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MINING LANDS SECTION

AIRBORNE ELECTROMAGNETIC SURVEY

CANADIAN GOLD AND METALS INC.

BOTSFORD LAKE AREA, ONTARIO

FILE NO: 23002 APRIL 1981

Questor Surveys Limited, 6380 Viscount Road, Mississauga, Ontario L4V 1H3



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INTRODUCTION

This report contains our interpretation of the results of an airborne electromagnetic survey flown in the Botsford Lake Area, Ontario, during February and March, 1981.

A brief description of the survey procedure together with recommendations for ground follow-up is included.

The total survey was 558 kilometers (347 miles) and the survey was performed by Questor Surveys Limited. The survey aircraft was a Shorts Skyvan C-FQSL and the operating base was Dryden, Ontario.

The area outline is shown on a 1:25,000 map at the end of this report. This is part of the National Topographic Series sheet number 52J.

FIELD CREW

Pilot B. McKenna
Co-Pilot R. Webster
Operator W. Hutchinson
Engineer P. Melen
Crew Manager K. Cuomo
Crew Manager K. Sherk

MAP COMPILATION

The base maps for navigation and flight path recovery were constructed from uncontrolled mosaics which were produced from photographs at a scale of 1:60,000. The final maps were reproduced at a scale of 1:15,840 on stable transparent film from which white prints can be made.

Flight path recovery was accomplished by comparison of the 35mm film with the mosaic in order to locate the fiducial points. These points were approximately 1340 meters apart.

SURVEY PROCEDURE

Terrain clearance was maintained as close to 122 meters as possible, with the E.M. bird at approximately 48 meters above the ground. Rough terrain could be a factor for the aircraft not being at 122 meters. A normal S-pattern flight path using approximately 1½ kilometer turns was used. The equipment operator logged the flight details and monitored the instruments.

A line spacing of 200 meters was used.

INTERPRETATION AND RECOMMENDATIONS

The survey area is located 24 kilometers east of Sioux

Lookout, Ontario. This is within the Superior Province of the

Canadian Shield. The mapped rock types include mafic metavolcanics

(greenstone), rhyolite, tuff, and felsic intrusives. The rocks

occurring on either side of the Manitou-Dinorwic Fault Zone, which

passes through Botsford Lake, have been brecciated, sheared, and

mylonitized. An iron formation appears to be related to this

fault.

There are several gold showings outside the survey area, just south of Split Lake. The gold is commonly found in sulphide bearing quartz veins in greenstone. The long linear conductors in the survey area are related to the above mentioned fault zone and the iron formation.

There are several areas of higher than normal conductivity-widths along the long conductors, designated A, B, and C on the maps. They may indicate a widening of the iron formation, perhaps due to an influx of additional mineralizing fluids. Further examination of these zones may be warranted.

Some of the one and two channel responses coinciding with lakes, are thought to be due to conductive lake bottom sediments. All of the conductors which are outlined on the maps as zones are related to bedrock sources.

During the course of the survey, an attempt was made to fly the flight lines in alternate directions. This procedure aids in the interpretation of a dip of a conductor. Double peaks occur on the up-dip flight line while only one intercept usually occurs on the down-dip flight line. If more than one anomaly occurs on the down-dip line, then more than one conductor is suspected. Where the conductor is considered to be vertical, a small response usually precedes the larger second response. This will occur no matter what direction the flight line is flown. The ratio in channel 2 amplitudes between the first and second anomaly is approximately 1:10. For a conductor dipping at 45°, the ratio is roughly 1:1.5. The direction and amount of dip have been put on the INPUT maps where it was deemed possible.

Conductor axes have been plotted as accurately as possible on the maps. They should not be construed as being in the exact location. Ground geophysical surveys are definitely needed to pinpoint them accurately on the ground. The axes on the INPUT maps should be used as a guide only.

A brief discussion on each of the outlined zones in the Botsford Lake Area follows:

BCTSFORD LAKE AREA

ZONE 1

The responses tend to be small, indicating a weak near surface conductive source. The regional government aeromagnetic map indicates that the conductor falls along a magnetic trough. The zone could represent a sheet of clay or glacial deposits, or it may be due to a basement source. A ground reconnaissance survey is suggested to determine the cause of the conductivity.

ZONE 2

The conductor is at right angles to the main conductive trend. It coincides with a magnetic anomaly which may be due to a minor amount of magnetic minerals or graphite along a contact alteration zone. A ground survey over this zone is recommended.

ZONES 3 and 4

The conductors in both zones lie on the down-dip side of the iron formation, and coincide with small magnetic anomalies. The responses are small, indicating weak conductive sources. The conductivity may be due to minor sulphides and/or graphitic material with magnetite in a shear zone. These zones are considered low priority targets.

ZONE 5

The zone coincides along part of a regional magnetic ridge, in an area mapped as greenstone. It could be related to the iron formation in the west part of the survey area. The conductivity is thought to be due to minor sulphide mineralization and graphite.

Further work is suggested over this zone to further define the source.

ZONE 6

This isolated intercept appears to be a continuation of the main conductive trend following the fault through Botsford Lake. It coincides with a greenstone/granite contact, and has magnetic correlation. It is probably related to the contact or fault zone, and is considered a low priority target.

