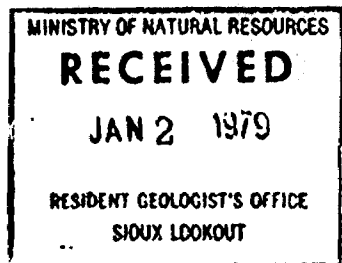




52J075W0027 52J075E0070A1 HOUGHTON LAKE

010

APPENDIX "B"



DETAIL AIRBORNE MAGNETIC AND VLF ELECTROMAGNETIC
SURVEYS IN THE FARRINGTON-HOUGHTON LAKES AREA

1. INTRODUCTION

Very detailed airborne magnetic and VLF electromagnetic surveys were flown for UMEX by Aerodat Ltd., during April 26-29, 1978. The area is located NW of Savant Lake, in the Patricia Mining Division, northwestern Ontario. The technical information and survey specifications are outlined below and were abstracted from information which was supplied by Aerodat Ltd. and the manufacturers of the instruments.

2. AREA SURVEYED

The survey area is located NW of Savant Lake as shown on the location map. It consists of a larger block from west of Farrington Lake to the eastern edge of Houghton Lake, and a smaller block about 5 km WNW of Evans Lake and straddling the new Marchington Road from Evans Lake to Sioux Lookout. The area is entirely within NTS map 52J, Sioux Lookout. A total of 798 line-kilometres (496 miles) were flown.

3. EQUIPMENT AND FLIGHT SPECIFICATIONS

The survey aircraft was a Bell Jet ranger II helicopter operated by Codiac Helicopters Limited of Moncton, New Brunswick, locally operating out of Savant Lake.

The navigation was carried out using a Motorola Mini-Ranger III (MRS III) radar positioning system together with an Aerodat-Perle flight-line direction and line-spacing guidance system for navigation control.

The range accuracy of the navigation system is 3 metres. A nominal line-spacing of 125 metres was maintained. The ground control was based on points located on NTS topographic maps 52J/6, 7, 10 and 11, at a scale of 1:50,000 as well as an uncontrolled airphoto mosaic at a scale of 1:15,840. In addition, a Geocam 35 mm flight path camera and intervalometer were used together with manual fiducials on the mosaic.

The large block was flown in a north-south direction while the small block was flown approximately NW-SE.

The helicopter altitude was nominally 61 m (200 ft) but average altitude was approximately 70 m. The altitude was measured with a Hoffman radar altimeter. The survey airspeed was approximately 112 km/h.

The magnetometer was a Barringer AM-104 proton precession magnetometer with a 2 gamma noise-level in this installation. The magnetometer sensor was towed on a cable about 15 m below the aircraft.

The electromagnetic system consisted of a Totem 1A VLF electromagnetometer made by Herz Industries Ltd., Toronto. The sensor, containing three (X, Y, Z configured) receiving coils automatically correcting for aircraft pitch, yaw and roll noise, was towed 7.5 m below the helicopter.

The results were recorded on a Barringer 8-channel analogue recorder, and in addition the magnetometer output and the navigational positioning parameters were recorded digitally.

4. SURVEY PROCEDURES

The corners and relevant survey points of the area were located in the field by the helicopter at survey altitude from the topographic maps and airphoto mosaic, and the coordinates were entered into the micro processor controlled navigation system, which then guided the pilot to fly pre-determined line-spacings and lengths. The grid was flown along lines spaced 125 m apart in alternating north and south directions.

The MRS III range information was recorded digitally on magnetic tape and subsequently computer processed and plotted to produce maps which show the actual flight paths. In order to plot the flight grid from the range information a base-map with higher accuracy than the mosaic was necessary, and a precise enlargement was made from the 1:50,000 topographic maps to a scale of 1:15,840 (1 inch = 1,320 feet).

5. DATA REDUCTION AND PLOTTING

The magnetometer data was computer processed and contoured with 10 gamma contour intervals where possible. The plotting was done by Data Plotting Services Ltd., 160 Duncan Mill Road, Don Mills, on a flat bed plotter. Line to line correlation was carried out, but the regional gradient was not removed.

The VLF-EM data were digitized from the analogue records and using the field calibration, the baselevel was determined and the total field response was directly contoured while the quadrature data were plotted as profiles, as if flown uniformly in the south direction, positive values to west of line.

The source for the VLF-EM primary signal was the U.S. Navy transmitter NLK/NPG at Seattle, Washington, with a frequency of 18.6 kHz. A duplicate unit of the Totem 1A was used with a Rustrak recorder as a ground monitor to determine changing signal strengths or breaks in the transmission. No transmission breaks occurred, and no apparent fluctuation can be seen in the signal strength records during survey flight times. The data therefore did not require corrections prior to contouring of the inphase, or total field, responses.

The plotting was carried out by Data Plotting Services Ltd. on their flatbed plotter from the digitized data. The contour interval of the inphase is a minimum of 2 percent, derived from the receiver output where a signal change of $\pm 100\%$ is represented by ± 1 volt.

6. GEOLOGY

From the federal-provincial aeromagnetic maps, and from the ODM Preliminary maps P933 and P996, Houghton-Hough Lakes Area, and Farrington Lake Area, respectively, the geology has a prevailing east-west trend which turns to an approximately northeast-southwest trend in the area of the smaller block.

The rocks underlying the survey areas consist of an Archean succession of volcanic rocks belonging to the Handy Lake Volcanic Sequence of mafic, intermediate to felsic extrusives, with some basic and acid intrusives.

