Updated NI 43-101 Technical Report Paul Isnard Project French Guiana

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Report Prepared for

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Summary (Item 1)

Property Description and Ownership

This Technical Report on Resources is for use by Columbus Gold Corporation (Columbus Gold) to further the evaluation of the Paul Isnard Project (Paul Isnard or the Project).

The Paul Isnard project area and mining concessions are located in the northwestern portion of French Guiana, South America. The Montagne d'Or area, which hosts the gold mineralization that is subject of this Technical Report, occurs within Concession C 02/46 in the southern part of the Project. Camp Citron, the base camp for the project, is located approximately 4 km northwest of Montagne d'Or. The property is accessible year around by air or seasonally by road.

The elevation of the Project is 130 m amsl. Due to its remote site location, significant infrastructure facilities will need to be constructed or upgraded for development of the Project.

Ownership

SOTRAPMAG SAS, a privately held company and wholly-owned subsidiary of Auplata S.A., is registered owner of the eight concessions comprising the Paul Isnard Project and applicant for the pending PEX described in Section 2.2.2. Columbus Gold has the right, pursuant to an Option Agreement with Auplata, SOTRAPMAG and Pelican Venture SAS, to acquire a 100% interest in SOTRAPMAG and the Paul Isnard mining concessions and pending PEX.

The mining concessions which cover an area of approximately 135 km^2 (13,500 ha). All mineral rights are administered by the Direction de l'Environnement, de l'Aménagement et du Logement (DEAL), a branch of the Ministère de l'Ecologie, du Développement Durable, des Transports et du Logement. The Project also includes a pending application for an exclusive exploitation permit (PEX), covering an area of 14.4 km^2, contiguous with Concession C02/46 in the Montagne d'Or area.

Royalties & Encumbrances

The Paul Isnard Project is subject to a Gross Sales Royalty (GSR) payable to Euro Resources SA on the first 5 Moz gold production from the Project at rate of 10% less $400/oz Au on the first 2 Moz, then 5% less US$400/oz Au on the balance. There is also a royalty payable to the Department of French Guiana, for distribution to the local communes (towns), of €224.18 (US$289.64)/kg gold production for small and medium sized companies and €448.36 (US$579.28)/kg for larger companies.

Columbus Gold has the right, pursuant to an Option Over Royalty Agreement with Euro Resources SA, to acquire the aforementioned GSR and replace it with a Net Smelter Returns Royalty (NSR) payable to Euro Resources SA on the first 5 Moz gold production on the Project at a rate of 1.8% on the first 2 Moz, then 0.9% on the balance. Finally, there is also an obligation to pay to Golden Star Resources LTD a US$1,000,000 payment upon the first commercial production of gold from the Project, to be paid either by Auplata SA or Columbus Gold depending on which party first initiates such production.

Environmental

The Montagne d'Or project area is an intermittently active exploration property centered in dense tropical rain forest. Exploration activities will require manual or mechanized line cutting for construction of access tracks, trenching, drill pads and camps. Environmental liabilities resulting from exploration activities are expected to be minimal, as natural vegetation regeneration and a high precipitation rate contributes to the rapid natural rehabilitation of project excavations and drill sites.

The mining concessions allow large-scale mine operations and are valid until 31st December 2018 with potential renewal for a maximum of 25 years conditional upon a number of conditions including economic viability.

The President of France initiated a review of the potential impacts of mining in 2008 to define the zones in which mining is authorized and under what conditions. The review is referred to as the "Scheme of Mining Orientation and Management of French Guiana" (the Scheme). The objective of the Scheme is to encourage and provide incentive, including security of land tenure and clear guidelines to development, to serious and environmentally responsible mining companies while inhibiting environmentally damaging illegal mining activities. The Project is located within an area, which has the most favorable classification (under the Scheme) for mining activity. The Scheme was passed into law in December, 2011 and became effective on January 1st, 2012.

Process & Metallurgy

There have been three metallurgical test programs conducted on Paul Isnard samples between 1998 and 2008. In these test programs, various metallurgical variables were examined to determine the optimum design parameters for the processing plant including:

- Gravity separation;
- Flotation;
- Cyanidation of whole ore and concentrates;
- Grinding size for liberation;
- Bottle roll testing; and
- Ball mill work index.

The results of the metallurgical testwork indicate that the gold is predominantly free. However, gravity concentrating methods alone will not recover a sufficient amount of the gold into a product that can be directly smelted. A satisfactory gold recovery of greater than 85% can be achieved by direct cyanidation or a combination of gravity and cyanidation of gravity tailings or flotation and cyanidation of flotation tailings.

The scoping level flowsheet is a combination of gravity and carbon-in-leach (CIL) of the gravity tailings for recovery of the gold into a doré. Due to the low copper grade, no recovery is included in this flowsheet or recovery circuits.

The proposed processing flowsheet for Paul Isnard is based on the scoping-level metallurgical test results as follows utilizing conventional technologies for the production of gold doré.

- Primary crushing using a jaw crusher;
- Grinding using a SAG –ball mill configuration;

- Gravity concentrating using Gemini and Diester tables for production of a gravity concentrate for direct smelting;
- Cyanide leaching and CIP;
- Carbon stripping; and
- Induction furnace for production of a gold doré.

Geology and Mineralization

The Paul Isnard Concession occurs within the Guiana Shield, a 900,000 km^2 segment of the Amazonian Craton of South America. The majority of the Guiana Shield formed during Proterozoic periods of intense magmatism, metamorphism and deformation that culminated in the Trans-Amazonian tectono-thermal event of 2.1 to 1.9 Ga. The low-grade, volcanic-sedimentary greenstone sequences and affiliated granite intrusives that comprise the shield yield U-Pb age dates between 2.25 and 2.08 Ga.

The greenstone belts of French Guiana are subdivided into two major groups. The northern group is associated with the NGT and includes the Paramaca Formation an assemblage of volcanic, volcaniclastic and sedimentary units. The southern group is associated with the CGSZ and both extend from Surinam through French Guiana. It includes sedimentary rocks of the Lower Orapu Formation and volcanic-sedimentary units of the Arima Formation (2.11-2.09 Ga), which unconformably overlie volcanic units of the Lower Proterozoic Paramaca Formation and the granite-gneiss complex of the *Guianese Massif Central* (2.3-2.2 and 2.13-2.08 Ga).

The Paul Isnard property lies within the northern greenstone belt and is comprised of mafic metavolcanics of the Paramaca Formation located south of the contact of the Arima and Orapu Formations. The geology is dominated by a large gabbro and diorite complex interpreted by some to be a basal portion of the Paramaca Formation. The greenstone belt locally is limited to the south and west by regionally-extensive post-orogenic granites and to the east by inferred high-grade metamorphic rocks of migmatitic and granitic gneiss.

At Montagne d'Or, the gold mineralization is hosted within a 400 m thick sequence of intercalated felsic and mafic volcanics with subordinate volcaniclastics that are assigned to the Lower Proterozoic Paramaca Formation. The units strike east-west, dipping steeply south and are exposed on the northern slopes of Dékou-Dékou Mountain. Gold mineralization is associated with primary sulfide minerals as replacements within pyrite and chalcopyrite. At a macroscopic scale, the following five types of mineralization have been identified in mapping and drill core logging.

- Semi-massive sulfides (SMS, >20% sulfides) with associated gold mineralization;
- Sulfides as disseminations and stringers with associated gold mineralization;
- Late-stage disseminated euhedral pyrite mineralization;
- Rhythymic mafic tuff with associated pyrrhotite mineralization; and
- Gold mineralization associated with quartz veins.

Mineral Resource Estimate

The Paul Isnard deposit was modeled primarily for gold. However, the copper content of each block was also interpolated. The gold block grade estimates were made using the 2.5 m bench composites. For copper, straight composites of the re-sampled intervals were used to estimate the block grades.

Mineral Resources are classified under the categories of Measured, Indicated and Inferred according to CIM guidelines. Classification of the mineral resources reflects the relative confidence of the grade estimates. The Paul Isnard mineral resource statement is presented in Table 1. The results reported in the mineral resource statement have been rounded to reflect the approximation of grade and quantity, which can be achieved at this level of mineral resource estimation. The 0.4 ppm Au cut-off grade was chosen for resource reporting based on; mining at US$2.50/t, processing at US$10.00/t, G&A at US$2.00/t, recovery of 95%, no NSR and a gold value of US$1,200.00/oz.

Table 1: Paul Isnard Mineral Resource Statement as of January 15, 2011

Resource Category	Au Cut-off (g/t)	Total Tonnes (Mt)	Au Grade (g/t)	Contained Au (Moz)
Inferred	0.4	36.7	1.6	1.9

The grade tonnage distributions of the inferred mineral resources at Paul Isnard are presented in Table 2.

Table 2: Paul Isnard Inferred Mineral Resource Sensitivity

Au Cut-off (g/t)	Total Tonnes (Mt)	Au Grade (g/t)	Cu Grade (ppm)	Contained Au (Moz)	Contained Cu(Mlb)
0.2	40.4	1.5	364	1.95	32.37
0.3	39.1	1.5	370	1.89	31.85
0.4	36.7	1.6	384	1.89	31.03
0.5	33.2	1.7	412	1.81	30.13
0.6	29.8	1.8	441	1.72	28.93
0.7	27.2	1.9	466	1.66	27.93
0.8	24.8	2.1	494	1.67	26.97
0.9	22.7	2.2	509	1.61	25.52

Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resource estimate will be converted into Mineral Reserve estimate.

Recommendations

SRK recommends that Columbus Gold conduct a drilling program targeting resource confirmation and expansion, conduct geotechnical drilling for pit slope stability analysis, and perform additional metallurgical testing before evaluating the options to proceed with a Preliminary Economic Assessment (PEA).

The resource confirmation drillholes should be positioned to test continuity of mineralization and provide grade confirmation. Once this is established, the well mineralized portions of the deposit should be infill drilled on 50 m centers. Sample analysis should be accompanied by a QA/QC program including standards, duplicates and blanks. Additional work could include: petrographic studies, whole rock analysis, detailed alteration and mineralogical studies as well as preliminary isotopic age dating, and fluid-inclusion geochemistry. These studies would provide verification of a geologic model to be applied to future exploration drilling.

Additional studies should include: bench scale metallurgical testing, establishing an environmental permitting time line and baseline environmental studies.

Table of Contents

List of Tables

List of Figures

Appendices

1 Introduction (Item 2)

1.1 Terms of Reference and Purpose of the Report

This report was prepared as a National Instrument 43-101 (NI 43-101) Technical Report for Columbus Gold Corporation (Columbus Gold) by SRK Consulting (U.S.), Inc. (SRK). The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in SRK's services, based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Columbus Gold subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits Columbus Gold to file this report as a Technical Report with Canadian securities regulatory authorities pursuant to NI 43-101, Standards of Disclosure for Mineral Projects. Except for the purposes legislated under provincial securities law, any other uses of this report by any third party is at that party's sole risk. The responsibility for this disclosure remains with Columbus Gold. The user of this document should ensure that this is the most recent Technical Report for the property as it is not valid if a new Technical Report has been issued.

This report provides mineral resource and mineral reserve estimates, and a classification of resources and reserves in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum Standards on Mineral Resources and Reserves: Definitions and Guidelines, November 27, 2010 (CIM).

1.2 Qualifications of Consultants (SRK)

The Consultants preparing this technical report are specialists in the fields of geology, exploration, mineral resource and mineral reserve estimation and classification, underground mining, geotechnical, environmental, permitting, metallurgical testing, mineral processing, processing design, capital and operating cost estimation, and mineral economics.

None of the Consultants or any associates employed in the preparation of this report has any beneficial interest in Columbus Gold. The Consultants are not insiders, associates, or affiliates of Columbus Gold. The results of this Technical Report are not dependent upon any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings between Columbus Gold and the Consultants. The Consultants are being paid a fee for their work in accordance with normal professional consulting practice.

The following individuals, by virtue of their education, experience and professional association, are considered Qualified Persons (QP) as defined in the NI 43-101 standard, for this report, and are members in good standing of appropriate professional institutions. The QP responsible for all sections is:

- Dr. Bart Stryhas, Principal Resource Geologist is the QP responsible for all sections of this report.

1.2.1 Details of Inspection

Dr. Bart Stryhas visited the Project property on July 15 and 16, 2007 and is the independent QP within the meaning of NI 43-101 for the preparation of the entire report.

1.3 Reliance on Other Experts (Item 3)

The Consultant's opinion contained herein is based on information provided to the Consultants by Columbus Gold throughout the course of the investigations. SRK has relied upon the work of other consultants in the project areas in support of this Technical Report. The sources of information include data and reports supplied by Columbus Gold personnel as well as documents referenced in Section 17.

The Consultants used their experience to determine if the information from previous reports was suitable for inclusion in this technical report and adjusted information that required amending. This report includes technical information, which required subsequent calculations to derive subtotals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, the Consultants do not consider them to be material.

1.3.1 Sources of Information and Extent of Reliance

The background studies and additional references for this Technical Report on Resources are listed in Section 17. SRK has reviewed the project data and, where appropriate, incorporated the results into this Technical Report. Revisions to previous data were based on research, recalculations and information from other projects. The level of detail used was appropriate for this level of study.

SRK's opinion contained herein is based on information provided to SRK by Columbus Gold throughout the course of SRK's investigations.

The Qualified Persons (QP) preparing and supervising this Technical Report have not relied on a report, opinion or statement of a legal or other expert, who is not a qualified person for information concerning legal, environmental, political or other issues and factors relevant to this Technical Report on Resources.

1.4 Effective Date

The effective date of this report is February 1, 2012.

1.5 Units of Measure

The metric system has been used throughout this report. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in U.S. dollars (US$) unless otherwise stated.

2 Property Description and Location (Item 4)

2.1 Property Location

The Paul Isnard project area and mining concessions are located in the northwestern portion of French Guiana, South America (Figure 2-1). The Montagne d'Or area, which hosts the gold mineralization that is subject of this Technical Report, occurs within Concession C 02/46 in the southern part of the Project. The project area extends from longitude 53° 53' 52'' W (UTM 178.475) to 54° 03' 09'' W (UTM 161.360), and latitude 4° 40' 59'' N (UTM 518.322) to 4° 51' 03'' N (UTM 536.922). Camp Citron, the base camp for the project, is located approximately 4 km northwest of Montagne d'Or and has Universal Transverse Mercator (UTM) coordinates of 171,623 E, 524,072 N.

2.2 Mineral Titles

2.2.1 Geopolitical

French Guiana has been an Overseas Department of France since 1946, as accorded in the French Constitution of September 28, 1958. French Guiana is a *Département* of France and is subject to French laws, with certain modifications and differences that are applicable to *Départements d'Outre Mer* (overseas departments). The *Ministre de l'Outre-mer* within the French government, is responsible for these departments. The local administration is run under the direction of the *Préfet*, who is the representative of the French government. In overseas *Départements,* the *Préfet* has more extensive powers than their counterpart in mainland France (Suter, 1999).

2.2.2 Mineral Rights and Properties

All mineral rights are administered by the Direction de l'Environnement, de l'Aménagement et du Logement (DEAL), a branch of the *Ministère de l'Ecologie, du Développement Durable, des Transports et du Logement*.

In French Guiana, mining concessions, exploitation permits (PEX) and exclusive exploration permits (PER) are paper locations. Their locations are reported in UTM, World Geodetic System (WGS) 84, Zone 22.

The Project is composed of 8 mining concessions which cover an area of approximately 135km^2 (13,500 ha). The concessions are listed in Table 2.2.1 and shown in Figure 2-2.

Table 2.2.1: Land Tenure of the Paul Isnard Project

# Mining Title	Type	Surface Km^2	Transfer to Sotrapmag	Expiry Date
C01/19	Concession	1.200	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
C02/24	Concession	4.471	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
C01/46	Concession	17.272	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
C02/46	Concession	15.075	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
C03/46	Concession	22.470	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
C01/48	Concession	24.500	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
C02/48	Concession	25.375	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
C03/48	Concession	24.469	Decree : 12/27/1995 (JO : 12/29/1995)	12/31/2018
	Total	**134.832**		

The Project also includes a pending application for an exclusive exploitation permit (PEX), covering an area of 14.4 km^2, contiguous with Concession C02/46 in the Montagne d'Or area. The location of the pending PEX is shown on Figure 2-2.

Nature and Extent of Issuer's Interest

Columbus Gold entered into an Option Agreement dated 30th November 2010, with Auplata S.A., SOTRAPMAG SAS, and Pelican Venture SAS (together, the "Optioners"), which was amended on May 25, 2011, June 6, 2011, June 15, 2011, and December 5, 2011 (as amended, the "Option Agreement"). Under the Option Agreement, Columbus Gold has the right to acquire a 100% interest in SOTRAPMAG (or the Project directly, at Columbus Gold's election) which holds the 8 mining concessions and pending PEX application comprising the Paul Isnard Project. The Option Agreement required Columbus Gold, among other things, to issue shares to the Optioners a total of 30,276,266 shares in the capital of Columbus Gold, and also complete a private placement to Pelican Venture SAS of 10,092,089 shares in the capital of Columbus Gold. These share issuances were completed on June 29, 2011. The completion by Columbus Gold of the acquisition of the project is now subject only to one condition, being the payment of US$500,000 upon the expiration of the non-objection period required by the appropriate department of the French government, including without limitation MEDDTL, which period is pending as at the date of this report. Location of Mineralization and Facilities

The Montagne d'Or exploration area is located approximately halfway up the steep northern slope of the Dékou-Dékou Mountain with mineral concession C02/46 (215) shown in Figure 2-2. The mineralization and proposed mining and processing facilities, with the exception of the man camp, are within mineral concession C02/46.

The mancamp for the current exploration and the proposed mining operation could be located at Citron Camp. Citron Camp is within mineral concessions C01/46 held by SOTRAPMAG and C01/32 held by Tanon S.A. (Tanon). The access road crosses two Tanon held mineral concessions. The road crosses Tanon held mineral concessions C01/32 between the mineralized zone and Citron Camp and mineral concession C01/33 north of Citron Camp (Figure 2-2). Columbus Gold does not have surface or mineral rights on the Tanon held mineral concessions.

2.3 Royalties, Agreements and Encumbrances

The Paul Isnard Project is subject to a royalty payable to Euro Ressources SA, former owner of SOTRAPMAG SAS and the mining concessions, on the first 5 Moz gold production from the Project. The royalty is payable as follows (Table 2.4.1):

Table 2.4.1: Royalty Payable

Gold Production	Royalty
To 2Moz	10% of gold sales price less US$400/oz.
2 to 5Moz	5% of gold sales prices less US$400/oz.

Columbus Gold has the right, pursuant to an Option Over Royalty Agreement dated December 2, 2011 with Euro Resources SA (Euro), to acquire the aforementioned GSR and replace it with a Net Smelter Returns Royalty (NSR) payable to Euro on the first 5 Moz gold production on the Project at a rate of 1.8% on the first 2 Moz, then 0.9% on the balance. In order to maintain this option, Columbus

Gold is required to pay Euro an annual option fee of $50,000 on the anniversary date of the agreement. In order to exercise the option, Columbus Gold is required to pay Euro $4,200,000 in cash; issue 12,865,600 shares in the capital of Columbus Gold to Euro, subject to adjustment; and issue the aforementioned NSR royalty to Euro. The option will remain exercisable until the earlier of (i) July 30, 2015; (ii) 120 days following the date on which Columbus Gold has earned a 100% interest in the Project; and (iii) 30 days following an anniversary date of the Option Over Royalty Agreement if an applicable annual maintenance payment has not been duly paid to Euro.

There is also a royalty payable to the Department of French Guiana, for distribution to the local communes (towns), of €224.18 (US$289.64)/kg gold production for small and medium sized companies and €448.36 (US$579.28)/kg for larger companies. The Euro-US dollar conversion is based on an exchange rate of US$1.29: €1.00.

Pursuant to an agreement dated November 19, 2009 between Golden Star Resources LTD (Golden Star) and Auplata SA (Auplata), Auplata agreed to pay to Golden Star the sum of US$1,000,000 on the date when gold is first commercially produced on the Project. Under an Agreement dated November 22, 2011, Columbus Gold agreed that it would be jointly and severally liable with Auplata for such payment, though the fourth amendment to the Option Agreement dated December 5, 2011 contains a provision under which Auplata agreed that it would pay the entirety of such payment to Golden Star in the event that its activities on the Project cause its activation.

The Paul Isnard Project is also subject to reclamation of illegal mining works, as described in Section 2.5, to a maximum expenditure of €350,000.

2.4 Environmental Liabilities and Permitting

2.4.1 Environmental Liabilities

The Montagne d'Or project area is an intermittently active exploration property centered in dense tropical rain forest. Exploration activities will require manual or mechanized line cutting for construction of access tracks, trenching, drill pads and camps. Environmental liabilities resulting from exploration activities are expected to be minimal, as natural vegetation regeneration and a high precipitation rate contributes to the rapid natural rehabilitation of project excavations and drill sites.

Prior to its acquisition by Auplata (and the current agreement with Columbus) SOTRAPMAG had entered various agreements, none of which remain in effect, with local alluvial gold mining companies to carry out operations at Paul Isnard under terms of small mine permits designated Authorization d' Exploitation (AEX). Holders of these permits are required by law to remediate worked areas, control downstream silting, and are prohibited from using mercury. These activities are monitored by government authorities and are not expected to create any liability to Columbus.

The areas of environmental degradation of concern to Columbus Gold are mainly associated with illegal artisanal placer mining. Some of the environmental damage is visible from aerial reconnaissance, and includes clearing of the forest adjacent to streams, severe downstream silting, and potential mercury contamination. Auplata, and by extension Columbus, has reached agreement with French regulatory authorities to dedicate up to €350,000 (US$452,000) to reclamation of the illegal mining sites.

A Nature Reserve, the Réserve Biologique Domaniale Lucifer Dékou-Dékou managed by the National Office of Forests (ONF) occurs north and south of Montagne d'Or. Its Management Plan from the ONF is yet to be ratified. The boundaries of this reserve overlap four of the Paul Isnard mineral concessions. Since these concessions exist and there has been continued exploration and mining activity in the area, the ONF has agreed to create several zones within the reserve boundaries where mining is permitted. The Montagne d'Or deposit itself is within a zone where mining is permitted, but quite close to the zone limit.

2.4.2 Required Permits and Status

The Paul Isnard Project is comprised of 8 mining concessions covering approximately 135 km^2. The mining concessions, combined with appropriate permits, allow large-scale mine operations and are valid until December 31, 2018 with potential renewal for a maximum of 25 years conditional upon a number of conditions including economic viability. The Project also includes a pending application for an exploitation permit (PEX) covering an additional 14.4 km^2. The PEX, combined with appropriate permits, also provides for medium to large scale mine operations and is granted for 5 years with two potential and maximum renewals of 5 years each.

Small-scale mining, including most alluvial operations, are carried out through exploitation authorizations (AEX) granted for areas no larger than 1 km^2. There are no current AEX within the Paul Isnard Project area. Exploration activities are undertaken under auspices of exclusive exploration permits (PER) which are issued through a competitive bid process. The Paul Isnard Project does not currently include any PER.

The Paul Isnard mining concessions, and the PEX pending issuance, require quarterly reporting to the State but carry no defined financial commitments for maintenance.

Large scale mining operations, as would be contemplated at Paul Isnard, require different levels of permitting from the local authorities. Such authorizations are subject to an approved feasibility study, a full environmental impact study, and public inquiries.

2.4.3 Government Approval of Operating Permits

Following the French government's decision in 2008 to reject the mining permit application by IAMGOLD for its Camp Caiman gold project in the Department of French Guiana, on the basis of project-specific environmental concerns, the President of France initiated a review of the potential impact of mining in the Department to define the zones in which mining is authorized and under what conditions. The proposed "Scheme of Mining Orientation and Management of French Guiana" {Project de Schéma Départmental d'Orientation Minière de la Guyane ("SDOM")} was passed into law in December, 2011 and became effective on January 1st, 2012.

There is an awareness and acknowledgement by French authorities that responsible development of the gold mining industry is important for the economy of French Guiana. Therefore, the objective of the SDOM is to encourage and provide incentive, including security of land tenure and clear guidelines to development, to serious and environmentally responsible mining companies while inhibiting environmentally damaging illegal mining activities. To achieve its duel objectives (economic development and environmental protection) the SDOM assigns all lands in French Guiana to one of five classifications requiring varying levels of obligations for mining companies operating in the Department.

The SDOM provides that the Department is covered by three zoning classifications setting out clear rules for mining therein. The three mineral land zone classes defined by the SDOM are:

- Area in which Mining Activity is Authorized. Mining activity, including open pit and underground mining, is authorized in these areas;
- Area in which Mining Activity is Banned Except for Underground Mining and Airborne Surveys. Underground mining is possible in these areas, but other mining activity is forbidden in these areas; and
- Area in which Mining Activity is Banned. All mining activity is forbidden in these areas.

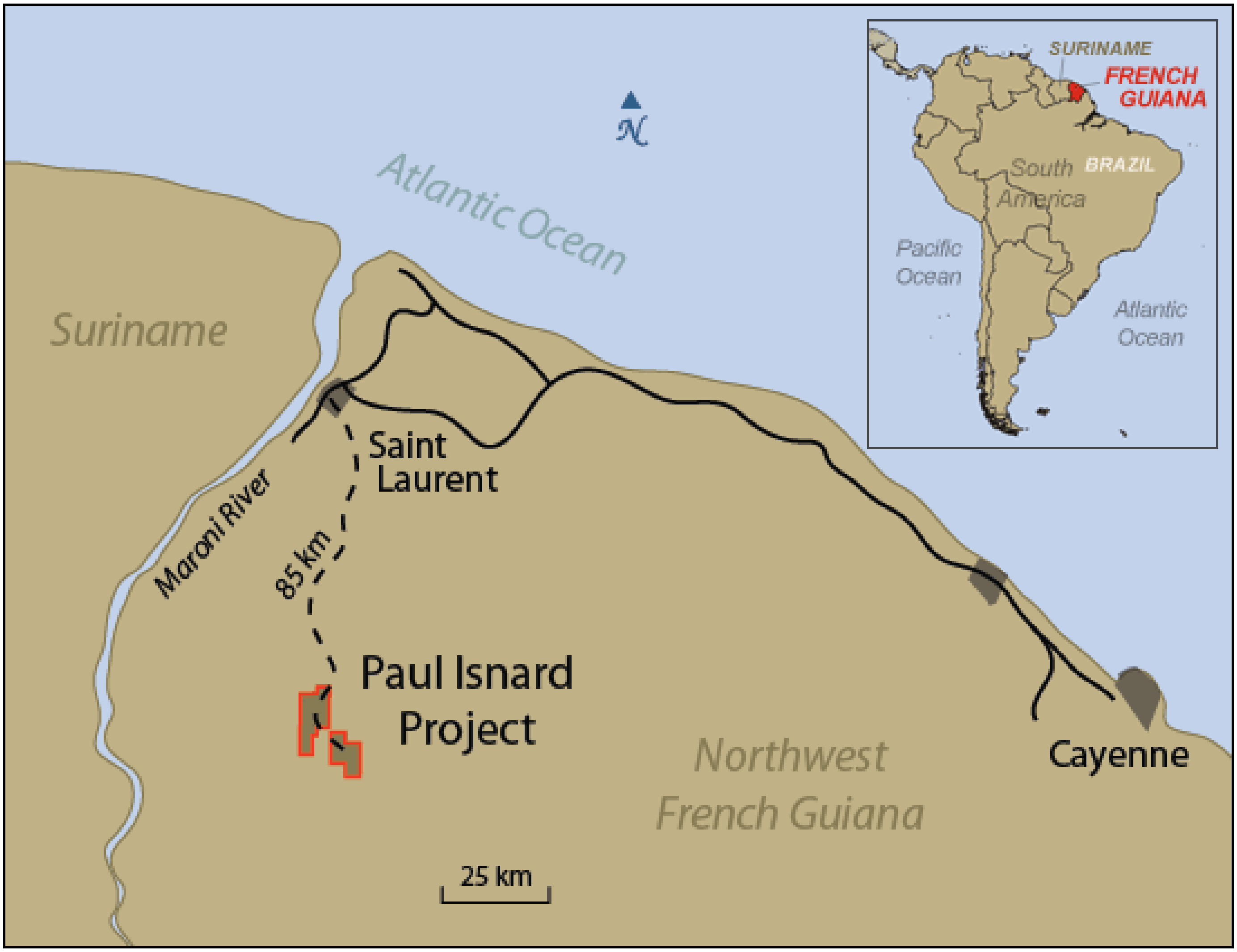
Most of the Paul Isnard concession area, including the Montagne d'Or gold deposit, lies within the classification designated as "Area in which Mining Activity is Authorized". Conditions to mining in these areas, which in actual fact would be applicable to large scale mining operations anywhere in the Department include:

- Demonstration of a viable mineral deposit;
- Completion of an Environmental Impact Study and Reclamation Plan; and
- Possible additional reclamation, or environmental investigations as may be required for the public interest, on or off site.

