

D.B. Sutherland  
Consulting Geophysicist

January, 1979

MATTAGAMI LAKE MINES LIMITED  
EXPLORATION DIVISION

FOR

KAPUSKASING PROJECT

GROUPS F-E & E-U-C

ELECTROMAGNETIC & MAGNETIC SURVEY

REPORT ON THE

MINING LANDS SECTION

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INTRODUCTION:

This report covers the geophysical surveys carried out on Groups F-E and E-U-C during 1978 and their correlation with Groups F, E, U and C which adjoin the two groups as shown on the accompanying compilation maps. Groups F-E and E-U-C consist of 23 and 27 claims respectively and cover some 38 airborne responses that lie between the previously surveyed grids; most of these are strong 6 channel anomalies. Picket lines were cut at 400 foot intervals on both grids at a bearing of  $135^{\circ}$ . Horizontal loop electromagnetic surveying covered 11.4 line miles on Groups F-E and 14.8 line miles on Group E-U-C. Magnetometer surveying totalled 14.5 line miles on Group F-E and 15.9 line miles on Group E-U-C.

The surveying was carried out by the crews of Mattagami Lake Mines Limited during November, 1978.

LOCATION & ACCESS:

The Kapuskasing Project area lies between latitude  $48^{\circ}51'N.$  and  $49^{\circ}11'N.$ , longitude  $82^{\circ}06'W.$  and  $82^{\circ}39'W.$  and is situated about 16 miles due south of Kapuskasing, Ontario.

The area can be reached from Kapuskasing by either of two good gravel roads maintained by Spruce Falls Power and Paper Company. Winter cut haul roads provide good control for ground work but are not driveable. Rivers and lakes provide additional access to areas of outcrop.

GEOLOGY:

The Kapuskasing Project area is a meta-volcanic-meta-sedimentary sequence of upper to mid-amphibolite metamorphic grade greenstones. It is bounded on the east by an abrupt transition to high-grade gneisses and migmatites and on the west by granite plutonic rocks. Original volcanic structures are visible in some of the greenstones. Mineralization occurs as iron formation in the greenstones and as disseminated sulphides throughout the survey area with concentrations predominantly occurring in the metasedimentary, low grade gneiss terrain.

DETAIL GEOLOGY:

Previous drilling on groups B, E and F indicate the area to be underlain by metasedimentary and metavolcanic schists and gneisses.

Group F is underlain by predominantly metasedimentary rocks containing graphitic schists. Group B is underlain by gneisses and porphyritic (augen gneiss) of uncertain origin. Group E, in the centre, is underlain by cordierite schists and felsic agglomeratic rocks overlying more mafic tuffaceous material at the base.

SURVEY INSTRUMENTS:

A direct reading Scintrex MF-2 fluxgate instrument was used to measure the total field to an accuracy of 10 gammas.

A Geonics EM-17 electromagnetic was employed for the horizontal loop survey. A frequency of 1600 Hz and a coil separation of 200 feet was used. The in-phase and quadrature components were measured to an accuracy of  $\pm 1\%$  of the primary field.

PRESENTATION OF RESULTS:

The following maps show the results of the current program at a scale of 1" = 200'.

Group F-E	Horizontal Loop	Map 1
Group F-E	Magnetics	Map 2
Group E-U-C	Horizontal Loop	Map 3
Group E-U-C	Magnetics	Map 4

Maps 5 and 6 are composite maps of the data on the above groups as well as the adjoining previously surveyed Groups F, E, U, C and B at a scale of 1" = 1320 feet.

Map 5 shows the airborne electromagnetic data.

Map 6 is a composite of the ground electromagnetics and magnetics.

DISCUSSION OF RESULTS:

The composite electromagnetic and magnetic map shows that most of the conductors are related to magnetic horizons and furthermore, may represent a series of geologic units. The geophysical results on Groups E-U-C indicate banded iron formation, while those on Groups F-E- & E are more typical of volcanic contact zones. One drill hole, drilled on Zone A, Group E in 1977, encountered a mafic felsic volcanic contact and consequently encouraged further exploration.

The strike and displacement of the conductors of Groups F and E are strong indications of folding or faulting.

The results on Groups F-E and E-U-C will be discussed separately below. A total of 15 conductive zones were outlined in the current program and have been numbered consecutively. Zones 1 to 7 occur on Group F-E and Zones 8 to 15 on Group E-U-C.

In addition, the six zones, Zones A to E, on Group E will be reviewed and reinterpreted.

Group F-E

Seven conductive zones, lettered Zones 1 to 7 inclusive were encountered on the group.

