TECHNICAL REPORT

On the

ROCHER DEBOULE PROPERTY

Rocher Deboule Range
Omineca Mining Division
British Columbia
NTS 93M/4
Latitude 55° 10' North
Longitude 127° 38' West

For

ROCHER DEBOULE MINERALS CORP.

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1.0 Summary

The Rocher Deboule gold-silver-copper-(zinc-lead-cobalt) property ("the Property") in the Omnicea Mining Division, Rocher Deboule Range, is located 8 kilometres south of Hazelton, British Columbia. This is an old mining property and historical underground mine production is recorded from the 1916-1918 and 1952 periods for the Rocher Deboule Mine and intermittently from 1918 through 1928 and 1940-1941 for the Victoria Mine. The Rocher Deboule Mine produced 47,825 tonnes and 139.72 kilograms gold, 2627.5 kilograms of silver, 2,819,810 kilograms of copper and minor lead and zinc. The Victoria Mine produced 81.65 tonnes and 10.14 kilograms of gold, 20,254.5 kilograms of arsenic, 954.5 kilograms of molybdenum and 2235.5 kilograms of cobalt.

The Property consists of 33 mineral tenures totalling 9896 hectares within the Omineca Mining Division. Rocher Deboule Minerals Corp. owns the Property as to 100%.

The Property lies on the northwestern margin of a Late Cretaceous granodiorite pluton intruded into upper Jurassic sediments and upper Cretaceous volcanics where a series of precious-base metal quartz-sulphide veins have had historical mine production. All of the defined mineral showings described in detail, on the Rocher Deboule Property, comprise vein fillings of shear zones, normally in close proximity to the margin of the Rocher Deboule intrusive stock. These mineralized shears closely parallel one set of orthogonal joint pattern caused by the cooling of the stock. The veins all strike in a northeasterly to easterly direction and dip approximately 55 degrees to the north. The veins are found over significant lengths of shear zone, up to 1500 metres, and 200 metres depth, and are locally of very high grade. Economic mineralization, as defined by historical mining on the Rocher Deboule mine, occurred over short strike lengths of 30–75 metres and was concentrated in near vertical shoots

Based on the host lithologies and mapped alteration assemblages, the Rocher Deboule Property is classified as a high sulfidation, intrusive (sediment) hosted, epithermal gold – silver – base metal vein-shear deposit.

The economic potential and Property merit is to be found not only in the historical quartz-sulphide veins but also in mineralization and alteration that has copper-gold porphyry and/ or iron oxide-copper-gold (IOCG) affinities and potential. It must be stressed that the vein systems known on the Rocher Deboule Property could be part of a much larger hydrothermal system that are indicative of a porphyry copper (gold) system laterally or possibly at depth. Hydrothermal vein systems, like Rocher Deboule, can be outboard of a typical hydrothermally altered defined porphyry copper (gold) system.

Exploration at the Rocher Deboule and Victoria mines covers the period commencing in the early 1900’s through to 2007. Data that is reliable and documented on the Rocher Deboule mine falls into three general periods including the early1950’s, 1987- 1990 and 2001-2007. Exploration work by Rocher Deboule Minerals Corp. in 2001-2002, 2004, and 2007 was directed at confirming favourable surface exploration results defined by Southern Gold Resources Ltd. in 1987 and 1988.

Exploration since 1952 has focussed on definition of the known gold-silver-copper quartz-sulphide veins on the Rocher Deboule Property. Underground channel sampling results by Western Uranium Cobalt Mines Ltd. in 1952 and Southern Gold Resources Ltd. in 1987 and 1988 defined several areas underground and on surface where potential economic copper and gold-silver vein mineralization is present. Surface geological mapping, geochemical soil (in-situ gold, copper and arsenic) and geophysical (electromagnetic and magnetic) exploration survey also define the surface expression of the veins and provide good exploration targets for further follow-up, including drilling, to expand the known and potential new veins.

Finally, little is mentioned of inter-vein mineralization and alteration in the reports reviewed. Further surface geological mapping should not only focus on the known vein style mineralization and its definition and extensions but on the recognition and definition of hydrothermal alteration of large tonnage, albeit, low grade bulk tonnage porphyry copper (gold) and/or iron oxide-copper-gold style mineralization in veins, disseminations and breccias.

It is the writers opinion that the character and favourable underground and surface sampling results for precious and base metals obtained to date by Rocher Deboule Minerals Corp., Southern Gold Resources Ltd., Western Cobalt Uranium Mines Ltd., and others, are of sufficient merit to warrant a two-phase exploration program on the Property consisting of core drilling, geological mapping, trenching, core drilling, and litho-geochemical sampling, and road improvement followed by additional diamond drilling, and further geological mapping are proposed. Prior to commencement of field work, a detailed evaluation of the Fugro airborne geophysical survey, done in 2007, should be completed. The object of this proposed geological fieldwork is to test the Rocher Deboule No. 1, No. 2 and No. 4 veins, and Victoria No. 1 vein. A concurrent program of drilling, hand trenching, geological mapping and rock chip sampling is required to outline further extensions of other known mineral occurrences and veins including Highland Boy, Cap, and Golden Wonder.

A Stage One portion totalling $232,500 is recommended. Assuming favourable Phase One results, a Phase Two program of $350,000 recommended.

2.0 Introduction & Terms of Reference

Rocher Deboule Minerals Corp. ("Rocher Deboule") commissioned Burgoyne Geological Inc. ("BGI") and Geo-Facts Consulting to initiate a comprehensive review and evaluation of all pertinent geological, exploration, mining, and other data that is available on the company's Rocher Deboule gold-silver-copper-zinc-lead-uranium-tungsten property ("the Property") in the Omnicea Mining Division, Rocher Deboule Range 8 kilometres south of Hazelton, BC. This is an old mining property and historical underground mine production is recorded from the 1916-1918 and 1952 periods. The Property lies on the northwestern margin of a granodiorite pluton intruded into sediments and volcanics where a series of precious-base metal quartz-sulphide veins have had historical mine production. The economic potential and Property merit is to be found in the quartz-sulphide veins and in the mineralization and alteration that has copper-gold porphyry and iron oxide-copper-gold (IOCG) potential.

This Property was evaluated during November and December 2007. The writers have conferred with Mr. Larry Reaugh, President of Rocher Deboule Minerals Corp. and conducted extensive technical discussions and review of the data. Mr. Andris Kikauka, P.Geo., a Director of Rocher Deboule, completed mineral exploration on the property for Rocher Deboule in October 2001 and May 2002 (Kikauka 2002) and in June and August 2004 (Kikauka 2004). Mr. Kikauka, as internal QP, was also responsible for the 2007 core diamond drilling and sampling program on the property. A review and evaluation was made of all published data and some unpublished reports including old mining production and "reserve" reports, Government geological and mining reports, assessment reports and press releases. A variety of plans, maps, including extensive underground coverage from the 1916-1917 and 1952 mining periods form the basis for this report.

Mr. Kikauka, P.Geo. is the internal QP for the Rocher Deboule property. Mr. Kikauka was on the property during July and September 2007 to supervise the drilling and sampling program. The mineral claim ownership records were checked at the Minerals Title office of the BC Ministry of Mines and Energy in Victoria, BC. This 43-101 report is an update of an earlier one completed in February 2006 by Burgoyne (2006).

Burgoyne, the external QP, made a site visit in June 2004 and a current site visit was not considered necessary as developments since 2004 are not considered material to this report and the respective recommendations given. Since 2004, three major developments have occurred; these include the acquisition of a large package of land in 2007 but particularly mineral tenure 374216 (most of the former Rocher Deboule mine), the completion of a large airborne geophysical survey in July 2007, and the drilling in September 2007 of the Highland Boy vein 2 kilometres east of the Rocher Deboule mine. No significant work has been done since 2004 on the Rocher Deboule mine and on the newly acquired mineral tenures. Burgoyne previously in 2004 and 2006 fully evaluated the Rocher Deboule mine. The airborne geophysical survey results remains to be geologically evaluated and recommendations and funds have been recommended to do this in **Item 19**. Finally, concerning the drilling done on Highland Boy vein, no significant or potentially economic mineralization has been defined and the writers are not recommending any further work here, at this time.

This Report is a summary of findings and is planned to meet the Technical Report requirements for NI 43-101. It is understood that this document will be filled with the TSE Venture Exchange and possibly the BC Securities Commission and will become a public document.

The reports used in preparing this Technical Report are given in **Item 20.0 References** and are noted when quoted in this report; however, some of the more important technical reports referenced by the writers include those of Burgoyne (2006), Sutherland Brown (1960), Quin (1987), Quin (1989), Kikauka (2002), Kikauka (2004) and Jasper (1952) and Fugro Airborne Surveys Corp. (2007).

All currency values are expressed in Canadian dollars unless otherwise indicated. The metric system of weights and measurements are used where possible; however, much of the historic exploration and mining data is in Imperial measurements and they may be used but, if so, the metric equivalent units are indicated or bracketed where feasible.

3.0 Reliance on Other Experts

An informal review of mineral title and ownership, of the claims comprising the Rocher Deboule property, of Rocher Deboule Mineral Corp. was completed through checking the records of the Mineral Title Branch, Ministry of Mines and Energy for British Columbia. However, there has been no formal legal mineral title and ownership review as this is outside the expertise of the writers. The mineral tenure data was supplied by Ms. Terri Piorun of Rocher Deboule Minerals Corp. The Company also provided the information on environmental liability in **Item 4.0.** The authors disclaim responsibility for such information in these aforementioned items.

This report is based on an extensive technical review and discussion of information that was available. This report is believed to be correct at the time of preparation. It is believed that the information contained herein will be reliable under the conditions and subject to the limitations herein.

Burgoyne Geological Inc. and Geo-Facts Consulting have exerted a normal engineering standard of due diligence in the preparation of this report, both in regards to technical detail and in property descriptions and title. All data contained within this report are believed to be correct and complete at the time of writing. All conclusions drawn from the data are based on technical judgments in consultation with experienced professionals. There is nothing material, known to the writers, regarding the Rocher Deboule Property that is not included or referred to in this report.

4.0 Property Description & Location

The Rocher Deboule Property lies at the north end of the Rocher Deboule Range in central British Columbia at a latitude of 55 degrees, 10 minutes north and a longitude of 127 degrees, 38 minutes west on NTS Map Sheet 93M/4E and is 8 kilometres south of Hazelton, the Canadian National Railway and Provincial Highway 16 (Yellowhead). The eastern and southern portions of the property are located in the Juniper Creek drainage basin. Note **Figure 4-1**.

Access to the Rocher Deboule mine involves using a 4-wheel drive road up Juniper Creek from Skeena Crossing whereas the Victoria mine is reached via an un-maintained road southwest of Seeley Lake Provincial Park. Access is described in detail in **Item 5.1.**

All of the mineral tenures are have been staked and registered with MTO (Mineral Titles Online) for the province of BC. These are electronic claims based on coordinates for the cells in UTM NAD 83 format. Two tenures, 510469 and 374216 are converted Legacy Claims.

The below information on mineral tenures was provided by Terri Piorun of Rocher Deboule Minerals Corp. The Property consists of thirty three (33) adjoining mineral tenures that aggregate in total 9698 hectares within the Omineca Mining Division. The tenure numbers, claim names, whether purchased or staked, their expiry dates and areas are given in **Table 4-1.** The location of the mineral tenures is illustrated in **Figure 4-2.** The mineral tenures rights do not include ownership of surface rights.

Those mineral tenures that have been purchased by Rocher Deboule Minerals Corp. include:

- Mineral tenure 374216 was purchased from James Matthew Hutter in June 2007 for a 100% interest for $50,000 and 50,000 shares of Rocher DeBoule Minerals Corp.

- Mineral tenure 538388 was purchased from David Agustin Heyman in February 2007 for a 100% interest for $5,000 and 40,000 shares of Rocher DeBoule Minerals Corp.

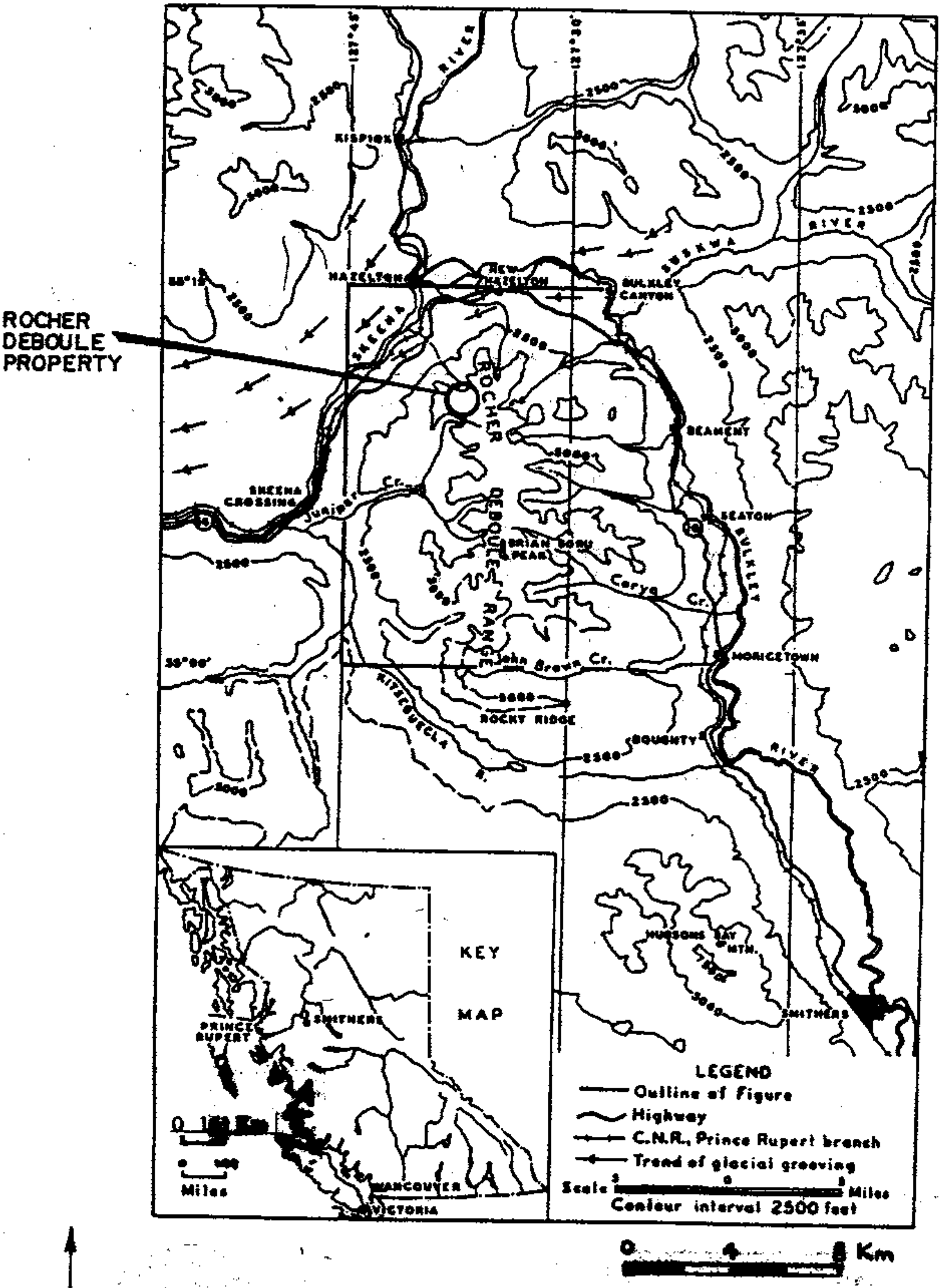
- Mineral tenures 403289, 303290, 514180, 514781 and 514929 were purchased from Stephan Bjorn Soby in August 2007 for a 100% interest for $5,000 and 40,000 shares of Rocher DeBoule Minerals Corp.

The authors are not aware of any potential environmental liabilities that affect the Property other than the small amount of tailings and waste rock that were mined historically at the Rocher Deboule, Highland Boy and Victoria mines; these tailings and waste dumps, for the most part, have been overgrown by native vegetation and are not recognizable. When A. Kikauka examined the portals in early September 2002, there was no water flowing out of the adits. Rocher Deboule has informed the writers that they are not aware of any environmental problems. During the writers site visits limited water was draining out of most of the adit portals on Rocher Deboule. There are, as is usual, on many of these old mining properties the presence of unfenced and caved adits. The location of adits and underground workings is illustrated on **Figures 10-1** and **10-2** for the Rocher Deboule mine and **Figure 10-10** for the Victoria mine.

The Mines Permit MXC-1-728, approval number 07-02200047-0727was issued by the BC Department of Mines to complete mineral exploration in 2007.

TABLE 4-1
MINERAL TENURES – ROCHER DEBOULE PROPERTY

Tenure Number		**Claim Name**	**Staked/Purchased**	**Map No.**	**Good To Date**	**Status**	**Area (Hc)**
374216	Mineral	RDB (Hutter)	Purchased	093M012	2012/jul/31	GOOD	25.0
403289	Mineral	STU	Purchased	093M012	2008/feb/06	GOOD	25.0
403290	Mineral	PID	Purchased	093M012	2008/feb/06	GOOD	25.0
510469	Mineral		Staked	093M	2012/jul/31	GOOD	1736.7
514780	Mineral	GOLDEN WONDERS	Purchased	093M	2008/feb/06	GOOD	36.9
514781	Mineral	HIDDEN WONDER	Purchased	093M	2008/feb/06	GOOD	147.8
514929	Mineral	LOST WONDERS	Purchased	093M	2008/feb/06	GOOD	36.9
538388	Mineral	OLD DALEY WEST (Heyman)	Purchased	093M	2012/jul/31	GOOD	461.3
541866	Mineral	ROCHER DEBOULE	Staked	093M	2012/jul/31	GOOD	406.2
541867	Mineral	RDB	Staked	093M	2012/jul/31	GOOD	221.6
541873	Mineral	RDB2	Staked	093M	2012/jul/31	GOOD	147.9
541980	Mineral	RD3	Staked	093M	2012/jul/31	GOOD	184.8
548516	Mineral	MADDIE3	Staked	093M	2012/jul/31	GOOD	443.7
548520	Mineral	MADDIE4	Staked	093M	2012/jul/31	GOOD	55.4
548521	Mineral	MADDIE5	Staked	093M	2012/jul/31	GOOD	443.6
548522	Mineral	MADDIE6	Staked	093M	2012/jul/31	GOOD	424.6
548523	Mineral	MADDIE7	Staked	093M	2012/jul/31	GOOD	443.0
548524	Mineral	MADDIE1	Staked	093M	2012/jul/31	GOOD	443.0
548525	Mineral	MADDIE2	Staked	093M	2012/jul/31	GOOD	443.2
548526	Mineral	MADDIE9	Staked	093M	2012/jul/31	GOOD	405.9
548527	Mineral	MADDIE10	Staked	093M	2012/jul/31	GOOD	332.1
551445	Mineral	MADDIE11	Staked	093M	2012/jul/31	GOOD	443.1
551447	Mineral	MADDIE14	Staked	093M	2012/jul/31	GOOD	129.3
558095	Mineral		Staked	093M	2012/jul/31	GOOD	443.0
558096	Mineral		Staked	093M	2012/jul/31	GOOD	442.8
558480	Mineral	PYTHON	Staked	093M	2012/jul/31	GOOD	37.0
558484	Mineral	PYTHON1	Staked	093M	2012/jul/31	GOOD	37.0
558584	Mineral	PYTHON2	Staked	093M	2012/jul/31	GOOD	110.8
558586	Mineral	PYTHON3	Staked	093M	2012/jul/31	GOOD	110.8
563164	Mineral		Staked	093M	2008/jul/19	GOOD	444.1
563165	Mineral	RDM1	Staked	093M	2008/jul/19	GOOD	425.5
567378	Mineral	DEFAULT NAME	Staked	093M	2008/oct/03	GOOD	37.0
571085	Mineral	RD CREEK	Staked	093M	2008/nov/30	GOOD	74.0
							9896.0



ROCHER DEBOULE MINERALS CORP.

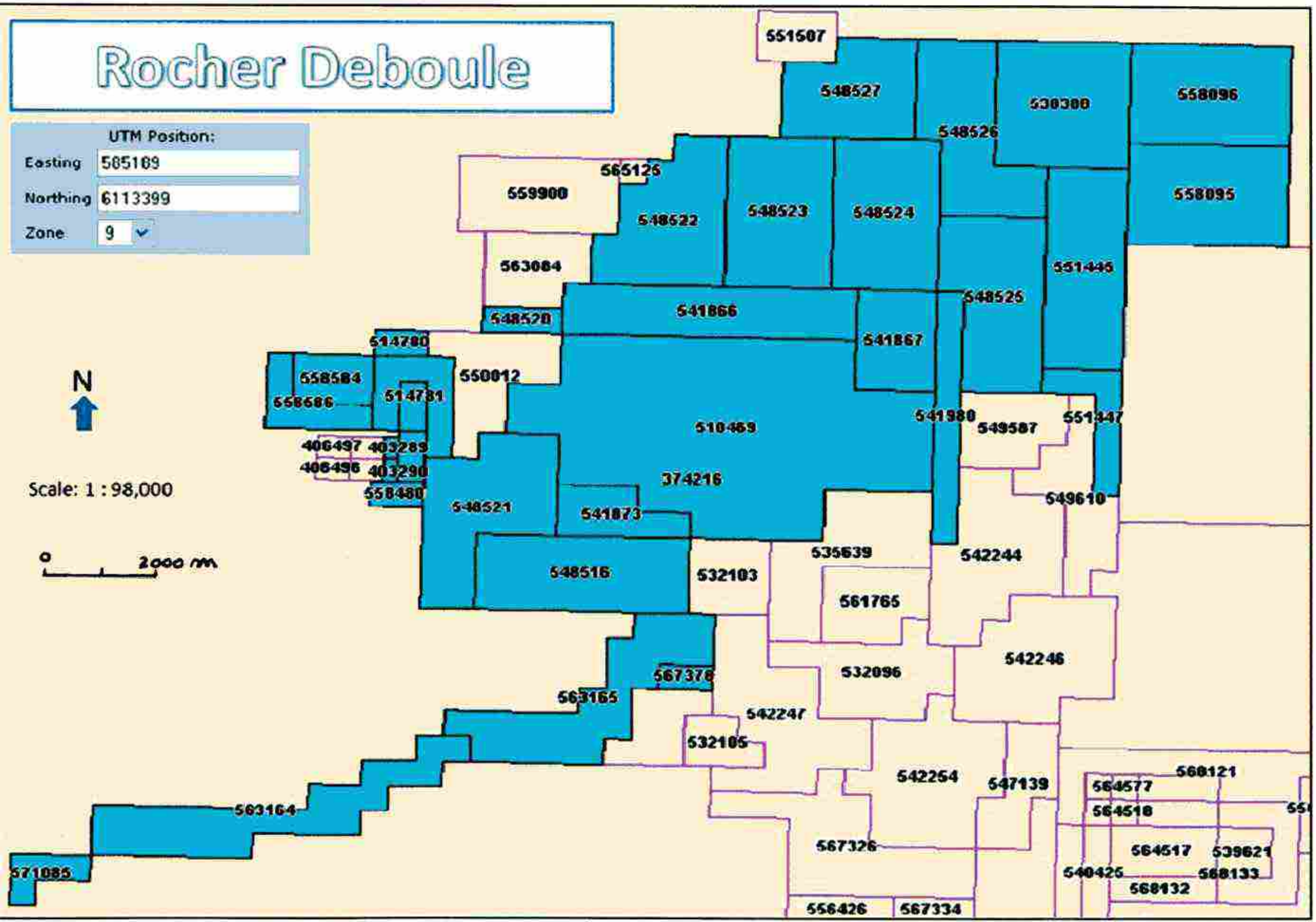
WHITE ROCK, BRITISH COLUMBIA, CANADA

ROCHER DEBOULE PROPERTY

FIG. 4-1 GENERAL LOCATION MAP

OMENICA MINING DIVISION, BRITISH COLUMBIA

National Topographic Series Map 093 M/4E



ROCHER DEBOULE MINERALS CORP.

FIGURE 4-2 MINERAL TENURES
ROCHER DEBOULE PROPERTY
OMINECA MINING DIVISION, BC

5.0 Accessibility, Climate, Local Resources, Infrastructure & Physiography

5.1 Access

The Rocher Deboule property lies at the north end of the Rocher Deboule Range in central British Columbia at a latitude of 55 degrees, 10 minutes north and a longitude of 127 degrees, 38 minutes west on NTS Map Sheet 93M/4E and is 8 kilometres south of the community of Hazelton, the Canadian National Railway, and Provincial Highway 16 (the Yellowhead) in the Skeena River valley. Note **Figure 4-1.**

The eastern and southern portions of the Property are located in the Juniper Creek drainage basin.

The historic mine workings of the former Rocher Deboule mine and the southern parts of the property are reached via a 4-wheel drive road that leaves Provincial Highway 16 at Skeena Crossing, 19 kilometres southwest of Hazelton, BC. This access road is a maintained logging road for 1 kilometre and then branches off to follow Juniper Creek to the old Rocher Deboule mine site, a distance of about 14.5 kilometres. The Juniper Creek road is heavily overgrown with alder and washed out is several places and will require improving by use of a bulldozer to be maintained to 4-wheel drive standards. The Victoria mine site area, located about 400 meters north of the Rocher Deboule mine site is best reached from the west via an un-maintained 4-wheel drive road that leaves Highway 16 just southwest of Seeley Lake Provincial Park and climbs up the western slopes of the Rocher Deboule Range to approximately 400 meters below the lowest adit on the old Victoria mine site. This road also provides access to the eastern part of the Rocher Deboule property. Foot trails provide access on the property.

5.2 Physiography

The Rocher Deboule Range of mountains is rugged with deeply incised valleys. Slopes are steep to precipitous with large areas covered in talus and bare rock; higher elevations have steep bluffs. The Property can be best described physiographically as one of mountainous topography at a stage of early maturity. The higher peaks and ridges are sharp crested, commonly serrated and have cirque glaciers and permanent snowfields. The terrain can impede access to certain areas and the talus obliterates outcrop at lower elevations. Within the Property elevations range, from 365 meters at the western side, to 1200 meters at the center, over a horizontal distance of about four kilometers.

5.3 *Flora and Fauna*

Vegetation on the Property is sparse. The areas with significant tree cover include the area immediately south and west of the Rocher Deboule mine site, the lower slopes of Armagosa Creek and on the western parts of the Property. The tree cover is principally pine and juniper with some alder.

Fauna in the area include deer and moose; cougars, black bear, wolf, coyote, and wolverine Represent carnivorous animals.

5.4 Climate

The Rocher Deboule Range is located on the eastern edge of the much larger Coast Mountain Range resulting in a mix of coastal and interior British Columbia weather patterns. Climate in the Hazelton area is described, as semi-arid and annual precipitation is less than 51 centimetres per year. Since there are heavy snow accumulations in winter, the recommended exploration work season for high elevations is between July and September. Lower elevation zones can be explored from May through October. It should be noted that accumulation of deep snow at higher elevations could result in a heavy spring runoff. With the onset of summer, snow melting is rapid and by July most of the Property is snow free, apart from isolated areas of permanent snowfield. The summer months tend to be dry and hot, though Pacific coastal storms occasionally reach this far inland. Year round access to the Rocher Deboule abandoned mine site is possible with a program of snow clearing and avalanche control in some slide sensitive zones on the steep slopes adjacent to the roads, from December to April.

5.5 Infrastructure & Local Resources

The main towns in the area are Hazelton, in the Skeena River valley, population 2000, and Smithers, population 8000, in the Bulkley River valley; these communities are located 8 kilometres south and 51 kilometres southwest of the Property, respectively. Commercial jet aircraft service Smithers. These communities offer a full service, supply, and infrastructure base. The procurement, when required, of adequate mining and development personnel should not present a problem. The Canadian National Railway, Provincial Highway 16 (the Yellowhead), and a major electrical grid service these communities and others all along the Skeena River.

As numerous annual streams are present on the Property water supply should not be a problem.

6.0 History

The Rocher Deboule Property covers the former Rocher Deboule mine, the Victoria mine, Highland Boy, Great Ohio, Cap, Golden Wonder, Three Hills, and Daley West workings and veins. Each of these previous operations or exploration/development targets is individually discussed below.

6.1 Rocher Deboule & Victoria Mines

Rocher Deboule Mine

1910 - 1952

The following historic description of production of the Rocher Deboule mine is from Sutherland Brown (1960) who completed a geological mapping and compilation of the underground workings, which are illustrated in **Figure 10-1 and 10-2.** The Rocher Deboule property was located in 1910 by Sargeant and Munroe of Hazelton, BC, which was acquired, in 1911, by Rocher Deboule Copper Company of Salt Lake City, Utah. Development on the property was done under lease by the Montana Continental Development Company, a company owned by the principals of Rocher Deboule Company. Ore was mined and shipped from the upper part of the No. 4 vein from April 1915, until February 1916, when the property reverted to its owners. Development work, previously neglected, was done on the No. 2 and No. 4 veins and by 1917 a 3100-foot (945 metres), known as the 1201, was driven from the bottom of the valley of Juniper Creek to intersect all known veins. Production in 1917-18 was largely from the No. 2 vein and was much less than in the previous two years, although the copper-gold grade was good. The mine was closed in October 1918, because of a lack of developed ore and a drop in copper price.

In 1929 Aurimont Mines Limited who mined and shipped some ore leased the property. In 1930 Hazelton Copper Mines Limited again leased the property but no production was done. The property remained inactive until 1950 when it was acquired by Western Uranium Cobalt Mines Ltd. whose initial interest was a means of access to the adjacent Victoria mine; the company immediately began to investigate Rocher Deboule as a source of copper and precious metal ore and as a prospect for uranium-cobalt. In 1950 a slide that blocked the portal of the 1200 level was cleared, the upper levels were rehabilitated and construction of a camp was begun. A 100-ton/day mill was put in operation in May 1952, and shut down in November of the same year because the grade was lower than expected. Part of the mill equipment was moved to the nearby Red Rose tungsten mine which was owned by the same company. **Note Section 15.** After the Red Rose mine was closed in 1954, equipment from both mines was sold. Production recorded from Rocher Deboule mine is given in **Table 6-1**.

TABLE 6-1
ROCHER DEBOULE MINE PRODUCTION

YEAR	TONS	GOLD (Oz.)	SILVER (Oz.)	COPPER (Lb)	LEAD (Lb)	ZINC (Lb)
1915	17,000	1,418	21,893	2,788,000		
1916	16,760	1,184	16,738	1,753,225		
1917	2,889	781	7,987	714,871		
1918	3,184	832	16,247	635,870		
1929	72	10	2,972	6,120	751	7,219
1952	12,814	267	18,640	305,498		
TOTAL	**52,719**	**4,492**	**84,477**	**6,203,584**	**751**	**7,219**
Metric	**Tonnes: 47,825**	**Kg: 139.72**	**Kg: 26,27.53**	**Kg: 2,819,810**	**Kg: 341.4**	**Kg: 3,281.4**

The mineralization is contained in a group of parallel veins striking in the order of north 75 degrees east and dipping about 55 degrees north into the mountain. The main veins are numbered from Nos. 1 to 4 from south to north and are illustrated on **Figure 10-1.** The outcrop elevations are in the order of 1372, 1454, and 1631 metres. A fifth vein, No. 2a, of similar strike but flatter dip occurs between No. 2 and No. 3. No. 2 and No. 4 veins are the only veins significantly developed and are the ones from which all production has occurred.

The veins are developed by three main crosscut levels include the 1200 (elev. 1270 metres), 1000 (elev. 1350 metres), and 300 (elev.1570 metres). The upper part of the No. 4 vein is developed by the 300 Level and a winze leading down to a flooded 500 Level and to the 100-adit Level above. There is no development between the 500 Level and the 950 Level; the 950 Level accesses the No, 2 at outcrop by a short adit. The lower part of the No. 4 vein is reached by the long 1201 crosscut. No. 2 vein is developed by long drifts on the 1200 and 1000 Levels and three small sublevels, 950, 1050, and 1300; the 1300 are connected by winze to the 1200 Level. The small No. 2a vein is reached by a crosscut on the 1000 level, and No. 3 vein is followed by a drift on the 1200 level. In total there are over 1585 metres of crosscuts, approximately 915 metres of drifts on No. 4 vein, 1067 metres on No. 2 vein and 395 metres on all other veins. The amount of vertical development is small compared to the horizontal.

1987-1990

Southern Gold Resources Ltd acquired the property in 1987and performed surface geological mapping at 1:2500 scale, and underground mapping and sampling on the No. 2 and 4 veins. Additional surface exploration consisted of geochemical soil surveys for gold, silver, arsenic, lead, zinc and copper, geophysical ground magnetic, and VLF electromagnetic surveys, all at a 1:2500 scale, over an area of approximately 1 square kilometre that was centred on the known strike and dip extensions of the known veins (No. 1 through 4) that have been developed and mined on the property. The results of these surveys are available through Assessment Reports and are reported in some detail in this report. Southern Gold also completed reconnaissance talus fines sampling on the eastern side of the property

Further exploration work is reported for 1988 and possibly 1990 (George Cross News Letter 1990). Southern Gold Resources Ltd. completed underground drilling on the Rocher Deboule No. 2 vein and underground rehabilitation and sampling of the No 4 vein in the period of 1987 and 1988. During 1988 Southern Gold completed an underground diamond drilling program in the order of 894 meters over 14 holes from the 1200 level to test the No. 2 vein

Victoria Mine

1917-1941

The Victoria mine was first developed and mined by New Hazelton Gold-Cobalt Mines Ltd. between 1917 and 1926 who shipped carloads of hand sorted ore in 1918 and 1926, the successor company, Aurimont Mines Limited, mined and shipped another car load in 1928. In the period of 1940-1941 the then owner, R.C. McCorkell, made three further shipments. In 1949 Western Uranium Cobalt Mines Limited, the then owners of the Rocher Deboule Mine, cleaned out the workings, extended the No. 2 and 00 adits, and started the No. 3 adit, but shipped no ore. Production from the Victoria No. 1 vein is given in **Table 6-2.**

TABLE 6-2

VICTORIA MINE PRODUCTION

YEAR	TONS	GOLD Oz./Ton	SILVER Oz./Ton	ARSENIC %	MOLYB-DENUM %	COBALT %	ZINC %
1918	26.6	1.24	*	8.98	0.96	1.18	*
1926	22.0	4.65	*	42.3	*	4.6	*
1928	23.0	6.25	*	37.9	3.4	3.76	*
1940	7.7	2.18	0.2	6.6	*	2.6	Nil
1941	7.3	2.02	0.2	6.1	*	1.4	0.6
1941	3.4	3.92	0.3	33.3	*	*	4.4
TOTAL	**Tons 90.0**	**326 oz**		**44,560 lb.**	**2,100 lb**	**4,918 lb.**	
Metric	**Tonnes:81.6**	**10,139 grams**		**9803 Kg**	**955 Kg**	**2235 Kg**	

* Not available

The workings consist of five adits, one raise and sub-level, and a number of open cuts. All of the underground workings are on the No. 1 vein, the most northerly of three 080 trending and dipping 60 north, parallel veins; these veins comprise the main showings at the Victoria Mine. **Figure 10-10** is a plan of a chain and compass survey compiled by Southerland Brown (1960) and Stevenson (1949). The results are reported on **Table 10-10. Figure 10-10** illustrates the workings on the No. 1 vein from the lowest adit, No. 3, at elevation 1576 metres to the highest adit, No.00, at about 1799 metres, and No. 1 open cut on the ridge at 1860 metres. Open cuts No. 2 & No. 4 are further east on the serrated ridge top. Workings on No. 2 and No. 3 veins consist of a few open cuts.

1978 - 1983

The following description is for historical drilling completed by Arber Resources Inc., DeGroot Logging, and Southern Gold Resources Ltd.

The Victoria mine was inactive until 1978 when Arber Resources Inc. constructed an access road to the 1,265-metre elevation and rehabilitated two adits at the 1,605 metres and 1768 metres elevations. At the same time DeGroot Logging were working on adjacent ground, not under lease to Arber Resources, and conducted an unsuccessful diamond drilling program of 12 holes over 1670 metres in 1981 and 1983 on the No. 2 vein. This drilling by Plecash (1982) and Plecash (1983) was done over a relatively small surface area. Drill holes were drilled southerly but several were also drilled near vertical in an effort to intersect the vein at depth. The bulk of the drilling was done in 1981 and most of these holes were not assayed nor analysed. The three holes done in 1983 were analysed for gold, silver, copper, nickel, cobalt and arsenic. The assays did not reveal any significant economic values for metals except there were some elevated arsenic values. Multi element trace metal analysis procedure, such as Induced Couple Plasma, which would have helped in alteration mapping and modelling, was not done.

1987-1990

It appears that Southern Gold in the No. 2 adit area did some limited surface sampling work.

Here a “porphyry” zone is reported grading 30.5-g/t gold and 0.35% cobalt over 2.44 metres (George Cross News Letter 1990).

6.2 Highland Boy 1917-1921

The Highland Boy is located 2 km east of the Rocher Deboule veins. Butte-Rocher Deboule Copper Company Ltd first prospected the property in 1912. Two east-west trending quartz-sulphide fissure veins occur on the Highland Boy area from 1,768-1,980 metres elevation. The southernmost fissure vein zone is traced west along surface to the No. 4 Rocher Deboule Vein. These veins are reportedly continuations of vein shears on the Rocher Deboule and certainly are part of the same set.

The Delta Copper Company of Edmonton secured the property in 1917 and shipped 68 tonnes to the Ladysmith smelter, which returned 4,770 kilograms of copper, 124.4 grams gold and 1,088 grams silver. (Annual Reports, Minister of Mines, B.C.: 1912, 1913, 1916, 1917, 1918, 1920, 1921).

6.4 Great Ohio

Sargent and Munroe staked the Great Ohio in 1910. Quartz fissure veins with variable chalcopyrite-pyrite-galena-sphalerite are hosted in porphyritic granodiorite. An adit, at elevation 1,372 metres explores 3 parallel shear zones in the porphyritic granodiorite trending 055 degrees and dipping 65-70 degrees northwest.

6.5 Cap

The Cap showing is located on the lower westerly slopes of the Rocher Deboule Range at an elevation of about 670 metres. The showings were investigated mainly between 1914 and 1918 with some further work done in the late 1920’s. In 1917 a shipment of 26.3 tonnes of sorted ore yielded: 933 grams gold, 7838 grams silver, and 1534 kilograms of copper. The showings consist of a main vein-shear that trends north 70 degrees east and dips +70 degrees to the north. The vein has a 23-metre adit crosscut leading to a 29-metre drift, which connects, with a shaft that extends 6 metres below the drift. Another small shaft is 60 metres southwest of the first and a 60 metre adit is a further 120 metres southwest. There are a number of overgrown open cuts, which were observed by the writer during the site visit.

6.6 Golden Wonder

The showing is on a large rock drumlin on the bench northwest of the Rocher Deboule Range. It is 7.3 kilometres southwest of South Hazelton at about 396 metres elevation. It is 0.8 kilometres from Highway 16. The showings were first investigated about 1912, but not much work was done until 1917 and 1918. The workings consist of a shaft 30.5 metres deep on top of the knoll, a shallower shaft a 100 to 150 metres west and a number of open cuts. Kindle (1954) reports of sacked ore and two ore piles. At the north end of the rock drumlin, 305 metres northeast of the main shaft, a shear zone striking North 70 degrees west and dipping 75 degrees south and up to 1.2 metres wide is exposed in a series of open cuts for a few hundred metres.

6.6 Three Hills

These showings are between South Hazelton and Skeena Crossing on elevation (335 metres). The terrain is flat and drift-covered except for a number of rock drumlins on which the showings are found. The showings are about 300 meters southeast of the Highway 16 at about the same elevation. The main showing consists of a small rock drumlin about 35 metres wide and about two or three times as long, that rises some 7 metres above the adjacent drift-covered area. This area has a shallow trench cut out of the surficial rock across the centre of the drumlin. The trench strikes north 30 degrees west and is approximately at right angles to the trend of the drumlin.

During 1955 and 1956 the property was under option to Silver Standard Mines

6.7 Daley West

This showing is located 3.2 kilometres south of New Hazelton on the east side of Mission Creek at 400 to 700 metres elevation. No work appears to have been done on the showings since the original investigations of 1916 although limited work in 1981 reports grab sampling - note **Item 7.10**.

The showings are defined by two caved adits of 72 and 47 metres in length driven by the Spokane Rocher Deboule Mining and Copper Company in 1916. The workings expose a silicified shear zone with small amounts of vein quartz that strikes north 20 degrees east and dips 65 degrees northwest.

6.8 Historical Mineral Resources

The historical resource estimates discussed below are not compliant with either National Instrument 43-101 or CIM standards and the Issuer should not treat them as current resources/reserves.

1951-1952 Historical Resource Estimates

The following 1951-1952 information below, on three historical "reserve" estimates, is given for information purposes only. Although such estimates were considered relevant, at the time, they are not today due to changing economics and mining methods. The estimates are not considered reliable or relevant today and the writer has not classified the historical estimates as current mineral resources/reserves.

As the Rocher Deboule Mine has a production history there is substantial documentation on sampling and "ore reserves" up to March 1952. Sutherland Brown (1960) gives a good discussion of the different estimates as based on Holland (1952b). Prior to the post May 1952 production there were four separate "ore reserve" estimates and studies; they are reported in their original Imperial units and include:

- The first estimate by A.L. Clark, Managing Director and Consulting Engineer estimated the "ore reserve" of the No. 2 vein to be 200,000 tons at a of grade 4.1% copper. 0.4 ounces per ton gold and 4 ounces per ton silver. This was done sometime in the spring of 1951. This estimate was done without any sampling as indicated by Walker (1952); consequently **the "ore reserve" is not considered credible or relevant by the writers.**
- The second by Hill and Legg (1951) in November 1951, Consulting Engineers of Vancouver who collected about 100 samples on the 1200 Level east and west of the main winze. They defined, in No. 2 vein, an "ore body" in the order of 130 feet west of the winze and 145 feet east of the winze to have a mining width of 4 feet and grade 0.28 ounces per ton gold, 7.2 ounces per ton silver, 2.74% copper, 0.15% cobalt and 0.07% tungsten. They reported

11,050 tons in two ore shoots. **This estimate was the only credible one accepted by the BC Department of Mines in 1952 as given by Walker (1952).**

- The third estimate by Kohanowsk (1951) in December 1951 calculated, on the basis of twelve samples, 315,000 tons of "indicated and reasonably assured ore" on the No. 2 vein having a content of about 4% copper. This estimate assumed "ore" for 850 feet east of the winze on 1200 level, to extend as much as 350 feet below 1200 level, to extend to a height from 225 to 370 feet above 1000 level, and included a very large tonnage of ore in the sedimentary rocks extending as much as 500 feet beyond the granodiorite contact. Southerland Brown believed that on the basis of present knowledge (1960), these assumptions are not warranted. Holland (1952a) also was highly critical of the estimate. **The writer does not consider this estimate relevant.**
- A fourth study by J.E. Merrett and A.R.C. James of the BC Department of Mines who in March 1952 collected eighty samples on the 1000 Level, 12-4w raise, 12-11w raise and the 1200 level. These samples did not indicate any further ore shoots on 1200 Level (other than that defined by Hill and Legg), and all ore reserves were entirely within No. 2 vein. They did not define any "proven or probable ore" for No. 4 vein above the 300 Level.

These estimates were reviewed in detail by the BC Department of Mines in June 1952 and the only acceptable estimate considered, is the one made by Hill and Legg. During 1952 (post May) in the order of 12,814 tons were mined from the Rocher Deboule mine to produce 305,498 pounds of copper, 18,640 ounces of silver, and 267 ounces of gold. No information is forthcoming as to dilution or mill recovery.

1987-1990 Historical Resource Estimate by Southern Gold

Southern Gold Resources Ltd. completed underground drilling on the Rocher Deboule No. 2 Vein in 1988. These results formed the basis for a resource estimate (Quin 1989). Quin reports that simple "reserve estimates" were made on the No. 2 vein, based on the 1988 underground diamond drilling and on the 1988, and 1987, and historical underground sampling that is detailed in **Item 10.** The block model (polygon) method of calculation was used, taking a maximum 7.62 meter (25 feet) distance from a drill hole, drift, or raise. Where two samples were closer than 7.62 meters the separating distance was split equally to limit the area of influence of each sample. In all cases where the width of the sample was less than 1.22 meters (4 feet), copper, gold, and silver values were diluted to a 1.22 meter minimum width. This led to a width-weighted average for each grade for each block based on the diluted width of each sample. The dimensions of each block was calculated from longitudinal sections, sample positions and the average diluted width of all samples within the block. A density factor was estimated on the based on the percentage of copper present. It was assumed that all the copper occurred as chalcopyrite and that an equal percentage of sulphides were present as pyrite and pyrrhotite. The remaining gangue was assumed to be equal percentages of hornblende and quartz.

Three types of "reserves" were utilized and they included drill indicated, drift indicated and Inferred based on drill intercepts, drift sampling, and inferred mineralization, respectively. In addition an estimate was made for additional potential.

The estimate resulted in total "indicated and inferred reserve" of 55,000 tonnes averaging 2.69% copper, 207.5 grams per metric tonne silver (6.06 oz/ton), and 3.50 grams per tonne gold (0.102

oz/ton). These “reserves” are in fact a resource and tonnages are given in **Table 6-3**. These “reserves” are found in two separate areas of the Rocher Deboule mine. The resource consist of the “Drilled Area Reserve” at the western end of the 1200 Level which contribute about 40% and those in the Upper Levels down dip of the 1000 Level and in the more eastern parts of the mine.

TABLE 6-3
SOUTHERN GOLD HISTORICAL RESOURCE TONNAGE
(from Quin 1989)

Category	Metric Tonnes
Drilled Area - Drill Indicated	10,541
Drilled Area - Drift Indicated	5,437
Drilled Area- Less Mined – Old Stopes	(2167)
Upper Levels – Drift Indicated	33,379
Sub Total	47,190
Drilled Area - Inferred	7,558

Quin (1988) also estimated a potential (resource) of a further 70,000 metric tonnes in the mine with about 19,000 tonnes in the vicinity of the 1200 Level at its west end and 51,000 tonnes in the Upper Levels of the mine.

The above information on historical “resource” and “reserve” estimates is given for information purposes only. These estimates do not meet CIM and 43-101 standards. The estimates are not considered reliable or relevant today and the writer has not classified the historical estimates as current mineral resources/reserves.

BC Minfile Report gives … “ unclassified reserves at Victoria [Mine] are 1,000 tonnes grading 42.55 g/t Au, 2.84 g/t Ag, 2% cobalt”. This estimate is not compliant with CIM or 43-101 standards and is not relevant. The information should be treated as historical information only.

7.0 Geological Setting

7.1 Regional Geology

The Rocher Deboule Range was first mapped by Sutherland Brown (1960) in the late 1950's at a scale of 1:63,360 and is a good map to use for location and definition of both property and regional lithologies and structures. Later in 1977 and 1978 Richards (Richards 1978), (Richards 1980) completed an updated regional geological map at a scale of 1:250,000 and refined the relative ages and correlation of the different lithologic units. Richards map defines the area of the Rocher Deboule Range to be underlain by late Jurassic to early Tertiary successor basin assemblages of the Bowser Lake, Skeena, and Sustut Groups, containing locally significant thickness of volcanic rocks. Granodioritic intrusions, from large stocks to abundant dykes, are assigned to the late Cretaceous Bulkley Intrusions. These intrusions are closely related to most of the mineral occurrences in the area. The regional and district geology respectively, is illustrated in **Figure 7-1** and **Figure 7-2.** The Southerland Brown map of **Figure 7-2** is more detailed for the area but is less up to date with respect to relative ages of the units.

Southerland Brown's geological mapping on the west side of the Rocher Deboule Range, and in the vicinity of the Rocher Deboule mine defines the Brian Boru Formation which consists of varicoloured porphyritic andesitic flows and breccias, tuffs, minor volcanic sandstone and conglomerate. This formation was originally given a Lower Cretaceous age by Southerland Brown but is defined to be Upper Cretaceous (uKB) age by Richards. Underlying the Brian Boru Formation are Upper Jurassic Bowser Lake Group (uJB) sedimentary rocks of the "Lower Bowser Lake subdivision". These rocks consist of greywacke, shale, siltstone, and hornfelsic equivalents, and minor conglomerate and coal. The east side of the Rocher Deboule stock intrudes the Bowser Lake Group sediments (uJB) and volcanics of the Brian Boru Formation (uKB) which strike northerly to north-easterly and dip generally westerly to north-westerly although variations occur. The Rocher Deboule stock is composed of porphyritic granodiorite, quartz monzonite, and dioritic dykes. The uJB Brian Boru Formation is in fault contact with sediments of uKB where the westerly-located uKB rocks have been down dropped.

7.2 Property Geology

The geology of the Rocher Deboule Mine and area along with the location of the Victoria Mine, Highland Boy, Great Ohio, Cap, Golden Wonder, Three Hills, and Daley West vein workings are described below. District geology and locations of the various workings are illustrated on **Figure 7-2**.

The Rocher Deboule Property lies on the western margin of the Rocher Deboule stock with the southern and western areas being underlain by Upper Jurassic-Lower Cretaceous Bowser Lake Group. The following description is taken from Quin (1987). The Rocher Deboule stock underlies about 70 square kilometres of the northern part of the Rocher Deboule Range. The stock is an elongate pluton oriented north 25 degrees west. It is a composite of two domes with a connecting saddle. The details of the walls of this stock are readily apparent in the vertical exposures that the rugged relief offers, and the roof is exposed along parts of the central spine of peaks. The stock is asymmetrical; the eastern side has a gentler slope than the western side.

The main part of the stock is composed of porphyritic granodiorite, a light grey mottled rock in which tabular phenocrysts of plagioclase and dark hornblende and biotite are set in a faintly pink matrix. In general the porphyritic granodiorite is very homogeneous. Inclusions in the porphyritic granodiorite are ubiquitous forming a reported 1% of the rock in the main mass and from 2% to 4% near the roof contacts. Some of the inclusions are up to 12 metres long.

The second rock type of the Rocher Deboule stock is a fine-grained, buff coloured, biotite quartz monzonite that forms the northernmost part of the stock

The structure of the stock is important in exploration of the property. The stock is clearly intrusive and the granodiorite cuts cleanly across the fold structure of the Bowser Lake Group with no apparent deformation of the older rocks. Neither in general the granodiorite is neither foliated nor lineated. Jointing throughout the granodiorite is pronounced, regular, and patterned and the contacts of the two domes and their intervening saddle are important in the distribution of these joints. There are three sets of joints, of which the two most prevalent include one parallel to the contact and one normal to the contact and making a horizontal trace on the contact surface. This second set is referred to as cross-joints. The third set and least developed is radial, normal to the first two, and dips vertically. Note **Item 7.3**. Sutherland brown suggests that the lack of foliation, the lack of evidence of intense forceful intrusion, and the fit of the pattern to the shape of the stock, indicate that cooling contraction caused the joints. The stock is dated at 72 million years.

The principal other rock types within the Property are sandstones and siltstones of the Lower Bowser Lake Group (uJB) that appear to represent a northerly pro-grading deltaic assemblage, the debris comprising principally of volcanic clasts. Much of the sediments have undergone thermal metamorphism forming a biotite hornfels rim to the Rocher Deboule stock. Deformation of the Bowser sediments is related to major block faulting and intrusion of the pluton. Block faulting is thought to have uplifted the Rocher Deboule Range, exposing the pluton to erosion, while persevering sediments in the valleys to the north and west. As a result of the intrusion of the Rocher Deboule stock, the sediments consistently dip to the west.

Minor rock types several types of dykes, all younger than the pluton; from oldest to youngest they include:

- Aplites and pegmatites.
- Granitoid dykes of a quartz monzonite composition, including the Rocher Dyke in the Rocher Deboule mine, which is up to 30 metres wide.
- Porphyritic andesite dykes.
- Felsite dykes of aphanitic texture.
- Late fine-grained dark, often aphanitic biotite-lamprophyres and basalts.

The surface geological mapping done by Quin (1987) is restricted to that of the Rocher Deboule mine and is illustrated in **Appendix A**. Reconnaissance geological mapping was completed in 2001-2002 by Kikauka (2002)**.**

7.3 Rocher Deboule Mine

The following description is, in part, from Sutherland Brown (1960). Note **Figure 10-1 and 10-2.** The mine is on the western periphery of the northern dome of the Rocher Deboule stock. The western ends of the 1202 and 1002 drifts cross the contact into hornfelsic siltstones of the now defined upper Jurassic Bowser Lake Group (uJB). In the mine the contact strikes north 50 degrees west and dips 63 degrees southwest. The country rock is porphyritic granodiorite of the Rocher Deboule stock, but locally deuteric alteration along joints has removed the dark minerals. Jointing is pronounced in a least four sets with average attitudes as follows:

- Strike north 55 degrees east; dip, 55 degrees southeast.
- Strike north 15 degrees west; dip 65 degrees west.
- Strike north 85 degrees east; dip, 5 degrees north.
- Strike north 60 degrees east; dip 65 degrees northwest.

The last three joints sets conform fairly closely with the normal orthogonal joint system of the stock. The last set contains much of the deuteric alteration and quartz-hornblende pegmatitic veinlets. Both alteration and pegmatitic veinlets are particularly prominent on the footwall sides of the major veins.

Dykes are not abundant in the mine and four main rock types are present. The first forms the Rocher dyke, a fine-grained quartz monzonite 12 to 24 metres wide, that strikes north 10 degrees east and dips 52 degrees west on the average, but dips locally from 47 to 60 degrees. The dyke has chilled margins and the petrology is similar to that of the quartz-monzonite phase of the Rocher Deboule stock. The age relations with the veins and vein fractures are complicated. The dyke is offset by the veins in the1002 Level west and 1204 east drifts 1.2 to 2,4 metres, but on 1202 west drift the dyke apparently offset by dilation No. 4 vein and fracture.

On the 1200 level a small dioritic dyke parallels the Juniper fault and about 120 metres south of the 1203 drift a similar 4.5 metre wide dyke strikes north 30 degrees east and dips 70 degrees north-westward.

A porphyritic andesite dyke 3.7 metres wide occurs in the hanging wall of No. 3 vein shear on the 1200 level. The rock resembles dykes related to the Brian Boru Formation, although it is younger.

The last type of dyke consists of two occurrences of narrow, 0.6 metres wide, pale greenish-grey aphanitic dikes found on the 1200 level.

The Juniper fault, striking north 57 degrees west and dipping 70 degrees southwestward, is the only significant fault in the mine. It is younger than the veins and a small granitoid dyke that it follows on the 1200 level. It offsets No. 2 vein 30 metres to the left, although drag indicates a right-hand movement.

The veins occupy shears that are remarkably uniform in over all attitudes. The veins are complex and were formed by successive deposition along fissures or shears that moved repeatedly. As a result the veins are lenticular in shape and variable in detail they may be negligible in tight shears, or be 1.2 to 2.4 metres wide with or without much brecciated and altered granodiorite. There is a variable amount of mineralization in the wall rocks.

Vein Descriptions

The No.1 vein is followed by a drift for 15 metres on the 1200 level and is exposed in the rockslide on the surface. On the 1200 level it is a 0.6 metre wide breccia zone cemented by calcite with traces of chalcopyrite. On surface it is better mineralized with chalcopyrite in hornblende and quartz.

The No. 2 vein is developed chiefly by the 1200 and 1000 Levels, but there are several additional small workings including a winze and small drift below the 1200 Level. Most of the ore mined in 1952 came from the stopes above the 1000 Level on No. 2 vein. most of this 1952 production would now be located on the mineral tenure 374216. On the 1200 Level east of the Juniper fault the vein consists of lenses of crushed rock about 0.6 metres wide, cemented with quartz and with some arsenopyrite, pyrite, chalcopyrite, and malachite. West of the fault to about 45 metres beyond the Rocher dyke the shear is tight and contains some lenses 0.3 to 0.9 metres wide, but normally not more than 0.3 metres of vein material consisting of third stage mineralization.

The No. 2a vein is exposed only on the 1000 Level and is believed to be flooded.

The No. 3 vein is exposed by about 180 metres of drift on the 1200 Level. Here it is chiefly a fault with a 3.7 metre wide porphytitic andesite dyke on the hanging wall and containing little quartz and calcite material.

The No. 4 vein is developed by the 100, 300, 500, and 1200 Levels. On the 1200 Level the vein consists either of barren shear or pegmatitic hornblende-quartz-feldspar with almost no metallic minerals. The upper part of the No. 4 vein produced all the ore shipped in 1915 and 1916 and some of that shipped in 1917 and 1918. Four distinct ore shoots, which contained large quantities of chalcopyrite in hornblende, but apparently the shoots terminated abruptly with little disseminated mineralization between them.

Results of various sampling programs are discussed and tabulated in **Item 10** and illustrated on **Figure 10-1**.

7.4 Victoria Mine

Mine Geology & Vein Descriptions

The Victoria veins form one system with those of the Rocher Deboule mine. **Note Figure 7-2**. From the No.1 vein of the Rocher Deboule mine there is a sequence of veins or similar orientation, spaced every 200 to 300 metres, to the No. 1 vein of the Victoria. Note **Figure 10-10** is a compilation of mapping and sampling by Sutherland Brown (1960) but includes earlier work by Stevenson (1949) and Kindle (1954). Results of the sampling are given in **Table 10-10** of **Item 10**.

The showings of significance are all within the Rocher Deboule stock adjacent to the western contact of the northern dome of porphyritic granodiorite. Hornfelsic greywackes and siltstones outcrop immediately west of portal No. 3 adit and they strike nearly north and dip steeply west.

Dykes are not abundant in the surface showings but are quite prominent in the workings as dykes follow the same shears as No. 1 and No. 2 veins. Veins cut the dykes. There are three main types of dyke rock, similar to the Rocher Deboule mine. Following the No.1 vein shear is a dark grey, fine-grained diorite dyke that averages 0.6 to 0.9 metres in No. 1 adit and above, but thickens to 6 metres in No. 3 adit. A second type of dyke is found in the in the wall of No. 1 vein is an aphanitic light grey felsite with some feldspar and quartz. This dyke is also seen in No. 1

adit where it is 3.7 to 4.6 metres wide, strikes northeastward and dips steeply southeastwards. A third type follows the No.2 vein shear. It is feldspar porphyry 9 metres wide that strikes eastward and dips 60 degrees north and is similar to the feldspar porphyry that follows No. 3 vein on the 1200 level of the Rocher Deboule mine.

The showings are in three parallel vein shears and one small cross-vein. The main vein shears strike about north 85 degrees east, and dip about 60 degrees north. No. 1 vein is well exposed. No. 2 vein is about 300 metres south of No.1 and is intermittently exposed. No. 3 vein is about 200 metres south of No. 2 vein and 300 metres north of the No. 4 vein of the Rocher Deboule mine.

No.1 vein has been explored in some detail. No. 1 vein shear strikes north 85 degrees east and dips 58 degrees north. Striations in the shear plane in No. 2 adit rake 60 degrees to the west in the plane of the shear. The shear cuts a fine dioritic dyke that averages 0.6 to 0.9 metres wide; the dyke is offset in No. 1 adit 6 metres to the left. It is filled with variable amount of vein material ranging up to 0.6 metres.

7.5 Highland Boy Vein Description

The Highland Boy is located 2 km east of the Rocher Deboule veins. Butte-Rocher Deboule Copper Company Ltd first prospected the property in 1912. Two east-west trending quartz-sulphide fissure veins occur on the Highland Boy area from 1,768-1,980 metres elevation. The southernmost fissure vein zone is traced west along surface to the No. 4 Rocher Deboule vein. These veins are reportedly continuations of vein shears on the Rocher Deboule and certainly are part of the same set. The Chicago Creek fault, the northerly trending fault on the east side of the Rocher Deboule Property, crosses the Highland Boy on its eastern side and vein showings are not known east of it. Note **Figure 7-2**.

At elevation 1,738 metres, the lower adit has been driven in a northwest direction along a fissure zone that dips 80 degrees north. At elevation 1,791 metres, located approximately 95 metres uphill from the lower adit, the middle adit follows the same quartz-sulphide fissure zone. The upper adit is located at 1,844 metres, approximately 107 metres uphill from the middle adit. The upper adit was driven 91 metres following a quartz-sulphide fissure, which trends at a bearing of 306 degrees and dip of 70 degrees north. At the upper adit portal, a zone of 30% chalcopyrite-pyrite-magnetite occurs across a width of 0.5 metres. Nine metres within the upper adit, the vein pinches and no heavy sulphides are seen until a 0.12 metre seam of almost solid pyrite with some chalcopyrite, comes in on the south wall 21.3 metres from the portal. For the next 4.6 metres the vein strengthens, and between 26.5-32 metres the roof is stoped out and a winze has been sunk 3-9 metres. Strong sulphide mineralization (chalcopyrite-pyrite-magnetite) occurs in widths ranging from 0.3-0.8 metres. Above the adits, the fissure zone is followed by several open cuts to an elevation of 1,950 metres. In one open cut at 1,932 metres elevation, and 150 metres west of the upper portal, the zone is 0.6 metres wide with massive and banded chalcopyrite, coarsely crystalline magnetite and pyritohedral pyrite crystals 2.5 cm in diameter. West of this cut, a branch splay of the fissure joins the main vein. The branch splay carries 0.6 metres of solid sulphide, chiefly chalcopyrite, for a distance of 9 metres from the main vein.

A representative sample of solid sulphide ore stacked at the portal of the upper adit assayed 0.13 opt Au, 0.73 opt Ag, and 15.03% Cu (Annual Reports, Minister of Mines, B.C.: 1912, 1913, 1916, 1917, 1918, 1920, 1921).

7.6 Great Ohio

Quartz fissure veins with variable chalcopyrite-pyrite-galena-sphalerite are hosted in porphyritic granodiorite. The quartz-sulphide vein system occurs near the west edge of the Bulkley Intrusive Complex in close proximity to hornfels sediments and volcanics. Minor hornblende lamprophyre dykes occur in the porphyritic granodiorite. An adit, at elevation 1,372 metres explores 3 parallel shear zones in the porphyritic granodiorite trending 055 degrees and dipping 65-70 degrees northwest. This prospect is at the west contact of the granodiorite in contact with sandstone and argillaceous sediments. A strong shear zone is traced for 250 metres with numerous open cuts. **Note Figure 7-2.**

7.7 Cap

The showings consist of a main vein-shear that trends north 70 degrees east and dips +70 degrees to the north and a subsidiary vein a few hundred metres to the east of the last workings on the main vein. The main vein-shear is silicified and in places contains vein quartz with pyrite, siderite, chalcopyrite, and some arsenopyrite. The vein has a 23-metre adit crosscut leading to a 29-metre drift, which connects, with a shaft that extends 6 metres below the drift. Another small shaft is 60 metres southwest of the first and a 60 metre adit is a further 120 metres southwest. There are a number of overgrown open cuts on the subsidiary vein. **Note Figure 7-2.**

7.8 Armagosa

The Armagosa is located on the north side of Armagosa Creek and approximately 600 metres south of the Great Ohio veins and is just south of the Property. A steep gully on the south side of a ridge trends 030 degrees and dips 60 degrees west. This gully follows a quartz-sulphide fissure vein system with chalcopyrite-magnetite-scheelite hosted in hornfelsic greywacke and siltstone/argillite. Old workings are at 1,325-1,463 metre elevations. There are two adits and one small shaft. The lower adit is at 1,322 metres and the upper adit is at 1,408 metres where a 45.7 metre long crosscut trends 360 degrees and cuts a 030-degree trending shear zone. **Note Figure 7-2.**

7.9 Golden Wonder

The showings are underlain by somewhat pyritic argillite of the Red Rose formation, which is believed to be folded with a trend east of north. The workings consist of a shaft 30 metres deep on top of the knoll, a shallower shaft 100 to 150 metres west, and a number of open cuts. Two shear zones are reported, with most of the workings on the southern one. The workings consist of a shaft 30.5 metres deep on top of the knoll, a shallower shaft 100 to 150 metres west and a number of open cuts. The shear zone trends north 85 degrees west and dips 80 degrees north and has been traced more than 152 metres. It is up to 0.9 metres wide, is silicified in places, and contains small quartz stringers. In the shear are lenses of almost pure sulphides, mostly pyrrhotite, hut including chalcopyrite, arsenopyrite, and pyrite. Kindle (1954, p. 44) reports assays from two ore piles near the main shaft as follows: Gold, 6.22 and 14.31 grams per tonne respectively; silver, 223.9 and 50.70 g/t; copper, 6.50 and 4.69 per cent; nickel, none. Kindle also reports an assay of some sacked ore that shows 0.15 per cent tin.

At the north end of the rock drumlin, 305 metres northeast of the main shaft, a shear zone striking north 70 degrees west and dipping 75 degrees south and up to 1.2 metres wide is exposed in a series of open cuts for a few hundred metres. A post mineral porphyry dyke occupies the shear. Small quartz stringers and lenses of sulphides, mostly pyrite and chalcopyrite occur within the shear.

7.10 Three Hills

The terrain is flat and drift-covered except for a number of rock drumlins on which the showings are found. The showings are about 300 meters southeast of the Highway 16 at about 335 metres elevation. The main showing consists of a small rock drumlin about 35 metres wide and about two or three times as long, that rises some 7 metres above the adjacent drift-covered area. This area has a shallow trench cut out of the surficial rock across the centre of the drumlin. The trench strikes north 30 degrees west and is approximately at right angles to the trend of the drumlin.

The rocks are hornfelsic argillite and feldspar porphyry of the Hazelton Group. They strike north 35 degrees east, parallel to the trend of the drumlins and on the southeast dip 40 degrees northwest; elsewhere the dip is obscure. The rocks are fractured by many small joints striking north 75 to 90 degrees east and dipping about 60 degrees north. Some joints are filled with small stringers of quartz and chalcopyrite. Two chip samples each taken over 3.05 metres in the central, better-looking part of the trench assayed trace gold, 9.3 g/t silver and 0.058% copper; and, trace gold and silver and 0,61% copper.

