REPORT ON
AIRBORNE GEOPHYSICAL SURVEY
OF THE
CARDIFF TOWNSHIP AREA OF ONTARIO
FOR
MR. L.T. CHANDLER

010

I. INTRODUCTION

This report pertains to the combined airborne EM and scintillation survey flown on behalf of Mr. L.T. Chandler in the Cardiff Township area of Ontario. The flying was accomplished on October 26, 1966 and February 19, 1967 by the Canadian Aero Mineral Surveys Limited geophysically equipped Otter aircraft (registration CF-IGM).

The survey was flown at a mean terrain clearance of 150' with flight lines spaced at 1/16 mile intervals. All lines were oriented north-south. Approximately 80 line miles of flying were performed in order to provide the necessary data for compilation of the survey. However, only 66 line miles were performed over the actual claims involved.

Canadian Aero Mineral Surveys Limited personnel associated with the project were as follows:-

K. Dempster	-	Pilot
R. Veale	-	Navigator
P. Mitchell	-	Navigator
R. Foxcroft	-	Operator
T. Peacock	-	Operator
D. Sarazin	-	Data Compiler
D. Graham	-	Data Compiler

A. Martin - Draughtsman

R. W. Stemp - Geophysicist

The EM anomalies and all significant scintillation counter anomalies are plotted on a plan map at the scale of 1" = ¼ mile which accompanies this report. An airphoto laydown provided the base for this map.

II. DISCUSSION OF RESULTS

Unfortunately, no EM anomalies were outlined by the airborne survey. If sulphides do exist within the claim group, they are either too deep or too disseminated to be detected by the EM system.

All significant scintillation counter anomalies detected during the February 19th flight have been plotted on the plan map. The large number of anomalous occurrences is rather unusual for an airborne survey. They are believed to be associated with outcropping or very thinly covered uranium bearing granitic pegmatites.

On the basis of the airborne results, ground follow-up work for uranium is highly recommended on these claims.

Respectfully submitted,

R. W. Stemp

OTTAWA, Ontario.
March 28, 1967.

Robert W. Stemp, P.Eng.
Geophysicist.

APPENDIX II

A. EQUIPMENT

The electromagnetic unit and the magnetometer are the key instruments in the Canadian Aero Mineral Surveys Limited Otter survey system. The remainder of the equipment consists of a radio-altimeter, a scintillation counter, an accelerometer, a continuous-strip camera, two recorders and a fiducial numbering system.

The EM unit is the low frequency (320 c.p.s.) in-phase/out-of-phase system designed by Mullard Ltd. of England and operated formerly by Riocanex. The transmitting and receiving coils are mounted on the wingtips of the Otter, with a vertical coplanar orientation and a separation of 61 feet. An electronic null device is adjusted so that in the absence of a conductor within the range of the system no signal is recorder. The anomalous signal is divided into two components, the "in-phase" component having the same phase as the transmitted field and the "quadrature" or "out-of-phase" component being at right angles to it. These two measurements are recorded on two channels of the six-channel recorder.

Variations in the total magnetic field of the earth are measured by a Gulf Fluxgate magnetometer mounted in the aircraft. Anomalies as small as 10 gammas can normally be distinguished. The output of the magnetometer is presented as one channel on the six-channel recorder to facilitate correlation with the EM traces. It is also presented at a larger scale and in rectilinear form on a separate recorder, these recordings being used in the preparation of isomagnetic contour maps whenever they are required.

An APN-1 radio altimeter provides a terrain clearance profile on one channel of the six-channel recorder. Because EM response decays rapidly with increasing altitude this altitude information is important in the analysis of the EM data.

A vertical accelerometer mounted in the aircraft provides a record of the air turbulence and of any drastic manoeuvres of the aircraft. The accelerometer trace on the six-channel recorder is often helpful in recognizing spurious blips on the EM traces caused by air turbulence on drastic manoeuvres.

A Nuclear Enterprises Mark VI-A scintillation counter in the aircraft records gamma radiation from the land surface. This record can be used as auxiliary location information since outcrop, overburden-covered areas and swamps are readily distinguishable by their radiation levels.

The entire flight path is photographed by a vertically-mounted Aeropath 35 mm. continuous-strip camera.

