NTS 093M 04/E, TRIM 093M.012
LAT. 55 10' 22" N
LONG. 127 41' 21" W

GEOPHYSICSAL & GEOCHEMICAL REPORT ON ROCHER DEBOULE VICTORIA No 1 & VENT ZONE

MINERAL OCCURRENCES
HAZELTON, B.C.

Omineca Mining Division

by

36827

Andris Kikauka, P.Geo.
4199 Highway 101,
Powell River, BC V8A 0C7

Oct 15, 2017

BRITISH COLUMBIA
The Best Place on Earth

Ministry of Energy and Mines
BC Geological Survey

RECEIVED
OCT 17 2017
MINISTRY OF ENERGY AND MINES

Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Gechemcal, Geophysical

TOTAL COST: 27,687.62

AUTHOR(S): Andris Kikauka

SIGNATURE(S): A. Kikauka

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):

YEAR OF WORK: 2017

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5669035

PROPERTY NAME: Rocher Deboule (Victoria)

CLAIM NAME(S) (on which the work was done): 510469

COMMODITIES SOUGHT: Au-Ag-Co (Cu-Ni-Fe-REE)

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: 093M 072

MINING DIVISION: Omineca

NTS/BCGS: 082J 05/E, 082J.032

LATITUDE: 55 ° 10 ' 20 " **LONGITUDE:** 127 ° 39 ' 06 " **(at centre of work)**

OWNER(S):
1) American Manganese Inc
2)

MAILING ADDRESS:
2-17942 55th Ave
Surrey, BC V3S 6C8

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

MAILING ADDRESS:
same

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):
Victoria No 1 Vein Zone characterized by arsenopyrite, Co-Ni arsenate (Saffo rite-Lollingite), gold:silver ratio approx 9:1, hosted in hornblende-actinolite-chlorite gangue and diorite-lamprophyre dykes related to Late Cretaceous Rocher Deboule porphyritic granodiorite-diorite. Victoria No 1 trends east (450 m strike length) and dips steep-moderate north (traced vertically 300 m). To SW, Victoria Vent Zone exhibits IOCG deposit type Cu-Au-Ag-Fe-REE bearing mineral assemblage & redox cell SGH anomaly

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: 8336, 10368, 11019, 11513, 16575, 16714, 16714, 25674, 26984, 27558, 28625, 29338, 33297

Next Page

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic	7.2 km (576 readings)	510469	6,894.55
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for...)			
Soil	144 spatiotemporal geochemical hydrocarbon	510469	12,978.77
Silt			
Rock	14 ME-MS41 & Metallurgy (ALS)	510469	7,814.30
Other			
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other			
		TOTAL COST:	27,687.62

TABLE OF CONTENTS AND LIST OF FIGURES

LIST OF FIGURES

1.0 Summary

The Rocher Deboule property consists of MTO tenure numbers 510491 and 856170, and covers 4 past-producing underground mines (Rocher Deboule, Victoria, Highland Boy, & Cap) and significant prospects (Hazelton View, Silvertip Basin, and Great Ohio) located in-and-around the Rocher Deboule stock, south of Hazelton in Central British Columbia. British Columbia Ministry of Energy, Mines and Petroleum Resources MINFILE database lists the Rocher Deboule [MINFILE 093M071] mine produced 36,457 tonnes containing 2,167,780 grams silver, 133,676 grams gold and 2,557,433 kilograms of copper between 1915 and 1929; the adjacent Highland Boy [MINFILE 093M070] mine produced 68 tonnes containing 1,089 grams silver, 124 grams gold and 4,760 kilograms of copper, and the nearby Victoria [MINFILE 093M072] mine produced 51 tonnes, containing 7,341 grams gold, 7,710 kilograms of arsenic and 785 kilograms of cobalt between 1926 and 1940. These mines and other mines and prospects at Great Ohio [MINFILE 093M069], Cap [MINFILE 093M073], reflect the presence of widespread vein and disseminated mineralization associated with the Late Cretaceous Bulkley Plutonic Suite, and the satellite Rocher Deboule feldspar porphyry stock which displays "Iron Oxide Copper Gold" (anomalous Fe-Cu-Au-Ag-Co-P-La-REE's) breccia/fault array style mineralization.

The property is underlain by a broad, east-west trending belt of alteration zones and/or intermittent mineralization that may reflect the presence of one or more buried intrusion in a 1 X 4 km area, resulting in hydrothermal alteration and late-stage copper, silver and gold bearing minerals along fracture and/or fissure zones with quartz-carbonate-chlorite gangue. Cu-Ag-Au bearing mineralization located between the Cap (westernmost) and Highland Boy (easternmost) occurrences covering a 1 X 4 km area,

The Victoria mineral zones are located in the west portion of the claim group at 1,200-1,900 meters elevation. The Victoria No 1 Vein showings are hosted in Rocher Deboule granodiorite and minor phases of feldspar porphyry. Hydrothermal activity associated with the emplacement of hornblende-chlorite vein-dyke with Au-As-Co bearing sulphide mineralization related to the nearby intrusion of the Rocher Deboule granodiorite stock. The Victoria mineral zones consist of three parallel vein structures (Victoria #1, #2 and #3), 200 to 300 metres apart, which strike 085 degrees and dip 60 degrees north, and a small cross-vein which strikes north and dips 50 degrees east).

The Victoria No. 1 vein contains hornblende-chlorite-quartz-calcite gangue, and arsenopyrite-safflorite-lollingite-molybdenite mineralization. The No 1 Vein follows a dark grey, fine-grained diorite dike and averages 0.5 metre wide, is up to 450 metres along strike, and is 300 metres in vertical extent. It is open to the east and at depth. The No. 2 vein follows a feldspar porphyry dike and is 10 metres wide and up to 800 metres long. The No. 3 vein is up to 723 metres long and is intersected by a cross-vein containing galena, sphalerite, tetrahedrite, arsenopyrite, safflorite and pyrite.

The 'Vent Zone' is located approximately 1 km SW of the Victoria No 1 Vein. The Vent Zone is charterized by disseminated, widespread mineralization and alteration hosted in andesitic flows/tuffs (porphyritic) of Upper Cretaceous Kasalka Group (Brian Boru Formation) mixed with Lower Cretaceous Red Rose Formation coarse clastic sediments. The Vent Zone is well defined by SGH (spatiotemporal geochemical hydrocarbon) sample results (Actlabs A17-06702, Appendix D). A total of 144 soil samples (B horizon), were taken from the Victoria No 1 area (to the north) and the Victoria Vent Zone (to the south) for SGH analysis at Aotlabs, Ancastar, ON. The results of this hydrocarbon survey identified a redox cell anomaly in the Vent Zone (6.0 out of 6.0 rating), and copper-gold anomalous zones that coincide with the redox cell anomaly (5.0 out of 6.0 rating). In the area of the Victoria No 1 Vein the SGH survey identified (5.0 out of 6.0 rating) copper-gold anomaly clusters . It is postulated from the SGH redox cell anomaly results and elevated Cu-Au-Ag-Fe-REE geochemistry suggest the Vent Zone represents an IOCG (iron oxide copper gold) exploration target.

Hydrothermal activity associated with the emplacement of quartz-carbonate-sulphide fissure veins is related to the nearby intrusion of the Rocher Deboule granodiorite stock. A program of geochemical rock chip sampling (14 rock chip samples over a 100 hectare area, Fig 5, 6, & 7), on the Victoria showings (located on the west portion of the property), were carried out by American Manganese personnel in June, 2017. Rock samples were analyzed (ME-MS-41 & Co-OG46) by ALS Minerals, and 3 of 14 select samples were analyzed by ALS Metallurgical with Particle Mineral Analysis (Appendix A). A total of 14 rock chip samples taken in the area of the Victoria showings are listed as follows:

Rock Samples from Victoria area

Sample ID	Fe %	Ce ppm	La ppm	Ni ppm	Bi ppm	Ca %	Pb ppm	Zn ppm
17VIC-1	1.62	5.33	2.8	310	83.9	2.59	1	33
17VIC-2	10.7	24.6	20.2	639	1815	1.73	2.9	23
17VIC-3	4.69	12.9	5.9	102	4.97	3.05	15.1	109
17VIC-4	11	199.5	159.5	3020	318	0.85	6.6	23
17VIC-5	10.5	7.72	5.5	3500	1650	1.05	2.3	17
17VIC-6	8.21	23.6	15.1	1745	783	2.36	7.2	27
17VIC-7	1.47	>500	600	423	156	1.55	3.5	10
17VIC-8	3	>500	610	33	1.05	0.06	2.9	779
17VIC-9	5.98	21.6	12.5	601	230	9.2	346	35
17VIC-10	15.15	4.82	2.9	137	1.47	0.19	5.6	61
17VIC-11	7.89	34.8	16.6	38.7	0.57	0.72	4.2	170
17VIC-12	12.3	20.8	9.5	4.4	0.22	0.36	36.5	169
17VIC-13	28.2	>500	620	8	0.44	5.9	1.8	89
17VIC-14	8.41	169.5	136.5	5660	1060	1.41	21	60

Sample ID	Au ppm	Au g/t	Ag ppm	Cu ppm	Co ppm	Co %	As ppm	As %	Mo ppm
17VIC-1	8.77		2.32	7.7	3400		>10000	1.555	2260
17VIC-2	>25.0	110.5	3.67	2.3	>10000	1.535	>10000	18.05	2310
17VIC-3	0.22		0.77	514	48.7		451		9.39
17VIC-4	>25.0	126	7.75	4.5	>10000	1.705	>10000	20.2	4130
17VIC-5	>25.0	96.8	2.84	1.1	>10000	2.75	>10000	26.2	2410
17VIC-6	>25.0	56.8	1.95	1.5	>10000	2.05	>10000	15.55	1885
17VIC-7	>25.0	119	7.95	37.8	>10000	2.46	>10000	9.72	5960
17VIC-8	0.18		0.21	43.5	222		4730		314
17VIC-9	13.65		20.4	12	2360		>10000	2.68	33.2
17VIC-10	0.12		2.04	5090	138		3760		125
17VIC-11	0.04		0.17	60.8	35.1		58.3		3.93
17VIC-12	<0.02		1.57	410	11.2		96.4		6.25
17VIC-13	0.07		2.22	3950	9.1		34.5		11.05
17VIC-14	>25.0	164	22.4	18.3	>10000	1.135	>10000	18.8	905

Geochemical analysis results from rock chip samples 1-7, and 14 (Victoria No 1 Vein), suggest elevated Au values are associated with Ag-Co-As (Ni-Mo-La-Ce-Fe-Bi) in a gangue of hornblende-actinolite. Results from rock chip samples 8, 10-13 (Victoria Vent Zone) show elevated Au values associated with increased Cu-Fe-Ce-La values. Au-Cu-Fe-Ce-La geochemical association suggests Victoria Vent Zone is associated with IOCG type mineralization.

Geophysical readings were taken using GEM Systems GSM19T v 7.0, vertical component of total field was recorded at 12.5 m intervals over the area of the SGH survey (50 meter line spacing). Results suggest a moderate strength, relatively well-defined (100-400 nT) positive anomaly (approx. 100 X 300 m area, elongated east-west) located in the east portion of the Victoria No 1 Vein (1,550-1,700 m elev), and open to the east) which coincides with the area of adits and underground development work (Fig 8). The positive anomalies are likely caused by increased magnetic minerals associated with mafic dykes that are associated with Au-Ag-Co-As-Mo bearing mineralization. Additional weak and relatively poorly defined positive magnetometer anomalies (50-150 nT) occur approximately 200 meters north and south of the Victoria No 1 Vein. The weak north magnetometer anomaly (200 m n of Victoria No 1), coincides with 15 cm width outcrop rock chip sample 17VIC-1 which contains 8.77 g/t Au, 2.32 g/t Ag, 0.34% Co, 1.56% As, 0.23% Mo (source: ALS cert VA17142788).

The magnetometer survey included the area of the Vent Zone (located 500-1,000 m southwest of the Victoria No 3 Vein). The Vent Zone features weak (100-200 nT) and poorly to moderately defined anomalies in the east portion of the grid area covering an area of approximately 200 X 600 meters (Fig 9). These magnetometer anomalies in the higher elevation portions of the Vent Zone (1,410-1,640 m elevation) coincide with rock chip samples 17VIC-8, 10, & 13 with the following results (source: ALS cert VA17142788):

Vent Zone Rock Chip Sample Results:

Sample	Width	Au g/t	Ag g/t	Cu%	As ppm	La ppm	Ce ppm	Fe %
17VIC-8	float	0.18	0.21	0.01	4,730	610	>500	3.0
17VIC-10	30 cm	0.12	2.04	0.51	3,760	2.9	4.82	15.15
17VIC-13	18 cm	0.07	2.22	0.40	34.5	620	>500	28.2

ALS Metallurgy Kamloops, Test Results from Rock Chip Sample 17VIC-4, 5, & 9 (Appendix A):

The main arsenic bearing minerals present in rock chip samples (17VIC-4, 5, & 9) are arsenopyrite and Safflorite/Lollingite in a gangue of hornblende-actinolite and chlorite, with minor quartz-calcite-sericite-apatite-epidote. When the As content increases, more of the safflorite/lollingite is present. The cobalt distribution roughly correlates with arsenic distribution. The spectra data shows the cobalt content in these arsenic bearing minerals. Sulphur is mostly associated with arsenopyrite, then in molybdenite. The two high As samples (4 & 5) seem to have significantly different host rock compositions from Sample 9: i.e. high amphibole, low carbonates. Gold particle observations shows some silver content. Metallurgical process testing (on crushed rejects) that could be done might include: Grind to a typical processing size (150µm P80) and investigate cyanide leaching, froth flotation and gravity recovery. The flotation testing would give a good indication of gold association with arsenopyrite, since that and molybdenum are the only 2 main species that should float. Cyanide leaching may be best way to recover gold, as the arsenopyrite may be difficult to sell as a concentrate. If gold is refractory with arsenopyrite, which would be indicated by the flotation and cyanide leach response, pressure oxidation on a flotation concentrate is recommended.
Finally, gravity is always good to check and see what can be recovered by grinding and non-chemical methods. High mass recoveries due the high levels of arsenic bearing minerals may incur some high smelter penalties. Cobalt recovery, may be achieved by hydrometallurgical treatment.

Follow up exploration work including detailed mapping, hand trenching, core drilling and metallurgical testing of elevated precious metal bearing vein and disseminated mineral zones is recommended. A program of exploration to cover the Victaria No 1 Vein (1,550-1,700 m elev), Victoria Vent Zone (1,410-1,640 m elevation), Silvertip Creek, Rocher Deboule, & Hazelton View area is also recommended. The proposed follow up fieldwork would also include core drilling of the Rocher Deboule No 2 Vein (in the vicinity of Southern Gold Res Ltd 1988 core drilling, near the intrusive contact zones in the west portion of the Rocher Deboule No 2 Vein).

2.0 Introduction

2.1 General Statement

The Rocher Deboule gold-silver-copper-(zinc-lead-cobalt) property is 100% owned by American Manganese Inc. This report describes the history of development of small mines, the geology and mineralization of the area and the exploration history, including previous data such as six holes drilled into the Highland Boy Upper vein in 2007 by American Manganese Inc, and the results of an airborne geophysical survey flown by Dighem that same year, and a description of surface exploration program conducted by Ethier Exploration, on behalf of American Manganese Inc in 2011, that includes data on 455 rock samples, 841 soil and 68 stream sediment samples.

2.2 Location and Access

The Rocher Deboule property lies at the north end of the Rocher Deboule Range in central British Columbia. It is at latitude of 55 degrees, 10 minutes north, and longitude 127 degrees, 38 minutes west on NTS Map Sheet 93M/04E (093M.012 & 013) and approximately 8 kilometres south of the community of Hazelton.

The central part of the property is rugged and mountainous. Many of the old workings can be accessed by roads and trails (Figure 1). The historic mine workings of the former Rocher Deboule Mine and much of the southwestern part of the property can be reached using an ATV vehicle along an old, largely over-grown road that follows Juniper Creek. The road links to Highway 16 approximately 1 kilometre northeast of the Kitsegulka bridge. The Victoria and Cap mine site is best reached via an un-maintained four-wheel drive road that leaves the east side of Comeau Road (1 km south of Highway 16), located approximately 3 km southeast of Seeley Lake Provincial Park. The mine road leads to a switchback trail 400 metres below the lowest adit (Victoria No 3 adit). Other parts of the property are also accessed by trails that lead back to a rudimentary road system in the Juniper Creek valley.

Hazelton is in the Skeena River valley, one of the main arterial routes from central British Columbia to the Pacific coast. It is well serviced. It has major road (Highway 16), rail (Canadian National) and hydro-electric power links to the rest of the province and easy access to port facilities at Prince Rupert and Stewart. There are routine commercial flights into airports at the near-by communities of Terrace and Smithers, both of which provide local services.

2.3 Topography and Climate

The Rocher Deboule Range is located on the eastern edge of the Coast Mountain Range. Elevations range from approximately 2200 metres in the east to 400 metres in the west.

Vegetation is sparse above timberline. However, there is significant tree cover, especially on the east and west flanks of the mountain. It is mostly a mix of conifer; hemlock, balsam, spruce, pine and deciduous; poplar, birch, vine-maple, and alder. At lower levels the fauna include moose, deer and goat; bear, black and grizzly, wolf, coyote, cougars, wolverines and eagles, hawks and owls.

The Rocher Deboule Range is subject to both coastal and interior weather patterns. The climate in the Hazleton area is semi-arid with annual precipitation of less than 51 centimetres per year; however, there is considerable accumulation of snow at higher elevations during the winter months. The summer months tend to be hot and dry, punctuated by intermittent Pacific storms.

2.4 Claim Data

The Rocher Deboule property is 100% owned by American Manganese Inc. It consists of a contiguous block of claims that covers an area of reverted Crown Grant mineral claims (Figure 2). It consists of 2 tenures that cover an aggregate of 997.76 hectares (2,464.5 acres). The tenures are listed as follows:

Tenure number	Claim Name	Issue Date	Good To Date	Area in hectares
510469		2005/apr/09	2021/jul/12	979.29
856170	Capp	2011/jun/02	2021/jul/12	18.47

3.0 Exploration and Development History

The history of exploration of the area is discussed in considerable detail in a NI 43-101 compliant report entitled "Technical Report on the Rocher Deboule Property, Rocher Deboule Range, Omineca Mining Division, British Columbia" written by A.A. Burgoyne and A. Kikauka for Rocher Deboule Minerals Corp., in December, 2007. The Technical Report describe the known history of the old showings, including the three small past producing mines at Rocher Deboule, Victoria and Highland Boy, and surface and underground sampling programs conducted by Western Cobalt Uranium Mines Limited (Hill, H.K. and Legg, R.E., 1951), Southern Gold Resources Limited (Quin,1987, 1989), and Ameridex Minerals Corp (currently American Manganese Inc which recently carried out exploration of disseminated, bulk tonnage type targets. The principal areas of Interest that American Manganese focused on in their 2011 fieldwork extending an East – West trending belt from Cap (about 1 km west of the contact of the stock) through the Rocher Deboule and Victoria mines and east to the Highland Boy (which host mineralization within the Rocher Stock). 2011 fieldwork focused on areas that lie under the floor of a hanging cirque at Silvertip, approximately mid-way between the Rocher and Highland Boy mines.

3.1 Cap [Minfile 093M 073]

The Cap showing is in Kasalka Group volcanic breccia exposed at 670 metres elevation on the lower slope of the Rocher Deboule range, west of the stock contact. The main zone is reported to consists of east-west fractured andesite flow and breccia cut by numerous veins containing quartz, carbonate, pyrite, chalcopyrite, arsenopyrite and, locally at least, sphalerite. The rocks in a 1.0 X 0.5 km area are moderately clay-altered (phyllic alteration) and strongly pyritized (1-5% disseminated and fracture filling pyrite).

The Cap showing is accessible by means of the Victoria mine access road. The principal vein is exposed in four locations over 80 metres strike length. Sample 76056 is a grab sample from the lower access tunnel. Uphill, at the principal showing there are several trenches and a shaft. Sample 76057, which assayed 587g/t silver, 1.2% copper and 3.8% zinc, is a 1metre chip across the vein in the shaft. Mineralization is also exposed in a rock cut a futher 65m to the northeast. Chip samples 11 DE 211, 212, and 213 describe the vein over 2.5 metres. The high-grade part of the vein (212 -0.5m) assayed 1.8 g/t gold, 407g/t silver, 1.6% copper, 2.11% zinc and 0.28% lead.
Sample 11 DE 833 is from a heavily altered, 8m wide shear in the road bed. The samples are listed in Table 3 and shown in Figure 7. More detailed analyses are given in the appendix.

Soil Surveys have shown geochemical anomalies in the pyritized volcanic breccia around the Capp showing. An extension of the previous soil grid was done using the roadways to help determine the extent of the main anomaly. Soil samples were collected at 50 metres intervals along the Victoria road from the Comeau Road turn off to the 1100m elevation, a distance of 4.2 km, (labelled V 1+150). A similar line of samples were taken along the old tramway tower service road, 400 metres below the Capp tunnel. It extends 2.29 km (labelled T 1+150). Both lines show that, where underlain by volcanic rock, the soils are enriched in silver, zinc and, to a lesser extent, copper. The linear anomaly on the Tower road contained an average of 4 grams per ton silver over 675 metres road length, and on the main access road the anomaly averaged the same amount between 550 metres and 1050 metres elevation. In all, 188 soil samples were collected along the road system and the Capp soil grid. Of these 49 samples were greater than 2 g/t silver, indicating a significant system 1500m east to west and 600m north to south and open to the north and south.

The Yellow Gossan

Visible from the highway, it is a limonitic cliff exposure with a characteristic yellow colour. The zone appears to have a circular shape within the Kasalka Volcanic breccia unit. The rocks are strongly altered and pyritized, which suggests hydrothermal activity. No other sulfides have been found; however, zinc is enriched in some stream sediment samples (11 KM 733 Zn, 6318ppm), and anomalous mercury values have been found in stream sediments around the yellow gossan as well as in rocks in the vicinity.

Geochem; Cap Showings rock, stream sediment.

3.3 Hazelton View

The area discussed here is 3.5 km in length and about 1.2 km wide. It is mapped as sediments and is in contact with the intrusive to the east. The west boundary of the sediments is the Cap fault and the The

Table 3; Geochem; Capp show rock, stream sediment,

Sample	UTM	East	North	Au	Ag	Cu	Pb	Zn	Hg
				ppb	ppb	ppm	ppm	ppm	ppm
cap 201	9 U	583295	6114797	82	18550	540	846	1860	
cap 202	9 U	583283	6114795	128	27500	294	416	3170	
Cap 203	9 U	583346	6114821	9	430	56.6	35.7	42	
Cap 204	9 U	583358	6114833	233	245000	13300	629	1550	
Cap 205	9 U	583431	6114831	1	430	47.6	23.5	31	
Cap 206	9 U	583466	6114848	9	930	65.7	22.5	35	
Cap 207	9 U	582422	6112939	5	100	58	4.5	112	
Cap 208	9 U	582545	6113093	3	160	51.2	7.5	39	
Cap 209	9 U	582580	6113091	8	580	140	310	21	
Cap 210	9 U	582805	6113070	3	180	29.3	7.3	34	
Cap 211	9 U	583354	6114838	703	141000	6250	635	1680	
Cap 212	9 U	583356	6114839	1815	407000	16000	2790	21100	
Cap 213	9 U	583359	6114839	37	10700	293	178.5	1005	
11 KM 732	9 U	583899	6115104	360.3	4710	424.3	36.87	178.5	109
11 KM 734	9 U	582342	6112348	2.2	99	44.09	3.48	16	1054
11 KM 739	9 U	583504	6113865	2	83	30.19	2.8	76.1	30
11 KM 740	9 U	582760	6112428	2.2	94	51.1	7.31	441.1	434
11 KM 742	9 U	583191	6112488	1.1	36	19.63	3.79	60.8	380
11 KM 743	9 U	583177	6112367	0.2	26	14.89	4.69	41.6	298
11 CA 902	9 U	583318	6114253	0.4	66	12.5	25.47	32.2	12
11 CA 940	9 U	582849	6112771	2	60	58.55	2.52	42.5	<5
11 CA 956	9 U	582843	6112790	1.1	51	38.03	6.63	68.6	1438
11 DE 807	9 U	584501	6113638	27.4	1277	303.98	21.41	32	13
11 DE 808	9 U	584500	6113625	10.9	1642	138.39	158.71	795.9	36
11 DE 831	9 U	583594	6114728	26	7171	137.24	190.08	230.4	
11 DE 831 b	9 U	583594	6114728	5	391	17.19	31.58	90	
11 DE 832	9 U	583619	6114714	6.8	2738	60.19	127.42	178.5	
11 DE 833	9 U	583984	6114744	10.3	342	6.29	24.59	11.6	
11EE0100	9 U	583542	6114890	1.7	23	28.34	10.03	12	
11EE0101	9 U	583508	6114893	4.3	305	24.62	33.66	24.5	
76-056	9 U	583178	6114758	226	477000	6890	1260	12900	
76-057	9 U	583305	6114801	149	587000	11900	3290	38800	
11 KM 902 s	9 U	584558	6115111	94.3	1211	150.99	26.4	98.8	109
11 KM 733 s	9 U	582271	6112433	0.6	77	40.16	12.51	6318.4	319
11 KM 738 s	9 U	583193	6113382	0	124	38.27	7.78	211.7	163
11 KM 741 s	9 U	583129	6112592	0.9	154	22.17	9.64	50.1	852
11 CA 950 s	9 U	582008	6113616	3.5	485	26.87	21.37	269.7	158
11 CA 951 s	9 U	583031	6114005	1.7	86	33.21	14.98	121.1	503
11 CA 952 s	9 U	583038	6113557	1	57	21.86	15.43	238.5	135
11 CA 953 s	9 U	582500	6112398	1.3	39	27.79	15.72	118.2	98
11 CA 954 s	9 U	582694	6112452	1.1	56	33.69	9.11	121.5	260

Sediments are hornfelsed and in many places appear to be a thin layer as granodiorite is seen to be occurring as an interfingered mixture of intrusive with sediment.

All of the principal shear veins of the Rocher and Victoria mines follow a general east west pattern. The westward extensions of these veins enter the sediment.

Airborne geophysical targets were identified ("D" and "C") and a soil survey was conducted to evaluate the area covered in overburden.

Geophysics Target D

A total of 223 soil samples were taken approximately 25 metres apart on six, one kilometres long, parallel, lines spaced 100 metres apart. A further 121 samples at 50 metre spacing extended the grid to the south. The results are in the appendix under soils. The data are inconclusive. There were samples containing anomalous amounts of molybdenum and cobalt in the northeast and a fan of silver enriched samples suggestive of migration down-slope from the vicinity of the "D" anomaly on the intrusion contact but no clearly defined indications of underlying mineralization. (Figure 9)

The "C" anomaly, which covers the intersection of two faults that meet on a contact between volcanic and sedimentary rock was only partially covered and remains unexplained. There are scattered point anomalies for other metels down elope from the intrusion contact but none clearly match the known Victoria or Rocher Deboule veins. However, two new veins, enriched in gold, silver and copper have been found by prospecting float (11 KM 786 and 787, and 788 and 789), in the vicinity of the tramway and rail transfer spot. Soils collected towards the southeast suggest there may be other veins to be found further to the southwest (Figure 10). There may be an unidentified silver-rich vein half way between the Rocher Deboule #1 vein and the Great Ohio vein.

Prospecting southwest of the Victoria creek watershed.

There are several copper-bearing showings of a black mat of biotite or hornblende, several inches thick, with magnetite, chalcopyrite and pyrite, usually as blebs in the biotite. The showings are commonly found in what appears to be altered granodiorite, often with carbonate as well as limonite staining, at the contact with the sediments. Garnet is commonly found beside the biotite. The garnet is an alteration product as well as the biotite. This type of mineralization occurs on the east and west sides of the intrusive on the mountain near the contact. (ie Mudflat creek, Limonite Ridge areas).

The old reports speak of the Hazelton View and the Victoria as being the same occurrence, however while prospecting the area a set of railroad tracks protruding from a collapsed tunnel was found. The showing accessed by the tunnel is presumably covered but may be reflected in local debris. Sample 11 DE 814, is a high-grade sample collected near the mouth of the tunnel. It is the most significant indication of mineralization in the Hazelton View area and was found to contain 6 g/t gold, 65 g/t silver, 10.14 % copper, 0.27 % cobalt and 1.0 % arsenic.

Elsewhere in the Hazelton View area, there is a 1m wide shear zone that contains frothy quartz, and there are several areas of rock stained by malachite. Sample DE 820 consists of hornfelsed sediment that contains disseminations of chalcopyrite and assays 9 g/t silver and 0.27 % copper. Sample KM 747 is a biotite, magnetite and chalcopyrite rich rock that contains 2.3 % copper and 17 g/t silver.

Hazelton View and extensions of Victoria and Rocher Veins

Sample #	Au	Ag	Cu	Zn	Mo	Ni	Comments
	ppb	ppb	ppm	ppm	ppm	ppm	
09 DE 314	246.1	11269	15860	104.6	37.09	39.2	
09 DE 315	9690	1748	17.22	42.3	3770	37.3	Re 969, Pd 236
11 DE 814	5914.9	65682	10.14%	148.7	7.72	65.1	Co 2000ppm Copper Hill hygrade
11 DE 816	5.3	233	53.03	44.8	1.35	15.9	1m chip
11 DE 817	517.1	1400	478.43	62	11.7	45	Co 2000
11 DE 818	27.3	3468	6903.19	192.9	8.97	67.1	Float
11 DE 819	19.6	903	263.45	260.7	0.46	64.4	Zn 260, float
11 DE 820	39.3	9088	2700.79	388	1.71	25.7	Zn 380ppm
11 DE 821	4.1	185	223.08	73.1	0.92	6.1	
11 DE 827	80.6	142	114.42	40.7	711.06	102.8	
11 DE 829	279.3	2522	12.68	88.7	5.05	4.4	
11 DE 830	4.8	410	232.8	72	0.93	5.9	
11 DE 871	48.5	524	4462.11	52.2	49.83	12.6	
11 DE 872	139.7	810	29.39	47.2	1.26	4.4	
11 DE 873	265.4	1054	196.9	28	1.5	163.5	Bi 217
11 DE 874	3370.1	955	569.95	21.8	43.98	616	Co 1367, Bi 978, 1m chip
1000 EE08	23400	48800	16700	13	32.5	202	Bi 268
1001 EE08 f	4340	11900	6470	27	40.7	43.7	Float 0.72% Co
1002 EE08	1485	6260	7660	53	10.75	21.2	Co 608
1003 EE08 f	16	0.36	157.5	231	0.84	4.8	Float, garnet, Y 45.2,
1004 EE08	25	0.16	152.5	201	0.81	9.8	Ce 76.1, Y 96.8 Garnet
1005 EE08	7	0.35	161	88	1.41	3.6	
1006 EE08	16	1.13	66.3	3830	124	27.3	Zn 3830
1007 EE08	74	25	11000	122	1.34	16.1	
1008 EE08	28	2.35	2660	75	61.7	5.4	
1009 EE08	32	2.91	2500	90	73.1	5.7	
1010 EE08	3	0.19	172.5	133	2.88	19.8	Ce, Li
105-1201	6.1	415	97.4	63	0.34	10.3	
105-1202	3.1	118	38.08	19.5	0.4	11.7	float
105-1203	1.2	281	115.77	148.4	0.32	3.1	
105-1204	1.2	127	53.42	35.6	2.07	80.8	
105-1205	2.2	719	278.26	116.6	3.27	7.5	

Sample #	Au	Ag	Cu	Zn	Mo	Ni	Comments
	ppb	ppb	ppm	ppm	ppm	ppm	
105-1206	7.7	870	554.13	123.7	7.74	4.3	
105-1296	5.7	136	58.47	85	0.51	16.2	
105-1297	5.3	432	845.6	92.5	2.9	20.2	Chip soil sample 1m of soil
105-1298	1	71	1004.99	61.5	0.9	9.9	
105-1299	6.1	1579	21.71	43	22.64	7.9	
105-1339	1.7	140	38.17	79.5	1.66	13.9	
105-1340	1.7	282	93.04	165.6	0.48	17.1	
105-1341	1.6	106	176.47	134.8	1.75	18.7	garnetization
105-1342	1.5	129	20.78	139.6	0.31	19.4	old trench near tunnel
105-1402	2.1	77	125.74	112.2	0.33	19.9	float
105-1408	0.8	67	27.61	21.6	4.63	17.8	float
105-1409	0.9	157	95.37	15.4	0.38	8.1	float
105-1410	0.2	240	122.02	45.1	2.16	6.2	
11 CA 958	12.5	282	2303.9	35.6	0.17	7.1	float
65E 3350	23	200	21.4	68	2.47	22.6	Soil highlight
66E 3300	1883.3	32016	0	273.9	29.51	31.2	Soil highlight, Hazelton View tunnel
67E 0650	19	241	70.64	80.3	4.95	17.7	Soil highlight
67E 0750	10.8	1171	114.82	103.1	9.52	20.4	Soil highlight
67E 0850	21.9	4060	33.57	21.5	4.81	5.7	Soil highlight
69E 2050	139.7	349	81.31	43	9.95	11.6	Soil highlight
69E 2350	2.8	901	29.23	33.3	5.02	6.9	Soil highlight
11 KM 745	956.2	1323	1322.38	137.2	57.76	38.6	Te 7.5, Co1488
11 KM 746	4	670	191.78	181.6	0.61	10.1	garnet
11 KM 747	280.2	17212	2.30%	192.5	35.2	40.9	float
11 KM 748	146.3	8849	1.42%	102.1	26.59	23.1	
11 KM 752	360.3	5730	4617.3	51.9	87.09	48.8	
11 KM 753	151.3	1791	878.39	91.4	4.84	15.5	
11 KM 754	63.1	861	546.96	234.2	3.6	16.7	float, garnet
11 KM 755	25.5	244	198	48.5	1.33	9.8	Garnet, prospector's hole, float
11 KM 756	10.3	404	192.18	121.9	2.88	3.4	
11 KM 757	34.3	999	1170.23	42.7	327.67	154.4	Mo 327, Float
11 KM 759	284.3	388	143.19	136.2	6.97	26.6	
11 KM 785	595.8	3799	26.73	319.2	87.17	83	Pb 1835 ppm, Co 814ppm, trench
11 KM 786	637.6	22120	136.55	142.9	1.59	7.3	
11 KM 787	240.9	485g	150.66	62.7	13.46	1.2	Pb 3014ppm, Sb 2000ppm trench
11 KM 788	281.4	56747	115.7	151.1	2.47	6.5	trench material
11 KM 789	41792	7297	493.97	27.3	39.97	8.4	Bi, Sb. trench

3.4 Rocher Deboule Mine [Minfile 093M 071]

The Rocher Deboule mine was an underground operation that exploited a series of northeast trending, northwest dipping veins within a 750 metres wide block of intrusive rock a short distance to the east of the intrusion contact. The underground miners exploited narrow, high-grade veins and developed approximately 775 metres of tunnel at the 1200 m level. According to MINFILE, the deposit had a combined "probable and possible" resource of 54,000 tonnes grading 2.7 percent copper, 207.4 g/t silver and 3.5 g/t gold in 1990. The estimate was taken from George Cross Newsletter, #228, published on 26th November, 1990. It is an historic estimate presented for interest only. It is not NI 43101 compliant.

The current program explored for extensions and additional structures of known veins. It focused on the potential for broader zones of lower-grade mineralization that might provide an opportunity for open-cut development. There was less emphasis on resampling the older, known veins. There are five main shear-veins in the Rocher Mine, which are numbered from 1 to 5; the No. 2 and 4 veins being the most important. They occur within parallel structures which generally strike 075 degrees and dip 35 to 65 degrees north. The veins are 0.5 to 2.4-metres wide and locally contain gold, silver, copper, cobalt, molybdenite and tungsten. There is little alteration of host rock associated with the mineralization and, although geochemical and geophysical work conducted prior to and in 1987 were successful in identifying the surface expression of the main veins and also of four other possible veins, they were found to be hard to trace. In 2011, the exploration program focused on the area surrounding the Rocher Deboule mine. New veins were found and pockets of alteration were noted and sampled. Fourteen samples were collected in the general vicinity of the old mine (Figure 11). Selected results are shown in Table 6. Complete analyses are shown in an appendix.

Although the veins are tight and generally display little wall-rock alteration, there is commonly some alteration and also rusty granodiorite found adjacent to a vein. The Rocher Deboule #2 vein is a case in point. It is exposed and was sampled in a small creek very close to the original 1912 tunnel. Further along the vein (on the east side) the vein is buried by debris; however, there are several patches of rusty granodiorite that contains malachite and chalcopyrite. This patch, which was approximately 3m x 4m in exposed surface area is one of four in the area of the attached photograph. These were not systematically sampled as only the one sample, 1019, was taken. The values from the 1019 sample are strong and indicate further evaluation of all rusty spots should be conducted. Sample 1018 EE 08 (1.5 g/t gold, 138 g/t silver and 15.75 percent copper) is a chip sample across the Rocher Deboule #2 vein and sample 1019 EE 08, (0.882 g/t gold, 19.3 g/t silver and 6.0 percent copper) is a panel sample across a pod above the vein.

Large rusty spots were also found in granodiorite alongside the Rocher #4 vein. However, there is little evidence of mineralization away from the obvious veins. Ten samples were taken to evaluate the granodiorite in the vicinity of the old Rocher workings. Generally these samples were not anomalous. However, one sample (Sample 105-1315) containing quartz stringers and traces of sericite and malachite was found to contain 2.3 g/t gold and 0.1 percent Copper. The sample was collected approximately 20m above the #4 vein. The potential for stockwork mineralization to occur beyond the veins was explored to a greater extent some 200 to 600 metres to the east of the #4 vein and is discussed as the Silvertip Basin stockwork.

Several other areas were also examined; including anomalous zones described by Quinn (1987) on the west side of Rocher Deboule mine, along the Tramway ridge and along the contact between the granodiorite and the sediment. Four trenches and one tunnel were located along the ridge as well as what is probably the Hazelton View mine. These showings mark structures that are probably extensions of the Rocher Deboule veins. The old trenches require cleaning out as the material sampled was float rock. The samples in the attached table show that anomalous gold values in the trenches range from 0.24 g/t to 41.8 g/t gold. Similarly, anomalous silver values range from 3.8 g/t to 485 g/t silver. Galena was found in Samples 11 KM 785 & 787; however, there was no chalcopyrite. Fourteen samples were collected in the general vicinity of the old mine.
(Figure 11) and the results are shown in Table 5 and Appendix, Rock Geochem.

Rocher Mine Area

Table 5; Rocher Mine Area

Sample	Au ppb	Ag ppb	Cu	Pb	Comments
08 KM 2002	2170	26000	41600	17.9	Rocher #2 vein,
08 EE 1018	1505	138000	157500	279	Rocher#2 vein in creek, 070/48W, chip
08 EE 1019	882	19300	61700	20.2	Pod 10ft X 12ft above vein #2 , panel sample
105-1314	115.4	1204	319.11	4.94	Rocher #4 alteration.
105-1315	2335.1	2147	1098.59	6.39	Rocher #4 Granite with quartz stringers,
105-1339	1.7	140	38.17	6.47	quartz veinlet possible rocher #4 ext
105-1340	1.7	282	93.04	2.94	biotite infill crystals. possible rocher #4 ext
105-1341	1.6	106	176.47	6.08	o/c, garnetization, possible rocher #4 ext
105-1342	1.5	129	20.78	3.01	old trench near tunnel, possible rocher #4 ext
11 KM 785	595.8	3799	26.73	1835.32	qtz, arsenopyrite, biotite, tram area trench
11 KM 786	637.6	22120	136.55	17.87	crystaline qtz in dyke, breccia? tram area trench
11 KM 787	240.9	485g	150.66	3014.57	biotite with quartz stringers, tram area trench
11 KM 788	281.4	56747	115.7	42.94	trench material, tram area trench
11 KM 789	41792	7297	493.97	31.56	trench west end of #2 Rocher Mine. Tram

3.5 Victoria Mine [Minfile 093M 072]

The Victoria Mine is reported to consist of at least three, approximately east – west oriented veins (Victoria #1 to Victoria #3); however, prospecting suggests there may be a well-mineralized, parallel, unexplored vein, Victoria #0, a short distance to the north and a mineralized shear, Victoria #4, further south (Figure 12). When plotted on a map, the adits and trenches of the Victoria #1 vein demonstrate the strike and dip as it is exposed across the topography (downhill). This pattern is duplicated in the mapping of the #2 vein. The Victoria #4 can also be seen on surface. It is known that the veins are sub parallel and form strong linear features throughout the Rocher Dehoule and Victoria mine areas. Other mineralized rock samples appeared to follow the same pattern and may reflect similar veins.

Victoria #0 is poorly exposed but strike compatible sections were observed from Victoria Peak. Samples 105-1311, 1312, 1313 and 105-1412 appear to project towards and may reflect a structure that links with the newly discovered Victoria #0 vein. Sample 105-1412, appears to lead downhill to the northwest through Samples 105-1334 and 105-1331. The same structure may also extend through Samples KM 749 and DE 824 to EE 1012. Together, the above mix of outcrop and float suggests the presence of hornblende-rich stringer system of variable width but locally up to two metres wide, which contains typical, Victoria area mineralization and an appreciable amount of gold and silver.

The Victoria #1, Victoria #2 and Victoria #3 veins were prospected uphill to the southeast towards the height of land and beyond. Numerous showings were found prospecting from northeast to southwest along the ridge top. These showings are thought to reflect the numbered veins. In all, a total of 58 rock samples (grab and chip) are listed in Table 7, which shows the content of gold and silver in parts per billion, and copper, cobalt, molybdenum, bismuth and nickel in parts per million.

Victoria #2 may extend into the metasediment immediately beyond the granodiorite intrusion contact and crop out as a large area of quartz, sericite and carbonate alteration sampled by Sample DE 323, which assayed 0.5 g/t gold, 18 g/t silver and 0.26 percent Cu over 8 metres. Similarly, the Victoria #3 vein may show as an 8 metres wide altered shear zone containing chlorite, fist-sized pods of biotite and quartz, hornblende and sulphide exposed in the vicinity of DE 325. Several other samples (DE 312, 313 and 315) also appear to contain a trace of gold.

The Victoria #1 vein, as defined by Sample 105-1215 (0.484 g/t gold, 19.7 g/t silver and 1.33 percent copper) projects towards some in-filled trenches near the summit: poorly mineralized nearby samples include 105-1306 and 105-1411. The Victoria #2 vein was identified as mineralized clay gouge in altered, hornblende, quartz, sericite-rich granodiorite. Samples 105-1303, 1304, 1307, 1308 and 1407 show that it is poorly mineralized at this elevation; however, if it is the same structure as found at 09-DE 323 (0.26% Cu, 0.55 g/t gold and 17.8 g/t silver) and at 11 KM 751 (Au 10.8 g/t) it may be mineralized elsewhere along its length. Sample 105-1301 and 1302 define a mineralized fault that appears to project into the Victoria #2 vein. Victoria #3 is probably marked by a well-defined notch in the ridge-top. One sample 105-1300 was found to be barren; however, other samples collected in the same general area, 11 DE 873, DE 874 and to a lesser extent 105-1410 are mineralized. The structure appears to project towards 11 KM 757 and 09 DE 315, which are float samples found along a drill road.

Several rock samples, 11 DE 871, 872, 105-1297, 1298 and 1299 were collected in an area of carbonate veining and strong limonite staining in granodiorite that defines a shear zone that strikes 250 degrees, is vertical and projects towards the Hazelton View. It may also reflect the presence of another structure (Victoria #4) that projects to the west and links to an area of rusty sediment high up on the west side of the Victoria basin. This is referred to as the "50m circle".

The contact between the granodiorite and sediment in the Victoria area is poorly defined. Some of the sediments west of the contact are limonite stained and appear uninteresting; however they locally contain stringer veinlets of arsenopyrite and pyrite and have been found to carry gold values greater than 1 g/t (e.g. samples 09 DE 312, 2.8 g/t gold; 09 DE 315. 9.6 g/t gold). The Victoria mine is approached by a switchback trail that the company is maintaining. While clearing debris, it located a cliff face of altered, rusty sediment that contains disseminated pyrite and chalcopyrite. Sample DE 826, from an intensely limonitic pod assayed 2.6 g/t gold, 20.5 g/t silver and 2.58 % copper. Below the drill road, at 1440m elevation, there an area of rusty limonitic sediment near the creek that contains disseminated chalcopyrite and arsenopyrite. Sample 11 KM 752 assayed 0.36 g/t gold, 5.7 g/t silver and 0.46% copper.

Victoria Area Geochem

Sample	Au ppb	Ag ppb	Cu	Co	Comments
08 KM 2001	67300	2720	208	20500	float from the Victoria Mine.
09DE310	18820	899	1.69	4480	float 19 g/t Au
09DE312	2829	1723	2508.11	3130	grab veinlet, Co As
09DE313	36.8	353	531.3	605.2	grab, As velblet, close to 312, 200/vert.
09DE315	9690	1746	17.22	52.7	float, along old drill rd, As in hornblende.
09DE316	87899	5434	58.8	11330	1m chip. quartz, chlorite, hornblende, 130° 85°E
09DE317	161650	12712	11.48	25800	same place as 316 hygrade zone 3 " wide.
09DE323	554.2	17858	2608.11	26.4	8m shear, 248/80N, sericite, qtz,ca,bleached seds.
09DE324	150.6	225	55.13	17.7	Lot 619 Rosa, black silicified sed with garnet.
09DE325	151.7	346	83.46	27.1	float, qtz, 8m shear, chlorite, Hornblende stockwork
09DE326	22.8	542	163.58	14.5	garnet in biotitte, altered seds, Shear?
08 EE 1004	25	0.16	152.5	26.3	Garnet in intrusive contact.
08 EE 1005	7	0.36	161	8.8	contact, intrusive at sediment
08 EE 1006	16	1.13	66.3	26.6	Zn 3830
08 EE 1007	74	25	11000	71	Cu 1.1
08 EE 1008	28	2.35	2660	26.9	o/c, malachite, qtz vein with pyrite.
08 EE 1009	32	2.91	2500	9.4	same as 1008. grab Cu .25%, 040/80W
08 EE 1010	3	0.19	172.5	13.8	Ce, Li
08 EE 1011	3	0.17	77.5	6.9	granite, bands of hornblende.
08 EE 1012	206000	27900	20.1	22400	Mo 2250, U 379, Ni 7320 Float, hb, euretherite
08 EE 1013	47	0.31	58.3	16.8	Ce 29, Sr 562, o/c, small bleck veins
105-1214	2	101	2331.65	33.8	Cu .2, oc, qtz, calcite, malachite
105-1215	247.8	19744	1.33%	9.4	10% mag, fsp porphyry, footwall 10ft from tunnel.
105-1216	1.4	280	129.24	2.4	oc, hornblende at tunnel
105-1292	2.4	117	12.41	2.5	o/c fractured granite with quartz, hornblende
105-1293	2.3	56	25.51	10.4	tunnel, 1m diameter and 1.5m deep. Quartz crystal
105-1294	0.2	50	12.84	5.1	OC, fractured granite, limonite,shear? Rep sample
105-1295	6159.8	499	11.64	1322.8	granite, quartz, hornblende, tetrahedrite? Electrum?
105-1296	5.7	136	58.47	15.2	OC, blue 'mafic' granodiorite, SW of Victoria
105-1297	5.3	432	845.6	37.7	soil, in saddle fault gouge near main Victoria site.
105-1298	1	71	1004.99	12.5	green blue granodiorite, malachite, calcite. 084/60
105-1299	6.1	1579	21.71	7.5	calcite veins, parallel, five/ 3m, 340/88E. pyrite, cpy
105-1300	0.2	60	27.2	7.5	parallel faulting with hb Rep sample 270/46N,
105-1301	1.5	403	335.84	18.9	granite, diss cpy, magnetite. connected to 105130
105-1302	101.6	1821	559.91	1113.4	granite, diss arsenopyrite– cpy, pyrite.
105-1303	1.5	109	17.98	10.5	OC, fault 300/60SW calcite, limonite. target for drill
105-1304	3.2	149	36.31	16.2	soil of fault gouge red brn sandy clay
105-1305	1	129	46.18	7.5	'the flag pole' 1996m right above No.2 vein Victoria
105-1306	0.8	75	23.93	8.4	green alteration, micacious looking flakey mineral.
105-1307	0.2	28	2.72	2.7	no.2 vein, 'mica like' seracite? 270/42N calcite
105-1308	0.2	12	2.14	2.7	OC, hornblende blob with quartz very limonite.
105-1309	0.5	97	24.5	3.8	OC, parallel no.1 vic vein,quartz, hornblende, calcite

Sample	Au ppb	Ag ppb	Cu	Co	Comments
105-1310	0.5	89	17.51	3.7	OC, big fault no.1 vic 40/60SW granite
105-1311	0.9	136	6.49	5.7	OC, calcite, qtz, limonite contact zone,
105-1312	0.2	126	19.68	2.1	OC, volcanic, carbonate stains,
105-1313	0.2	209	4.25	1	quartz vein carbonate and limonite 130/50NE
105-1331	12.3	63	10.65	3.8	o/c, hornblende 1cm wide, 8 over 2m 100/56N
105-1332	1.9	111	33.38	11.1	weird outcrop or large float?,
105-1333	150.4	195	5.92	113.2	U 1842, o/c, 340/60 SW, fault ,quartz, hornblende
105-1334	2034.7	418	0.83	128.1	hb, quartz, calcite. 290/42 N. 1 ft wide, cobalt
105-1335	1.1	106	37.06	7.6	above 1012, contact, qtz, bleached granite, dyke?
105-1336	3.3	571	128.01	12.2	o/c, volcanic, rusty stringer veins. 240/56 NW
105-1337	1.6	75	17.75	11.5	o/c volcanic, quartz, 240/68SE, 360/70W, 120/45NE
105-1338	34	56	7.67	1.3	Hb stringers in granite, qtz. creek wall.
105-1403	88.5	6782	1815.62	27.1	float, grano with diss cpy and possibly As
105-1404	6	5834	2679.86	9.7	float, Hb veins 2mm, cpy fracture fills
105-1405	7	2294	928.69	2.4	dyke, 2ft, diss pyr in grano, trace cpy 340/58w
105-1406	31.3	7161	3877.4	2.2	cpy in grano, close to shear
105-1407	1.7	54	11.94	7.3	o/c, Hornblende, As
105-1408	0.8	67	27.61	5.1	float, Hb qtz veins purple and green qtz, rusty.
105-1409	0.9	157	95.37	6	float bleached grano, cpy, pyr
105-1410	0.2	240	122.02	2.1	o/c, diss cpy, 300/42E
105-1411	0.4	16	11.39	7.3	o/c, grano, magnetic,320/54E, 035/70E
105-1412	37.7	2142	1863.15	4.5	o/c, bleached grano, minor cpy, 215/14E, 266/66W,
11 DE 822	8682.1	1520	14.62	1192.5	searching for 1012 Hornblende eurytherite,
11 DE 823	6.7	476	512.18	59.2	diss pyr, cpy silicifield, Dyke? pegmetic feldspars
11 DE 824	3294.2	1302	2.04	831.9	Mo 0.79%, hornblende, nickel–arsenio and cobalt
11 DE 825	9.7	549	35.99	8	Tunnel NV Victoria #1, chlorite, shear zone mud 24"
11 DE 826	2558.6	20501	2.58%	34.6	pods 1m cubed, alteration, disseminated pyr, cpy
11 DE 827	80.6	142	114.42	382	Mo 711, Victoria drill road, Hornblende
11 DE 871	48.5	524	4462.11	9.8	Cu .44%, shear in granodiorite 250/vert.
11 DE 872	139.7	810	29.39	8.9	fsp porphyry pastel green blue with pyrite dyke
11 DE 873	265.4	1054	196.9	118	lighter green hornblende Vic style,
11 DE 874	3370.1	955	569.95	1367	1m chip, hornblende, As
11 KM 749	10277.8	2411	154.16	0.37%	Mo 827, Arsenopyrite >1%, cobalt, in hornblende
11 KM 750	406.9	4562	6712.56	38.4	float,chalcopyrite above tunnel
11 KM 751	10808	770	11.43	2.18%	Mo 329, As 1%, float, Victoria mine high grade ore,
11 KM 752	360.3	5730	4617.3	367	arsenpyrite (triangles) diss pyrite
11 KM 756	10.3	404	192.18	5.5	decomposed rock, o/c, cpy,pyr, biotite, garnet
11 KM 757	34.3	999	1170.23	61	cpy, pyr massive? Float

3.6 Highland Boy [Minfile 093M 070]

American Manganese Inc. diamond drilled six holes in the upper vein at Highland Boy and prospected the area around the upper adit in 2007. The drill results were disappointing; however, recent re-examination of the core provides considerable insight into the workings of the hydrothermal system responsible for the mineralization in the surrounding rocks. Careful examination of the core shows that fresh, granodiorite has been fractured, and that the cracks are filled with veins of quartz, carbonate and magnetite, with or without chalcopyrite and other sulphides. It also shows that the veins have well developed bleached envelopes that clearly formed through the destruction of magnetite and dark "mafic" minerals, such as hornblende in the country rock granodiorite. The rocks show clear indication of remobilization of iron and other metals out of the granodiorite into a well-defined vein system.

The Highland Boy mine consists of two principal, east to west trending, veins and several other parallel structures, such as the "60 metre fault" that can be readily traced to the west into the Silvertip area and beyond towards and into the Rocher Deboule mine. The vein system appears to be cut-off by the north-south oriented Chicago fault, a short distance east of the Highland Boy mine and either by the north-south Capp fault or the intrusion contact in the Rocher Deboule mine area to the west. It has been traced for approximately 3.5 kilometres.

The Highland Boy veins are exposed on a south-facing slope below a rugged east-west oriented mountainous ridge informally known as "The Teeth". The lower vein can be traced as a colour anomaly across a dangerous slope into the Silvertip area. It has been sampled at several localities including 105-1276, 1277, and KM 797, 798. Exploration in the upper vein area has located a vein with a more northwesterly trend than expected. However, it is clearly part of the main vein system. Sample 105-1244, 1248 and 1249 are part of a predominantly magnetite based composite vein system 3 to 4 metres wide. However, sample 1249 comes from a magnetite stringer zone that also contains quartz, hornblende, chalcopyrite and hematite.

Prospecting of "The Teeth" and the rocks around a small pot-hole lake at the head of the Silvertip cirque, shows that the granodiorite is strongly fractured and that many, if not all the major fractures contain quartz veins with hornblende and magnetite, with or without biotite and calcite (and or chalcopyrite or traces of malachite) bordered by more or less bleached, altered granodiorite. Samples 1221 to 1232 are from twelve different parallel veins along the cliff face. They are grab samples of mineralized vein material from veins up to 1.0 metres wide and/or mineralized pods collected over different widths; however, they show consistent enrichment in gold, silver, copper and molybdenum. The samples include several from the "60 metres zone", which is parallel to and approximately 250 metres north of the Highland Boy upper adit. It is a particularly well defined, broad (60 metres) east – west trending zone of altered granodiorite riddled with micro-veins of magnetite with or without chalcopyrite. Although the general trend of the major veins is east-west, there are numerous interconnecting structures, such as those that separate individual "Teeth" in "The Teeth zone". The Happy Jack showing, north of the Highland Boy, is a 2 metres wide calcite-chalcopyrite lens in a coarse-grained quartz, feldspar, calcite, hornblende pegmatite zone in the granodiorite that strikes north twenty degrees east. Samples 07 HB 107, HB 111 and HB 112 show that it is rich in copper, and contains significant traces of gold and silver.

Highland Boy Geochem

Highland Boy							
Sample #	Au	Ag	Cu	Zn	Mo	Ni	Notes
	ppb	ppb	ppm	ppm	ppm	ppm	
07 HB101	2260	20100	10000	216	132	39	tunnel, Upper vein
07 HB102	285	4400	6636	27	41	71	
07 HB107	10	2800	6059	97	3	27	1.5m chip, Happy Jack
07 HB108	405	5800	10000	136	155	101	W 100, Upper vein
07 HB109	80	800	1161	571	104	100	
07 HB110	25	1100	5009	436	179	42	Upper vein
07 HB111	180	2100	10000	31	16	151	1m chip Happy Jack
07 HB112	2310	26400	10000	24	25	144	Happy Jack
07 HB113	80	600	277	48	23	24	W 100
105-1221	4	77	91.21	25.1	5.21	75.1	60m shear area
105-1222	0.4	74	135.67	15.1	1.36	6.9	60m shear area
105-1223	0.3	58	6.05	9.8	80.65	13.5	60m shear area
105-1224	2	102	79.68	42.5	75.71	26.5	60m shear area
105-1225	484.2	2445	5122.11	15.2	72.47	34.5	BIG VEIN
105-1226	32734.5	23453	9.68%	15.7	171.73	168.3	Big Vein
105-1228	19.2	197	164.61	56.3	12.3	12.6	60m shear area
105-1229	27	263	238.41	14.7	64.28	105.7	60m shear area
105-1230	4.8	143	70.74	29.8	24.59	16.9	Overlooking highland boy.
105-1231	214.7	3495	2.25%	97.6	1.56	30.9	60m shear area, north
105-1232	1213.9	2870	1.77%	37.4	13.79	56.2	60m shear area, north

3.7 Silvertip Stockwork

The small cirque at the head of Silvertip Creek is locally known as the Silvertip basin. It is above 1700 metres elevation, surrounded by rugged mountains on three sides and to a large extent floored in coarse, blocky talus. It is midway between the Rocher Deboule and Highland Boy mines, west of the Delta Tunnel, on the immediate easterly projection of the Rocher Deboule #4 vein, which passes through the stockwork zone. The stockwork has limited exposure as small, isolated areas of altered and mineralized outcrop along the creek, amongst the talus and on the immediate walls of the cirque. The full extent of the stockwork zone has yet to be delineated.

The granodiorite underlying the stockwork zone is broken and altered and lighter in colour than found on the overlying mountain slopes. It is more or less bleached to a whitish colour through the removal of mefic minerals and it has develeped a light tan colour.

Locally, the granodiorite is associated with pegmatite. Altered and bleached granodiorite is often intimately associated with coarse hornblende-feldspar-quartz pegmatite that contains magnetite, chalcopyrite, especially in the "Area E". A similar pegmatite area at the "Shower Show" has alteration but it is otherwise un-mineralized.

