Report

on a

Helicopter-Borne Magnetic Survey

on the

KISGEGAS MOLYBDENUM PROPERTY

Hazelton Area
West-Central British Columbia

NTS 93M14W
55^0 45' N, 127^0 26' W

R.H. McMillan Ph.D., P.Geo.
15 January 2010

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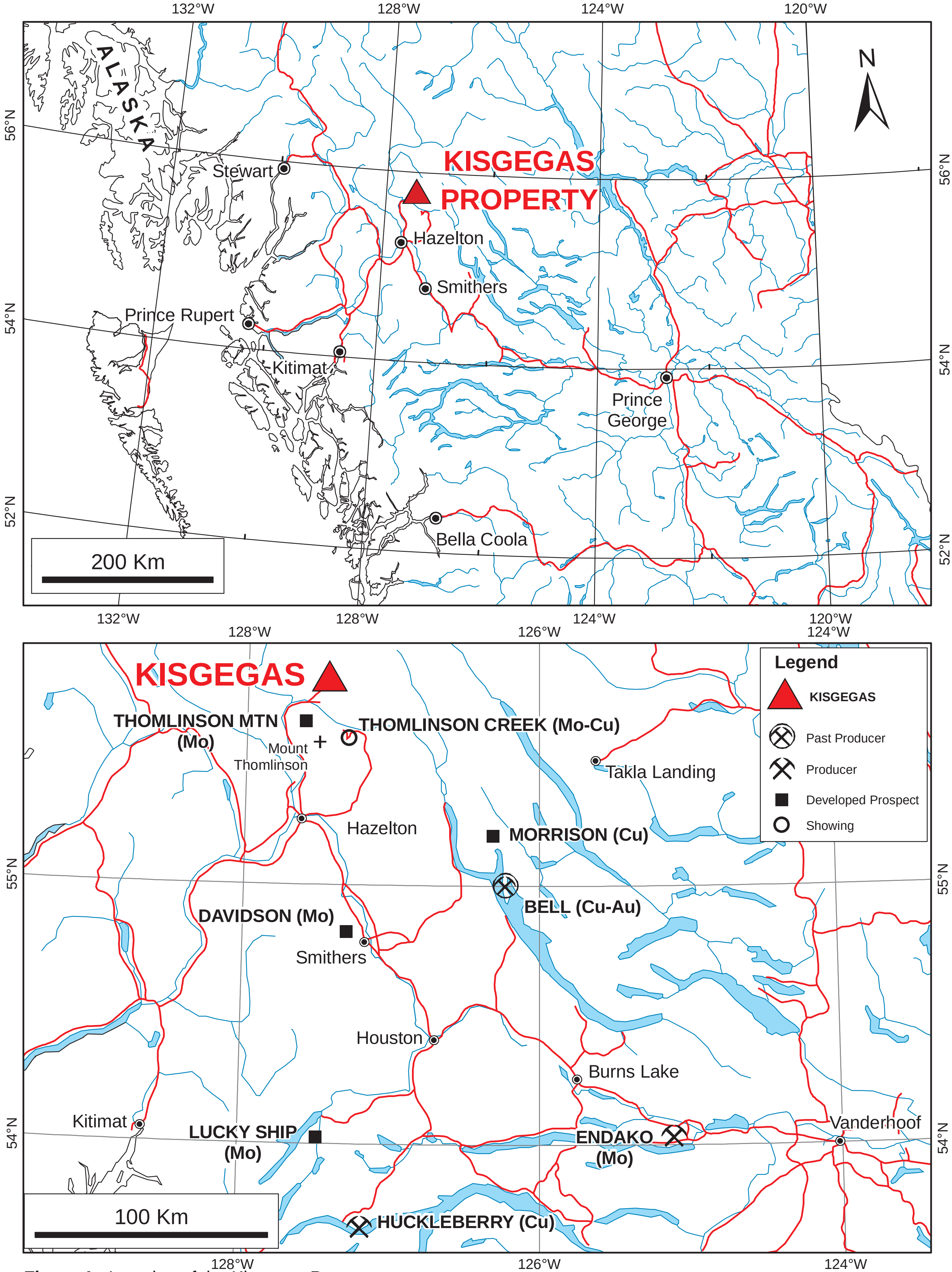


Figure 1. Location of the Kisgegas Property

1 Introduction -- Synopsis

A potentially economic intersection (30 metres grading 0.122% Mo or 0.203% MoS_2) of porphyry-style molybdenite mineralization was encountered by Texasgulf Inc. in a diamond drill program in 1981 on the Kisgegas (Goathead Creek) Property. Because of the sharp decline of the price of molybdenum at the time, Texasgulf allowed the option on the property to lapse without defining the extent, tenor or attitude of the mineralized zone.

In an earlier visit to the property in 2006, the author (McMillan, 2006) sampled a 20 kg. boulder of glacially-transported high-grade float located at the toe of the glacier approximately 50 metres southwest of the collar of Texasgulf hole K-2-82. Assays showed significant rhenium values associated with the molybdenum (sample WP041 assayed 0.652% Mo or 1.09% MoS_2 with 1.4 g/t Re).

On 29 November, 2007, Fugaro Airborne Surveys Corp. completed an airborne magnetometer survey over the property for Molystar Resources Inc., who held an option on the property from the current owners at the time. The option has since terminated. This report has been prepared to provide sufficient documentation such that the report is acceptable for assessment credit under the BC Mining Regulations. The original report, which is appended herein, did not provide the required historical, geological or tenure information. Further, the information was plotted on an obsolete topographic map on NAD 27 datum. The above shortcomings have been rectified in this report.

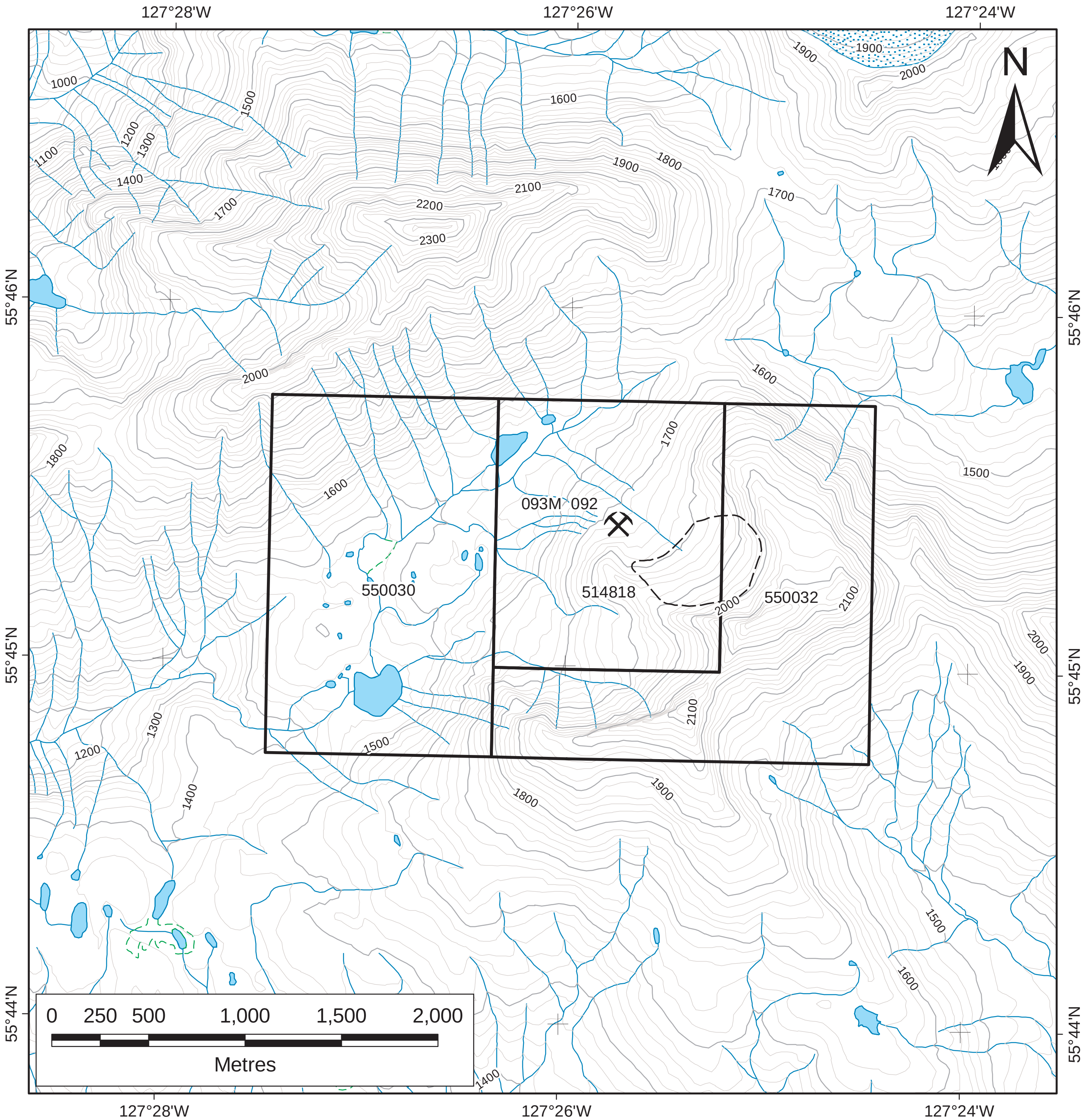
Follow-up work is clearly warranted on the property -- the following report documents confirmatory work completed on the property and recommends a follow-up diamond drill program.

2 Location and Access

The Kisgegas (Goathead Creek) molybdenite prospect is located in the Atna Range near the headwaters of Goathead Creek, 58 kilometres north of Hazelton (Figure 1). The mineral showings outcrop at the toe of a receding glacier at an elevation of 1800 metres. The abandoned Gitksan village of Kisgegas is located on the Babine River, 12 kilometres southwest of the property.

