41009NW0002 2.12956 ~~OSWAY~~ MALLARD

010

REPORT ON AN

2.12956

AIRBORNE MAGNETIC & VLF-EM SURVEY MALLARD TOWNSHIP PROJECT OSWAY TOWNSHIP PROJECT PORCUPINE MINING DIVISION ONTARIO

for

PIONEER METALS CORPORATION

by

TERRAQUEST LTD.
Toronto, Canada

November 8, 1989

240 Adelaide Street West, Toronto, Canada M5H 1W7, Telephone (416) 971-5400, Fax (416) 971-6449

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NOTE: there are two survey areas, the Mallard Township Project (A-840.1) and the Osway Township Project (A-840.2), therefore there are two of each of the above listed maps.

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1. INTRODUCTION

This report describes the specifications and results of a geophysical survey carried out for Pioneer Metals Corporation of 1100-1090 West Pender Street, Vancouver, British Columbia, V6E 2N7 by Terraquest Ltd., 240 Adelaide Street West, Toronto, Canada. The field work was completed on May 23 to 28, 1989 and the data processing, interpretation and reporting from September 29 to November 8, 1989.

The purpose of a survey of this type is two-fold. First to prospect directly for anomalously conductive and magnetic areas in the earth's crust which may be caused by, or at least related to, mineral deposits. A second is to use the magnetic and conductivity patterns derived from the survey results to assist in mapping geology, and to indicate the presence of faults, shear zones, folding, alteration zones and other structures potentially favourable to the presence of gold and base-metal concentration. To achieve this purpose the survey area was systematically traversed by an aircraft carrying geophysical instruments along parallel flight lines spaced at even intervals, 100 metres above the terrain surface, and aligned so as to intersect the regional geology in a way to provide the optimum contour patterns of geophysical data.

2. THE PROPERTY

The Mallard Township Project (A-840.1) is located in the southwest quadrant of Mallard Township, in the Porcupine Mining Division of Ontario about 50 kilometres east-southeast of the town of Chapleau and 25 kilometres north of the hamlet of Ramsey. The property can be accessed directly by bush roads leading north from the main haulage road that extends eastwards from route number 667.

The latitude and longitude are 47 degrees 42 minutes, and 82 degrees 18 minutes respectively, and the N.T.S. reference is 410/9. The claim outline is shown in figure 2a.

The Osway Township Project(A-840.2) is located in the south central part of the township at the south end of Opeepeesway Lake, in the Porcupine Mining Division of Ontario about 10 kilometres north of the hamlet of Ramsey. The claims are accessible from the Jerome Mine road.

The latitude and longitude are 47 degrees 36 minutes, and 82 degrees 15 minutes respectively, and the N.T.S. reference is 410/9. The claim outline is shown in figure 2b.

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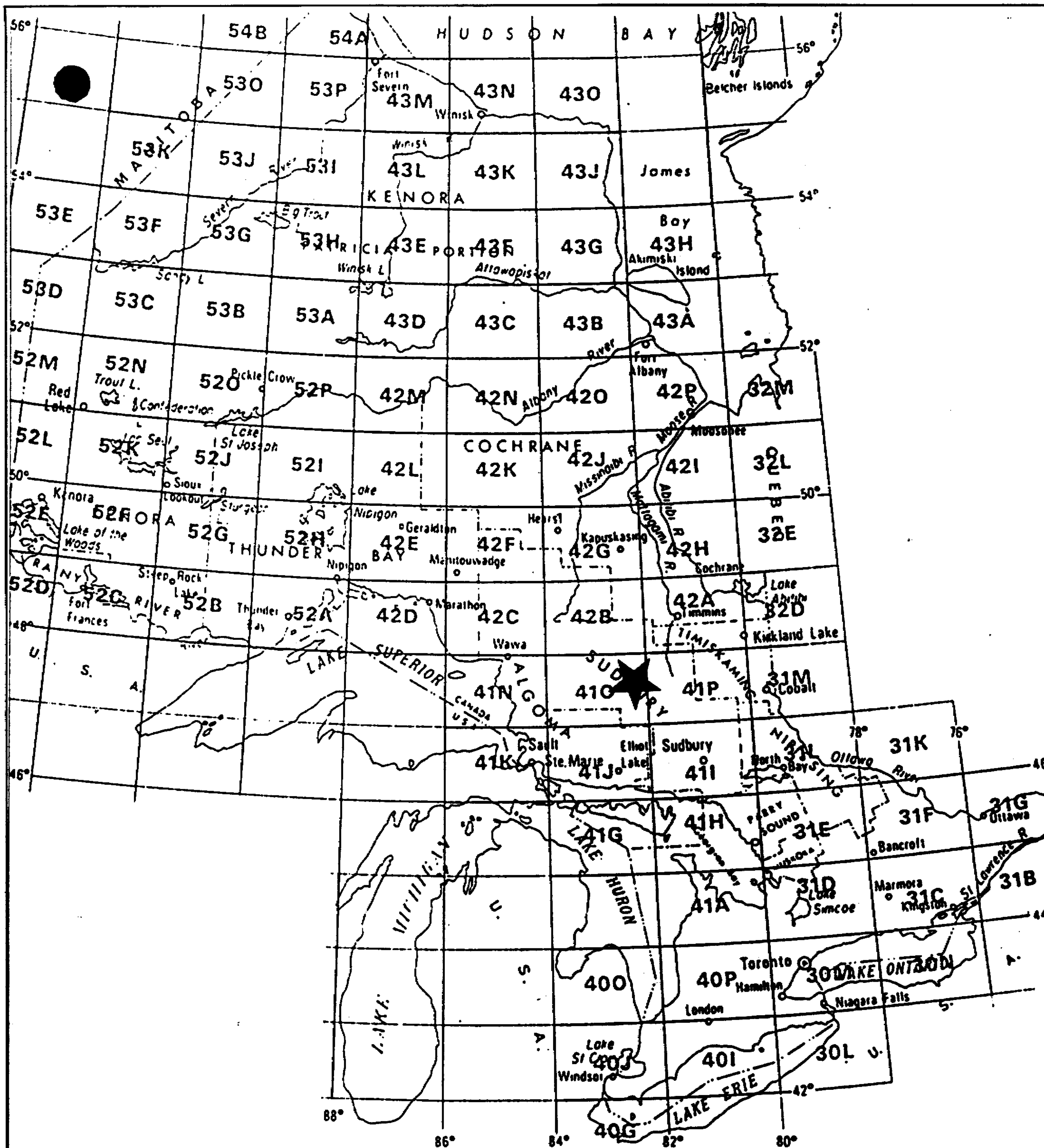

FIGURE 1. Location Map

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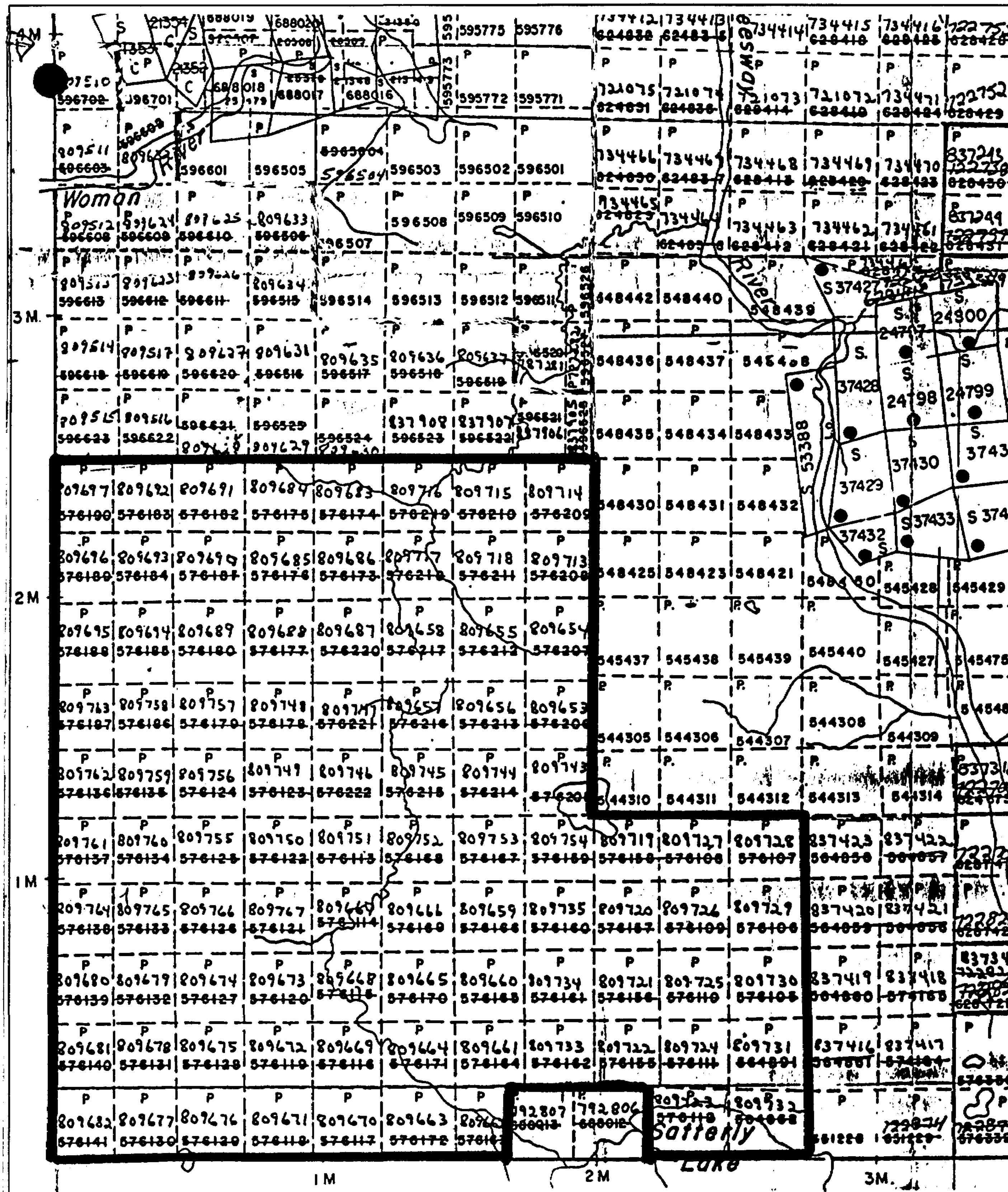

FIGURE 2a SURVEY AREA

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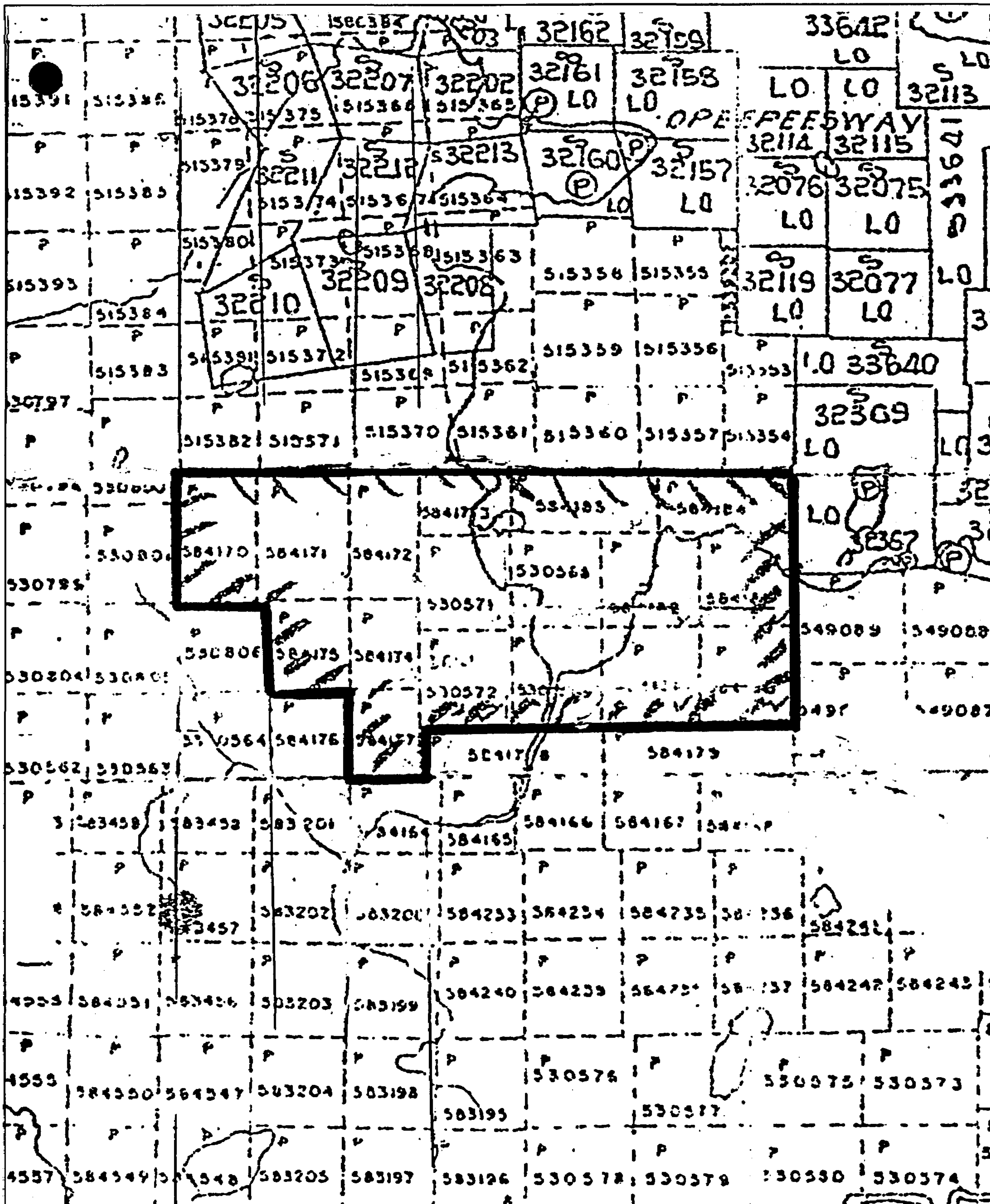

FIGURE 2b SURVEY AREA

(exact claim locations not certified)

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3. GEOLOGY

Map References

1. Map 44g: Opeepeesway Lake Area. scale 1:63,360. ODM 1935
2. Map 1949-2: Township of Osway. scale 1:12,000. ODM 1949
3. Map 2352: Chapleau. scale 1:250,000. ODM 1978
4. Map 2504: Benton and Mallard Townships. scale 1:31,680. OGS 1987

The Mallard Township Project survey block is underlain by northwest trending mafic metavolcanics to the north and intermediate and mafic metavolcanics to the south. Narrow horizons of felsic metavolcanics and conformable gabbroic to dioritic intrusions occur along the northeastern edge of the survey area. Graphite, pyrite, pyrrhotite, chalcopyrite, and sphalerite have been mapped along the eastern edge of the property. Elsewhere in the region, diabase dykes strike to the northwest.