Synchronization of the film strip with the two recorders is accomplished by means of an automatic fiducial numbering system which prints simultaneous time markers on all three records at regular time intervals, normally every ten seconds.

B. DESCRIPTION OF RECORDS

Rectilinear Magnetic Record

With the chart oriented so that fiducial numbers increase from right to left, upward deflections on the chart indicate increases in the total magnetic field of the earth. At the setting used for this survey (600 scale) the smallest division on the chart is approximately equivalent to 5 gammas. When the record "steps" a change of approximately 500 gammas is indicated.

The fiducial marks are normally spaced at 10-second intervals, a spacing which is equivalent to approximately 1500 feet on the ground. The exact horizontal scale of the tape can be established by measuring the fiducial spacing on the map.

Brush Six-Channel Record

With the chart oriented so that fiducial numbers increase from right to left the tracings from the bottom to the top of the chart are as follows:

(1) Fiducial markers - same comments as above

(2) Magnetometer - positive upward. At the setting used (600 scale) 1 mm. is approximately equivalent to 7.5 gammas and a step is approximately 500 gammas.

(3) EM In-Phase - positive upward. 1 mm. represents approximately 20 parts per million, referred to the primary field at the receiving coil. The scale is linear until approximately 600 p.p.m. is reached, after which compression occurs to a level of 1200 p.p.m., beyond which the value is "off-scale".

(4) EM Quadrature - positive upward. Same scale as In-Phase.

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(6) Accelerometer - an acceleration of 1/3"G" is equivalent to a 5 mm. deflection from the central point.

(7) Scintillation - positive upward. 5 mm. represents a change of approximately 0.06 mr./hr.

C. SURVEY AND MAP COMPILATION PROCEDURES

Uncontrolled airphoto mosaics usually serve as base maps for flying the survey and for compilation of the geophysical data. The most common scale is 1/4 mile per inch.

The flight lines are oriented perpendicular to the assumed longest dimension of massive sulphide occurrences anticipated in the survey area. Occasionally two or more line directions have to be used to accommodate changes of geological strike within the area. Line spacings normally range between 1/8 mile and 1/4 mile.

The navigator is provided with "flight strips" of the area to be surveyed. These flight strips are a copy of the airphoto mosaic, with the intended flight lines inked and numbered. Navigation along the parallel flight lines is accomplished by visual means based on the physical detail observed on the photos. The aircraft is flown at a terrain clearance of 150 feet or, in rough terrain, at the lowest safe altitude.

Flight path is recovered in the field by comparison of the 35 mm. strip film with the airphoto mosaics. Identifiable points are marked on the mosaics and esignated by numbers determined from the fiducial numbering system on the film. These recovered flight lines provide the positional basis for plotting the geophysical data. The EM anomalies are listed and graded in the field and are often plotted on the field mosaics to permit immediate acquisition of ground.

In our Ottawa office transparent overlays of the mosaics are prepared, upon which are drafted the recovered fiducial points, the interpolated flight lines positions, the key planimetric features as traced from the mosaics, and the significant geophysical data. The geophysical data are subjected to a careful analysis by a geophysicist who prepares an interpretation report including recommendations for further work.

D. DATA PRESENTATION

The data presentation procedure which we employ for the Otter geophysical system is a combination of an anomaly listing and a plan map plot of graded EM anomalies. The anomaly listing provides the significant details concerning each anomaly and the map gives a "bird's eye view" of the conductors detected.

For purposes of listing and to facilitate reference in the report each EM anomaly is assigned a "name", which is made up of the number of the line upon which the anomaly occurs plus a letter. For example, on line 257 anomalies would be named 257A, 257B, 257C, etc., from south to north or from west to east. The letter which appears beside each EM anomaly on the map is therefore part of its name. These names also appear on the Brush records and in the anomaly list.

The anomaly list contains the fiducial numbers at the edges of the EM anomaly, the in-phase and quadrature amplitudes in p.p.m., the altitude at which the anomaly was detected, the positional relationship of the EM anomaly to magnetic anomalies (if any), a rating, and comments concerning any other pertinent characteristics of the anomaly.

