Report on an Airborne

RADIOMETRIC and MAGNETIC SURVEY

of

Part of Palmerston Township, Ontario

for

J.P. JEWELL

Flown and Compiled

by

GEOTERREX LIMITED
84-143

OTTAWA, Ontario
April, 1977.

R. WASYLECHKO
Geophysicist

geoterrex ltd.

INTRODUCTION

Geoterrex Limited was contracted by J.P. Jewell, Mining Geologist, to perform an airborne radiometric and magnetic survey over the Riddell Claim Block in Palmerston Township, County of Frontenac, Province of Ontario.

SURVEY PROCEDURES

The survey was conducted by flying 10 parallel north-south lines at one-eight mile spacing. A total of 3 line miles of survey was completed over the 5 claim block.

The survey was conducted on July 4th and 5th, 1976, using the Geoterrex Otter aircraft, registration CF-AYR. The aircraft and crew were based at Ottawa.

The spectrometer installed in the aircraft was an Exploranium DiGRS 3001, 4 channel digital output unit. The total crystal volume was 1444 cubic inches. Detailed specifications of all the equipment and recording procedures are listed in the appendix attached.

The cost of the survey was $350.00.

PERSONNEL

The personnel involved in this survey were as follows:

Joe Broeders	Pilot	Manotick, Ontario
Alvin Tolley	Navigator	Maniwaki, Quebec
Bob Innes	Aircraft Mechanic	Kingston, Ontario
Jean Tarin	Electronics Operator	Ottawa, Ontario
Frank Kiss	Data Reductionist	Ottawa, Ontario
Peter Tallyhoe	Compilation Chief	Ottawa, Ontario
Bob Schingh	Drafting Chief	Ottawa, Ontario
Don Wagg	Geophysicist	Ottawa, Ontario
Roman Wasylechko	Geophysicist	Ottawa, Ontario

The survey was supervised by Don M. Wagg, a registered Professional Engineer in the Province of Ontario, previously accredited by the Ontario Ministry of Natural Resources.

CLAIMS COVERED

The claims covered by this survey are:

Claim numbers EO 402129/30/31/32/33

RESULTS

Accompanying this report is a plan map at a scale of 1 inch equals 1320 feet, showing the location of the claims and the flight lines covering the area. Radiometric anomalies have been selected and are plotted on the base map.

The anomalies were selected and graded on the basis of anomaly amplitude over background, uranium to thorium ratio, and anomaly shape.

Grading of the anomalies was based on the following criteria:

1. Good amplitude and/or high uranium to thorium ratio.

2. Fair to weak amplitude and/or low uranium to thorium ratio.

A) Good shape - appropriate to finite geometry of source.

B) Broad shape and/or poor statistical correlation between channel responses.

Symbols used for the above grades are shown on the plan map. A complete list of the anomalies is attached to this report.

A magnetic contour map from the survey results over these claims, at a scale of 1 inch equals 1320 feet, accompanies this report.

GENERAL CONCLUSIONS

A variety of anomaly types have been selected over this small area. It appears that most of the anomalies conform with the strike of geological formations in the area. All the anomalies should be examined.

Respectfully submitted

R. Wasylechko

Geophysicist.

Qualifications: 2.2284

RADIOMETRIC ANOMALY LISTING

Anom	Fids	Center	Tot	K	UR	Th	Alt	Rate	Remarks
19A	216.75-216.95	216.85	500	60	20	5	140	2A	
20A	227.2 - 227.4	227.3	960	100	42	26	145	2B	Poor correlation
21A	237.28-237.53	237.38	1120	115	40	23	180	1B	
22A	246.85 - 247.05	246.95	480	46	32	14	135	1A	Good uranium
23A	258.27 - 258.95	258.6	5950	370	54	40	170	2A	Broad anomaly
24A	268.65 - 268.9	268.8	1000	60	53	20	155	2B	
25A	278.86 - 279.11	279.0	480	50	34	8	180	1A	
26A	296.93 - 297.35	297.2	1000	125	60	22	155	2B	Broad
27A	307.15 - 307.35	307.25	600	175	14	10	165	2B	Weak

geoterrex ltd.

EQUIPMENT OPERATION

The system is controlled by a command signal from the proton resonance magnetometer, which synchronizes magnetometer and spectrometer sample times, and fiducial system for identifying digital and analogue recorder and camera times. The usual time used is one second intervals, with fiducial numbers each 20 seconds indicated by a wide fiducial marker on the analogue recorders.