The Osway Township Project survey block is underlain by northwest trending clastic metasediments in the northeastern half of the survey area, and mafic metavolcanics in the southwestern half. Along strike to the southeast, iron formation occurs within the clastic metasediments, and along strike to the northwest iron formation occurs within the mafic metavolcanics. Diabase dykes strike variably from the northwest to north.

4. SURVEY SPECIFICATIONS

4.1 Aircraft and Instruments

The survey was carried out using a Cessna 206 aircraft, registration C-GUCE, which carries two high sensitivity magnetometers and a VLF electromagnetic detector.

The magnetometers are a high sensitivity, optically pumped cesium vapour magnetometer mounted in wing tip extensions, approximately 5 feet beyond the wing tip with a total separation of 14.3 metres. The specifications of the magnetometers are as follows:

Working range:	20,000-100,000 gammas
Sensitivity:	0.005 gammas
Sampling rate:	0.2 seconds
Model:	BIW 2321H8
Manufacturer:	Scintrex, Concord Ontario.

The magnetometer processor is a PMAG 3000 and the data acquisition system is a PDAS 1000, both manufactured by Picodas Group Inc.

The signal to noise ratio of the magnetic response is improved by a real time compensation technique provided by Picodas Limited. The sources of noise are permanent, induced and eddy current effects of the airframe, and the heading effects. The system uses three orthogonal fluxgate magnetometers to measure

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the aircraft attitude with respect to the earth's magnetic field vector. A mathematical model is used to solve this interference effect.

The VLF-EM unit uses three orthogonal detector coils to measure (a) the total field strength of the time-varying EM field and (b) the phase between the vertical coil and both the "along line" coil (LINE) and the "cross-line" coil (ORTHO). The LINE coil is tuned to a transmitter station that is ideally positioned at right angles to the flight lines, while the ORTHO coil transmitter should be in line with the flight lines. It's specifications are:

Accuracy:	1%
Reading Interval:	0.2 second
Model:	TOTEM 2A
Manufacturer:	Herz Industries, Toronto, Canada

The VLF sensor is mounted in a plastic tube projected forward from the midsection of the starboard wing.

Other instruments are:

* King KRA-10A radar altimeter
* PDAS-1000 data processor with 40 mByte cassette tape and 3 1/2" disk recorder manufactured by Picodas Group Inc.
* GPS satellite and Loran-C navigation where possible
* Video tape flight path confirmation, 1/10th second fiducial intervals and with electronic attitude compensation

4.2 Lines and Data

Line spacing:	100 metres
Line direction:	090 degrees
Terrain clearance:	100 m
Average ground speed:	193 km/hr
Data point interval:	
Magnetic:	11 metres
VLF-EM:	11 metres
Tie Line interval:	2 km
Channel 1 (LINE):	NAA Cutler, 24.0 kHz
Channel 2 (ORTHO):	NSS Annapolis, 21.4 kHz

Line km over total survey area: 245 line km

Line km over claim groups:	Mallard Township Project	93 claims - 186 km
	Osway Township Project	17 claims - 34 km

4.3 Tolerances

Line spacing: Any gaps wider than twice the line spacing and longer than 10 times the line spacing were filled in by a new line.
Terrain clearance: Portions of line which were flown above 125 metres for more than one km were reflown if safety considerations were acceptable.
Diurnal magnetic variation: Less than ten gammas deviation from a smooth background over a period of two minutes or less as seen on the base station

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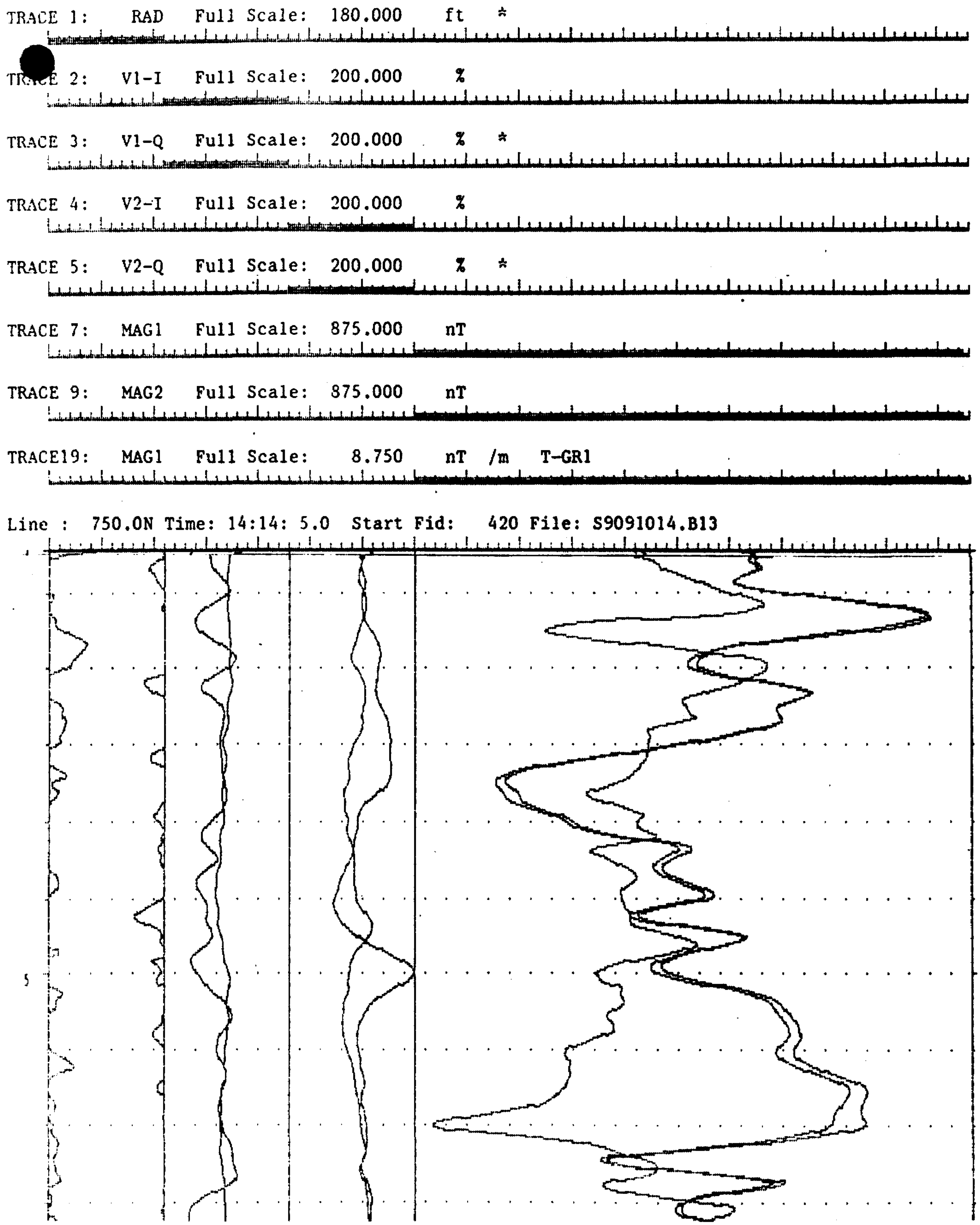

FIGURE 3. SAMPLE OF ANALOG DATA

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analogue record.
Manoeuvre noise: nil

4.4 Photomosaics

For navigating the aircraft and recovering the flight path, semi-controled mosaics of aerial photographs were made from existing air photos. Each photograph forming the mosaic was adjusted to conform to the NTS map system before the mosaic was assembled.

5. DATA PROCESSING

Flight path recovery was carried out in the field using a video tape viewer to observe the flight path as recorded by the Geocam video camera system. The flight path recovery was completed daily to enable reflights to be selected where needed for the following day.

The magnetic data was levelled in the standard manner by tying survey lines to the tie lines. The IGRF has not been removed. The total field was contoured by computer using a program provided by Dataplotting Services Inc. To do this the final levelled data set is gridded at a grid cell spacing of 1/10th of an inch at map scale.

The vertical magnetic gradient is computed from the gridded and contoured total field data using a method of transforming the data set into the frequency domain, applying a transfer function to calculate the gradient, and then transforming back into the spatial domain. The method is described by a number of authors including Grant, 1972 and Spector, 1968. The computer program for this purpose is provided by Paterson, Grant and Watson Ltd. of Toronto.

The VLF data was treated automatically so as to normalize the non conductive background areas to 100 (total field strength) and zero (quadrature). The algorithms to do this were developed by Terraquest and will be provided to anyone interested by application to the company.

All of these dataprocessing calculations and map contouring were carried out by Dataplotting Services Inc. of Toronto.

Grant, F.S. and Spector A., 1970: Statistical Models for Interpreting Aeromagnetic Data; Geophysics, Vol 35
Grant, F.S., 1972: Review of Data Processing and Interpretation Methods in Gravity and Magnetics; Geophysics Vol 37-4
Spector, A., 1968: Spectral Analysis of Aeromagnetic maps; unpublished thesis; University of Toronto.

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6. INTERPRETATION

6.1 General Approach

To satisfy the purpose of the survey as stated in the introduction, the interpretation procedure was carried out on both the magnetic and VLF data. On a local scale the magnetic gradient contour patterns were used to outline geological units which have different magnetic intensity and patterns or "signatures". The delineation of the magnetic units was done initially from the calculated vertical magnetic gradient contour map. These contacts were then adjusted inbetween the flight lines on a local scale, using the measured horizontal gradient vector plot to provide extra detail. Finally, the interpretation map was compared with the total field magnetic contours to obtain the relative intensity of the magnetic units. Where possible these are related to existing geology to provide a geological identity to the units. On a regional scale the total field contour patterns were used in the same way.

Faults and shear zones are interpreted mainly from lateral displacements of otherwise linear magnetic anomalies but also from long narrow "lows". The direction of regional faulting in the general area is taken into account when selecting faults. Folding is usually seen as curved regional patterns. Alteration zones can show up as anomalously quiet areas, often adjacent to strong, circular anomalies that represent intrusives. Magnetic anomalies that are caused by iron deposits of ore quality are usually obvious owing to their high amplitude, often in tens of thousands of gammas.

VLF anomalies are categorized according to whether the phase response is normal, reverse, or no phase at all. The significance of the differing phase responses is not completely understood although in general reverse phase indicates either overburden as the source or a conductor with considerable depth extent, or both. Normal phase response is theoretically caused by surface conductors with limited depth extent. In some cases, a change in the orientation of the conductor appears to affect the sense of the phase response.

Areas showing a smooth VLF-EM response somewhat above background (ie. 110 or so) are likely caused by overburden which is thick enough and conductive enough to saturate at these frequencies. In this case no response from bedrock is seen.

The VLF-EM conductor axes have been identified and evaluated according to the Terraquest classification system (Figure 4). This system correlates the nature and orientation of the conductor axes with stratigraphic, structural and topographic features to obtain an association from which one or more origins may be selected. Alternate associations are indicated in parentheses.

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FIGURE 4

TERRAQUEST CLASSIFICATION OF VLF-EM CONDUCTOR AXES

SYMBOL	CORRELATION	ASSOCIATION: Possible Origins
a , A	Coincident with magnetic stratigraphy	Bedrock magnetic horizons: stratabound mineralogic origin or shear zone
b , B	Parallel to magnetic stratigraphy	Bedrock non-magnetic horizons: stratabound mineralogic origin or shear zone
c , C	No correlation with magnetic stratigraphy	Association not known: possible small scale stratabound mineralogic origin, fault or shear zone, overburden
d , D	Coincident with magnetic dyke	Dyke or possible fault: mineralogic or electrolytic
f , F	Coincident with topographic lineament or parallel to fault system	Fault zone: mineralogic or electrolytic
ob , OB	Contours of total field response conform to topographic depression	Most likely overburden: clayey sediments, swampy mud
cul , CUL	Coincident with cultural sources	Electrical, pipe or railway lines

NOTES

1 - Upper case symbols denote a relatively strong total field strength

2 - Underlined symbols denote a relatively strong quadrature response

3 - Mineralogic origins include sulphides, graphite, and in fault zones, gouge

4 - Electrolytic origins imply conductivity related to porosity or high moisture content

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6.2 Interpretation

The magnetic and VLF-EM data are shown in contoured format on maps at a scale of 1:10,000 in the back pocket. An interpretation map is also provided. The following notes are intended to supplement these maps.