The nomenclature used in the "magnetics" column of the anomaly list requires some explanation. The main terms used are side, flank, edge and direct. These refer to the position of the EM peak relative to the axis of the magnetic feature. "Direct" depicts coincident peaks and similar widths; "edge" is slightly offset; "flank" is somewhere along the flank of the magnetic anomaly; "side" is down near the base. "N. Flank 800g" means that the EM anomaly occurs along the northern flank of a magnetic feature of 800 gammas total amplitude. When one peak of a multiple EM anomaly coincides with a magnetic high the specific peak may be designated. For example, if the southern peak of a double EM anomaly coincided with a 250 gamma magnetic anomaly the nomenclature would be "Dir. S. 250g".

The rating assigned to each EM anomaly in the listing determines the symbol which represents the anomaly on the map. Six categories of anomalies are defined: 1A, 1B, 2A, 2B, 3, and X. The numbers "1", "2" and "3" are primarily a measure of in-phase amplitude corrected for altitude variation: "1" is for very large anomalies, "2" for intermediate, and "3" for relatively weak response. This rating is sometimes affected by the shape, by

the in-phase to quadrature ratio, or by the location of the anomaly. The letters "A" and "B" merely refer to the magnetics: "A" indicates a directly coincident magnetic anomaly, and "B" indicates the lack thereof. The "X" rating is reserved for questionable anomalies. The legend on the map shows the symbol used for each of these ratings. In general, the more the rectangle is filled in, the stronger the anomaly.

In the case of directly coincident magnetic anomalies, the amplitude of the magnetic feature is shown on the EM map. It is stencilled beneath the symbol which portrays the EM anomaly.

During the final interpretation stage, EM anomalies are correlated from line to line wherever possible and the conductive zones are outlined. All definite conductors are numbered on the map and discussed in the report.

REPORT ON AIRBORNE MAGNETOMETER SURVEY OF THE CARDIFF TOWNSHIP AREA OF ONTARIO FOR L.T. CHANDLER

63 2148

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CANADIAN AERO *Mineral Surveys* LIMITED

II. EQUIPMENT

The magnetometer used in this survey was the Gulf Fluxgate Magnetometer. See Appendix II for further details.

The flight path of the aircraft is recorded by an Aeropath AS-5 continuous strip, 35 mm. camera. The camera is synchronized with the magnetometer record by means of a fiducial numbering system. Path recovery is accomplished by relating this strip film to an airphoto composite of the area. Identified points are designated by their fiducial numbers.

An overlay of the airphoto mosaic showing the recovered fiducial points provides the base for the isomagnetic contour map. After a line-to-line comparison of the levels of the magnetic record to reduce all the profiles to the same base level, the profiles are transcribed from the plates to the plan map. These results are then contoured at 50 gamma intervals and drafted.

The isomagnetic contours of the Cardiff Township area are presented on a plan map at the scale of 1" = ¼ mile.

III. GEOLOGY and RESULTS

The following map has been used as a reference:-

Ontario Dept. of Mines - Map #1957-1, Scale: 1" = ½ mile.

All of the rocks within the claim group are of Precambrian age and the geology is quite complex. The area is bordered on the south by the Cheddar granitic batholith. North of this in some general order lie a band of marble, a series of paragneisses and schists, a mixture of granitic gneisses and pegmatites, and finally

a group of syenitic rocks. There is some intermingling among these rock types but this is the general order.

The magnetic results are also very complex but the general pattern fits very well with the mapped geology. The east-west strike and strong folding in the northeast are clearly indicated on the contour map. The relatively flat band of contours on the south are related to the marble. The other gneisses and pegmatites yield very complex magnetic patterns.

Respectfully submitted,

R. W. Stemp per RWB.

Robert W. Stemp, P.Eng.
Geophysicist.

R. W. Stemp

OTTAWA, Ontario.
March 28, 1967.

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EASTERN ONTARIO MINING DIVISION

MONMOUTH AND CARDIFF TOWNSHIPS

E031776 to E031785 inclusive	10 claims
E032191 to E032208 inclusive	18 claims
E033837 to E033844 inclusive	8 claims
TOTAL	36 claims

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CANADIAN AERO *Mineral Surveys* LIMITED

THE TOWNSHIP OF CARDIFF

COUNTY OF HALIBURTON

EASTERN ONTARIO MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

Harcourt Twp.