Access to the property is by helicopter which can be chartered from several companies based in Smithers, 125 kilometres to the south. The closest road is a logging road located 7 km. south of the property. Equipment and supplies can be flown from the logging road and clearcut (Figure 2).

The molybdenite showings are exposed in a gently undulating area at the toe of a small receding glacier at an elevation of approximately 1800 metres. Exposure is generally good, however the glacier and terminal moraine cover extensions of the mineralized showings.



MINFILE occurrence (093M 092)

Claim boundary with Tenure Number

Glacier or Icefield

Table 1. Kisgegas Property Claims

Registered Owner	Tenure No.	Expiry Date	Size Hectares
Ronald Ross Blusson	514818	2014/Sept/30	163.843
Ronald H McMillan	550030	2014/Sept/30	218.467
Ronald H McMillan	550032	2014/Sept/30	200.269

Figure 2. Claims Location, Kisgegas Property

3 Claim Status

The Kisgegas (Goathead Creek) Property consists of three mineral claims covering an area totaling 582.58 ha. (Figure 2, previous page). The claims are held in the names of Mr. Ronald Ross Blusson (FMC # 102629) and Ronald Hugh McMillan (FMC # 132841) and listed in the table 1 (previous page).

The three claims are owned jointly (50% and 50%) by Mr. Blusson and the author, Mr. R.H. McMillan.

4 Physiography and Vegetation

The area is characterized by isolated peaks separated by broad wooded valleys. The timber line is about 1300 metres in the area. Peaks above 2000 metres are surrounded by glaciers and snowfields. The Kisgegas (Goathead Creek) Property is located in a north-facing cirque between the elevations of 1700 and 1900 metres.

Much of the area below the glacier is well suited for diamond drill sites, with shallow to negligible overburden and with ample sources of water close by during the summer season.

5 Past Exploration Work

Canex Placer Ltd. was the first group known to have worked on the property. It was initially known as the Ole Group, and was held by Canex from 1961 to 1963. The Canex work focused on low-grade Mo-Cu mineralization in rusty hornfels adjacent to the granodiorite stock.

Amax Exploration Inc. subsequently staked the Fog and Frost claims and during 1964, 1965 and 1966 carried out programs of geological mapping, trenching, rock chip sampling and one 453 metre diamond drill hole. The assay results from the Amax drilling are not available in the public domain. The Amax work focused on molybdenite mineralization in quartz vein stockworks in the granodiorite stock.

The property was staked by John Bot of Smithers in 1977, and optioned by Texasgulf Inc. in 1979 after high-grade angular float was observed (Bending, 1982) near the edge of the glacier (Fig. 4). During 1981, two diamond drill holes totaling 712.5 metres were completed. Drill hole K-1-81 was drilled to a depth of 421.5 metres, intersecting 30 metres grading 0.203 % MoS_2 between 342 and 372 metres. Hole K-2-81 was drilled to a depth of 291.0 metres. Table 2 (below) summarizes the higher assay results obtained in the Texasgulf drilling.

Table 2

Hole	Interval	Length	% MoS_2
K-1-81	**51.0- 54.0**	**3.0**	**0.143**
K-1-81	**267.0-270.0**	**3.0**	**0.125**
K-1-81	**342.0-372.0**	**30.0**	**0.203**
including	**342.0-345.0**	**3.0**	**0.152**
	345.0-348.0	**3.0**	**0.400**
	352.0-354.0	**3.0**	**0.179**
	354.0-357.0	**3.0**	**0.295**
	357.0-360.0	**3.0**	**0.145**
	360.0-363.0	**3.0**	**0.285**
	369.0-372.0	**3.0**	**0.409**
K-2-82	**108.0-111.0**	**3.0**	**0.107**

The current claims were staked by Mr. Blusson and the author because of the encouraging results obtained in Texasgulf drill hole K-1-81. McMillan (2006) visited the property in 2005 and obtained character samples of mineralized material and accurate GPS locations for the Amax and Texasgulf drill holes.

6 Geology

The Kisgegas Property is located within the Intermontane Tectonic Belt, at the southeast margin of the Bowser Basin, a large successor basin underlain mainly by clastic sedimentary rocks of the Jurassic to Cretaceous Bowser Lake Group (Carter, 1976). The Bowser Lake Group sedimentary rocks have been intruded by a northwest-trending series of granodiorite and quartz monzonite stocks called the Bulkley and Babine Intrusions which are Cretaceous and early Tertiary in Age. Carter (1976) has dated the Bulkley intrusions by the potassium-argon method at between 70 and 84 Ma. More recently Richards (1990) presented a potassium-argon date for the Goathead Creek plug of 51 Ma, utilizing biotite. The Bulkley and Babine Intrusions are host to several important molybdenum deposits, among them the Hudsons Bay Mountain (Glacier Gulch) and Mount Thomlinson deposits.

The oldest rocks exposed on the property are clastic sedimentary rocks of the Bowser Lake Group. Bending (1982) recognized four distinct assemblages. A lower section of argillite and siltstone is overlain by a fifty metre thick section of interbedded argillites and greywacke. This unit is in turn overlain by an interval characterized by locally calcareous argillites with one to two metre thick limestone interlayers. The limestone unit is characterized by pelecypod fossils. The uppermost unit is massive chert pebble conglomerate which caps many of the local peaks.

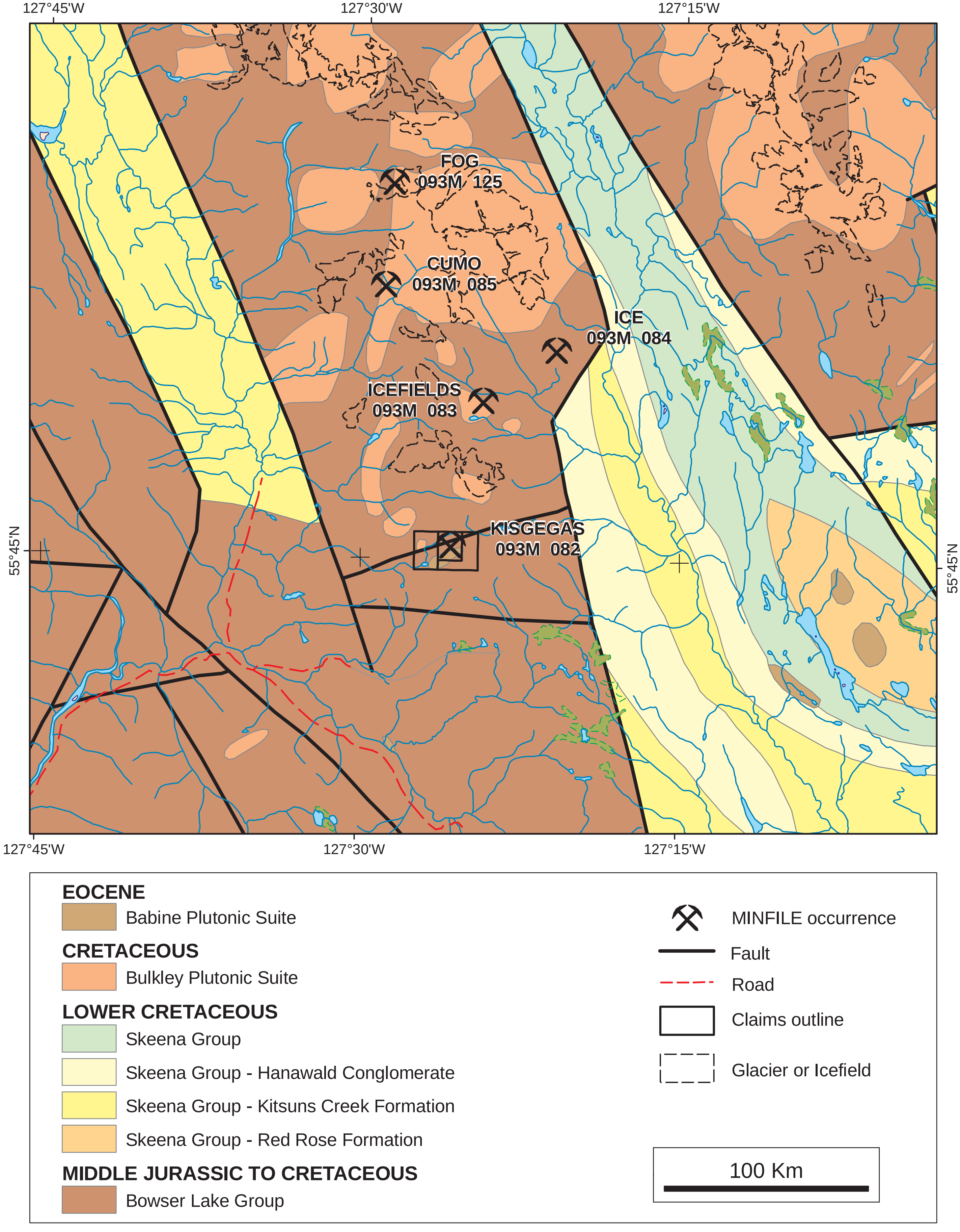


Figure 3. Regional Geology, Kisgegas area (after Massey et al, 2005)

The Bowser Group sedimentary rocks are intruded by an elongate, east-west trending granodiorite porphyry stock approximately 600 metres wide and 1500 metres long. The stock has a composition ranging from quartz diorite to quartz monzonite (Bending, 1982). The porphyry features large zoned phenocrysts of K-feldspar which range from 2 to 3 centimetres in size, in a medium grained groundmass of plagioclase, quartz, K-feldspar and biotite. Hornblende is an erratic constituent. Unaltered specimens are weakly magnetic.

Granodiorite dykes emanating from the stock intrude the argillites north of the intrusive. Other granodiorite dykes intrude the stock itself and indicate that there was a complexity of granodioritic intrusive activity. The granodiorite dykes predate the molybdenite mineralization.

