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REPORT ON
AIRBORNE GEOPHYSICAL SURVEY
SURVEY OF THE
ELDORADO TOWNSHIP AREA, ONTARIO
FOR
B.W. LANG & ACMA GAS & OIL CO. LTD.
BY
CANADIAN AERO MINERAL SURVEYS LIMITED

I. INTRODUCTION

This report pertains to the combined airborne EM and magnetometer survey flown on behalf of B.W. Lang and Acma Gas and Oil Company Limited over two claim groups in Eldorado and Douglas Townships, near Timmins, Ontario.

The flying was accomplished by the Canadian Aero Mineral Surveys Limited geophysically equipped Otter aircraft (registration CF-IGM) based at Timmins. The flying was completed by February 10, 1966.

All flight lines were oriented N32°E at a spacing of 1/8 mile. The mean terrain clearance of the aircraft was approximately 150 feet. The geophysical data acquired totalled approximately 20 line miles in the northern claim group and 11.5 line miles in the southern group.

Personnel associated with the project were as follows:

G.A. Curtis	Project Manager
G. Deluce	Pilot
R. Irvin	Aircraft Maintenance Engineer
T. Peacock	Electronic Technician
D. Sarazin	Navigator
G. Granger	Data Compiler and Draftsman
P. Tallyhoe	Data Chief.

The EM data are presented on a plan map at the scale of 1" = $\frac{1}{4}$ mile which accompanies this report. An uncontrolled photo mosaic served as the base for this map.

11. GEOLOGY

The following O.D.M. maps have been used for reference:

P.141, 1" = 2 miles.

47d, 1" = 1 mile.

49h, 1" = 1 mile.

The survey area covers parts of a broad belt of Keewatin-type volcanic rocks, striking generally east-southeast across Eldorado Township and into the adjacent townships. Most of the area is covered by swamp and muskeg so outcrop is not plentiful, except in the vicinity of the Redstone River. Where exposed, the volcanics appear to be mostly of basic composition, with occasional occurrences of acidic and intermediate composition.

The volcanic belt is flanked to the northeast and southwest (mostly outside the survey block) by large acidic intrusives. Numerous small intrusives of various composition have been mapped within the volcanics, including granite, porphyry, quartz diabase, olivine diabase and ultrabasics.

Massive sulphide mineralization is reported at several locations, sometimes as a pyrrhotite replacement in iron formation and sometimes as a pyrite-pyrrhotite replacement in volcanics and sediments. Traces of copper, nickel and lead are reported.

III. DISCUSSION OF RESULTS

Unfortunately, no definite EM conductors were detected in either of the claim groups. One "X" - type or "questionable" anomaly has been plotted on line 34. If real, (i.e. not due to aircraft turbulence) it is a good sulphide prospect as it is isolated, and has a coincident magnetic anomaly.

If any sulphides exist within the claim groups, they are too disseminated or too deep to be detected by the airborne survey.

Respectfully submitted,

R. W. Stemp

Robert W. Stemp, P.Eng.,
Chief Geophysicist.

OTTAWA, Ontario,
January 3rd., 1968.

BERT W. LANG

Summary of Claims Located in Eldorado and Douglas Townships
On Which This Survey is to be Applied

<u>Claim No.</u>	<u>Days</u>	<u>Claim No.</u>	<u>Days</u>
P-78361	20	P-78346	20
P-78362	20	P-78347	20
P-78363	20	P-78348	20
P-78364	20	P-78349	20
P-78365	20	P-78350	20
P-78366	20	P-78351	20
P-78367	20	P-78352	20
P-78368	20	P-78353	20
P-78342	20	P-78354	20
P-78343	20	P-86475	20
P-78344	20	P-86511	20
P-78345	20		

There are approximately 11-1/2 line miles flown over these claims.