QUESTOR SURVEYS LIMITED

Dennis Kinvig,

Geologist.

APPENDIX

EQUIPMENT

The aircraft is equipped with a Mark VI INPUT (R) airborne E.M. system and Sonotek P.M.H. 5010 Proton Magnetometer. Radar altimeters are used for vertical control. The outputs of these instruments together with fiducial timing marks are recorded by means of galvanometer type recorders using light sensitive paper. Thirty-five millimeter continuous strip cameras are used to record the actual flight path.

(I) BARRINGER/QUESTOR MARK VI INPUT (R) SYSTEM

The Induced Pulse Transient (INPUT) system is particularly well suited to the problems of overburden penetration. Currents are induced into the ground by means of a pulsed primary electromagnetic field which is generated in a transmitting loop around the aircraft. by using half sine wave current pulses and a loop of large turns-area, the high output power needed for deep penetration is achieved.

The induced current in a conductor produces a secondary electromagnetic field which is detected and measured after the termination of each primary pulse.

Detection is accomplished by means of a receiving coil towed behind the aircraft on four hundred feet of cable,

and the received signal is processed and recorded by equipment in the aircraft. Since the measurements are in the time domain rather than the frequency domain common to continuous wave systems, interference effects of the primary transmitted field are eliminated. The secondary field is in the form of a decaying voltage transient originating in time at the termination of the transmitted pulse. The amplitude of the transient is, of course, proportional to the amount of current induced into the conductor and, in turn, this current is proportional to the dimensions, the conductivity and the depth beneath the aircraft.

The rate of decay of the transient is inversely proportional to conductivity. By sampling the decay curve at six different time intervals, and recording the amplitude of each sample, an estimate of the relative conductivity can be obtained. By this means, it is possible to discriminate between the effects due to conductive near-surface materials such as swamps and lake bottom silts, and those due to genuine bedrock sources. The transients due to strong conductors such as sulphides exhibit long decay curves and are therefore commonly recorded on all six channels. Sheet-like surface materials, on the other hand, have short decay curves and will normally only show a response in the first two or three channels.

The samples, or gates, are positioned at 310, 490, 760, 1120, 1570 and 2110 micro-seconds after the cessation of the pulse. The widths of the gates are 180, 180, 360, 360, 540, and 540 micro-seconds respectively.

For homogeneous conditions, the transient decay will be exponential and the time constant of decay is equal to the time difference at two successive sampling points divided by the log ratio of the amplitudes at these points.

(II) SONOTEK P.M.H. 5010 PROTON MAGNETOMETER

The magnetometers which measure the total magnetic field have a sensitivity of 1 gamma and a range from 20,000 gammas to 100,000 gammas.

Because of the high intensity field produced by the INPUT transmitter, the magnetometer results are recorded on a time-sharing basis. The magnetometer head is energized while the transmitter is on, but the read-out is obtained during a short period when the transmitter is off. Using this technique, the head is energized for 0.83 seconds while the precession frequency is being recorded and converted to gammas. Thus a magnetic reading is taken every 1.13 second.

For this survey, a lag factor has been applied to the data. Magnetic data recorded on the analogue records at fiducial 10.00 for example would be plotted at fiducial 9.95 on the mosaics.

DATA PRESENTATION

The symbols used to designate the anomalies are shown in the legend on each map sheet, and the anomalies on each line are lettered in alphabetical order in the direction of flight. Their locations are plotted with reference to the fiducial numbers on the analog record.

A sample record is included to indicate the method used for correcting the position of the E.M. Bird and to identify the parameters that are recorded.

All the anomaly locations, magnetic correlations, conductivity-thickness values and the amplitudes of channel number 2 are listed on the data sheets accompanying the final maps.

GENERAL INTERPRETATION

The INPUT system will respond to conductive overburden and near-surface horizontal conducting layers in addition to bedrock conductors. Differentiation is based on the rate of transient decay, magnetic correlation and the anomaly shape together with the conductor pattern and topography.

Power lines sometimes produce spurious anomalies but these can be identified by reference to the monitor channel.

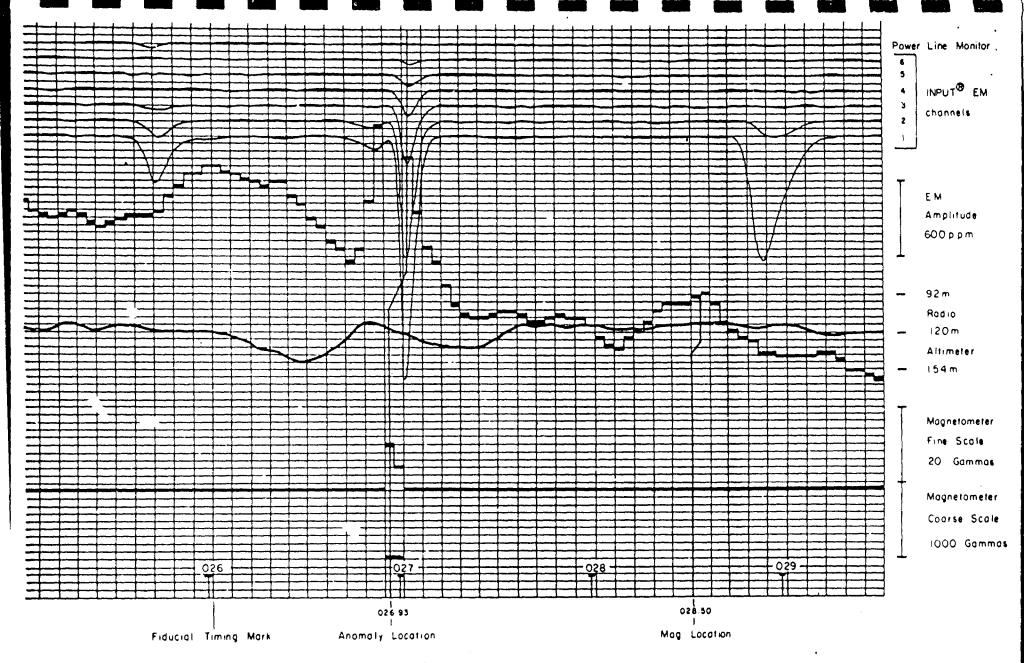
Railroad and pipeline responses are recognized by studying the film strips.

