TECHNICAL REPORT

ON THE

CHIRANO GOLD MINE,

REPUBLIC OF GHANA

FOR

RED BACK MINING INC

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Table of Contents

List of Figures

List of Tables

1 SUMMARY

1.1 Introduction

In October, 2004, Red Back Mining Inc (Red Back) announced its decision to develop the Chirano Gold Mine, when the Proven and Probable Reserves were estimated to be 17.8Mt grading 1.9 g/t gold, for a total of 1.09 million ounces. The capital cost to develop the Chirano Mine was $73.4 million. First gold was poured at Chirano in October 2005.

Since that time drilling at and around the Chirano Mine has continued to fully define the open pit reserve and has identified a significant underground reserve at Akwaaba, which is now in the process of being developed. Inferred resources at depth have also been delineated below the Suraw and Paboase South pits.

The Proven and Probable Reserves estimate at the December 2008 are 32.3Mt grading 2.2g/t for 2.33 million ounces. By December 2008 the mine had processed 7.0Mt grading 2.0g/t for 0.44 million ounces contained.

1.2 Location

The mine is situated in southwestern Ghana, 100 kilometers south-west of Kumasi, which is Ghana's second largest city. The town of Bibiani lies 15 kilometers north-northeast of the mine area (37 kilometers by road). Access to the mine from the capital Accra is via a sealed highway to Kumasi and then sealed highway running south-west towards Bibiani and onwards to the town of Sefwi-Bekwai. The final approach is via a 13 kilometer gravel road whose junction is approximately 9 kilometers beyond Sefwi-Bekwai.

Mine infrastructure comprises a centrally located processing plant, tailings storage facility, water storage facility, staff village, workshops and offices.

1.3 Ownership

The Chirano Mine and the mining lease on which it is based are owned 100% by Chirano Gold Mines Limited (“CGML”), a Ghanaian subsidiary of Red Back. CGML is 100% owned by Red Back through its intermediate subsidiary, Red Back Mining (Ghana) Limited. On April 8, 2004, CGML was issued a mining lease (PL2/56) in respect of the Chirano Mine valid for a period of 15 years. The Government of Ghana retains the right to back-in to a 10% carried interest in the Chirano Mine under Section 8 of the Ghana Mining Act, which interest may be increased to 30% by negotiation and arbitration. This 10% interest would represent a portion of CGML’s 100% interest. The mining lease is exclusive to CGML, and is not subject to any option or joint venture arrangement. No back-in rights are held by any party other than the Government of Ghana.

A royalty is payable to the Government of Ghana equal to 3% of gross revenue, unless the operation is highly profitable (where the operating margin is more than 30% of the value of the minerals extracted), in which case the royalty may be increased in stages up to a ceiling of 6%. An additional royalty equal to 0.6% of gross revenue is payable in relation to minerals extracted from Ghana’s productive forest reserves. Production from most of the Chirano Open Pits is subject to this extra royalty. Akwaaba lies outside of the forest reserve.

1.4 Geology

The Chirano mine area lies within the Proterozoic terrain of southwest Ghana, along a major structure separating the Sefwi Belt to the west from the Kumasi Basin to the east known as the Bibiani Shear zone. The belt and basin architecture comprises rocks of Birimian age, with the belts being dominated by mafic volcanics and the basins typified by fine grained, deep marine sediments. Both are intruded by granites.

The Chirano gold deposits lie close to a splay off the main Bibiani shear zone known as the Chirano Shear. The two are separated by a small inlier of younger Tarkwaian epiclastic sediments. The deposits occur at regular intervals along a mineralized zone eleven kilometers long. The mineralized horizon is characterized by foliation, veining and brecciation, and is interpreted as a splay fault off the Chirano Shear with mineralization occurring within 200 meters to the west of the Chirano Shear.

1.5 Mineralization

The Chirano gold deposits are hosted by fractured and altered mafic volcanics and granite, and include stacked arrays of parallel veinlets, veinlet stockworks and mineralized cataclasites. The geometry and shape of the deposits range from tabular (Obra), or pipe-like (Tano), to multiple parallel lodes (Paboase). The mineralized zone thickness ranges from a few meters to over 70 meters. Most deposits dip very steeply towards the west or southwest, and also plunge very steeply. Generally, the tenor of the gold mineralization correlates with the intensity of alteration, veining and brecciation. The gold mineralization is fine grained and is associated with 1% to 5% pyrite, and the distribution of gold appears to be closely associated with the presence of pyrite. The hydrothermal alteration assemblage is characterized by silica, ankerite, albite, sericite and pyrite.

1.6 Exploration Concept

Exploration in the early phases of the project was largely empirical with the fourteen known deposits discovered through routine soil geochemistry followed up by trenching and later drilling. Over the last two years and driven in part by the discovery of the Akwaaba underground resource, exploration is becoming more conceptual in the search for deeper, possibly blind deposits along the Chirano Shear.

1.7 Status of Exploration

Exploration is at a very advanced stage. The known open pit and underground resources have been fully defined by drilling. Geological mapping continues to advance knowledge of the mineralization and controls and more sophisticated ground geophysics has been utilized to probe deeper parts of the 11km strike length of the Chirano Shear.

1.8 Mineral Resources

On March 30, 2009 Red Back announced a revised open pit Resource estimate for the Chirano Project. Hellman & Schofield Pty Ltd. (“H&S”) was retained to estimate the gold resources as at end December 2008 for input into the revised open pit optimisation, underground mining studies and mine planning for the Chirano Project.

Red Back also announced an initial underground resource estimate for the Paboase South and Suraw deposits, also calculated by H&S, and restated the Akwaaba Deeps underground resource as at 31 December 2008. The underground resource estimates are exclusive of the open pit resource estimates.

The summarized resource statements are reported in accordance with NI 43-101 and the classifications adopted by CIM Council in August 2000. The resource classification is also consistent with the Australasian Code for the Reporting of Mineral Resources and Ore Reserves (2004) prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia (JORC). The resource statements are summarized in tables 1.8-1 and 1.8-2.

Table 1.8-1 Open Pit Resource Statement

Open Pit Resource Statement[1] December 31, 2008			
Resource Category	**Tonnes (million)**	**Average Gold Grade (g/t Au)**	**Contained Gold (Moz)**
Measured	18.46	1.92	1.14
Indicated	11.82	1.68	0.64
Stockpiles	2.17	1.05	0.07
Total Measured and Indicated	**32.46**	**1.78**	**1.85**
Inferred	5.26	1.7	0.28

Table 1.8-2 Underground Resource Statement

Underground Resource Statement December 31, 2008			
Resource Category	**Tonnes (million)**	**Gold Grade (g/t Au)**	**Contained Gold (Moz)**
Indicated			
Akwaaba[2]	6.10	6.00	1.17
Inferred			
Akwaaba[2]	0.40	3.4	0.04
Paboase South[3]	2.27	3.5	0.25
Suraw[3]	1.87	4.1	0.24

Notes to Resource Statement;

1. Open pit Resources are reported above a 1g/t cut off and have been depleted to the 30th December 2008 pit surfaces. Gold grades for the reported open pit resource have been determined using Multiple Indicator Kriging (MIK) based on block dimensions of 12.5m (east) x 25m (north) x 6m (elevation) and using a selective mining unit of 4m (east) by 8m (north) by 3m (elevation). Gold estimation and model blocks were constrained within geologically/grade derived wireframes. H&S considers these resources to be recoverable by mining and thus recommend that no dilution factors are applied when estimating reserves based on these resources.

2. The Akwaaba Underground Resources are reported above a 2.5g/t cut off and below the 2212mRL which is the base of the mined Akwaaba open pit. Gold grades for the reported underground resource model have been determined using Ordinary Kriging (OK) with grades interpolated into parent blocks with dimensions of 5m (east) by 25m (north) by 12m (elevation). Gold estimation and model blocks were constrained within geologically derived wireframes.

3. The Paboase South and Suraw Underground Resources are reported above a 2.0g/t cut off and below the 2248m and 2224m elevations, respectively, which are the base of current open pit designs. Gold grades for the reported underground resource model have been determined using Ordinary Kriging (OK) with grades interpolated into parent blocks with dimensions of 10m (east) by 25m (north) by 24m (elevation) at Paboase South and 2m (east) by 25m (north) by 24m (elevation) at Suraw. Gold estimation and model blocks were constrained within grade derived wireframes.

1.9 Mineral Reserves

Following the 2008 Open Pit Resource estimate prepared by H&S, a revised Ore Reserve estimate was completed by AMC. The Ore Reserve estimate was based on the H&S December 2008 resource block model and depleted to the December 31, 2008 pit surfaces. The statement includes ROM and low grade stockpiles. The resource estimate is inclusive of the Ore Reserve estimate.

The Ore Reserve statement set out in table 1.9-1 have been determined and reported in accordance with NI 43-101 and the classifications adopted by CIM Council in August 2000. The reserve classifications are also consistent with the 'Australasian Code for Reporting of Mineral Resources and Ore Reserves' of September 1999 as prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia (JORC).

Table 1.9-1 Summary Ore Reserve Statement

Reserve Estimate December 31, 2008									
Area	Proven			Probable			Total		
	Tonnes (Mt)	Au (g/t)	Ounces (Moz)	Tonnes (Mt)	Au (g/t)	Ounces (Moz)	Tonnes (Mt)	Au (g/t)	Ounces (Moz)
Open Pits	17.4	1.68	0.9	4.5	1.39	0.2	21.9	1.62	1.1
Akwaaba UG	-	-	-	8.2	4.21	1.1	8.2	4.21	1.1
Stockpile	2.2	1.05	0.1	-	-	-	2.2	1.05	0.1
Total	**19.6**	**1.61**	**1.0**	**12.7**	**3.21**	**1.3**	**32.3**	**2.24**	**2.3**

1.10 Development and Operations

The mine construction was completed in September 2005. The final development capital cost of the mine was $73.4 million. Red Back commissioned the Chirano gold plant in September 2005 with the first gold pour on October 10, 2005. To December 31, 2008 the Chirano Mine has produced a total of 405 thousand ounces of gold.

Conventional open pit mining methods are used to mine the ore and waste. The operation utilizes selective mining techniques to separate ore and waste. The contractor has a mining fleet which is a combination of 250 tonne hydraulic excavators with 14 m^3 buckets loading 90 tonne trucks. All primary (fresh) material is drilled and blasted. The majority of oxide requires drilling and blasting.

The Akwaaba underground ore production will utilise Sub Level Caving (SLC), with mechanised underground development methods being used to access the resource. The proposed underground mining fleet operated by a mining contractor is a combination of 36t and 50t class dump trucks with 17t class loaders for load and haul, jumbo drill rigs for decline and level development and top hammer production drill rigs for SLC production. Ore will be hauled from underground and trucked 7km to the process plant ROM pad.

The original process plant is currently being expanded to enable treatment of 3.5mtpa to accommodate the Akwaaba underground ore. Once completed in 2009 the treatment plant flow sheet will comprise tertiary stage crushing, ball milling, pre-leach thickening, a single stage of leaching and a nine stage CIL circuit. Gold is recovered by an elution circuit with electro-winning of the gold onto stainless steel cathodes. The gold is removed from the cathodes with high pressure water sprays and smelted to a final bullion product. Historic gold recoveries have ranged from 90% to 93% and this is expected to continue for the life of the mine.

CGML currently employs 578 people, of which 14 are expatriates. 83 employees (including 2 expatriates) are working on the mill expansion construction. Mining is currently being carried out by contractors in both the open pits and underground.

The Chirano Project has a peak continuous power demand of approximately 8.5MW with an installed power capacity of 11.05MW. The supply of power in this region is controlled by the Electricity Commission of Ghana (ECG) and power is sourced from the national grid at 161kV, stepped down at the Asawinso substations and reticulated to the project by a new 33kV overhead power line.

The primary source of raw water is the 400,000m^3 Water Storage Facility ("WSF") which is located in a natural stream valley about 2km east of the treatment plant site. The WSF is confined by a dividing embankment between the WSF and the tailings storage facility (TSF). The WSF is recharged by runoff, from pit dewatering pumped to the facility and from pumped inflows from the Suraw River Water Pond. An emergency spillway has been incorporated into the WSF design.

Gold produced at the mine site is shipped from site, under secured conditions, to a refining company. Under pre-established contractual instructions, the refiner delivers the refined gold directly to an account held by Chirano with an international financial institution. Once received at the financial institution, the refined gold is sold in the market at spot as Chirano is not a party to any contract for the sale of its gold with proceeds automatically credited to a Chirano bank account.

Chirano's annual taxable profits are taxed at a flat rate of 25%. To date, amortization and depreciation of Chiranos's significant capital projects, from its initial development costs to its current expansion and ongoing exploration, has been applied using the established tax rates of amortization to offset the income otherwise subject to tax.

The mine is estimated to have a life of a further 10 years.

1.11 Environmental Issues

An Environmental Impact Statement (EIS) has been completed by environmental consultants SGS and submitted to the Environmental Protection Authority in Ghana. The EIS has been accepted and the EPA permit was granted on 5 April 2004.

The EIS identified an increase in dust and noise levels and deterioration in water quality as potential impacts of the mine. Knight Piesold (KP) undertook investigations of the waste materials in order to characterize them and assess the potential for acid rock drainage (ARD) and/or highlight other potential environmental issues. The main conclusion from the KP ARD report is that the waste rock from the Chirano Gold Mine is classified as non-acid forming.

The Akwaaba Underground EIS was submitted to the EPA in May 2008. An initial permit was issued to commence development of the underground mine. The final permit is expected to be issued in 2009.

1.12 Conclusions

The Chirano mine comprises a granted mining lease in southwestern Ghana, within which 14 gold deposits have been identified, quantified and reserves estimated. The EPA permit has been granted and formal permission to mine has been given. All necessary permits and licenses are in place.

Production began in October 2005 and by the end of 2008 a total of 405 thousand ounces have been produced.

Continuing exploration has led to increase in open pit Ore Reserves and the discovery of a high grade underground resource at Akwaaba and inferred resources below two other pits.

1.13 Recommendations

Exploration should continue throughout the Chirano Mine area both to locate further open pit resources and to follow up on other high grade plunging shoots below the base of the designed pits.

2 INTRODUCTION AND TERMS OF REFERENCE

2.1 Terms of Reference

The author has been requested by Red Back to prepare a Technical Report on the Chirano Gold Mine to reflect updates in project development and the project's Mineral Resources and Ore Reserves.

The report complies with National Instrument 43-101 and the resource and reserve classifications adopted by CIM Council in August 2000. The report is also consistent with the "Australasian Code for Reporting of Mineral Resources and Ore Reserves" of September 1999 (the Code) as prepared by the Joint Ore Reserves committee of Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia (JORC).

All monetary amounts expressed in this report are in United States of America dollars (US$) unless otherwise stated.

2.2 The Purpose of this report

The purpose of this report is to update the August 24, 2007 technical report in light of subsequent developments, including the initiation of underground mining at Akwaaba, a revised Mineral Resource estimate and a revised Ore Reserve estimate.

2.3 Principal Sources of Information

This report has been compiled using information from a variety of sources:

- **Resources:** Hellman & Schofield Pty Ltd.,
- **Geotechnical Open Pit:** Coffey Mining Pty Ltd
- **Mining Open Pit:** CGML
- **Geotechnical Akwaaba:** AMC Consulting Pty Ltd
- **Mining Akwaaba:** AMC Consulting Pty Ltd
- **Reserves (Open Pit and Akwaaba):** AMC Consulting Pty Ltd.
- **Metallurgy**: CGML
- **Infrastructure**: CGML
- **Operating Costs:** CGML
- **Environmental:** CGML
- **Marketing Terms:** CGML
- **Geology:** CGML
- **Drilling and Data Collection:** CGML
- **General Information:** CGML

2.4 Qualifications and Experience

The primary author of this report is Mr. Hugh Stuart, who is a professional geologist with 20 years experience in the exploration and evaluation of mineral properties internationally. Mr. Stuart is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM).

Mr Stuart is Vice President Exploration of Red Back Mining Inc and is a Qualified Person as defined by

National Instrument 43-101. The author has been involved with the Chirano mine since 2004 and is fully acquainted with all aspects of the Chirano mine including exploration history, geology, metallurgy, mineral resource and ore reserve estimations and project development. The author has visited the Chirano Gold Mine on numerous occasions, the most recent being in April 2009.

2.5 Abbreviations

A full listing of abbreviations used in this report is provided in table 2.5-1 below.

Table 2.5-1: Listing of Abbreviations

Abbreviations List			
$	United States of America Dollars	kWhr/t	Kilowatt hours per tonne
"	Inches	l/hr/m^2	Litres per per square metres
µ	Microns	LM2	Labtechnics 2kg (nominal) pulverizing mill
3d	Three dimensional	M	Million
AAS	Atomic absorption spectrometry	m	Metres
AMC	Australian Mining Consultants	Ma	Million years
Aa	Gold	MIK	Multiple indicator kriging
Bcm	Bank cubic metres	ml	Milliliters
BFP	BFP Consultants	mm	Milimetres
CC	Correlation coefficient	MMI	Mobile metal ion
Cfm	Cubic feet per minute	Moz	Million ounces
CGML	Chirano Gold Mines Ltd	Mtpa	Million tonnes per annum
CIC	Carbon in column	N (Y)	Northing
CIL	Carbon in leach	NaCN	Sodium cyanide
cm	Centimeter	NPV	Net present value
Cusum	Cumulative sum of the deviations	NQ_2	Size of diamond drill bit
CV	Coefficient of variation	ºC	Degrees celsisc
DFS	Definitive bankable feasibility study	OK	Ordinary kriging
DTM	Digital terrain model	oz	Troy ounce
E(X)	Easting	P80-75 µ	80% passing 75 microns
EDM	Electronic distance measuring	PAL	Pulverize and leach
EV	Expected value	ppb	Parts per billion
G	Gram	ppm	Parts per million
g/m^3	Grams per cubic metre	psi	Pounds per square inch
g/t	Grams per tonne	PVC	Ply vinyl chloride
HARD	Half the absolute relative difference	QC	Quality control
HDPE	High density poly ethylene	Q-Q	Quantile – quantile
HQ_2	Size of diamond drill bit	RAB	Rotary air blast
hr	Hours	RC	Reverse circulation
HRD	Half relative difference	RL (Z)	Reduced
ICP-MS	Incuctively coupled plasma mass spectroscopy	RQD	Rock quality designation
ID	Inverse distance weighting	RSG	RSG Global
ID^2	Inverse distance squared	SD	Standard deviation
IPS	Integrated pressure stripping	SG	Specific gravity
IRR	Internal rate of return	SGS	Societe Generale de Surveillance
ISO	International standards organization	SMU	Simulated mining unit
ITS	Inchcape testing services	t	Tonnes
kg	Kilogram	t/m^3	Tonnes per cubic metres
kg/t	Kilogram per tonne	tpa	Tonnes per annum
km	Kilometers	w:o	Waste to ore ratio
km^2	Square kilometers	WADS	West African Drilling Services
KP	Knight Piesold Pty Ltd		
kw	kilowatts		

3 RELIANCE ON OTHER EXPERTS

This report is based on information provided by CGML and various consultants which reflect various technical and economic conditions prevailing at the time of compilation of the report. These conditions can change significantly over relatively short periods of time and as such the information and opinions contained in this report may be subject to change.

This report includes technical information, which requires subsequent calculations to derive subtotals, totals and weighted averages. Such calculations may involve a degree of rounding and consequently introduce an error. Where such errors occur, the author does not consider them to be material.

- **Resources:** The revised resource estimates included in this report were prepared by Nicolas James Johnson of Hellman & Schofield Pty Ltd., an independent consulting firm. A separate certificate of responsibility in relation to Section 16.1-16.4 is included in this report.
- **Geotechnical:** The geotechnical assessment for the open pit was undertaken Coffey Mining Pty Ltd (Coffey) in May 2008.
- **Open Pit Reserves/Mining:** The revised Open Pit Ore Reserve included in this report was prepared by Bruce Gregory of AMC Consulting Pty Ltd., an independent consulting firm. A separate certificate of responsibility in relation to Section 16.5.1 is included in this report.
- **Akwaaba Reserves/Mining:** The revised Akwaaba Ore Reserve included in this report was prepared by Anthony Chris Silveira of AMC Consulting Pty Ltd., an independent consulting firm. A separate certificate of responsibility in relation to Sections 16.5.2 and 18.2 is included in this report.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 The Mine Tenement and Area

The Chirano Mine is based on a granted Mining Lease (PL2/56) which covers an area of 36.34 square kilometers. The lease area is shown on Figure 7.2-2 and the points defining its boundary are listed in Table 4.1-1 below.

Table 4.4.4.1-1: Chirano Mine Tenement

Chirano Mining Lease PL 2/56 : List of Tenement Corners		
Pillar	**Longitude (west)**	**Latitude (north)**
P1	2º 22' 40”	6º 20' 44”
P2	2º 21' 22”	6º 20' 44”
P3	2º 21' 45”	6º 19' 52”
P4	2º 22' 20”	6º 19' 18”
P5	2º 21' 54”	6º 17' 49”
P6	2º 22' 20”	6º 15' 00”
P7	2º 24' 15”	6º 14' 59”
P8	2º 24' 15”	6º 16' 16”
P9	2º 24' 04”	6º 16' 54”
P10	2º 23' 53”	6º 18' 17”
P11	2º 23' 33”	6º 19' 59”

4.2 Mine Location

The mine is located in the Western Region of Ghana in West Africa. It is 100 kilometers south-west of Kumasi, which is Ghana's second largest city. The town of Bibiani lies 15 kilometers north-northeast of the mine area (37 kilometers by road). Access to the mine from the capital Accra is via a sealed highway to Kumasi and then sealed highway running southwest towards Bibiani and onwards to Sefwi-Bekwai. The final approach is either via a 22 kilometer gravel road from Tanoso Junction (15 kilometers south of Bibiani) or via a 13 kilometer gravel road whose junction is approximately 9 kilometers beyond Sefwi-Bekwai. The Chirano Gold mine is located at 697,000N, 568,000E (UTM, WGS84, Zone 30N), site layout is shown in Figure 4.2.2 illustrating the main mineralised zones and infrastructure development.

Figure 4.2-1: Mine Location

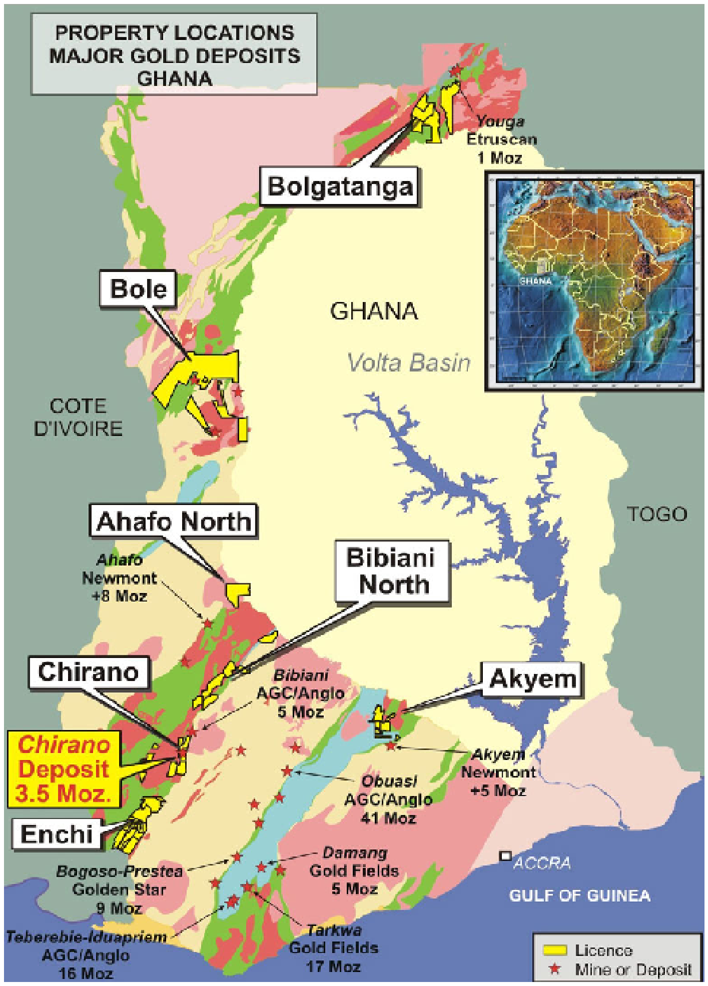
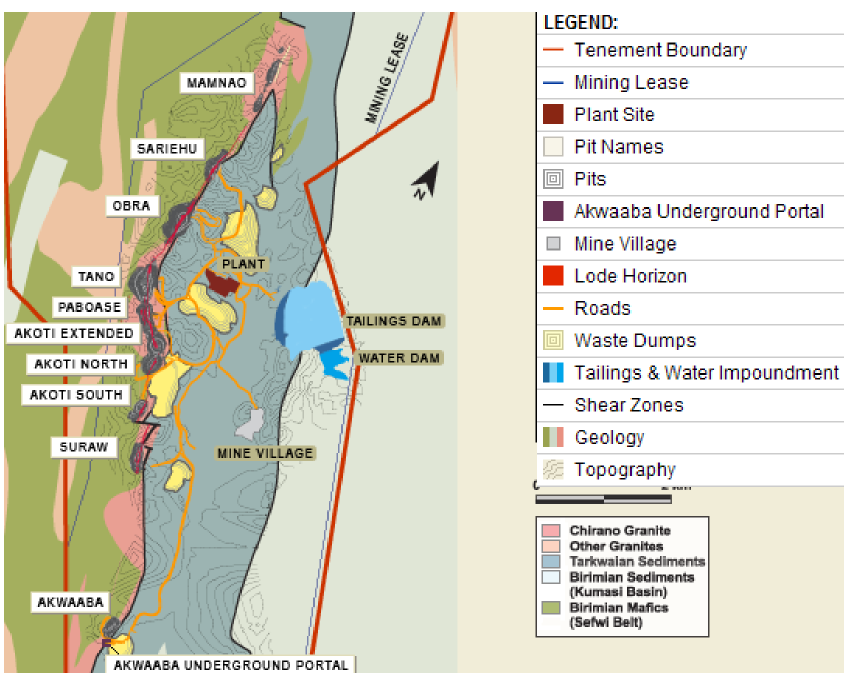


Figure 4.2-2: Chirano Site Plan



4.3 Mine Ownership

The Chirano Mine and the mining lease on which it is based are owned 100% by CGML, a Ghanaian subsidiary of Red Back. CGML is currently 100% owned by Red Back through its intermediate subsidiary, Red Back Mining (Ghana) Limited. The Government of Ghana retains the right to back-in to a 10% carried interest in the Chirano mine under Section 8 of the Ghana Mining Act, which interest may be increased to 30% by negotiation and arbitration. This 10% interest would represent a portion of CGML's 100% interest.

4.4 Royalties, Payments, Agreements and Encumbrances

4.4.1 Royalty

A royalty is payable to the government. This is 3% of the gross revenue, unless the operation is highly profitable (with the operating margin being more than 30% of the value of the minerals extracted), in which case the royalty may be increased in stages up to a ceiling of 6%. An additional 0.6% gross revenue royalty is payable in relation to minerals extracted from Ghana's productive forest reserves. Production from most of the proposed Chirano pits is subject to this additional royalty. Akwaaba lies outside of the forest reserve.

4.4.2 Agreements

Mining Lease PL2/56 is wholly owned by CGML, without any option or joint venture arrangement. No back-in rights are held by any party.

4.4.3 Other Encumbrances

Red Back is required to lodge a bond to guarantee proper performance in environmental matters. The company is in the process of finalizing this bond with the Environmental Protection authority of Ghana.

4.5 Environmental Liabilities

There are no environmental liabilities inherited by CGML from previous owners and explorers.

4.6 Permits

The Chirano mine is based on Mining Lease PL2/56 held by Chirano Gold Mines Limited. The lease has replaced part of CGML's Prospecting Licence PL3/92, which was an amalgamation of two earlier Prospecting Licences originally held in the names of Chirano Goldfields Co Ltd (granted on 29 January 1991) and Johnsons Ltd (granted on 9 March 1992). Ministerial consent for assignment of the Chirano Goldfields Co Ltd licence to Johnsons Ltd was obtained on 29 April 1998. Ministerial consent for assignment of the Johnsons Ltd licences to Chirano Gold Mines Ltd. was obtained on 7 September 1999. Subsequently a mining lease was applied for, covering part of PL3/92, and this lease was granted on 8 April 2004. Formal permission to mine within area covered by the lease was notified in a Mining Permit dated 5 April 2004.

Exploration work continues on both the Mining Lease and the adjoining Prospecting License. The term of the Mining Lease is 15 years. The most recent one year extension to the term of the Prospecting License was granted on 29 January 2007. Exploration work on a Prospecting License requires a permit from the Environmental Protection Agency (EPA). A new permit must be applied for annually. The most recent permit covering PL3/92 was granted on 29 June 2004. An annual report must be submitted to the EPA. The granted environmental permit for the mining lease does not require periodic renewal.

A permit to operate in Forest Reserves must be obtained from the Forestry Commission every three months. Forestry Department personnel regularly inspect exploration sites at Chirano, and CGML routinely applies for (and is granted) the necessary permit.

A comprehensive EIS was submitted to the EPA in late 2003, which was subsequently approved and an EPA permit was granted on 5 April 2004. In May 2006, following discussions with the community in the villages of Akoti and Etwebo, the EPA, by letter, amended the EPA permit such that the villages would not be re-located as originally agreed.

The Akwaaba Underground EIS was submitted to the EPA in May 2008. An initial permit was issued to commence development of the underground mine. The final permit is expected to be issued in 2009.

4.7 Surveying of the License

The mining lease boundary is defined by a list of the latitude and longitude coordinates of its corners ("pillar points" see Table 4.1_1) submitted by CGML and accepted by the Minerals Commission. The boundaries are not physically marked on the ground and have not been surveyed, however, extensive surveying has been carried out within both the Mining Lease and adjoining Prospecting License. To date more than 30,000 points have been located via formal surveying by qualified surveyors using EDM total station surveying instruments, and many additional points have been picked up by DGPS and GPS methods. Field personnel working in the lease area are well aware of its boundaries. All the known gold deposits are well inside the boundaries, and the size and shape of the Mining Lease is adequate for the intended mining and processing activities.

4.8 Background Information on Ghana

4.8.1 Geography

Ghana is a West African country covering 239,000 square kilometers (about the size of Britain). Ghana has an estimated population of 24 million people (2009 estimate), generally concentrated in the south of the country. The country lies immediately north of the equator and has a largely tropical climate. The capital, Accra, is a modern coastal city with a population rapidly approaching two million. The second city, Kumasi, lies in the heart of the Ashanti region and has about 1.2 million people.

English is the official language. Twi is the most widely spoken African language.

Ghana is one of the five African nations along the northern coastline of the Gulf of Guinea. It is bordered on the west by Cote d'Ivoire, to the north by Burkina Faso, and to the easy by Togo. The country is bisected by the Greenwich meridian and operates on Greenwich Mean Time.

The country consists mostly of low Savannah regions with a hilly central belt of forest. Ghana's distinguishing geographic feature is the Volta River, on which was built the Akosombo Dam in 1964, which provides a substantial portion of the country's electricity requirements via hydro-electric generation. The damming of the Volta created the enormous Lake Volta, which occupies a sizeable portion of Ghana's southeastern territory.

Ghana has a large variety of African tribal or sub-ethnic units. The main groups include the Akan, Mole-Dagbani, Ga and Ewe people. Birth rates are high compared with world averages and the annual rate of population growth is one of the highest in the world, although about average for sub-Saharan Africa. Ghana has a relatively young population, with almost 40% of the total population less than 15 years of age. More than two-thirds of the population live in rural areas.

About 70% of the population are Christian. The northern ethnic groups are largely Muslim. Traditional animist religions are also practiced throughout the country.

4.8.2 Political System

Formed from the merger of the British colony of the Gold Coast and the Togoland trust territory, Ghana in 1957 became the first sub-Saharan country in colonial Africa to gain its independence. Ghana endured a long series of coups before Lt. Jerry Rawlings took power in 1981 and banned political parties. After approving a new constitution and restoring multiparty politics in 1992, Rawlings won presidential elections in 1992 and 1996, but was constitutionally prevented from running for a third term in 2000. John Kufuor succeeded him and was reelected in 2004. Kufuor is constitutionally barred from running for a third term.

Ghana is governed under a multiparty democratic system, with elected presidents allowed to hold power for a maximum of two terms or four years. The most recent election was held on 7 December 2008 and resulted in the election of the National Democratic Congress. The election received widespread praise from independent observers and is generally considered to have been peaceful, free and fair. The current President is John Evans Atta Mills.

4.8.3 Legal System

Under the constitution of Ghana the judiciary is independent of government and cannot be overruled by the president or the parliament. The head of the judiciary is the Chief Justice. The judiciary rules on civil, criminal and constitutional matters. The system includes the Supreme Court, the Court of Appeal, the High Court and Regional Tribunals.

There is also a Judicial Council, with representatives from all parts of the justice system, which acts as a forum to observe and review the functioning of the judiciary and to recommend reforms to government.

The constitution also dictates that there is an Attorney General who is a Minister of State and is the principal legal adviser of the government.

4.8.4 The Economy

The unit of Ghanaian currency is the New Cedi. In 2007 Ghana revalued its currency with 10,000 old Cedis equal to 1 New Cedi. The exchange rate is presently 1.35 New Cedi to the US dollar.

Well endowed with natural resources, Ghana has roughly twice the per capita output of the poorest countries in West Africa. Even so, Ghana remains heavily dependent on international financial and technical assistance. Gold, cocoa production and individual remittances, are major sources of foreign exchange. The domestic economy continues to revolve around agriculture, which accounts for about 35% of GDP and employs about 55% of the work force, mainly small landholders. Sound macro-economic management along with high prices for gold and cocoa helped sustain GDP growth in 2008. Most of the working population (60%) grow food crops (plantain, cassava, maize, yams, rice, groundnuts, etc) for local consumption. The most important cash crop is cocoa. Lesser cash crops include palm oil, rubber, coffee and coconuts. Cattle are farmed in northern Ghana.

The most important source of foreign exchange is gold mining, followed by cocoa and timber products. Manganese, bauxite and diamonds are also mined. Tourism is growing rapidly. Gold represents Ghana's major export commodity, representing approximately 50% of GDP. Ghana is the world's 10th and Africa's 2nd largest producer of gold, with current production estimated at 2.4Moz per annum.

Ghana has substantial natural resources and a much higher per capita output than many other countries in West Africa. Nevertheless, it remains dependent on international financial and technical assistance.

Inflation, decreasing currency exchange rate and high interest rates have caused concern in recent years, but are improving with more stringent fiscal and monetary policies.

4.8.5 Transport and Communications

Over the past 15 years enormous investments have been made to rehabilitate and expand the infrastructure within Ghana. A priority has been the road network, and bitumen roads now extend from the capital Accra to within 22 kilometers of the Chirano mine area.

The expanded electrification scheme has brought power to many rural areas for the first time.

The two modern ports of Takoradi and Tema have been used for the implementation and construction of several gold mines in recent years.

A modern communications network has been established throughout much Ghana.

4.8.6 Government Policies and Regulations

Since the early 1980s, the government of Ghana has made a sustained effort to improve and liberalize the fiscal policies of the country in order to attract private investment and stimulate economic growth. Many state-owned companies have been privatized. The result has been a sustained period of real economic growth and an improvement in the country's balance of payments. However, persistent problems remain such as relatively high inflation and unemployment rates.

A new Mining Act was established in 1986. All minerals in the ground in Ghana are considered property of the republic, and exploration for mineral deposits requires a license from the Ministry of Mines. The government may acquire, without payment, a 10% interest in the rights and obligations of any mining operation, and may increase this interest to 30% by negotiation and arbitration. In practice, the Government has acquired only a 10% interest in recently developed projects.

An Environmental Impact Assessment Study must be completed, and a permit issued by the Environmental Protection Agency, before a mining lease is granted. The award of a Mining Lease, and the accompanying Deed of Warranty, are negotiated with the Minerals Commission. This is an independent, though government funded, body that advises the government on exploration and mining policy. The operator of a mining venture is expected to use Ghanaian materials, products, services and employees as far as practicable.

The taxing of mining operations is legislated within the Mining Law and is not generally affected by changes to taxation in other areas. The corporate tax rate for mining companies is 25%. A royalty is payable to the government. This is 3% of gross revenue, unless the operation is highly profitable (with the operating margin being more than 30% of the value of the minerals extracted), in which case the royalty may be increased in stages up to a ceiling of 6%. An additional 0.6% of gross revenue royalty is payable in relation to minerals extracted from Ghana's productive forest reserves.

Capital allowance provisions allow for a tax deduction for 75% of the value of the capital expenditure in the year of purchase and 50% of the remaining expenditure in each year thereafter.

The Mining Act is currently under review and whilst there may be amendments to some of the rates, the spirit of the existing act is expected to be retained. Table 4.8.6_1 summarizes the current Ghanaian Mineral Exploration and Mining Rights:

Table 4.8.6-1: Ghana: Mineral Exploration and Mining Rights

Mining Act		:	1994/1986
State Ownership of Minerals		:	Yes
Negotiated Agreement		:	No
Mining Title / License Types			
Reconnaissance Tenements		:	Reconnaissance License
Exploration Tenements		:	Prospecting License
Mining Tenements		:	Mining Lease / Restricted Mining Lease
Retention Tenements		:	No
Special Purpose Tenements		:	
Small Scale Mining Tenements		:	Yes
Reconnaissance Tenement			
Name		:	Reconnaissance License
Purpose	*(Note 1)*	:	Entitles the holder to search for specific minerals by surface prospecting
Maximum Area		:	Area extent is negotiable
Duration		:	1 year
Renewals		:	Yes 1 year (multiple) if in public interest
Area Reduction		:	No
Procedure		:	By application
Granted By		:	Ministry of Lands and Natural Resources
Prospecting Tenement			
Name		:	Prospecting License
Purpose		:	Confers the exclusive right to search for specific minerals and to determine their extent and economic value
Maximum Area	*(Note 2)*	:	150km2
Duration		:	3 years
Renewals		:	Multiple 2 year extensions
Area Reduction		:	Yes
Procedure		:	By application
Granted By		:	Minister of Lands and Natural Resources
Mining Tenement			
Name		:	Mining Lease
Purpose		:	Exclusive rights to extract specified materials
Maximum Area	*(Note 3)*	:	50km2
Duration		:	30 years
Renewals		:	Yes
Area Reduction		:	No
Procedure	*(Note 4)*	:	By application
Granted By		:	Minister of Lands and Natural Resources
Mining Tenement			
Name		:	Restricted Mining Lease
Purpose		:	Exclusive rights to extract building and industrial minerals for local consumption
Maximum Area		:	
Duration		:	
Renewals		:	
Procedure		:	By application
Granted By		:	Ministry of Lands and Natural Resources

Notes:

1) A Reconnaissance License confers on the holder the right to search for specified minerals by geochemical, geophysical and geological means. It does not permit drilling, excavation, or other physical activities on the land, except where such activity is specifically permitted by the License.
2) The maximum area of the Prospecting License of 150km2 can be exceeded at the discretion of the Government.
3) The maximum area of a Mining Lease is 50km2 or, where a holder acquires more than one lease, an aggregate of 150km2. These limits can be extended at the discretion of Government if it is in the public interest to do so.
4) A Mining Lease is granted, an application to the Secretary for Lands and Natural Resources, on terms and conditions determined by the Secretary. Thus, within the parameters set by the Law, there is room for negotiation between the investor and the Government to work out a package suited to the specific project. Among important matters which are negotiated are deferment of royalty payments, work programs, and retention allowances. The Minerals Commission conducts all necessary technical reviews before an application, with recommendations, is submitted to the Secretary. The Minerals and Mining Law insists upon the recruitment and training of Ghanaians for all levels of work, and local sourcing, to the maximum possible extent. The Minerals Commission reviews all the reports which lease holders are required to submit, and monitors activities in the field.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Site Topography, Elevation and Vegetation

The Chirano mine area is mostly drained by the Suraw River and its tributaries, except for the area from Mamnao northward which drains into the Ankobra River.

The western side of the area is dominated by the south Bibiani Range which forms a major range of hills. This runs roughly north-south and the Chirano gold deposits lie halfway up its steep eastern slope, such that the open pits will have high western walls and low eastern walls. The range rises from a height for about 250 meters above sea level near the river to about 550 meters at its crest. The slopes are steep, commonly 15º to 25º and locally up to 35º. The eastern face of the range is corrugated by numerous ridges and valleys that run easterly down the slope toward the river. There is a tendency for the gold deposits to occur under these ridges, with gaps in the mineralization under the gullies. The range is mostly comprised of hard mafic rocks.

Land around the Suraw River, in the middle of the mine area, is relatively flat lying and parts are swampy after rain. Most of the mine infrastructure has been built on the gently sloping edges of this low-lying area. The current exploration camp and the mine village have been sited on hills near the edges of the floodplain. The Suraw River drains to the south and overall its flood plain slopes gently southward. This basin is mostly underlain by Tarkwaian arkosic sandstones and shales.

East of the Suraw River the country rises again to steep forested hills.

Part of the mining lease (42%) lies within forest reserves, and is covered by tall, primary, semi-deciduous rain forest. Most of this area is reserved for commercial timber production. Some logging has taken place in the past, and further logging is currently in progress. Parts of the reserves have been degraded by illegal farming activity.

The remainder of the area is farmland. The main food crops grown locally are cocoa, plantain, maize, cocoyam, cassava, and rice. There are also several small oil palm plantations.

5.2 Access

The Chirano mine is situated 100 kilometers southwest of Kumasi, which is Ghana's second largest city and has a population of about 1.2 million. The towns of Bibiani lies 15 kilometers north-northeast of the mine area (37 kilometers by road). Bibiani has a population of approximately 22,000. Access to the mine from the capital Accra is via a sealed highway to Kumasi and then sealed highway running south-west towards Bibiani and onwards to Sefwi-Bekwai. The final approach is via a 13 kilometer gravel road whose junction is approximately 9 kilometers beyond Sefwi-Bekwai.