Zones 1, 2 and 3

These three conductors lie near the centre of a broad magnetic feature and each is associated with a local coincident magnetic high of 400 gammas or more. It seems

likely that these anomalies represent a single horizon that has been faulted or folded.

Zone 1 is a weak response at an indicated depth of 60 feet. It may extend farther west under deep overburden and surveying with longer cables may be warranted. However, Zone 1 shows a low conductance of 4 mhos and a 400 gamma magnetic high. It has been awarded a second priority classification.

Zone 2 is a weak and poorly defined response with a magnetic expression of more than 2000 gammas on 88W but none on 84W. The weak response could be due to deep overburden. Zone 2 is a third priority target at present.

Zone 3 consists of two well-defined responses that indicate a depth of 40 feet and a conductance of 11 mhos with a correlating magnetic high of 800 gammas on 80W. This is a strong second priority anomaly that should be reassessed on the basis of the results obtained in drilling Zone 4.

#### Zone 4

A strong conductive response on 72W and a weak one on 68W, constitute Zone 4. However, the closely associated magnetic structure extends for at least 1600 feet. Zone 4 may be the faulted or folded continuation of Zone 3.

Zone 4 displays a conductance of 12 mhos and a depth of 35 feet on 72W with a correlating magnetic high of 1000 gammas. This conductor is definitely a first priority anomaly and a drill hole has been spotted to test it.

### Zone 5

A strong well defined source extends from 44W to 16W, to the south of the baseline. The conductor is indicated to be 10 feet deep on 20W and 20 feet on 44W. The conductance is 10 to 20 mhos with an 18 mho value on 20W. A strong magnetic high (up to 7000 gammas) coincides with most of the conductor but on 20W, the magnetics show an 18,000 gamma dipole.

Zone 5 is a first priority target on 20W and a drill hole has been spotted to test it.

### Zone 6

This short conductor displays 7 mhos conductance and a depth of 10 feet on 20W. There is a correlating 4500 gamma magnetic high on 20W and a drill hole has been spotted to test this first priority target.

### Zone 7

Zone 7 consists of a single, poorly-formed response on 20W. The indicated conductance is 7 mhos, the depth 30 feet, and the magnetic expression nearly 8,000 gammas.

Zone 7 may be the western continuation of Zone A from Group E and consequently has been given a second priority rating.

### GROUP E

An error in the reported cable length on the initial survey has necessitated a revision of the width, depth, and

conductance of the anomalies. The new values for Zones A to F are shown in the attached table accompanying this report are for a 400 foot cable. A 1978 drill hole on Zone A encountered a mafic-felsic contact and has increased the economic potential of the grid.

Four zones, Zones A, B, C and D display good conductivity and coincident magnetics. These have been awarded first priority classifications in this current program and drill holes have been spotted to test them.

It is suggested that Zones E and F be resurveyed prior to drilling.

#### GROUP E-U-C

Eight conductive zones, numbered Zones 8 to 15 inclusive, have been interpreted from the results on Group E-U-C. All of the conductors on the group are closely related to a complex series of elongated magnetic anomalies. The conductors may in fact delineate conductive horizons within a magnetic series such as a banded iron formation. Should this be the case, the conductors would have a low economic potential.

None of the conductors are considered to be first priority targets at present. The overburden is indicated to be shallow and detailed geologic examination is recommended along the conductor axes.



Zone 8

A single line response on 132S shows a depth of 20 feet and a conductance of 12 mhos. There is a narrow coincident magnetic peak of nearly 6000 gammas. Zone 8 is a third priority conductor due to its short strike.

Zone 9

Zone 9 has been traced from 60S to 116S. The conductor is characterized by strong but variable electromagnetic and magnetic responses along its length and its eastern portion is complexed by nearby zones.

On 104S the results show a 40 foot wide zone, 10 feet deep, with a conductance of 18 mhos and a narrow, correlating magnetic peak of 9,000 gammas. Zone 9 warrants a second priority rating on this line.

Zone 10

Zone 10 is a short conductor displaying 36 mhos at a depth of 10 feet and 8500 gammas relief on line 116S. Because of its limited strike, it is a third priority zone.

Zone 11

This short conductor may be an extension of Zone 10. The best results, on 104S, show 14 mhos, at a depth of 10 feet correlating with a dipole displaying a negative of nearly 9000 gammas. Zone 11 is considered a third priority target.

### Zone 12

Zone 12 has been traced from 60S to 100S and has a sharp flexure near 78S. It is a narrow source except for the two southern lines where it broadens to 60 feet and shows a much lower conductivity.

On 72S, the conductance is 14 mhos and the depth 10 feet: these values are representative of all of the conductor, except the southern 600 feet. The coincident magnetic high is about 3000 gammas on 72S and generally more than 1000 gammas elsewhere.