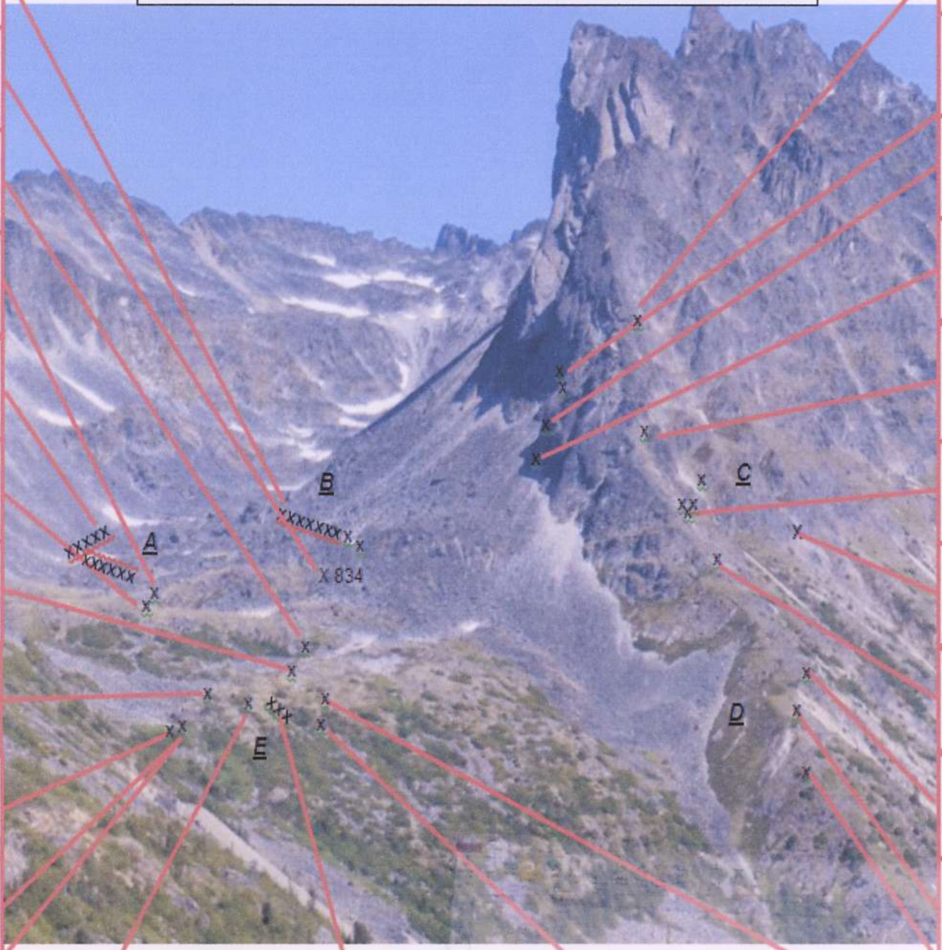
In the stockwork zone, the altered granodiorite commonly contains limonitic hairline fractures and it locally contains veins and pods of quartz that are either weakly or strongly correlated with pegmatite, malachite and more rarely, chalcopyrite. Numerous showings were located in-amongst the talus; however, they tend to cluster and five locations ("A" to "E") are described separately.

In all, a total of 224 rock samples collected from 180 sites in an area of approximately 2,000 metres by 1,000 metres were submitted for analysis for 53 elements. Of these, 119 were found to be anomalous in at least one metal. However, most contained a combination of gold > 0.5 g/t, silver > 1.5 g/t and > 0.1% copper.

Highlights of Silvertip Stockwork

Stockwork Zone *** Highlights ***

Refer to notes for details A to E
Silvertip Basin



11 DE 853
Au 7g, Ag 9.4g, Cu .34%, altered, fractures contain cpy, mag,

11 DE 834
Au.27g Ag11g Cu.19%, grab

11 DE 854
Au.5g, Ag 4.6g Cu.5%, Qtz, heavy bleaching

11 DE 892
Ag 5.1g Cu 0.2%,

11 DE 890
Ag 7g Cu.54%, Chip 16" of hygrade.

11 DE 844-849
Shower Show

11 DE 858
Ag 1.7g Cu 0.1%, Rocher #4 extension

11 DE 870
Au >100g, Ag 10.7g, Cu 0.03%, 18" chip.

11 DE 838
Au1.3g Ag32g Cu>1%, 9 veinlets in 2 metres

11 DE 867
Ag 4.3g, Cu .25%, 1m chip across 866

11 DE 866
Au3.7g, Ag41g Cu>1%, Grab of pod.

11 DE 839
Au0.77g Ag8.2g Cu.7%
Stringer veinlets 4-8"

11 DE 860-863
Au.25g Ag3.2g Cu.33%
Avg of 4m chips

11 DE 865
Au.3g, Ag 4g, Cu.08%, vein 12"

11 DE 894, 895
1.5 metres magnetite
Fe 21%

105-1274
Ag 2.3g, Cu >1, La 1215 vein in stockwork.

11 KM 797,798 **
Ag 2.2g, Cu .43%, bleached, diss cpy

105-1277 **
Cu 0.18%, Footwall, altered.

1015-1276
Au .2g, Ag 6.5g, Cu .52%, stockwork

11 KM 795
Au .356g, Ag 8.5g, Cu .557%, disseminated cpy, stockwork show

11 KM 793
Au.72g Ag30g Cu2.6%, Qtz cpy, vein stockwork

105-1321
Au.7g, Ag3g Cu0.65%, Altered, diss cpy.

1051319
Ag 1.4g Cu 0.14%, 1418

11 DE 897-899
Avg Ag 4.6g, Cu 0.4%
Over 3m

11 DE 840
Au 6g, Ag 14g Cu>1%, vein 16" of hygrade.

1051281
Ag 1.1g Cu 0.16%, grab

“Area A”

Area A is the furthest north in the stockwork, located 75 metres northeast of camp which is the Shower show, described above (Figure 16). It covers an area of 250 x 50 metres of mixed outcrop, large fragile pieces of float that are believed to be locally derived and talus. Table 8 shows the assay results obtained from rock samples derived from either outcrop or residual float. The data show significant enrichment in gold, silver and copper. The mineralization in this area occurs in altered granodiorite and in the most northerly areas around the pond it is quartz with malachite staining. Malachite occurs in the granodiorite as fracture fills, and disseminations. Pegmatite mineralization occurs as hornblende quartz and this may also contain chalcopyrite.

Silvertip Creek Area “A``

Sample	Area		Au ppb	Ag ppb	Cu ppm	comments
11 KM 775	A	float	25.3	341	725.49	qtz with malachite
11 DE 845	A	chip 2m	1.3	515	34.61	Shower Show, hornblende quartz
11 DE 849	A	chip 1 m	0.2	62	7.22	Shower Show, hornblende quartz
11 DE 851	A	grab	354.2	8426	904.78	fractured in multiple directions.
11 DE 852	A	grab	73.6	4713	1782.8	malachite in qtz
11 DE 857	A	grab	2	54	7.3	La 883, Ce 1123,
11 DE 884	A	float	46.2	4711	3094.53	grano frac-filled diss. Malachite cpy, mag.
11 DE 885	A	float	11	811	2566.59	mag, cpy, and black dots
11 DE 886	A	grab	3.7	249	2403.17	malachite staining in altered grano
11 DE 887	A	grab	1416.1	86604	3.19%	cpy disseminated in grano.
11 DE 888	A	grab	81	2882	1017.01	bleached grano, malachite stained
11 DE 889	A	grab	17.8	403	548.89	grano with hb stringers, cpy
11 DE 890	A	chip 16"	123.6	7082	5414.64	altered bleached grano, Cpy diss, mag.
11 DE 891	A	chip 12"	166.2	2846	1055.48	4-12” qtz vein, malachite.
11 DE 892	A	grab	171.8	5104	1994.26	malachite.

“Silvertip Creek Area B”

South of the 887 area 75m, is the next group in the series of altered granodiorite zones containing light limonite and malachite. This location is on the south side of the lower pond that is the next bench above camp 100m. The coarse dimension of the sample area is 140m x 50m. There are no obvious mineral showings, it appears to be dead ground. A few hornblende stringer veins and light limonite on fractures. Sample 853, gold at 7 grams with 0.34% Cu, is a hairline fracture in a series of micro fractures.

Silvertip Creek Area “B``

Sample	Area		Au ppb	Ag ppb	Cu ppm	comments
11 DE 834	B	grab	275.4	11164	1920.24	malachite Pict.
11 DE 853	B	grab	7088.8	9426	3425.57	altered, fractures contain cpy, mag,
11 DE 856	B	grab	11.3	517	60.07	carbonate stringers. Possible 350°
11 DE 875	B	chip 1 m	1224.2	4133	1984.03	grano fractures
11 DE 876	B	grab	14.3	152	167.19	Fe 20%, biotite pods in grano. magnetite
11 DE 877	B	float	1429.2	25432	1.17%	apalite? Rusty rotted grano, cpy
11 DE 878	B	float	33.8	2016	1571.87	qtz vein with cpy
11 DE 879	B	chip 0.3 m	317.2	9314	8303.16	bleached grano? Cpy 12” wide
11 DE 880	B	grab	58.6	1230	1448.47	Bleached grano, hb, cpy, limonite
11 DE 881	B	grab	31.9	1184	2055.58	qtz, bleached grano fracture fills of cpy
11 DE 882	B	chip 1 m	156.6	1634	4362.71	connected with 883.
11 DE 883	B	chip 1 m	799.3	11880	2354.69	massive mag, cpy and 2” cube of Moly

“Silvertip Creek Area C”

Area C is a further 125 metres to the south. It covers an area 200 metres by 120 meters on the western end and lower slopes of “The Teeth”. It starts near the ridge and extends south towards Juniper Creek. The geology appears to be more varied than under the valley floor. The rocks consist of unaltered and altered granodiorite along with dykes and lenses of feldspar porphyry. Mineralization is erratic and unevenly distributed but locally contains “high-grade” material. 17 of 31 samples show significant enrichment in gold and silver and, in particular copper. It is possible that one or other of the “higher-grade” veins encountered reflects the eastern extension of the Rocher Deboule #4 vein.

Area C

Sample	Area		Au ppb	Ag ppb	Cu ppm	comments
105-1260	C	float	62.1	2116	2059.84	float, very large 6m x 4m x 3m malachite
105-1261	C	chip 1.5m	7997.6	45821	1.51%	vein over tunnel, W 0.05%
105-1262	C	grab	33	1974	6085.88	malachite in a quartz vein 10cm wide
105-1263	C	grab	17	275	956.77	quartz, green tinge.magnetite calcite quartz
105-1264	C	grab	38.3	1192	1473.35	altered small vein.magnetite and malachite
105-1265	C	grab	176.6	3492	2024.26	float boulder 11m x 3m x 2m. 3 veins
105-1266	C	grab	41	1488	2325.44	fresh granite unweathered with chalcopyrite
105-1267	C	grab	186.1	5327	1.57%	chalcopy magnetite calcite
105-1274	C	grab	46.7	2370	7.64%	La 1215, vein going cross ways
105-1275	C	grab	1.3	37	184.37	quartz vein in the stock work magnetite
105-1276	C	grab	239.7	6560	5252.57	hanging wall pod of chalcopyrite, bleached
105-1318	C	grab	0.6	66	86.48	alteration or contact with a granite
105-1319	C	grab	79	1422	1498.04	cpy, magnetite, pyrite.
105-1320	C	chip 1 m	2.8	129	28.43	hb vein 1m wide. meets 11KM 1418.
105-1321	C	grab	659.4	13190	6523.91	diss pyrite in bleached granite.
105-1322	C	grab	1.5	113	37.97	contact of bleached with regular granite
105-1324	C	chip 1 m	3.8	115	30.01	hb, qtz and magnetite, vein in granite.
105-1325	C	grab	58.2	1726	2764.91	Intersect of mag highs chalcopyrite,magnetite
105-1417	C	grab	0.2	35	20.1	o/c, grano, magnetitte, epidote, kspar alteration
105-1418	C	grab	96.6	1069	767.54	, o/c, 1.5 - 2m qtz, hb, mag, cpy, 15m e of 1320,
105-1419	C	chip 0.6 m	13.1	110	77.64	o/c, hb, qtz,magnetitte, calcite, 0.6m wide
105-1420	C	chip 0.75 m	16	184	83.14	Fe 10%, o/c, hb, qtz, magnetitte, 0.75m
105-1421	C	grab	568.8	9964	1.29%	o/c, blue volcanic, magnetitte, cpy
11 KM 784	C	grab	7670.4	19967	9365.21	Au 7.67g Ag 19.967g, Cu .936%
11 KM 793	C	grab	721.9	30498	2.62%	o/c, 20mx15m bleached grano, grab of Qtz, cpy,
11 KM 794	C	grab	52.8	1781	2386.15	diss cpy, stockwork show
11 KM 795	C	grab	356.2	8472	5565.27	disseminated cpy, stockwork show
11 KM 796	C	chip 0.6 m	8.2	627	281.54	8" vein, magnetite, cpy, pyrite, stockwork show
11 KM 797	C	grab	103.1	2259	4343.36	Ag 2.2g, Cu .43%, bleached grano with diss cpy
11 KM 798	C	grab	44.4	1568	2103.96	magnetitte, hemetitte, quartz, cpy, carbonate stain
11 DE 835	C	grab	1.7	101	1411.97	qtz,malachite

"Silvertip Area D"

Area D is at 1670 m elevation on the lower slopes of "The Teeth".
A 16 inch wide vein at the contact of granodiorite and andesitic feldspar porphyry was discovered (DE 840 Au 6g/t, Ag 14g/t, Cu 1.32%). The mineralization was not restricted to the vein. A 1m chip of the fractures in the adjacent granodiorite (footwall) shows 0.95% copper. The hanging wall, andesitic feldspar porphyry is mineralized with disseminated pyrite and chalcopyrite, 1m chip of 500 ppm copper. There are several pieces of hygrade float rock and a strong magnetometer anomaly requiring follow up. East of the 840 vein 75 meters, the mag anomaly led to a limonitic feldspar porphyry

with malachite, pyrite and chalcopyrite. The average of 4.6 g/t Ag and 0.4% Cu is over 3 meters. The area below these showings was not investigated.

Silvertip Creek Area D

Sample	Area		Au ppb	Ag ppb	Cu ppm	comments
105-1277	D	grab o/c	102.2	913	1859.75	malachite, magnetite, hematite in bleached granite.
105-1278	D	grab o/c	1.5	87	48.19	OC, multi fractured granodiorite with 1-2% magnetite.
105-1279	D	grab	1.9	122	79.93	OC, rusty spots on granite chloritized
105-1280	D	grab	43.9	789	1076.44	small show #2A extension? Lots of fractures
105-1281	D	grab	30.4	1146	1622.22	OC, bleached granite with malachite 2-4%
105-1282	D	grab	2.8	123	90.41	OC, same vein as #281 Hb qtz, diss cpy, glassy qtz.
105-1286	D	grab	1	43	7.82	
105-1287	D	grab	193.9	4993	2663.51	quartz vein, malachite. shear zone, bleached
105-1288	D	grab	0.5	31	2.73	rusty walls of shear zone very rotten granite.
105-1289	D	float	5.3	125	23.7	float, white bleached granite, pyrite.
105-1290	D	grab	0.9	101	6.1	blue green andesite dike with apalite bands,
105-1291	D	grab	31.9	319	9172.63	malachite in a quartz hornblende vein through granite.
11 DE 840	D	chip 16"	6013.6	14028	1.32%	vein 16" of hygrade. 310 / 75 s.
11 DE 841	D	grab	42.8	632	217.25	Sr 283,feldspar porphyry contact granite, Epidote.
11 DE 842	D	grab	108.6	3586	9517.44	La 255, Ce 381, fracture fills 1m into granite
11 DE 843	D	chip 0.3	92.4	1740	1777.25	La 145, Ce 210, 12" sample, magnetite calcite cpy
11 DE 844	D	chip 1 m	19.2	707	505.12	fsp porphyry andesite, mineralized hanging wall
11 DE 896	D	float	37.8	2969	1.06%	float, malachite, carbonate, cpy
11 DE 897	D	chip 1 m	41.1	2642	1706.09	fsp porphyry, rusty. Mag, cpy, pyr. 280/40N.
11 DE 898	D	chip 1 m	34.2	3774	3611.92	Ag 3.8g, Cu .36%, continue 1m chip
11 DE 899	D	chip 1 m	66	7617	6818.46	Ag 7.6g, Cu .68%, continue 1m chip

“Sivertip Creek Area E”

Silvertip creek at 1600m elevation takes a sharp turn to the east, following a fault believed to be the Rocher #4 vein. In the creek bed a 1 meter wide hornblende, quartz, magnetite, chalcopyrite vein has been exposed in two locations, 11 DE 858, and 869. The rock that forms the south bank of the creek at this location forms a bench which has been scoured by ice. This bench is the footwall of the #4 vein and it has the altered granodiorite with numerous fractures throughout it. Prospecting this bench several shows were located of pegmatite hornblende, quartz, magnetite veins. This area is roughly 200m x 60m and within that area 10 shows were identified, trenched and sampled. Visible gold was located.
A strong consistent Magnetometer anomaly traversed this bench on a bearing of 100° using 11DE 838 as the fixed point.

Silvertip Creek Area E

Sample	Area		Au ppb	Ag ppb	Cu ppm	comments
11 DE 811	E	grab	12.8	772	1039.74	hornfels seds, pyr often contains cpy
11 DE 812	E	grab	189.8	759	2714.77	limonite pod, Cpy, hematite? Magnetite?
11 DE 838	E	grab	1365.8	32321	2.75%	#4 vein perhaps only 20m away. 8 small veins
11 DE 839	E	grab	776.1	8251	7260.02	stringers 4 to 8" wide, 300 / 5 ne.
11 DE 854	E	grab	497.5	4625	5045.16	bedrock, qtz and malachite. heavy bleaching
11 DE 855	E	float	115.9	126	6.85	float, rotted qtz, magnetite.
11 DE 858	E	chip 1 m	19.7	1688	1030.64	Rocher #4 vein, Hornblende, qtz, mag, cpy.
11 DE 859	E	chip 1 m	19.6	373	621.19	Cu 621ppm, Fe 29%, mag, qtz pods.
11 DE 860	E	chip 1 m	409.9	7014	7907.44	mag, hb, minor cpy
11 DE 861	E	chip 1 m	68	728	733.74	1m chip, mag, hb, minor cpy
11 DE 862	E	chip 1 m	439.9	3078	1843.29	mag, hb, minor cpy
11 DE 863	E	chip 1 m	109.6	2158	2799.21	mag, hb, minor cpy.
11 DE 864	E	chip 1 m	196.9	5517	924.07	La 127, Ce 165, magnetite massive, hornblende.
11 DE 865	E	grab	315.3	4009	848.59	qtz vein ~1 ft mag, hb, cpy. Rotted granodiorite
11 DE 866	E	grab	3676.1	41198	4.68%	pods of o/c with hornblende mag, cpy. Grab
11 DE 867	E	chip 1 m	102.5	4328	2535.39	chip 1m wide across 866 show
11 DE 868	E	grab	25.7	1946	1713.37	parallel to #4 Rocher shear plane. 6-8 inches
11 DE 869	E	chip 1 m	3301.8	17981	1.65%	magnetite vein 1m thick, chip
11 DE 870	E	chip 1 m	82.1g	10710	303.94	black calcite mix, vg, pod 18” apparent 340/56 SW.
11 DE 893	E	grab	42.5	161	203.27	altered grano, qtz vein, cpy, mag, hb.
11 DE 894	E	chip 0.5 m	100.2	176	262.2	altered grano, massive mag in bands. Hb, cpy, qtz,
11 DE 895	E	chip 1 m	62	186	79.16	Fe 24%, 1m chip 240/55N, mag, hb, qtz, cpy

Soil Survey; Silvertip Basin

The Silvertip basin is a typical upland cirque that has been glacially scoured and in filled with blocky talus from its side slopes. The soil development is extremely poor. Where found, the soils may be talus fines, locally developed or glacially transported material, or a mixture thereof. Nevertheless, a limited soil survey was conducted over an area of 400 metres x 225 metres in the floor of the cirque.
A total of 50 samples were collected and analyzed. There results were erratic, one sample assayed 205 ppb gold, three adjacent samples gave values greater than 10 g/t silver, and eleven samples contained between 100 and 182 ppm copper.

Magnetometer Survey; Silvertip Basin

The Rocher Deboule stock consists of mafic granodiorite that is moderately magnetic; however, it is locally altered and magnetite has clearly been remobilized, out of some granodiorite into veins and fractures. A series of magnetometer survey traverses were done to establish the value of using magnetic data to identify zones of iron depletion and of magnetite enrichment.

Out of 897 readings, twenty, mostly on the north ridge west of the pot-hole lake at the head of Silvertip basin, were found to be below 55000 gammas, and 21 were found to be above 58,000 gammas. The latter were found at relatively low elevation west of the stockwork zone. They appear to be related to the Rocher Deboule #3 and #4 hornblende, quartz, magnetite vein systems.

4.0 Regional Geology

The Rocher Deboule area lies within the Skeena Arch, a northeast-trending belt of uplifted Jurassic and older rocks that transects central British Columbia and now separates the Bowser and Nechako Basins. The Skeena Arch is extremely well mineralized and it has been mapped in considerable detail.

The Skeena Arch straddles Skeena Terrane; which is a volcanic arc complex that formed off-shore and accreted to the west coast of North America in Middle Jurassic time. The terrane comprises two cycles of volcanic and related intrusions and overlying sedimentary rock (Takla Group and Hazelton Group) built on a pre-existing basement of metamorphosed volcanic rock and limestone (Asitka Group). Volcanism ceased shortly after the terrane docked and the arch developed as a topographic high that separated a large overlying sedimentary basin (Bowser Basin) in the northwest from a continental volcanic basin (Nechako Basin) in the southeast. The Rocher Deboule area is on the Bowser Basin side of the arch. Marine sediments gave way to non-marine (Skeena Group), in the early Cretaceous.

At about thet time, the Skeena Terrane and its cover of Bowser Group sediment started to undergo severe contraction. According to Evanchick and Thorkelson (2005), there was approximately 44% or 150 kilometres of shortening across the Basin. Folding and to a lesser extent faulting caused significant thickening of the crust. Contraction continued into the Tertiary but peaked in the Late Cretaceous, between 110 ma and 90 ma.

Continental volcanism, accompanied by emplacement of small plutons in the thickened crust, started in the Skeena Arch and in the Nechake Basin shortly after peak deformation and continued intermittently through to the Tertiary. The main period occurred between approximately 88 ma and 74 ma, when the Bulkley intrusions were emplaced and the Kasalka volcanic rocks were extruded. The Rocher Deboule intrusion and the surrounding volcanic rocks are from one of these volcanic complexes. There was a similar, later, episode of volcanism an intrusion the Babine in the Early Tertiary, between 54 ma and 51.5 ma.

According to MacIntyre and Diakow (1998) the two magmatic events occurred during periods of extension which lead to local horst (uplift) and graben (collapse) development between parallel north-south oriented faults, and also deposition of substantial thicknesses of lava within caldera basins and on their flanks. They also note that there is commonly a close association between the volcanic rocks and their associated intrusions.
MacIntyre and Diakow (1998) indicate there are thrae stages in the development of the Central Skeena Terrane. The relationship at Rocher Deboule is well displayed at the west end of the Late Cretaceous (95-65 ma) section. There, Hazelton Group volcanic rocks (lmJH) are overlain by Bowser Lake Group sediments (mJKB) and Skeena Group (lKS) sediments. The rocks are deformed, eroded and faulted – in this schematic by a cauldron subsidence complex. Kasalka Group volcanic rocks are shown surrounding the down-drop basin and the underlying Bulkley intrusions are shown to have off-shoots that (potentially at least) are associated with porphyry style Cu mineralization. At Rocher Deboule, there are 16 MINFILE occurrences clearly associated with the main body of the stock. Most, including the Rocher Deboule and Victoria are found around the outer rim.

5.0 Local Geology

A list of lithologies present on the property are listed as follows:

LKBfp Late Cretaceous Bulkley Plutonic Suite
feldspar porphyry (Rocher Deboule Stock)
LKBg Late Cretaceous Bulkley Plutonic Suite
granodiorite (Rocher Deboule Stock)
uKK Upper Cretaceous Kasalka Grp
andesitic tuffs/flows (Brian Boru Fm)
lKSRs Lower Cretaceous Skeena Grp
coarse clastic sediments (Red Rose Fm)
lKSK Lower Cretaceous Skeena Grp
shale, siltstone (Kitsumkalum Fm)

The vein-related mineral showings on the Rocher Deboule property are either within or immediately adjacent to a composite intrusion that was mapped by Sutherland Brown and reported in Bulletin 43 (Sutherland Brown, 1960).

The Rocher Deboule stock consists of two, Bulkley-aged intrusions. The main pluton is an elongate body of granodiorite (LKBg) and lesser feldspar porphyry (LKBfp) that is cut by a smaller, slightly younger body of quartz monzonite (LKBqm) at its northern end. The two intrusions cut through hornfels folded fine-grained clastic sediments of the

Lower Cretaceous Skeena Group Red Rose formation (lKSRs) between two north-south oriented extension faults. The stock appears to reduce in size to the south, where it appears to cut higher up section, into Upper Cretaceous Kasalka Group (uKK) volcanic rocks (mainly andesite). The main body of the stock appears to be fairly homogenous, consisting of approximately 60% plagioclase, 10% orthoclase, 10% quartz, 10% hornblende, 10% biotite (Kikauka, 2004) and a minor amount of magnetite. Other less abundant rock types reported in the literature include aplite, pegmatite and, quartz diorite, which are present as dykes. The granodiorite is strongly magnetic and airborne magnetometer (first vertical derivative) data from the "Mapplace" and from a Fugro Airborne Survey Corp survey flown over the property in 2007 (Burgoyne and Kikauka, 2007) both suggest that the intrusion dips moderately to the west.

The main northern body of the stock is jointed throughout. There are three main joint sets, of which the two most prevalent include one parallel to the contact and one (a "cross-joint") normal to the contact. The latter makes a horizontal trace on the contact surface. The third and least well developed joint set is radial, vertical and normal to the other two. The pattern suggests orthogonal fracturing in response to contraction on cooling. In the Rocher Deboule mine area, the three principal joint sets on average strike north 15 degrees west and dip 65 degrees west (approximately parallel to the contact); north 85 degrees east and dips 5 degrees north (sub-horizontal "cross-joints") and north 60 degrees east and dips at 65 degrees northwest (radial). There is also a fourth set that strikes north 55 degrees east and dips at 55 degrees to the southeast.

The east trending, northerly dipping radial fractures appear to be particularly important as they host most of the mineralized veins. They are also responsible introducing fluid for alteration, quartz-hornblende pegmatite vein development and for mineralization. The east - west trending, northerly dipping radial fractures on the west side of the intrusive appear to be particularly important as they host most of the mineralized veins. They are also responsible for introducing fluid for alteration, quartz-hornblende pegmatite vein development and for mineralization.

6.0 Mineralization, Deposit Types and Previous Work

The veins in the northern part of the Rocher Deboule stock are widespread, have considerable strike length and, where known, appear to project to considerable depth. They are largely polymetallic, shear and/or fracture-hosted veins & some locally develop into stockwork zones. The veins contain a wide range of potentially economic elements, not all of which are commonly associated with typical "porphyry" deposits. The Victoria veins in the north, for instance, contain gold, silver, cobalt and nickel arsenides, but are low in copper, molybdenum and tungsten. The Silvertip Glacier [MINFILE 09and3M055], vein/breccia on the central portion of the property contains variable amounts of tin, tungsten, copper, molybdenum, gold, silver, lead and arsenic but not much nickel or cobalt. The Red Rose [MINFILE 093M 067] deposit to the south of the property contained sufficient tungsten, copper, gold, silver molybdenum and uranium that it became an active producer of tungsten between 1942 and 1954. However, the nearby Great Ohio [MINFILE 093M069], located on the Rocher Deboule property a short distance to the north and west of the Red Rose Mine which contains tungsten, copper, with minor gold, silver, lead and zinc. These vein deposits cluster around the Rocher Deboule and Highland Boy mines.

The stock may show some affinity with iron-oxide-copper-gold (IOCG) deposits found elsewhere, or with some underlying "porphyry" system. Compilation of geological data suggests that there is a broad, west to east trending corridor of mineralization, roughly 1 km wide and 11 km long, of which 6 kms has been focused on. There are numerous past producing mines in the corridor and 2 porphyry copper-molybdenum showings. The majority of mineral showings, with certain exceptions (porphyry and stockwork zone), on the Rocher Deboule Property comprise vein fillings of shear zones, normally in close proximity to the margin of the Rocher Deboule stock.

6.1 Rocher Deboule

The Rocher Deboule [MINFILE 093M071] mine, on the west side of the pluton consists of at least five main sub parallel structures that host veins. They strike 075 degrees east and dip at between 35 and 65 degrees to the north, within a 750 metres thick package of rock. The veins (numbered No. 1 to No. 5) are up to 700 metres in length and generally 0.5 to 2.5 metres wide. Some, such as the No. 2, extend across the western contact of the intrusion and are found in hornfelsed sediment as well as in granodiorite. The veins are remarkably uniform in overall attitude"; however, they are also described as being complex "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 meters wide with or without much brecciated and altered granodiorite. There appear to have been three stages of mineralization. The first introduced hornblende, quartz, feldspar, apatite and magnetite, along with minor scheelite, & molybdenite, in the pegmatite described above. The second stage introduced glassy quartz, chalcopyrite, arsenopyrite, cobaltite and pyrrhotite. The third introduced milky quartz, siderite, calcite, tetrahedrite, sphalerite, galena and pyrite. The mineralogical and metallurgical complexity of the veins clearly results from the continued movement of the shear-veins and the introduction of three distinct and progressively cooler pulses of hydrothermal fluid.

6.2 Victoria

The Victoria [MINFILE 093M072] mine is approximately 1000 metres to the north of Rocher Deboule, along the contact and although it differs in detail, it is thought to be part of the same mineral system. It consists of at least three parallel veins, 200 to 300 metres, apart that strike at north 85 degrees and dip at 60 degrees to the north. There is also a small cross vein that strikes north and dips at 50 degrees to the east. Some of the veins are associated with dykes. The No. 1 vein follows a diorite dyke and has a felsite dyke in its wall, and the No. 2 vein follows a feldspar porphyry dyke. The main veins are of variable thickness. They consist of a hornblende, quartz, feldspar pegmatite gangue that contains streaks and massive lenses of gold-bearing cobalt and nickel arsenides, and minor amounts of molybdenite and uraninite. The veins contain very little copper.

6.3 Highland Boy

The Highland Boy [MINFILE 093M070] mine is located in the heart of the main stock, to the east of the Rocher Deboule mine. It bas at least two principle east-west trending, northerly dipping veins. The southern vein may be the easterly extension of the Rocher Deboule No. 4 vein. The veins are similar to those at Rocher Deboule. They are essentially hornblende, quartz and carbonate veins that are up to 2.0 metres wide and contain variable amounts of massive and/or locally banded gold-bearing chalcopyrite, pyrite, haematite, magnetite, scheelite, cassiterite and uraninite. There appears to be very little lead and zinc in this part of the system (Burgoyne and Kikauka, 2007).

7.0 2017 Exploration Program Victoria No 1 & Vent Zone

7.1 Methods and Procedures

Historical data from the Victoria area has focused on Au-Ag-Co-Ni-As-Mo bearing mineralization located in adits and underground workings of the Victoria No 1. The 2017 fieldwork program also covered the Vent Zone 1 km SW of the No 1 Vein. The Vent Zone features elevated Cu-Au-Ag-Fe-REE and possible IOCG type mineralization.

Geochemical sampling of 14 rock chips (for laboratory multi-element analysis and metallurgical testing) and 144 soil sampling (for SGH spatiotemporal geochemical sampling) was carried out on the Victoria No 1 and Vent Zone mineral occurrences

Rock samples were taken with rock hammer and chisel (about 1-2 kgs total size per sample, and sample chips about acorn to walnut sized), from exposed bedrock or grab samples either of rock float train, unless otherwise stated, as chip channel samples of bed-rock (Appendix B). The samples were, labelled, bagged and shipped to ALS Global, North Vancouver, and Kamloops, BC for standard crushing, pulverizing processing and multi-element ICP multi-element analysis (ME-MS41) and separate Au-Co-As geochemical analysis (ME-OG46). Methods and procedures of analysis are listed in Appendix A (geochemical analysis certificate). A selection of 3 rock chip sample pulp & rejects (17VIC-4, 5, & 8) were shipped to ALS Metallurgy (Kamloops, BC) for PMA and preliminary metallurgical testing, under the supervision of Peter Mehfert, P Eng (Appendix A).

A total of 144 soil samples were taken from a consistent depth of 2-20 cm using tree planting shovels and placing approximately 500 gm B horizon material in double bagged and sealed in marked, plastic ziplock bags. Sample texture, colour and depth were recorded at each sample station (Appendix E). Soil samples were shipped to Actlabs, Ancastor ON for spatiotemporal geochemical hydrocarbon analysis. Results from SGH analysis is summarized by 52 page report by Dale Sutherland, Professional Chemist, Actlabs, Appendix D.

A Total of 7.2 line km of field magnetometer geophysical instrument surveying was carried out over the Victoria No 1 and Vent Zone on June 12-15, 2017. The instrument used is a GEM GSM-19T v 7.0 proton magnetometer. The readings were taken at 12.5 meter intervals using a Garmin 60Cx GPS for survey location. A total of 590 field readings were done along east-west oriented grid lines (grid numbers correlate with UTM grid). Instrument sensor was oriented to record vertical component of total field. Values in nT recorded by GEM GSM-19T v 7.0 proton magnetometer are absolute (not relative values). Raw data was corrected by looping (returning to a common point and verifying reading over time intervals of 20-120 minutes, and comparing the correction with diurnal changes recorded by magnetic observatories operated by Natural Resources Canada (Appendix C).

7.2 Victoria No 1 Vein-Dyke & Vent Zone Geology and Mineralization

The Victoria mineral zones are located in the west portion of the claim group at 1,200-1,900 meters elevation. The Victoria No 1 Vein showings are hosted in Rocher Deboule granodiorite and minor phases of feldspar porphyry. Hydrothermal activity associated with the emplacement of hornblende-chlorite vein-dyke with Au-As-Co bearing sulphide mineralization related to the nearby intrusion of the Rocher Deboule granodiorite stock. The Victoria mineral zones consist of three parallel vein structures (Victoria #1, #2 and #3), 200 to 300 metres apart, which strike 085 degrees and dip 60 degrees north, and a small cross-vein which strikes north and dips 50 degrees east). The Victoria No. 1 vein contains hornblende-chlorite-quartz-calcite gangue, and arsenopyrite-safflorite-lollingite-molybdenite mineralization. The No 1 Vein follows a dark grey, fine-grained diorite dike and averages 0.5 metre wide, is up to 450 metres along strike, and is 300 metres in vertical extent. It is open to the east and at depth. The No. 2 vein follows a feldspar porphyry dike and is 10 metres wide and up to 800 metres long. The No. 3 vein is up to 723 metres long and is intersected by a cross-vein containing galena, sphalerite, tetrahedrite, arsenopyrite, safflorite and pyrite. Hydrothermal activity associated with the emplacement of quartz-carbonate-sulphide fissure veins is related to the nearby intrusion of the Rocher Deboule granodiorite stock. A program of geochemical rock chip sampling (14 rock chip samples over a 100 hectare area, Fig 5, 6, & 7), on the Victoria showings (located on the west portion of the property), were carried out by personnel in June, 2017. Rock samples were analyzed (ME-MS-41 & Co-OG46) by ALS Minerals, and 3 of 14 select samples were analyzed by ALS Metallurgical with Particle Mineral Analysis (Appendix A). A total of 14 rock chip samples from the Victoria showings are listed as follows:

Rock Samples from Victoria area

Sample ID	Fe %	Ce ppm	La ppm	Ni ppm	Bi ppm	Ca %	Pb ppm	Zn ppm
17VIC-1	1.62	5.33	2.8	310	83.9	2.59	1	33
17VIC-2	10.7	24.6	20.2	639	1815	1.73	2.9	23
17VIC-3	4.69	12.9	5.9	102	4.97	3.05	15.1	109
17VIC-4	11	199.5	159.5	3020	318	0.85	6.6	23
17VIC-5	10.5	7.72	5.5	3500	1650	1.05	2.3	17
17VIC-6	8.21	23.6	15.1	1745	783	2.36	7.2	27
17VIC-7	1.47	>500	600	423	156	1.55	3.5	10
17VIC-8	3	>500	610	33	1.05	0.06	2.9	779
17VIC-9	5.98	21.6	12.5	601	230	9.2	346	35
17VIC-10	15.15	4.82	2.9	137	1.47	0.19	5.6	61
17VIC-11	7.89	34.8	16.6	38.7	0.57	0.72	4.2	170
17VIC-12	12.3	20.8	9.5	4.4	0.22	0.36	36.5	169
17VIC-13	28.2	>500	620	8	0.44	5.9	1.8	89
17VIC-14	8.41	169.5	136.5	5660	1060	1.41	21	60

Sample ID	Au ppm	Au g/t	Ag ppm	Cu ppm	Co ppm	Co %	As ppm	As %	Mo ppm
17VIC-1	8.77		2.32	7.7	3400		>10000	1.555	2260
17VIC-2	>25.0	110.5	3.67	2.3	>10000	1.535	>10000	18.05	2310
17VIC-3	0.22		0.77	514	48.7		451		9.39
17VIC-4	>25.0	126	7.75	4.5	>10000	1.705	>10000	20.2	4130
17VIC-5	>25.0	96.8	2.84	1.1	>10000	2.75	>10000	26.2	2410
17VIC-6	>25.0	56.8	1.95	1.5	>10000	2.05	>10000	15.55	1885
17VIC-7	>25.0	119	7.95	37.8	>10000	2.46	>10000	9.72	5960
17VIC-8	0.18		0.21	43.5	222		4730		314
17VIC-9	13.65		20.4	12	2360		>10000	2.68	33.2
17VIC-10	0.12		2.04	5090	138		3760		125
17VIC-11	0.04		0.17	60.8	35.1		58.3		3.93
17VIC-12	<0.02		1.57	410	11.2		96.4		6.25
17VIC-13	0.07		2.22	3950	9.1		34.5		11.05
17VIC-14	>25.0	164	22.4	18.3	>10000	1.135	>10000	18.8	905

Geochemical analysis results from rock chip samples 1-7, and 14 (Victoria No 1 Vein), suggest elevated Au values are associated with Ag-Co-As (Ni-Mo-La-Ce-Fe-Bi) in a gangue of hornblende-actinolite. Results from rock chip samples 8, 10-13 (Victoria Vent Zone) show elevated Au values associated with increased Cu-Fe-Ce-La values. Au-Cu-Fe-Ce-La geochemical association suggests the Vent Zone is IOCG type mineralization. A new zone of disseminated, widespread mineralization and alteration 'Vent Zone' is hosted in andesitic flows/tuffs (porphyritic) of Upper Cretaceous Kasalka Group (Brian Boru Formation) mixed with Lower Cretaceous Red Rose Formation coarse clastic sediments. The Vent Zone is well defined by SGH (spatiotemporal geochemical hydrocarbon) sample results (Actlabs A17-06702, Appendix D).

7.3 Victoria No 1 Vein-Dyke & Vent Zone Actlabs SGH sample survey

The 'Vent Zone' is located approximately 1 km SW of the Victoria No 1 Vein. The Vent Zone is characterized by disseminated, widespread mineralization and alteration hosted in andesitic flows/tuffs (porphyritic) of Upper Cretaceous Kasalke Group (Brian Boru Formation) mixed with Lower Cretaceous Red Rose Formation coarse clastic sediments. The Vent Zone is well defined by SGH (spatiotemporal geochemical hydrocarbon) sample results (Actlabs A17-06702, Appendix D). A total of 144 soil samples (B horizon), were taken from the Victoria No 1 area (to the north) and the Victoria Vent Zone (to the south) for SGH analysis at Actlabs, Ancaster, ON. The results of this hydrocarbon survey identified a redox cell anomaly in the Vent Zone (6.0 out of 6.0 rating), and copper-gold anomalous zones that coincide with the redox cell anomaly (5.0 out of 6.0 rating). In the area of the Victoria No 1 Vein the SGH survey identified (5.0 out of 6.0 rating) copper-gold anomaly clusters . It is postulated from the SGH redox cell anomaly results and elevated Cu-Au-Ag-Fe-REE geochemistry suggest the Vent Zone represents an IOCG (iron oxide copper gold) exploration target.

7.4 Victoria No 1 Vein-Dyke & Vent Zone magnetometer survey

Geophysical readings were taken using GEM Systems GSM19T v 7.0, vertical component of total field was recorded at 12.5 m intervals over the area of the SGH survey (50 meter line spacing). Results suggest a moderate strength, relatively well-defined (100-400 nT) positive anomaly (approx. 100 X 300 m area, elongated east-west) located in the east portion of the Victoria No 1 Vein (1,550-1,700 m elev, and open to the east) which coincides with the area of adits and underground development work (Fig 8). The positive anomalies are likely caused by increased magnetic minerals associated with mafic dykes that are associated with Au-Ag-Co-As-Mo bearing mineralization. Additional weak and relatively poorly defined positive magnetometer anomalies (50-150 nT) occur approximately 200 meters north and south of the Victoria No 1 Vein. The weak north magnetometer anomaly coincides with 15 cm width outcrop rock chip sample 17VIC-1 which contains 8.77 g/t Au, 2.32 g/t Ag, 0.34% Co, 1.555% As, 0.23% Mo (source: ALS cert VA17142788).

The magnetometer survey included the area of the Vent Zone (located 500-1,000 m southwest of the Victoria No 3 Vein). The Vent Zone features weak (100-200 nT) and poorly to moderately defined anomalies in the east portion of the grid area covering an area of approximately 200 X 600 meters (Fig 9). These magnetometer anomalies in the higher elevation portions of the Vent Zone (1,410-1,640 m elevation) coincide with rock chip samples 17VIC-8, 10, & 13 with the following results (source: ALS cert VA17142788):

Vent Zone Rock Chip Sample Results:

Sample	Width	Au g/t	Ag g/t	Cu%	As ppm	La ppm	Ce ppm	Fe %
17VIC-8	float	0.18	0.21	0.01	4,730	610	>500	3.0
17VIC-10	30 cm	0.12	2.04	0.51	3,760	2.9	4.82	15.15
17VIC-13	18 cm	0.07	2.22	0.40	34.5	620	>500	28.2

7.5 Victoria No 1 Vein Metallurgical Testing

ALS Metallurgy Kamloops, Test Results from Rock Chip Samples 17VIC-4, 5, &9:

The main arsenic bearing minerals present in rock chip samples (17VIC-4, 5, & 9) are arsenopyrite and Safflorite/Lollingite in a gangue of hornblende-actinolite and chlorite, with minor quartz-calcite-sericite-apatite-epidote. When the As content increases, more of the safflorite/lollingite is present. The cobalt distribution roughly correlates with arsenic distribution. The spectra data shows the cobalt content in these arsenic bearing minerals. Sulphur is mostly associated with arsenopyrite, then in molybdenite. The two high As samples (4 & 5) seem to have significantly different host rock compositions from Sample 9: i.e. high amphibole, low carbonates. Gold particle observations shows some silver content. Metallurgical process testing (on crushed rejects) that could be done might

include: Grind to a typical processing size (150µm P80) and investigate cyanide leaching, froth flotation and gravity recovery. The flotation testing would give a good indication of gold association with arsenopyrite, since that and molybdenum are the only 2 main species that should float. Cyanide leaching may be best way to recover gold, as the arsenopyrite may be difficult to sell as a concentrate. If gold is refractory with arsenopyrite, which would be indicated by the flotation and cyanide leach response, pressure oxidation on a flotation concentrate is recommended.
Finally, gravity is always good to check and see what can be recovered by grinding and non-chemical methods. High mass recoveries due the high levels of arsenic bearing minerals may incur some high smelter penalties. Cobalt recovery, may be achieved by hydrometallurgical treatment.

8.0 Discussion

The Rocher Deboule property covers the northern part of a well-defined granodiorite stock that forms a prominent mountain immediately to the south of Hazelton, in northern British Columbia. It covers three small past producing mines; the Rocher Deboule, Victoria and Highland Boy and several other showings that are described separately in the British Columbia Ministry of Energy and Mines "MINFILE" database. There are other showings confined to the stock to the south of the Rocher Deboule property and, equally important, in the immediately surrounding volcanic and sedimentary rocks..

The regional geological setting of the Rocher Deboule stock has been studied in considerable detail by Government geologists, including Stevenson (1947, 1949), Sutherland Brown (1960, 1976) and Richardson (1980) and MacIntyre and Diakow (1998) and, although much of the early work is now missing, the various mines and prospects have been studied and reported on by numerous company geologists, including Walker (1952), Plecash (1982, 1983), Quin (1987, 1989) and Kikauka (2002, 2004). The geology and history of the area is summarized in a NI 43-101 compliant technical report prepared by Burgoyne and Kikauka (2007).

One of the principal features of the area is the diversity of style and mineralogy of the various showings and the apparent chemical zonation shown by the veins. Some of the prospects within the stock appear to be "porphyry-type" stockworks; others more clearly resemble "polymetallic veins". The showings display a remarkable degree of chemical diversity. "Porphyry" occurrences contain one or more of Cu, Mo, Au, Ag, W and Sn while the "polymetallic veins" appear to be strongly zoned, carrying Cu, Au and Ag in the centre of the stock (Highland Boy); Co, Ni, As, Au and Ag in the northwest part (Victoria) and Cu, Pb, Zn, Au and Ag on the western margin (Cap).

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 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 to 1.0 metres. Quin (1987) suggests there may be some evidence for regional zoning of the sulphides from the interior of the pluton where pyrrhotite-chalcopyrite predominate (Great Ohio, 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, and are considered the main target of economic mineralization.

The third 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 mineral fillings consist of combs of quartz containing siderite and calcite. The eastern-end of the No. 2. vein, at the Rocher Deboule mine is the best example of this phase. This phase has limited tonnage but is important and a secondary target of economic mineralization

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 phase three minerals carrying most of the silver".

The three phases of mineralization reflect three pulses of mineralization along deep, reactivated structures. The degree and extent of overlap presumably reflects the extent to which various shear-hosted veins were reopened and their proximity to the source of later, incoming fluids. The composition of the fluid will be governed by its source, subsequent reaction with country-rock and temperature gradient.

The known veins on the Rocher Deboule property are widely distributed throughout the northern part of the Rocher Deboule stock. For the most part they are oriented with a easterly strike and a moderate north dip, parallel to one of four prominent joint sets. The current exploration program shows that there are undoubtedly far more veins than have been mapped to-date, and that there are a significant number of crosscutting structures that are also mineralized. Most of the veins display minimal wall-rock alteration, but recent work also shows that there is alteration and mineralization in the Silvertip stockwork area end alongside many of the veins. It was noted in several places adjacent to the Rocher Deboule veins west of the Silvertip stockwork. The nature of the alteration is uncertain; however, analysis of several samples of bleached granodiorite adjacent to well-defined veins of quartz, carbonate and magnetite in core from the

Company's 2007 drill program at Highland Boy, show that this particular alteration process has removed, and presumably remobilized a trace amount of copper, zinc, nickel and cobalt, in addition to substantial amounts of iron. This type of alteration may be more extensive than hitherto realized and it is conceivable that the nickel and cobalt found in arsenides in the Victoria vein system are sourced through this type of alteration.

To date, the most extensive zones of alteration have been found under the floor of the Silvertip valley. The granodiorite underlying the Silvertip stockwork zone is broken and altered and lighter in colour than found on the overlying mountain slopes. It is more or less bleached to a whitish colour through the removal of mafic minerals and it has developed a light tan colour. There, the altered granodiorite commonly contains limonitic hairline fractures and it locally contains veins and pods of quartz, either glassy or white, that are either weakly or strongly correlated with the pegmatite, malachite, chalcopyrite and pyrite. The alteration appears strongest in an east went path that would follow the 60 metre fault zone, connecting with the Chicago fault at the Highland Boy area and probably splitting into several shears of size such as the Victoria #2 (up to 8 metres) and #3 vein (up to 13 metres). Much of the Silvertip stockwork area is covered by talus derived from the surrounding slopes and the full extent and significance of the area has yet to be determined; however, it lies mid-way between the Rocher Deboule and Highland Boy mines, where their respective vein systems appear to break down. It could mark the presence of buried intrusion responsible for the introduction of the copper, gold and silver found concentrated in the major veins on the property and dispersed throughout the stockwork.

The Silvertip stockwork is one of several alteration zones located in a broadly east to west trending, 1.0 km wide, zone extending from the Chicago fault in the east to the Capp fault, and beyond in the west, a distance of approximately 4.0 km. Exploration throughout this area has located numerous new veins and showings and has established the widespread nature of the copper-gold silver mineralization within the Granodiorite stock. It has also located possible extensions of some of the main veins west of the granodiorite contact. In addition, it has established the presence of considerable areas of alteration and mineralization along the western contact of the stock and in the surrounding metasediment and metavolcanic rock (Cap). The size of the alteration system and the extent and nature of the mineralization in the Cap area suggests a separate fluid source to the one responsible for the Silvertip stockwork.

The chemistry of the veins varies from place to place throughout the property and the source of the fluid has yet to be determined; however, the presence a younger quartz monzonite stock at the Daley West, and of feldspar porphyry dykes in the Rocher Deboule and Victoria workings suggests that there may be buried "porphyry" intrusions capable of contributing the copper, silver, gold, lead, zinc, molybdenum, cobalt & tungsten found in the vein systems.

9.0 RECOMMENDATIONS

Follow up exploration work including detailed mapping, hand trenching, core drilling and metallurgical testing of elevated precious metal bearing vein and disseminated mineral zones is recommended. A program of exploration to cover the Victoria No 1 Vein (1,550-1,700 m elev), Victoria Vent Zone (1,410-1,640 m elevation), Silvertip Creek, Rocher Deboule, & Hazelton View area is also recommended. The proposed follow up fieldwork would also include core drilling of the Rocher Deboule No 2 Vein (in the vicinity of Southern Gold Res Ltd 1988 core drilling, near the intrusive contact zones in the west portion of the Rocher Deboule No 2 Vein).

1) The Silvertip stockwork zone is talus covered and poorly defined. Nevertheless, it is important to establish the extent and continuity of the copper, gold and silver mineralization. The area needs to be prospected to establish size, mapped (where possible) to establish vein density and orientation, and trenched to assess continuity of grade. It will be important to see if there is any correlation between alteration and extent of mineralization. If there is evidence of breakdown of magnetite in the host granodiorite (and the terrain allows) it could warrant a detailed magnetometer survey. The Silvertip alteration zone may project to depth. The slopes below the Silvertip bench and the Juniper creek upper basin from the Rocher Deboule to the Highland Boy mine should be prospected looking for mineralization, alteration and feldspar porphyry dykes.

2) The Silvertip alteration zone appears to be following the principal veins. The Rocher Mine area needs to be reassessed for alteration, especially in the east portion of the No 4 Vein. A program of core drilling on the Rocher Deboule No 2 Vein is also recommended. In 1987–1989, Southern Gold Resources Limited completed drill testing and sampling of the No. 2 Vein and an estimated a potebtial resource of 49 800 tonnes averaging 2.69 per cent copper, 208.1 grams per tonne silver and 3.51 grams per tonne gold. With a well planned drill program, additional ore can be developed.

3) Efforts should be made to identify and map the shear zones of Victoria #2, 3, and 4 in detail, especially in areas where the vein(s) widen and form 'ore shoots'. Metasediment below the Victoria veins are locally limonitic. Reference samples of these sediments contain significant values. A trenching and sampling program would evalueto this area.

4) The Cap area needs to be mapped in detail to identify a drill target. Particular areas of interest include an area where airborne geophysics and soil sampling indicates anomalies. Area near the junction of the Skeene and Cap faults are an excellent area to map and survey. Induced polarization goophysics would also be an excellent tool to identify drill targets.

5) The Hazelton View should be hand trenched and chip sampling especially in areas known to have high values of gold and the disseminated chalcopyrite samples.

9.0 References

Burgoyne, A.A., 2006: Geological Report on the Rocher Deboule Property for Ameridex Minerals Corp., dated February 7, 2006.

Burgoyne, A.A. and Kikauka, A. (2007): Technical Report on the Rocher Deboule Property, Omenica Mining Division; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 29,677.

Ethier, D., 2011, Prospecting and Geochemical Report on the Rocher Deboule Property, Assessment Report 33297, for American Manganese Inc (report date June, 2012).

Kikauka, A., 2002: Geological & Geochemical Report On The RD 1-6 Claim Group, Rocher Deboule Range, Hazelton, BC for Ameridex Minerals Corp., November 30, 2002.

Kikauka, A., 2004: Geological & Geochemical Report On The RD 1-8 Claim Group, Rocher Deboule Range, Hazelton, BC Amertdex Minerals Corp, Nov, 2004. Assessment Report 27,558

Fugro Airborne Surveys Corp., 2007: Dighem Survey for Rocher Deboule Minerals Corp., New Hazelton Area, British Columbia, NTS 93M/4, dated September 4, 2007.

Geological Survey Branch of British Columbia, 2001: RGS Stream Sediments Survey Compilation Maps for 95th Percentile for Au, La, Fe, and Cu

Geological survey of Canada, 1969: Airborne Magnetic Survey, Skeena Crossing, British Columbia, NTS 93 M4 in Geophysics Paper 5245 and Map 5245G.

George Cross Newsletter, 1990: International Kengate Ventures Inc., in George Cross Newsletter, No. 228 (1990), November 26, 1990.

Geoscience Canada 1993: Ore Deposit Models, Volumes 1 and 2. Editors PA Sheahan, ME Cherry, RG Roberts

Geoscience Canada 1996: Atlas of Alteration, editors AJB Thompson and JFH Thompson

Hill, H.L. and Legg, R.E. (1951): Report on Western Uranium Cobalt Mines Limited, Skeena Crossing, B.C., Rocher Deboule Mine, November, 1951.

Holland, S.S. 1952 b: Minister of Mines, BC. Annual Report 1952.

Jasper, M., W., 1952: Assay Plan – No. 2 Vein, Rocher Deboule Property, Western Uranium Cobalt Mines Ltd., Map No. 1-52, May 5, 1952.

Kindle, E. D. (1954): Mineral Resources, Hazelton and Smithers Areas, Geol. Surv., Canada, Mem. 223 (revised).

Minister of Mines, B.C., **Annual Reports** for 1912, 1916, 1917, 1918, 1920, 1921, 1926, 1926, 1928, 1929, 1930, 1948, 1949, 1950, 1951, 1952.

Minister of Mines, B.C., **Assessment Reports** 00092, 00324, 01134, 02855, 03469, 03872, 04839, 06894, 07779, 07903, 08323A, 08323B, 08332, 08336, 08521, 08705, 08937, 10106, 10368, 11019, 11134, 11513, 12133, 12712, 14632, 16012, 16455, 16575, 16714,

Minister of Mines, B.C., **Minfile** 093M 053, 055, 056, 057, 058, 059, 061, 062, 063, 065, 066, 067, 068, 069, 070, 071, 072, 073, 074, 075, 096, 098, 113, 114, 115, 150, 154, 186, 093L 001.

Pezzot, E. Trent, 1987: Geophysical Report on a magnetic and VLF Electromagnetic Survey on the Rocher Deboule Property for southern Gold Resources Ltd., October 7, 1987. Assessment Report 16,575.

Pinsent, R., Ethier, D., 2011, Prospecting and Geochemical Report on the Rocher Deboule Property, Assessment Report 33297, for American Manganese Inc (report date June, 2012).

Plecash, D.C. 1983: Rocher Deboule Property, Victoria Group, NTS 93M/4E, Omineca M.D., D. Groot Logging Ltd., Minerals Exploration, Smithers, B.C., November 1983, Assessment Report 11,513

Plecash, D.C. 1982: Rocher Deboule Property, Victoria Group, NTS 93M/4E, Omineca M.D., D. Groot Logging Ltd., Minerals Exploration, Smithers, B.C., March, 1982. Assessment Report 10,368.

Quin, S.P., 1987: Summary Report, 1987 Exploration Program, Rocher Deboule Property for Southern Gold Resources Ltd., November 9, 1987. Assessment Report 16,714.

Quin, S.P., 1989: Summary Report, 1988 Exploration Program, Rocher Deboule Property for Southern Gold Resources Ltd. and Canamin Resources Ltd., June 1989.

Richards, T.A., 1980: Geology of Hazelton (93M) Map Area, Open File 720, Geological Survey of Canada.

Richards, T.A., 1978: Geology of Hazelton (West half) Map Area, Geological Survey of Canada Paper 78-1A, pp. 59-60.

Richards, T.A., 1994: Petrology and Alteration for Prospectors

Schroeter, T.G., 1995: Porphyry Deposits of the Northwestern Cordillera of North America, Special Volume 46, Canadian Institute of Mining and Metallurgy.

Sutherland Brown, A., 1976: Porphyry Deposits of the Canadian Cordillera, A Volume Dedicated to Charles S. Ney, Special Volume 15, Canadian Institute of Mining and Metallurgy.

Stevenson, J. S., 1949: Victoria, *Minister of Mines,* B.C., Annual Report, pp. 82-93.

Stevenson, J.S., 1947: Red Rose Mine, *Econ. Geol.,* Vol. XLII, pp. 433-464.

Sutherland Brown, A., 1960: Geology of the Rocher Deboule Range, Bulletin No. 43, British Columbia Department of Mines and Petroleum Resources

STATEMENT OF QUALIFICATIONS

I, Andris Kikauka, of 4199 Highway 101, Powell R, BC V8A 0C7 am a self-employed professional geoscientist. I hereby certify that:

1. I am a graduate of Brock University, St. Catharines, Ont., with an Honours Bachelor of Science Degree in Geological Sciences, 1980.
2. I am a Fellow in good standing with the Geological Association of Canada.
3. I am registered in the Province of British Columbia as a Professional Geoscientist.
4. I have practiced my profession for thirty years in precious and base metal exploration in the Cordillera of Western Canada, U.S.A., Mexico, Central America, and South America, as well as for three years in uranium exploration in the Canadian Shield.
5. The information, opinions, and recommendations in the Geophysical and Geochemical Report are based on fieldwork carried out in my presence on the subject properties during June, 2017 during which time a technical evaluation eonsisting of systematic mapping, surveying and sampling of rock & soil, and total field magnetics from the subject property was carried out by the writer.
6. I am a Director of American Manganese Inc and have a direct interest in the subject property.
7. As at the date hereof, to the best of my knowledge, information and belief, the Geophysical and Geochemical Report contains all scientific and technical information that is required to be disclosed to make it not misleading.
8. Recommendations in this report are guidelines. The recommendations contained within this report are not intended for public financing.