Accra has daily international flights to and from Europe and from South Africa. Domestic flight services have recently been reintroduced in Ghana and include services between Accra and Kumasi.

5.3 Climate

Ghana lies just north of the equator and the climate is tropical, particularly in the southern half of the country. Seasonal temperature variations are minor. Daytime temperatures are high throughout the year, reaching about 30ºC on most days. Diurnal variation is about 6º to 10ºC in the humid south, and somewhat greater in the drier northern areas.

Rainfall tends to be heavy in the southern part of the country (1,500mm to 2,000mm per year), decreasing northwards (to about 750mm to 1,250mm per year in the northern border). The rainfall in the southern parts is mostly between April and October, with peaks in May to June and September to October. The northern rainy season is shorter, peaking in August and September.

During the dry season, particularly December to February, Harmattan winds blow from the northeast bringing dust from the Sahara and lowering the humidity.

5.4 Surface Rights

The Chirano mine is based on granted Mining Lease PL2/56 held by Chirano Gold Mines Limited. Red Back applied for this lease on 7 November 2003 and it was granted on 8 April 2004. The EIS was submitted to the EPA in late 2003, and was approved and an EPA permit granted on 5 April 2004.

Development of the open pit mines and the associated infrastructure has required the acquisition of some farmland and the resettlement of some local people. This has been achieved through intensive consultation with the local community on issues of land use, compensation and resettlement.

There are no competing mining rights (for example, small artisanal mining licenses) in the mine area.

5.5 Site Development

The development of the Chirano Gold Mine has required development at five major locations:

- The treatment plant area.
- The mine services area, including the mine administration building, mine workshops, refueling area, mine control areas and explosives yard.
- The staff village.
- The tailings storage facility and the water storage facility.
- Akwaaba underground office, workshop, change room and mess facilities

5.6 Water Supply

The primary source of raw water is the Water Storage Facility (WSF) which has been designed to store approximately 400,000m^3. The water storage facility is located in a natural river valley approximately 2km east of the treatment plant site. The water storage facility is confined by a dividing embankment between the tailings storage area and the water storage area, and by a saddle dam located to the south. The water storage facility is recharged by runoff from its 165 hectare upstream catchment, from pit dewatering pumped to the facility and from pumped inflows from the Suraw River Water Pond. An emergency spillway has been incorporated into the WSF design.

Water supplied by pit dewatering is pumped directly to the raw water pond (4,000m^3 HDPE lined) until the pond is full and is then diverted to the WSF. Water is returned from the WSF to the raw water pond as required. Raw water is used for elution, reagent make-up, cooling, dust suppression, fire services and process water make-up.

Process water is returned from the decant pond at the tailings storage facility to the process water pond (2,000m^3 HDPE lined). This pond also receives water from the leach feed thickener overflow stream and the raw water pond. Process water is used for milling, screen sprays, process plant wash-down and carbon transfer.

Potable water is used for drinking, ablutions, laboratory, buildings and safety showers, and is sourced from bores to minimize the risk of disease from surface sources. The bore water is treated by chlorination and ultraviolet sterilization before being distributed by pump to the plant, mine services area and the staff village. Potable bore water is not required for any process purpose.

5.7 Power Supply

The supply of power in this region is controlled by the Electricity Commission of Ghana (ECG) in an arrangement whereby power is purchased from the 161kV national grid, controlled by the VRA (Volta River Authority), stepped down at ECG owned substations and reticulated as required to consumers.

The power supply from the VRA grid is subject to spasmodic outages, typically resulting in milling utilization reductions in the order of 1% to 2.5%. The cost of on-site power generation has been reviewed and the VRA power supply selected as most cost effective solution, even with loss of production time taken into consideration.

The electrical power supply to the mine area is provided by a switching arrangement at the Asawinso main substation from the existing transformer feeding the Bibiani plant. A 33kV switching bay has been extended from the Bibiani bay at the Asawinso substation and a 33kV overhead power line has been constructed from Asawinso to the plant site at Chirano. The overhead 33kV power line distributes 33kV power directly to the plant switchyard where it is distributed via 33kV reclosers to the plant.

In order to provide additional power for the expansion of the mill and the Akwaaba underground a 5MW HFO set will be installed on the site and operated by a third party. In addition 6 diesel generation sets have been procured to provide standby power in the case of ECG supply problems.

On completion of the expansion installed power is estimated to be 17MW, with a peak continuous power demand of 13.5MW.

5.8 Mine Personnel

At the end of December 2008 CGML employed 578 staff of whom 14 are expatriates. 83 employees (including 2 expatriates) are working on the expansion of the mill.

5.9 Mine Services Area

Facilities have been established for the mining contractor, African Mining Services (AMS) to suit the overall requirements of administration, maintenance, fueling, magazine, messing and ablutions.

The mine service area is supplied with power by an overhead power line from the plant.

Potable water is supplied from the water treatment facility at the plant. Sewage is pumped to the sewage treatment plant at the process plant.

5.10 Tailings Storage Facility

A tailings storage facility (TSF) has been constructed as a cross-valley facility with three additional confining embankments. The southern confining embankment acts as the divide embankment for the TSF and the raw water storage facility, the remaining two confining embankments have been designed to prevent the tailings inundating parts of the adjoining Forest Reserve.

The main TSF embankment has been constructed as a zoned earth and rock fill embankment in 2 stages, with subsequent stages to be constructed of compacted low permeability soils by upstream techniques. The embankment has a maximum height of approximately 35 meters above natural ground level and a final embankment crest length of 920 meters.

As a result of the expansion in reserves, options are being investigated to provide additional tailings storage. The selected option will require permitting.

5.11 Waste Rock Storage

Consultants Knight Piesold Pty Ltd (KP) designed the waste dumps for the Chirano mine as part of the DFS. Their studies covered the details of waste dump designs and the proposed method of rehabilitation.

As part of the DFS, KP undertook investigations of the waste materials in order to characterize them and assess the potential for acid rock drainage (ARD) and/or highlight other potential environmental issues. The testwork indicates the waste dumps can be considered to be non-acid forming, indicating that the weathering of sulphides within the waste rock mass due to percolating water will not result in the formation of ground water with an acidic character, and therefore do not require special engineering to exclude the infiltration of oxygen or water.

Subsequent to the DFS, AMC has modified the waste dump locations to optimize haulage of waste. Redesign of the dumps by AMC has been in consultation with KP.

5.12 Administration and Plant Site Buildings

The expanded exploration offices now form administration, HSE, exploration and mining offices. The treatment plant is served by a dedicated, purpose built office within the plant perimeter. A further administration building is being constructed adjacent to the plant site.

5.13 Accommodation

Accommodation is provided for expatriate and senior national staff in the mine village. Staff that are not accommodated in the village are provided a housing subsidy as a contribution to the cost of their accommodation in local communities.

The accommodation provided consists of 2, 3, and four-bedroom houses, two-bedroom duplex units, and one-bedroom units contained in motel style quadruplexes.

5.14 Communications

The mine is provided with the modern communication and radio facilities:

- Telephone system with 100 internal extension facility complete with battery back-up facility.
- VOIP Satellite telephone system suitable for phone, fax and data transmission.
- Base station radio system.
- 20 vehicle radios.
- 35 hand-held radios.
- Cell phone coverage through a dedicated mast located close to the project site.

5.15 Mobile Equipment

Sufficient mobile equipment for the efficient running of the operations is in place comprising light vehicles (including ambulance), light trucks, cranes, forklifts, buses and generators.

5.16 Security

The plant area is fenced and a single access gate is provided, which is manned by security guards 24 hours each day. Buildings outside the plant fence, the mine services area and the staff village, are also fenced and patrolled.

5.17 Goods and Consumables

The port of entry for goods and consumables is either Tema, which is 20km from Accra or Takoradi, 200km west of Accra. Materials are transported by road to the mine site. The roads as far as the village of Ntrentreso are suitable for heavy or oversized loads and the existing gravel road from Ntrentreso to the site has been widened and upgrade over its entire length of 13km.

6 HISTORY

6.1 Ownership History

In the mid 1930s two concessions covered the Chirano area; one held by Gold Coast Selection Trust and one by Anglo-African Goldfields Ltd. No reports of work at this time survive, but some small pits have been found which may date from this period.

Billiton International Metals BV held the area in the late 1980s, possibly undertaking regional reconnaissance for gold-bearing laterite deposits.

The current phase of exploration began in early 1990s when Mr Johnson Gyamfi, a prominent Ghanaian businessman, applied for two prospecting concessions at Chirano in the names of Johnsons Limited and Chirano Goldfields Company Limited. In November 1993 an agreement was reached with Placer Outokumpu Exploration ltd (POE). However, after several phases of exploration, POE judged that the area was unlikely to deliver its minimum target of ore million ounces, and they joint ventured the project to the British company Reunion Mining Plc (Reunion) in May 1995.

Work was halted in March 1996 by a government imposed moratorium on exploration work in Forest Reserves. In November 1997 Reunion was given permission to resume exploration under strict environmental constraints and temporary permits however the company eventually chose to farm-out the property to concentrate on another project in Namibia.

Red Back negotiated an option agreement with Reunion in mid 1998. By April 1999, Red Back's subsidiary company CGML had acquired 95% interest in the project. The remaining 5% held by the estate of Mr Gyamfi was purchased by Red Back in November 2005.

6.2 Exploration History

POE carried out the first systematic reconnaissance exploration of the area, via stream sediment sampling, widely spaced soil geochemical traversing, rock chip sampling, then trenching and pitting of the more promising soil anomalies. This work defined several gold prospects, however POE judged that the area was unlikely to deliver the company's minimum target object of one million ounces and the project was joint ventured to Reunion Mining Plc in May 1995.

Reunion carried out the first detailed exploration work. They extended and in-filled the soil sampling grid and excavated trenches across the better soil anomalies. Many of the trenches defined wide-zones of potentially ore grade gold mineralization and several prospects worthy of drilling were defined. Twenty five short diamond drillholes were completed, testing the Obra and Paboase Prospects. These holes confirmed that the mineralized widths and grades encountered in trenches persisted deep into the bedrock. The exploration programme undertaken by Reunion focused on shallow oxide mineralization. A modest oxide gold resource was defined and preliminary metallurgical testing was completed.

Work was halted in March 1996 by a government imposed moratorium on exploration work in Forest Reserves, but in November 1997 Reunion was given permission to resume exploration under strict environmental constraints and temporary permits, but eventually chose to farm out the project so that they could concentrate on a project in Namibia. Total expenditure by POE and Reunion from 1993 to 1998 is estimated at approximately US$2.35 million.

After technical and legal due diligence studies, CGML as a subsidiary of Red Back, proceeded with intensive exploration of the project area. Between 1998 and 2004 CGML's work has included very extensive and detailed soil geochemistry, geological and regolith mapping, trenching, ground geophysics (magnetics and induced polarization), and RC and diamond core drilling. As well as routine field exploration, CGML has studied the petrography of the mineralization and associated alteration, the trace element signature of the gold deposits, the metallurgy of the lode material, local hydrology, and the geotechnical characteristics of the host rocks.

New discoveries by CGML have brought the number of known Chirano gold deposits to fourteen, distributed along a strike length of nine kilometers.

By mid 2004 all of the deposits had been drilled sufficiently to define their gold resources. The company had collected 15,000 soil samples, dug 81 trenches with a total length of 4,063 meters, and completed 605 drill holes totaling 60,489 meters. A prefeasibility study for establishing a mining operation was completed by CGML in 2000, and a Bankable Feasibility Study was completed in early 2003. Pre-development exploration expenditure totaled US$17.5 million

Exploration has continued both during and after the development of the mine. Most significantly drilling below the planned Akwaaba open pit has delineated a high grade underground resource in excess of 1Moz. Exploration expenditure in 2008 totaled $US 13 million.

6.3 Resource History

Several Mineral Resource estimates have been made for the project and are listed in table 6.3-1:

Table 4.8.6: Resource History

Date	Source		Measured and Indicated			Inferred		
		COG	Mt	Au g/t	Moz	Mt	Au g/t	Moz
2004	Red Back BFS	1.0	28.82	1.99	1.841	7.94	1.99	0.509
2007	Red Back Dec 2007	1.0/2.5	40.86	2.44	3.200	6.88	1.99	0.440

The resources and reserves associated with the Chirano Gold Mine have recently been updated by Hellman and Schofield and AMC, respectively, using data available up to December 2008. The updated resources and Ore Reserve estimates , which have been classified and reported in compliance with the requirements of both Canadian National Instrument 43-101 and the Australasian JORC Code, are discussed in detail in Section 16 of this report.

6.4 Production History

There has been no significant historical gold production at Chirano, however the surrounding region includes numerous gold deposits and significant historic and recent production is attributed to the Bibiani Mine, lying 20 kilometers north of Chirano.

There are minor artisanal workings at Chirano, generally concentrated along streams. Some of these may be very old, as the nearby Bibiani area has been a centre of artisanal mining activity for many generations. The earliest European workings date back to the gold rush of the late 1890s to early

1900s, and comprise four small adits and a decline shaft at Sariehu. Only one small concession was held at Chirano at that time.

CGML poured the first gold at Chirano on 10 October 2005. Historic production is shown in table 6.4-1:

Table 4.8.6.4-1: Historic Production

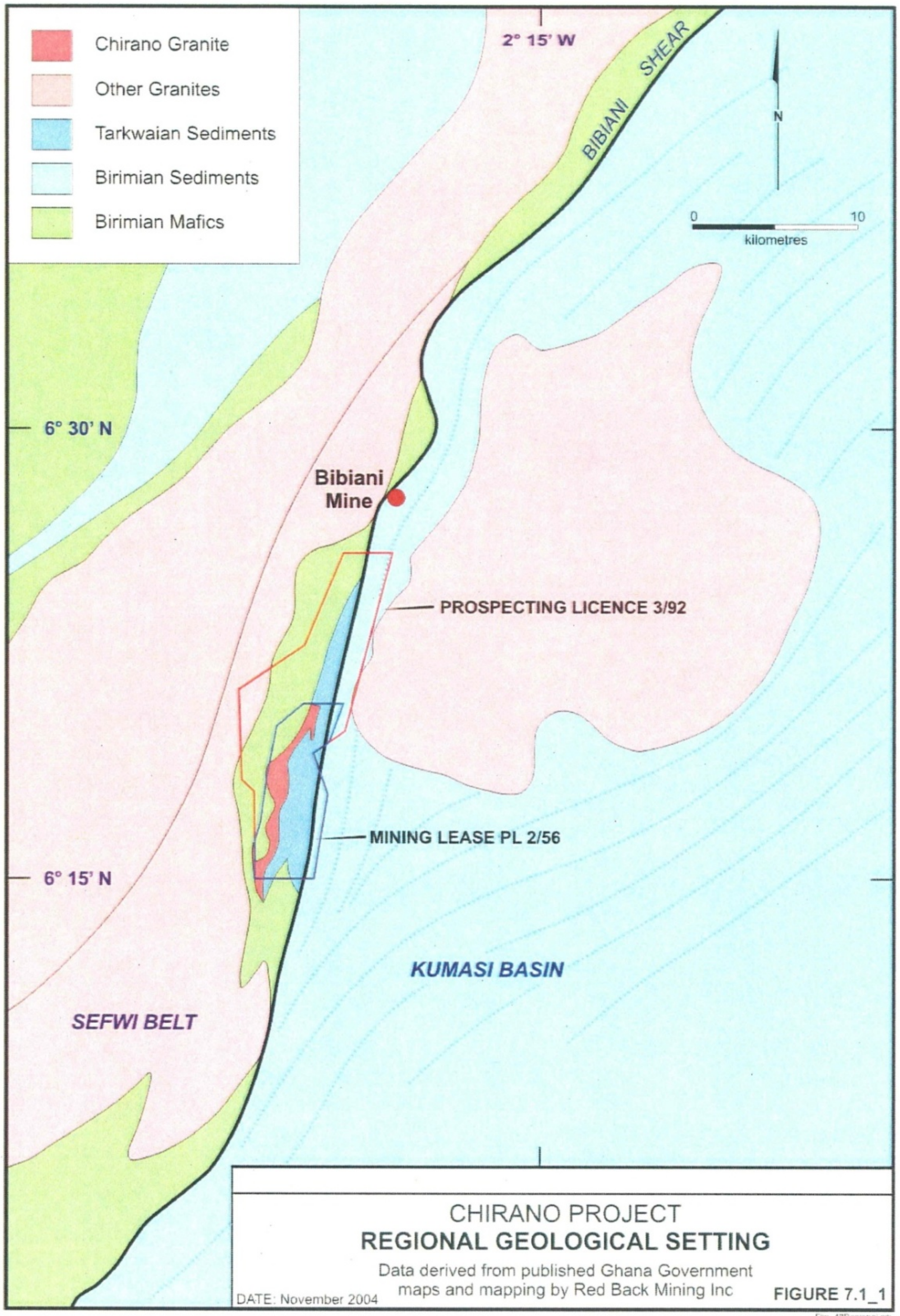
Year	Tonnes Milled (Mt)	Grade (g/t)	Recovery	Gold Produced (‘000 ozs)	Cash Operating Cost ($/oz)
2008	2.21	1.90	91.8%	121	478
2007	1.98	2.17	90.3%	127	372
2006	2.31	1.88	90.7%	127	326
2005	0.51	1.84	93.7%	30	195

7 GEOLOGICAL SETTING

7.1 Regional Geological Setting

The Chirano mine area lies within the Paleo-Proterozoic Birimian rocks of southwestern Ghana. The regional geological setting is shown on Figure 7.1-1.

Figure 7.1-1 Chirano Regional Geological Setting



The mine area straddles the boundary between the Sefwi volcanic belt to the west and the sedimentary Kumasi Basin to the east. Throughout the rest of southwest Ghana this boundary generally trends northeasterly, but the section surrounding Chirano has a northerly trend. In a regional perspective, this change in trend is one of the most obvious characteristics of the Chirano goldfield, and is almost certainly an important factor in the location of the mineralization. It is not certain whether this unusually oriented section of the belt-basin contact reflects a flexure (jog) in the contact, or is a north-south fault which offsets the contact.

A regional digital terrain model shows a prominent north-south topographic lineament passing through Chirano, and also the Bibiani and Ahafo (Yamfo) gold deposits. This lineament can be traced for several hundred kilometers across the whole of Ghana.

The Sefwi belt and the Kumasi basin both comprise rocks of Birimian age. Along their contact at Chirano, the belt and basin rocks are separated by an inlier of younger Tarkwaian sediments up to two kilometers wide (Figure 7.1-1). As with most exposures of Tarkwaian stratigraphy throughout the Birimian of West Africa, the Tarkwaian inlier at Chirano is likely to have been preserved adjacent to a major transcurrent shear structure by crustal extension between two compressive deformational phases during the Eburnean Orogeny.

Immediately west of the contact of the Tarkwaian sediments with the Sefwi belt, there is an elongate granitic intrusion (the Chirano Granite), which is the host for some of the Chirano gold deposits. The Chirano granite is at least 10 kilometers long, mostly less than 150 meters wide, but locally reaches a maximum width of 600 meters as shown in Figure 7.2-1.

The fault between the Sefwi Belt and the Tarkwaian is termed the Chirano Shear, while the fault between the Tarkwaian and the Birimian sediments of the Kumasi Basin is referred to as the Bibiani Shear.

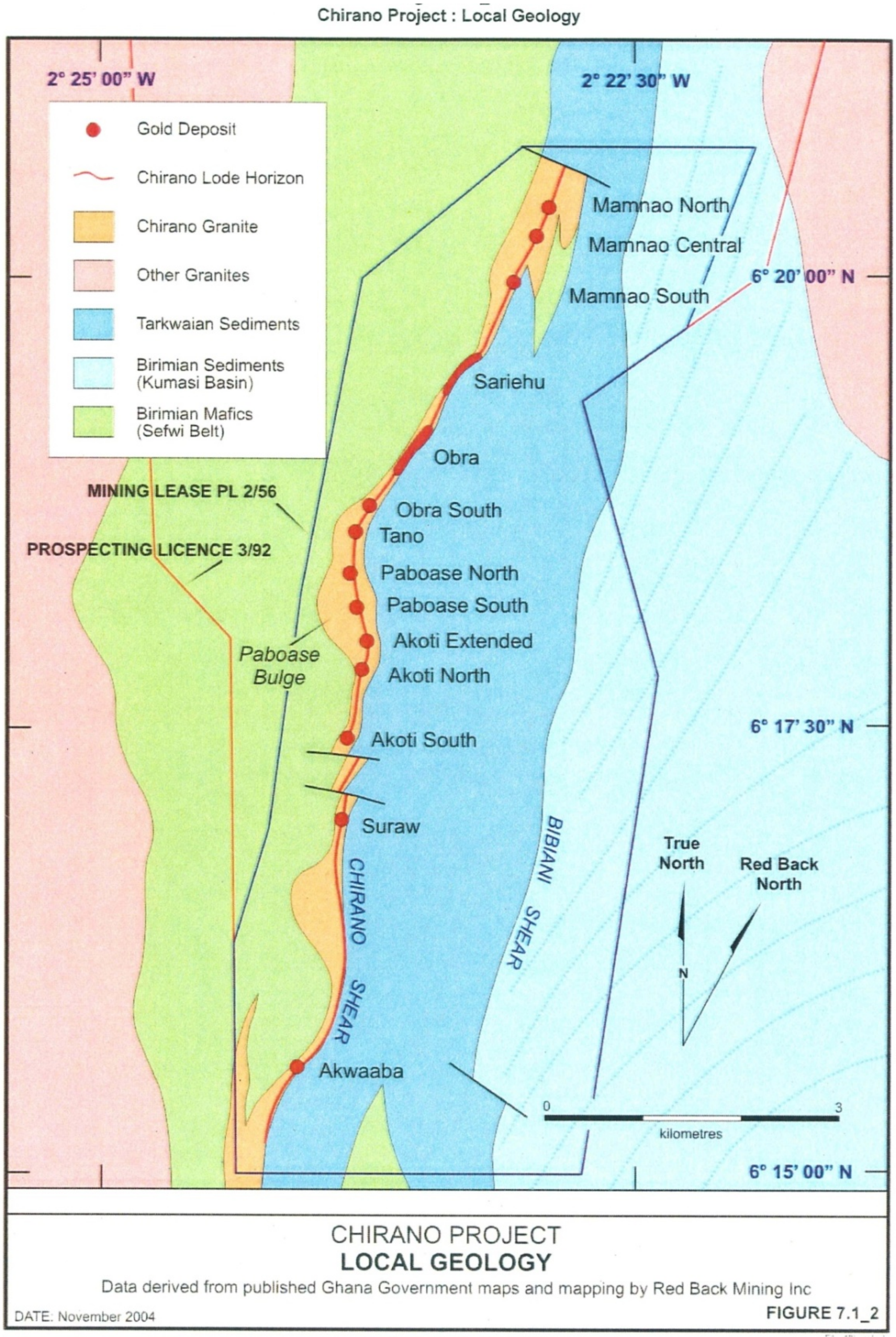
7.2 Property Geology

The Chirano granite is flanked on its western side by mafic rocks ranging from fine grained basalts to medium grained dolerites. The granite is flanked to the east by Tarkwaian sediments, comprising arkosic sandstones, siltstones and minor conglomerates. The granite itself is a composite body, incorporating numerous thin but extensive sheets of mafic rock.

The granite is generally thin, and strikes north-northeast, but includes a thicker section with a northerly trend, termed the Paboase Bulge, as shown in Figure 7.2-1. This bulge may be considered to be a major sinistral jog affecting both the granite and the Chirano Shear. The fourteen known gold deposits occur along a single mineralized horizon. They are centered on the Paboase Bulge, but extend for several kilometers to the north and south.

The gold deposits are hosted by fractured, veined and altered mafic volcanic and granite. Most occur within 200 meters of the Chirano Shear zone. The deposits range in form from tabular (Obra), or pipe like (Tano), to several parallel lodes (Paboase). Most dip steeply west, but two dip steeply east, and local moderate west dips are also evident.

Figure 7.2-1: Chirano Local Geology



The gold mineralization at Chirano is associated with intense hydrothermal alteration, predominantly manifest as a silica-ankerite-albite- -sericite assemblage. Pyrite is the primary sulphide mineral and is generally present in concentrations of between 1% and 2%, but can attain concentrations up to 5%. A close correlation has been demonstrated between gold and the presence of pyrite and albite-ankerite alteration.

Significant weathering of the mineralized zones and surround rocks at Chirano is generally restricted to within 20 meters to 40 meters from surface, with saprolite and transitional zones commonly developed. Slight weathering along joints and fractures is often evident below the transitional zone. The weathering profile tends to be flatter than the land surface and is typically deeper under the hills and ridges, and shallower beneath valleys and gullies, where fresh pyrite-bearing rock may be exposed. The weathering profile is locally depressed along shears and granite-mafic contacts, often coinciding with foliated rock, particularly at Tano and Sariehu.

8 DEPOSIT TYPES

The Chirano gold deposits can be described as epigenetic, mesothermal gold deposits, demonstrating a strong structural control and a brittle structural style. They are hosted by mafic volcanics and granite, ranging from stacked parallel veinlet systems to vein stockworks, breccias and cataclasites. The veinlets are dominated by quartz, with lesser ankerite, calcite, albite and traces of pyrite and hematite. The deposits show varying degrees of ankerite-albite-muscovite-pyrite alteration superimposed on earlier hematite alteration.

The deposits occur close to a major fault (the Chirano Shear), and is considered likely that any new deposits found will also be closely associated with faulting. In particular, individual deposits are often closely associated with small dextral jogs in the host structure. Although the currently known gold deposits are in granite, there are also strong gold anomalies in Birimian metasediments elsewhere within the mine area, which require concerted follow-up exploration.

8.1 Mineralization

Almost all the gold mineralization delineated to date at Chirano is hosted within mafic volcanic and granite. The gold deposits lie along a single mineralized horizon which can be followed for at least ten kilometers. The individual gold deposits can be characterized as local increases in the thickness of mineralized zone that occur at intervals along the horizon.

8.2 Deposit Geometry

Figure 8.2-1 shows eleven of the Chirano deposits in plan projection and illustrates their typical shape and size.

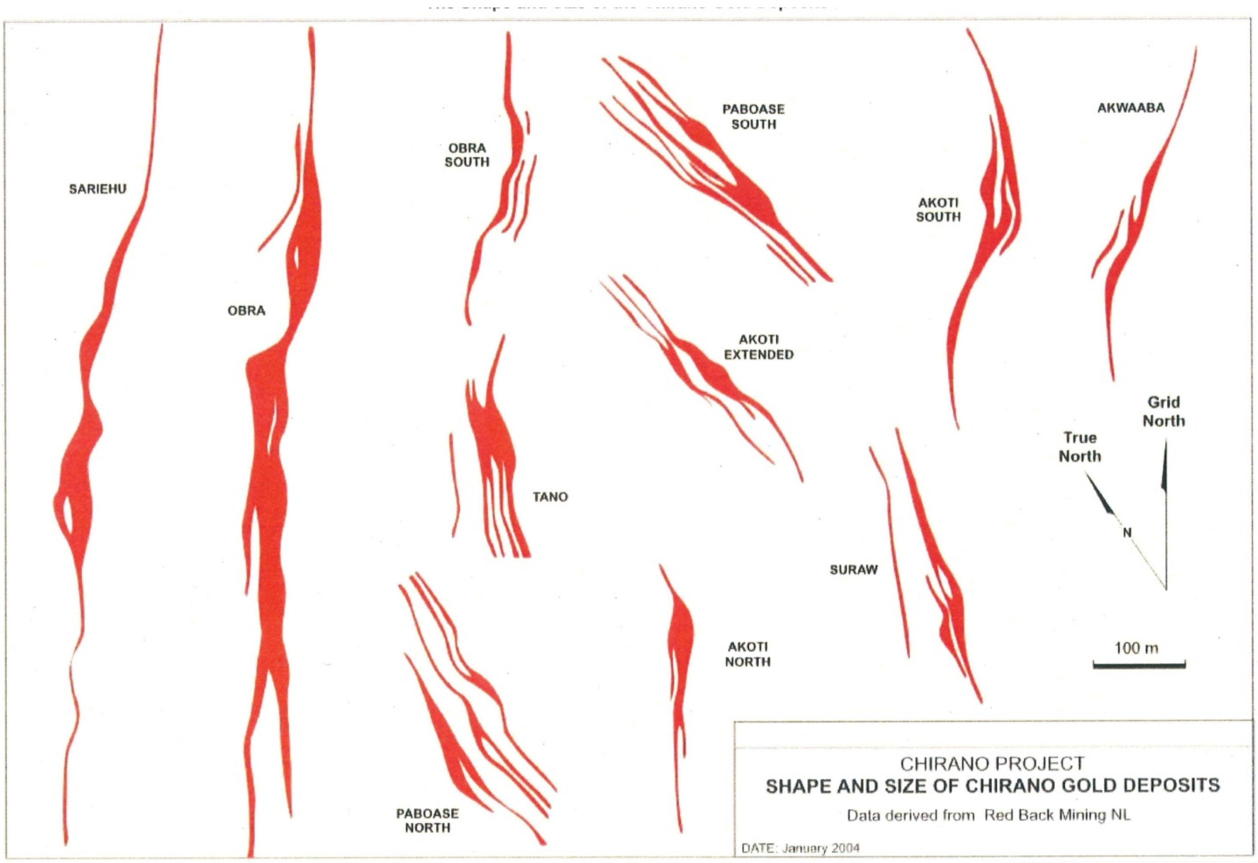
The deposits range in strike length from 150 meters to 700 meters, and range in thickness from a few meters over 70 meters. They vary from rather tabular (Obra, Sariehu, Suraw) to more pipe-like (Tano and Akoti North) morphologies. The longer, the more tabular bodies generally comprise at least two shorter lenticular shoots, such as the Obra main and north lenses. These lenses may be separated by a small dextral jog such as those at Obra and Sariehu. Within the Paboase Bulge there are several parallel lodes, whereas elsewhere along the mineralized horizon there is commonly only a single zone is evident.

Most of the deposits dip steeply to the west, however shallow west, vertical and steep east dips occur locally. The mineralization plunges either directly down dip or steeply northwards. The mineralization demonstrates excellent continuity, there being no known gaps due to oblique faults or dykes.

Unusually flat dips have been noted in short sections of the lode horizon at Mamnao Central (39,850 N to 39,975 N), Obra South (36,850 N to 36,950 N), Sariehu (38,400 N), and Akoti South (34,635 N), however these areas do not demonstrate any spatial relationship with thicker or higher grade mineralized intervals.

In some of the deposits, thicker zones of gold mineralization appear to have formed where nearby parallel lodes have coalesced. Such deposits have a single thick zone in the core of the deposit, which splits into two or three thinner zones along strike. Tano is the best example of this type of deposit geometry.

Figure 8.2-1: Shape and Size of Chirano Gold Deposits



The deposits have been drilled to depths ranging from 50 meters to 700 meters, and generally remain open at depth.

Many of the deposits show a consistent asymmetry, which is characterized by the following observations:

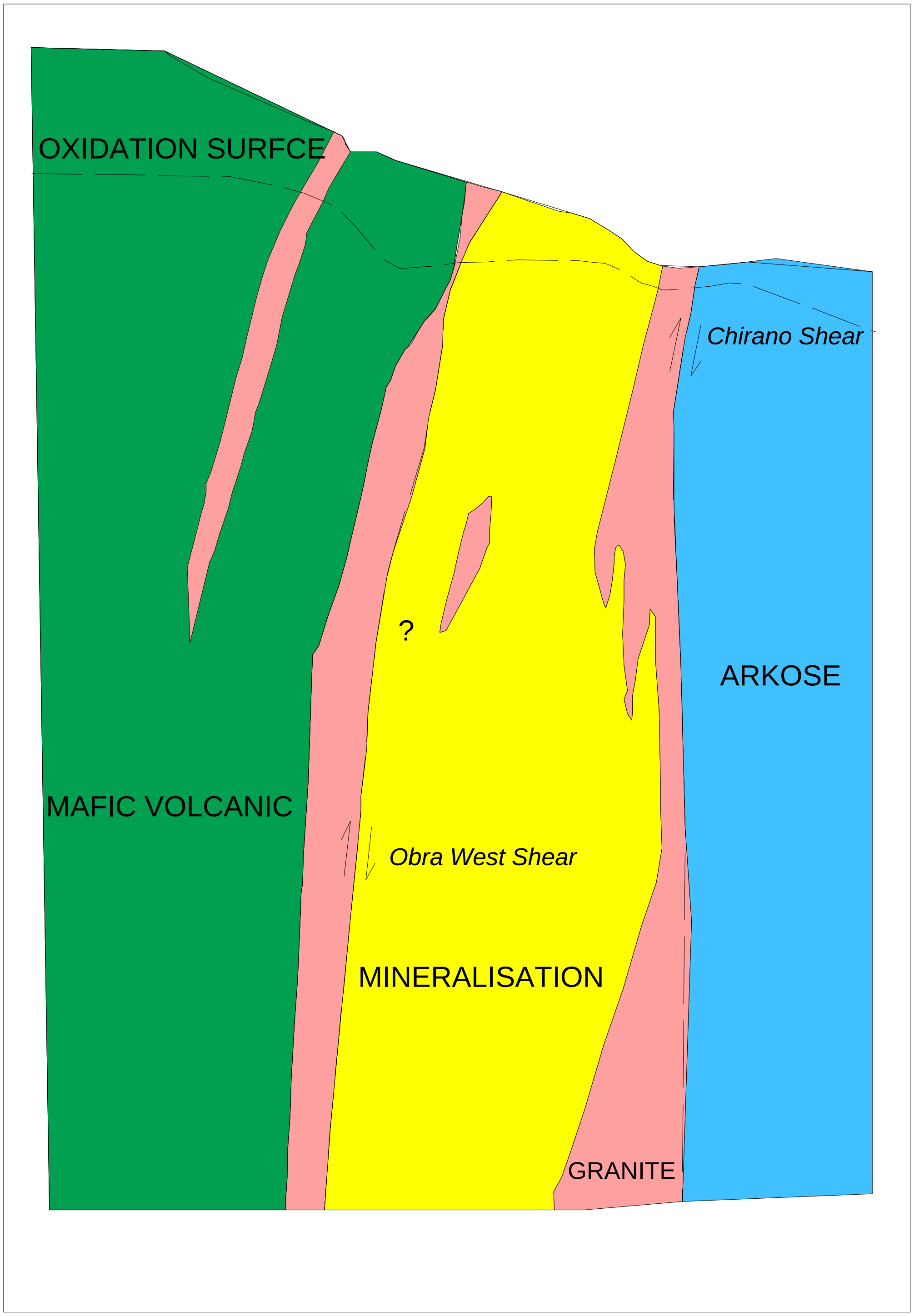
- There is commonly an abrupt change from elevated gold grades to barren assays at the eastern margin of the lode, but a more gradual transition on the western side, with patches of low grade material or thin mineralized veins.
- Unusually high gold assays are often concentrated near the eastern side of the lode.
- Where unusually strong quartz veining occurs, it is usually on the eastern side of the lode (and is usually low grade).
- Close spaced drilling at Tano suggests that veins on the eastern side tend to dip steeply west (parallel to the lode envelope) whereas veins on the western side may dip more flatly west, and be discordant to the lode envelope.
- Where a strong marginal shear occurs adjacent to a lode, it is usually on the eastern side.

These asymmetries presumably reflect the proximity of the Chirano Shear to the eastern side of the deposits and the common occurrence of a strong footwall shear on the east side of the deposits.

A significant exception to the above observations on deposit asymmetry is Obra. This deposit is unique in having very large shear on its western margin (the Obra Shear) as well as on its eastern side (the Chirano Shear), and as such is less asymmetric. It is also unusually wide and low grade, probably because the entire volume of rock between the two shears has been fractured and mineralized, giving a large volume of mineralized rock with a lower gold grade, due to the high rock to fluid ratio (see figure 8.2.2).

A type section of the Chirano gold deposits is shown in cross section in Figure 8.2-2 from the Obra deposit. Mineralisation occurs in granite andmafics and is flanked by Tarkwaian arkose to the east. Major shear zones occur on each side of the deposit. The zone of weathering is relatively shallow, as it lies in a gulley; and the weathering profile is significantly deeper immediately along strike to the north and south beneath the hills.

Figure 8.2-2: Type Chirano Section



8.3 Deformation

The deposits comprise fractured, veined, altered and slightly pyritic mafic volcanics and granite. Within each deposit there is generally a positive correlation between the intensity of fracturing and brecciation and intensity of gold mineralization, however the degree of fracturing varies greatly between the deposits.

The gold mineralization at Obra is generally hosted in severely deformed and brecciated granite (cataclasite), whereas much of the Tano lode is less fractured and can be considered more of a stockwork or vein swarm.

At Obra there is clear evidence that brecciation, veining and alteration have been prolonged, or the result of repeated episodes of deformation, and diamond drill core shows a complex array of small scale structures that often appear ambiguous or contradictory. For example, some rock fragments in the Obra cataclasite contain veins that predate the brecciation and later veins cut through the breccia. Fragments of altered and unaltered rock are juxtaposed in some parts of the breccia, implying alteration before deformation, however adjacent fragments show alteration that overprints the brecciation. In addition, stylolites have been observed to cut across the breccia and early veins, but are cut by later veining.

8.4 Veining

All the gold deposits at Chirano contain numerous quartz and ankerite veinlets and there is generally a positive correlation between intensity of veining and elevated tenor of gold mineralization. The majority of observed veining is oriented parallel to the dip of the overall mineralized zone horizon, however veins have also been noted to dip more shallowly to the west, and some deposits have a sub-horizontal vein set in addition to the dominant west-dipping vein set.

The shallowly west-dipping veins have been interpreted to result from 'west-block-up' shearing in the mineralized zone. The veinlets are mostly a few millimeters to a few centimeters thick. More massive vein quartz (sometimes meters thick) occurs locally, usually on the eastern side of a deposit close to a footwall shear and usually carries only low gold grades. This feature has been observed at Sariehu and Tano.

The quartz veins vary in style from early veins (which may be recrystallized, folded, boudinaged, corroded by pressure solution, offset by micro faults or truncated at the edges of clasts) to late quartz veins (which may be undeformed and exhibit evidence of internal zonation such as carbonate crystals lining the vein selvedge). Some veins contain pyrite replacing hematite in the adjacent rock (sulphidation).

At Obra the ankerite veins tend to comprise irregular networks, and may have formed early in the paragenetic history.

8.5 Sulphide Development

The deposits contain trace amounts of pyrite, typically 1% or 2% by volume, rarely exceeding 5% by volume. It is noted that the surrounding barren rocks contain lower levels of disseminated sulphides than the mineralized horizon. Mineralogical studies indicate that the pyrite has a very high gold content. Three pyrite flotation concentrates contained 120ppm, 220ppm and 450ppm gold respectively.

The pyrite may be very fine grained and disseminated throughout the rock mass, as at Obra, or occur as cubic euhedra a millimeter or two in diameter (and rarely larger at Tano and Sariehu). Pyrite may also occur as rare aggregates to a centimeter in size, and has also been observed to form concentrations along stylolites. The quartz-carbonate veins can also contain pyrite, and pyrite has also been noted as an alteration selvedge to the quartz-carbonate veins. Pyrite also occurs disseminated through the altered host to veining.

Within some of the Chirano gold deposits there is a strong positive correlation between pyrite concentration and gold grade, however, the Sariehu deposit is characterized by strong pyrite development associated with low gold grades.

Disseminated hematite close to a quartz vein has been noted to have been replaced by pyrite, indicating sulphidation.

No sulphides other than pyrite have been seen in hand specimens of the mineralized material, nor is it strongly anomalous in any trace element other than gold and molybdenum. Minute traces of chalocopyrite, arsenopyrite, molybdenite and tetrahedrite have been recorded in polished sections under microscopic examination.

8.6 Gold Particle Size

There are several lines of evidence suggesting that the gold is very fine grained, including the following:

- Visible gold has only been noted in a handful of reverse circulation (RC) and diamond drill core samples collected to date at Chirano.
- Relatively few gold grains are seen in polished section, even in sections incorporating high pyrite concentrates.
- Much of the gold seems to be sub-microscopic.
- Dissolution of gold during cyanide leaching is very rapid.
- Gold can be panned from RC samples, but only with difficulty and poor associated recoveries.
- Knelson gravity concentration recovers less than half the gold.
- Repeat assays of drill samples are extremely consistent, indicating that the gold is fine grained and evenly distributed.
- The gold is very closely associated with pyrite.
- The grade variation is unusually even for gold mineralization, with erratic grade patterns and isolated high grades being rare, with the possible exception of Paboase.

8.7 Supergene Effects

Elevated gold grades derived from surface trenching suggest an absence of severe near-surface depletion. In general the width and tenor of trench intersections provide a good guide to the width and grade of sub-surface gold mineralization.

Consistent with the majority of deposits within the Birimian of West Africa, most of the Chirano deposits show no clear evidence of either depletion or enrichment of gold in the saprolite profile.

A few sections at Paboase show possible supergene enrichment near the base of the weathered zone. The lodes here seem to be thicker and/or higher grade than they are in deeper intersection. The most convincing examples of this are at Paboase South between 35,775 N and 35,800 N (holes CHRC 144, 162, 264, 376, 390) and Paboase North, between 36,080 N and 36,140 N (holes CHRC 150, 247, 259 and 271).

At Obra, the shallow and unusually high grade intersection in CHRC 11 may reflect supergene enrichment.

9 EXPLORATION

9.1 Introduction

Exploration at Chirano is at a very advanced stage. It has culminated in the discovery of 14 surface gold deposits and one underground deposit. Significant potential remains to increase the known Mineral Resources and Mineral Reserves, and exploration will continue during the life of the mining operation.

