ARIS SUMMARY SHEET

District Geologist, Prince George — Off Confidential: 94.11.08

ASSESSMENT REPORT 23098 — MINING DIVISION: Omineca

PROPERTY:	Quartz Lake				
LOCATION:	LAT	52 35 0	LONG	124 00 00	
	UTM	10	5826173	432243	
	NTS	093B12W	093C09E		
CLAIM(S):	Bako 1-16				
OPERATOR(S):	Cogema Resources Inc.				
AUTHOR(S):	Pritchard, R.;Fraser, D.				
REPORT YEAR:	1993, 96 Pages				
COMMODITIES SEARCHED FOR:	Gold				
KEYWORDS:	Eocene - Miocene,Volcanics				

WORK DONE: Geophysical
EMAB 620.0 km;VLF
Map(s) - 5; Scale(s) - 1:20 000
MAGA 620.0 km
Map(s) - 1; Scale(s) - 1:20 000

Filmed

Report Number 93-CND-78-05

DIGHEM^{V} SURVEY FOR COGEMA RESOURCES INC. QUARTZ LAKE PROPERTY BRITISH COLUMBIA

NTS 93B/12, 93C/9

Dighem Surveys & Processing Inc.
Mississauga, Ontario
April 26, 1993

Ruth A. Pritchard
Geophysicist

A1138APR.93R

Province of British Columbia — Ministry of Energy, Mines and Petroleum Resources

ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TYPE OF REPORT/SURVEY(S)	TOTAL COST
Geophysical	$48,990.00

AUTHOR(S) Ruth A. Pritchard 501457 SIGNATURE(S)

Supervised by Douglas C. Fraser

DATE STATEMENT OF EXPLORATION AND DEVELOPMENT FILED ... YEAR OF WORK 1993.

PROPERTY NAME(S) Quartz Lake

COMMODITIES PRESENT Au

B.C. MINERAL INVENTORY NUMBER(S), IF KNOWN:

MINING DIVISION Cariboo NTS 93B/12W 93 C/9E

LATITUDE 52°35'N LONGITUDE 124°00'W

NAMES and NUMBERS of all mineral tenures in good standing (when work was done) that form the property [Examples: TAX 1-4, FIRE 2 (12 units); PHOENIX (Lot 1706); Mineral Lease M 123; Mining or Certified Mining Lease ML 12 (claims involved)]:

BAKO 1 to 16

OWNER(S)

(1) COGEMA Resources Inc.
801-409 Granville St (2)

MAILING ADDRESS

801-409 Granville St
Vancouver B.C. V6C 1T2

OPERATOR(S) (that is, Company paying for the work)

(1) COGEMA Resources Inc (2)

MAILING ADDRESS

801-409 Granville St,
Vancouver B.C. V6C 1T2

SUMMARY GEOLOGY (lithology, age, structure, alteration, mineralization, size, and attitude):

Volcanic and volcaniclastic felsic and mafic rocks of Eocene to Miocene age underlie the property.

REFERENCES TO PREVIOUS WORK

(over)

SUMMARY

This report describes the logistics and results of a DIGHEM^V airborne geophysical survey carried out for Cogema Resources Inc. over the Quartz Lake Property, British Columbia. Total coverage of the survey block amounted to 659 km, including tie lines. The survey was flown from March 8 to March 12, 1993.

The purpose of the survey was to detect zones of conductive mineralization and to provide information that could be used to map the geology and structure of the survey area. This was accomplished by using a DIGHEM^V multi-coil, multi-frequency electromagnetic system, supplemented by a high sensitivity Cesium magnetometer and a two-channel VLF receiver. The information from these sensors was processed to produce maps which display the magnetic and conductive properties of the survey area. An electronic navigation system, operating in the UHF band, ensured accurate positioning of the geophysical data with respect to the base map. Visual flight path recovery techniques were used in areas where transponder signals were blocked by topographic features.

The survey property contains several anomalous features, some of which may be of moderate to high priority as exploration targets. Most of the inferred bedrock conductors appear to warrant further investigation using appropriate surface exploration techniques. Areas of interest may be assigned priorities on the basis of supporting geophysical, geochemical and/or geological information. After initial investigations have

been carried out, it may be necessary to re-evaluate the remaining anomalies based on information acquired from the follow-up program.

CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

LIST OF MAPS

INTRODUCTION

A DIGHEM^V electromagnetic/resistivity/magnetic/VLF survey was flown for Cogema Resources Inc. from March 8 to March 12, 1993, over the Quartz Lake Property, British Columbia. The survey area can be located on NTS map sheets 93B/12, 93C/9 (see Figure 1).

The Quartz Lake property consists of 16 contiguous claims (308 units, 77 km^2), located by COGEMA in the fall of 1992; the claims are listed on Table 1-1 and shown on Figure 2.

Table 1-1

List of Claims

NAME	RECORD NO	UNITS	STAKING DATE	EXPIRY DATE
BAKO 1	314961	20	92/11/19	93/11/19
BAKO 2	314962	20	92/11/18	93/11/18
BAKO 3	314963	20	92/11/20	93/11/20
BAKO 4	314964	20	92/11/19	93/11/19
BAKO 5	314965	20	92/11/22	93/11/22
BAKO 6	314966	20	92/11/20	93/11/20
BAKO 7	314967	20	92/11/22	93/11/22
BAKO 8	314968	20	92/11/22	93/11/22
BAKO 9	314969	20	92/11/23	93/11/23
BAKO 10	314970	20	92/11/23	93/11/23
BAKO 11	314971	18	92/11/20	93/11/20
BAKO 12	314972	18	92/11/20	93/11/20
BAKO 13	314973	18	92/11/21	93/11/21
BAKO 14	314974	18	92/11/21	93/11/21

NAME	RECORD NO	UNITS	STAKING DATE	EXPIRY DATE
BAKO 15	314975	18	92/11/24	93/11/24
BAKO 16	314976	18	92/11/24	93/11/24
	TOTAL	308		

Survey coverage consisted of approximately 659 line-km, including tie lines. Flight lines were flown in an azimuthal direction of 90°/270° with a line separation of 200 m.

The survey employed the DIGHEM^{V} electromagnetic system. Ancillary equipment consisted of 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.

The instrumentation was installed in an Aerospatiale AS350B turbine helicopter (Registration C-GJIX) which was provided by Questral Helicopters Ltd. The helicopter flew at an average airspeed of 130 km/h with an EM bird height of approximately 30 m.

Section 2 also provides details on the data channels, their respective sensitivities, and the navigation/flight path recovery procedure. Noise levels of less than 2 ppm are generally maintained for wind speeds up to 35 km/h. Higher winds may cause the system to be grounded because excessive bird swinging produces difficulties in flying the helicopter. The swinging results from the 5 m^2 of area which is presented by the bird to broadside gusts.

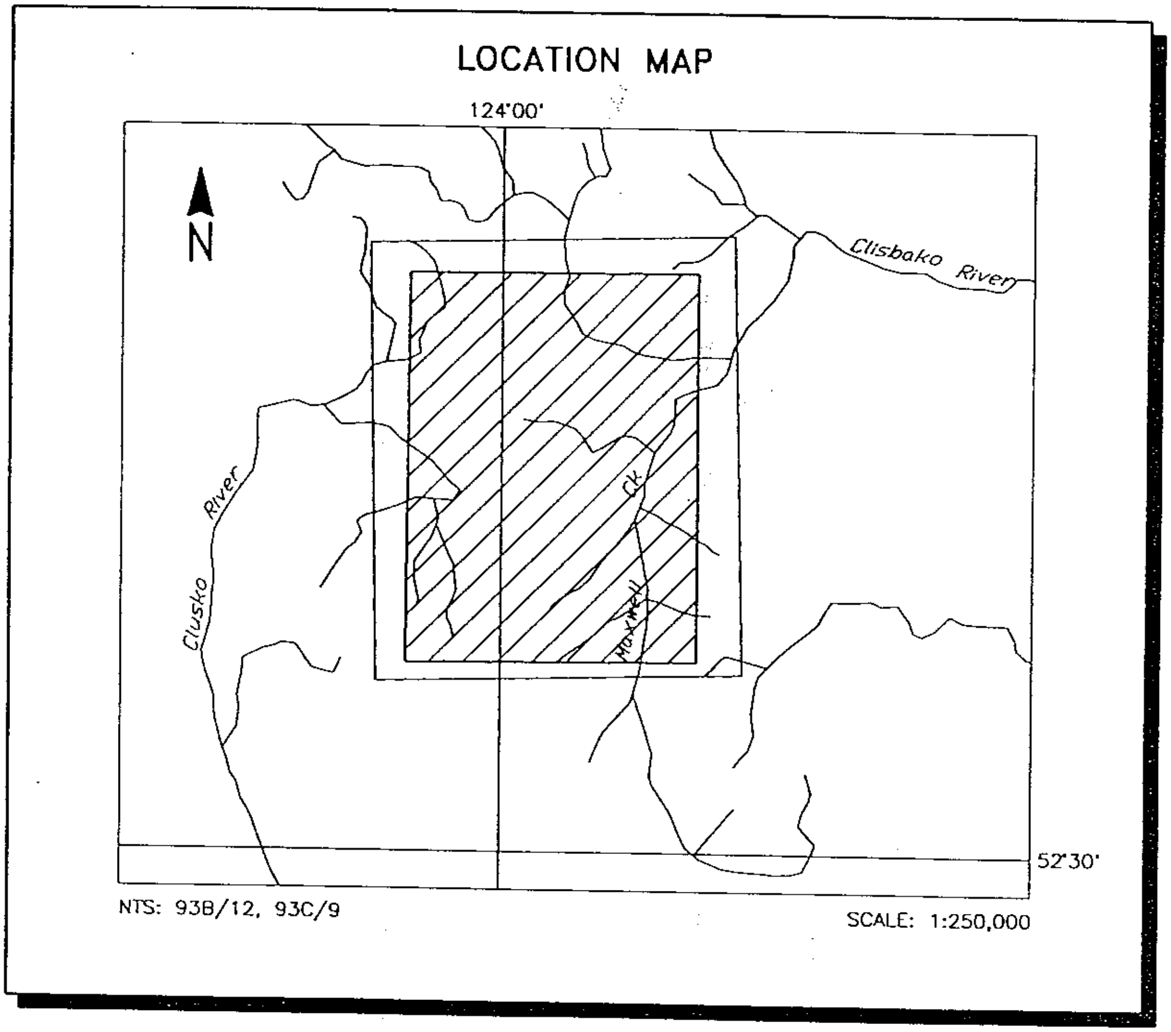

FIGURE 1

COGEMA RESOURCES INC.

QUARTZ LAKE PROPERTY - 1138

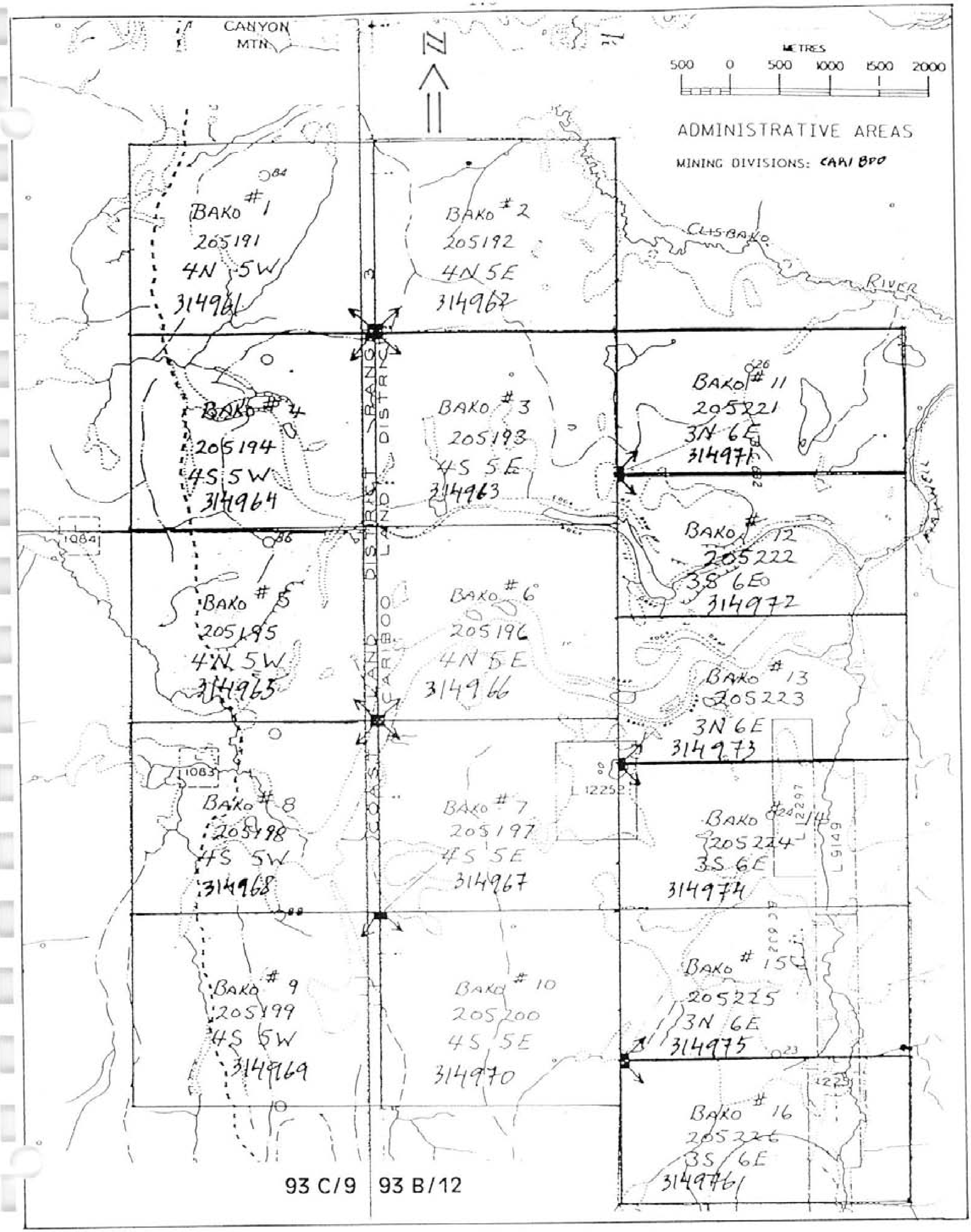

Figure 2. Quartz Lake Claim Map.

SURVEY EQUIPMENT

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

Electromagnetic System

Model: DIGHEM^{V}

Type: Towed bird, symmetric dipole configuration operated at a nominal survey altitude of 30 metres. Coil separation is 8 metres for 900 Hz and 7200 Hz, and 6.3 metres for the 56,000 Hz coil-pair.

Coil orientations/frequencies:
coaxial / 900 Hz
coplanar / 900 Hz
coaxial / 7,200 Hz
coplanar / 7,200 Hz
coplanar / 56,000 Hz

Channels recorded:
5 inphase channels
5 quadrature channels
2 monitor channels

Sensitivity:
0.1 ppm at 900 Hz
0.2 ppm at 7,200 Hz
0.5 ppm at 56,000 Hz

Sample rate: 10 per second

The electromagnetic system utilizes a multi-coil coaxial/coplanar technique to energize conductors in different directions. The coaxial coils are vertical with their axes in the flight direction. The coplanar coils are horizontal. The secondary fields are sensed simultaneously by means of receiver coils which are maximum coupled to their respective transmitter coils. The system yields an inphase and a quadrature channel from each transmitter-receiver coil-pair.

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:	Seattle, Washington;	NLK, 24.8 kHz
	Cutler, Maine;	NAA, 24.0 kHz
	Lualualei, Hawaii;	NPM, 23.4 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. This information is used in the processing algorithm which determines conductor depth.

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 geophysical data channels and the vertical scale of each profile.

Table 2-1. The Analog Profiles

Channel Name	Parameter	Scale units/mm	Designation on digital profile
1X9I	coaxial inphase (900 Hz)	2.5 ppm	CXI (900 Hz)
1X9Q	coaxial quad (900 Hz)	2.5 ppm	CXQ (900 Hz)
3P9I	coplanar inphase (900 Hz)	2.5 ppm	CPI (900 Hz)
3P9Q	coplanar quad (900 Hz)	2.5 ppm	CPQ (900 Hz)
2P7I	coplanar inphase (7200 Hz)	5 ppm	CPI (7200 Hz)
2P7Q	coplanar quad (7200 Hz)	5 ppm	CPQ (7200 Hz)
4X7I	coaxial inphase (7200 Hz)	5 ppm	CXI (7200 Hz)
4X7Q	coaxial quad (7200 Hz)	5 ppm	CXQ (7200 Hz)
5P5I	coplanar inphase(56000 Hz)	10 ppm	CPI (56 kHz)
5P5Q	coplanar quad (56000 Hz)	10 ppm	CPQ (56 kHz)
ALTR	altimeter	3 m	ALT
CMGC	magnetics, coarse	20 nT	MAG
CMGF	magnetics, fine	2.0 nT	
VF1T	VLF-total: primary stn.	2%	VLF (primary total field)
VF1Q	VLF-quad: primary stn.	2%	VLF (primary quadrature)
VF2T	VLF-total: secondary stn.	2%	VLF (secondary total field)
VF2Q	VLF-quad: secondary stn.	2%	VLF (secondary quadrature)
CXSP	coaxial spherics monitor		CXS
CPSP	coplanar spherics monitor		CPS
CXPL	coaxial powerline monitor		CXP
CPPL	coplanar powerline monitor		CPP

Table 2-2. The Digital Profiles

Channel Name (Freq)		Observed parameters	Scale units/mm
MAG		magnetics	20 nT
ALT		bird height	6 m
CXI	(900 Hz)	vertical coaxial coil-pair inphase	2 ppm
CXQ	(900 Hz)	vertical coaxial coil-pair quadrature	2 ppm
CPI	(900 Hz)	horizontal coplanar coil-pair inphase	2 ppm
CPQ	(900 Hz)	horizontal coplanar coil-pair quadrature	2 ppm
CXI	(7200 Hz)	vertical coaxial coil-pair inphase	4 ppm
CXQ	(7200 Hz)	vertical coaxial coil-pair quadrature	4 ppm
CPI	(7200 Hz)	horizontal coplanar coil-pair inphase	4 ppm
CPQ	(7200 Hz)	horizontal coplanar coil-pair quadrature	4 ppm
CPI	(56 kHz)	horizontal coplanar coil-pair inphase	10 ppm
CPQ	(56 kHz)	horizontal coplanar coil-pair quadrature	10 ppm
VLF1T		primary station total field	5%
VLF1Q		primary station quadrature	5%
VLF2T		secondary station total field	5%
VLF2Q		secondary station quadrature	5%
CXS		coaxial spherics monitor	
CXP		coaxial powerline monitor	
CPS		coplanar spherics monitor	
CPP		coplanar powerline monitor	
		Computed Parameters	
MAG		enhanced magnetics	200 nT
DFI	(900 Hz)	difference function inphase from CXI and CPI	2 ppm
DFQ	(900 Hz)	difference function quadrature from CXQ and CPQ	2 ppm
RES	(900 Hz)	log resistivity	.06 decade
RES	(7200 Hz)	log resistivity	.06 decade
RES	(56 kHz)	log resistivity	.06 decade
DP	(900 Hz)	apparent depth	6 m
DP	(7200 Hz)	apparent depth	6 m
DP	(56 kHz)	apparent depth	6 m
CDT		conductance	1 grade

Digital Data Acquisition System

Manufacturer: RMS Instruments

Type: DGR 33

Tape Deck: RMS TCR-12, 6400 bpi, tape cartridge recorder

The digital data are used to generate several computed parameters. Both measured and computed parameters are plotted as "multi-channel stacked profiles" during data processing. These parameters are shown in Table 2-2. In Table 2-2, the log resistivity scale of 0.06 decade/mm means that the resistivity changes by an order of magnitude in 16.6 mm. The resistivities at 0, 33 and 67 mm up from the bottom of the digital profile are respectively 1, 100 and 10,000 ohm-m.

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

Model:	Del Norte 547
Type:	UHF electronic positioning system
Sensitivity:	1 m
Sample rate:	2 per second

The navigation system uses ground based transponder stations which transmit distance information back to the helicopter. The ground stations are set up well away from the survey area and are positioned such that the signals cross the survey block at an angle between 30° and 150°. The onboard Central Processing Unit takes any two transponder distances and determines the helicopter position relative to these two ground stations in cartesian coordinates.

The cartesian coordinates are transformed to UTM coordinates during data processing. This is accomplished by correlating a number of prominent topographical locations with the navigational data points. The use of numerous visual tie points serves two purposes: to accurately relate the navigation data to the map sheet and to minimize location errors which might result from distortions in uncontrolled photomosaic 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.

Global Positioning System

Manufacturer: Trimble Navigation Ltd.

Type: Pathfinder (C/A code, dual channel)

Accuracy: 25 metres (5 metres in differential mode)

Update: Once per second

The Pathfinder system uses signals broadcast by the NAVSTAR GPS satellites to provide positional readouts in latitude/longitude or UTM coordinates. The GPS unit is placed at each UHF transponder site to determine its exact location. The system can also be used aboard the helicopter to provide real-time navigation guidance. Recorded data can be downloaded to a field computer for immediate post-survey processing, or transmitted to the central processing facility for final plotting.

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. Most parameters can be displayed as contours, profiles, or in colour.

Base Maps

A base map of the survey area has 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.

Electromagnetic Anomalies

Anomalous electromagnetic responses are selected and analysed by computer to provide a preliminary electromagnetic anomaly map. This preliminary map is used, by the geophysicist, in conjunction with the computer-generated digital profiles, to produce the final interpreted EM anomaly map. This map includes bedrock surficial and cultural conductors. A map containing only bedrock conductors can be generated, if desired.

Resistivity

The apparent resistivity in ohm-m may be generated from the inphase and quadrature EM components for any of the frequencies, using a pseudo-layer halfspace model. A resistivity map portrays all the EM information for that frequency over the entire survey area. This contrasts with the electromagnetic anomaly map which provides information only over interpreted conductors. The large dynamic range makes the resistivity parameter an excellent mapping tool.

EM Magnetite

The apparent percent magnetite by weight is computed wherever magnetite produces a negative inphase EM response.

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.

Enhanced Magnetics

The total field magnetic data are subjected to a processing algorithm. This algorithm enhances the response of magnetic bodies in the upper 500 m and attenuates the response of deeper bodies. The resulting enhanced magnetic map provides better definition and resolution of near-surface magnetic units. It also identifies weak magnetic features which may not be evident on the total field magnetic map. However, regional magnetic variations, and magnetic lows caused by remanence, are better defined on the total field magnetic map. The technique is described in more detail in Section 5.

Magnetic Derivatives

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

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.

Multi-channel Stacked Profiles

Distance-based profiles of the digitally recorded geophysical data are generated and plotted by computer. These profiles also contain the calculated parameters which are used in the interpretation process. These are produced as worksheets prior to interpretation, and can also be presented in the final corrected form after interpretation. The profiles display electromagnetic anomalies with their respective interpretive symbols. The differences between the worksheets and the final corrected form occur only with respect to the EM anomaly identifier.

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.

Resistivity Sengpiel Sections

The apparent resistivity and approximate thickness of two or more horizontal layers can be displayed simultaneously for all coplanar frequencies. An inversion algorithm has been developed by Dr. K.P. Sengpiel* of the B.G.R., which determines the generalized skin depth, or "centroid depth" of the inphase current concentration, as a function of frequency. The centroid depth is combined with the apparent resistivity over a broad frequency range to produce resistivity-thickness pseudo-sections. A coloured presentation yields a smoothed representation of the true resistivity-depth distribution within the limits of the model used.

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

SURVEY RESULTS

GENERAL DISCUSSION

The survey results are presented on 1 map sheet for each parameter at a scale of 1:20,000. Table 4-1 summarizes the EM responses in the survey area, with respect to conductance grade and interpretation.

The anomalies shown on the electromagnetic anomaly map are based on a near-vertical, half plane model. This model best reflects "discrete" bedrock conductors. Wide bedrock conductors or flat-lying conductive units, whether from surficial or bedrock sources, may give rise to very broad anomalous responses on the EM profiles. These may not appear on the electromagnetic anomaly map if they have a regional character rather than a locally anomalous character. These broad conductors, which more closely approximate a half space model, will be maximum coupled to the horizontal (coplanar) coil-pair and should be more evident on the resistivity parameter. Resistivity maps, therefore, may be more valuable than the electromagnetic anomaly maps, in areas where broad or flat-lying conductors are considered to be of importance. Contoured resistivity maps, based on the 900 Hz, 7200 Hz and 56,000 Hz coplanar data are included with this report.

TABLE 4-1

EM ANOMALY STATISTICS

QUARTZ LAKE PROPERTY

CONDUCTOR GRADE	CONDUCTANCE RANGE *SIEMENS (MHOS)*	NUMBER OF RESPONSES
7	>100	0
6	50 - 100	2
5	20 - 50	13
4	10 - 20	23
3	5 - 10	91
2	1 - 5	357
1	<1	143
*	INDETERMINATE	273
TOTAL		902

CONDUCTOR MODEL	MOST LIKELY SOURCE	NUMBER OF RESPONSES
D	DISCRETE BEDROCK CONDUCTOR	3
B	DISCRETE BEDROCK CONDUCTOR	380
S	CONDUCTIVE COVER	207
H	ROCK UNIT OR THICK COVER	264
E	EDGE OF WIDE CONDUCTOR	48
TOTAL		902

(SEE EM MAP LEGEND FOR EXPLANATIONS)

Excellent resolution and discrimination of conductors was accomplished by using a fast sampling rate of 0.1 sec and by employing common frequencies (900 Hz and 7200 Hz) on two orthogonal coil-pairs (coaxial and coplanar). The resulting "difference channel" parameters often permit differentiation of bedrock and surficial conductors, even though they may exhibit similar conductance values.

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

Magnetics

A Scintrex 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 map using a contour interval of 10 nT where gradients permit. The map shows 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 an enhanced magnetic map. 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 map. A map of the first or second vertical magnetic derivative can also be prepared from existing survey data, if requested.

There is some evidence on the magnetic map which suggests that the survey area have been subjected to deformation and/or alteration. These structural complexities are evident on the contour map 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 map.

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 area.

VLF

VLF results were obtained from the transmitting stations at Cutler, Maine (NAA - 24.0 kHz), Seattle, Washington (NLK - 24.8 kHz) and Lualualei, Hawaii (NPM - 23.4 kHz). Table 4-2 shows the VLF stations used for the contour map. Table 4-3 displays the VLF stations that were recorded as the primary and secondary stations and that are plotted as total field and quadrature on the digital profiles.

Table 4-2

Area	VLF Station(s)
Quartz Lake	Seattle (24.8 kHz - NLK) - lines 40460-40640 Hawaii (23.4 kHz - NPM) - all other lines

Table 4-3

Area	Primary Station (VLF1)	Secondary Station (VLF2)
Quartz Lake	Seattle (24.8 kHz - NLK)	Hawaii (23.4 kHz - NPM)

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.

The VLF parameter does not normally provide the same degree of resolution available from the EM data. 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. The filtered total field VLF contours are presented on the base map with a contour interval of one percent.

Resistivity

Resistivity maps, which display the conductive properties of the survey area, were produced from the 900 Hz, 7200 Hz and 56,000 Hz coplanar data. The maximum resistivity value, which is calculated for each frequency, is approximately 1.15 times the numerical value of the frequency. This cutoff eliminates the meaningless higher resistivities which would result from very small EM amplitudes. In general, the resistivity patterns show some agreement with the magnetic trends. This suggests that a few of the resistivity lows are probably related to bedrock features, rather than conductive overburden. There are some areas, however, where contour patterns appear to be strongly influenced by conductive surficial material.

Electromagnetics

The EM anomalies resulting from this survey appear to fall within one of two general categories. The first type consists of discrete, well-defined anomalies which yield marked inflections on the difference channels. These anomalies are usually attributed to conductive sulphides or graphite and are generally given a "B", "T" or "D" interpretive symbol, denoting a bedrock source.

The second class of anomalies comprises moderately broad responses which exhibit the characteristics of a half space and do not yield well-defined inflections on the difference channels. Anomalies in this category are usually given an "S" or "H" interpretive symbol. The lack of a difference channel response usually implies a broad or flat-lying conductive source such as overburden. Some of these anomalies may reflect conductive rock units or zones of deep weathering.

The effects of conductive overburden are evident over portions of the survey areas. Although the difference channels (DFI and DFQ) are extremely valuable in detecting bedrock conductors which are partially masked by conductive overburden, sharp undulations in the bedrock/overburden interface can yield anomalies in the difference channels which may be interpreted as possible bedrock conductors. Such anomalies usually fall into the "S?" or "B?" classification but may also be given an "E" interpretive symbol, denoting a resistivity contrast at the edge of a conductive unit.

In areas where EM responses are evident primarily on the quadrature components, zones of poor conductivity are indicated. Where these responses are coincident with magnetic anomalies, it is possible that the inphase component amplitudes have been suppressed by the effects of magnetite. Most of these poorly-conductive magnetic features give rise to resistivity anomalies which are only slightly below background. If it is expected that poorly-conductive economic mineralization may be associated with magnetite-rich units, most of these weakly anomalous features will be of interest. In areas where magnetite causes the inphase components to become negative, the apparent conductance and depth of EM anomalies may be unreliable.

It is difficult to assess the relative merits of EM anomalies on the basis of conductance. It is recommended that an attempt be made to compile a suite of geophysical "signatures" over areas of interest. Anomaly characteristics are clearly defined on the computer-processed geophysical data profiles which are supplied as one of the survey products.

A complete assessment and evaluation of the survey data should 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.

The electromagnetic anomaly map shows the anomaly locations with the interpreted conductor type, dip, conductance and depth being indicated by symbols. Direct magnetic correlation is also shown if it exists. The strike direction and length of the conductors are indicated when anomalies can be correlated from line to line. When studying the map sheets, consult the anomaly listings appended to this report.

QUARTZ LAKE PROPERTY

The magnetic data within this survey block are highly complex. There are many very sharp contacts between zones of differing magnetic intensity. The general magnetic strike is approximately north/south to north-northeast/south-southwest. Many possible structural features cut across this magnetic strike. Magnetic zones are truncated or offset by these possible breaks.

The highest magnetic values are contained within a complex, highly magnetic feature which trends north-northeast/south-southwest over line 40020 to 40290. An interesting magnetic anomaly is located over lines 40040 through 40070, near the northern edge of this highly magnetic zone. It consists of a circular magnetic low surrounding a moderately strong magnetic peak. Several possible bedrock anomalies are associated with the southern edge of this circular feature, at the contact between it and the highly magnetic unit to the south.

A large, relatively non-magnetic feature is situated near the western ends of lines 40090 to 40310. Very sharp contacts exist between this zone and highly magnetic units to the east and west at the northern end of this zone. There are several possible bedrock anomalies associated with these contacts.

A very sharp contact is also evident between a thin magnetic unit, which extends south from fiducial 1311 on line 40451 to fiducial 4958 on line 40520, and a relatively non-magnetic zone to the east. Many possible, moderately strong bedrock anomalies are associated with these magnetic features, and the contact between them.

Resistivity patterns exhibit little resemblance to magnetic trends. Many of the resistivity lows defined in the survey area are probably related to surficial features, as they are coincident with the river systems within the block.

A thin, highly conductive, circular ring-like feature dominates the south central portion of the map over lines 40210 through 40640. Much of this zone seems to reflect a possible conductive half space at depth. Resistivities within this feature are generally less than 50 ohm-metres. Resistivities within this zone are generally similar for the 900 Hz and 7200 Hz except of lines 40260 to 40420. On these lines the 900 Hz resistivity map displays resistivity values about half as large as the 7200 Hz resistivity.

A large, highly conductive zone is situated over the western ends of lines 40010 to 40440. It merges with the previously mentioned ring-like feature in the vicinity of fiducial 2040 on line 40430. The northern half of this zone contains many possible discrete bedrock anomalies, whereas the southern portion of this zone tends to display broader anomalous features more closely resembling half spaces at depth.

Many bedrock anomalies have been interpreted from the survey. The anomalies have diverse magnetic correlations, as some are directly associated with magnetic peaks while others seem to be related to magnetic contacts. Some are associated with magnetite-rich units. Many anomalies also appear to be related to resistivity contrasts. If the geophysical signatures over a known target can be determined, other anomalous zones can be prioritized based on the similarity of the geophysical signatures.

BACKGROUND INFORMATION

This section provides background information on parameters which are available from the survey data. Those which have not been supplied as survey products may be generated later from raw data on the digital archive tape.

ELECTROMAGNETICS

DIGHEM electromagnetic responses fall into two general classes, discrete and broad. The discrete class consists of sharp, well-defined anomalies from discrete conductors such as sulfide lenses and steeply dipping sheets of graphite and sulfides. The broad class consists of wide anomalies from conductors having a large horizontal surface such as flatly dipping graphite or sulfide sheets, saline water-saturated sedimentary formations, conductive overburden and rock, and geothermal zones. A vertical conductive slab with a width of 200 m would straddle these two classes.

The vertical sheet (half plane) is the most common model used for the analysis of discrete conductors. All anomalies plotted on the electromagnetic map are analyzed according to this model. The following section entitled **Discrete Conductor Analysis** describes this model in detail, including the effect of using it on anomalies caused by broad conductors such as conductive overburden.

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

Geometric interpretation

The geophysical interpreter attempts to determine the geometric shape and dip of the conductor. Figure 5-1 shows typical DIGHEM anomaly shapes which are used to guide the geometric interpretation.

Discrete conductor analysis

The EM anomalies appearing on the electromagnetic map are analyzed by computer to give the conductance (i.e., conductivity-thickness product) in Siemens (mhos) of a vertical sheet model. This is done regardless of the interpreted geometric shape of the conductor. This is not an unreasonable procedure, because the computed conductance increases as the electrical quality of the conductor increases, regardless of its true shape. DIGHEM anomalies are divided into seven grades of conductance, as shown in Table 5-1 below. The conductance in Siemens (mhos) is the reciprocal of resistance in ohms.

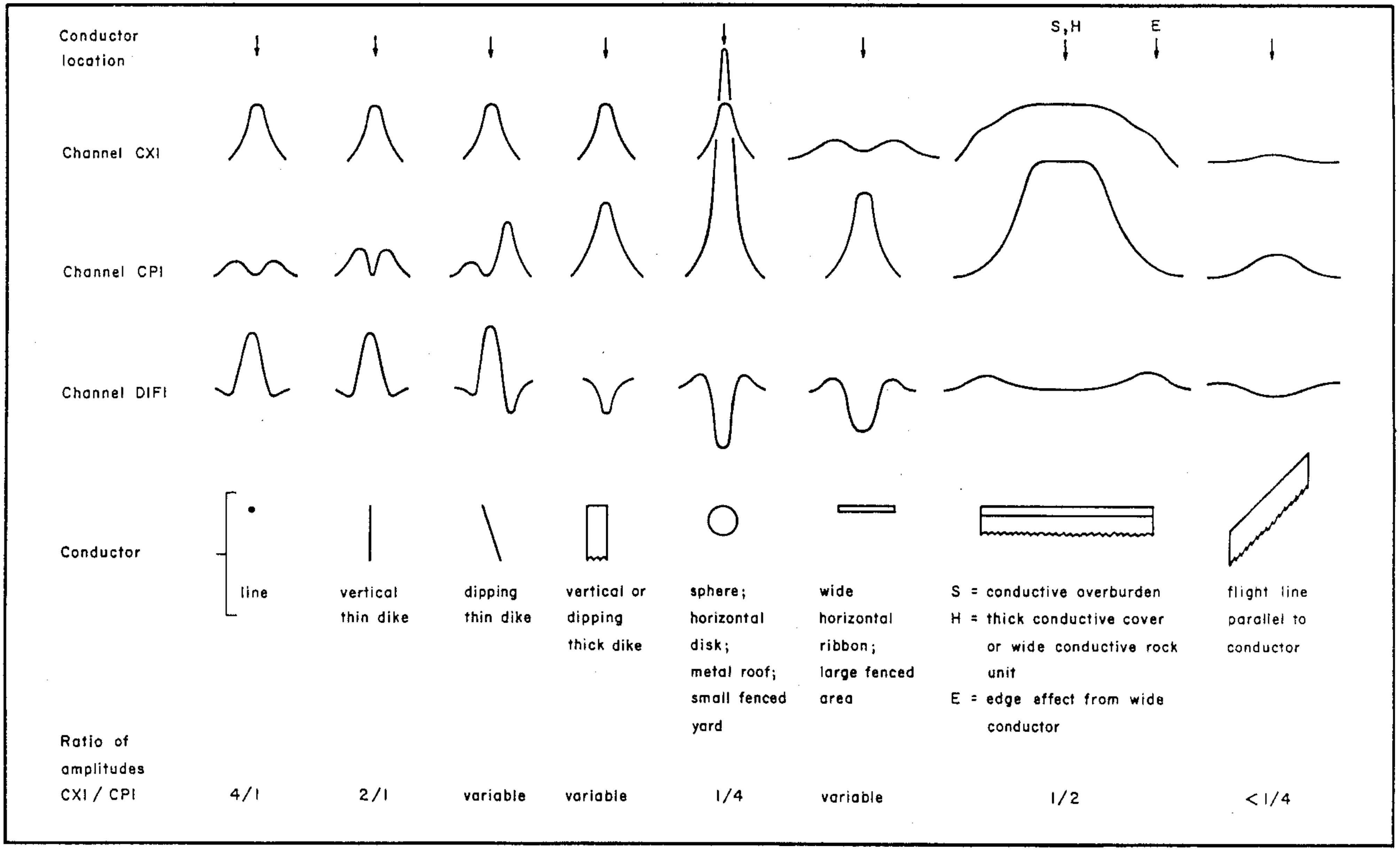

Fig. 5-1 Typical DIGHEM anomaly shapes

Table 5-1. EM Anomaly Grades

Anomaly Grade	Siemens
7	> 100
6	50 - 100
5	20 - 50
4	10 - 20
3	5 - 10
2	1 - 5
1	< 1

The conductance value is a geological parameter because it is a characteristic of the conductor alone. It generally is independent of frequency, flying height or depth of burial, apart from the averaging over a greater portion of the conductor as height increases. Small anomalies from deeply buried strong conductors are not confused with small anomalies from shallow weak conductors because the former will have larger conductance values.

Conductive overburden generally produces broad EM responses which may not be shown as anomalies on the EM maps. However, patchy conductive overburden in otherwise resistive areas can yield discrete anomalies with a conductance grade (cf. Table 5-1) of 1, 2 or even 3 for conducting clays which have resistivities as low as 50 ohm-m. In areas where ground resistivities are below 10 ohm-m, anomalies caused by weathering variations and similar causes can have any conductance grade. The anomaly shapes from the multiple coils often allow such conductors to be recognized, and these are indicated by the letters S, H, and sometimes E on the electromagnetic anomaly map (see EM map legend).

For bedrock conductors, the higher anomaly grades indicate increasingly higher conductances. Examples: DIGHEM's New Insco copper discovery (Noranda, Canada) yielded a grade 5 anomaly, as did the neighbouring copper-zinc Magusi River ore body; Mattabi (copper-zinc, Sturgeon Lake, Canada) and Whistle (nickel, Sudbury, Canada) gave grade 6; and DIGHEM's Montcalm nickel-copper discovery (Timmins, Canada) yielded a grade 7 anomaly. Graphite and sulfides can span all grades but, in any particular survey area, field work may show that the different grades indicate different types of conductors.

Strong conductors (i.e., grades 6 and 7) are characteristic of massive sulfides or graphite. Moderate conductors (grades 4 and 5) typically reflect graphite or sulfides of a less massive character, while weak bedrock conductors (grades 1 to 3) can signify poorly connected graphite or heavily disseminated sulfides. Grades 1 and 2 conductors may not respond to ground EM equipment using frequencies less than 2000 Hz.

The presence of sphalerite or gangue can result in ore deposits having weak to moderate conductances. As an example, the three million ton lead-zinc deposit of Restigouche Mining Corporation near Bathurst, Canada, yielded a well-defined grade 2 conductor. The 10 percent by volume of sphalerite occurs as a coating around the fine grained massive pyrite, thereby inhibiting electrical conduction.

Faults, fractures and shear zones may produce anomalies which typically have low conductances (e.g., grades 1 to 3). Conductive rock formations can yield anomalies of any conductance grade. The conductive materials in such rock formations can be salt water, weathered products such as clays, original depositional clays, and carbonaceous material.

On the interpreted electromagnetic map, a letter identifier and an interpretive symbol are plotted beside the EM grade symbol. The horizontal rows of dots, under the interpretive symbol, indicate the anomaly amplitude on the flight record. The vertical column of dots, under the anomaly letter, gives the estimated depth. In areas where anomalies are crowded, the letter identifiers, interpretive symbols and dots may be obliterated. The EM grade symbols, however, will always be discernible, and the obliterated information can be obtained from the anomaly listing appended to this report.

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

Flight line deviations occasionally yield cases where two anomalies, having similar conductance values but dramatically different depth estimates, occur close together on the same conductor. Such examples illustrate the reliability of the conductance measurement while showing that the depth estimate can be unreliable. There are a number of factors which can produce an error in the depth estimate, including the averaging of topographic variations by the altimeter, overlying conductive overburden, and the location and attitude of the conductor relative to the flight line. Conductor location and attitude can provide an erroneous depth estimate because the stronger part of the conductor may be deeper or to one side of the flight line, or because it has a shallow dip. A heavy tree cover can also produce errors in depth estimates. This is because the depth estimate is computed as the distance of bird from conductor, minus the altimeter reading. The altimeter can lock onto the top of a dense forest canopy. This situation yields an erroneously large depth estimate but does not affect the conductance estimate.

Dip symbols are used to indicate the direction of dip of conductors. These symbols are used only when the anomaly shapes are unambiguous, which usually requires a fairly resistive environment.

A further interpretation is presented on the EM map by means of the line-to-line correlation of anomalies, which is based on a comparison of anomaly shapes on adjacent lines. This provides conductor axes which may define the geological structure over portions of the survey area. The absence of conductor axes in an area implies that anomalies could not be correlated from line to line with reasonable confidence.

DIGHEM electromagnetic maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a follow-up program. The actual conductance values are printed in the attached anomaly list for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of conductors in terms of length, strike and dip, geometric shape, conductance, depth, and thickness. The accuracy is comparable to an interpretation from a high quality ground EM survey having the same line spacing.

The attached EM anomaly list provides a tabulation of anomalies in ppm, conductance, and depth for the vertical sheet model. The EM anomaly list also shows the conductance and depth for a thin horizontal sheet (whole plane) model, but only the vertical sheet parameters appear on the EM map. The horizontal sheet model is suitable for a flatly dipping thin bedrock conductor such as a sulfide sheet having a thickness less than 10 m. The list also shows the resistivity and depth for a conductive earth (half space) model, which is suitable for thicker slabs such as thick conductive overburden. In the EM anomaly list, a depth value of zero for the conductive earth model, in an area of thick cover, warns that the anomaly may be caused by conductive overburden.

Since discrete bodies normally are the targets of EM surveys, local base (or zero) levels are used to compute local anomaly amplitudes. This contrasts with the use of true zero levels which are used to compute true EM amplitudes. Local anomaly amplitudes are shown in the EM anomaly list and these are used to compute the vertical sheet parameters of conductance and depth. Not shown in the EM anomaly list are the true amplitudes which are used to compute the horizontal sheet and conductive earth parameters.

Questionable Anomalies

DIGHEM maps may contain EM responses which are displayed as asterisks (*). These responses denote weak anomalies of indeterminate conductance, which may reflect one of the following: a weak conductor near the surface, a strong conductor at depth (e.g., 100 to 120 m below surface) or to one side of the flight line, or aerodynamic noise. Those responses that have the appearance of valid bedrock anomalies on the flight profiles are indicated by appropriate interpretive symbols (see EM map legend). The others probably do not warrant further investigation unless their locations are of considerable geological interest.

The thickness parameter

DIGHEM can provide an indication of the thickness of a steeply dipping conductor. The amplitude of the coplanar anomaly (e.g., CPI channel on the digital profile) increases relative to the coaxial anomaly (e.g., CXI) as the apparent thickness increases, i.e., the thickness in the horizontal plane. (The thickness is equal to the conductor width if the conductor dips at 90 degrees and strikes at right angles to the flight line.) This report refers to a conductor as thin when the thickness is likely to be less than 3 m, and thick when in excess of 10 m. Thick conductors are indicated on the EM map by parentheses "( )". For base metal exploration in steeply dipping geology, thick conductors can be high priority targets because many massive sulfide ore bodies are thick, whereas non-economic bedrock conductors are often thin. The system cannot sense the thickness when the strike of the conductor is subparallel to the flight line, when the conductor has a shallow dip, when the anomaly amplitudes are small, or when the resistivity of the environment is below 100 ohm-m.

Resistivity mapping

Areas of widespread conductivity are commonly encountered during surveys. In such areas, anomalies can be generated by decreases of only 5 m in survey altitude as well as by increases in conductivity. The typical flight record in conductive areas is characterized by inphase and quadrature channels which are continuously active. Local EM peaks reflect either increases in conductivity of the earth or decreases in survey altitude. For such conductive areas, apparent resistivity profiles and contour maps are necessary for the correct interpretation of the airborne data. The advantage of the resistivity parameter is that anomalies caused by altitude changes are virtually eliminated, so the resistivity data reflect only those anomalies caused by conductivity changes. The resistivity analysis also helps the interpreter to differentiate between conductive trends in the bedrock and those patterns typical of conductive overburden. For example, discrete conductors will generally appear as narrow lows on the contour map and broad conductors (e.g., overburden) will appear as wide lows.

The resistivity profiles and the resistivity contour maps present the apparent resistivity using the so-called pseudo-layer (or buried) half space model defined by Fraser (1978)[1]. This model consists of a resistive layer overlying a conductive half space. The depth channels give the apparent depth below surface of the conductive material. The apparent depth is simply the apparent thickness of the overlying resistive layer. The apparent depth (or thickness) parameter will be positive when the upper layer is more resistive than the underlying material, in which case the apparent depth may be quite close to the true depth.

The apparent depth will be negative when the upper layer is more conductive than the underlying material, and will be zero when a homogeneous half space exists. The apparent depth parameter must be interpreted cautiously because it will contain any errors which may exist in the measured altitude of the EM bird (e.g., as caused by a dense tree cover). The inputs to the resistivity algorithm are the inphase and quadrature components of the coplanar coil-pair. The outputs are the apparent resistivity of the conductive half space (the source) and the sensor-source distance. The flying height is not an input variable, and the output resistivity and sensor-source distance are independent of the flying height. The apparent depth, discussed above, is

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

simply the sensor-source distance minus the measured altitude or flying height. Consequently, errors in the measured altitude will affect the apparent depth parameter but not the apparent resistivity parameter.

The apparent depth parameter is a useful indicator of simple layering in areas lacking a heavy tree cover. The DIGHEM system has been flown for purposes of permafrost mapping, where positive apparent depths were used as a measure of permafrost thickness. However, little quantitative use has been made of negative apparent depths because the absolute value of the negative depth is not a measure of the thickness of the conductive upper layer and, therefore, is not meaningful physically. Qualitatively, a negative apparent depth estimate usually shows that the EM anomaly is caused by conductive overburden. Consequently, the apparent depth channel can be of significant help in distinguishing between overburden and bedrock conductors.

The resistivity map often yields more useful information on conductivity distributions than the EM map. In comparing the EM and resistivity maps, keep in mind the following:

(a) The resistivity map portrays the apparent value of the earth's resistivity, where resistivity = 1/conductivity.

(b) The EM map portrays anomalies in the earth's resistivity. An anomaly by definition is a change from the norm and so the EM map displays anomalies, (i) over narrow, conductive bodies and (ii) over the boundary zone between two wide formations of differing conductivity.