7.10 Daley West

The showings are within the fine-grained quartz monzonite phase of the Rocher Deboule stock. The showings are defined by caved two adits of 72 and 47 metres in length driven by the Spokane Rocher Deboule Mining and Copper Company in 1916. The workings expose a silicified shear zone with small amounts of vein quartz that strikes north 20 degrees east and dips 65 degrees northwest. The shear zone contains some masses of arsenopyrite with pyrrhotite, pyrite and some chalcopyrite. The limited work done in 1981 by A. L'Orsa in Assessment report #8937 gives the following from two grab samples taken from about 15 cm of mineralization within the shear zone that is up to 1.5 metres width.

Lab Number	Au g/t	Ag – g/t	Cu %	W %	Co %	% Arsenopyrite
3600	2.18	15.6	1.06	0.66	0.10	15 +/-
3601	4.04	15.6	0,59	---	0.44	80 +/-

The arsenopyrite does not carry significant cobalt or nickel and little gold and silver.

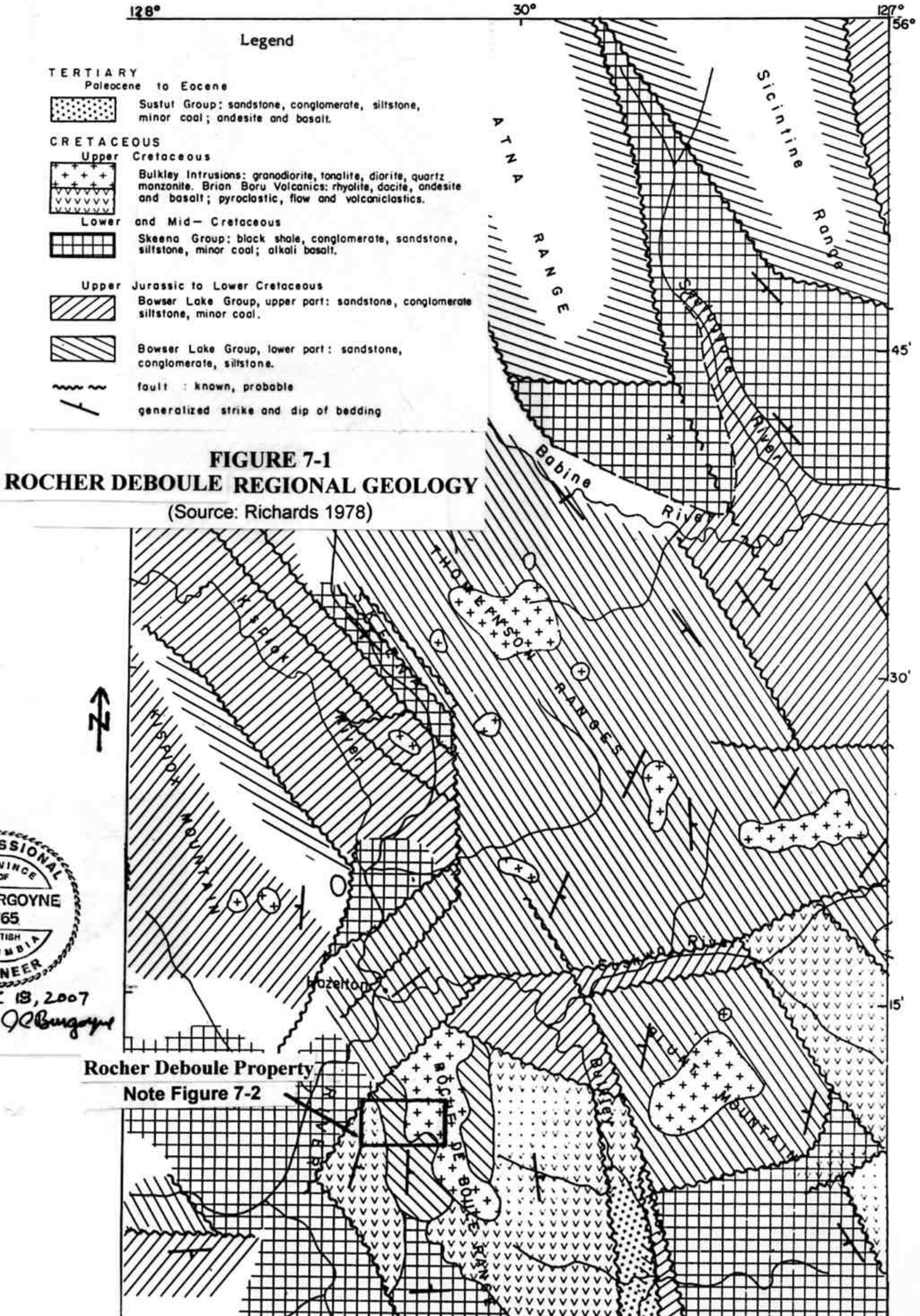


FIGURE 7-1
ROCHER DEBOULE REGIONAL GEOLOGY
(Source: Richards 1978)

Rocher Deboule Property
Note Figure 7-2

A.A. BURGOYNE
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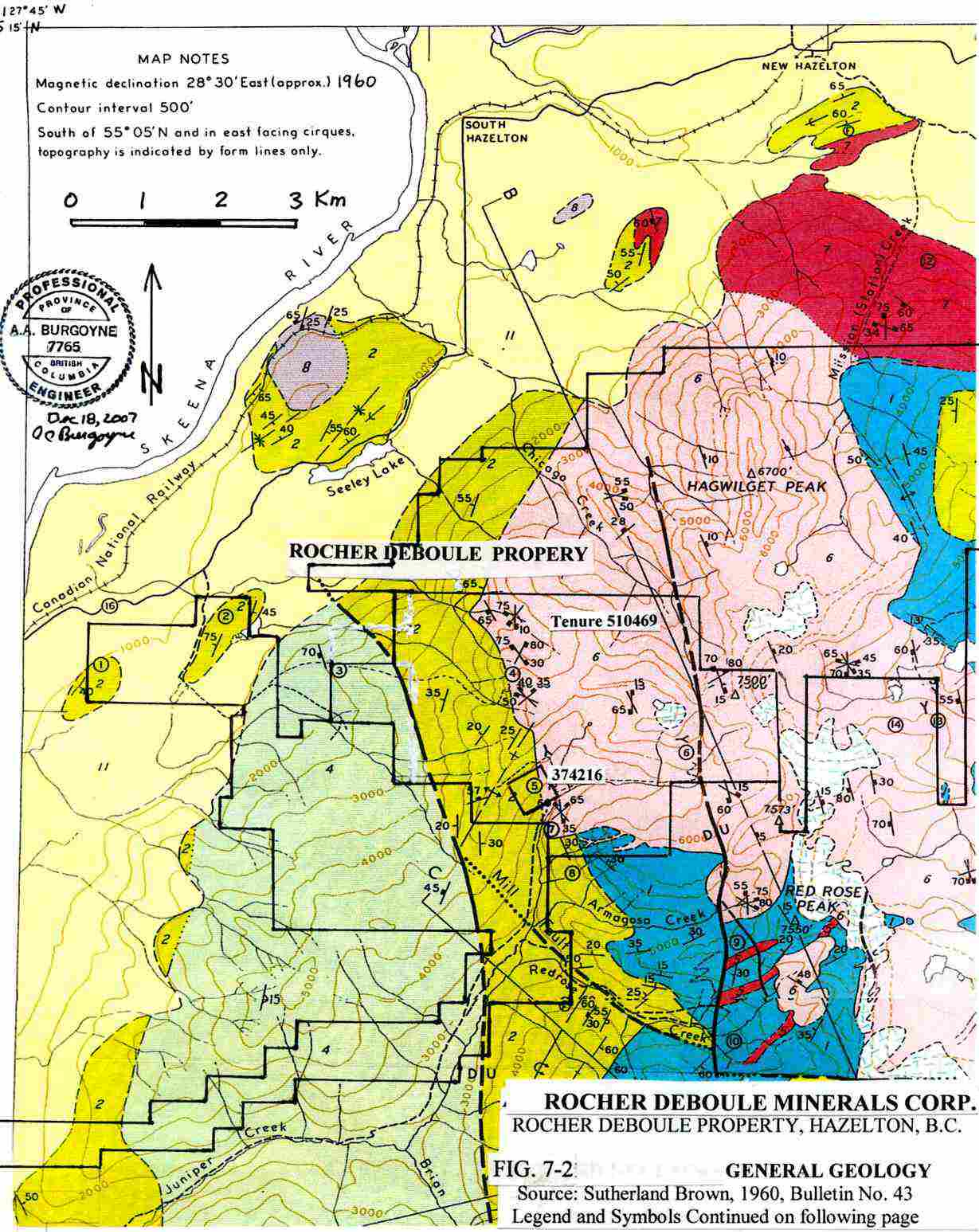
DεC 18, 2007
JCBurgoyne



A.A. BURGOYNE
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Dec 18, 2007
A C Burgoyne

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE PROPERTY, HAZELTON, B.C.

FIG. 7-2 **GENERAL GEOLOGY**
Source: Sutherland Brown, 1960, Bulletin No. 43
Legend and Symbols Continued on following page

LEGEND

GSC OPEN FILE 720 EQUIVALENT LITHOLOGIC UNITS	PLEISTOCENE AND RECENT 11 Drift and alluvium PALEOCENE OR LATER 10 Andesite, basalt flows and dykes PALEOCENE 9 Greywacke, shale, conglomerate, coal
LATE CRETACEOUS LKB	CRETACEOUS BULKLEY INTRUSIONS (5-8) 6 7 ROCHER DEBOULE STOCK: 6-porphyritic granodiorite; 7-quartz monzonite; 8 Undivided 5 Diorite dykes
UPPER CRETACEOUS uKB	UPPER JURASSIC AND LOWER CRETACEOUS HAZELTON GROUP (IN PART) (1-4) 4a Related sill 4 BRIAN BORU FORMATION: varicoloured porphyritic andesitic flows and breccias, tuffs, minor volcanic sandstone and conglomerate
UPPER JURASSIC LOWER BOWSER LK FM uJB	RED ROSE FORMATION (1-3) 3 MEMBER D: conglomerate, greywacke, shale, and hornfelsic equivalents 1 2 1-MEMBER B: shale, siltstone, and hornfels. 2-MEMBERS A and C: greywacke, shale, siltstone, and hornfelsic equivalents; minor conglomerate and coal

SYMBOLS

Geological boundary; defined, approximate, assumed	—— - - - - ....
Bedding; horizontal, inclined, vertical, overturned	+
Flow layering in volcanic rocks	
Foliation, lineation in granitic rocks	
Joints	
Anticline; upright, overturned	
Syncline	
Fault with movement	U D
Glacial striae, roche moutonee	←
Fossil locality	Ⓕ
Mining property (see list below)	⑧
Adit	
Trail	- - - - - - -
Highway 16, other roads	⑯ - - - - -
Glacier, snowfield	

Scale 0 1 2 Miles

0 1 2 3 Km.

LIST OF PROPERTIES

① Three Hills
② Golden Wonder
③ Cap
④ Victoria
⑤ Rocher Deboule
⑥ Highland Boy
⑦ Great Ohio
⑧ Armagosa
⑨ Red Rose
⑩ Brunswick
⑪ Brian Boru
⑫ Daley West
⑬ Black Prince
⑭ Blue Lake
⑮ Lone Star
⑯ Sultana

ROCHER DEBOULE MINERALS CORP.

ROCHER DEBOULE PROPERTY, HAZELTON, B.C.

FIG. 7-2 (CONTINUED)

LEGEND AND SYMBOLS GENERAL GEOLOGY

Source: Sutherland Brown, 1960, Bulletin No. 43

8.0 Deposit Type

Based on the host lithologies and mapped alteration assemblages, the Rocher Deboule Property is classified as a high sulfidation, intrusive (sediment) hosted, epithermal gold – silver – base metal vein-shear deposit. The Property lies on the northwestern margin of a granodiorite pluton intruded into sediments and volcanics where a series of precious-base metal quartz-sulphide veins have had historical mine production. The economic potential and Property merit is to be found not only in the historical quartz-sulphide veins but also in mineralization and alteration that has copper-gold porphyry and/ or iron oxide-copper-gold (IOCG) affinities and potential.

All of the mineral showings described in detail, with certain exceptions, on the Rocher Deboule Property comprise vein fillings of shear zones, normally in close proximity to the margin of the Rocher Deboule stock. These mineralized shears closely parallel one set of orthogonal joint pattern caused by the cooling of the stock. The veins all strike in a northeasterly to easterly direction and dip approximately 55 degrees to the north. The veins are found over significant lengths of shear zone, e.g., on the Highland Boy – Rocher Deboule system a strike length of perhaps 1500 metres is indicated. However, economic mineralization, as defined by mining on the Rocher Deboule mine, occurred over short strike lengths of 30 – 75 metres and was concentrated in near vertical shoots, e.g., the No. 4 vein at the Rocher Deboule mine.

Three distinct phases of mineralization defined in the different veins have been described by Southerland Brown (1960) and are discussed in **Item 9**. All three phases can overlap, especially at the western and eastern ends of No. 2 vein at the Rocher Deboule mine. The precious metals appear to be distributed among several minerals, but principally the iron-cobalt sulpharsenides and arsenides, tetrahedrite, and chalcopyrite.

In 2002 (Kikauka 2002) Ministry of Energy and Mines, Geological Survey Branch published Fe-Oxide Cu-Au (IOCG) deposit potential which lists the new major mineral deposits recently discovered, e.g., Olympic Dam (Southeast Australia), 2 billion tonnes grading 1.6% Cu, 0.04% U_3O_8, 3.5 g/t Ag, 0.6 g/t Au, and Candelaria (Northern Chile), 366 million tonnes 1.08% Cu, 0.26 g/t Au, 4.5 g/t Ag. The IOCG deposit characteristics are high iron content (hematite and/or magnetite), albite, K-feldspar, sericite, carbonate, chlorite, quartz, amphibole, pyroxene, biotite, tourmaline and apatite gangue, with geochemically anomalous Fe, Cu, Au, Ag, Co, P, U, and Rare Earth Elements (REE) (Eckstrand et al. 1995), (Webster 2002). The Geological Survey Branch of British Columbia (2001) lists the Rocher Deboule area as having Regional Geochemical Stream sediments >95th percentile for Au, La, Fe, & Cu. The Rocher Deboule also contains geochemically anomalous values in Co, U and REE as well as most of the gangue minerals common to IOCG deposits. The deep-seated structural setting of the Rocher Deboule occurrence combined with a geochemical signature possibly similar to other IOCG deposits increases the potential for an IOCG-type high grade and tonnage resource at depth. The Rocher Deboule can be classified as a vein/replacement type of occurrence, but the geochemical signature similar to know IOCG deposits suggests that the consideration be given to deeper exploration for porphyry mineralization. The anomalous lanthanum defined by the BC Geological Survey regional stream sediment surveys for the area and the anomalous air magnetic pattern defined by the Geological Survey of Canada are good indicators of iron-oxide-copper-gold style mineralization. The historical air magnetic coverage for the Property and surrounding area is given in the Geological Survey of Canada Geophysics paper 5245**.** It should be noted that there is a large magnetic anomaly with a +6500 gamma high. The air magnetic anomalies for IOCG deposits can be regional and are related to magnetite and / or coeval igneous rocks.

In 1990 (George Cross Newsletter 1990) International Kengate Ventures Inc. reported the No. 2 Porphyry Zone about 366 metres to the north of the Rocher Deboule mine. It is thought that this zone may be the area of the No. 2 vein at the Victoria mine. This porphyry zone is reported as a hydrothermal zone that has “estimated” dimensions of 762 metres length, 610 metres in depth and 12.2 metres in width. Mineralization is reported from a surface trench that yielded values as high as 30.5 grams per tonne gold and 0.35% cobalt. The 1990 report must be treated as anecdotal in nature. However, it is significant that the area where this reported mineralization occurs could be coincident to a 9 metre wide feldspar porphyry dyke, which follows No.2 vein at Victoria mine and is, in part, altered to quartz-sericite -carbonate rock.

It must be stressed that the vein systems known on the Rocher Deboule Property could be part of a much larger hydrothermal system that are indicative of a porphyry copper (gold) system laterally or possibly at depth. Hydrothermal vein systems, like Rocher Deboule, can be outboard of a typical hydrothermally altered defined porphyry copper (gold) system. From an exploration concept further evaluation should be focussed to the west of the Rocher Deboule and Victoria mines towards and into the sediments (uJB) and volcanics (uKB) to define porphyry style mineralization and alteration.

9.0 Mineralization & Alteration

All of the mineral showings described in detail, with certain exceptions, on the Rocher Deboule Property comprise vein fillings of shear zones, normally in close proximity to the margin of the Rocher Deboule stock. These mineralized shears closely parallel one set of orthogonal joint pattern caused by the cooling of the stock. The veins all strike in a northeasterly to easterly direction and dip approximately 55 degrees to the north. The veins are found over significant lengths of shear zone, e.g., on the Highland Boy – Rocher Deboule system a strike length of perhaps 1500 metres is indicated. However, economic mineralization, as defined by mining on the Rocher Deboule mine, occurred over short strike lengths of 30 – 75 metres and was concentrated in near vertical shoots, e.g., the No. 4 vein at the Rocher Deboule mine.

9.1 Rocher Deboule Mine

Three distinct phases of mineralization defined in the different veins have been described by Southerland Brown (1960). These include:

1. The oldest and most widespread, a pegmatitic phase, formed veins composed principally of dark massive hornblende and glossy quartz with minor feldspar, apatite, magnetite, scheelite, tourmaline, ferberite, and molybdenite. This style of mineralization predominates on the Highland Boy, Great Ohio, and is locally well developed on No. 2 and No. 4 veins of the Rocher Deboule mine. The small amount of uraninite present, e.g., No. 2 vein Rocher Deboule, may belong to this phase.
2. The second stage forms the main phase of sulphide mineralization including principally chalcopyrite (No. 4 vein, Rocher Deboule), pyrrhotite (Great Ohio), but also locally significant amounts of arsenopyrite and cobalt-nickel sulpharsenides (Victoria vein) and pyrite. It appears that these minerals replace the hornblende and possibly the quartz and cavities. The sulphide content is variable, averaging 5-10% and ranging up to 89-90% over 0.5-1.0 metres. Quin (1987) suggests that there may some evidence for regional zoning of the sulphides from the interior of the pluton where pyrrhotite-chalcopyrite predominate (Great Ohio and Highland Boy) to chalcopyrite and pyrite at the pluton margins (No. 4 vein, Rocher Deboule) to sulpharsenides in the sediments outside the pluton (Victoria vein). Precious metals are associated with the sulphides of this phase.
3. The third and final stage of mineralization cross cuts the earlier stages. Mineralization consists of milky quartz with main sulphides of tetrahedrite, galena, and pyrite and possibly chalcocite. Gangue minerals fillings consist of combs of quartz containing siderite and calcite. The eastern end of No. 2 vein at Rocher Deboule mine is the best example of this phase.

All three phases can overlap, especially at the western and eastern ends of No. 2 vein at the Rocher Deboule mine on the 1200 and 950 levels, respectively. The precious metals appear to be distributed among several minerals, but principally the iron-cobalt sulpharsenides and arsenides, tetrahedrite, and chalcopyrite. Phases three and two are the main precious metal carriers with the of phase three minerals carrying most of the silver.

Southerland Brown reports that the granodiorite wall rock alteration is slight except for seemingly late magmatic or early hydrothermal alteration. This alteration involves a net removal of dark minerals adjacent to joints, giving the effect of bleaching, and in some places is balanced by deposition of hornblende with quartz and feldspar and rare tourmaline in veinlets within the joints and in larger amounts within the vein shears. This alteration is related in distribution to the main vein systems and in intensity to value within the veins. The zone of bleaching and alteration is on the footwall side of the veins, in joints that are sub parallel in strike to the veins and mostly sub parallel to dip.

9.2 Victoria Mine

At the Victoria mine and showings the vein material consists principally of cobalt-nickel arsenides in hornblende gangue with glassy quartz and feldspar. Additional minerals include molybdenite, uraninite, apatite, sphene, allanite, and rare scapolite. Secondary minerals include erythite and possibly autunite. The cobalt-nickel sulpharsenides are complex and variable. They occur in discrete crystals within hornblende and in quartz-feldspar veinlets in the hornblende veins and as streaks and lenses of massive sulpharsenides. The gold is contained in the sulpharsenides. The molybdenite and uraninite tend to occur erratically in the pegmatitic phases of the hornblende veins but also occur in the walls. Alteration of the wall rock is minor, but in several places the granodiorite and fine diorite dyke have undergone patchy alteration to a sericite-quartz-carbonate rock. Also, a 9 metre wide feldspar porphyry dyke, which follows No.2 vein, is in part altered to quartz-sericite -carbonate rock.

10.0 Exploration

10.1 Introduction

Exploration at the Rocher Deboule and Victoria mines covers the period commencing in the early 1900's through to 2007. Historical exploration data, that is reliable, documented and available, falls into two general periods including the 1950's and 1987- 1990 and is summarized in **Item 6** along with mine production and detailed in this **Item 10**. Exploration completed by the Issuer, Rocher Deboule Minerals Corp., was done in 2001,2002, 2004, and 2007and is detailed in **Item 10.4.**

At the Rocher Deboule mine underground channel sampling results for the two main phases of **historical** sampling, the Western Uranium Cobalt Mines Ltd. (1952 program) and the Southern Gold Resources Ltd. (1987 program) for mineral tenure 510469 are summarized in **Table 10-1** and the details are given in **Tables 10-2**. The location of the results is given in **Figure 10-1.**

TABLE 10-1
HISTORICAL SUMMARY OF UNDERGROUND ASSAY VALUES – AREAS A TO Z FOR 950, 1002, & 1202 LEVEL DRIFTS, ROCHER DEBOULE MINE NO. 1, 2, 3, & 4 VEINS

(NOTE-AREA 'W' SAMPLES TAKEN FROM SURFACE NEAR PORTAL AT 950 LEVEL DRIFT)

Sources: Area 'A'-'G', M.W. Jasper (1952) & Area 'V'-'Z', Quin (1987)

Note Figure 10-1 for Sample & Area Locations

Area & (Level) Vein No.	Average Width	*Length of Drift Sampled	Weighted Average % Cu	Weighted Average Grade -Ag Oz/Ton (gram/ tonne)	Weighted Average Grade – Au Oz/Ton (gram/tonne)
		Western Uranium Cobalt Mines Ltd.			
'A' (950) Vein 2	38.3 inches (97.2 cm)	68.8 feet (20.96 metres)	6.22	4.14 (141.9)	0.154 (5.28)
'B' (1002) Vein 2	43.3 inches (110.1 cm)	75.0 feet (22.86 metres)	3.86		
'C' (1002) Vein 2	30.7 inches (77.9 cm)	60.4 feet (18.41 metres)	4.03		
'D' (1050) Vein 2	43.06 inches (109.37 cm)	130.0 feet (39.62 metres)	3.12		
'E' (1202) Vein 2	43.3 inches (110.1 cm)	195.0 feet (59.44 metres)	0.32		
'F' (1202) Vein 2	18.7 inches (47.4 cm)	20.8 feet (6.34 metres)	3.00	3.73 (127.9)	0.086 (2.95)
'G' (1202) Vein 2	31.4 inches (79.87 cm)	180.0 feet (54.86 metres)	0.30		
		Southern Gold Resources Ltd.			
'V' (1201) Vein 1	41.9 inches (106.3 cm)	45.9 feet (14.0 metres)	0.71	0.95 (32.6)	0.010 (0.34)
'W' (950) Vein 2	13.12 inches (33.33 cm)	164.0 feet (50 metres)	5.44	3.20 (109.7)	0.593 (20.33)
'X' (1002) Vein 2	49.83 inches (126.6 cm)	183.7 feet (56 metres)	2.33	11.83 (390.2)	0.283 (9.70)
'Y' (1203) Vein 3	37.6 inches (95.5 cm)	32.8 feet (10 metres)	0.11	0.83 (28.5)	0.005 (0.17)
'Z' (1204) Vein 4	32.8 inches (83.3 cm)	242.8 feet (74 metres)	0.01	0.01 (0.3)	0.001 (0.03)

Note- Blank space indicates sample was not assayed for precious metals.

On the 950, 1002, 1050 and 1200 Levels on the eastern part of the No.2 vein high (>3%) copper and locally high gold values (3-20 grams/tonne) over significant strike lengths of 14 to 50 meters across widths of 0.33 to 1.10 metres are defined.

The sampling results of Southern Gold from Quin (1987) and Quin (1988) for the west portions of the No. 2 vein on the 1000, 1100, and 1200 Levels on mineral tenure 374216 are given in **Figures 10-3 through 10-5**.

On the down dip part of No. 2 vein at its western end, on the 1200 Level, Southern Gold has defined high grade gold values, varying from 1.44 to 112.64 g/t, silver values from 142 to 1459 g/t, and higher grade copper values generally greater than 3%. **Note Figure 10-3**. On the 1100 Sub Level, for mineral tenure 374216, the full length of about 48 meters of vein on this sub level was sampled as indicated in **Figure 10-4.** The vein varies from 0.66 to 1.85 meters in width and copper values range from 1.28 to 9.66%, silver values range from 32.23 to 1083.9 g/t and gold from 0.72 to 28.84 g/t. On the 1000 Level results are given on **Figure 10-5** for mineral tenure 374216.

The eastern and western parts of the No.2 vein are worthy of future exploration. Extensive surface exploration, completed by Southern Gold in 1987, is reported in **Item 10.3** suggest additional targets occur on the relatively unexplored #1, #2A, and #3 Veins as well as dip and strike extensions of the #2 vein. The No. 4 vein is open to the east and west of the Rocher Deboule mine as defined by geophysics and mapping. Also, numerous geophysical and geochemical targets defined by Southern gold remain to be evaluated for vein mineralization.

10.2 Rocher Deboule Historical Exploration / Development

Mine development completed on Rocher Deboule is detailed in **Item 6.** The last period for mine production at Rocher Deboule was 1952. Extensive underground chip and channel sampling was completed by Western Uranium Cobalt Mines Ltd. during 1951 and 1952 in anticipation of mining. The results for back channel samples taken perpendicular to the vein trends are given for several sections of the No. 2 vein where no mining has subsequently taken place as determined by review of longitudinal stope sections. Mine plans and stope outlines vein sections are indicated on **Figures 10-1** & **10-2 and** results on pre 1987 work on **Tables 10-1** and **10-2**

Sutherland Brown (1960) in the late 1950's, after mine production had ceased, completed through the then British Columbia Department of Mines and Energy, an underground geological mapping and compilation of the Rocher Deboule mine. The results of this geological mapping program are discussed in **Item 7.3** and **Figures 10-1** and **10-2** illustrates the results in relation to geology and vein location.

10.3 Southern Gold 1987 – 1990: Rocher Deboule Historical Underground & Surface

In the period of 1987 through 1990 Southern Gold Resources Ltd. was active on the Property. During 1987 and 1988 both underground and surface channel sampling was completed for the Rocher Deboule mine. This work cumulated in the completion of a resource estimate in early 1989 that is discussed in **Item 6.8.** Underground work concentrated on the No. 2 vein although limited sampling was done on the No. 1., 2A, 3, and 4 veins. The following descriptions and assay data is taken from Quinn (1987) and Quinn (1989). Most of the work was done on the No. 2 vein from the 1200 level although a limited amount of sampling, on this vein, was done on the upper 950, 1050 and 1100 levels. Very limited sampling work has been done on the No. 1, No. 3, and No. 4 veins. The exploration results are broken into vein number for the respective levels.

No. 1 Vein

Results are given in **Figure 10-1** and **Table 10-3** on the 1200 Level under Area V on mineral tenure 510469**.** Here a 14.0 m length of vein averaging 1.06 meters wide and weight averages 5.44% Cu, 32.6 g/t Ag, and 0.34 g/t Au base on three channel samples.

No. 2 Vein

On the 1200 Level, for mineral tenure 374216, on the western end of the 1202 level drift an 85-meter length of vein contains high-grade Cu-Ag-Au mineralization. The vein varies from 0.40 to 1.27 meters wide. **Note Figure 10-3.** Copper ranges from 2.1 to 14.87%, silver from 141.96 to 1454.9 g/t and gold from 1.44 to 112.64 g/t.

On the 1100 Sub Level, for mineral tenure 374216, the full length of about 48 meters of vein on this sub level was sampled as indicated in **Figures 10-1 and Figure 10-4.** The vein varies from 0.66 to 1.85 meters in width and copper values range from 1.28 to 9.66%, silver values range from 32.23 to 1083.9 g/t and gold from 0.72 to 28.84 g/t. The grade can be described as relatively medium grade copper and silver and lower grade gold mineralization. Sixteen (16) channels have been taken

On the 1050 sub level for mineral tenure 510469 results give 23.20 meters of exposed vein with a width of 0.48 to 1.30 meters wide. The sampling is based on six channel samples as illustrated in **Table 10-4**

On the 1000 Level results are given on **Figure 10-1** and **Table 10-3** under Area X on mineral tenure 510469. Here 56 meters of vein length averages 1.266 meters wide and grades 2.33% Cu, 390.2 g/t Ag, and 9.70 g/t Au based on nine channel samples.

On the 1000 Level results are given on **Figures 10-1 and 10-5** for mineral tenure 374216. Here an approximate 90-meter length of vein on the west end of the 1002 drift varies from 0.53 to 1.40 meters wide. Copper grades ranges from 1.31 to 6.98 %, silver ranges from 26.7 to 396.4 g/t, and gold ranges from 1.51 to 5.80 g/t based on 18 channel samples

On the 950 Level results are given on **Figure 10-1** and **Table 10-3** under Area W on mineral tenure 510469. Here 50.0 meters of vein length averages 0.333 meters wide and grades 5.44% Cu, 109.7 g/t Ag, and 17.3 g/t Au base on three channel samples. Due to the sparse sampling the results are not representative of this 50 meters of vein length.

No. 2A Vein

This vein was defined on surface by strong and anomalous geophysics and geochemistry in 1987. Follow up work in 1988 consisted of the plotting of cross sections to define that this area would tie-in with the reported No. 2A vein on the 1000 Level. Examination of where the vein comes to surface revealed a 0.49 meter wide vein with significant copper, lead, zinc, and silver values in a quartz-tetrahedrite-pyrite-chalcopyrite matrix. Sampling of the vein on surface returned the results given below**.** The vein varies in width from 0.21 to 0.51 meters in width. Note **Table 10-5**

No. 3 Vein

Results are given in **Figure 10-1** and **Table 10-3** on the 1200 Level Crosscut under Area Y on mineral tenure 510469**.** Here a 10.0 m length of vein averaging 0.955 meters wide and weight averages 0.11% Cu, 28.5 g/t Ag, and 0.17 g/t Au based on two channel samples.

No.4 Vein

Results are given in **Figure 10-1** and **Table 10-3** on the 1200 Level Crosscut under Area Z on mineral tenure 510469**.** Here a 74.0 m length of vein averaging 0.833 meters wide and weight averages 0.01% Cu, 0.3 g/t Ag, and 0.03 g/t Au based on four channel samples.

Surface channel sampling of No. 4 Vein done in 1987 is illustrated in **Table 10**-**6** and sample locations are indicated in **Appendix A**

Quin (1988) concluded that based on a brief examination of this vein that significant resource potential may remain. And further work is merited of existing workings and exploration along trend and down dip.

Resource Estimation

A detailed historical “reserve” estimate was completed by Quin (1988) at the completion of the underground exploration in 1988 on the Rocher Deboule mine. This is detailed in **Item 6.8**.

Surface Exploration

Southern Gold also undertook a surface sampling and geological mapping program over the No. 2 and No. 4 veins on north-south grid lines 100 metres apart; geological mapping (1:2500 scale) is given on **Appendix A.** They also completed a 1:5000 scale contoured base map and extensive ground geochemical and ground geophysical surveys. A summary and interpretation of the results is given in **Figure 10-6**

Additional surface exploration consisted of geochemical soil surveys for gold, silver, arsenic, lead, zinc and copper, geophysical ground magnetic, and VLF electromagnetic surveys, all at a 1:2500 scale, over an area of approximately 1 square kilometre that was centred on the known strike and dip extensions of the known veins (No. 1 through 4) that have been developed and mined on the property. The results of these surveys are available through assessment reports by Quin (1987) and Pezzot (1987). Geochemical in-situ gold, silver, copper, arsenic, lead and zinc defined anomalous extensions and vein projections. The results for gold/silver and copper/arsenic soil surveys are given in Quin (1987) and the soil geochemistry for gold is given in **Figure 10-7**. Geophysical very low frequency (VLF) and magnetic surveys also were useful in defining structure that is favourable to hosting of the precious-base metal quartz-sulphide veins. A number of small isolated magnetic lows are observed within the stock which likely reflect localized areas of increased fault activity and probably define the vein-shear zones. Also. Alternating narrow bands of moderately conductive and resistive materials are aligned at 075 degrees across the main survey grid (Pezzot 1987) – these conductive zones are probably related to the mineralized shear-vein zones already known and to new undefined zones. The

No. 4 vein is open to the east and west of the Rocher Deboule mine as defined by geophysics and mapping. Southern Gold also completed reconnaissance talus fines sampling on the eastern side of the property.

From VLF-EM conductivity data, the main follow up targets occur within 200 meters of the intrusive contact with the volcanic/sediment country rock at 1,600-1,750 m (5,248-5,740 ft) elevation (approx. 50-150 m from the #4 Vein). Data compilation suggests additional targets occur on the relatively unexplored #1, #2A, and #3 Veins as well as dip and strike extensions of the #2 Vein. A geophysical compilation is taken from Quin (1988) and is given as **Figure 10.8**.

10.4 Rocher Deboule Mineral Corp. 2001-2002, 2004, & 2007 Exploration

2001/2002, 2004 Exploration

The rock sampling and stream sediment sampling locations for 2001/2002, 2004 and 2007 are illustrated on **Figure 10-9** and **Tables 10-7** through **10-9**.

Geological surveying and geochemical rock and stream sediment sampling was carried out over parts of the former Rocher Deboule and Victoria mines during the period of October 2001 and May 2002 by Mr. Andris Kikauka, P.Geo. on behalf of Rocher Deboule Minerals Corp. (Kikauka 2002). These results are discussed in detail in this report. The cost of this exploration work was in the order of $ 4000. During June and August 2004 (Kikauka 2004) Rocher Deboule spent $9725 on mineral exploration that was used for claim assessment.

An area of 0.7 X 1.0 km (70 hectares) was mapped in a reconnaissance fashion at a scale of 1:5,000. A global positioning satellite instrument was used for locating outcrop stations, as well as stream sediment and rock chip sample locations.

A total of 6 silt fraction stream sediment samples were taken from RD 1 & 3 claims (now Mineral Tenure 510469) at an elevation ranging from 1,380- 1,660 metres. Samples were taken with a shovel from active stream channels and were wet screened through -20 mesh screens. Stream sediment samples were placed in marked kraft envelopes and shipped to Pioneer Labs, Richmond, B.C. for 30 element Induced Couple Plasma (ICP) and gold geochemical analysis.

A total of 18 rock chip samples were taken from RD 1 and 3 claims (now part of Mineral Tenure 510469) at an elevation ranging from 1,380- 1,860 metres. The rock samples were taken across widths ranging from 0.2- 0.8 metres. Rock chip samples consisted of acorn to walnut sized chips taken with rock hammer and maul averaging 2.5 kg in weight. Samples were placed in marked poly bags and shipped to Pioneer Labs, Richmond, B.C. for 30 element Induced Couple Plasma and gold geochemical analysis.

The 2001/2002 rock sample and stream sediment locations are given on **Figure 10-9** and results on **Table 10-7.** Rock chip samples taken from Rocher Deboule are AR1-13, and AR-18 whereas the Victoria Vein is AR 14-17.

Aside from the expected Cu-Ag-Au values of economic interest, which returned values up to 14.8 g/t Au, >10% copper, and 399.6 g/t silver, the Rocher Deboule 2, 3 and 4 Veins contain variable molybdenite, sphalerite, arsenopyrite and safflorite (which accounts for geochemically anomalous Mo-Zn-Co-As). Also, AR-8 and 9 contain 5,227 and 1,658 ppm La that is a pathfinder element for Iron Oxide-Copper Gold mineralization.

Kikauka reports a noticeable lack of copper bearing sulphide mineralization in the Victoria No. 1 vein. The elevated Au-Mo-Co-As is consistent with values obtained by previous work. The geochemically anomalous bismuth values suggest the Victoria No. 1 vein contains variable bismuthinite. The Victoria Vein, represented by samples AR 14-17, have an average geochemical analysis value >100 ppm uranium. The background values of uranium from samples taken from the Victoria No. 1 Vein is about 4 times greater than that of the Rocher Deboule No. 2,3 & 4 vein samples with the exception of AR-11, a rock chip sample taken from Rocher Deboule No. 4 Vein, that contains 405 ppm uranium.

The higher gold-silver values obtained from ST-5 (1,640 ppb gold and 160.9 ppm silver) correspond to elevated Cu-Pb-Zn-As-Co values and occur in the same area that Southern Gold located anomalous gold in soil (Quin 1987). This is located near Portal 100 on the Rocher Deboule No. 4 vein and is considered a prime area of exploration. Stream sediment samples ST-3 and ST-6 were taken from the larger creek that drains the valley between the Highland Boy and Rocher Deboule workings. ST-3 contains elevated Cu-Au-Ag values and ST-6, which was taken at higher elevation, contains elevated copper and low gold-silver values.

Exploration in 2004 was conducted by Kikauka (2004). This exploration focused on limited sampling and a small ground magnetic survey. This included three sediment samples in the vicinity of the Highland Boy mine (Mineral Tenure 510469). A further three rock chip samples from the vicinity of the No. 4 vein of the Rocher Deboule mine and four rock chip (AR 1–AR 4 samples from the Highland Boy mine were taken over widths of 0.2 to 0.6 m. Also 10 soil samples in the vicinity of the Highland Boy vein showing were taken some 2 kilometers east of the Rocher Deboule veins. Note **Figure 7.2** for Highland Boy showing and **Figure 10-9** and **Table 10-8** for location of samples and results.

At the Cap showing a northwest trending 300 meter sol line was established where seven (7) soil samples (C soil horizon) were taken. No significant base or precious metal results were obtained.

The sediment and rock sampling procedure and handling were treated identically to the 2002 sampling. The soil samples were taken from 0.3 to 0.55 m depth and averaged 0.5 kg in weight. Samples were placed in marked kraft bags and shipped to Acme Labs in Vancouver, BC and Pioneer Labs in Richmond, BC for 30 element ICP and Gold geochemical analyses.

The rock sample from the No. 4 Vein and the Highland Boy veins were analyzed geochemically and the results were all in excess of 10,000 ppm copper, from 0.79 to 1.80 g/t gold and 7.1 to 100 g/t silver and were similar to similar to the 2002 and historical results. The sediment results were from the stream in the vicinity of the Highland Boy Lower Vein and this returned anomalous copper (143 to 537 ppm), one anomalous arsenic value of 1437 ppm and gold values of 64.7 and 265.7 ppb. The soil sample results from the Highland Boy showing area returned highly anomalous copper (1757 to >10,000 ppm), anomalous silver and arsenic and moderate to highly anomalous gold (46 to 11,131 ppb.). The soil samples indicate known vein mineralization of the Upper and Lower Veins.

The 2004 ground magnetometer survey consisted of 3.3 line kilometers. The grid was oriented in a 030 degrees bearing with grid lines at 50 meter and 100 meter spacings; magnetic readings were done every 12.5 metres. The survey defined strong, positive total field values on the west edge of the grid area along the Highland Boy upper and lower veins. It appears that magnetite is found with and related to the Cu-Ag-Au bearing carbonate-sulphide fissure veins of the Highland Boy upper and lower veins. The Chicago Creek Fault transects the centre of the grid and is conspicuous as a magnetic low. The north end of the grid contains a broad magnetic high that requires further field investigations.

2007 Exploration

During 2007 Rocher Deboule conducted limited prospecting and rock and soil sampling, a large area Dighem airborne geophysical survey by Fugro airborne Surveys Corp., a remote sensing analysis by John L. Berry, a small area ground magnetometer survey, and a diamond core drilling program of 1106.1 meters over 6 drill holes on the Highland Boy Showing in August and September 2007. The diamond drilling program is discussed in **Item 11**. The cost of this exploration during 2007 is $705,000.

The prospecting and rock sampling involved collecting a total of 41 grab and chip samples and 6 soil samples. The work was done by Andris Kikauka, P.Geo., Sean Derby, Geologist, and Dan Ethier, Geological Technologist. A majority of the sampling of the work was concentrated on the Highland Boy Showing with lesser amounts on the Golden Wonder and Cap showings and on the Rocher Deboule and Victoria mines. The work done by Sean Derby include 18 grabs and chips (RD07-001 to 018 series) directed to analyses of Iron Oxide-Gold-Copper (IOGC) metals of gold, nickel, copper, iron, cobalt, and rare earth metals. Some of the samples were quite anomalous in La, Nd, and U in support of IOGC mineralization environment as reported in **Table 10-9**. The analytical results and location of the samples are illustrated in **Figure 10-9** and results are given in **Table 10-9.** The results for the sampling, for the most part, give exceedingly high and anomalous values for copper, silver, and gold. Locally there are anomalous concentrations of arsenic, cobalt, nickel, iron, molybdenum and tungsten. Most of the mineralization, where described, defines veins of narrow width (mostly less than 1 meter) containing massive sulfides minerals of pyrite, and chalcopyrite associated locally with magnetite at the Highland Boy showings. These results are consistent with previous sampling programs completed during 2001/2002 and 2004.

A focus of the 2007 exploration work was on the Highland Boy Cu-Ag-Au mineral occurrence, which features two 090 to 120 degrees trending and steeply north dipping quartz-sulphide-iron oxide fissure veins that outcrop in rugged terrain at 1768 to 1980 meter elevation. The southernmost vein zone is traced west along surface to the No. 4 Rocher Deboule No. 4 vein. The Highland Boy veins contain massive and banded chalcopyrite, coarsely crystalline magnetite, and pyrite in a gangue of quartz, calcite, dolomite, hornblende, tourmaline, actinolite, sericite, biotite and chlorite. Additional prospecting in the vicinity of the two main veins led to the discovery of several parallel and perpendicular quartz-sulphide zones where 15 rock chip samples were taken that include grabs and chip samples across widths from 0.1 to 1.5 meters. From a 200 by 300 meter area located in the cliff area west of the 2007 drill site. In addition six soil samples were taken along the west extension of the Highland Boy Vein at 50 meter spacing.

As noted above the Highland Boy upper and lower veins were the focus of the 2007 exploration program, in order to determine the correlation between the 2000-3000 nT total magnetic field anomaly and nearby mineral trends on the Highland Boy Upper Vein. A ground magnetometer survey of six cross lines totaling 2.5 line kilometers was completed with readings at 12.5 meter centers. The baseline was oriented 120 degrees and the respective cross lines at 030 degrees. The survey adjoined and was to the west of the 2004 ground magnetometer survey.

Results from rock chip sampling of the Highland Boy Upper Vein indicate there is a relatively low arsenic-antimony values with elevated values of Cu-Ag-Au-Fe. The iron notably occurs as magnetite, and the magnetometer geophysical performed in 2004 clearly shows a direct correlation between the vein and the magnetic anomaly. The magnetite zone is also verified by the DIGHEM airborne magnetic survey of Fugro Airborne Surveys Corp. (note below) and correlates closely with Cu-Ag-Au bearing sulphide mineralization of the Highland Boy Upper Vein.

From July 7 to 17, 2007 Fugro Airborne Surveys Corp. (Fugro, 2007) completed a DIGHEM airborne geophysical survey over the Rocher Deboule Property in a survey block amounting to 1089 line kilometers. The purpose of the survey was to detect zones of conductive mineralization and to provide information that could be used to map geology and structure of the survey area. This was accomplished by using a DIGHEM multi-coil, multi-frequency electromagnetic system, supplemented by a high sensitivity cesium magnetometer and a 256-channel spectrometer. The information from these sensors was process to produce maps that display the magnetic, radiometric and conductive properties of the survey area. A series of eight colored maps illustrating the data include Total Magnetic Field, Calculated Vertical Magnetic Gradient, Radiometric Total Counts, Radiometric Potassium Counts, Radiometric Thorium Counts, Radiometric Uranium Counts, and Apparent Resistivity 56,000 Hz, and Apparent Resistivity 72,000 Hz. The report provided by Fugro gives only a brief description of the survey results and mostly describes the equipment, data processing procedures, and logistics of the survey. The various maps noted above display the magnetic, radiometric and conductive properties of the survey area. A complete assessment and detailed evaluation of the survey results remain to be carried out in conjunction with all available geophysical, geological, and geochemical information. Once this has been done consideration can be given to additional processing of existing geophysical data in order to extract the maximum amount of information from the survey results. The geophysical surveys remain to be evaluated by the Rocher Deboule geological staff. The Total Magnetic Field, Radiometric Total Counts, and Apparent Resistivity, 7200 Hz are illustrated in **Appendix B**.

The Remote Sensing Analysis of the Rocher Deboule Area given to the writers does not contain any text report but a series of color slides. The veins, dykes and faults from the study are included in the Fugro (2007) survey maps discussed above.

10.5 Victoria Mine

Sutherland Brown (1960) completed geological mapping, sampling, and compiled available results for the Victoria Mine. The workings consist of five adits, one raise and sub-level, and a number of open cuts. All of the underground workings are on the No. 1 vein, the most northerly of three 080 trending and dipping 60 north, parallel veins; these veins comprise the main showings at the Victoria Mine. **Figure 10-10** is a plan of a chain and compass survey compiled by Southerland Brown (1960) and Stevenson (1949). This figure illustrates the workings on the No. 1 vein from the lowest adit, No. 3, at elevation 1576 metres to the highest adit, No.00, at about 1799 metres, and No. 1 open cut on the ridge at 1860 metres. Open cuts No. 2 & No. 4 are further east on the serrated ridge top. Workings on No. 2 and No. 3 veins consist of a few open cuts.

These results are illustrated on **Figure 10-10** and **Table 10-10**. The sampling results are a compilation from Stevenson (1949) (samples 1-38), Kindle (1954) (samples K1-K7), and Sutherland Brown (1960) (B1-B3). The Victoria mine was inactive until 1978 when Arber Resources Inc. constructed an access road to the 1,265-metre elevation and rehabilitated two adits at the 1,605 metre and 1768 metre elevations. At the same time DeGroot Logging were working on adjacent ground, not under lease to Arber Resources, and conducted an unsuccessful diamond drilling program which is reported in **Item 11.**

10.6 Conclusions

Exploration since 1952 has focussed on definition of the known gold-silver-copper quartz-sulphide veins on the Rocher Deboule Property. These veins are locally of very high grade and extend over significant strike and dip lengths, up to 1500 and 200 metres, respectively. The veins are relatively narrow but local steeply dipping “ore shoots” can be of high grade as defined by historical mining. The underground channel sampling results given in this **Item** provide an indication of the expected precious and base metal grades. Surface geological, geochemical (in-situ soil gold, copper and arsenic) and geophysical (electomagnetics and magnetics) exploration survey also define the surface expression of the veins and can provide good exploration targets for further follow-up, including drilling, to expand the known and potential new veins. The following targets are worthy of further exploration:

- On the 950, 1002, 1050 and 1200 Levels on the eastern part of the No.2 vein high (>3%) copper and locally high gold values (3-20 grams/tonne) over significant strike lengths of 14 to 50 meters across widths of 0.33 to 1.10 metres are defined. The eastern part of the No.2 vein is worthy of future exploration.
- On the 1200 Level, on the western part of the No. 2 vein, locally high grade gold, silver, and copper values are present whereas on the 1100, 1050, 1000, and 950 sub levels and levels and moderate grade copper, silver, and gold grades are present.
- The No. 4 vein is open to the east and west of the Rocher Deboule mine as defined by geophysics and mapping.
- Data compilation suggests additional targets occur on the relatively unexplored #1, #2A, and #3 Veins as well as dip and strike extensions of the #2 Vein.
- Numerous geophysical and geochemical targets defined by Southern Gold remain to be evaluated for vein mineralization.

Finally, only limited attention, is given or mentioned concerning inter-vein mineralization and alteration in the reports reviewed. Further surface geological mapping should focus both on the vein style mineralization and its extensions and on the recognition and definition of hydrothermal alteration of large tonnage, albeit, low-grade bulk tonnage porphyry copper (gold) and/or iron oxide-copper-gold (IOCG) style mineralization. The anomalous lanthanum defined by the BC Geological Survey regional stream sediment surveys and the anomalous La, Nd and U defined by Rocher Deboule rock sampling on the Property and the anomalous air magnetic pattern defined by the Geological Survey of Canada, as outlined in **Item 8,** can be good indicators of iron-oxide-copper-gold style mineralization.

TABLE 10-2
HISTORICAL COPPER, SILVER & GOLD ASSAY VALUES - 950, 1002 & 1202 LEVEL DRIFTS
ROCHER DEBOULE MINE, NO. 2 VEIN – WESTERN URANIUM COBALT MINES LTD. DATA

(Source: Jasper, 1952)

Note Figure 10-1 for "Area" Locations

AREA 'A': Underground Drift Level 950

Sample No.	Width: Inches, (cm)	Drift Level	% Cu	Oz/ Ton Ag	Oz/ Ton Au
391	14 (35.6)	950	1.50	2.80	0.030
390	24 (61.0)	950	2.90	6.00	0.160
389	20 (50.8)	950	1.20	1.60	0.150
388	44 (111.8)	950	4.10	2.40	0.120
387	72 (182.9)	950	6.70	3.80	0.070
386	28 (71.1)	950	9.50	12.10	0.240
385	32 (81.3)	950	10.20	1.90	0.560
384	72 (182.9)	950	7.40	3.80	0.070
	Average Width	*Length of Drift sampled	Weighted Average % Cu	Weighted Average	Weighted Average
Imperial	**38.3 inches**	**68.8 feet**	**6.22**	**4.14 opt Ag**	**0.154 opt**
Metric	**97.2 cm**	**20.96 metres**	**6.22**	**141.9 g/t Ag**	**5.28 g/t Au**

Note- Blank space indicates sample was not assayed for precious metals.
*Fence pattern sampled @ 3-5 m sample spacing.

AREA 'B': Underground Drift Level 1002

Sample No.	Width: Inches (Centimetres)	Drift Level	% Cu	Oz/Ton Ag	Oz/Ton Au
156	60 (152.4)	1002	4.52		
413	44 (111.8)	1002	2.60	4.30	0.850
157	48 (121.9)	1002	1.40		
412	46 (116.8)	1002	5.80	3.90	0.030
158	55 (139.7)	1002	0.67		
411	48 (121.9)	1002	4.10	9.50	0.150
159	48 (121.9)	1002	6.81		
410	32 (81.3)	1002	5.10	8.90	0.090
160	47 (119.4)	1002	2.23		
409	30 (76.2)	1002	6.80	12.80	0.060
161	58 (147.3)	1002	1.71		
162	45 (114.3)	1002	3.53		
	Average Width	*Length of Drift sampled	Weighted Average % Cu		
Imperial **Metric**	**43.3 inches** **110.1 cm**	**75.0 feet** **22.86 metres**	**3.86**		

Note- Blank space indicates sample was not assayed for precious metals.
*Fence pattern sampled @ 3-5 m sample spacing.

TABLE 10-2 cont

AREA 'C': Underground Level 1002

Sample No.	Width: Inches (Centimetres)	Drift Level	% Cu	Oz/Ton Ag	Oz/Ton Au
414	34 (86.4)	1002	2.50	8.40	0.060
148	33 (83.8)	1002	6.29		
147	51 (129.5)	1002	5.20		
150	32 (81.3)	1002	2.13		
23W	18 (45.7)	1002	0.90		
151	24 (61.0)	1002	3.53		
152	42 (106.7)	1002	3.49		
153	24 (61.0)	1002	7.54		
154	18 (45.7)	1002	3.22		
	Average Width	*Length of Underground drift sampled	Weighted Average % Cu		
Imperial **Metric**	**30.7 inches** **77.9 cm**	**60.4 feet** **18.41 metres**	**4.03**		

Note- Blank space indicates sample was not assayed for precious metals.
*Fence pattern sampled @ 3-5 m sample spacing.

AREA 'D': Underground Level 1050

Sample No.	Width: Inches (Centimetres)	Drift Level	% Cu	Oz/Ton Ag	Oz/Ton Au
180	72 (182.9)	1050	1.76	8.40	0.060
179	36 (91.4)	1050	2.23		
178	36 (91.4)	1050	4.00		
177	54 (137.2)	1050	3.79		
176	58 (147.3)	1050	8.37		
175	60 (152.4)	1050	8.58		
174	24 (61.0)	1050	7.95		
173	40 (101.6)	1050	1.61		
172	30 (76.2)	1050	1.19		
171	30 (76.2)	1050	1.61		
170	42 (106.7)	1050	3.84		
169	38 (96.5)	1050	1.87		
168	36 (91.4)	1050	1.19		
167	54 (137.2)	1050	0.72		
181	32 (81.3)	1050	0.83		
182	36 (91.4)	1050	0.72		
166	54 (137.2)	1050	0.41		
	Average Width	*Length of Drift sampled	Weighted Average % Cu		
Imperial **Metric**	**43.06 inches** **109.37 cm**	**130.0 feet** **39.62 metres**	**3.12**		

Note- Blank space indicates sample was not assayed for precious metals.
*Fence pattern sampled @ 3-5 m sample spacing.

AREA 'E': Underground Level 1202

Sample No.	Width: Inches (Centimetres)	Drift Level	% Cu
93	18 (45.7)	1202	0.35
94	22 (55.9)	1202	0.10
95	24 (61.0)	1202	0.10
96	37 (94.0)	1202	0.35

97	18 (45.7)	1202	0.51
98	24 (61.0)	1202	0.10
99	18 (45.7)	1202	0.20
100	30 (76.2)	1202	0.25
101	33 (83.8)	1202	0.15
102	31 (78.7)	1202	0.96
	Average Width	*Length of Drift sampled	Weighted Average %Cu
Imperial **Metric**	**43.3 inches** **110.1 cm**	**195.0 feet** **59.44 metres**	**0.32**

Note- Blank space indicates sample was not assayed for precious metals.
*Fence pattern sampled @ 3-5 m sample spacing.

AREA 'F': Underground Level 1202

Sample No.	Width: Inches (Centimetres)	Drift Level	% Cu	Oz/Ton Ag	Oz/Ton Au
402	28 (71.1)	1202	0.80	4.60	0.020
401	14 (35.6)	1202	8.20	2.20	0.200
400	14 (35.6)	1202	2.20	3.50	0.105
	Average Width	*Length of Drift sampled	Weighted Average % Cu	Weighted Average	Weighted Average
Imperial **Metric**	**18.7 inches** **47.4 cm**	**20.8 feet** **6.34 metres**	**3.00**	**3.73 oz/ton Ag** **127.9 g/t Ag**	**0.086 oz/ton Au** **2.95 g/t Au**

Note- Blank space indicates sample was not assayed for precious metals.
*Fence pattern sampled @ 3-5 m sample spacing.

AREA 'G': Underground Level 1202

Sample No.	Width: Inches (Centimetres)	Drift Level	% Cu
260-261	65 (165.1)	1202	0.62
81	31 (78.7)	1202	0.51
265-266	53 (134.6)	1202	0.41
82	30 (76.2)	1202	0.15
269-271	61 (154.9)	1202	0.23
83	16 (40.6)	1202	0.05
274	28 (71.1)	1202	0.15
84	12 (30.5)	1202	0.10
275	30 (76.2)	1202	0.15
85	16 (40.6)	1202	0.00
276	42 (106.7)	1202	0.10
86	22 (55.9)	1202	0.30
277	14 (35.6)	1202	0.35
87	16 (40.6)	1202	0.20
278	20 (50.8)	1202	0.40
88	11 (27.9)	1202	0.20
279	48 (121.9)	1202	0.20
280	51 (129.5)	1202	0.45
	Average Width	*Length of Drift sampled	Weighted Average % Cu
Imperial **Metric**	**31.4 inches** **79.87 cm**	**180.0 feet** **54.86 metres**	**0.30**

Note- Blank space indicates sample was not assayed for precious metals.
*Fence pattern sampled @ 3-5 m sample spacing

TABLE 10-3
COPPER, SILVER & GOLD ASSAY VALUES - 950 (surface), 1002 & 1201 LEVEL DRIFTS
ROCHER DEBOULE MINE, NO. 1, 2, 3, 4 VEINS – SOUTHERN GOLD RESOURCES 1987 DATA

Source: Quin 1987

Note Figure 10-1 for "Area" Locations

AREA 'V' (NO. 1 VEIN):

Sample No.	Width: Inches (Centimetres)	Underground Drift Level	% Cu	Oz/Ton Ag	Oz/Ton Au
RU 11	39.4 (100)	1201	1.28	1.30	0.011
RU 12	39.0 (99)	1201	0.97	1.68	0.019
RU 13	47.2 (120)	1201	0.01	0.05	0.002
	Average Width	*Length of Underground drift sampled	Weighted Average % Cu	Weighted Average	Weighted Average
Imperial	**41.9 inches**	**45.9 ft.**	**0.71**	**0.95 oz/ton Ag**	**0.010 oz/ton Au**
Metric	**106.3 cm**	**14.0 m**	**0.71**	**32.6 g/t Ag**	**0.34 g/t**

*Fence pattern sampled @ 7 m sample spacing.

AREA 'W' (NO. 2 VEIN):

Sample No.	Width: Inches (Centimetres)	Underground Drift Level	% Cu	Oz/Ton Ag	Oz/Ton Au
RD#1R	15.7 (40)	950	8.09	0.92	1.390
RD#5R	11.8 (30)	950	4.41	7.26	0.065
RD#6R	11.8 (30)	950	2.92	2.18	0.059
	Average Width	*Length of Drift Sampled	Weighted Average % Cu	Weighted Average	Weighted Average
Imperial	**13.12 inches**	**164.0 feet**	**5.44**	**3.20 oz/ton Ag**	**0.593 oz/ton Au**
Metric	**33.3 cm**	**50.0 metres**	**5.44**	**109.7 g/t Ag**	**20.33 g/t Au**

*Fence pattern sampled @ 25 m sample spacing.

AREA 'X' (NO. 2 VEIN):

Sample No.	Width: Inches (Centimetres)	Underground Drift Level	% Cu	Oz/Ton Ag	Oz/Ton Au
R3	80.7 (205)	1002	0.79	0.81	0.016
R4	88.6 (225)	1002	1.39	5.19	0.023
RA159	43.3 (110)	1002	4.24	2.43	0.066
RA160	43.3 (110)	1002	0.01	0.02	0.068
RA161	37.8 (96)	1002	0.27	0.19	0.067
RU2001	47.6 (121)	1002	5.73	40.85	0.034
RU2002	34.3 (87)	1002	1.26	1.85	0.032
RU2003	53.1 (135)	1002	5.51	47.73	2.070
RU2004	63.0 (160)	1002	0.88	1.95	0.037
	Average Width	*Length of Drift Sampled	Weighted Average % Cu	Weighted Average	Weighted Average
Imperial	**49.83 inches**	**183.7 feet**	**2.33**	**11.83 oz/ton Ag**	**0.283 oz/ton Au**
Metric	**126.6 cm**	**56.0 metres**	**2.33**	**405.6 g/t Ag**	**9.70 g/t Au**

*Fence pattern sampled @ 5-7 m sample spacing.

AREA ‘Y’ (NO. 3 VEIN):

Sample No.	**Width: Inches (Centimetres)**	**Underground Drift Level**	**% Cu**	**Oz/Ton Ag**	**Oz/Ton Au**
RU31	45.7 (116)	1203	0.06	0.91	0.004
RU32	29.5 (75)	1203	0.20	0.71	0.007
	Average Width	*Length of Drift Sampled	Weighted Average % Cu	Weighted Average	Weighted Average
Imperial	**37.6 inches**	**32.8 feet**	**0.11**	**0.83 oz/ton Ag**	**0.005 oz/ton Au**
Metric	**95.5 cm**	**10.0 metres**	**0.11**	**28.5 g/t Ag**	**0.17 g/t Au**

*Fence pattern sampled @ 10 m sample spacing.

AREA ‘Z’ (NO. 4 VEIN):

Sample No.	**Width: Inches (Centimetres)**	**Underground Drift Level**	**% Cu**	**Oz/Ton Ag**	**Oz/Ton Au**
RU41	47.2 (120)	1204	0.01	0.01	0.001
RU42	29.5 (75)	1204	0.02	0.02	0.001
RU44	24.8 (63)	1204	0.01	0.01	0.001
RU45	29.5 (75)	1204	0.01	0.01	0.001
	Average Width	*Length of Underground drift sampled	Weighted Average % Cu	Weighted Average	Weighted Average
Imperial	**32.8 inches**	**242.8 feet**	**0.01**	**0.01 oz/ton Ag**	**0.001 oz/ton Au**
Metric	**83.3 cm**	**74.0 metres**	**0.01**	**0.3 g/t Ag**	**0.03 g/t Au**

*Fence pattern sampled @ 25 m sample spacing.