Andris Kikauka, P. Geo.,

A. Kikauka

Oct 15, 2017

ITEMIZED COST STATEMENT-

ROCHER DEBOULE VICTORIA PROJECT-
GEOPHYSICAL AND GEOCHEMICAL FIELDWORK
Dates worked: June 8-15, 2017
BCGS 093M.012, NTS 093 M/4 E, SKEENA MINING DIVISION
Work carried out on MTO tenure number: 510469

FIELD CREW:

A. Kikauka (Geologist) 8 days	$ 4,200.00
D. Ethier (Geotechnician) 8 days	$ 2,625.00
A. Ethier (Geotechnician) 8 days	$ 2,100.00
L. Munoz (Geotechnician) 8 days	$ 2,100.00

FIELD COST:

Preparation, Mob and Demob	$	395.20
Equipment (bags, flags, tags), Supplies, Generator		173.90
Magnetometer Rental 8 days		400.00
Geochemical analysis 14 rock chip samples (& shipping to ALS Global Laboratories, N Vancouver, BC)		761.19
Geochemical metallurgical analysis (QEMSCAN) composite rock chip samples (& shipping to ALS Metallurgical, Kamloops, BC)		1,344.34
Activation Labs SGH soil analysis, hydrocarbon geochemistry		8.577.34
ATV rental (32 days total)		1,560.00
Meals		1,161.55
Fuel		616.75
Accommodations		705.90
Communication (sat phone, VHF radios)		116.45
Report		850.00

Total amount= $ 27,687.62

Appendix A

ALS Metallurgy Kamloops
2957 Bowers Place
Kamloops, BC V1S 1W5
T +250 828 6157 F +250 828 6159

August 21, 2017

Mr. Andris Kikauka, P.Geo.
Director
American Manganese Inc.
#2, 17942 55th Avenue
Surrey, BC
V3S 6C8

Dear Mr. Kikauka;

Re: Mineralogical Assessment of Roche DeBoule Samples - KM5437

We are pleased to report that we have now completed mineralogical analyses on samples from the Roche DeBoule property that were provided on behalf of American Manganese Inc. A total of 14 pulp samples and their associated crushed rejects were received as two separate shipments on August 4 and August 17, 2017, respectively. Detailed information regarding the samples received is listed in Appendix I - Sample Origin. The objective of this assessment was to determine the mineral assemblage of three selected samples, 17VIC-4, 17VIC-5 and 17VIC-9.

QEMSCAN sample mounts were subsequently prepared using the pulp samples and analyzed using a Particle Mineral Analysis (PMA) protocol in order to aid in the identification of the arsenic bearing mineral phases. Chemical assays were provided by ALS Minerals North Vancouver. A summary of the assay results is located in Table 1 and detailed results are located in Appendix II - Special Data. Detailed mineralogical results are located in Appendix III.

TABLE 1
ASSAY RESULTS

Product	Elements for Assay - percent				
	As	Co	Fe	Mo	S
17VIC-4	20.2	1.71	11.0	0.41	4.37
17VIC-5	26.2	2.75	10.5	0.24	1.87
17VIC-9	2.68	0.24	5.98	<0.01	0.93

The primary minerals in samples 17VIC-4 and 17VIC-5 were identified as amphiboles and the arsenic bearing minerals arsenopyrite and safflorite/lollingite. In sample 17VIC-4, arsenopyrite was identified as the main arsenic bearing mineral at approximately 24 percent while safflorite/lollingite measured approximately 12 percent in content. This was in contrast to sample 17VIC-5, as the main arsenic bearing mineral was identified as safflorite/lollingite and measured approximately 32 percent in content; arsenopyrite measured at approximately 9 percent. Quartz was also detected in both samples and range in content from 8 to 9 percent. Other non-sulphide gangue minerals present in lesser amounts in both samples included chlorite, apatite, micas and carbonates. Epidote was measured at approximately 3 percent in sample 17VIC-4.

The mineral assemblage for sample 17VIC-9 varied from the other two samples. The primary minerals detected were quartz, carbonates and micas with amphiboles, feldspars and chlorite present in minor amounts. Arsenopyrite was identified as the main arsenic bearing mineral and composed of approximately 5 percent of the sample. Trace amounts of safflorite/lollingite were also detected.

In sample 17VIC-4, approximately 57 percent of the arsenic was associated with arsenopyrite with the majority of the remaining arsenic associated with safflorite/lollingite. In sample 17VIC-5, approximately 83 percent of the arsenic was associated with safflorite/lollingite while approximately 16 percent of the arsenic measured was associated with arsenopyrite. In sample 17VIC-9, approximately 98 percent of the arsenic was associated with arsenopyrite with the majority of the remaining arsenic associated with safflorite/lollingite. Cobalt distribution within the samples was similar to the arsenic distribution. Sulphur was mostly associated with arsenopyrite in all three samples.

Approximately 8 and 10 percent of the sulphur was associated with molybdenite in the 17VIC-4 and 17VIC-5 samples, respectively, while approximately 3 percent of the sulphur measured was associated with molybdenite in the 17VIC-9 sample.

A few gold bearing particles were also observed in sample 17VIC-4. The majority of the gold bearing particles were identified as a gold/silver alloy that was composed of approximately 5 percent silver and 95 percent gold.

To further investigate the metallurgical properties of the samples the following test work is recommended on the crushed rejects.

- Flotation testing: This would provide a good indication of gold association with arsenopyrite, since that and molybdenum are the only 2 main species that should float.
- Cyanide leaching: As the arsenopyrite may be difficult to sell as a concentrate, this method may be the most effective way to treat this material.
- Gravity Recovery: This would provide information on what can be recovered by grinding and non-chemical methods. Unfortunately this method may have high mass recoveries due the high levels of arsenic bearing minerals and may result in a concentrate that incurs some high penalty elements.

Thank you for the opportunity to participate in your mineralogical studies. If you have any questions regarding this report, or the results generated by this program, please do not hesitate to contact us.

Regards,

Kendall Culligan, GIT
Mineralogist

P. J. MEHRFERT
24527

Aug 21, 2017

Peter Mehrfert, P. Eng.
Operations Manager
ALS Metallurgy - Kamloops

APPENDIX I - KM5437

SAMPLE ORIGIN

1.0 Sample Origin

Fourteen pulp samples and their associated crushed rejects were received as two separate shipments on August 4 and August 17, 2017, respectively. These samples were sent to ALS Metallurgy Kamloops by ALS Minerals North Vancouver on the behalf of American Manganese Inc. The samples are listed in Table I-1 and I-2.

TABLE I-1
MASS AND IDENTIFICATION OF THE ROCHE DEBOULE PULP SAMPLES
RECEIVED AUGUST 4, 2017

Sample ID	Weight (kilograms)
17VIC-01	0.229
17VIC-02	0.223
17VIC-03	0.277
17VIC-04	0.223
17VIC-05	0.228
17VIC-06	0.249
17VIC-07	0.238
17VIC-08	0.249
17VIC-09	0.234
17VIC-10	0.275
17VIC-11	0.259
17VIC-12	0.261
17VIC-13	0.269
17VIC-14	0.207

TABLE I-2
MASS AND IDENTIFICATION OF THE ROCHE DEBOULE CRUSHED REJECTS RECEIVED AUGUST 17, 2017

Sample ID	Weight (kilograms)
17VIC-01	1.01
17VIC-02	0.92
17VIC-03	1.73
17VIC-04	0.88
17VIC-05	0.52
17VIC-06	1.24
17VIC-07	0.77
17VIC-08	0.10
17VIC-09	0.37
17VIC-10	0.99
17VIC-11	0.82
17VIC-12	0.33
17VIC-13	0.46
17VIC-14	0.73

ALS Canada Ltd.
2103 Dollarton Hwy
North Vancouver BC V7H 0A7
Phone: +1 (604) 984 0221   Fax: +1 (604) 984 0218
www.alsglobal.com

Appendix II KM 5437

To: KIKAUKA, ANDRIS
4199 HIGHWAY 101
POWELL RIVER BC V8A 0C7

Page: 1
Total # Pages: 2 (A - D)
Plus Appendix Pages
Finalized Date: 26-JUL-2017
Account: KIKAND

CERTIFICATE VA17142788

Project: Rocher Deboule Victoria

This report is for 14 Rock samples submitted to our lab in Vancouver, BC, Canada on 10-JUL-2017.

The following have access to data associated with this certificate:

ANDRIS KIKAUKA		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-22	Sample login - Rcd w/o BarCode
CRU-QC	Crushing QC Test
PUL-QC	Pulverizing QC Test
CRU-31	Fine crushing - 70% <2mm
SPL-21	Split sample - riffle splitter
PUL-31	Pulverize split to 85% <75 um

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-OG46	Ore Grade Elements - AquaRegia	ICP-AES
Au-GRA21	Au 30g FA-GRAV finish	WST-SIM
As-OG46	Ore Grade As - Aqua Regia	ICP-AES
Co-OG46	Ore Grade Co - Aqua Regia	ICP-AES
ME-MS41	Ultra Trace Aqua Regia ICP-MS	

To: **KIKAUKA, ANDRIS**
4199 HIGHWAY 101
POWELL RIVER BC V8A 0C7

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

To: **KIKAUKA, ANDRIS**
4199 HIGHWAY 101
POWELL RIVER BC V8A 0C7

Project: Rocher Deboule Victoria

CERTIFICATE OF ANALYSIS VA17142788

Method	WEI-21	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
Analyte	Recvd Wt.	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs
Units	kg	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Sample Description LOR	0.02	0.01	0.01	0.1	0.02	10	10	0.05	0.01	0.01	0.01	0.02	0.1	1	0.05
17VIC-1	1.28	2.32	0.37	>10000	8.77	<10	20	0.12	83.9	2.59	0.28	5.33	3400	2	0.89
17VIC-2	1.20	3.67	0.58	>10000	>25.0	<10	20	0.29	1815	1.73	0.14	24.6	>10000	1	3.24
17VIC-3	2.04	0.77	3.16	451	0.22	<10	70	0.35	4.97	3.05	0.40	12.90	48.7	17	0.21
17VIC-4	1.16	7.75	0.50	>10000	>25.0	<10	10	0.06	318	0.85	<0.01	199.5	>10000	2	0.23
17VIC-5	0.78	2.84	0.47	>10000	>25.0	<10	<10	0.07	1650	1.05	<0.01	7.72	>10000	1	0.77
17VIC-6	1.54	1.95	0.64	>10000	>25.0	<10	20	0.10	783	2.36	<0.01	23.6	>10000	1	3.72
17VIC-7	1.04	7.95	0.31	>10000	>25.0	<10	10	0.09	156.0	1.55	<0.01	>500	>10000	2	0.24
17VIC-8	0.38	0.21	0.41	4730	0.18	10	70	0.15	1.05	0.06	0.73	>500	222	9	0.57
17VIC-9	0.60	20.4	0.75	>10000	13.65	10	30	0.54	230	9.20	0.46	21.6	2360	8	3.62
17VIC-10	1.24	2.04	3.98	3760	0.12	<10	20	0.66	1.47	0.19	0.17	4.82	138.0	11	1.14
17VIC-11	1.06	0.17	4.30	58.3	0.04	<10	340	0.45	0.57	0.72	0.18	34.8	35.1	30	22.6
17VIC-12	0.58	1.57	2.64	96.4	<0.02	<10	330	0.14	0.22	0.36	0.38	20.8	11.2	13	10.00
17VIC-13	0.70	2.22	3.45	34.5	0.07	<10	380	0.41	0.44	5.90	0.19	>500	9.1	36	31.9
17VIC-14	0.98	22.4	1.07	>10000	>25.0	<10	80	0.11	1060	1.41	0.01	169.5	>10000	8	0.64

ALS Canada Ltd.

2103 Dollarton Hwy
North Vancouver BC V7H 0A7
Phone: +1 (604) 984 0221 Fax: +1 (604) 984 0218
www.alsglobal.com

To: **KIKAUKA, ANDRIS**
4199 HIGHWAY 101
POWELL RIVER BC V8A 0C7

Project: Rocher Deboule Victoria

CERTIFICATE OF ANALYSIS VA17142788

Sample Description	Method Analyte Units LOR	ME-MS41 Cu ppm 0.2	ME-MS41 Fe % 0.01	ME-MS41 Ga ppm 0.05	ME-MS41 Ge ppm 0.05	ME-MS41 Hf ppm 0.02	ME-MS41 Hg ppm 0.01	ME-MS41 In ppm 0.005	ME-MS41 K % 0.01	ME-MS41 La ppm 0.2	ME-MS41 Li ppm 0.1	ME-MS41 Mg % 0.01	ME-MS41 Mn ppm 5	ME-MS41 Mo ppm 0.05	ME-MS41 Na % 0.01	ME-MS41 Nb ppm 0.05
17VIC-1		7.7	1.62	3.00	0.19	0.02	0.03	0.170	0.01	2.8	4.4	0.66	347	2260	0.02	<0.05
17VIC-2		2.3	10.70	6.10	0.32	0.04	0.09	0.312	0.08	20.2	5.7	0.31	164	2310	0.02	0.09
17VIC-3		514	4.69	7.55	0.24	0.22	0.01	0.045	<0.01	5.9	22.5	0.97	457	9.39	0.02	0.10
17VIC-4		4.5	11.00	3.78	0.43	0.02	0.15	0.103	0.02	159.5	8.1	0.43	189	4130	0.02	0.13
17VIC-5		1.1	10.50	8.31	0.34	<0.02	0.12	0.195	0.02	5.5	4.8	0.53	218	2410	0.01	0.12
17VIC-6		1.5	8.21	6.53	0.38	0.02	0.09	0.230	0.07	15.1	6.0	0.56	298	1885	0.02	0.13
17VIC-7		37.8	1.47	5.99	0.77	0.02	0.03	0.125	0.03	600	2.7	0.38	134	5960	0.03	0.08
17VIC-8		43.5	3.00	5.49	0.52	0.05	0.01	0.068	0.22	610	1.9	0.04	953	314	0.01	<0.05
17VIC-9		12.0	5.98	2.13	0.06	<0.02	0.03	0.101	0.24	12.5	7.8	0.89	1160	33.2	0.01	<0.05
17VIC-10		5090	15.15	15.30	0.16	0.03	0.01	0.451	0.17	2.9	34.5	1.19	500	125.0	0.01	<0.05
17VIC-11		60.8	7.89	11.30	0.26	0.03	0.12	0.089	1.54	16.6	45.8	1.15	1420	3.93	0.09	0.12
17VIC-12		410	12.30	10.20	0.34	0.03	0.12	0.167	1.15	9.5	12.7	0.63	699	6.25	0.02	0.23
17VIC-13		3950	28.2	51.0	1.20	0.26	0.12	0.884	2.06	620	45.6	0.67	2150	11.05	0.02	0.07
17VIC-14		18.3	8.41	6.51	0.29	0.07	0.32	0.120	0.13	136.5	23.0	0.81	433	905	0.02	1.60

To: **KIKAUKA, ANDRIS**
4199 HIGHWAY 101
POWELL RIVER BC V8A 0C7

Project: Rocher Deboule Victoria

CERTIFICATE OF ANALYSIS VA17142788

Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
Analyte	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti
Units	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
Sample Description LOR	0.2	10	0.2	0.1	0.001	0.01	0.05	0.1	0.2	0.2	0.2	0.01	0.01	0.2	0.005
17VIC-1	310	1310	1.0	0.5	0.553	0.24	2.46	1.7	2.0	0.3	18.6	<0.01	12.30	<0.2	0.007
17VIC-2	639	1000	2.9	11.4	0.142	2.10	32.3	0.7	37.4	0.3	159.0	<0.01	306	0.2	0.007
17VIC-3	102.0	1770	15.1	0.3	0.001	1.32	0.33	7.3	2.4	0.5	23.8	0.01	0.93	0.6	0.088
17VIC-4	3020	2680	6.6	0.8	0.149	4.37	56.5	0.6	23.3	<0.2	16.1	<0.01	181.5	8.7	0.008
17VIC-5	3500	1160	2.3	2.0	0.820	1.87	45.1	0.6	23.8	<0.2	41.6	<0.01	222	0.3	0.006
17VIC-6	1745	4940	7.2	19.8	0.356	1.90	41.1	0.8	19.2	0.3	112.0	<0.01	163.5	4.9	0.008
17VIC-7	423	5180	3.5	1.4	0.466	0.49	15.10	0.7	9.6	0.2	23.8	<0.01	143.5	4.3	0.010
17VIC-8	33.0	430	2.9	13.9	0.013	0.12	3.07	4.7	2.0	<0.2	9.4	<0.01	0.63	21.2	<0.005
17VIC-9	601	80	346	15.6	0.008	0.93	17.85	15.7	3.5	<0.2	124.0	<0.01	33.2	1.4	<0.005
17VIC-10	137.0	480	5.6	18.2	0.008	3.40	4.42	14.7	10.9	0.8	5.2	<0.01	0.71	0.2	0.029
17VIC-11	38.7	1790	4.2	78.3	0.001	0.01	0.18	9.4	1.1	0.3	39.5	<0.01	0.19	1.4	0.227
17VIC-12	4.4	3080	36.5	60.1	0.001	0.88	2.10	8.1	13.8	0.4	41.6	<0.01	0.53	0.4	0.196
17VIC-13	8.0	60	1.8	224	0.001	0.54	0.74	28.6	3.2	2.2	80.4	<0.01	0.16	37.0	0.255
17VIC-14	5660	5420	21.0	4.9	1.885	0.38	33.4	1.7	10.5	0.3	39.0	0.01	192.5	12.2	0.044

To: **KIKAUKA, ANDRIS**
4199 HIGHWAY 101
POWELL RIVER BC V8A 0C7

Project: Rocher Deboule Victoria

CERTIFICATE OF ANALYSIS VA17142788

Sample Description	Method Analyte Units LOR	ME-MS41 Tl ppm 0.02	ME-MS41 U ppm 0.05	ME-MS41 V ppm 1	ME-MS41 W ppm 0.05	ME-MS41 Y ppm 0.05	ME-MS41 Zn ppm 2	ME-MS41 Zr ppm 0.5	Au-GRA21 Au ppm 0.05	As-OG46 As % 0.001	Co-OG46 Co % 0.0005
17VIC-1		<0.02	8.39	80	0.21	3.72	33	0.5		1.555	
17VIC-2		0.30	76.3	89	2.55	3.74	23	1.1	110.5	18.05	1.535
17VIC-3		0.05	0.85	60	0.11	11.00	109	6.2			
17VIC-4		0.04	451	37	0.56	7.45	23	0.7	126.0	20.2	1.705
17VIC-5		0.25	51.6	49	0.88	4.29	17	0.6	96.8	26.2	2.75
17VIC-6		0.33	457	53	0.81	11.60	27	0.7	56.8	15.55	2.05
17VIC-7		0.13	254	41	0.61	10.15	10	0.7	119.0	9.72	2.46
17VIC-8		0.12	3.53	24	0.13	20.4	779	1.4			
17VIC-9		0.13	7.40	49	0.06	28.3	35	<0.5		2.68	
17VIC-10		0.12	1.13	217	0.07	3.49	61	0.7			
17VIC-11		1.10	0.58	95	0.13	15.10	170	1.1			
17VIC-12		1.36	0.51	86	1.11	15.40	169	1.2			
17VIC-13		1.61	2.25	811	0.23	51.7	89	6.1			
17VIC-14		0.12	635	67	1.62	13.25	60	1.7	164.0	18.80	1.135

ALS Canada Ltd.

2103 Dollarton Hwy
North Vancouver BC V7H 0A7
Phone: +1 (604) 984 0221 Fax: +1 (604) 984 0218
www.alsglobal.com

To: **KIKAUKA, ANDRIS**
4199 HIGHWAY 101
POWELL RIVER BC V8A 0C7

Page: Appendix 1
Total # Appendix Pages: 1
Finalized Date: 26-JUL-2017
Account: KIKAND

Project: Rocher Deboule Victoria

CERTIFICATE OF ANALYSIS VA17142788

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).

Applies to Method: ME-MS41

LABORATORY ADDRESSES

Processed at ALS Vancouver located at 2103 Dollarton Hwy, North Vancouver, BC, Canada.

Applies to Method:

As-OG46	Au-GRA21	Co-OG46	CRU-31
CRU-QC	LOG-22	ME-MS41	ME-OG46
PUL-31	PUL-QC	SPL-21	WEI-21

SAMPLE PREPARATION PACKAGE

PREP- 31

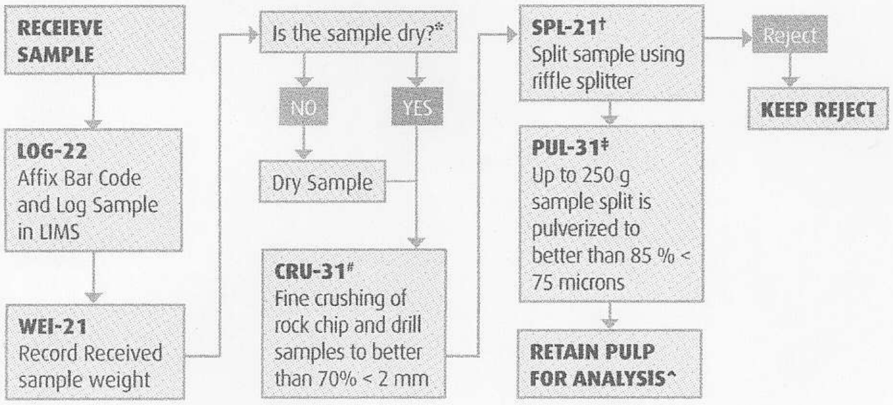
STANDARD SAMPLE PREPARATION: DRY, CRUSH, SPLIT AND PULVERIZE

Sample preparation is the most critical step in the entire laboratory operation. The purpose of preparation is to produce a homogeneous analytical sub-sample that is fully representative of the material submitted to the laboratory.

The sample is logged in the tracking system, weighed, dried and finely crushed to better than 70 % passing a 2 mm (Tyler 9 mesh, US Std. No.10) screen. A split of up to 250 g is taken and pulverized to better than 85 % passing a 75 micron (Tyler 200 mesh, US Std. No. 200) screen. This method is appropriate for rock chip or drill samples.

METHOD CODE	DESCRIPTION
LOG-22	Sample is logged in tracking system and a bar code label is attached.
DRY-21	Drying of excessively wet samples in drying ovens. This is the default drying procedure for most rock chip and drill samples.
CRU-31	Fine crushing of rock chip and drill samples to better than 70% of the sample passing 2 mm.
SPL-21	Split sample using riffle splitter.
PUL-31	A sample split of up to 250 g is pulverized to better than 85% of the sample passing 75 microns.

FLOW CHART - SAMPLE PREPARATION PACKAGE – PREP-31 STANDARD SAMPLE PREPARATION: DRY, CRUSH, SPLIT AND PULVERIZE



*If samples air-dry overnight, no charge to client. If samples are excessively wet, the sample should be dried to a maximum of 120°C. (**DRY-21**)

#QC testing of crushing efficiency is conducted on random samples (**CRU-QC**).

†The sample reject is saved or dumped pending client instructions. Prolonged storage (> 45 days) of rejects will be charged to the client.

‡QC testing of pulverizing efficiency is conducted on random samples (**PUL-QC**).

^Lab splits are required when analyses must be performed at a location different than where samples received.

ALS Minerals

GEOCHEMICAL PROCEDURE

ME- MS41

ULTRA- TRACE LEVEL METHODS USING ICP- MS AND ICP- AES

SAMPLE DECOMPOSITION

Aqua Regia Digestion (GEO-AR01)

ANALYTICAL METHOD

Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES)
Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)

A prepared sample (0.50 g) is digested with aqua regia in a graphite heating block. After cooling, the resulting solution is diluted to with deionized water, mixed and analyzed by inductively coupled plasma-atomic emission spectrometry. Following this analysis, the results are reviewed for high concentrations of bismuth, mercury, molybdenum, ment spectral interferences.

ELEMENT	SYMBOL	UNITS	LOWER LIMIT	UPPER LIMIT
Silver	Ag	ppm	0.01	100
Aluminum	Al	%	0.01	25
Arsenic	As	ppm	0.1	10 000
Gold	Au	ppm	0.2	25
Boron	B	ppm	10	10 000
Barium	Ba	ppm	10	10 000
Beryllium	Be	ppm	0.05	1 000
Bismuth	Bi	ppm	0.01	10 000
Calcium	Ca	%	0.01	25
Cadmium	Cd	ppm	0.01	1 000
Cerium	Ce	ppm	0.02	500
Cobalt	Co	ppm	0.1	10 000
Chromium	Cr	ppm	1	10 000
Cesium	Cs	ppm	0.05	500
Copper	Cu	ppm	0.2	10 000
Iron	Fe	%	0.01	50
Gallium	Ga	ppm	0.05	10 000
Germanium	Ge	ppm	0.05	500
Hafnium	Hf	ppm	0.02	500

ALS Minerals

ME- MS41

ELEMENT	SYMBOL	UNITS	LOWER LIMIT	UPPER LIMIT
Mercury	Hg	ppm	0.01	10 000
Indium	In	ppm	0.005	500
Potassium	K	%	0.01	10
Lanthanum	La	ppm	0.2	10 000
Lithium	Li	ppm	0.1	10 000
Magnesium	Mg	%	0.01	25
Manganese	Mn	ppm	5	50 000
Molybdenum	Mo	ppm	0.05	10 000
Sodium	Na	%	0.01	10
Niobium	Nb	ppm	0.05	500
Nickel	Ni	ppm	0.2	10 000
Phosphorus	P	ppm	10	10 000
Lead	Pb	ppm	0.2	10 000
Rubidium	Rb	ppm	0.1	10 000
Rhenium	Re	ppm	0.001	50
Sulphur	S	%	0.01	10
Antimony	Sb	ppm	0.05	10 000
Scandium	Sc	ppm	0.1	10 000
Selenium	Se	ppm	0.2	1 000
Tin	Sn	ppm	0.2	500
Strontium	Sr	ppm	0.2	10 000
Tantalum	Ta	ppm	0.01	500
Tellurium	Te	ppm	0.01	500
Thorium	Th	ppm	0.2	10000
Titanium	Ti	%	0.005	10
Thallium	Tl	ppm	0.02	10 000
Uranium	U	ppm	0.05	10 000
Vanadium	V	ppm	1	10 000
Tungsten	W	ppm	0.05	10 000
Yttrium	Y	ppm	0.05	500
Zinc	Zn	ppm	2	10 000
Zirconium	Zr	ppm	0.5	500

NOTE: In the majority of geological matrices, data reported from an aqua regia leach should be considered as representing only the leachable portion of the particular analyte.

ALS Minerals

ASSAY PROCEDURE

ME- OG46

ORE GRADE ELEMENTS BY AQUA REGIA DIGESTION USING CONVENTIONAL ICP- AES ANALYSIS

SAMPLE DECOMPOSITION

HNO_3 -HCl Digestion (ASY-4R01)

ANALYTICAL METHOD

Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP - AES)*

Assays for the evaluation of ores and high-grade materials are optimized for accuracy and precision at high concentrations. Ultra high concentration samples (> 15 -20%) may require the use of methods such as titrimetric and gravimetric analysis, in order to achieve maximum accuracy.

A prepared sample is digested in 75% aqua regia for 120 minutes. After cooling, the resulting solution is diluted to volume (100 mL) with de-ionized water, mixed and then analyzed by inductively coupled plasma - atomic emission spectrometry or by atomic absorption spectrometry.

***NOTE:** ICP-AES is the default finish technique for ME-OG46. However, under some conditions and at the discretion of the laboratory an AA finish may be substituted. The certificate will clearly reflect which instrument finish was used.

ELEMENT	SYMBOL	UNITS	LOWER LIMIT	UPPER LIMIT
Silver	Ag	ppm	1	1,500
Arsenic	As	%	0.01	30
Cadmium	Cd	%	0.001	10
Cobalt	Co	%	0.001	20
Copper	Cu	%	0.001	40
Iron	Fe	%	0.01	100
Manganese	Mn	%	0.01	50
Molybdenum	Mo	%	0.001	10
Nickel	Ni	%	0.001	10
Lead	Pb	%	0.001	20
Zinc	Zn	%	0.001	60

APPENDIX III - KM5437

MINERALOGICAL DATA

TABLE 1A
MINERAL COMPOSITION OF ROCHE DEBOULE SAMPLES
KM5437

Minerals	17VIC-4	17VIC-5	17VIC-9
Arsenopyrite	23.5	8.6	5.1
Safflorite/Lollingite	12.0	32.2	0.1
Arsenates	0.5	1.2	<0.1
Molybdenite	0.7	0.4	<0.1
Pyrite	<0.1	<0.1	<0.1
Iron Oxides	0.1	<0.1	0.3
Amphibole	41.7	45.7	5.9
Quartz	9.2	7.6	37.6
Carbonates	0.2	0.1	30.7
Micas	0.6	0.3	11.5
Feldspars	4.0	0.1	3.9
Chlorite	2.2	1.8	2.4
Apatite	1.4	0.8	0.1
Epidote	3.0	<0.1	<0.1
Titanium Minerals	<0.1	0.1	0.7
Others	0.8	1.1	1.6
Total	100	100	100

Notes: 1) Iron Oxides includes Magnetite, Hematite, Goethite/Limonite and Tramp Iron.

2) Carbonates includes Calcite and Ankerite.

3) Micas includes Muscovite and Biotite/Phlogopite.

4) Feldspars includes K-Feldspar and trace amounts of Feldspar-Albite and Plagioclase Feldspar.

5) Titanium Minerals includes Rutile/Anatase, Sphene (Titanite) and Ilmenite.

6) Others includes Zircon, Galena, Sphalerite, Copper Sulphides, Gold/Electrum, Uranium Oxides, Lead Bismuth Sulfosalt, Native Bismuth, Bismuth Telluride and unresolved mineral species.

7) A Particle Mineral Analysis (PMA) was used for these measurements.

TABLE 1B
% ARSENIC BEARING MINERAL OF TOTAL ARSENIC
KM5437

Mineral	17VIC-4	17VIC-5	17VIC-9
Arsenopyrite	57.4	15.6	97.6
Safflorite/Lollingite	41.5	82.8	1.7
Other Arsenic Minerals	1.1	1.5	0.7
Total	100	100	100

Note: Other Arsenic Minerals includes Arsenates and trace amounts of Uranium Oxides.

TABLE 1C
% COBALT BEARING MINERAL OF TOTAL COBALT

Mineral	17VIC-4	17VIC-5	17VIC-9
Arsenopyrite	55.9	14.9	97.6
Safflorite/Lollingite	43.1	85.1	2.2
Arsenates	0.9	<0.1	0.2
Total	100	100	100

TABLE 1D
% SULPHUR BEARING MINERAL OF TOTAL SULPHUR

Mineral	17VIC-4	17VIC-5	17VIC-9
Arsenopyrite	90.5	86.8	95.1
Safflorite/Lollingite	<0.1	0.6	<0.1
Arsenates	1.5	<0.1	<0.1
Molybdenite	7.6	11.9	2.6
Other Sulphur Minerals	0.4	0.6	2.3
Total	100	100	100

Note: Other Sulphur Minerals includes Pyrite, Galena, Sphalerite, Copper Sulphides and Lead Bismuth Sulfosalt.

TABLE 1E
CHEMICAL COMPOSITION OF ROCHE DEBOULE SAMPLES
KM5437

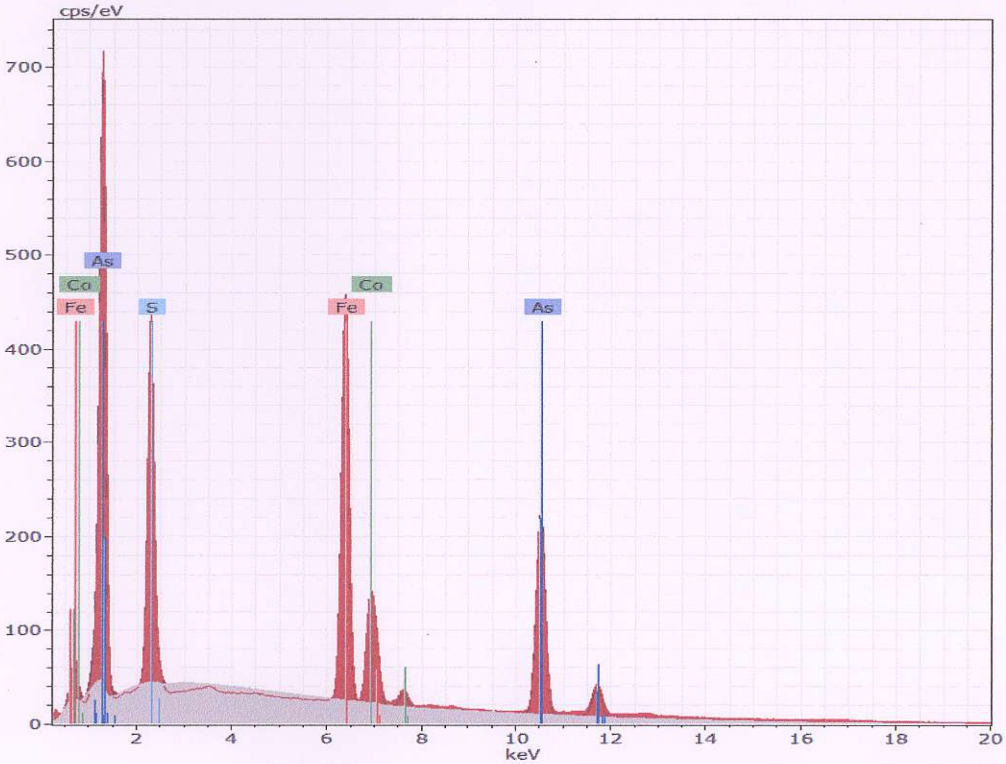
Element	Assay Methods	17VIC-4	17VIC-5	17VIC-9
As	QEMSCAN	21.3	28.7	2.71
	Chemical	20.2	26.2	2.68
Co	QEMSCAN	2.29	3.15	0.28
	Chemical	1.71	2.75	0.24
Fe	QEMSCAN	13.3	12.4	5.14
	Chemical	11.0	10.5	5.98
Mo	QEMSCAN	0.41	0.25	<0.01
	Chemical	0.41	0.24	<0.01
S	QEMSCAN	3.65	1.39	0.76
	Chemical	4.37	1.87	0.93

TABLE 2
QEMSCAN X-RAY ANALYSIS ON ARSENOPYRITE PARTICLES
KM5437

Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
1	Sulfur	K-series	11.0	13.9	25.0	1.3
	Iron	K-series	22.4	28.4	29.3	1.8
	Arsenic	K-series	41.4	52.5	40.4	3.3
	Cobalt	K-series	4.2	5.3	5.2	0.4
		Sum:	79.0	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
2	Sulfur	K-series	10.9	13.9	25.0	1.3
	Iron	K-series	22.1	28.1	29.1	1.8
	Arsenic	K-series	41.3	52.6	40.5	3.3
	Cobalt	K-series	4.3	5.5	5.4	0.4
		Sum:	78.5	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
3	Iron	K-series	20.0	25.9	26.8	1.6
	Cobalt	K-series	3.8	4.9	4.8	0.4
	Arsenic	K-series	40.4	52.3	40.4	3.2
	Sulfur	K-series	10.6	13.8	24.8	1.2
	Nickel	K-series	2.5	3.2	3.1	0.3
		Sum:	77.2	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
4	Sulfur	K-series	11.0	14.0	25.3	1.3
	Iron	K-series	19.6	25.1	25.9	1.6
	Cobalt	K-series	5.8	7.5	7.3	0.5
	Arsenic	K-series	40.5	51.8	39.9	3.2
	Nickel	K-series	1.3	1.6	1.6	0.2
		Sum:	78.1	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
5	Sulfur	K-series	10.0	13.1	23.8	0.4
	Iron	K-series	20.4	26.6	27.8	0.5
	Cobalt	K-series	5.1	6.6	6.6	0.2
	Arsenic	K-series	41.2	53.7	41.8	1.1
		Sum:	76.7	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
6	Sulfur	K-series	10.5	13.7	24.7	1.2
	Iron	K-series	19.5	25.3	26.3	1.6
	Cobalt	K-series	5.4	7.0	6.9	0.5
	Arsenic	K-series	40.4	52.4	40.5	3.2
	Nickel	K-series	1.3	1.6	1.6	0.2
		Sum:	77.1	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
7	Sulfur	K-series	12.0	15.7	27.7	1.4
	Iron	K-series	26.1	34.2	34.5	2.1
	Arsenic	K-series	38.4	50.1	37.8	3.0
		Sum:	76.5	100	100	

Note: Particles 1-5 were from sample 17-4 and particles 6-7 were from sample 17-9.

FIGURE 1
QEMSCAN X-RAY ANALYSIS ON ARSENOPYRITE PARTICLES
PARTICLE 1



PARTICLE 3

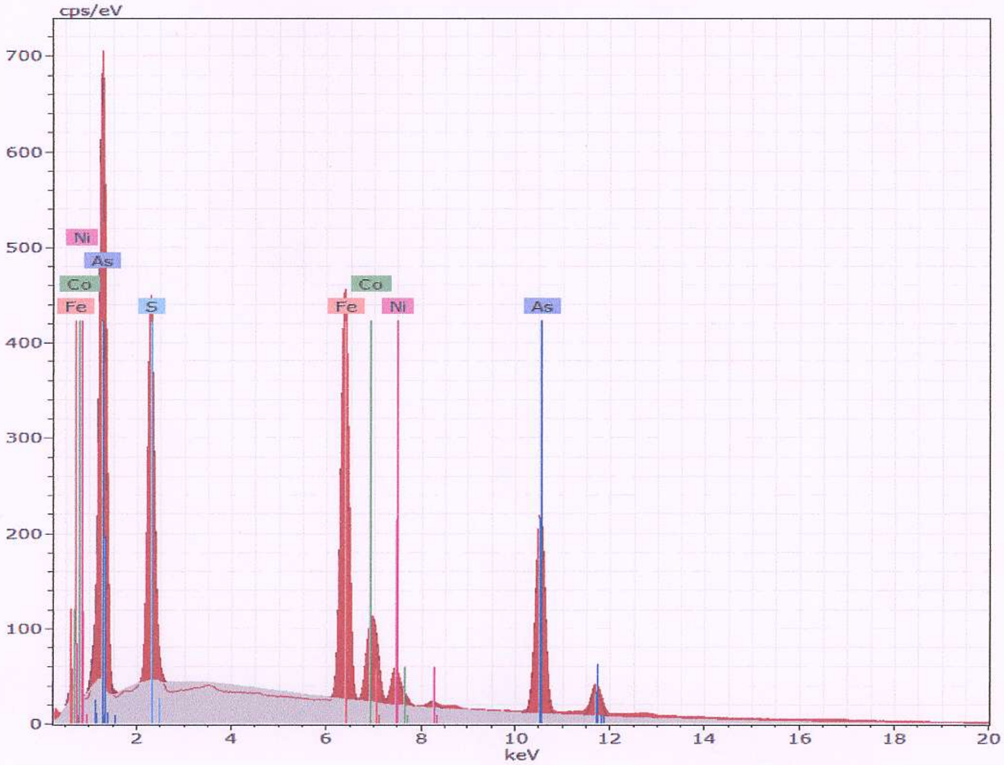
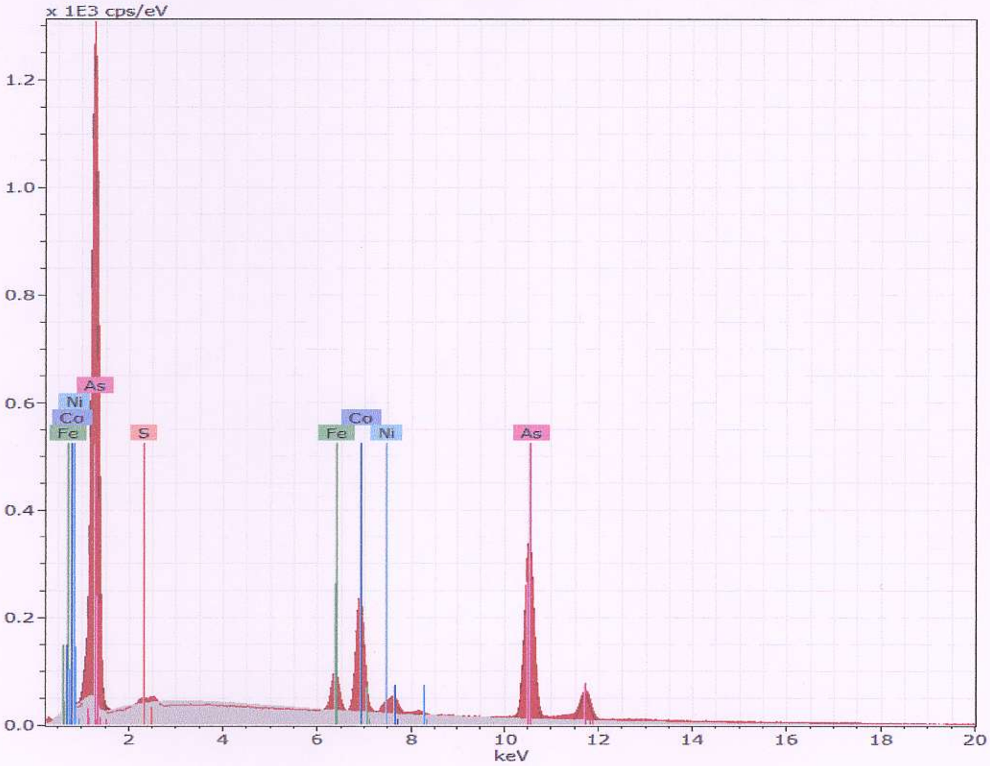


TABLE 3
QEMSCAN X-RAY ANALYSIS ON SAFFLORITE/LOLLINGITE PARTICLES
KM5437

Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
1	Sulfur	K-series	0.9	1.2	2.6	0.2
	Iron	K-series	2.7	3.6	4.5	0.3
	Cobalt	K-series	12.5	16.7	19.7	1.0
	Arsenic	K-series	59.1	78.5	73.2	4.6
		Sum:	75.2	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
2	Sulfur	K-series	0.3	0.4	1.0	0.1
	Iron	K-series	3.3	4.2	5.4	0.3
	Cobalt	K-series	11.6	14.8	17.7	1.0
	Nickel	K-series	1.1	1.4	1.7	0.2
	Arsenic	K-series	61.8	79.1	74.3	4.8
		Sum:	78.2	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
3	Iron	K-series	2.5	3.2	4.1	0.3
	Cobalt	K-series	11.9	15.2	18.3	1.0
	Nickel	K-series	1.7	2.2	2.6	0.2
	Arsenic	K-series	62.3	79.4	75.1	4.8
		Sum:	78.5	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
4	Iron	K-series	14.4	20.2	24.9	1.2
	Arsenic	K-series	52.6	73.8	68.1	4.1
	Cobalt	K-series	4.3	6.0	7.0	0.4
		Sum:	71.3	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
5	Iron	K-series	12.8	16.0	19.8	1.1
	Arsenic	K-series	58.4	73.1	67.4	4.5
	Cobalt	K-series	8.7	10.9	12.8	0.7
		Sum:	80.0	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
6	Iron	K-series	13.7	18.7	23.2	1.1
	Arsenic	K-series	54.8	75.0	69.4	4.3
	Cobalt	K-series	4.6	6.3	7.4	0.4
		Sum:	73.1	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
7	Iron	K-series	0.8	1.1	1.4	0.1
	Arsenic	K-series	59.1	79.9	75.7	4.6
	Cobalt	K-series	14.0	19.0	22.9	1.1
		Sum:	73.9	100	100	

Note: Particles 1-3 were from sample 17-4, particles 4-5 from sample 17-5 and particles 6-7 were from sample 17-9.

FIGURE 2
QEMSCAN X-RAY ANALYSIS ON SAFFLORITE/LOLLINGITE PARTICLES
PARTICLE 2



PARTICLE 6

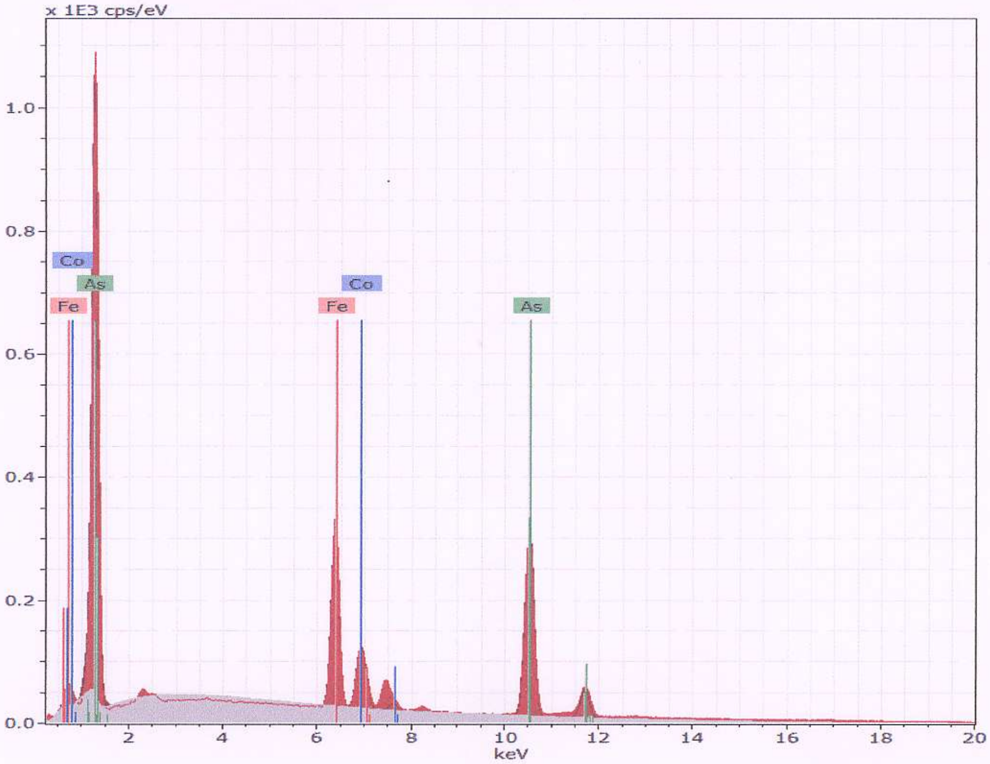


TABLE 4
QEMSCAN X-RAY ANALYSIS ON ARSENATE PARTICLES
KM5437

Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
1	Iron	K-series	24.0	31.9	22.7	1.9
	Oxygen	K-series	15.8	21.0	52.2	5.3
	Arsenic	K-series	35.5	47.1	25.0	2.8
		Sum:	75.4	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
2	Iron	K-series	24.4	31.3	22.2	2.0
	Oxygen	K-series	16.6	21.4	52.8	5.9
	Arsenic	K-series	36.8	47.3	25.0	2.9
		Sum:	77.9	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
3	Iron	K-series	23.6	31.1	22.3	1.9
	Oxygen	K-series	15.8	20.9	52.2	5.7
	Arsenic	K-series	36.3	48.0	25.6	2.9
		Sum:	75.7	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
4	Iron	K-series	18.2	28.2	20.5	1.5
	Oxygen	K-series	11.1	17.1	43.5	3.8
	Arsenic	K-series	27.0	41.6	22.6	2.1
	Calcium	K-series	8.5	13.1	13.3	0.8
		Sum:	64.8	100	100	

Note: Particles 1-4 were from sample 17-5.

FIGURE 3
QEMSCAN X-RAY ANALYSIS ON ARSENATE PARTICLES
PARTICLE 1

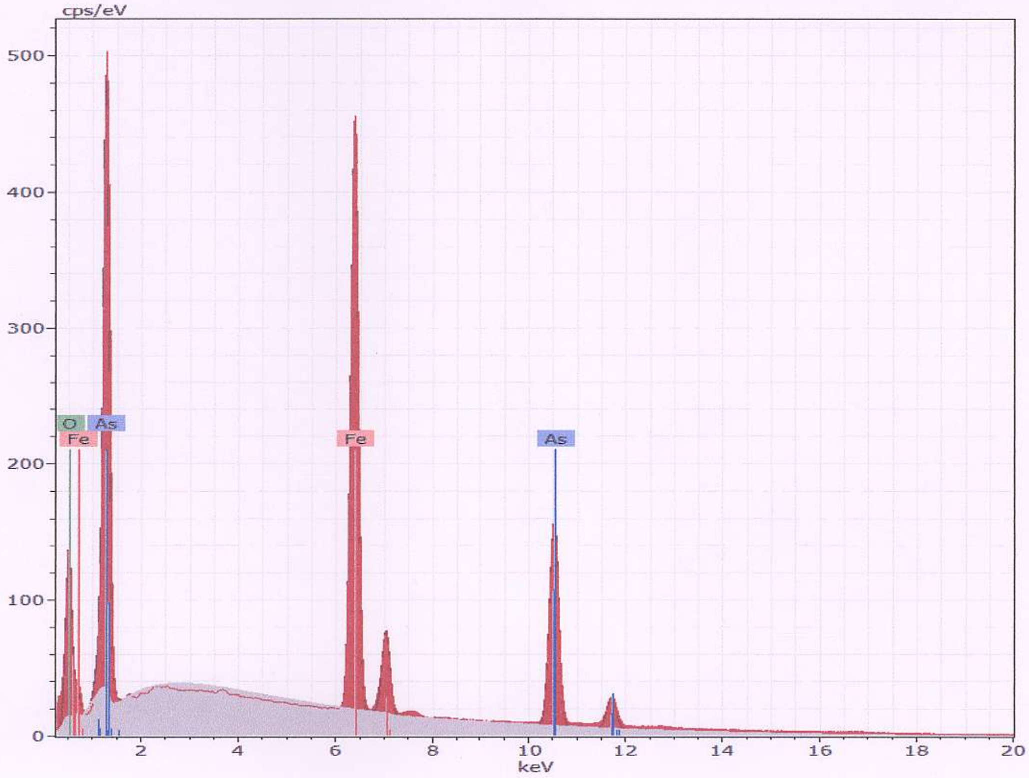


TABLE 5
QEMSCAN X-RAY ANALYSIS ON GOLD PARTICLES
KM5437

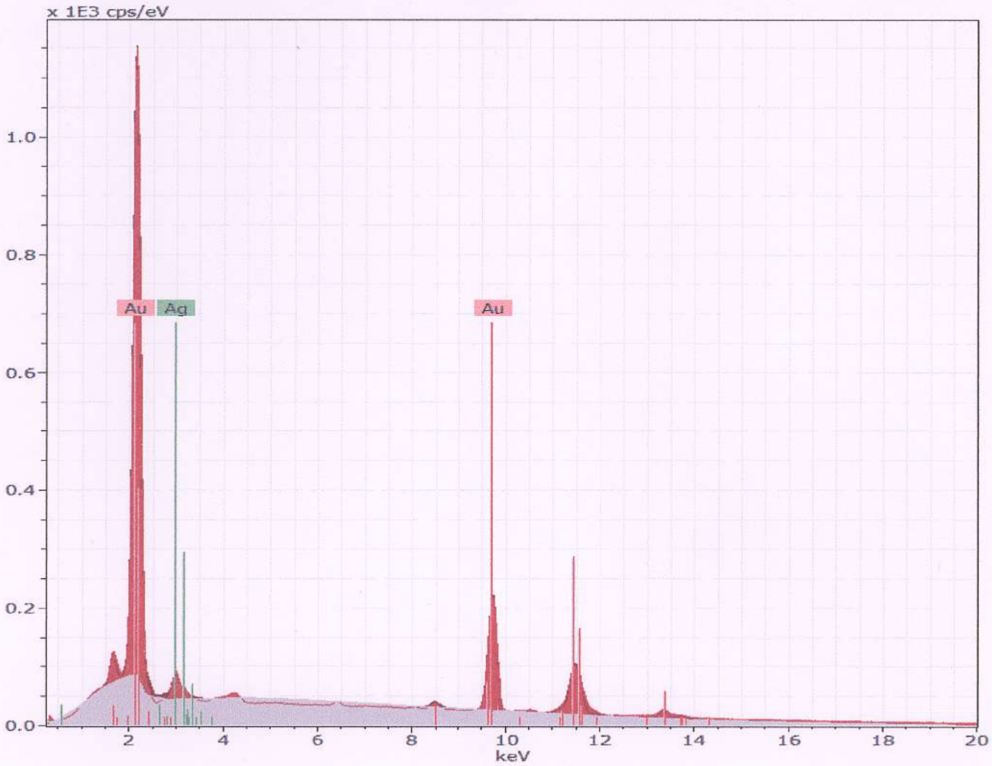
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
1	Gold	L-series	68.0	94.3	90.0	5.3
	Silver	L-series	4.1	5.7	10.0	0.5
		Sum:	72.2	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
2	Gold	L-series	70.1	100	100	5.4
		Sum:	70.1	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
3	Silver	L-series	3.4	4.9	8.5	0.4
	Gold	L-series	66.7	95.1	91.5	5.2
		Sum:	70.1	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
4	Gold	L-series	70.7	94.8	90.9	5.5
	Silver	L-series	3.9	5.2	9.1	0.4
		Sum:	70.1	100	100	

Note: Particles 1-4 were from sample 17-4.

FIGURE 4

QEMSCAN X-RAY ANALYSIS ON GOLD PARTICLES

PARTICLE 1



PARTICLE 2

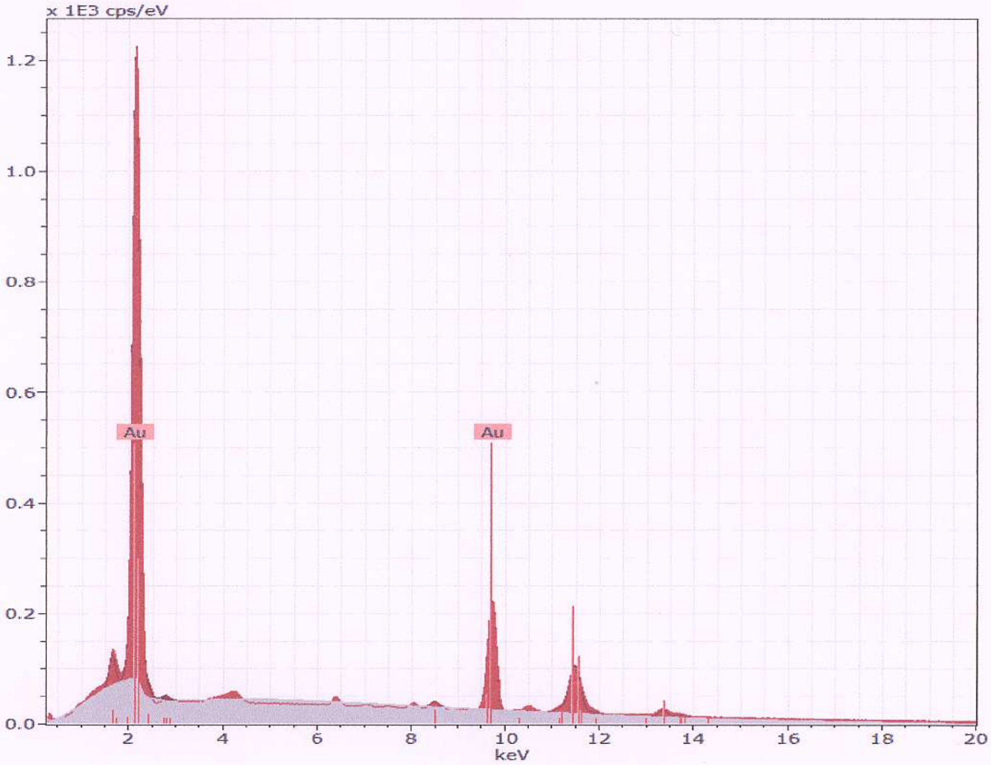
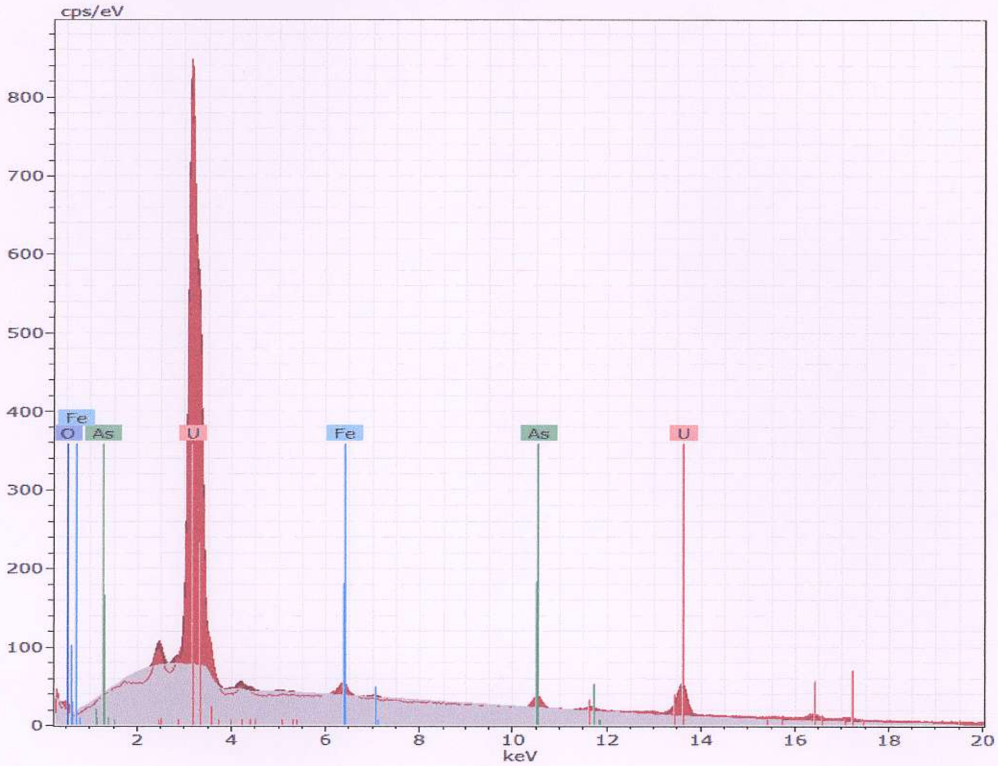


TABLE 6
QEMSCAN X-RAY ANALYSIS ON URANIUM OXIDE PARTICLES
KM5437

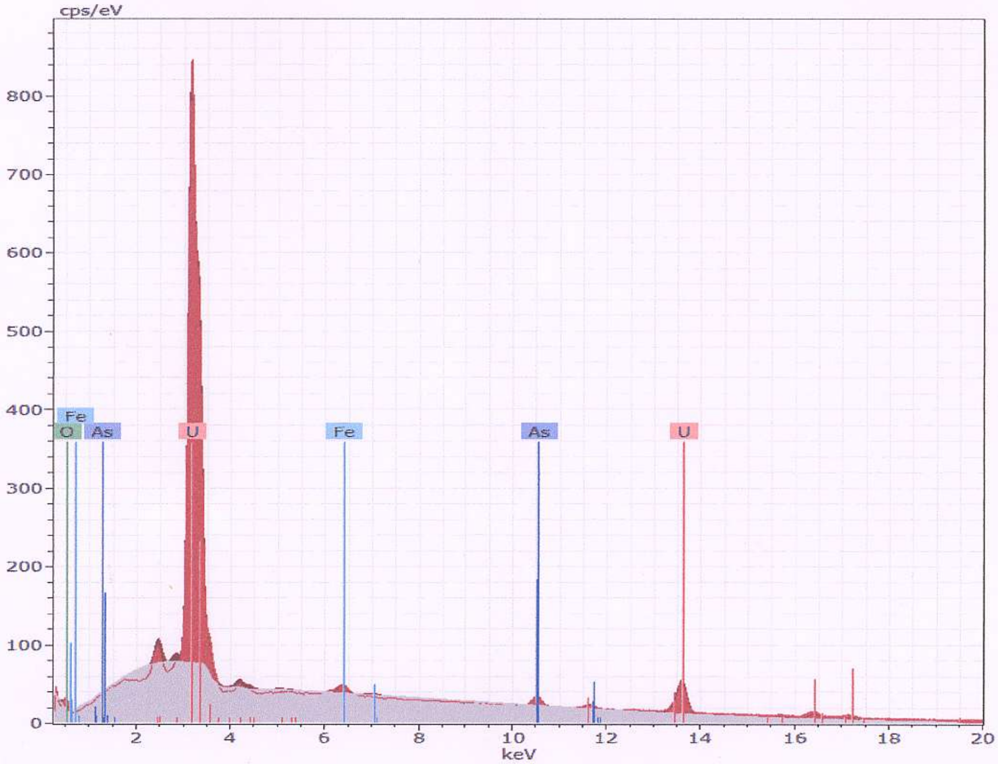
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
1	Uranium	L-series	66.1	91.4	60.0	5.8
	Arsenic	K-series	3.0	4.1	8.6	0.3
	Oxygen	K-series	2.0	2.7	26.6	0.8
	Iron	K-series	1.2	1.7	4.7	0.2
		Sum:	72.3	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
2	Uranium	L-series	67.2	92.3	62.6	5.9
	Arsenic	K-series	2.7	3.7	7.9	0.3
	Oxygen	K-series	1.8	2.5	25.2	0.9
	Iron	K-series	1.1	1.5	4.3	0.2
		Sum:	72.8	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
3	Uranium	L-series	69.6	93.7	64.9	6.1
	Oxygen	K-series	1.9	2.5	25.9	0.8
	Arsenic	K-series	2.1	2.8	6.1	0.2
	Iron	K-series	0.8	1.0	3.1	0.1
		Sum:	74.3	100	100	
Particle	Element	Series	Weight Percent	Normal Weight Percent	Normal Atomic Percent	Error in Percent
4	Uranium	L-series	56.9	81.6	34.9	5.1
	Oxygen	K-series	5.3	7.6	48.1	2.2
	Arsenic	K-series	4.4	6.2	8.5	0.4
	Iron	K-series	3.2	4.6	8.5	0.3
		Sum:	69.7	100	100	

Note: Particles 1-2 were from sample 17-4 and particles 3-4 were from sample 17-5.