Figure 2-3 illustrates SDOM land classification of the Paul Isnard concession area.

2.5 Other Significant Factors and Risks

There are no other significant factors or risks.



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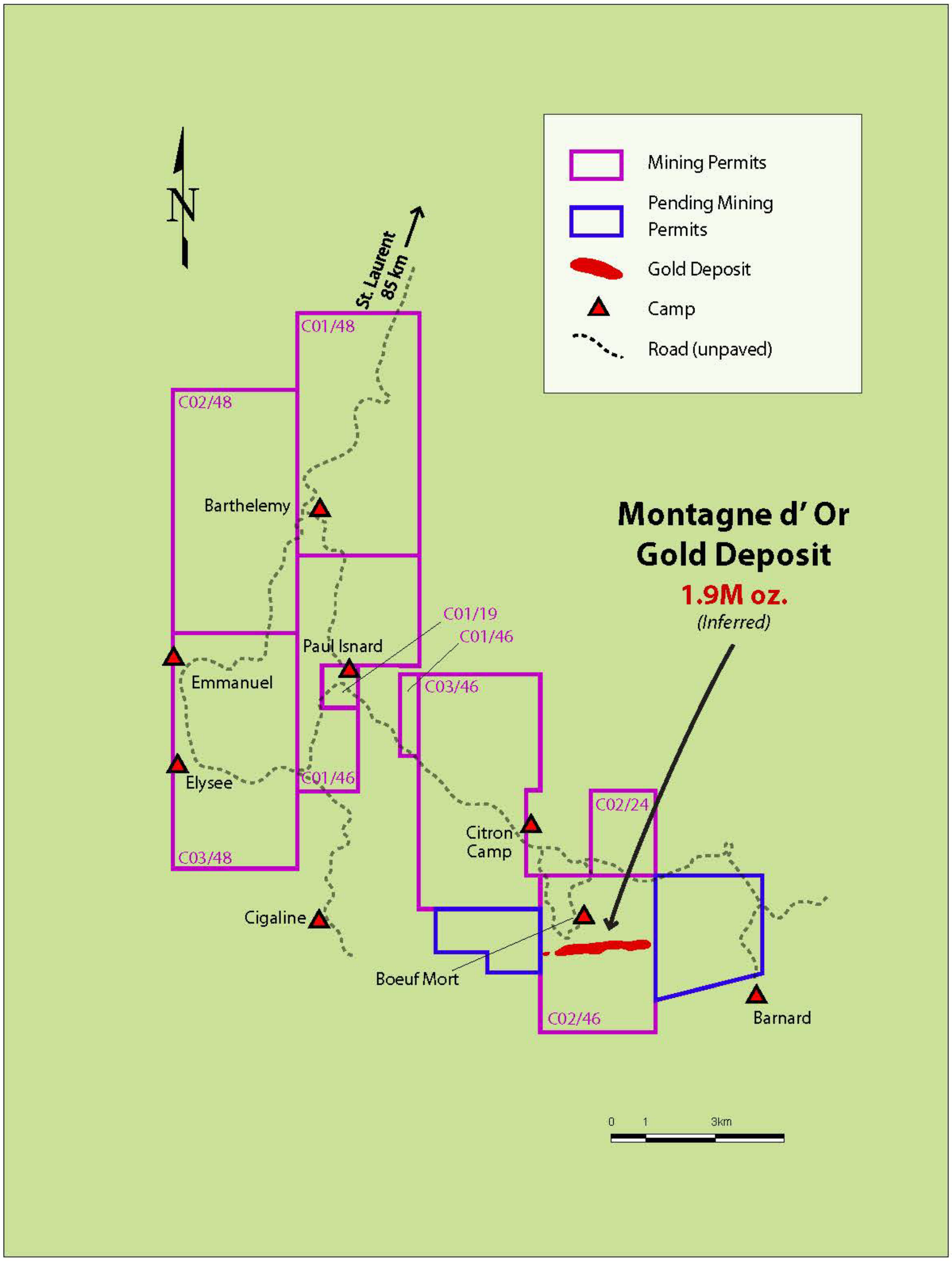
Paul Isnard Project, French Guiana

Source: Columbus Gold Corporation, 2010

Figure 2-1

Paul Isnard Location Map



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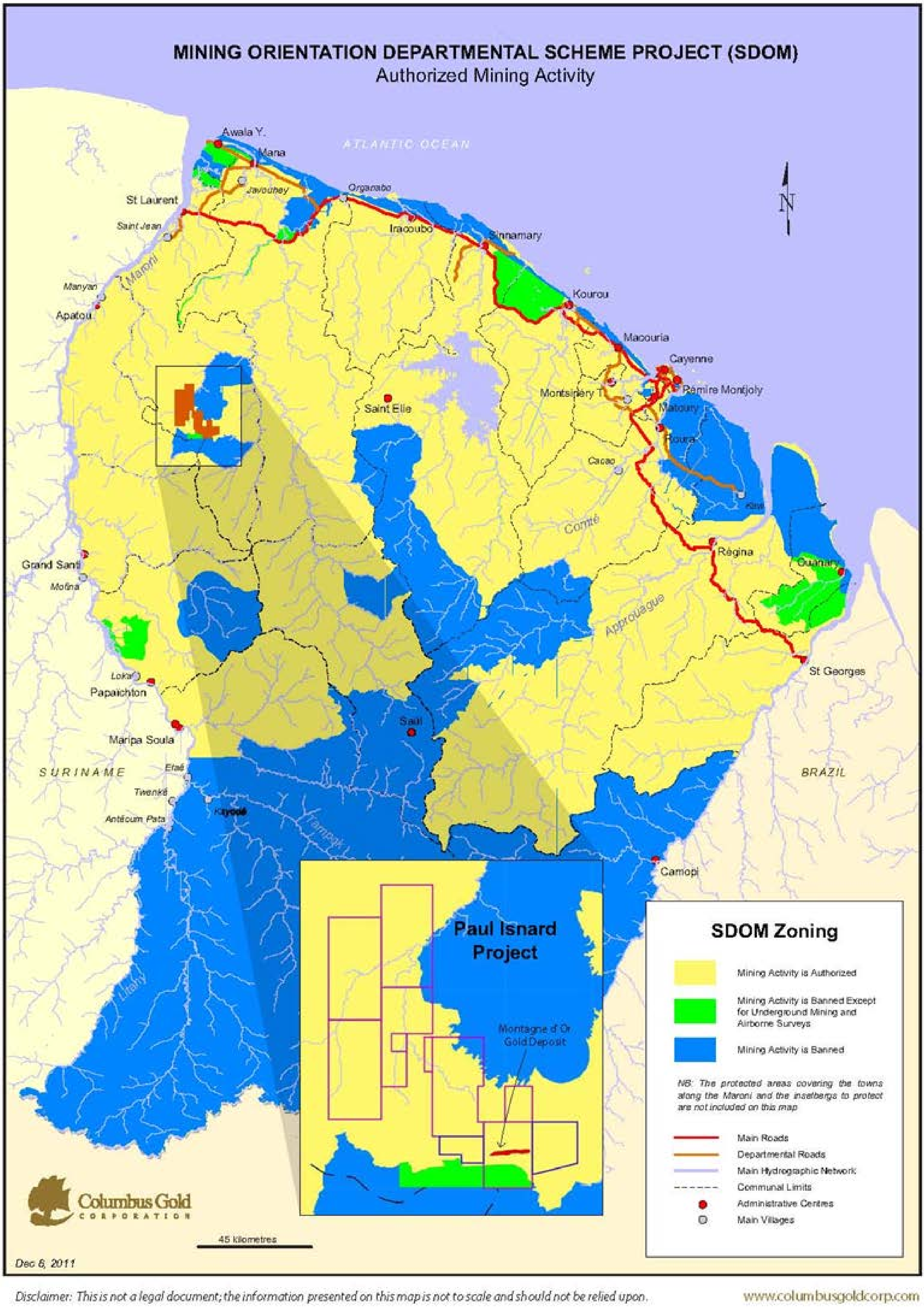
Paul Isnard Project, French Guiana

Source: Columbus Gold Corporation, 2012

Figure 2-2

Paul Isnard Concession Map



srk consulting	Paul Isnard Project, French Guiana Source: Columbus Gold Corporation, 2012	**Figure 2-3** **Paul Isnard SDOM Land Classification Map**

3 Accessibility, Climate, Local Resources, Infrastructure and Physiography (Item 5)

3.1 Topography, Elevation and Vegetation

The elevation of the Project is 130 m amsl. Three prominent topographical features dominate the relief of the region. The E-W trending Massif Dékou-Dékou range is located to the south of the property. The SW-NE trending duricrust plateau of Montagne Lucifer is located to the northeast. The NW-SE drainage system of the Roche River separates these two areas of elevated relief eventually joining the Eau Claire River to the SE of Dékou-Dékou. The two high relief areas are notable for their steep flanks.

There are numerous broad valleys, many of which have been exploited for their alluvial gold deposits. These are separated by areas of moderately rugged to more rounded hilly relief and often deeply incised valleys. To the east and north-east of the Massif Dékou-Dékou along the Montagne Patawa Range more rugged relief is again typical (Suter, 1999).

Most of the region is covered by a thick canopy of primary and secondary forest. The larger valleys which have been extensively impacted by alluvial mining and are now covered by secondary forest or grassy-scrub with bamboo.

3.2 Climate and Length of Operating Season

The climate is typically equatorial, with daytime temperatures between 29°C and 33°C, falling to 19°C to 23°C at night. There are two wet seasons; the main period is typically from April to end August, and the lesser one from mid-November to mid-March. The average annual rainfall is in excess of 2,000 mm with a minimum monthly rainfall of 50 mm. The humidity is constantly high, typically ranging between 78% and 92% (Suter, 1999). The operating season is year-round.

3.3 Sufficiency of Surface Rights

Surface rights on the mineral concessions are held by SOTRAPMAG s.a.r.l. (100% subsidiary of Auplata S.A.) and, on the PER applications are held by Auplata but are to be transferred to Columbus Gold once issued.

3.4 Accessibility and Transportation to the Property

The property is accessible year around by air or seasonally by road. Fixed wing aircraft are available from either Cayenne or St. Laurent. Charter flights are currently operated by private services. Helicopter access is also available from Cayenne through several companies and costs approximately US$2,000/hr. The flight from Cayenne is approximately 55 minutes and from St. Laurent is about 20 minutes.

There is a forest road from St. Laurent on the Moroni River approximately 120 km to the Paul Isnard project area. The first 65 km to Croisée d'Apatou is maintained by the State and supports all season travel. SOTRAPMAG has an exclusive right to the final 55 km. This section is currently being renovated by Auplata to accommodate normal vehicle access for servicing the site.

3.5 Infrastructure Availability and Sources

There is currently minimal infrastructure for development of the Project. Near Citron, there is an exploration camp, 500 m grassed airstrip for small fixed wing aircraft and an unimproved heliport. Access to the mine site area is by an unimproved dirt road from Saint-Laurent-de Maroni. Due to its remote site location, significant infrastructure facilities will need to be constructed or upgraded for development of the Project.

3.5.1 Power

There is currently no power line near the Project site. A 138 kV power line will likely need to be constructed from Saint-Laurent-de Maroni to support operations. Diesel electric power generators will be sufficient to support exploration and pre-production activities.

3.5.2 Water

Potable water is available on site, sourced from a 40 m drilled well.

3.5.3 Access Road

The first 65 km of the Paul Isnard access road, from St. Laurent to Croisée d'Apatou, is reasonably maintained by the State and passable by most vehicles in all seasons. SOTRAPMAG has an exclusive right to the last 55 km from Croisée d'Apatou to Citron Camp. This section is currently being renovated to accommodate normal vehicle access for servicing the site.

3.5.4 Man-Camp

Citron Camp is owned by SOTRAPMAG and provides all necessary facilities to service exploration activity at Montagne d'Or.

3.5.5 Communications

A satellite communications system will be required for communications. Typically, these systems employ a satellite telephone/data system linking the mine-process plant site to the mancamp and corporate office.

3.5.6 Heliport & Airstrip

The existing heliport is adequate for initial site activities, but will need to be upgraded once the project advances and transportation requirements increase.

3.5.7 Mining Personnel

Semi-skilled and unskilled labor is readily available in Cayenne, with most professional and technical personnel being trained in metropolitan France. Unskilled labor is also available in St. Laurent. Skilled labor will come from recruitment outside of the region. French labor laws apply to all disciplines, resulting in relatively high salaries and restrictive employment contracts compared to the neighboring countries of Suriname and Brazil (Suter, 1999).

3.5.8 Buildings and Ancillary Facilities

During the history of the project, two camps have been used as the principal bases for activities. Initially the existing mining village of Citron was used exclusively by SOTRAPMAG mining personnel. Subsequent to this, an exploration camp called Boeuf Mort was established approximately 5 km south of Citron and used as a base for work in the Montagne d'Or area. After the shut down of SOTRAPMAG activities in 1997, the Boeuf Mort camp was abandoned and all personnel moved back to the Citron village. The Boeuf Mort camp does not exist anymore, as having been destroyed during alluvial workings. The Citron village currently contains approximately 25 buildings. Citron village has been upgraded by Columbus and currently has an office with staff living facilities and kitchen, living quarters for about 25 SOTRAPMAG/Columbus personnel, core storage and logging facilities and heavy equipment service area. Several additional buildings are occupied by local alluvial miners.

3.5.9 Potential Tailings Storage Areas

Based primarily on recently flown site topography, a potential tailings storage site has been identified at the head of a large drainage valley (Topaz Creek) located directly north of the western parts of the mineralization. The area is covered by thick tropical rain forest type vegetation. No geotechnical drilling or testing has been conducted in the proposed area to date.

3.5.10 Potential Waste Disposal Areas

Two areas of potential waste disposal have been identified, each is located direct north of the east and west zone of mineralization, respectively.

3.5.11 Potential Heap Leach Pad Areas

Heap leach processing has not been investigated and therefore no potential heap leach areas are identified.

3.5.12 Potential Processing Plant Sites

A potential processing plant site has been identified on the flat ground locate directly northeast of the western zone of mineralization.

4 History (Item 6)

4.1 Prior Ownership and Ownership Changes

SOTRAPMAG SAS, a privately held company and wholly-owned subsidiary of Auplata S.A., is registered owner of the eight concessions comprising the Paul Isnard Project and applicant for the pending PEX described in Section 2.2.2. Columbus Gold has the right, pursuant to an Option Agreement dated 30th November 2010 with Auplata, SOTRAPMAG and Pelican Venture SAS, as amended, to acquire a 100% interest in SOTRAPMAG and the Paul Isnard mining concessions and pending PEX.

4.2 Previous Exploration and Development Results

The Paul Isnard concession has been a regional center of alluvial and colluvial gold production since 1873. Minor hardrock excavations of gold vein systems during an uncertain era are also scattered throughout the concessions. Mechanized "New Zealand" type bucket dredging commenced in the early 1900's and continued until dragline dredging began in 1949. Mining activity was delayed from 1950 through 1965 due to legal problems related to administrative delays. From 1965 to 1986, Compagnie Miniere de Paul Isnard (CMPI) held the mining permits and conducted placer mining operations. Total gold production from the Paul Isnard region is estimated at 2 M ounces. Alluvial mining has been mainly concentrated on the Roche-Lezard river system and its tributaries and the Elysee valley.

The property was purchased by local company, Societe de Travaux Publics et de Auriferes en Guyane (SOTRAPMAG) in 1986, which continued placer mining through to 1997. In October 1994, Guyanor Resources S.A. acquired all the shares of SOTRAPMAG and the eight concession blocks, with 25-year terms, totaling approximately 136 km^2 were officially transferred the new SOTRAPMAG company in 1995 by Ministerial Decree. In November 1999, Guyanor was granted one Type A permit (since converted to an Exclusive Exploration Permit (PER)) for 283 km^2 of prospective ground. The PER has been reduced to 140 km^2, renewed by EURO through November 2007, and is currently in review for an extension into 2010.

Early exploration work was first conducted by Bureau Minier Guyanais (BMG), a state mining group, at Montagne d'Or from 1930 to 1958, and by the Bureau de Recherches Géologiques et Minières (BRGM) from 1964 to 1991. The BRGM chose to focus their activities on the Paul Isnard region due to the economic importance of the alluvial deposits that made the area one of the most important gold producing regions in French Guiana. The Montagne d'Or bedrock mineralization was initially indicated by the BRGM regional geochemical sampling program in 1976, but was not recognized at the time. Reinterpretation of the data in 1984, suggested that elevated boron and potassium-barium values in the area may be important pathfinders to gold mineralization. Follow-up soil sampling and mapping in the area ensued over the next five years. In 1989, a 100 ppb Au anomalous zone was identified, and over the next few years a series of auger holes were drilled to a maximum depth of 6 m. Some grab and channel sampling followed, and a 1:4,000 detailed geologic map was constructed.

Guyanor conducted exploration during 1994 and 1995, using regional-scale remote sensing (LandSat, geophysics), geological examinations and geochemical surveys. An airborne geophysical survey of magnetics and radiometrics was flown in 1994 by Aerodat. This was conducted along 200 m north-south spacing over a 20 km x 40 km area, as part of Guyanor's semi-detailed airborne geophysical program over all the project properties in French Guiana and Surinam.

Guyanor entered into a Joint Venture (JV) with ASARCO, and La Source as a silent partner, from June 1996 to April 1998. Essentially, ASARCO provided funding for exploration of the Montagne d'Or zone. Firstly, 921 m of channel samples were collected in 1995 from 87 sites. A total of 56 diamond drillholes totaling 10,916 m were completed in 1996-97-98. In addition, from 1996 to 1998, the Montagne d'Or investigations program included; geological mapping, rock sampling, petrographic studies; ground magnetic surveys, pulse electro-magnetic (EM) and induced polarization (IP) surveys. Downhole pulse EM surveys were conducted on some drillholes in 1998. The exploration program between 1999 and 2000 consisted mainly of regional mapping and grab sampling. This was aimed at improving geological interpretation and locating other gold occurrences (mainly at Elysée area on the NW part of the concessions and on the PER).

Guyanor and Rio Tinto entered into a JV Agreement from January to September 2001. During this period, they retrieved and digitized all of the BRGM soil profile and grid geochemistry data over the entire Paul Isnard concession. Additional, soil sampling was conducted along ridges and spurs seeking extensions and enhancement of the Montagne d'Or mineralization. Twelve DDH were carried out on the Elysée target, and 2 groups of 3 DDH each were drilled on combined soil geochem and ground Mag anomalies in the Paul-Isnard concessions not far from the Citron village. On the SE part of Montagne d'Or, 3 DDH were drilled over a large IP anomaly. Due to weak results, not corresponding to the Rio Tinto objectives, Rio Tinto withdrew from the JV. Since 2001, the Montagne d'Or project has been on care and maintenance status.

The total drilling campaign to date includes 59 diamond drillholes at Montagne d'Or, totaling 11,421 m.

Golden Star Resources Ltd. Acquired a 100 percent interest in SOTRAPMAG and the Paul Isnard Project, subject to the royalty payable to Euro Resources S.A. described in Section 2.4, pursuant to a Settlement Agreement dated 18th November 2009. Auplata S.A. in turn acquired SOTRAPMAG and the Project, subject to the Euro royalty, in a Purchase and Sale Agreement dated November 19, 2009. Columbus acquired its right to acquire 100% of SOTRAPMAG and the Project through an Option Agreement, terms of which are outlined in Section 2.2.2, dated November 30, 2010 as amended thereafter. Apart from limited metallurgical testwork and a mineralo resource estimate carried out by SRK for Golden Star in 2007 to 2008. None of these groups had carried out drilling or substantive exploration activities on the Project.

Since mid-2011 SOTRAPMAG has carried out extensive facilities upgrades at Citron Camp and rehabilitated road access to the Montagne d'Or site. Columbus commenced diamond core drilling in late 2011 and has currently completed 14 holes for 4,882 meters with assays pending.

4.3 Historic Mineral Resource and Reserve Estimates

The Montagne d'Or gold deposit has one historic resource estimations done by Guyanor Resources in 1999. The 1999 resource estimation by Guyanor/Golden Star used a geologically constrained approach and reported resources at a 1.1gpt cut-off based on US$350/oz gold price. The 1999 resource estimation listed in Table 4.3.1 is not CIM-complaint, is not relevant to current disclosure standards and therefore, cannot be relied upon.

Table 4.3.1: Montagne d'Or Historical Resource Estimations

Year	Source	CIM Compliant	Classification	Au Cut-off (g/t)	Mt	Au grade (g/t)	Contained Au (Moz)
1999	Guyanor	No	Inferred Resource	0.5	42.3	1.4	1.90
1999	Guyanor	No	Inferred Resource	1.1	7.4	2.6	0.63

A modern, NI 43-101 compliant Mineral Resource estimate is presented in Section 12 of this report.

5 Geological Setting and Mineralization (Item 7)

5.1 Regional Geology

The Paul Isnard concession occurs within the Guiana Shield, a 900,000 km^2 segment of the Amazonian Craton of South America. The majority of the Guiana Shield formed during Proterozoic periods of intense magmatism, metamorphism and deformation that culminated in the Trans-Amazonian tectono-thermal event of 2.1 to 1.9 Ga. The low-grade, volcanic-sedimentary greenstone sequences and affiliated granite intrusives that comprise the shield yield U-Pb age dates between 2.25 and 2.08 Ga. The major structural features include the Central Guiana Shear Zone (CGSZ) and the North Guiana Trough (NGT). The CGSZ is a large-scale ductile shear zone, extends from French Guiana westerly through central Suriname and north-central Guiana. The NGT is interpreted to be a sinistral strike-slip structure formed during the Trans-Amazonian Orogeny (Voicu et al, 2001).

The greenstone belts of French Guiana are subdivided into two major groups (Figure 5-1). The northern group is associated with the NGT and includes the Paramaca Formation an assemblage of volcanic, volcaniclastic and sedimentary units. This Formation occurs extensively across northern French Guiana, it strikes N110°E and hosts a number of gold deposits including; Paul Isnard, Camp Caiman, St. Elie, Kool Hoven and Gross Rosebel (cf: Royal Hill, in Suriname).

The southern group is associated with the CGSZ and both extend from Surinam through French Guiana. It includes sedimentary rocks of the Lower Orapu Formation and volcanic-sedimentary units of the Arima Formation (2.11-2.09 Ga), which unconformably overlie volcanic units of the Lower Proterozoic Paramaca Formation and the granite-gneiss complex of the Guianese Massif Central (2.3-2.2 and 2.13-2.08 Ga). This group hosts gold mineralization at Benzdorp in Suriname, Yaou and Dorlin in French Guiana and numerous other smaller workings. Most of the remainder of the country is composed of the Lower Proterozoic granite-gneiss metamorphic complex of the Guianese Massif Central, and a central belt of Paramaca volcanic, volcaniclastic, and sedimentary lithologies.

The Project lies within the northern greenstone belt and is comprised of mafic metavolcanics of the Paramaca Formation located south of the contact of the Arima and Orapu Formations. The geology is dominated by a large gabbro and diorite complex interpreted by some to be a basal portion of the Paramaca Formation. The greenstone belt locally is limited to the south and west by regionally-extensive post-orogenic granites and to the east by inferred high-grade metamorphic rocks of migmatitic and granitic gneiss. To the north, a narrow band of Paramaca-Armina Formation is unconformably overlain by Upper Detrital Series (Ensemble Detrique Superieur-EDS) siliciclastic sediments comprised of the Bonidoro, Orapu and Rosebel Formations. The sediments are surrounded by gabbro and granite. The EDS sediments are interpreted as having been deposited in pull-apart basins associated with the NGT. The Paramaca and EDS are probable equivalent or correlatives of the Birimian and Tarkwaian sequences respectively of the West African Craton and may have been co-extensive prior to the separation of Gondwanaland in the Mesozoic.

5.2 Property Geology

At Montagne d'Or, the gold mineralization is hosted within a 400 m thick sequence of intercalated felsic and mafic volcanics with subordinate volcaniclastics that are assigned to the Lower Proterozoic Paramaca Formation (Figure 5-2). The units strike east-west, dipping steeply south and are exposed on the northern slopes of Dékou-Dékou Mountain. The eastern portion contains a preponderance of mafic volcanics relative to felsic volcanics. The mineralized units have been strongly deformed, as evidenced by a penetrative S1 foliation that locally transposes S0 and in places is mylonitic. The S1 foliation is constant throughout the section, striking 080° to 100° with a 70°S to sub-vertical dip. The intensity of deformation varies significantly over the distance of a few meters. The shear displacement is interpreted as dip slip movement. The project area is cross cut by post deformation swarms of mafic dikes.

Previous geological reports have interpreted the geology and mineralization at Montagne d'Or to represent a bimodal sequence of submarine volcanic flows and pyroclastic rocks hosting syngenetic exhalative, volcanogenic massive sulfide-affiliated mineralization. Alternative interpretations have also been offered in favor of a deformed, metamorphosed, epigenetic, quartz porphyry-related hydrothermal system. The merits of each of these hypotheses will be discussed below in Section 6.

The entire region has undergone Tertiary age lateritic weathering. The weathering surface is dissected to the south and north of the Montagne d'Or project site, particularly on the steep northern face of Dékou-Dékou where the erosion has deeply incised the underlying saprolite exposing fresh bedrock.

5.2.1 Lithology

The Montagne d'Or area is composed of a bimodal felsic and mafic igneous units with lesser volcaniclastics towards the base of the sequence. These are overlain to the north by stratified grey pelites, greywacke, and siltites of the Armina Formation. A major east-west shear zone forms the contact between the upper metasedimentary rocks and the bimodal igneous units.

Amphibolites are a common lithotype found nearby, particularly on Dékou-Dékou to the south of Montagne d'Or. These are typically fine to medium grained and composed of amphiboles with accessory intercalations of quartz. At Paul Isnard, they may represent mafic metamorphosed Paramaca units.

Lower Mafic Unit

This unit consists of mafic and intermediate mafic-banded tuffs. It is a local project differentiation between textural varieties of mafic rocks separating flows from dikes (described below). This unit consists of meter-scale rhythmically banded tuffs in its basal part and sedimentary, pyrrhotite rich pelites and graphitic schists in its upper part and is an excellent stratigraphic marker. Near the top of the unit, an East-West fault is defined by a graphitic marker unit.

One interpretation holds that the mafic banded tuffs are possibly deformed hyalopilitic zones formed between pillowed flows, and possibly define flow unit boundaries, but may also include hyperchlorite-sheared zones. Other units logged within this unit are composed of intercalated mafic and felsic horizons interpreted to mark a hiatus in volcanic activity. These felsic/intermediate sections are intercalated with sediments and graded bedding that consistently indicate a south-facing younging direction for the sequence. Some of the units may represent tectonized sills and the units are often altered to hyperchlorite bodies (Franklin, 1999).

An alternative interpretation is that the mixed mafic and intermediate units represent a mafic micro-porphyry. Texturally, the rock is holocrystalline and there is little evidence of volcanic glass or devitrified glass or pyroclastic crystalline fragments. The rock groundmass is aphanitic to fine-grained phaneritic, and overall shows equigranular to generally fine-grained feldspar micro-porphyritic texture. Petrographically, the mafic units are dominated by plagioclase-amphibole-biotite-(chlorite-actinolite-epidote-sericite-ankerite) ±quartz, and only trace magnetite. The mafic suite may represent a series of syn- and post-quartz porphyry sills or dikes, or represent pre-quartz porphyry wall rocks. Whole rock geochemistry shows the mafic rocks are calc-alkaline and mostly dioritic to weakly gabbroic in composition (Gold Fields Ltd, 2001).

Felsic Unit

This group consists predominantly of felsic rocks of rhyolitic to dacitic composition with local feldspathic masses present. The groundmass is essentially quartz and sericite, light gray in color and strongly foliated; stretched quartz eyes (augens) are common, with a bluish variety being distinctive. The rock is characterized by the ubiquitous and defining presence of 3 to 10% subhedral to euhedral bipyramidal quartz phenocrysts, enmeshed in a holocrystalline matrix of fine-grained quartz-feldspar-biotite- (sericite-chlorite), and lacking primary magnetite.

The drill logging at Montagne d'Or differentiated three general felsic units that are visually distinct. The "felsic tuff", "lapilli tuff", and "welded tuff" are project designations assigned to the felsic lithologies of Montagne d'Or for logging and mapping purposes. Franklin (1999) described the three varieties as facies of a pyroclastic ash flow sequence, and interprets the felsic section in terms of a subaerial, volcanogenic, bimodal sequence. He defines a basal "felsic lapilli tuff" as a coarse basal sequence composed of matrix-supported juvenile clasts to 5 cm in diameter. Most occurrences contain abundant quartz crystals, and have apparent reverse-graded bedding at their bases. His "felsic agglomerates" are interpreted as the coarsest facies of ash-flow sequences, with large quartz crystals within lapilli tuff units. These comprise the central portion of ash flows, composed of fine- to medium-grained ash units. Large quartz crystals similar to those in the "felsic agglomerates" are scattered through the section. The upper portion of each flow is composed of very fine material, with an aphanitic groundmass hosting quartz crystals in about the same abundance as lower units. The felsic rocks geochemically are akin to highly evolved rocks of the Canadian shield (Franklin, 1999).