The resistivity map might be likened to a total field map and the EM map to a horizontal gradient in the direction of flight[2]. Because gradient maps are usually more sensitive than total field maps, the EM map therefore is to be preferred in resistive areas. However, in conductive areas, the absolute character of the resistivity map usually causes it to be more useful than the EM map.

Interpretation in conductive environments

Environments having background resistivities below 30 ohm-m cause all airborne EM systems to yield very large responses from the conductive ground. This usually prohibits the recognition of discrete bedrock conductors. However, DIGHEM data processing techniques produce three parameters which contribute significantly to the recognition of bedrock conductors. These are the inphase and quadrature difference channels (DFI and DFQ), and the resistivity and depth channels (RES and DP) for each coplanar frequency.

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[2] The gradient analogy is only valid with regard to the identification of anomalous locations.

The EM difference channels (DFI and DFQ) eliminate most of the responses from conductive ground, leaving responses from bedrock conductors, cultural features (e.g., telephone lines, fences, etc.) and edge effects. Edge effects often occur near the perimeter of broad conductive zones. This can be a source of geologic noise. While edge effects yield anomalies on the EM difference channels, they do not produce resistivity anomalies. Consequently, the resistivity channel aids in eliminating anomalies due to edge effects. On the other hand, resistivity anomalies will coincide with the most highly conductive sections of conductive ground, and this is another source of geologic noise. The recognition of a bedrock conductor in a conductive environment therefore is based on the anomalous responses of the two difference channels (DFI and DFQ) and the resistivity channels (RES). The most favourable situation is where anomalies coincide on all channels.

The DP channels, which give the apparent depth to the conductive material, also help to determine whether a conductive response arises from surficial material or from a conductive zone in the bedrock. When these channels ride above the zero level on the digital profiles (i.e., depth is negative), it implies that the EM and resistivity profiles are responding primarily to a conductive upper layer, i.e., conductive overburden. If the DP channels are below the zero level, it indicates that a resistive upper layer exists, and this usually implies the existence of a bedrock conductor. If the low frequency DP channel is below the zero level and the high frequency DP is above, this suggests that a bedrock conductor occurs beneath conductive cover.

The conductance channel CDT identifies discrete conductors which have been selected by computer for appraisal by the geophysicist. Some of these automatically selected anomalies on channel CDT are discarded by the geophysicist. The automatic selection algorithm is intentionally oversensitive to assure that no meaningful responses are missed. The interpreter then classifies the anomalies according to their source and eliminates those that are not substantiated by the data, such as those arising from geologic or aerodynamic noise.

Reduction of geologic noise

Geologic noise refers to unwanted geophysical responses. For purposes of airborne EM surveying, geologic noise refers to EM responses caused by conductive overburden and magnetic permeability. It was mentioned previously that the EM difference channels (i.e., channel DFI for inphase and DFQ for quadrature) tend to eliminate the response of conductive overburden. This marked a unique development in airborne EM technology, as DIGHEM is the only EM system which yields channels having an exceptionally high degree of immunity to conductive overburden.

Magnetite produces a form of geological noise on the inphase channels of all EM systems. Rocks containing less than 1% magnetite can yield negative inphase anomalies caused by magnetic permeability. When magnetite is widely distributed throughout a survey area, the inphase EM channels may continuously rise and fall, reflecting variations in the magnetite percentage, flying height, and overburden thickness. This can lead to difficulties in recognizing deeply buried bedrock conductors, particularly if conductive overburden also exists. However, the response of broadly distributed magnetite generally vanishes on the inphase difference channel DFI. This feature can be a significant aid in the recognition of conductors which occur in rocks containing accessory magnetite.

EM magnetite mapping

The information content of DIGHEM data consists of a combination of conductive eddy current responses and magnetic permeability responses. The secondary field resulting from conductive eddy current flow is frequency-dependent and consists of both inphase and quadrature components, which are positive in sign. On the other hand, the secondary field resulting from magnetic permeability is independent of frequency and consists of only an inphase component which is negative in sign. When magnetic permeability manifests itself by decreasing the measured amount of positive inphase, its presence may be difficult to recognize. However, when it manifests itself by yielding a negative inphase anomaly (e.g., in the absence of eddy current flow), its presence is assured. In this latter case, the negative component can be used to estimate the percent magnetite content.

A magnetite mapping technique was developed for the coplanar coil-pair of DIGHEM. The technique yields a channel (designated FEO) which displays apparent weight percent magnetite according to a homogeneous half space model.[3] The method can be complementary to magnetometer mapping in certain cases. Compared to magnetometry, it is far less sensitive but is more able to resolve closely spaced magnetite zones, as well as providing an estimate of the amount of magnetite in the rock. The method is sensitive to 1/4% magnetite by weight when the EM sensor is at a height of 30 m above a magnetitic half space. It can individually resolve steep dipping narrow magnetite-rich bands which are separated by 60 m. Unlike magnetometry, the EM magnetite method is unaffected by remanent magnetism or magnetic latitude.

The EM magnetite mapping technique provides estimates of magnetite content which are usually correct within a factor of 2 when the magnetite is fairly uniformly distributed. EM magnetite maps can be generated when magnetic permeability is evident as negative inphase responses on the data profiles.

Like magnetometry, the EM magnetite method maps only bedrock features, provided that the overburden is characterized by a general lack of magnetite. This contrasts with resistivity mapping which portrays the combined effect of bedrock and overburden.

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[3] Refer to Fraser, 1981, Magnetite mapping with a multi-coil airborne electromagnetic system: Geophysics, v. 46, p. 1579-1594.

Recognition of culture

Cultural responses include all EM anomalies caused by man-made metallic objects. Such anomalies may be caused by inductive coupling or current gathering. The concern of the interpreter is to recognize when an EM response is due to culture. Points of consideration used by the interpreter, when coaxial and coplanar coil-pairs are operated at a common frequency, are as follows:

1. Channels CXP and CPP monitor 60 Hz radiation. An anomaly on these channels shows that the conductor is radiating power. Such an indication is normally a guarantee that the conductor is cultural. However, care must be taken to ensure that the conductor is not a geologic body which strikes across a power line, carrying leakage currents.

2. A flight which crosses a "line" (e.g., fence, telephone line, etc.) yields a center-peaked coaxial anomaly and an m-shaped coplanar anomaly.[4] When the flight crosses the cultural line at a high angle of intersection, the amplitude ratio of coaxial/coplanar response is 4. Such an EM anomaly can only be caused by a line. The geologic body which yields anomalies most closely resembling a line is the vertically dipping thin dike. Such a body, however, yields an amplitude ratio of 2 rather than 4. Consequently, an

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[4] See Figure 5-1 presented earlier.

m-shaped coplanar anomaly with a CXI/CPI amplitude ratio of 4 is virtually a guarantee that the source is a cultural line.

3. A flight which crosses a sphere or horizontal disk yields center-peaked coaxial and coplanar anomalies with a CXI/CPI amplitude ratio (i.e., coaxial/coplanar) of 1/4. In the absence of geologic bodies of this geometry, the most likely conductor is a metal roof or small fenced yard.[5] Anomalies of this type are virtually certain to be cultural if they occur in an area of culture.

4. A flight which crosses a horizontal rectangular body or wide ribbon yields an m-shaped coaxial anomaly and a center-peaked coplanar anomaly. In the absence of geologic bodies of this geometry, the most likely conductor is a large fenced area.[5] Anomalies of this type are virtually certain to be cultural if they occur in an area of culture.

5. EM anomalies which coincide with culture, as seen on the camera film or video display, are usually caused by culture. However, care is taken with such coincidences because a geologic conductor could occur beneath a fence, for example. In this example, the fence would be expected to yield an m-shaped coplanar anomaly as in case #2 above.

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

If, instead, a center-peaked coplanar anomaly occurred, there would be concern that a thick geologic conductor coincided with the cultural line.

6. The above description of anomaly shapes is valid when the culture is not conductively coupled to the environment. In this case, the anomalies arise from inductive coupling to the EM transmitter. However, when the environment is quite conductive (e.g., less than 100 ohm-m at 900 Hz), the cultural conductor may be conductively coupled to the environment. In this latter case, the anomaly shapes tend to be governed by current gathering. Current gathering can completely distort the anomaly shapes, thereby complicating the identification of cultural anomalies. In such circumstances, the interpreter can only rely on the radiation channels and on the camera film or video records.

MAGNETICS

The existence of a magnetic correlation with an EM anomaly is indicated directly on the EM map. In some geological environments, an EM 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).

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.

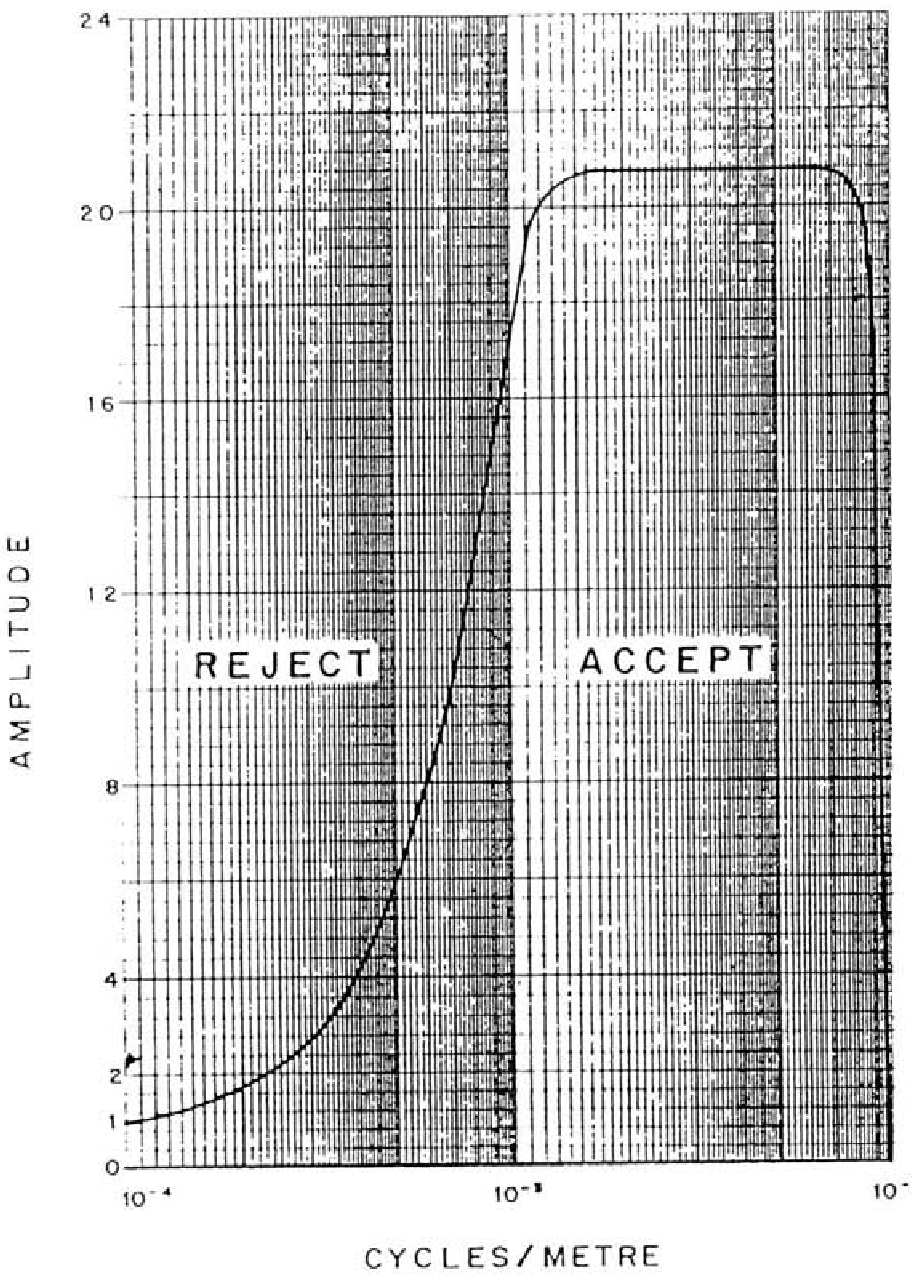

Fig. 5-2 Frequency response of magnetic enhancement operator.

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.

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.

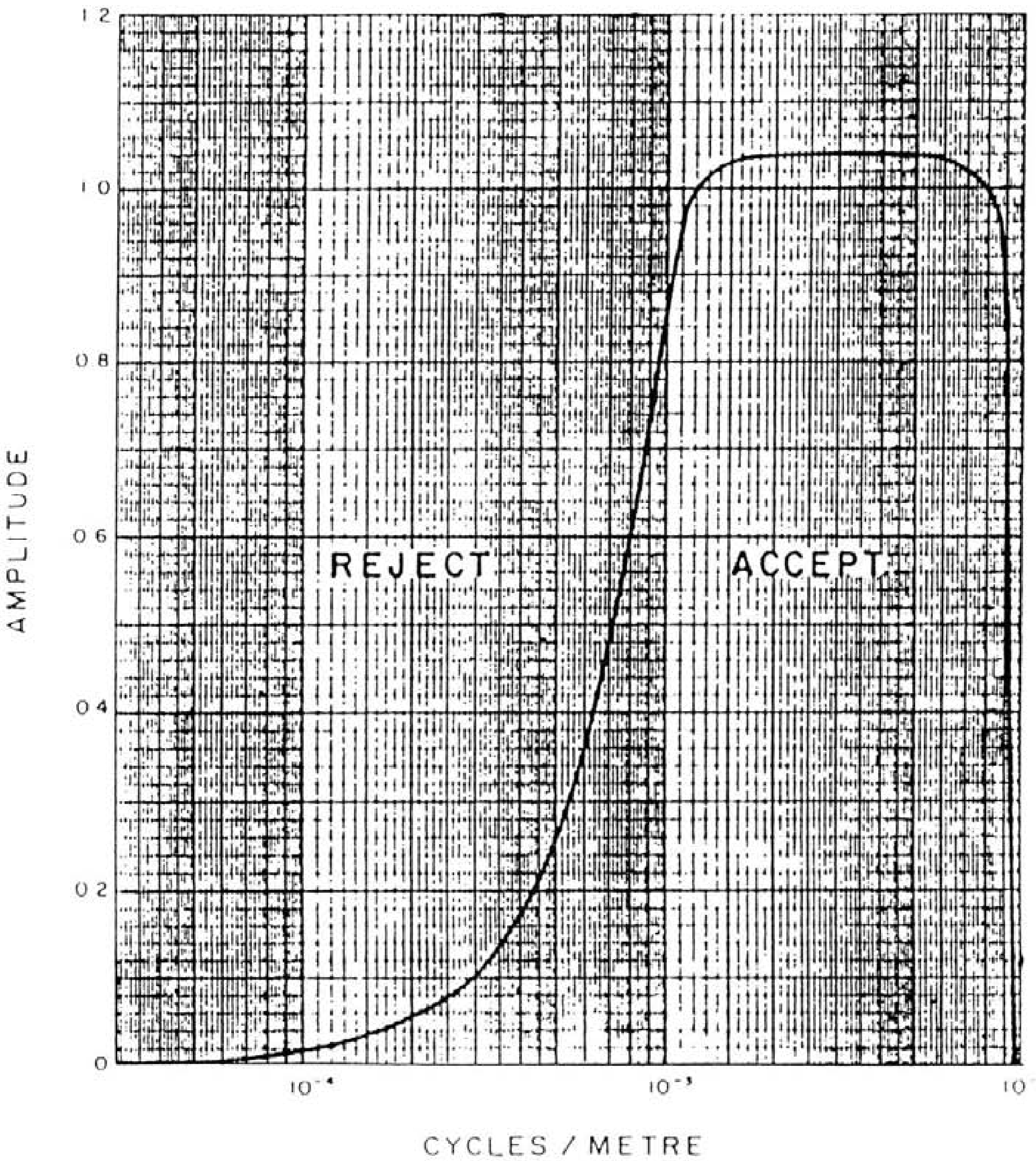

Fig. 5-3 Frequency response of VLF operator.

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 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 survey was successful in locating several anomalous zones which may warrant additional work. The various maps included with this report display the magnetic and conductive properties of the survey area. It is recommended that the survey results be reviewed in detail, in conjunction with all available geophysical, geological and geochemical information. Particular reference should be made to the computer generated data profiles which clearly define the characteristics of the individual anomalies.

Most anomalies in the area are moderately weak and poorly-defined. Many have been attributed to conductive overburden or deep weathering, although a few appear to be associated with magnetite-rich rock units. Others coincide with possible structural features which may reflect faults or shears. Such structural breaks are considered to be of particular interest as they may have influenced mineral deposition within the survey area.

The interpreted bedrock conductors defined by the survey should be subjected to further investigation, using appropriate surface exploration techniques. Anomalies which are currently considered to be of moderately low priority may require upgrading if follow-up results are favourable.

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 SURVEYS & PROCESSING INC.

R. Pritchard

Ruth A. Pritchard
Geophysicist

RAP/sdp

A1138APR.93R

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 Cogema Resources Inc. over the Quartz Lake Property, British Columbia.

Steve Kilty	Vice President, Operations
Robert Gordon	Survey Operations Supervisor
Dave Miles	Senior Geophysical Operator
Maurie Bergstrom	Second Geophysical Operator
Del Rokosh	Pilot (Questral Helicopters Ltd.)
Gordon Smith	Data Processing Supervisor
Ruth A. Pritchard	Interpretation Geophysicist
Lyn Vanderstarren	Drafting Supervisor
Steve Mast	Draftsperson (CAD)
Susan Pothiah	Word Processing Operator
Albina Tonello	Secretary/Expeditor

The survey consisted of 659 km of coverage, including tie lines, flown from March 8 to March 12, 1993.

All personnel are employees of Dighem Surveys & Processing Inc., except for the pilot who is an employee of Questral Helicopters Ltd.

DIGHEM SURVEYS & PROCESSING INC.

R. Pritchard

Ruth A. Pritchard
Geophysicist

RAP/sdp

A1138APR.93R

APPENDIX B

STATEMENT OF EXPENDITURE

Date: April 26, 1993

IN ACCOUNT WITH
DIGHEM SURVEYS & PROCESSING INC.

To: Dighem flying of Agreement dated December 15, 1992, pertaining to an Airborne Geophysical Survey over the Quartz Lake Property, British Columbia.

Survey Charges

620 km of traverse line flying @ $77.00/km plus mobilization costs of $1,250.00.	$48,990.00

Allocation of Costs

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

DIGHEM SURVEYS & PROCESSING INC.

R. Pritchard

Ruth A. Pritchard
Geophysicist

RAP/sdp

A1138APR.93R

APPENDIX C

STATEMENT OF QUALIFICATIONS

I, Ruth A. Pritchard of the City of Brampton, Province of Ontario, do hereby certify that:

1. I am a geophysicist, residing at 31 Barrington Crescent, Brampton, Ontario, L6Z 1N2.

2. I am a graduate of York University, Downsview, Ontario, with a Specialized Honours B.Sc. Earth Sciences - Geophysics (1986).

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

4. The statements made in this report represent my best opinion and judgement.

I, Douglas C. Fraser of the City of Mississauga, Province of Ontario, do hereby certify that I am a Professional Engineer of Ontario, Registration Number 14934012, and that I have supervised the reporting herein.

R. Pritchard

Ruth A. Pritchard
Geophysicist

D. Fraser

Douglas C. Fraser
Geophysicist

APPENDIX D

EM ANOMALY LIST

ANOMALY/ FID/INTERP	COAXIAL 1126 HZ REAL PPM	COAXIAL 1126 HZ QUAD PPM	COPLANAR 875 HZ REAL PPM	COPLANAR 875 HZ QUAD PPM	COPLANAR 7219 HZ REAL PPM	COPLANAR 7219 HZ QUAD PPM	VERTICAL DIKE COND SIEMEN	VERTICAL DIKE DEPTH* M	HORIZONTAL SHEET COND SIEMEN	HORIZONTAL SHEET DEPTH M	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH M	MAG CORR NT
LINE 40010 (FLIGHT 17)													
A 2041B?	17	34	16	40	216	181	3.7	3	1	25	48	2	30
B 2048B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C 2052B?	7	13	17	13	45	51	3.3	22	1	35	62	8	0
D 2055B?	9	11	26	12	45	35	5.0	22	2	35	37	11	0
E 2060B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F 2064B?	1	2	1	2	2	4	-	-	-	-	-	-	60
G 2073B?	5	19	14	30	107	81	1.4	0	1	32	54	5	0
H 2082H	1	4	9	8	27	25	0.7	16	1	41	190	3	0
I 2121S	3	8	6	34	67	159	1.5	20	1	6	329	0	0
J 2135S?	10	13	12	22	88	80	4.5	19	1	20	143	0	0
K 2161H	1	2	1	2	2	4	-	-	-	-	-	-	0
L 2168B?	12	16	16	27	69	86	5.0	22	2	36	44	12	0
M 2173B?	9	16	16	27	69	86	3.4	15	1	29	52	4	0
N 2179B?	1	2	1	2	2	4	-	-	-	-	-	-	0
O 2189H	1	2	1	2	2	2	-	-	-	-	-	-	0
P 2202B?	1	2	1	2	2	4	-	-	-	-	-	-	0
Q 2219S	3	10	2	16	49	89	1.4	12	1	16	294	0	0
R 2238S	4	7	2	10	41	59	3.0	34	1	34	179	1	0
S 2264S	5	14	5	23	76	143	1.8	11	1	20	240	0	0
T 2280S	3	7	2	20	49	122	2.1	27	1	23	250	0	0
LINE 40020 (FLIGHT 17)													
A 2005B?	15	38	17	54	24	162	3.1	3	2	31	46	7	0
B 2001B?	8	14	10	5	33	170	3.2	18	1	24	50	1	0
C 1995B?	1	2	1	2	2	4	-	-	-	-	-	-	0
D 1992B?	8	29	8	22	90	177	1.9	0	1	26	61	1	0
E 1979B?	13	14	16	25	88	69	6.3	16	2	37	36	12	0
F 1969B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G 1932B?	5	10	6	14	52	64	2.6	13	1	32	214	0	0
H 1919S	2	10	2	15	44	93	1.0	6	1	27	294	0	0
I 1905B?	4	15	3	23	68	8	1.4	2	1	22	191	0	0
J 1870B?	1	2	1	2	2	4	-	-	-	-	-	-	0
K 1862B?	12	15	11	21	73	87	5.2	18	1	32	58	6	0
L 1854H	2	10	14	17	51	14	0.8	0	1	37	59	8	0
M 1843S?	4	7	4	11	39	28	2.6	27	1	36	146	2	0
N 1782S	3	9	5	14	25	92	1.5	18	1	15	491	0	0
LINE 40030 (FLIGHT 17)													
A 1475S?	1	2	1	2	2	4	-	-	-	-	-	-	0
B 1490B?	12	16	14	23	83	74	4.9	16	2	35	48	9	0
C 1498B?	1	2	1	2	2	3	-	-	-	-	-	-	0

* ESTIMATED DEPTH MAY BE UNRELIABLE BECAUSE THE STRONGER PART OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

ANOMALY/ FID/INTERP	COAXIAL 1126 HZ REAL PPM	COAXIAL 1126 HZ QUAD PPM	COPLANAR 875 HZ REAL PPM	COPLANAR 875 HZ QUAD PPM	COPLANAR 7219 HZ REAL PPM	COPLANAR 7219 HZ QUAD PPM	VERTICAL DIKE COND SIEMEN	VERTICAL DIKE DEPTH* M	HORIZONTAL SHEET COND SIEMEN	HORIZONTAL SHEET DEPTH M	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH M	MAG CORR NT
LINE 40030	(FLIGHT	17)											
D 1504B?	5	19	11	8	27	14	1.6	0	2	34	33	9	0
E 1508E	1	2	1	2	2	4	-	-	-	-	-	-	0
F 1524S	0	7	2	11	35	68	0.4	0	1	12	482	0	0
G 1541S?	5	6	10	23	39	20	4.6	37	1	32	116	1	0
H 1555B?	4	8	1	10	27	52	2.2	15	1	17	264	0	420
I 1572S?	1	2	1	2	2	4	-	-	-	-	-	-	0
J 1590H	1	2	1	2	2	4	-	-	-	-	-	-	0
K 1608H	2	16	4	25	57	137	0.6	0	1	18	118	0	0
L 1613B?	7	14	10	23	22	87	2.7	20	1	28	89	2	0
M 1618B?	1	2	1	2	2	4	-	-	-	-	-	-	230
N 1635S	1	2	1	2	2	4	-	-	-	-	-	-	0
O 1645S	2	12	4	18	61	71	0.7	0	1	17	126	0	0
P 1675S	1	10	1	15	42	78	0.4	7	1	22	192	0	80
Q 1709S	2	9	4	14	50	65	1.2	15	1	18	195	0	0
LINE 40040	(FLIGHT	17)											
A 1354B?	15	5	19	46	172	96	31.3	32	1	32	53	6	0
B 1337B?	12	18	23	28	88	54	4.7	15	2	46	36	20	0
C 1325B?	1	2	1	2	2	4	-	-	-	-	-	-	0
D 1320B?	1	2	1	2	2	4	-	-	-	-	-	-	0
E 1304B?	4	13	3	20	52	55	1.7	10	1	10	461	0	0
F 1254H	3	1	0	0	1	23	18.3	76	1	61	75	27	0
G 1233S	6	21	6	32	72	150	1.6	3	1	29	88	1	0
H 1209S?	3	12	3	15	58	66	1.1	6	1	15	410	0	0
I 1200S	4	11	7	17	69	58	1.8	12	1	28	130	0	0
J 1186S	3	15	4	24	73	124	0.9	2	1	19	150	0	0
K 1137H	2	7	2	10	35	41	1.1	10	1	37	149	2	0
LINE 40050	(FLIGHT	17)											
A 839H	1	2	1	2	2	4	-	-	-	-	-	-	0
B 844E	18	35	27	60	193	125	4.0	0	2	31	32	8	0
C 854B?	3	8	3	8	19	64	1.7	20	2	71	57	38	0
D 864B?	4	10	8	16	2	85	1.9	9	1	59	67	25	0
E 870B?	16	8	18	10	28	85	16.7	32	2	57	27	33	100
F 894B?	10	15	15	25	64	31	4.1	16	1	44	73	14	0
G 899B?	6	3	15	25	70	1	16.0	60	1	67	70	33	0
H 936H	1	2	1	2	2	4	-	-	-	-	-	-	0
I 966H	1	2	1	2	2	4	-	-	-	-	-	-	0
J 988S	1	2	1	2	2	4	-	-	-	-	-	-	0
K 1030S?	1	1	1	1	2	4	-	-	-	-	-	-	0
L 1036S?	1	2	1	2	2	4	-	-	-	-	-	-	0

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ANOMALY/	FID/INTERP	COAXIAL 1126 HZ REAL PPM	COAXIAL 1126 HZ QUAD PPM	COPLANAR 875 HZ REAL PPM	COPLANAR 875 HZ QUAD PPM	COPLANAR 7219 HZ REAL PPM	COPLANAR 7219 HZ QUAD PPM	VERTICAL DIKE COND SIEMEN	VERTICAL DIKE DEPTH* M	HORIZONTAL SHEET COND SIEMEN	HORIZONTAL SHEET DEPTH M	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH M	MAG CORR NT
LINE 40050	(FLIGHT 17)													
M	1049S	3	11	4	17	46	65	1.4	16	1	36	119	6	110
LINE 40060	(FLIGHT 17)													
A	805B?	1	2	1	2	2	4	-	-	-	-	-	-	30
B	802B?	24	7	39	53	152	51	47.5	32	3	37	18	18	0
C	799B?	8	27	39	53	173	51	1.8	1	2	38	21	17	0
D	776B?	1	2	1	2	2	4	-	-	-	-	-	-	90
E	770B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F	767B?	8	11	6	22	31	25	4.0	12	1	40	68	9	0
G	753B?	7	7	11	12	25	21	5.5	38	1	62	64	30	0
H	713H	1	2	1	2	2	3	-	-	-	-	-	-	0
I	681H	7	22	16	37	36	13	1.8	1	2	32	44	7	0
J	658S	5	13	6	20	56	116	1.9	7	1	11	350	0	0
K	626H	6	5	10	21	2	14	8.1	45	1	29	66	3	0
L	616B?	1	2	1	2	2	4	-	-	-	-	-	-	0
M	611H	1	2	1	2	2	4	-	-	-	-	-	-	0
N	580H	1	10	3	17	47	74	0.4	0	1	32	74	3	0
LINE 40070	(FLIGHT 17)													
A	286H	1	2	1	2	2	4	-	-	-	-	-	-	0
B	309S?	6	19	12	28	99	115	2.0	0	1	33	90	2	0
C	326B?	16	19	17	37	138	112	6.5	12	2	42	32	18	0
D	363S?	0	15	7	35	30	187	0.4	8	1	9	339	0	0
E	377B?	0	7	6	21	40	52	0.4	4	1	45	315	6	0
F	384B?	1	2	1	2	2	4	-	-	-	-	-	-	360
G	387B?	1	8	4	5	6	19	0.4	0	1	29	170	0	0
H	396B?	3	5	5	5	16	43	2.2	31	1	23	169	0	0
I	411H	3	32	8	59	150	210	0.5	0	1	25	57	2	0
J	447B?	0	26	0	40	122	246	0.4	6	1	7	340	0	0
K	449B?	0	26	0	40	122	246	0.4	6	1	1	275	0	0
L	454B?	4	8	3	35	34	215	2.0	27	1	16	413	0	0
M	475B?	8	19	10	33	115	66	2.7	4	1	30	76	2	0
N	478B?	9	19	10	33	115	76	2.8	2	1	27	71	0	0
O	485B?	7	8	6	12	49	18	5.5	22	1	35	83	4	0
P	512H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40080	(FLIGHT 16)													
A	5892H	7	12	22	20	57	45	3.1	14	3	33	17	13	6
B	5889B?	21	21	22	20	61	37	8.1	12	3	39	21	18	0
C	5868S	1	10	5	25	98	7	0.5	0	1	26	106	0	0
D	5855B?	12	10	15	19	34	22	8.1	21	2	50	27	25	0

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LINE 40080	(FLIGHT 16)													
E	5847B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F	5839B?	0	7	4	11	53	85	0.4	0	1	20	541	0	0
G	5827B?	5	19	5	26	69	113	1.4	3	1	18	239	0	0
H	5823B?	0	2	1	2	2	4	-	-	-	-	-	-	0
I	5804B?	1	2	0	2	2	4	-	-	-	-	-	-	0
J	5801B?	4	18	6	24	80	108	1.0	7	1	11	267	0	0
K	5799B?	4	12	6	24	80	108	1.4	15	1	18	217	0	0
L	5790S?	1	2	1	2	2	4	-	-	-	-	-	-	0
M	5761H	4	9	11	1	32	52	0.8	0	1	29	88	12	0
N	5729S?	0	9	1	11	46	93	0.4	4	1	6	344	0	0
O	5709S	3	5	3	8	31	31	2.6	45	1	44	216	7	0
P	5697S	2	7	6	10	38	45	0.9	8	1	25	255	0	160
Q	5686H	1	2	1	0	1	4	-	-	-	-	-	-	0
R	5672B?	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40090	(FLIGHT 16)													
A	5404B?	18	26	34	34	104	38	5.1	9	3	39	21	18	5
B	5408B?	18	22	34	34	104	30	6.0	6	3	38	22	16	0
C	5430H	5	15	3	18	69	17	1.7	7	1	35	102	5	0
D	5447B?	11	12	4	6	69	39	6.1	27	1	34	68	7	830
E	5451B?	10	17	18	30	75	48	3.4	18	1	31	75	5	0
F	5458E	2	10	0	24	85	107	0.6	3	1	14	475	0	0
G	5469S?	1	24	3	36	138	150	0.4	0	1	3	358	0	0
H	5485B?	0	15	0	25	75	74	0.4	0	1	12	541	0	0
I	5489B?	0	16	0	15	75	85	0.4	1	1	10	423	0	0
J	5491B?	0	11	1	15	29	85	0.4	4	1	10	391	0	0
K	5515S	3	7	4	11	35	33	1.7	8	1	21	197	0	0
L	5560S?	1	2	1	2	2	4	-	-	-	-	-	-	0
M	5575S?	0	8	0	9	52	177	0.4	8	1	4	291	0	0
N	5605S?	1	2	1	2	2	4	-	-	-	-	-	-	0
O	5621H	10	13	16	27	70	61	4.6	27	1	35	72	8	0
LINE 40100	(FLIGHT 16)													
A	5369B?	21	28	34	53	164	66	5.9	9	3	39	20	18	0
B	5354B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C	5328B?	14	24	16	39	112	103	4.1	9	2	34	38	10	0
D	5320B?	9	7	16	15	77	36	8.3	30	1	33	87	3	240
E	5308S?	4	8	5	12	33	31	2.0	25	1	37	233	1	130
F	5293S?	0	5	0	5	21	28	0.4	0	1	32	683	0	0
G	5284S	0	10	0	15	25	78	0.4	1	1	16	491	0	0
H	5266B?	5	8	4	14	53	43	3.3	30	1	29	256	0	0

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LINE 40100		(FLIGHT		16)										
I	5233H	1	2	1	2	2	4	-	-	-	-	-	-	0
J	5205S?	2	7	0	18	0	77	1.5	29	1	8	365	0	0
LINE 40110		(FLIGHT		16)										
A	4875H	10	23	20	41	60	98	2.8	9	2	35	32	13	40
B	4902H?	5	6	10	11	38	47	4.1	32	2	50	47	22	460
C	4917H?	5	9	7	15	44	33	2.7	26	1	43	135	8	0
D	4959S	0	8	3	12	35	29	0.4	0	1	21	344	0	0
E	4972S?	0	10	3	14	33	84	0.4	0	1	10	498	0	0
F	4985H	3	8	13	16	25	16	1.8	4	2	36	54	7	0
G	4998H	4	14	10	24	51	103	1.5	7	1	36	62	8	0
H	5069H?	0	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40120		(FLIGHT		16)										
A	4812B?	9	17	15	28	83	74	3.4	10	1	45	65	15	0
B	4806B?	15	9	20	28	83	43	13.2	31	2	68	50	38	0
C	4803B?	15	18	20	28	83	36	6.3	4	2	42	24	18	150
D	4774B?	11	20	19	23	128	95	3.5	19	1	38	59	12	400
E	4771B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F	4740B?	0	4	0	8	27	35	0.4	0	1	34	687	0	0
G	4737B?	0	6	0	8	27	35	0.4	0	1	31	652	0	0
H	4716S?	1	5	3	9	37	29	0.6	6	1	20	365	0	0
I	4710B?	1	1	1	2	2	4	-	-	-	-	-	-	0
J	4688H	9	9	6	15	47	60	5.6	34	1	46	68	17	0
K	4681B?	1	2	1	2	2	4	-	-	-	-	-	-	440
L	4668H	1	2	1	2	2	4	-	-	-	-	-	-	0
M	4602S	0	2	0	2	2	4	-	-	-	-	-	-	0
LINE 40130		(FLIGHT		16)										
A	4301B	7	11	14	21	4	4	3.1	16	2	58	42	29	0
B	4314B	12	20	18	34	102	59	4.0	10	2	43	34	19	0
C	4340B	15	21	25	33	84	40	5.4	15	2	42	34	18	240
D	4379B?	0	6	0	10	39	35	0.4	0	1	43	731	0	0
E	4398B?	2	4	1	4	23	15	1.0	0	1	44	121	24	0
F	4420S?	0	24	2	47	116	208	0.4	4	1	0	261	0	100
G	4436H	1	2	1	2	2	4	-	-	-	-	-	-	0
H	4443B?	1	2	1	2	2	4	-	-	-	-	-	-	0
I	4462H	1	2	1	2	2	4	-	-	-	-	-	-	0
J	4496H	1	2	1	2	2	4	-	-	-	-	-	-	0
K	4520B?	0	26	0	38	47	302	0.4	12	1	4	242	0	0
LINE 40140		(FLIGHT		16)										
A	4203B?	11	12	15	18	54	32	5.9	17	2	45	33	20	0

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LINE 40140		(FLIGHT	16)											
B	4194D	9	14	11	20	53	48	3.7	15	1	43	61	13	0
C	4168B	1	2	1	2	2	4	-	-	-	-	-	-	0
D	4163B	10	11	22	10	9	51	5.7	20	1	36	79	6	250
E	4127B?	1	2	0	2	2	4	-	-	-	-	-	-	0
F	4117B?	1	2	0	2	2	4	-	-	-	-	-	-	0
G	4112D	4	24	3	28	98	147	0.9	0	1	4	383	0	0
H	4074H	10	22	18	47	132	121	2.9	4	1	26	58	1	0
I	4061H	4	6	3	10	46	36	3.4	37	1	32	180	0	0
J	4045H	11	9	16	47	51	156	8.8	36	1	31	56	7	0
K	4012H	1	2	1	2	2	4	-	-	-	-	-	-	0
L	3993H	3	14	11	24	91	115	0.8	1	1	25	82	0	6
M	3989B?	5	17	11	24	91	108	1.5	7	1	25	122	0	0
N	3986B?	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40150		(FLIGHT	16)											
A	3700E	1	2	1	2	2	4	-	-	-	-	-	-	0
B	3710B?	7	11	12	26	82	47	3.4	9	2	45	41	17	140
C	3717B?	1	2	1	2	2	4	-	-	-	-	-	-	0
D	3745B?	9	12	4	18	29	46	4.3	19	1	28	122	0	340
E	3763S	3	14	5	21	81	28	1.2	5	1	19	242	0	0
F	3794B?	2	18	1	59	106	295	0.6	4	1	7	324	0	0
G	3797B?	2	33	0	59	106	295	0.5	7	1	4	236	0	0
H	3800B?	0	22	0	59	106	295	0.4	9	1	7	306	0	0
I	3830S	6	11	9	15	53	27	2.8	7	1	25	119	0	0
J	3856B?	1	2	1	2	2	4	-	-	-	-	-	-	0
K	3864B?	1	2	1	2	2	4	-	-	-	-	-	-	0
L	3904H	1	2	1	2	2	4	-	-	-	-	-	-	220
LINE 40160		(FLIGHT	16)											
A	3646B?	12	12	21	32	77	51	6.8	18	2	36	30	12	0
B	3627B?	10	16	28	27	80	38	3.8	11	2	41	22	19	450
C	3599S?	2	11	3	16	48	89	0.6	0	1	7	331	0	0
D	3575B?	1	2	0	2	2	4	-	-	-	-	-	-	0
E	3558S?	1	2	1	2	2	4	-	-	-	-	-	-	0
F	3523S?	2	5	5	7	30	13	1.9	26	1	35	232	0	0
G	3515S?	0	2	0	6	17	39	0.4	0	1	22	661	0	0
H	3508S?	3	14	5	26	83	99	0.9	0	1	14	271	0	0
I	3488B?	5	6	9	10	30	50	4.6	33	1	29	127	0	0
J	3434H	4	5	2	25	24	106	3.7	46	1	37	66	10	50
LINE 40170		(FLIGHT	16)											
A	3176H	13	5	22	46	32	33	24.1	39	2	31	29	10	80

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LINE 40170	(FLIGHT 16)													
B	3195B?	12	10	19	17	45	9	8.5	22	2	49	25	25	570
C	3223S?	5	11	6	19	56	58	2.6	12	1	17	189	0	0
D	3257B?	0	16	0	29	100	140	0.4	0	1	6	411	0	0
E	3258B?	0	19	0	29	100	140	0.4	0	1	1	368	0	0
F	3264B?	0	38	0	39	79	218	0.4	6	1	4	310	0	0
G	3266B?	0	38	0	39	79	218	0.4	11	1	3	247	0	0
H	3271B?	0	16	0	35	50	156	0.4	6	1	13	398	0	0
I	3274B?	0	6	0	4	51	13	0.4	4	1	22	512	0	0
J	3276B?	0	2	0	2	2	4	-	-	-	-	-	-	0
K	3280B?	0	5	0	12	44	94	0.4	1	1	26	587	0	0
L	3282B?	0	10	0	12	44	94	0.4	5	1	22	505	0	0
M	3307B?	1	2	1	2	2	4	-	-	-	-	-	-	0
N	3312S?	8	24	9	41	136	165	2.2	6	1	7	267	0	0
O	3340S?	1	2	1	2	2	4	-	-	-	-	-	-	0
P	3352S?	1	2	1	2	2	4	-	-	-	-	-	-	0
Q	3377H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40180	(FLIGHT 16)													
A	3105B?	19	27	34	43	133	54	5.3	7	3	35	20	14	570
B	3095H	5	6	4	8	43	41	4.2	36	1	35	100	4	0
C	3060B?	0	2	0	2	2	4	-	-	-	-	-	-	0
D	3057B?	0	5	0	7	27	32	0.4	0	1	16	589	0	0
E	3038S?	2	10	2	17	66	73	0.8	0	1	0	468	0	0
F	3032B?	4	4	1	12	7	4	4.8	40	1	11	525	0	0
G	3025B?	0	15	0	18	68	102	0.4	0	1	2	412	0	0
H	3017B?	0	12	0	13	52	68	0.4	0	1	7	527	0	0
I	3000S?	0	12	0	21	55	96	0.4	0	1	3	417	0	0
J	2989S?	3	8	5	13	55	51	1.3	11	1	19	237	0	0
K	2964S?	5	17	11	29	95	5	1.7	6	1	16	134	0	0
L	2931H	1	2	1	2	2	4	-	-	-	-	-	-	0
M	2924H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40190	(FLIGHT 16)													
A	2645H	1	2	1	2	2	4	-	-	-	-	-	-	110
B	2661H	18	11	28	27	78	48	13.7	18	3	32	16	13	0
C	2681B?	1	2	1	2	2	4	-	-	-	-	-	-	0
D	2685B?	1	2	1	2	2	4	-	-	-	-	-	-	0
E	2705B?	1	8	0	11	36	58	0.7	6	1	18	553	0	0
F	2715B?	1	5	0	8	22	55	0.9	13	1	22	625	0	1360
G	2733B?	4	12	4	14	55	55	1.5	6	1	8	483	0	0
H	2745B?	3	11	1	14	57	87	1.4	6	1	8	484	0	0

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LINE 40190 (FLIGHT 16)													
I 2764B?	0	17	0	26	65	126	0.4	0	1	4	381	0	0
J 2796B?	0	21	0	33	111	150	0.4	2	1	0	295	0	0
K 2798B?	0	2	0	2	2	4	-	-	-	-	-	-	0
L 2819S?	0	14	4	23	73	141	0.4	1	1	9	310	0	0
M 2832H	9	12	9	22	49	40	5.0	23	1	37	52	11	0
N 2858H	5	6	8	11	34	39	3.5	33	2	40	45	14	0
LINE 40200 (FLIGHT 16)													
A 2524H	6	20	21	39	85	62	1.9	3	2	24	22	5	0
B 2513H	13	22	31	61	98	136	4.0	13	3	28	18	9	170
C 2501B?	5	8	6	5	31	33	3.2	28	1	21	194	0	580
D 2488H	5	20	13	39	125	80	1.5	0	1	25	91	0	0
E 2476B?	0	11	2	12	48	58	0.4	0	1	17	509	0	0
F 2462S	3	18	3	32	107	120	0.8	0	1	10	374	0	0
G 2446B?	3	13	6	34	68	45	1.2	3	1	21	593	0	0
H 2440B?	7	14	7	35	82	54	2.8	11	1	15	191	0	0
I 2432B?	4	13	4	19	79	69	1.7	4	1	12	311	0	0
J 2415H	1	2	0	2	2	4	-	-	-	-	-	-	0
K 2401H	5	10	2	16	33	80	2.3	21	1	9	450	0	0
L 2391H	6	10	4	14	64	72	2.9	16	1	7	289	0	0
M 2384B?	1	2	0	2	2	4	-	-	-	-	-	-	0
N 2379B?	1	2	0	2	2	4	-	-	-	-	-	-	0
O 2366S?	1	2	1	2	2	4	-	-	-	-	-	-	0
P 2349H	7	5	11	10	32	30	8.0	37	2	44	39	18	0
Q 2325H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40210 (FLIGHT 16)													
A 2067H	6	9	32	20	52	33	3.6	23	3	29	16	11	0
B 2091B?	14	31	50	53	185	197	3.4	7	1	22	57	0	0
C 2101B?	4	13	4	17	53	91	1.3	11	1	25	121	0	0
D 2103B?	4	15	8	4	62	39	1.4	9	1	20	129	0	0
E 2105B?	5	15	8	4	62	29	1.6	10	1	19	109	0	0
F 2121B?	5	12	9	18	72	64	2.2	16	1	30	224	0	0
G 2138S?	8	22	11	39	161	105	2.2	9	1	24	132	0	0
H 2160S?	8	18	14	49	136	129	2.5	11	1	20	81	0	0
I 2185S?	10	28	15	54	194	122	2.5	2	1	18	100	0	0
J 2196B?	3	11	3	16	38	63	1.3	9	1	8	435	0	0
K 2209B?	1	7	0	11	21	48	0.4	3	1	17	520	0	0
L 2216B?	1	2	0	2	2	4	-	-	-	-	-	-	0
M 2223B?	3	15	1	18	56	97	1.0	5	1	11	436	0	0
N 2252H	1	2	1	2	2	4	-	-	-	-	-	-	0

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LINE 40220	(FLIGHT	16)											
A 2005H	13	13	25	32	74	55	6.9	19	2	26	26	5	0
B 1996B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C 1994B?	6	12	22	23	70	94	2.6	17	1	27	47	3	0
D 1991B?	14	2	24	67	186	3	80.6	38	2	30	31	8	0
E 1988B?	15	34	24	67	186	99	3.3	0	2	25	28	4	0
F 1975B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G 1974B?	1	2	1	2	2	4	-	-	-	-	-	-	0
H 1970B?	3	18	4	25	83	119	0.8	0	1	24	131	0	0
I 1953H	4	15	11	27	98	55	1.2	0	1	27	112	0	0
J 1941B?	1	2	1	2	2	4	-	-	-	-	-	-	0
K 1938B?	4	5	10	26	114	8	4.4	38	1	26	121	0	0
L 1933S?	4	13	9	26	71	56	1.6	7	1	27	196	0	60
M 1918S	11	31	22	56	186	139	2.5	0	1	26	61	0	0
N 1909B?	0	13	5	17	74	68	0.4	0	1	27	222	0	0
O 1906B?	1	2	1	2	2	4	-	-	-	-	-	-	0
P 1892S?	11	23	21	45	197	115	3.2	11	1	25	71	0	0
Q 1878S?	0	15	1	21	58	125	0.4	0	1	3	356	0	0
R 1859S?	0	14	4	22	73	74	0.4	0	1	15	264	0	0
S 1838S	0	23	9	38	113	72	0.4	0	1	21	147	0	0
T 1825B?	1	2	1	2	2	4	-	-	-	-	-	-	0
U 1811H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40230	(FLIGHT	16)											
A 1531H	1	2	1	2	2	4	-	-	-	-	-	-	0
B 1549B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C 1553B?	28	19	50	45	123	34	14.8	5	3	27	17	7	0
D 1566B?	1	2	1	2	2	4	-	-	-	-	-	-	0
E 1579S?	6	15	12	44	82	103	2.3	9	1	23	64	0	0
F 1598B?	2	5	7	4	23	34	1.4	38	1	37	277	4	0
G 1615B?	6	14	18	37	124	40	2.4	12	1	21	109	0	0
H 1623E	10	43	30	83	294	245	1.8	1	1	9	209	0	0
I 1627H	14	46	31	83	294	186	2.4	0	1	22	53	0	0
J 1640S?	5	19	9	38	157	91	1.5	0	1	15	149	0	0
K 1653E	1	2	1	2	2	4	-	-	-	-	-	-	0
L 1656S?	10	21	19	37	142	114	2.9	3	1	30	63	3	0
M 1673S?	7	17	12	32	124	81	2.5	5	1	18	109	0	0
N 1682B?	1	2	1	1	2	4	-	-	-	-	-	-	0
O 1688B?	6	22	10	29	115	119	1.8	3	1	16	182	0	0
P 1728B?	1	2	1	2	2	4	-	-	-	-	-	-	0
Q 1743B?	4	10	11	17	6	29	1.9	9	2	50	25	25	0
LINE 40240	(FLIGHT	16)											
A 1401H	8	16	35	55	151	71	2.9	13	2	30	24	10	0