FIGURE 5
QEMSCAN X-RAY ANALYSIS ON URANIUM OXIDE PARTICLES
PARTICLE 1



PARTICLE 3



Appendix B Rock Chip Sample Descriptions

Sample ID	Tenure No	Easting NAD 83	Northing NAD 83	Elev (m)	Sample Type	Lithology
17VIC-1	510469	585740	6114955	1562	Rock chip channel	andesitic tuffs-flows
17VIC-2	510469	585951	6114714	1673	Angular float	granodiorite
17VIC-3	510469	585604	6114677	1462	Rock chip channel	andesitic tuffs-flows
17VIC-4	510469	585821	6114786	1562	Rock chip channel	andesitic tuffs-flows
17VIC-5	510469	586105	6114681	1807	Angular float	granodiorite
17VIC-6	510469	586066	6114713	1772	Angular float	granodiorite
17VIC-7	510469	585650	6114450	1703	Angular float	granodiorite
17VIC-8	510469	585679	6114083	1615	Angular float	granodiorite
17VIC-9	510469	585684	6114429	1457	Angular float	andesitic tuffs-flows
17VIC-10	510469	585601	6114317	1481	Rock chip channel	andesitic tuffs-flows
17VIC-11	510469	585425	6114204	1488	Angular float	andesitic tuffs-flows
17VIC-12	510469	585703	6113967	1614	Rock chip channel	andesitic tuffs-flows
17VIC-13	510469	585732	6113946	1562	Rock chip channel	andesitic tuffs-flows
17VIC-14	510469	585491	6114840	1388	Angular float	andesitic tuffs-flows

Sample ID	Alteration, gamgue
17VIC-1	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-2	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-3	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-4	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-5	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite, 0.1% barite
17VIC-6	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite, 0.1% barite
17VIC-7	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite, 0.1% barite
17VIC-8	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite, 0.1% barite
17VIC-9	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite, 0.1% barite
17VIC-10	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-11	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-12	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-13	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite
17VIC-14	30% actinolite, 20% hornblende, 0.2% calcite, 0.3% sericite

Sample ID	Sulphides
17VIC-1	5% diss arsenopyrite, 0.1% py, 1% safflorite
17VIC-2	5% diss arsenopyrite, 0.1% py, 1% safflorite
17VIC-3	0.5% diss arsenopyrite, 0.1% cpy, 1% py
17VIC-4	5% diss arsenopyrite, 0.1% py, 1% safflorite
17VIC-5	5% diss arsenopyrite, 0.1% py, 1% safflorite
17VIC-6	5% diss arsenopyrite, 0.1% py, 1% safflorite
17VIC-7	5% diss arsenopyrite, 0.1% py, 1% safflorite
17VIC-8	1% diss arsenopyrite, 0.1% py
17VIC-9	5% diss arsenopyrite, 0.1% py, 0.2% safflorite
17VIC-10	1% diss arsenopyrite, 0.1% cpy
17VIC-11	trace diss arsenopyrite, 0.1% cpy, 0.1% sph
17VIC-12	trace diss arsenopyrite, 0.1% cpy, 0.1% sph
17VIC-13	trace diss arsenopyrite, 0.1% cpy
17VIC-14	5% diss arsenopyrite, 0.1% cpy, 1% safflorite

Sample ID	Vein Strike	Vein Dip	Au ppm	Au g/t	Ag ppm	Cu ppm	Co ppm	Co %	As ppm	As %
17VIC-1	87	84 S	8.77		2.32	7.7	3400		>10000	1.555
7VIC-2			>25.0	110.5	3.67	2.3	>10000	1.535	>10000	18.05
17VIC-3	77	78 N	0.22		0.77	514	48.7		451	
17VIC-4	107	57 N	>25.0	126	7.75	4.5	>10000	1.705	>10000	20.2
17VIC-5			>25.0	96.8	2.84	1.1	>10000	2.75	>10000	26.2
17VIC-6			>25.0	56.8	1.95	1.5	>10000	2.05	>10000	15.55
17VIC-7			>25.0	119	7.95	37.8	>10000	2.46	>10000	9.72
17VIC-8			0.18		0.21	43.5	222		4730	
17VIC-9			13.65		20.4	12	2360		>10000	2.68
17VIC-10	167	87 W	0.12		2.04	5090	138		3760	
17VIC-11			0.04		0.17	60.8	35.1		58.3	
17VIC-12			<0.02		1.57	410	11.2		96.4	
17VIC-13	65	80 N	0.07		2.22	3950	9.1		34.5	
17VIC-14			>25.0	164	22.4	18.3	>10000	1.135	>10000	18.8

Sample ID	Width (cm)	Mo ppm	Fe %	Ce ppm	La ppm	Ni ppm	Bi ppm	Ca %	Pb ppm	Zn ppm
17VIC-1	15	2260	1.62	5.33	2.8	310	83.9	2.59	1	33
17VIC-2	angular float	2310	10.7	24.6	20.2	639	1815	1.73	2.9	23
17VIC-3	30	9.39	4.69	12.9	5.9	102	4.97	3.05	15.1	109
17VIC-4	30	4130	11	199.5	159.5	3020	318	0.85	6.6	23
17VIC-5	angular float	2410	10.5	7.72	5.5	3500	1650	1.05	2.3	17
17VIC-6	angular float	1885	8.21	23.6	15.1	1745	783	2.36	7.2	27
17VIC-7	angular float	5960	1.47	>500	600	423	156	1.55	3.5	10
17VIC-8	angular float	314	3	>500	610	33	1.05	0.06	2.9	779
17VIC-9	angular float	33.2	5.98	21.6	12.5	601	230	9.2	346	35
17VIC-10	30	125	15.15	4.82	2.9	137	1.47	0.19	5.6	61
17VIC-11	angular float	3.93	7.89	34.8	16.6	38.7	0.57	0.72	4.2	170
17VIC-12	20	6.25	12.3	20.8	9.5	4.4	0.22	0.36	36.5	169
17VIC-13	18	11.05	28.2	>500	620	8	0.44	5.9	1.8	89
17VIC-14	angular float	905	8.41	169.5	136.5	5660	1060	1.41	21	60

Appendix C June 12, 2017 Magnetometer Readings

```
/Gem Systems GSM-19T 6112151 v7.0 7 XI 2006 M t-e2.v7
/ID 1 file 01survey.m   19 II 00
/
/X Y nT sq cor-nT time
85700E  14050.00N   56217.53 99  000000.00 011442.0
85700E  14037.50N   56213.60 99  000000.00 011550.0
85700E  14025.00N   56197.79 99  000000.00 011634.0
85700E  14012.50N   56215.95 99  000000.00 011754.0
85700E  14000.00N   56212.67 99  000000.00 011854.0
85700E  13987.50N   56145.19 99  000000.00 012706.0
85700E  13975.00N   56181.88 99  000000.00 012746.0
85700E  13962.50N   56121.54 99  000000.00 012818.0
85700E  13950.00N   56173.80 99  000000.00 014922.0
85700E  13937.50N   56196.06 99  000000.00 020034.0
85700E  13925.00N   56152.29 99  000000.00 024350.0
85700E  13912.50N   56228.70 99  000000.00 024434.0
85700E  13900.00N   56186.12 99  000000.00 030606.0
85650E  13900.00N   56154.42 99  000000.00 030826.0
85650E  13912.50N   56177.72 99  000000.00 031210.0
85650E  13925.00N   56171.10 99  000000.00 031306.0
85650E  13937.50N   56147.20 99  000000.00 032510.0
85650E  13950.00N   56163.32 99  000000.00 032546.0
85650E  13962.50N   56152.72 99  000000.00 032630.0
85650E  13975.00N   56138.95 99  000000.00 032710.0
85650E  13987.50N   56150.57 99  000000.00 032750.0
85650E  14000.00N   56188.48 99  000000.00 033526.0
85650E  14012.50N   56182.76 99  000000.00 033602.0
85650E  14025.00N   56224.97 99  000000.00 033630.0
85650E  14037.50N   56194.74 99  000000.00 033842.0
85650E  14050.00N   56143.32 99  000000.00 034626.0
85600E  14050.00N   56185.88 99  000000.00 035106.0
85600E  14037.50N   56138.65 99  000000.00 041634.0
85600E  14025.00N   56133.37 99  000000.00 041730.0
85600E  14012.50N   56179.87 99  000000.00 041806.0
85600E  14000.00N   56177.32 99  000000.00 041906.0
85600E  13987.50N   56157.91 99  000000.00 042402.0
85600E  13975.00N   56178.26 99  000000.00 042426.0
85600E  13962.50N   56203.49 99  000000.00 042506.0
85600E  13950.00N   56223.52 99  000000.00 043018.0
85600E  13937.50N   56253.32 99  000000.00 043058.0
85600E  13925.00N   56187.16 99  000000.00 043146.0
85600E  13912.50N   56232.80 99  000000.00 043206.0
85600E  13900.00N   56424.66 59  000000.00 043334.0
85600E  13887.50N   56166.00 29  000000.00 043838.0
85600E  13875.00N   56156.90 99  000000.00 043910.0
85600E  13862.50N   56183.98 99  000000.00 043950.0
85600E  13850.00N   56107.49 99  000000.00 044026.0
85550E  13850.00N   56127.11 99  000000.00 045022.0
85550E  13862.50N   56144.95 99  000000.00 045116.0
85550E  13875.00N   56124.26 99  000000.00 045230.0
85550E  13887.50N   56136.32 99  000000.00 045322.0
85550E  13900.00N   56175.11 99  000000.00 045454.0
```

June 12, 2017 Magnetometer Readings

85550E	13912.50N	56169.25	99	000000.00	050306.0
85550E	13925.00N	56107.26	99	000000.00	050458.0
85550E	13937.50N	56155.47	99	000000.00	050546.0
85550E	13950.00N	56159.02	99	000000.00	050758.0
85550E	13962.50N	56169.25	99	000000.00	052126.0
85550E	13975.00N	56197.09	99	000000.00	052210.0
85550E	13987.50N	56162.13	99	000000.00	052322.0
85550E	14000.00N	56152.07	99	000000.00	052434.0
85550E	14012.50N	56167.32	99	000000.00	053022.0
85550E	14025.00N	56174.33	99	000000.00	053110.0
85550E	14037.50N	56187.34	99	000000.00	053202.0
85550E	14050.00N	56155.39	99	000000.00	053306.0

June 13, 2017 Magnetometer Readings

```
/Gem Systems GSM-19T 6112151 v7.0 7 XI 2006 M t-e2.v7
/ID 1 file 01survey.m   18 II 00
/
/X Y nT sq cor-nT time
85650E   14450.00N   56236.61 99   000000.00 002550.0
85650E   14437.50N   56271.40 99   000000.00 002742.0
85650E   14425.00N   56278.83 99   000000.00 002914.0
85650E   14412.50N   56171.26 99   000000.00 003030.0
85650E   14400.00N   56200.29 99   000000.00 003250.0
85650E   14387.50N   56199.62 99   000000.00 003306.0
85650E   14375.00N   56220.39 99   000000.00 003402.0
85650E   14362.50N   56208.44 99   000000.00 003430.0
85650E   14350.00N   56198.04 99   000000.00 003538.0
85650E   14337.50N   56209.87 99   000000.00 003630.0
85650E   14325.00N   56207.63 99   000000.00 003750.0
85650E   14312.50N   56199.67 99   000000.00 004106.0
85650E   14300.00N   56222.89 99   000000.00 004238.0
85650E   14287.50N   56216.21 99   000000.00 004358.0
85650E   14275.00N   56211.77 99   000000.00 004518.0
85650E   14262.50N   56202.24 99   000000.00 004650.0
85650E   14250.00N   56162.93 99   000000.00 004822.0
85650E   14237.50N   56173.59 99   000000.00 005006.0
85650E   14225.00N   56078.63 99   000000.00 005054.0
85650E   14212.50N   56169.94 99   000000.00 005214.0
85650E   14300.00N   56170.34 99   000000.00 005314.0
85650E   14187.50N   56165.39 99   000000.00 005426.0
85650E   14175.00N   56175.46 99   000000.00 005522.0
85650E   14162.50N   56169.02 99   000000.00 005622.0
85650E   14150.00N   56181.81 99   000000.00 005714.0
85650E   14137.50N   56175.48 99   000000.00 005754.0
85650E   14125.00N   56180.88 99   000000.00 005846.0
85650E   14112.50N   56175.34 99   000000.00 005930.0
85650E   14100.00N   56183.07 99   000000.00 010014.0
85700E   14075.00N   56185.70 99   000000.00 015406.0
85700E   14087.50N   56182.47 99   000000.00 015522.0
85700E   14100.00N   56184.69 99   000000.00 015634.0
85700E   14112.50N   56153.43 99   000000.00 015742.0
85700E   14125.00N   56223.19 99   000000.00 020930.0
85700E   14137.50N   56220.50 99   000000.00 021018.0
85700E   14150.00N   56227.29 99   000000.00 021106.0
85700E   14162.50N   56208.50 99   000000.00 021306.0
85700E   14175.00N   56220.74 99   000000.00 021522.0
85700E   14187.50N   56229.10 99   000000.00 021706.0
85700E   14300.00N   56230.68 99   000000.00 021806.0
85700E   14212.50N   56218.25 99   000000.00 021910.0
85700E   14225.00N   56226.04 99   000000.00 021946.0
85700E   14237.50N   56212.02 99   000000.00 022034.0
85700E   14250.00N   56216.59 99   000000.00 022114.0
85700E   14262.50N   56220.02 99   000000.00 022202.0
85700E   14275.00N   56217.76 99   000000.00 022238.0
85700E   14287.50N   56211.38 99   000000.00 022310.0
85700E   14300.00N   56214.10 99   000000.00 022326.0
```

June 13, 2017 Magnetometer Readings

85700E	14312.50N	56214.63	99	000000.00	022358.0
85700E	14325.00N	56215.66	99	000000.00	022434.0
85700E	14337.50N	56213.42	99	000000.00	022526.0
85700E	14350.00N	56210.14	99	000000.00	022550.0
85700E	14362.50N	56209.38	99	000000.00	022622.0
85700E	14375.00N	56212.29	99	000000.00	022654.0
85700E	14387.50N	56237.01	99	000000.00	022806.0
85700E	14400.00N	56249.77	99	000000.00	022902.0
85700E	14412.50N	56256.69	99	000000.00	023022.0
85700E	14425.00N	56266.21	99	000000.00	023330.0
85700E	14437.50N	56251.54	99	000000.00	023734.0
85700E	14450.00N	56243.60	99	000000.00	023826.0
85600E	14450.00N	56240.79	99	000000.00	033038.0
85600E	14437.50N	56208.31	99	000000.00	033130.0
85600E	14425.00N	56202.44	99	000000.00	033226.0
85600E	14412.50N	56204.95	99	000000.00	033254.0
85600E	14400.00N	56167.17	99	000000.00	033950.0
85600E	14387.50N	56176.61	99	000000.00	034034.0
85600E	14375.00N	56179.77	99	000000.00	034116.0
85600E	14362.50N	56209.54	99	000000.00	035430.0
85600E	14350.00N	56200.83	99	000000.00	035538.0
85600E	14337.50N	56202.55	99	000000.00	035638.0
85600E	14325.00N	56197.42	99	000000.00	035726.0
85600E	14312.50N	56200.30	99	000000.00	035834.0
85600E	14300.00N	56191.45	99	000000.00	035954.0
85600E	14287.50N	56173.85	99	000000.00	041506.0
85600E	14275.00N	56186.17	99	000000.00	041618.0
85600E	14262.50N	56178.46	99	000000.00	041822.0
85600E	14250.00N	56146.42	99	000000.00	042010.0
85600E	14237.50N	55977.33	99	000000.00	042134.0
85600E	14225.00N	56091.52	99	000000.00	042222.0
85600E	14212.50N	56288.24	99	000000.00	042302.0
85600E	14200.00N	56223.70	99	000000.00	042346.0
85600E	14187.50N	56285.74	99	000000.00	042434.0
85600E	14175.00N	56183.69	99	000000.00	042522.0
85600E	14162.50N	56171.37	99	000000.00	042602.0
85600E	14150.00N	56198.73	99	000000.00	042642.0
85600E	14137.50N	56179.99	99	000000.00	042706.0
85600E	14125.00N	56192.32	99	000000.00	042730.0
85600E	14112.50N	56176.11	99	000000.00	042750.0
85600E	14100.00N	56184.01	99	000000.00	042818.0
85550E	14100.00N	56151.53	99	000000.00	042950.0
85550E	14112.50N	56167.34	99	000000.00	043026.0
85550E	14125.00N	56175.43	99	000000.00	043042.0
85550E	14137.50N	56168.83	99	000000.00	043102.0
85550E	14150.00N	56154.48	99	000000.00	043122.0
85550E	14162.50N	56159.05	99	000000.00	043142.0
85550E	14175.00N	56155.40	99	000000.00	043206.0
85550E	14187.50N	56167.57	99	000000.00	043246.0
85550E	14200.00N	56167.52	99	000000.00	043310.0
85550E	14212.50N	56141.27	99	000000.00	043346.0
85550E	14225.00N	56137.35	99	000000.00	043426.0
85550E	14237.50N	56177.23	99	000000.00	043502.0
85550E	14250.00N	56176.04	99	000000.00	045130.0

June 13, 2017 Magnetometer Readings

85550E	14262.50N	56188.60	99	000000.00	045250.0
85550E	14275.00N	56159.05	99	000000.00	045434.0
85550E	14287.50N	56194.85	99	000000.00	045538.0
85550E	14300.00N	56204.28	99	000000.00	045706.0
85550E	14312.50N	56207.32	99	000000.00	045750.0
85550E	14325.00N	56198.15	99	000000.00	045850.0
85550E	14337.50N	56185.41	99	000000.00	045930.0
85550E	14350.00N	56190.59	99	000000.00	050010.0
85550E	14362.50N	56196.76	99	000000.00	050206.0
85550E	14375.00N	56188.60	99	000000.00	050250.0
85550E	14387.50N	56192.22	99	000000.00	050346.0
85550E	14400.00N	56187.98	99	000000.00	050418.0
85550E	14412.50N	56185.99	99	000000.00	050438.0
85550E	14425.00N	56194.83	99	000000.00	050458.0
85550E	14437.50N	56189.35	99	000000.00	050522.0
85550E	14450.00N	56187.44	99	000000.00	050550.0
85550E	14462.50N	56145.32	99	000000.00	050646.0
85500E	14450.00N	56140.91	99	000000.00	050834.0
85500E	14437.50N	56153.07	99	000000.00	050918.0
85500E	14425.00N	56158.10	99	000000.00	050938.0
85500E	14412.50N	56154.84	99	000000.00	051006.0
85500E	14400.00N	56166.29	99	000000.00	051030.0
85500E	14387.50N	56162.71	99	000000.00	051102.0
85500E	14375.00N	56163.73	99	000000.00	051126.0
85500E	14362.50N	56156.12	99	000000.00	051210.0
85500E	14350.00N	56162.06	99	000000.00	051302.0
85500E	14337.50N	56168.28	99	000000.00	051348.0
85500E	14325.00N	56172.90	99	000000.00	051458.0
85500E	14312.50N	56170.90	99	000000.00	051546.0
85500E	14300.00N	56172.75	99	000000.00	051638.0
85500E	14287.50N	56169.65	99	000000.00	051722.0
85500E	14275.00N	56165.15	99	000000.00	051802.0
85500E	14262.50N	56157.50	99	000000.00	051846.0
85500E	14250.00N	56165.02	99	000000.00	051918.0
85500E	14237.50N	56160.34	99	000000.00	051958.0
85500E	14225.00N	56164.81	99	000000.00	052022.0
85500E	14212.50N	56156.05	99	000000.00	052050.0
85500E	14300.00N	56158.70	99	000000.00	052118.0
85500E	14187.50N	56155.88	99	000000.00	052210.0
85500E	14175.00N	56155.28	99	000000.00	052250.0
85500E	14162.50N	56151.88	99	000000.00	052334.0
85500E	14150.00N	56149.96	99	000000.00	052358.0
85500E	14137.50N	56154.28	99	000000.00	052438.0
85500E	14125.00N	56136.87	99	000000.00	052510.0
85500E	14112.50N	56138.02	99	000000.00	052550.0
85500E	14100.00N	56173.92	99	000000.00	052622.0
85450E	14100.00N	56150.27	99	000000.00	053618.0
85450E	14112.50N	56156.01	99	000000.00	053658.0
85450E	14125.00N	56160.44	99	000000.00	053730.0
85450E	14137.50N	56164.03	99	000000.00	053830.0
85450E	14150.00N	56148.51	99	000000.00	053922.0
85450E	14162.50N	56162.14	99	000000.00	054018.0
85450E	14175.00N	56160.53	99	000000.00	054054.0
85450E	14187.50N	56159.44	99	000000.00	054134.0

June 13, 2017 Magnetometer Readings

85450E	14200.00N	56156.06	99	000000.00	054206.0
85450E	14212.50N	56152.89	99	000000.00	054402.0
85450E	14225.00N	56171.65	99	000000.00	054430.0
85450E	14237.50N	56191.25	99	000000.00	054502.0
85450E	14250.00N	56178.21	99	000000.00	054610.0
85450E	14262.50N	56159.38	99	000000.00	054654.0
85450E	14275.00N	56177.12	99	000000.00	054726.0
85450E	14287.50N	56179.06	99	000000.00	054810.0
85450E	14300.00N	56180.91	99	000000.00	054838.0
85400E	14300.00N	56181.12	99	000000.00	054942.0
85400E	14287.50N	56187.87	99	000000.00	055018.0
85400E	14275.00N	56195.40	99	000000.00	055046.0
85400E	14262.50N	56168.67	99	000000.00	055126.0
85400E	14250.00N	56171.96	99	000000.00	055154.0
85400E	14237.50N	56170.26	99	000000.00	055230.0
85400E	14225.00N	56165.77	99	000000.00	055302.0
85400E	14212.50N	56173.70	99	000000.00	055350.0
85400E	14200.00N	56205.49	99	000000.00	055414.0
85400E	14187.50N	56163.32	99	000000.00	055458.0
85400E	14175.00N	56199.25	99	000000.00	055518.0
85400E	14162.50N	56167.29	99	000000.00	055546.0
85400E	14150.00N	56158.94	89	000000.00	055638.0
85400E	14137.50N	56136.66	99	000000.00	055714.0
85400E	14125.00N	56142.01	99	000000.00	055730.0
85400E	14112.50N	56151.04	99	000000.00	055754.0
85400E	14100.00N	56149.36	99	000000.00	055814.0
85350E	14100.00N	56139.70	99	000000.00	055942.0
85350E	14112.50N	56133.24	89	000000.00	060014.0
85350E	14125.00N	56140.87	99	000000.00	060050.0
85350E	14137.50N	56121.10	99	000000.00	060114.0
85350E	14150.00N	56149.45	99	000000.00	060138.0
85350E	14162.50N	56138.49	99	000000.00	060154.0
85350E	14175.00N	56137.25	99	000000.00	060230.0
85350E	14187.50N	56125.96	99	000000.00	062346.0
85350E	14200.00N	56164.64	99	000000.00	062408.0
85350E	14212.50N	56164.10	99	000000.00	062434.0
85350E	14225.00N	56161.38	99	000000.00	062502.0
85350E	14237.50N	56159.70	99	000000.00	062526.0
85350E	14250.00N	56159.43	99	000000.00	062554.0
85350E	14262.50N	56160.90	99	000000.00	062626.0
85350E	14275.00N	56166.69	99	000000.00	062650.0
85350E	14287.50N	56178.90	99	000000.00	062734.0
85350E	14300.00N	56173.37	99	000000.00	062754.0

June 14, 2017 Magnetometer Readings

```
/Gem Systems GSM-19T 6112151 v7.0 7 XI 2006 M t-e2.v7
/ID 1 file 02survey.m   16 II 00
/
/X Y nT sq cor-nT time
85550E  14675.00N   56232.18 99   000000.00 000534.0
85550E  14662.50N   56241.49 99   000000.00 000554.0
85550E  14650.00N   56244.12 99   000000.00 000626.0
85550E  14637.50N   56232.67 99   000000.00 000654.0
85550E  14625.00N   56225.71 99   000000.00 000714.0
85550E  14612.50N   56224.54 99   000000.00 000822.0
85550E  14600.00N   56224.28 99   000000.00 000846.0
85600E  14600.00N   56226.31 99   000000.00 001326.0
85600E  14612.50N   56241.97 99   000000.00 001358.0
85600E  14625.00N   56246.49 99   000000.00 001422.0
85600E  14637.50N   56239.42 99   000000.00 001438.0
85600E  14650.00N   56236.51 99   000000.00 001502.0
85600E  14662.50N   56248.85 99   000000.00 002630.0
85600E  14675.00N   56247.82 99   000000.00 002826.0
85600E  14687.50N   56246.29 99   000000.00 002854.0
85600E  14700.00N   56250.77 99   000000.00 003022.0
85600E  14712.50N   56254.15 99   000000.00 003110.0
85600E  14725.00N   56248.10 99   000000.00 003154.0
85750E  14625.00N   56306.77 99   000000.00 004758.0
85750E  14612.50N   56315.26 99   000000.00 004934.0
85750E  14600.00N   56307.69 99   000000.00 005022.0
85750E  14587.50N   56312.88 99   000000.00 005106.0
85750E  14575.00N   56319.39 99   000000.00 005130.0
85750E  14562.50N   56321.57 99   000000.00 005214.0
85750E  14550.00N   56314.31 99   000000.00 005354.0
85750E  14537.50N   56321.36 99   000000.00 005422.0
85750E  14525.00N   56324.16 99   000000.00 005522.0
85750E  14512.50N   56332.64 99   000000.00 005758.0
85750E  14500.00N   56337.46 99   000000.00 005838.0
85750E  14487.50N   56342.50 99   000000.00 005910.0
85750E  14475.00N   56350.87 99   000000.00 010026.0
85750E  14462.50N   56349.36 99   000000.00 010138.0
85750E  14450.00N   56343.94 99   000000.00 010218.0
85750E  14437.50N   56363.80 99   000000.00 010358.0
85750E  14425.00N   56357.65 99   000000.00 010430.0
85750E  14412.50N   56369.95 99   000000.00 010546.0
85750E  14400.00N   56387.99 99   000000.00 010910.0
85750E  14387.50N   56364.59 99   000000.00 010946.0
85750E  14375.00N   56369.18 99   000000.00 011050.0
85750E  14362.50N   56368.68 99   000000.00 011122.0
85750E  14350.00N   56381.46 99   000000.00 011226.0
85750E  14337.50N   56389.57 99   000000.00 011318.0
85750E  14325.00N   56386.60 99   000000.00 011442.0
85800E  14950.00N   56399.74 99   000000.00 011802.0
85800E  14937.50N   56415.02 99   000000.00 011846.0
85800E  14925.00N   56399.16 99   000000.00 011910.0
85800E  14912.50N   56392.17 99   000000.00 011942.0
85800E  14900.00N   56389.28 99   000000.00 012034.0
```

June 14, 2017 Magnetometer Readings

85800E	14887.50N	56386.92	99	000000.00	012122.0
85800E	14875.00N	56379.35	99	000000.00	012214.0
85800E	14862.50N	56395.47	99	000000.00	012302.0
85800E	14850.00N	56396.66	99	000000.00	012342.0
85800E	14837.50N	56395.70	99	000000.00	012410.0
85800E	14825.00N	56384.54	99	000000.00	012434.0
85800E	14812.50N	56382.52	99	000000.00	012506.0
85800E	14800.00N	56418.51	99	000000.00	012542.0
85800E	14787.50N	56421.77	99	000000.00	023146.0
85800E	14775.00N	56422.20	99	000000.00	023254.0
85800E	14762.50N	56481.42	99	000000.00	023350.0
85800E	14750.00N	56398.78	99	000000.00	023618.0
85800E	14737.50N	56416.10	99	000000.00	023646.0
85800E	14725.00N	56375.87	99	000000.00	023714.0
85800E	14712.50N	56459.33	99	000000.00	023842.0
85800E	14700.00N	56444.63	99	000000.00	024210.0
85800E	14687.50N	56416.15	99	000000.00	024458.0
85800E	14675.00N	56417.24	99	000000.00	024526.0
85800E	14662.50N	56423.01	99	000000.00	024610.0
85800E	14650.00N	56388.02	99	000000.00	024638.0
85850E	14650.00N	56378.27	99	000000.00	025146.0
85850E	14662.50N	56388.27	99	000000.00	025402.0
85850E	14675.00N	56394.58	99	000000.00	025422.0
85850E	14687.50N	56399.64	99	000000.00	025454.0
85850E	14700.00N	56457.46	99	000000.00	025654.0
85850E	14712.50N	56449.23	99	000000.00	025814.0
85850E	14725.00N	56502.68	99	000000.00	025842.0
85850E	14737.50N	56508.94	99	000000.00	025946.0
85850E	14750.00N	56522.06	99	000000.00	030006.0
85850E	14762.50N	56533.33	99	000000.00	030026.0
85850E	14775.00N	56447.23	99	000000.00	030750.0
85850E	14787.50N	56437.79	99	000000.00	030858.0
85850E	14800.00N	56440.04	99	000000.00	030930.0
85850E	14812.50N	56341.61	99	000000.00	031126.0
85850E	14825.00N	56367.33	99	000000.00	031226.0
85850E	14837.50N	56415.92	99	000000.00	031330.0
85850E	14850.00N	56432.71	79	000000.00	031442.0
85850E	14862.50N	56440.20	99	000000.00	031558.0
85850E	14875.00N	56443.45	59	000000.00	031702.0
85850E	14887.50N	56459.50	99	000000.00	031738.0
85850E	14900.00N	56446.16	99	000000.00	031814.0
85900E	14900.00N	56457.41	99	000000.00	032110.0
85900E	14887.50N	56498.51	99	000000.00	032210.0
85900E	14875.00N	56462.69	99	000000.00	032354.0
85900E	14862.50N	56472.40	99	000000.00	032426.0
85900E	14850.00N	56487.38	99	000000.00	032646.0
85900E	14837.50N	56528.77	99	000000.00	032710.0
85900E	14825.00N	56449.84	99	000000.00	032818.0
85900E	14812.50N	56526.04	99	000000.00	033306.0
85900E	14800.00N	56554.50	99	000000.00	033522.0
85900E	14787.50N	56547.75	99	000000.00	033610.0
85900E	14775.00N	56573.80	99	000000.00	033650.0
85900E	14762.50N	56542.27	99	000000.00	033746.0
85900E	14750.00N	56542.45	99	000000.00	033834.0

June 14, 2017 Magnetometer Readings

85900E	14737.50N	56507.99	99	000000.00	034122.0
85900E	14725.00N	56570.56	99	000000.00	034222.0
85900E	14712.50N	56484.84	99	000000.00	034258.0
85900E	14700.00N	56460.38	99	000000.00	034530.0
85900E	14687.50N	56453.51	99	000000.00	034602.0
85900E	14675.00N	56417.36	99	000000.00	034646.0
85900E	14662.50N	56399.24	99	000000.00	034738.0
85900E	14650.00N	56382.88	99	000000.00	034822.0
85900E	14637.50N	56391.88	99	000000.00	034914.0
85900E	14625.00N	56442.69	99	000000.00	035030.0
85900E	14612.50N	56453.41	99	000000.00	035138.0
85900E	14600.00N	56446.05	99	000000.00	035222.0
85900E	14587.50N	56412.64	99	000000.00	035346.0
85900E	14575.00N	56449.84	99	000000.00	035446.0
85900E	14562.50N	56411.02	99	000000.00	035534.0
85900E	14550.00N	56445.35	99	000000.00	035602.0
85900E	14537.50N	56357.19	99	000000.00	035658.0
85900E	14525.00N	56415.37	99	000000.00	035850.0
85900E	14512.50N	56466.22	99	000000.00	035918.0
85900E	14500.00N	56407.52	99	000000.00	040026.0
85900E	14487.50N	56382.04	99	000000.00	040110.0
85900E	14475.00N	56411.10	99	000000.00	040202.0
85900E	14462.50N	56379.09	99	000000.00	040242.0
85900E	14450.00N	56404.93	99	000000.00	040322.0
85900E	14437.50N	56403.62	99	000000.00	040354.0
85900E	14425.00N	56408.60	99	000000.00	040430.0
85900E	14412.50N	56310.29	99	000000.00	040738.0
85900E	14400.00N	56347.11	99	000000.00	040806.0
85950E	14400.00N	56361.67	99	000000.00	040930.0
85950E	14412.50N	56392.29	99	000000.00	041002.0
85950E	14425.00N	56378.14	99	000000.00	041030.0
85950E	14437.50N	56406.73	99	000000.00	041050.0
85950E	14450.00N	56363.28	99	000000.00	041218.0
85950E	14462.50N	56340.35	99	000000.00	041334.0
85950E	14475.00N	56394.10	99	000000.00	041542.0
85950E	14487.50N	56410.08	99	000000.00	041710.0
85950E	14500.00N	56363.53	49	000000.00	044338.0
85950E	14512.50N	56420.51	99	000000.00	044430.0
85950E	14525.00N	56433.89	99	000000.00	044506.0
85950E	14537.50N	56418.06	99	000000.00	044542.0
85950E	14550.00N	56381.27	99	000000.00	044642.0
85950E	14562.50N	56418.43	99	000000.00	044802.0
85950E	14575.00N	56424.76	99	000000.00	044922.0
85950E	14587.50N	56416.48	99	000000.00	045018.0
85950E	14600.00N	56426.08	99	000000.00	045206.0
85950E	14612.50N	56409.86	99	000000.00	045350.0
85950E	14625.00N	56415.43	99	000000.00	045442.0
85950E	14637.50N	56438.28	99	000000.00	045534.0
85950E	14650.00N	56439.86	99	000000.00	045622.0
85950E	14662.50N	56465.53	99	000000.00	045858.0
85950E	14675.00N	56481.23	99	000000.00	045958.0
85950E	14687.50N	56437.09	99	000000.00	050358.0
85950E	14700.00N	56514.86	99	000000.00	050726.0
85950E	14712.50N	56554.58	99	000000.00	050954.0

2017 June 14, Magnetometer Readings

85950E	14725.00N	56639.27	69	000000.00	051022.0
85950E	14737.50N	56502.76	99	000000.00	051042.0
85950E	14750.00N	56495.73	99	000000.00	052814.0
85950E	14762.50N	56517.36	99	000000.00	053054.0
85950E	14775.00N	56498.29	99	000000.00	053142.0
85950E	14787.50N	56545.10	99	000000.00	053230.0
85950E	14800.00N	56634.19	99	000000.00	053330.0

June 15, 2017 Magnetometer Readings

```
/Gem Systems GSM-19T 6112151 v7.0 7 XI 2006 M t-e2.v7
/ID 1 file 01survey.m   15 II 00
/
/X Y nT sq cor-nT time
85500E  14750.00N   56185.64 99  000000.00 000234.0
85500E  14762.50N   56196.74 99  000000.00 000342.0
85500E  14775.00N   56200.25 99  000000.00 000538.0
85500E  14787.50N   56196.82 99  000000.00 000650.0
85500E  14800.00N   56195.10 99  000000.00 000822.0
85500E  14812.50N   56187.43 99  000000.00 000958.0
85500E  14825.00N   56248.49 99  000000.00 001050.0
85500E  14837.50N   56201.10 99  000000.00 001134.0
85500E  14850.00N   56216.11 99  000000.00 001214.0
85500E  14862.50N   56207.58 99  000000.00 001242.0
85500E  14875.00N   56212.69 99  000000.00 001326.0
85500E  14887.50N   56216.77 99  000000.00 001418.0
85500E  14900.00N   56232.88 99  000000.00 001506.0
85500E  14912.50N   56237.12 99  000000.00 001610.0
85500E  14925.00N   56281.87 99  000000.00 001746.0
85500E  14937.50N   56259.69 99  000000.00 001826.0
85500E  14950.00N   56260.59 99  000000.00 001906.0
85500E  14962.50N   56268.88 99  000000.00 001946.0
85500E  14975.00N   56286.06 99  000000.00 002214.0
85500E  14987.50N   56296.31 99  000000.00 002254.0
85500E  15000.00N   56313.08 99  000000.00 002334.0
85500E  15012.50N   56291.62 99  000000.00 002434.0
85500E  15025.00N   56308.78 99  000000.00 002506.0
85500E  15037.50N   56303.23 99  000000.00 002550.0
85500E  15050.00N   56292.62 99  000000.00 002714.0
85550E  15050.00N   56308.82 99  000000.00 002902.0
85550E  15037.50N   56293.22 99  000000.00 002934.0
85550E  15025.00N   56280.78 99  000000.00 003022.0
85550E  15012.50N   56345.87 99  000000.00 003102.0
85550E  15000.00N   56321.99 99  000000.00 003142.0
85550E  14987.50N   56314.40 99  000000.00 003214.0
85550E  14975.00N   56339.87 99  000000.00 003334.0
85550E  14962.50N   56337.24 99  000000.00 005722.0
85550E  14950.00N   56313.85 99  000000.00 005814.0
85550E  14937.50N   56291.61 99  000000.00 005902.0
85550E  14925.00N   56280.03 99  000000.00 005958.0
85550E  14912.50N   56262.04 99  000000.00 010046.0
85550E  14900.00N   56234.43 99  000000.00 010134.0
85550E  14887.50N   56298.75 99  000000.00 010214.0
85550E  14875.00N   56281.54 99  000000.00 010254.0
85550E  14862.50N   56297.39 99  000000.00 010330.0
85550E  14850.00N   56289.53 99  000000.00 010434.0
85550E  14837.50N   56274.18 99  000000.00 010530.0
85550E  14825.00N   56244.11 99  000000.00 010630.0
85550E  14812.50N   56277.93 99  000000.00 011210.0
85550E  14800.00N   56290.05 99  000000.00 011238.0
85550E  14787.50N   56287.34 99  000000.00 011314.0
85550E  14775.00N   56298.21 99  000000.00 011406.0
```

June 15, 2017 Magnetometer Readings

```
85550E  14762.50N   56308.71 99   000000.00 011446.0
85550E  14750.00N   56247.16 99   000000.00 011610.0
85600E  14750.00N   56269.19 99   000000.00 012034.0
85600E  14762.50N   56274.19 99   000000.00 012154.0
85600E  14775.00N   56264.43 99   000000.00 012226.0
85600E  14787.50N   56274.62 99   000000.00 012302.0
85600E  14800.00N   56264.68 99   000000.00 012346.0
85600E  14812.50N   56261.37 99   000000.00 012434.0
85600E  14825.00N   56243.39 99   000000.00 012554.0
85600E  14837.50N   56274.55 99   000000.00 012650.0
85600E  14850.00N   56296.06 99   000000.00 012802.0
85600E  14862.50N   56301.88 99   000000.00 012854.0
85600E  14875.00N   56315.79 99   000000.00 013018.0
85600E  14987.50N   56320.45 99   000000.00 015326.0
85600E  14900.00N   56319.28 99   000000.00 015430.0
85600E  14912.50N   56323.40 99   000000.00 015554.0
85600E  14925.00N   56332.66 99   000000.00 015638.0
85600E  14937.50N   56342.74 99   000000.00 015726.0
85600E  14950.00N   56348.50 99   000000.00 015822.0
85600E  14962.50N   56347.91 99   000000.00 015922.0
85600E  14975.00N   56337.51 99   000000.00 020002.0
85600E  14987.50N   56326.29 99   000000.00 020050.0
85600E  15000.00N   56326.52 99   000000.00 020126.0
85600E  15012.50N   56338.13 99   000000.00 020210.0
85600E  15025.00N   56358.98 99   000000.00 021446.0
85600E  15037.50N   56391.19 99   000000.00 021534.0
85600E  15050.00N   56375.51 99   000000.00 021750.0
85650E  15050.00N   56377.59 99   000000.00 022042.0
85650E  15037.50N   56382.49 99   000000.00 022138.0
85650E  15025.00N   56394.98 99   000000.00 022202.0
85650E  15012.50N   56374.33 99   000000.00 022238.0
85650E  15000.00N   56347.21 99   000000.00 022338.0
85650E  14987.50N   56365.61 99   000000.00 022702.0
85650E  14975.00N   56361.46 99   000000.00 022754.0
85650E  14962.50N   56353.75 99   000000.00 022822.0
85650E  14950.00N   56354.22 99   000000.00 022838.0
85650E  14937.50N   56362.78 99   000000.00 022914.0
85650E  14925.00N   56357.31 99   000000.00 022934.0
85650E  14812.50N   56346.26 99   000000.00 023018.0
85650E  14900.00N   56319.66 99   000000.00 023054.0
85650E  14887.50N   56321.53 99   000000.00 023130.0
85650E  14975.00N   56324.21 99   000000.00 023202.0
85650E  14862.50N   56325.43 99   000000.00 023234.0
85650E  14850.00N   56301.16 99   000000.00 023310.0
85650E  14837.50N   56294.50 99   000000.00 023410.0
85650E  14925.00N   56311.88 99   000000.00 023518.0
85650E  14812.50N   56306.64 99   000000.00 023558.0
85650E  14800.00N   56297.33 99   000000.00 023634.0
85650E  14787.50N   56274.91 99   000000.00 023718.0
85650E  14775.00N   56296.55 99   000000.00 023834.0
85650E  14762.50N   56320.81 99   000000.00 023958.0
85650E  14750.00N   56299.55 99   000000.00 024126.0
85700E  14700.00N   56308.95 99   000000.00 033426.0
85700E  14712.50N   56314.77 99   000000.00 033542.0
```

June 15, 2017 Magnetometer Readings

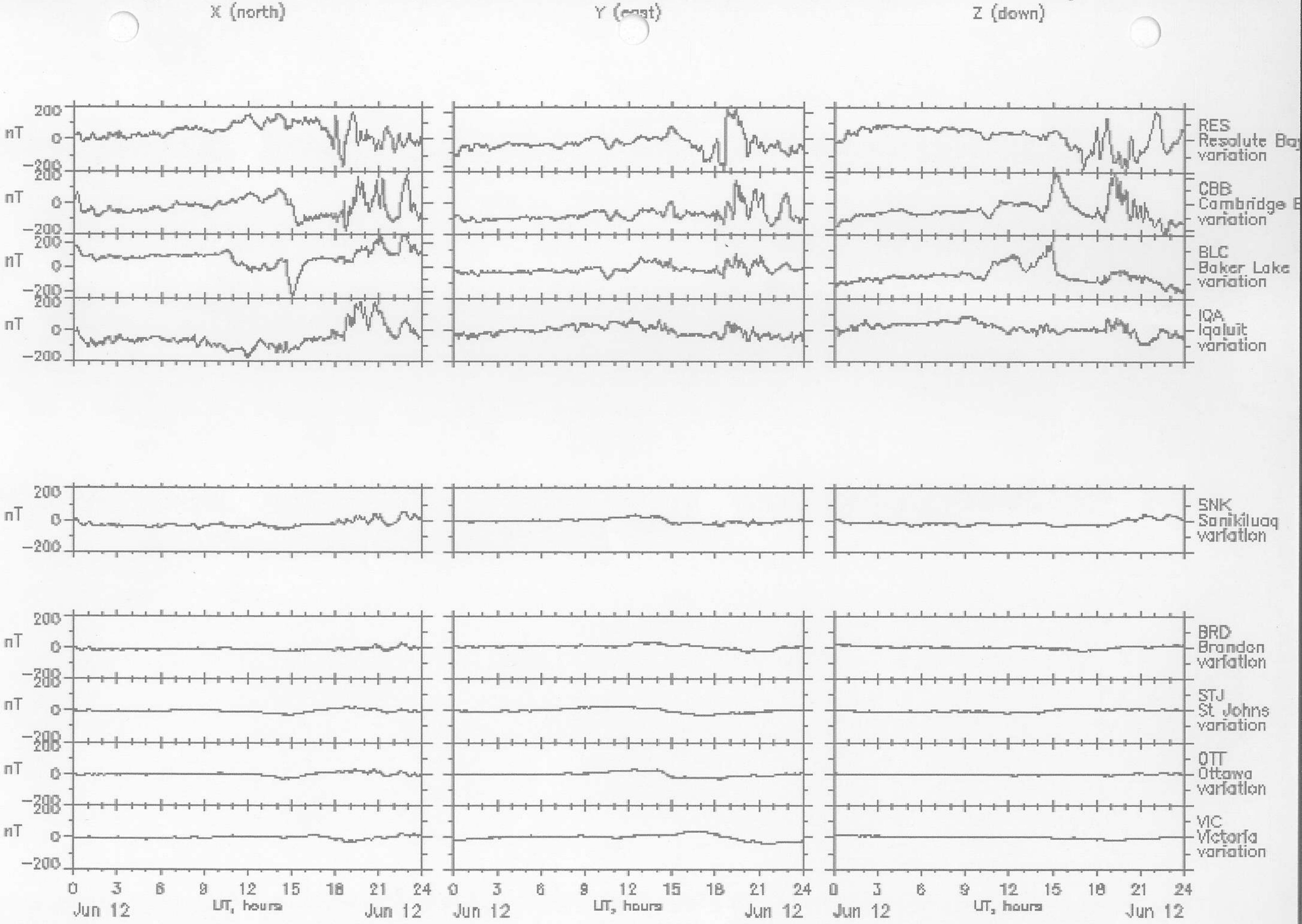
85700E	14725.00N	56304.77	99	000000.00	033618.0
85700E	14737.50N	56302.93	99	000000.00	033658.0
85700E	14750.00N	56310.43	99	000000.00	033742.0
85700E	14762.50N	56311.01	99	000000.00	033842.0
85700E	14775.00N	56292.60	99	000000.00	033930.0
85700E	14787.50N	56307.77	99	000000.00	034018.0
85700E	14800.00N	56317.17	99	000000.00	034114.0
85700E	14812.50N	56353.98	99	000000.00	034330.0
85700E	14825.00N	56313.88	99	000000.00	034422.0
85700E	14837.50N	56334.16	99	000000.00	035650.0
85700E	14850.00N	56331.35	99	000000.00	035746.0
85700E	14862.50N	56339.22	99	000000.00	035834.0
85700E	14875.00N	56352.41	99	000000.00	035958.0
85700E	14887.50N	56368.99	99	000000.00	040050.0
85700E	14900.00N	56352.38	99	000000.00	040242.0
85700E	14912.50N	56365.81	99	000000.00	040338.0
85700E	14925.00N	56376.17	99	000000.00	040426.0
85700E	14937.50N	56378.73	99	000000.00	040534.0
85700E	14950.00N	56390.35	99	000000.00	040710.0
85700E	14962.50N	56376.13	99	000000.00	040802.0
85700E	14975.00N	56412.32	99	000000.00	040846.0
85700E	14987.50N	56406.77	99	000000.00	040914.0
85700E	15000.00N	56416.46	99	000000.00	040942.0
85700E	15012.50N	56416.31	99	000000.00	041018.0
85700E	15025.00N	56415.83	99	000000.00	041106.0
85700E	15037.50N	56421.70	99	000000.00	041134.0
85700E	15050.00N	56385.91	99	000000.00	041210.0
85700E	15062.50N	56429.84	99	000000.00	041606.0
85750E	15050.00N	56410.14	79	000000.00	041810.0
85750E	15037.50N	56420.08	99	000000.00	041914.0
85750E	15025.00N	56447.50	99	000000.00	041954.0
85750E	15012.50N	56452.52	99	000000.00	042030.0
85750E	15000.00N	56444.22	99	000000.00	042114.0
85750E	14987.50N	56407.49	99	000000.00	042238.0
85750E	14975.00N	56413.36	99	000000.00	042338.0
85750E	14962.50N	56351.33	99	000000.00	042502.0
85750E	14950.00N	56414.49	99	000000.00	045638.0
85750E	14937.50N	56411.47	99	000000.00	045814.0
85750E	14925.00N	56409.84	99	000000.00	045922.0
85750E	14912.50N	56396.08	99	000000.00	050034.0
85750E	14900.00N	56393.75	99	000000.00	050542.0
85750E	14887.50N	56351.65	99	000000.00	050706.0
85750E	14875.00N	56365.25	99	000000.00	050822.0
85750E	14862.50N	56382.03	99	000000.00	051130.0
85750E	14850.00N	56372.36	99	000000.00	051402.0
85750E	14837.50N	56362.31	99	000000.00	051434.0
85750E	14825.00N	56358.38	99	000000.00	051458.0
85750E	14812.50N	56362.84	99	000000.00	051518.0
85750E	14800.00N	56342.67	99	000000.00	051602.0
85750E	14787.50N	56371.05	99	000000.00	051854.0
85750E	14775.00N	56369.80	99	000000.00	051918.0
85750E	14762.50N	56362.07	99	000000.00	052006.0
85750E	14750.00N	56373.04	99	000000.00	052158.0
85750E	14737.50N	56373.58	99	000000.00	052226.0

June 15, 2017 Magnetometer Readings

85750E	14725.00N	56350.73	99	000000.00	052618.0
85750E	14712.50N	56333.59	99	000000.00	052730.0
85750E	14700.00N	56365.95	99	000000.00	054230.0
85750E	14687.50N	56346.36	99	000000.00	054254.0
85750E	14675.00N	56365.83	99	000000.00	054346.0
85750E	14662.50N	56330.17	99	000000.00	054450.0
85750E	14650.00N	56339.08	99	000000.00	054538.0

June 15, 2017 Magnetometer Readings

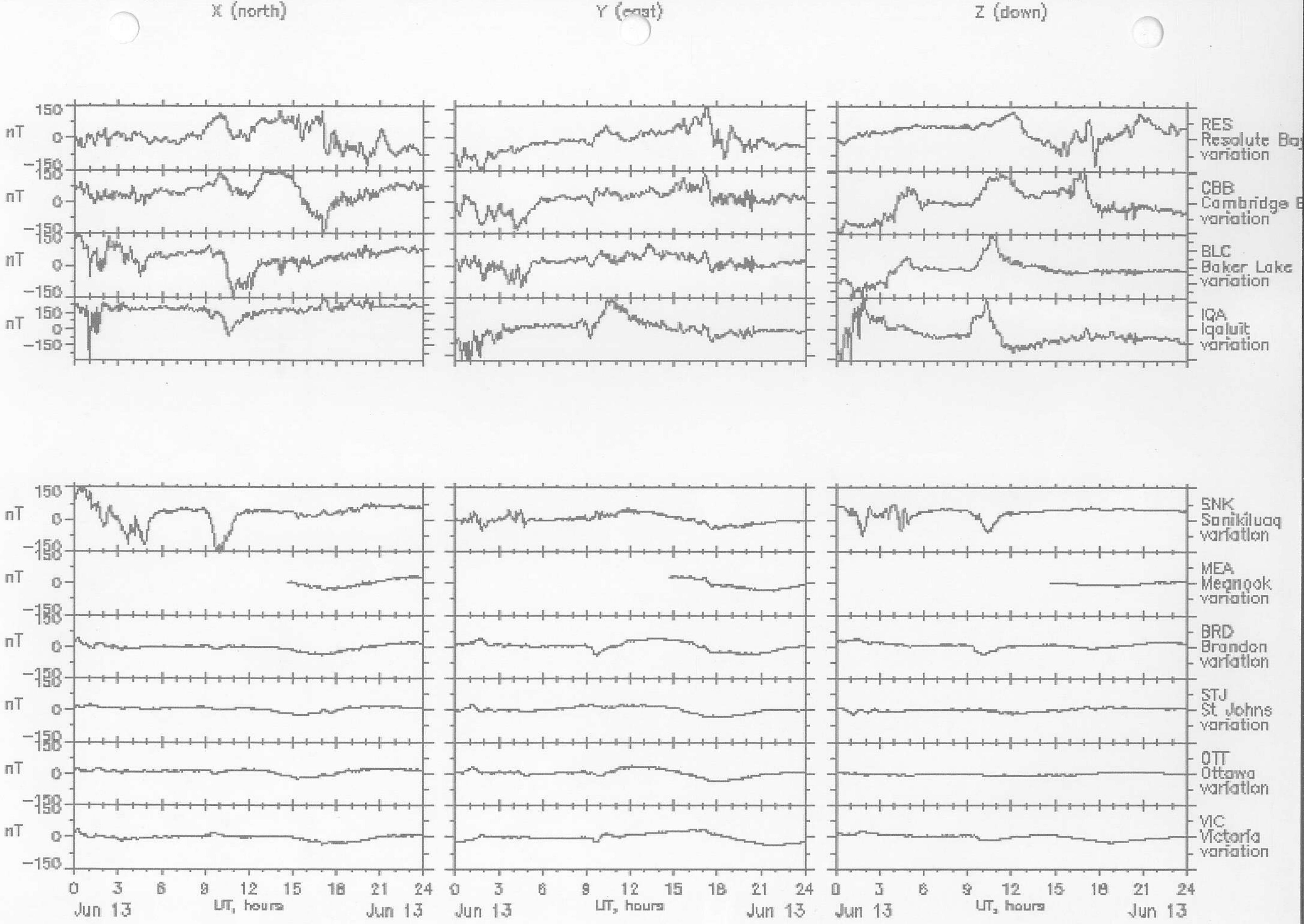
```
/Gem Systems GSM-19T 6112151 v7.0 7 XI 2006 M t-e2.v7
/ID 1 file 01survey.m   15 II 00
/
/X Y nT sq cor-nT time
85500E  14600.00N   56215.88 99  000000.00 233542.0
85500E  14612.50N   56228.36 99  000000.00 233646.0
85500E  14625.00N   56238.63 99  000000.00 233738.0
85500E  14637.50N   56203.80 99  000000.00 233818.0
85500E  14650.00N   56217.36 99  000000.00 234234.0
85500E  14662.50N   56209.19 99  000000.00 234410.0
85500E  14675.00N   56211.75 99  000000.00 234458.0
85500E  14687.50N   56217.31 99  000000.00 234550.0
85500E  14700.00N   56229.92 99  000000.00 234622.0
85500E  14712.50N   56206.20 99  000000.00 234658.0
85500E  14725.00N   56196.48 99  000000.00 234750.0
85550E  14725.00N   56215.50 99  000000.00 235726.0
85550E  14712.50N   56223.52 99  000000.00 235826.0
85550E  14700.00N   56231.11 99  000000.00 235850.0
85550E  14687.50N   56225.94 99  000000.00 235942.0
```



June 12, 2017

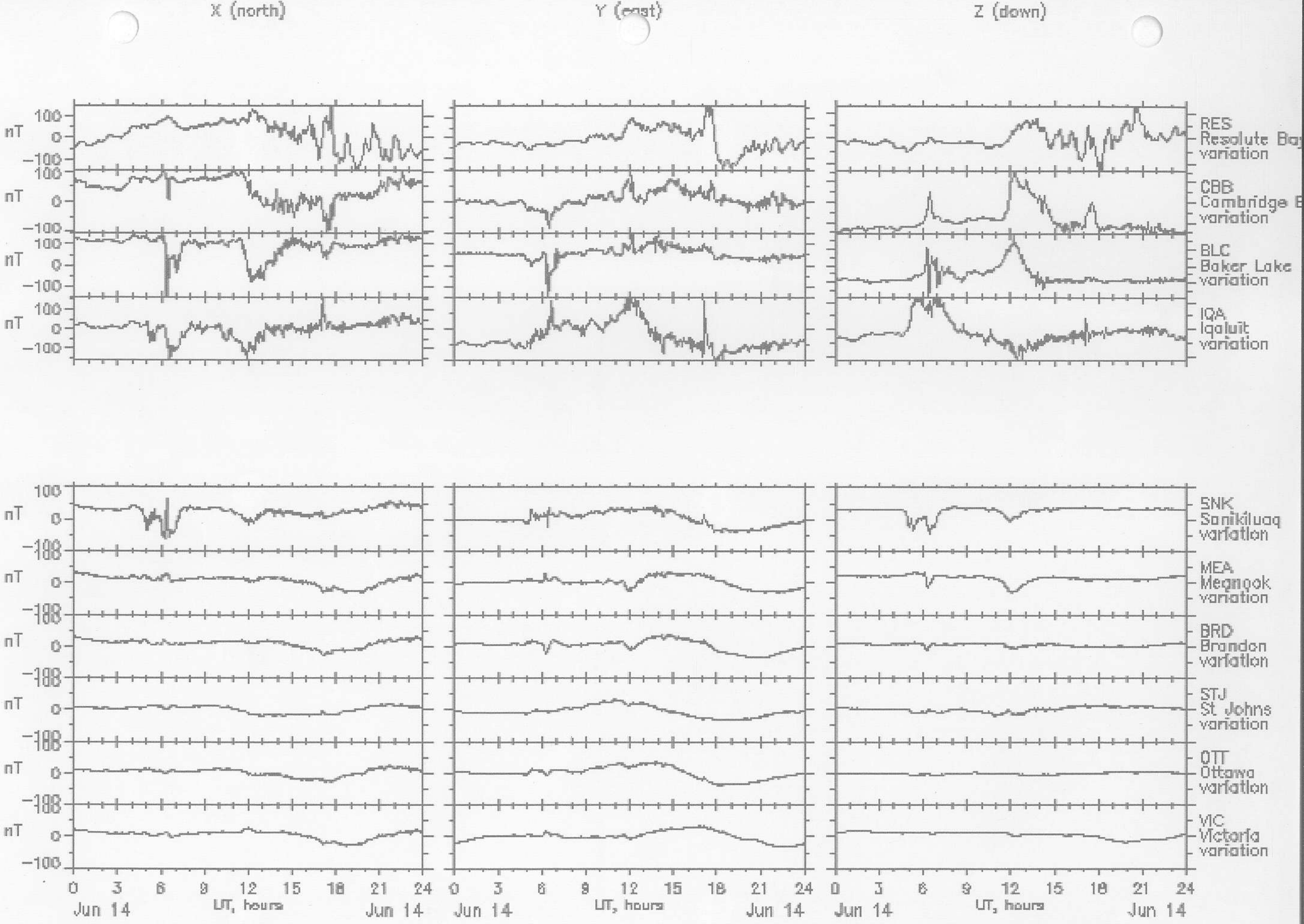
Natural Resources Canada
Ressources naturelles Canada

Canadian Magnetic Observatories — 1 min data Day 164 — 13 June 2017



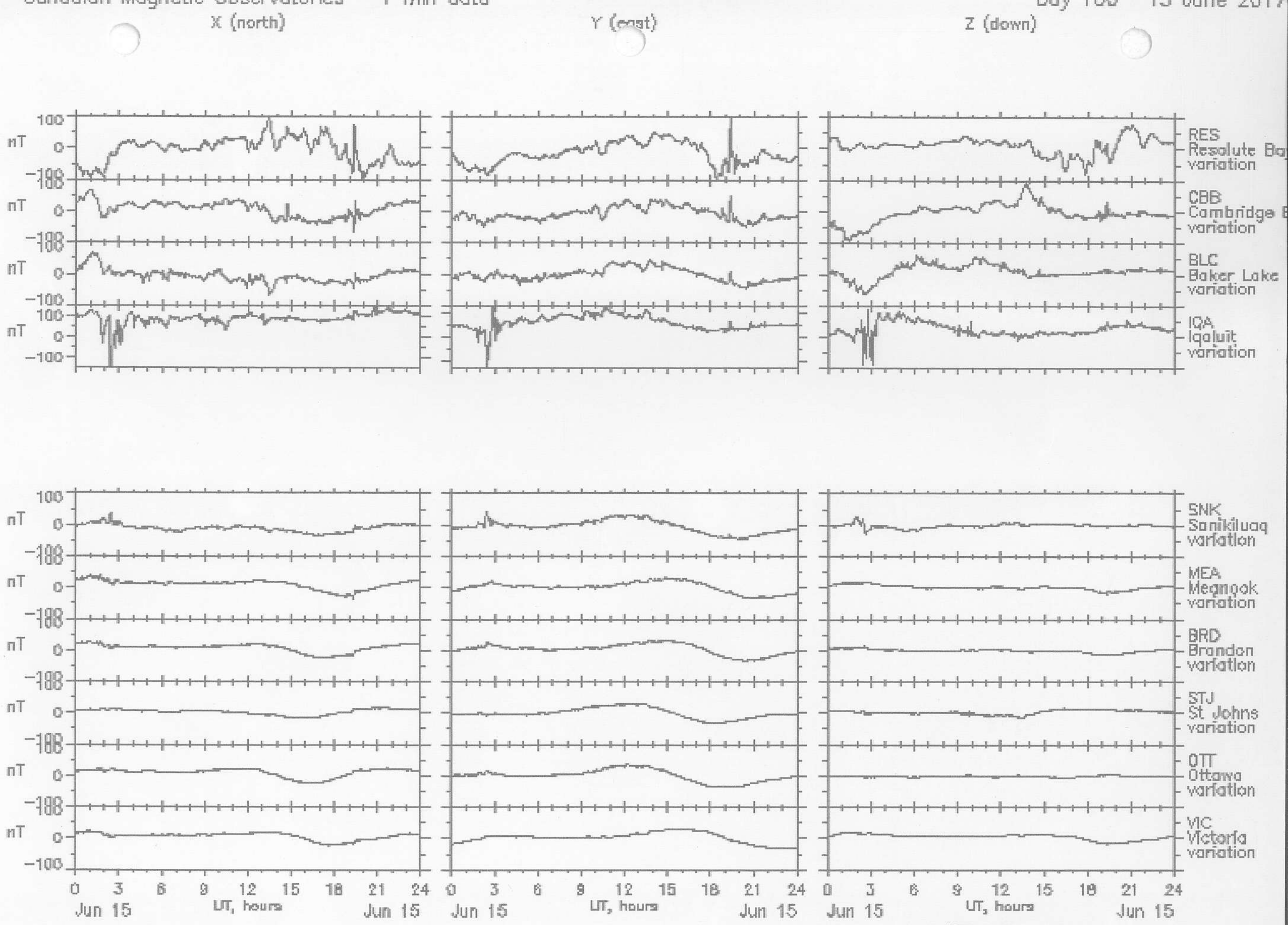
June 13, 2017

Natural Resources Canada
Ressources naturelles Canada



June 14, 2017

Natural Resources Canada
Ressources naturelles Canada



June 15, 2017

Natural Resources Canada
Ressources naturelles Canada

Cana

Appendix D

3D - SGH

"A SPATIOTEMPORAL GEOCHEMICAL HYDROCARBON INTERPRETATION"

AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT
SGH SOIL SURVEY

(This page purposely left blank)

SGH – SPATIOTEMPORAL GEOCHEMICAL HYDROCARBON
Predictive Geochemistry

for

AMERICAN MANGANESE INC.

