Ministry of Forests, Mines and Lands
BC Geological Survey

Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Geochemical Soil Survey, Airborne Geophysical Survey **TOTAL COST:** $68,953.67

AUTHOR(S): A. Koffyberg **SIGNATURE(S):** *Original Signed by Author*

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): **YEAR OF WORK:** 2011

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5341448 (2012/Jun/11); 5376912 (2012/Jun/29)

PROPERTY NAME: Quesnel Lake

CLAIM NAME(S) (on which the work was done): 810582, 849064, 849066, 849069, 849070

COMMODITIES SOUGHT: Gold

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:

MINING DIVISION: Cariboo **NTS/BCGS:** 093A/11

LATITUDE: 52 ° 31 ' " **LONGITUDE:** 121 ° 23 ' " **(at centre of work)**

OWNER(S):
1) Spanish Mountain Gold Ltd. **2)**

MAILING ADDRESS:
920 - 1055 West Hastings Street
Vancouver, BC V6E 2E9

OPERATOR(S) [who paid for the work]:
1) same as above **2)**

MAILING ADDRESS:
same as above

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):
Quesnel Terrane, Nicola Group, Upper Triassic, sandstone, siltstone, shale, phyllite, gold mineralization

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: 13869, 13178, 12513, 11555, 10649, 10262

Next Page

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne	DIGHEM	810582, 849064, 849066, 849069, 84(	41372.20
GEOCHEMICAL (number of samples analysed for...)			
Soil	248 soils, multi -element ICP-MS	849064, 849066, 849070	27581.47
Silt			
Rock			
Other			
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other			
		TOTAL COST:	$68,953.67

ASSESSMENT REPORT

on the

2011 GEOCHEMICAL SOIL SURVEY

and

AIRBORNE GEOPHYSICAL SURVEY

QUESNEL LAKE PROPERTY

Cariboo Mining Division, BC

BCGS 093A.053, 063

For
Owner/Operator

SPANISH MOUNTAIN GOLD LTD.

Exploration on 5 claims: 810582, 849064, 849066, 849069, 849070

Work filed on 5 claims: 810582, 849064, 849066, 849069, 849070

NTS:	093A/11
LATITUDE:	52° 31' N
LONGITUDE:	121° 23' W
AUTHOR:	A. Koffyberg, PGeo
CONSULTANTS:	Discovery Consultants
DATE:	August 24, 2012

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 SUMMARY

This assessment report ("Report") describes the 2011 geochemical soil survey and the airborne geophysical survey by Spanish Mountain Gold Ltd ("SMG") on the Quesnel Lake Property ("Property"). The work is part of an ongoing program of exploring for sediment-hosted-vein ("SHV") gold deposits by SMG. Fieldwork for the soil survey was carried out by personnel of SMG, and the airborne geophysical survey was contracted to Fugro Airborne Surveys of Mississauga, Ontario. Discovery Consultants of Vernon, BC was retained to interpret the geochemical results, prepare the figures and report on the results of both surveys.

The Property is located in south-central British Columbia, approximately 15 km southeast of the village of Likely and 63 km northeast of the City of Williams Lake. The centre of the Property lies at latitude 52˚31' north and longitude 121˚23' west, and the Property is situated on the north shore of Quesnel Lake.

The Property can be reached from the city of Williams Lake via a paved secondary road that leaves Highway 97 at the community of 150 Mile House, approximately 16 km south of Williams Lake, and continues for 87 km to the village of Likely. From Likely, the Property is accessed along the Cedar Creek / Winkley Creek Road (FSR 3900), for a distance of about 15 km.

Geologically, the majority of the Property is predominately underlain by Upper Triassic volcanic and sedimentary rocks of the Nicola Group. These rocks consist of a basaltic flows, tuffs and breccias along with sandstones, siltstones, shales and phyllites of unit uTrNsv. The western part of the Property comprises volcaniclastic rocks that comprise tuffs, breccias and lesser limestones belonging to unit uTrNppbb. A younger sedimentary unit of Cretaceous – Tertiary age cuts across this package of rocks. The eastern part of the Property is underlain by unit muTrNvs, which consists of the same package of volcaniclastic rocks that host the Spanish Mountain deposit to the north.

The 2011 exploration program consisted of a grid soil survey of seven northeast-southwest lines at 400-m spacing, resulting in a grid that covered the north-central part of the Property. Samples were collected at 50 m intervals. Access to the grid was by truck. In total, 248 soil samples were collected and sent for analysis.

In general, gold is not anomalous. The highest value is 15 ppb, and only 5 samples are greater than 10 ppb Au. For copper, the northeastern end of the majority of the lines has

concentrations of anomalous copper values. In particular, line 7 has values of 151, 122, and 112 ppm Cu. Line 5 has a high value of 141 ppm Cu in the same area. A second area of interest lies along the southwest end of Line 4, where 5 samples are greater than 50 ppm, and where the highest copper value of 252 ppm Cu is found.

Arsenic forms a similar pattern to copper but is less pronounced. The three highest values of 273, 246 and 109 ppm As occur on Lines 2 and 3 in the northwest corner of the grid. In addition, three sequential samples on the northeast end of Line 7 are anomalous, having values of 85, 72 and 76 ppm As.

Four samples carry anomalous molybdenum and occur on Line 7 in the northeast end of the line. These samples have values of 12, 13, 20 and 24 ppm Mo, which are significantly higher than the remainder of the samples. These samples correspond to anomalous copper values, high mercury values, and high arsenic values.

The magnetometer survey appears to reflect the northwest-southeast trend of the regional geology. For the electromagnetic survey, there are some apparent geological trends detected in the northern portion of the survey area. However, along the north shore of Quesnel Lake it appears that thick clay-rich surficial deposits are the predominant electromagnetic features. The airborne geophysical survey resulted in numerous electromagnetic conductor anomalies, as shown on the Electromagnetic Anomaly map. Four separate zones, named Zones A2, C3, D and E, have been identified, based on electromagnetic responses.

Recommendations include a follow-up soil survey in the area of Line 7, and between Lines 2 and 3. In addition, the soil survey should be expanded to cover the eastern part of the Property. On-going field observations of ice direction would help in any future geochemical interpretation. In addition, geophysical electromagnetic targets should be followed-up by field examination and prospecting.

2.0 INTRODUCTION

This Report has been prepared at the request of Judy Stoeterau, Vice President, Geology of SMG, and describes the 2011 geochemical soil survey and the airborne geophysical survey. Fieldwork pertaining to the soil survey was performed by Spanish Mountain Gold personnel. The airborne geophysical survey was contracted to Fugro Airborne Surveys (“Fugro”) of Mississauga, Ontario. Discovery Consultants of Vernon, BC was retained to interpret the geochemical results, prepare the figures and report on the results of both surveys.

The focus of the survey was to explore for an SHV-type gold deposit, similar to the Spanish Mountain deposit. The geochemical survey took place from July 16 to 24, 2011. The airborne geophysical survey took place from September 24 to October 1, 2011.

3.0 LOCATION AND ACCESS

The Property is located in south-central British Columbia, approximately 15 km southeast of the village of Likely and 63 km northeast of the City of Williams Lake (Figure 1). The centre of the Property lies at latitude 52˚31' north and longitude 121˚23' west, and the Property is situated on the north shore of Quesnel Lake.

The Property can be reached from the city of Williams Lake via a paved secondary road that leaves Highway 97 at the community of 150 Mile House, approximately 16 kilometres south of Williams Lake, and continues for 87 kilometres to the village of Likely. From Likely, the Property is accessed along the Cedar Creek / Winkley Creek Road (FSR 3900), for a distance of about 15 kilometres. Logging roads provide access to the central part of the Property, while the eastern and western parts are best accessed by hiking.

The village of Likely has basic amenities including a motel, hotel, rental cabins, corner store, gas pumps, and a seasonal restaurant. Some heavy equipment is also available for hire from local contractors. All services and supplies are readily available in Williams Lake, an hour’s drive from Likely. The Williams Lake airport is serviced by three scheduled airlines that provide daily service with Vancouver, BC and points north within BC.

Legend

- Cities
- Highways

DISCOVERY Consultants	
Spanish Mountain Gold Ltd.	
Quesnel Lake Property	
Property Location	
Date: August 24, 2012	Scale: 1:8,000,000
Project: 930	BCGS: 093A. 043, 044, 053, 054
Figure: 1	Mining Div: Cariboo

4.0 TOPOGRAPHY, VEGETATION & CLIMATE

Physiographically, the area is situated within the Quesnel Highlands, which is transitional between the gently undulating topography of the Cariboo Plateau to the west, and the steeper, sub-alpine to alpine terrain of the Cariboo Mountains to the east. The terrain is moderately mountainous with rounded ridge tops and U-shaped valleys. Topography is locally rugged with occasional cliffs and deeply incised creek valleys. Within the Property, elevations above sea level range from 730 metres at Quesnel Lake to 1,400 metres along the south flank of Spanish Mountain. Drainage is via Winkley Creek and other small un-named creeks, which all flow south into Quesnel Lake. Quesnel Lake flows into Quesnel River, and joined by Cariboo Creek, flows west to eventually join the Fraser River near the town of Quesnel.

Vegetation in the region consists of balsam, cedar, fir and cottonwood in valley bottoms and spruce, fir and pine at higher elevations. Alder, willow and devil's club grow as part of the underbrush, which can be locally thick. Parts of the Property have been logged at various times, resulting in areas having open hillsides with younger forest growth.

Overburden depths are unknown but historical work suggests that it is fairly deep towards the south part of the Property towards Quesnel Lake (AR 10649). During the last glacial period, the ice advanced in a northwesterly direction (Tipper, 1971). Rock outcroppings are scarce and are typically found at higher elevations along the crest of ridges and road cuts, in creek gullies, and in tree roots exposed in windfall (AR 10649).

The climate of the Likely area is modified continental with cold snowy winters and warm summers. Likely has an annual average precipitation of approximately 70 centimetres. Snowfall in the region averages approximately 200 centimetres between the months of October and April. Most small drainages tend to dry up in the late summer.

5.0 PROPERTY DESCRIPTION

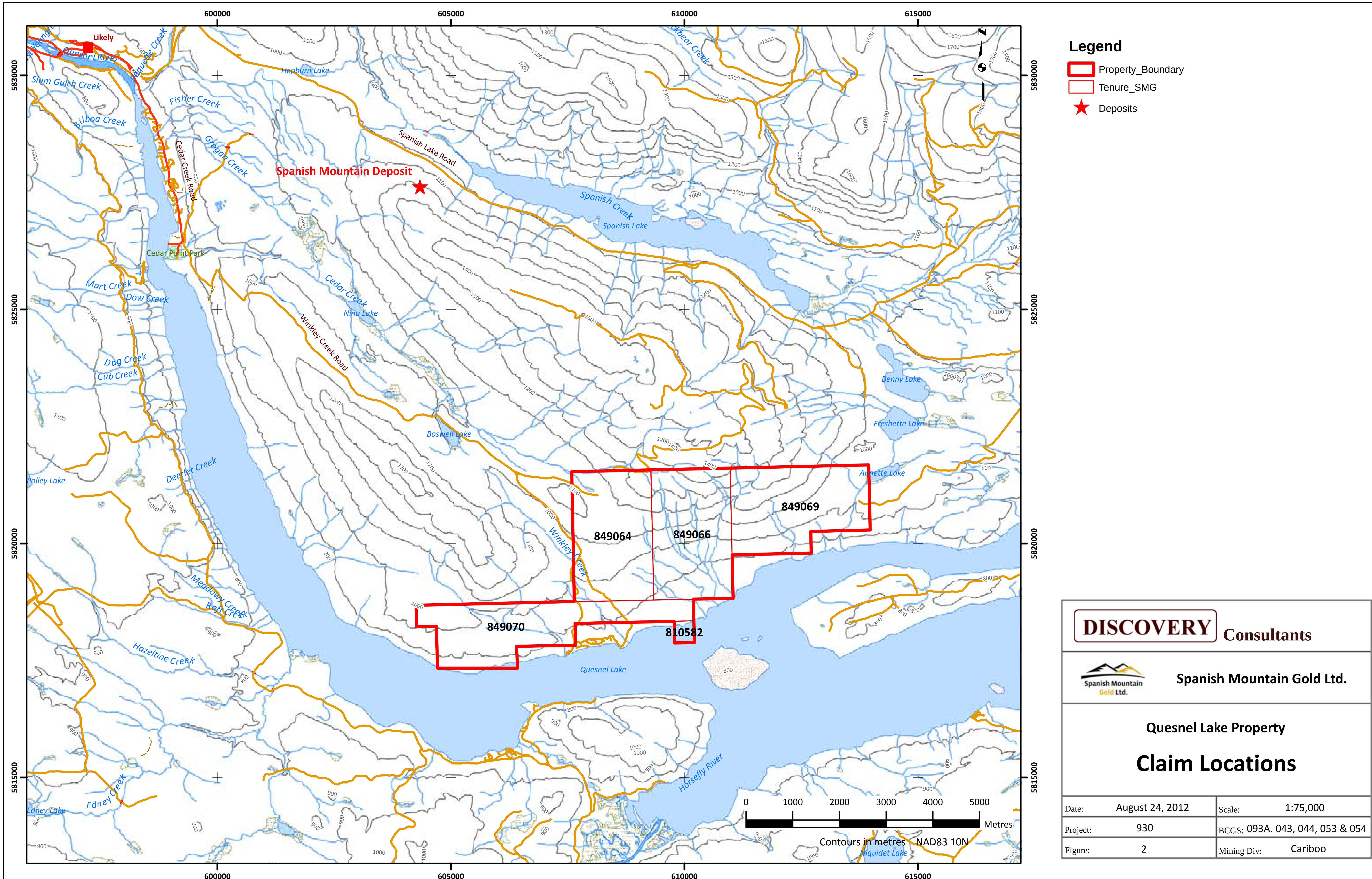
The Property consists of five contiguous MTO mineral claims and covers an area of about 1,947 hectares (Figure 2). The claim block stretches for 9 km east-west and is about 3.5 km wide. The Property was acquired by MTO staking in March 2011 and all claims are 100% owned by SMG. Assessment work in 2011 was done on all five claims. Table 1 lists the details of the claim tenures.

TABLE 1: Tenure Description

Tenure Number	Claim Name	Area (ha)	Registered Owner	Good to Date**
810582	SPAN 2	19.68	Spanish Mountain Gold Ltd.	2019/jul/01
849064	SPAN 5	472.05	"	2019/jul/01
849066	SPAN 6	472.06	"	2019/jul/01
849069	SPAN 7	491.71	"	2019/jul/01
849070	SPAN 8	491.96	"	2019/jul/01
Total:		**1,947.46**		

** Good to date is dependent on the acceptance of this report

The Property is located 9 km south of the Spanish Mountain deposit, where most of the historic and current work in the region has been focussed. The Spanish Mountain deposit is currently being explored by SMG.


Legend
Property_Boundary
Tenure_SMG
Deposits
Spanish Mountain Deposit
849064
849066
849069
849070
810582
Likely
Quesnel River
Quesnel Lake
Spanish Lake
Spanish Creek
Spanish Lake Road
Winkley Creek Road
Winkley Creek
Cedar Creek
Cedar Creek Road
Cedar Point Park
Hepburn Lake
Fisher Creek
Slum Gulch Creek
Bilboa Creek
Mart Creek
Dow Creek
Dog Creek
Cub Creek
Deerlet Creek
Polley Lake
Meadow Creek
Raft Creek
Hazeltine Creek
Edney Creek
Edney Lake
Nina Lake
Boswell Lake
Benny Lake
Freshette Lake
Annette Lake
Horsefly River
Niquidet Lake
600000
605000
610000
615000
5830000
5825000
5820000
5815000
0 1000 2000 3000 4000 5000 Metres
Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Claim Locations
Date: August 24, 2012
Scale: 1:75,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 2
Mining Div: Cariboo

6.0 EXPLORATION HISTORY

The Spanish Mountain area was first explored during the historic Cariboo Gold Rush of 1859, when placer gold was first discovered in the Quesnel and Horsefly rivers. The following year, placer gold was found in Keithley, Showshoe and Harvey Creeks (Holland, 1950). Although minor production was recorded on Cedar Creek in the early 1880s, richer placer deposits were not found until 1921, on the creek bed at higher elevations than the present valley bottom. This creek is located about 10 kilometres northwest of the Property. It is estimated that 37,784 ounces of gold were mined from Cedar Creek between 1881 and 1945; and 3,706 ounces of gold from Spanish Creek between 1886 and 1945 (Holland, 1950). Spanish Creek is located 9 km north of the Property.

The first recorded work on the Property was done in 1981 as part of the larger Kangaroo Property, which was staked in June 1981 by K.W. Livingston and G.G. Richards. The target was high grade gold mineralization within quartz veins, similar to the mineralization found in the Spanish Mountain deposit to the north. The 1981 work was limited to areas near logging roads, and consisted of the collection of 47 soil samples, 22 silt samples and 9 rock chip samples (AR 10262). A gold-arsenic soil anomaly was outlined about 1,000 m east of Winkley Creek (currently on tenure 849064). It consisted of seven anomalous samples along two neighbouring east-west trails. Six of these samples had gold values between 29 and 41 ppb Au; one sample carried 426 ppb Au and greater than 500 ppm As.

In the following two years, the reconnaissance-type geochemical survey was enlarged to cover the majority of the Property, resulting in the collection of 554 soil, 34 silt and 203 rock chip samples (AR 10649, 11555). A second gold-arsenic soil anomaly was outlined on the Property south of Spanish Lake along a logging road. Geological mapping in this area indicated argillaceous phyllites and greenstones adjacent to younger andesitic tuffs in fault contact with the phyllites. This zone lies north of the current Property boundaries. It was noted that extensive glacial drift may have partially masked or limited the extent of both soil anomalies.

An airborne geophysical survey was flown over the Property in 1984. It consisted of a magnetic survey, combined with a very low frequency (VLF) electromagnetic survey, with forty lines flown in the north-south direction, for a total of 340 line-km (AR 12513). A magnetic anomaly was outlined west of Winkley Creek north of the shoreline, having a magnetic variation of 450 gammas above a background level of 57,000 gammas, currently located on claim 849070. In addition, a weak, irregular shaped magnetic feature was evident about 1.5 km west of Annette

Lake, situated currently on claim 849069.

In late 1984, geochemical surveying focussed in the north part of the Property (AR 13178) and in 1985, these geochemical targets were followed up with trenching (AR 13869). In total, 455 soil samples, 35 rock chip samples from individual outcrop and 129 rock chip samples from four trenches were collected. The four trenches, located north of the Property, were dug in black phyllites; best results were 20 m of 0.21 g/t gold.

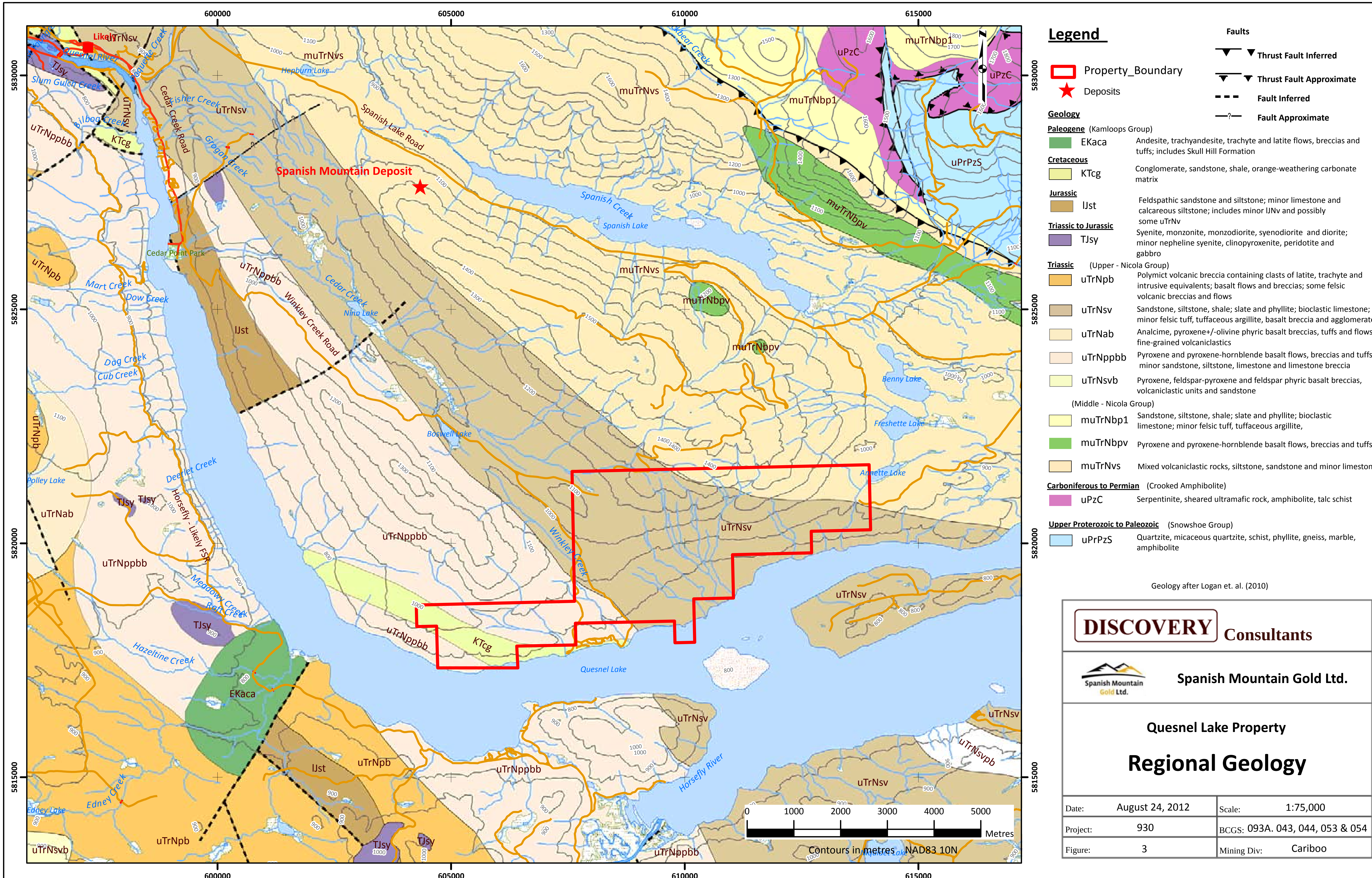
7.0 GEOLOGY

7.1 Regional Geology

The Property lies within the Quesnel Terrane of the Intermontane Belt. The rocks of the Quesnel Terrane are predominately sedimentary and volcanic rocks of middle Triassic to early Jurassic in age, representing an island arc and marginal basin assemblage. The eastern boundary of the Quesnel Terrane in the region is marked by the Eureka thrust, a major southwesterly dipping thrust fault. To the east are the intensely deformed, variably metamorphosed Proterozoic and Paleozoic pericratonic rocks of the Barkerville Subterrane. This includes the Snowshoe Group (unit uPrPzs) and the Quesnel Lake Gneiss. Splays of the Eureka Thrust, including the Spanish Thrust, bisect the Spanish Mountain area.

The stratigraphy of the Quesnel Terrane in the Spanish Mountain area has been examined by Rees (1981), Struik (1983), and Bloodgood (1988). Panteleyev et al. (1996) have produced a geological compilation of the Quesnel River – Horsefly area. Nomenclature has varied for the rocks within the central part of the Quesnel Terrane, such as Quesnel River Group, Horsefly Group, Takla Group and Nicola Group; however, Panteleyev et al. assign the term Nicola Group rocks as the most accurate usage. The oldest suite of rocks in the area is the Crooked Amphibolite unit of the Slide Mountain Terrane, of Pennsylvanian to Permian age (unit uPzC). It consists of talc chlorite schists, amphibolites, serpentinites and ultramafic rocks. This unit is in structural contact with the base of the Quesnel Terrane, and marks the trace of the Eureka Thrust.

The overlying rocks, which belong to the Quesnel Terrane, consist of a sedimentary package of black graphitic argillites, phyllitic siltstones, sandstones, limestones and banded tuffs (units muTrNbp1 and muTrNvs), are weakly metamorphosed and belong to the Nicola Group. The age of this unit, based on conodont fossils found south of Quesnel Lake, is Middle to Late Triassic age.



Legend
Property_Boundary
Deposits
Faults
Thrust Fault Inferred
Thrust Fault Approximate
Fault Inferred
Fault Approximate
Geology
Paleogene (Kamloops Group)
EKaca Andesite, trachyandesite, trachyte and latite flows, breccias and tuffs; includes Skull Hill Formation
Cretaceous
KTcg Conglomerate, sandstone, shale, orange-weathering carbonate matrix
Jurassic
lJst Feldspathic sandstone and siltstone; minor limestone and calcareous siltstone; includes minor lJNv and possibly some uTrNv
Triassic to Jurassic
TJsy Syenite, monzonite, monzodiorite, syenodiorite and diorite; minor nepheline syenite, clinopyroxenite, peridotite and gabbro
Triassic (Upper - Nicola Group)
uTrNpb Polymict volcanic breccia containing clasts of latite, trachyte and intrusive equivalents; basalt flows and breccias; some felsic volcanic breccias and flows
uTrNsv Sandstone, siltstone, shale; slate and phyllite; bioclastic limestone; minor felsic tuff, tuffaceous argillite, basalt breccia and agglomerate
uTrNab Analcime, pyroxene+/-olivine phyric basalt breccias, tuffs and flows, fine-grained volcaniclastics
uTrNppbb Pyroxene and pyroxene-hornblende basalt flows, breccias and tuffs; minor sandstone, siltstone, limestone and limestone breccia
uTrNsvb Pyroxene, feldspar-pyroxene and feldspar phyric basalt breccias, volcaniclastic units and sandstone
(Middle - Nicola Group)
muTrNbp1 Sandstone, siltstone, shale; slate and phyllite; bioclastic limestone; minor felsic tuff, tuffaceous argillite,
muTrNbpv Pyroxene and pyroxene-hornblende basalt flows, breccias and tuffs
muTrNvs Mixed volcaniclastic rocks, siltstone, sandstone and minor limestone
Carboniferous to Permian (Crooked Amphibolite)
uPzC Serpentinite, sheared ultramafic rock, amphibolite, talc schist
Upper Proterozoic to Paleozoic (Snowshoe Group)
uPrPzS Quartzite, micaceous quartzite, schist, phyllite, gneiss, marble, amphibolite
Geology after Logan et. al. (2010)
Spanish Mountain Deposit
Quesnel Lake
Spanish Lake
Likely
Cedar Point Park
Spanish Lake Road
Winkley Creek Road
Horsefly - Likely FSR
Horsefly River
0 1000 2000 3000 4000 5000 Metres
Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Regional Geology
Date: August 24, 2012
Scale: 1:75,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 3
Mining Div: Cariboo

A narrow sequence of volcanic and volcaniclastic rock (unit muTrNbpv) occurs as a discrete subunit within the sedimentary sequences.

The overlying Nicola Group volcanic rocks (units uTrNab and uTrNppbb) are in depositional contact with the metasedimentary rocks. The oldest package of volcanic rocks is mainly of alkali composition, and has been divided into an older package of dark grey to green flows, pillow basalts, breccias and tuff, and a younger volcanic sequence of dark green to maroon flows, tuff, volcaniclastic sandstone and breccias, with minor limestone (unit uTrNsv).

Overlying the alkalic basalts is a younger package of volcanic rocks consisting predominantly of basaltic and feldspathic volcanic rocks with derived volcaniclastic sediments (unit uTrNpb). Rock types include volcanic breccias, lahars, crystal lithic tuffs, sandstones and conglomerates.

The region has been strongly affected by fold and thrust deformations, as described by Bloodgood (1988) and Rhys et al. (2009). The area has undergone at least two main phases of deformation, referred to as D1 and D2. Phase D1 deformation consists of isoclinal folding associated with the development of thrust faults, including the Eureka Thrust. This event is associated with peak metamorphism, thought to have occurred sometime from 174 to 139 Ma; that is, mid-Jurassic to Early Cretaceous (Rhys et al., 2009). Phase D2 deformation includes the Eureka Peak syncline, which refolds earlier folds, forming open folds, and associated foliation and thrust faults. Structurally late, although possibly long lived are north-northeasterly trending faults that have offset earlier thrusts and structures. These faults are associated with late gold-bearing quartz veins in the district.

Metamorphic mineral assemblages are of sub-greenschist facies. Figure 3 shows the regional geology, based on the bedrock geological compilation of the QUEST map area (Logan et al., 2010).

7.2 Property Geology

The majority of the Property is predominately underlain by Upper Triassic volcanic and sedimentary rocks of the Nicola Group. Unit uTrNsv, which underlies the central and eastern part of the Property, consists of basaltic flows, tuffs and breccias along with sandstones, siltstones, shales and phyllites. The western part of the Property comprises volcaniclastic rocks that comprise tuffs, breccias and lesser limestones belonging to unit uTrNppbb. A younger sedimentary unit of Cretaceous – Tertiary age (unit KTcg) cuts across this package of rocks.

The far eastern part of the Property is underlain by unit muTrNvs, which consists of the same package of volcaniclastic rocks that host the Spanish Mountain deposit to the north.

The target of the current exploration is SHV-type gold deposits, similar to the Spanish Mountain deposit. The Spanish Mountain deposit is hosted by a black phyllite package of rocks belonging to the middle to upper Triassic Nicola Group (unit muTrNvs). At Spanish Mountain, the package of rocks comprises interbedded slaty to phyllitic, dark grey to black siltstone, carbonaceous mudstone, greywacke, tuff and minor conglomerate. The main host of the gold mineralization is black, graphitic phyllitic argillite. The sedimentary unit has been intruded by plagioclase-quartz-hornblende sills and dykes, which range in thickness from tens of centimetres to as much as 100 m thick. The intrusive rocks have been affected by all phases of folding, alteration and quartz veining.

The sedimentary package hosting the gold mineralization has undergone widespread alteration. The most extensive alteration consists of ankerite-sericite-pyrite, with accessory rutile. Ankerite typically occurs as porphyroblasts up to 10 mm in diameter, which are sometimes stretched parallel to foliation within the black argillite. Within the tuffs/greywackes and intrusive sills, the ankerite is more pervasive, and along with silica alteration, sometimes completely alters the original composition of the rock. Sericite alteration is also locally intense, resulting in a bleached appearance. Silicification has affected the siltstone and tuff units and varies in intensity from weak to strong and pervasive. Bright green chrome mica (fuchsite) occurs as isolated grains within tuffs/ greywackes and within intrusive sills, where it also appears as a pervasive green alteration. Pyrite is typically 1 to 2% within the argillite but can be up to 6% locally, and occurs as fine disseminations, as cubes up to 1.5 cm, along veins as blebs, and as fracture fill. Within siltstones, tuffs and greywackes, it forms larger cubes up to 15 mm, but is generally less abundant.

8.0 2011 GEOCHEMICAL SOIL SURVEY

8.1 Sampling Method and Approach

The focus of the exploration on the Property is an SHV-type gold deposit. Bedrock exposures are rare so geochemistry is an important exploration tool. However, historical work indicated evidence of a thick accumulation of glacial drift, pronounced in the south part of the Property (AR 10649). It was suggested that extensive glacial drift and related unconsolidated sediments mantle the ground below approximately 1,000 m elevation. As shown on Figure 2, the southern third of the Property is below this elevation.

The 2011 exploration program comprised a reconnaissance-type gridded soil geochemical survey across the north-central portion of the Property. The grid consisted of six southwest-northeast lines at 400-m spacing placed perpendicular to ice direction, which is to the northwest (Tipper, 1971). Samples were collected at 50 m intervals.

Fieldwork was performed by personnel of SMG, who carried out the work from July 16 to 24, 2011. The area contained several locations having swamps and wet ground, and soils were not collected in these locations. The samples were collected at 10 to 40 cm depth, generally within the C horizon, with some B horizon samples. The soil collected is believed to be till, modified till and/or colluvium.

The Property was accessed using 4-wheel drive vehicles. The crew stayed at the SMG facilities outside of Likely. In total, 248 samples were sent for analysis. Samples were collected in kraft bags, placed in rice bags and sent to Eco Tech Laboratory Ltd. ("Eco-Tech") of the Stewart Group in Kamloops, BC.

8.2 Sampling Preparation, Analysis, QC/QA

At Eco-Tech, the soil samples were dried at 60° C and sieved to -80 mesh (<177 microns). A 15 gram sub-sample was digested in hot (95° C) aqua regia ($HCl-HNO_3-H_2O$); following this, the samples were analysed by inductively–coupled plasma mass spectrometry (ICP-MS) techniques for gold analysis. Subsequently, the sample was diluted and run for a multi-element ICP-MS analysis, for a suite of 45 elements (ICP/MS45). The analytical results are shown in Appendix I.

Because of the reconnaissance level of exploration, no field standards, field duplicates or blanks were added to the sample batches. Quality control samples from the lab include control blanks, duplicates and standards.

Duplicate samples comprised an analysis of another sub-sample of the -80 mesh silts. From 248 samples, the lab ran 22 duplicate soils. No significant variation is evident between the duplicate samples, for both gold and multi-element analyses. Standards indicate good accuracy in the analyses.

8.3 Results

In this survey, in addition to gold values, copper values have also been plotted, as copper-gold porphyry deposits are known to exist elsewhere in volcanic units of the Quesnel Terrane. Arsenic is considered to be a possible geochemical pathfinder.

A statistical analysis using probability plots was used to determine the geochemical classification of the soils, as shown on Table 2. Because the results of the gold geochemistry show uniformly low values, gold is not classified.

TABLE 2: Geochemical Soil Classification (n = 248)

	Cu (ppm)	Cu Percentile	As (ppm)	As Percentile
Anomalous	>50	88.0	>40	94.5
Threshold	30-50	69.5	17-40	78.0
Background	<30		<17	

Copper values of greater than 50 ppm Cu, and arsenic values of greater than 40 ppm are anomalous. Although the correlation chart does not show a significant correlation between copper and arsenic, a scatter plot shows a general positive correlation. In addition, a scatter plot of copper versus molybdenum also shows a positive correlation. Mercury is also weakly correlated to copper.

The sample ID, gold, copper and arsenic values are shown on Figures 4, 5, 7 and 9, respectively. Although gold is not classified, values higher than 10 ppb Au are shown on Figure 6. The results of the copper and arsenic classifications are represented as bubble maps on Figures 8 and 10.

The soil grid lies in an area that is underlain by the upper Triassic Nicola Group sedimentary rocks consisting of sandstones, siltstones, shales, phyllites, with lesser tuffs and basalt breccias. In addition, glacial till thickness likely varies from a thin veneer of about 1 to 3 m depth on the south flank of Spanish Mountain, to possibly a till blank of 3 to 10+ m thick towards Quesnel Lake. Previous work indicated a thick cover of glacial drift in this area, although it was not quantified (AR 11555).

GOLD

In general, gold is not anomalous. The highest value is 15 ppb, and only 5 samples are greater than 10 ppb Au.

COPPER

In general, the northeastern end of the majority of the lines has concentrations of anomalous copper values. In particular, Line 7 has three highly anomalous values of 151, 122, and 112 ppm Cu. Line 5 has a high value of 141 ppm Cu in the same area.

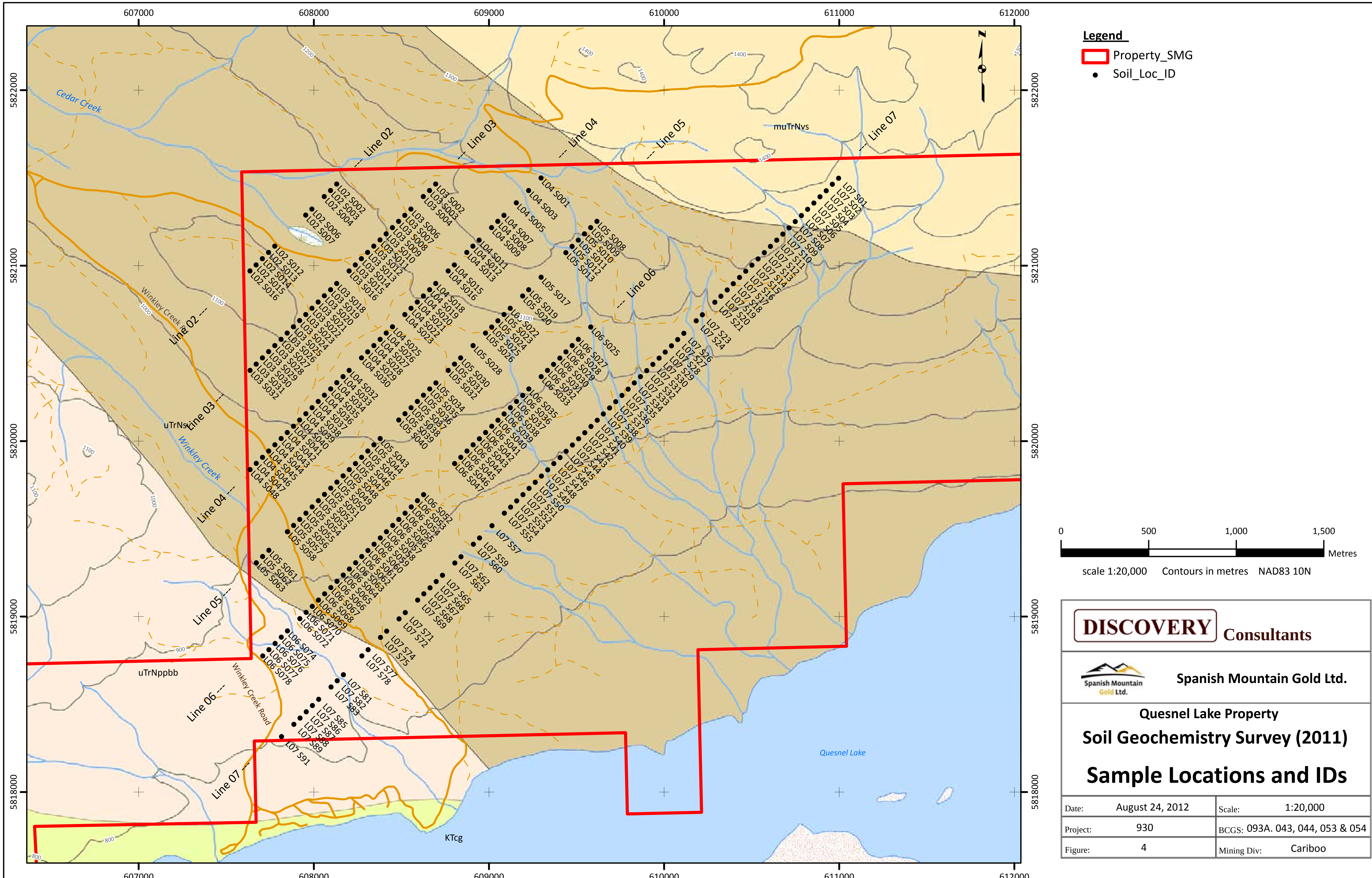
A second area of interest lies along the southwest end of Line 4, where 5 samples are anomalous, and where the highest copper value of 252 ppm Cu is found.

ARSENIC

Arsenic forms a similar pattern to copper but is less pronounced. The three highest values of 273, 246 and 109 ppm As occur on Lines 2 and 3 in the northwest corner of the grid. In addition, three sequential samples on the northeast end of Line 7 are anomalous, having values of 85, 72 and 76 ppm As.

MOLYBDENUM

Four samples carry significant molybdenum and occur on Line 7 in the northeast end of the line. Samples L07 S12, S13, S15 and S17 have values of 12, 13, 20 and 24 ppm Mo, which are significantly higher than the remainder of the samples. These samples correspond to anomalous copper values, high mercury values, and high arsenic values.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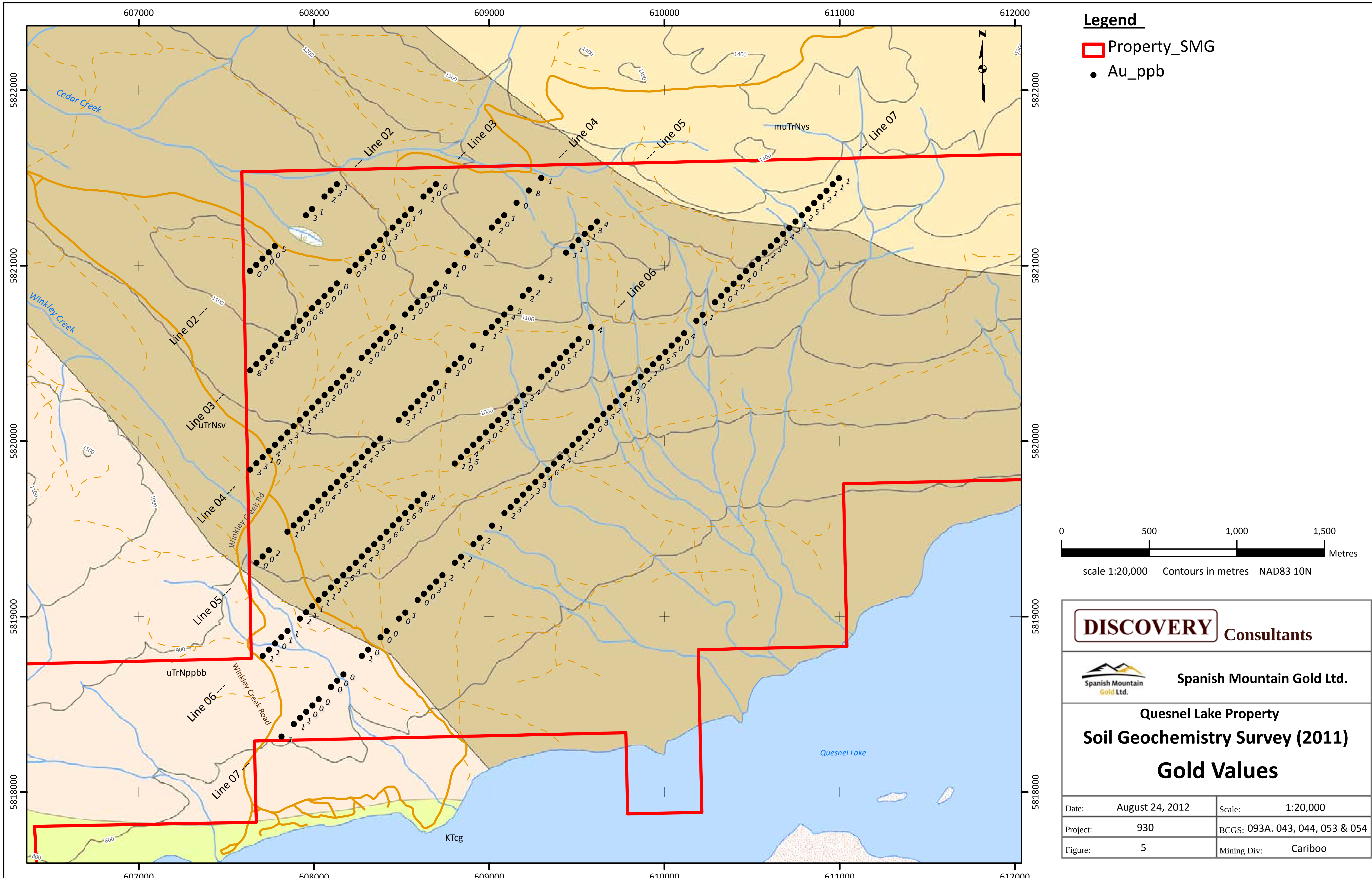
scale 1:20,000 Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Soil Geochemistry Survey (2011)
Sample Locations and IDs
Date: August 24, 2012
Scale: 1:20,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 4
Mining Div: Cariboo
Cedar Creek
Winkley Creek
Winkley Creek Road
Quesnel Lake
muTrNvs
uTrNs
uTrNppbb
KTcg
Line 02
Line 03
Line 04
Line 05
Line 06
Line 07
607000
608000
609000
610000
611000
612000
5822000
5821000
5820000
5819000
5818000


Legend
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Au_ppb
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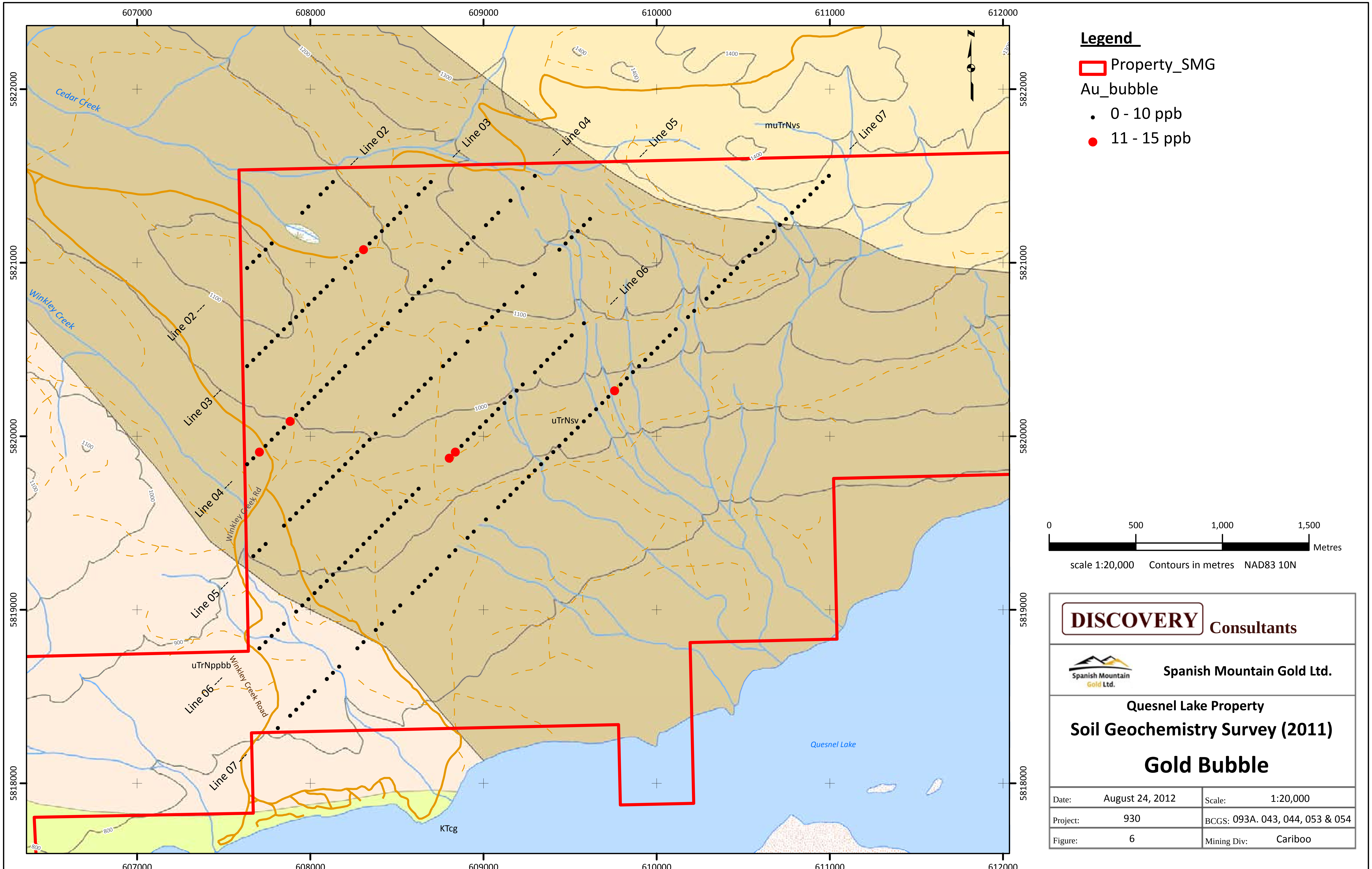
scale 1:20,000 Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Soil Geochemistry Survey (2011)
Gold Values
Date: August 24, 2012
Scale: 1:20,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 5
Mining Div: Cariboo
Line 02
Line 03
Line 04
Line 05
Line 06
Line 07
Cedar Creek
Winkley Creek
Winkley Creek Rd
Winkley Creek Road
Quesnel Lake
muTrNvs
uTrNsv
uTrNppbb
KTcg
607000
608000
609000
610000
611000
612000
5822000
5821000
5820000
5819000
5818000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Au_bubble
0 - 10 ppb
11 - 15 ppb
0 500 1,000 1,500
Metres
scale 1:20,000 Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Soil Geochemistry Survey (2011)
Gold Bubble
Date: August 24, 2012
Scale: 1:20,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 6
Mining Div: Cariboo
Line 02
Line 03
Line 04
Line 05
Line 06
Line 07
Cedar Creek
Winkley Creek
Winkley Creek Rd
Winkley Creek Road
Quesnel Lake
muTrNvs
uTrNsv
uTrNppbb
KTcg
607000
608000
609000
610000
611000
612000
5822000
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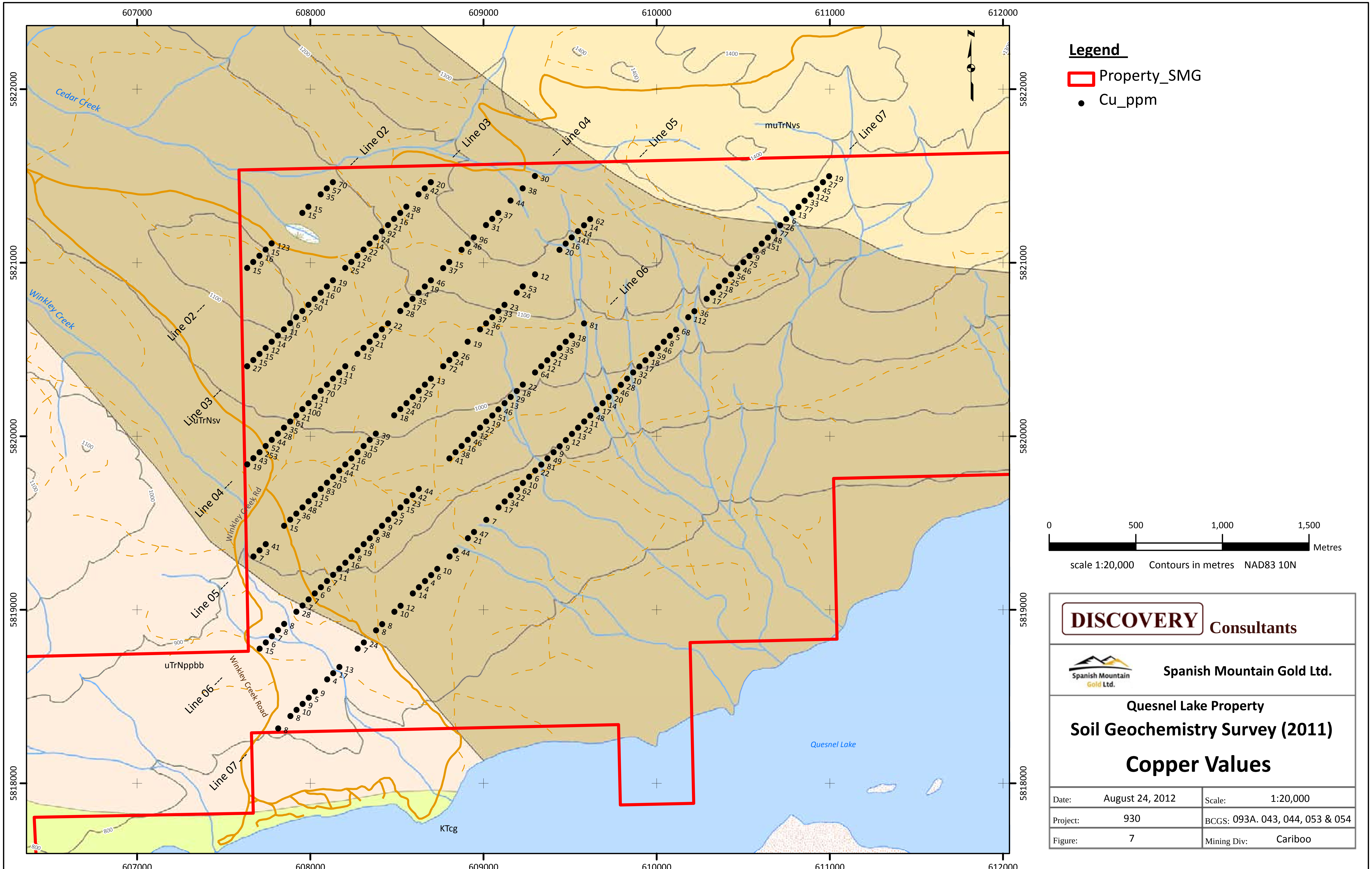
5820000
5819000
5818000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Cu_ppm
0 500 1,000 1,500
Metres
scale 1:20,000 Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Soil Geochemistry Survey (2011)
Copper Values
Date: August 24, 2012
Scale: 1:20,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 7
Mining Div: Cariboo
Line 02
Line 03
Line 04
Line 05
Line 06
Line 07
Cedar Creek
Winkley Creek
Winkley Creek Rd
Winkley Creek Road
Quesnel Lake
muTrNvs
uTrNsv
uTrNppbb
KTcg
607000
608000
609000
610000
611000
612000
5822000
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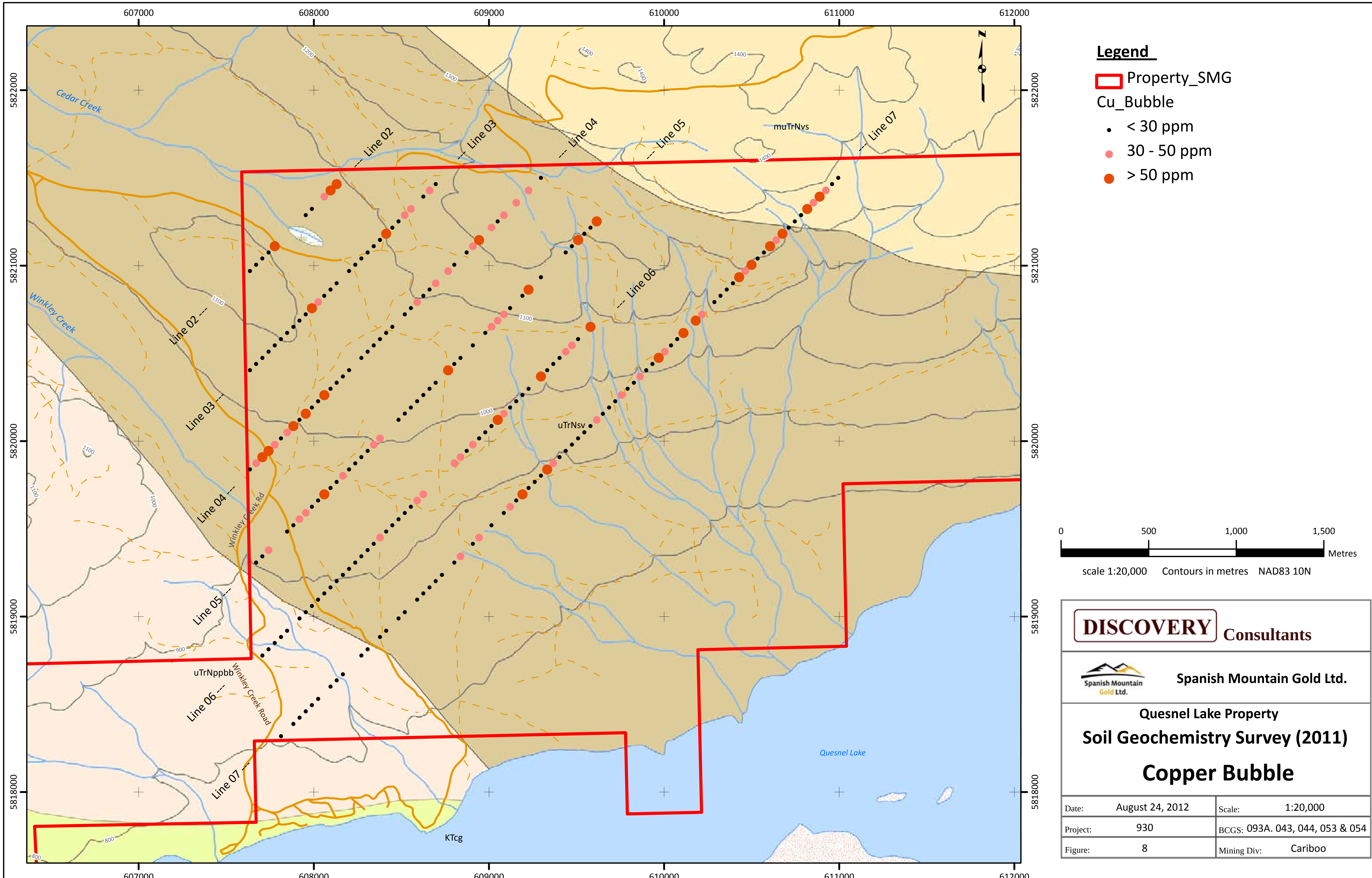
5820000
5819000
5818000



