

093 886
Assessment Report

Swift River, Yukon - 1997

093 886



June 20, 1997

Birch Mountain Resources Ltd.
Calgary, Alberta

This report has been examined by
the Geological Evaluation Unit
under Section 53 (4) Yukon Quartz
Mining Act and is allowed as
representation work in the amount
of \$ 85,200.

M. B. L.
for Regional Manager, Exploration and
Geological Services for Commissioner
of Yukon Territory.

0118-74560
093886
v.1

ASSESSMENT REPORT

WORK COMPLETED APRIL 30 1997

SWIFT RIVER EXPLORATION
FOR BASE METALS

IN

WATSON LAKE MINING DISTRICT,
SOUTHERN YUKON TERRITORY

DAN, M, SAM, MINE, AND STRATA CLAIM BLOCKS

Latitude 60°10'N : Longitude 131°10'W

NTS 105 B/3

SUBMITTED

JUNE 20 1997

EXECUTIVE SUMMARY

The Swift River property is located in the south-central Yukon, 130 km west of Watson Lake. The property has good road access to the Alaska Highway and the port of Skagway in Alaska. The 580 claims cover approximately 14,500 hectares in the Watson Lake Mining District.

A number of companies have explored the area since the initial exploration by Hudson Bay Mining & Smelting discovered the Dan showing in 1946. The showings have been explored by HBMS (1946 to 1964), Boswell River Mines (1967 to 1971), Amax (1978), Cominco (1993) and First Yukon Silver Resources (1988 to present).

The Property contains Volcanogenic Massive Sulphide **copper-zinc-silver** mineralization in Yukon-Tanana strata. Chip sampling of the chalcopyrite-pyrrhotite interval by Birch Mountain on the most recent discovery, the Lucy showing, (made by First Yukon following the 1993 Cominco work) returned **2.28 % Cu** and **96 g/tonne Ag** over 1 metre.

A horizontal loop EM survey, conducted in March 1997 over 27 line-km, identified 6 major conductors and 7 minor conductors, all consistent with stratigraphy. Conductor "A", corresponding to the Lucy showing, measures 2 km in length and is open along strike. Conductor width varies from less than 25 metres to greater than 50 metres in the immediate vicinity of the Lucy showing.

Results of the ground magnetometer survey are also consistent with stratigraphy. The largest magnetic anomaly identified in the survey strikes parallel to Conductor "A", and lies approximately 25 to 50 metres to the south. The ground geophysical work supplements and confirms previous aerial and ground geophysical work done by Boswell and Cominco.

Work was carried out on 29 of the Park and M claims, and this work is applied to 284 of the contiguous claims, being the bulk of the Dan, M, Sam, Mine and Strata blocks of claims. A total of \$86,904.63 spent on the two programs is applied against the assessment for these claims - \$306.00 per claim.

1

TABLE OF CONTENTS

	Page
Executive Summary	2
1 Table of Contents	3
2 List of Appendices	4
3 List of Maps	5
4 Introduction	6
5 Property Description, Ownership, Location	6
6 Access, Climate, Infrastructure	7
7 Previous Work Done	7
7.1 Regional Geology	7
7.2 Property Geology	8
8 Work conducted in 1996/7	8
8.1 Geological Sampling - Fall 1996 Program	8
8.2 Geophysical Work - Spring 1997 Program	9
9 Statement of Expenditure	12
10 Certification	13

2

LIST OF APPENDICES

- 8.1 November 8, 1996 - Report Swift River Property, Yukon Territory, Lucy Showing
- 8.2 Horizontal Loop Electromagnetic and Magnetic Surveys
Mark Bowman Associated Mining Consultants Limited
April 14 1997

3

LIST OF MAPS

- 5.1 Claims covered by Assessment Report
- 6.1 Position and Access
- 8.1 Location of samples
- 8.2 Location of lines cut and surveyed

4

INTRODUCTION

This assessment work is applied to the following claims:

Claim Name		Claim Grant Number	Anniversary Date	Total
Dan	1 - 10	YB14428-YB14437	13 July 1997	10
	12 - 64	YB14439-YB14491	13 July 1997	53
	65 - 122	YB14494-YB14551	14 July 1997	58
M	1 - 14	YB15913-YB15926	11 August 1997	14
	16	YB15736	11 August 1997	1
	20 - 22	YB15928-YB15930	11 August 1997	3
	24 - 64	YB15932-YB15972	11 August 1997	41
Sam	1 - 20	YB15973-YB15992	11 August 1997	20
	41 - 49	YB16013-YB16021	11 August 1997	9
	51 - 64	YB16023-YB16036	11 August 1997	14
	85 - 86	YB16057-YB16058	11 August 1997	2
Mine	1 - 40	YB16066-YB16105	16 August 1997	40
Strata	24 - 42	YB16106-YB16124	18 August 1997	19

Total Number of claims: 284

All are wholly owned by the Registered Owner, First Yukon Silver Resources Inc.

In September 1996, a party of four visited the claims, carried out two days of geological reconnaissance, then spent a further three days chip-sampling on six lines in the two Lucy trenches, before further work was precluded by inclement weather. Field work was suspended in favour of detailed literature review and preparatory map collation.

In March 1997, a field crew of seven revisited the property to cut lines and carry out a Horizontal Loop EM and Magnetic Survey over a hitherto unsurveyed portion of the claims.

A total of \$86,904.63, spent on these two programs, is applied against the assessment for these claims - \$306.00 per claim.

5

PROPERTY DESCRIPTION, OWNERSHIP, LOCATION

The claims covered by this assessment report are detailed above. Their location is shown on Figure 5.1. The property is in south-

central Yukon, 130 km west of Watson Lake. The 580 total claims cover approximately 145 km² at latitude 60°10'N, longitude 131°10'W, in the Watson Lake Mining District, NTS 105 B/3.

6 ACCESS, CLIMATE, INFRASTRUCTURE

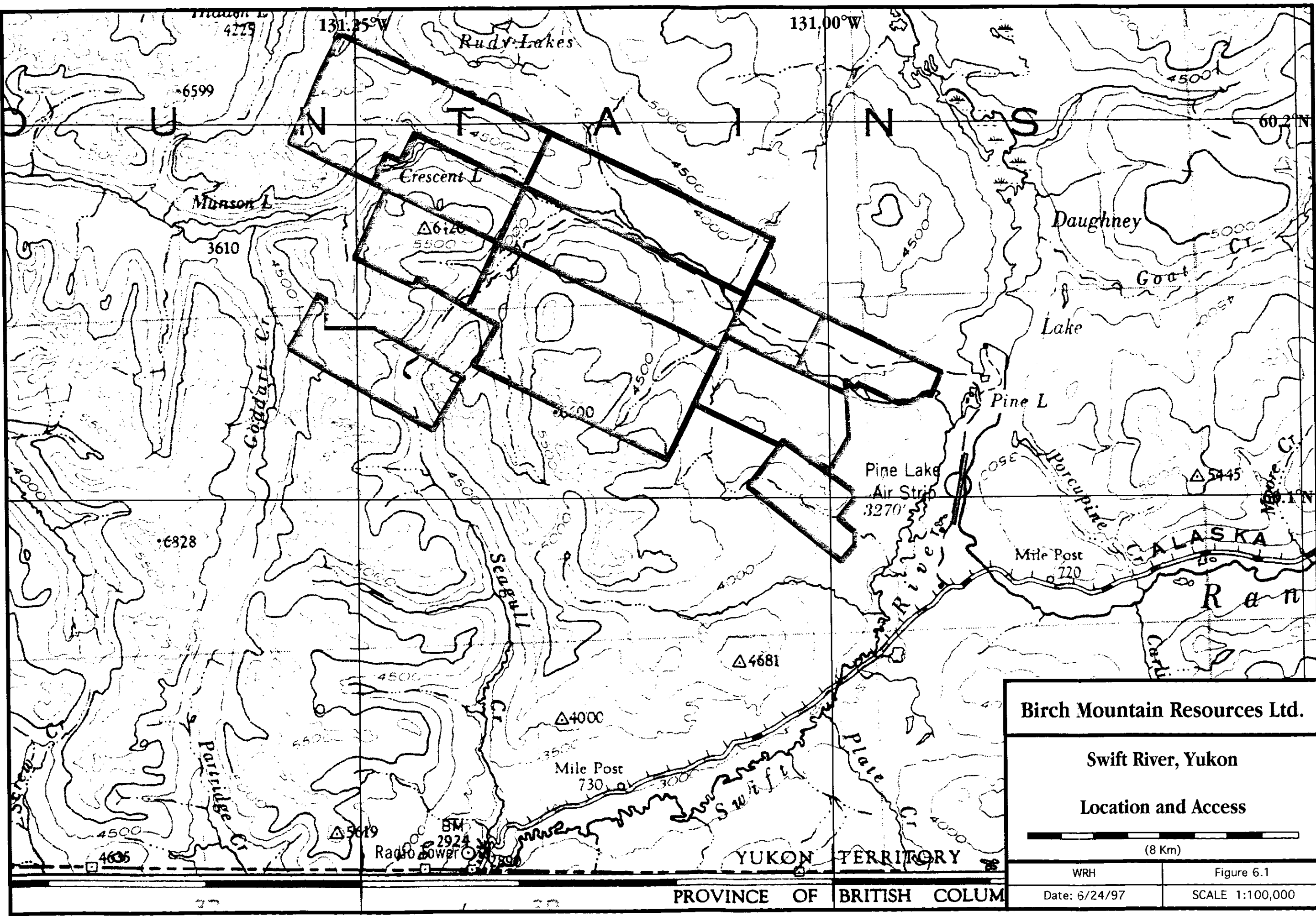
The access, climate and infrastructure are covered in previous assessment reports. As to climate, this is the Yukon, with a short, but warm summer of long daylight hours; and a long winter. Being on the continental divide means that the weather is changeable. The claims are accessed by 4WD truck from the Alaska Highway, via the Pine Lake Airstrip road from immediately west of Rancheria bridge. Field work logistics were handled from both Watson Lake and Whitehorse. The latter is a modern city of some 24,000 population, with almost all amenities and logistical infrastructure. Figure 6.1 details access to the area.

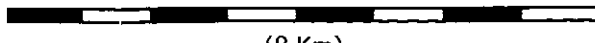
7 PREVIOUS WORK DONE

A number of companies have explored the area since the initial exploration by Hudson Bay Mining and Smelting (HBMS) discovered the Dan showing in 1946. The area has been explored by HBMS (1946 to 1964), Boswell River Mines (1967 to 1971), Amax (1978), Cominco (1993), and First Yukon Silver Resources (1988 to present). The work done by these companies resulted in the location of a number of massive sulphide showings and float occurrences. Exploration consisted of geologic mapping, soil geochemistry, trenching, ground EM and magnetic surveys, airborne EM and magnetic surveys and diamond drilling. The most recent discovery, the Lucy showing, was made by First Yukon Silver Resources following the 1993 Cominco work.

7.1 Regional Geology

The VMS mineralization at Swift River occurs within rocks of the Yukon-Tanana Terrane. The **Kudz Ze Kayah** (Cominco) and **Wolverine** (Westmin) deposits consist of lenses of massive and semi-massive pyritic Pb-Zn-Cu mineralization that occur within felsic metavolcanic and volcanoclastic assemblages and are spatially associated with deformed subvolcanic domes or thick sills. The **Fyre Lake** (Columbia Gold) deposits of massive chalcopyrite, pyrite, pyrrhotite and magnetite iron formation occur in a deformed and metamorphosed succession of basic to intermediate flows with intercalated volcanoclastics and volcanically derived fine-grained sedimentary rocks. The **Ice** (Expatriate) massive pyrite, chalcopyrite and bornite deposit occurs within pillowed, massive and brecciated basalt



Birch Mountain Resources Ltd.	
Swift River, Yukon	
Location and Access	
	
WRH	Figure 6.1
Date: 6/24/97	SCALE 1:100,000

of the Slide Mountain Terrane.

Restoration of 450 km of mid-Cretaceous right-lateral movement on the Tintina fault brings the Finlayson area to a position east of Dawson. Devonian-Mississippian strata, correlative to the Yukon-Tanana Terrane, extend from the Dawson area through the Swift River area to the Gataga area of British Columbia and contain a number of VMS deposits and occurrences.

7.2 Property Geology

The Swift River property is underlain by a sequence of Devonian to Permian argillite, shale, calcareous andesitic tuffs, siltstone and limestone which strikes at an azimuth of 110-140° and dips 65-90° SW. VMS mineralization consists of stratabound, finely laminated, massive pyrrhotite-magnetite containing variable amounts of sphalerite, chalcopyrite, galena and pyrite. Microscopy indicates that the rocks to the mineralization are fine grained sediments or tuffaceous sediments with a contact metamorphic overprint and a planar fabric that is probably bedding. The delicately laminated, fine grained tuff is an andesitic or trachyandesitic ash. A number of NE-SW left-lateral faults transect the sequence. Some of these faults may be syn-depositional rift faults. The sequence is intruded by a diorite sill, the Cassiar Batholith on the East and the Seagull Batholith on the West.

Volcanogenic massive sphalerite-chalcopyrite-pyrrhotite-magnetite showings are poorly exposed in an area of little till cover and moderate topography. The finely laminated nature of the sulphide mineralization and the paucity of shear deformation suggests that the sulphide mineralization was deposited syngenetically with tuffaceous sediments.

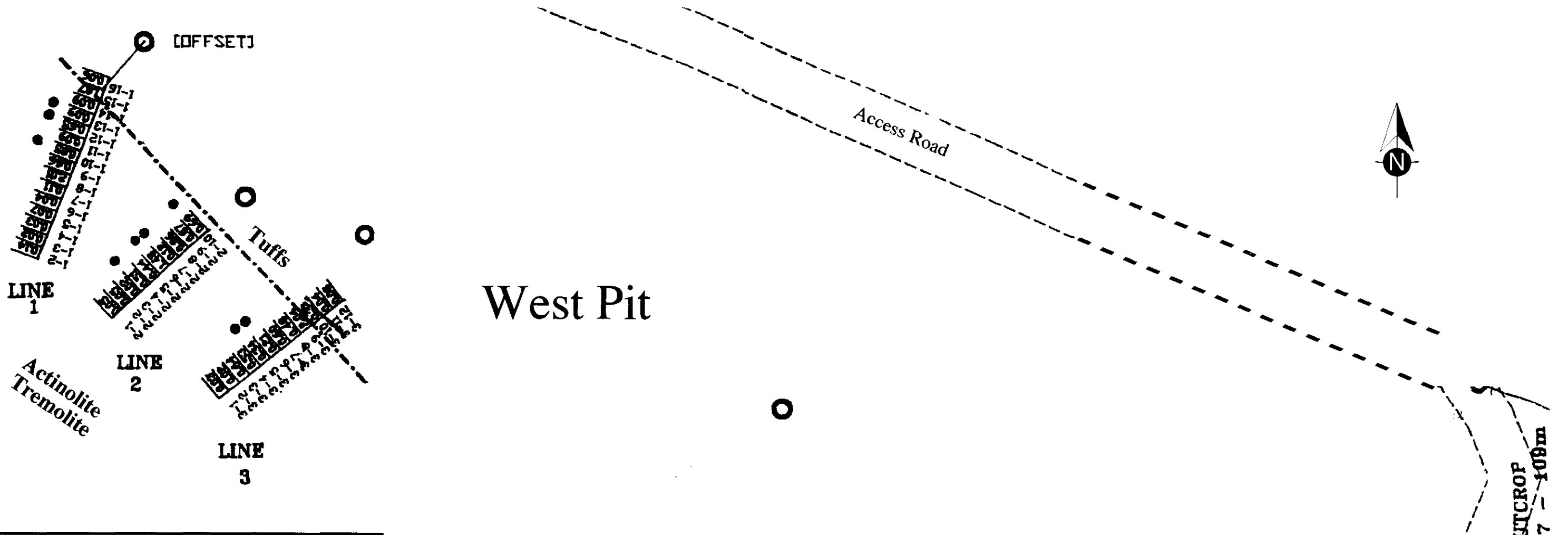
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WORK CONDUCTED IN 1996/7

The following work was done by Birch Mountain Resources Ltd on the Swift River Project, owned by First Yukon Silver Resources Inc.:

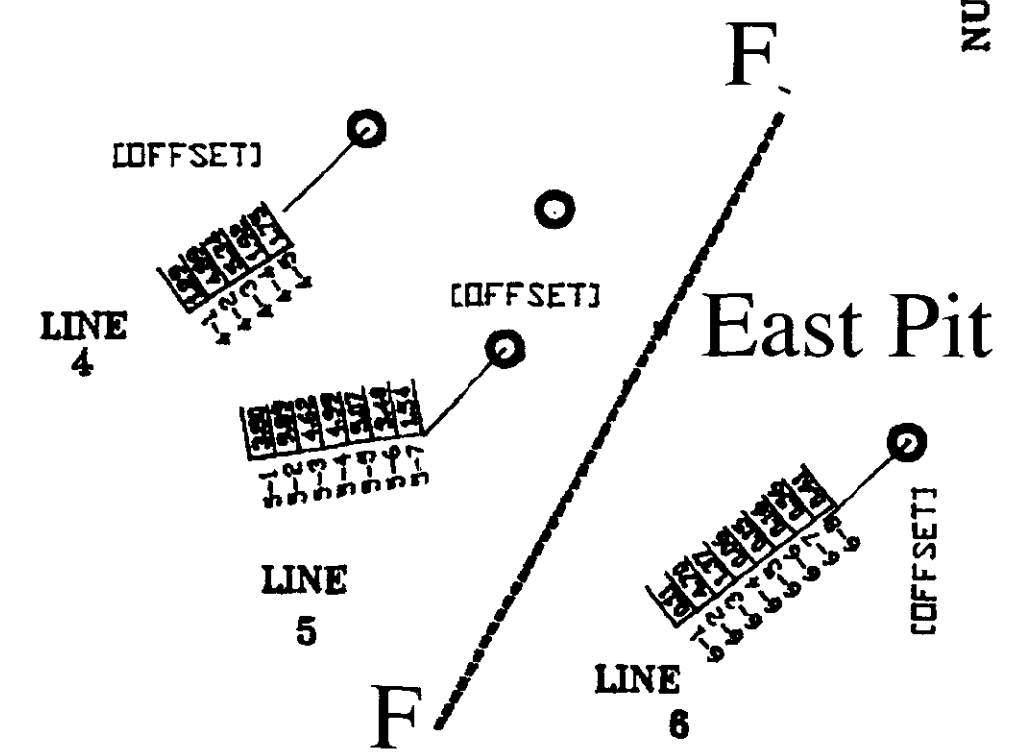
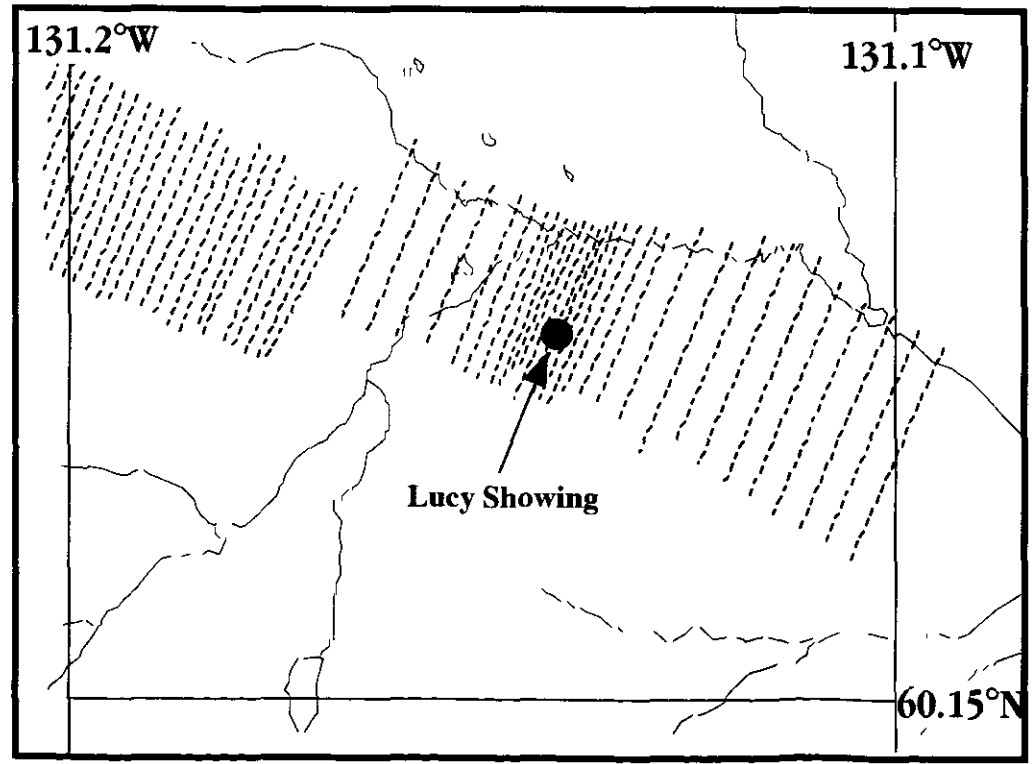
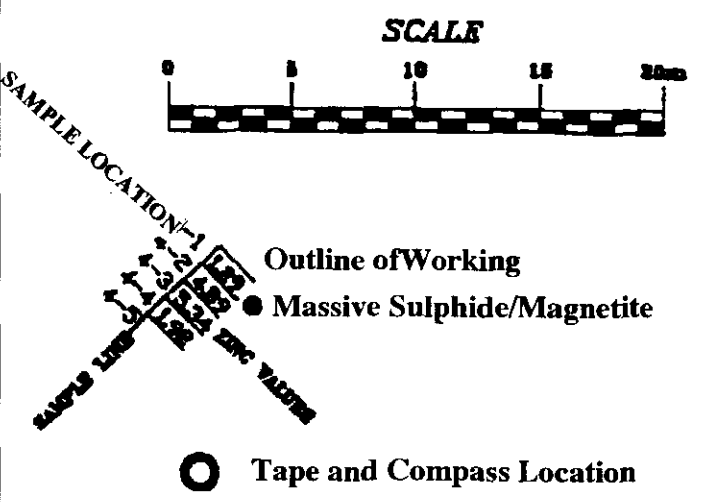
8.1 Geological Sampling - Fall 1996 Program

Two days were spent in road and foot geological reconnaissance. Three days were spent chip sampling. On the Lucy trenches, six lines were marked, cleared and swept, then chip sampled over full intervals of 1m. In total, 59 samples were taken and submitted for multi-element (30) ICP scan. Figure 8.1 shows the sample localities. Appendix 8.1 details the work done.



BIRCH MOUNTAIN RESOURCES

SWIFT RIVER PROJECT
 Sample Locations at Lucy Workings
DETAIL OF PRELIMINARY WORK
ZINC VALUES



ARMAN G. MAND, P. Geol., Ph.D.

Figure 8.1

This work was done between September 19 and 28 1996, concentrated on, but not exclusively confined to, Park 40 (YB09555).

The following personnel were involved:

Name	Function	Dates	Residence
Adrian Mann	Geologist	18-28 September	Calgary
Valmar Pratico	Geologist	19-22 September	Calgary
Jimmie Wolftail	Sampling	19-23 September	Watson Lake
George Millen	Sampling	19-24 September	Watson Lake

8.2 Geophysical Survey - Spring 1997 Program

Baseline cutting and flagging covered 4012m from 1200W to 2812E. From 1200W to 100W, the baseline followed the pre-cut baseline and crosslines of Cominco. Thereafter, a fresh baseline was cut as far as 2800E, and fresh crosslines were blazed and flagged.

Line #	Flags	Magnetometer	HLEM
1200W	1075	0	0
1000W	1025	0	0
800W	1025	900	1025
600W	1050	900*	1050
400W	1050	900*	1050
300W	600	0	0
200W	1060	900*	1025
100W	920	575	1020
50W	800	800	0
00E/W	1000	800	1000
50E	920	700	920
100E	1030	725	1030
150E	850	700	850
200E	1125	575	1025
250E	925	575	925
300E	1175	750	1175
400E	975	850	975
500E	850	725	900
600E	1050	400	1050
800E	1100	800	1100
1000E	1475	1050	1475
1200E	1300	1200	1300
1400E	1275	975	1275
1600E	1292	900	1292
1800E	1460	1250	1460
2000E	450	175	0

2200E	930	0	930
2400E	360	0	0
2600E	350	0	0
<u>2800E</u>	<u>244</u>	<u>0</u>	<u>0</u>
Total	27741	19200	24490

*Certain lines were surveyed twice for different station intervals in HLEM. The baseline extends from Park 33 YB 09548 to Park 51 YB 09566. The grid, shown on Figure 8.2, covers the claims:

Park 33	YB 09548	Park 34	YB 09549	Park 1	YB 09516
Park 3	YB 09518	Park 36	YB 09551	Park 35	YB 09550
Park 37	YB 09552	Park 38	YB 09553	Park 5	YB 09520
Park 7	YB 09522	Park 40	YB 09555	Park 39	YB 09554
Park 41	YB 09556	Park 42	YB 09557	Park 9	YB 09524
Park 11	YB 09526	Park 44	YB 09559	Park 43	YB 09558
M 21	YB 15929	M 19	YB 15927	Park 45	YB 09560
Park 46	YB 09561	Park 48	YB 09563	Park 47	YB 09562
M 17	YB 15737	M 15	YB 15735	Park 49	YB 09564
Park 51	YB 09566	M 13	YB 15925	(29 claims total)	

The geophysical work was designed to evaluate all the area covered by the grid, in a manner to tie the known, outcropping and trenched, geology to the geophysics. Hence, although work was more intensive in certain areas, it is impossible to apportion a particular cost to any one specific claim. The overall cost relates equally to all claims covered by the grid.

Snow ploughing and clearing of the access road was done between March 10 and 13, 1997, and camp set-up from March 10 to March 17, 1997. The line cutting and geophysical work was done between March 17 and March 31 1997.

The following personnel were involved:

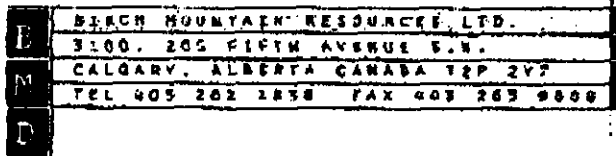
<u>Name</u>	<u>Function</u>	<u>Dates</u>	<u>Residence</u>
Adrian Mann	Geologist, Flagging	15-31 March	Calgary
Mark Bowman	Geophysicist	21-31 March	Calgary
George Millen	Line Cutting, Set-up	10-31 March	Watson Lake
Paul Lima	Line Cutting, Set-up	10-31 March	Watson Lake
Michel Mann	Flagging, Magnetometer	17-31 March	Victoria
Jeff Huckle	Cutting, Flagging, HLEM	17-31 March	Edmonton
Margaret Lima	Cook	16-31 March	Watson Lake

Expediting and Field Logistics were handled by Thrundiuk Engineering of Watson Lake, YT.

Appendix 8.2 is a report by Associated Mining Consultants Limited, detailing the work done, results and their recommendations.

SEPTEMBER 4, 1998

Patti L. McLeod
Mining Recorder
Watson Lake Mining District
PO Box 269
Watson Lake, Yukon
Y0A 1C0
Fax: 1-867-536-7842



Dear Ms. McLeod

In response to your letters of August 4 and September 3, 1998 requesting a revised cost statement for the assessment report August 1997 and the response to the letter from Mike Burke regarding the geological deficiencies we provide the following information.

Upon review of our cost accounts for the period claimed in the Assessment report, September 1996 to March 1997 we found that the cost of the March 1997 geophysical program was higher than originally claimed the revised cost are:

ITEM	REVISED COST	INITIAL COST
Geophysical data acquisition	\$ 17,995.00	\$ 14,495.00
Data manipulation	\$ 8,865.00	\$ 7,115.50
Not eligible expense		(2,498.00)
Total Cost for ASSESSMENT	\$ 89,656.63	\$ 84,406.63

I am enclosing a copy of the letter sent to Mike Burke answering his questions on the technical issues of the Assessment Report.

If you have any further questions please contact Bob Lipsett at 403-262-1838.

Yours truly;
Birch Mountain Resources Ltd.

Per: 
L. Robert Lipsett, P.Eng.
General Manager, Operations

RECEIVED
SEP - 7 1998
MINING RECORDER
WATSON LAKE, YK
I.N.A.C.

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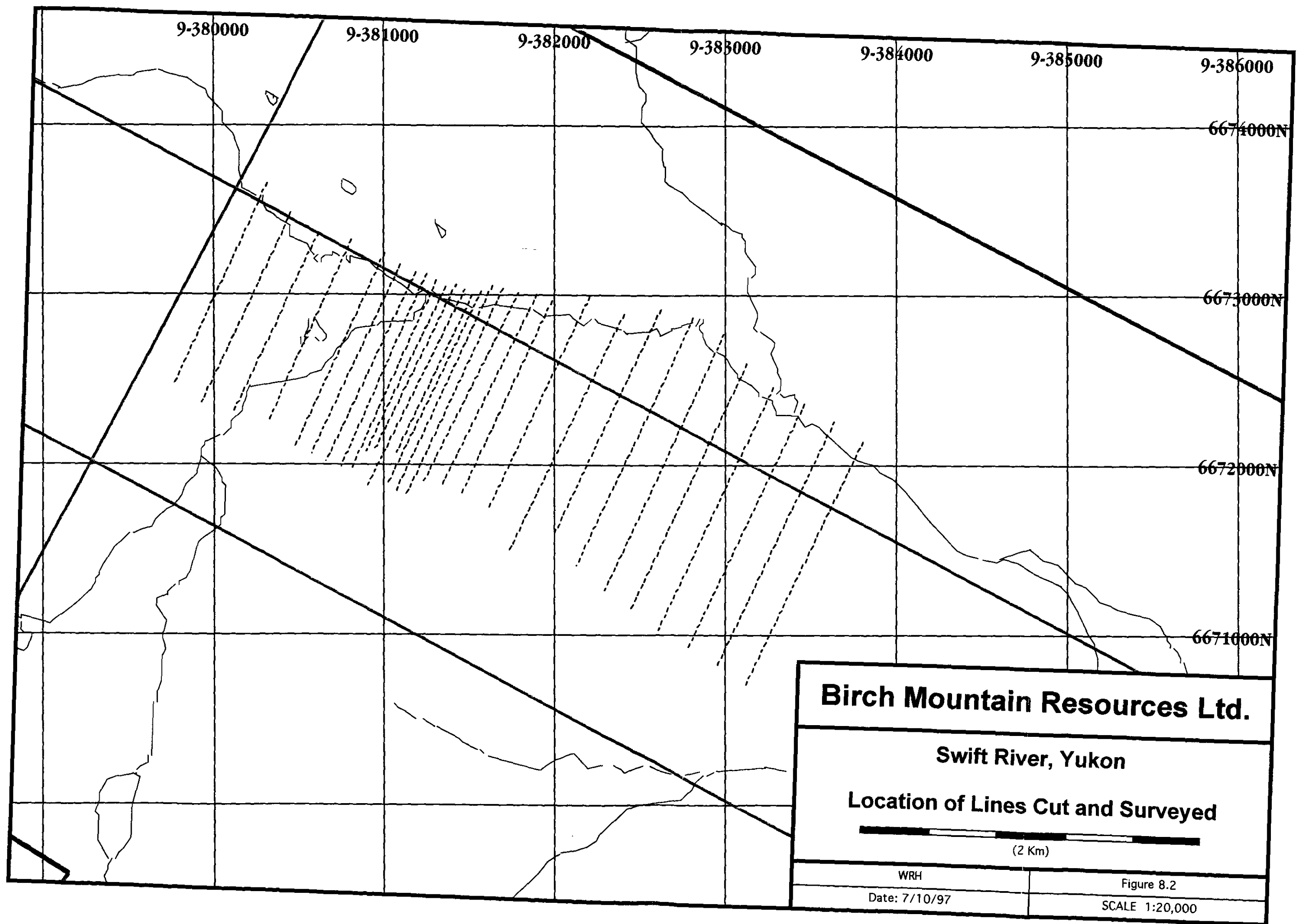
STATEMENT OF EXPENDITURE

September 1996

Airfares	2,498.00
Vehicles	669.29
Accommodation and expenses	667.25
	549.90
Professional Fees & Salaries	2,700.00
	2,058.00
Analyses	1,404.64
Contract Labour	<u>1,828.72</u>
SUBTOTAL	10,575.80

March 1997

Airfares	Huckle J	1,616.00
	Mann M	1,125.65
Travel	Mann AG (and Expenses)	2,799.25
Camp Setup		
Russell Contractor		357.50
Jedway - CAT and trailer rental		5,510.00
Canada Freightways		727.93
Camp Costs		
Thru diuk Engineering Mobilization		8,665.96
Expediting		2,596.19
Line Cutting		10,907.76
Demob.		2,538.36
Sundries		768.63
Maps and xerox		45.10
Professional Fees & Salaries		7,200.00
		5,960.00
Contract Labour		2,400.00
		1,500.00
Geophysical Data Acquisition		14,495.00
Data Manipulation		7,115.50
SUBTOTAL		76,328.83
TOTAL		86,904.63



10

CERTIFICATION

I, Adrian G. Mann, undersigned, certify that:

I am a graduate of the Universities of London (England) and of the Witwatersrand, South Africa;

I hold the degrees of B.Sc.(General Honours), B.Sc.(Special Honours)(Geology), Ph.D., and M.B.A.;

I am a member in good standing of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA) and am registered with them as a Professional Geologist;

the geological work cited in the report was done by me, or under my direct field supervision, or, in the case of the geophysical work, done by an independent contractor, working in close collaboration with me in the field;

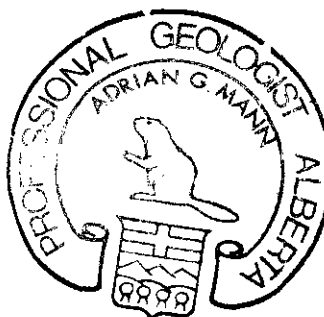
the technical content of this report, and of the accompanying appendices, is a true and fair representation of the work done on the properties listed herein;

the expenditure detailed in the report is a realistic and true representation of the costs incurred and accrued in the exploration of these properties;

I hold 20,000 shares, and options to acquire shares, in Birch Mountain Resources Ltd..

Dated at Calgary this 7/2/97

Adrian G. Mann Ph.D., P.Geol...



MEMORANDUM

To Valmar Pratico
From Adrian Mann

November 8, 1996

SWIFT RIVER PROPERTY, YUKON TERRITORY LUCY SHOWING

The property was visited, and the Lucy showing was sampled at the end of September 1996. Inclement weather precluded detailed mapping of the two pits sampled. Attached is a tape and compass survey map of the showings sampled, and a logging of the principal lithological units represented in the chip samples taken. Six chip channels were taken across the deposit, roughly cut perpendicular to strike, but not absolutely perpendicular to dip. Direction and location of sampling lines were dictated by ease of sampling, rather than by geological guidelines, as the wet snow cover made meaningful mapping impossible. Samples were all taken over one metre, with chipping being as representative as of that metre as possible.