ROUCHER DEBOULE VICTORIA PROJECT - SGH SOIL SURVEY

August 31, 2017

** Dale Sutherland,*

Activation Laboratories Ltd

(- author, originator)*

EVALUATION OF SAMPLE DATA - EXPLORATION FOR: "IOCG" TARGETS

THE SGH COPPER AND GOLD INTERPRETATION TEMPLATES ARE USED FOR THIS REPORT

Workorder: A17-06702

Table of Contents

Executive Summary

It is important to read the Report Preface on the next page as an introduction to the report. For more detail the Overview section on page 11 could also be read.

The Rocher Deboule Victoria project grid had 144 samples collected in a general North-South grid. These samples were received on July 4th and were sorted. After drying in our walk-in temperature controlled drying room and subsequent sieving, the samples were made available to the Organics Laboratory for analysis on July 15th. Samples were extracted and analyzed by Gas Chromatography coupled with Mass Spectrometry (GC/MS) on July 17th. The data was processed and the initial mapping completed on July 26th. After review and interpretation of this one project site, a second set of SGH Class maps was developed on August 10th, and then a final set of maps were completed on August 14th. The background SGH information, site interpretation and final maps were then entered into the SGH Interpretation Report. This report was completed on August 31st . The SGH interpretation results for the ROUCHER DEBOULE VICTORIA PROJECT Survey starts on page 18.

In the author's opinion, SGH appeared to perform very well in the ability to illustrate anomalies for Copper and for Gold veins in the northern section of the grid and an area that may be indicative of IOCG mineralization in the southern sector. SGH cannot determine whether the ROUCHER DEBOULE VICTORIA PROJECT is specifically an IOCG type of deposit. SGH is only able to depict the zonation of Copper and Gold in a similar fashion as has been successfully done in Copper-Gold Vein and Porphyry type deposits.

Note that some exploration companies submit this report intact to government assessors as proof of work on their claim. Be aware that the SGH data is not attached to this report as it is supplied separately as an Excel spreadsheet. Government assessors will also have to be supplied with this data.

PREFACE

THIS SGH INTERPRETATION REPORT:

The purpose of this Spatiotemporal Geochemical Hydrocarbon (SGH) interpretation is to ensure that clients and other potential reviewers of the results have a good understanding of this organic, deep penetrating geochemistry. As SGH provides such a large data set and is not interpreted in the same way as an inorganic geochemical method, the provision of this interpretation and report enables the user to realize the results in a timely fashion and capitalizes on years of research and development since the inception of SGH in 1996 combined with the knowledge obtained by Activation Laboratories through the interpretation of SGH data from over 1,000 surveys for a wide variety of target types in various lithologies from many geographical locations. Although referenced today as a "nano-technology", the analysis of SGH has not changed since inception. The report is compulsory as it is the only known organic geochemistry that, in spite of the name, uses "non-gaseous" semi-volatile organic compounds interpreted using a forensic signature approach. Many different sample types can be used in the same survey. Interpretation is based solely on SGH data and does not include the consideration from any other geochemistry (inorganic), geology, or geophysics that may exist related to the survey area(s). This report can also provide evidence of project maintenance. To keep the price to a minimum and to provide as short a turnaround time as practically possible, usually only one SGH Pathfinder Class map is illustrated in a "Standard Report" with an applied interpretation although several other SGH Pathfinder Class maps are used and referenced. Definitions of certain terms or phrases used in this report can be found in Appendix A. Options include, a Supplemental Report and/or interpretations for other target types and/or a GIS package. (See Appendix H)

The interpretation in this report has used the results from some of the research with SGH in recent years which has focused on the potential that the SGH data is able to further dissect and understand the relationships between the chemical Redox conditions in the overburden the development of an electrochemical cell and its affect in shaping geochemical anomalies. This research has resulted in the development by Activation Laboratories of a new enhanced model of the Electrochemical/ Redox Cell theory originated by Govett (1976) that was further developed to the model by Hamilton (2004, 2009). The new enhanced model developed by Sutherland (2011) takes the general anomalies expected by the Hamilton model to a higher level of detail and specificity. This has resulted in a more confident level of interpretation which has been referenced as 3D-SGH or **3D-"Spatiotemporal Geochemical Hydrocarbons"**. This model has been formally introduced at the International Applied Geochemistry Symposium (IAGS) organized by The Association of Applied Geochemists that took place in Rovaniemi, Finland, in August 2611. This new level of understanding of the expected anomaly types that can be observed with SGH provides a new level of quality control in the interpretation process as the symmetry of SGH anomalies can assure the interpreter which anomalies are as a result of a buried target. With the enhanced 3D-SGH interpretation that was introduced in 2012, we also mark the beginning of the ability to make some statements regarding the possible depth to mineralization for some projects as we dissect the Redox cell relative to the new Electrochemical Cell theory. The cover of this report is an artist's rendering of the pathways of different classes of Spatiotemporal Geochemical Hydrocarbons which migrate through the overburden. This model is used as the new 3D-SGH interpretation approach.

DISCLAIMER

This "SGH Interpretation Report" has been prepared to assist the user in understanding the development and capabilities of this Organic based Geochemistry. The interpretation of the Spatiotemporal Geochemical Hydrocarbon (previously called "Soil Gas Hydrocarbon") or SGH data is in reference to a template or group of SGH classes of compounds specific to a type of mineralization or target that is chosen by the client (i.e. the template for gold, copper, VMS, uranium, etc.). The various templates of SGH Pathfinder Classes that together define the forensic identification signature for a wide range of commodity target types; Gold, Nickel, VMS, SEDEX, Uranium, Cu-Ni-PGE, IOCG, Base Metal, Tungsten, Lithium, Polymotallic, and Copper, as well as for Kimberlites, Coal Seam, Wet Gas and Oil Play, have been developed through years of research and have been further refined from review of case studies and orientation studies has proven to be able to also address a wide range of lithologies. Even with 20+ years of development, experience, and use of SGH, Activation Laboratories Ltd. cannot guarantee that the templates used are applicable to every type of target in every type of environment. The interpretation in this report attempts to identify an anomaly that has the best SGH signature in the survey for the type of mineralization or target chosen by the client. However, this interpretation is not exhaustive and there may be additional SGH anomalies that may warrant interest. It should not be viewed due to the generation of this SGH report, that Activation Laboratories Ltd. has the expertise or is in the business of interpreting any other type of geochemical data as a general service. As the author is the originator of the SGH geochemistry, has researched and developed this exploration tool since 1996, and has produced similar interpretations using SGH data for over 1,100 surveys, he is the best qualified person to prepare this interpretation as assistance to clients wishing to use this SGH geochemistry. Activation Laboratories Ltd. can offer assistance in general suggestions for sampling protocols and in sample grid design; however we accept no responsibility to the appropriateness of the samples taken. Activation Laboratories Ltd. has made every attempt to ensure the accuracy and reliability of the information provided in this report. Activation Laboratories Ltd. or its employees do not accept any responsibility or liability for the accuracy, content, completeness, legality, or reliability of the information or description of processes contained in this report. The information is provided "as is" without a guarantee of any kind in the interpretation or use of the results of the SGH geochemistry. The client or user accepts all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from using any information or material contained in this report or using data from the associated spreadsheet of results.

Cautionary Note Regarding Assumptions and Forward Looking Statements

The statements and target rating made in the Spatiotemporal Geochemical Hydrocarbon (SGH) interpretive report or in other communications may contain or imply certain forward-looking information related to the quality of a target or SGH anomaly.

Statements related to the rating of a target are based on comparison of the SGH signatures derived by Activation Laboratories Ltd. through previous research on known case studies. The rating is not derived from any statistics or other formula. The rating is a subjective value on a scale of 0 to 6 relative to the similarity of the SGH signature reviewed compared to the results of previous scientific research and case studies based on the analysis of surficial samples over known ore bodies. No information on the results from other geochemical methods, geophysics, or geology is usually available as additional information for the interpretation and assignment of a rating value unless otherwise stated. The rating does not imply ore grade and is not to be used in mineral resource estimate calculations. References to the rating should be viewed as forward-looking statements to the extent that it involves a subjective comparison to known SGH case studies. As with other geochemical methods, an implied rating and the associated anticipated target characteristics may be different than that actually encountered if the target is drilled tested or the property developed.

Activation Laboratories Ltd. may also make a scientifically based prediction in this interpretive report to an area that might be used as a drill target. Usually the nearest sample is identified as an approximation to a "possible drill target" location. This is based only on SGH results and is to be regarded as a guide based on the current state of this science.

Unless otherwise stated, Activation Laboratories Ltd. has not physically observed the exploration site and has no prior knowledge of any site description or details or previous test results. Actlabs makes general recommendations for sampling and shipping of samples. Unless stated, the laboratory does not witness sampling, does not take into consideration the specific sampling procedures used or factors such as; the season of sampling, sample handling, packaging, or shipping methods. The majority of the time, Activation Laboratories Ltd. has had no input into sampling survey design. Where specified Activation Laboratories Ltd. may not have conducted sample preparation procedures as it may have been conducted at the client's assigned laboratory external to Actlabs. Although Actlabs has attempted to identify important factors that could cause actual actions, events or results to differ scientifically which may impact the associated interpretation and target rating from those described in forward-looking statements, there may be other factors that cause actions, events or results that are not anticipated, estimated or intended.

In general, any statements that express or involve discussions with respect to predictions, expectations, beliefs, plans, projections, objectives, assumptions, future events or performance are not statements of historical fact. These "scientifically based educated theories" should be viewed as "forward-looking statements".

Readers of this interpretive report are cautioned not to place undue reliance on forward-looking information. Forward looking statements are made based on scientific beliefs, estimates and opinions on the date the statements are made and for the interpretive report issued. The Company undertakes no obligation to update forward-looking statements or otherwise revise previous reports if these beliefs, estimates and opinions, future scientific developments, other new information, or other circumstances should change that may affect the analytical results, rating, or interpretation.

Actlabs nor its employees shall be liable for any claims or damages as a result of this report, any interpretation, omissions in preparation, or in the test conducted. This report is to be reproduced in full, unless approved in writing.

SPATIOTEMPORAL GEOCHEMICAL HYDROCARBON (SGH) GEOCHEMISTRY – OVERVIEW

In the search for minerals and elements, geologists require tools to assess the location and potential quantity of minerals and ores. In the past people looked at the landscape to find the deposit. Similar landscapes indicate similar mineral and metal deposits. This is searching on a macro level, while geochemistry is searching on a micro level. Surficial materials requires many minerals and elements, so surficial materials can contain indications of the presence of minerals and elements.

SGH is a deep penetrating geochemistry that involves the analysis of surficial samples from over potential mineral or petroleum targets. The analysis involves the testing for 162 hydrocarbon compounds in the C5-C17 carbon series range applicable to a wide variety of sample types. These hydrocarbons have been shown to be residues from the decomposition of bacteria and microbes that feed on the target commodity as they require inorganic elements to catalyze the reactions necessary to develop hydrocarbons and grow cells in their life cycle. Specific classes of hydrocarbons (SGH) have been successful for delineating mineral targets found at over 950 metres in depth. Samples of various media have been successfully analyzed i.e., soil (any horizon), sand, till, drill core, rock, peat, humus, lake-bottom sediments and even snow. After preparation in the laboratory, the SGH analysis incorporates a very weak leach, essentially aqueous, that only extracts the surficial bound hydrocarbon compounds and those compounds in interstitial spaces around the sample particles. These are the hydrocarbons that have been mobilized from the target depth. SGH is unique and should not be confused with other hydrocarbon tests or traditional analyses that measure C1 (Methane) to C5 (Pentane) or other gases. Thus, in spite of the name, SGH does not analyze for any hydrocarbons that are actually gaseous at room temperature and SGH can also be used to analyze for hydrocarbons in sample types other than soil. SGH is also different from other soil hydrocarbon tests that thermally extracts or desorbs all of the hydrocarbons from the whole soil sample. This test is less specific as it does not separate the hydrocarbons and thus does not identify or measure the responses as precisely. These tests also do not use a forensic approach for identification. In SGH, the hydrocarbons in the sample extract are separated by high resolution capillary column gas chromatography and then detected by mass spectrometry to isolate, confirm, and measure the presence of only the individual hydrocarbons that have been found to be of interest from initial research and development and from performance testing especially from two Canadian Mining Industry Research Organization (CAMIRO) projects (97E04 and 01E02).

Over the past 15+ years of research, Activation Laboratories Ltd. has developed an in-depth understanding of the unique SGH signatures associated with different commodity targets. Using a forensic approach we have developed target signatures or templates for identification, and the understanding of the expected geochromatography that is exhibited by each class of SGH compounds. In 2004 we began to include an SGH interpretation report delivered with the data to enable our clients to realize the complete value and understanding of the SGH results in a short time frame and provide the benefits to them from past research sponsored by Actlabs, CAMIRO, OMET and other industrial sponsors. In 2011, a new model of Electrochemical/Redox Cell theory was proposed and the new 3D-SGH interpretation approach based on this theory was incorporated in 2012 on a routine basis for SGH interpretation reports.

SGH has attracted the attention of a large number of Exploration companies. In the above mentioned initial research projects the sponsors have included (in no order): Western Mining Corporation, BHP-Billiton, Inco, Noranda, Outokumpu, Xstrata, Cameco, Cominco, Rio Algom, Alberta Geological Survey, Ontario Geological Survey, Manitoba Geological Survey and OMET. Further, beyond this research, Activation Laboratories Ltd. has interpreted the SGH data for over 1,000 targets from clients since January of 2004. In both CAMIRO research projects over known mineralization, client orientation studies, and in exploration projects over unknown targets, SGH has performed exceptionally well. As an example, in the first CAMIRO research project that commenced in 1997 (Project 97E04), there were 10 study areas that were submitted blindly to Actlabs. These study sites were specifically selected since other inorganic geochemical methods were unsuccessful at illustrating anomalies related to the target. Although Actlabs was only provided with the samples and their coordinates, SGH was able to locate the blind mineralization with exceptional accuracy in 9 of the 10 surveys. In 2007, shortly after providing SGH interpretation reports, SGH was credited in helping locate previously unknown mineralization, e.g. Golden Band Resources drilled an SGH anomaly and discovered a significant vein containing "visible" gold. (www.goldenbandresources.com) SGH has been very successful and mining companies have repeatedly used SGH on several reports. Of those clients that try this SGH Geochemistry, over 90+% have continued to use this technique as repeat clients. SGH has helped discover a large number of new deposits, however many clients have kept this to themselves as a competitive strategy.

SPATIOTEMPORAL GEOCHEMICAL HYDROCARBON SURVEY DESIGN AND SAMPLING

Summary: See Appendix C for more details

In summary, the best conditions for the sample type and survey design include:

- Fist sized samples are usually retrieved from a shallow dug hole in the 15 to 40 cm range of depth for soils.
- Different sample types can be taken even "within" the same survey or transect, data leveling is rarely required. SGH is highly effective in areas of very difficult terrain. The Golden Rule is to always take a sample.
- Samples should be evenly spaced in a grid or as a second choice, in a series of transects with sample lines spaced at a ratio of up to 4:1 (line spacing: sample spacing).
- A minimum of 50 sample "locations" is recommended with one-third over the target and one-third on each side of the target into background if this can be predicted. More samples representing a larger area is preferred in order to optimize data contrast.
- Wet, samples can be drip dried in the field. No special preservation is required for shipping.
- Relative or UTM sample location coordinates are required to allow interpretation.

SAMPLE PREPARATION AND SGH ANALYSIS

Summary: See Appendix D for more details

Upon receipt at Activation Laboratories:

- The samples are air-dried at a relatively low temperature of 40°C.
- The samples are then sieved and the -60 mesh sieve fraction (<250 microns, although different mesh sizes can be used at the preference of the exploration geologist) is collected.
- The collected "pulp" is packaged in a Kraft paper envelope and transferred from our sample preparation department to our Organic Geochemical department also located in our World Headquarters in Ancaster, Ontario, Canada.
- Each sample is then extracted, compounds separated by gas chromatography and detected by mass spectrometry at a *Reporting Limit* of one part-per-trillion (ppt).
- The results of the SGH analysis is reported in raw data form in an Excel spreadsheet as "semi-quantitative" concentrations without any additional statistical modification.

SGH DATA QUALITY

Summary: See Appendix E for more details

Reporting Limit:

- The Excel spreadsheet of concentrations for each of the 162 compounds monitored is in units of ppt as "parts-per-trillion" which is equivalent to nanograms/kilogram (ng/Kg). The reporting limit of 1 ppt represents a value of approximately 5 times the standard deviation of low level analysis. Essentially all background noise has already been eliminated. All data reported should be used in geochemical mapping. Actual detectable levels can be significantly < 1 ppt.

Laboratory Replicate Analysis:

- An equal aliquot of a random sample is analyzed as a laboratory replicate.
- Due to the large amount of data, the estimate of method variability is reported as the percent coefficient of Variation (%CV).
- A laboratory replicate analysis is reported at a frequency of 1 for every 15 samples analyzed.
- The variability of field duplicate samples are similarly reported if identified.

Historical SGH Precision:

- Although the SGH analysis reports results at such trace ppt concentration levels, the average %CV for laboratory replicates is excellent at an average of 8% within a range of ±4%.
- Field duplicates have histerically been 3 to 5% higher than laboratory replicates.

Laboratory Materials Blank (LMB-QA):

- The LMB-QA values are only an early warning as a quality assurance procedure to indicate the relative cleanliness of laboratory glassware, vials, caps, and the laboratory water supply at the ppt concentration level.
- The LMB-QA values should not be subtracted from any SGH data as any background or noise characteristics have already been removed from SGH data through the use of a Reporting Limit instead of a Detection Limit.

SGH DATA INTERPRETATION

Summary: See Appendix F for more details

SGH Interpretation and Report:

- Due to the very large data set provided by the SGH analysis, this interpretation report is provided to offer guidance in regards to the results of this geochemistry for the survey.
- In our interpretation procedure, we separate the 162 compound results into 19 SGH sub-classes. These classes include specific alkanes, alkenes, Thiophenes, aromatic, and polyaromatic compounds. The concentrations of the individual hydrocarbons within a class are simply summed. None of these compounds are gaseous at room temperature.
- At this time the magnitude of the hydrocarbon class data has not been proven to imply a higher grade or quantity of the mineralization if present.
- A "geochemical anomaly threshold value" should not be calculated for SGH data as any background or noise has already been filtered out through the use of a Reporting Limit instead of some type of detection limit.
- SGH hydrocarbon data should never be interpreted individually. Interpretation must always use a compound class.
- Multiple SGH Classes are compared. Multiple SGH Classes that have been associated with the presence of specific mineralization are called SGH Pathfinder Classes that together represent the forensic signature or fingerprint identification that is associated with a specific type of mineralization or petroleum play.
- The anomalies of each class are compared as to their geochromatographic dispersion and ability to vector to a common location that may be referenced as a potential drill target.
- The agreement and behaviour between SGH Pathfinder Classes for a type of target, as a template of Classes, is compared against SGH research and orientation studies. The quality of agreement is expressed as an SGH Rating of confidence that the SGH anomalies of the survey being interpreted are similar to the behaviour of these classes over known mineralization.
- The interpretation is customized for the project survey by the Author. The SGH Rating and Interpretation is subjective and based on the experience from 1,000+ SGH survey interpretations. The interpretation is not conducted or assisted by any computerized process.

SGH CHARACTERISTICS

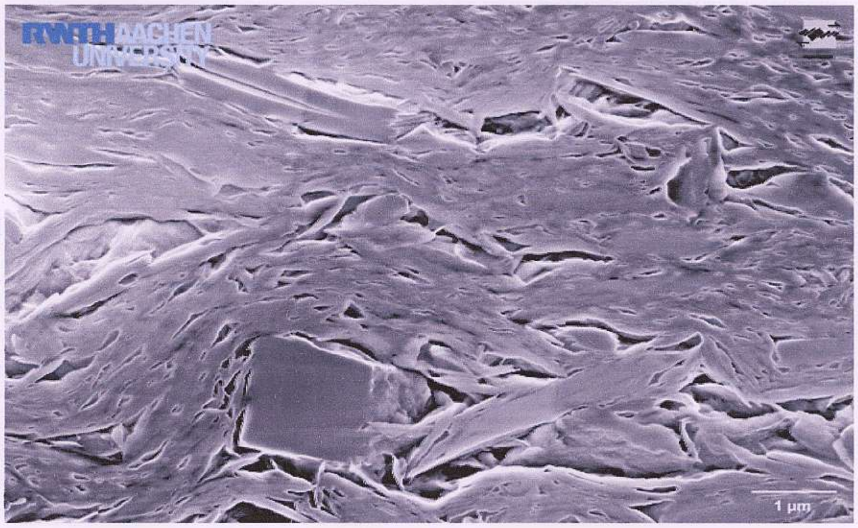
Summary: See Appendix G for more details

SGH Characteristics:

- The pattern of SGH anomalies are usually of high contrast and easily observed.
- SGH is able to illustrate exceptionally symmetrical anomalies in spite of exotic overburden and barriers such as permafrost, shale and basalt caps, previously thought to be impenetrable.
- Inorganic geochemistry can illustrate anomalies of metals that have been mobilized by surficial physical processes. As SGH is essentially "blind" to the inorganic content of a sample, SGH anomalies illustrate the true source of mineralization as it is not affected by the effects of terrain or from mobilized cover such as from glacial transport.
- As SGH hydrocarbons are essentially non-polar, highly symmetrical anomalies are observed. As such symmetry is rare in geochemistry this provides a higher level of confidence to the interpretation that is reflected by a higher SGH Rating Score in comparison to known case studies.
- SGH can be analyzed on samples collected in different seasons or adjacent years. The combined data most often does not require any data leveling.

SGH INTERPRETATION – LATEST ENHANCEMENTS

SGH continues to be developed even after 18 years since inception. Although the sample preparation and analysis has stayed the same, in the last 10 years in particular it is the interpretation and understanding of the SGH data and the intricacies of the SGH signatures that have been more refined. In the last 4 years this understanding has extended to the ability to make some prediction of depth from just the use of this geochemistry. A "first" for a geochemistry that is unique to SGH. Today the latest SGH development is the introduction of the concept of the "transparent overburden". The basis of this ability is the understanding that SGH is a Nano-geochemistry. The term "Nano" is not only used to describe the capability in detecting "Nano" quantities of these hydrocarbon based bacterial decomposition products, with the ability to detect 1 nanogram per kilogram (ng/Kg or 1 part-per-trillion), but "Nano" also describes the size of the hydrocarbon compounds detected which are typically < 1 micron in size. These relatively non-polar hydrocarbons are far smaller in size than inorganic oxides and sulphides. This difference is the reason why SGH anomalies are reliable vertical projections of mineral and/or petroleum based targets. This SGH Nano-geochemistry thus makes even the most exotic overburden "transparent". The SEM (Scanning Electron Microscope) image below illustrates the large number of micron sized pore spaces in "Boom Clay", specific high density clay, used to cap deep chambers of high hazard and radioactive wastes. To SGH, this is just a sieve that these hydrocarbons are able to still migrate through by Nano-Capillary action. Inorganic oxides and sulphide anomalies from targets below such complex overburden may be laterally displaced as they must rely on faults and shears in order to migrate to the surface. This topic will be presented at the 2015 International Applied Geochemistry Symposium in April, 2015.

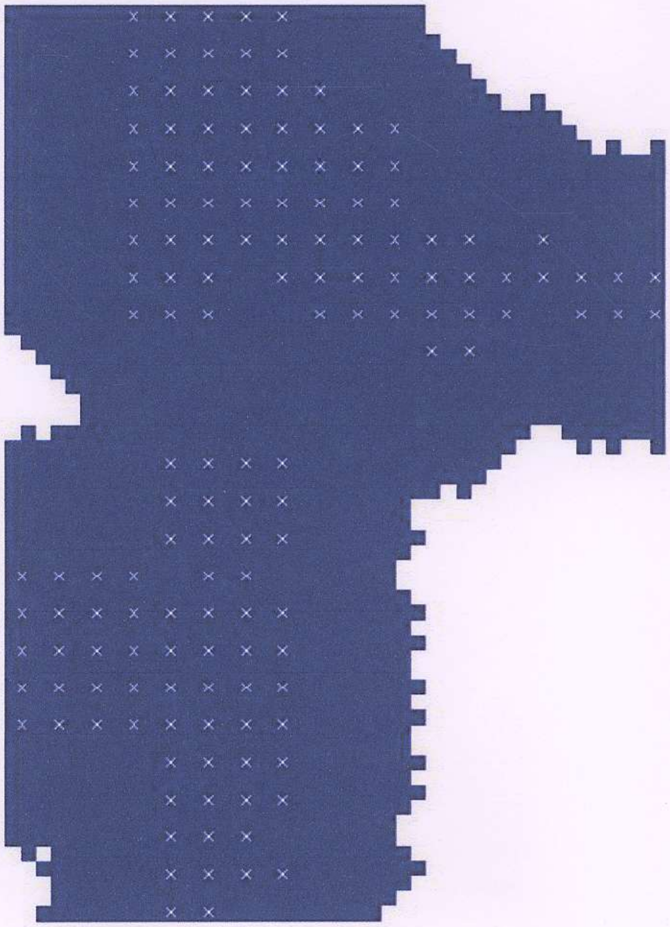


This new understanding of the rationale of why SGH anomalies are so reliable in their vertical projection of the location of mineralization and in the ability to so accurately delineate shallow and deep mineralization has further lead to the ability to use SGH to review different layers of the overburden as it relates to the mineral target due to the wide molecular weight range of the SGH Nano-geochemistry. Another factor that aids in this review of layers, much like peeling back the layers of a sweet-onion, is the understanding of weathering processes in the 5 metres near the surface that includes the Vadose zone.

INTERPRETATION OF SGH RESULTS - A17-06702 AMERICAN MANGANESE INC. - ROUCHER DEBOULE VICTORIA PROJECT - SGH SURVEY

This report is based on the SGH results from the analysis of a total of 144 samples that were from one survey area. The ROUCHER DEBOULE VICTORIA PROJECT SGH Soil Survey Area is described by a closely located North and South survey area with a grid of samples regularly spaced at 50 metres apart. SGH is a Nano-technology that only requires some sample surface area to temporarily collect these hydrocarbons. Sample locations were provided for mapping of the SGH results for these samples as relative coordinates with a map illustrating the orientation of the survey. The sample location map is shown below.

ROUCHER DEBOULE VICTORIA PROJECT SGH SURVEY SAMPLE LOCATIONS



SGH SURVEY INTERPRETATION
A17-06702 – AMERICAN MANGANESE INC. - QUALITY ASSURANCE
ROUCHER DEBOULE VICTORIA PROJECT SGH SURVEY

Note that the associated SGH results of the interpreted maps are presented in a separate Excel spreadsheet. This data is semi-quantitative and is presented in units of pg/g or *parts-per-trillion* (ppt) as the concentration of specific hydrocarbons in the sample. The number of samples submitted for this survey is adequate to use SGH as an exploration tool in the main body of this survey. As SGH is an organic geochemistry it is essentially "blind" to the elemental presence of any inorganic species as actual VMS or elemental gold, copper, silver, uranium, etc. content in the each sample analyzed. SGH has been proven to discriminate between false mobilized soil anomalies and is able to actually locate the source target deposition. SGH is a deep-penetrating geochemistry and has been proven to locate Copper, Gold, VMS, and other types of mineralization at several hundred metres below the surface irrespective of the type of overburden. Note that the SGH data is only reviewed for the particular target deposit type requested, in this case for the presence of Copper and Gold targets and the possibility of an IOCG type deposit. It is assumed that there is only one potential target. If known, in surveys with several complex geophysical targets, te obtain the best interpretation the client should indicate that there are possibly multiple targets. The possibility of multiple geophysical targets should be known due to potential overlap and increased complexity of the resulting geochromatographic anomalies, which could alter the interpretation as to which targets are mineralized or not.

The overall precision of the SGH analysis for the samples at the ROUCHER DEBOULE VICTORIA PROJECT SGH Survey was excellent as demonstrated by 10 different samples taken from this survey which were used for laboratory replicate analysis and were randomized within the analytical run list. The average Coefficient of Variation (%CV) of the replicate results for the survey samples in this submission for data at 1.0 ppt was **5.5%** which represents an excellent level of analytical performance especially at such low parts-per-trillion concentrations

The location of **Field Duplicate samples was not identified for this SGH Survey.** It is typically observed that the variability of field duplicates is 5% to 8% CV higher than for laboratory duplicates of random samples taken from the survey which would be judged as very acceptable especially at such low parts-per-trillion concentrations and again using random samples analyzed from this survey (i.e. not an unrelated store of homogenous sample material).

Note that the SGH geochemistry does not detect all organic hydrocarbons present in the samples. It is specific at detecting those compounds that through years of research have been associated with specific commodity types.

A17-06702 – AMERICAN MANGANESE INC. - QUALITY ASSURANCE ROUCHER DEBOULE VICTORIA PROJECT SGH SURVEY

No other statistics were used on the data for this report for mapping or interpretation purposes aside from the use of a Kriging trending algorithm in the GeoSoft Oasis Montaj mapping software. **This interpretation is based only on the analytical results provided by the SGH Nano-Geochemistry from this submission of samples for the ROUCHER DEBOULE VICTORIA PROJECT SGH Soil Survey.** A template or group of SGH Pathfinder Classes that have been found to be associated with buried IOCG targets, Gold and Copper were used as the basis for the interpretation of the ROUCHER DEBOULE VICTORIA PROJECT SGH Soil Survey. The final interpretation is customized and conducted by the author. Although the term "template" or "signature" appears in this SGH Report, a computerized interpretation is not used.

SGH INTERPRETATION - SGH TARGET PATHFINDER CLASS MAPS

The maps shown in plan and in 3D views in this report are SGH "Pathfinder Class maps" for targeting various chemical classes of hydrocarbon flux signatures related to Redox conditions and the Copper and Gold aspects of IOCG type targets. This report may have been expanded by the author to include additional SGH information that may help understand the structure of the mineralization if present at the ROUCHER DEBOULE VICTORIA PROJECT survey. The maps shown represent the simple summation of several individual hydrocarbon compound concentrations that are grouped from within the same organic chemical class. SGH Pathfinder Class maps have been shown to be robust as they are each described using from 4 to 14 chemically related SGH compounds (unless otherwise stated) which are simply summed to create each chemical class map. Thus each map has a higher level of confidence as it is not illustrating just one compound measurement. A legend of the compound classes is in the SGH data spreadsheet.

The IOCG template of SGH Pathfinder Classes uses primarily low and medium molecular weight classes of hydrocarbon compounds. At least three Pathfinder Class maps, associated with the SGH signature developed for IOCG and must be present to begin to be considered for assignment of a good rating relative to the SGH performance in case studies over known IOCG type mineralization (some of these maps might not be shown in this report). These SGH classes must also concur and support a consistent interpretation in relation to the expected geochromatographic characteristics of the Pathfinder Class. Note that only one of the interpreted maps is usually shown in this report. The *overall* SGH interpretation Rating has even a higher level of confidence as it further implies the consensus between at least three SGH pathfinder classes. A combination of these SGH Pathfinder Classes potentially defines the signature of a target at depth if present. Each of the SGH Pathfinder Class maps shown in this report is a specific *portion* of the SGH signature relative to the presence of IOCG as described. Each pathfinder class map is still just a subset of the Pathfinder Class maps used in the interpretation template for IOCG. Additional interpretation information which may contain additional SGH Pathfinder Class maps is sometimes available as a Supplementary Report at an additional price (see Appendix H).

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SGH SURVEY
SGH INTERPRETATION - TARGET PATHFINDER CLASS MAPS

Note that any concentration value in the accompanying Excel spreadsheet greater than the "Reporting Limit" of 1.0 ppt is important data and has been able to depict mineralization at depth in other projects. The majority of the variability or noise has already been eliminated; additional filtering will adversely affect any interpretation. Note again that a Kriging trending algorithm has been applied to the mapping routine in the Geosoft Oasis Montaj software in the development of the SGH Class maps. SGH concentrations are in some way probably related to the amount of mineralization present and the grade of mineralization, which probably defines the characteristics or quantity of the biofilm(s) in contact with the deposit, as well as being related to the depth to mineralization. SGH results have also been shown to illustrate Redox/Electrochemical Cells and correlate well with geophysical measurements such as magnetic anomalies and those of CSAMT.

The SGH Class maps are the plot of the sums of the particular hydrocarbon class in parts-per-trillion (ppt) concentrations. The dark blue represents very low or non-detect values. For plotting purposes the values at the Reporting Limit are plotted as one-half of this filtering, or one-half of 1.0 ppt. The hotter colours represent higher concentrations of the sum of the class with the highest values being purple in colour. The lowest concentrations that may be at 0.5 ppt, are shown in blue.

SGH is a "deep penetrating" geochemistry but also works well for relatively shallow targets. Targets shallower than about 3 to 5 metres will have a reduced SGH signal due to interaction with atmospheric conditions and samples taken right at surface outcrops will have even weaker signals due to a higher degree of weathering from various environmental processes on these volatile and semi-volatile organic hydrocarbons.

In the interpretation of SGH data there are several goals. In order of importance they are:

- Review for the presence of Redox Cells
- Vector to the location of a mineral target
- Delineate the mineral target
- Identify the type of mineral target
- Describe the features of the possible mineral target
- See if there is information on the basement structure
- Predict a drill target
- Predict the possible depth to the mineral target

Not every goal is expected to be able to be achieved with each SGH data set or survey.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT
SGH INTERPRETATION RATING AND CLARIFICATION

Often a geochemistry such as SGH is used as an economical exploration investigation tool to provide more information on an exploration target as some geological body or help prioritize some geophysical target. Such occurrences are in general expected to change the chemistry of the immediate overburden which in turn is expected to result in a chemical anomaly as detected in surficial samples. The author believes that it is important to convey to the client the presence of an anomaly even if there is only part of the SGH signature present that may be related to the mineral signature or template requested. In other words, the anomaly illustrated in the report may not be representative of the mineralization sought as only a part of the SGH signature is present, but the anomaly may confirm the presence of some geological or geophysical target which may be valuable to the client for comparison with other data. In addition it would confirm the ability and sensitivity of SGH to show geological or geophysical occurrences. Example: A well defined rabbit-ear anomaly on an SGH Pathfinder Class map in a report, even though it may have a lower rating of 2.0 or 3.0, may illustrate to the exploration geologist that SGH does agree that there is some geological body at depth that is changing the chemistry and forming a Redox cell in the overburden. However the SGH forensic signature Rating indicates that there is a lower confidence that the "identification" of that body is likely to be say Gold (if the SGH Gold template is requested). This information would provide a confirmation that a target does exist, however if the SGH Rating indicates that the target has a lower level of confidence then the target does not have the forensic signature of the mineralization sought. SGH would thus provide a savings to the exploration program and divert focus to potentially other targets having a higher confidence in the SGH identification Rating for Gold in this example.

Thus, the SGH rating must always be considered in conjunction with the SGH Pathfinder Class map(s) shown in the report. It is this rating that provides an insight into the authors' complete interpretation and is a measure of the confidence and to what degree the complete SGH signature compares with the SGH results from over case studies of similar known deposits. Unfortunetely, the interpretation of a visual, as the SGH map provided, is so ingrained in humans that the reader may erroneously disregard the author's subjective rating to a large degree. As of November 25, 2011, the author now highlights the rating directly on the page having the plan view of the SGH Pathfinder Class map chosen to be illustrated. Thus to the reader of the report, the authors Rating is actually **MORE IMPORTANT** than the readers instinctive interpretation of just the one map provided. Again, SGH should not be used in isolation from other site information, and that a Rating of 4.0 is when, in the authors' estimation, a signature only starts to have a good identification relative to that type of mineralization, and that the survey may warrant further study although it is not a specific recommendation to drill test the anomaly. As the SGH interpretation is represented by a signature, the SGH Pathfinder Class map(s) illustrated in reports is always only "PART" of the specific SGH signature or template that the client requests (i.e. for Gold, etc.). No one SGH map can represent the complete signature due te the different amounts of spatial dispersion of the anomalies that are expected for the variety of SGH chemical classes within each signature. Thus the author selects the one SGH Class Map relative to the mineralization requested that best represents an anomaly that estimates the overall signature found in the survey.

A17-06702 – AMERICAN MANGANESE INC. - SGH SURVEY ROUCHER DEBOULE VICTORIA PROJECT - SGH INTERPRETATIONS

As a general comment in regard to the SGH results at this ROUCHER DEBOULE VICTORIA PROJECT SGH Soil Survey, the SGH data in general had a moderate signal strength and the SGH Class anomalies in this report have good contrast. It's important to not think of contrast with SGH as Signal:Noise as by using a "Reporting Limit" the noise has already been completely or nearly completely removed.

One of the first steps in the interpretation of SGH data is to locate potential Redox conditions in the overburden. Redox conditions have been well known to be related to blind mineral targets; however, Redox conditions can also be attributed to other geological bodies that are of no particular interest. SGH signatures have been shown to be able to differentiate between these targets. SGH has been described by the Ontario Geological Survey of Canada (OGS) as a "Redox Cell locator". Redox Cells can be related to the presence of bacteriological activity related to mineralization but also may be related to the presence of geological bodies such as Granite Gneiss, Dunite, etc. Recently SGH has been shown to be far more sensitive to depicting Redox conditions than even measurements using pH or ORP tests. It is important to understand that; not only is SGH a Redox cell locator, but due to the SGH forensic signature of mineralization used in the interpretation process, SGH can discriminate mineral targets and other target types from geological bodies, other magnetically detected targets, mineralized versus non-mineralized conductors, cultural effects, etc. evon in surveys over highly difficult or exotic terrain that often requires the collection of multiple sample types. In the interpretation it is not necessary to detect a Redox cell if mineralization is within approximately 30 metres of the surface as this would be insufficient depth to develop a dispersion halo anomaly.

Many SGH surveys for Gold, Copper, and other mineral targets can result in multiple types of anomalies, depending on the class of SGH compounds, even over the same target and in the same set of samples. Thus "Apical", "Segmented-Nested-Halo", and "Rabbit-Ear" or "Segmented Halo" type anomalies are all typically observed within the SGH data set from the effect of Redox cells that have developed over mineralization and their interaction with Redox conditions and the electromotive forces produced by the subsequent Electrochemical Cell. Different types of anomalies have also been associated with the depth to the target. The types of anomalies developed have been recently explained by the use of the 3D-SGH model of interpretation. The highly symmetrical anomalies illustrated by SGH data closely follow the expected self-organizing patterns of neutral species within an electrochemical cell in recent experiments in physics laboratories. The highly symmetrical anomalies are also able to be observed as the Nano-sized dimensions of these organic hydrocarbons are much smaller than inorganic oxides and sulphides. Thus the SGH hydrocarbons can migrate through the Nano-sized fissures of even clay, basalt, and permafrost caps by means of Nano-capillary action. The simple fact that the SGH anomalies are geometrically symmetrical and not random further improves the confidence of SGH interpretations.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SURVEY
SGH REDOX INTERPRETATION

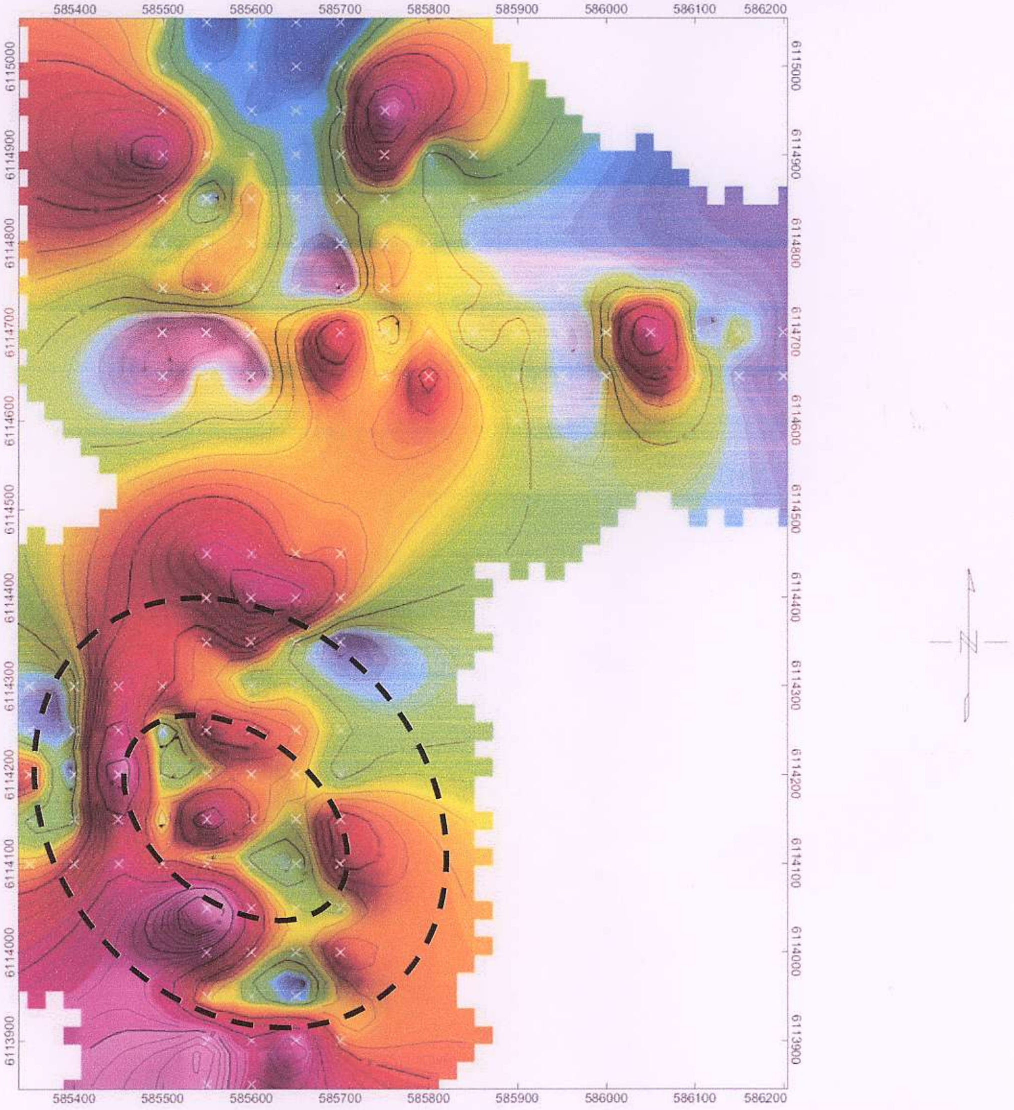
In this ROUCHER DEBOULE VICTORIA PROJECT survey area the 1:1 ratio, as 50 metre regularly spaced samples was ideal for SGH interpretation and directly contributed to diagnostic results. Note that data at the boundaries of the survey areas may appear to be enhanced due to the Kriging trending algorithm. At the ROUCHER DEBOULE VICTORIA PROJECT the northern survey area did not show the presence of any well defined Redox cells while an exceptionall well defined Redox cell was observed in the southern survey. SGH detection of Redox conditions often agrees exceptionally well with geophysical magnetic anomalies such as from IP and CSAMT surveys.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT - SGH IOCG INTERPRETATION

The SGH interpretation for the presence of a possible IOCG deposit is initiated by the review for Redox conditions and then followed up by an interpretation for the presence of Copper and/or for the presence of Gold. This report illustrates an SGH Pathfinder Class map diagnostic for Redox conditions on page 27 in plan view and on page 28 in 3D view. Note that this is not the only SGH Pathfinder map used to interpret Redox conditions. The map shown on page 25 was the best map to illustrate the Redox conditions found in the southern survey area. In fact this is one of a very few times that the Redox conditions is illustrated by the nested halo SGH anomaly (smaller dashed black oval) is shown an accentuated by the larger dashed black oval interpretation. This double halo anomaly, much like the rings on a dartboard, with the small central "nested" anomaly as the bulls-eye, is indicative of very deep seated Redox conditions. The central nested anomaly, or the bulls-eye of the dartboard is expected to be location of the deep source of mineralized hydrothermal fluids. Many times SGH has shown the connection with such Redox cells and mineralization. SGH has seen similar situations with IOCG type deposits which is not unexpected, i.e., "Alkaline Porphyry Copper Depdsits and IOCG – What is the Link?" by Teixeira, Ganade, Matos, et al.

The dashed black interpretation of the Redox conditions have also been placed on the SGH Gold Pathfinder Class and SGH Copper Pathfinder Class maps on pages 29 and 31. The possible location of Gold and Copper mineralization associated with these maps is discussed on page 33.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SURVEY
SGH "REDOX" PATHFINDER CLASS

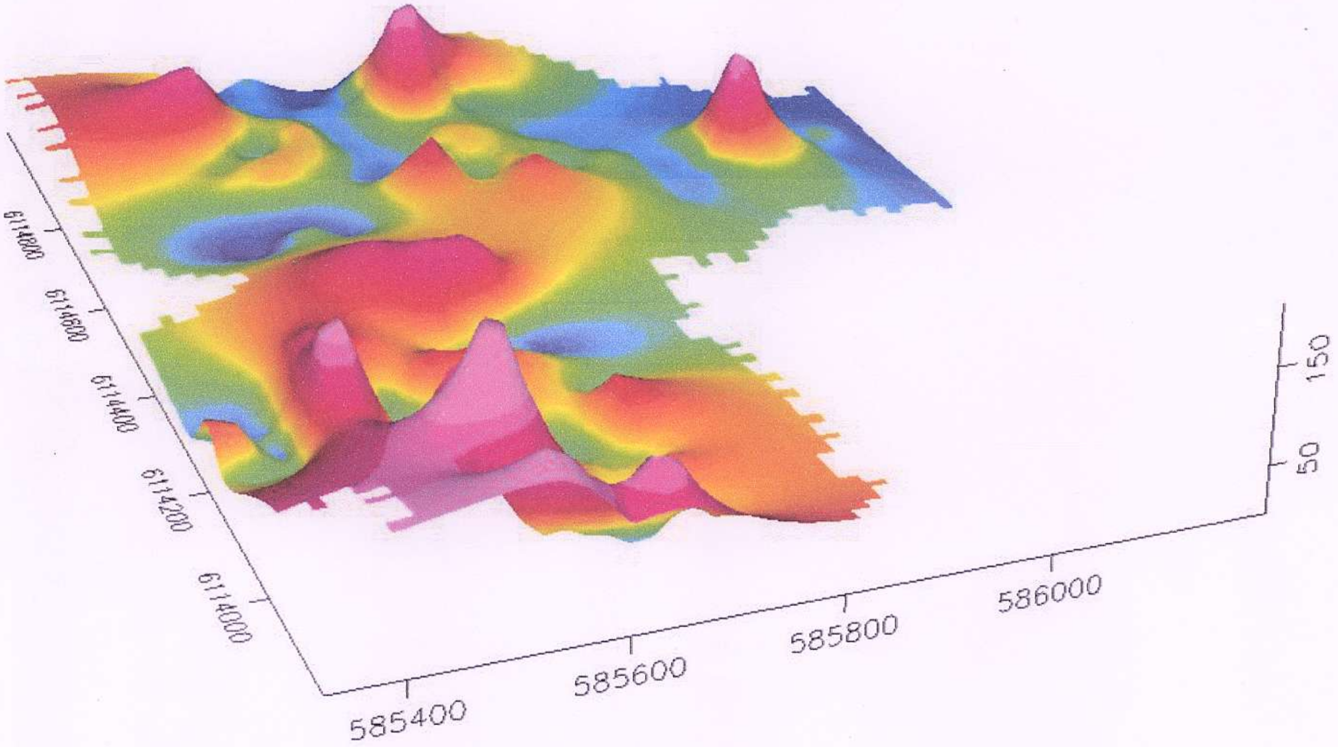


BLACK DASHED OUTLINES ILLUSTRATE POSSIBLE LOCATION OF A REDOX CELL

SGH SIGNATURE RATING RELATIVE TO "REDOX CONDITIONS" = 6.0 OF 6.0

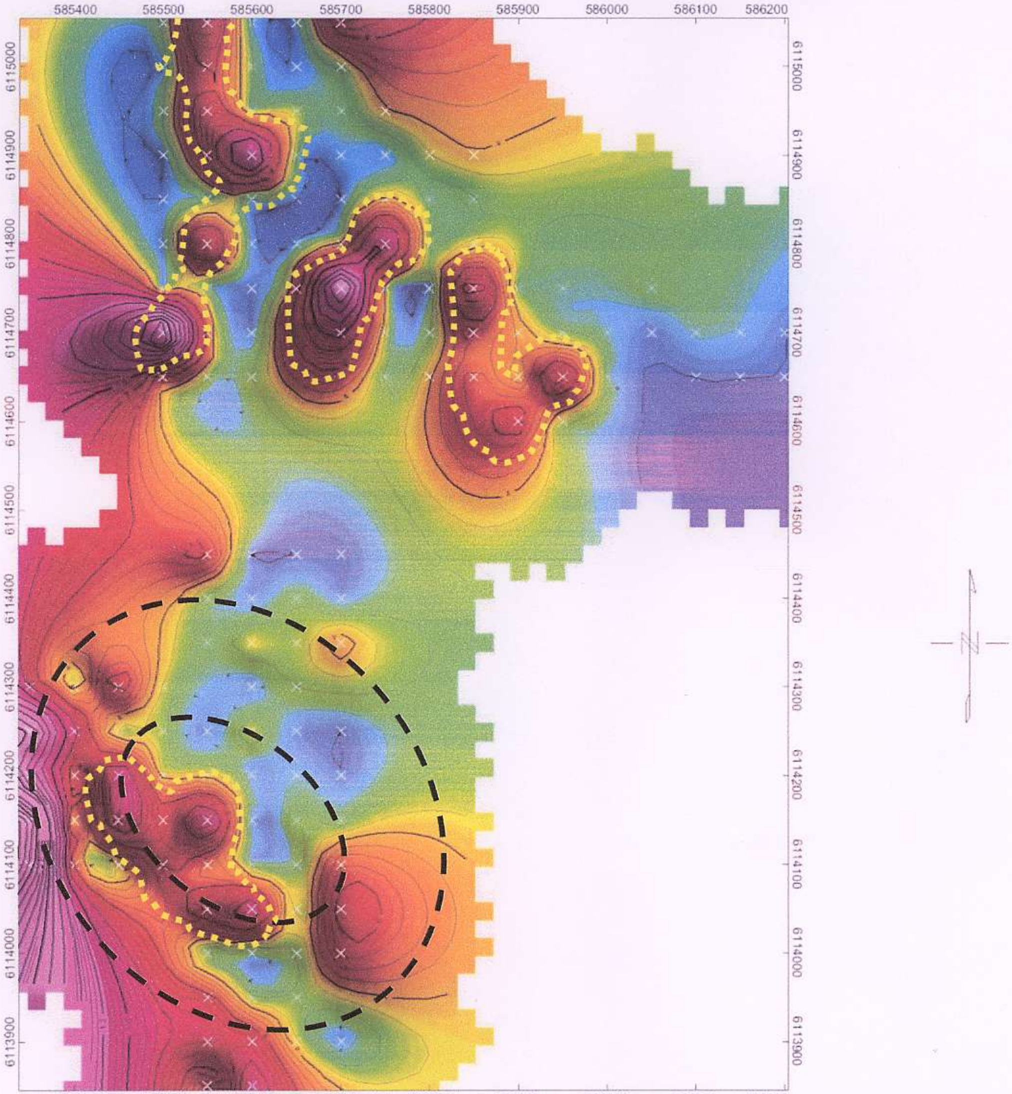
GEOSOFT.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SURVEY
SGH "REDOX" PATHFINDER CLASS



GEOSOFT.