Legend
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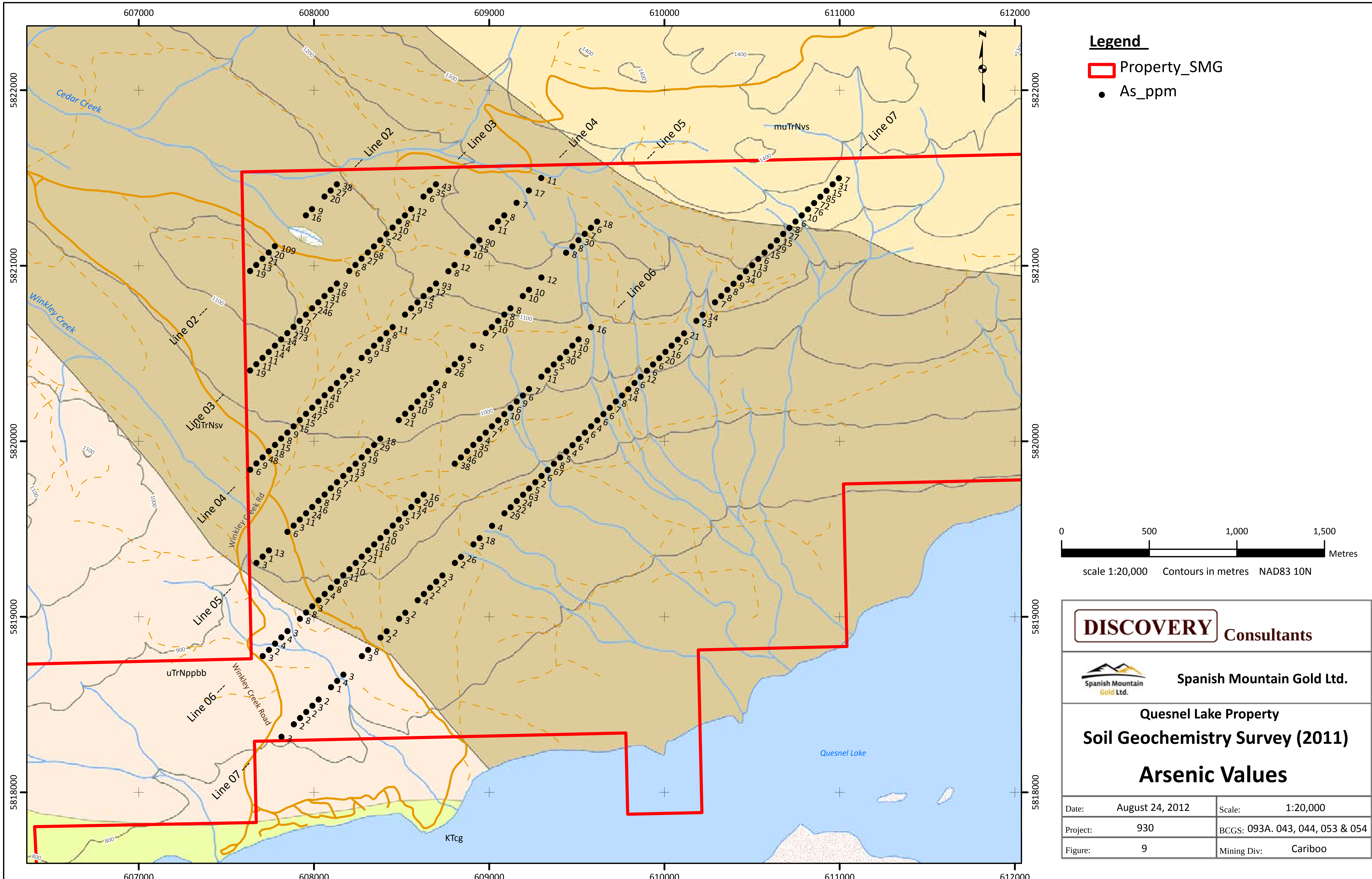
Cu_Bubble
< 30 ppm
30 - 50 ppm
> 50 ppm
0 500 1,000 1,500 Metres
scale 1:20,000 Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Soil Geochemistry Survey (2011)
Copper Bubble
Date: August 24, 2012
Scale: 1:20,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 8
Mining Div: Cariboo
Line 02
Line 03
Line 04
Line 05
Line 06
Line 07
Cedar Creek
Winkley Creek
Winkley Creek Rd
Winkley Creek Road
muTrNvs
uTrNsv
uTrNppbb
KTcg
Quesnel Lake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As_ppm
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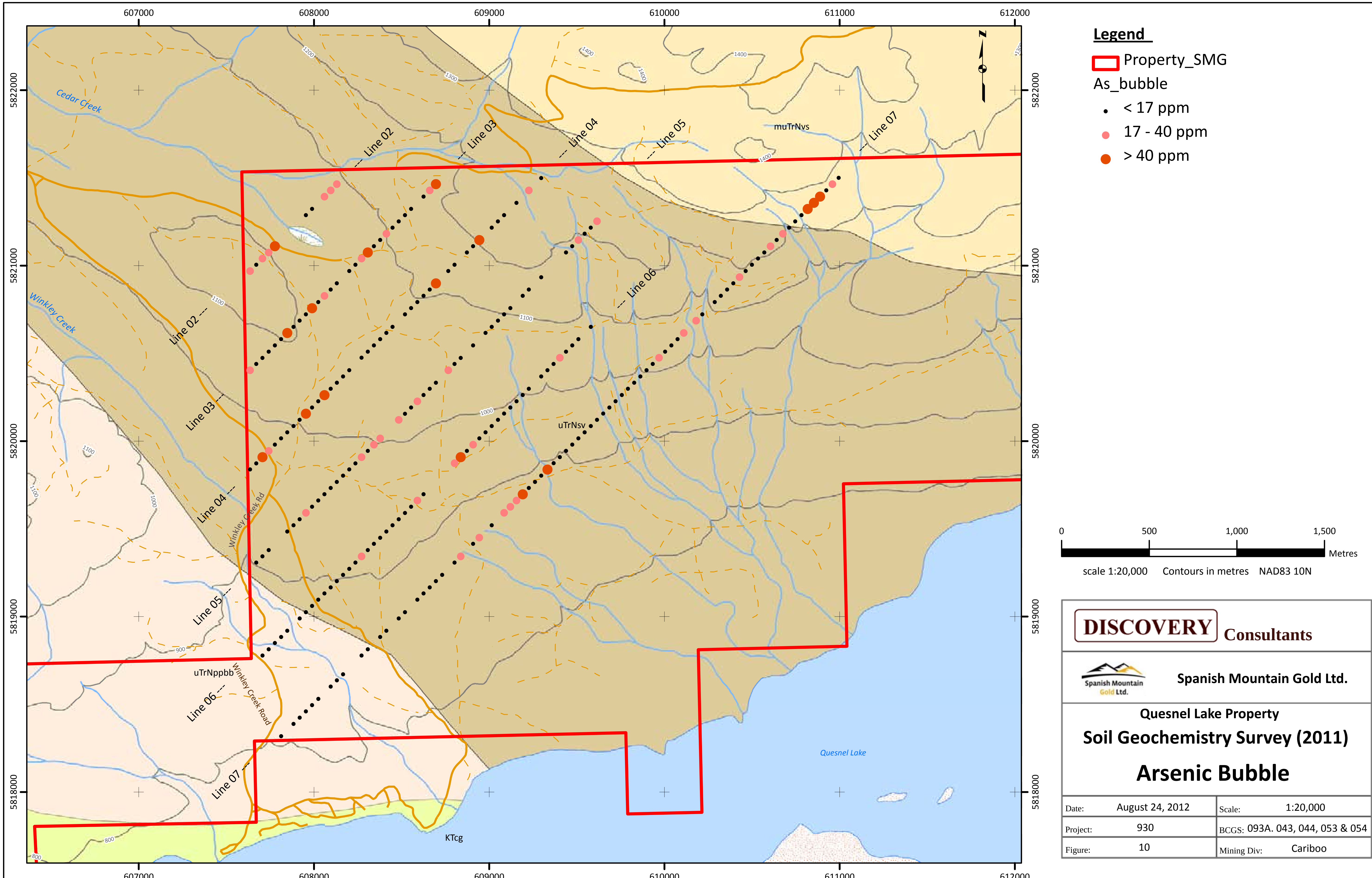
scale 1:20,000 Contours in metres NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Soil Geochemistry Survey (2011)
Arsenic Values
Date: August 24, 2012
Scale: 1:20,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 9
Mining Div: Cariboo
Cedar Creek
Winkley Creek
Winkley Creek Rd
Winkley Creek Road
Quesnel Lake
muTrNvs
uTrNsv
uTrNppbb
KTcg
Line 02
Line 03
Line 04
Line 05
Line 06
Line 07
607000
608000
609000
610000
611000
612000
5822000
5821000
5820000
5819000
5818000


Legend
Property_SMG
As_bubble
< 17 ppm
17 - 40 ppm
> 40 ppm
0
500
1,000
1,500
Metres
scale 1:20,000
Contours in metres
NAD83 10N
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Soil Geochemistry Survey (2011)
Arsenic Bubble
Date: August 24, 2012
Scale: 1:20,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 10
Mining Div: Cariboo
607000
608000
609000
610000
611000
612000
5822000
5821000
5820000
5819000
5818000
Cedar Creek
Winkley Creek
Winkley Creek Rd
Winkley Creek Road
Quesnel Lake
Line 02
Line 03
Line 04
Line 05
Line 06
Line 07
muTrNvs
uTrNsv
uTrNppbb
KTcg

9.0 AIRBORNE GEOPHYSICAL SURVEY

9.1 Method and Approach

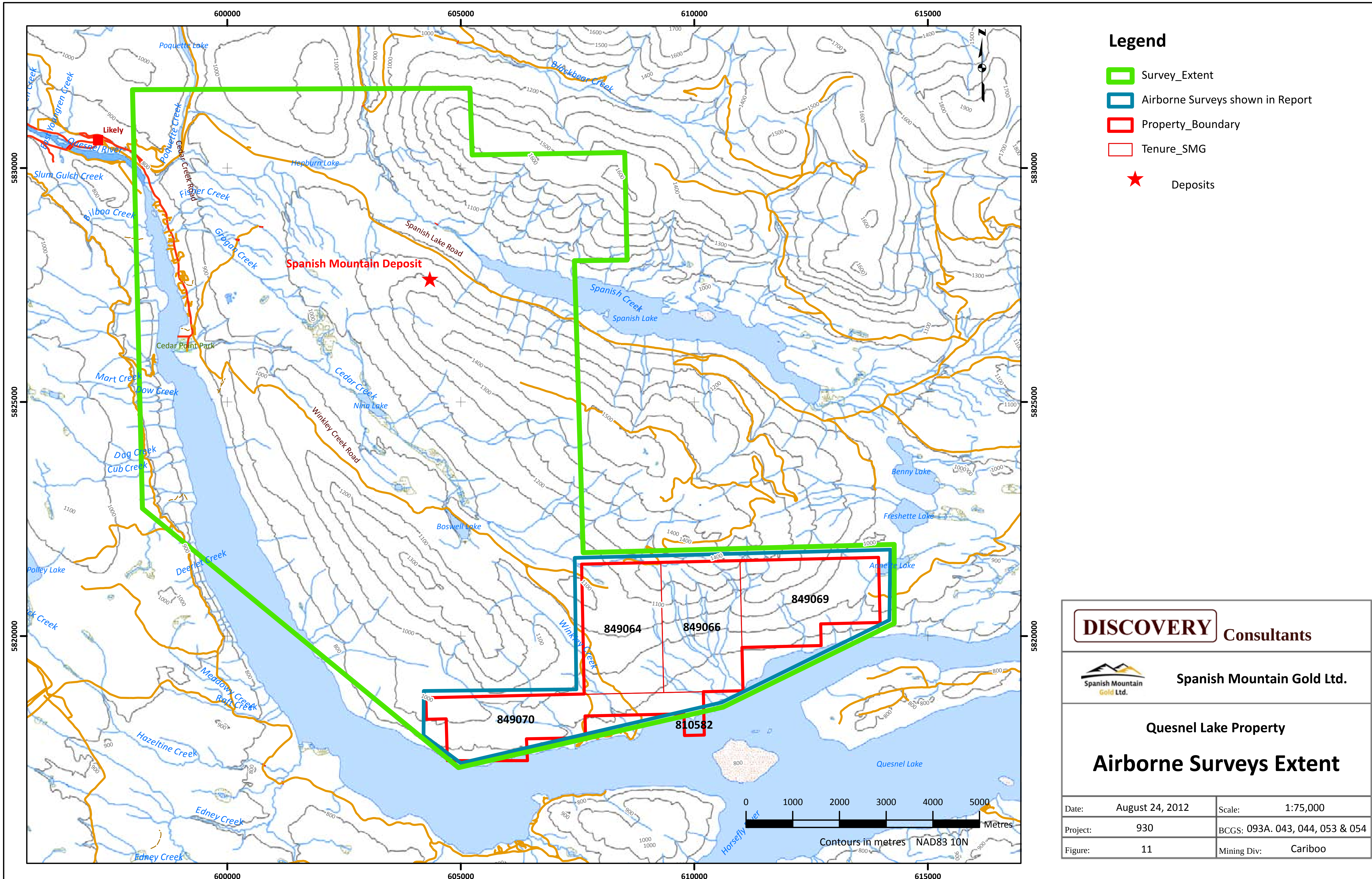
The 2011 helicopter-borne magnetic gradiometer and DIGHEM V electromagnetic - resistivity - magnetic survey was carried out by Fugro during the period of September 24 to October 1, 2011. Figure 11 shows the extent of the geophysical survey, which extends from the Property boundary on Quesnel Lake, northwards to include SMG's Spanish Mountain property.

Total coverage of the surveyed block is 1,395 line-km, including 128 km of tie lines. Flight lines were flown NE-SW with a line separation of 100 metres. Tie lines were flown orthogonal to the traverse lines (NW-SE) with a line separation of 1,000 metres. The logistics, survey parameters and results of the 2011 geophysical program are presented in a report by Fugro, which is given in Appendix II. An AS350-B2 helicopter was used to conduct the survey. The helicopter is owned and operated by Questral Helicopters Ltd of Ottawa, Ontario. The survey aircraft was flown at an average speed of 100 km/h with the electromagnetic sensor height at a nominal terrain clearance of about 35 metres.

The electromagnetic system consists of a DIGHEM V-BKS 54, flown as a towed bird 28 metres below the helicopter. The airborne magnetometer is a Scintrex CS-3 sensor having a sensitivity of 0.01 nanoteslas (nT) and a sample rate of 10 per second. The magnetometer sensor is housed in the HEM bird. The magnetic base station was located at SMG's camp near Likely, BC.

Other instrumentation includes navigational equipment (airborne GPS and base station), radar altimeter, barometric pressure and temperature sensors, digital data acquisition system, and video flight path recording system.

Six plan maps, showing residual magnetic intensity, calculated vertical magnetic gradient, apparent resistivity 7200 Hz, apparent resistivity 56000 Hz, and electromagnetic anomalies, are given in Appendix III, at a scale of 1:20,000.


Legend
Survey_Extent
Airborne Surveys shown in Report
Property_Boundary
Tenure_SMG
Deposits
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Airborne Surveys Extent
Date: August 24, 2012
Scale: 1:75,000
Project: 930
BCGS: 093A. 043, 044, 053 & 054
Figure: 11
Mining Div: Cariboo
Spanish Mountain Deposit
Likely
Quesnel River
Spanish Lake Road
Spanish Creek
Spanish Lake
Cedar Point Park
Cedar Creek
Nina Lake
Winkley Creek Road
Boswell Lake
Benny Lake
Freshette Lake
Quesnel Lake
Polley Lake
Hepburn Lake
Poquette Lake
849064
849066
849069
849070
810582
Contours in metres NAD83 10N
0 1000 2000 3000 4000 5000 Metres
600000
605000
610000
615000
5830000
5825000
5820000

9.2 Results

The geophysical data was interpreted by Fugro and the results are summarized here. The full interpretation is included in their report (Appendix II). Fugro used various criteria to identify the following targets:

- Conductive sulphides and /or graphite zones
- Zones of alteration or clay-rich shears
- Quartz vein or porphyry-type auriferous mineralization

The first two targets are conductive where as the third target of interest may be resistive. As quartz vein or porphyry-type auriferous mineralization is likely to be very poorly conductive, anomaly picks were based primarily on the mid-frequency (5500Hz) coaxial channel, which responds better to weaker conductors than the lower 1000Hz frequency. Fugro displayed the geophysical data as follows:

Magnetic Data

The residual magnetic field data (IGRF removed) was presented as contours on base maps using a contour interval of 5 nT where gradients permit. In addition, the residual magnetic field data were also subjected to a processing algorithm to produce maps of the calculated vertical gradients. This procedure enhances near-surface magnetic units and suppresses regional gradients.

Apparent Resistivity

Apparent resistivity grids, which display the conductive properties of the survey area, were produced from the 900 Hz, 7200 Hz and 56,000 Hz coplanar data. Both resistivity and conductive trends are evident on all three resistivity maps.

Electromagnetic Anomalies

Discrete EM anomalies were picked in order to locate other possible sulphide sources and to detect zones of alteration or clay-rich shears. The EM anomalies resulting from this survey appear to fall within one of four general categories. The first type consists of discrete, well defined anomalies that yield marked inflections on the difference channels. These anomalies are usually attributed to conductive sulphides or graphite, and are given a "B" or "D" interpretive symbol, denoting a bedrock source.

The second class of anomalies comprises moderately broad responses that exhibit the characteristics of a half-space and do not yield well-defined inflections on the difference channels. Anomalies in this category are usually given an "S" (at, or near surface) or "H" (buried half-space) interpretive symbol. The lack of a difference channel response usually implies a broad or flat-lying conductive source. Some of these anomalies could reflect buried, flat-dipping conductive rock units (argillite/mudstone) zones of deep weathering, or increased overburden thickness, all of which can yield “non-discrete” signatures.

The symbol "E" denotes a resistivity contrast at the edge of a conductive unit. This may occur in areas of bedrock conductors that are partially masked by conductive overburden. Where there are sharp undulations in the bedrock/overburden interface, the anomaly in the difference channels may be interpreted as an "S?" or "B?" or an "E". The "?" symbol does not question the validity of an anomaly but instead indicates some degree of uncertainty as to which is the most appropriate EM source model. The presence of a conductive upper layer (i.e., overburden) has a tendency to mask or alter the characteristics of bedrock conductors, making interpretation difficult.

Cultural sources are given the symbol "L". Anomalies in this category can include telephone or power lines, pipelines, railways, fences, metal bridges or culverts, vehicles and mining equipment, and buildings and other metallic structures.

The final interpreted EM anomaly map includes bedrock, surficial and cultural conductors. Most of the interpreted discrete bedrock responses are contained within moderately broad zones of low resistivity. These zones are shown in blue on the EM anomaly map. The zones outline approximately the 100 ohm-m contour taken from the (deeper) 900 Hz resistivity. Most of the graphitic or sulphide-type responses that have been attributed to possible or probable bedrock sources are shown on the EM anomaly map in red or blue colours. Table 3 gives the UTM coordinates of selected EM anomalies cited by Fugro.

TABLE 3: Geophysical EM Anomalies*

Anomaly**	Easting	Northing	Zone	Identifier	Symbol
11490J	609745	5821329	A2	J	E
11600H	611330	5821334	A2	H	H
11690B	610515	5819261	D	B	H
11710E	613375	5821819	E	E	B
11720E	613460	5821776	E	E	D
11750F	613813	5821715	E	F	B
11750H	613973	5821886	E	H	D
11770G	614066	5821659	E	G	D
11780F	614120	5821584	E	F	B

* anomaly name indicates the flight line and the identifier along the line
** list includes selected anomalies mentioned in the text

Fugro provided a geophysical interpretation of the survey, summarized as follows:

Zone A2

Zone A2 is a broad resistivity low that trends northwest-southeast. Anomalies 11490J and 11600H both occur near inferred subtle breaks. Stronger non-magnetic responses occur along the lower susceptibility central axis.

Zone C3

Zone C3 consists of a long, relatively narrow northwest-southeast trending resistivity low that hosts zones of higher conductivity. The response is generally thin and non-magnetic. Most of the thin responses in Zone C indicate dips to the northeast. The central axis of Zone C loosely follows a creek valley that also correlates with a relative magnetic low. The creek valley could reflect a major fault. The C3 conductive zone, however, continues to the southeast.

Zone D

The anomalies in Zone D exhibit the characteristics of a conductive half-space, and may be of no geological interest. The homogeneous resistivity low includes a portion of Quesnel Lake, but the unit extends inland well north of the lakeshore. Lacustrine clays could be a possible cause, but the eastern half of this resistivity low hosts a weak magnetic anomaly. A very subtle NNW-SSE trending linear break can be inferred from the CVG data, in the vicinity of anomaly 11690B. A moderately strong east-west magnetic trough defined the northern contact of the magnetic unit, with a parallel arcuate magnetic high to the north.

Zone E

Zone E is a resistivity low at the eastern Property boundary. It remains open to the north and east beyond the limits of survey coverage. Strong thin bedrock conductors are evident between anomalies 11710E and 11780F. Although dip estimates are uncertain due to the close spacing of the conductors, anomalies 11720E and 11770G both suggest northeast dips.

The strongest responses occur at the eastern end of line 11750, where three separate sources are indicated between anomalies 11750F and 11750H. Anomaly 11750F is the strongest, yielding a resistivity of less than 3 ohm-m. The high conductance and lack of magnetic correlation suggest graphite as a probable source. Because gold can be associated with graphite in the Spanish Mountain area, additional work is highly recommended in order to confirm the causative source(s) of these conductors.

The zone is non-magnetic, but is located just east of a slightly folded, layered sequence that can be seen on the vertical gradient map.

10.0 DISCUSSION AND CONCLUSIONS

Geochemical Soil Survey

Historical work in the mid-1980s outlined a gold-arsenic anomaly situated currently between Lines 6 and 7, where soil, silt and rock chip samples were collected along two logging roads. Five soils, one silt and three rock chips were stated as having greater than 19 ppb Au (ARs 10649, 11555). Arsenic was also anomalous at the 300 ppm level, resulting in numerous anomalous samples extending beyond the gold anomaly.

From the current geochemical survey, two soil samples in this area along Line 6 have values of 15 and 10 ppb Au, which although are not anomalous, are elevated. Arsenic has three anomalous soils of 67, 63 and 46 ppm As, on lines 6 and 7, thus confirming the historic work. However, from historic work, the gold-arsenic anomaly appeared to be limited to the southeast by extensive glacial drift. The current survey did not extend further to the southeast, so it is not known whether it is limited.

Several general conclusions can be made:

- The underlying lithology is Nicola Group sedimentary rocks
- Gold values are low throughout the survey, with values of 15 ppb Au or less
- The historic gold-arsenic anomaly is confirmed. However, it remains an overall subdued anomaly with only weakly elevated gold values. Arsenic values enlarge the anomaly, but the potential of extending it either to the southeast or northwest is very limited.
- Copper is anomalous along the northeastern end of the majority of the lines
- Arsenic correlates to copper. A small arsenic anomaly occurs on Lines 2 and 3
- The northeast end of Line 7 has a coincident copper–arsenic-molybdenum-mercury anomaly. Mercury may indicate the presence of faulting
- Glacial drift becomes notably thicker towards the south end of the Property and likely masks the geochemical signature at the southwest end of the grid
- Soil geochemistry is a useful exploration tool in areas of thin to moderate thickness of till. However, lacustrine and outwash gravel deposits will mask underlying bedrock geochemistry in standard geochemical soil surveys. Detailed information on the surficial geology on the Property is not available.

Airborne DIGHEM Geophysical Survey

The magnetometer survey appears to reflect the northwest-southeast trend of the regional geology. For the electromagnetic survey, there are some apparent geological trends detected in the northern portion of the survey area. However, along the north shore of Quesnel Lake it appears that thick clay-rich surficial deposits are the predominant electromagnetic features.

The airborne geophysical survey resulted in numerous electromagnetic conductor anomalies, as shown on the EM anomaly map. Four separate zones, named Zones A2, C3, D and E, have been identified, based on electromagnetic responses.

11.0 RECOMMENDATIONS

The following is recommended:

- Follow-up of areas of anomalous copper-in-soil and arsenic-in-soil areas by in-fill soil surveys
- Expand the soil survey to cover the eastern part of the Property
- On-going field observations of ice direction and surficial geology to help in any future geochemical interpretation
- Follow-up of areas of geophysical electromagnetic targets by field examination and prospecting
- The 2011 geochemical soil data be integrated with previous geochemical data (reconnaissance soil from the programs of the 1980s) and re-interpreted in light of the better understanding of underlying geology, surficial geology and ice direction

Respectfully submitted,

DISCOVERY CONSULTANTS

Original Signed by Author
____

A. Koffyberg, PGeo

Vernon, BC
August 24, 2012

12.0 REFERENCES

Bloodgood, M.A. (1988): Geology of the Quesnel Terrane in the Spanish Lake Area, Central British Columbia (93A/11); BC Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1987, Paper 88-1, p.139-145.

British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Reports: 10262, 10649, 11555, 12513, 13178, 13869

Christie, J.S. and Livingstone, K.W. (1982): Geochemistry on the Kangaoo Property, Cariboo Mining Division, for E & B Explorations Inc.; Assessment Report 10262

Holland, S.S. (1950): Placer Gold Production of British Columbia; BC Ministry of Energy, Mines and Petroleum Resources, Bulletin 28, 90 p.

Howell, W.A. (1982): Geochemistry of the Kangaroo Property, Cariboo Mining Division, for E & B Explorations Inc.; Assessment Report 10649

Logan, J.M., Schiarizza, P., Struik, L.C., Barnett, C., Nelson, J.L., Kowalczyk, P., Ferri, F., Mihalynuk, M.G., Thomas, M.D., Gammon, P., Lett, R., Jackaman, W., Ferbey, T. (2010): Bedrock Geology of the QUEST map area, central British Columbia; Geoscience BC Report 2010-5, British Columbia Geological Survey Geoscience Map 2010-1

Massey, N.W.D., MacIntryre, D.G., Desjardins, P.J. and Cooney, R.T. (2005): Digital Geology Map of British Columbia, Tile NN10 Central BC. BC Ministry of Mines and Energy Geofile 2005-6

Panteleyev, A., Bailey, D.G., Bloodgood, M.A., and Hancock, K.D. (1996): Geology and Mineral Deposits of the Quesnel River – Horsefly map area, central Quesnel Trough, British Columbia NTS map sheet 93A/5,6,7,11,12,13; 93B/9, 16; 93G/1; 93H/4; BC Ministry of Energy, Mines and Petroleum Resources, Bulletin 97, 156 p. Map at scale 1:100,000

Rees, C.J. (1981): Western Margin of the Omineca Belt Boundary at Quesnel Lake, British Columbia, *in* Current research Part A, Geological Survey of Canada Paper 81-1A, p 223-226

Rhys, D.A. Mortensen, J.K., Ross, K. (2009) Investigations of orogenic gold deposits in the Cariboo Gold District, east-central British Columbia (parts of NTS 093A, H): Progress Report; *in* Geoscience BC Summary of Activities 2008, Report 2009-1, p.49-74

Richards, G.G. (1985): Geology and Geochemistry on the Kangaroo Property, Cariboo Mining Division, for E & B Explorations Inc.; Assessment Report 13869

Richards, G.G. (1984): Geology and Geochemistry on the Kangaroo Property, Cariboo Mining Division, for E & B Explorations Inc.; Assessment Report 13178

Richards, G.G. (1983): Geochemistry on the Kangaroo Property, Cariboo Mining Division, for E & B Explorations Inc.; Assessment Report 11555

Struik, L.C. (1983): Bedrock Geology of Spanish Lake (93A/11) and parts of Adjoining Map Areas, Central British Columbia. Geological Survey of Canada, Open File Map 920, 1: 50,000.

Tipper, H.W. (1971): Multiple Glaciation in Central British Columbia. Canadian Journal of Earth Sciences, vol 8, p. 335-345

Walker, J.T. (1984): Report on the Airborne Geophysical Survey on the Kangaroo Property, Quesnel Lake area, B.C., for E & B Explorations Inc.; Assessment Report 12513

13.0 STATEMENT OF COSTS

1	Professional Services					
	J. Stoeterau, PGeo					
	Program Planning, Supervision					
		1.5 days @	$700 per day		$1,050.00	
	A. Gow, geologist					
	Supervision, Organizing, Field Program & Support					
		3.0 days @	$600 per day		1,800.00	
	W.R. Gilmour, PGeo					
	Data interpretation, Report Editing					
		0.5 days @	$750 per day		375.00	
	A. Koffyberg, PGeo					
	Report Writing					
		88.5 hrs @	$95 per hr		8,407.50	
					----------------	$11,632.50
2	Personnel					
	Field					
	Soil Sampling					
	S. Halas, (July 15 - July 25)					
		11.00 days @	$200 per day		2,200.00	
	M. Mielniczuk, (July 16 - 24)					
		9.00 days @	$230 per day		2,070.00	
	M. Sellars, (July 19 - 24)					
		6.00 days @	$200 per day		1,200.00	
	B. Pelton, (July 19, 20, 23 & 24)					
		4.00 days @	$215 per day		860.00	
	S. Ajas, (July 21 - 24)					
		4.00 days @	$200 per day		800.00	
					----------------	7,130.00
	Office					
	Drafting				1,080.00	
	Data Compilation				120.00	
	Secretarial				720.00	
					----------------	1,920.00
3	Expenses					
	Analysis					
	Ecotech Lab (Alex Stewart Group)					
	Soil samples (Gold & multi-element ICP-MS)					
		248 sample @	$26.78 per sample	$6,641.44		
	Freight			300.00		
				----------------	6,941.44	
	Communications				54.50	
	Field Supplies				150.00	
	Lodging & Meals				3,000.00	
	Office				103.57	
	Transportation					
	4x4 trucks	14 days @	$45 per day		630.00	
	fuel				250.00	
	Sub-Contracting - Fugro Airborne Survey				30,873.14	
					----------------	42,002.65

					Exploration Expenditures:	$62,685.15
4	Corporate Mamangement Fee	@ 10%				6,268.52

					Total Exploration Expenditures:	**$68,953.67**

14.0 STATEMENT OF QUALIFICATIONS

I, Agnes Koffyberg, PGeo, of Discovery Consultants, 201-2928 29th Street, Vernon, BC,

DO HEREBY CERTIFY that:

1. I am a geologist in mineral exploration and am employed by Discovery Consultants, Vernon, BC.

2 I graduated with a B.Sc. degree in combined Geological Sciences/Chemistry from Brock University in 1987. In addition, I have obtained a M.Sc. in Geology from the University of Alberta in 1994.

3. I am a member of the Association of Professional Engineers and Geoscientists of BC, registration number 31384, and am a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta, registration number M60148.

4. I have worked as a geologist for a total of 15 years since graduation from university.

5. This report is based upon knowledge of the Property gained from a site visit on August 16, 2011 on the Property, and a review of existing industry and government reports.

Signed and dated this 24th day of August, 2012 in Vernon, BC

DISCOVERY CONSULTANTS

Original Signed by Author
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Agnes Koffyberg, PGeo

APPENDIX I

SOIL GEOCHEMISTRY - ANALYTICAL RESULTS

APPENDIX I - Soil Geochemistry

Sapnish Mountain Gold Ltd.

QUESNEL LAKE PROPERTY

Soil Sampling Results (2011)

Sample ID	Lab Report #	UTM East	UTM North	Au ppb	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm
	Analytical Method --->			ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L02 S002	AK2011-1135	608130	5821465	1	0.3	2.05	38.3	132.5	0.5	0.12	0.41	0.67	23.3	23.6	62.5	69.5
L02 S003	AK2011-1135	608095	5821429	3	0.3	1.72	27.0	125.0	0.4	0.08	0.47	0.58	20.6	16.8	50.0	57.1
L02 S004	AK2011-1135	608060	5821394	2	0.1	1.42	20.2	82.5	0.2	0.06	0.46	0.46	13.4	15.0	38.5	35.0
L02 S006	AK2011-1135	607989	5821323	1	0.2	1.26	8.5	43.5	<0.1	0.10	0.25	0.23	8.5	5.2	30.5	15.4
L02 S007	AK2011-1135	607954	5821288	3	0.1	1.30	16.3	68.5	<0.1	0.10	0.17	0.13	9.0	5.5	31.0	15.3
L02 S012	AK2011-1135	607777	5821111	5	0.3	2.62	108.6	67.0	0.7	0.08	0.67	0.35	24.9	29.2	38.5	123.4
L02 S013	AK2011-1135	607741	5821076	<1	0.2	1.20	20.2	49.0	0.2	0.12	0.39	0.11	7.7	5.9	24.5	15.0
L02 S014	AK2011-1135	607706	5821040	<1	0.1	1.22	21.0	51.5	0.2	0.16	0.31	0.26	6.8	8.2	33.0	15.5
L02 S015	AK2011-1135	607671	5821005	<1	<0.1	1.05	13.1	58.5	0.1	0.10	0.30	0.12	8.2	5.6	19.5	9.0
L02 S016	AK2011-1135	607635	5820970	<1	<0.1	1.08	19.0	38.5	0.1	0.13	0.14	0.15	8.5	4.7	24.0	15.1
L03 S002	AK2011-1135	608696	5821465	<1	0.2	1.43	43.2	50.5	0.4	0.14	0.16	0.35	10.5	7.8	28.5	20.4
L03 S003	AK2011-1135	608661	5821429	<1	0.9	1.09	34.6	80.0	0.2	0.14	0.11	0.50	7.4	12.9	25.0	42.2
L03 S004	AK2011-1135	608625	5821394	1	0.1	0.80	5.8	31.5	0.2	0.10	0.42	0.32	5.8	4.3	17.0	8.0
L03 S006	AK2011-1135	608555	5821323	4	0.1	1.99	12.3	54.5	0.3	0.06	0.51	0.22	5.7	11.2	45.5	37.9
L03 S007	AK2011-1135	608519	5821288	1	0.4	1.95	10.9	73.5	0.3	0.08	0.66	0.18	14.5	13.1	50.0	40.6
L03 S008	AK2011-1135	608484	5821253	<1	0.1	1.30	7.7	58.0	0.2	0.08	0.25	0.24	7.0	7.6	27.0	16.3
L03 S009	AK2011-1135	608449	5821217	3	<0.1	1.15	9.6	50.0	0.2	0.08	0.32	0.19	8.7	9.9	31.5	20.6
L03 S010	AK2011-1135	608413	5821182	3	0.6	2.15	22.0	103.0	0.4	0.12	0.75	0.42	19.6	16.6	62.5	91.7
L03 S011	AK2011-1135	608378	5821146	1	0.4	1.70	4.8	60.5	0.4	0.12	0.45	0.12	16.4	10.4	77.0	24.1
L03 S012	AK2011-1135	608342	5821111	3	<0.1	1.50	7.4	54.0	0.2	0.08	0.32	0.14	7.3	9.0	31.5	13.8
L03 S013	AK2011-1135	608307	5821076	10	0.5	1.26	68.2	67.0	0.3	0.18	0.31	0.24	8.3	8.8	37.0	22.4
L03 S014	AK2011-1135	608272	5821040	1	0.4	2.10	26.6	92.0	0.3	0.14	0.31	0.41	6.1	15.1	75.0	26.1
L03 S015	AK2011-1135	608236	5821005	3	0.2	0.73	7.8	29.0	0.2	0.12	0.53	0.32	5.0	4.7	43.5	12.1
L03 S016	AK2011-1135	608201	5820970	<1	0.1	1.49	6.3	114.0	0.5	0.08	0.35	0.14	15.4	13.2	54.0	24.9
L03 S018	AK2011-1135	608130	5820899	<1	0.1	1.48	9.3	59.0	<0.1	0.10	0.43	0.37	6.5	7.5	61.5	18.6

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Fe % 0.01	ICP/MS45 Ga ppm 0.0	ICP/MS45 Ge ppm 0.0	ICP/MS45 Hg ppb 5	ICP/MS45 K % 0.01	ICP/MS45 La ppm 0.5	ICP/MS45 Li ppm 1.0	ICP/MS45 Mg % 0.01	ICP/MS45 Mn ppm 5	ICP/MS45 Mo ppm 0.05	ICP/MS45 Na % 0.001	ICP/MS45 Nb ppm 0.05	ICP/MS45 Ni ppm 0.2	ICP/MS45 P ppm 1.0	ICP/MS45 Pb ppm 0.2	ICP/MS45 Rb ppm 0.1	ICP/MS45 S % 0.01
L02 S002	4.16	5.6	3.8	50	0.08	12.5	4.1	0.88	1980	3.48	0.034	0.48	40.1	790	13.2	5.5	0.04
L02 S003	3.25	4.4	3.0	50	0.08	9.0	3.7	0.74	1436	2.97	0.029	0.36	35.3	591	7.6	5.2	0.04
L02 S004	2.91	4.2	2.7	25	0.05	4.5	3.5	0.77	1198	2.28	0.034	0.30	24.7	576	6.5	2.8	0.04
L02 S006	2.59	6.4	2.3	35	0.05	4.0	2.7	0.43	210	1.32	0.032	0.84	12.6	356	5.7	3.3	0.04
L02 S007	2.20	5.8	1.9	30	0.04	4.5	2.8	0.39	345	0.81	0.031	0.62	13.2	475	6.2	4.0	0.04
L02 S012	5.72	9.7	5.5	110	0.06	13.0	4.1	1.42	1389	2.17	0.032	0.10	27.5	677	7.9	3.3	0.04
L02 S013	2.11	5.8	1.9	30	0.06	3.5	2.8	0.43	333	0.75	0.030	0.58	11.7	792	6.6	4.1	0.04
L02 S014	2.91	7.5	2.6	40	0.04	3.5	3.0	0.38	556	0.81	0.031	0.82	14.9	1351	7.6	4.4	0.04
L02 S015	2.04	5.5	1.8	20	0.04	4.0	2.7	0.29	322	0.71	0.030	0.52	9.4	538	5.4	4.6	0.04
L02 S016	2.62	5.9	2.3	20	0.04	4.4	2.8	0.29	156	0.99	0.031	0.84	12.2	507	6.6	5.6	0.04
L03 S002	2.99	5.8	2.6	35	0.05	5.0	3.0	0.37	307	1.43	0.029	0.68	17.5	568	6.8	6.0	0.04
L03 S003	4.78	6.5	4.1	40	0.05	3.5	2.4	0.48	743	2.72	0.024	0.18	15.1	835	9.7	4.0	0.04
L03 S004	1.31	4.9	1.2	20	0.03	3.0	2.1	0.28	182	0.67	0.026	0.50	6.9	201	4.6	3.6	0.04
L03 S006	3.36	6.2	3.2	20	0.05	3.0	3.1	0.87	494	1.02	0.027	0.54	23.9	1238	4.4	7.0	0.04
L03 S007	2.99	5.6	2.8	60	0.06	5.5	3.7	0.69	461	1.20	0.033	0.80	27.8	298	6.2	6.2	0.06
L03 S008	2.40	4.5	2.2	25	0.05	3.5	2.6	0.50	286	0.88	0.023	0.54	15.6	765	5.1	5.2	0.04
L03 S009	2.30	4.7	2.2	15	0.04	4.0	2.4	0.52	500	1.07	0.029	0.50	15.4	513	4.8	4.5	0.04
L03 S010	3.71	6.1	3.8	100	0.14	10.5	3.2	0.80	885	1.90	0.030	0.82	38.8	578	7.9	8.0	0.08
L03 S011	2.42	5.8	2.3	45	0.04	9.0	2.4	0.55	428	0.70	0.032	1.10	32.9	378	7.5	6.2	0.04
L03 S012	3.05	5.6	2.8	15	0.05	3.5	2.6	0.57	339	1.03	0.028	0.70	13.8	836	5.0	5.0	0.04
L03 S013	2.37	4.8	2.2	55	0.06	4.0	2.4	0.45	736	0.97	0.026	0.56	17.5	569	25.2	6.0	0.06
L03 S014	3.74	8.8	3.5	40	0.06	3.0	3.5	1.04	1500	1.10	0.030	0.48	30.4	628	8.0	9.0	0.06
L03 S015	2.22	5.5	2.0	20	0.04	2.5	1.8	0.29	153	1.08	0.027	0.84	11.7	606	5.9	3.6	0.06
L03 S016	2.26	5.7	2.1	30	0.05	7.5	2.2	0.55	901	1.01	0.030	0.54	19.9	522	5.4	4.7	0.06
L03 S018	3.43	7.4	3.1	30	0.04	3.0	2.4	0.59	233	1.19	0.027	0.96	22.6	293	5.7	2.9	0.06

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Sb ppm 0.05	ICP/MS45 Sc ppm 0.1	ICP/MS45 Se ppm 0.2	ICP/MS45 Sn ppm 0.2	ICP/MS45 Sr ppm 2.0	ICP/MS45 Ta ppm 0.1	ICP/MS45 Te ppm 0.02	ICP/MS45 Th ppm 0.1	ICP/MS45 Ti % 0.005	ICP/MS45 Tl ppm 0.02	ICP/MS45 U ppm 0.1	ICP/MS45 V ppm 2	ICP/MS45 W ppm 0.1	ICP/MS45 Y ppm 0.1	ICP/MS45 Zn ppm 2.0	ICP/MS45 Zr ppm 1.00
L02 S002	2.80	5.0	0.9	0.3	25.5	<0.05	0.06	1.0	0.039	0.10	1.0	70	0.3	6.8	105.9	0.95
L02 S003	1.62	4.4	0.9	0.2	26.0	<0.05	0.04	0.5	0.029	0.08	1.0	54	0.2	9.6	83.0	0.92
L02 S004	2.30	3.7	0.5	0.2	21.0	<0.05	0.02	0.6	0.048	0.06	0.4	56	0.2	4.9	70.7	0.89
L02 S006	1.20	2.5	0.2	0.4	11.5	<0.05	0.02	0.4	0.076	0.04	0.2	90	0.3	2.3	48.3	1.07
L02 S007	0.92	2.3	0.1	0.4	6.5	<0.05	0.02	0.6	0.045	0.04	0.2	66	0.2	1.6	38.8	0.92
L02 S012	12.38	16.0	0.5	0.3	31.0	<0.05	0.06	1.3	0.027	0.08	0.3	132	0.2	19.5	85.7	3.08
L02 S013	1.66	2.3	0.1	0.4	12.5	<0.05	0.04	0.5	0.036	0.04	0.1	64	0.2	1.6	42.1	0.88
L02 S014	1.16	2.6	0.2	0.6	10.0	<0.05	0.02	0.5	0.057	0.04	0.2	86	0.3	1.6	62.5	1.25
L02 S015	0.98	2.1	0.1	0.4	10.0	<0.05	<0.02	0.5	0.045	0.04	0.1	62	0.2	1.4	40.2	0.99
L02 S016	1.56	2.0	0.1	0.4	5.5	<0.05	0.02	0.8	0.056	0.07	0.1	70	0.2	1.4	41.6	1.23
L03 S002	1.60	2.1	0.2	0.4	9.5	<0.05	0.02	0.8	0.029	0.06	0.2	64	0.2	1.5	73.2	0.68
L03 S003	4.70	2.6	0.3	0.3	8.0	<0.05	0.04	0.1	0.012	0.06	0.1	96	0.2	1.4	78.8	0.34
L03 S004	0.80	2.2	<0.1	0.3	13.0	<0.05	<0.02	0.4	0.074	0.04	0.1	54	0.1	2.1	30.1	1.37
L03 S006	1.34	3.9	0.2	0.2	15.5	<0.05	0.02	0.6	0.063	0.04	0.2	86	0.2	2.8	66.1	2.10
L03 S007	2.56	4.4	0.4	0.3	34.5	<0.05	0.04	0.8	0.071	0.06	0.2	72	0.2	5.7	56.9	2.10
L03 S008	1.02	2.2	0.2	0.2	10.5	<0.05	0.02	0.6	0.044	0.04	0.2	52	0.2	2.0	58.5	1.06
L03 S009	1.54	2.4	0.2	0.2	15.0	<0.05	0.02	0.7	0.049	0.04	0.2	54	0.2	2.6	50.3	1.17
L03 S010	3.34	5.9	0.8	0.3	41.5	<0.05	0.04	0.6	0.060	0.10	0.5	76	0.3	13.5	72.2	1.72
L03 S011	1.02	3.3	0.3	0.4	25.0	<0.05	<0.02	1.1	0.085	0.06	0.6	62	0.2	6.1	47.3	1.99
L03 S012	1.26	2.9	0.1	0.3	11.5	<0.05	0.02	0.7	0.066	0.04	0.2	78	0.2	2.2	59.6	1.85
L03 S013	1.76	2.4	0.2	0.3	17.0	<0.05	0.02	0.3	0.039	0.04	0.2	58	0.2	2.5	58.3	0.81
L03 S014	4.08	4.2	0.1	0.4	19.0	<0.05	<0.02	0.3	0.019	0.06	0.2	110	0.2	1.5	135.0	0.73
L03 S015	2.92	1.7	0.2	0.5	24.5	<0.05	0.04	0.3	0.098	0.02	0.1	88	0.3	1.3	35.2	1.03
L03 S016	0.66	2.6	0.2	0.3	16.5	<0.05	0.02	0.3	0.037	0.06	0.3	58	0.2	5.0	55.4	0.71
L03 S018	1.50	3.3	0.1	0.4	13.0	<0.05	0.02	0.5	0.105	0.04	0.2	118	0.3	2.1	68.2	1.56