The geology of the area is described in great detail by W.D. Bond, 1978, in the Ontario Geological Survey Open File Report 5237: Geology of the Houghton-Hough Lakes Area (Savant Lake Area), District of Thunder Bay, and the westward continuation by Trusler, J.R., 1975, Farrington Lake Area, District of Kenora, Ontario Division of Mines, Prelim. Map P996, Geological Series. Scale 1 inch to 1/4 mile or 1:15,840. Geology 1974.

7. INTERPRETATION OF THE RESULTS

7.1 The Aeromagnetic Survey

In geophysical surveys for mineral exploration, a magnetic survey serves a dual purpose, to aid in mapping of the geology, and to ascertain if any conductive horizons have a magnetic correlation which may be due to sulphides such as pyrrhotite, or possibly graphite associated with magnetite. The distinction between these cases can often be very difficult.

The present survey was flown in conjunction with the electromagnetics and was designed to provide high resolution, more comparable to a ground survey, yet avoiding the high noise-level encountered by the latter due to nearsurface very local sources.

The results correlate well with some of the lithological units shown in the maps P933 and P996, but the smaller units are either too small for the resolution or lack sufficient contrast to be represented. The large basic intrusive south-east of Farrington Lake is well outlined and the high degree of inhomogeneity is evident. Similarly the large granitic masses along the south edge of the area are well delimited, but show that to the east a large number of inclusions of basic rocks probably are present.

The mafic volcanic unit which passes through the south end of Farrington Lake is also distinct through the presence of higher magnetic activity.

Further north, the magnetic contour pattern becomes strongly banded in an east-west direction in part coinciding with mapped mafic volcanic and basic intrusive rocks which are relatively thin. Magnetic "ridges" are also apparent within the intermediate and felsic rock units probably outlining separate volcanic events by means of varying magnetite content.

The total field magnetics over the smaller block is much lower than over the large block. Only moderate anomalies are present, except at the south end where an anomaly is 300 gammas above average background. In this area, the geological map shows a folded sequence of rather alternating intermediate and felsic volcanics. The anomaly is possibly an expression of a somewhat higher intermediate to felsic ratio than further north.

The lowest magnetic values are found in the north-east corner of the block.

7.2 VLF Electromagnetic Survey

In contrast to "conventional" electromagnetic methods which are used in geophysical exploration and use short distances between transmitter of the primary field and the receiver, the VLF-EM method utilizes powerful transmitters far from the survey areas. Furthermore, the primary signal is a very low radio frequency, many times higher than the normal geophysical frequencies of 1 to 2 kHz. The transmitter used for the present survey was the U.S. Navy submarine communications station NLK, Seattle, Washington, transmitting at 18.6 kHz.

The remoteness of the source ensures a plane-wave uniform primary signal only affected by the geology at the receiver. It is thus suitable as a mapping tool. The magnetic field component of the VLF signal is elliptically polarized in the vicinity of electrical conductors. The Totem 1A receiver used for this survey has antenna coils oriented in the x, y and z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency gives high response factors making it possible to map quite poorly conducting zones such as faults, shears, porous flow tops, brecciated and altered rocks, etc. The increased sensitivity to poorer conductors also gives rise to responses from conductive overburden.

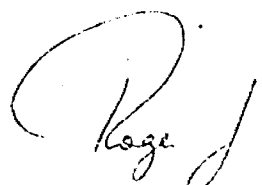
In common with the magnetics the VLF responses also show distinct east-west banding due to contacts and volcanic flows, but the detail is different. Not all the VLF responses have magnetic correlation and such anomalies should be particularly scrutinized for possible overburden origin.

Within the smaller block the VLF-EM highs do not show as much linearity as over the larger block and also less correlation with the magnetics. Much of the high response in the northern part of the area correlates with low, wet ground, and may thus be due to overburden conductivity.

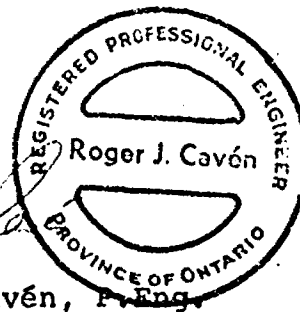
8. CONCLUSIONS

The magnetic and VLF-EM surveys have provided very detailed maps closely comparable to results obtainable on the ground. The results will be useful in efforts to correlate the geology and hopefully define volcanic units for ground follow-up.

RJC/tn
August 2nd, 1978



Roger J. Cavén, P. Eng.
Chief Geophysicist





52J076W0027 52J07SE0070A1 HOUGHTON LAKE

File 2.2765

300 GEOLOGICAL - GEOCHEMICAL
TECHNICAL DATA STATEMENT

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 Airborne Geophysical
Township or Area NW of Savant Lake
Claim holder(s) Alan Best
Savant Lake, Ontario
Author of Report Roger J. Cavén c/o UMEX
Address 1935 Leslie St., Don Mills, Ontario
Covering Dates of Survey April 26-29, 1978
(linecutting to office)
Total Miles of Line cut N/A

MINING CLAIMS TRAVERSED
List numerically

Pa. 391653
(prefix) (number)
Pa. 391655
Pa. 391656

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

* **AIRBORNE CREDITS** (Special provision credits do not apply to airborne surveys)
Magnetometer 32 Electromagnetic 32 Radiometric _____
(enter days per claim)

DATE August 9, 1978 SIGNATURE: Roger J. Cavén
Author of Report or Agent

PROJECTS SECTION L.D.
Res. Geol. _____ Qualifications 2.1049
Previous Surveys _____