Herschel Twp.

Monmouth Twp.

Faraday Twp.

Anstruther Twp.

Chandos Twp.

CON XXII

CON. XXI

XXIII XXII XXI XX XIX XVIII XVII XVI XV XIV XIII XII XI X IX VIII VII VI V IV III II I

A

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Surface rights only withdrawn fr. staking Sec. 42 of the Mg Act. File: 19715

Cardiff Lake

Lower Cardiff

Cardiff Cr.

C.N.R.

CANADIAN NATIONAL

Leafield Cr.

Hudson Lake

Cope Lake

Hudson

Highland Grove P.O. & Sta.

RAILWAY

Jordan Lake

Diamond L.

Deer Lake

Crowe R.

Cub L.

Monk Lake

Upper West Crowe Lake

Huckleberry L.

Cope L.

North Eels L.

Eels Lake

Mink L.

Big Runway Lake

Farrel Cr.

Joe Bay

Mullet I.

Poudash Lake

Ransom Pt.

Johnston I.

Poudash

Pine seed

Birch L.

North Bay

Kidds Corner

Silent Lake

Little Lowrie L.

Lowrie

Crowe R. (North)

Crowe R. (River)

Mountain L.

Centre L.

Shingerl L.

Moulds Moss I.

Reg Pl No.-176

Reg Pl No.-358

Reg Pl No.-433

NEW SURVEY COMMON POINT

RES. 50 FT. R/W

DMO GRAVEL

S.R.O.

M.R.O.

LANDS RESTRICTED TO MINING RIGHTS ONLY

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	
KINGS HIGHWAYS	28
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	

NOTES

This Map Is Not To Be Used —FOR SURVEY PURPOSES—

400' Surface Rights Reservation around all lakes and rivers.

For status of summer resort locations shown thus: Please contact Dept. of Lands & Forests:

Original shoreline shown thus:

F.R.I. shoreline shown thus:

Patents-Map shoreline shown thus:

Gravel Reserve shown thus:

550' Reserve on each side of Highway "28"

66' R/W H.E.P.C. of Ontario.

Surface Rights Only of Lot 32 Con.10 Reserved by Order in Council 2097/56 for Townsite Purposes.

Area shown thus: Surface Rights Only reserved for Park Development Purposes. Sec. 39(d) of the Mining Act. File: 79963.

MINING CLAIMS STAKED IN THIS TWP. SUBJECT TO SEC. 110 OF THE MINING ACT.

AIR BORNE E.M. & MAG. SURVEYS

DATE OF ISSUE
MAY 1 1967
ONTARIO DEPT. OF MINES

PLAN NO.- M. 69

DEPARTMENT OF MINES
—ONTARIO—

200

J.P. v. K.

Dudley Twp. (M-84)

Glamorgan Twp. (M-95)

Cardiff Twp. (M-69)

Anstruther Twp. (M-45)

THE TOWNSHIP
OF
MONMOUTH
COUNTY OF
HALIBURTON

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	
KINGS HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	

