give credibility to its environmental performance and would help in designing reforestation programs.	To be developed
Training Unit of Rural Development (UNCADER)	With this alliance, Minera Cardel would be able to foster productive projects with community members.	Formalized
Agricultural Related Trust (FIRA)	With this alliance, Minera Cardel would be able to foster productive projects with community members.	In progress*
Institute for Adult Education of the State of Veracruz (IVEA)	With this alliance, Minera Cardel seeks to promote community well-being by training adults.	In progress*
Sierra Hidalguense University	This alliance would help Minera Cardel to train its workers in performing mining activities.	In progress*
Technical Training Institute of the State of Veracruz (ICATVER)	With this alliance, Minera Cardel seeks to provide training to its workers not directly related to operating mining machinery.	In progress*
Postgraduate College (COLPUS)	Details on this alliance are not available.	In progress*
University of Veracruz (UV)	Details on this alliance are not available.	To be developed
National Autonomous University of Mexico (UNAM)	Details on this alliance are not available.	To be developed

Source: Data provided by Minera Cardel (2012).

* No evidence on which to base the degree of completion for these alliances was submitted.

National legislation does not require Minera Cardel to formalize alliances with any identified stakeholder or to develop any CDA. Nonetheless, by pursuing them as part of social issues' management, Minera Cardel is implementing best international practices.

20.8.3 Current Activities and Plans for the Project

Minera Cardel has implemented public forums meetings to keep local and regional communities informed about the project with respect to activities to address concerns and provide factual information on developments. In addition socioeconomic impacts are addressed as are potential sustainable development opportunities. Formal public hearings are anticipated which will include State and Federal authorities, community leaders and local population groups.

Minera Cardel has spent great effort in understanding the social context of its Project. Current social-oriented initiatives are of great ingenuity and some are of major relevance; however, a stronger link between social risk management and the design of

CDAs and alliances would ensure that the latter are successfully implemented in the long term.

20.9 Closure

As part of the EIA, the mine submitted a Closure Plan that includes design criteria for mine closure in compliance with Mexican environmental requirements. Further, this plan includes all aspects to consider during the mine closure.

Once mining is concluded the Closure Plan will be implemented with the main objective of verifying that the whole project area remains safe in terms of land stability, landslides prevention, and free of contamination. The design of the whole mine project considered mitigation measures to ensure the possible future use of the disturbed lands and an adequate reclamation of the abandoned pit. Some of the considered actions are: (1) the topsoil conservation program where most all fertile soil will be stockpiled during the construction phase for future uses during reclamation and closure, and (2) the flora and fauna rescue program where some individual plants will be relocated with special attention to those under any type of protection.

The mine has already determined that there will not be enough topsoil for future reclamation purposes. Therefore it is considered, that the rock layer to be placed as an erosion control in the waste rock pile will also help to enhance the growth of vegetation. Reforestation will be done first with seeded grass and then with bushes and native species of trees.

The heap leach pads will go through a detoxification process to remove any residual cyanide previous to reforestation and vegetation. The heap leach pads will be covered with soil and rock generated during the construction and mining prior to starting the reforestation.

20.9.1 Infrastructure Decommissioning

All the structures will be removed within the following three months after the end of the mine operation. First, heavy machinery and equipment will be removed from the site, followed by process equipment, the activated carbon adsorption / desorption / recovery plant, and supporting services such as the power generation units or the wastewater treatment plant. The equipment used for the neutralization of the heap leach pads will remain on site until the detoxification process is completed, as well as the offices and camp for workers. A chain-link fence will be built along the open pit boundary to prevent the entrance of local fauna.

20.9.2 Reforestation and Vegetation

This activity will be done after the detoxification process using native species, in accordance to the following procedure:

- Contouring to slopes within the AIE such that they can sustain vegetation.
- Soil enrichment by the use of nutrients-rich soil.
- Reforestation individuals coming either from the local greenhouse, or not-endangered native species.
- Perimeter fences for cattle to restrict the access to the reforested areas.
- Use of native species whenever appropriate.
- Protection for herbivores to restrict their entrance into conservation areas, through continual monitoring.
- Maintenance of the area use to transplant flora species: The mine will keep a logbook with the relocated plant records as well as the mortality rate.
- Survival rates will be monitored, after vegetation and reforestation activities are concluded. Special care will be provided to the relocated plants until they have adapted to the new habitat.

20.9.3 Residues Disposal

All waste will be disposed according to the waste programs previously developed and authorized by SEMARNAT and SEDEMA, through authorized companies.

A remediation plan will be followed as part of the closure activities. The remediation plan states that if any of the environmental mitigation measures and programs fail and consequently cause environmental liabilities, the affected areas will be restored. The mine will submit a restoration plan to SEMARNAT.

20.9.4 Monitoring Programs

As part of the closure program a monitoring period of time is considered to ensure this plan is performed with success.

The closure plan will be periodically reviewed and revised, to make any needed modifications. Adequate financial provisions will be performed during the mine lifespan cycle, ensuring the effectiveness of the closure plan, without any environmental or social liabilities.

20.9.5 Closure and Environmental Measures Costs

According the EIA submitted to SEMARNAT (Regional Modality), the project Caballo Blanco estimated a total of US\$ 3,265,000 for the environmental mitigation

measures and an assigned budget of US\$ 5,000,000 for the mine closure plan. All the environment and social mitigation measures and programs are considered throughout the whole project.

21.0 CAPITAL AND OPERATING COST ESTIMATE

The costs to mine, load, haul, place and spread the waste rock from the mine pit to the waste stockpile areas (including the haul road fill areas) using 100-tonne trucks is included in SRK costs. A cost to mine, load, haul, place, and spread resource from the mine pit to the heap leach pile using 40 tonne trucks is included in the mining costs provided by SRK.

It is assumed that in the future the haulage of resource by trucks will be replaced by a conveyor system. The cost of the conveyor is included as a sustaining capital cost. The capital and operating costs for the conveyor system is estimated by KDE.

21.1 Open Pit Mining Operating and Capital Cost Estimate

21.1.1 Mine Operating Costs

The open pit mining activities for the La Paila deposit was assumed to be primarily undertaken by a mining contractor as the basis for this preliminary economic assessment. The cost estimate was built from first principles, input from Minera Cardel, as well as SRK experience of similar sized open pit operations. Equipment efficiency was estimated based on site conditions (e.g. estimated haul routes for each phase). Local labor rates (for operating, maintenance, and supervision/technical personnel) and estimates on diesel fuel pricing were taken into consideration for the mining cost estimate.

Open pit mining costs for this preliminary assessment were estimated to be \$1.60/t waste mined and \$2.70/t mineralized material mined. The increase in estimated mineralized material mining cost is attributable to the additional haul distance required to transport the mineralized material to the heap leach facility located to the south west of the deposit, as well as re-handling of material at primary crusher.

The mining cost estimates encompass open pit and dump operations, road maintenance, mine supervision and technical services, as well as contractor mark-up.

21.1.2 Mining Capital Costs

Capital costs for the project were developed from a mix of first principles, reference projects, and experience. No open pit mining fleet capital costs are included since contract mining is assumed and the contractor will be responsible for supplying an adequate mining fleet.

Open pit mine capital costs were estimated to be \$4.5M and include only shell development costs (i.e. pumps and necessary dewatering requirements) as well as mining contractor mobilization and set-up.

21.2 Process Operating and Capital Costs

21.2.1 Process Operating Costs

Annual and unit process operating cost estimates for base case of process operation (excluding water treatment costs) are summarized in Table 21.1. Support Tables for the cost estimates are shown in Tables 21.2 to 21.6.

Table 21.1 Process Plant Operating Cost Estimate - Summary						
Throughput Cost Centre	At \$ 0.06/KWH Purchased Power			At \$ 0.30/KWH Generated Power		
	Annual Cost (US\$)	Unit Cost (US\$)/tonne Ore Treated	Cum Unit Cost (US\$)/tonne Ore Treated	Annual Cost (US\$)	Unit Cost (US\$)/tonne Ore Treated	Cum Unit Cost (US\$)/tonne Ore Treated
Administration - Labor	5,707,000	0.793	0.793	5,707,000	0.793	0.793
Mine Supervision	1,165,791	0.162	0.162	1,165,791	0.162	0.162
Site - Labor	1,897,733	0.264	0.425	1,897,733	0.264	0.425
Plant - Consumables	7,217,953	2.391	2.817	17,217,953	2.391	2.817
Power & Energy	832,012	0.116	2.932	4,160,061	0.578	3.395
Mechanical	1,471,119	0.204	3.137	1,471,119	0.204	3.599
Water	616,583	0.086	3.222	616,583	0.086	3.685
TOTAL USD	28,908,191	4.015	US\$/t	32,236,240	4.477	US\$/t

The detailed power consumption estimate is based on the equipment noted in the equipment list and the installed power with estimates of the operating power draft and operating time. The process power consumption is summarized in Table 21.2.

Table 21.2 Operating Cost Estimate Heap Leach Power & Energy					
Section	3/8" CRUSHED ORE				
	Installed Power kW	Power Demand kW	Annual Cost (@ 0.06 US\$/KWH)	Annual Cost (@ 0.30 US\$/KWH)	(kWh/t)
Area 10 - Primary Crushing					
Power	460	339	120,936	604,681	0.2799
Area 10 - Secondary Crushing					
Power	617	466	201,301	1,006,508	0.4618
Area 17 - Lime Addition					
Power	19	14	\$4,103	20,517	0.0095
Area 20 - Heap Leach					
Power	1,485	469	238,506	1,192,529	0.5521
Area 23 - Carbon Adsorption					
Power	30	23	9,612	48,059	0.0222
Area 25 - Carbon Strip					
Power	2	2	285	1,424	0.0007
Area 25 - Strip Solution Handling					
Power	12	5	2,190	10,949	0.0051
Area 25 - Electrowinning and Refining					
Power	146	104	31,405	157,026	0.0727
Area 27 - Carbon Regeneration and Handling					
Power	36	27	3,151	65,756	0.0304
Area 27 - Acid Wash					
Power	15	11	4,490	22,450	0.0104
Area 30 - Reagent Mix / Storage					
Power	14	9	4,490	22,450	0.0104
Area 90 - Auxiliary Equipment					
Power	-	0	-	-	0.0000
Area 100 - Utilities					
Power	529	397	201,543	1,007,713	0.4665
TOTAL HEAP LEACH POWER COST (per annum)			832,012	4,160,061	
POWER CONSUMPTION kwh/tonne					1.9260
COST PER TONNE ORE \$/tonne			0.1156	0.5778	

The labor cost estimate for process operations are shown in Table 21.3. The labor rates and burden are based on the information provided by Goldgroup. General and Administrative labor estimates are provided in Table 21.4.

Table 21.3
Operating Cost Estimate - Plant Labor

Position	Category	Number Persons Req'd	Annual Salary (US\$)	Annual Base Cost (US\$)	On Cost Factor	Annual Oncost (US\$)	Annual Cost (US\$)	(US\$/t)
OPERATIONS								
ADR Plant								
Superintendent	E	1	150,000	150,000	7,960	157,960	157,960	
ADR Chief	E	1	69,669	69,669	3,943	73,612	73,612	
Supervisor	N	3	47,032	141,096	8,434	149,530	149,530	
Operator	N	3	13,389	40,168	3,387	43,556	43,556	
Electric - Mechanic	N	3	13,389	40,168	3,387	43,556	43,556	
Helper	N	3	7,706	23,118	2,535	25,653	25,653	
Refinery								
Operators	N	4	13,389	53,558	4,516	58,074	58,074	
Power Plant								
Operators	N	6	13,389	80,337	6,774	87,111	87,111	
General Services								
Helper	N	8	8,364	66,912	7,022	73,934	73,934	
Operations Total		32		665,026		712,985	712,985	0.10
Laboratory								
Metallurgy Supervisor	E	1	62,673	62,673	3,593	66,266	66,266	
Laboratory Assistant	N	1	22,781	22,781	1,599	24,380	24,380	
Metallurgy Assistant	E	1	48,309	48,309	2,875	51,184	51,184	
Fire Assay Lab Supervisor	E	3	47,032	141,096	8,434	149,530	149,530	
Sampling preparation	N	6	13,389	80,337	6,774	87,111	87,111	
Smelting	N	6	13,389	80,337	6,774	87,111	87,111	
Sampling Separation	N	6	13,389	80,337	6,774	87,111	87,111	
Helper	N	4	8,364	33,456	3,511	36,967	36,967	
Laboratory Total		28		549,325		589,661	589,661	0.08
Plant Maintenance								
Maintenance chief	E	1	69,669	69,669	3,943	73,612	73,612	
Maintenance Supervisor	E	1	47,032	47,032	2,811	49,843	49,843	
Diesel Mechanic	N	3	13,389	40,168	3,387	43,556	43,556	
Gasoline Mechanic	N	3	13,389	40,168	3,387	43,556	43,556	
Helper	N	6	10,494	62,965	5,906	68,871	68,871	
Maintenance Electric								
Electric chief	E	1	69,669	69,669	3,943	73,612	73,612	
Electric Supervisor	E	3	47,032	141,096	8,434	149,530	149,530	
Helper	N	3	10,494	31,482	2,953	34,435	34,435	
Electric A	N	3	13,389	40,168	3,387	43,556	43,556	
Instrumentist	N	1	13,389	13,389	1,129	14,519	14,519	
Maintenance Total		25		555,808		595,088	595,088	0.08
GRAND TOTAL		85		1,770,159		1,897,733	1,897,733	0.26
TOTAL LEACH OPERATIONS FIXED COST (per annum)							1,897,733	
COST PER TONNE ORE							0.26	

Table 21.4 Operating Cost Estimate - General Administration Labor					
	Annual Salary (USD)	Number	On-Cost	Annual Cost	
				(US\$)	(US\$/t)
General & Operations Management					
General Manager	221,538	1	11,537	233,075	0.0324
Project Manager	221,538	1	11,537	233,075	0.0324
Operations Manager	221,538	1	11,537	233,075	0.0324
Business / Administration					
Business Manager	120,601	1	6,490	127,091	0.0177
Administration Superintendent	55,403	1	3,230	58,633	0.0081
Lawyer	43,739	1	2,647	46,386	0.0064
Cooks	8,324	8	876	73,600	0.0102
Maintenance supervisor	9,809	2	950	21,518	0.0030
Helper	8,364	2	878	18,484	0.0026
Electric	8,323	1	876	9,198	0.0013
Vigilant	8,323	1	876	9,198	0.0013
Administration Auxiliary	8,740	1	897	9,637	0.0013
Administration Assistant	20,168	1	1,468	21,636	0.0030
Human Resources					
Payroll supervisor	43,739	1	2,647	46,386	0.0064
Talent attraction supervisor	43,739	1	2,647	46,386	0.0064
HHRR assistant	22,941	1	1,607	24,547	0.0034
Finance - Accounting					
Controller	92,305	1	5,075	97,380	0.0135
Accountant Senior	73,722	2	4,146	155,736	0.0216
Accountant Junior	20,168	3	1,468	64,907	0.0090
Information Support					
TI supervisor	47,032	1	2,811	49,843	0.0069
Purchasing/Warehouse					
Senior buyer	73,722	1	4,146	77,868	0.0108
Buyer	17,252	3	1,322	55,724	0.0077
Warehouse supervisor	29,873	3	1,953	95,480	0.0133
Helper	7,706	3	845	25,653	0.0036
Safety					
Safety Manager	69,669	1	3,943	73,612	0.0102
Safety Assistant	21,667	1	1,543	23,210	0.0032
Medic	29,873	1	1,953	31,827	0.0044
Safety supervisor	16,008	3	1,260	51,803	0.0072
Paramedic	16,008	3	1,260	51,803	0.0072
Driver	8,750	1	897	9,647	0.0013
Environmental					
Environmental Manager	69,669	1	3,943	73,612	0.0102
Environmental Technician	16,008	1	1,260	17,268	0.0024
Helper	8,364	5	878	46,209	0.0064
Community Relations					
Community Relations Manager	92,306	1	5,075	97,381	0.0135
Assistant	21,667	1	1,543	23,210	0.0032
Productive projects	35,533	1	2,236	37,769	0.0052
Medic	29,873	1	1,953	31,827	0.0044
Training coordinator	29,873	1	1,953	31,827	0.0044
Sub Total		64		2,435,517	0.3383
Cost/day					

Table 21.4					
Operating Cost Estimate - General Administration Labor					
	(US\$)				
Accommodation					
Minera Cardel Office Staff	15	64		336,000	0.0467
Offices and Accommodation Rentals				840,000	
Services					
Communications, consumables, consultants	500	1		360,000	0.0500
insurances, scheduled flights				500,000	0.0694
Vehicles fuel and insurance, \$/m	30	10		350,000	0.0486
Legal				105,000	0.0146
				100,000	0.0139
Corporate Office	750	1		262,500	0.0365
Sub Total		76		2,853,500	0.3963
TOTAL ADMINISTRATION COST (per annum)				5,707,000	
COST PER TONNE ORE				0.7926	

Reagent cost estimates are shown in Table 21.5. The reagent consumption rates are based on similar projects.