9.2 Exploration Methods Used

Stream sediment sampling detected gold in catchments at Chirano.

Soil geochemistry produced many anomalies, which proved to be directly related to underlying gold mineralization. Exploration to date has shown that all gold soil anomalies within the Chirano granite that cover a significant area and generate anomalies above 500ppb gold, reflect a gold deposit directly beneath.

Rock chip and channel sampling have also been routinely employed. Trenches across the core of the soil anomalies yielded widths and grades of gold comparable to those seen in later drilling beneath the trenches.

Geological mapping has been undertaken over the entire Chirano mine area.

Ground geophysics has also been used (magnetics and induced polarization) and many of the known deposits have a specific geophysical signature that are being used in exploring for repetitions and extensions.

Both reverse circulation (RC) and diamond drilling have been employed for exploration and resource definition purposes.

9.3 Interpretation of Exploration Information

9.3.1 Introduction

Interpretation of the exploration information is continuous and ongoing.

9.3.2 Soil Sampling

Geochemical data derived from soil sampling has generally produced clearly delineated anomalies. All 14 gold deposits identified to date underlie coherent areas of anomalous gold soil geochemistry. Based on statistical analysis, zones at Chirano with a significant area returning greater than 500ppb gold directly overlie a significant deposit. On very steep slopes, the anomalies show some asymmetry due to down-slope dispersion, however the core of these anomalies are not significantly displaced downhill from the source. Regolith development in most of the Chirano area is favorable for soil sampling.

9.3.3 Geological Mapping

Geological mapping in the Chirano area is rendered difficult due to the rugged topography and thick vegetation cover. However it has been possible to identify most of the gold deposits in outcrop. The mineralization can usually be seen at the surface as trains of boulders and rubble comprising of grey, 'cherty' looking, altered granite with quartz-carbonate veinlets and minor pyrite staining.

Mapping has been useful in defining the extent and morphology of the granite that hosts the mineralization, and the proximity of the mineralization to the Chirano Shear. One deposit (Akwaaba) was found after mapping had drawn attention to a prospective dextral jog in the Chirano Shear.

9.3.4 Rock Chip Sampling

Rock chip samples have been useful in confirming the position of the lode horizon. Rock chip samples assaying above 1g/t gold generally define the exposed lodes.

9.3.5 Trenches

Excavation of trenches as an exploration technique has been very successful. Significant gold intersections in trenches typically overlie sub-surface zones of similar grade and width, as defined by subsequent drilling. Vein orientations in the trenches are usually indicative of the strike and dip of the mineralized zone beneath.

9.3.6 Drilling

Drilling indicates that the various deposits at Chirano are generally quite simple in morphology, and that the continuity of mineralized width and grade are predictable. The deposits are not significantly interrupted by faulting or dyke development, nor complicated by folding, and demonstrate a gradual, orderly change in strike and dip.

There is no clear indication of widespread supergene depletion or enrichment of gold grades (perhaps five sections out of 200 which have been drilled to date show possible local supergene enrichment near the base of weathering).

Over ninety percent of the RC holes were completed under dry drilling conditions. Results from diamond holes adjacent to wet RC holes give no evidence that any wet RC samples are returning positively biased results. As drilling has moved deeper the use of core drilling has increased.

9.3.7 Ground Geophysics

Ground geophysical surveys at Chirano have not materially influenced either the exploration approach or resulted in the discovery of 'blind' deposits to date.

Ground magnetic data at Chirano is difficult to interpret, and has been of limited use.

Induced polarization (IP) surveys have identified the location of the mineralized horizon. Interpretation shows that the mineralized horizon is 'visible' in the IP results as a moderately resistive, moderately chargeable horizon. Within the mineralized zone horizon some of the gold deposits are easily discernible as specific anomalies whilst others are not. Drilling of IP targets has intersected mineralization in about 50% of cases, however these targets were also identified by soil sampling and geological mapping. The pole-dipole method used appears to be able to detect some Chirano mineralization up to 200 meters below surface. Following the discovery and delineation of the Akwaaba Underground resource further pole-dipole surveys were undertaken.

9.4 Data Reliability

Data acquired during exploration at Chirano is considered to be very reliable. All work as been carried out be technically qualified personnel, and has been planned and supervised by highly trained and experienced geoscientists. The location of all exploration data is known with adequate accuracy. The quality of geochemical analysis has been monitored by the use of blanks, standards, field duplicates, and check analysis via primary and umpire laboratories. The quality of all geophysical data has been monitored by a consultant independent of the field contractor. Some RC drill intersections have been verified by adjacent diamond core twin hole drilling.

10 DRILLING

10.1 Introduction

The primary method used for exploration and development drilling at Chirano has been reverse circulation (RC) drilling with the increasing use of diamond core drilling since 2006. A summary of drilling statistics for the mine to date are shown in table 10.1-1:

Table 10.1-1 Summary Drilling Statistics

Total Holes	1,476	Total Metres drilled	239,082
RC Holes	1,393	Total RC Metres	171,804
Diamond Holes	83	Total Diamond Metres	67,278

Note: Diamond metres include cored extensions to RC holes.

10.2 Drilling Procedures

10.2.1 RC and Diamond Drilling Procedures

Red Back has routinely adopted a series of RC drilling and sampling procedures, established to maximize drilling and sample quality. These procedures include the following:

- Only face-sampling hammers have been used.
- The advancing hole is cleaned out at the end of each rod and at any time when there are concerns about drilling conditions.
- The cyclone is cleaned when necessary to minimize contamination of new samples with previous sample residue.
- All rigs used have powerful air packs.

Diamond drilling is mostly carried out using multi-purpose rigs, with each diamond tail being drilled soon after its RC pre-collar. This avoids the problems commonly associated with later re-entry of an RC hole for diamond coring.

Diamond drilling procedures are routine, as the rock quality is usually excellent and requires few special techniques. Core diameter is usually NQ2 (50mm) but occasionally HQ (geotechnical core) or PQ (for comminution testing). Core is usually retrieved from the barrel in three meter runs, but shorter runs are used where the rock is broken. Red Back personnel observe the transfer of core from barrel to box, and driller's breaks are marked at this time to assist later geotechnical logging. All depths marked by the drillers are carefully checked by Red Back personnel. Downhole surveys are carried out during drilling, using an Eastman single-shot camera or Reflex. In the case of most of the deeper holes drilled at Akwaaba a Gyro instrument was used to provide a continuous survey of the drillhole.

10.2.2 RC and Core Sample Quality

A variety of procedures were developed to monitor and maintain RC sampling quality, and to document such parameters as drilling recovery, wet drilling conditions and potential contamination.

The geological log established by Red Back records the percentage sample recovery for each one meter interval, based on a visual estimate. While this qualitative rather than quantitative estimate is suboptimal, the RC sample recoveries have been routinely recorded for all RC holes following CHRC19. Recovery estimates are available for 99% of the Red Back RC drilling, with the great majority of holes returning notional sample recoveries averaging 95%.

The geological log records whether each one-meter sample was collected under dry or wet drilling conditions. Overall, 90% of samples are collected under dry drilling conditions.

Downhole drilling contamination has rarely occurred during RC drilling at Chirano, due in part to the high volume/high pressure compressed air supply that has been routinely employed, along with a face sampling hammer bit.

Sharp changes in gold assays returned from successive RC samples are commonly seen as the drillhole passes from a mineralized zone into barren footwall lithologies. The abrupt change in gold tenor between two adjacent RC drill samples is considered to represent further evidence that downhole 'smearing' has been minimized or eliminated.

Where a sample appears to be contaminated or comprises extraneous material, this is noted in the comments field of the drillhole log.

Diamond drilling at Chirano presents few problems, as the rock is generally of good quality with widely spaced joints, little foliation and few broken zones. As a result, core loss is minimal, and core quality is high. One hundred percent recovery is the norm, and any core losses of more than 5% in a three meter run are rare. The only exception relates to dedicated holes cored from surface through the saprolite zone to obtain samples for determination of bulk density of the weathered profile. Modest core loss may occur in these holes, however this is of little significance as the samples are not assayed.

10.3 RC and Core Sampling Procedures

The sampling procedures followed during both RC and diamond drilling are detailed in Section 11.

10.4 Drilling Orientations

Almost all the Chirano mineralization is steeply dipping and most of the deposits dip steeply west, typically at about 80º. Steep easterly dips have been encountered at Suraw and Akoti Extended. Moderate west dips occur locally within some deposits, with Obra South being an example.

Wherever practically possible, drilling has been undertaken normal to the plane of the principal mineralized orientation. The most common situation at Chirano is for a lode dipping 80º to the west to be intersected by a drillhole inclined at -60º to the east. In this situation the true thickness of the mineralized interval will approximate 65% of the drilled thickness. It should be noted, however, that drillhole inclinations range from -45º to vertical, the dip of the lodes vary, and not all holes have azimuths perpendicular to the strike of the mineralization. In addition, it should be noted that the three dimensional modeling methods applied in resource estimation accurately reflect the morphology of mineralized zones, regardless of the orientation of the drillholes. The true thicknesses of the mineralized zones range from a few meters up to 70 meters.

11 SAMPLING METHODS

11.1 Soil Sampling

Soil sampling and analysis has been the major tool used in the early phases of exploration at Chirano, and has been the major factor in locating each of the fourteen gold deposits found to date. The entire Prospecting License has been covered by soil sampling, with the sample spacing ranging from reconnaissance traverses at an 800 meter by 100 meter sample spacing, through to detailed infill surveys at a 50 meter by 10 meter spacing.

An industry standard soil sampling technique, appropriate for the regolith developed at Chirano, has been routinely employed. A hole 40 centimeters to 50 centimeters deep is excavated by hand and a three kilogram bulk sample is collected from the bottom of the hole. This entire sample is bagged and sent to the laboratory without preliminary processing, apart from the removal of large rocks and macroscopic organic material.

The entire sample is then oven dried, pulverized in a large ring mill, and analyzed for gold by atomic absorption spectroscopy (AAS) after either fire assay digestion or aqua regia digestion.

Field duplicate samples, assay standards and blanks have been routinely included in the sequence of samples which have been sent to the assay laboratories for analysis.

It is not practical to include a listing of all soil sample results, as 14,291 samples have been collected to date. Table 11.1-1 summarizes pertinent statistics from the soil sampling programmes.

Table 11.1-1 Summary Soil Sampling Statistics

Cutoff Grade (ppb)	Percentage of Soil Samples
50	37.5
100	22.4
200	13.1
500	4.5
1,000	1.7

Statistical analysis indicates that soil samples returning greater than 50ppb are anomalous, relative to the background population. With only one exception, all major clusters of samples above 500ppb gold are directly related to a significant mineralization. The one exception is the Tetteh anomaly, which occurs in lateritic soil overlying Tarkwaian sediments.

11.2 Trench Sampling

Excavation of trenches has been used to test soil anomalies. The trenches are dug by hand to a width of approximately 80 centimeters to one meter, a depth of approximately three meters.

One meter long, continuous channel samples have been cut from the northern wall of each trench, near the base of the trench, with about three kilograms of sample material being collected onto a plastic sheet. The channel sampling programmes have been supervised by Red Back geological staff to ensure that a high quality channel sample was collected. The material from each one meter interval is transferred from the plastic sheet to a calico sample bag, prior to dispatch to the assay laboratory.

Each sample is sent to the laboratory where it is oven dried, pulverized in a large Labtechnics LM5 ring mill and analyzed for gold by atomic absorption spectroscopy after 50 gram fire assay digestion.

Eighty one trenches have been completed by Red Back, along with a further 63 trenches excavated by Reunion. The sampling protocols, relating to the exploration undertaken by Reunion are unknown. The trenches have been dominantly excavated into the Chirano granite and were focused on the Chirano mineralized horizon. The average spacing of the trenches in areas of particular interest is generally 50 meters along strike.

Some 4,059 trench samples have been collected to date. Table 11.2-1 summarizes key statistics relating to assaying of the trench samples.

Table 11.2-1 Summary Trench Sampling Statistics

Cutoff Grade (g/t)	Percentage of Trench Samples
1	7.6
5	0.4
10	0.15

Intersections of mineralized in trenches are generally comparable in width and grade to subsequent intersections encountered in drillholes beneath the trenches. There is no compelling evidence that trench gold values are significantly affected by supergene enrichment or depletion.

11.3 Reverse Circulation Drill Sampling Procedures

In the case of dry RC drilling, the entire sample is collected into a large plastic bag tightly clamped onto the base of the cyclone. The entire length of each RC hole is sampled. A one-meter sample length is used in all holes that might be included in resource estimation. Dry samples, of nominal 20kg to 25kg weight, are reduced in size by riffle splitting used a two stage Jones riffle splitter to about three kilograms, and then placed in pre-numbered sample bags for dispatch to the assay laboratory. A record is made at the drill site of the sample identity numbers and corresponding intervals, and this is also recorded in the geological log.

CGML have routinely employed quality control measures during RC drilling, including the use of blow backs after the advance of each rod during RC drilling, cleaning of the cyclone when sample build-up is evident, routine logging of RC sample and core recoveries, collection of duplicate RC sample splits, and insertion of in-house prepared blanks and standards for qualitative laboratory performance monitoring.

Two methods have been used for processing wet samples. Holes up to CHRC272 were processed by collection into a plastic bag, contained within a wheelbarrow. Sediment from water overflowing the bag was recovered then stir-mixed into the rest of the sample. After thorough mixing in the wheel barrow, the sample for dispatch to the laboratory was collected using a scoop. With later holes, after CHRC272, the bulk sample was collected into a plastic bag, excess water was drained, and pipe (tube) sampling was used to collect the assay sample from the bulk sample. This process involved a tube of PVC, cut at an oblique angle, being repeatedly inserted through the sample cuttings in order to collect a representative sample for assay dispatch.

RSG recommended early in the mine life that no wet RC drilling should be allowed and drilling should always revert to diamond core as soon as wet sampling conditions were encountered. Following an internal review, CGML chose to allow wet RC drilling and use 'twinned' diamond drillholes to check the validity of the wet RC sampling results. To date there is no evidence that wet RC drilling at Chirano has resulted in positively biased gold grades when compared to the diamond twin drilling. Since 2006 little or no wet RC drilling has been undertaken in the ore zone due to the increased use of core drilling on the project.

The majority of the RC drilling is concentrated along the seven kilometer strike length of the Chirano mineralized horizon extending from Akwaaba to Mamnao. Within the gold deposits, drill sections are generally spaced 25 meters apart. On each traverse the drillholes are typically spaced to give a vertical separation of about 25 meters between mineralized zone intersections. The appropriateness of the 25m drill section spacing has been tested by confirmation drilling in two areas (Tano and Obra), where a 50 meter long block of each deposit was drilled at a 10 meter spacing, on traverses 12.5 meters apart (four times the normal density). Resource estimates for these densely drilled blocks closely corresponded to previous estimates based on routine 25 meter by 25 meter drilling. The denser drilling gave a slight increase (a few percent) in estimated tonnes, grade and contained gold.

Approximately one kilogram of each RC sample is archived at the field camp as a source of material for check logging, petrography, metallurgy, density determination, or re-assaying where laboratory contamination of the original sample is suspected.

11.4 Diamond Core Sampling Procedures

On arrival at the core yard, the trays are laid out on racks of suitable height in consecutive order. The core is carefully measured, marked at one meter intervals, and the results reconciled with the driller's depth marks.

Three separate logs are made for each hole as follows:

- Rock quality log: This records percentage core recovery, weathering state, rock strength, RQD values and fracture frequency.
- Oriented structure log: This records the location of joints, veins, foliations, bedding and faults, the angular data needed to calculate their orientation and characteristics like width, shape, smoothness and mineral coatings.
- Detailed geological log: This log records features like rock type, alteration, veining, sulphides, weathering and oxidation.

The geotechnical information in the rock quality and oriented structure logs is later assessed both by Red Back personnel and by geotechnical consultants.

Representative billets of core are selected and their dry bulk density determined by trained CGML personnel. Both the tray position and sample bag are clearly labeled with the hole number and interval. Once this process is complete, the billets are returned to the correct position within the trays.

All diamond core is photographed, both dry (for the geotechnical consultants) and wet. The photography is carried out using high quality conventional cameras and more recently digital cameras. The photos stored in albums and also digitized by high resolution scanning and compiled onto compact discs.

Once all technical data has been derived from the core, the core is cut lengthwise using a diamond saw to consistently cut along the orientation line before being correctly placed back into the tray. The half-core is then sampled ensuring that the same side is consistently sampled, and placed into calico bags labeled with the assigned sample number. The resulting samples are then submitted (by hole) to the Bibiani laboratory for analysis. Early core drilling was sampled on one meter intervals. Over the last two years the amount of core drilling has increased significantly and sampling is now undertaken based on geological boundaries in order to increase knowledge of the gold distribution. Under this system maximum sample size is 1-1.25m with a minimum of 0.5m.

The residual half core is stored in the core shed for reference purposes. The trays and clearly re-labeled with the hole number, tray number and interval.

11.5 Sample Quality

The production of high quality samples has been a key aspect of the entire exploration programme that has been managed by Red Back and this philosophy has been applied to all aspects of sampling.

For soil sampling, a standard sampling procedure was adopted and applied rigorously in order to maintain a consistent type and quality of sample.

During trench sampling great care was taken to ensure that a sampling channel of consistent width and depth was collected.

Diamond core recoveries are routinely recorded as part of the standard geological logging practice. The vast majority of diamond core is highly competent and recoveries of 100% are the norm, and rarely fall below 95%. Core loss tends to occur due to washing and/or grinding at the commencement and completion of drilling runs, particularly within the partially oxidized portion of the profile or within friable zones of tectonized rock. Due to the consistently high core recoveries, the opportunity for over or under-reporting grades from diamond drill samples is minimal.

Red Back has not routinely recorded RC sample weights, however all RC drilling was carried out using face sampling hammers, employing rigs equipped with a large air capacity and pressure to effectively flush samples from the hole face through the rod line and hoses. The RC string and hole were cleaned after each drill rod was attached and prior to continuing drilling. Very sharp changes in gold grade are commonly seen at the edge of mineralized zones, suggesting that there is little smearing or contamination of the samples.

Individual RC sample recoveries are routinely estimated by the geologist supervising the drilling for all RC drilling. While this practice is not optimal, the notional RC sample recovery is reasonably consistent, except for the first few meters of each hole.

Ten percent of the RC samples were drilled under wet drilling conditions. Comparison of RC intersections with immediately adjacent and specifically drilled “twin” diamond core holes indicates that RC sampling has not produced positively or negatively biased assay grades. Table 11.5_1 summarizes the results of the RC/diamond drill core 'twin' drillholes.

Table 11.5-1 Summary of RC & Diamond Twin Drillhole Intersections

Chirano Mine Summary of RC and Diamond Twin Drillhole Intersections							
Hole		**Intersection**			**% Extra Gold in Core**	**Wet / Dry**	**Prospect**
ID	**Type**	**Length**	**Grade**	**Metal**			
CHRC112 CHRC373D	RC Diamond	43 42	4.19 7.06	180 297	65	84% Wet	Tano
CHRC212 CHRC238D	RC Diamond	16 16	3.07 4.69	49 75	53	All Wet	Akoti North
CHRC223 CHRC237D	RC Diamond	89 84	1.82 2.34	162 197	22	82% Wet	Obra
CHRC109 CHRC374D	RC Diamond	55 54	3.12 2.72	172 147	-15	Dry	Tano
CHRC028 CHRC378D	RC Diamond	30 30	1.83 1.86	55 56	2	Dry	Sariehu
CHRC157 CHRC379D	RC Diamond	58 58	1.70 2.18	99 126	27	Dry	Sariehu

12 SAMPLE PREPARATION, ANALYSIS AND SECURITY

12.1 Sample Storage and Dispatch

The collection and processing of all samples prior to dispatch to the laboratory is carried out by employees of CGML.

After collection, samples are usually stockpiled briefly at the Chirano exploration office in the sample storage area, prior to dispatch to the laboratory. The camp is patrolled day and night by security personnel and all areas are illuminated at night.

Field duplicates, blanks and standards are incorporated into sample batches of all types before dispatch to the laboratory.

The samples are picked up at the Chirano camp by SGS staff and are transferred to the SGS laboratory at Bibiani in SGS vehicles.

12.2 Laboratory Procedures

All of the CGML exploration samples have been prepared and analyzed by the SGS laboratory in Bibiani. This laboratory is not certified by any standards association, however selected sample pulps from this laboratory are check assayed each month at other certified SGS laboratories worldwide. Smee and Associates Consulting Ltd conducted an audit of the facility in April 2006 and observed that the equipment was in good repair and that all areas of the facility were clean and operating systematically, and industry standard procedures were being used at each stage of the sample preparation and assaying process.

All RC, diamond, trench and soil samples weigh about two to three kilograms on submission. The entire sample is oven dried then pulverized in a 5kg ring mill (single stage mix and grind). All drill and trench samples are analyzed via 50 gram fire assay with an AAS (atomic absorption spectrophotometry) finish. Soil samples are assayed using either fire assay or aqua regia digestion, followed by an AAS finish.

SGS in Bibiani has employed appropriate and systematic quality control measures, including the cleaning of crushing and pulverizing equipment with compressed air between samples, flushing of ring mills with barren material after each batch of 15 samples, wet sieving of 2% of the sample pulps to monitor grinding performance, inclusion of laboratory blanks, standards and pulp duplicates and pulp splits in each batch of 50 samples, recalibration and scaling of the AAS machine at appropriate frequencies, discriminate repeat assaying of laboratory pulps, and monthly check analysis of selected pulps by SGS.

12.3 Quality Control

Quality control is discussed in full in Section 13.6.

12.4 Summary

The sampling methods, chain of custody procedures, sample preparation procedures and analytical techniques are all considered appropriate and are compatible with accepted industry standards.

13 DATA VERIFICATION

13.1 Introduction

The following section describes the data verification procedures and quality control measures relating to the drill data that has been incorporated into the current resource calculations.

13.2 Database Development

Previous resource estimates at Chirano were based on data supplied by Red Back in the form of a relational database held in Microsoft Access. In July 2007 CGML installed a Century systems database management system under the supervision of an experienced on site database manager. All drill data has been imported into this system and has been re-validated. The drill data for resource estimation purposes was exported as comma delimited ASCII files.

13.3 Topographic Model

The supplied EDM survey data and regional contour data were used in the construction of a DTM model for the Chirano topography. Adequate survey data are available to construct a robust model of the survey topography over all the Chirano prospect areas.

13.4 Sample Quality

The quality of the exploration samples from the Chirano mine has been investigated, based on the CGML RC sample and core recovery data, comparison of the assay data for adjacent wet and dry RC samples, and the mineralized intersections in the RC and diamond twin drillholes. High (notational) average RC sample recoveries (96%) and core recoveries (98%) were noted, with no correlation evident between intervals with reduced recoveries and elevated gold grades. There is no material evidence of downhole contamination of samples in the wet or dry RC drillholes, however the mineralized intersection grades for the wet RC wholes are all less than those for the corresponding twin diamond holes, which may imply that the grade data for wet RC samples may tend to understate the gold content of the supplied in situ mineralization.

13.5 Assay Precision and Accuracy

The precision and accuracy of the gold assay data for the Chirano mine has been statistically assessed based on Analabs internal assay quality control data and the assay results derived from CGML's quality control monitoring activities. Red Back's current quality control regime is shown in table 13.5-1.

Table 13.5-1 Quality Control Regime

RC Drilling	Field Duplicates	1 in 25
	Field Triplicates	1 in 50
	Standards	1 in 60
	Blanks	1 in 40
Core Drilling	Field Duplicates	1 in 10
	Field Triplicates	1 in 40
	Standards	1 in 40
	Blanks	1 in 40

Transfer of assay data from the SGS and Genalysis laboratories to Red Back is in electronic format. Assays are provided by the laboratories in digital form, which is emailed to the Red Back database manager and merged into the computer database. This effectively eliminates post-laboratory errors in the same number and related assay data.

13.6 2008 QAQC Data

The Quality Assurance and Quality Control (QAQC) data collected during 2008 demonstrates that SGS Bibiani performed exceptionally and reported assay data which is considered to be of high quality and reliable for inclusion in the 2009 resource estimation.

Data for 2008 effectively replicates the continued high level of analytical quality seen at Chirano throughout the projects life.

CGML use SGS Bibiani exclusively for their resource assaying. CGML have historically maintained 20% total QC throughout the project sample stream. Throughout 2008, a total of 4,136 QCQA samples including 699 standards (STD), 875 blanks (BLK), 1,945 routine blind field duplicates and 617 third party, independent, umpire pulp checks (UC) by Genalysis Pty Ltd in Perth (Genalysis).

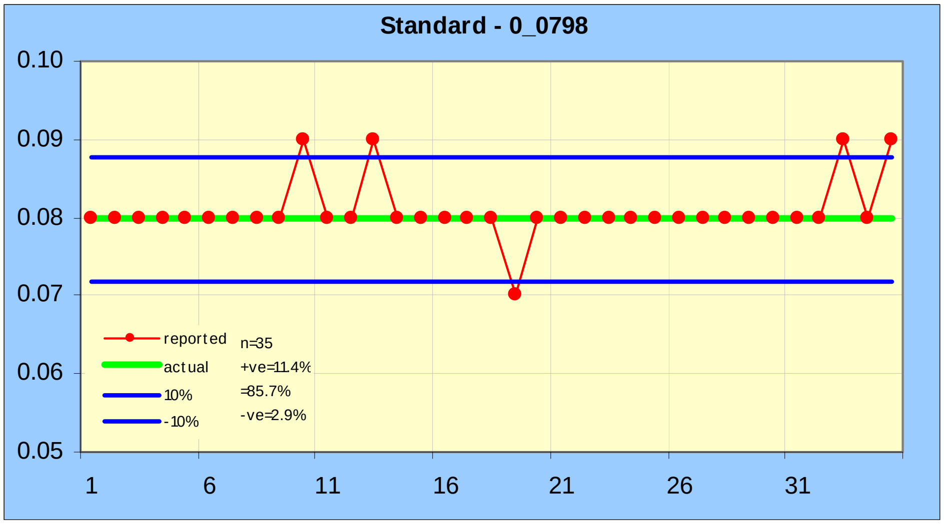
Table13.6-1: SGS Bibiani – QAQC Samples submitted

Standards, Blanks and Dups	No of samples	IS	LNR	Gross Error	no of samples Plotted	over limits	% between limits
0.0798	36	1	0	0	35	5	85.7
0.0811	103	0	0	0	103	2	98.1
0.413	110	0	0	0	110	18	83.6
0.416	12	1	0	0	11	0	100
0.805	29	0	0	0	29	1	96.6
0.81	94	0	0	0	94	0	100
1.323	25	0	0	0	25	0	100
1.326	12	1	0	0	11	1	90.9
1.38	97	2	0	0	95	2	97.9
1.801	67	0	0	0	67	1	98.5
1.868	16	0	0	0	16	0	100
4.041	46	0	0	0	46	1	98.8
8.543	31	1	0	0	30	0	100
8.573	7	0	0	0	7	0	100
18.1	14	0	0	0	14	3	79.6
Blank	875	0	1	0	874	0	100
Duplicates RC	641	0	0	0	641	_	_
Duplicates DD	1304	0	0	15	1304	_	_
Duplicates UC	617	0	0	0	617	_	_
Total	**4136**	**6**	**0**	**15**	**4129**		

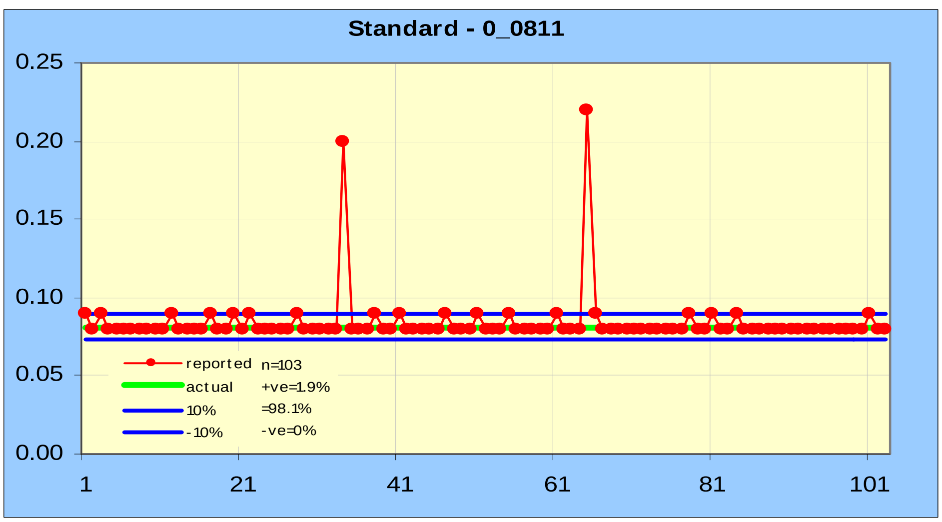
IS- Insufficient sample, LNR – Listed not received.

13.6.1 Standards

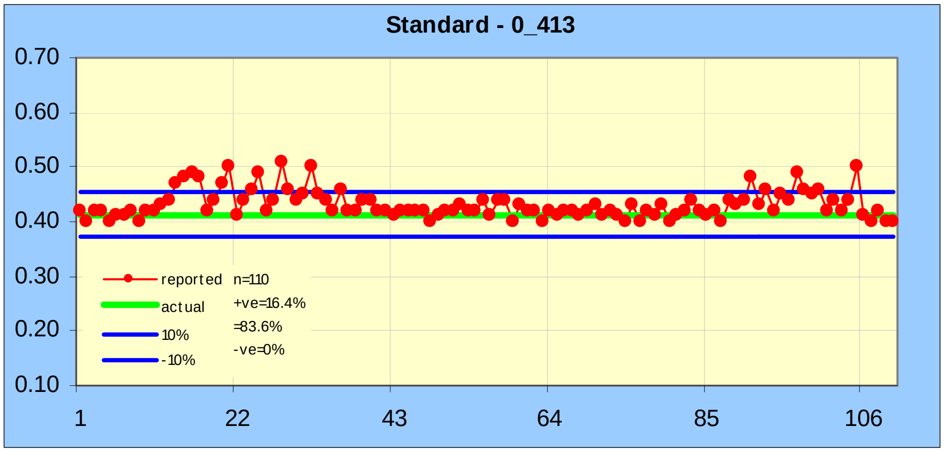
CGML used fifteen different ICRMs ranging from 0.08 to 18.1 g/t. Overall, SGS Bibiani reported 95% of all standards submitted to within the ±10% of the reference values.



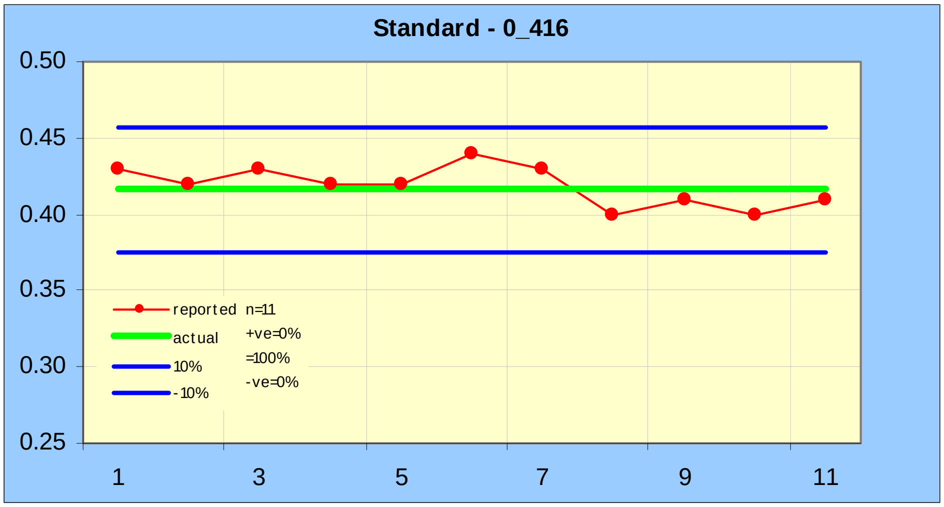
The performance of STD 0.0798g/t reported well but had only 35 observations. The percentage of the number of samples that reported within the ±10% boundaries is 85.7%.



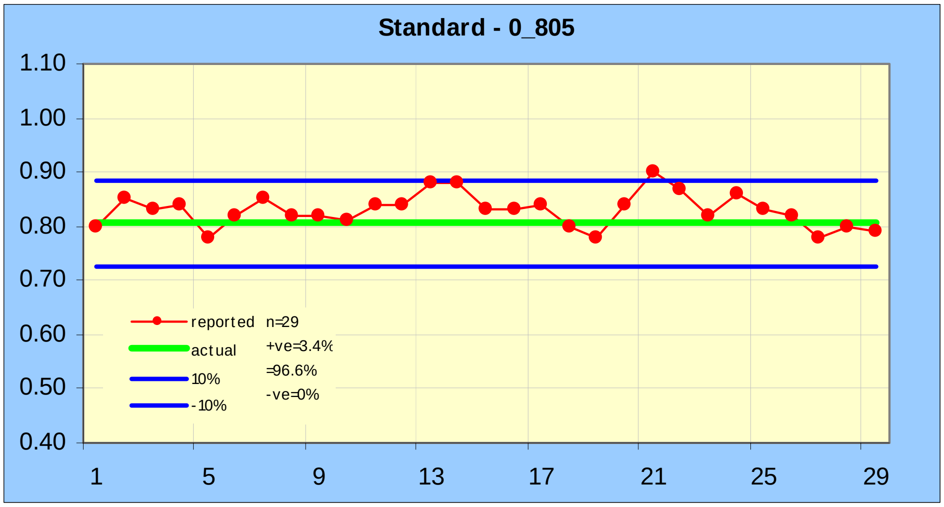
The STD 0.0811g/t performed very well with only 2 gross errors evident. The percentage of the number of samples that reported within the ±10% boundaries is 98.1%.



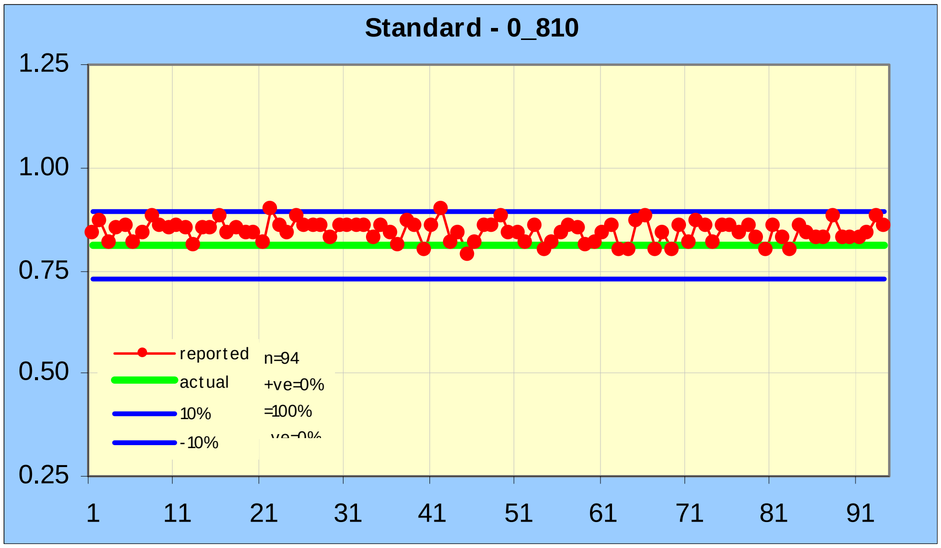
A total of 192 of the 0.413g/t STD were submitted and all the values reported were used for plotting the chart. The chart illustrates two periods of batch drift which were identified as potential periods for high bias and flagged for the lab to check assay. The percentage of the number of samples that reported within the ±10% boundaries is 83.6%.



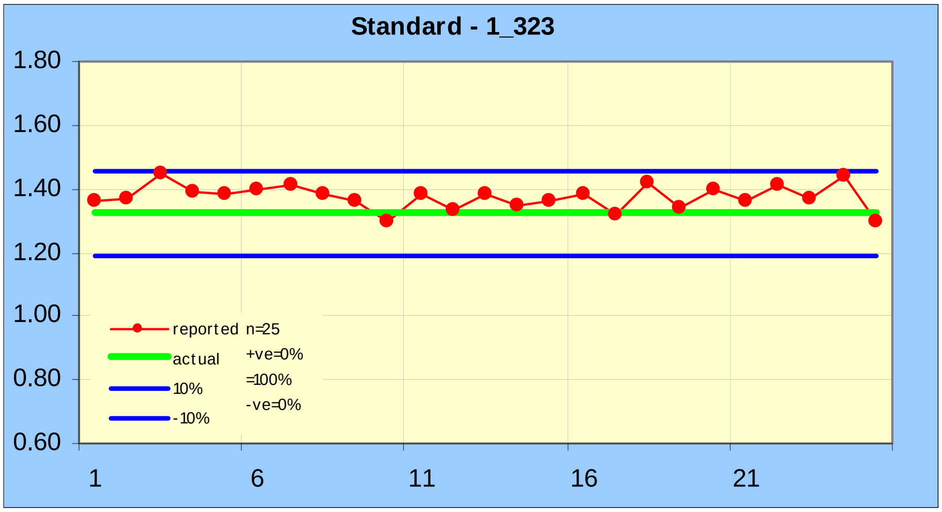
The performance of the STD 0.416 is perfect but limited. The percentage of the number of samples that reported within the ±10% boundaries is 100%.



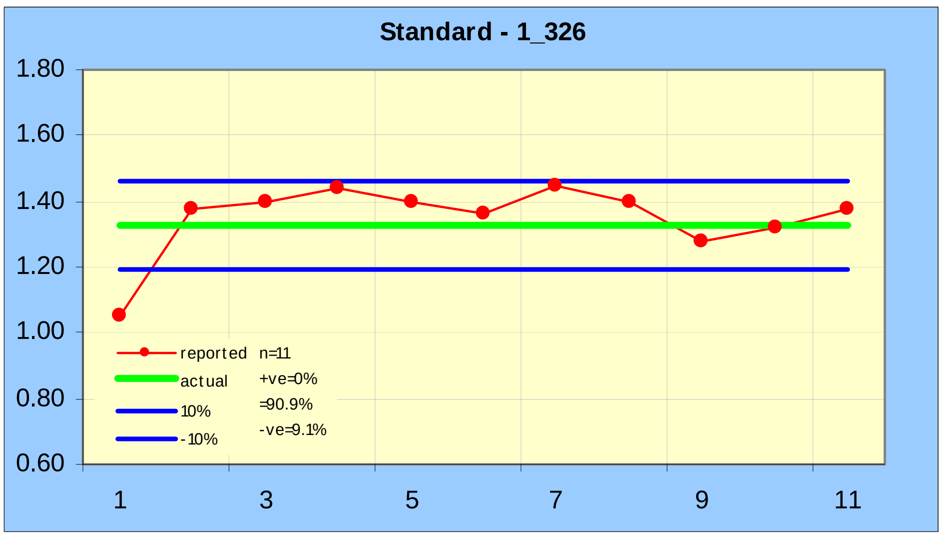
A total of 29 0f the 0.413g/t STD were submitted and all the values reported were used for plotting the chart. The percentage of the number of samples that reported within the ±10% boundaries is 96.6%.



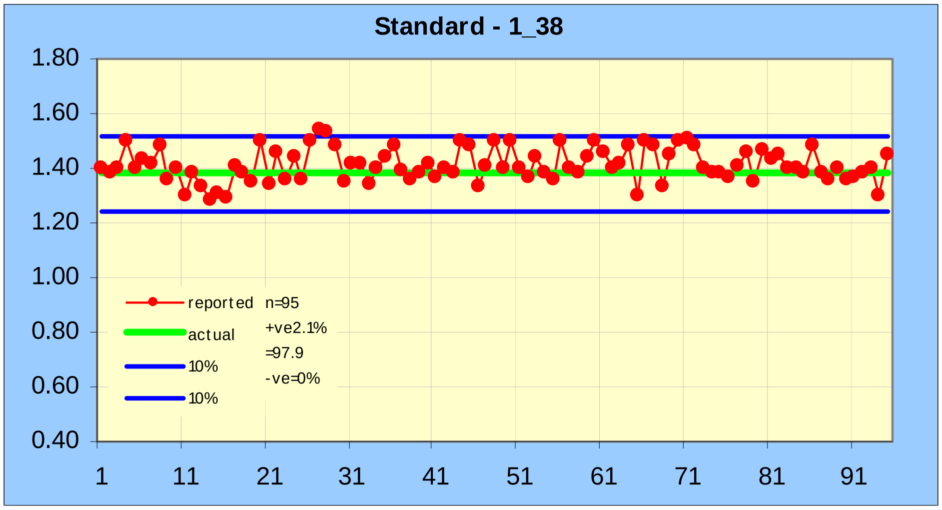
The chart illustrates the performance of STD 0.810g/t. The minimal high bias evidenced by the bulk of assays reporting above the reference is probably more reflective of a need to reset the reference value. The percentage of the number of samples that reported within the ±10% boundaries is 100%.