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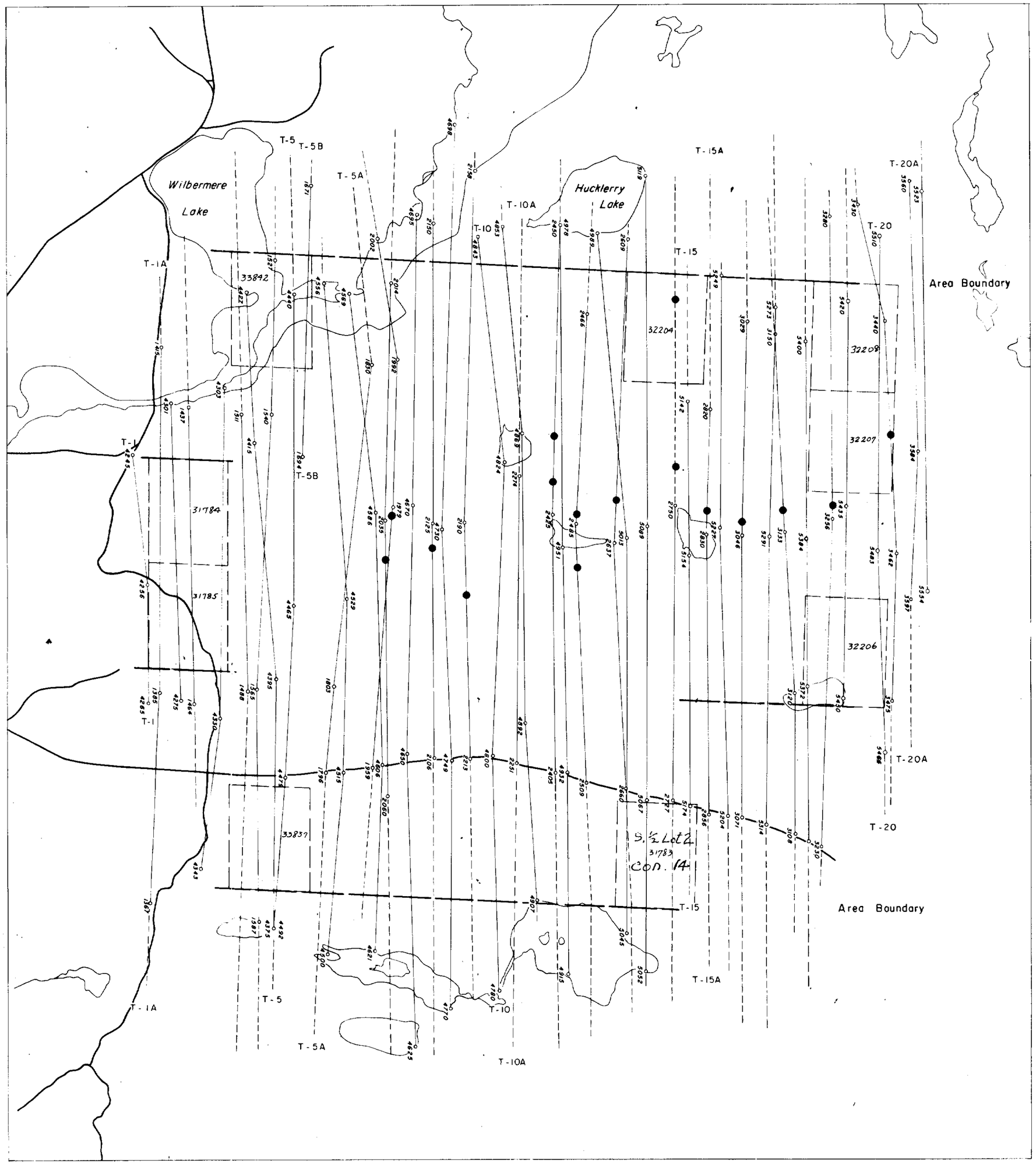
AIRBORNE
EM
&
MAG.
SURVEYS