Graphite or carbonaceous material exhibits a wide range of conductivity. When long conductors without magnetic correlation are located on or parallel to known faults or photographic linears, graphite is most likely the cause.

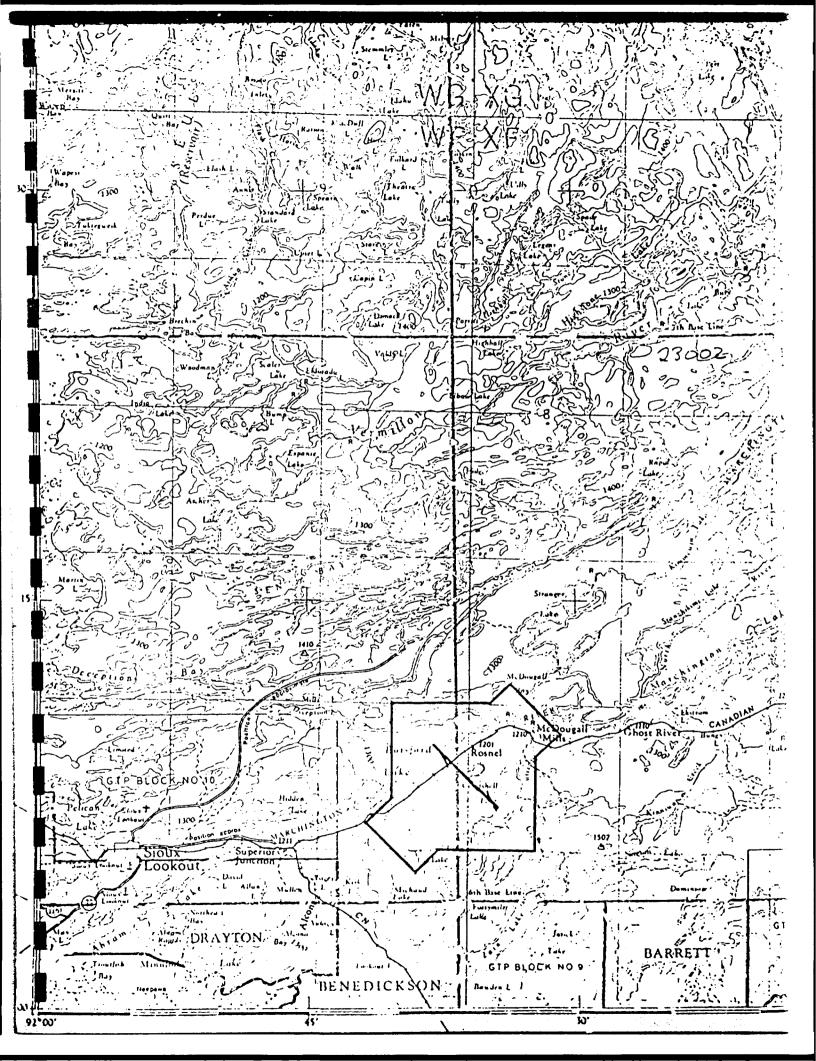
Contact zones can often be predicted when anomaly trends coincide with the lines of maximum gradient along a flanking magnetic anomaly. It is unfortunate that graphite can also occur as relatively short conductors and produce attractive looking anomalies. With no other information than the airborne results, these must be examined on the ground.

Serpentinized peridotites often produce anomalies with a character that is fairly easy to recognize. The conductivity which is probably caused in part by magnetite, is fairly low so that the anomalies often have fairly large response on channel #1; they decay rapidly, and they have strong magnetic correlation. INPUT E.M. anomalies over massive magnetites show a relationship to the total Fe content. Below 25 - 30%, very little or no response at all is obtained, but as the percentage increases the anomalies become quite strong with a characteristic rate of decay which is usually greater than that produced by massive sulphides.

Commercial sulphide ore bodies are rare, and those that respond to airborne survey methods usually have medium to high conductivity. Limited lateral dimensions are to be expected and many have magnetic correlation caused by magnetite or pyrrhotite. Provided that the ore bodies do not occur within formational conductive zones as mentioned above, the anomalies caused by them will usually be recognized on an E.M. map as priority targets.



