REPORT ON

AIRBORNE GEOPHYSICAL SURVEY

Snowbird Property

FORT ST. JAMES, B.C.
OMINECA MINING DIVISION

LATITUDE: 54 28'N LONGITUDE: 124 32'W

NTS: 93K/7E-8W

for

X-CAL RESOURCES LTD.
700 - 700 West Pender Street
Vancouver, B.C. V6C 1G8

Barry W. Smee, P.Geo.

Vancouver, B.C.
August 19, 1994

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SUMMARY AND CONCLUSIONS

An airborne magnetic and VLF survey consisting of 525 line kilometres was flown over the Snowbird property by Dighem Surveys Ltd. The resulting data provided valuable information on geological lithologies and structure.

In particular, the magnetics show a clear contrast between the volcanic and sedimentary rocks. Several small intrusives are indicated near the east-central portion of the property. Unfortunately the ultramafic rocks associated directly with the known mineralization do not appear to produce a significant geophysical response, probably due to intense alteration destroying magnetic minerals. Further interpretation will be necessary to discern detailed structure.

Both the magnetic and VLF-EM data define major structures trending north-easterly and north-westerly. The general strike of the rocks is northwest.

1. INTRODUCTION

Dighem, a Division of CGG Canada Ltd. was retained to conduct an airborne geophysical survey over the Snowbird Property in February 1994 in order to identify zones of conductive mineralization and to map the geology and structure within the survey area.

This report has been prepared in order to meet the requirements for filing an assessment report describing the airborne geophysical survey conducted over the Snowbird claim group owned by X-Cal Resources Ltd. Portions of this report were obtained from a summary report by Sampson, 1993.

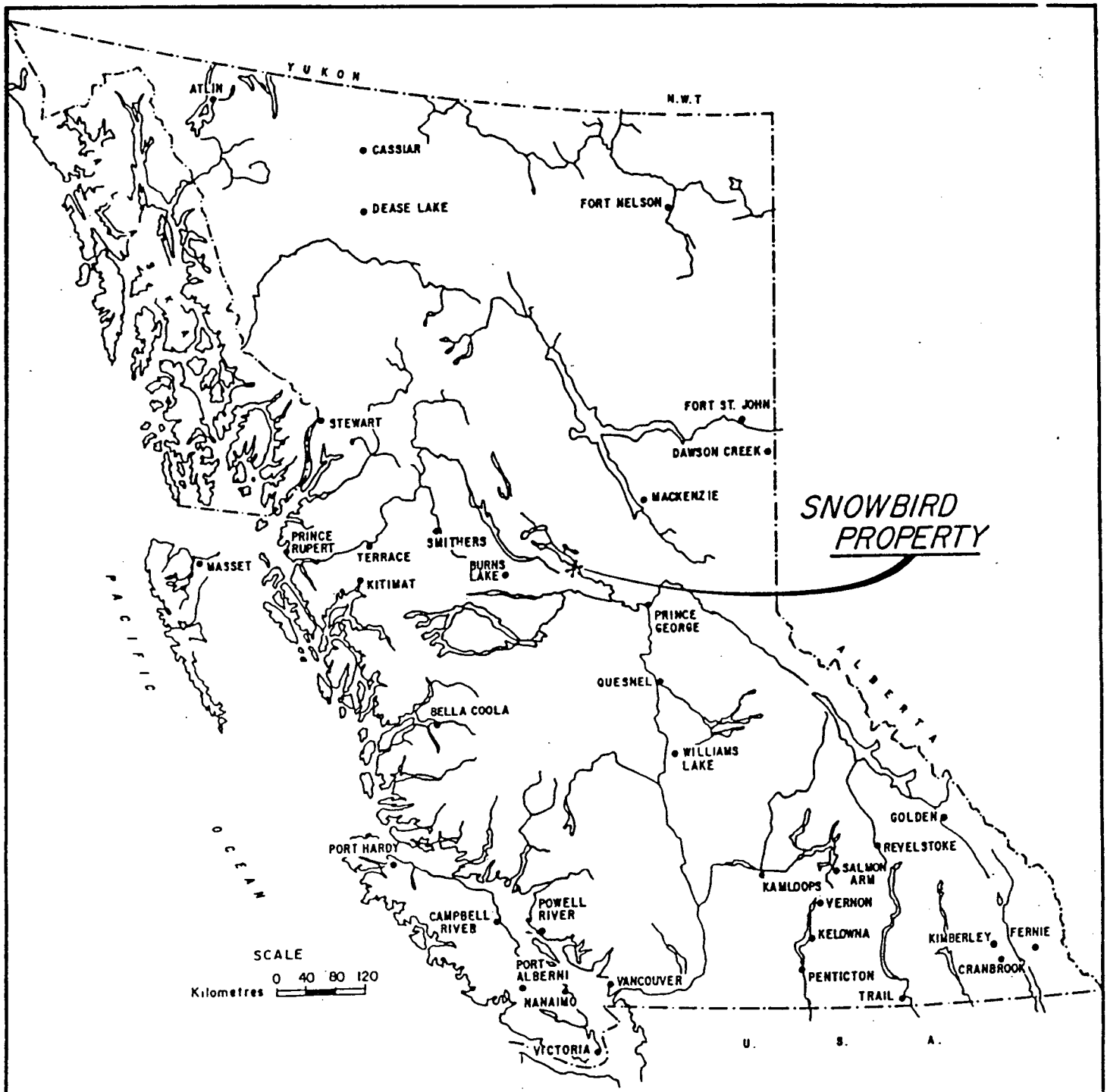
RECOMMENDATIONS

Additional data interpretation is required to define the extensions of the Snowbird mineralized zones. The data should be given to a geophysicist with experience in enhancing subtle magnetic responses. An interpretative structural map should be produced which outlines major and minor structural directions and attempts to outline the offsets of the known mineralized zones.

2. LOCATION AND ACCESS

The Snowbird property (Figure 1) is situated in the Omineca Mining Division, approximately 25km due west of Fort St. James on the southwest shore of Stuart Lake in central British Columbia.

Access to the property from Fort St. James is via 17km of public highway to the Sowchea Bay campground and thence via 7 km of dirt road to the main showing area (Stuart Lake Antimony Mine). This road generally requires the use of a 4x4 vehicle. Access to the north and west parts of the property is gained via old trails which generally require upgrading and regular maintenance.



PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
E.W. SMEE
GEOSCIENTIST

X-CAL RESOURCES LTD.

SNOWBIRD PROPERTY
Omineca Mining Division, Fort St. James, B.C.

Figure 1

LOCATION MAP

Aug. 1994 | 93K/7E-8W | 1:8,000,000

3. PHYSIOGRAPHY

A large portion of the central part of the property lies within a northwest trending, broad but shallow depression with locally extensive bogs and beaver pond systems. Rising steeply to the west is a series of low peaks forming a prominent northwest trending ridge system, cumulating in Mt. Nielspat 1,315 m elevation. Bounding the broad central depression to the east, and dropping down to Stuart Lake (680 m elevation) is a series of low topographic rises showing a "drumlinoid" or "crag and tail" morphology.

4. PROPERTY DESCRIPTION AND HISTORY

The property is presently comprised of 18 4-post mineral claims and 3 2-post mineral claims totalling 266 units, as detailed in Table 1 and shown in Figure 2.

In 1985 X-Cal Resources Ltd. optioned the property from Pipawa Exploration Ltd. and is now vested in a 100% beneficial interest subject to a 3% net smelter royalty retained by Pipawa. During 1991 Cominco Ltd. optioned the property from X-Cal. Work carried out during this period has consisted of:

1991: gridding, trenching, soil and stream sediment sampling, rock sampling, geological mapping (1:5,000 and 1:10,000); VLF-EM and Mag conducted by Cominco Ltd. over areas not previously gridded by X-Cal.

1990: recalculation of geological reserves by Western Mining Corp. in the Main and North Zones (Jones, March 1990).

1989: 3363 m NQ diamond drilling on both the North and East Zones; calculation of geological reserves (Sampson and Game, March 1989; Game, April 1990).