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LINE 40240		(FLIGHT		16)										
B	1383B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C	1379B?	31	39	57	74	233	78	7.4	0	3	24	19	5	0
D	1367E	11	22	22	42	154	116	3.1	9	1	21	105	0	0
E	1363H	11	22	22	42	154	116	3.1	3	1	25	55	0	0
F	1328E	1	2	1	2	2	4	-	-	-	-	-	-	0
G	1322H	10	24	14	43	144	38	2.7	0	1	29	61	2	0
H	1307H	1	1	1	2	2	4	-	-	-	-	-	-	0
I	1295B?	1	2	1	2	2	4	-	-	-	-	-	-	0
J	1281H	11	27	24	49	178	153	2.7	2	2	33	49	8	0
K	1264H	6	18	14	34	108	55	2.1	1	1	25	62	0	0
L	1248H	1	2	1	2	2	4	-	-	-	-	-	-	0
M	1221S	6	13	9	21	84	84	2.4	13	1	28	93	0	0
N	1195S	7	6	13	15	10	43	6.3	29	3	47	21	24	0
LINE 40250		(FLIGHT		16)										
A	931H	21	37	37	71	232	104	4.6	7	2	26	26	6	0
B	952H	7	4	23	3	7	40	10.8	48	3	32	16	14	0
C	985H	9	24	15	40	128	107	2.4	2	2	26	41	3	0
D	995B?	1	2	1	2	2	4	-	-	-	-	-	-	0
E	1004B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F	1008H	5	5	14	13	32	36	5.0	33	2	34	45	7	0
G	1023H	7	12	14	23	52	3	3.0	14	2	41	31	17	0
H	1046E	14	20	27	6	96	115	5.3	18	1	28	86	1	0
I	1051H	12	15	26	31	82	46	5.7	20	2	29	34	7	0
J	1065H	9	16	15	33	92	46	3.3	17	1	24	56	0	0
K	1076H	1	2	1	2	2	4	-	-	-	-	-	-	0
L	1089H	1	2	1	2	2	4	-	-	-	-	-	-	0
M	1106H	7	12	13	24	66	22	3.4	23	1	25	83	0	0
N	1126S?	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40260		(FLIGHT		16)										
A	860H	9	24	5	47	156	109	2.4	0	2	30	40	6	0
B	841E	7	19	15	45	133	122	2.1	4	1	12	160	0	0
C	823H	1	2	1	2	2	4	-	-	-	-	-	-	0
D	801E	30	45	55	10	25	139	6.1	4	1	18	54	0	0
E	790H	10	5	13	14	142	184	14.3	49	2	23	29	5	0
F	781E	26	26	46	61	144	71	8.8	15	2	25	44	3	80
G	769S?	16	30	22	54	167	61	3.8	6	1	21	57	0	0
H	752S?	17	27	35	50	117	97	4.7	8	2	30	26	9	0
I	741S?	10	19	17	40	91	122	3.4	14	1	26	60	2	0
J	727B?	7	13	10	16	64	48	2.8	21	1	18	128	0	950

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LINE 40260		(FLIGHT	16)											
K	692S?	9	16	20	29	80	165	3.6	24	1	0	263	0	0
L	669H	1	9	3	21	46	88	0.4	0	2	43	39	17	180
LINE 40270		(FLIGHT	16)											
A	208H	1	0	1	2	2	4	-	-	-	-	-	-	0
B	223H	1	2	1	2	2	4	-	-	-	-	-	-	0
C	237H	5	14	16	40	68	86	2.0	16	1	24	43	3	0
D	262S?	2	21	5	14	88	112	0.4	0	1	2	292	0	0
E	272S?	15	25	27	43	140	189	4.4	13	1	20	52	0	0
F	288B?	29	51	60	105	330	318	5.2	9	2	20	37	0	0
G	299B?	38	66	75	130	392	280	5.6	9	1	19	40	0	0
H	302H	40	56	75	130	392	270	7.3	10	2	25	22	7	0
I	334H	9	9	14	21	37	56	6.1	28	2	30	46	6	0
J	350H	10	8	15	15	52	62	9.5	37	2	40	36	17	0
K	360B?	12	9	12	13	13	72	9.6	36	1	22	111	0	0
L	373B?	5	3	9	48	96	208	9.9	72	1	0	330	0	0
M	376B?	0	23	8	48	96	208	0.4	12	1	0	183	0	0
N	394H	8	34	18	62	148	239	1.6	2	2	25	41	4	0
O	404B?	10	5	22	1	7	93	14.8	43	1	31	48	7	90
P	415B?	5	7	13	29	56	55	3.7	41	1	24	177	0	0
Q	432H	7	11	16	3	13	24	4.0	14	2	45	30	20	0
LINE 40280		(FLIGHT	15)											
A	6944H	10	5	14	7	22	190	12.7	42	2	29	36	7	0
B	6931H	5	14	10	21	69	66	1.9	10	2	35	34	12	0
C	6919H	10	17	6	28	90	36	3.7	9	2	38	35	13	0
D	6912B?	5	11	20	27	89	48	2.2	11	1	26	149	0	0
E	6906S?	0	18	4	28	109	144	0.4	0	1	10	300	0	0
F	6877H	12	13	19	20	48	25	6.7	18	2	37	33	13	0
G	6872B?	11	7	19	20	44	17	13.2	29	1	37	72	7	0
H	6866E	13	12	22	23	64	47	7.8	21	1	35	52	8	0
I	6830H	3	3	8	4	10	24	4.3	50	2	44	50	15	0
J	6784H	8	11	15	21	45	25	4.3	23	1	40	80	10	40
K	6741B?	6	14	12	23	61	63	2.5	13	2	44	36	19	150
L	6731B?	5	11	12	19	49	70	2.2	16	2	47	52	19	0
LINE 40290		(FLIGHT	15)											
A	6449H	1	2	1	2	2	4	-	-	-	-	-	-	0
B	6488S?	13	22	29	50	164	131	3.9	15	2	26	41	4	0
C	6524H	1	2	1	2	1	4	-	-	-	-	-	-	0
D	6583H	8	12	16	22	58	76	4.3	22	2	40	34	16	0

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LINE 40290		(FLIGHT	15)											
E	6596B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F	6601B?	2	27	3	31	102	200	0.5	0	1	27	193	0	0
G	6604B?	4	27	4	31	102	200	1.0	0	1	22	148	0	0
H	6637B?	1	2	1	2	2	4	-	-	-	-	-	-	0
I	6644B?	2	17	9	28	74	105	0.5	0	2	43	38	17	0
J	6662S?	3	10	10	18	44	63	1.5	14	2	50	53	22	0
LINE 40300		(FLIGHT	15)											
A	6379H	1	2	1	2	2	4	-	-	-	-	-	-	0
B	6352H	1	2	1	2	2	4	-	-	-	-	-	-	0
C	6343E	0	2	1	2	2	4	-	-	-	-	-	-	0
D	6334S?	0	10	0	11	28	80	0.4	0	1	19	535	0	0
E	6314H	1	2	1	2	2	4	-	-	-	-	-	-	0
F	6256H	1	7	6	10	37	54	0.7	5	2	46	45	19	0
G	6242B?	8	6	9	8	17	14	9.1	31	2	50	31	24	0
H	6227S?	2	7	3	10	27	77	1.3	21	1	18	466	0	0
I	6190H	1	2	1	2	2	4	-	-	-	-	-	-	0
J	6168H	3	10	11	18	57	85	1.3	12	1	46	62	17	0
LINE 40310		(FLIGHT	15)											
A	5881H	17	45	33	112	310	342	3.0	11	2	23	26	6	30
B	5908H	18	13	24	37	61	43	11.7	34	2	35	45	12	0
C	5929B?	11	71	15	121	475	698	1.2	0	1	10	117	0	0
D	5962H	1	2	1	2	2	4	-	-	-	-	-	-	0
E	6010H	1	2	1	2	2	4	-	-	-	-	-	-	0
F	6048S?	0	10	0	17	26	136	0.4	7	1	14	401	0	0
G	6062S?	6	11	11	23	59	133	3.2	33	1	51	64	23	0
H	6089H	1	2	1	2	2	3	-	-	-	-	-	-	240
I	6103H	3	16	6	25	97	86	0.8	7	1	43	64	15	0
J	6114H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40320		(FLIGHT	15)											
A	5820H	1	2	1	2	2	4	-	-	-	-	-	-	0
B	5792S?	10	23	18	40	153	207	2.9	11	1	21	125	0	0
C	5760H	1	2	1	2	2	4	-	-	-	-	-	-	170
D	5746S?	1	2	1	2	2	4	-	-	-	-	-	-	0
E	5713H	4	9	3	13	46	68	1.8	15	2	44	52	16	0
F	5674H	1	2	1	2	2	4	-	-	-	-	-	-	0
G	5640H	5	12	7	21	87	90	1.9	18	1	41	58	14	0
H	5625B?	9	15	12	48	174	130	3.8	19	1	27	52	3	0
I	5622B?	1	2	1	2	2	4	-	-	-	-	-	-	0

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LINE 40330	(FLIGHT		15)										
A 5203H	21	37	32	75	253	258	4.5	15	2	23	25	6	0
B 5292H	1	2	1	2	2	4	-	-	-	-	-	-	0
C 5324H	4	9	7	14	40	85	2.1	18	2	40	36	16	0
D 5339H	1	2	1	2	2	4	-	-	-	-	-	-	0
E 5378H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40331	(FLIGHT		15)										
A 5507H	6	4	12	54	44	79	7.7	61	1	37	49	14	0
B 5538H	1	2	1	2	2	4	-	-	-	-	-	-	0
C 5555H	1	14	3	22	51	100	0.4	8	1	32	110	5	0
D 5569H	9	26	21	43	102	168	2.2	6	2	31	41	8	0
LINE 40341	(FLIGHT		15)										
A 5140H	8	11	17	38	77	63	3.8	23	2	31	25	10	9
B 5079H	7	23	13	38	105	103	1.8	6	2	37	37	14	50
C 5062B?	5	11	6	12	71	50	2.2	21	1	17	199	0	0
D 5054E	10	21	23	36	114	98	2.9	13	1	25	89	0	0
E 5047H	4	3	14	36	106	126	6.7	53	2	37	33	13	0
F 5000B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G 4979H	8	19	15	31	89	77	2.4	9	2	44	31	20	0
H 4969H	1	2	1	2	2	4	-	-	-	-	-	-	0
I 4954H	5	12	7	17	63	76	2.1	18	1	33	80	5	0
LINE 40350	(FLIGHT		15)										
A 4454H	8	10	13	16	53	35	4.8	23	2	32	26	10	0
B 4393H	6	15	11	25	75	90	2.4	10	2	40	37	15	0
C 4376E	5	11	10	16	63	52	2.1	13	1	26	225	0	0
D 4355H	1	2	1	2	2	4	-	-	-	-	-	-	0
E 4285H	5	11	13	2	3	4	2.5	12	2	41	25	18	0
LINE 40360	(FLIGHT		15)										
A 3966S?	1	2	1	2	2	4	-	-	-	-	-	-	0
B 3996H	14	5	20	26	123	71	24.7	48	2	32	31	12	0
C 4049H	7	24	12	39	34	177	1.7	7	1	32	50	8	0
D 4064B?	1	2	1	2	2	4	-	-	-	-	-	-	110
E 4069E	1	2	1	2	2	4	-	-	-	-	-	-	0
F 4070S	16	37	21	65	271	218	3.2	6	1	19	79	0	0
G 4081E	1	2	1	2	2	4	-	-	-	-	-	-	0
H 4085S	6	20	8	30	156	198	1.8	9	1	19	155	0	15
I 4103E	1	2	1	2	2	4	-	-	-	-	-	-	0
J 4119B?	1	2	1	2	2	4	-	-	-	-	-	-	0

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LINE 40360 (FLIGHT 15)													
K 4182H	2	5	8	8	19	60	1.8	30	2	42	41	16	0
L 4188E	1	2	1	2	2	4	-	-	-	-	-	-	0
M 4202E	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40370 (FLIGHT 15)													
A 3701H	6	5	8	8	28	15	5.7	32	2	41	31	16	0
B 3641B?	6	19	7	27	150	133	1.7	6	1	13	199	0	0
C 3633B?	0	19	0	22	57	164	0.4	9	1	9	335	0	0
D 3624B?	2	29	12	33	134	167	0.4	1	1	1	292	0	1200
E 3617S	8	15	17	25	105	66	3.1	20	1	22	91	0	0
F 3600B?	6	1	11	11	1	6	49.0	65	2	51	27	27	0
G 3577B?	1	2	1	2	2	4	-	-	-	-	-	-	0
H 3563B?	1	1	1	2	2	4	-	-	-	-	-	-	0
I 3539S?	1	2	1	2	2	4	-	-	-	-	-	-	0
J 3524S?	1	15	2	24	89	143	0.4	0	1	19	525	0	0
LINE 40371 (FLIGHT 15)													
A 3900H	6	15	11	27	84	71	2.1	6	2	32	46	7	0
B 3880H	11	10	5	15	41	53	7.3	24	2	42	36	17	0
LINE 40380 (FLIGHT 15)													
A 3240H	1	2	1	2	2	4	-	-	-	-	-	-	0
B 3266B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C 3305H	3	7	14	15	30	37	2.1	25	2	35	38	11	0
D 3326B?	4	19	5	17	93	101	1.1	5	1	13	274	0	0
E 3334S?	0	12	0	11	27	115	0.4	8	1	10	341	0	0
F 3354B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G 3362H	10	6	37	60	84	32	12.6	46	2	28	34	8	50
H 3417B?	1	2	1	2	2	4	-	-	-	-	-	-	0
I 3425B?	10	15	18	26	54	92	4.1	23	2	41	43	16	0
J 3438S	3	23	3	35	61	146	0.7	0	1	11	299	0	0
K 3441S?	1	2	1	2	2	4	-	-	-	-	-	-	0
L 3453S?	1	11	1	14	37	73	0.4	0	1	17	536	0	0
M 3471S	1	7	0	13	30	71	0.4	10	1	28	512	0	0
LINE 40390 (FLIGHT 15)													
A 3182H	1	2	1	2	2	4	-	-	-	-	-	-	0
B 3170H	6	9	20	23	68	95	3.7	31	2	34	23	14	0
C 3143B?	1	2	1	2	2	4	-	-	-	-	-	-	80
D 3118H	5	15	24	45	49	53	1.6	11	2	35	35	12	0
E 3111B?	8	21	20	46	116	98	2.3	5	1	26	102	0	60

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ANOMALY/ FID/INTERP	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	COND SIEMEN	DEPTH* M	COND SIEMEN	DEPTH M	RESIS OHM-M	DEPTH M	NT
LINE 40390	(*FLIGHT*	15)											
F 3108B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G 3100S?	2	18	5	29	114	161	0.5	0	1	13	236	0	0
H 3094B?	0	6	0	7	29	46	0.4	4	1	16	445	0	0
I 3083E	12	39	20	62	273	242	2.2	4	1	17	96	0	0
J 3071H	13	6	22	8	17	103	17.3	38	2	35	27	13	0
K 3061B?	7	16	5	19	81	106	2.7	20	2	32	36	11	0
L 3023H	1	2	1	2	2	4	-	-	-	-	-	-	0
M 3011S?	1	2	1	1	2	4	-	-	-	-	-	-	0
N 2999B?	0	20	0	24	14	136	0.4	5	1	11	394	0	510
O 2988S?	0	10	0	15	48	75	0.4	2	1	33	642	0	0
LINE 40400	(FLIGHT	15)											
A 2708H	4	50	29	79	219	398	0.6	0	2	28	28	10	0
B 2736H	4	27	19	43	11	31	0.8	0	2	36	29	14	0
C 2774H	1	2	1	2	2	4	-	-	-	-	-	-	0
D 2800E	3	23	4	32	105	197	0.8	0	1	7	305	0	0
E 2826B?	1	2	1	2	2	2	-	-	-	-	-	-	0
F 2842E	12	3	3	53	133	156	49.6	47	1	30	71	4	0
G 2868H	1	7	6	13	44	51	0.4	0	2	42	50	14	0
H 2901S	1	2	1	2	2	3	-	-	-	-	-	-	130
LINE 40410	(FLIGHT	15)											
A 2622H	12	41	9	70	170	194	2.2	1	2	30	35	8	0
B 2605H	9	25	20	39	106	161	2.4	9	2	35	25	15	0
C 2583H	11	28	24	60	131	201	2.6	3	2	31	27	10	0
D 2565B?	6	35	20	56	206	221	1.2	0	1	29	153	0	160
E 2557B?	2	14	5	22	78	145	0.6	2	1	23	248	0	0
F 2523H	1	2	1	2	2	4	-	-	-	-	-	-	170
G 2461H	7	19	21	40	118	208	2.2	19	1	28	47	6	0
H 2437S?	1	2	1	2	2	4	-	-	-	-	-	-	540
LINE 40420	(FLIGHT	15)											
A 2160E	17	31	3	52	65	99	4.0	11	1	32	50	8	0
B 2180H	1	2	1	2	2	4	-	-	-	-	-	-	0
C 2203H	11	27	20	44	141	152	2.8	6	2	31	26	11	0
D 2220S?	13	6	18	6	179	131	16.3	42	1	23	77	0	0
E 2242E	5	20	4	10	87	46	1.3	4	1	22	285	0	0
F 2271H	2	20	26	32	82	22	0.4	2	2	32	30	12	0
G 2295E	7	30	14	49	203	301	1.5	5	1	20	87	0	0
H 2317B?	1	2	1	2	2	4	-	-	-	-	-	-	0
I 2326B?	1	2	1	2	2	4	-	-	-	-	-	-	0

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LINE 40420		(FLIGHT		15)										
J	2339E	18	77	36	124	352	646	2.1	1	1	22	48	2	0
K	2365H	1	2	1	2	2	4	-	-	-	-	-	-	0
L	2384H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40430		(FLIGHT		15)										
A	2073H?	11	3	4	23	73	22	43.0	43	1	34	53	7	0
B	2066B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C	2040H	4	12	11	23	73	79	1.5	14	2	31	24	11	0
D	2002S?	6	12	7	14	57	73	2.8	17	1	26	173	0	0
E	1990B?	8	11	12	18	78	35	4.5	22	1	28	130	0	0
F	1978B?	14	12	26	25	52	99	8.5	25	2	34	32	11	0
G	1951H	1	2	1	2	2	4	-	-	-	-	-	-	0
H	1926B?	19	6	27	29	15	15	33.0	33	2	38	31	15	0
I	1909H	1	2	1	2	2	4	-	-	-	-	-	-	0
J	1895H	8	9	16	27	55	98	5.1	28	2	29	34	6	40
LINE 40440		(FLIGHT		15)										
A	1610H	1	2	1	2	2	4	-	-	-	-	-	-	0
B	1632B?	18	13	21	19	81	184	11.6	33	1	19	94	0	0
C	1638B?	25	17	48	44	149	41	14.7	29	1	24	63	2	0
D	1647H	1	2	1	2	2	4	-	-	-	-	-	-	0
E	1667H	6	35	26	54	156	222	1.2	1	2	30	28	11	0
F	1690B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G	1695B?	1	2	1	2	2	4	-	-	-	-	-	-	0
H	1725E	1	2	1	2	2	4	-	-	-	-	-	-	0
I	1756H	5	4	5	7	25	25	7.6	53	2	44	42	18	0
J	1780H	9	10	13	47	63	51	5.7	34	2	35	33	13	210
K	1787E	17	19	2	6	106	98	6.8	19	1	29	48	6	0
L	1810H	1	1	1	2	2	4	-	-	-	-	-	-	0
LINE 40450		(FLIGHT		15)										
A	1017B?	15	20	19	36	120	92	5.2	14	1	33	49	8	0
B	1007B?	5	16	5	24	81	80	1.8	3	1	31	137	0	0
LINE 40451		(FLIGHT		15)										
A	1315B?	1	2	1	2	2	4	-	-	-	-	-	-	0
B	1309B?	1	2	1	2	2	4	-	-	-	-	-	-	310
C	1300B?	4	10	1	16	45	60	1.8	13	1	36	112	4	0
D	1295E	1	2	1	2	2	4	-	-	-	-	-	-	0
E	1288H	2	20	29	34	49	82	0.5	0	2	36	23	15	120
F	1274H	10	8	16	13	49	95	9.4	32	2	32	33	9	20

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LINE 40451	(FLIGHT 15)													
G	1223E	4	16	25	31	50	61	1.2	0	2	41	30	17	0
H	1217H	1	2	1	2	2	4	-	-	-	-	-	-	0
I	1193H	5	6	19	25	40	77	4.1	36	2	34	28	11	0
LINE 40452	(FLIGHT 15)													
A	1460H	3	6	3	8	29	24	2.2	18	1	32	55	4	0
LINE 40460	(FLIGHT 15)													
A	727H	5	19	10	30	105	103	1.4	2	1	30	79	3	0
B	744B?	1	2	1	2	2	4	-	-	-	-	-	-	0
C	751B?	5	22	16	36	112	88	1.3	2	1	31	69	5	0
D	757B?	7	15	9	16	63	82	2.8	14	1	38	115	6	0
E	769B?	6	10	21	49	170	220	2.8	27	1	16	146	0	0
F	775H	3	16	20	23	92	29	1.0	5	2	44	39	19	0
G	784H	15	13	23	24	84	74	8.3	21	2	36	34	13	0
H	801S?	2	8	20	41	22	41	1.0	15	1	27	49	3	0
I	819S?	7	7	7	8	46	3	5.4	27	1	32	105	0	0
J	837S	0	9	0	14	37	93	0.4	3	1	11	408	0	0
K	865H	1	2	1	2	2	4	-	-	-	-	-	-	30
L	889H	13	22	9	39	134	102	4.1	14	2	35	37	12	0
M	919H	7	17	12	25	80	134	2.3	10	2	32	32	10	0
N	936H	1	2	1	2	2	4	-	-	-	-	-	-	0
O	953B?	1	2	1	2	2	4	-	-	-	-	-	-	0
P	962B?	6	10	6	10	12	6	3.2	21	1	25	192	0	0
Q	966B?	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40470	(FLIGHT 15)													
A	670H	1	2	1	2	2	4	-	-	-	-	-	-	0
B	646B?	15	23	14	22	62	47	4.6	10	1	33	52	7	16
C	641B?	3	21	19	43	75	95	0.7	0	1	33	74	4	0
D	636B?	8	9	10	23	15	81	4.7	20	1	58	151	17	0
E	610H	16	13	25	26	104	65	9.2	20	2	41	33	16	0
F	593S?	1	2	1	2	2	4	-	-	-	-	-	-	0
G	582B?	8	14	9	4	34	86	0.6	0	1	20	63	6	0
H	580B?	8	2	10	4	34	86	34.8	52	1	37	89	6	0
I	539H	16	23	29	39	92	85	5.1	13	2	31	24	11	0
J	519H	7	18	11	29	96	93	2.2	5	2	34	30	11	0
K	491B?	11	16	18	27	82	66	4.5	13	2	41	37	16	0
L	480H	7	15	13	21	63	46	2.8	9	2	32	39	7	0
LINE 40480	(FLIGHT 15)													
A	173H	8	11	10	19	82	70	4.1	25	1	40	96	9	0