Although no geological mapping was done, the general impression gained is of a bedded massive sulphide deposit, dipping steeply to the south, underlain by well banded felsic to andesitic tuffs. Local, apparently contact, metamorphism has overprinted a distinctly skarn type of mineralogy to the more calcareous beds in places. The texture and fabric of the rock, as seen in polished slabs kept by the owner on site; and general field relations observed on the Lucy, and more especially the Dan, showings, militates against a skarn or tectonic origin for the deposits. The massive sulphides are too well banded, with common soft sediment deformation features, to be mylonitic in origin, as has been proposed; and their extensive nature, regardless of degree of metamorphism, is strong evidence against a skarn alteration origin.

Two distinct populations are apparent in the geochemical fingerprints:

To the west the upper (southern) massive sulphide-magnetite bands and tremolite-actinolite mafic extrusives are copper bearing. The copper appears to be in scattered blebs, and more rarely as disseminations, of pyrrhotite and chalcopyrite. One interesting value (2.28 per cent) of copper, with appreciable silver (96g/t) and minimal zinc (0.14 percent), was recorded at the most southern extremity of line #1. Beneath the copper rich zone, which was only touched in one channel (line #1), are gossanous magnetitic tremolite-actinolite interbanded with earthy, gossanous massive sulphides, containing disseminated and lenticular discontinuous layers of sphalerite and magnetite. These are underlain by leucocratic banded tuffs, which are themselves zinc bearing as crystal bands and disseminations. Zinc is the only metal of consequence in the samples from the west pit, returning values of:

- #1 0.59% Zn over 8.00m (high 2.02% Zn) including one section of 1.34% Zn over 2.00m
- #2 0.71% Zn over 7.00m (high 1.48% Zn) including two sections of 0.80% Zn over 3.00m
- #3 0.65% Zn over 8.00m (high 2.04% Zn) including one section of 1.04% Zn over 3.00m

In the smaller eastern pit, there is no copper. The pit appears to be lower in the stratigraphy, with some vestiges of leucocratic banded cherty tuffs to the south (hangingwall). Again, lithology is interbanded tremolite-actinolite with discontinuous lenses and disseminations of sphalerite and magnetite; and massive, bedded, magnetite-sulphide. Zinc values are very encouraging, and are marked by a sharply increased gold fingerprint of up to 155ppb. The following zinc values were returned:

- #4 3.04% Zn over 5.00m (high 5.34% Zn) including one section of 5.11% Zn over 2.00m
- #5 4.71% Zn over 7.00m (high 9.89% Zn; low 1.54% Zn)
- #6 1.06% Zn over 7.00m (high 4.70% Zn) including one section of 3.04% Zn over 2.00m

The easternmost line (#6) lies to the east of a cross fault, of apparently normal throw (west-up: east-down), of unknown but probably minor magnitude. Although only 25m of strike is exposed in this eastern pit, there is considerable potential to it. If indeed the zone is in the footwall of the zone that is exposed in the western pit, and if, as is reasonable, the zone extends to the west, then one could expect at least a further 80-100m of

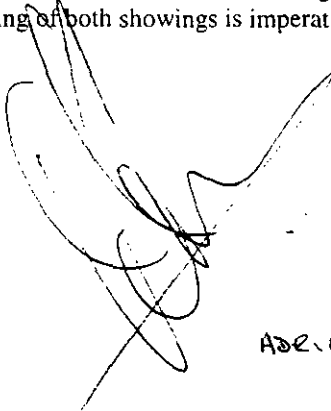
the body within the area pitted. A further outcrop, as yet not properly exposed, was seen 109m to the east of the eastern pit. This was only grab sampled, returning

#7 2.02% Zn over ± 2 m (high 3.56% Zn)

This represents some 200m of potential in this showing alone. The strong zinc showing in an earthy, weathered, surface exposure is itself encouraging, as one would expect some leaching of zinc from the gossan. Better grades should be expected at a shallow depth, below the zone of surface interference.

Recommendation.

The showing must be exposed more fully at surface, by pitting and strike trenching, and by washing the pits, as has been done on the Dan showing. Detailed mapping of this and the Dan, and systematic channel sampling of both showings is imperative.



ADRIAN MANN
P. GEOL

LUCY SAMPLE LINE #1 All samples over 1 metre, start south.

SAMPLE DESCRIPTION
#

Cu% Zn%

1-2 2.28 0.14 Tremolite-actinolite, non magnetic, interlocking acicular needle clusters with intercrystalline pyrrhotite.

1-3 0.15 0.02 Massive sulphide and magnetite, heavy, scattered tremolite-actinolite, very magnetic, chalcopyrite-pyrrhotite-magnetite-sphalerite(?)-galena(?)

1-4 0.06 0.03 Tremolite-actinolite, interlocking acicular clusters, non magnetic, with abundant intercrystalline limonite after sphalerite.

1-5 0.03 0.07 Tremolite-actinolite clusters with intercrystalline sphalerite and pyrrhotite.

1-6 0.54 0.04 Generally unmineralized tremolite-actinolite chlorite rock, pale olive-green, banded at 10mm intervals.

1-7 0.01 0.11 Darker green chloritic, with layered disseminated pyrrhotite blebs in part, generally disseminated silvery sulphide.

1-8 0.06 2.01 Alternately banded pale tremolite-actinolite banded rock and coarse dark green generally nonmagnetic, friable black-brown (?) sphalerite.

1-9 0.06 0.66 Tremolite-actinolite with disseminated limonite and haematite after ?sphalerite and some pyrrhotite.

1-10 0.03 0.05 Very decomposed haematite, strongly magnetic, granular, gossanous.

1-11 0.02 0.09 Very pale grey green actinolite-tremolite, banded in part, rare disseminated sulphides.

1-12 0.03 0.65 Strongly magnetic, very well banded, black to black-green, magnetite with subordinate sphalerite and pyrrhotite.

1-13 0.04 0.09 Dark grey -black, magnetitic tremolite-actinolite well banded, with scattered silver-grey sulphide needles.

1-14 0.03 0.09 Pyrite-pyrrhotite-sphalerite and possibly galena in well banded tremolite-actinolite rock, non magnetic, dark to medium olive green.

1-15 0.01 1.07 Banded dark grey cryptocrystalline cherty rock, chloritic in part, some planar sulphide accretions parallel to banding, probable tuff ?.

1-16 0.02 0.06 Pale grey to off white banded cherty tuff.

LUCY SAMPLE LINE #2 All samples over 1 metre, start south.

SAMPLE #	DESCRIPTION		
	Cu%	Zn%	
2-1	0.11	0.05	Pale grey very well banded cherty tuff, occasional black sulphide (sphalerite), some magnetite, common pyrrhotite as blebs and arranged as thin bands parallel to banding.
2-2	0.14	0.05	Grey-green pale tremolite-actinolite, medium well banded in 10mm bands with strong intercrystalline pyrite-pyrrhotite and earthy brown haematite (after sphalerite?)
2-3	0.05	0.02	Very decayed, earthy black-brown sphalerite-magnetite.
2-4	0.04	0.51	Dark green, heavy massive sulphide - pyrrhotite-sphalerite-chalcopyrite-magnetite (as deep purple splotches) banded with chlorite.
2-5	0.00	0.44	Dark green tremolite-actinolite-chlorite-magnetite
2-6	0.02	1.48	Massive magnetite-tremolite/actinolite with disseminated pyrrhotite and occasional (?) sphalerite.
2-7	0.07	0.12	Generally as above, magnetite-sphalerite, chalcopyrite-pyrrhotite and acicular crystals of tremolite-actinolite (2 specimens, a and b).
2-8	0.01	0.86	Fairly massive, dark to medium green grey tremolite-actinolite with minimal sulphides.
2-9	0.00	0.87	Banded magnetite with occasional silvery needle sulphide, common actinolite-tremolite clusters.
2-10	0.00	0.69	Magnetite-pyrrhotite well banded with tremolite-actinolite.

LUCY SAMPLE LINE #3 All samples over 1 metre, start south.

SAMPLE #	DESCRIPTION		
	Cu%	Zn%	
3-1	0.02	0.03	Dark to medium grey well banded cherty tuff, shot through with fine grey sulphide.
3-2	0.07	0.02	Dark green tremolite-actinolite well interbanded with sphalerite and chalcopyrite.
3-3	0.02	0.64	Dark to medium green grey tremolite actinolite with intercrystalline pyrrhotite and occasional sphalerite, chalcopyrite and possible bornite (?).
3-4	0.01	0.53	Magnetite-tremolite-actinolite with earthy blebs of haematite and limonite, possibly after sphalerite.
3-5	0.00	0.34	Black to red, earthy, friable, very decayed magnetite-sphalerite gossan, common actinolite-tremolite, some leached vugs with crystalline lining.
3-6	0.02	0.21	Essentially as above to massive magnetite.
3-7	0.01	0.60	Dark green interlocking acicular crystal aggregates of tremolite-actinolite, well banded with intercrystalline bands of limonite after sphalerite.
3-8	0.00	0.48	Very well banded, essentially as above, tremolite actinolite with local intercrystalline discrete crystals of limonite after sphalerite (?).
3-9	0.01	2.04	Chlorite-tremolite-actinolite with scattered pyrrhotite as discrete bands and intercrystalline sphalerite.
3-10	0.04	0.34	Chlorite-tremolite-actinolite with strong epidote overprint, bedded with massive sulphides - pyrite-pyrrhotite.
3-11	0.00	0.04	Cherty chloritic banded pale grey green tuff.
3-12	0.01	0.08	Essentially as above, very well banded.

LUCY SAMPLE LINE #4 All samples over 1 metre, start south.

SAMPLE		DESCRIPTION	
#			
	Cu%	Zn%	
4-1	0.01	1.29	Well banded pale khaki to grey green epidote rich rock with bands of sulphide; sphalerite-(?)galena-pyrrhotite.
4-2	0.02	4.89	Earthy brown-black magnetite well banded, rotten, friable, gossanous with interbedded actinolite-tremolite and sphalerite-magnetite, somewhat epidotitic.
4-3	0.00	5.34	Massive sulphide, honey sphalerite, purple magnetite.
4-4	0.00	1.92	Medium grained banded felsic tuff, epidotitic to cherty in part.
4-5	0.00	1.75	Banded magnetite-actinolite-tremolite, strongly epidotized in part, dark green to green-black with discrete bands of limonite-haematite after (?) sphalerite.

LUCY SAMPLE LINE #5 All samples over 1 metre, start south.

SAMPLE #	DESCRIPTION		
	Cu%	Zn%	
5-1	0.00	3.50	Banded magnetite with closely intermingled honey coloured sphalerite, tremolite, actinolite and either epidote or green pyroxene.
5-2	0.00	9.89	Banded, folded in part, magnetite-sphalerite rich tuff.
5-3	0.01	4.62	Essentially as above with lower magnetite and sulphide content.
5-4	0.00	4.99	Essentially as above very much richer in magnetite and occasional sphalerite, common bright yellow cadmium staining.
5-5	0.00	5.07	Generally as above, now very epidote rich in part, some rotten earthy and friable gossanous zones.
5-6	0.00	3.40	Tremolite-actinolite-magnetite with occasional disseminated limonite after sphalerite.
5-7	0.00	1.54	Tremolite-actinolite-magnetite as above, with occasional limonite after sphalerite and very common yellow cadmium staining.

LUCY SAMPLE LINE #6 All samples over 1 metre, start south.

SAMPLE #	DESCRIPTION		
	Cu%	Zn%	
6-1	0.01	0.11	Tremolite-actinolite, very iron stained, splotchy purple magnetite and disseminated limonitic sphalerite throughout.
6-2	0.02	4.70	Tremolite-actinolite-chlorite-magnetite with banded limonite after sphalerite blebs in part.
6-3	0.02	1.37	Generally as above, strongly magnetitic.
6-4	0.00	0.06	Essentially as above, marginally finer grained, very magnetitic.
6-5	0.03	0.15	Rotten, earthy, granulated, friable, gossanous material in medium green actinolite-tremolite, with discrete bands of limonite after sphalerite-galena.
6-6	0.00	0.16	Dark to medium green chlorite-tremolite-actinolite, well banded, epidotitic in part, with bands of sphalerite.
6-7	0.00	0.56	Massive sulphide, decayed, friable in part, sphalerite-magnetite-tremolite-actinolite all banded together.
6-8	0.00	0.41	Disseminated sphalerite-epidote-chlorite-haematite.