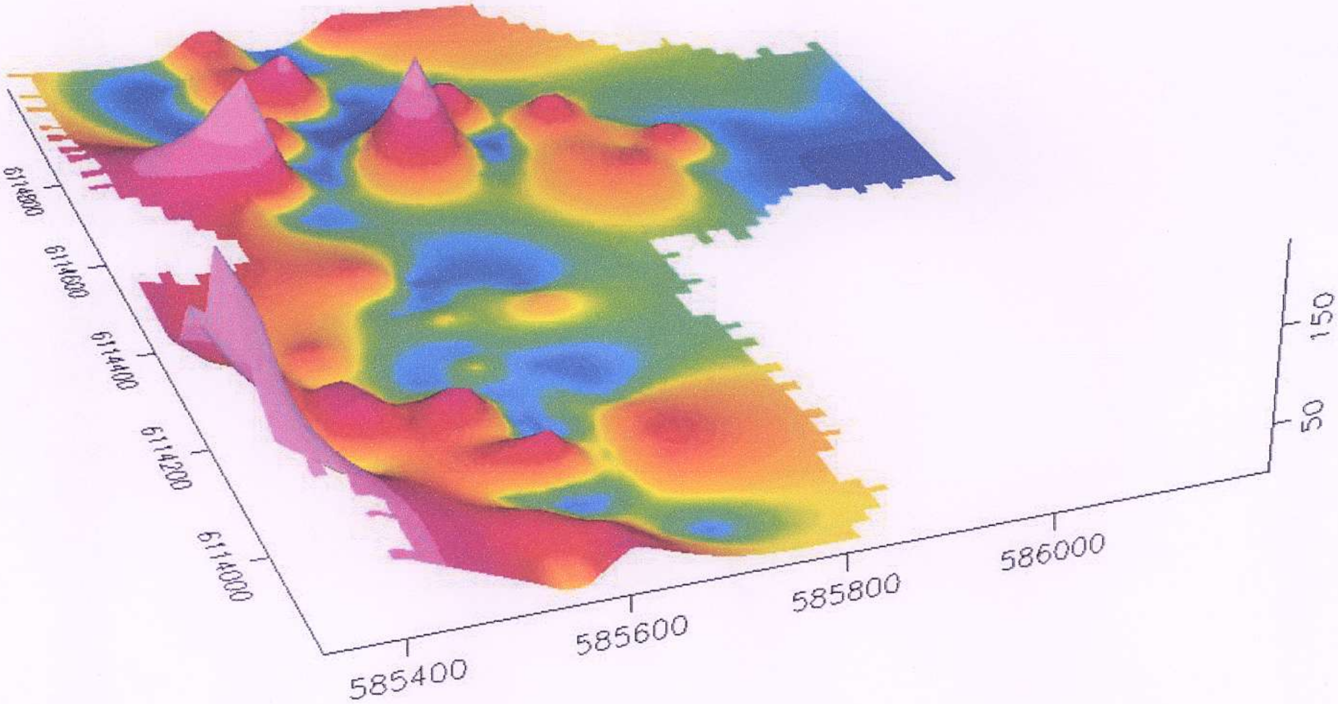
A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SURVEY
SGH "GOLD" PATHFINDER CLASS



YELLOW DOTTED OUTLINES ILLUSTRATE POSSIBLE ZONES OF GOLD MINERALIZATION

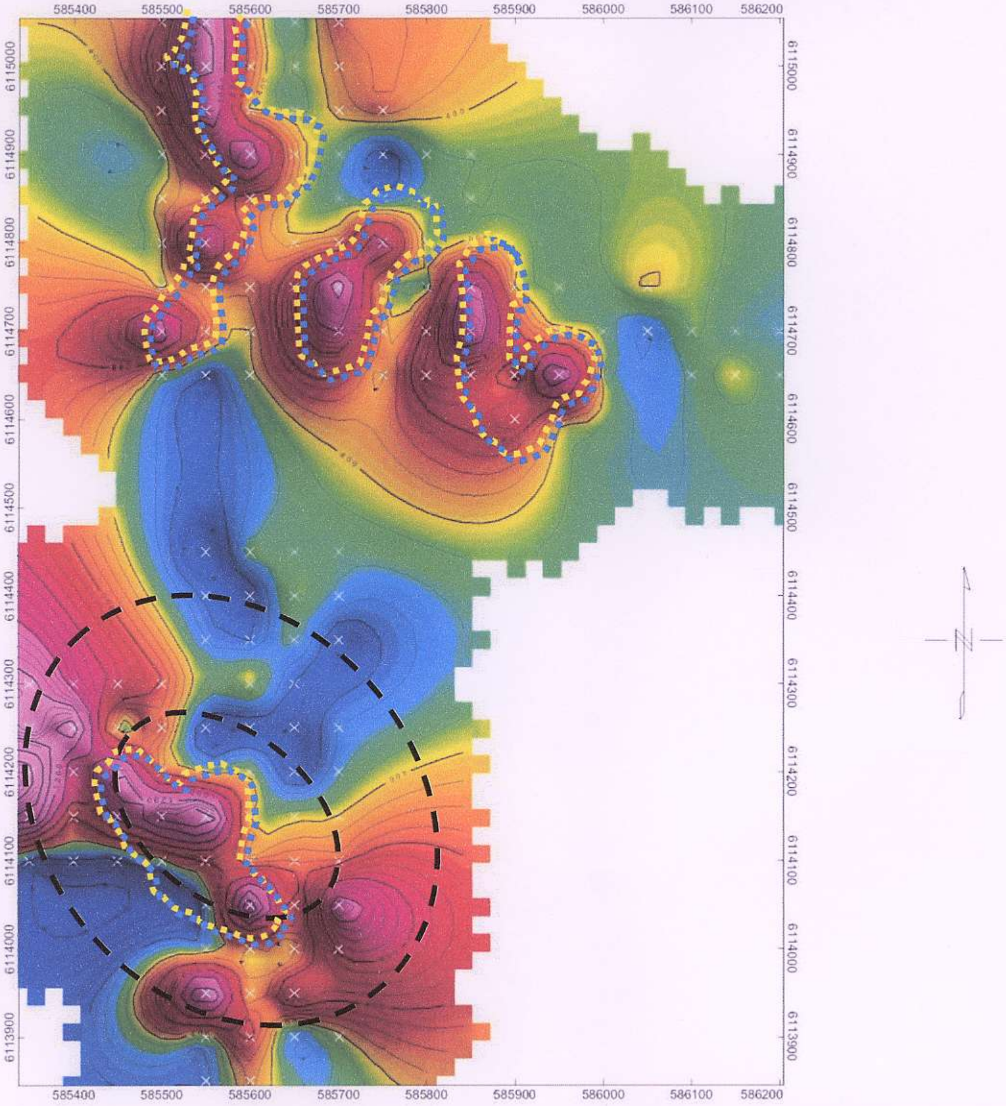
SGH SIGNATURE RATING RELATIVE TO "GOLD" = 5.0 OF 6.0

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SURVEY
SGH "GOLD" PATHFINDER CLASS



GEOSOFT.

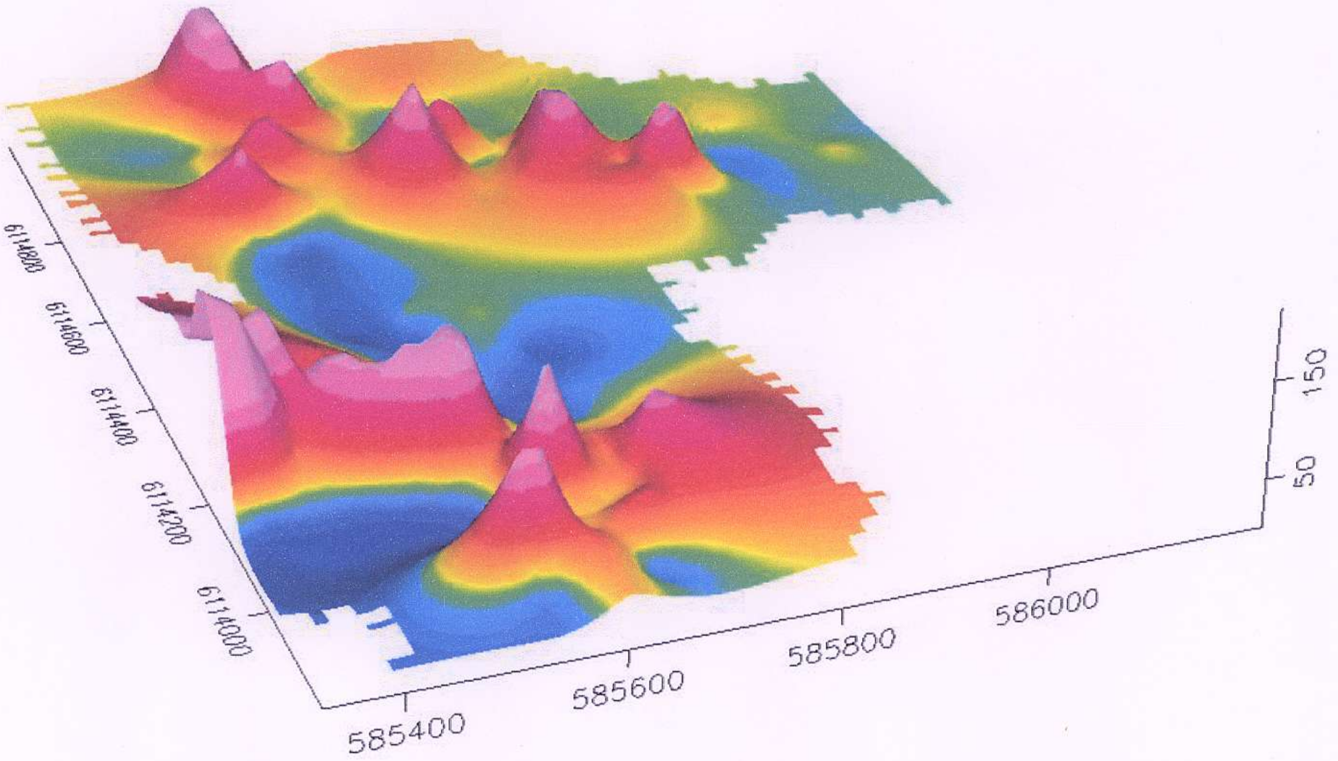
A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SURVEY
SGH "COPPER" PATHFINDER CLASS



BLUE DOTTED OUTLINES ILLUSTRATE POSSIBLE ZONES OF COPPER MINERALIZATION

SGH SIGNATURE RATING RELATIVE TO "COPPER" = 5.0 OF 6.0

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SURVEY
SGH "COPPER" PATHFINDER CLASS



GEOSOFT.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SGH SURVEY
SGH INTERPRETATION FOR IOCG MINERALIZATION

The previous pages 29 and 31 illustrate the SGH pathfinder class maps that have been very reliable in its association with the presence of Gold and Copper mineralization. These SGH Class maps are only a portion of the SGH maps used in the interpretation for the presence of Gold and/or Copper. There is not any one SGH Class map that can, as a single map, be reliably used to interpret the presence of Copper or Gold or any other type of mineralization. The use of multiple SGH Class maps as separate portions of each signature increases the reliability of the interpretations. It should also be noted that some SGH Classes can be used as a portion of other SGH mineral signatures, i.e. some portions of SGH signatures overlap in their use.

In the instance of the Roucher Deboule Victoria project surveys, the SGH Gold and the SGH Copper interpretation are coincident, i.e. showing no zonation between these commodities. The SGH Gold and Copper Pathfinder Classes are often expected to illustrate an apical response this is a direct vertical projection over mineralization. The SGH Class maps for Gold and Copper illustrate the possibility of coincident mineralization within the dotted yellow and blue outline on the southwest side of the Redox conditions in the southern survey area. In the northern survey area the SGH Class maps for Gold and Copper again show the prediction of coincident mineralization within the dotted yellow and blue outlines. However the interpretation of mineralization in the northern survey is not associated with well illustrated Redox conditions. The bands of possibly coincident Gold and Copper mineralization in the northern survey may be short veins or stringers of mineralization.

Thus the possible mineralization located by SGH in the northern survey may not be associated with IOCG or Porphyry style deposits. In contrast the prediction of the location of Gold and Copper mineralization in the southern survey appears to be directly related to strong and well defined Redox conditions which may be associated with IOCG or Porphyry style deposits. Again other SGH Classes at the ROUCHER DEBOULE VICTORIA PROJECT survey grid agree with and support the interpretation of these locations.

Note that SGH interpretations have been proven to be vertical projections of possible mineralization. SGH anomalies have been shown to not be deflected by complex overburden, faults, shears and even major fault conditions. Also note that SGH is very sensitive and that should mineralization be present it may or may not be economic. Also, at this time, no geochemical method can predict the thickness of mineralization. From client feedback in recent years, grass roots exploration surveys that have been interpreted with an SGH Confidence Rating of over 4.0 have been drill tested and have had successful intersections. However the frequency of success is much more prevalent for those targets that have associated SGH Rating Scores of ≥5.0.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SGH SURVEY
SGH INTERPRETATION FOR IOCG MINERALIZATION

The SGH Ratings shown for these grids in this and all SGH reports are based on a scale of 6.0, in 0.5 increments, with a value of 6.0 being the best. The SGH Ratings discussed in relation to Copper and/or Gold mineralization represents the similarity of these SGH results with other SGH case studies and orientation studies over known mineralization. Theses SGH signatures or templates have been constantly refined and enhanced since inception and has been proven to be effective and reliable. The SGH templates are based on the review and interpretation from over 1,000 surveys in many different geographical regions and from a wide variety of litholegies. The degree of confidence in the SGH Rating only starts to be "good" at a level of 4.0. A Rating of 4.0 or more is an indication that this SGH Nano-Geochemistry predicts that the zone(s) described may warrant more work or more consideration.

The coincident Gold and Copper anomalies could be defined as drill targets at the Roucher Deboule Victoria project surveys. The identification of any drill target(s) is not an explicit recommendation by Activation Laboratories Ltd. to drill test the associated location or SGH anomaly. A drill target is implied to ensure that the reader is aware of the location having the highest confidence of being the location of the vertical projection of possibly the shallowest mineralization, based only on SGH data. This is also not a recommendation for vertical drilling, although this may be the most reliable way of intersecting mineralization. However, vertical drilling may not be the best approach in this area. Activation Laboratories Ltd. has no experience in actual exploration drilling techniques. Other geological, geochemical and/or geophysical information should also be considered.

As there is no zonation between the predicted SGH anomalies for Gold and Copper, it is predicted, especially in the northern survey, that mineralization may be relatively shallow, perhaps in the neighbourhood of less than 50 metres deep. Any mention of the depths to mineralization is an estimate and is very approximate. This prediction is a result of the development of the 3D-SGH interpretation process that recognizes the importance of symmetrical anomalies. Such estimates cannot be calibrated except from the responses received from those SGH clients that have offered feedback from actual drilling results or prior site knowledge. The feedback obtained regarding depth since the use of 3D-SGH has been quite encouraging. SGH is the only geochemistry to our knowledge that is able to make some statement with regards to the depth to mineralization under cover.

It must be remembered that other SGH Class maps not shown in this report have also been reviewed to support the interpretation shown. To deduce the most scientifically sound interpretation of the ROUCHER DEBOULE VICTORIA PROJECT survey, the client should use a combination of the SGH results shown in this report with additional geochemical, geophysical, and geological information to possibly obtain a more confident and precise target location. This is not a statement to convey some lower level of confidence in SGH results. This statement is made to recognize the proper use and interpretation of any scientific data. Whenever possible, multiple methods should always be employed so that any decisions do not rely on any one technique.

A17-06702 – AMERICAN MANGANESE INC.
ROUCHER DEBOULE VICTORIA PROJECT SGH SURVEY
SGH SURVEY RECOMMENDATIONS

The sample survey design using a 1:1 ratio of sample spacing was ideal for the SGH analysis and interpretation. If more accurate drill sites were sought for any relatively small targets, infill sampling at 25 metre spacing in the vicinity of specific anomalies can be conducted. SGH does not yield additional detail for samples spaced less than 20 metres apart. This infill sampling can be easily added to the current data set 90% of the time i.e. without any data leveling. When infill sampling is used it is suggested, as cheap insurance, to resample at least 1 of the current locations, perhaps at anomaly and some distance away, to provide a set of reference points that can aid in data leveling on the remote chance that it would have to be used. This is also discussed below.

GENERAL RECOMMENDATIONS FOR ADDITIONAL OR IN-FILL SAMPLING FOR SGH ANALYSIS

In general, if the client decides that in-fill sampling may be warranted, to obtain the best results from additional sampling for SGH it is usually recommended that sample locations from the original survey within, or bordering, the area of interest be re-sampled rather than just combining new sample results with the sample data from the initial survey. Although several SGH surveys have previously been easily and directly, combined without data leveling, it cannot be guaranteed that data leveling will not be required. It has been found that data leveling is more apt to be required should the new samples be collected under significantly different environmental conditions than during the initial sample survey, i.e. summer collection versus winter collection. The process of data leveling adds a minimum of 3 to 5 days of work to conduct the additional data evaluation, develop additional plots of the results, conduct new interpretations, and additional report descriptions. Results from data leveling is also always considered "an approximation", thus the confidence in a combined interpretation will be lower than the interpretation from samples collected during one excursion to the field and submitted as one survey. An additional cost will be invoiced should data leveling operations be required if the client requests that two SGH data sets be interpreted and reported together. Thus re-sampling a few of the original sample locations will provide a faster turnaround time for results and provide more accurate and confident surveys for evaluation and aid in deciding specific drill targets.

Date Submitted for SGH at Actlabs, Ancaster, ON: July 4, 2017

Date Analyzed at Actlabs Global Headquarters, Ancaster ON: July 17-26, 2017.

SGH Interpretation Report: August 31, 2017

AMERICAN MANGANESE INC.

#2, 17942 – 55th Ave.

Surrey, British Columbia, Canada, V3S 6CB

Attention: Andris Kikauka

RE: Your Reference: ROUCHER DEBOULE VICTORIA PROJECT - SGH SURVEY

Activation Laboratories Workorder: A17-06702

CERTIFICATE OF ANALYSIS

This Certificate applies to the associated Excel Spreadsheet of Hydrocarbon results combined with the discussion and SGH Pathfinder Class maps of the data shown in this report.

144 Samples were analyzed for this submission.

Sample preparation –Actlabs Ancaster - S4: Drying at 60°C and Sieving with -80 mesh collected

Interpretation relative to IOCG targets using SGH Copper and Gold signatures

The following analytical package was requested and analyzed at Actlabs Ancaster Canada:

Analysis Code SGH – Spatiotemporal Geochemical Hydrocarbon Geochemistry using High Resolution Gas Chromatography/Mass Spectrometry (HRGC/MS)

REPORT/WORKORDER: A17-06702

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at the time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of the material submitted for analysis.

Notes: The SGH – Spatiotemporal Geochemical Hydrocarbon Geochemistry is a semi-quantitative analytical procedure to detect and measure 162 hydrocarbon compounds as the organic signature in the sample material collected from a survey area. It is not an assay of mineralization but is a predictive geochemical tool used for exploration. This certificate pertains only to the SGH data presented in the associated Microsoft Excel spreadsheet of results.

The author of this SGH Interpretation Report, Mr. Dale Sutherland, is the creator of the SGH and OSG organic geochemical methods. He is a Chartered Chemist (C.Chem.) and Forensic Scientist specializing in organic chemistry. He is a member of the Association of the Chemical Profession of Ontario, the Association of Applied Geochemists, the International Association of GeoChemistry, the Ontario Prospectors Association, the Association for Mineral Exploration British Columbia, the Geochemical Society Association, the Ontario Petroleum institute, the Chemical Institute of Canada, and the Canadian Society for Chemistry, as well as having memberships in several national and international Forensic associations. He is not a professional geologist.

CERTIFIED BY:

D Sutherland

Dale Sutherland, B.Sc.,B.Sc.,B.Ed.,C.Chem.,MCIC
Forensic Scientist, Organics Manager,
Director of Research
Activation Laboratories Ltd.

Dale A Sutherland

APPENDIX "A"

List of terms

1. **SGH** – "SPATIOTEMPORAL GEOCHEMICAL HYDROCARBON" (previously called "SOIL GAS HYDROCARBON") GEOCHEMISTRY – a Predictive Geochemistry, used for delineate buried inorganic mineral deposits and organic petroleum plays. This is the original name used to describe this geochemistry since inception in 1996. Code SGH is still used when submitting samples.
2. **3D-SGH**- "3D- SPATIOTEMPORAL GEOCHEMICAL HYDROCARBONS - the method of interpreting SGH and OSG results based on the Redox/Electrochemical Cell model developed by Activation Laboratories Ltd. in 2011.
3. **Redox cell**- an area of oxidation-reduction reactions or exchange of electrons that is produced over geological bodies, mineralization and petroleum based plays.
4. **Electrochemical cell**- the effect of adjacent chemically reduced areas and chemically oxidized areas as a Redox cell produces a electrical gradient that obeys the physics of a typical Electrochemical cell.
5. **Anthropogenic contamination**- the introduction of impurities/compounds of the same type as those that are being analyzed by human actions that could lead to erroneous results.
6. **Background areas**- the area around a mineral deposit that is beyond the effect of the Redox cell formed over geological bodies or exploration targets. Sampling is required into background areas to produce data that has sufficient contrast to illustrate and differentiate anomalies associated with exploration targets.
7. **Background subtracted**- A sample taken some distances away as to not contain any elements of the target being analyzed.
8. **Biofilm**- a layer of microorganisms and microbe and their related secretions and decomposition products, in this case found to inhabit mineral deposits .
9. **Biomarker**- a compound used as an indicator of a biological state. In this case a biological substance used to indicate the presence of a mineral deposit.
10. **Blind mineralization** – buried mineralization that shows no physical indication of its existence at the surface
11. **Compound** – used synonymously with the term hydrocarbon in this report
12. **Compound chemical class** – a group of hydrocarbons that are similar in size, structure, and molecular weight such that their chemical characteristics, such as water solubility, partition coefficients, vapour pressures, etc. are similar
13. **Cultural activities** – human initiated processes that may affect the physical and chemical characteristics at the earth's surface
14. **Delineating targets**- indicate the position or outlines of an exploration target as a vertical projection of the target at depth.

15. **Geochemical anomalies** – inorganic element or organic hydrocarbon measurements that are significantly different than the average low level measurements or background in a survey i.e. the needle in a haystack is an anomaly
16. **Dispersion patterns** – the movement/ spreading of something. In this context the spatial arrangements of hydrocarbons caused by their movements to the surface from some depth.
17. **Exploration tool** – a geological, geophysical or geochemical method that attempts to illustrate data in exploration activities that may indicate the presence of mineralization or petroleum plays.
18. **Fit for purpose**- this method is ideal for its intended use.
19. **Forensic signature**- a grouping or pattern found to identify a substance having multiple characteristics with a high degree of specificity.
20. **High specificity**- as in being very specific to the mineralization.
21. **Anomalies**- this is the spatial representation of data that illustrates a high or low response as well as the combined spatial shape of anomalous data from several neighbouring samples in a survey that can form anomalies described as Rabbit-Ear, Halo, Segmented-halo, nested-halo, etc.
22. **Inorganic geochemistry** – the measurement of inorganic elements in a survey of near surface samples as a tool for exploration
23. **Data leveling** – a technique that attempts to normalize the data sets obtained between two or more sampling programs. The results of data leveling is always considered as an approximation.
24. **Lithologies**- the charactaristics and classifications of rock.
25. **Locations**- the physical/ geographical position or coordinates of samples in a survey.
26. **Noise**- interference in a measurement which is independent of the data signal.
27. **Nugget effect**- Anomalously high precious metal assays resulting from the analysis of samples that may not adequately represent the composition of the bulk material tested due to non-uniform distribution of high-grade nuggets in the material to be sampled. (Webster's online dictionary)
28. **Organic geochemistry**- the Spatiotemporal Geochemical Hydrocarbon geochemistry (SGH), or now more accurately named as Spatiotemporal Geochemical Hydrocarbons, is the analysis to detect specific organic, or carbon based, hydrocarbon compounds in a sample. The Organo-Sulphur Geochemistry (OSG) is the analysis to detect specific organic compounds that have sulphur joined to carbon in its molecular structure.
29. **Percent Coefficient of Variation (%CV)** – a measure of data variability
30. **Project maintenance** – an activity where the associated cost is applied to the exploration, advancement, and/or operation of activities associated with a particular claim
31. **Rating**- a value given to the overall confidence in the SGH results
32. **Real (in relation to data)**- any rational or irrational number
33. **Reporting Limit** – minimum concentration of an analyte that can be accurately measured for a given analytical method.
34. **Sample matrix**- the components of a sample other than the analyte.
35. **Sample type** – soil, till, humus, lake bottom sediment, sand, snow, etc.

36. **Semi-quantitative-** yielding an approximation of the quantity or amount of a substance
37. **SGH anomalies** ("Apical", "Nested-Halo", and "Rabbit-Ear" or "Halo")
38. **SGH Pathfinder** (class map/compounds)
39. **SGH template** – a set of hydrocarbon classes that together form a geochemical signature that has been associated with the presence of a particular type of mineralization the majority of the time
40. **Surficial bound hydrocarbons –**
41. **Surficial samples-** a sample from near the earth's surface.
42. **Survey-** the area, position, or boundaries of a region to be analyzed, as set out by the client.
43. **Project-** a planned undertaking
44. **Transect-** A straight line or narrow section through an object or across a section of land.
45. **Target-** Target refers to the ore body of interest

    Target signature: the unique characteristics that identify the target.

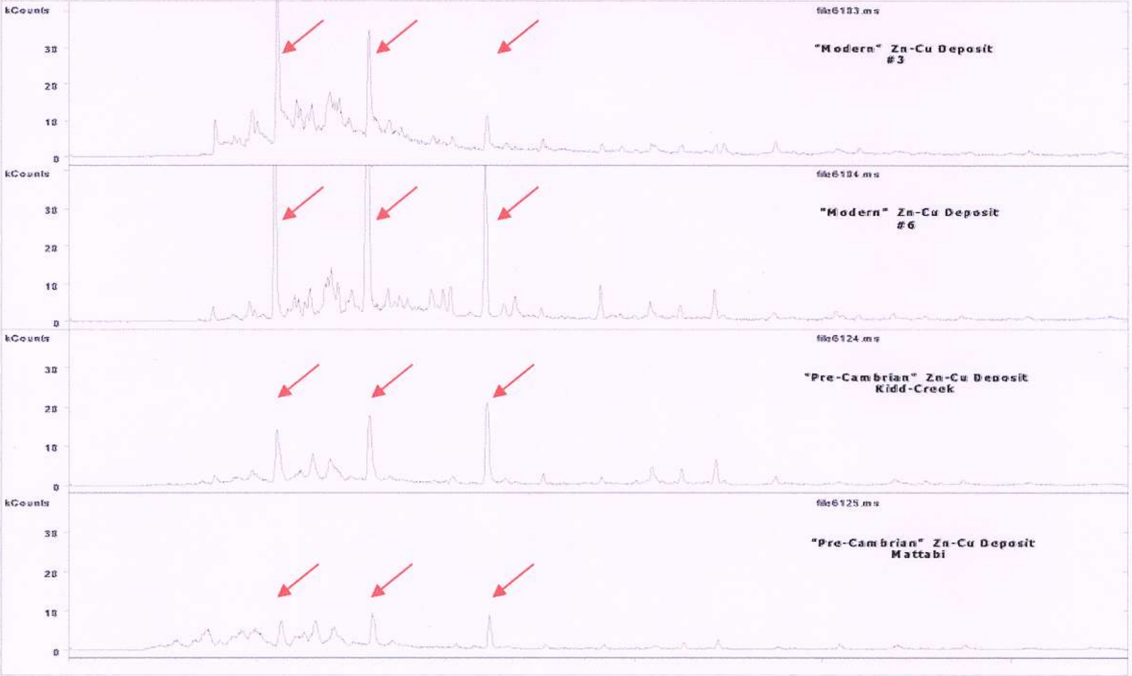
    Target type:

    i.e. Gold, Nickel, Copper, Uranium, SEDEX, VMS, Lithium Pegmatites, IOCG, Silver, Ni-Cu-PGE, Tungsten, Polymetallic, Kimberlite as well as Coal, Oil and Gas.
46. **Threshold-** level or point at which data is accepted as significant or true.
47. **Total measurement error-** An estimate of the error in a measurement. Based on either limitation of the measuring instruments or from statistical fluctuations in the quantity being measured.
48. **Visible (in terms of signature)**- the portion shown in a chart or map

APPENDIX "B"
EXAMPLE OF AN SGH FORENSIC GEOCHEMICAL SIGNATURE
EXAMPLE SHOWN FOR A VMS TARGET

The following analyses examine the Volcanic Massive Sulphide (VMS) deposit in various known locations. These analyses show how the gas chromatography indicates the reality of deposits. For all the profiles in this section, the red arrows indicate the signature of the VMS, which have all been found by organic geochemistry. These forensic geochemical signatures are shown to be consistent for similar target areas; therefore, the analyses are reliable indicators for the presence of VMS.

One of the first experiments in 1996 in the development of the SGH analysis was to observe if an SGH response could be obtained directly from an ore sample. From office shelf specimens, small rock chips were obtained which were then crushed and milled. The fine pulp obtained was then subjected to the SGH analysis. These shelf specimen samples were from well known VMS deposits of the Mattabi deposit from the Archean Sturgeon Lake Camp in Northwestern Ontario and from the Kidd Creek Archean volcanic-hosted copper-zinc deposit. Even these specimen samples contain a geochemical record of the hydrocarbons produced by the bacteria that had been feeding on these deposits at depth. As a comparison, SGH analysis were similarly conducted on modern-day VMS ore samples taken from a "black smoker" hydrothermal volcanic vent from the deep sea bed of the Juan de Fuca Ridge where high concentrations of microbial growth was also known to exist. The raw data profiles as GC/MS Total Ion Chromatograms are shown below to illustrate the *"visible"* portion of the VMS signature obtained from the SGH analysis.

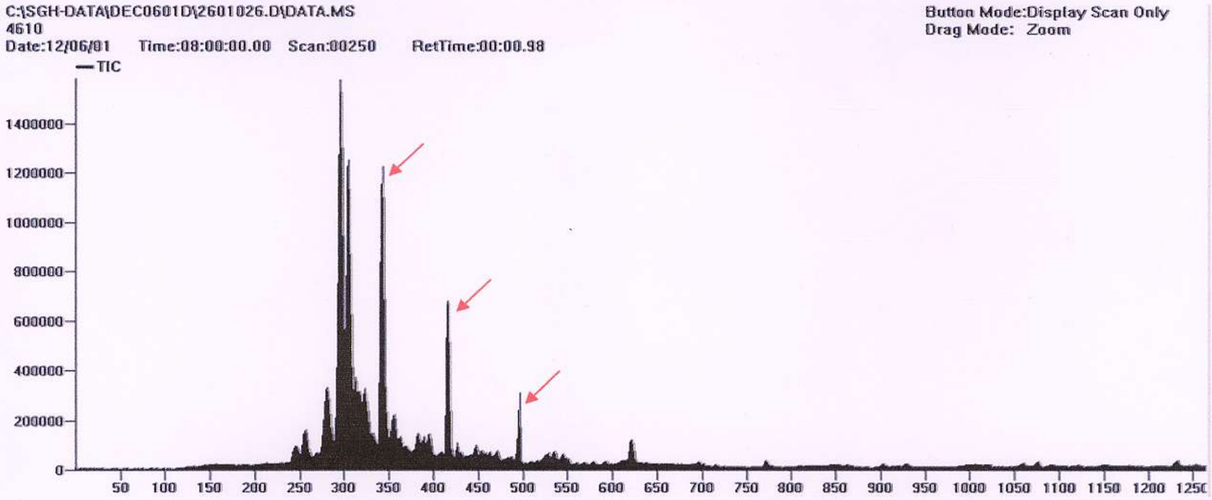


The above profiles are:

- First profile: Samples from modern day "black smokers"
- Second profile: Samples from modern day "black smokers"
- Third profile: Samples from Pre-Cambrian Zn-Cu Kidd Creek deposit
- Fourth profile: Samples from Mattabi deposit

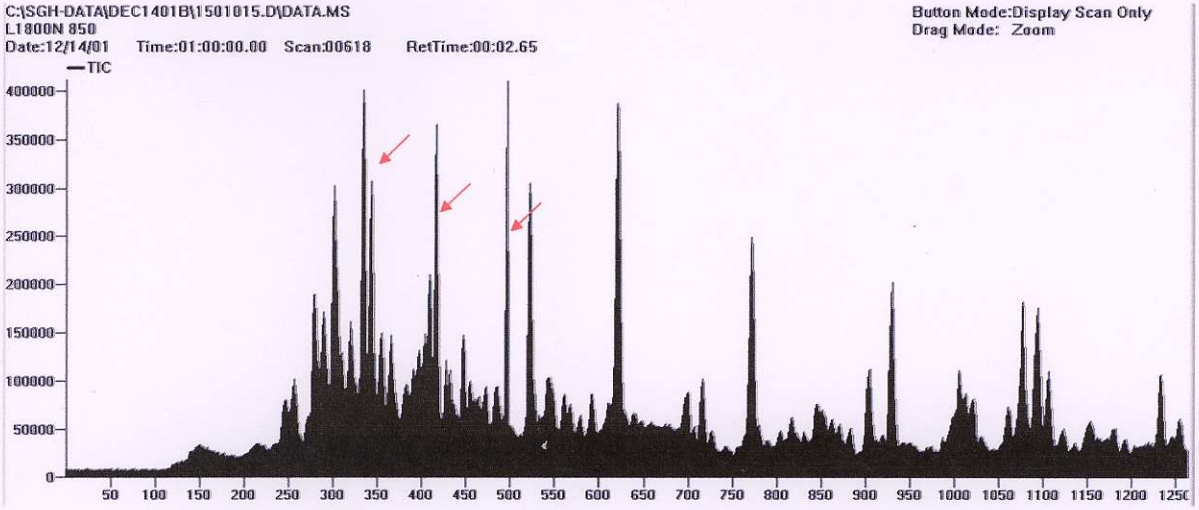
The red arrows point to three compounds that are a *portion* of the SGH signature for VMS type deposits. This visible portion of the VMS signature of hydrocarbons can easily be seen in the analysis of each of these four samples.

The next question in our early objectives was to see if this SGH signature could also be observed in *surficial soil samples* that had been taken over VMS deposits. Through our research projects, soil samples were obtained from over the Ruttan Cu-Zn VMS deposit near Leaf Rapids, Manitoba and located in the Paleoproterozoic Rusty Lake greenstone belt. The profile obtained, as observed in the raw GC/MS chromatogram, is shown in this next image below:



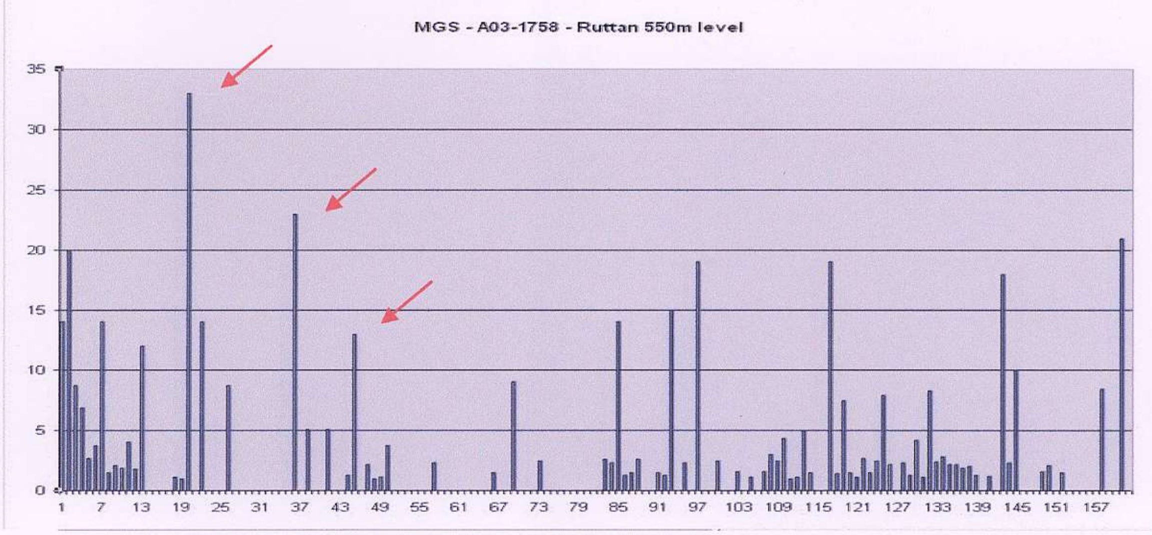
The three compounds indicated by the red arrows represent the same *visible portion* of the VMS signature observed from the modern day black smoker samples and the ore samples taken from the Mattabi and Kidd Creek, even though this soil was taken from over a different VMS deposit in a geographically different area. Is this coincidence?

Another soil sample was obtained from Noranda's Gilmour South base-metal occurrence in the Bathurst Mining camp in northern New Brunswick. As shown below, this sample contained a very complex SGH signature, however the visible portion of the VMS signature as indicated by the red arrows is still observed as in the black smoker, Mattabi and Kidd Creek ore samples.



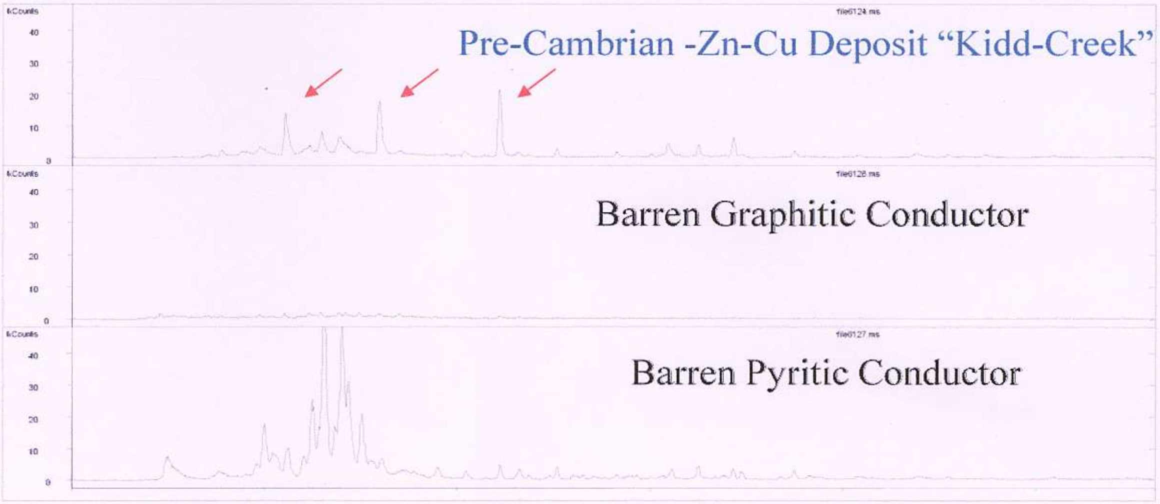
In research conducted by the Ontario Geological Survey, this same portion of the SGH signature was also observed over the VMS deposit at Cross Lake in Ontario. **Note that the visible signature shown as the three compounds indicated by the red arrows is only a small portion of the complete SGH VMS signature.** The full VMS signature is made up of at least three groups, as three organic chemical classes, that together contain at least 35 of the individual SGH hydrocarbons.

The chromatograms shown on the preceding page from the GC/MS analysis are not used directly in the interpretation of SGH data. As we are only interested in a specific list of 162 hydrocarbons, the mass spectrometer and associated software programs specifically identifies the hydrocarbons of interest, runs calculations using relative responses to a short list of hydrocarbons used as standards, and develops an Excel spreadsheet of semi-quantitative concentration data to represent the sample. Thus the SGH results for a sample, like that observed in ore from the Ruttan, are filtered to obtain the concentrations for the specific 162 hydrocarbons. A simple bar graph drawn from the Excel spreadsheet of the hydrocarbons and their concentrations results in a DNA like *forensic SGH signature* as shown below. The portion discussed hear as the "visible" SGH VMS signature in the GC/MS chromatograms, is again shown by the red arrows.



Through the work done in the SGH CAMIRO research projects, it was observed that the hydrocarbon signature produced by the SGH technique appeared to also be able to be used to differentiate barren from ore-bearing conductors. This was explored further through the submission and analysis of specific specimen samples that represented a barren pyritic conductor and a barren graphitic conductor.

The GC/MS chromatograms from these two specimens are compared to that obtained from the Kidd-Creek ore as shown below. This diagram conclusively shows that the SGH signatures obtained from the two types of barren conductors are completely different than that obtained by SGH over VMS type ore. SGH is thus able to differentiate between ore-bearing conductors and barren conductors as **the Forensic SGH Geochemical signature is different**.



SGH has been described by the Ontario Geological Survey of Canada (OGS) as a "REDOX cell locator". Many SGH surveys for Gold and other mineral targets can result in multiple types of anomalies, depending on the class of SGH compounds, even over the same target and in the same set of samples. Thus "Apical", "Nested-Halo", and "Rabbit-Ear" or "Halo" type SGH anomalies are all typically observed from the effect of REDOX cells that have developed over deposits. REDOX cells are also related to the presence of bacteriological activity.

The VMS template of SGH Pathfinder Classes uses low and medium weight classes of hydrocarbon compounds. Again, at least three Pathfinder Class group maps, associated with the SGH signature for VMS, must be present to begin to be considered for assignment of a good rating. The Pathfinder Class anomalies in these maps must logically concur and support a consistent interpretation in relation to the expected geochromatographic characteristics of the Pathfinder Class, for a specific area.

The interpretation development history for VMS SGH Pathfinder Class map(s) shown in this report is similar to the development history for other target types. The reader should not draw a conclusion that SGH is used only for sulphide based mineralization as some of the most intense SGH anomaly has been associated with Kimberlites where sulphides are essentially not present.

APPENDIX "C"
SPATIOTEMPORAL GEOCHEMICAL HYDROCARBON SURVEY DESIGN AND SAMPLING

Sample Type and Survey Design: It is highly recommended that a ***minimum*** of 50 sample "locations" is preferred to obtain enough samples into background areas on both sides of *small* suspected targets (wet gas plays, Kimberlite pipes, Uranium Breccia pipes, veins, etc.). SGH is not interpreted in the same way as inorganic based geochemical method. SGH must have enough samples over both the target and background areas in order to fully study the dispersion patterns or geochromatography of the SGH classes of compounds. Based on our minimum recommendation of at least 50 sample locations we further suggest that all samples be *evenly spaced* with about one-third of the samples over the target and one-third on each side of the target in order for SGH to be used for exploration. Targets other than gas plays, pipes, dykes or veins usually require additional samples to represent both the target and background areas.

SGH has been shown to be very robust to the use of differeht sample types even "within" the same survey or transect. Research has illustrated that it is far more important to the ultimate interpretation of the results to take a complete sample transect or grid than to skip samples due to different sample media. The most ideal natural sample is still believed to be soil from the "Upper B-Horizon", however excellent results can also be obtained from other soil horizons, humus, peat, lake-bottom sediments, and even snow. The sampling design is suggested to use evenly spaced samples from 15 metres to 200 metres and line spacing from 50 metres to 500 metres depending on the size and type of target. A 4:1 ratio is suggested, however, larger orientation surveys have also been successful. Ideally even large grids should have one-third of the samples over the target and two-thirds of the samples into anticipated background areas. This will allow the proper assessment of the SGH geochromatographic vectoring and background site signature levels with minimal bias. Individual samples taken at significant distances from the main survey area to represent background are not of value in the SGH interpretation as SGH results are not background subtracted. Samples can be drip dried in the field and do not need special preservation for shipping and has been specifically designed to avoid common contaminants from sample handling and shipping. SGH has also been shown to be robust to cultural activities even to the point that successful results and interpretation has been obtained from roadside right-of-ways. In conclusion, the conditions for the sample type and survey design include:

- Fist sized samples are usually retrieved from a shallow dug hole in the 15 to 40 cm range of depth.
- Different sample types can be taken even "within" the same survey or transect, data leveling is rarely ever required. SGH is highly effective is areas of very difficult terrain. The Golden Rule is to always take a sample.
- Samples should be evenly spaced in a grid or a series of transects with sample lines spaced at a ratio of up to 4:1 (line spacing: sample spacing).

- A minimum of 50 sample "locations" is recommended with one-third over the target and one-third on each side of the target into background if this can be predicted. This provides the opportunity of optimal data contrast.
- If very wet, samples can be drip dried in the field.
- No special preservation is required for shipping.

APPENDIX "D"
SAMPLE PREPARATION AND ANALYSIS

Upon receipt at Activation Laboratories the samples are air-dried in isolated and dedicated environmentally controlled rooms set to 40°C. The dried samples are then sieved. In the sieving process, it is important that compressed air is not used to clean the sieves between samples as trace amounts of compressor oils "may" poison the samples and significantly affect some target signatures. At Activation Laboratories a vacuum is used to clean the sieve between each sample. The -60 mesh sieve fraction (<250 microns, although different mesh sizes can be used at the preference of the exploration geologist) is collected and packaged in a Kraft paper envelope and transferred from our sample preparation department to our Organics Geochemical department also in our World Headquarters in Ancaster, Ontario, Canada. Each sample is then extracted, separated by gas chromatography and analyzed by mass spectrometry using customized parameters enabling the highly specific detection of the 162 targeted hydrocarbons at a *reporting limit* of one part-per-trillion (ppt). This trace level limit of reporting is critical to the detection of these hydrocarbons that, through research, have been found to be related at least in part to the breakdown and release of hydrocarbons from the death phase of microbes directly interacting with a deposit at depth. The hydrocarbon signatures are directly linked to the deposit type, which is used as a food source. The hydrocarbons that are mobilized and metabolized by the microbes are released in the death phase of each successive generation. Very few of the hydrocarbons measured are actually due to microbe cell structure, or hydrocarbons present or formed in the genesis of the deposit or from anthropogenic contamination. The results of the SGH analysis is reported in raw data form in an Excel spreadsheet as "semi-quantitative" concentrations without any additional statistical modification.

APPENDIX "E"
SGH DATA QUALITY
Reporting Limit

The SGH Excel spreadsheet of results contains the raw unaltered concentrations of the individual SGH compounds in units of "part-per-trillion" (ppt). The reporting of these ultra low levels is vital to the measurement of the small amounts of hydrocarbons now known to be leached/metabolized and subsequently released by dead bacteria that have been interacting with the ore at depth. To ensure that the data has a high level of confidence, a "reporting limit" is used. The reporting limit of 1 ppt actually represents a level of confidence of approximately 5 standard deviations where SGH data is assured to be "real" and non-zero. Thus in SGH the use of a reporting limit automatically removes site variability, and there is no need to further background subtract any data as the reporting limit has already filtered out any site background effects. Thus we recommend that all data that is equal to or greater than 2 ppt should be used in any data review. It is important to review all SGH data as low values that may be the centre of halo anomalies and higher values as apical anomalies or as halo ridges are all important.

Laboratory Replicate Analysis

A laboratory replicate is a sample taken randomly from the submitted survey being analyzed and are not unrelated samples taken from some large stockpile of bulk material. In the Organics laboratory an equal portion of this sieved sample, or pulp, is taken and analyzed in the same manner using the Gas Chromatography/Mass Spectrometer. The comparison of laboratory replicate and field duplicate results for chemical tests in the parts-per-million or even parts-per-billion range has typically been done using an absolute "relative percent difference (RPD)" statistic which is an easy proxy for error estimation rather than a more complete analysis of precision as specified by Thompson and Howarth. An RPD statistic is not appropriate for SGH results as the reporting limit for SGH is *1 part-per-trillion*. Further, *SGH is a semi-quantitative technique* and was not designed to have the same level of precision as other less sensitive geochemistry's as it is only used as an exploration tool and not for any assay work. SGH is also designed to cover a wide range of organic compounds with an unprecedented 162 compounds being measured for each sample. In order to analyze such a wide molecular weight range of compounds, sacrifices were made to the variability especially in the low molecular weight range of the SGH analysis. The result is that the first fifteen SGH compounds in the Excel spreadsheet is expected to exhibit more imprecision than the other 147 compounds. An SGH laboratory replicate is a large set of data for comparison even for just a few pairs of analyses. Precision calculations using a Thompson and Howarth approach should only be used for estimating error in individual measurements, and not for describing the average error in a larger data set. In geochemical exploration geochemists seek concentration patterns to interpret and thus rigorous precision in individual samples is not required because the concentrations of many samples are interpreted collectively. For these reasons recent and independent research at Acadia University in Canada promote that a percent Coefficient of Variation (%CV) should be used as a universal measurement of relative error in all geochemical applications. As SGH results are a relatively large data set for nearly all submissions, %CV is a better statistic for use with SGH. By using %CV, the concentration of duplicate pairs is irrelevant because the units of concentration cancel out in the formation of the coefficient of variation ratio. For SGH, the

%CV is calculated on all values ≥ 2 ppt. These values are averaged and represent a value for each pair of replicate analysis of the sample. All of the %CV values for the replicates are then averaged to report one %CV value to represent the overall estimate of the relative error in the laboratory sub-sampling from the prepared samples, and any instrumental variability, in the SGH data set for the survey. Actlabs' has successfully addressed the analytical challenge to minimize analytical variability for such a large list of compounds. Thus as SGH is also interpreted as a signature and is soloy used for exploration and not assay measurement, the data from SGH is *"fit for purpose"* as a geochemical exploration tool.

Historical SGH Precision

In the general history of geochemistry, studies indicate that a large component of total measurement error is introduced during the collection of the initial sample and in sub-sampling, and that only a subordinate amount of error in the result is introduced during preparation and analysis. A historical record encompassing many projects for SGH, including a wide variety of sample types, geology and geography, shows that the consistency and precision for the analysis of SGH *is excellent* with an overall precision of 6.8% Coefficient of Variation (%CV). When last calculated, this number had a range of a maximum of 12.4% CV, a minimum of 3.0% CV, with a standard deviation of 1.6%, in a population made up of over 400 targets (over 45,000 samples) interpreted since June of 2004. Again the precision of 6.8% CV included all of the sample types as soil from different horizons, peat, till, humus, lake-bottom sediments, ocean-bottom sediments, and even snow. When field duplicates have been revealed to us, we have found that the precision of the field duplicates are in the range of about 9 to 12 %CV. As SGH is interpreted using a combination of compounds as a chemical "class" or signature, the affect of a few concentrations that may be imprecise in a direct comparison of duplicates is not significant. Further, projects that have been re-sampled at different times or seasons are expected to have different SGH concentrations. The SGH anomalies may not be in exactly the same position or of the same intensity due to variable conditions that may have affected the dispersion of different pathfinder classes. However, the SGH "signature" as to the presence of the specific mix of SGH pathfinder classes will definitely still exist, and will retain the ability to identify the deposit type and vector to the same target location.

Laboratory Materials Blank – Quality Assurance (LMB-QA)

The Laboratory Materials Blank Quality Assurance measurements (LMB-QA) shown in the SGH spreadsheet of results are matrix free blanks analyzed for SGH. These blanks are not standard laboratory blanks as they do not accurately reflect an amount expected to be from laboratory handling or laboratory conditions that may be present and affect the sample analysis result. The LMB-QA measurements are a pre-warning system to only detect any contamination originating from laboratory glassware, vials or caps. As there is no substrate to emulate the sample matrix, the full solvating power of the SGH leaching solution, effectively a water leach, is fully directed at the small surface area of the glassware, vials or caps. In a sample analysis the solvating power of the SGH leaching solution is distributed between the large sample surface area (from soil, humus, sediments, peat, till, etc.) and the relatively small contribution from the laboratory materials surfaces. The sample matrix also buffers the solvating or leaching effect in the sample versus the more vigorous leaching of the laboratory materials which do not experience this buffering effect. Thus the level of the LMB-QA reported is biased high relative to the sample concentration and the actual contribution of the laboratory reagents, equipment, handling, etc. to the values in samples is significantly lower. This situation in organic laboratory analysis only occurs at such extremely low part-per-trillion (ppt) measurement levels. This is one of the reasons that SGH uses a reporting limit and not a detection limit. The 1 ppt reporting limit used in the SGH spreadsheet of raw concentration data is 3 to 5 times greater than a detection limit. The reporting limit automatically filters out analytical noise, the actual LMB-QA, and most of the sample survey site background. This has been proven as SGH values of 1 to 3 parts-per-trillion (ppt) have very often illustrated the outline of anomalies directly related to mineral targets. **Thus all SGH values greater than or equal to 1 or 2 ppt should be used as reliable values for interpretations.**

The LMB-QA values thus should not be used to background subtract any SGH data. The LMB-QA values are only an early warning as a quality assurance procedure to indicata tha relative cleanliness of laboratory glassware, vials, caps, and the laboratory water supply at the ppt concentration level. *Do not subtract the LMB-QA values from SGH sample data.*

APPENDIX "F"
SGH DATA INTERPRETATION

SGH Interpretation Report

All SGH submissions must be accompanied by relative or UTM coordinates so that we may ensure that the sample survey design is appropriate for use with SGH, and to provide an SGH interpretation with the results. In our interpretation procedure, we separate the results into 19 SGH sub-classes. These classes include specific alkanes, alkenes, thiophenes, aromatic, and polyaromatic compounds. Note that none of the SGH hydrocarbons are "gaseous" at room temperature and pressure. The classes are then evaluated in terms of their geochromatography and for coincident compound class anomalies that are unique to different types of mineralization. Actlabs uses a six point scale in assigning a subjective rating of similarity of the SGH signatures found in the submitted survey to signatures previously reviewed and researched from known case studies over the same commodity type. Also factored into this rating is the appropriateness of the survey and amount of data/sample locations that is available for interpretation. This rating scale is described in detail in the following section.

SGH PATHFINDER CLASS MAGNITUDE

The magnitude of any individual concentration or that of a hydrocarbon class *does not imply* that the data is of more importance or that mineralization is of higher quantity or grade. SGH interpretation must use the review of the combination of specific hydrocarbon classes to make any interpretation.

GEOCHEMICAL ANOMALY THRESHOLD VALUE

In the interpretation of "inorganic" geochemical data one of the determinations to be made is to calculate a "Threshold" value above which data is considered anomalous. This is done on an element by element basis. In the interpretation of this "organic" geochemical data this determination is done differently. The determination of a threshold value is not calculated for each hydrocarbon compound. The determination of a threshold value is also a concentration below which geochemical data is considered as "noise" for the purposes of geochemical interpretation. As discussed, SGH uses a "Reporting Limit" instead of some type of Detection Limit. The amount of noise that is already eliminated in the data, as below the Reporting Limit of 1 part-per-trillion (shown in the data spreadsheet as "-1" as "not-detected at a Reporting Limit of 1 ppt") is equivalent to approximately 5 standard deviations of variability. *To thus calculate an additional Threshold Value is a loss of real and valuable data.* Further, in the interpretation of SGH data, individual compounds are not considered (unless explicitly mentioned in the report). The interpretation of SGH data is exclusively conducted by "compound chemical class" which is the sum of four to fourteen individual hydrocarbons in the same organic chemical class as these compounds naturally have the same chemical properties that ultimately define their spatial dispersion characteristics in their rise from a mineral target through the overburden. This combined class is more reliable than the measurement of any one compound. SGH also eliminates the need for a Threshold value determination above the Reporting Limit due to the "high specificity" of the specific hydrocarbons and the classes they form. Each of the hydrocarbons has been hand selected due to their lower probability of being found in general surface soils. Further, only those classes where the majority of the compounds are detected above the Reporting Limit are considered in the interpretation. This defines the SGH geochemistry as having less geochemical noise due to the use of a reporting limit and as having higher confidence in the use of groups (classes) of data instead of individual compounds. However the most important aspect of interpretation is the use of a forensic signature. At least three specific "Pathfinder" classes, based on the combinations or template of classes we have developed, must be present to define the hydrocarbon signature to confidently predict the presence of a specific type of mineral target. *Do not calculate another Threshold value.* **Fact:** It has been proven many times that important SGH anomalies that depict mineralization at depth can exist even with data at 3 ppt.

Mobilized Inorganic Geochemical Anomalies

It is important to note that SGH is essentially "blind" to any inorganic content in samples as only *organic* compounds as hydrocarbons are measured. Thus inorganic geochemical surface anomalies that have migrated away from the mineral source, and thus may be interpreted and found to be a false target location, is not detected and does not affect SGH results. This fact is of great advantage when comparing the SGH results to inorganic geochemical results. If there is agreement in the location of the anomalies between the organic and inorganic technique, such as Actlabs' Enzyme Leach, a significant increase in confidence in the target location can be realized. If there is no agreement or a shift in the location of the anomalies between the techniques, the inorganic anomaly may have been mobilized in the surficial environment.

The Nugget Effect

As SGH is "blind" to the inorganic content in the survey samples, any concern of a "nugget effect" will not be encountered with SGH data. A "nugget effect" may be of a concern for other inorganic geochemical methods from surveys over copper, gold, lead, nickel, etc. type targets.

SGH DATA LEVELING

The combination of SGH data from different field sampling events has rarely required leveling in order to combine survey grids. The only circumstances that have occasionally required leveling has been the combination of samples that are very fine in texture, thus having a combined large surface area to samples of peat that may be in nearby areas. Even after maceration of the peat and in using the maximum size of sample amenable to this test method, peat samples have a significantly lower surface area. Peat samples have only required leveling in one survey in the last 500 SGH interpretations.

In only the last year it has been observed that SGH data *may* require leveling when different field sampling events have significantly different soil temperature. It has been documented that only when "soil" samples are taken from "frozen" ground that data leveling may be required as frozen sample act as a frozen cap to the hydrocarbon flux and may collect a higher concentration of hydrocarbon compounds compared to sampling during seasons where the samples are not frozen. Only two surveys have required leveling in the last 500 SGH interpretations.