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LINE 40480	(FLIGHT 15)													
B	198H	9	6	7	13	37	13	9.7	38	1	32	53	6	0
C	211B?	10	14	10	12	55	74	4.3	21	1	42	115	9	0
D	232H	1	5	12	12	7	30	0.4	7	2	51	37	26	0
E	240E	17	18	13	32	120	162	7.0	18	2	41	42	16	0
F	252S	4	16	6	23	88	151	1.5	8	1	20	190	0	0
G	256B?	1	2	1	2	2	4	-	-	-	-	-	-	0
H	267B?	1	2	1	2	2	4	-	-	-	-	-	-	0
I	272H	1	2	1	2	2	4	-	-	-	-	-	-	0
J	300B?	1	2	1	2	2	4	-	-	-	-	-	-	0
K	316H	7	11	20	8	48	33	3.3	22	2	30	32	8	30
L	336H	1	2	1	2	2	4	-	-	-	-	-	-	250
M	353B?	8	6	6	4	30	58	8.5	43	1	32	112	3	0
N	358B?	0	8	10	6	30	58	0.4	9	1	32	151	4	80
O	369H	4	19	13	4	88	124	1.1	2	2	37	31	14	0
P	396B?	1	2	1	2	2	4	-	-	-	-	-	-	0
Q	398B?	6	18	5	22	85	86	2.1	9	1	31	156	0	0
LINE 40490	(FLIGHT 14)													
A	5984H	1	1	1	2	2	4	-	-	-	-	-	-	0
B	5980S?	5	23	13	36	68	130	1.3	3	1	27	117	0	0
C	5975S?	1	2	1	2	2	4	-	-	-	-	-	-	0
D	5960B?	1	2	1	2	2	4	-	-	-	-	-	-	0
E	5956H	10	6	17	33	46	60	11.5	35	1	29	56	3	0
F	5946B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G	5943B?	7	9	6	11	42	51	4.1	22	1	52	142	13	0
H	5936B?	1	8	7	16	66	70	0.6	3	1	41	215	3	0
I	5933B?	3	12	7	16	66	70	1.4	4	1	37	132	3	450
J	5892H	2	1	13	20	3	80	6.2	89	1	40	72	9	0
K	5874S	0	6	0	7	22	44	0.4	0	1	33	677	0	0
L	5863S	5	15	7	23	98	103	1.7	11	1	30	182	0	0
M	5838H	5	21	25	35	45	84	1.4	1	2	29	38	6	0
N	5833B?	15	19	27	35	29	77	5.9	17	1	32	67	5	0
O	5825B?	1	2	1	2	2	4	-	-	-	-	-	-	0
P	5818B?	4	9	2	8	31	35	2.3	17	1	28	230	0	0
Q	5801H	2	12	15	22	63	106	0.8	0	2	35	38	10	0
R	5780S	4	11	6	19	59	67	2.0	10	1	23	181	0	0
S	5773B?	0	7	5	16	61	83	0.4	1	1	17	499	0	0
T	5769B?	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40500	(FLIGHT 14)													
A	5472H	12	10	21	45	157	201	8.5	35	1	28	67	3	0

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LINE 40500	(FLIGHT	14)											
B 5480S?	1	2	1	2	2	4	-	-	-	-	-	-	0
C 5501H	1	2	1	2	2	4	-	-	-	-	-	-	0
D 5507B?	8	26	11	34	130	142	1.9	8	1	23	103	0	0
E 5517B?	8	20	8	28	86	161	2.3	9	1	41	134	8	0
F 5544H	1	2	1	2	2	4	-	-	-	-	-	-	0
G 5557E	11	10	16	14	159	146	6.9	35	1	21	98	0	0
H 5564B?	1	15	2	34	94	187	0.4	0	1	13	453	0	0
I 5569B?	1	2	1	2	2	4	-	-	-	-	-	-	240
J 5573B?	4	14	7	17	66	89	1.6	7	1	26	154	0	0
K 5598B?	2	9	0	9	22	21	0.9	15	1	43	694	0	0
L 5614S	0	2	1	2	2	4	-	-	-	-	-	-	40
M 5637S?	1	17	11	60	57	193	0.4	6	1	26	64	3	380
N 5643E	8	23	6	59	40	172	2.1	14	1	21	133	0	0
O 5657S?	8	21	12	38	131	233	2.4	15	1	24	99	0	0
P 5676H	1	2	1	2	2	4	-	-	-	-	-	-	0
Q 5698S?	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40510	(FLIGHT	14)											
A 5434H	10	12	21	23	93	127	4.8	26	1	32	62	6	0
B 5428S?	2	15	16	20	54	121	0.6	5	1	11	366	0	0
C 5416S?	7	28	10	45	177	224	1.5	8	1	23	141	0	0
D 5405S?	8	19	13	32	93	114	2.7	12	1	27	73	1	0
E 5401B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F 5390B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G 5386B?	1	2	1	2	2	4	-	-	-	-	-	-	0
H 5368H	1	2	1	2	2	4	-	-	-	-	-	-	8
I 5349S	6	10	4	16	61	119	3.2	21	1	25	117	0	0
J 5339E	0	2	1	2	2	4	-	-	-	-	-	-	0
K 5328S	0	4	0	6	23	40	0.4	3	1	44	699	0	8
L 5299B?	1	2	1	2	2	4	-	-	-	-	-	-	60
M 5297B?	4	6	15	30	111	115	2.9	46	1	31	130	3	0
N 5290H	7	10	15	15	49	28	3.6	27	1	30	61	4	360
O 5275B?	16	22	18	17	22	25	5.4	16	2	32	30	10	0
P 5271B?	3	7	18	19	54	33	1.6	23	2	27	27	7	30
Q 5268B?	9	8	18	19	54	72	7.1	39	2	31	37	9	0
R 5259B?	13	36	13	62	159	175	2.8	14	2	41	40	18	0
S 5236H	12	7	21	13	37	29	11.9	32	1	28	55	2	0
T 5222B?	0	2	1	2	2	4	-	-	-	-	-	-	0
U 5218B?	0	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40520	(FLIGHT	14)											
A 4915S?	7	12	14	19	79	58	3.0	23	1	30	98	2	0

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LINE 40520	(FLIGHT	14)											
B 4931S?	0	15	5	21	79	112	0.4	0	1	16	259	0	0
C 4957B?	1	2	1	2	2	4	-	-	-	-	-	-	390
D 4960B?	1	13	2	26	71	135	0.4	3	1	22	313	0	0
E 4974E	1	2	1	2	2	4	-	-	-	-	-	-	40
F 4992H	1	2	0	2	2	4	-	-	-	-	-	-	0
G 5012B?	9	22	10	20	53	57	2.5	11	1	31	90	4	0
H 5016B?	1	2	1	2	2	4	-	-	-	-	-	-	0
I 5054S?	0	4	3	10	55	22	0.4	0	1	16	400	0	120
J 5066B?	2	18	10	30	32	115	0.6	2	1	14	315	0	0
K 5069B?	2	18	12	30	18	115	0.6	3	1	22	138	0	0
L 5075H	1	2	1	2	2	4	-	-	-	-	-	-	0
M 5096H	1	2	1	2	2	4	-	-	-	-	-	-	0
N 5135H	1	2	1	2	2	4	-	-	-	-	-	-	0
O 5164S?	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40530	(FLIGHT	14)											
A 4867S?	5	14	13	25	100	89	2.0	13	1	24	107	0	0
B 4832B?	6	25	11	42	150	168	1.5	1	1	24	132	0	0
C 4804S?	1	2	1	2	2	4	-	-	-	-	-	-	15
D 4795S	7	12	9	20	46	65	3.2	16	1	28	72	1	0
E 4779S?	1	2	1	2	2	4	-	-	-	-	-	-	0
F 4762S	0	8	3	5	54	44	1.0	0	1	25	111	8	70
G 4735S?	4	15	2	26	86	100	1.3	8	1	26	97	0	0
H 4724H	7	8	10	16	80	44	4.7	30	1	41	73	11	0
I 4709H	26	42	50	78	28	129	5.2	2	2	26	27	5	0
J 4705B?	22	41	48	61	172	144	4.5	5	2	28	25	8	0
K 4652S?	3	18	8	35	122	132	0.8	0	1	22	154	0	0
LINE 40540	(FLIGHT	14)											
A 4369S?	8	12	14	46	102	173	3.8	33	1	32	92	6	0
B 4404S	6	9	9	38	89	162	3.2	28	1	26	110	0	40
C 4426S	8	30	9	46	70	191	1.7	5	1	22	97	0	0
D 4451S?	8	16	12	36	15	107	2.9	21	1	25	94	0	0
E 4456B?	1	2	1	2	2	4	-	-	-	-	-	-	12
F 4465E	4	25	11	39	150	191	0.8	0	1	28	115	0	0
G 4481S?	1	2	1	2	2	4	-	-	-	-	-	-	0
H 4490S?	1	2	1	2	2	4	-	-	-	-	-	-	0
I 4519B?	1	2	1	2	2	4	-	-	-	-	-	-	0
J 4523B?	1	2	1	2	2	4	-	-	-	-	-	-	0
K 4528B?	8	11	8	22	78	97	4.1	30	1	33	117	4	0
L 4531B?	8	16	8	22	78	97	2.9	20	1	28	115	0	0

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LINE 40540		(FLIGHT	14)											
M	4538E	18	23	52	107	294	282	6.1	15	1	29	51	5	0
N	4543H	18	8	25	32	224	410	23.1	44	2	26	27	8	0
O	4547B?	2	8	35	32	224	410	1.3	25	2	24	26	6	0
P	4575S?	1	22	1	34	68	217	0.4	5	1	15	156	0	0
Q	4601S?	4	9	3	8	44	36	1.8	11	1	24	188	0	0
R	4610S?	4	12	5	14	39	42	1.8	10	1	25	254	0	0
LINE 40550		(FLIGHT	14)											
A	4323B?	4	15	6	19	79	79	1.3	9	1	39	83	10	0
B	4320B?	1	2	1	2	2	4	-	-	-	-	-	-	110
C	4313B?	1	2	1	2	2	4	-	-	-	-	-	-	0
D	4310B?	9	31	11	54	182	205	1.9	3	1	24	89	0	0
E	4299B?	3	5	4	7	33	46	2.8	46	1	32	210	0	40
F	4289B?	6	11	2	14	43	62	2.8	19	1	39	154	4	0
G	4273S?	3	20	8	38	126	184	0.8	0	1	22	147	0	30
H	4270B?	3	20	8	38	126	124	0.9	1	1	24	203	0	0
I	4255S?	5	3	11	38	79	42	11.5	62	1	23	106	0	0
J	4234H	1	2	1	2	2	4	-	-	-	-	-	-	0
K	4220H	1	11	7	18	59	68	0.4	0	1	35	102	4	0
L	4190H	1	1	1	0	2	4	-	-	-	-	-	-	0
M	4149H	1	32	29	52	131	201	0.4	2	2	28	25	8	0
N	4126H	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40560		(FLIGHT	14)											
A	3805S?	8	17	13	29	93	107	3.0	16	1	25	83	0	0
B	3820S	3	12	4	24	77	127	1.3	14	1	19	206	0	0
C	3827S	4	13	3	17	57	102	1.7	13	1	29	160	0	0
D	3835S	3	14	3	21	70	116	1.2	6	1	27	156	0	0
E	3845S	5	11	4	16	44	86	2.4	16	1	37	158	2	0
F	3859S	6	22	8	35	127	157	1.5	0	1	26	113	0	0
G	3865S	6	19	7	28	90	145	1.7	2	1	20	195	0	60
H	3897H	1	2	1	2	2	4	-	-	-	-	-	-	0
I	3909B?	5	10	7	10	38	55	2.6	26	1	41	168	7	0
J	3935S?	4	12	7	16	72	82	1.9	23	1	32	145	3	0
K	3945S?	0	19	4	24	88	171	0.4	5	1	12	305	0	0
L	3952D	5	26	9	24	95	165	1.2	5	1	13	275	0	0
M	3968H	1	2	1	2	2	4	-	-	-	-	-	-	0
N	3981H	1	2	1	2	2	4	-	-	-	-	-	-	0
O	4008H	5	5	3	9	11	59	5.9	46	1	40	89	10	0
P	4036B?	10	10	2	39	139	132	6.2	30	1	29	101	1	0
LINE 40570		(FLIGHT	14)											
A	3374S?	11	5	17	54	179	154	16.7	42	1	28	81	1	0

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LINE 40570	(FLIGHT 14)												
B 3370E	1	2	1	2	2	4	-	-	-	-	-	-	0
C 3357B?	0	7	0	9	33	56	0.4	0	1	33	671	0	0
LINE 40571	(FLIGHT 14)												
A 3756H	9	25	15	42	157	129	2.4	2	1	27	89	0	0
B 3754E	9	27	15	42	157	129	2.2	2	1	26	120	0	0
C 3738S	1	2	1	2	2	4	-	-	-	-	-	-	0
D 3714S	1	6	3	9	28	56	0.7	9	1	28	239	0	0
E 3701S?	4	12	7	20	5	84	1.5	7	1	28	153	0	0
F 3668H	7	13	12	20	70	49	3.2	25	2	42	49	16	0
G 3641B?	1	2	1	2	2	4	-	-	-	-	-	-	20
H 3639B?	2	8	1	10	27	52	1.0	19	1	44	182	9	0
I 3608E	7	12	10	30	10	25	3.6	16	1	29	116	0	0
J 3594H	5	33	27	53	64	129	1.0	0	2	31	30	10	0
K 3582B?	19	8	5	7	27	19	24.7	31	2	29	31	8	0
L 3578E	9	25	30	4	26	19	2.3	6	2	32	38	9	0
M 3566S?	4	19	6	29	98	72	1.2	5	1	31	101	3	0
LINE 40580	(FLIGHT 14)												
A 3083B?	6	16	15	31	95	123	2.0	7	1	32	101	2	0
B 3086E	9	20	15	31	95	72	3.0	7	1	30	93	1	0
C 3143S?	8	18	9	29	118	80	2.8	1	1	28	113	0	0
D 3167H	1	2	1	2	2	4	-	-	-	-	-	-	0
E 3186B?	1	2	1	2	2	4	-	-	-	-	-	-	0
F 3189B?	5	11	5	15	17	43	2.4	22	1	45	100	12	0
G 3192B?	1	2	1	2	2	4	-	-	-	-	-	-	100
H 3211B?	5	11	7	14	45	62	2.1	11	1	41	117	7	250
I 3226B?	1	2	1	2	2	4	-	-	-	-	-	-	0
J 3237B?	15	2	17	18	56	94	88.0	40	2	40	36	16	0
K 3254H	23	40	32	41	183	118	4.8	8	2	25	32	5	0
L 3257B?	1	2	1	2	2	4	-	-	-	-	-	-	0
M 3282H	1	2	1	2	2	4	-	-	-	-	-	-	0
N 3309B?	9	3	13	32	64	85	29.4	51	1	33	103	3	0
O 3323S	1	8	0	10	29	64	0.6	7	1	31	652	0	0
LINE 40590	(FLIGHT 14)												
A 3042B?	17	16	13	25	92	77	7.8	18	1	35	76	6	0
B 3032B?	7	12	11	17	63	50	3.6	24	1	31	130	1	0
C 3028B?	8	25	9	38	134	136	1.9	0	1	19	149	0	0
D 2995S?	1	17	7	26	77	142	0.4	0	1	24	164	0	0
E 2983S?	0	10	4	14	46	86	0.4	0	1	24	296	0	0

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ANOMALY/ FID/INTERP	COAXIAL 1126 HZ REAL PPM	QUAD PPM	COPLANAR 875 HZ REAL PPM	QUAD PPM	COPLANAR 7219 HZ REAL PPM	QUAD PPM	VERTICAL DIKE COND SIEMEN	DEPTH* M	HORIZONTAL SHEET COND SIEMEN	DEPTH M	CONDUCTIVE EARTH RESIS OHM-M	DEPTH M	MAG CORR NT
LINE 40590	(FLIGHT	14)											
F 2940H	9	19	15	30	103	83	2.8	4	1	29	57	3	0
G 2938B?	9	19	15	30	103	83	3.0	5	1	32	82	3	420
H 2925H	9	9	7	12	40	23	6.4	28	1	44	66	14	0
I 2907B	3	22	4	9	35	142	0.6	2	1	32	90	6	0
J 2905B	1	2	1	2	2	4	-	-	-	-	-	-	60
K 2904B?	1	2	1	2	2	4	-	-	-	-	-	-	80
L 2875H	18	22	28	41	142	70	6.6	12	2	32	32	9	0
M 2873E	18	23	28	41	142	70	6.1	11	2	29	44	5	0
N 2859H	13	25	18	40	150	129	3.4	6	1	26	54	2	40
O 2837H	8	6	9	17	35	119	7.8	38	1	40	56	13	30
P 2817B?	3	6	8	11	30	54	2.5	33	1	30	196	0	0
Q 2814B?	3	12	8	11	30	54	1.3	8	1	26	202	0	0
LINE 40600	(FLIGHT	14)											
A 2493B?	19	46	24	64	225	231	3.5	11	1	36	62	12	0
B 2506B?	4	14	5	25	63	124	1.4	15	1	61	175	21	0
C 2510B?	7	32	8	41	132	211	1.5	0	1	18	169	0	0
D 2526S?	1	18	3	19	88	111	0.4	6	1	14	412	0	70
E 2560S	1	8	3	11	27	65	0.4	2	1	26	320	0	20
F 2582H	2	8	5	13	33	58	0.9	13	1	45	153	10	0
G 2595S?	4	8	2	11	47	67	2.4	20	1	27	210	0	20
H 2603B?	9	16	14	32	103	106	3.1	18	1	35	132	4	80
I 2610H	8	9	14	17	57	35	5.2	26	1	37	52	10	0
J 2614B?	8	9	14	15	57	35	5.3	30	1	39	90	9	0
K 2619B?	7	7	4	22	61	43	5.4	40	1	43	98	13	510
L 2626B?	9	20	7	21	70	149	2.7	16	1	37	72	11	30
M 2635B?	8	16	8	27	92	111	2.9	15	1	35	52	9	0
N 2650B?	6	10	3	6	27	39	2.9	22	1	42	62	13	0
O 2655B?	1	2	1	2	2	4	-	-	-	-	-	-	0
P 2665S?	1	2	0	2	2	4	-	-	-	-	-	-	0
Q 2674H	18	33	27	56	160	158	4.3	11	2	29	38	7	0
R 2702S?	19	21	27	38	210	256	7.2	20	1	26	55	2	0
S 2715S?	2	16	7	26	64	204	0.5	2	1	20	173	0	0
T 2725B?	11	30	9	49	141	184	2.6	8	1	31	68	5	0
U 2741B?	1	2	1	2	2	4	-	-	-	-	-	-	0
V 2752S?	4	8	5	7	32	44	2.5	31	1	38	232	2	0
LINE 40610	(FLIGHT	14)											
A 2467B?	16	22	18	30	118	78	5.1	12	1	31	64	5	0
B 2455S?	8	28	11	46	164	142	1.9	3	1	24	125	0	0
C 2425B?	3	17	7	25	68	105	1.0	2	1	24	199	0	0

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		COAXIAL 1126 HZ		COPLANAR 875 HZ		COPLANAR 7219 HZ		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH		MAG CORR
ANOMALY/ FID/INTERP		REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	COND SIEMEN	DEPTH* M	COND SIEMEN	DEPTH M	RESIS OHM-M	DEPTH M	NT
LINE 40610		(FLIGHT	14)											
D	2421B?	1	2	1	2	2	4	-	-	-	-	-	-	0
E	2388B?	5	5	4	7	6	9	5.7	41	1	40	127	6	0
F	2385B?	1	2	1	2	2	4	-	-	-	-	-	-	0
G	2349H	1	2	1	2	2	4	-	-	-	-	-	-	70
H	2302H	1	2	1	2	2	4	-	-	-	-	-	-	0
I	2279B?	1	2	1	2	2	4	-	-	-	-	-	-	0
J	2271H	1	2	1	2	2	4	-	-	-	-	-	-	0
K	2248B?	0	5	7	5	25	32	0.4	0	1	32	243	0	90
L	2246B?	2	8	4	5	25	32	1.3	10	1	31	296	0	0
M	2239B?	1	2	1	2	2	4	-	-	-	-	-	-	0
N	2237B?	4	12	9	17	73	76	1.4	0	1	27	136	0	0
LINE 40620		(FLIGHT	14)											
A	1733B?	11	18	13	24	74	69	4.1	11	1	26	77	0	640
B	1746S?	6	23	9	39	107	114	1.7	3	1	20	126	0	0
C	1790S?	1	2	1	2	2	4	-	-	-	-	-	-	0
D	1873B?	12	19	6	3	104	67	3.9	5	2	32	44	6	0
E	1879B?	8	8	10	4	22	45	6.3	30	1	31	50	6	0
F	1882B?	1	2	1	2	2	4	-	-	-	-	-	-	60
G	1904H	1	2	1	2	2	4	-	-	-	-	-	-	30
H	1924H	14	17	24	32	15	112	5.9	24	1	26	64	2	0
I	1932S?	1	2	1	2	2	4	-	-	-	-	-	-	30
J	1934S?	2	27	0	43	135	212	0.5	0	1	0	270	0	0
K	1945S?	3	9	0	9	25	92	1.2	8	1	7	456	0	0
L	1954S	5	6	10	17	39	11	4.1	19	1	23	108	0	0
M	2031S	1	2	1	2	2	4	-	-	-	-	-	-	0
LINE 40630		(FLIGHT	14)											
A	1567S?	11	12	11	18	46	24	5.6	17	1	32	95	1	0
B	1523S?	2	8	2	10	14	47	0.9	9	1	17	462	0	130
C	1491S?	1	2	1	2	2	4	-	-	-	-	-	-	0
D	1475S?	6	15	8	28	89	71	2.3	13	1	25	151	0	10
E	1451B?	16	33	21	53	173	170	3.5	6	2	35	42	11	430
F	1447B?	9	20	20	53	2	3	3.0	9	2	33	47	8	0
G	1443B?	3	9	10	25	89	50	1.6	11	1	35	59	7	0
H	1428H	7	17	10	26	90	91	2.5	9	2	34	49	8	0
I	1400S?	4	9	9	20	74	93	2.0	25	1	35	70	8	0
J	1381B?	0	65	0	80	203	576	0.4	16	1	5	210	0	0
K	1360S?	1	2	1	2	2	4	-	-	-	-	-	-	0
L	1343H	1	2	1	2	2	4	-	-	-	-	-	-	0
M	1330E	0	18	0	19	75	143	0.4	5	1	13	408	0	0