The 4 channels of radiometric data are recorded on the TR-888, along with aircraft altitude and magnetometer results. Analogue scales are chosen as appropriate for the area flown. Commonly these are 0-1000 cps for Total count with a multiplier of 4 - 0-500 cps for Potassium (multiplier 1), 0-100 cps for Uranium (multiplier 1), and 0-100 cps for Thorium (multiplier 1).

Altimeter scale is commonly 100 feet to 400 feet and magnetic scale 0-500 gammas.

The magnetometer results are also recorded on the 10 inch Moseley recorder, usually with scales of 0-500 gammas and 0-5000 gammas.

Digital data is recorded on 7 track magnetic tape in incremental mode at 200 bpi. Scan time is usually one scan per second of 40 characters, with 20 cans per block. Language is ASCII.

Tape format is as follows;

2 characters	manual entry - flight number
3 characters	manual entry - line number or test identification
5 characters	fiducial number (each 20 readings)
5 characters	magnetic value in gammas (total field)
4 characters	altitude in relative numbers
4 characters	total count (c.p.s.)
2 characters	total count multiplier
4 characters	potassium count (c.p.s.)
1 character	potassium multiplier
4 characters	uranium count (c.p.s.)
1 character	uranium multiplier
4 characters	thorium count
1 character	thorium multiplier

Recording of spectrometer results both analogue and digital, is normally made with no Compton scatter correction, although such correction is available on the analogue data if desired.

SURVEY PROCEDURES

Normal speed of the Otter is 100 mph (147 ft/sec) and normal terrain clearance is 150 to 200 feet.

Spectrometer stability is achieved by close temperature control of the enclosed and insulated sodium iodide crystals

OTTER RADIOMETRIC SYSTEM - EQUIPMENT AND PROCEDURES

EQUIPMENT

The equipment used in this survey is installed in a DeHavilland DHC-3 Otter aircraft, Canadian registration C-FAYR. It comprises the following units:

A. Exploranium DiGRS-3001, 4-channel digital output spectrometer.

Window settings are:

Total count	- 0.4 to 2.82 Mev.
K-40	- 1.36 to 1.56 Mev (Potassium)
Bi-214	- 1.66 to 1.86 Mev (Uranium)
TL-208	- 2.42 to 2.82 Mev (Thorium)

B. Crystal Detectors - 11 - Harshaw 6"x4" Sodium Iodide plus 1 - 8"x4" crystals, total volume 1444 cubic inches (temperature controlled).

C. Geometrics Model 704 Digital acquisition system with Cipher Model 70 magnetic tape recorder.

D. Geometrics G-803 Proton resonance magnetometer.

E. Gulton TR-888, eight channel hot-pen analogue recorder.

F. Moseley 7100-B Dual 10" analogue recorder

G. Sperry Radar Altimeter Model RT-220

H. Hulcher 35 mm strip film path recovery camera

I. Geoterrex Intervalometer, solid state, controlled by the magnetometer.

and photomultipliers on a 24 hour continuous basis. In addition high voltage supplies are oversized and highly regulated.

Tests for stability are performed daily as follows:

Prior to the first flight each day and after the last flight of the day;

a) Analogue chart zero and full scale positions are checked and adjusted if necessary.

b) System calibration is checked by placing sample sources of uranium and thorium respectively in fixed positions relative to the detectors, as well as recording background count for each channel. Values of uranium count less background and thorium count less background, should remain constant within ±10% to indicate system stability.

c) A test line covering water (if feasible) and outcrop area, flown at survey elevation is established and repeated as accurately as possible. A distance of some 3-4 miles is used. Repeatability of results is an indication of system stability.

d) Radar altimeter checks are made while flying over water, usually at 100 feet and 400 feet.

An in-flight oscilloscope displaying digital values is monitored for verification of digital data being recorded.

DATA TREATMENT

The following presentation of data is available at the discretion of the contracting party;

A. Magnetic - Contour maps at contour intervals and plan scales as desired.

- Magnetic profile maps with scales as desired.

B. Radiometric - For rapid exploration and prospecting purposes anomalies may be picked and plotted on a plan map. These would be chosen and graded manually or by computer according to amplitude over background, curve shape and distribution, and ratio of uranium to thorium.