Checked by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

TOTAL CLAIMS 3

OFFICE USE ONLY

If space insufficient, attach list

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

Corrections made _____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth - include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

Additional information (for understanding results) _____

AIRBORNE SURVEYS

Type of survey(s) Magnetic and VLF-Electromagnetic

Instrument(s) Barringer AM-104 and Herz Totem 1A (NLK-18.6 kHz)

(specify for each type of survey)

Accuracy ± 2 gamma and ± 1 percent

(specify for each type of survey)

Aircraft used Bell Jetranger II helicopter

Sensor altitude nominally 46 m and 53 m above ground, respectively

Navigation and flight path recovery method Motorola Mini-Ranger III with Aerodat-Perle navigational guidance and data acquisition system, Geocam 35mm flight-path camera

Aircraft altitude average 71 m above ground Line Spacing 125 m

Miles flown over total area 496 Over claims only 2.4

2.4 x 40 = 96 ÷ 3 = 32 days per claim / each survey

436309 436372 436371 436370 436369 436182 436178 436179 436180 436181
Shoehorn Hough Lake Staunton

S25/07 SE
EVANS LK
M-1774
Scale
40 CHS.

CONANT TWP.
FOR STATUS REFER TO TWP. PLAN - M.1682

Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
465014	436372	436371	436370	436369	436182	436178	436179	436180	436181
Pa	Pa	Pa	Pa	Pa	391317	391318	391319	391320	391321
465020	465021	465022	465023	465024	Pa	Pa	Pa	Pa	Pa
Pa	Pa	Pa	Pa	Pa	391322	391323	391324	391325	391326
391816	465039	465038	465037	465036	Pa	Pa	Pa	Pa	Pa
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
391807	391723	391720	391719	391659	391327	391328	391329	391330	391331
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
391806	391722	391721	391718	391660	391398	391399	391400	391401	391402
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
391614	391656	391652	391650	391651	391163	391164	391165	391166	391167
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
391613	391655	391651	391649	391648	391167	391168	391169	391170	391171
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
391056	391105	391103	391102	391101	391172	391173	391174	391175	391176
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
391059	391096	391098	391099	391097	391225	391226	391227	391228	391229
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
391085	391282	432754	432753	432752	391217	391218	391219	391220	391221
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
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390989	390975	390976	390978	391258	391259	391260	391261	391262	391263
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390988	390921	390922	391182	390935	390935	261218	254501	391485	391486
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
390989	390923	390924	391183	391509	391510	391511	391512	391513	391514
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
390990	421559	421560	421561	421562	391521	391522	391523	391524	391525
Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa

AIR
2-27-65

HOUGHTON LAKE - M.2165

3M.

4M.

5M.

6M.

7M.

PROJECTED LINE

M.T.C. Gravel Res. File 168405

GRAVEL FILE: 189277 48616

Evans Lake

Harold

Conant

Staunton

Shoehorn

Hough

Lake



Ministry of
Natural
Resources

Lands
Administration
Branch

Unit

Work Credits

2.2765

Recorded Holder:

Alan Best

Township or Area:

Evans Lake

Type of survey and number of Assessment days credit per claim	Mining Claims
Geophysical Electromagnetic <u>32</u> days	Pa. 391653
Magnetometer <u>32</u> days	391655 - 56
Radiometric _____ days	
Induced polarization _____ days	
Section 86 (18) _____ days	
Geological _____ days	
Geochemical _____ days	
Man days <input type="checkbox"/>	Airborne <input checked="" type="checkbox"/>
Special provision <input type="checkbox"/>	Ground <input type="checkbox"/>
Notice of Intent to be issued:	
<input type="checkbox"/> Credits have been reduced because of partial coverage of claims.	
<input type="checkbox"/> Credits have been reduced because of corrections to work dates and figures of applicant.	
<input type="checkbox"/> No credits have been allowed for the following mining claims as they were not sufficiently covered by the survey:	
<hr/>	
<hr/>	
<hr/>	
<hr/>	

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical — 80; Geological — 40; Geochemical — 40;



Ontario

2.2765

Ministry of
Natural
Resources

Notification of recording
of assessment work credits

RECEIVED

RECEIVED

AUG 24 1978

AUG 23 1978

MINING LANDS SECTION

LANDS ADMINISTRATION
BRANCH

Lands Administration Branch
Mining Lands Section
Ministry of Natural Resources
Room 1617, Whitney Block
Queen's Park, Toronto
M7A 1W3

Date of recording of work: August 3rd, 1978

Recorded holder: Alan Best

Address: Savant Lake, Ontario

Township or Area: Evans Lake (M-1774)

Type of survey and number of Assessment days credit per claim	Mining claims
Geophysical	Pa. 391653, Pa. 391655, and Pa. 391656 Pa. 391653, Pa. 391655, and Pa. 391656
Electromagnetic <u>32</u> days	
Magnetometer <u>32</u> days	
Radiometric _____ days	
Induced polarization _____ days	
Section 86 (18) _____ days	
Geological _____ days	
Geochemical _____ days	
Man days <input type="checkbox"/>	Airborne <input checked="" type="checkbox"/>
Special provision <input type="checkbox"/>	Ground <input type="checkbox"/>

Notice to recorded holder:

- Survey reports and maps in duplicate be submitted to the Lands Administration Branch, Toronto within 60 days from the date of recording of this work.
- Reports and maps are being forwarded to the Lands Administration Branch with this letter.

Daniel H. Caven
Mining recorder
Acting
c.c. Roger J. Caven-UMEX-Don Mills.
Alan Best - Savant Lake

78-62
78-63



Ministry of
Natural
Resources

Your file:

Our file: 2.2765

1978 12 28

Mr. Albert Hanson
Mining Recorder
Ministry of Natural Resources
P.O. Box 669, Court House
Sioux Lookout, Ontario
POV 2T0


Dear Sir:

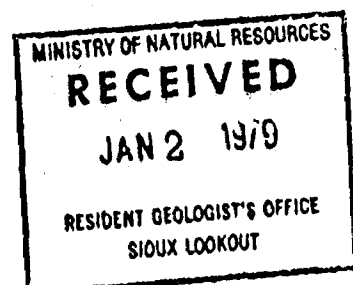
Re: Mining Claims Pa. 391653 et al. Evans Lake, File 2.2765

The Geophysical (Electromagnetic & Magnetometer) assessment work credits as shown on the attached statement 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,


J.R. Morton
Acting Director
Lands Administration Branch
Whitney Block, Room 6450
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-6918



DN:ie

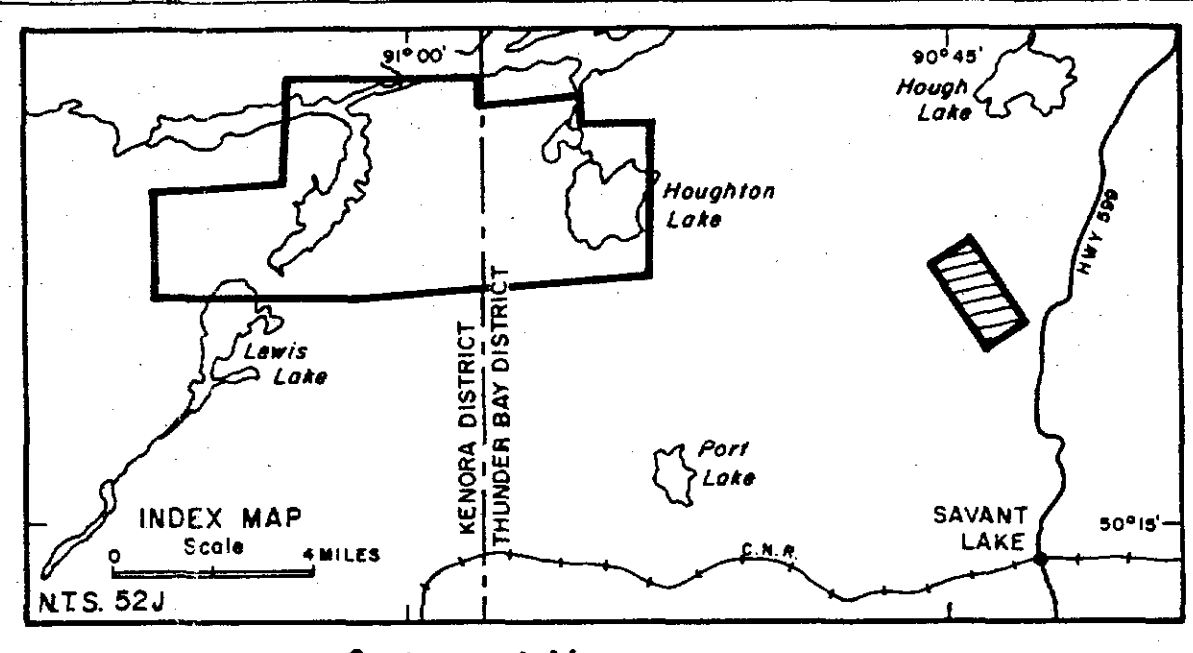
cc: Mr. Alan Best
Savant Lake, Ontario
Union Miniere Explorations and
Mining Corporations Limited
Don Mills, Ontario
Attn: Mr. Roger J. Caven
Resident Geologist ✓
Sioux Lookout, Ontario

FOR ADDITIONAL

INFORMATION

SEE MAPS:

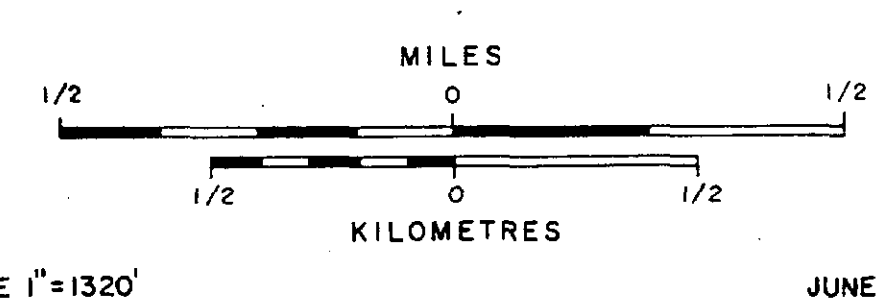
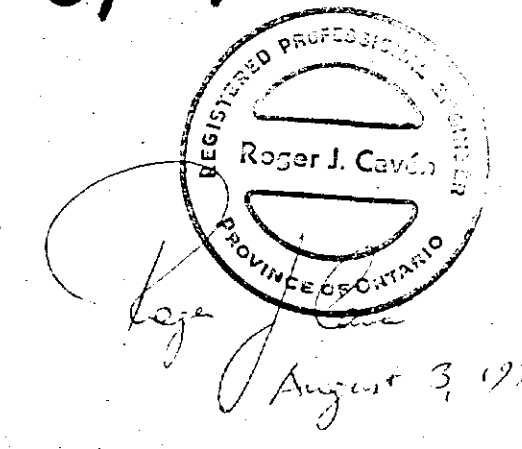
52 J107SE-0070-A1 #1-2