Table 21.5					
Operating Cost Estimate - Heap Leach Consumables					
Section	Usage (t/a)	Unit Cost (USD/t)	Use Rate kg/t	Annual Cost	
				(USD)	(USD/t)
1. Crushing & Agglomeration					
Liners - primary		\$ -		\$ 113,180	0.016
Liners - secondary		\$ -		\$ 165,980	0.023
Liners - tertiary		\$ -		\$ -	0.000
Liners - tertiary		\$ -		\$ -	0.000
Loader - transloading costs		\$0.300		\$2,160,000	0.300
Screens				\$65,237	0.009
Sub Total				\$2,504,397	0.348
2. Heap Leach					
Antiscalant	41	\$256	0.006	\$ 10,573	0.001
HDPE Liners	0	\$ -	0.000	\$ -	0.000
Poly pipe	0	\$ -	0.000	\$ -	0.000
Plastic Pipe	0	\$ -	0.000	\$ -	0.000
Drippers	0	\$ -	0.000	\$ -	0.000
Sub Total				\$ -	0.000
3. ADR					
Lime	34,560	\$ 256	4.800	\$8,847,360	1.229
Cement	0	\$308	0.000	\$ -	0.000
Sodium Cyanide	1,181	\$3,413	0.164	\$4,030,070	0.560
Carbon	144	\$3,550	0.020	\$511,200	0.071
Propane (tonnes)	314	\$ 690	0.050	\$216,660	0.030
Sodium Cyanide	0	\$ 3,413	0.000	\$ -	0.000
Sodium Hydroxide	359	\$880	0.050	\$ 316,166	0.044
Hydrochloric Acid	39	\$950	0.005	\$ 36,936	0.005
Sub Total				\$13,958,393	1.939
4. Goldroom					
Propane (tonnes)	314	\$ 690	0.050	\$ 216,660	0.030
Steel Wool	35	\$680	0.005	\$ 23,762	0.003
Silca Sand	1	\$750	0.0002	\$ 1,067	0.000
Borax	39	\$1,950	0.01	\$ 75,793	0.011
Nitre	11	\$2,950	0.002	\$33,559	0.005
Sodium Carbonate	5	\$950	0.001	\$4,323	0.001
Sub Total				\$ 355,163	0.049
5. Laboratory					
Process Plant samples		\$ 10	15,000	\$ 150,000	0.021
Grade Control samples		\$ 10	25,000	\$250,000	0.035
Sub Total				\$400,000	0.056
TOTAL HEAP LEACH CONSUMABLES COST (per annum)				\$17,217,953	
COST PER TONNE ORE				\$ 2391	

Wear material cost estimates are provided in Table 21.6.

Table 21.6			
Wear Material Cost Estimates			
Tonnage	<1" CRUSHED ORE		Source
Total Equipment Installed Cost	29,422,376	US\$	CAPEX
Maintenance Percentage	5.00%		Other projects
Annual Maintenance Cost	1,471,119	US\$	Calculated
Cost per tonne	0.204	US\$/t	Calculated

The process water cost estimate, shown in Table 21.7, is based on the consumption at similar operation, and the delivered water price of \$0.05 per tonne.

Table 21.7			
Water			
Tonnage	<1" ORE		Source
Tonnes water per tonne ore	0.1543		Design Criteria
Power Cost, \$ per tonne water	\$ 0.550		Other projects
Maintenance Percentage	\$ 0.005		Other projects
Annual Raw Water Power Cost	616,583	US\$	Calculated
Cost per tonne	0.086	US\$/t	Calculated

21.2.2 Process Capital Cost

A summary of the 2-stage crushing, process plant and associated infrastructure capital costs is shown in the following Table 21.8 and an alternative 3-stage crushing plant is shown in Table 21.9. These tables include direct costs, indirect costs, and a contingency. These are factored capital cost estimates and are based on equipment costs multiplied by factors to include installation costs. It should be noted that the capital costs estimate does not include sunk costs such as drilling and prior studies undertaken to date.

Table 21.8	
Summary Process Plant Cost - 2 Stage Crushing	
Description	Cost US\$
DIRECT COSTS	
Process Plant	
Area 10 - Primary Crushing	4,567,384
Area 10 - Secondary Crushing	5,810,185
Area 10 - Tertiary Crushing	not included
Area 10 - Lime Addition	491,863
Area 20 - Heap Leach	856,956
Area 23 - Carbon Adsorption	2,052,050
Area 25 - Carbon Strip (incl. solution handling)	421,850
Area 25 - Electrowinning and Refining	1,120,428
Area 27 - Carbon Regeneration and Handling	1,597,841
Area 27 - Acid Wash	349,172
Area 30 - Reagent Mix/ Storage	208,904
Area 100 - Utilities	200,200
Equipment Cost	17,676,832
Process Plant Systems	
Power Generation and Substation	1,440,000
Power Distribution	2,060,000
Instrumentation	190,000
Heap Leach piping	1,875,000
Road development to crushing & process plant	250,000
Process Piping	562,500
Site Development	1,767,683
Plant Process Systems Total	1,440,000
TOTAL DIRECT COSTS	25,822,015
PLANT INDIRECT COSTS	
Engineering & Procurement	3,873,302
Engineering for ADR Equipment	356,452
Construction Management (self-perform)	1,686,734
Construction Indirect Costs incl:	924,000
Construction Supervision	
Equipment Rental	
Field office expense	
Mobilization / Demobilization	
Consumables	
Initial Fill & Reagents	667,000
Equipment Insurance & Freight Cost	1,164,549
Spare Parts	618,071
Training	185,421
Commissioning	309,036
TOTAL INDIRECT COSTS	9,784,566
TOTAL DIRECT AND INDIRECT	35,606,581
CONTINGENCY	10,681,974
OWNERS COSTS	9,050,000
TOTAL	55,338,555

Table 21.9	
Summary Process Plant Cost - 3 Stage Crushing	
Description	Cost US\$
DIRECT COSTS	
Process Plant	
Area 10 - Primary Crushing	4,567,384
Area 10 - Secondary Crushing	5,810,185
Area 10 - Tertiary Crushing	15,267,420
Area 10 - Lime Addition	491,863
Area 20 - Heap Leach	856,956
Area 23 - Carbon Adsorption	2,052,050
Area 25 - Carbon Strip (incl. solution handling)	421,850
Area 25 - Electrowinning and Refining	1,120,428
Area 27 - Carbon Regeneration and Handling	1,597,841
Area 27 - Acid Wash	349,172
Area 30 - Reagent Mix/ Storage	208,904
Area 100 - Utilities	200,200
Equipment Cost	32,944,252
Process Plant Systems	
Power Generation and Substation	2,541,600
Power Distribution	2,900,000
Instrumentation	240,000
Heap Leach piping	1,875,000
Road development to crushing & process plant	250,000
Process Piping	51,230
Site Development	3,294,425
Total Process Plant Systems	11,152,255
TOTAL DIRECT COSTS	44,096,508
PLANT INDIRECT COSTS	
Engineering & Procurement	6,614,476
Engineering for ADR Equipment	356,452
Construction Management (self-perform)	2,108,418
Construction Indirect Costs incl:	1,155,000
Construction Supervision	
Equipment Rental	
Field office expense	
Mobilization / Demobilization	
Consumables	
Initial Fill & Reagents	667,000
Equipment Insurance & Freight Cost	1,978,685
Spare Parts	1,151,897
Training	345,569
Commissioning	575,948
TOTAL INDIRECT COSTS	14,953,445
TOTAL DIRECT AND INDIRECT	59,049,952
CONTINGENCY	17,714,986
OWNERS COSTS	9,050,000
TOTAL	85,814,938

Direct Costs

Two capital cost estimates were performed for this project. The first includes a two stage crushing plant and the second includes a three stage crushing plant. Both cost estimates also include the ADR Processing facility and solution management requirements to and from the heap and associated infrastructure. The Direct capital costs were based on the following list of documents:

- Design Criteria
- Equipment lists were developed for each crushing option
- Budget quotations for major equipment
- K D Engineering equipment database for minor equipment
- Engineering drawings performed by KDE
 - 00-G-001 (P3) Site Plan Project Overall View
 - 00-G-002 (P3) Site Plan Crushing/Process Plant
 - 00-E-001 (P2) Electrical Single Line Diagram
 - 00-F-01 (P3) Mass Balance
 - 10-F-01 (P2) Flowsheet Primary & Secondary Crusher
 - 10-F-02 (P2) Flowsheet Tertiary Crushing
 - 20-F-01 (P3) Flowsheet Heap Leach
 - 23-F-01 (P3) Flowsheet Carbon Adsorption
 - 25-F-01 (P2) Flowsheet Stripping & Refining
 - 27-F-01 (P3) Flowsheet Carbon Reactivation
 - 30-F-01 (P2) Flowsheet Utilities & Reagents
 - 10-L-001 (P2) General Arrangement Crushing Plant
 - 23-L-001 (P2) General Arrangement CIC Column ADR Plant Plan

The direct costs exhibited in this estimate include infrastructure, materials and equipment and the associated installation labor for the construction activities discussed below:

Equipment Costs

Two equipment lists, one for 2-stage crushing and one for 3-stage crushing were developed and considered for this project. The estimate for equipment was developed from the following sources:

- Written or e-mailed budgetary estimates from vendors for major equipment.
- KDE Historical data and budget costs from similar projects for miscellaneous equipment.

The cost of installing the equipment and materials were based on installation factors with the intent to provide a +/- 30 percent capital cost estimate.

Currency

The basis for the capital cost estimate pricing was Q1 2012 costs. All estimated costs were expressed in United States Dollars (US\$).

Units of Measure

Metric units were used throughout the estimate, with some exceptions such as conveyor widths and piping which assumes nominal sizing.

Site Development

Currently the site is undeveloped except for roads sufficient to provide access for drill rigs and mobile maintenance equipment. The Project will require development of the following:

- The mining areas including a truck shop and haul roads for resource and waste and is provided by others.
- Crushing area
- ADR processing plant.
- Solution management system to transport solutions between the leach pad, ponds and ADR Processing plant.
- Infrastructure including electrical power, fresh water, bulk excavation and access roads to the project site.

Site Preparation and Earthwork

The cost associated with this effort was included in Site Development. The topography is mountainous and fairly steep in some areas of the project; however the proposed area of the crusher and plant facilities is relatively flat agricultural land. Bulk excavation will be required to develop a level working surface to install the proposed facilities. At this time the location of the crushing and ADR plant facilities have not been optimized. The proposed area has a 1 meter covering of top soil and clay, beneath this is contiguous basalt Mesa. A geotechnical report will be required before detail design can be completed.

Road Development to Crushing and Process Plant

Existing access roads are agricultural and will need to be further upgraded to provide access to the crushing and processing facilities. KDE has an allowance for 5 km of roads from the local paved road to access the process plant area. Roads to the Mine area are not included in the KDE cost estimate and are provided by others.

Material Handling (Crusher Area conveyors)

KDE only included belt conveyor costs in the crushing plant facility. The conveyor belt lengths were based on the General Arrangement Drawing No. 10-L-001. It was assumed that the contract miner will load ROM resource to the primary crusher dump hopper and will also load crushed resource into haul trucks and provide transportation to the leach pad. The cost for resource transportation will be included in the contract mining costs.

Additional metallurgical testing is recommended to determine if agglomeration is required and the benefits of conveying crushed resource and stacking on the leach pad.

Piping

The ADR Package plant vendor Summit Valley provided a quote with the ADR facility for process piping. KDE has also added additional piping costs for pump headers and solution management of the Intermediate and Pregnant Leach solutions that will be transported from the Barren and ILS Pond to the leach pad and from the Pregnant leach pond to the ADR plant site.

Construction Equipment

Construction equipment costs were estimated by Minera Cardel and included in the Owners' costs. These costs were provided by Minera Cardel and include the following:

- Construction services support equipment
- Cranes, forklifts and flatbed trucks for on-site works

Fresh and Potable Water

The fresh water source, water distributing and associated capital cost was provided by Minera Cardel. The basis of the estimate provided by Minera Cardel is indicated below:

- Alignment of the pipeline with an existing road for 70 percent of the distance

- Provision of a 5 kilometer, 250 millimeter diameter pipeline to supply up to 200m³/h of water
- A minimum of two booster stations, total lift 400 meters
- Power to the booster stations will be diesel generated.

Electrical and Instrumentation

It has been assumed the project will include 100 percent diesel generated power for the project which includes a generation station. There is a nuclear power plant in the region and it is recommended to enter into discussions with the electrical producer to see if this power is available. If electrical power is available from the electrical grid this would be a good opportunity to reduce the operating cost of electrical power.

On site power distribution voltage will be 4.16kV. Depending on the load, 4.16 KV will be utilized directly (operating voltage for motors greater than 300 HP) or it will be further stepped down to a 480 VAC, 3-phase, 3-wire system for feeding motors below 300 HP. The 480 VAC will be further reduced or transformed to feed lighting loads at 480/277VAC and 208/120 VAC to feed instrumentation requirements and general office equipment (receptacles, computers, printers, etc.). Power distribution, lighting and grounding design will follow the federal, state and local standards.

The cost estimate included a total of 3.5 MW diesel generators to provide power for the 2 stage crushing plant alternative and 6.5 MW for the 3 stage crushing alternative. Power will be distributed via separate overhead power lines to the crushing plant and process plant electrical buildings respectively. A third line will distribute power to the administration building, main gate and other buildings as required.

Mining and water supply to the plant were excluded from the cost estimate and will be included by others.

Equipment Insurance and Freight

Costs were estimated using a seven percent (7%) factor of the plant equipment costs.

Indirect Costs

Indirect costs required in this estimate include the following items in the capital cost:

- **Engineering and Procurement** was based on a factored cost of 15 percent of the Direct Costs

- **Construction Management** will be self-performed by Minera Cardel and the costs for this task were provided by Minera Cardel based on the following assumptions:
 - Manpower loading of CM staff
 - Project support labor for the duration of construction
- **Camp costs** are excluded from the estimate for construction contractor(s), mining contractor and the Owners based on the following assumptions:
 - Mining cost estimate includes an all-in rate
 - The local infrastructure and accommodation is sufficient to support contractor needs
 - Minera Cardel already has an established off site office and accommodation for senior management and support staff at Villa Rica.
- **Field Office Expenses** were provided by Minera Cardel and included in the Owners' costs. The basis for this estimate was the following:
 - Provision of temporary construction offices, communications and office equipment
 - Provision of construction service contracts to support the field office infrastructure
- **Training** was included in the capital cost and was based on a factored cost of 1.5 percent of the equipment cost.
- **Commissioning** was included in the capital cost and was based on a factored cost of 2.5 percent of the equipment cost.
- **Initial Fill & Reagents** costs were calculated by KDE and include an allowance of US\$ 667,000.
- **Spare parts** costs were estimated using a five percent (5%) factor of the equipment costs.
- **Owners Costs** were included in the estimate and were provided by Minera Cardel. An allowance of US\$ 9.05 Million dollars includes the following list of items:

	US\$
▪ Water Source and supply to site	1,200,000
▪ Mine Workshops	360,000
▪ Administration and engineering Offices	50,000
▪ Mobile Equipment	1,200,000
▪ Laboratory Equipment and building Upgrade	80,000
▪ Communications	50,000
▪ Plant Warehouse	270,000
▪ Septic Systems	40,000
▪ Fire Water Distribution System	100,000
▪ Land Cost	1,500,000
▪ Working Capital	<u>4,200,000</u>
Total Owners Cost	\$9,050,000

Contingency and Accuracy

The KDE crushing and process plant portion of the cost estimate includes a 30 percent contingency for project unknowns and identified risks. Contingency is a necessary part of the cost estimate and KDE utilized 30 percent based on the minimal metallurgical testing and engineering design available at this time. KDE believes the estimated contingency amount will be spent during the life of the project for identified risks and unknown items.