1988: 1564 m NQ diamond drilling, resulting in the discovery of the North Zone; prospecting, trenching, and percussion drilling resulting in the discovery of the East Zone(Sampson and Game, March 1988; Sampson, December 1988).

1987: 2680 m of NQ diamond drilling; geophysical surveys (I.P. Max-Min, EM, VLF-EM, Magnetometer) centred on the area of drilling; 1530 m percussion drilling (Sampson and Game, June 1987; March and Cruikshank, May 1987; Game, December 1987).

1986: geological soil mapping over the area surrounding the Main Vein, Peg-Leg Vein and Stibnite Vein; trenching; 933 m of NQ diamond drilling (Sampson and Game, January 1987).

Previous work on the property (prior to 1986) consisted of:

1980: 612 m of diamond drilling on the Main Vein by Prism Resources Ltd.

1974: 280 m of diamond drilling by Westwind Mines Ltd.

1970: Geochemical survey conducted over the main showings by Consolidated Shunsby Mines.

1947: Inland Mining Co. Ltd. (Los Angeles) stoped out additional ore from the Cross Vein. Shipments totalled 13.22 tons of 55% Sb, 17.88 tons of 58.8% Sb and 35 tons of 60% Sb.

1943: 308 m of diamond drilling on the Main Zone by Leta Exploration Ltd.

1942: Consolidated Mining and Smelting drilled seven holes on the quartz stringer zones of the Shaft Fraction (Main Zone).

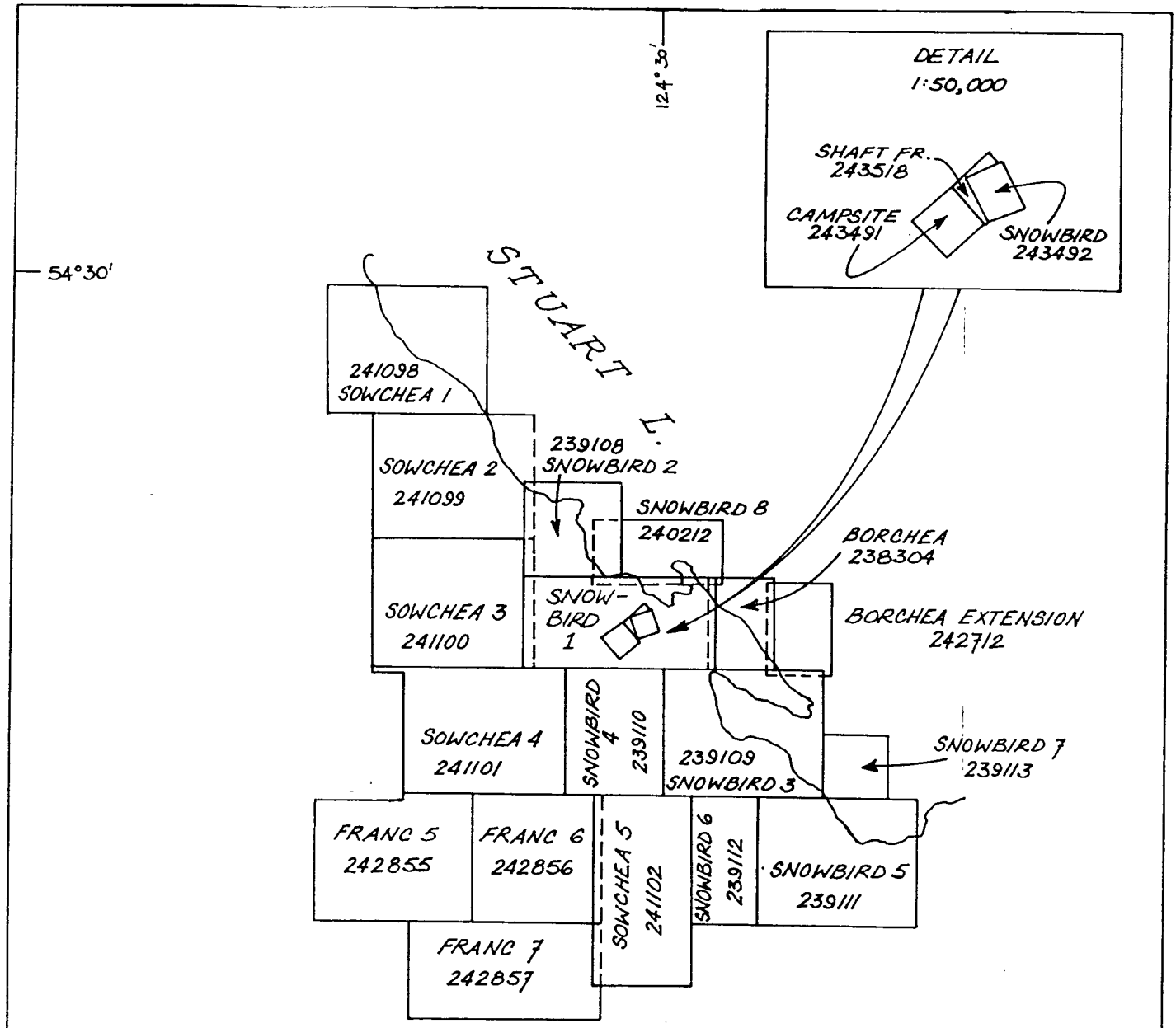
1939: Examination of surface showings by Dr. V. Dolmage and R.H. Stewart. Pioneer Gold Mines sank an inclined shaft on the Main Vein in a quartz stringer zone to a depth of 45 m, and drove an adit and drifted on the massive stibnite Cross Vein (Stibnite Vein) for a distance of 45 m. 36 tons of crude ore was shipped.

1937: 54 tons of antimony ore was hand cobbed and sold by T.E. Nielson.

1920: Claims first staked; some development work done on the Snowbird, Campsite and Shaft Fraction claims.

Table 1. Snowbird Property Claim Status

EXP DATE	PROJECT	CLAIM	TENURE #	REC #	LOT #	TYPE	PROVIN	UNITS	MIN DIV'N	NTS	REC DATE
29/07/94	SNOWBIRD	Sowchea 2	241099	10941		MC4	BC	20	OMINECA	93K/07E	29/07/89
29/07/94	SNOWBIRD	Sowchea 1	241098	10940		MC4	BC	20	OMINECA	93K/07E	29/07/89
31/07/94	SNOWBIRD	Sowchea 3	241100	10942		MC4	BC	20	OMINECA	93K/07E	31/07/89
31/07/94	SNOWBIRD	Sowchea 4	241101	10943		MC4	BC	20	OMINECA	93K/07E	31/07/89
01/08/94	SNOWBIRD	Sowchea 5	241102	10944		MC4	BC	18	OMINECA	93K/08W	01/08/89
18/09/94	SNOWBIRD	Boarchea Extension	242712	12562		MC4	BC	6	OMINECA	93K/08W	18/09/90
12/10/94	SNOWBIRD	Franc 5	242855	12705		MC4	BC	20	OMINECA	93K/07E	12/10/90
13/10/94	SNOWBIRD	Franc 6	242856	12706		MC4	BC	16	OMINECA	93K/07E	13/10/90
14/10/94	SNOWBIRD	Franc 7	242857	12707		MC4	BC	18	OMINECA	93K/07E	14/10/90
24/03/96	SNOWBIRD	Snowbird # 2	239108	7538		MC4	BC	9	OMINECA	93K/07E	24/03/86
24/03/96	SNOWBIRD	Snowbird # 3	239109	7539		MC4	BC	20	OMINECA	93K/08W	24/03/86
24/03/96	SNOWBIRD	Snowbird # 4	239110	7540		MC4	BC	12	OMINECA	93K/08W	24/03/86
24/03/96	SNOWBIRD	Snowbird # 5	239111	7541		MC4	BC	20	OMINECA	93K/08W	24/03/86
24/03/96	SNOWBIRD	Snowbird # 6	239112	7542		MC4	BC	8	OMINECA	93K/08W	24/03/86
24/03/96	SNOWBIRD	Snowbird # 7	239113	7543		MC4	BC	4	OMINECA	93K/08W	24/03/86
24/03/96	SNOWBIRD	Snowbird # 1	239107	7537		MC4	BC	18	OMINECA	93K/08W	24/03/86
15/05/96	SNOWBIRD	Boarchea	238304	3008		MC4	BC	6	OMINECA	93K/08W	15/05/80
20/10/96	SNOWBIRD	Shaft Fr.	243518	8723		MC2	BC	1	OMINECA	93K/07E	20/10/53
04/11/96	SNOWBIRD	Snowbird # 8	240212	10017		MC4	BC	8	OMINECA	93K/07E	04/11/88
05/11/96	SNOWBIRD	Snowbird	243492	1900		MC2	BC	1	OMINECA	93K/07E	05/11/37
05/11/96	SNOWBIRD	Campsite	243491	1896		MC2	BC	1	OMINECA	93K/07E	05/11/37



PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
B. W. SMEE
GEOSCIENTIST

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SNOWBIRD PROPERTY
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Figure 2

CLAIM MAP

June 1994 | 93K/7E-8W | 1:100,000

5. REGIONAL GEOLOGICAL SETTING

Au-quartz vein mineralization and associated listwanite (silica-carbonate-fuchsite alteration) at Snowbird is hosted within Cache Creek Group rocks of Pennsylvanian to Late Triassic age. These rocks form part of the regionally extensive northwest trending Cache Creek Terrane in which several Au-listwanite vein type showings and deposits have been documented, eg. Atlin, Cassiar areas (see Ash and Arksey, 1990 for summary).

The Cache Creek Group rocks are interpreted to be of oceanic origin and, in the Fort St. James area, include bedded radiolarian cherts, argillites, greywackes, carbonates, pillowed basalts, gabbros, serpentinized alpine-type ultramafics and local blueschist metamorphic assemblages. These rocks have been multiply deformed (Paterson, 1974) and intruded by granitoid stocks and plutons of probable Jurassic age.

In the Fort St. James area, the Cache Creek Terrane is bounded by a complex, major northwest trending, transcurrent fault system - the Pinchi Fault (Paterson, 1977). The numerous mineral deposits associated with the Pinchi Fault indicate that this regional structure was a major conduit for mineralizing hydrothermal fluids.

A related, parallel, northeast dipping fault structure, traceable over approximately 20 km, crosses the east part of the Snowbird property and has been termed the Sowchea Shear Zone (Armstrong, 1949). This structure is the major control on the localization of Au-quartz vein mineralization and associated listwanite alteration on the property.

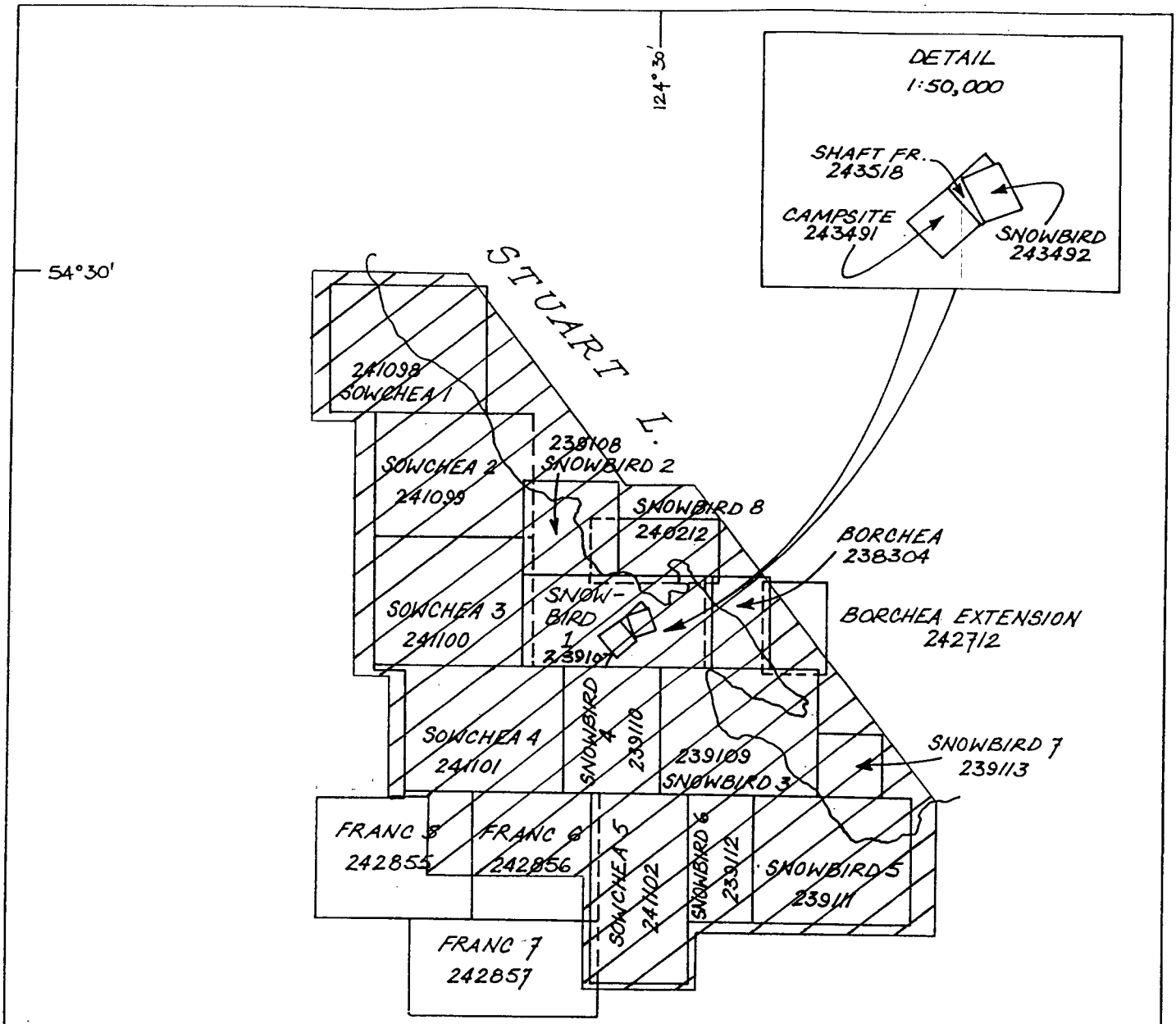
Placer gold has been recovered from Sowchea Creek immediately south of the property and from Dog Creek, approximately 25 km southeast of the property.

6. PROPERTY GEOLOGY AND MINERALIZATION

A combined geological resource of 305,980 tons @ 0.22 oz/ton Au has been estimated by X-Cal for the Snowbird Zone (Main Vein, Peg-Leg Vein) and the North Zone, which currently represents the most economically significant mineralized zones on the property (Jones, March 1990). Though these zones remain open at depth, current data suggests that gold grades are erratic.

7. 1994 AIRBORNE GEOPHYSICAL SURVEY

A magnetic/VLF airborne geophysical survey was flown by DIGHEM on February 5 and February 6, 1994 over the Snowbird property, covering a survey block of 529 km (Figure 3). The resulting report is presented in Appendix 1.



Area covered by DIGHEM airborne geophysical survey February 5 and 6, 1994.

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Figure 3

AIRBORNE GEOPHYSICAL SURVEY AREA

Aug. 1994 | 93K/7E-8W | 1:10000

8. References

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COST STATEMENT

BARRY W. SMEE, Ph.D., P.Geo.
consulting geochemist/geologist

June 30, 1994

Mr. Shawn Kennedy
X-Cal Resources Ltd.
700 - 700 West Pender Street
Vancouver, B.C.
V6C 1G8

Dear Shawn:

Re: Snowbird Property, British Columbia
Statement of Work

This statement summarizes the work performed in preparation for the geophysical survey on the Snowbird Property and subsequent to the receipt of the airborne data from Dighem.