TABLE 10- 4

ROCHER DEBOULE MINE - PLAN OF UNDERGROUND SAMPLING
1050 LEVEL, No. 2 VEIN

(From Quin (1989))

Sample No.	Width (metres)	Cu %	Ag g/t	Ag OPT	Au g/t	Au OPT
R1050-1	0.48	0.89	1846.2	53.8	3.05	0.09
R1050-2	0.9	0.532	73.7	2.15	18.24	0.53
R1050-3	1.3	0.258	676.2	19.7	8.85	0.26
R1050-4	0.6	0.174	26.4	0.77	5.97	0.17
R1050-5	0.9	0.06	36.0	1.05	0.38	0.01
R1050-6	0.85	0.011	44.2	1.29	2.06	0.06

TABLE 10-5

ROCHER DEBOULE MINE - SURFACE SAMPLING No. 2A VEIN

(from Quin 1989)

Sample No.	Location	Width (metres)	Cu %	Ag g/t	Ag OPT	Au g/t	Au OPT
RD88-2R	2+50W 2+50N	0.49	2.15	555.2	16.19	0.96	0.028
RD88-2A-1	0+60W 3+10N	0.20	3.91	15.09	0.44	40.05	1.168
RD88-2A-2	0+60W 3+10N	0.46	7.90	567.5	16.55	11.04	0.322
RD88-2A-3	0+60W 3+10N	0.51	12.92	1365.8	39.83	6.79	0.198
RD88-2A-4	0+60W 2+95N	0.25	9.67	67.2	1.96	4.39	0.128
RD88-2A-5	1000 X C E. Side	0.26	2.49	107.7	3.14	0.38	0.011
RD88-2A-6	1000 X C W. Side	0.21	0.09	8.6	0.25	0.03	0.001

TABLE 10-6
SURFACE CHANNEL SAMPLING 1987 – No. 4 VEIN
ROCHER DEBOULE MINE AREA – SOUTHERN GOLD RESOURCES LTD. DATA

(Refer to Appendix A for Sample Location)
Source: Quin 1987

VEIN	SAMPLE	WIDTH metres	Cu %	Pb %	Zn %	Ag g/t	Au g/t
4	RD 13R	Selected Float Grab	8.25	0.01	0.06	27.1	9.43
4	RD14R	0.65	1.06	0.01	0.01	17.8	0.75
4	RD15R	0.65	0.34	<0.01	<0.01	10.0	0.27
4	RD16R	0.32	0.07	<0.01	0.01	3.7	0.14
4	RD17R	0.35	3.71	<0.01	0.04	56.5	5.45
4	RD18R	0.22	3.96	<0.01	0.02	34.5	17.00
4	RD19R	0.70	1.36	<0.01	0.01	76.3	7.30
4	RD101R	0.80	0.16	0.01	0.01	2.7	5.69
4	RD21R	1.00	2.26	<0.01	0.01	25.6	3.53
4	RD102R	1.15	0.92	0.07	0.02	32.6	2.26
4	RD32R	Dump Grab	0.09	<0.01	<0.01	2.0	0.03
4	RD33R	Dump Grab	0.05	<0.01	<0.01	0.6	0.03
4	RD34RA	Dump Grab	0.05	<0.01	<0.01	2.1	0.03
4	RD35RA	Dump Grab	3.24	<0.01	0.01	39.6	9.02
4	RD36R	Dump Grab	no	Results			
4	RD37R	0.95	4.14	<0.01	<0.01	47.6	2.23
4	RD103R		No	Results			
4	RD38R	0.50	1.37	<0.01	<0.01	1.0	0.03
4	RD39R	Dump Grab	10.0	<0.01	0.11	64.9	0.62

TABLE 10-7*
ROCK CHIP SURFACE SAMPLE ANALYSES
ROCHER DEBOULE & VICTORIA MINES – ROCHER DEBOULE MINERALS 2001-2002 DATA

Sample No.	Width	ppm Mo	ppm Cu	ppm Pb	ppm Zn	ppm Ag	ppm Co	ppm As	ppm Bi	ppm Au
AR-1	0.4 m	1131	99999	825	9980	64.3	127	1470	3	0.61
AR-2	0.6 m	3941	47913	1165	6083	399.6	248	8109	49	1.56
AR-3	0.4 m	15	89393	6	280	0.3	208	60	40	.02
AR-4	0.5 m	106	97239	143	492	107.0	1388	35184	191	14.80
AR-5	0.7 m	139	83609	24	294	72.0	807	14473	63	5.06
AR-6	0.8 m	44	3377	955	99999	145.7	10	5726	3	1.78
AR-7	0.3 m	460	475	3	23	1.2	859	20809	205	9.78
AR-8	0.6 m	21	49163	76	279	21.8	88	1293	30	1.44
AR-9	0.6 m	1034	69429	86	441	51.2	197	4323	22	0.32
AR-10	0.5 m	7	99999	8	809	50.0	110	597	3	0.64
AR-11	0.4 m	14811	1105	3	44	1.8	17	320	5	0.11
AR-12	0.5 m	11	6407	10	59	4.5	67	1360	6	0.42
AR-13	0.3 m	18197	28	3	76	0.9	801	22017	14	0.11
AR-14	0.2 m	3790	17	3	41	19.5	1468	99999	2071	154.14
AR-15	0.2 m	2762	24	3	16	10.7	1694	99999	1421	125.13
AR-16	0.2 m	1999	37	3	51	7.1	1817	99999	926	59.29
AR-17	0.2 m	7785	131	3	21	0.7	630	3080	10	1.41
AR-18	0.4 m	9041	59613	80	399	104.2	537	14895	29	1.55

STREAM SEDIMENTS SAMPLES – ROCHER DEBOULE MINERALS 2001-2002 DATA

Sample No.	**ppm Cu**	**ppm Pb**	**ppm Zn**	**ppm Co**	**ppm As**	**ppm Ag**	**ppm Au**
ST-1	478	15	51	16	73	0.9	0.01
ST-2	4749	909	370	34	547	16.8	0.98
ST-3	2577	188	428	15	184	11.9	0.10
ST-4	1092	24	115	22	259	1.2	0.16
ST-5	8208	1925	9682	320	1634	160.9	1.64
ST-6	1537	15	87	19	129	1.1	0.015

***Source:** Kikauka (2002)

***NOTE FIGURE 10-9 FOR SAMPLE LOCATIONS**

TABLE 10-8*
SURFACE SAMPLING
ROCHER DEBOULE & VICTORIA MINES – ROCHER DEBOULE MINERALS 2004 DATA

Rock Sampling

Sample No.	Cu ppm	Ag ppm	As ppm	Fe %	Au ppm
M386031	>10,000	>100	537	39.86	0.84
M386032	>10,000	>100	4604	14.3	0.79
RD-04-AR-1	>10,000	22.9	100	32.44	3.11
RD-04-AR-2	>10,000	7.1	66	21.58	1.17
RD-04-AR-3	>10,000	13.2	28	38.67	1.21
RD-04-AR-4	>10,000	8.7	7	27.41	1.80
Stream Sediment Sampling					
RD-04-AST-51	143	0.2	17	11.32	0.06
RD-04-AST-52	537	0.5	1437	7.52	0.27
Soil Sampling - Highland Boy					
5000N 4700E	3786	1.3	112	10.72	0.08
5000N 4800E	1924	0.6	37	8.73	0.05
5000N 4850E	>10,000	14.5	107	22.9	5.46
5000N 4900E	5137	25.6	98	25.61	11.13
5000N 4950E	>10,000	5.3	132	14.2	0.31
5000N 5000E	1757	116.2	3664	11.79	2.44
4900N 4475E	4937	5.4	36	11.96	0.70
4900N 4425E	3089	6.3	42	12.35	0.59
4900N 4575E	1995	3	212	39.94	0.05
4900N 4625E	5797	16.1	1352	47.71	2.74

***Source:** Kikauka (2004)

*NOTE FIGURE 10-9 FOR SAMPLE LOCATIONS

TABLE 10-9

SURFACE SAMPLING ANALYSES

ROCHER DEBOULE PROPERTY – ROCHER DEBOULE MINERALS 2007 DATA

Sample No		% Cu	% Zn	ppm Ag	ppm As	ppm Au	ppm Co	ppm Mo	ppm W
GOLDEN	**WONDER**	**ROCKS**							
76051	0.6 m	3.3	0.05	54.2	>10000	4.93	1980		
76052	0.2 m	1.92	0.05	61.9	6800	0.331	88		
76053	grab	3.13	0.02	104	>10000	21.9	12150		
76054	grab	0.23	0.01	6.7	>10000	1.29	617		
CAP		**ROCKS**							
76055	0.2 m	3.14	0.05	144	802	0.23	61		
76056	0.77 m	0.69	1.29	477	4170	0.226	21		
76057	0.15 m	1.19	3.88	587	>10000	0.149	19		
HIGHLAND	**BOY**	**ROCKS**							
Sample No		**% Cu**		**ppm Ag**	**ppm As**	**ppm Au**			
HB-07-A-1	0.3 m	0.022		0.6	36	0.095		1613	
HB-07-A-2(B)	0.1 m	0.239		4.5	259	0.145		1042	
HB-07-A-2(S)	grab	>1		52.8	333	0.545		360	
	ROCKS	**% Cu**	**% Zn**	**ppm Ag**	**ppm As**	**ppm Au**			
07-HB-101	grab	>1	0.02	20.1	22	2.26			>100
07-HB-102	grab								
07-HB-103	0.31 m								
07-HB-104	grab								
07-HB-105	grab								
07-HB-106	grab								
07-HB-107	1.5 m								
07-HB-108	0.80 m	>1	0.01	5.8	16	0.405			>100
07-HB-109	0.91 m								
07-HB-110	1.0 m								
07-HB-111	1.0 m	>1	0.01	2.1	117	0.18			2
07-HB-112	grab	>1	0.01	26.4	28	2.31			2
07-HB-113	grab								

HIGHLAND BOY SOILS

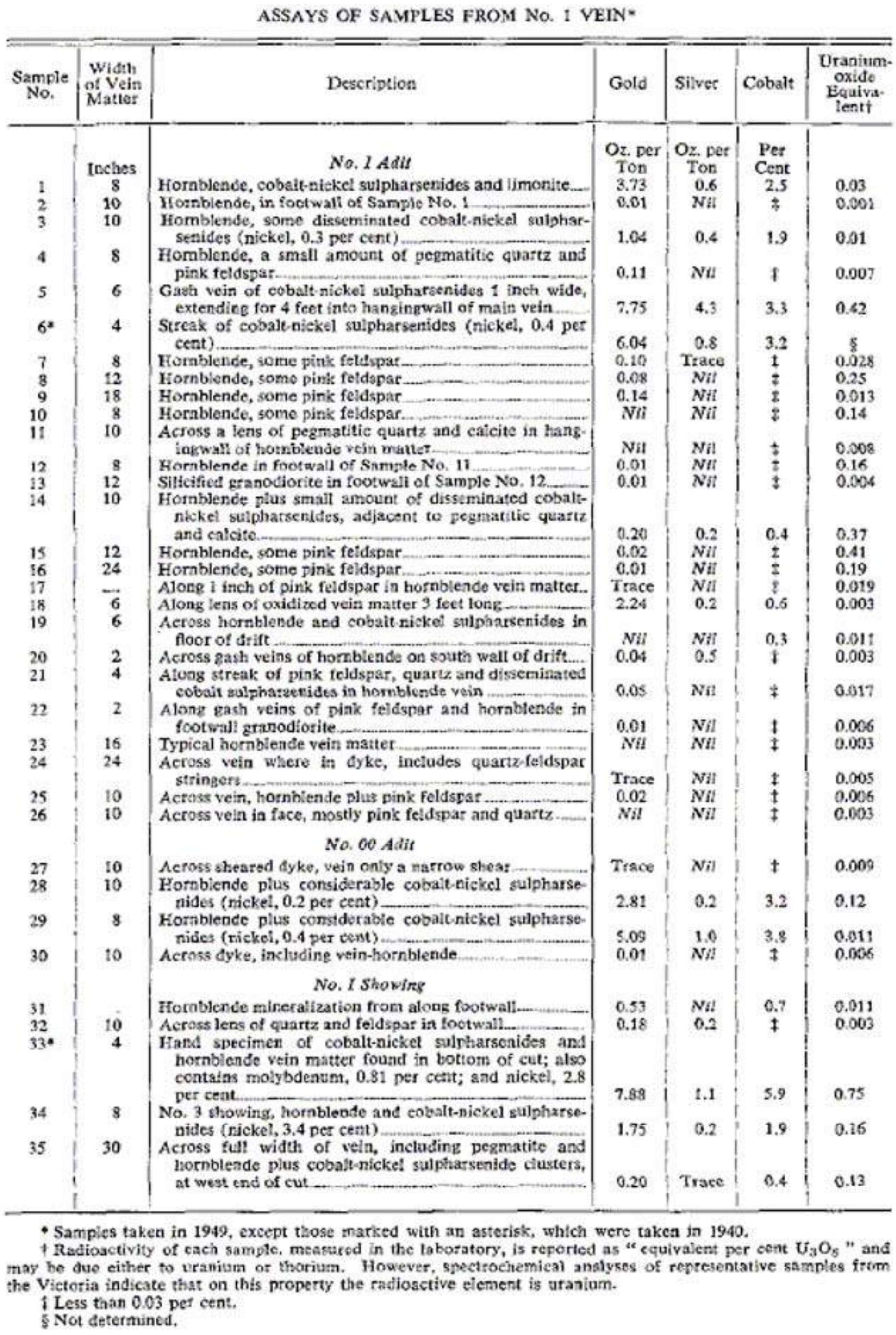
grid line	station	ppm Cu	ppm Zn	ppm Ag	ppm As	ppb Au	ppm Pb	ppm Mo	ppm W
5000 N	4750 E	3122	352	2.3	23	150	214	260	>100
5000 N	4700 E	1181	427	1.3	67	24	83	14	2
5000 N	4650 E	2886	90	2.1	48	205	41	306	45
5000 N	4600 E	3254	129	1.5	73	225	27	329	2
5000 N	4550 E	1146	89	0.8	31	21	11	138	2
5000 N	4500 E	>10000	85	4.9	43	320	21	64	>100

TABLE 10-9 CONTINUED
ROCK SAMPLING – IRON OXIDE GOLD COPPER DEPOSIT SUITE

Sample No.	Type	Locality	Cu ppm	Cu %	Ag ppm	Au ppm	Fe %	Co ppm or (%)	Ni ppm
RD07-001	Grab	Rocher Deboule West Adit	>10000	12.05	50.4	0.37	17.54	(0.29%)	430
RD07-002	Grab	Highland Boy Adit	109			0.01	25.21	9	51
RD07-003	Grab	Rocher Deboule East Adit	>10000	17.80	39.5	31.14	16.92	2000	8473
RD07-004	Grab	Great Ohio	5467			0.12	26.22	172	932
RD07-005	Grab	New Discovery	>10000	20.50	135	2.47	20.94	93	106
RD07-006	Grab	Victoria Adit	68			26.64	5.21	(1.0%)	1665
RD07-007	Grab	Victoria Adit	83			41.99	11.12	(1.1%)	1992
RD07-009	Chip	HB Outcrop	120			0.25	24.95	63	21
RD07-010	Chip	HB Outcrop	152			0.04	23.32	33	37
RD07-011	Grab	Highland Boy Adit	>10000	6.05		1.89	23.89	383	166
RD07-012	Grab	Highland Boy Adit	>10000	8.47		1.65	36.09	876	333
RD07-013	Grab	Golden Wonder	>10000	1.01	57.6	10.34	27.72	1683	837
RD07-014	Chip	Cap	238			0.08	5.25	30	35
RD07-015	Grab	Rocher Deboule Main Adit	>10000	8.23	248	2.35	11.36	196	1450
RD07-016	Grab	Rocher Deboule Main Adit	>10000	2.55		12.06	25.67	186	447
RD07-017	Grab	Rocher Deboule Main Adit	>10000	23.70	163	2.27	22.62	50	42
RD07-018	Chip	Gravel Pit	>10000	1.02		5.42	27.22	1164	29

Sample No.	Ce ppm	Dy ppm	Er ppm	Eu ppm	Gd ppm	Ho ppm	La ppm	Lu ppm	Nd ppm	Pr ppm	Sc ppm	Sm ppm	Tb ppm	Th ppm	Tm ppm	U ppm	Y ppm
RD07-003	115.3	1.7	1.3	0.2	3.3	0.4	71.5	0.2	25.4	8.9	2.6	2.6	0.3	3.2	0.2	15.5	6.6
RD07-005	84.9	1.8	1	0.4	3.7	0.3	47.1	0.1	26	7.5	1.7	3.5	0.4	2.7	0.1	3.3	8.1
RD07-006	27.9	1.8	1.2	<0.1	2.2	0.4	21	0.3	7.6	2.5	7.3	1.6	0.3	3.5	0.2	281	10.4
RD07-007	19.1	1.6	1.1	<0.1	1.9	0.3	13.7	0.2	6.6	1.9	3.9	1.5	0.3	0.7	0.1	328	9.5
RD07-011	130.3	0.9	0.3	1.2	4.8	0.1	111	<0.1	34.7	10.9	1.5	4.4	0.3	0.8	<0.1	15.6	2.6
RD07-012	18.8	0.4	0.2	<0.1	1.0	0.1	14.7	<0.1	6.4	1.7	0.2	0.9	0.1	0.3	<0.1	7.7	1.7
RD07-013	165.2	6.1	2.6	1.1	13.0	0.9	97.6	0.3	70.4	19.5	4.8	13.4	1.4	2.1	0.3	41.9	19.3
RD07-015	133.3	1.8	0.9	0.4	4.5	0.3	103	0.1	32.5	11.4	4.6	3.9	0.4	5.7	0.1	4.9	6.8
RD07-016	85.8	0.8	0.5	<0.1	2.6	0.2	72	0.1	18.8	6.7	1.4	1.9	0.2	1.8	0.1	4.8	4.3
RD07-017	27.7	0.2	0.1	<0.1	0.7	<0.1	23.3	<0.1	5.8	2.1	<0.1	0.5	<0.1	0.2	<0.1	3.8	0.9
RD07-018	17.3	2	1	0.4	2.4	0.4	10	0.2	7.2	1.9	1.2	2.5	0.3	1.4	0.1	7.4	9.1

TABLE 10-10
VICTORIA MINE PLAN – HISTORICAL SAMPLING
(Modified from Sutherland Brown 1960)



ASSAYS OF SAMPLES FROM No. 1 VEIN*

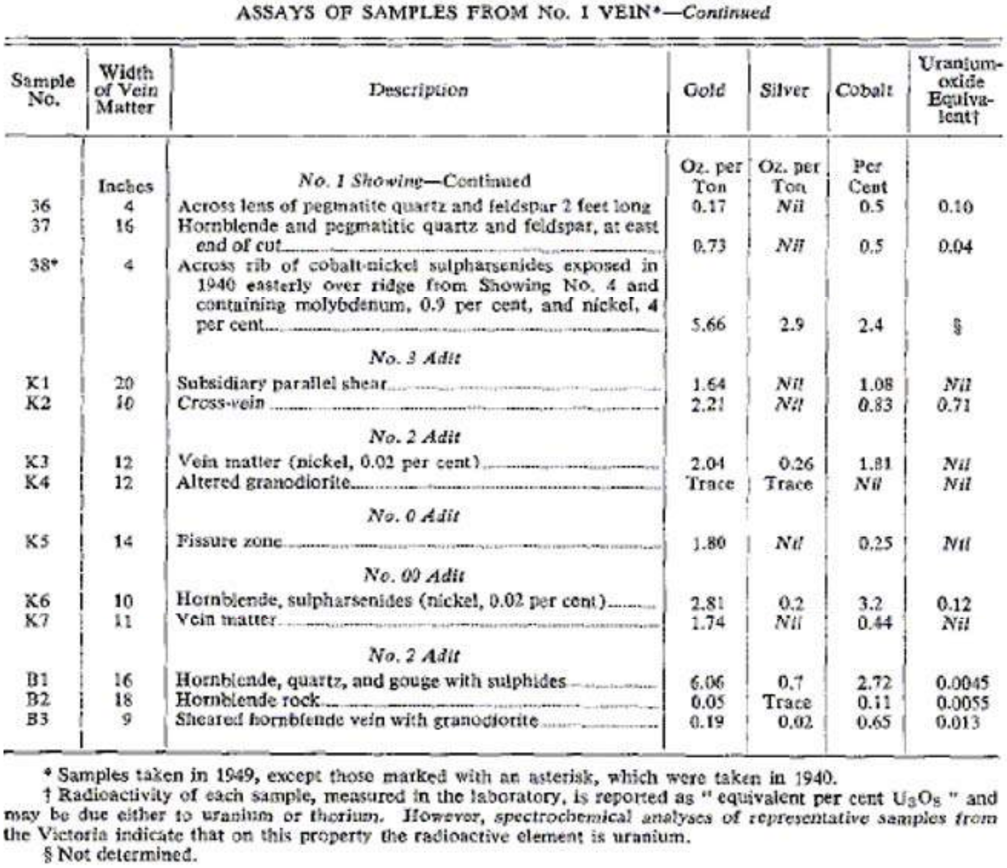
Sample No.	Width of Vein Matter	Description	Gold	Silver	Cobalt	Uranium-oxide Equivalent†
	Inches	*No. 1 Adit*	Oz. per Ton	Oz. per Ton	Per Cent	
1	8	Hornblende, cobalt-nickel sulpharsenides and limonite	3.73	0.6	2.5	0.03
2	10	Hornblende, in footwall of Sample No. 1	0.01	*Nil*	‡	0.001
3	10	Hornblende, some disseminated cobalt-nickel sulpharsenides (nickel, 0.3 per cent)	1.04	0.4	1.9	0.01
4	8	Hornblende, a small amount of pegmatitic quartz and pink feldspar	0.11	*Nil*	‡	0.007
5	6	Gash vein of cobalt-nickel sulpharsenides 1 inch wide, extending for 4 feet into hangingwall of main vein	7.75	4.3	3.3	0.42
6*	4	Streak of cobalt-nickel sulpharsenides (nickel, 0.4 per cent)	6.04	0.8	3.2	§
7	8	Hornblende, some pink feldspar	0.10	Trace	‡	0.028
8	12	Hornblende, some pink feldspar	0.08	*Nil*	‡	0.25
9	18	Hornblende, some pink feldspar	0.14	*Nil*	‡	0.013
10	8	Hornblende, some pink feldspar	*Nil*	*Nil*	‡	0.14
11	10	Across a lens of pegmatitic quartz and calcite in hangingwall of hornblende vein matter	*Nil*	*Nil*	‡	0.008
12	8	Hornblende in footwall of Sample No. 11	0.01	*Nil*	‡	0.16
13	12	Silicified granodiorite in footwall of Sample No. 12	0.01	*Nil*	‡	0.004
14	10	Hornblende plus small amount of disseminated cobalt-nickel sulpharsenides, adjacent to pegmatitic quartz and calcite	0.20	0.2	0.4	0.37
15	12	Hornblende, some pink feldspar	0.02	*Nil*	‡	0.41
16	24	Hornblende, some pink feldspar	0.01	*Nil*	‡	0.19
17	—	Along 1 inch of pink feldspar in hornblende vein matter	Trace	*Nil*	‡	0.019
18	6	Along lens of oxidized vein matter 3 feet long	2.24	0.2	0.6	0.003
19	6	Across hornblende and cobalt-nickel sulpharsenides in floor of drift	*Nil*	*Nil*	0.3	0.011
20	2	Across gash veins of hornblende on south wall of drift	0.04	0.5	‡	0.003
21	4	Along streak of pink feldspar, quartz and disseminated cobalt sulpharsenides in hornblende vein	0.05	*Nil*	‡	0.017
22	2	Along gash veins of pink feldspar and hornblende in footwall granodiorite	0.01	*Nil*	‡	0.006
23	16	Typical hornblende vein matter	*Nil*	*Nil*	‡	0.003
24	24	Across vein where in dyke, includes quartz-feldspar stringers	Trace	*Nil*	‡	0.005
25	10	Across vein, hornblende plus pink feldspar	0.02	*Nil*	‡	0.006
26	10	Across vein in face, mostly pink feldspar and quartz	*Nil*	*Nil*	‡	0.003
		No. 00 Adit				
27	10	Across sheared dyke, vein only a narrow shear	Trace	*Nil*	‡	0.009
28	10	Hornblende plus considerable cobalt-nickel sulpharsenides (nickel, 0.2 per cent)	2.81	0.2	3.2	0.12
29	8	Hornblende plus considerable cobalt-nickel sulpharsenides (nickel, 0.4 per cent)	5.09	1.0	3.8	0.011
30	10	Across dyke, including vein-hornblende	0.01	*Nil*	‡	0.006
		No. 1 Showing				
31	.	Hornblende mineralization from along footwall	0.53	*Nil*	0.7	0.011
32	10	Across lens of quartz and feldspar in footwall	0.18	0.2	‡	0.003
33*	4	Hand specimen of cobalt-nickel sulpharsenides and hornblende vein matter found in bottom of cut; also contains molybdenum, 0.81 per cent; and nickel, 2.8 per cent	7.88	1.1	5.9	0.75
34	8	No. 3 showing, hornblende and cobalt-nickel sulpharsenides (nickel, 3.4 per cent)	1.75	0.2	1.9	0.16
35	30	Across full width of vein, including pegmatite and hornblende plus cobalt-nickel sulpharsenide clusters, at west end of cut	0.20	Trace	0.4	0.13

* Samples taken in 1949, except those marked with an asterisk, which were taken in 1940.

† Radioactivity of each sample, measured in the laboratory, is reported as "equivalent per cent U_3O_8" and may be due either to uranium or thorium. However, spectrochemical analyses of representative samples from the Victoria indicate that on this property the radioactive element is uranium.

‡ Less than 0.03 per cent.

§ Not determined.



ASSAYS OF SAMPLES FROM No. 1 VEIN*—*Continued*

Sample No.	Width of Vein Matter	Description	Gold	Silver	Cobalt	Uranium-oxide Equivalent†
	Inches	*No. 1 Showing*—Continued	Oz. per Ton	Oz. per Ton	Per Cent	
36	4	Across lens of pegmatite quartz and feldspar 2 feet long	0.17	*Nil*	0.5	0.10
37	16	Hornblende and pegmatitic quartz and feldspar, at east end of cut	0.73	*Nil*	0.5	0.04
38*	4	Across rib of cobalt-nickel sulpharsenides exposed in 1940 easterly over ridge from Showing No. 4 and containing molybdenum, 0.9 per cent, and nickel, 4 per cent	5.66	2.9	2.4	§
		No. 3 Adit				
K1	20	Subsidiary parallel shear	1.64	*Nil*	1.08	*Nil*
K2	10	Cross-vein	2.21	*Nil*	0.83	0.71
		No. 2 Adit				
K3	12	Vein matter (nickel, 0.02 per cent)	2.04	0.26	1.81	*Nil*
K4	12	Altered granodiorite	Trace	Trace	*Nil*	*Nil*
		No. 0 Adit				
K5	14	Fissure zone	1.80	*Nil*	0.25	*Nil*
		No. 00 Adit				
K6	10	Hornblende, sulpharsenides (nickel, 0.02 per cent)	2.81	0.2	3.2	0.12
K7	11	Vein matter	1.74	*Nil*	0.44	*Nil*
		No. 2 Adit				
B1	16	Hornblende, quartz, and gouge with sulphides	6.06	0.7	2.72	0.0045
B2	18	Hornblende rock	0.05	Trace	0.11	0.0055
B3	9	Sheared hornblende vein with granodiorite	0.19	0.02	0.65	0.013

* Samples taken in 1949, except those marked with an asterisk, which were taken in 1940.

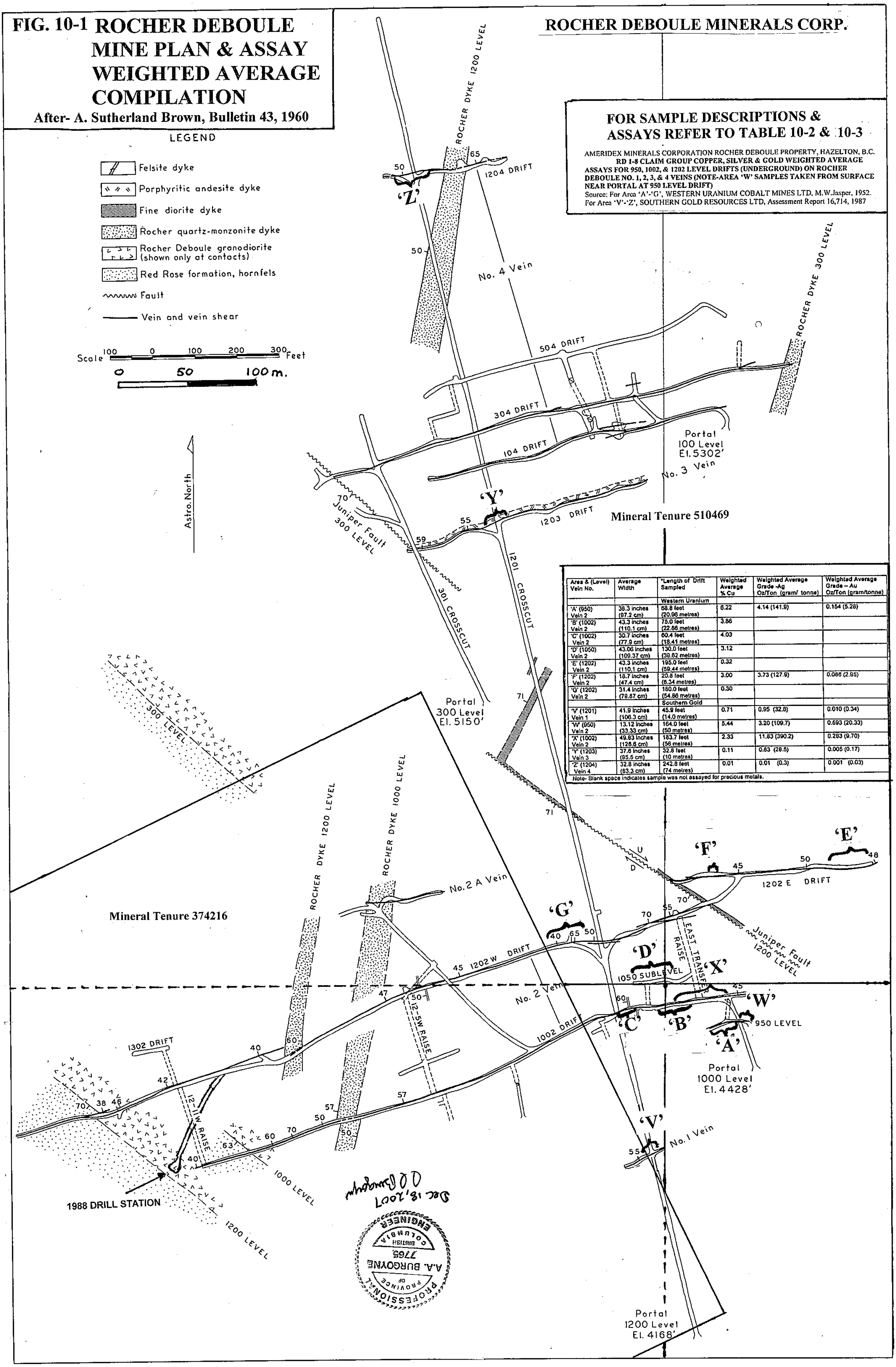
† Radioactivity of each sample, measured in the laboratory, is reported as " equivalent per cent U_3O_8 " and may be due either to uranium or thorium. *However, spectrochemical analyses of representative samples from* the Victoria indicate that on this property the radioactive element is uranium.

§ Not determined.

FIG. 10-1 ROCHER DEBOULE MINE PLAN & ASSAY WEIGHTED AVERAGE COMPILATION

After- A. Sutherland Brown, Bulletin 43, 1960

ROCHER DEBOULE MINERALS CORP.



FOR SAMPLE DESCRIPTIONS & ASSAYS REFER TO TABLE 10-2 & 10-3

AMERIDEX MINERALS CORPORATION ROCHER DEBOULE PROPERTY, HAZELTON, B.C.
RD 1-8 CLAIM GROUP COPPER, SILVER & GOLD WEIGHTED AVERAGE ASSAYS FOR 950, 1002, & 1202 LEVEL DRIFTS (UNDERGROUND) ON ROCHER DEBOULE NO. 1, 2, 3, & 4 VEINS (NOTE-AREA 'W' SAMPLES TAKEN FROM SURFACE NEAR PORTAL AT 950 LEVEL DRIFT)
Source: For Area 'A'-'G', WESTERN URANIUM COBALT MINES LTD. M.W.Jasper, 1952.
For Area 'V'-'Z', SOUTHERN GOLD RESOURCES LTD, Assessment Report 16,714, 1987

Area & (Level) Vein No.	Average Width	*Length of Drift Sampled	Weighted Average % Cu	Weighted Average Grade -Ag Oz/Ton (gram/ tonne)	Weighted Average Grade – Au Oz/Ton (gram/tonne)
		Western Uranium			
'A' (950) Vein 2	38.3 inches (97.2 cm)	68.8 feet (20.96 metres)	6.22	4.14 (141.9)	0.154 (5.28)
'B' (1002) Vein 2	43.3 inches (110.1 cm)	75.0 feet (22.86 metres)	3.88		
'C' (1002) Vein 2	30.7 inches (77.9 cm)	60.4 feet (18.41 metres)	4.03		
'D' (1050) Vein 2	43.06 inches (109.37 cm)	130.0 feet (39.62 metres)	3.12		
'E' (1202) Vein 2	43.3 inches (110.1 cm)	195.0 feet (59.44 metres)	0.32		
'F' (1202) Vein 2	18.7 inches (47.4 cm)	20.8 feet (6.34 metres)	3.00	3.73 (127.9)	0.086 (2.95)
'G' (1202) Vein 2	31.4 inches (79.87 cm)	180.0 feet (54.86 metres)	0.30		
		Southern Gold			
'V' (1201) Vein 1	41.9 inches (106.3 cm)	45.9 feet (14.0 metres)	0.71	0.95 (32.6)	0.010 (0.34)
'W' (950) Vein 2	13.12 inches (33.33 cm)	164.0 feet (50 metres)	5.44	3.20 (109.7)	0.593 (20.33)
'X' (1002) Vein 2	49.83 inches (126.6 cm)	183.7 feet (56 metres)	2.33	11.83 (390.2)	0.283 (9.70)
'Y' (1203) Vein 3	37.6 inches (95.5 cm)	32.8 feet (10 metres)	0.11	0.83 (28.5)	0.005 (0.17)
'Z' (1204) Vein 4	32.8 inches (83.3 cm)	242.8 feet (74 metres)	0.01	0.01 (0.3)	0.001 (0.03)

Note- Blank space indicates sample was not assayed for precious metals.

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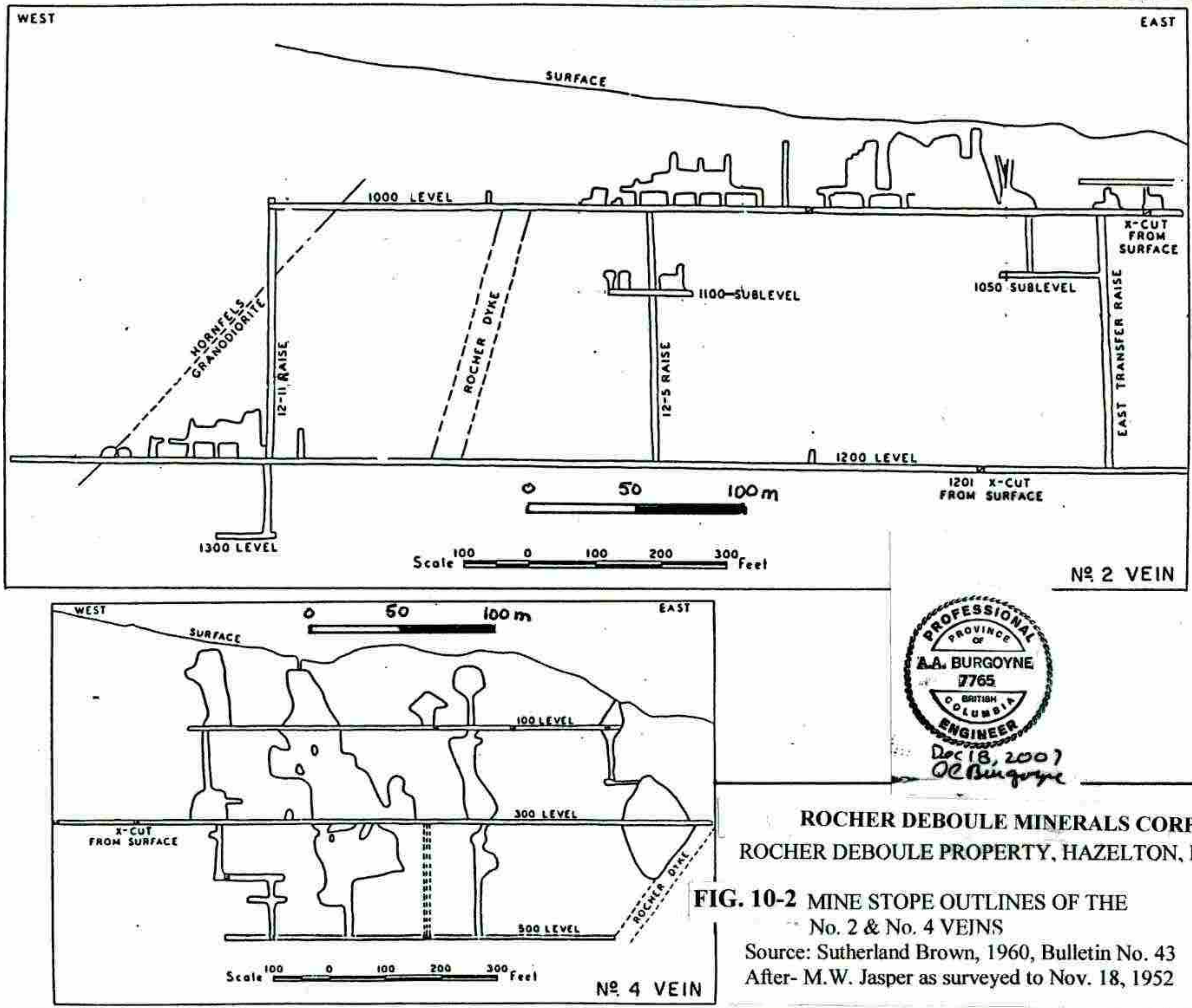

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ROCHER DEBOULE PROPERTY, HAZELTON, B.C.

FIG. 10-2 MINE STOPE OUTLINES OF THE
No. 2 & No. 4 VEINS
Source: Sutherland Brown, 1960, Bulletin No. 43
After- M.W. Jasper as surveyed to Nov. 18, 1952

Sample No.	Width (metres)	Cu %	Ag g/t	Ag OPT	Au g/t	Au OPT
RU 201	0.4	3.84	519.49	15.15	10.97	0.32
RU 202	1.27	2.19	621.68	18.13	9.94	0.29
RU 203	1.3	2.64	349.07	10.18	1.44	0.04
RU204	0.7	2.1	155.68	4.54	2.61	0.08
RU 21	0.8	8.76	542.81	15.83	53.49	1.56
RU22	0.73	10.93	1049.3	30.60	24.76	0.72
RU22A	0.58	14.87	963.21	28.09	78.49	2.29
RU23	0.47	6.37	737.92	21.52	9.77	0.29
RU24	0.65	12.91	1454.9	42.43	112.64	3.29
RU25	0.95	5.8	473.54	13.81	46.84	1.37
RU26	0.7	5.55	153.62	4.48	12.17	0.36
RU28	1.15	6.87	197.85	5.77	9.33	0.27
RU28A	0.4	11.51	158.42	4.62	12.21	0.36
RU29	0.99	5.06	141.96	4.14	20.51	0.60
RU29A	0.81	3.69	154.31	4.50	2.47	0.07
RU30	0.69	2.95	215.68	6.29	4.87	0.14
RU30A	0.47	15.78	1683.6	49.10	43.03	1.26

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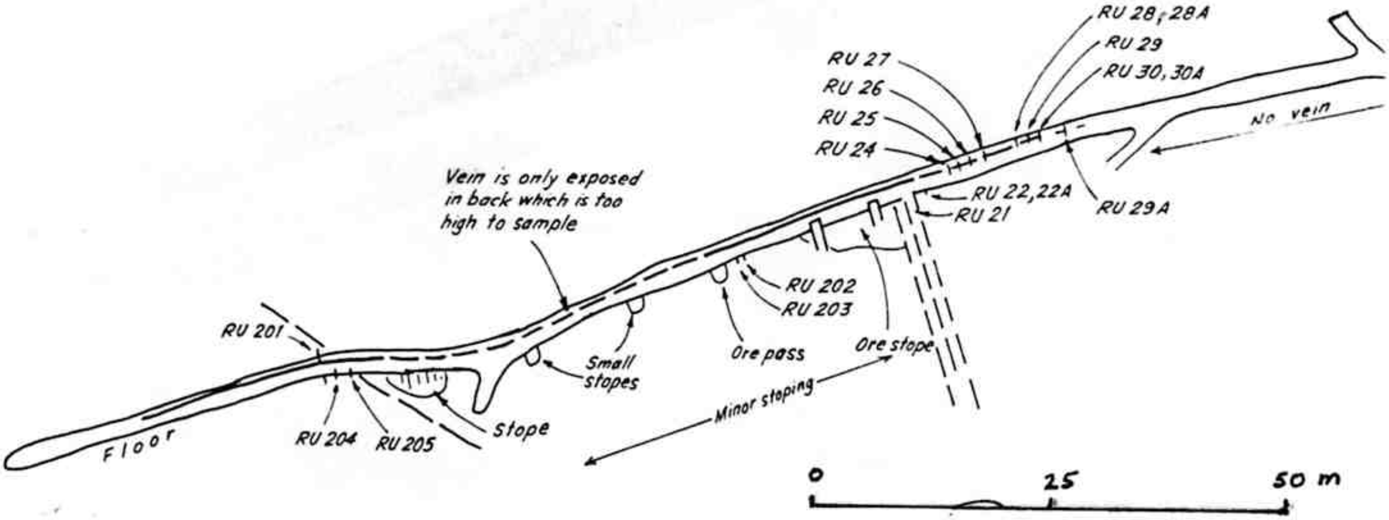


ROCHER DEBOULE MINERALS CORP

FIGURE 10-3
PLAN OF UNDERGROUND SAMPLING
WEST PORTION OF 1200 LEVEL, # 2 VEIN ROCHER DEBOULE MINE
(FROM SOUTHERN GOLD RESOURCES LTD. (1987)

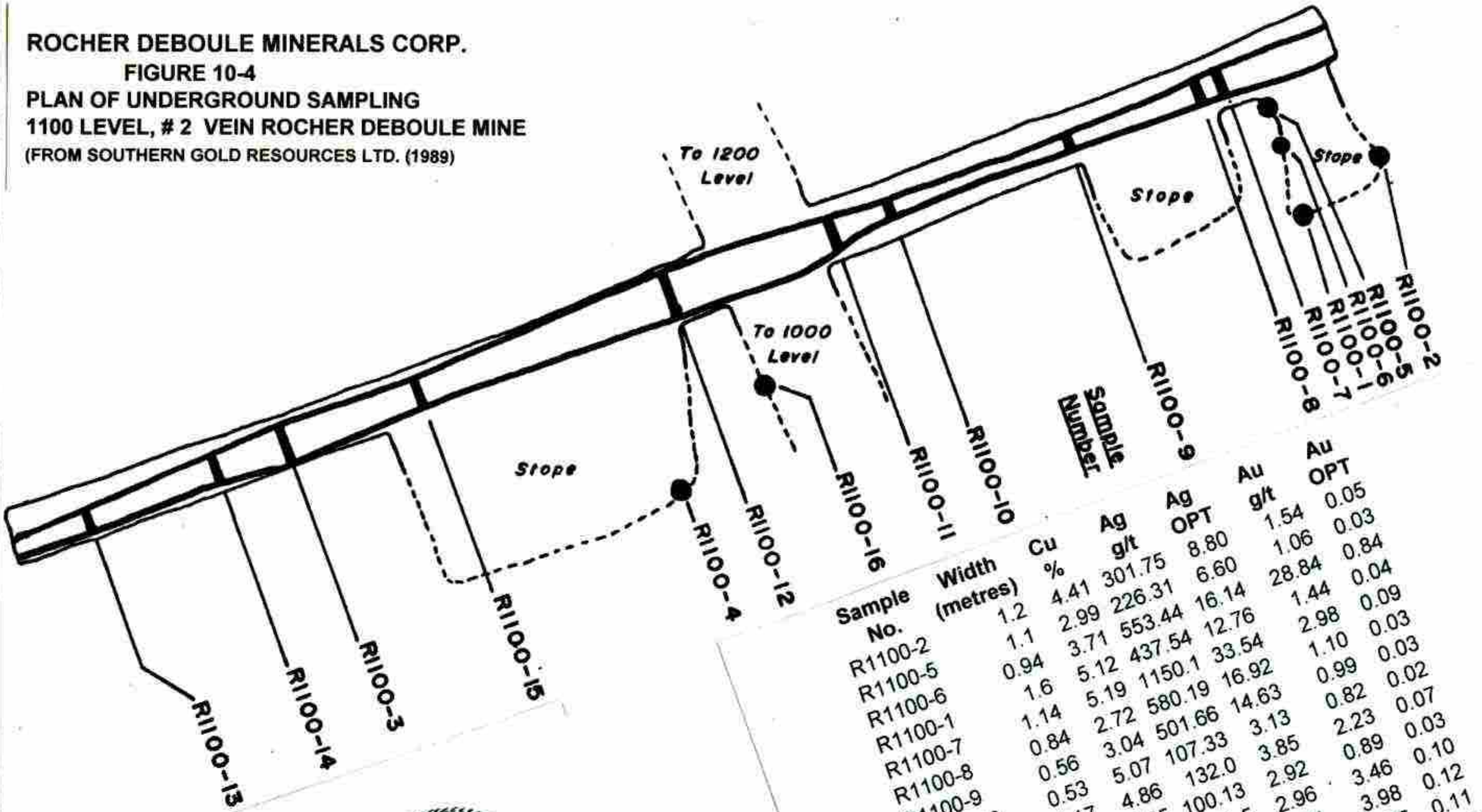
ROCHER DEBOULE MINERALS CORP.

FIGURE 10-4

PLAN OF UNDERGROUND SAMPLING

1100 LEVEL, # 2 VEIN ROCHER DEBOULE MINE

(FROM SOUTHERN GOLD RESOURCES LTD. (1989)



Sample No.	Width (metres)	Cu %	Ag g/t	Ag OPT	Au g/t	Au OPT
R1100-2	1.2	4.41	301.75	8.80	1.54	0.05
R1100-5	1.1	2.99	226.31	6.60	1.06	0.03
R1100-6	0.94	3.71	553.44	16.14	28.84	0.84
R1100-1	1.6	5.12	437.54	12.76	1.44	0.04
R1100-7	1.14	5.19	1150.1	33.54	2.98	0.09
R1100-8	0.84	2.72	580.19	16.92	1.10	0.03
R1100-9	0.56	3.04	501.66	14.63	0.99	0.03
R1100-10	0.53	5.07	107.33	3.13	0.82	0.02
R1100-11	1.17	4.86	132.0	3.85	2.23	0.07
R1100-16	1.22	7.85	100.13	2.92	0.89	0.03
R1100-12	1.85	8.01	101.5	2.96	3.46	0.10
R1100-4	1.7	9.66	32.233	0.94	3.98	0.12
R1100-15	0.99	4.73	353.53	10.31	3.77	0.11
R1100-13	1.5	3.81	1083.9	31.61	1.99	0.06
R1100-14	1.04	1.28	152.93	4.46	0.75	0.02
R1100-13	0.66	4.51	44.577	1.30	0.72	0.02

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Sample No.	Width (metres)	Cu %	Ag g/t	Ag OPT	Au g/t	Au OPT
RA 1	0.53	1.31	90.9	2.65	0.62	0.018
RA 11	1.00	1.72	198.9	5.8	5.80	0.169
RWU 55	1.35	2.63	183.5	5.35	1.47	0.043
RA 12	1.10	1.5	105.6	3.08	0.51	0.015
RA 13	1.38	4.77	83.0	2.42	2.81	0.082
RA 14	1.30	1.69	26.7	0.78	3.29	0.096
RA 16	0.75	2.49	148.8	4.34	0.65	0.019
RA 17	1.40	3.83	62.1	1.81	1.92	0.056
RA 90	1.00	1.43	164.6	4.8	2.02	0.059
RA 29/30	1.15	2.51	396.4	11.56	1.20	0.035
RA 32	0.60	5.19	44.6	1.3	1.30	0.038
RA 41	0.90	5.35	142.3	4.15	0.69	0.02
R 42	0.73	3.85	197.9	5.77	0.00	
R 1	1.13	5.65	294.2	8.58	1.99	0.058
R 2	0.85	6.98	199.2	5.81	1.89	0.055
RA 101	1.00	2.92	323.0	9.42	5.69	0.166
RWU 75	1.05	3.16	88.8	2.59	3.91	0.114
RWU 77	1.05	1.73	63.8	1.86	1.51	0.044

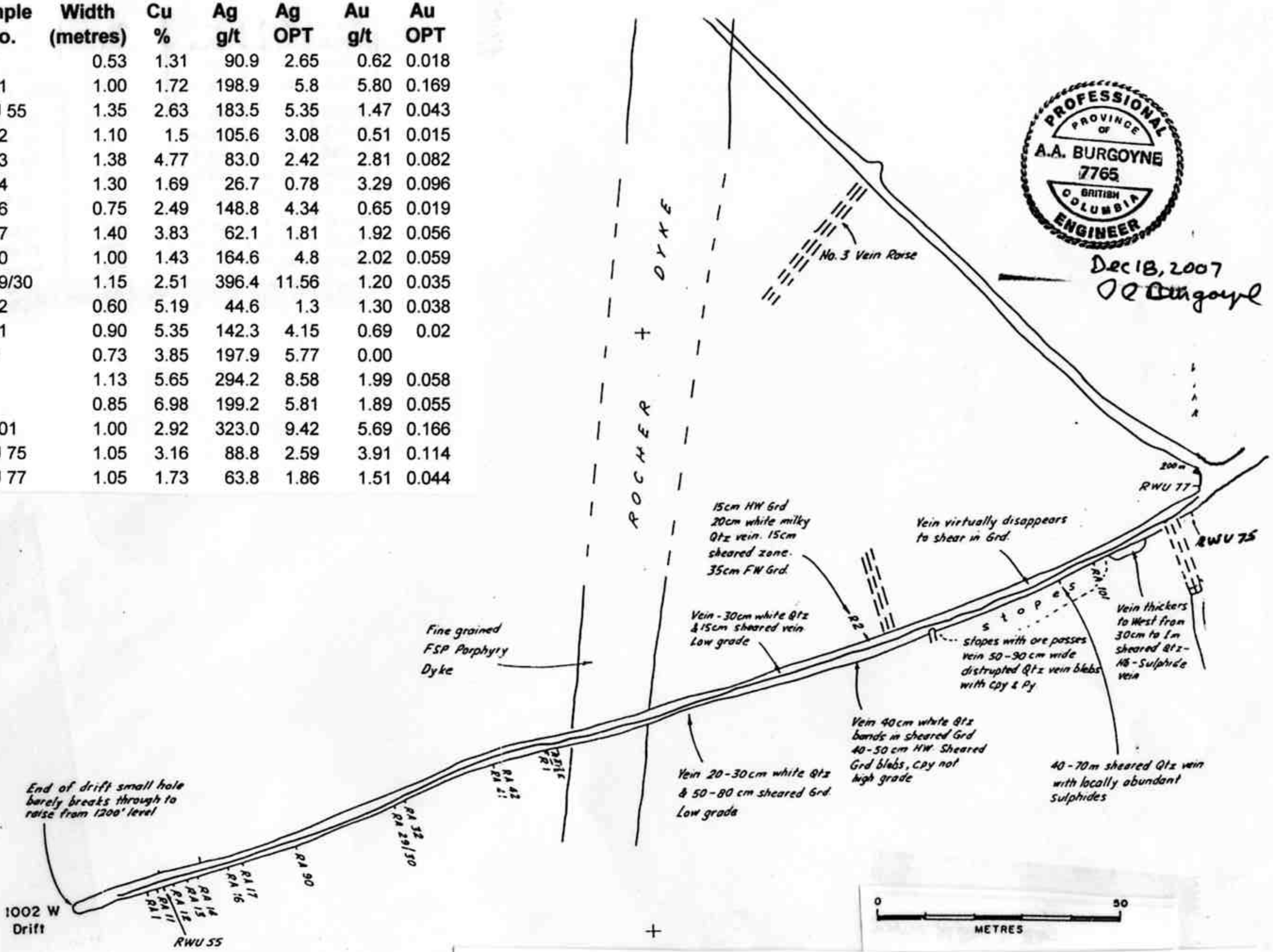

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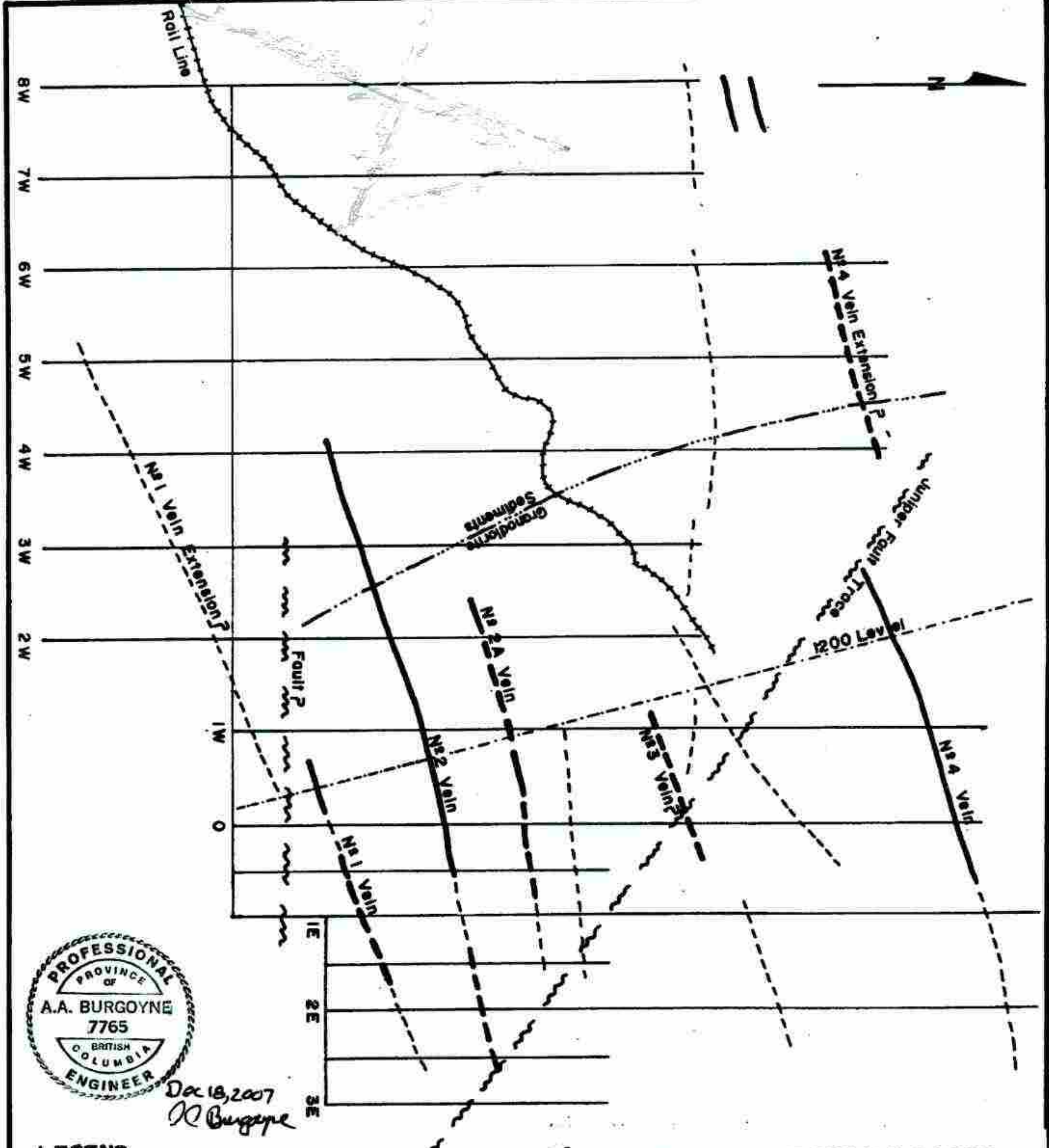
FIGURE 10-5

PLAN OF UNDERGROUND SAMPLING

WEST PORTION OF 1000 LEVEL, # 2 VEIN ROCHER DEBOULE MINE

(FROM SOUTHERN GOLD RESOURCES LTD, Quin (1987))



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LEGEND

▬▬	Known Vein
▬ ▬ ▬	Strong Geophysical &/or Geochemical Anomaly
- - - -	Geophysical &/or Geochemical Anomaly

ROCHER DEBOULE MINERALS CORP.
FIGURE 10-6
SUMMARY OF GEOPHYSICAL
& GEOCHEMICAL RESULTS
ROCHER DEBOULE MINE AREA
(From, Quin (1989))

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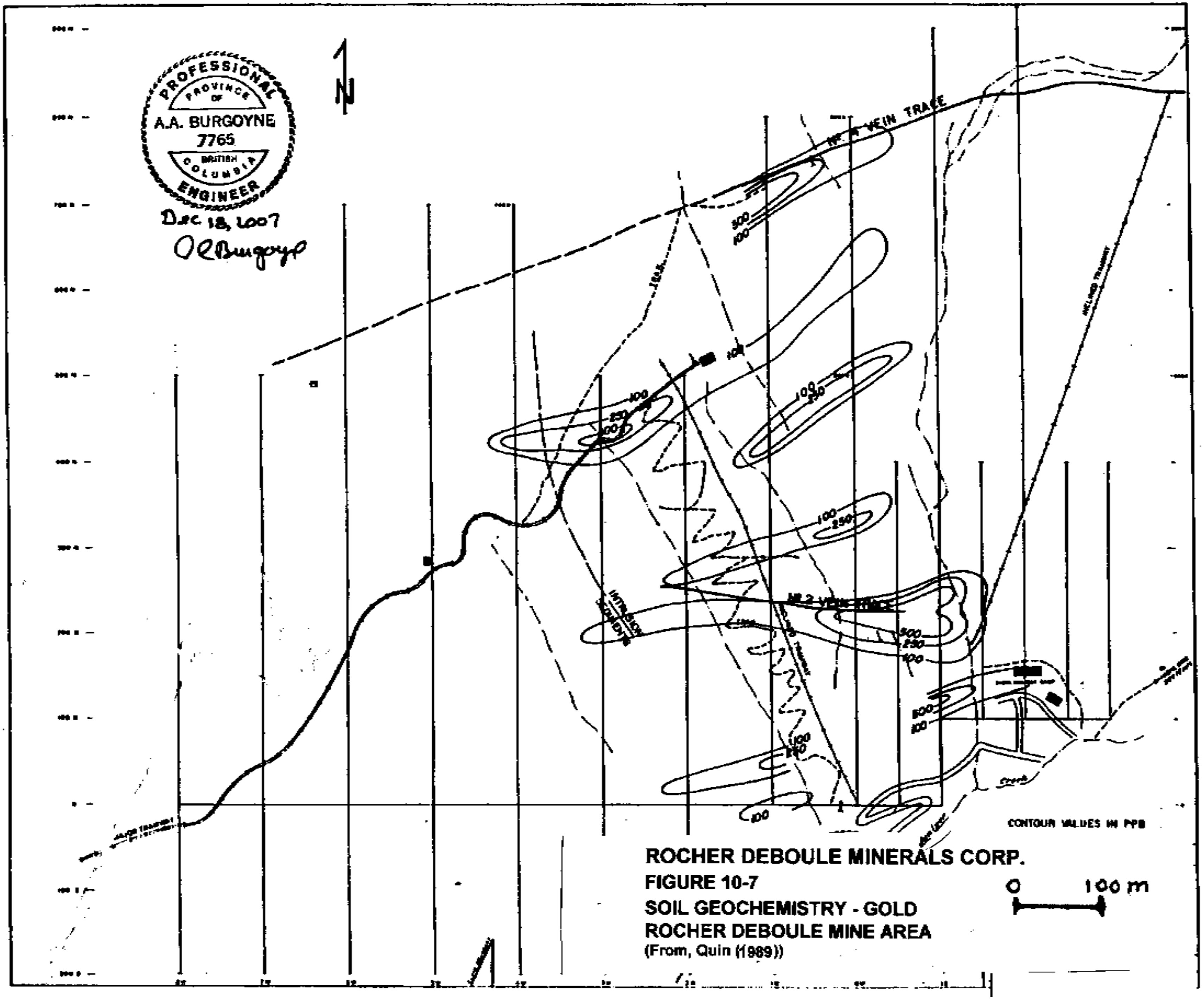
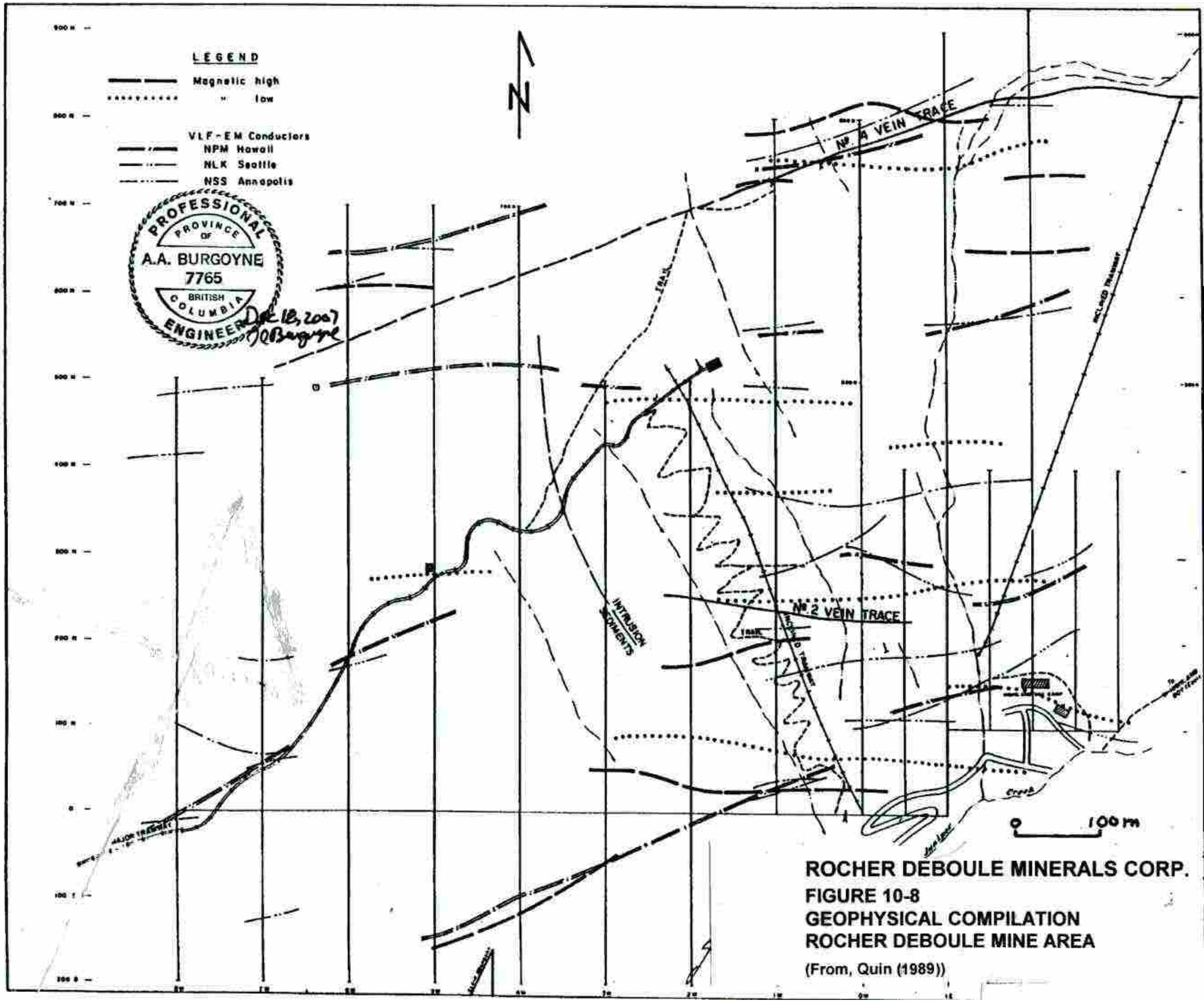


ROCHER DEBOULE MINERALS CORP.
FIGURE 10-7
SOIL GEOCHEMISTRY - GOLD
ROCHER DEBOULE MINE AREA
(From, Quin (1989))



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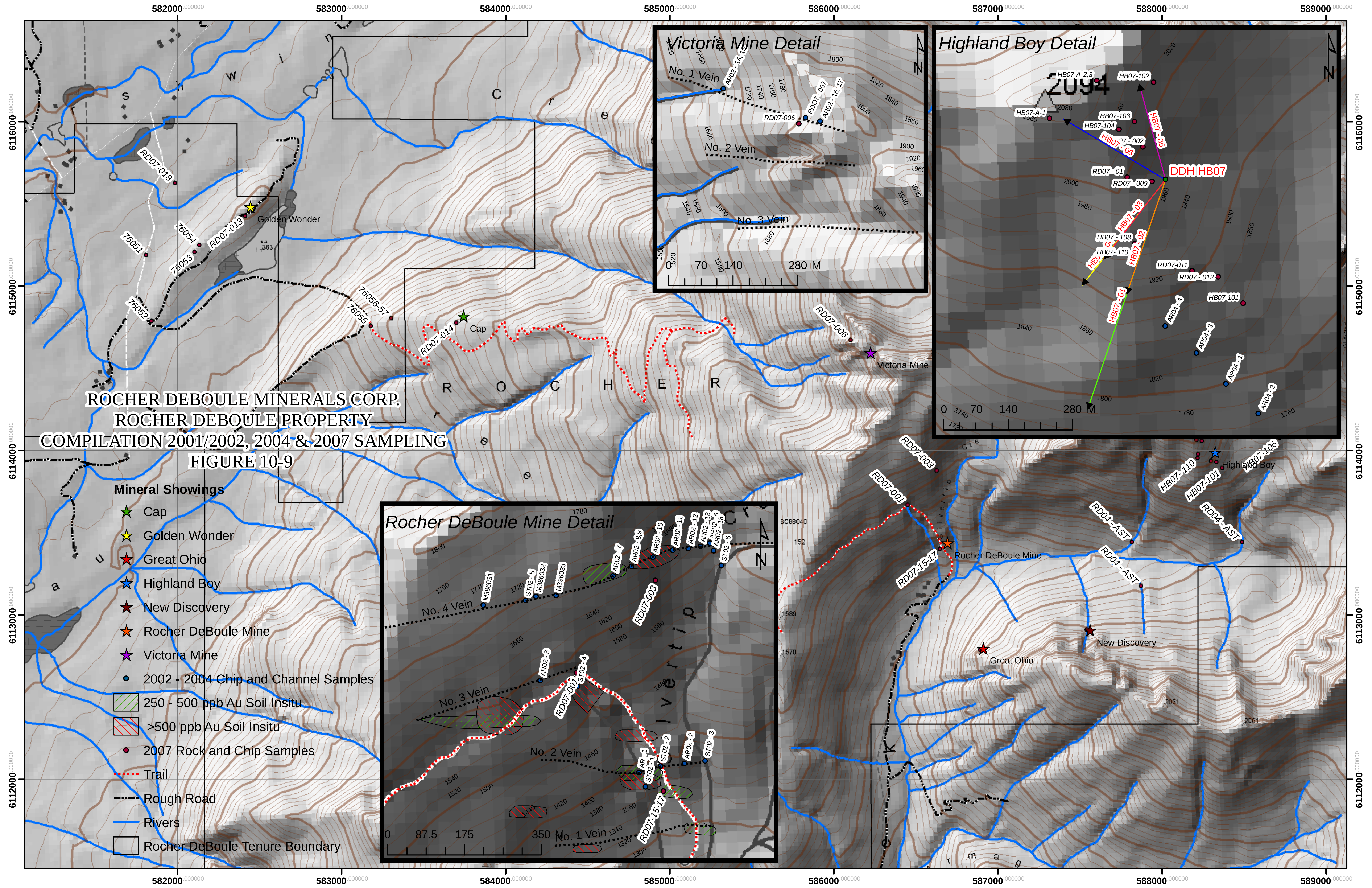
ROCHER DEBOULE MINERALS CORP.

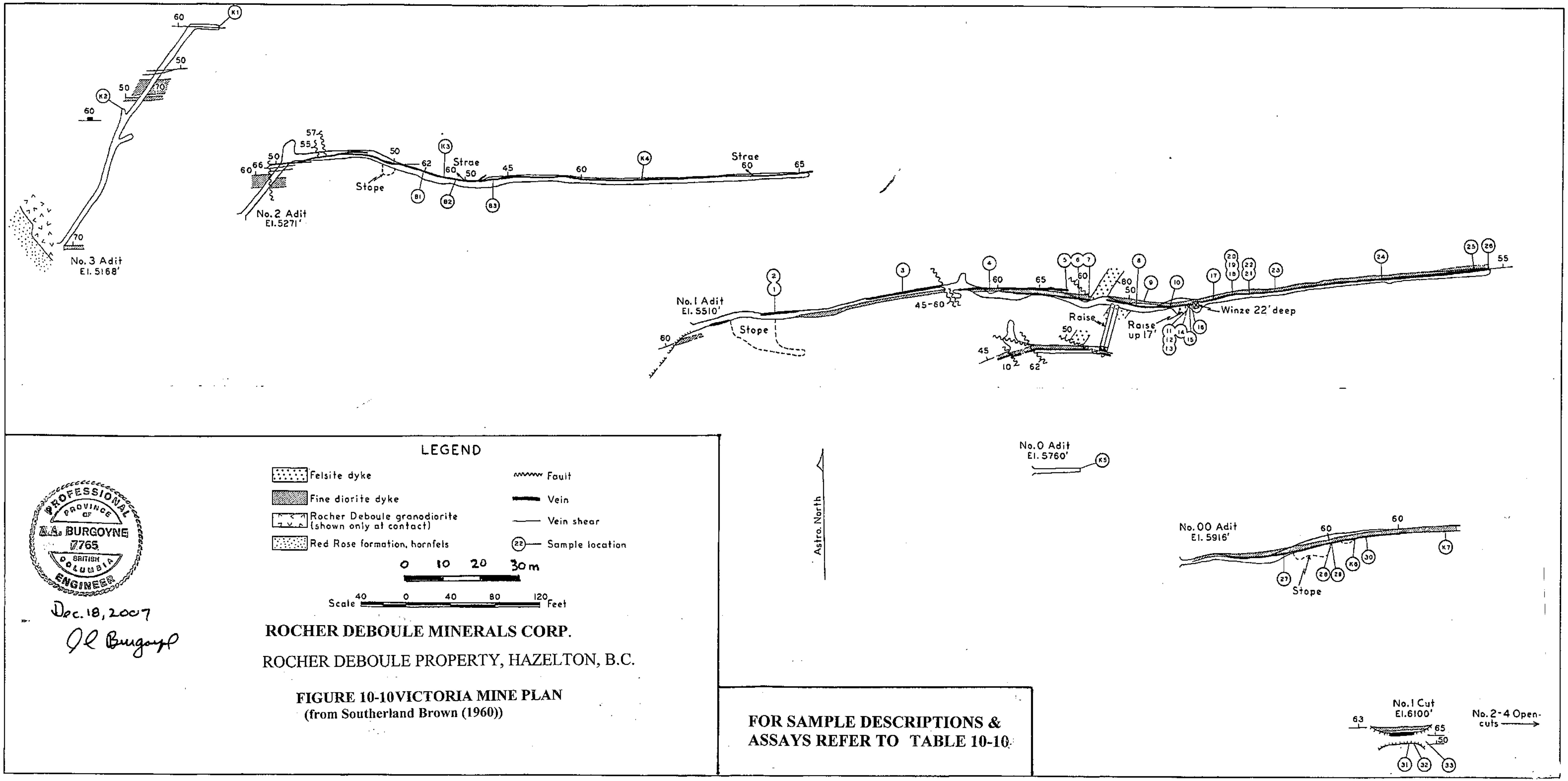
FIGURE 10-8

GEOPHYSICAL COMPILATION
ROCHER DEBOULE MINE AREA

(From, Quin (1989))



ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE PROPERTY
COMPILATION 2001/2002, 2004 & 2007 SAMPLING
FIGURE 10-9



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ROCHER DEBOULE PROPERTY, HAZELTON, B.C.