Summary of Claims Located in Eldorado Township
and Recorded in the Name of ACME GAS & OIL CO., LIMITED
on which Airborne Electromagnetic Survey is to be applied

<u>Claim No.</u>	<u>No. of Days</u>	<u>Claim No.</u>	<u>No. of Days</u>
P-83467	20	P-85719	20
P-83468	20	P-85720	20
P-83469	20	P-85721	20
P-83470	20	P-85722	20
P-83471	20	P-85723	20
P-83472	20	P-85724	20
P-85693	20	P-85725	20
P-85694	20	P-85726	20
P-85695	20	P-85727	20
P-85700	20	P-85728	20
P-85701	20	P-85729	20
P-85710	20	P-85799	20
P-85711	20	P-85800	20
P-85712	20	P-85803	20
P-85713	20	P-85807	20
P-85714	20	P-85808	20
P-85715	20	P-85809	20
P-85716	20	P-85810	20
P-85717	20	P-85811	20
P-85718	20	P-85812	20

There are approximately 20 line miles flown over these claims.

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 recorded. 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 the Elliott electron-beam tube magnetometer mounted in the aircraft. This instrument was designed by Elliott Brothers (London) Ltd. Anomalies as small as 10-15 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 normal setting (300 scale) the smallest division on the chart is approximately equivalent to 12 gammas. When the record "steps" a change of approximately 400 gammas is indicated. Two other scales are available to accommodate areas of large magnetic relief. On the "1000" scale 1 small division is 40 gammas and a step is equivalent to 1200 gammas. On the "3000" scale 1 division is 120 gammas and a step is 3600 gammas. All changes of scale are noted on the tape by the operator.