While KDE has not performed a statistical analysis of the crushing plant and process plant accuracy of the capital cost estimate we believe based on previous experience with similar projects there is reasonable confidence that the accuracy of the process portion of the PEA capital cost estimate will end up between minus 10 percent and plus 35 percent of the KDE capital cost estimate.

Exclusions

KDE has excluded the following items from the process plant estimate:

- Mine capital costs including mining preproduction costs (Provided by SRK)
- Transporting resource and loading the primary crusher dump pocket
- Loading crushed resource into haul trucks and transportation to the leach pad
- Access and mine truck haul roads and associated tunnel costs
- Blasting costs for mining or equipment foundation excavations
- Reclamation and closure costs (included by MWH)

- Geotechnical design and facility cost of leach pad and ponds (included by MWH)
- Permits, royalties and licenses
- Environmental testing and monitoring
- Metallurgical testing
- Escalation and Insurances
- Taxes, duty and import fees
- Property Acquisition (included in Owners cost by Minera Cardel)
- Mobile Equipment Costs (included in Owners cost by Minera Cardel)
- Water source and supply (included in Owners cost by Minera Cardel)
- Mine, Engineering & Administration offices (included in Owners cost by Minera Cardel)
- Electrical power supply for mining and water distribution
- Maintenance Shops and warehouse (included in Owners cost by Minera Cardel)
- Camp costs for mine contractor, Construction contractor(s) and Owner
- Site Drainage
- Fuel Storage pumps and containment
- Hazardous waste removal
- Allowance for design growth or specification changes

21.3 Heap Leach and Pond Project Costs

Opinion of probable costs (OPCC) for capital and operating expenses (CAPEX and OPEX) were prepared for the scoping-level design of the heap leach and resource and solution processing facilities. MWH estimated costs for the heap leach and related infrastructure, SRK has estimated the costs to mine, load haul and place mined material, and KDE estimated costs for the resource and solution processing facilities (plant). The OPCCs were designed to be within the guidelines of the Association for the

Advancement of Cost Estimating (AACE) Class 5 estimate (AACE, 1997) with a target accuracy of plus/minus 40 percent. The Class 5 estimate is intended as a conceptual screening tool and is qualified by several project uncertainties that cannot be resolved at the scoping/trade-off study level.

The OPCC gives overall project costs related to MWH's components of the project as follows:

- Initial Capital cost (CAPEX) year 1 = \$24.9 million (2012 USD)
- Total Capital costs (CAPEX) = \$78.4 million (2012 USD)
- Operating costs (OPEX) = \$35.4 million (2012 USD)

Detailed cost tables for the heap leach and associated facilities are provided in Appendix 9. Explanations of how the OPCCs for the heap leach and resource and solution processing were developed are provided below.

21.3.1 Heap Leach Pad and Associated Operations

The CAPEX and OPEX for the leach pad and related facilities are estimated as follows:

- The CAPEX and OPEX for the leach pad, collection ponds, waste stockpiles, resource haul roads, and diversion channels are based on unit costs that include contractor markups and insurance. The capital project will be administered by a construction management team and there will not be a prime contractor. Some work will be self-performed by Minera Cardel.
- Engineering and Construction Management costs were assumed to be 5 percent of the total furnished and construction item costs. Construction Management includes Quality Assurance and Quality Control.
- Contractor mobilization and demobilization are assumed to be 5 percent of the total cost for construction items and are included as a separate line item in the estimate.
- Subcontractor general conditions assumes a separate contractor will be used for liner installation. Minera Cardel will self-perform some of this work.
- A parametric contingency of 5 percent of the total CAPEX was added as an allowance for unlisted items that may be added in further design stages.

- Estimates for prices for key consumables and construction materials are escalated to equivalent 2012 prices, but are then assumed to remain constant throughout the life of the project.
- The cost estimate assumes a start-up period plus 10-years of operation and closure. Costs that will extend beyond year 10 (i.e. water treatment) are lumped into the year 10 costs.
- An effective contingency of 30 percent of the capital and operating cost is provided.
- Quantities for the estimate were derived from conceptual design drawings.

The following assumptions were made regarding earthwork costs:

Haul Road

- Clear and grub unit cost assumes a road will be pre-pioneered by Minera Cardel prior to earthwork contractor mobilization (the pre-pioneering cost is not included).
- Cuts along the haul road alignment assume the rock to be mostly rippable and unit cost is based on Minera Cardel's contractor estimates.
- Fills along the haul road assume that non-acid-generating waste from the pit will be available to use, where necessary. This waste will need to be hauled and dumped regardless. Thus, the cost for using waste as haul road fill was only the cost for the additional haul length and material spreading.
- Tunneling rates are as provided by Minera Cardel for similar work performed at Caballo Blanco and include drilling and blasting, partial rock bolting and shotcrete support, ventilation, and lighting.

Leach Pad, Waste Stockpile, and Pond Subgrade

- Storm water diversions are in place prior to construction of the leach pad, waste stockpile, and pond subgrade.
- Clear and grub unit cost assumes areas to be primarily thick, grassy vegetation.
- Excavations to a depth of 5-meters assumed rippable rock. Excavations deeper than 5-meters may require blasting. Drilling and blasting unit costs reflect self-perform rates provided by Minera Cardel.

- Imported material for fill is assumed to be available within 500-meters of the work area.
- Clay for the leach pad and sulfide waste stockpile footprints is assumed to behave a layer with adequate thickness currently in-place. Clay may require disking (for drying) and will be compacted into a smooth, unyielding sub-grade surface.
- Subgrade for the ponds was assumed to be half exposed rock. The exposed rock areas will be covered with a minimum layer of 150-mm and compacted into a smooth, unyielding sub-grade surface. Fill material for the pond subgrade is assumed to be within 500-meters of the work area.

Over Liner

- Over liner will be crushed into gravel with a maximum particle size of 37-mm.
- Over liner production and placement unit costs reflect self-perform rates provided by Minera Cardel.

Waste Stockpiles

- Costs for excavating, loading, and hauling mine waste from the pit is accounted for in SRK's mine plan. MWH accounted for the additional haul distance and material grading required for shaping of the waste stockpiles.

Storm water Diversion Channels

- Excavation of storm water diversion channels may require blasting. Drill and blast to be by Minera Cardel.
- Filter material (37-mm minus) and riprap (D50 = 70 to 340-mm) assumed to be available on-site (non-processed).
- A lump sum was provided for closure costs related to energy dissipation and down drain protection in areas downstream of the Caballo Blanco site.

21.3.2 Geomembrane Liners and HDPE Pipe

The following assumptions were made regarding geomembrane liners and HDPE piping.

Leach Pad, Sulfide Waste Stockpile, and Pond Liners

- The leach pad liner will be 80-mil HDPE or LLDPE smooth liner. Costs for these materials are highly dependent on prevailing oil price.
- The sulfide waste stockpile and pond liners will be 80-mil HDPE or LLDPE double-textured liner. Double-textured liner adds stability of the liner under loading and provides increased safety during installation.
- Process ponds will be double-lined with a geonet LCRS layer between the primary and secondary liners to allow for free-drainage should a leak occur in the primary liner. The LCRS geonet layer will convey flows to a gravel LCRS sump where it can be monitored and pumped out by way of access through an LCRS pipe riser. Costs for LCRS sumps were provided as a lump sum.
- Unit costs for liner were derived from similar projects in the region.

HDPE Pipe

HDPE pipe sizes and types are assumed to be as follows (refining of the pipes may be required during a later stage in design):

- Secondary collectors - 100-mm diameter CPT N12 pipe
- Primary collectors - 200-mm diameter CPT N12 pipe
- Collection headers and intra-cell berm stubs - 300 mm diameter HDPE SDR-11
- Unit costs for piping were derived from similar projects in the region.

21.3.3 Water Treatment

The following assumptions were made regarding water treatment:

Cyanide Detox and Lime-Precipitation Treatment Plants

- Treatment will begin in Phase 2 and will not be required during Phase 1, based on the water balance criteria developed.
- Maximum rate for cyanide detoxification plant = 250 -m³/hr.
- Maximum rate for lime-precipitation plant = 400 -m³/hr.

Costs for water treatment plant provided by Minera Cardel and are highly dependent on type of treatment required. At this stage the required treatment is difficult to assess. Treatment is to neutralization and not necessarily drinking water standard.

21.3.4 MWH Exclusions

Exclusions to the leach pad CAPEX and OPEX costs calculated by MWH include:

- Pit perimeter fencing at closure
- Perimeter fencing for re-vegetated areas
- Heap rinsing (we assume passive closure)
- Interest on closure assurance monies
- Permeability testing costs
- Metallurgical testing
- Property acquisition costs
- Permitting costs
- Plant Site work
- Capital spare parts
- Special inspections
- Permits, royalties, and licenses
- Research and development costs
- Finance Costs
- Escalation
- Preproduction costs
- Hazardous waste removal
- Consultant costs other than MWH
- Sales Tax
- Owner's home office expense

22.0 ECONOMIC ANALYSIS

A pre-income tax economic analysis model was prepared. The model uses the production and cost estimates shown earlier in this report. Costs are in 2012 constant dollars. The economic analysis uses a gold sale price US\$ 1,500 per ounce and a silver sale price of US\$ 30.00 per ounce. . Two different scenarios were prepared, they are;

- Two Stage Crushing (Base Case)
- Three Stage Crushing

22.1 Two Stage Crushing (Base Case)

Table 22.1 shows the project's pre-income tax internal rate of return and the project's pre-income tax net present values at discount rates from 0 to 20 percent.

Table 22.1 Economic Analysis Summary (Two Stage Crushing)	
Internal Rate of Return (IRR), %	66.41
Net Present Values	US\$ x 1000
@ 0 % discount rate	386,308
@ 5 % discount rate	283,800
@ 10 % discount rate	210,972
@ 15 % discount rate	158,176
@ 20 % discount rate	119,196

Table 22.2 summarizes the project's revenue, costs and pre-income tax cash flow and also shows the values in units of resource processed and saleable gold ounces.

Table 22.2			
Economic Analysis Summary - US\$ Pre-Income Tax Cash Flow (Two Stage Crushing)			
	\$US x 1000	\$US/t Resource	\$US/oz Gold
<i>Mine Gate Value of All Resource Net of Transportation and Refining</i>	<i>1,063,704</i>	<i>21.58</i>	<i>1,546.77</i>
Mining Operating Cost	(264,302)	(5.36)	(384.33)
Processing Cost	(160,707)	(3.26)	(233.69)
Water Treatment/management Operating Cost	(35,379)	(0.72)	(51.45)
General & Administration	(60,142)	(1.22)	(87.45)
Royalties	(18,615)	(0.38)	(27.07)
Cash Operating Cost	(539,145)	(10.94)	(783.99)
Cash Operating Cash Flow	524,560	10.64	762.78
Capital Cost including Pre-Production Development	(138,252)	(2.80)	(201.04)
Pre-Income Tax Cash Flow	386,308	7.84	561.74

Table 22.3																
Cash Flow Schedule (Two Stage Crushing)																
				Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Mine Production																
TOTAL OPEN PIT	Resources Mined	tonnes				4,322,772	7,000,000	6,999,875	7,000,001	7,000,000	7,000,000	7,000,000	2,974,004			49,296,652
	Gold	g/t				0.550	0.550	0.510	0.530	0.550	0.530	0.520	0.610			0.538
	Silver	g/t				2.420	3.040	2.530	2.870	2.250	1.760	1.760	1.390			2.314
	Waste	tonnes				2,105,828	9,007,787	15,343,599	10,331,113	10,862,511	17,999,894	13,687,603	2,662,240			82,000,575
	Total Mined	tonnes				6,428,600	16,007,787	22,343,474	17,331,114	17,862,511	24,999,894	20,687,603	5,636,244			131,297,227
Processing Plants Production																
TOTAL RESOURCE PROCESSED	Resources Processed	tonnes				4,322,772	7,000,000	6,999,875	7,000,001	7,000,000	7,000,000	7,000,000	2,974,004			49,296,652
	Gold	g/t				0.550	0.550	0.510	0.530	0.550	0.530	0.520	0.610			0.538
	Silver	g/t				2.420	3.040	2.530	2.870	2.250	1.760	1.760	1.390			2.314
TOTAL RECOVERY	Gold Recovery	%				81%	81%	81%	81%	81%	81%	81%	81%			81%
	Silver Recovery	%				37%	37%	37%	37%	37%	37%	37%	37%			37%
TOTAL METAL RECOVERABLE	Gold Recoverable	ounces				61,648	99,829	92,567	96,199	99,829	96,199	94,384	47,040			687,694
	Silver Recoverable	ounces				123,266	250,748	208,678	236,725	185,586	145,170	145,170	48,710			1,344,052
	Silver/Gold Ratio					2.0	2.5	2.3	2.5	1.9	1.5	1.5	1.0			2.0
	Cumulative Recoverable Gold	ounces				61,648	161,477	254,044	350,243	450,072	546,270	640,654	687,694			
	Cumulative Recoverable Silver	ounces				123,266	374,013	582,691	819,416	1,005,003	1,150,172	1,295,342	1,344,052			
	Initial Year Percent of Recoverable Metal Recovery Factor	%				88	88	88	88	88	88	88	100			
	Second Year Percent of Recoverable Metal Recovery Factor	%				12	12	12	12	12	12	12	12			
	Gold Recovered	ounces				54,250	95,247	93,438	95,763	99,393	96,634	94,601	58,366			687,694
	Silver Recovered	ounces				108,474	235,450	213,726	233,360	191,723	150,020	145,170	66,131			1,344,052