APPENDIX I - Soil Geochemistry

Sample ID	Lab Report #	UTM East	UTM North	Au ppb	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm
	Analytical Method --->			ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L03 S019	AK2011-1135	608095	5820864	<1	0.1	1.10	16.4	85.5	0.2	0.12	0.15	0.14	9.9	5.2	20.5	10.1
L03 S020	AK2011-1135	608060	5820828	<1	0.3	1.71	31.4	89.5	0.3	0.12	0.20	0.24	9.3	11.5	36.5	16.3
L03 S021	AK2011-1135	608024	5820793	<1	0.1	2.05	16.9	69.0	0.5	0.08	0.33	0.24	7.6	14.3	32.0	41.3
L03 S022	AK2011-1135	607989	5820758	8	0.2	2.73	245.6	59.0	0.5	0.08	0.13	0.22	14.0	23.0	128.0	50.2
L03 S023	AK2011-1135	607954	5820722	<1	0.2	0.73	7.1	60.0	<0.1	0.10	0.10	0.12	9.5	4.5	15.0	7.0
L03 S024	AK2011-1135	607918	5820687	<1	0.1	0.75	7.1	53.5	0.1	0.08	0.20	0.10	8.5	4.9	17.0	9.4
L03 S025	AK2011-1135	607883	5820651	<1	0.1	0.64	9.9	41.5	0.1	0.08	0.29	0.14	6.8	5.7	14.5	6.2
L03 S026	AK2011-1135	607847	5820616	8	0.2	1.24	273.3	56.0	0.2	0.08	0.17	0.17	7.6	6.9	27.5	11.2
L03 S027	AK2011-1135	607812	5820581	1	0.3	1.18	14.1	74.0	<0.1	0.10	0.15	0.21	8.6	5.8	23.0	17.4
L03 S028	AK2011-1135	607777	5820545	<1	0.2	1.25	14.0	84.5	0.2	0.10	0.23	0.26	10.5	8.9	32.0	14.3
L03 S029	AK2011-1135	607741	5820510	1	<0.1	1.01	14.2	71.5	0.2	0.10	0.26	0.18	9.0	10.0	20.5	11.7
L03 S030	AK2011-1135	607706	5820475	6	0.1	1.22	10.6	48.5	0.2	0.06	0.31	0.22	7.3	7.7	26.0	15.2
L03 S031	AK2011-1135	607671	5820439	3	0.2	1.22	11.1	31.0	0.3	0.08	0.29	0.18	7.6	6.6	29.5	14.9
L03 S032	AK2011-1135	607635	5820404	8	0.1	1.33	18.6	50.5	0.2	0.06	0.45	0.22	7.4	9.4	62.5	27.1
L04 S001	AK2011-1135	609297	5821500	1	0.2	1.94	10.6	120.0	0.2	0.12	0.20	0.25	8.4	10.3	41.5	29.8
L04 S003	AK2011-1135	609226	5821429	8	0.3	1.58	17.1	67.5	0.2	0.06	0.27	0.29	6.2	8.7	25.5	37.5
L04 S005	AK2011-1135	609156	5821359	<1	0.2	2.13	7.1	39.5	0.1	0.06	0.27	0.08	6.6	24.0	249.5	44.2
L04 S007	AK2011-1135	609085	5821288	1	0.2	2.55	8.4	110.0	0.3	0.14	0.34	0.14	10.4	12.0	59.5	37.2
L04 S008	AK2011-1135	609050	5821253	<1	0.2	1.02	6.9	130.0	0.2	0.12	0.36	0.62	8.1	10.2	23.5	7.3
L04 S009	AK2011-1135	609014	5821217	2	0.2	1.24	10.9	42.0	0.2	0.08	0.31	0.15	11.0	8.1	37.0	31.2
L04 S011	AK2011-1135	608944	5821146	1	0.1	2.16	90.4	86.0	0.6	0.16	0.33	0.81	8.9	45.2	33.0	96.1
L04 S012	AK2011-1135	608908	5821111	1	<0.1	2.01	14.9	54.5	0.3	0.08	0.38	0.23	7.4	14.7	42.5	46.0
L04 S013	AK2011-1135	608873	5821076	<1	<0.1	0.77	9.5	24.0	0.2	0.08	0.24	0.16	6.3	4.2	31.0	6.2
L04 S015	AK2011-1135	608802	5821005	<1	0.1	1.39	12.2	59.5	0.1	0.10	0.33	0.21	8.7	10.9	38.0	15.3
L04 S016	AK2011-1135	608767	5820970	1	<0.1	1.55	8.2	63.0	0.2	0.08	0.25	0.13	10.4	12.8	48.5	37.4
L04 S018	AK2011-1135	608696	5820899	8	0.3	2.05	92.7	19.0	0.2	0.04	0.16	0.19	4.5	26.9	249.0	45.5
L04 S019	AK2011-1135	608661	5820864	<1	0.1	1.29	11.6	59.5	0.2	0.12	0.20	0.09	9.6	4.4	33.5	19.3
L04 S020	AK2011-1135	608625	5820828	<1	<0.1	0.49	4.2	21.5	<0.1	0.10	0.15	0.10	6.2	1.7	11.0	4.2
L04 S021	AK2011-1135	608590	5820793	<1	0.4	2.23	15.3	71.0	0.4	0.16	0.68	0.32	6.3	21.8	33.5	34.8
L04 S022	AK2011-1135	608555	5820758	<1	0.1	1.48	9.1	34.5	0.2	0.06	0.33	0.15	5.6	9.8	65.5	17.1

APPENDIX I - Soil Geochemistry

Sample ID	Fe	Ga	Ge	Hg	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	S
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	%	ppm	ppm	ppb	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
	0.01	0.0	0.0	5	0.01	0.5	1.0	0.01	5	0.05	0.001	0.05	0.2	1.0	0.2	0.1	0.01
L03 S019	2.19	5.6	1.9	25	0.04	5.0	2.2	0.27	139	0.69	0.025	0.70	11.0	454	5.6	6.0	0.04
L03 S020	3.68	6.8	3.2	35	0.05	4.5	2.7	0.44	496	1.18	0.025	0.84	16.0	1242	7.2	6.8	0.06
L03 S021	3.68	6.7	3.5	35	0.05	3.5	3.0	0.76	512	0.76	0.028	0.56	18.9	1113	5.1	7.6	0.06
L03 S022	4.54	7.8	4.2	30	0.06	5.5	4.2	1.69	814	1.30	0.032	0.18	111.3	501	6.9	6.4	0.06
L03 S023	1.36	4.8	1.2	35	0.04	4.5	1.7	0.19	1467	0.46	0.025	0.26	6.8	362	5.0	4.6	0.06
L03 S024	1.35	3.2	1.2	25	0.03	4.5	2.0	0.27	127	0.48	0.025	0.46	10.5	202	4.5	4.2	0.04
L03 S025	1.25	3.5	1.1	25	0.03	3.0	1.5	0.19	1019	0.33	0.027	0.36	5.6	344	5.0	3.3	0.06
L03 S026	2.39	4.4	2.2	20	0.04	3.5	2.2	0.45	654	0.69	0.024	0.42	15.2	376	5.1	4.7	0.04
L03 S027	2.01	4.9	1.8	20	0.04	4.0	2.1	0.38	439	0.80	0.026	0.42	12.2	462	5.0	3.2	0.04
L03 S028	2.22	4.4	2.1	55	0.06	5.0	2.3	0.45	336	0.78	0.026	0.62	18.2	315	6.1	6.7	0.06
L03 S029	1.80	4.1	1.8	20	0.04	4.0	1.8	0.36	2054	0.55	0.022	0.48	11.5	424	5.0	4.8	0.06
L03 S030	1.88	4.0	1.8	20	0.04	3.5	2.2	0.50	388	0.50	0.023	0.38	16.9	280	3.3	5.2	0.06
L03 S031	2.04	4.4	1.9	35	0.05	3.5	2.1	0.40	195	0.96	0.022	0.62	15.8	659	4.0	5.8	0.06
L03 S032	2.38	4.8	2.2	25	0.05	3.5	2.1	0.71	327	0.77	0.023	0.58	28.1	572	5.8	4.3	0.06
L04 S001	3.44	6.7	3.1	35	0.07	4.0	2.2	0.61	472	1.44	0.022	0.64	19.6	1411	6.3	7.4	0.06
L04 S003	3.12	5.4	2.9	25	0.04	3.0	2.4	0.73	420	1.28	0.021	0.36	17.4	1188	4.2	4.4	0.06
L04 S005	3.38	6.0	3.2	20	0.10	3.0	2.6	2.18	509	1.06	0.023	0.32	106.3	617	4.8	16.3	0.06
L04 S007	3.83	7.7	3.6	30	0.14	5.0	2.5	0.79	374	1.32	0.027	0.88	41.4	1039	7.1	12.9	0.06
L04 S008	1.87	5.0	1.8	30	0.05	3.5	1.4	0.26	3302	0.76	0.023	0.42	10.1	689	7.0	4.9	0.06
L04 S009	2.06	3.7	1.9	30	0.05	6.0	2.6	0.50	636	0.80	0.023	0.50	23.7	145	5.8	6.2	0.06
L04 S011	8.19	9.3	7.2	45	0.06	4.0	2.4	0.72	1883	2.83	0.023	0.74	44.0	1120	10.8	6.4	0.08
L04 S012	3.42	6.2	3.2	15	0.07	3.5	2.1	0.95	441	1.85	0.021	0.28	30.4	372	4.8	6.2	0.06
L04 S013	1.45	3.5	1.3	20	0.03	3.0	1.5	0.30	145	0.84	0.020	0.48	11.8	173	4.5	2.2	0.06
L04 S015	2.86	5.4	2.6	25	0.06	4.0	1.9	0.52	441	1.07	0.023	0.70	16.5	775	5.7	7.7	0.06
L04 S016	2.72	4.4	2.5	20	0.07	4.5	2.2	0.71	345	1.22	0.022	0.60	29.1	358	5.7	5.3	0.06
L04 S018	3.00	5.8	2.9	35	0.02	2.0	2.0	2.22	550	0.53	0.024	0.10	144.6	432	7.5	1.1	0.06
L04 S019	2.30	5.6	2.0	45	0.06	4.5	1.6	0.34	165	1.13	0.024	0.78	11.7	460	7.5	4.9	0.06
L04 S020	0.90	3.4	0.7	20	0.02	3.0	1.0	0.10	75	0.49	0.021	0.46	4.3	290	4.7	1.6	0.06
L04 S021	4.11	10.9	3.9	65	0.04	3.0	2.5	0.68	1156	0.86	0.026	1.14	16.9	1198	6.9	5.5	0.08
L04 S022	2.65	5.3	2.4	20	0.04	2.5	2.5	0.74	301	0.93	0.023	0.46	27.3	380	4.5	7.2	0.06

APPENDIX I - Soil Geochemistry

Sample	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	Sb	**Sc**	**Se**	**Sn**	**Sr**	**Ta**	**Te**	**Th**	**Ti**	**Tl**	**U**	**V**	**W**	**Y**	**Zn**	**Zr**
ID	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
	0.05	0.1	0.2	0.2	2.0	0.1	0.02	0.1	0.005	0.02	0.1	2	0.1	0.1	2.0	1.00
L03 S019	1.04	1.9	0.1	0.4	7.5	<0.05	0.02	0.8	0.049	0.04	0.2	60	0.2	1.5	53.8	0.95
L03 S020	2.12	2.8	0.2	0.4	7.5	<0.05	0.04	0.9	0.056	0.06	0.2	94	0.3	1.8	78.6	1.42
L03 S021	2.14	3.9	0.2	0.3	7.5	<0.05	0.02	0.7	0.048	0.04	0.2	90	0.2	2.7	93.0	1.87
L03 S022	10.22	6.4	0.3	0.3	8.5	<0.05	0.04	0.7	0.004	0.08	0.2	86	0.2	3.5	88.0	1.19
L03 S023	0.52	1.2	0.1	0.4	5.0	<0.05	<0.02	0.2	0.020	0.04	0.1	36	0.1	1.0	34.7	0.35
L03 S024	0.56	1.6	0.1	0.2	9.5	<0.05	<0.02	0.8	0.037	0.02	0.2	32	0.1	2.0	29.1	0.78
L03 S025	0.64	1.3	<0.1	0.3	11.0	<0.05	<0.02	0.2	0.037	0.04	0.1	36	0.2	1.4	30.1	0.61
L03 S026	2.14	2.2	0.1	0.2	5.5	<0.05	<0.02	0.7	0.034	0.06	0.1	50	0.2	1.6	49.2	0.80
L03 S027	1.50	2.1	0.2	0.3	5.5	<0.05	<0.02	0.7	0.024	0.06	0.2	48	0.1	1.6	44.3	0.69
L03 S028	0.90	2.0	0.2	0.3	10.5	<0.05	0.02	0.6	0.046	0.06	0.2	50	0.2	1.9	64.2	0.80
L03 S029	0.54	1.9	0.1	0.2	10.0	<0.05	<0.02	0.7	0.033	0.08	0.2	44	0.2	1.7	44.7	0.71
L03 S030	1.14	2.8	0.1	0.2	11.0	<0.05	<0.02	0.5	0.037	0.04	0.1	50	0.1	2.0	64.0	0.82
L03 S031	0.82	2.5	0.1	0.3	11.5	<0.05	<0.02	0.6	0.045	0.04	0.2	50	0.2	1.8	55.9	1.20
L03 S032	1.24	3.4	0.2	0.2	15.0	<0.05	<0.02	0.8	0.065	0.04	0.2	68	0.2	2.3	46.6	1.91
L04 S001	1.80	4.1	0.2	0.4	9.5	<0.05	0.02	0.9	0.036	0.08	0.2	80	0.2	2.3	90.0	1.98
L04 S003	1.64	3.4	0.2	0.2	9.5	<0.05	<0.02	0.6	0.037	0.04	0.2	68	0.1	2.8	73.4	1.31
L04 S005	0.62	1.9	0.1	0.2	14.0	<0.05	<0.02	0.8	0.057	0.08	0.2	82	0.1	1.6	50.4	1.12
L04 S007	2.10	4.2	0.2	0.4	15.5	<0.05	0.04	1.2	0.052	0.10	0.3	84	0.2	2.5	98.5	1.49
L04 S008	0.58	1.8	0.1	0.4	14.5	<0.05	<0.02	0.3	0.037	0.08	0.1	52	0.1	1.6	91.8	0.54
L04 S009	1.18	2.5	0.2	0.2	18.0	<0.05	<0.02	1.0	0.047	0.06	0.3	42	0.1	5.3	50.8	1.35
L04 S011	6.28	5.7	0.4	0.6	18.5	<0.05	0.06	0.8	0.071	0.10	0.3	138	0.5	3.0	192.1	1.88
L04 S012	2.30	4.4	0.2	0.3	12.5	<0.05	0.04	1.0	0.087	0.06	0.2	84	0.2	3.4	76.2	3.32
L04 S013	0.96	1.5	<0.1	0.2	12.5	<0.05	<0.02	0.4	0.041	0.04	0.1	44	0.1	1.4	34.3	0.82
L04 S015	1.48	2.9	0.1	0.3	13.5	<0.05	0.02	0.8	0.056	0.06	0.2	60	0.2	2.4	64.6	1.39
L04 S016	1.66	3.7	0.2	0.2	11.0	<0.05	0.02	1.2	0.063	0.06	0.2	58	0.1	2.8	46.3	2.18
L04 S018	8.64	6.6	0.2	<0.1	12.5	<0.05	<0.02	0.1	0.010	<0.02	<0.1	88	<0.1	2.2	67.2	0.59
L04 S019	1.28	2.2	0.1	0.4	10.0	<0.05	0.02	0.8	0.040	0.06	0.2	72	0.2	1.5	31.1	1.03
L04 S020	0.52	0.9	<0.1	0.3	7.0	<0.05	<0.02	0.3	0.023	0.02	<0.1	30	0.1	0.9	16.5	0.52
L04 S021	2.72	6.5	0.2	0.7	19.0	<0.05	0.04	0.5	0.127	0.06	0.2	150	0.4	3.6	131.9	3.00
L04 S022	1.02	2.9	<0.1	0.3	14.0	<0.05	<0.02	0.5	0.058	0.04	0.1	72	0.1	2.1	50.5	1.44

APPENDIX I - Soil Geochemistry

Sample	Lab	Analytical Method --->		ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
		UTM		Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu
ID	Report #	East	North	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L04 S023	AK2011-1135	608519	5820722	1	0.4	1.47	6.6	58.0	0.2	0.08	0.76	0.46	11.2	10.9	43.0	28.2
L04 S025	AK2011-1135	608449	5820651	1	0.1	1.88	10.8	81.5	0.3	0.14	0.28	0.31	9.4	9.9	53.5	22.1
L04 S026	AK2011-1135	608413	5820616	<1	0.1	0.81	8.3	52.0	<0.1	0.08	0.19	0.21	8.9	4.9	23.0	6.7
L04 S027	AK2011-1135	608378	5820581	<1	<0.1	0.54	7.9	22.0	0.2	0.06	0.13	0.20	4.3	4.0	11.0	8.5
L04 S028	AK2011-1135	608342	5820545	<1	0.2	1.36	13.3	155.5	0.2	0.12	0.27	0.63	9.9	13.2	24.5	20.5
L04 S029	AK2011-1135	608307	5820510	<1	0.1	0.89	9.0	51.5	0.1	0.08	0.33	0.18	10.3	6.2	29.0	9.1
L04 S030	AK2011-1135	608272	5820475	2	0.1	0.86	8.8	25.5	0.1	0.08	0.36	0.27	8.4	6.0	25.0	14.7
L04 S032	AK2011-1135	608201	5820404	<1	0.2	0.43	2.1	68.5	<0.1	0.08	0.19	0.32	6.4	4.5	10.0	6.3
L04 S033	AK2011-1135	608166	5820369	<1	<0.1	0.84	4.5	28.0	<0.1	0.06	0.21	0.17	7.6	5.7	23.0	10.8
L04 S034	AK2011-1135	608130	5820333	<1	<0.1	1.10	7.2	31.0	0.1	0.06	0.24	0.09	11.1	6.9	27.5	13.4
L04 S035	AK2011-1135	608095	5820298	<1	0.4	1.14	5.8	44.5	0.3	0.08	0.41	0.25	10.0	7.6	24.5	16.5
L04 S036	AK2011-1135	608060	5820263	2	0.7	2.41	40.5	144.0	0.8	0.22	0.84	0.42	30.4	16.2	55.0	69.8
L04 S037	AK2011-1135	608024	5820227	<1	<0.1	0.88	16.1	47.0	0.1	0.08	0.21	0.08	8.5	7.0	31.5	10.7
L04 S038	AK2011-1135	607989	5820192	3	0.1	0.88	15.1	40.0	0.1	0.10	0.18	0.11	9.3	6.5	24.0	12.1
L04 S039	AK2011-1135	607954	5820156	4	0.8	2.44	47.4	145.0	0.7	0.18	0.78	0.59	29.7	16.7	69.5	100.3
L04 S040	AK2011-1135	607918	5820121	1	0.1	1.22	14.6	39.5	0.2	0.10	0.59	0.33	9.4	9.3	37.0	20.5
L04 S041	AK2011-1135	607883	5820086	12	0.7	2.33	15.1	117.0	0.5	0.22	1.05	0.79	26.4	18.0	75.0	61.4
L04 S042	AK2011-1135	607847	5820050	3	0.2	1.64	9.4	66.5	0.3	0.12	0.64	0.37	21.8	13.8	49.0	35.2
L04 S043	AK2011-1135	607812	5820015	5	0.2	1.24	8.3	50.5	0.2	0.10	0.68	0.23	15.6	9.2	33.5	27.5
L04 S044	AK2011-1135	607777	5819980	3	0.3	1.94	14.5	113.5	0.4	0.18	0.86	0.76	23.1	16.1	52.5	43.7
L04 S045	AK2011-1135	607741	5819944	4	0.2	1.54	18.2	68.0	0.3	0.16	0.71	0.67	25.8	15.8	47.5	52.2
L04 S046	AK2011-1135	607706	5819909	10	1.7	4.03	47.7	285.0	1.1	0.40	1.76	3.63	42.1	24.7	99.5	252.5
L04 S047	AK2011-1135	607671	5819874	3	0.1	1.71	9.3	63.5	0.4	0.16	0.39	0.37	21.4	13.2	42.5	42.6
L04 S048	AK2011-1135	607635	5819838	3	0.3	1.28	5.7	64.0	0.2	0.14	0.38	0.54	21.0	11.5	28.5	18.9
L05 S008	AK2011-1135	609615	5821253	4	0.2	1.92	17.6	62.0	0.3	0.12	0.98	0.68	14.4	17.9	40.5	62.0
L05 S009	AK2011-1135	609580	5821217	3	<0.1	1.13	6.2	49.5	0.1	0.08	0.31	0.15	7.0	5.2	15.5	13.7
L05 S010	AK2011-1135	609545	5821182	1	<0.1	1.06	7.2	59.5	0.1	0.10	0.30	0.17	9.3	6.9	15.5	13.5
L05 S011	AK2011-1135	609509	5821146	3	0.4	2.28	29.5	123.0	0.5	0.20	0.66	0.39	24.2	16.4	40.5	141.1
L05 S012	AK2011-1135	609474	5821111	1	0.2	1.42	8.4	87.5	0.2	0.10	0.14	0.24	11.2	10.0	18.0	16.4
L05 S013	AK2011-1135	609438	5821076	1	0.1	1.54	7.9	79.0	0.2	0.14	0.20	0.14	10.7	7.9	37.5	19.5

Sample ID	ICP/MS45 Fe %	ICP/MS45 Ga ppm	ICP/MS45 Ge ppm	ICP/MS45 Hg ppb	ICP/MS45 K %	ICP/MS45 La ppm	ICP/MS45 Li ppm	ICP/MS45 Mg %	ICP/MS45 Mn ppm	ICP/MS45 Mo ppm	ICP/MS45 Na %	ICP/MS45 Nb ppm	ICP/MS45 Ni ppm	ICP/MS45 P ppm	ICP/MS45 Pb ppm	ICP/MS45 Rb ppm	ICP/MS45 S %
	0.01	0.0	0.0	5	0.01	0.5	1.0	0.01	5	0.05	0.001	0.05	0.2	1.0	0.2	0.1	0.01
L04 S023	2.38	5.0	2.4	30	0.06	6.5	1.9	0.61	709	0.85	0.024	0.68	21.9	208	5.1	6.4	0.06
L04 S025	3.68	7.4	3.4	30	0.06	4.5	2.7	0.56	412	0.93	0.023	0.92	31.7	1522	7.4	8.7	0.06
L04 S026	1.46	3.8	1.3	15	0.03	4.5	1.6	0.36	391	0.43	0.021	0.40	10.8	344	3.8	5.8	0.06
L04 S027	1.37	2.9	1.1	20	0.03	2.0	1.3	0.18	127	0.50	0.019	0.34	6.8	320	3.1	4.3	0.06
L04 S028	2.79	6.2	2.5	30	0.06	4.5	1.9	0.41	2345	0.87	0.022	0.52	14.9	1110	7.6	6.9	0.06
L04 S029	1.68	3.6	1.6	20	0.05	5.0	1.7	0.37	425	0.68	0.022	0.48	15.2	321	4.6	5.2	0.06
L04 S030	1.72	3.2	1.6	15	0.04	4.0	1.8	0.38	212	0.68	0.023	0.54	15.8	220	4.9	4.5	0.06
L04 S032	0.77	2.7	0.7	25	0.04	3.0	0.9	0.08	2915	0.55	0.020	0.24	3.8	402	4.3	1.9	0.06
L04 S033	1.57	3.2	1.4	20	0.04	3.5	1.7	0.36	288	0.59	0.022	0.40	11.4	572	3.6	4.4	0.06
L04 S034	1.96	3.6	1.8	20	0.05	5.5	2.1	0.47	202	0.77	0.024	0.46	16.9	271	4.1	5.3	0.06
L04 S035	1.90	3.7	1.8	40	0.06	6.5	2.1	0.39	302	0.78	0.024	0.70	15.1	352	4.6	7.3	0.06
L04 S036	4.01	6.9	4.1	70	0.14	21.5	3.2	0.51	776	1.71	0.028	1.32	41.1	300	11.3	12.4	0.08
L04 S037	1.62	3.5	1.5	10	0.04	4.0	1.7	0.37	400	0.53	0.022	0.36	17.3	307	3.6	6.0	0.06
L04 S038	1.78	3.5	1.6	20	0.04	4.5	1.8	0.34	339	0.70	0.021	0.38	13.8	318	5.3	6.4	0.06
L04 S039	4.08	7.0	4.1	125	0.15	18.5	2.9	0.73	1006	1.55	0.025	0.96	56.5	464	10.3	13.0	0.08
L04 S040	2.20	4.8	20.0	30	0.06	4.5	15.6	0.44	356	1.08	0.032	0.76	20.9	758	6.4	6.4	0.04
L04 S041	3.51	6.7	31.1	80	0.12	18.0	26.8	0.78	1147	1.45	0.055	1.26	61.7	412	8.4	13.7	0.04
L04 S042	2.61	5.0	23.1	35	0.07	11.5	20.6	0.69	613	0.77	0.035	0.80	40.6	235	7.0	7.9	<0.02
L04 S043	1.93	3.6	17.3	40	0.05	7.5	13.3	0.48	255	0.56	0.032	0.80	23.8	310	3.7	5.4	0.04
L04 S044	3.09	5.6	27.6	50	0.09	10.0	25.5	0.55	1450	1.20	0.031	1.18	44.4	408	8.9	10.5	0.04
L04 S045	2.94	5.0	26.3	45	0.15	12.5	17.9	0.77	617	1.41	0.031	0.90	42.2	787	7.7	10.4	0.04
L04 S046	5.85	11.8	54.3	210	0.25	48.0	37.1	0.71	4274	4.86	0.056	2.30	101.2	1005	16.4	20.0	0.10
L04 S047	2.72	4.9	25.1	25	0.10	10.5	18.9	0.54	375	1.64	0.029	1.10	31.9	313	8.2	9.0	0.06
L04 S048	2.02	3.8	19.4	25	0.07	10.0	20.3	0.37	301	2.04	0.026	0.96	25.0	339	5.9	8.5	0.06
L05 S008	3.54	5.2	32.5	65	0.09	6.5	24.3	0.64	627	1.99	0.029	1.06	32.9	659	9.6	8.3	0.08
L05 S009	2.03	4.6	19.1	15	0.03	3.5	7.5	0.34	282	1.11	0.026	0.42	7.5	333	7.3	3.3	0.02
L05 S010	1.69	4.5	15.7	15	0.05	4.5	8.4	0.25	785	1.26	0.025	0.66	7.2	315	5.2	4.4	0.04
L05 S011	3.41	5.8	32.0	65	0.08	16.0	30.2	0.56	1238	1.57	0.030	1.12	36.1	244	8.7	10.6	0.06
L05 S012	2.11	4.7	20.7	30	0.05	5.5	13.1	0.34	622	0.71	0.027	0.28	10.4	489	6.1	11.8	0.06
L05 S013	2.39	5.2	23.0	20	0.04	5.5	12.8	0.48	424	1.09	0.026	0.60	21.2	652	5.5	8.5	0.06

APPENDIX I - Soil Geochemistry

Sample ID	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	0.05	0.1	0.2	0.2	2.0	0.1	0.02	0.1	0.005	0.02	0.1	2	0.1	0.1	2.0	1.00
L04 S023	1.14	4.4	0.3	0.3	32.0	<0.05	0.02	0.9	0.078	0.06	0.5	68	0.1	5.8	54.9	2.23
L04 S025	0.98	2.8	0.2	0.4	10.5	<0.05	0.02	1.2	0.064	0.06	0.2	84	0.2	2.0	91.1	1.73
L04 S026	0.82	1.7	0.1	0.3	7.0	<0.05	<0.02	0.7	0.040	0.04	0.1	40	0.1	1.7	40.0	0.76
L04 S027	0.88	1.2	<0.1	0.2	6.5	<0.05	<0.02	0.3	0.037	0.02	<0.1	36	0.3	0.8	26.7	0.63
L04 S028	1.10	2.5	0.1	0.4	12.5	<0.05	0.02	0.4	0.036	0.08	0.2	62	0.2	2.0	112.6	0.68
L04 S029	1.08	1.6	0.1	0.2	16.0	<0.05	<0.02	0.5	0.037	0.04	0.2	40	0.1	1.5	47.4	0.59
L04 S030	1.02	2.0	0.2	0.2	16.5	<0.05	<0.02	1.0	0.051	0.04	0.2	40	0.1	1.8	48.3	1.46
L04 S032	0.36	0.7	0.1	0.3	7.0	<0.05	<0.02	<0.1	0.028	0.04	0.1	24	<0.1	1.0	21.1	0.40
L04 S033	0.56	1.7	0.1	0.2	7.5	<0.05	<0.02	0.7	0.037	0.04	0.1	40	0.1	1.6	36.6	0.82
L04 S034	0.74	2.0	0.2	0.2	11.5	<0.05	<0.02	0.8	0.039	0.04	0.2	42	0.1	1.9	39.4	0.65
L04 S035	0.78	2.7	0.2	0.2	21.0	<0.05	<0.02	0.6	0.058	0.04	0.4	46	0.1	4.0	59.5	1.06
L04 S036	2.20	6.5	0.9	0.4	77.5	<0.05	0.06	2.2	0.050	0.12	1.0	66	0.3	17.0	70.6	2.62
L04 S037	0.90	1.9	0.1	0.2	8.0	<0.05	<0.02	0.7	0.036	0.04	0.2	40	0.1	1.6	37.4	0.86
L04 S038	1.22	1.6	0.1	0.2	10.5	<0.05	<0.02	0.5	0.025	0.04	0.2	40	0.3	1.5	38.5	0.52
L04 S039	2.54	9.0	0.8	0.4	89.0	<0.05	0.06	2.2	0.055	0.12	1.1	78	0.3	19.0	79.0	2.84
L04 S040	0.82	2.9	0.2	0.3	27.5	0.05	0.06	1.1	0.066	0.06	0.2	74	0.2	2.3	75.9	1.72
L04 S041	1.12	5.4	0.8	0.3	64.0	0.10	0.14	2.9	0.078	0.14	1.6	84	0.3	10.5	118.6	2.13
L04 S042	0.70	4.3	0.4	0.2	28.0	<0.05	0.06	3.0	0.085	0.08	0.7	74	0.1	6.3	65.0	2.42
L04 S043	0.80	3.2	0.4	0.2	31.5	0.05	0.08	1.7	0.067	0.06	0.6	56	0.1	4.6	54.9	2.03
L04 S044	1.18	4.0	0.5	0.3	49.5	<0.05	0.12	2.3	0.068	0.10	1.2	76	0.1	5.7	119.5	1.93
L04 S045	1.28	4.5	0.4	0.2	37.0	<0.05	0.08	3.5	0.068	0.12	0.5	68	0.2	7.1	78.8	1.79
L04 S046	2.56	13.4	2.2	0.5	129.0	0.10	0.28	4.5	0.078	0.34	5.9	124	0.3	36.9	187.3	3.56
L04 S047	0.72	3.0	0.5	0.3	25.0	<0.05	0.08	3.1	0.048	0.10	0.7	58	0.1	3.4	71.9	1.29
L04 S048	0.44	2.0	0.5	0.2	31.5	<0.05	0.06	2.5	0.039	0.08	0.8	40	0.1	3.1	84.2	1.09
L05 S008	44.10	3.7	0.4	0.3	43.5	<0.05	0.12	1.2	0.055	0.08	0.4	86	0.1	6.2	128.8	2.20
L05 S009	1.30	2.4	0.1	0.3	8.0	<0.05	0.04	0.8	0.057	0.04	0.2	70	<0.1	2.4	43.8	1.76
L05 S010	0.66	2.1	0.1	0.3	11.5	<0.05	0.04	0.9	0.044	0.06	0.2	54	<0.1	2.2	55.3	1.11
L05 S011	2.10	5.1	0.6	0.3	40.5	<0.05	0.10	2.8	0.065	0.14	0.4	74	0.1	20.8	97.7	1.97
L05 S012	1.16	1.8	0.1	0.3	8.0	<0.05	0.02	0.9	0.007	0.08	0.2	48	<0.1	1.4	105.6	0.68
L05 S013	0.96	2.1	0.2	0.3	10.0	<0.05	0.04	1.2	0.035	0.10	0.3	66	0.1	1.6	66.6	0.59

APPENDIX I - Soil Geochemistry

Sample	Lab	Analytical Method --->		ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
		UTM		Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu
ID	Report #	East	North	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L05 S017	AK2011-1135	609297	5820934	2	<0.1	1.21	11.6	59.0	0.2	0.12	0.28	0.16	10.3	6.9	24.0	12.4
L05 S019	AK2011-1135	609226	5820864	2	0.1	2.42	10.1	49.0	0.2	0.08	0.38	0.19	7.1	29.0	313.0	53.4
L05 S020	AK2011-1135	609191	5820828	2	0.2	1.34	9.8	52.5	0.1	0.10	0.27	0.24	8.3	9.2	26.0	24.1
L05 S022	AK2011-1135	609120	5820758	5	0.3	1.26	7.9	61.5	0.1	0.08	0.35	0.23	9.5	10.4	30.5	22.7
L05 S023	AK2011-1135	609085	5820722	4	0.2	1.52	7.7	39.0	0.2	0.08	0.38	0.18	11.2	11.7	36.0	32.9
L05 S024	AK2011-1135	609050	5820687	1	0.2	1.44	9.9	46.0	0.2	0.08	0.44	0.17	18.8	12.3	38.5	37.4
L05 S025	AK2011-1135	609014	5820651	2	<0.1	1.66	10.3	69.5	0.3	0.10	0.39	0.22	16.1	11.5	37.5	35.6
L05 S026	AK2011-1135	608979	5820616	1	<0.1	1.27	6.6	42.0	0.1	0.08	0.26	0.15	10.5	7.6	29.0	21.2
L05 S028	AK2011-1135	608908	5820545	1	0.1	1.22	5.0	47.0	0.2	0.08	0.23	0.19	7.8	7.9	26.5	18.7
L05 S030	AK2011-1135	608837	5820475	<1	0.1	1.57	4.7	32.5	0.3	0.10	0.37	0.14	8.1	14.0	29.5	25.6
L05 S031	AK2011-1135	608802	5820439	<1	0.1	1.52	8.9	96.0	0.2	0.14	0.45	0.30	12.1	9.5	31.0	23.7
L05 S032	AK2011-1135	608767	5820404	3	0.2	2.16	25.7	73.0	0.4	0.14	0.78	0.39	12.5	22.5	27.5	71.7
L05 S034	AK2011-1135	608696	5820333	1	<0.1	0.72	7.7	36.5	<0.1	0.10	0.35	0.20	10.6	4.9	20.0	13.2
L05 S035	AK2011-1135	608661	5820298	<1	0.2	0.86	3.8	36.0	<0.1	0.10	0.14	0.12	10.0	4.6	18.0	6.8
L05 S036	AK2011-1135	608625	5820263	<1	0.4	1.78	4.6	125.0	0.3	0.14	0.19	0.23	13.2	9.9	32.0	25.0
L05 S037	AK2011-1135	608590	5820227	1	0.1	1.34	19.1	43.5	0.1	0.16	0.15	0.12	10.0	7.4	26.0	16.9
L05 S038	AK2011-1135	608555	5820192	1	0.1	1.05	9.5	61.0	0.2	0.12	0.17	0.29	14.1	8.3	25.5	20.3
L05 S039	AK2011-1135	608519	5820156	1	0.2	1.56	8.6	45.0	0.2	0.10	0.26	0.25	14.6	10.9	32.5	23.9
L05 S040	AK2011-1135	608484	5820121	2	0.4	0.89	21.1	56.5	<0.1	0.12	0.25	0.22	8.2	6.3	21.5	18.3
L05 S043	AK2011-1135	608378	5820015	3	0.2	1.31	18.2	52.0	0.2	0.08	0.17	0.10	9.8	8.4	10.5	38.5
L05 S044	AK2011-1135	608342	5819980	5	0.1	1.44	28.8	45.0	0.2	0.10	0.25	0.08	13.7	10.1	39.0	36.5
L05 S045	AK2011-1135	608307	5819944	2	<0.1	1.05	6.4	43.5	0.2	0.10	0.38	0.10	12.4	6.0	21.5	15.0
L05 S046	AK2011-1135	608272	5819909	4	0.2	1.63	19.3	59.5	0.2	0.12	0.63	0.28	12.3	10.3	42.0	29.5
L05 S047	AK2011-1135	608236	5819874	4	<0.1	0.96	8.5	29.5	0.1	0.12	0.37	0.31	9.3	8.2	24.0	16.3
L05 S048	AK2011-1135	608201	5819838	2	0.1	1.32	13.1	28.0	0.2	0.10	0.35	0.16	8.2	7.3	33.5	21.4
L05 S049	AK2011-1135	608166	5819803	2	<0.1	1.35	16.5	55.0	0.2	0.12	0.44	0.33	20.7	15.2	43.5	44.2
L05 S050	AK2011-1135	608130	5819768	6	0.2	1.09	7.4	99.5	0.2	0.10	0.20	0.71	12.7	6.8	24.0	15.0
L05 S051	AK2011-1135	608095	5819732	1	<0.1	1.04	5.9	44.0	0.1	0.10	0.17	0.29	17.8	7.1	25.5	20.2
L05 S052	AK2011-1135	608060	5819697	4	0.6	4.03	16.9	278.5	1.0	0.36	1.28	1.12	55.8	21.4	78.5	83.0
L05 S053	AK2011-1135	608024	5819662	<1	0.2	1.20	8.4	71.5	0.2	0.10	0.23	0.28	9.8	9.4	25.5	15.1

APPENDIX I - Soil Geochemistry

Sample ID	Fe	Ga	Ge	Hg	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	S
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	%	ppm	ppm	ppb	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
	0.01	0.0	0.0	5	0.01	0.5	1.0	0.01	5	0.05	0.001	0.05	0.2	1.0	0.2	0.1	0.01
L05 S017	1.82	4.2	17.8	20	0.04	5.0	9.8	0.35	387	0.87	0.024	0.62	14.5	366	4.9	6.3	0.06
L05 S019	3.58	6.9	33.9	40	0.05	3.5	22.7	2.43	1051	0.74	0.027	0.66	140.2	637	6.5	8.8	0.04
L05 S020	2.34	4.2	22.2	40	0.04	4.0	12.4	0.53	435	1.42	0.026	0.76	16.6	559	6.8	7.1	0.04
L05 S022	2.08	4.2	20.0	45	0.05	4.5	11.5	0.49	682	1.09	0.049	0.68	19.1	528	5.7	5.6	0.06
L05 S023	2.49	4.5	24.0	35	0.05	4.5	14.8	0.62	367	1.02	0.027	0.70	22.5	338	3.7	6.4	0.04
L05 S024	2.44	4.3	23.6	15	0.06	7.5	13.0	0.63	563	1.26	0.028	0.62	26.7	354	4.7	5.9	0.04
L05 S025	2.63	5.1	26.4	35	0.07	7.5	12.3	0.53	593	1.45	0.028	0.70	24.7	551	6.7	6.8	0.06
L05 S026	2.22	4.1	22.6	10	0.04	5.5	12.2	0.51	273	1.15	0.025	0.64	18.0	367	3.7	5.1	0.06
L05 S028	2.01	4.1	20.6	15	0.03	3.5	9.1	0.42	958	0.96	0.025	0.50	18.5	613	3.0	7.8	0.06
L05 S030	2.97	8.6	29.5	20	0.03	4.0	9.6	0.44	686	0.79	0.028	0.66	16.5	544	4.4	7.5	0.06
L05 S031	2.50	5.8	24.2	45	0.07	6.0	15.3	0.44	1018	1.07	0.026	1.12	22.6	579	7.3	10.4	0.06
L05 S032	4.74	9.7	45.1	60	0.05	5.5	18.3	0.73	1685	1.38	0.027	0.90	17.8	1070	8.0	6.8	0.08
L05 S034	1.46	3.3	14.6	25	0.04	5.0	7.3	0.27	248	0.86	0.026	0.68	11.8	252	4.7	4.2	0.04
L05 S035	1.37	3.4	13.7	25	0.03	5.0	8.5	0.23	309	0.51	0.025	0.50	9.5	262	3.9	4.3	0.06
L05 S036	2.15	6.2	22.1	35	0.05	6.5	12.2	0.36	2095	0.68	0.027	0.72	21.0	669	6.5	7.8	0.06
L05 S037	2.34	5.3	23.7	30	0.04	5.0	14.5	0.28	482	1.34	0.027	1.02	14.9	320	5.8	5.6	0.06
L05 S038	2.03	3.4	20.5	25	0.05	7.0	10.9	0.35	505	1.71	0.025	0.52	22.9	512	5.3	6.2	0.04
L05 S039	2.47	4.4	24.4	15	0.06	7.0	17.1	0.62	275	0.91	0.029	0.68	26.3	605	7.6	6.6	0.06
L05 S040	1.72	4.1	17.2	40	0.04	4.0	9.1	0.30	194	0.78	0.027	0.74	11.7	473	5.6	5.3	0.08
L05 S043	2.05	4.0	20.8	25	0.04	4.5	17.5	0.23	177	0.58	0.043	0.26	8.8	432	1.0	9.4	0.08
L05 S044	2.38	4.6	25.3	20	0.04	7.0	15.4	0.54	254	0.50	0.031	0.50	31.5	295	7.1	6.3	0.02
L05 S045	1.65	3.3	17.3	30	0.04	6.5	13.0	0.29	139	0.60	0.032	0.74	16.9	350	4.5	6.0	0.04
L05 S046	2.55	4.9	25.8	35	0.04	7.0	21.8	0.55	325	0.88	0.033	0.86	31.5	501	4.7	7.2	0.04
L05 S047	1.80	4.3	18.9	25	0.05	4.5	12.2	0.34	235	0.82	0.059	0.76	14.3	747	2.3	7.8	0.04
L05 S048	2.25	4.3	23.5	20	0.04	4.0	18.1	0.47	176	1.01	0.030	0.72	21.2	244	3.2	5.1	0.04
L05 S049	2.58	4.5	26.9	35	0.09	9.5	14.0	0.68	715	1.71	0.032	0.56	35.2	519	6.8	6.5	0.02
L05 S050	1.75	3.9	18.8	25	0.04	6.0	9.5	0.29	317	0.56	0.030	0.58	15.7	933	3.8	7.1	0.04
L05 S051	1.86	3.6	20.0	15	0.04	9.0	16.3	0.42	180	1.17	0.032	0.60	17.5	399	7.7	6.4	0.06
L05 S052	4.66	11.2	49.8	115	0.20	34.0	30.8	0.73	2611	3.85	0.069	1.86	74.5	815	12.9	20.4	0.10
L05 S053	2.22	4.5	22.4	25	0.03	5.0	12.7	0.39	487	1.66	0.032	0.66	17.2	698	5.2	7.7	0.04

APPENDIX I - Soil Geochemistry

Sample ID	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	0.05	0.1	0.2	0.2	2.0	0.1	0.02	0.1	0.005	0.02	0.1	2	0.1	0.1	2.0	1.00
L05 S017	0.82	1.6	0.2	0.3	13.5	<0.05	0.04	0.8	0.028	0.08	0.2	50	0.1	1.6	81.7	0.55
L05 S019	0.80	1.9	0.2	0.2	27.5	<0.05	0.06	0.7	0.067	0.10	0.2	120	<0.1	1.8	85.9	0.94
L05 S020	0.86	2.4	0.3	0.2	12.5	<0.05	0.04	1.0	0.065	0.04	0.3	66	0.1	2.4	77.3	1.40
L05 S022	0.80	2.4	0.2	0.2	18.5	<0.05	0.04	0.8	0.066	0.06	0.2	60	0.1	2.3	66.6	0.90
L05 S023	1.04	3.2	0.2	0.2	16.0	<0.05	0.04	1.1	0.071	0.04	0.3	74	<0.1	2.9	67.4	1.65
L05 S024	0.94	3.6	0.3	0.2	24.0	<0.05	0.06	2.1	0.076	0.06	0.5	68	0.1	4.3	57.6	1.83
L05 S025	1.14	3.3	0.3	0.3	22.0	<0.05	0.06	1.1	0.059	0.06	0.5	70	0.1	4.8	69.0	0.97
L05 S026	0.80	2.4	0.2	0.2	11.0	<0.05	0.04	1.4	0.065	0.06	0.3	66	<0.1	2.4	55.2	1.52
L05 S028	0.58	2.2	0.1	0.2	9.0	<0.05	0.04	1.2	0.055	0.06	0.3	54	<0.1	2.0	56.0	1.09
L05 S030	1.18	4.2	0.1	0.4	13.0	<0.05	0.04	1.0	0.105	0.06	0.3	130	0.1	2.6	87.3	2.86
L05 S031	0.80	2.4	0.2	0.3	32.5	<0.05	0.08	1.7	0.070	0.06	0.3	76	0.1	2.0	96.2	1.60
L05 S032	2.24	5.8	0.3	0.5	34.5	<0.05	0.12	1.1	0.105	0.06	0.4	140	0.1	4.9	143.1	2.29
L05 S034	0.96	1.6	0.2	0.2	19.0	<0.05	0.06	1.4	0.049	0.04	0.2	44	<0.1	1.8	39.3	1.16
L05 S035	0.52	1.4	0.1	0.3	5.0	<0.05	0.02	1.2	0.029	0.06	0.2	40	<0.1	1.3	42.8	0.70
L05 S036	0.68	2.8	0.2	0.3	9.0	<0.05	0.04	1.8	0.043	0.08	0.3	66	0.1	2.2	74.9	1.09
L05 S037	1.00	2.2	0.1	0.3	7.5	<0.05	0.06	1.4	0.051	0.06	0.3	78	0.1	1.5	45.7	1.29
L05 S038	1.36	1.7	0.3	0.2	8.0	<0.05	0.04	1.6	0.034	0.08	0.4	42	<0.1	1.7	87.1	0.57
L05 S039	0.82	2.7	0.2	0.2	9.5	<0.05	0.04	2.2	0.054	0.04	0.4	58	<0.1	2.6	100.7	1.34
L05 S040	0.94	2.1	0.3	0.3	14.0	<0.05	0.04	0.8	0.054	0.06	0.2	54	0.1	2.1	63.1	0.91
L05 S043	0.98	3.8	0.1	0.2	12.0	<0.05	0.02	0.8	0.003	0.08	0.1	60	0.1	1.6	87.2	0.79
L05 S044	1.38	2.8	0.1	0.2	9.0	<0.05	0.04	1.9	0.037	0.08	0.2	70	0.2	2.0	55.0	1.09
L05 S045	0.60	1.7	0.1	0.2	20.0	<0.05	0.04	1.8	0.033	0.06	0.3	40	0.1	1.7	51.9	1.18
L05 S046	1.08	3.2	0.2	0.3	30.5	<0.05	0.08	1.7	0.053	0.06	0.3	72	0.1	3.3	89.3	1.74
L05 S047	0.76	2.5	0.2	0.3	16.5	<0.05	0.02	1.1	0.071	0.06	0.2	54	<0.1	2.1	77.6	1.42
L05 S048	1.14	2.8	0.1	0.3	15.0	<0.05	0.04	1.1	0.056	0.04	0.2	68	<0.1	2.4	78.5	1.70
L05 S049	1.52	4.5	0.3	0.2	21.5	<0.05	0.06	2.8	0.064	0.08	0.4	68	<0.1	5.6	67.0	1.60
L05 S050	0.56	2.1	0.1	0.2	11.5	<0.05	0.04	1.7	0.037	0.06	0.3	46	<0.1	1.9	88.8	1.00
L05 S051	0.80	1.9	0.2	0.2	9.0	<0.05	0.04	2.5	0.032	0.06	0.3	40	<0.1	2.1	77.1	0.77
L05 S052	1.66	7.4	1.6	0.6	88.0	<0.05	0.18	4.4	0.063	0.22	3.9	86	0.2	18.1	140.9	2.45
L05 S053	1.20	2.4	0.2	0.2	8.5	<0.05	0.04	1.6	0.048	0.08	0.2	64	0.1	1.8	85.9	1.68