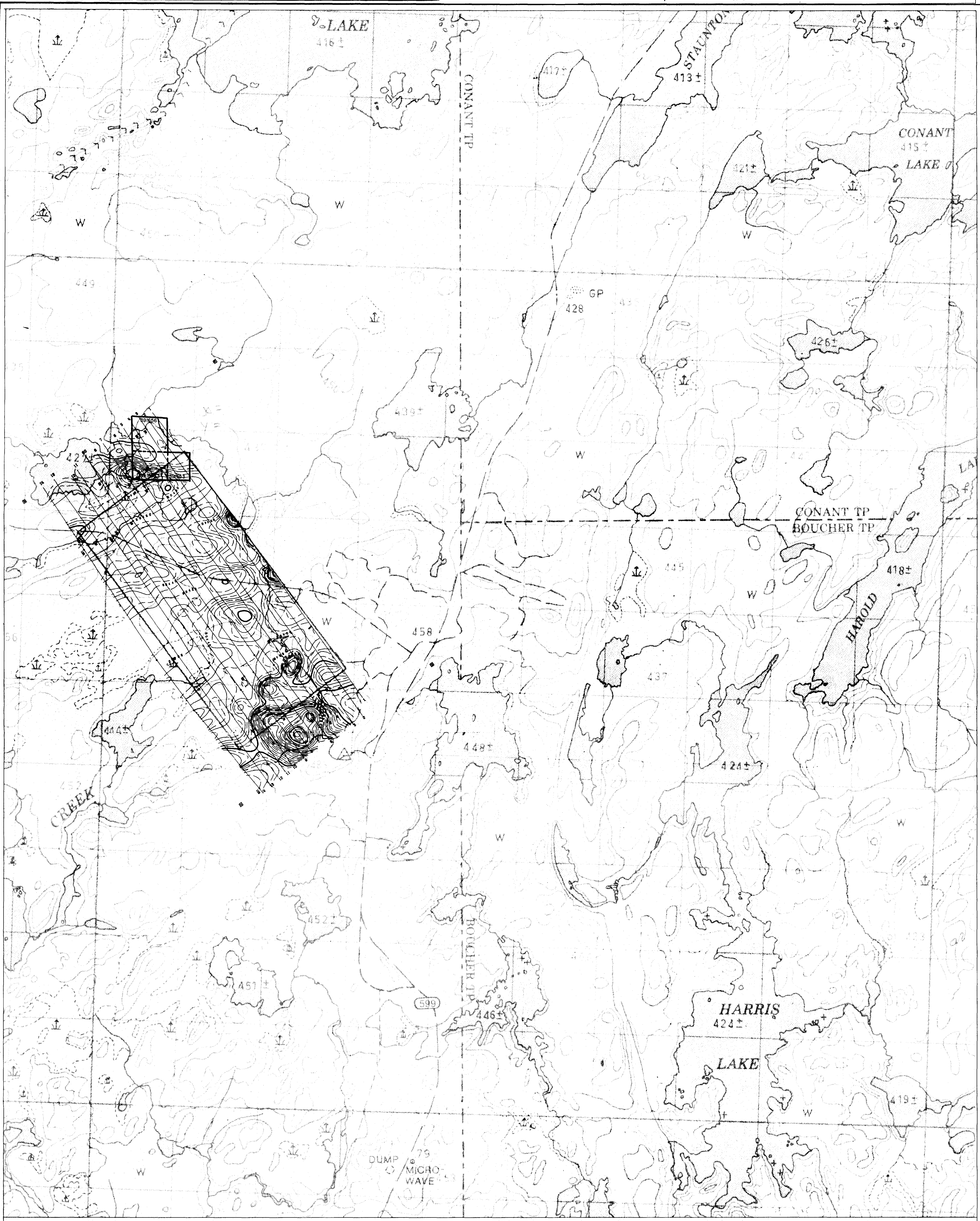
52J/07SE-0070-A1 #1

52J/07SE-0070-A1 #1 Map
TOTAL FIELD MAGNETIC MAP

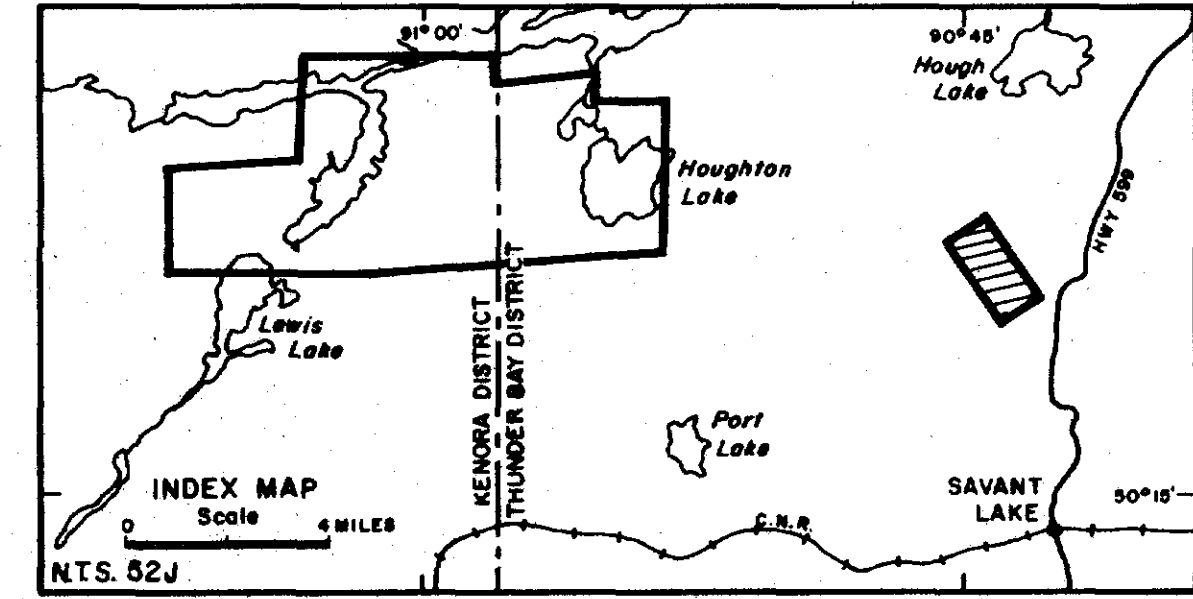
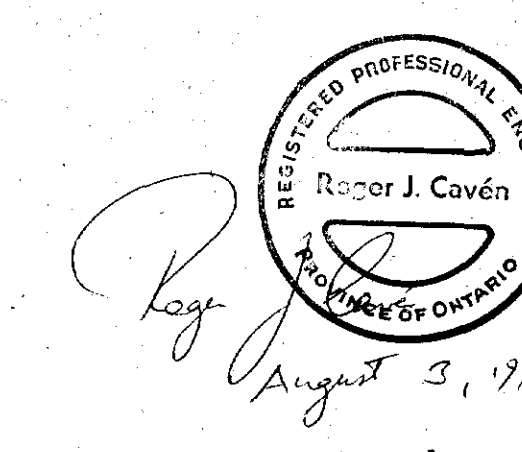
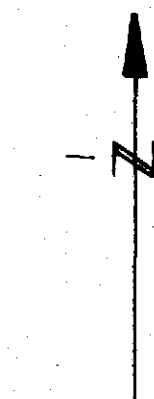
LEGEND
1,000 gammae
100 gammae
20 gammae
10 gammae