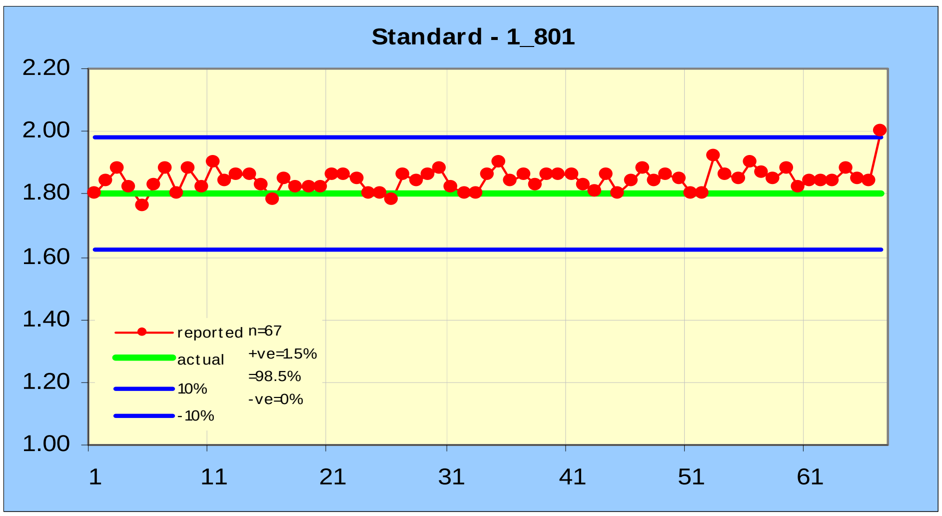
A total of 25 samples of STD 1.323 were submitted and the chart illustrates the performance. The percentage of the number of samples that reported within the ±10% boundaries is 100%.



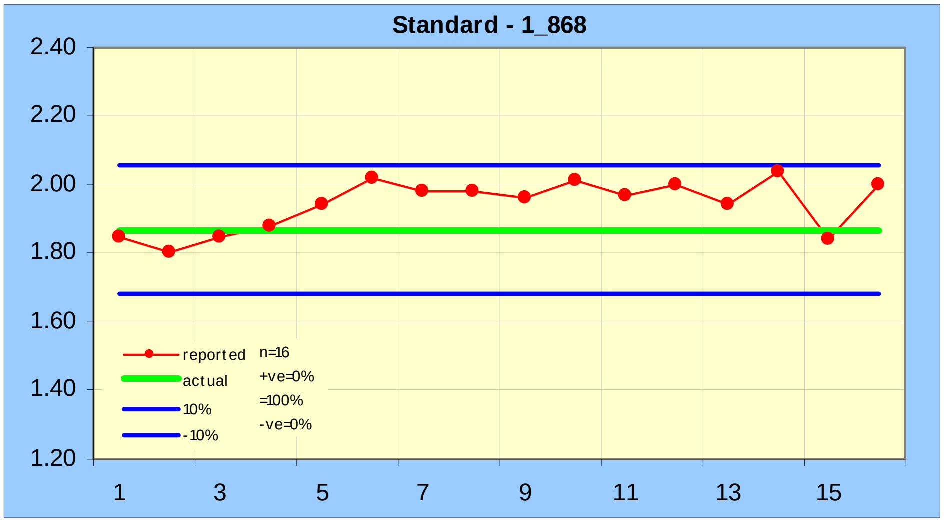
A total of 11 0f the 1.326g/t STD were submitted and all the values reported were used for plotting the chart. The percentage of the number of samples that reported within the ±10% boundaries is 90.9%.



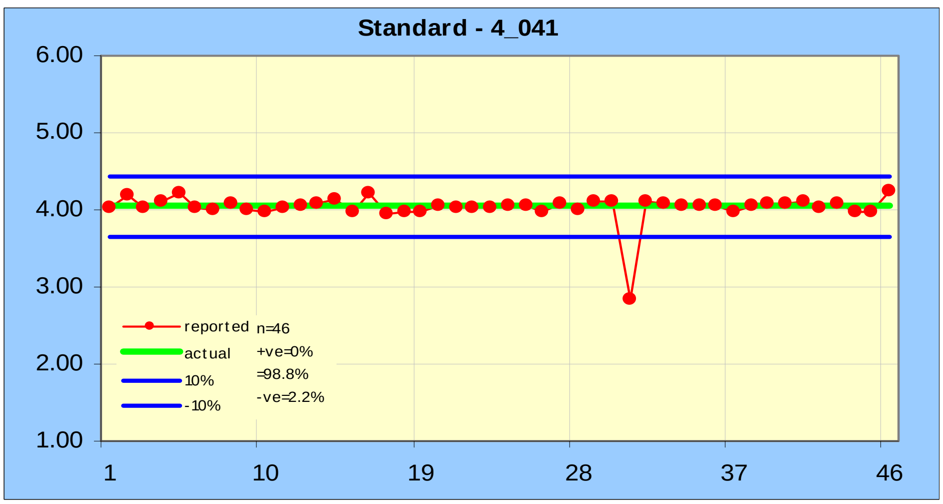
The performance of the STD 1.38g/t was very good. The percentage of the number of samples that reported within the ±10% boundaries is 97.9%.



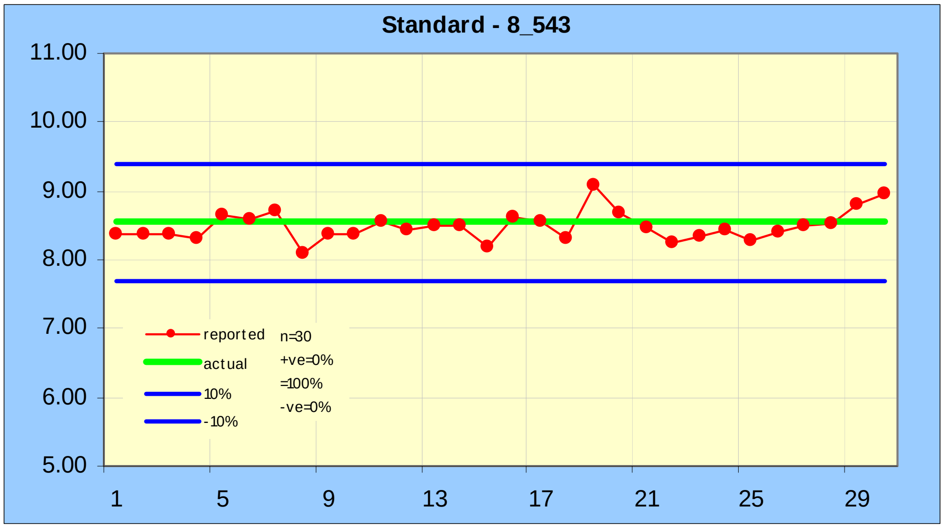
A total of 67 of the 1.801g/t STD were submitted and all the values reported were used for plotting the chart. The percentage of the number of samples that reported within the ±10% boundaries is 98.5%.



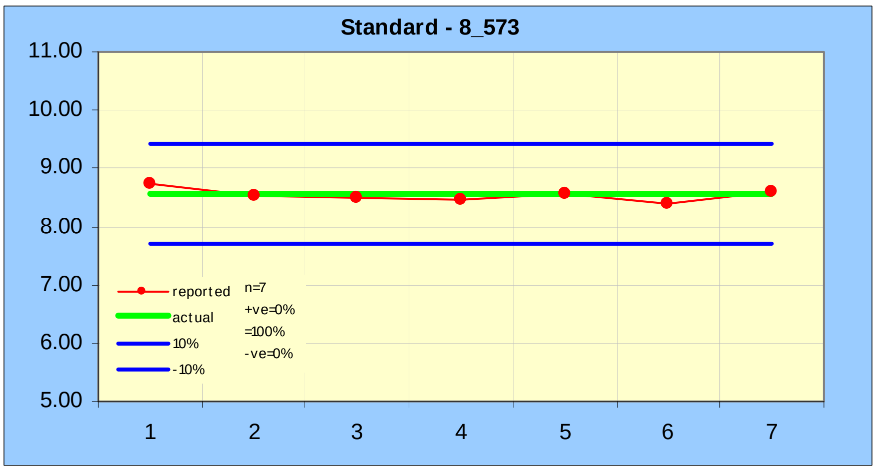
Even though all the values reported for STD 1.868 fell within the limits, there seems to be some traces of high bias in the treatment of some the samples. The percentage of the number of samples that reported within the ±10% boundaries is 100%.



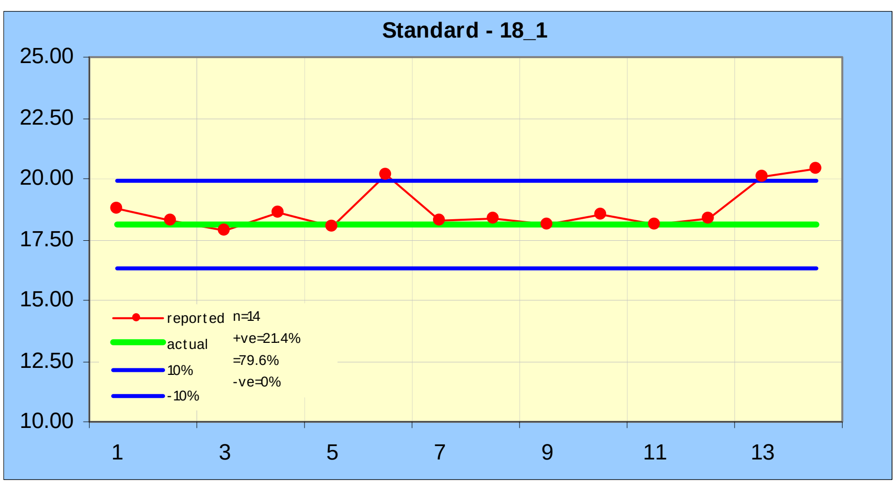
The values reported by the lab for STD 4.041. One gross error is evident. The percentage of the number of samples that reported within the ±10% boundaries is 98.8%.



The values for STD 8.543g/t as plotted, illustrate a perfect performance. The percentage of the number of samples that reported within the ±10% boundaries is 100%.

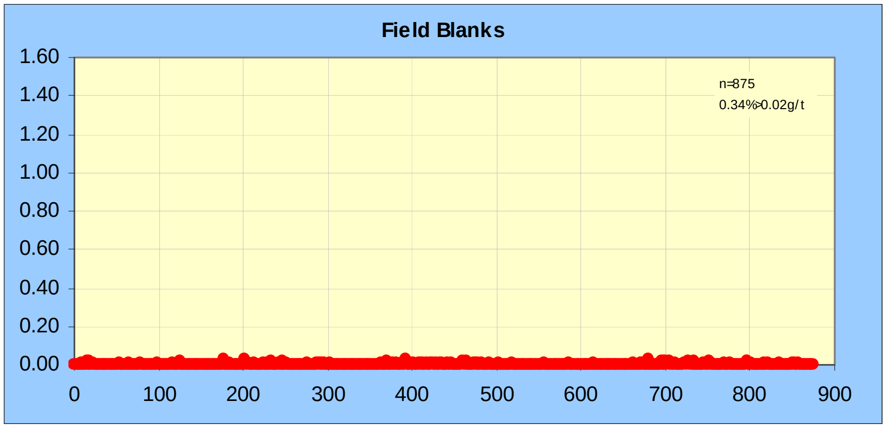


Very few of the STD 8.573g/t were submitted and they all reported perfectly. The percentage of the number of samples that reported within the ±10% boundaries is 100%.



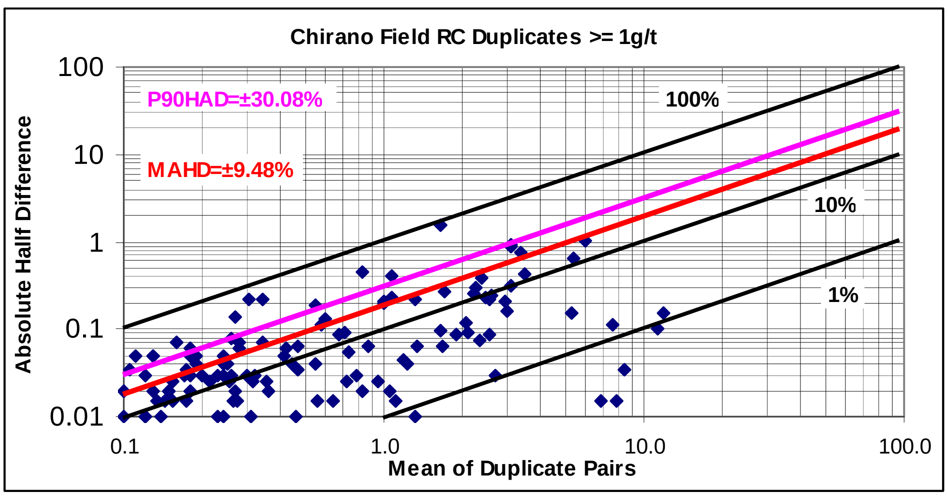
The STD 18.1g/t performed well but needs to be monitored. The percentage of the number of samples that reported within the ±10% boundaries is 79.6%.

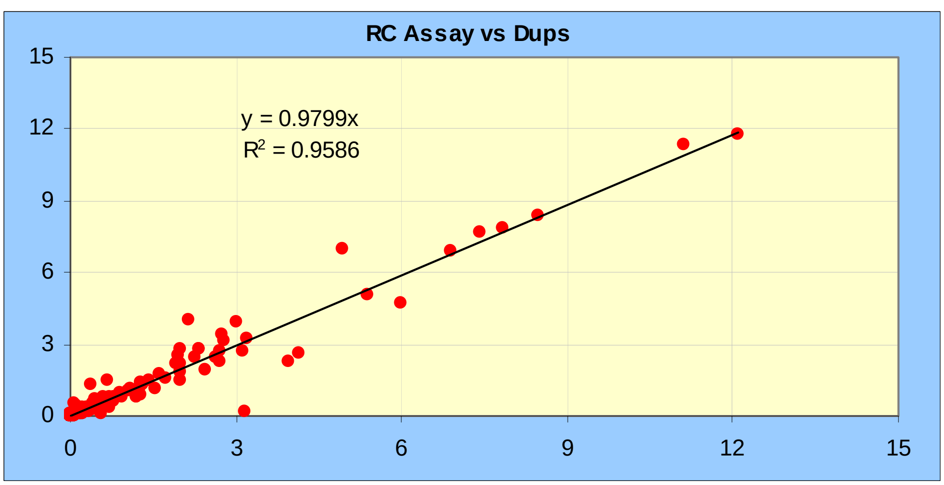
13.6.2 Blanks



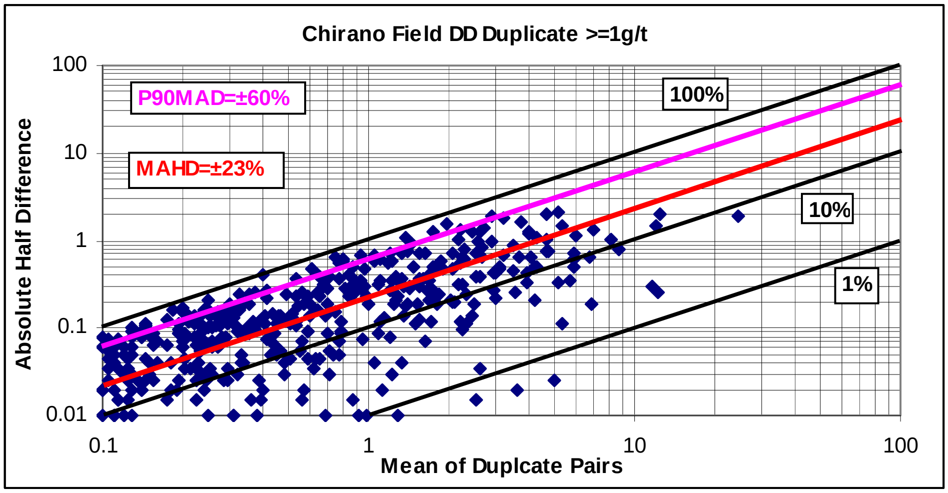
The routine blind blanks performed perfectly illustrating no evidence of routine low-level contamination. 875 Blanks were submitted and 99.66% reported <0.02g/t (20 ppb).

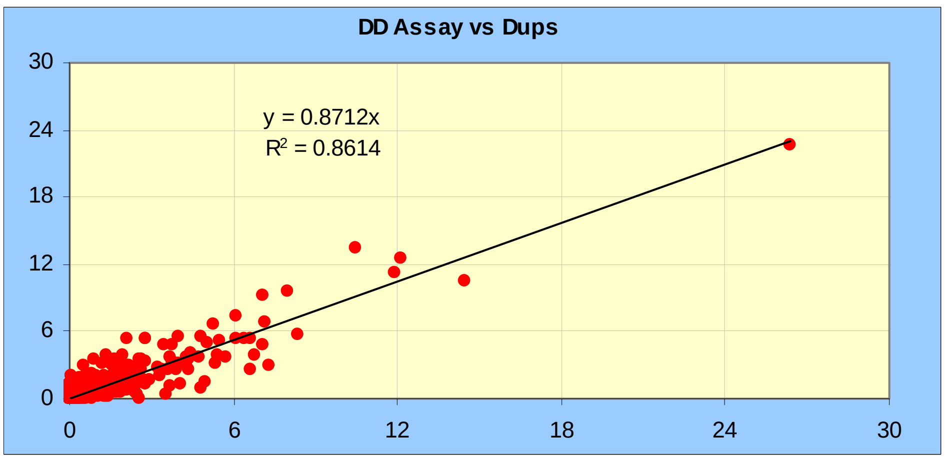
13.6.3 Blind Field Duplicates





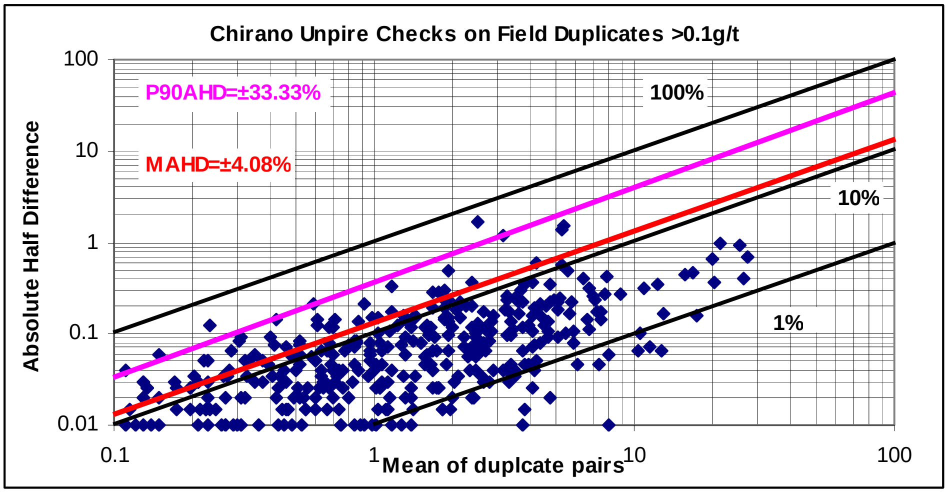
The Total Operation Precision (TOP) of the RC duplicates as expressed by a 50th percentile (MAHD) and the 90th Percentile AHD are ±9.48% and ±30.08% respectively of resource grade assays >0.2g/t and is well within the acceptable limits of a mesothermal gold deposit such as Chirano.

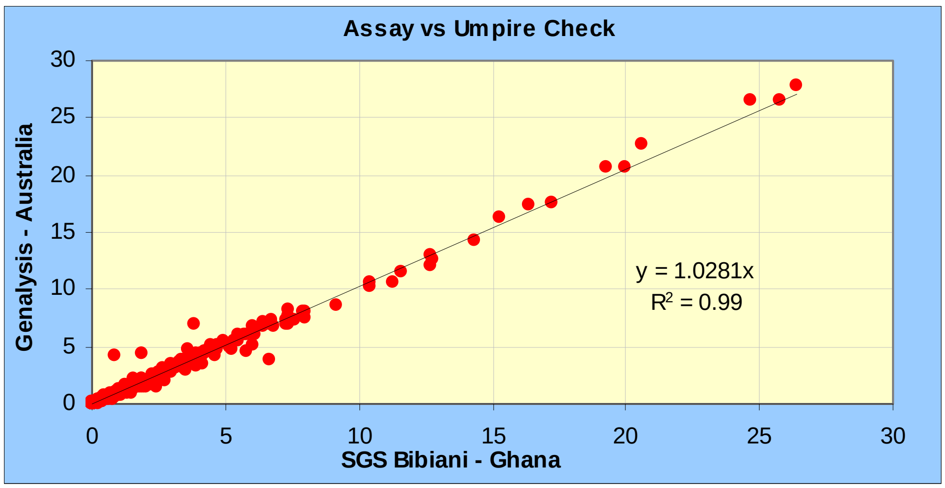




The Total Operation Precision (TOP) of the DD duplicates as expressed by a 50th percentile (MAHD) and the 90th Percentile AHD are ±23% and ±30.08% respectively of resource grade assays >0.2g/t. It can clearly be seen that, the DD duplicates do not give better correlation due to the ¼ core sampling procedure. This will be reviewed.

13.6.4 Umpire Checks





The Total Operation Precision (TOP) of the umpire check duplicates as expressed by a 50th percentile (MAHD) and the 90th Percentile AHD are ±4.08% and ±33.33% respectively of resource grade assays >0.2g/t and is well within the acceptable limits of a mesothermal gold deposit such as Chirano.

13.7 Conclusion

In 2008, a total of 4,136 QCQA samples including 699 standards, 875 blanks, 1,945 routine blind field duplicates and 617 3rd party, independent, umpire pulp checks were assayed for resource purposes.

1. Internationally Certified Reference Materials (ICRM) – SGS Bibiani were monitored by the routine blind inclusion of 15 different GEOSTATS ICRMs which ranged from 0.08 g/t to 18.1 g/t and achieved 95% of all standards reported within acceptable limits i.e. +/-10% of certified reference values.

2. Analytical Blanks - 100% of all blanks reported less than twice the detection limit i.e. < 20 ppb.

3 Blind Field RC Duplicates – the Total Operational Precision (TOP) of the RC duplicates as expressed by the 50th percentile (MAHD) is +/-9%, ranging to +/- 30% at 90% confidence levels. These exceptional levels of precision are thought to be consequent of the Chirano gold mineralization being lower greenschist, characteristically very fine and bound close to the sulphide lattice.

4. Blind Field DD Core Duplicates – the TOP of the DD core duplicates are an order of magnitude less precise than the RC samples i.e. P90 +/- 60% versus +/-30%. This is due to the duplicate sampling procedure employed at Chirano, using ¼ core.

5. 3rd Party Umpire Pulp Checks by GENALYSIS PTY Ltd. – the TOP of the re-submitted pulps shows exceptional reproducibility of MAHD = +/- 4% and P90 of +/- 33%. The inter-lab and Intra-lab precision are equivalent to the routine blind RC duplicates, which demonstrates the high quality of the routine assaying reported during the period.

Overall the SGS Bibiani assay data indicates that the analytical accuracy of the SGS gold fire assay for the mine is of a very high quality and well within industry accepted standards.

14 ADJACENT PROPERTIES

The Chirano gold deposits are closely related to the Chirano Shear which is considered to be a splay off the nearby Bibiani Shear. This latter structure hosts the four million ounce Bibiani deposit, approximately 15 kilometers north of the Chirano deposits. Bibiani and Chirano both occur on the eastern margin of the Sefwi Belt. It should be noted that the two areas differ in style of mineralization, with the gold mineralization at Bibiani is predominantly hosted by Birimian metasediments, although some ore is hosted within highly sericitised granite.

15 MINERAL PROCESSING AND METALLURGICAL TESTING

15.1 Introduction

The Obra, Tano and Akoti North deposits have been the subject of numerous metallurgical test work campaigns by the present and former owners of the mine since 1996.

This early work was been supplemented by a new testing program carried out from May through to November 2002, under the direction of CGML and Lycopodium. This test work was primarily performed at AMMTEC laboratories in Australia, on samples selected to be representative of the Chirano deposits, including Obra, Paboase, Tano, Sariehu, Akoti North and Mamnao.

15.2 Metallurgical Sampling

There are 14 known gold deposits at Chirano, but style of mineralization is essentially similar in each. In particular, almost all the mineralization is hosted in granite. In each case the gold mineralization is associated with similar fracturing, veining and alteration, and the gold is always closely associated with pyrite.

In detail, there are some differences between the deposits; for example gold grade varies from low (most of Sariehu) to relatively high (the core of Akoti North). Cataclastic deformation and alteration range from moderate (Tano) to severe (Obra). The average pyrite content also varies significantly (highest at Sariehu).

Samples used in metallurgical testing were selected to cover the full spectrum of all such variations and deposits, from a variety of depths, and from both the middle and marginal portions of the various deposits. Both oxidized and primary samples were tested.

15.3 Testwork Programme

A conventional cyanidation treatment route was assumed for the Chirano ores, based on assessment of the earlier test work.

The test work programme undertaken as part of the DFS aimed for achieve for key objectives:-

- Establish and confirm the optimum processing route.
- Determine the optimum plant operating parameters for the ores to be processed.
- Evaluate the variability in metallurgical performance for the different deposits.
- Define parameters required for the engineering and design of the plant inclusive of specific tests.

Furthermore, since the Obra primary mineralization represents the largest contribution to resource at Chirano (37%), it was agreed that the plant design would be based primarily on throughput of this ore type, however allowances have been made for processing other ore types.

15.4 Comminution Testing

PQ core samples were submitted for advanced media competency and JK drop weight testing. The full series of comminution test work was completed on the Obra and Paboase primary mineralization.

The comminution test work results indicated that primary ore samples are classed as having low to moderate competency behaviour, and compressive strength testing classed the samples as weak.

Rod mill and ball mill work indices are high and indicate that primary ore is tough to grind at a coarse size and will have an above average energy demand in ball milling. The rod:ball ratio is high (1.38 and 1.24), suggesting there is a high potential that the ore will form critical size material in a SAG mill.

The abrasiveness of the ore is classed as very high and high liner and media consumption is experienced.

A SABC grinding circuit is proposed for these ores. Pebble crushing has been recommended to contend with the observed high rod:ball work index ratio.

15.5 Metallurgical Testing

15.5.1 Grind Size

Testwork was undertaken to determine the optimum grind size for the Mine. It was noted that reducing the particle size by additional grinding increased the percentage of gold recoverable via leaching of the gravity of tails, but neither increased nor decreased the percentage recoverable via gravity separation.

The total extraction of gold, using a combination of gravity separation and cyanide leaching, increased as the particle size was reduced.

An economic evaluation of additional gold revenue for primary ore versus increased operating costs for finer grinding (power and media consumption) showed that the net benefit (revenue less the increased costs) increased as the fineness of the grain decreased. As such, it was concluded that a practical optimum grind size of p80 106 microns be adopted for a plant design, along with subsequent testwork on the Obra variability samples and the other major ore types. This was based on experience that if the grind were to be any coarser, settling may become problematic within the leach circuit.

15.5.2 Leach/CIL Testing

Forty eight hour, oxygen assisted leach tests at a 50% pulp density were carried out on the gravity tails. Results of the test work indicate that, for primary ore types, the cyanide and lime consumptions are low.

In most cases the 24 hour extractions of gravity tails were virtually identical to the 48 hour extractions. Where the extractions were not identical, they differed by a maximum of 5%, and in most cases less than 2%. A 24 hour leach retention time was therefore adopted for the plant design. Anticipated plant recoveries were calculated from the test work by allowing for a solution tail loss of 0.01ppm. This is equivalent 0.01g Au/t solution loss at 50% solids.

Design plant recoveries for the different ore types covered in the test work are shown in table 15.7-1.

15.6 Testwork Summary

The metallurgical treatment route has been selected based on the results of the recent testwork and can be summarized as follows:

- Primary crushing using gyratory crusher.
- SAG-ball milling with recycle crushing.
- Gravity concentration of ball mill cyclone underflow using centrifugal concentrators.
- Pre-leach thickening.
- Hybrid carbon in leach (CIL).
- Zadra stripping plant.

15.7 Metallurgical Recoveries

The recoveries for the Chirano ore deposits based on the selected treatment route and historical operation of the plant, are presented in table 15.7-1.

Table 15.7-1 Metallurgical Recoveries

Ore Type	% Recovery
Oxide	95.0
Fresh	90.6

15.8 Refining

Gold production from the Chirano mine is shipped and refined under contract by Rand Refinery Ltd of Johannesburg, Republic of South Africa.

16 MINERAL RESOURCES AND MINERAL RESERVES

16.1 Revised Resource Estimate

Hellman & Schofield Pty Ltd (H&S) was retained by Red Back to estimate the gold resources at the Chirano Gold Mine. The new resource estimates are required for open pit mine optimisation studies, underground mine studies and mine planning purposes.

The previous mineral resource estimate was compiled by H&S in July 2007. Since that time drilling has continued to infill and expand several of the 14 known open pit deposits as well as target deep resources in several areas. The current revision by H&S includes inferred underground resources for the mineralization below the Suraw and Paboase South open pits as well as the Akwaaba Deeps deposit.

Under JORC reporting requirements and guidelines Nicolas James Johnson, a member of the Australian Institute of Geoscientists, with more than five years experience in the use of geostatistics for estimation of recoverable resources in gold deposits, is the Competent Person for the purposes of this work. Mr Johnson visited the project in February 2008.

The Multiple Indicator Kriging (MIK) recoverable resource estimates reported for the open pit resources and the Ordinary Kriging (OK) estimates reported for the underground resource have been built using GS3©, the resource modeling software developed by Hellman and Schofield Pty Ltd.

16.2 Open Pit Mineral Resource Estimate

Open Pit drilling has focused on infill in several deposits with a view to locally improve the resource estimate to mine production reconciliations. Open Pit resources are stated based on the 30 December 2008 pit surfaces. The open pit mining at Akwaaba was completed in 2008 and the underground operation was commenced. It is anticipated that no further resources will be mined at Akwaaba via open cut mining, therefore, the present study has removed Akwaaba from the open pit resource estimate.

16.2.1 Resource Data Sets

The supplied drill hole data base used to undertake the open pit resource estimate for Chirano has been generated from 1,431 holes, combining to provide 234,439 metres of drilling. Approximately 72% of the total drill hole meters is identified as coming from reverse circulation (RC) drilling and the remaining is from diamond core (DDH) drilling; 169,359 and 65,080 metres, respectively.

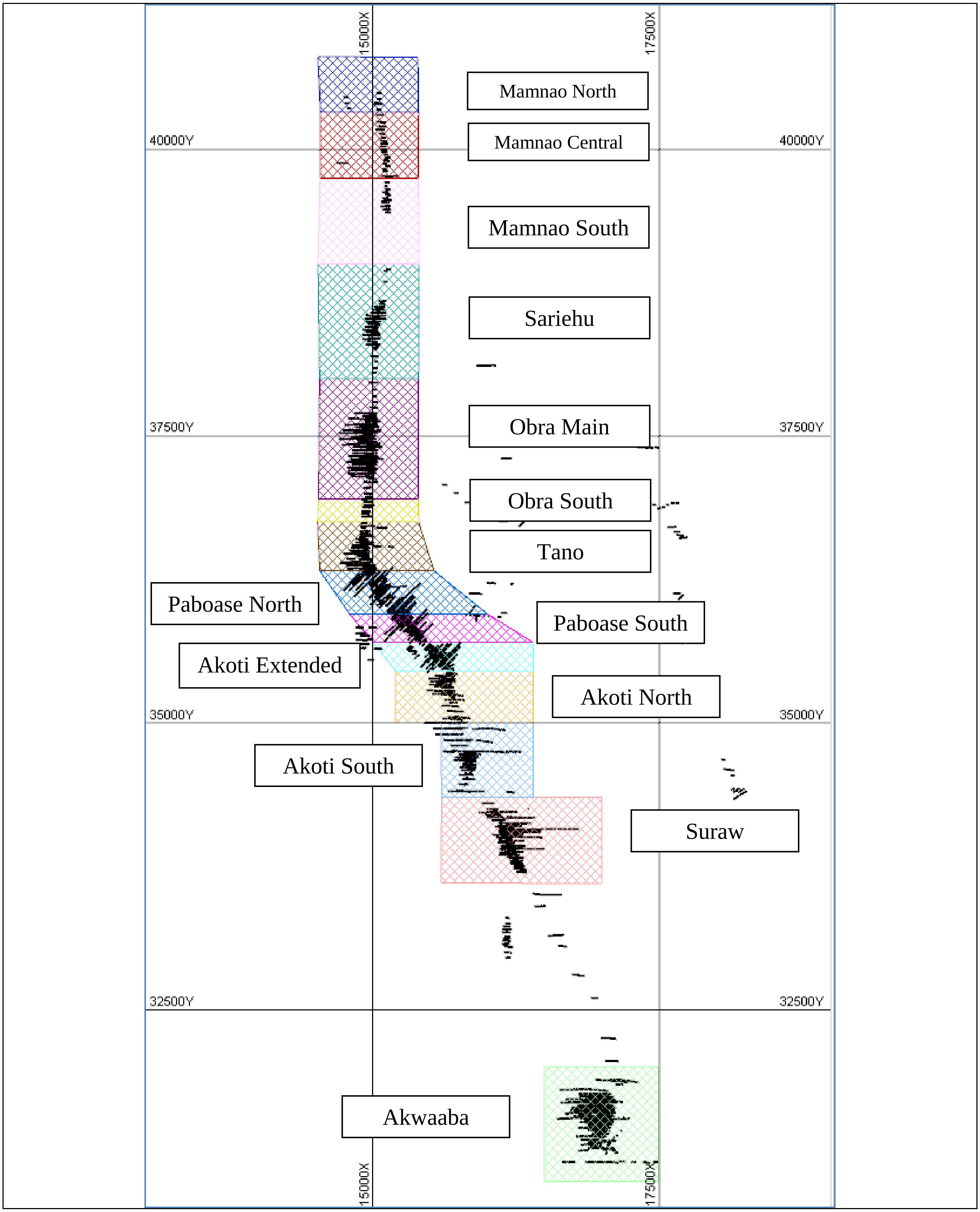
The data set represents all drill hole information available at 31st December 2008.

16.2.2 Drill Hole Spacing

Figure 16.2.2-1 shows a plot of drill hole collars for the drilling completed at Chirano. Each open pit resource area is also shown on the plot.

The majority of identified gold mineralisation at Chirano has been drill tested on 25 metre north spaced drill traverses oriented at right angles to the general strike of the mineralised gold zones at each deposit. Holes, on section, are mostly oriented to be inclined between 50° and 70° towards mine grid east or west.

Figure 16.2.2-1: Chirano resource drilling collar locations.



16.2.3 Oxidation Surfaces

Logging available in the geological data base has been used to interpret the oxidation profiles on cross-sections and these were then joined to form surfaces representing the transition between base of oxidation and the top of fresh rock. The elevation of the fresh rock interface undulates across the resource area but averages about 30-40 metres below the natural surface. The thickness of transition material only averages between 10 to 15 metres.

16.2.4 Bulk Density Data

As part of the original Chirano Bankable Feasibility Study (BFS), detailed analysis of specific gravity and bulk density (BD) data were performed and recommendations for appropriate BD's at Chirano for inclusion into the resource estimation were made. No new BD information is available and H&S have not reviewed the original density data. The BD's used in the present study are shown below and have been sourced from the BFS:

- Oxide material 1.56g/cc
- Transition 2.40g/cc
- Fresh rock 2.75g/cc.

16.2.5 Data Preparation and Treatment

16.2.5.1 Mineralisation Wireframes

Comprehensive wireframe models of the Chirano gold deposits were revised and extended to accommodate the results of the most recent drilling. The mineralization zone was defined for resource purposes using a lower cutoff grade in the region of 0.2g/t gold to produce relatively simple volumes suitable for block modeling and to ensure that all minable mineralization would be captured. The wireframed surfaces included mineralized envelopes, weathering and oxidation surfaces and the land surface.

16.2.5.2 Modeling Domains

Table 16.2.5.2-1 lists the domain identifiers used in each of the resource models that covers all the Chirano deposits modeled using MIK for open pit gold resources.

Table 16.2.5.2-1: Chirano open pit resource modeling domains

Deposit (Model Run)	Description	Primary Domain
Suraw	Peripheral weakly/barren mineralised zones	0
	West	1
	Central	2
	East	3
	North	4
Akoti North and South	Peripheral weakly/barren mineralised zones	0
	Akoti South - West	1
	Akoti South - East	2
	Akoti South - North	3
	Akoti North - South	4
	Akoti North - East	5
	Akoti North - West	6
Akoti Extended	Peripheral weakly/barren mineralised zones	0
	Main Zone	1
Paboase North and South	Peripheral weakly/barren mineralised zones	0
	Paboase South	1
	Paboase Nouth	2
Tano	Peripheral weakly/barren mineralised zones	0
	Main Zone	1
Obra South and Main	Peripheral weakly/barren mineralised zones	0
	Main Zone	1
	Obra Upper (South) Zone	2
Sariehu -Mamnao South, Central and North	Peripheral weakly/barren mineralised zones	0
	Sariehu South	1
	Sariehu North	2
	Mamnao Main	3
	Mamnao Upper Central	4

16.2.5.3 Compositing

H&S composited the resource data into uniform two metre down hole intervals before commencing the model building process.

For each resource composite a gold composite grade is recorded and located by the mid-point de-surveyed coordinate. In addition to the gold grade the composites are identified as belonging to either one of the primary domains and also to either the oxide, transitional or fresh horizon, 1, 2 or 3 respectively (secondary domains). The primary domaining were assigned via 3D solid models (wireframes) and the secondary domains have been coded from a DTM surface, both described in earlier sections.

After some minor trimming of data peripheral to the deposit study areas the final resource data sets comprising of two metre composites are shown in the following tables. The co-ordinate extents of the resource data sets and a summary count of data coded to primary and secondary domains are listed in the tables16.2.5.3-1 to 16.2.5.3-7.

Table 16.2.5.3-1: Data extents and summary counts of resources composites Suraw

Suraw Pit Resource Data		
	Minimum	Maximum
Easting	15939.25	16345.14
Northing	33696.22	34302.34
Elevation	2110.16	2412.21
Primary Domain	Number	
0	5998	
1	417	
2	721	
3	1387	
4	184	
Secondary Domain	Number	
Oxide	469	
Transition	219	
Fresh	8019	

Table 16.2.5.3-2: Data extents and summary counts of resources composites Akoti South and Akoti North

Akoti South and Akoti North Pit Resource Data		
	Minimum	Maximum
Easting	15490.36	15935.58
Northing	34460.67	35508.67
Elevation	1976.39	2389.77
Primary Domain	Number	
0	5035	
1	180	
2	1340	
3	269	
4	140	
5	639	
6	985	
Secondary Domain	Number	
Oxide	1223	
Transition	265	
Fresh	7100	

Table 16.2.5.3-3: Data extents and summary counts of resources composites Akoti Extended

Akoti Extended Pit Resource Data		
	Minimum	Maximum
Easting	15371.05	15731.15
Northing	35397.98	35764.53
Elevation	1864.13	2384.87
Primary Domain	Number	
0	2100	
1	3630	
Secondary Domain	Number	
Oxide	562	
Transition	236	
Fresh	4932	

Table 16.2.5.3-4: Data extents and summary counts of resources composites, Paboase North and South

Paboase North and South Pit Resource Data		
	Minimum	Maximum
Easting	14942.92	15711.81
Northing	35470.03	36274.87
Elevation	1959.10	2392.88
Primary Domain	Number	
0	2917	
1	4576	
2	2981	
Secondary Domain	Number	
Oxide	1882	
Transition	614	
Fresh	7978	

Table 16.2.5.3-5: Data extents and summary counts of resources composites Tano

Tano Extended Pit Resource Data		
	Minimum	Maximum
Easting	14743.53	15100.09
Northing	36275.02	36703.50
Elevation	2072.60	2445.00
Primary Domain	Number	
0	2818	
1	5687	
Secondary Domain	Number	
Oxide	1167	
Transition	333	
Fresh	7005	

Table 16.2.5.3-6: Data extents and summary counts of resources composites Obra

Obra Extended Pit Resource Data		
	Minimum	Maximum
Easting	14809.91992	15099.58008
Northing	36700.23828	37965.83984
Elevation	2053.06006	2438.45996
Primary Domain	Number	
0	5346	
1	9549	
2	1038	
Secondary Domain	Number	
Oxide	3978	
Transition	941	
Fresh	11014	

Table 16.2.5.3-7: Data extents and summary counts of resources composite, Sariehu - Mamnao South, Central and North

Sariehu - Mamnao South, Central and North Pit Resource Data		
	Minimum	Maximum
Easting	14909.07	15223.99
Northing	38050.90	40490.15
Elevation	2199.99	2456.51
Primary Domain	Number	
0	3771	
1	1187	
2	710	
3	1310	
4	210	
Secondary Domain	Number	
Oxide	2727	
Transition	577	
Fresh	3884	

16.2.6 Exploratory Data Analysis

H&S has investigated the univariate statistics of two-metre composite gold grades within all mineralized domains at Chirano. All populations were highly skewed, as would be expected for gold deposits. Coefficients of variation (CV) are moderate (1.1 to 2.7), which reflects the relatively consistent gold grades seen in the Chirano deposits. The lowest CV is at Obra (1.1), which matches the consistent low grade character and thick geometrically simple form of this lode.

16.2.7 Spatial Continuity Analysis

The spatial continuity of gold grades is important in resource estimation. H&S studied this aspect in considerable detail using variography based on directional correlograms. The continuity of gold grades were characterized by indicator variograms at 14 indicator thresholds. In general the variography shows that the dominant control on the mineralization is within steeply dipping planes, striking either to grid north or grid north-west reflecting the local change in strike direction seen at each deposit.

16.2.8 Resource Estimate

H&S has considered that Multiple Indicator Kriging (MIK) represented the most appropriate approach to estimating the Chirano deposits, quantifying the tonnage and grade of economic material within large blocks (panels). MIK of gold grades used indicator variography based on the resource sample grades, with continuity of gold grades characterized by indicator variograms at 14 indicator thresholds. The panels have dimensions of 12.5m (east) x 25m (north) x 6m (elevation), and have been selected as a good compromise between selecting a panel dimension compatible to the average drill hole spacing and a panel size acceptable for input into open pit optimisation.

16.2.9 Indicator Kriging for Recoverable Resources

The MIK method was developed in the early 1980's with a view toward addressing some of the problems associated with estimation of resources in mineral deposits. These problems arise where sample grades show the property of extreme variation and consequently where estimates of grade show extreme sensitivity to a small number of very high grades. These characteristics are typical of many lode gold deposits, where the coefficient of variation in samples normally exceeds 2. MIK is one of a number of methods that can be used to provide better estimates than the more traditional methods such as ordinary kriging and inverse distance weighting.