FIGURE 10-10VICTORIA MINE PLAN
(from Southerland Brown (1960))

FOR SAMPLE DESCRIPTIONS & ASSAYS REFER TO TABLE 10-10

11.0 Drilling

Historical drilling by DeGroot Logging on the Victoria Mine is discussed in **Item 6.**

The 1988-drilling program by Southern Gold Resources on the Rocher Deboule mine is detailed below.

Rocher Deboule Minerals Corp. 2007 Drilling

During September 2007 Rocher Deboule Minerals Corp. completed 1106.1 meters over six drill holes on the Highland Boy Showing and vein structure. This drilling was carried out under the supervision of Mr. Andris Kikauka, P.Geo., Qualified Person. The holes were drilled from one set up, approximately 100 m north of the surface trace of Cu-Ag-Au bearing quartz-sulphide Highland Boy Upper Vein, at 1952 meter elevation and the six drill holes were completed that varied from 137.2 to 327.7 meters in depth as tabulated in **Table 11-1**. The Highland Boy Cu-Ag-Au mineral occurrence features two 090 to 120 degrees trending and steeply north dipping quartz-sulphide-iron oxide fissure veins that outcrop in rugged terrain at 1768 to 1980 meter elevation. The southernmost vein zone is traced west along surface to the No. 4 Rocher Deboule No. 4 vein. The Highland boy veins contain massive and banded chalcopyrite, coarsely crystalline magnetite, and pyrite in a gangue of quartz, calcite, dolomite, hornblende, tourmaline, actinolite, sericite, biotite and chlorite. The drilling was completed by Neill's Mining Ltd. and was of BQ TW diameter core size.

Diamond drill hole data including hole number, depth, easting, northing, elevation, azimuth, and dip are given in **Table 11-1. Figure 10-9 gives** the location of the drill holes.

TABLE 11-1
HIGHLAND BOY DIAMOND DRILL HOLE DATA

Hole	Depth (Meters)	Easting*	Northing*	Elevation (meters)	Azimuth (degrees)	Dip (degrees)
07HB1	327.7	588259	6114062	1952 m	200	-70
07HB2	163.1	588259	6114062	1952 m	200	-50
07HB3	144.5	588259	6114062	1952 m	220	-50
07HB4	182.9	588259	6114062	1952 m	220	-70
07HB5	150.9	588259	6114062	1952 m	340	-50
07HB6	137.2	588259	6114062	1952 m	300	-48

* UTM - NAD 83

The core from six drill holes was logged in detail by Andris Kikauka, P.Geo. Sample assay sheets were developed for the 97 split drill core samples that were split and assayed. These sample intervals varied in length from 0.31 to 2.63 meters. No down the whole surveys were completed and the ground location were done with a hand held GPS unit.

The following potential economic intercepts were obtained from a quartz -sulphide vein. This quartz – sulphide vein dips 60 degrees to the north was intercepted in holes 07HB1 and 07-

HB2. The results for the better assays results are given in **Table 11-2** and illustrated on **Figure 11-1.** The estimated true thickness of the mineralized intercepts is also given in **Table 11-2.**

TABLE 11-2
HIGHLAND BOY DRILL HOLE ASSAY RESULTS

Hole	Sample Number	From (meters)	To (meters)	Intercept (meters)	Est. True Thickness (meters)	Cu %	Ag g/t	Au g/t	Mo %	W %
07HB1	D1-14	130.82	131.34	0.52	0.42	0.71	0.77	0.118	0.054	0.001
07HB2	D2-7,8	105.37	107.38	2.01	1.93	2.18	7.71	0.511	0.004	0.070
including	D2-7,8	105.37	105.68	0.31	0.30	13.80	47.5	3.140	0.026	0.452
07HB4	D4-8	136.64	137.77	1.13	1.04	0.10	0.27	0.250	0.046	0.024

Southern Gold Resources Ltd. 1988 Historical Drilling Program

In order to facilitate an underground drilling program near the west end of the 1200 Level drift to define the extent and grade of the No. 2 Vein, a footwall drift was extended 66 meters to the 1202 drift. At the end of this crosscut a drill station was established followed by a second drill station approximately 40 meters south of the crosscut junction with the 1202 drift. Note **Figure 10-1** for the location of the crosscut.

A total of 894 meters over 14 holes was completed of BQ core size utilizing a BBU-1 drill and a 1200 cfm Gardiner Denver compressor. A panel of about 80 x 80 meters was effectively tested. This was about one half of the area that was scheduled for testing – in effect the eastern one half of the proposed area for drilling was not done. The plan level of the 1988 drilling is illustrated in **Figure 11-2** and a section through the drill station at the end of the crosscut is illustrated in **Figure 11-3.**

The diamond drill hole data for nine drill holes returned 11 potential economic intercepts as given below on **Tables 11-3** and **Table 11-4.** On this **Table 11-3** the intercept lengths have not been corrected to true thickness.

Holes 2, 5, 6, and 11 intersected a quartz-hornblende vein structure with associated shearing but contained no significant values. Hole 14 intersected an old stope.

These results formed the basis for an historical resource estimate (Quin 1989) that is discussed in **Item 6.8**. Quin reports that simple “reserve estimates” were made on the No. 2 vein, based on the 1988 underground diamond drilling and on the 1988, and 1987, and historical underground sampling that is detailed in **Item 10.**

TABLE 11-3
ROCHER DEBOULE MINE DRILL HOLE ASSAY RESULTS
SOUTHER GOLD RESOURCES 1988 DATA
(from Quin 1989)

Drill Hole	From (meters)	To (meters)	Intercept (meters)	Cu %	Ag OPT	Ag g/t	Au OPT	Au g/t
RDU 88-1	44.27	46.40	2.13	1.49	2.63	90.2	0.018	0.62
RDU 88-3	29.15	29.85	0.7	4.17	36.72	1259	0.081	2.78
RDU 88-4	27.80	28.96	1.16	4.51	0.81	27.8	0.041	1.41
and	40.91	41.98	1.07	0.80	3.79	129.9	0.041	1.41
RDU 88-7	61.65	62.20	0.55	6.55	12.53	429.6	0.177	6.07
RDU 88-8	50.88	53.66	2.78	3.77	4.04	138.5	0.381	13.06
including	52.38	53.66	1.28	4.92	2.42	83	0.765	26.23
RDU 88-9	31.46	32.84	1.37	1.29	1.04	35.7	0.008	0.27
RDU 88-10	40.34	41.46	1.13	3.4	35.87	1229.8	0.021	0.72
RDU 88-12	30.30	31.43	1.13	0.66	3.01	103.2	0.007	0.24
RDU 88-13	61.40	66.95	5.55	3.07	7.72	264.7	0.219	7.51
including	62.10	63.48	1.83	6.86	19.46	667.2	0.12	4.11
and	66.28	66.95	0.67	1.65	3.2	109.7	1.26	43.2

TABLE 11-4
ROCHER DEBOULE MINE DRILL HOLE DATA 1988
Located on 1202 W Drift & in 1988 Drill Cross-Cut (Quin 1989)

Hole	Depth (Meters)	Section	Azimuth (degrees)	Dip (degrees)
RDU 88-1	62.6	0 + 25' W	340	-5
RDU 88-2	76.2	0 + 25' W	340	-16
RDU 88-3	47.3	0 + 25' W	340	+30
RDU 88-4	47.6	0 + 25' W	349	+70
RDU 88-5	70.4	0 + 25' W	340	-50
RDU 88-6	73.2	0 + 50' W	323	-12
RDU 88-7	97.9	0 + 50' W	314	-16
RDU 88-8	66.8	0 + 90' W	308	-8.5
RDU 88-9	54.9	0 + 50' W	308	+25
RDU 88-10	64.0	0 + 90' W	298	+7
RDU 88-11	66.5	0 + 10' E	344	-10
RDU 88-12	44.2	0 + 30' E	360	+28
RDU 88-13	71.6	1 + 00' W	014	-9
RDU 88-14	48.5	1 + 00' W	018	+6

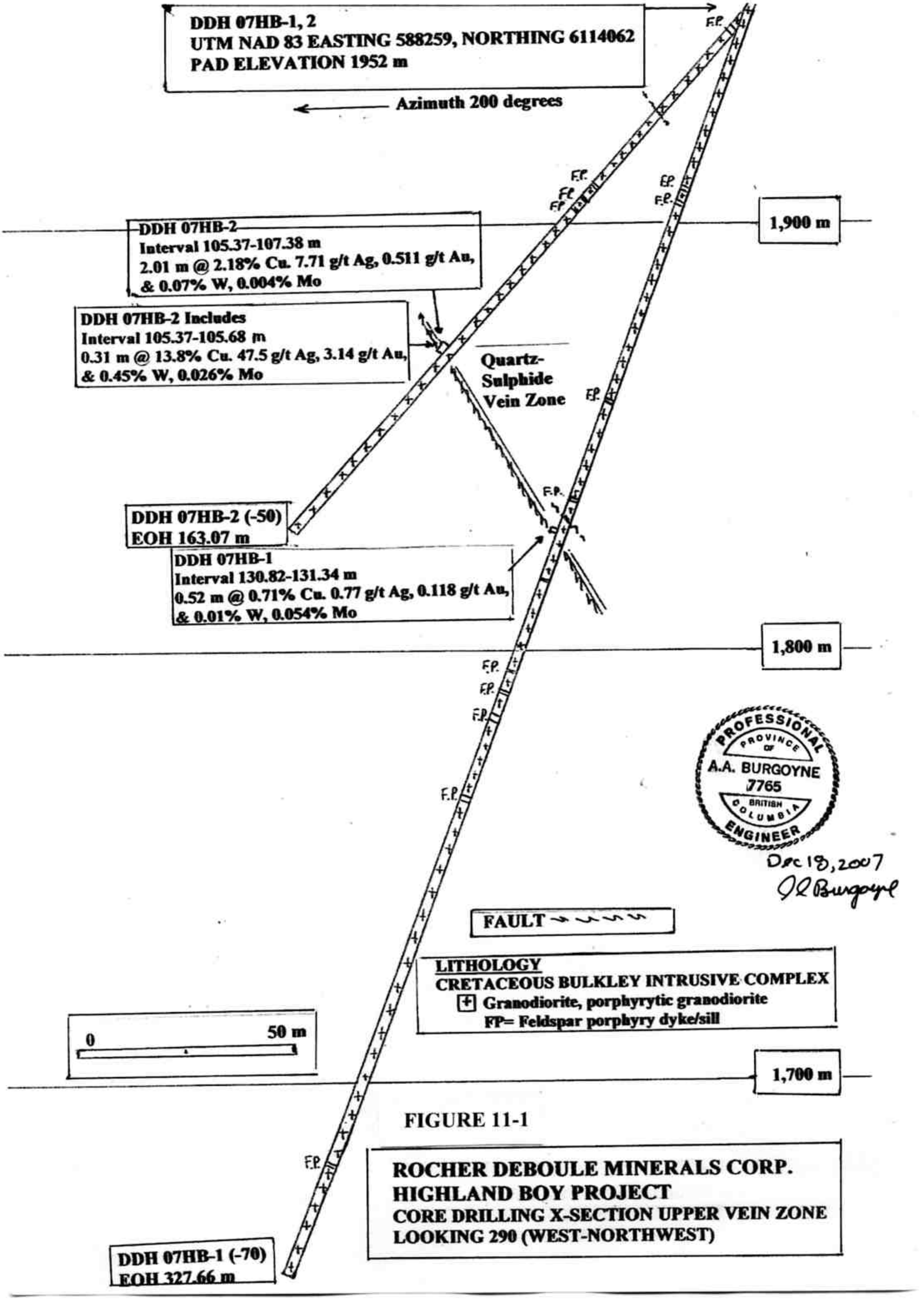

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FIGURE 11-1

ROCHER DEBOULE MINERALS CORP.
HIGHLAND BOY PROJECT
CORE DRILLING X-SECTION UPPER VEIN ZONE
LOOKING 290 (WEST-NORTHWEST)

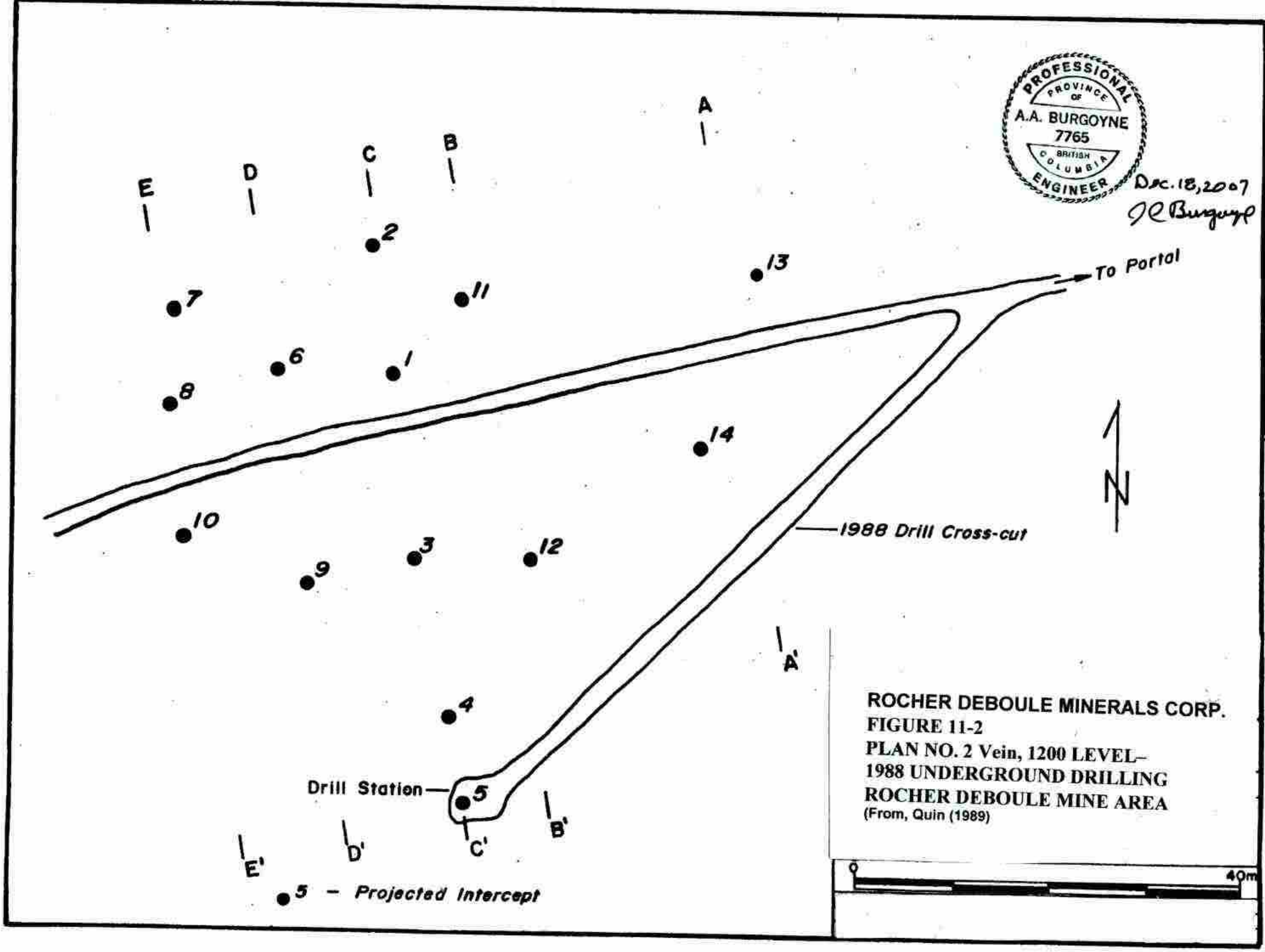

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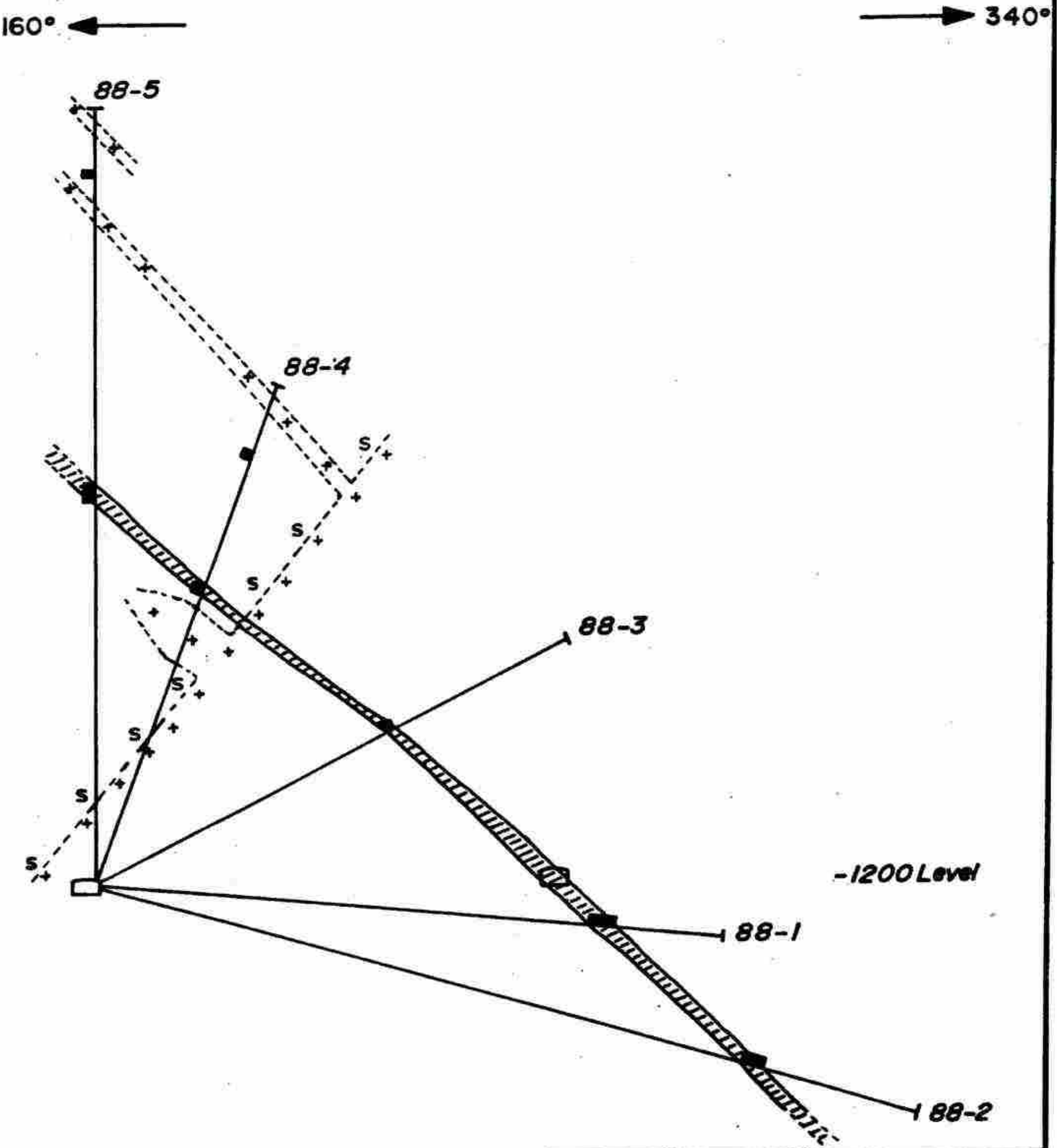
FIGURE 11-2
PLAN NO. 2 Vein, 1200 LEVEL–
1988 UNDERGROUND DRILLING
ROCHER DEBOULE MINE AREA
(From, Quin (1989)



LEGEND

+ ....Granodiorite

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FIGURE 11-3
PLAN NO. 2 Vein, 1200 LEVEL–
SECTION C-C', 1988 Drilling – NO. 2 VEIN
ROCHER DEBOULE MINE AREA
(From, Quin (1989)

0 10 20 30m

12.0 Sampling Method and Approach

During the 2007 Rocher Deboule diamond-drilling program core boxes from the 6 drill holes were transported to Hazelton and laid out in sequence for visual inspection and photographic record. Geological and mineralogical data was recorded with visual observations in the form of drill log. The core was laid out in a manner whereby data for variance in mineral, alteration and structure could be recorded. The core was half split using a manual, screw-tightened vice core-splitter. Split core samples were placed in marked poly bags and shipped to ASL Chemex North Vancouver, BC for 4 acid-near total digestion (ALS Code ME-MS61) 48 element ICP geochemical analyses. The remaining 1/2 split core was returned to the box as an oriented specimen and placed back in marked core boxes. Sample intervals varying in width from 0.31-2.63 m, resulting in a total of 97 split core samples. After the core was examined, photographed, and split, core boxes were labelled and lids were fastened. The core boxes were cross-stacked >1 m high for storage.

The Rocher Deboule Minerals Corp. 2001-2002 and 2004, and 2007 rock sampling programs consisted of samples taken across widths ranging from 0.2-1.5 metres. Rock chip samples consisted of acorn to walnut sized chips taken with rock hammer and maul averaging 2.5 kg in weight. Samples were placed in marked poly bags and shipped to Pioneer Labs, Richmond, B.C. for 30 element Induced Couple Plasma (ICP) and gold geochemical analysis. Silt fraction stream sediment samples were taken with a shovel from active stream channels and were wet screened through -20 mesh screens. Stream sediment samples were placed in marked kraft envelopes and shipped to Pioneer Labs, Richmond, B.C. for 30 element ICP and gold geochemical analysis. The soil samples in the 2004 and 2007 programs were taken from 0.3 to 0.55 m depth and averaged 0.5 kg in weight.

Soil samples were taken with a grub hoe and consist of talus fines, the soil horizon is poor to moderately well developed in the grid area and the soil sample material is considered to be weathered ‘C’ horizon. Samples were placed in marked kraft bags and shipped to Acme Labs in Vancouver, BC and Pioneer Labs in Richmond, BC for 30 element ICP and gold geochemical analyses (2004 program) and to Pioneer Labs in Richmond, BC (2007 program). Lines were surveyed with Garmin C60 GPS, hip chain and compass. Flagging, and aluminium tags were used to mark stations at 50 m intervals. Slope correction distance was adjusted with the use of clinometer readings.

The majority of the sampling results reported in this report are for the underground sampling completed by Western Uranium Cobalt Mines Ltd. in the early 1950’s and that for Southern Gold Resources in 1987. There are no written descriptive reports on the “methodology” of the 1950’s sampling except that it is reported as channel sampling. Results from the various mine sampling programs are reported and verified by M.W. Jasper P.Eng., Resident Mine Engineer in Jasper (1952). Also, these sampling results were reviewed by Kohanowski (1951), Associate Professor of Mining Geology, University of North Dakota and Assistant State Geologist, State of North Dakota, and he was in complete agreement with these results. The assay methods and laboratory used are not reported.

The samples for the Victoria Mine, reported on by Sutherland Brown (1960), were all taken by Government geologists of the British Columbia Department of Mines or the Geological Survey of Canada. The samples date mostly from 1949 but also from 1940.

The Southern Gold Resources underground and surface sampling program is reported by Quin (1987) and Quin (1989). All underground samples were chipped channel samples and surface samples included chipped channel and grab samples. From reading the description of the work it appears that Quin was quite careful in his sampling and duplicate channel samples are reported. The samples were submitted to Acme Analytical Labs of Vancouver, BC for analyses.

13.0 Sample Preparation, Analyses & Security

Sample collection and analyses methods and procedures prior to 1960 are not known.

Rock samples for analyses, collected by Southern Gold in 1987 and 1988, were transported from the site by vehicle to Smithers and shipped by commercial transport to Acme Analytical Labs in Vancouver, BC. The samples were crushed, pulverized and analyzed. Gold was done by traditional fire assay methods. All lead, zinc, and copper and silver analyses were done by Induced Couple Plasma; however, all high values were resubmitted for conventional assay methods including silver, which was done by traditional fire assay. All gold values were reported as ounces per ton. All other values were reported as parts per million except when samples were reanalyzed by conventional assay methods gave copper, lead and zinc in percent and silver in ounces per ton. The laboratory analyses are considered accurate, as a reputable laboratory, such as Acme, would have used internal checks and standards.

Rock samples collected by Rocher Deboule Minerals Corp. during the 2001/2002 and 2004 programs were delivered to Pioneer Labs of Richmond, BC. During the 2007 program all samples, except drill core, were sent to Pioneer Labs for analysis; the split drill core was sent to ALS Chemex Labs in North Vancouver for analysis. Qualified Person, Andris A Kikauka, P.Geo supervised core sampling and logging. Here the samples were crushed and pulverized and analyzed by Induced Couple Plasma for all elements, except gold, which was done independently as a Geochemical analyses by a combined fire assay and atomic absorption method. All element except gold were expressed in parts per million. Gold analyses was expressed in both parts per billion and parts per million. The ICP multi-element analyses used a 0.5-gram sample digested with 3 ml of aqua regia diluted to 10 ml of water. Gold analysis uses a 10-gram sample digested with aqua regia, methyl isobutyl ketone extracted (MIBK), graphite furnace and atomic absorption finished to 1 part per billion detection.

Split core samples from the 2007 program were placed in marked poly bags and shipped to ASL Chemex North Vancouver, BC for 4 acid-near total digestion (ALS Code ME-MS61) 48 element ICP geochemical analyses.

The security programs for rock samples for the pre 1960 (Western Uranium Cobalt Mines Ltd) and the 1987 Southern Gold Resources sampling is not known nor recorded. The rock, soil, and silt samples collected by Rocher Deboule Minerals Corp. were personally collected by Mr. Andris Kikauka, P.Geo, and delivered personally by him to Pioneer Labs in Richmond, BC and Acme Labs in Vancouver, BC during the 2001/2002 and 2004 programs. During the 2007 program Andris Kikauka, P.Geo., Sean Derby, Geologist and Dan Ethier, geological technician collected the rock and soil samples.

Acme Labs of Vancouver, BC is an ISO 9001:2000 accredited with certificate number FM63007. ALS Chemex Labs of North Vancouver, BC is an ISO 9001:2000 and ISO 17025 accredited. They are also a member of the Standards Council of Canada Accredited Laboratories. Pioneer Labs of Richmond, BC is a fully accredited analytical laboratory. The laboratories have stated that the data generated for Rocher Deboule Minerals Corp. samples carried out in 2004 to 2007, was performed in each respective lab by university graduate and post-graduate personnel whom have degrees in analytical chemistry. In addition to maintaining a high level of qualified personnel. Regulatory authorities recognize all of the subject labs.

14.0 Data Verification

Much of the information used in the preparation of this report is on public record in the form of assessment reports filed with the BC Ministry of Energy and Mines and in their respective geological and mining publications. The writers have no reason to doubt the quality or veracity of these data. All of the exploration work conducted since 1951, with subsequent reporting, was performed by competent, qualified persons. The writers have completed site visits to the Property. Kikauka has visited all showings on the property whereas Burgoyne has evaluated the Rocher Deboule mine and Cap showing. The writers have collected surface samples for visual evaluation during the course of the field examinations. A substantial amount of surface and underground sampling has been done since 1951 to provide a reasonable assessment of average grades on the Property.

The sampling programs underground and on surface by Western Uranium Cobalt Mines Ltd. (1952), Southern Gold Resources Ltd. (Quin 1987, 1989), Sutherland Brown (1960) and Rocher Deboule Minerals Corp. in 2001/2002, 2004 and 2007 confirm the general tenor and extent of the precious-base metal quartz-sulphide veins that are present on the Rocher Deboule Property.

The concept and undertaking of quality control/quality assurance as known today was not present during the Southern Gold 1987 & 1988 programs and earlier Western Uranium Cobalt Mines programs. Field blanks and manufactured reference samples provide indications of absolute accuracy of the sampling and assaying procedures. It is clear from a review of the data that sampling and subsequent analyses were taken with care and diligence; however, the concepts of using extensive duplicate, field blank, and reference standard samples, as we know today, was normally not undertaken. These historic sampling programs had no data verification scheme in place (that is used in present day quality control/quality assurance programs) other than some assay duplicates (identical samples taken at source), as was customary at that time. There is also no record of any check assay program being initiated.

The Rocher Deboule Minerals sampling method, preparation, analyses and security program is the only modern one and was done according to good-practise industry standards.

A detailed review, was completed by the writers, of all underground and surface rock sampling programs done on the Property and included:

- A geological and mineralization in-depth review and on-site evaluation of the Rocher Deboule mine, the Victoria mine, the Highland Boy, Cap and Golden Wonder showings;
- Review and confirmation of the location of all historical underground workings, rock sampling programs, trench/surface sampling programs and drill hole locations (where appropriate);
- A review of all technical reports dealing with the Property and many maps and sections;
- Technical discussions with the representatives of Rocher Deboule Minerals Corp.

15.0 Adjacent Properties

The Rocher Deboule Property is located within the Hazelton Mountain Range of central British Columbia. This is a very prolific mineralized belt for a variety of metals and styles of mineralization.

The Red Rose mine is located 11 km south of Hazelton and 1.5 km southeast of the Rocher Deboule Property. Note **Figure 7-2**. The Red Rose (Kikauka 2002) mineral occurrence consists of a quartz vein system, which contains variable amounts of tungsten, copper, gold, silver, molybdenum, and uranium. Siltstone and argillite of the Middle Jurassic to Lower Cretaceous Bowser Lake Group are intruded by the Late Cretaceous Rocher Deboule granodiorite stock of the Bulkley intrusive complex. Sediments are hornfelsed and are intruded by a set of northeast trending diorite dykes that predate the Rocher Deboule stock. Bedding in the sediments strikes 015 degrees and dips 70 west. The Chicago Creek Fault, striking 010 degrees and dips 70 west, cuts all rocks and is a normal fault with dip-slip of 600-900 metres. The Red Rose vein occupies a shear zone that trends 145 degrees and dips 65 west and is hosted in a diorite dyke. The vein is 1.2 to 2.8 metres wide, 60-120 metres along strike and at least 335 metres down dip. The vein consists largely of quartz with lesser feldspar, biotite, hornblende, ankerite, tourmaline, apatite, scheelite, ferberite, chalcopyrite, pyrrhotite, molybdenite, and uraninite. Extensive lenses of chalcopyrite occur in the hanging wall shear. The biggest concentrations of radioactive material are erratically distributed with molybdenite in the wall rocks. Between 1942 and 1954, 103,424 tonnes or ore produced 1,002,839 kg of tungsten. Probable “reserves” listed in a company report are 13,606 tonnes grading 1.18 % tungsten or 1.5% tungsten trioxide. This reserve is most likely a “resource” and is neither CIM nor 43-101 compatible. The Red Rose also contains quartz veins with reported assay values greater than 17 grams per tonne gold and silver, which occur with chalcopyrite and/or tetrahedrite.

The Armagosa is located on the north side of Armagosa Creek and approximately 600 metres south of the Great Ohio veins. A steep gully on the south side of a ridge trends 030 degrees and dips 60 degrees west. This gully follows a quartz-sulphide fissure vein system with chalcopyrite-magnetite-scheelite hosted in hornfelsic greywacke and siltstone/argillite. Old workings are at 1,325-1,463 metre elevations. There are two adits and one small shaft. The lower adit is at 1,322 metres and the upper adit is at 1,408 metres where a 45.7 metre long crosscut trends 360 degrees and cuts a 030-degree trending shear zone.

Within approximately 150 kilometres of the Rocher Deboule Property there are no less than eleven large porphyry or porphyry–style copper-molybdenum, copper-gold, molybdenum, and molybdenum-tungsten deposits. Grades are typically low to medium ranging from 0.30 to 0.48% copper, 0.013 to 0.192 % molybdenum, 0.041 % tungsten and 0.03 to 0.8 grams per tonne gold. The deposits range from 20.6 million tonnes to perhaps 250,000,000 tonnes. These deposits have been systematically explored for many years and mineral resources / mineral reserves are reported for all of them. The deposits include: Bell-Granisle (Cu-Au), Berg (Cu-Mo), Big Onion (Cu-Mo), Endako (Mo), Huckleberry Main & East Zones (Cu-Mo-Au), Kitsault (Mo), Louise Lake (Cu-Mo), Poplar (Cu-Mo), and York Hardy (Mo-W). Endako, currently Canada’s largest molybdenum producer, and Huckleberry are in production. For a detailed review of these deposits the reader is referred to CIM Special Volumes 15 and 46 by Schroeter (1995) and Sutherland Brown (1976). There are also other small base metal vein and replacement deposits including the Duthie (Pb-Zn) and Hearne Hill (Cu-Au).

The writers are unable to verify the above information and the information is not necessarily indicative of the mineralization on the Rocher Deboule property.

16.0 Mineral Resource

The historical resource and reserve estimates are discussed in **History, Item 6.3**; they are not compliant with either National Instrument 43-101 or CIM standards and are only relevant for information and documentation in a historical sense. **The Issuer should not treat the historical resource/reserve as current resources/reserves.**

Rocher Deboule Minerals Corp. has not completed any resource estimates. The information on historical "resource" and "reserve" estimates in Item 6.3 is given for information purposes only. The estimates are not considered reliable or relevant today and the writers have not classified the historical estimates as current mineral resources/reserves. The historical resource estimates should not be relied upon.

17.0 Mineral Processing and Metallurgical Testing

There is no documented report(s) on mineral processing and metallurgical testing.

18.0 Interpretation & Conclusions

1. The authors have completed a detailed technical evaluation of the Rocher Deboule Property that includes the Rocher Deboule Mine, the Victoria Mine and the Great Ohio, Highland Boy Cap, and Golden Wonder vein workings. The preparation of this technical report included certain due diligence procedures. It is concluded that the technical field work, office data compilation, and reporting of data, completed by previous owners/operators including Western Uranium Cobalt Mines Ltd, Southern Gold Resources Ltd. and now by Rocher Deboule Mineral Resources Corp., is of good quality and meets good practice industry standards.

2. The objective of the exploration mapping and surface sampling, and other surveys undertaken by Rocher Deboule Mineral s Corp. in 2001-2002 and 2004, and 2007 over the projected Rocher Deboule and Highland Boy veins, was to confirm, on the ground, the extent and grade of the veins known to exist. A second objective was to consider the possibility of an Iron Oxide-Copper-Gold (IOGC) deposit potential as defined by stream sediments anomalous in copper, lead, zinc, arsenic, cobalt, iron, silver and gold and other elements.

3. Based on the host lithologies and mapped alteration assemblages, the Rocher Deboule Property is classified as a high sulfidation, intrusive (sediment) hosted, epithermal gold – silver – base metal vein-shear deposit. The Property lies on the northwestern margin of a granodiorite pluton intruded into sediments and volcanics where a series of precious-base metal quartz-sulphide veins have had historical mine production.

4. The economic potential and Property merit is to be found not only in the historical quartz-sulphide veins but in mineralization and alteration that has copper-gold porphyry and/ or iron oxide-copper-gold (IOCG) affinities and potential where mineralization is found as veins, disseminations and breccias.

5. On the Property, the Rocher Deboule mine No.2 vein, on its western and eastern parts, contains potential economic gold-silver-copper mineralization and further exploration is warranted. Also, the No. 4 vein is open on strike to the east. From VLF-EM conductivity data, the main follow up targets occur within 200 meters of the intrusive contact with the volcanic/sediment country rock at 1,600-1,750 m (5,248-5,740 ft) elevation (approx. 50-150 m from the #4 Vein). Data compilation suggests additional targets occur on the relatively unexplored #1, #2A, and #3 Veins as well as dip and strike extensions of the #2 Vein.

6. At the Victoria mine further exploration is warranted along trend to define additional mineralization.

7. All of the mineral showings described in detail, with certain exceptions, on the Rocher Deboule Property comprise vein fillings of shear zones, normally in close proximity to the margin of the Rocher Deboule stock. These mineralized shears closely parallel one set of orthogonal joint pattern caused by the cooling of the stock. The veins all strike in a northeasterly to easterly direction and dip approximately 55 degrees to the north. The veins are found over significant lengths of shear zone, e.g., on the Highland Boy – Rocher Deboule system a strike length of perhaps in excess of 1500 metres and a dip length in excess of 200 metres is indicated. However, economic mineralization, as defined by mining on the Rocher Deboule mine, occurred

over short strike lengths of 30 – 75 metres and was concentrated in near vertical shoots, e.g., the No. 4 vein at the Rocher Deboule mine.

8. It must be stressed that the vein systems known on the Rocher Deboule Property could be part of a much larger hydrothermal system that are indicative of a porphyry copper (gold) system laterally or possibly at depth. Hydrothermal vein systems, like Rocher Deboule, can be outboard of a typical hydrothermally altered porphyry copper (gold) system. From an exploration concept further evaluation should be focussed to the west of the Rocher Deboule and Victoria mines towards and into the sediments (uJB) and volcanics (uKB) to define porphyry style mineralization and alteration

9. The primary exploration and development objective is to complete an exploration program that will focus on the undertaking of surface geological mapping and rock sampling that is directed at the scope and nature of hydrothermal alteration. This would be followed by testing the potential for precious metal-chalcopyrite-quartz veins and porphyry-style alteration and mineralization by diamond drilling. Prior to this, the road access to the Property up Juniper Creek, from Highway 16 on the Skeena River, must be repaired and maintained.

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19.0 Recommendations

The Rocher Deboule Property, located over the historic Rocher Deboule and Victoria Mines, the Great Ohio, Highland Boy, and Cap, and Golden Wonder vein workings, should be advanced by further surface exploration.

On the Property, the Rocher Deboule mine No.2 vein, on its western and eastern parts, contains potential economic gold-silver-copper mineralization and further exploration is warranted. Also, the No. 4 vein is open on strike to the east. The No. 1 vein has anomalous surface geophysics and geochemistry and is open. From VLF-EM conductivity data, the main follow up targets occur within 200 meters of the intrusive contact with the volcanic/sediment country rock at 1,600-1,750 m (5,248-5,740 ft) elevation (approx. 50-150 m from the #4 Vein). Data compilation suggests additional targets occur on the relatively unexplored #1, #2A, and #3 Veins as well as dip and strike extensions of the #2 Vein.

It is the writers opinion that the character and favourable underground and surface sampling results for precious and base metals (Cu-Ag-Au and W-Mo-Co-As) obtained to date by Rocher Deboule Resources Corp., Southern Gold Resources Ltd., Western Cobalt Uranium Mines Ltd., and others, are of sufficient merit to warrant the following programs as detailed below. A two phase program consisting of core drilling, geological mapping, core drilling, and litho-geochemical sampling, and road improvement followed by additional diamond drilling, and further geological mapping are proposed. Prior to commencement of fieldwork, a detailed evaluation of the Fugro airborne geophysical survey, done in 2007, should be completed.

The recommended Phase One core drilling program of 800 meters will be done from 4 drill pads located 50 m NNW of and upslope of surface trace of west portion of Rocher Deboule No 2 Vein on claim 374216) are listed as follows:

Hole 1 Zone 9 UTM NAD 83 Northing 6113490, Easting 586200, elevation 1550 m, dip -90, depth 200 m
Hole 2 Zone 9 UTM NAD 83 Northing 6113500, Easting 586250, elevation 1530 m, dip -90, depth 200 m
Hole 3 Zone 9 UTM NAD 83 Northing 6113510, Easting 586300, elevation 1510 m, dip -90, depth 200 m
Hole 4 Zone 9 UTM NAD 83 Northing 6113520, Easting 586350, elevation 1490 m, dip -90, depth 200 m

The object of this proposed geological fieldwork is to test the Rocher Deboule No.1, No. 2, and No. 4 veins, and Victoria No. 1 vein. Concurrent with this, a program of drilling, possible hand trenching, geological mapping and rock chip sampling is required to outline further extensions of other known mineral occurrences and veins including Highland Boy, Cap, and Golden Wonder. Surface geological mapping should be directed at the scope and nature of hydrothermal alteration specifically covering Rocher Deboule and Victoria mines and Cap, and other showings. Also determine how this is related to the underlying structural controls and especially to test the potential for porphyry-style alteration and mineralization. This geological mapping should focus not only at confirming the potential and extension of additional precious–base metal quartz-sulphide veins, but also for iron oxide-copper-gold and/or copper-gold-base metal porphyry alteration and mineralization.

A detailed budget of this two-phase exploration program is given in **Tables 19-1** and **19-2**. The Phase One portion totals $232,500 and the Phase Two program $350,000.

TABLE 19-1
PHASE ONE RECOMMENDED EXPLORATION PROGRAM & BUDGET

FIELD CREW- Geologist, and geo-technician, 42 days		$ 25,000
FIELD COSTS-Assays 250 Samples		9,400
	Geological/Geochemical Survey	15,000
	Geological Evaluation of Fugro Airborne Survey	10,000
	800 m core drilling @ $100/ meter	80,000
	Equipment and Supplies	2,000
	Communication	900
	Food	2,400
	Transportation & Helicopter	63,600
	Road Improvement	7,350
REPORT PREPARATION		1,850
	Contingency	15,000
	Total	**$ 232,500**

Assuming favourable Phase One results the following Phase Two program is recommended.

TABLE 19-2
PHASE TWO RECOMMENDED EXPLORATION PROGRAM & BUDGET

FIELD CREW- Geologist, 1 Geo-technician, 1 cook 120 days		$ 46,000
FIELD COSTS- Core drilling, (1,800 meters) 150,000		
	Assays 900 Samples	20,500
	Equipment and Supplies	4,000
	Communication	3,000
	Food	6,500
	Transportation & Helicopter	98,000
REPORT		2,000
	Contingency	20,000
	Total	**$ 350,000**

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21.0 SIGNATURE PAGE

The report titled “Technical Report on the Rocher Deboule Property, Rocher Deboule Range, Omineca Mining Division, British Columbia for Rocher Deboule Minerals Corp.” dated December 18, 2007 was prepared and signed by the following authors.

(Signed and Sealed)
A. A. Burgoyne, P.Eng., M.Sc.,

Consulting Geologist
Burgoyne Geological Inc.

Dated at North Saanich, British Columbia
December 18, 2007

(Signed and Sealed)

Andris Kikauka, P.Geo.

Consulting Geologist
Geo-Facts Consulting

Dated at Sooke, British Columbia
December 18, 2007

22.0 CERTIFICATE - STATEMENT OF QUALIFIED PERSON

BURGOYNE GEOLOGICAL INC.
Consulting Geologists & Engineers

548 Lands End Road
North Saanich, BC, Canada
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TEL / FAX (250) 656 3950

A.A. (Al) Burgoyne, P.Eng. M.Sc.

I Alfred A. Burgoyne hereby certify:

1. I am an independent consulting Geologist employed by Burgoyne Geological Inc. with residence and office at 548 Lands End Road, North Saanich, BC, CANADA, V8L 5K9.
2. I graduated from the University of British Columbia in 1962 with a Bachelor of Science Degree in Geology and from the University of New Mexico in 1967 with a Master of Science Degree in Geology.
3. I am a registered Professional Engineer in the Association of Professional Engineers and Geoscientists for the Province of British Columbia and am registered as a Fellow of the Geological Association of Canada.
4. I have practiced my profession for 44 years and have been involved in mineral exploration and development in Canada, USA, Latin America (including Mexico), Southeast Asia and Eastern Europe.
5. During this period of professional practice I have been extensively involved in the discovery / definition, recognition and development phases of no less than four major and one small gold deposits in British Columbia, Nevada and Manitoba of which all attained production.
6. Prior to establishing Burgoyne Geological Inc. in 1991 I held several successive positions from 1980 to 1991 as Vice President-Exploration for Breakwater Resources Ltd., Western Canadian Mining Corporation, Cassiar Mining Corporation and Bethlehem Copper Corporation. From 1970 to 1979 I was Exploration Manager of Western Canada for UMEX Corp.
7. I have read the definition of “qualified person” set out in national Instrument 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
8. The report dated December 18, 2007 and titled “Technical Report on the Rocher Deboule Property, Rocher Deboule Range, Omineca Mining Division, British Columbia for Rocher Deboule Minerals Corp.” is based on three weeks of technical evaluation in November and December 2007, Mr. Kikauka has helped in compilation of the Tables and supervised the previous exploration programs in 2001/2002, 2004, and 2007 on the property.
9. A two day site visit was made to the property on June 21 and 22, 2004. The Rocher Deboule mine and Cap showing were examined. The examination covered geology, mineralization, landforms, infrastructure, and old surface and mine workings. The sources of all information not based on personal examination are quoted in the report. The information provided by the various parties is to the best of my knowledge and experience correct.
10. I have written all Items of the report with exception of Items 10, 11. 12, 13, 14,15, and 19 which were co written with Mr. Kikauka. All Items were thoroughly vetted and reviewed by the writer. Item 4. Mineral Tenure was prepared by Terri Piorun of Rocher Deboule Minerals Corp. That as of the date of this certificate, to the best of the qualified person’s knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
11. Numerous maps and sections, especially in respect to underground sampling were supplied by Rocher Deboule Minerals Corp. and reviewed.
12. I am independent of the issuer applying all the tests in section 1.4 of National Instrument 43-101

13. I have read National Instrument 43-101 and Form 43-101FI and the Technical Report has been prepared in compliance with that instrument and form
14. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public of the Technical Report.

Dated at North Saanich, British Columbia this 18th day of December 2007.

(Signed and Sealed)
A. A. Burgoyne, P.Eng., M.Sc.,

Dated at North Saanich, British Columbia
December 18, 2007

Independent Qualified Person
Consulting Geologist
Burgoyne Geological Inc.

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GEOFACTS CONSULTING
Consulting Geologist

406-4901 East Sooke Road
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V0S 1N0
TEL (250) 656 3950

A.A. Kikauka, P.Geo.

I Andris A. Kikauka hereby certify:

1. I am a self-employed consulting Geologist with residence and office at 406-4901 East Sooke Road, Sooke, BC, CANADA, V0S 1N0. I am a Director of Rocher Deboule Minerals Corporation and I have a direct interest in the subject property, as part of a stock option agreement dated Sept 4, 2007, I am entitled to purchase 100,000 shares of Rocher Deboule Minerals Corporation at $0.55 up to and including Sept 4, 2012
2. I graduated from Brock University in 1980 with Honours Bachelor of Science Degree in Geology.
3. I am a registered Professional Geoscientist (18,275) in the Association of Professional Engineers and Geoscientists for the Province of British Columbia and am registered as a Fellow of the Geological Association of Canada (F5717).
4. I have practiced my profession for 21 years and have been involved in mineral exploration and development in Canada, USA, Latin America (including Mexico).
5. During this period of professional practice I have been extensively involved in the discovery / definition, recognition and development phases of gold deposits in British Columbia and Mexico which have attained production.
6. Prior to establishing Geofacts Consulting in 1996, I held several successive positions from 1981 to 1995 with numerous mining companies such as Rayrock Mines, Anaconda Canada Exploration, Skyline Explorations, Gulf International Minerals, Inel Resources, Navarre Resources, Verdstone Gold, Molycor Gold, and Stirrup Creek.
7. I have read the definition of “qualified person” set out in national Instrument 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101. The report dated December 18, 2007 and titled “Technical Report on the Rocher Deboule Property, Rocher Deboule Range, Omineca Mining Division, British Columbia for Rocher Deboule Minerals Corp.” is based on three weeks of technical evaluation on the property in July and September, and December 2007.
8. I have been on the Rocher Deboule property performing technical fieldwork on 5 separate occasions which include site visits ranging from 1-7 days in length during Sept, 2001, June, 2004, Sept, 2004, July, 2007, and Sept, 2007. These property examinations dealt primarily with geological mapping, rock chip sampling of mineralization on the Rocher Deboule No 1-4 Veins, Victoria No 1-3 Veins, Highland Boy Upper and Lower Veins, Golden Wonder and Cap occurrences, magnetometer ground surveys, logging drill core from 2007 Highland Boy drilling, recording all relevant technical data pertaining to geological evaluation of surface and mine workings. The sources of all information not based on personal examination are quoted in the report. The information provided by the various parties is to the best of my knowledge and experience correct.
9. I have assisted in writing Items 10, 11. 12, 13, 14,15, and 19which were co written with Mr. Burgoyne. All Items were thoroughly vetted and reviewed by the writer. Item 4, Mineral Tenure was prepared by Terri Piorun of Rocher Deboule Minerals Corp. That as of the date of this certificate, to the best of the qualified person’s knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
10. Numerous maps and sections, especially in respect to underground sampling were supplied by Rocher Deboule Minerals Corp. and reviewed.

11. I am not independent of the issuer applying all the tests in section 1.4 of National Instrument 43-101
12. I have read National Instrument 43-101 and Form 43-101Fl and the Technical Report has been prepared in compliance with that instrument and form
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public of the Technical Report.

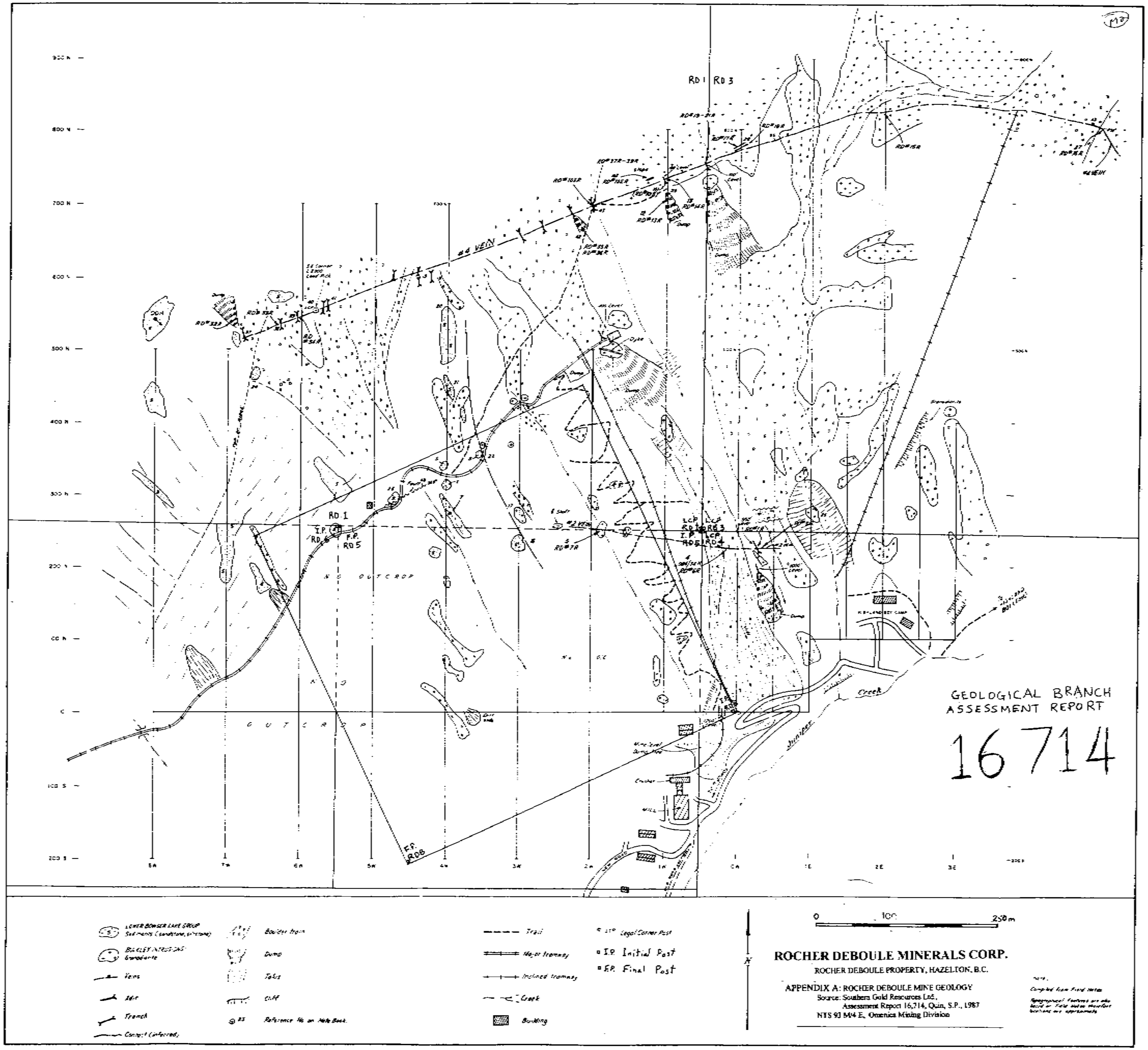
Dated at East Sooke, British Columbia this 18th day of December 2007.

(Signed and Sealed)
A. A. Kikauka, P.Geo.,

Dated at East Sooke, British Columbia
December 18, 2007

Qualified Person
Consulting Geologist
Geo-Facts Cnsulting

APPENDIX A



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16714

ROCHER DEBOULE MINERALS CORP.

ROCHER DEBOULE PROPERTY, HAZELTON, B.C.

APPENDIX A: ROCHER DEBOULE MINE GEOLOGY
Source: Southern Gold Resources Ltd.,
Assessment Report 16,714, Quin, S.P., 1987
NTS 93 M/4 E, Omenica Mining Division

Compiled from Field Notes

APPENDIX B

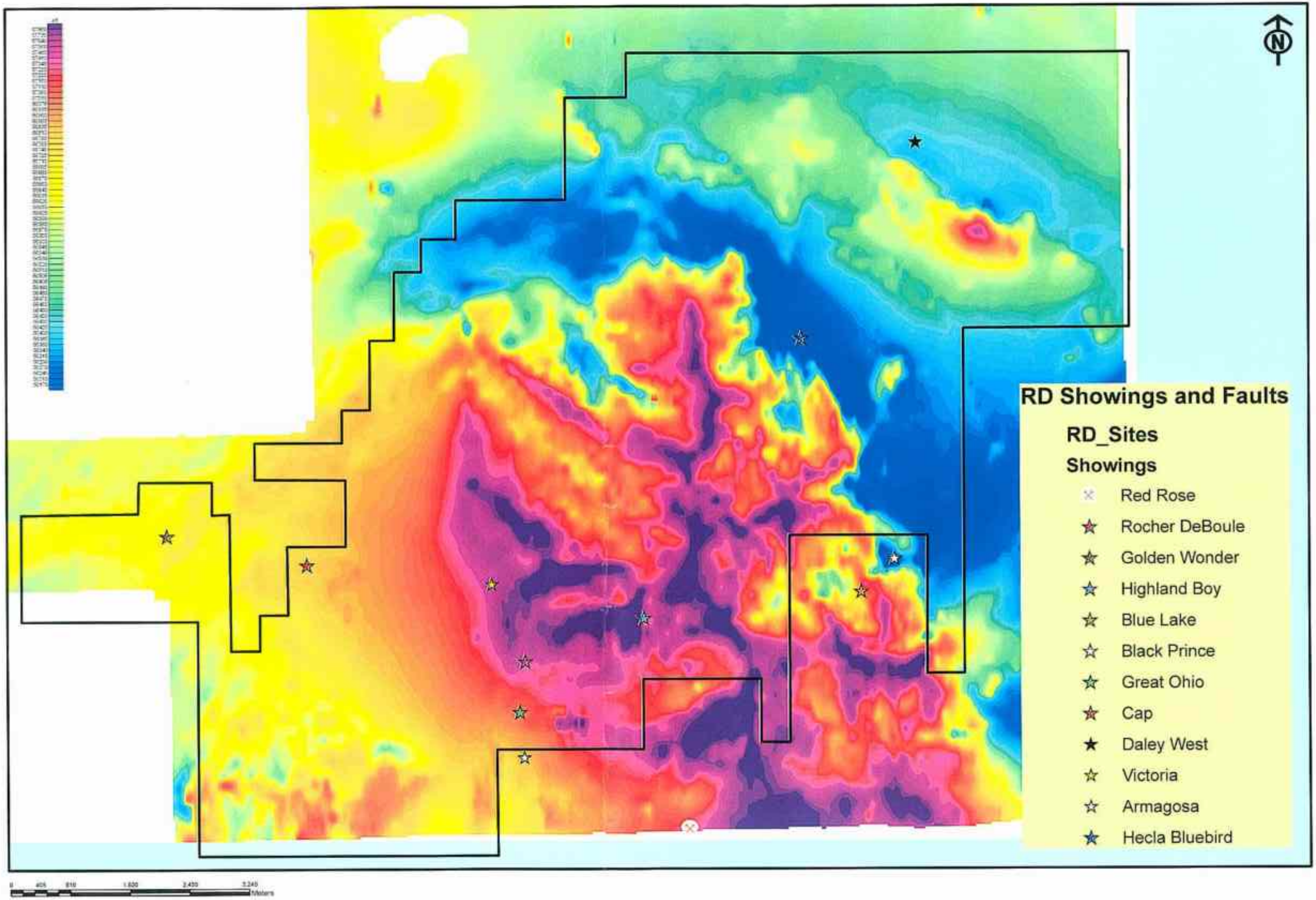
Fugro 2007 Airborne Survey, Rocher Deboule Property Summary Maps

RD – Mag - Total Magnetic Field -

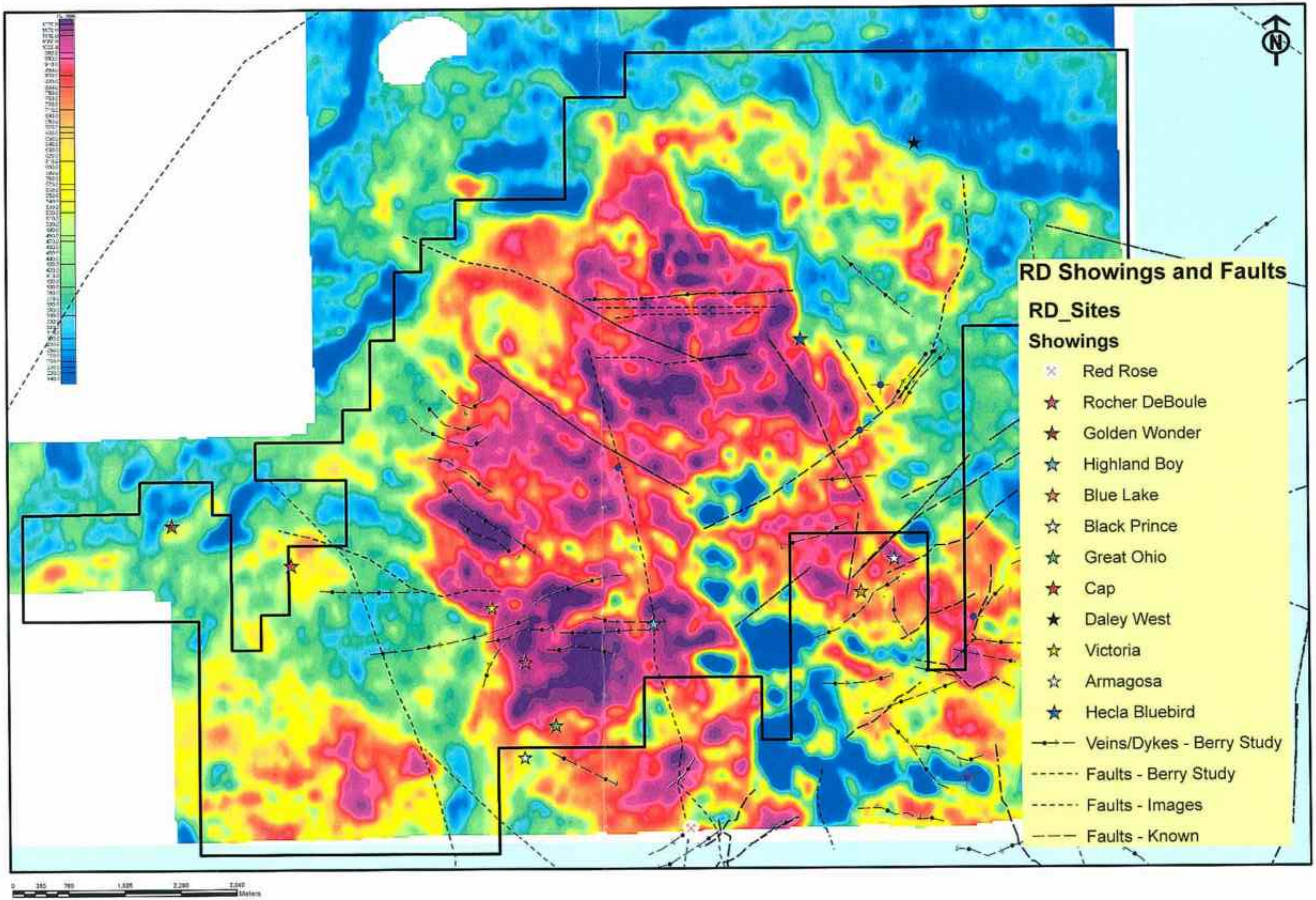
RD – TC Field - Radiometric Total Counts

RD – Resistivity - Apparent Resistivity, 7200 Hz

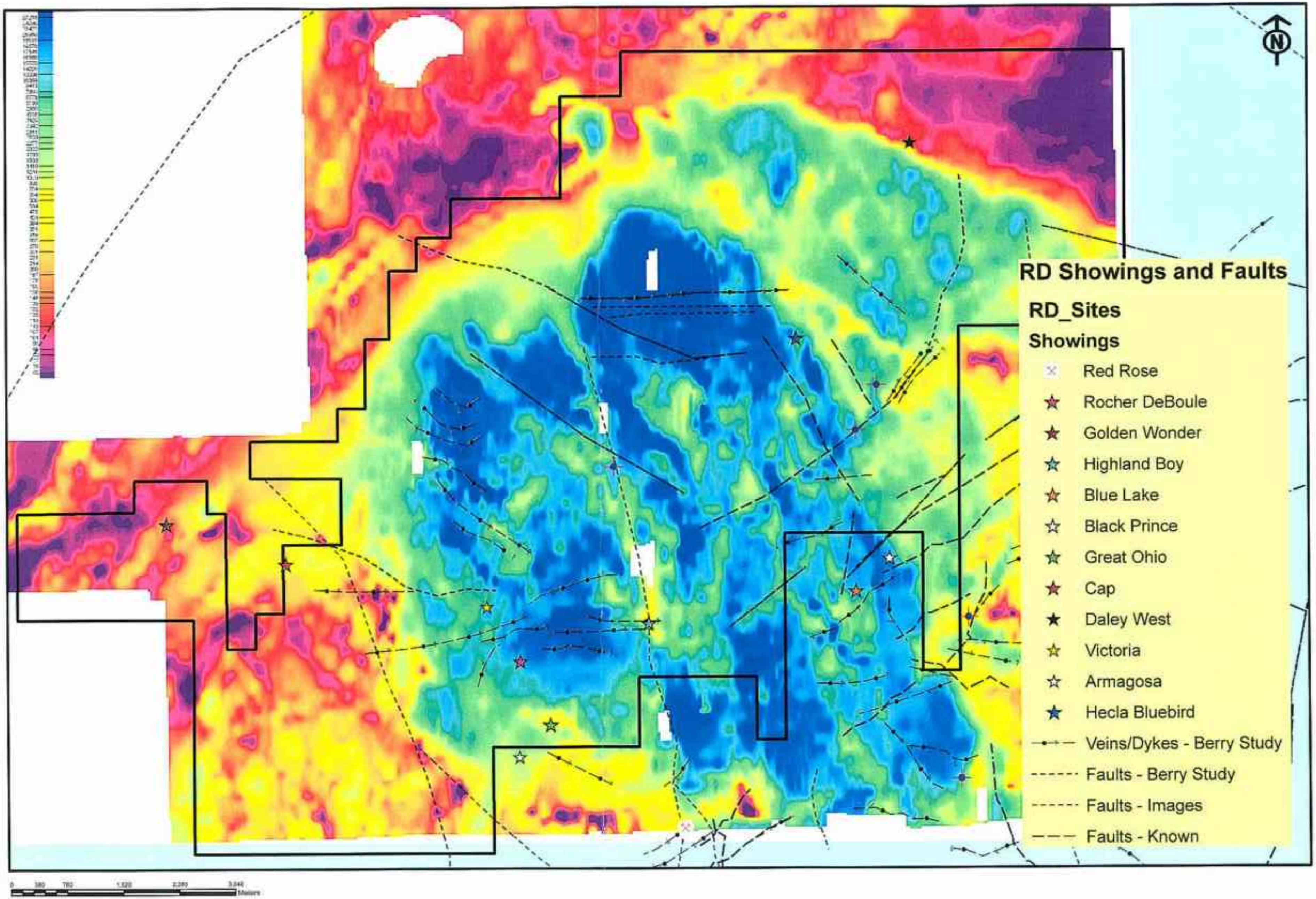
RD - Mag


N
RD Showings and Faults
RD_Sites
Showings
Red Rose
Rocher DeBoule
Golden Wonder
Highland Boy
Blue Lake
Black Prince
Great Ohio
Cap
Daley West
Victoria
Armagosa
Hecla Bluebird
0
405
810
1,620
2,430
3,240
Meters

RD - TC Field


N
RD Showings and Faults
RD_Sites
Showings
Red Rose
Rocher DeBoule
Golden Wonder
Highland Boy
Blue Lake
Black Prince
Great Ohio
Cap
Daley West
Victoria
Armagosa
Hecla Bluebird
Veins/Dykes - Berry Study
Faults - Berry Study
Faults - Images
Faults - Known
0
380
760
1,520
2,280
3,040
Meters

RD - Resistivity 7200 Field



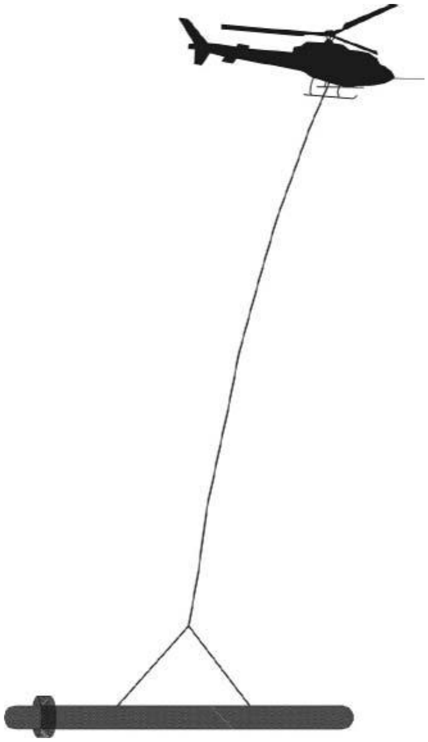
The contract was for 1067 flight line KM for $205,000.00.