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 normal setting (300 scale) 1 mm. is approximately equivalent to 15 gammas and a step is approximately 400 gammas. At the "1000" and "3000" scales 1 mm. is 50 gammas and 150 gammas respectively and the steps are 1200 gammas and 3600 gammas.

It should be noted that this trace is a differential record with a time constant of some 4 seconds. The net result of this is to wipe out long term variations but to leave short term changes relatively unaltered. This magnetometer record is therefore used primarily to check for possible relationships between EM anomalies and sharp magnetic features.

- 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."

- 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.
- 5) Altimeter - increasing altitude upward. Centre line position approximately 150 feet. Scale below 150 feet approximately 5 feet per mm. Scale above 150 feet approximately 7 feet per mm.
- 6) Accelerometer - an acceleration of $1/3$ "G" is equivalent to a 5 mm. deflection from the central point.
- 7) Scintillometer - 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 designated 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 line 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.

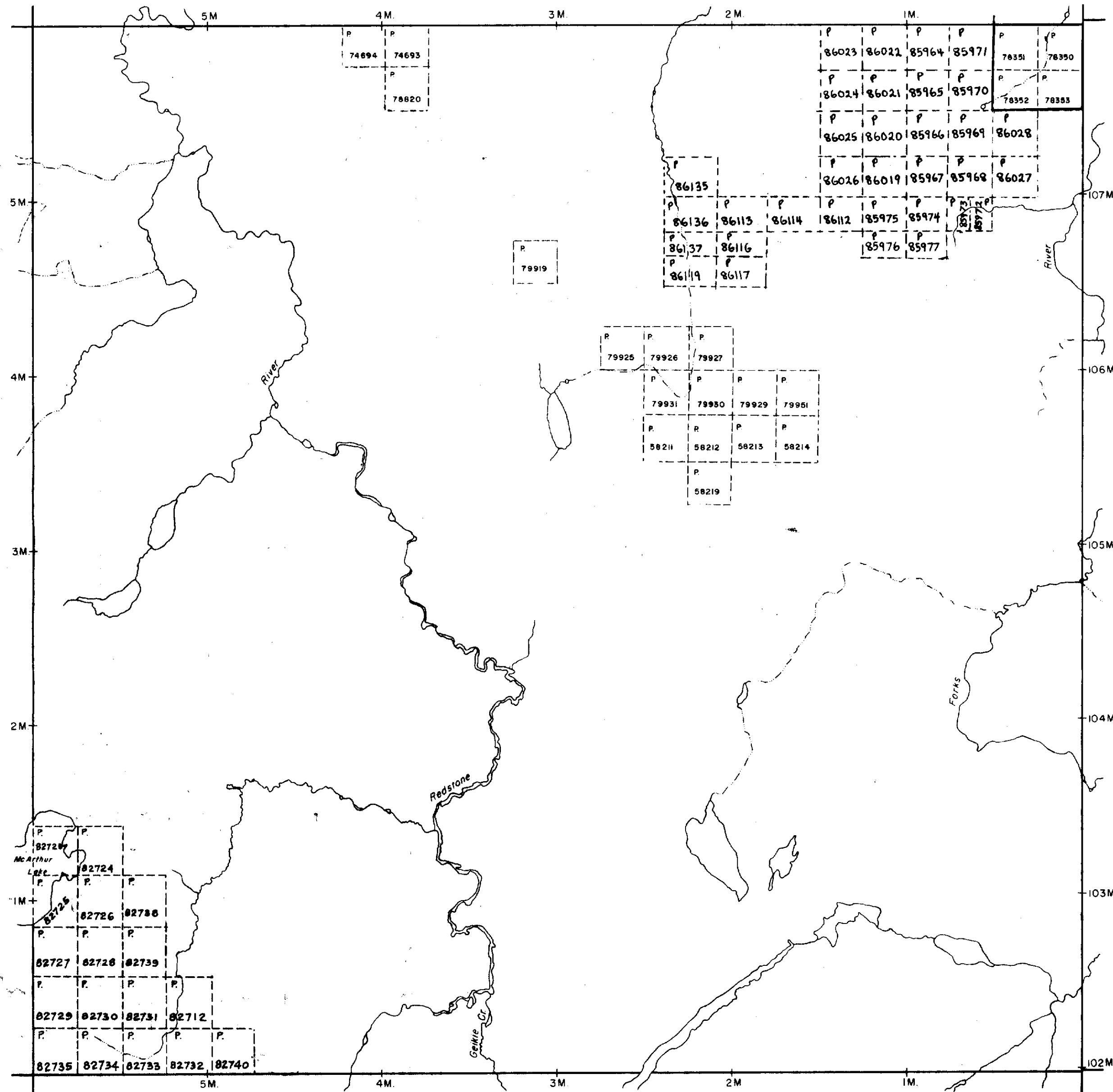
During the final interpretation stage, EM anomalies are correlated from line to line wherever possible and the conductive zones are outlined. All definite conductors are numbered on the map and discussed in the report.