These textural interpretations have been re-interpreted in light of the deformational history of the region. The felsic lithologies are alternatively interpreted as a quartz porphyry units, which have been altered, mineralized and subject to varying degrees of deformation.

Whole rock geochemistry data show that the felsic lithologies are calc-alkalic in magma-series chemistry, likely emplaced or deposited in an arc or back-arc basin environment. The whole rock compositions range between granite and granodiorite (Suter, 1999; Gold Fields Ltd, 2001).

Over 80% of the mineralization at Montagne d'Or is hosted in the felsic units. These define a major stratigraphic package hosting all varieties of the felsic lithologies. It predominates in the western and central portions of Montagne d'Or.

Upper Mafic Unit

This unit consists of alternating sequences of mafic flows, and intermediate to mafic tuffs and mafic dikes. It occurs predominantly in the eastern portion and appears to intercalate with the felsic unit.

The flows are generally non-schistose, fine grained, massive, finely feldspar phyric, weakly to moderately magnetic, and dark-gray to black in color. Occasional, vesicle and hyalopilitic zones are noted, and have been interpreted as evidence for a flow origin for the unit.

The mafic dikes are all very fine grained, and slightly chloritized along margins. Contacts are slightly oblique to schistosity. They are deformed, indicating emplacement early in the geological evolution of the site. These are interpreted as synvolcanic dikes and sills petrogenetically related to upper mafic units. The dikes show very poor to no lateral continuity.

Re-interpretation of the geochemistry, mineralogy, and structural setting of the mafic units suggests they may be a calc-alkaline dioritic complex related to the larger gabbro/diorite complex located to the north of Paul Isnard. The “flows” are also re-interpreted as portions of a dioritic plutonic complex. The mafic (diorite) units are pre-quartz porphyry in timing of their emplacement, and conceptually represent the basement to the system, possibly a marginal phase of the large gabbro complex located to the north of the Montagne d’Or area.

Sedimentary Unit

The sediments occur predominantly in the southern part of the property. They overlie felsic units and form a sedimentary cap to the section. They are interpreted to represent a hiatus or waning stage in felsic volcanism, and occur at both the base and top of the section. On the north end of Montagne d’Or, the sediments form rhythymically-banded fine-grained, occasionally graphitic intercalations. To the south, a series of quartzites (metamorphosed cherts), black shales and pelitic and graphitic schists become more dominant in the upper part.

Intermediate Intrusive

This unit occurs in both the mafic and felsic lithologies of the Paul Isnard area. It is a unique and easily identifiable unit that forms an apparent stratigraphic or structural marker. Two stratigraphically-distinct intermediate intrusive units have been identified. These units form tabular bodies parallel to schistosity but locally cross-cut the volcano-sedimentary package. The unit was originally logged and described as a lapillistone or a welded tuffaceous unit. Petrographic examination shows the lapilli are actually relict feldspar crystals replaced by albite, epidote, and quartz, while the groundmass is composed of a fine-grained aggregate of quartz, feldspar, mica, and carbonate. The feldspar phenocrysts are deformed into sub-rounded ovoid masses, typically with quartz and carbonate pressure shadows. Biotite grains are aligned in the plane of foliation. The textures and mineralogy indicate it is clearly an intrusive occurring as thin, distinct sills (Franklin, 1999). The unit is also described as a feldspar ± quartz porphyry. The rock carries from 2 to 10% sodic plagioclase phenocrysts contained within a holocrystalline fine-grained phaneritic feldspar-quartz-biotite-(sericite-chlorite) matrix, and very few and rare quartz phenocrysts.(Gold Fields Ltd., 2001).

Quartz veins

Quartz veins, per se, are not generally associated with mineralization and vary in width from millimeter to meter scale. Larger veins are more common in the mafic units, likely due to late brittle deformation. Within mafic flows and intrusions, they occur as white, meter scale veins that cross-cut lithologic layering. The quartz veins within the felsic units are thin, white or blue-gray color and they transect the S_1 schistosity. The Gustave vein is a large feature in the eastern part of the property striking approximately 135º.

Weathering Products

The Montagne d'Or project area is covered by an alluvial and colluvial sequence, which has undergone extensive, Tertiary lateritic weathering. The colluvial sequence at Dékou-Dékou Mountain is sharply truncated by the steep and incised slopes. Here, a thin (<1.0 m) colluvium overlies either a thin (1.0 to 2.0 m) zone of red lateritic massive clay, or else is sited directly above saprolite or sap-rock (transition zone into fresh rock). Fresh rocks are only mapped in steep valley incisions and creek beds. A typical lateritic profile in the project area is comprised of the following weathered regolith lithologies.

- 0 – 1.0 m soil, colluvium;
- 1 – 3.0 m massive, ochreous-red clay with quartz and saprolite fragments;
- 3.0 – 6.0 m mottled zone or mixed lateritic clay-saprolite zone;
- 6.0- 15.0 m saprolite;
- 15.0-20.0 m sap-rock/transition zone; and
- 20.0+ m fresh bedrock.

The depth of lateritic clays overlying the saprolite is approximately 4m with massive non-pisolitic clay as the predominant weathering product. Duricrust is developed locally on the Dékou-Dékou Ridge and is widespread on the Massif Lucifer plateau; truncated and/or red gravosol lateritic profiles are typical (Klohn Crippen Berger, 2007). A small portion of the gold resource occurs in saprolite.

5.2.2 Alteration

The alteration products at Montagne d'Or formed through partial replacement of all lithologies by Fe- and sulfide rich fluids. The predominant additions to the rock geochemistry were sulfur and iron, as well as potassium, gold, and base metals, and concomitant removal of sodium and calcium. The precipitation mechanism was likely direct interaction of the hydrothermal fluids with the country rocks.

The hyperchlorite zones at Montagne d'Or are composed of variably chloritized portions of nearly all lithologies. They occur predominantly in the mafic volcanic units, intermittently in the felsic units and rarely in mafic intrusive units. The mineralogical and textural characteristics of the zones are quite similar in both mafic and felsic units. The hyperchlorite alteration zones are composed of well-foliated biotite (with incipient chlorite replacement), and locally contain a calc-silicate-rich assembly of calcite actinolite, garnet, quartz, calcite-dolomite and magnetite + pyrite, chalcopyrite and pyrrhotite. The magnetite within this assemblage appears to be hydrothermal, and some magnetite-rich intervals with sulfides can be highly auriferous. These zones are interpreted as reflecting primary mineralization as opposed to post-mineral processes.

Within felsic rocks, the edges of the felsic unit are characterized by chlorite veining. Quartz phenocrysts are preserved while most of the primary textures are destroyed, particularly within central parts. Sulfide rich zones up to 50% can be associated with the chloritic alteration. Some units logged as mafic tuff may actually represent highly chloritized felsic units. Visual separation of hydrothermal and metamorphic chlorite is very difficult.

Chloritization occurs as a pervasive alteration of mafic units, and as millimeter-scale veinlets within felsic lithologies. The chlorite is Fe rich, in contrast to Mg rich chlorite typically associated with VMS type alteration. There is no correlation noted between chloritization and gold content. There is, however, a weak correlation between hypochlorite zones and gold mineralization. The hyperchlorite zones are typically deficient in gold but commonly located adjacent to strongly auriferous zones.

The prominent addition to the mafic rocks is Fe^{3+}, as well as gold. This is in part due to addition of sulfide, and perhaps to formation of Fe rich chlorite. The addition of K_2O, as either sericite, secondary biotite, or secondary K-feldspar is also present. Alteration is typically strongest at the margins of the mineralized zones.

Silicification is fairly pervasive in all volcanic units. Within the center of the Montagne d'Or deposit, the less silicified units tend to have a higher sulfide content.

Sericitization is a major and widespread alteration feature within the felsic units. It is interpreted as a later overprinting alteration stage on an earlier secondary K-feldspar assemblage (see Mineralization section). There does not appear to be any association between sericitic alteration and gold content. However, the early BRGM regional geochemistry showed that K and Ba are elevated proximal to faults and shear systems. This feature in time provided the pathfinder to the Montagne d'Or gold mineralization.

Carbonate alteration occurs within felsic rocks as fine stringers and replacements. Within mafic units, calcite development is more pervasive, occurring as massive replacement within rhythmically banded tuffs, and as carbonate-chlorite or quartz-carbonate veinlets. It is difficult to separate the hydrothermal alteration carbonates from that derived by metamorphic processes. There is no correlation between carbonate alteration and gold content noted.

Normative corundum plots derived from ICP analysis of altered rocks from Montagne d'Or show a distribution of high normative corundum values at a high angle to the strike of the mineralization. This zonation is interpreted as defining a fracture system which may have controlled hydrothermal flux and alteration related to the mineralization. On the western end of the mineralized zone, the aluminous units strike N30°W, and on towards the eastern end strike north-south.

5.2.3 Structure

The Paul Isnard area has experienced two distinct deformational events. The first involved ductile deformation during the Lower Proterozoic accretionary arc tectonism that formed the Guiana Shield. The second is related to more brittle deformation associated with the faulting within the NGT. Figure 5-2 presents a chronological accounting of events which have affected the area.

The first phase of regional deformation is associated with NE-SW compression developing the pervasive S_1 schistosity striking 080° to 100° and dipping steeply south. This event postdates mineralization as evidenced by the highly deformed sulfide fabric. The development of the S_1 schistosity was accompanied by upper greenschist and lower amphibolite facies metamorphism affiliated with the emplacement of granitic plutons and migmatites. Peak metamorphic temperatures in the 420° to 530°C range and pressures in the 2.1 to 3.8 kbar range are indicated from the petrographic assemblages. According to the BRGM, the minerals of the greenschist facies are retrograde products of an earlier amphibolite facies, peak metamorphism. The mineralization at Montagne d'Or is somewhat anomalous from others in the area, due to its higher degree of peak metamorphism.

The intensity of shearing and isoclinal folding associated with the S_1 fabric at Montagne d'Or ranges from modest to extreme. The intensity of foliation development is controlled by the relative rheological susceptibility of the various rock types. Large scale folding is not well documented, rather most folds are small-scale asymmetric folds likely related to ductile shearing. Much of the historical interpretation of sedimentary laminations, tuffaceous compositional banding, and pyroclastic welding may be re-interpreted as due to transposition of compositional layering during ductile shearing and small scale isoclinal folding.

The second phase of regional deformation postdates the EDS sediments and is related to sinistral transcurrent tectonism, marking the contact between the NGT and Paramaca greenstone units. As a result of the second deformation, the earlier S_1 schistosity is locally crenulated. A weak S_2 fabric is characterized by a spaced cleavage, which strikes 060°. A well-developed set of faults and fractures with four principal orientations were also developed (Figure 5-3). The relative intensity of these brittle structures listed from strongest to weakest are:

- North – South (48%);
- Northeast - Southwest (28%);
- Northwest – Southeast (16%); and
- East – West (7%).

The northwest-southeast and northeast-southwest faults appear to be conjugate sets with relatively small displacement. Relative movement along the former set is dextral, with an uncertain degree of vertical component in it. The northeast-southwest structures are generally associated with D_2 deformation throughout French Guiana.

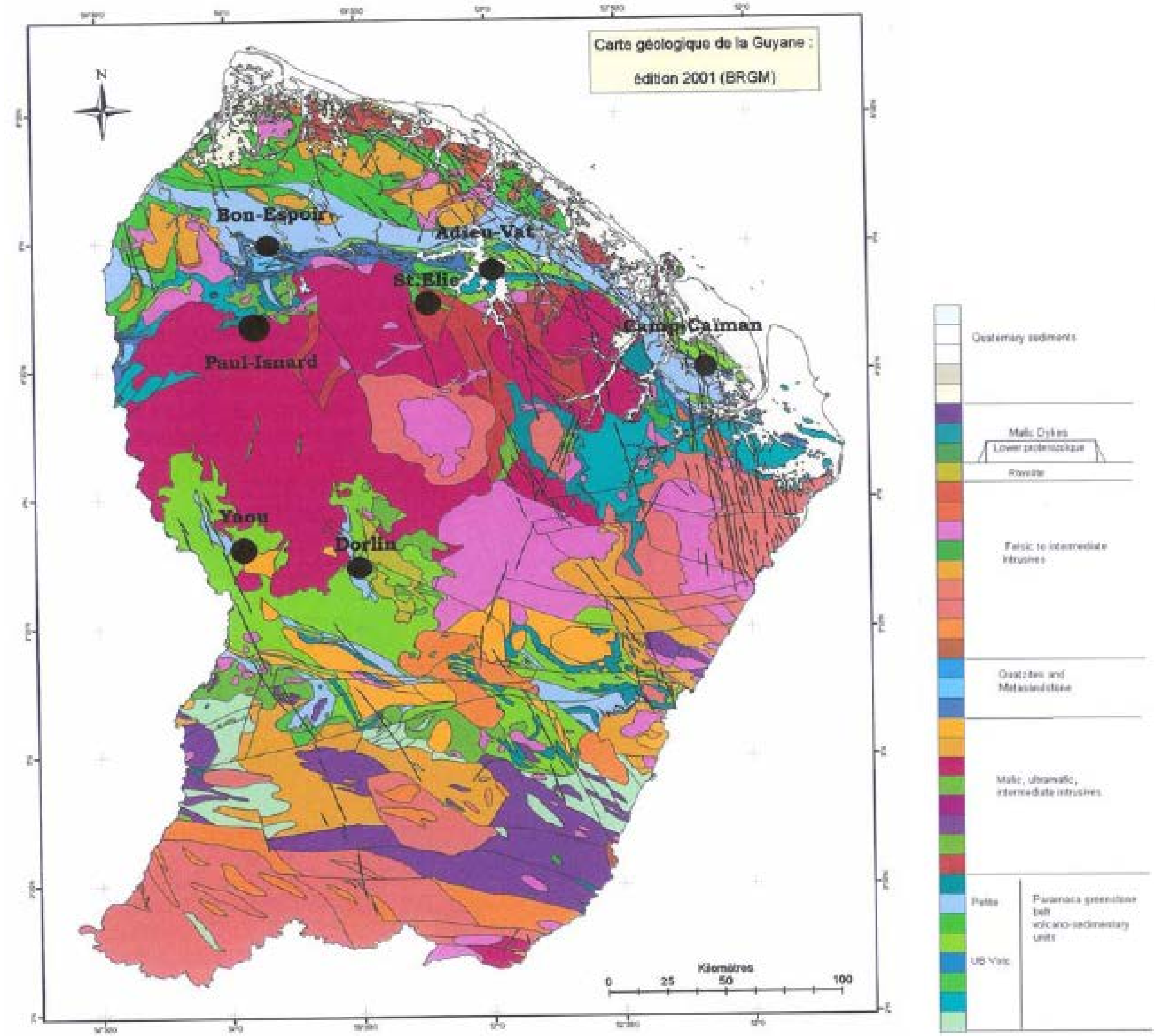
At Montagne d'Or, the east-west fracture systems follow the well-developed ductile fabric as shown by the major fault marking the contact between the Paramaca and EDS units, and the contact between the altered greenstones that host the Montagne d'Or gold mineralization and the amphibolites to the south. These structures can be traced on the regional geophysical maps into the Mana River to the southeast. The D_2 movement is interpreted to be normal-sinistral, related to transcurrent movement and reactivation of earlier ductile fabric. At its westerly limits, these fault/contacts are deflected to a southerly strike, in an area of southeast-verging thrust structures.

Interpretation of the original character of gold mineralization requires that the effects of deformation and metamorphism be subtracted from the observed physical and chemical state of the mineralization state. The effects of shearing, folding, and metamorphism clearly overprint and post-date mineralization. The structural relations present at Montagne d'Or indicate that the mineralization is neither shear-hosted nor metamorphic in origin.

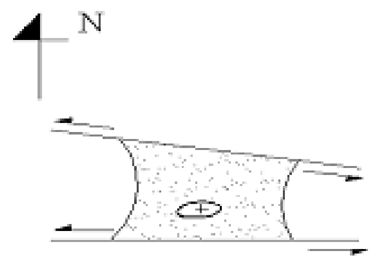
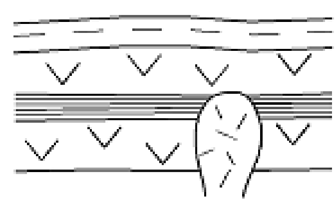
5.3 Significant Mineralized Zones

Gold mineralization at Montage d'Or is most common within the felsic, or quartz porphyry, body. This unit could very likely represent a high-level intrusive body, an elongate pluton or a series of dikes. It has retained its relatively homogeneous lithology despite the cumulative effects of mineralization, alteration, shearing, and metamorphism. Narrow (1 to 3 m) intervals of quartz porphyry, sited within the mafic micro-porphyry and distal from the main mass, have been found to be preferentially mineralized. Gold mineralization within the quartz porphyry unit is strongly affiliated with chalcopyrite mineralization, and lesser; pyrite and pyrrhotite is present but does not appear to always be associated with gold. Semi-massive sulfide veins and fractures that form >20% sulfide concentrations also occur within the felsic porphyry which have been strongly deformed (Figure 6-2).

The Montagne d'Or gold deposit, is interpreted from the relatively widely spaced and shallow fence drilling, as a steeply south-dipping quartz porphyry unit that may have intruded a mafic micro-porphyry, or dioritic section.



Carte géologique de la Guyane :
édition 2001 (BRGM)
N
Bon-Espoir
Adieu-Vat
St.Elie
Camp-Caiman
Paul-Isnard
Yaou
Dorlin
Kilomètres
0
25
50
100
Quaternary sediments
Mafic Dykes
Felsic to intermediate intrusives
Mafic, ultramafic, intermediate intrusives
Paramaca greenstone belt volcano-sedimentary units
UB Volc

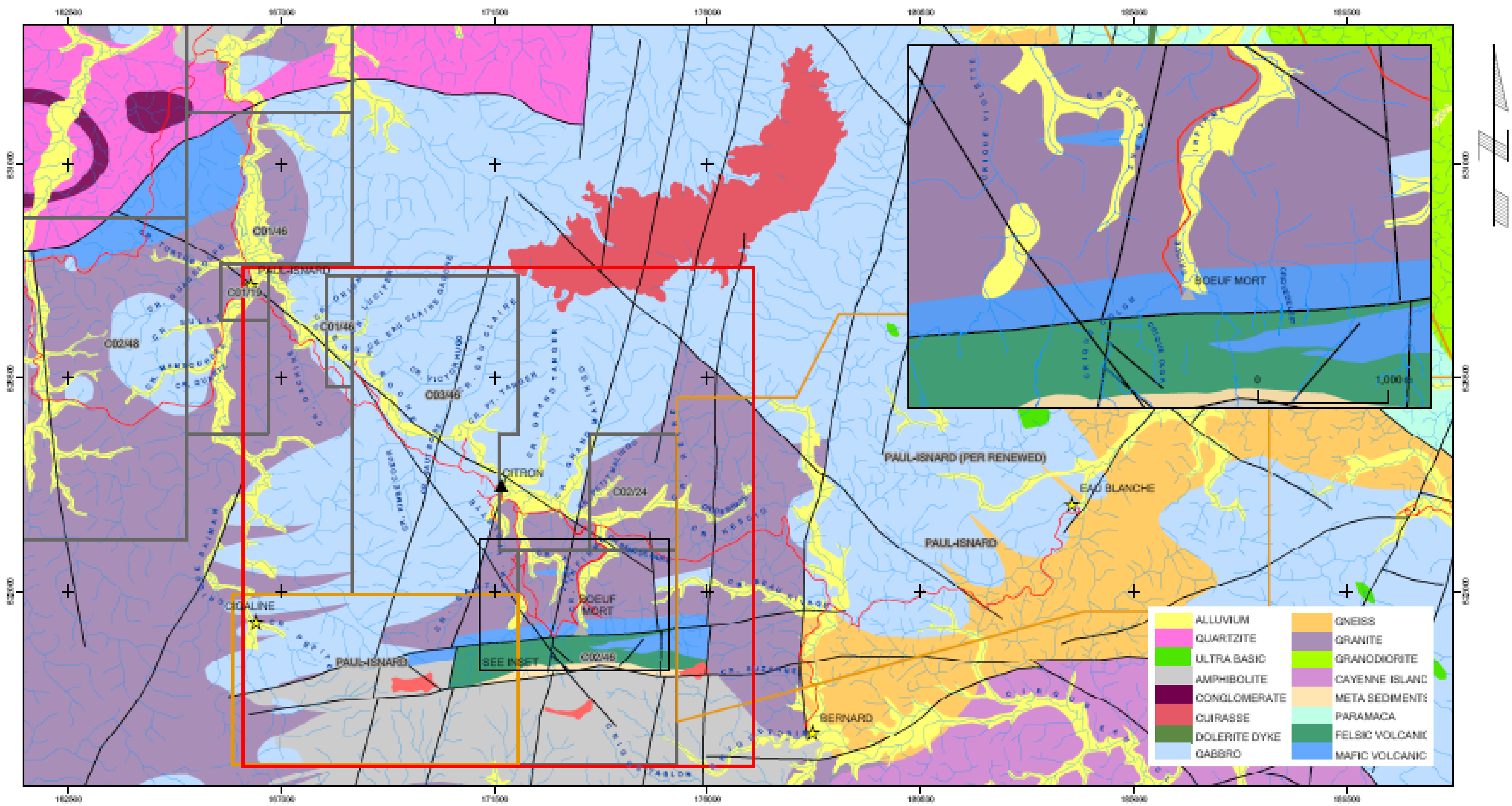
Series (Ledru et al., 1991, Egal et al., 1992, Manier, 1992)	Formations (Choubert, 1974)	Dominant lithologies	Principal Events - depositional, tectono-metamorphic and magmatic	Orogenic Episode
ENSEMBLE DETRITIQUE SUPERIEUR DU SILLON NORD GUYANAIS (Upper Detrital Formation of the North Guyana Trough)	*Grès Bonidoro* (Bonidoro Sandstones) *Conglomérats Orapu* (Orapu Conglomerates)	Coarse-grained sediments	 Sinestral transcurrent tectonism 2080 MA Opening of syn-sedimentation pull-apart basins (North Guyanese Trough) + granitoid plutons + metamorphism	*TRANSAMAZONIAN D2*
			 Collisional compressional tectonism + caribes granites + greenschist facies metamorphism 2100 MA	*TRANSAMAZONIAN D1*
PARAMACA	*Schistes Orapu* (Orapu Schists) Flysch	Metasediments	 Volcano-sedimentary deposits 2200-2100 MA	
	PARAMACA	Volcanics with sedimentary / schistose intercalations	Gabbro-diorite plutons 2145-2115 MA	

Paul Isnard Project,
French Guiana

Source: Suter 1999

Figure 5-2

Structural History of the Paul Isnard Area



NOTES:
1.DATUM: WGS 83
2.PROJECTION: UTM ZONE 22N

LEGEND:

- EXPLORATION CAMP
- PREVIOUS EXPLORATION CAMP
- SETTLEMENT
- ROAD
- FAULT
- PROJECT AREA
- (PER) PAUL-ISNARD CONCESSION
- CONCESSION

NOT FOR CONSTRUCTION DRAFT

AUG. 2007

(SCALE: 1:65,000) 0 2,500m

srk consulting

Paul Isnard Project, French Guiana

Source: Klohn Crippen Berger

Figure 5-3

Local Geology of the Montagne d'Or Area

6 Deposit Type (Item 8)

The known gold deposits of the Guiana Shield are all located in close proximity to major structures, and occur within low to medium metamorphic- grade granitoid-greenstone belts. Most of the deposits appear to be epigenetic in origin, although some tend to be affiliated with specific stratigraphic units. These deposits occur within lithologic units that are rheologically more brittle than the adjacent country rocks. In contrast to most orogenic gold regions, the Guiana Shield has not endured high erosion rates, thus deposits formed at relatively shallow levels remain preserved. The age range of the Guiana greenstone belts are correlated with the Birimian System in West Africa, where major gold deposits are associated with shear zones within greenstone belts.

Gold deposits within the Guiana Shield are mainly associated with mesothermal epigenetic style mineralization. This style is generally affiliated with regionally metamorphosed terrains that have undergone strong and protracted deformation. Correlative Archean and Proterozoic greenstone belts include the Abitibi belt of Canada, the deposits of the Yilgarn Block, Western Australia, the Birimian sequences of West Africa and the Lake Victoria region of Tanzania. Mineralization in these terrains typically consists of vein or stockwork fabrics developed within zones of brittle-ductile deformation. Brittle dilation zones are commonly found at deflections of ductile shear zones. These can form due rheological contrasts between rock types or by the increase in pore pressure related to the introduction of fluids. The fracture zones provide channel ways for hydrothermal flow and areas of relatively low pressure for view deposition.

The gold mineralization at Montagne d'Or has been interpreted to be the result of two very different processes. The earliest interpretation was that the gold was deposited in a syngenetic, exhalative, volcanogenic, massive sulfide-affiliated mineralization. A later hypothesis suggested that the gold was deposited in an epigenetic, quartz porphyry-related hydrothermal system, which was strongly deformed within a high strain shear zone. Each of these models are discussed below.

The original interpretation of the Montagne d'Or mineralization was that of a syngenetic, volcanogenic, massive sulfide exhalative environment deposited in a subaerial oceanic island arc setting (VMS). The hyperchlorite zones were interpreted as chloritic feeder pipes and sulfide mineralization as stringer zone sulfides. The VMS genetic model guided exploration on the Montagne d'Or deposit throughout the drilling campaigns of the 1990's. Franklin (1999a,b,c) provides extensive observations and correlations for this model. It was responsible for the majority of the interpretive descriptions used to characterize the lithologies encountered in the drill logs. The atypical alteration assemblages were the primary features casting doubt on the VMS model.

A focused re-examination of the textural, structural and mineralogical attributes of the deposit made by Goldfields Ltd. in 2001 (see Section 5.2.1) and Redwood (2002) provided an alternative explanation. They proposed that the gold mineralization was actually formed as a sub-volcanic porphyry-related gold-copper system.

Plots of normative corundum values on the gridded soil map of Montagne d'Or shows elevated values within distinct zones oriented oblique to the strike of the gold mineralization. This cross cutting corundum zonation is also supported by contoured plots of gold, copper, and zinc grades in soil (Figure 6-1). These features suggest that a cross-cutting fracture or feeder system may have controlled the original source fluids and the mineralized felsic unit has subsequently been deformed along the east-west shear zone. The main features that support a non-syngenetic origin for the deposit include:

- The oblique angle at which the alteration and mineralization features transect the east-west-trending felsic lithologic package;
- The lack of rhyolitic breccias or agglomerates (“millrock” or culminant stage explosive volcanism);
- A secondary biotite and K-feldspar alteration assemblage association typical of porphyry systems;
- The ubiquitous presence of chalcopyrite associated with the gold mineralization;
- A general absence of exhalative siliceous sediments or widespread magnetite component within the wall rocks;
- The separation of Au-Cu from other base metals; and
- The prevalence of Fe rich chlorite and the lack of Mg rich chlorite.

Gold mineralization at Montagne d’Or is most common within the felsic, or quartz porphyry, body. This unit could very likely represent a high-level intrusive body, an elongate pluton or a series of dikes. It has retained its relatively homogeneous lithology despite the cumulative effects of mineralization, alteration, shearing, and metamorphism. Narrow (1 to 3 m) intervals of quartz porphyry, sited within the mafic micro-porphyry and distal from the main mass, have been found to be preferentially mineralized. This observation supports the magmatic-genetic link between the quartz porphyry unit and gold mineralization. Gold mineralization within the quartz porphyry unit is strongly affiliated with chalcopyrite mineralization, and lesser; pyrite and pyrrhotite is present but does not appear to always be associated with gold. Semi-massive sulfide veins and fractures that form >20% sulfide concentrations also occur within the felsic porphyry which have been strongly deformed (Figure 6-2).

The Montagne d’Or gold deposit, is interpreted from the relatively widely spaced and shallow fence drilling, as a steeply south-dipping quartz porphyry unit that may have intruded a mafic micro-porphyry, or dioritic section. The Benzdorp gold property, located 170 km to the south-southwest inside Suriname is interpreted to have formed by a similar, regional porphyry related mineralization.

Other models for the Montagne d’Or deposit that have been discussed include a distal gold skarn model as shown by the magnetite-pyrrhotite, minor garnet, and Au-Bi association. The lack of appreciable calc-silicate minerals diminishes the credibility of this model. The Fe-K enrichment is also typical for iron oxide Cu-Au systems, but the abundance of quartz-sulfide veinlets is not typical. Such deposits are generally hosted by volcanic rocks in the roof or contact zone of granite batholiths, and have a deep zone of K and Na alteration with magnetite-biotite-actinolite and Cu-Au, and are overlain by a lower temperature sericite-specularite or sericite-pyrite alteration with Cu-Au (Redwood, 2002). RTZ has also speculated the mineralization is akin to the Hemlo Mine.