	Airborne Survey	**Days**	**Standby**	**GST**	**Total**
02-Jul-07	123,000.00			7,380.00	130,380.00
18-Jul-07	61,500.00			3,690.00	65,190.00
07-Aug-07		8.57	25,713.00	1,542.78	27,255.78
05-Sep-07	20,500.00			1,230.00	21,730.00
					-
	205,000.00		25,713.00	13,842.78	**$ 244,555.78**
			Flight only		$ 217,300.00
			Standby charge		$ 27,255.78

Report #06094

DIGHEM SURVEY
FOR
ROCHER DEBOULE MINERALS CORP.
NEW HAZELTON AREA
BRITISH COLUMBIA

NTS: 93M/4



Fugro Airborne Surveys Corp.
Mississauga, Ontario

September 4, 2007

SUMMARY

This report describes the logistics, data acquisition, processing and presentation of results of a DIGHEM airborne geophysical survey carried out for Rocher Deboule Minerals Corp., over a property located near New Hazelton, British Columbia. Total coverage of the survey block amounted to 1089 km. The survey was flown from July 7 to July 17, 2007.

The purpose of the survey was to detect zones of conductive 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 DIGHEM multi-coil, multi-frequency electromagnetic system, supplemented by a high sensitivity cesium magnetometer and a 256-channel spectrometer. The information from these sensors was processed to produce maps that display the magnetic, radiometric 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 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.

CONTENTS

APPENDICES

1. INTRODUCTION

A DIGHEM electromagnetic/resistivity/magnetic/radiometric survey was flown for Rocher Deboule Minerals Corp., from July 7 to July 17, 2007, over a survey block located near New Hazelton, British Columbia. The survey area can be located on NTS map sheet 93M/4 (Figure 2).

Survey coverage consisted of approximately 1089 line-km, including 98 line-km of tie lines. Flight lines were flown in an azimuthal direction of 90°/270° with a line separation of 150 metres. Tie lines were flown orthogonal to the traverse lines with a line separation of 1500 metres.

The survey employed the DIGHEM electromagnetic system. Ancillary equipment consisted of a magnetometer, radar and barometric altimeter, video camera, digital recorders, a 256-channel spectrometer and an electronic navigation system. The instrumentation was installed in an AS350B3 turbine helicopter (Registration C-FQDA) that was provided by Great Slave Helicopters Ltd. The helicopter flew at an average airspeed of 72 km/h with an EM sensor height of approximately 44 metres. The spectrometer crystal package was housed within the helicopter, with a nominal terrain clearance of 74 metres.

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.

Due to the presence of cultural features in the survey area, any interpreted conductors that occur in close proximity to cultural sources, should be confirmed as bedrock conductors prior to drilling.

Figure 1: Fugro Airborne Surveys DIGHEM EM bird with AS350-B3

2. SURVEY OPERATIONS

The base of operations for the survey was established at Smithers, British Columbia. The survey area can be located on NTS map sheet 93M/4 (Figure 2).

Table 2-1 lists the corner coordinates of the survey area in NAD83, UTM Zone 9, central meridian 129° W.

Table 2-1

	Block	X-UTM (E)	Y-UTM (N)
1	**New Hazelton**	583798	6122785
2		594658	6123004
3		594909	6111259
4		581984	6111002
5		581921	6114402
6		579621	6114360
7		579580	6116678
8		583912	6116758

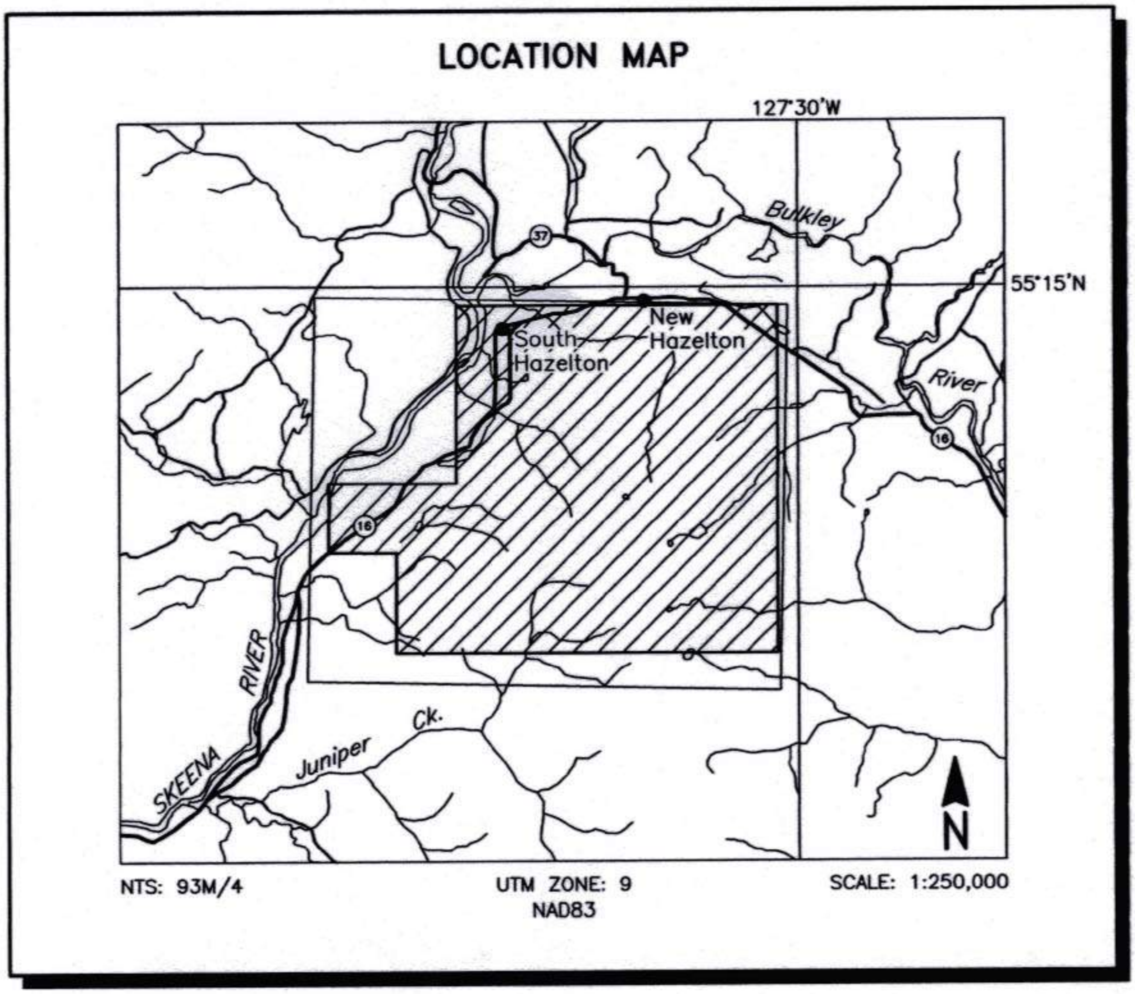


Figure 2
Location Map and Sheet Layout
New Hazelton Survey Area
Job # 06094

The survey specifications were as follows:

Parameter	Specifications
Traverse line direction	90°/270°
Traverse line spacing	150 m
Tie line direction	0°/180°
Tie line spacing	1500 m
Sample interval	10 Hz, 2.0 m @ 72 km/h
Aircraft mean terrain clearance	76 m
EM sensor mean terrain clearance	44 m
Mag sensor mean terrain clearance	44 m
Average speed	72 km/h
Navigation (guidance)	±5 m, Real-time GPS
Post-survey flight path	±2 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 AS350B3 helicopter. This aircraft provides a safe and efficient platform for surveys of this type.

Electromagnetic System

Model:	DIGHEM
Type:	Towed bird, symmetric dipole configuration operated at a nominal survey altitude of 30 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	1125 Hz
211	coplanar	/	900 Hz	875 Hz
67	coaxial	/	5500 Hz	5452 Hz
56	coplanar	/	7200 Hz	7150 Hz
15	coplanar	/	56,000 Hz	56400 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 3.3 m, at a survey speed of 120 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 halfspace) 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 CS3 sensor
Type:	Optically pumped cesium vapour
Sensitivity:	0.01 nT
Sample rate:	10 per second

The magnetometer sensor is housed in the EM bird, 28 m below the helicopter.

Magnetic Base Station

Primary

Model: Fugro CF1 base station with timing provided by integrated GPS

Sensor type: CS3

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 MPXA4115A
- Accuracy: ±3.0º kPa max (-20ºC to 105ºC temp. ranges)
- Resolution: 0.013 kPa
- Sample rate: 1 Hz
- Range: 55 kPa to 108 kPa

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 54.819416° N, 127.1890411° W WGS84.

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.

Sample rate: 10 Hz update.

Accuracy: Better than 1 metre in differential mode.

Antenna: Mounted on nose of EM bird.

Primary Base Station for Post-Survey Differential Correction

Model: Novatel OEM4

Type: Code and carrier tracking of L1 band, 12-channel, dual frequency C/A code at 1575.2 MHz, and L2 P-code 1227 MHz

Sample rate: 0.5 second update

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 is a line of sight, satellite navigation system that utilizes time-coded signals from at least four of forty-eight available satellites. Both Russian GLONASS and American NAVSTAR satellite constellations are used to calculate the position and to provide real time guidance to the helicopter. For flight path processing a Novatel OEM4 was used as the mobile receiver. A similar 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 at latitude 54 ° 49’ 10.56891” N, longitude 127 ° 11’ 20.24542” W at an elevation of 516.54 metres above the ellipsoid. The GPS records data relative to the WGS84 ellipsoid, which is the basis of the revised North American Datum (NAD83).

Radar Altimeter

Manufacturer: Honeywell/Sperry

Model: AA 330 or RT220

Type: Short pulse modulation, 4.3 GHz

Sensitivity: 0.3 m

Sample rate: 2 per second

The radar altimeter measures the vertical distance between the helicopter and the ground. 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/°C or 10 mV/°C (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 and internal operating temperatures. A third sensor in the bird monitors the external operating temperature.

Digital Data Acquisition System

Manufacturer:	Fugro
Model:	HELIDAS
Recorder:	IBM Microdrive

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:	Panasonic WVCL322 Colour Video Camera
Recorder:	Axis 241S Video Server with 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.

Spectrometer

Manufacturer: Exploranium
Model: GR-820
Type: 256 Multichannel, Potassium stabilized
Accuracy: 1 count/sec.
Update: 1 integrated sample/sec.

The GR-820 Airborne Spectrometer employs four downward looking crystals (1024 cu.in.- 33.6 L) and one upward looking crystal (256 cu.in.- 8.4 L). The downward crystal records the radiometric spectrum from 410 KeV to 3 MeV over 256 discrete energy windows, as well as a cosmic ray channel which detects photons with energy levels above 3.0 MeV. From these 256 channels, the standard Total Count, Potassium, Uranium and Thorium channels are extracted. The upward crystal is used to measure and correct for Radon.

The shock-protected Sodium Iodide (Thallium) crystal package is unheated, and is automatically stabilized with respect to the Potassium peak. The GR-820 provides raw or Compton stripped data that has been automatically corrected for gain, base level, ADC offset and dead time.

The system is calibrated before and after each flight using three accurately positioned hand-held sources. Additionally, fixed-site hover tests or repeat test lines are flown to determine if there are any differences in background. This procedure allows corrections to be applied to each survey flight, to eliminate any differences that might result from changes in temperature or humidity.

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 EM calibrations, drift correction of the raw airborne EM data, spike rejection and filtering of all geophysical and ancillary data, verification of 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 30 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 non-normalized 4th difference will not exceed 1.6 nT over a continuous distance of 1 km 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)
1000 Hz	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 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.

Anomalous electromagnetic responses are 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 map 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 includes 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 halfspace. 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 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 7,200 Hz and 56,000 Hz coplanar frequencies are included in the XYZ and grid archives. Values are in ohm-metres on all final products.

Dielectric Permittivity and Magnetic Permeability Corrections[1]

In resistive areas having magnetic rocks, the magnetic and dielectric effects will both generally be present in high-frequency EM data, whereas only the magnetic effect will exist in low-frequency data.

The magnetic permeability is first obtained from the EM data at the lowest frequency, because the ratio of the magnetic response to conductive response is maximized and because displacement currents are negligible. The homogeneous half-space model is used. The computed magnetic permeability is then used along with the in-phase and quadrature response at the highest frequency to obtain the relative dielectric permittivity, again using the homogeneous half-space model. The highest frequency is used because the ratio of dielectric response to conductive response is maximized. The resistivity can then be determined from the measured in-phase and quadrature components of each frequency, given the relative magnetic permeability and relative dielectric permittivity.

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 terrain values, 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 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[2]; and,

(2) Differential resistivity sections, where the differential resistivity is plotted at the differential depth[3].

(3) Occam[4] or Multi-layer[5] inversion.

---

[1] Huang, H. and Fraser, D.C., 2001 Mapping of the Resistivity, Susceptibility, and Permittivity of the Earth Using a Helicopter-borne Electromagnetic System: Geophysics 106 pg 148-157.

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

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

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

[5] 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.

Both the Sengpiel and differential methods are derived from the pseudo-layer half-space model. Both yield a coloured resistivity-depth section that attempts to portray a smoothed approximation of the true resistivity distribution with depth. Resistivity-depth sections are most useful in conductive layered situations, but may be unreliable in areas of moderate to high resistivity where signal amplitudes are weak. In areas where in-phase responses have been suppressed by the effects of magnetite, or adversely affected by cultural features, the computed resistivities shown on the sections may be unreliable.

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.

Total Magnetic Field

A fourth difference editing routine was applied to the magnetic data to remove any spikes. The aeromagnetic data were corrected for diurnal variation using the magnetic base station data. The results were then leveled using tie and traverse line intercepts. Manual adjustments were applied to any lines that required leveling, as indicated by shadowed images of the gridded magnetic data. The manually leveled data were then subjected to a microleveling filter.

Calculated Vertical Magnetic Gradient

The diurnally-corrected total 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 total field map. However, regional magnetic variations and changes in lithology may be better defined on the total magnetic field map.

EM Magnetite (optional)

The apparent percent magnetite by weight is computed wherever magnetite produces a negative in-phase EM response. This calculation is more meaningful in resistive areas.

Residual Magnetic Intensity (optional)

The residual magnetic intensity (RMI) is derived from the total magnetic field (TMF), the diurnal, and the regional magnetic field. The total magnetic intensity is measured in the aircraft, the diurnal is measured from the ground station, and the regional magnetic field is calculated from the international geo-referenced magnetic field (IGRF). The low frequency component of the diurnal is extracted from the filtered ground station data and removed from the TMF. The average of the diurnal is then added back in to obtain the resultant total magnetic intensity. The regional magnetic field, calculated for the specific survey location and the time of the survey, is then removed from the resultant total magnetic intensity to yield the residual magnetic intensity.

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.

Digital Elevation (optional)

The radar altimeter values (ALTR – aircraft to ground clearance) are subtracted from the differentially corrected and de-spiked GPS-Z values to produce profiles of the height above the ellipsoid 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 adjusted to mean sea level. 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, ALTR and GPS-Z. The ALTR 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, <u>THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.</u>

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 20% of the line interval.

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.

Monochromatic shadow maps or images are 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.

Multi-channel Stacked Profiles

Distance-based profiles of the digitally recorded geophysical data are generated and plotted at an appropriate scale. These profiles also contain the calculated parameters that are used in the interpretation process. These are produced as worksheets prior to interpretation, and are also presented in the final corrected form after interpretation. The profiles display electromagnetic anomalies with their respective interpretive symbols. Table 5-1 shows the parameters and scales for the multi-channel stacked profiles.

In Table 5-1, the log resistivity scale of 0.06 decade/mm means that the resistivity changes by an order of magnitude in 16.6 mm. The resistivities at 0, 33 and 67 mm up from the bottom of the digital profile are respectively 1, 100 and 10,000 ohm-m.

Table 5-1. Multi-channel Stacked Profiles

Channel Name (Freq)	Observed Parameters	Scale Units/mm
MAG_FINAL	total magnetic field (fine)	10 nT
MAG_FINAL	total magnetic field (coarse)	100 nT
ALTBIRD	EM sensor height above ground	6 m
CXI1000	vertical coaxial coil-pair in-phase (1000 Hz)	2 ppm
CXQ1000	vertical coaxial coil-pair quadrature (1000 Hz)	2 ppm
CPI900	horizontal coplanar coil-pair in-phase (900 Hz)	4 ppm
CPQ900	horizontal coplanar coil-pair quadrature (900 Hz)	4 ppm
CXI5500	vertical coaxial coil-pair in-phase (5500 Hz)	4 ppm
CXQ5500	vertical coaxial coil-pair quadrature (5500 Hz)	4 ppm
CPI7200	horizontal coplanar coil-pair in-phase (7200 Hz)	8 ppm
CPQ7200	horizontal coplanar coil-pair quadrature (7200 Hz)	8 ppm
CPI56K	horizontal coplanar coil-pair in-phase (56,000 Hz)	10 ppm
CPQ56K	horizontal coplanar coil-pair quadrature (56,000 Hz)	10 ppm
CXSP	coaxial spherics monitor	
CPPL	coplanar powerline monitor	
CPSP	coplanar spherics monitor	
TC_COR	Corrected Total Count radiometrics (cps)	50 ppm
K_COR	Corrected Potassium (cps)	10 ppm
U_COR	Corrected Uranium (cps)	5 ppm
TH_COR	Corrected Thorium (cps)	5 ppm
	Computed Parameters	
DIFI (mid freq.)	difference function in-phase from CXI and CPI	6 ppm
DIFQ (mid freq.)	difference function quadrature from CXQ and CPQ	6 ppm
RES900	log resistivity	.06 decade
RES7200	log resistivity	.06 decade
RES56K	log resistivity	.06 decade
DEP900	apparent depth	6 m
DEP7200	apparent depth	6 m
DEP56K	apparent depth	6 m

Radiometrics

All radiometric data reductions performed by Fugro rigorously follow the procedures described in the IAEA Technical Report[6].

All processing of radiometric data was undertaken at the natural sampling rate of the spectrometer, i.e., one second. The data were not interpolated to match the fundamental 0.1 second interval of the EM and magnetic data.

The following sections describe each step in the process.

Pre-filtering

The radar altimeter data were processed with a 49-point median filter to remove spikes.

Reduction to Standard Temperature and Pressure

The radar altimeter data were converted to effective height (h_e) in feet using the acquired temperature and pressure data, according to the following formula:

$$h_e = h * \frac{273.15}{T + 273.15} * \frac{P}{1013.25}$$

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[6] Exploranium, I.A.E.A. Report, Airborne Gamma-Ray Spectrometer Surveying, Technical Report No. 323, 1991.

where: *h* is the observed crystal to ground distance in feet

T is the measured air temperature in degrees Celsius

P is the barometric pressure in millibars

Live Time Correction

The spectrometer, an Exploranium GR-820, uses the notion of "live time" to express the relative period of time the instrument was able to register new pulses per sample interval. This is the opposite of the traditional "dead time", which is an expression of the relative period of time the system was unable to register new pulses per sample interval.

The GR-820 measures the live time electronically, and outputs the value in milliseconds. The live time correction is applied to the total count, potassium, uranium, thorium, upward uranium and cosmic channels. The formula used to apply the correction is as follows:

$$C_{lt} = C_{raw} * \frac{1000.0}{L}$$

where: C_{lt} is the live time corrected channel in counts per second

C_{raw} is the raw channel data in counts per second

L is the live time in milliseconds

Intermediate Filtering

Two parameters were filtered, but not returned to the database:

- Radar altimeter was smoothed with a 5-point Hanning filter (h_{ef}).
- The Cosmic window was smoothed with a 29-point Hanning filter (Cos_f).

Aircraft and Cosmic Background

Aircraft background and cosmic stripping corrections were applied to the total count, potassium, uranium, thorium and upward uranium channels using the following formula:

$$C_{ac} = C_{lt} - (a_c + b_c * \mathrm{Cos}_f)$$

where: C_{ac} is the background and cosmic corrected channel

C_{lt} is the live time corrected channel

a_c is the aircraft background for this channel

b_c is the cosmic stripping coefficient for this channel

Cos_f is the filtered Cosmic channel

Radon Background

The determination of calibration constants that enable the stripping of the effects of atmospheric radon from the downward-looking detectors through the use of an upward-looking detector is divided into two parts:

1) Determine the relationship between the upward- and downward-looking detector count rates for radiation originating from the ground.

2) Determine the relationship between the upward- and downward-looking detector count rates for radiation due to atmospheric radon.

The procedures to determine these calibration factors are documented in IAEA Report #323 on airborne gamma-ray surveying. The calibrations for the first part were determined as outlined in the report.

The latter case normally requires many over-water measurements where there is no contribution from the ground. Where this is not possible, it is standard procedure to establish a test line over which a series of repeat measurements are acquired. From these repeat flights, any change in the downward uranium window due to variations in radon background would be directly related to variations in the upward window and the other downward windows.

The validity of this technique rests on the assumption that the radiation from the ground is essentially constant from flight to flight. Inhomogeneities in the ground, coupled with deviations in the flight path between test runs, add to the inaccuracy of the accumulated results. Variations in flying heights and other environmental factors also contribute to the uncertainty.

The use of test lines is a common solution for a fixed-wing acquisition platform. The ability of rotary wing platforms to hover at a constant height over a fixed position eliminates a number of the variations which degrade the accuracy of the results required for this calibration.

A test site was established in or near the survey area. The tests were carried out at the start and end of each day, and at the end of each flight. Data were acquired over a four-minute period at the nominal survey altitude (60 m). The data were then corrected for live time, aircraft background and cosmic activity.

Once the survey was completed, the relationships between the counts in the downward uranium window and in the other four windows due to atmospheric radon were determined using linear regression for each of the hover sites. The following equations were used:

$$u_r = a_u Ur + b_u$$

$$K_r = a_K U_r + b_K$$

$$T_r = a_T U_r + b_T$$

$$I_r = a_I U_r + b_I$$

where: u_r is the radon component in the upward uranium window

K_r, U_r, T_r and I_r are the radon components in the various windows of the downward detectors

the various "a" and "b" coefficients are the required calibration constants

In practice, only the "a" constants were used in the final processing. The "b" constants, which are normally near zero for over-water calibrations, were of no value as they reflected the local distribution of the ground concentrations measured in the five windows.

The thorium, uranium and upward uranium data for each line were copied into temporary arrays, then smoothed with 21, 21 and 51 point Hanning filters to product Th_f, U_f, and u_f respectively. The radon component in the downward uranium window was then determined using the following formula:

$$U_r = \frac{u_f - a_1 * U_f - a_2 * Th_f + a_2 * b_{Th} - b_u}{a_u - a_1 - a_2 * a_{Th}}$$

where: U_r is the radon component in the downward uranium window

u_f is the filtered upward uranium

U_f is the filtered uranium

Th_f is the filtered thorium

a_1, a_2, a_u and a_{Th} are proportionality factors and

b_u and b_{Th} are constants determined experimentally

The effects of radon in the downward uranium are removed by simply subtracting U_r from U_{ac}. The effects of radon in the total count, potassium, thorium and upward uranium are then removed based upon previously established relationships with U_r. The corrections are applied using the following formula:

$$C_{rc} = C_{ac} - (a_c * U_r + b_c)$$

where: C_{rc} is the radon corrected channel

C_{ac} is the background and cosmic corrected channel

U_r is the radon component in the downward uranium window

a_c is the proportionality factor and

b_c is the constant determined experimentally for this channel

Compton Stripping

Following the radon correction, the potassium, uranium and thorium are corrected for spectral overlap. First, α,β and γ the stripping ratios, are modified according to altitude. Then an adjustment factor based on a, the reversed stripping ratio, uranium into thorium, is calculated. (Note: the stripping ratio altitude correction constants are expressed in change per metre. A constant of 0.3048 is required to conform to the internal usage of height in feet):

$$\alpha_h = \alpha + h_{ef} * 0.00049$$

$$\alpha_r = \frac{1.0}{1.0 - a * \alpha_h}$$

$$\beta_h = \beta + h_{ef} * 0.00065$$

$$\gamma_h = \gamma + h_{ef} * 0.00069$$

where: α, β, γ are the Compton stripping coefficients

α_h, β_h, γ_h are the height corrected Compton stripping coefficients

h_{ef} is the height above ground in metres

α_r is the scaling factor correcting for back scatter

a is the reverse stripping ratio

The stripping corrections are then carried out using the following formulas:

$$Th_c = (Th_{rc} - a * U_{rc}) * \alpha_r$$

$$K_c = K_{rc} - \gamma_h * U_c - \beta_h * Th_c$$

$$U_c = (U_{rc} - \alpha_h * Th_{rc}) * \alpha_r$$

where: U_c, Th_c and K_c are corrected uranium, thorium and potassium

α_h,β_h,γ_h are the height corrected Compton stripping coefficients

U_{rc}, Th_{rc} and K_{rc} are radon-corrected uranium, thorium and potassium

α_r is the backscatter correction

Attenuation Corrections

The total count, potassium, uranium and thorium data are then corrected to a nominal survey altitude, in this case 200 feet. This is done according to the equation:

$$C_a = C * e^{\mu(h_{ef} - ho)}$$

where: C_a is the output altitude corrected channel

C is the input channel

e^{μ} is the attenuation correction for that channel

h_{ef} is the effective altitude

h_0 is the nominal survey altitude to correct to

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, percent magnetite, resistivities corrected for magnetic permeability and/or dielectric permittivity, digital terrain, resistivity-depth sections, inversions, and overburden thickness. Most parameters can be displayed as contours, profiles, or in colour.

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:

<u>Projection Description</u>:

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

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

Final Products

	No. of Map Sets		
	Mylar	Blackline	Colour
EM Anomalies		2	
Total Magnetic Field			2
Calculated Vertical Magnetic Gradient			2
Apparent Resistivity 7200 Hz			2
Apparent Resistivity 56,000 Hz			2
Radiometrics - Total Count			2
- Potassium			2
- Uranium			2
- Thorium			2

Additional Products

Digital Archive (see Archive Description)	1 DVD-ROM
Survey Report	2 copies
Multi-channel Stacked Profiles	All lines
Flight Path Video	1 DVD-ROM

7. SURVEY RESULTS

General Discussion

Table 7-1 summarizes the EM responses in the survey area, with respect to conductance grade and interpretation. 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. The picking and interpretation procedure 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 anomalies shown on the electromagnetic anomaly maps are based on a near-vertical, half plane model. This model best reflects "discrete" bedrock conductors. Wide bedrock conductors or flat-lying conductive units, 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.

TABLE 7-1 EM ANOMALY STATISTICS

CONDUCTOR GRADE	CONDUCTANCE RANGE SIEMENS (MHOS)	NUMBER OF RESPONSES
7	>100	0
6	50 - 100	0
5	20 - 50	4
4	10 - 20	9
3	5 - 10	51
2	1 - 5	303
1	<1	242
*	INDETERMINATE	193
TOTAL		

CONDUCTOR MODEL	MOST LIKELY SOURCE	NUMBER OF RESPONSES
D	DISCRETE BEDROCK CONDUCTOR	12
B	DISCRETE BEDROCK CONDUCTOR	167
S	CONDUCTIVE COVER	317
H	ROCK UNIT OR THICK COVER	149
E	EDGE OF WIDE CONDUCTOR	13
L	CULTURE	144
TOTAL		

(SEE EM MAP LEGEND FOR EXPLANATIONS)

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 parameter. 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. Contoured resistivity maps, based on the 7,200 Hz and 56,000 Hz coplanar data are included with this report.

Excellent resolution and discrimination of conductors was accomplished by using a fast sampling rate of 0.1 sec and by employing a “common” frequency (5500/7200 Hz) 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.

Anomalies that occur near the ends of the survey lines (i.e., outside the survey area), should be viewed with caution. Some of the weaker anomalies could be due to aerodynamic noise, i.e., bird bending, which is created by abnormal stresses to which the bird is subjected during the climb and turn of the aircraft between lines. Such aerodynamic noise is usually manifested by an anomaly on the coaxial in-phase channel only, although severe stresses can affect the coplanar in-phase channels as well.

Magnetics

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.

The total magnetic field data have 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.

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, in conjunction with the other geophysical parameters, have provided valuable information that can be used to effectively map the geology and structure in the survey area.

Apparent Resistivity

Apparent resistivity maps, which display the conductive properties of the survey area, were produced from the 7,200 Hz and 56,000 Hz coplanar data. The maximum resistivity values, which are calculated for each frequency, are 8,225 and 64,400 ohm-m respectively. These cutoffs eliminate the erratic higher resistivities that would result from unstable ratios of very small EM amplitudes.

In general, the resistivity patterns show moderately good agreement with the magnetic trends. This suggests that many of the resistivity lows are probably related to bedrock features, rather than conductive overburden. There are some areas, however, where contour patterns appear to be strongly influenced by conductive surficial material.

There are other resistivity lows in the area. Some of these are quite extensive and often reflect "formational" conductors that may be of minor interest as direct exploration targets. However, attention may be focused on areas where these zones appear to be faulted or folded or where anomaly characteristics differ along strike.

Electromagnetic Anomalies

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", "T" 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" or "H" interpretive symbol. The lack of a difference channel response usually implies a broad or flat-lying conductive source such as overburden. Some of these anomalies could reflect conductive rock units, zones of deep weathering, or the weathered tops of kimberlite pipes, all of which can yield “non-discrete” signatures.

The effects of conductive overburden are evident over portions of the survey area. 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 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. The effects of magnetite-rich rock units are usually evident on the multi-parameter geophysical data profiles as negative excursions of the lower frequency in-phase channels.

In areas where EM responses are evident primarily on the quadrature components, zones of poor conductivity are indicated. Where these responses are coincident with magnetic anomalies, it is possible that the in-phase component amplitudes have been suppressed by the effects of magnetite. 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 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 (shallow) depth calculations.

The fourth class consists of cultural anomalies which 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, buildings and other metallic structures.

As potential targets within the area may be associated with massive to weakly disseminated sulphides, which may or may not be hosted by magnetite-rich rocks, it is impractical to assess the relative merits of EM anomalies on the basis of conductance. It is recommended that an attempt be made to compile a suite of geophysical "signatures" over any known areas of interest. Anomaly characteristics are clearly defined on the multi-parameter geophysical data profiles that are supplied as one of the survey products.

Potential Targets in the Survey Area

The electromagnetic anomaly map shows the anomaly locations with the interpreted conductor type, dip, conductance and depth being indicated by symbols. Direct magnetic correlation is also shown if it exists. The strike direction and length of the conductors are indicated only where anomalies can be correlated from line to line with a reasonable degree of confidence.

Magnetic relief across the area is approximately 3300 nT, ranging from a low of about 55,600 nT to a high of 58,600 nT. There are non-magnetic linears that trend northwest and northeast in the area which may represent faults or contacts. The linear trends are better defined on the calculated vertical gradient map.

The most prominent feature in the survey block is a circular resistive unit associated with a topographic high. This unit is divided into two parts by a northwest-trending linear that extends from line10150 fiducial 4140 to line10380 fiducial 6217.

South of the northwest-trending linear is a large plug-like unit that is magnetite-rich. Due to the presence of magnetite, the in-phase response has been suppressed, increasing the apparent resistivity values. This can be seen predominately on the 900 HZ as negative in-phase inflections. Magnetite values calculated from the 900 Hz in-phase yield values between 1-9%. Greater than eight percent magnetite can be found on line 10460 at fiducial 4748.

In general, the radiometric signature of the plug-like unit is strong. A lack of signal in the southeastern quadrant of the plug is coincident with snow and ice cover, possibly due to a greater thickness. This effect can be seen on line 10620 at fiducial 2676.

Within the plug-like unit, the magnetic patterns show various structural trends that are coincident with the topography. In addition to the northwest and northeast trends of the survey block, the magnetic grid shows some east-west and north-south structures.

EM anomalies in the plug-like unit have been interpreted as S? and may be caused by accumulated glacial debris or alluvial cover. However, because of the magnetite effects, it is possible that these anomalies could be bedrock related. Anomalies 10580D and 10600F occur at the intersection of east-west and north-south linear trends. These anomalies are coincident with a break in the topography. Additional work is required to determine if the source is related to structure or conductive cover.

A smaller resistive zone is located to the northeast of the plug-like unit and the northwest-trending linear feature previously described. The resisitive zone is less magnetic than the plug, but the former only has a slight radiometric signature. There are little to no magnetite effects associated with this zone. This could be the result of more conductive material or less magnetite content. This resistive zone is separated from the plug-like unit by a magnetic low lying southwest of the northwest-trending linear.

A few bedrock anomalies have been interpreted along the northwest-trending linear. These anomalies vary from thin discrete conductors to moderately broad conductors located at depth. Anomaly 10220H is an example of a thin source where the conductivity increases with depth.

Surrounding the resistive unit, the survey block is generally conductive and weakly to non-magnetic. Within the conductive zone surrounding the plug, there are several zones of increased conductivity. These conductive units form linear to curvilinear features around the perimeter of the plug-like unit. East of the plug-like unit there are two north-south trending conductive features crossing the topography at a moderately shallow angle. Lower resistivity values on the 900Hz and 7200 Hz indicate that the conductivity increases with depth. Such examples can be seen at anomalies 10520H and 10520I, where highly conductive buried sources are evident.

South and southwest of the plug-like unit, a conductive zone forms a semi-circular feature. This conductive zone is similar to the north-south trending conductive features. Several thin, discrete bedrock conductors of varying thickness are located at depth. An example of this is anomaly 10780T.

In general, EM anomalies in the survey block appear to be associated with three different environments: structural breaks or faults, magnetite-rich units and the perimeter of the plug-like unit. Mineralization in quartz-rich veins may be associated with resistive areas whereas sulphides and shear zones may be more conductive. Broader, flat lying zones of mineralization may not yield discrete EM anomalies but should be defined on the resistivity maps. Many of these can be seen as H-type anomalies in the absence of magnetite suppression.

The area contains numerous sources of cultural interference, including power lines, railway tracks, buildings and roads. Care should be taken to verify any anomalies of interest that are located near man-made structures.

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, radiometric and conductive properties of the survey areas. 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. Particular reference should be made to the multi-parameter data profiles that clearly define the characteristics of the individual anomalies.

It is 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 contour 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 RESOLVE/DIGHEM airborne geophysical survey carried out for Rocher Deboule Minerals Corp., near New Hazelton, British Columbia.

David Miles	Manager, Helicopter Operations
Emily Farquhar	Manager, Data Processing and Interpretation
Delvin Masilamani	Senior Geophysical Operator
Darcy McGill	Field Geophysicist
Glenn Charbonneau	Pilot (Great Slave Helicopters Ltd.)
Al Sweet	Pilot (Great Slave Helicopters Ltd.)
Emily Farquhar	Geophysical Data Processor
Elizabeth Bowslaugh	Interpretation Geophysicist
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The survey consisted of 1089 km of coverage, flown from July 7 to July 17, 2007.

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APPENDIX B

BACKGROUND INFORMATION

- Appendix B.1 -

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. All anomalies plotted on the geophysical maps are analyzed according to this model. The following section entitled **Discrete Conductor Analysis** describes this model in detail, including the effect of using it on anomalies caused by broad conductors such as conductive overburden.

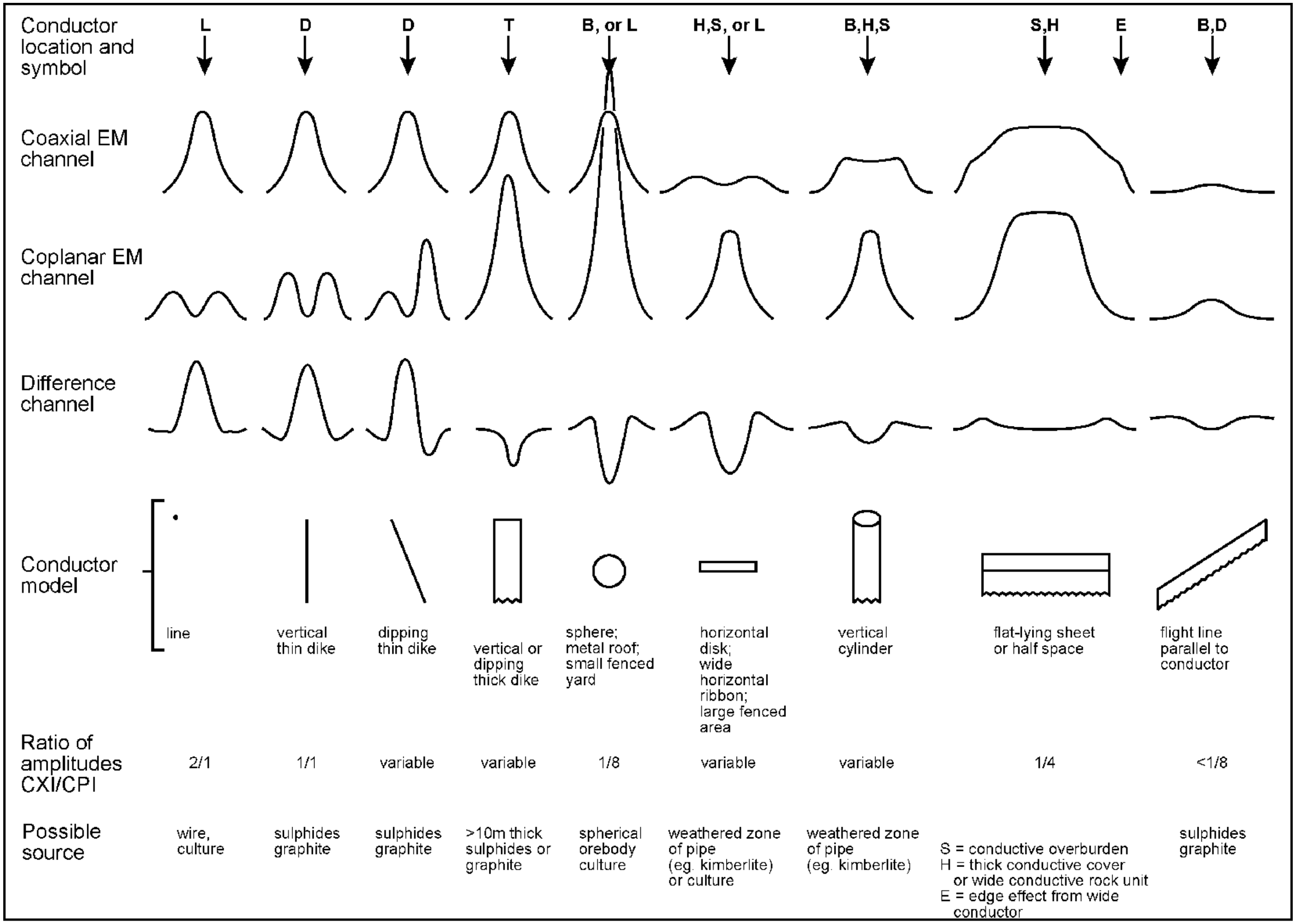
The conductive earth (half-space) model is suitable for broad conductors. Resistivity contour maps result from the use of this model. A later section entitled **Resistivity Mapping** describes the method further, including the effect of using it on anomalies caused by discrete conductors such as sulphide bodies.

Geometric Interpretation

The geophysical interpreter attempts to determine the geometric shape and dip of the conductor. Figure C-1 shows typical HEM anomaly shapes which 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) of a vertical sheet model. This is done regardless of the interpreted geometric shape of the conductor. This is not an unreasonable procedure, because the computed conductance increases as the electrical quality of the conductor increases, regardless of its true shape. DIGHEM 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.



Conductor location and symbol	L	D	D	T	B, or L	H,S, or L	B,H,S	S,H E	B,D
Conductor model	line	vertical thin dike	dipping thin dike	vertical or dipping thick dike	sphere; metal roof; small fenced yard	horizontal disk; wide horizontal ribbon; large fenced area	vertical cylinder	flat-lying sheet or half space	flight line parallel to conductor
Ratio of amplitudes CXI/CPI	2/1	1/1	variable	variable	1/8	variable	variable	1/4	<1/8
Possible source	wire, culture	sulphides graphite	sulphides graphite	>10m thick sulphides or graphite	spherical orebody culture	weathered zone of pipe (eg. kimberlite) or culture	weathered zone of pipe (eg. kimberlite)	S = conductive overburden H = thick conductive cover or wide conductive rock unit E = edge effect from wide conductor	sulphides graphite

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 which have resistivities as low as 50 ohm-m. In areas where ground resistivities are below 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. The horizontal rows of dots, under the interpretive symbol, indicate the anomaly amplitude on the flight record. The vertical column of dots, under the anomaly letter, gives the estimated depth. In areas where anomalies are crowded, the letter identifiers, interpretive symbols and dots may be obliterated. The EM grade symbols, however, will always be discernible, and the obliterated information can be obtained from the anomaly listing appended to this report.

The purpose of indicating the anomaly amplitude by dots is to provide an estimate of the reliability of the conductance calculation. Thus, a conductance value obtained from a large ppm anomaly (3 or 4 dots) will tend to be accurate whereas one obtained from a small ppm anomaly (no dots) could be quite inaccurate. The absence of amplitude dots indicates that the anomaly from the coaxial coil-pair is 5 ppm or less on both the in-phase and quadrature channels. Such small anomalies could reflect a weak conductor at the surface or a stronger conductor at depth. The conductance grade and depth estimate illustrates which of these possibilities fits the recorded data best.

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 bird from 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 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 anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of conductors in terms of length, strike and dip, geometric shape, conductance, depth, 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 model. No conductance or depth estimates are shown for weak anomalous responses that are not of sufficient amplitude to yield reliable calculations.

Since discrete bodies normally are the targets of EM surveys, local base (or zero) levels are used to compute local anomaly amplitudes. This contrasts with the use of true zero levels which are used to compute true EM amplitudes. Local anomaly amplitudes are shown in the EM anomaly list and these are used to compute the vertical sheet parameters of conductance and depth.

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 <u>thin</u> when the thickness is likely to be less than 3 m, and <u>thick</u> 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 below 100 ohm-m.

- Appendix B.6 -

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 which is associated with Carlin-type deposits in the south west 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 south west 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)[7]. 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.

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

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, 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 which 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 which 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[8] 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.

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[8] 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).

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 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, that 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 102,000 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
102,000	CP	7.86	0.1	30	32.5	117.2	9409	-0.3	1 Air
102,000	CP	7.86	0.1	30	11.7	127.2	25956	-16.8	5 Quartz
102,000	CP	7.86	0.1	30	-14.0	141.6	97064	-26.5	10 Epidote
102,000	CP	7.86	0.1	30	-62.9	176.0	83995	-26.8	20 Granite
102,000	CP	7.86	0.1	30	-107.5	215.8	73320	-27.0	30 Diabase
102,000	CP	7.86	0.1	30	-147.1	259.2	64875	-27.2	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. Channels CXPL and CPPL monitor 60 Hz radiation. An anomaly on these channels 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.[9] 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.[10] 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.

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[9] See Figure C-1 presented earlier.

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

5. EM anomalies that coincide with culture, as seen on the camera film or 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. The 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 channels and on the camera film or video records.

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

DATA ARCHIVE DESCRIPTION

APPENDIX C

ARCHIVE DESCRIPTION

Reference: CDVD00230
# of DVD's: 1
Archive Date: September 4, 2007

This archive contains final data archives and grids of an airborne geophysical survey conducted by FUGRO AIRBORNE SURVEYS CORP. on behalf of ROCHER DEBOULE MINERALS CORP. during July, 2007.

Job # 06094

The DVD set comprises of 24 files contained in 4 directories

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

\GRIDS
Grids in Geosoft format.

06094_CVG.GRD - Calculated Vertical Magnetic Gradient
06094_MAG.GRD - Total Magnetic Field
06094_RES900.GRD - Apparent Resistivity 900 Hz coplanar
06094_RES7200.GRD - Apparent Resistivity 7200 Hz coplanar
06094_RES56K.GRD - Apparent Resistivity 56000 Hz coplanar
06094_TC.GRD - Total Count Radiometrics
06094_K.GRD - Potassium
06094_Th.GRD - Thorium
06094_U.GRD - Uranium

\LINEDATA
06094_ARCHIVE.TXT - Documentation for data archive file
06094_ARCHIVE.XYZ - Final data archive in Geosoft ASCII format
06094_ARCHIVE.GDB - Final data archive in Geosoft Binary database format
ANOMALY.TXT - Documentation for anomaly archive file
AN06094.XYZ - Anomaly archive in Geosoft XYZ format

\PDF
final maps in PDF format

06094_CVG.PDF - Calculated Vertical Magnetic Gradient
06094_MAG.PDF - Total Magnetic Field
06094_AEM.PDF - Electromagnetic Anomalies
06094_RES7200.PDF - Apparent Resistivity 7200 Hz coplanar
06094_RES56K.PDF - Apparent Resistivity 56000 Hz coplanar
06094_TC.PDF - Total Count Radiometrics
06094_K.PDF - Potassium
06094_Th.PDF - Thorium
06094_U.PDF - Uranium

\REPORT
06094_RDMINERALS.PDF - Logistics and Interpretation Report

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

Datum	NAD83
Spheroid	GRS 1980
Projection	UTM
Central meridian	129 West (Z9N)

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 D

EM ANOMALY LIST

EM Anomaly List

Label	Fid	Interp	XUTM	YUTM	CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
			m	m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE	10010		FLIGHT 2										
A	2189.8	S	584395	6122798	5.8	7.8	73.3	67.9	27.9	30.8	0.8	17	0
B	2159.1	L	585478	6122815	13.1	1.6	39.3	42.4	53.9	25.3	---	---	0
C	2143.3	H	586034	6122814	6.4	15.6	15.1	49.5	7.9	11.4	0.5	11	0
D	2117.3	S	586947	6122862	1.7	4.0	83.8	171.5	13.1	42.4	---	---	0
E	2114.8	S	587036	6122863	5.7	12.4	83.8	139.3	13.1	32.9	0.5	7	0
F	2110.3	L	587195	6122859	31.7	4.5	103.7	82.5	60.0	43.5	28.5	8	0
G	2086.3	L	588002	6122808	19.8	3.9	57.2	51.7	20.9	53.5	14.8	9	0
H	2080.2	L	588195	6122764	25.8	15.0	62.8	85.3	65.1	94.9	3.5	7	0
I	2066.6	L	588616	6122675	17.5	7.1	25.7	33.4	29.4	25.7	5.0	28	0
J	2055.5	S?	588934	6122598	4.5	21.5	70.6	191.0	10.2	31.8	0.3	0	0
K	2049.2	L	589128	6122555	44.4	24.6	166.6	219.5	28.2	66.3	4.5	2	0
L	2003.3	L	590589	6122763	19.2	5.5	68.7	68.1	13.7	29.0	8.4	23	0
M	1934.9	L	592950	6122953	8.0	1.5	15.6	7.0	21.0	6.8	---	---	0
LINE	10020		FLIGHT 9										
A	3388.8	S	584468	6122631	6.8	12.9	51.0	103.1	14.4	29.2	0.6	7	0
B	3300.7	L	586927	6122709	10.8	9.0	67.8	61.9	16.1	38.2	1.7	10	5
C	3296.0	L	587075	6122710	23.9	8.4	98.0	67.9	69.2	59.1	6.8	12	0
D	3291.9	L	587201	6122702	24.2	6.8	100.2	39.9	69.2	57.6	9.4	5	0
E	3266.3	L	588010	6122716	18.5	6.5	27.4	16.6	42.6	40.9	6.3	6	0
F	3263.4	L	588106	6122718	7.9	8.0	37.5	59.7	26.3	44.8	1.2	9	0
G	3247.5	L	588611	6122683	15.1	5.6	26.7	33.9	28.8	10.9	5.5	30	0
H	3229.5	L	589119	6122576	32.9	17.0	80.4	105.8	16.3	33.1	4.5	0	0
I	3184.3	L	590613	6122734	8.9	3.8	37.5	35.5	7.9	16.5	3.7	17	0
LINE	10030		FLIGHT 9										
A	3535.8	S	584558	6122471	6.7	11.5	40.1	76.4	12.9	20.3	0.7	6	0
B	3563.9	L	585341	6122488	8.7	4.1	24.8	16.1	24.2	23.4	3.2	31	0
C	3588.2	S?	586148	6122511	10.1	15.3	80.5	104.7	19.3	29.6	0.9	1	0
D	3618.7	L	587120	6122524	6.9	13.8	114.1	104.3	57.1	62.7	0.6	0	0
E	3645.0	L	588001	6122551	31.9	15.5	60.9	52.9	31.6	41.6	4.8	0	25
F	3659.6	S	588491	6122559	3.5	12.7	77.4	128.6	27.2	40.6	0.3	0	0
G	3663.4	L	588610	6122562	18.0	12.8	77.5	118.7	27.2	40.6	2.4	2	0
H	3672.6	L	588902	6122563	11.1	36.4	104.2	257.6	16.9	54.8	0.5	0	0
I	3679.1	L	589119	6122560	35.3	17.4	113.8	121.1	21.9	39.7	4.9	5	35
J	3730.4	L	590709	6122599	22.7	10.6	107.5	77.2	82.1	26.5	4.6	4	0
K	3797.3	S	592885	6122640	5.4	7.0	56.2	81.1	11.2	23.1	0.8	12	7

CX = COAXIAL
CP = COPLANAR

Note:EM values shown above are local amplitudes

*Estimated Depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or magnetite/overburden effects

EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM m	YUTM m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE	10030		FLIGHT 9										
L	3807.7	L	593233	6122642	12.9	8.3	55.3	59.6	5.2	18.8	2.5	17	0
LINE	10040		FLIGHT 9										
A	4216.7	B?	584573	6122326	16.2	34.5	166.1	218.2	11.8	65.7	0.7	0	0
B	4213.1	B?	584649	6122328	10.6	18.9	166.1	242.6	11.8	65.7	0.7	0	0
C	4186.9	L	585303	6122359	10.4	2.5	35.9	22.0	34.5	26.0	---	---	44
D	4140.3	L	586711	6122336	12.0	6.8	5.3	0.0	9.5	6.9	2.8	28	0
E	4099.0	L	587984	6122420	25.3	12.9	62.7	10.8	17.1	29.7	4.2	0	0
F	4082.8	S	588525	6122414	6.6	11.7	81.8	152.4	4.3	38.5	0.6	7	7
G	4069.7	L	588933	6122413	21.5	35.8	58.3	260.8	9.7	29.6	1.0	0	106
H	4064.8	S	589093	6122417	4.7	9.5	162.7	260.8	31.5	67.8	0.5	16	0
I	4019.4	S?	590511	6122438	6.8	4.4	66.6	47.2	33.0	23.3	2.0	39	0
J	4009.5	L	590790	6122453	9.0	3.6	11.7	9.3	13.6	5.4	4.2	14	11
K	3935.4	L	593416	6122513	14.4	14.8	73.6	87.7	13.8	31.7	1.5	14	0
LINE	10050		FLIGHT 9										
A	4483.9	B?	584575	6122178	30.4	24.0	195.5	163.4	41.4	89.4	2.6	0	0
B	4486.9	B?	584654	6122181	36.9	17.6	195.5	58.7	41.4	89.4	5.2	0	0
C	4510.6	L	585193	6122239	8.4	2.6	28.3	24.7	53.1	29.0	---	---	0
D	4531.8	L	585808	6122226	12.5	8.9	28.9	48.7	33.3	19.1	2.2	0	0
E	4571.3	S	587031	6122236	3.0	13.0	70.9	123.2	9.8	36.2	---	---	0
F	4601.6	L	588003	6122248	36.1	18.5	78.5	61.2	23.9	39.7	4.7	0	0
G	4640.0	B	589242	6122274	2.7	1.7	39.9	9.7	29.0	19.4	---	---	0
H	4671.3	L	590143	6122288	4.6	5.3	84.8	15.3	61.6	37.5	0.9	32	0
I	4674.0	L	590231	6122287	10.7	2.1	72.5	62.9	66.5	24.8	---	---	0
J	4714.6	L	591481	6122312	10.8	2.7	65.4	26.1	17.2	30.3	---	---	0
K	4755.6	L	592871	6122346	32.3	57.5	209.1	291.0	5.0	89.7	1.1	0	0
L	4802.9	S	594528	6122381	6.0	8.8	72.9	76.3	11.8	33.6	0.8	12	0
LINE	10060		FLIGHT 9										
A	5203.1	H	584244	6122018	6.2	11.1	56.0	85.6	3.0	22.5	0.6	22	0
B	5186.5	S	584524	6122040	11.3	34.4	126.6	192.6	5.2	51.9	0.5	0	0
C	5166.3	L	584803	6121966	17.6	8.2	1.0	15.9	4.5	4.1	4.2	6	0
D	5145.0	L	585198	6122263	35.1	2.5	10.6	7.0	5.0	14.4	---	---	0
E	5142.5	L	585269	6122283	9.1	14.6	18.2	7.0	22.9	23.2	0.8	0	0
F	5119.4	L	585915	6122225	9.7	2.0	19.3	35.1	23.1	16.1	---	---	0
G	5077.0	L	587033	6122072	17.5	20.0	94.5	122.7	16.0	38.0	1.4	0	0
H	5041.8	L	588122	6122102	23.7	17.5	82.6	83.0	20.0	34.2	2.6	0	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM m	YUTM m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE 10060			FLIGHT 9										
I	5035.2	L	588327	6122105	6.7	13.7	116.1	142.3	14.4	49.5	0.6	3	0
J	5007.9	S?	589252	6122121	20.7	19.1	59.5	36.2	31.4	29.8	1.9	0	0
K	5004.4	B?	589364	6122123	22.9	0.0	3.7	14.6	10.9	4.4	---	---	0
L	4984.0	B	589939	6122144	7.4	1.0	82.1	28.6	61.2	34.9	---	---	0
M	4870.6	L	593886	6122224	9.1	6.7	57.8	56.9	8.2	24.0	1.9	22	0
N	4850.0	S	594563	6122244	28.0	35.2	222.2	246.7	24.3	91.9	1.5	0	0
LINE 10070			FLIGHT 9										
A	5380.0	L	585246	6122253	26.9	13.7	33.6	13.0	40.4	42.5	4.3	0	0
B	5399.9	L	585813	6122190	21.1	4.1	33.6	43.0	43.1	25.5	---	---	0
C	5459.9	L	587280	6121933	11.9	15.8	117.3	192.0	23.2	55.7	1.0	4	0
D	5482.2	S	588012	6121948	7.5	26.0	120.6	200.9	24.2	55.7	0.4	0	25
E	5514.0	B	589055	6121966	9.0	9.6	37.1	31.5	27.0	15.8	---	---	0
F	5523.0	B	589311	6121974	15.6	7.1	262.0	52.7	313.0	99.3	4.2	27	0
G	5532.8	B	589603	6121977	13.8	6.4	39.7	49.1	27.7	21.7	3.9	34	0
H	5545.4	B?	589985	6121989	5.8	6.1	35.4	0.0	27.9	26.3	---	---	0
I	5553.5	B?	590199	6121989	9.4	5.7	34.8	10.1	14.7	23.9	---	---	22
J	5561.2	H	590434	6121992	2.1	2.7	43.7	9.4	35.9	26.8	---	---	0
K	5603.4	S	591896	6122023	12.4	10.2	58.9	84.3	3.5	22.3	1.8	6	0
LINE 10080			FLIGHT 9										
A	6088.4	S	584461	6121734	4.8	11.2	52.5	102.2	3.1	26.5	0.5	0	0
B	5936.5	S	587445	6121792	3.9	8.5	82.9	187.7	7.8	40.0	0.5	19	0
C	5875.9	B	589517	6121831	13.8	6.6	16.3	18.2	45.6	3.9	3.7	29	0
D	5839.4	H	590717	6121858	0.4	2.8	16.1	38.9	14.1	9.4	---	---	0
E	5809.8	S	591731	6121876	19.2	46.4	164.9	335.3	8.4	75.8	0.7	0	0
LINE 10090			FLIGHT 9										
A	6199.1	S	584494	6121563	4.4	13.2	45.1	66.8	7.0	18.6	0.4	0	0
B	6253.7	L	585148	6120981	7.7	2.6	21.5	17.1	6.1	9.8	---	---	0
C	6268.4	L	585579	6120995	13.1	3.4	31.0	13.0	13.1	11.6	8.7	0	7
D	6345.4	S	587534	6121637	9.0	25.4	114.3	321.4	2.0	62.3	0.5	0	0
E	6356.1	S	587918	6121650	5.6	26.0	72.0	192.6	4.3	39.3	0.3	0	0
F	6397.0	H	589327	6121677	0.5	1.7	7.0	0.9	7.5	2.0	---	---	5
G	6418.3	B	590023	6121690	16.8	8.5	92.1	70.4	54.2	49.9	3.7	29	0
H	6430.5	H	590412	6121695	17.1	2.7	101.7	18.3	99.8	39.0	---	---	0
I	6548.9	L	594589	6121781	14.1	11.7	73.4	51.0	8.1	33.8	1.9	4	0

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EM Anomaly List

Label	Fid	Interp	XUTM	YUTM	CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
			m	m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE 10100			FLIGHT 5										
A	2188.6	S	584484	6121433	5.9	8.5	50.1	88.5	5.6	22.7	0.8	9	0
B	2174.0	L?	584775	6121403	8.0	4.2	10.6	15.7	6.4	5.0	2.7	22	7
C	2097.6	S	587057	6121475	8.5	20.3	178.0	260.3	14.7	83.8	0.5	5	0
D	2075.2	S	587839	6121496	5.6	8.3	99.8	197.9	7.6	46.0	0.7	21	0
E	2038.0	H	589226	6121521	0.9	0.9	14.0	11.9	9.2	0.0	---	---	0
F	2015.6	B	590053	6121537	10.2	4.7	61.8	25.6	50.3	23.6	3.5	33	0
G	1963.3	S	591964	6121584	7.0	8.4	53.9	59.1	11.2	20.3	1.0	21	0
H	1903.1	L	594210	6121640	6.1	8.3	70.8	66.5	11.5	26.4	0.8	20	0
LINE 10110			FLIGHT 5										
A	2455.7	L	584772	6121288	6.0	3.0	11.7	13.7	0.1	2.4	---	---	0
B	2470.2	L	585126	6121295	12.8	4.4	24.1	24.1	5.9	12.6	5.8	6	0
C	2513.6	S	586543	6121318	9.7	16.6	112.5	170.5	10.2	47.9	0.8	7	0
D	2544.0	S	587595	6121342	5.8	8.5	64.9	97.0	3.4	22.8	0.8	12	0
E	2556.7	S	588027	6121355	5.7	11.8	69.4	116.2	7.3	32.4	0.5	1	0
F	2599.5	H	589551	6121384	0.0	0.9	12.8	23.8	1.6	3.3	---	---	0
G	2610.4	B	589919	6121388	14.6	5.2	81.4	21.8	52.4	34.9	5.7	18	0
H	2613.3	B	590024	6121389	12.5	6.0	81.4	68.9	52.4	34.9	3.6	30	5
I	2621.4	H	590315	6121391	0.0	0.0	13.2	0.0	28.6	0.5	---	---	0
J	2652.7	H	591500	6121419	13.3	20.1	116.4	154.7	73.3	55.8	1.0	6	0
K	2668.0	H	592038	6121429	6.0	4.1	36.9	23.5	41.8	10.2	1.8	37	0
LINE 10120			FLIGHT 5										
A	3135.5	S	584375	6121124	2.0	11.5	83.9	141.9	18.2	41.5	---	---	0
B	3106.6	L	584767	6121141	23.8	15.6	2.8	1.2	39.1	0.5	3.0	0	0
C	3081.5	L	585152	6121030	9.5	1.3	11.1	6.4	5.8	5.7	---	---	0
D	3064.0	L	585583	6121068	18.5	6.7	80.3	53.4	12.1	34.2	6.1	0	7
E	3031.9	S	586442	6121174	10.9	21.9	111.1	146.4	9.8	45.5	0.7	0	0
F	2953.5	B	589129	6121218	3.3	1.5	8.6	1.0	11.9	2.3	---	---	0
G	2919.0	H	590294	6121244	2.0	1.2	13.9	11.8	21.0	5.0	---	---	0
H	2896.7	H	591122	6121264	2.9	1.9	16.6	15.0	22.2	0.0	---	---	0
I	2870.5	H	592054	6121270	6.8	6.0	73.5	13.5	57.0	28.0	1.4	9	0
LINE 10130			FLIGHT 5										
A	3246.5	L	584704	6120983	7.0	3.0	15.1	12.9	0.1	6.7	---	---	215
B	3264.0	L	585141	6120977	11.4	2.7	26.1	20.5	5.0	8.6	---	---	0
C	3280.4	L	585577	6121005	23.4	9.6	55.0	66.8	24.1	60.7	5.5	0	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE	10130		FLIGHT 5										
D	3287.0	S	585788	6121011	7.8	8.6	174.1	73.2	8.1	44.4	1.1	20	0
E	3304.9	S	586392	6121027	4.2	10.8	93.9	155.6	8.0	44.0	0.4	4	0
F	3319.0	S	586865	6121032	12.3	15.5	85.7	60.9	6.0	34.3	1.1	11	0
LINE	10140		FLIGHT 5										
A	3930.2	S	584208	6120829	3.2	8.5	48.5	115.6	10.3	24.1	0.4	13	0
B	3902.4	L	584634	6120827	11.3	6.4	33.1	42.2	8.6	11.3	2.8	21	0
C	3875.0	L	585170	6120853	16.8	5.8	24.7	29.9	8.5	11.7	6.2	11	0
D	3858.6	L	585584	6120844	21.6	0.4	36.8	9.9	16.7	24.2	---	---	21
E	3844.0	S	586035	6120857	6.5	8.3	80.7	72.9	12.3	36.8	0.9	19	0
F	3812.3	S	587102	6120885	6.4	2.9	110.4	44.9	16.0	51.3	---	---	36
G	3781.8	S	588080	6120901	4.7	7.7	106.8	132.5	5.2	39.0	0.6	10	11
LINE	10150		FLIGHT 5										
A	3999.7	S	584117	6120668	8.5	16.6	81.8	137.3	4.3	36.8	0.6	0	0
B	4014.7	L	584537	6120681	19.5	9.2	29.2	38.1	11.0	13.6	4.3	18	0
C	4036.1	L	585149	6120696	14.6	0.0	11.5	7.1	10.9	6.7	---	---	5
D	4048.8	L	585579	6120702	18.1	2.2	91.5	64.3	33.2	41.3	---	---	0
E	4056.2	S	585843	6120709	7.2	8.9	82.9	81.3	8.6	36.3	1.0	17	0
F	4150.0	H	588689	6120766	2.3	3.4	5.7	21.8	0.9	3.3	---	---	0
LINE	10160		FLIGHT 5										
A	4928.2	S	583914	6120511	11.5	20.3	60.5	117.8	11.0	32.1	0.8	2	0
B	4899.2	L	584531	6120534	21.6	10.9	29.2	41.4	9.0	12.9	4.0	8	0
C	4873.2	L	585178	6120534	11.0	1.3	7.8	4.6	12.9	3.4	---	---	0
D	4857.7	L	585597	6120544	29.3	16.1	97.5	82.7	32.8	46.7	4.0	0	0
E	4778.2	H	587969	6120600	13.1	16.0	76.5	89.1	1.7	25.1	1.2	0	0
F	4620.0	B	591901	6120676	2.1	1.1	26.7	0.0	21.1	1.7	---	---	0
LINE	10170		FLIGHT 5										
A	5009.2	L	584518	6120380	20.0	10.2	30.5	37.4	4.8	13.7	3.9	19	0
B	5029.0	L	585091	6120371	4.5	5.2	59.7	95.5	25.5	29.5	0.9	26	0
C	5046.1	L	585600	6120371	11.6	4.1	25.1	14.7	10.4	12.4	5.4	9	0
D	5062.9	S	586121	6120421	6.1	6.4	117.3	113.4	15.9	51.5	1.1	24	0
E	5075.1	S	586527	6120429	12.9	18.7	126.4	130.7	18.7	55.0	1.0	4	0
F	5101.1	S	587364	6120433	6.9	9.8	89.3	76.9	12.8	28.3	0.8	17	0
G	5125.4	H	587955	6120438	6.0	5.9	58.6	58.8	7.1	20.6	1.2	31	0
H	5303.0	B	592037	6120520	4.1	5.2	46.1	27.4	19.5	14.9	---	---	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM m	YUTM m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE 10180			FLIGHT 5										
A	5800.8	L	584583	6120225	14.7	7.8	58.6	60.6	0.8	23.7	3.3	12	0
B	5788.2	S	584910	6120242	8.2	11.7	103.4	123.4	8.7	45.2	0.9	16	0
C	5749.7	S	585936	6120253	11.7	31.1	281.3	390.5	24.0	123.3	0.6	0	0
D	5732.1	S	586533	6120266	14.1	15.9	108.1	99.2	20.3	50.3	1.3	0	0
E	5660.7	B	588727	6120306	12.0	3.4	41.5	3.9	36.0	16.5	7.4	22	0
F	5514.0	E	592032	6120382	2.0	3.8	14.7	16.2	5.5	4.3	---	---	0
LINE 10190			FLIGHT 5										
A	6034.5	L	584545	6120078	20.6	16.9	76.5	75.8	10.1	33.0	2.2	4	0
B	6047.3	S	584877	6120079	7.3	14.9	79.6	112.7	16.2	42.5	0.6	2	0
C	6057.5	L	585181	6120080	17.4	6.3	54.5	49.8	16.2	25.6	5.9	0	0
D	6071.7	L	585616	6120091	20.3	18.4	74.5	57.6	30.2	55.7	1.9	0	0
E	6078.0	S	585828	6120106	34.6	51.1	226.0	288.3	25.8	98.4	1.3	0	0
F	6086.2	S	586104	6120118	12.6	19.6	277.4	356.0	26.6	119.1	0.9	7	0
G	6118.1	S	587155	6120132	8.1	17.9	78.4	113.1	3.1	30.7	0.6	4	0
H	6132.7	D	587573	6120145	12.3	4.7	59.9	24.0	48.3	28.5	4.9	31	0
LINE 10200			FLIGHT 3										
A	937.4	L	584658	6119958	59.6	21.2	267.5	91.0	254.4	98.9	9.1	0	542
B	932.4	L	584832	6119943	20.7	9.2	144.6	71.7	70.1	50.1	4.7	1	0
C	922.6	L	585176	6119904	23.7	4.5	29.2	7.7	23.8	14.8	16.4	0	0
D	908.1	L	585651	6119959	23.6	10.4	61.9	3.8	20.0	17.2	5.0	3	0
E	896.8	S	586006	6119975	2.2	5.5	103.0	127.3	3.7	46.7	---	---	15
F	892.2	S	586165	6119971	12.5	22.4	177.9	200.6	16.3	78.3	0.8	2	0
G	868.2	S	587004	6119963	4.3	8.7	104.2	143.6	3.0	41.7	0.5	23	0
H	855.0	D	587443	6119987	12.9	14.3	71.6	80.9	29.7	32.7	1.3	16	5
I	780.7	B?	589567	6120010	9.4	12.4	24.0	26.7	4.0	9.7	1.0	20	18
LINE 10210			FLIGHT 3										
A	1032.5	L	584520	6119757	19.7	14.9	38.7	71.1	6.3	13.7	2.3	10	0
B	1036.1	S	584631	6119761	6.5	10.5	75.9	69.1	12.4	33.4	0.7	2	0
C	1044.8	L	584901	6119773	14.4	1.6	22.5	12.0	18.9	10.7	---	---	0
D	1054.7	L	585186	6119811	21.7	3.8	14.0	27.4	23.4	8.0	18.2	5	0
E	1063.9	L	585452	6119811	10.5	13.5	151.1	145.9	47.0	53.6	1.0	8	24
F	1066.8	S	585540	6119811	15.8	21.2	115.3	148.1	47.0	46.8	1.1	0	0
G	1071.6	L	585690	6119808	5.1	0.6	0.0	0.0	13.9	4.7	---	---	9
H	1078.3	S	585913	6119803	12.5	19.6	84.0	109.9	7.1	28.2	0.9	6	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM m	YUTM m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE	10210		FLIGHT 3										
I	1101.8	S	586773	6119816	12.6	25.5	43.8	152.6	0.0	24.7	0.7	0	21
J	1213.1	B	589433	6119849	4.3	11.5	52.2	75.7	10.9	25.3	0.4	13	0
LINE	10220		FLIGHT 3										
A	1826.8	L	584484	6119626	23.8	15.2	71.7	78.0	14.8	31.1	3.1	9	0
B	1821.6	S	584669	6119625	9.6	24.9	104.3	182.4	0.0	35.4	0.5	0	0
C	1814.9	L	584922	6119629	28.7	27.2	203.3	220.8	34.4	79.7	2.0	0	0
D	1807.7	L	585202	6119627	22.3	0.7	24.7	20.3	27.2	11.0	---	---	15
E	1782.4	S	586144	6119668	2.6	9.9	68.2	78.6	21.8	34.6	---	---	11
F	1764.9	S	586755	6119688	7.3	24.3	28.0	196.4	4.1	27.9	0.4	0	0
G	1747.6	S	587378	6119688	9.0	8.3	95.5	94.9	12.8	36.2	1.4	16	0
H	1663.8	B	589630	6119729	10.2	7.0	15.1	27.1	9.0	11.5	2.1	34	11
I	1461.7	S	594462	6119863	5.7	8.4	91.2	102.0	8.4	38.2	0.7	20	0
LINE	10230		FLIGHT 5										
A	6986.7	L	584942	6119497	21.8	33.7	126.6	214.5	3.8	52.1	1.1	2	0
B	6978.4	L	585188	6119490	11.4	1.4	0.0	7.3	7.6	0.0	---	---	0
C	6963.1	L	585656	6119487	11.9	4.6	59.0	37.0	7.1	27.4	4.8	15	0
D	6808.0	B?	589415	6119579	1.3	1.1	7.4	2.3	4.3	2.6	---	---	0
E	6539.6	S	594630	6119684	10.7	21.2	117.6	155.4	8.9	49.3	0.7	0	0
LINE	10240		FLIGHT 5										
A	7095.5	S	584266	6119323	14.1	32.1	129.9	196.1	4.6	53.0	0.7	0	0
B	7099.4	S	584396	6119324	15.5	26.7	129.9	196.1	4.6	53.0	0.9	0	0
C	7122.3	L	585167	6119348	20.3	7.6	24.2	39.8	35.3	10.1	5.9	22	0
D	7144.0	B?	585796	6119363	16.6	17.6	114.5	116.7	80.3	54.8	1.5	7	0
E	7371.5	S?	589654	6119423	5.0	8.2	32.0	48.3	1.6	12.7	---	---	0
F	7608.5	S	594645	6119528	25.3	37.7	176.1	220.2	19.9	74.4	1.2	0	0
LINE	10250		FLIGHT 5										
A	8335.7	S	584236	6119177	20.5	47.9	141.3	256.5	2.4	51.7	0.7	0	0
B	8302.6	L	585189	6119193	28.5	13.2	127.9	41.6	116.2	51.2	4.9	0	0
C	8298.5	L	585309	6119210	13.4	2.9	127.9	41.6	116.2	39.3	---	---	0
D	8285.7	B?	585661	6119217	30.6	34.8	120.8	178.2	55.1	57.8	1.7	0	0
LINE	10260		FLIGHT 5										
A	8420.6	S	584614	6119040	10.0	36.4	53.1	170.0	17.5	31.4	0.4	0	0
B	8453.5	S	585655	6119062	13.0	17.6	86.7	88.5	12.8	33.4	1.1	0	0