LUCY SAMPLE LINE #7 Grabs only

SAMPLE #			DESCRIPTION
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	Cu%	Zn%	
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7-1	0.01	3.58	Solid earthy sphalerite, occasionally epidotitic, abundant haematite, common yellow cadmium staining.
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7-2	0.00	0.46	Disseminated graphite(?) in tremolite-actinolite, common sphalerite(?).
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LINE	No	THICK -NESS cm	Zn %	Cu %	Pb %	Ag ppm	Au ppb	Mn %	Fe %	Ca %	Mg %	Ti %	Al %	Na %	K %	Ba ppm	W ppm	Sn ppm	Cd ppm	V ppm	Cr ppm	Fe/Mn	Ca/Mg	Ca/Ba	Fe/Al
1	2	100	0.14	2.28	0	96	60	0.38	19.90	6.39	5.07	0.09	2.76	0.20	0.29	207	0	22	13	4	33	0.52	1.26	0.31	7.21
1	3	100	0.02	0.15	10	4	0	0.17	37.07	2.90	2.69	0.02	0.65	0.06	0.05	10	75	5	4	64	19	2.22	1.08	2.90	57.03
1	4	100	0.03	0.06	8	1	0	0.21	31.94	2.92	1.97	0.04	1.23	0.12	0.22	120	12	8	3	56	23	1.54	1.48	0.24	25.97
1	5	100	0.07	0.03	7	1	0	0.49	21.87	7.28	4.22	0.04	1.71	0.12	0.08	25	0	16	5	111	19	0.45	1.73	2.91	12.79
1	6	100	0.04	0.06	17	1	0	0.47	23.61	6.56	3.29	0.09	2.13	0.14	0.19	57	0	18	3	88	34	0.51	1.99	1.15	11.08
1	7	100	0.11	0.01	29	1	0	0.46	24.33	7.22	6.81	0.03	0.65	0.09	0.06	39	0	10	6	52	21	0.53	1.06	1.85	37.43
1	8	100	2.02	0.06	30	1	0	0.15	24.65	5.15	6.94	0.02	0.41	0.07	0.03	5	0	4	140	39	27	1.61	0.74	10.30	60.12
1	9	100	0.66	0.06	24	0	0	0.11	34.30	2.95	3.97	0.02	0.48	0.07	0.06	30	0	5	44	31	15	3.08	0.74	0.98	71.46
1	10	100	0.05	0.03	17	0	0	0.10	31.68	3.69	5.20	0.02	0.41	0.07	0.05	18	0	5	3	40	16	3.15	0.71	2.05	77.27
1	11	100	0.09	0.02	8	0	0	0.46	25.18	5.65	3.94	0.03	0.54	0.05	0.04	17	0	21	4	29	17	0.55	1.43	3.32	46.63
1	12	100	0.65	0.03	21	0	0	0.33	30.50	4.61	2.28	0.04	1.01	0.11	0.18	64	0	8	47	43	18	0.94	2.02	0.72	30.20
1	13	100	0.09	0.04	20	0	0	0.34	30.39	4.44	2.03	0.07	1.46	0.14	0.26	40	4	9	16	47	17	0.88	2.19	1.11	20.82
1	14	100	0.09	0.03	7	0	0	0.32	33.26	3.66	1.94	0.06	1.22	0.08	0.10	143	30	17	6	44	15	1.04	1.89	0.26	27.26
1	15	100	1.07	0.01	14	1	0	0.18	10.87	4.76	2.34	0.25	7.50	1.32	1.33	217	0	0	72	162	59	0.60	2.03	0.22	1.45
1	16	100	0.06	0.02	14	1	0	0.09	8.83	2.96	2.54	0.29	8.28	1.89	3.30	6911	0	0	2	167	38	0.96	1.17	0.00	1.07
2	1	100	0.05	0.11	6	5	0	0.27	14.35	3.88	3.78	0.24	5.69	0.83	1.76	37	0	5	3	237	73	0.54	1.03	1.05	2.52
2	2	100	0.05	0.14	5	14	0	0.29	22.19	5.36	4.64	0.12	2.43	0.23	0.32	250	118	7	4	147	45	0.77	1.16	0.21	9.13
2	3	100	0.02	0.05	16	1	0	0.15	41.64	2.37	1.95	0.02	0.56	0.07	0.13	99	104	4	3	43	13	2.82	1.22	0.24	74.36
2	4	100	0.51	0.04	6	1	0	0.42	24.71	7.28	3.38	0.04	1.35	0.12	0.15	58	0	10	30	35	21	0.59	2.15	1.26	18.30
2	5	100	0.44	0.00	15	0	0	0.51	24.56	8.00	4.31	0.02	0.46	0.06	0.05	75	0	14	23	27	25	0.48	1.86	1.07	53.39
2	6	100	1.48	0.02	17	1	0	0.42	23.56	6.16	4.61	0.02	0.50	0.06	0.03	24	0	11	106	32	31	0.55	1.34	2.57	47.12
2	7	100	0.12	0.07	15	1	0	0.16	29.67	4.02	4.96	0.02	0.64	0.10	0.04	14	0	8	9	42	19	1.81	0.81	2.87	46.36
2	8	100	0.85	0.01	0	0	0	0.56	21.74	7.78	3.94	0.05	1.04	0.07	0.05	14	0	19	48	52	23	0.39	1.98	5.55	20.90
2	9	100	0.87	0.00	11	0	0	0.64	16.66	10.94	4.56	0.03	0.97	0.11	0.10	94	0	12	48	42	20	0.26	2.40	1.16	17.18
2	10	100	0.69	0.00	0	0	0	0.76	19.71	9.69	3.82	0.06	2.03	0.21	0.31	332	0	16	42	37	17	0.26	2.54	0.29	9.71
3	1	100	0.03	0.02	10	1	0	0.17	16.81	3.11	1.85	0.29	6.34	0.38	2.34	58	0	5	1	174	95	1.01	1.68	0.54	2.65
3	2	100	0.02	0.07	25	1	0	0.17	27.13	3.97	4.15	0.05	1.05	0.12	0.15	50	45	4	4	41	29	1.61	0.96	0.79	25.84
3	3	100	0.64	0.02	0	0	0	0.51	21.93	7.12	3.34	0.04	1.71	0.11	0.12	84	0	13	40	30	22	0.43	2.13	0.85	12.82
3	4	100	0.54	0.01	12	1	0	0.62	19.22	8.12	4.06	0.02	0.81	0.09	0.06	97	0	19	27	26	16	0.31	2.00	0.84	23.73
3	5	100	0.34	0.00	0	0	0	0.52	20.96	8.76	5.13	0.03	0.48	0.05	0.04	46	0	13	19	28	19	0.40	1.71	1.90	43.67
3	6	100	0.21	0.02	0	0	0	0.24	32.27	4.62	4.96	0.03	0.40	0.05	0.04	29	0	4	12	33	21	1.33	0.93	1.59	80.68
3	7	100	0.60	0.01	12	0	0	0.48	17.76	7.50	6.65	0.04	0.92	0.13	0.09	76	0	5	36	33	23	0.37	1.13	0.99	19.30
3	8	100	0.48	0.00	5	1	0	0.78	18.34	8.54	4.32	0.03	1.28	0.11	0.10	278	0	14	28	46	17	0.24	1.98	0.31	14.33
3	9	100	2.04	0.01	8	1	0	0.65	20.85	7.64	3.08	0.07	2.80	0.20	0.27	226	10	13	179	45	38	0.32	2.48	0.34	7.45
3	10	100	0.34	0.04	13	1	0	0.36	17.26	5.28	2.82	0.10	2.99	0.36	0.40	20	0	7	23	62	37	0.48	1.87	2.64	5.77
3	11	100	0.04	0.00	11	0	0	0.06	2.92	2.16	2.30	0.27	7.77	1.89	2.69	5959	0	2	1	154	47	0.47	0.94	0.00	0.38
3	12	100	0.08	0.01	25	1	0	0.07	3.37	2.32	2.28	0.27	7.79	2.63	1.99	3724	0	0	3	142	37	0.47	1.02	0.01	0.43
4	1	100	1.29	0.01	114	3	125	0.23	15.69	7.94	0.91	0.35	8.84	0.19	0.66	424	238	193	91	226	104	0.69	8.73	0.19	1.77
4	2	100	4.89	0.02	280	1	30	0.17	34.76	4.79	0.29	0.16	3.47	0.03	0.03	43	0	69	383	94	129	2.01	16.52	1.11	10.02
4	3	100	5.34	0.00	647	3	49	0.70	33.14	6.02	0.88	0.02	0.59	0.06	0.02	102	38	27	373	43	84	0.47	6.84	0.59	56.17
4	4	100	1.92	0.00	12	1	0	1.06	22.71	11.05	1.09	0.06	1.97	0.07	0.04	103	20	43	139	86	65	0.21	10.14	1.07	11.53
4	5	100	1.75	0.00	9	0	0	1.11	15.91	11.34	3.28	0.07	0.58	0.06	0.03	119	0	19	84	23	45	0.14	3.46	0.95	27.43
5	1	100	3.50	0.00	9	0	55	0.80	17.57	10.14	2.05	0.07	2.18	0.19	0.41	117	33	31	237	51	95	0.22	4.96	0.87	8.06
5	2	100	9.89	0.00	16	0	30	1.48	20.73	8.97	0.57	0.02	0.71	0.08	0.08	36	189	36	816	14	45	0.14	15.74	2.49	29.20
5	3	100	4.62	0.01	40	1	25	1.07	23.85	7.94	0.97	0.05	1.15	0.14	0.17	38	0	62	311	30	88	0.22	8.19	2.09	20.74
5	4	100	4.99	0.00	24	0	20	1.13	21.92	10.73	1.19	0.02	0.98	0.09	0.09	69	76	44	339	20	105	0.19	9.02	1.56	22.37
5	5	100	5.07	0.00	16	0	7	1.12	21.62	8.63	1.37	0.07	1.43	0.07	0.07	83	0	38	353	26	93	0.19	6.30	1.04	15.12
5	6	100	3.40	0.00	12	0	5	0.51	12.90	7.59	7.29	0.04	1.02	0.06	0.05	57	0	22	212	23	65	0.25	1.04	1.33	12.65
5	7	100	1.54	0.00	6	0	0	0.69	18.18	8.20	2.38	0.09	2.59	0.13	0.17	278	463	74	88	46	35	0.26	3.45	0.29	7.02
6	1	100	0.11	0.01	0	0	40	0.60	26.35	6.50	1.10	0.02	0.63	0.05	0.10	53	36	36	7	19	20	0.44	5.91	1.23	41.83
6	2	100	4.70	0.02	0	0	155	0.63	27.12	5.27	0.80	0.02	0.69	0.08	0.05	58	0	30	375	14	84	0.43	6.59	0.91	39.30
6	3	100	1.37	0.02	0	0	133	0.57	28.72	5.38	0.96	0.02	0.65	0.09	0.08	86	183	42	92	15	33	0.50	5.60	0.63	44.18
6	4	100	0.06	0.00	0	0	70	0.48	24.32	6.31	3.30	0.01	0.50	0.06	0.04	39	30	44	5	14	19	0.50	1.91	1.62	48.64
6	5	100	0.15	0.03	10	1	15	0.42	23.50	5.65	3.99	0.03	0.90	0.07	0.07	45	0	40	8	18	12	0.56	1.42	1.27	26.25
6	6	100	0.16	0.00	0	0	0	0.39	14.85	7.09	7.10	0.09	2.37	0.12	0.13	41	0	51	6	35	19	0.38	1.00	1.73	6.27
6	7	100	0.56	0.00	5	0	0	0.60	20.92	7.74	2.63	0.08	2.33	0.16	0.19	95	6	58	44	42	21	0.35	2.94	0.81	8.98
6	8	100	0.41	0.00	0	0	0	0.56	20.36	7.72	2.26	0.11	3.56	0.22	0.38	179	29	23	23	70	35				

To BIRCH MOUNTAIN MINERALS LTD.
3100 Bow Valley Square II
205 - 5th Avenue S.W.
Calgary, Alberta T2P 2V7
ATTN: Val Pratico



Certificate of Assay

Loring Laboratories Ltd.

629 Beaverdam Road, NE Calgary Alberta
Tel: (403)274-2777 Fax: (403)275-0541

File No : 38577
Date : October 23, 1996
Samples : Rock
Project : Swift River
P.O.#

Sample No.

PPB
Au

"Geochemical Analysis"

Lucy Line #1 - 2	60
Lucy Line #1 - 3	<5
Lucy Line #1 - 4	<5
Lucy Line #1 - 5	<5
Lucy Line #1 - 6	<5
Lucy Line #1 - 7	<5
Lucy Line #1 - 8	<5
Lucy Line #1 - 9	<5
Lucy Line #1 - 10	<5
Lucy Line #1 - 11	<5
Lucy Line #1 - 12	<5
Lucy Line #1 - 13	<5
Lucy Line #1 - 14	<5
Lucy Line #1 - 15	<5
Lucy Line #1 - 16	<5
Lucy Line #2 - 1	<5
Lucy Line #2 - 2	<5
Lucy Line #2 - 3	<5
Lucy Line #2 - 4	<5
Lucy Line #2 - 5	<5
Lucy Line #2 - 6	<5
Lucy Line #2 - 7	<5
Lucy Line #2 - 8	<5
Lucy Line #2 - 9	<5
Lucy Line #2 - 10	<5
Lucy Line #3 - 1	<5
Lucy Line #3 - 2	<5
Lucy Line #3 - 3	<5
Lucy Line #3 - 4	<5
Lucy Line #3 - 5	<5

I HEREBY CERTIFY that the above results are those assays
made by me upon the herein described samples :


Assayer

Rejects and pulps are retained for one month unless specific arrangements are made in advance.

To BIRCH MOUNTAIN MINERALS LTD.
3100 Bow Valley Square II
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Certificate of Assay

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629 Beaverdam Road, NE Calgary Alberta
Tel: (403)274-2777 Fax: (403)275-0541

File No : 38577
Date : October 23, 1996
Samples : Rock
Project : Swift River
P.O.#

Sample No.	PPB Au
Lucy Line # 3 - 6	<5
Lucy Line # 3 - 7	<5
Lucy Line # 3 - 8	<5
Lucy Line # 3 - 9	<5
Lucy Line # 3 - 10	<5
Lucy Line # 3 - 11	<5
Lucy Line # 3 - 12	<5
Lucy Line # 4 - 1	125
Lucy Line # 4 - 2	30
Lucy Line # 4 - 3	49
Lucy Line # 4 - 4	<5
Lucy Line # 4 - 5	<5
Lucy Line # 5 - 1	55
Lucy Line # 5 - 2	30
Lucy Line # 5 - 3	25
Lucy Line # 5 - 4	20
Lucy Line # 5 - 5	7
Lucy Line # 5 - 6	5
Lucy Line # 5 - 7	<5
Lucy Line # 6 - 1	40
Lucy Line # 6 - 2	155
Lucy Line # 6 - 3	133
Lucy Line # 6 - 4	70
Lucy Line # 6 - 5	15
Lucy Line # 6 - 6	<5
Lucy Line # 6 - 7	<5
Lucy Line # 6 - 8	<5
Lucy Line # 7 - 1	63
Lucy Line # 7 - 2	20

I HEREBY CERTIFY that the above results are those assays
made by me upon the herein described samples :


Assayer

Rejects and pulps are retained for one month unless specific arrangements are made in advance.



Loring Laboratories Ltd.

629 Beverdam Road NE

Calgary Alberta T2C 1W7

Tel 274-2777 Fax 275-0541

TO: Birch Mountain Minerals Ltd
FILE # 38577

DATE: October 22, 1998

ELEMENT	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Cs	P	La	Cr	Mg	Ba	Ti	Al	Na	K	W	Zr	Sn	Y	Nb	Be	Sc
SAMPLES	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
L1-2	<2	22798	<5	1413	86.1	33	121	3791	19.90	32	<10	<4	3	14	13.3	<5	<5	105	6.39	0.053	2	33	5.07	207	0.09	2.78	0.20	0.29	<4	14	22	14	<2	<1	7
L1-3	5	1487	10	192	4.2	15	105	1669	37.07	7	18	<4	2	5	3.5	<5	5	84	2.90	0.035	<2	19	2.69	10	0.02	0.65	0.06	0.05	75	2	5	10	<2	<1	2
L1-4	4	837	8	298	0.5	10	9	2077	31.84	<5	<10	<4	8	21	2.5	<5	<5	58	2.92	0.032	3	23	1.97	120	0.04	1.23	0.12	0.22	12	7	8	6	<2	<1	3
L1-5	<2	338	7	740	0.8	22	57	4913	21.87	8	<10	<4	2	59	5	<5	8	111	7.28	0.088	<2	19	4.22	25	0.04	1.71	0.12	0.08	<4	8	18	8	<2	<1	3
L1-6	<2	554	17	391	1.4	19	218	4873	23.81	198	<10	<4	2	84	2.8	8	7	88	6.56	0.047	<2	34	3.29	57	0.09	2.13	0.14	0.19	<4	10	18	11	<2	2	8
L1-7	8	130	28	1147	0.0	18	15	4630	24.33	<5	<10	<4	2	8	5.5	8	12	52	7.22	0.039	<2	21	8.81	39	0.03	0.65	0.08	0.06	<4	5	10	7	<2	2	2
L1-8	<2	620	30	20159	1.1	11	18	1535	24.65	<5	21	<4	<2	4	139.8	<5	10	39	5.15	0.023	<2	27	6.94	5	0.02	0.41	0.07	0.03	<4	3	4	7	<2	<1	1
L1-9	<2	604	24	8573	<5	10	3	1115	34.30	<5	14	<4	<2	3	43.6	<5	<5	31	2.95	0.042	<2	15	3.87	30	0.02	0.48	0.07	0.08	<4	3	5	6	<2	3	<1
L1-10	<2	285	17	513	<5	9	<2	1007	31.88	<5	12	<4	2	3	3.2	<5	7	40	3.89	0.033	<2	18	5.20	18	0.02	0.41	0.07	0.05	<4	3	5	6	<2	<1	1
L1-11	<2	152	8	920	<5	13	5	4581	25.18	<5	<10	<4	3	4	3.8	<5	<5	29	5.85	0.034	<2	17	3.94	17	0.03	0.54	0.05	0.04	<4	4	21	3	<2	1	2
L1-12	<2	319	21	8505	<5	22	11	3253	30.50	<5	<10	<4	<2	8	48.8	<5	<5	43	4.61	0.033	<2	18	2.28	54	0.04	1.01	0.11	0.18	<4	5	8	4	<2	<1	2
L1-13	<2	379	20	899	<5	31	18	3443	30.39	<5	18	<4	<2	11	18	<5	<5	47	4.44	0.029	<2	17	2.03	40	0.07	1.46	0.14	0.28	<4	11	9	5	<2	<1	3
L1-14	<2	273	7	877	<5	12	<2	3189	33.29	14	<10	<4	2	20	5.8	15	<5	44	3.69	0.024	<2	15	1.94	143	0.08	1.22	0.08	0.10	30	7	17	5	<2	4	3
L1-15	<2	83	14	10739	1.0	12	8	1820	10.87	<5	<10	<4	3	310	72.2	9	<5	182	4.76	0.046	13	59	2.34	217	0.25	7.50	1.32	1.33	<4	17	<2	16	<2	<1	10
L1-16	<2	184	14	630	1.1	8	12	917	8.83	<5	<10	<4	4	280	2.2	<5	7	187	2.69	0.054	11	38	2.54	6911	0.29	8.28	1.89	3.30	<4	15	<2	17	<2	<1	20
L2-1	<2	1139	8	520	5.4	27	62	2658	14.35	<5	<10	<4	4	113	2.8	<5	<5	237	3.88	0.037	3	73	3.78	37	0.24	5.69	0.83	1.78	<4	16	5	16	<2	5	28
L2-2	9	1404	5	483	13.8	13	14	2889	22.19	12	19	<4	3	25	4.2	15	<5	147	5.35	0.057	8	45	4.64	250	0.12	2.43	0.23	0.32	116	12	7	21	<2	<1	8
L2-3	<2	588	10	236	0.7	13	<2	1478	41.54	<5	18	<4	3	4	2.9	<5	<5	43	2.37	0.027	<2	13	1.95	99	0.02	0.58	0.07	0.13	104	4	4	6	<2	<1	1
L2-4	<2	382	8	5123	0.8	22	15	4184	24.71	<5	<10	<4	2	27	29.8	<5	<5	35	7.28	0.054	<2	21	3.38	58	0.04	1.35	0.12	0.15	<4	6	10	8	<2	3	2
L2-5	<2	44	15	4436	<5	33	18	5082	24.56	<5	<10	<4	<2	7	22.8	6	<5	27	8.03	0.049	<2	25	4.31	75	0.02	0.48	0.08	0.05	<4	3	14	5	<2	3	<1
L2-6	<2	172	17	14796	0.7	13	17	4249	23.56	<5	<10	<4	<2	5	105.0	<5	<5	32	8.18	0.025	<2	31	4.81	24	0.02	0.50	0.08	0.03	<4	3	11	7	<2	3	<1
L2-7	4	701	15	1230	0.8	7	4	1838	29.67	<5	14	<4	3	3	8.5	<5	<5	42	4.02	0.029	<2	19	4.98	14	0.02	0.64	0.10	0.04	<4	3	8	7	<2	<1	1
L2-8	<2	103	<5	8507	<5	7	9	5837	21.89	<5	<10	<4	<2	75	47.4	<5	<5	52	7.74	0.017	<2	24	3.82	14	0.05	1.04	0.07	0.05	<4	6	19	6	<2	<1	4
REL 2-8	<2	100	<5	8574	<5	8	9	5651	21.78	<5	<10	<4	2	75	48.9	<5	<5	52	7.81	0.017	<2	22	3.95	14	0.05	1.04	0.07	0.04	<4	6	20	6	<2	<1	4
L2-9	<2	21	11	8870	<5	11	15	8413	19.95	<5	<10	<4	2	28	48.3	<5	<5	42	10.84	0.042	<2	20	4.59	94	0.03	0.97	0.11	0.10	<4	4	12	5	<2	5	2
L2-10	<2	17	<5	6915	<5	13	14	7598	19.71	<5	<10	<4	<2	61	41.6	<5	<5	37	9.69	0.033	<2	17	3.82	332	0.06	2.03	0.21	0.31	<4	10	16	7	<2	2	3
L3-1	9	171	10	254	1.1	19	24	1658	18.81	<5	<10	<4	3	144	1.4	<5	8	174	3.11	0.043	6	95	1.85	58	0.29	6.34	0.39	2.34	<4	21	5	16	<2	5	18
L3-2	5	730	25	237	1.2	18	37	1689	27.13	<5	<10	<4	2	13	3.8	10	<5	41	3.97	0.033	<2	28	4.15	50	0.05	1.05	0.12	0.15	45	7	4	7	<2	3	3
L3-3	<2	243	<5	8358	<5	22	28	5090	21.93	<5	<10	<4	<2	80	40	<5	<5	30	7.12	0.051	<2	22	3.34	84	0.04	1.71	0.11	0.12	<4	9	13	7	<2	<1	3
L3-4	<2	112	12	5380	1.2	15	18	6218	19.22	<5	<10	<4	<2	11	27.1	11	<5	28	8.12	0.054	<2	16	4.08	97	0.02	0.81	0.09	0.06	<4	4	19	6	<2	4	1
L3-5	<2	41	<5	3580	<5	34	14	6220	20.98	<5	<10	<4	2	8	10.1	5	<5	28	8.78	0.041	<2	19	5.13	48	0.03	0.48	0.03	0.04	<4	5	13	6	<2	<1	2



Loring Laboratories Ltd.