SCALE 1"=1320' JUNE 1978 Appendix "E"

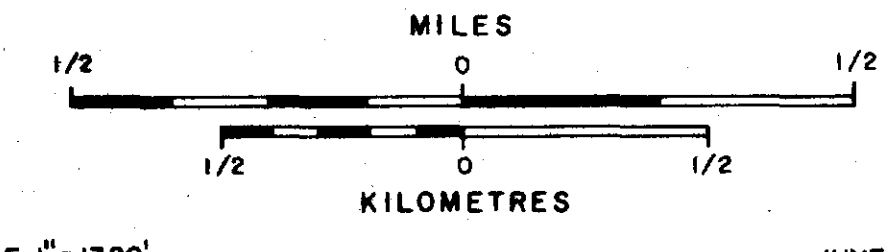


LEGEND
1,000 gammae
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20 gammae
10 gammae



TOTAL FIELD MAGNETIC MAP

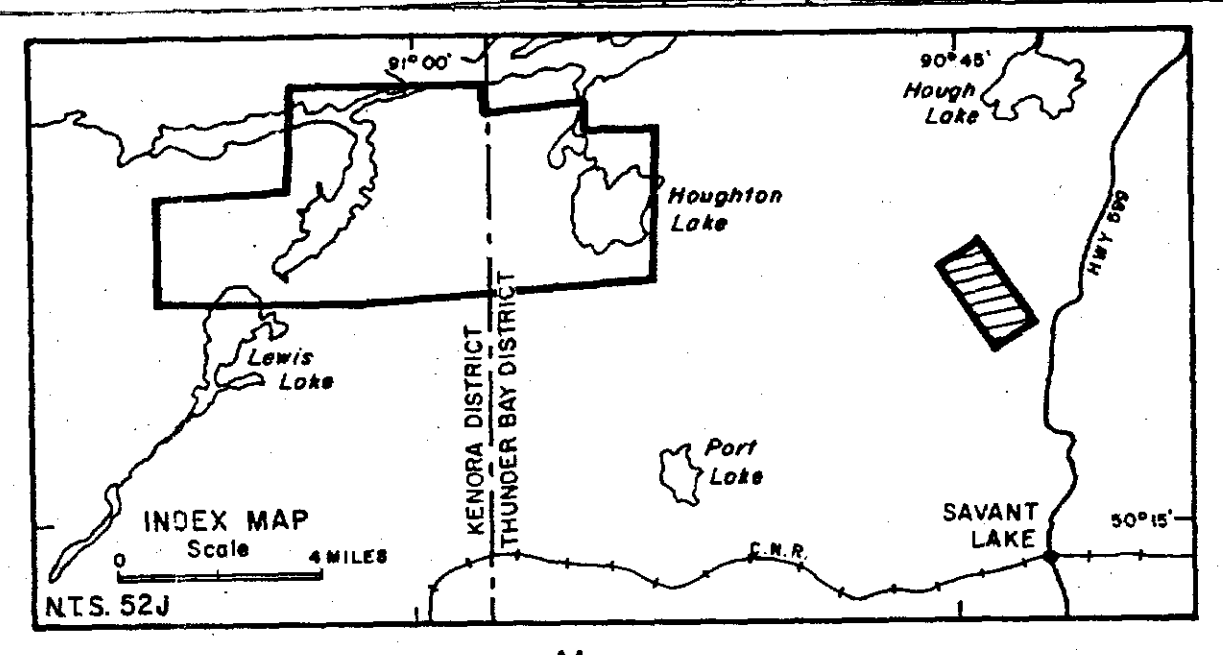
SAVANT LAKE AREA
ONTARIO
UMEX



SCALE 1"=1320' JUNE 1978 Appendix "E"