Representative INPUT[®], Magnetometer and Altimeter Recording



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FINAL ANOMALY	FID	CHS	CH1.AMP	CH2.AMP	-SIEMENS	—— <u>М</u> АС	VALUE
100100	10.075			-7.A			
10010A	19.875	2		30	NC		
10021A	36.250	2		39	NC		
10030A	36.725	2		46	NC		
10030B 10030C	36,875 -37,125 -	2 1	5 -	58	NC Ne	- 37.55	15
-10040A	46,125	1	 69		NE		<u> </u>
10040B	46.375	4		159	2	-	
10050A	46.625	4		100	2	••	
10060A	56.550	2		48	NC	_	
10070A	56.875	2		60	NC	-	
10080A	66.950	3		64	9	-	
10090A	67.525	1	5		NC	<u>-</u>	
10095A	29.375	2		40	NC	· -	
10095B 10095C	29.800 30.350	6 1	35	206	45 NC	29.75 30.05	112 387
-1-01-00A	76+70 0	2		40	NC		
10100B	77,025	6		175	34	-	
10110A	77.625 77.800	3		106 134	1 2	77.40	710
10110B -10110C	78 -250	i_	7 -	134	NC		
-10120A	87.125	1	128	a de la companya de l	NC		
10120B 10120C	87.375 87.550 87.75 0	4 6 		166 338 30	1 5 	- - 	33
-101200				30	NC.	37470	<i></i>
-10131A 10131B	579.725 579.975	<u>2</u> 3		48 104	 NC 3	- 379.80	360
10131C	580.100	3		95	3	_	

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FINAL							
ANUMALY	FID	CHS	CH1 AMP	CH2.AMP	- SIEMENS	HAG	VALUE
101310	580.300	2		70	NC	-	
10140A	98.900	2		49	NC		
10140B 10140C	99.175 99.775	4····· 2	- 4-4-4	342 30	NC	99.50	376
The cause is the sequence consistent to him and have the second decision.							
10150A 10150B	101.050 101.300	2 3		55 - 155	NC 1	101.05	302
101500	101.475	<u> </u>		149	NC		
_10160A		2		56	NG NG		
10160B	112.075	3		209	1	-	200
10160C 10160D	112,200 112,675	<u>1</u>	14	647	22 NC	112.40	280
_10170A	114 475			141	•	114-35	70-
10170B	114.675	6		538	17	114.55	23
10176A	34.475	5		179	15	34.35	73
10176B	34.625	6		632	14	34.55	77
-10176C	35+0⊕0		3.t	7	NC		
-10180A	125.525		217		NC		
10180B 10180C	125.700 125.875	3 გ		123 1132	12 22	125.80	129
10190A	129,025	2		61	NC	128.95	235
10190B	129.250	5		223	3	120+75	
101900	129.575	2		30	NC	129.90	33
10200A	140.900	2	<u>. 16 g</u>	46	NC	-	
10200B -10200C	141.250 141.600	5 2		315 30	6 6	141.40	269
_10210A				69	NC NC	145.00	255
10210B	145.325	4		109	7	143.00	200
10210C	145.700	1	5		NC	_	
10220A	158.125	2		51	NC	_	
10220B 10220C	158.550 158.850	6 1	31	183	18 NC	153.65 -	247
10225A	48.550	2		63	NC		
10225B	48.950	5		129	74	49.05	244

FINAL ANOMALY	FID	CHS	CH1.AMP	CH2.AMP	SIEMENS	MAG	-VAL:UE
10230A	165.050	2		30	NC	165.05	371
10230B	165,150	2		46	NC	192102	3/1
102300	165.300	2			NC NC		
102300	165.675	1	51	• • •	NC	166.05	6
10235A	56.375	2		30	NC		
10235B 10235C	56.500 56.700	2		30 30	NC 	56.50 	453
# 37 A. 1.0 (A) W	301700	.		.50	IAC		
10240A	1-78+000	2		56	NC		
1024QB	178.300	3		75	3	178.40	432
102400	178.700	2		31	NC		
10250A	183.425	2		30	NC	107 45	707
	183+700	1	86-	30	NC NC	183.45	387
10250C	184.075	1	30		NC	-	
10255A	40.250	2		30	NC	40.2	164
10255B	47.375	2		53	NC	-	
10260A	196.800	2		80	NC		
10260B 10260C	197.150 197.525	· 2· 1	45	83	NC NC	197,20	360
				······································			
10265A	57.375	2		61	NC	-	
10265B	57,725	3		71	5	57.80	296
102650	58.000	2		30	NC		
-10270A	203,425-	1	90		NC		
10270B	203.750	2		43	NC	203.60	171
102700	204.150	1	59		NC		
10280A	211.900	2		53	NC	211.85	19
10280B	214.900	5		30	NC		
10280C	215,300	3		30	9	215.20	11
10280D	215.850	3		51	9	215.45	13
10280E	219.125	2		88	NC		
: 10280F	219.400	2 2		51	NC	-	
102806	219,750			42	NC		
10285A	65.675	2		78	NC		
10285B	65.900	4-		94	<u> </u>	65.80	174-
10285C	66.150	1	66		NC		
•							J