MALLARD TOWNSHIP PROJECT (A-840.1)

The total magnetic field has a relief of approximately 500 gammas and shows several strong anomalies trending to the north-northwest and numerous moderate strength anomalies trending to the northwest. The southern edge of the survey is characterized by uniform and relatively low magnetic responses. The vertical magnetic gradient improves resolution of the strong anomalies and enhances subtle magnetic trends. The measured horizontal magnetic gradient vector plot further improves the resolution of these units, particularly the strong anomalies to the north and those trends that are at a low angle with the flight lines.

The relatively strong north-northwest magnetic units are interpreted to be related to diabase dykes (Unit 11). The interpreted widths may be somewhat exaggerated due to an overwhelming effect commonly associated with strong susceptibilities. The magnetic intensity of these units decreases toward the southeast; this may be related to either a change in composition along the trends or an alteration effect characterized by a loss or replacement of magnetic minerals. It becomes difficult to discriminate the diabase dykes from the metavolcanic stratigraphy in the southeast corner.

Two narrow northest trending units are also interpreted to be related to diabase dykes.

The subtle magnetic trends across the survey area are interpreted as magnetic stratigraphic horizons wihin the mafic (Unit 1) and intermediate (Unit 2) metavolcanics. These subtle magnetic trends may be related to an increase in concentration of magnetic minerals such as magnetite or pyrrhotite, or to more mafic lithologies including hypabyssal metavolcanics. In general the intermediate metavolcanics are associated with weaker response than the mafic metavolcanics as demonstrated along the southern edge of the survey area. Where the gabbro (Unit 5), felsic metavolcanics (Unit 3) and intermediate metavolcanics occur as narrow units it is impossible to discriminate at this scale, their responses from the responses that originate from the undifferentiated mafic metavolcanics.

Numerous northeast trending faults or shear zones have been interpreted from displacements in the magnetic units. A narrow swarm of north-northeast trending structures occur across the central part of the block. A solitary but major north-northwest trending structure has been interpreted from a persistent magnetic low and appears to offset all the other structures.

Numerous VLF-EM conductor axes have been interpreted that couple well with the Cutler transmitter which is orientated at 100 degrees azimuth from the property. Several conductor axes coincide with the edges of swampy areas and

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lakes suggesting that conductive, clay-rich overburden is generally restricted to topographic deressions.

Conductor axes that are oblique to or cross-cut magnetic stratigraphy plus the long persistent conductor axes are interpreted to possess structural origins. This type of conductivity may be caused by a) minerals such as sulphides, graphite or gouge within the structure, or b) an ionic effect created by water or porosity either within the structure or along the upper weathered and leached edge. Structures identifed by either magnetic or VLF-EM methods bear potential for epithermal mineralization.

Numerous conductor axes coincide with or are parallel to magnetic stratigraphy and therefore possess potential for bedrock stratabound sources. This type of conductivity may originate from disseminated to massive sulphides, graphite or porosity (such as porous flowtops). These warrant further investigation by ground EM or IP methods.

OSWAY TOWNSHIP PROJECT (A-840.2)

The total magnetic field has a relief of aproximately 1,600 gammas and is strongly dominated by a single northwest trending anomaly that runs diagonally across the centre of the survey area. The resolution of this anomaly is improved considerably by the vertical magnetic gradient plot. Several moderate strength magnetic anomalies trend to the north and northeast.

The strong northwest trending magnetic anomaly is interpreted to be derived from an iron formation that occurs at or near the contact between the metasediments (Unit 3) to the north and metavolcanics (Unit 1) to the south. The responses from the iron formation overwhelm and dominate most of the other responses in the survey area. The interpreted width may be exaggerated due to this overwhelming effect.

The subtle northwest trending magnetic anomalies are interpreted to originate from magnetic horizons within the mafic metavolcanics (Unit 1m) south of the iron formation, and to magnetic units within the metasediments (Unit 3m) north of the iron formation. These are probably related to lithologies with higher concentrations of magnetite or pyrrhotite or are characterized by a stronger mafic content. The 3m horizons may represent metavolcanic intercalations within the metasedimentary suite.

The north to northeast trending magnetic anomalies are interpreted to be related to diabase dykes (Unit 7).

Two northwest trending faults have been interpreted from the magnetic data. Others are suspected to exist but are difficult to identify as they would be parallel to the dominant magnetic fabric.

The VLF-EM survey has identified several strong conductor axes that coincide with or are adjacent to the iron formation. It is suggested there are several sources along this trend. Where the conductor axes coincde with the

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iron formation the strongest conductivity probably originates from sulphides within the iron formation horizon. Where the conductor axes lie slightly to the south of the iron formation the major source is interpreted to occur along a contact or fault between the clastic metasediments to the north and mafic metavolacnics to the south. Also, in the centre of the survey area, there is a substantial contribution from conductive overburden associated with the edge of the lake.

Three weak conductor axes to the east are interpreted to possess bedrock origins as they are either coincident with or parallel to magnetic stratigraphy. These should be verified and further investigated on the ground using EM or IP methods to improve their resolution.

The remaining conductors coincide with either swamps or lakes and therefore are probably related to surficial conductivity.

7. SUMMARY

An airborne combined magnetic and VLF-EM survey has been carried out at 100 metre line intervals with data reading stations at 11 metres along the flight lines. All data is produced on maps at a scale of 1:10,000.

The magnetic data has been used to provide relatively detailed delineation of diabase dykes and subtle to strong magnetic horizons within the metavolcanic and metasedimentary units. A high degree of resolution has been achieved from both the calculated vertical magnetic gradient and the measured horizontal magnetic gradient data. The magnetic data has also been used to identify numerous northeast trending faults across the Mallard Township Project area and a few northwest trending structures across both properties. A number of VLF-EM conductor axes were identified on both properties and are interpreted to originate from clayey overburden in topographic depressions, faults or shear zones and stratabound bedrock sources. Potential sites of mineralization occur along structures identified by either magnetic or VLF-EM methods or along interpreted bedrock conductors.

GEOLOGICAL ASSOCIATION OF CANADA
CHARLES Q. BARRIE
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Qual 2.8305

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Ministry of Northern Development and Mines

Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

DOCUMENT No. W 8906·531

2.12956

41O09NW0002 2.12956 OSWAY MALLARD

Type of Survey(s)	Township or Area
Airborne Magnetic VLF/EM Survey	Mallard

Claim Holder(s)	Prospector's Licence No.
Pioneer Metals Corporation 2.12956	T 1043

Address: 1100 - 1090 West Pender Street, Vancouver, British Columbia V6E 2N7

Survey Company	Date of Survey (from & to)	Total Miles of line Cut
Terraquest Ltd.	23 05 89 (Day Mo. Yr.) – 28 05 89 (Day Mo. Yr.)	n/a

Name and Address of Author (of Geo-Technical report): Charles Q. Barrie, M.Sc., 240 Adelaide Street West, Toronto, Ontario M5H 1W7

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

RECEIVED
PORCUPINE MINING DIVISION
NOV 27 1989

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions

Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
	See attached				

RECEIVED
DEC 2 1989
MINING LANDS SECTION

RECORDED
NOV 27 1989

Total number of mining claims covered by this report of work: 71

Date	Recorded Holder or Agent (Signature)
November 23/89	[signature]

For Office Use Only		
Total Days Cr. Recorded	Date Recorded	Mining Recorder
5680	Nov. 27/89	[signature]
	Date Approved as Recorded	Branch Director
	Feb 26/90	[signature]

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying

November 23, 1989

COMPANY: PIONEER METALS CORPORATION
TOWNSHIP: MALLARD
PROVINCE: ONTARIO
MINING DISTRICT: PORCUPINE MINING DIVISION

PREFIX	NUMBER	EXPEND DAYS CR.	PREFIX	NUMBER	EXPEND DAYS CR.
P	1046374	80	P	1071749	80
	1046375	80		1071750	80
	1046376	80		1071751	80
	1046377	80		1071752	80
	1046378	80		1071753	80
	1046379	80		1071754	80
	1046380	80		1071755	80
	1046381	80		1071756	80
	1046382	80		1071757	80
	1046383	80		1071758	80
	1046384	80		1071759	80
	1046385	80		1071760	80
	1046386	80		1071761	80
	1046387	80		1071762	80
	1046388	80		1071763	80
	1046389	80		1071764	80
	1046390	80		1037129	80
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	1046393	80		1037132	80
	1046394	80		1037133	80
	1046395	80		1037134	80
	1046396	80		1037135	80
	1046397	80		1037136	80
	1046398	80		1037137	80
	1046399	80		1037138	80
	1046400	80		1037139	80
	1046401	80		1037140	80
	1046402	80		1037141	80
	1046403	80		1037142	80
	1046404	80		1037143	80
	1046405	80		1037144	80
	1046406	80		1037145	80
	1046407	80		1037146	80
	1046408	80		1037147	80
				1037148	80

FROM:M.R. PORCUPINE MIN.DIV. TO:MINING LANDS SECTION JAN 18, 1990 4:18PM P.08

Northern Development and Mines
Ontario

(Geophysical, Geological, Geochemical and Expenditures)

DOCUMENT NO. W 9006·030

Mining Act

Note: – If number of mining claims traversed exceeds space on this form, attach a list.
– Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

2.12956

Jan 6

Type of Survey(s): Airborne Magnetic VLF/EM Survey

Township or Area: Osway

Claim Holder(s): Pioneer Metals Corporation

Prospector's Licence No.: T 1043

Address: 1100 - 1090 West Pender Street, Vancouver, British Columbia V6E 2N7

Survey Company: Terraquest Ltd.

Date of Survey (from & to): 23 05 89 | 28 05 89 (Day Mo. Yr.)

Total Miles of line Cut: n/a

Name and Address of Author (of Geo-Technical report): Charles Q. Barrie, M.Sc., 240 Adelaide Street West, Toronto, Ontario M5H 1W7

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	
	Geochemical	
Man Days	**Geophysical**	**Days per Claim**
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	
Airborne Credits		**Days per Claim**
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Prefix	Mining Claim Number	Expend. Days Cr.
P	1037109	80
	1037110	80
	1037111	80
	1037112	80
	1037113	80
	1037114	80
	1037115	80
	1037116	80
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	1037120	80
	1037121	80
	1037122	80
	1037123	80
	1037124	80
	1037125	80
	1037126	80
	1037127	80
	1037128	80

RECORDED NOV 27 1989

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

RECEIVED NOV 27 1989

ONTARIO GEOLOGICAL SURVEY ASSESSMENT FILES OFFICE MAR - 2 1990 RECEIVED

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Total number of mining claims covered by this report of work: 20

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only

Total Days Cr. Recorded: 1600 | Date Recorded: Nov. 27/89 | Mining Recorder
Date Approved as Recorded: Feb 26/90 | Branch Director

Date: November 23/89 | Recorded Holder or Agent (Signature)

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: Jim Tompkins, Pioneer Metals Corporation, 1100 - 1090 West Pender Street, Vancouver, B.C. V6E 2N7

Date Certified: November 23/89 | Certified by (Signature)

1362 (85/12)

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	◓
" , MINING RIGHTS ONLY	◒
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	⬒
" , MINING RIGHTS ONLY	⬓
LICENCE OF OCCUPATION	▼
ORDER-IN COUNCIL	OC
RESERVATION	⊙
CANCELLED	⊗
SAND & GRAVEL	⊙

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1

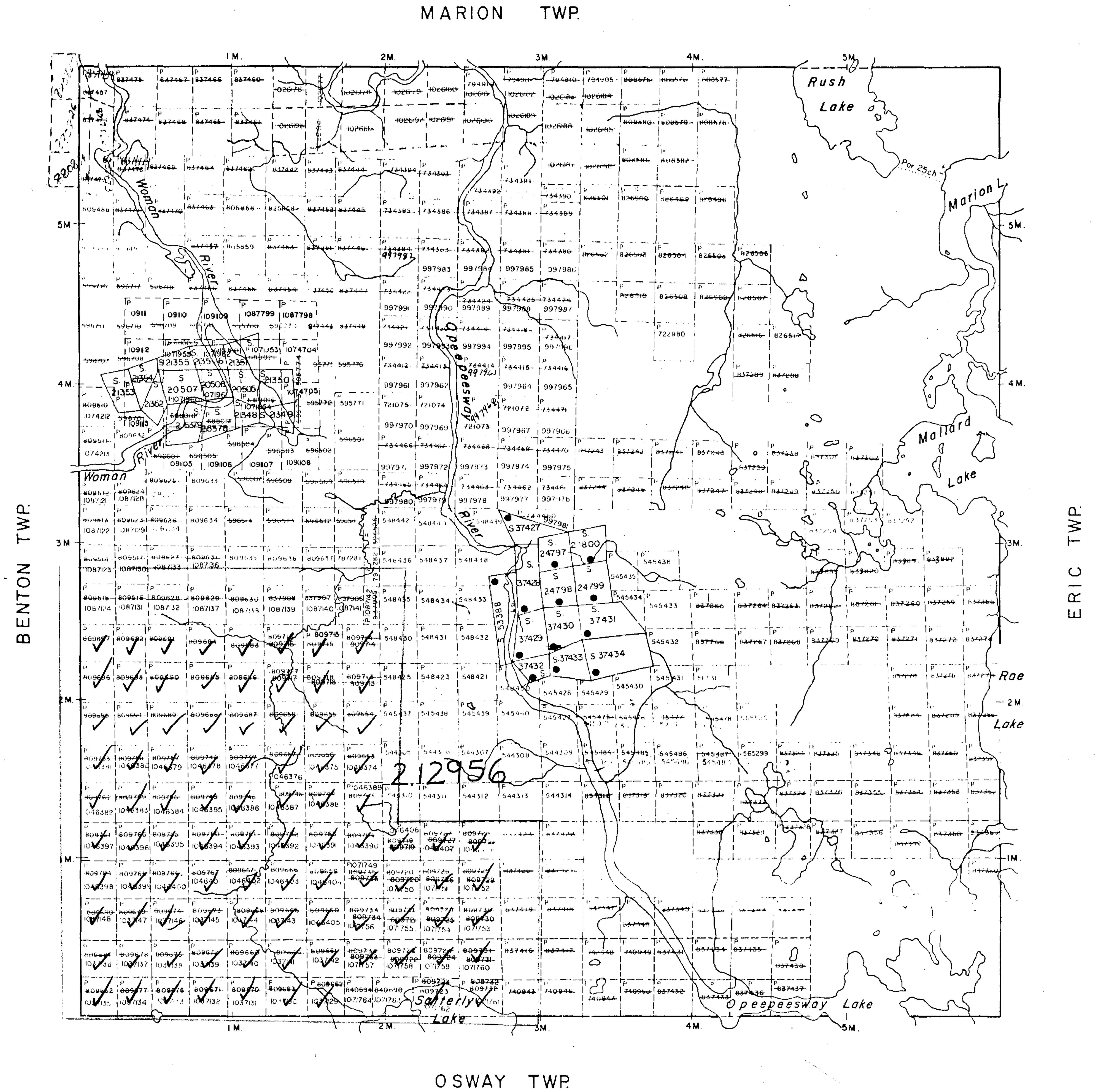
AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY

S.R.O. – SURFACE RIGHTS ONLY

M.+ S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File



41089NW0002 2.12956 OSWAY MALLARD

200

LEGEND

HIGHWAY AND ROUTE No.	
OTHER ROADS	
TRAILS	
SURVEYED LINES:	
TOWNSHIPS, BASE LINES, ETC.	
LOTS, MINING CLAIMS, PARCELS, ETC.	
UNSURVEYED LINES:	
LOT LINES	
PARCEL BOUNDARY	
MINING CLAIMS ETC.	
RAILWAY AND RIGHT OF WAY	
UTILITY LINES	
NON PERENNIAL STREAM	
FLOODING OR FLOODING RIGHTS	
SUBDIVISION OR COMPOSITE PLAN	
RESERVATIONS	
ORIGINAL SHORELINE	
MARSH OR MUSKEG	
MINES	⚒
TRAVERSE MONUMENT	⊕

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000

METRES 0 200 1000 (1 KM) 2000 (2 KM)

ACRES 40 HECTARES 16

RECEIVED MAR 8 1989

TOWNSHIP OF

MALLARD

DISTRICT OF

SUDBURY

MINING DIVISION

PORCUPINE

Ministry of Natural Resources | Ministry of Northern Development and Mines

Ontario

Date	Plan No.
JULY 1986	G-1171
National Topographic Series	

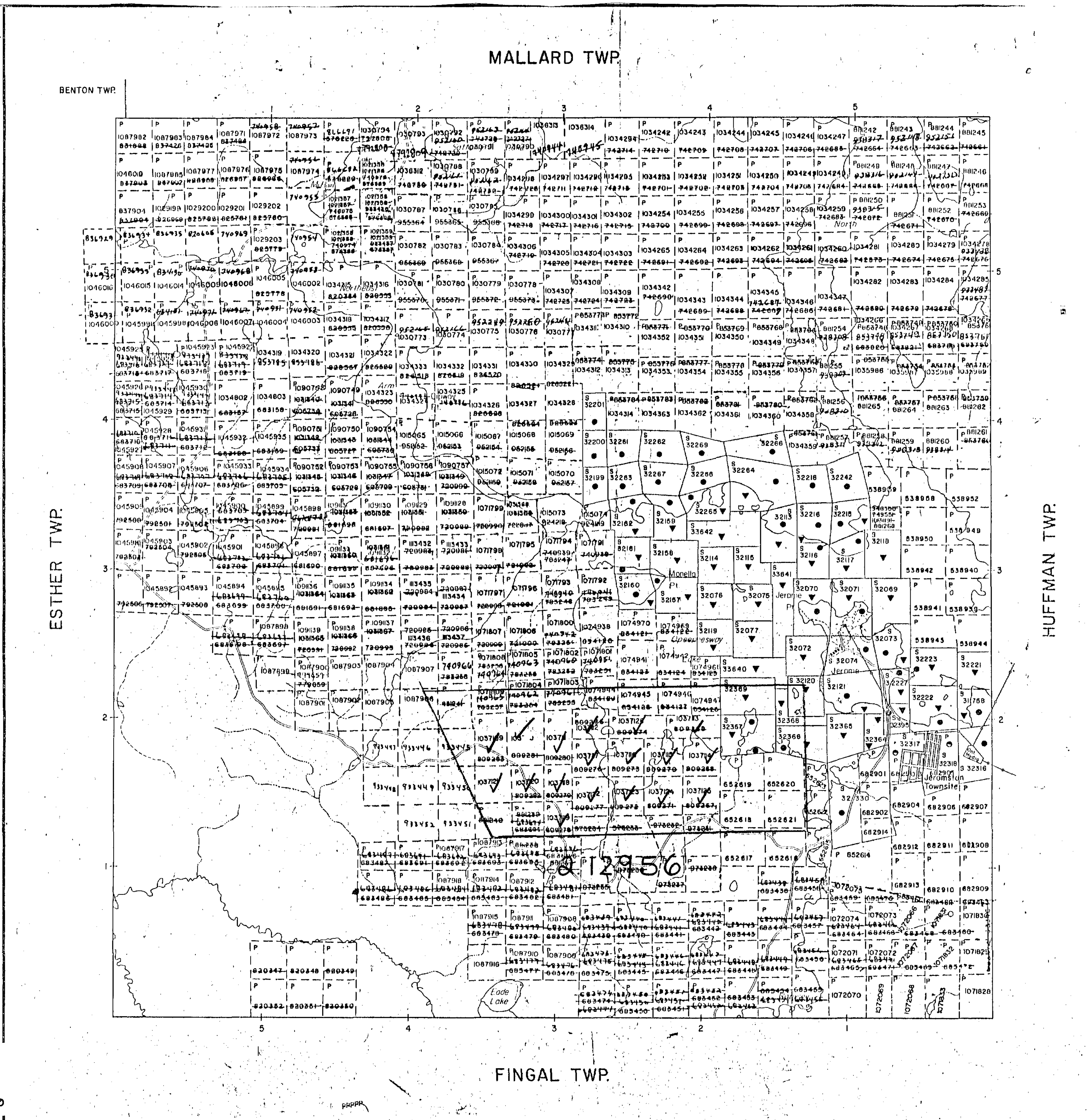
REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+ S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File

PORCUPINE MINING DIVISION
RECEIVED
MAY 26 1989



LEGEND

HIGHWAY AND ROUTE No.
OTHER ROADS
TRAILS
SURVEYED LINES:
TOWNSHIPS, BASE LINES, ETC.
LOTS, MINING CLAIMS, PARCELS, ETC.
UNSURVEYED LINES:
LOT LINES
PARCEL BOUNDARY
MINING CLAIMS ETC.
RAILWAY AND RIGHT OF WAY
UTILITY LINES
NON-PERENNIAL STREAM
FLOODING OR FLOODING RIGHTS
SUBDIVISION OR COMPOSITE PLAN
RESERVATIONS
ORIGINAL SHORELINE
MARSH OR MUSKEG
MINES
TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	
" , SURFACE RIGHTS ONLY	
" , MINING RIGHTS ONLY	
LEASE, SURFACE & MINING RIGHTS	
" , SURFACE RIGHTS ONLY	
" , MINING RIGHTS ONLY	
LICENCE OF OCCUPATION	
ORDER-IN-COUNCIL	OC
RESERVATION	
CANCELLED	
SAND & GRAVEL	

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1.

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000
METRES 0 200 1000 (1 KM) 2000 (2 KM)

RECEIVED
MAY 26 1989

TOWNSHIP

OSWAY

M.N.R. ADMINISTRATIVE DISTRICT

CHAPLEAU

MINING DIVISION

PORCUPINE

LAND TITLES / REGISTRY DIVISION

SUDBURY

Ministry of Natural Resources Ontario — Land Management Branch

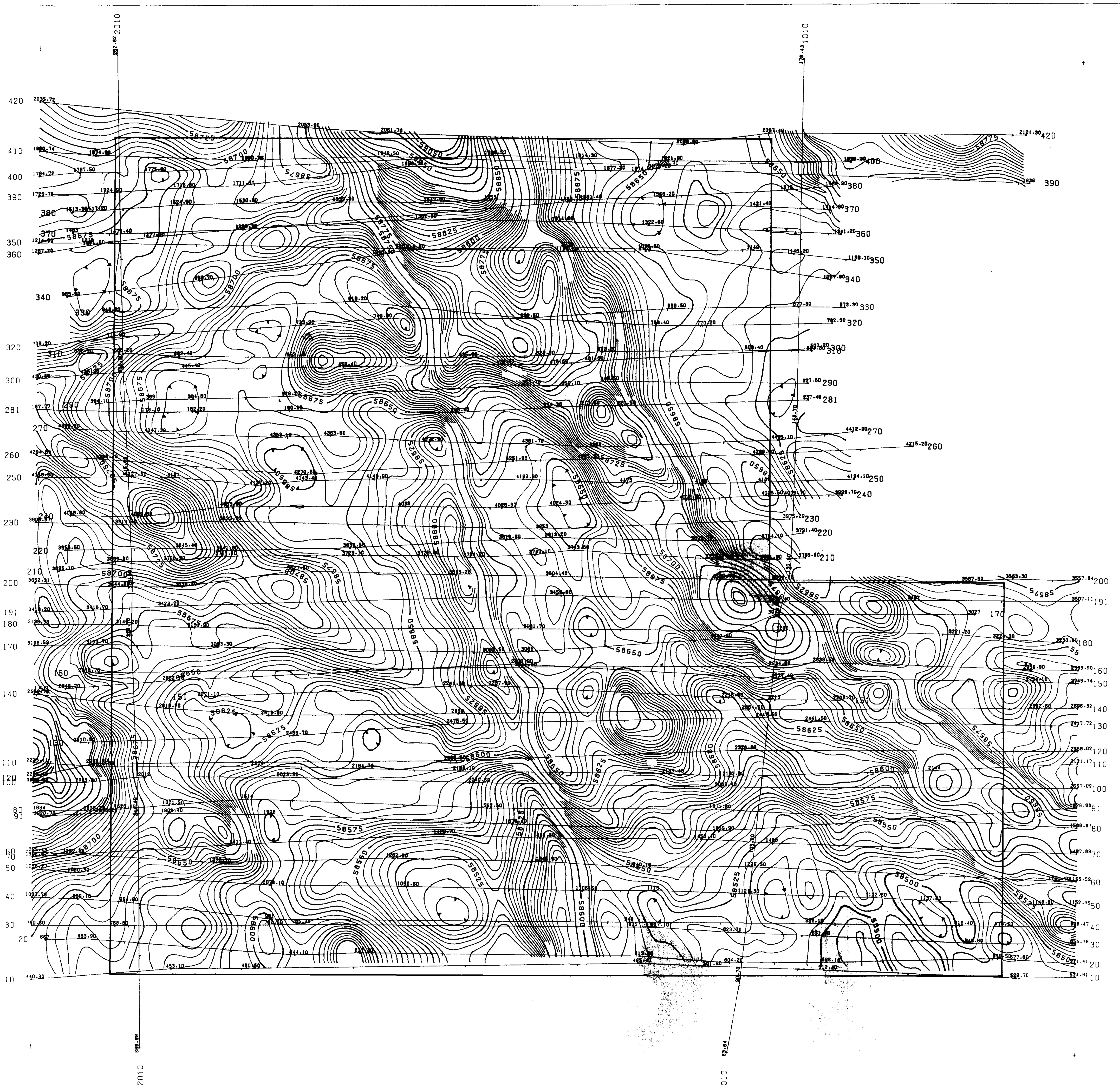
Date MARCH, 1985

Number G-3243

c.f. June 6/95

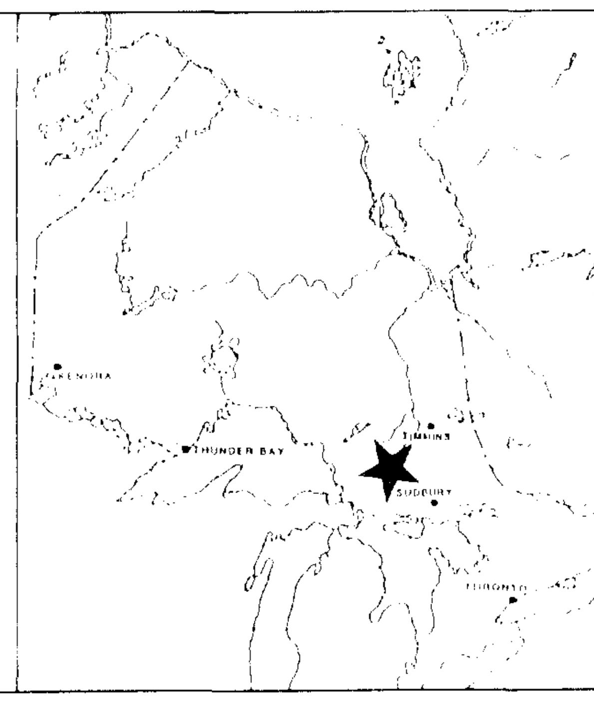
41089NW0002 2.12956 OSWAY MALLARD

210



LEGEND

Survey Altitude	100 metres MTC
Line Spacing	100 metres
Survey Boundary	
TOTAL MAGNETIC FIELD	
500 gammas	
100 gammas	
25 gammas	
5 gammas	



PIONEER METALS CORPORATION

AIRBORNE MAGNETIC SURVEY

TOTAL MAGNETIC FIELD

6

MALLARD TWP. PROJECT
ONTARIO

N.T.S. NO.	41O/9	DRAWING NO.	A-840.1-1
SCALE:	1 : 10,000	DATE:	August 1989

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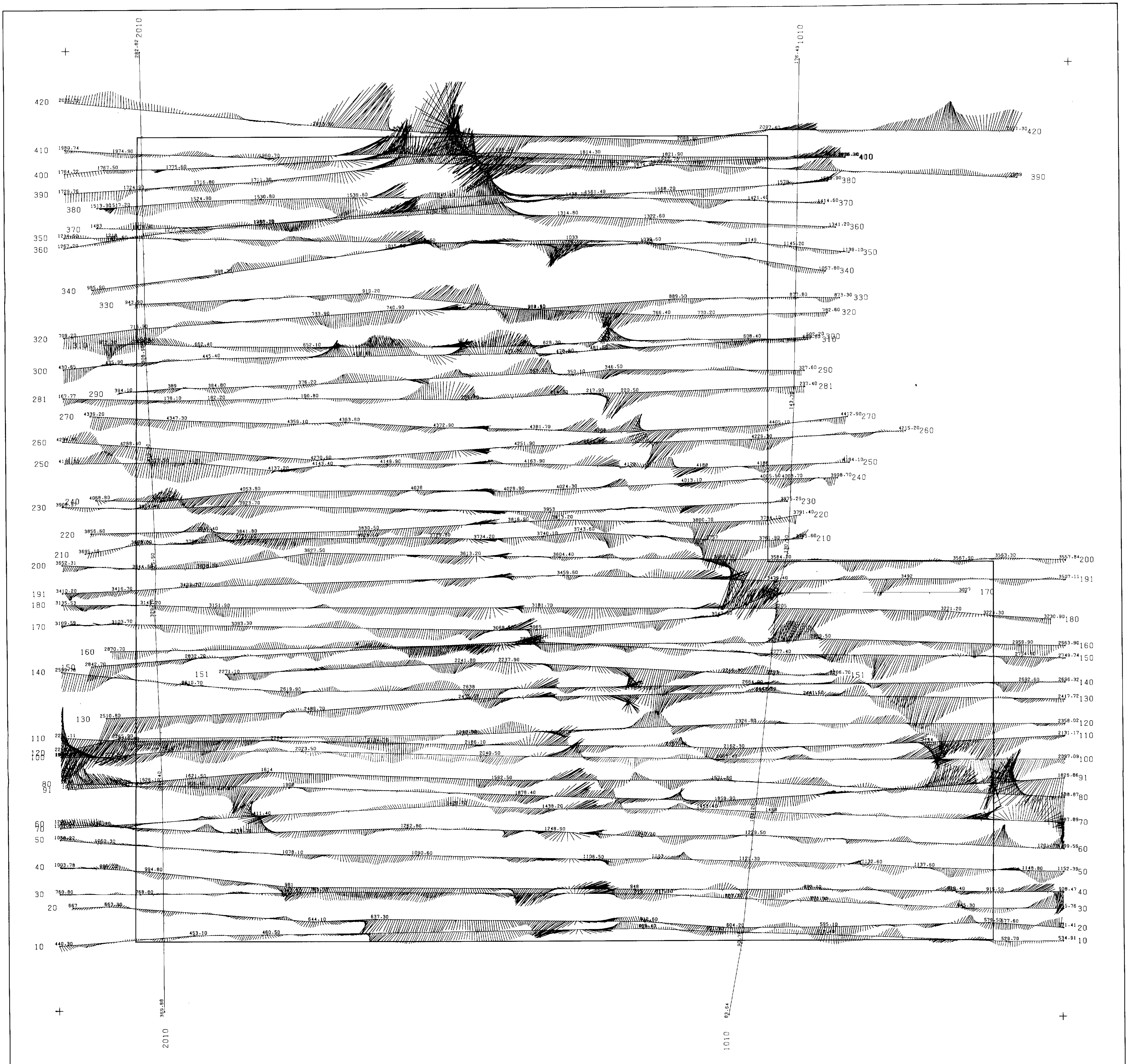
TORONTO, CANADA

1

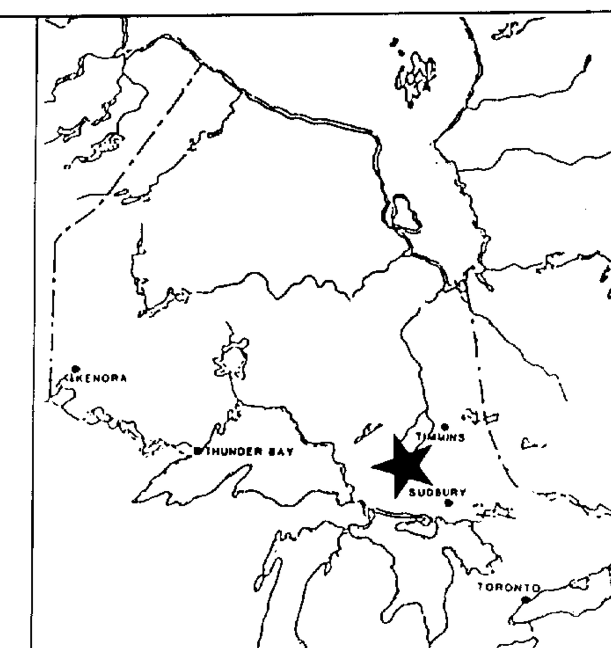
220



LEGEND

Survey Altitude 100 metres MTC
Line Spacing 100 metres
Survey Boundary

HORIZONTAL MAGNETIC GRADIENT VECTORS
5 gammas/metre/cm.



PIONEER METALS CORPORATION

AIRBORNE MAGNETIC SURVEY
HORIZONTAL MAGNETIC GRADIENT

2.12956

MALLARD TWP. PROJECT
ONTARIO

N.T.S. NO.	41O/9	DRAWING NO.	A-840.1-2
SCALE:	1 : 10,000	DATE:	August 1989

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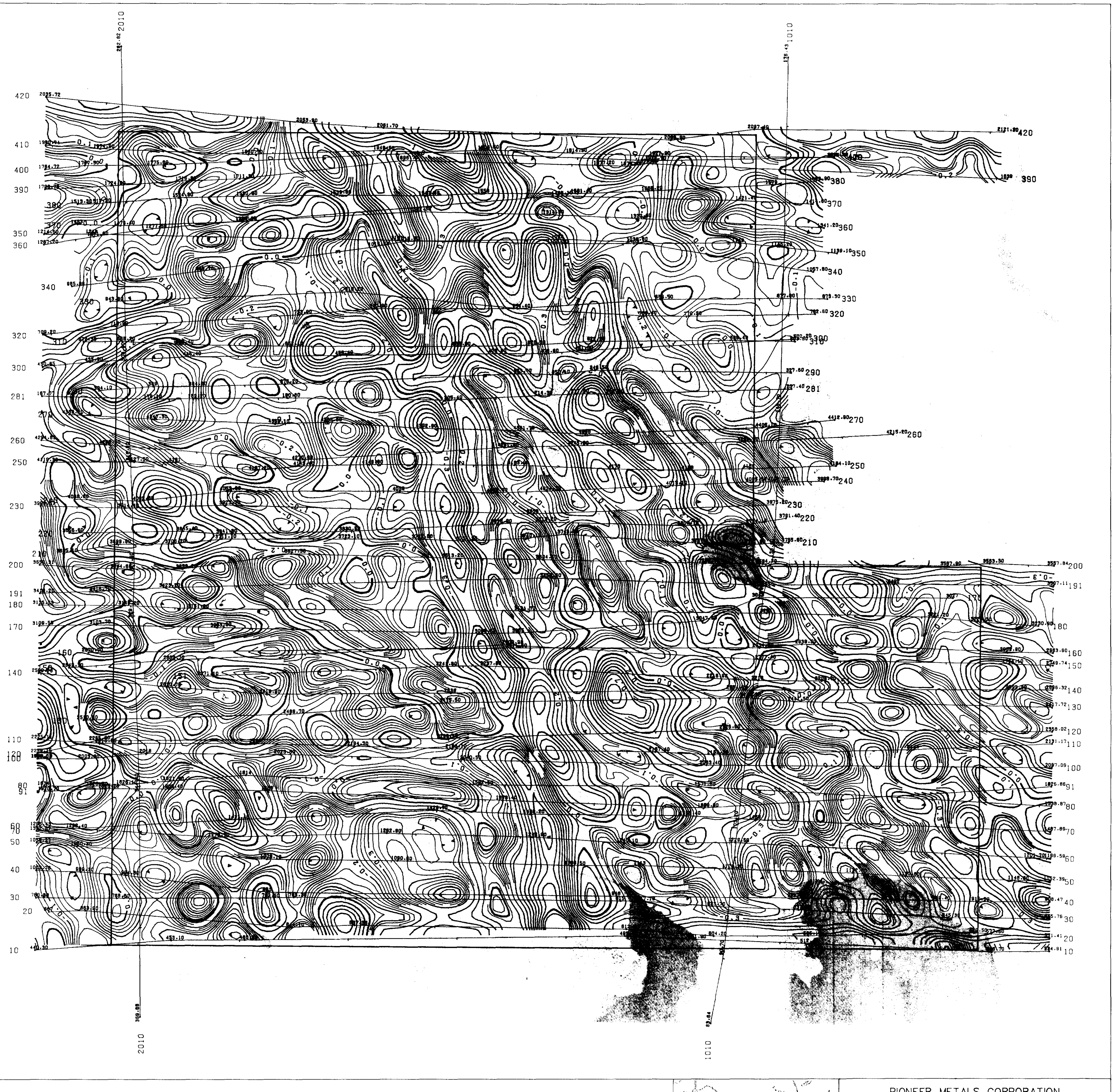
41O09NW0002 2.12956

230



LEGEND

Survey Altitude 100 metres MTC
Line Spacing 100 metres
Survey Boundary

VERTICAL MAGNETIC GRADIENT
2.500 gammas/metre
0.500 gammas/metre
0.100 gammas/metre
0.025 gammas/metre