Eldorado Twp. - M.276

McArthur Twp. - M.298

Fallon Twp. - M.278

Geikie Twp. - M.320



THE TOWNSHIP
OF
DOUGLAS

DISTRICT OF
TIMISKAMING

PORCUPINE
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

NOTES

400' Surface Rights Reservation around
all lakes and rivers.

DATE OF ISSUE

JAN 23 1968

ONTARIO DEPT. OF MINES

ONT. DEPT. OF MINES
MINING LANDS BR.

THIS MAP FOR CHECKING
PURPOSES ONLY - MUST
NOT BE SOLD.

PLAN NO. **M.274**

DEPARTMENT OF MINES

— ONTARIO —



42A065E0112 63.2249A ELDORADO

Shaw Twp. - M.311

THE TOWNSHIP OF
OF
ELDORADO

DISTRICT OF
TIMISKAMING

PORCUPINE
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

- PATENTED LAND ⊙
- CROWN LAND SALE C.B.
- LEASES ⊖
- 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.

NOTES

400' Surface Rights Reservation around all lakes and rivers.

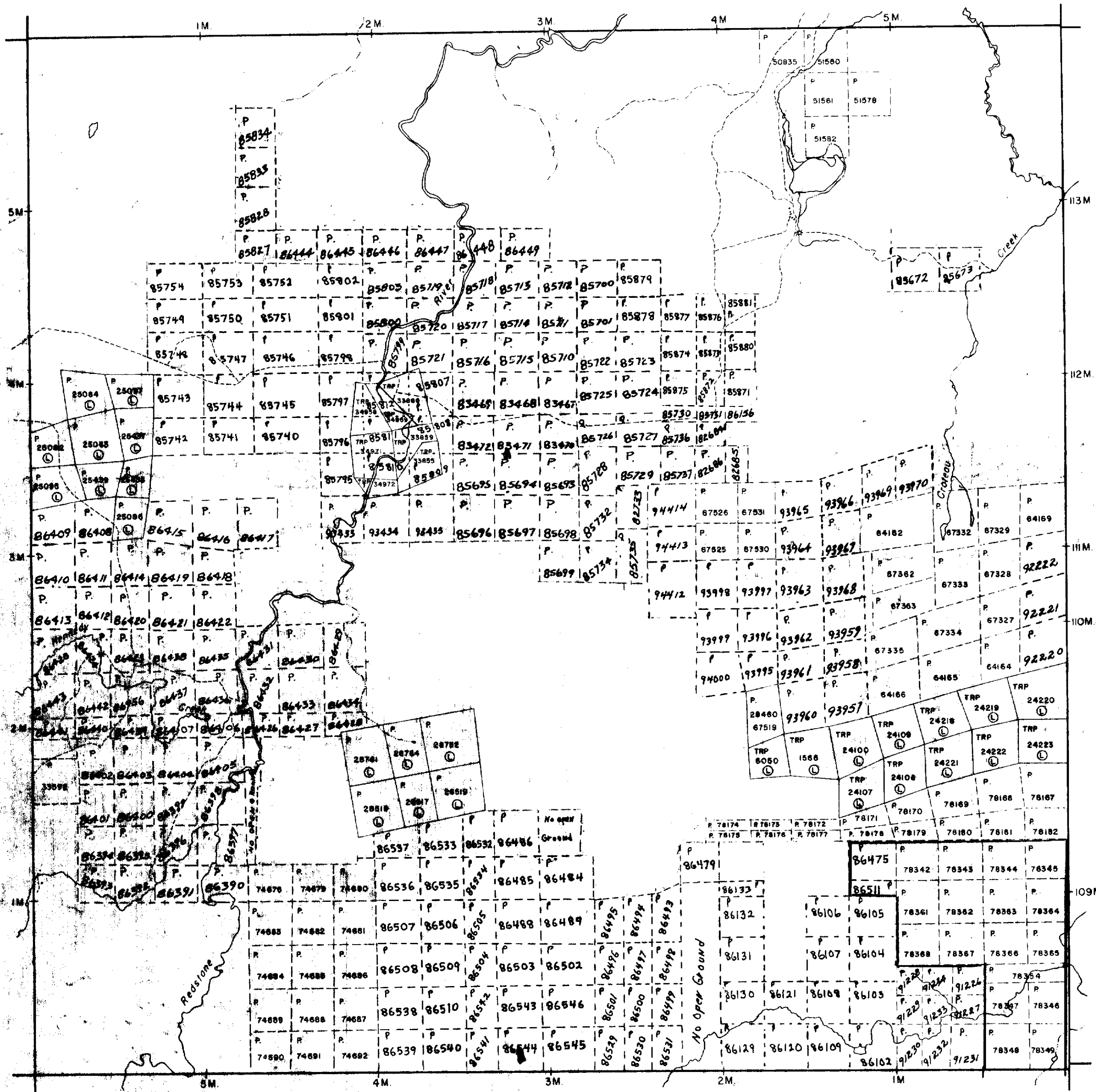
DATE OF ISSUE
 JAN 23 1968
ONTARIO DEPT. OF MINES

ONT. DEPT. OF MINES
 MINING LANDS BR.
 THIS MAP FOR CHECKING
 PURPOSES ONLY - MUST
 NOT BE SOLD.