Table 22.3 continued																
Cash Flow Schedule (Two Stage Crushing)																
				Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Revenue																
COMMODITY PRICES	Gold	\$/ounce				1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00			1,500.00
	Silver	\$/ounce				30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00			30.00
GROSS SALES	Gold	\$				81,375,633	142,870,787	140,157,553	143,644,391	149,089,884	144,951,521	141,902,203	87,548,978			1,031,540,950
	Silver	\$				3,254,218	7,063,492	6,411,780	7,000,793	5,751,687	4,500,588	4,355,089	1,983,922			40,321,567
REFINING & TRANSPORTATION	Gold	\$				(325,503)	(571,483)	(560,630)	(574,578)	(596,360)	(579,806)	(567,609)	(350,196)			(4,126,164)
		\$/ounce				(6.00)	(6.00)	(6.00)	(6.00)	(6.00)	(6.00)	(6.00)	(6.00)			(6.00)
	Silver	\$				-	-	-	-	-	-	-	-			-
		\$/ounce				-	-	-	-	-	-	-	-			-
PAYABLES	Gold	%				100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00			100.00
	Silver	%				90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00			90.00
NET REVENUE	Gold	\$				81,050,131	142,299,304	139,596,923	143,069,813	148,493,524	144,371,715	141,334,594	87,198,782			1,027,414,786
		\$/ounce				1,494.00	1,494.00	1,494.00	1,494.00	1,494.00	1,494.00	1,494.00	1,494.00			1,494.00
	Silver	\$				2,928,796	6,357,143	5,770,602	6,300,713	5,176,518	4,050,529	3,919,580	1,785,529			36,289,411
		\$/ounce				27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00			27.00
	Total Net Revenue	\$				83,978,927	148,656,447	145,367,525	149,370,527	153,670,042	148,422,244	145,254,174	88,984,311			1,063,704,197
Operating Costs																
Mining Cost		\$				15,040,809	33,312,459	43,449,421	35,429,784	36,280,018	47,699,830	40,800,165	12,289,395			264,301,880
		\$/tonne				3.48	4.76	6.21	5.06	5.18	6.81	5.83	4.13			5.36
Processing		\$				14,092,237	22,820,000	22,819,593	22,820,003	22,820,000	22,820,000	22,820,000	9,695,253			160,707,086
		\$/tonne				3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26			3.26
MWH Operating Cost		\$				\$362,954	\$1,555,515	\$3,342,688	\$3,482,934	\$3,586,635	\$13,402,734	\$4,070,573	\$1,858,285	\$1,858,285		35,378,888
		\$/tonne				0.08	0.22	0.48	0.50	0.51	1.91	0.58	0.62			0.72
General & Administration		\$				5,273,782	8,540,000	8,539,848	8,540,001	8,540,000	8,540,000	8,540,000	3,628,285			60,141,915
		\$/tonne				1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22			1.22
Royalties		\$					2,824,472	2,761,983	2,838,040	2,919,731	2,820,023	2,759,829	1,690,702			18,614,780
		\$/tonne				-	0.40	0.39	0.41	0.42	0.40	0.39	0.57			0.38
	Total Operating Cost	\$			-	34,769,781	69,052,447	80,913,532	73,110,762	74,146,384	95,282,587	78,990,567	29,161,920	1,858,285	1,858,285	539,144,550
Operating Profit																
Operating Profit		\$				49,209,146	79,604,000	64,453,993	76,259,764	79,523,659	53,139,658	66,263,606	59,822,391	(1,858,285)	(1,858,285)	524,559,647
		\$/gold ounce				907.07	835.76	689.80	796.34	800.09	549.90	700.45	1,024.95			762.78
Capital Costs																
Mining Cost		\$			4,500,000											4,500,000
	Process Plant Direct Cost	\$			25,822,015											25,822,015
Process Plant Indirect Cost & Contingency & Owner Cost		\$			29,516,540											29,516,540
	Leach Pad, Ponds, and Waste Stockpile Construction	\$			24,926,368	-	14,384,247	16,754,710	-	-	-	-	7,449,371	7,449,371	7,449,371	78,413,439
		\$														
	Total Capital Cost	\$			84,764,923	0	14,384,247	16,754,710	0	0	0	0	7,449,371	7,449,371	7,449,371	138,251,993
Pre-Income Tax Cash Flow																
Pre-Income Tax Cash Flow		\$			(84,764,923)	49,209,146	65,219,753	47,699,284	76,259,764	79,523,659	53,139,658	66,263,606	52,373,020	(9,307,656)	(9,307,656)	386,307,654
		\$/gold ounce				907.07	684.74	510.49	796.34	800.09	549.90	700.45	897.32			561.74
	Cumulative Pre-income Tax Cash Flow	\$			(84,764,923)	(35,555,778)	29,663,975	77,363,259	153,623,023	233,146,682	286,286,340	352,549,946	404,922,966	395,615,310	386,307,654	
Payback, operating years																
Pre-Income Net Present Values and Rate of Return																
NPV @ 0% discount rate		\$		386,307,654												
	NPV @ 5% discount rate	\$		283,799,748												
	NPV @ 10% discount rate	\$		210,971,859												
	NPV @ 15% discount rate	\$		158,175,883												
	NPV @ 20% discount rate	\$		119,196,428												
	IRR			66.4%												

Sensitivity Analysis

The project's pre-income tax internal rate of return sensitivity relative to incremental changes in metal prices, recoveries, grades and costs are shown in Table 22.4 and Figure 22.1

Table 22.4									
Rate of Return Sensitivity (Two Stage Crushing)									
Percent Changes	-20%	-15%	-10%	-5%	Base	5%	10%	15%	20%
Gold Price	37.5%	45.2%	52.6%	59.6%	66.4%	73.0%	79.5%	85.8%	92.1%
Silver Price	65.3%	65.6%	65.9%	66.1%	66.4%	66.7%	66.9%	67.2%	67.5%
Gold Recovery	37.6%	45.3%	52.6%	59.6%	66.4%	73.0%	79.4%	85.8%	92.0%
Silver Recovery	65.3%	65.6%	65.9%	66.1%	66.4%	66.7%	66.9%	67.2%	67.5%
Gold Grade	37.6%	45.3%	52.6%	59.6%	66.4%	73.0%	79.4%	85.8%	92.0%
Silver Grade	65.3%	65.6%	65.9%	66.1%	66.4%	66.7%	66.9%	67.2%	67.5%
Operating Cost	79.1%	76.0%	72.8%	69.7%	66.4%	63.1%	59.7%	56.3%	52.8%
Capital Cost	84.4%	79.2%	74.5%	70.3%	66.4%	62.9%	59.7%	56.7%	53.9%

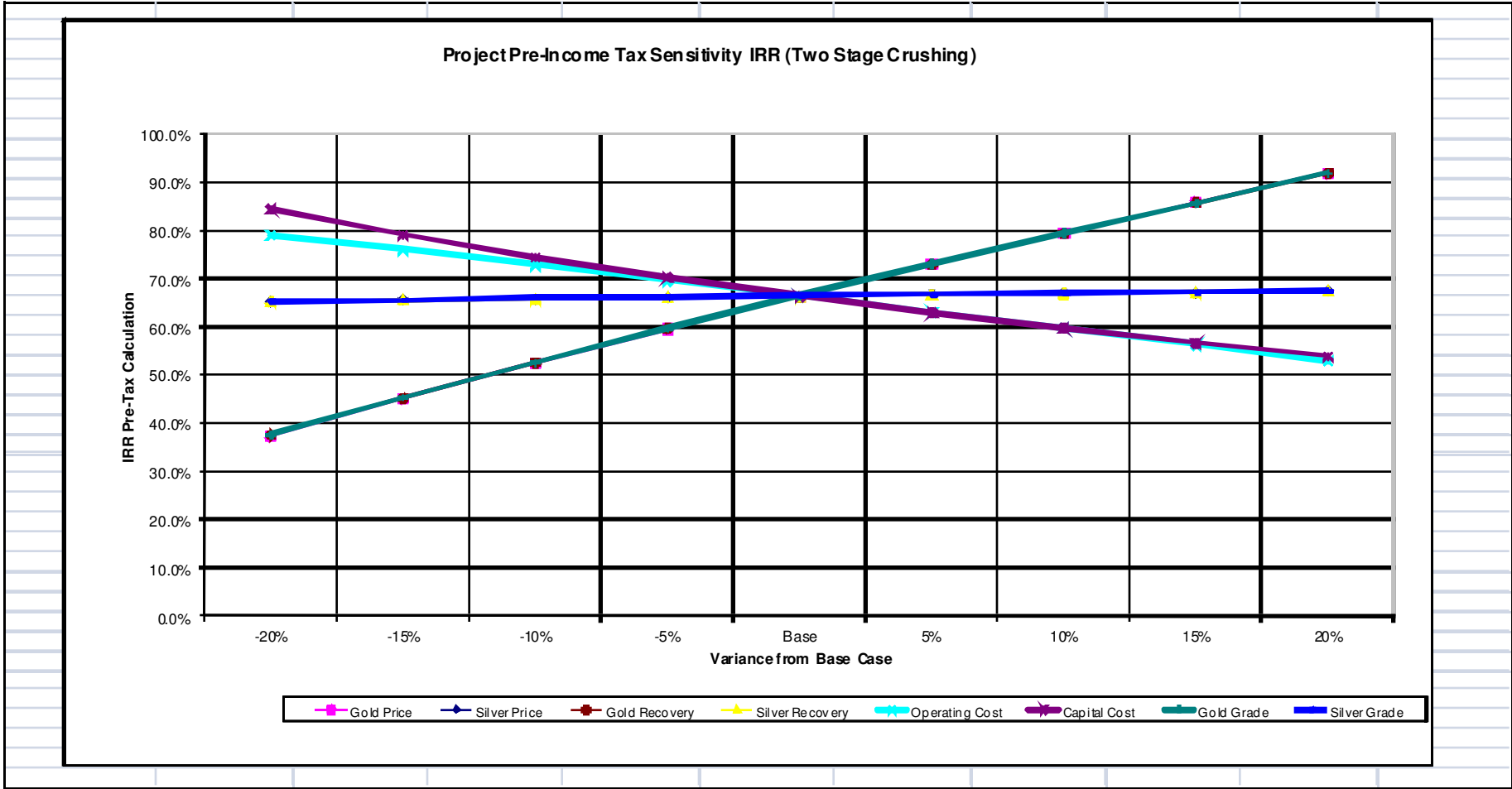


Figure 22.1 - Minera Cardel Gold Project Pre-Tax Sensitivity IRR

The project's pre-income tax net present value, using a five percent discount rate, sensitivity relative to incremental changes in metal prices, recoveries, grades and costs are shown in Table 22.5 and Figure 22.2.

Table 22.5 NPV Sensitivity (US\$ X 1000) (Two Stage Crushing)									
Percent Changes	-20%	-15%	-10%	-5%	Base	5%	10%	15%	20%
Gold Price	128,162	167,071	205,981	244,890	283,800	322,709	361,619	400,528	439,438
Silver Price	278,222	279,616	281,011	282,405	283,800	285,194	286,589	287,983	289,378
Gold Recovery	128,784	167,538	206,292	245,046	283,800	322,554	361,307	400,061	438,815
Silver Recovery	278,222	279,616	281,011	282,405	283,800	285,194	286,589	287,983	289,378
Gold Grade	128,784	167,538	206,292	245,046	283,800	322,554	361,307	400,061	438,815
Silver Grade	278,222	279,616	281,011	282,405	283,800	285,194	286,589	287,983	289,378
Operating Cost	363,499	343,574	323,649	303,725	283,800	263,875	243,950	224,025	204,100
Capital Cost	307,934	301,900	295,867	289,833	283,800	277,766	271,733	265,699	259,666

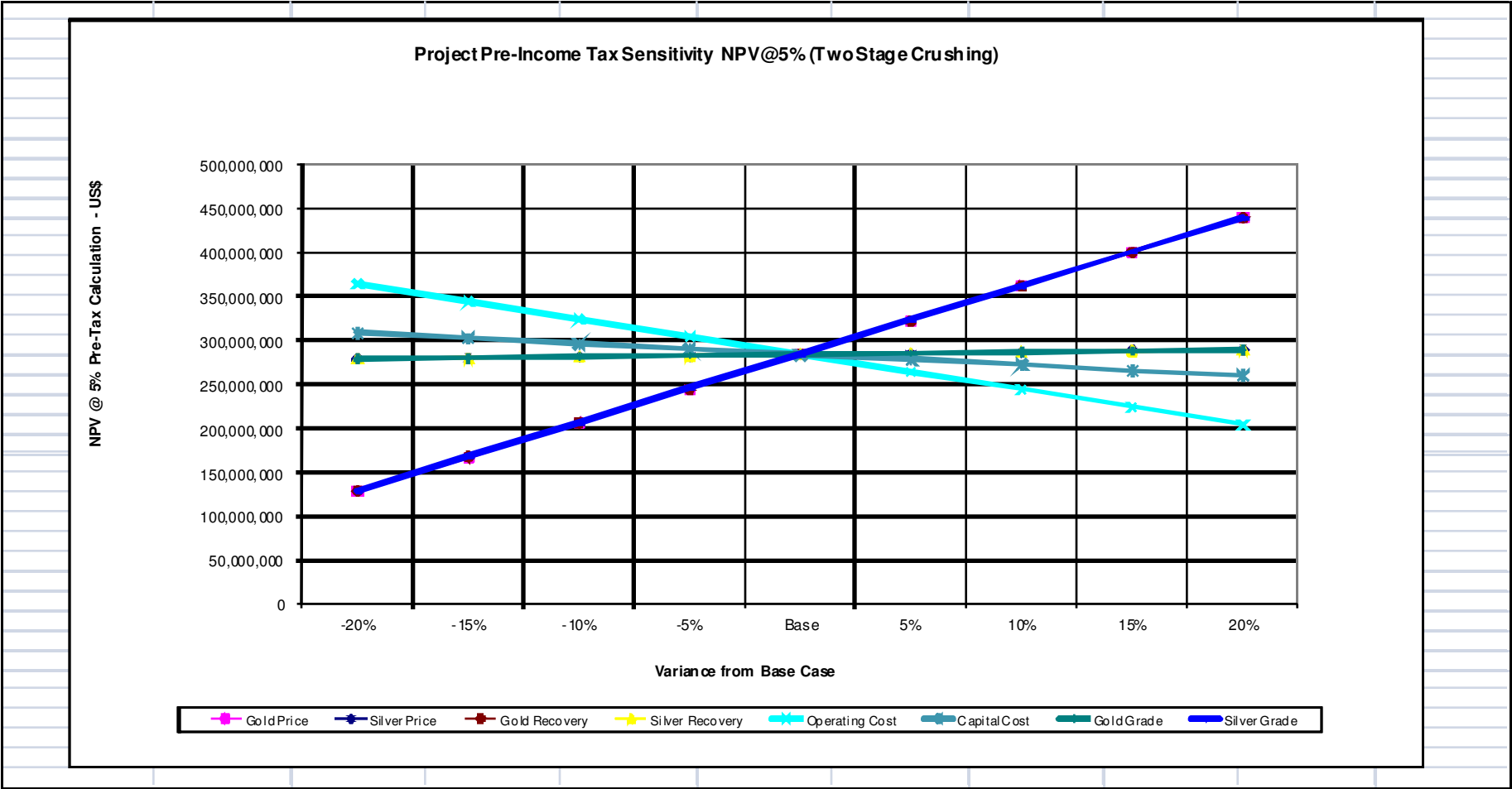


Figure 22.2 - Minera Cardel Gold Project Pre-Tax Sensitivity NPV@5%

As seen in Tables 22.4 and 22.5, the project's base case pre-income tax rate of return is 66.4 percent and the project's pre-income tax net present value at a 5 percent discount rate is US\$ 283.8 million. A ten percent increase in the gold price increases the estimated rate of return to 79.5 percent and increases the project's net present value, at a 5 percent discount rate, to US\$ 361.6 million.

22.2 Three Stage Crushing

Table 22.6 shows the project's pre-income tax internal rate of return and the project's pre-income tax net present values at discount rates from 0 to 20 percent.

Table 22.6 Economic Analysis Summary (Three Stage Crushing)	
Internal Rate of Return (IRR), %	52.93
Net Present Values	US\$ x 1000
@ 0 % discount rate	400,269
@ 5 % discount rate	288,883
@ 10 % discount rate	210,032
@ 15 % discount rate	153,093
@ 20 % discount rate	111,239

Table 22.7 summarizes the project's revenue, costs and pre-income tax cash flow and also shows the values in units of resource processed and saleable gold ounces.

Table 22.7 Economic Analysis Summary - US\$ Pre-Income Tax Cash Flow (Three Stage Crushing)			
	\$US x 1000	\$US/t Resource	\$US/oz Gold
<i>Mine Gate Value of All Resource Net of Transportation and Refining</i>	1,126,996	22.86	1,550.20
Mining Operating Cost	(264,302)	(5.36)	(363.55)
Processing Cost	(178,454)	(3.62)	(245.47)
Impacted Water Treatment/Management Operating Cost	(35,379)	(0.72)	(48.66)
General & Administration	(60,142)	(1.22)	(82.73)
Royalties	(19,722)	(0.40)	(27.13)
Cash Operating Cost	(557,999)	(11.32)	(767.53)
Cash Operating Cash Flow	568,998	11.54	782.66
Capital Cost including Pre-Production Development	(168,728)	(3.42)	(232.09)
Pre-Income Tax Cash Flow	400,269	8.12	550.57

Table 22.8 shows the annual economic analysis.