PIONEER METALS CORPORATION

AIRBORNE MAGNETIC SURVEY
VERTICAL MAGNETIC GRADIENT
Calculated From Total Field

MALLARD TWP. PROJECT
ONTARIO

N.T.S. NO.	410/9	DRAWING NO.	A-840.1-3
SCALE:	1 : 10,000	DATE:	August 1989

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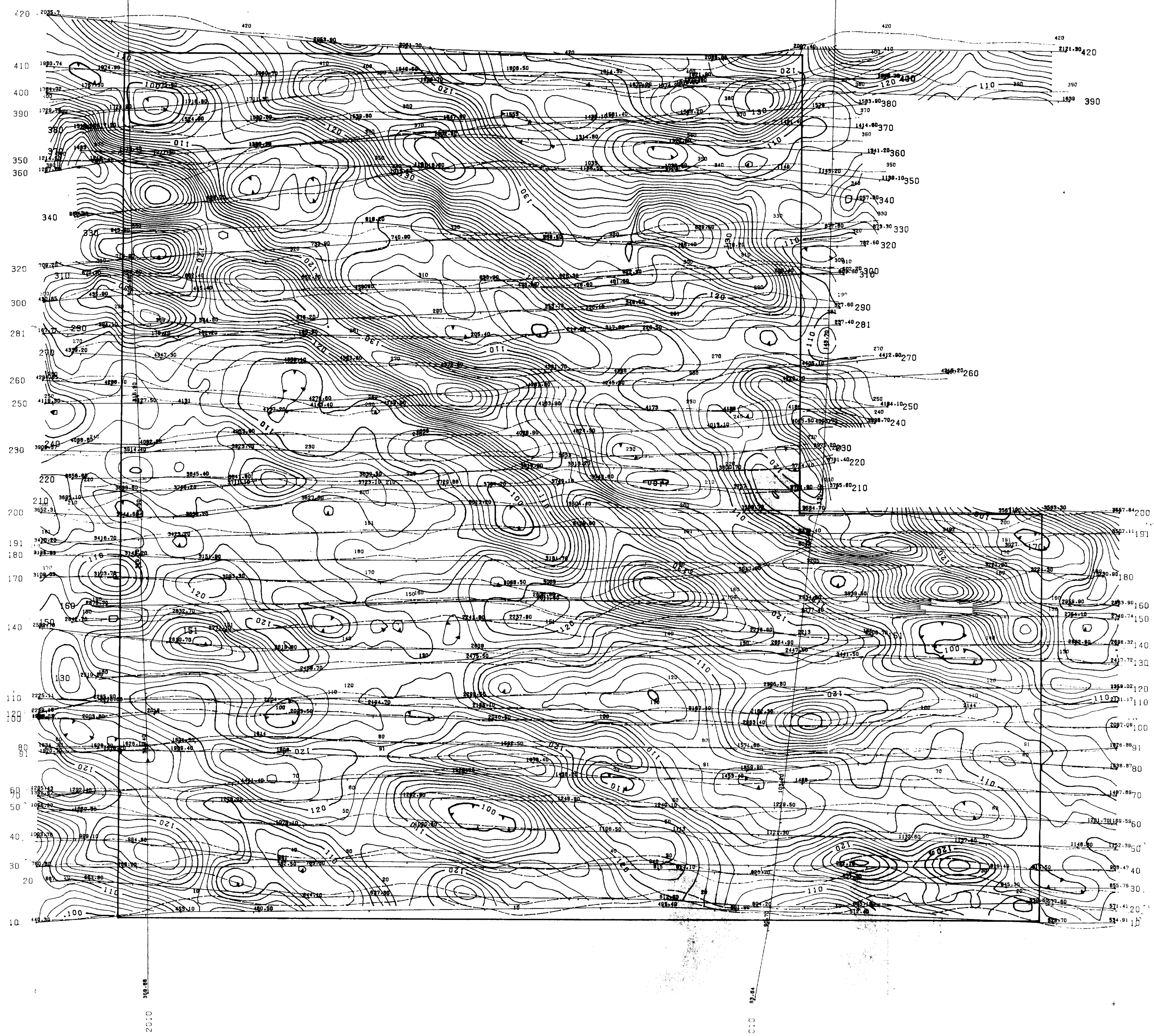


VLF Transmitter

LEGEND

Survey Altitude	100 metres MTC
Line Spacing	100 metres
Survey Boundary	

TOTAL FIELD STRENGTH (Contours)

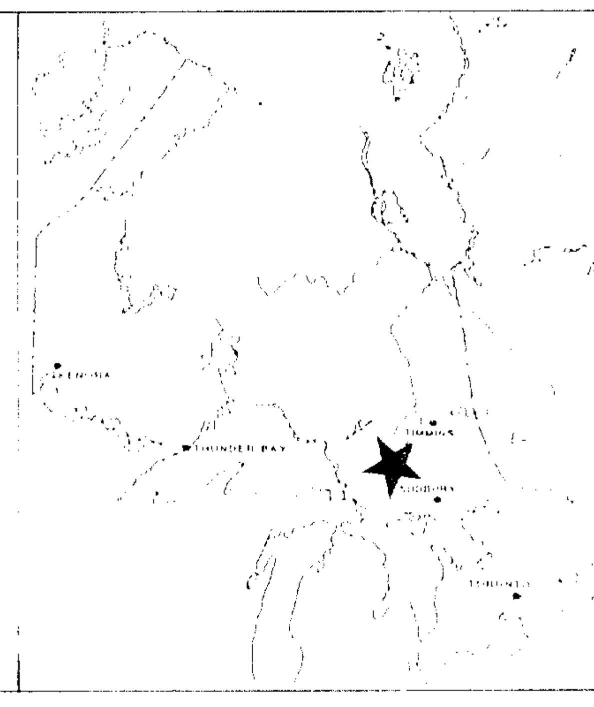
50%
10%
2%

QUADRATURE (Profiles along Flight Lines)

Normal Slope | Reverse Slope

+ 5% | + 5%

5% | 5%



PIONEER METALS CORPORATION

AIRBORNE VLF–EM SURVEY

CONTOURS OF TOTAL FIELD STRENGTH
PROFILES OF QUADRATURE

MALLARD TWP. PROJECT

ONTARIO

N.T.S. NO.	410/9	DRAWING NO.	A 840.1 4
SCALE:	1 : 10,000	DATE:	August 1989

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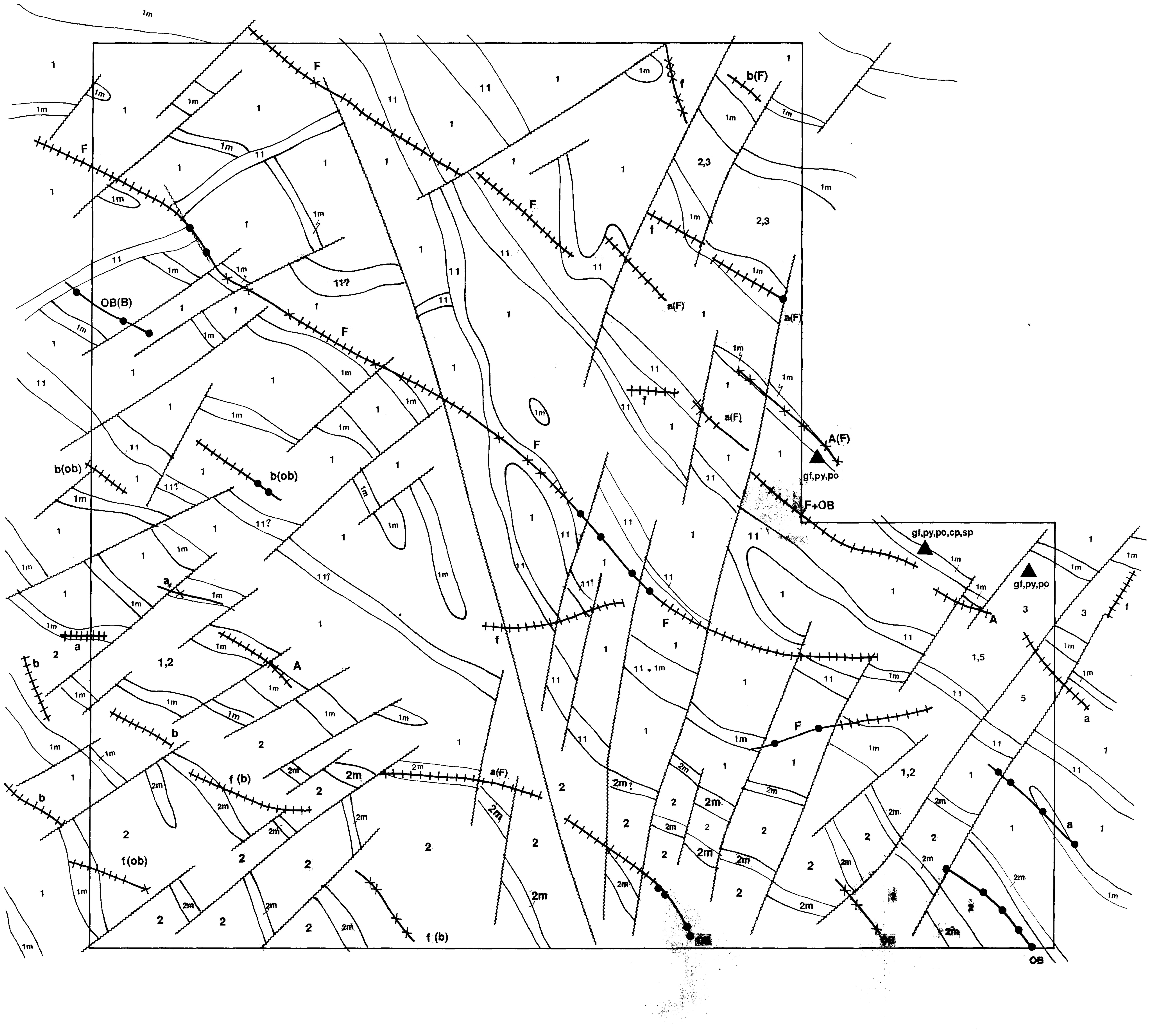
250



LEGEND

Terrain Clearance .... 100 metres
Line Spacing .... 100 metres
Property Boundary

INTERPRETATION

Contact
Fault

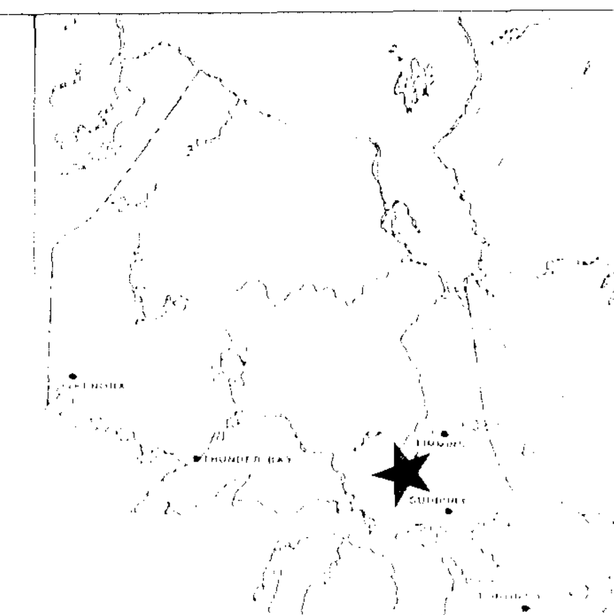
VLF-EM Conductor Axes

Normal Quadrature
Reverse Quadrature
Total Field Only

See Text for classification of VLF-EM Conductor Axes

11	Diabase Dyke
5	Gabbro, Diorite
3m	Felsic Metavolcanics
2m	Magnetic Unit Within 2
2	Intermediate Metavolcanics
1m	Magnetic Unit Within 1
1	Mafic Metavolcanics

VLF Transmitter



PIONEER METALS CORPORATION

INTERPRETATION

MALLARD TWP. PROJECT
ONTARIO

N.T.S. NO.	41O/9	DRAWING NO.	A-840.1.5
SCALE	1 : 10,000	DATE	August 1989

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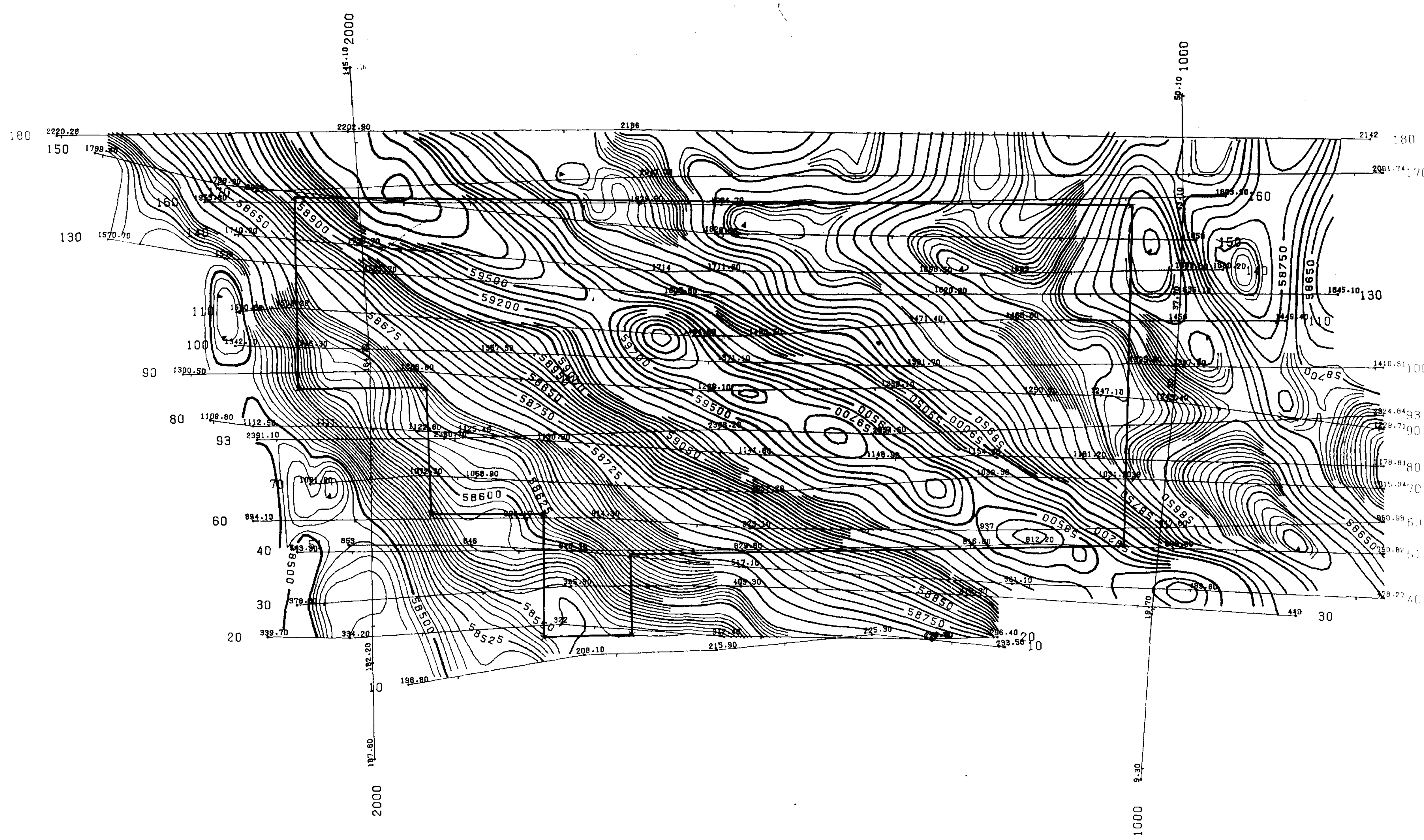
260

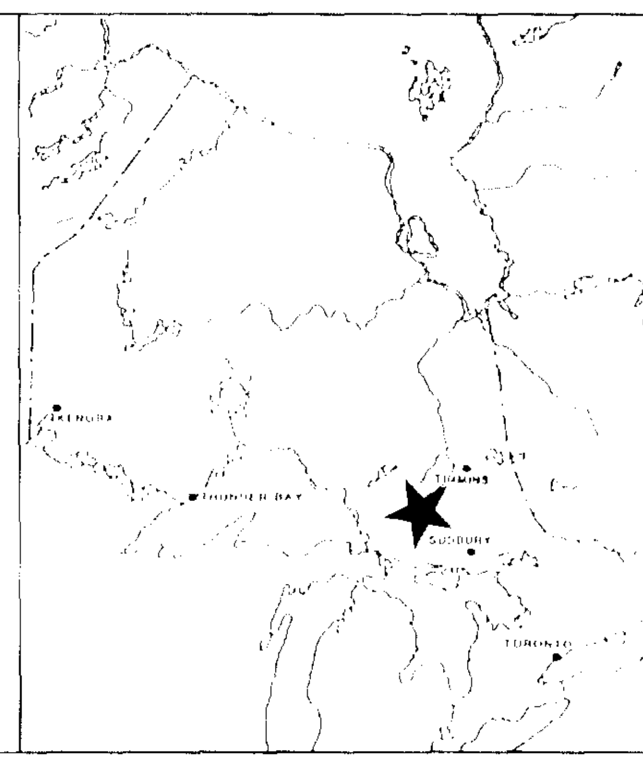


LEGEND

Survey Altitude	100 metres MTC
Line Spacing	100 metres
Survey Boundary	

TOTAL MAGNETIC FIELD
500 gammas
100 gammas
25 gammas
5 gammas

270



PIONEER METALS CORPORATION

AIRBORNE MAGNETIC SURVEY

TOTAL MAGNETIC FIELD

6

OSWAY TWP. PROJECT

ONTARIO

N.T.S. NO.	410/9	DRAWING NO.	A 840.2 1
SCALE:	1 : 10,000	DATE:	August 1989

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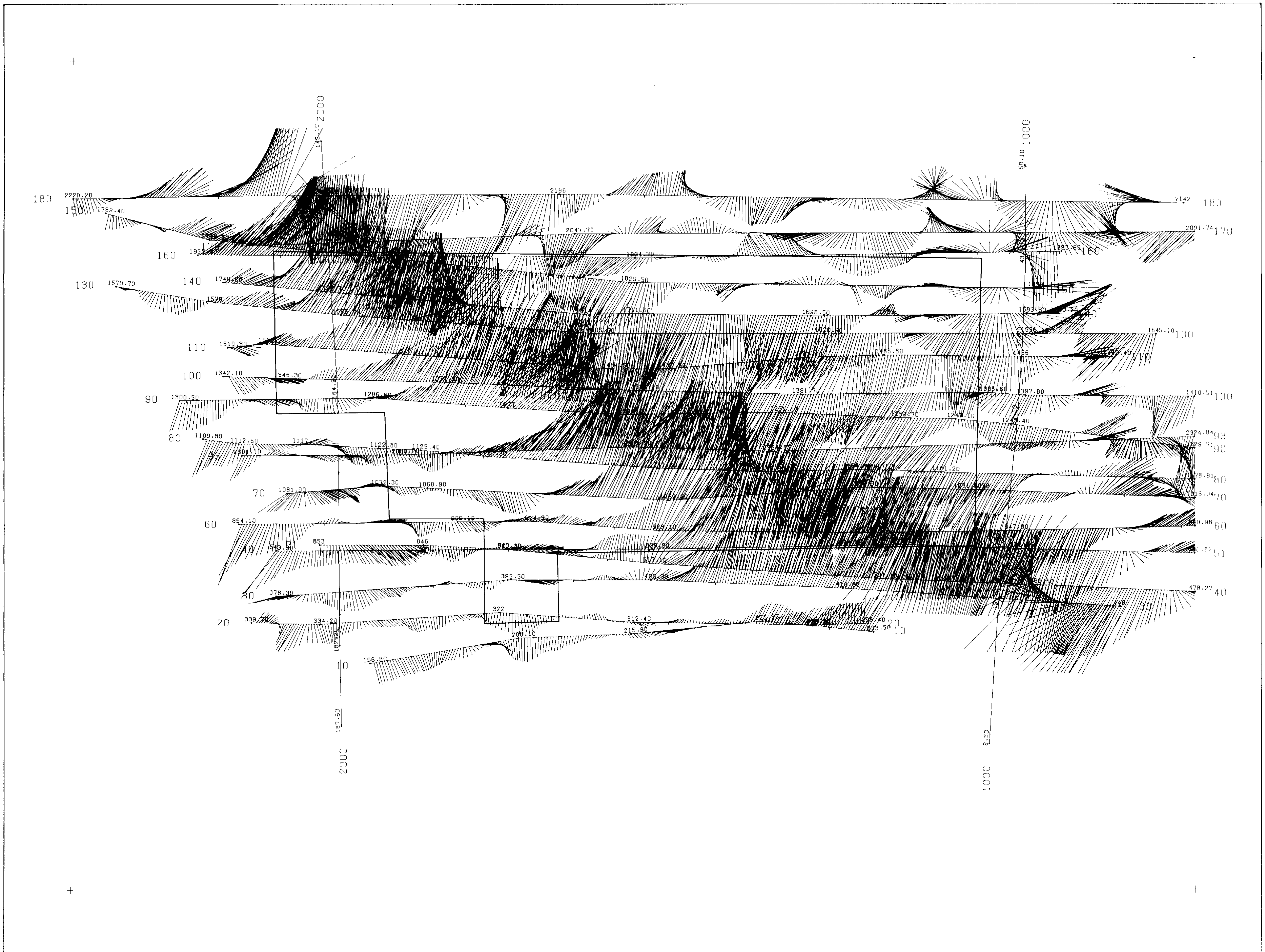
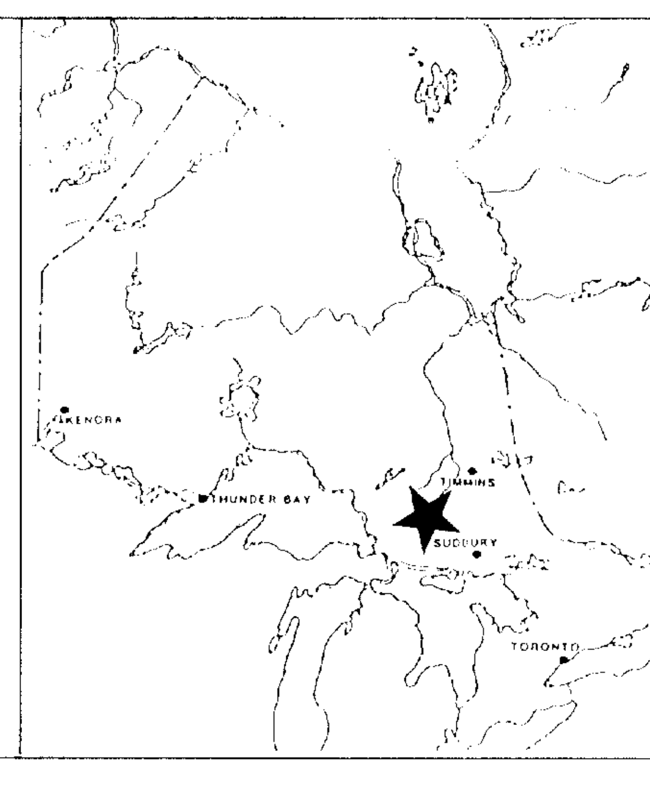


LEGEND

Survey Altitude	100 metres MTC
Line Spacing	100 metres
Survey Boundary	

HORIZONTAL MAGNETIC GRADIENT VECTORS
5 gammas/metre/cm.



PIONEER METALS CORPORATION

AIRBORNE MAGNETIC SURVEY
HORIZONTAL MAGNETIC GRADIENT

OSWAY TWP. PROJECT
ONTARIO

N.T.S. NO.	41O/9	DRAWING NO.	A 840.2-2
SCALE:	1 : 10,000	DATE:	August 1989

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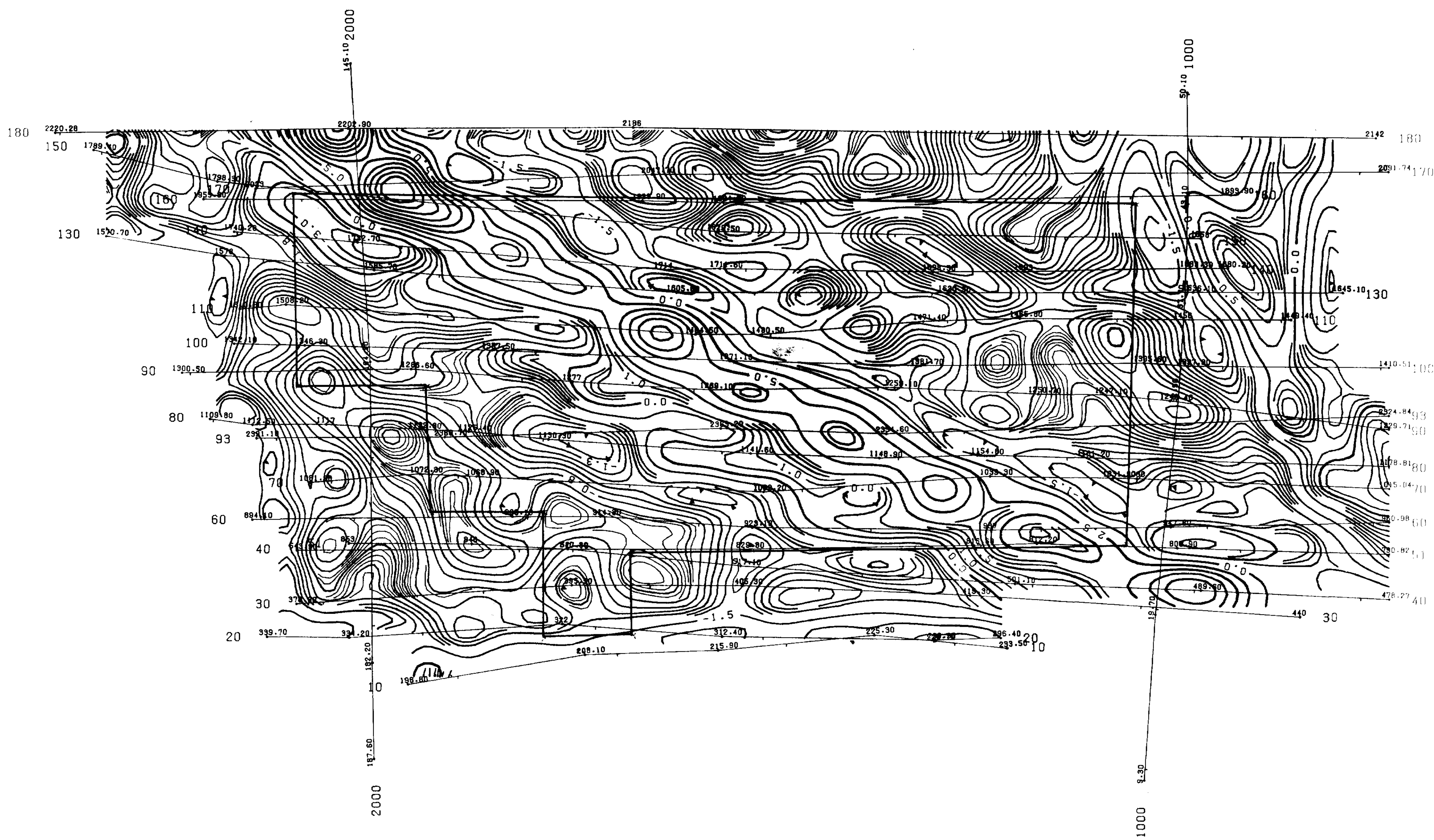
280