A complex of aplite dykes crosscuts the granodiorites and is temporally and genetically related to the molybdenite mineralization and the associated hydrothermal alteration assemblage. The relationship between felsic dyking, alteration and mineralization is summarized in Table 2 (after Bending, 1982). The dykes range from 0.3 to 20 centimetres in thickness and consist of five important phases. These include two phases of brown-pink aplite, pale grey aplite, pink felsite and buff felsite. Most of the aplites are characterized by quartz phenocrysts ranging from 1 to 4 millimetres in size.

Irregular bodies of fine grained mafic intrusive rock contain xenoliths of fresh and altered granodiorite cut mineralized granodiorite of the stock and are clearly post-ore. In addition, a porphyry dyke of intermediate composition and a porpyhritic mafic dyke cut all the veins and associated alteration mineral assemblages.

7 Mineralization, Alteration and Veining

7.1 General

The Mo-Cu-W mineralization on the Kisgegas (Goathead Creek) Property is found within and adjacent to the granodiorite stock. Molybdenite, chalcopyrite and pyrite are found in quartz veins, in stockworks and disseminated in altered areas within the granodiorite. Pyrite, pyrrhotite and lesser amounts of scheelite, chalcopyrite and molybdenite are found in hornfels near the eastern contact (Bending, 1982). Sheelite occurs in veins in fractures in argillite and in garnet-epidote-pyroxene skarn in calcareous beds within the contact aureole of the granodiorite plug (Bending, 1982). Bending (1982) estimates that some float found in the cirque contains up to 2% sheelite - however no systematic sampling work has been undertaken on the tungsten mineralization. Bending (1982) also reported that “near the toe of the glacier, 300 metres northeast of drillsite K-1-81, are large angular blocks of granodiorite float cut by potassic veins bearing scheelite and powellite” and that “this float may be evidence that a tungsten zone exists in peripheral parts of the early potassic vein system.”

Bending (1982) recognized a total of eight types of veining that have effected the intrusive rocks. The most significant molybdenite mineralization is present in early potassic veins and in grey quartz veins. These two vein types are separated in time by the intrusion of brown-pink and pale grey felsite dykes. Traces of molybdenite have been found in "deep pink potassic veins" and in West Ridge veining" (Bending, 1982).

7.2 Chronology of Alteration and Veining.

The earliest alteration to effect the granodiorite is a widespread pale green (sericitic?) alteration which has been crosscut by all the veins and dykes (Bending, 1982). The central part of the stock has been most effected - fine pyrite and traces of finely disseminated chalcopyrite are characteristic of this alteration which also destroys the weak magnetism found in unaltered granodiorite.

The next alteration resulted in deposition of pink pegmatitic veins with minor molybdenite near the north contact of the granodiorite. Within the granodiorite, the early potassic veins carrying quartz, pyrite, K-feldspar, and minor molybdenite are associated with K-feldspathization and deposition of fine molybdenite and pyrite. Fluorite, gypsum, stibnite and sphalerite are present in Texasgulf hole K-1-81. There is a suggestion (Bending, 1982) that the potassic alteration demonstrates a vertical zonation, changing from a K-feldspar alteration near the drill collar to a pale green sericitic alteration with depth. Although the drill core carried uniformly low tungsten values (<3 ppm W), the presence of boulders of granodiorite float (Bending, 1982) northeast of Texasgulf drill hole K-1-81cut by potassic veins carrying scheelite and powellite suggest that a tungsten zone may be present in peripheral parts of the early potassic alteration zone.

The next mineralizing event produced the grey quartz veins which carry molybdenite, chalcopyrite and pyrite. These veins range from 2 millimetres to 25 centimetres in width and the walls are weakly silicified.

Strongly sheeted quartz veins carrying K-feldspar and minor pyrite crosscut the earlier molybdenite-bearing veins, and are particularly prominent on the western portions of the granodiorite stock. Vuggy quartz-K-feldspar-pyrite veins and still later vuggy quartz veins cut all the earlier veins.

A late argillic alteration has produced 2-3 metre wide zones of desilicated clay-altered rock which weathers recessively.

7.3 Structure of the Quartz Vein Systems

Mapping by Bending (1982) has documented a strong preferred orientation in many of the vein systems. This is particularly prominent in the sheeted vein system and in the vuggy quartz vein systems which trend east-northeast, dipping 70^0 to 80^0 to the northwest. While some of the earlier molybdenite-bearing vein systems also define northeast trends, plotting of structural measurements on stereographic projections (Bending, 1982) has demonstrated that many of he early potassic and grey quartz veins have random orientations. There also appears to be variation in orientation of the veins with depth - for example, the grey molybdenite-bearing veins in Texasgulf drill hole K-1-81 have an average dip of 30^0 in the upper parts of the hole and steepen considerably with depth (Bending, 1982).

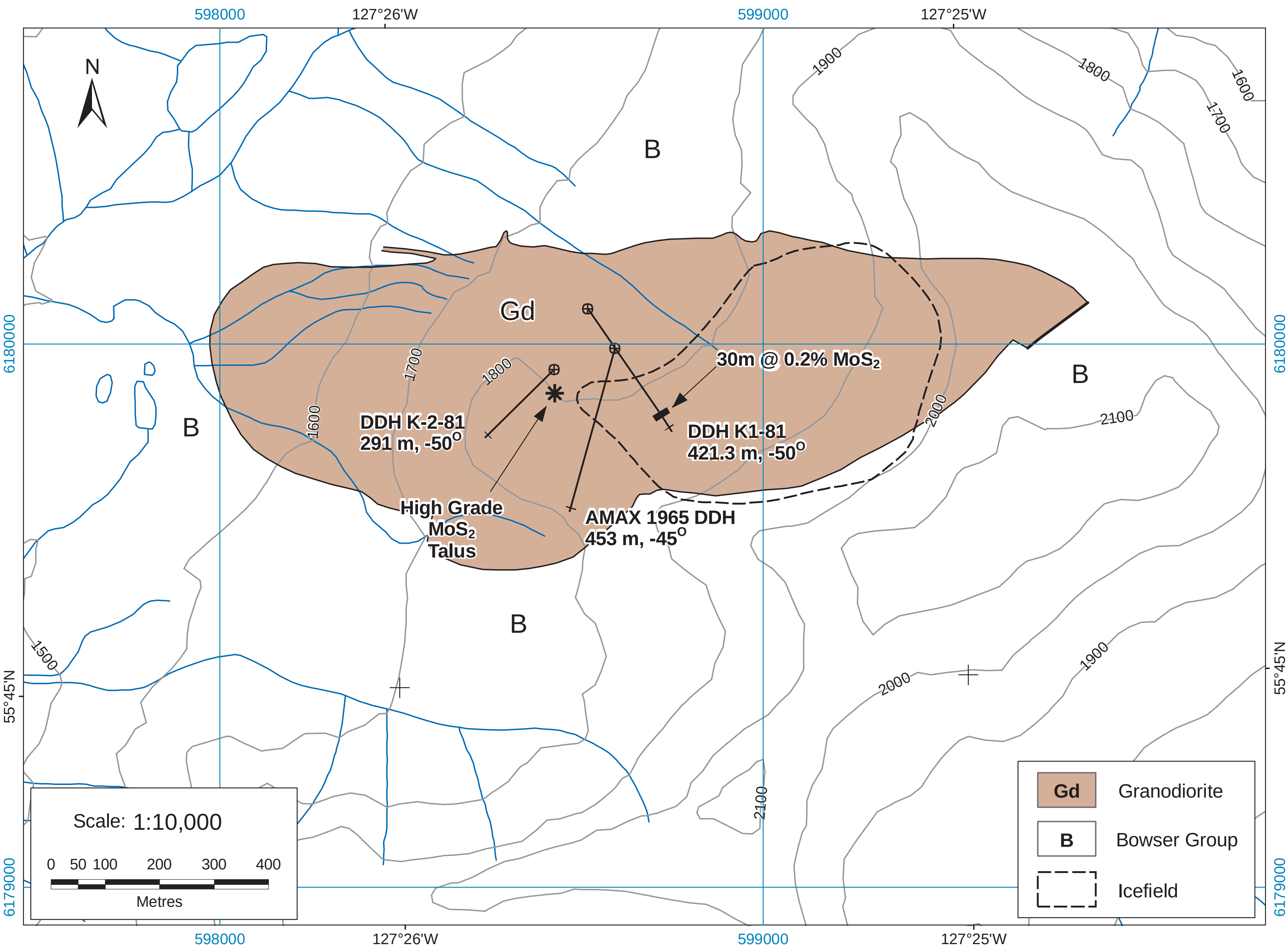


Figure 4. Kisgegas Molybdenum Property - Geology

8 Present Exploration Work

The present work describes the results of a helicopter-borne stinger-mounted airborne magnetic survey utilizing a high-sensitivity cesium magnetometer. A Global Positioning (GPS) electronic navigation system was utilized to ensure accurate positioning of the survey area. The survey totalled 36 line kilometres and was flown on 26 November 2007. The survey was flown by Fugro Airborne Surveys Corp. of Mississauga, Ontario. The work was processed in the Fugro Surveys Mississauga office and was presented in a technical report dated 16 September 2009. The report is appended to this report as Appendix 3.

Because the maps in the Fugro report were plotted on maps utilizing imperial units and now-obsolete NAD 27 co-ordinates, they have been re-compiled and presented in this report on NAD 83 co-ordinates and metric units. Total Magnetic Field is presented in Figure 5 and Calculated Vertical Magnetic Gradient in Figure 6.