Table 22.8																
Cash Flow Schedule (Three Stage Crushing)																
				Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Mine Production																
TOTAL OPEN PIT	Resources Mined	tonnes				4,322,772	7,000,000	6,999,875	7,000,001	7,000,000	7,000,000	7,000,000	2,974,004			49,296,652
	Gold	g/t				0.550	0.550	0.510	0.530	0.550	0.530	0.520	0.610			0.538
	Silver	g/t				2.420	3.040	2.530	2.870	2.250	1.760	1.760	1.390			2.314
	Waste	tonnes				2,105,828	9,007,787	15,343,599	10,331,113	10,862,511	17,999,894	13,687,603	2,662,240			82,000,575
	Total Mined	tonnes				6,428,600	16,007,787	22,343,474	17,331,114	17,862,511	24,999,894	20,687,603	5,636,244			131,297,227
Processing Plants Production																
TOTAL RESOURCE PROCESSED	Resources Processed	tonnes				4,322,772	7,000,000	6,999,875	7,000,001	7,000,000	7,000,000	7,000,000	2,974,004			49,296,652
	Gold	g/t				0.550	0.550	0.510	0.530	0.550	0.530	0.520	0.610			0.538
	Silver	g/t				2.420	3.040	2.530	2.870	2.250	1.760	1.760	1.390			2.314
TOTAL RECOVERY	Gold Recovery	%				85%	85%	85%	85%	85%	85%	85%	85%			85%
	Silver Recovery	%				41%	41%	41%	41%	41%	41%	41%	41%			41%
TOTAL METAL RECOVERABLE	Gold Recoverable	ounces				65,172	105,535	97,858	101,698	105,535	101,698	99,779	49,729			727,003
	Silver Recoverable	ounces				138,771	282,288	234,926	266,502	208,930	163,430	163,430	54,837			1,513,113
	Silver/Gold Ratio					2.1	2.7	2.4	2.6	2.0	1.6	1.6	1.1			2.1
	Cumulative Recoverable Gold	ounces				65,172	170,707	268,565	370,263	475,798	577,495	677,274	727,003			
	Cumulative Recoverable Silver	ounces				138,771	421,058	655,984	922,486	1,131,416	1,294,846	1,458,276	1,513,113			
	Initial Year Percent of Recoverable Metal Recovery Factor	%				88	88	88	88	88	88	88	100			
	Second Year Percent of Recoverable Metal Recovery Factor	%				12	12	12	12	12	12	12	12			
	Gold Recovered	ounces				57,351	100,692	98,779	101,237	105,075	102,158	100,009	61,702			727,003
	Silver Recovered	ounces				122,118	265,066	240,609	262,713	215,839	168,890	163,430	74,449			1,513,113

Table 22.8 continued															
Cash Flow Schedule (Three Stage Crushing)															
			Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Revenue															
COMMODITY PRICES	Gold	\$/ounce			1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00			1,500.00
	Silver	\$/ounce			30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00			30.00
GROSS SALES	Gold	\$			86,027,111	151,037,363	148,169,039	151,855,186	157,611,947	153,237,033	150,013,414	92,553,327			1,090,504,419
	Silver	\$			3,663,548	7,951,969	7,218,282	7,881,383	6,475,159	5,066,692	4,902,891	2,233,468			45,393,393
REFINING & TRANSPORTATION	Gold	\$			(344,108)	(604,149)	(592,676)	(607,421)	(630,448)	(612,948)	(600,054)	(370,213)			(4,362,018)
		\$/ounce			(6.00)	(6.00)	(6.00)	(6.00)	(6.00)	(6.00)	(6.00)	(6.00)			(6.00)
	Silver	\$			-	-	-	-	-	-	-	-			-
		\$/ounce			-	-	-	-	-	-	-	-			-
PAYABLES	Gold	%			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00			100.00
	Silver	%			90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00			90.00
NET REVENUE	Gold	\$			85,683,002	150,433,214	147,576,363	151,247,766	156,981,499	152,624,085	149,413,360	92,183,114			1,086,142,402
		\$/ounce			1,494.00	1,494.00	1,494.00	1,494.00	1,494.00	1,494.00	1,494.00	1,494.00			1,494.00
	Silver	\$			3,297,193	7,156,772	6,496,454	7,093,245	5,827,643	4,560,023	4,412,602	2,010,121			40,854,054
		\$/ounce			27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00			27.00
	Total Net Revenue	\$			88,980,196	157,589,986	154,072,817	158,341,010	162,809,142	157,184,107	153,825,962	94,193,235			1,126,996,456
Operating Costs															
	Mining Cost	\$			15,040,809	33,312,459	43,449,421	35,429,784	36,280,018	47,699,830	40,800,165	12,289,395			264,301,880
		\$/tonne			3.48	4.76	6.21	5.06	5.18	6.81	5.83	4.13			5.36
	Processing	\$			15,648,435	25,340,000	25,339,548	25,340,004	25,340,000	25,340,000	25,340,000	10,765,894			178,453,880
		\$/tonne			3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62			3.62
	MWH Operating Cost	\$			\$362,954	\$1,555,515	\$3,342,688	\$3,482,934	\$3,586,635	\$13,402,734	\$4,070,573	\$1,858,285	\$1,858,285	\$1,858,285	35,378,888
		\$/tonne			0.08	0.22	0.48	0.50	0.51	1.91	0.58	0.62			0.72
	General & Administration	\$			5,273,782	8,540,000	8,539,848	8,540,001	8,540,000	8,540,000	8,540,000	3,628,285			60,141,915
		\$/tonne			1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22			1.22
	Royalties	\$				2,994,210	2,927,384	3,008,479	3,093,374	2,986,498	2,922,693	1,789,671			19,722,309
		\$/tonne			-	0.43	0.42	0.43	0.44	0.43	0.42	0.60			0.40
	Total Operating Cost	\$		-	36,325,979	71,742,184	83,598,887	75,801,202	76,840,027	97,969,062	81,673,431	30,331,531	1,858,285	1,858,285	557,998,873
Operating Profit															
	Operating Profit	\$			52,654,217	85,847,802	70,473,930	82,539,809	85,969,116	59,215,045	72,152,531	63,861,704	(1,858,285)	(1,858,285)	568,997,582
		\$/gold ounce			918.10	852.58	713.45	815.31	818.17	579.64	721.46	1,035.00			782.66
Capital Costs															
	Mining Cost	\$		4,500,000											4,500,000
	Process Plant Direct Cost	\$		44,096,508											44,096,508
	Process Plant Indirect Cost & Contingency & Owner Cost	\$		41,718,430											41,718,430
	Leach Pad, Ponds, and Waste Stockpile Construction	\$		24,926,368	-	14,384,247	16,754,710	-	-	-	-	7,449,371	7,449,371	7,449,371	78,413,439
		\$													
	Total Capital Cost	\$		115,241,306	0	14,384,247	16,754,710	0	0	0	0	7,449,371	7,449,371	7,449,371	168,728,376
Pre-Income Tax Cash Flow															
	Pre-Income Tax Cash Flow	\$		(115,241,306)	52,654,217	71,463,555	53,719,220	82,539,809	85,969,116	59,215,045	72,152,531	56,412,333	(9,307,656)	(9,307,656)	400,269,206
		\$/gold ounce			918.10	709.73	543.83	815.31	818.17	579.64	721.46	914.27			550.57
	Cumulative Pre-income Tax Cash Flow	\$		(115,241,306)	(62,587,090)	8,876,465	62,595,685	145,135,494	231,104,609	290,319,655	362,472,185	418,884,518	409,576,862	400,269,206	
Payback, operating years															
		1.9													
Pre-Income Net Present Values and Rate of Return															
	NPV @ 0% discount rate	\$	400,269,206												
	NPV @ 5% discount rate	\$	288,883,225												
	NPV @ 10% discount rate	\$	210,031,610												
	NPV @ 15% discount rate	\$	153,093,097												
	NPV @ 20% discount rate	\$	111,238,626												
	IRR		52.9%												

Sensitivity Analysis

The project's pre-income tax internal rate of return sensitivity relative to incremental changes in metal prices, recoveries, grades and costs are shown in Table 22.9 and Figure 22.3

Table 22.9 Rate of Return Sensitivity (Three Stage Crushing)									
Percent Changes	-20%	-15%	-10%	-5%	Base	5%	10%	15%	20%
Gold Price	29.0%	35.5%	41.6%	47.3%	52.9%	58.3%	63.6%	68.8%	73.8%
Silver Price	52.0%	52.2%	52.5%	52.7%	52.9%	53.2%	53.4%	53.6%	53.8%
Gold Recovery	29.2%	35.6%	41.6%	47.4%	52.9%	58.3%	63.6%	68.7%	73.7%
Silver Recovery	52.0%	52.2%	52.5%	52.7%	52.9%	53.2%	53.4%	53.6%	53.8%
Gold Grade	29.2%	35.6%	41.6%	47.4%	52.9%	58.3%	63.6%	68.7%	73.7%
Silver Grade	52.0%	52.2%	52.5%	52.7%	52.9%	53.2%	53.4%	53.6%	53.8%
Operating Cost	63.2%	60.7%	58.1%	55.6%	52.9%	50.2%	47.5%	44.7%	41.9%
Capital Cost	67.1%	63.0%	59.3%	56.0%	52.9%	50.1%	47.5%	45.1%	42.8%

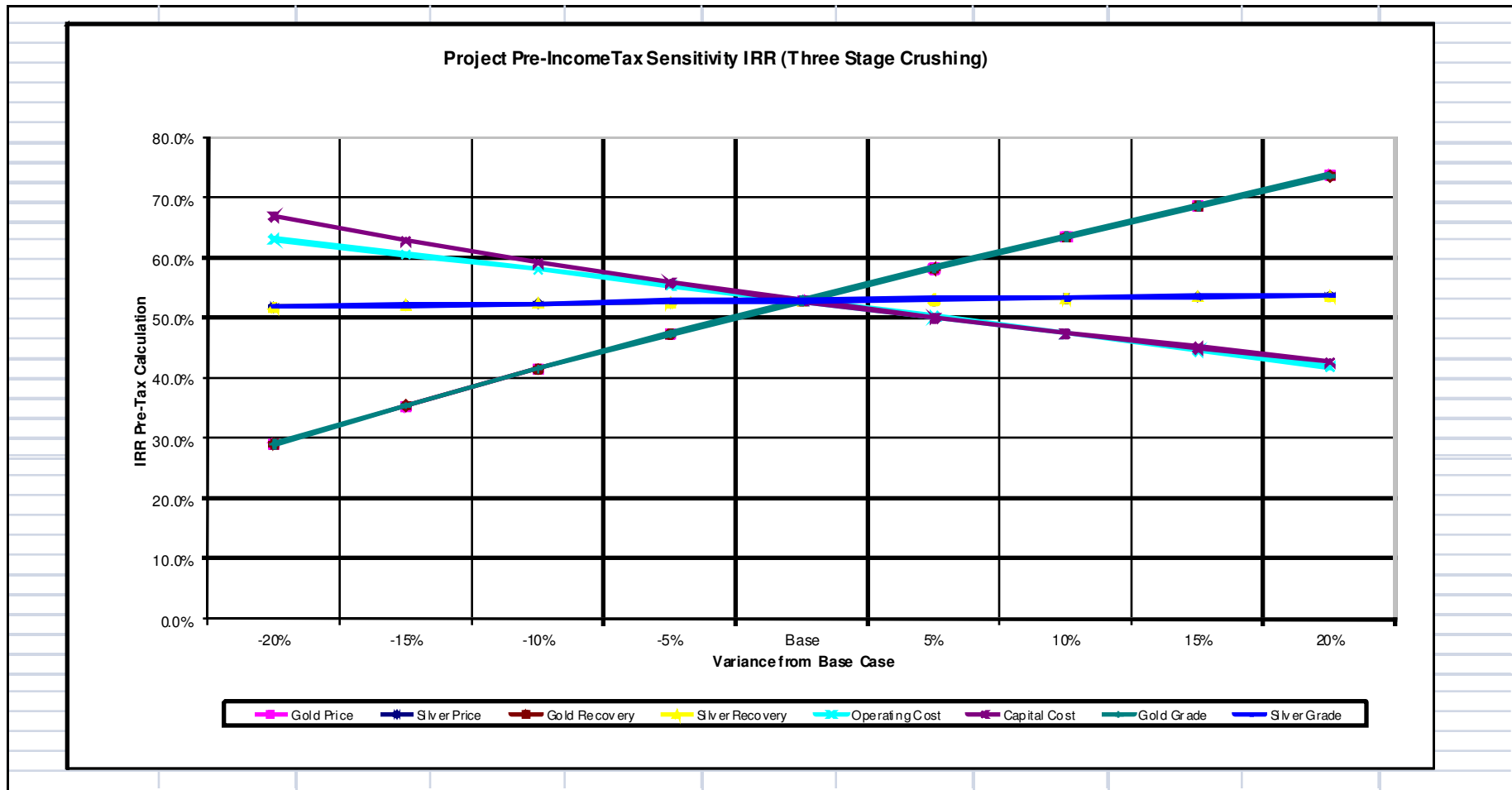


Figure 22.3 - Minera Cardel Gold Project Pre-Tax Sensitivity IRR

The project's pre-income tax net present value, using a five percent discount rate, sensitivity relative to incremental changes in metal prices, recoveries, grades and costs are shown in Table 22.10 and Figure 22.4.

Table 22.10 NPV Sensitivity (US\$ X 1000) (Three Stage Crushing)									
Percent Changes	-20%	-15%	-10%	-5%	Base	5%	10%	15%	20%
Gold Price	124,349	165,483	206,616	247,750	288,883	330,017	371,150	412,284	453,417
Silver Price	282,604	284,174	285,744	287,313	288,883	290,453	292,023	293,593	295,163
Gold Recovery	125,007	165,976	206,945	247,914	288,883	329,852	370,821	411,790	452,759
Silver Recovery	282,604	284,174	285,744	287,313	288,883	290,453	292,023	293,593	295,163
Gold Grade	125,007	165,976	206,945	247,914	288,883	329,852	370,821	411,790	452,759
Silver Grade	282,604	284,174	285,744	287,313	288,883	290,453	292,023	293,593	295,163
Operating Cost	371,323	350,713	330,103	309,493	288,883	268,273	247,663	227,053	206,443
Capital Cost	317,965	310,694	303,424	296,154	288,883	281,613	274,342	267,072	259,802

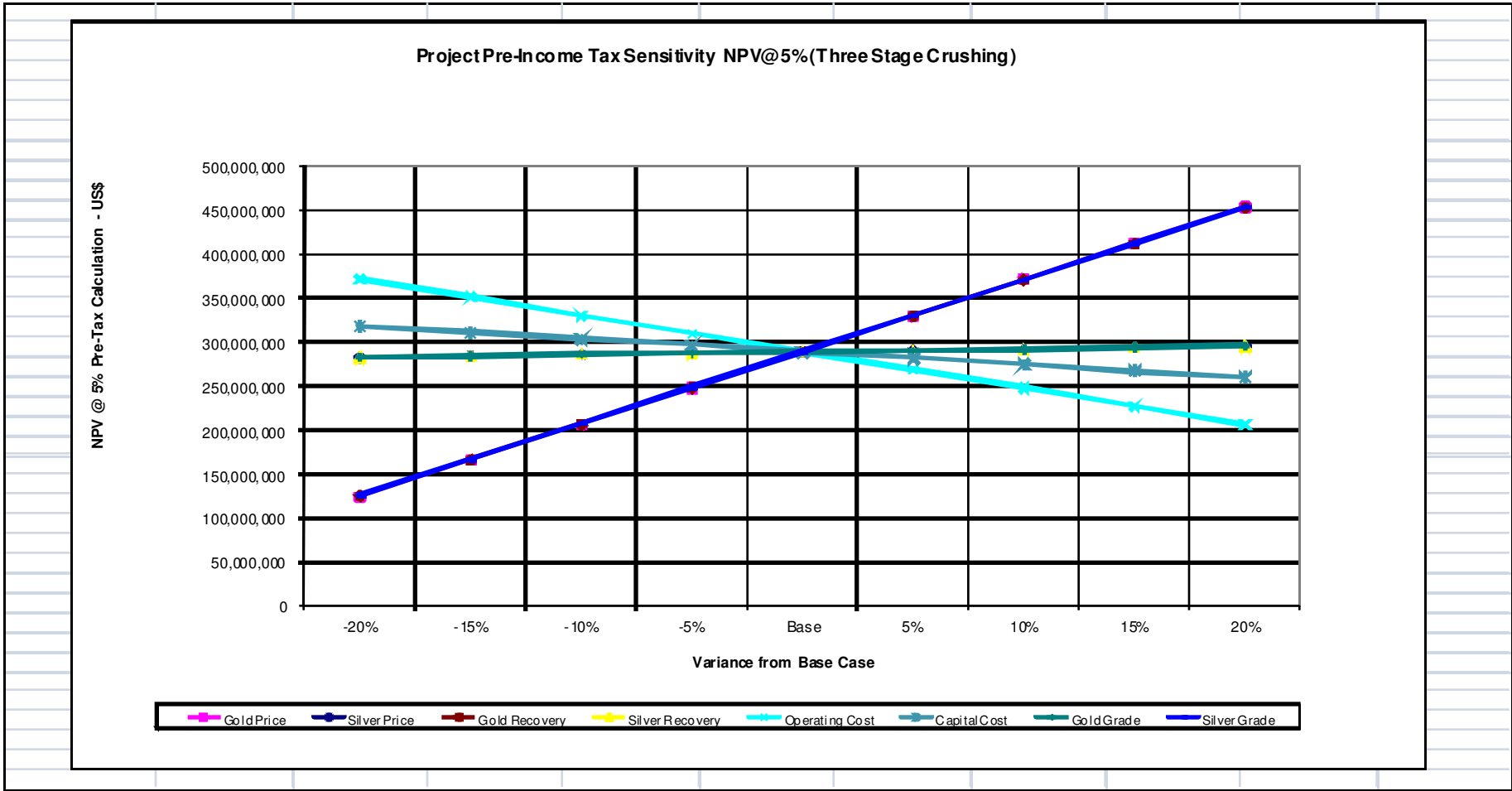


Figure 22.2 - Minera Cardel Gold Project Pre-Tax Sensitivity NPV@5%

As seen in Tables 22.9 and 22.10, the project's base case pre-income tax rate of return is 52.9 percent and the project's pre-income tax net present value at a 5 percent discount rate is US\$ 288.9 million. A ten percent increase in the gold price increases the estimated rate of return to 63.6 percent and increases the project's net present value, at a 5 percent discount rate, to US\$ 371.2 million.