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EM Anomaly List

Label	Fid	Interp	XUTM	YUTM	CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
			m	m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE	10260		FLIGHT 5										
C	9029.4	S	594409	6119229	14.1	15.3	49.9	51.7	12.4	23.1	1.4	9	0
LINE	10270		FLIGHT 5										
A	9682.2	L	584837	6118884	21.7	15.0	65.9	86.8	35.8	31.3	2.7	2	0
B	9667.9	S	585209	6118888	8.3	17.4	35.1	66.8	3.4	18.9	0.6	5	20
C	9131.0	S	594444	6119079	10.5	7.5	27.9	45.5	4.8	11.5	2.0	15	0
LINE	10280		FLIGHT 6										
A	623.9	B	584449	6118728	13.4	3.6	71.1	60.6	34.4	33.5	8.1	26	0
B	639.4	S	584897	6118732	8.1	20.0	51.4	101.8	15.3	27.8	0.5	0	0
C	1076.0	S?	591369	6118857	4.1	10.8	19.0	66.7	2.2	16.2	0.4	11	0
LINE	10290		FLIGHT 6										
A	1876.6	B?	584267	6118565	7.9	10.0	47.9	45.3	17.7	22.0	1.0	13	0
B	1866.7	L	584510	6118582	27.6	15.5	63.7	46.3	48.2	32.6	3.8	7	0
LINE	10300		FLIGHT 6										
A	1948.0	H	584233	6118427	6.2	6.1	42.0	22.5	38.0	16.7	1.2	31	0
B	1954.8	L	584407	6118431	10.9	1.8	36.7	10.3	19.0	9.8	---	---	0
C	2366.6	H	590273	6118540	12.2	10.5	43.5	55.6	17.0	17.7	1.7	9	0
D	2583.3	H	594079	6118644	2.3	0.3	19.5	6.7	5.8	5.8	---	---	0
LINE	10310		FLIGHT 6										
A	3387.8	L?	584114	6118263	21.6	7.5	94.1	33.9	79.3	43.5	6.7	21	0
B	3004.0	H	590390	6118395	2.5	1.7	29.2	11.6	18.2	6.3	---	---	74
C	2796.9	H	594149	6118469	12.2	6.2	48.0	23.9	21.5	17.5	3.3	23	8
LINE	10320		FLIGHT 6										
A	3457.3	L?	584244	6118126	27.3	8.3	61.6	35.6	73.4	39.0	8.7	17	0
B	3462.8	L	584384	6118130	15.1	4.6	46.0	77.0	41.0	17.0	7.2	6	0
C	3938.0	B?	590659	6118245	3.2	5.3	24.2	28.7	3.4	11.9	0.5	35	0
D	3972.0	B	591098	6118250	13.2	18.1	79.4	73.6	16.6	36.8	1.1	17	0
E	4143.1	H	594001	6118319	7.3	2.2	49.1	15.1	25.3	18.7	---	---	0
LINE	10330		FLIGHT 6										
A	4411.4	S	591330	6118111	6.5	21.4	19.9	91.0	0.4	16.4	0.4	0	19
B	4271.5	H	593960	6118171	4.6	2.1	25.3	12.8	13.4	8.5	---	---	7

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE 10331			FLIGHT 7										
A	706.2	L	584159	6117977	10.0	7.2	31.8	17.3	29.9	18.2	2.0	14	0
B	713.8	S	584404	6117972	16.2	34.6	58.6	141.6	31.0	38.3	0.7	0	5
C	1218.5	S	590735	6118092	4.4	10.7	22.4	44.4	4.3	12.1	0.4	2	24
LINE 10340			FLIGHT 7										
A	1541.7	L	583861	6117806	36.3	13.1	73.0	95.6	100.1	16.5	7.6	0	0
B	1553.2	S	584263	6117826	15.3	17.0	64.1	131.7	29.5	38.1	1.4	5	0
C	2060.0	B	591309	6117960	2.1	0.3	50.8	26.8	10.4	22.2	---	---	5
D	2086.0	B?	591741	6117975	3.3	0.8	21.6	14.1	13.0	11.8	---	---	13
E	2162.0	H	593092	6117999	3.6	0.6	13.8	2.4	13.6	4.3	---	---	0
F	2194.0	H	593976	6118018	3.5	2.1	19.2	19.4	11.3	6.3	---	---	10
LINE 10350			FLIGHT 7										
A	2390.9	S?	591920	6117837	2.2	14.9	6.3	48.7	0.6	8.0	---	---	28
B	2347.6	H	592650	6117841	7.5	5.1	76.1	29.6	58.3	40.8	1.9	38	0
C	2326.7	H	593149	6117846	5.6	1.9	69.6	28.6	65.5	24.1	---	---	0
D	2299.6	H	593929	6117886	8.4	4.8	43.9	25.3	36.1	14.0	2.5	30	7
LINE 10351			FLIGHT 17										
A	3687.4	S	584042	6117673	17.7	57.8	130.1	310.2	27.3	69.4	0.5	0	41
B	3334.8	S?	589651	6117812	8.0	1.6	29.1	1.9	35.8	0.2	---	---	31
LINE 10360			FLIGHT 9										
A	6848.0	H	592917	6117707	1.8	3.5	24.5	36.5	53.3	2.4	---	---	12
B	6798.7	H	593973	6117716	27.7	11.5	167.5	24.4	125.5	82.9	5.7	5	10
C	6780.1	S	594402	6117712	4.7	14.9	64.4	98.9	6.7	33.0	0.4	0	0
LINE 10361			FLIGHT 17										
A	2791.0	S?	588329	6117598	2.8	4.7	12.5	15.4	16.8	2.6	---	---	0
LINE 10370			FLIGHT 17										
A	2453.8	S	584155	6117362	12.5	11.3	44.1	44.4	5.5	16.8	1.6	17	0
B	2176.0	S?	588319	6117450	0.0	5.0	0.0	26.1	115.5	3.8	---	---	0
C	1873.7	S	592029	6117531	2.5	11.7	30.2	75.5	8.0	13.9	---	---	0
D	1855.0	H	592406	6117528	4.6	4.1	27.7	28.4	22.1	11.1	1.2	39	0
E	1824.5	H	593142	6117554	15.1	8.4	106.0	17.3	77.9	56.5	3.1	19	6
F	1784.8	H	594101	6117579	16.3	9.5	97.4	33.4	51.3	57.5	3.0	15	107

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE	10380		FLIGHT 16										
A	6117.5	S	592148	6117396	6.5	20.2	29.8	54.5	18.0	13.8	0.4	0	0
B	6128.2	H	592347	6117388	11.2	6.1	25.7	10.0	21.2	9.2	3.0	18	0
C	6155.3	H	592873	6117408	14.2	11.0	71.7	43.8	40.7	37.0	2.0	14	0
D	6176.7	H	593360	6117393	18.3	8.6	48.4	24.7	17.6	27.9	4.2	17	0
E	6199.7	H	593918	6117418	10.2	13.0	55.4	46.5	35.1	29.9	1.0	10	0
LINE	10390		FLIGHT 16										
A	4484.7	H	593081	6117254	4.0	2.1	31.3	12.2	22.1	12.4	---	---	9
B	4475.2	E	593306	6117268	17.9	8.3	52.1	30.1	17.6	25.9	4.2	9	6
C	4434.4	H	594008	6117281	3.3	11.4	43.2	60.9	18.4	21.7	0.3	0	16
LINE	10401		FLIGHT 16										
A	3778.0	S?	589358	6117019	10.9	1.8	28.3	17.0	37.5	3.0	---	---	0
B	4031.6	S	591972	6117075	6.0	20.4	41.3	73.8	7.1	20.6	0.4	0	0
C	4083.0	H	593184	6117104	7.8	2.1	40.7	3.8	28.3	19.9	---	---	0
D	4115.7	H	593987	6117128	14.1	14.7	42.8	49.2	10.3	21.6	1.4	2	26
LINE	10410		FLIGHT 16										
A	2563.5	S?	589396	6116869	0.0	2.3	8.1	20.2	10.1	2.7	---	---	0
B	2321.0	S	591903	6116920	6.9	15.1	26.1	60.4	2.7	12.4	0.5	0	13
C	2311.8	S	592127	6116920	1.3	16.6	25.4	84.8	1.4	18.1	---	---	0
D	2258.0	H	593150	6116952	1.3	1.6	35.0	12.7	27.0	18.0	---	---	0
LINE	10420		FLIGHT 2										
A	3946.1	S	580161	6116546	19.3	36.4	172.9	249.6	16.8	71.0	0.9	0	0
B	3966.8	L	580868	6116546	12.7	16.3	0.0	162.5	7.9	35.3	1.1	4	0
C	3971.7	H	581023	6116557	5.9	25.3	94.7	162.5	7.9	35.3	0.3	2	23
D	4003.9	L	582163	6116578	28.4	22.1	94.5	96.7	12.3	34.7	2.6	0	21
E	4020.3	S	582752	6116590	5.0	12.1	121.4	89.4	28.5	50.7	0.5	2	0
F	4024.7	S	582908	6116592	6.8	14.5	73.9	83.9	24.7	30.7	0.6	15	0
LINE	10421		FLIGHT 3										
A	3408.2	S	592021	6116768	2.5	13.0	6.6	48.3	1.1	8.5	---	---	15
B	3458.0	H	593053	6116787	2.4	3.3	30.8	13.2	23.3	15.8	---	---	0
LINE	10430		FLIGHT 2										
A	4946.8	S	579918	6116392	20.8	29.2	192.7	274.1	14.7	75.5	1.2	8	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE	10430		FLIGHT 2										
B	4938.0	S	580236	6116398	24.7	51.6	258.6	514.5	18.9	133.1	0.9	0	8
C	4920.8	L	580814	6116406	14.3	10.4	36.9	78.3	3.4	12.4	2.2	13	0
D	4887.5	L	582016	6116439	19.0	14.2	123.6	81.3	23.1	45.8	2.3	13	0
E	4870.0	H	582666	6116447	2.1	0.0	30.3	17.5	21.3	13.6	---	---	0
LINE	10431		FLIGHT 3										
A	3010.0	S?	591933	6116649	1.3	10.3	13.7	55.6	8.1	9.9	---	---	37
B	2954.0	H	593148	6116676	2.6	1.5	27.4	9.2	22.1	11.3	---	---	0
C	2926.8	H	593865	6116695	7.5	3.3	26.9	11.5	6.8	11.5	3.4	37	0
D	2904.0	S	594644	6116703	7.3	16.7	36.3	65.3	1.8	16.1	0.5	9	0
LINE	10440		FLIGHT 3										
A	2039.0	S	579665	6116210	15.3	41.5	77.3	175.4	7.2	41.2	0.6	0	0
B	2044.6	S	579858	6116219	23.2	23.0	168.6	214.2	22.9	61.1	1.8	12	0
C	2054.7	S	580210	6116227	23.3	43.7	210.5	239.8	18.7	87.0	0.9	0	11
D	2074.0	L	580798	6116247	22.6	10.6	21.9	4.3	12.9	11.0	4.5	17	0
E	2107.3	L	581924	6116268	28.5	6.9	69.8	104.0	29.6	34.2	12.3	14	0
F	2113.8	S	582140	6116266	17.8	41.2	50.4	147.0	6.2	32.2	0.7	0	8
G	2563.7	S?	589235	6116395	4.8	3.2	13.3	16.0	16.8	2.3	---	---	0
H	2575.3	S?	589503	6116422	9.4	4.2	24.9	6.5	30.4	0.4	---	---	0
I	2665.0	S?	591290	6116445	0.0	10.2	8.5	25.1	11.4	4.7	---	---	0
J	2766.0	H	593342	6116478	0.0	1.7	5.9	6.6	12.1	2.9	---	---	0
K	2809.8	H	594561	6116528	3.0	6.9	39.3	25.4	3.7	11.8	---	---	5
LINE	10450		FLIGHT 3										
A	4348.7	S	579951	6116096	22.8	51.9	205.3	337.3	20.0	92.2	0.8	0	13
B	4325.4	L	580784	6116104	20.2	9.9	44.3	35.3	13.6	19.4	4.1	20	0
C	4314.9	L	581155	6116116	12.1	17.8	18.4	68.3	1.4	15.5	1.0	3	0
D	4312.1	S	581257	6116118	1.4	6.1	36.0	68.3	6.1	17.9	---	---	0
E	4296.4	L	581855	6116118	10.1	7.4	31.0	40.7	20.0	6.0	2.0	29	0
F	4053.0	S?	587457	6116236	4.9	2.9	15.3	30.3	20.1	5.8	---	---	0
G	3954.0	S?	589042	6116287	0.4	0.5	2.1	42.0	1.1	6.6	---	---	0
H	3936.0	S?	589331	6116294	0.0	9.8	0.0	21.2	0.0	3.0	---	---	0
I	3929.9	S?	589498	6116295	9.2	7.8	53.0	11.1	71.1	2.2	---	---	0
J	3783.7	S?	592436	6116361	1.1	3.5	9.1	35.2	1.2	5.8	---	---	46
K	3740.8	B	593259	6116364	9.7	7.3	52.9	17.8	31.1	25.4	1.9	35	0
L	3703.1	H	594491	6116394	3.5	5.6	40.7	56.3	2.7	17.1	0.6	30	19

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE 10460			FLIGHT 3										
A	4418.7	S	579952	6115928	24.2	47.5	259.0	356.5	21.6	109.7	0.9	0	18
B	4443.7	L	580733	6115952	18.8	17.4	40.8	58.1	9.0	15.3	1.8	15	0
C	4454.8	L	581108	6115945	15.6	20.5	60.2	63.0	6.1	21.1	1.2	0	0
D	4470.6	L	581669	6115963	15.3	8.1	62.9	42.9	33.2	35.3	3.4	17	20
E	4475.6	L	581851	6115962	5.6	5.4	40.7	20.2	27.0	16.7	1.2	31	0
F	4483.1	S	582123	6115964	15.9	38.7	102.3	166.3	7.5	50.3	0.7	0	6
G	4875.8	S?	589112	6116125	4.8	9.5	50.3	52.3	59.6	8.4	---	---	0
H	4884.1	S?	589347	6116118	13.3	7.8	55.6	12.5	64.8	1.5	---	---	0
I	4957.4	S?	591145	6116164	0.0	10.9	17.4	40.1	30.9	5.2	---	---	545
J	5070.3	B	593352	6116176	7.4	1.0	42.0	12.6	23.8	14.8	---	---	0
K	5082.0	H	593774	6116185	8.6	3.3	36.1	14.4	13.6	18.7	4.2	35	22
L	5117.0	H	594571	6116200	2.6	4.8	47.7	42.3	5.4	17.7	---	---	0
LINE 10470			FLIGHT 3										
A	5898.6	S	579868	6115789	28.3	37.9	294.9	403.6	25.4	123.6	1.4	3	41
B	5863.1	L	581158	6115841	17.4	14.3	85.7	89.0	7.3	35.5	2.0	3	0
C	5854.0	L	581490	6115816	7.9	3.7	17.7	24.8	16.3	13.3	3.2	37	16
D	5767.6	S?	584538	6115900	7.8	8.1	8.6	13.4	1.6	3.5	1.2	15	13
E	5725.7	S?	585216	6115912	4.9	9.2	19.0	32.3	2.0	7.8	---	---	0
F	5595.4	S?	587748	6115965	6.4	1.9	38.4	13.7	66.8	3.3	---	---	0
G	5343.6	H	593322	6116065	11.3	1.0	33.5	12.5	15.9	16.0	---	---	0
H	5336.9	B	593603	6116080	14.9	5.3	44.9	27.0	25.4	23.6	5.7	26	0
LINE 10480			FLIGHT 3										
A	5971.4	S	579723	6115619	22.3	26.6	206.8	246.0	21.9	83.6	1.4	3	20
B	6019.8	L	581308	6115611	7.7	20.2	68.9	112.3	36.6	29.2	0.5	0	0
C	6098.2	B	583867	6115720	16.3	13.6	70.1	29.0	16.5	30.3	1.9	18	0
D	6101.6	B	583938	6115722	21.7	16.5	70.1	29.0	16.5	30.3	2.4	20	0
E	6130.2	D	584517	6115726	23.0	17.5	51.1	27.6	21.2	22.7	2.5	14	0
F	6134.3	B	584615	6115722	17.5	13.6	51.1	27.6	17.2	22.7	2.2	17	0
G	6327.8	S?	587690	6115779	18.1	1.5	41.8	24.4	51.5	2.9	---	---	0
H	6335.4	S?	587908	6115781	19.4	4.6	73.3	24.4	99.0	1.8	---	---	0
I	6625.7	B	593312	6115896	12.2	2.1	39.5	17.6	14.3	16.9	---	---	0
J	6636.0	H	593693	6115912	6.7	0.0	51.3	33.6	21.0	27.3	---	---	47
K	6682.0	S	594663	6115919	6.0	10.8	47.4	46.6	1.7	14.5	0.6	3	0

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EM Anomaly List

Label	Fid	Interp	XUTM	YUTM	CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
					Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE 10490			FLIGHT 16										
A	1059.2	S	580824	6115494	6.8	11.7	123.4	170.1	16.2	51.3	0.7	8	0
B	1064.6	S	581016	6115496	9.9	11.0	123.4	126.3	27.5	34.8	1.2	5	0
C	1078.9	S	581524	6115502	17.9	26.2	121.4	106.0	15.1	52.0	1.1	0	0
D	1119.3	S	582735	6115537	13.9	23.7	66.0	93.1	4.3	27.3	0.9	4	0
E	1182.1	B	584159	6115566	11.9	8.6	39.5	46.4	4.8	16.1	2.1	27	0
F	1201.7	D	584486	6115565	18.5	22.4	71.8	53.1	18.6	37.2	1.3	7	0
G	1213.1	B	584656	6115569	13.4	11.6	65.6	35.0	14.3	31.2	1.8	19	0
H	1409.0	S?	587057	6115618	1.8	1.7	31.9	24.0	41.6	3.3	---	---	0
I	1455.5	S?	588063	6115640	0.0	4.5	36.3	25.2	49.8	4.0	---	---	0
J	1600.0	S?	589300	6115662	2.4	4.1	0.0	41.4	0.0	5.7	---	---	25
K	1700.5	S?	590822	6115711	0.0	4.9	55.6	21.3	74.0	3.1	---	---	0
L	1810.1	B	593273	6115750	14.9	8.8	55.7	19.4	34.8	23.6	2.9	21	0
M	1823.0	H	593600	6115746	27.9	22.9	129.8	67.1	27.9	61.5	2.4	9	0
N	1831.2	B	593818	6115747	11.0	11.8	66.0	32.6	18.8	28.9	1.3	7	0
LINE 10500			FLIGHT 15										
A	8831.5	L	579656	6115318	17.8	11.4	45.4	26.5	11.9	17.1	2.8	13	60
B	8815.6	S	580212	6115345	5.0	18.2	16.6	84.7	1.0	12.4	0.3	0	5
C	8798.5	L	580829	6115357	12.8	4.6	88.3	53.8	15.7	35.3	5.4	30	0
D	8767.7	L	581921	6115371	10.7	9.7	49.4	30.2	12.4	22.6	1.5	15	0
E	8747.7	S	582588	6115378	17.9	23.4	72.4	101.8	2.9	30.2	1.2	0	24
F	8679.5	B	584486	6115442	12.6	12.4	41.0	23.9	12.9	18.2	1.5	6	0
G	8565.9	S?	586498	6115465	0.8	9.2	45.7	50.7	59.1	6.9	---	---	202
H	8484.2	S?	587968	6115504	6.4	2.8	19.4	24.5	27.6	3.9	---	---	106
I	8156.3	H	593220	6115601	4.1	2.7	11.2	10.7	5.1	5.4	---	---	13
J	8141.5	B	593610	6115610	19.7	7.4	53.7	45.3	17.4	24.6	5.8	5	26
K	8113.1	S?	594181	6115622	3.2	11.0	17.1	44.8	1.3	8.1	0.3	7	104
LINE 10510			FLIGHT 15										
A	7015.6	L	580637	6115183	13.8	9.5	64.3	37.5	17.8	25.9	2.3	4	0
B	7046.9	B?	581870	6115229	20.1	13.1	100.6	58.8	26.1	44.3	2.8	10	0
C	7051.2	D	582014	6115229	28.0	21.7	100.6	58.8	26.1	44.3	2.6	7	18
D	7066.2	S	582490	6115227	54.7	81.7	328.2	410.4	15.6	117.1	1.5	0	0
E	7104.0	H	583708	6115260	1.9	5.0	43.0	16.6	32.7	22.9	---	---	0
F	7114.0	H	583954	6115271	1.3	1.3	24.9	1.5	26.7	11.3	---	---	0
G	7137.7	B	584398	6115267	7.6	3.4	35.0	10.7	19.2	4.5	3.3	40	0
H	7276.0	S?	586355	6115295	2.8	1.3	17.6	35.0	13.7	6.3	---	---	0

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	CX 5500 HZ Quad ppm	CP 7200 HZ Real ppm	CP 7200 HZ Quad ppm	CP 900 HZ Real ppm	CP 900 HZ Quad ppm	Vertical Dike COND siemens	Vertical Dike DEPTH* m	Mag. Corr NT
LINE 10511			FLIGHT 15										
A	7618.4	S?	590194	6115393	1.9	3.2	4.1	38.4	5.8	6.4	---	---	0
B	7780.0	B?	593285	6115452	6.3	6.6	4.9	14.1	3.3	3.1	---	---	0
C	7804.0	H	593673	6115451	23.8	7.8	109.6	78.8	42.9	51.6	7.5	1	0
D	7866.4	S	594759	6115484	7.8	21.6	67.4	121.7	5.8	28.7	0.5	0	0
LINE 10520			FLIGHT 15										
A	6479.0	S?	586549	6115170	8.5	2.1	67.8	20.1	89.9	3.2	---	---	0
B	6409.5	S?	588149	6115223	14.8	6.2	59.7	24.7	77.9	4.1	---	---	55
C	6272.8	S?	590118	6115251	3.8	2.4	91.7	8.2	112.9	2.9	---	---	0
D	6262.1	S?	590322	6115260	20.9	11.8	80.4	16.5	105.5	2.2	---	---	594
E	6226.0	S?	590603	6115264	0.0	3.1	13.7	18.4	18.2	3.2	---	---	0
F	6174.0	S?	591160	6115273	4.8	1.6	40.6	22.1	53.2	4.5	---	---	251
G	6115.6	S	592043	6115272	4.4	14.2	13.1	66.7	7.8	12.2	0.3	6	0
H	6040.6	H	593544	6115318	10.4	13.5	73.5	70.5	24.9	31.9	1.0	13	0
I	6022.3	B	593714	6115323	36.7	19.2	122.6	37.2	75.3	54.7	4.6	0	0
J	5977.7	S	594524	6115343	15.7	42.4	49.7	82.1	7.9	25.4	0.6	0	0
LINE 10521			FLIGHT 16										
A	614.2	S	579899	6115039	2.2	6.8	44.7	123.5	2.6	23.8	---	---	0
B	629.8	L	580427	6115052	9.4	8.8	43.1	31.8	7.2	15.8	1.4	2	15
C	637.3	L	580693	6115047	12.3	10.1	2.5	4.9	2.1	1.7	1.8	16	0
D	645.7	S	581004	6115037	11.3	9.3	38.2	37.3	5.5	19.8	1.8	24	0
E	653.5	S	581302	6115049	10.7	4.9	45.0	32.2	9.2	17.4	3.6	26	0
F	666.2	B?	581748	6115081	10.3	0.0	0.0	0.0	8.8	0.0	---	---	0
G	674.3	B	581988	6115081	24.8	20.3	73.0	49.8	23.3	34.0	2.3	14	0
H	688.6	H	582428	6115087	11.0	14.3	69.9	97.2	3.6	26.6	1.0	19	0
I	755.3	H	583982	6115119	9.9	4.4	69.2	28.0	56.4	23.7	3.7	25	0
LINE 10530			FLIGHT 15										
A	4873.0	L	580227	6114903	15.7	19.4	36.4	11.7	25.3	21.3	1.2	0	0
B	4878.0	L	580417	6114907	11.1	11.2	20.4	62.4	20.8	11.4	1.4	4	0
C	4882.1	S	580568	6114899	18.0	15.0	43.6	62.4	20.8	11.4	2.0	11	0
D	4893.2	S	580983	6114896	8.7	20.0	88.5	147.8	6.0	36.7	0.6	2	0
E	4900.5	S	581263	6114911	13.4	11.4	107.7	74.9	8.9	42.6	1.8	12	0
F	4913.1	S?	581729	6114920	10.1	4.0	22.9	23.4	7.2	8.2	4.3	18	0
G	5020.0	B	584442	6114982	8.8	4.9	30.9	18.8	18.2	13.5	2.6	21	0
H	5048.3	S	584939	6114969	5.6	20.9	20.7	69.7	1.9	12.7	0.3	0	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE 10530			FLIGHT 15										
I	5579.7	S	591979	6115139	1.7	16.3	22.8	84.1	11.2	15.0	---	---	0
J	5627.7	B?	593110	6115158	3.2	2.0	24.6	10.8	6.6	7.8	---	---	0
K	5659.9	E	593426	6115137	6.5	17.9	42.6	85.7	4.5	22.9	0.4	9	0
L	5677.6	H	593658	6115149	69.5	38.1	243.4	102.1	162.0	109.4	5.3	0	0
M	5741.7	S	594690	6115175	10.9	28.3	76.5	179.8	6.6	36.3	0.6	0	0
LINE 10540			FLIGHT 15										
A	4573.0	S	580000	6114743	35.4	37.0	199.0	218.4	47.2	74.8	2.0	0	0
B	4562.3	B?	580345	6114748	12.1	7.2	24.0	0.0	33.7	10.6	2.7	19	9
C	4559.9	B?	580420	6114747	13.6	11.9	24.0	79.3	10.9	10.6	1.8	2	9
D	4541.9	S?	580996	6114756	51.6	53.5	267.2	252.6	25.4	103.9	2.2	4	0
E	4522.6	L	581675	6114774	14.9	26.2	62.3	119.2	6.9	27.2	0.9	0	0
F	4397.5	S	584522	6114819	8.7	12.4	41.3	60.8	4.4	17.6	0.9	9	0
G	4026.2	S?	590681	6114959	1.8	3.2	6.7	27.2	7.6	4.2	---	---	0
H	3891.0	H	593090	6115003	2.8	1.9	21.2	9.5	12.3	10.6	---	---	0
I	3828.3	B	593605	6115004	18.0	27.1	90.6	90.1	17.7	32.2	1.1	4	0
J	3803.2	H	593852	6115010	49.9	27.1	265.9	138.4	100.8	124.2	4.8	0	0
K	3768.9	B?	594391	6115024	10.1	13.2	17.5	10.6	1.4	5.1	1.0	13	0
L	3735.6	S	594815	6115037	3.1	50.2	65.6	197.1	4.6	40.5	0.1	0	20
LINE 10550			FLIGHT 15										
A	2494.7	B	579848	6114580	17.1	1.8	334.9	237.1	88.8	146.5	---	---	0
B	2500.5	E	580039	6114583	59.0	60.1	334.9	237.1	88.8	146.5	2.4	0	0
C	2521.9	S	580707	6114594	7.4	9.9	57.6	104.1	1.8	22.0	0.9	18	0
D	2529.7	H	580981	6114591	17.4	17.0	113.0	114.5	26.4	60.4	1.7	12	13
E	2549.6	L	581678	6114626	11.6	15.2	46.7	67.2	9.0	19.0	1.1	1	0
F	2675.9	B	584621	6114672	13.9	12.6	79.8	72.2	17.1	33.0	1.7	9	0
LINE 10551			FLIGHT 15										
A	3204.5	S?	590230	6114799	15.6	3.8	27.5	6.5	35.9	1.6	---	---	0
B	3223.0	S?	590542	6114792	11.4	5.4	40.5	15.3	57.4	2.5	---	---	57
C	3349.1	H	592904	6114847	11.0	8.5	48.0	37.5	12.0	20.3	1.9	17	14
D	3430.3	B	593501	6114835	35.7	17.5	100.1	48.4	37.2	53.2	5.0	0	7
E	3446.5	H	593842	6114876	25.6	10.0	84.7	39.2	69.5	39.5	6.0	0	0
F	3473.5	B	594190	6114864	9.6	19.0	64.2	100.9	2.3	27.5	0.7	8	10
G	3501.9	S	594526	6114870	8.8	22.1	70.2	145.1	6.0	35.7	0.5	0	0
H	3515.0	S	594679	6114888	9.4	27.8	42.9	136.5	0.0	29.6	0.5	0	6
I	3525.6	S	594781	6114875	12.4	17.9	44.6	138.9	2.3	26.2	1.0	12	34

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE 10560			FLIGHT 15										
A	2310.6	L	579707	6114438	14.2	23.8	185.6	182.1	26.3	61.1	0.9	0	0
B	2306.0	B	579860	6114437	38.2	19.5	148.4	50.9	71.2	78.0	4.8	4	0
C	2296.7	B	580162	6114434	14.9	14.4	31.5	53.7	16.9	15.8	1.6	13	0
D	2273.3	S	580948	6114460	24.1	20.4	137.6	133.4	18.1	60.9	2.2	13	0
E	2251.0	L	581688	6114456	9.1	10.7	51.6	57.5	5.7	19.5	1.1	16	0
F	2141.9	H	584298	6114520	11.0	12.7	63.9	48.1	18.5	25.9	1.2	16	0
G	2122.4	B	584705	6114527	17.6	15.6	53.9	36.1	11.8	25.3	1.9	0	0
H	2108.0	H	584972	6114528	12.1	15.6	65.0	33.8	13.5	28.5	1.1	8	0
I	1935.5	S?	587859	6114580	5.8	6.2	35.0	17.6	52.3	3.3	---	---	0
J	1820.0	S?	589396	6114631	12.6	3.5	18.2	22.1	19.1	3.1	---	---	0
K	1686.6	S?	591026	6114646	1.6	11.9	13.8	75.9	16.9	12.6	---	---	0
L	1486.0	B?	593514	6114710	3.3	6.0	16.1	46.3	6.5	11.6	---	---	0
M	1444.8	H	593920	6114724	11.4	3.4	87.8	122.9	54.9	44.9	6.6	19	0
N	1389.4	S?	594755	6114741	10.1	45.1	59.0	169.6	7.1	36.1	0.4	0	0
LINE 10570			FLIGHT 14										
A	4093.4	H	584169	6114379	17.6	11.7	70.7	50.4	21.7	28.2	2.6	26	0
B	4115.0	B	584553	6114384	14.4	21.9	127.8	92.9	49.6	53.6	1.0	8	0
C	4122.9	D	584694	6114387	37.0	5.6	107.2	69.5	75.1	65.6	26.7	12	0
D	4133.1	B	584838	6114378	9.0	19.9	75.9	71.0	12.9	31.4	0.6	2	0
E	4144.5	B	585001	6114372	16.3	8.3	159.9	123.9	31.2	63.3	3.6	14	5
F	4340.0	S?	588003	6114304	6.8	2.5	25.8	26.8	28.2	4.4	---	---	0
G	4371.0	S?	588485	6114457	5.2	2.3	32.3	10.0	34.4	2.0	---	---	0
H	4463.7	S?	590323	6114503	0.0	8.8	51.5	43.7	71.6	5.7	---	---	245
LINE 10571			FLIGHT 17										
A	806.9	S?	593334	6114542	12.3	24.9	30.8	53.3	3.9	14.3	0.7	0	19
B	818.3	S	593506	6114562	2.4	23.7	9.7	72.9	2.6	13.1	---	---	34
C	833.9	S	593778	6114567	6.9	35.6	31.4	73.5	7.3	18.8	0.3	0	80
D	844.0	H	593982	6114572	16.6	11.6	56.0	78.0	16.4	25.3	2.4	0	0
E	866.3	S	594371	6114565	12.6	25.0	75.7	155.1	9.2	40.3	0.7	0	0
F	873.6	S	594492	6114571	16.7	34.2	75.7	155.1	9.2	40.3	0.8	0	6
LINE 10580			FLIGHT 14										
A	3748.1	S	583935	6114212	12.0	17.2	72.8	97.9	2.8	27.5	1.0	14	6
B	3719.6	B	584593	6114231	24.1	11.4	81.3	16.9	59.6	35.2	4.6	15	0
C	3710.6	B	584815	6114232	13.5	0.3	159.8	35.9	126.0	67.3	---	---	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE	10580		FLIGHT 14										
D	3460.1	S?	588425	6114305	20.2	17.5	50.5	93.3	47.9	18.3	---	---	0
LINE	10581		FLIGHT 17										
A	1096.6	B	593222	6114407	19.1	47.4	45.8	135.5	4.3	30.7	0.7	0	6
B	1084.2	D	593317	6114412	31.5	21.7	98.4	110.6	19.2	47.7	3.1	12	0
C	1075.9	B	593379	6114412	33.0	39.3	96.1	111.7	6.6	38.7	1.7	3	0
D	1063.2	S?	593476	6114417	11.5	16.2	17.5	82.9	2.5	11.1	1.0	16	27
E	1036.2	H	593943	6114424	13.1	16.2	66.9	20.1	12.6	29.6	1.2	4	0
F	1016.1	S?	594334	6114420	31.1	86.2	74.1	242.8	10.9	50.7	0.7	0	0
G	1005.4	S	594511	6114426	11.7	48.7	46.4	142.0	7.2	38.8	0.4	0	0
LINE	10590		FLIGHT 14										
A	2341.5	S	582796	6114037	20.3	29.9	151.1	130.9	9.8	55.9	1.1	8	0
B	2351.7	S	583033	6114048	14.2	17.8	100.4	91.7	4.8	33.1	1.2	16	0
C	2381.1	S	583655	6114033	10.2	17.3	69.8	61.1	5.6	25.1	0.8	13	0
D	2426.6	B	584370	6114082	13.5	21.9	61.3	110.4	2.6	26.3	0.9	8	0
E	2459.0	B	584796	6114080	27.2	26.0	100.4	58.6	67.9	54.8	2.0	0	0
F	2469.5	B	584862	6114082	12.0	13.3	155.7	94.6	25.5	54.2	1.3	15	0
LINE	10591		FLIGHT 14										
A	2801.3	S?	588727	6114194	0.0	8.2	15.9	45.9	14.3	7.5	---	---	112
B	2968.5	S?	590922	6114204	6.9	10.9	23.0	31.8	25.1	4.0	---	---	0
LINE	10592		FLIGHT 17										
A	1397.2	S	592745	6114239	5.0	35.9	27.8	100.6	2.4	16.9	0.2	0	0
B	1441.3	B	593198	6114248	52.6	33.6	232.3	100.4	93.2	125.5	4.0	3	14
C	1448.7	B	593309	6114250	122.9	60.2	232.3	104.8	93.2	125.5	7.5	0	20
D	1476.8	H	593861	6114276	10.0	3.7	38.5	11.9	9.8	11.9	4.7	37	0
LINE	10600		FLIGHT 14										
A	2098.4	S	582659	6113887	10.7	12.8	89.7	58.7	5.6	29.4	1.1	18	0
B	2026.9	H	584256	6113920	16.1	18.4	79.0	77.4	8.0	33.7	1.4	5	0
C	2006.4	E	584692	6113922	18.5	17.0	201.5	118.4	49.3	84.3	1.8	1	0
D	2001.4	B	584798	6113928	56.5	32.2	201.5	118.4	69.0	84.3	4.7	0	0
E	1994.0	B	584928	6113938	20.2	4.9	44.2	15.9	69.0	82.9	11.0	0	0
F	1771.0	S?	588383	6114010	0.9	16.6	43.7	99.2	32.6	16.8	---	---	0
G	1574.3	S?	590977	6114058	7.8	9.6	21.7	43.7	18.5	7.9	---	---	24
H	1447.9	S?	592429	6114080	11.2	20.3	45.4	101.7	8.9	21.4	0.8	17	0

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	 Quad ppm	CP 7200 HZ Real ppm	 Quad ppm	CP 900 HZ Real ppm	 Quad ppm	Vertical Dike COND siemens	 DEPTH* m	Mag. Corr NT
LINE 10600			FLIGHT 14										
I	1384.5	H	593185	6114118	30.9	29.1	112.1	25.9	29.5	31.0	2.1	0	0
J	1368.6	B	593404	6114097	153.7	145.8	751.9	453.9	208.4	387.9	3.6	0	0
K	1347.1	S?	593779	6114119	30.2	37.9	86.4	122.0	12.0	39.6	1.5	0	0
L	1324.4	S	594275	6114119	8.5	19.0	59.9	115.9	13.3	27.0	0.6	0	0
M	1314.2	S?	594451	6114125	4.8	16.9	41.5	58.2	23.7	15.6	0.3	0	0
N	1298.4	S?	594628	6114137	8.9	11.5	32.3	3.6	56.4	0.0	1.0	20	278
LINE 10610			FLIGHT 12										
A	3299.0	S?	591343	6113926	1.2	8.6	39.1	15.6	0.6	4.5	---	---	0
B	3220.5	S?	592625	6113926	3.5	14.4	24.3	44.0	7.9	12.6	0.3	0	0
C	3210.9	S?	592773	6113948	2.5	12.5	8.5	46.7	2.8	9.7	---	---	0
D	3181.3	B	593064	6113958	10.8	20.1	59.4	96.5	18.7	33.6	0.7	6	0
E	3169.8	B?	593228	6113951	7.7	13.3	22.2	71.2	7.9	12.2	0.7	13	0
F	3161.0	B?	593354	6113964	3.3	11.5	20.7	75.0	4.7	11.9	0.3	0	0
G	3138.9	B	593581	6113978	17.4	18.2	89.5	116.6	14.2	38.3	1.5	0	8
H	3116.1	H	594218	6113962	10.4	16.6	76.0	87.7	18.7	31.8	0.8	7	0
I	3096.6	S?	594639	6113973	2.2	32.6	28.1	125.2	11.2	16.6	---	---	180
LINE 10611			FLIGHT 17										
A	3975.0	H	583691	6113760	12.0	16.1	57.7	56.7	7.5	25.2	1.0	9	0
B	4015.0	H	584682	6113784	6.4	8.6	17.3	60.1	50.2	23.1	0.8	17	0
C	4034.0	B	584965	6113795	27.4	12.5	283.4	27.3	242.3	142.4	5.0	15	0
LINE 10620			FLIGHT 12										
A	2311.2	S	582570	6113592	8.0	8.9	38.9	48.0	2.3	14.0	1.1	20	0
B	2331.4	H	582918	6113596	11.6	8.8	62.5	53.6	8.0	24.2	2.0	23	47
C	2385.6	H	584202	6113615	5.6	5.2	47.1	21.5	9.2	20.9	1.2	41	0
D	2408.5	H	584673	6113641	1.5	0.3	14.9	0.1	21.9	0.6	---	---	0
E	2423.6	B	584952	6113644	3.1	2.7	61.9	8.7	59.5	22.7	---	---	0
F	2607.0	S?	588310	6113710	19.2	10.8	72.2	26.8	93.3	5.6	---	---	0
G	2855.7	B	593434	6113808	28.9	35.5	91.7	116.5	26.3	37.4	1.5	0	17
H	2861.5	B	593529	6113812	15.4	14.8	71.8	116.5	26.3	37.4	1.6	9	0
I	2873.2	B?	593736	6113813	9.3	17.4	32.7	48.4	1.3	14.5	0.7	0	0
J	2883.4	S	594002	6113831	13.9	18.3	74.0	91.7	10.2	25.3	1.1	10	0
K	2888.7	H	594168	6113828	13.2	11.3	74.0	91.7	10.2	25.3	1.8	7	0
L	2900.8	S	594536	6113810	17.0	16.7	51.4	66.0	12.1	21.3	1.6	0	0

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					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM m	YUTM m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE 10630			FLIGHT 12										
A	1517.7	S?	592745	6113647	4.0	22.4	42.1	131.3	4.3	25.4	0.2	0	0
B	1503.7	S?	592988	6113641	6.4	20.8	54.7	99.9	3.0	21.9	0.4	0	8
C	1470.1	B?	593444	6113661	11.2	11.8	56.3	57.8	5.3	16.0	1.3	18	32
D	1453.1	B?	593573	6113666	3.2	11.2	31.9	24.3	5.2	13.1	0.3	7	0
E	1444.0	B?	593665	6113667	0.7	13.2	24.4	52.0	6.0	11.9	---	---	0
F	1423.0	H	594074	6113661	12.4	9.0	42.3	35.8	17.2	21.9	2.1	22	0
LINE 10631			FLIGHT 12										
A	2063.0	S	583136	6113444	10.6	12.3	50.0	42.9	11.5	24.6	1.2	19	18
B	2052.8	S	583409	6113451	9.2	13.5	51.2	85.8	4.5	26.5	0.9	18	0
C	2022.3	B	584223	6113471	8.9	6.2	23.4	15.9	4.0	12.3	2.0	29	0
D	2010.6	H	584516	6113471	3.9	11.6	44.7	66.5	13.7	11.8	0.4	0	6
E	2000.0	B	584781	6113487	6.5	0.0	117.7	26.4	33.5	62.6	---	---	0
F	1981.4	B	585154	6113488	6.2	13.8	25.8	42.4	10.6	10.3	0.5	2	0
LINE 10640			FLIGHT 12										
A	591.1	H	583126	6113305	17.0	19.8	89.8	83.9	14.8	37.5	1.4	15	11
B	658.0	H	584674	6113329	2.1	8.0	8.8	44.7	23.7	4.0	---	---	0
C	707.1	B	585342	6113346	42.4	48.4	254.0	164.8	73.7	104.0	1.9	0	0
D	1190.4	S	593680	6113509	17.6	35.4	52.4	123.4	5.5	26.2	0.8	0	0
E	1206.7	H	594081	6113523	16.6	15.2	67.1	25.4	14.0	28.6	1.8	11	0
LINE 10650			FLIGHT 11										
A	6971.5	H	582095	6113105	7.3	5.1	108.0	56.6	14.8	44.5	1.9	34	31
B	6951.5	S	582633	6113130	6.1	8.6	40.4	62.4	0.6	14.5	0.8	7	0
C	6921.8	H	583319	6113156	12.4	5.5	66.3	60.9	10.6	27.7	4.0	27	0
D	6890.8	H	584200	6113170	10.1	8.7	43.9	36.9	8.9	24.2	1.6	25	0
E	6532.0	S?	590922	6113350	4.3	8.4	24.4	52.1	35.3	8.5	0.5	17	0
F	6457.7	S?	592214	6113323	2.0	5.8	24.9	69.0	12.8	4.6	---	---	5
G	6378.0	H	594031	6113370	7.5	9.4	67.8	76.6	8.0	26.3	1.0	8	0
H	6358.7	H	594624	6113385	7.7	12.0	48.7	63.4	7.1	20.7	0.8	11	0
LINE 10660			FLIGHT 11										
A	5470.2	L	582168	6112986	6.5	12.6	101.1	126.9	11.8	36.1	0.6	1	27
B	5471.8	L	582212	6112986	3.4	5.1	101.1	126.9	11.8	36.1	0.6	23	27
C	5554.2	H	583301	6112991	9.9	12.2	50.4	37.1	9.8	22.8	1.1	16	0
D	5608.0	H	584753	6113034	0.0	5.2	21.5	13.3	15.2	16.8	---	---	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM	YUTM	Real	Quad	Real	Quad	Real	Quad	COND	DEPTH*	
			m	m	ppm	ppm	ppm	ppm	ppm	ppm	siemens	m	NT
LINE 10660			FLIGHT 11										
E	5630.0	S?	585130	6113048	0.2	3.5	22.1	48.4	4.8	6.6	---	---	0
F	5640.0	S?	585233	6113046	3.8	4.8	14.6	57.9	2.0	10.2	0.7	39	6
G	6109.7	S?	592183	6113181	1.3	9.3	1.5	32.5	1.9	5.0	---	---	284
H	6153.0	H	593435	6113191	3.8	7.9	26.2	13.1	8.8	12.1	---	---	0
I	6172.1	H	594051	6113217	10.2	10.4	46.1	43.0	6.1	18.9	1.3	13	0
J	6188.3	H	594620	6113232	12.5	15.4	61.5	77.3	7.0	28.9	1.2	17	0
LINE 10670			FLIGHT 11										
A	5259.7	S	582170	6112822	10.1	21.0	105.1	104.7	8.3	44.2	0.7	0	0
B	5224.0	S	582833	6112836	4.4	7.0	55.4	56.4	3.6	22.1	0.6	16	0
C	5213.0	S?	583047	6112835	2.2	3.8	32.9	17.3	6.5	7.5	---	---	24
D	5203.0	B	583245	6112844	9.3	15.9	58.5	60.2	9.3	24.7	0.8	13	0
E	5136.5	H	584974	6112890	12.5	11.7	45.7	26.2	7.7	12.8	1.6	12	0
F	4505.6	H	593568	6113052	16.5	13.2	55.0	42.6	11.4	23.6	2.1	10	0
G	4468.7	H	594545	6113085	8.7	7.1	35.2	19.6	6.1	13.5	1.6	23	0
LINE 10680			FLIGHT 11										
A	3385.0	S?	582738	6112682	8.6	15.8	49.0	70.3	3.6	21.0	0.7	2	44
B	3408.3	H	583124	6112698	9.2	10.5	28.5	23.9	9.3	15.5	1.1	20	59
C	3429.2	E	583528	6112703	16.6	27.7	89.5	110.4	5.4	33.7	0.9	5	0
D	3432.9	S	583613	6112699	14.2	27.7	89.5	110.4	5.4	33.7	0.8	1	0
E	3492.6	H	585046	6112740	13.0	7.2	72.6	49.9	15.9	31.4	3.0	18	0
F	3791.7	S?	587408	6112766	4.7	12.2	14.6	51.3	34.3	17.7	0.4	16	99
LINE 10681			FLIGHT 11										
A	4238.0	H	593292	6112896	1.0	1.7	36.1	36.3	6.7	13.7	---	---	5
B	4264.4	S	594125	6112916	9.2	12.6	73.3	76.6	4.1	30.4	0.9	12	0
C	4275.5	H	594437	6112925	10.8	16.6	52.9	71.3	6.5	20.9	0.9	18	0
LINE 10690			FLIGHT 11										
A	2515.0	S?	591621	6112725	5.8	6.0	39.5	33.6	46.4	6.7	1.1	27	0
B	2435.3	H	593330	6112743	0.1	0.6	22.0	0.4	12.5	8.3	---	---	0
LINE 10691			FLIGHT 11										
A	3165.3	S	582341	6112533	5.2	9.9	60.8	75.6	0.9	22.2	0.6	10	0
B	3126.1	H	583104	6112547	14.5	14.0	56.6	44.3	12.1	25.6	1.6	10	21
C	3114.6	S	583365	6112549	9.2	14.4	18.7	39.2	4.4	11.5	0.8	16	0
D	3043.0	H	585322	6112600	2.0	4.0	17.2	18.9	8.9	8.6	---	---	0

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	CX 5500 HZ Quad ppm	CP 7200 HZ Real ppm	CP 7200 HZ Quad ppm	CP 900 HZ Real ppm	CP 900 HZ Quad ppm	Vertical Dike COND siemens	Vertical Dike DEPTH* m	Mag. Corr NT
LINE 10691			FLIGHT 11										
E	2902.8	B?	587082	6112623	12.2	11.1	26.9	38.6	6.9	14.9	1.6	12	0
F	2874.0	S?	587416	6112634	7.5	15.0	42.9	71.3	26.3	17.1	0.6	2	268
LINE 10700			FLIGHT 11										
A	1511.8	H	582981	6112419	4.6	10.0	87.0	73.8	15.4	41.3	0.5	11	10
B	1559.5	S	583780	6112399	9.8	18.8	30.1	80.4	6.5	15.8	0.7	5	0
C	1594.0	S	584550	6112434	6.4	19.3	40.9	85.4	8.3	18.8	0.4	0	0
D	1614.2	H	585068	6112435	6.7	6.5	43.3	43.5	9.4	23.1	1.2	24	0
E	1638.9	B	585356	6112451	1.0	2.4	0.0	0.0	1.3	0.0	---	---	5
F	1884.0	S	587452	6112492	1.6	4.7	22.2	51.5	1.6	12.4	---	---	8
G	2082.0	S?	591167	6112571	0.0	7.8	29.2	43.8	0.5	8.0	---	---	154
H	2177.3	H	593376	6112606	5.5	1.0	41.6	15.4	15.6	15.6	---	---	0
I	2186.6	S	593675	6112605	9.1	13.1	18.0	50.6	6.3	7.0	0.9	0	0
LINE 10710			FLIGHT 10										
A	4180.2	H	583099	6112251	10.7	9.8	31.4	25.4	9.3	16.8	1.5	15	48
B	4137.8	S	583924	6112258	3.9	11.7	24.9	42.3	4.1	11.4	0.3	2	58
C	4085.8	B	585293	6112306	25.1	15.0	145.1	64.7	56.0	62.0	3.4	6	20
D	4081.6	B	585363	6112305	29.3	9.1	145.1	64.7	56.0	62.0	8.6	5	0
E	3890.0	S?	588019	6112369	0.1	4.2	7.3	27.2	10.1	4.3	---	---	165
F	3643.6	S?	591143	6112406	18.1	13.3	81.2	74.4	112.7	13.5	---	---	266
G	3525.0	H	593627	6112469	9.8	5.9	32.8	16.8	10.2	14.7	2.5	22	0
H	3501.5	H	594424	6112482	6.0	9.6	46.1	40.0	3.4	20.0	0.7	12	0
LINE 10720			FLIGHT 10										
A	2766.9	H	585364	6112141	12.0	4.8	67.2	37.1	37.9	34.6	4.5	28	0
B	2778.0	B	585526	6112144	5.3	6.4	0.1	30.6	4.9	0.3	0.9	22	27
C	2798.2	B	585766	6112140	11.0	12.6	71.4	47.6	17.3	36.1	1.2	28	5
D	2994.0	S?	588538	6112211	10.0	7.1	26.7	28.8	28.9	4.7	2.0	34	435
E	3062.0	S?	589717	6112218	8.1	0.8	47.4	17.2	60.6	2.1	---	---	0
F	3141.5	S?	591075	6112266	8.4	13.7	32.4	60.0	40.3	10.3	---	---	39
G	3258.3	B?	593519	6112322	14.8	11.3	82.3	65.5	11.2	31.8	2.1	6	0
H	3261.2	B?	593596	6112320	24.2	27.2	82.3	65.5	11.2	31.8	1.6	0	0
I	3292.7	S	594496	6112327	6.4	10.2	32.9	45.6	2.9	16.7	0.7	8	0
LINE 10731			FLIGHT 10										
A	1472.4	S?	592895	6112153	4.7	6.4	56.9	35.6	90.8	6.9	0.7	21	0
B	1435.3	H	593645	6112163	9.9	9.8	41.3	30.1	6.5	11.7	1.4	13	0

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EM Anomaly List

					CX 5500 HZ		CP 7200 HZ		CP 900 HZ		Vertical Dike		Mag. Corr
Label	Fid	Interp	XUTM m	YUTM m	Real ppm	Quad ppm	Real ppm	Quad ppm	Real ppm	Quad ppm	COND siemens	DEPTH* m	NT
LINE 10732			FLIGHT 10										
A	2273.8	S	583391	6111936	12.1	23.6	44.5	76.1	5.2	19.8	0.7	4	0
B	2267.4	S	583497	6111948	6.3	8.8	40.3	76.1	4.1	17.4	0.8	13	0
C	2240.7	S	583909	6111963	11.6	29.0	45.6	82.4	2.1	20.8	0.6	0	16
D	2220.3	S	584234	6111970	3.4	13.4	29.7	88.0	2.7	18.2	0.3	0	53
E	2197.7	S	584646	6111976	8.0	19.7	53.2	93.9	2.7	21.2	0.5	0	0
F	2192.6	S	584742	6111982	8.1	16.3	59.7	93.9	4.1	20.3	0.6	0	77
G	2165.1	H	585096	6111981	3.8	15.6	55.4	56.4	8.1	23.1	0.3	0	0
H	2101.0	B	585910	6112015	3.9	5.4	43.6	11.2	35.9	22.5	0.7	33	0
I	1953.2	B	588200	6112070	16.3	17.8	11.2	22.8	6.8	3.8	1.4	14	24
J	1931.3	B?	588404	6112064	9.8	27.9	34.8	24.7	18.3	9.0	0.5	9	0
LINE 10740			FLIGHT 2										
A	9391.4	S	583727	6111808	10.4	15.5	36.3	92.8	7.7	20.5	0.9	12	13
B	9377.7	S	584138	6111816	14.4	18.7	65.5	96.3	3.3	28.1	1.1	3	0
C	9362.0	S	584644	6111827	9.9	22.3	49.7	84.0	5.1	22.7	0.6	4	126
D	9320.4	B	585775	6111846	30.1	17.6	199.6	92.1	118.4	109.2	3.7	10	0
E	9302.6	B	586178	6111853	9.2	1.3	47.3	14.2	56.9	13.2	---	---	77
F	9249.4	B?	587705	6111913	13.4	17.3	89.3	66.2	12.7	47.6	1.1	13	92
G	9244.8	B	587807	6111917	7.2	13.4	89.3	66.2	29.6	47.6	0.6	5	0
H	9017.1	S	592861	6111988	6.2	10.3	41.5	53.3	21.2	10.5	0.7	4	0
I	8982.8	B?	593572	6112035	16.8	5.6	147.4	40.2	50.6	72.8	6.6	25	20
J	8980.8	B?	593625	6112033	23.8	5.6	147.4	40.2	50.6	72.8	12.1	10	0
K	8960.2	S	594188	6112021	8.5	8.2	28.5	53.4	9.5	13.3	1.3	15	0
LINE 10750			FLIGHT 2										
A	8303.0	S?	582068	6111613	0.3	5.6	28.7	48.1	45.3	12.1	---	---	0
B	8331.4	S	582539	6111640	3.5	5.6	12.0	57.1	0.9	6.5	0.6	35	0
C	8347.0	S	582859	6111635	4.5	7.4	47.9	34.8	11.4	15.7	0.6	20	0
D	8403.8	S	583841	6111650	11.3	48.2	173.6	292.6	18.0	79.4	0.4	0	0
E	8413.2	S	584149	6111667	13.0	12.8	54.0	62.5	1.7	15.0	1.5	10	0
F	8429.4	S	584647	6111684	9.3	25.3	74.9	104.5	4.3	30.1	0.5	0	130
G	8472.6	B	585772	6111693	22.9	8.1	72.6	46.8	8.9	41.2	6.6	19	0
H	8478.8	B	585916	6111693	32.0	17.0	188.0	48.2	110.9	97.2	4.3	7	0
I	8486.7	H	586139	6111693	1.7	3.2	18.8	6.0	25.8	10.1	---	---	0
J	8511.2	H	586920	6111703	6.8	11.9	56.3	62.4	14.8	26.4	0.7	13	30
K	8582.0	S	588725	6111753	5.8	22.4	23.5	74.9	7.2	12.8	0.3	0	22
L	8646.8	E	589621	6111772	8.8	5.6	31.1	31.2	7.7	13.2	2.2	7	0

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	CX 5500 HZ Quad ppm	CP 7200 HZ Real ppm	CP 7200 HZ Quad ppm	CP 900 HZ Real ppm	CP 900 HZ Quad ppm	Vertical Dike COND siemens	Vertical Dike DEPTH* m	Mag. Corr NT
LINE 10750			FLIGHT 2										
M	8656.5	B	589686	6111775	6.7	4.1	129.2	28.7	95.5	54.6	2.1	30	0
N	8675.0	B	589859	6111775	5.3	2.8	2.9	3.9	2.3	2.1	---	---	0
O	8833.8	H	593742	6111845	28.4	6.0	93.0	14.8	27.2	43.5	15.1	15	0
LINE 10760			FLIGHT 2										
A	8063.0	S	583571	6111506	5.9	37.5	49.3	115.3	7.1	28.1	0.2	0	37
B	8039.7	S	584017	6111515	9.9	29.1	114.5	158.0	9.5	47.6	0.5	0	77
C	8035.1	S	584150	6111523	17.4	20.9	49.9	71.6	7.8	18.0	1.3	7	0
D	8019.9	S	584568	6111533	10.9	41.1	75.5	149.2	6.4	39.8	0.4	0	69
E	8001.4	S	584983	6111542	3.1	21.0	64.1	157.6	3.1	36.1	0.2	0	42
F	7985.7	S	585385	6111548	6.3	12.5	51.7	74.3	10.9	20.7	0.6	15	0
G	7979.0	H	585581	6111540	3.7	5.0	40.0	26.6	65.6	6.5	0.7	27	0
H	7967.1	D	585830	6111541	27.3	24.3	164.2	130.4	41.0	71.4	2.2	15	0
I	7954.2	H	586135	6111548	6.9	0.0	31.0	0.0	34.8	12.4	---	---	97
J	7943.5	B	586462	6111574	10.1	7.2	48.3	30.7	22.6	15.6	2.0	33	7
K	7940.9	B	586554	6111578	15.7	8.8	48.3	30.7	22.6	15.6	3.1	31	7
L	7926.5	B	586950	6111586	36.3	16.5	109.3	75.7	63.5	42.4	5.5	14	87
M	7922.5	B	587075	6111581	15.5	9.9	109.3	75.7	63.5	42.4	2.7	23	22
N	7870.1	S?	588641	6111615	5.5	11.0	43.1	129.1	11.1	26.5	0.5	20	15
O	7866.4	S?	588787	6111611	10.5	33.9	31.6	129.1	5.7	24.9	0.5	0	16
P	7858.0	S?	589085	6111606	1.6	2.0	3.8	2.8	9.8	2.5	---	---	20
Q	7831.3	E	589600	6111655	23.6	14.6	69.5	54.1	22.0	31.6	3.2	1	48
R	7827.4	D	589655	6111651	27.7	16.5	69.5	53.1	28.8	19.9	3.5	0	0
S	7820.0	B	589747	6111631	8.0	2.3	33.8	11.9	28.8	19.7	---	---	35
T	7804.3	B	589927	6111641	11.2	5.5	36.7	33.3	20.9	17.1	3.3	28	0
U	7796.0	B?	590089	6111632	6.6	4.4	10.8	10.7	7.4	3.8	1.9	11	0
V	7640.5	E	593314	6111722	14.3	19.5	211.3	134.1	34.6	94.7	1.1	16	0
W	7637.0	B	593361	6111726	23.3	22.9	211.3	134.1	34.6	94.7	1.8	13	0
X	7613.0	B	593853	6111738	5.4	21.2	9.0	72.9	17.5	14.4	0.3	0	57
LINE 10770			FLIGHT 2										
A	7058.4	S	583991	6111331	28.6	58.7	242.4	274.6	16.9	98.7	0.9	0	0
B	7083.6	S?	584628	6111348	6.2	13.1	18.7	34.3	4.7	8.6	0.5	7	82
C	7094.7	S	584826	6111363	7.9	15.7	41.3	91.1	3.4	21.7	0.6	17	41
D	7098.0	S	584902	6111370	5.2	11.1	45.3	102.2	3.4	24.3	0.5	16	0
E	7120.4	H	585536	6111407	8.3	1.8	51.1	15.4	47.7	30.8	---	---	0
F	7132.4	B	585828	6111414	13.9	12.1	88.6	47.9	25.9	45.2	1.8	15	0
G	7151.1	H	586475	6111410	13.2	6.5	63.4	35.5	38.9	22.9	3.5	10	0