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ANOMALY/ FID/INTERP	COAXIAL 1126 HZ REAL PPM	COAXIAL 1126 HZ QUAD PPM	COPLANAR 875 HZ REAL PPM	COPLANAR 875 HZ QUAD PPM	COPLANAR 7219 HZ REAL PPM	COPLANAR 7219 HZ QUAD PPM	VERTICAL DIKE COND SIEMEN	VERTICAL DIKE DEPTH* M	HORIZONTAL SHEET COND SIEMEN	HORIZONTAL SHEET DEPTH M	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH M	MAG CORR NT
LINE 40630	(FLIGHT 14)												
N 1318B?	6	9	6	3	149	39	1.0	0	1	20	80	6	0
O 1315B?	7	31	8	44	124	212	1.5	5	1	22	180	0	0
P 1306S?	1	16	1	22	57	138	0.4	1	1	15	473	0	0
Q 1301S?	6	11	10	24	85	138	3.0	21	1	31	174	0	350
R 1296S?	7	11	10	24	85	83	3.3	19	1	30	134	0	0
LINE 40640	(FLIGHT 14)												
A 956B?	16	41	16	37	140	257	3.0	3	1	28	64	3	0
B 960B?	5	15	14	37	140	257	1.8	16	1	28	115	1	0
C 966B?	8	12	14	18	88	75	4.1	25	1	29	102	1	0
D 985S	0	2	0	2	2	4	-	-	-	-	-	-	220
E 1029S	1	10	1	17	45	115	0.4	0	1	9	445	0	16
F 1045S?	7	5	6	15	19	51	7.3	44	1	38	271	1	0
G 1052S?	7	6	5	4	20	11	7.5	33	1	23	188	0	110
H 1070S	3	11	6	15	49	94	1.3	16	1	12	412	0	0
I 1086E	16	25	20	43	76	106	4.7	7	2	33	41	8	370
J 1111H	1	2	1	2	2	4	-	-	-	-	-	-	0
K 1130B?	7	28	13	27	113	133	1.6	0	1	22	91	0	0
L 1134B?	1	2	1	2	2	4	-	-	-	-	-	-	0
M 1139B?	8	20	29	45	173	17	2.4	18	1	29	96	4	0
N 1154B?	12	29	18	61	228	215	2.9	6	1	12	130	0	60
O 1179B?	10	7	12	16	93	42	11.1	34	1	22	132	0	0
P 1221B?	7	27	8	48	174	259	1.6	7	1	1	404	0	0
Q 1226B?	1	2	1	2	2	4	-	-	-	-	-	-	0
R 1240B?	13	45	13	73	274	325	2.3	3	1	11	155	0	0
LINE 49010	(FLIGHT 17)												
A 3709S	0	5	2	5	19	34	0.6	0	1	22	190	2	0
B 3621H	9	7	12	20	1	24	8.8	20	2	31	48	4	0
C 3589H	11	11	20	20	11	27	6.8	14	2	36	29	12	0
D 3514H	3	13	17	24	69	25	1.0	0	2	35	33	10	0
E 3501H	17	10	25	22	12	34	14.4	18	3	32	21	11	0
F 3455H	10	20	16	31	103	83	3.1	1	3	36	22	14	0
G 3416B?	8	8	13	12	9	27	6.6	27	2	66	26	39	0
LINE 49020	(FLIGHT 17)												
A 2790S?	6	13	5	13	77	64	2.6	3	1	19	235	0	0
B 2774B?	6	12	6	23	70	43	2.6	12	1	27	229	0	0
C 2736S?	1	1	1	2	2	4	-	-	-	-	-	-	0
D 2711H	1	2	1	2	2	4	-	-	-	-	-	-	0
E 2696E	13	6	37	57	168	41	20.4	37	1	32	67	5	300

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	COAXIAL 1126 HZ		COPLANAR 875 HZ		COPLANAR 7219 HZ		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH		MAG CORR
ANOMALY/ FID/INTERP	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	COND SIEMEN	DEPTH* M	COND SIEMEN	DEPTH M	RESIS OHM-M	DEPTH M	NT
LINE 49020	(FLIGHT 17)												
F 2656H	5	19	5	32	109	116	1.5	3	1	28	66	2	0
G 2570B?	6	10	6	15	41	53	3.1	23	2	44	38	18	0
H 2537S?	5	14	1	23	70	181	1.6	15	1	2	304	0	0
I 2500H	1	2	1	2	2	4	-	-	-	-	-	-	130

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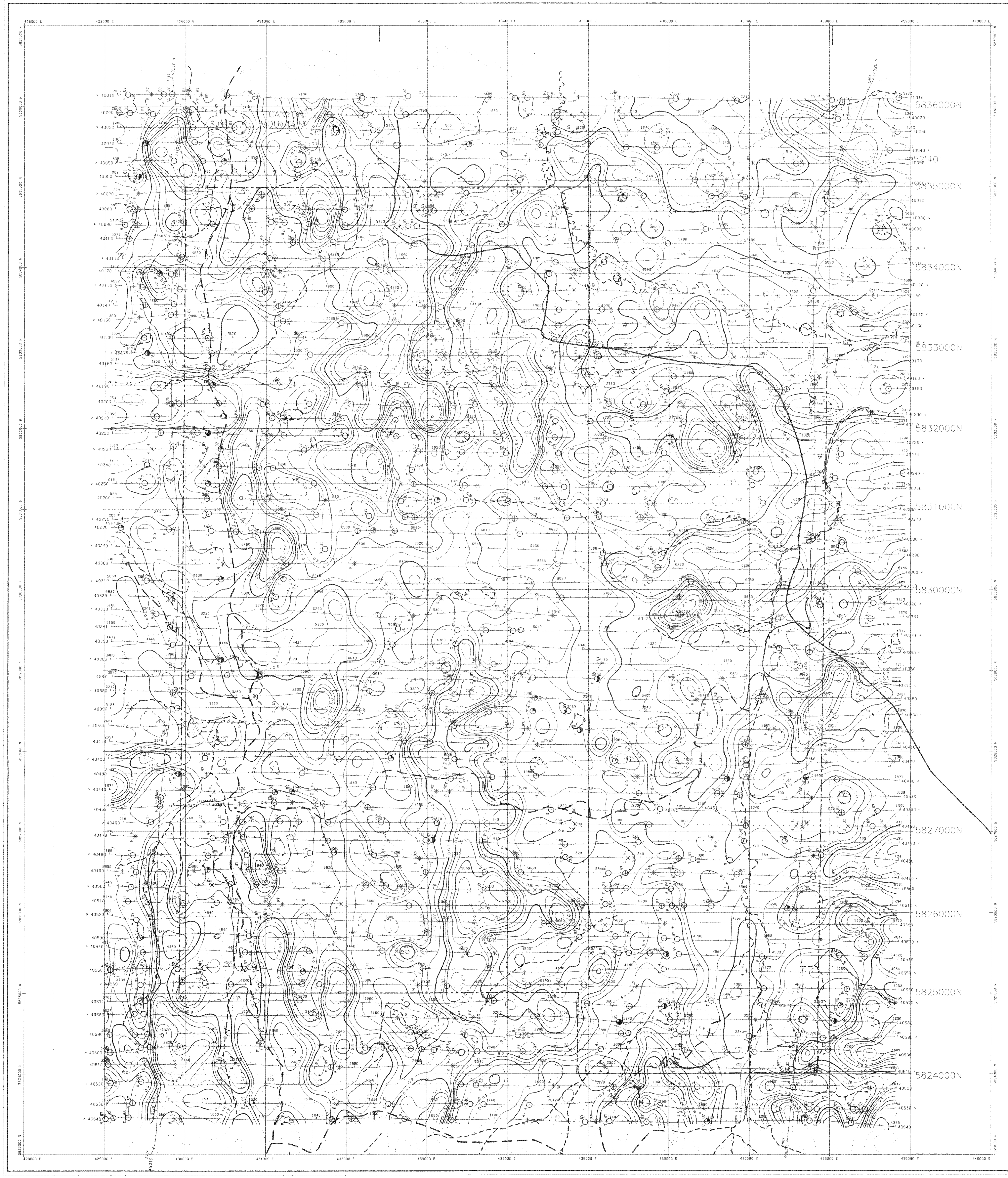


TECHNICAL SUMMARY

Navigation	Del Norte UHF electronic positioning
Data reduction grid interval	25 metres
Terrain clearance	Helicopter 60 m Electromagnetic sensor 30 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%
Electromagnetic system	DIGHEM[V]

Frequency	Sensitivity	Coil Orientation
900 Hz	0.1 ppm	Vertical coaxial
7200 Hz	0.2 ppm	Vertical coaxial
900 Hz	0.1 ppm	Horizontal coplanar
7200 Hz	0.2 ppm	Horizontal coplanar
56000 Hz	1.0 ppm	Horizontal coplanar

ELECTROMAGNETIC ANOMALIES

Grade	Anomaly	Conductance
7	●	>100 siemens
6	◕	50–100 siemens
5	◒	20–50 siemens
4	⊕	10–20 siemens
3	⊕	5–10 siemens
2	○	1–5 siemens
1	◌	< 1 siemens
–	✳	Questionable anomaly

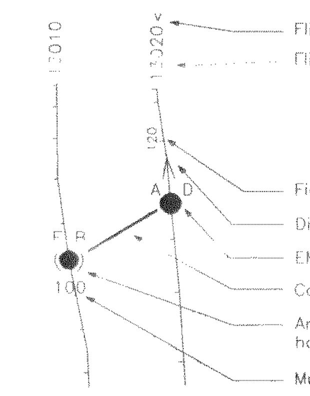
Anomaly identifier — Interpretive symbol

Depth is greater than: · 15 m; : 30 m; ⁝ 45 m; ⁞ 60 m

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

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

FLIGHT LINES WITH EM ANOMALIES

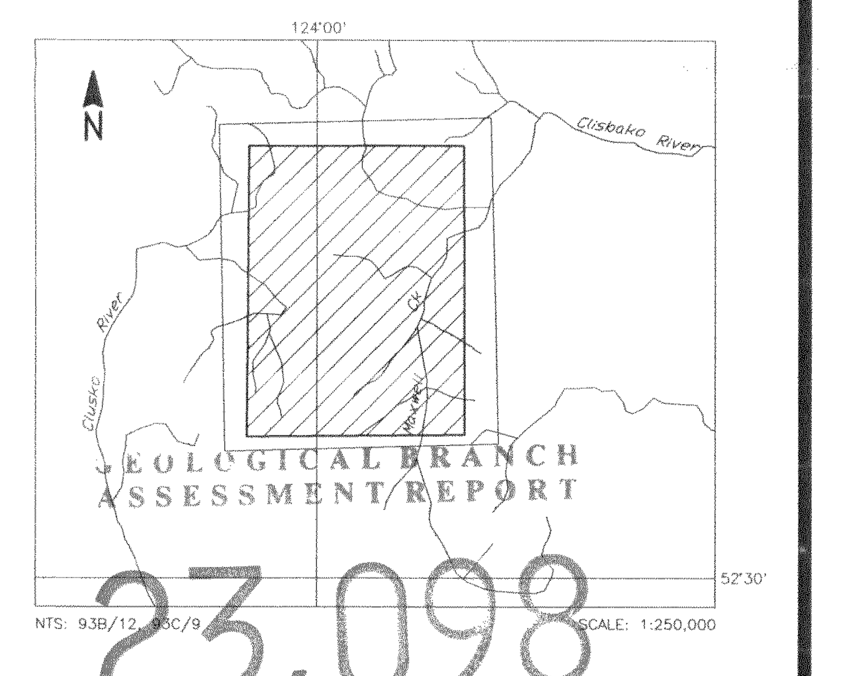


RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm–m at 10 intervals per decade

LOCATION MAP



COGEMA RESOURCES INC.
QUARTZ LAKE PROPERTY

RESISTIVITY
56,000 Hz COPLANAR

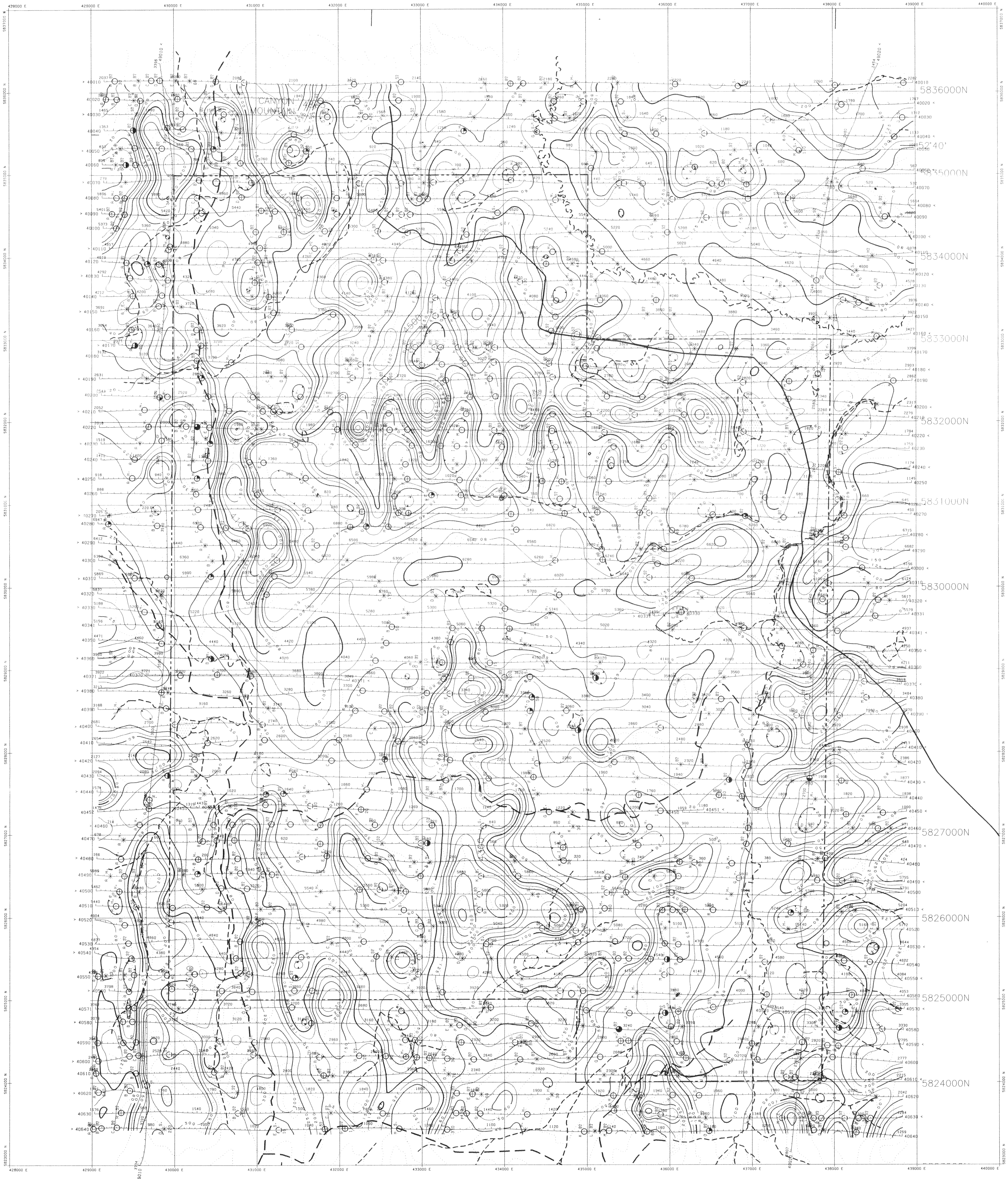
DIGHEM[V] SURVEY	NTS: 93B/12, 93C/9	GEOPHYSICIST: RP
DATE: MARCH, 1993	JOB: 1138	SHEET: 1

DIGHEM SURVEYS & PROCESSING INC.

0 — 1 — 2 Km

Scale 1:20 000

Dighem



TECHNICAL SUMMARY

Navigation	Del Norte UHF electronic positioning
Data reduction grid interval	25 metres
Terrain clearance	Helicopter 60 m Electromagnetic sensor 30 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%
Electromagnetic system	DIGHEM[V]

Frequency	Sensitivity	Coil Orientation
900 Hz	0.1 ppm	Vertical coaxial
7200 Hz	0.2 ppm	Vertical coaxial
900 Hz	0.1 ppm	Horizontal coplanar
7200 Hz	0.2 ppm	Horizontal coplanar
56000 Hz	1.0 ppm	Horizontal coplanar

ELECTROMAGNETIC ANOMALIES

Grade	Anomaly	Conductance
7	●	>100 siemens
6	◕	50–100 siemens
5	◒	20–50 siemens
4	⊕	10–20 siemens
3	⊕	5–10 siemens
2	○	1–5 siemens
1	◌	< 1 siemens
–	✳	Questionable anomaly

Anomaly identifier — Interpretive symbol

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

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

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

FLIGHT LINES WITH EM ANOMALIES

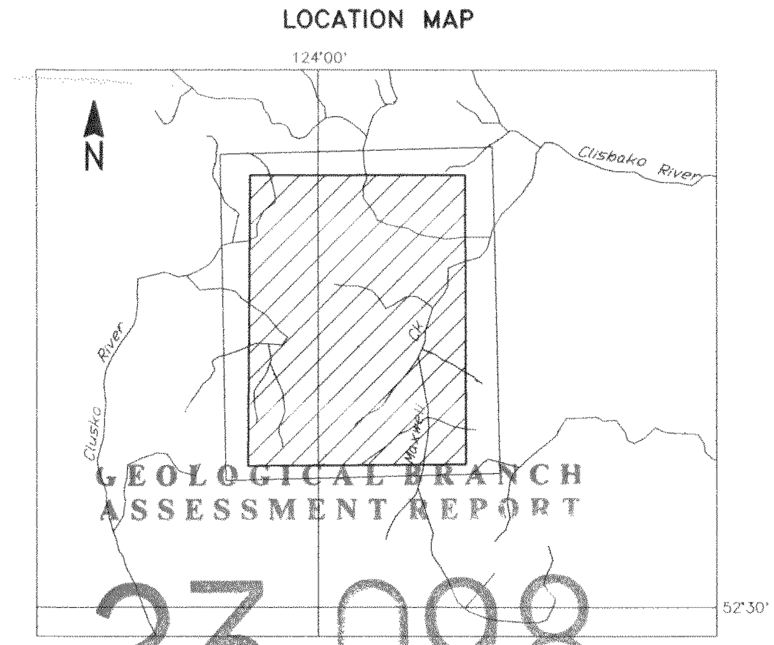
- Flight direction
- Flight line number
- 11020: Reflight Number, Line Number, Area Number
- Fiducials identified on profiles
- Dip direction
- EM anomaly (see EM legend)
- Conductor axis (on EM maps only)
- Arcs indicate the conductor has a thickness > 10m
- Magnetic correlation in nT (gammas)

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

LOCATION MAP



NTS: 93B/12, 93C/9 SCALE: 1:250,000

GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,098

COGEMA RESOURCES INC.
QUARTZ LAKE PROPERTY

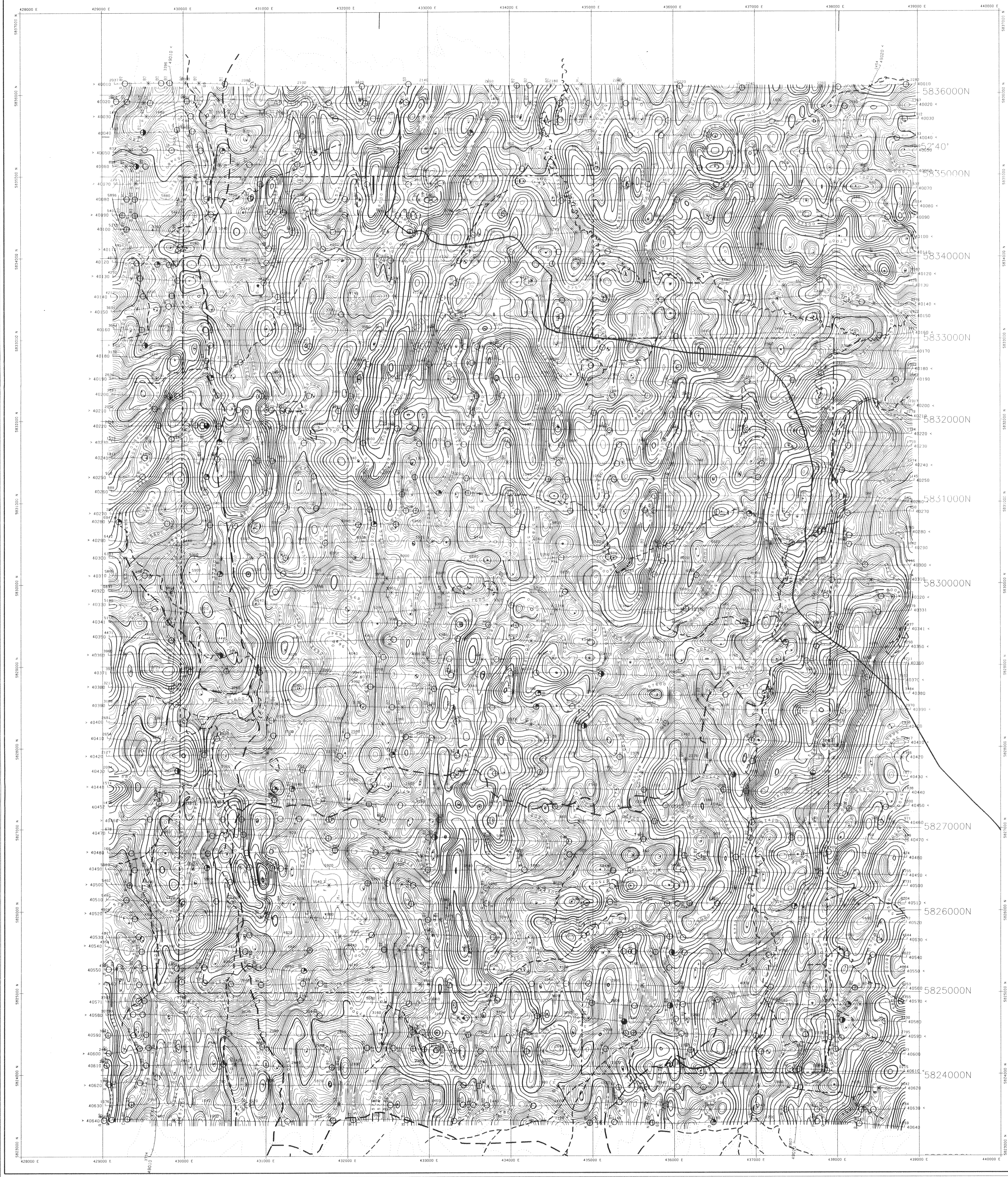
RESISTIVITY
7200 Hz COPLANAR

DIGHEM[V] SURVEY	NTS: 93B/12, 93C/9	GEOPHYSICIST: RP
DATE: MARCH, 1993	JOB: 1138	SHEET: 1

DIGHEM SURVEYS & PROCESSING INC.