Zone 12 is a second priority zone and should be included in the ground investigations.

### Zone 13

Zone 13 lies 200 to 300 feet south of Zone 9 between 64S and 84S. The best electromagnetic response occurs on 72S but shows interference from Zone 14 to the north. The conductance is typically 18 mhos and the depth 10 feet on 72S. It shows little definite magnetic expression but on 80S it appears to coincide with a 10,000 gamma magnetic high.

Because of its length and conductivity, it has been given a second priority rating.

### Zone 14

Zone 14 has been interpreted from sharp peaks in the broad responses on 68S and 72S that suggest multiple banding rather than wide conductors. Anomaly characteristics have a

low reliability but suggest a conductance of 19 mhos and a depth of 10 feet. The conductor occurs in an area of high magnetics but there are no definite coincident magnetic peaks.

Zone 14 is a third priority target.

#### Zone 15

Zone 15 covers lines 72S and 76S. The response on 76S is most unusual. It is unlikely that it represents a source 400 feet wide but it could be caused by a conductor crossing line 76S at a low angle. Additional traversing would be of value in assessing this unusual response.

The values on 76S indicate a source at a depth of 10 feet with a conductance of 14 mhos. Zone 15 deserves a second priority classification.

#### SUMMARY & RECOMMENDATIONS:

Twenty-one conductive zones are covered by this report: - 7 on Group F-E, 6 on Group E and 8 on Group E-U-C. Almost all of these are associated with linear magnetic features and have coincident magnetic anomalies (up to 18,000 gammas) along their length.

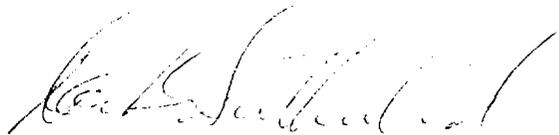
On Group F-E, Zones 4, 5 and 6 are first priority targets that may lie along a volcanic contact. Three other

zones are second priority and one zone has a third priority rating.

Group E has 4 first priority zones, Zones A, B, C and D. Previous drilling intersected a mafic-felsic contact on the eastern part of Zone A and consequently Group E is highly regarded. Zones E and F are low priority conductors that should be resurveyed prior to drilling.

The geophysical results on Group E-U-C are typical of banded iron formation. Overburden is indicated to be shallow (i.e. 10 to 20 feet) and detailed geological examination of the conductor axes may establish the cause of the conductors. Zones 9, 12, 13 and 15 are considered as second priority targets in the drilling program but first for the geological work.

Respectfully submitted,



D. B. Sutherland  
Consulting Geophysicist

ANOMALY TABLE

		G R O U N D							PRIOR- ITY	D I A M O N D D R I L L H O L E S			
GRID	ZONE	DEPTH	$\rho_z$	W	$\sigma$	MAG	LINE	STA.		DIP	DIRECTION	LENGTH	
F-E	1	60	4	1		400	96W						
F-E	2	100	10	1		2000	88W						
F-E	3	40	11	1		800	80W						
F-E	4	35	12	20		1000	72W	16.5S	-50°	N. along traverse	300		
F-E	5	10	18	1		18,000 dipole	20W	2.0S	-50°	" "	300		
F-E	6	10	7	20		4500	20W	5.0S	-50°	" "	300		
F-E	7	30	7	1		8000	0						
E	A	50	72	90		8000	8S	6.5E	-50°	W. along traverse	350		

ANOMALY TABLE

		G R O U N D							PRIOR- ITY	D I A M O N D D R I L L H O L E S			
GRID	ZONE	DEPTH	$\sigma^2$	W	$\sigma$	MAG			LINE	STA.	DIP	DIRECTION	LENGTH
E	B	40	30	40		800		1	16N	2.5E	-50°	W. along traverse	300
E	C	20	30	70		5,500		1	28N	8.0W	-50°	" "	350
E	D	40	1	1		1,000		1	24W	6.0N	-50	N. along traverse	300
E	E	110	3	1		1,000		2	12W				
E	F	30	1	280?		-		3	28N				
E-U-C	8	20	12	1		6,000		3	132S				
E-U-C	9	10	18	40		9,000		2	104S				
E-U-C	10	10	36	20		8,500		3	116S				





GEOPHYSICAL - GEOLOGICAL  
TECHNICAL DATA



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TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT  
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT  
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Ground Geophysics

Township or Area Casselman

Claim Holder(s) Mattagami Lake Mines Limited

Survey Company Mattagami Lake Mines Limited

Author of Report D.B. Sutherland

Address of Author \_\_\_\_\_

Covering Dates of Survey November 1978 to January 1979  
(linecutting to office)