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are local amplitudes

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	Quad ppm	CP 7200 HZ Real ppm	Quad ppm	CP 900 HZ Real ppm	Quad ppm	Vertical Dike COND siemens	DEPTH* m	Mag. Corr NT
LINE 10770			FLIGHT 2										
H	7159.5	E	586686	6111415	19.5	7.0	77.6	19.9	38.8	34.0	6.1	15	0
I	7171.0	B	586845	6111425	33.8	33.0	269.2	178.4	117.4	113.5	2.1	1	0
J	7191.3	B	587174	6111396	66.5	34.4	412.7	135.2	274.5	203.0	5.7	8	0
K	7194.4	B	587260	6111400	70.7	19.0	412.7	135.2	274.5	203.0	14.3	6	14
L	7217.1	B	587904	6111434	29.4	26.4	206.1	103.8	62.2	109.1	2.2	14	0
M	7219.7	B	587975	6111435	45.3	19.7	206.1	103.8	62.2	109.1	6.3	11	0
N	7231.2	S?	588279	6111447	15.9	26.5	47.2	78.1	7.2	13.8	0.9	10	0
O	7236.0	S?	588408	6111448	7.7	16.1	69.1	99.1	11.6	39.8	0.6	11	0
P	7241.7	S?	588556	6111445	12.4	23.8	69.1	111.1	10.5	39.8	0.7	6	83
Q	7274.3	B	589182	6111461	0.5	2.2	33.1	11.8	27.4	16.0	---	---	0
R	7331.1	B	589726	6111468	31.1	21.5	250.6	91.2	167.1	116.1	3.0	15	36
S	7340.1	B	589841	6111474	43.1	12.6	254.5	85.3	172.9	117.9	10.7	2	65
T	7350.8	D	590106	6111481	21.4	12.7	42.9	30.7	26.5	17.5	3.3	13	40
U	7413.2	S?	591667	6111515	0.0	2.8	23.7	23.6	37.8	4.1	---	---	143
LINE 10780			FLIGHT 2										
A	6315.8	S	582783	6111203	7.1	9.4	75.5	72.3	3.8	28.3	0.9	20	0
B	6285.2	S	583400	6111217	7.9	14.4	57.6	80.9	2.9	24.1	0.7	8	0
C	6251.2	S	584013	6111231	17.4	42.4	140.5	210.3	16.6	66.6	0.7	0	0
D	6228.2	S	584562	6111231	17.9	49.2	83.9	221.3	4.4	43.3	0.6	0	0
E	6213.7	S	584895	6111228	10.0	15.2	47.5	85.3	6.8	21.8	0.9	16	0
F	6189.0	B	585531	6111248	5.4	0.3	29.9	2.0	28.0	9.7	---	---	0
G	6180.2	B	585741	6111248	14.6	19.2	82.2	84.5	20.5	38.3	1.1	14	0
H	6174.3	B	585903	6111249	14.0	6.5	29.8	18.5	26.0	12.9	3.9	24	0
I	6158.8	H	586431	6111274	16.6	7.3	70.8	59.7	51.3	22.0	4.4	20	8
J	6147.0	H	586812	6111275	6.4	5.0	56.8	9.2	39.8	15.5	1.6	39	7
K	6140.3	B	586946	6111291	37.5	13.1	209.6	140.4	84.2	96.3	8.0	11	0
L	6134.3	B	587048	6111296	26.4	28.7	209.6	140.4	84.2	96.3	1.7	0	0
M	6123.4	B	587265	6111295	35.3	34.5	238.4	108.1	125.8	115.1	2.1	3	0
N	6121.1	B	587324	6111295	28.6	25.6	238.4	108.1	125.8	115.1	2.2	10	22
O	6107.3	B	587742	6111291	107.6	59.3	745.3	361.0	449.3	392.4	6.1	0	9
P	6102.0	B	587895	6111295	49.6	34.1	345.3	239.8	83.3	174.2	3.6	4	0
Q	6090.5	H	588217	6111311	12.1	26.0	86.0	132.0	13.3	32.0	0.7	0	54
R	6079.7	H	588544	6111311	11.2	10.7	50.6	50.5	5.4	24.7	1.5	14	39
S	6018.3	B	589814	6111323	85.4	44.6	405.3	225.4	303.2	153.4	6.1	1	41
T	6016.7	B	589854	6111323	85.4	39.7	405.3	225.4	303.2	153.4	7.1	3	0

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	 Quad ppm	CP 7200 HZ Real ppm	 Quad ppm	CP 900 HZ Real ppm	 Quad ppm	Vertical Dike COND siemens	 DEPTH* m	Mag. Corr NT
LINE 10790			FLIGHT 2										
A	5267.8	S	583719	6111050	8.1	13.3	73.0	115.5	23.8	24.1	0.7	0	0
B	5282.0	S	584085	6111050	4.9	18.7	74.0	63.6	11.7	28.3	0.3	0	0
C	5329.4	H	585197	6111101	2.8	14.6	17.0	71.9	0.9	11.8	---	---	29
D	5340.8	B	585506	6111103	10.9	4.2	39.7	50.7	21.6	15.3	4.6	20	0
E	5366.0	H	586406	6111104	5.5	5.7	83.7	21.7	82.8	16.8	1.1	30	0
F	5374.2	H	586706	6111100	7.8	3.6	65.3	30.8	49.0	20.5	3.3	39	0
G	5409.7	B	587540	6111119	19.9	22.2	171.8	112.6	53.3	70.5	1.5	7	13
H	5412.9	B	587599	6111119	19.9	17.5	171.8	112.6	53.3	70.5	2.0	18	0
I	5419.7	B	587727	6111120	34.3	24.1	205.0	119.0	56.7	96.7	3.1	11	13
J	5424.5	D	587841	6111118	20.5	22.4	205.0	119.0	44.2	96.7	1.6	14	0
K	5430.2	B	587998	6111116	24.5	14.4	92.6	0.0	69.7	50.0	3.5	12	40
L	5438.0	B	588237	6111120	33.7	40.3	103.0	158.9	29.0	35.3	1.7	0	0
M	5646.3	B	592763	6111200	13.0	30.5	77.2	176.4	1.4	32.3	0.6	0	27
LINE 19010			FLIGHT 2										
A	3619.7	H?	580467	6114805	10.9	8.3	27.8	32.2	7.8	8.4	1.9	17	0
B	3627.7	L	580457	6115108	10.0	12.5	78.1	88.5	4.4	20.2	1.1	13	7
C	3645.3	L	580458	6115786	12.1	16.3	29.7	19.6	4.8	13.3	1.0	13	75
D	3669.9	S	580451	6116675	16.7	42.5	198.0	371.5	8.3	89.7	0.7	0	0
LINE 19020			FLIGHT 2										
A	3376.5	H	581958	6113425	7.9	7.0	70.1	48.3	6.2	24.7	1.4	36	0
B	3344.1	S	581951	6114515	1.7	13.3	22.7	77.5	0.9	14.5	---	---	14
C	3324.4	B	581948	6115172	36.7	16.3	140.6	65.0	53.3	65.7	5.7	17	17
D	3320.4	B?	581946	6115307	20.9	12.1	73.2	72.8	13.7	30.7	3.3	16	0
LINE 19030			FLIGHT 2										
A	3060.2	S	583547	6112730	6.8	8.7	51.5	50.3	7.4	17.9	0.9	27	50
LINE 19040			FLIGHT 2										
A	2824.9	S	585029	6111440	6.4	15.3	34.6	52.3	5.5	13.3	0.5	9	0
B	2723.6	B	585008	6113788	34.8	10.8	131.1	14.3	105.7	64.8	9.2	9	0
C	2708.0	B	584997	6114253	34.4	39.5	148.1	115.8	32.2	66.8	1.7	0	0
D	2705.6	B	584997	6114327	15.7	38.0	148.1	115.8	32.2	66.8	0.7	0	0
E	2511.7	S	584866	6118724	4.3	8.2	37.2	60.3	11.9	19.4	0.5	5	0
F	2503.1	H	584865	6118997	7.7	9.4	38.7	20.5	21.2	19.0	1.0	17	0
G	2485.9	H	584877	6119579	28.5	30.5	228.1	219.0	49.2	80.8	1.8	0	14

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	CX 5500 HZ Quad ppm	CP 7200 HZ Real ppm	CP 7200 HZ Quad ppm	CP 900 HZ Real ppm	CP 900 HZ Quad ppm	Vertical Dike COND siemens	Vertical Dike DEPTH* m	Mag. Corr NT
LINE	19040		FLIGHT 2										
H	2476.6	L	584874	6119885	36.5	12.3	91.7	20.2	124.5	33.0	8.4	0	117
I	2438.0	H	584818	6121073	0.1	0.0	0.0	0.0	14.0	0.0	---	---	0
J	2400.6	B	584782	6122261	19.3	5.0	49.4	0.0	17.1	24.6	9.7	22	0
LINE	19050		FLIGHT 2										
A	9758.7	H	586530	6111482	4.4	1.5	60.1	29.0	38.1	25.6	---	---	0
B	10129.8	S	586390	6119762	12.5	21.0	111.4	92.9	26.0	41.4	0.8	0	0
C	10147.0	S	586355	6120372	12.8	19.5	107.1	126.7	17.5	50.5	0.9	1	8
D	10168.1	S	586347	6121103	16.0	28.4	113.6	208.0	16.2	54.2	0.9	3	7
E	10197.1	S	586329	6122118	9.8	13.6	21.6	55.5	7.5	9.4	0.9	7	0
F	10205.0	L	586328	6122394	19.6	10.1	63.7	64.5	43.9	46.5	3.8	16	8
G	10208.3	L	586330	6122509	20.3	13.5	63.7	49.8	15.0	9.6	2.8	4	0
LINE	19060		FLIGHT 19										
A	740.9	H	588068	6111267	11.9	15.2	58.0	39.0	36.4	29.7	1.1	14	0
B	1073.0	S?	587995	6114402	5.9	5.0	26.3	14.3	14.5	5.1	1.4	0	0
C	1160.0	S?	587973	6115589	1.0	6.4	10.9	38.5	21.3	6.4	---	---	53
D	1412.8	H	587857	6120134	8.7	4.9	52.1	38.6	11.2	15.8	2.6	40	57
E	1441.5	E	587850	6120975	13.1	20.6	81.8	100.5	1.9	29.5	0.9	0	0
F	1456.7	S	587828	6121463	22.7	55.5	139.3	239.2	14.0	67.1	0.7	0	0
G	1460.7	S	587829	6121597	6.8	12.9	139.3	230.7	14.0	57.2	0.6	9	0
H	1470.8	L	587831	6121920	28.7	21.1	59.3	160.8	13.8	12.9	2.8	3	0
I	1494.7	L	587814	6122653	15.3	1.7	20.9	25.8	34.7	29.2	---	---	0
LINE	19070		FLIGHT 19										
A	2358.5	S	589535	6111750	7.8	16.3	24.5	45.0	4.9	12.4	0.6	2	0
B	2127.0	S?	589457	6115034	14.8	2.4	44.9	17.4	57.7	1.7	---	---	0
C	1850.0	H	589373	6119635	0.7	1.2	15.3	9.3	5.2	6.2	---	---	0
D	1749.9	E	589319	6121848	31.8	4.1	173.1	11.4	200.2	65.3	32.6	14	0
E	1747.6	D	589316	6121919	34.0	5.0	173.1	11.4	200.2	65.3	27.3	18	0
F	1742.5	E	589311	6122067	13.0	3.9	152.6	11.4	172.1	68.0	6.9	32	0
G	1736.8	L	589304	6122235	12.8	5.1	29.4	11.4	27.6	22.7	4.6	32	0
H	1730.6	B	589293	6122427	15.3	34.9	72.0	167.0	11.6	26.0	0.7	0	10
I	1724.4	B?	589275	6122645	16.9	6.9	105.4	133.7	15.6	58.3	4.9	21	41
J	1722.2	L	589275	6122721	16.9	7.7	105.4	133.7	18.0	58.3	4.3	4	43
LINE	19081		FLIGHT 19										
A	2778.0	S?	590981	6114501	3.2	2.4	11.0	5.8	15.6	1.4	---	---	0

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EM Anomaly List

Label	Fid	Interp	XUTM m	YUTM m	CX 5500 HZ Real ppm	CX 5500 HZ Quad ppm	CP 7200 HZ Real ppm	CP 7200 HZ Quad ppm	CP 900 HZ Real ppm	CP 900 HZ Quad ppm	Vertical Dike COND siemens	Vertical Dike DEPTH* m	Mag. Corr NT
LINE	19081		FLIGHT 19										
B	3016.3	S?	590882	6117767	0.5	7.5	18.0	60.3	0.7	11.4	---	---	0
C	3189.3	H	590824	6121742	24.8	2.5	51.5	22.7	65.5	27.1	---	---	0
D	3196.8	B	590832	6122005	24.6	7.2	92.2	63.9	26.9	48.8	8.8	7	0
E	3203.7	H	590827	6122250	22.1	20.0	15.9	61.4	11.9	10.0	2.0	6	0
F	3209.0	B	590821	6122442	9.2	6.1	37.1	41.9	12.7	14.0	2.1	14	0
LINE	19090		FLIGHT 9										
A	1684.0	S?	592498	6113434	2.7	1.7	24.7	11.1	8.7	5.6	---	---	0
B	1900.5	B?	592420	6117253	10.0	7.2	29.9	29.6	7.7	12.1	2.0	17	0
C	1917.7	H	592416	6117712	4.5	4.0	34.2	8.7	29.9	14.0	1.2	34	0
D	2066.7	H	592345	6120554	5.1	6.8	83.0	69.9	11.6	30.0	0.8	25	0
E	2110.3	H	592314	6121922	7.7	5.7	63.4	58.1	11.4	30.0	1.7	33	5
LINE	19100		FLIGHT 2										
A	1201.1	S	594054	6111335	0.7	20.7	59.4	140.3	6.9	30.7	---	---	0
B	1295.6	S	593989	6113437	5.9	11.4	60.1	79.6	6.8	25.4	0.6	21	0
C	1340.2	S	593993	6114677	6.5	9.0	54.9	42.3	13.7	22.7	0.8	8	0
D	1439.3	B	593920	6117491	20.4	6.8	83.7	21.2	35.2	37.8	7.0	29	30
E	1446.3	H	593920	6117690	27.6	14.1	212.7	56.5	130.9	102.8	4.3	7	0
F	1568.8	H	593843	6121020	2.9	7.0	74.0	65.5	9.8	29.6	---	---	0
G	1588.0	L	593829	6121681	17.7	20.3	18.3	41.7	5.6	14.8	1.4	1	0
H	1604.1	L	593826	6122261	9.6	12.2	59.4	67.8	13.5	21.8	1.0	12	0
I	1619.0	S	593808	6122815	12.5	17.7	60.7	98.4	6.6	35.3	1.0	4	0

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Anomalies Summary

Conductor Grade	No, of Responses
7	0
6	0
5	4
4	9
3	51
2	303
1	242
0	193
Total	802

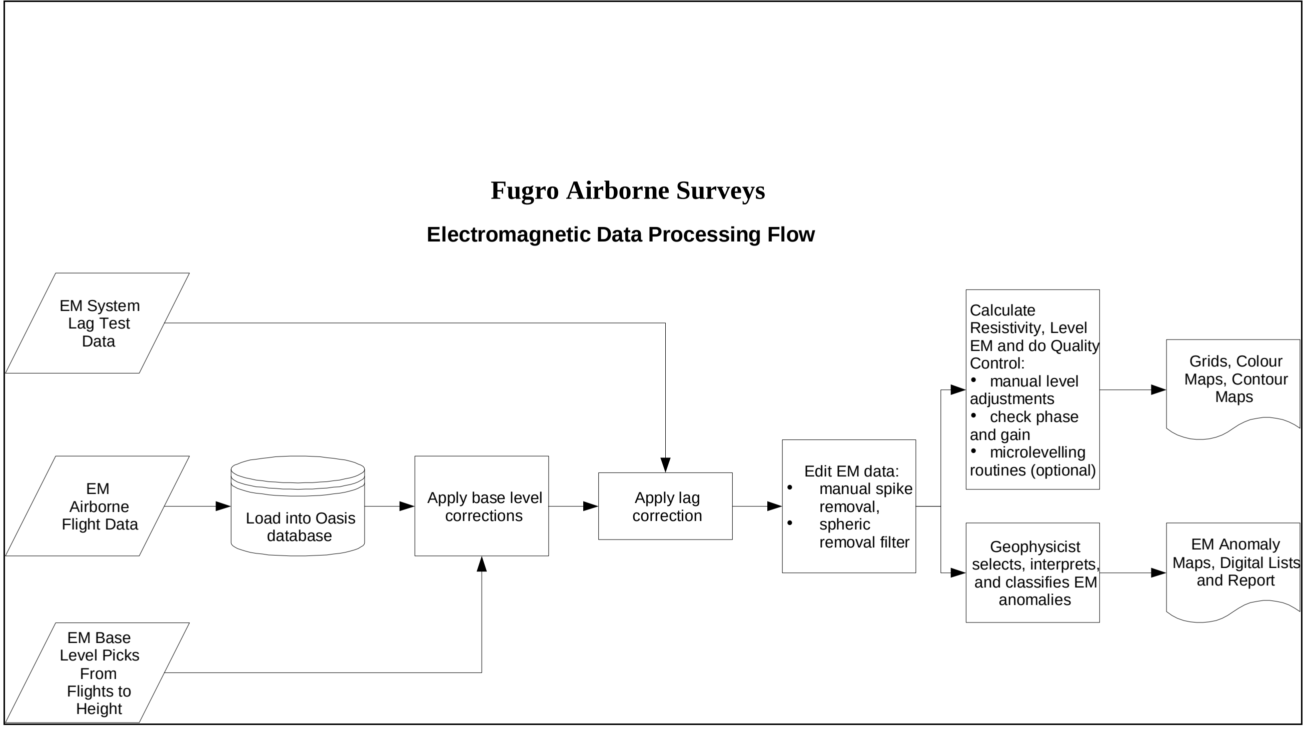
Conductor Model	No, of Responses
E	13
B	167
D	12
S	317
L	144
H	149
Total	802