It is fundamental to the estimation of resources that the estimation error is inversely related to the size of the volume being estimated. To take the extreme case, the estimate of the average grade of a deposit generated from a weighted average grade of the entire sample data set is much more reliable than the estimate of the average grade of a small block of material within the deposit generated from a local neighbourhood of data.

Another fundamental notion relevant to the optimisation of resources to develop an open pit mine and schedule is that the optimisation algorithm does not require the resource be defined on extremely small blocks relative to data spacing. Small blocks cannot provide the basis for reliable estimates of recoverable resources.

The basic unit of an MIK block model is a panel that normally has the dimensions of the average drill hole spacing in the horizontal plane. The panel should be large enough to contain a reasonable number of blocks, or Selective Mining Units (SMUs; about 15). The SMU is the smallest volume of rock that can be mined separately as ore or waste and is usually defined by a minimum mining width. At Chirano, the dimensions of this block are assumed to be in the order of 4mE x 8mN x 3.0mRL.

The goal of MIK is to estimate the tonnage and grade of ore that would be recovered from each panel if the panel were mined using the SMU as the minimum selection criteria to distinguish between ore and waste. To achieve this goal, the following steps are performed:

1. Estimate the proportion of each domain within each panel. This estimation can be achieved by kriging of indicators of domain classifications of sample data points. In the Chirano model proportions of each domain in each panel were calculated by passing the panels through the domain wireframes.

2. Estimate the histogram of grades of sample-sized units within each domain within each panel using MIK. MIK actually estimates the probability of the grade within each panel being less than a series of indicator threshold grades. These probabilities are interpreted as panel proportions.

3. For each domain, and for each panel that receives an estimated grade greater than 0.0g/t Au, implement a block support correction (variance adjustment) on the estimated histogram of sample grades in order to achieve a histogram of grades for SMU-sized blocks. This step incorporates an explicit adjustment for Information Effect.

4. Calculate the proportion of each panel estimated to exceed a set of selected cut-off grades, and the grades of those proportions.

5. Apply to each panel, or portion of a panel below surface, a bulk density to achieve estimates of recoverable tonnages and grades for each panel.

Apart from considerations of resource confidence classification (Section 16.2.11), Step 5 above completes construction of the resource model. The estimates of recoverable resources for each panel may be combined to provide an estimate of global recoverable resources for the deposit.

16.2.10 Indicator Kriging Parameters

The input parameters to Indicator Kriging of the Chirano mineralisation include:

- Indicator variogram models describing the spatial continuity of indicator variables within each domain at each indicator threshold.
- Variograms describing the spatial continuity of gold grades within each domain.
- Average gold grades of each of the indicator classes within each domain.

The following tables show the grid framework and Kriging parameters used in the MIK models. All domain boundaries were treated as soft boundaries in the Kriging process. The allocation of resource confidence categories is described in Section 16.2.11.

Table 16.2.10-1: Model framework and kriging search parameters Suraw

	East	North	Elevation
Panel origin (Block Edge)	16000	33675	2104
Panel Dimensions	12.5	25	6
No. of panels	28	23	52
Panel Discretisation	5	5	3
Kriging Parameters (all domains)			
Criteria	Category 1	Category 2	Category 3
Min no. of data	16	16	8
Max no. of data per octant	6	6	6
Min no. of octants with data	4	4	2
X search radius (metres)	20	30	30
Y search radius (metres)	25	37.5	37.5
Z search radius (metres)	15	22.5	22.5
Search rotations			
Domain	Rotation axis	Rotation	
All	Z Y	25 (y axis oriented 335 mine grid) -90 (x axis oriented vertically)	

Table 16.2.10-2: Model framework and kriging search parameters Akoti South and Akoti North

	East	North	Elevation
Panel origin (Block Edge)	15400	34400	1972
Panel Dimensions	12.5	25	6
No. of panels	42	42	72
Panel Discretisation	5	5	3
Kriging Parameters (all domains)			
Criteria	Category 1	Category 2	Category 3
Min no. of data	16	16	8
Max no. of data per octant	6	6	6
Min no. of octants with data	4	4	2
X search radius (metres)	25	50	50
Y search radius (metres)	40	80	80
Z search radius (metres)	15	30	30
Search rotations			
Domain	Rotation axis	Rotation	
All	Y	-80 (x axis oriented -80 -> 090 mine grid)	

Table 16.2.10-3: Model framework and kriging search parameters Akoti Extended

	East	North	Elevation
Panel origin (Block Edge)	14900	35400	1858
Panel Dimensions	12.5	25	6
No. of panels	68	12	91
Panel Discretisation	5	5	3
Kriging Parameters (all domains)			
Criteria	Category 1	Category 2	Category 3
Min no. of data	16	16	8
Max no. of data per octant	6	6	6
Min no. of octants with data	4	4	2
X search radius (metres)	25	50	50
Y search radius (metres)	40	80	80
Z search radius (metres)	15	30	30
Search rotations			
Domain	Rotation axis	Rotation	
All	Z Y	45 (y axis oriented 315 mine grid) -90 (x axis oriented vertically)	

Table 16.2.10-4: Model framework and kriging search parameters, Paboase North and South

	East	North	Elevation
Panel origin (Block Edge)	14900	35475	1918
Panel Dimensions	12.5	25	6
No. of panels	68	32	81
Panel Discretisation	5	5	3
Kriging Parameters (all domains)			
Criteria	Category 1	Category 2	Category 3
Min no. of data	16	16	8
Max no. of data per octant	6	6	6
Min no. of octants with data	4	4	2
X search radius (metres)	25	50	50
Y search radius (metres)	40	80	80
Z search radius (metres)	15	30	30
Search rotations			
Domain	Rotation axis	Rotation	
All	Z Y	45 (y axis oriented 315 mine grid) -80 (x axis oriented -80 -> 045 mine grid)	

Table 16.2.10-5: Model framework and kriging search parameters Tano

	East	North	Elevation
Panel origin (Block Edge)	14800	36250	2068
Panel Dimensions	12.5	25	6
No. of panels	20	22	71
Panel Discretisation	5	5	3
Kriging Parameters (all domains)			
Criteria	Category 1	Category 2	Category 3
Min no. of data	16	16	8
Max no. of data per octant	6	6	6
Min no. of octants with data	4	4	2
X search radius (metres)	25	50	50
Y search radius (metres)	40	80	80
Z search radius (metres)	15	30	30
Search rotations			
Domain	Rotation axis	Rotation	
All	Z Y	20 (y axis oriented 340 mine grid) -80 (x axis oriented -80 -> 020 mine grid)	

Table 16.2.10-6: Model framework and kriging search parameters Obra

	East	North	Elevation
Panel origin (Block Edge)	14750	36750	1918
Panel Dimensions	12.5	25	6
No. of panels	28	49	88
Panel Discretisation	5	5	3
Kriging Parameters (all domains)			
Criteria	Category 1	Category 2	Category 3
Min no. of data	16	16	8
Max no. of data per octant	6	6	6
Min no. of octants with data	4	4	2
X search radius (metres)	25	50	50
Y search radius (metres)	40	80	80
Z search radius (metres)	15	30	30
Search rotations			
Domain	Rotation axis	Rotation	
All	Y	-80 (x axis oriented -80 -> 090 mine grid)	

Table 17.2.16: Model framework and kriging search parameters, Sariehu -Mamnao South, Central and North

	East	North	Elevation
Panel origin (Block Edge)	14900	38100	2194
Panel Dimensions	12.5	25	6
No. of panels	28	96	45
Panel Discretisation	5	5	3
Kriging Parameters (all domains)			
Criteria	Category 1	Category 2	Category 3
Min no. of data	16	16	8
Max no. of data per octant	6	6	6
Min no. of octants with data	4	4	2
X search radius (metres)	25	50	50
Y search radius (metres)	40	80	80
Z search radius (metres)	15	30	30
Search rotations			
Domain	Rotation axis	Rotation	
All	Y	-80 (x axis oriented -80 -> 090 mine grid)	

16.2.11 Block Support Adjustment (Variance Adjustment)

The H&S resource results are intended to reflect the tonnes and grade that can be recovered from each panel given certain mining considerations and an assumption of grade control practices. A block support correction (or variance adjustment), including an additional adjustment for the information effect, was used to achieve this. It is assumed that each panel will be mined as a number of smaller blocks called selective mining units (SMUs), representing the smallest volume of rock that can be mined separately as either ore or waste, given excavators and trucks of a particular size.

Block support adjustment ratios applied in estimating Chirano recoverable gold resources are listed in Table 16.2.11-1. Selective mining (SMU) dimensions of 4mE by 8mN by 3.0mRL and grade control sample spacing of 5mE by 8mN by 1.25mRL have been assumed. The block support adjustments applied to the Chirano models represent large reductions of variance, similar to what would be applicable in shear hosted gold deposits, and in H&S opinion, appropriate for Chirano.

Table 16.2.11-1: Block support adjustments used in the Chirano resource models

Deposit (Model Run)	Primary Domain	Panel to block adjustment	Information Effect	Total Block Support adjustment
Suraw	0	0.431	0.200	0.086
	1	0.431	0.200	0.086
	2	0.431	0.200	0.086
	3	0.431	0.200	0.086
	4	0.431	0.200	0.086
Akoti North and South	0	0.345	0.815	0.281
	1	0.345	0.815	0.281
	2	0.345	0.815	0.281
	3	0.345	0.815	0.281
	4	0.288	0.687	0.198
	5	0.288	0.687	0.198
	6	0.288	0.687	0.198
Akoti Extended	0	0.312	0.816	0.255
	1	0.312	0.816	0.255
Paboase North and South	0	0.345	0.881	0.304
	1	0.345	0.811	0.304
	2	0.246	0.765	0.188
Tano	0	0.050	1.000	0.050
	1	0.050	1.000	0.050
Obra South and Main	0	0.261	0.400	0.104
	1	0.261	0.400	0.104
	2	0.261	0.400	0.104
Sariehu -Mamnao South, Central and North	0	0.250	0.904	0.226
	1	0.250	0.904	0.226
	2	0.246	0.806	0.198
	3	0.316	0.898	0.284
	4	0.316	0.898	0.284

16.2.12 Resource Classification

Panels in the resource model have been allocated a confidence category based on the number and location of samples used to estimate proportions and grade of each panel. The approach is based on the principle that larger numbers of samples, which are more evenly distributed throughout the search neighborhood, will provide a more reliable estimate. The number of samples and the particular geographic configurations that may qualify the panel as Measured rather than Indicated or Inferred are essentially the domain of the Competent Person. The search parameters used to decide the classification of a panel resource in this study are:

- *Minimum number of samples found in the search neighborhood.*
  For Measured and Indicated resources, this parameter is set to sixteen. For Inferred, a minimum of eight samples is required. This parameter ensures that the panel estimate is generated from a reasonable number of sample data.

- *Minimum number of spatial octants informed.*
  The space around the centre of a panel being estimated is divided into eight octants by the axial planes of the data search ellipsoid. This parameter ensures that the samples informing an estimate are relatively evenly spread around the panel and do not all come from one drill hole. For Measured and Indicated resources, at least four octants must contain at least one sample. For Inferred panels, at least two octants must contain data.

- *The distance to informing data.*
  The search radii define how far the kriging program may look in any direction to find samples to include in the estimation of resources in a panel. Panel dimensions and the sampling density in various directions usually influence the length of these radii. It is essential that the search radii be kept as short as possible while still achieving the degree of resolution required in the model. Search radii used in the Chirano resource models are detailed in Section 17.2.9, earlier in the report.

16.2.13 The Open Pit Resource Estimate

Table 16.2.13-1 summarizes the estimated recoverable resources for all Chirano deposits, combined, at a 1g/t cut off grade. H&S consider these resources to be recoverable by mining, and thus recommend that no dilution factors are applied when estimating reserves based on these resources. Open Pit resources are stated based on the 31 December 2008 pit surfaces.

The estimated resources shown exclude Akwaaba open pit estimates, which has now been mined out. Also the depth extent of the reported estimates for Paboase South and Suraw have been limited to the base of the current open pit designs. Below these elevations the Paboase South and Suraw underground resource estimates are reported (described later in this report). The stockpile resources shown in the table have been provided by Red Back, H&S have not been involved in the generation of these figures.

The estimation and classification of the resources by H&S are consistent with the Australian Code for “the Reporting of Identified Mineral Resources and Ore Reserves” of September 1999 (the Code) as prepared by the Joint Ore Reserves Committee of the Australian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia (JORC).

Furthermore, the resource classification is also consistent with Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects of February 2001 (the Instrument) and the classifications adopted by CIM Council in August 2000.

The H&S resource estimate was undertaken by Nicolas Johnson, who is a member of the Australian Institute of Geoscientists, and has more than five years experience in the use of geostatistics for estimation of recoverable resources in gold deposits. Mr Johnson is both a “Competent Person” and a “Qualified Person” with respect to the JORC Code and CIM Standards respectively.

Table 17.2_12 gives a more detailed breakdown of the estimated resources at a 1.0 g/t gold lower cutoff grade.

Table 16.2.13-1 Open Pit Mineral Resource Estimate

Open Pit Mineral Resource Estimate, December 31, 2008 (1g/t Au cutoff)			
Resource Category	**Tonnes (million)**	**Average Gold Grade (g/t Au)**	**Contained Gold (Moz)**
Measured	18.46	1.92	1.14
Indicated	11.82	1.68	0.64
Stockpiles	2.17	1.05	0.07
Total Measured and Indicated	**32.46**	**1.78**	**1.85**
Inferred	5.26	1.7	0.28

Table 17.2.12 Detailed Breakdown of the Estimated Resources

Open Pit Mineral Resource Estimate December 31, 2008 (1g/t Au cutoff)				
Project Area	**Resource Category**	**Tonnes (million)**	**Gold (g/t Au)**	**Contained Gold (Moz)**
Suraw	**Measured**	**1.56**	**2.36**	**0.118**
	Indicated	**0.33**	**2.14**	**0.023**
	Total Meas+Ind	**1.89**	**2.32**	**0.141**
	Inferred	**0.11**	**1.9**	**0.007**
Akoti South	**Measured**	**1.02**	**1.74**	**0.057**
	Indicated	**1.34**	**1.63**	**0.070**
	Total Meas+Ind	**2.36**	**1.67**	**0.127**
	Inferred	**0.54**	**1.6**	**0.028**
Akoti North	**Measured**	**0.77**	**2.33**	**0.058**
	Indicated	**1.01**	**2.06**	**0.067**
	Total Meas+Ind	**1.78**	**2.18**	**0.125**
	Inferred	**0.43**	**1.9**	**0.026**
Akoti Extended	**Measured**	**1.01**	**2.81**	**0.091**
	Indicated	**0.50**	**2.09**	**0.034**
	Total Meas+Ind	**1.51**	**2.57**	**0.125**
	Inferred	**0.35**	**2.2**	**0.025**
Paboase South	**Measured**	**0.84**	**1.92**	**0.052**
	Indicated	**0.27**	**1.72**	**0.015**
	Total Meas+Ind	**1.11**	**1.87**	**0.067**
	Inferred	**0.01**	**1.8**	**0.001**
Paboase North	**Measured**	**1.97**	**1.58**	**0.100**
	Indicated	**1.42**	**1.54**	**0.070**
	Total Meas+Ind	**3.39**	**1.56**	**0.170**
	Inferred	**0.34**	**1.6**	**0.017**
Tano	**Measured**	**2.07**	**2.25**	**0.150**
	Indicated	**1.18**	**2.01**	**0.076**
	Total Meas+Ind	**3.25**	**2.16**	**0.226**
	Inferred	**0.57**	**1.8**	**0.033**
Obra South	**Measured**	**0.08**	**1.43**	**0.004**
	Indicated	**0.11**	**1.42**	**0.005**
	Total Meas+Ind	**0.19**	**1.42**	**0.009**
	Inferred	**0.06**	**1.4**	**0.003**
Obra Main	**Measured**	**5.99**	**1.71**	**0.329**
	Indicated	**4.03**	**1.53**	**0.199**
	Total Meas+Ind	**10.02**	**1.64**	**0.528**
	Inferred	**1.48**	**1.6**	**0.077**
Sariehu	**Measured**	**1.85**	**1.69**	**0.100**
	Indicated	**0.69**	**1.46**	**0.033**
	Total Meas+Ind	**2.55**	**1.62**	**0.133**
	Inferred	**0.73**	**1.4**	**0.032**
Mamnao South	**Measured**	**0.50**	**2.08**	**0.034**
	Indicated	**0.22**	**1.77**	**0.013**
	Total Meas+Ind	**0.72**	**1.99**	**0.046**
	Inferred	**0.15**	**1.9**	**0.009**
Mamnao Central	**Measured**	**0.75**	**1.74**	**0.042**
	Indicated	**0.62**	**1.64**	**0.033**
	Total Meas+Ind	**1.36**	**1.70**	**0.074**
	Inferred	**0.44**	**1.7**	**0.024**
Mamnao North	**Measured**	**0.04**	**1.50**	**0.002**
	Indicated	**0.11**	**1.46**	**0.005**
	Total Meas+Ind	**0.15**	**1.47**	**0.007**
	Inferred	**0.05**	**1.4**	**0.002**
All Project Areas Combined	**Measured**	**18.46**	**1.92**	**1.138**
	Indicated	**11.82**	**1.68**	**0.640**
	Total Meas+Ind	**30.29**	**1.83**	**1.778**
	Inferred	**5.26**	**1.7**	**0.284**

16.3 Akwaaba Underground Mineral resource

Ongoing drilling at Akwaaba during the early 2007 and early 2008 was focused on the conversion and upgrade of inferred resources to indicated to allow full definition of the underground ore reserve.

16.3.1 Resource Data Sets

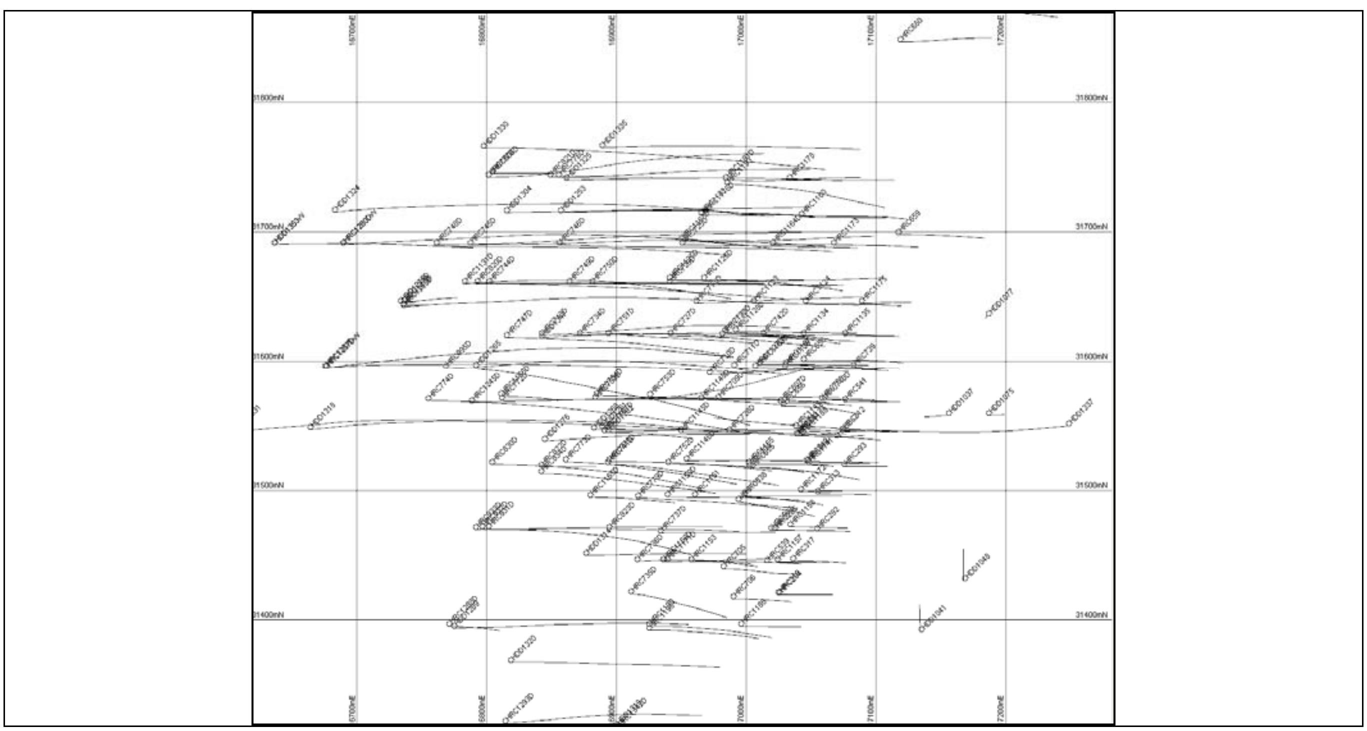
The Akwaaba resource data were supplied in comma delimited ASCII files separated into collar, down-hole survey, assay and major geology interval files. H&S loaded the data into Micromine to undertake the necessary data manipulation to form the data sets required for undertaking resource estimation.

The drill hole data base contains 174 drill holes which have a combined length of 45,418.62 metres and the assay data set comprise some 24,536 sample intervals, of which, 21,427 intervals have gold grades recorded. The intervals without gold grades are primarily from un-sampled RC pre-collars of diamond holes and portions of diamond holes peripheral to the Akwaaba mineralised zone, both deemed to be barren of gold mineralisation.

16.3.2 Drill Hole Spacing

The Akwaaba resource has been drilled on local grid east-west oriented drill traverses at 25 to 50metre intervals along the strike of the gold mineralisation. The majority of drill holes are angled steeply (~60^{o} to ~70^{o}) towards grid east and typically intersect the mineralised gold zones at 25 metre to 50 metre intervals on section.

Figure 16.3.2-1: Plan projection showing drill hole collars and traces



16.3.3 Bulk Densities

Only gold mineralisation within the fresh horizon is estimated in the Akwaaba underground resource model. The bulk density for fresh rock used in the present study is 2.75g/cc and is consistent to those used in the BFS and all subsequent models at Chirano:

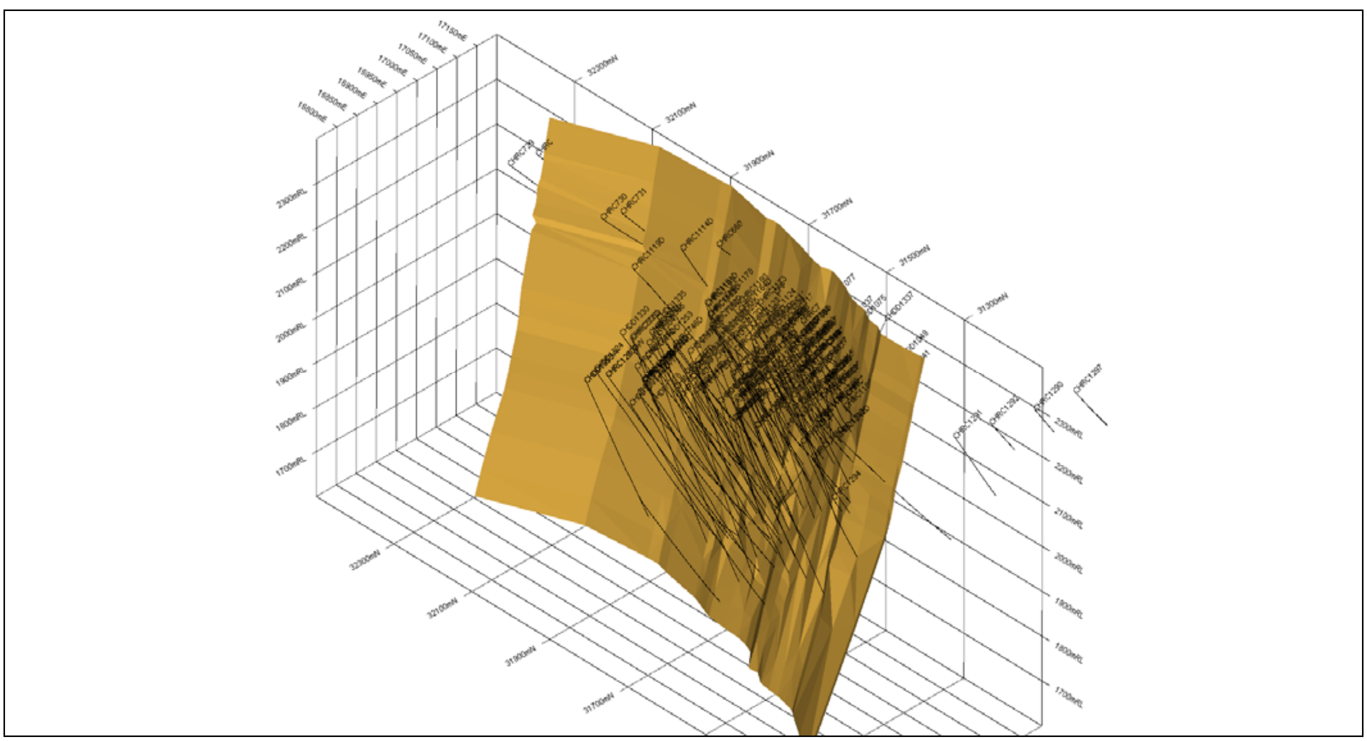
16.3.4 Data Preparation and Treatment

16.3.4.1 Mineralisation Wireframes

Although structural and lithological controls on the gold mineralisation at Akwaaba are still under review, the currently available drilling is sufficiently close spaced to allow the orientations to the mineralised zone to be confidently defined. The footwall contact to the Akwaaba gold mineralisation is positioned at the Tarkwaian sedimentary contact (Figure 16.3.4.1-1). Only on rare occasions has drilling intersected gold mineralisation extending into the Tarkwaian sediments.

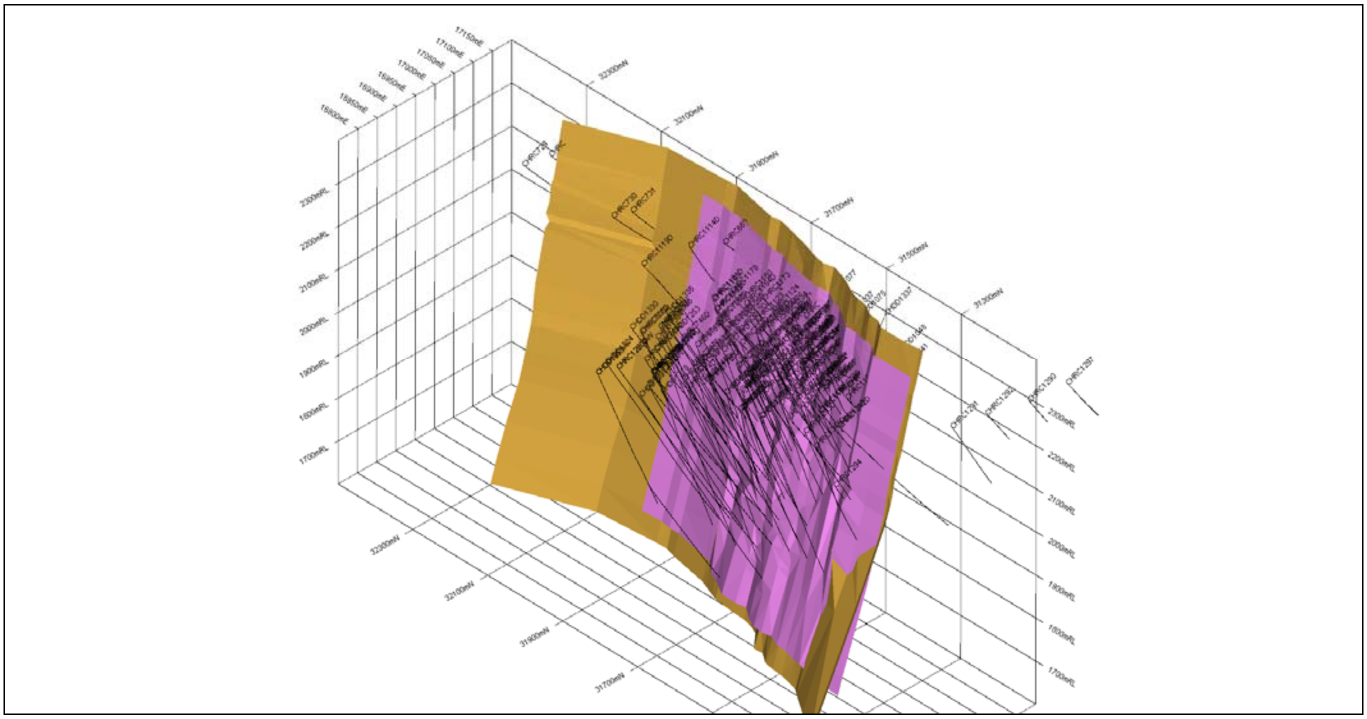
H&S observed that drill core at the Tarkwaian contact is highly broken and extensively sheared. Although not a significant issue for open pit mining it will have an impact on underground mining. It is recommended that the footwall position of the designed mining stopes should be coincident with the Tarkwaian sedimentary contact i.e. not based solely on grade. Designing the footwall position of mining stopes away from of the sedimentary contact is unlikely to represent a realistic mining scenario.

Figure 16.3.4.1-1: 3D view showing Tarkwaian contact - footwall contact to gold mineralisation



The hangingwall to the gold mineralisation is less well defined with variable gold grades intersected in drill holes up to 70 metres west of the footwall contact. A sectional interpretation based on grade alone forms the basis for hangingwall surface to the gold mineralisation (Figure *16.3.4.1-2*).

Figure 16.3.4.1-2: 3D views showing hangingwall mineralisation contact (magenta coloured surface)



The northern and down dip extensions to the gold mineralisation are not closed off by the current drilling. To the south, drilling indicates that the southern limit to the gold mineralisation is controlled by a slight change in orientation of the footwall sedimentary contact. The footwall contact is interpreted to flatten slightly and swing towards the west, merging with the hangingwall surface and forming the southern termination of the mineralised zone (left-hand plot on Figure *16.3.4.1-2*).

The footwall and hanging wall DTM surfaces, which when merged, form the mineralisation three dimensional wireframe , used for in flagging the resource composites and also as a constraint to the resource blocks.

16.3.4.2 Treatment of Unsampled Intervals

Un-sampled intervals have been considered to represent samples devoid of significant gold grades and were inserted with 0.00 gold assays. All remaining un-sampled intervals within the data set were assigned “-9999” for later removal after compositing. Samples with assays reporting gold less than detection limit of 0.01 g/t are recorded in the assay laboratory reports as -0.01 g/t. These intervals are routinely replaced with 0.005 g/t (i.e. half the detection limit) when loaded into the exploration data base.

16.3.4.3 Compositing and Domain Flagging

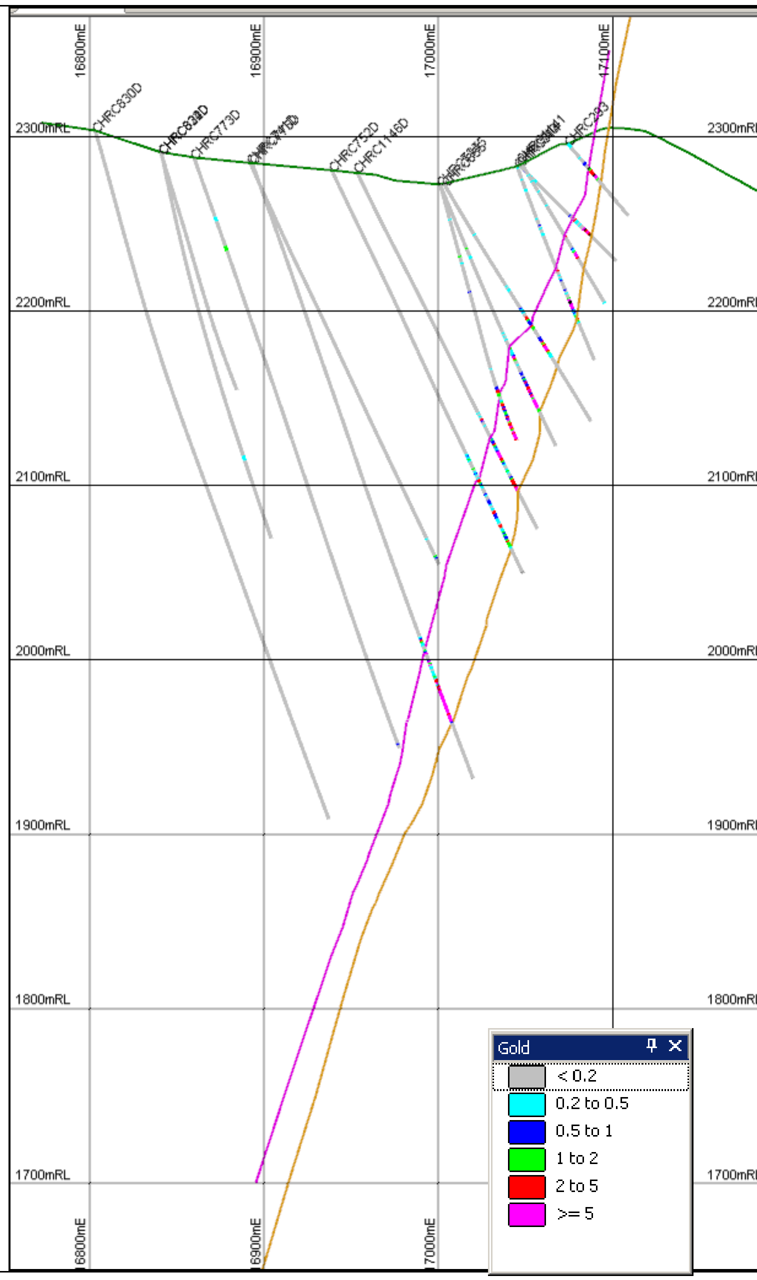
Weighted average gold grades were calculated for one metre down hole intervals and the following intervals discarded:

- Residuals less than the target composite length i.e. one metre.
- Composites reporting negative gold grades, those intervals having been impacted by missing assays.

Composites outside the mineralised domain were excluded, giving a file comprising 4,229 one metre composites, which represents the complete drill hole data set and forms the basis of the underground model. No elevation constraints were applied to this dataset.

Figures 16.3.4.3-1 shows a representative cross section through the Akwaaba deposit (31,520mN). The one metre composites are coloured by gold grade and are shown together with the footwall and hanging wall DTM surfaces. The topographic surface is plotted as a green line.

Figure 16.3.4.3-1: Cross section through Akwaaba resource data and DTM constraints, footwall (magenta) and hanging wall (brown)



16.3.5 Exploratory Data Analysis

Figure 16.3.5-1 shows the histogram and summary univariate statistics of one metre composite gold grades within the underground modeling domain at Akwaaba. The composite grades show a positively skewed population with a moderate CV of 1.9 with an average grade of 3.99 g/t and the highest composite grade being 113 g/t Au. Only the resource data flagged as being within the mineralised domain wireframe are used to inform the underground resource model. Figure 16.3.5-2 presents the cumulative histogram for the underground resource data. This plot shows that there is a continuous range of gold grades up to the maximum. This feature of the data sets together with the moderate CV and moderate maximum grade suggests that applying an upper grade cut to the resource data is not necessary prior to running the OK estimation.

Figure 16.3.5-1: Histogram and summary univariate statistics of resource data flagged within mineralised domain.

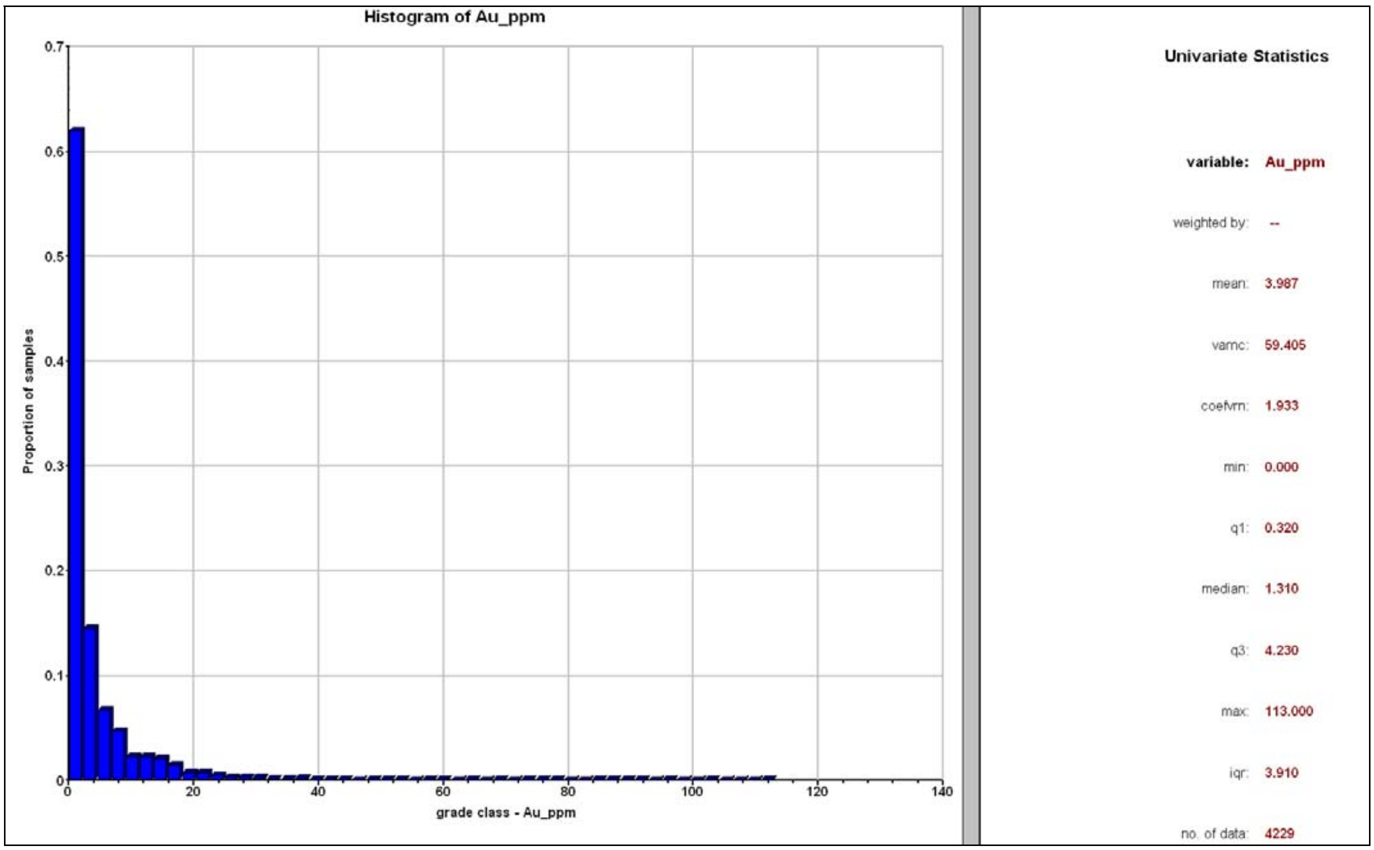
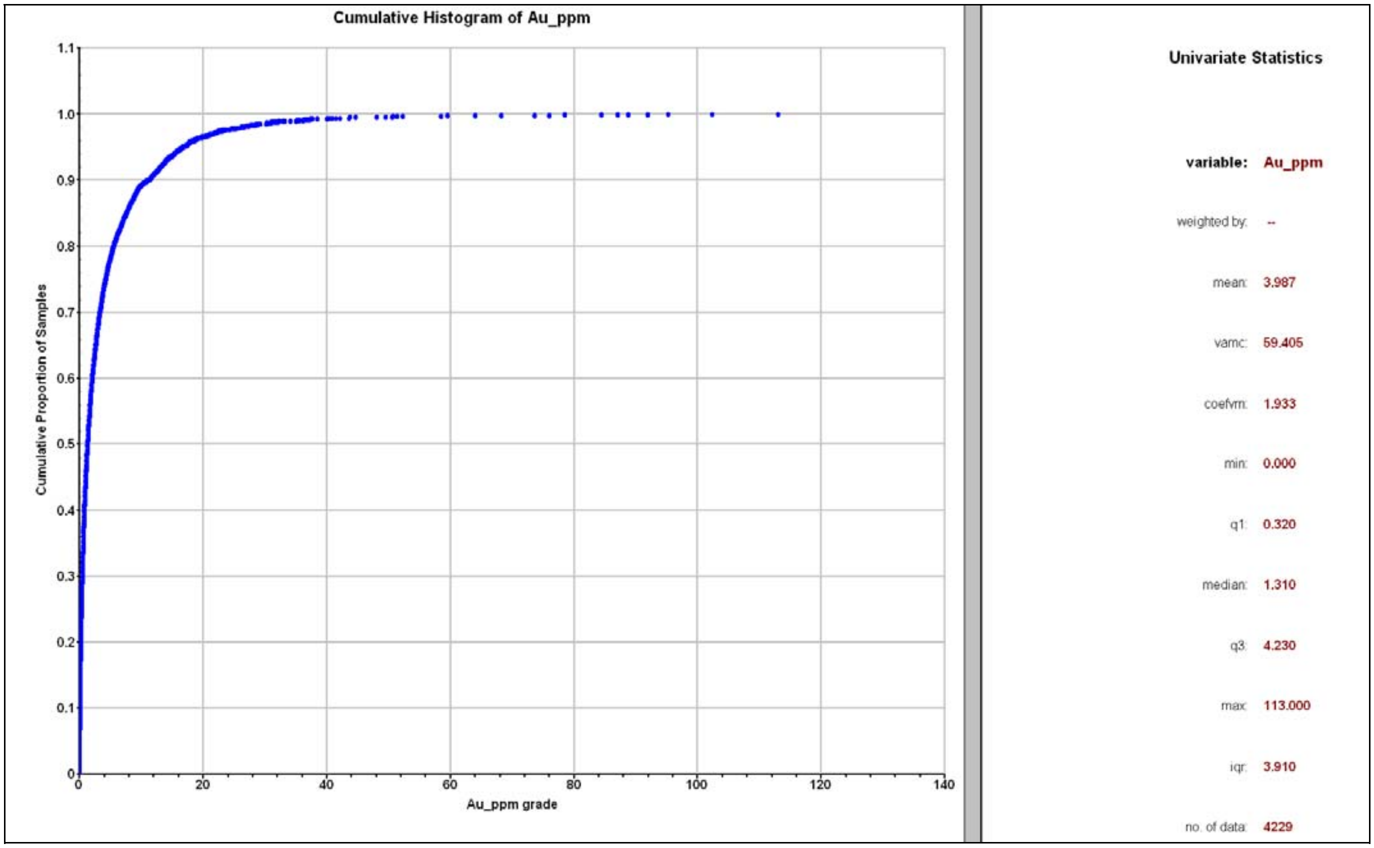


Figure 16.3.5-2: Cumulative histogram and summary univariate statistics of resource data flagged within mineralised domain.

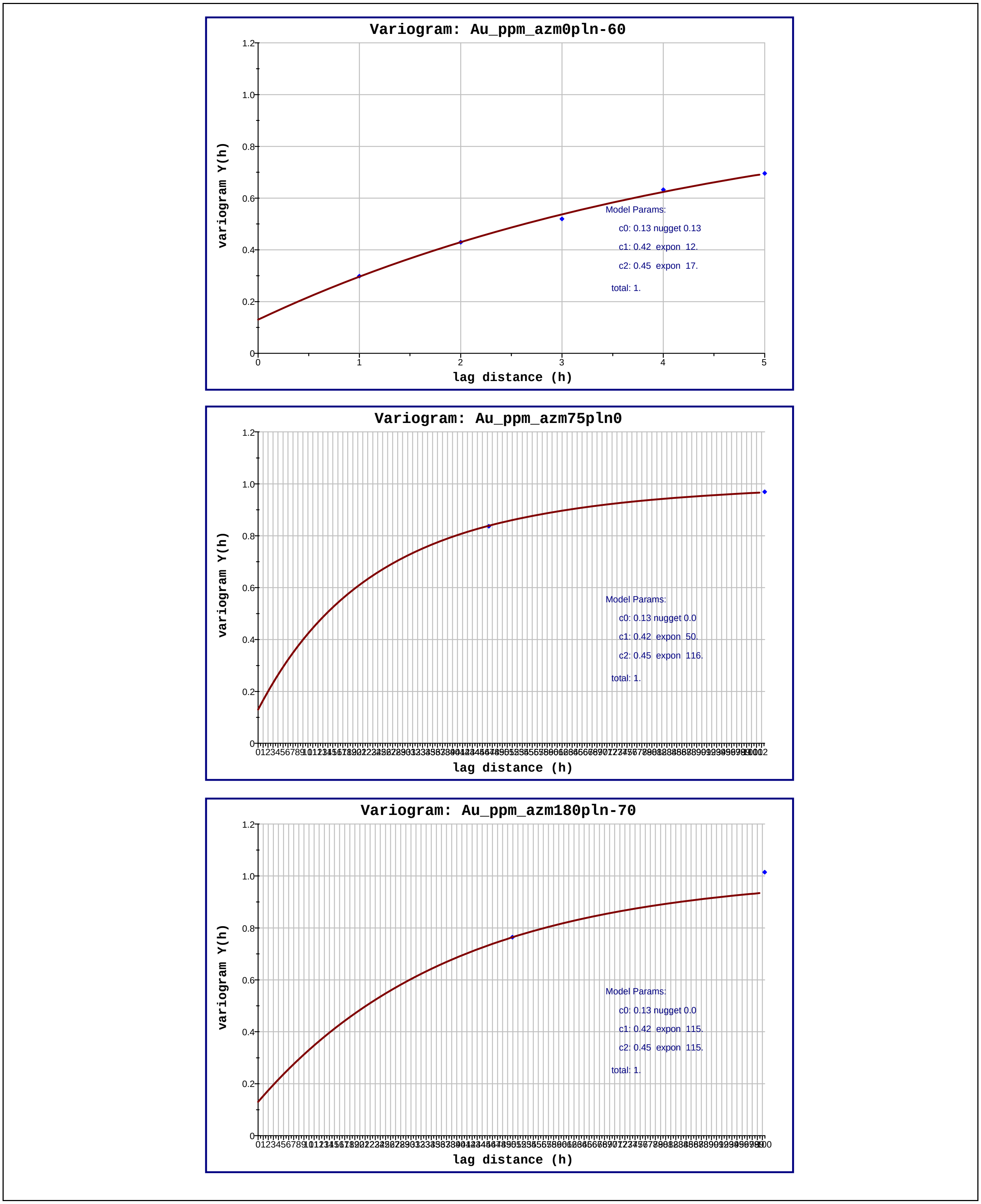


16.3.6 Spatial Continuity Analysis

A variogram of gold grades is required for constructing the OK model of gold at Akwaaba. The gold directional experimental variograms and the models are based on the one metre resource data and are shown in Figure 16.3.6-1.

On the figure the variogram plotted at the top is the down hole direction (60 degrees down towards grid east), the centre variogram is oriented looking along strike (025 grid) and the variogram plotted at the bottom is the down dip direction (70 degrees down towards grid west). The directional variograms provide a three dimensional variogram which show weak long ranges of continuity in the along strike and down dip directions, and relative to these, a short range of continuity in the across dip direction. The continuity seen in the three dimensional variogram is confirmed by observations on the composite gold grades in cross section and plan.

Figure 16.3.6-1: Variograms of gold in Akwaaba resource composites



16.3.7 The Underground Resource Model

The input parameters to OK of the Akwaaba gold mineralisation include:

- Variograms describing the spatial continuity of gold grades within mineralisation.
- Selection of appropriate block dimensions and search criteria.

The one metre composites flagged as contained within the mineralised domain were used for estimation of the OK model. Figure 16.3.6-1 shows the gold variogram model applied to the OK model of gold at Akwaaba. Resource block model grid framework and kriging parameters are shown in Table 16.3.7-1. A parent block size of 5mE by 25mN by 12mRL was used as the basis for estimation of gold. Subsequent to estimation of gold into the parent blocks, parent blocks have been intersected with the mineralised wireframe to accurately represent the interpreted lode geometry to a minimum sub-block of 1mE by 5mN by 2mRL. The sub-blocking is employed to ensure the model honors the volumetric and spatial position of the constraining wireframes. The sub-block dimensions do not imply an improved level of accuracy of the gold estimate.

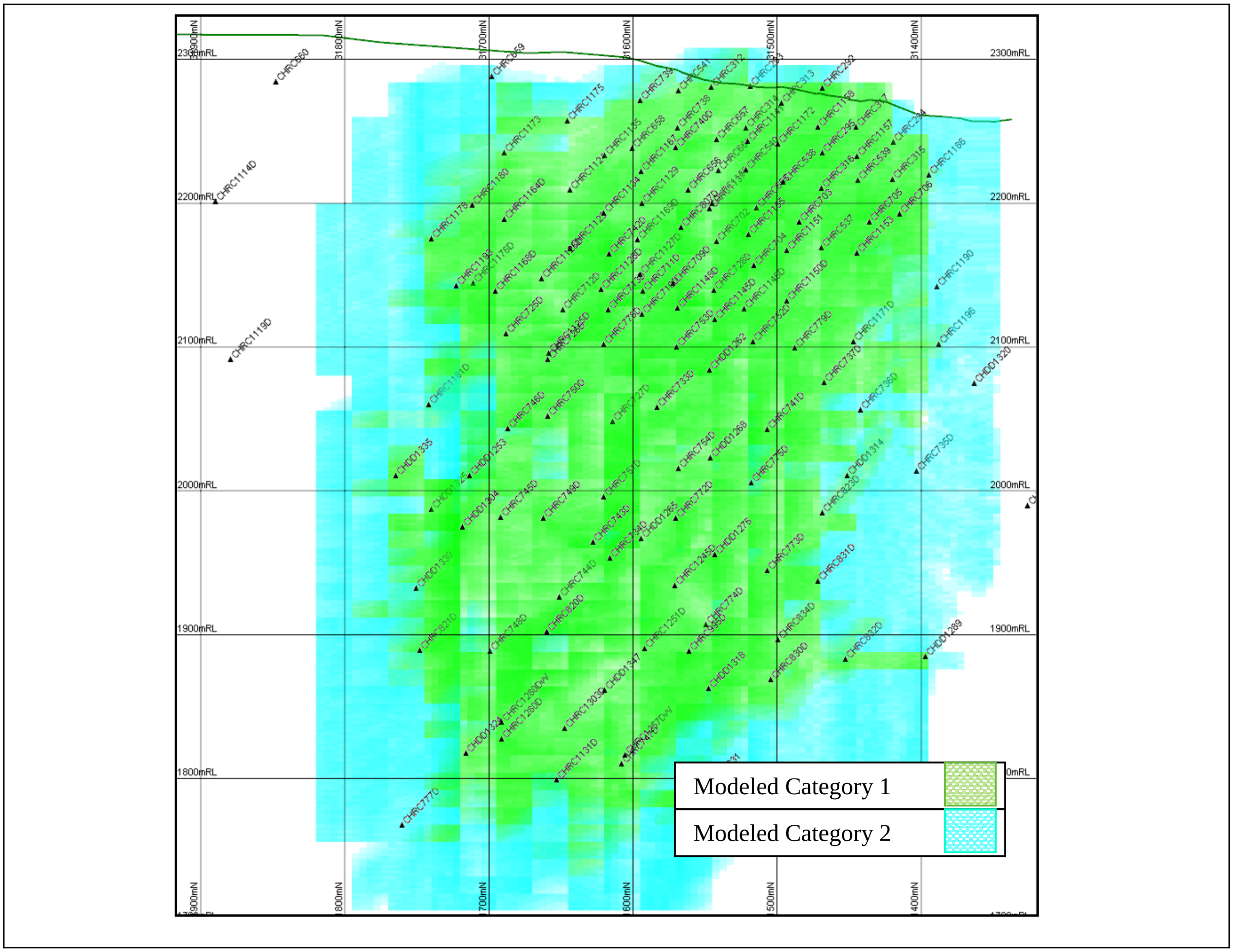
Table 16.3.7-1: Model framework and kriging parameters, Akwaaba underground model

	East	North	Elevation
Model origin (block centroid)	16,757.5	31,337.5	1714
Block dimensions	5	25	12
No. of blocks	86	20	55
Block discretisation	5	5	4
Kriging Parameters			
Criteria	1st pass	2nd pass	
Min no. of data	8	4	
Max no. of data per octant	8	8	
Min no. of octants with data	4	2	
X (east) search radius (metres)	25	50	
Y (north) search radius (metres)	50	100	
Z (rl) search radius (metres)	50	100	
Search rotations			
Rotation axis	Rotation		
z (rl)	-15 (y axis oriented 015 grid)		
y (north)	15 (z axis oriented -75o -> 285 grid)		

16.3.8 Akwaaba Underground Resource Classification

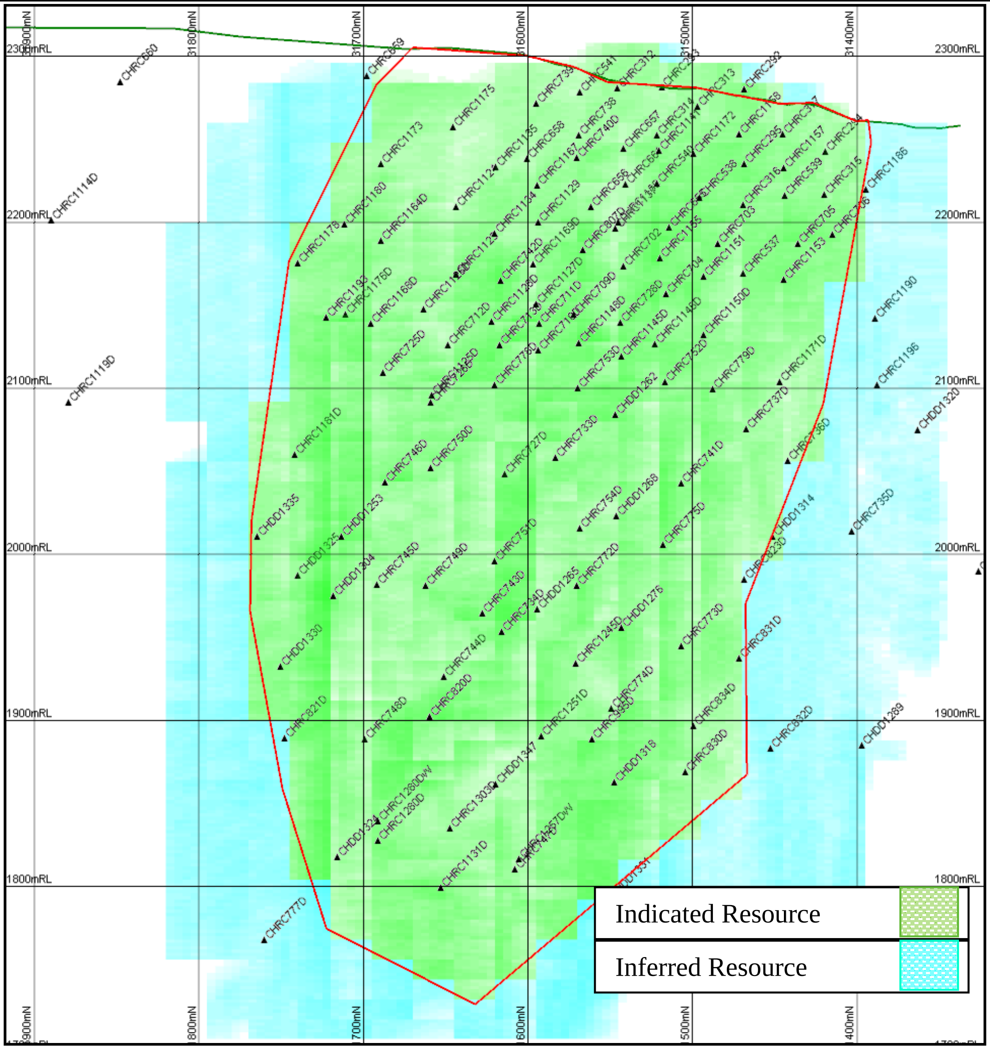
The search criteria adopted for the Akwaaba underground resource model uses two search passes to produce block estimates of two modeled categories. Previous studies have used this categorisation of blocks as the basis of resource classification. Blocks estimated by 1st Pass search criteria were classified as Indicated resources and blocks estimated by the 2nd Pass search were classed as Inferred. Although this strategy of resource classification yields sensible results and locates the high confidence blocks is areas of better drill hole coverage, the spatial arrangement and intermixing of blocks of the different confidence types can cause issues at the mine design/planning stage. Figure 16.3.8-1 shows a longsection (looking east) of the underground resource blocks coloured by modeled category.

Figure 16.3.8-1: Akwaaba underground resource model coloured by modeling category



The current study makes some minor modifications to the modeled categories to arrive at the final confidence categories for reporting the Akwaaba underground resource estimates. In long section the perimeter of the more consistently distributed modeled category 1 blocks has been interpreted as a polygon. The area contained within the polygon defines the limit of 50 metre by 50 metre spaced drilling intercepts located on the Akwaaba gold zone. This polygon is shown in Figure 16.3.8-2 (red line) and has been used to re-assign the model category, and this is used as the final resource confidence classification. The net result of the change in resource classification is an increase of 8% of resource blocks reporting to Indicated.

Figure 16.3.8-2: Akwaaba underground resource model coloured by confidence classification



16.3.9 The Resource Estimates

Table 17.3.2 list the estimated underground mineral resources at Akwaaba. The Akwaaba underground estimates are reported from the OK model restricted to the elevations 2,212mRL (approximate base to the completed Akwaaba open pit) and 1,700mRL (512 metres vertical). The selection of mining method for the underground operation will determine the dilution/ore loss factors that will need to be considered for conversion of the reported resources to reserves. Also the authors' observation from drill core inspection indicate that the Tarkwaian contact is characterised by being highly broken and extensively sheared. Based on this observation it is recommended that the footwall position of mining stopes must be designed to be coincident with the Tarkwaian contact i.e. not based solely on grade. Designing the footwall position of mining stopes away from of the sedimentary contact is unlikely to represent a realistic mining scenario.

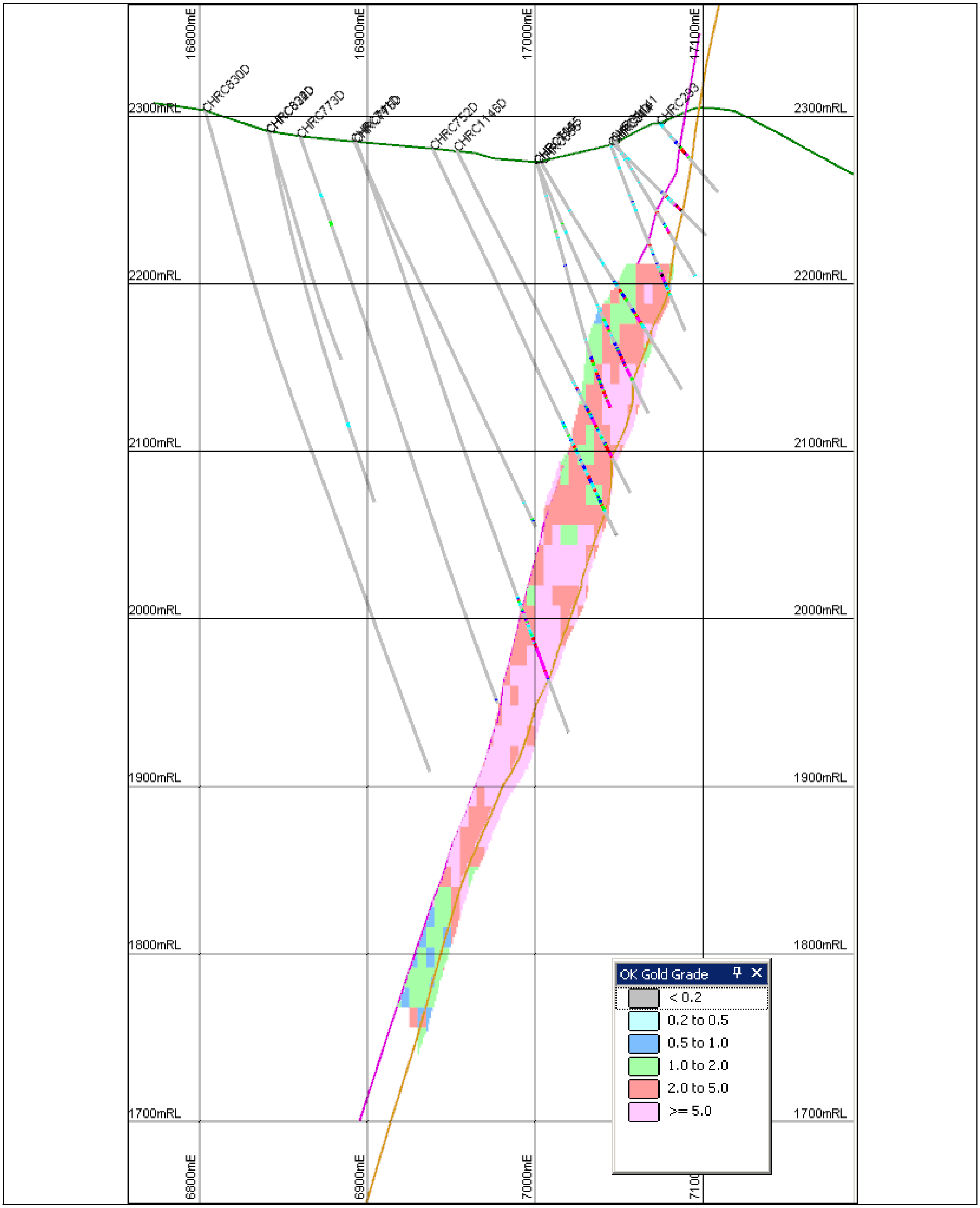
Table 17.3.2 Estimated Akwaaba Underground Mineral Resources, by Confidence Category

Resource Category	Tonnes (million)	Gold Grade (g/t Au)	Contained Gold (Moz)
Indicated			
Akwaaba	6.10	6.00	1.17
Inferred			
Akwaaba	0.40	3.4	0.04

16.3.10 Plot of the Akwaaba Resource model

Figure 16.3.10-1 shows a representative cross-section through the Akwaaba resource data and OK model. The OK model blocks are shown coloured by estimated gold grade and the section is centered on northing 31 520mN with a +-12.5 metre window used for selection drill holes for plotting.

Figure 16.3.10-1: Section through Akwaaba underground resource model and informing resource composites, coloured by gold grade



16.4 Suraw and Paboase Underground Mineral Resources

A portion of the exploration drilling programs undertaken between early 2007 through to early 2008 were utilized to target potential underground resources below the existing open pits, encouraged by the successes at Akwaaba. A review of the available deeper drilling in the current study has identified gold zones at Paboase South and Suraw, which have a likihood of supporting underground mining operations. Although at this stage drill density precludes any Measured or Indicated mineral resources being reported for these gold zones, there is sufficient information and understanding on the gold mineralisation styles to allow Inferred resources to be reported.

16.4.1 Resource Data Sets

The Paboase South and Suraw resource data were sourced from the Chirano drill hole data base, which is detailed in full in earlier sections of this report.

16.4.2 Drill Hole Spacing

The Paboase South resource has been drilled on 45 degree oriented drill traverses at 25 to 50 metre intervals. Drill holes are angled steeply (~60^{o}) towards grid north east and south west and typically intersect the mineralised gold zones at 25 metre to 50 metre spacing on section, to a depth of approximately 250 metres from surface. Below this level drill spacing reduces to 50 metre to 100 metre spacing. Figure 16.4.2-1 show a plan and cross sectional projection of the Paboase South drill holes.

The Suraw resource has been drilled on local grid east-west oriented drill traverses at 25 to 50 metre intervals. Drill holes are angled steeply (~60^{o}) towards grid east and west and typically intersect the mineralised gold zones at 25 metre to 50 metre spacing on section, to a depth of approximately 250 metres from surface. Below this level drill spacing reduces to 50 metre to 100 metre spacing. Figure 16.4.2-2 show a plan and cross sectional projection of the Suraw drill holes.

Figure 16.4.2-1: Plan (top) and cross sectional (bottom) projection of the Paboase South drill holes

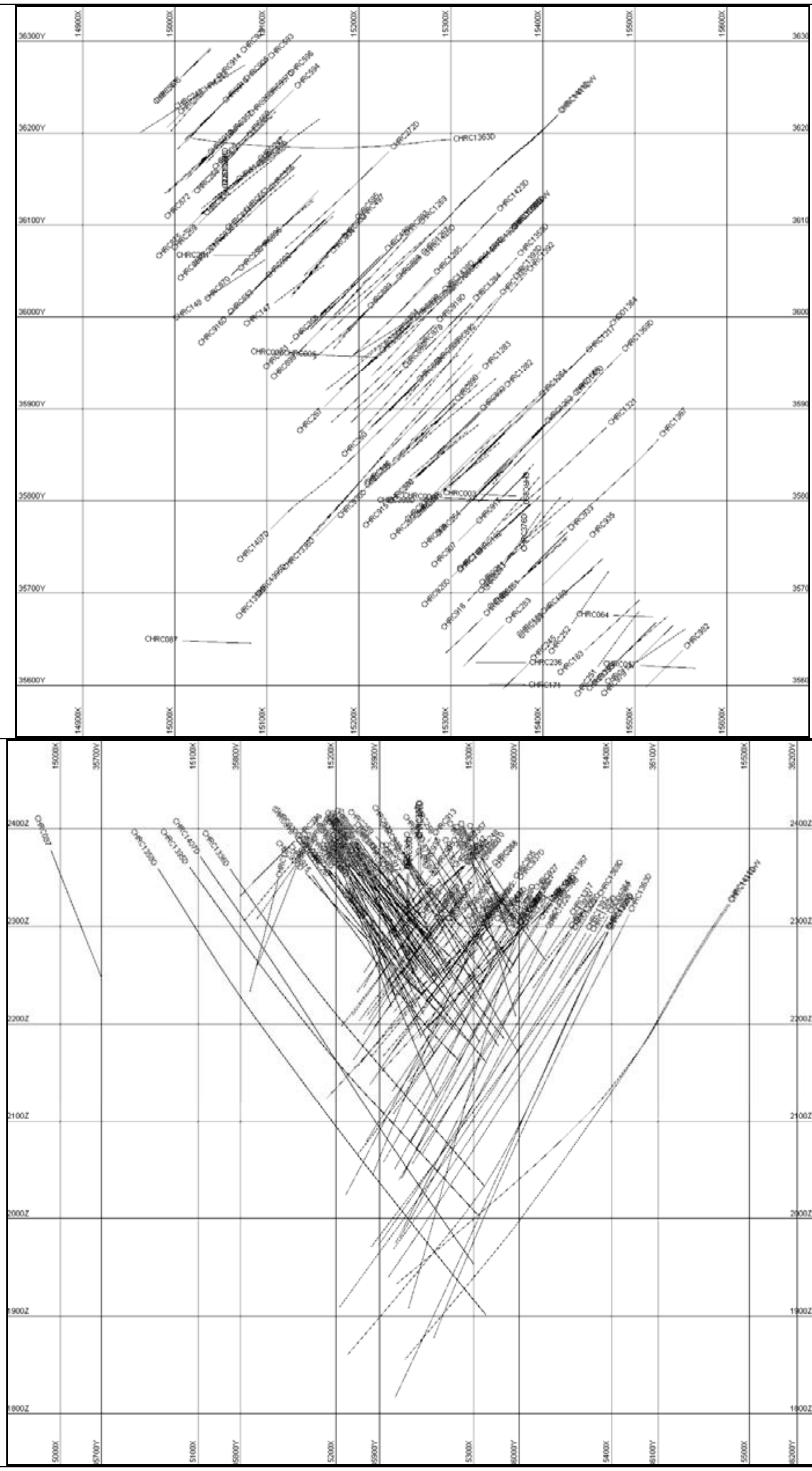
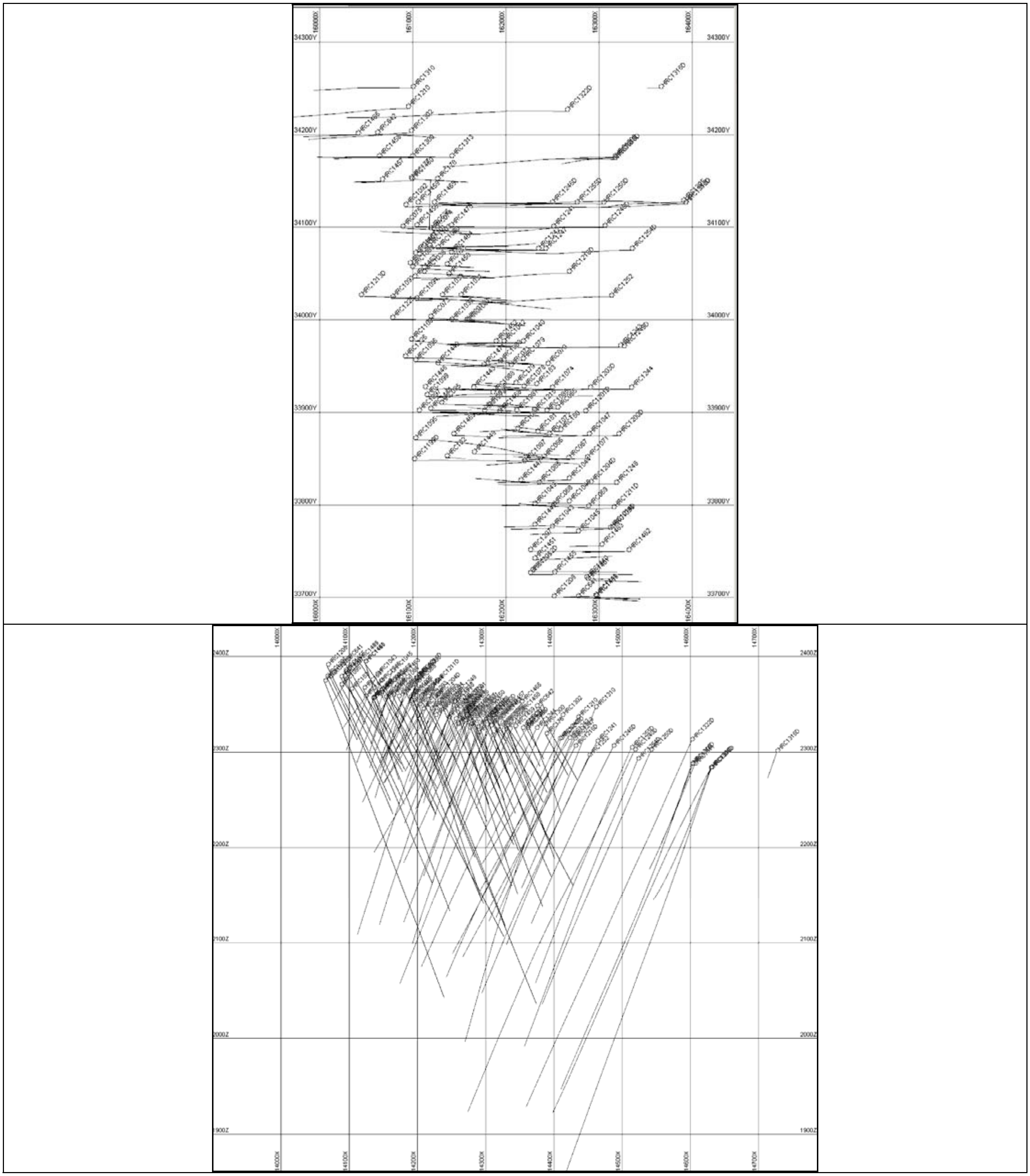


Figure 16.4.2-2: Plan (top) and cross sectional (bottom) projection of the Suraw drill holes



16.4.3 Bulk Densities

Only gold mineralisation within the fresh rock horizon is estimated by the Paboase South and Suraw underground resource models. The bulk density for fresh rock used in the present study is 2.75g/cc and is consistent to those used in the BFS and all subsequent models at Chirano:

16.4.4 Data Preparation and Treatment

16.4.4.1 Mineralisation Wireframes

Although structural and lithological controls on the gold mineralisation at Paboase South and Suraw are still under review, the currently available drilling is sufficiently close spaced to allow the orientations to the mineralised zone to be defined. H&S have interpreted mineralised envelopes using a nominal 1.0 g/t cut-off, although lower grade intervals have been included to aid in strike and dip continuity in the interpretation.

Figures 16.4.4.1-1 and 16.4.4.1-2 show the interpreted mineralisation wireframes used as the basis for constructing the Paboase South and Suraw resource models. The viewing position on these figures is from the south west, looking down towards the north east.

Figure 16.4.4.1-1: Plan (top) and cross sectional (bottom) projection of the Suraw drill holes

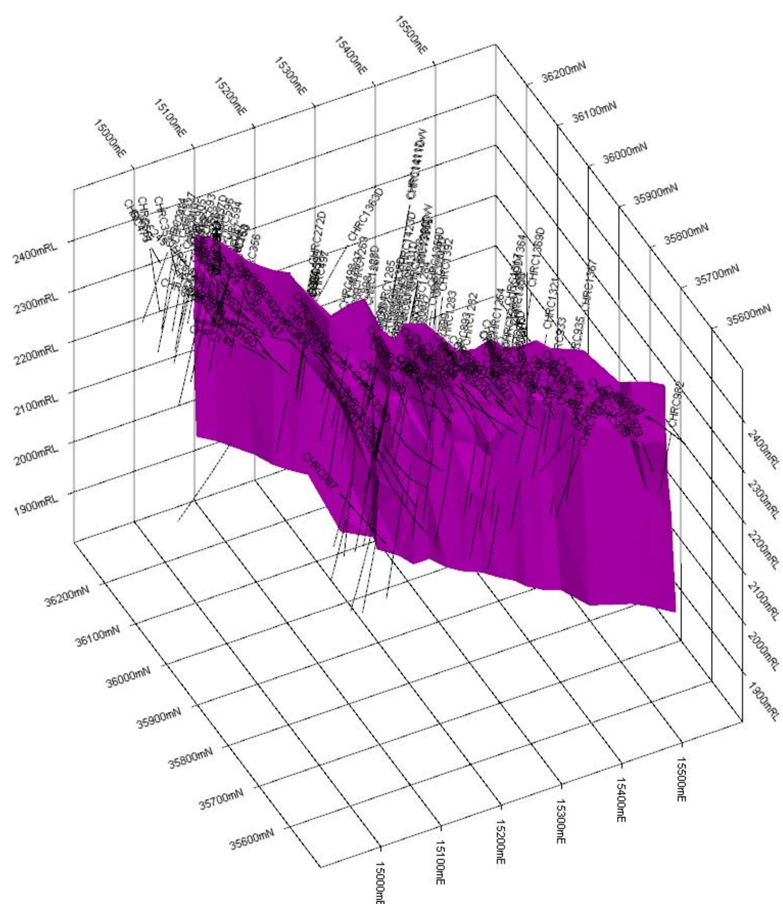
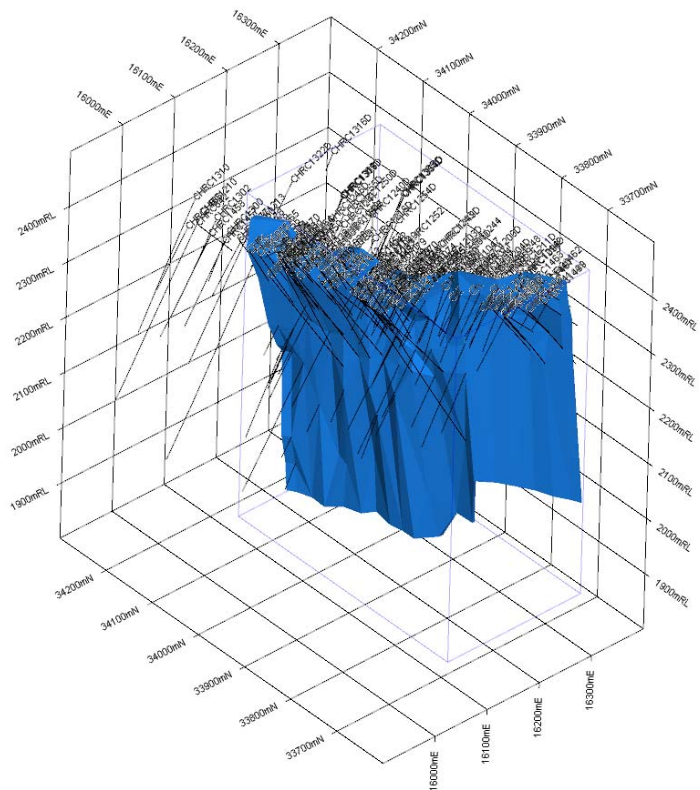


Figure 16.4.4.1-2: Plan (top) and cross sectional (bottom) projection of the Suraw drill holes



16.4.4.2 Treatment of Unsampled Intervals

Un-sampled intervals have been considered to represent samples devoid of significant gold grades and were inserted with 0.00 gold assays. All remaining un-sampled intervals within the data set were assigned "-9999" for later removal after compositing. Samples with assays reporting gold less than detection limit of 0.01 g/t are recorded in the assay laboratory reports as -0.01 g/t. These intervals are routinely replaced with 0.005 g/t (i.e. half the detection limit) when loaded into the exploration data base.

16.4.4.3 Compositing and Domain Flagging

Weighted average gold grades were calculated for one metre down hole intervals and the following intervals discarded:

- Residuals less than the target composite length i.e. one metre.
- Composites reporting negative gold grades, those intervals having been impacted by missing assays.

Composites outside the mineralised domain were excluded, giving a files comprising 2,242 one metre composites for Paboase South and , which represents the complete drill hole data set and forms the basis of the underground model. No elevation constraints were applied to this dataset.

16.4.5 Exploratory Data Analysis

16.4.5.1 Underground Resource Data

Figure 16.4.5.1-1 shows the histogram and summary univariate statistics of one metre composite gold grades within the underground modeling domain at Paboase South. The composite grades show a positively skewed population with a moderate CV of 1.3 with an average grade of 2.56 g/t and the highest composite grade being 41.6 g/t Au. Only the resource data flagged as being within the mineralised domain wireframe are used to inform the Paboase South underground resource model. Figure 16.4.5.1-2 presents the cumulative histogram for the underground resource data. This plot shows that there is a continuous range of gold grades up to 23 g/t Au, beyond this grade there are only six gold grades extending up to maximum. H&S has applied an upper grade cut to the resource data at 23 g/t Au prior to running the OK estimation.

Figure 16.4.5.1-1: Histogram and summary univariate statistics of resource data flagged within Paboase South mineralised domain.

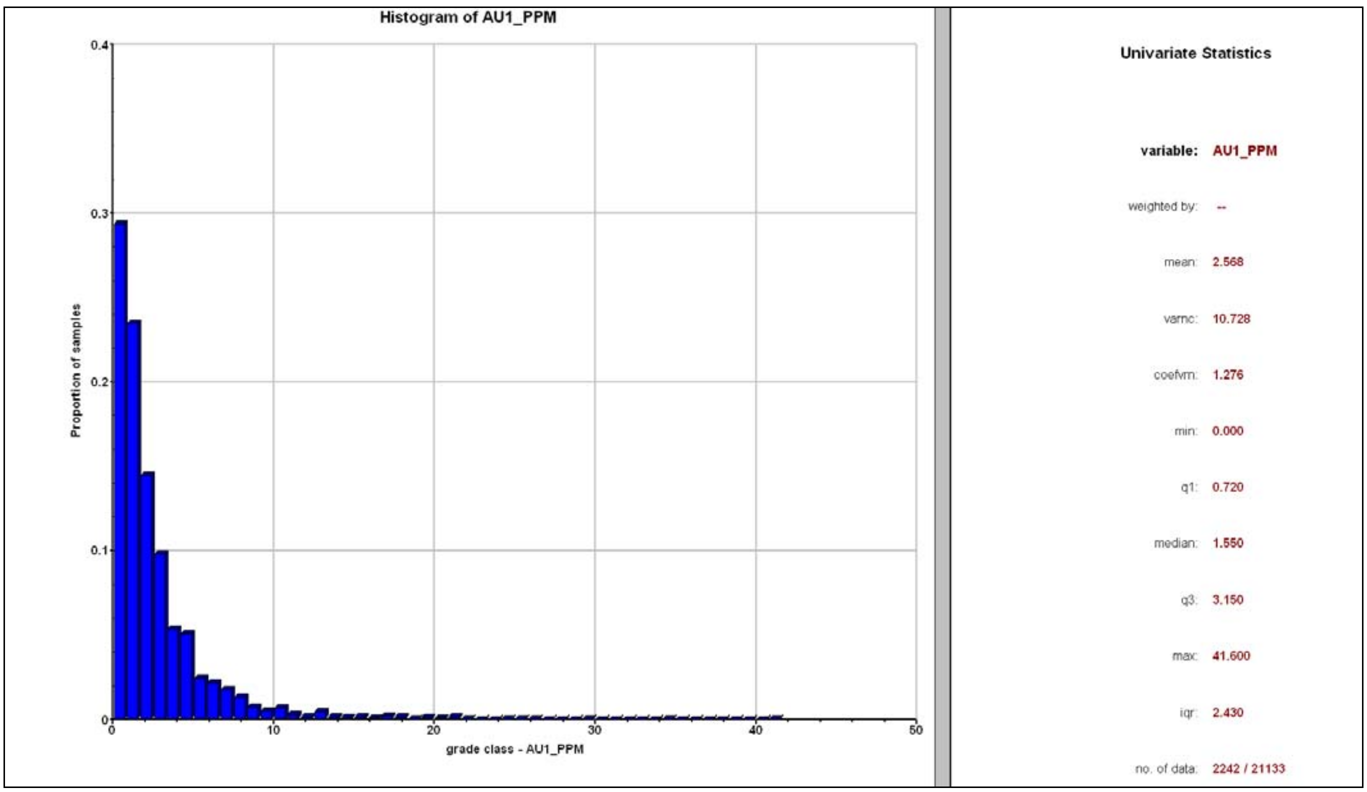
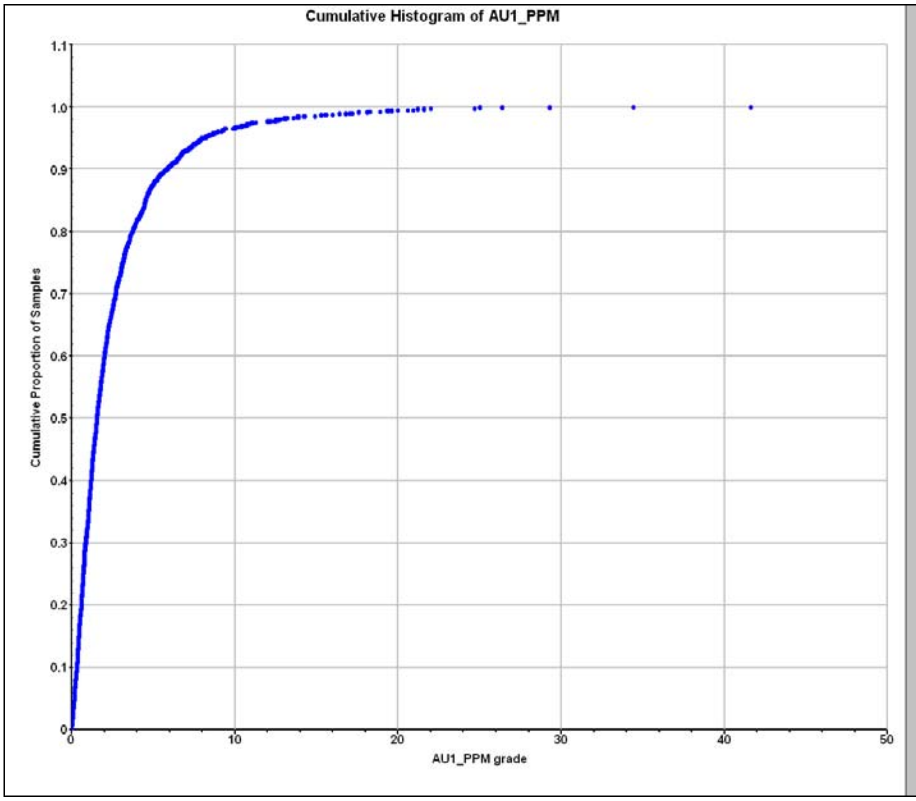


Figure 16.4.5.1-2: Cumulative histogram and summary univariate statistics of resource data flagged within Paboase South mineralised domain.



Univariate Statistics	
variable:	AU1_PPM
weighted by:	--
mean:	2.568
varnc:	10.728
coefvrn:	1.276
min:	0.000
q1:	0.720
median:	1.550
q3:	3.150
max:	41.600
iqr:	2.430
no. of data:	2242 / 21133

Figure 16.4.5.1-3 shows the histogram and summary univariate statistics of one metre composite gold grades within the underground modeling domain at Suraw. The composite grades show a positively skewed population with a moderate CV of 1.1 with an average grade of 3.91 g/t and the highest composite grade being 46.2 g/t Au. Only the resource data flagged as being within the mineralised domain wireframe are used to inform the Suraw underground resource model. Figure 16.4.5.1-4 presents the cumulative histogram for the underground resource data. This plot shows that there is a continuous range of gold grades up to 20 g/t Au, beyond this grade there are only seven gold grades extending up to maximum. H&S has applied an upper grade cut to the resource data at 20 g/t Au prior to running the OK estimation.

Figure 16.4.5.1-3: Histogram and summary univariate statistics of resource data flagged within Suraw mineralised domain.

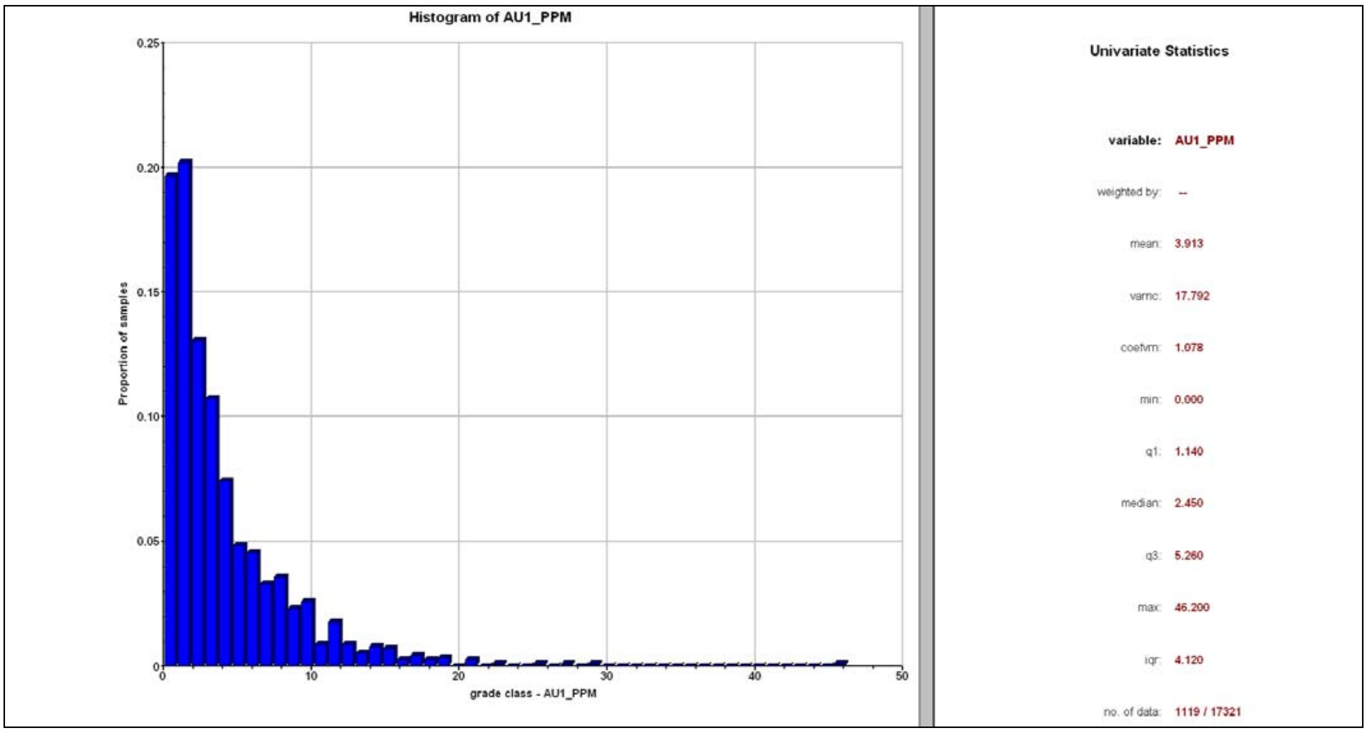
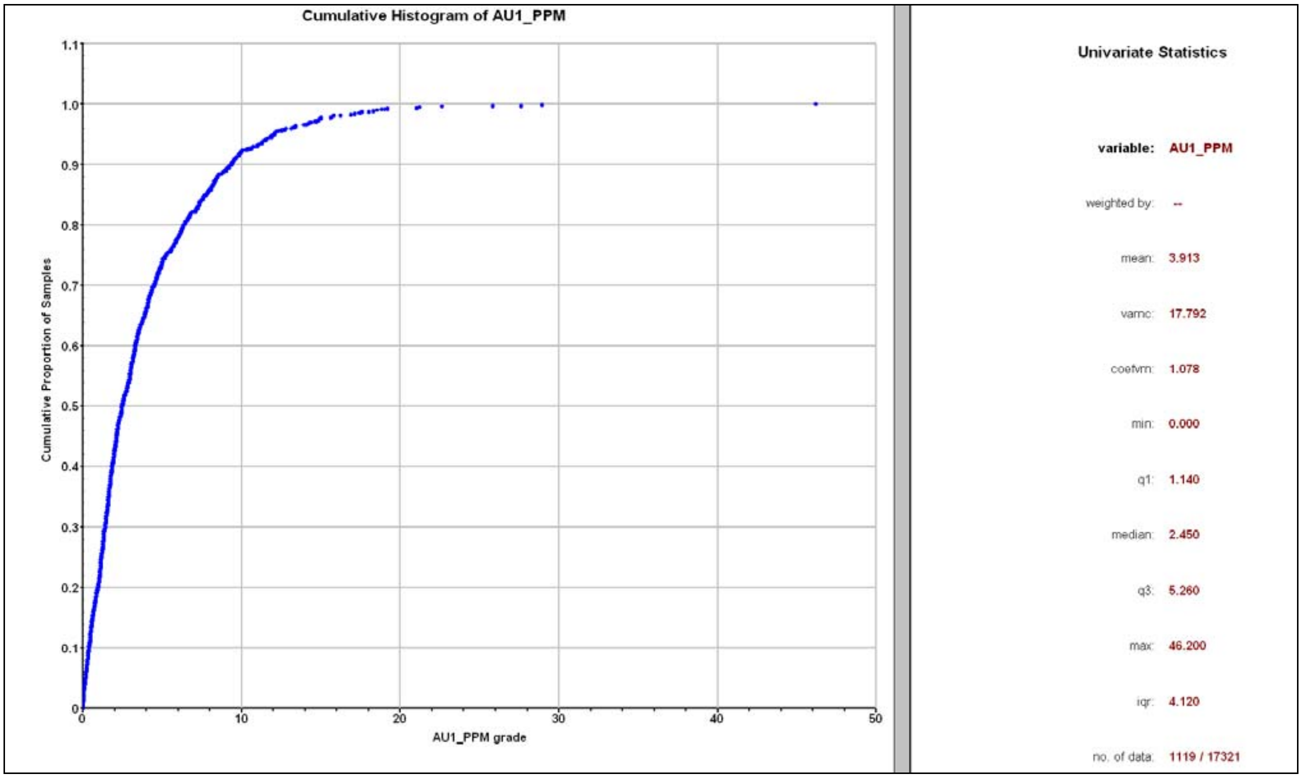


Figure 16.4.5.1-4: Cumulative histogram and summary univariate statistics of resource data flagged within Suraw mineralised domain.



16.4.6 Spatial Continuity Analysis

A variogram of gold grades is required for constructing the Ordinary Kriging model of gold at Paboase South and Suraw. The gold directional variograms and the models are based on the one metre resource data and are shown in Figures 16.4.6-1 and 16.4.6-2. On each figure the variogram plotted at the top is the down hole direction (60 degrees down towards grid north east at Paboase South and 60 degrees down towards grid east at Suraw), the centre variogram is oriented looking along strike (either grid 323 or 360, Paboase South and Suraw, respectively) and the variogram plotted at the bottom is the down dip direction (80 degrees down dip). The directional variograms provide a three dimensional variogram which, for both deposits, show weak long ranges of continuity in the along strike and down dip directions, and relative to these, a short range of continuity in the across dip direction. The continuity seen in the three dimensional variogram is confirmed by observations on the composite gold grades in cross section and plan.

Figure 16.4.6-1: Variograms of gold in Paboase South resource composites

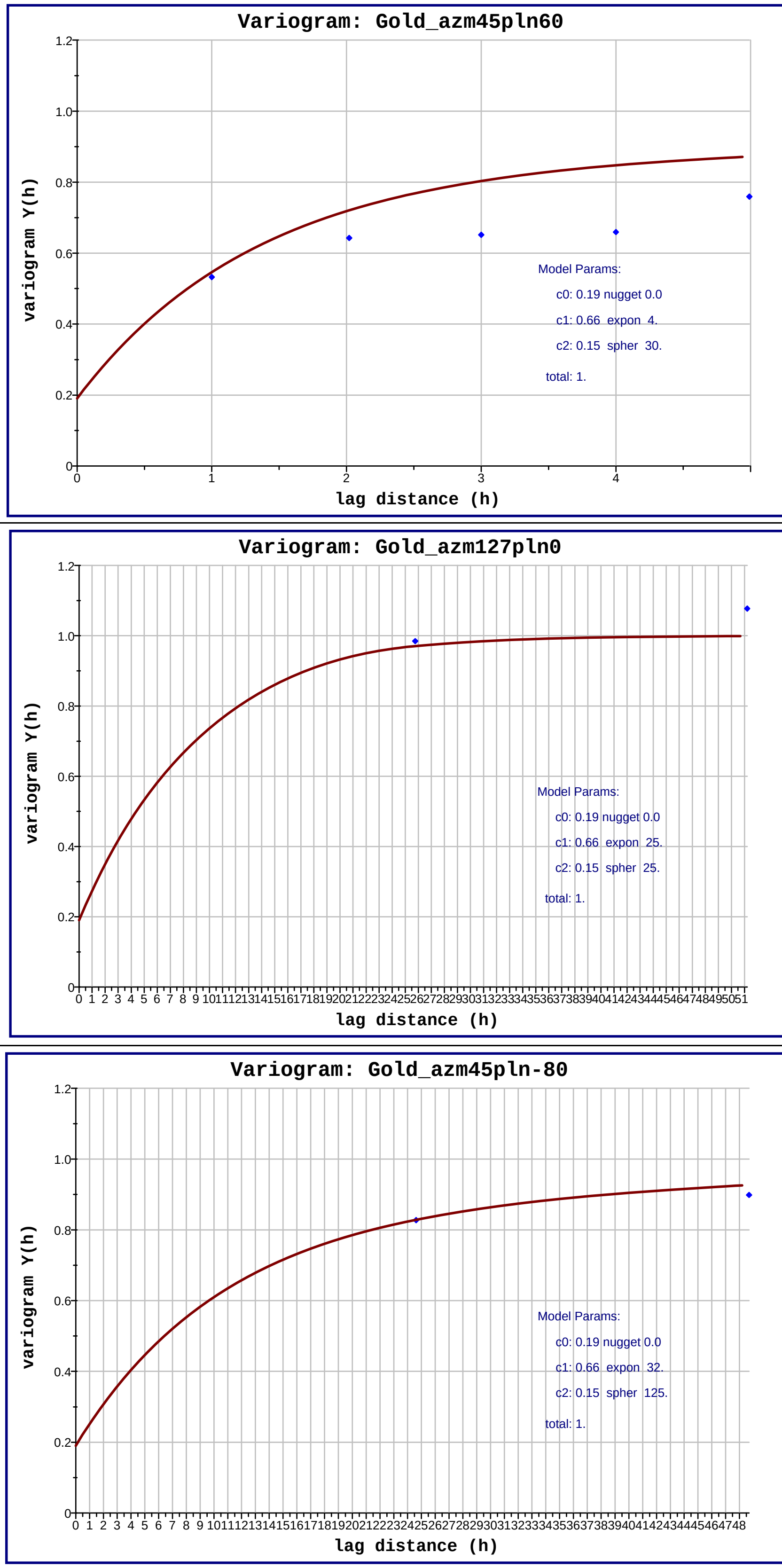
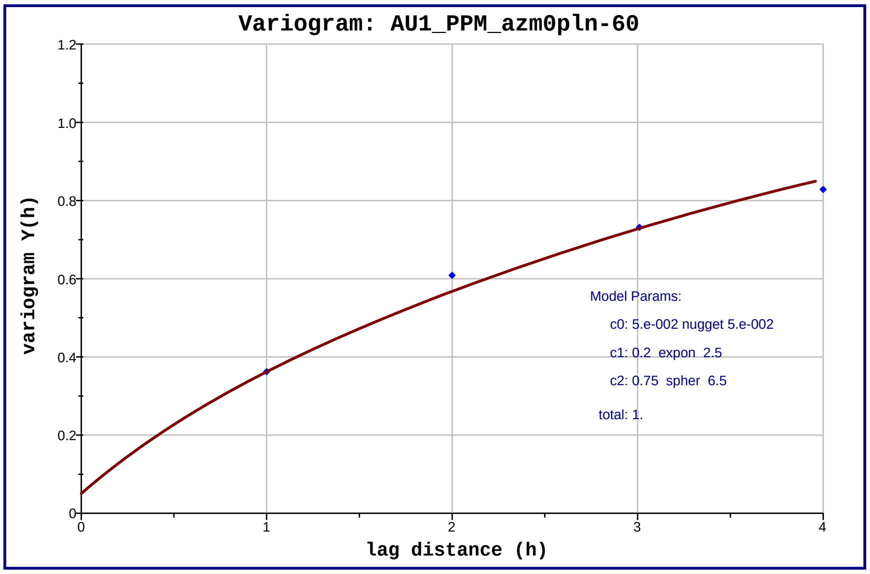
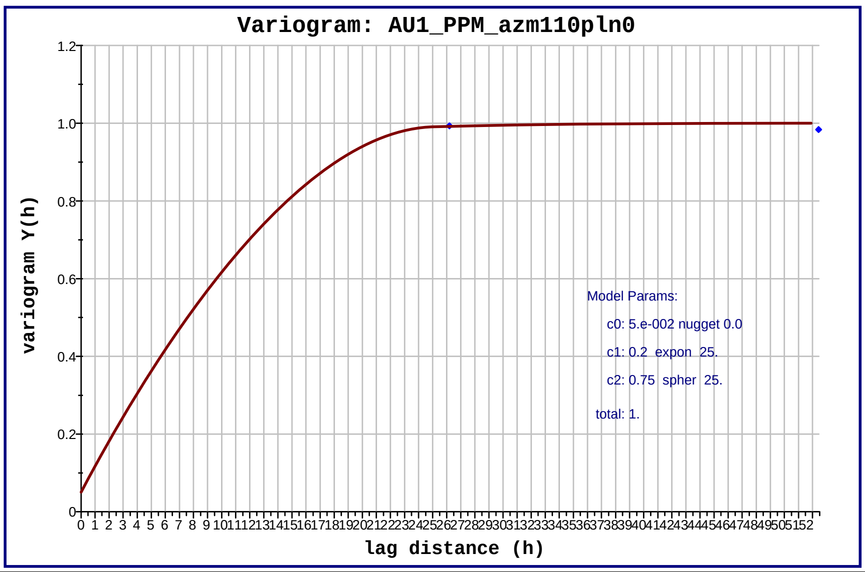
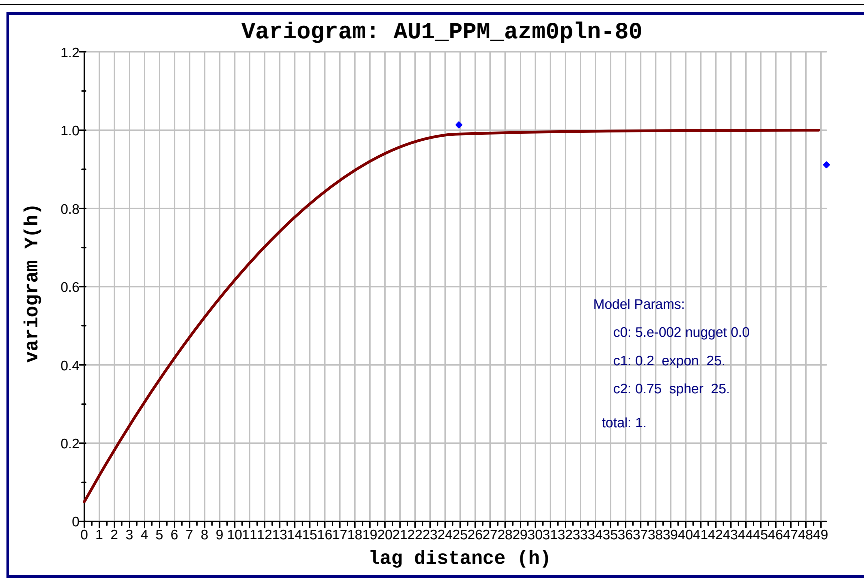


Figure 16.4.6-2: Variograms of gold in Suraw resource composites







16.4.7 The Paboase & Suraw Underground Resource Models

The input parameters to Ordinary Kriging (OK) of the Paboase South and Suraw gold mineralisation include:

- Variograms describing the spatial continuity of gold grades within the mineralisation.
- Selection of appropriate block dimensions and search criteria.

The one metre composites flagged as contained within the mineralised domain were used for estimation of the OK model. Figures 16.4.6-1 and 16.4.6-2shows the gold variogram model applied to the OK model of gold at Paboase South and Suraw, respectively. Resource block model grid framework and kriging parameters are shown in Tables 16.4.7-1 and 16.4.7-2. A parent block sizes of 10mE by 25 mN by 25mRL (Paboase South) and 2mE by 25 mN by 25mRL were used as the basis for estimation of gold. Subsequent to estimation of gold into the parent blocks, parent blocks have been intersected with the mineralised wireframe to accurately represent the interpreted lode geometry to a minimum sub-block of 1mE by 2.5mN by 3mRL. The sub-blocking is employed to ensure the model honors the volumetric and spatial position of the constraining wireframes. The sub-block dimensions do not imply an improved level of accuracy of the gold estimate.

Table 16.4.7-1: Model framework and kriging parameters, Paboase South underground model

	East	North	Elevation
Origin (block centroid)	15,055	35,625	1,888
Block dimensions	10	25	24
No. of blocks	51	25	23
Block discretisation	5	5	5
Kriging Parameters			
Criteria	1st pass	2nd pass	
Min no. of data	8	4	
Max no. of data per octant	8	8	
Min no. of octants with data	4	2	
X (east) search radius (metres)	15	30	
Y (north) search radius (metres)	75	150	
Z (rl) search radius (metres)	75	150	
Search rotations			
Rotation axis	Rotation		
z (rl)	37 (y oriented axis grid 323)		
y (north)	-10 (z axis oriented -80o -> grid 053)		

Table 16.4.7-2: Model framework and kriging parameters, Suraw underground model

	East	North	Elevation
Origin (block centroid)	16,101	33,650	1,768
Block dimensions	2	25	24
No. of blocks	126	22	29
Block discretisation	2	5	5
Kriging Parameters			
Criteria	1st pass	2nd pass	
Min no. of data	8	4	
Max no. of data per octant	8	8	
Min no. of octants with data	4	2	
X (east) search radius (metres)	15	30	
Y (north) search radius (metres)	75	150	
Z (rl) search radius (metres)	75	150	
Search rotations			
Rotation axis	Rotation		
z (rl)	20 (y axis oriented grid 350)		
y (north)	-10 (z axis oriented -80 -> grid 070)		

16.4.8 Underground Resource Classification

Although at this stage drill density precludes any Measured or Indicated mineral resources being reported at Paboase South and Suraw, there is sufficient information and understanding on the gold mineralisation styles to allow Inferred resources to be reported. In the current study the block estimates coming from the two modeled search passes are combined to Inferred Mineral Resources.

16.4.9 The Resource Estimates

Table 16.4.9-1 list the estimated underground mineral resources at Paboase South and Suraw. Both resource models have been restricted vertically to only extend to the base of the current open pit designs. At Paboase South this elevation is 2248mRL and at Suraw the elevation is set at 2242mRL. An additional constraint is applied to the Paboase South resource model before reporting the mineral resources. In longsection projection a perimeter of a higher grade core was interpreted and used to trim the resource model blocks.

Table 16.4.9-1 Estimated Paboase South and Suraw Underground Mineral Resources, by Confidence Category

Resource Category	Tonnes (million)	Gold Grade (g/t Au)	Contained Gold (Moz)
Inferred			
Paboase South	2.27	3.5	0.25
Suraw	1.87	4.1	0.24

16.4.10 Plots of the Paboase South and Suraw Resource models

Figures 16.4.10-1 and 16.4.10-2 show three dimensional views of the Paboase South and Suraw OK block models with the blocks coloured by estimated gold grade. The viewing position on these figures is from the south west, looking down towards the north east.

Figure 16.4.10-1: Three dimensional view of the Paboase South OK model

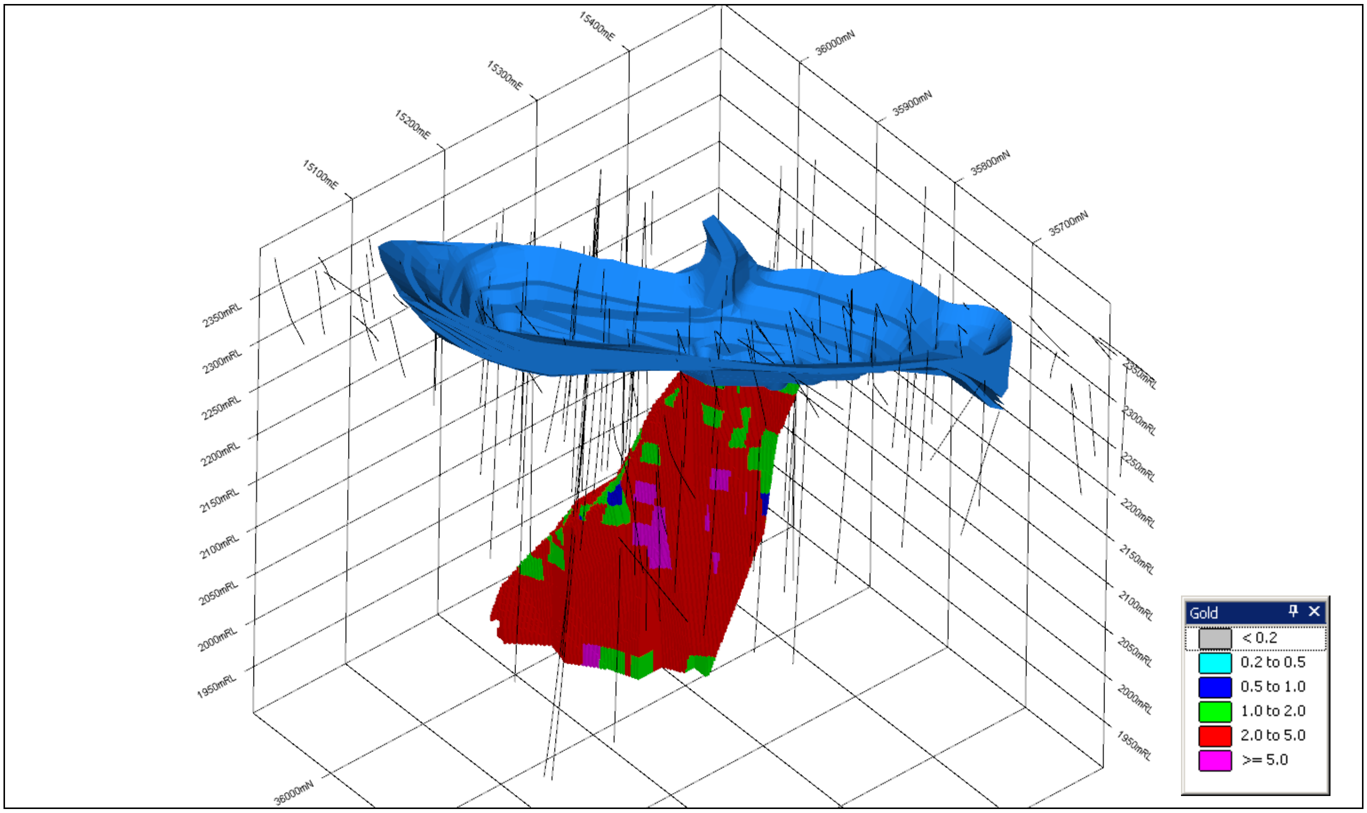
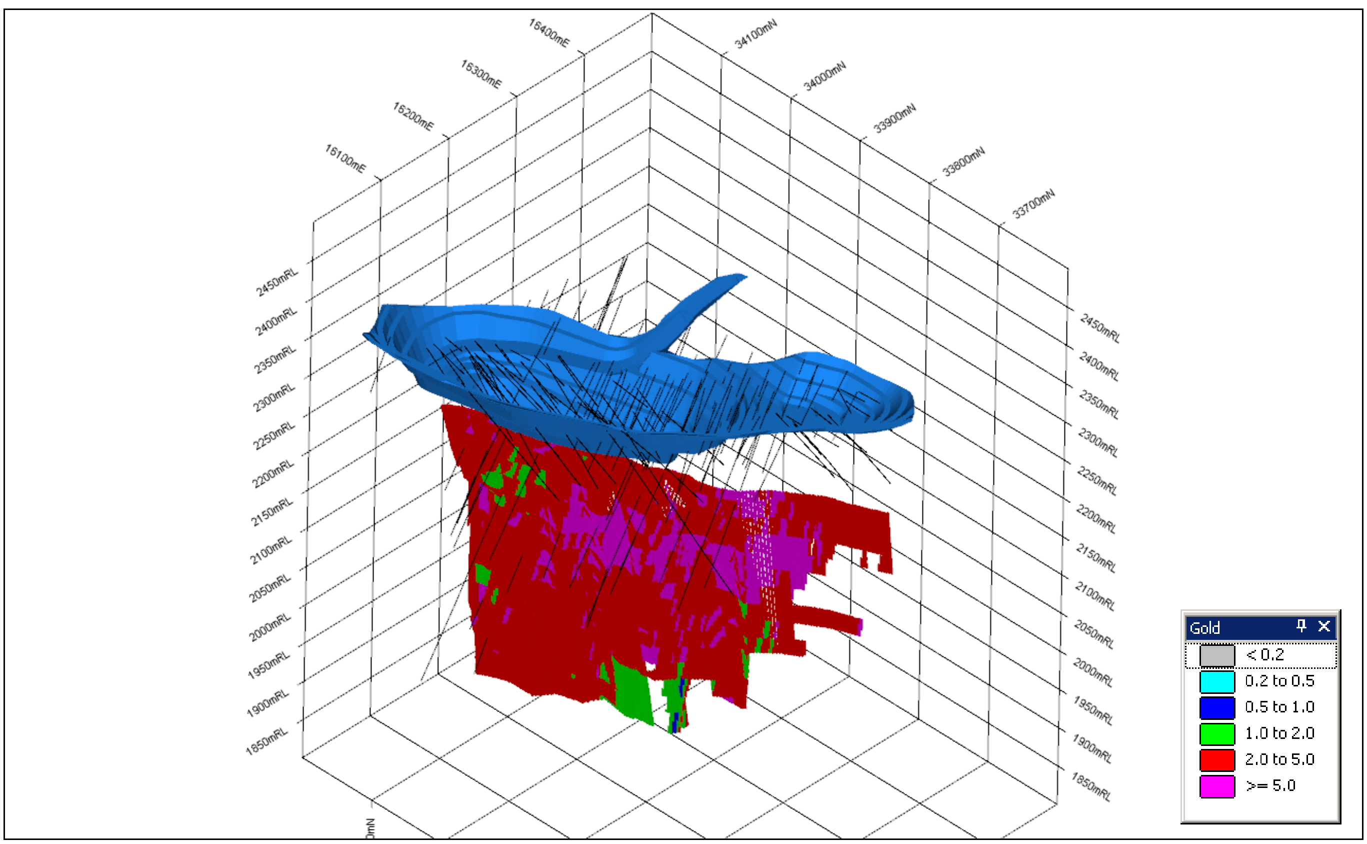


Figure 16.4.10-2: Three dimensional view of the Suraw OK model



16.5 Mineral Reserve Estimates

16.5.1 Open Pit Mineral Reserve Estimates

Following the new resource estimate prepared by H&S in December 2008, a revised Open Pit Ore Reserve estimate was completed by AMC Consultants Ltd (AMC). The Open Pit Ore Reserve Estimate is based on the December 31, 2008 pit surfaces. The new reserve study was based on the H&S resource block models and involved pit optimizations, pit designs and Ore Reserve estimation. These are discussed in details in Section 18.1 of this report.

The Chirano Open Pit Ore Reserve estimate is summarized in Table 16.5.1-1

Table 16.5.1-1: Mineral Open Pit Reserve Estimate

Open Pit Reserve Estimate December 31, 2008									
Area	Proven			Probable			Total		
	Tonnes (Mt)	Au (g/t)	Ounces (Moz)	Tonnes (Mt)	Au (g/t)	Ounces (Moz)	Tonnes (Mt)	Au (g/t)	Ounces (Moz)
Open Pits	17.4	1.68	0.9	4.5	1.39	0.2	21.9	1.62	1.1
Stockpile	2.2	1.05	0.1	-	-	-	2.2	1.05	0.1
Total	**19.6**	**1.61**	**1.0**	**4.5**	**1.39**	**0.2**	**24.1**	**1.55**	**1.2**

- Numbers may not add correctly due to rounding
- The Mineral Reserve estimate was made using a gold price of US$700
- Various cut-off grades were used to estimate the Open pit inventories and form the Mineral Reserve depending on material type and location with an average breakeven cut-off grade in the range of 0.60g/t and 0.65 g/t.

Based on the December 31, 2008 underground Mineral Resource calculation, AMC estimated an Open Pit Ore Reserve of 1.2 million ounces (24.1 Mt @ 1.57 g/t, using a gold price of US$700 with various cut-off grades used to estimate the Open pit inventories and form the Mineral Reserve depending on material type and location with an average breakeven cut-off drade in the range of 0.60g/t and 0.65 g/t.

These reserves have been estimated and reported in accordance with Canadian National Instrument 42-101 Standards of Disclosure for Mineral Projects of February 2001 (the Instrument) and the classifications adopted by CIM Council in August 2000.

Furthermore, the reserve classification is also consistent with the Australian Code for Reporting of Mineral Resources and Ore Reserves of September 1999 (the JORC Code) as prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia.

The estimation of reserves was carried out or supervised by Bruce Gregory who is a member of the Australian Institute of Mining and Metallurgy. Mr Chesher is a full time employee of AMC Consultants Pty Ltd. He has sufficient experience, which is relevant to the estimation of Ore Reserves for the style of mineralization and type of deposit, to qualify as a “Competent Person” as defined in the JORC Code and a “Qualified Person” with respect to the CIM Standards.

All reserves mentioned are completely included within the quoted resources.

16.5.2 Underground Mineral Reserve Estimates

Following the new resource estimate prepared by H&S in December 2008, a revised Undergound Mineral Reserve estimate was completed by AMC. The Underground Mineral Reserve Estimate is estimated below the 2175 production level. The reserve study was based on the H&S resource block models and involved pit optimizations, underground designs, Ore Reserve estimation and mine production scheduling. These are discussed in details in Section 18.2 of this report.

The Chirano Underground Ore Reserve estimate is summarized in Table 16.9.2-1.

Table 16.9.2-1 Akwaaba Mineral Reserve Estimate

Underground Reserve Estimate December 31, 2008									
Area	Proven			Probable			Total		
	Tonnes (Mt)	Au (g/t)	Ounces (Moz)	Tonnes (Mt)	Au (g/t)	Ounces (Moz)	Tonnes (Mt)	Au (g/t)	Ounces (Moz)
Akwaaba UG	-	-	-	8.2	4.21	1.1	8.2	4.21	1.1
Total	**-**	**-**	**-**	**8.2**	**4.21**	**1.1**	**8.2**	**4.21**	**1.1**

- The Underground Mineral Reserve is based on SLC design and comprises development and production (stope) ore. Development ore includes only the Indicated Resources that are intersected by the development headings
- For the SLC stopes only Indicated Resource was included in the stoping shapes for production levels 2175mRL to 1775mRL
- All unclassified material (zero grade) lying within the above SLC stopes was included as planned dilution essential for the mineable SLC shape. Similarly a small portion of Inferred resource (and its grade) required to define the SLC stoping shapes was included as planned dilution with modeled grade. The total quantity included amounts to 1.08% of the SLC stoping tonnes
- A minimal quantity of inferred resource lying within the ore development was also included as planned dilution with modeled grade. The total quantity included amounts to less than 0.24% of the ore development ounces. All Inferred resource & unclassified material lying at the extremes of the ore body was excluded from the mine design and SLC stoping shapes.
- The reserve estimate is based upon a cutoff grade of 2.2g/t and a gold price of US$700/oz.

Based on the December 31, 2008 Underground Mineral Resource calculation, AMC estimated an Underground Ore Reserve of 1.1 million ounces (8.2 Mt at 4.21 g/t, using a gold price of US$700 with a breakeven cut-off grade of 2.20g/t.

These reserves have been estimated and reported in accordance with Canadian National Instrument 42-101 Standards of Disclosure for Mineral Projects of February 2001 (the Instrument) and the classifications adopted by CIM Council in August 2000.

Furthermore, the reserve classification is also consistent with the Australian Code for Reporting of Mineral Resources and Ore Reserves of September 1999 (the JORC Code) as prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia.

The estimation of reserves was carried out or supervised by Tony Silveira who is a member of the Australian Institute of Mining and Metallurgy. Mr Silveira is a full time employee of AMC Consultants Pty Ltd. He has sufficient experience, which is relevant to the estimation of Ore Reserves for the style of mineralization and type of deposit, to qualify as a "Competent Person" as defined in the JORC Code and a "Qualified Person" with respect to the CIM Standards.

All reserves mentioned are completely included within the quoted resources

16.6 Non-geological Factors Relevant to Resources and Reserves

The ability to exploit mineral resources and reserves can be affected by many "external" factors. These are discussed in other parts of this report, particularly Section 4. The necessary mining lease has been granted, a final environmental impact statement has been accepted by the Ghana Environmental Protection Authority, and a permit granted. Mining operations commenced in April 2005.

Royalties, agreements, encumbrances, government policies and related matters are dealt with in Section 4. Taxation is covered in Section 18.7.

17 OTHER RELEVANT DATA AND INFORMATION

17.1 Reconciliation

Reconciliation of block model estimates to production is used to evaluate the predictive nature of the block model for future production. Two sets of data are available to compare with the block model estimates: grade control data and milled production data.

Grade control drilling is carried out independent of blast hole drilling, and employs the sampling of material from reverse circulation drill rigs. Grade control drilling using face-sampling hammers is carried out on a 8m x 10m grid.

Grade control resource modeling is carried out using indicator modified ordinary kriging. With this approach, the lower pit reserve cut-off i.e. oxide cut-off, is used as an indicator threshold to develop a probability constrained model. An ordinary kriging run is then performed within the probability constrained model to estimate gold grades.

The data in Table 17.1-1 comprises mill statistics, tonnages as mined in the field and block model gold estimates. Milled material versus block model tonnage, gold grade and gold metal are shown. The ratio of milled material to block model is a measure of how well the milled ore tonnage and grade reconciles to predictions made by the block model.

Table 17.1-1 Grade Reconciliation

Milled Material to Grade Control Model Reconciliation			
Year	**Tonnage ('000 t)**	**Au (g/t)**	**Au Metal ('000ozs)**
Milled Production			
2005/2008	7,048	1.94	440
Block Model			
2005/2008	7,117	2.01	461
Mill / Model Ratio			
2005/2008	0.99	0.96	0.95

Results of the reconciliation review show good predictability of tonnage and gold grade by the block model. These results demonstrate the level of confidence in block model estimates, which support the designations of Mineral Reserves and Resources.

18 REQUIREMENTS FOR TECHNICAL REPORTS ON PRODUCTION PROPERTIES

The mine construction was completed in September 2005. Red Back commissioned the Chirano gold plant in September 2005 with the first gold pour on October 10, 2005. To December 31, 2008 the Chirano Mine has produced a total of 405 thousand ounces of gold..

18.1 Open Pit Mining

The Chirano mine has been an operating mine since 2004. Pre-production stripping and mining commenced in November 2004.

This new study reflects additional resource drilling and resource modeling which was completed in 2008. It also contains an update to the mining costs based upon 2009 CGML budget figures. The administration and processing cost estimates used in this update are based on actual performance as per the 2009 budget.

AMC was commissioned to update the Ore Reserve estimate. All optimization parameters were supplied by CGML or derived in consultation with CGML and are consistent with a nominal 3.5 Mtpa on site mineral processing operation. Pits were re-optimized, and detailed staged and ultimate pit designs developed. Using the inventories from these detailed designs, a mining schedule was produced by CGML.

African Mining Services Ltd (AMS) operate the mining contract at Chirano.

All ore and waste is mined via conventional, open pit mining gold methods. The operation is selective in terms of separately mining ore and waste. The degree of selectivity upon which the dilution and ore loss allowances are based reflects the scale of mining equipment, the grade control method and the nature of the mineralization. The mining benches are 6m in height comprising two 3m flitches to mine ore. Bulk waste material is mined in a single 6m bench. The 4m wide by 2.5m high and 8m long Selective Mining Unit size is commensurate with the orebody model as described in the geological section of this report.

The excavation fleet on site date is a combination of one Liebherr 994, 250t hydraulic excavator with 14m^3 bucket and one Liebherr 984, 110t hydraulic excavator with 7m^3 bucket loading 90t Caterpillar 777d trucks. The mining fleet on site includes the requisite ancillary equipment (dozers, graders and water trucks) for haul and pit access road construction and maintenance, waste dump and ROM pad maintenance and rehabilitation.

Provision has been made for drilling and blasting all primary materials. All of the oxide ore has been assumed to require drilling and blasting, however there may be areas where free dig is possible.

Ore is hauled to the ROM pad adjacent to the primary crusher. The majority of ore is tipped to a stockpile for reclaim by a front-end-loader (FEL). Low-grade ore is stockpiled adjacent to the ROM pad for later treatment.

Waste is used for haul road construction as needed or hauled to waste dumps located outside the Forest Reserve.

In May 2008, Coffey conducted a site visit to Chirao and provided a report which identified the appropriate geotechnical design parameters, which are shown in the Table 18.1-1.

Table 18.1-1: Geotechnical Design Parameters

Geotechnical Design Paramters			
Material	**Batter Angle (Degrees)**	**Batter Height (m)**	**Berm Width (m)**
Weathered	45	18 to 24	5 to 6
Fresh	70	18 to 24	5 to 6

A base gold price of $700/oz was used. A base government royalty of 3.0% was applied with a further Forest Reserve royalty of 0.6% was applied to gold produced from within the Forest Reserve.

18.2 Akwaaba Underground Mining

The Akwaaba underground ore production will utilise Sub Level Caving (SLC), with mechanised underground development methods being used to access the resource. The proposed underground mining fleet operated by a mining contractor is a combination of 36t and 50t class dump trucks with 17t class loaders for load and haul, jumbo drill rigs for decline and level development and top hammer production drill rigs for SLC production. Ore will be hauled from underground and trucked 7km to the process plant ROM pad.