Total Miles of Line Cut 32.5

MINING CLAIMS TRAVERSED List numerically	
P. 522082	P. 522083
(prefix)	(number)
P. 522084	P. 522085
P. 522086	P. 522087
P. 522088	P. 522090
P. 522091	P. 522092
P. 522093	P. 522094
P. 522095	P. 522097
P. 522098	P. 522099
P. 522100	P. 522103
P. 522104	P. 522105
P. 522106	P. 522107
P. 522108	P. 522110
P. 522111	P. 522112
P. 522113	P. 522114
P. 522115	P. 522116
P. 522117	P. 522119
P. 522120	P. 522122
P. 522123	P. 522124
P. 522125	P. 522126
P. 522127	P. 522128
P. 522129	
TOTAL CLAIMS <u>41</u>	

If space insufficient, attach list

<u>SPECIAL PROVISIONS CREDITS REQUESTED</u>	Geophysical	DAYS per claim
ENTER 40 days (includes line cutting) for first survey.	-Electromagnetic	<u>20</u>
ENTER 20 days for each additional survey using same grid.	-Magnetometer	<u>40</u>
	-Radiometric	_____
	-Other	_____
	Geological	_____
	Geochemical	_____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer \_\_\_\_\_ Electromagnetic \_\_\_\_\_ Radiometric \_\_\_\_\_  
(enter days per claim)

DATE: March 28/79 SIGNATURE: [Signature]  
Author of Report or Agent

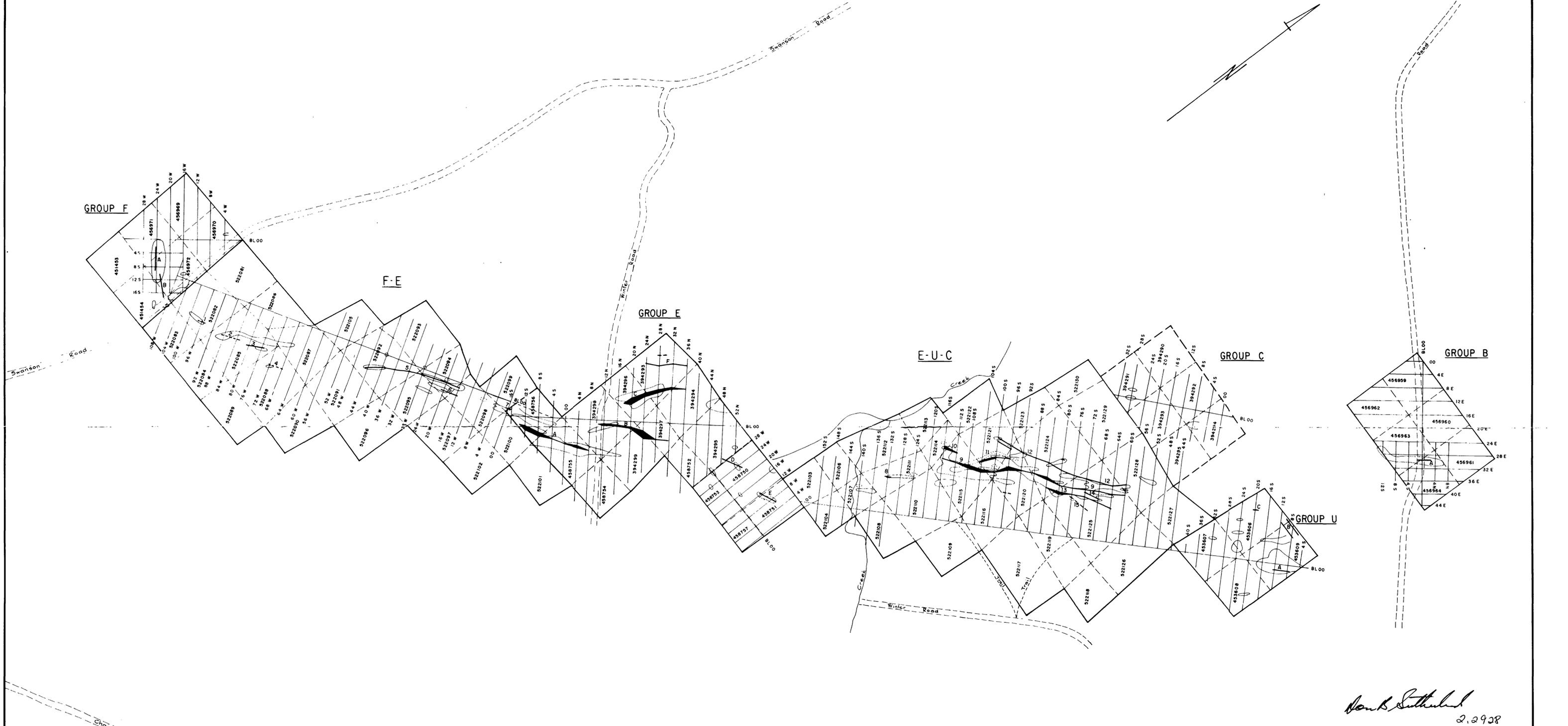
Res. Geol. L.D. Qualifications BS - 1162