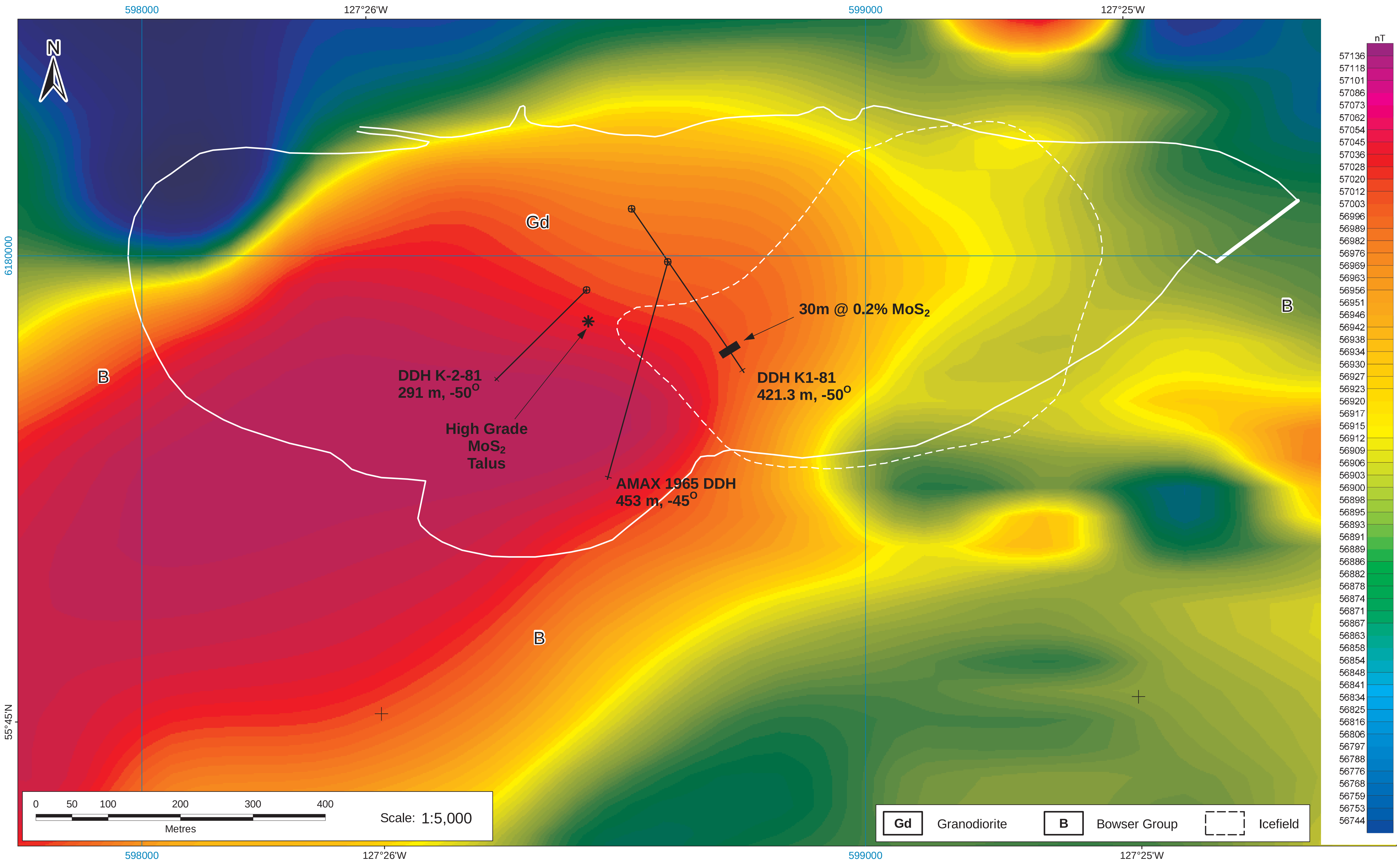


Figure 5. Kisgegas Property - Total Magnetic Field

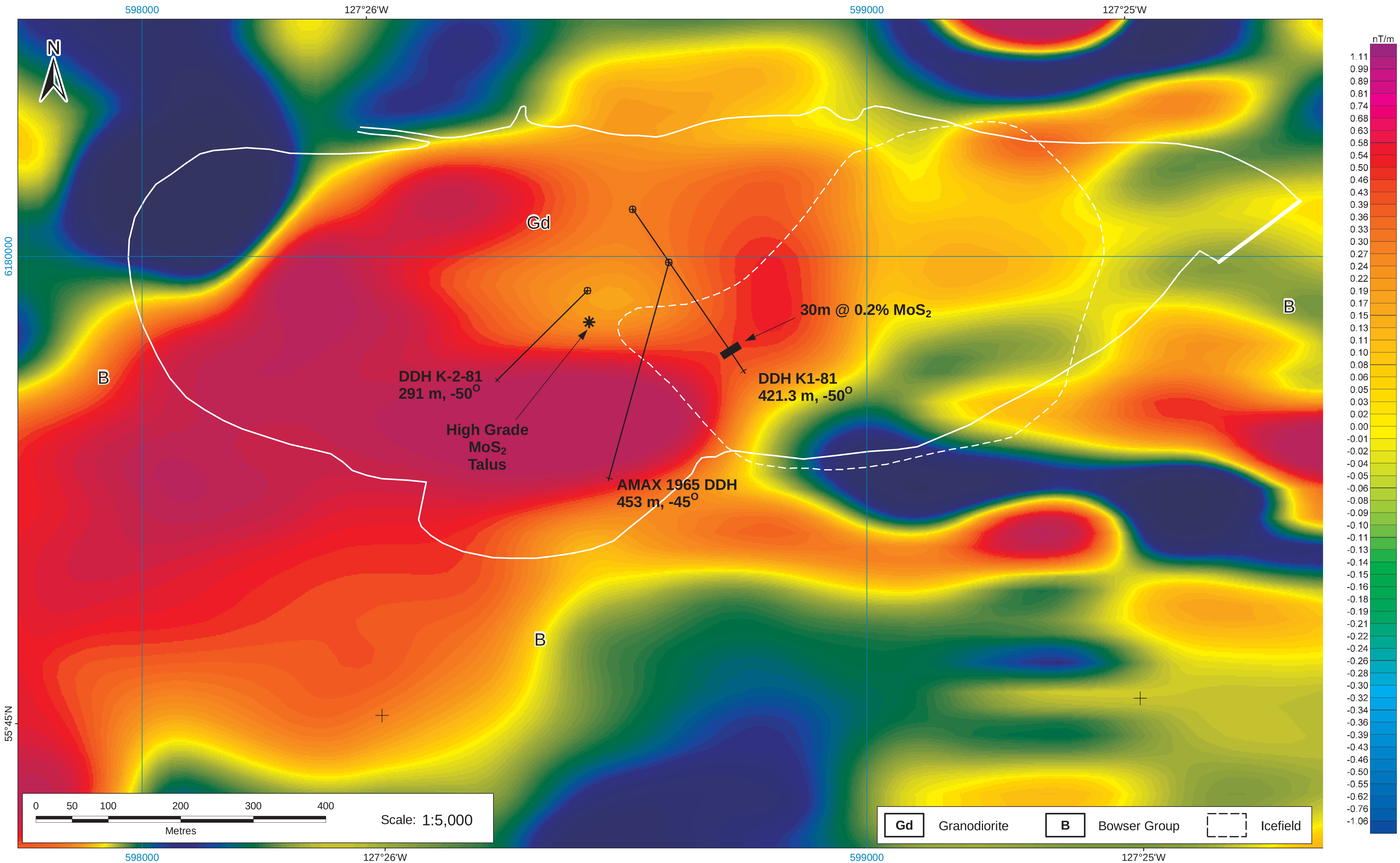


Figure 6. Kisgegas Property - Calculated Vertical Magnetic Gradient

9 Discussion and Conclusions

1) The Kisgegas property is a porphyry molybdenite prospect with a drill intersection that is close to being ore-grade in tenor.

2) The attitude of the mineralized zone is as yet unknown, however it seems reasonable to assume that it might parallel the east-northeast strike direction of the majority of the molybdenite-bearing and barren quartz veins -- if this is the case, only Texasgulf hole K-1-81 has cross-cut the mineralized structure.

3) Regardless of the above, the mineralized zone is open along strike to the east and at depth, and the presence of “high grade” float at the toe of the glacier indicates that it subcrops beneath the glacier.

4) The molybdenite mineralization contains significant values in the precious metal Rhenium – 1.4 g/t Re (McMillan, 2006).

10 Recommendations

1) Additional diamond drilling should be undertaken to define the attitude of the and tenor of the mineralized zone intersected in Texasgulf hole K-1-81 -- initially, three holes totaling 1000 metres should be adequate. The first hole could be collared near the site of the Amax 1965 hole and drilled at -45^0, on an azimuth of 150^0 to a depth of 250 metres. The second and third holes could be drilled from sites approximately 200 metres to the northeast, also at an azimuth of 150^0, one for 250 metres at -45^0 and the other for 500 metres at -55^0.

2) Additional prospecting is warranted -- Bending (1982) makes reference to float estimated to contain 2% scheelite in skarn. Although he recommended that Texasgulf prospect for the source of the float in skarn horizons exposed along the ridge above the cirque, it was never done because of time restraints and to bad weather.

11 Bibliography

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Appendix I

Certificate

I, RONALD HUGH McMILLAN, of 6606 Mark Lane, Victoria,
British Columbia (V9E 2A1), do hereby certify that:

1. I am a Consulting Geologist, registered with the Association of Professional Engineers and Geoscientists of British Columbia since 1992, and with the Association of Professional Engineers of Ontario since 1981.

2. I am a graduate of the University of British Columbia with B.Sc. (Hon. Geology, 1962), and the University of Western Ontario with M.Sc. and Ph.D. (1969 and 1972) in Mineral Deposits Geology.

3. I have practiced my profession throughout Canada, as well as in other areas of the world continuously since 1962.

4. The foregoing report on the Kisgegas Property is based on a review of published and unpublished information regarding the geological setting, styles of mineralization and results of previous exploration programs within and adjacent to the subject property. The author supervised the drill program completed by Amax Exploration Inc. in 1966 and has since visited the property on two occasions.

5. I have a 50% interest in the mineral claims which constitute the Kisgegas Property.

R. H. McMillan Ph.D. P.Geo.

Victoria, B. C.
15 January 2010

Appendix 2 ***Statement of Expenditures***

Fugro Helicopter Airborne Survey		$25,000.00
Report writing	R. McMillan 3 days @ $ 100.00	$ 3,000.00
Reports and Maps (Drafting)		$ 1,010.63
Total		**$29,010.63**

Appendix 3:

Helicopter-Borne Stinger-Mounted Magnetic Survey for Molystar Resources Inc. Kisgegas Property, B.C., Canada

by Fugro Airborne Surveys Corp. (2009)

Report #07113

HELICOPTER-BORNE STINGER-MOUNTED MAGNETIC GEOPHYSICAL SURVEY FOR MOLYSTAR RESOURCES INC. KISGEGAS PROPERTY, BC CANADA

Fugro Airborne Surveys Corp.
Mississauga, Ontario
September 16, 2009

Fugro Airborne Surveys, 2505 Meadowvale Boulevard, Mississauga, Ontario, Canada, L5N 5S2
Phone: 1905 812 0212, Fax 1 905 812 1504

SUMMARY

This report describes the logistics, data acquisition, processing and presentation of results of a stinger-mounted Magnetic airborne geophysical survey carried out for Molystar Resources Inc. over Kisgegas property in the province of British Colombia, Canada. Total coverage of the survey block amounted to 36 km. The survey was flown on November 29th, 2007.

The purpose of the survey was to detect zones of mineralization and to provide information that could be used to map the geology and structure of the survey area. This was accomplished by using a high sensitivity cesium magnetometer. The information from this sensor was processed to produce maps that display the magnetic property of the survey area. A GPS electronic navigation system ensured accurate positioning of the geophysical data with respect to the base maps.

The survey data were processed and compiled in the Fugro Airborne Surveys Toronto office. Map products and digital data were provided in accordance with the scales and formats specified in the Survey Agreement.

The survey property contains several anomalous features, some of which are considered to be possible exploration targets. 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 anomalies based on information acquired from the follow-up program.

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APPENDICES

A. List of Personnel
B. Background Information
C. Data Archive Description
D. Glossary

1. INTRODUCTION

A stinger-mounted magnetic and radiometric survey was flown for Molystar Resource Inc., on November 29th, over Kisgegas property in the province of British Columbia, Canada. The survey area is shown in Figure 2.

Survey coverage consisted of approximately 36 line-km, including 6.3 line-km of tie lines. Flight lines were flown in an azimuthal direction of 0°/180° with a line separation of 200 metres. Tie lines were flown orthogonal to the traverse lines with a line separation of 1700 meters.

The survey employed the stinger-mounted magnetic system. Ancillary equipment consisted of radar altimeter, a video camera, a digital recorder, and an electronic navigation system. The instrumentation was installed in an AS350B2 turbine helicopter (Registration C-GYFS) that was provided by Great Slave Helicopters. The helicopter flew at an average airspeed of 73km/h with a nominal terrain clearance of 60 metres.

Figure 1: Fugro Airborne Surveys Stinger with AS350-B2

2. SURVEY OPERATIONS

The base of operations for the survey was established at Smithers, British Columbia, Canada.

Table 2-1 lists the corner coordinates of the survey areas in WGS1984, UTM Zone 9N, central meridian 129° W.

Table 2-1

Block	Corners	X-UTM (E)	Y-UTM (N)
07113-2	1	596751	6180709
	2	599888	6180780
	3	599931	6178925
	4	596793	6178854

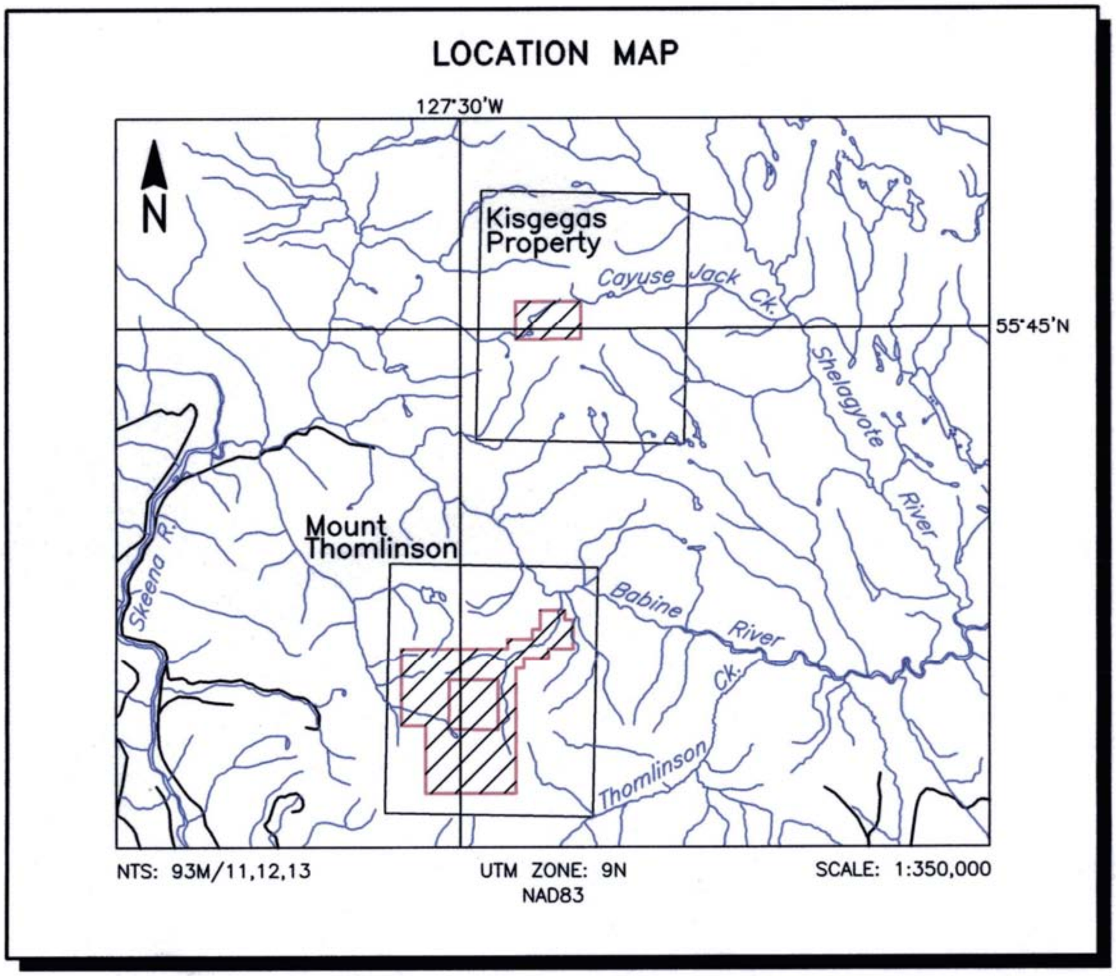

Figure 2
Survey Location Map and Sheet Layout
Kisgegas Property, British Columbia, Canada
Job # 07113

The survey specifications were as follows:

Parameter	Specifications
Traverse line direction	0°/180°
Traverse line spacing	200 m
Tie line direction	90°/270°
Tie line spacing	1700 m
Mag sample interval	10 Hz, 2.1 m @ 75 km/h
Aircraft mean terrain clearance	60 m
Mag sensor mean terrain clearance	60 m
Average speed	73 km/h
Navigation (guidance)	±5 m, Real-time GPS
Post-survey flight path	±1 m, Differential GPS

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 AS350B2 helicopter. This aircraft provides a safe and efficient platform for surveys of this type.

Airborne Magnetometer

Model:	Fugro D1344 processor with Scintrex CS3 sensor.
Type:	Optically pumped cesium vapour.
Sensitivity:	0.01 nT
Sample rate:	10 per second

The magnetometer sensor is housed in a stinger mounted on the helicopter.

Magnetic Base Station

Model:	Fugro CF1 base station with timing provided by integrated GPS	
Sensor type:	Scintrex CS-3 Optically pumped cesium vapour.	
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

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 location of the base station set-up in WGS84 geographic coordinates was as follows:

Location	Date	Latitude	Longitude	Height (above ellipsoid)
Smithers, BC, Canada	November 29th, 2007	54° 49' 10.67166" N	127° 11' 33.16058" W	516 m

A GEM Systems GSM-19 proton precession magnetometer (part of the CF-1 base station) was used as a back-up unit.

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, 12-channel
Sample rate:	10 Hz update. 2Hz recording
Accuracy:	Manufacturer's stated accuracy for differential corrected GPS is better than 1 metre.

Antenna: Aero AT1675; Mounted on tail of aircraft.

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, 12-channel

Sample rate: 10 Hz update. 2Hz recording

Accuracy: Manufacturer's stated accuracy for differential corrected GPS is better than 1 metre.

Secondary GPS Base Station

Model: Marconi Allstar OEM, 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 2 metres.

The Novatel OEM4 captured the airborne positional data which were post-processed using the base station GPS to provide differentially corrected positional data. The Novatel OEM4 is operated as the primary base station and utilizes time-coded signals from at least four of the twenty-four NAVSTAR satellites. The base station raw XYZ data are recorded, thereby permitting post-survey processing for theoretical accuracies of better than 1 m. The Novatel OEM4 receiver was coupled with a PNAV navigation system for real-time guidance. A Marconi Allstar GPS unit, part of the CF-1, was used as a secondary base station.

The location of the GPS base station set-up in WGS84 geographic coordinates was as follows:

Location	Date	Latitude	Longitude	Height (above ellipsoid)
Remote Site, BC, Canada	November 29th, 2007	55° 41' 40.51977" S	127° 39' 34.98477" W	398 m

Radar Altimeter

Manufacturer: Terra

Model: TRA3000 / TRI30

Type: Short pulse modulation, 4.3 GHz

Sensitivity: 1.5 m

Sample rate: 2 per second

The radar altimeter measures the vertical distance between the helicopter and the ground, except in areas of dense tree cover.