The quartz porphyry intrusive and “porphyry-hosted gold” interpretation demonstrates a style of gold mineralization uncommon in the Guiana Shield. The calc-alkalic chemistry of the system and internal features have analogies with Precambrian greenstone belt gold deposits of the Canadian and Yilgarn Shield zones, and with some attributes of the Mesozoic orogenic- and intrusion- related gold systems of the Alaska-Yukon – B.C. accretionary arc terrains. From an exploration viewpoint, it opens up the exploration potential for exploring for deeper plutonic source and/or for co-magmatic equivalent bodies, and for fracture-system controlled sulfide mineralization.

In the Paul Isnard placer operations, fine-grained gold typically dominates over coarser nugget gold. The coarse alluvial gold mineralization in the region is associated with tourmaline and carbonates, which in turn are suspected to be associated with quartz veining exposed in valley floors. The regional alluvial gold fields have developed by the profound lateritic weathering, erosion, dispersion, and re-concentration, of gold mineralization from multiple source areas into the drainage courses. These have been the most important gold producing region in French Guiana.

6.1 Geological Model

Gold mineralization at the Montagne d'Or deposit is associated with primary sulfide minerals as replacements within pyrite and chalcopyrite. At a macroscopic scale, the following five types of mineralization have been identified in mapping and drill core logging.

- Semi-massive sulfides (SMS, >20% sulfides) with associated gold mineralization;
- Sulfides as disseminations and stringers with associated gold mineralization;
- Late-stage disseminated euhedral pyrite mineralization;
- Rhythymic mafic tuff with associated pyrrhotite mineralization; and
- Gold mineralization associated with quartz veins.

The Semi-massive sulfide mineralization (SMS) is characterized by high sulfide content (>20%) over intervals tens of centimeters up to 4 m wide. Generally, it is massive with a "cauliflower" texture. Thicker zones may include material transitional to disseminated stringer type mineralization. The SMS includes sulfide-rich breccia dikes that host rolled and milled clasts of host rock within a ductile and deformed pyrite-chalcopyrite-pyrrhotite matrix. Occasional galena, sphalerite, and bornite are also present, and minor amounts of arsenopyrite have been identified in polished sections. Magnetite can be present in significant quantities, although wall rock magnetite is overall low in felsic units and sporadic in mafic units. There is a direct correlation between sulfide veinlets and sulfide-rich breccia zones and gold values. The wider SMS mineralization has been intersected in 14 drillholes and exhibits a weighted average grade of 21 g/t-Au over an average interval of 1.1 m.

The disseminated mineralization is characterized by the presence of finely disseminated to finely fracture-controlled sulfides, including chalcopyrite, pyrite and pyrrhotite. Close detailed logging of core and outcrop inspection reveals that gold associated with this style of mineralization is largely controlled by the abundance of fine sulfide quartz veinlets and fracture fillings. These have been strongly folded, sheared and transposed into the ubiquitous S1 foliation fabric. The sulfides also occur as grouped disseminations and agglomerations. Disseminated mineralization is of major significance in felsic units separating the Lower and Upper Favorable Horizons. Anomalous gold grades within the disseminated mineralization typically range from 0.5 to 3.0 g/t over sample intervals of approximately 1 m, and can be extend over tens of meters.

A late, disseminated euhedral pyrite mineralization has also been recognized. The pyrite occurs as euhedral millimeter scale crystals, undeformed and disseminated through the units. The percentage of this type of mineralization rarely exceeds 1% and there is no association with gold mineralization.

The Rhythmic mafic tuff associated pyrrhotite mineralization is best known in the Lower Mafic Unit. It has no association to gold mineralization.

Gold mineralization associated with quartz veins is also present at Montagne d'Or. This type of mineralization is known from a few small quartz veinlets proximal to larger quartz veins within the

Upper Mafic Unit (e.g. hole MO9748 associated with the surface Gustave vein) and close to the Lower Mafic Unit contact with the Felsic Unit (holes MO9729 and MO9730). Visible gold is present but laterally restricted. This type of mineralization is considered to be of minor interest at the present stage of exploration. The principal areas of gold associated quartz veining are in the Northwest (holes MO9729 and MO9730) and Northeast (hole MO9748). The Gustave vein shows that although gold may be associated with quartz veining it is not necessarily hosted within the large massive quartz veins.

Early drill core logging had led to the geologic/genetic interpretation that gold mineralizing occurred in high-grade "favorable units" and as lower grade, "disseminations". These two styles of mineralization are typically transitional between each other.

The favorable units are characterized by the presence of semi-massive sulfide mineralization associated with significant gold mineralization. This unit occurs at two stratigraphic levels, the "Upper and Lower Favorable Units" and possibly a third. The favorable horizons are found within both the mafic and the felsic units. A typical favorable horizon unit consists of a basal sequence of intercalated felsic, intermediate and mafic tuffs passing up into a hyperchloritized unit. The upper part of the sequence consists of lapilli tuffs and welded felsic tuffs with well developed, centimeter scale, blue quartz eyes. The semi-massive sulfide zones are generally associated with the lower part of the sequence. Gold mineralization is also associated with these horizons although its position within the sequence is more variable. It is common for one or more components described above, to be absent from this assemblage.

All three rock types (felsic, mafic and intercalated mafic/felsic) are mineralized to varying degrees. However, 80% of the gold mineralization in the deposit occurs within the quartz porphyry unit. Gold mineralization occurs in an east-west-striking prospective zone approximately 3,500 m x 400 m wide over a felsic unit of 5,000 m strike length. Drilling has apparently closed it off at shallow levels at both ends, with mineralization appearing to taper off at the east and west ends, but further and deeper drilling is required to confirm this observation. The central 1,500 m section of the felsic unit is the most consistently mineralized portion of the deposit as revealed by shallow drilling.

The disseminated sulfide mineralization is hosted within a fairly homogenous felsic quartz-eye schistose unit. Mineralization clearly occurred before deformation and shearing. The coarse quartz eyes are contained within a sericite-pyrite matrix possessing a pronounced shear fabric. The quartz eyes are frequently blue, indicative of high strain, rotated and stretched. Disseminated pyrite crystals are coarse and also stretched or transposed. Deformed sulfide grains tend to be coarse-grained rather than comminuted, indicating recrystallization by annealing following deformation. Some mafic units carry similar mineralization, but at a notably lower sulfide vein density. The felsic schists host intercalations of intermediate to mafic schist some of which contain plagioclase phenocrysts. The units cannot be correlated between the current drill spacing, suggesting they have been strongly sheared and transposed.

Most mineralized drill intersections assay below 5 g/t. Typical higher-grade intersections include 20 m @ 3.15 g/t-Au (DDH MO-96214) and 13.89 m @ 16.18 g/t-Au (DDH MO-9740). There are also short, higher-grade intervals encountered in eight of the diamond core holes, attaining a maximum of 2.10 m @ 95.5 g/t-Au (DDH M0-9740). There appears to be a downhole diminishment in gold values with depth, with significant low-grade intervals noted below 150 m. Gold grades increase as visual sulfide content increases, as a general rule.

Limited multi-element ICP analyses (n=174) demonstrate that SMS, and some disseminated stringer mineralization, can carry between 0.1% and 2.6% copper, and silver grades up to 131 g/t. Geochemically anomalous elements noted at Montagne d'Or are gold (maximum 89.5 ppm Au), arsenic (to 6,366 ppm As), bismuth (to 4,070 ppm Bi), iron (to 14.6%Fe), phosphorus (to 7,390 ppm P), and zinc (to 6,730 ppm Zn). Weakly anomalous metals are; cobalt (to 94 ppm Co), chromium (to 1,135 ppm Cr), lanthanum (to 214 ppm La), nickel (to 188 ppm Ni), antimony to 596 ppm Sb), and tungsten (to 120 ppm W). Correlation coefficients for the following element pairs are also noted: Ag-Cu (0.91), Ag-Zn (0.60), Ag-Pb (0.58), Ag-As (0.51), Au-Pb (0.46) Au-Ag (0.41) and Au-Cu (0.41). Metals that are notably non-anomalous at Montagne d'Or are barium (to 566 ppm Ba maximum), mercury (<1 ppm Hg maximum), molybdenum (to 10 ppm Mo maximum), uranium (<10 ppm U maximum), and vanadium (maximum 263 ppm V maximum). Gold mineralization is associated with Fe and K enrichment, strong normative corundum, and depletion of Na and Ca.

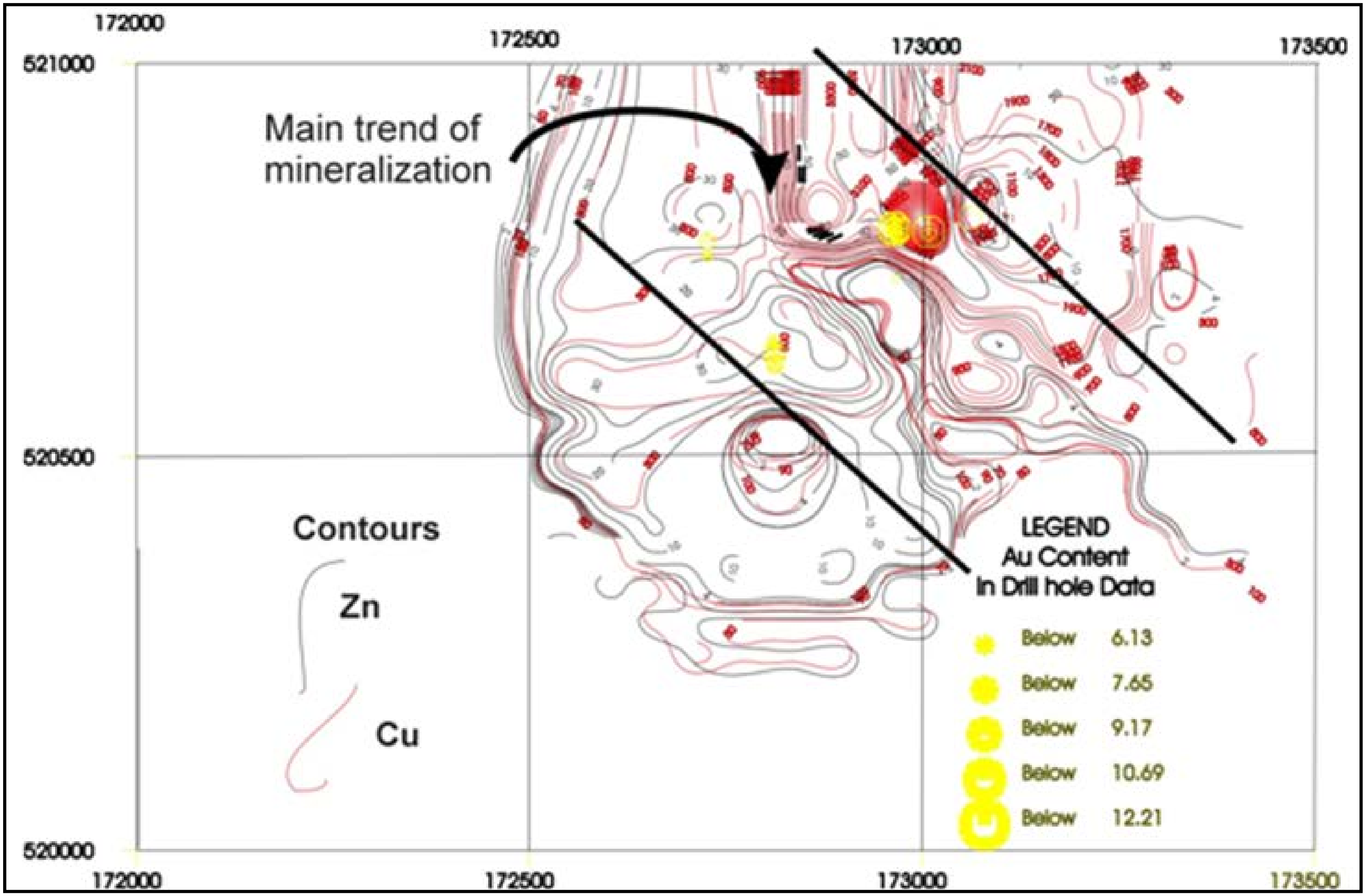
Franklin's VMS model for the deposit noted there was potential for Pb-Zn-Ag bodies 200 to 500 m stratigraphically above the gold zones that would have formed at or near the sea floor. Such a zone to the east-southeast of the Montagne d'Or zone has not been found to date, although there is a chargeability anomaly at the southeast limit of the geophysical survey grid. Base metals are irregularly distributed through the disseminated and SMS mineralization.

Gold mineralization is accompanied by pervasive alteration, which includes sericite, secondary biotite (retrograded to chlorite) and secondary K-feldspar ± quartz. Sericite is the dominant alteration phase in the shallower part of the drillholes, approximately 40 to 120 m downhole depth. It transitions into secondary biotite below 150 m. The most pervasive alteration is dominantly a phyllic assemblage. This includes: quartz-sericite-pyrite and veinlet-controlled potassic assemblages of secondary biotite and associated pervasive secondary K-feldspar. A less common, propylitic assemblage consists of chlorite-epidote-calcite. Veinlet assemblages include; quartz-pyrite-pyrrhotite-chalcopyrite, secondary biotite-pyrite-pyrrhotite, and magnetite-pyrrhotite-chalcopyrite-quartz-chlorite-minor red garnet. Veinlets can be partially transposed into the foliation but typically do not cross-cut it. They are both tightly folded and boudinaged. Chlorite alteration within mafic and intermediate units may include some secondary biotite. The overlapping phyllic, potassic, and propylitic assemblages and quartz-sulfide veinlets are strongly suggestive of an intrusive porphyry–related epigenetic deposit. Zonation of peripheral Pb-Zn disposed about an Au-Cu center is also suggestive of a porphyry-type system.

Late stage, narrow quartz veins are planar and cross cut the foliation and mineralized veinlets. They typically have a broad selvage of carbonate-chlorite alteration.

Studies of epidote-chlorite-tourmaline hydrothermal alteration have been interpreted as typical of a mesothermal system with temperatures in the 300° to 350°C range (Suter, 1999).

The Montagne d'Or area hosts significant fine-grained gold mineralization affiliated with sulfide veins and masses within the fresh country rock beginning at shallow depths. Only a small portion of the gold mineralization has been subjected to upper level oxidation.



Note: The oblique distribution of metals contrasts with the east-west strike of felsic units. (Franklin, 1999)

500 m

N

srk consulting	Paul Isnard Project, French Guiana Source: Franklin 1999	**Figure 6-1** Contoured Cu, Zn and Au Data for the Montagne d'Or Deposit

srk consulting

Paul Isnard Project,
French Guiana

Source: Franklin 1999

Figure 6-2

Refolded and Transposed Sulfide Veins (Outlined) DDH MO97-27:77.5-78.6 m

7 Exploration (Item 9)

A thorough coverage of the detailed historical and recent exploration history of the Montagne d'Or Project is provided in Suter (1999) and is tabulated in Figure 7-1.

The Paul Isnard project area is an intermediate- to advanced -stage exploration target, currently hosting a bulk-tonnage, intermediate grade, gold orebody. The presence of significant alluvial gold deposits first focused attention on the area with the intent of locating the bed rock source. Exploration in the Guiana Shield region is logistically difficult, as it is situated within remote South American tropical rainforest. The thick dense vegetative cover and deep lateritic weathered cover conceals most outcrop, and exploration activities consequently require line cutting and mechanized clearing.

The BMG first conducted research at the Paul Isnard area from 1930 to 1958. The BRGM conducted a series of regional exploration surveys from 1964 to 1991. Their program progressed from regional geophysical and geochemical surveys to follow-up surveys of anomalous areas and outcrop mapping wherever possible. Anomalous gold was first discovered at Dékou-Dékou Mountain during the BRGM regional geochemical survey. Guyanor Ressources acquired the Paul Isnard property in 1994 and conducted extensive exploration activities including mapping, sampling, trenching, and geophysical surveys. This work included an Aerodat airborne radiometrics and magnetics survey over a 24 km x 40 km area. From 1996 through 1998, Guyanor joint ventured their exploration program at Montagne d'Or with ASARCO and La Source. This work entailed geologic mapping and rock sampling, trench sampling, petrographic studies, ground geophysical surveys including ground magnetics, pulse EM, and Induced Polarization. Once a target zone was defined, a drilling program was developed that ultimately totaled 59 diamond core holes, for 11,321 m. Additionally, 921 m of detailed channel sampling was completed. Total project expenditures on the Paul Isnard Concession from 1994-1999 were US$5,568,515 (Suter, 1999).

The documentation files for the Paul Isnard property include numerous airborne and ground geophysical survey maps and compilations conducted both by the BRGM, Guyanor and ASARCO partners. Interpretive geophysical reports are not well documented.

A ground magnetic survey was carried by ASARCO over the eastern and central portion of the deposit (Suter, 1999). The results of the survey indicated a positive relation between the BRGM soil anomalies and mineralization in drillholes with zones of high magnetic susceptibility. An IP-resistivity survey, performed by CSA Inc, Ireland, used a gradient array with 100m electrode spacing and 50m measurement intervals. Four gradient-array panels were surveyed with nominal electrode spacing of 1,950 m. Line spacing was typically at 100 m intervals and rarely 200 m. All geophysical stations were measured horizontally, due to the steep terrain, and surveyed by Guyanor personnel.

A mise a la masse (MALM) downhole IP-resistivity survey was conducted around each drillhole over an 800 m x 800 m area at 50 m stations. The resistivity survey showed two prominent east-west trending zones, one to the south covering most of the amphibolites, and a second one in the centered grid of unknown cause. The IP survey identified two east-west bands of high chargeability; a northern zone corresponding to the SMS and disseminated sulfide zones, and a second one to the south that correlates with the contact of the Paramaca volcanics and amphibolites. A northeast-southwest zone of high chargeability was located in the southeastern corner of the survey grid. Overall, the MALM confirmed the general east-west trend of the felsic unit and mineralization.

The exploration drilling program successfully outlined the Montagne d'Or gold mineralization with several fences of wide-spaced (~ 200 m) drillholes. These have indicated a significant, intermediate grade gold deposit. Mineralization is largely contained within a 400 m-wide, east-west-striking, steeply south-dipping felsic schistose unit. Gold is predominantly associated with semi massive and disseminated sulfide zones containing pyrite, chalcopyrite, and other sulfides. Drilling was carried out over a 3,500 m strike length and mineralization was encountered along the entire strike length. The majority of continuous mineralization appears to occur in the central portion of the unit along a strike length of 2,200 m.

A pulse-EM ground loop survey was conducted that identified the two major conductive sulfide horizons encountered by drilling, along with ten additional anomalous zones. Subsequent drill testing of the additional anomalies proved negative, due to the presence of pyrrhotite, which is not associated with gold.

At a fairly early stage of Guyanor's exploration, the bi-modal nature of the volcano-sedimentary units of Montagne d'Or as well as abundant semi-massive sulfide mineralization was interpreted to indicate that the gold mineralization was related to a volcanogenic massive sulfide mineralization style. It was also apparent that subsequent deformation had affected the original gold distribution making an absolute model of mineralization even more difficult. The Guyanor exploration model that drove the 1996 to 1999 drilling program evolved over time as understanding of mineralization and geology improved. A focused re-examination of the textural, structural and mineralogical attributes of the deposit made by Goldfields Ltd. in 2001 (see Section 5.2.1) and Redwood (2002) provided an alternative explanation. Goldfields Ltd. proposed that the gold mineralization was actually formed as a sub-volcanic porphyry-related gold-copper system.

Exploration drilling to date has focused on the relatively shallow (~200 m) upper portions of a steeply-dipping quartz porphyry or felsic unit. Drilling to search for additional massive sulfide lenses has had little success. The original model developed for the deposit as a stratabound volcanogenic sea floor exhalative or massive sulfide system is worthy of rethinking as an alternative means to expanding new areas to explore. The re-examination of the salient features of the system suggesting that it may represent a quartz porphyry-hosted epigenetic porphyry gold–(copper) system appears to be credible. However, the applicability of either model remains to be demonstrated, as all drilling has been relatively shallow, and project-wide continuity or coalescence of mineralization and alteration features have yet to be fully documented by drilling. Either interpretation offers additional incentive and opportunity to both infill drill between widely-spaced drillholes, and to explore the deeper zones of the felsic unit for coalescing fracture system mineralization and/or for a possible plutonic source area.

7.1 Interpretation

The exploration drilling program conducted by Guyanor from 1994 to present was largely responsible for advancing the property from a raw exploration prospect to its current status. This program mapped, sampled and diamond core drilled the mineralized shear zone at Montagne d'Or. These procedures were conducted in a careful and professional manner. Most of the drillholes were surveyed for down hole deviation. The core was logged, split and sampled properly. All samples were analyzed using appropriate assay procedures of the time. The drill logging and assay results were correctly compiled onto cross-sections. The exploration work described above resulted in the delineation of anomalous gold mineralization located within several tabular, south-dipping zones, ranging from a few meters up to 75 m in true thickness along 2,200 m of strike length. The drilling and assay results of the exploration work described above were subsequently incorporated into historical resource estimates (Costelloe, 1999, RSG Global 2004) as discussed in Section 4.3. Most of the technical data supporting the resource estimation discussed in Section 15 has also been provided.

All of the relevant exploration work described above was conducted by employees, subcontractors or JV partners of Guyanor Resources.

PAUL ISNARD project : Summary of exploration programmes — Table n° 1

JV	Year	MINING CONCESSIONS		B PERMITS		
	1994	Airborne Geophysics (Mag + Radiometry)				
	1994			A PERMIT APPLICATION		
ASARCO		Other areas	Montagne d'Or		Eau Blanche	Other areas
ASARCO	1995		Channel sampling 300 m sampled		Soil Geochemistry 497 samples	
ASARCO	1996	Channel sampling 130 m sampled	Channel sampling 339 m sampled			
ASARCO	1996	Soil Geochemistry 99 samples	DDH 18 DDH : 3 233 m			
ASARCO	1996	Regional geological mapping				
ASARCO	1997	Ground Geophysics (Mag) 11 km of lines	Ground Geophysics (PP, mag, MALM) 42 km of lines	7 km lines		
ASARCO	1997	Channel sampling 31 m sampled	DDH 28 DDH : 5 815 m	2 DDH : 314 m		
ASARCO	1997	Soil Geochemistry 449 samples		Soil Geoch. 541 samp.		
	1998	Channel sampling 22 m sampled	Ground Geophysics (EM) 12 holes + 7 km of lines			
	1998		DDH 8 DDH : 1 554 m			
	1999	Channel sampling and trenches 457 m samp. - 280 m trench.	Regional geological mapping			
	1999	Soil Geochemistry 766 samples				
	1999			GRANTING OF PAUL-ISNARD EXPLORATION PERMIT (PER)		

JV	Year	MINING CONCESSIONS		PAUL-ISNARD PER		
	2000			Regional geological mapping		
RIO TINTO	2001	Area covered by the Guyanor - Rio Tinto JV			Area not covered by the JV	
RIO TINTO	2001	Regional "*Ridges and spurs*" soil geochemistry and follow-up lines 854 samples		544 samp.	Regional geological mapping Soil Geochemistry 100 samples	
RIO TINTO	2001	Ground Geophysics (Mag) 61 km of lines				
RIO TINTO	2001	DDH (Elysée, Paul Isnard, Citron and Apollon areas) 18 DDH : 1 937 m		3 DDH : 404 m		
	2002			Regional geological mapping		RENEWAL APPLIC. Of PAUL-ISNARD PER

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Paul Isnard Project,
French Guiana

Source: Guyanor Ressources circa 2002

Figure 7-1

Summary of Recent Exploration Programs at Montagne d' Or, 1995-2002

8 Drilling (Item 10)

Details of drilling procedures for the Montagne d'Or are noted in the documentation files.

8.1 Type, Extent and Procedures

Drilling operations at Montagne d'Or have exclusively used diamond core. The Guyanor and ASARCO/ La Source joint ventures used Major Drilling Company (*Forage Major S.A.*), a Canadian drilling contractor, for all 59 drillholes. Drill pads and access were prepared using bulldozers and/or excavators; every attempt was made to limit deforestation and for this reason, use of an excavator was preferred for construction of drill pads.

Drilling procedures were to collar each hole with HQ bits (core diameter = 63.5 mm) and reduce to NQ (core diameter = 47.6 mm) when hard and not oxidized rock was intersected. Core recovery was routinely measured and recorded for each core run. Core recoveries overall were generally excellent. Major Drilling used a Longyear 38 wireline diamond drilling rigs. Drillhole spacing is variable, from 50 m to 250 m, but is mainly spaced from 50 m to 100 m. Drill fences are spaced at 100 m to 200 m apart. Many cross-sections have only one drillhole. Where there are multiple holes, the average spacing along sections is about 65 m. Most drillholes are angled between -43° and -63°, drilled due north. Average drillhole depth is 190 m and maximum depth was 295.6 m. The number of diamond drillholes completed to date is 59, for a total of 11,321 m.

The presence of clearly visible, regionally-consistent, and well-defined S_1 fabric allowed the core to be manually oriented in the core boxes, although local variations have, on occasion, caused incorrect orientation. Saprolite was not oriented due to the absence of a clearly defined fabric. Core was placed in plastic core boxes at the drill site, with core markers placed at the start and end of each core run, and boxes securely covered. Core boxes were transported back to camp for detailed logging and core splitting. Core photography was only carried out infrequently.

All drillhole collars were a surveyed for X,Y,Z coordinates tied to the mine grid shortly after completion so as to provide an accurate location for resource estimation. The mine grid was tied to the X,Y UTM grid and the Z coordinates were shifted 1,000 m above MSL so that no negative elevations were present within the drillholes. Drillhole location surveys were performed by Guyanor survey crews and external surveyors from SATTAS using TDS equipment.

The first 47 drillholes were surveyed downhole for deviation and deflection by Major Drilling, mainly using acid bottle etch or Pajari/Tropari means. Downhole survey intervals were at 50 m. The final eight drillholes were surveyed in with Sperry Sun equipment (Table 8.1.1). The downhole surveys using acid bottle etch and Tropari equipment are criticized within the supplied documents as inaccurate and poorly suited to the task. Recommendations to re-enter and re-survey the holes using the Sperry Sun directional survey equipment are well founded. The inaccuracy of the early downhole surveys induces a risk although it should be noted that due to the relatively short length, significant drillhole deviation and deflection at Montagne d'Or are minimal, with rises of 5° to 10° over 200 m typical. At the current drillhole spacing, this has little influence on the mineral resource estimation of this report. Four drill holes were not surveyed.

Table 8.1.1: Montagne d'Or Downhole Drillhole Survey Summary

DDH Numbers	Downhole Survey Type
MO96-01 - MO96-14	Tropari
MO96-15 - MO96-18	Acid bottle
MO96-19 - MO97-24	Not Surveyed
MO97-25	Tropari (1998)
MO97-26 - MO97-30	Not Surveyed
MO97-31 - MO97-33	Tropari (1998)
MO97-34 - MO97-46	Tropari
MO97-47 - MO97-48	Not Surveyed
MO98-49 - MO98-56	Tropari (1998)
MO98-52 – MO99-59	Sperry Sun

8.2 Interpretation and Relevant Results

A total of 59 drillholes, for 11,321 m were completed in the drilling programs. The summary and interpretation of all drilling results indicates that anomalous gold mineralization is located within several tabular south dipping units, which average 10 to 20 m in true thickness along 1,500 m of strike length. The drillholes are predominantly inclined moderately to the north whereas the mineralization dips at 65° to the south. Therefore, the drillholes intercepts do not represent true thickness. Rather, true thickness averages approximately 75% of the drillhole intercept distance.

SRK is of the opinion that the drilling operations were conducted by professionals, the core was handled, logged, and sampled in an acceptable manner by professional geologists, and the results are suitable for support of a NI 43-101 compliant mineral resource estimation.

9 Sample Preparation, Analysis and Security (Item 11)

9.1 Methods

Sampling methods and procedures employed by Guyanor during the 1996-97-98 drilling campaigns followed standard industry practice typical of that era.

9.1.1 Diamond Drilling

The diamond drill core was transported from the drill site to Boeuf Mort camp where all geologic logging and sampling was conducted. Sample intervals were marked in advance by the project geologists. The saprolite core was halved with a knife, while fresh rock core was sawn with a powered diamond saw. The original assay lengths range from 0.1 m to 4.3 m with an average of 1.0 m. A total of 10,693 samples were taken. The presence of dispersed zones of very narrow sulfide bands in some cases, forced sample intervals that did not always conform to the actual lithologic breaks. The sawn half-core was bagged, labeled on site, and sent out for assaying. Samples were routinely placed in plastic rice bags and sealed to prevent tampering between the campsite and the lab. The remaining half core was returned to the core box and stored for future reference.

Rock quality description (RQD) measurements were completed on selected intervals in seven drillholes during the 1998 campaign. Magnetic susceptibility measurements were completed for 18 drillholes during the same campaign (MO96-01 –MO-96-18).