FINAL ANOMALY	FID	снѕ	CH1.AMP	CH2.AMP	SIEMENS-	MAG	VALUE
10290A 10290B	225.250 225.425	2 2		48	NC NG		,
10290C	225.725	4		130	19	225.60	220
10290D	225.975	1	39		ЙĊ	_	
10290E	231.675	1	96		NC	231.85	140
-10300A	233.750	1	59			- 233+60-	49-
10300B	239.800	3		78	1		• • •
10300C	240.000	ద		678	18	239.95	292
10300D	-240.500	5		34	NC	240.55	3-
-10310A	247.275		· ————	97			·
10310B	247.625	2		60	. NC	247.45	200
10310C	253.425	1	64		NC	253.30	7
-10310D	254.775			48	NC	254.75	
-10320A	255+575	1	70		NC		
10320B	255.800	2	, , ,	48	NC NC	255.70	7
10 720C	263.225	6		268	24	_	•
10320D~	263,700	2		33	мс		<u> </u>
-10330A	271700	2_		97			
10330B	272.075	1	43	, ,	NC	271.90	222
103300	279.150	1	51		NC	279.10	10
10340AX 10340A	279.400 287.150	2 3		60 108	1	287.15	205
-10340B	287.700			33		288.00	9 -
107500	296,850	-9		4.4.5	10		
10350A 10350B	297,300	4		80	6 6	297.20	214
and the second s		- A STORE OF STREET					
10360A	329.500	1	19	222	ИС	329.15	14
10360B 10360C	330.750 331.250	4 2	44 · #	228	4 NC	330.70 331.05	176 10
-10365A	66+725	6	····	607	14	55.70	248
10365B	67,075	4		48	7	67.10	18
103650	67.300	2		30	NC	67,45	15
10370A	340.400	2		58	NC	340.40	25
-10370B 10370C	340+6 00 340+900	4 4	للتناف فالمراجع والمريق والمتابي المتواجع	161 158	- - 13 47	340.80	201
	 •				* ************************************		
10380A	350,250	1	45		NC	350.05	7
10380B	354.575	3		101	9	354.50	153

ANOMAL.Y	FID	CHS	CH1.AMP	CH2.AMP	SIEMENS-	-MAG	-VALU
103800	354.825	4		179	43	354.90	50
10380D	355,150	1	39		NG		
10390A	363.875	1	189	·	NC NC	363.95	41
10390B	364.175	2	0.1	35	NC	364.35	135
10390C 10390D	364•550 366• 325	1	21		NC	364.75	197
10390E	367.650	1 - 1	50 46			366.40 368.05	- 251 25
					,,,	555705	
10400A	377.650	2		84	NC	377.70	4
10400B	378.050	1	27		NC	-	·
		_					
10410A	386.075	2		59	NC	385.80	11
10410B	386+325	2		35	NC	386.25	211
10410C	388,225	2		46	NC	388.20	338
10420A	395,650	1	22		NC	395.65	325
10420B	397,000	$\frac{1}{2}$		30	NC	396.95	137
104206	398.075			77	NC NC	378.15	
10420D	399,350	1	10		NC	-	
10430A	404,750	1	29	·	NC	AAA 70	12
10430B	405.975	2	£. /	39	NC	404.70 405.75	46
10430C	406,125	<u>.</u> 2		55	NC	406-15	37
104300	407,975	2		33	NC	408.00	367
	A 4 "7" - "10 PT 2"						
10440A 10440B	417,725 417,900	1	73	63	NC	417.80	60
10440C	417.700	3 2		၀၁ 	9 NC	418.15	28
201100	7237270	-		01	110	710110	2.0
	425+ 625	5		47	NC	425.45	47
10450B	425.800	5		175	13	425.80	74
•							
10460A	436,325	2		91	NC	- 436,25	60
-10460B	436+82 5	1_	49		NC		
1047754	A A 79						
-10470A - · ·	443,000	3		146		442.70	211
10470B	443.125	4		275	6	443.05	5:
10480A	453.375	6		321	12	453.30	5:
10480B	453,600	1	93		NC	453,65	10
-10480C	454.550	2		30	NC-		

FINAL ANOMALY	FID	CHS	CH1.AMF	CH2.AMP	-SIEMENS -	MAG	VALUE
10490A 10490B	458.600 459.200	2	110	67	NC	458.80	16
10490C	459.850	3	112	67	8 8	- 459+45 - 459+80	58 ≺ 30
10500A	469.750	2		86	NC	469.65	16
10510A	476,000	2		32	NC	475.60	64
10520A	483.600	3		110	1	483.75	56
10530A 10530B	488,250 488,925	2 2		47 38	NC NC	488.55 489.10	45 8
10540A	496.500	2		50	ИС	496.60	38
10550A	524.600	2		30	NC	524.40	28
10560A	502.000	2		30	NC	501.90	18
10570A	508.700	2	· · · · · · · · · · · · · · · · · · ·	30	NC	508.70	27
10590A	519.750 520 .1 00	2		30 	NC NC	519.80	89
10610A	535.525	1	41		NC	535.60	28
10620A	542,200	2		32	ИС	542.30	84
10650A	556,600	1	73		иĊ	_	
10660A	562,100	2		37	NC	562.55	236
10670A	566.100	2		33	NC	565.50	178
10680A -10680B	571.325 	3 ——2		74 	1 NC	- 571.70	169
1-9010A	588+400		68		NC -	588.25	10