Preparation of the base maps, contract specifications and contract negotiations 2.5 days @ $400/d	$ 1,000.00
On-going contact with Dighem during flying, examination of preliminary data, computer imaging 1.0 days @ $400/d	400.00
Receipt of data, image processing, contract to geophysicist for detailed structural interpretation 1.5 days @ $400/d	600.00
Total Cost on Snowbird	**$ 2,000.00**

Yours truly,

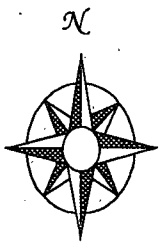
Barry W. Smee, Ph.D., P.Geo.

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
B. W. SMEE

BWS/kf

#608 - 1508 Mariner's Walk
Vancouver, British Columbia, Canada
V6J 4X9
Tel: (604) 739-2035
Fax: (604) 739-2036

STATEMENT OF QUALIFICATIONS



BARRY W. SMEE, Ph.D., P.Geo.
consulting geochemist/geologist

CERTIFICATE OF QUALIFICATIONS

I, **Barry W. Smee**, do hereby certify that:

1. I am a Consulting Geologist with residence at #608 - 1508 Mariner's Walk, Vancouver, B.C. V6J 4X9.

2. I am a Professional Geologist, registered with the Professional Engineers and Geoscientists of British Columbia, registration number 18421.

3. I am a graduate of the University of Alberta with a B.Sc. (1969) and the University of New Brunswick with a Ph.D. in geology (1982).

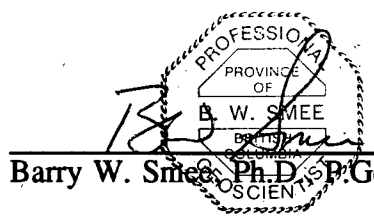
4. I am a member of the Association of Exploration Geochemists (1970).

5. I have been practising my profession in Canada, the United States and Australia since 1969.

6. I organized, directed and compiled the geological information prior to the flying of the Snowbird property, and subsequent to the receipt of the airborne data.

7. I am a officer and director of X-Cal Resources Ltd.

Dated at Vancouver, B.C. this 4th day of July, 1994.



Barry W. Smee, Ph.D., P.Geo.

#608 - 1508 Mariner's Walk
Vancouver, British Columbia, Canada
V6J 4X9
Tel: (604) 739-2035
Fax: (604) 739-2036

APPENDIX I

Report #1165

DIGHEM SURVEY
FOR
X-CAL RESOURCES LTD.
SNOWBIRD PROPERTY
FORT ST. JAMES, BRITISH COLUMBIA

NTS 93 K/7,8

Dighem, A Division of CGG Canada Ltd.
Mississauga, Ontario
March 24, 1994

Douglas L. McConnell, P.Eng.
Geophysicist

A1165MAR.94R

SUMMARY

This report describes the logistics and results of a DIGHEM airborne geophysical survey carried out for X-Cal Resources Ltd. over the Snowbird Property located near Fort St. James, British Columbia. Total coverage of the survey block amounted to 529 km. The survey was flown from February 5 to February 6, 1994.

The purpose of the survey was to detect zones of conductive mineralization and to provide information that could be used to map the geology and structure of the survey area. This was accomplished by using a high sensitivity cesium magnetometer and a four-channel VLF receiver. The information from these sensors was processed to produce maps which display the magnetic and conductive properties of the survey area. A GPS electronic navigation system, utilizing a UHF link, ensured accurate positioning of the geophysical data with respect to the base maps. Visual flight path recovery techniques were used to confirm the location of the helicopter where visible topographic features could be identified on the ground.

The survey property contains several anomalous features which are considered to be of moderate to high priority as exploration targets. Areas of interest may be assigned priorities on the basis of supporting geophysical, geochemical and/or geological information.

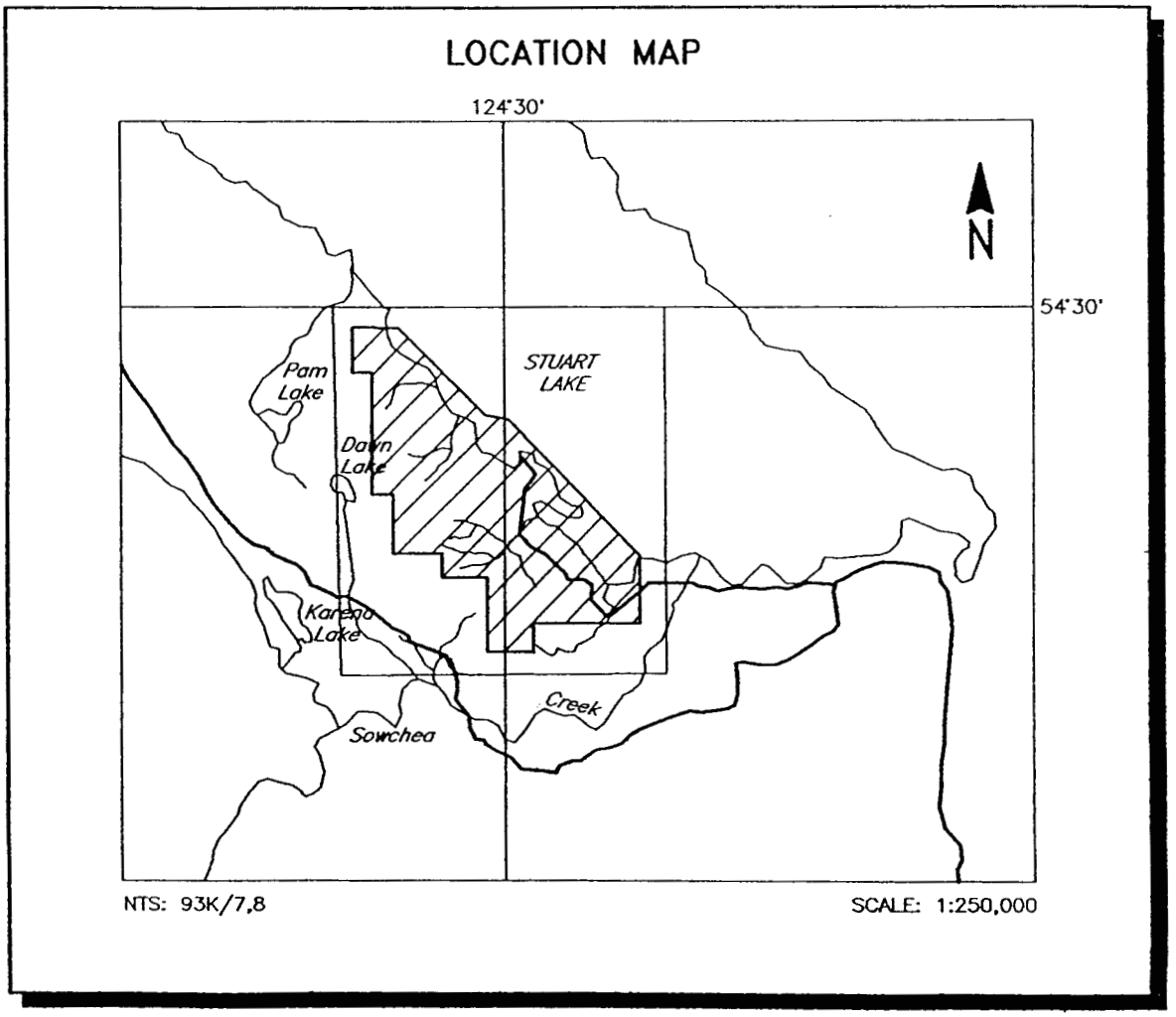


FIGURE 1

X-CAL RESOURCES LTD.

SNOWBIRD PROPERTY, FT. ST. JAMES, B.C. - 1165

CONTENTS

INTRODUCTION

A DIGHEM magnetic/VLF survey was flown for X-Cal Resources Ltd. from February 5 to February 6, 1994, over the Snowbird Property located near Fort St. James, British Columbia. The survey area can be located on NTS map sheet 93K 7/8 (see Figure 1).