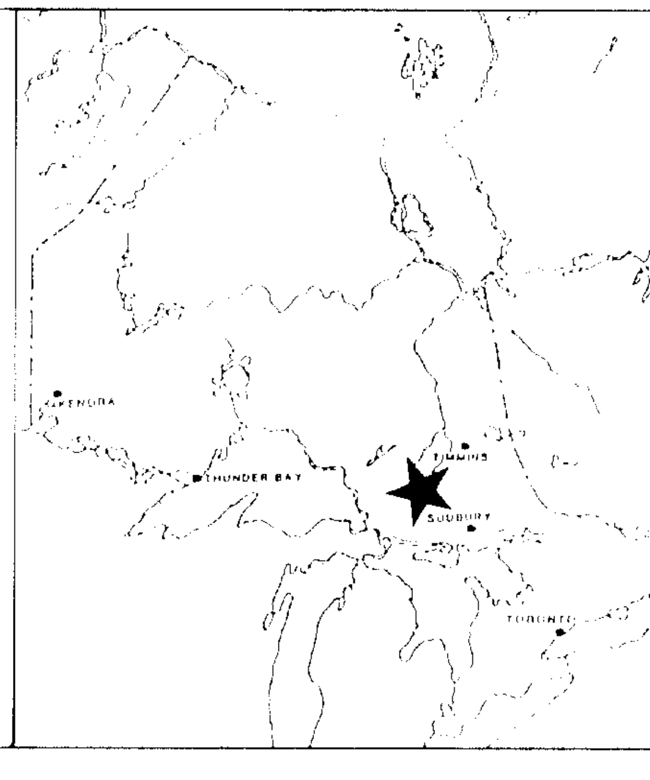
LEGEND

Survey Altitude	100 metres MTC
Line Spacing	100 metres
Survey Boundary	

VERTICAL MAGNETIC GRADIENT

2.500 gammas/metre
0.500 gammas/metre
0.100 gammas/metre
0.025 gammas/metre

290



PIONEER METALS CORPORATION

AIRBORNE MAGNETIC SURVEY

VERTICAL MAGNETIC GRADIENT
Calculated From Total Field

OSWAY TWP. PROJECT
ONTARIO

N.T.S. NO.	41O/9	DRAWING NO.	A-840.2-3
SCALE:	1 : 10,000	DATE:	August 1989

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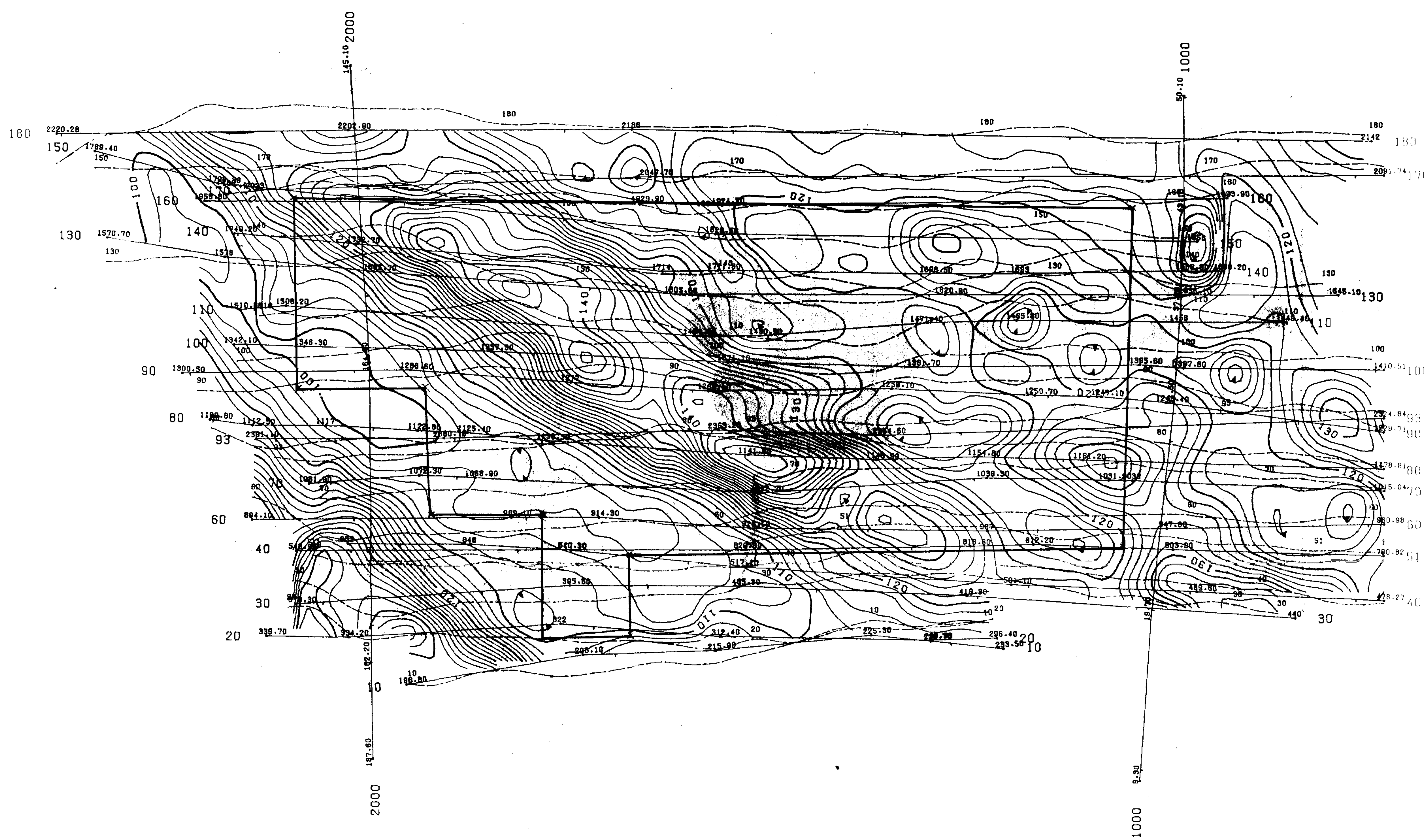


LEGEND

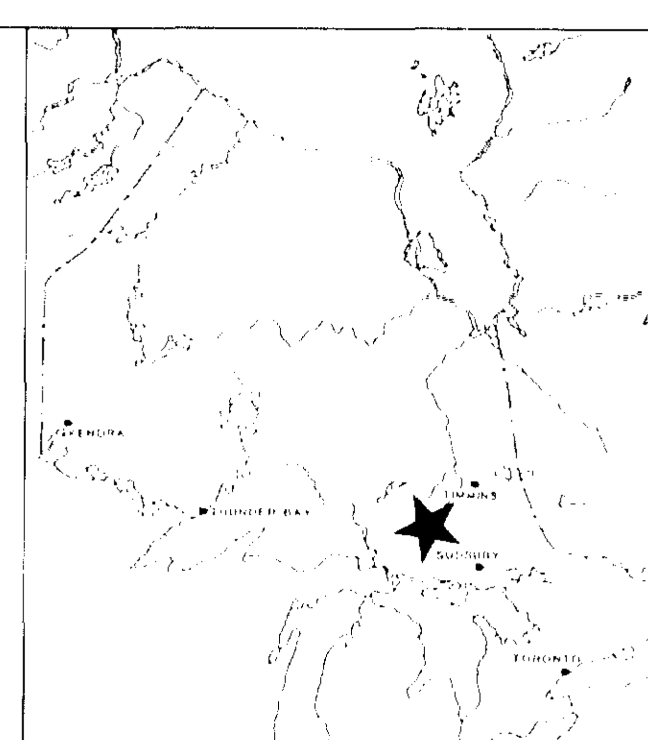
Survey Altitude 100 metres MTC
Line Spacing 100 metres
Survey Boundary

TOTAL FIELD STRENGTH (Contours)
50%
10%
2%

QUADRATURE (Profiles along Flight Lines)
Normal Slope — Reverse Slope
+ 5% — + 5%
% — 5%

VLF Transmitter

300



PIONEER METALS CORPORATION

AIRBORNE VLF–EM SURVEY

CONTOURS OF TOTAL FIELD STRENGTH
PROFILES OF QUADRATURE

OSWAY TWP. PROJECT
ONTARIO

N.T.S. NO.	410/9	DRAWING NO.	A-840.2-4
SCALE:	1 : 10,000	DATE:	August 1989

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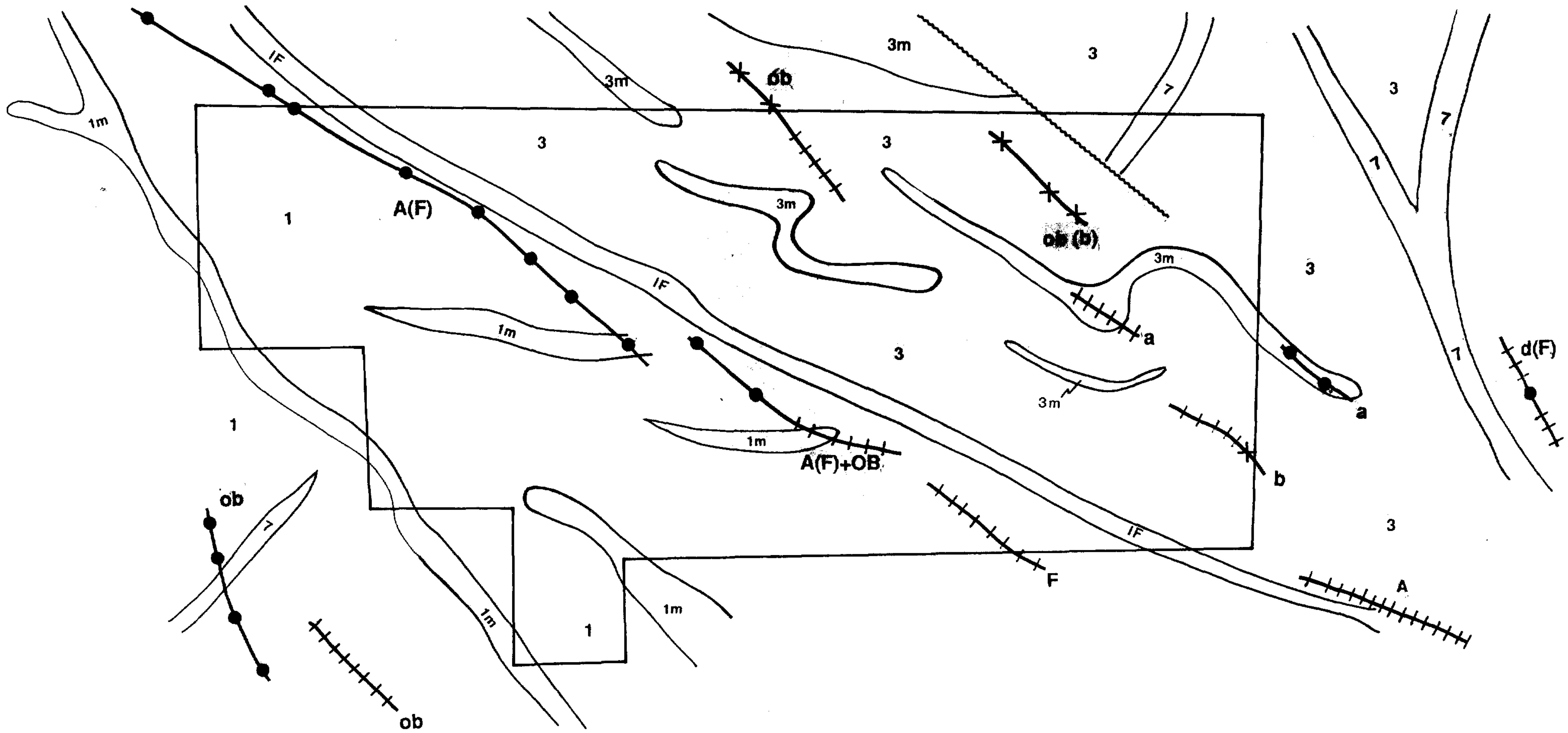
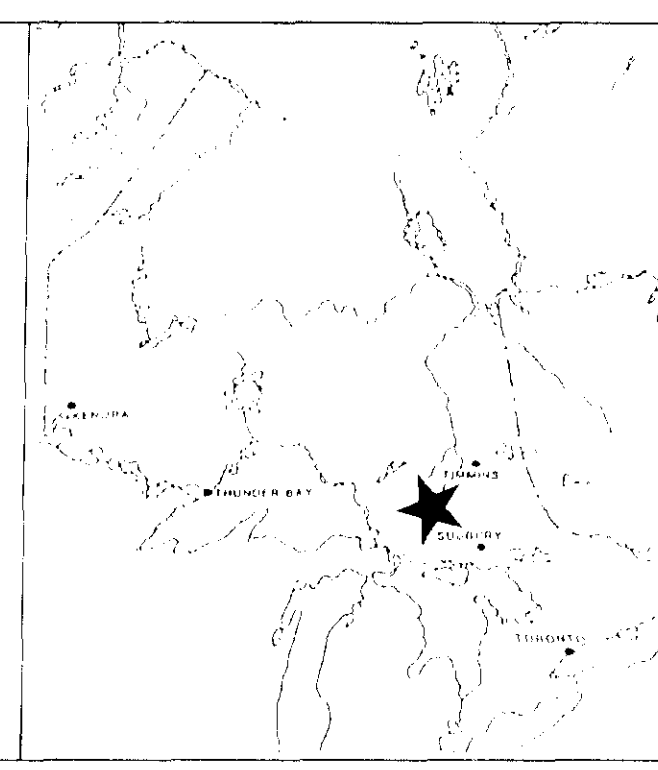


LEGEND

Terrain Clearance .... 100 metres
Line Spacing .... 100 metres
Property Boundary
INTERPRETATION
Contact
Fault
VLF-EM Conductor Axes
Normal Quadrature
Reverse Quadrature
Total Field Only
See Text for classification of VLF -EM Conductor Axes

7	Diabase
3m	Magnetic Unit Within 3
3	Metasediments
1m	Magnetic Unit Within 1
1	Mafic Metavolcanics
IF	Iron Formation



PIONEER METALS CORPORATION

INTERPRETATION

OSWAY TWP. PROJECT
ONTARIO

N.T.S. NO.	41O/9	DRAWING NO.	A-840.2-5
SCALE:	1 : 10,000	DATE:	August 1989

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