52J04NE9055 2.3869 ZARN LAKE

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Your file: 52] /4 NE (22)

Our file:

2.3869

1982 03 24

Mr. Albert Hanson Mining Recorder Ministry of Natural Resources P.O. Box 669 Sioux Lookout, Ontario POV 2TO

Dear Sir:

Re: Airborne Geophysical (Electromagnetic Survey submitted on Mining Claims Pa 272336 et al in the Botsford Lake Area

The Airborne Geophysical (Electromagnetic Survey assessment work credits as listed with my Notice of Intent dated February 26, 1982 have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours very truly,

F.F. Anderson

Diferent

Land Management Branch

Whitney Block, Room 6450 Queen's Park Toronto, Ontario M7A 1W3

Phone: 416/965-1316

' Ministry of Natural Resources

RECEIVED

APR - 2 1982

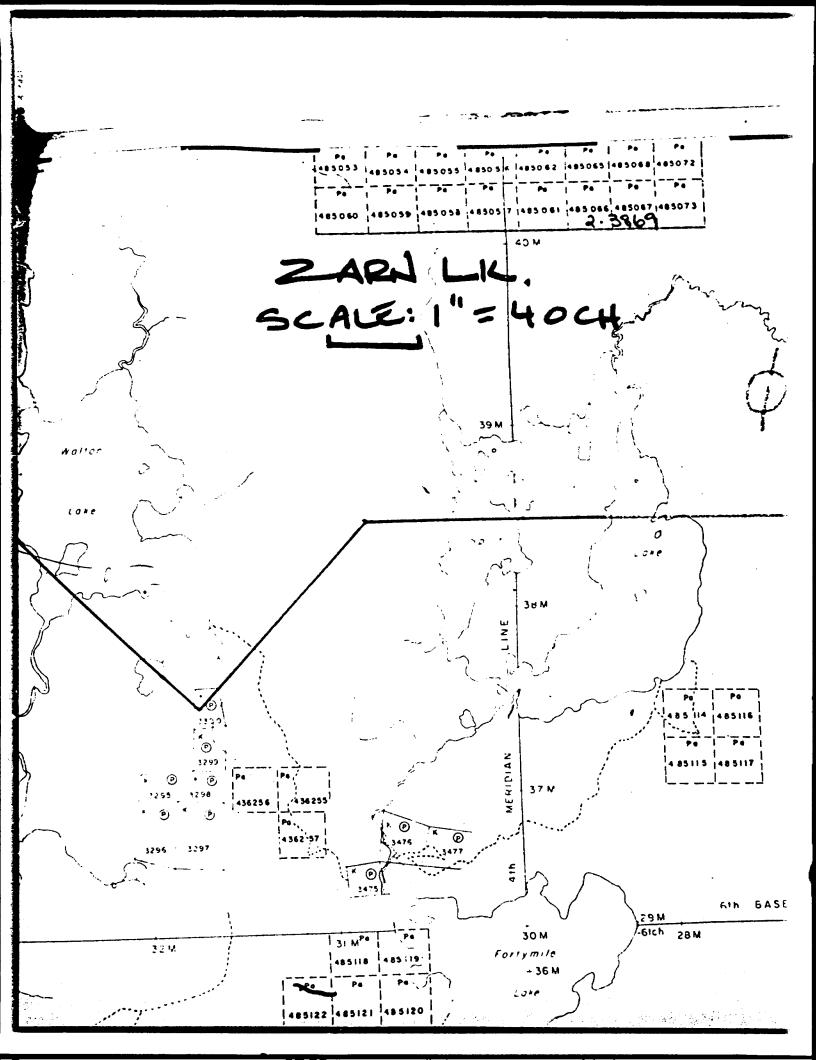
RESIDENT GEOLOGIST SIOUX LOOKOUT

A. Barr/amc

cc: Canadian Gold & Metals Inc. Timmins, Ontario

cc: Canadian Gold & Metals Inc. Mississauga, Ontario

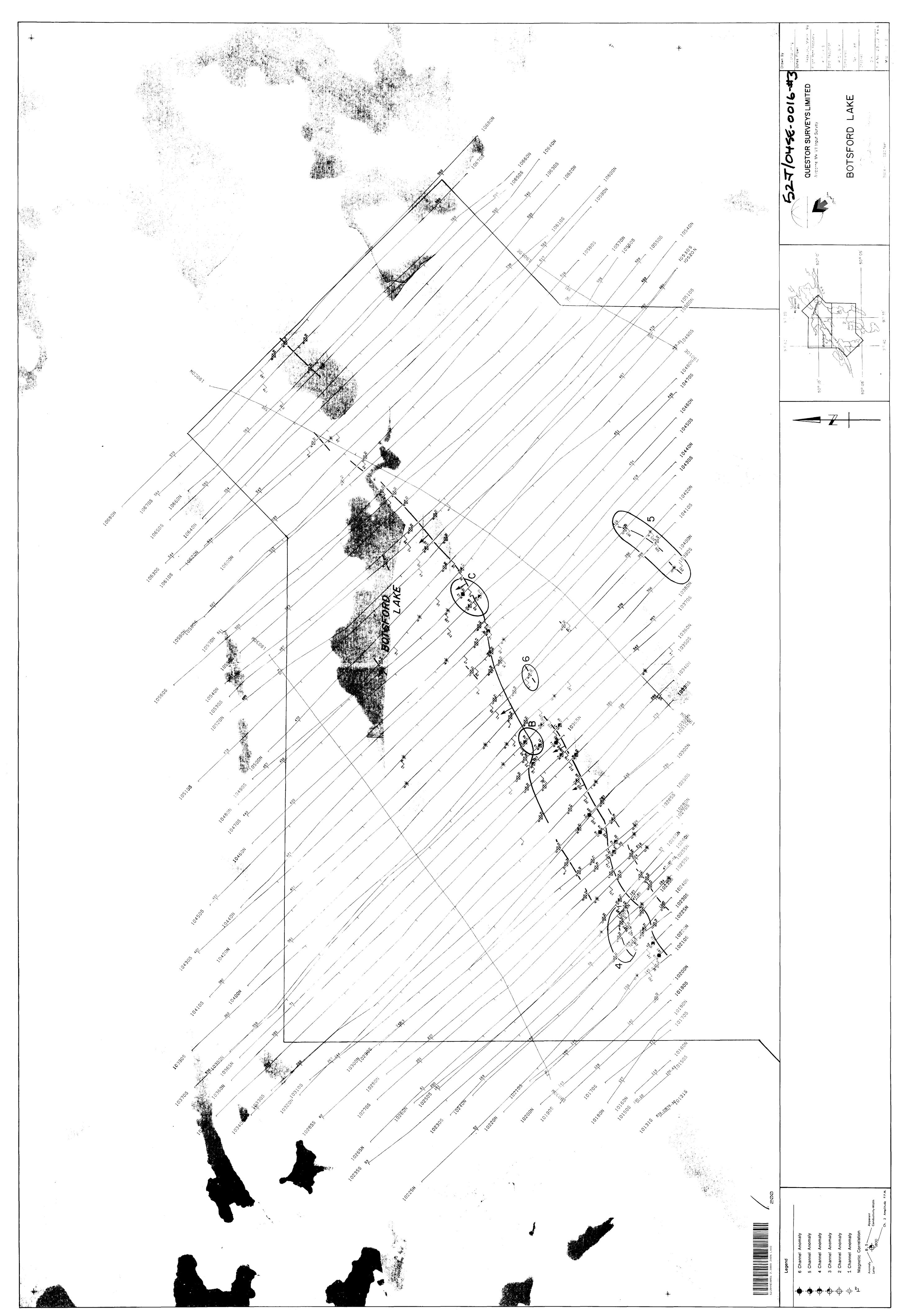
cc: Resident Geologist
Sioux Lookout, Ontario