APPENDIX E

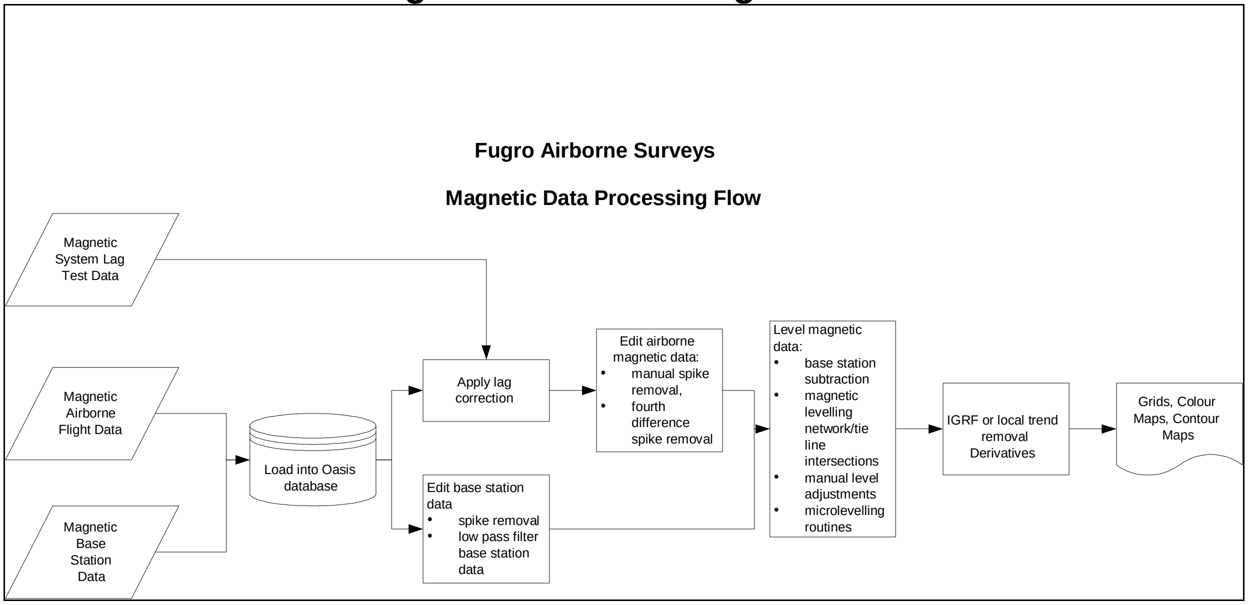
DATA PROCESSING FLOWCHARTS

APPENDIX E

Processing Flow Chart - Electromagnetic Data



Processing Flow Chart - Magnetic Data



APPENDIX F

RADIOMETRIC PROCESSING CONTROL FILE

```
//////////////////////////////////////////////////
// Atlas Control/Workspace File
// # or // for commment
//////////////////////////////////////////////////

CONTROL_BEGIN

  PROGRAM  = AGSCorrection
  VERSION  = 1.4.0

   ### Process or Calibration? ###
      WhatToDo = Process Survey Line

   ### Corrections to apply ###
      CorrectionType = Yes  Filtering
      CorrectionType = Yes  LiveTimeCorrection
      CorrectionType = Yes  CosmicAircraftBGRemove
      CorrectionType = Yes  CalcEffectiveHeight
      CorrectionType = Yes  RadonBGRemove
      CorrectionType = Yes  ComptonStripping
      CorrectionType = Yes  HeightCorrection
      CorrectionType = No   ConvertToConcentration


   ### Main I/O settings ###
      MainChannelIO|TC       = TC_DOWN --> TC_DOWN_COR
      MainChannelIO|K        = K_DOWN --> K_DOWN_COR
      MainChannelIO|U        = U_DOWN --> U_DOWN_COR
      MainChannelIO|Th       = TH_DOWN --> TH_DOWN_COR
      MainChannelIO|UpU      = U_UP       --> U_UP_Cor
      MainChannelIO|Cosmic   = COSMIC     --> COSMIC_Cor
      MainChannelIO|Spectrum =            -->

   ### Control Channel I/O settings ###
      ControlChannel|RadarAltimeter     = ALTR_M  [metres]
      ControlChannel|Pressure/Barometer = KPA        [kPa]
      ControlChannel|Temperature        = TEMP_EXT


   ### Input for correction ###
      InputForCorrection    = ROIs


   ### Pre-filtering settings ###
      Filtering|TC      = 0
      Filtering|K       = 0
      Filtering|U       = 0
      Filtering|Th      = 0
      Filtering|UpU     = 0
      Filtering|Cosmic  = 13
      Filtering|RadarAltimeter     = 7
      Filtering|Pressure/Barometer = 7
      Filtering|Temperature        = 7

   ### Live-time correction settings ###
      LiveTimeChannel            = LIVE_TIME
      LiveTimeUnits              = milli-seconds
      ApplyLiveTimeCorrToUpU      = Yes

   ### Cosmic correction settings ###
      CosmicCorrParam|TC      = 0.809517,  39.012170
      CosmicCorrParam|K       = 0.054033,  5.559398
```

```
    CosmicCorrParam|U       = 0.037619,  1.055709
    CosmicCorrParam|Th      = 0.035951,  1.352775
    CosmicCorrParam|UpU     = 0.008371,  0.409521
    CosmicCorrParam|SpectrumBackgroundFile    =

  ### Effective-Height settings ###
    EffectiveHeightOutputChannel = EffectiveHeight
    EffectiveHeightOutputUnits   = metres

  ### Radon correction settings ###
    RadonCorrMethod                        = UpU
    RadonCorrParam_FilterWidth              = 201
    RadonOutputChannel                     = Radon
    RadonCorrParam_UgInUpU(A1) = 0.075000
    RadonCorrParam_ThInUpU(A2) = 0.010000
    RadonCorrParam|TC      = 14.000000,  0.000000
    RadonCorrParam|K       = 0.930000,  0.000000
    RadonCorrParam|Th      = 0.080000,  0.000000
    RadonCorrParam|UpU     = 0.300000,  0.000000

  ### Special Stripping (Compton Stripping) ###
    ComptonCorrParam_Stripping_Alpha     = 0.224000
    ComptonCorrParam_Stripping_Beta      = 0.393000
    ComptonCorrParam_Stripping_Gamma     = 0.717000
    ComptonCorrParam_AlphaPerMetre       = 0.000010
    ComptonCorrParam_BetaPerMetre        = 0.000010
    ComptonCorrParam_GammaPerMetre       = 0.000010
    ComptonCorrParam_GrastyBackscatter_a = 0.051000
    ComptonCorrParam_GrastyBackscatter_b = 0.004000
    ComptonCorrParam_GrastyBackscatter_g = 0.001000

  ### Height Correction settings ###
    SurveyHeightDatum     = 60.000000
    AttenuationCorrControl = 0
    HeightCorrParam|TC      = -0.007400, 300.000000
    HeightCorrParam|K       = -0.01040, 300.000000
    HeightCorrParam|U       = -0.00440, 300.000000
    HeightCorrParam|Th      = -0.00800, 300.000000

  ### Concentration settings ###
   ConcentrationParam|K       = Concentration_K,  0.000000
   ConcentrationParam|U       = Concentration_U,  0.000000
   ConcentrationParam|Th      = Concentration_Th,  0.000000
   AirAbsorbedDoseRateParam   = DoseRate,  0.000000
   NaturalAirAbsorbedDoseRateParam = NaturalDoseRate,  0.000000, 0.000000, 0.000000


CONTROL_END
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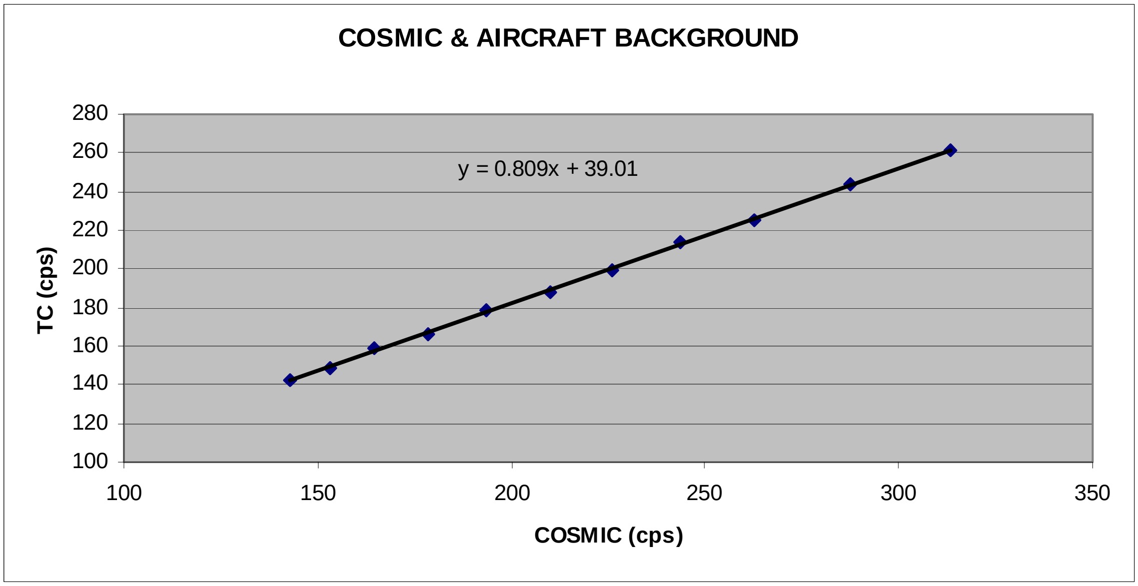
APPENDIX G

TESTS AND CALIBRATIONS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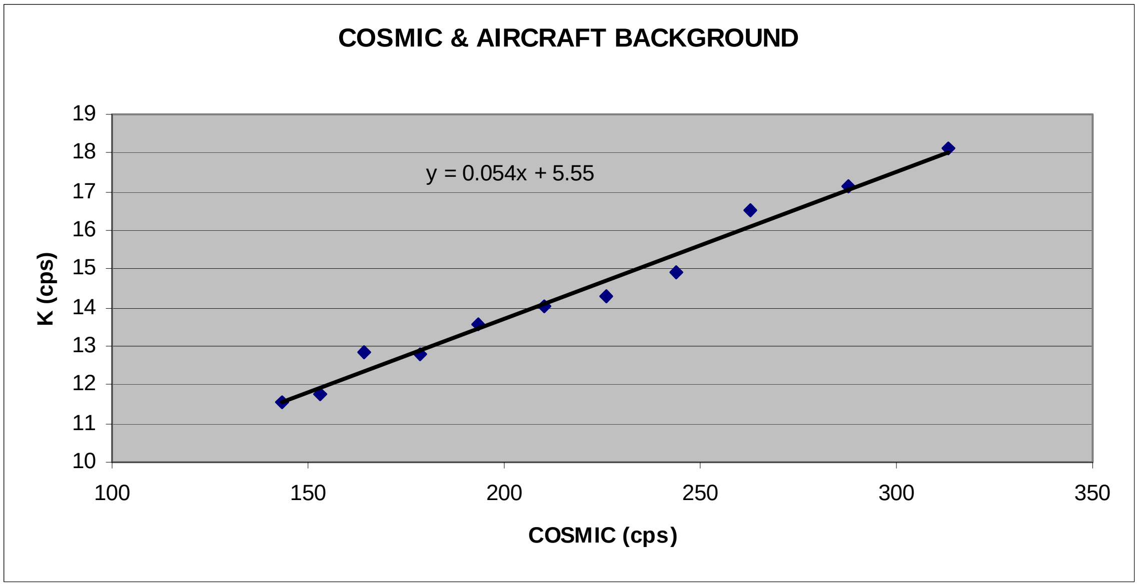
COSMIC (cps)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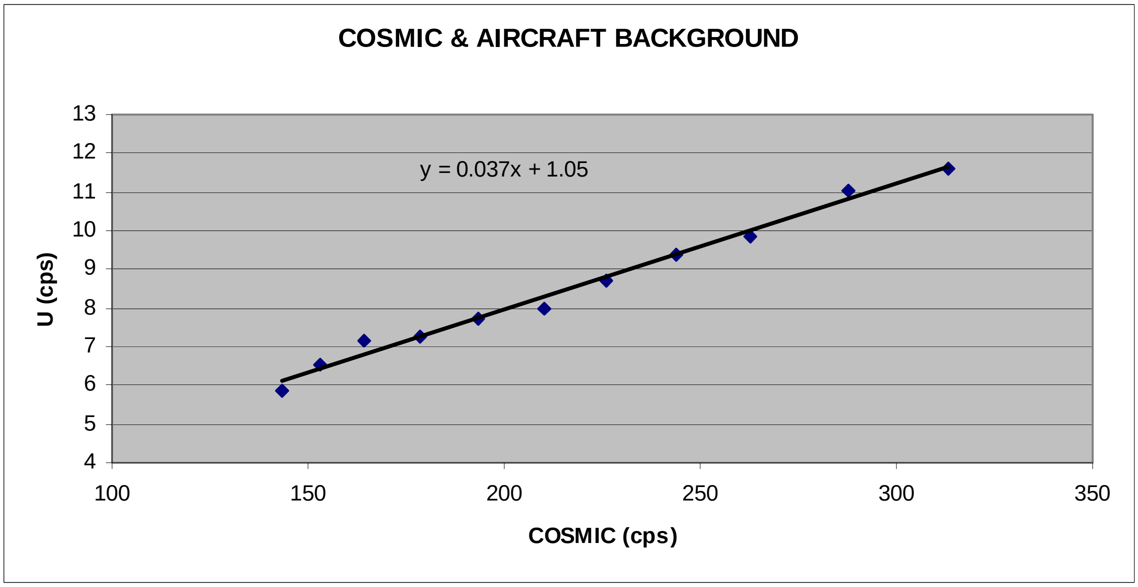
COSMIC (cps)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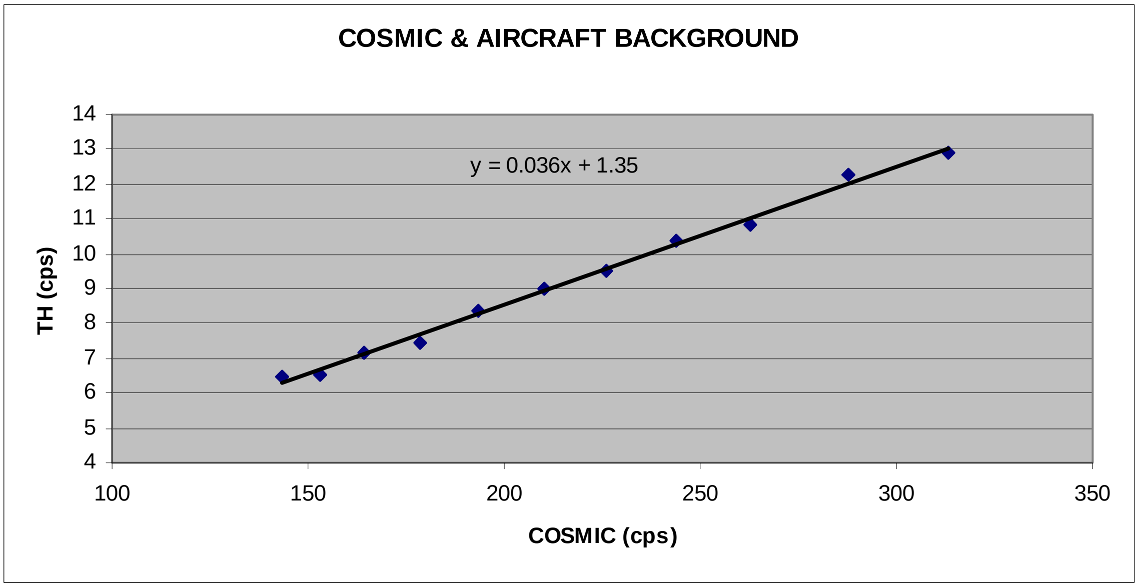
COSMIC (cps)


COSMIC & AIRCRAFT BACKGROUND
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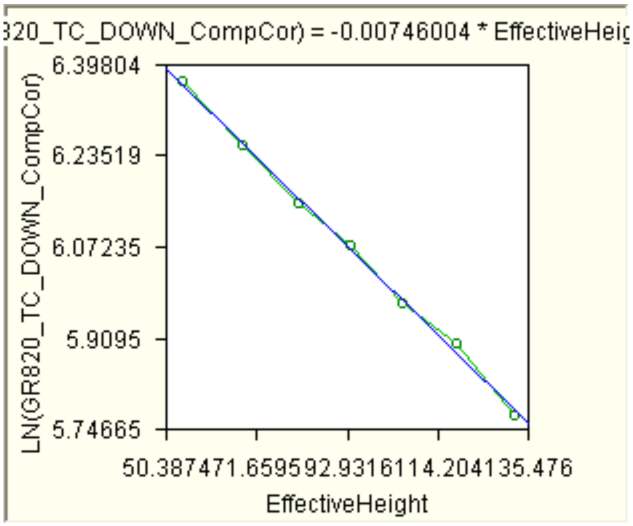
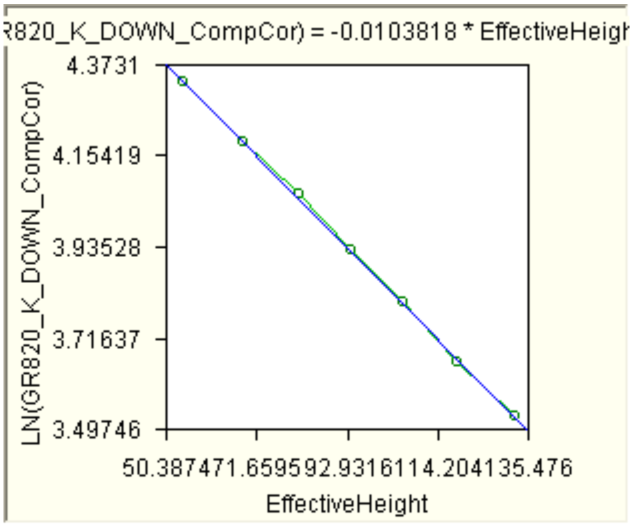
200
250
300
350
COSMIC (cps)

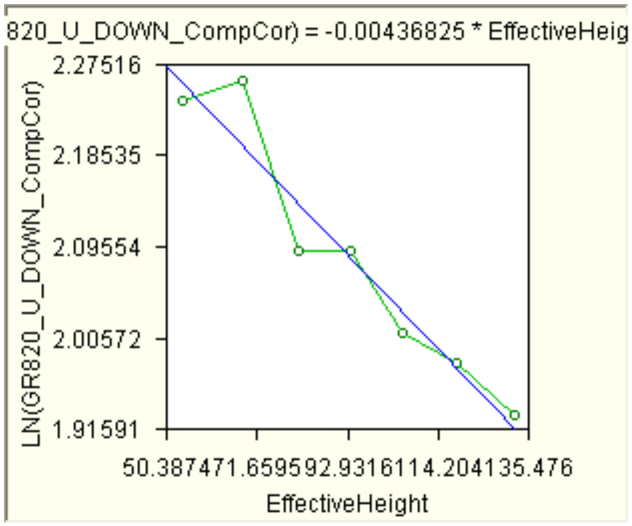
ALTITUDE ATTENUATION : TC



ALTITUDE ATTENUATION : K



ALTITUDE ATTENUATION : U



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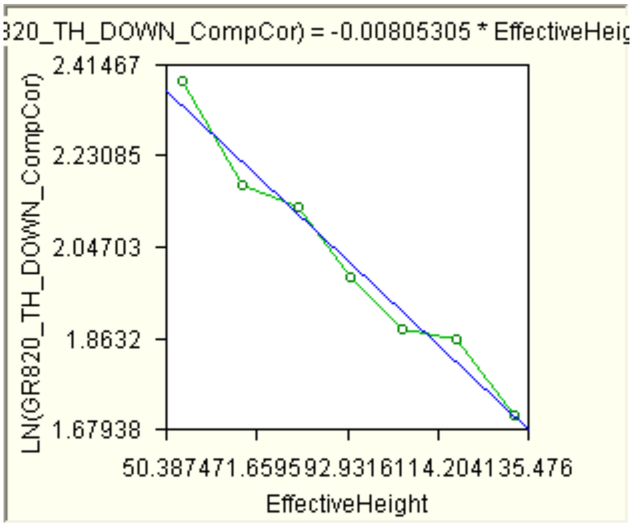

APPENDIX H

GLOSSARY

APPENDIX H

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: [σ**t**] 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 $\mu\omega\sigma t h$, 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
σ**t**	Conductivity thickness
τ	Tau, or time constant
Ω**m**	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

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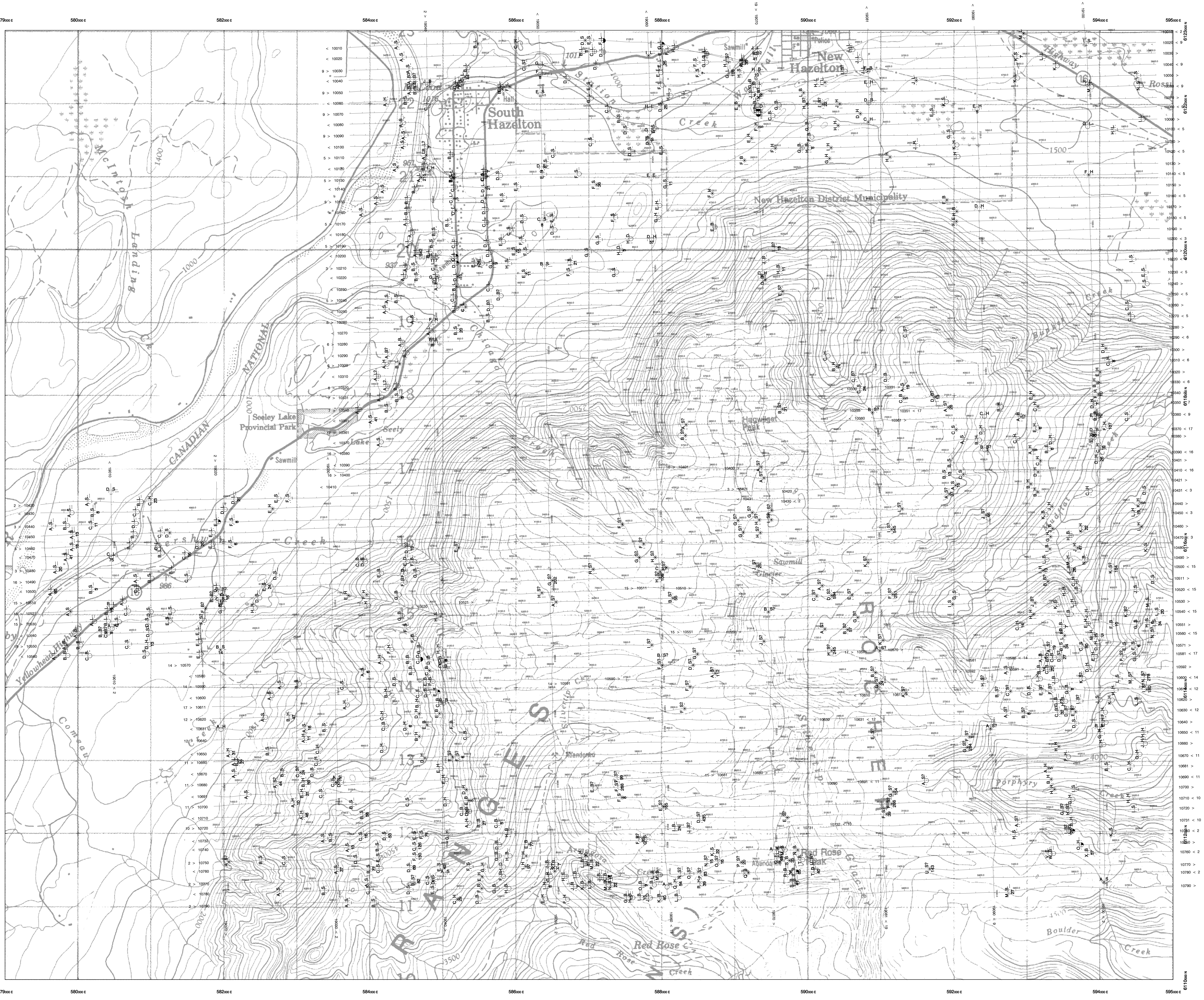
Macnae, J. and Lamontagne, Y., 1987, Imaging quasi-layered conductive structures by simple processing of transient electromagnetic data: Geophysics, v52, 4, 545-554.

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*



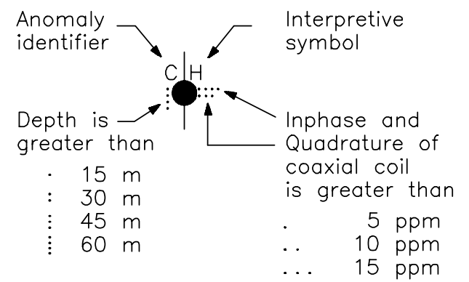
TECHNICAL SUMMARY

Navigation . . . . Differentially–corrected GPS
Data reduction grid interval . . . . 30 metres
Terrain clearance . . . . Helicopter, Spectrometer 57 m
Electromagnetic sensor 30 m
Magnetometer 30 m
Data sampling interval . . . . 0.1 second
Magnetometer / sensitivity . . . . . Cesium / 0.01 nT
Electromagnetic system . . . . . . DIGHEM^{V}
Spectrometer GR820

Frequency	Sensitivity	Coil Orientation
1000 Hz	.06 ppm	Vertical coaxial
5500 Hz	.12 ppm	Vertical coaxial
900 Hz	.12 ppm	Horizontal coplanar
7200 Hz	.24 ppm	Horizontal coplanar
56000 Hz	.60 ppm	Horizontal coplanar

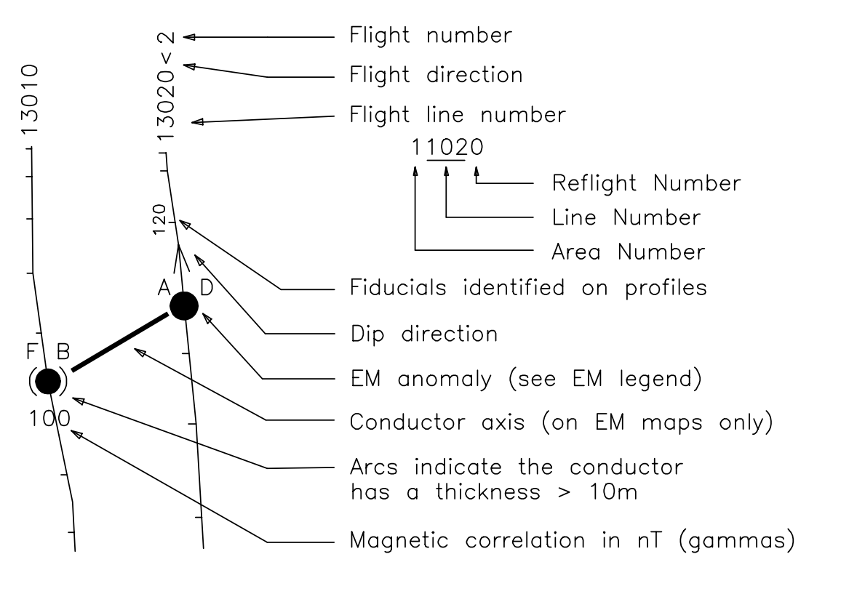
ELECTROMAGNETIC ANOMALIES

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

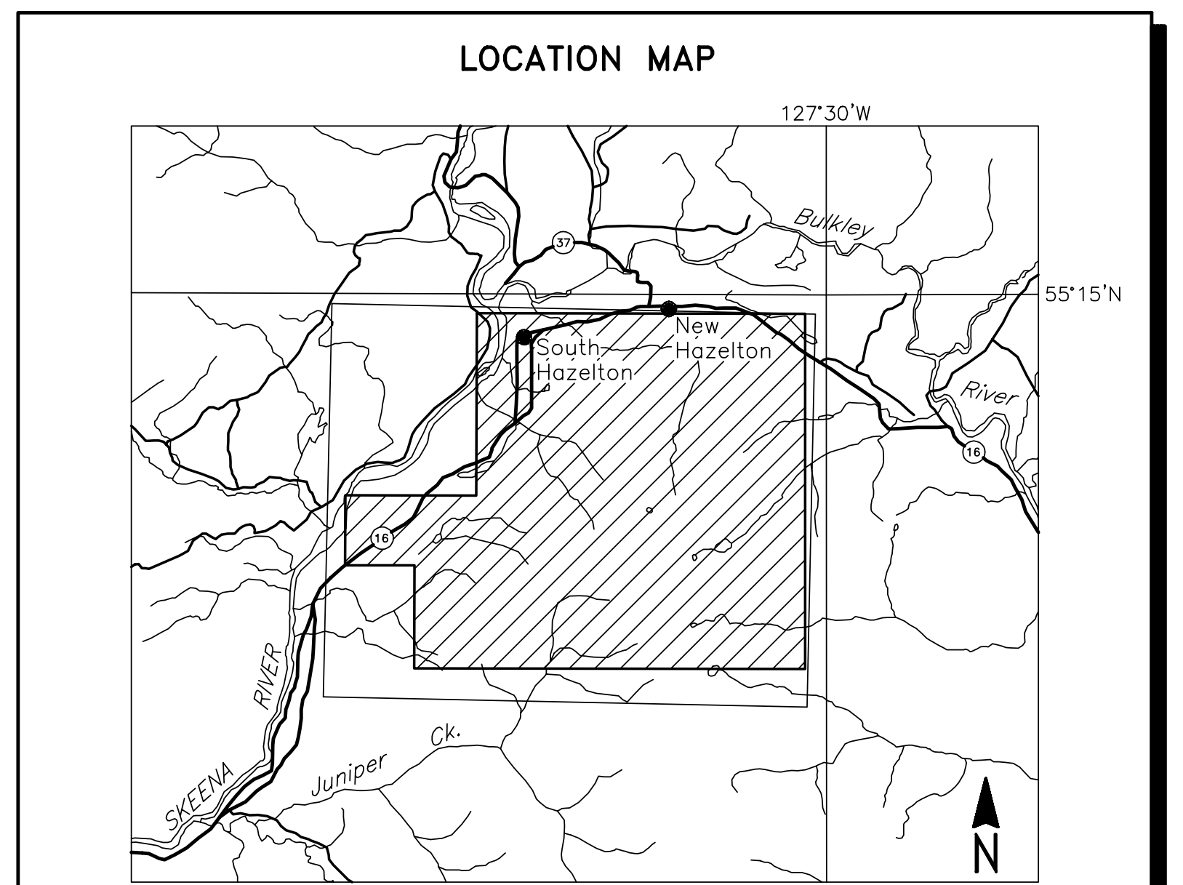


Interpretive symbol	Conductor ("model")
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover ("half space")
E	Edge of broad conductor ("edge of half space")
L	Culture, e.g. power line, metal building or fence

FLIGHT LINES WITH EM ANOMALIES



LOCATION MAP



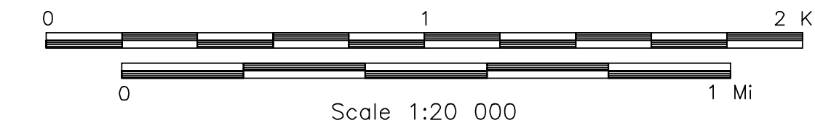
NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

ELECTROMAGNETIC ANOMALIES

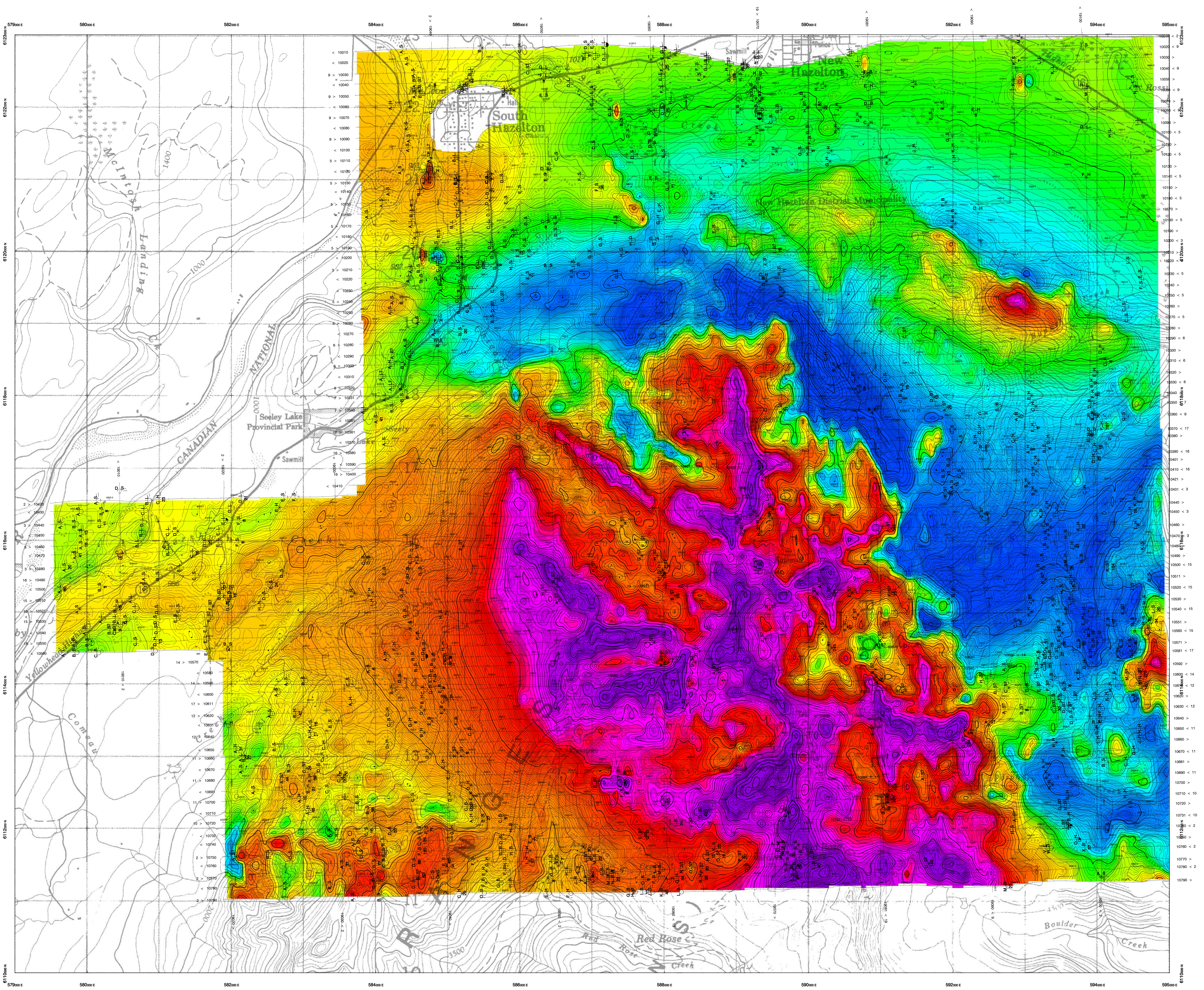
FUGRO DIGHEM^{V}/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys



Scale 1:20 000

FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

Navigation . . . . Differentially-corrected GPS
Data reduction grid interval . . . . 30 metres
Terrain clearance . . . . Helicopter, Spectrometer 57 m
Electromagnetic sensor 30 m
Magnetometer 30 m
Data sampling interval . . . . 0.1 second
Magnetometer / sensitivity . . . . . Cesium / 0.01 nT
Electromagnetic system . . . . . . DIGHEM^{V}
Spectrometer GR820

Frequency	Sensitivity	Coil Orientation
1000 Hz	.06 ppm	Vertical coaxial
5500 Hz	.12 ppm	Vertical coaxial
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56000 Hz	.60 ppm	Horizontal coplanar

nT

57860
57735
57640
57560
57485
57410
57345
57285
57225
57165
57110
57060
57015
56975
56935
56900
56865
56835
56810
56785
56765
56745
56725
56710
56695
56685
56670
56660
56645
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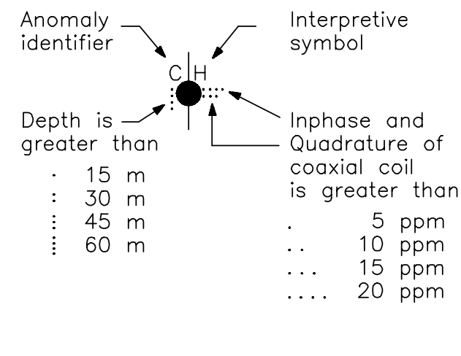
56505
56495
56490
56480
56475
56465
56460
56450
56435
56425
56405
56385
56360
56340
56315
56290
56270
56245
56215
56175

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

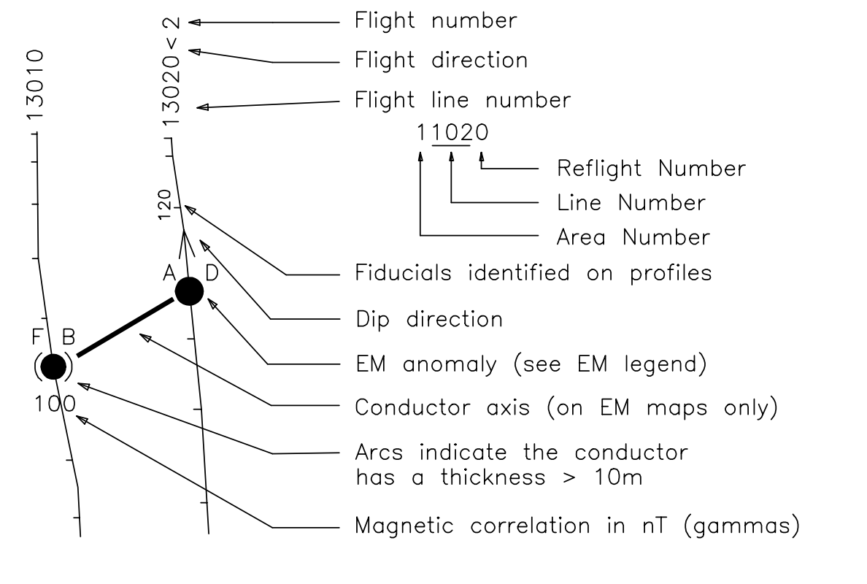


Depth is greater than
. 15 m
: 30 m
⋮ 45 m
⋮ 60 m

Inphase and Quadrature of coaxial coil is greater than
. 5 ppm
.. 10 ppm
... 15 ppm
.... 20 ppm

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

FLIGHT LINES WITH EM ANOMALIES

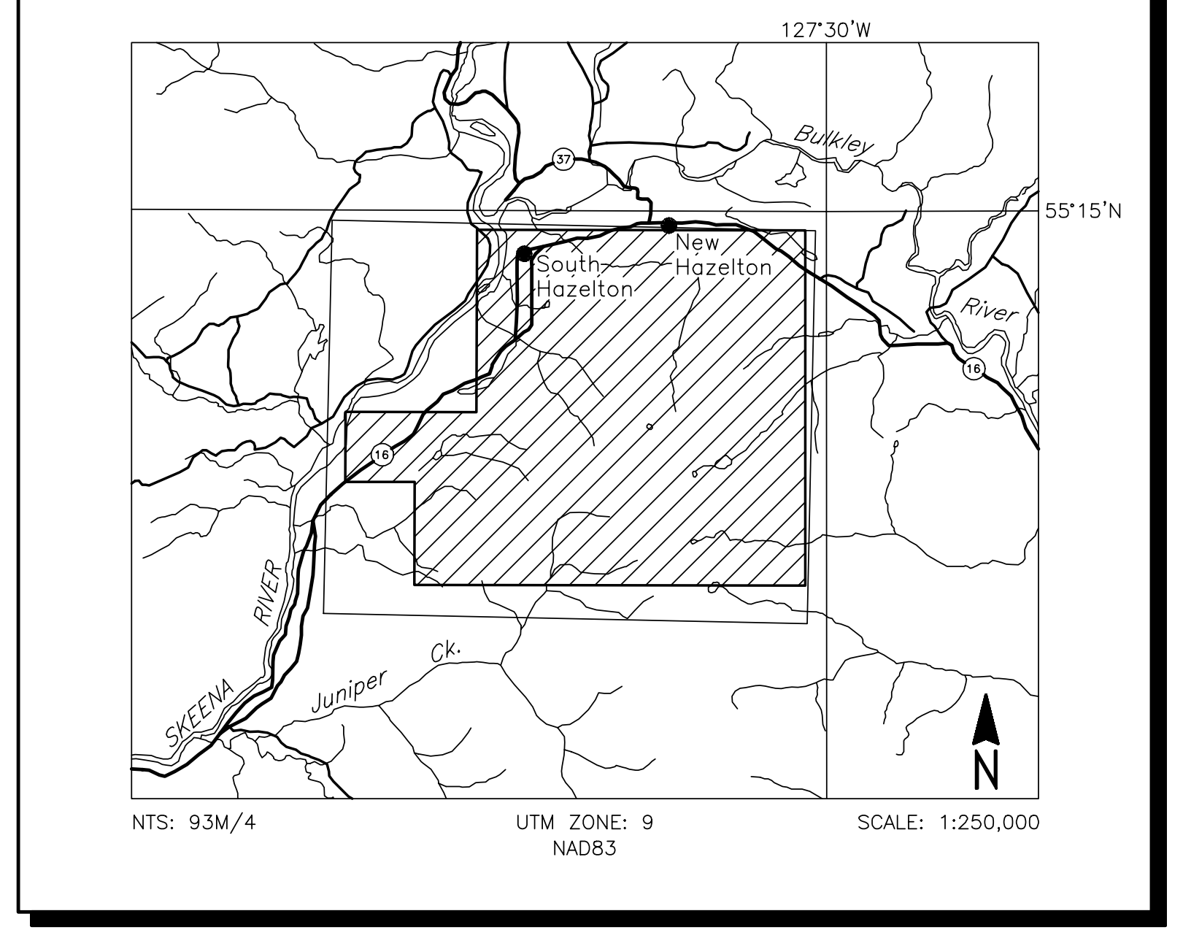


TOTAL MAGNETIC FIELD CONTOURS

. . . . 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/4 UTM ZONE: 9 NAD83 SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE-IOCG/NEW HAZELTON, BC.

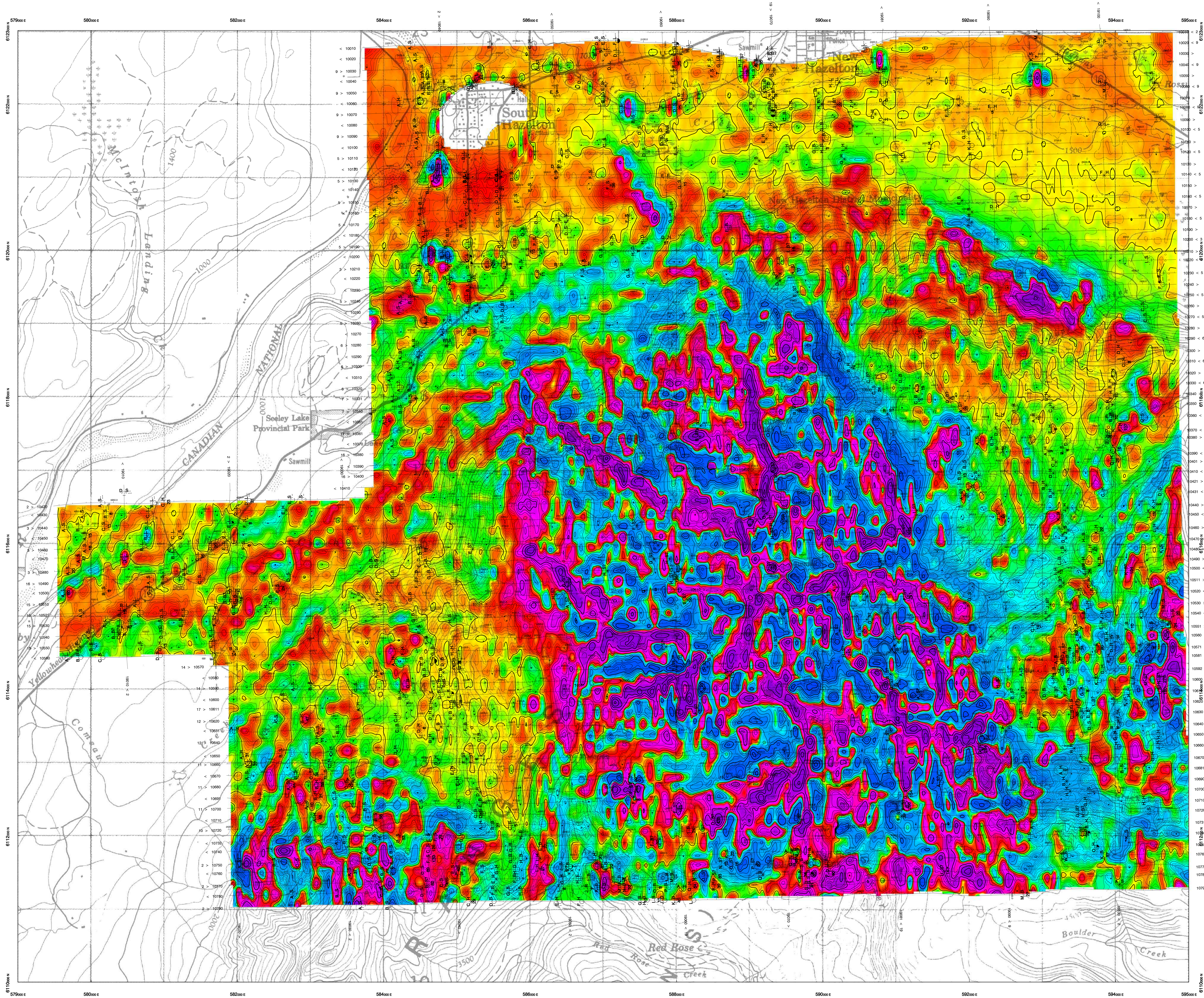
TOTAL MAGNETIC FIELD

FUGRO DIGHEM^{V}/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys

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

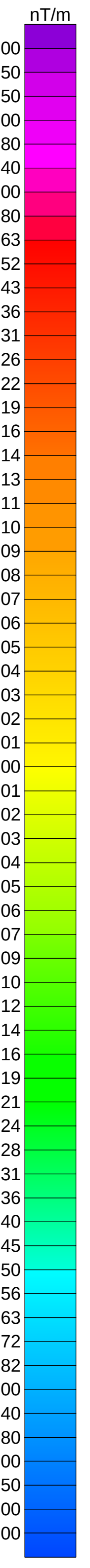
FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

Navigation	Differentially–corrected GPS
Data reduction grid interval	30 metres
Terrain clearance	Helicopter, Spectrometer 57 m Electromagnetic sensor 30 m Magnetometer 30 m
Data sampling interval	0.1 second
Magnetometer / sensitivity	Cesium / 0.01 nT
Electromagnetic system	DIGHEM^V
Spectrometer	GR820

Frequency	Sensitivity	Coil Orientation
1000 Hz	.06 ppm	Vertical coaxial
5500 Hz	.12 ppm	Vertical coaxial
900 Hz	.12 ppm	Horizontal coplanar
7200 Hz	.24 ppm	Horizontal coplanar
56000 Hz	.60 ppm	Horizontal coplanar



ELECTROMAGNETIC ANOMALIES

Grade	Anomaly	Conductance
7	●	>100 siemens
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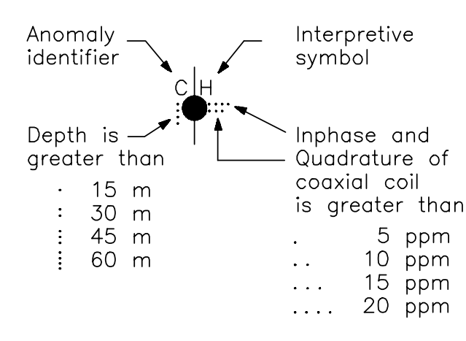
3	⊕	5–10 siemens
2	○	1–5 siemens
1	◌	< 1 siemens
–	✳	Questionable anomaly



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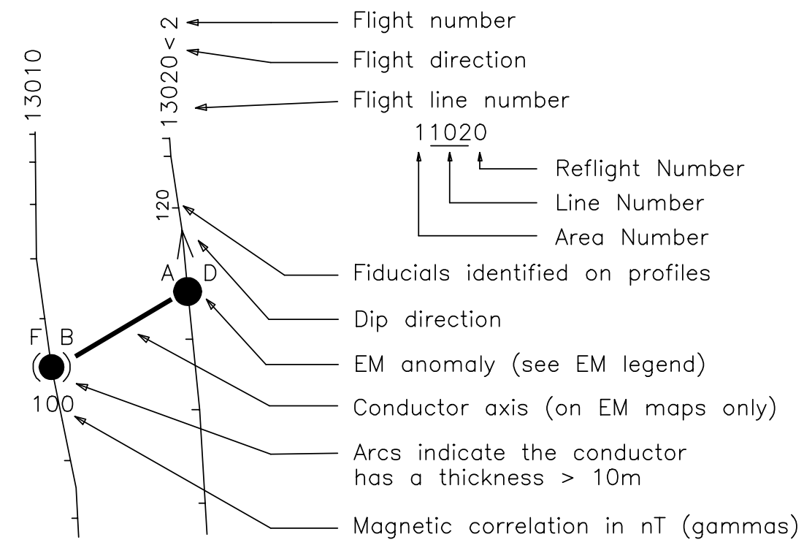
L	Culture, e.g. power line, metal building or fence

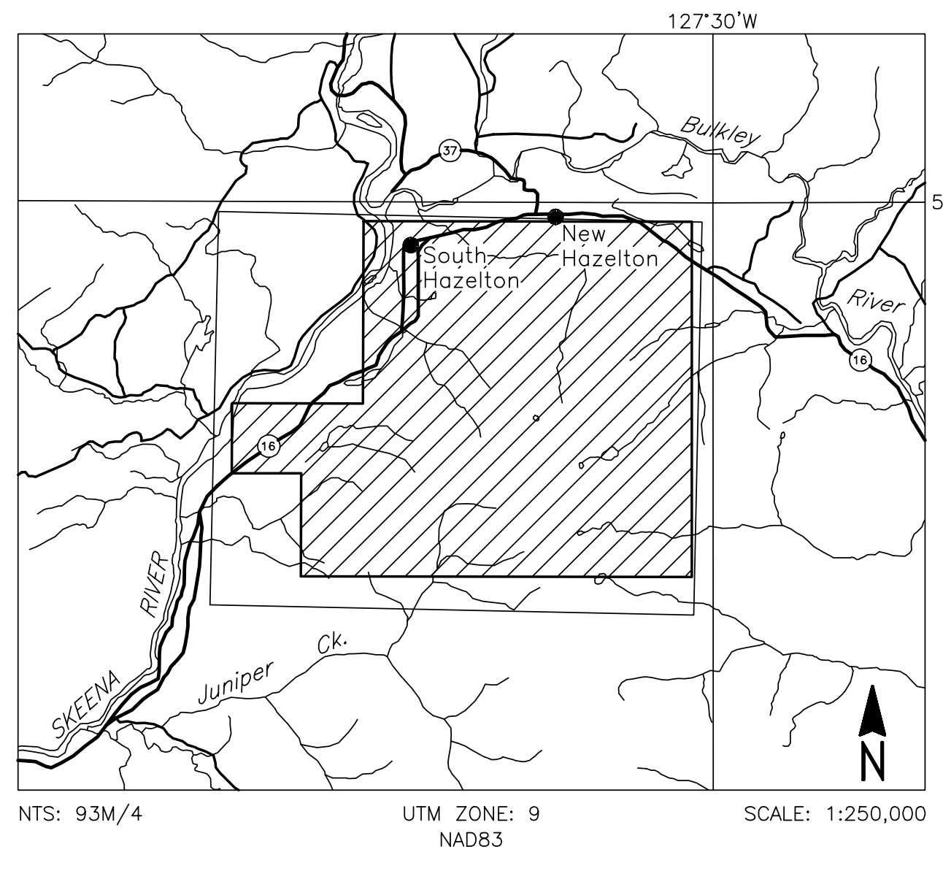
FLIGHT LINES WITH EM ANOMALIES



CALCULATED VERTICAL GRADIENT CONTOURS

▬▬▬▬	2.5 nT/metre
━━━━	0.5 nT/metre
────	0.1 nT/metre
— — — —	0.05 nT/metre

LOCATION MAP



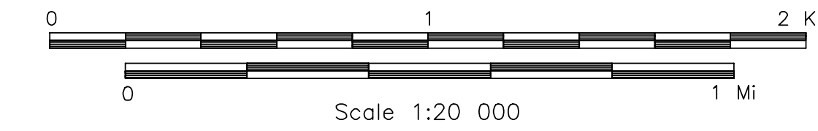
NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

CALCULATED VERTICAL MAGNETIC GRADIENT

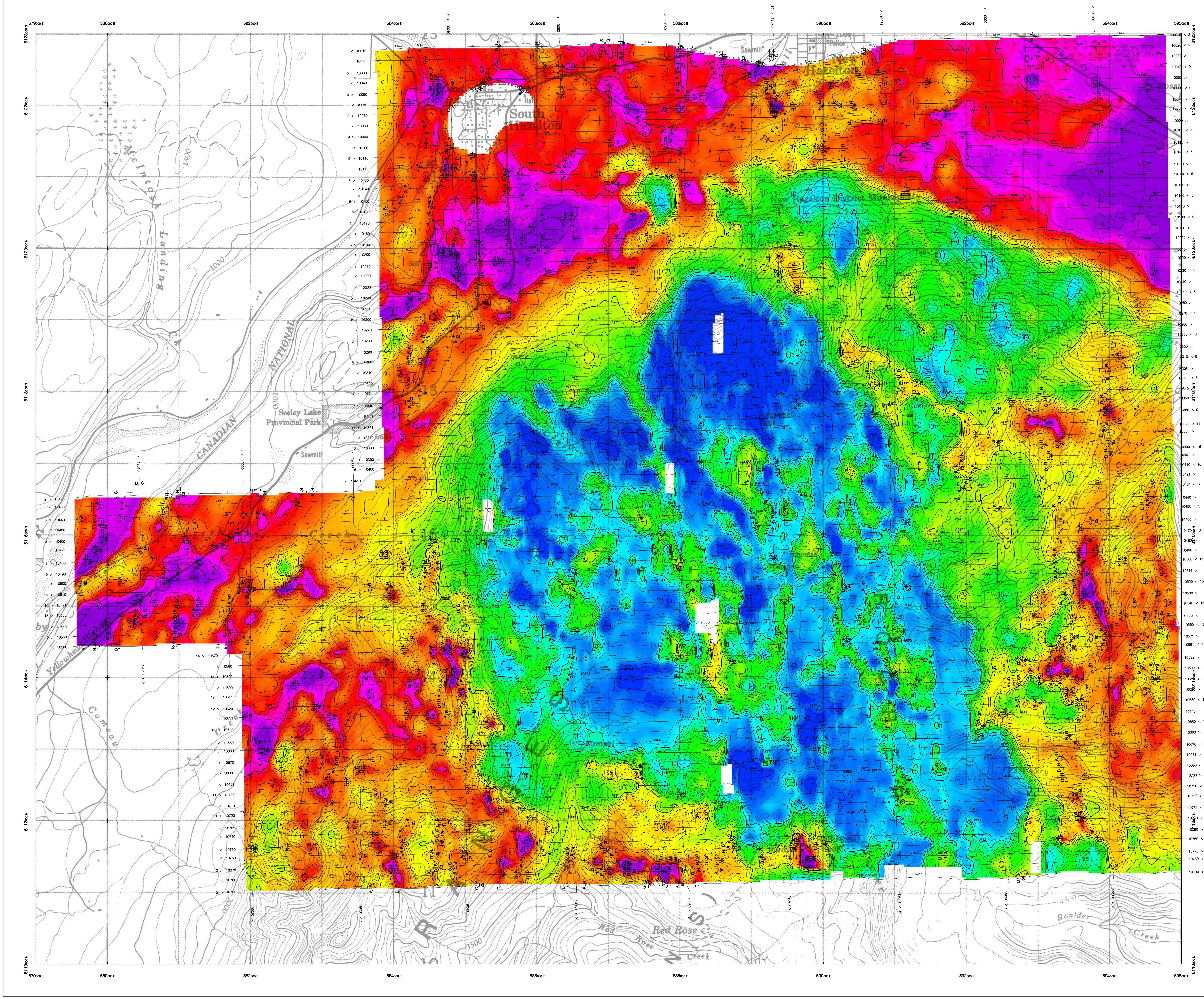
FUGRO DIGHEM^V/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys



Scale 1:20 000

FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

Navigation	Differentially-corrected GPS
Data reduction grid interval	30 metres
Terrain clearance	Helicopter, Spectrometer 57 m Electromagnetic sensor 30 m Magnetometer 30 m
Data sampling interval	0.1 second
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Electromagnetic system	DIGHEM^{V}
Spectrometer	GR820

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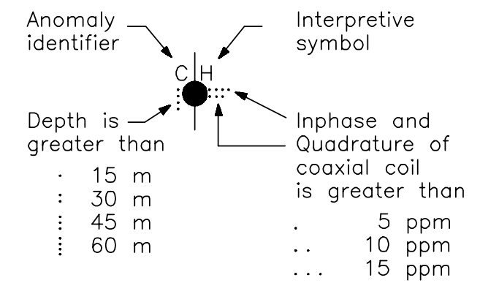
900 Hz	.12 ppm	Horizontal coplanar
7200 Hz	.24 ppm	Horizontal coplanar
56000 Hz	.60 ppm	Horizontal coplanar

ohm·m

27251
24390
22472
20958
19815
18679
17641
16669
15579
14226
12609
10968
9413
7993
6778
5790
5005
4338
3826
3342
2911
2559
2277
2022
1799
1600
1410
1231
1070
926
794
694
606
534
473
424
384
351
319
292
270
251
231
214
200
187
175
165
156
148
139
132
125
118
113
107
101
95
89
83
77
70
62

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



Depth is greater than
- · 15 m
- : 30 m
- ⋮ 45 m
- ⁞ 60 m

Inphase and Quadrature of coaxial coil is greater than
- . 5 ppm
- .. 10 ppm
- ... 15 ppm
- .... 20 ppm

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")
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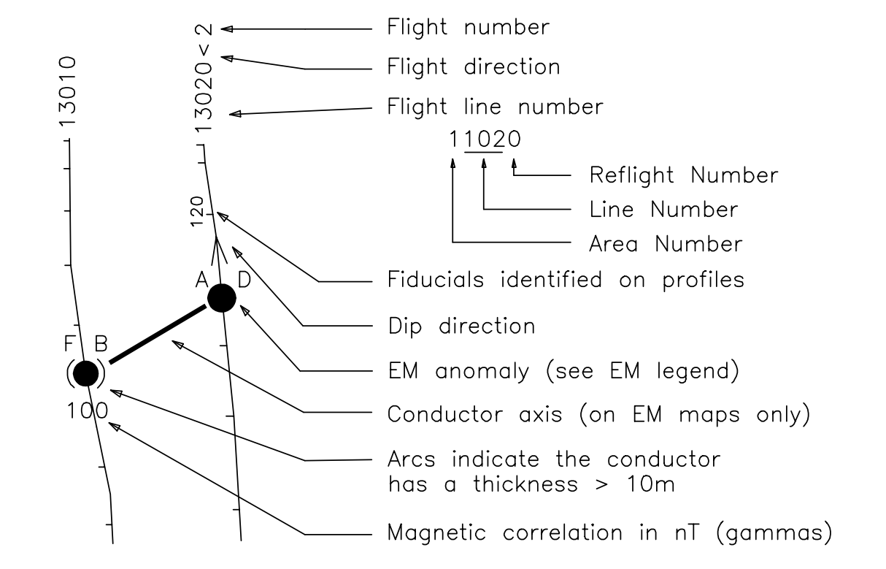
L	Culture, e.g. power line, metal building or fence

FLIGHT LINES WITH EM ANOMALIES

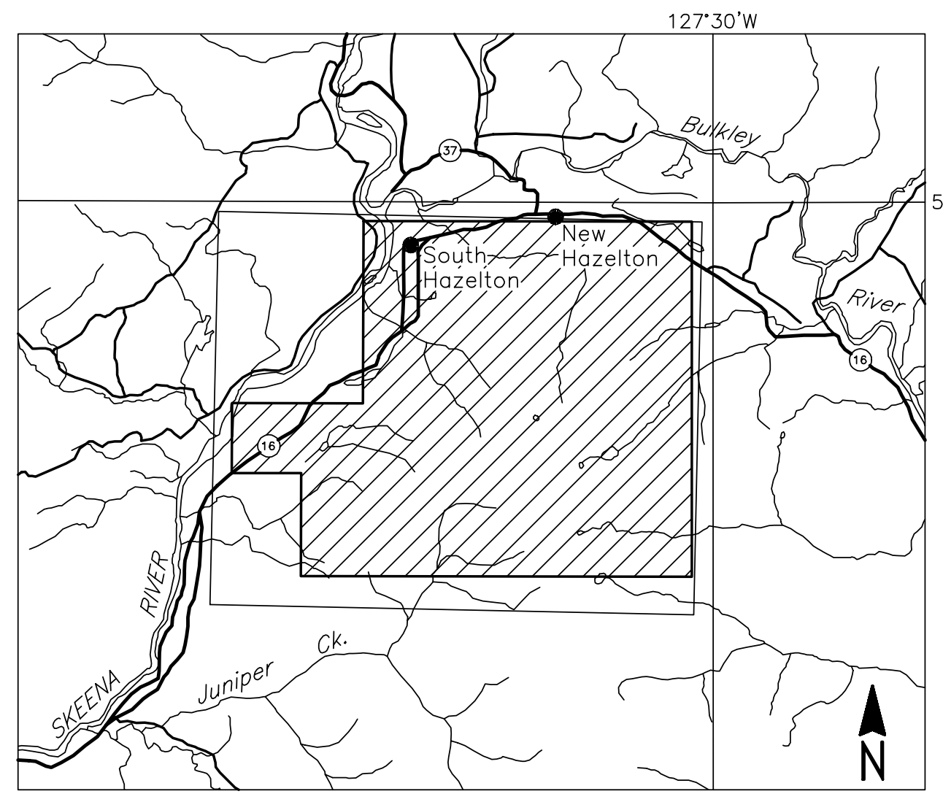


RESISTIVITY CONTOURS

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).

LOCATION MAP



NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

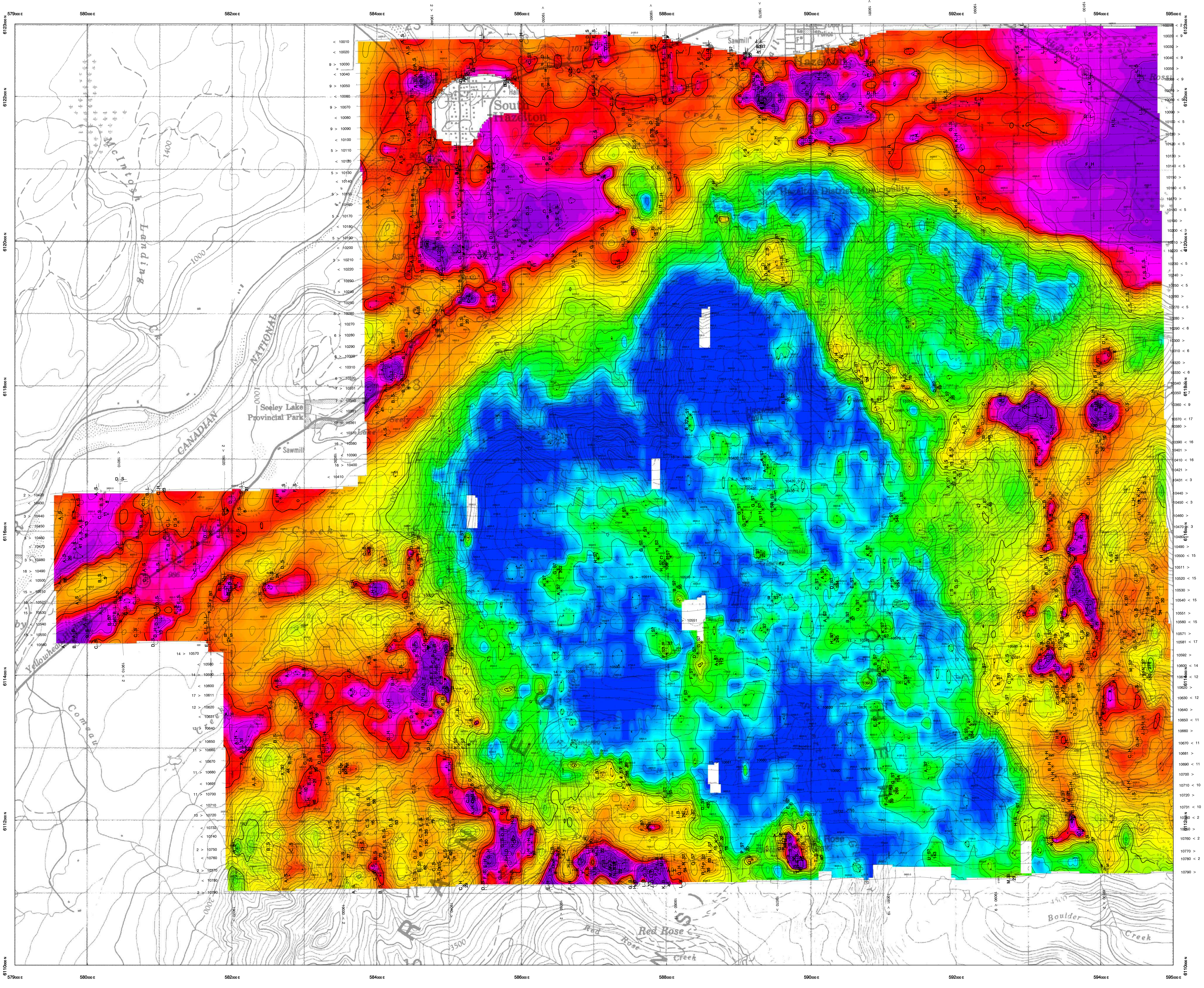
APPARENT RESISTIVITY
56,000 Hz COPLANAR

FUGRO DIGHEM^{V}/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys

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

FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

Navigation	Differentially-corrected GPS
Data reduction grid interval	30 metres
Terrain clearance	Helicopter, Spectrometer 57 m Electromagnetic sensor 30 m Magnetometer 30 m
Data sampling interval	0.1 second
Magnetometer / sensitivity	Cesium / 0.01 nT
Electromagnetic system	DIGHEM^V
Spectrometer	GR820

Frequency	Sensitivity	Coil Orientation
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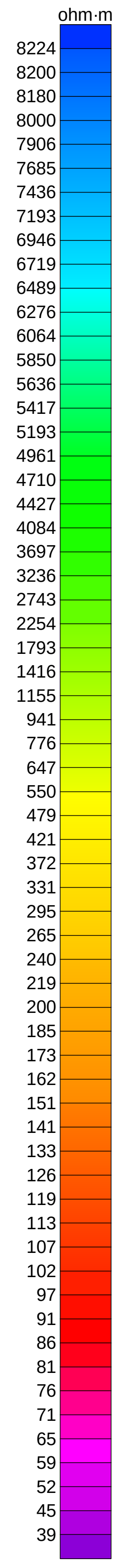

ELECTROMAGNETIC ANOMALIES

Grade	Anomaly	Conductance
7	●	>100 siemens
6	◕	50–100 siemens
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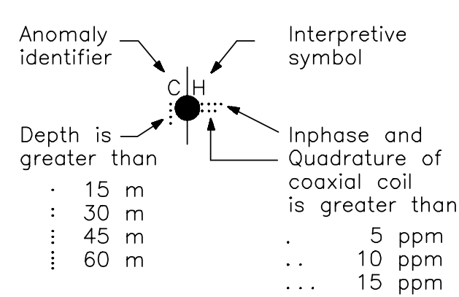
–	✳	Questionable anomaly



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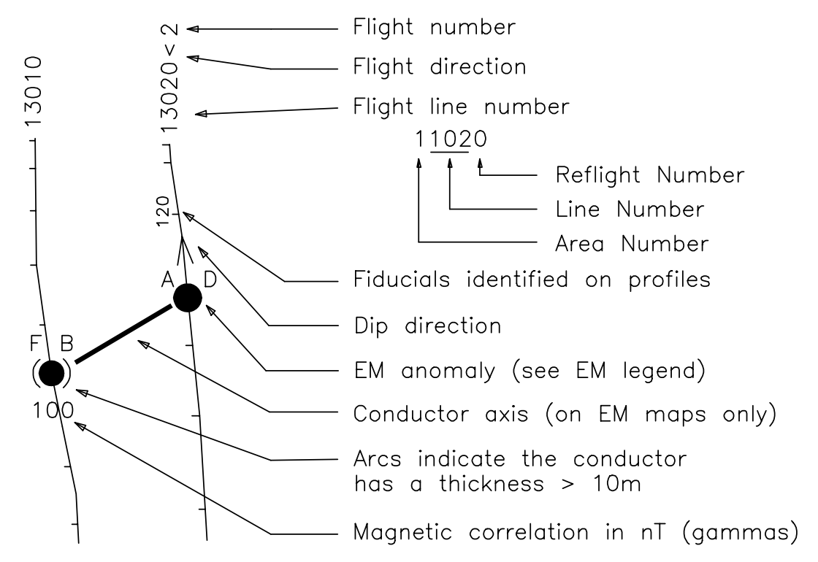
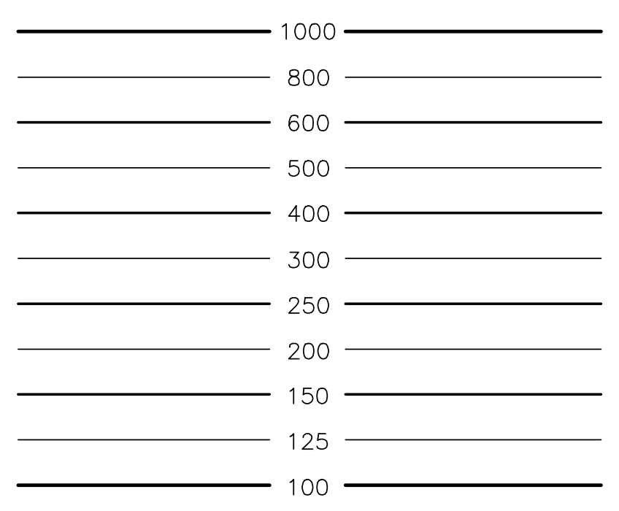
FLIGHT LINES WITH EM ANOMALIES

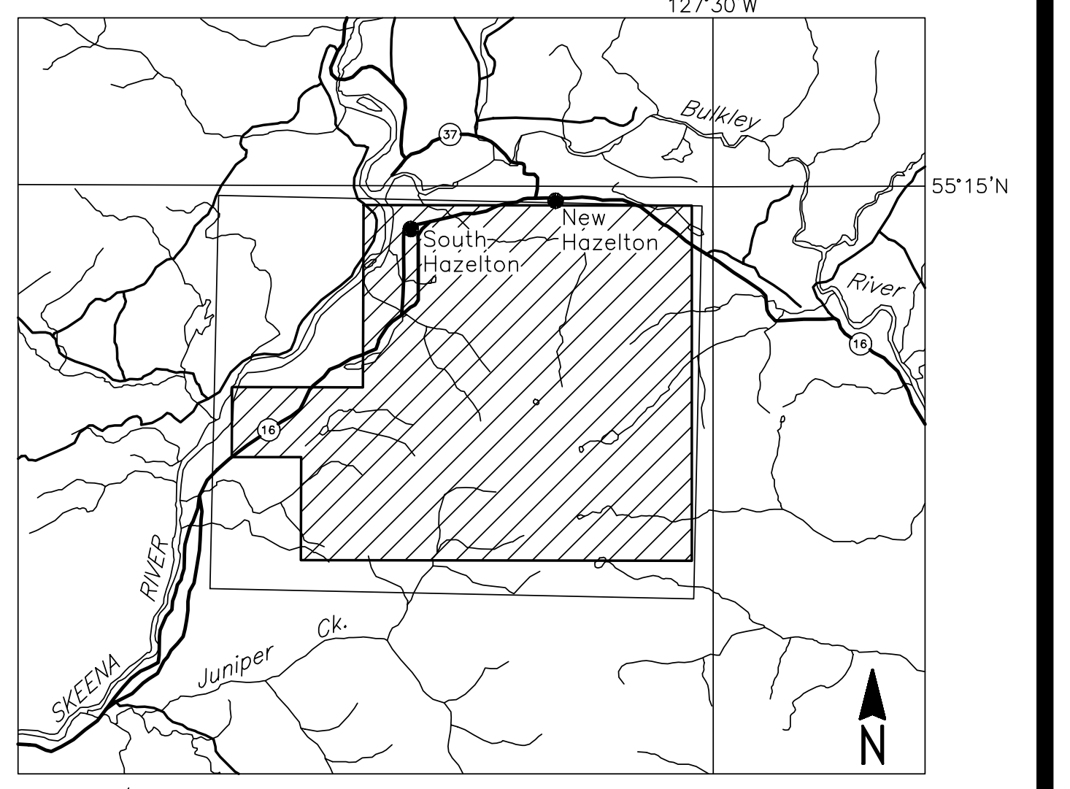


RESISTIVITY CONTOURS



Contours in ohm–m at 10 intervals per decade.
Apparent resistivity calculated using a pseudo–layer half–space model (Fraser 1978).

LOCATION MAP



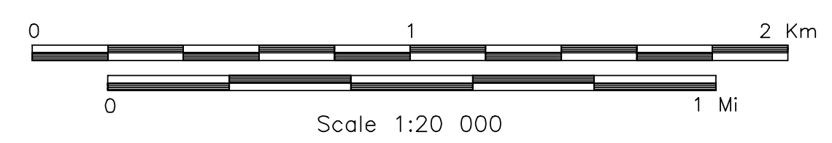
NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

APPARENT RESISTIVITY
7200 Hz COPLANAR

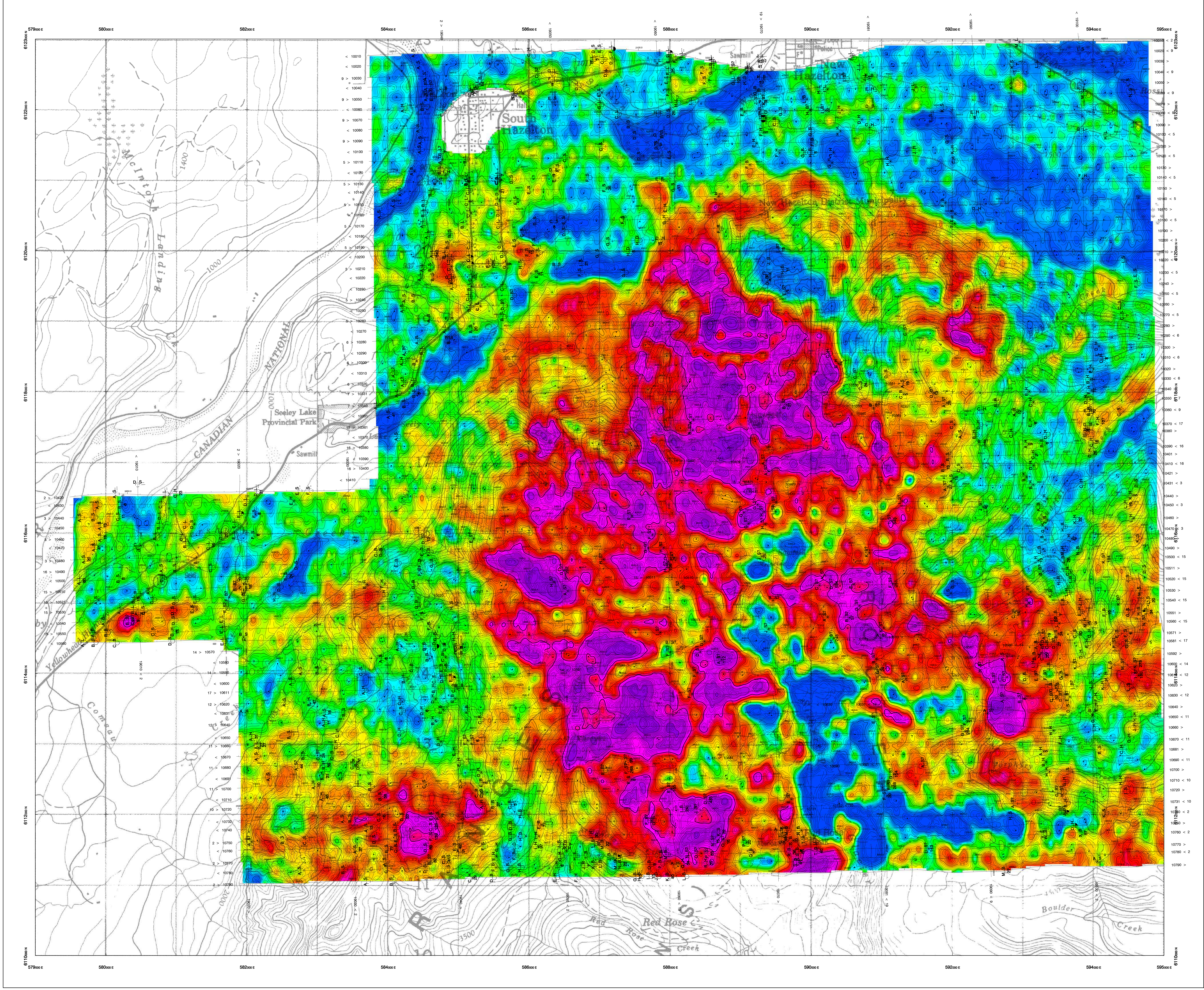
FUGRO DIGHEM^V/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys



Scale 1:20 000

FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

Navigation . . . . Differentially-corrected GPS
Data reduction grid interval . . . . 35 metres
Terrain clearance . . . . Helicopter, Spectrometer 57 m
Electromagnetic sensor 30 m
Magnetometer 30 m
Data sampling interval . . . . 0.1 second
Magnetometer / sensitivity . . . . . Cesium / 0.01 nT
Electromagnetic system . . . . . . DIGHEM^{V}
Spectrometer GR820

Frequency	Sensitivity	Coil Orientation
1000 Hz	.06 ppm	Vertical coaxial
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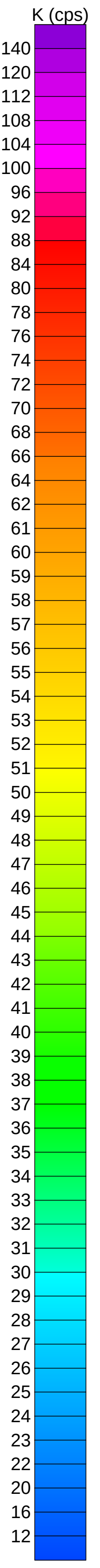

ELECTROMAGNETIC ANOMALIES

Grade	Anomaly	Conductance
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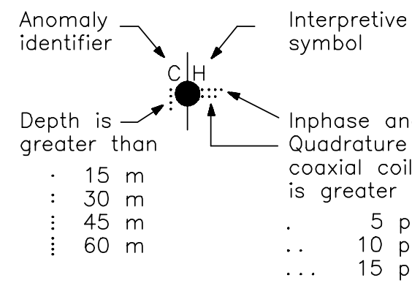
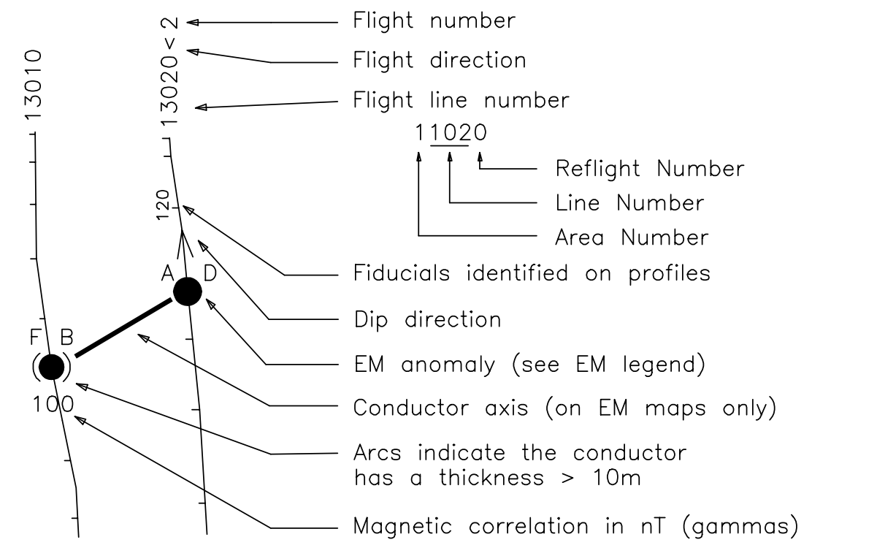


Depth is greater than
- · 15 m
- : 30 m
- ⋮ 45 m
- ⁞ 60 m

Inphase and Quadrature of coaxial coil is greater than
- . 5 ppm
- .. 10 ppm
- ... 15 ppm
- .... 20 ppm

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

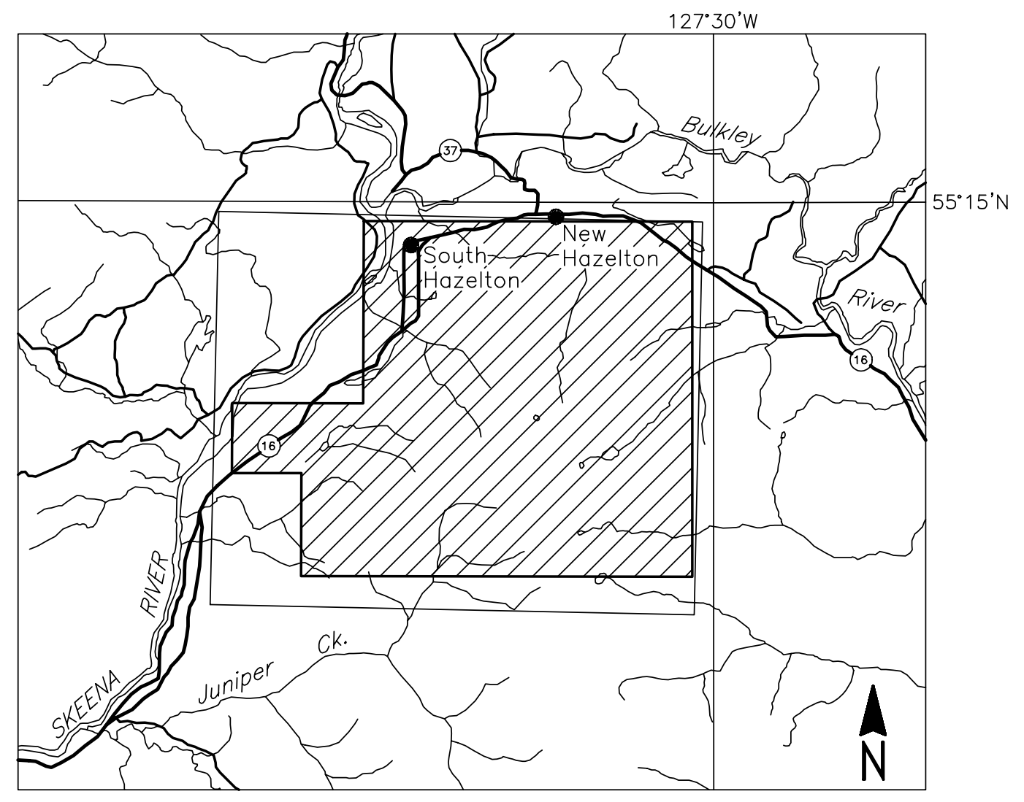
FLIGHT LINES WITH EM ANOMALIES



CONTOUR INTERVALS

━━━━	. . . . 100 cps
━━━━	. . . . 20 cps
────	. . . . 4 cps
— — — —	. . . . 2 cps
◯	. . . . low

LOCATION MAP



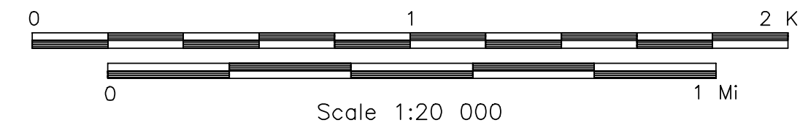
NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

RADIOMETRIC POTASSIUM COUNTS

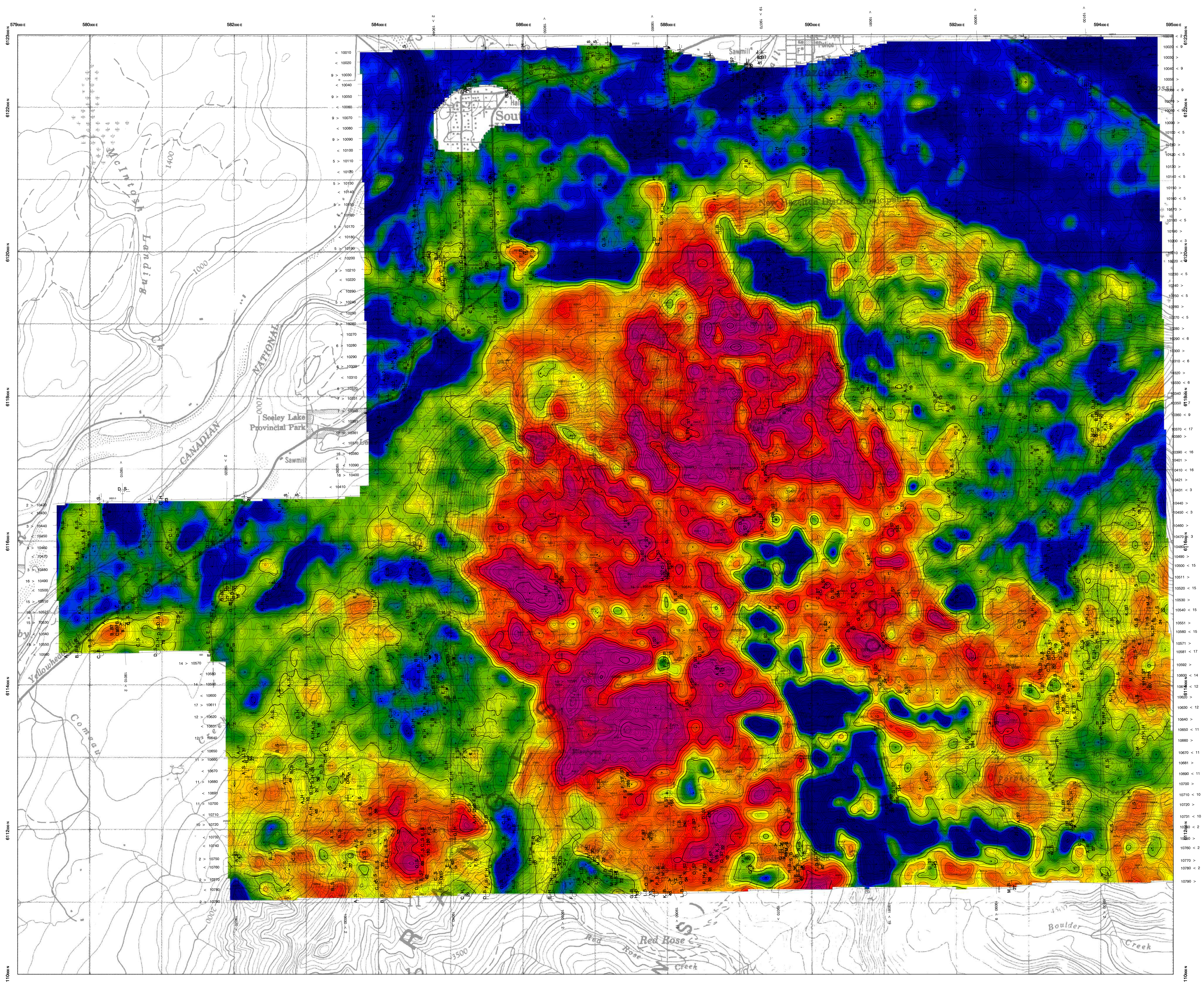
FUGRO DIGHEM^{V}/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys



Scale 1:20 000

FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

Navigation . . . . Differentially-corrected GPS
Data reduction grid interval . . . . 35 metres
Terrain clearance . . . . Helicopter, Spectrometer 57 m
Electromagnetic sensor 30 m
Magnetometer 30 m
Data sampling interval . . . . 0.1 second
Magnetometer / sensitivity . . . . . Cesium / 0.01 nT
Electromagnetic system . . . . . . DIGHEM^V
Spectrometer GR820

Frequency	Sensitivity	Coil Orientation
1000 Hz	.06 ppm	Vertical coaxial
5500 Hz	.12 ppm	Vertical coaxial
900 Hz	.12 ppm	Horizontal coplanar
7200 Hz	.24 ppm	Horizontal coplanar
56000 Hz	.60 ppm	Horizontal coplanar

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

Anomaly identifier
Interpretive symbol
Depth is greater than
· 15 m
: 30 m
⋮ 45 m
⋮ 60 m
Inphase and Quadrature of coaxial coil is greater than
. 5 ppm
.. 10 ppm
... 15 ppm
.... 20 ppm

Interpretive symbol	Conductor ("model")
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
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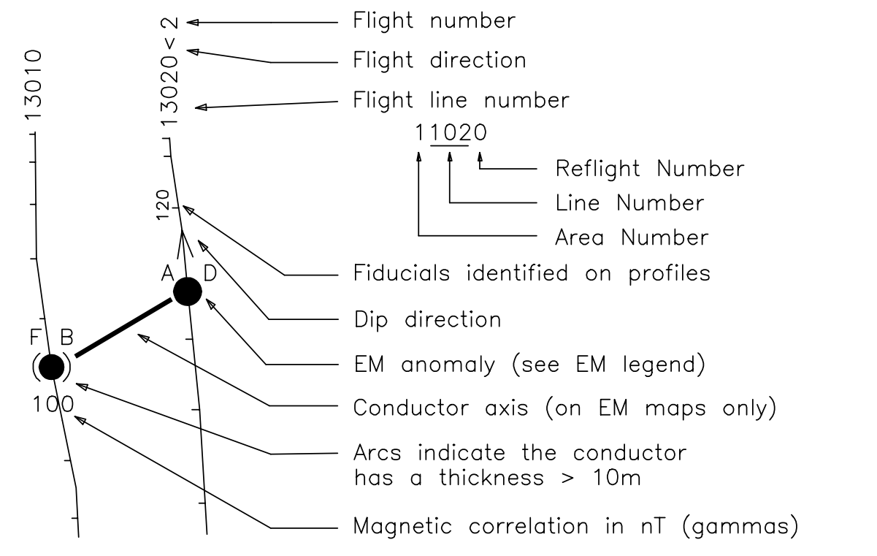
FLIGHT LINES WITH EM ANOMALIES

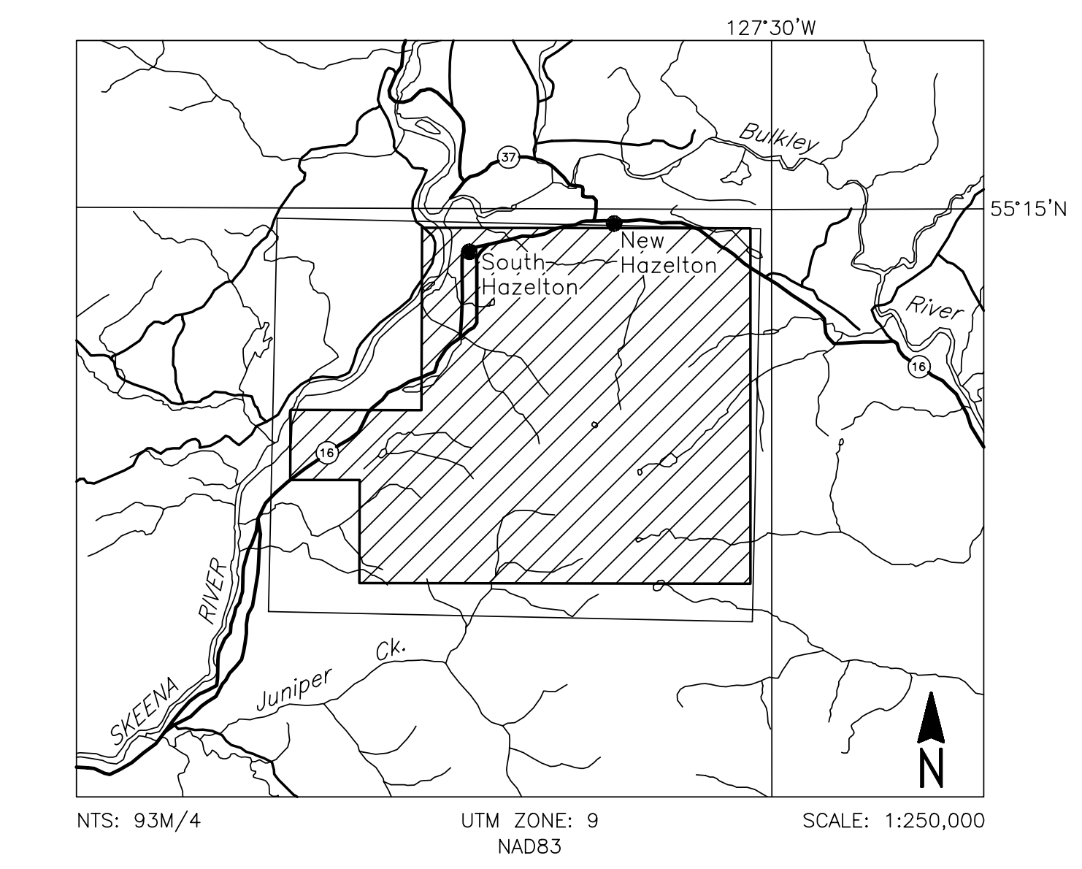


Flight number
Flight direction
Flight line number
11020
Reflight Number
Line Number
Area Number
Fiducials identified on profiles
Dip direction
EM anomaly (see EM legend)
Conductor axis (on EM maps only)
Arcs indicate the conductor has a thickness > 10m
Magnetic correlation in nT (gammas)

CONTOUR INTERVALS

. . . . 500 cps
. . . . 100 cps
. . . . 20 cps
. . . . 10 cps
. . . . low

LOCATION MAP



NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

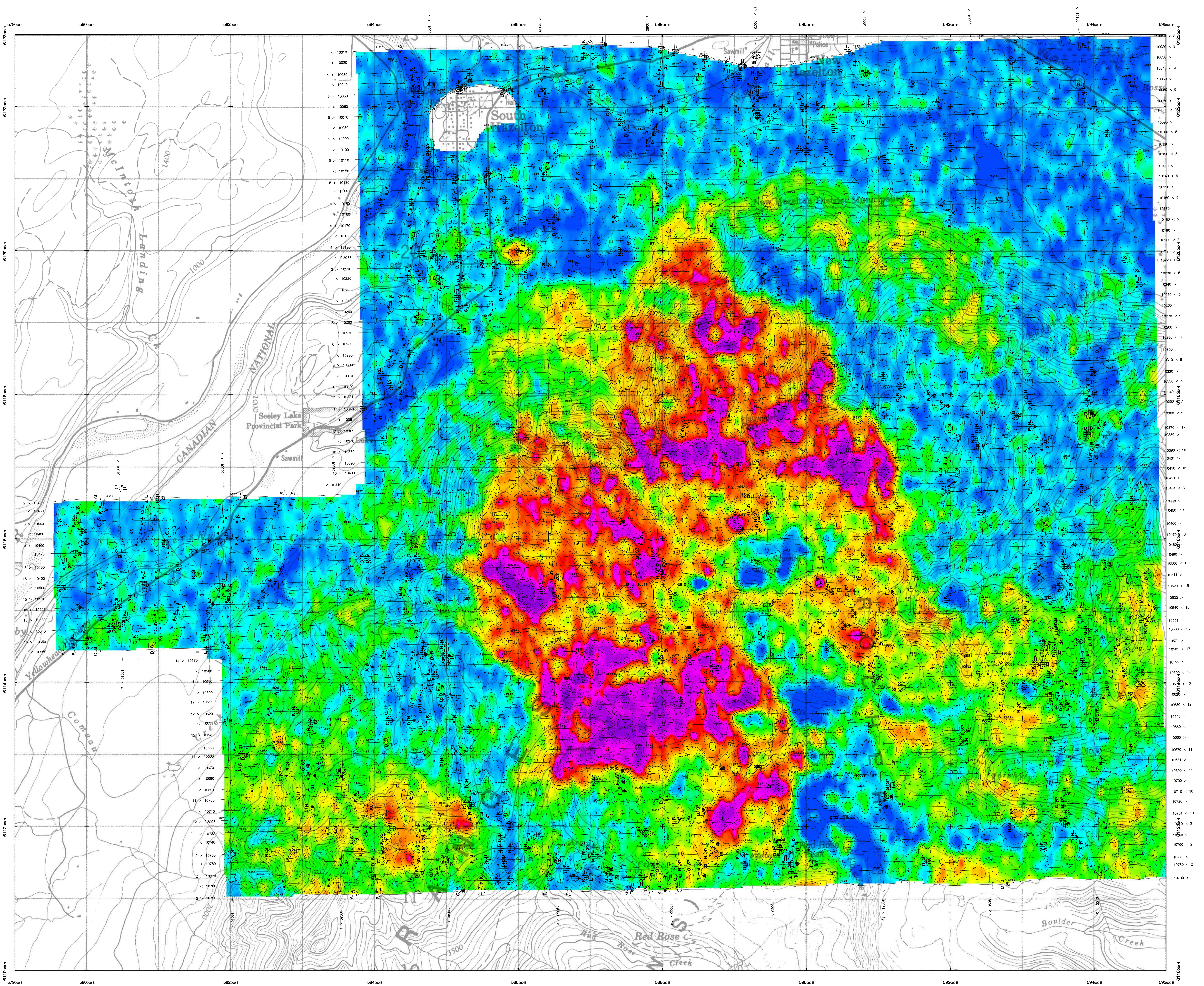
RADIOMETRIC TOTAL COUNT

FUGRO DIGHEM^V/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys

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

FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

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Spectrometer GR820

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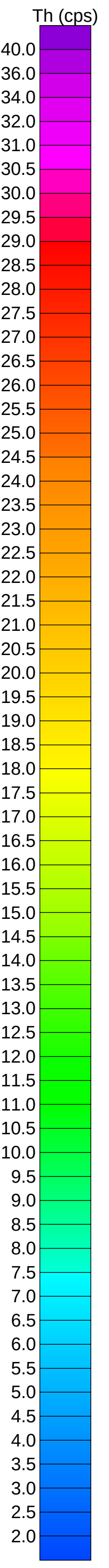
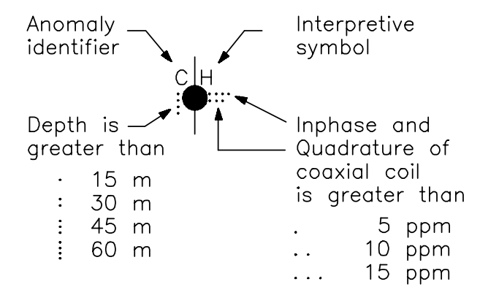


ELECTROMAGNETIC ANOMALIES

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



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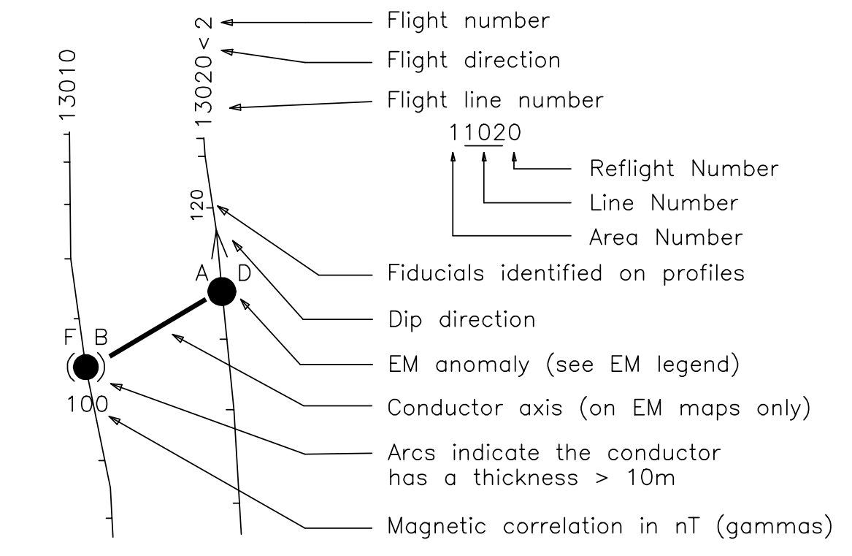
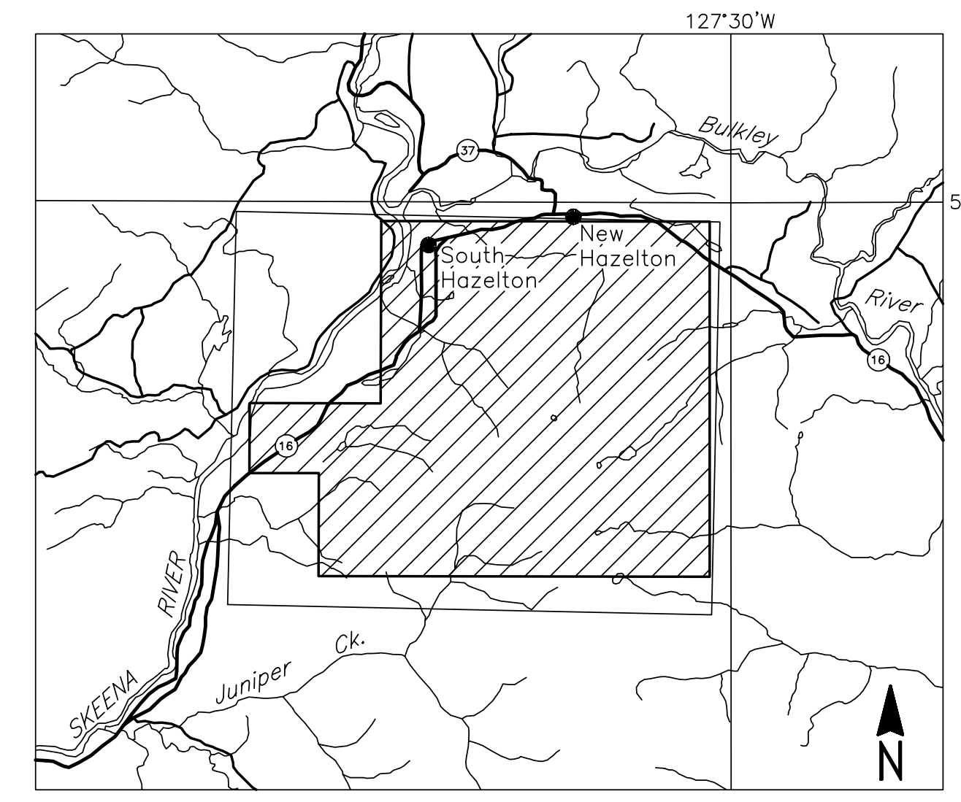
FLIGHT LINES WITH EM ANOMALIES



CONTOUR INTERVALS

. . . . 100 cps
. . . . 20 cps
. . . . 4 cps
. . . . 2 cps
. . . . low

LOCATION MAP



NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.
ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

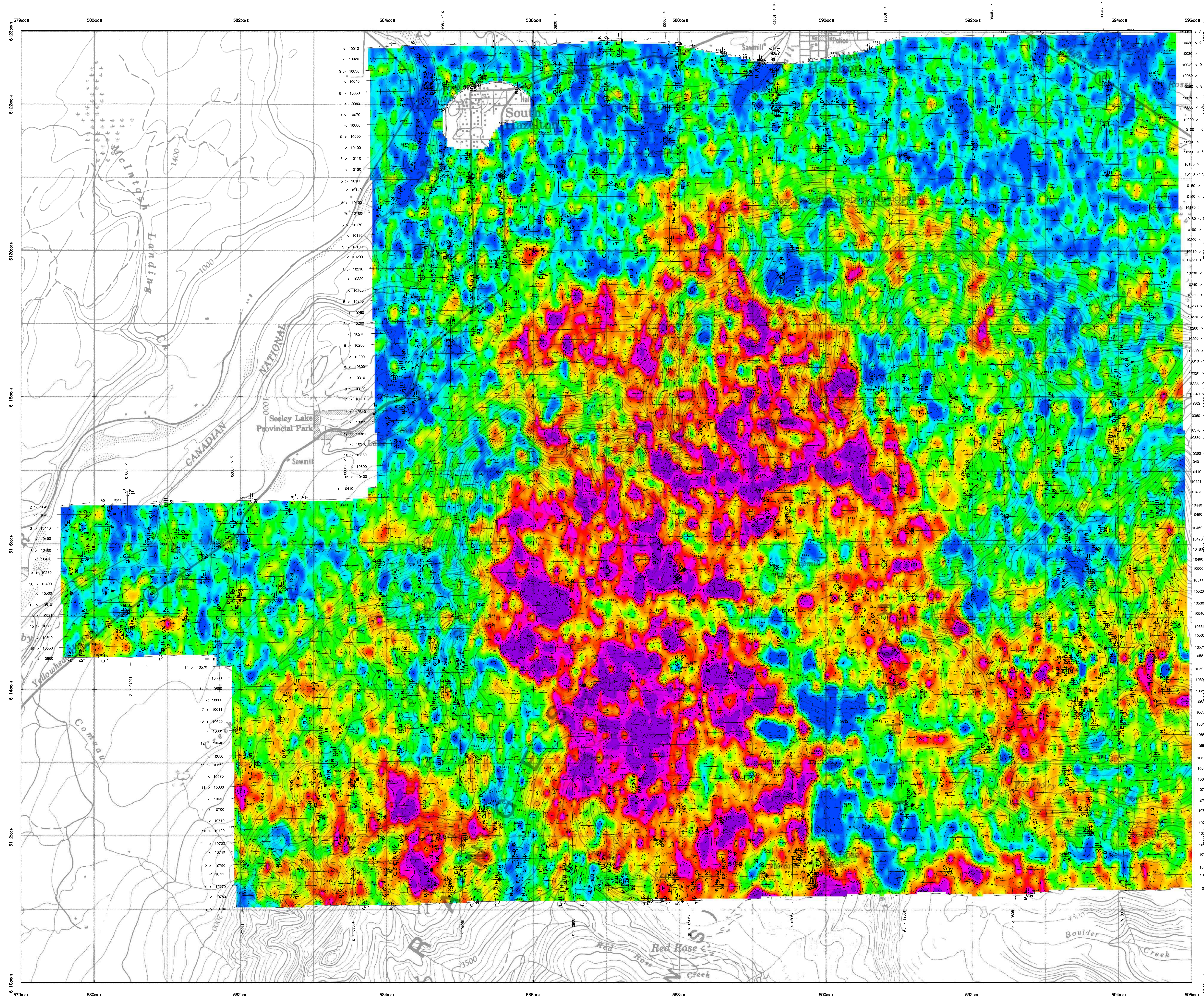
RADIOMETRIC
THORIUM COUNTS

FUGRO DIGHEM^V/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys

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

FUGRO AIRBORNE SURVEYS



TECHNICAL SUMMARY

Navigation	Differentially–corrected GPS
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Terrain clearance	Helicopter, Spectrometer 57 m Electromagnetic sensor 30 m Magnetometer 30 m
Data sampling interval	0.1 second
Magnetometer / sensitivity	Cesium / 0.01 nT
Electromagnetic system	DIGHEM^V
Spectrometer	GR820

Frequency	Sensitivity	Coil Orientation
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5500 Hz	.12 ppm	Vertical coaxial
900 Hz	.12 ppm	Horizontal coplanar
7200 Hz	.24 ppm	Horizontal coplanar
56000 Hz	.60 ppm	Horizontal coplanar

U (cps)

U (cps)
22.0
20.0
19.0
18.0
17.5
17.0
16.5
16.0
15.5
15.0
14.5
14.0
13.5
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5

ELECTROMAGNETIC ANOMALIES

Grade	Anomaly	Conductance
7	●	>100 siemens
6	◕	50–100 siemens
5	◒	20–50 siemens
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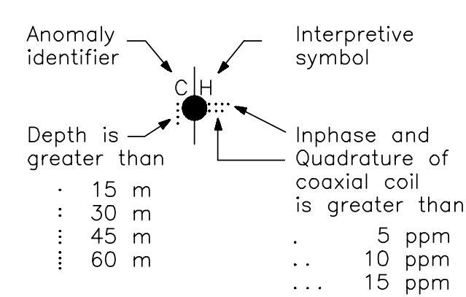
3	⊕	5–10 siemens
2	○	1–5 siemens
1	◌	< 1 siemens
–	✳	Questionable anomaly



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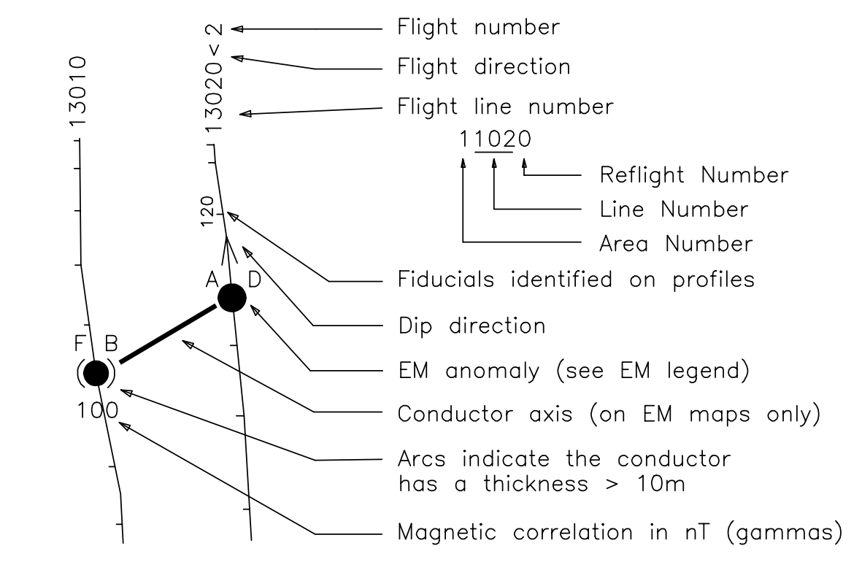
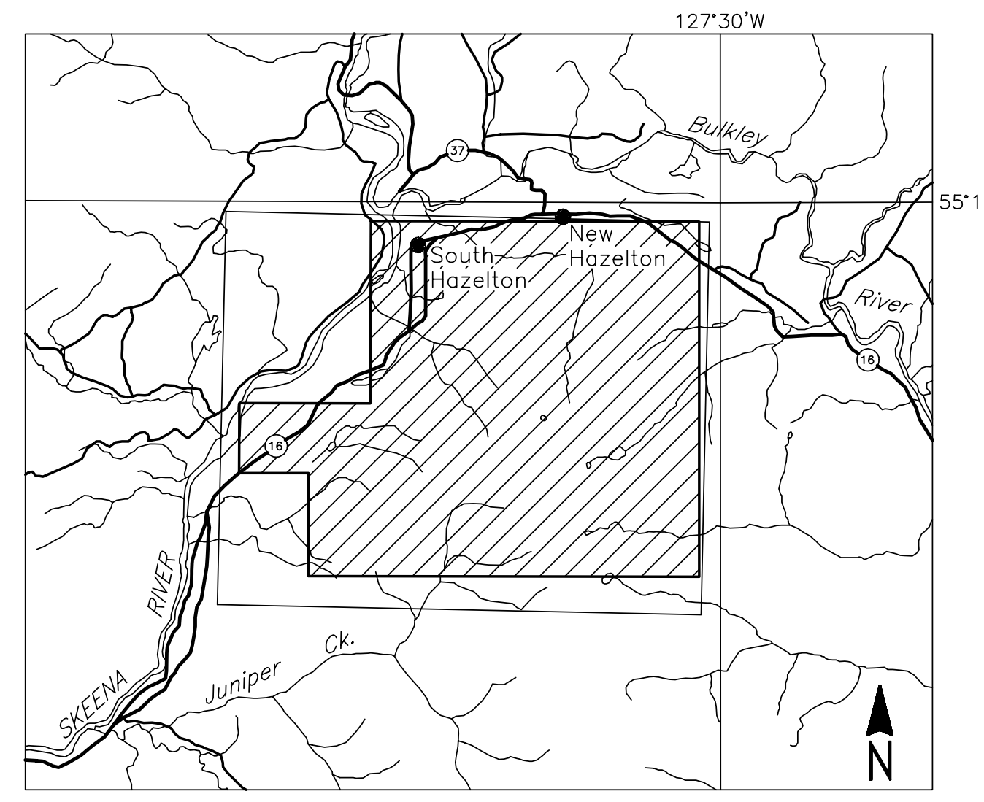
FLIGHT LINES WITH EM ANOMALIES



CONTOUR INTERVALS

━━━━	100 cps
━━━━	20 cps
────	4 cps
— — — —	2 cps
◯	low

LOCATION MAP



NTS: 93M/4
UTM ZONE: 9
NAD83
SCALE: 1:250,000

ROCHER DEBOULE MINERALS CORP.

ROCHER DEBOULE–IOCG/NEW HAZELTON, BC.

RADIOMETRIC URANIUM COUNTS

FUGRO DIGHEM^V/RAD SURVEY	NTS: 93M/4	GEOPHYSICIST:
DATE: AUGUST, 2007	JOB: 06096	SHEET: 1

Fugro Airborne Surveys

0 1 2 Km

0 1 Mi

Scale 1:20 000

FUGRO AIRBORNE SURVEYS