The author has taken introductory training in the leveling of geochemical data. If leveling is required, both data sets are reviewed in terms of maximum, minimum and average values for each SGH Pathfinder Class intended for use in the interpretation. Data is sectioned into quartiles and each section is assigned specific leveling factors that are then applied to one data set. It should be noted that any type of data leveling is an approximation.

APPENDIX "G"
SGH RATING SYSTEM DESCRIPTION

To date SGH has been found to be successful in the depiction of buried mineralization for Gold, Nickel, VMS, SEDEX, Uranium, Cu-Ni-PGE, IOCG, Base Metal, Tungsten, Lithium, Polymetallic, and Copper, as well as for Kimberlites, Coal Seam, Wet Gas and Oil Plays. SGH data has developed into a dual exploration tool. From the interpretation, a vertical projection of the predicted location of the target can be made as well as a statement on the rating of the comparability of the identification of the anticipated target type to that from known case studies, as an example: if the client anticipates the target to be a Gold deposit, what is the rating or comporability that the target is similar to the SGH results over a Gold deposit in Nunavut, shear hosted and sediment hosted deposits in Nevada, or Paleochannel Gold mineralization in Western Australia.

- **A rating of "6"** is the highest or best rating, and means that the SGH classes most important to describing a Gold related hydrocarbon signature are all present and consistently vector to the same location with well defined anomalies. To obtain this rating there also needs to be other SGH classes that when mapped lend support to the predicted location.
- **A rating of "5"** means that the SGH classes most important to describing a Gold signature are all present and consistently describe the same location with well defined anomalies. The SGH signatures may not be strong enough to also develop additional supporting classes.
- **A rating of "4"** means that the SGH classes most important to describing a Gold signature are mostly present describing the location with well defined anomalies. Supporting classes may also be present.
- **A rating of "3"** means that the SGH classes most important to describing a Gold signature are mostly present and describe the same location with fairly well defined anomalies. Some supporting classes may or may not be present.
- **A rating of "2"** means that some of the SGH classes most important to describing a Gold signature are present but a predicted location is difficult to determine. Some supporting classes may be present
- **A rating of "1"** is the lowest rating, and means that one of the SGH classes most important to describing a Gold signature is present but a predicted location is difficult to determine. Supporting classes are also not helpful.

The SGH rating is directly and significantly affected by the survey design. Small data sets, especially if significantly <50 sample locations, or transects/surveys that are geographically too short *will automatically receive a lower rating no matter how impressive an SGH anomaly might be.* When there is not enough sample locations to adequately review the SGH class geochromatography, or when the sample spacing is inadequate, or if the spacing is highly variable such that it biases the interpretation of the results, then the confidence in the interpretation of any geochemistry is adversely affected. The SGH rating is not just a rating of the agreement between the SGH pathfinder classes for a particular target type; it is a rating of the overall confidence in the SGH results from this particular survey. The interpretation is only based on the SGH results without any information from other geochemical, geological or geophysical information unless otherwise specified.

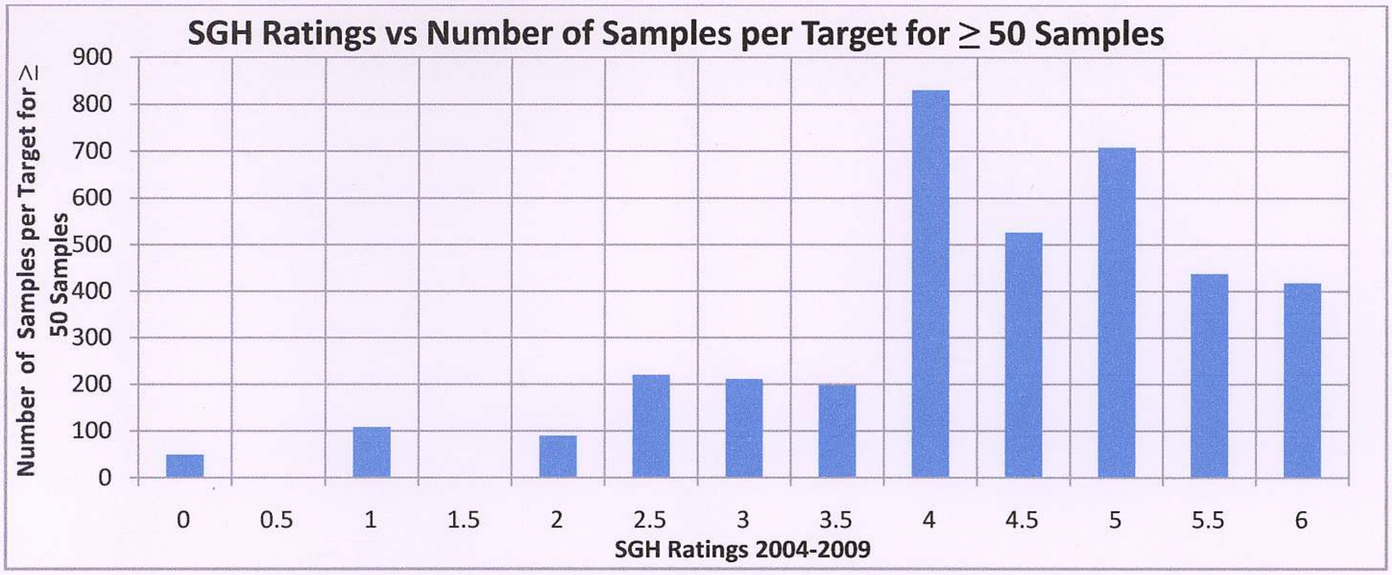
HISTORY & UNDERSTANDING

The subjective SGH rating system has been used since 2004 when Activation Laboratories started providing an SGH Interpretation Report with every submission for SGH analysis to aid our clients in understanding this organic geochemistry and ensuring that they obtain the best results for their surveys. As explained in the previous section, the SGH rating is not just a rating of how definitive an SGH anomaly is, and it is net based just on the map(s) provided in this report. It is a rating of "confidence in the interpreted anomaly" from the combination of:

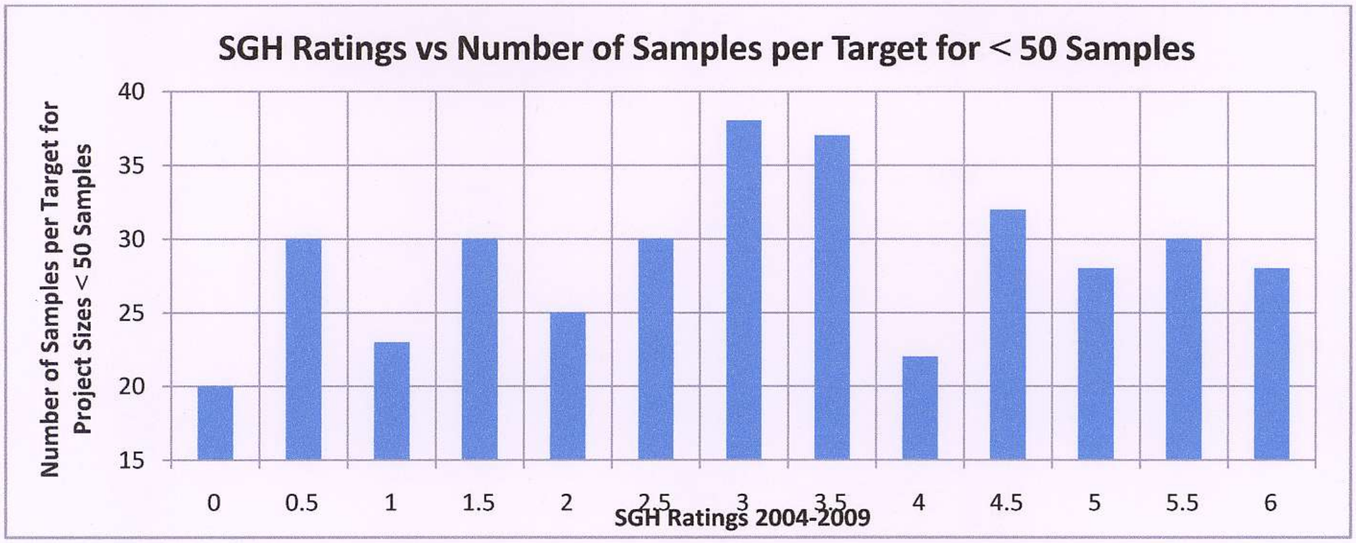
- (i) are the expected SGH Pathfinder Classes of compounds present from the template for this target type (one Pathfinder Class map is shown in the report, at least three must be present to adequately describe the correct signature for a particular target),
- (ii) how well do these SGH Pathfinder Classes agree in describing a particular area,
- (iii) how well does this agreement compare to SGH case studies over known targets of that type,
- (iv) how well is the interpreted anomaly defined by the survey (i.e. a single transect does not provide the same confidence as a complete grid of samples), and
- (v) is there at least a minimum of 50 sample locations in the survey so that there may be an adequate amount of data to observe the geochromatography of the different SGH Pathfinder Class of compounds.

The question often arises by clients as to the frequency of a rating, e.g. "how often is a rating of 5.0 given in an interpretation". To better understand this we present this review of the history of the SGH rating program since 2004 and some of the underlying situations that can affect the historical rating charts. Originally it was recommended that a minimum of 35 sample location be used for small target exploration, hewever it was quite quickly realized that this is often insufficient and at least 50 sample locations were required. In 2007 the rating scale was refined to include increments of 0.5 units rather than just integer values from 0 to 6.

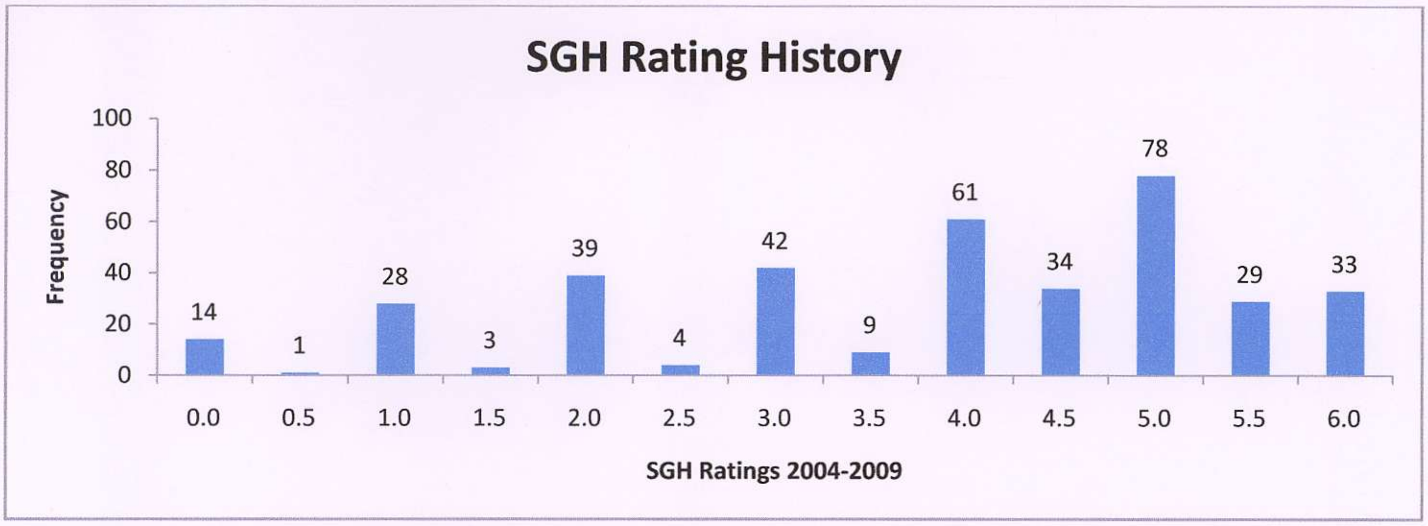
A rating frequency may be biased high as most clients conduct an orientation study over a known target, thus several of these projects result in high ratings. Note that, at this time, the rating is not said to be linked to grade of a deposit or depth to the target. Even in exploration surveys clients tend to submit samples over more promising targets due to knowledge of the geology and prior geochemical or geophysical results. As shown in the following chart, projects with SGH data from 200 or more sample locations have a higher level of confidence in the interpretation as the geochromatography of the SGH Pathfinder Classes of compounds can be more completely observed and reviewed.



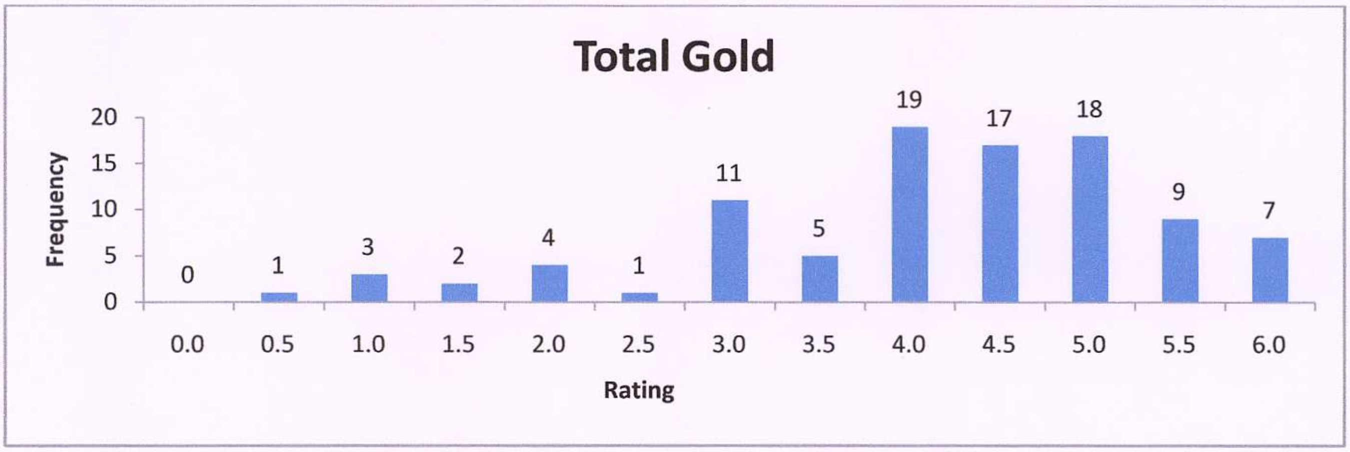
The rating frequency may be biased low as research projects often include a bare minimum of samples to reduce costs. Research projects may also be over targets known to be difficult to depict with geochemistry. Multiple targets in close vicinity in a survey may result in a low bias as the Pathfinder Class geochromatography is more difficult to deconvelute. Ratings may also be biased low if less than the recommended 50 sample locations are submitted as indicated by the following chart. This chart also illustrates that there is no interpretation bias to a particular rating value.



The overall rating frequency for over 400 targets from January 2004 to December 2009 is shown in the chart below illustrating that surveys over more promising targets are most often submitted for best use of research or exploration dollars. It also indicates that the 0.5 increments were less frequent as they started in 2007.



More specific for SGH interpretation for Gold targets, the overall rating frequency for 97 targets from January 2004 to December 2009 is shown in the chart below that also illustrates that surveys over more promising Gold targets are most often submitted for best use of research or exploration dollars.



APPENDIX "H"

NOTE: THERE IS NEW PRICING FOR THE SGH AND OSG GEOCHEMISTRIES AS OF 2017

SAMPLE PREPARATION: CODE S4 - $4.50 CDN per sample

INTERPRETATION FOR ONE COMMODITY TARGETS: Included in the price of analysis of $48.00 CDN per sample

INTERPRETATION FOR MULTI-COMMODITY TARGETS: i.e. VMS, SEDEX, Polymetallic, IOCG, IOCGU, Cu-Au-Porphyry, etc. – add additional price of $500 is applied to cover the additional time in interpretation.

"SUPPLEMENTAL REPORT": ($ 1,200.00)

Those clients who have determined that these SGH results will add an important aspect to their exploration effort can request a "Supplemental Report". This report contains the additional SGH Pathfinder Classes and an explanation of their use in the SGH interpretation that supports the initial applied "Rating" for the survey as a relative comparison to the results previously obtained in case studies that were used to create the SGH template for the general target type.

"ADDITIONAL INTERPRETATIONS": ($ 500.00 or 1,200.00 if 30 days after the report)

The SGH data can be interpreted multiple times in comparison to a variety of SGH templates developed for exploration for different mineral targets or petroleum plays. The samples do not have to be reanalyzed. This can be addressed as a separate section of a report or as a separate report based on the client's wishes. The price is per survey area, e.g. if there are two projects in a submission, perhaps a North area and South area, and both survey areas are to be interpreted for say Gold and Copper, the first interpretation is included in the SGH analysis price, the second interpretation for each area would be priced at $500 per area, or $1,200 per area if after 30 days from the issue of the original report.

"REPORT GIS PACKAGE": ($ 300.00)

Those clients that wish to import the SGH results into their GIS software can request a "GIS Package", which will include the geo-referenced image files that reflect the mapped SGH Pathfinder Class or Classes contained in the Standard or Supplemental Report and an Excel CSV file(s) containing the associated Class Sum data.

Appendix E SGH Soil Sample Descriptions pg 1 of 4

ID	Zone	Easting	Northing	Min depth	Max depth	texture	colour	horizon
1	Victoria 3	585350	6114100	2	20	silt-sand-cobbles	brown	B
2	Victoria 3	585350	6114150	2	20	silt-sand-cobbles	brown	B
3	Victoria 3	585350	6114200	2	20	silt-sand-cobbles	brown	B
4	Victoria 3	585350	6114250	2	20	silt-sand-cobbles	brown	B
5	Victoria 3	585350	6114300	2	20	silt-sand-cobbles	brown	B
6	Victoria 3	585400	6114100	2	20	silt-sand-cobbles	brown	B
7	Victoria 3	585400	6114150	2	20	silt-sand-cobbles	brown	B
8	Victoria 3	585400	6114200	2	20	silt-sand-cobbles	brown	B
9	Victoria 3	585400	6114250	2	20	silt-sand-cobbles	brown	B
10	Victoria 3	585400	6114300	2	20	silt-sand-cobbles	brown	B
11	Victoria 3	585450	6114100	2	20	silt-sand-cobbles	brown	B
12	Victoria 3	585450	6114150	2	20	silt-sand-cobbles	brown	B
13	Victoria 3	585450	6114200	2	20	silt-sand-cobbles	brown	B
14	Victoria 3	585450	6114250	2	20	silt-sand-cobbles	brown	B
15	Victoria 3	585450	6114300	2	20	silt-sand-cobbles	brown	B
16	Victoria 3	585500	6114100	2	20	silt-sand-cobbles	brown	B
17	Victoria 3	585500	6114150	2	20	silt-sand-cobbles	brown	B
18	Victoria 3	585500	6114200	2	20	silt-sand-cobbles	brown	B
19	Victoria 3	585500	6114250	2	20	silt-sand-cobbles	brown	B
20	Victoria 3	585500	6114300	2	20	silt-sand-cobbles	brown	B
21	Victoria 3	585550	6113850	2	20	silt-sand-cobbles	brown	B
22	Victoria 3	585550	6113900	2	20	silt-sand-cobbles	brown	B
23	Victoria 3	585550	6113950	2	20	silt-sand-cobbles	brown	B
24	Victoria 3	585550	6114000	2	20	silt-sand-cobbles	brown	B
25	Victoria 3	585550	6114050	2	20	silt-sand-cobbles	brown	B
26	Victoria 3	585550	6114100	2	20	silt-sand-cobbles	brown	B
27	Victoria 3	585550	6114150	2	20	silt-sand-cobbles	brown	B
28	Victoria 3	585550	6114200	2	20	silt-sand-cobbles	brown	B
29	Victoria 3	585550	6114250	2	20	silt-sand-cobbles	brown	B
30	Victoria 3	585550	6114300	2	20	silt-sand-cobbles	brown	B
31	Victoria 3	585550	6114350	2	20	silt-sand-cobbles	brown	B
32	Victoria 3	585550	6114400	2	20	silt-sand-cobbles	brown	B
33	Victoria 3	585550	6114450	2	20	silt-sand-cobbles	brown	B
34	Victoria 3	585600	6113850	2	20	silt-sand-cobbles-boulders	brown	B
35	Victoria 3	585600	6113900	2	20	silt-sand-cobbles	brown	B
36	Victoria 3	585600	6113950	2	20	silt-sand-cobbles	brown	B
37	Victoria 3	585600	6114000	2	20	silt-sand-cobbles	brown	B
38	Victoria 3	585600	6114050	2	20	silt-sand-cobbles	brown	B
39	Victoria 3	585600	6114100	2	20	silt-sand-cobbles	brown	B
40	Victoria 3	585600	6114150	2	20	silt-sand-cobbles	brown	B
41	Victoria 3	585600	6114200	2	20	silt-sand-cobbles	brown	B
42	Victoria 3	585600	6114250	2	20	silt-sand-cobbles	brown	B
43	Victoria 3	585600	6114300	2	20	silt-sand-cobbles	brown	B
44	Victoria 3	585600	6114350	2	20	silt-sand-cobbles	brown	B
45	Victoria 3	585600	6114400	2	20	silt-sand-cobbles	brown	B
46	Victoria 3	585600	6114450	2	20	silt-sand-cobbles	brown	B

SGH Soil Sample Descriptions

ID	Zone	Easting	Northing	Min depth	Max depth	texture	colour	horizon
47	Victoria 3	585650	6113900	2	20	silt-sand-cobbles	brown	B
48	Victoria 3	585650	6113950	2	20	silt-sand-cobbles	brown	B
49	Victoria 3	585650	6114000	2	20	silt-sand-cobbles	brown	B
50	Victoria 3	585650	6114050	2	20	silt-sand-cobbles	brown	B
51	Victoria 3	585650	6114100	2	20	silt-sand-cobbles	brown	B
52	Victoria 3	585650	6114150	2	20	silt-sand-cobbles	brown	B
53	Victoria 3	585650	6114200	2	20	silt-sand-cobbles	brown	B
54	Victoria 3	585650	6114250	2	20	silt-sand-cobbles	brown	B
55	Victoria 3	585650	6114300	2	20	silt-sand-cobbles	brown	B
56	Victoria 3	585650	6114350	2	20	silt-sand-cobbles	brown	B
57	Victoria 3	585650	6114400	2	20	silt-sand-cobbles-boulders	brown	B
58	Victoria 3	585650	6114450	2	20	silt-sand-cobbles-boulders	brown	B
59	Victoria 3	585700	6113900	2	20	silt-sand-cobbles	brown	B
60	Victoria 3	585700	6113950	2	20	silt-sand-cobbles	brown	B
61	Victoria 3	585700	6114000	2	20	silt-sand-cobbles	brown	B
62	Victoria 3	585700	6114050	2	20	silt-sand-cobbles	brown	B
63	Victoria 3	585700	6114100	2	20	silt-sand-cobbles	brown	B
64	Victoria 3	585700	6114150	2	20	silt-sand-cobbles	brown	B
65	Victoria 3	585700	6114200	2	20	silt-sand-cobbles	brown	B
66	Victoria 3	585700	6114250	2	20	silt-sand-cobbles	brown	B
67	Victoria 3	585700	6114800	2	20	silt-sand-cobbles	brown	B
68	Victoria 3	585700	6114350	2	20	silt-sand-cobbles	grey	B
69	Victoria 3	585700	6114400	2	20	silt-sand-cobbles-boulders	grey	B
70	Victoria 3	585700	6114450	2	20	silt-sand-cobbles-boulders	grey	B
71	Victoria 1	585500	6114750	2	20	silt-sand-cobbles	brown	B
72	Victoria 1	585500	6114800	2	20	silt-sand-cobbles	brown	B
73	Victoria 1	585500	6114850	2	20	silt-sand-cobbles	brown	B
74	Victoria 1	585500	6114900	2	20	silt-sand-cobbles	brown	B
75	Victoria 1	585500	6114950	2	20	silt-sand-cobbles	brown	B
76	Victoria 1	585500	6115000	2	20	silt-sand-cobbles	brown	B
77	Victoria 1	585500	6115050	2	20	silt-sand-cobbles	brown	B
78	Victoria 1	585550	6114750	2	20	silt-sand-cobbles	brown	B
79	Victoria 1	585600	6114800	2	20	silt-sand-cobbles	brown	B
80	Victoria 1	585600	6114850	2	20	silt-sand-cobbles	brown	B
81	Victoria 1	585600	6114900	2	20	silt-sand-cobbles	brown	B
82	Victoria 1	585600	6114950	2	20	silt-sand-cobbles	brown	B
83	Victoria 1	585600	6115000	2	20	silt-sand-cobbles	brown	B
84	Victoria 1	585600	6115050	2	20	silt-sand-cobbles	brown	B
85	Victoria 1	585600	6114750	2	20	silt-sand-cobbles	brown	B
86	Victoria 1	585600	6114860	2	20	silt-sand-cobbles	brown	B
87	Victoria 1	585600	6114850	2	20	silt-sand-cobbles	brown	B
88	Victoria 1	585600	6114900	2	20	silt-sand-cobbles	brown	B
89	Victoria 1	585600	6114950	2	20	silt-sand-cobbles	brown	B
90	Victoria 1	585600	6115000	2	20	silt-sand-cobbles	brown	B
91	Victoria 1	585600	6115050	2	20	silt-sand-cobbles	brown	B
92	Victoria 1	585600	6114750	2	20	silt-sand-cobbles	brown	B
93	Victoria 1	585600	6114800	2	20	silt-sand-cobbles	brown	B

SGH Soil Sample Descriptions pg 3 of 4

ID	Zone	Easting	Northing	Mindepth	Maxdepth	texture	colour	horizon
94	Victoria 1	585600	6114850	2	20	silt-sand-cobbles	brown	B
95	Victoria 1	585600	6114900	2	20	silt-sand-cobbles	brown	B
96	Victoria 1	585600	6114950	2	20	silt-sand-cobbles	brown	B
97	Victoria 1	585600	6115000	2	20	silt-sand-cobbles-boulders	brown	B
98	Victoria 1	585600	6115050	2	20	silt-sand-cobbles-boulders	brown	B
99	Victoria 1	585700	6114700	2	20	silt-sand-cobbles	brown	B
100	Victoria 1	585700	6114750	2	20	silt-sand-cobbles	brown	B
101	Victoria 1	585700	6114800	2	20	silt-sand-cobbles	brown	B
102	Victoria 1	585700	6114850	2	20	silt-sand-cobbles	brown	B
103	Victoria 1	585700	6114900	2	20	silt-sand-cobbles	brown	B
104	Victoria 1	585700	6114950	2	20	silt-sand-cobbles	brown	B
105	Victoria 1	585700	6115000	2	20	silt-sand-cobbles	brown	B
106	Victoria 1	585700	6115050	2	20	silt-sand-cobbles	brown	B
107	Victoria 1	585750	6114650	2	20	silt-sand-cobbles	brown	B
108	Victoria 1	585750	6114700	2	20	silt-sand-cobbles	brown	B
109	Victoria 1	585750	6114750	2	20	silt-sand-cobbles	brown	B
110	Victoria 1	585750	6114800	2	20	silt-sand-cobbles	brown	B
111	Victoria 1	585750	6114850	2	20	silt-sand-cobbles	brown	B
112	Victoria 1	585750	6114900	2	20	silt-sand-cobbles	brown	B
113	Victoria 1	585750	6114950	2	20	silt-sand-cobbles	brown	B
114	Victoria 1	585800	6115650	2	20	silt-sand-cobbles	brown	B
115	Victoria 1	585800	6115700	2	20	silt-sand-cobbles	brown	B
116	Victoria 1	585800	6115750	2	20	silt-sand-cobbles	brown	B
117	Victoria 1	585800	6115800	2	20	silt-sand-cobbles	brown	B
118	Victoria 1	585800	6115850	2	20	silt-sand-cobbles	brown	B
119	Victoria 1	585800	6115900	2	20	silt-sand-cobbles	brown	B
120	Victoria 1	585850	6115650	2	20	silt-sand-cobbles	brown	B
121	Victoria 1	585850	6115700	2	20	silt-sand-cobbles	brown	B
122	Victoria 1	585850	6115750	2	20	silt-sand-cobbles	brown	B
123	Victoria 1	585850	6115800	2	20	silt-sand-cobbles	brown	B
124	Victoria 1	585850	6115850	2	20	silt-sand-cobbles	brown	B
125	Victoria 1	585850	6115900	2	20	silt-sand-cobbles	brown	B
126	Victoria 1	585900	6114660	2	20	silt-sand-cobbles	brown	B
127	Victoria 1	585900	6115650	2	20	silt-sand-cobbles	brown	B
128	Victoria 1	585900	6115700	2	20	silt-sand-cobbles	grey	B
129	Victoria 1	585900	6115750	2	20	silt-sand-cobbles-boulders	grey	B
130	Victoria 1	585950	6114600	2	20	silt-sand-cobbles	brown	B
131	Victoria 1	585950	6115650	2	20	silt-sand-cobbles	brown	B
132	Victoria 1	585950	6115700	2	20	silt-sand-cobbles	brown	B
133	Victoria 1	585950	6115750	2	20	silt-sand-cobbles	brown	B
134	Victoria 1	586000	6114600	2	20	silt-sand-cobbles	brown	B
135	Victoria 1	586000	6115650	2	20	silt-sand-cobbles	brown	B
136	Victoria 1	586000	6115700	2	20	silt-sand-cobbles	brown	B
137	Victoria 1	586050	6115700	2	20	silt-sand-cobbles	grey	B
138	Victoria 1	586050	6115750	2	20	silt-sand-cobbles	grey	B
139	Victoria 1	586100	6115650	2	20	silt-sand-cobbles	grey	B
140	Victoria 1	586100	6115700	2	20	silt-sand-cobbles	grey	B

SGH Soil Sample Descriptions pg 4 of 4

ID	Zone	Easting	Northing	Mindepth	Maxdepth	texture	colour	horizon
141	Victoria 1	586150	6115650	2	20	silt-sand-cobbles	grey	B
142	Victoria 1	586150	6115700	2	20	silt-sand-cobbles-boulders	grey	B
143	Victoria 1	586200	6115650	2	20	silt-sand-cobbles-boulders	grey	B
144	Victoria 1	586200	6115700	2	20	silt-sand-cobbles-boulders	grey	B

BRITISH
COLUMBIA

Appendix F

MINFILE Detail Report
BC Geological Survey
Ministry of Energy, Mines and Natural Gas and Responsible for Housing

Location/Identification

MINFILE Number: 093M 072

National Mineral Inventory Number: 093M4 Co1

Name(s): VICTORIA (L. 3303)
HAZELTON VIEW (L.3299), NEW HAZELTON GOLD, AURIMONT, ROCHER DEBOULE, RD

Status: Past Producer
Mining Method Underground
Regions: British Columbia
BCGS Map: 093M012
NTS Map: 093M04E
Latitude: 55 10 20 N
Longitude: 127 39 06 W
Elevation: 1680 metres
Location Accuracy: Within 500M
Comments: The No. 1 adit, on the northwest side of Rocher Deboule Mountain, 10 kilometres south of Hazelton.

Mining Division: Omineca
Electoral District: Bulkley Valley-Stikine
Forest District: Skeena Stikine Forest District

UTM Zone: 09 (NAD 83)
Northing: 6114786
Easting: 585878

Mineral Occurrence

Commodities: Gold, Cobalt, Silver, Molybdenum, Nickel, Uranium, Arsenic, Copper, Zinc

Minerals

Significant: Cobaltite, Arsenopyrite, Molybdenite, Uraninite, Autunite, Pyrite, Sphalerite, Allanite, Galena, Tetrahedrite, Safflorite

Associated: Actinolite, Quartz, Feldspar, Apatite, Sphene, Erythrite, Scapolite

Alteration Type: Quartz-Carb., Sericitic
Mineralization Age: Unknown

Deposit

Character: Vein, Shear
Classification: Hydrothermal, Epigenetic
Type: I05: Polymetallic veins Ag-Pb-Zn+/-Au
Shape: Regular **Modifier:** Sheared
Dimension: 450x300x1 metres **Strike/Dip:** 085/60N
Comments: No. 1 vein; 0.5 metre wide.

Host Rock

Dominant Host Rock: Plutonic

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Jurassic-Cretaceous	Bowser Lake	Undefined Formation	------
Upper Cretaceous	------	------	Bulkley Intrusions

Isotopic Age	Dating Method	Material Dated
------	------	------
72 Ma	Potassium/Argon	Biotite

Lithology: Porphyritic Granodiorite, Diorite Dike, Feldspar Porphyry Dike, Greywacke, Siltstone, Hornfels

Comments: Mineralization is hosted in the Rocher Deboule stock, age date is from Geological Survey of Canada Open File 2322.

Geological Setting

Tectonic Belt: Intermontane
Physiographic Area: Hazelton Ranges

Terrane: Plutonic Rocks, Bowser Lake

Metamorphic Type: Contact
Grade: Hornfels

Inventory

Ore Zone: VICTORIA
Year: 1983
Category: Unclassified
Report On: Y
Quantity: 1,000 tonnes
NI 43-101: N

Commodity	Grade
Silver	2.8400 grams per tonne
Gold	42.5500 grams per tonne
Cobalt	2.0000 per cent

Comments:
Reference: CIM Special Volume 37, page 186.

Summary Production

		Metric		Imperial	
	Mined:	51	tonnes	56	tons
	Milled:	51	tonnes	56	tons
Recovery	Gold	7,341	grams	236	ounces
	Arsenic	7,710	kilograms	16,998	pounds
	Cobalt	785	kilograms	1,731	pounds

Capsule Geology

The Victoria property is located on the northwest side of Rocher Deboule Mountain, 8 kilometres south of South Hazelton. Between 1926 and 1940, 51 tonnes produced 7 710 kilograms of arsenic, 7 341 grams of gold and 785 kilograms of cobalt.

Hornfelsic greywackes and siltstones of the Middle Jurassic to Lower Cretaceous Bowser Lake Group are intruded by the Rocher Deboule porphyritic granodiorite stock of the Late Cretaceous Bulkley Plutonic Suite. The stock is cut by vein/dike systems which follow east trending fractures.

The Victoria deposit consists of three parallel vein structures (Victoria #1, #2 and #3), 200 to 300 metres apart, which strike 085 degrees and dip 60 degrees north, and a small cross-vein which strikes northward and dips 50 degrees east. However work it was reported in 2011 that prospecting suggests there may be a well-mineralized, parallel, unexplored vein, Victoria #0, a short distance to the north and a mineralized shear, Victoria #4, further south (Assessment Report 33297, page 33).

The No. 1 vein follows a dark grey, fine-grained diorite dike and averages 0.5 metre wide, is up to 450 metres along strike, and is 300 metres in vertical extent. It is open to the east and at depth. The No. 2 vein follows a feldspar porphyry dike and is 10 metres wide and up to 800 metres long. The No. 3 vein is up to 723 metres long and is intersected by a cross-vein containing galena, sphalerite, tetrahedrite, arsenopyrite, safflorite and pyrite.

The vein material consists of an assemblage of gold-bearing cobalt-nickel sulpharsenides with minor molybdenite in a gangue of actinolite with glassy quartz and feldspar. Additional minerals include uraninite, apatite, sphene, allanite, erythrite, cobaltite, d rare scapolite and possibly autunite.

A 10-centimetre sample taken in 1940 assayed 270 grams per tonne gold, 37.7 grams per tonne silver, 5.9 per cent cobalt, 0.81 per cent molybdenum, 2.8 per cent nickel and 0.64 per cent equivalent uranium (Bulletin 43). Samples taken in 1950 on the No. 1 and No. 2 veins assayed 47.3 grams per tonne gold, 0.90 per cent cobalt, and 0.16 per cent equivalent uranium across 0.85 metre, and 143.3 grams per tonne gold, 2.05 per cent cobalt and 0.59 per cent equivalent uranium from a veinlet sample, respectively (Geological Survey of Canada Economic Geology 16). A 1983 sample on the No. 2 vein assayed 23.32 grams per tonne gold and 0.0063 per cent arsenic over 0.5 metre (Assessment Report 11019).

In 1987, Southern Gold Resources Limited identified, an untested, coincidental geophysical and geochemical anomaly associated with a possible easterly extension of the No. 1 vein. Further work was performed on the Roche Deboule property (see 093M 071).

Unclassified reserves at Victoria are 1000 tonnes grading 2.84 grams per tonne silver, 42.55 grams per tonne gold and 2 per cent cobalt (CIM Special Volume 37, page 186).

Ameridex reported in 2002 that the Victoria vein exhibits continuity over a distance of 305 metres horizontally and vertically.

WORK HISTORY

The name (Victoria) applied to the property has varied with ownership, some using the name Hazelton View, however, the Victoria was the first claim located and practically all of the underground workings are on that claim. The Rocher Deboule property adjoins to the southeast.

New Hazelton Gold-Cobalt Mines, Limited was incorporated in June 1916 to acquire 8 claims variously named the Victoria, Hazelton View or Indian groups. Development work began in open cuts on No. 1 vein. A 305-metre aerial tram-way was installed in 1917 and some ore was shipped the following year. The 8 claims, the Hazelton View, Lead Pick, Moose, Elk, Victoria, Belle, View Fr., and Belle Fr. (Lots 3299-3306 respectively) were Crown-granted to the company in 1917. The No. 1 drift adit (elev. 1679 metres) was extended to 217 metres in 1918. At 113 metres from the portal a 60 degree raise was driven 27.4 metres, and from that point a drift was run 26 metres westerly. The No. 2 adit (elev. 1605 metres) was begun in 1918 and driven as a crosscut for 23 metres to the vein, which was drifted on for 45.7 metres. In subsequent years No. 2 adit was extended to a length of 165 metres.

During the summer of 1918 some work was done on the more southerly claims, to prospect for the extensions of the gold-copper veins on the adjacent Rocher Deboule property. A crosscut was driven 7.6 metres and about 300 metres of drifting was done along the supposed strike of one of the veins. Work on the property was discontinued later in the year. Adjacent claims surrounding the Victoria group on 3 sides, and including the Homestake, Tiger, etc. (Lots 3307-3316), were Crown-granted in 1918 to The Cats Mining Company, Limited. The only work reported is a 30 metre adit on the Homestake-Tiger boundary.

New Hazelton Gold-Cobalt reopened the mine in 1925. A new drift adit No.00 adit; (elev. 1795 metres) was driven about 46 metres on No. 1 vein and some ore was shipped. Due to financial difficulties the company mortgaged the property in 1926 and the mortgagee's interest was transferred to a share interest in a new company, Aurimont Mines, Limited which was incorporated in August 1927. During 1928 the aerial tramway was extended to a length of 580 metres and some ore was shipped. Development work was done in the No.00 adit, which was extended to a length of 52 metres. The mine closed in the latter part of the year.

During subsequent years some of the claims reverted to the Crown. Three of the Crown-grants, the Victoria, Belle, and Belle Fr. were retained by R.C. McCorkell. During 1940 the claims were under lease to Jack Lee and A.S. Barker of Hazelton. Some mining was carried out and small lots of ore were shipped in 1940 and 1941 to the Government Sampling Plant at Prince Rupert.

In 1948 it was recognized that the ore in these veins contained uranium.

Western Uranium Cobalt Mines, Limited was incorporated in June 1949 to acquire the property, in part under option from McCorkell and as Mineral Leases from the Government. The Homestake and Tiger claims, formerly held by Cats Mining and in 1949 held as mineral leases by George Royles of Prince Rupert, were purchased by the company. During 1949 the 00 adit was extended to a total length of 65 metres. A new lower crosscut, No. 3 adit, (elev. 1570 metres) was begun during 1949 and was advanced 69 metres to the vein, which was drifted on for 6.7 metres. The mine closed in the fall of 1950. Total development work to that date comprised about 567 metres of drifts, crosscuts, and a raise in 4 main adits, the 00, 1, 2, and 3.

Rocher Deboule Mountain Mines Ltd in 1952 carried out diamond drilling on the Moose, Elk, and Lead Pick claims to test for the westward extension of the copper-gold veins of the Rocher Deboule property.

In 1975 the Crown-grants were owned by W. McGowan and J .M. Hutter, of Telkwa. Work during 1975-76 included re-opening the workings, underground geological mapping and sampling, and road construction. In 1978, J. Hutter Jr. rehabilitated two adits. The property was then leased to Arbor Resources Inc and unspecified work was reported in 1979.

In 1982-1983, on adjacent ground to that of Arbor, on one of the veins, D. Groot Logging carried out geological mapping, sampling, and 385 metres of diamond drilling in 3 holes.

In 1986, reserves were reported as 1 000 tonnes at 42.55 grams per tonne gold, 2.84 grams per tonne silver, and 2 per cent cobalt (Preliminary Map 65, BC Department of Mines, 1986) .

In 1987, Southern Gold Resources Limited identified, an untested, coincidental geophysical and geochemical anomaly associated with a possible easterly extension of the No. 1 vein.

In 1990 (George Cross Newsletter 1990) International Kongate Ventures Inc reported the No. 2 Porphyry Zone about 366 metres to the north of the Rocher Deboule mine (as reported in Assessment Report 29338). 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 per cent cobalt (as reported in Assessment Report 29338).

In 2002, Ameridex Corp conducted geological surveying and geochemical rock and stream sediment sampling on the Rocher Deboule and Victoria mines on their RD claims (Assessment Report 26984).

In 2004, Ameridex Corp conducted work on several locations but apparently not on the Victoria (Assessment Report 27558).

In March 2007, Rocher DeBoule Minerals Corp contracted Fugro Airborne Survey Corporation to complete a Dighem electromagnetic, magnetic, radiometric geophysical survey over the Rocher Deboule property in a survey block amounting to 1089 line kilometres. Assessment Report 29338). The company also conducted limited prospecting and rock and soil sampling and diamond core drilling program of 1106.1 meters over 6 drill holes on the Highland Boy Showing (093M 070).

In 2011, American Manganese Inc carried out a program that entailed 22 kilometres of ground magnetometer survey, 841 soil samples, 455 rock samples and 68 silt samples. The most significant soil sample returned 8650 parts per billion gold, 72.4 parts per million silver, 0.58 per cent copper, 1.31 per cent arsenic and 20.09 per cent iron (V STOCKWATCH, November 20, 2012; Assessment Report 33297). At this time, the Rocher Deboule property consisted of 35 tenures, covering an aggregate of 9,937 hectares, These tenures contained three small, past-producing mines and five significant prospects including: Highland Boy (093M 070), Rocher Deboule (093M 071), Victoria (093M 072), Great Ohio (093M069), Cap (093M073), Golden Wonder (093M074), Three Hills (093M075) and Daley West (093M053). Sampling and geological work was done in the Victoria Mine area in 2011.

See Rocher Deboule (093M 071) for related details of work done on the Rocher Deboule property of American Manganese, of which the Victoria was part of in the late 2000s.

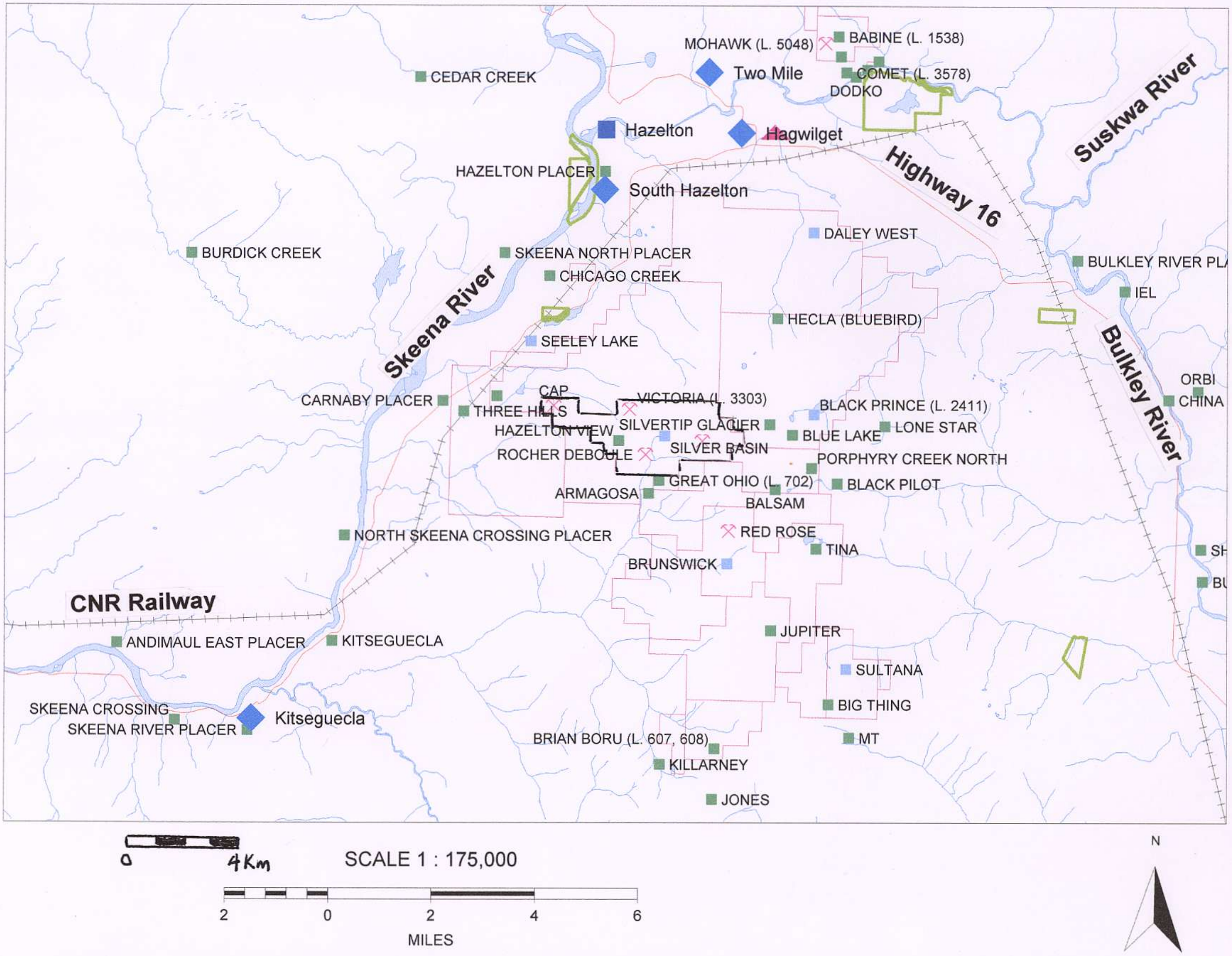
Also refer to the new "Hazelton View" MINFILE occurrence, just south of the Victoria area, which was described by American Manganese in 2011.

Bibliography

EMPR AR 1916-114,115; 1917-103,104,372; 1918-112,113; 1925-134; 1926-126; 1927-132; 1928-159; 1948-80-82; *1949-82-93; 1950-99; 1952-89,92
EMPR ASS RPT 7779, *8336, 10368, *11019, 11513, 16575, 16714, 25674, 26984, 27558, 28625, *29338, *33297
EMPR BULL 9, p. 82; *43, pp. 69-73
EMPR EXPL 1975-146-147; 1976-155; 1978-223; 1979-230; 1980-348,349; 1981-273; 1982-314,315; 1983-447
EMPR FIELDWORK 1978, pp. 102,103; 2006, pp. 1-17
EMPR MAP 22; 53; 58; 65, 1989
EMPR OF 1990-32; 1992-1; 1990-32; 1992-1; 1992-3; 1998-10; 2008-6
EMPR PF (Lay, D. (1937): Report on Aurimont Mines Ltd.; Geology and Assay Plan of accessible workings on No. 1 vein, source and date unknown; Sketches of adits, source and date unknown)
EMPR PF Placer Dome (M. Cannon (1992): Preliminary Test Work, memo, notes and maps; S.P. Quin (1989): Summary Report 1989 Exploration Program; Unknown (1980): Sampling Report on Victoria Mineral Claim; Mineral Environment Labs (1992): Assay Certificates - Norica Property)
EMR CANMET IR 493, pp. 71-73; 509, pp. 121-126; 542, pp. 56-58; 592, pp. 40-43
EMR MIN BULL MR 223 B.C. 245
EMR MP CORPFILE (Rocher Deboule Mountain Mines Ltd.; New Hazelton Gold Cobalt Mines Ltd.; Western Tungsten Copper Mines Ltd.)
GSC EC GEOL 4, pp. 48-49; 16, pp. 42-43; 16 (2nd Ed.), p. 236; 20, p. 238
GSC MAP 44-24; 971A; 1731
GSC MEM *110, pp. 20-23; 223, pp. 44-46; *223 (Rev.), pp. 84-89
GSC OF 551; 720; *2322; 5705
GSC P 44-24; 51-10, p. 43
CIM Transactions 1950 Vol. LIII, pp. 282,285
ECON GEOL *Vol.46 (1951), pp. 353-366

Date Coded:	1985/07/24	**Coded By:**	BC Geological Survey (BCGS)	**Field Check:**	N
Date Revised:	2015/02/17	**Revised By:**	Garry J. Payie (GJP)	**Field Check:**	N

Fig 1 Rocher Deboule Property General Location



32857

Fig 2 MTO Mineral Tenures Rocher Deboule

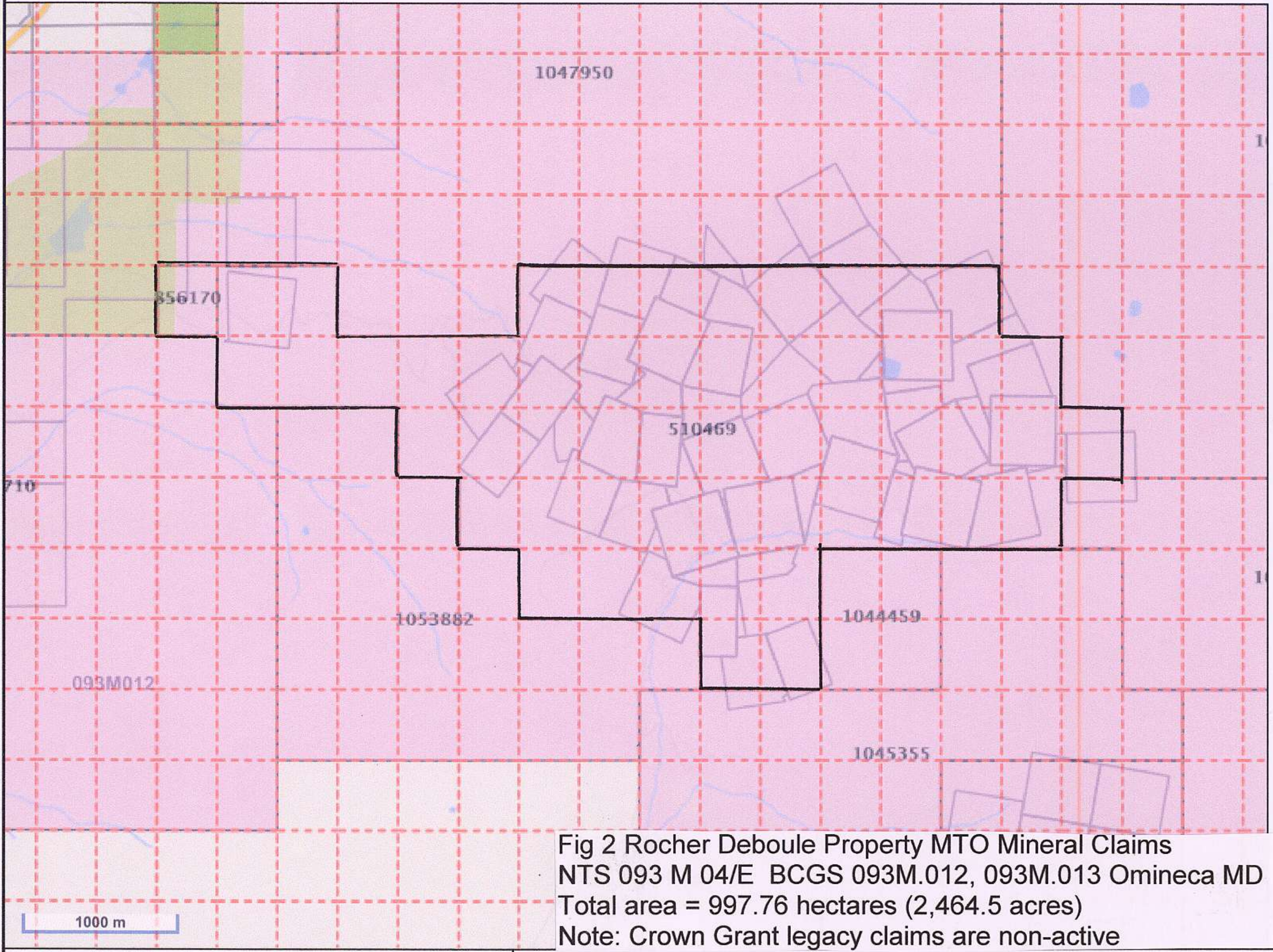


Fig 2 Rocher Deboule Property MTO Mineral Claims
NTS 093 M 04/E BCGS 093M.012, 093M.013 Omineca MD
Total area = 997.76 hectares (2,464.5 acres)
Note: Crown Grant legacy claims are non-active

Legend

Mineral Titles (MTO)

MTO Grid ⬚

Title (current)

🟪 LEASE

🟪 CLAIM

Reserves

🟩 No Registration

🟨 Conditional

▨ Heritage/Historic Site

Crown Land Layers (Tantalis)

Land Act Survey Parcels - Tantalis - Legal Descriptions

Label Text

Land Act Survey Parcels - Tantalis - Outlined ☐

Administrative Boundaries

Federal Transfer Lands - Outlined ☐

Federal Transfer Lands - Colour Filled 🟧

National Parks - Outlined

☐ National Parks

National Parks - Colour Filled 🟩

Conservancy Areas - Tantalis - Colour Filled

🟩 Conservancy Areas

Ecological Reserves - Tantalis - Colour Filled

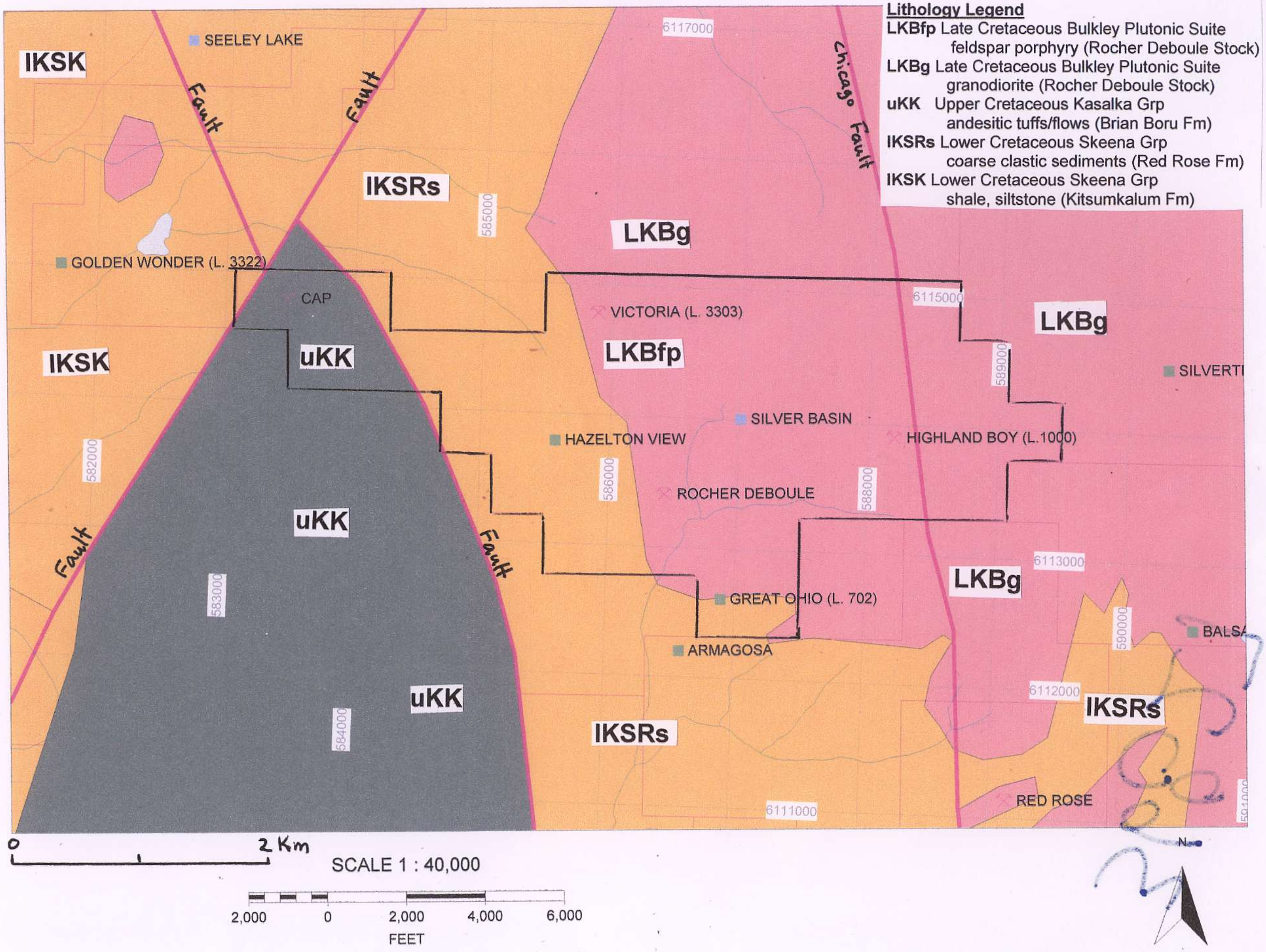
This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Printed using the Mineral Titles Online (MTO) application. BCGS 093M.012, ~~Skeena~~ Omineca Mining Division

Center: 55°9'45", -127°38'45"
Scale: 1 : 67,710
SRS: EPSG:3857
UTM Zone: 9

N

Fig 3 General Geology Rocher Deboule Property



Lithology Legend

LKBfp Late Cretaceous Bulkley Plutonic Suite feldspar porphyry (Rocher Deboule Stock)

LKBg Late Cretaceous Bulkley Plutonic Suite granodiorite (Rocher Deboule Stock)