MINISTRY OF NATURAL RESOURCES
RECEIVED
JAN 2 1979
RESIDENT GEOLOGIST'S OFFICE
SUDBURY

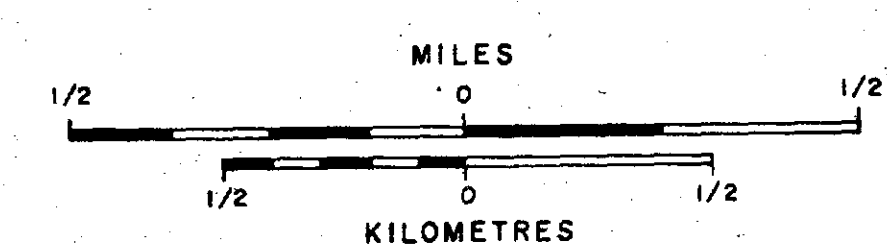
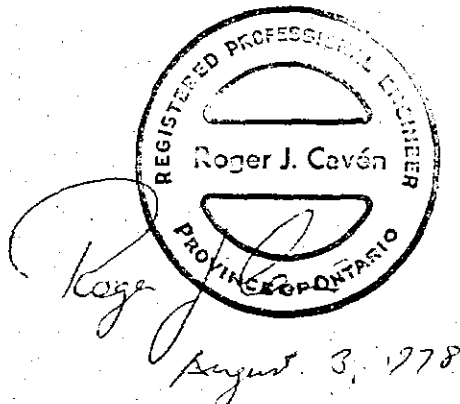
52J/07SE-0070-A1 #1