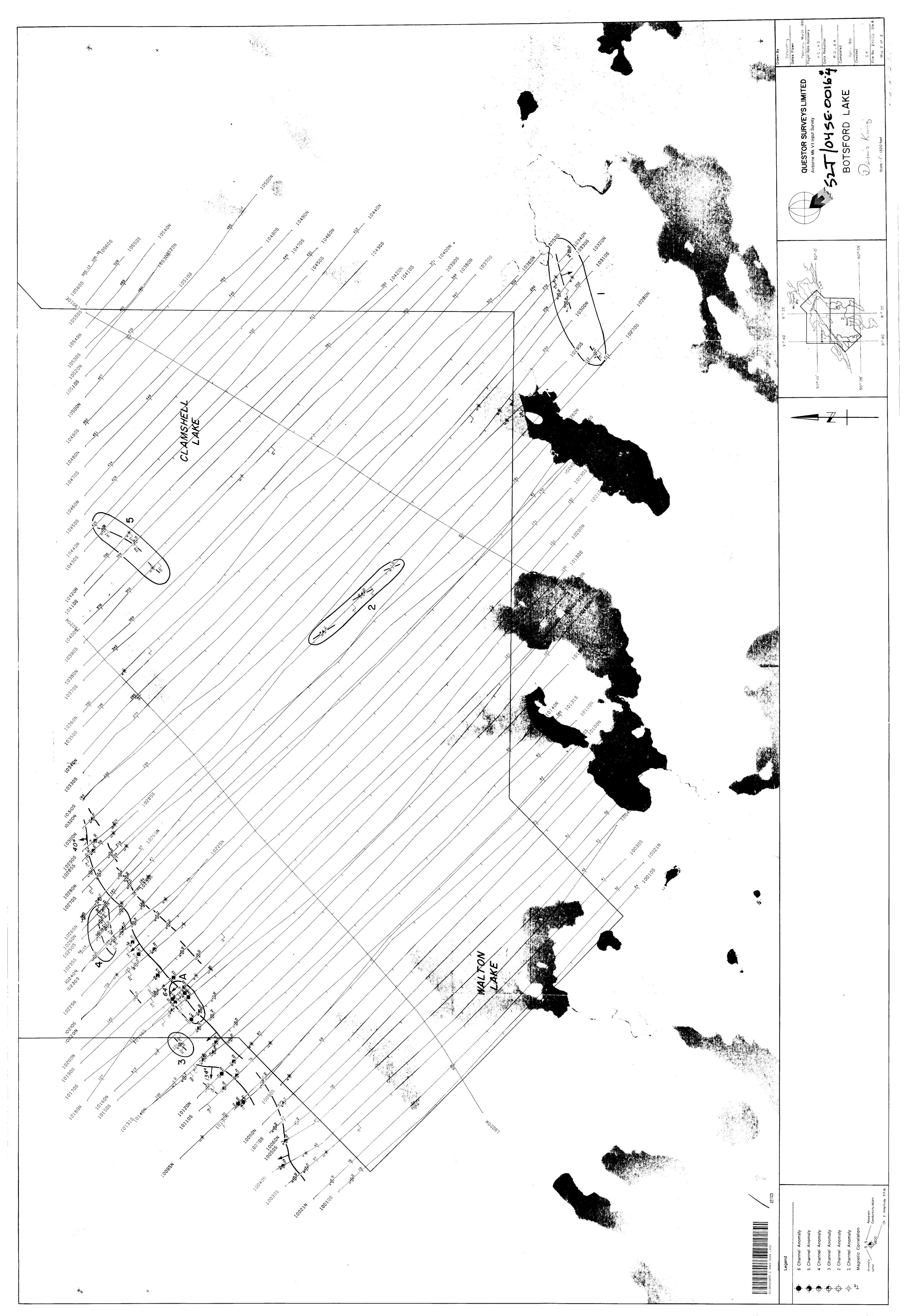


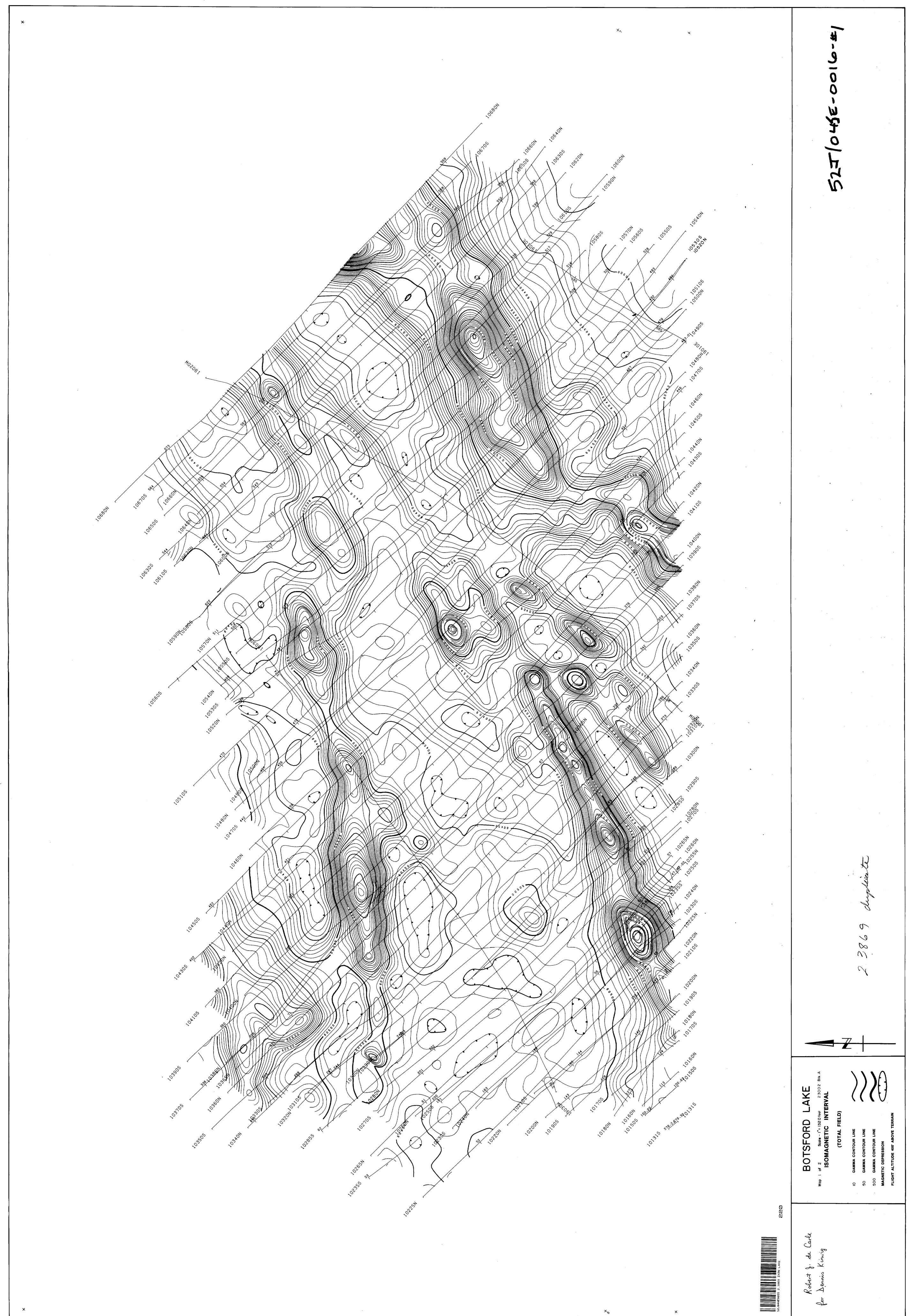
FOR ADDITIONAL INFORMATION

SEE MAPS:

527/045E-0016 #1-#4







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