Survey coverage consisted of approximately 529 line-km, including tie lines. Flight lines were flown in an azimuthal direction of 90° with a line separation of 100 metres.

The survey employed a magnetometer, radar altimeter, video camera, analog and digital recorders, a VLF receiver and an electronic navigation system. Details on the survey equipment are given in Section 2. Section 2 also provides details on the data channels, their respective sensitivities, and the navigation/flight path recovery procedure.

The instrumentation was installed in an Aerospatiale AS350B2 turbine helicopter (Registration CF-CFM) which was provided by Northern Air Support Ltd. The helicopter flew at an average airspeed of 110 km/h.

SURVEY EQUIPMENT

This section provides a brief description of the geophysical instruments used to acquire the survey data:

Magnetometer

Model:	Picodas 3340
Type:	Optically pumped Cesium vapour
Sensitivity:	0.01 nT
Sample rate:	10 per second

The magnetometer sensor is towed in a bird 20 m below the helicopter.

Magnetic Base Station

Model:	Scintrex MP-3
Type:	Digital recording proton precession
Sensitivity:	0.10 nT
Sample rate:	0.2 per second

A digital recorder is operated in conjunction with the base station magnetometer to record the diurnal variations of the earth's magnetic field. The clock of the base station is synchronized with that of the airborne system to permit subsequent removal of diurnal drift.

VLF System

Manufacturer:	Herz Industries Ltd.	
Type:	Totem-2A	
Sensitivity:	0.1%	
Stations:	Lualualei, Hawaii;	NPM, 23.4 kHz
	Cutler, Maine;	NAA, 24.0 kHz

The VLF receiver measures the total field and vertical quadrature components of the secondary VLF field. Signals from two separate transmitters can be measured simultaneously. The VLF sensor is housed in the same bird as the magnetic sensor, and is towed 20 m below the helicopter.

Radar Altimeter

Manufacturer:	Honeywell/Sperry
Type:	AA 220
Sensitivity:	1 ft

The radar altimeter measures the vertical distance between the helicopter and the ground.

Analog Recorder

Manufacturer:	RMS Instruments
Type:	DGR33 dot-matrix graphics recorder
Resolution:	4x4 dots/mm
Speed:	1.5 mm/sec

The analog profiles are recorded on chart paper in the aircraft during the survey. Table 2-1 lists the active geophysical data channels and the vertical scale of each profile. The other channels shown on the analogs (EM) were not measured.

Table 2-1. The Analog Profiles

Channel Name	Parameter	Scale units/mm	Designation on digital profile
ALTR	altimeter	3 m	ALT
CMGC	magnetics, coarse	20 nT	MAG
CMGF	magnetics, fine	2.0 nT	
VF1T	VLF-total: primary stn.	2%	
VF1Q	VLF-quad: primary stn.	2%	
VF2T	VLF-total: secondary stn.	2%	
VF2Q	VLF-quad: secondary stn.	2%	

Digital Data Acquisition System

Manufacturer: Picodas

Type: PDAS 1000

The PDAS 1000 has a built-in hard drive for digital data storage and two internal magnetometer counters.

Tracking Camera

Type: Panasonic Video

Model: AG 2400/WVCD132

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

Navigation System (RT-DGPS)

Model:	Sercel NR106, Real-time differential positioning
Type:	SPS (L1 band), 10-channel, C/A code, 1575.42 MHz.
Sensitivity:	-132 dBm, 0.5 second update
Accuracy:	< 5 metres in differential mode, ± 50 metres in S/A (non differential) mode

The Global Positioning System (GPS) is a line of sight, satellite navigation system which utilizes time-coded signals from at least four of the twenty-four NAVSTAR satellites. In the differential mode, two GPS receivers are used. The base station unit is used as a reference which transmits real-time corrections to the mobile unit in the aircraft, via a UHF radio datalink. The on-board system calculates the flight path of the helicopter while providing real-time guidance. The raw XYZ data are recorded for both receivers, thereby permitting post-survey processing for accuracies of approximately 2 metres.

Although the base station receiver is able to calculate its own latitude and longitude, a higher degree of accuracy can be obtained if the reference unit is established on a known benchmark or triangulation point. The GPS records data relative to the WGS84 ellipsoid, which is the basis of the revised North American Datum (NAD83). Conversion software is used to transform the WGS84 coordinates to the system displayed on the base maps.

Field Workstation

Manufacturer:	Dighem
Model:	FWS: V2.41
Type:	80386 based P.C.

A portable PC-based field workstation is used at the survey base to verify data quality and completeness. Flight tapes are dumped to a hard drive to permit the creation of a database. This process allows the field operators to display both the positional (flight path) and geophysical data on a screen or printer.

PRODUCTS AND PROCESSING TECHNIQUES

The following products are available from the survey data. Those which are not part of the survey contract may be acquired later. Refer to Table 3-1 for a summary of the maps which accompany this report, some of which may be sent under separate cover. Most parameters can be displayed as contours, profiles, or in colour.

Base Maps

Base maps of the survey area have been produced from published topographic maps. These provide a relatively accurate, distortion-free base which facilitates correlation of the navigation data to the UTM grid. Photomosaics are useful for visual reference and for subsequent flight path recovery, but usually contain scale distortions. Orthophotos are ideal, but their cost and the time required to produce them, usually precludes their use as base maps.

Table 3-1 Plots Available from the Survey

MAP PRODUCT	NO. OF SHEETS	ANOMALY MAP	PROFILES ON MAP	CONTOURS		SHADOW MAP
				INK	COLOUR	
Total Field Magnetics	1/2	N/A	-	10,000/ 20,000	10,000/ 20,000	10,000/ 20,000
1st Vertical Derivative Magnetics	1/2	N/A	-	10,000/ 20,000	10,000/ 20,000	-
Filtered Total Field VLF	1/2	N/A	-	10,000/ 20,000	10,000/ 20,000	-
Multi-channel stacked profiles		Worksheet profiles				-
		Interpreted profiles				-

N/A	Not available
-	Not required under terms of the survey contract
*	Recommended
10,000	Scale of delivered map, i.e, 1:10,000

Notes:

- Inked contour maps are provided on transparent media and show flight lines and suitable registration. Two paper prints of each map are supplied.

Total Field Magnetics

The aeromagnetic data are corrected for diurnal variation using the magnetic base station data. The regional IGRF can be removed from the data, if requested.

Magnetic Derivatives

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

first vertical derivative (vertical gradient)

second vertical derivative

magnetic susceptibility with reduction to the pole

upward/downward continuations

All of these filtering techniques improve the recognition of near-surface magnetic bodies, with the exception of upward continuation. Any of these parameters can be produced on request. Dighem's proprietary enhanced magnetic technique is designed to provide a general "all-purpose" map, combining the more useful features of the above parameters.

VLF

The VLF data are digitally filtered to remove long wavelengths such as those caused by variations in the transmitted field strength.

Contour, Colour and Shadow Map Displays

The geophysical data are interpolated onto a regular grid using a modified Akima spline technique. The resulting grid is suitable for generating contour maps of excellent quality.

Colour maps are produced by interpolating the grid down to the pixel size. The parameter is then incremented with respect to specific amplitude ranges to provide colour "contour" maps. Colour maps of the total magnetic field are particularly useful in defining the lithology of the survey area.

Monochromatic shadow maps are generated by employing an artificial sun to cast shadows on a surface defined by the geophysical grid. There are many variations in the shadowing technique. These techniques may be applied to total field or enhanced magnetic data, magnetic derivatives, VLF, resistivity, etc. Of the various magnetic

products, the shadow of the enhanced magnetic parameter is particularly suited for defining geological structures with crisper images and improved resolution.

SURVEY RESULTS

GENERAL DISCUSSION

Magnetics

A proton precession magnetometer was operated at the survey base to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to permit subsequent removal of diurnal drift.