PLAN NO.-M.164

DEPARTMENT OF MINES
—ONTARIO—



LEGEND

- 1 A ANOMALY
- 1 B ANOMALY
- 2 A ANOMALY
- 2 B ANOMALY
- 3 B ANOMALY
- X type ANOMALY

●.....SIGNIFICANT SCINTILLATION COUNTER ANOMALIES

MEAN TERRAIN CLEARANCE. 150 FEET
FLIGHT LINE SPACING .....1/16 MILE
HORIZONTAL CONTROL.... BASED ON PHOTO LAYDOWN

AIRBORNE ELECTROMAGNETIC SURVEY

CARDIFF TWP. AREA

ONTARIO

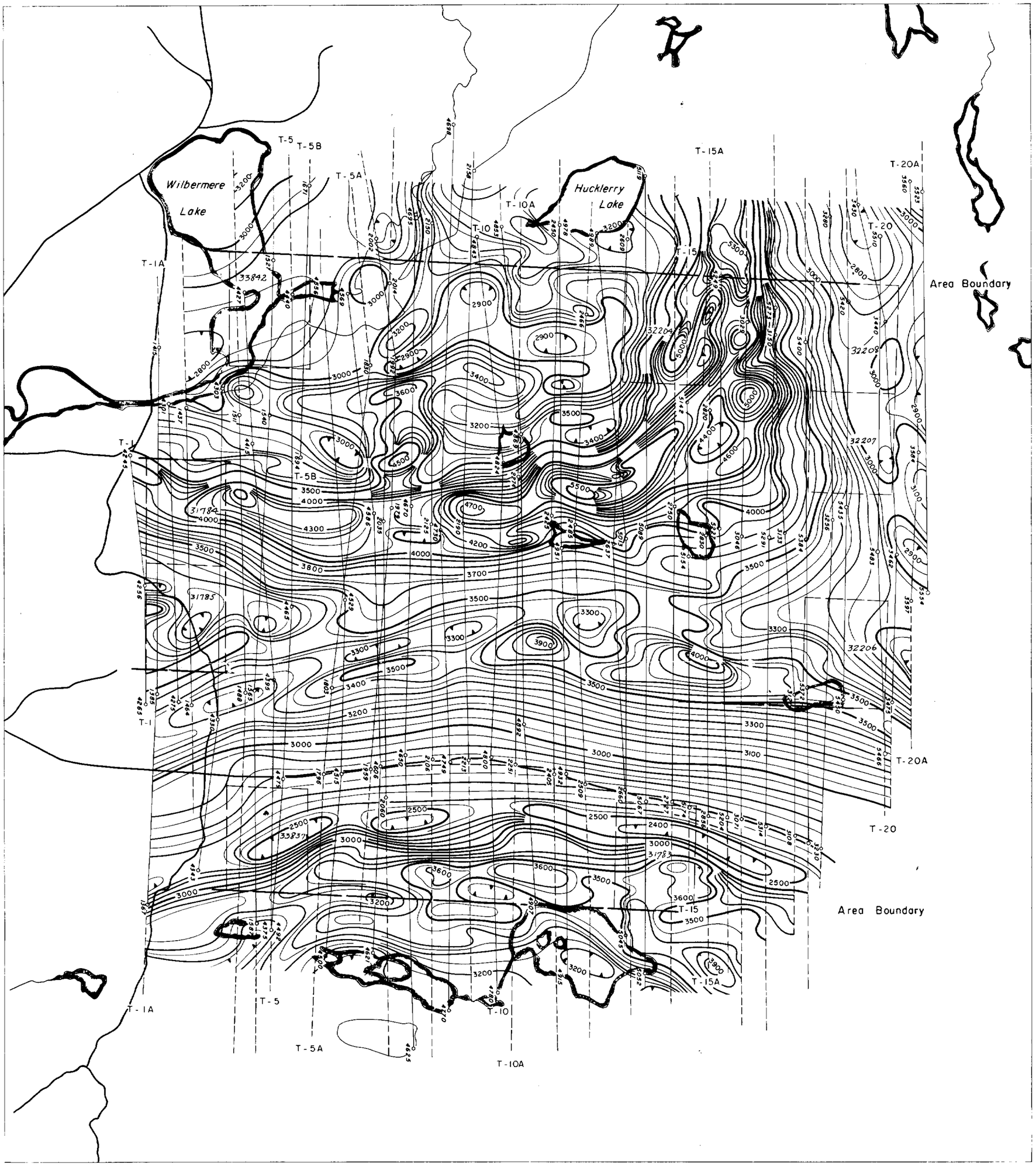
LLOYD C. CHANDLER

SCALE: 1 INCH TO 1320 FEET (APPROX)

63 2148

CANADIAN AERO
Mineral Surveys LTD.
OTTAWA & TORONTO, ONTARIO

C.A.M.S.- 7034



AIRBORNE MAGNETOMETER SURVEY

CARDIFF TWP. AREA

ONTARIO

LLOYD C. CHANDLER

SCALE: 1 INCH TO 1320 FEET (APPROX)

CONTOUR INTERVAL ..... 50 GAMMAS
BASE INTENSITY ..... ARBITRARY

MEAN TERRAIN CLEARANCE .. 150 FEET
FLIGHT LINE SPACING ..... 1/16 MILE
HORIZONTAL CONTROL .... BASED ON PHOTO LAYDOWN

63.2148

CANADIAN AERO
Mineral Surveys LTD.
OTTAWA & TORONTO, ONTARIO

R. W. Stamp