620 Burnside Road NE,
Calgary Alberta T2K 4W7
Tel. 274-2777 Fax 274-0541

TO: Birch Mountain Minerals Ltd
FILE #38577

DATE: October 22, 1995

ELEMENT	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	Al	Na	K	W	Zr	Sn	Y	Nb	Be	Se	
SAMPLES	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
L-3-5	2	234	< 5	2117	< 5	8	< 2	2421	32.27	< 5	< 10	< 4	< 2	4	12	< 5	< 5	33	4.62	0.038	< 2	21	4.98	29	0.03	0.40	0.05	0.04	< 4	< 2	4	9	< 2	< 1	1	
L-3-7	< 2	65	12	5955	< 5	19	13	4780	17.79	5	< 10	< 4	< 2	10	35.5	9	< 5	32	7.50	0.078	< 2	23	6.65	78	0.04	0.92	0.13	0.09	< 4	3	5	11	< 2	4	2	
L-3-8	< 2	26	5	4840	0.5	15	22	7792	18.34	< 5	< 10	< 4	< 2	44	27.8	< 5	< 5	46	8.54	0.051	< 2	17	4.32	278	0.03	1.28	0.11	0.10	< 4	4	14	8	< 2	4	3	
L-3-9	< 2	100	8	20385	0.9	25	36	8478	20.85	< 5	< 10	< 4	< 2	63	178.7	10	< 5	45	7.84	0.041	< 2	38	3.08	226	0.07	2.80	0.20	0.27	10	9	13	10	< 2	< 1	4	
STANDARD CT2	20	59	34	163	7.1	78	32	1169	4.73	24	22	7	45	248	18.7	17	18	139	1.18	0.107	48	125	1.32	847	0.38	7.30	1.60	1.84	19	43	17	15	8	2	14	
L-3-10	< 2	378	13	3405	0.9	18	28	3582	17.28	< 5	< 10	< 4	< 2	77	23.4	7	< 5	62	5.28	0.031	3	37	2.82	20	0.10	2.99	0.36	0.40	< 4	12	7	9	< 2	4	7	
L-3-11	< 2	14	11	391	< 5	8	8	619	2.92	< 5	< 10	< 4	< 2	219	0.8	< 5	< 5	154	2.19	0.050	14	47	2.30	5959	0.27	7.77	1.89	2.69	< 4	23	2	18	< 2	< 1	19	
L-3-12	< 2	59	25	785	0.9	8	8	714	3.37	< 5	< 10	< 4	< 2	187	3.1	< 5	< 5	142	2.32	0.050	12	37	2.28	3724	0.27	7.79	2.63	1.89	< 4	17	< 2	15	< 2	< 1	18	
L-4-1	< 2	86	114	12893	3.4	11	260	2262	15.69	126	< 10	< 4	< 2	414	90.6	47	287	226	7.94	0.039	8	104	0.91	424	0.35	8.84	0.19	0.66	238	22	193	17	< 2	5	30	
L-4-2	< 2	159	280	48870	1.3	15	108	1730	34.78	165	14	< 4	< 2	202	363.3	8	12	84	4.79	0.029	5	129	0.29	43	0.18	3.47	0.03	0.03	< 4	13	69	14	< 2	6	10	
L-4-3	< 2	37	647	53364	2.5	15	88	7033	33.14	< 5	< 10	< 4	< 2	54	372.8	< 5	6	43	6.02	0.022	2	84	0.88	102	0.02	0.59	0.08	0.02	38	3	27	7	< 2	3	1	
L-4-4	< 2	18	12	18161	0.7	10	47	10919	22.71	< 5	< 10	< 4	< 2	210	139.2	< 5	9	86	11.05	0.046	6	65	1.09	103	0.08	1.97	0.07	0.04	20	4	43	13	< 2	4	4	
L-4-5	< 2	10	9	17549	< 5	14	40	11110	15.81	< 5	< 10	< 4	< 2	18	83.8	< 5	< 5	23	11.34	0.033	3	45	3.28	119	0.07	0.58	0.08	0.03	< 4	4	19	6	< 2	5	2	
L-5-1	8	34	8	35148	< 5	13	76	8072	17.70	< 5	< 10	< 4	< 2	45	238.5	< 5	20	51	10.24	0.027	3	93	2.08	114	0.07	2.20	0.20	0.41	28	5	31	12	< 2	3	4	
REL-5-1	8	33	10	34811	< 5	12	78	7924	17.44	< 5	< 10	< 4	< 2	44	235.8	< 5	17	51	10.04	0.027	3	97	2.03	120	0.07	2.18	0.19	0.40	38	5	30	11	< 2	5	4	
L-5-2	3	18	18	98853	< 5	18	199	14839	20.73	15	< 10	< 4	< 2	8	815.9	< 5	23	14	8.97	0.024	< 2	45	0.57	38	0.02	0.71	0.08	0.08	189	4	36	8	< 2	< 1	1	
L-5-3	2	55	40	48203	0.7	324	124	10718	23.85	< 5	22	< 4	< 2	24	311.2	< 5	18	30	7.94	0.033	3	88	0.97	38	0.05	1.15	0.14	0.17	< 4	9	82	8	< 2	4	3	
L-5-4	2	18	24	49904	< 5	10	128	11345	21.92	< 5	< 10	< 4	< 2	7	358.9	< 5	18	20	10.73	0.023	2	105	1.19	69	0.02	0.98	0.09	0.09	76	4	44	7	< 2	3	1	
L-5-5	< 2	19	18	50890	< 5	15	98	11214	21.82	< 5	< 10	< 4	< 2	80	353.2	< 5	7	29	8.63	0.022	5	93	1.37	83	0.07	1.43	0.07	0.07	< 4	9	38	7	< 2	3	3	
L-5-6	< 2	9	12	33998	< 5	4	58	5085	12.90	< 5	< 10	< 4	< 2	25	212.3	18	10	23	7.59	0.021	2	65	7.29	57	0.04	1.02	0.06	0.05	< 4	3	22	7	< 2	5	2	
L-5-7	< 2	10	8	18356	< 5	12	44	6891	16.18	< 5	< 10	< 4	< 2	58	87.8	< 5	8	48	8.20	0.023	6	36	2.38	278	0.09	2.50	0.13	0.17	463	9	74	9	< 2	4	7	
L-6-1	2	78	< 5	1128	< 5	19	90	8018	26.35	< 5	19	< 4	< 2	17	67	< 5	34	19	6.50	0.024	< 2	20	1.10	53	0.02	0.63	0.05	0.10	36	3	38	5	< 2	2	2	
L-6-2	< 2	155	< 5	47038	< 5	21	163	8309	27.12	< 5	< 10	< 4	< 2	7	374.8	< 5	9	14	5.27	0.025	< 2	84	0.80	58	0.02	0.69	0.08	0.05	< 4	5	30	6	< 2	1	1	
L-6-3	18	204	< 5	13700	< 5	14	120	5733	28.72	< 5	< 10	< 4	< 2	6	91.5	< 5	10	15	5.38	0.022	< 2	33	0.86	86	0.02	0.65	0.09	0.08	183	5	42	6	< 2	2	1	
L-6-4	2	33	< 5	587	< 5	12	73	4845	24.32	< 5	< 10	< 4	< 2	4	51	< 5	7	14	6.31	0.026	< 2	19	3.30	39	0.01	0.50	0.06	0.04	30	3	44	5	< 2	3	1	
L-6-5	3	258	11	1485	0.8	7	97	4328	24.09	83	11	< 4	< 2	11	7.9	11	5	18	5.78	0.023	3	13	4.07	48	0.03	0.91	0.07	0.07	< 4	4	41	7	< 2	3	2	
REL-6-5	3	248	8	1431	0.9	9	95	4395	22.90	75	< 10	< 4	< 2	10	8	< 5	9	18	5.51	0.021	2	11	3.80	43	0.02	0.88	0.06	0.08	< 4	4	40	7	< 2	3	2	
L-6-6	< 2	11	< 5	1819	< 5	11	43	3876	14.85	< 5	< 10	< 4	< 2	21	6	9	< 5	35	7.09	0.027	6	19	7.10	41	0.09	2.37	0.12	0.13	< 4	12	51	9	< 2	5	8	
L-6-7	< 2	33	5	5570	< 5	7	61	8034	20.92	< 5	< 10	< 4	< 2	58	44	< 5	< 5	42	7.74	0.025	5	21	2.83	95	0.08	2.33	0.19	0.19	9	8	58	11	< 2	1	5	
L-6-8	< 2	22	< 5	4142	< 5	11	41	5583	20.38	< 5	< 10	< 4	< 2	139	23.3	9	< 5	70	7.72	0.035	15	35	2.26	179	0.11	3.56	0.22	0.38	29	12	23	17	< 2	< 1	9	
L-7-1	3	52	13	35780	1.5	11	36	10558	14.01	5	< 10	< 4	< 2	17	288	< 5	13	59	17.83	0.025	3	179	0.43	121	0.09	3.08	0.02	0.37	< 4	6	7	31	< 2	8	5	



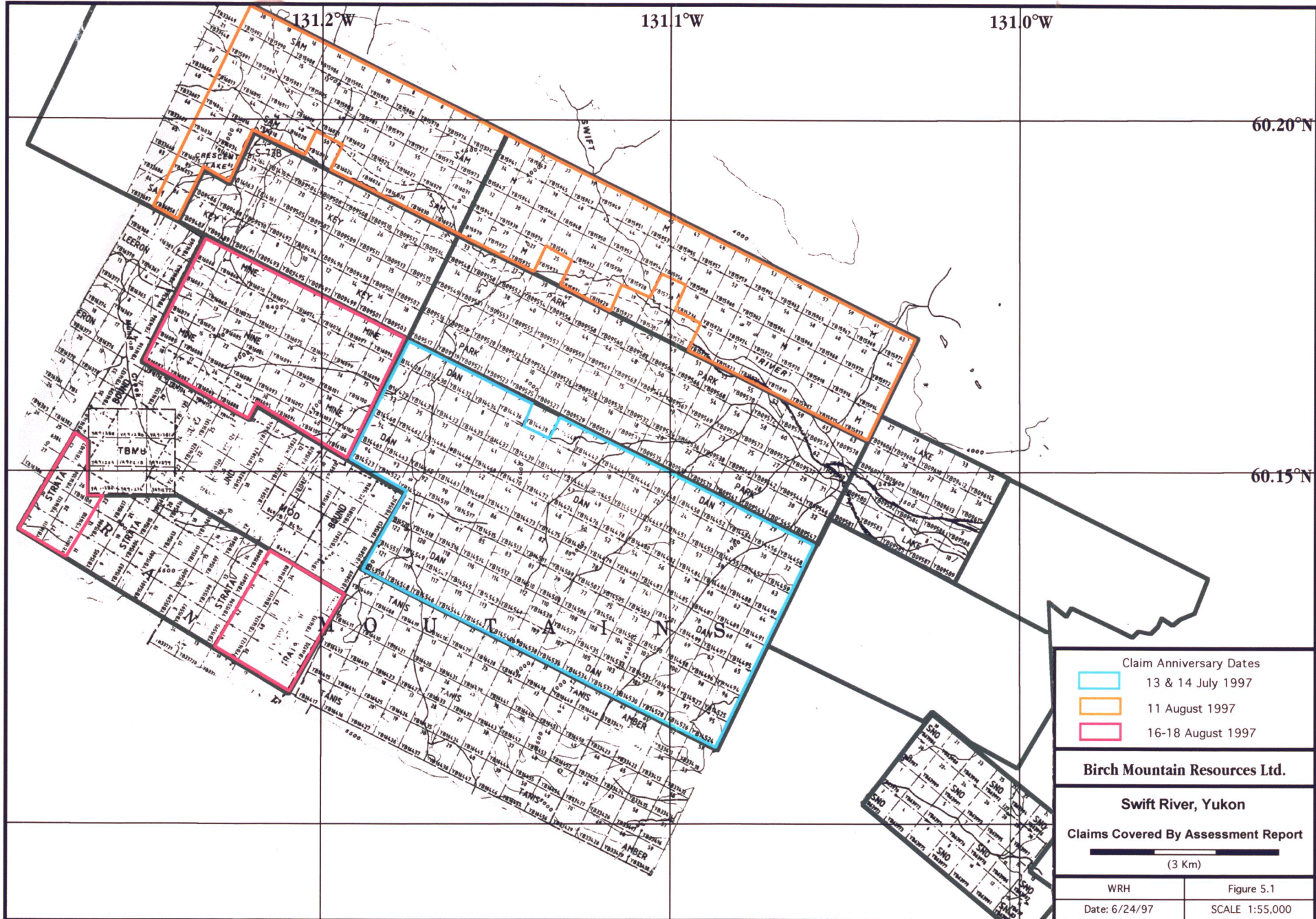
Loring Laboratories Ltd.

629 Beaverdam Road N.E.
Calgary Alberta T2N 4W7
Tel 274-2777 Fax 275-0541

TO: Birch Mountain Minerals Ltd
FILE #38577

DATE: October 22, 1996

ELEMENT	Mn	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	Al	Na	K	W	Zr	Sn	Y	Nb	Sr	Sc
SAMPLES	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
L7-2	<2	15	14	4647	0.8	11	19	5672	7.01	<5	<10	<4	2	453	25	9	<5	102	16.93	0.037	13	57	1.50	214	0.17	5.24	0.02	0.13	<4	17	10	23	<2	<1	10
STANDARD CT2	19	55	39	150	8.6	74	30	1124	4.31	24	15	5	39	230	17.3	19	18	128	1.11	0.102	41	112	1.19	752	0.32	6.73	1.51	1.68	17	42	19	14	7	1	14



COPY

**HORIZONTAL LOOP ELECTROMAGNETIC
AND MAGNETIC SURVEYS
SWIFT RIVER PROPERTY, YUKON TERRITORY**

Submitted to:
Birch Mountain Resources Ltd.
Calgary, Alberta

Submitted by:
Associated Mining Consultants Ltd.
Calgary, Alberta



093 886



File: 97PH04
April 14, 1997

BIRCH MOUNTAIN RESOURCES LTD.
3100, Bow Valley Square 2
205 - 5th Avenue S.W.
Calgary, Alberta
T2P 2V7

Attention: Val Pratico, P.Geol.

Dear Mr. Pratico

Associated Mining Consultants Ltd. (AMCL) is pleased to submit the following final report entitled:

*Horizontal Loop Electromagnetic and Magnetic Surveys
Swift River Property, Yukon Territory*

We would like to express our thanks to Birch Mountain Resources Ltd. for the opportunity to provide our services in relation to this project.

Yours truly
ASSOCIATED MINING CONSULTANTS LTD.

Mark Bowman, P.Geoph.
Senior Geophysicist

MB/mlh

TABLE OF CONTENTS

Letter of Transmittal

Table of Contents

1.0	INTRODUCTION	1
2.0	GEOLOGY (from MacRobbie, 1992)	2
3.0	SURVEY GRID DESCRIPTION	3
4.0	METHOD	4
4.1	Horizontal Loop Electromagnetics (HLEM)	4
4.2	Total Field Magnetism	5
5.0	RESULTS	6
6.0	CONCLUSIONS AND RECOMMENDATIONS	9
7.0	REFERENCES	10

1.0 INTRODUCTION

This report presents the results of a horizontal loop electromagnetic survey and total field magnetometer survey undertaken at the Birch Mountain Resources Ltd. (BMRL) Swift River Property located approximately 15 kilometres north of the Pine Lake airstrip, Yukon Territory. Performed between March 21 and 29, 1997, the objective of the geophysical surveys was to detect and map the location of mineralised zones and/or stratigraphic intervals for correlation with base metal exploration targets.

All work for this project was undertaken in accordance with Associated Mining Consultants Ltd.'s proposal dated January 28, 1997 (AMP 819).

2.0 GEOLOGY (from MacRobbie, 1992)

The regional geology is dominated by the northwest trending Cretaceous Cassiar Batholith comprised of quartz monzonite to granodiorite, with smaller batholiths and stocks of Cretaceous to Tertiary quartz monzonite, diorite and alaskite occurring to the west. Major regional faulting includes the northwest trending Cassiar Fault and Swift River Fault, the later separating Devonian-Mississippian black argillite from Cambrian-Ordovician carbonate, phyllite, minor schist and hornfels. The Devonian-Mississippian sequence is overlain by Mississippian to Permian (?) Carbonate, conglomerate, chert, phyllite, volcanic rocks, schist, quartzite and amphibolite of the Yukon Cataclastic Complex.