Digital Data Acquisition System

Manufacturer: Fugro

Model: HeliDAS

Recorder: 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.

Compensation System

Manufacturer: Fugro

Model: HeliDAS, with Billingsley TFM100G2-1E fluxgate magnetometer

The presence of the helicopter in close proximity to the sensors causes considerable deviations on the readings. The orientation of the aircraft with respect to the sensors and the motion of the aircraft through the earth's magnetic field are contributing factors. A special calibration flight is flown to record the information necessary to remove these effects.

The manoeuvre consists of flying a series of calibration lines at high altitude to gain information in each of the required line directions. During this procedure, the pitch, roll and yaw of the aircraft are varied. Each variation is conducted in succession (first vary pitch, then roll, then yaw). This provides a complete picture of the effects of the aircraft at designated headings in all orientations.

The HeliDAS compensation system derives a set of coefficients for each line direction and for each magnetometer sensor. The coefficients can be applied real-time or in a post-processing environment.

Video Flight Path Recording System

Type:	Axis 2420 Digital Network Camera
Recorder:	Axis 241S Video Server and Fujitsu Tablet Computer
Format:	NTSC

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, spike rejection and filtering of all geophysical and ancillary data, verification of flight videos, 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 ±50% 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 60 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 - The magnetometer noise envelope of ± 0.1 nT is exceeded intermittently over a cumulative total of 10 percent or more of any flight line or continuously over 1 kilometre or more.

Base Mag - Diurnal variations not to exceed 10 nT over a straight line time chord of 1 minute. The base station recorded magnetometer instrument noise levels are in excess of 0.5 nT for periods longer than 5 minutes or where the base station has ceased to function for periods of 5 minutes or more.

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 1 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.

Total Magnetic Field

The magnetic data were corrected to produce a final leveled total magnetic field product by the application of the following sequence of procedures:

- Data quality check on the raw and compensated magnetic data
- Lag correction
- Loading, checking and application of the measured diurnal data
- Leveling of total magnetic intensity (TMI) data

The data quality check was accomplished in the field by applying a fourth difference filter to all raw compensated magnetic data after it had been loaded into the Oasis Montaj™ database. Plotting the raw and compensated data together permitted tracking the performance of the magnetometer sensor as well as monitoring the noise levels that were superimposed on the data during survey activities. Magnetometer noise levels were maintained within stated specifications.

The aeromagnetic data from the magnetic sensor was inspected in both grid and profile format. Spikes were removed manually with the aid of a fourth difference calculation and small gaps were interpolated using an Akima spline.

A lag correction was applied to remove the effects of temporal delay inherent in the data acquisition system. A correction 1.5 seconds was applied to the data.

The diurnal variations recorded by the base station were edited for any cultural contamination and filtered to remove high-frequency noise. This diurnal magnetic data was then subtracted from the despiked, lagged TMI to provide a first order diurnal correction. The diurnal-removed magnetic field data were then gridded and compared to a grid of the despiked, lagged magnetic data to ensure that the data quality was improved by diurnal removal.

Once the lagged and diurnal-removed grids were created and examined, the results were then levelled using tie and traverse line intercepts. Manual adjustments were applied to any lines that required further leveling, as indicated by shadowed images of the gridded magnetic data. After the application of tie-line or manual levelling, a procedure known as microleveling was applied. This technique is designed to remove any persistent, low-amplitude component of flight line noise remaining after tie-line levelling. Directional filters were then applied to the magnetic grid to produce a decorrugated "noise" grid. This grid is then re-sampled back into the database where the resultant "noise" channel was filtered to remove any remaining short wavelength responses that could be due to geologic sources. The amplitude of the "noise" channel was also limited to restrict the effect that the microleveling might have on strong geologic response. Finally, the "noise" channel is subtracted from the leveled channel created earlier in the processing sequence, resulting in the final leveled total magnetic field channel.

It should be noted that tie-line leveling does not always produce favourable results because of the significant differences in magnetic gradient at intersection points. In these instances manual and microleveling techniques can be applied to the data. There are also several areas in the dataset where the topography changed rapidly and the pilot was unable to maintain the aircraft height above ground consistently from line to line. Where these altitude differences have occurred in high gradient areas, differences in magnetic values from line to line are seen. Care has been taken to remove these problems where possible, but because the wavelength of these differences can be very short, and the amplitudes of the anomalies can be quite high, it is difficult to remove them entirely without risking the removal of real geological features of similar characteristics.

Calculated Vertical Magnetic Gradient

The final magnetic field data were 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 residual field map. However, regional magnetic variations and changes in lithology may be better defined on the residual magnetic field map (optional).

Digital Elevation (Optional)

The radar altimeter values (altrad_heli) are subtracted from the differentially corrected and de-spiked GPS-Z values (gpsz) to produce profiles of the height above the spheroid along the survey lines. These values can be gridded to produce contour maps showing approximate elevations within the survey area.

The accuracy of the elevation calculation is directly dependent on the accuracy of the two input parameters, altrad_heli and gpsz. The radar altimeter value 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 may be introduced during the interpolation and gridding process.

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, THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.

Contour and Colour 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 20m for the magnetic grids.

Colour maps 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.

6. PRODUCTS

This section lists the final maps and products that have been provided under the terms of the survey agreement. Other products can be prepared from the existing dataset, if requested. These include: magnetic enhancements or derivatives, or digital terrain.

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. The topographic files were combined with geophysical data for plotting the final maps. All maps were created using the following parameters:

Projection Description:

Datum:	NAD83		
Ellipsoid:	GRS80		
Projection:	UTM (Zone: 9N)		
Central Meridian:	129° W		
Latitude of Origin:	0°		
False Northing:	0 m		
False Easting:	500000 m		
Scale Factor:	0.9996		
WGS84 to Local Conversion:	Molodensky		
Datum Shifts:	DX: 0	DY: 0	DZ: 0

Final Products

The following parameters are presented on a single map sheet, at a scale of 1:20,000. All maps include flight lines and topography, unless otherwise indicated. Preliminary products are not listed.

Hardcopy Products

2 copies: Final color maps (1:20,000)
- a) Total Magnetic Intensity (nT)
- b) Calculated Vertical Magnetic Gradient (nT/m)

2 copies: Logistics and Processing Report

7. SURVEY RESULTS

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 total magnetic field data have been presented as contours on the base map using a contour interval of 5 nT where gradients permit. The map shows the magnetic properties of the rock units underlying the survey area. In this map presentation, the red colours represent rock units containing higher amounts of magnetite, while the blue coulours are non-magnetic.

The total magnetic field data have also been 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 units and displays weak magnetic features that may not be clearly evident on the total field maps. On this map presentation, red colours represent the more magnetic units.

There is some evidence on the magnetic maps that suggests the survey area has been subjected to deformation and/or alteration. These structural complexities are evident on the contour maps as variations in magnetic intensity, irregular patterns, and as offsets or changes in strike direction.

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 total field 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 various lithological units.

The magnetic results have provided valuable information that can be used to effectively map the geology and structure in the survey area.

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 survey.

The various maps included with this report display the magnetic properties of the survey area. It is recommended that a complete assessment and detailed evaluation of the survey results be carried out, in conjunction with all available geophysical, geological and geochemical information.

It is also recommended that additional processing of existing geophysical data be considered, in order to extract the maximum amount of information from the survey results. Current software and imaging techniques often provide valuable information on structure and lithology, which may not be clearly evident on the images and colour maps. These techniques can yield images that define subtle, but significant, structural details.

Respectfully submitted,

FUGRO AIRBORNE SURVEYS CORP.

APPENDIX A

LIST OF PERSONNEL

The following personnel were involved in the acquisition, processing, interpretation and presentation of data, relating to a magnetometer airborne geophysical survey carried out for Molystar Resources Inc., Kisgegas Property, British Columbia, Canada.

David Miles	Manager, Geophysical Projects
Emily Farquhar	Manager, Geophysical Services
Graham Konieczny	Manager, Data Processing and Interpretation
Sheli Droszio	Field Geophysicist
Matt Harrison	Geophysical Operator
Yuri Mironenko	Geophysicist
Stephen Harrison	Geophysicist
Michel de Reneville	Pilot (GSH)
William Harper	AME(GSH)
Lyn Vanderstarren	Drafting Supervisor
Susan Pothiah	Administrative Assistant
Albina Tonello	Secretary/Expeditor

The survey consisted of 36 km of coverage, flown on November 29th, 2007.

All personnel are employees of Fugro Airborne Surveys, except for the Pilot and AME who are employees of Great Slave Helicopters.

APPENDIX B

BACKGROUND INFORMATION

BACKGROUND INFORMATION

Magnetic Responses

The measured total magnetic field provides information on the magnetic properties of the earth materials in the survey area. The 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 which 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 field magnetic response. 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 field magnetic 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 field magnetic 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 total field 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.

Gamma Ray Spectrometry

Radioelement concentrations are measures of the abundance of radioactive elements in the rock. The original abundance of the radioelements in any rock can be altered by the subsequent processes of metamorphism and weathering.

Gamma radiation in the range that is measured in the thorium, potassium, uranium and total count windows is strongly attenuated by rock, overburden and water. Almost all of the total radiation measured from rock and overburden originates in the upper .5 metres. Moisture in soil and bodies of water will mask the radioactivity from underlying rock. Weathered rock materials that have been displaced by glacial, water or wind action will not reflect the general composition of the underlying bedrock. Where residual soils exist, they may reflect the composition of underlying rock except where equilibrium does not exist between the original radioelement and the products in its decay series.