PLAN NO. **M.276**

DEPARTMENT OF MINES

— ONTARIO —

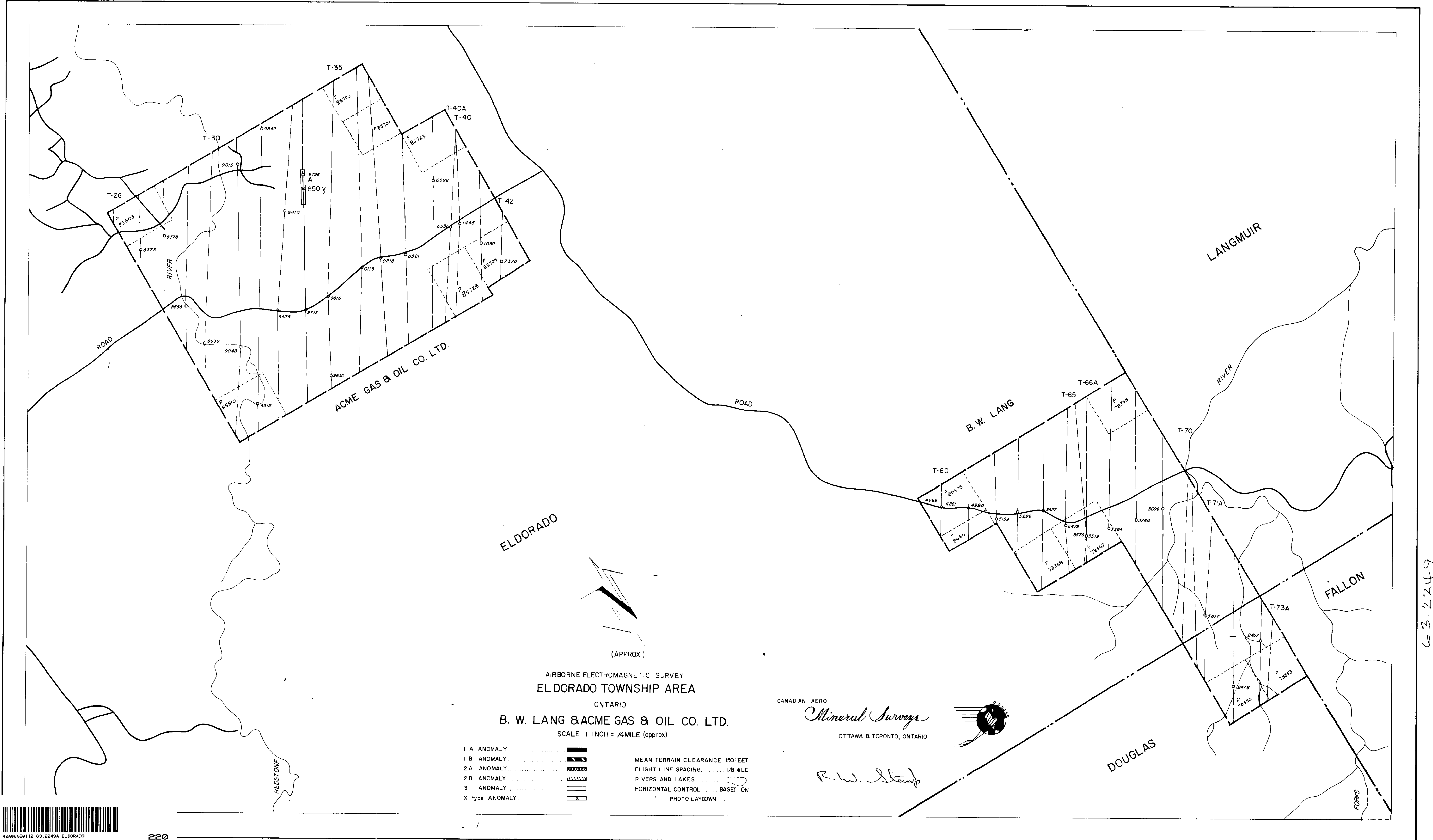


Langmuir Twp. - M.292

Adams Twp. - M.261

Douglas Twp. - M.274





ELDORADO

LANGMUIR

FALLON

DOUGLAS

FORMS



AIRBORNE ELECTROMAGNETIC SURVEY
ELDORADO TOWNSHIP AREA

ONTARIO

B. W. LANG & ACME GAS & OIL CO. LTD.

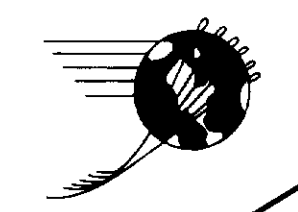
SCALE: 1 INCH = 1/4 MILE (approx)

- | | | |
|---------------------|--|-----------------------------------|
| 1 A ANOMALY..... | | MEAN TERRAIN CLEARANCE 150 FEET |
| 1 B ANOMALY..... | | FLIGHT LINE SPACING..... 1/8 MILE |
| 2 A ANOMALY..... | | RIVERS AND LAKES..... |
| 2 B ANOMALY..... | | HORIZONTAL CONTROL..... BASED ON |
| 3 ANOMALY..... | | PHOTO LAYDOWN |
| X type ANOMALY..... | | |

CANADIAN AERO

Mineral Surveys

OTTAWA & TORONTO, ONTARIO



R. W. Stamp



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