Within the property boundary, Devonian-Mississippian calcareous argillite is overlain by Mississippian to Permian (?) Medium to thinly bedded marble, massive stratabound to stratiform Fe-Ca-silicate skarn and finely laminated Ca-silicate hornfels/meta-tuff (?).

Mineralisation is predominantly Zn and Fe, with evidence of Pb, Cu, Au, Ag and W, Sn. Mineralised boulders are comprised of medium to coarse-grained banded skarn with thin to thick massive sphalerite, magnetite, pyrrhotite and pyrite bands within Fe-Ca-silicates. The mineralised boulders and subcrop exposure may indicate the occurrence of well mineralised skarn over widths of up to 5-20 metres, with skarn textures suggesting that several Zn(Fe) mineralised skarn horizons occur within a less mineralised sequence.

Within the survey grid perimeter, previous studies have concluded that stratigraphy dips steeply to the south.

3.0 SURVEY GRID DESCRIPTION

The survey grid, established by BMRL personnel, extended to the east and west of the existing Dan and Lucy showings. Where possible, existing cutlines were incorporated into the present survey grid. Survey lines were generally located on 200 metre centres, decreasing to 100 metres and 50 metres in close proximity to the Lucy showing.

Stations were flagged at 25 metre intervals along the north-south survey lines.

4.0 METHOD

Horizontal loop electromagnetic and total field magnetic surveys were conducted over known skarn mineralisation at the BMRL Swift River, Y.T. property in an attempt to delineate sulphide mineralisation and/or stratigraphy hosting the mineralisation. A brief review of the geophysical methods employed in this study are presented as follows:

4.1 Horizontal Loop Electromagnetics (HLEM)

The HLEM method induces eddy current flow in the subsurface by means of a time varying magnetic field imparted by a magnetic dipole transmitter. The eddy current flow, in turn, induces a secondary magnetic field which is sensed by a receiver dipole. The magnitude of the secondary field is largely dependent upon the electrical properties of the subsurface. Two perpendicular vector components of the secondary field (in-phase and quadrature components) are measured to determine the location and orientation of subsurface conductive features. As a rule of thumb, the in-phase/quadrature ratio is to some degree proportional to conductor quality, relating here to an qualitative indication of sulphide/silicate ratios.

HLEM instrumentation design enables both variable transmitter-receiver coil spacing and operating frequencies, resulting in expandable exploration depths in addition to promoting optimal transmitter-conductor coupling. The use of multiple operating frequencies may also result in higher resolution in complex conductive zones, aid interpretation within geologically noisy environments, and enable the determination of overburden resistivities.

Four HLEM survey data sets, at operating frequencies of 1760, 3520, 7060, and 14080 Hz were collected at 25 metre station intervals using the APEX MaxMin I portable EM system in the horizontal coplanar mode. A nominal transmitter-receiver coil separation of 100 metres was maintained over the survey grid. As conductor strength diminished to the west of the Lucy showing, the transmitter-receiver coil separation was expanded to 150 metres to increase exploration depth. Time constraints did not permit an increased coil separation to be implemented to the east of the Lucy showing, or peripheral to the Dan showing.

For steeply dipping, highly conductive dike-like conductive zones, effective exploration depths are in the order of 0.7 times the transmitter-receiver coil separation distance.

In total, 19.20 kilometres of HLEM survey data were collected during this program. HLEM data acquisition along the full southern extent of the survey lines was generally precluded by deep snow on steep slopes, and by dense vegetation cover on uncut lines.

4.2 Total Field Magnetism

Variations within the earth's magnetic field, as measured by portable magnetometers, indicate localised variations of anomalous ferrimagnetic mineralisation. The geomagnetic field is comprised of three main parts:

- I) The earth's magnetic field. The origin of this field is apparently a system of electrical currents originating in the earth's fluid conductive core. The resulting magnetic field resembles that of a large bar magnet.
- ii) The external magnetic field originating in the outer atmosphere. This includes the eleven year cycle of sunspot activity, solar diurnal variations due to the action of the sun on ionospheric currents, lunar diurnal variations due to moon-ionosphere variations, magnetic storms usually associated with the aurora, and localised electrical storms.
- iii) Local magnetic anomalies resulting from the magnetic content of relatively near-surface rocks.

The total magnetic field intensity, as measured in the present study with the GEM Systems Inc. GSM-19 magnetometer system, is a scalar measurement, or simply the magnitude of the earth's field vector independent of direction. Units of measurement of the geomagnetic field are generally nanoTeslas (nT), where 1 nT is in the order of 10^{-5} of the earth's main field. Resolution of the GSM-19 system is 0.01nT; accuracy is approximately 0.2 nT within the operating range.

Field measurements were acquired at 12.5 metre station intervals along the survey lines, employing a magnetometer console configured as a field magnetometer. The effects of diurnal variations in the earth's magnetic field were removed from the field data by means of a base station magnetometer. The base station magnetometer was configured to collect magnetic field data at five second intervals over the duration of each survey day at a stationary position in close proximity to the survey grid.

In total, 24.49 kilometres of total field magnetism survey data were acquired during this program.

5.0 RESULTS

HLEM survey data are presented as separate figures for each transmitter-receiver coil separation and frequency pairing (Figures 1 to 8). Prominent conductors have been identified and labelled in each figure. Strike is predominantly east-west relative to the survey grid coordinates. The amplitude of the anomalous responses is an indicator of the conductivity-thickness and/or depth of a subsurface conductor. In general, electromagnetic response to the occurring mineralisation at the Swift River property is weak, as is illustrated by the response directly over both the Lucy and Dan showings. A greater response may be expected from associated stratigraphy containing pyrrhotite.

Due to the effects of current gathering, the amplitude of those conductors defined by the higher frequencies of operation are generally greater than those mapped with the lower operating frequencies. The attenuating effects of conductive overburden notwithstanding, the higher frequency results generally have a greater potential of identifying subsurface conductors. Consideration of multiple frequencies enables the identification of shallow anomalies which may mask conductors at depth.

Variations in transmitter-receiver coil spacing, due predominantly to large topographical gradients and/or minor inaccuracies in surveyed station spacing, result in noise that is most apparent in the in-phase response. In data where this noise is apparent, the quadrature response generally yields a more reliable indicator of subsurface anomalies.

Total field magnetometer survey data are presented as line profiles (Figure 9) and as a coloured contour map (Figure 10) with background response (55,850 nT) removed. Stratigraphic horizons containing magnetite may yield a greater magnetic response than that of the two showings.

Conductor A-A' extends to the west and east of the Lucy showing, apparent from 200W to 800E in the 14080 Hz, 7040 Hz and 3520 Hz data sets. Strike length is somewhat reduced within the 1760 Hz data. Dip is estimated at 90° to 75° to the south relative to topography. Conductor width varies from less than 25 metres along Lines 400E and 200W to greater than 50 metres in the immediate vicinity of the Lucy showing.

The corresponding magnetic anomaly, the largest identified within the survey area, strikes parallel to the conductor approximately 25 to 50 metres to the south, possibly indicative of an adjacent magnetite-rich stratigraphic unit. Skarn mineralisation may occur between the HLEM conductor and the magnetic anomaly.

Conductor A-A' is discontinuous between Lines 0 and 100E, possibly a result of faulting.

In an attempt to extend the strike of Conductor **A-A'** to the west, transmitter-receiver coil spacing was increased from 100 metres to 150 metres along Lines 200W, 400W and 600W to increase the exploration depth. No evidence of Conductor **A-A'** continuing at depth is apparent within these data.

Conductor **B-B'** occurs 50 to 100 metres south of the trenched Dan showing, and is apparent within all four frequency data sets. Although the interference of an adjacent conductor may compromise dip angle evaluation, dip is estimated to be 90° to 75° to the south relative to topography. Conductor width is estimated at 25 metres or less.

A magnetic anomaly occurs coincident with Conductor **B-B'**, with the greatest magnitude occurring along Line 1200E.

Conductor **C-C'**, occurring parallel and south of Conductor **B-B'**, is most continuous within the 14080 Hz and 7040 Hz data sets may be an extension of Conductor **A-A'**. Anomalous magnetic response is coincident with the conductor. Dip appears to be approximately 75° to the south relative to topography.

A strong in-phase anomaly, Conductor **D-D'** extends from 100E to the eastern extent of the survey area. Estimated conductor width ranges from 25 metres or less up to 75 to 100 metres. Minimal corresponding quadrature response along portions of the conductor may be due, at least in part, to a reduced transmitter-receiver separation resulting from the high topographical gradients that occur in this region.

Little to no magnetic response is apparent in correlation with Conductor **D-D'**. This may suggest that the conductor is a graphite response and/or due to highly disseminated sulphides, as would be consistent with the nature of the quadrature response.

Other models that may satisfy this type response may include a conductor overlain by conductive overburden. Although vegetation occurring in this region is indigenous of sandy soils, proximity to the river may indicate that finer grained material (more conductive) may occur below the sands.

Conductor **D-D'** is coincident with a geologically mapped contact of argillites to the north and volcanics to the south.

Conductor **E-E'**, located north of, and parallel to, Conductor **A-A'** extends from 200W to 500E. Conductor width is estimated to be less than 25 metres. The conductor appears relatively strong within each of the four different frequency data sets. A parallel magnetic anomaly is offset 50 metres to 100 metres to the south between 200W and 200E, and coincident to the east of 200E. Dip of the conductor is estimated at 60° to the south.

Strike continuity of Conductor E-E' is interrupted between 0 and 100E, analogous to Conductor A-A'.

With lateral extent greatest within the 14080 Hz data set, Conductor F-F' extends from Line 200W to the western perimeter of the survey area. Estimated conductor dip, as observed along Line 600W, is 75° to the south. Maximum conductor width is estimated to be 75 metres. A parallel striking magnetic anomaly is offset 150 metres to 175 metres to the south.

In addition to those conductors described above, several other anomalous responses are identified (Figures 1 to 8), representing conductors of limited apparent extent and magnitude, and magnetic anomalies in areas where no HLEM data were collected.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The geophysical surveys performed on the BMRL Swift River, Y.T. property have identified a number of subsurface electrical conductors and magnetic anomalies. These may be used to prioritise locations for ground follow-up.

HLEM magnetic anomalous response is mostly attributed to pyrrhotite and magnetite, respectively, within stratigraphic boundaries. Mineralisation hosted by skarn horizons may occur between the mapped HLEM conductors and magnetic anomalies.

Magnetic anomalies mostly occur to the south (up-section) of mapped HLEM conductors. The magnitude of relative displacement may be attributed to the relationship between dip angle and topography. That is, displacement is generally less in areas of high topographical gradient along the southern portion of the grid as compared to relatively flat regions to the north.

Given the accepted geological model of this region, the induced polarisation (IP) method may provide results of greater detail than the HLEM technique. However, given the apparent success of the HLEM method of extending the known conductors laterally, the increased data acquisition costs associated with the IP survey method may not be warranted at this time.

It is recommended that further geophysical surveys include extension of existing data to the south in regions that were essentially inaccessible at the time of the present survey due to dense vegetation and/or excessive snow cover on steep topography. In addition, a reduction of survey line spacing to 100 metres or 50 metres in the region between the Lucy and Dan showings, and immediately east of the Dan showing, would better delineate continuity of conductor strike. To ensure complete HLEM survey coverage of the grid area, some line cutting may be required.

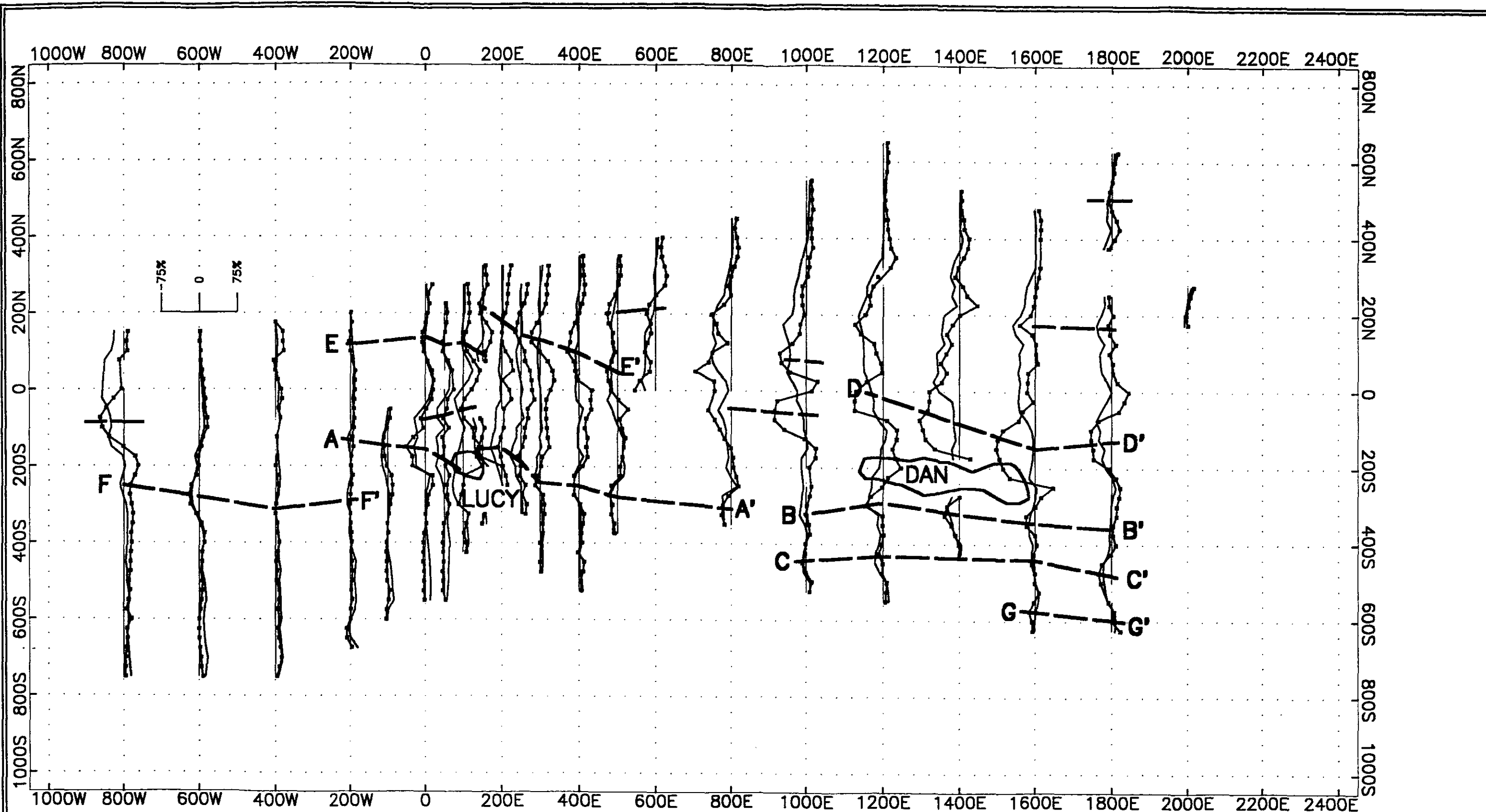
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1993. **Internal Report on HLEM and Magnetic Surveys at the Swift River Option, Yukon Territory.**

Ketola, M., Puranen, M.;

1967. **Type Curves for the Interpretation of Slingram (Horizontal Loop) Anomalies Over Tabular Bodies.** Geological Survey of Finland.

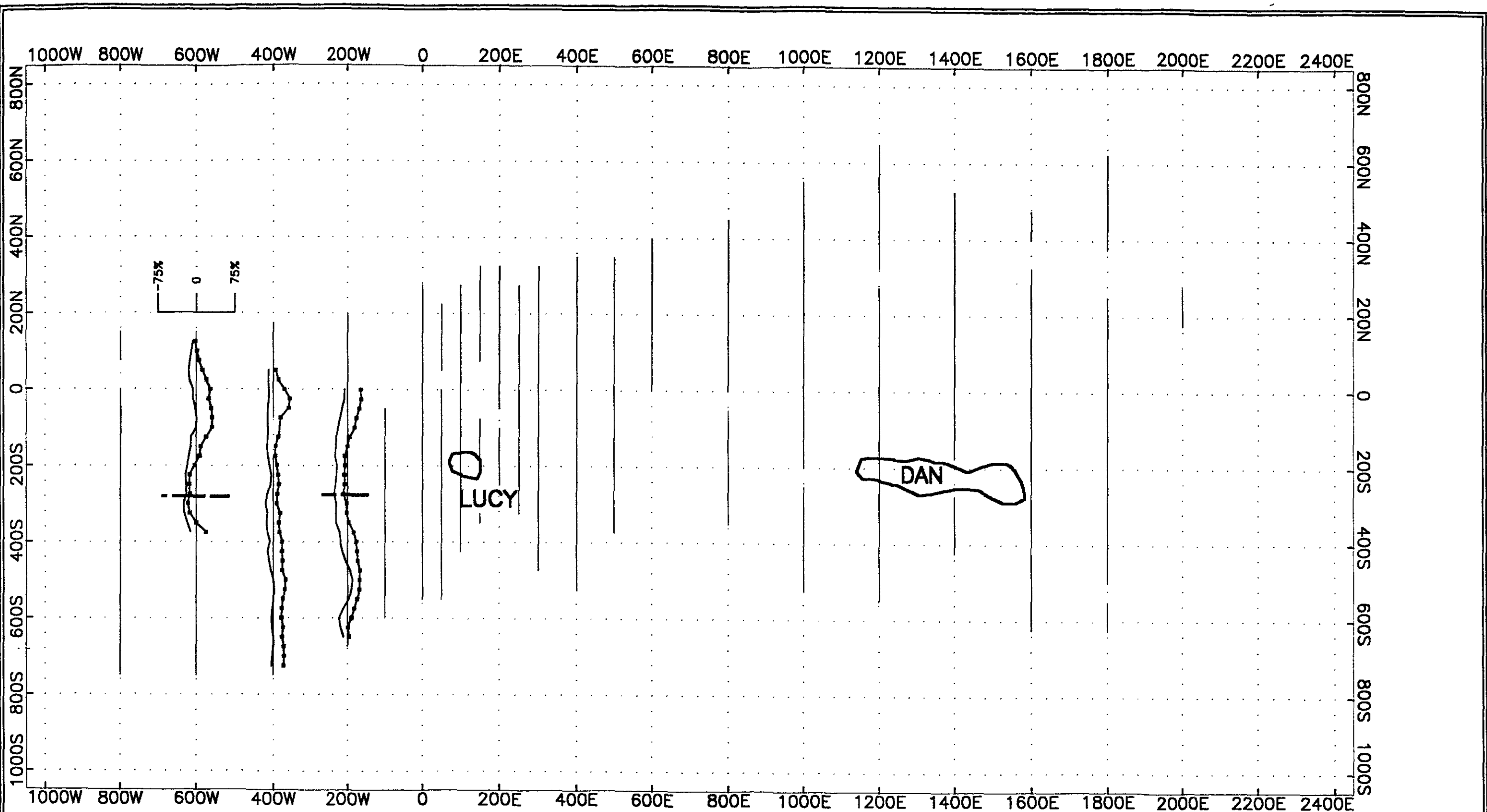


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SWIFT RIVER PROPERTY, YUKON TERRITORY

HORIZONTAL LOOP EM (MAX-MIN I)
 14080 Hz - 100 metre Transmitter/Receiver Separation
 Scale: 1:10,000
 April, 1997 - Figure 1

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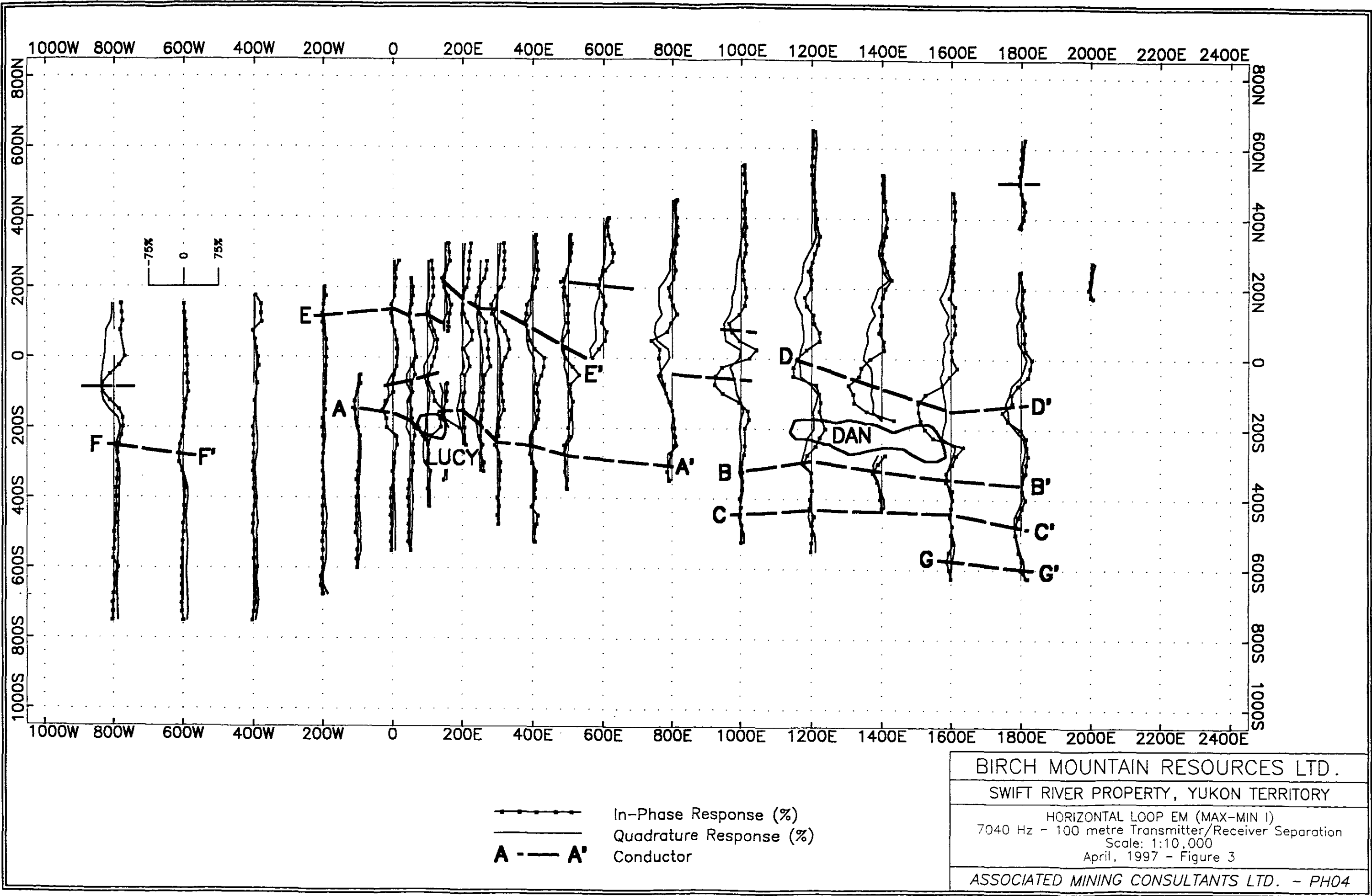
—•—•—•—•— In-Phase Response (%)
————— Quadrature Response (%)
A - - A' Conductor

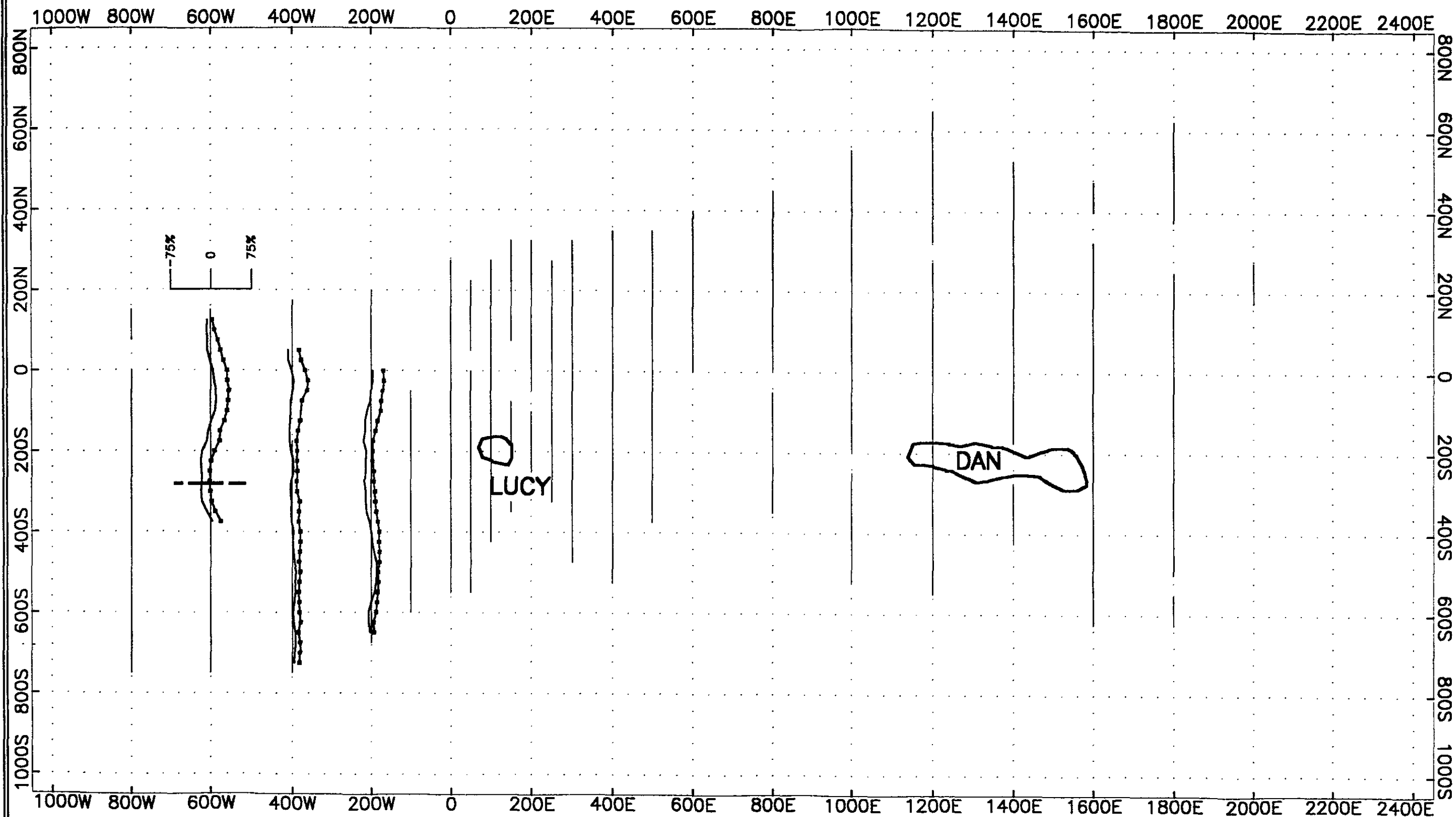
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SWIFT RIVER PROPERTY, YUKON TERRITORY

HORIZONTAL LOOP EM (MAX-MIN i)
14080 Hz - 150 metre Transmitter/Receiver Separation
Scale: 1:10,000
April, 1997 - Figure 2

ASSOCIATED MINING CONSULTANTS LTD. - PH04





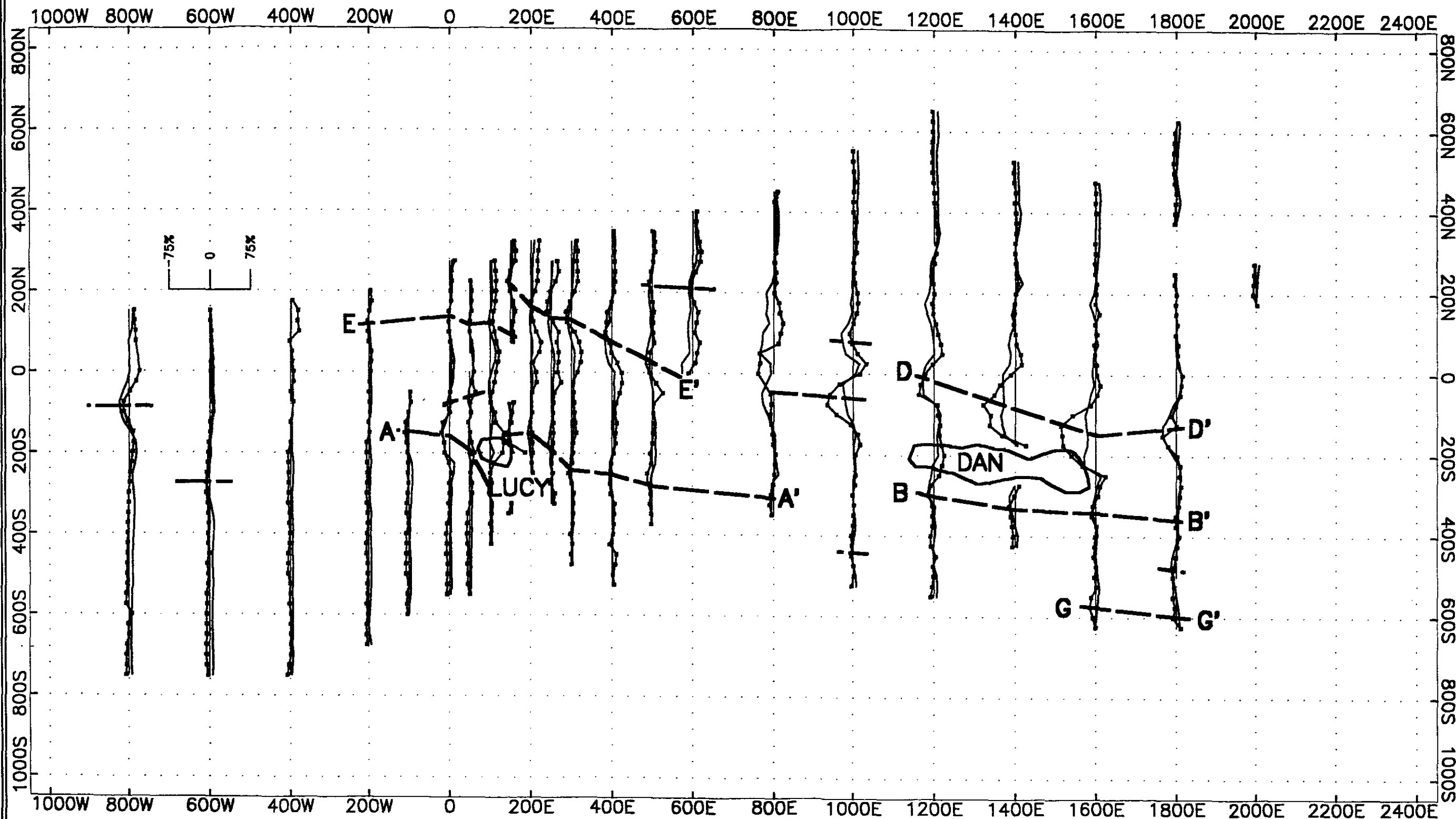
..... In-Phase Response (%)
 _____ Quadrature Response (%)
 A --- A' Conductor

BIRCH MOUNTAIN RESOURCES LTD.

SWIFT RIVER PROPERTY, YUKON TERRITORY

HORIZONTAL LOOP EM (MAX-MIN)
 7040 Hz - 150 metre Transmitter/Receiver Separation
 Scale: 1:10,000
 April, 1997 - Figure 4

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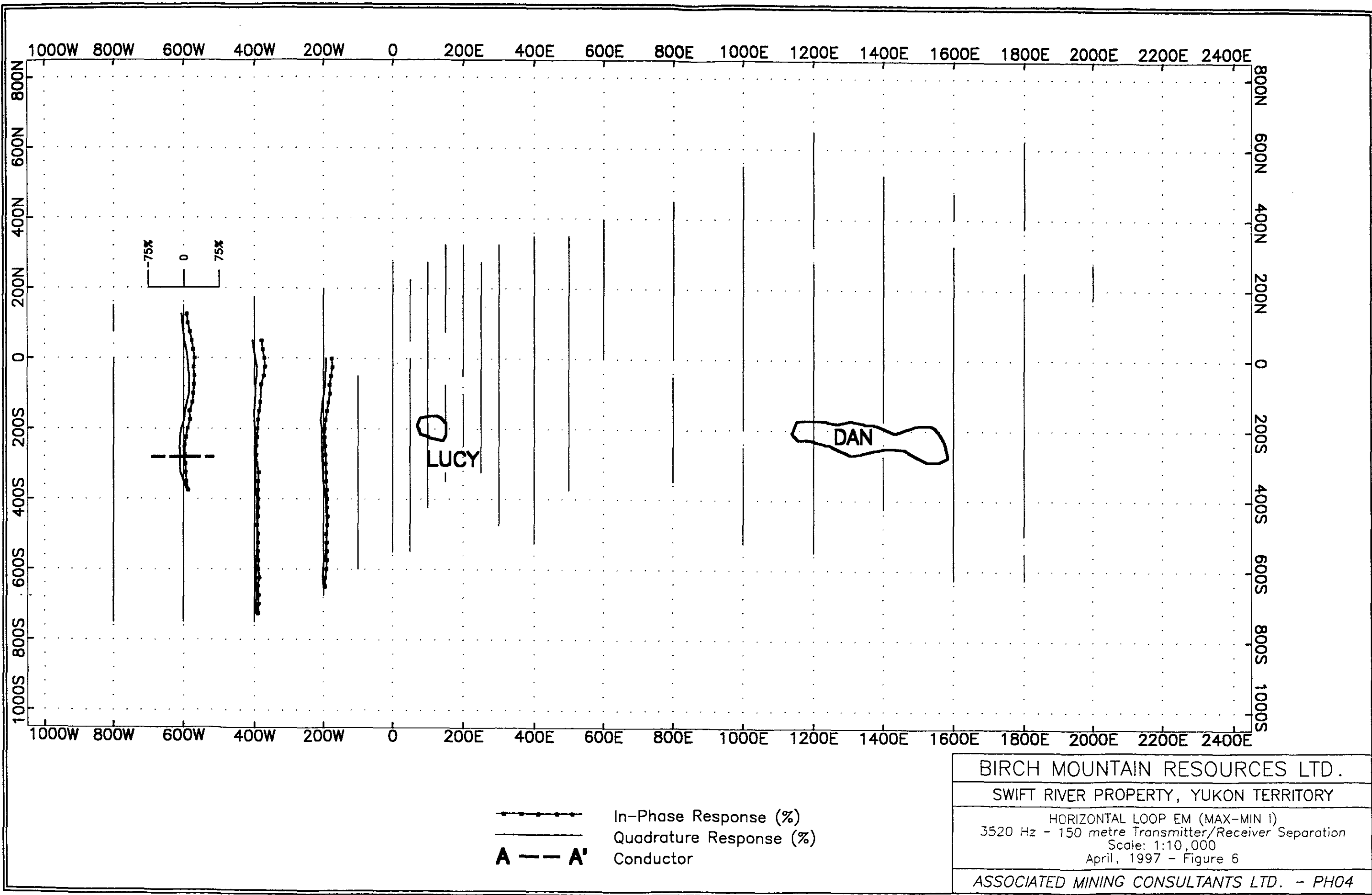
..... In-Phase Response (%)
 _____ Quadrature Response (%)
A — A' Conductor

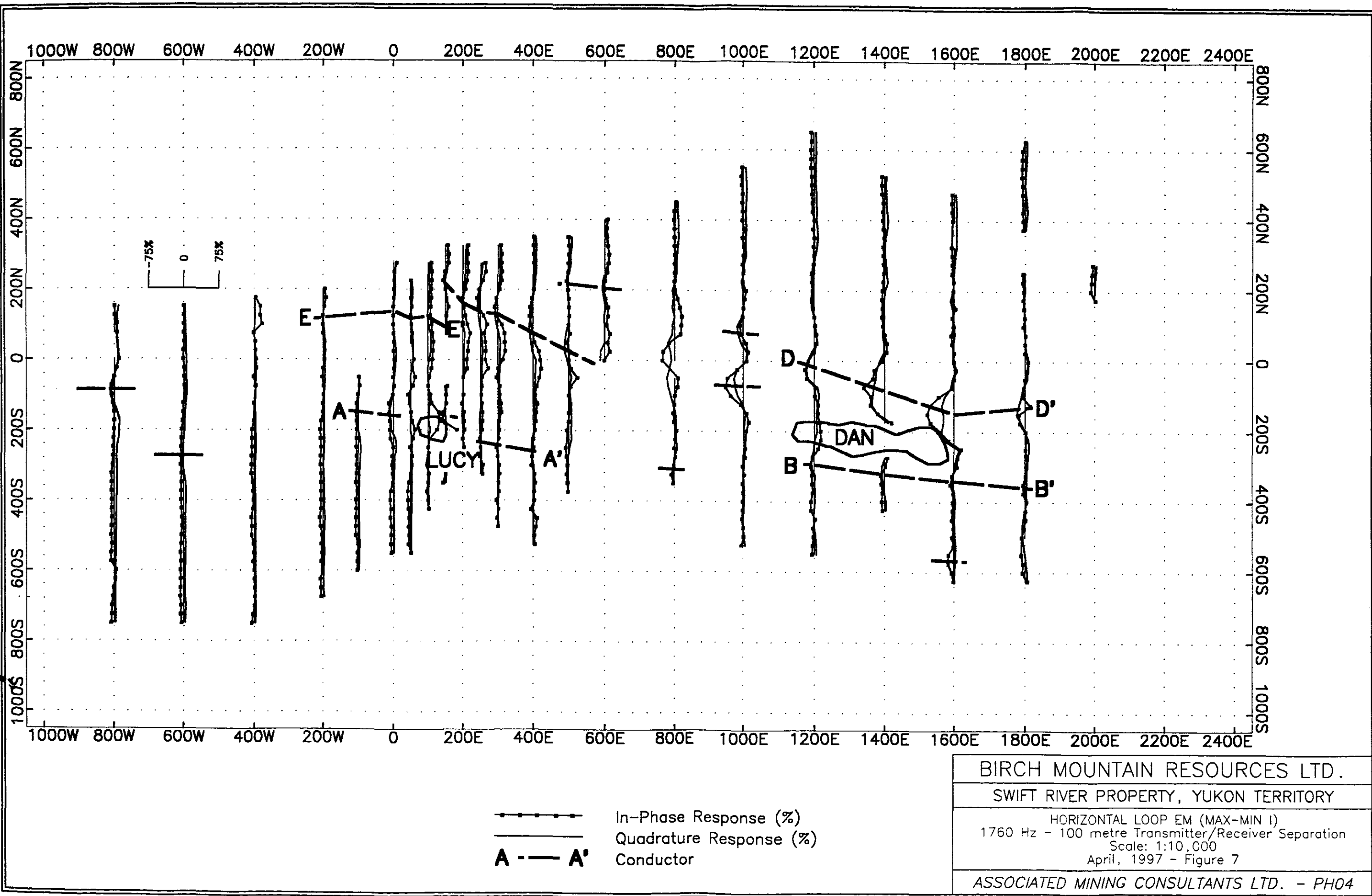
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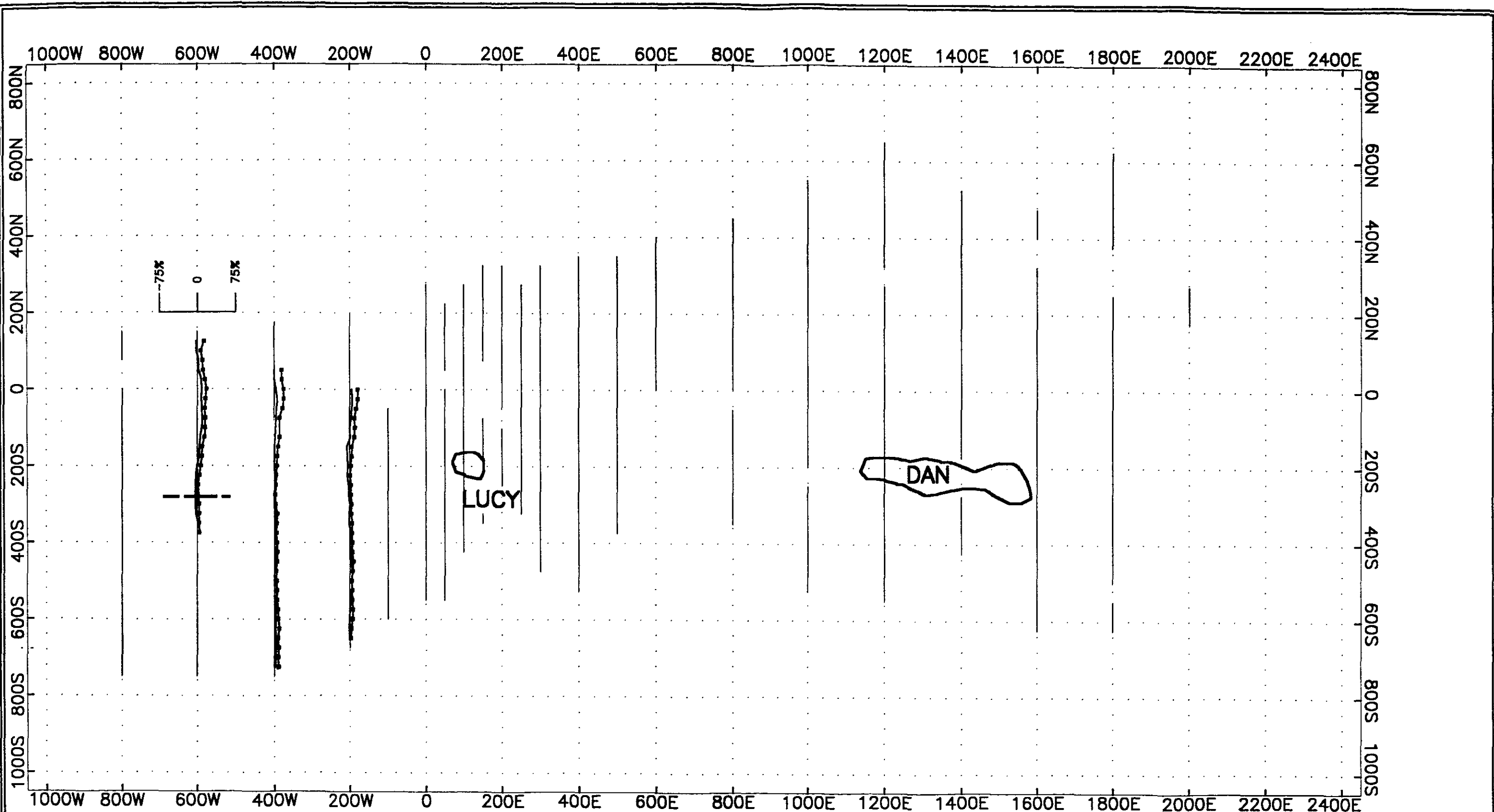
SWIFT RIVER PROPERTY, YUKON TERRITORY

HORIZONTAL LOOP EM (MAX-MIN I)
 3520 Hz - 100 metre Transmitter/Receiver Separation
 Scale: 1:10,000
 April, 1997 - Figure 5

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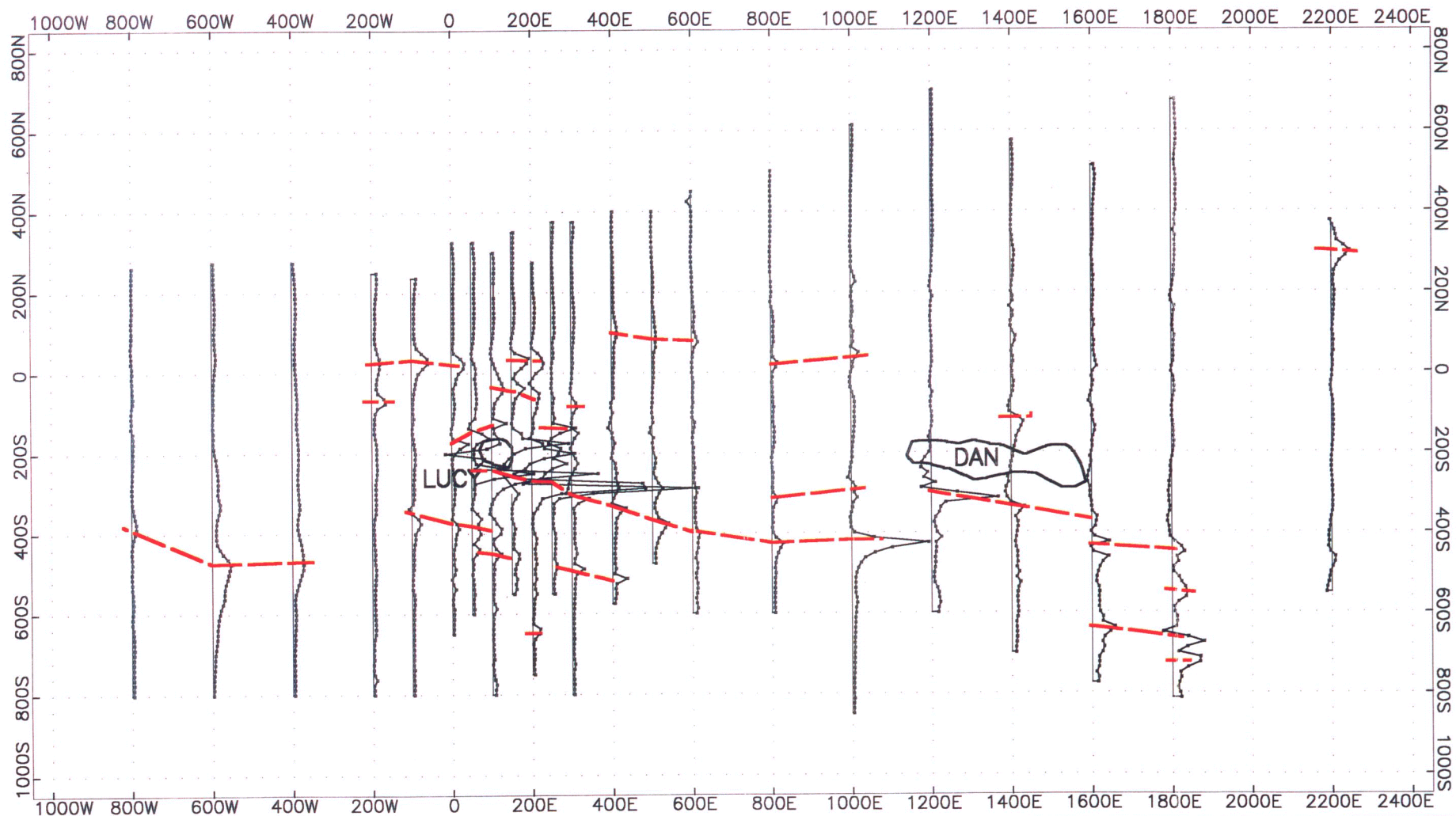
- - - - - In-Phase Response (%)
 - - - - - Quadrature Response (%)
A - - - A' Conductor

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SWIFT RIVER PROPERTY, YUKON TERRITORY

HORIZONTAL LOOP EM (MAX-MIN I)
 1760 Hz - 150 metre Transmitter/Receiver Separation
 Scale: 1:10,000
 April, 1997 - Figure 8

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--- Strike of Magnetic Anomaly

55,800 nT Subtracted from Field Data

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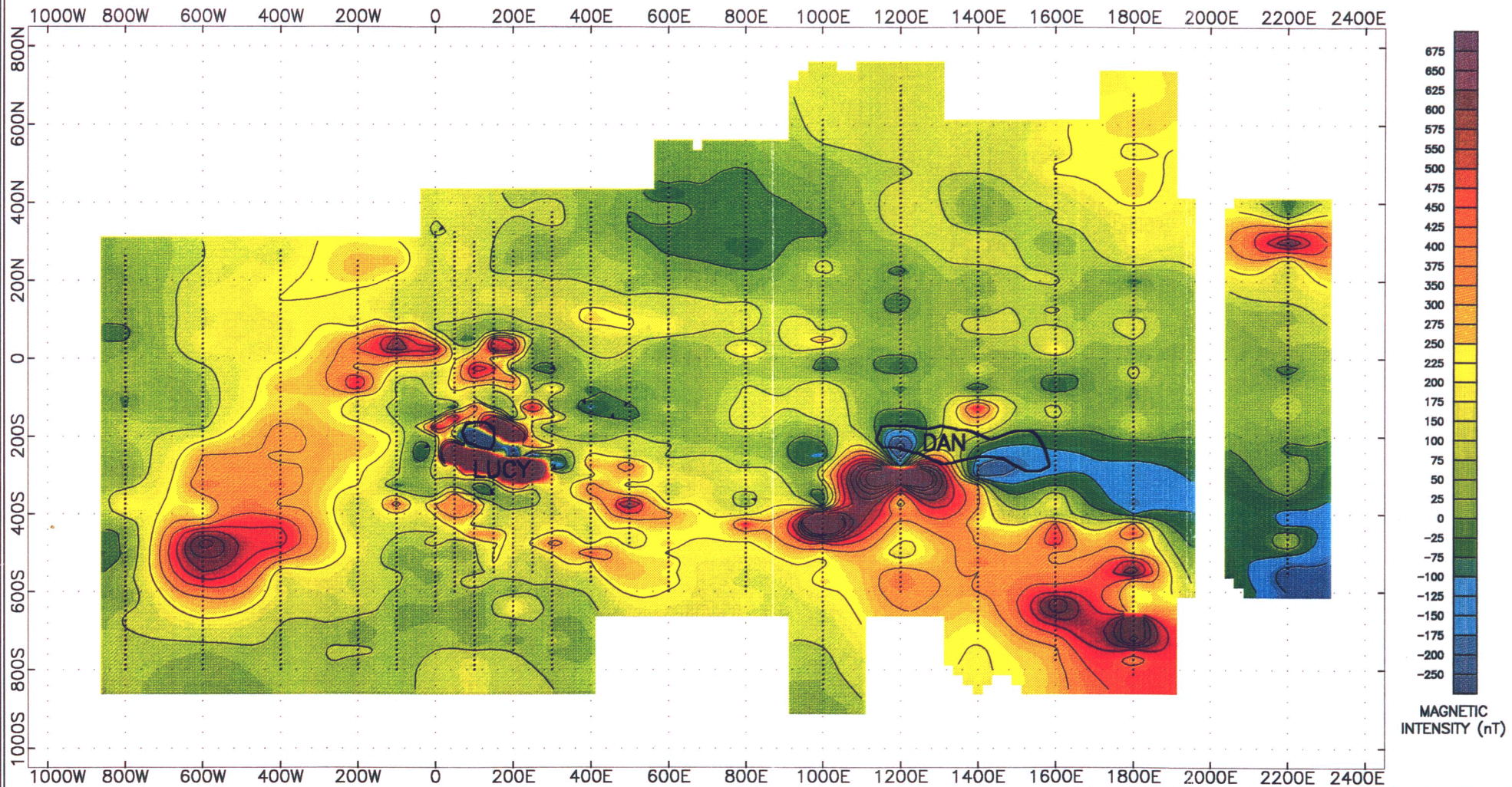
SWIFT RIVER PROPERTY, YUKON TERRITORY

TOTAL FIELD MAGNETICS SURVEY
MAGNETIC INTENSITY PROFILES

Scale: 1:10,000

April, 1997 - Figure 9

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• Measurement Station

55,800 nT Subtracted from Field Data

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SWIFT RIVER, YUKON TERRITORY

TOTAL FIELD MAGNETICS SURVEY
MAGNETIC INTENSITY CONTOUR MAP

Scale: 1:10,000

April, 1997 - Figure 10

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