Bulk density measurements on drill core were not performed on a regular basis. The densities used for previous resource estimations utilized densities taken from equivalent or nominal rock types (not described).

Channel sampling was conducted as a supplementary tool to the drilling to provide a surface sample for the up-dip projection of mineralization penetrated by the drill. Surface channel samples were collected mostly from stream beds in fresh rock, where streams had incised through the saprolite into fresh rock. These were cut using a powered diamond saw to consistent dimensions to produce a reasonably consistent sample volume. Standard channel samples were 1.0 m long, 3 cm to 10 cm wide and 2 to 5 cm deep. All of the material between the two parallel cuts was collected with hammer and chisel. This material was bagged, tagged with ID numbers, and transported to the sample preparation facility at the base camp. A total of 87 channel locations were cut and sampled for 921 m. Average channel sample length was 0.94 m.

The channel samples were surveyed by measuring the first “from” position by Easting, Northing, and Elevation (XYZ coordinates), corresponding to a pseudo drill collar. The remainder of the channel was then manually oriented with a compass and clinometer and recorded as pseudo down hole surveys. These coordinates were then used to incorporate the channel samples into the database as pseudo drillholes.

9.1.2 Soil Sampling

A standard procedure for reconnaissance soil samples collected by the BRGM prior to Guyanor’s acquisition of the property consisted of 1kg of material taken at a depth of 25 to 40 cm. This was dried, quartered and screened to 125 µm, generally in the field, and 80g of material was sent to the BRGM laboratory in Orleans, France, or elsewhere, for analysis of gold by atomic absorption spectroscopy. Some soil samples were sent to the BRGM laboratory for multi-element ICP geochemical study.

Most Guyanor soil samples at Paul Isnard were collected using 2 inch Dutch auger to a depth of 1 m, with the first 15 cm being discarded and the interval 0.15 m - 0.70 m being kept for reference; the interval 0.70 m - 1.00 m was assayed (average sample weight 0.5 kg). In the most recent campaign at Elysee, the interval 0.00 m - 0.70 m has been discarded and a reference sample taken by deepening the hole by 10 cm – 20 cm after the assay sample has been collected. The reference samples from Elysee are stored at Camp Citron. Samples are bagged in the field and submitted for analysis with no further splitting or treatment on site. Soil samples have been collected at stations spaced on 50 m, 25 m or 15 m centers along lines space 50 m to 500 m apart.

Deep auger soil sampling was conducted by the BRGM using manual augers for sample collection. Samples were collected every meter, with first 15 cm to 20 cm from each hole discarded. The last sample did not always attain a full meter length. The approximate sample weight was 2 kg. The sample was dried quartered and screened to 80 µm. No samples were analyzed by ICP. As with the shallow soil samples it is believed that the samples were sent to the BRGM laboratory in France for analysis. The spacing between auger holes varied; in 1989 a spacing of 15 m was used and in 1991 spacing of 5 m or 10 m were used. Little or no geological logging of auger holes was undertaken; hand written copies of some logs are available in Guyanor archives.

To date, only a limited amount of deep auger sampling was carried out by Guyanor. This work was actually undertaken by the SOTRAPMAG geology department during the first half of 1997. Sampling strategy was similar to that used by the BRGM. Manual and hand held mechanical (3.5 hp Trado-auger) augers were used. Trado holes are collared at 6inch dia., reducing to 2 inch or 3 inch, occasionally 4 inch, at around 0.5 m depth; the first 30 cm of material is discarded. The maximum hole depth reached at Paul Isnard was 8 m with samples being collected at 1 m intervals. Holes were generally drilled 1 m – 2 m into saprolite, as defined by the field technician. Geological logging was undertaken by the technician with two rock types being distinguished “volcanic” and granitic; the former probably represents undifferentiated mafic rock types, as well as amphibolites. The coarse rejects and pulps for this material have been discarded.

9.2 Factors Impacting Accuracy of Results

Several factors affecting sample accuracy common to all drilling and sampling operations are present at Paul Isnard. These include; accurate measurements taken by the driller while boxing the core runs, proper hole information on boxes, proper selection of, and accurate marking of assay intervals, proper sawing of core, proper bagging/tagging and accurately recording the sample ID data.

There is no discussion in the documents supplied to SRK pertaining to errors or shortcomings noted in the sampling programs. SRK assumes all drill site, logging, and core splitting operations were carried out to mining industry standards, using the appropriate tools, by cadres of experienced drillers, geologists, and technicians.

9.3 Sample Quality

The drill logs from core holes indicate average core recoveries were typically in excess of 90%. Recoveries on this magnitude inherently ensure that a good sample has been provided by the drilling contractor.

9.4 Relevant Samples

The average sample interval of 1.0 m discussed above, is appropriate for the nature of the gold mineralization and generally, will not incorporate any higher-grade intervals within longer, lower grade intervals. Since not all gold mineralization is readily visible to the naked eye, the intervening “non-mineralized” horizons were sampled over their entirety. The sampled intervals are noted on the geologic drill logs for each hole that correspond to a lithologic notation entry and the later recorded respective gold assay.

9.5 Security Measures

There is no documentation in the files reviewed, which describe security measures or chain of custody procedures in effect at the time of the original drilling programs. It is standard industry practice to prohibit any outsiders from handling or observing the drill core other than designated project personnel. SRK assumes the drilling at Montagne d’Or was performed to mining industry standards by professional drilling crews using the appropriate equipment, and directed by experienced project geologists.

9.6 Sample Preparation and Laboratories

The diamond core and channel samples collected at the Montagne d’Or project area during the drilling campaign were dispatched to six separate laboratories for sample size reduction, homogenization, and assay determination (Table 9.6.1). Analytical methodologies utilized were typically fire assay with an atomic absorption finish. A few samples were assayed by FA with a gravimetric finish. These are appropriate and standard methodologies for gold analysis. There is no documentation in the project files related to the certification of any of the laboratories used to analyze the Montagne d Or samples. It was not industry standard of the time to undergo certification procedures.

Table 9.6.1: Paul Isnard Project Assay Laboratory Breakdown (RSG Global 2004*)

Laboratory	From Sample #	To Sample #	From Hole #	To Hole #	No. of Samples	Sample Type
CanTech	MORA-001	MORA-0361	RA9501	RA9532	382	Channel
	MORA-0373	MORA-0426	RA9635	RA9642		
Omai	MORA-0362	MORA-0372	RA9633	RA9635	11	
SGS France	MORA-0427	MORA-0701	RA9643	RA9787	272	
SGS France	MOF001	MOF2937	MO9601	MO9618	2937	Drillhole
SGS Cayenne	MOF2938	MOF4224	MO9719	MO9726	2586	
	MOF8497	MOF9797	MO9849	MO9856		
Triad	MOF4225	MOF4549	MO9726	MO9728	325	
Cone	MOF4550	MOF8496	MO9729	MO9748	3947	

*No laboratory certification statements were made available to SRK and therefore SRK assumes laboratories are not certified by any standards association.

A total of 382 channel samples were sent to CanTech Laboratory, Paramaribo, Suriname, for sample preparation and analysis. After weighing and drying, the samples were crushed to a nominal -10 mesh (<1.68 mm). A split was then taken to produce a 200 g to 250 g sub-sample. This sub-sample was then pulverized and sieved to -150 mesh (<0.105 mm). A 50 g aliquot was extracted and assayed.

Eleven channel samples were sent to Omai Laboratory in Guiana. There is no information available on sample preparation and analytical methodologies used by this laboratory.

A total of 272 channel samples and 2,937 core samples were sent to SGS Laboratories, Cayenne, French Guiana for initial jaw crushing and splitting. A sub-sample was next dispatched to SGS Laboratories in Carcassonne, France, where the remainder of the sample preparation and assay process was completed. After drying and weighing, the sample was crushed to -10 mesh and a 500 g split was taken. The split was next pulverized and sieved to -200 mesh. A 30 g aliquot was extracted and assayed.

Core samples totaling 2,586 were sent to SGS Laboratories, Cayenne, French Guiana for sample preparation, splitting, and assay determination. Following drying and weighing, the half-core sample was processed through a jaw crusher to a nominal -10 mesh, and split to produce a 500g sub-sample. The sub-sample was pulverized and sieved to -200 mesh. A 50g aliquot was collected and assayed.

A total of 325 core samples were sent to Triad laboratories, Cayenne, French Guiana for initial jaw crushing and splitting. A sub-sample was then sent to Triad laboratories, Puerto Ordaz, Venezuela, for the remainder of sample preparation and assaying was performed. The sample was weighed and dried, and jaw crushed to -20 mesh (<0.841 mm). A split was made to produce a 250 g sub-sample. The sub-sample was next pulverized and screened to -150 mesh. A 30 g aliquot was collected and assayed.

Samples totaling 3,947 were sent to Triad Laboratories in Cayenne, French Guiana for initial jaw and cone crushing. A subsample was then sent to Cone Geochemical Laboratories, in Colorado, where the remainder of the sample preparation and assaying was performed. After weighing and drying, the sample was jaw crushed to -2 mesh and then cone crushed to -6 mesh. A split was made to produce a 400 g sub-sample. The sub-sample was then pulverized and sieved to -200 mesh. A 30 g aliquot was collected and assayed.

In SRK's opinion, the sample preparation and assay analysis for the Montagne d'Or samples were carried out using conventional and accepted industry methods of the time. No laboratory certification statements were made available to SRK and therefore SRK assumes laboratories are not certified by any standards association. However, difficulties encountered during 2007 and 2008 assay duplication of the original assay results provide doubt on the quality of the work employed during the original sample preparation and or assay analysis. This is discussed further in Section 12.1.

Crushed rejects from core samples and Montagne d'Or channel samples were stored by Guyanor in Cayenne or at SGS in Carcassonne. All crushed rejects from grab, soil samples were routinely discarded after two to three months. The pulps for samples were normally stored by the laboratory where the original analysis was undertaken. These were retrieved form the laboratories and stored in St-Laurent but there condition gradually deteriorated and they were subsequently discarded.

9.7 QA/QC Procedures

The QA/QC procedures for the Montagne d'Or analytical work prior to 1998 utilized check assays performed on quarter core, the remaining half of re-sawn split half core. Most quarter-core samples were collected from barren core (<0.05 g/t-Au) and used for blank material. After 1998, check samples exclusively utilized crushed reject material. Since the samples were not extracted from the same pulp, the samples are more correctly termed field duplicates. No data are available for assay standards included with any of the drill or channel sample analyses. Internal check assay information is provided for five of the six laboratories that were used for gold assaying. Golden Star attempted to create standard samples representing high, medium and low-grade mineralization from the Montagne d'Or drill core. Chemex Laboratories prepared and blended the samples however after numerous assays of each sample they were abandoned when it was found that the test results from the standards were too variable to be of use.

RSG (2004) provided a review of the QA/QC results obtained during the history of the drilling and they concluded the following:

The results of the RSG Global statistical assessment of the quality control data suggest that the SGS Cayenne and CanTech laboratories were producing assay results of an acceptable precision and unknown accuracy, but that the SGS France and Cone Colorado laboratories were not producing assays of an acceptable precision. The various coarse reject check assaying programs indicate that ether are serious problem at all or some of the laboratories, and that precision levels from all the check assay programs are unacceptable. Correlation between assay pairs is very poor with significant bias shown in some instances. The accuracy of the data produced by each laboratory cannot be assessed without standard reference assay data, and this is a material flaw in the check assay programs completed to date.

SRK agrees with the assessment of RSG and judges the quality control procedures implemented at the Montagne d'Or project inadequate for a full assessment of the precision and accuracy of the assay data.

9.8 Opinion on Adequacy

SRK is of the opinion that the sample preparation and analytical work performed by the labs discussed above was likely of sub-industry standards. The main issues believed to have negatively affected the duplication of assay results were likely involved with the sample preparation and/or assay analyses.

There are no references in any of the documents supplied to SRK pertaining to security procedures in effect at the drill site and field camp. During the late 1990's, it was not a standard component of project reporting to document the routines of project operation. Industry and corporate standards have always been to prohibit any outsiders to handle or inspect fresh drill core at any stage of exploration operations. The drill core is picked up at the drill site by the geologist or designated assistant, or delivered by the driller at the end of shift. At the core logging facility, only the geologist and assistant help are permitted to handle and prepare the core. Transportation of the split bagged core to a laboratory facility is usually handled by commercial carriers in bulk form in boxes, larger sacks, pallets, or buckets.

SRK assumes the drill core for the programs was handled in the accustomed industry manner by drill contractors, geologists, and transportation carriers, and was not compromised by outsiders.

Golden Star conducted a modern QA/QC analysis during the re-assay program of the historical drill core at the Paul Isnard deposit. This consisted of re-sampling a wide distributing of the core, insertion of blanks and standards, and submitting all these to an accredited laboratory. The laboratory employed industry standard sample preparation and the techniques of analyses were appropriate for the level of gold mineralization. The results of the QA/QC verified the credibility of the 2007 re-assay results.

10 Data Verification (Item 12)

10.1 Procedures

Data supporting the Paul Isnard mineral resource estimation was verified in two areas. The first pertains to the electronic database and the second involved duplication of the original drill core assays.

The electronic database was constructed by Golden Star and Guyanor Resources from hard copies of the original drill logs, sample sheets and from electronic assay datasheets. The original drill logs consist of standardized, hand typed paper log sheets that included from, to, intervals, rock type codes and geologic descriptions. The original sample sheets include entries of from, to, and sample lengths recorded as the core was sampled. The geologic log and sample information was hand entered into an Excel spreadsheets to create the electronic database. Once assay results were received from the lab, they were transferred either by hand entry or by electronic cut and paste to the appropriate sample numbers in the electronic database. The original electronic database was thoroughly verified during its development. An incomplete set of original assays certificates were available to validate the drill log assay values. RSG Global (2004) conducted the following data verification prior to completion of its mineral resource estimation:

The following general activities were undertaken during database validation:

- Cross check total hole depth and final sample depth data;
- Check for overlapping and missing sampling intervals;
- Replace less than detection limits with 0.005 values;
- Replace un-sampled intervals (blanks) with 0.001 for exclusion from data compositing and resource estimation routines;
- Check drillhole survey data for initial or suspect downhole deviations; and
- Check lithology and alteration codes.

Minor errors were noted in the supplied databases, which were corrected by RSG Global. The current validated project databases are considered globally robust.

None of the original assay sheets have been provided with which to check the top Au assay values in the database, and time constraints did not allow this exercise to be carried out by RSG Global.

The original assays certificates were available to validate the assay results of the 2007 re-assay program. SRK performed spot check verification of the electronic database using these assay certificates and no errors were found.

A re-assay program of the historical core to provide verification of the original assay data accompanied by a modern QA/QC program and to obtain representative copper assay data was conducted. Samples were collected from 35 diamond drillholes located throughout the deposit and at a variety of depths. This involved re-sampling every fifth original assay from within the mineralized envelope. The original core was collected, bagged, tagged and sent to the lab with appropriate blanks and standards. In total, 724 samples over 827 m of drilling were analyzed by FILAB Guyane in the Paramaribo Lab in Suriname using 50 g fire assay with an AA finish. Pulp duplicates from 200 of these samples were verified in FILAB France, in Dijon.

The results of the re-assay program verified many of the original assay analyses but also presented significant issues with assay duplication. This problem had been discussed previously by RSG Global (2004) and has yet to be resolved. The results of the FILAB assays were plotted on half absolute relative deviation plots (HARD) for sample pairs with Au greater than the detection limit to evaluate the reliability of the duplicates (Figure 10-1). Abusah (2008) provided the following interpretation of the plot.

The HARD graph clearly shows poor repeatability among sample pairs, at 20% half absolute relative deviation, only 43% of the sample populations have the likelihood of repeating or reproducing same grades, an indication low reliability on the results. Analyzing the sample population with Au value greater than in 0.5 ppm, the situation did not change much.

The FILAB Guyane results were then plotted against the FILAB France results to evaluate the reproducibility of the assays. Figure 10-2 shows that the majority of the assay results produced by FILAB Guyane were reproducible from the pulp duplicates analyzed by FILAB France.

SRK subdivided the re-assay samples into data subsets based on the original project laboratories described in Table 9.6.1. This analysis was conducted to investigate whether specific sample sub sets could be identified which provided better or worse duplication results. Simple x-y scatter plots were constructed. Figure 10-3 suggests that when the samples were prepared by Triad laboratories, Cayenne and analyzed by Triad laboratories, Puerto Ordaz, Venezuela the original results are reproducible within a reasonable limit of correlation. Figure 10-4 suggests that when the samples were prepared by Triad laboratories, Cayenne and analyses by Cone Laboratories, Colorado the data is semi verifiable but overall does not meet current standards of reproducibility. When the samples were prepared at SGS Laboratories, Cayenne and analyzed at SGS Laboratories France the correlation of duplication results are unacceptable (Figure 10-5). The same holds true for samples prepared at SGS Laboratories, Cayenne and analyzed at SGS Laboratories Cayenne (Figure 10-6).

This analysis presents the question of whether the problems of assay duplication are related to the sample treatment during analysis or whether the problem is related to gold distribution within the actual sample. To investigate this, 100 coarse rejects were selected from the 2007 samples analyzed by FILAB and sent them to “The Assay Office” in Paramaribo, Suriname for independent preparation and Au analysis. All of the samples which produced fire assay results greater than 5gpt-Au were then re-tested by screen metallic analysis. The results of this showed that the coarse reject samples produced very good duplication result by fire assay and the screen metallic analyses produced very good duplication results to the fire assays. Figures 10-7 shows a scatter plot of the 2007 FILAB fire assays plotted against the 2008 Assay Office results. Figure 10-8 shows a scatter plot of the 2008 Assay Office fire assays plotted against the 2008 Assay Office screen metallic results.

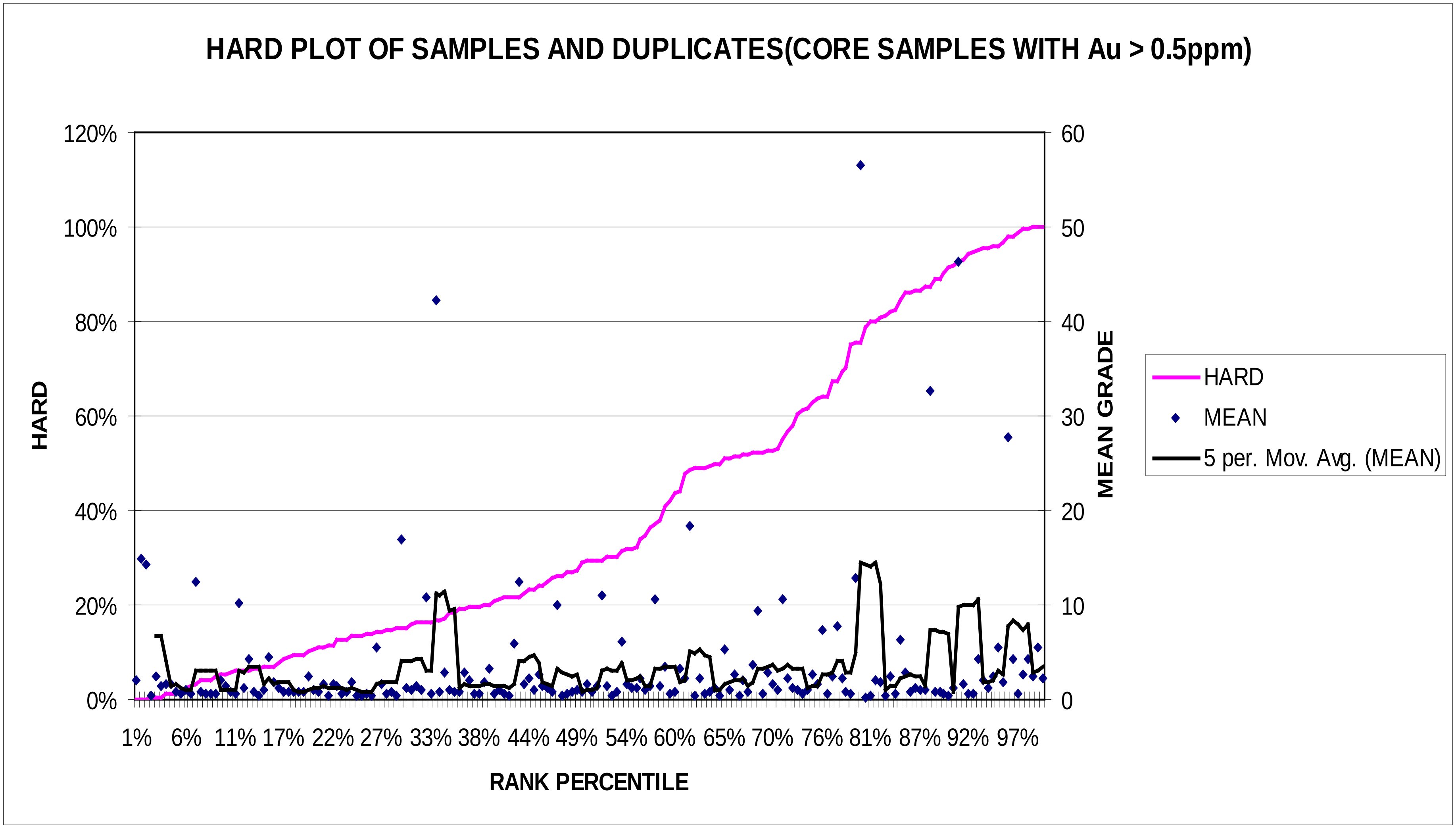
10.2 Interpretation

Much of the electronic database provided by Golden Star was previously verified by RSG Global and updated assay results were verified by SRK. The database is interpreted to meet current industry standards for mineral resource estimation.

The verification of original drill core assay results was unsuccessful and has a negative impact on the mineral resource classification discussed in Section 15. Based on the results of the 2007 re-assay program, SRK is of the opinion that the problem with assay duplication stems from the original assay laboratories and are not related to gold distribution within individual samples.

10.3 Limitations

SRK relies on the industry professionalism of Guyanor Resources and Golden Star, to have assembled and maintained the database with utmost regards to accuracy of the data. Additionally, SRK suggests that before further mineral resource estimation is conducted, all intervals of all drillholes should be re-sampled and re-analyzed accompanied by a modern QA/QC program.