18.2.1 Mine Development

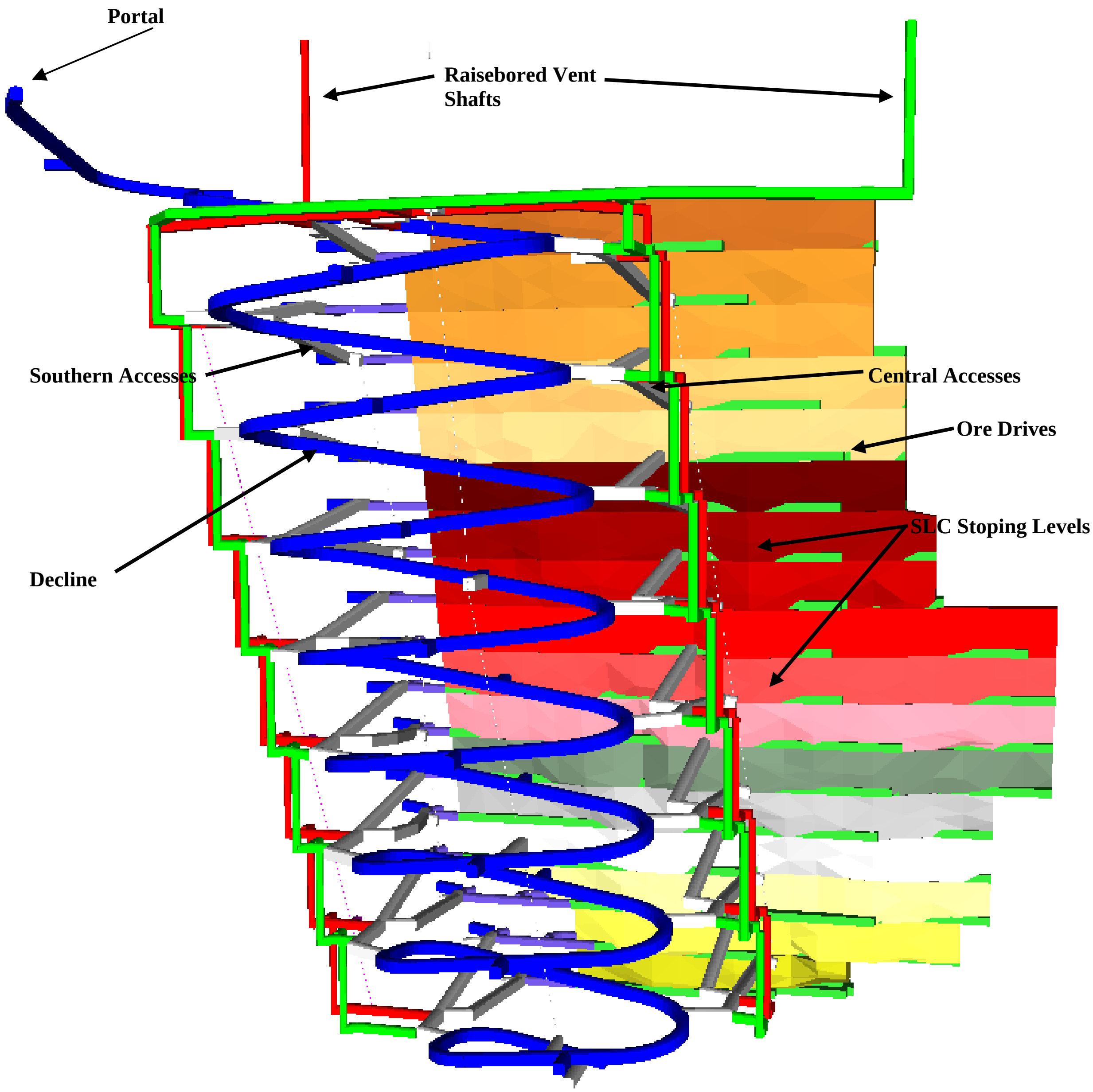
The orebody dips generally at 70 - 75 degrees to the west and plunges to the north at 78 – 84 degrees along strike. The orebody is between 12m to 45m thick (footwall to hanging wall, nominally west to east) and an average 230m along strike (nominally north to south).

The underground mine is accessed via a portal located on the surface at approximately 2250mRL. The main decline, ventilation intake and ventilation exhaust shafts are located on the footwall side of the orebody. The decline is designed 6.0m high x 5.5m wide and is a major intake airway supplying half the mine's required airflow. A ventilation intake shaft (FAW) will provide the remaining air inflow.

Level development access from the decline to the orebody would occur at 25m vertical intervals The stopes are accessed via southern and central level accesses to the ore body. All infrastructure including primary and secondary ventilation shafts, pump stations & settling dams, magazines and sumps are located in the FW, with the decline located approximately 100 metres from the ore body.

Ore drives would be developed within the orebody, spaced at 14m centre-to-centre intervals, with a 6.0m wide x 4.5 m high flat profile to accommodate a 17t capacity loader.

Figure 18.2.1-1 Akwaaba development layout



18.2.2 Mining Production

Production ore would be extracted from the orebody with a SLC mining method. A top down mining sequence is used with sub level extraction, planned to commence at the 2175mRL, approximately 30 metres below the pit floor, and conclude at the 1775mRL. Sub levels would be blasted and extracted in retreat, from the northern to the southern extent of each production level. A 30m crown pillar will remain from the base of the open pit to the top level of underground ore extraction.

Sub level spacing is designed at 25m in height, comprising of ore drives spaced at 14 metre centres on all production levels. Production blast holes would be drilled in rows of up holes, from the ore drives.

Manned and remote controlled loaders would be used to excavate the blasted ore.

Air blast mitigation requirements during the initial establishment of the SLC restrict the maximum draw of ore from the upper 8 levels between 40% and 80% of the ore fired.

Rockfill will be introduced into the cave from the open pit whilst production mucking is carried out on the levels below, to ensure that an adequate quantity of broken rock is maintained above active production levels for airblast mitigation.

A cut-off grade of 2.2 g/t Au was calculated based on a gold price of US$700/oz and this grade formed the design basis of the SLC outlines.

18.2.3 Sub Level Caving

The Akwaaba SLC utilises a longitudinal layout, with an oredrives required for every 14m of orebody width.

The main design issue at Akwaaba is associated with the good quality of the hangingwall. This is not expected to cave readily. Geotechnical analysis using numerical modelling to assess the extent of stress induced damage and displacements around SLC stope void and access development drives, was conducted using the finite element program Abaqus.

The modelling results indicated very little yield around the abutments of the SLC and very little yield in the hangingwall and footwall of the SLC. As the hangingwall of the SLC is not expected to readily cave, suitable systems/methods will be required to provide regional hangingwall support and to reduce the exposure of personnel to airblast if the hanging wall was to suddenly fail.

The expected lack of hangingwall caving will be managed in several ways at Akwaaba:

- Restricted Draw

  During initial production, the tonnage drawn from the Sublevel cave will be restricted to only a part of the ring tonnes to ensure that some broken rock remains in the stope to keep the brows closed. This approach has been applied to the upper 8 levels during initial mining of the Akwaaba SLC.

- Introduced Rockfill

  Rockfill (waste or low grade mineralised material) will be introduced into the cave from suitable tipping points in the pit. Tipping point(s) would be established in the completed Akwaaba pit which would allow fill to be introduced into the mined SLC. The coarsest material available would be selected as this will tend to allow the finer ring-blasted SLC material to report preferentially to the draw points.

- Airblast Plugs

  Airblast plugs are also planned to be used in the uppermost levels of the mine.

18.2.4 Production assumptions – mining dilution and mining recovery (ore loss)

The following steps outline the procedure used to develop the stope designs for the Akwaaba underground project.

a) Stope shapes were designed using the 2.2g/t Au cut-off grade. The stope designs took into account the following criteria:

- 25m vertical level intervals
- SLC strike length of the ore body
- 40 to 80% draw of ore from the 8 uppermost levels,
- tipping of waste rock into the SLC from the pit.
- all SLC levels spaced at 14m centre-to centre intervals.

b) Based on the proposed mining layout, each SLC level will be mined in sequence from the top to the bottom of the ore body, in retreat from the northern to the southern extent. In the latter stages of the mine operation Waste rock tipped into the SLC from the open pit, would provide a blanket of broken rock above the cave and mitigate the potential for occurrence of an air blast.

c) Each SLC level has dilution applied which is made up of rock defined by the relaxation zone from the stress modelling on the FW and HW.

d) Dilution and material flow modelling is based on a combination of Finite Element and Stochastic model, with the Stochastic flow code MFLOW used to model flow and assess dilution.

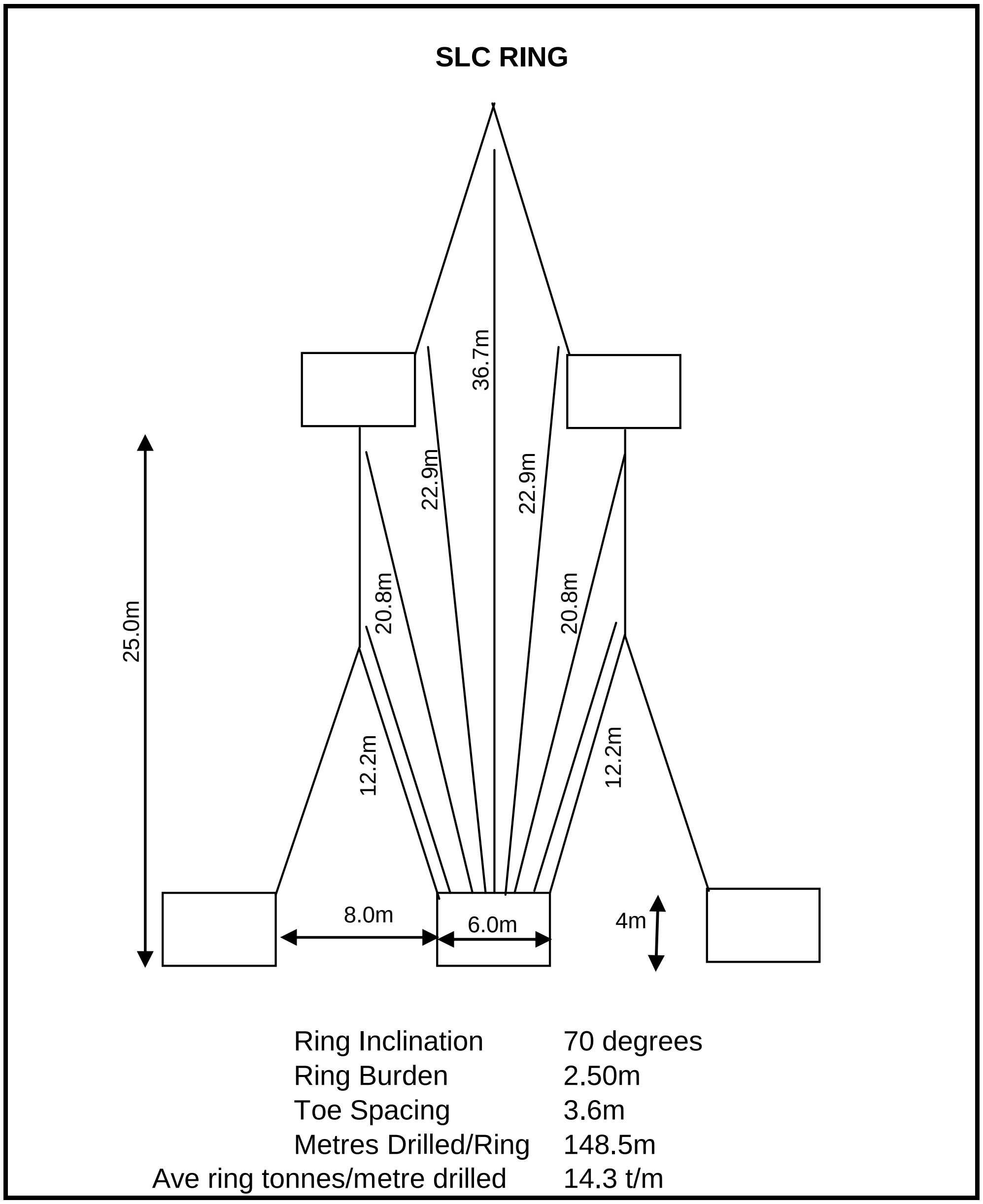
e) The mining recovery for the SLC has been estimated based on a certain portion of ore left behind in the cave, and the wall rock added to the SLC.

18.2.5 Drill and Blast Parameters

In SLC mining the blasted ore should have a finer average fragmentation than the average fragmentation of the unravelled and introduced waste rock. This will allow the draw and flow of broken ore in preference to the compacted coarser waste.

A seven hole drill ring (Figure 18.2.5-1) with 102mm diameter blast holes drilled on a burden of 2.5m with a nominal toe spacing of 3.6m has been designed for initial production drilling. The drill rings will be inclined at 70° towards the cave to improve the flow of blasted material.

Figure 18.2.5-1 Typical Ring Design at Akwaaba



18.2.6 Underground Infrastructure

The main underground infrastructure would comprise the decline, level development drives in ore and waste and the fresh (FAW) and return (RAW) air way shafts. Fresh air enters the mine via the decline and FAW and contaminated air exhausts from the mine via the RAW.

Other infrastructure includes:

- two crib rooms would be installed close to the FAW for the underground workforce to have their meals.
- pump stations and settling dams would be required to dewater the mine.
- sumps on every SLC lower access level, to collect and redirect all ground and service water to the settling dams, and pump stations.

- permanent substations located at 100m vertical intervals, for power reticulation underground. Electrical power supply to the underground workings will comprise of one 11 kV feeder down a series of diamond drill holes terminated in in-by boxes and one feeder down the ramp. The feeder down the ramp will supply power to the substations as well as illumination of the ramp and refuge bays located on the ramp. The second feeder will serve as a ring feeder.
- refuge chambers for safe location of underground personnel in the event of an emergency
- secondary means of egress established in the FAW for retrieval of personnel from the underground workings in the event of an emergency and/or blockages to the decline and portal access
- underground working party magazines for the storage of explosives and explosive initiators underground for use in development and SLC stope mining

18.2.7 Underground Equipment

The main items of underground plant comprise:

- two primary ventilation fans for exhausting the mine through the RAWs
- 110kW and 180kW secondary fans for mine development and production
- air compressor on surface (capable of 2.42 m^3/sec) delivering air at 7 bar.
- 800 metres of ladder way installed in the FAW
- The underground services namely service water, potable water, compressed air, electrical power and dewatering will follow the same route, up or down the ramp, to or from the access points for a mining area.
- Main pump stations have been designed to be located off the ramp at 2000mRL and 1752mRL, and be equipped with Mono E106 pumps.
- surface workshop for maintenance of all underground mobile fleet of trucks, loaders, jumbos, production drill rigs, light vehicles, IT’s and other equipment.
- two generator sets for back-up power.
- contractors plant supplied by the mining contractor during the development stage including jumbo, fan and pump starter boxes, portable pumps and secondary ventilation fans.

18.2.8 Mine Ventilation

Ventilating airflow will intake from surface via the main access decline and primary fresh airway (FAW) and, exhaust via the primary return airway (RAW). Both airways are located on the east side of the orebody and extend from surface to 2175 mRL.

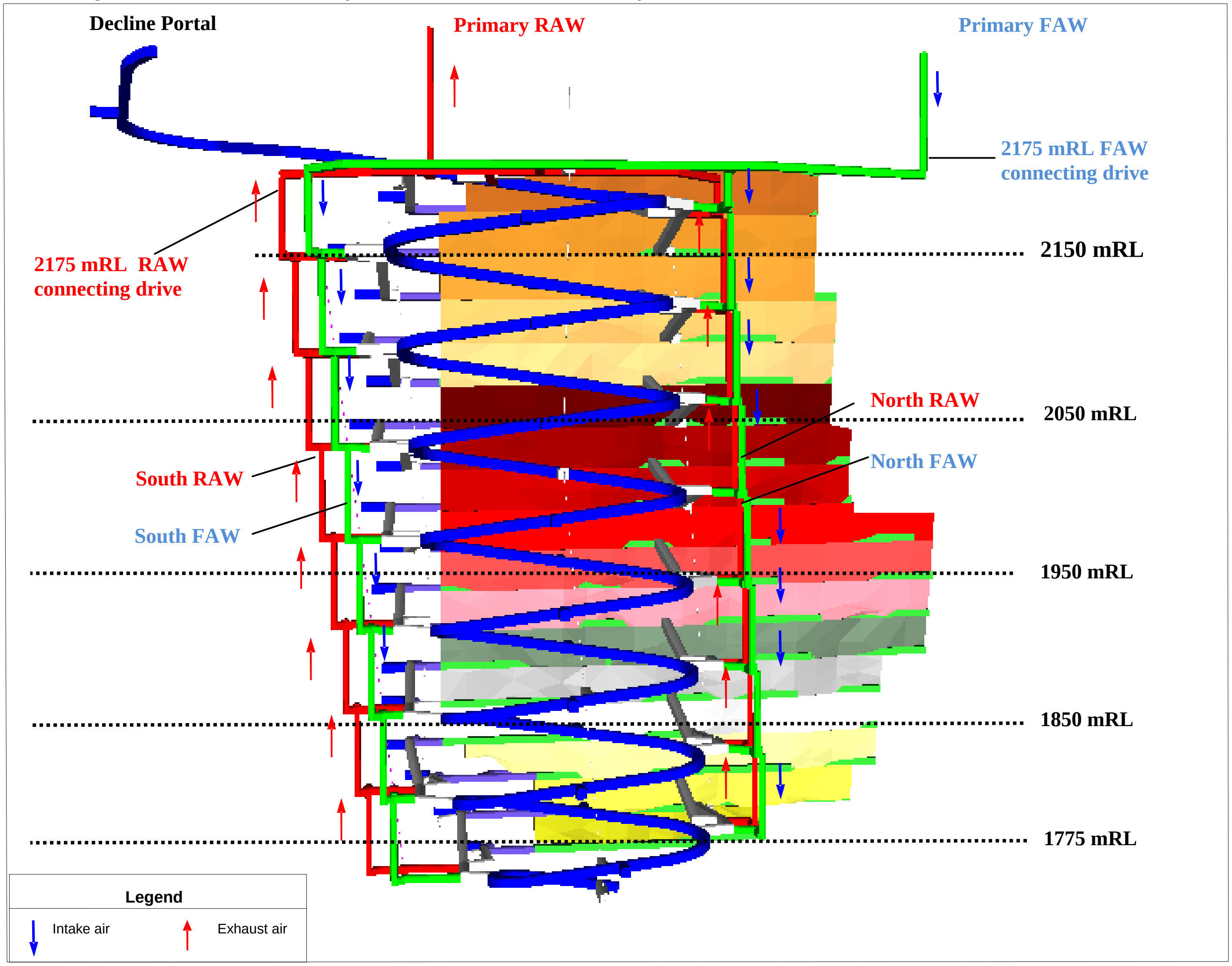
A drive on the 2175 mRL will connect the base of the primary FAW to the North and South extension raises below 2175 mRL. These 4.0m x 4.0m raises are designed to intersect the access drives on every level.

North and South RAW extension raises, developed at 4.5m x 4.5m, are designed to intersect the access drives on every level. An adjustable type regulator will be installed in each connection between the RAW extension and the level access x-cut. The 2175 mRL RAW drive will connect the main RAW to the North and South Extensions.

Auxiliary fans and duct will be installed adjacent to the FAW on each level access x-cut. These fans will force air into the working areas and the return air will be rejected to RAW on the level on which it was contaminated.

All development and production activities will be forced ventilated.

Figure 18.2.8-1 Primary ventilation distribution layout



18.3 Process

Ore is transported from the open pits to the plant by truck and deposited onto the Run-Of-Mine pad (ROM). Crushing of the ore takes place in three stages; a primary jaw crusher that reduces ore to less than 150mm; a secondary cone crusher and two tertiary cone crushers. Secondary crushed ore is conveyed to a screening section before two tertiary stage crushers. Oversized ore is subjected to further crushing and returned to the screens, the tertiary screens and crushers forming a closed circuit. Material passing through the tertiary screens joins the secondary screen undersize as final product which is then transferred to a Fine Ore Bin (FOB).

Grinding

Crushed ore is transferred from the fine ore bin at a controlled rate to the primary ball mill (a converted SAG mill) by means of a conveyor belt. Water is added to the mill feed to permit wet grinding and slurry pumping. Ore passes through the mill, is reduced in size and is pumped to hydrocyclones for classification. Ore that is less than 106 microns in size exits the grinding circuit together with some process solution and passes to the leaching circuit. Ore that has not been reduced to 106 microns is returned to two ball mills for further grinding and then returned to the cyclones.

Carbon-in-Leach

The leaching circuit is a carbon-in-leach circuit. The slurry gravitates across a trash screen into the pre leach tank and then to the first of nine agitated leaching tanks. Dilute sodium cyanide solution and lime are added to start the chemical dissolution of gold from the ore. Compressed air is pumped into each tank to accelerate the dissolution. Activated carbon granules adsorb the dissolved gold from solution. Carbon that has a high gold content is termed “loaded” and is pumped from time to time to the elution circuit for recovery of the gold.

Carbon Elution and Electrolysis

To recover gold from the carbon, batches of carbon are subject to a high pressure and temperature process called elution. A hot caustic solution is used to remove the gold from the carbon and into solution. The gold is recovered from the caustic solution by electrolysis onto mild steel wire wool cathodes in an electro-winning tank. The loaded wool is removed regularly, mixed with fluxing chemicals and smelted on site to produce bullion bars of approximately 75% purity. The bullion is shipped to a refinery for further refining and sale. After gold recovery the “barren” carbon is heated to reactivate it, and returned to the circuit.

Tailings Waste

Tailings from the CIL process are pumped to tailings storage facility (TSF). The TSF is a specifically engineered facility located three km west of the processing plant. After settling a quantity of process solution is recovered and pumped to the plant for re-use. Solids are retained in the facility.

18.3.1 Process Recoveries

The recoveries for the Chirano ore deposits based on the selected treatment route and historical operation of the plant, are presented in Table 19.3.1-1 below.

Table 18.3.1-1: Metallurgical Recoveries

Ore Type	% Recovery
Oxide	95.0
Fresh	90.6

The concentrator recovery for the period to the end of 2008 was 90.9%.

18.4 Markets

Gold produced at the mine site is shipped from site, under secured conditions, to a refining company. Under pre-established contractual instructions, the refiner delivers the refined gold directly to an account held by Tasiast with an international financial institution. Once received at the financial institution, the refined gold is sold with proceeds automatically credited to a Chirano bank account.

18.5 Contracts

Gold is sold in the market at spot as Chirano is not a party to any contract for the sale of its gold.

18.6 Environmental Considerations

The environmental baseline study has assessed the physical (atmospheric, surface and groundwater hydrology, soils and land use), ecological (flora and fauna) and socio-economic characteristics of the mine.

18.6.1 Climate

The mine falls within the wet semi-equatorial climatic zone of Ghana. It is characterized by an annual double-maxima rainfall pattern occurring in the months of March to July and from September to mid-November. The wet semi-equatorial climatic type is determined by the movement of the Inter-Tropical Convergence Zone (ITCZ). This zone oscillates annually about the equator attracting air masses from both the north and the south. The northern air masses locally called “Harmattan” bring hot and dry weather in December, January and February. The southern air masses, known as the “Monsoon”, bring cool and moist weather.

18.6.2 Air Quality

CGML's concession area is entirely rural and ambient air quality is considered good within the context of the region. There are no specific sources of gaseous or particulate emissions except from bush burning on farms and some local traffic along the unsealed roads. As a characteristic of this geographical part of the continent, the area is under the influence of the dust-laden Harmattan winds. This seasonal particulate pollution occurs principally during the three months of the dry season, from December to February.

18.6.3 Water Quality

Water quality was found to be typical of rural areas in Ghana. The pH was generally neutral to slightly acidic depending on the water body and the sampling period values ranging from 5.2 to 7.4 and a mean of 6.5. Apparent color and turbidity were very high for most of the samples and always exceeded the WHO guideline values. Levels of suspended solids (TSS) were generally high, although a few samples had concentrations below the 20ppm quoted by the WHO guideline values. Concentrations of nutrients were low and close to the natural background for all water samples analyzed. Up to fifteen trace metals were analyzed.

Concentrations of total iron (Fe) were high (0.02 to 831ppm) and exceeded by up to 8,310 times the WHO guideline values of 0.10ppm. The most recent maximum discharge value proposed by the Ghanaian EPA is 10.0ppm. This guideline value was exceeded 20% of the time. Manganese (Mn), aluminum (Al) and zinc (Zn) were also detected in concentrations often higher than the WHO guidelines values. Very low concentrations of arsenic (As) were found in most of the samples and for all the sampling periods. The highest value of 0.027ppm was detected in the Asanteman stream in December 2000.

18.6.4 Flora of the Mine Area

The Tano Suraw Forest Reserve is located within rolling hills and steep slopes, dissected by gullies. The forest still has its primary vegetation, which has been variously classified as “semi-deciduous” and as “moist semi-deciduous – southeast subtype” - MS (SE). Structurally, the forest sub-type is characterized by a 3-layered, tree strata, shrub layer and herbaceous layer.

Outside the Forest Reserves, the vegetation of the mine has been considerably disturbed through human activities, such as logging and farming. Off-reserve areas comprise mainly cocoa and good crop farms, and farm fallows created from the original forest vegetation as is evident from relict trees and re-growth vegetation. Thus, the current vegetation is very much degraded and has been reduced to a mosaic of secondary vegetation at different stages of succession. Most of the species comprising the regrowth vegetation were shrubs and ruderals found in open wastelands or associated with other vegetation types. A typical example is Chromolaena odorata, a ubiquitous plant commonly found on abandoned farms, roadsides and open wastelands.

18.6.5 Fauna of the Forest Area

Data and observations obtained during three fauna surveys of the two Forest Reserves indicate that the area has relatively good faunal diversity for both avifauna (birds) and mammals but many recordings are hearsay only, particularly with regard to the presence of endangered species. All fauna surveys concluded with the necessity to implement faunal protection/conservation measures, such as the demarcation of pockets of forest and corridors to ensure survival of endangered species. Outside the Forest Reserves, habitat disturbance resulting from subsistence farming, logging and hunting pressures has all but destroyed good faunal diversity, especially for the larger mammals previously found in the region.

18.6.6 Soils of the Mine Area

The soil resources of the CGML concession area have been mapped at a detailed level inside and outside the Forest Reserves. Soul examinations, measurements, recordings and soul identifications and descriptions were made at regular intervals along existing footpaths, roads, stream and river courses, Forest Reserve boundaries and especially cut traverses. The soils are described in detail according to the FAO (1990) method. The soils were further evaluated for their suitability for agricultural production as prescribed by the FAO (1976).

18.6.7 Land Use and Agriculture of the Mine Area

The area covered by the survey included three villages namely, Etwebo and Akoti in the centre, and Paboase on the southern border, along with 22 hamlets in the CGML concession. Land use along the drainage channel of the Suraw River and the roads from the north Tano Suraw Forest Reserve (TSFR) to Paboase, from Akoti to Kwakrom, Etwebo to Bron and Obra pit to Obrayeko were ascertained. From the northern to the central section of the concession, the drainage channels of the Suraw stream were encountered. Informal interviews were held with farmers and representatives of some settlements which were located in the concession area.

Farming based on traditional methods is the main occupation of the entire mine. Farming is dominated by cocoa and mixed food crop farms. There are several cocoa farms of different age classes, ranging from 1 year to 40 years, and mixed food crop farms of plantain, cocoyam, cassava and maize. In the inland valleys, mixed cropping is practiced.

18.6.8 The Socio-Economic Environment

The baseline study undertook a detailed socio-economic survey of the two Districts in which the mine is located, mostly in the Sefwi Wiawso District and partly in the Bibiani-Anwiaso-Bekwai District of the Western Region. Information on such topics as political administration, revenue sources, local economy and development, industry, banking services, health, education, water and sanitation among others has been obtained.

18.6.9 Impact Assessment and Mitigation Measures

The original environmental impact assessment resulted in the preliminary identification and evaluation of environmental impacts associated with the location, construction and operation of the mine involving surface mining from 14 different deposits and ore processing using conventional CIL techniques. The assessment process has been based on the interrelation matrix approach, which identifies the sources of impact to be various aspects of the environment.

18.6.10 Environmental Management Plan

A full EMP has been developed and submitted to the Authorities, which includes plans to monitor environmental impacts that are predicted to occur, as well as planned mitigation measures. These plans cover the period which extends from the construction phase to the mine post closure.

18.6.11 Rehabilitation and Closure Plans

A rehabilitation and closure plan, has been developed and submitted to the Authorities. Selected objectives of the rehabilitation and closure plans are summarized in Table 19.6.11-1.

Table 18.6.11-1: Chirano Mine Closure Objectives

Chirano Mine Closure Objectives	
Legal Compliance	Meets current Ghanaian legislation and anticipates changes to Ghanaian legislative and community expectations over the next 10 years
Corporate Policy	Complies with Policy
MCA Code of Environmental Management	Complies with the undertakings of the code
Risk of future non compliance	Low
Final Land Use	Sustainable agricultural industry

As part of the details rehabilitation and closure plan, a scope of work for each major component has been developed. Unit costs are based on information and experience of other similar type of operations in Ghana. These costs represent an order of magnitude only. Major costs, for example rock waste dump contouring, can be assigned as being incurred during operations.

CGML will finance part of the rehabilitation and closure aspects of the mine from the company's annual budget and operating costs. A detailed cash flow analysis of annual funds required has been developed.

The Akwaaba Underground EIS was submitted to the EPA in May 2008. An initial permit was issued to commence development of the underground mine. The final permit is expected to be issued in 2009.

CGML is in discussion with the Authorities to make provision for reclamation bond.

18.7 Taxation

Chirano's annual taxable profits are taxed at a flat rate of 25%. To date, amortization and depreciation of Chiranos's significant capital projects, from its initial development costs to its current expansion and ongoing exploration, has been applied using the established tax rates of amortization to offset the income otherwise subject to tax.

18.8 Capital and Operating Cost Estimates

18.8.1 Capital Expenditure

The estimated cost of the mill expansion is $52.2 million of which $32.2 million had been incurred up to the end of 2008. The remaining $20.0 million will be incurred in 2009.

The estimated cost of the Akwaaba development is $68.2 million of which $23.9 million had been incurred up to the end of 2008. It is estimated that $25.8 million will be incurred in 2009, $15.8 million in 2010 and the remaining $4.0 million will be incurred in 2011.

A further $23.8 million is forecast to be incurred in capital expenditure in 2009.

Table 18.8.1-1 below details the forecast capital expenditure for the life of mine:

Table 18.8.1-1: Mine Capital Expenditures

		LOM	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Mill Expansion	$ million	20.0	20.0									
Total Capital Cost UG	$ million	47.9	28.2	15.7	3.9							
TSF Upgrade	$ million	6.0		2.0		2.0		2.0				
Standby Power Station	$ million	3.0	3.0									
Infrastructure	$ million	3.8	2.3	0.5		0.5		0.5				
Equipment	$ million	8.8	2.3	1.0	1.0	1.0	1.0	1.0	1.0	0.5		
Open Pit Cutback	$ million	13.9	13.9									
Total Sustaining Capital	$ million	35.4	21.4	3.5	1.0	3.5	1.0	3.5	1.0	0.5		
Total Capital	$ million	103.3	69.6	19.2	4.9	3.5	1.0	3.5	1.0	0.5	0.0	0.0

18.8.2 Operating Expenditure

The life of mine unit operating costs are estimated in Table 18.8.2-1 below:

Table 18.8.2-1: Chirano Mine Operating Costs

		LOM
OP Mining Cost	$/t mined	2.18
UG Mining Cost	$/t mined	23.40
OP & UG Mining Cost	$/t milled	13.00
CIL Process Cost	$/t milled	7.00
Power Cost	$/t milled	3.39
G&A Costs	$/t milled	3.24
Total Cost	$/t milled	26.62

18.9 Financial Analysis

18.9.1 Cash Flow Forecast

A financial model based on the Life of Mine Plan is presented in Table 18.9.1-1. The model is based on the December 2008 reserve model.

This model has been prepared on the basis of the following assumptions:

- Pre-tax state royalty of 3.2%
- No escalation has been applied to operating costs.
- The mine life is 10 years.

The model is based on the mining and treatment of proven and probable reserves from the start of 2009 at an initial throughput rate of 2.6 mtpa increasing to 3.5 mtpa following completion of the mill expansion.

The principal results of the evaluation are:

- Net Present value at 7% US$496 million
- Net cash Flow US$ 666 million
- Total Royalty Payments US$ 53 million

Table 18.9.1-1: Cash Flow Forecast

	Units	LOM	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CIL												
Milled Tonnes	million t	32.1	2.6	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	1.5
Grade	g/t	2.23	2.24	2.45	2.43	2.35	2.45	2.50	2.46	1.74	1.45	2.22
Recovered Ounces	'000 oz	2,088	170	250	248	241	250	255	251	178	148	98
Gold Price	$/oz	728	850	850	800	800	800	800	800	800	800	800
Revenue	$ million	1,668	121	213	198	193	200	204	201	142	118	78
Total Operating Costs	$ million	845	62	105	113	86	92	94	90	86	66	51
Operating Cash flow	$ million	823	59	107	86	107	108	111	111	56	52	27
Royalty	$ million	53	4	7	6	6	6	7	6	5	4	3
Total Capital	$ million	103	70	19	5	4	1	4	1	1	-	-
Cash Flow	$ million	666	(15)	81	74	97	101	101	103	51	48	24
$NPV_{7\%}$	$ million	496										

18.9.2 Sensitivity Analysis

Sensitivity Studies have been undertaken on the financial model for gold price variations and changes in operating costs. The effect of these scenarios on net present value (NPV) are shown in table 18.9.2-1.

Table 18.9.2-1: Sensitivity Analysis

Chirano Mine Sensitivity Analysis		
Area	**% Change**	**NPV**
Gold price	20%	744
	10%	620
	0	496
	-10%	372
	-20%	248
Operating Cost	20%	367
	10%	431
	0	496
	-10%	560
	-20%	625

The sensitivity analysis demonstrates that the mine is most sensitive to changes in revenue which is equally influenced by gold price, grade and recovery.

18.10 Payback

Following the completion of the mill expansion, the mine will be able to fund all capital and restoration requirements through cash flow.

18.11 Mine Life

The current life of the mine is 10 years based on current reserves.

However, the exploration potential of the project is considered positive. Further Ore Reserves will potentially be defined from underground resource defined under the Paboase South and Suraw open pits.

19 INTERPRETATION AND CONCLUSIONS

Geological, mining and metallurgical data from Chirano Mine is sufficient to obtain a good level of understanding to assess the Chirano end December 2008 Mineral Reserve and Resource statement. The following is a list of general conclusions.

1. The geology is well understood for the Open Pit and Underground deposits. The gold mineralization types and extents are well defined and that knowledge has been integrated into the geologic block models, mining practice and metallurgy.

2. The quality of the assay data used for block model grade estimates is supported by good reconciliation of material milled to block model grades and tonnages.

3. The block models have been developed using industry-accepted methods.

4. The cutoff grade strategy employed is based on industry-accepted parameters.

5. Metallurgical expectations are reasonable and reflect the metallurgical results during the first year of production from the oxide ore.

6. Operating cost estimates are reasonable and have been calculated using sound industry-accepted practices.

7. The assumptions used for the economic forecast are within market parameters and are valid assumptions for an economic forecast.

8. There is potential to further increase the Chirano Mineral Resources and Ore Reserves.

20 RECOMMENDATIONS

Exploration at Chirano has been successful in converting inferred Mineral resources to measured and indicated resources and hence to Ore Reserves.

The potential for further underground as well as open pit resources is considered good and the use of ground geophysics such as pole-dipole induced polarization to explore for “blind” deposits is logical and further exploration is justified elsewhere on the mine to test lower order soil geochemical anomalies.

21 REFERENCES

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22 DATE AND SIGNATURE

May 14, 2009
Date

Hugh Stuart, B.Sc., M.Sc, MAusIMM
VP Exploration
Qualified Person

23 CERTIFICATES OF AUTHORS

CERTIFICATE OF AUTHOR

TO: British Columbia Securities Commission
Alberta Securities Commission
Saskatchewan Financial Services Commission
Manitoba Securities Commission
Ontario Securities Commission
New Brunswick Securities Commission
Nova Scotia Securities Commission
Securities Commission of Newfoundland and Labrador
Prince Edward Island Securities Office
Autorité des marchés financiers

I, Hugh Stuart, of Lingfield, Marton Road, Birdingbury, Warwickshire, UK, a qualified person responsible for the technical report entitled “Technical Report on the Tasiast Gold Project, Islamic Republic of Mauritania” dated May 14, 2009 (the “Technical Report”), do hereby certify that:

1. I am a full time employee of Red Back Mining Inc., 2101 – 885 West Georgia Street, Vancouver, British Columbia, Canada and am therefore not independent pursuant to National Instrument 43-101 (“NI 43-101”);

2. I hold a Bachelor of Science (Honours) degree conferred by the University of Manchester in Geology (1985) and a Master of Science degree conferred by the University of Leicester in Mineral Exploration and Mining Geology (1988).

3. I am a member, in good standing, of the Australasian Institute of Mining and Metallurgy.

4. I have been practicing my profession related to mining and mineral exploration for over 20 years including international managerial responsibilities covering exploration from grass roots to advanced exploration.

5. I fulfill the requirements to be a “qualified person” as defined under NI 43-101.

6. I have personally visited the Chirano Gold Mine on numerous occasions since April 2004. My last personal inspection of the project took place in April 2009.

7. I am the Vice President of Exploration for Red Back Mining Inc. and have been involved with the Tasiast Gold Project since its acquisition by Red Back Mining Inc.

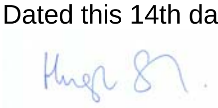
8. I am responsible for the overall preparation of the Technical Report.

9. To the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the report not misleading.

10. I have read NI 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form.

11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 14th day of May, 2009



Signature of Qualified Person

Hugh Stuart

CERTIFICATE OF AUTHOR

TO: British Columbia Securities Commission
Alberta Securities Commission
Saskatchewan Financial Services Commission
Manitoba Securities Commission
Ontario Securities Commission
New Brunswick Securities Commission
Nova Scotia Securities Commission
Securities Commission of Newfoundland and Labrador
Prince Edward Island Securities Office
Autorité des marchés financiers

I, Nicolas James Johnson, of 102 Colin St, West Perth, WA, a qualified person responsible for Sections 16.1 – 16.4 of the technical report entitled "Technical Report on the Chirano Gold Mine, Republic of Ghana" dated May 14, 2009 (the "Technical Report"), do hereby certify that:

1. I am an independent consulting geologist and Australian citizen residing in Perth, Western Australia. I am a full time employee with the firm of Hellman & Schofield Pty. Ltd. of Suite 6, 3 Trelawney Street, Eastwood, NSW.

2. I hold a Bachelor of Science (Honours) degree, graduating from La Trobe University in 1988.

3. I am a member, in good standing, of the Australian Institute of Geoscientists.

4. I have been practicing my profession related to mining and mineral exploration for 20 years.

5. I fulfill the requirements to be an "independent qualified person" as defined under "National Instrument 43-101".

6. I have personally visited the Chirano Gold Mine Property on two occasions, the latest being a 10 day period commencing on the 7th November, 2006 for the purpose of updating the resource estimates for the Akwaaba deposit..

7. I am responsible for Sections 16-1 to 16-4 of the Technical Report.

8. To the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the report not misleading.

9. I am independent of Red Back Mining Inc., applying all of the tests in section 1.4 of National Instrument 43-101.

10. I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form.

11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 14th day of May, 2009

Signature of Qualified Person

Nicolas James Johnson

<u>Certificate of Qualified Person</u>

TO: British Columbia Securities Commission
Alberta Securities Commission
Saskatchewan Financial Services Commission
Manitoba Securities Commission
Ontario Securities Commission
New Brunswick Securities Commission
Nova Scotia Securities Commission
Securities Commission of Newfoundland and Labrador
Prince Edward Island Securities Office
Autorité des marchés financiers

I, Bruce Gregory, Principal Mining Engineer, AMC Consultants Pty Ltd of 9 Havelock Street, West Perth, Western Australia 6005, Australia, a qualified person responsible for Sections 16.5.1 of the technical report entitled "Technical Report on the Chirano Gold Mine, Republic of Ghana" dated May 14, 2009 (the "Technical Report"), do hereby certify that:

1. I am an independent consulting mining engineer and Australian citizen residing in Perth, Western Australia. I am a full time employee with the firm of AMC Consultants Pty Ltd, 9 Havelock Street, West Perth Western Australia 6005, Australia.

2. I hold a Bachelor of Engineering (Mining) degree, graduating from Sydney University in 1981.

3. I am a member, in good standing, of the Australasian Institute of Mining and Metallurgy.

4. I have been practicing my profession related to mining for 28 years.

5. I fulfill the requirements to be an "independent qualified person" as defined under "National Instrument 43-101".

6. I have personally visited the Chirano Gold Mine Property in August 2004.

7. I am responsible for Sections 16.5.1 of the Technical Report.

8. To the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the report not misleading.

9. I am independent of Red Back Mining Inc., applying all of the tests in section 1.4 of National Instrument 43-101.

10. I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form.

11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 14 day of May, 2009

Bruce Gregory

Certificate of Qualified Person

TO: British Columbia Securities Commission
Alberta Securities Commission
Saskatchewan Financial Services Commission
Manitoba Securities Commission
Ontario Securities Commission
New Brunswick Securities Commission
Nova Scotia Securities Commission
Securities Commission of Newfoundland and Labrador
Prince Edward Island Securities Office
Autorité des marchés financiers

I, Anthony Chris Silveira, Senior Mining Engineer, with the firm of AMC Consultants Pty Ltd of 9 Havelock Street, West Perth, Western Australia 6005, Australia, the a qualified person responsible for Sections 16.5.2 and 18.2 of the technical report entitled "Technical Report on the Chirano Gold Mine, Republic of Ghana" dated May 14, 2009 (the "Technical Report"), do hereby certify that:

1. I am an independent consulting mining engineer and Australian citizen residing in Perth, Western Australia. I am a full time employee with the firm of AMC Consultants Pty Ltd, 9 Havelock Street, West Perth Western Australia 6005, Australia.

2. I hold a Bachelor of Engineering (Mining) degree, graduating from the University of New South Wales in 1994.

3. I am a member, in good standing, of the Australasian Institute of Mining and Metallurgy.

4. I have been practicing my profession related to mining for 15 years.

5. I fulfill the requirements to be an "independent qualified person" as defined under "National Instrument 43-101".

6. I have personally visited the Chirano Gold Mine Property in April 2008 and November 2008.

7. I am responsible for Sections 16.5.2 and 18.2 of the Technical Report.

8. To the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the report not misleading.

9. I am independent of Red Back Mining Inc., applying all of the tests in section 1.4 of National Instrument 43-101.

10. I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form.

11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 14 day of May, 2009

Anthony Chris Silveira