23.0 ADJACENT PROPERTIES

There are no records of any neighbouring mineral properties of merit in the area of the Caballo Blanco Project; however the author was not able to verify this fact. If mineralization is known adjacent to the property it is not necessarily indicative of mineralization found on the Caballo Blanco property.

Under the terms of the agreement described in Section 4 of this report, Almaden is now the 100 percent owner of the El Cobre porphyry copper project located immediately to the south of the Caballo Blanco concessions. This was previously subject to a joint venture between Goldgroup and Almaden called the 'El Cobre' joint venture.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Site Water Balance

This section describes the criteria, methods, and results for the water balance and conceptual design of the ponds and the water treatment facility for the Caballo Blanco Heap Leach project. The water and mass balance for the process plant was not included in this part of the study.

24.1.1 Design Criteria

The criteria for the water balance and conceptual designs are provided in Table 24.1 below. The size of the ponds and water treatment facility are sensitive to these criteria; therefore, these criteria should be reviewed and approved by the heap leach operators prior to final design. Many of the criteria are based on assumptions that need to be verified through field and/or laboratory testing.

Table 24.1 Leach Pad Design Criteria used for the Pond Sizing Calculation			
Criteria	Value	Units	Notes
Loading Rate	20,000	tpd	Provided by Minera Cardel
Average Lift thickness	6	m	Provided by KDE
Total Leach Cycle Time	60	days	Provided by KDE
Total Active Leach Area	137,931	m ²	Area under leach for the given loading rate, lift height, and cycle time
Inactive Leach Pad Area	512,069	m ²	Area not used for active leaching but contributing to water balance
Catchment Area Draining to Process Plant	0	m ²	Not evaluated
Catchment Area Draining to Events Pond	0	m ²	MWH Layout
Runoff Coefficient	1.00	--	Estimated (conservative)
Solution Application Rate	12	l/hr/m ²	Provided by KDE
Solution Application Method	Drippers and Sprinklers	--	Assumes dripper and/or sprinklers can be used as needed to managed water excoesse s
Average Sprinkler Loss (percent of applied solution)	4	%	See Note 1.1

Note: ^{1.1} No site-specific data exists for water losses from sprinklers. The average annual sprinkler loss was estimated from published values and nomographs (Kappes 2002; Zazueta, 1994, Frost and Schwalen, 1955). KAPPES (2002) REPORTS THAT FOR HEAP LEACH OPERATIONS IN TROPICAL CLIMATES THE OVERALL EVAPORATION FROM ALL SOURCES WHEN USING WOBBLER-TYPE SPRINKLERS 24 HOURS PER DAY IS ABOUT 7 PERCENT OF THE SOLUTION PUMPED. Using the sprinkler loss nomograph developed by Frost and Schwalen (1955) and assuming a nozzle size between 1/8" (3.2 mm) and 3/16" (4.8 mm) and pressure around 25 psi (345 KPa to 552 KPa), yields annual average losses between 3 and 5 percent of the solution applied. We assumed that the maximum average sprinkler loss is 4 percent of the applied solution during the time when sprinklers are used to apply the solution. Collecting site-specific sprinkler loss data is important for accurately computing the water balance because sprinkler losses are a large component of the water balance. Determination of sprinkler losses should be part of the test program. Overall evaporation losses, including losses from sprinklers and ponds are approximately 5.8% of the solution flow.

Resource Properties

The assumed Resource properties are listed in Table 24.2 below. Limited data is currently available on the properties of the Resource; therefore, we are not certain about the assumed resource properties. Resource properties, particularly the resource moisture contents, are important components of the water balance. We recommend that resource characterization tests be conducted to define the resource properties and refine the water balance.

Table 24.2 Resource Properties			
Criteria	Value	Units	Notes
Resource Density	1450	kg/m ³	Preliminary Tests by Minera Cardel
Natural Moisture Content Prior to Application	1.42	%	Preliminary Tests by Minera Cardel
Resource Field Capacity Moisture Content	5.60	%	Preliminary Tests by Minera Cardel
Resource Moisture Content Under Leach	12.95	%	Preliminary Tests by Minera Cardel
Effective Porosity of In-Heap Water Storage (Select Material)	12	%	Assumed. Needs to be verified

Note: ^{2.1} Absorption values provided by preliminary testing by Minera Cardel are considered low when compared to standard expectations of resource characteristics. Increased absorption by the resource can affect the outcome of the water balance. Performing additional absorption tests on the resource is recommended for later stages of design and refinement of the water balance.

24.1.2 Alternative Evaluation

Initial water balance evaluations estimated that a heap with no side slope covers and no water treatment would require an external Events Pond with a capacity of 1.5M m³. Heap leaching will be done in two phases. Phase 1 will be for years 1 and 2; Phase 2 will be implemented for the balance of life of mine.

To reduce this required capacity, the following alternatives were evaluated:

Pond Storage

The conceptual design of the PEA heap leach has relatively small ponds for Pregnant Leach Solution (PLS), Intermediate Leach Solution (ILS), and Barren Solution (BS) storage and a larger pond for storage of large single-storm events and extended wet periods (Events Pond). The PLS, ILS, and BS Ponds were conceptually designed to have a nominal storage volume of 10,000-cubic meters (m³) with a freeboard volume of 13,250-m³, which is equivalent to an 8-hour drain down from the heap, assuming a solution application rate of 12-L/hr/m². The process ponds, Events Pond, and supplemental water treatment were sized so that there is adequate storage for the 100-year, 24-hour event in the heap. The required volume of in-heap storm water storage for the 100-year event is 135,000-m³ during Phase 1 and 266,250-m³ during Phase 2. The storage capacity of the Events Pond was designed for the cumulative volume of the peak water excess for the wettest year of the 33-year record (1973 to 2005). The external Events Pond will be located adjacent, but separate, to the heap, and the surface would be open to the atmosphere.

The in-heap pond will use the void space within the resource on the heap for water storage. This will require storage within the resource capable of containing the water volumes established by our design criteria. For this pond, the effective porosity of the resource was assumed to be 12-percent, based on inspection of the resource and engineering judgment. This assumption cannot be verified with the limited resource property data that are currently available. Resource characterization tests should be conducted to define the resource properties and refine the water balance prior to final design. We propose placing resource with higher porosities in the lower areas of the heap to improve storage capacity. The leach pad will have berms constructed around the perimeter to the elevation required to achieve the target storage volume. Phase 1 will require a perimeter berm height elevation of approximately 386-meters above sea level (masl), Phase 2 will require a perimeter berm height elevation of approximately 387.5-masl.

Water Treatment

The large annual rainfall based on the Laguna Verde data multiplied by 1.46 will create an annual water excess (see Hydrology section below) that, in the long term, will be difficult to manage without treatment to meet discharge standards and for environmental release. Treatment of heap draindown water will be required during closure of the heap leach. For these reasons, this evaluation considered water treatment during mine operation. The treatment of water during mine operation significantly helps reduce water excess in the circuit which reduces the required size of the Events Pond and cost to construct. The Phase 1 heap and pond system was designed to contain water excess developed from the design criteria, no water treatment will be required during Phase 1 based on these criteria. Phase 2 operations will require a treatment rate of approximately 250-m³/hr to handle the increased water excesses. This value will be adjusted once the Plant site precipitation is calibrated against the Laguna Verde data and the resource absorption properties are verified by laboratory testing.

24.1.3 Precipitation and Evaporation Data

Hydrology

Historical precipitation and evaporation measurements are not currently available for the site. MWH contracted Meteorological Solutions, Inc. (MSI) to develop estimates of monthly precipitation and evaporation and the 100-year, 24-hour storm depth. MSI prepared estimates of average monthly precipitation and evaporation at the Caballo Blanco site by regressing meteorological data from local and regional weather stations. MSI developed a 33-year precipitation record for the Minera Cardel mine by applying monthly scaling factors to the monthly precipitation data from the Laguna Verde weather station. The estimates of average monthly precipitation and evaporation depths are shown in Table 24.3, and the estimated precipitation record is shown Figure 24.1 below. Based on the location and elevation of the Caballo Blanco site relative to the other weather stations used in this study, MSI estimated the 100-year, 24-hour storm to be 375-millimeters (mm) (as a comparison, MWH estimated the 100-year, 24-hour storm

as 246 mm for Laguna Verde). The MSI precipitation and evaporation report can be found in Appendix 8. In order to refine the water balance for Caballo Blanco, actual precipitation and evaporation data from the site are required.

Table 24.3				
Estimated Average Precipitation and Evaporation at Caballo Blanco (per MSI)				
Month	Precipitation (mm)	Pan Evaporation (mm)	Evaporation On Pond and Active Leach Areas¹ (mm)	Evaporation On Inactive Leach Areas² (mm)
January	80	90	63	13
February	80	100	70	14
March	60	140	98	20
April	70	155	109	22
May	110	165	116	23
June	250	155	109	22
July	330	150	105	21
August	320	150	105	21
September	280	135	95	19
October	170	125	88	18
November	150	100	70	14
December	90	90	63	13
Total	1990	1555	1089	218

Notes: ¹ Assumes a pan coefficient of 0.7

² Assumes an evaporation rate of 20 percent of the pond and active leach areas

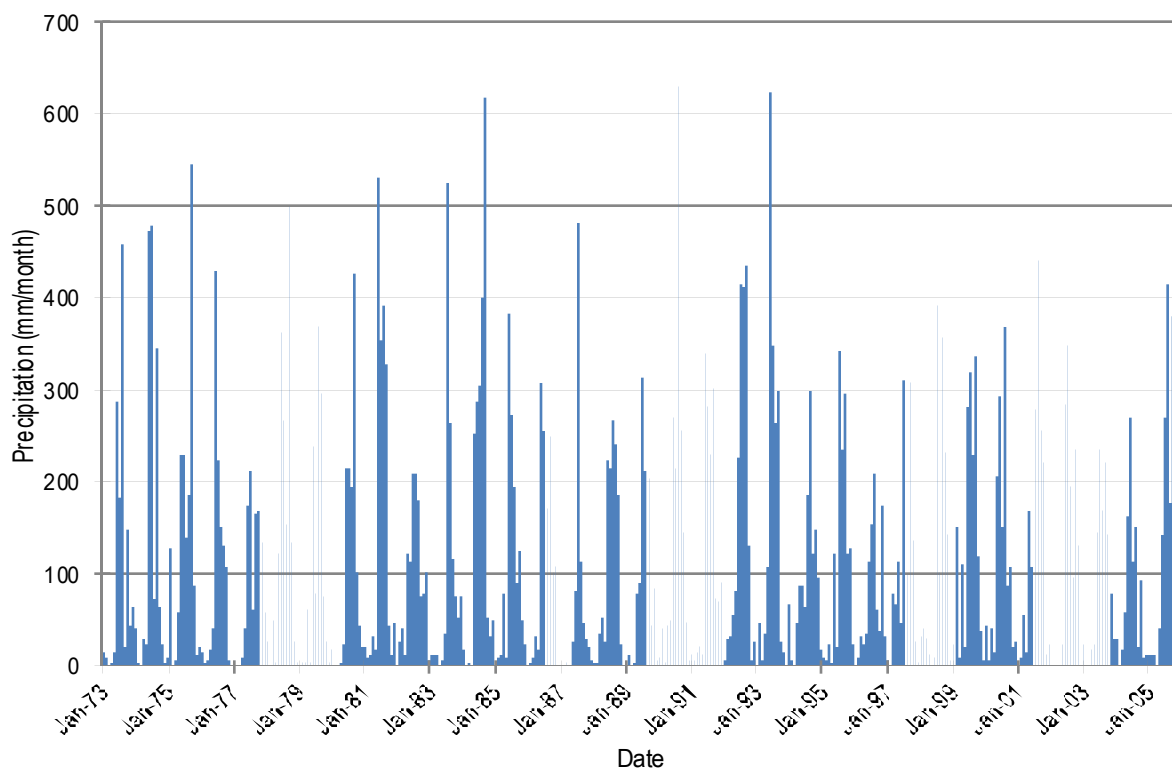


Figure 24.1 - Estimated Monthly Precipitation Depths at the Caballo Blanco Site

24.1.4 Methods

Water Balance for Operational Period

The precipitation volumes for the 100-year, 24-hour event were determined by multiplying the rainfall depth by the total catchment area (active leach area, peripheral area, and pond area). This assumes no rainfall losses. The volume of the 8-hour drain down was computed by multiplying the 8-hour solution application depth by the active leach area.

The volume for the peak water excess was computed by simulating the water balance for the entire period of record (1973 to 2005) for precipitation and evaporation. The water balance was computed on a monthly time step using the following general equation for the water balance of the leach heap and ponds:

$$\text{Water Excess} = \text{Water Inflows} - \text{Water Outflows}$$

Water inflows considered in the analysis were as follows:

- Precipitation on the heap surface
- Precipitation on the process ponds and Events Pond
- Storm water runoff from catchments (none in this case)

- Make-up water added to the leach circuit

Water outflows considered in the analysis were as follows:

- Evaporation or sprinkler losses from the heap surface
- Evaporation from the process ponds and Events Pond
- Solution bleed to the water treatment plant

A schematic showing the water balance components is shown in Figure 24.2 below.

An alternative simplified water balance was conducted on factored daily rainfall data at Laguna Verde for the period of 1990 to 2011 (the data includes two significant precipitation events). This model produced similar results.