Sample ID	Lab Report #	UTM East	UTM North	Au ppb	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm
Analytical Method --->				ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L05 S054	AK2011-1135	607989	5819626	<1	0.2	1.38	16.1	73.5	0.3	0.12	0.31	0.56	9.4	12.2	28.5	11.7
L05 S055	AK2011-1135	607954	5819591	1	0.2	1.56	23.5	53.0	0.2	0.16	0.25	0.50	11.3	13.3	35.5	48.1
L05 S056	AK2011-1135	607918	5819555	1	0.5	1.49	11.2	83.5	0.3	0.16	0.36	0.65	23.2	10.4	33.5	36.4
L05 S057	AK2011-1135	607883	5819520	<1	<0.1	0.78	3.1	36.5	0.1	0.20	0.12	0.12	19.4	3.9	15.0	6.6
L05 S058	AK2011-1135	607847	5819485	1	0.1	0.77	6.4	43.5	<0.1	0.10	0.33	0.35	9.8	5.8	24.5	14.6
L05 S061	AK2011-1135	607741	5819379	2	0.3	1.60	12.6	96.0	0.4	0.22	0.39	0.34	35.9	12.4	35.0	40.5
L05 S062	AK2011-1135	607706	5819343	<1	<0.1	0.33	1.4	22.5	<0.1	0.10	0.03	0.15	10.4	2.4	5.5	2.5
L05 S063	AK2011-1135	607671	5819308	<1	<0.1	0.73	3.2	35.5	0.1	0.12	0.13	0.14	15.4	4.7	15.0	7.4
L06 S025	AK2011-1135	609580	5820651	4	0.2	2.31	16.0	54.5	0.4	0.12	1.08	0.28	18.9	22.3	53.5	80.9
L06 S027	AK2011-1135	609509	5820581	<1	0.1	1.50	8.5	70.0	0.2	0.12	0.25	0.26	11.1	11.8	31.0	17.8
L06 S028	AK2011-1135	609474	5820545	2	0.1	1.87	9.5	53.0	0.2	0.10	0.33	0.21	12.7	12.0	39.5	39.2
L06 S029	AK2011-1135	609438	5820510	1	0.2	2.00	11.5	50.0	0.3	0.12	0.39	0.21	10.3	9.9	40.0	35.1
L06 S030	AK2011-1135	609403	5820475	5	0.1	1.77	29.7	81.0	0.3	0.14	0.28	0.29	11.4	13.1	34.0	22.5
L06 S031	AK2011-1135	609368	5820439	<1	0.1	1.77	5.3	80.5	0.3	0.12	0.30	0.22	11.9	11.1	37.0	20.5
L06 S032	AK2011-1135	609332	5820404	<1	<0.1	1.14	4.6	36.5	0.1	0.08	0.31	0.14	9.9	5.9	24.0	11.6
L06 S033	AK2011-1135	609297	5820369	2	0.5	2.05	11.0	118.5	0.4	0.18	0.58	0.82	25.6	16.7	60.0	63.6
L06 S035	AK2011-1135	609226	5820298	4	<0.1	1.21	6.8	58.5	0.1	0.14	0.30	0.44	14.7	9.7	36.0	21.7
L06 S036	AK2011-1135	609191	5820263	2	<0.1	1.14	5.7	38.5	0.2	0.08	0.24	0.29	15.0	8.8	32.5	18.1
L06 S037	AK2011-1135	609156	5820227	3	0.2	1.66	8.7	55.5	0.2	0.14	0.29	0.20	12.5	11.0	32.0	29.4
L06 S038	AK2011-1135	609120	5820192	5	<0.1	1.09	5.8	57.0	0.1	0.08	0.26	0.29	11.4	7.0	24.5	12.8
L06 S039	AK2011-1135	609085	5820156	1	0.3	1.49	10.2	67.0	0.3	0.14	0.59	0.32	20.2	11.6	41.0	46.2
L06 S040	AK2011-1135	609050	5820121	2	0.3	1.72	7.7	80.5	0.3	0.12	0.24	0.26	30.2	17.2	46.5	50.5
L06 S041	AK2011-1135	609014	5820086	2	0.2	1.02	4.3	34.5	<0.1	0.08	0.23	0.19	11.5	5.6	26.0	19.0
L06 S042	AK2011-1135	608979	5820050	<1	<0.1	1.07	6.9	42.5	0.1	0.08	0.23	0.16	11.2	6.7	26.0	22.1
L06 S043	AK2011-1135	608944	5820015	3	0.3	1.08	3.9	67.0	0.1	0.12	0.16	0.28	13.2	8.8	19.5	11.9
L06 S044	AK2011-1135	608908	5819980	4	0.4	1.61	34.6	89.0	0.4	0.12	0.39	0.17	24.2	12.4	55.5	45.5
L06 S045	AK2011-1135	608873	5819944	4	0.1	1.29	10.1	54.5	0.2	0.08	0.31	0.15	10.9	10.6	27.0	15.6
L06 S046	AK2011-1135	608837	5819909	15	0.2	1.20	45.7	58.5	0.2	0.08	0.47	0.16	20.7	13.1	28.5	38.4
L06 S047	AK2011-1135	608802	5819874	10	0.3	1.41	38.3	74.0	0.3	0.08	0.49	0.16	24.7	11.9	37.5	41.3
L06 S052	AK2011-1135	608625	5819697	8	0.6	1.65	15.9	59.5	0.2	0.10	0.44	0.13	14.3	9.8	45.5	44.0

APPENDIX I - Soil Geochemistry

Sample ID	Fe	Ga	Ge	Hg	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	S
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	%	ppm	ppm	ppb	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
	0.01	0.0	0.0	5	0.01	0.5	1.0	0.01	5	0.05	0.001	0.05	0.2	1.0	0.2	0.1	0.01
L05 S054	2.66	5.5	27.2	20	0.04	4.5	12.6	0.25	1062	2.37	0.031	0.58	12.4	1792	4.3	7.2	0.06
L05 S055	3.05	4.9	30.4	25	0.05	5.5	17.1	0.54	293	4.19	0.030	0.56	35.8	1200	6.4	9.1	0.06
L05 S056	2.47	4.4	25.8	40	0.08	11.5	23.6	0.47	695	1.68	0.032	0.90	35.1	305	6.6	10.8	0.06
L05 S057	1.45	3.7	15.2	15	0.04	10.0	12.2	0.24	95	0.66	0.029	0.70	11.1	638	4.7	6.2	0.06
L05 S058	1.48	3.2	15.2	20	0.04	5.0	8.7	0.30	329	0.83	0.029	0.68	14.9	395	8.7	6.1	0.06
L05 S061	2.65	4.6	27.3	60	0.12	19.0	20.1	0.50	534	1.33	0.032	0.94	38.3	259	9.2	14.4	0.06
L05 S062	0.66	2.1	6.9	5	0.02	5.5	2.5	0.05	95	0.49	0.030	0.40	3.6	162	2.2	3.3	0.04
L05 S063	1.58	3.2	16.4	15	0.04	8.0	13.4	0.25	95	0.83	0.028	0.58	13.2	393	4.9	5.5	0.06
L06 S025	3.96	7.4	39.9	50	0.08	8.5	19.9	1.02	961	1.91	0.037	0.92	37.7	731	7.3	5.7	0.06
L06 S027	2.63	5.8	26.8	20	0.05	5.5	13.2	0.38	899	1.08	0.031	0.70	19.2	504	4.7	7.1	0.04
L06 S028	2.98	5.3	30.4	25	0.06	6.5	17.5	0.63	327	1.57	0.033	0.82	25.6	314	4.3	8.9	0.06
L06 S029	2.96	5.8	30.1	30	0.06	5.0	15.1	0.61	285	1.26	0.030	0.98	29.7	881	4.5	8.0	0.08
L06 S030	2.53	5.5	26.9	30	0.06	5.0	12.5	0.50	766	1.19	0.030	1.04	26.8	519	5.8	11.0	0.06
L06 S031	2.47	5.7	24.8	30	0.06	5.5	14.5	0.43	649	1.01	0.034	0.76	25.5	694	5.1	9.5	0.06
L06 S032	1.91	4.4	19.8	10	0.03	5.0	10.1	0.37	191	0.74	0.031	0.74	12.8	557	2.8	5.2	0.04
L06 S033	3.39	5.9	34.3	65	0.11	13.0	17.8	0.64	1095	1.75	0.034	1.18	50.7	255	7.8	10.2	0.06
L06 S035	2.19	4.3	22.7	10	0.06	7.5	12.0	0.53	460	1.10	0.032	0.52	23.1	846	4.6	5.7	0.04
L06 S036	2.03	3.5	21.1	10	0.05	7.0	11.3	0.47	272	1.00	0.033	0.66	21.8	500	3.6	7.7	<0.02
L06 S037	2.77	5.2	29.5	25	0.05	6.0	17.2	0.57	438	1.31	0.032	0.78	26.0	596	5.3	9.5	0.04
L06 S038	1.80	3.8	19.0	15	0.03	6.0	11.2	0.40	222	0.84	0.030	0.64	15.8	521	4.2	5.6	0.04
L06 S039	2.50	4.3	25.7	40	0.08	10.5	16.8	0.50	574	1.27	0.034	1.10	33.2	249	6.4	8.1	0.04
L06 S040	2.67	5.0	27.5	45	0.06	16.0	17.8	0.71	887	1.67	0.032	0.58	34.5	395	8.2	8.2	0.04
L06 S041	1.81	3.6	18.9	20	0.03	6.0	12.9	0.42	178	0.97	0.031	0.66	16.4	192	3.1	5.5	0.04
L06 S042	2.00	3.6	21.6	15	0.03	6.0	12.5	0.43	228	1.29	0.031	0.54	17.6	500	4.3	4.2	0.04
L06 S043	1.62	3.9	16.8	45	0.04	6.0	12.5	0.23	814	1.30	0.029	0.58	11.1	615	3.8	6.4	0.04
L06 S044	2.64	5.1	29.4	35	0.09	13.5	17.2	0.50	592	1.15	0.029	0.70	31.5	275	6.8	6.6	<0.02
L06 S045	2.39	4.8	41.2	15	0.06	5.5	13.3	0.48	624	0.74	0.025	0.54	17.1	868	4.2	7.7	0.02
L06 S046	2.22	4.1	37.1	25	0.08	9.5	11.4	0.46	563	1.11	0.054	0.72	26.9	309	4.2	6.9	0.06
L06 S047	2.39	4.3	37.7	65	0.10	12.0	13.7	0.48	480	1.22	0.028	0.80	29.1	312	6.4	8.0	0.04
L06 S052	2.59	5.6	37.8	30	0.08	7.5	20.3	0.57	292	0.71	0.030	0.94	31.7	626	8.3	12.3	0.04

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Sb ppm 0.05	ICP/MS45 Sc ppm 0.1	ICP/MS45 Se ppm 0.2	ICP/MS45 Sn ppm 0.2	ICP/MS45 Sr ppm 2.0	ICP/MS45 Ta ppm 0.1	ICP/MS45 Te ppm 0.02	ICP/MS45 Th ppm 0.1	ICP/MS45 Ti % 0.005	ICP/MS45 Tl ppm 0.02	ICP/MS45 U ppm 0.1	ICP/MS45 V ppm 2	ICP/MS45 W ppm 0.1	ICP/MS45 Y ppm 0.1	ICP/MS45 Zn ppm 2.0	ICP/MS45 Zr ppm 1.00
L05 S054	1.14	2.4	0.2	0.3	13.0	<0.05	0.04	1.4	0.043	0.10	0.3	82	0.1	1.8	105.2	0.81
L05 S055	2.72	3.4	0.7	0.3	12.0	<0.05	0.06	2.2	0.053	0.12	0.4	76	0.1	2.6	135.7	1.41
L05 S056	1.10	3.4	0.5	0.2	26.0	<0.05	0.08	3.5	0.042	0.12	0.9	42	0.1	5.6	96.0	1.30
L05 S057	0.14	1.1	0.2	0.2	9.0	<0.05	0.04	2.8	0.020	0.04	0.3	22	<0.1	1.3	44.6	0.51
L05 S058	0.72	1.7	0.2	0.2	17.0	<0.05	0.04	1.4	0.046	0.04	0.3	40	<0.1	1.7	57.8	0.90
L05 S061	0.96	4.3	0.7	0.2	31.0	<0.05	0.10	4.6	0.042	0.16	1.2	38	0.1	10.4	60.8	1.44
L05 S062	0.18	0.6	0.1	0.1	3.0	<0.05	0.02	1.3	0.010	0.02	0.2	16	<0.1	0.7	19.3	0.33
L05 S063	0.22	1.1	0.2	0.2	8.5	<0.05	0.02	2.9	0.023	0.04	0.3	28	0.1	1.4	42.7	0.54
L06 S025	3.76	7.9	0.6	0.4	37.5	<0.05	0.14	1.9	0.130	0.06	0.5	128	0.1	8.6	89.2	3.62
L06 S027	1.04	2.5	0.2	0.3	11.5	<0.05	0.06	1.5	0.058	0.06	0.3	70	<0.1	2.2	124.0	1.29
L06 S028	1.62	3.4	0.3	0.3	17.5	<0.05	0.06	1.7	0.056	0.06	0.3	80	0.1	2.9	86.3	1.84
L06 S029	1.86	3.0	0.3	0.3	17.0	<0.05	0.08	1.7	0.057	0.06	0.3	84	0.1	2.3	97.8	2.10
L06 S030	1.24	2.9	0.2	0.3	12.5	<0.05	0.06	1.5	0.067	0.10	0.3	66	0.1	2.6	121.7	1.98
L06 S031	0.80	2.7	0.2	0.3	14.5	<0.05	0.04	1.1	0.048	0.10	0.3	66	<0.1	2.3	129.7	0.82
L06 S032	0.56	2.3	0.1	0.2	10.5	<0.05	0.04	1.4	0.066	0.04	0.3	64	<0.1	2.4	45.5	2.43
L06 S033	2.12	5.8	0.6	0.3	44.5	<0.05	0.12	3.6	0.068	0.12	0.6	72	0.1	8.9	106.3	3.33
L06 S035	0.98	2.5	0.3	0.2	12.5	<0.05	0.04	2.2	0.061	0.06	0.3	56	<0.1	2.6	86.8	1.20
L06 S036	0.82	2.0	0.2	0.1	12.5	<0.05	0.04	2.2	0.054	0.04	0.3	48	<0.1	2.0	85.9	1.36
L06 S037	1.02	2.7	0.2	0.3	12.5	<0.05	0.06	2.0	0.051	0.08	0.3	66	0.1	2.4	111.3	1.39
L06 S038	0.68	2.0	0.2	0.2	12.5	<0.05	0.06	1.7	0.036	0.06	0.2	50	<0.1	1.9	77.3	1.90
L06 S039	1.72	3.6	0.4	0.2	40.0	<0.05	0.10	2.7	0.057	0.08	0.4	54	0.1	6.7	68.8	2.68
L06 S040	0.94	3.9	0.6	0.2	13.0	<0.05	0.04	2.4	0.041	0.10	0.8	62	0.1	8.6	77.7	0.72
L06 S041	0.70	2.0	0.2	0.2	11.0	<0.05	0.04	1.5	0.047	0.04	0.3	50	<0.1	2.4	59.0	0.99
L06 S042	0.98	2.0	0.2	0.2	11.5	<0.05	0.04	1.6	0.035	0.04	0.3	50	<0.1	2.0	56.2	0.91
L06 S043	0.40	1.5	0.2	0.2	9.5	<0.05	0.04	1.4	0.021	0.10	0.3	34	<0.1	1.5	94.6	0.61
L06 S044	2.02	4.5	0.6	0.2	23.0	0.05	0.04	2.6	0.044	0.06	0.4	64	0.2	8.9	50.4	1.17
L06 S045	0.58	2.6	0.2	0.2	11.5	0.05	0.04	1.7	0.051	0.06	0.2	62	0.1	1.9	52.9	0.99
L06 S046	2.60	4.2	0.5	0.2	28.0	0.10	0.08	3.1	0.057	0.06	0.4	44	0.2	5.8	47.6	2.27
L06 S047	2.68	4.2	0.7	0.2	24.0	0.10	0.04	2.1	0.052	0.06	0.4	56	0.2	7.3	51.8	1.39
L06 S052	0.60	2.7	0.2	0.3	24.0	0.05	0.04	2.4	0.070	0.06	0.3	82	0.1	2.1	72.7	1.59

APPENDIX I - Soil Geochemistry

Sample ID	Lab Report #	UTM East	UTM North	Au ppb	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm
	Analytical Method --->			ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L06 S053	AK2011-1135	608590	5819662	6	0.1	1.89	20.3	76.5	0.4	0.10	0.32	0.10	14.8	12.3	50.5	42.2
L06 S054	AK2011-1135	608555	5819626	8	0.2	1.99	13.5	104.0	0.3	0.08	0.39	0.15	14.2	10.8	78.0	22.7
L06 S055	AK2011-1135	608519	5819591	6	0.3	0.77	16.6	77.5	0.1	0.08	0.34	0.47	15.4	6.2	16.0	15.3
L06 S056	AK2011-1135	608484	5819555	5	<0.1	0.62	4.7	33.5	<0.1	0.06	0.12	0.48	14.4	2.6	15.5	4.9
L06 S057	AK2011-1135	608449	5819520	6	0.2	1.39	8.5	78.5	0.3	0.12	0.35	0.21	29.9	11.0	38.5	26.9
L06 S058	AK2011-1135	608413	5819485	6	0.1	0.68	5.6	25.5	<0.1	0.06	0.19	0.24	14.0	3.9	21.5	8.5
L06 S059	AK2011-1135	608378	5819449	4	0.2	1.20	9.5	55.0	0.2	0.08	0.16	0.13	11.7	12.0	50.0	37.8
L06 S060	AK2011-1135	608342	5819414	3	0.2	0.69	15.6	67.5	<0.1	0.06	0.11	0.63	10.2	5.6	15.5	8.2
L06 S061	AK2011-1135	608307	5819379	3	0.2	0.79	10.9	44.0	<0.1	0.08	0.20	0.35	10.4	4.1	20.0	7.5
L06 S062	AK2011-1135	608272	5819343	4	0.2	1.02	21.2	70.5	0.2	0.14	0.17	0.33	10.0	7.9	30.5	18.9
L06 S063	AK2011-1135	608236	5819308	4	0.1	0.52	6.7	30.5	<0.1	0.06	0.23	0.18	11.8	4.5	18.0	7.8
L06 S064	AK2011-1135	608201	5819273	3	0.3	0.54	10.3	41.0	0.1	0.10	0.12	0.33	18.4	3.2	9.5	16.2
L06 S065	AK2011-1135	608166	5819237	6	<0.1	0.82	10.7	71.0	0.1	0.10	0.11	0.46	17.0	5.3	14.0	3.8
L06 S066	AK2011-1135	608130	5819202	2	0.1	0.82	7.5	41.0	<0.1	0.18	0.22	0.17	14.2	5.7	19.5	11.3
L06 S067	AK2011-1135	608095	5819167	1	0.1	0.61	7.5	47.5	<0.1	0.10	0.09	0.18	12.7	5.0	14.5	6.6
L06 S068	AK2011-1135	608060	5819131	1	<0.1	0.87	4.4	49.5	0.2	0.10	0.08	0.12	13.2	5.3	17.5	5.7
L06 S069	AK2011-1135	608024	5819096	1	0.1	1.17	7.3	101.5	0.2	0.14	0.15	0.33	14.3	6.0	26.0	5.6
L06 S070	AK2011-1135	607989	5819060	1	<0.1	0.89	3.4	54.0	0.1	0.12	0.11	0.13	15.4	3.5	17.5	6.6
L06 S071	AK2011-1135	607954	5819025	1	0.2	1.05	7.6	57.0	0.2	0.10	0.07	0.67	14.5	5.3	22.0	7.1
L06 S072	AK2011-1135	607918	5818990	2	0.4	1.35	7.5	58.5	0.2	0.08	0.29	2.08	10.9	7.4	21.0	28.1
L06 S074	AK2011-1135	607847	5818919	1	<0.1	0.82	3.4	45.5	<0.1	0.08	0.16	0.11	13.4	5.4	18.5	8.4
L06 S075	AK2011-1135	607812	5818884	1	<0.1	0.81	3.5	45.5	0.1	0.08	0.15	0.11	13.4	5.4	18.0	8.3
L06 S076	AK2011-1135	607777	5818848	<1	<0.1	0.45	3.6	25.0	<0.1	0.08	0.10	0.11	9.5	4.2	14.0	7.2
L06 S077	AK2011-1135	607741	5818813	1	0.2	0.60	2.3	38.0	<0.1	0.10	0.16	0.11	16.8	3.4	13.5	5.5
L06 S078	AK2011-1135	607706	5818778	1	0.1	0.95	3.4	38.5	0.2	0.08	0.35	0.10	20.2	7.5	23.0	14.6
L07 S01	AK2011-1135	610994	5821500	1	0.2	1.65	7.4	62.0	0.3	0.12	0.18	0.37	11.1	12.1	21.5	19.3
L07 S02	AK2011-1135	610959	5821465	1	0.1	0.96	31.3	48.0	0.1	0.14	0.08	0.27	11.5	7.7	29.0	26.5
L07 S03	AK2011-1135	610923	5821429	1	0.4	1.47	15.2	104.0	0.2	0.08	0.39	0.27	7.4	13.3	18.0	44.5
L07 S04	AK2011-1135	610888	5821394	2	0.7	1.45	84.5	58.0	0.4	0.06	1.15	0.39	15.9	13.9	17.0	122.0
L07 S05	AK2011-1135	610853	5821359	1	0.1	1.36	71.5	37.5	0.1	0.06	0.36	0.17	9.3	8.6	27.0	32.7

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Fe % 0.01	ICP/MS45 Ga ppm 0.0	ICP/MS45 Ge ppm 0.0	ICP/MS45 Hg ppb 5	ICP/MS45 K % 0.01	ICP/MS45 La ppm 0.5	ICP/MS45 Li ppm 1.0	ICP/MS45 Mg % 0.01	ICP/MS45 Mn ppm 5	ICP/MS45 Mo ppm 0.05	ICP/MS45 Na % 0.001	ICP/MS45 Nb ppm 0.05	ICP/MS45 Ni ppm 0.2	ICP/MS45 P ppm 1.0	ICP/MS45 Pb ppm 0.2	ICP/MS45 Rb ppm 0.1	ICP/MS45 S % 0.01
L06 S053	2.68	5.3	36.9	30	0.08	7.0	16.9	0.59	197	0.68	0.026	1.08	37.4	360	5.2	8.8	0.04
L06 S054	2.84	6.9	37.4	20	0.08	7.0	24.3	0.82	261	0.55	0.052	1.02	48.6	869	2.8	10.6	0.08
L06 S055	1.45	3.4	18.4	25	0.04	8.0	11.4	0.21	230	3.37	0.026	0.44	17.5	224	3.2	7.0	0.04
L06 S056	1.16	3.3	14.3	10	0.04	7.5	6.4	0.17	68	1.16	0.027	0.60	7.3	320	3.8	3.8	0.04
L06 S057	2.45	4.7	16.0	35	0.13	14.0	16.7	0.58	331	1.00	0.034	0.80	29.9	357	6.9	12.1	0.04
L06 S058	1.35	3.1	13.8	10	0.04	7.0	8.0	0.27	97	0.88	0.027	0.72	12.3	255	2.9	4.8	0.04
L06 S059	3.19	4.5	30.4	25	0.05	6.0	24.3	0.48	190	5.23	0.027	0.64	39.2	518	3.1	8.0	0.06
L06 S060	1.26	3.2	11.8	15	0.03	5.0	7.5	0.17	585	1.95	0.026	0.38	9.6	728	2.9	4.4	0.04
L06 S061	1.58	4.0	13.9	25	0.03	5.5	11.6	0.25	103	1.57	0.026	0.62	11.0	489	3.1	6.8	0.04
L06 S062	2.33	4.0	18.8	20	0.05	5.0	13.1	0.31	167	1.68	0.026	0.80	20.7	1235	5.8	6.9	0.04
L06 S063	1.06	2.7	8.8	20	0.04	6.0	7.0	0.20	227	0.74	0.027	0.44	9.9	398	3.2	5.0	0.06
L06 S064	1.41	2.9	10.7	20	0.04	10.0	7.0	0.14	53	1.23	0.025	0.30	13.3	340	4.4	6.3	0.04
L06 S065	1.52	3.8	11.1	15	0.05	8.5	13.2	0.24	204	1.07	0.031	0.52	10.3	942	4.9	7.6	0.04
L06 S066	1.64	3.3	8.3	15	0.05	7.0	14.5	0.30	207	0.92	0.028	0.54	15.6	641	4.6	7.0	0.04
L06 S067	1.31	3.3	7.9	10	0.04	6.5	8.9	0.18	217	0.41	0.027	0.54	9.9	814	4.2	7.3	0.04
L06 S068	1.80	3.8	10.4	20	0.05	7.0	13.2	0.22	126	0.60	0.025	0.72	12.9	1054	5.0	8.6	0.02
L06 S069	2.08	5.2	11.1	30	0.07	7.5	16.4	0.26	176	0.60	0.027	0.94	15.1	2242	5.8	10.8	0.02
L06 S070	1.51	4.2	8.1	20	0.04	8.0	9.7	0.23	118	0.41	0.026	0.70	10.6	502	5.7	5.2	0.04
L06 S071	1.89	5.0	9.6	20	0.05	7.5	14.4	0.27	142	0.55	0.027	0.70	14.3	1110	4.8	8.1	0.02
L06 S072	2.19	4.0	10.6	60	0.07	6.0	30.1	0.40	387	1.91	0.032	0.76	21.6	518	4.6	10.0	0.04
L06 S074	1.53	3.1	7.4	20	0.07	7.0	12.3	0.30	586	0.50	0.027	0.56	14.8	945	3.0	11.9	0.04
L06 S075	1.51	3.0	7.2	20	0.07	7.0	12.3	0.29	580	0.53	0.026	0.56	14.6	934	3.3	11.7	0.04
L06 S076	1.12	2.6	5.1	15	0.04	5.0	5.8	0.14	181	0.86	0.033	0.72	7.6	151	3.4	7.7	0.04
L06 S077	1.20	3.3	5.4	30	0.05	9.0	9.2	0.22	130	0.35	0.031	0.62	9.9	407	5.5	8.2	0.04
L06 S078	1.81	3.6	7.3	20	0.06	11.0	14.4	0.43	289	0.36	0.034	0.72	17.8	350	4.3	10.2	0.04
L07 S01	3.26	6.3	12.5	40	0.05	5.5	12.1	0.25	473	1.87	0.032	0.70	12.5	778	6.7	7.7	0.04
L07 S02	2.70	3.3	10.4	25	0.05	6.0	12.9	0.35	274	4.54	0.031	0.58	29.1	296	7.1	6.0	0.04
L07 S03	2.60	5.5	9.6	40	0.06	3.5	13.2	0.38	935	2.19	0.032	0.72	10.2	672	6.0	6.6	0.06
L07 S04	2.49	5.2	9.4	60	0.05	14.0	19.4	0.37	1059	1.16	0.035	0.50	12.7	394	5.4	6.1	0.06
L07 S05	2.35	3.9	8.3	30	0.05	4.5	20.1	0.45	222	1.39	0.033	0.76	18.1	180	4.8	5.3	0.04

APPENDIX I - Soil Geochemistry

Sample ID	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	0.05	0.1	0.2	0.2	2.0	0.1	0.02	0.1	0.005	0.02	0.1	2	0.1	0.1	2.0	1.00
L06 S053	0.84	3.0	0.2	0.3	20.0	<0.05	0.04	2.6	0.059	0.06	0.4	80	0.1	2.4	55.6	2.15
L06 S054	0.44	3.1	0.3	0.3	16.0	0.05	0.04	2.1	0.100	0.06	0.3	90	0.6	2.4	87.0	1.72
L06 S055	1.84	1.7	0.6	0.3	20.0	<0.05	0.06	1.5	0.011	0.06	0.2	46	0.1	1.7	89.8	1.10
L06 S056	0.34	1.0	0.2	0.2	7.5	<0.05	0.02	1.8	0.025	0.04	0.2	36	<0.1	1.2	35.2	0.57
L06 S057	0.64	3.5	0.5	0.2	21.5	<0.05	0.04	4.7	0.057	0.08	0.7	46	0.1	5.7	54.5	2.02
L06 S058	0.50	1.3	0.3	0.2	14.5	<0.05	<0.02	2.0	0.045	0.02	0.3	36	<0.1	1.5	38.6	0.87
L06 S059	0.76	5.8	0.6	0.3	10.0	<0.05	0.04	1.8	0.025	0.06	0.3	106	0.1	1.7	76.2	0.85
L06 S060	0.62	1.2	0.3	0.2	6.0	<0.05	0.02	1.4	0.020	0.06	0.2	38	<0.1	1.1	67.1	0.46
L06 S061	0.64	1.5	0.3	0.2	11.0	<0.05	0.02	1.3	0.037	0.04	0.2	52	<0.1	1.3	61.8	0.72
L06 S062	0.88	2.0	0.6	0.2	13.5	<0.05	0.06	1.9	0.044	0.06	0.3	58	0.1	1.6	86.3	1.18
L06 S063	0.38	1.0	0.3	0.1	16.0	<0.05	0.02	1.1	0.025	0.02	0.2	26	<0.1	1.1	37.3	0.42
L06 S064	1.46	1.2	0.5	0.2	11.5	<0.05	0.04	1.6	0.005	0.04	0.3	20	<0.1	1.3	50.4	0.36
L06 S065	0.14	0.9	0.2	0.2	9.5	<0.05	<0.02	2.0	0.016	0.06	0.2	22	<0.1	1.1	84.8	0.43
L06 S066	0.36	1.2	0.3	0.2	16.5	<0.05	0.02	2.4	0.023	0.04	0.3	26	0.1	1.4	54.8	0.59
L06 S067	0.26	1.0	0.2	0.2	8.0	<0.05	0.04	2.2	0.028	0.04	0.2	24	0.2	1.1	53.3	0.55
L06 S068	0.16	1.0	0.2	0.2	6.5	<0.05	0.02	2.5	0.028	0.04	0.2	30	<0.1	1.1	55.6	0.90
L06 S069	0.20	1.4	0.2	0.3	13.5	<0.05	<0.02	2.7	0.039	0.04	0.3	38	<0.1	1.3	93.9	0.92
L06 S070	0.18	1.0	0.2	0.3	8.0	<0.05	<0.02	2.3	0.025	0.04	0.2	34	<0.1	1.1	34.4	0.63
L06 S071	0.18	1.1	0.2	0.3	5.5	<0.05	<0.02	2.2	0.028	0.08	0.3	36	<0.1	1.2	110.3	0.67
L06 S072	0.74	2.3	0.5	0.3	22.0	<0.05	0.04	1.2	0.047	0.26	0.4	66	<0.1	2.6	259.1	1.14
L06 S074	0.18	1.0	0.2	0.1	9.0	<0.05	<0.02	2.4	0.032	0.04	0.3	20	<0.1	1.4	46.6	0.51
L06 S075	0.18	1.0	0.2	0.1	9.0	<0.05	<0.02	2.4	0.031	0.04	0.3	20	<0.1	1.4	46.1	0.51
L06 S076	0.26	0.8	0.1	0.2	9.0	<0.05	0.02	1.5	0.038	0.02	0.2	30	0.2	1.0	34.1	0.66
L06 S077	0.10	0.8	0.1	0.2	12.0	<0.05	0.02	2.4	0.026	0.02	0.3	18	<0.1	1.4	37.7	0.59
L06 S078	0.28	1.6	0.2	0.2	22.5	<0.05	0.02	2.6	0.039	0.04	0.4	32	<0.1	2.8	51.3	0.81
L07 S01	0.48	1.9	0.2	0.5	8.0	<0.05	0.04	0.8	0.032	0.06	0.4	78	0.1	1.9	139.5	0.73
L07 S02	3.98	1.7	0.4	0.2	7.0	<0.05	0.08	1.7	0.015	0.08	0.4	40	<0.1	1.1	104.8	0.77
L07 S03	0.68	2.0	0.1	0.4	41.0	<0.05	0.04	0.6	0.033	0.04	0.2	74	0.1	1.5	99.9	0.90
L07 S04	0.60	2.9	0.5	0.3	49.5	<0.05	0.04	0.5	0.016	0.04	0.2	78	<0.1	13.0	58.9	0.83
L07 S05	0.76	2.6	0.2	0.2	18.0	<0.05	0.06	1.0	0.039	0.04	0.2	66	<0.1	1.9	70.2	1.21

Sample ID	Lab Report #	UTM East	UTM North	Au ppb	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm
	Analytical Method --->			ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L07 S06	AK2011-1135	610817	5821323	5	0.7	2.35	76.2	118.0	0.5	0.12	0.44	0.75	31.5	19.6	49.0	76.6
L07 S07	AK2011-1135	610782	5821288	2	<0.1	1.00	9.5	47.0	<0.1	0.04	0.19	0.19	11.9	7.0	37.0	13.0
L07 S08	AK2011-1135	610747	5821253	1	<0.1	0.66	6.1	40.5	<0.1	0.04	0.24	0.13	10.1	3.7	22.0	6.0
L07 S09	AK2011-1135	610711	5821217	2	0.1	1.18	8.1	68.5	0.2	0.04	0.20	0.19	12.8	9.4	40.5	25.7
L07 S10	AK2011-1135	610676	5821182	4	0.5	2.16	27.1	129.0	0.4	0.16	0.45	0.33	32.2	18.7	92.5	77.4
L07 S11	AK2011-1135	610641	5821146	2	0.3	1.53	14.6	95.5	0.3	0.10	2.71	0.58	18.8	13.9	60.5	48.4
L07 S12	AK2011-1135	610605	5821111	5	0.7	2.54	28.5	155.0	0.8	0.12	0.49	2.97	98.3	34.8	60.5	150.9
L07 S13	AK2011-1135	610570	5821076	2	0.6	0.83	15.3	60.5	0.1	0.16	0.23	0.46	7.8	1.8	15.5	7.9
L07 S14	AK2011-1135	610534	5821040	2	0.2	0.91	5.7	50.5	<0.1	0.08	0.14	0.60	7.6	3.6	12.0	8.7
L07 S15	AK2011-1135	610499	5821005	1	0.2	1.37	13.0	378.0	0.3	0.18	0.61	2.90	21.4	40.2	14.0	74.6
L07 S16	AK2011-1135	610464	5820970	<1	0.2	1.80	9.6	132.5	0.3	0.10	0.40	0.91	10.4	14.4	22.0	45.9
L07 S17	AK2011-1135	610428	5820934	4	0.5	0.55	34.2	73.5	0.3	0.16	0.29	0.77	14.5	8.7	11.0	56.2
L07 S18	AK2011-1135	610393	5820899	<1	<0.1	1.46	9.1	59.0	0.1	0.06	0.22	0.53	10.5	10.1	47.5	25.2
L07 S19	AK2011-1135	610358	5820864	1	<0.1	1.22	8.3	71.0	0.2	0.06	0.22	0.17	11.2	6.9	31.5	17.5
L07 S20	AK2011-1135	610322	5820828	<1	0.2	1.55	8.4	108.5	0.2	0.10	0.38	0.60	11.2	13.8	24.0	26.5
L07 S21	AK2011-1135	610287	5820793	1	<0.1	1.04	7.4	83.0	0.1	0.06	0.25	0.18	13.1	8.8	25.5	17.3
L07 S23	AK2011-1135	610216	5820722	1	<0.1	1.18	14.2	42.0	0.2	0.04	0.34	0.34	12.1	13.2	33.0	35.5
L07 S24	AK2011-1135	610181	5820687	4	0.7	1.73	23.2	100.0	0.3	0.10	1.22	1.10	24.5	16.9	49.0	111.6
L07 S26	AK2011-1135	610110	5820616	4	0.2	1.42	21.2	65.5	0.2	0.08	0.39	0.20	20.3	12.6	53.5	68.3
L07 S27	AK2011-1135	610075	5820581	<1	<0.1	0.60	6.4	44.5	<0.1	0.04	0.30	0.18	8.2	4.9	16.5	5.0
L07 S28	AK2011-1135	610040	5820545	<1	0.1	1.00	7.1	49.5	0.2	0.04	0.24	0.17	9.9	8.1	30.0	8.4
L07 S29	AK2011-1135	610004	5820510	5	0.1	1.16	16.4	69.5	0.2	0.08	0.52	0.33	21.5	13.4	45.5	46.1
L07 S30	AK2011-1135	609969	5820475	5	0.2	1.35	19.6	82.5	0.2	0.14	0.53	0.34	22.3	15.1	55.0	59.4
L07 S31	AK2011-1135	609933	5820439	<1	0.2	1.09	6.2	66.0	0.2	0.06	0.47	0.38	17.2	8.5	38.5	18.2
L07 S32	AK2011-1135	609898	5820404	1	1.0	1.04	6.4	57.0	0.1	0.04	0.26	0.26	14.9	8.2	34.0	16.7
L07 S33	AK2011-1135	609863	5820369	2	0.2	1.13	11.6	56.0	0.2	0.06	0.29	0.22	18.8	10.6	46.5	32.2
L07 S34	AK2011-1135	609827	5820333	<1	<0.1	0.79	6.0	36.0	<0.1	0.08	0.27	0.18	8.3	4.8	21.0	9.5
L07 S35	AK2011-1135	609792	5820298	<1	<0.1	0.99	7.9	51.5	0.1	0.04	0.15	0.19	9.5	7.2	30.5	28.2
L07 S36	AK2011-1135	609757	5820263	13	0.3	1.45	13.9	80.0	0.3	0.08	0.31	0.32	24.5	12.6	48.5	46.2
L07 S37	AK2011-1135	609721	5820227	4	<0.1	1.01	7.6	43.5	0.1	0.04	0.21	0.12	10.5	7.2	28.5	20.2

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Fe % 0.01	ICP/MS45 Ga ppm 0.0	ICP/MS45 Ge ppm 0.0	ICP/MS45 Hg ppb 5	ICP/MS45 K % 0.01	ICP/MS45 La ppm 0.5	ICP/MS45 Li ppm 1.0	ICP/MS45 Mg % 0.01	ICP/MS45 Mn ppm 5	ICP/MS45 Mo ppm 0.05	ICP/MS45 Na % 0.001	ICP/MS45 Nb ppm 0.05	ICP/MS45 Ni ppm 0.2	ICP/MS45 P ppm 1.0	ICP/MS45 Pb ppm 0.2	ICP/MS45 Rb ppm 0.1	ICP/MS45 S % 0.01
L07 S06	3.50	5.1	10.5	55	0.09	10.5	26.7	0.56	373	1.75	0.035	0.74	42.7	410	8.6	8.3	0.04
L07 S07	2.08	3.6	6.6	10	0.05	6.0	10.6	0.49	219	1.19	0.033	0.40	17.3	503	3.4	6.2	0.04
L07 S08	1.19	3.0	4.0	10	0.04	5.0	6.6	0.29	148	0.81	0.038	0.40	9.6	189	2.3	4.5	0.04
L07 S09	2.16	3.6	6.7	15	0.05	6.5	15.8	0.57	348	1.13	0.036	0.32	21.0	174	3.5	4.8	0.04
L07 S10	3.95	6.1	12.0	50	0.22	13.0	18.9	0.81	611	3.59	0.036	0.46	60.2	373	8.5	14.2	0.04
L07 S11	2.87	4.4	8.5	35	0.12	9.5	20.1	0.59	901	1.71	0.038	1.14	39.7	273	6.0	8.1	0.10
L07 S12	4.92	5.6	14.7	110	0.12	22.5	49.2	0.64	1779	12.46	0.040	0.56	166.6	632	13.9	8.1	0.10
L07 S13	1.71	3.1	5.0	60	0.04	4.5	14.7	0.45	182	13.39	0.032	1.34	5.7	608	18.3	3.5	0.06
L07 S14	1.57	4.1	4.4	20	0.03	4.0	8.5	0.25	189	2.00	0.033	0.38	7.1	279	5.0	2.6	0.04
L07 S15	5.41	4.9	15.2	105	0.10	10.0	8.3	0.32	4882	19.63	0.035	0.62	30.4	1585	17.3	10.4	0.08
L07 S16	4.39	6.2	12.0	30	0.07	5.5	14.6	0.58	807	3.42	0.035	0.56	20.0	864	7.4	9.6	0.06
L07 S17	3.22	1.7	8.9	190	0.07	7.5	4.6	0.10	448	23.74	0.033	0.14	32.7	629	18.0	3.5	0.08
L07 S18	2.55	4.4	7.1	10	0.07	5.5	13.3	0.67	353	1.57	0.035	0.40	29.1	766	3.7	7.5	0.04
L07 S19	2.33	4.4	6.1	15	0.05	5.5	11.7	0.47	359	1.88	0.033	0.42	17.9	346	4.0	6.8	0.06
L07 S20	3.15	5.2	8.4	30	0.08	5.5	12.6	0.50	1611	1.98	0.036	0.48	18.0	719	7.0	9.2	0.06
L07 S21	1.88	3.2	5.1	15	0.06	6.5	8.1	0.38	619	1.20	0.033	0.58	19.2	221	4.5	6.0	0.04
L07 S23	2.71	3.7	7.2	20	0.06	6.0	11.7	0.62	622	3.12	0.036	0.38	21.4	560	5.4	3.9	0.06
L07 S24	3.35	4.8	9.1	130	0.14	18.0	16.3	0.65	957	4.18	0.039	0.98	47.9	679	8.6	7.9	0.08
L07 S26	2.89	4.2	7.9	40	0.15	11.0	11.5	0.65	574	2.00	0.036	0.52	38.1	350	5.4	7.6	0.04
L07 S27	1.09	2.7	3.2	10	0.05	4.0	6.1	0.23	541	0.84	0.034	0.40	8.2	353	3.3	4.2	0.04
L07 S28	1.76	3.3	4.7	10	0.06	5.0	9.3	0.36	252	0.98	0.039	0.42	18.0	550	3.4	7.5	0.04
L07 S29	2.47	3.5	6.5	25	0.10	10.0	10.1	0.54	742	2.03	0.035	0.68	35.8	429	6.0	6.9	0.04
L07 S30	2.88	4.1	7.5	50	0.14	11.0	11.5	0.64	771	2.50	0.038	0.80	43.7	584	7.1	9.5	0.04
L07 S31	1.99	3.2	5.3	20	0.08	8.5	16.2	0.40	765	1.21	0.035	0.60	28.8	198	4.5	7.3	0.04
L07 S32	1.73	3.3	4.7	15	0.07	6.5	9.1	0.46	346	0.61	0.033	0.42	22.0	505	3.1	5.6	0.02
L07 S33	2.19	3.6	5.9	30	0.11	9.0	11.3	0.55	423	1.12	0.035	0.48	30.7	443	4.5	6.2	0.04
L07 S34	1.58	3.4	4.0	10	0.04	4.5	8.5	0.31	193	0.87	0.033	0.48	11.7	435	9.3	5.4	0.04
L07 S35	1.88	2.8	5.0	5	0.05	4.5	8.8	0.47	231	1.25	0.031	0.30	23.5	376	3.1	5.9	0.04
L07 S36	2.61	4.4	6.6	45	0.11	13.0	14.4	0.56	681	1.51	0.036	0.50	35.8	336	6.1	7.6	0.04
L07 S37	1.81	3.0	4.5	10	0.06	5.5	9.7	0.47	215	0.89	0.034	0.32	22.7	394	2.6	4.7	0.06

APPENDIX I - Soil Geochemistry

Sample ID	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	0.05	0.1	0.2	0.2	2.0	0.1	0.02	0.1	0.005	0.02	0.1	2	0.1	0.1	2.0	1.00
L07 S06	1.34	4.5	0.5	0.3	37.5	<0.05	0.06	2.9	0.048	0.08	0.4	70	0.1	6.8	250.7	2.02
L07 S07	0.56	1.8	0.2	0.2	11.5	<0.05	0.02	1.6	0.045	<0.02	0.3	52	<0.1	1.8	50.5	0.86
L07 S08	0.46	1.5	0.1	0.2	13.0	<0.05	0.02	1.3	0.050	<0.02	0.2	36	<0.1	1.8	40.8	1.02
L07 S09	0.56	2.3	0.2	0.2	13.5	<0.05	0.02	2.0	0.063	0.02	0.3	56	<0.1	2.5	56.7	1.31
L07 S10	2.10	7.3	0.7	0.3	28.5	<0.05	0.10	5.2	0.071	0.10	0.9	80	0.1	8.7	83.4	5.53
L07 S11	1.18	4.1	1.2	0.2	83.5	<0.05	0.08	2.6	0.056	0.06	0.5	52	0.1	6.9	66.0	2.87
L07 S12	2.64	6.4	1.7	0.2	77.5	<0.05	0.10	4.9	0.064	0.38	2.4	70	0.2	15.0	342.0	5.86
L07 S13	1.96	1.0	0.8	0.5	17.0	<0.05	0.12	0.8	0.041	0.22	0.5	70	<0.1	1.6	60.3	1.30
L07 S14	0.46	1.4	0.2	0.3	8.5	<0.05	<0.02	0.8	0.008	0.06	0.2	48	<0.1	1.5	85.9	0.70
L07 S15	0.80	2.9	0.9	0.4	37.5	<0.05	0.20	1.0	0.018	0.20	1.0	92	0.1	6.9	270.1	1.07
L07 S16	0.74	3.1	0.4	0.3	24.0	<0.05	0.08	1.2	0.020	0.10	0.4	84	0.1	3.8	205.8	1.41
L07 S17	5.18	2.7	2.2	0.3	27.5	<0.05	0.16	1.4	0.002	0.38	1.0	44	0.1	6.7	176.4	1.13
L07 S18	0.60	2.4	0.3	0.2	13.0	<0.05	0.04	1.8	0.056	0.04	0.3	62	<0.1	2.1	103.8	1.23
L07 S19	1.38	2.1	0.2	0.2	11.5	<0.05	0.04	1.5	0.035	0.04	0.3	62	<0.1	2.2	68.7	1.14
L07 S20	4.18	2.0	0.3	0.4	52.0	<0.05	0.06	0.6	0.039	0.06	0.3	64	0.1	2.9	136.0	0.66
L07 S21	0.74	1.9	0.2	0.2	15.5	<0.05	0.02	2.1	0.045	0.04	0.3	44	<0.1	2.1	47.1	1.62
L07 S23	1.22	2.6	0.4	0.1	17.0	<0.05	0.04	1.3	0.055	0.06	0.5	62	0.1	3.5	65.8	0.75
L07 S24	2.52	4.4	1.6	0.2	60.5	<0.05	0.10	1.5	0.042	0.12	1.8	66	0.1	17.1	102.4	1.85
L07 S26	1.38	4.8	0.5	0.2	18.5	<0.05	0.06	2.9	0.058	0.06	0.5	62	0.1	8.5	58.5	2.89
L07 S27	0.32	1.3	0.1	0.2	13.5	<0.05	0.02	1.1	0.036	0.02	0.2	32	<0.1	1.3	38.1	0.93
L07 S28	0.60	1.7	0.2	0.1	11.5	<0.05	0.04	1.4	0.042	0.02	0.2	44	<0.1	1.5	57.1	1.07
L07 S29	1.14	3.5	0.5	0.1	29.5	<0.05	0.06	3.3	0.056	0.06	0.5	48	0.1	5.2	60.3	2.57
L07 S30	1.42	4.4	0.6	0.2	31.5	<0.05	0.06	3.5	0.055	0.08	0.6	54	0.1	7.0	70.0	2.98
L07 S31	0.84	2.6	0.3	0.2	28.0	<0.05	0.04	2.0	0.058	0.04	0.4	42	<0.1	3.8	50.4	1.49
L07 S32	0.72	2.3	0.2	0.1	13.5	<0.05	0.02	1.7	0.057	0.04	0.3	48	<0.1	2.2	50.1	0.86
L07 S33	1.50	3.2	0.4	0.1	16.5	<0.05	0.04	2.3	0.054	0.04	0.4	52	<0.1	3.8	56.7	1.10
L07 S34	0.52	1.8	0.2	0.2	11.5	<0.05	0.04	1.3	0.055	0.02	0.2	46	<0.1	1.8	43.5	1.13
L07 S35	0.76	1.9	0.3	0.1	9.5	<0.05	0.02	1.8	0.046	0.02	0.3	40	<0.1	2.0	49.5	1.15
L07 S36	1.56	4.9	0.5	0.2	18.5	<0.05	0.04	3.0	0.066	0.06	0.7	60	0.1	9.0	59.0	2.02
L07 S37	0.88	2.1	0.3	0.2	9.5	<0.05	0.02	1.8	0.055	<0.02	0.3	46	<0.1	2.1	37.5	1.50

APPENDIX I - Soil Geochemistry

Sample	Lab	Analytical Method --->		ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
		UTM		Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu
ID	Report #	East	North	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L07 S38	AK2011-1135	609686	5820192	2	0.1	0.95	6.5	70.0	0.1	0.08	0.25	0.20	11.8	7.5	27.5	13.6
L07 S39	AK2011-1135	609651	5820156	5	0.1	0.93	6.0	54.5	<0.1	0.04	0.26	0.50	13.4	8.7	27.0	16.6
L07 S40	AK2011-1135	609615	5820121	3	0.2	1.47	6.0	84.5	0.3	0.06	0.18	0.28	35.7	11.8	40.5	47.5
L07 S41	AK2011-1135	609580	5820086	<1	0.1	1.05	4.0	53.0	0.1	0.06	0.13	0.16	13.5	6.6	28.5	10.7
L07 S42	AK2011-1135	609545	5820050	1	0.1	1.04	6.1	47.5	0.2	0.04	0.20	0.13	20.5	8.5	37.0	22.3
L07 S43	AK2011-1135	609509	5820015	2	<0.1	0.89	4.0	32.0	0.2	0.08	0.15	0.10	15.2	7.0	31.5	13.1
L07 S44	AK2011-1135	609474	5819980	2	0.2	1.07	5.5	51.0	0.2	0.08	0.21	0.13	11.9	5.9	32.5	12.0
L07 S45	AK2011-1135	609438	5819944	1	<0.1	1.00	3.8	56.0	0.2	0.08	0.19	0.13	11.4	6.9	31.5	9.3
L07 S46	AK2011-1135	609403	5819909	4	<0.1	1.03	5.0	61.0	<0.1	0.10	0.25	0.14	10.2	6.2	25.5	9.0
L07 S47	AK2011-1135	609368	5819874	4	0.5	2.03	7.7	173.0	0.7	0.18	0.72	0.90	25.6	14.8	62.0	49.0
L07 S48	AK2011-1135	609332	5819838	6	<0.1	1.84	66.5	73.0	0.5	0.18	0.45	0.15	28.9	16.2	59.5	81.3
L07 S49	AK2011-1135	609297	5819803	4	<0.1	1.37	5.9	54.5	0.3	0.12	0.25	0.11	26.5	12.2	38.0	22.3
L07 S50	AK2011-1135	609262	5819768	3	<0.1	0.80	2.2	36.5	0.1	0.10	0.15	0.14	15.1	5.1	20.0	5.9
L07 S51	AK2011-1135	609226	5819732	3	<0.1	1.46	5.0	68.5	0.3	0.14	0.27	0.20	18.4	10.9	32.0	9.5
L07 S52	AK2011-1135	609191	5819697	7	0.4	1.81	62.6	131.5	0.6	0.18	2.05	0.97	24.4	17.1	49.5	62.4
L07 S53	AK2011-1135	609156	5819662	2	<0.1	1.20	23.5	52.5	0.2	0.10	0.35	0.21	17.9	11.4	32.5	22.4
L07 S54	AK2011-1135	609120	5819626	3	0.3	1.69	22.2	95.0	0.3	0.16	0.83	0.46	24.2	13.5	40.5	34.0
L07 S55	AK2011-1135	609085	5819591	2	0.1	1.31	28.7	34.0	0.2	0.08	0.44	0.23	8.5	7.7	46.0	17.2
L07 S57	AK2011-1135	609014	5819520	1	<0.1	0.77	4.2	40.5	0.1	0.10	0.18	0.12	12.6	3.4	16.5	6.8
L07 S59	AK2011-1135	608944	5819449	2	0.1	1.88	17.6	129.5	0.4	0.16	0.38	0.17	28.4	13.3	45.5	47.2
L07 S60	AK2011-1135	608908	5819414	1	<0.1	1.53	3.3	69.0	0.3	0.12	0.20	0.07	17.1	10.1	28.0	20.9
L07 S62	AK2011-1135	608837	5819343	2	0.3	1.49	25.6	132.5	0.3	0.16	0.55	0.32	23.9	12.6	40.0	44.2
L07 S63	AK2011-1135	608802	5819308	1	<0.1	1.18	2.0	78.5	0.4	0.12	0.08	0.10	16.6	4.9	20.5	5.4
L07 S65	AK2011-1135	608731	5819237	2	<0.1	1.00	2.8	48.0	0.3	0.10	0.26	0.08	17.3	7.2	20.0	9.6
L07 S66	AK2011-1135	608696	5819202	1	<0.1	1.02	2.3	44.0	0.2	0.10	0.11	0.08	15.2	5.5	17.5	6.4
L07 S67	AK2011-1135	608661	5819167	3	<0.1	0.59	1.9	28.5	0.1	0.10	0.12	0.06	14.9	3.0	11.0	3.7
L07 S68	AK2011-1135	608625	5819131	<1	<0.1	0.74	1.6	46.5	<0.1	0.10	0.09	0.05	15.7	4.5	14.0	4.3
L07 S69	AK2011-1135	608590	5819096	<1	<0.1	1.40	3.9	111.0	0.3	0.18	0.39	0.31	26.6	11.4	30.0	14.1
L07 S71	AK2011-1135	608519	5819025	1	<0.1	1.24	2.2	52.5	0.3	0.14	0.21	0.08	25.5	9.0	23.0	12.1
L07 S72	AK2011-1135	608484	5818990	<1	0.3	1.42	3.1	107.5	0.3	0.16	0.34	0.26	15.2	8.7	24.0	10.3

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Fe % 0.01	ICP/MS45 Ga ppm 0.0	ICP/MS45 Ge ppm 0.0	ICP/MS45 Hg ppb 5	ICP/MS45 K % 0.01	ICP/MS45 La ppm 0.5	ICP/MS45 Li ppm 1.0	ICP/MS45 Mg % 0.01	ICP/MS45 Mn ppm 5	ICP/MS45 Mo ppm 0.05	ICP/MS45 Na % 0.001	ICP/MS45 Nb ppm 0.05	ICP/MS45 Ni ppm 0.2	ICP/MS45 P ppm 1.0	ICP/MS45 Pb ppm 0.2	ICP/MS45 Rb ppm 0.1	ICP/MS45 S % 0.01
L07 S38	1.62	3.1	4.2	15	0.06	6.0	8.6	0.39	507	0.78	0.033	0.38	18.8	326	4.8	5.8	0.04
L07 S39	1.89	3.2	4.8	15	0.06	6.0	7.7	0.42	564	1.04	0.035	0.38	17.2	282	4.3	6.5	0.04
L07 S40	2.11	4.5	6.0	30	0.08	27.0	11.6	0.46	761	1.01	0.035	0.58	29.4	525	4.5	9.0	0.04
L07 S41	1.65	3.4	4.2	10	0.05	7.0	11.8	0.38	142	0.72	0.034	0.38	18.4	344	3.4	6.0	0.04
L07 S42	1.81	3.3	4.7	15	0.07	11.5	10.9	0.48	344	0.86	0.034	0.38	25.1	224	4.1	6.1	0.04
L07 S43	1.71	2.9	4.0	10	0.05	8.0	11.9	0.41	168	0.69	0.032	0.50	19.6	236	2.7	5.7	<0.02
L07 S44	1.95	3.5	4.4	20	0.05	6.0	14.1	0.38	136	0.81	0.031	0.60	19.0	566	3.1	6.2	<0.02
L07 S45	1.75	3.3	4.1	20	0.06	5.5	10.4	0.36	168	0.69	0.030	0.58	17.1	662	2.9	6.4	<0.02
L07 S46	1.91	3.8	4.3	15	0.06	5.0	12.2	0.33	217	0.94	0.032	0.64	15.9	804	3.4	5.8	<0.02
L07 S47	3.51	5.8	8.1	55	0.15	16.0	19.7	0.54	1901	2.08	0.035	1.12	48.3	331	7.2	12.2	0.02
L07 S48	3.63	5.6	8.5	40	0.24	14.0	20.8	0.74	530	2.84	0.035	0.54	38.9	479	7.7	12.2	0.02
L07 S49	2.48	4.2	5.7	20	0.11	12.0	17.3	0.58	323	0.87	0.035	0.40	27.8	338	5.2	10.3	0.02
L07 S50	1.26	3.1	3.4	10	0.05	7.5	15.1	0.25	132	0.70	0.030	0.60	11.7	221	3.0	5.9	<0.02
L07 S51	2.45	4.8	5.7	25	0.09	8.5	24.7	0.38	379	0.82	0.033	0.84	21.8	638	6.6	9.9	0.02
L07 S52	3.80	5.5	9.0	145	0.20	14.0	21.6	0.73	3115	1.37	0.038	1.18	44.0	725	9.9	15.5	0.08
L07 S53	2.36	3.7	5.5	30	0.07	8.5	12.7	0.49	395	0.95	0.035	0.78	23.3	268	4.8	7.5	<0.02
L07 S54	3.01	5.0	7.0	40	0.13	12.0	20.0	0.58	628	0.76	0.036	1.04	31.6	332	6.1	13.2	<0.02
L07 S55	2.42	4.4	5.7	30	0.05	4.0	19.1	0.51	190	1.05	0.032	0.66	24.4	372	2.3	6.7	<0.02
L07 S57	1.26	3.4	3.1	10	0.03	6.5	6.5	0.18	80	0.32	0.031	0.56	7.8	478	3.1	5.2	<0.02
L07 S59	3.17	5.8	7.6	25	0.13	15.5	21.2	0.59	477	0.90	0.037	1.04	32.8	283	6.9	12.6	0.02
L07 S60	2.48	4.5	5.9	10	0.07	8.0	17.9	0.42	182	0.59	0.032	0.50	21.1	278	4.4	8.4	<0.02
L07 S62	3.54	4.7	8.6	70	0.14	13.0	15.4	0.53	1518	2.81	0.036	0.68	40.0	380	6.3	12.5	0.04
L07 S63	2.04	4.1	5.1	35	0.06	8.0	13.8	0.20	81	0.54	0.033	0.52	11.1	1130	5.1	12.0	<0.02
L07 S65	1.76	3.1	4.3	15	0.05	7.5	17.7	0.33	113	0.79	0.032	0.58	17.2	279	4.2	6.4	0.02
L07 S66	1.86	3.2	4.4	20	0.05	7.5	17.1	0.30	118	0.57	0.032	0.58	16.1	704	4.1	7.3	0.02
L07 S67	1.13	3.1	3.3	15	0.03	7.5	9.4	0.16	76	0.66	0.030	0.50	7.4	302	3.0	3.7	<0.02
L07 S68	1.38	3.1	3.6	10	0.04	8.0	14.3	0.22	181	0.59	0.030	0.46	9.2	280	3.8	6.0	<0.02
L07 S69	2.76	4.5	6.8	20	0.14	11.0	21.4	0.56	595	1.39	0.035	0.72	25.7	299	7.1	16.4	0.02
L07 S71	2.46	3.8	6.2	15	0.07	11.5	25.0	0.49	164	0.34	0.031	0.52	20.6	212	7.1	9.8	0.02
L07 S72	2.19	3.9	5.2	35	0.07	7.5	35.8	0.29	352	0.47	0.035	0.74	24.0	357	7.0	11.0	0.02

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Sb ppm 0.05	ICP/MS45 Sc ppm 0.1	ICP/MS45 Se ppm 0.2	ICP/MS45 Sn ppm 0.2	ICP/MS45 Sr ppm 2.0	ICP/MS45 Ta ppm 0.1	ICP/MS45 Te ppm 0.02	ICP/MS45 Th ppm 0.1	ICP/MS45 Ti % 0.005	ICP/MS45 Tl ppm 0.02	ICP/MS45 U ppm 0.1	ICP/MS45 V ppm 2	ICP/MS45 W ppm 0.1	ICP/MS45 Y ppm 0.1	ICP/MS45 Zn ppm 2.0	ICP/MS45 Zr ppm 1.00
L07 S38	0.80	1.7	0.2	0.2	12.5	<0.05	0.02	1.1	0.045	0.02	0.3	42	<0.1	1.9	49.6	0.67
L07 S39	0.94	2.0	0.2	0.1	18.0	<0.05	0.02	1.8	0.043	0.02	0.3	44	<0.1	2.2	59.0	1.70
L07 S40	0.80	3.9	0.6	0.2	11.5	<0.05	0.04	2.1	0.032	0.06	0.6	48	<0.1	16.2	82.1	1.43
L07 S41	0.48	1.6	0.2	0.2	7.0	<0.05	0.02	2.0	0.042	0.04	0.3	38	<0.1	1.7	62.1	0.79
L07 S42	0.86	2.8	0.3	0.1	11.0	<0.05	0.02	2.8	0.055	0.04	0.6	44	<0.1	5.6	45.8	1.64
L07 S43	0.52	1.6	0.2	0.1	9.0	<0.05	0.02	2.0	0.045	0.06	0.3	28	0.2	2.0	42.6	1.06
L07 S44	0.58	1.7	0.2	0.2	12.5	0.05	<0.02	1.6	0.037	0.06	0.2	32	0.2	1.6	59.5	0.98
L07 S45	0.42	1.8	0.1	0.2	11.5	0.05	<0.02	1.9	0.040	0.06	0.2	32	0.2	1.7	46.8	1.70
L07 S46	0.46	1.8	0.1	0.2	15.0	<0.05	<0.02	1.7	0.041	0.04	0.2	34	0.2	1.6	62.9	1.77
L07 S47	1.48	5.2	0.6	0.3	62.5	<0.05	0.04	3.4	0.065	0.10	0.9	48	0.2	11.3	115.1	3.05
L07 S48	3.04	6.9	0.4	0.3	35.5	<0.05	0.06	4.9	0.068	0.14	0.4	62	0.4	10.8	67.6	4.20
L07 S49	0.68	2.9	0.3	0.2	15.5	<0.05	0.02	4.3	0.050	0.08	0.4	34	0.2	3.7	53.3	2.36
L07 S50	0.28	1.1	0.1	0.2	11.5	<0.05	<0.02	2.0	0.031	0.06	0.2	22	0.1	1.4	58.6	0.93
L07 S51	0.46	1.9	0.2	0.3	22.0	<0.05	0.02	2.6	0.034	0.08	0.3	32	0.1	1.7	82.1	1.14
L07 S52	2.92	3.9	1.6	0.3	106.0	<0.05	0.06	1.9	0.045	0.14	0.5	46	0.2	11.3	250.3	1.78
L07 S53	1.34	2.6	0.3	0.2	24.0	<0.05	0.04	2.1	0.051	0.06	0.3	38	0.2	3.1	59.2	1.35
L07 S54	1.46	4.1	0.6	0.2	53.5	<0.05	0.04	3.4	0.061	0.08	0.5	44	0.2	6.0	66.6	2.29
L07 S55	1.62	2.7	0.2	0.2	20.0	<0.05	0.04	1.2	0.051	0.04	0.2	56	0.2	2.0	52.4	2.15
L07 S57	0.18	1.3	0.1	0.2	12.0	<0.05	<0.02	1.5	0.037	0.04	0.2	26	0.1	1.4	38.7	1.00
L07 S59	1.18	4.7	0.4	0.3	35.5	<0.05	0.04	3.8	0.061	0.10	0.6	52	0.2	7.7	59.4	2.24
L07 S60	0.36	2.4	0.2	0.2	12.5	<0.05	<0.02	3.6	0.041	0.06	0.3	36	0.1	2.2	50.2	1.96
L07 S62	1.10	3.8	0.8	0.2	41.5	<0.05	0.06	2.6	0.044	0.10	0.6	40	0.2	8.6	48.2	1.54
L07 S63	0.10	1.2	0.1	0.2	8.5	<0.05	<0.02	2.8	0.009	0.06	0.2	24	0.1	1.2	55.6	1.03
L07 S65	0.22	1.3	0.4	0.1	21.0	<0.05	<0.02	2.5	0.029	0.04	0.3	20	0.1	1.7	36.5	0.76
L07 S66	0.12	1.1	0.1	0.1	11.5	<0.05	<0.02	2.7	0.022	0.04	0.3	18	0.1	1.3	55.5	0.81
L07 S67	0.10	0.8	0.1	0.2	13.0	<0.05	<0.02	2.1	0.016	0.04	0.2	16	0.1	1.0	24.6	0.62
L07 S68	0.10	0.9	0.1	0.2	9.5	<0.05	<0.02	2.3	0.011	0.04	0.2	16	<0.1	1.0	35.5	0.62
L07 S69	0.32	2.5	0.6	0.2	37.0	<0.05	0.04	5.2	0.043	0.10	0.4	24	0.1	3.8	52.2	1.49
L07 S71	0.12	1.5	0.2	0.2	23.0	<0.05	<0.02	3.9	0.024	0.06	0.3	18	<0.1	2.4	50.6	0.70
L07 S72	0.22	1.5	0.4	0.3	42.5	<0.05	0.02	2.4	0.037	0.06	0.3	24	0.1	2.5	97.8	1.09

APPENDIX I - Soil Geochemistry

		Analytical Method --->		ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
Sample	**Lab**	**UTM**		**Au**	**Ag**	**Al**	**As**	**Ba**	**Be**	**Bi**	**Ca**	**Cd**	**Ce**	**Co**	**Cr**	**Cu**
ID	**Report #**	**East**	**North**	**ppb**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L07 S74	AK2011-1135	608413	5818919	<1	<0.1	1.11	2.4	45.5	0.2	0.12	0.19	0.13	22.4	8.1	21.0	8.0
L07 S75	AK2011-1135	608378	5818884	<1	0.1	0.99	1.8	42.5	0.3	0.10	0.21	0.12	18.4	6.6	19.0	7.5
L07 S77	AK2011-1135	608307	5818813	<1	0.2	1.31	8.2	98.0	0.4	0.18	0.45	0.50	23.7	12.0	28.5	23.5
L07 S78	AK2011-1135	608272	5818778	1	<0.1	0.88	2.6	30.0	0.1	0.10	0.15	0.09	13.4	5.4	20.0	6.5
L07 S81	AK2011-1135	608166	5818672	<1	<0.1	0.93	3.3	35.5	0.1	0.10	0.21	0.08	19.8	8.4	26.5	12.6
L07 S82	AK2011-1135	608130	5818636	<1	<0.1	1.13	3.5	59.5	0.3	0.10	0.22	0.10	18.0	9.8	32.0	17.3
L07 S83	AK2011-1135	608095	5818601	<1	0.1	0.79	1.3	62.0	<0.1	0.10	0.07	0.15	14.4	5.1	13.5	4.4
L07 S85	AK2011-1135	608024	5818530	<1	0.2	1.06	2.1	43.5	0.2	0.12	0.07	0.14	13.9	6.1	19.0	8.8
L07 S86	AK2011-1135	607989	5818495	<1	0.1	0.89	2.6	67.5	0.2	0.10	0.10	0.20	15.3	4.4	18.0	5.2
L07 S87	AK2011-1135	607954	5818459	<1	0.2	1.11	2.1	65.0	0.2	0.12	0.30	0.22	18.4	7.9	21.5	8.5
L07 S88	AK2011-1135	607918	5818424	1	0.3	0.93	2.2	31.5	0.2	0.10	0.06	0.10	15.6	5.6	17.5	9.6
L07 S89	AK2011-1135	607883	5818389	1	<0.1	0.77	2.0	22.5	<0.1	0.08	0.10	0.09	12.9	5.1	18.5	8.0
L07 S91	AK2011-1135	607812	5818318	1	0.1	0.90	2.8	31.0	0.2	0.10	0.06	0.10	11.3	4.7	15.5	7.7
	Pulp Duplicates:															
L02 S002	AK2011-1135	608130	5821465	1	0.3	2.05	38.3	132.5	0.5	0.12	0.41	0.67	23.3	23.6	62.5	69.5
L02 S002	AK2011-1135			3	0.3	2.02	37.1	129.0	0.3	0.10	0.40	0.69	22.7	22.8	60.5	66.4
L02 S016	AK2011-1135	607635	5820970	<1	<0.1	1.08	19.0	38.5	0.1	0.13	0.14	0.15	8.5	4.7	24.0	15.1
L02 S016	AK2011-1135			<1	<0.1	1.09	19.8	38.5	0.1	0.14	0.15	0.16	8.0	4.8	24.0	15.2
L03 S011	AK2011-1135	608378	5821146	1	0.4	1.70	4.8	60.5	0.4	0.12	0.45	0.12	16.4	10.4	77.0	24.1
L03 S011	AK2011-1135			<1	0.3	1.66	4.4	58.0	0.4	0.12	0.42	0.10	15.9	9.6	75.5	22.3
L03 S029	AK2011-1135	607741	5820510	1	<0.1	1.01	14.2	71.5	0.2	0.10	0.26	0.18	9.0	10.0	20.5	11.7
L03 S029	AK2011-1135			<1	<0.1	1.01	14.1	73.0	0.1	0.09	0.26	0.19	9.7	10.1	20.5	11.8
L04 S009	AK2011-1135	609014	5821217	2	0.2	1.24	10.9	42.0	0.2	0.08	0.31	0.15	11.0	8.1	37.0	31.2
L04 S009	AK2011-1135			2	0.2	1.29	11.5	43.5	0.2	0.08	0.33	0.14	11.2	8.4	38.0	32.9
L04 S022	AK2011-1135	608555	5820758	<1	0.1	1.48	9.1	34.5	0.2	0.06	0.33	0.15	5.6	9.8	65.5	17.1
L04 S022	AK2011-1135			<1	0.1	1.50	9.4	35.5	0.3	0.06	0.33	0.14	5.6	10.0	66.0	17.7

	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
Sample	**Fe**	**Ga**	**Ge**	**Hg**	**K**	**La**	**Li**	**Mg**	**Mn**	**Mo**	**Na**	**Nb**	**Ni**	**P**	**Pb**	**Rb**	**S**
ID	**%**	**ppm**	**ppm**	**ppb**	**%**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**
	0.01	0.0	0.0	5	0.01	0.5	1.0	0.01	5	0.05	0.001	0.05	0.2	1.0	0.2	0.1	0.01
L07 S74	2.12	3.5	5.1	15	0.06	9.5	23.7	0.42	279	0.51	0.033	0.44	19.3	186	5.0	11.6	0.02
L07 S75	1.72	3.2	4.2	20	0.06	8.5	15.5	0.32	204	0.38	0.031	0.54	17.6	195	4.4	12.0	0.02
L07 S77	2.59	4.2	6.3	30	0.12	13.5	17.7	0.50	941	1.51	0.034	0.78	30.5	310	7.0	15.4	0.04
L07 S78	1.70	3.2	4.2	15	0.04	6.5	15.9	0.31	92	1.12	0.032	0.64	13.9	213	3.1	5.7	0.04
L07 S81	1.96	3.3	4.9	10	0.08	9.5	12.6	0.45	236	0.40	0.034	0.54	17.5	724	3.9	7.5	0.02
L07 S82	2.13	3.8	5.1	15	0.06	9.0	14.3	0.52	279	0.45	0.031	0.52	20.2	370	3.9	6.3	0.02
L07 S83	1.29	3.0	3.5	15	0.04	7.0	11.5	0.23	445	0.31	0.030	0.46	10.6	288	2.9	9.1	<0.02
L07 S85	1.95	3.4	4.9	15	0.06	7.0	15.1	0.29	84	0.63	0.029	0.72	19.2	397	4.5	8.3	<0.02
L07 S86	1.67	3.4	4.4	20	0.05	7.5	13.9	0.28	108	0.49	0.030	0.60	12.6	711	6.4	7.0	<0.02
L07 S87	1.73	3.5	4.3	25	0.08	8.0	15.2	0.32	562	0.59	0.033	0.54	16.6	394	5.1	9.2	0.04
L07 S88	1.74	2.8	4.3	10	0.06	7.0	13.2	0.34	95	0.46	0.032	0.48	18.2	473	4.6	6.7	<0.02
L07 S89	1.47	2.6	3.7	15	0.05	6.5	11.9	0.34	99	0.41	0.033	0.54	13.8	231	5.0	6.8	0.02
L07 S91	1.64	2.7	3.8	20	0.04	5.5	12.1	0.24	79	0.33	0.032	0.60	16.4	592	4.2	6.4	0.02
L02 S002	4.16	5.6	3.8	50	0.08	12.5	4.1	0.88	1980	3.48	0.034	0.48	40.1	790	13.2	5.5	0.04
L02 S002	4.03	5.4	3.9	45	0.08	12.5	3.4	0.86	1947	3.34	0.033	0.46	38.4	771	12.2	5.4	0.04
L02 S016	2.62	5.9	2.3	20	0.04	4.4	2.8	0.29	156	0.99	0.031	0.84	12.2	507	6.6	5.6	0.04
L02 S016	2.67	6.1	2.4	25	0.05	4.0	2.4	0.30	161	1.03	0.028	0.84	12.4	514	6.8	5.6	0.04
L03 S011	2.42	5.8	2.3	45	0.04	9.0	2.4	0.55	428	0.70	0.032	1.10	32.9	378	7.5	6.2	0.04
L03 S011	2.35	5.4	2.2	45	0.04	8.0	2.1	0.50	408	0.65	0.031	1.02	31.7	357	6.9	5.8	0.06
L03 S029	1.80	4.1	1.8	20	0.04	4.0	1.8	0.36	2054	0.55	0.022	0.48	11.5	424	5.0	4.8	0.06
L03 S029	1.80	4.1	1.7	20	0.04	4.4	1.8	0.35	2099	0.55	0.024	0.48	11.2	431	6.0	5.0	0.07
L04 S009	2.06	3.7	1.9	30	0.05	6.0	2.6	0.50	636	0.80	0.023	0.50	23.7	145	5.8	6.2	0.06
L04 S009	2.15	3.9	2.0	30	0.05	6.0	2.6	0.52	651	0.80	0.022	0.52	24.2	153	6.5	6.4	0.06
L04 S022	2.65	5.3	2.4	20	0.04	2.5	2.5	0.74	301	0.93	0.023	0.46	27.3	380	4.5	7.2	0.06
L04 S022	2.71	5.4	2.6	20	0.04	2.5	2.6	0.75	305	0.99	0.023	0.50	27.9	385	5.1	7.5	0.06

APPENDIX I - Soil Geochemistry

Sample ID	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	0.05	0.1	0.2	0.2	2.0	0.1	0.02	0.1	0.005	0.02	0.1	2	0.1	0.1	2.0	1.00
L07 S74	0.16	1.5	0.3	0.1	23.0	<0.05	0.02	3.5	0.028	0.06	0.4	18	<0.1	2.3	59.2	0.85
L07 S75	0.14	1.3	0.2	0.1	21.0	<0.05	<0.02	2.6	0.025	0.04	0.3	16	<0.1	2.1	55.6	0.77
L07 S77	0.60	3.3	0.7	0.2	45.5	<0.05	0.04	3.9	0.041	0.12	0.5	28	0.2	6.6	50.1	1.59
L07 S78	0.24	1.2	0.2	0.1	17.0	<0.05	<0.02	2.1	0.026	0.04	0.2	22	0.2	1.4	33.9	0.80
L07 S81	0.34	1.7	0.2	0.1	14.5	<0.05	<0.02	3.1	0.045	0.06	0.3	24	0.2	2.5	42.2	0.81
L07 S82	0.42	2.0	0.2	0.2	14.5	<0.05	<0.02	2.7	0.046	0.04	0.3	32	<0.1	2.2	45.7	0.95
L07 S83	0.08	0.9	<0.1	0.1	8.5	<0.05	<0.02	2.3	0.020	0.04	0.2	16	0.1	1.2	49.4	0.63
L07 S85	0.16	1.2	0.1	0.1	7.0	<0.05	<0.02	2.9	0.028	0.04	0.3	22	0.2	1.4	50.4	0.90
L07 S86	0.20	1.0	0.2	0.1	11.0	<0.05	<0.02	2.3	0.022	0.04	0.3	20	<0.1	1.4	46.0	0.71
L07 S87	0.22	1.3	0.2	0.2	30.0	<0.05	<0.02	1.3	0.018	0.06	0.3	22	0.1	2.0	67.1	0.46
L07 S88	0.16	1.1	0.2	0.1	5.5	<0.05	<0.02	2.9	0.027	0.04	0.3	18	<0.1	1.4	39.1	1.07
L07 S89	0.30	1.2	0.1	0.1	8.5	<0.05	<0.02	2.4	0.031	0.04	0.3	20	<0.1	1.7	31.0	0.94
L07 S91	0.16	1.0	0.1	0.1	5.5	<0.05	<0.02	2.6	0.024	0.04	0.3	18	0.1	1.4	38.4	0.99
L02 S002	2.80	5.0	0.9	0.3	25.5	<0.05	0.06	1.0	0.039	0.10	1.0	70	0.3	6.8	105.9	0.95
L02 S002	2.68	4.9	0.8	0.2	24.5	<0.05	0.06	0.9	0.039	0.10	0.9	68	0.2	6.7	102.2	0.89
L02 S016	1.56	2.0	0.1	0.4	5.5	<0.05	0.02	0.8	0.056	0.07	0.1	70	0.2	1.4	41.6	1.23
L02 S016	1.60	2.0	0.1	0.4	5.0	<0.05	0.02	0.7	0.056	0.06	0.2	72	0.2	1.5	41.4	1.18
L03 S011	1.02	3.3	0.3	0.4	25.0	<0.05	<0.02	1.1	0.085	0.06	0.6	62	0.2	6.1	47.3	1.99
L03 S011	0.98	3.0	0.3	0.4	23.0	<0.05	<0.02	0.9	0.082	0.06	0.5	60	0.2	5.7	45.5	1.84
L03 S029	0.54	1.9	0.1	0.2	10.0	<0.05	<0.02	0.7	0.033	0.08	0.2	44	0.2	1.7	44.7	0.71
L03 S029	0.59	2.0	0.1	0.2	11.0	<0.05	<0.02	0.7	0.033	0.07	0.1	44	0.1	1.8	45.0	0.75
L04 S009	1.18	2.5	0.2	0.2	18.0	<0.05	<0.02	1.0	0.047	0.06	0.3	42	0.1	5.3	50.8	1.35
L04 S009	1.32	2.5	0.2	0.2	18.5	<0.05	<0.02	0.9	0.048	0.06	0.3	44	0.1	5.5	53.3	1.30
L04 S022	1.02	2.9	<0.1	0.3	14.0	<0.05	<0.02	0.5	0.058	0.04	0.1	72	0.1	2.1	50.5	1.44
L04 S022	1.08	2.9	<0.1	0.3	14.5	<0.05	0.02	0.6	0.060	0.04	0.2	72	0.1	2.1	51.6	1.35

APPENDIX I - Soil Geochemistry

Sample	Lab	Analytical Method --->		ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
		UTM		Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu
ID	Report #	East	North	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L04 S040	AK2011-1135	607918	5820121	1	0.1	1.22	14.6	39.5	0.2	0.10	0.59	0.33	9.4	9.3	37.0	20.5
L04 S040	AK2011-1135			3	<0.1	1.16	13.2	37.0	0.2	0.10	0.54	0.30	9.0	8.7	35.5	19.9
L05 S009	AK2011-1135	609580	5821217	3	<0.1	1.13	6.2	49.5	0.1	0.08	0.31	0.15	7.0	5.2	15.5	13.7
L05 S009	AK2011-1135			1	<0.1	1.10	6.0	48.5	0.1	0.08	0.30	0.15	6.6	5.1	14.5	13.2
L05 S025	AK2011-1135	609014	5820651	2	<0.1	1.66	10.3	69.5	0.3	0.10	0.39	0.22	16.1	11.5	37.5	35.6
L05 S025	AK2011-1135			1	<0.1	1.60	9.6	66.5	0.3	0.10	0.37	0.21	15.1	10.8	35.5	34.1
L05 S044	AK2011-1135	608342	5819980	5	0.1	1.44	28.8	45.0	0.2	0.10	0.25	0.08	13.7	10.1	39.0	36.5
L05 S044	AK2011-1135			5	0.1	1.46	30.7	47.5	0.2	0.12	0.27	0.08	14.6	10.3	40.5	37.5
L05 S053	AK2011-1135	608024	5819662	<1	0.2	1.20	8.4	71.5	0.2	0.10	0.23	0.28	9.8	9.4	25.5	15.1
L05 S053	AK2011-1135			<1	0.2	1.27	9.7	74.0	0.2	0.12	0.25	0.31	10.9	10.5	27.5	16.7
L06 S025	AK2011-1135	609580	5820651	4	0.2	2.31	16.0	54.5	0.4	0.12	1.08	0.28	18.9	22.3	53.5	80.9
L06 S025	AK2011-1135			7	0.2	2.44	16.3	56.0	0.4	0.14	1.11	0.29	19.5	23.4	56.5	84.4
L06 S044	AK2011-1135	608908	5819980	4	0.4	1.61	34.6	89.0	0.4	0.12	0.39	0.17	24.2	12.4	55.5	45.5
L06 S044	AK2011-1135			5	0.3	1.61	34.2	90.0	0.4	0.10	0.39	0.16	24.1	12.0	53.0	43.3
L06 S057	AK2011-1135	608449	5819520	6	0.2	1.39	8.5	78.5	0.3	0.12	0.35	0.21	29.9	11.0	38.5	26.9
L06 S057	AK2011-1135			3	0.1	1.45	8.9	83.0	0.4	0.12	0.35	0.22	31.9	11.6	40.5	28.2
L06 S066	AK2011-1135	608130	5819202	2	0.1	0.82	7.5	41.0	<0.1	0.18	0.22	0.17	14.2	5.7	19.5	11.3
L06 S066	AK2011-1135			2	0.1	0.80	7.5	41.5	<0.1	0.17	0.22	0.15	13.9	5.6	18.7	11.0
L07 S06	AK2011-1135	610817	5821323	5	0.7	2.35	76.2	118.0	0.5	0.12	0.44	0.75	31.5	19.6	49.0	76.6
L07 S06	AK2011-1135			7	0.6	2.28	74.6	114.0	0.5	0.12	0.41	0.73	28.9	18.1	47.0	72.6
L07 S19	AK2011-1135	610358	5820864	1	<0.1	1.22	8.3	71.0	0.2	0.06	0.22	0.17	11.2	6.9	31.5	17.5
L07 S19	AK2011-1135			<1	<0.1	1.29	8.9	73.5	0.2	0.08	0.23	0.20	11.7	7.4	33.5	18.6
L07 S26	AK2011-1135	610110	5820616	4	0.2	1.42	21.2	65.5	0.2	0.08	0.39	0.20	20.3	12.6	53.5	68.3
L07 S26	AK2011-1135			3	0.2	1.39	20.7	65.5	0.2	0.08	0.39	0.21	20.1	12.4	52.0	66.3
L07 S43	AK2011-1135	609509	5820015	2	<0.1	0.89	4.0	32.0	0.2	0.08	0.15	0.10	15.2	7.0	31.5	13.1
L07 S43	AK2011-1135			1	<0.1	0.90	3.9	33.0	0.2	0.08	0.15	0.11	15.8	6.8	30.5	12.6

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Fe % 0.01	ICP/MS45 Ga ppm 0.0	ICP/MS45 Ge ppm 0.0	ICP/MS45 Hg ppb 5	ICP/MS45 K % 0.01	ICP/MS45 La ppm 0.5	ICP/MS45 Li ppm 1.0	ICP/MS45 Mg % 0.01	ICP/MS45 Mn ppm 5	ICP/MS45 Mo ppm 0.05	ICP/MS45 Na % 0.001	ICP/MS45 Nb ppm 0.05	ICP/MS45 Ni ppm 0.2	ICP/MS45 P ppm 1.0	ICP/MS45 Pb ppm 0.2	ICP/MS45 Rb ppm 0.1	ICP/MS45 S % 0.01
L04 S040	2.20	4.8	20.0	30	0.06	4.5	15.6	0.44	356	1.08	0.032	0.76	20.9	758	6.4	6.4	0.04
L04 S040	2.17	4.4	19.5	30	0.06	4.5	14.6	0.41	340	0.99	0.029	0.70	19.6	732	4.3	6.1	0.04
L05 S009	2.03	4.6	19.1	15	0.03	3.5	7.5	0.34	282	1.11	0.026	0.42	7.5	333	7.3	3.3	0.02
L05 S009	2.00	4.6	19.1	15	0.03	3.5	8.2	0.34	284	1.00	0.024	0.40	7.3	326	4.3	3.1	0.04
L05 S025	2.63	5.1	26.4	35	0.07	7.5	12.3	0.53	593	1.45	0.028	0.70	24.7	551	6.7	6.8	0.06
L05 S025	2.51	4.9	25.0	35	0.06	7.0	12.1	0.52	577	1.34	0.027	0.66	22.8	536	6.4	6.5	0.06
L05 S044	2.38	4.6	25.3	20	0.04	7.0	15.4	0.54	254	0.50	0.031	0.50	31.5	295	7.1	6.3	0.02
L05 S044	2.49	4.9	27.1	20	0.04	7.5	15.8	0.59	262	0.55	0.033	0.54	32.1	307	7.0	6.8	0.03
L05 S053	2.22	4.5	22.4	25	0.03	5.0	12.7	0.39	487	1.66	0.032	0.66	17.2	698	5.2	7.7	0.04
L05 S053	2.32	4.9	24.1	25	0.04	5.5	13.1	0.41	508	1.77	0.031	0.68	19.2	718	4.7	8.1	0.06
L06 S025	3.96	7.4	39.9	50	0.08	8.5	19.9	1.02	961	1.91	0.037	0.92	37.7	731	7.3	5.7	0.06
L06 S025	4.08	7.8	41.5	55	0.09	8.5	21.6	1.10	972	2.03	0.036	0.98	39.2	754	7.9	6.0	0.06
L06 S044	2.64	5.1	29.4	35	0.09	13.5	17.2	0.50	592	1.15	0.029	0.70	31.5	275	6.8	6.6	<0.02
L06 S044	2.60	4.9	29.2	35	0.09	13.5	17.5	0.50	589	1.14	0.030	0.68	29.7	273	7.3	6.8	0.04
L06 S057	2.45	4.7	16.0	35	0.13	14.0	16.7	0.58	331	1.00	0.034	0.80	29.9	357	6.9	12.1	0.04
L06 S057	2.58	4.9	17.7	35	0.13	15.0	17.3	0.61	346	1.00	0.032	0.84	31.5	382	8.2	13.0	0.04
L06 S066	1.64	3.3	8.3	15	0.05	7.0	14.5	0.30	207	0.92	0.028	0.54	15.6	641	4.6	7.0	0.04
L06 S066	1.58	3.2	7.3	15	0.05	7.2	14.2	0.30	205	0.86	0.031	0.53	15.4	651	5.0	6.9	0.04
L07 S06	3.50	5.1	10.5	55	0.09	10.5	26.7	0.56	373	1.75	0.035	0.74	42.7	410	8.6	8.3	0.04
L07 S06	3.31	4.9	9.6	55	0.09	10.0	26.1	0.53	356	1.69	0.036	0.68	40.5	392	7.8	8.2	0.04
L07 S19	2.33	4.4	6.1	15	0.05	5.5	11.7	0.47	359	1.88	0.033	0.42	17.9	346	4.0	6.8	0.06
L07 S19	2.48	4.6	6.7	15	0.05	6.0	11.9	0.50	383	1.97	0.032	0.46	19.3	351	4.3	7.1	0.04
L07 S26	2.89	4.2	7.9	40	0.15	11.0	11.5	0.65	574	2.00	0.036	0.52	38.1	350	5.4	7.6	0.04
L07 S26	2.84	4.2	7.4	45	0.15	11.0	11.5	0.64	586	2.13	0.034	0.58	36.6	344	5.5	7.5	0.04
L07 S43	1.71	2.9	4.0	10	0.05	8.0	11.9	0.41	168	0.69	0.032	0.50	19.6	236	2.7	5.7	<0.02
L07 S43	1.67	2.9	4.1	10	0.06	8.0	12.0	0.42	171	0.64	0.032	0.48	18.6	231	3.0	5.7	<0.02

APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Sb ppm 0.05	ICP/MS45 Sc ppm 0.1	ICP/MS45 Se ppm 0.2	ICP/MS45 Sn ppm 0.2	ICP/MS45 Sr ppm 2.0	ICP/MS45 Ta ppm 0.1	ICP/MS45 Te ppm 0.02	ICP/MS45 Th ppm 0.1	ICP/MS45 Ti % 0.005	ICP/MS45 Tl ppm 0.02	ICP/MS45 U ppm 0.1	ICP/MS45 V ppm 2	ICP/MS45 W ppm 0.1	ICP/MS45 Y ppm 0.1	ICP/MS45 Zn ppm 2.0	ICP/MS45 Zr ppm 1.00
L04 S040	0.82	2.9	0.2	0.3	27.5	0.05	0.06	1.1	0.066	0.06	0.2	74	0.2	2.3	75.9	1.72
L04 S040	0.84	2.7	0.2	0.2	25.5	<0.05	0.08	1.1	0.063	0.04	0.2	72	0.1	2.2	73.2	1.54
L05 S009	1.30	2.4	0.1	0.3	8.0	<0.05	0.04	0.8	0.057	0.04	0.2	70	<0.1	2.4	43.8	1.76
L05 S009	1.34	2.3	0.1	0.3	7.5	<0.05	0.04	0.8	0.055	0.04	0.2	66	<0.1	2.3	42.0	1.66
L05 S025	1.14	3.3	0.3	0.3	22.0	<0.05	0.06	1.1	0.059	0.06	0.5	70	0.1	4.8	69.0	0.97
L05 S025	1.08	3.2	0.2	0.3	21.0	<0.05	0.06	1.0	0.056	0.06	0.5	68	0.1	4.7	66.6	0.94
L05 S044	1.38	2.8	0.1	0.2	9.0	<0.05	0.04	1.9	0.037	0.08	0.2	70	0.2	2.0	55.0	1.09
L05 S044	1.58	3.1	0.2	0.2	9.5	<0.05	0.04	2.0	0.042	0.08	0.2	74	0.1	2.3	56.9	1.25
L05 S053	1.20	2.4	0.2	0.2	8.5	<0.05	0.04	1.6	0.048	0.08	0.2	64	0.1	1.8	85.9	1.68
L05 S053	1.32	2.5	0.3	0.3	9.0	<0.05	0.06	1.8	0.051	0.10	0.2	68	0.1	1.9	87.9	1.66
L06 S025	3.76	7.9	0.6	0.4	37.5	<0.05	0.14	1.9	0.130	0.06	0.5	128	0.1	8.6	89.2	3.62
L06 S025	3.80	8.0	0.5	0.4	39.0	<0.05	0.12	2.0	0.133	0.06	0.5	132	0.1	8.9	94.7	3.63
L06 S044	2.02	4.5	0.6	0.2	23.0	0.05	0.04	2.6	0.044	0.06	0.4	64	0.2	8.9	50.4	1.17
L06 S044	2.08	4.5	0.6	0.2	23.5	<0.05	0.04	2.7	0.042	0.06	0.4	60	0.1	9.1	49.4	1.13
L06 S057	0.64	3.5	0.5	0.2	21.5	<0.05	0.04	4.7	0.057	0.08	0.7	46	0.1	5.7	54.5	2.02
L06 S057	0.68	3.7	0.6	0.2	23.0	<0.05	0.04	4.9	0.061	0.08	0.8	48	0.1	6.0	57.7	2.03
L06 S066	0.36	1.2	0.3	0.2	16.5	<0.05	0.02	2.4	0.023	0.04	0.3	26	0.1	1.4	54.8	0.59
L06 S066	0.35	1.3	0.3	0.2	16.0	<0.05	0.02	2.4	0.022	0.04	0.3	24	<0.1	1.3	53.5	0.57
L07 S06	1.34	4.5	0.5	0.3	37.5	<0.05	0.06	2.9	0.048	0.08	0.4	70	0.1	6.8	250.7	2.02
L07 S06	1.30	4.2	0.5	0.3	36.0	<0.05	0.06	2.8	0.044	0.06	0.4	66	0.1	6.4	248.8	1.87
L07 S19	1.38	2.1	0.2	0.2	11.5	<0.05	0.04	1.5	0.035	0.04	0.3	62	<0.1	2.2	68.7	1.14
L07 S19	1.48	2.3	0.3	0.2	12.0	<0.05	0.06	1.6	0.037	0.04	0.3	66	<0.1	2.2	71.5	1.21
L07 S26	1.38	4.8	0.5	0.2	18.5	<0.05	0.06	2.9	0.058	0.06	0.5	62	0.1	8.5	58.5	2.89
L07 S26	1.36	4.6	0.5	0.2	18.5	<0.05	0.04	3.0	0.056	0.06	0.5	60	0.1	8.6	57.7	2.81
L07 S43	0.52	1.6	0.2	0.1	9.0	<0.05	0.02	2.0	0.045	0.06	0.3	28	0.2	2.0	42.6	1.06
L07 S43	0.54	1.6	0.2	0.1	9.5	<0.05	<0.02	2.3	0.045	0.04	0.3	26	0.1	2.1	41.9	1.05

Sample ID	Lab Report #	UTM East	UTM North	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu
		Analytical Method --->		ICP/MS	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
				ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
				1	0.1	0.01	0.1	0.5	0.1	0.02	0.01	0.01	0.1	0.1	2.0	2.0
L07 S53	AK2011-1135	609156	5819662	2	<0.1	1.20	23.5	52.5	0.2	0.10	0.35	0.21	17.9	11.4	32.5	22.4
L07 S53	AK2011-1135			1	<0.1	1.24	24.0	55.0	0.2	0.12	0.36	0.21	18.3	11.8	33.5	22.5
L07 S65	AK2011-1135	608731	5819237	2	<0.1	1.00	2.8	48.0	0.3	0.10	0.26	0.08	17.3	7.2	20.0	9.6
L07 S65	AK2011-1135			<1	<0.1	0.96	2.7	46.0	0.2	0.10	0.24	0.08	16.4	6.9	19.0	9.1
L07 S88	AK2011-1135	607918	5818424	1	0.3	0.93	2.2	31.5	0.2	0.10	0.06	0.10	15.6	5.6	17.5	9.6
L07 S88	AK2011-1135			<1	<0.1	0.93	2.2	31.0	0.2	0.10	0.06	0.10	16.6	5.5	17.5	9.5
	Lab Standards:															
Pb129a	AK2011-1135				11.5	0.85	5.2	62.0	0.1	0.42	0.49	57.45	9.2	5.1	12.0	1408.0
Pb129a	AK2011-1135				11.5	0.83	5.2	62.0	<0.1	0.42	0.49	57.14	9.1	5.0	12.0	1415.0
Pb129a	AK2011-1135				11.4	0.81	5.5	60.0	<0.1	0.46	0.47	55.53	9.6	5.2	11.0	1396.0
Pb129a	AK2011-1135				11.7	0.82	5.3	60.0	<0.1	0.48	0.47	56.04	9.8	5.2	11.0	1405.0
Pb129a	AK2011-1135				11.5	0.83	6.2	62.0	<0.1	0.40	0.45	54.51	9.5	5.0	11.0	1380.0
Pb129a	AK2011-1135				12.0	0.81	6.3	63.5	<0.1	0.42	0.48	57.50	9.0	5.2	11.5	1426.0
Pb129a	AK2011-1135				11.9	0.81	4.9	66.5	<0.1	0.40	0.45	54.27	9.2	4.9	10.5	1444.0
Pb129a	AK2011-1135				11.7	0.82	5.3	61.5	<0.1	0.44	0.48	58.53	9.8	5.3	11.5	1453.0
OXE86	AK2011-1135			597												
OXE86	AK2011-1135			605												
OXE86	AK2011-1135			609												
OXE86	AK2011-1135			599												
OXE86	AK2011-1135			610												
OXE86	AK2011-1135			611												
OXE86	AK2011-1135			515												
OXE86	AK2011-1135			614												

W.R. Gilmour, PGeo
Discovery Consultants
20-Aug-12

Sample ID	Fe	Ga	Ge	Hg	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	S
	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45	ICP/MS45
	%	ppm	ppm	ppb	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
	0.01	0.0	0.0	5	0.01	0.5	1.0	0.01	5	0.05	0.001	0.05	0.2	1.0	0.2	0.1	0.01
L07 S53	2.36	3.7	5.5	30	0.07	8.5	12.7	0.49	395	0.95	0.035	0.78	23.3	268	4.8	7.5	<0.02
L07 S53	2.44	4.0	5.8	30	0.07	8.5	13.7	0.52	415	0.93	0.033	0.80	23.7	274	5.4	8.1	0.02
L07 S65	1.76	3.1	4.3	15	0.05	7.5	17.7	0.33	113	0.79	0.032	0.58	17.2	279	4.2	6.4	0.02
L07 S65	1.69	2.9	4.1	15	0.05	7.5	16.4	0.32	109	0.72	0.032	0.54	16.4	269	4.0	6.2	0.02
L07 S88	1.74	2.8	4.3	10	0.06	7.0	13.2	0.34	95	0.46	0.032	0.48	18.2	473	4.6	6.7	<0.02
L07 S88	1.73	2.8	4.2	10	0.06	7.5	13.3	0.34	96	0.50	0.034	0.44	18.2	465	3.8	6.9	<0.02
Pb129a	1.58	2.5	4.5	70	0.13	4.0	1.1	0.70	375	1.89	0.048	0.12	5.4	431	6125.0	3.4	0.82
Pb129a	1.56	2.5	4.5	75	0.12	4.0	0.9	0.69	373	1.90	0.044	0.12	5.2	422	6248.0	3.4	0.80
Pb129a	1.55	2.5	4.9	75	0.10	4.0	1.7	0.66	359	2.02	0.045	0.14	5.6	412	6089.0	3.2	0.82
Pb129a	1.57	2.5	5.4	75	0.10	4.5	1.7	0.66	353	2.07	0.050	0.12	5.5	420	6228.0	3.2	0.84
Pb129a	1.59	2.4	5.0	70	0.11	4.0	1.7	0.66	348	2.05	0.050	0.12	5.3	424	6136.0	3.3	0.84
Pb129a	1.57	2.4	4.7	70	0.12	4.5	1.6	0.69	368	2.11	0.052	0.12	5.4	406	6291.0	3.5	0.81
Pb129a	1.54	2.3	4.5	75	0.10	3.5	1.5	0.67	355	1.99	0.050	0.10	4.7	409	6043.0	3.0	0.80
Pb129a	1.68	2.5	4.9	75	0.11	4.0	1.8	0.69	374	2.17	0.053	0.10	5.1	418	6197.0	3.3	0.82
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APPENDIX I - Soil Geochemistry

Sample ID	ICP/MS45 Sb ppm 0.05	ICP/MS45 Sc ppm 0.1	ICP/MS45 Se ppm 0.2	ICP/MS45 Sn ppm 0.2	ICP/MS45 Sr ppm 2.0	ICP/MS45 Ta ppm 0.1	ICP/MS45 Te ppm 0.02	ICP/MS45 Th ppm 0.1	ICP/MS45 Ti % 0.005	ICP/MS45 Tl ppm 0.02	ICP/MS45 U ppm 0.1	ICP/MS45 V ppm 2	ICP/MS45 W ppm 0.1	ICP/MS45 Y ppm 0.1	ICP/MS45 Zn ppm 2.0	ICP/MS45 Zr ppm 1.00
L07 S53	1.34	2.6	0.3	0.2	24.0	<0.05	0.04	2.1	0.051	0.06	0.3	38	0.2	3.1	59.2	1.35
L07 S53	1.42	2.6	0.3	0.2	25.0	<0.05	0.02	2.1	0.052	0.06	0.3	38	0.1	3.3	61.9	1.23
L07 S65	0.22	1.3	0.4	0.1	21.0	<0.05	<0.02	2.5	0.029	0.04	0.3	20	0.1	1.7	36.5	0.76
L07 S65	0.20	1.2	0.3	0.1	20.0	<0.05	<0.02	2.5	0.027	0.04	0.3	18	0.1	1.6	35.0	0.65
L07 S88	0.16	1.1	0.2	0.1	5.5	<0.05	<0.02	2.9	0.027	0.04	0.3	18	<0.1	1.4	39.1	1.07
L07 S88	0.16	1.1	0.1	0.1	5.5	<0.05	<0.02	3.3	0.026	0.04	0.3	16	<0.1	1.5	39.2	0.99
Pb129a	16.24	0.7	0.2	1.1	29.5	<0.05	0.30	0.2	0.041	0.04	<0.1	18	0.2	2.2	>10000	1.94
Pb129a	16.30	0.7	0.2	1.1	31.0	<0.05	0.30	0.2	0.040	0.04	<0.1	20	0.2	2.3	>10000	1.84
Pb129a	15.10	0.8	0.2	1.0	28.5	<0.05	0.26	0.5	0.039	0.06	0.1	18	0.1	2.1	>10000	1.94
Pb129a	15.26	0.9	0.1	1.0	28.5	<0.05	0.30	0.5	0.039	0.06	0.1	18	0.1	2.1	>10000	1.85
Pb129a	15.02	0.6	0.2	1.0	29.5	<0.05	0.30	0.5	0.038	<0.02	0.1	20	<0.1	2.1	9976.0	1.96
Pb129a	15.68	0.7	0.2	1.0	31.0	<0.05	0.32	0.5	0.041	0.02	0.1	18	0.1	2.2	>10000	2.09
Pb129a	15.00	0.6	0.1	1.0	30.0	<0.05	0.28	0.4	0.036	0.04	<0.1	20	0.2	1.9	9986.0	1.95
Pb129a	16.36	0.7	0.1	1.0	30.5	<0.05	0.28	0.4	0.039	0.04	<0.1	20	0.2	2.0	>10000	1.96
OXE86																
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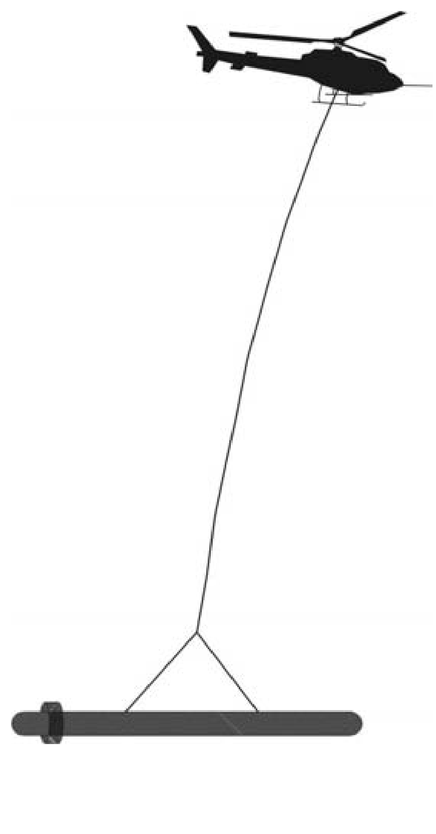
APPENDIX II

DIGHEM Survey for Spanish Mountain Gold Ltd.,
Spanish Mountain 2011 Area, Likely BC,
by Fugro Airborne Surveys,
dated January 12, 2012,
Report #11077

Report # 11077

DIGHEM ^{V} SURVEY
FOR
SPANISH MOUNTAIN GOLD LTD.
SPANISH MOUNTAIN 2011 AREA,
LIKELY, B.C.

NTS: 93 A/6, 11, 12



Fugro Airborne Surveys Corp.
Mississauga, Ontario

January 12, 2012

SUMMARY

This report describes the logistics, data acquisition, processing, and presentation of results pertaining to a DIGHEM^{V} airborne geophysical survey carried out for Spanish Mountain Gold Ltd., over a survey block located near Likely, B.C. Total coverage of the property amounted to 1395 line-km. The survey was flown from September 24 to October 1, 2011.

The multiple objectives of the survey were to determine the geophysical signatures over known mineralized zones; to map any intrusions, shears, or alteration zones that might be favourable for gold deposition; to detect conductive (sulphide or graphite) mineralization or magnetite-rich skarns; to outline any large circular features that might reflect Mt. Polley type Cu-Au porphyry intrusions; and to provide information that could be used to map the complex geology and structure of the survey area.

This was effected by using a DIGHEM ^{V} multi-coil, multi-frequency electromagnetic system, supplemented by a high sensitivity magnetometer. The information from these sensors was processed to produce maps that display the magnetic and conductive properties of the survey area. A GPS electronic navigation system ensured accurate positioning of the geophysical data with respect to the base maps.

The survey outlined numerous anomalous features, both resistive and conductive, some of which are considered to be of moderate to high priority as exploration targets. Although vein-type auriferous targets are often associated with resistive units, rather than conductive units, there are numerous highly conductive sources evident in the proposed pit area. Auriferous mineralization in the area is reportedly hosted by argillites that are high in graphite and pyrite content. These sources are likely to be conductive, but probably not magnetic. Conversely, some boulders in the area reportedly contain semi-massive pyrrhotite, which would be both conductive and magnetic. Therefore, both magnetic and non-magnetic conductors are considered to be of interest in this area.

Portions of the survey area are covered by overburden, lakes, and creek valleys, which have yielded background values of moderately low (<200 ohm-m) resistivity. The first ridge of high ground northeast of Quesnel Lake is resistive, as one might expect. However, the other two sub-parallel ridges to the NE, and the valley in between, are generally much more conductive. Resistivity values of less than 50 ohm-m are evident along the second ridge, and drop to less than 1 ohm-m under the third ridge, in the NE corner of the property. In general, the lowest resistivities are observed on the lower (900 Hz) frequency, which indicates that the conductance increases at depth, or that the conductive unit is covered by up to 40m of more resistive cover in some areas. Some of the resistive units within this large conductive zone could be due to felsic or mafic intrusions.

Areas of interest may be assigned priorities on the basis of supporting geophysical, geochemical and/or geological information. After initial investigations have been carried out, it may be necessary to re-evaluate the remaining anomalous responses based on information acquired from the follow-up program.

In some portions of the survey area, the steep topography forced the pilot to exceed normal terrain clearance for reasons of safety. It is possible that some weak conductors may have escaped detection in areas where the bird height exceeded 120 m. In difficult areas where near-vertical climbs were necessary, the forward speed of the helicopter was reduced to a level that permitted excessive bird swinging. This problem, combined with the severe stresses to which the bird was subjected, gave rise to aerodynamic noise levels that are slightly higher than normal on some lines. Where warranted, reflights were carried out to minimize these adverse effects.

There is a small gap in coverage neat the intersection of line 10210 and tie line 19080, near the road along the northeastern shore of Quesnel Lake. The proposed flight path was altered in this area in order to safely avoid a physical obstruction. The property contains numerous cultural sources that have affected the geophysical responses.

CONTENTS

APPENDICES

1. INTRODUCTION

A DIGHEM V electromagnetic/resistivity/magnetic survey was flown for Spanish Mountain Gold Ltd., over a survey block located near Likely, B.C. Total coverage of the survey block amounted to 1395 line-km, including 128 km of tie lines. The survey was flown from September 24 to October 1, 2011. The survey area can be located on NTS map sheets 93 A/6/11/12. (Figure 2)

Flight lines were flown NE-SW with a line separation of 100 metres. Tie lines were flown orthogonal to the traverse lines (NW-SE) with a line separation of 1000 metres

The survey employed the DIGHEM ^{V} electromagnetic system. Ancillary equipment consisted of an optically pumped, high-sensitivity cesium magnetometer, radar, laser and barometric altimeters, a video camera, digital recorders, and an electronic navigation system. The instrumentation was installed in an AS350-B2 turbine helicopter (Registration C-GJIX) that was provided by Questral Helicopters Ltd. The helicopter flew at an average airspeed of 100 km/h with an EM sensor height of approximately 35 metres.

Figure 1: Fugro Airborne Surveys DIGHEM ^{V} EM bird with AS350-B2

2. SURVEY OPERATIONS

The base of operations for the survey was established at the the Spanish Mountain Gold Camp, at the NW corner of the property. Table 2-1 lists the corner coordinates of the survey block in NAD83, UTM Zone 10N, central meridian 123°W.

Table 2-1

Nad83 UTM zone 10N

Block	Corners	X-UTM (E)	Y-UTM (N)
11077-1	1	598044	5830654
Spanish	2	605270	5830934
Mountain	3	605275	5830286
2011	4	608509	5830212
	5	608549	5828199
	6	607441	5828165
	7	607594	5821566
	8	613951	5821691
	9	613981	5820289
	10	610232	5818381
	11	604709	5817296
	12	598212	5822743

The survey specifications were as follows:

Parameter	**Specifications**
Traverse line direction	45°/ 225°
Traverse line spacing	100m
Tie line direction	1356°/ 315°
Tie line spacing	1000m
Sample interval	10 Hz, 2.75 m @ 100 km/h
Aircraft mean terrain clearance	65 m
EM & mag sensors mean terrain clearance	35m
Average speed	100 km/h
Navigation (guidance)	±5 m, Real-time GPS
Post-survey flight path	±2 m, Differential GPS

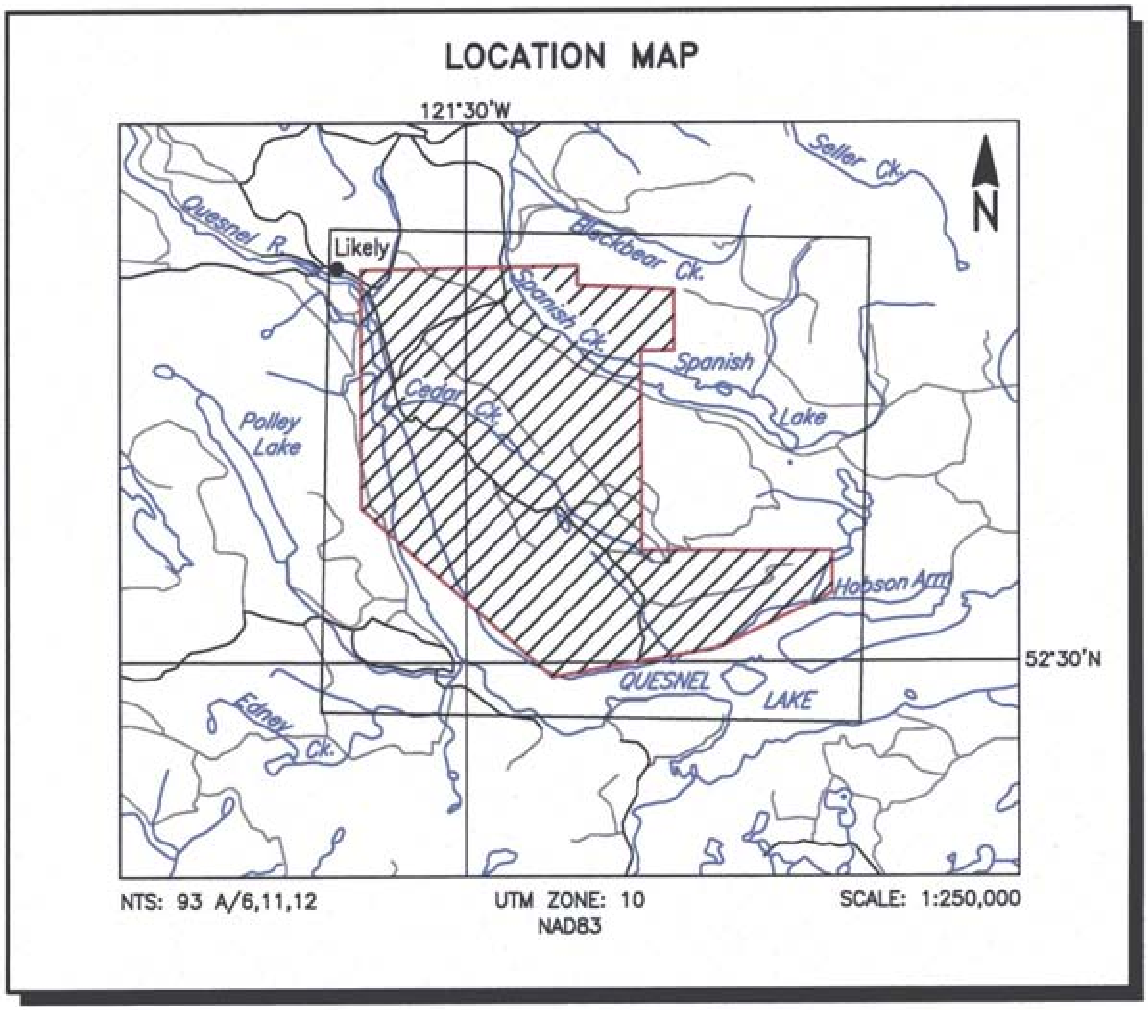


Figure 2-1
Location Map and Sheet Layout
Spanish Mountain 2011 Project Area
Job # 11077

3. SURVEY EQUIPMENT

This section provides a brief description of the geophysical instruments used to acquire the survey data and the calibration procedures employed. The geophysical equipment was installed in an AS350-B2 helicopter. This aircraft provides a safe and efficient platform for surveys of this type.

Electromagnetic System

Model: DIGHEM ^{V}-BKS 54

Type: Towed bird, symmetric dipole configuration operated at a nominal survey altitude of 50 metres. Coil separation is 8 metres for 900 Hz, 1000 Hz, 5500 Hz and 7200 Hz, and 6.3 metres for the 56,000 Hz coil-pair.

Coil orientations, frequencies and dipole moments

Atm^2	orientation	nominal	actual
211	coaxial /	1000 Hz	1114 Hz
211	coplanar /	900 Hz	924 Hz
67	coaxial /	5500 Hz	5495 Hz
56	coplanar /	7200 Hz	7095 Hz
15	coplanar /	56,000 Hz	55630 Hz

Channels recorded:
5 in-phase channels
5 quadrature channels
2 monitor channels

Sensitivity:
0.06 ppm at 1000 Hz Cx
0.12 ppm at 900 Hz Cp
0.12 ppm at 5,500 Hz Cx
0.24 ppm at 7,200 Hz Cp
0.60 ppm at 56,000 Hz Cp

Sample rate:	10 per second, equivalent to 1 sample every 2.75 m, at a survey speed of 100 km/h.

The electromagnetic system utilizes a multi-coil coaxial/coplanar technique to energize conductors in different directions. The coaxial coils are vertical with their axes in the flight direction. The coplanar coils are horizontal. The secondary fields are sensed simultaneously by means of receiver coils that are maximum-coupled to their respective transmitter coils. The system yields an in-phase and a quadrature channel from each transmitter-receiver coil-pair.

In-Flight EM System Calibration

Calibration of the system during the survey uses the Fugro AutoCal automatic, internal calibration process. At the beginning and end of each flight, and at intervals during the flight, the system is flown up to high altitude to remove it from any “ground effect” (response from the earth). Any remaining signal from the receiver coils (base level) is measured as the zero level, and is removed from the data collected until the time of the next calibration. Following the zero level setting, internal calibration coils, for which the response phase and amplitude have been determined at the factory, are automatically triggered --- one for each frequency. The on-time of the coils is sufficient to determine an accurate response through any ambient noise. The receiver response to each calibration coil “event” is compared to the expected response (from the factory calibration) for both phase angle and amplitude, and any phase and gain corrections are automatically applied to bring the data to the correct value. In addition, the outputs of the transmitter coils are continuously monitored during the survey, and the gains are adjusted to correct for any change in transmitter output.

Because the internal calibration coils are calibrated at the factory (on a resistive half-space) ground calibrations using external calibration coils on-site are not necessary for system calibration. A check calibration may be carried out on-site to ensure all systems are working correctly. All system calibrations will be carried out in the air, at sufficient altitude that there will be no measurable response from the ground.

The internal calibration coils are rigidly positioned and mounted in the system relative to the transmitter and receiver coils. In addition, when the internal calibration coils are calibrated at the factory, a rigid jig is employed to ensure accurate response from the external coils.

Using real time Fast Fourier Transforms and the calibration procedures outlined above, the data are processed in real time, from measured total field at a high sampling rate, to in-phase and quadrature values at 10 samples per second.

Airborne Magnetometer

Model:	Scintrex CS-3 sensor with a Fugro D1344 counter.
Type:	Optically pumped cesium vapour
Sensitivity:	0.01 nT
Sample rate:	10 per second

The magnetometer sensor is housed in the HEM bird, which is flown 28 m below the helicopter.

Magnetic Base Station

Model:	Fugro CF1 base station with timing provided by integrated GPS	
Sensor type:	Scintrex CS-3	
Counter specifications:	Accuracy:	±0.1 nT
	Resolution:	0.01 nT
	Sample rate	1 Hz

GPS specifications:	Model:	Marconi Allstar
	Type:	Code and carrier tracking of L1 band, 12-channel, C/A code at 1575.42 MHz
	Sensitivity:	-90 dBm, 1.0 second update
	Accuracy:	Manufacturer's stated accuracy for differential corrected GPS is 2 metres

Environmental Monitor specifications: Temperature:

- Accuracy: ±1.5ºC max
- Resolution: 0.0305ºC
- Sample rate: 1 Hz
- Range: -40ºC to +75ºC

Barometric pressure:

- Model: Motorola MPXA4115AP
- Accuracy: ±3.0º kPa max (-20ºC to 105ºC temp. ranges)
- Resolution: 0.013 kPa
- Sample rate: 1 Hz
- Range: 55 kPa to 108 kPa

Sample rate: 3 second intervals

A digital recorder is operated in conjunction with the base station magnetometer to record the diurnal variations of the earth's magnetic field. The clock of the base station is synchronized with that of the airborne system, using GPS time, to permit subsequent removal of diurnal drift. The Fugro CF1 was the primary magnetic base station. It was located at the Spanish Mountain Gold camp, at WGS 84 Latitude 52° 37′ 07.69916 ″ N; Longitude 121° 31′ 58.95381″ W.

Navigation (Global Positioning System)

Airborne Receiver for Real-time Navigation & Guidance

Model:	NovAtel OEM4.
Type:	Code and carrier tracking of L1-C/A code at 1575.42 MHz and L2-P code at 1227.0 MHz. Dual frequency, 24-channel. WAAS enabled.
Sensitivity:	-132 dBm, 10 Hz update.
Accuracy:	Manufacturer's stated accuracy is better than 2 metres, real time.
Antenna:	Aero AT1675; Mounted on tail of aircraft.

Airborne Receiver for Sensor Location

Model:	NovAtel OEM4.
Type:	Code and carrier tracking of L1-C/A code at 1575.42 MHz and L2-P code at 1227.0 MHz. Dual frequency, 24-channel. WAAS enabled.
Sensitivity:	-132 dBm, 10 Hz update.
Accuracy:	Better than 2 metres, real time.
Antenna:	Aero AT2775; Mounted in bird.

Primary Base Station for Post-Survey Differential Correction

Model:	NovAtel OEM4
Type:	Code and carrier tracking of L1-C/A code at 1575.42 MHz and L2-P code at 1227.0 MHz. Dual frequency, 24-channel.
Sample rate:	10 Hz update.
Accuracy:	Better than 1 metre in differential mode.

Secondary GPS Base Station

Model:	Marconi Allstar, CMT-1200
Type:	Code and carrier tracking of L1 band, 12-channel, C/A code at 1575.42 MHz
Sensitivity:	-90 dBm, 1.0 second update
Accuracy:	Manufacturer’s stated accuracy for differential corrected GPS is better than 2 metres.

The Wide Area Augmentation System (WAAS enabled) NovAtel OEM4 is a line of sight, satellite navigation system that utilizes time-coded signals from at least four of forty-eight available satellites. Both GLONASS and NAVSTAR satellite constellations are used to calculate the position and to provide real time guidance to the helicopter. For flight path processing, a similar NovAtel system was used as the primary base station receiver. The mobile and base station raw XYZ data were recorded, thereby permitting post-survey differential corrections for theoretical accuracies of better than 2 metres. A Marconi Allstar GPS unit, part of the CF-1, was used as a secondary (back-up) base station.

Each base station receiver is able to calculate its own latitude and longitude. For this survey, the primary GPS station was located with the magnetic base station at Latitude 57° 37′ 05.65598″ N; Longitude 121° 31′ 59.52788″ W, at an orthometric elevation of 928.309 m (a.m.s.l.). The back-up (Marconi) unit was located nearby, at Latitude 57° 37′ 05.69916″ N; Longitude 121° 31′ 59.95381″ W, at an orthometric elevation of 909.487 m (a.m.s.l.).

The GPS records data relative to the WGS84 ellipsoid, which is the basis of the revised North American Datum (NAD83). Conversion software is used to transform the WGS84 Lat/Lon coordinates to the UTM Zone 10N system displayed on the maps.

Radar Altimeter

Manufacturer:	Honeywell/Sperry
Model:	AA 300
Type:	Short pulse modulation, 4.3 GHz
Sensitivity:	0.3 m
Sample rate:	10 per second

The radar altimeter measures the vertical distance between the helicopter and the ground except in areas of dense tree cover. This information is used in the processing algorithm that determines conductor depth.

Barometric Pressure and Temperature Sensors

Model:	DIGHEM D 1300	
Type:	Motorola MPX4115AP analog pressure sensor	
	AD592AN high-impedance remote temperature sensors	
Sensitivity:	Pressure:	150 mV/kPa
	Temperature:	100 mV/℃ or 10 mV/℃ (selectable)
Sample rate:	10 per second	

The D1300 circuit is used in conjunction with one barometric sensor and up to three temperature sensors. Two sensors (baro and temp) are installed in the EM console in the aircraft, to monitor pressure (KPA) and internal operating temperature (TEMP_INT). A third sensor (TEMP_EXT) was used to measure the external ambient temperature variations.

Digital Data Acquisition System

Manufacturer:	Fugro
Model:	HeliDAS – Integrated Data Acquisition System
Recorder:	SanDisk compact flash card (PCMCIA)

The stored data are downloaded to the field workstation PC at the survey base, for verification, backup and preparation of in-field products.

Video Flight Path Recording System

Type:	Axis 2420 Digital Network Camera
Recorder:	Axis 241S Video Server and Tablet Computer
Format:	BIN/BDX

Fiducial numbers are recorded continuously and are displayed on the margin of each image. This procedure ensures accurate correlation of data with respect to visible features on the ground.

4. QUALITY CONTROL AND IN-FIELD PROCESSING

Digital data for each flight were transferred to the field workstation, in order to verify data quality and completeness. A database was created and updated using Geosoft Oasis Montaj and proprietary Fugro Atlas software. This allowed the field personnel to calculate, display and verify both the positional (flight path) and geophysical data on a screen or printer. Records were examined as a preliminary assessment of the data acquired for each flight.

In-field processing of Fugro survey data consists of differential corrections to the airborne GPS data, verification of the flight path, verification of EM calibrations, drift correction of the raw airborne EM data, spike rejection and filtering of all geophysical and ancillary data, verification of the flight videos, calculation of preliminary resistivity data, diurnal correction, and preliminary leveling of magnetic data.

All data, including base station records, were checked on a daily basis, to ensure compliance with the survey contract specifications. Reflights were required if any of the following specifications were not met.

Navigation - Positional (x,y) accuracy of better than 10 m, with a CEP (circular error of probability) of 95%.

Flight Path - No lines to exceed ±25 % departure from nominal line spacing over a continuous distance of more than 1 km, except for reasons of safety.

Clearance - Mean terrain sensor clearance of 35 m, ±10 m, except where precluded by safety considerations, e.g., restricted or populated areas, severe topography, obstructions, tree canopy, aerodynamic limitations, etc.

Airborne Mag - Aerodynamic magnetometer noise envelope not to exceed 0.5 nT over a distance of more than 1 km. The non-normalized 4th difference not to exceed 1.6 nT over a continuous distance of 1 kilometre excluding areas where this specification is exceeded due to natural anomalies.

Base Mag - Diurnal variations not to exceed 10 nT over a straight-line time chord of 1 minute.

EM - Spheric pulses may occur having strong peaks but narrow widths. The EM data area considered acceptable when their occurrence is less than 10 spheric events exceeding the stated noise specification for a given frequency per 100 samples continuously over a distance of 2,000 metres.

Frequency	**Coil Orientation**	**Peak to Peak Noise Envelope (ppm)**
1000Hz	vertical coaxial	5.0
900 Hz	horizontal coplanar	10.0
5500 Hz	vertical coaxial	10.0
7200 Hz	horizontal coplanar	20.0
56,000 Hz	horizontal coplanar	40.0

5. DATA PROCESSING

Flight Path Recovery

The raw range data from at least four satellites are simultaneously recorded by both the base and mobile GPS units. The geographic positions of both units, relative to the model ellipsoid, are calculated from this information. Differential corrections, which are obtained from the base station, are applied to the mobile unit data to provide a post-flight track of the aircraft, accurate to within 2 m. Speed checks of the flight path are also carried out to determine if there are any spikes or gaps in the data.

The corrected WGS84 latitude/longitude coordinates are transformed to the UTM coordinate system used on the final maps. Images or plots are then created to provide a visual check of the flight path.

Electromagnetic Data

EM data are processed at the recorded sample rate of 10 samples/second. Spheric rejection median and Hanning filters are then applied to reduce noise to acceptable levels. EM test profiles are then created to allow the interpreter to select the most appropriate EM anomaly picking controls for a given survey area. The EM picking parameters depend on several factors but are primarily based on the dynamic range of the resistivities within the survey area, and the types and expected geophysical responses of the targets being sought.

The interpretation geophysicist determines initial anomaly picking parameters and thresholds. Anomalous electromagnetic responses that meet the specific criteria are then automatically selected and analysed by computer to provide a preliminary electromagnetic anomaly map. The automatic selection algorithm is intentionally oversensitive to assure that no meaningful responses are missed. Using the preliminary maps in conjunction with the multi-parameter stacked profiles, the interpreter then classifies the anomalies according to their source and eliminates those that are not substantiated by the data. The final interpreted EM anomaly map will include bedrock, surficial and cultural conductors. A map containing only bedrock conductors can be generated, if desired.

Apparent Resistivity

The apparent resistivities in ohm-m are generated from the in-phase and quadrature EM components for all of the coplanar frequencies, using a pseudo-layer half-space model. The inputs to the resistivity algorithm are the in-phase and quadrature amplitudes of the secondary field. The algorithm calculates the apparent resistivity in ohm-m, and the apparent height of the bird above the conductive source. Any difference between the apparent height and the true height, as measured by the radar altimeter, is called the pseudo-layer and reflects the difference between the real geology and a homogeneous half-space. This difference is often attributed to the presence of a highly resistive upper layer. Any errors in the altimeter reading, caused by heavy tree cover, are included in the pseudo-layer and do not affect the resistivity calculation. The apparent depth estimates, however, will reflect the altimeter errors. Apparent resistivities calculated in this manner may differ from those calculated using other models.

In any areas where the effects of magnetic permeability or dielectric permittivity have suppressed the in-phase responses, the calculated resistivities will be erroneously high. Various algorithms and inversion techniques can be used to partially correct for the effects of permeability and permittivity.

Apparent resistivity maps portray all of the information for a given frequency over the entire survey area. This full coverage contrasts with the electromagnetic anomaly map, which provides information only over interpreted conductors. The large dynamic range afforded by the multiple frequencies makes the apparent resistivity parameter an excellent mapping tool.

The preliminary apparent resistivity maps and images are carefully inspected to identify any lines or line segments that might require base level adjustments. Subtle changes between in-flight calibrations of the system can result in line-to-line differences that are more recognizable in resistive (low signal amplitude) areas. If required, manual level adjustments are carried out to eliminate or minimize resistivity differences that can be attributed, in part, to changes in operating temperatures. These leveling adjustments are usually very subtle, and do not result in the degradation of discrete anomalies.

After the manual leveling process is complete, revised resistivity grids are created. The resulting grids can be subjected to a microleveling technique in order to smooth the data for contouring. The coplanar resistivity parameter has a broad 'footprint' that requires very little filtering.

The calculated resistivities for the 900 Hz, 7200 Hz and 56kHz coplanar frequencies are included in the XYZ and grid archives. Apparent Resistivity maps have been created from the two higher frequencies (7200 and 56000 Hz). Values are in ohm-metres on all final products.

Resistivity-depth Sections (optional)

The apparent resistivities for all frequencies can be displayed simultaneously as coloured resistivity-depth sections. Usually, only the coplanar data are displayed as the close frequency separation between the coplanar and adjacent coaxial data tends to distort the section. The sections can be plotted using the topographic elevation profile as the surface. The digital elevations, in metres a.m.s.l., can be calculated from the GPS Z-value or barometric altimeter, minus the aircraft radar altimeter.

Resistivity-depth sections are not recommended for most of this area because portions are too resistive to yield meaningful results. In more conductive environments, however, resistivity-depth sections can be generated in three formats:

(1) Sengpiel resistivity sections, where the apparent resistivity for each frequency is plotted at the depth of the centroid of the in-phase current flow[1]; and,

(2) Differential resistivity sections, where the differential resistivity is plotted at the differential depth[2].

(3) Occam[3] or Multi-layer[4] inversion

Both the Occam and multi-layer inversions compute the layered earth resistivity model that would best match the measured EM data. The Occam inversion uses a series of thin, fixed layers (usually 20 x 5m and 10 x 10m layers) and computes resistivities to fit the EM data. The multi-layer inversion computes the resistivity and thickness for each of a defined number of layers (typically 3-5 layers) to best fit the data.

Residual Magnetic Intensity

The residual magnetic intensity (RMI) is derived from the total magnetic field (TMF) channels, the diurnal, and the regional magnetic field. The total magnetic intensity is recorded in the aircraft, the diurnal is measured from the ground base station, and the regional magnetic field is calculated from the updated IGRF (International Geomagnetic Reference Field).

A fourth difference editing routine is applied to the magnetic data to remove any spikes. The data are then corrected for diurnal variation using the magnetic base station data. These results can then be leveled using tie and traverse line intercepts. Manual adjustments are applied to any lines that require leveling, as indicated by shadowed images of the gridded magnetic data.

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[1] Sengpiel, K.P., 1988, Approximate Inversion of Airborne EM Data from Multilayered Ground: Geophysical Prospecting 36, 446-459.

[2] Huang, H. and Fraser, D.C., 1993, Differential Resistivity Method for Multi-frequency Airborne EM Sounding: presented at Intern. Airb. EM Workshop, Tucson, Ariz.

[3] Constable et al, 1987, Occam's inversion: a practical algorithm for generating smooth models from electromagnetic sounding data: Geophysics, 52, 289-300.

[4] Huang H., and Palacky, G.J., 1991, Damped least-squares inversion of time domain airborne EM data based on singular value decomposition: Geophysical Prospecting, 39, 827-844.

The IGRF is calculated for the specific survey location and the time of the survey, and is then removed from the leveled magnetic data to yield the residual magnetic intensity (RMI). The leveled data are then subjected to a microleveling filter for gridding and contouring

Calculated Vertical Magnetic Gradient

The diurnally-corrected residual magnetic field data are subjected to a processing algorithm that enhances the response of magnetic bodies in the upper 500 m and attenuates the response of deeper bodies. The resulting vertical gradient map provides better definition and resolution of near-surface magnetic units. It also identifies weak magnetic features that may not be evident on the total field or residual magnetic maps. However, regional magnetic variations and changes in lithology may be better defined on the total magnetic field or residual magnetic intensity maps.

Magnetic Derivatives (optional)

The total magnetic field data can be subjected to a variety of filtering techniques to yield maps or images of the following:

- enhanced magnetics
- second vertical derivative
- reduction to the pole/equator
- magnetic susceptibility with reduction to the pole
- upward/downward continuations
- analytic signal

All of these filtering techniques improve the recognition of near-surface magnetic bodies, with the exception of upward continuation. Any of these parameters can be produced on request.

Contour, Colour and Shadow Map Displays

The geophysical data are interpolated onto a regular grid using a modified Akima spline technique. The resulting grid is suitable for image processing and generation of contour maps. The grid cell size is usually 20% of the line interval, and cell size of 20 m was used for this block.

Colour maps or images are produced by interpolating the grid down to the pixel size. The parameter is then incremented with respect to specific amplitude ranges to provide colour "contour" maps.

Monochromatic shadow maps or images can be generated by employing an artificial sun to cast shadows on a surface defined by the geophysical grid. There are many variations in the shadowing technique. These techniques can be applied to total field or enhanced magnetic data, magnetic derivatives, resistivity, etc. The shadowing technique is also used as a quality control method to detect subtle changes between lines.

Digital Elevation (optional)

The altimeter values (sensor to ground clearance) are subtracted from the differentially corrected and de-spiked GPS-Z values to produce profiles of the orthometric heights (a.m.s.l.) along the survey lines. These values are gridded to produce contour maps showing approximate elevations within the survey area. The calculated digital terrain data are then tie-line leveled and can be adjusted to any known benchmarks in the survey area. Any remaining subtle line-to-line discrepancies are manually removed. After the manual corrections are applied, the digital terrain data are filtered with a microleveling algorithm.

The accuracy of the elevation calculation is directly dependent on the accuracy of the two input parameters, altimeter and GPS-Z. The altimeter values may be erroneous in areas of heavy tree cover, where the altimeter reflects the distance to the tree canopy rather than the ground. The GPS-Z value is primarily dependent on the number of available satellites. Although post-processing of GPS data will yield X and Y accuracies in the order of 1-2 metres, the accuracy of the Z value is usually much less, sometimes in the ±10 metre range. Further inaccuracies might be introduced during the interpolation and gridding process.

The data archive contains the calculated digital elevations above the geoid (a.m.s.l.). Because of the inherent inaccuracies of this method, no guarantee is made or implied that the information displayed is a true representation of the height above sea level. Although this product may be of some use as a general reference, <u>THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.</u>

6. PRODUCTS

This section lists the final maps and products that are provided under the terms of the survey agreement. Other products can be prepared from the existing dataset, if requested. These include stacked multi-parameter profiles, magnetic enhancements or derivatives, percent magnetite, and digital elevation. Most parameters can be displayed as contours, profiles, or in colour; or as digital images in PDF or other file formats.

Base Maps

Base maps of the survey area were produced by scanning published topographic maps to a bitmap (.bmp) format. This process provides a relatively accurate, distortion-free base that facilitates correlation of the navigation data to the map coordinate system. It should be noted that the (older) scanned topographic maps show UTM coordinate lines in the NAD 27 datum, whereas the smaller graticules (crosses) are in the newer NAD 83 system. The difference between the two coordinate systems is seen as a shift of about 230 m to the south and 95 m to the east for NAD 83 relative to NAD 27. This is not a location error, as the NAD 83 geophysical data are properly positioned relative to the NAD 27 topography. The NAD 27 topographic files were combined with NAD 83 geophysical data for plotting the final maps. All maps were created using the following parameters:

<u>Projection Description</u>:

Datum:	NAD 83
Ellipsoid:	WGS 84; GRS 1980
Projection:	UTM (Zone: 10N)
Central Meridian:	123° W
False Northing:	0
False Easting:	500000
Scale Factor:	0.9996
WGS84 to Local Conversion:	Molodensky
Datum Shifts:	DX: 0 DY: 0 DZ: 0

Final Products

The following parameters have been presented on a single map sheet at a scale of 1:20,000. All maps include flight lines and topography, unless otherwise indicated.

	1 Map Sheet x 2 Sets	
	Blackline	Colour
EM Anomalies		1x2
Residual Magnetic Intensity		1x2
Calculated Vertical Magnetic Gradient		1x2
Apparent Resistivity 7200 Hz		1x2
Apparent Resistivity 56 kHz		1x2

<u>Additional Products</u>

Digital Archives* (see Archive Description)	1 DVD
Final Digital versions of all maps above*	PDF files on Archive (+DXF of EM)
Flight Path Video Records	4 DVDs
Survey Report	2 copies + PDF version

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7. SURVEY RESULTS

General Discussion

The EM anomaly picking routine has been designed to detect conductive sulphide (or graphite) zones as well as zones of alteration or clay-rich shears. However, other targets of interest may be resistive, rather than conductive. As quartz-vein or porphyry-type auriferous mineralization is likely to be very poorly conductive, anomaly picks were based primarily on the mid-frequency (5500 Hz) coaxial channel, which responds better to weaker conductors than the lower 1000 Hz. Stronger conductors however, will also be evident on the lower frequencies.

Resistive units do not yield strong secondary responses, and are therefore considered to be non-anomalous. However, in the presence of conductive hosts, these resistive units often show as troughs in the EM channels profiles, which in turn, give rise to resistivity highs. Narrow resistive units may not be obvious on the “averaged” resistivity grids, but can often be seen on the profiled resistivity data, particularly at the higher frequencies. In the search for thin resistive units, the high frequency resistivity profiles can provide valuable information. In addition to resistive units, It should be noted that troughs or depressions in the EM profiles can also be caused by changes in flying height or by the presence of magnetite (in-phase channels only).

Table 7-1 summarizes the EM responses in the survey area, with respect to conductance grade and interpretation. For “discrete” conductors (B, D, or T), the apparent conductance and depth values shown in the EM Anomaly list appended to this report have been calculated from “local” in-phase and quadrature amplitudes of the Coaxial 5500 Hz frequency, using a near vertical, half plane model. Conductance values for the broader (S, H, or E) types have been calculated from absolute amplitudes using a horizontal half-space model.

Wide bedrock conductors or flat-lying conductive units, (S, H, or E) whether from surficial or bedrock sources, may give rise to very broad anomalous responses on the EM profiles. These may not appear on the electromagnetic anomaly map if they have a regional character rather than a locally anomalous character. These broad conductors, which more closely approximate a half-space model, will be maximum coupled to the horizontal (coplanar) coil-pair and should be more evident on the resistivity parameters. Resistivity maps, therefore, may be more valuable than the electromagnetic anomaly maps, in areas where broad or flat-lying conductors are considered to be of importance, or where resistive units are being sought. All three coplanar resistivity grids are included on the final data archive.

The picking and interpretation procedure for EM conductors relies on several parameters and calculated functions. For this survey, the Coaxial 5500 Hz responses and the mid-frequency difference channels were used as two of the main picking criteria. The 7200 Hz coplanar results were also weighted to provide picks over wide or flat-dipping sources. The quadrature channels provided picks in any areas where the in-phase responses might have been suppressed by magnetite.

As previously mentioned, because of the possibility that some of the auriferous mineralization in the area could be poorly conductive, the difference calculations were based on the mid frequencies rather than the low frequencies. The lower frequencies are less attenuated by conductive cover and tend to “see deeper” than the higher frequencies in conductive environments, but the reliable resistivity limit (low signal threshold) tops out at about 1080 ohm-m for the 900 Hz. The higher frequencies, however, not only respond better to weaker conductors and resistive units, but also provide a much larger dynamic range of resistivities, and are therefore better suited to poorly conductive targets.

Excellent resolution and discrimination of conductors was accomplished by using a fast sampling rate of 0.1 sec., and by employing a “common” frequency (5500Hz / 7200Hz) on two orthogonal coil-pairs (coaxial and coplanar). The resulting difference channel parameters often permit differentiation of bedrock and surficial conductors, even though they may exhibit similar conductance values.

While the gridded resistivity data provide an excellent overview of the conductive properties of the survey area, the gridding process itself tends smooth or average the values over a moderately large footprint. Conversely, the along-line profile data still retain the 0.1 second sampling interval (equal to about 2.75m on the ground), and therefore provide better definition over conductors. The coaxial coil pair also yields more clearly defined single peak responses over thin, near vertical sources.

Magnetic Data

A Fugro CF-1 cesium vapour magnetometer was operated at the survey base to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to permit subsequent removal of diurnal drift’

The residual magnetic field data (IGRF removed) have been presented as contours on the base maps using a contour interval of 5 nT where gradients permit. The maps show the magnetic properties of the rock units underlying the survey area.

The residual magnetic field data were also subjected to a processing algorithm to produce maps of the calculated vertical gradient. This procedure enhances near-surface magnetic units and suppresses regional gradients. It also provides better definition and resolution of magnetic boundaries and displays weak magnetic features that may not be clearly evident on the residual intensity maps.

There is strong evidence on the magnetic maps, particularly the calculated vertical gradient, which shows that the survey area has been subjected to deformation and/or alteration. These structural complexities are evident on the colour contour maps as variations in magnetic intensity, linear highs or lows, irregular patterns, and as offsets or changes in strike direction. Several structural breaks and contacts have been inferred from the vertical gradient data.

If a specific magnetic intensity can be assigned to the rock type that is believed to host the target mineralization, it may be possible to select areas of higher priority on the basis of the magnetic data. This is based on the assumption that the magnetite content of the host rocks will give rise to a limited range of contour values that will permit differentiation of the various lithological units.

Magnetic relief over the property yields a dynamic range of more than 2750 nT. Within the non-magnetic units, however, there are several linear lows and highs that have been attributed, respectively, to faults or weakly magnetic intrusions. The local geological strike is roughly 130° (±10°), but the strikes of the inferred faults and dykes are quite variable.

The magnetic results have provided valuable information that can be used in conjunction with the other geophysical parameters, to help map the geology and structure in the survey area. The magnetic parameter may prove to be more useful than the EM/Resistivity parameters in outlining the geological structures, but the EM has identified numerous conductors that do not yield any magnetic response. The complementary nature of the two parameters is clearly demonstrated in this project area.

Apparent Resistivity

Apparent resistivity grids, which display the conductive properties of the survey area, were produced from the 900 Hz, 7200 Hz, and 56000 Hz coplanar data. The maximum resistivity values, which are calculated for each frequency, are 1080, 8,300 and 25,000 ohm-m respectively. These cut-offs eliminate the erratic higher resistivities that could result from unstable ratios of very small EM amplitudes. All coplanar resistivity data are included on the final data archive.

Both resistive and conductive trends are evident on all resistivity maps. It is interesting to note that while most of the stronger magnetic units are resistive, some of the lower susceptibility units in the northeast are highly conductive. As previously stated, there is no consistent direct correlation between the two parameters, suggesting that the composition of the conductive sources is also variable.

There are several other smaller plug-like resistivity highs that are evident on the 56 kHz resistivity map. Although these are not necessarily due to intrusive plugs, they reflect small resistive units that may be of interest. A larger resistive unit is centered near line 11380 at fiducial 7880 and line 11710 at 4152.

Electromagnetic Anomalies

Targets of interest in this area may be conductive (gold associated with graphite /argillite) or resistive (intrusive related). Discrete EM anomalies were picked in order to locate other possible sulphide sources and to detect zones of alteration or clay-rich shears.

The EM anomalies resulting from this survey appear to fall within one of four general categories. The first type consists of discrete, well-defined anomalies that yield marked inflections on the difference channels. These anomalies are usually attributed to conductive sulphides or graphite, and are generally given a "B" or "D" interpretive symbol, denoting a bedrock source.

The second class of anomalies comprises moderately broad responses that exhibit the characteristics of a half-space and do not yield well-defined inflections on the difference channels. Anomalies in this category are usually given an "S" (at, or near surface) or "H" (buried half-space) interpretive symbol. The lack of a difference channel response usually implies a broad or flat-lying conductive source. Some of these anomalies could reflect buried, flat-dipping conductive rock units (argillite/mudstone), zones of deep weathering, or increased overburden thickness, all of which can yield “non-discrete” signatures.

The effects of conductive overburden are evident in a few areas. Although the difference channels (DIFI and DIFQ) are extremely valuable in detecting bedrock conductors that are partially masked by conductive overburden, sharp undulations in the bedrock/overburden interface can yield anomalies in the difference channels which may be interpreted as possible bedrock conductors. Such anomalies usually fall into the "S?" or "B?" classification but may also be given an "E" interpretive symbol, denoting a resistivity contrast at the edge of a conductive unit.

The "?" symbol does not question the validity of an anomaly, but instead indicates some degree of uncertainty as to which is the most appropriate EM source model. This ambiguity results from the combination of effects from two or more conductive sources such as overburden and bedrock, gradational changes, or moderately shallow dips. The presence of a conductive upper layer has a tendency to mask or alter the characteristics of bedrock conductors, making interpretation difficult. This problem is further exacerbated in the presence of magnetite.

The third anomaly category includes the very few responses that are associated with magnetite. Magnetite can cause suppression or polarity reversals of the in-phase components, particularly at the lower frequencies in resistive areas. Conductive overburden often tends to mask many of these negative excursions, particularly at the higher frequencies, but the effects of magnetite-rich rock units are evident on a few EM profiles as suppressions or negative excursions of the lower frequency in-phase channels.

If there is no appreciable coincident (positive) quadrature response, the magnetic source is non-conductive.

Poorly conductive magnetic features can give rise to resistivity anomalies that are only slightly below or slightly above background. If it is expected that poorly conductive economic mineralization could be associated with magnetite-rich units, most of these weakly anomalous features will also be of interest. In areas where magnetite causes the in-phase components to become negative, the apparent conductance and depth of EM anomalies will be unreliable. Magnetite effects usually give rise to overstated (higher) resistivity values and understated (too shallow) depth calculations.

The fourth class consists of anomalies that are due to cultural sources. These are usually given the symbol "L" or "L?". Anomalies in this category can include telephone or power lines, pipelines, railways, fences, metal bridges or culverts, vehicles and mining equipment, and buildings and other metallic structures.

Potential targets within the survey area can be associated with highly conductive units that are magnetic (pyrrhotite) or non-magnetic (graphite), mafic to felsic intrusions, weakly conductive faults or alteration zones, or non-magnetic sedimentary units, all of which can be overlain by conductive overburden or resistive scree. Based on these factors, it is impractical to assess the relative merits of EM anomalies on the basis of conductance, or on the basis of magnetic correlation. It is recommended that an attempt be made to compile a suite of geophysical "signatures" over any known areas of interest. If distinct geological/geochemical/geophysical signatures can be determined, these should serve to help identify similarly mineralized zones on the property, and perhaps to screen out the less favourable areas.

The electromagnetic anomaly map shows the anomaly locations with the interpreted conductor type, dip, and conductance being indicated by symbols. Direct magnetic correlation is also shown, if it exists. Conductor axes have not been shown on the EM anomaly map because of the numerous, closely-spaced anomalies, and because most trends and conductor segments can be visually correlated from line to line with a reasonable degree of confidence

Most of the anomalous responses are of moderate to strong signal amplitude and they generally yield moderate to high conductance values. The conductance calculations are based on the mid-frequency coaxial responses, so there could be higher conductance values than those shown on the maps, particularly in areas where the 900 Hz resistivities suggest an increase in conductivity at depth. The depth calculations in the northeastern quadrant often suggest a buried flat-dipping layer (of conductive bedrock) that appears to be overlain by more resistive cover that gets thicker towards the northeast. In some areas, where the altimeter locks on to a dense tree canopy, the apparent depth estimates may be overstated. Heavy tree cover can sometimes make the depths to conductive sources appear deeper than they actually are.

Table 7-1 shows a breakdown of the different conductor categories and grades. The anomalous EM responses detected by the survey have been assigned a simple colour code on the EM Anomaly maps, in order to facilitate source recognition. The thinner dyke-like (D) sources have been assigned a red colour, while the thicker (B) bedrock sources are shown in dark blue. Surficial (S) overburden responses or buried thick layers (H) are shown in green, as are edge effects (E).

Most of the interpreted discrete bedrock responses are contained within moderately broad zones of low resistivity. These have been shown on the EM anomaly map. The zone outlines approximate the 100 ohm-m contour taken from the (deeper) 900 Hz resistivity.

Some of the weaker EM responses within these broad conductive hosts could reflect changes in survey height, while others could be due to local changes in conductance within the flat-dipping sedimentary units. Some of the “B” (bedrock) conductors may appear wide enough or flat enough to be interpreted as “H”-type (half-space) sources. In view of the gold/graphite association in the project area, these broad conductive zones are of obvious exploration interest, particularly those that occur in areas of favourable geology or geochemistry.

TABLE 7-1 EM ANOMALY STATISTICS

SPANISH MOUNTAIN 2011 PROJECT AREA

CONDUCTOR GRADE	CONDUCTANCE RANGE SIEMENS (MHOS)	NUMBER OF RESPONSES
7	>100	8
6	50 - 100	28
5	20 - 50	120
4	10 - 20	178
3	5 - 10	340
2	1 - 5	1696
1	<1	145
*	INDETERMINATE	199
TOTAL		2714

CONDUCTOR MODEL	MOST LIKELY SOURCE	NUMBER OF RESPONSES
D	DISCRETE BEDROCK CONDUCTOR	448
B	DISCRETE BEDROCK CONDUCTOR	1008
S	CONDUCTIVE COVER	682
H	ROCK UNIT OR THICK COVER	271
E	EDGE OF WIDE CONDUCTOR	181
L	CULTURE	124
TOTAL		2714

(SEE EM MAP LEGEND FOR EXPLANATIONS)

It is beyond the scope of this report to attempt to describe the 2714 anomalous responses detected by the survey, 1678 of which have been attributed to possible or probable bedrock sources. Most of the graphitic or sulphide-type responses that have been attributed to possible or probable bedrock sources are shown on the EM Anomaly map in red or blue colours. The following text very briefly describes only a few of the more attractive locations, based on favourable structure, magnetic association, conductance, length, width, or depth extent. Although most of these reflect graphite or sulphide-type targets, they do not necessarily represent all of the more economically attractive areas, given the apparent weakly- to non-conductive nature of many other auriferous deposits in the general area.

ZONE A

In Zone A2, which is a probable southeast continuation of Zone A1, anomalies 11490J and 11600H both occur near inferred subtle breaks. Stronger non-magnetic responses occur along the lower susceptibility central axis.

b

Zones C1, C2 and C3

Zone C consists of a very long, relatively narrow, SE-trending (134°) resistivity low that hosts three zones of higher conductivity. These more concentrated portions are shown on the EM Map as Zones C1, C2, and C3. The
responses forming this conductive trend are generally thin and non-magnetic, although some of the conductor segments on the SW flank, do exhibit magnetic correlation. Most of the thin responses indicate dips to the northeast, and in many cases, the conductance appears to get stronger at depth.

The central axis o0f Zone C loosely follows a creek valley that also correlates with a relative magnetic low. The creek valley could reflect a major fault The moderately strong, wedge-shaped magnetic unit on the SW flank gets thinner towards the SE, and tends to pinch out south of line 11450. The C3 conductive zone, however, continues to the SE.

Zone D

The anomalies in Zone D exhibit the characteristics of a conductive half-space, and may be of no geological interest. The homogeneous resistivity low includes a portion of Quesnel Lake, but the unit extends inland, well north of the lakeshore. Lacustrine clays could be a possible cause, but the eastern half of this resistivity low hosts a weak magnetic anomaly. A very subtle SSE-trending linear break can be inferred from the CVG data, in the vicinity of anomaly 11690B. A moderately strong E-W magnetic trough defines the northern contact of the magnetic unit, with a parallel arcuate magnetic high to the north. .

Zone E

Zone E is an attractive resistivity low at the eastern property boundary. It remains open to the north and east beyond the limits of survey coverage. Strong thin, bedrock conductors are evident between anomalies 11710E and 11780F. Although dip estimates are uncertain due to the close spacing of the conductors, anomalies 11720E and 11740 both suggest northeast dips.

The strongest responses occur at the eastern end of line 11750, where three separate sources are indicated between 11750F and 11750H. Anomaly 11750F is the strongest, yielding a resistivity of less than 3 ohm-m. The high conductance and lack of magnetic correlation suggest graphite as a probable source. However, because gold can be associated with graphite in the Spanish Mountain area, additional work is highly recommended in order to confirm the causative source(s) of these conductors.

This zone is non-magnetic, but is located just east of a slightly folded, layered sequence that can be seen on the vertical gradient map. A possible break along the eastern edge of this sequence appears to strike SSW (204°) from the vicinity of 10700F

There are several other anomalous responses on the property that may also be of interest. These generally exhibit shorter strike lengths than those associated with the larger "zones" described in the foregoing paragraphs. However, the shorter strike lengths do not necessarily detract from their significance. A few of these are listed in the following table:

Anomaly	Type	Mag	Comments

Anomaly	Type	Mag	Comments

Anomaly	Type	Mag	Comments
11480D 11510C	B? B?	- 17	These are part of a group of anomalies that are associated with a very weak conductive zone located near a road west of Winkley Creek. The vertical gradient data show a few small magnetic highs, e.g., west of 10480D and south of 11540B, the proximity of which tends to enhance their significance. A few anomalies have been partially attributed to conductive overburden, but these could actually be due to poorly conductive bedrock sources. The CVD data suggest the presence of a possible E-trending break in the vicinity of anomaly 11530B (near a road).
11680F 11700D 11710D	D D D	- 55 65	A thin conductor strikes E-W, parallel to the layered magnetic structures between Zones A2 and E. This very weak thin source appears to be contact related. It occurs in a relatively resistive area, but may warrant further attention.

The foregoing text describes a few of the possible graphite or sulphide-type responses on the Spanish Mountain Property. Most of the stronger sources are considered to be potential targets because of the reported graphite/sulphide association with gold. Additionally, in the search for disseminated sulphides or quartz-hosted auriferous mineralization, the weaker EM conductors may also be of little importance

After an analysis of the signatures over the mineralized zones has been carried out, it may be necessary to upgrade the significance of the other magnetic or non-magnetic anomalies in the survey area, as they too could potentially reflect economic, mineralization. In selecting potential areas for follow-up, it is recommended that the flight path videos be viewed in order to help locate areas of outcrop, and also to help detect any zones of discoloration that could reflect gossans or other altered / weathered zones.

8. CONCLUSIONS AND RECOMMENDATIONS

This report provides a very brief description of the survey results and describes the equipment, data processing procedures and logistics of the airborne survey over the Spanish Mountain 2011 Area, near Likely, B.C. The various products accompanying this report display the magnetic and conductive properties of the survey area.

The previous section briefly describes a few of the possible target areas defined by the survey. In the search for auriferous mineralization, the value of EM conductors may be of minor importance, unless the gold is known to be associated with conductive material such as graphite, sulphides, conductive shears or faults, alteration products, or magnetite-rich zones. The difficulty will
be in trying to devise an effective screening tool that can be used to locate the more favourable areas for further investigation

Resistive zones can also be of exploration interest, particularly if the host rocks are siliceous, or if the targets are expected to be associated with resistive (porphyritic) intrusives.

The magnetic results have provided valuable structural information that might help to locate the more favourable areas for structurally-controlled gold deposition, and to help outline magnetic or non-magnetic porphyry-type intrusives. In addition to locating several linear faults and shears, the vertical gradient data have defined the contacts of both magnetic and non-magnetic units. The latter could reflect zones of alteration, felsic intrusions, or reducing environments that might host auriferous mineralization.

In many areas, the magnetic parameter appears to have been more effective than the resistivity in delineating rock units. This is due to the fact that the magnetic parameter usually sees deeper than the EM/Resistivity methods, with the former reflecting changes in the deeper basement units and the latter responding to variations in the near surface layer(s). The two parameters are complementary, and when used together, should help to locate the more favourable structures for mineral deposition. As the overlying sedimentary units are generally of lower magnetic susceptibility than the underlying (volcanic?) units, there are several areas where the magnetic anomalies could be responding to basement units and structures that may not be exposed at surface.

The resistivity parameters have outlined both conductive and resistive units. The former are generally attributed to conductive argillaceous rock units, conductive overburden, possible alteration zones, or increases in graphite or sulphide content. The non-magnetic plug-like resistivity highs could be due to siliceous (porphyry-type) intrusives, while a few of the magnetic resistive zones are obviously due to rock units containing higher concentrations of magnetite.

There were 2714 anomalous EM responses detected in the survey block, with approximately 53% of these being interpreted as possible or probable bedrock conductors. Most of these responses are of moderate to strong amplitude, and generally yield moderate conductance values of 5 to 10 siemens.

There are a few areas, that contain broad
conductive zones which host multiple conductors. Some of these could be due to thick (non-magnetic) argillaceous or graphitic sediments, which are sometimes overlain by more resistive cover. The individual conductors within these units can be either magnetic or non-magnetic. The former have been attributed to magnetic sulphides such as pyrrhotite, while the latter are likely due to graphitic sedimentary units or carbonaceous shales and

argillites. While most of the more discrete (magnetic) responses could be due to increases in conductive sulphide content, the larger “formational” zones may be of greater economic interest, given the known gold-graphite association. The approximate outlines of the more conductive zones, taken from the deeper 900 Hz resistivity grids, have been shown on the EM Anomaly map.

Other more subtle anomalous EM responses coincide with magnetic linears that reflect contacts, faults, or shears. These inferred contacts and structural breaks are also considered to be of particular interest as they may have influenced or controlled mineral deposition within the survey area.

The interpreted bedrock conductors and some of the anomalous (resistive) defined by the survey should be subjected to further investigation, using appropriate surface exploration techniques. Anomalies that are currently considered to be of moderately low priority may require upgrading if follow-up results are favourable.

An attempt should be made to compare the geophysical data with the known geology over all of the mineralized showings, in order to determine if any of these yield distinct geophysical signatures. If a distinct geophysical signature can be determined, this should allow further exploration efforts to be focused on the more favourable target areas that are more likely to host similarly mineralized zones. A detailed analysis of existing geophysical data is recommended, in conjunction with all available geological and geochemical data, in order to extract the maximum amount of information from the survey results. Current software and imaging techniques can often provide valuable information on structure and lithology, which may not be clearly evident on the colour maps and images provided with this report.

Respectfully submitted,

FUGRO AIRBORNE SURVEYS CORP.
R11077

APPENDIX A

LIST OF PERSONNEL

The following personnel were involved in the acquisition, processing, interpretation and presentation of data, relating to a DIGHEM ^{V} airborne geophysical survey carried out for Spanish Mountain Gold Ltd., over the Spanish Mountain 2011 Project Area, near Likely, B.C.

Brett Robinson	Project Manager
Terry Lacey	Equipment Operator
Amanda Heydorn	Crew Leader
Michael Wu	Field Processor
Tayebe Hamzeh	Data Processor (Office)
Lyn Vanderstarren	Drafting Supervisor
Ed Ashie	Pilot (Questral Helicopters Ltd.)

The survey consisted of 1395 km of coverage, flown from September 24 to October 1, 2011.

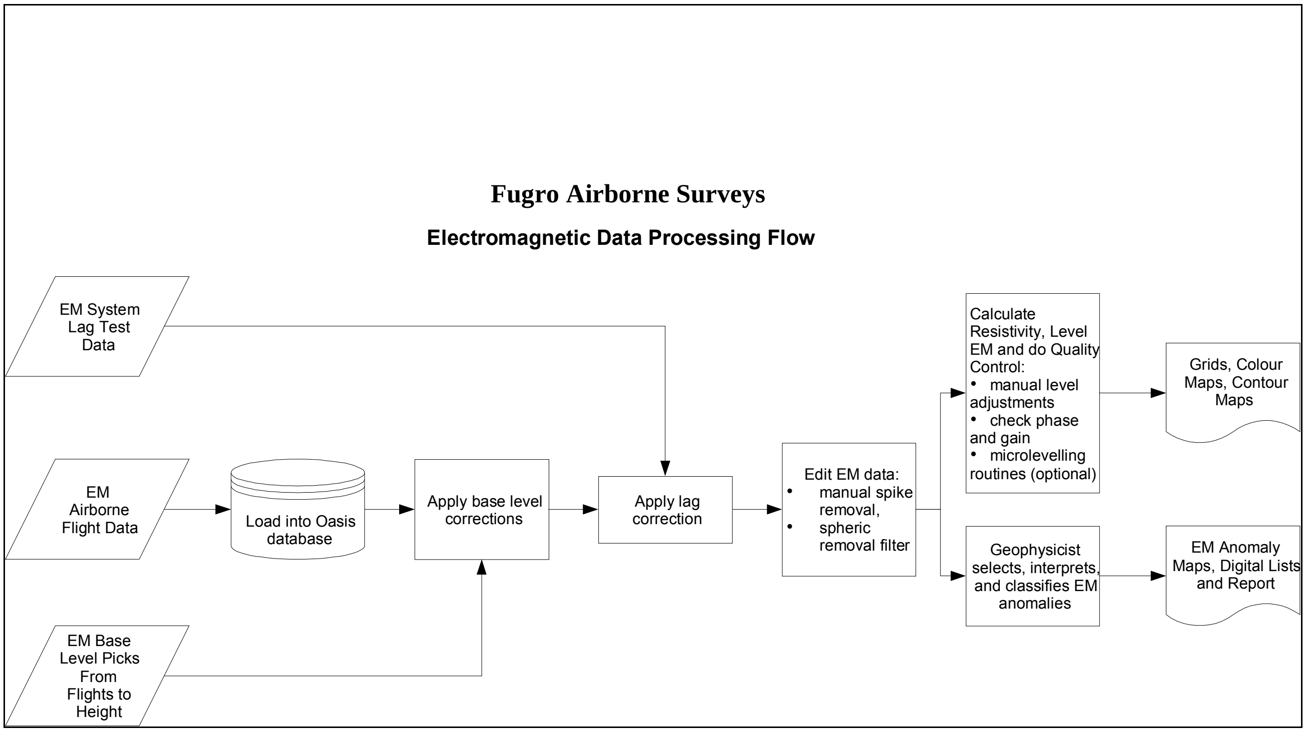
All personnel are employees of Fugro Airborne Surveys, except for the pilot who is an employee of Questral Helicopters Ltd.

APPENDIX B

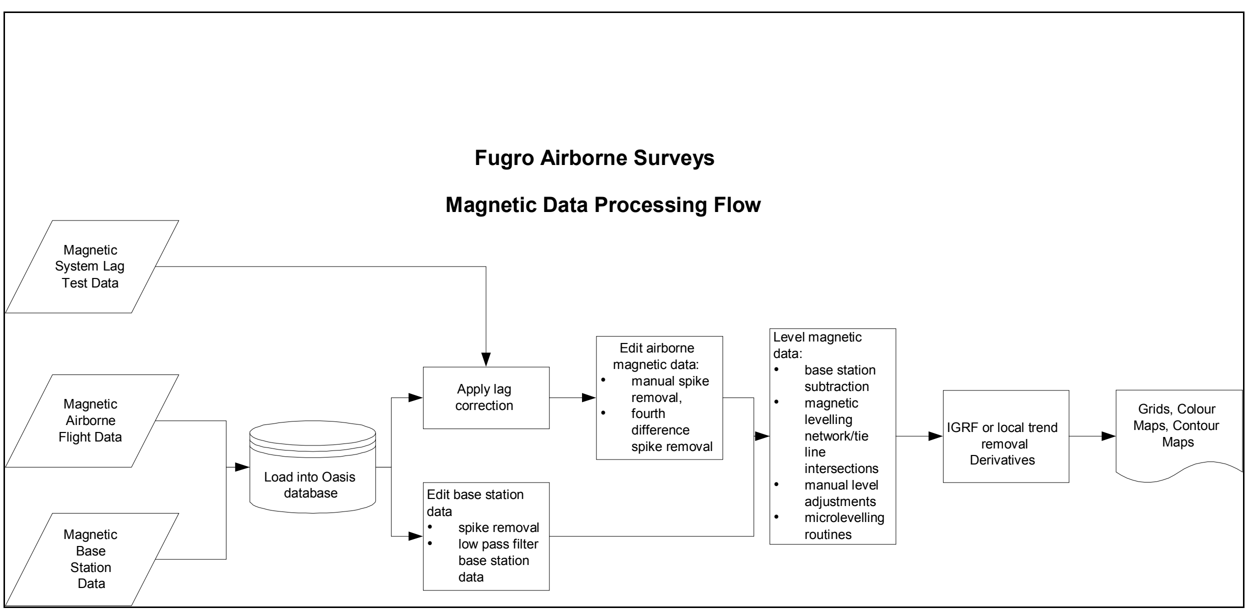
DATA PROCESSING FLOWCHARTS

APPENDIX B

Processing Flow Chart - Electromagnetic Data



Processing Flow Chart - Magnetic Data



APPENDIX C

BACKGROUND INFORMATION

BACKGROUND INFORMATION

Electromagnetics

Fugro electromagnetic responses fall into two general classes, discrete and broad. The discrete class consists of sharp, well-defined anomalies from discrete conductors such as sulphide lenses and steeply dipping sheets of graphite and sulphides. The broad class consists of wide anomalies from conductors having a large horizontal surface such as flatly dipping graphite or sulphide sheets, saline water-saturated sedimentary formations, conductive overburden and rock, kimberlite pipes and geothermal zones. A vertical conductive slab with a width of 200 m would straddle these two classes.

The vertical sheet (half plane) is the most common model used for the analysis of discrete conductors. The B, D and T type are analyzed according to this model, with the conductance being calculated from the local amplitudes of the coaxial data.. The following section entitled **Discrete Conductor Analysis** describes this model in detail.

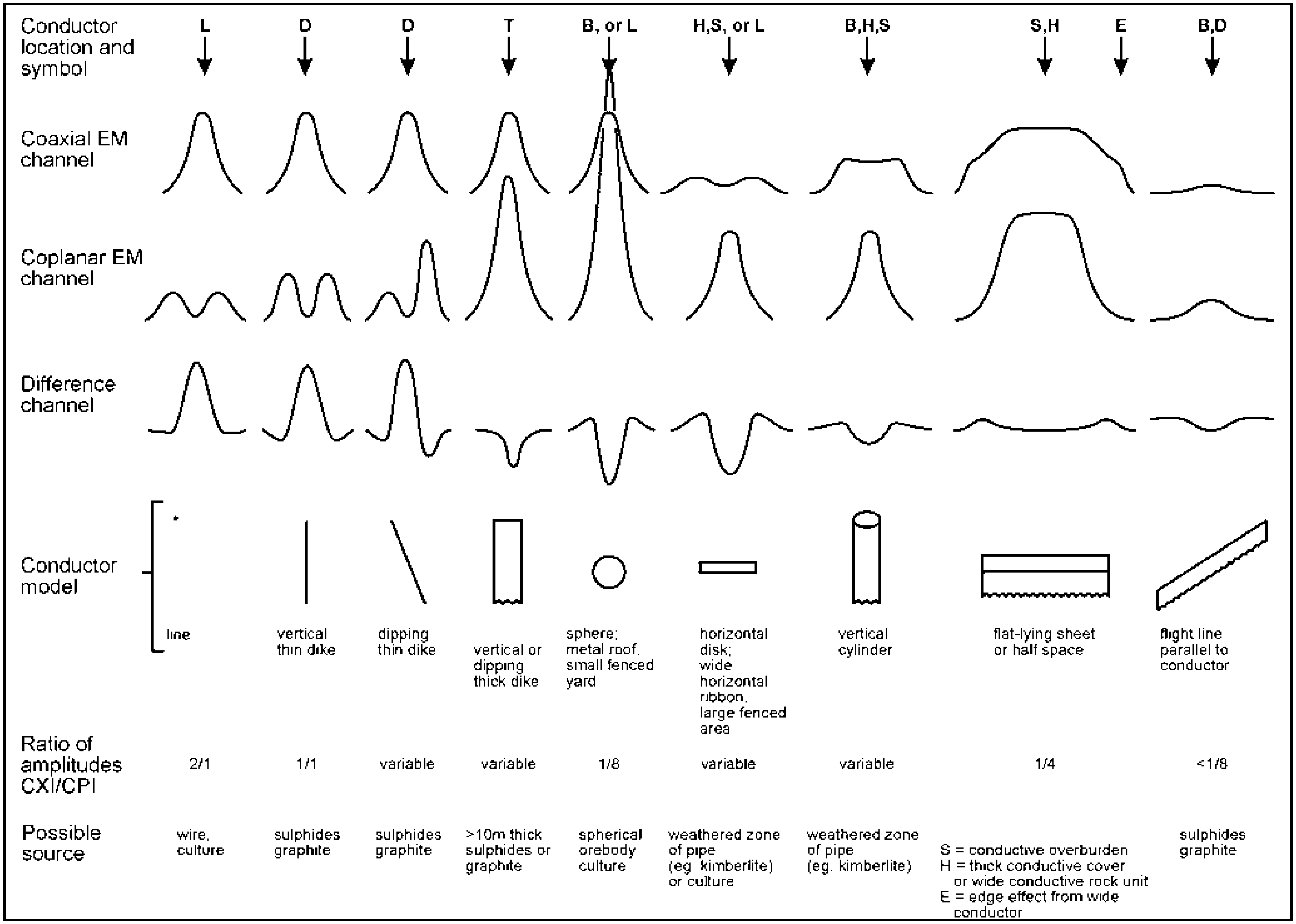
The conductive earth (half-space) model is more suitable for broad conductors that carry an S, H, or E type interpretation symbol. Conductance values for these anomalous responses are based on the absolute amplitudes of the selected coplanar channels. Resistivity maps result from the use of this model. A later section entitled **Resistivity Mapping** describes the method further.

Geometric Interpretation

The geophysical interpreter attempts to determine the geometric shape and dip of the conductor. Figure C-1 shows typical HEM anomaly shapes that are used to guide the geometric interpretation.

Discrete Conductor Analysis

The EM anomalies appearing on the electromagnetic map are analyzed by computer to give the conductance (i.e., conductivity-thickness product) in siemens (mhos). The B, D, and T type calculations are based on a vertical sheet model. This is not an unreasonable procedure, because the computed conductance increases as the electrical quality of the conductor increases, regardless of its true shape. HEM anomalies are divided into seven grades of conductance, as shown in Table C-1. The conductance in siemens (mhos) is the reciprocal of resistance in ohms.



Typical HEM anomaly shapes

Figure C-1

The conductance value is a geological parameter because it is a characteristic of the conductor alone. It generally is independent of frequency, flying height or depth of burial, apart from the averaging over a greater portion of the conductor as height increases. Small anomalies from deeply buried strong conductors are not confused with small anomalies from shallow weak conductors because the former will have larger conductance values.

Table C-1. EM Anomaly Grades

Anomaly Grade	Siemens
7	> 100
6	50 - 100
5	20 - 50
4	10 - 20
3	5 - 10
2	1 - 5
1	< 1

Conductive overburden generally produces broad EM responses which may not be shown as anomalies on the geophysical maps. However, patchy conductive overburden in otherwise resistive areas can yield discrete anomalies with a conductance grade (cf. Table C-1) of 1, 2 or even 3 for conducting clays that have resistivities as low as 50 ohm-m. In areas where ground resistivities are less than 10 ohm-m, anomalies caused by weathering variations and similar causes can have any conductance grade. The anomaly shapes from the multiple coils often allow such conductors to be recognized, and these are indicated by the letters S, H, and sometimes E on the geophysical maps (see EM legend on maps).

For bedrock conductors, the higher anomaly grades indicate increasingly higher conductances. Examples: the New Insco copper discovery (Noranda, Canada) yielded a grade 5 anomaly, as did the neighbouring copper-zinc Magusi River ore body; Mattabi (copper-zinc, Sturgeon Lake, Canada) and Whistle (nickel, Sudbury, Canada) gave grade 6; and the Montcalm nickel-copper discovery (Timmins, Canada) yielded a grade 7 anomaly. Graphite and sulphides can span all grades but, in any particular survey area, field work may show that the different grades indicate different types of conductors.

Strong conductors (i.e., grades 6 and 7) are characteristic of massive sulphides or graphite. Moderate conductors (grades 4 and 5) typically reflect graphite or sulphides of a less massive character, while weak bedrock conductors (grades 1 to 3) can signify poorly connected graphite or heavily disseminated sulphides. Grades 1 and 2 conductors may not respond to ground EM equipment using frequencies less than 2000 Hz.

The presence of sphalerite or gangue can result in ore deposits having weak to moderate conductances. As an example, the three million ton lead-zinc deposit of Restigouche Mining Corporation near Bathurst, Canada, yielded a well-defined grade 2 conductor. The 10 percent by volume of sphalerite occurs as a coating around the fine-grained massive pyrite, thereby inhibiting electrical conduction. Faults, fractures and shear zones may produce anomalies that typically have low conductances (e.g., grades 1 to 3). Conductive rock formations can yield anomalies of any conductance grade. The conductive materials in such rock formations can be salt water, weathered products such as clays, original depositional clays, and carbonaceous material.

For each interpreted electromagnetic anomaly on the geophysical maps, a letter identifier and an interpretive symbol are plotted beside the EM grade symbol. In areas where anomalies are crowded, the letter identifiers and interpretive symbols may be obliterated. The EM grade symbols, however, will always be discernible, and any obliterated information can be obtained from the anomaly listing appended to this report.

The conductance measurement is considered more reliable than the depth estimate. There are a number of factors that can produce an error in the depth estimate, including the averaging of topographic variations by the altimeter, overlying conductive overburden, and the location and attitude of the conductor relative to the flight line. Conductor location and attitude can provide an erroneous depth estimate because the stronger part of the conductor may be deeper or to one side of the flight line, or because it has a shallow dip. A heavy tree cover can also produce errors in depth estimates. This is because the depth estimate is computed as the distance of the bird from the conductor, minus the altimeter reading. The altimeter can lock onto the top of a dense forest canopy. This situation yields an erroneously large depth estimate but does not affect the conductance estimate.

Dip symbols are used to indicate the direction of dip of conductors. These symbols are used only when the anomaly shapes are unambiguous, which usually requires a fairly resistive environment.

A further interpretation is often presented on the EM map by means of the line-to-line correlation of bedrock anomalies, which is based on a comparison of anomaly shapes on adjacent lines. This provides conductor axes that may define the geological structure over portions of the survey area. The absence of conductor axes in an area implies that anomalies could not be correlated from line to line with reasonable confidence.

The electromagnetic anomalies are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a follow-up program. The actual conductance values are printed in the attached anomaly list for those who wish quantitative data. The map provides an interpretation of conductors in terms of length, strike and dip, geometric shape, conductance, and thickness. The accuracy is comparable to an interpretation from a high quality ground EM survey having the same line spacing.

The appended EM anomaly list provides a tabulation of anomalies in ppm, conductance, and depth for the vertical sheet or horizontal sheet models. The vertical sheet model (B, D, and T types) uses the local coaxial amplitudes for the calculation. Values for the horizontal sheet model (S, H, and E types) are calculated from the absolute amplitudes of the selected coplanar channels. No conductance or depth estimates are shown for weak anomalous responses that are not of sufficient amplitude to yield reliable calculations, or where magnetite effects have caused negative in-phase responses.

Questionable Anomalies

The EM maps may contain anomalous responses that are displayed as asterisks (*). These responses denote weak anomalies of indeterminate conductance, which may reflect one of the following: a weak conductor near the surface, a strong conductor at depth (e.g., 100 to 120 m below surface) or to one side of the flight line, or aerodynamic noise. Those responses that have the appearance of valid bedrock anomalies on the flight profiles are indicated by appropriate interpretive symbols (see EM legend on maps). The others probably do not warrant further investigation unless their locations are of considerable geological interest.

The Thickness Parameter

A comparison of coaxial and coplanar shapes can provide an indication of the thickness of a steeply dipping conductor. The amplitude of the coplanar anomaly (e.g., CPI channel) increases relative to the coaxial anomaly (e.g., CXI) as the apparent thickness increases, i.e., the thickness in the horizontal plane. (The thickness is equal to the conductor width if the conductor dips at 90 degrees and strikes at right angles to the flight line.) This report refers to a conductor as thin when the thickness is likely to be less than 5 m, and thick when in excess of 10 m. Thick conductors are indicated on the EM map by parentheses "( )". For base metal exploration in steeply dipping geology, thick conductors can be high priority targets because many massive sulphide ore bodies are thick. The system cannot sense the thickness when the strike of the conductor is subparallel to the flight line, when the conductor has a shallow dip, when the anomaly amplitudes are small, or when the resistivity of the environment is less than 100 ohm-m.

Resistivity Mapping

Resistivity mapping is useful in areas where broad or flat lying conductive units are of interest. One example of this is the clay alteration that is associated with Carlin-type deposits in the southwest United States. The resistivity parameter was able to identify the clay alteration zone over the Cove deposit. The alteration zone appeared as a strong resistivity low on the 900 Hz resistivity parameter. The 7,200 Hz and 56,000 Hz resistivities showed more detail in the covering sediments, and delineated a range front fault. This is typical in many areas of the southwest United States, where conductive near surface sediments, which may sometimes be alkalic, attenuate the higher frequencies.

Resistivity mapping has proven successful for locating diatremes in diamond exploration. Weathering products from relatively soft kimberlite pipes produce a resistivity contrast with the unaltered host rock. In many cases weathered kimberlite pipes were associated with thick conductive layers that contrasted with overlying or adjacent relatively thin layers of lake bottom sediments or overburden.

Areas of widespread conductivity are commonly encountered during surveys. These conductive zones may reflect alteration zones, shallow-dipping sulphide or graphite-rich units, saline ground water, or conductive overburden. In such areas, EM amplitude changes can be generated by decreases of only 5 m in survey altitude, as well as by increases in conductivity. The typical flight record in conductive areas is characterized by in-phase and quadrature channels that are continuously active. Local EM peaks reflect either increases in conductivity of the earth or decreases in survey altitude. For such conductive areas, apparent resistivity profiles and contour maps are necessary for the correct interpretation of the airborne data. The advantage of the resistivity parameter is that anomalies caused by altitude changes are virtually eliminated, so the resistivity data reflect only those anomalies caused by conductivity changes. The resistivity analysis also helps the interpreter to differentiate between conductive bedrock and conductive overburden. For example, discrete conductors will generally appear as narrow lows on the contour map and broad conductors (e.g., overburden) will appear as wide lows.

The apparent resistivity is calculated using the pseudo-layer (or buried) half-space model defined by Fraser (1978)[5]. This model consists of a resistive layer overlying a conductive half-space. The depth channels give the apparent depth below surface of the conductive material. The apparent depth is simply the apparent thickness of the overlying resistive layer. The apparent depth (or thickness) parameter will be positive when the upper layer is more resistive than the underlying material, in which case the apparent depth may be quite close to the true depth.

The apparent depth will be negative when the upper layer is more conductive than the underlying material, and will be zero when a homogeneous half-space exists. The apparent depth parameter must be interpreted cautiously because it will contain any errors that might exist in the measured altitude of the EM bird (e.g., as caused by a dense tree cover). The inputs to the resistivity algorithm are the in-phase and quadrature components of the coplanar coil-pair. The outputs are the apparent resistivity of the conductive half-space (the source) and the sensor-source distance. The flying height is not an input variable, and the output resistivity and sensor-source distance are independent of the flying height when the conductivity of the measured material is sufficient to yield significant in-phase as well as quadrature responses. The apparent depth, discussed above, is simply the sensor-source distance minus the measured altitude or flying height. Consequently, errors in the measured altitude will affect the apparent depth parameter but not the apparent resistivity parameter.

The apparent depth parameter is a useful indicator of simple layering in areas lacking a heavy tree cover. Depth information has been used for permafrost mapping, where positive apparent depths were used as a measure of permafrost thickness. However, little quantitative use has been made of negative apparent depths because the absolute value of the negative depth is not a measure of the thickness of the conductive upper layer and,

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[5] Resistivity mapping with an airborne multicoil electromagnetic system: Geophysics, v. 43, p.144-172

therefore, is not meaningful physically. Qualitatively, a negative apparent depth estimate usually shows that the EM anomaly is caused by conductive overburden. Consequently, the apparent depth channel can be of significant help in distinguishing between overburden and bedrock conductors.

Interpretation in Conductive Environments

Environments having low background resistivities (e.g., below 30 ohm-m for a 900 Hz system) yield very large responses from the conductive ground. This usually prohibits the recognition of discrete bedrock conductors. However, Fugro data processing techniques produce three parameters that contribute significantly to the recognition of bedrock conductors in conductive environments. These are the in-phase and quadrature difference channels (DIFI and DIFQ, which are available only on systems with “common” frequencies on orthogonal coil pairs), and the resistivity and depth channels (RES and DEP) for each coplanar frequency.

The EM difference channels (DIFI and DIFQ) eliminate most of the responses from conductive ground, leaving responses from bedrock conductors, cultural features (e.g., telephone lines, fences, etc.) and edge effects. Edge effects often occur near the perimeter of broad conductive zones. This can be a source of geologic noise. While edge effects yield anomalies on the EM difference channels, they do not produce resistivity anomalies. Consequently, the resistivity channel aids in eliminating anomalies due to edge effects. On the other hand, resistivity anomalies will coincide with the most highly conductive sections of conductive ground, and this is another source of geologic noise. The recognition of a bedrock conductor in a conductive environment therefore is based on the anomalous responses of the two difference channels (DIFI and DIFQ) and the resistivity channels (RES). The most favourable situation is where anomalies coincide on all channels.

The DEP channels, which give the apparent depth to the conductive material, also help to determine whether a conductive response arises from surficial material or from a conductive zone in the bedrock. When these channels ride above the zero level on the depth profiles (i.e., depth is negative), it implies that the EM and resistivity profiles are responding primarily to a conductive upper layer, i.e., conductive overburden. If the DEP channels are below the zero level, it indicates that a resistive upper layer exists, and this usually implies the existence of a bedrock conductor. If the low frequency DEP channel is below the zero level and the high frequency DEP is above, this suggests that a bedrock conductor occurs beneath conductive cover.

Reduction of Geologic Noise

Geologic noise refers to unwanted geophysical responses. For purposes of airborne EM surveying, geologic noise refers to EM responses caused by conductive overburden and magnetic permeability. It was mentioned previously that the EM difference channels (i.e., channel DIFI for in-phase and DIFQ for quadrature) tend to eliminate the response of conductive overburden.

Magnetite produces a form of geological noise on the in-phase channels. Rocks containing less than 1% magnetite can yield negative in-phase anomalies caused by magnetic permeability. When magnetite is widely distributed throughout a survey area, the in-phase EM channels may continuously rise and fall, reflecting variations in the magnetite percentage, flying height, and overburden thickness. This can lead to difficulties in recognizing deeply buried bedrock conductors, particularly if conductive overburden also exists. However, the response of broadly distributed magnetite generally vanishes on the in-phase difference channel DIFI. This feature can be a significant aid in the recognition of conductors that occur in rocks containing accessory magnetite.

EM Magnetite Mapping

The information content of HEM data consists of a combination of conductive eddy current responses and magnetic permeability responses. The secondary field resulting from conductive eddy current flow is frequency-dependent and consists of both in-phase and quadrature components, which are positive in sign. On the other hand, the secondary field resulting from magnetic permeability is independent of frequency and consists of only an in-phase component which is negative in sign. When magnetic permeability manifests itself by decreasing the measured amount of positive in-phase, its presence may be difficult to recognize. However, when it manifests itself by yielding a negative in-phase anomaly (e.g., in the absence of eddy current flow), its presence is assured. In this latter case, the negative component can be used to estimate the percent magnetite content.

A magnetite mapping technique, based on the low frequency coplanar data, can be complementary to magnetometer mapping in certain cases. Compared to magnetometry, it is far less sensitive but is more able to resolve closely spaced magnetite zones, as well as providing an estimate of the amount of magnetite in the rock. The method is sensitive to 1/4% magnetite by weight when the EM sensor is at a height of 30 m above a magnetitic half-space. It can individually resolve steep dipping narrow magnetite-rich bands that are separated by 60 m. Unlike magnetometry, the EM magnetite method is unaffected by remanent magnetism or magnetic latitude.

The EM magnetite mapping technique provides estimates of magnetite content that are usually correct within a factor of 2 when the magnetite is fairly uniformly distributed. EM magnetite maps can be generated when magnetic permeability is evident as negative in-phase responses on the data profiles.

Like magnetometry, the EM magnetite method maps only bedrock features, provided that the overburden is characterized by a general lack of magnetite. This contrasts with resistivity mapping which portrays the combined effect of bedrock and overburden.

The Susceptibility Effect

When the host rock is conductive, the positive conductivity response will usually dominate the secondary field, and the susceptibility effect[6] will appear as a reduction in the in-phase, rather than as a negative value. The in-phase response will be lower than would be predicted by a model using zero susceptibility. At higher frequencies the in-phase conductivity response also gets larger, so a negative magnetite effect observed on the low frequency might not be observable on the higher frequencies, over the same body. The susceptibility effect is most obvious over discrete magnetite-rich zones, but also occurs over uniform geology such as a homogeneous half-space.

High magnetic susceptibility will affect the calculated apparent resistivity, if only conductivity is considered. Standard apparent resistivity algorithms use a homogeneous half-space model, with zero susceptibility. For these algorithms, the reduced in-phase response will, in most cases, make the apparent resistivity higher than it should be. It is important to note that there is nothing wrong with the data, nor is there anything wrong with the processing algorithms. The apparent difference results from the fact that the simple geological model used in processing does not match the complex geology.

Measuring and Correcting the Magnetite Effect

Theoretically, it is possible to calculate (forward model) the combined effect of electrical conductivity and magnetic susceptibility on an EM response in all environments. The difficulty lies, however, in separating out the susceptibility effect from other geological effects when deriving resistivity and susceptibility from EM data.

Over a homogeneous half-space, there is a precise relationship between in-phase, quadrature, and altitude. These are often resolved as phase angle, amplitude, and altitude. Within a reasonable range, any two of these three parameters can be used to calculate the half space resistivity. If the rock has a positive magnetic susceptibility, the in-phase component will be reduced and this departure can be recognized by comparison to the other parameters.

The algorithm used to calculate apparent susceptibility and apparent resistivity from HEM data, uses a homogeneous half-space geological model. Non half-space geology, such as horizontal layers or dipping sources, can also distort the perfect half-space relationship of the three data parameters. While it may be possible to use more complex models to calculate both rock parameters, this procedure becomes very

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[6] Magnetic susceptibility and permeability are two measures of the same physical property. Permeability is generally given as relative permeability, μ_r, which is the permeability of the substance divided by the permeability of free space ($4 \pi \times 10^{-7}$). Magnetic susceptibility k is related to permeability by $k=\mu^r-1$. Susceptibility is a unitless measurement, and is usually reported in units of 10^{-6}. The typical range of susceptibilities is –1 for quartz, 130 for pyrite, and up to 5×10^5 for magnetite, in 10^{-6} units (Telford et al, 1986).

complex and time-consuming. For basic HEM data processing, it is most practical to stick to the simplest geological model.

Magnetite reversals (reversed in-phase anomalies) have been used for many years to calculate an “FeO” or magnetite response from HEM data (Fraser, 1981). However, this technique could only be applied to data where the in-phase was observed to be negative, which happens when susceptibility is high and conductivity is low.

Applying Susceptibility Corrections

Resistivity calculations done with susceptibility correction may change the apparent resistivity. High-susceptibility conductors, which were previously masked by the susceptibility effect in standard resistivity algorithms, may become evident. In this case the susceptibility corrected apparent resistivity is a better measure of the actual resistivity of the earth. However, other geological variations, such as a deep resistive layer, can also reduce the in-phase by the same amount. In this case, susceptibility correction would not be the best method. Different geological models can apply in different areas of the same data set. The effects of susceptibility, and other effects that can create a similar response, must be considered when selecting the resistivity algorithm.

Susceptibility from EM vs Magnetic Field Data

The response of the EM system to magnetite may not match that from a magnetometer survey. First, HEM-derived susceptibility is a rock property measurement, like resistivity. Magnetic data show the total magnetic field, a measure of the potential field, not the rock property. Secondly, the shape of an anomaly depends on the shape and direction of the source magnetic field. The electromagnetic field of HEM is much different in shape from the earth’s magnetic field. Total field magnetic anomalies are different at different magnetic latitudes; HEM susceptibility anomalies have the same shape regardless of their location on the earth.

In far northern latitudes, where the magnetic field is nearly vertical, the total magnetic field measurement over a thin vertical dike is very similar in shape to the anomaly from the HEM-derived susceptibility (a sharp peak over the body). The same vertical dike at the magnetic equator would yield a negative magnetic anomaly, but the HEM susceptibility anomaly would show a positive susceptibility peak.

Effects of Permeability and Dielectric Permittivity

Resistivity algorithms that assume free-space magnetic permeability and dielectric permittivity, do not yield reliable values in highly magnetic or highly resistive areas. Both magnetic polarization and displacement currents cause a decrease in the in-phase component, often resulting in negative values that yield erroneously high apparent resistivities. The effects of magnetite occur at all frequencies, but are most evident at the lowest frequency. Conversely, the negative effects of dielectric permittivity are most evident at the higher frequencies, in resistive areas.

The table below shows the effects of varying permittivity over a resistive (10,000 ohm-m) half space, at frequencies of 56,000 Hz (DIGHEM^{V}) and 140,000 Hz (RESOLVE).

Apparent Resistivity Calculations
Effects of Permittivity on In-phase/Quadrature/Resistivity

Freq (Hz)	Coil	Sep (m)	Thres (ppm)	Alt (m)	In Phase	Quad Phase	App Res	App Depth (m)	Permittivity
56,000	CP	6.3	0.1	30	7.3	35.3	10118	-1.0	1 Air
56,000	CP	6.3	0.1	30	3.6	36.6	19838	-13.2	5 Quartz
56,000	CP	6.3	0.1	30	-1.1	38.3	81832	-25.7	10 Epidote
56,000	CP	6.3	0.1	30	-10.4	42.3	76620	-25.8	20 Granite
56,000	CP	6.3	0.1	30	-19.7	46.9	71550	-26.0	30 Diabase
56,000	CP	6.3	0.1	30	-28.7	52.0	66787	-26.1	40 Gabbro
140,000	CP	7.94	0.1	30	52.1	159.1	8710	0.2	1 Air
140,000	CP	7.94	0.1	30	16.1	180.4	29215	-18.5	5 Quartz
140,000	CP	7.94	0.1	30	-27.0	211.9	102876	-26.9	10 Epidote
140,000	CP	7.94	0.1	30	-103.6	287.0	84044	-27.2	20 Granite
140,000	CP	7.94	0.1	30	-166.0	371.5	70766	-27.5	30 Diabase
140,000	CP	7.94	0.1	30	-215	459.3	61433	-27.6	40 Gabbro

Methods have been developed (Huang and Fraser, 2000, 2001) to correct apparent resistivities for the effects of permittivity and permeability. The corrected resistivities yield more credible values than if the effects of permittivity and permeability are disregarded.

Recognition of Culture

Cultural responses include all EM anomalies caused by man-made metallic objects. Such anomalies may be caused by inductive coupling or current gathering. The concern of the interpreter is to recognize when an EM response is due to culture. Points of consideration used by the interpreter, when coaxial and coplanar coil-pairs are operated at a common frequency, are as follows:

1. The CPPL channel monitors 60 Hz radiation. An anomaly on this channel shows that the conductor is radiating power. Such an indication is normally a guarantee that the conductor is cultural. However, care must be taken to ensure that the conductor is not a geologic body that strikes across a power line, carrying leakage currents.

2. A flight that crosses a "line" (e.g., fence, telephone line, etc.) yields a centre-peaked coaxial anomaly and an m-shaped coplanar anomaly.[7] When the flight crosses the cultural line at a high angle of intersection, the amplitude ratio of coaxial/coplanar response is 2. Such an EM anomaly can only be caused by a line. The geologic body that yields anomalies most closely resembling a line is the vertically dipping thin dike. Such a body, however, yields an amplitude ratio of 1 rather than 2. Consequently, an m-shaped coplanar anomaly with a CXI/CPI amplitude ratio of 2 is virtually a guarantee that the source is a cultural line.

3. A flight that crosses a sphere or horizontal disk yields centre-peaked coaxial and coplanar anomalies with a CXI/CPI amplitude ratio (i.e., coaxial/coplanar) of 1/8. In the absence of geologic bodies of this geometry, the most likely conductor is a metal roof or small fenced yard.[8] Anomalies of this type are virtually certain to be cultural if they occur in an area of culture.

4. A flight that crosses a horizontal rectangular body or wide ribbon yields an m-shaped coaxial anomaly and a centre-peaked coplanar anomaly. In the absence of geologic bodies of this geometry, the most likely conductor is a large fenced area.[5] Anomalies of this type are virtually certain to be cultural if they occur in an area of culture.

5. EM anomalies that coincide with culture, as seen on the video display, are usually caused by culture. However, care is taken with such coincidences because a geologic conductor could occur beneath a fence, for example. In this example, the fence would be expected to yield an m-shaped coplanar anomaly as in case #2 above. If, instead, a centre-peaked coplanar anomaly occurred, there would be concern that a thick geologic conductor coincided with the cultural line.

6. Thee above description of anomaly shapes is valid when the culture is not conductively coupled to the environment. In this case, the anomalies arise from inductive coupling to the EM transmitter. However, when the environment is quite conductive (e.g., less than 100 ohm-m at 900 Hz), the cultural conductor may be conductively coupled to the environment. In this latter case, the anomaly shapes tend to be governed by current gathering. Current gathering can completely distort the anomaly shapes, thereby complicating the identification of cultural anomalies. In such circumstances, the interpreter can only rely on the radiation channel and the video records

Magnetic Responses

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[7] See Figure C-1 presented earlier.

[8] It is a characteristic of EM that geometrically similar anomalies are obtained from: (1) a planar conductor, and (2) a wire that forms a loop having dimensions identical to the perimeter of the equivalent planar conductor.

The measured total magnetic field provides information on the magnetic properties of the earth materials in the survey area. This information can be used to locate magnetic bodies of direct interest for exploration, and for structural and lithological mapping.

The total magnetic field response reflects the abundance of magnetic material in the source. Magnetite is the most common magnetic mineral. Other minerals such as ilmenite, pyrrhotite, franklinite, chromite, hematite, arsenopyrite, limonite and pyrite are also magnetic, but to a lesser extent than magnetite on average.

In some geological environments, an EM anomaly with magnetic correlation has a greater likelihood of being produced by sulphides than one that is non-magnetic. However, sulphide ore bodies may be non-magnetic (e.g., the Kidd Creek deposit near Timmins, Canada) as well as magnetic (e.g., the Mattabi deposit near Sturgeon Lake, Canada).

Iron ore deposits will be anomalously magnetic in comparison to surrounding rock due to the concentration of iron minerals such as magnetite, ilmenite and hematite.

Changes in magnetic susceptibility often allow rock units to be differentiated based on the total magnetic field. Geophysical classifications may differ from geological classifications if various magnetite levels exist within one general geological classification. Geometric considerations of the source such as shape, dip and depth, inclination of the earth's field and remanent magnetization will complicate such an analysis.

In general, mafic lithologies contain more magnetite and are therefore more magnetic than many sediments which tend to be weakly magnetic. Metamorphism and alteration can also increase or decrease the magnetization of a rock unit.

Textural differences on a total field magnetic contour, colour or shadow map due to the frequency of activity of the magnetic parameter resulting from inhomogeneities in the distribution of magnetite within the rock, may define certain lithologies. For example, near surface volcanics may display highly complex contour patterns with little line-to-line correlation.

Rock units may be differentiated based on the plan shapes of their total or residual magnetic field responses. Mafic intrusive plugs can appear as isolated "bulls-eye" anomalies. Granitic intrusives appear as sub-circular zones, and may have contrasting rings due to contact metamorphism. Generally, granitic terrain will lack a pronounced strike direction, although granite gneiss may display strike.

Linear north-south units are theoretically not well defined on total magnetic field maps in equatorial regions, due to the low inclination of the earth's magnetic field. However, most stratigraphic units will have variations in composition along strike that will cause the units to appear as a series of alternating magnetic highs and lows.

Faults and shear zones may be characterized by alteration that causes destruction of magnetite (e.g., weathering) that produces a contrast with surrounding rock. Structural breaks may be filled by magnetite-rich, fracture filling material, as is the case with diabase dikes, or by non-magnetic felsic material.

Faulting can also be identified by patterns in the magnetic contours or colours. Faults and dikes tend to appear as lineaments and often have strike lengths of several kilometres. Offsets in narrow, magnetic, stratigraphic trends also delineate structure. Sharp contrasts in magnetic lithologies may arise due to large displacements along strike-slip or dip-slip faults.

APPENDIX D

DATA ARCHIVE DESCRIPTION

APPENDIX D

ARCHIVE DESCRIPTION

of DVD's: 1
Archive Date: January, 2012

This archive contains FINAL data and grids of an airborne Dighem^{V} electromagnetic and magnetic geophysical survey over a property in the Likely area, B.C., conducted by FUGRO AIRBORNE SURVEYS CORP. on behalf of SPANISH MOUNTAIN GOLD LTD. The survey was flown from September 24 to October 1, 2011.
Job # 11077

******* Disc 1 of 1 *******

\GRIDS Grids in Geosoft format

CVG.GRD	- Calculated Vertical Magnetic Gradient nT/m
Mag.GRD	- Residual Magnetic Intensity nT
RES900.GRD	- Apparent Resistivity 900 Hz ohm·m
RES7200.GRD	- Apparent Resistivity 7200 Hz ohm·m
RES56K.GRD	- Apparent Resistivity 56k Hz ohm·m

\LINEDATA

11077.GDB	- Data archive in Geosoft GDB format
11077.XYZ	- Data archive in Geosoft ASCII format
Anom_11077.XYZ	- Anomaly archive in ASCII format

\MAPS Final colour maps in Geosoft PDF format (Anomaly in DXF format)

Anom.PDF	- Electromagnetic Anomalies with Interpretation
CVG.PDF	- Calculated Vertical Magnetic Gradient nT/m
MAG.PDF	- Residual Magnetic Intensity nT
RES900.PDF	- Apparent Resistivity 900 Hz ohm•m
RES7200.PDF	- Apparent Resistivity 7200 Hz ohm•m
RES56k.PDF	- Apparent Resistivity 56 kHz ohm•m

\REPORT

11077_Report.PDF	- Survey Report

\Videos

Digital video in BIN/BDX format is archived for all survey flights. To view the files, a video viewer is included.
FUGROVIDEOVIEWER.ZIP

- Appendix D. 2 -

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GEOSOFT GDB and XYZ ARCHIVE SUMMARY

# CHANNEL NAME	TIME	UNITS	DESCRIPTION
1 x	0.1	m	eastings NAD83 (Zone 10N)
2 y	0.1	m	northings NAD83 (Zone 10N)
3 fid	0.1		synchronization counter
4 longitude	0.1	degrees	longitude WGS84
5 latitude	0.1	degrees	latitude WGS84
6 flight	0.1		flight number
7 date	0.1		flight date (yyyy/mm/dd)
8 altrad_bird	0.1	m	calculated bird height above ground from radar altimeter
9 altlas_bird	0.1	m	measured bird height above surface from laser altimeter
10 gpsz	0.1	m	survey height above spheroid
11 dtm	0.1	m	terrain with respect to ellipsoid
12 diurnal_filt	0.1	nT	ground magnetic intensity
13 diurnal_cor	0.1	nT	diurnal correction - base removed
14 mag_raw	0.1	nT	total magnetic field - spike rejected
15 mag_lag	0.1	nT	total magnetic field - corrected for lag
16 mag_diu	0.1	nT	total magnetic field - diurnal variation removed
17 igrf	0.1	nT	international geomagnetic reference field
18 mag_rmi	0.1	nT	residual magnetic intensity - final
19 cpi900_filt	0.1	ppm	coplanar inphase 900 Hz - unlevelled
20 cpq900_filt	0.1	ppm	coplanar quadrature 900 Hz - unlevelled
21 cxi1000_filt	0.1	ppm	coaxial inphase 1000 Hz - unlevelled
22 cxq1000_filt	0.1	ppm	coaxial quadrature 1000 Hz - unlevelled
23 cxi5500_filt	0.1	ppm	coaxial inphase 5500 Hz - unlevelled
24 cxq5500_filt	0.1	ppm	coaxial quadrature 5500 Hz - unlevelled
25 cpi7200_filt	0.1	ppm	coplanar inphase 7200 Hz - unlevelled
26 cpq7200_filt	0.1	ppm	coplanar quadrature 7200 Hz -unlevelled
27 cpi56k_filt	0.1	ppm	coplanar inphase 56 kHz - unlevelled
28 cpq56k_filt	0.1	ppm	coplanar quadrature 56 kHz - unlevelled
29 cpi900	0.1	ppm	coplanar inphase 900 Hz
30 cpq900	0.1	ppm	coplanar quadrature 900 Hz
31 cxi1000	0.1	ppm	coaxial inphase 1000 Hz
32 cxq1000	0.1	ppm	coaxial quadrature 1000 Hz
33 cxi5500	0.1	ppm	coaxial inphase 5500 Hz
34 cxq5500	0.1	ppm	coaxial quadrature 5500 Hz
35 cpi7200	0.1	ppm	coplanar inphase 7200 Hz
36 cpq7200	0.1	ppm	coplanar quadrature 7200 Hz
37 cpi56k	0.1	ppm	coplanar inphase 56 kHz
38 cpq56k	0.1	ppm	coplanar quadrature 56 kHz
39 res900	0.1	ohm·m	apparent resistivity - 900 Hz
40 res7200	0.1	ohm·m	apparent resistivity - 7200 Hz
41 res56k	0.1	ohm·m	apparent resistivity - 56 kHz
42 dep900	0.1	m	apparent depth - 900 Hz
43 dep7200	0.1	m	apparent depth - 7200 Hz
44 dep56k	0.1	m	apparent depth - 56 kHz
45 difi	0.1		difference channel based on cxi5500/cpi7200
46 difq	0.1		difference channel based on cxq5500/cpq7200
47 cppl	0.1		coplanar powerline monitor
48 cxsp	0.1		coaxial spherics monitor
49 cpsp	0.1		coplanar spherics monitor

FUGRO ANOMALY SUMMARY

# CHANNEL NAME	TIME	UNITS	DESCRIPTION
1 Easting	0.10	m	easting NAD83 (Zone 10N)
2 Northing	0.10	m	northing NAD83 (Zone 10N)
3 FID	1.00		Synchronization Counter

4 FLT	0.10		Flight
5 MHOS	0.10	siemens	Conductance (see report for model used)
6 DEPTH	0.10	m	Depth (see report for model used)
7 MAG	0.10	nT	Mag Correlation, local amplitude
8 CXI1	0.10	ppm	Inphase Coaxial 1000 Hz, local amplitude
9 CXQ1	0.10	ppm	Quadrature Coaxial 1000 Hz, local amplitude
10 CPI1	0.10	ppm	Inphase Coplanar 900 Hz, absolute amplitude
11 CPQ1	0.10	ppm	Quadrature Coplanar 900 Hz, absolute amplitude
12 CPI2	0.10	ppm	Inphase Coplanar 7200 Hz, absolute amplitude
13 CPQ2	0.10	ppm	Quadrature Coplanar 7200 Hz, absolute amplitude
14 LET	0.10		Anomaly Identifier
15 SYM	0.10		Anomaly Interpretation Symbol
16 GRD	0.10		Anomaly Grade

The coordinate system for all grids and the data archive is projected as follows

Datum	NAD83
Spheroid	GRS80
Central meridian	123 West (Z10N)
False easting	500000
False northing	0
Scale factor	0.9996
Northern parallel	N/A
Base parallel	N/A
WGS84 to local conversion method	Molodensky
Delta X shift	0
Delta Y shift	0
Delta Z shift	0

If you have any problems with this archive please contact

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APPENDIX E

EM ANOMALY LIST

NOTE:

The EM Anomaly Table which would normally be appended to this report as Appendix E has not been printed due to the large number of pages. A digital form of this table, which contains all of the pertinent information, has been included on the final data archive.

APPENDIX F

GLOSSARY

APPENDIX F

GLOSSARY

Note: The definitions given in this glossary refer to the common terminology as used in airborne geophysics.

altitude attenuation: the absorption of gamma rays by the atmosphere between the earth and the detector. The number of gamma rays detected by a system decreases as the altitude increases.

apparent- : the ***physical parameters*** of the earth measured by a geophysical system are normally expressed as apparent, as in "apparent ***resistivity*"**. This means that the measurement is limited by assumptions made about the geology in calculating the response measured by the geophysical system. Apparent resistivity calculated with ***HEM***, for example, generally assumes that the earth is a ***homogeneous half-space*** – not layered.

amplitude: The strength of the total electromagnetic field. In ***frequency domain*** it is most often the sum of the squares of ***in-phase*** and ***quadrature*** components. In multi-component electromagnetic surveys it is generally the sum of the squares of all three directional components.

analytic signal: The total amplitude of all the directions of magnetic ***gradient***. Calculated as the sum of the squares.

anisotropy: Having different ***physical parameters*** in different directions. This can be caused by layering or fabric in the geology. Note that a unit can be anisotropic, but still **homogeneous**.

anomaly: A localized change in the geophysical data characteristic of a discrete source, such as a conductive or magnetic body: something locally different from the **background**.

B-field: In time-domain **electromagnetic** surveys, the magnetic field component of the (electromagnetic) **field**. This can be measured directly, although more commonly it is calculated by integrating the time rate of change of the magnetic field **dB/dt**, as measured with a receiver coil.

background: The "normal" response in the geophysical data – that response observed over most of the survey area. **Anomalies** are usually measured relative to the background. In airborne gamma-ray spectrometric surveys the term defines the **cosmic**, radon, and aircraft responses in the absence of a signal from the ground.

base-level: The measured values in a geophysical system in the absence of any outside signal. All geophysical data are measured relative to the system base level.

base frequency: The frequency of the pulse repetition for a ***time-domain electromagnetic*** system. Measured between subsequent positive pulses.

bird: A common name for the pod towed beneath or behind an aircraft, carrying the geophysical sensor array.

bucking: The process of removing the strong ***signal*** from the ***primary field*** at the ***receiver*** from the data, to measure the ***secondary field***. It can be done electronically or mathematically. This is done in ***frequency-domain EM***, and to measure ***on-time*** in ***time-domain EM***.

calibration coil: A wire coil of known size and dipole moment, which is used to generate a field of known ***amplitude*** and ***phase*** in the receiver, for system calibration. Calibration coils can be external, or internal to the system. Internal coils may be called Q-coils.

coaxial coils: **[CX]** Coaxial coils in an HEM system are in the vertical plane, with their axes horizontal and collinear in the flight direction. These are most sensitive to vertical conductive objects in the ground, such as thin, steeply dipping conductors perpendicular to the flight direction. Coaxial coils generally give the sharpest anomalies over localized conductors. (See also ***coplanar coils***)

coil: A multi-turn wire loop used to transmit or detect electromagnetic fields. Time varying ***electromagnetic*** fields through a coil induce a voltage proportional to the strength of the field and the rate of change over time.

compensation: Correction of airborne geophysical data for the changing effect of the aircraft. This process is generally used to correct data in ***fixed-wing time-domain electromagnetic*** surveys (where the transmitter is on the aircraft and the receiver is moving), and magnetic surveys (where the sensor is on the aircraft, turning in the earth's magnetic field.

component: In ***frequency domain electromagnetic*** surveys this is one of the two **phase** measurements – ***in-phase or quadrature***. In "multi-component" electromagnetic surveys it is also used to define the measurement in one geometric direction (vertical, horizontal in-line and horizontal transverse – the Z, X and Y components).