File No.	Type	Date	Claim Holder

OFFICE USE ONLY







*Don B. Sutherland*  
2.29.78

MATTAGAMI LAKE MINES LTD.  
EXPLORATION DIVISION

COMPOSITE MAP  
KAPUSKASING PROJECT  
ONTARIO

DATE: JAN. 1979	SCALE: 1" = 1320'	TWP: 1
DRAWN BY:		MAP No:

○ Mag. Contour  
— EM Conductor



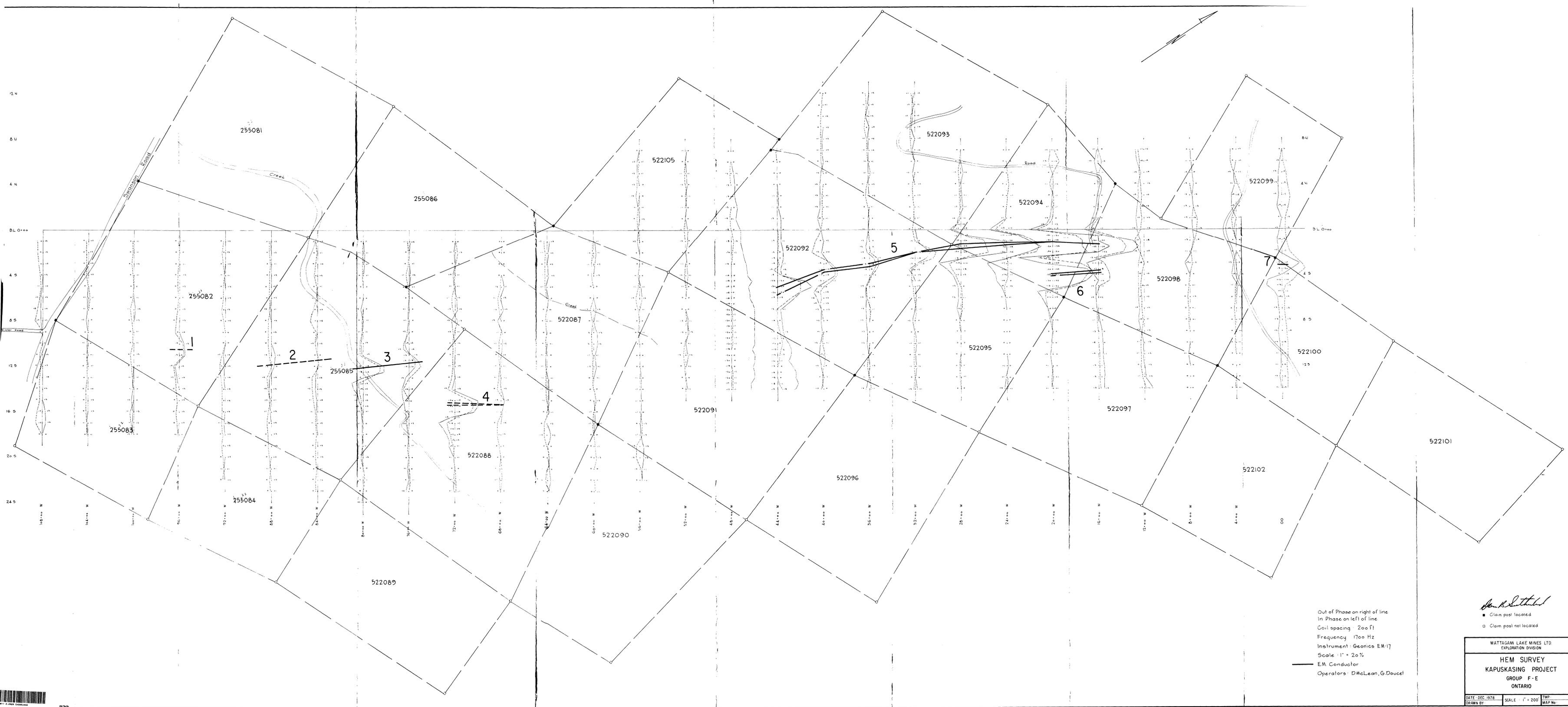


- 6 Channel Anomaly
- ◆ 5 " "
- ◇ 4 " "
- ◇ 3 " "
- ◇ 2 " "