Scale 1:20 000 (0 – 1 – 2 Km)

Dighem



TECHNICAL SUMMARY

Navigation . . . . Del Norte UHF electronic positioning
Data reduction grid interval . . . . 50 metres
Terrain clearance . . . . Helicopter 60 m
Electromagnetic sensor 30 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%
Electromagnetic system . . . . DIGHEM V

Frequency	Sensitivity	Coil Orientation
900 Hz	0.1 ppm	Vertical coaxial
7200 Hz	0.2 ppm	Vertical coaxial
900 Hz	0.1 ppm	Horizontal coplanar
7200 Hz	0.2 ppm	Horizontal coplanar
56000 Hz	1.0 ppm	Horizontal coplanar

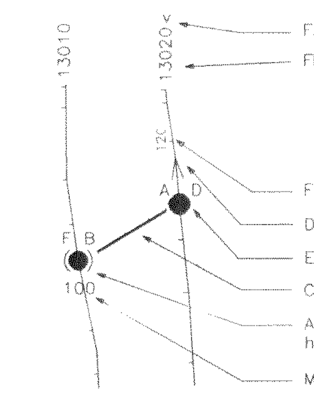
ELECTROMAGNETIC ANOMALIES

Grade	Anomaly	Conductance
7	●	>100 siemens
6	◕	50–100 siemens
5	◒	20–50 siemens
4	⊕	10–20 siemens
3	⊕	5–10 siemens
2	○	1–5 siemens
1	◌	< 1 siemens
–	*	Questionable anomaly

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

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

FLIGHT LINES WITH EM ANOMALIES



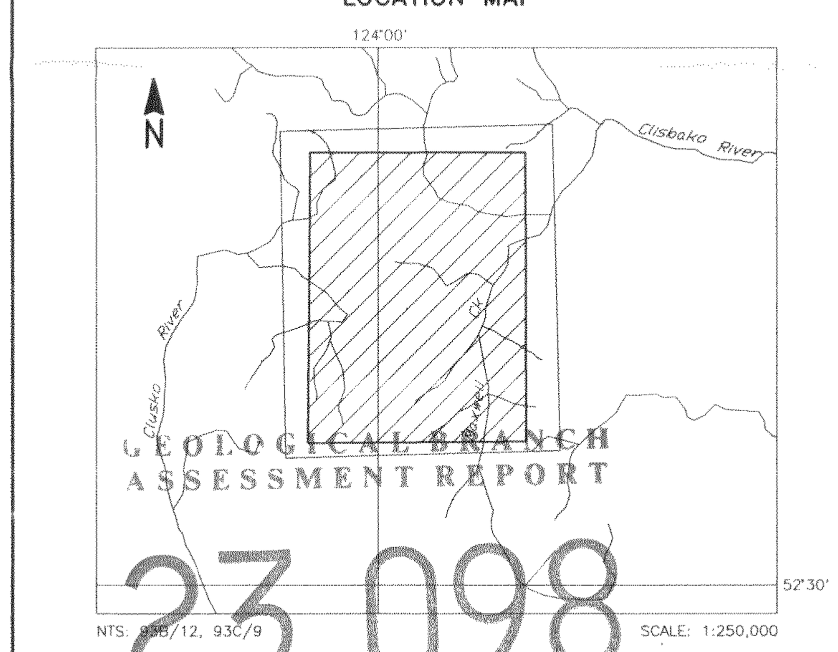
Flight direction
Flight line number
11020 — Reflight Number; Line Number; Area Number
Fiducials identified on profiles
Dip direction
EM anomaly (see EM legend)
Conductor axis (on EM maps only)
Arcs indicate the conductor has a thickness > 10m
Magnetic correlation in nT (gammas)

TOTAL FIELD MAGNETIC CONTOURS

. . . . 500 nT
. . . . 100 nT
. . . . 20 nT
. . . . 10 nT
. . . . magnetic low

Magnetic inclination within the survey area: 73 degrees

LOCATION MAP



NTS: 93B/12, 93C/9 SCALE: 1:250,000

GEOLOGICAL BRANCH
ASSESSMENT REPORT
23,098

COGEMA RESOURCES INC.
QUARTZ LAKE PROPERTY

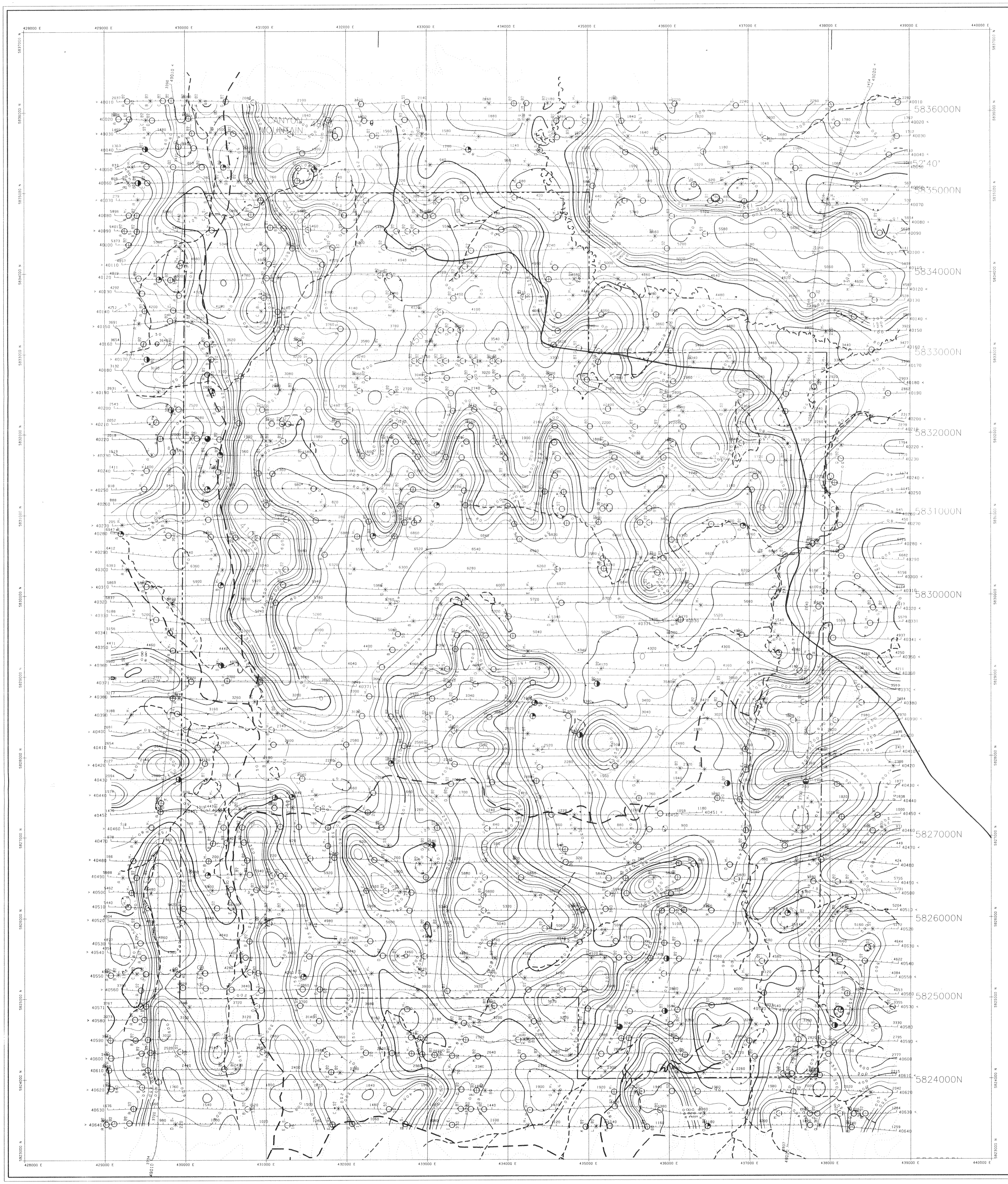
TOTAL FIELD MAGNETICS

DIGHEM V SURVEY	NTS: 93B/12, 93C/9	GEOPHYSICIST: RP
DATE: MARCH, 1993	JOB: 1138	SHEET: 1

DIGHEM SURVEYS & PROCESSING INC.

0 1 2 Km
Scale 1:20 000

Dighem



TECHNICAL SUMMARY

Navigation	Del Norte UHF electronic positioning
Data reduction grid interval	25 metres
Terrain clearance	Helicopter 60 m Electromagnetic sensor 30 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%
Electromagnetic system	DIGHEM[V]

Frequency	Sensitivity	Coil Orientation
900 Hz	0.1 ppm	Vertical coaxial
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900 Hz	0.1 ppm	Horizontal coplanar
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ELECTROMAGNETIC ANOMALIES

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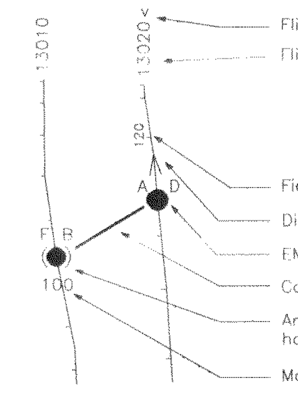
FLIGHT LINES WITH EM ANOMALIES



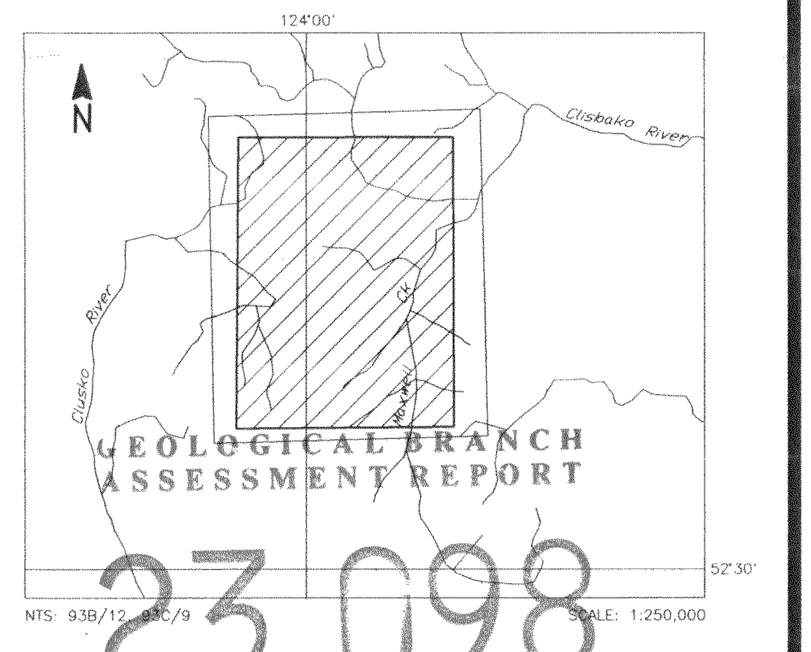
- Flight direction
- Flight line number
- 11020: Reflight Number; Line Number; Area Number
- Fiducials identified on profiles
- Dip direction
- EM anomaly (see EM legend)
- Conductor axis (on EM maps only)
- Arcs indicate the conductor has a thickness > 10m
- Magnetic correlation in nT (gammas)

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm–m at 10 intervals per decade

LOCATION MAP



GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,098

COGEMA RESOURCES INC.
QUARTZ LAKE PROPERTY

RESISTIVITY
900 Hz COPLANAR

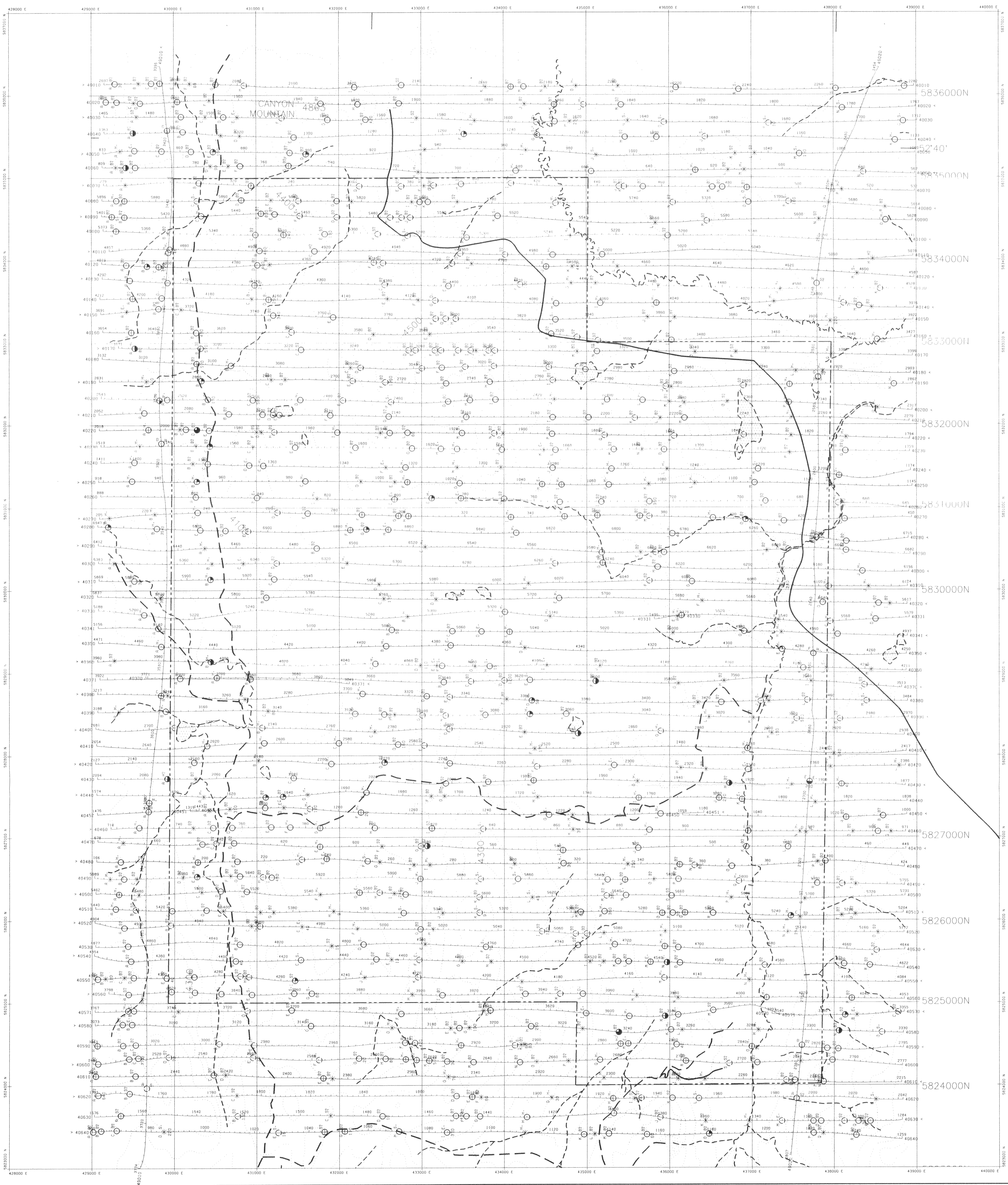
DIGHEM[V] SURVEY	NTS: 93B/12, 93C/9	GEOPHYSICIST: RP
DATE: MARCH, 1993	JOB: 1138	SHEET: 1

DIGHEM SURVEYS & PROCESSING INC.

0 — 1 — 2 Km

Scale 1:20 000

Dighem



TECHNICAL SUMMARY

Navigation	Del Norte UHF electronic positioning
Data reduction grid interval	25 metres
Terrain clearance	Helicopter 60 m Electromagnetic sensor 30 m Magnetometer, VLF receiver 40 m
Data sampling interval	0.1 second
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Electromagnetic system	DIGHEM^V

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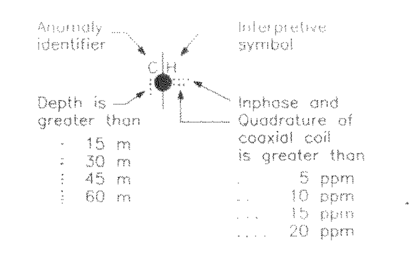

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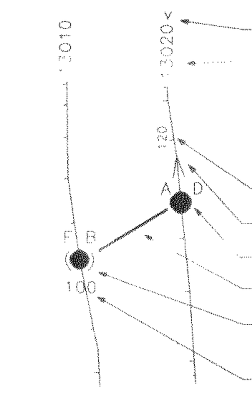
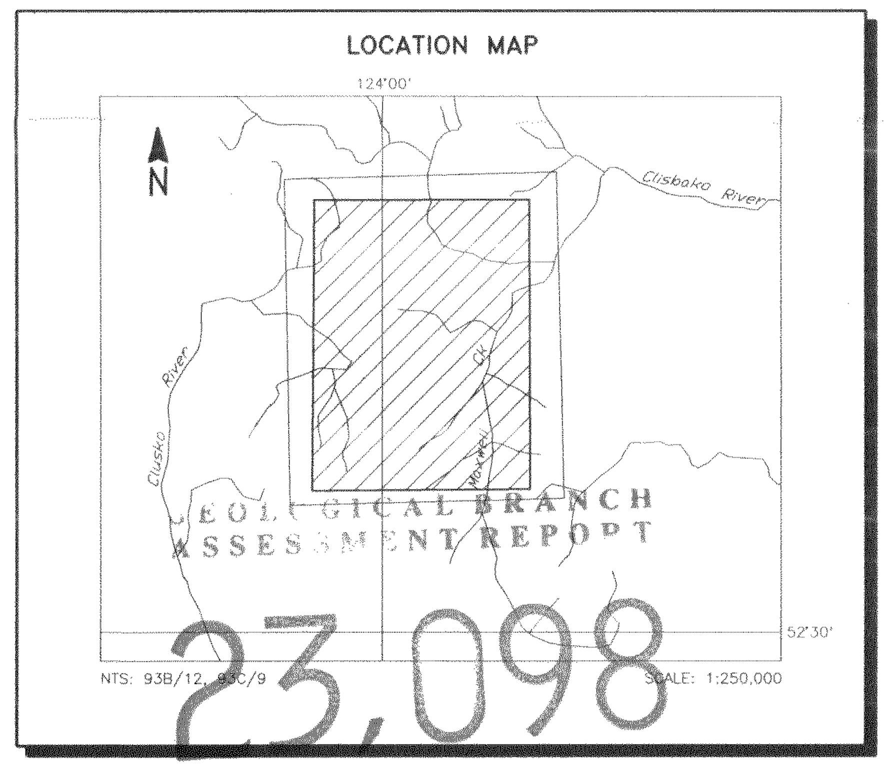
FLIGHT LINES WITH EM ANOMALIES



LOCATION MAP



GEOLOGICAL BRANCH ASSESSMENT REPORT

23,098

COGEMA RESOURCES INC.
QUARTZ LAKE PROPERTY

ELECTROMAGNETIC ANOMALIES

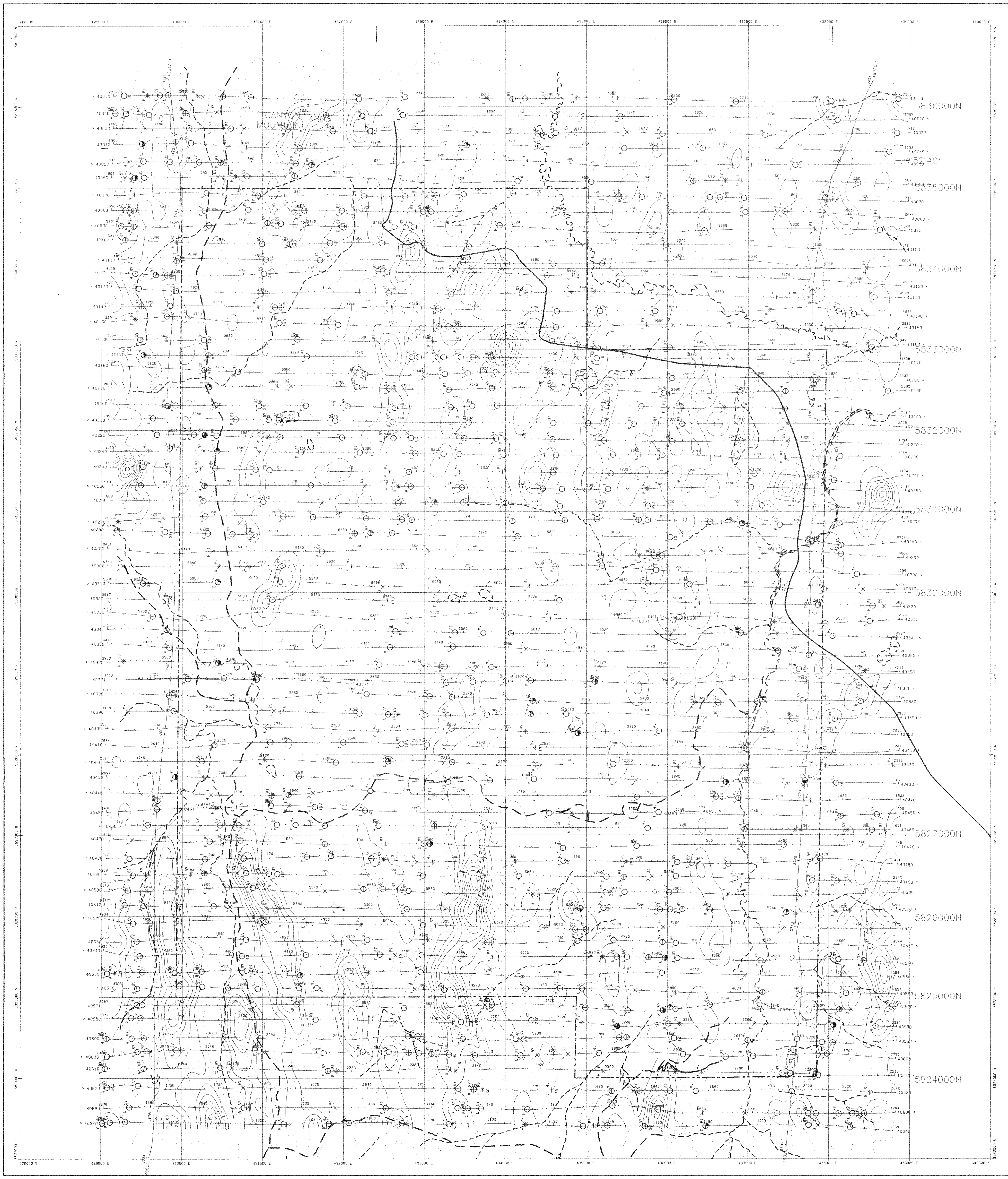
DIGHEM^V SURVEY	NTS: 93B/12, 93C/9	GEOPHYSICIST:
DATE: MARCH, 1993	JOB: 1138	SHEET: 1

DIGHEM SURVEYS & PROCESSING INC.

0 1 2 Km

Scale 1:20 000

Dighem



TECHNICAL SUMMARY

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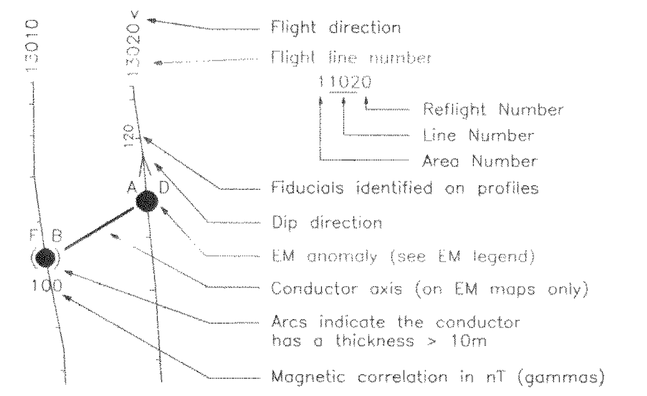
FLIGHT LINES WITH EM ANOMALIES



VLF CONTOURS

Contours in percent

—— 10 ——

—— 2 ——

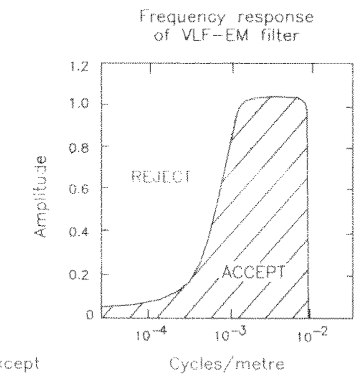
– – 1 – –

STATIONS

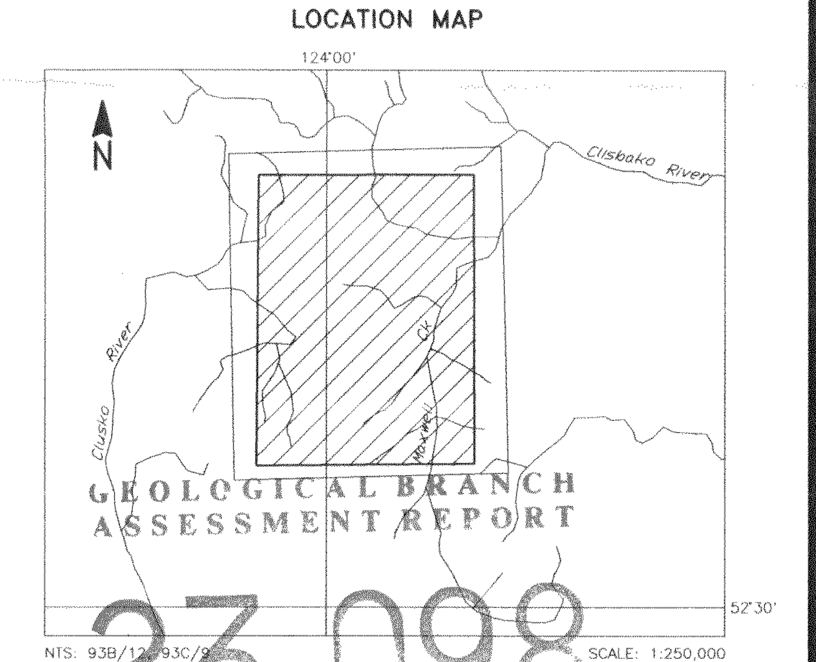
NPM Lualualei (Haw.) 23.4 kHz – all lines except

NLK Seattle (Wash.) 24.8 kHz – lines 40460–40640

Frequency response of VLF–EM filter



LOCATION MAP



NTS: 93B/12, 93C/9 SCALE: 1:250,000

COGEMA RESOURCES INC.
QUARTZ LAKE PROPERTY

FILTERED VLF

DIGHEM[V] SURVEY	NTS: 93B/12, 93C/9	GEOPHYSICIST:
DATE: MARCH, 1993	JOB: 1138	SHEET: 1

DIGHEM SURVEYS & PROCESSING INC.

0 1 2 Km

Scale 1:20 000

Dighem