The background magnetic level has been adjusted to match the International Geomagnetic Reference Field (IGRF) for the survey area. The IGRF gradient across the survey block is left intact.

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

The total field magnetic data have been subjected to a processing algorithm to produce calculated vertical gradient magnetic maps. This procedure enhances near-surface magnetic units and suppresses regional gradients. It also provides better

definition and resolution of magnetic units and displays weak magnetic features which may not be clearly evident on the total field maps.

There is some evidence on the magnetic maps which suggests that the survey area has been subjected to deformation and/or alteration. These structural complexities are evident on the contour maps as variations in magnetic intensity, irregular patterns, and as offsets or changes in strike direction. Some of the more prominent linear features are also evident on the topographic base maps.

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

The magnetic results, in conjunction with the other geophysical parameters, should provide valuable information which can be used to effectively map the geology and structure in the survey areas.

VLF

VLF results were obtained from the transmitting stations at Lualualei, Hawaii (NPM -23.4 kHz), and Seattle, Washington (NLK - 24.8 kHz). The VLF maps show the contoured results of the filtered total field from Lualualei, Hawaii.

The VLF method is quite sensitive to the angle of coupling between the conductor and the propagated EM field. Consequently, conductors which strike towards the VLF station will usually yield a stronger response than conductors which are nearly orthogonal to it.

Closely-spaced conductors, conductors of short strike length or conductors which are poorly coupled to the VLF field, may escape detection with this method. Erratic signals from the VLF transmitters can also give rise to strong, isolated anomalies which should be viewed with caution. Regardless of these limitations, however, the VLF results have provided valuable additional information, particularly within the more resistive portions of the survey area. The VLF method could probably be used as a follow-up tool in most areas, although its effectiveness will be somewhat limited in areas of moderate to high conductivity. The filtered total field VLF contours are presented on the base maps with a contour interval of one percent.

SURVEY RESULTS

Geophysical Signatures

Harzburgite (no. 1 on the geology map[1]) in the area is expected to be strongly magnetic as is the granular gabbroic to ultramafic unit (2). Clay from weathered serpentinite hosted by the harzburgite, and weathered siltstones and argillite in the clastic sediments (6), may cause a VLF response. Pyrite in the chert (8) and the sources of other pyrite and pyrrhotite showings in the area may also yield VLF responses. The following describes the geophysical and geological setting of showings in the area.

Granite Zone

The granite zone flanks a magnetic anomaly that is probably due to a northwest trending, narrow magnetic unit. This unit is parallel to the mapped contact of the rocks which host the "granite zone". This suggests that the showing may be associated with the contact of the magnetic unit. A northeast trending VLF anomaly, probably due to structure, transects the rock unit hosting the granite zone about 200 m to the south of the showing.

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[1] Property Geology, Snowbird Claims, X-Cal Resources Ltd., October 1993.

Main Zone and North Zone

The setting for the Main zone and North zone is a northwest trending magnetic low that correlates with the mapped extent of a mariposite (fuchsrite) alteration zone (MAZ). Although the magnetic low flanks a weak high, it is probably not part of a dipolar type signature from the source of the high. The low could be due to magnetite destruction remanent magnetization within the alteration zone.

The North zone correlates with a northeast trending structural break, which can be inferred as extending from about line 10570 at fiducial 8560 through line 10500 at fiducial 1134. Northeast shear zones are also indicated on the geology map. Another northeast shear is suggested by a VLF trend which intersects the MAZ at about line 10560 fiducial 8900.

East Zone

The east zone, and the northeast fault as mapped by the geology with which it is coincident, correlates with a weak VLF anomaly. The magnetic contours are relatively featureless in this location.

VLF

Numerous northeast trending VLF conductors were mapped, particularly in the southwest half of the survey area. The signals from the transmitting station at Lualualei are maximum coupled to conductors with this orientation. There are drainage channels and other topographic features with northeast orientation which have likely influenced the VLF contours, however, as the magnetics indicate northeast structures, bedrock structure may be the underlying cause for many of the VLF trends.

A northeast fault, which is indicated on the geology, which was identified on regional magnetics extending from the vicinity of Mount Nielsp to Kasaan Bay, yields a VLF anomaly from line 10640 at fiducial 6640 to line 10520 at fiducial 9932. Conductive mineralization or clay associated with the fault are likely sources for the anomaly.

If it is thought that northeast structures have influenced the deposition of economic mineralization in this area, then some of the suspected shear zones, as identified by the VLF, will be of interest.

Magnetics

The inferred stratigraphic strike direction from the magnetics is approximately northwest. Strongly magnetic trends that may reflect harzburgite, gabbroic or ultramafic strata, dominate the western and northern portion of the survey area. These form an inverted "v" shape that may be indicative of the nose of a large fold, with approximately N50°W orientated central axis.

If this is the case, then the strata which hosts the showings may be repeated to the west. The magnetic data clearly shows where extensions along strike of the mineralized strata exist.

Northeast trending structures are apparent on the total field magnetic map. These can best be seen using the moving shadow option on an imaging workstation. Examples of these structures extend from line 10750 fiducial 3640 through line 10410 at fiducial 3420, line 10270 at fiducial 6300 through line 10190 at fiducial 8090 and a weakly evident trend from line 10730 at fiducial 4170 through line 10500 at fiducial 1160.

In addition to the northeast structure, there appear to be prominent northwest breaks. One extends from the east end of line 10450 through line 10201 at fiducial 7400. Another is apparent from line 10560 fiducial 8900 through line 10400 fiducial 3660.

If it is though that structure in the survey area has influenced mineral deposition, then these apparent structural breaks will be of interest.

BACKGROUND INFORMATION

This section provides background information on the magnetic and VLF-EM parameters.

MAGNETICS

In some geological environments, a VLF anomaly with magnetic correlation has a greater likelihood of being produced by sulfides than one that is non-magnetic. However, sulfide ore bodies may be non-magnetic (e.g., the Kidd Creek deposit near Timmins, Canada) as well as magnetic (e.g., the Mattabi deposit near Sturgeon Lake, Canada). Precious metal deposits can also be associated with magnetic material (pyrrhotite or magnetite) or several non-magnetic hosts. The value of magnetic data as a direct exploration tool will vary, depending on the magnetic characteristics of the mineralization being sought.

The magnetometer data are digitally recorded in the aircraft to an accuracy of 0.01 nT for cesium magnetometers. The digital tape is processed by computer to yield a total field magnetic contour map. When warranted, the magnetic data may also be treated mathematically to enhance the magnetic response of the near-surface geology, and an enhanced magnetic contour map is then produced. The response of the enhancement

operator in the frequency domain is illustrated in Figure 5-2. This figure shows that the passband components of the airborne data are amplified 20 times by the enhancement operator. This means, for example, that a 100 nT anomaly on the enhanced map reflects a 5 nT anomaly for the passband components of the airborne data.

The enhanced map, which bears a resemblance to a downward continuation map, is produced by the digital bandpass filtering of the total field data. The enhancement is equivalent to continuing the field downward to a level (above the source) which is 1/20th of the actual sensor-source distance.

Because the enhanced magnetic map bears a resemblance to a ground magnetic map, it simplifies the recognition of trends in the rock strata and the interpretation of geological structure. It defines the near-surface local geology while de-emphasizing deep-seated regional features. It primarily has application when the magnetic rock units are steeply dipping and the earth's field dips in excess of 60 degrees.

Any of a number of filter operators may be applied to the magnetic data, to yield vertical derivatives, continuations, magnetic susceptibility, etc. These may be displayed in contour, colour or shadow.

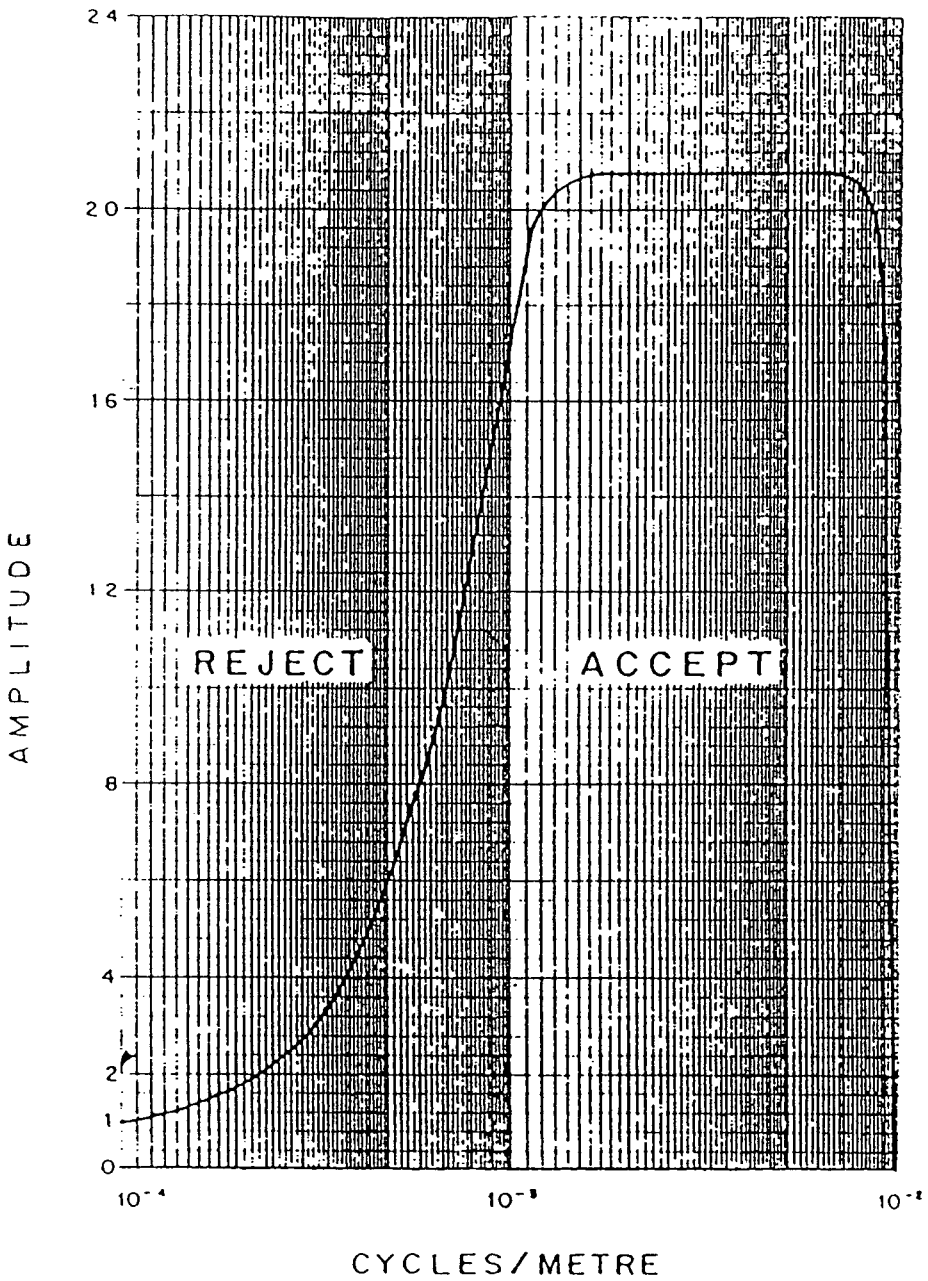


Fig. 5-2 Frequency response of magnetic enhancement operator.

VLF

VLF transmitters produce high frequency uniform electromagnetic fields. However, VLF anomalies are not EM anomalies in the conventional sense. EM anomalies primarily reflect eddy currents flowing in conductors which have been energized inductively by the primary field. In contrast, VLF anomalies primarily reflect current gathering, which is a non-inductive phenomenon. The primary field sets up currents which flow weakly in rock and overburden, and these tend to collect in low resistivity zones. Such zones may be due to massive sulfides, shears, river valleys and even unconformities.

The VLF field is horizontal. Because of this, the method is quite sensitive to the angle of coupling between the conductor and the transmitted VLF field. Conductors which strike towards the VLF station will usually yield a stronger response than conductors which are nearly orthogonal to it.

The Herz Industries Ltd. Totem VLF-electromagnetometer measures the total field and vertical quadrature components. Both of these components are digitally recorded in the aircraft with a sensitivity of 0.1 percent. The total field yields peaks over VLF current concentrations whereas the quadrature component tends to yield crossovers. Both appear as traces on the profile records. The total field data are filtered digitally and

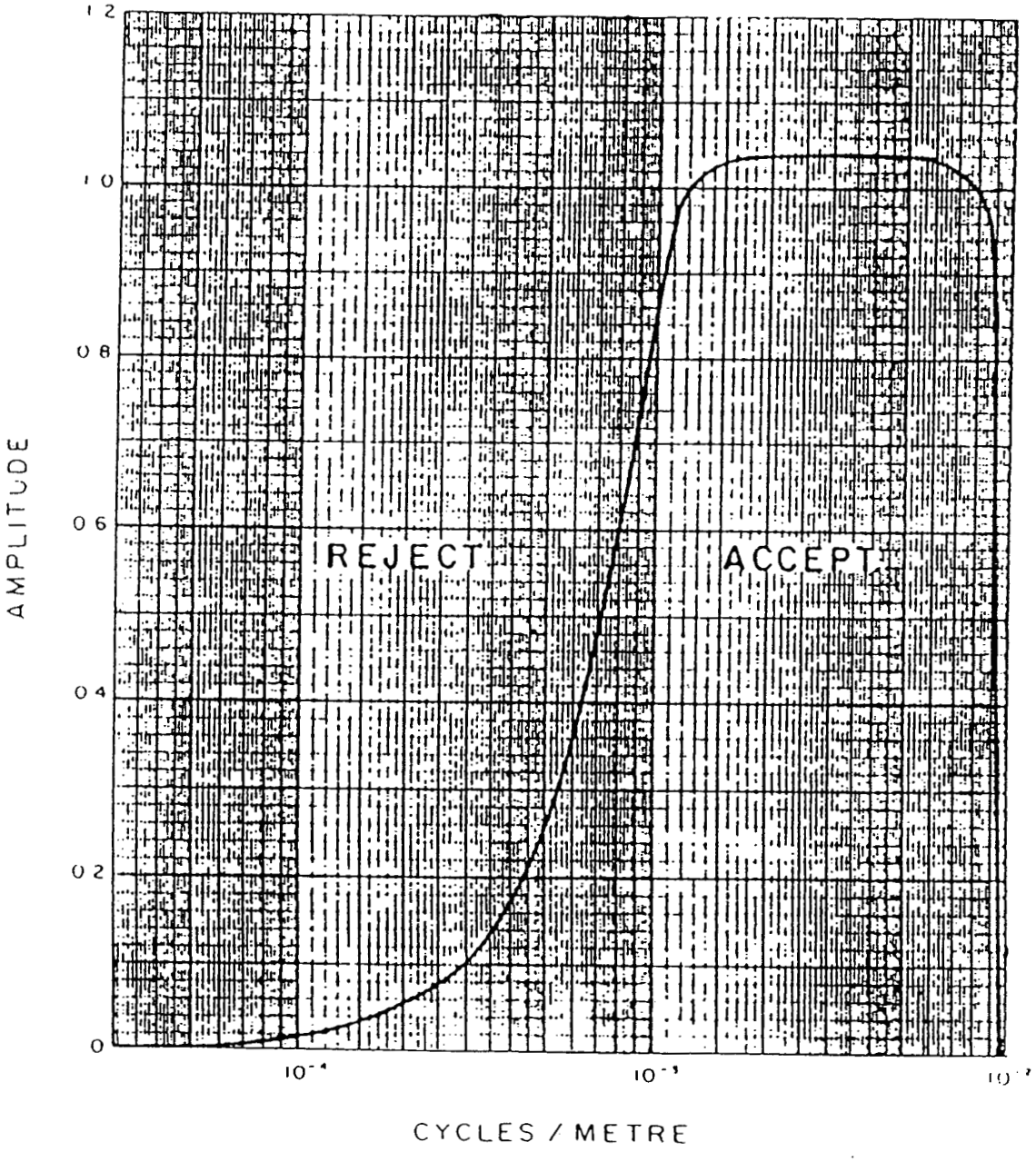


Fig. 5-3 Frequency response of VLF operator.

displayed as contours to facilitate the recognition of trends in the rock strata and the interpretation of geologic structure.

The response of the VLF total field filter operator in the frequency domain (Figure 5-3) is basically similar to that used to produce the enhanced magnetic map (Figure 5-2). The two filters are identical along the abscissa but different along the ordinant. The VLF filter removes long wavelengths such as those which reflect regional and wave transmission variations. The filter sharpens short wavelength responses such as those which reflect local geological variations.

CONCLUSIONS AND RECOMMENDATIONS

This report provides a very brief description of the survey results and describes the equipment, procedures and logistics of the survey.

The magnetics and VLF data provide information on structures and stratigraphy in the area which, combined with a knowledge of the settings of known showings, may lead to new areas of interest.

It is recommended that a complete assessment of the survey data be carried out by one or more qualified professionals who have access to, and can provide a meaningful compilation of, all available geophysical, geological and geochemical data.

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

Respectfully submitted,

DIGHEM

Doug McConnell

Douglas L. McConnell, P.Eng.
Geophysicist

APPENDIX A

LIST OF PERSONNEL

The following personnel were involved in the acquisition, processing, interpretation and presentation of data, relating to a DIGHEM^{V} airborne geophysical survey carried out for X-Cal Resources Ltd., near Fort St James, B.C.

Steve Kilty	Vice President, Operations
Greg Paleolog	Survey Operations Supervisor
Dave Miles	Senior Geophysical Operator
Jordan Cronkwright	Second Geophysical Operator
Kathy Miles	Dataperson
Del Rokosh	Pilot (Northern Air Support Ltd.)
Gordon Smith	Data Processing Supervisor
Doug McConnell	Interpretation Geophysicist
Lyn Vanderstarren	Drafting Supervisor
Steve Mast	Draftsperson (CAD)
Susan Pothiah	Word Processing Operator
Albina Tonello	Secretary/Expeditor

The survey consisted of 529 km of coverage, flown from February 5 to February 6, 1994.

All personnel are employees of Dighem, A Division of CGG Canada Inc., except for the pilot who is an employee of Northern Air Support Ltd.

DIGHEM

Douglas L. McConnell, P.Eng.
Geophysicist

APPENDIX B

STATEMENT OF COST

Date: March 24, 1994

IN ACCOUNT WITH DIGHEM

To: Dighem flying of Agreement dated January 27, 1994, pertaining to an Airborne Geophysical Survey in the Fort St. James area, British Columbia.

Survey Charges

510 km of flying @ $67.00/km
plus mobilization costs of
$4,000 $38,170.00

Allocation of Costs

- Data Acquisition	(60%)
- Data Processing	(20%)
- Interpretation, Report and Maps	(20%)

DIGHEM

Doug McConnell

Douglas L. McConnell, P.Eng.
Geophysicist

APPENDIX C

STATEMENT OF QUALIFICATIONS

I, Douglas L. McConnell of the City of Mississauga, Province of Ontario, do hereby certify that:

1. I am a geophysicist, residing in Mississauga, Ontario.

2. I am a graduate of Queens University, with a B.Sc. Engineering, Geophysics (1984).

3. I have been actively engaged in geophysical exploration since 1986.

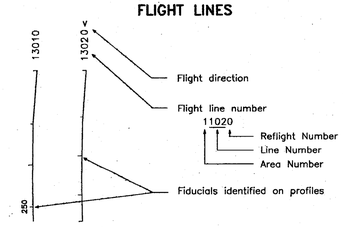
4. I was personally responsible for the interpretation of the geophysical data described in this report.

Douglas L. McConnell, P.Eng.
Geophysicist

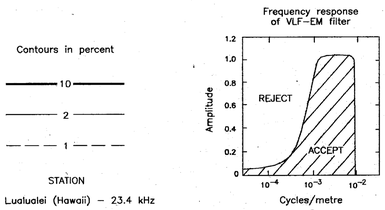
TECHNICAL SUMMARY

Navigation	Sercel real time differential GPS positioning
Data reduction grid interval	25 metres
Terrain clearance	Helicopter 60 m Magnetometer. VLF receiver 40 m
Data sampling interval	0.1 second
Magnetometer / sensitivity	Scintrex cesium / 0.01 nT
VLF receiver / sensitivity	Herz 2A / 1%

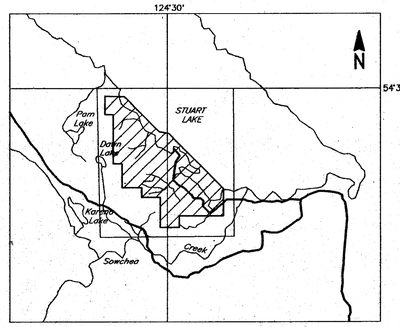
FLIGHT LINES



VLF CONTOURS



LOCATION MAP



X-CAL RESOURCES LTD.

SNOWBIRD PROPERTY, Ft. St. JAMES, B.C.

FILTERED VLF

DIGHEM SURVEY	NTS: 93K/7,8	GEOPHYSICIST: . JM
DATE: FEBRUARY	JOB: 1165	SHEET: 1

DIGHEM, A division of CGG Canada Ltd.

0 1 2 Km
Scale 1:20 000

PROFESSIONAL ENGINEERS PROVINCE OF B.C. W. SMITH

DIGHEM Quality and Service in Airborne Geophysics

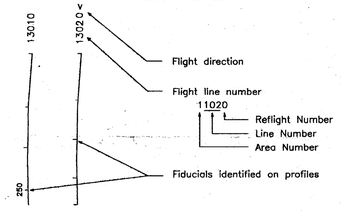
GEOLOGICAL BRANCH ASSESSMENT REPORT

23,523

TECHNICAL SUMMARY

Navigation	Sercel real time differential GPS positioning
Data reduction grid interval	25 metres
Terrain clearance	Helicopter 60 m Magnetometer, VLF receiver 40 m
Data sampling interval	0.1 second
Magnetometer / sensitivity	Scintrex cesium / 0.01 nT
VLF receiver / sensitivity	Herz 2A / 1%

FLIGHT LINES



TOTAL FIELD MAGNETIC CONTOURS

——————— . . . . . 250 nT

——————— . . . . . 50 nT

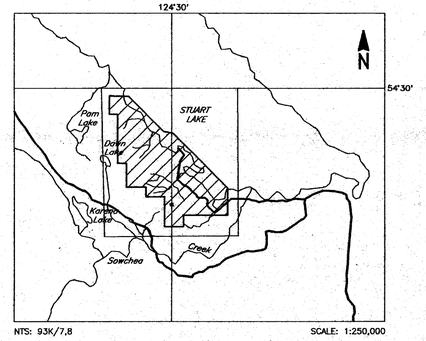
——————— . . . . . 10 nT

— — — — — — . . . . . 5 nT

. . . . . magnetic low

Magnetic inclination within the survey area: 74 degrees

LOCATION MAP



NTS: 93K/7,8 SCALE: 1:250,000

X-CAL RESOURCES LTD.

SNOWBIRD PROPERTY, Ft. St. JAMES, B.C.

TOTAL FIELD MAGNETICS

DIGHEM SURVEY	NTS: 93K/7,8	GEOPHYSICIST: OH.
DATE: FEBRUARY	JOB: 1165	SHEET: 1

DIGHEM, A division of CGG Canada Ltd.

0 1 2 Km

Scale 1:20 000

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA R. W. SMSE

DIGHEM Quality and Service in Airborne Geophysics

GEOLOGICAL BRANCH ASSESSMENT REPORT

23,523