*David B. Sutherland*

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
COMPOSITE MAP KAPUSKASING PROJECT ONTARIO		
DATE: JAN 1979	SCALE: 1" = 1320'	TWP:
DRAWN BY:		MAP No:



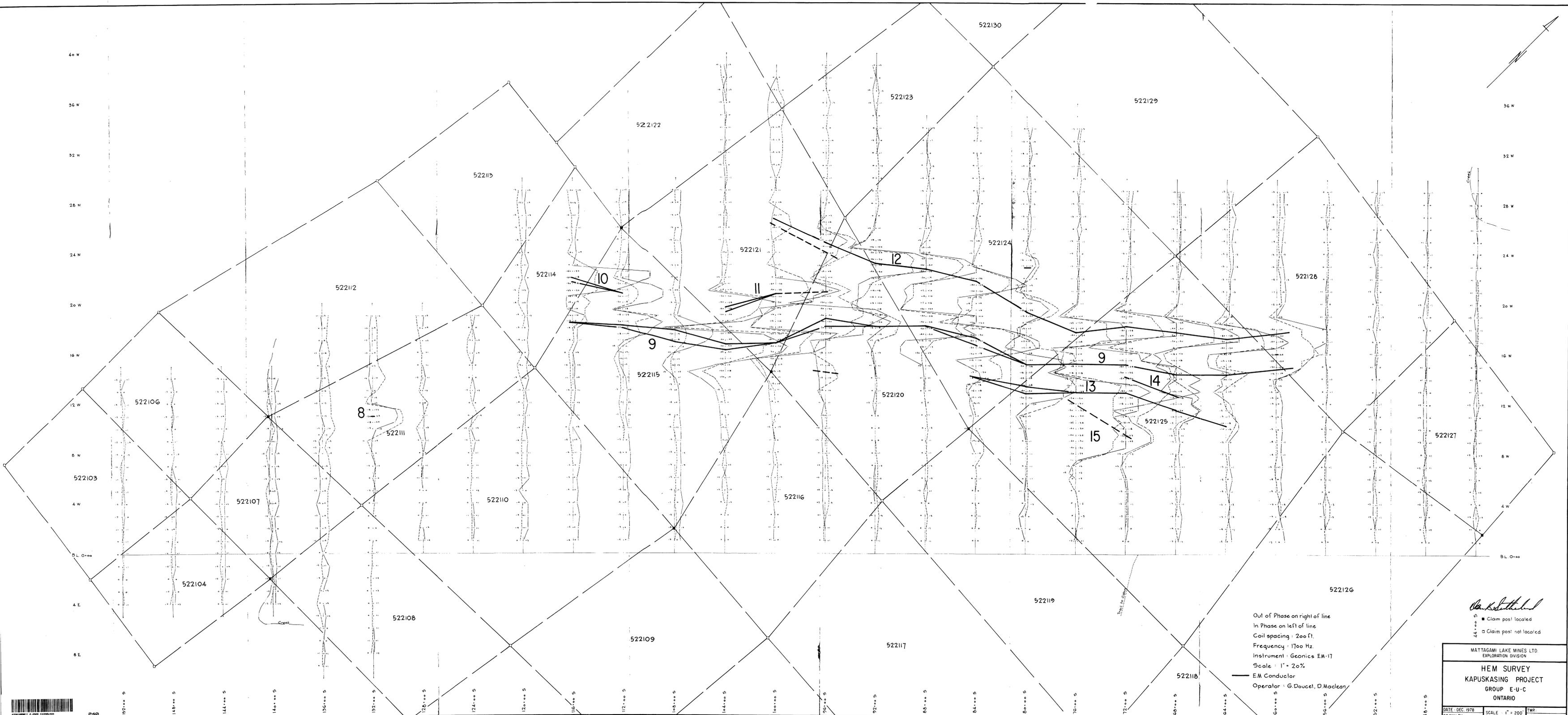


Out of Phase on right of line  
 In Phase on left of line  
 Coil spacing: 200 ft  
 Frequency: 1700 Hz  
 Instrument: Geonics EM-17  
 Scale: 1" = 200'  
 EM Conductor  
 Operators: D. McLean, G. Doucet

*John B. Little*  
 ■ Claim post located  
 □ Claim post not located

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
HEM SURVEY KAPUSKASING PROJECT GROUP F-E ONTARIO		
DATE: DEC. 1978	SCALE: 1" = 200'	TWP:
DRAWN BY:		MAP No:



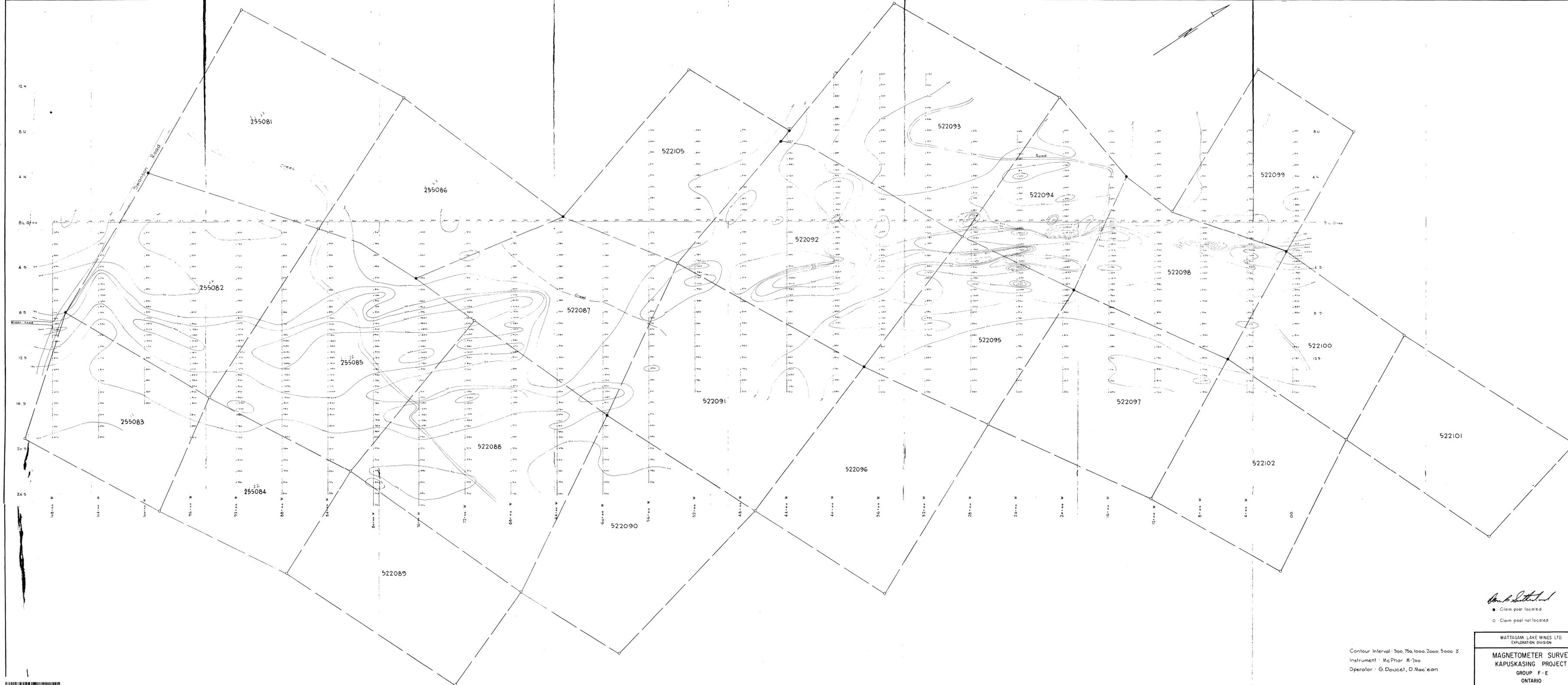


Out of Phase on right of line  
 In Phase on left of line  
 Coil spacing : 200 ft.  
 Frequency : 1700 Hz.  
 Instrument : Geonics EM-17  
 Scale : 1" = 20'  
 E.M. Conductor  
 Operator : G. Doucet, D. Maclean

*G. Doucet*  
 ■ Claim post located  
 □ Claim post not located

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
<b>HEM SURVEY</b>		
<b>KAPUSKASING PROJECT</b>		
GROUP E-U-C		
ONTARIO		
DATE: DEC. 1978	SCALE: 1" = 200'	TWP:
DRAWN BY:		MAP NO:



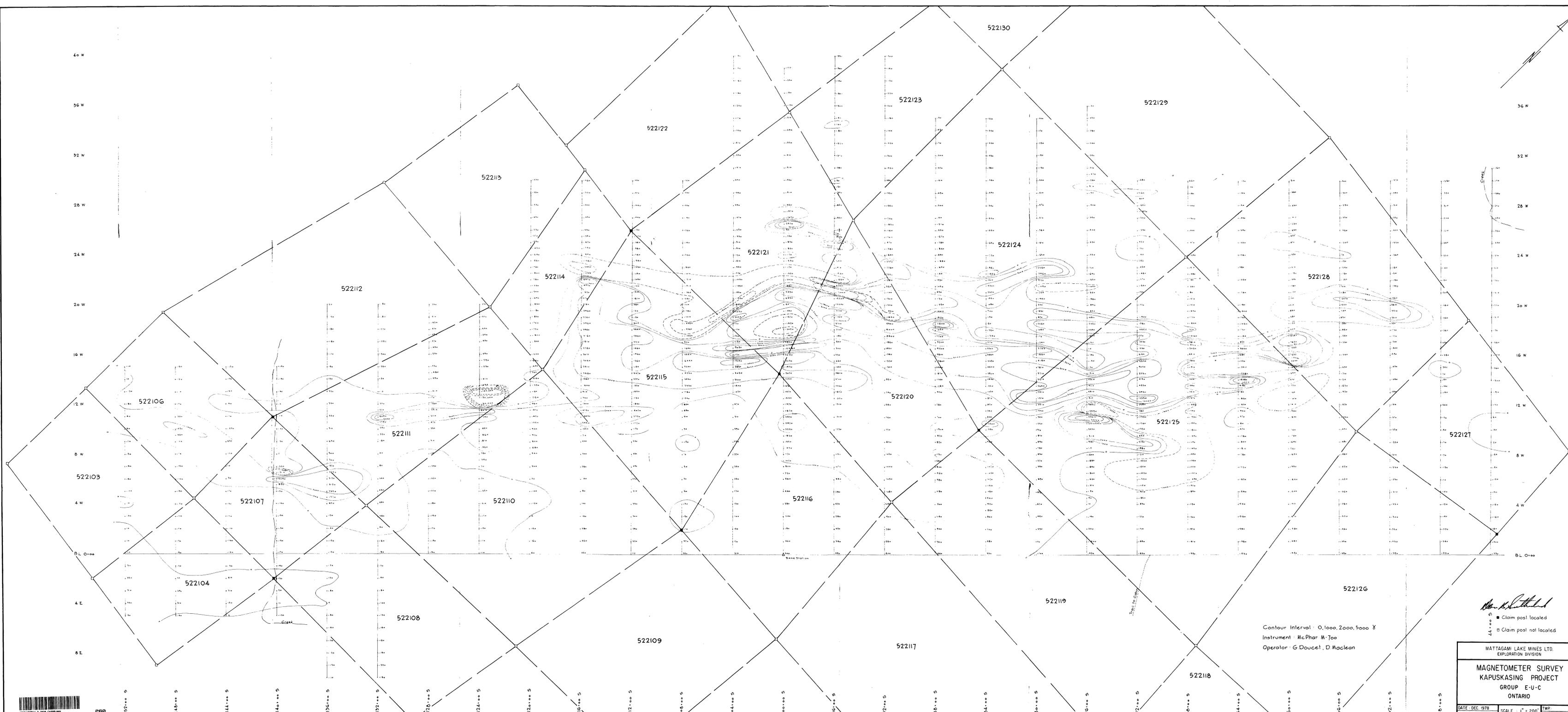


*Don E. Sutherland*  
 ■ Claim post located  
 □ Claim post not located

Contour Interval: 500, 750, 1000, 2000, 5000 &  
 Instrument: McPhar M-700  
 Operator: G. Doucet, D. Maclean

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
MAGNETOMETER SURVEY KAPUSKASING PROJECT GROUP F-E ONTARIO		
DATE: DEC 1978	SCALE: 1" = 200'	TWP: 25S 08W
DRAWN BY:		MAP No:





Contour Interval : 0, 1000, 2000, 5000 X  
 Instrument : McPhar M-700  
 Operator : G. Doucet, D. Maclean

*[Signature]*  
 ■ Claim post located  
 □ Claim post not located

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION	
<b>MAGNETOMETER SURVEY</b> KAPUSKASING PROJECT	
GROUP E-U-C ONTARIO	
DATE : DEC. 1978	SCALE : 1" = 200'
DRAWN BY :	TWP : MAP No :



260 92000 S 148000 S 144000 S 140000 S 136000 S 132000 S 128000 S 124000 S 120000 S 116000 S 112000 S 108000 S 104000 S 100000 S 96000 S 92000 S 88000 S 84000 S 80000 S 76000 S 72000 S 68000 S 64000 S 60000 S 56000 S 52000 S 48000 S