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Source: Abusah 2008

Figure 10-1

Hard Plot of 2007
Re-assay Results

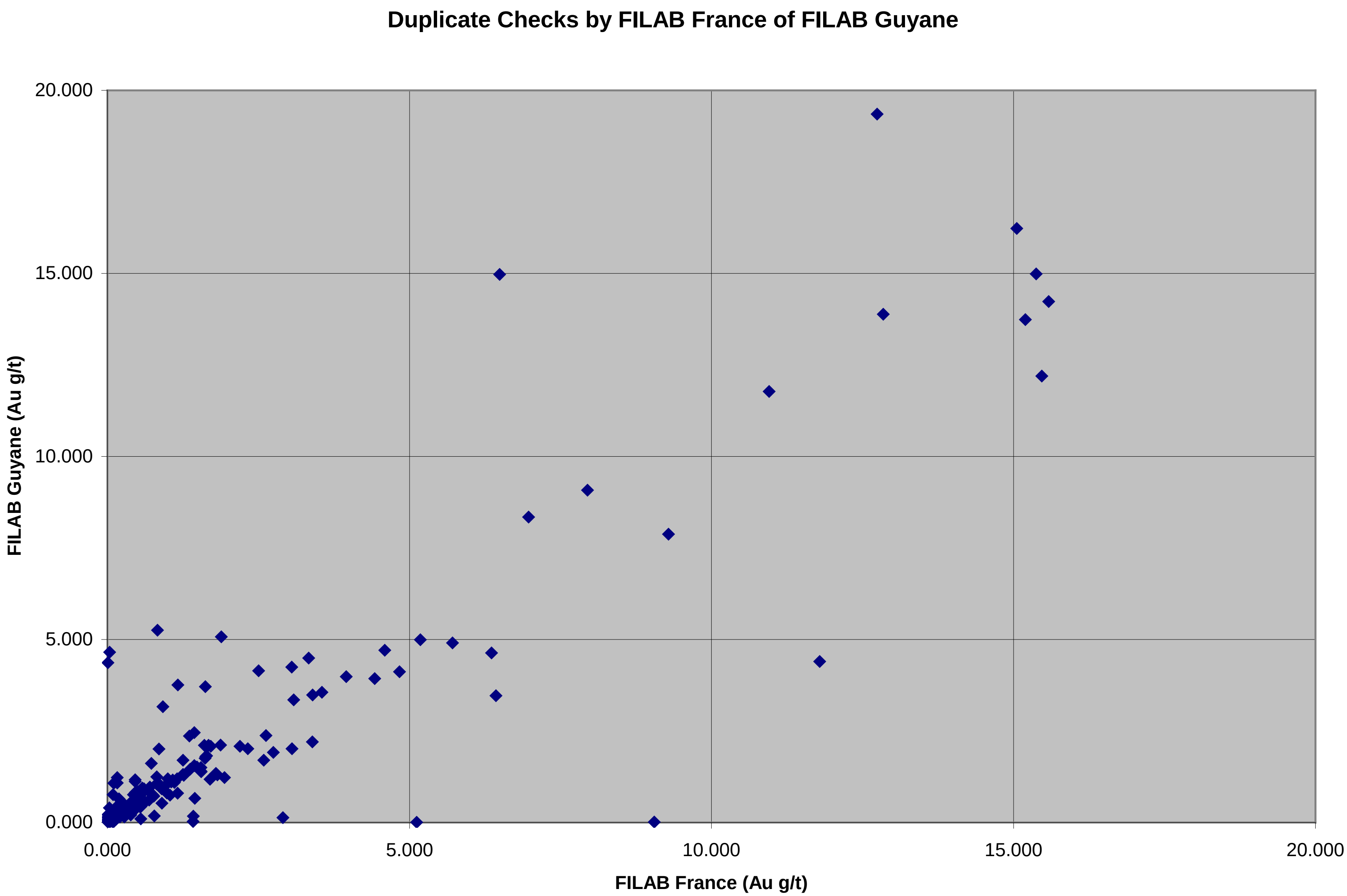

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Figure 10-2

2007 Duplicate Checks of FILAB Guyane by FILAB France

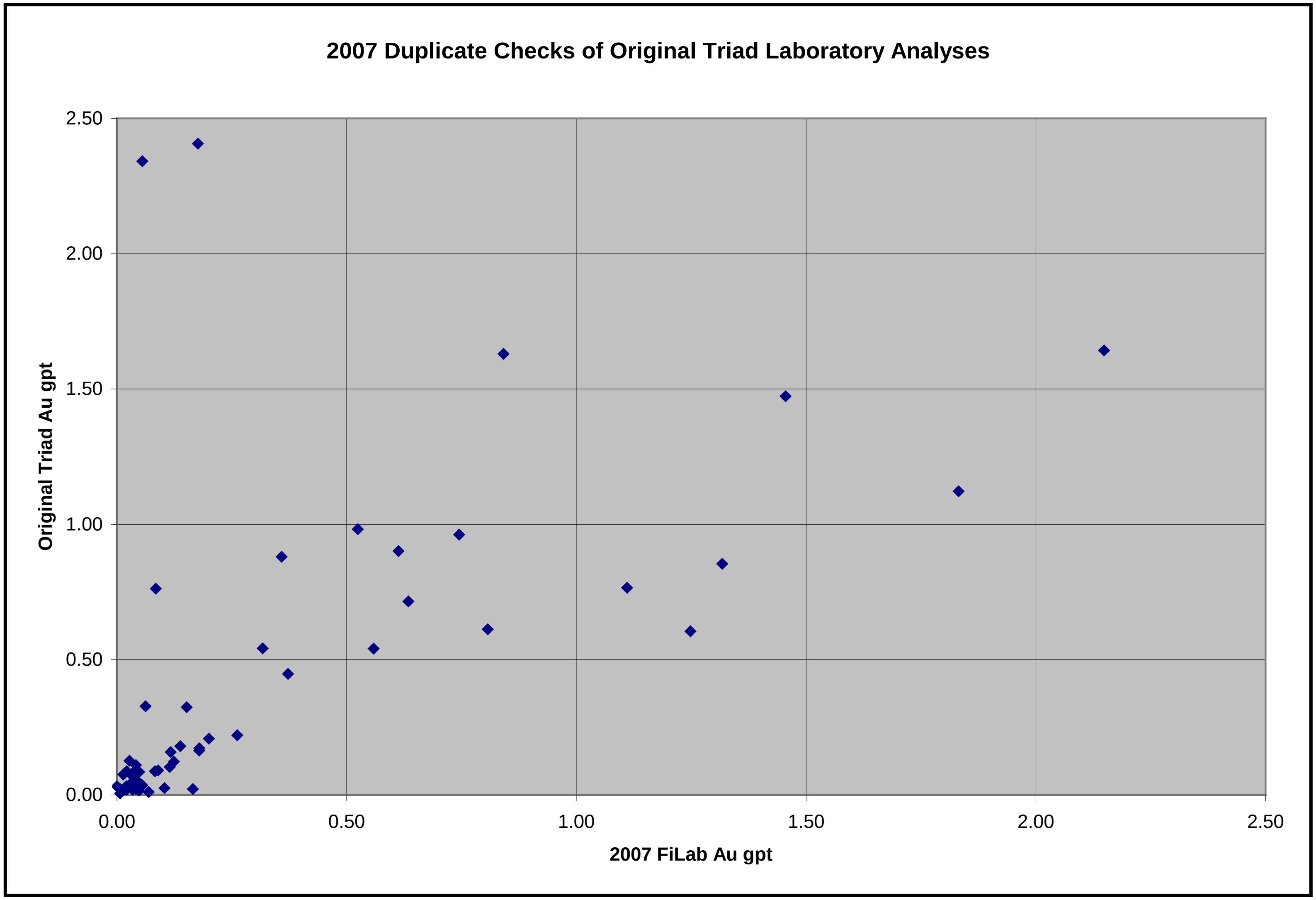

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Figure 10-3

2007 Duplicate Checks of Original Triad Laboratory Analysis

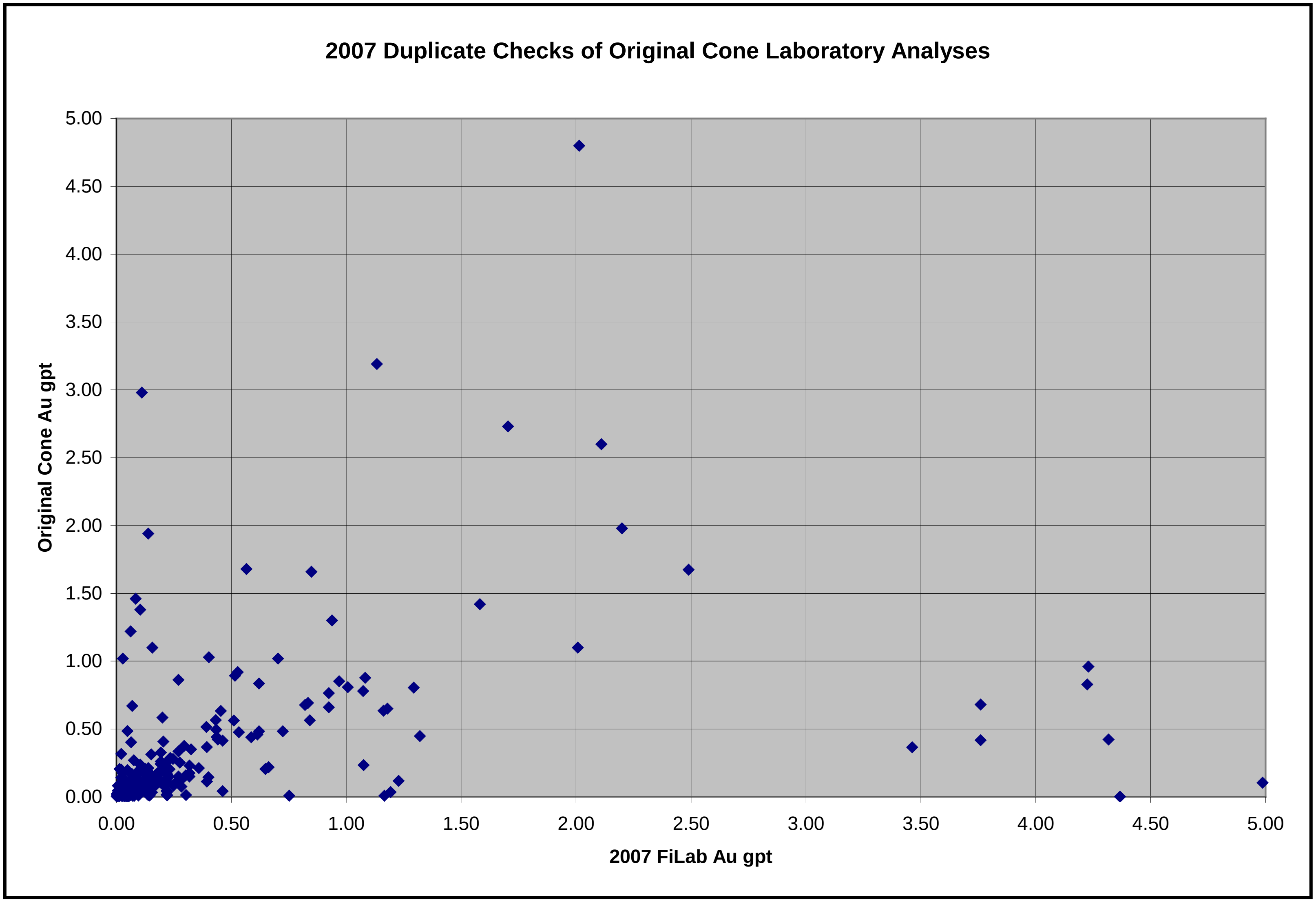

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Figure 10-4

2007 Duplicate Check of Original Cone Laboratory Analysis

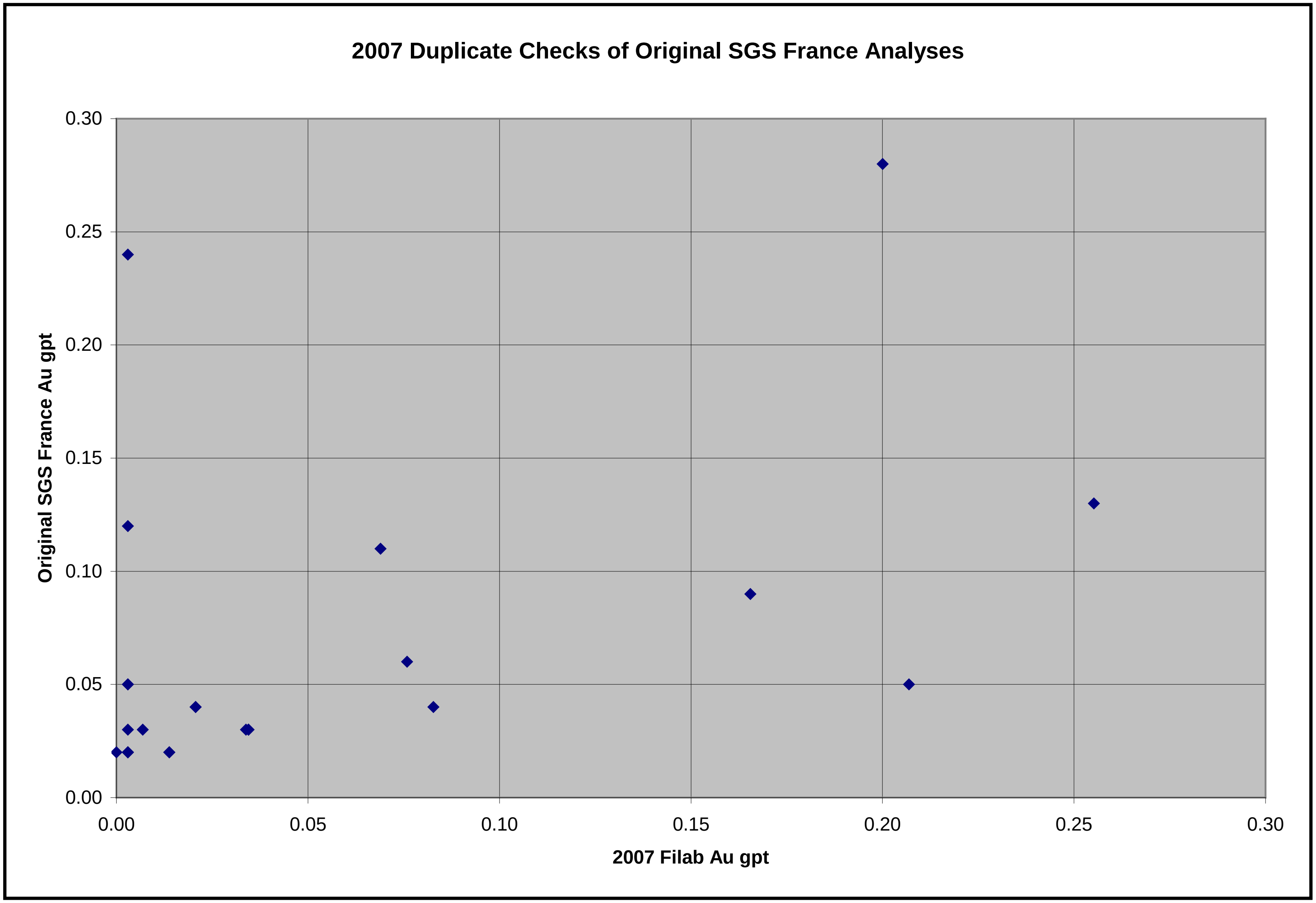

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Figure 10-5

2007 Duplicate Checks of Original SGS France Laboratory Analysis

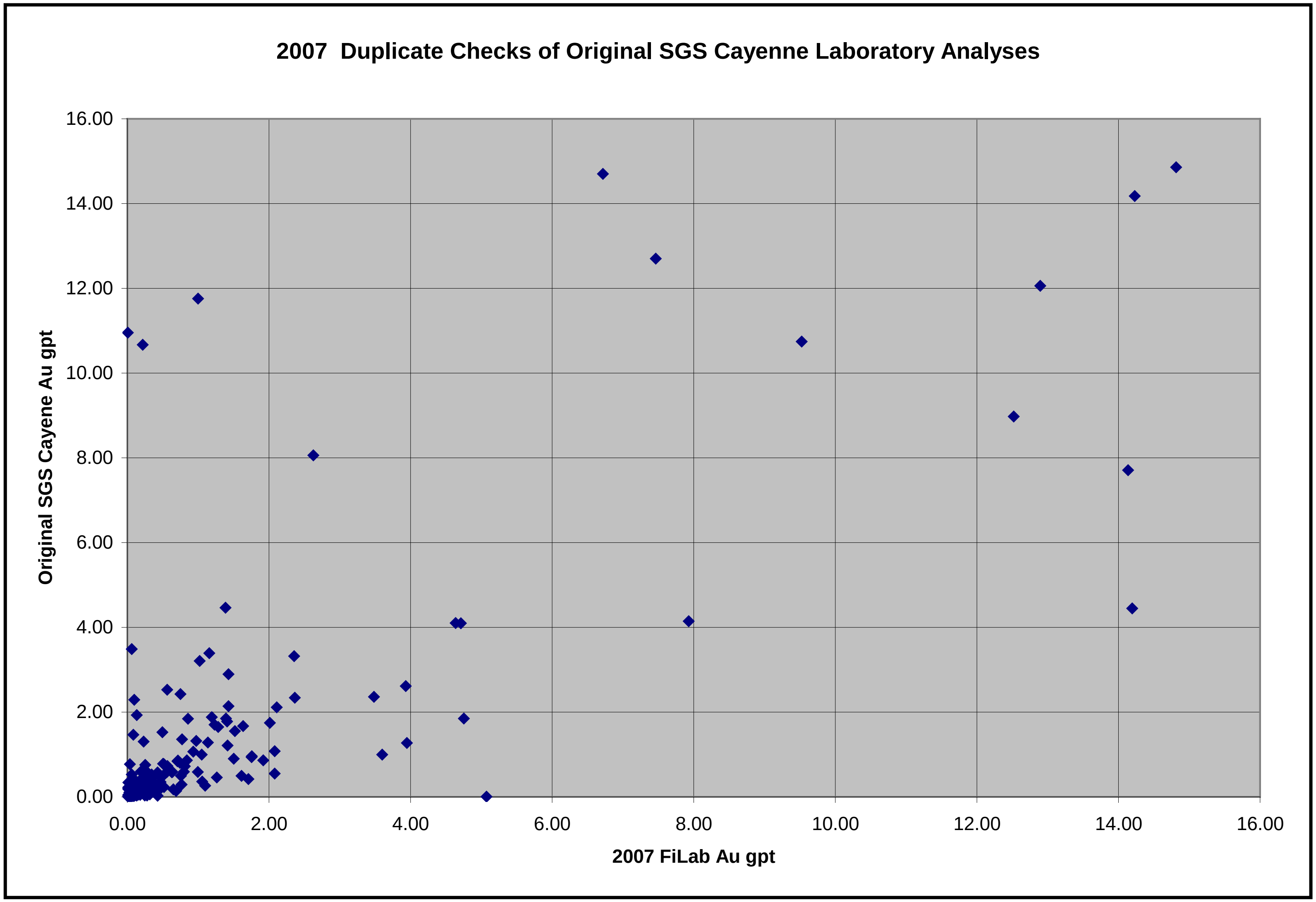

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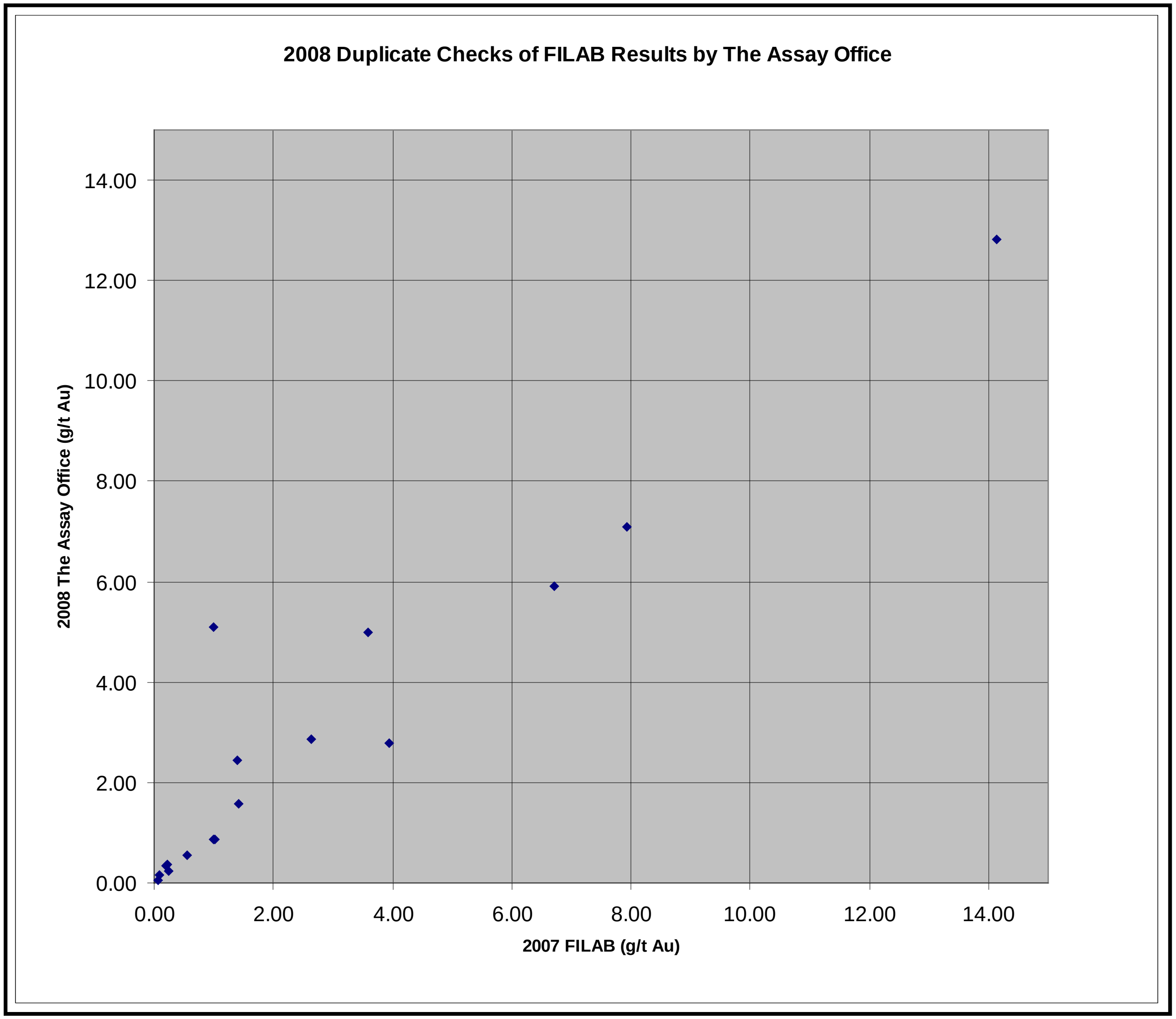
Figure 10-6

2007 Duplicate Checks of Original SGS Cayenne Laboratory Analysis



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French Guiana

Figure 10-7

2008 Duplicate Checks of FILAB Results by The Assay Office

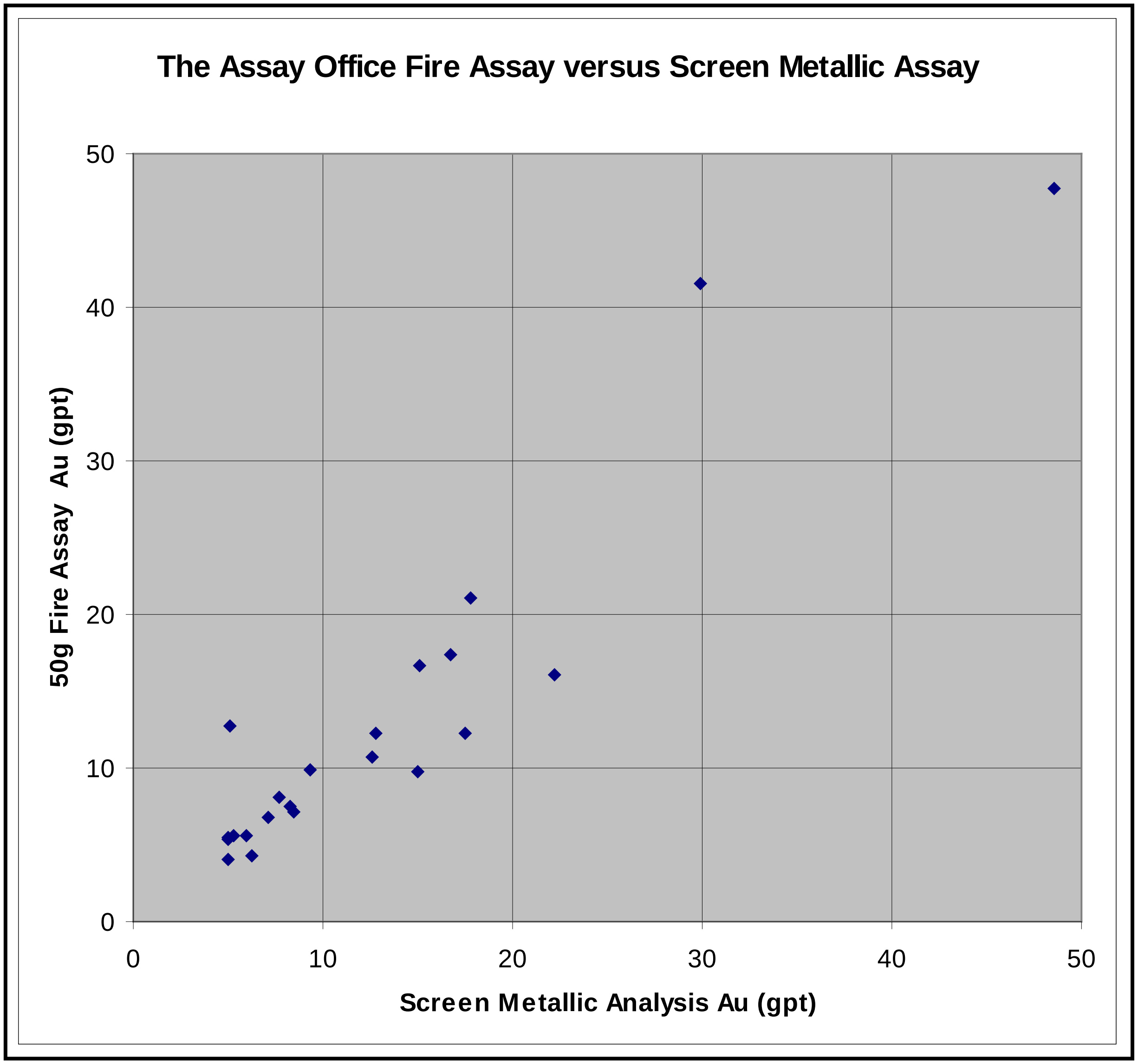

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Figure 10-8

2008 Duplicate Checks of The Assay Office Fire Assays by Screen Metallic Assay

11 Mineral Processing and Metallurgical Testing (Item 13)

11.1 Testing and Procedures

There have been three metallurgical test programs conducted on Paul Isnard samples between 1998 and 2008. In these test programs, various metallurgical variables were examined to determine the optimum design parameters for the processing plant including:

- Gravity separation;
- Flotation;
- Cyanidation of whole ore and concentrates;
- Grinding size for liberation;
- Bottle roll testing; and
- Ball mill work index.

11.1.1 Historic Testwork (June 1998)

RDi, located in Wheatridge, Colorado, conducted bottle roll testing on two samples designated as semi-massive and disseminated. The objective of the test program was to determine the refractory nature of the two samples. The test results indicated that the contained gold could be extracted by cyanide from both samples and the ores were not refractory. Table 11.1.1 summarizes the test results for the 48 hr leach products for the two samples with high gold recoveries of 85 and 90% for the semi-massive and disseminated samples, respectively.

Table 11.1.1: Test Results from RDi Metallurgical Test Program, June 1998

	Volume/	Assay, g/t		Content, mg		Extraction, %	
Sample	Weight	Au	Ag	Au	Ag	Au	Ag
Semi-Massive	1.5236	6.66	5.51	10.3070	8.4353	84.9	19.65
Disseminated	1.5286	1.02	0.58	1.6052	0.8977	89.6	20.65

P_{80}=270 mesh; 40% solids; pH = 11; 10g/L NaCN; product at 48 hours leach; average for two tests.

11.1.2 Historic Testwork (July 1998)

RDi conducted a second metallurgical test program in July 1998 on the samples from the June 1998 tests to examine: (1) gravity recovery for both semi-massive and disseminated samples; (2) bottle roll leaching of the disseminated sample to determine its amenability to heap leaching; and (3) intensive leaching of the feeds and residues from the June 1998 tests to examine the extraction of zinc and copper.

Free gold was noted in both samples and tests were conducted using both Gemini and Diester tables. The Gemini table recovered 35.5% and 17.8% of the gold from the disseminated and semi-massive samples, respectively. The Diester table recovered 61.6% and 73.1% of the gold from the disseminated and semi-massive samples, respectively. Tables 11.1.2.1 and 11.1.2.2 summarize the gravity test results for the disseminated and semi-massive samples, respectively.

Table 11.1.2.1: Gravity Test Results for the Disseminated Sample from RDi Metallurgical Test Program, July 1998

	Assay, ppm		Distribution, %		
Product	**Au**	**Ag**	**Wt.**	**Au**	**Ag**
Gemeni Conc.	49.6	20	1.02	35.5	4.5
Gemeni Midds & Tails	2.84	<2	13.09	26.1	2.9
Cal. Diester Conc.	6.22	2.37	14.11	61.6	7.4
Diester Midds	0.70	4.0	48.61	23.8	43.1
Diester Tails	0.56	6.0	37.28	14.6	40.5
Cal. Feed	1.43	4.52	100.0	100.0	100.0

Table 11.1.2.2: Gravity Test Results for the Semi-Massive Sample from RDi Metallurgical Test Program, July 1998

	Assay, ppm		Distribution, %		
Product	**Au**	**Ag**	**Wt.**	**Au**	**Ag**
Gemeni Conc.	270.5	390	0.61	17.8	8.8
Gemeni Midds & Tails	13.3	44.0	38.56	55.3	62.4
Cal. Diester Conc.	17.3	49.4	39.16	73.1	71.2
Diester Midds	3.34	6.0	30.90	11.1	6.8
Diester Tails	4.90	20.0	29.94	15.8	22.0
Cal. Feed	9.28	27.2	100.0	100.0	100.0

Bottle roll kinetic leach tests were conducted on a disseminated sample to determine its amenability to heap leaching. The test conditions were done at 40% solids, pH>10.5, and 1g/L NaCN. The gold and silver extractions were 57.7% and 29.1%, respectively, after 100 hours of leaching; however, very little additional extraction (1.7%) occurred after 52 hours. Table 11.1.2.3 summarizes the bottle roll test results indicating that a reasonable gold recovery of 60 to 70% could be achieved by heap leaching.

Table 11.1.2.3: Bottle Roll Test Results for Heap Leaching Amenability for the Disseminated Sample

	Volume/	Assay, g/t		Content, mg		Extraction, %		NaCN
Product	**Weight**	**Au**	**Ag**	**Au**	**Ag**	**Au**	**Ag**	**Kg/t**
6 hr, liquor	0.7816	0.22	0.19	0.1720	0.1485	29.5	20.5	0.16
24 hr, liquor	0.7815	0.34	0.23	0.2712	0.1845	46.5	25.4	0.46
52 hr, liquor	0.7815	0.40	0.24	0.3266	0.1981	56.0	27.3	0.75
100 hr, liquor	0.7805	0.40	0.25	0.3362	0.1981	57.7	29.1	1.47
Residue	0.5144	0.48	<2	0.2469	0.5144	42.3	70.9	
Calc. Head		1.13	1.4	0.5831	0.7250	100	100	

Intensive leaching conditions of the feeds and residues from the June 1998 tests were done to examine the extraction of zinc and copper. Low copper and zinc recoveries were observed in both semi-massive and disseminated samples as summarized in Table 11.1.2.4.

Table 11.1.2.4: Intensive Leach Condition Results for the Extraction of Copper and Zinc from Semi-Massive and Disseminated Samples

Test Sample	Head Assay, ppm		Leach Residue, ppm		Extraction, %	
	Cu	Zn	Cu	Zn	Cu	Zn
Disseminated A	554	<100	427	<100	22.0	-
Disseminated B	554	<100	434	<100	21.7	-
Semi-Massive A	8,411	890	7,837	995	6.8	-
Semi-Massive B	8,411	890	7,167	990	14.8	-

11.1.3 Current Testwork (February 2008)

A metallurgical test program was completed by RDi in 2008 to provide technical data for this Technical Report on Resources. The program was comprised of: Bond's ball mill work index, gravity tests, flotation tests, leach tests; and combinations of gravity, flotation and leach tests. The tests were conducted on three composites, which were categorized according to the parameters shown in Table 11.1.3.1.

Table 11.1.3.1: Categorization Parameters and Assays for Three Composites in the RDi February 2008 Metallurgical Test Program

Composite No.	Composite Classification	Au, g/t	%S (total)	Hg, g/t	Cu, g/t
1	Au>0.5 g/t; Cu<400 ppm	1.42	0.67	0.06	244
2	Cu >500 ppm	2.95	2.41	0.07	3,995
3	Au <0.5 ppm	0.18	0.99	<0.05	177

Bond's ball mill work indices were determined for the three composites at a 100 mesh grind using direct and indirect methods. The results indicate low to medium rock hardness in the three composites as summarized in Table 11.1.3.2

Table 11.1.3.2: Bond's Ball Mill Work Indices

Composite No.	Method	BWI
1	Indirect	8.88
2	Indirect	9.88
3	Direct	11.25

Gravity tests were conducted to determine if the contained free gold could be recovered from the ore into a concentrate. The gravity tests were conducted on all three composites with a 1 kg charge ground to P_{80} 65 and 100 mesh in a 3.5 inch dia. KC-MD3 Knelson concentrator. The test results indicate good gold recoveries between 68.5 and 89.0% can be achieved using gravity with the highest recovery in Composite 1. Table 11.1.3.3 summarizes these test results.

Table 11.1.3.3: Gravity Test Results Using Knelson Concentrator

Composite No.	Grind	Gravity Recovery, %			Concentrate Grade		Gravity Tails		Calc. Head	
	P_{80} Mesh	Wt.	Au	Cu	Au, g/t	Cu, ppm	Au, g/t	Cu, ppm	Au, g/t	Cu, ppm
1	65	9.3	89.0	18.8	25.56	482	0.75	214	3.09	239
1	100	9.4	85.0	19.7	15.02	484	0.55	204	1.66	230
2	65	12.2	78.6	25.3	18.11	5,700	1.37	2,330	2.81	2,740
2	100	11.1	68.5	43.4	13.17	10,900	1.51	1,778	2.13	2,791
3	65	11.0	78.5	20.2	1.03	380	0.07	186	0.14	207
3	100	10.6	77.8	24.9	1.03	472	0.07	169	0.14	201

Additional gravity tests were performed on a larger scale to examine the production of a high-grade concentrate for direct smelting using Gemini table and Diester table for upgrading in a cleaner gravity step. Table 11.1.3.4 shows the large-scale gravity test results indicating that the potential exists for producing a high-grade gold concentrate for direct smelting.