52J/07SE-0070-A1 #2

VLF SURVEY

SAVANT LAKE AREA
ONTARIO
UMEX

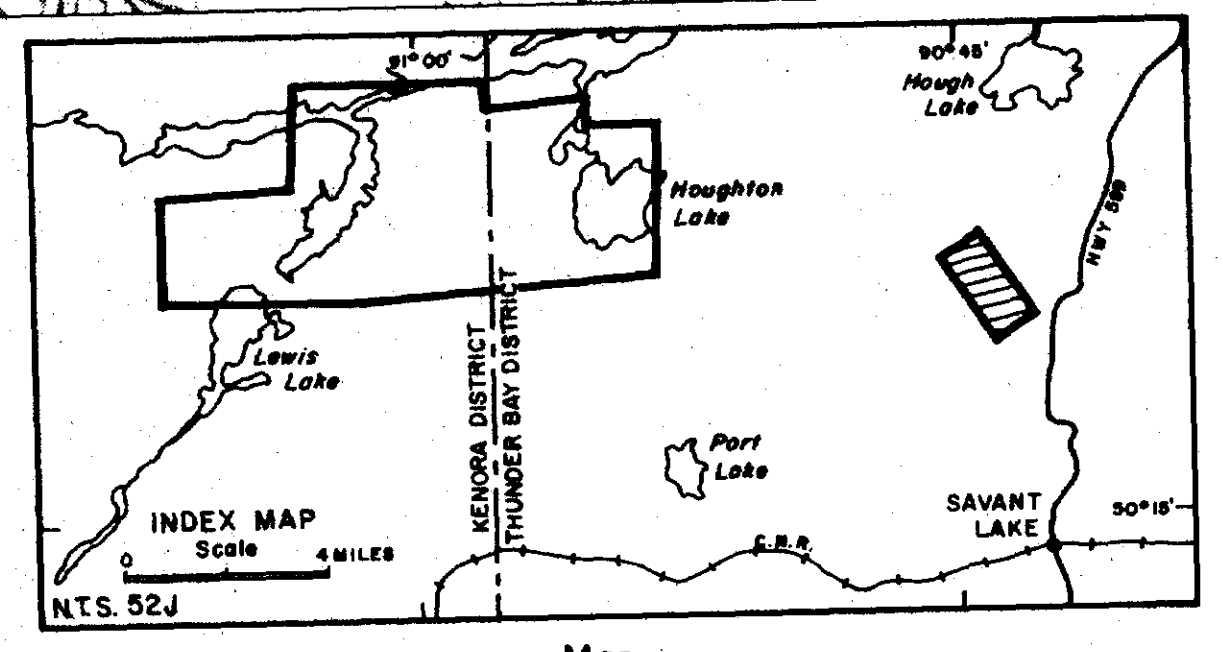
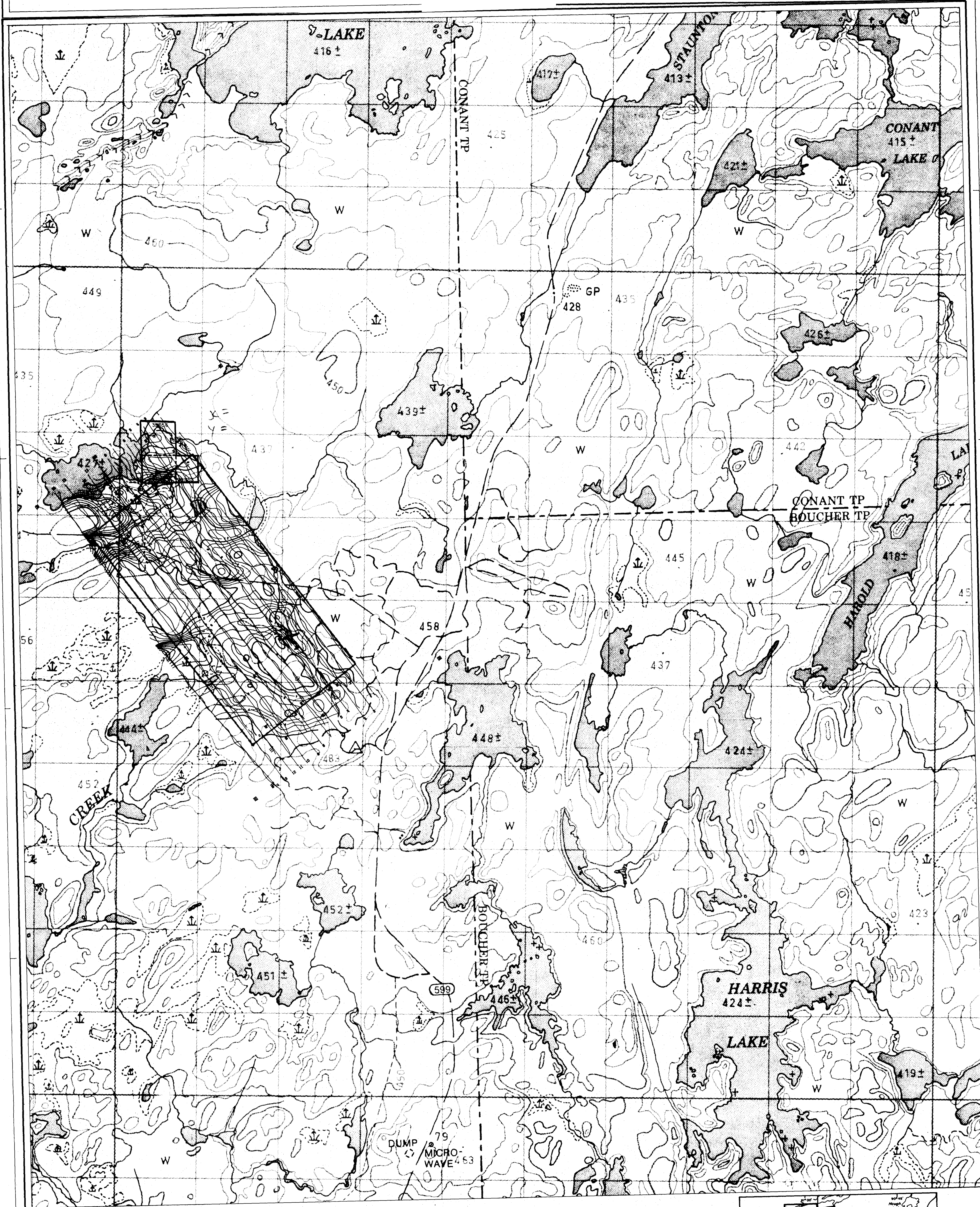
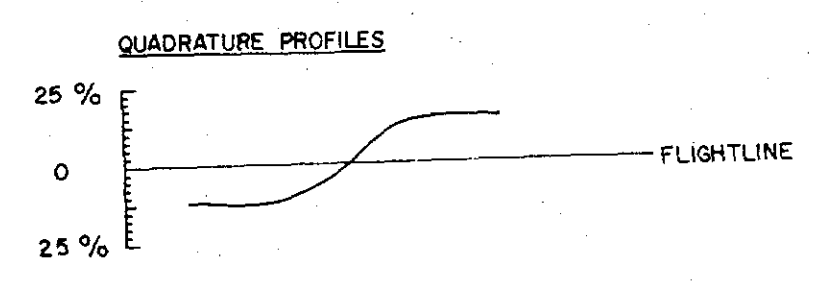


SCALE 1"=1320'

JUNE 1978

Appendix "a"

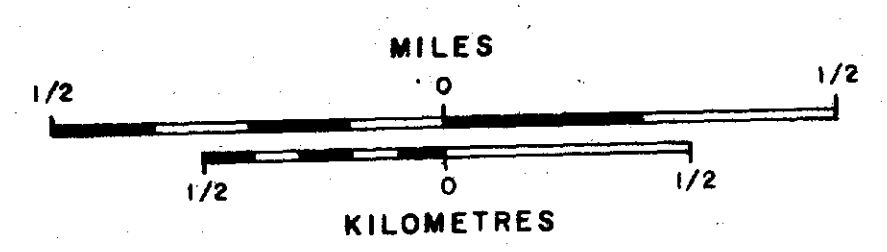
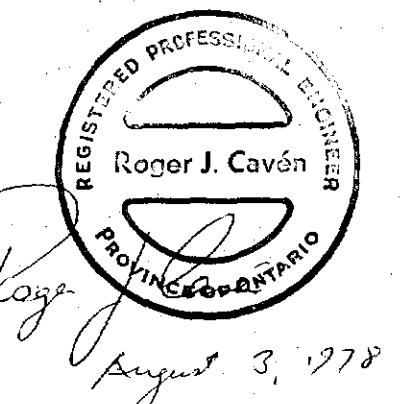
LEGEND
Percent Total Field
100 Percent
10 Percent
2 Percent
0 Percent



52J/07SE-0070-A1 #2

VLF SURVEY

SAVANT LAKE AREA
ONTARIO
UMEX



SCALE 1"=1320'

JUNE 1978

Appendix "a"

LEGEND
Percent Total Field
100 Percent
10 Percent
2 Percent
0 Percent