Radioelement counts (expressed as counts per second) are the rates of detection of the gamma radiation from specific decaying particles corresponding to products in each radioelements decay series. The radiation source for uranium is bismuth (Bi-214), for thorium it is thallium (Tl-208) and for potassium it is potassium (K-40).

The uranium and thorium radioelement concentrations are dependent on a state of equilibrium between the parent and daughter products in the decay series. Some daughter products in the uranium decay are long lived and could be removed by processes such as leaching. One product in the series, radon (Rn-222), is a gas which can easily escape. Both of these factors can affect the degree to which the calculated uranium concentrations reflect the actual composition of the source rock. Because the daughter products of thorium are relatively short lived, there is more likelihood that the thorium decay series is in equilibrium.

Lithological discrimination can be based on the measured relative concentrations and total, combined, radioactivity of the radioelements. Feldspar and mica contain potassium. Zircon, sphene and apatite are accessory minerals in igneous rocks that are sources of uranium and thorium. Monazite, thorianite, thorite, uraninite and uranothorite are also sources of uranium and thorium which are found in granites and pegmatites.

In general, the abundance of uranium, thorium and potassium in igneous rock increases with acidity. Pegmatites commonly have elevated concentrations of uranium relative to thorium. Sedimentary rocks derived from igneous rocks may have characteristic signatures that are influenced by their parent rocks, but these will have been altered by subsequent weathering and alteration.

Metamorphism and alteration will cause variations in the abundance of certain radioelements relative to each other. For example, alterative processes may cause uranium enrichment to the extent that a rock will be of economic interest. Uranium anomalies are more likely to be economically significant if they consist of an increase in the uranium relative to thorium and potassium, rather than a sympathetic increase in all three radioelements.

Faults can exhibit radioactive highs due to increased permeability which allows radon migration, or as lows due to structural control of drainage and fluvial sediments which attenuate gamma radiation from the underlying rocks. Faults can also be recognized by sharp contrasts in radiometric lithologies due to large strike-slip or dip-slip displacements. Changes in relative radioelement concentrations due to alteration will also define faults.

Similar to magnetics, certain rock types can be identified by their plan shapes if they also produce a radiometric contrast with surrounding rock. For example, granite intrusions will appear as sub-circular bodies, and may display concentric zonations. They will tend to lack a prominent strike direction. Offsets of narrow, continuous, stratigraphic units with contrasting radiometric signatures can identify faulting, and folding of stratigraphic trends will also be apparent.

APPENDIX C

GLOSSARY

APPENDIX C

GLOSSARY OF AIRBORNE GEOPHYSICAL TERMS

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 $\sqrt{}$(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.

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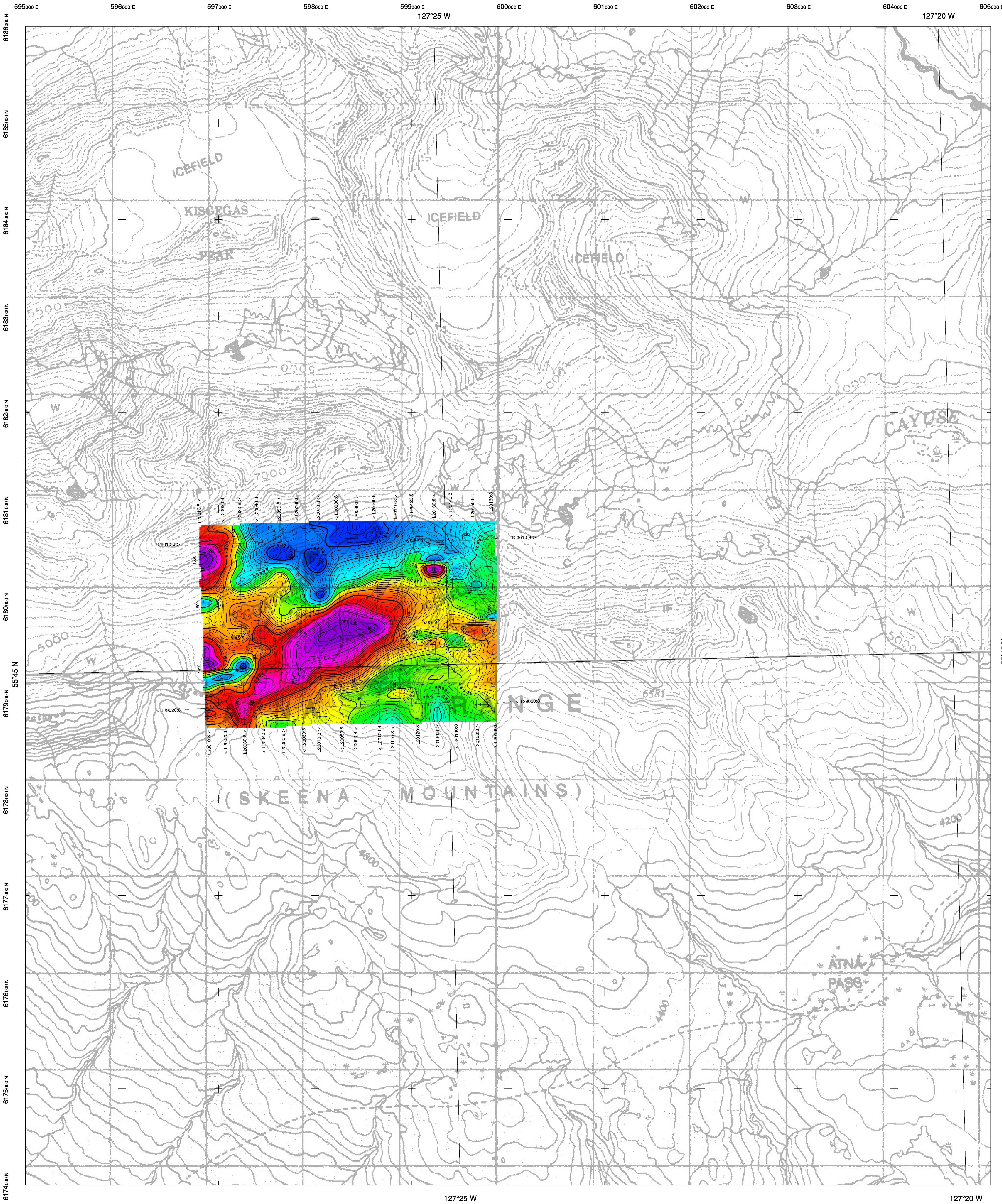
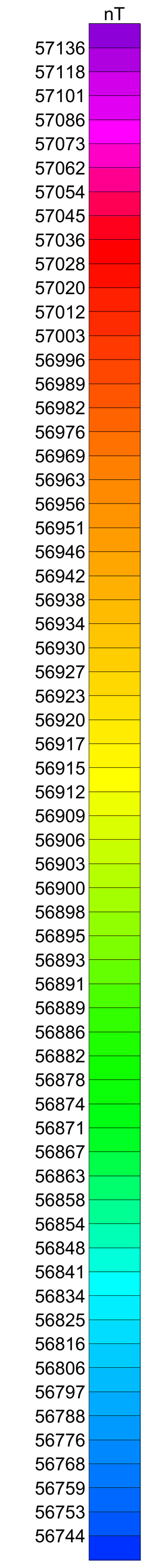
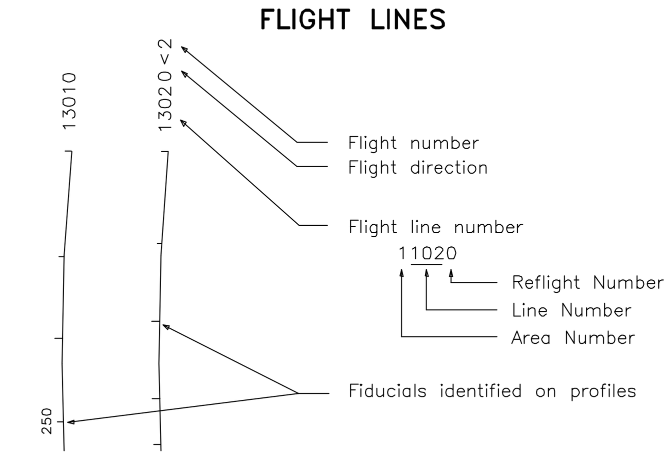


TECHNICAL SUMMARY

Navigation . . . . Differentially–corrected GPS
Data reduction grid interval . . . . 20 metres
Terrain clearance . . . . Helicopter 60 m
Magnetometer 60 m
Data sampling interval . . . . 0.1 second
Magnetometer / sensitivity . . . . . Cesium / 0.01 nT



FLIGHT LINES

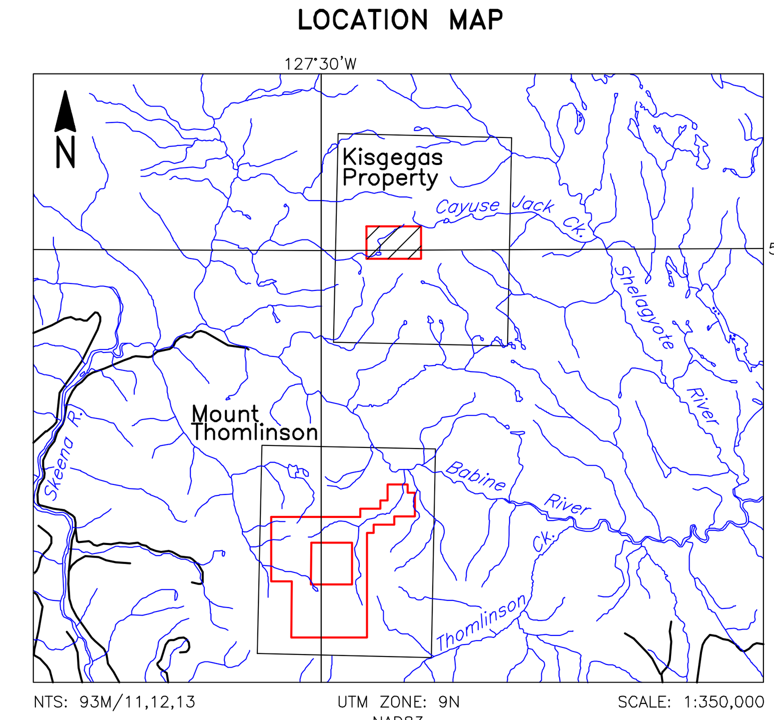


TOTAL MAGNETIC FIELD CONTOURS

. . . . 250 nT
. . . . 50 nT
. . . . 10 nT
. . . . 5 nT
. . . . magnetic low

Magnetic inclination within the survey area: 74 degrees N
Magnetic declination within the survey area: 21 degrees E

LOCATION MAP



NTS: 93M/11,12,13 UTM ZONE: 9N NAD83 SCALE: 1:350,000

MOLYSTAR RESOURCES INC.