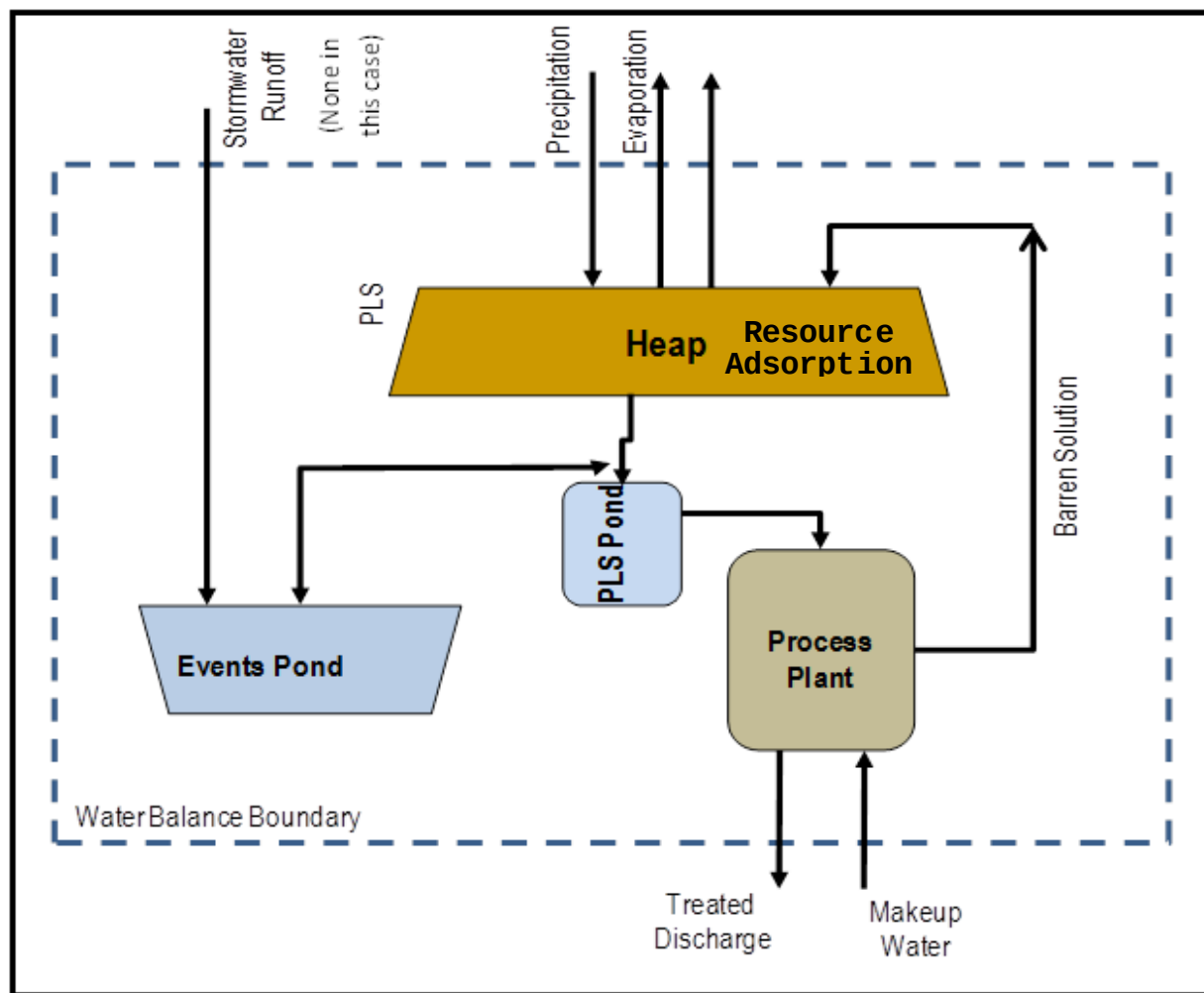


Figure 24.2 - Schematic for Leach Pad Water Balance

Scenarios Modeled

The water balance model was conducted for the operational scenarios listed in Table 24.4 below. Each scenario was modeled for the full 33-year period of record of precipitation.

Table 24.4 Operation Scenarios Considered in the Water Balance Simulations			
Scenario	Covered Sideslopes	Pond Type	Water Treatment Plant Capacity (m ³ /hr)
Phase 1	No	External solution and Events Ponds, in-heap storage for 100 year event	none
Phase 2	No	External solution and Events Ponds, in-heap storage for 100 year event	250

24.1.5 Water Balance Results

The results of the water balance calculations for Phase 1 and Phase 2 are listed in Table 24.5 below. For each scenario, sprinklers are assumed to operate full-time. Several treatment rates were evaluated during the water balance analysis to try to reduce the required size of the Events Pond to a reasonable volume. As Minera Cardel does not intend to treat water during Phase 1, the Events Pond had to be sized to contain 100-percent of the water excess from the established maximum storm record. The required capacity for the Phase 1 Events Pond was calculated to be 383,600-m³. For the calculation of the Phase 2 treatment rate, it was assume that the Events Pond capacity will not change (i.e. Events Pond does not expand during Phase 2). Our results indicate that the water treatment rate required during Phase 2 is approximately 250-m³/hr.

The heap can theoretically be operated with no treated discharge and with no external makeup-water input; however, this would require an unrealistically large pond volume that would provide sufficient excess water from the wet season for use in the dry season.

Lined or soil covered side slopes were initially considered to help reduce the catchment footprint and associated storm water influx however this alternative was rejected by Minera Cardel, but may be worthy of further review in later studies.

Table 24.5 Results of Water Balance Simulations		
Scenario	Phase 1	Phase 2
Pond Type	External PLS and Events Ponds with In-Heap Storage of 100-yr Storm	External PLS and Events Ponds with In-Heap Storage of 100-yr Storm
Water Treatment Plant Capacity (m³/hr)	0	250
Total Heap Area (m ²)	296,389	648,624
Active Leaching Area (m ²)	137,931	137,931
Inactive Heap Area, Uncovered (m ²)	162,069	512,069
Solution and Events Ponds Drainage Area (m ²)	52,241	52,241
Maximum Sprinkler Use (% of Month)	100	100
Maximum Water Treatment Rate (m ³ /hr)	0	250
Average Annual Water Treatment Volume (m ³ /hr) ¹	0	72.5
Average Annual Make-Up Water (m ³) ¹	65,970	68,176
Maximum Wet Period Excess (m ³)	383,600	328,800
Water Excess from 100-yr, 24-hr Storm (m ³)	135,000	266,250
Water Excess from 8-hr Draindown (m ³)	13,250	13,250
Total Process pond Volume (PLS, ILS, and BS Ponds) (m ³)	43,250	43,250
External Events Pond Volume (m ³)	383,600	328,800
In-Heap Storage Volume (m ³)	135,000	266,250

Notes: ^{5.1} Water treatment and make-up water requirement can vary significantly from year to year.

^{5.2} External Events Pond alternatives have been designed to accumulate storm water during the average precipitation year.

^{5.3} In-heap porosity of 12% assumed.

^{5.4} The period of record is from January 1973 to December 2005.

24.2 Water Balance at Heap Closure Review

Heap leach facilities have been permitted for closure using the following methods:

- Passive heap closure (no rinsing)
- Rinsing the heap with fresh water
- Rinsing the heap with reagents

Passive Heap Closure

Under a passive heap closure, the heap would be allowed to gravity drain. Drainage water would be treated to meet surface water standards and be discharged to

the environment. Drainage water in excess of the water treatment capacity would be recycled to the heap which will be progressively covered (or capped) with an appropriate layer of soil and/or geosynthetics. When the drainage rate decreases below the water treatment capacity, the heap can be fully covered. Drainage and water treatment will continue for several years after the heap is capped. The time required for cyanide in the heap to naturally degrade to levels below regulatory limits would likely be between 6 and 10 years (Wursten and Noranha, 1999). Tests and model simulations will be necessary to predict the exact length of the closure period. These simulations will depend on resource characterization data including permeability versus heap height, conductivity versus suction, water content versus suction, in-situ field moisture contents, and geochemical characterization of the spent resource.

The ability to passively close the heap without rinsing needs to be verified. This closure method is recognized by the United States Environmental Protection Agency (USEPA, 1994), but the requirements of Mexico environmental regulators are uncertain at this time. This method is selected for the conceptual level design of the heap in absence of site-specific data to evaluate rinsing requirements.

Heap Closure with Fresh Water Rinsing

Freshwater rinsing has been successfully used to close several heap leach facilities in the United States; however, rinsing requirements and successes are site-specific and can be highly variable. Some heaps are reported to have been successfully rinsed in days to weeks, while others require several years (Wursten and Noranha, 1999), and reported pore volume rinse requirements range from as low as 3 pore volumes to over 100 pore volumes (Smith, 1988; Hutchinson, 1988; Wursten and Noranha, 1999). Often, cyanide concentrations in heap drainage will rebound following the cessation of rinsing after low levels of cyanide were achieved (Smith, 1988). In some cases, fresh water rinsing can be used to meet the regulatory requirements for cyanide, but is ineffective in reducing concentrations of other constituents, such as arsenic and sulfate, to acceptable levels (Parshley and Howell, 2001). Other research and experience with fresh water rinsing of heaps indicates that fresh water rinsing could potentially alter the pH-redox conditions in the heap and lead to an increased release of constituents, including cyanide, through desorption, dissolution, and buffering reactions (Howell et al., 2009). Consequently, the effectiveness and rinsing requirements for a fresh water rinse of a heap must be determined from site-specific testing (e.g., column rinse testing).

Assuming that a freshwater rinse of the heap is a viable alternative for heap closure, the heap would be rinsed until drainage beneath the heap meets discharge standards. The heap would then be allowed to gravity drain and drainage would be discharged to the environment.

Heap Closure with Chemical Treatment and Rinsing

Heap closure with chemical rinsing involves adding a chemical reagent to the rinsing water to achieve more rapid cyanide destruction and minimize the amount of

pore volumes that need to be rinsed. Common chemical treatment methods used for chemical rinsing are alkaline chlorination, sulfur dioxide - air oxidation (INCO), and hydrogen peroxide oxidation (Smith, 1988; USEPA, 1994). The main advantage of chemical treatment compared with fresh water rinsing is in the time and rinse water savings. The main disadvantages are the cost of the reagents, the additional operator control required to add reagent and monitor pH levels, and the potential for formation of toxic compounds (Smith, 1988).

Preferred Closure Method

For the purposes of this preliminary study we assume that passive heap closure will be acceptable. At the start of closure, drainage from the heap will exceed the capacity of the treatment plant for the plant capacities considered in the water balance. Drainage exceeding the treatment capacity will be recycled to the heap which will be covered (or capped) with an appropriate layer of soil and/or geosynthetics (in this case 600 mm of soil). The drainage rate will decrease over time until the drainage rate is at or below the treatment capacity. At this time, recycle to the heap will be discontinued. We estimate that for a treatment plant with a capacity of 250 m³/hr, drainage will continue for 3 years (this is highly dependent on the spent resource properties). Drainage and water treatment will continue for several years at continually decreasing rates after recycling of solution to the heap is discontinued. Model simulations will be necessary to predict an exact length of the closure period. These simulations will require resource characterization data including permeability versus heap height, conductivity versus suction, water content versus suction, and in situ field moisture contents.

Heap Leach Pad Detoxification

As said, the detoxification will be made by the circulation of solutions and fresh water that will rinse the pad of any residual cyanide. The solution will be contained within the solution pond systems, destruction of the cyanide will be a combination of natural degradation and appropriate treatment. This whole process will be under continual supervision and monitoring for approximately one and a half years, which is the estimated time to decrease the cyanide concentration to the permissible limit stated in accordance with Mexican standard NOM-001-SEMARNAT-1996 –Maximum permissible limits for the wastewater discharges to National bodies of water.

The soil at the dams will be tested for heavy metals concentration in accordance with the official Mexican standard NOM-052-SEMARNAT-2005 –Hazardous waste characteristics, identification, and classification process and the List of the hazardous wastes

Future Studies

This report mentions several future studies that will allow optimization of the water balance. These studies include the following:

- Verification of Caballo Blanco rainfall by actual measurement

- Verification of sprinkler loss rate
- Characterization of resource hydraulic properties
- Column rinse tests
- Investigation of the permitting requirements for passive heap closure
- Analysis of leachate draindown to assess treatment requirements

24.3 Leach Pad and Pond Closure

Closure of the Heap Leach will consist of pushing out the sideslopes to 3H:1V. This will increase the pad footprint requiring extension of the leach pad liner and overliner around the perimeter. The top surface may require minor grading to allow for free drainage of stormwater from the closed heap. The slopes and top surface will be capped with 600-mm of non-acid-generating soil and then be vegetated or rock armored for erosion protection.

The process and Events Pond liners will be removed and the ponds will be breached to allow for free drainage of stormwater through these areas. Areas around the closed heap and ponds may require additional vegetating or rock armoring for erosion protection. The closure plan will be refined during a later design stage.

24.4 Waste Stockpiles

Caballo Blanco Oxide and Sulfide Waste Stockpiles

The SRK mine plan shows a total of 82-million tonnes (Mt) of oxide and sulfide waste will be produced from Caballo Blanco mining operations. Of the 82-Mt, 65 percent is estimated to be oxide waste (53-Mt), and 35 percent sulfide waste (28-Mt). This will be refined in later studies.

Sulfide Waste Stockpile

The sulfide waste stockpile will be located to the northwest of the pit. Preliminary acid rock drainage (ARD) tests on the sulfide waste indicate that the material is acid-generating. Because of this, the sulfide waste will require impermeable containment (80-mil HDPE or LLDPE liner) for protection of the surface and groundwater. The sulfide waste stockpile foundation slopes will need to be approximately 2.5H:1V or flatter. Double-textured liner will likely be required to increase stability of the stockpile and for safety during installation.

As with the leach pad design, the sulphide waste stockpile will require a clay liner layer (300-mm thick) beneath the HDPE or LLDPE. The clay liner should be prepared into a smooth and unyielding surface with no rock or debris protrusions. The HDPE/LLDPE liner will be topped with an overliner material (screened to minus 37-mm) in a layer thickness of 1-meter. This overliner thickness will provide protection of the liner from the equipment placing the overliner (assuming low-ground pressure equipment is used) and during the dumping of the sulphide waste (expected to be end-dumped off lifts from 10-meters or higher).

Access to the sulfide waste stockpile will be from a haul road built of oxide waste (discussed in a later section). Haul trucks will dump off the end of the haul road onto the overliner or subsequent lifts of waste. The haul road (constructed out of sulfide waste over the lined area) will continue to the base of the stockpile to fill the lower areas first. The stockpile will then be elevated as the dumping progresses, the sideslopes pushed out at 3H:1V to eliminate the need for re-grade during closure and covered concurrently with operations. This passive concurrent closure approach will reduce the area exposed to storm water infiltration, thus reducing the required treatment plant size. The ultimate height of the sulfide waste stockpile will be 200-meters and the stockpile will have a capacity of 28-Mt for sulfide waste from the pit.

The sulfide waste stockpile can be seen on MWH Drawing 7, Appendix 7.

ARD Collection Pond and Lime-Precipitation Treatment

An ARD collection pond will be required to collect acid solution that drains from the waste stockpile. The ARD collection pond will be located at the base of the sulfide waste stockpile allowing gravity flow of the ARD solution from the stockpile to the pond. The ARD collection pond has a liner system consisting of a 150-mm layer of clay liner beneath an 80-mil HDPE or LLDPE liner. Water collected in the ARD pond will be monitored and treated to acceptable pH levels, as required.

Water collected in the ARD collection pond will be treated by a lime-precipitation plant to neutralize the acid in the water which will then be responsibly discharged into the natural drainage downstream of the plant. Future tests may indicate the need to remove metals from the ARD water, which would create the need for additional treatment. The ARD collection pond was sized for the rainfall from the maximum wet season on record plus the 100-year, 24-hour storm depth and a maximum treatment flow of 400-m³/hr. A summary of the sulfide stockpile water balance criteria and results is provided in Table 24.6 below:

Table 24.6 Sulfide Waste Stockpile Criteria and Results	
Description	Results
Waste Rock Area (m ²)	449,453
Maximum Water Treatment Rate (m ³ /hr)	400
Pond Drainage Area (m ²)	27,878
Average Wet Period Excess (m ³)	0
Maximum Wet Period Excess (m ³)	76,509
Water Excess from 100-yr, 24-hr Storm (m ³)	181,875
Total Pond Volume for Max year + 100-yr, 24-hr storm (m ³)	258,384

Notes: ^{6.1} Absorption of the waste rock assumed to be 4.2-percent based on results of resource preliminary resource testing. Absorption values provided by preliminary testing by

Minera

Cardel are considered low when compared to standard expectations of resource characteristics. Increased absorption by the resource can affect the outcome of the water balance. Performing additional absorption tests on the resource is recommended for later stages of design and refinement of the water balance.

^{6.2} Evaporation on pond surface is 0.7 times pan evaporation

^{6.3} Evaporation on waste rock pile surface is 0.1 times pond evaporation.

^{6.4} Water excesses are cumulative from year to year.

Oxide Waste Stockpiles

The SRK mine plan indicates that 53-Mt of oxide waste and 28-Mt of sulfide waste will be excavated over the life of mine. The oxide waste occurs mostly as a cap to the resource body and is expected to be the first waste material encountered during mine pit excavation. This non-acid material (likely non-acid-generating) is assumed to not require an impermeable lined containment.

Since oxide waste is expected to be encountered early in the mining process, the plan is to use this material to construct portions of the resource conveyance haul road and a haul road for access to the selected location of the sulfide stockpile. The sulfide access haul road will require a width of at least 55-meters to allow for turnout dumping and adequate traffic safety berms. The maximum longitudinal slope of the haul road was chosen to be 10-percent. CAT technical support has indicated a loaded CAT 777 haul truck is able to travel down a 10-percent slope in fourth gear, at a maximum speed of 6.7-m/s (15 mph) without mechanical brake failure. The haul road bends have been designed with a minimum turning radius of 60-meters (to haul road centerline). The total length of the haul road is 1.3-kilometers. The initial construction of the haul road will consist of dumping of 15.5-Mt of oxide waste.