Compton scattering: gamma ray photons will bounce off electrons as they pass through the earth and atmosphere, reducing their energy and then being detected by ***radiometric*** sensors at lower energy levels. See also ***stripping***.

conductance: See ***conductivity thickness***

conductivity: [σ] The facility with which the earth or a geological formation conducts electricity. Conductivity is usually measured in milli-Siemens per metre (mS/m). It is the reciprocal of ***resistivity***.

conductivity-depth imaging: see ***conductivity-depth transform***.

conductivity-depth transform: A process for converting electromagnetic measurements to an approximation of the conductivity distribution vertically in the earth, assuming a ***layered earth***. (Macnae and Lamontagne, 1987; Wolfgram and Karlik, 1995)

conductivity thickness: [**σt**] The product of the ***conductivity***, and thickness of a large, tabular body. (It is also called the "conductivity-thickness product") In electromagnetic geophysics, the response of a thin plate-like conductor is proportional to the conductivity multiplied by thickness. For example a 10 metre thickness of 20 Siemens/m mineralization will be equivalent to 5 metres of 40 S/m; both have 200 S conductivity thickness. Sometimes referred to as **conductance**.

conductor: Used to describe anything in the ground more conductive than the surrounding geology. Conductors are most often clays or graphite, or hopefully some type of mineralization, but may also be man-made objects, such as fences or pipelines.

coplanar coils: **[CP]** In HEM, the coplanar coils lie in the horizontal plane with their axes vertical, and parallel. These coils are most sensitive to massive conductive bodies, horizontal layers, and the ***halfspace***.

cosmic ray: High energy sub-atomic particles from outer space that collide with the earth's atmosphere to produce a shower of gamma rays (and other particles) at high energies.

counts (per second): The number of ***gamma-rays*** detected by a gamma-ray ***spectrometer*****.** The rate depends on the geology, but also on the size and sensitivity of the detector.

culture: A term commonly used to denote any man-made object that creates a geophysical anomaly. Includes, but not limited to, power lines, pipelines, fences, and buildings.

current channelling: See current gathering.

current gathering: The tendency of electrical currents in the ground to channel into a conductive formation. This is particularly noticeable at higher frequencies or early time channels when the formation is long and parallel to the direction of current flow. This tends to enhance anomalies relative to inductive currents (see also ***induction***). Also known as current channelling.

daughter products: The radioactive natural sources of gamma-rays decay from the original "parent" element (commonly potassium, uranium, and thorium) to one or more lower-energy "daughter" elements. Some of these lower energy elements are also radioactive and decay further. ***Gamma-ray spectrometry*** surveys may measure the gamma rays given off by the original element or by the decay of the daughter products.

dB/dt: As the ***secondary electromagnetic field*** changes with time, the magnetic field [**B**] component induces a voltage in the receiving ***coil***, which is proportional to the rate of change of the magnetic field over time.

decay: In ***time-domain electromagnetic*** theory, the weakening over time of the ***eddy currents*** in the ground, and hence the ***secondary field*** after the ***primary field*** electromagnetic pulse is turned off. In ***gamma-ray spectrometry***, the radioactive breakdown of an element, generally potassium, uranium, thorium, or one of their ***daughter*** products.

decay constant: see time constant.

decay series: In ***gamma-ray spectrometry***, a series of progressively lower energy ***daughter products*** produced by the radioactive breakdown of uranium or thorium.

depth of exploration: The maximum depth at which the geophysical system can detect the target. The depth of exploration depends very strongly on the type and size of the target, the contrast of the target with the surrounding geology, the homogeneity of the surrounding geology, and the type of geophysical system. One measure of the maximum depth of exploration for an electromagnetic system is the depth at which it can detect the strongest conductive target – generally a highly conductive horizontal layer.

differential resistivity: A process of transforming ***apparent resistivity*** to an approximation of layer resistivity at each depth. The method uses multi-frequency HEM data and approximates the effect of shallow layer ***conductance*** determined from higher frequencies to estimate the deeper conductivities (Huang and Fraser, 1996)

dipole moment: [NIA] For a transmitter, the product of the area of a ***coil***, the number of turns of wire, and the current flowing in the coil. At a distance significantly larger than the size of the coil, the magnetic field from a coil will be the same if the dipole moment product is the same. For a receiver coil, this is the product of the area and the number of turns. The sensitivity to a magnetic field (assuming the source is far away) will be the same if the dipole moment is the same.

diurnal: The daily variation in a natural field, normally used to describe the natural fluctuations (over hours and days) of the earth's magnetic field.

dielectric permittivity: **[ε]** The capacity of a material to store electrical charge, this is most often measured as the relative permittivity [ε_r], or ratio of the material dielectric to that of free space. The effect of high permittivity may be seen in HEM data at high frequencies over highly resistive geology as a reduced or negative ***in-phase***, and higher ***quadrature*** data.

drape: To fly a survey following the terrain contours, maintaining a constant altitude above the local ground surface. Also applied to re-processing data collected at varying altitudes above ground to simulate a survey flown at constant altitude.

drift: Long-time variations in the base-level or calibration of an instrument.

eddy currents: The electrical currents induced in the ground, or other conductors, by a time-varying ***electromagnetic field*** (usually the ***primary field***). Eddy currents are also induced in the aircraft's metal frame and skin; a source of ***noise*** in EM surveys.

electromagnetic: **[EM]** Comprised of a time-varying electrical and magnetic field. Radio waves are common electromagnetic fields. In geophysics, an electromagnetic system is one which transmits a time-varying ***primary field*** to induce ***eddy currents*** in the ground, and then measures the ***secondary field*** emitted by those eddy currents.

energy window: A broad spectrum of ***gamma-ray*** energies measured by a spectrometric survey. The energy of each gamma-ray is measured and divided up into numerous discrete energy levels, called windows.

equivalent (thorium or uranium): The amount of radioelement calculated to be present, based on the gamma-rays measured from a **daughter** element. This assumes that the ***decay series*** is in equilibrium – progressing normally.

exposure rate: in radiometric surveys, a calculation of the total exposure rate due to gamma rays at the ground surface. It is used as a measurement of the concentration of all the **radioelements** at the surface. See also: **natural exposure rate**.

fiducial, or fid: Timing mark on a survey record. Originally these were timing marks on a profile or film; now the term is generally used to describe 1-second interval timing records in digital data, and on maps or profiles.

Figure of Merit: **(FOM)** A sum of the 12 distinct magnetic noise variations measured by each of four flight directions, and executing three aircraft attitude variations (yaw, pitch, and roll) for each direction. The flight directions are generally parallel and perpendicular to planned survey flight directions. The FOM is used as a measure of the **manoeuvre noise** before and after **compensation.**

fixed-wing: Aircraft with wings, as opposed to "rotary wing" helicopters.

footprint: This is a measure of the area of sensitivity under the aircraft of an airborne geophysical system. The footprint of an ***electromagnetic*** system is dependent on the altitude of the system, the orientation of the transmitter and receiver and the separation between the receiver and transmitter, and the conductivity of the ground. The footprint of a ***gamma-ray spectrometer*** depends mostly on the altitude. For all geophysical systems, the footprint also depends on the strength of the contrasting ***anomaly***.

frequency domain: An ***electromagnetic*** system which transmits a ***primary field*** that oscillates smoothly over time (sinusoidal), inducing a similarly varying electrical current in the ground. These systems generally measure the changes in the ***amplitude*** and ***phase*** of the ***secondary field*** from the ground at different frequencies by measuring the **in-phase** and **quadrature** phase components. See also ***time-domain***.

full-stream data: Data collected and recorded continuously at the highest possible sampling rate. Normal data are stacked (see ***stacking***) over some time interval before recording.

gamma-ray: A very high-energy photon, emitted from the nucleus of an atom as it undergoes a change in energy levels.

gamma-ray spectrometry: Measurement of the number and energy of natural (and sometimes man-made) gamma-rays across a range of photon energies.

gradient: In magnetic surveys, the gradient is the change of the magnetic field over a distance, either vertically or horizontally in either of two directions. Gradient data is often measured, or calculated from the total magnetic field data because it changes more quickly over distance than the ***total magnetic field***, and so may provide a more precise measure of the location of a source. See also ***analytic signal***.

ground effect: The response from the earth. A common calibration procedure in many geophysical surveys is to fly to altitude high enough to be beyond any measurable response from the ground, and there establish ***base levels*** or ***backgrounds***.

half-space: A mathematical model used to describe the earth – as infinite in width, length, and depth below the surface. The most common halfspace models are ***homogeneous*** and ***layered earth***.

heading error: A slight change in the magnetic field measured when flying in opposite directions.

HEM: Helicopter ElectroMagnetic, This designation is most commonly used for helicopter-borne, ***frequency-domain*** electromagnetic systems. At present, the transmitter and receivers are normally mounted in a ***bird*** carried on a sling line beneath the helicopter.

herringbone pattern: A pattern created in geophysical data by an asymmetric system, where the **anomaly** may be extended to either side of the source, in the direction of flight. Appears like fish bones, or like the teeth of a comb, extending either side of centre, each tooth an alternate flight line.

homogeneous: This is a geological unit that has the same ***physical parameters*** throughout its volume. This unit will create the same response to an HEM system anywhere, and the HEM system will measure the same apparent ***resistivity*** anywhere. The response may change with system direction (see ***anisotropy***).

HTEM: Helicopter Time-domain ElectroMagnetic, This designation is used for the new generation of helicopter-borne, ***time-domain*** electromagnetic systems.

in-phase: the component of the measured ***secondary field*** that has the same phase as the transmitter and the ***primary field***. The in-phase component is stronger than the ***quadrature*** phase over relatively higher ***conductivity***.

induction: Any time-varying electromagnetic field will induce (cause) electrical currents to flow in any object with non-zero ***conductivity***. (see ***eddy currents***)

induction number: also called the "response parameter", this number combines many of the most significant parameters affecting the ***EM*** response into one parameter against which to compare responses. For a ***layered earth*** the response parameter is $\mu\omega\sigma h^2$ and for a large, flat, ***conductor*** it is $\mu\omega\sigma th$, where μ is the ***magnetic permeability***, ω is the angular ***frequency***, σ is the **conductivity**, t is the thickness (for the flat conductor) and h is the height of the system above the conductor.

inductive limit: When the frequency of an EM system is very high, or the **conductivity** of the target is very high, the response measured will be entirely **in-phase** with no **quadrature** (**phase** angle =0). The in-phase response will remain constant with further increase in conductivity or frequency. The system can no longer detect changes in conductivity of the target.

infinite: In geophysical terms, an "infinite' dimension is one much greater than the ***footprint*** of the system, so that the system does not detect changes at the edges of the object.

International Geomagnetic Reference Field: **[IGRF]** An approximation of the smooth magnetic field of the earth, in the absence of variations due to local geology. Once the IGRF is subtracted from the measured magnetic total field data, any remaining variations are assumed to be due to local geology. The IGRF also predicts the slow changes of the field up to five years in the future.

inversion, or **inverse modeling**: A process of converting geophysical data to an earth model, which compares theoretical models of the response of the earth to the data measured, and refines the model until the response closely fits the measured data (Huang and Palacky, 1991)

layered earth: A common geophysical model which assumes that the earth is horizontally layered – the ***physical parameters*** are constant to ***infinite*** distance horizontally, but change vertically.

magnetic permeability: **[μ]** This is defined as the ratio of magnetic induction to the inducing magnetic field. The relative magnetic permeability [μ_r] is often quoted, which is the ratio of the rock permeability to the permeability of free space. In geology and geophysics, the ***magnetic susceptibility*** is more commonly used to describe rocks.

magnetic susceptibility: **[k]** A measure of the degree to which a body is magnetized. In SI units this is related to relative ***magnetic permeability*** by $k=\mu_r-1$, and is a dimensionless unit. For most geological material, susceptibility is influenced primarily by the percentage of magnetite. It is most often quoted in units of 10^{-6}. In HEM data this is most often apparent as a negative ***in-phase*** component over high susceptibility, high ***resistivity*** geology such as diabase dikes.

manoeuvre noise: variations in the magnetic field measured caused by changes in the relative positions of the magnetic sensor and magnetic objects or electrical currents in the aircraft. This type of noise is generally corrected by magnetic **compensation**.

model: Geophysical theory and applications generally have to assume that the geology of the earth has a form that can be easily defined mathematically, called the model. For example steeply dipping **conductor**s are generally modeled as being **infinite** in horizontal and depth extent, and very thin. The earth is generally modeled as horizontally layered, each layer infinite in extent and uniform in characteristic. These models make the mathematics to describe the response of the (normally very complex) earth practical. As theory advances, and computers become more powerful, the useful models can become more complex.

natural exposure rate: in radiometric surveys, a calculation of the total exposure rate due to natural-source gamma rays at the ground surface. It is used as a measurement of the concentration of all the natural **radioelements** at the surface. See also: **exposure rate**.

noise: That part of a geophysical measurement that the user does not want. Typically this includes electronic interference from the system, the atmosphere (***sferics***), and man-made sources. This can be a subjective judgment, as it may include the response from geology other than the target of interest. Commonly the term is used to refer to high frequency (short period) interference. See also ***drift***.

Occam's inversion: an ***inversion*** process that matches the measured ***electromagnetic*** data to a theoretical model of many, thin layers with constant thickness and varying resistivity (Constable et al, 1987).

off-time: In a ***time-domain electromagnetic*** survey, the time after the end of the ***primary field pulse***, and before the start of the next pulse.

on-time: In a ***time-domain electromagnetic*** survey, the time during the ***primary field pulse***.

overburden: In engineering and mineral exploration terms, this most often means the soil on top of the unweathered bedrock. It may be sand, glacial till, or weathered rock.

Phase, phase angle: The angular difference in time between a measured sinusoidal electromagnetic field and a reference – normally the primary field. The phase is calculated from $\tan^{-1}$(***in-phase / quadrature***).

physical parameters: These are the characteristics of a geological unit. For electromagnetic surveys, the important parameters are ***conductivity***, ***magnetic permeability*** (or ***susceptibility***) and ***dielectric permittivity***; for magnetic surveys the parameter is magnetic susceptibility, and for gamma ray spectrometric surveys it is the concentration of the major radioactive elements: potassium, uranium, and thorium.

permittivity: see ***dielectric permittivity***.

permeability: see ***magnetic permeability***.

primary field: the EM field emitted by a transmitter. This field induces ***eddy currents*** in (energizes) the conductors in the ground, which then create their own ***secondary* fields**.

pulse: In time-domain EM surveys, the short period of intense ***primary*** field transmission. Most measurements (the ***off-time***) are measured after the pulse. **On-time** measurements may be made during the pulse.

quadrature: that component of the measured ***secondary field*** that is phase-shifted 90° from the ***primary field***. The quadrature component tends to be stronger than the ***in-phase*** over relatively weaker ***conductivity***.

Q-coils: see ***calibration coil***.

radioelements: This normally refers to the common, naturally-occurring radioactive elements: potassium (K), uranium (U), and thorium (Th). It can also refer to man-made radioelements, most often cobalt (Co) and cesium (Cs)

radiometric: Commonly used to refer to ***gamma ray*** spectrometry.

radon: A radioactive daughter product of uranium and thorium, radon is a gas which can leak into the atmosphere, adding to the non-geological background of a gamma-ray spectrometric survey.

receiver: the ***signal*** detector of a geophysical system. This term is most often used in active geophysical systems – systems that transmit some kind of signal. In airborne ***electromagnetic*** surveys it is most often a ***coil***. (see also, ***transmitter***)

resistivity: **[ρ]** The strength with which the earth or a geological formation resists the flow of electricity, typically the flow induced by the ***primary field*** of the electromagnetic transmitter. Normally expressed in ohm-metres, it is the reciprocal of ***conductivity***.

resistivity-depth transforms: similar to ***conductivity depth transforms***, but the calculated ***conductivity*** has been converted to ***resistivity***.

resistivity section: an approximate vertical section of the resistivity of the layers in the earth. The resistivities can be derived from the ***apparent resistivity***, the ***differential resistivities***, ***resistivity-depth transforms***, or ***inversions***.

Response parameter: another name for the **induction number**.

secondary field: The field created by conductors in the ground, as a result of electrical currents induced by the ***primary field*** from the ***electromagnetic*** transmitter. Airborne ***electromagnetic*** systems are designed to create and measure a secondary field.

Sengpiel section: a ***resistivity section*** derived using the ***apparent resistivity*** and an approximation of the depth of maximum sensitivity for each frequency.

sferic: Lightning, or the ***electromagnetic*** signal from lightning, it is an abbreviation of "atmospheric discharge". These appear to magnetic and electromagnetic sensors as sharp "spikes" in the data. Under some conditions lightning storms can be detected from hundreds of kilometres away. (see ***noise***)

signal: That component of a measurement that the user wants to see – the response from the targets, from the earth, etc. (See also ***noise***)

skin depth: A measure of the depth of penetration of an electromagnetic field into a material. It is defined as the depth at which the primary field decreases to 1/e of the field at the surface. It is calculated by approximately 503 x √(resistivity/frequency). Note that depth of penetration is greater at higher ***resistivity*** and/or lower ***frequency***.

spectrometry: Measurement across a range of energies, where ***amplitude*** and energy are defined for each measurement. In gamma-ray spectrometry, the number of gamma rays are measured for each energy ***window***, to define the ***spectrum***.

spectrum: In ***gamma ray spectrometry***, the continuous range of energy over which gamma rays are measured. In ***time-domain electromagnetic*** surveys, the spectrum is the energy of the **pulse** distributed across an equivalent, continuous range of frequencies.

spheric: see ***sferic***.

stacking: Summing repeat measurements over time to enhance the repeating ***signal***, and minimize the random ***noise***.
stripping: Estimation and correction for the gamma ray photons of higher and lower energy that are observed in a particular ***energy window***. See also ***Compton scattering***.

susceptibility: See ***magnetic susceptibility***.

tau: [τ] Often used as a name for the ***time constant***.

TDEM: ***time domain electromagnetic***.

thin sheet: A standard model for electromagnetic geophysical theory. It is usually defined as a thin, flat-lying conductive sheet, ***infinite*** in both horizontal directions. (see also ***vertical plate***)

tie-line: A survey line flown across most of the ***traverse lines***, generally perpendicular to them, to assist in measuring ***drift*** and ***diurnal*** variation. In the short time required to fly a tie-line it is assumed that the drift and/or diurnal will be minimal, or at least changing at a constant rate.

time constant: The time required for an ***electromagnetic*** field to decay to a value of 1/e of the original value. In ***time-domain*** electromagnetic data, the time constant is proportional to the size and ***conductance*** of a tabular conductive body. Also called the decay constant.

Time channel: In ***time-domain electromagnetic*** surveys the decaying ***secondary field*** is measured over a period of time, and the divided up into a series of consecutive discrete measurements over that time.

time-domain: ***Electromagnetic*** system which transmits a pulsed, or stepped ***electromagnetic*** field. These systems induce an electrical current (***eddy current***) in the ground that persists after the ***primary field*** is turned off, and measure the change over time of the ***secondary field*** created as the currents ***decay***. See also ***frequency-domain***.

total energy envelope: The sum of the squares of the three ***components*** of the ***time-domain electromagnetic secondary field***. Equivalent to the ***amplitude*** of the secondary field.

transient: Time-varying. Usually used to describe a very short period pulse of ***electromagnetic*** field.

transmitter: The source of the ***signa*l** to be measured in a geophysical survey. In airborne ***EM*** it is most often a **coil** carrying a time-varying electrical current, transmitting the ***primary field***. (see also ***receiver***)

traverse line: A normal geophysical survey line. Normally parallel traverse lines are flown across the property in spacing of 50 m to 500 m, and generally perpendicular to the target geology.

vertical plate: A standard model for electromagnetic geophysical theory. It is usually defined as thin conductive sheet, ***infinite*** in horizontal dimension and depth extent. (see also ***thin shee***t)

waveform: The shape of the ***electromagnetic pulse*** from a ***time-domain*** electromagnetic transmitter.

window: A discrete portion of a ***gamma-ray spectrum*** or ***time-domain electromagnetic decay***. The continuous energy spectrum or ***full-stream*** data are grouped into windows to reduce the number of samples, and reduce ***noise***.

Version 1.5, November 29, 2005
Greg Hodges,
Chief Geophysicist
Fugro Airborne Surveys, Toronto

Common Symbols and Acronyms

k Magnetic susceptibility
ε Dielectric permittivity
μ, μ_r Magnetic permeability, relative permeability
ρ, ρ_a Resistivity, apparent resistivity
σ,σ_a Conductivity, apparent conductivity
σt Conductivity thickness
τ Tau, or time constant
Ωm ohm-metres, units of resistivity
AGS Airborne gamma ray spectrometry.
CDT Conductivity-depth transform, conductivity-depth imaging (Macnae and Lamontagne, 1987; Wolfgram and Karlik, 1995)
CPI, CPQ Coplanar in-phase, quadrature
CPS Counts per second
CTP Conductivity thickness product
CXI, CXQ Coaxial, in-phase, quadrature
FOM Figure of Merit
fT femtoteslas, normal unit for measurement of B-Field
EM Electromagnetic
keV kilo electron volts – a measure of gamma-ray energy
MeV mega electron volts – a measure of gamma-ray energy 1MeV = 1000keV
NIA dipole moment: turns x current x Area
nT nanotesla, a measure of the strength of a magnetic field
nG/h nanoGreys/hour – gamma ray dose rate at ground level
ppm parts per million – a measure of secondary field or noise relative to the primary or radioelement concentration.
pT/s picoteslas per second: Units of decay of secondary field, dB/dt
S siemens – a unit of conductance
x: the horizontal component of an EM field parallel to the direction of flight.
y: the horizontal component of an EM field perpendicular to the direction of flight.
z: the vertical component of an EM field.

References:

Constable, S.C., Parker, R.L., And Constable, C.G., 1987, Occam's inversion: a practical algorithm for generating smooth models from electromagnetic sounding data: Geophysics, 52, 289-300

Huang, H. and Fraser, D.C, 1996. The differential parameter method for muiltifrequency airborne resistivity mapping. Geophysics, 55, 1327-1337

Huang, H. and Palacky, G.J., 1991, Damped least-squares inversion of time-domain airborne EM data based on singular value decomposition: Geophysical Prospecting, v.39, 827-844

Macnae, J. and Lamontagne, Y., 1987, Imaging quasi-layered conductive structures by simple processing of transient electromagnetic data: Geophysics, v52, 4, 545-554.

Sengpiel, K-P. 1988, Approximate inversion of airborne EM data from a multi-layered ground. Geophysical Prospecting, 36, 446-459

Wolfgram, P. and Karlik, G., 1995, Conductivity-depth transform of GEOTEM data: Exploration Geophysics, 26, 179-185.

Yin, C. and Fraser, D.C. (2002), The effect of the electrical anisotropy on the responses of helicopter-borne frequency domain electromagnetic systems, Submitted to *Geophysical Prospecting*

APPENDIX III

FUGRO AIRBORNE SURVEY MAPS (1:20,000):

a: Residual Magnetic Field

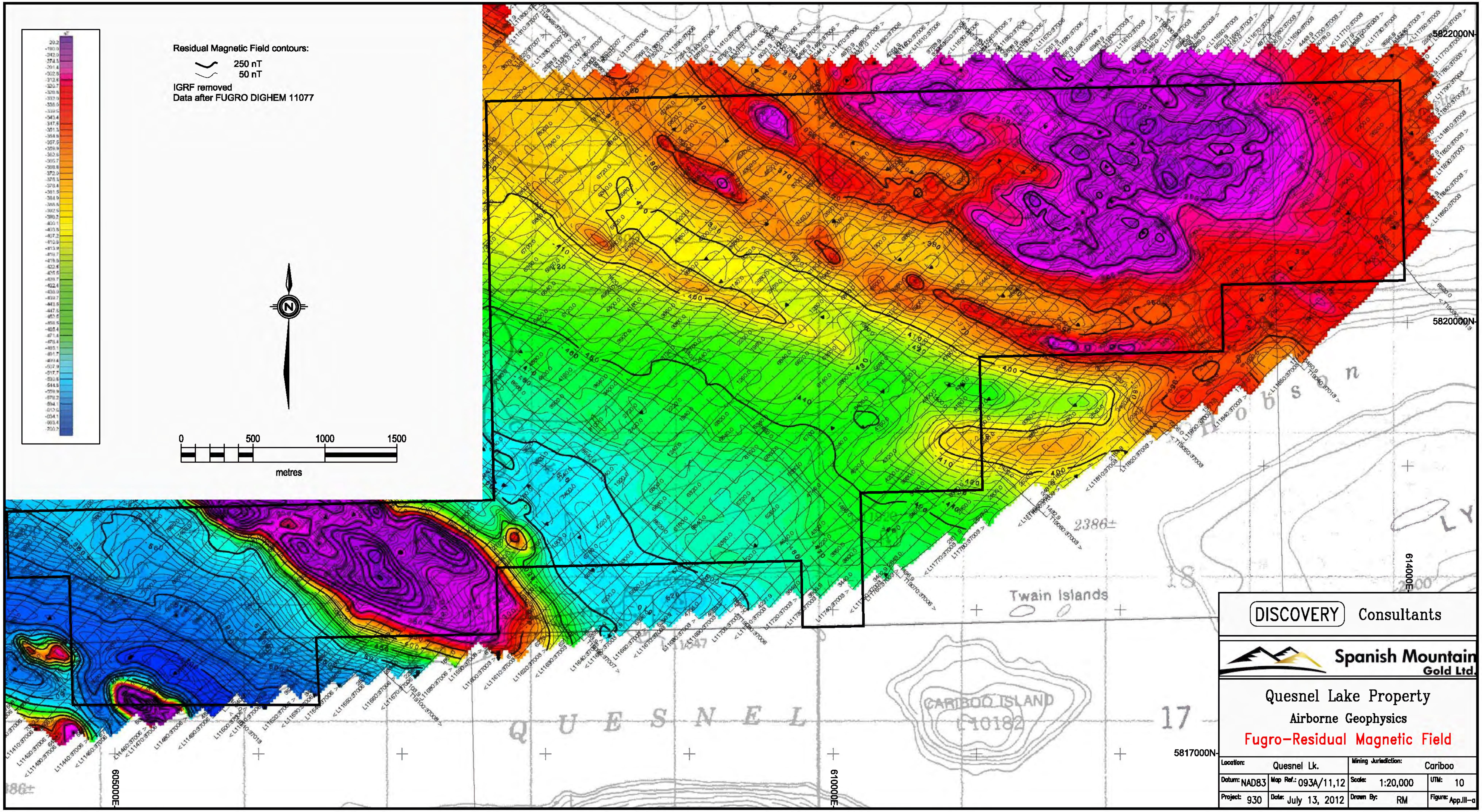
b: Calculated Vertical Magnetic Gradient

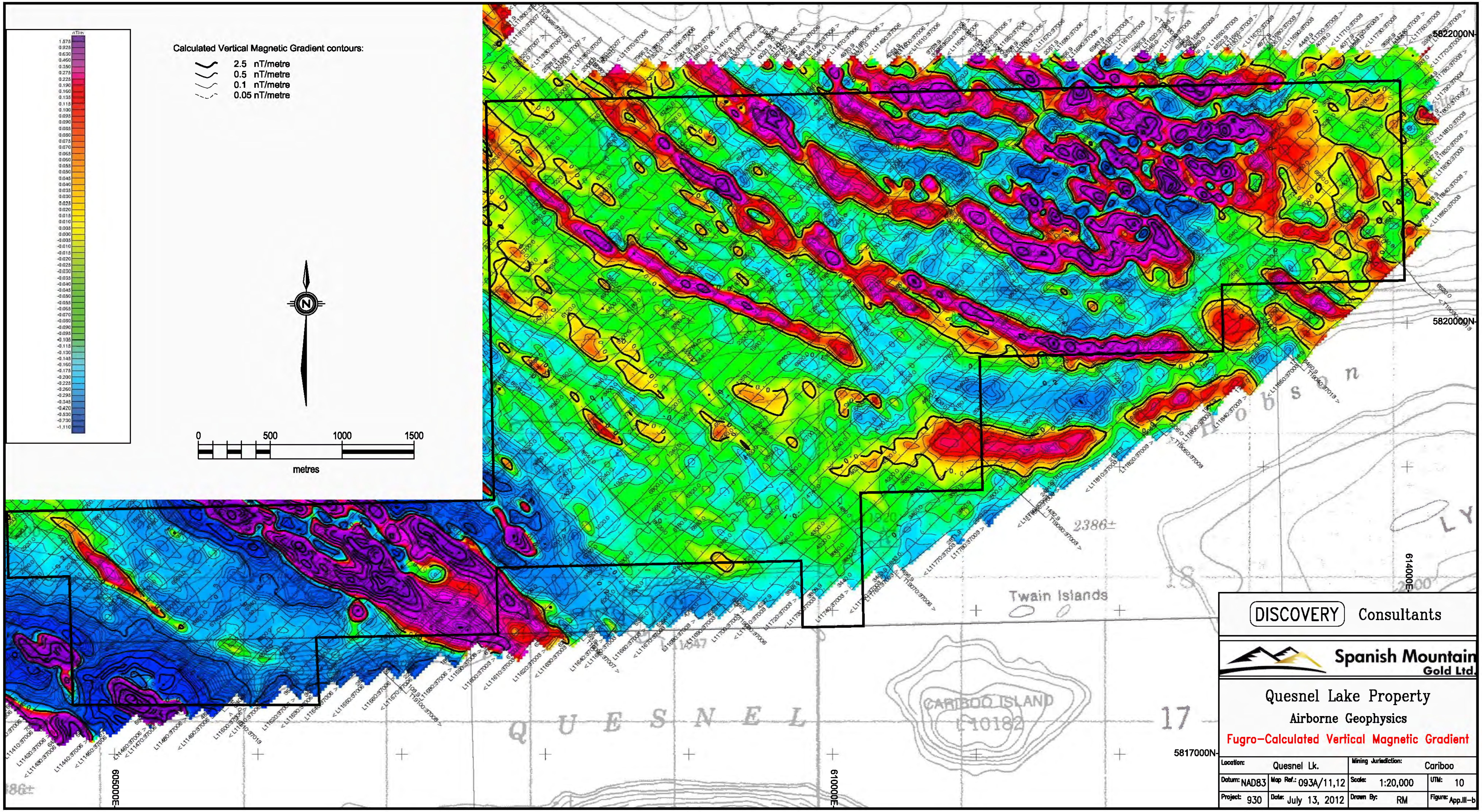
c: Apparent Resistivity 56,000 Hertz Coplanar

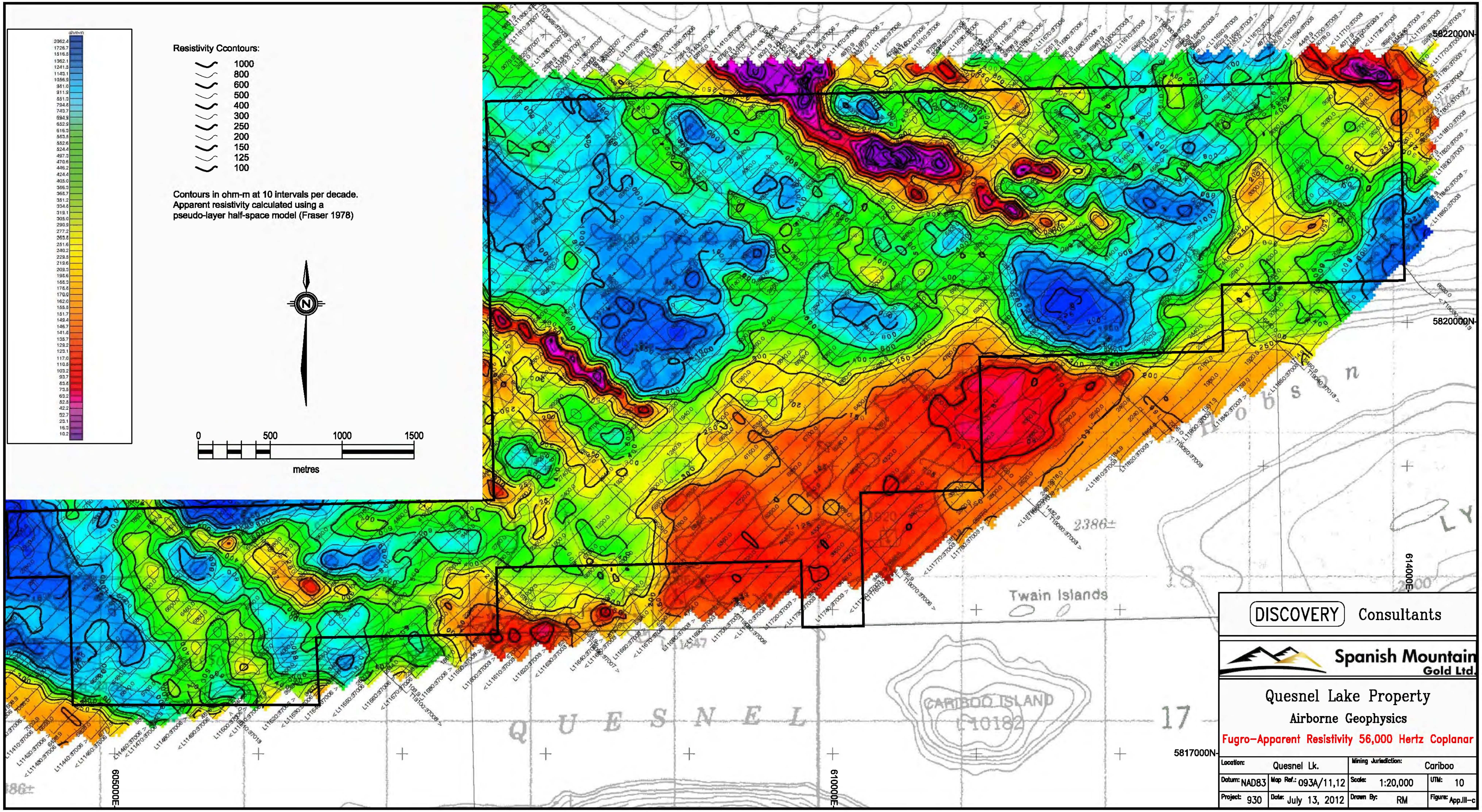
d: Apparent Resistivity 7,200 Hertz Coplanar

e: Apparent Resistivity 900 Hertz Coplanar

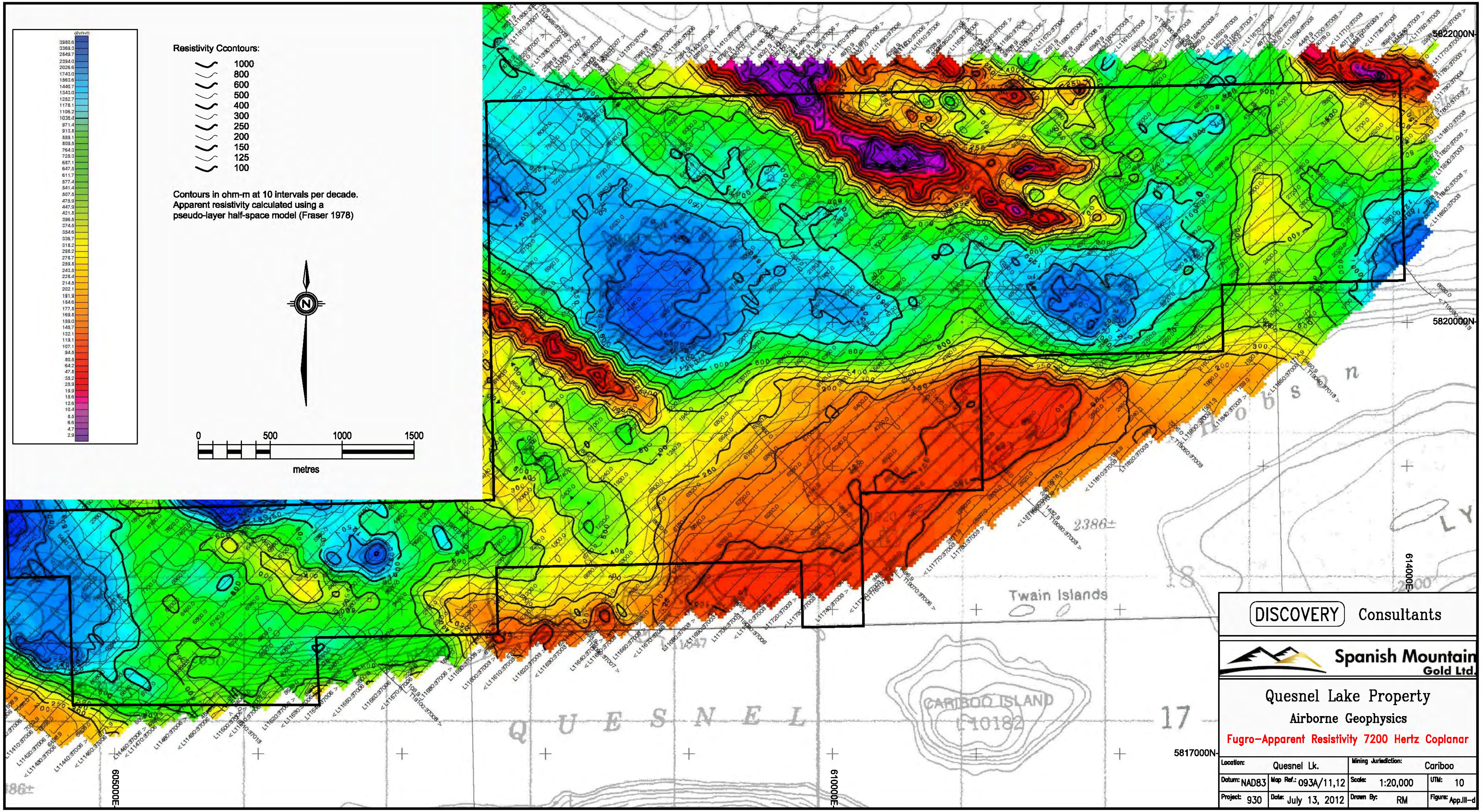
f: Electromagnetic Anomalies

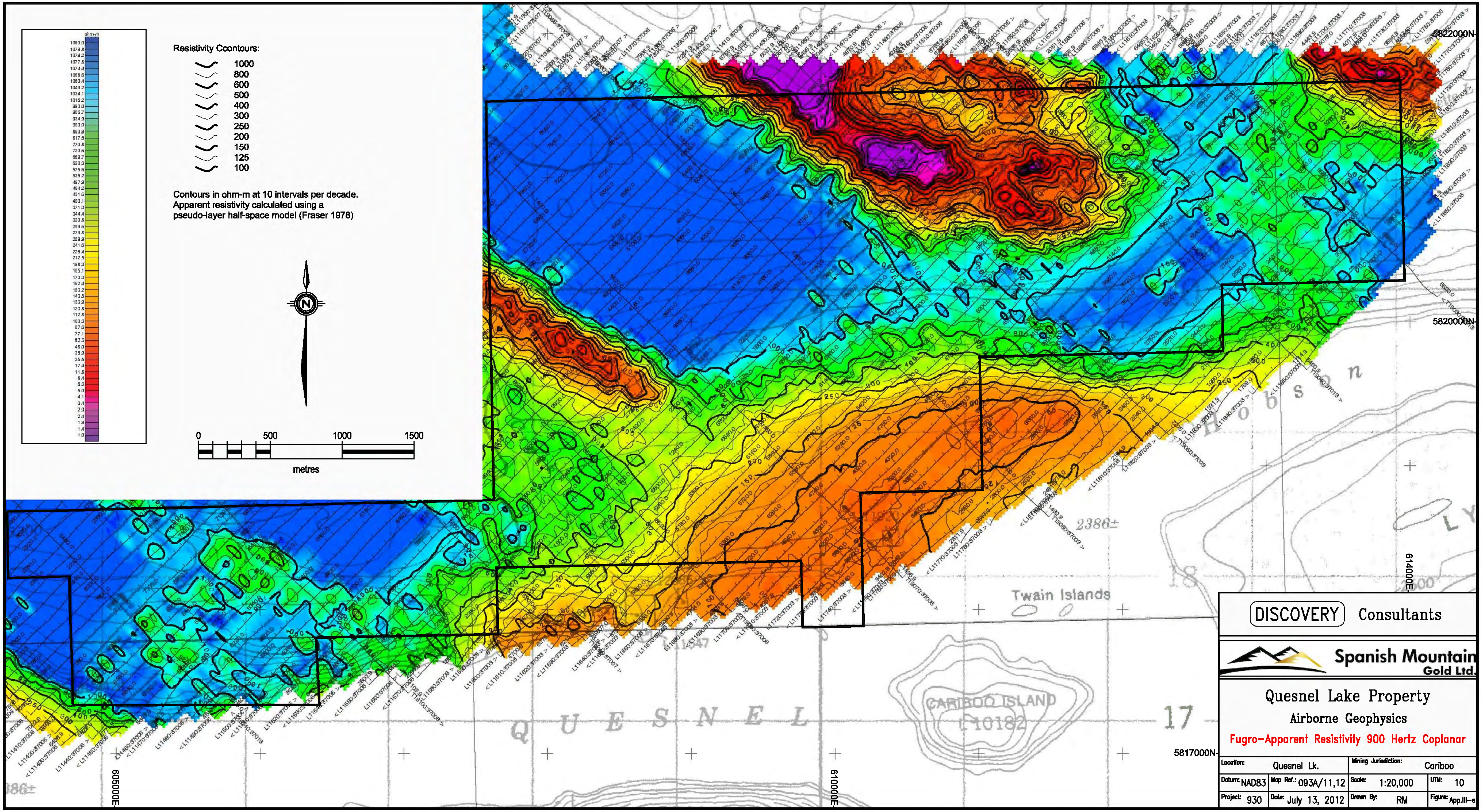

Residual Magnetic Field contours:
250 nT
50 nT
IGRF removed
Data after FUGRO DIGHEM 11077
0
500
1000
1500
metres
N
5822000N
5820000N
5817000N
605000E
610000E
614000E
Twain Islands
CARIBOO ISLAND
Q U E S N E L
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Airborne Geophysics
Fugro–Residual Magnetic Field
Location: Quesnel Lk.
Mining Jurisdiction: Cariboo
Datum: NAD83
Map Ref.: 093A/11,12
Scale: 1:20,000
UTM: 10
Project: 930
Date: July 13, 2012
Drawn By: RM
Figure: App.III–a


Calculated Vertical Magnetic Gradient contours:
2.5 nT/metre
0.5 nT/metre
0.1 nT/metre
0.05 nT/metre
nT/m
0 500 1000 1500
metres
N
5822000N
5820000N
5817000N
605000E
610000E
614000E
Twain Islands
CARIBOO ISLAND
Q U E S N E L
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Airborne Geophysics
Fugro-Calculated Vertical Magnetic Gradient
Location: Quesnel Lk.
Mining Jurisdiction: Cariboo
Datum: NAD83
Map Ref.: 093A/11,12
Scale: 1:20,000
UTM: 10
Project: 930
Date: July 13, 2012
Drawn By: RM
Figure: App.III-b

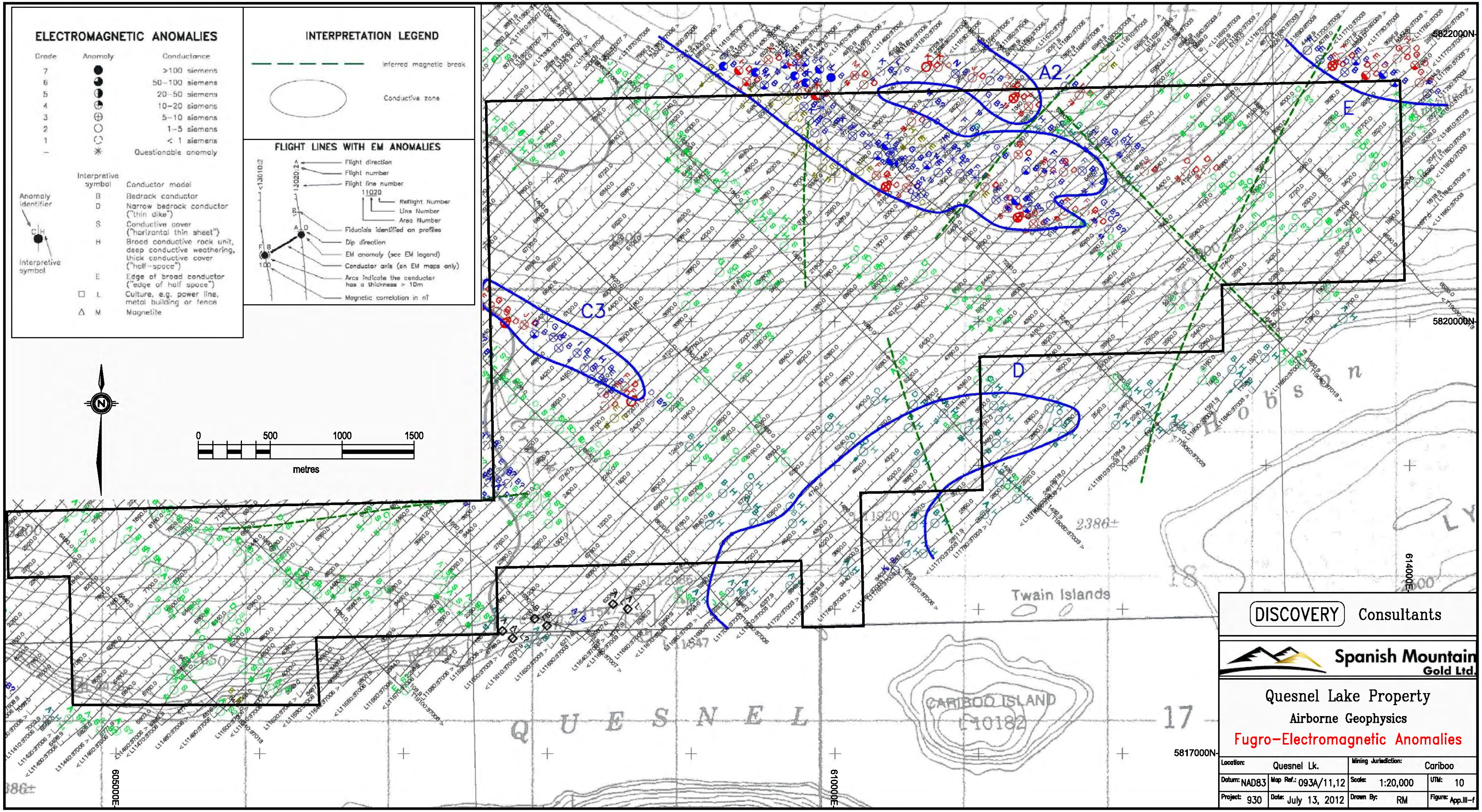


ohm-m
Resistivity Ccontours:
1000
800
600
500
400
300
250
200
150
125
100
Contours in ohm-m at 10 intervals per decade.
Apparent resistivity calculated using a
pseudo-layer half-space model (Fraser 1978)
0
500
1000
1500
metres
5822000N
5820000N
5817000N
605000E
610000E
614000E
Twain Islands
CARIBOO ISLAND
QUESNEL
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Airborne Geophysics
Fugro-Apparent Resistivity 56,000 Hertz Coplanar
Location: Quesnel Lk.
Mining Jurisdiction: Cariboo
Datum: NAD83
Map Ref.: 093A/11,12
Scale: 1:20,000
UTM: 10
Project: 930
Date: July 13, 2012
Drawn By: RM
Figure: App.III-c


Resistivity Ccontours:
1000
800
600
500
400
300
250
200
150
125
100
Contours in ohm-m at 10 intervals per decade.
Apparent resistivity calculated using a pseudo-layer half-space model (Fraser 1978)
0
500
1000
1500
metres
N
Twain Islands
CARIBOO ISLAND
Q U E S N E L
H o b s o n
5822000N
5820000N
5817000N
605000E
610000E
614000E
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Airborne Geophysics
Fugro–Apparent Resistivity 7200 Hertz Coplanar
Location: Quesnel Lk.
Mining Jurisdiction: Cariboo
Datum: NAD83
Map Ref.: 093A/11,12
Scale: 1:20,000
UTM: 10
Project: 930
Date: July 13, 2012
Drawn By: RM
Figure: App.III-d



Resistivity Ccontours:
1000
800
600
500
400
300
250
200
150
125
100
Contours in ohm-m at 10 intervals per decade.
Apparent resistivity calculated using a pseudo-layer half-space model (Fraser 1978)
0
500
1000
1500
metres
5822000N
5820000N
5817000N
605000E
610000E
614000E
Twain Islands
CARIBOO ISLAND
Q U E S N E L
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Airborne Geophysics
Fugro-Apparent Resistivity 900 Hertz Coplanar
Location: Quesnel Lk.
Mining Jurisdiction: Cariboo
Datum: NAD83
Map Ref.: 093A/11,12
Scale: 1:20,000
UTM: 10
Project: 930
Date: July 13, 2012
Drawn By: RM
Figure: App.III-e


ELECTROMAGNETIC ANOMALIES
Grade Anomaly Conductance
7 >100 siemens
6 50–100 siemens
5 20–50 siemens
4 10–20 siemens
3 5–10 siemens
2 1–5 siemens
1 < 1 siemens
– Questionable anomaly
Interpretive symbol Conductor model
B Bedrock conductor
D Narrow bedrock conductor ("thin dike")
S Conductive cover ("horizontal thin sheet")
H Broad conductive rock unit, deep conductive weathering, thick conductive cover ("half-space")
E Edge of broad conductor ("edge of half space")
L Culture, e.g. power line, metal building or fence
M Magnetite
Anomaly identifier
Interpretive symbol
INTERPRETATION LEGEND
Inferred magnetic break
Conductive zone
FLIGHT LINES WITH EM ANOMALIES
Flight direction
Flight number
Flight line number
Reflight Number
Line Number
Area Number
Fiducials identified on profiles
Dip direction
EM anomaly (see EM legend)
Conductor axis (on EM maps only)
Arcs indicate the conductor has a thickness > 10m
Magnetic correlation in nT
0 500 1000 1500
metres
A2
C3
D
E
5822000N
5820000N
5817000N
605000E
610000E
614000E
Twain Islands
CARIBOO ISLAND
QUESNEL
Hobson
DISCOVERY Consultants
Spanish Mountain Gold Ltd.
Quesnel Lake Property
Airborne Geophysics
Fugro–Electromagnetic Anomalies
Location: Quesnel Lk.
Mining Jurisdiction: Cariboo
Datum: NAD83
Map Ref.: 093A/11,12
Scale: 1:20,000
UTM: 10
Project: 930
Date: July 13, 2012
Drawn By: RM
Figure: App.III-f