KISGEGAS PROPERTY, BRITISH COLUMBIA

TOTAL MAGNETIC FIELD

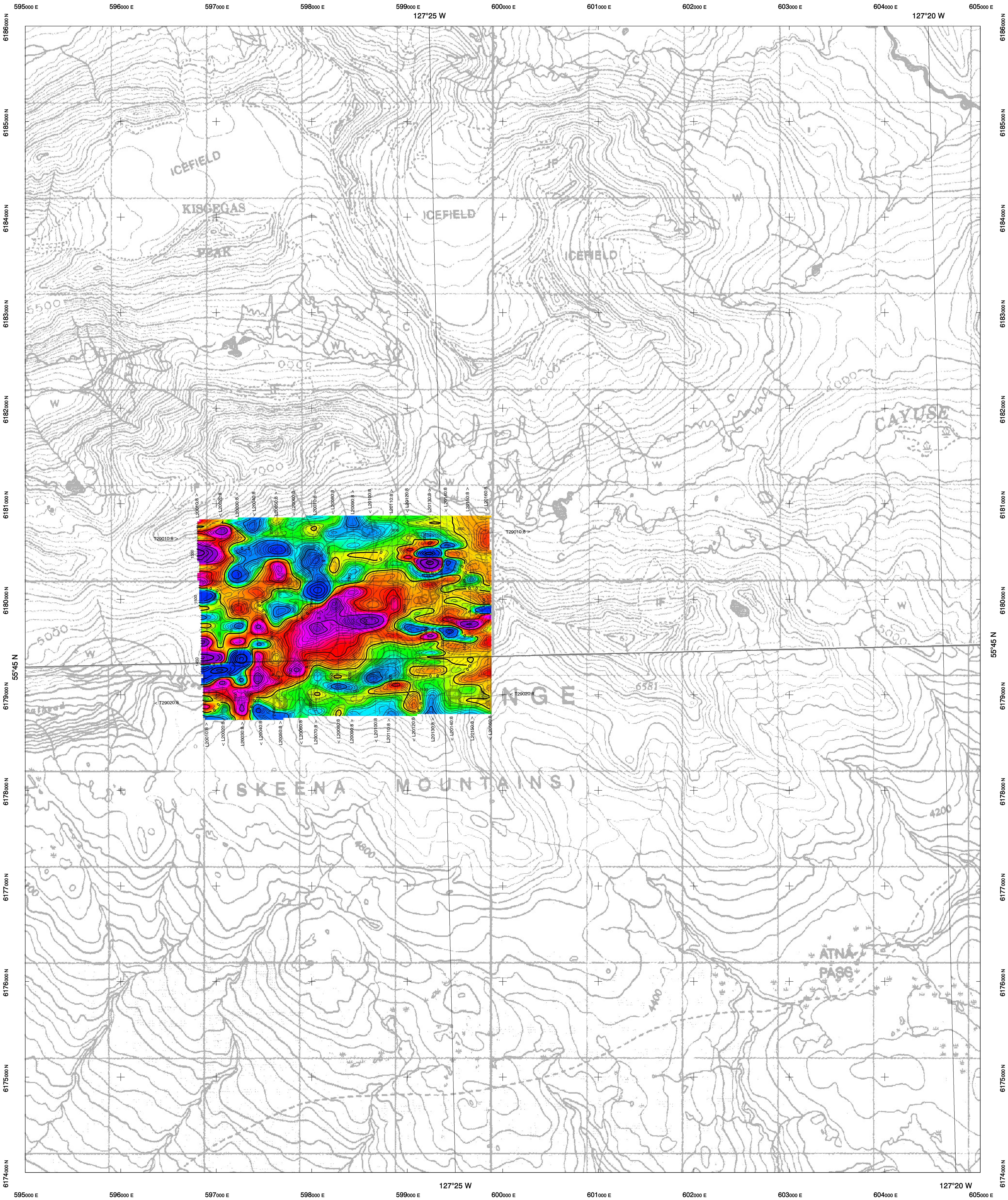
FUGRO MAG SURVEY	NTS: 93M/11,14	GEOPHYSICIST:
DATE: FEBRUARY, 2008	JOB: 07113	SHEET: 1

Fugro Airborne Surveys

0 1 2 Km
0 1 Mi
Scale 1:20 000

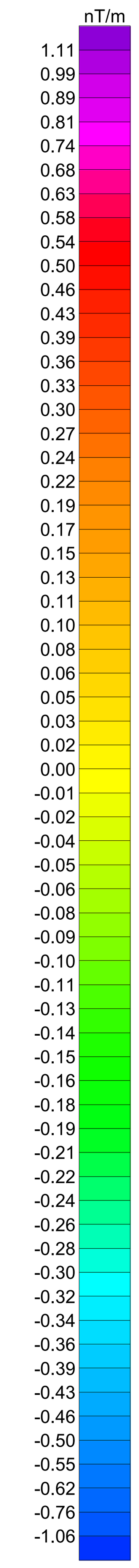
FUGRO

FUGRO AIRBORNE SURVEYS

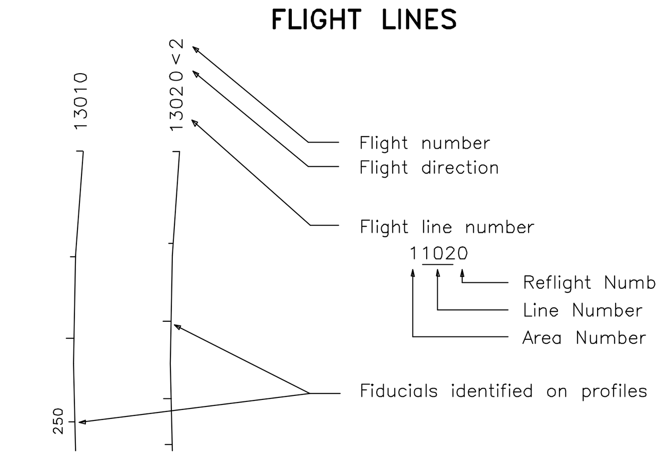


TECHNICAL SUMMARY

Navigation	Differentially-corrected GPS
Data reduction grid interval	20 metres
Terrain clearance	Helicopter 60 m Magnetometer 60 m
Data sampling interval	0.1 second
Magnetometer / sensitivity	Cesium / 0.01 nT



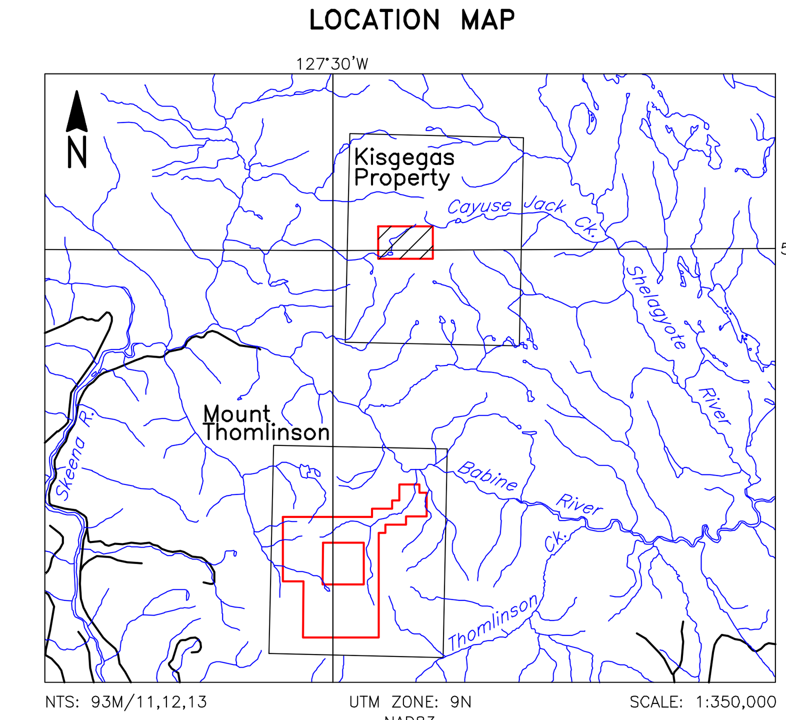
FLIGHT LINES



CALCULATED VERTICAL GRADIENT CONTOURS

(line)	2.5 nT/metre
(line)	0.5 nT/metre
(line)	0.1 nT/metre
(dashed line)	0.05 nT/metre

LOCATION MAP



NTS: 93M/11,12,13 UTM ZONE: 9N NAD83 SCALE: 1:350,000

MOLYSTAR RESOURCES INC.
KISGEGAS PROPERTY, BRITISH COLUMBIA

CALCULATED VERTICAL MAGNETIC GRADIENT

FUGRO MAG SURVEY	NTS: 93M/11,14	GEOPHYSICIST:
DATE: FEBRUARY, 2008	JOB: 07113	SHEET: 1

Fugro Airborne Surveys

Scale 1:20 000 (0 – 1 – 2 Km; 0 – 1 Mi)

FUGRO AIRBORNE SURVEYS