Table 11.1.3.4: Results from Large-Scale Gravity Tests

Product	Composite No. 1					Composite No. 2				
	Assay, g/t		Distribution, %			Assay, g/t		Distribution, %		
	Au	Cu	Wt.	Au	Cu	Au	Cu	Wt.	Au	Cu
Gemeni Conc.	61.20	1516	0.7	35.5	3.9	122	18,960	1.2	53.1	7.8
Gemeni Midds & Tails	5.50	912	4.5	20.1	14.7	8.08	21,600	5.4	16.6	41.5
Cal. Diester Conc.	13.14	995	5.2	55.6	18.5	28	21,137	6.6	69.6	49.3
Diester Tails	0.58	242.0	94.8	44.4	81.5	0.86	1,530	93.4	30.4	50.7
Cal. Feed	1.24	281				2.64	2,818			

Flotation tests were done on the rougher gravity tails for the three composites at a primary grind of P_{80} 65 mesh using AeroPromoter 404, potassium amyl xanthate and MIBC frother. The test results indicate good gold recoveries of 75 to 80% for Composites 1 and 2 as summarized in Table 11.1.3.5.

Table 11.1.3.5: Flotation Test Results from Rougher Gravity Tails

Composite No.		Rougher Concentrate (6 minutes)								
	Grind	Recovery, %			Grade, g/t		Tailing Assay, g/t		Calc. Head, g/t	
	P_{80} Mesh	Wt.	Au	Cu	Au	Cu	Au	Cu	Au	Cu
1	65	3.14	76.5	46.0	24.04	3,572	0.24	136	0.99	244
2	65	6.08	80.9	91.9	22.22	34,723	0.34	198	1.67	2,297
3	65	4.00	42.4	31.2	0.88	5,236	<0.1	482	0.08	672

Whole ore flotation tests were conducted on the three composites at a P_{80} grind of 150 mesh using the same reagent scheme as the rougher gravity tails flotation tests. Similar to the rougher gravity results, good gold recoveries of 85 and 92% were observed in Composites 1 and 2, respectively, as shown in Table 11.1.3.6.

Table 11.1.3.6: Flotation Test Results from Whole Ore Flotation

Composite No.	Grind	Rougher Concentrate (6 minutes)								
		Recovery, %			Grade, g/t		Tailing Assay, g/t		Calc. Head, g/t	
	P_{80} Mesh	Wt.	Au	Cu	Au	Cu	Au	Cu	Au	Cu
1	150	5.30	91.7	52.5	57.36	2,331	0.29	136	3.31	235
2	150	7.62	85.3	93.3	30.98	31,206	0.44	198	2.77	2,550
3	150	3.86	78.8	36.4	4.64	6,880	<0.1	482	0.23	720

Low gold recoveries were experienced in Composite 3 for both the rougher gravity tails and whole ore flotation tests due to its low ore grade.

Leach tests were conducted on: (1) gravity tailings, (2) flotation tailings, and (3) whole ore. The gravity leach tests were done at P_{80} 100 mesh for 48 hours at 40% solids and pH11. The test results indicate that a majority, >90%, of the gold is extracted within the first 24 hours of leach time as shown in Table 11.1.3.7.

Table 11.1.3.7: Leach Test Results for Gravity Tailings

Composite	Grind	Extraction, %				Residue, g/t		Cal. Head, g/t		Reagents, kg/t	
		24 hours		48 hours							
	P_{80} Mesh	Au	Cu	Au	Cu	Au	Cu	Au	Cu	NaCN	Lime
1	150	36.0	6.5	61.0	6.9	0.21	130	0.54	140	0.417	5.149
2	150	93.0	23.4	100.0	24.1	<0.10	142	0.29	188	0.306	4.342
3	150	98.2	21.8	100.0	23.3	<0.10	50	0.03	65	0.481	3.763

Cyanide leach tests were also done on rougher and cleaner gravity tailings from the large-scale gravity tests for Composites 1 and 2 at the P_{80} 100 mesh. The gold recovery from the gravity rougher tailing samples was about 83%; whereas, the gold recovery from the gravity cleaner tailings for Composites 1 and 2 were 91% and 61%, respectively. The lower recovery in Composite 2 was due to its higher copper content. Thus, the overall gravity plus leach recoveries for Composites 1 and 2 are 90.6% and 88.6%, respectively.

The leach result of the flotation tailings was significantly lower for Composite 1 at 61% after 48 hours; whereas, for Composites 2 and 3 were 93.0% and 98.2%, respectively, after 24 hours.

Whole ore leaching tests were done on all three composites at P_{80} 100 and 150 mesh, 40% solids, pH 11 and 1g/L NaCN. The results indicate that a majority of the gold is extracted in 24 hours leach time with low NaCN consumption rates as summarized in Table 11.1.3.8.

Table 11.1.3.8: Whole Ore Leach Test Results

Composite	Grind	Extraction, %				Residue, g/t		Cal. Head, g/t		Reagents, kg/t	
		24 hours		48 hours							
	P_{80} Mesh	Au	Cu	Au	Cu	Au	Cu	Au	Cu	NaCN	Lime
1	100	85.1	7.1	96.5	8.2	0.17	222.0	4.79	242	0.237	7.467
1	150	90.6	8.0	100.0	9.1	<0.10	208	3.19	229	0.484	7.369
2	100	88.5	5.9	93.6	7.1	0.14	2,608	2.17	2,889	0.954	7.972
2	150	83.3	6.8	93.3	8	0.14	2,560	1.09	2,786	1.252	8.933
3	100	74.3	9.9	100.0	12.3	<0.10	192	0.3	219	0.604	4.991
3	150	92.7	10.0	100.0	12.7	<0.10	182	0.26	209	1.135	4.234

The results of RDi's metallurgical testwork indicate that the gold is predominantly free. However, gravity concentrating methods alone will not recover a sufficient amount of the gold into a product that can be directly smelted. A satisfactory gold recovery of greater than 85% can be achieved by direct cyanidation or a combination of gravity and cyanidation of gravity tailings or flotation and cyanidation of flotation tailings.

RDi's recommendation for the scoping level (conceptual) flowsheet is a combination of gravity and carbon-in-leach (CIL) of the gravity tailings for recovery of the gold into a doré. Due to the low copper grade, no recovery is included in this flowsheet or recovery circuits.

11.2 Mineral Processing

The proposed processing flowsheet for Paul Isnard based on the scoping-level metallurgical test results would be as follows utilizing conventional technologies for the production of gold doré.

- Primary crushing using a jaw crusher;
- Grinding using a SAG –ball mill configuration;
- Gravity concentrating using Gemini and Diester tables for production of a gravity concentrate for direct smelting;
- Cyanide leaching and CIP;
- Carbon stripping; and
- Induction furnace for production of a gold doré.

12 Mineral Resource Estimate (Item 14)

12.1 Resource Estimation

12.1.1 Qualified Person of the Mineral Resource Estimate

Dr. Bart Stryhas constructed the geologic and resource model discussed below. He is responsible for the resource estimation methodology and the mineral resource statement. Dr. Stryhas is independent of the issuer applying all of the tests in Section 1.4 of NI 43-101.

12.2 Drillhole Database

The database was compiled by Golden Star personnel and includes continuous surface channel samples combined with diamond drillhole samples. The database consists of four Microsoft Excel spreadsheets containing collar/channel locations surveyed in UTM NAD83 coordinates, drillhole orientations with down hole deviation surveys, assay intervals with elemental analyses and geologic intervals with rock types. The appropriate codes for missing samples and no recovery were used during the modeling procedures.

The database contains information from 59 drillholes totaling 11,321 m of drilling and 87 channels totaling to 921 m. There are no gaps in the drillhole naming sequence. The maximum drillhole depth is 295 m and the average is 190 m. Most holes were drilled inclined steeply to the north normal to the strike and dip of the mineralization. Ninety three percent of the drillholes were surveyed for down hole deviations using either acid dip tests, Tropari or Sperry Sun tests. The average drillhole inclination is about -56° northward.

The database consists primarily of Au assays accompanied by representative Cu assays. The Au database currently consists of the original assay value accompanied by as many as eight duplicate check assays. For the resource model, any sample interval with multiple Au assays was individually averaged to generate the final assay value. As described in Section 12.1, every fifth sample from within the mineralized envelope was analyzed for Cu in 2007. Although the Cu assay data represents discontinuous and incomplete sampling, it is interpreted to be representative of the general Cu distribution.

12.3 Geologic Model

The mineral resource estimation is based on a very generalized geologic model consisting of intermixed felsic and mafic rock types located within a shear zone that strikes east-west and dips steeply to the south. For the resource modeling, the rock types were not differentiated. This was due to the complex nature of the lithic distribution within the shear zone and the fact that no significant grade deference was seen during statistical analysis of the various host lithologies.

12.4 Compositing

The raw Au assay data was first plotted on histogram and cumulative distribution graphs to understand its basic statistical distribution. The histogram shows a strong positive skewness and the cumulative distribution curve illustrates a continuous population set with no distinct break in slope. The original assay lengths range from 0.1 to 4.3 m with an average of 1.0 m. For the modeling, these were composited into 2.5 m bench lengths. The cumulative distribution plot of the composited data shows a continuous distribution up to 30 g/t followed by three outlier points. During the grade estimation, the composite Au data was capped at 30 g/t. This resulted in three composites ranging between 36.8 and 85.0 being reduced to 30g/t-Au.

The Cu assay data displays very similar statistical characteristics to the Au data. It too displays a strong positive skewness and continuous population set. Four of the samples reported Cu content at the upper limit of detection, 1%Cu. These were all capped at 1% during the compositing.

12.5 Density (Specific Gravity)

A specific gravity study was performed on the drill core during 2007 to be used for the mineral resource estimation. They selected a total of 107 samples from six lithic variations. These included: 52 samples from felsic lithologies; 41 samples from mafic lithologies and 14 samples from the saprolite. For this study, averaged specific gravities were estimated for the bedrock composed of mixed felsic and mafic lithologies and for the saprolite. The results of the specific gravity testwork are presented in Table 12.5.1. Specific gravity was assigned in the block model based on each blocks majority composition of bedrock or saprolite.

Table 12.5.1: Specific Gravity Determinations

Lithic Type	Specific Gravity (g/cm^3)
Felsic Lithologies	2.81
Mafic Lithologies	2.91
Combined Felsic and Mafic Lithologies	2.89
Saprolite	1.64

12.6 Variogram Analysis and Modeling

Variogram analysis was conducted on Au composite data, Au indicator flags used to construct the mineralized envelope and on Cu composites. The use of the Au indicator flags will be discussed in the next section. Variograms constructed from the drillhole spacing currently available at Paul Isnard have relatively limited use in determining true range projections of variance for the entire deposit. They can, however, be used to evaluate the range/variance correlations of the current data set. Variograms were constructed within the three principle directions of the mineralized zone. These include all direction along strike and dip defining the plane of mineralization and normal to strike and dip of the plane of mineralization. The results of the variograms are presented in Table 12.6.1.

Table 12.6.1: Paul Isnard Variogram Results

Data	Geologic Trend	Orientation	Range (m)	Nugget	Sill Differential
Au ppm	Within Mineralization Plane	85°, -75°	65	0.00	2.40
Au ppm	Normal to Mineralization Plane	175°, -15°	5	0.56	1.84
Au Indicator	Within Mineralization Plane	85°, -75°	55	0.03	0.11
Au Indicator	Normal to Mineralization Plane	175°, -15°	10	0.06	0.06
Cu ppm	Within Mineralization Plane	85°, -75°	75	17,500	1,500,000

12.6.1 Grade Estimation

The Paul Isnard deposit was modeled primarily for gold. However, the copper content of each block was also interpolated. The gold block grade estimates were made using the 2.5 m bench composites. For copper, straight composites of the re-sampled intervals were used to estimate the block grades.

Due to the intermittent nature of the gold mineralization, it was necessary to create a hard boundary within which to confine the estimation. The first choice was to use hard boundary grade shells. This had been completed during the Costello (1999) resource estimation and again by RSG Global in 2004. These shapes were available to the author and were tested in the current resource estimation. The shapes defined in 1999 are very detailed, consisting of 16 tabular bodies most of which are 1 to 3 m wide. Those defined by RSG are quite different from the previous, consisting of four large bodies ranging from 25 to 80 m wide. Both sets of grade shells performed poorly during the current modeling. The 1999 shapes are too thin to accommodate the block size of the current model and did not match the resurveyed locations of the drillholes very well. The RSG shapes are too generalized and incorporate excessive internal dilution. For these reasons, neither set was used in the current mineral resource estimation.

An alternative approach, using a categorical indicator was chosen to create the final grade shell. This method first separates the composite data into lower grade and higher-grade groups based on an appropriate cut-off value, in this case 0.35 g/t-Au. The composite values below 0.35 g/t-Au are flagged with a “0” and those above are flagged with a “1”. Variography is next conducted on the spatial distribution of the flagged indicators (0 and 1). The composite indicators values are then interpolated into the block model thus creating indicator block values between 0 and 1. This procedure effectively assigns a probability to each block as to whether it would be above the 0.35 g/t-Au cut-off. Blocks assigned with a value of 0.1 have a 10% probability, a 0.5 have 50% probability and those with a 1.0 have a 100% probability. For this mineral resource estimate, all blocks assigned with a value of 0.4 and above are considered to be within the 0.35 g/t-Au grade shell. The composites are next flagged with the interpolated block indicator values so that only composites within the interpolated grade shell are used for the actual grade interpolation within this shell. This technique precludes the necessity of creating very complex wire frame grade shells to control grade assignment.

The next step was to run Au grade interpolations by ordinary kriging and using a point validation technique to evaluate the results. This technique removes a drillhole from the database and then estimates grade for all composites within it. It then removes the next drillhole etc until all composites have been estimated. An x-y scatter plot is then constructed for the estimated versus actual grades to evaluate correlation. Numerous point validation runs are made to test the effects of different of min/max composites/block, octant search limitations and minimum number of drillholes required to assign grade. Once an optimal set of estimation parameters are determined, the actual grade interpolation is then conducted.

For the indicator interpolation, an ordinary kriging estimation was used which required a minimum of one and a maximum of three composites to assign probability to each block. No octant search restriction was used and no restriction was placed on the number of drillholes required to assign grade. A search ellipsoid with a range of 75 m down dip, 75 m along strike and 3 m across strike and dip was used. These ranges are based somewhat on the variography of the indicator composites but mainly on the author’s evaluation of what is appropriate for the deposit.

For the Au estimation, an ordinary kriging estimation was used which required a minimum of three and a maximum of ten composites to assign grade to each block. No octant search restriction was used and no restriction was placed on the number of drillholes required to assign grade. A search ellipsoid with a range of 75 m down dip, 75 m along strike and 10 m across strike and dip was used. These ranges are based somewhat on the variography of the Au composites but mainly on the author's evaluation of what is appropriate for the deposit.

For the Cu estimation, an ordinary kriging estimation was used which required a minimum of two and a maximum of ten composites to assign grade to each block. No octant search restriction was used and no restriction was placed on the number of drillholes required to assign grade. A search ellipsoid with a range of 75 m down dip, 75 m along strike and 10 m across strike and dip was used. Due to the discontinuous nature of the Cu assaying it was not possible to back code the Cu composites with the indicator probability values. During the Cu modeling, only the blocks chosen as within the Au grade shell were allowed to receive grade and they were estimated from any composites within the search criteria defined above. The copper grade estimations were compared with the nearby composite grades in cross section and bench plans. The results showed that grade was being assigned properly.

Representative bench planes and cross sections of the interpolated block model grades for gold and copper are shown in Figures 12-1 through 12-4.

12.7 Block Model

The block model was constructed within the UTM NAD83 grid coordinate limits listed in Table 12.7.1. The block size was chosen as an appropriate compromise between drillhole spacing, nature of mineralization and potential open pit bench height. The topographic surface was created from modern elevation coordinates supplied by Golden Star. Saprolite thickness varies considerably over the deposit and is present within 56% of the drillholes. A "top of bedrock" surface was created from the drilling data and all blocks were flagged as saprolite or bedrock in order to assign density.

Table 12.7.1: Block Model Limits

Orientation	Minimum (m)	Maximum (m)	Block Dimension (m)
Easting	172,150	175,550	10
Northing	520,200	521,400	5
Elevation	-100	475	5

12.8 Estimation Methodology

The Paul Isnard deposit was modeled primarily for gold. However, the copper content of each block was also interpolated. The gold block grade estimates were made using the 2.5 m bench composites. For copper, straight composites of the re-sampled intervals were used to estimate the block grades.

Due to the intermittent nature of the gold mineralization, it was necessary to create a hard boundary within which to confine the estimation. The first choice was to use hard boundary grade shells. This had been completed during the Costello (1999) resource estimation and again by RSG Global in 2004. These shapes were available to the author and were tested in the current resource estimation. The shapes defined in 1999 are very detailed, consisting of 16 tabular bodies most of which are 1 to 3 m wide. Those defined by RSG are quite different from the previous, consisting of four large bodies ranging from 25 to 80 m wide. Both sets of grade shells performed poorly during the current modeling. The 1999 shapes are too thin to accommodate the block size of the current model and did not match the resurveyed locations of the drillholes very well. The RSG shapes are too generalized and incorporate excessive internal dilution. For these reasons, neither set was used in the current mineral resource estimation.

An alternative approach, using a categorical indicator was chosen to create the final grade shell. This method first separates the composite data into lower grade and higher-grade groups based on an appropriate cut-off value, in this case 0.35 g/t-Au. The composite values below 0.35 g/t-Au are flagged with a "0" and those above are flagged with a "1". Variography is next conducted on the spatial distribution of the flagged indicators (0 and 1). The composite indicators values are then interpolated into the block model thus creating indicator block values between 0 and 1. This procedure effectively assigns a probability to each block as to whether it would be above the 0.35 g/t-Au cut-off. Blocks assigned with a value of 0.1 have a 10% probability, a 0.5 have 50% probability and those with a 1.0 have a 100% probability. For this mineral resource estimate, all blocks assigned with a value of 0.4 and above are considered to be within the 0.35 g/t-Au grade shell. The composites are next flagged with the interpolated block indicator values so that only composites within the interpolated grade shell are used for the actual grade interpolation within this shell. This technique precludes the necessity of creating very complex wire frame grade shells to control grade assignment.

The next step was to run Au grade interpolations by ordinary kriging and using a point validation technique to evaluate the results. This technique removes a drillhole from the database and then estimates grade for all composites within it. It then removes the next drillhole etc until all composites have been estimated. An x-y scatter plot is then constructed for the estimated versus actual grades to evaluate correlation. Numerous point validation runs are made to test the effects of different of min/max composites/block, octant search limitations and minimum number of drillholes required to assign grade. Once an optimal set of estimation parameters are determined, the actual grade interpolation is then conducted.

For the indicator interpolation, an ordinary kriging estimation was used which required a minimum of one and a maximum of three composites to assign probability to each block. No octant search restriction was used and no restriction was placed on the number of drillholes required to assign grade. A search ellipsoid with a range of 75 m down dip, 75 m along strike and 3 m across strike and dip was used. These ranges are based somewhat on the variography of the indicator composites but mainly on the author's evaluation of what is appropriate for the deposit.

For the Au estimation, an ordinary kriging estimation was used which required a minimum of three and a maximum of ten composites to assign grade to each block. No octant search restriction was used and no restriction was placed on the number of drillholes required to assign grade. A search ellipsoid with a range of 75 m down dip, 75 m along strike and 10 m across strike and dip was used. These ranges are based somewhat on the variography of the Au composites but mainly on the author's evaluation of what is appropriate for the deposit.

For the Cu estimation, an ordinary kriging estimation was used which required a minimum of two and a maximum of ten composites to assign grade to each block. No octant search restriction was used and no restriction was placed on the number of drillholes required to assign grade. A search ellipsoid with a range of 75 m down dip, 75 m along strike and 10 m across strike and dip was used. Due to the discontinuous nature of the Cu assaying it was not possible to back code the Cu composites with the indicator probability values. During the Cu modeling, only the blocks chosen as within the Au grade shell were allowed to receive grade and they were estimated from any composites within the search criteria defined above. The copper grade estimations were compared with the nearby composite grades in cross section and bench plans. The results showed that grade was being assigned properly.

Representative bench planes and cross sections of the interpolated block model grades for gold and copper are shown in Figures 12-1 through 12-4.

12.9 Model Validation

Three techniques were used to evaluate the validity of the block model. First, the interpolated block grades were visually checked on sections and bench plans for comparison to the composite assay grades. Second, statistical comparisons were made between the interpolated block grades, and the composite data. This included evaluation of histogram patterns, cumulative distribution plots and basic statistical values. The results are presented in Table 12.9.1. The third method of model evaluation involved an inverse distance squared interpolation using identical modeling parameters as the Kriged estimate. The results showed that the inverse distance squared interpolation agreed with the Kriged estimate producing slightly higher tonnes and grade. The inverse distance squared estimation produced 1.5% more tonnes, 6% higher Au grade and 3.6% higher copper grade. Overall, this suggests that the deposit is not sensitive to modeling algorithms.

Table 12.9.1: Model Validation Results

Data Set	Average	Median	Maximum	Variance	# of Samples
Raw Au Assays (g/t)	1.67	0.3	245	58	2467
2.5m Au Bench Composites (g/t)	1.53	0.6	85	18	789
Kriged Au Blocks (g/t)	1.02	0.6	18	2	80010
Straight Cu Composites (ppm)	405	84.0	10000	1522000	724
Kriged Cu Blocks (ppm)	307	76.0	6814	37000	80010

12.10 Resource Classification

Mineral Resources are classified under the categories of Measured, Indicated and Inferred according to CIM guidelines. Classification of the mineral resources reflects the relative confidence of the grade estimates. This is based on several factors including; sample spacing relative to geological and geo-statistical observations regarding the continuity of mineralization, data verification to original sources, specific gravity determinations, accuracy of drill collar locations, accuracy of topographic surface, quality of the assay data and many other factors, which influence the confidence of the mineral estimation. No single factor controls the resource classification rather each factor influences the end result. In general, most of the factors influencing the resource classification at Paul Isnard are positive. The primary detriments are the issues related to assay duplication and the average drillhole spacing within parts of the deposit.

The results of the 2007 re-sampling and assay verification program discussed above in Section 12 has illustrated significant issues related to validation of the earlier Au analyses. The average drillhole spacing in some parts of the deposit is sufficient however, much of the deposit has only widely spaced holes relative to the nature of the mineralization. Due to the problems with assay duplication and the widely spaced drilling in parts of the deposit, the entire Paul Isnard resource is classified as an Inferred Mineral Resource. Once a thorough assay verification program has been completed, parts of this resource can be upgraded to the indicated category where drillholes spacing warrants.

The inferred mineral resources of this section support the accompanying Technical Report on Resources. The reader is cautioned that these mineral resources remain too speculative geologically to have the economic considerations applied to them that would enable then to be categorized as mineral reserves, and there is no certainty that the preliminary assessment will be realized. The basis of this Technical Report on Resources resides within the fact that exploration work conducted at Paul Isnard has delineated a significant zone of gold mineralization, which can be inventoried to a limited level of confidence.

12.11 Mineral Resource Statement

The Paul Isnard mineral resource statement is presented in Table 12.11.1. The 0.4 ppm Au cut-off grade was chosen for resource reporting based on; mining at US$2.50/t, processing at US$10.00/t, G&A at US$2.00/t, recovery of 95%, no NSR and a gold value of US$1,200.00/oz. The results reported in the mineral resource statement have been rounded to reflect the approximation of grade and quantity, which can be achieved at this level of mineral resource estimation.

Table 12.11.1: Paul Isnard Mineral Resource Statement as of January 13, 2011

Resource Category	Au Cut-off (g/t)	Total Tonnes (Mt)	Au Grade (g/t)	Contained Au (Moz)
Inferred	0.4	36.7	1.6	1.9

Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resource estimate will be converted into Mineral Reserve estimate.

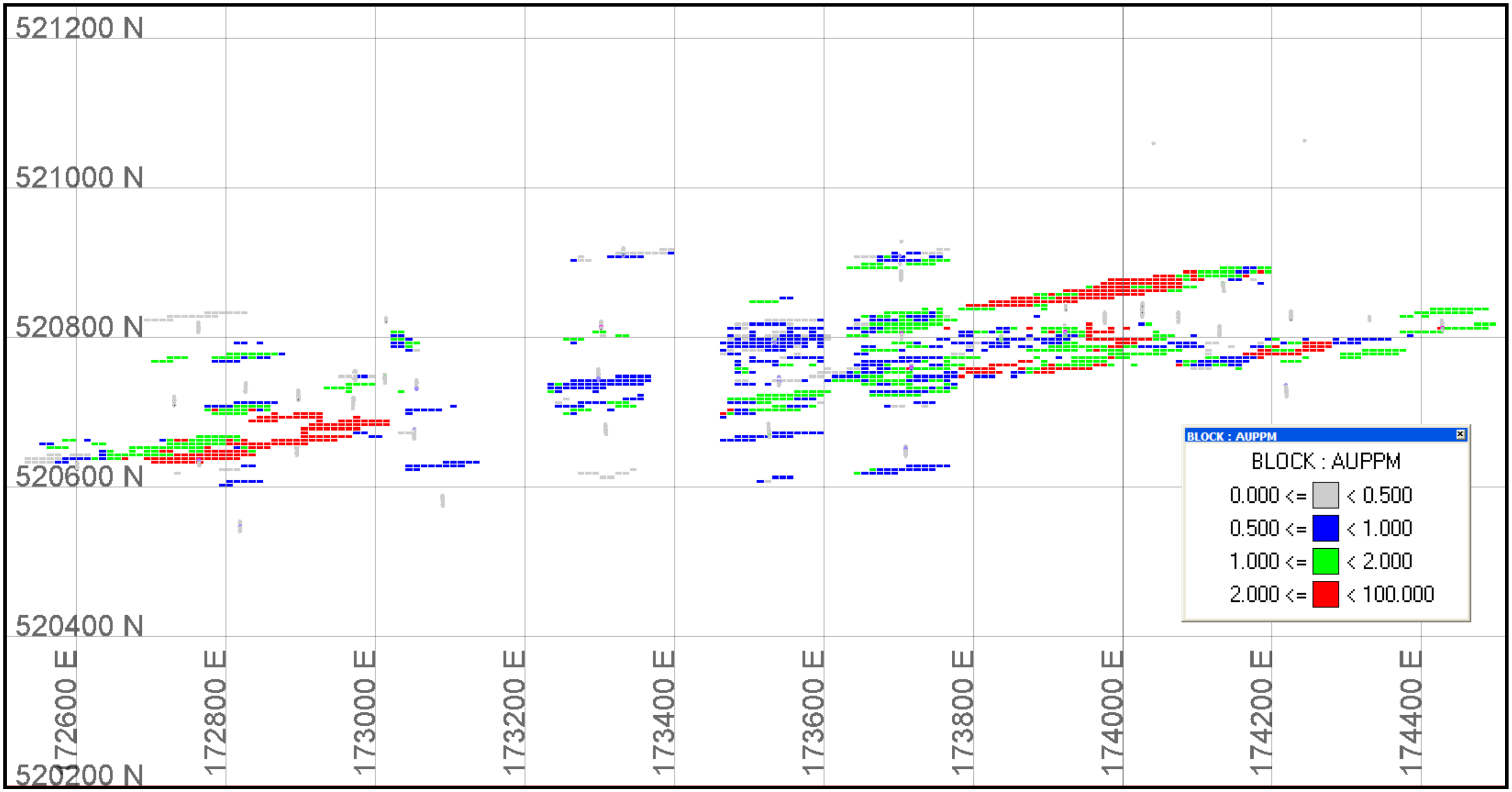
12.12 Mineral Resource Sensitivity

The grade tonnage distributions of the inferred mineral resources at Paul Isnard are presented in Table 12.12.1 and Figure 12-5.

Table 12.12.1: Paul Isnard Inferred Mineral Resource Sensitivity

Au Cut-off (g/t)	Total Tonnes (Mt)	Au Grade (g/t)	Cu Grade (ppm)	Contained Au (Moz)	Contained Cu (Mlb)
0.2	40.4	1.5	364	1.95	32.37
0.3	39.1	1.5	370	1.89	31.85
0.4	36.7	1.6	384	1.89	31.03
0.5	33.2	1.7	412	1.81	30.13
0.6	29.8	1.8	441	1.72	28.93
0.7	27.2	1.9	466	1.66	27.93
0.8	24.8	2.1	494	1.67	26.97
0.9	22.7	2.2	509	1.61	25.52

Mineral Resources are not Mineral Reserves, as they have not been converted to such by the completion of a Preliminary Feasibility Study.