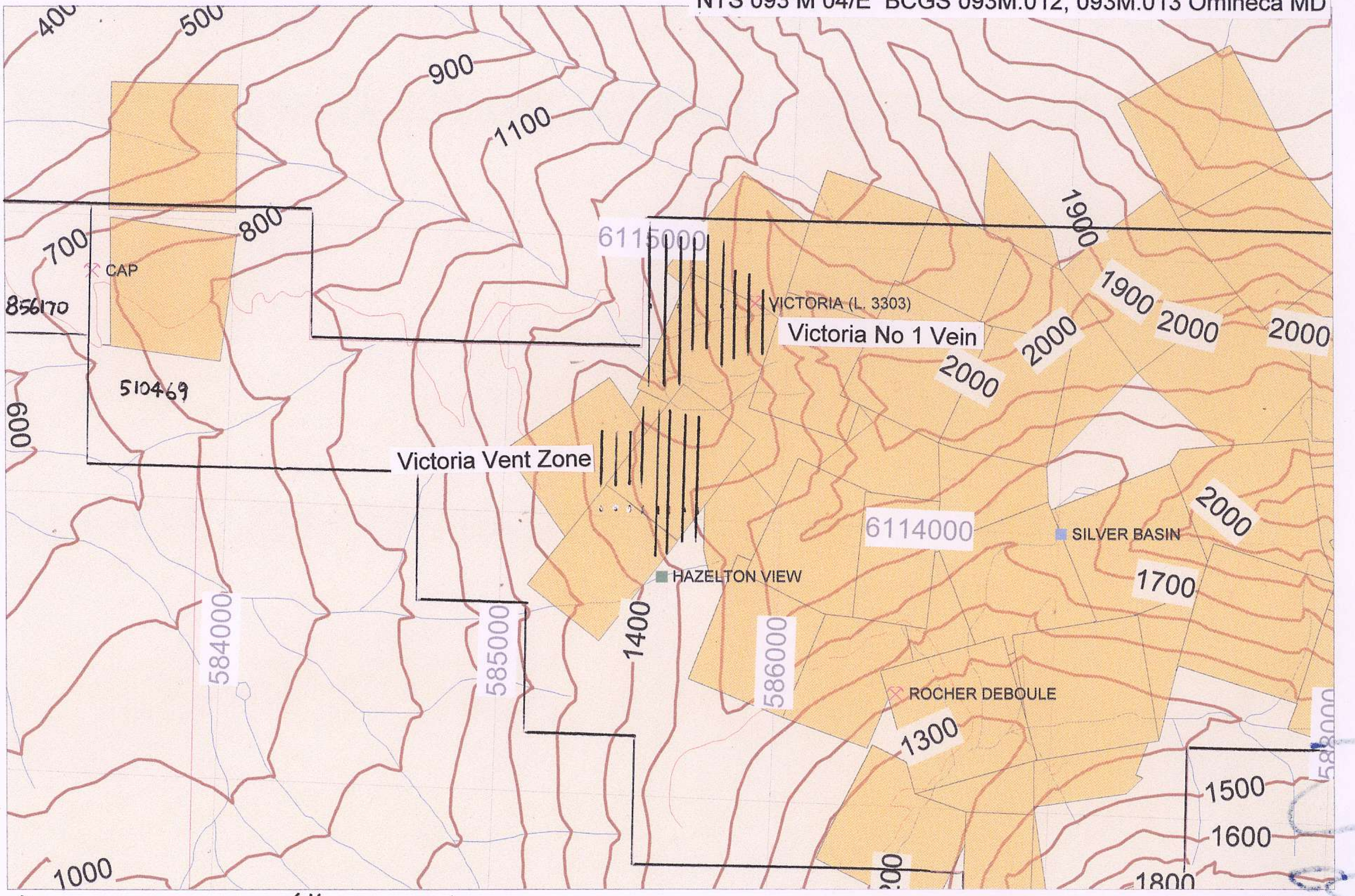
uKK Upper Cretaceous Kasalka Grp andesitic tuffs/flows (Brian Boru Fm)

IKSRs Lower Cretaceous Skeena Grp coarse clastic sediments (Red Rose Fm)

IKSK Lower Cretaceous Skeena Grp shale, siltstone (Kitsumkalum Fm)

Rocher Deboule Victoria SGH & Magnetometer Grids

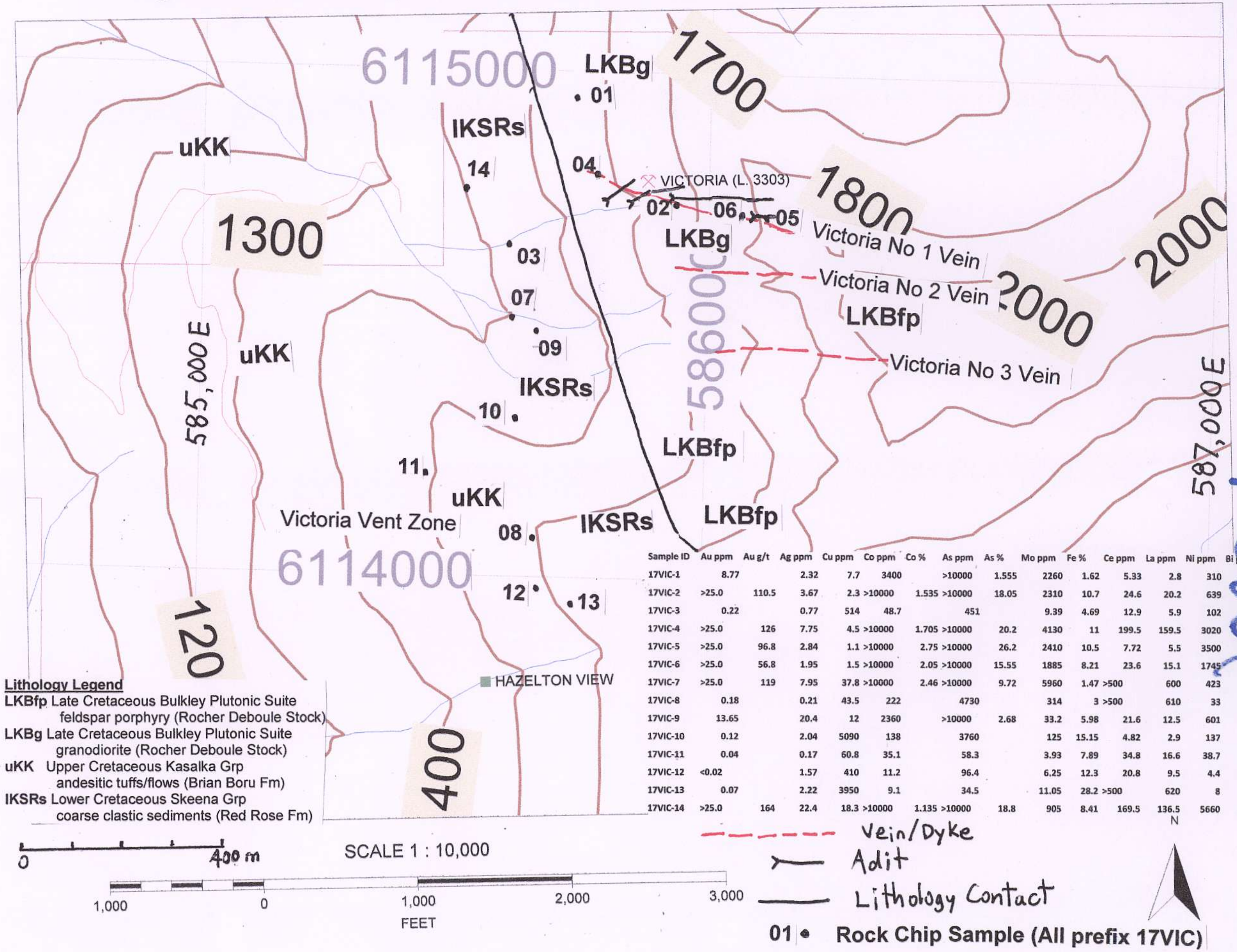
NTS 093 M 04/E BCGS 093M.012, 093M.013 Omineca MD



Note: Crown Grant legacy claims are non-active

Fig 4

Fig 5 Rocher Deboule Victoria Rock Samples



Sample ID	Au ppm	Au g/t	Ag ppm	Cu ppm	Co ppm	Co %	As ppm	As %	Mo ppm	Fe %	Ce ppm	La ppm	Ni ppm	Bi ppm
17VIC-1	8.77		2.32	7.7	3400		>10000	1.555	2260	1.62	5.33	2.8	310	83.9
17VIC-2	>25.0	110.5	3.67	2.3	>10000	1.535	>10000	18.05	2310	10.7	24.6	20.2	639	1815
17VIC-3	0.22		0.77	514	48.7		451		9.39	4.69	12.9	5.9	102	4.97
17VIC-4	>25.0	126	7.75	4.5	>10000	1.705	>10000	20.2	4130	11	199.5	159.5	3020	318
17VIC-5	>25.0	96.8	2.84	1.1	>10000	2.75	>10000	26.2	2410	10.5	7.72	5.5	3500	1650
17VIC-6	>25.0	56.8	1.95	1.5	>10000	2.05	>10000	15.55	1885	8.21	23.6	15.1	1745	783
17VIC-7	>25.0	119	7.95	37.8	>10000	2.46	>10000	9.72	5960	1.47	>500	600	423	156
17VIC-8	0.18		0.21	43.5	222		4730		314	3	>500	610	33	1.05
17VIC-9	13.65		20.4	12	2360		>10000	2.68	33.2	5.98	21.6	12.5	601	230
17VIC-10	0.12		2.04	5090	138		3760		125	15.15	4.82	2.9	137	1.47
17VIC-11	0.04		0.17	60.8	35.1		58.3		3.93	7.89	34.8	16.6	38.7	0.57
17VIC-12	<0.02		1.57	410	11.2		96.4		6.25	12.3	20.8	9.5	4.4	0.22
17VIC-13	0.07		2.22	3950	9.1		34.5		11.05	28.2	>500	620	8	0.44
17VIC-14	>25.0	164	22.4	18.3	>10000	1.135	>10000	18.8	905	8.41	169.5	136.5	5660	1060

Lithology Legend

LKBfp	Late Cretaceous Bulkley Plutonic Suite feldspar porphyry (Rocher Deboule Stock)
LKBg	Late Cretaceous Bulkley Plutonic Suite granodiorite (Rocher Deboule Stock)
uKK	Upper Cretaceous Kasalka Grp andesitic tuffs/flows (Brian Boru Fm)
IKSRs	Lower Cretaceous Skeena Grp coarse clastic sediments (Red Rose Fm)

- - - - - -	Vein/Dyke
≻——	Adit
———	Lithology Contact
01 ●	**Rock Chip Sample (All prefix 17VIC)**

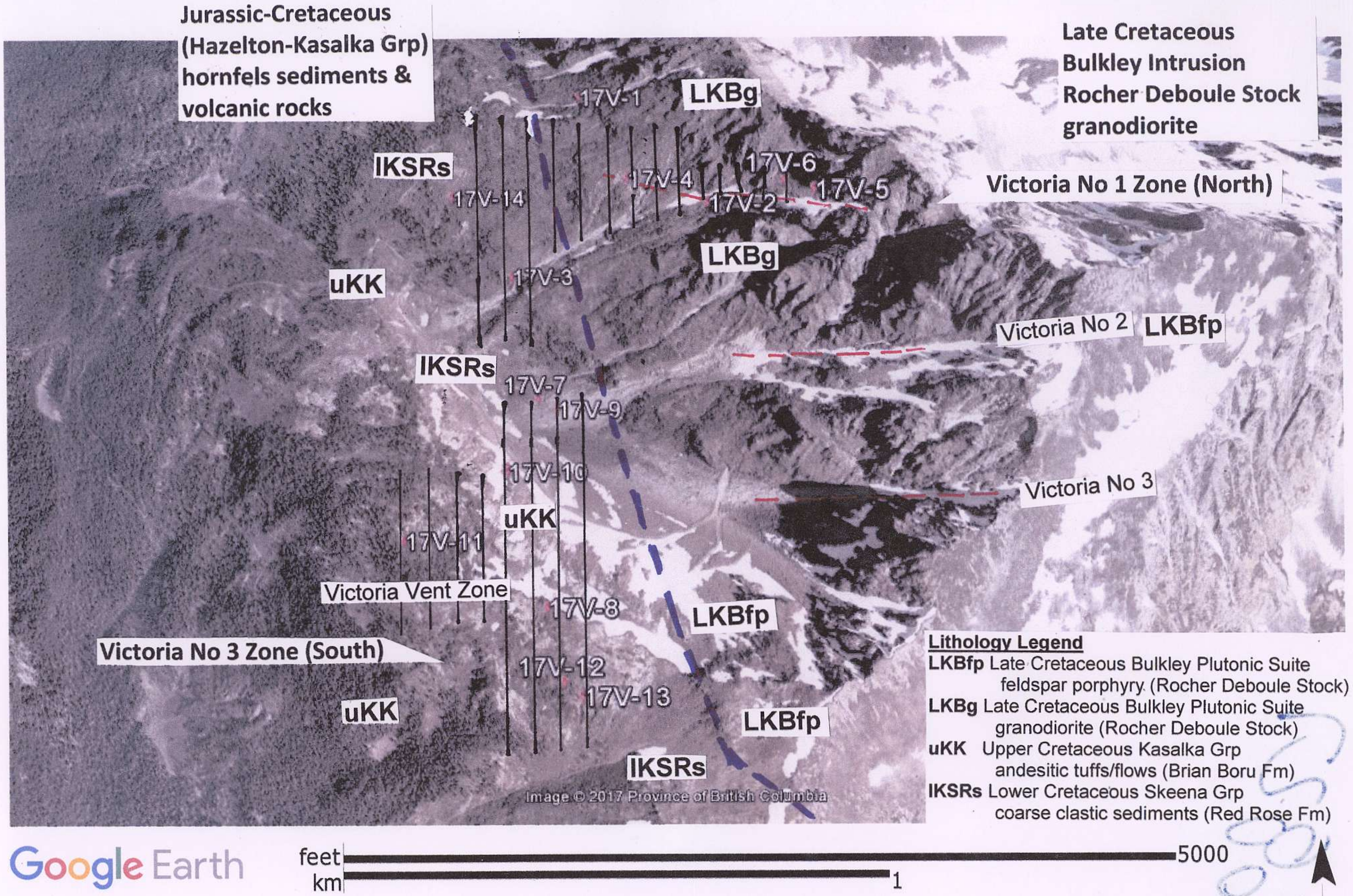


Fig 6

17V-1 Rock Chip Sample

— SGH Soil Line (50 m) & Magnetometer (12.5 m)

sample spacing

reading interval

Rocher Deboule Project

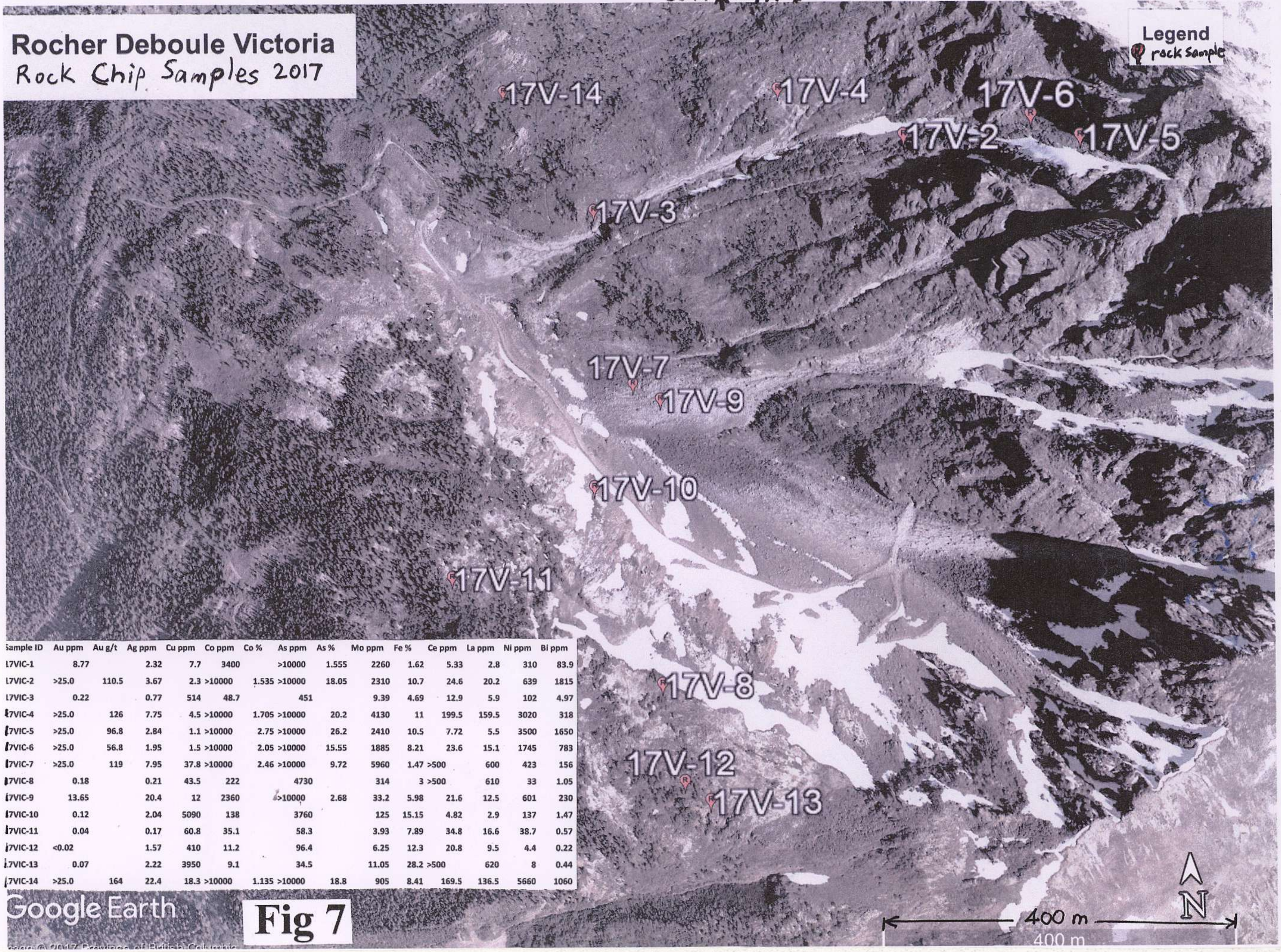
Victoria No 1 Zone (North)
Victoria No 3 Zone (South)

37083

35 m ↑ TO 17V-1

Rocher Deboule Victoria

Rock Chip Samples 2017



Sample ID	Au ppm	Au g/t	Ag ppm	Cu ppm	Co ppm	Co %	As ppm	As %	Mo ppm	Fe %	Ce ppm	La ppm	Ni ppm	Bi ppm
17VIC-1	8.77		2.32	7.7	3400		>10000	1.555	2260	1.62	5.33	2.8	310	83.9
17VIC-2	>25.0	110.5	3.67	2.3	>10000	1.535	>10000	18.05	2310	10.7	24.6	20.2	639	1815
17VIC-3	0.22		0.77	514	48.7		451		9.39	4.69	12.9	5.9	102	4.97
17VIC-4	>25.0	126	7.75	4.5	>10000	1.705	>10000	20.2	4130	11	199.5	159.5	3020	318
17VIC-5	>25.0	96.8	2.84	1.1	>10000	2.75	>10000	26.2	2410	10.5	7.72	5.5	3500	1650
17VIC-6	>25.0	56.8	1.95	1.5	>10000	2.05	>10000	15.55	1885	8.21	23.6	15.1	1745	783
17VIC-7	>25.0	119	7.95	37.8	>10000	2.46	>10000	9.72	5960	1.47	>500	600	423	156
17VIC-8	0.18		0.21	43.5	222		4730		314	3	>500	610	33	1.05
17VIC-9	13.65		20.4	12	2360		>10000	2.68	33.2	5.98	21.6	12.5	601	230
17VIC-10	0.12		2.04	5090	138		3760		125	15.15	4.82	2.9	137	1.47
17VIC-11	0.04		0.17	60.8	35.1		58.3		3.93	7.89	34.8	16.6	38.7	0.57
17VIC-12	<0.02		1.57	410	11.2		96.4		6.25	12.3	20.8	9.5	4.4	0.22
17VIC-13	0.07		2.22	3950	9.1		34.5		11.05	28.2	>500	620	8	0.44
17VIC-14	>25.0	164	22.4	18.3	>10000	1.135	>10000	18.8	905	8.41	169.5	136.5	5660	1060

Fig 7

Rocher Deboule Victoria No 1 Vein Magnetometer Survey

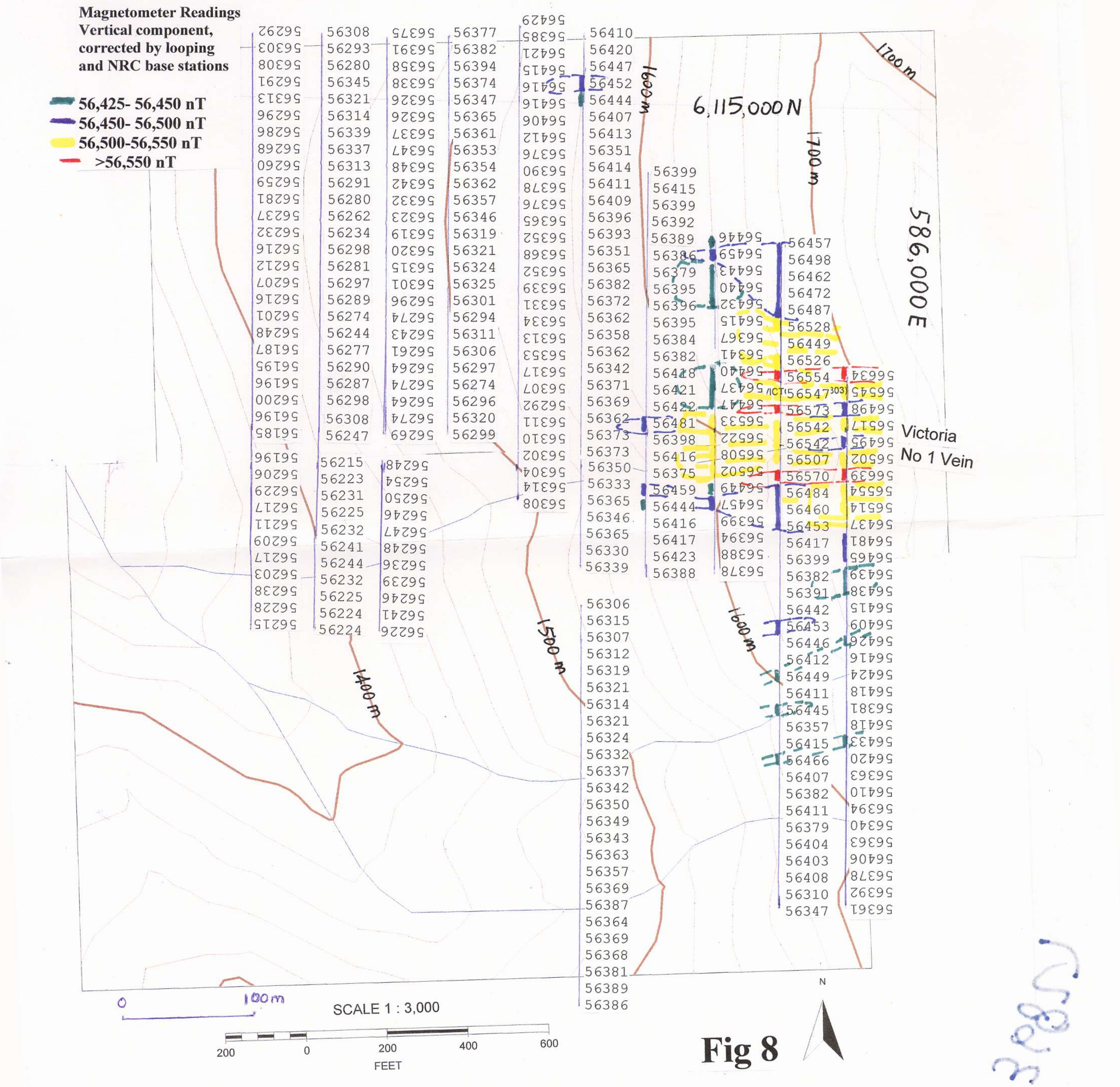


Fig 8

Rocher Deboule Victoria Vent Zone Magnetometer Survey

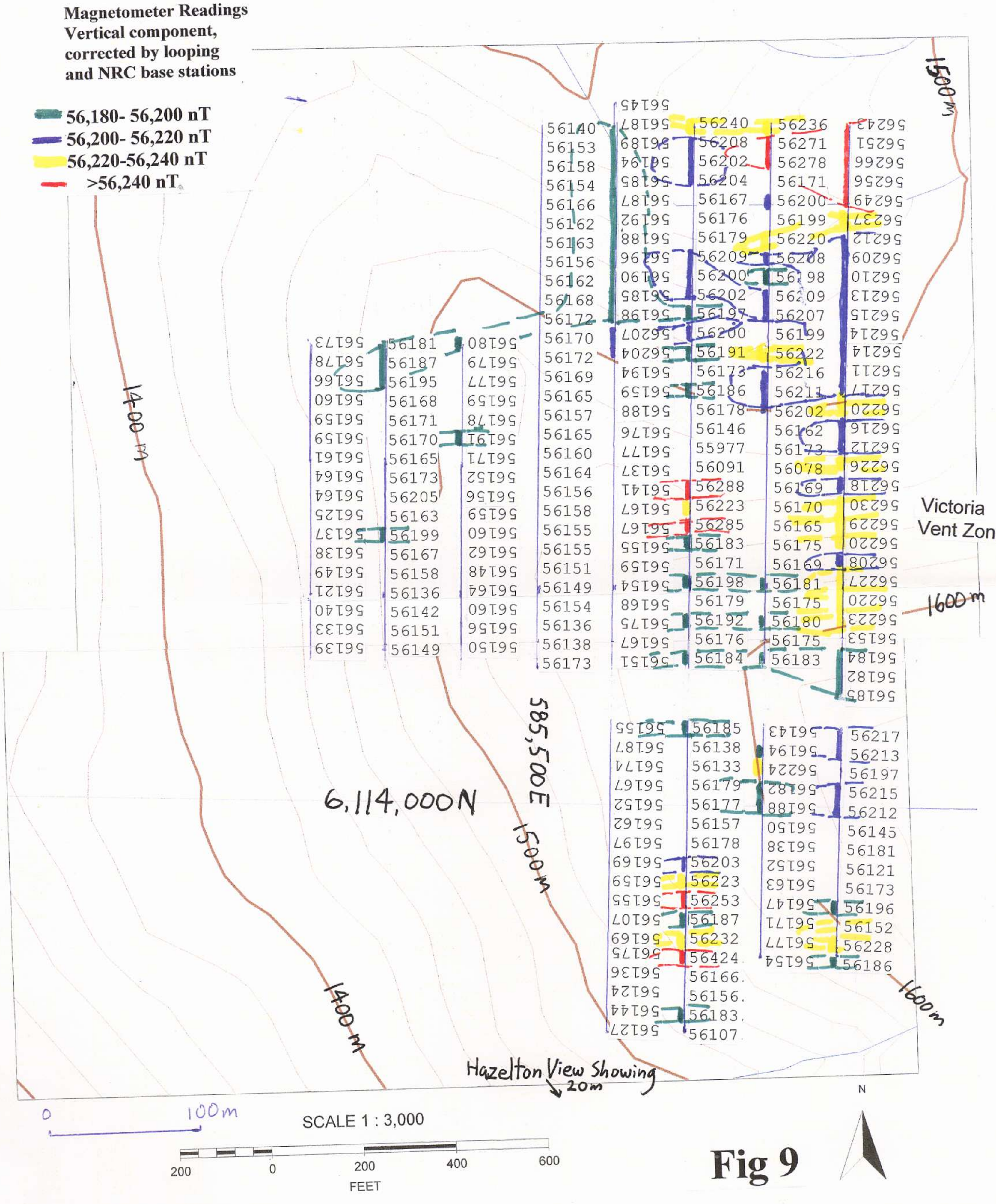


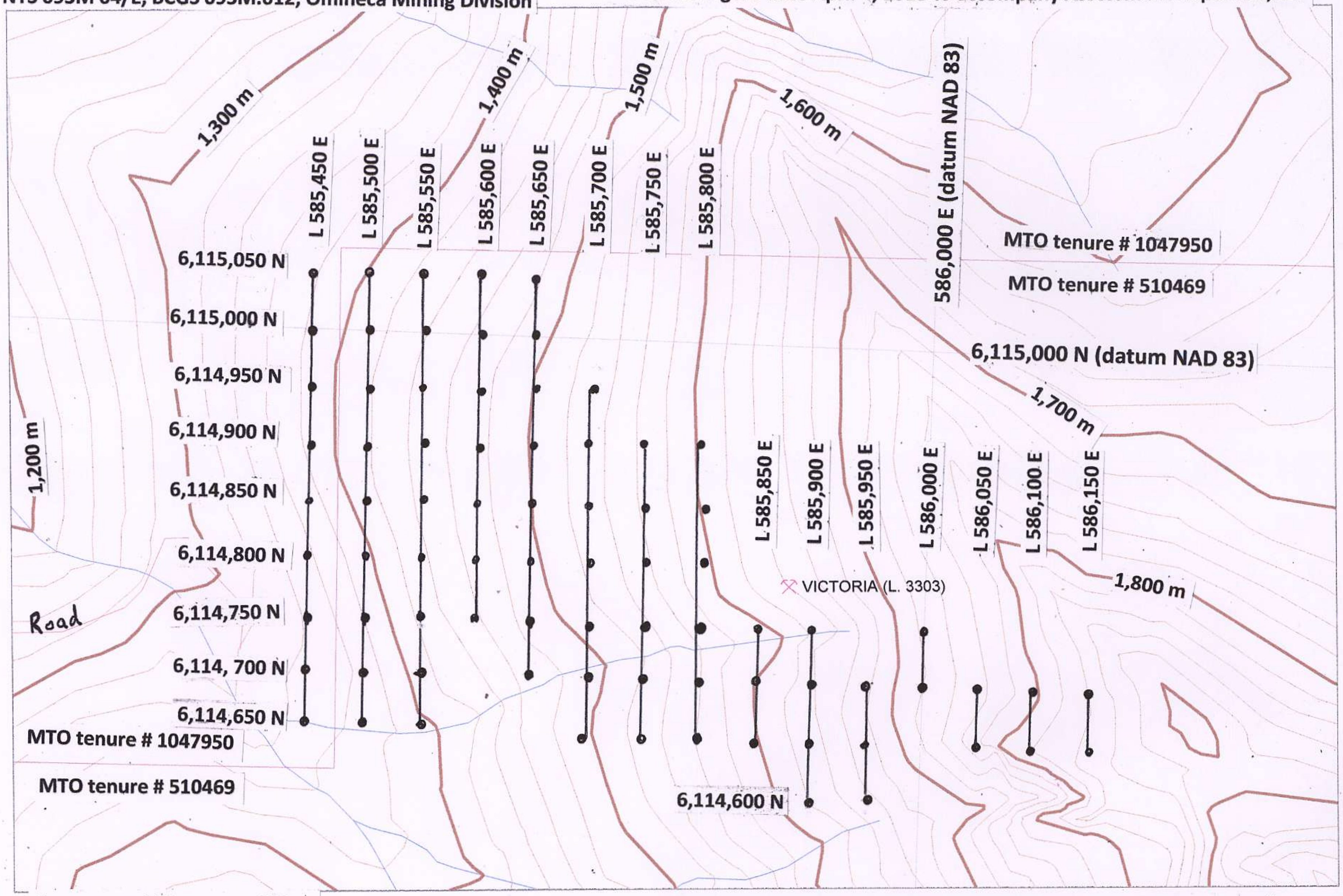
Fig 9

30857

Rocher Deboule Victoria No. 1 (N Zone) SGH Samples

NTS 093M 04/E, BCGS 093M.012, Omineca Mining Division

Amended Figure date April 4, 2018 to accompany Assessment Report 36,827



0 100 200 m

SCALE 1 : 5,000

500 0 500 1,000

FEET

● **SGH Soil Sample**

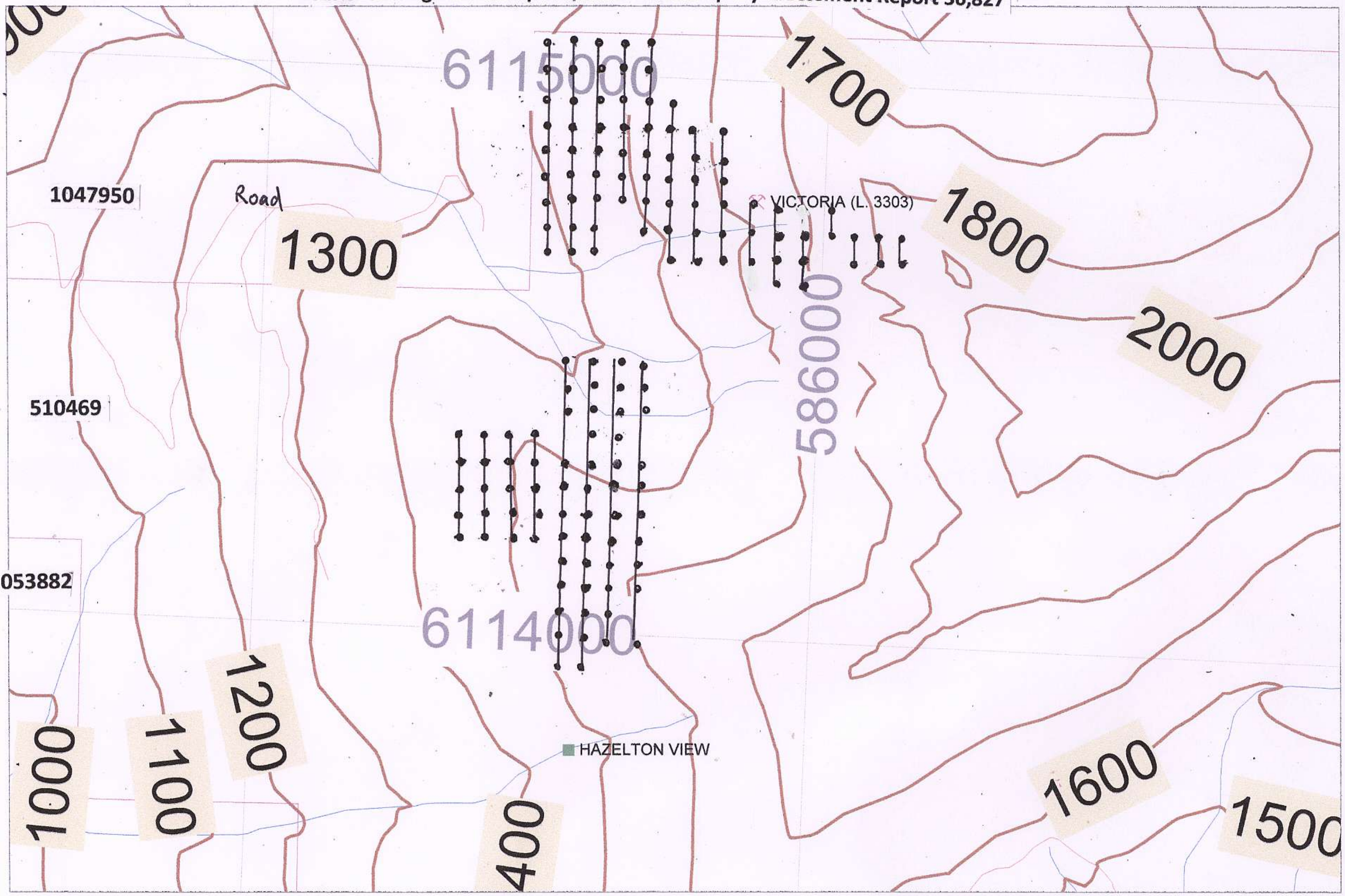
N

Amended Figure: SGH Soil Location (Victoria No. 1, N Half), Showing Location of Soil Samples used for hydrocarbon analysis.

Actlabs (SGH) is an extractive procedure which releases organic compounds adsorbed on B- horizon soil samples. The SGH procedure provides a highly focussed and sensitive method which measures compounds in the C5-C17 range down to the low parts-per-trillion (ppt)

Rocher Deboule Victoria SGH Soil Sample Location

Amended Figure date April 4, 2018 to accompany Assessment Report 36,827



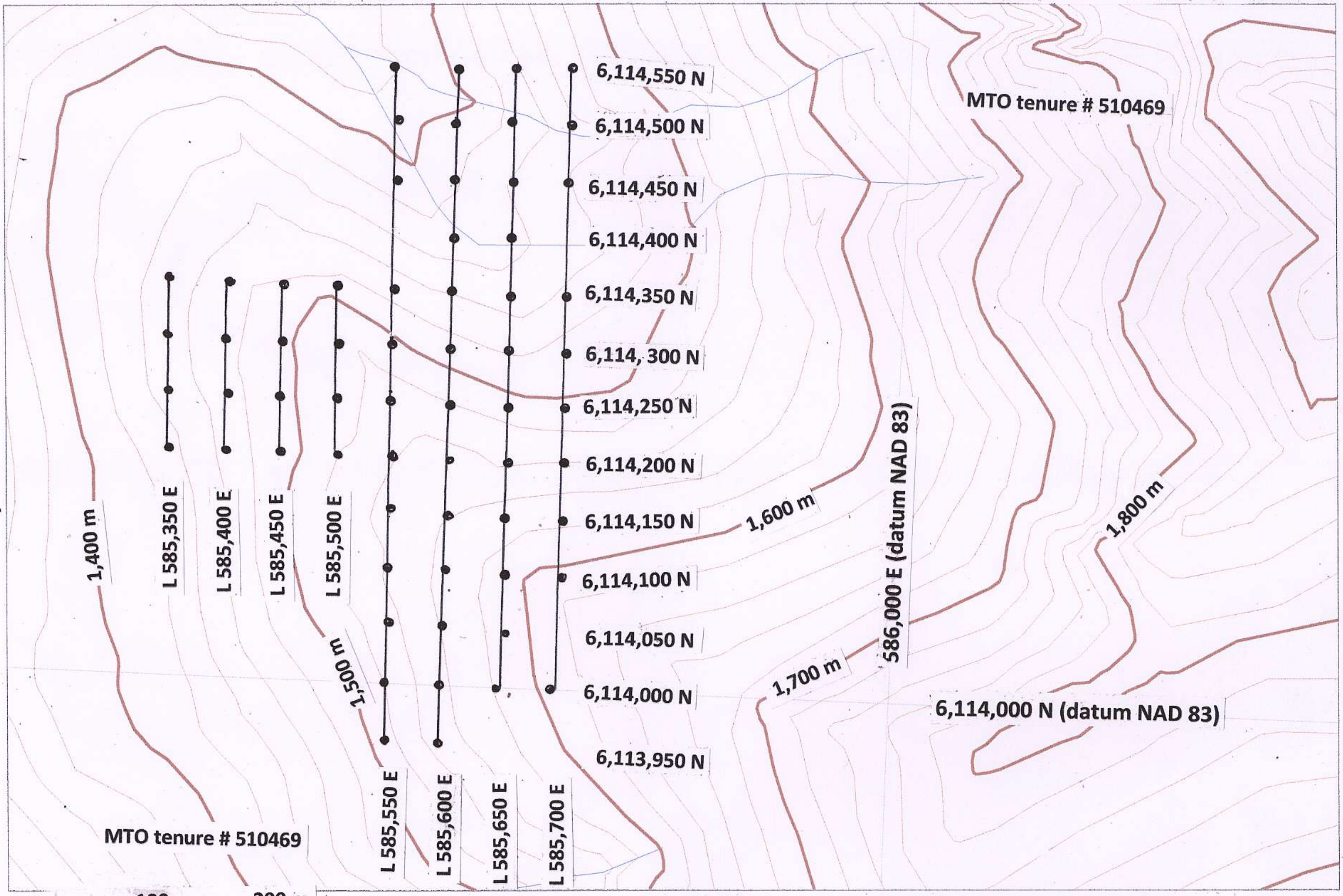
● SGH Soil Sample

Amended Figure for SGH Soil Report
Showing Location of Soil Samples
NTS 093M 04/E, BCGS 093M.012
Omineca Mining Division

Rocher Deboule Victoria No. 3 (S Zone) SGH Samples

NTS 093M 04/E, BCGS 093M.012, Omineca Mining Division

Amended Figure date April 4, 2018 to accompany Assessment Report 36.827



0 100 200 m

SCALE 1 : 5,000

500 0 500 1,000

FEET

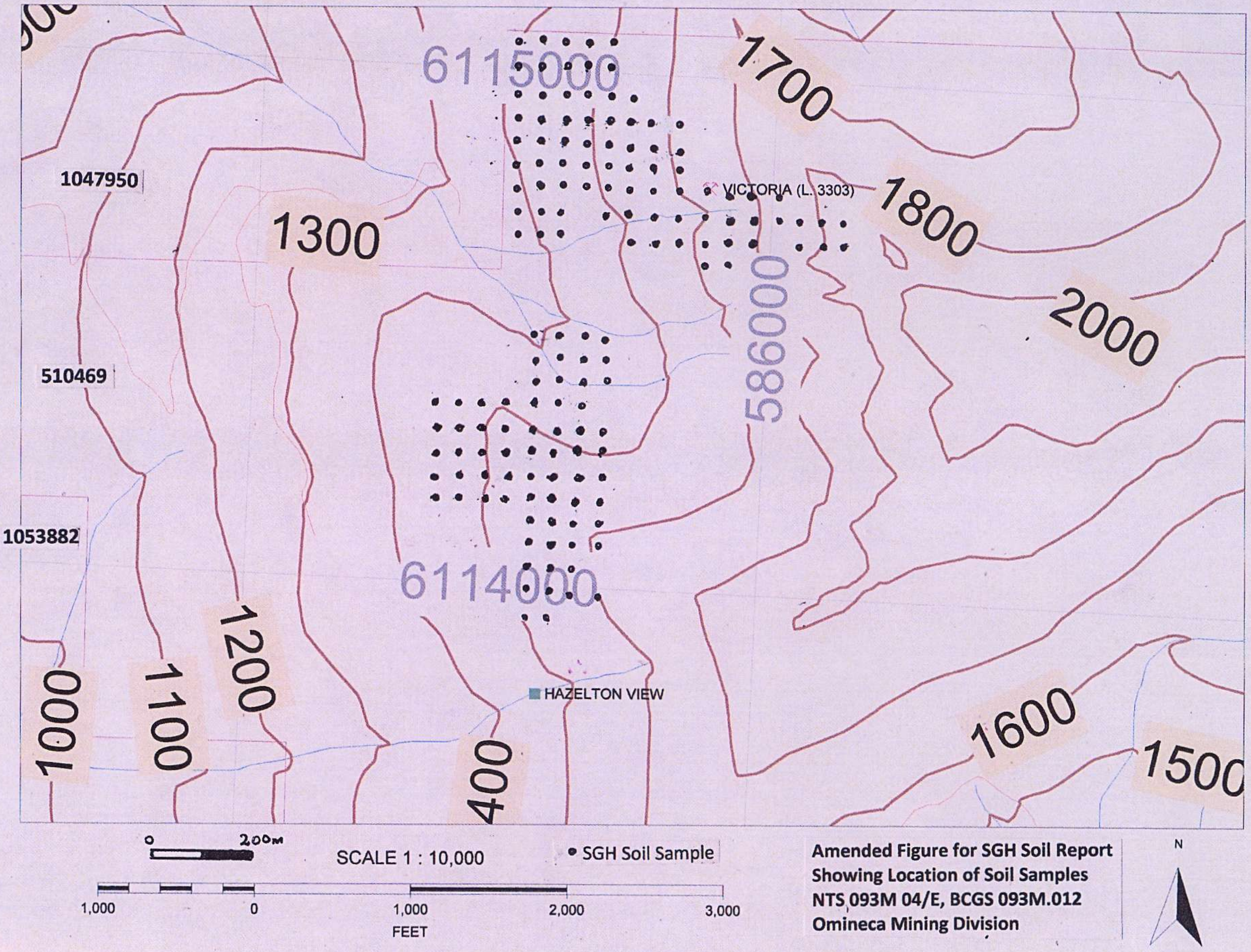
● SGH Soil Sample

Amended Figure: SGH Soil Location (Victoria No. 3, S Half), Showing Location of Soil Samples used for hydrocarbon analysis.

Actlabs (SGH) is an extractive procedure which releases organic compounds adsorbed on B- horizon soil samples. The SGH procedure provides a highly focussed and sensitive method which measures compounds in the C5-C17 range down to the low parts-per-trillion (ppt)

N

Rocher Deboule Victoria SGH Soil Sample Location



Amended Figure for SGH Soil Report
Showing Location of Soil Samples
NTS 093M 04/E, BCGS 093M.012
Omineca Mining Division

A17-06702 - Date: July 17, 2017 - Activation Laboratories Ltd.
American Manganese - Andris Kikauka
585350 E x 6114100 N
585350 E x 6114150 N
585350 E x 6114200 N
585350 E x 6114250 N
585350 E x 6114300 N
585350 E x 6114300 N-R
585400 E x 6114100 N
585400 E x 6114150 N
585400 E x 6114200 N
585400 E x 6114250 N
585400 E x 6114300 N
585450 E x 6114100 N
585450 E x 6114150 N
585450 E x 6114200 N
585450 E x 6114250 N
585450 E x 6114300 N
585500 E x 6114100 N
585500 E x 6114150 N
585500 E x 6114200 N
585500 E x 6114250 N
585500 E x 6114300 N
585500 E x 6114300 N-R
585550 E x 6113850 N
585550 E x 6113900 N
585550 E x 6113950 N
585550 E x 6114000 N
585550 E x 6114050 N
585550 E x 6114100 N
585550 E x 6114150 N
585550 E x 6114200 N
585550 E x 6114250 N
585550 E x 6114350 N
585550 E x 6114400 N
585550 E x 6114450 N
585600 E x 6113850 N
585600 E x 6113900 N
585500 E x 6113950 N
585600 E x 6113950 N-R
585600 E x 6114000 N
585600 E x 6114050 N
585600 E x 6114100 N
585600 E x 6114150 N
585600 E x 6114200 N

585600 E x 6114250 N
585600 E x 6114300 N
585600 E x 6114350 N
585600 E x 6114400 N
585600 E x 6114450 N
585650 E x 6113900 N
585650 E x 6113950 N
585650 E x 6114000 N
585650 E x 6114050 N
585650 E x 6114100 N
585650 E x 6114150 N
585650 E x 6114150 N-R
585650 E x 6114200 N
585650 E x 6114250 N
585650 E x 6114300 N
585650 E x 6114350 N
585650 E x 6114400 N
585650 E x 6114450 N
585700 E x 6113900 N
585700 E x 6114000 N
585700 E x 6114050 N
585700 E x 6114100 N
585700 E x 6114150 N
585700 E x 6114200 N
585700 E x 6114250 N
585700 E x 6114350 N
585700 E x 6114350 N-R
585700 E x 6114400 N
585700 E x 6114450 N
585500 E x 6114750 N
585600 E x 6114800 N
585500 E x 6114850 N
585500 E x 6114900 N
585500 E x 6114950 N
585600 E x 6115000 N
585500 E x 6115050 N
585550 E x 6114750 N
585600 E x 6114800 N
585600 E x 6114860 N
585600 E x 6114900 N
585600 E x 6114950 N
585600 E x 6115000 N
585600 E x 6115000 N-R
585600 E x 6115050 N
585600 E x 6114750 N
585700 E x 6114700 N

SPATIOTEMPORAL GEOCHEMICAL HYDROCARBONS (SGH) by GC/MS

585700 E x 6114750 N
585700 E x 6114800 N
585700 E x 6114850 N
585700 E x 6114900 N
585700 E x 6114950 N
585700 E x 6115000 N
585700 E x 6115050 N
585750 E x 6114650 N
585750 E x 6114700 N
585750 E x 6114750 N
585750 E x 6114800 N
585750 E x 6114850 N
585750 E x 6114850 N-R
585750 E x 6114900 N
585750 E x 6114950 N
585800 E x 6114650 N
585800 E x 6114700 N
585800 E x 6114750 N
585800 E x 6114800 N
585800 E x 6114850 N
585800 E x 6114900 N
585850 E x 6114650 N
585850 E x 6114700 N
585850 E x 6114750 N
585850 E x 6114800 N
585850 E x 6114850 N
585850 E x 6114900 N
585900 E x 6114600 N
585900 E x 6114600 N-R
585900 E x 6114650 N
585800 E x 6114700 N
585900 E x 6114750 N
585950 E x 6114600 N
585950 E x 6114650 N
585850 E x 6114700 N
585950 E x 6114750 N
586000 E x 6114650 N
586000 E x 6114700 N
586050 E x 6114700 N
586050 E x 6114750 N
586100 E x 6114650 N
586100 E x 6114700 N
586150 E x 6114650 N
586150 E x 6114700 N
586150 E x 6114700 N-R
586200 E x 6114650 N

586200 E x 6114700 N
585500 E x 6114650 N
585500 E x 6114700 N
585550 E x 6114650 N
585550 E x 6114700 N
585550 E x 6114800 N
585550 E x 6114850 N
585550 E x 6114900 N
585550 E x 6114950 N
585550 E x 6115000 N
585550 E x 5115050 N
585600 E x 6114650 N
585600 E x 6114700 N
585650 E x 6114750 N
585550 E x 6114750 N-R
585650 E x 6114800 N
585650 E x 6114850 N
585650 E x 6114900 N
585650 E x 6114950 N
585650 E x 6115000 N
585650 E x 6115050 N
585650 E x 6115050 N

SPATIOTEMPORAL GEOCHEMICAL HYDROCARBONS (SGH) by GC/MS

A17-06702 - Date: July 17, 2017 - Activation Laboratories Ltd.

Results represent only the material tested. Actlabs is not liable for any claim/damage from use of this report in excess of the test cost.

Unless requested samples are discarded in 90 days.

This report is only to be reproduced in full.

American Manganese - Andris Kikauka

R=Replicate Sample

Note: Replicate values are expected to be wide when the replicate falls on an anomal illustrating the natural spikey nature of significant anomalies.

Note: This map is only one pathfinder class map of this SGH signature. Anomalies can be as small as 3 ppt.

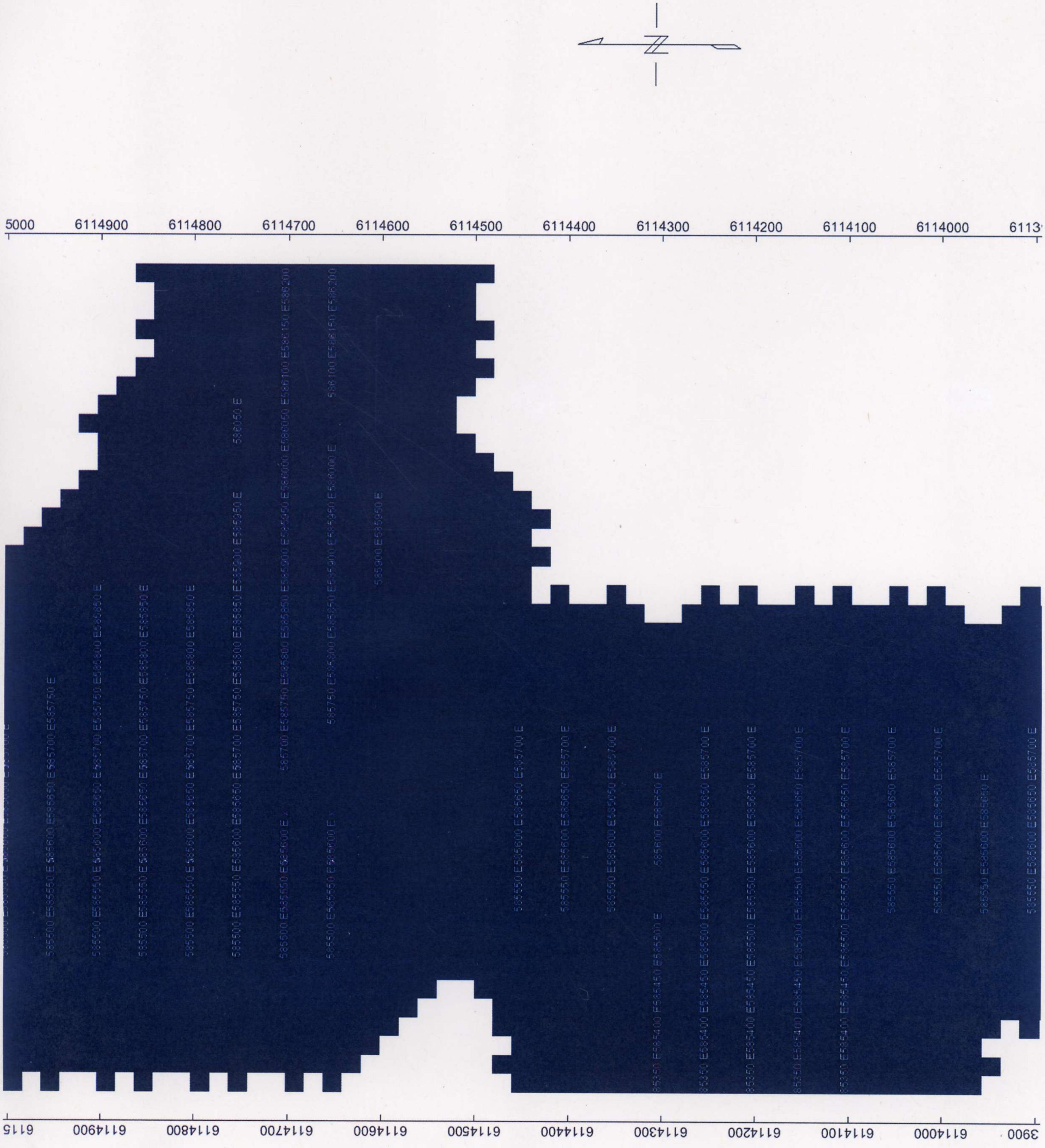
-1=Reporting Limit of 1pg/g (ppt=parts per trillion) (semi-quantitative)

SGH-Redox	SGH-Gold	SGH-Copper
5.5	34.2	19.6
4.8	36.6	1699.5
6.5	13.5	2038.3
4.5	21.6	1106.9
5.4	6.3	1124.3
4.0	8.0	1407.8
6.0	3.7	195.5
4.9	2.8	551.2
4.2	4.2	713.0
4.7	8.7	1573.0
4.8	2.8	922.6
7.0	2.9	99.3
7.1	11.4	1098.0
9.5	10.9	1398.4
7.6	2.5	208.4
6.9	7.5	782.0
5.9	6.2	276.8
5.1	5.9	1468.2
4.6	3.1	445.3
4.4	3.2	588.8
5.8	3.9	664.8
6.6	2.8	588.7
8.7	3.7	209.3
8.9	7.9	206.7
4.9	7.0	1641.8
7.8	2.0	184.8
11.0	7.2	165.0
4.9	4.6	544.1
8.2	11.5	1759.3
5.1	3.5	252.1
6.4	2.0	98.8
5.7	2.8	233.1
6.4	2.5	190.3
7.0	6.7	61.7
7.1	9.5	491.5
7.1	7.7	656.9
5.0	2.8	399.5
4.9	2.9	399.5
5.9	2.0	341.8
6.5	10.3	1731.0
4.8	2.0	408.3
6.0	2.0	379.0
5.6	2.0	403.6

6.3	3.6	148.1
4.8	2.0	436.3
6.2	3.7	194.5
7.4	2.0	131.4
6.7	2.0	334.1
8.6	3.2	150.0
4.0	3.2	825.3
5.2	2.8	330.8
5.2	2.6	408.0
4.6	2.5	560.3
4.8	3.1	568.9
5.5	3.3	229.0
5.6	2.6	88.1
5.9	2.0	147.5
5.3	3.1	175.3
4.8	3.2	333.3
7.6	3.1	381.7
5.6	2.0	329.6
5.7	2.0	370.7
6.2	5.9	818.1
5.1	6.6	1167.9
6.2	5.7	518.8
6.4	2.6	403.2
4.7	2.0	296.8
5.1	2.0	256.9
4.6	2.5	87.9
4.0	6.5	153.1
5.8	2.0	282.9
5.8	2.0	312.6
5.4	2.0	355.5
5.0	2.0	360.3
5.7	2.0	423.4
7.7	2.0	332.7
6.2	2.9	473.6
5.1	2.0	730.5
5.4	2.9	567.9
5.7	2.0	404.5
5.6	2.0	531.7
5.7	2.0	538.6
5.3	15.1	1301.3
4.5	2.5	352.0
4.7	2.6	458.3
4.7	3.4	576.7
4.9	2.0	433.9
5.1	2.0	451.6
7.0	11.0	1063.9

4.0	20.7	1346.4
4.6	2.6	436.3
5.0	2.0	322.9
5.1	2.5	343.9
4.8	2.8	424.4
4.9	3.0	450.0
4.0	7.5	510.5
5.3	2.6	399.1
4.6	2.8	420.1
5.5	2.0	327.7
5.6	12.4	1069.6
4.6	2.0	298.1
5.3	6.1	70.7
7.0	2.0	117.9
8.4	4.0	507.2
6.3	3.9	736.3
5.5	2.8	614.2
5.2	2.0	307.2
5.3	2.6	321.4
5.0	2.6	337.1
4.6	3.6	336.9
5.3	5.9	700.5
4.6	5.2	1257.4
5.2	10.1	1187.6
4.6	3.4	368.6
4.8	3.0	360.3
5.4	4.0	350.3
5.6	10.1	923.4
4.7	3.7	514.3
5.0	3.7	465.3
5.2	4.4	608.3
4.6	2.7	381.4
4.6	2.6	373.9
4.7	8.7	1355.7
4.6	2.6	362.7
4.7	2.7	354.1
4.7	2.6	335.9
4.9	2.5	327.2
8.9	2.0	223.0
4.7	2.9	419.2
5.4	2.0	307.7
4.3	2.6	367.5
4.5	2.0	395.2
4.7	3.0	313.5
5.4	2.0	287.1
4.4	2.0	313.5

4.3	2.0	292.5
4.0	4.2	314.6
4.3	29.0	1246.7
5.1	2.7	150.2
4.1	4.5	549.1
5.4	10.4	1156.6
4.3	2.0	419.3
5.4	6.4	731.1
5.2	7.4	1231.6
4.6	6.5	1349.2
4.2	8.8	1368.6
4.2	3.0	376.1
4.8	2.0	376.1
4.5	2.0	408.0
4.5	6.3	1008.5
4.7	2.0	405.4
4.5	2.0	386.4
4.6	2.0	446.5
4.8	3.4	327.0
4.2	2.0	354.7
4.2	2.0	284.6
4.1	2.0	301.1


N
5000
6114900
6114800
6114700
6114600
6114500
6114400
6114300
6114200
6114100
6114000
6113
6115
3900