Once the sulfide access haul road has reached the sulfide stockpile location, additional oxide waste can be dumped off the access haul road and progressed outward to the northwest. Additional oxide storage will be located to the southeast of the sulfide stockpile access road (adjacent to the pit). Dumping of this waste can begin near the rim of the pit and be pushed outward and downhill towards the access haul road. The haul road will be kept intact for transportation of sulfide waste. It is assumed that the

oxide waste stockpiles would be constructed with outcrops equal to the angle of repose of the waste rock (~1.5H:1V was assumed). Based on the contours provided, we estimate that these two additional stockpile areas will allow for disposing of 24.5-Mt of oxide waste (in addition to the waste disposed of during construction of the access haul road) for a total of 40-Mt disposed in these areas northwest of the pit.

A total tonnage of approximately 53 million tonnes of oxide waste is estimated by the mine plan (SRK). This means that an additional 13-Mt of storage volume is required. An area to the southwest of the pit has been identified for the additional storage of 11-Mt of oxide waste. This stockpile will buttress the resource transfer haul road to the south. Dumping of the oxide waste can begin from the resource transfer haul road and be dumped and pushed outward towards the south and southwest.

The additional 2 million tonnes of oxide waste can be used to construct the resource transfer haul road and the resource conveyance road, if necessary.

Waste Stockpile Surface Water Control

The west toe of the oxide waste stockpile haul road approaches a natural drainage. To ensure erosion of the toe does not occur, storm water management will likely be required (i.e. berms, ditches, additional rock armoring of the waste slopes, etc). This is dependent on the peak flows of the natural drainage and the erosion resistance of the oxide waste. A lump sum amount has accounted for this additional construction.

Berms will be constructed along the perimeter of the sulfide waste stockpile to prevent additional water from entering, or ARD water from exiting, the stockpile.

Closure Sulfide Waste Stockpile and ARD Ponds

Closure of the sulfide waste stockpile will consist of placing a 600-mm thick (minimum) layer of non-acid-generating soils over the exposed surfaces. Since the sideslopes of the sulfide waste stockpile will be pushed out at 3H:1V slope during loading, no further slope grading will be required during closure. It is suggested that covering of the sideslopes be performed concurrently with the placement of the sulfide waste so that the ARD treatment requirements can be reduced. The cover layer will be vegetated or rock armored to provide protection against erosion.

The ARD pond liner will be removed at closure and the pond will be breached to allow for free drainage, although the pond will likely need to remain in place for a number of years to catch residual stockpile drainage.

Closure of Oxide Waste Stockpiles

It is anticipated that the oxide waste will be coarse rock that will provide adequate erosion resistance. This would allow the sideslopes of the oxide waste stockpiles to be left "as-is" during closure. This would require verification at a later design stage. The top surfaces of the oxide waste stockpiles (including the resource transfer and conveyance

roads) will be tilled and vegetated during closure. The top surfaces should be constructed in a manner that will allow the for free drainage of storm water from the stockpiles.

Further Studies

- Condemnation Drilling of Proposed Waste Dump Areas
- Geotechnical Investigation of Waste Dump Areas
- Required Treatment of ARD
- Erosion studies of waste material

25.0 INTERPRETATION AND CONCLUSIONS

- Geological field work since 1995 has identified at least three large areas of epithermal precious metal and porphyry style copper gold mineralization at the Caballo Blanco Project. These areas are known as the Northern Zone, Highway Zone and Central Grid Zone and were originally under joint venture agreement between Goldgroup and Almaden Minerals Ltd, as described by Cuttle, Giroux, 2010. However in October 2011 Goldgroup completed the acquisition of the remaining interest in the Caballo Blanco project held by Almaden. Goldgroup now owns 100 percent of the Caballo Blanco project, excluding the copper-gold porphyry targets at the Central Grid Zone.
- Goldgroup drilled 19 reverse circulation (RC) holes and 123 diamond drill holes in the Northern Zone at Caballo Blanco. The RC holes proved very problematic with low sample recoveries and slow rates of advance particularly within the mineralised siliceous zones. The RC technique was abandoned in favour of large diameter diamond drill core. All fourteen RC holes at La Paila were later twinned with diamond drill core and recoveries improved significantly.
- A variety of geophysical, geochemical and geological surveys have been extremely useful in identifying drill targets in and around the Northern Zone and Highway Zone at Caballo Blanco. The most important surveys have been airborne magnetics, resistivity high IP anomalies, clay alteration haloes identified by TerraSpec® spectrometer, mineralized surface rock geochemistry and detailed geological and structural mapping. These surveys have not only been used successfully to outline a classic zonation of alteration representative of a large epithermal and porphyry systems but they have, most importantly, been used to define zones of silica flooding and associated gold and copper-gold mineralization. These surveys should remain principle exploration tools for future work at Caballo Blanco.
- The elongate and silicified gold rich mineralization at La Paila, in the Northern Zone, and its associated alteration patterns likely formed from fluid rising along a north trending fault structure well above a deeper intrusive 'heat source' (Sillitoe, 2008). Similar geochemical and geophysical anomalies and silica/clay alteration patterns have been recognized at La Cruz, Red Valley and Highway Zone, all of which lie along a north-south trend for a distance of over nine kilometers. This corridor represents an important exploration target for the future.
- In 2012, Gary Giroux of Giroux Consultants was retained to update the resource estimation for La Paila, based on the constraints of a geological solid surrounding the mineralized sections of a silica breccia. This is the resource available if one could mine to the limits of the mineralized solid and includes no edge dilution. The current drill hole density is not sufficient to establish any blocks in the measured category at this time and all blocks are

considered either Indicated or Inferred. In light of the metallurgical recoveries obtained by Goldgroup, a 0.2 gram per tonne gold cut-off identifies the following resource categories at La Paila:

0.2 g/t cut-off

Indicated - 28,890,000 tonnes, 0.62 g/t gold, 2.32 g/t silver or 575,000 ounces gold and 2,150,000 ounces silver

Inferred - 24,020,000 tonnes, 0.54 g/t gold, 2.50 g/t silver or 419,000 ounces gold and 1,930,000 ounces silver

- A total of forty five 'in-house' column tests have been completed to date on bulk surface sample and reverse circulation drill cuttings showing gold recoveries from 76 to 94 percent based on atomic absorption analysis of the recovered solution and a final fire assay of the column residue. Leach times have been run for an average of 40 days and average cyanide and lime consumptions are low at 0.14 and 1.6 kilograms per tonne of sample respectively. These tests have yet to be verified by an outside independent laboratory.
- At least eleven other areas outside of the La Paila zone justify further geological work at Caballo Blanco. These areas include; four large IP resistivity high anomalies on the inner flanks of a 3 kilometre round magnetic high 'ring structure' in the Northern Zone; strong 'acid' PH anomalies 1.5 kilometers west of La Paila in the Northern Zone; three separate areas where isolated rock chip samples assay up to 14.6 grams per tonne gold along the northwest and south portions of the Caballo Blanco property; and three other separate areas with encouraging 'new' soil anomalies, extensive rock alteration and untested IP chargeability and resistivity anomalies at the Highway Zone. These are described in detail by Cuttle and Giroux, 2010.
- The authors do not see any risks and uncertainties that could affect current levels of exploration information, resource estimates or economic projections by Goldgroup.

Industry standard mining, process design, construction methods and economic evaluation practices have been used to assess the Caballo Blanco Project. In SRK's opinion, there is adequate geological and other pertinent data available to generate a PEA.

Based on current knowledge and assumptions, the results of this study show that the project has positive economics, within the preliminary parameters of a PEA, and should be advanced to the next level of study by conducting the work indicated in the recommendations section.

As with almost all mining ventures, there are a large number of risks and opportunities that can influence the outcome of the Caballo Blanco project. Most of these risks and opportunities are based on a lack of scientific information (test results, drill results, etc.) or the lack of control over external drivers (metal price, exchange rates, etc.). The following section identifies the most significant potential risks and opportunities currently identified for the project, almost all of which are common to mining projects at this early stage of project development.

Subsequent higher-level engineering studies will need to further refine these risks and opportunities, identify new ones and define mitigation or opportunity implementation plans. While a significant amount of information is still required to do a complete assessment, at this point there do not appear to be any fatal flaws for the project.

The study achieved its original objective of providing a preliminary review of the potential economic viability of the Caballo Blanco La Paila project.

25.1 Risks

As with most early-stage projects there are a multitude of risks that could influence the economic potential of the project. Many of these risks are based on lack of knowledge and can be managed with appropriate engineering and additional studies. External risks are beyond the control of project proponents and are much harder to anticipate and mitigate although, in many instances, some risk reduction can be achieved. Tables 25.1 and 25.2 identify some of the more internal and external significant project risks, potential severity and possible mitigation approaches.

Table 25.1
Internal Project Risks

Risk	Explanation	Potential Impact	Possible Risk Mitigation
Mineral Resource Estimate			
Process Parameters	Process testwork, including metallurgical, chemical, permeability, physical material characteristics, mineralogical analyses, is incomplete or not available.	Permeability is underestimated: Fatal Flaw Recovery is overestimated: Significant impact on economics Physical material characteristics not established: Crushing equipment selection and circuit selection inadequate, reduced throughput	Complete testwork to define all areas of the project relative to Process. Complete Feasibility Study
CAPEX and OPEX	The ability to achieve the estimated CAPEX and OPEX costs would be an important element of success	As shown in the sensitivity analysis, an increase in CAPEX and/or OPEX would have a negative effect on the project economics.	Further cost accuracy with the next level of study as well as the active investigation of potential cost-reduction measures
Permit Acquisition			
Geotechnical Assessment	No geotechnical assessment has been undertaken to assess the rock mass strength and impact on pit slope stability.	A decrease in slope angles would negatively impact on project economics due to increase waste stripping requirements.	Additional investigation/evaluation for next level of study to develop reliable 3D structural, lithological and alteration models.
Water Management	The water balance defines the overall water management strategy and costs	Excess water can cause significant operating problems	Gather additional information on the precipitation characteristics on site
Waste Rock Facility and Stability	Waste rock has the ability to generate AMD	Costs associated with managing large tonnages of sulfide waste rock will impact the OPEX and CAPEX	Quantify the waste rock and lithology
Inclusion of taxation and financing costs	No taxation or financing costs were included in the economic evaluation.	Taxation and financing costs will reduce the NPV of the project.	Include taxation and financing costs in the next level of study.

Table 25.2
External Project Risks

Risk	Explanation	Potential Outcome	Possible Risk Mitigation
Metal prices	Metal prices (and in particular gold price) have significant impact on the economic viability of the project.		Current strong demand for copper and gold make it possible to forward sell production to reduce the risk of metal price volatility. This can be done for all or a portion of production.
Earthquakes	The project is located in a seismically active area which could impact the stability of infrastructure, open pits and building	A significant earthquake could create a number of problems for the site from power failure to destruction of buildings, equipment and infrastructure.	Appropriate design locations and standards must be adhered to should the project reach the construction phase to ensure all design work and building practices reasonably consider the potential impact of an earthquake.
Project Financing			
Hiring of Mining Contractor	The selection of an appropriate, experienced Mining Contractor will be critical to success of project	The inability of the company to retain a skilled mining contractor could have a negative impact on project timing, costs and overall success	The early search for an experienced mining contractor is required
Recruiting Experienced Professionals for the development and operating teams	The selection of appropriate, experienced people for the project will be important to its success	The inability of the company to retain a skilled development and operating team could have a negative impact on project timing, costs and overall success	The early search for an experienced workforce would be required along with appropriate compensation and benefits

25.2 Opportunities

Table 25.3
Project Opportunities

Opportunity	Explanation	Potential Benefit
Metal prices	Metal prices (and in particular gold prices) have a significant impact on the economic viability of the project.	In the base case, every 5% increase in the combined metal price improves the base case PT-NPV _{8%} by about \$40M.
Water balance	Capital cost of water pipeline and associated operating costs will influence the overall project economics. Environmental impacts	A neutral water balance will reduce the overall environmental impact and reduce costs.
Conveyor Stacking of Leach Pad	Capital investment in conveyor stacking of heap leach vs. truck stacking can have a significant impact on heap permeability	Improved permeability reduces risk and has the potential to improve recovery and reduce leach cycle time
Conveyor ROM Ore to Crusher	Capital investment in overland conveyor vs. truck hauling from pit to crusher	Improved operating costs, reduced downtime, increased revenue
Electrical Power	The current OPEX assumes on site power generation which is costly	Connect to the main power grid to reduce overall power costs
Exploration potential	Favourable exploration potential in the area could increase resources and might have a positive impact on the project mineral resources	Increased resources would lead to a potentially better project economics if they could be converted to reserves in the future. The more economic tonnes available to mine the better the project economics would be as total revenues would increase, potentially without adding more capital cost.

26.0 RECOMMENDATIONS

26.1 Additional Analytical and Metallurgical Testwork Recommended

Additional test work to verify extraction, reagent consumption, and crushing performance is recommended. The following test work should be performed:

- Variability Testing: Metallurgical column testing from core samples based on Lithology and grade to determine the overall extraction variability of the resource.
- Yearly Composite Testing: Metallurgical column testing based on composited core samples representing each year of mining.
- Master Composite Testing

Each set of composite samples should undergo the following test regimen:

- Leach Column statistical design study: Study will vary key parameters to determine optimal conditions for leach. Test parameters should include cyanide concentration, agglomerated, non-agglomerated-, lift height, crush size, irrigation flow-rate.
- Cyanide soluble gold analyses: Samples for the resource analyzed for cyanide soluble gold and added to the mine model along with total gold analyses by fire assay.
- Mercury testing: Analyses should be conducted on a selection of samples to determine if mercury will be recovered in the leaching process
- Multi-element analysis: Analyses conducted to determine the amount of other cyanide soluble elements, including copper, zinc, and lead.
- Whole rock analysis
- LECO testing: sulfur and carbon speciation.
- Mineralogical studies: Polished sections, XRD/XRF, defines mineralized matrices

Additional testing for each composite sample should include:

- Crusher Bond Work Index
- Pendulum testing

- Abrasion Testing
- Consolidation/Permeability Testing on leached residues

Testwork is recommended to be conducted on diamond drill core, logged and quartered specifically for metallurgical testing. Compositing should be overseen by qualified persons. All test work is recommended to be conducted by an independent, outside laboratory or supervised in house by independent, qualified persons. The above recommended test work may cost approximately US\$ 300,000.

26.2 Future Studies - MWH

This report mentions several future studies that will allow optimization of the water balance. These studies include the following:

- Verification of Caballo Blanco site rainfall by actual measurement
- Verification of sprinkler loss rate
- Characterization of ore hydraulic properties
- Column rinse tests
- Investigation of the permitting requirements for passive heap closure
- Analysis of leachate drain-down to assess treatment requirements
- Physical analysis of water treatment required
- Thorough geotechnical investigation for waste dumps, haul road, tunnel, leach pads, and plant areas.
- Verification that regulators allow Events Pond to contain dilute PLS on a seasonal basis and in-heap storage of 100 year 24 hour storm.
- Condemnation Drilling of Proposed Waste Dump Areas
- Required Treatment of ARD and leachate.
- Erosion studies of waste material

26.3 Future - SRK

- Detailed geotechnical investigations for open pit slopes and proposed main access roads
- Detailed hydrogeological/hydrology investigations
- Geochemical studies to determine potential ARD/ML issues and classification of material contained in open pit
- Resource definition drilling to upgrade Inferred Resources to Measured or Indicated category
- Conduct a preliminary feasibility study
- Estimated cost of above investigations is US\$ 4 to US\$ 6 million

26.4 Future Studies - ERM

Minera Cardel will need to develop impact mitigation plans as stated in the Environmental Impact Assessment (EIA). The approximate cost of this effort would be \$42,870 USD. This cost does not include the implementation of the plans at the Mine Site, which should be included in the environmental budget.

26.5 Additional Study Recommendations

- Investigate cost of connecting plant to Electrical Grid vs. Site diesel power generation
- Review trade-off study for Overland Conveyor vs. Truck Haulage from the pit to the Heap Leach
- Further define water treatment requirements

27.0 REFERENCES

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28.0 APPENDICES

Appendix Documents and Drawings
can be viewed and are available in the Goldgroup Mining, Inc.
offices in Vancouver, BC after signing a confidentiality agreement.