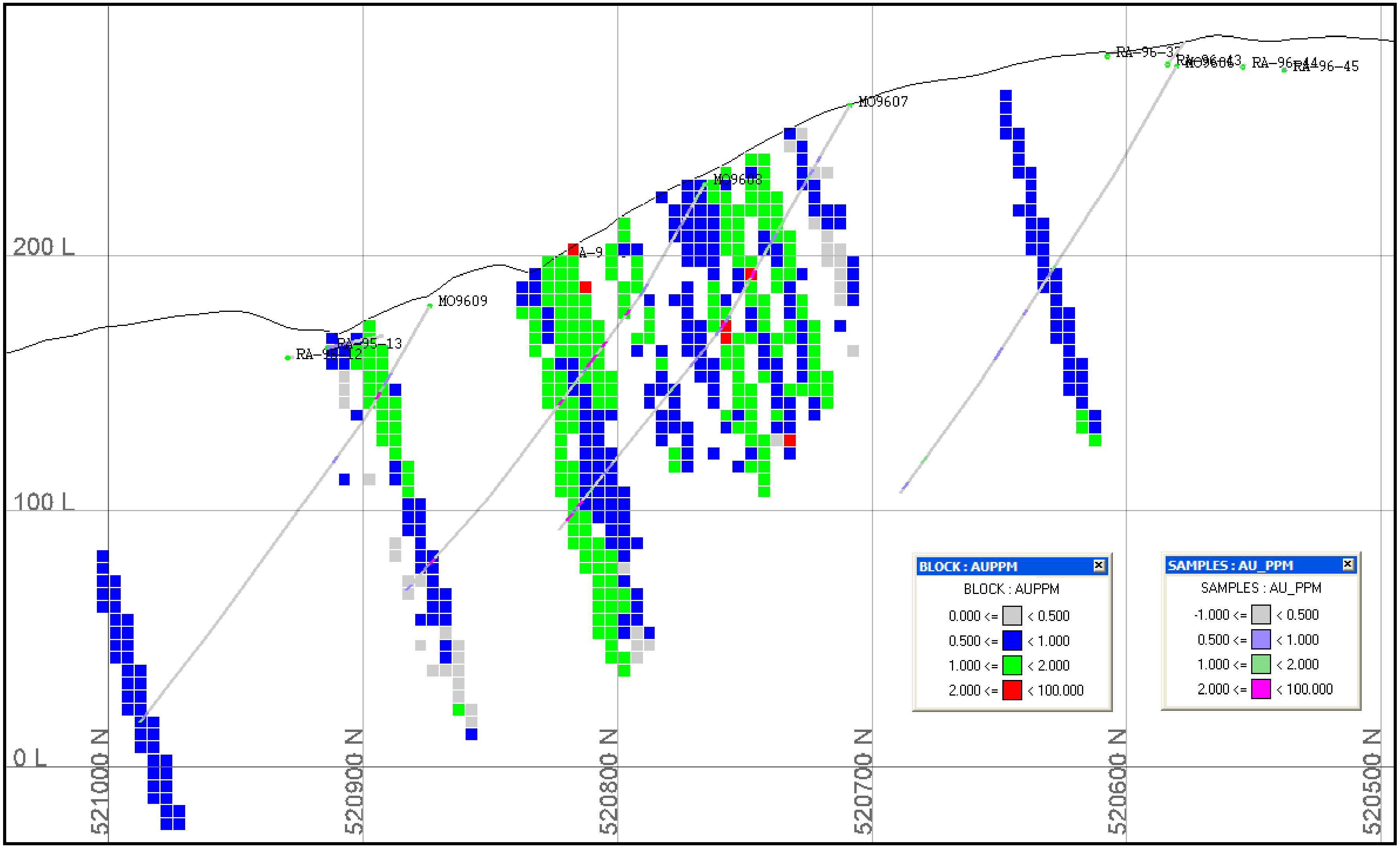


srk consulting

Paul Isnard Project,
French Guiana

Figure 12-1

165 m Bench Elevation of Interpolated Au Grade in Blocks

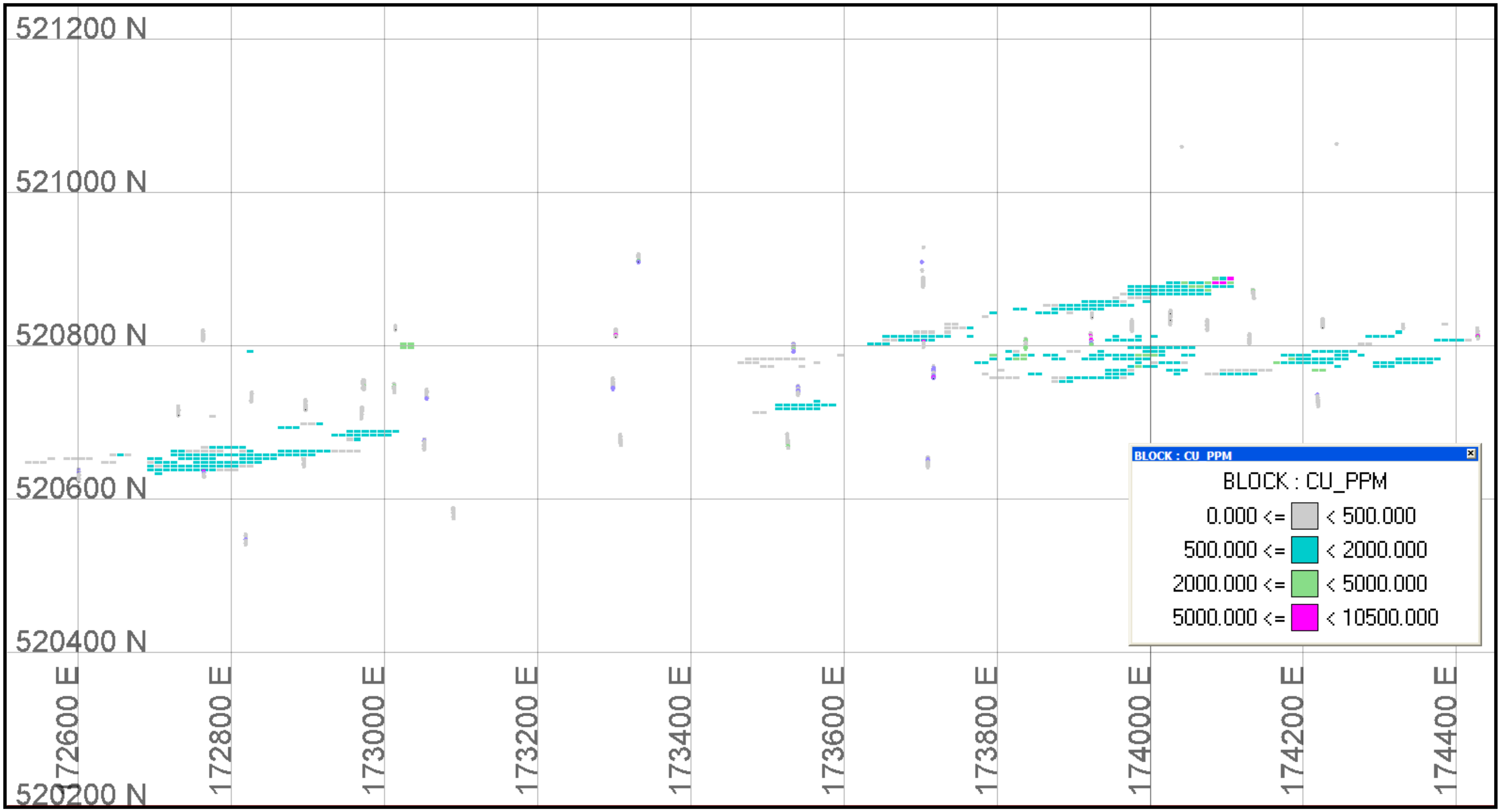


srk consulting

Paul Isnard Project,
French Guiana

Figure 12-2

Representative Cross-Section 173,720E Showing Interpolated Au Grade in Blocks

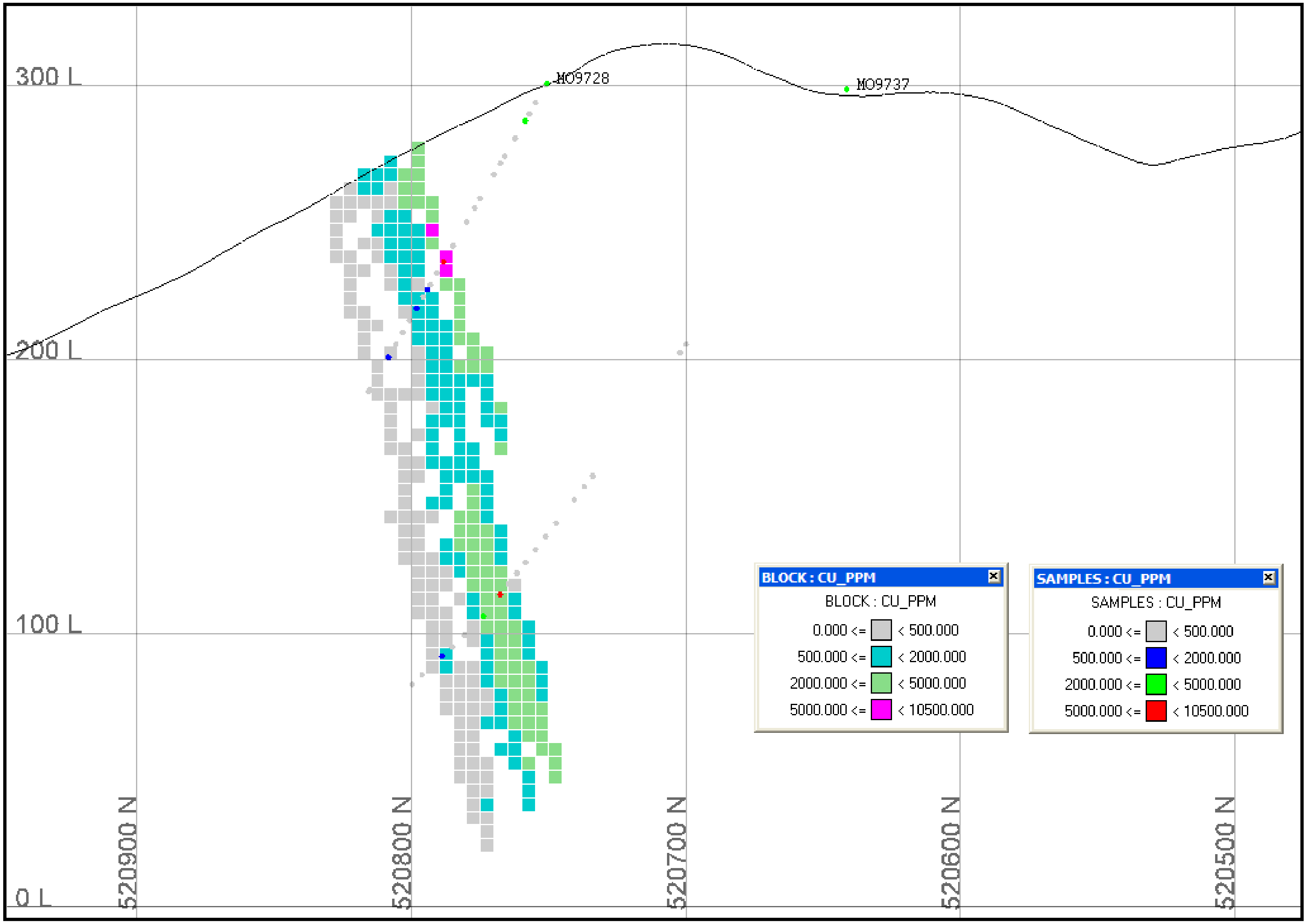


srk consulting

Paul Isnard Project,
French Guiana

Figure 12-3

165m Bench Elevation of Interpolated Cu Grade in Blocks

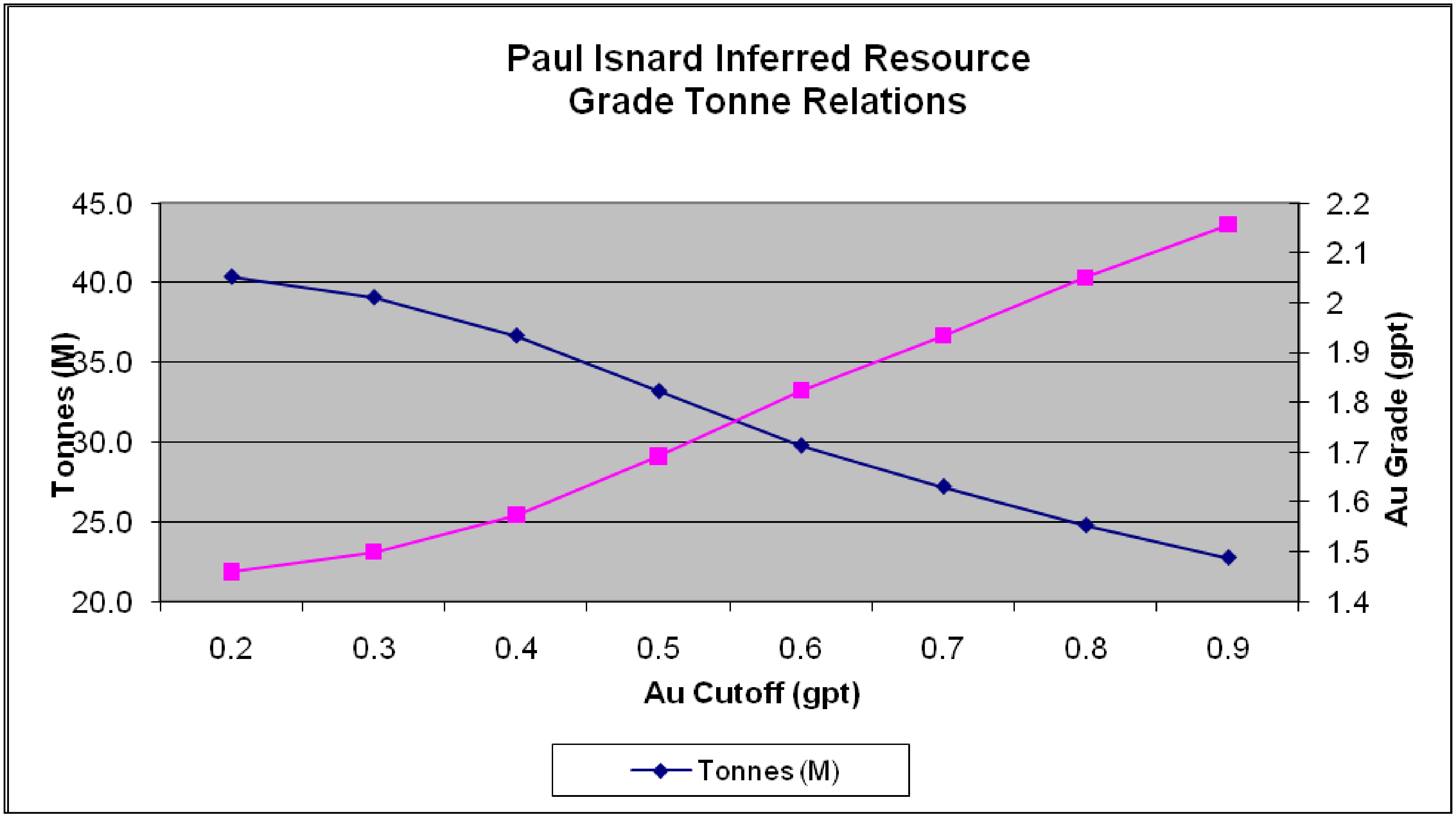


srk consulting

Paul Isnard Project,
French Guiana

Figure 12-4

Representative Cross-Section 174,200E Showing Interpolated Cu Grade in Blocks



srk consulting	Paul Isnard Project, French Guiana	**Figure 12-5** Paul Isnard Grade Tonnage Curve of Inferred Mineral Resources

13 Adjacent Properties (Item 23)

The are no mineralized properties which are geologically similar and immediately adjacent to the Project.

14 Other Relevant Data and Information (Item 24)

There are no other relevant data or information to be included in this Technical Report on Resources.

15 Interpretation and Conclusions (Item 25)

15.1 Interpretation

15.1.1 Field Surveys

A total of 59 drillholes, for 11,421 m were completed in the drilling programs. The summary and interpretation of all drilling results indicates that anomalous gold mineralization is located within several tabular south dipping units, which average 10 to 20 m in true thickness along 1,500 m of strike length. The drillholes are predominantly inclined moderately to the north whereas the mineralization dips at 65° to the south. Therefore, the drillholes intercepts do not represent true thickness. Rather, true thickness averages approximately 75% of the drill hole intercept distance. SRK is of the opinion that the drilling operations were conducted by professionals, the core was handled, logged and sampled in an acceptable manner by professional geologists, and the results are suitable for support of a NI 43-101 compliant mineral resource estimation.

15.1.2 Analytical and Testing Data

SRK is of the opinion that the sample preparation and analytical work performed by the original assay laboratories discussed above was likely of sub-industry standards. The main issues believed to have negatively affected the duplication of assay results were likely involved with the sample preparation and/or assay analyses. The verification of original drill core assay results was unsuccessful and has a negative impact on the resource classification discussed in Section 15.2.9 above. Based on the results of the 2007 re-assay program, SRK is of the opinion that the problem with assay duplication root back to the original assay laboratories and are not related to gold distribution within individual samples.

15.2 Significant Risks and Uncertainties

Risk Area	Risk Level
Resources	
Database	Low
Exploration data	Low
Quality	Low
Sufficiency/Adequacy	Low
Assaying	Moderate
Surveying	Low
Geology	Moderate
Geology and Resource Modeling	
Geological modeling	Moderate
Resource modeling approach	Low
Geostatistical analysis	Low
Resource estimate	Low
Metallurgical Test Work/Processing Facilities	
Metallurgical Test Work	Low
Ore type definition	Low

15.2.1 Exploration

The exploration drilling program conducted by Guyanor from 1994 to present was responsible for advancing the property from a raw exploration prospect to its current status. This program mapped, sampled and diamond core drilled the mineralized shear zone at Montagne d'Or. Most of the drillholes were surveyed for down hole deviation. The core was logged, split, and sampled properly. All samples were analyzed using appropriate assay procedures of the time. The drill logging and assay results were correctly compiled onto cross-sections. The exploration work described above resulted in the delineation of anomalous gold mineralization located within several tabular south dipping zones ranging from a few meters up to 75 m in true thickness along 2200 m of strike length. The drilling and assay results of the exploration work described above were subsequently incorporated into historical resource estimates (Costelloe, 1999, RSG Global 2004) as discussed above in Section 4.3. They also have provided most of the technical data supporting the resource estimation discussed in Section 12.

15.2.2 Mineral Resource Estimate

The Paul Isnard property consists of an inferred mineral resource based on well-documented exploration work. The results of 59 diamond drillholes completed during a six-year exploration history have delineated an east-west striking, steeply south dipping zone of gold and copper mineralization. The mineralization is defined over a 3.5 km strike length and has been tested on average down to 150 m below surface where it remains open at depth. The geological understanding of the area is well established and a reasonable hypothesis of mineralization has been established. The known geometry and distribution of the mineralization suggests that it has potential to be exploited by conventional open pit mining method.

15.2.3 Metallurgy and Processing

The results of RDi's metallurgical testwork indicate that the gold is predominantly free. However, gravity concentrating methods alone will not recover a sufficient amount of the gold into a product that can be directly smelted. A satisfactory gold recovery of greater than 85% can be achieved by direct cyanidation or a combination of gravity and cyanidation of gravity tailings or flotation and cyanidation of flotation tailings.

15.3 Conclusions

The resource estimation is based on information from 59 drillholes totaling 11,321 m of drilling and 87 channels totaling to 921 m. The resource model utilizes a very generalized geologic model consisting of intermixed felsic and mafic rock types located within a shear zone that strikes east-west and dips steeply to the south. The model blocks are 10 m x 5 m x 5 m in the x,y,z directions, respectively. All block grade estimates were made using 2.5 m bench composites. An Ordinary Kriging algorithm was employed to generate a categorical indicator grade shell based on a 0.35 ppm Au threshold. Ordinary Kriging algorithm was also used for the gold grade estimation. The results of the resource estimation provided a CIM classified Inferred Mineral Resource. This classification is based primarily on problems with assay duplication and the widely spaced drilling in parts of the deposit.

16 Recommendations (Item 26)

16.1 Recommended Work Programs

SRK recommends that Columbus Gold conduct a drilling program targeting resource confirmation and expansion, conduct geotechnical drilling for pit slope stability analysis, and perform additional metallurgical testing before evaluating the options to proceed with a Preliminary Economic Assessment (PEA).

The resource confirmation drillholes should be positioned to test continuity of mineralization and provide grade confirmation. Once this is established, the well mineralized portions of the deposit should be infill drilled on 50 m centers. Sample analysis should be accompanied by a QA/QC program including standards, duplicates and blanks. Additional work could include: petrographic studies, whole rock analysis, detailed alteration and mineralogical studies as well as preliminary isotopic age dating, and fluid-inclusion geochemistry. These studies would provide verification of a geologic model to be applied to future exploration drilling.

Additional studies should also include: additional bench scale metallurgical testing, establishing an environmental permitting time line and baseline environmental studies.

The PEA could be initiated at the conclusion of drilling and metallurgical work. This study should include an updated mineral resource estimate incorporating the results of the new drilling, conceptual mining plans, site layout, metallurgical studies and mill plans all cumulating into an economic model.

16.1.1 Costs

Cost estimates for the recommended work program are presented in Table 16.1.1.1.

Table 16.1.1.1: Additional Work Estimate

Proposed Work		**US$ Total Cost**
Confirmation drilling : 50 holes for 15,000 m	12 months	3,000,000
Metallurgical test work	3 months	250,000
Pit slope geotechnical drilling: 6 holes for 1,200 m	1 month	250,000
Permitting timeline assessment and baseline environmental studies	12 months	150,000
Preliminary Economic Assessment	3 months	180,000
Total		**3,830,000**

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18 Glossary

18.1 Mineral Resources

The mineral resources and mineral reserves have been classified according to the “CIM Standards on Mineral Resources and Reserves: Definitions and Guidelines” (November 27, 2010). Accordingly, the Resources have been classified as Measured, Indicated or Inferred, the Reserves have been classified as Proven, and Probable based on the Measured and Indicated Resources as defined below.

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

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

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

A ‘Measured Mineral Resource’ is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough to confirm both geological and grade continuity.

18.2 Mineral Reserves

A Mineral Reserve is the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined.

A ‘Probable Mineral Reserve’ is the economically mineable part of an Indicated, and in some circumstances a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility

Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified.

A 'Proven Mineral Reserve' is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified.

18.3 Definition of Terms

The following general mining terms may be used in this report.

Table 26.3.1: Definition of Terms

Term	Definition
Assay	The chemical analysis of mineral samples to determine the metal content.
Capital Expenditure	All other expenditures not classified as operating costs.
Composite	Combining more than one sample result to give an average result over a larger distance.
Concentrate	A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore.
Crushing	Initial process of reducing ore particle size to render it more amenable for further processing.
Cut-off Grade (CoG)	The grade of mineralized rock, which determines as to whether or not it is economic to recover its gold content by further concentration.
Dilution	Waste, which is unavoidably mined with ore.
Dip	Angle of inclination of a geological feature/rock from the horizontal.
Fault	The surface of a fracture along which movement has occurred.
Footwall	The underlying side of an orebody or stope.
Gangue	Non-valuable components of the ore.
Grade	The measure of concentration of gold within mineralized rock.
Hangingwall	The overlying side of an orebody or slope.
Haulage	A horizontal underground excavation which is used to transport mined ore.
Hydrocyclone	A process whereby material is graded according to size by exploiting centrifugal forces of particulate materials.
Igneous	Primary crystalline rock formed by the solidification of magma.
Kriging	An interpolation method of assigning values from samples to blocks that minimizes the estimation error.
Level	Horizontal tunnel the primary purpose is the transportation of personnel and materials.
Lithological	Geological description pertaining to different rock types.
LoM Plans	Life-of-Mine plans.
LRP	Long Range Plan.
Material Properties	Mine properties.
Milling	A general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product.
Mineral/Mining Lease	A lease area for which mineral rights are held.
Mining Assets	The Material Properties and Significant Exploration Properties.
Ongoing Capital	Capital estimates of a routine nature, which is necessary for sustaining operations.
Ore Reserve	See Mineral Reserve.
Pillar	Rock left behind to help support the excavations in an underground mine.
RoM	Run-of-Mine.
Sedimentary	Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks.
Shaft	An opening cut downwards from the surface for transporting personnel, equipment, supplies, ore and waste.

Term	Definition
Sill	A thin, tabular, horizontal to sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness.
Smelting	A high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or doré phase and separated from the gangue components that accumulate in a less dense molten slag phase.
Stope	Underground void created by mining.
Stratigraphy	The study of stratified rocks in terms of time and space.
Strike	Direction of line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction.
Sulfide	A sulfur bearing mineral.
Tailings	Finely ground waste rock from which valuable minerals or metals have been extracted.
Thickening	The process of concentrating solid particles in suspension.
Total Expenditure	All expenditures including those of an operating and capital nature.
Variogram	A statistical representation of the characteristics (usually grade).

18.4 Abbreviations

The following abbreviations may be used in this report.

Table 26.4.1: Abbreviations

Abbreviation	Unit or Term
A	ampere
AA	atomic absorption
A/m^2	amperes per square meter
ANFO	ammonium nitrate fuel oil
Ag	silver
Au	gold
AuEq	gold equivalent grade
°C	degrees Centigrade
CCD	counter-current decantation
CIL	carbon-in-leach
CoG	cut-off grade
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
cfm	cubic feet per minute
ConfC	confidence code
CRec	core recovery
CSS	closed-side setting
CTW	calculated true width
°	degree (degrees)
dia.	diameter
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
FA	fire assay
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram
gal	gallon
g/L	gram per liter
g-mol	gram-mole
gpm	gallons per minute
g/t	grams per tonne
ha	hectares

Abbreviation	Unit or Term
HDPE	Height Density Polyethylene
hp	horsepower
HTW	horizontal true width
ICP	induced couple plasma
ID2	inverse-distance squared
ID3	inverse-distance cubed
IFC	International Finance Corporation
ILS	Intermediate Leach Solution
kA	kiloamperes
kg	kilograms
km	kilometer
km^2	square kilometer
koz	thousand troy ounce
kt	thousand tonnes
kt/d	thousand tonnes per day
kt/y	thousand tonnes per year
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
kWh/t	kilowatt-hour per metric tonne
L	liter
L/sec	liters per second
L/sec/m	liters per second per meter
lb	pound
LHD	Long-Haul Dump truck
LLDDP	Linear Low Density Polyethylene Plastic
LOI	Loss On Ignition
LoM	Life-of-Mine
m	meter
m^2	square meter
m^3	cubic meter
masl	meters above sea level
MARN	Ministry of the Environment and Natural Resources
MDA	Mine Development Associates
mg/L	milligrams/liter
mm	millimeter
mm^2	square millimeter
mm^3	cubic millimeter
MME	Mine & Mill Engineering
Moz	million troy ounces
Mt	million tonnes
MTW	measured true width
MW	million watts
m.y.	million years
NGO	non-governmental organization
NI 43-101	Canadian National Instrument 43-101
OSC	Ontario Securities Commission
oz	troy ounce
%	percent
PLC	Programmable Logic Controller
PLS	Pregnant Leach Solution
PMF	probable maximum flood
ppb	parts per billion
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RC	rotary circulation drilling
RoM	Run-of-Mine
RQD	Rock Quality Description
SEC	U.S. Securities & Exchange Commission

Abbreviation	Unit or Term
sec	second
SG	specific gravity
SPT	standard penetration testing
st	short ton (2,000 pounds)
t	tonne (metric ton) (2,204.6 pounds)
t/h	tonnes per hour
t/d	tonnes per day
t/y	tonnes per year
TSF	tailings storage facility
TSP	total suspended particulates
µm	micron or microns
V	volts
VFD	variable frequency drive
W	watt
XRD	x-ray diffraction
y	year

Appendices

Appendix A: Certificate of Author

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CERTIFICATE OF AUTHOR

I, Bart A. Stryhas Ph.D. CPG # 11034, do hereby certify that:

1. I am a Principal Resource Geologist of:

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2. I graduated with a Doctorate degree in Structural Geology from Washington State University in 1988. In addition, I have obtained a Master of Science degree in Structural Geology from the University of Idaho in 1985 and a Bachelor of Arts degree in Geology from the University of Vermont in 1983.

3. I am a current member of the American Institute of Professional Geologists.

4. I have worked as a Geologist for a total of 25 years since my graduation from university. My relevant experience includes minerals exploration, mine geology, project development and resource estimation. I have conducted resource estimations since 1988 and have been involved in technical reports since 2004.

5. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

6. I am responsible for the preparation of all Sections of the technical report titled Updated NI 43-101 Technical Report, Paul Isnard Project, French Guiana, effective date, February 1, 2012, and dated February 21, 2012 (the "Technical Report") relating to the Paul Isnard property. I visited the Paul Isnard property on July 15 and 16, 2007.

7. I have had prior involvement with the Paul Isnard project that is the subject of the Technical Report. I have been the QP on three prior Technical Reports addressing resources of Paul Isnard, dated February 11, 2011, January, 13, 2011 and February 29, 2008.

8. I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.

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

10. 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.

11. As of February 1, 2012, to the best of my knowledge, information and belief, all sections contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 21 Day of February, 2012.

"Signed" *"Sealed"*

Bart A. Stryhas Ph.D. CPG # 11034