For more complete compilation used in mapping and thorough areal assessment, machine treatment of data is desirable.

In this case raw data is corrected for background, aircraft altitude and Compton scatter according to practises set out by the Canadian Government (Department of Energy, Mines and Resources). Corrected data is then used for any of the following:

- Contour maps of any of the spectrometer channel results or ratios of any two channels.
- Profile maps of any of the channels or ratios.
- Stacked profiles of all originally recorded fields plus ratios as required.

The foregoing are normally computer treated and machine plotted, so that versatility in special data treatment is easily accomplished.

July, 1976.

Don M. Wagg

Don M. Wagg, P.Eng.

* Qualifications 63.1136

2.2363

Ontario

RECE
NOV 0
PROJECTS UNIT

31C15NW0009 2.2363 PALMERSTON

File 2.2363

900 RECEIVED
NOV 9 1977
MINING LANDS SECTION

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) Airborne magnetic and Radiometric
Township or Area Palmerston
Claim Holder(s) ~~J.P. Jewell~~ ELWOOD L. REID
(Riddell Claim Block)
Survey Company Geoterrex Ltd.
Author of Report R. Wasylechko
Address of Author 22 Rebecca Crescent, Ottawa
Covering Dates of Survey 4, 5 July, 1976
(linecutting to office)
Total Miles of Line Cut

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

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)
Magnetometer 20 Electromagnetic ____ Radiometric 20
(enter days per claim)

DATE: 7 Nov 77 SIGNATURE: R. Wasylechko
Author of Report or Agent

L.D

Res. Geol. ____ Qualifications 2 2363

Previous Surveys

File No.	Type	Date	Claim Holder

OFFICE USE ONLY

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

TOTAL CLAIMS

If space insufficient, attach list

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION RESISTIVITY

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

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 Radiometric

Instrument(s) G803 proton precession magnetometer, DiGRS3001 Spectrometer

(specify for each type of survey)

Accuracy Magnetometer ±5 gammas; spectrometer ± 1 count per second

(specify for each type of survey)

Aircraft used DeHaviland DHC-3 Otter

Sensor altitude 150 feet

Navigation and flight path recovery method visual

_____

Aircraft altitude 150 feet Line Spacing 660 feet

Miles flown over total area about 30 miles Over claims only 3 line miles

3 x 40 = 120 ÷ 5 = 24 days

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken_____

_____

_____

Total Number of Samples_____

Type of Sample_____
(Nature of Material)

Average Sample Weight_____

Method of Collection_____

_____

Soil Horizon Sampled_____

Horizon Development_____

Sample Depth_____

Terrain_____

_____

Drainage Development_____

Estimated Range of Overburden Thickness_____

_____

_____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis_____

_____

_____

_____

General_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others_____

Field Analysis (_____tests)

Extraction Method_____

Analytical Method_____

Reagents Used_____

Field Laboratory Analysis

No. (_____tests)

Extraction Method_____

Analytical Method_____

Reagents Used_____

Commercial Laboratory (_____tests)

Name of Laboratory_____

Extraction Method_____

Analytical Method_____

Reagents Used_____

General_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

South Canonto Twp. (M.68)

Clarendon Twp.(M.77)

Lavant Twp.(M. 112)

Sherbrooke Twp.

Olden Twp.(M. 136)

Oso Twp (M.138)

THE TOWNSHIP OF PALMERSTON

2.2363

COUNTY OF FRONTENAC

EASTERN ONTARIO MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	P
CROWN LAND SALE	C. S.
LEASES	L
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C.
PATENTED S.R.O.	

NOTES

This Map Is Not To Be Used FOR SURVEY PURPOSES.

Lot And Concession Lines Shown Hereon Are Projected From The Best Information Available. But Their True Position Is Not Guaranteed. For Official Survey Purposes Consult The Original Survey Plans And Field Notes Of Records In the Ministry of Natural Resources

400' surface rights reservation along the shores of all lakes and rivers

The Acreages Shown Are The Amount That Were Patented And Do Not Necessarily Represent The True Surveyed Area Of The Parcel.

Flooding Rights to 110.5 elevation of Cross Lake. File 126113

RESERVES

(1) S.R.O. Reserved for public use. File 51910
(2) M N R Reserve
(3) SRO. Reserved sect 39(d) of Mining Act (R.S.O'60)

DATE OF ISSUE APR 21 1977

PLAN NO.- M.139

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH