826331

REPORT ON GEOPHYSICAL SURVEYS
HEATHER PROPERTY

CAROL S, TANIA S, LUCIA S, MARINO S
CAROL S2, EFRAM S, TANIA S2,
TANIA 3, TANIA S4, CAROL S3
CLAIMS

VICTORIA MINING DIVISION
NTS 92 C 15 and 16

Latitude 48°58'N, Longitude 124°30'W

for

CHEVRON CANADA RESOURCES LIMITED

January, 1984
Toronto, Ontario

J.L. LeBel, P.Eng.
C. Pawluk, B.Sc.
MPH Consulting Limited

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1.0 INTRODUCTION

This report presents the results of a program of transient electromagnetic and mise-a-la-masse geophysical surveys conducted on the Chevron Canada Resources Limited, Heather Property located on southern Vancouver Island.

The surveys were conducted on two areas designated the Showing Area and Area 1. In the Showing Area, both transient electromagnetic and mise-a-la-masse surveys were conducted. In Area 1 only transient electromagnetic measurements were made.

The purpose of the surveys was:

(i) Showing Area - identify the geophysical response of and trace the extent of a showing of Au, Cu and Zn mineralization;

(ii) Area 1 - locate the cause of weak airborne electromagnetic anomalies and related copper soil geochemical anomalies.

The surveys were conducted by MPH Consulting Limited of Toronto, Ontario during the period November 4 to December 15, 1983. The program was under the direction of J.L. LeBel, P.Eng. and C. Pawluk, B.Sc. The survey progressed at a relatively slow pace because of heavy preciptation, including snow, which made movement on the steep terraine particularly treacherous.

2.0 PROPERTY, LOCATION AND ACCESS

The Heather property consists of 10 mineral claims (191 units), the status of which is summarized below.

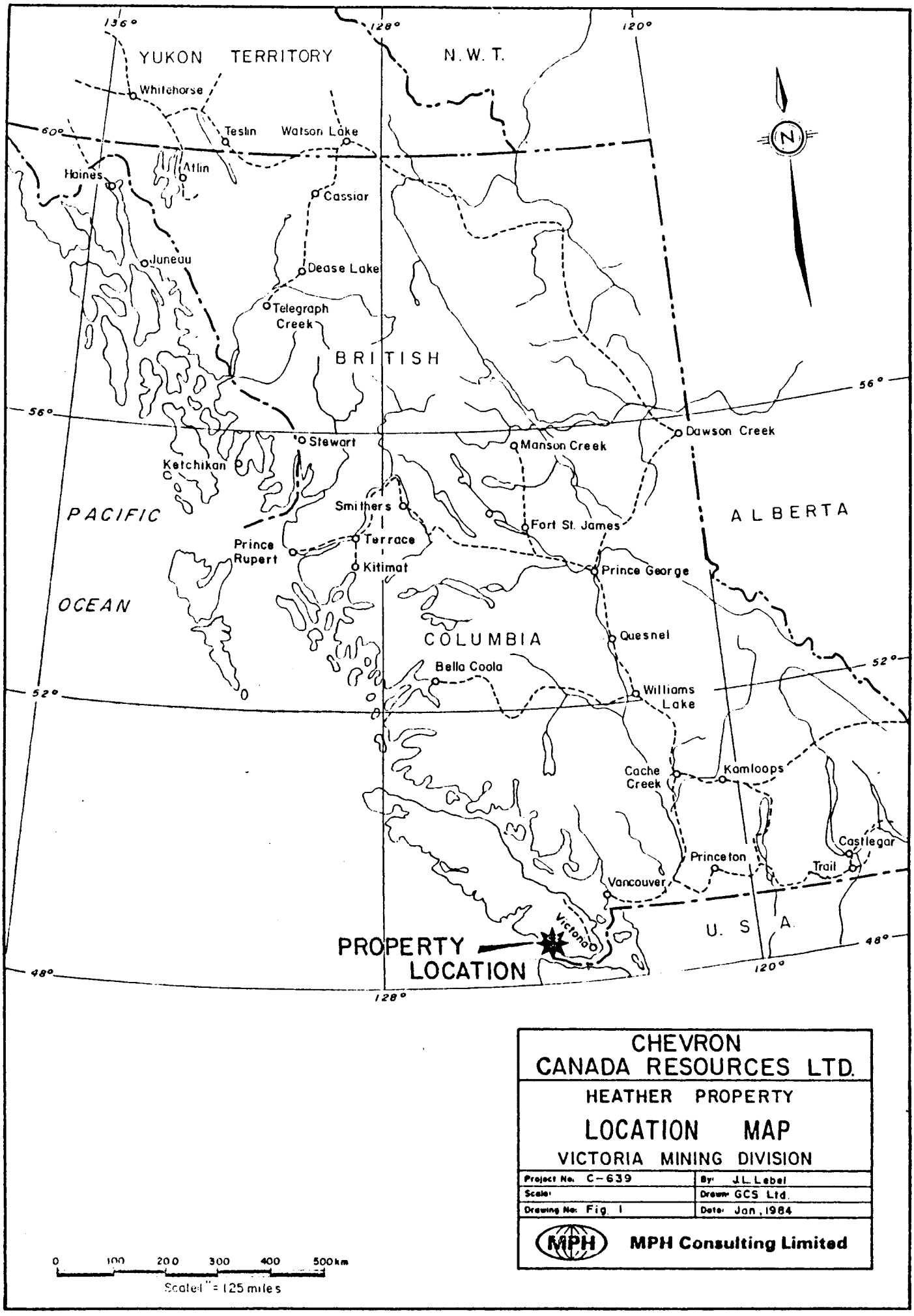
Claim Name	No. of Units	Record Date	Record No.
CAROL S	20	August 3, 1982	644
TANIA S	20	August 3, 1982	645
LUCIA S	20	August 3, 1982	646
MARINO S	20	August 3, 1982	647
CAROL S2	20	August 3, 1982	648
EFREM S	20	August 3, 1982	649
TANIA S2	15	October 5, 1982	683
TANIA S3	20	October 5, 1982	684
TANIA S4	16	October 5, 1982	685
CAROL S3	20	October 5, 1982	686

The geophysical surveys described herein focussed on the Carol S claim (Showing Area) and the Tania S4 claim (Area 1).

The property is located at the west end of Cowichan Lake on the southern end of Vancouver Island, approximatley 20 km west of the town of Youkou, B.C. at latitude 48°38'N, and longitude 124°30'W in the Victoria Mining Division-NTS 92 C15 and 16 (Figures 1 and 2).

Access to the property is gained from Youbou by either the north or south shore Cowichan Lake roads to the Crown Zellerbach main line. A network of branch logging roads provides access to the immediate areas of the surveys.

Road conditions at the time of the survey were poor because of heavy precipitation which caused numerous wash outs and threatened some of the bridges crossing creeks in the survey area.



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HEATHER PROPERTY

LOCATION MAP

VICTORIA MINING DIVISION

Project No. C-639	By: J.L. Lebel
Scale:	Drawn: GCS Ltd.
Drawing No: Fig. 1	Date: Jan., 1984

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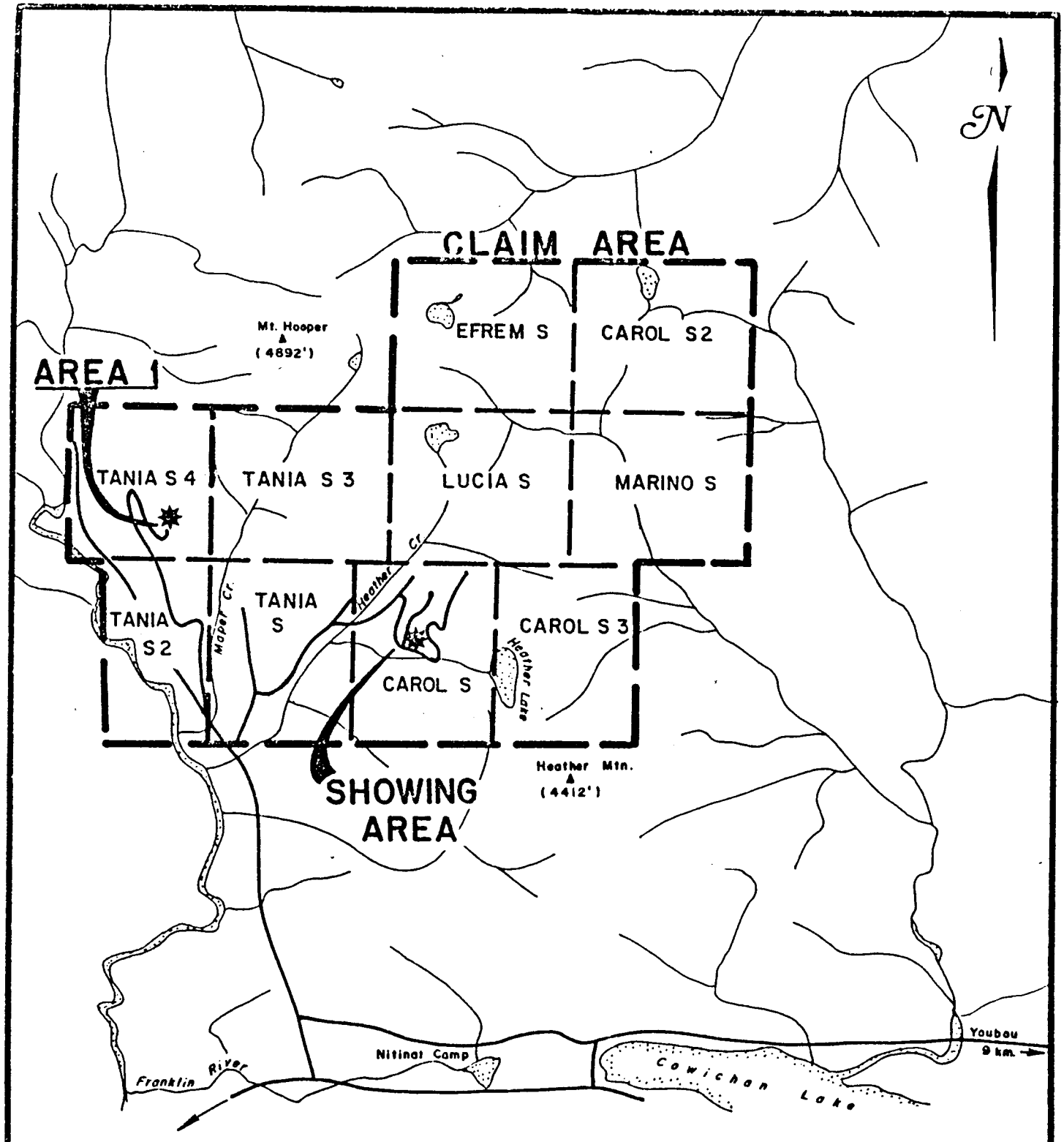

SCALE

0 1 2

KILOMETRES

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HEATHER PROPERTY

CLAIM MAP

VICTORIA MINING DIVISION

Project No.	C-639	By	J.I. Lebel
Scale	1:50,000	Drawn	GCS Ltd
Drawing No.	Fig: 2	Date	January 1984

MPH Consulting Limited

3.0 GEOLOGY AND MINERALIZATION

3.1 Regional Geology

The region is underlain by the rocks of the Sicker Group. The three major formations of the Sicker Group are the Buttle Lake Formation, Myra Formation and Nitinat Formation.

The lowermost Nitinat formation is composed of 8,000 to 10,000 feet of altered basalt flows, breccias and tuffs which are in turn overlain, intercalated and interfingered with greywacke, argillite, felsic tuffs, mafic intrusives and chert of the Myra formation. These are unconformably overlain by up to 2,000 feet of crinoidal and cherty limestone and argillite of the Buttle Lake Formation.

3.2 Property Geology

Although all the Sicker Group formations are present on the property, the Myra formation is of primary interest as it hosts the Westmin Resources deposits at Buttle Lake and at Mount Sicker. Both of the grids used in this survey are located within the boundries of the 1 to 1.5 kilometer wide, northwesterly striking, steeply dipping (45° - 90°) Myra formation. It is composed of a series of well bedded tuffs and tuffaceous sediments (in some cases shaley). The tuffs are rhyodacitic in composition although some rare quartz eyes have been located which may indicate the presence of some rhyolite tuffs. The entire formation is highly contorted suggesting the entire Sicker Group may be highly deformed.

A green tuff unit, a maroon tuff unit, and a silty tuff unit comprise the three main units of the Myra Formation. The green tuff appears to be the main volcanic unit and lies above and below the other two units with the maroon tuff

overlying the silty tuff. The maroon tuff is very well bedded and locally resembles shale. The silty unit is also well bedded (beds approximately 1-2" thick) and is locally well sheared. Most of the faulting seems to have been in the silty unit.

Medium to coarse grained diorite intrudes both the Myra and the Nitinat Formations. One of these diorite intrusions underlies the area covered by Area 1.

3.3 Mineralization

The only significant mineralization recognized on the property consists of stringer to massive sulphides composed of quartz/pyrite/chalcopyrite exposed in a trench centered in the Showing Area. The zone is hosted by an altered (clay, chlorite and sericite)silty tuff centered in a large antiform.

Taken by itself, the showing is probably unimportant but it may represnt a stringer sulphide zone on the fringe of a massive sulphide body or a faulted remnant of a massive sulphide.

4.0 PREVIOUS WORK

Previous work conducted on the property consisted of geological mapping, soil geochemical surveys and an Input MVI helicopter airborne electromagnetic survey.

The soil geochemical survey detected a good multi-element (Au, Cu and Zn) anomaly in the Showing Area. Moderate Cu soil geochemical anomalies were outlined on either side of Area 1. These anomalies may be linked together with other anomalies in the area to form a semi-continuous, 2 km long zone apparently related to the altered silty tuff horizon of the Myra Formation.

The Input airborne electromagnetic survey detected several weak 1 and 2 channel anomalies in the vicinity of Area 1. The anomalies could be attributed to any number of sources such as:

(i) deeply buried massive sulphide body;
(ii) shallow disseminated sulphide body or sulphide body composed principally of sphalerite and galena;
(iii) geological feature such as a contact or fault;
(iv) noise.

No Input anomalies were registered over the Showing Area.

5.0 INSTRUMENTATION AND SURVEY PROCEDURES

5.1 Line Cutting

Two grids to accomodate the survey were cut by Bema Industries Limited. The grids were oriented so that the transmitter loops for the transient electromagnetic survey would be as close to planar as possible. As a consequence, their orientation ignored local geologic trends.

In the Showing Area, the grid was centered on the Showing. The baseline extends 400m east and 400m at an azimuth of 090° from the showing. 400m long lines were established at 100m intervals along the base line extept at the center of the grid where lines were established at 25m intervals (Figure 3).

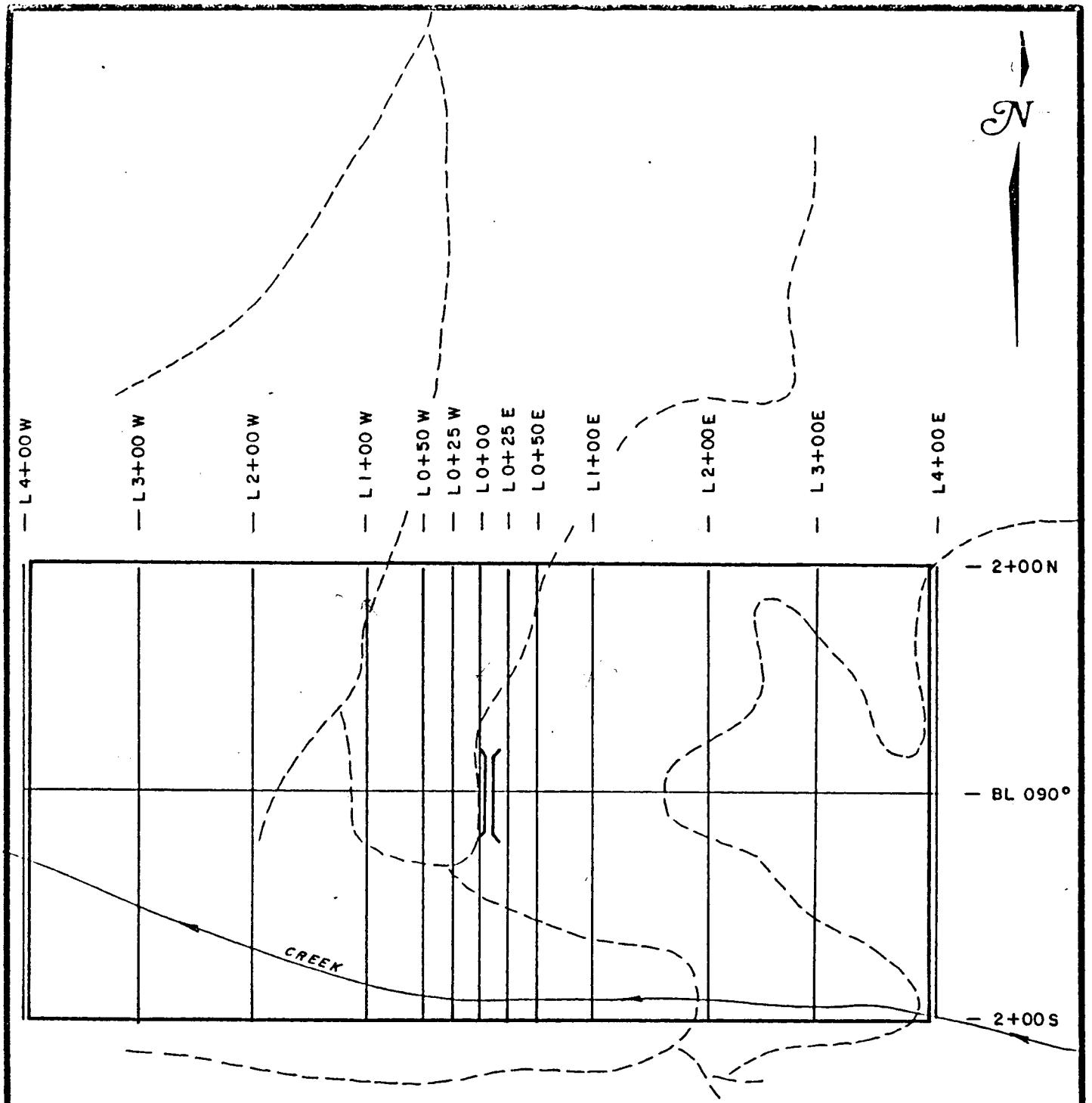
In Area 1, the grid consists of a 800m long base line with an azimuth of 000° with 800m long lines located at 100m intervals (Figure 4).

5.2 Transient Electromagnetic Survey

The transient electromagnetic survey was conducted with a Geonics EM-37 system. Specifications of the EM-37 are detailed in Appendix III.

The survey was conducted in the Turam Mode with large transmitter loops. One 800 x 400m transmitter loop was established in the Showing Area and two 800 x 300m were set up in Area 1 as indicated in figures 3 and 4.

An alternating commutated square wave curent form is impressed into the transmitter loop. The current in the transmitter is turned off abruptly producing a large electromagnetic field in the ground. The repetition rate of the current wave



LEGEND

- Tx Loop
- Trench
- Logging Road

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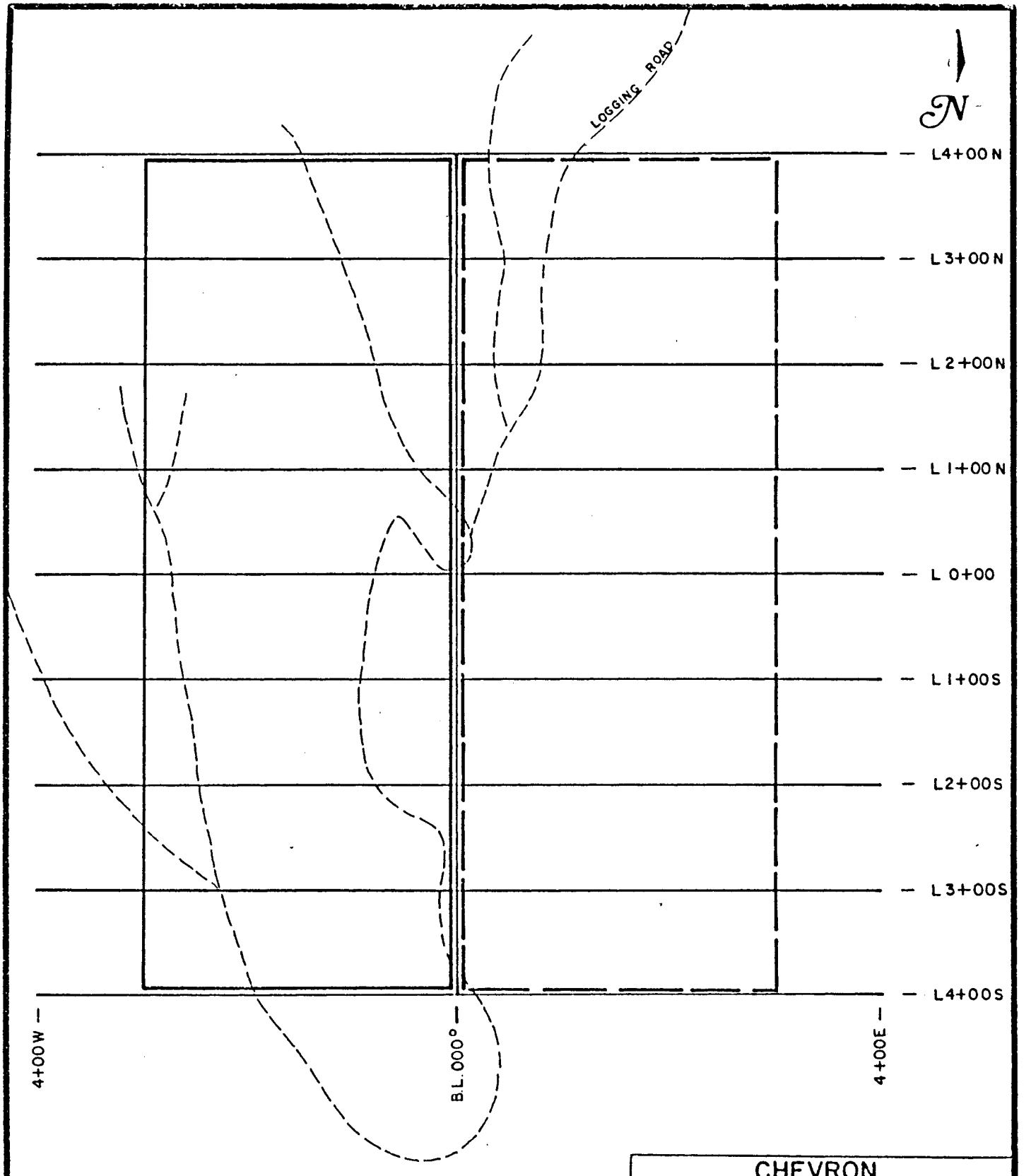
SHOWING AREA GRID PLAN

VICTORIA MINING DIVISION

Project No. C-639	By: J.L. Lebel
Scale: 1:5000	Drawn: GCS Ltd
Drawing No. Fig. 3	Date: January 1984

MPH Consulting Limited



LEGEND

Tx Loop (west)

Tx Loop (east)

Logging road

CHEVRON
CANADA RESOURCES LTD.

HEATHER PROPERTY

AREA 1 GRID PLAN

VICTORIA MINING DIVISION

Project No.	C-639	By:	J.I. Label
Scale:	1:5000	Drawn:	GCS Ltd
Drawing No.	Fig 4	Date:	January 1984

MPH Consulting Limited

form was set at 30 hz to respect the expected high background resistivities in the area.

Components of the secondary field induced by primary field are measured with a mobile receiver loop approximately 1m in diameter. In this case, components in the x, y and z directions where x is taken parallel to the line direction, were measured.

In order to keep the orientation of the receiver coil as constant as possible, orientations are defined as true directions rather than with respect to the plane of the transmitter.

Measurement of all of the components of the secondary fields is essential in determining the size and orientation of cause of any anomalies. Also, it was considered important to measure all of the components because the ultimate strike and dip of any conductors in the area was not precisely known. The EM-37 records the secondary fields across 20 gates spaced at logarithmic intervals after the current in the transmitter is terminated. Readings were taken at 25m and/or 50m intervals inside the transmitter loop. Measuring inside of the transmitter loop assures that the primary field is as uniform as possible and coupled with attempts to keep the transmitter in the plane of the topography reduces topographic effects that otherwise might be present.

Unfortunately, with this configuration, a vertical sheet-like conductor located in the middle of the loop will be zero coupled with the primary field and will not generate an anomalous secondary field.

To increase the extent of areal coverage in Area 1, a limited amount of coverage was affected outside of the transmitter loops.

The data collected were reduced and plotted using the Geonics "GSP37" processing software.

The following data was acquired:

Showing area:	L 2+00W, 1+50N - 1+00S
	L 1+00W, 1+75N - 1+00S
	L 0+00, 1+50N - 1+00S
	L 1+00E, 1+50N - 1+50S
Area 1:	
Loop 1 (west)	2+00N, 0+25W - 2+75W
	1+00N, 0+25W - 2+75W
	0+00, 0+25W - 2+75W
	0+50E - 3+00E
	1+00S, 0+25W - 2+75W
	2+00S, 0+25W - 4+00W
	3+00S, 0+25W - 4+00W
Loop 2 (east)	0+00, 0+25E - 3+75E
	1+00S, 0+25E - 3+75E

Data was collected on lines 2+00S, 1+00N and 2+00N in Area 1 but not saved because of failure of the data logger attributed to excessively wet conditions.

5.3 Mise-a-la-Masse-Survey

The mise-a-la-masse survey was conducted on the Showing Area with a Huntec Mark IV 2.5 kw induced polarization system. Specifications of the Huntec system are detailed in Appendix III.

Two separate current electrodes, designated electrode 1 and electrode 2, were installed in the showing on line 0+00 at 0+25N and 0+25S, respectively. Each electrode consisted of 3 stakes wrapped with aluminum foil which were jammed into holes excavated by a portable drill. The infinite current electrode consisted of a sheet of aluminum foil placed in a pit. It was located approximately 1 km south of the centre of the grid.

The mobile potential electrode consisted of a steel rod. The infinite potential reference electrode consisted of a sheet of Aluminum foil located approximately 800m north of the centre of the grid.

Current was transmitted sequentially through the two current electrodes and primary voltage measurements were made along the survey lines. Currents were in the 200 to 300 ma range with the transmitter voltage set at 2,200 volts.

Measurements were not taken along line 0+00 because most of the stations were located on an abandoned logging road where the potential electrode could not be driven into the ground.

5.4 Personnel

The MPH Consulting Limited personnel involved in the survey were:

L. LeBel, Senior Geophysical Consultant
C. Pawluk, Geophysicist
J. Ashenhurst, Technician
R. Krawinkel, Technician
T. Archibald, Technician

6.0 PRESENTATION OF DATA

The results of the transient electromagnetic survey are presented in Appendix I. Plots of the components of the secondary fields (dB/dt) in NV/Am^2 versus position are given for all 20 channels on each line.

Modelling results attempted for the results from the Showing Area using the "MODLSU" program of the GSP37 software are presented in Appendix II. The field data is shown as a dotted line, while the theoretical data is indicated by a solid line.

Appendix III contains a suite of models to illustrate the response of some typical conductors. The model adopted consists of a 300m by 100m plate with a conductance of 10 siemens (mho). A conductance of 10 may be low for a massive sulphide body but is considered adequately representative of a vein stringer disseminated type sulphide body. The plate is positioned in the center of an 800m by 400m transmitter loop with a strike parallel to the long dimension of the transmitter. Other strike directions would result in similarly shaped anomalies with appropriately reduced amplitudes. Results were calculated for various dips of the plate at depths of 50m and 150m. The model results assume that the transmitter loop lies in the xy-plane. In the survey areas this condition was not necessarily maintained because the x-direction was defined as true vertical and the transmitter was positioned on the land surface which, in places, sloped at up to 45°.

The results of the mise-a-la-masse survey for each current electrode position are illustrated on Map 1. The maps show the primary voltage normalized by the current in units volts/amp. Contours are at semi logarithmic intervals ... 1.0, 1.5, 2.0, 3.0, 5.0, 7.5, 10.0 ...

7.0 RESULTS AND INTERPRETATION

7.1 Showing Area

7.1.1 Transient Electromagnetic Survey

A weak 'cross-over' anomaly in the Z (vertical) component was recorded by the early channels at about station 1+00N on line 0+00. The observed response is consistent with the resposne expected at the north edge of a flat lying sheet with a conductance of 2 seimens and located at a depth of 50m as shown by the model modelling results in Appendix II. No response that would serve to indicate the southern edge of the sheet was recorded on the southern end of line 0+00. Note, however, that data was not collected south of the station 1+00S because of a culvert located at 1+50S. It is also possible that the edge of the sheet occurs outside of loop beyond the limits of the survey.

No anomalous responses were recorded on line 1+00W. A pseudo cross-over response observed at 0+75S on line 1+00E could not be satisfactorily modelled when considered in light of the anomaly observed on line 0+00. This response may be a topographic effect caused by a steep slope between 1+00S and the end of line 1+00E at 2+00S,

Elsewhere on the grid, no anomalies similar to the modelled responses for some typical examples shown in Appendix III were recorded.

7.1.2 Mise-a-la-Masse Survey

The contoured primary voltages of the mise-a-la-masse survey produce ellipses of low eccentricity. The

highest eccentricity (ratio of major axes of the ellipse to the minor axes of the ellipse) of approximately 2 occurs in a 100m x 50m area centered on electrode 2. The ellipses are elongated in a northwest/southeast direction parallel to the geological trend.

Considered separately, the results from each current electrode are consistent with the presence of a 75m x 30m conductor underneath each electrode. When the results are compared, however, it can be seen that the electrodes produce ellipses that are independent of each other. This implies that if a conductor is present it has extremely low, laterally varying conductivity.

The results may also be explained by a northwest trending zone of high resistivity flanked by low resistivities. This explanation concurs with the transient electromagnetic survey which did not detect a discrete conductive body.

7.2 Area 1

No transient electromagnetic anomalies similar to those illustrated by the modelling results in Appendix III were recorded in Area 1.

By way of general comments that pertain to both survey areas, it can be seen that the secondary field components decay to essentially zero amplitude by channel 10. This situation is a consequence of the high resistivities in the area which, according to the results of the mise-a-la-masse survey fall in the range of 2,000 ohm-m to 4,000 ohm-m.

8.0 CONCLUSIONS AND RECOMMENDATIONS

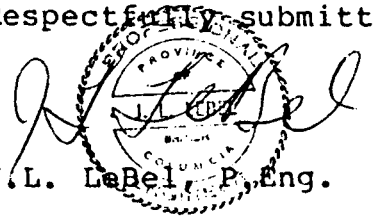
A poor, partially defined transient electromagnetic anomaly detected in the Showing Area may be explained by a small, shallow, low conductance flat lying sheet. The mise-a-la-masse survey results may also indicate a poor areally limited conductor but the results can also be explained by geological circumstances. The size of the conductor, if present, is too small to be of economic interest.

Nothing of interest was detected in Area 1.

The surveys covered only a small part of the Heather property. Economic potential for the property appears to be at depth. To completely evaluate the property additional coverage with a deep penetrating high resolution geophysical method like the transient electromagnetic method is recommended.

The modelling done indicates that a hypothetical, 300m by 100m, 10 siemen sulphide body should be detectable to a depth of at least 150m.

Respectfully submitted



J.L. LaBel, P.Eng.

C. Pawluk, Geophysicist

MPH CONSULTING LIMITED

CERTIFICATE

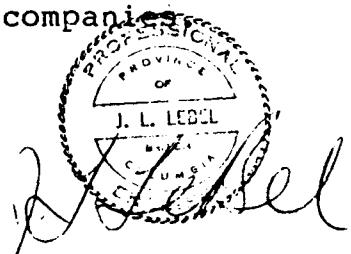
I, J.L. LeBel of Vancouver, British Columbia hereby certify that:

1) I hold a Bachelor of Science degree in Geological Engineering from Queen's University, Ontario, and a Master of Science degree in Geophysics from the University of Manitoba, Manitoba. I have practiced my profession in exploration geophysics continuously since graduation in 1972.

2) I am a Professional Engineer registered with the Association of Professional Engineers of British Columbia.

3) I have based conclusions and recommendations contained in this report on knowledge of the area, my previous experience in geophysical methods and interpretation and on the results of the field work conducted on the property.

4) I hold no interest, directly or indirectly in this property other than professional fees, nor do I expect to receive any interest in the property or in Chevron Canada Resources Limited or in any of its subsiduary companies.



Toronto, Ontario,
January, 1984

J.L. LeBel, P.Eng.

APPENDIX I

Transient Electromagnetic Data

Showing Area

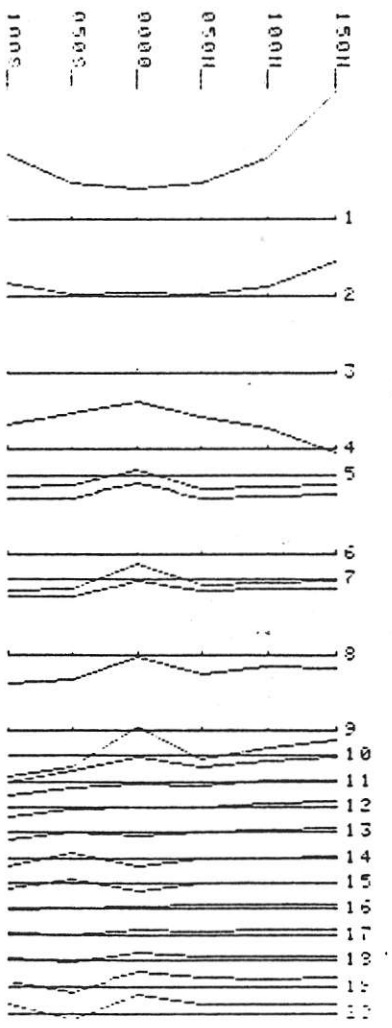
Area 1 (west transmitter loop)

Area 1 (east transmitter loop)

Data file 2W5HF
LINE 02W Z Component
dBZ/dT (nV/Am^4) TOFF corrected

vertical

Channels			Scale
1	to	1	1000.00
2	to	2	300.00
3	to	3	100.00
4	to	5	30.00
6	to	7	10.00
8	to	8	3.00
9	to	20	1.00



Data file 2W5HF
LINE 02W X Component
dBX/dT (nV/Am^4) TOFF corrected

horizontal
Hat to line

Channels			Scale
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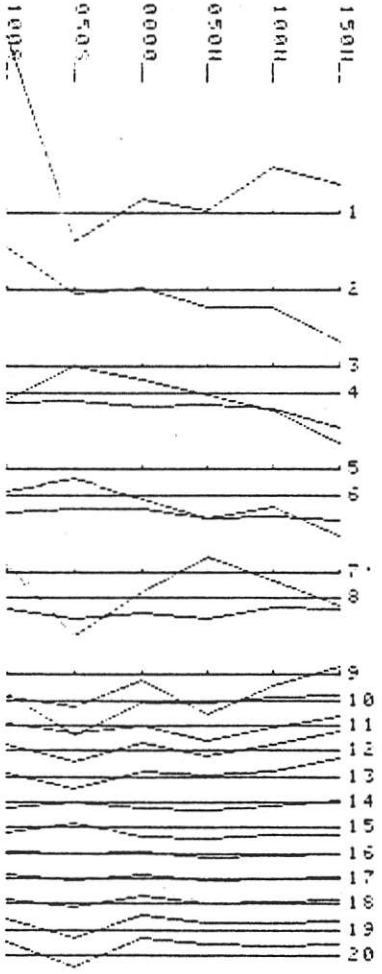
3	to	4	30.00
5	to	6	10.00
7	to	8	3.00
9	to	20	1.00



Data file 2W5HF
LINE 02W Y Component
dBY/dT (nV/Am^4) TOFF corrected

Channels			Scale
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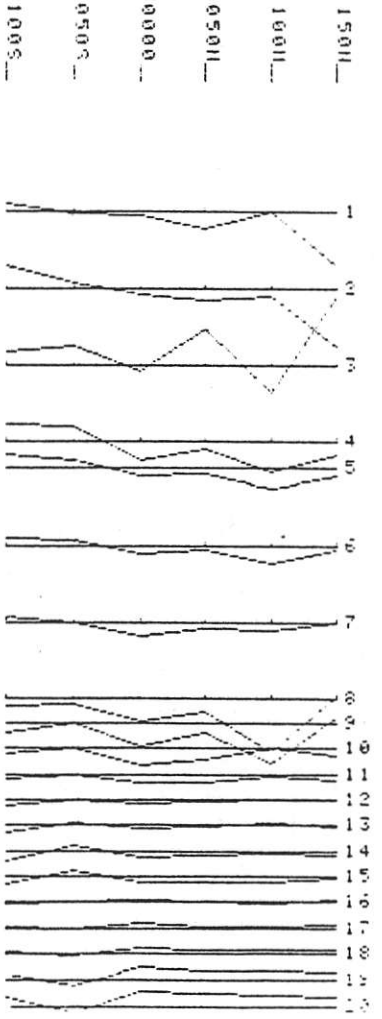
4	to	5	15.00
6	to	6	10.00
7	to	7	3.00
8	to	20	1.00



Data file 1WSHF
LINE 01W Z Component
dBZ/dT (nV/Am4); TOFF corrected

Channels	Scale
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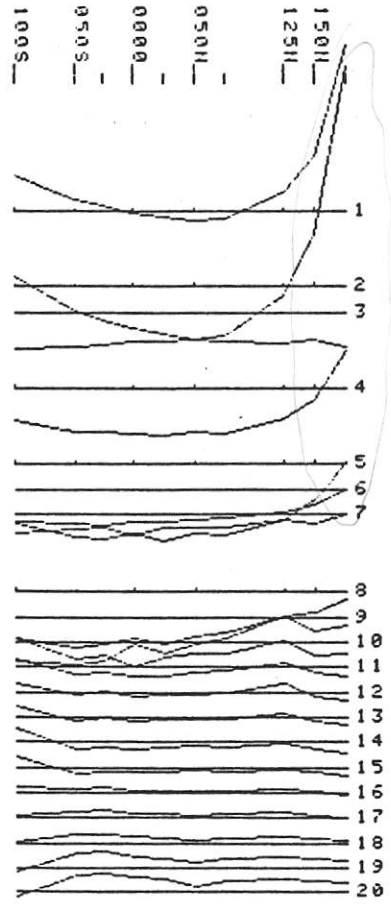
5 to 7	10.00
8 to 20	1.00



Data file 1WSHF
LINE 01W X Component
dBX/dT (nV/Am4); TOFF corrected

Channels	Scale
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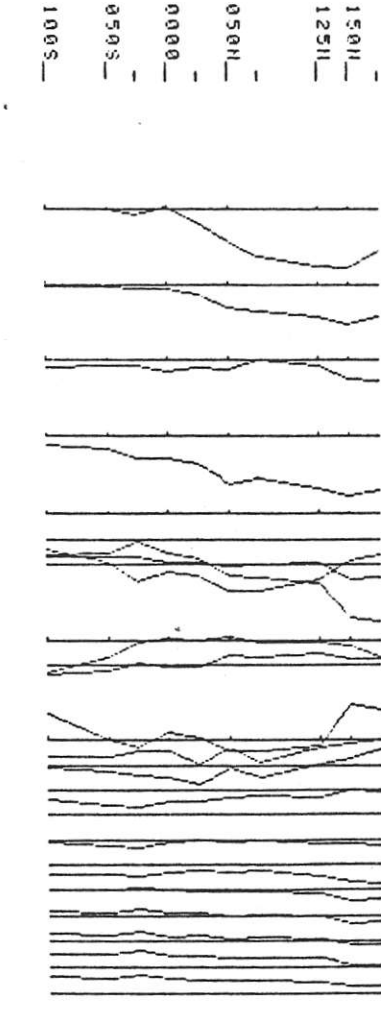
3 to 3	100.00
4 to 4	30.00
5 to 7	10.00
8 to 9	3.00
10 to 20	1.00



Data file 1WSHF
LINE 01W Y Component
dBY/dT (nV/Am4); TOFF corrected

Channels	Scale
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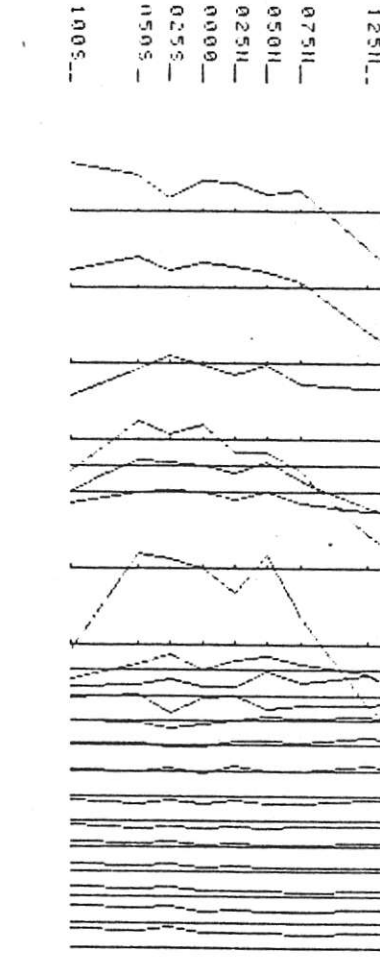
2 to 2	100.00
3 to 3	50.00
4 to 4	10.00
5 to 7	3.00
8 to 20	1.00



Data file 000SHP
LINE 000 Z Component
dBZ/dT (nV/Am4): TOFF corrected

Channels			Scale
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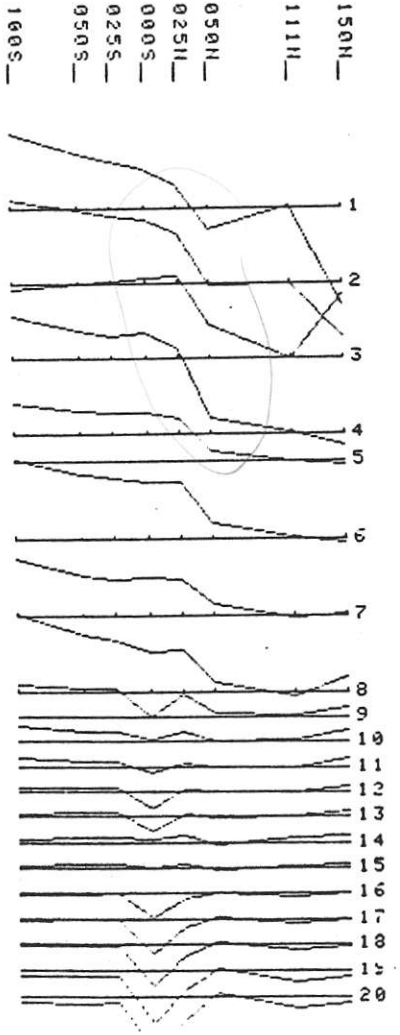
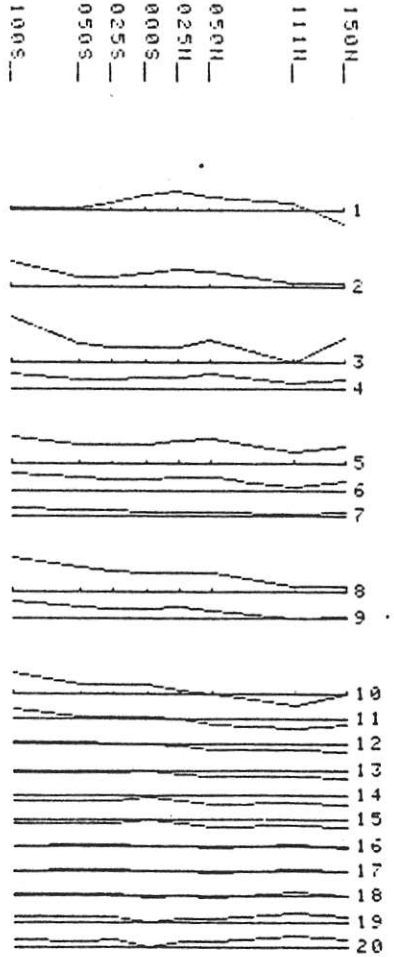
3	to	3	30.00
4	to	5	15.00
6	to	7	5.00
8	to	20	3.00
			1.00



LINE 000 : Component
dBX/dT (nV/Am4): TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	300.00
3	to	4	100.00
5	to	7	30.00
8	to	9	10.00
10	to	20	3.00
			1.00



Data file 000SHP
LINE 000 Y Component
dBY/dT (nV/Am4): TOFF corrected

Channels			Scale
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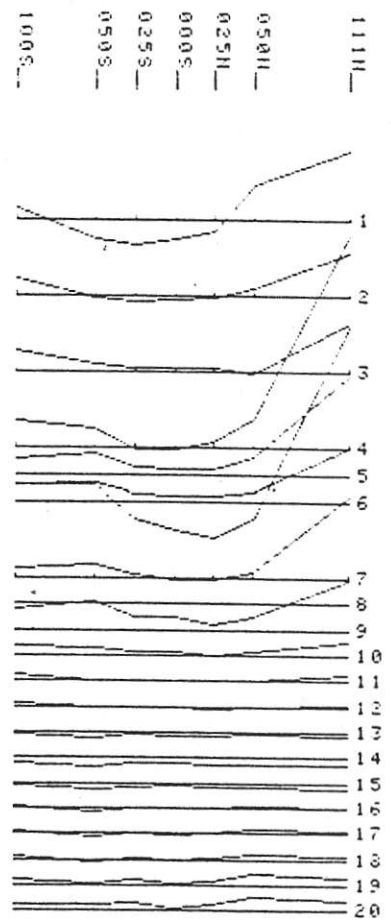
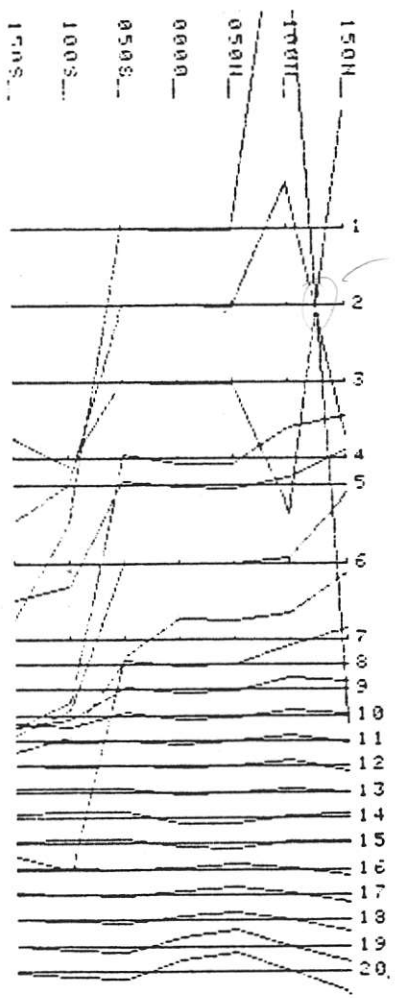
3	to	5	100.00
6	to	6	10.00
7	to	20	1.00



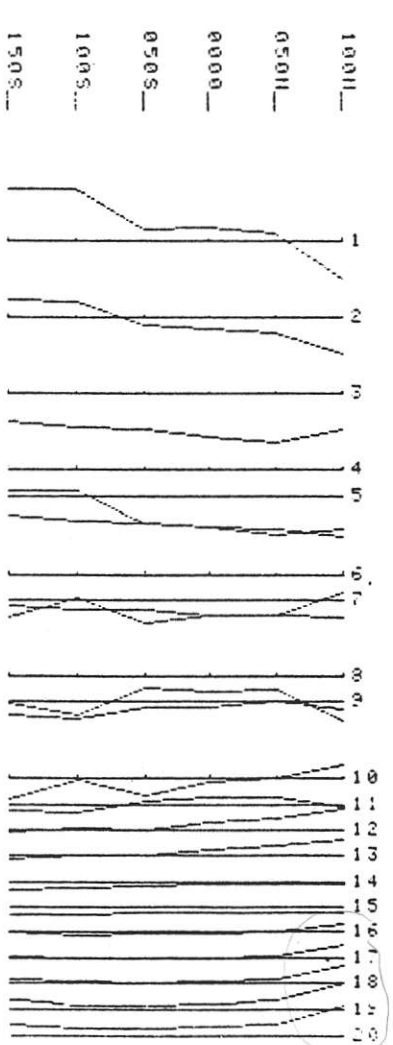
Data file 1E5HP
LINE 01E Z Component
dBz/dT (nV/Am4); TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	2	100.00
3	to	3	30.00
4	to	5	10.00
6	to	8	3.00
9	to	20	1.00



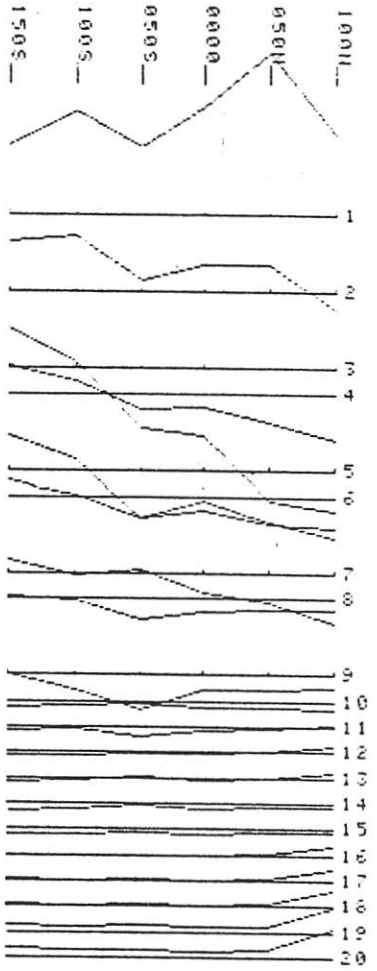
Data file 1E5HP
LINE 01E X Component
dBx/dT (nV/Am4); TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	300.00
3	to	3	100.00
4	to	5	30.00
6	to	7	10.00
8	to	9	3.00
10	to	20	1.00



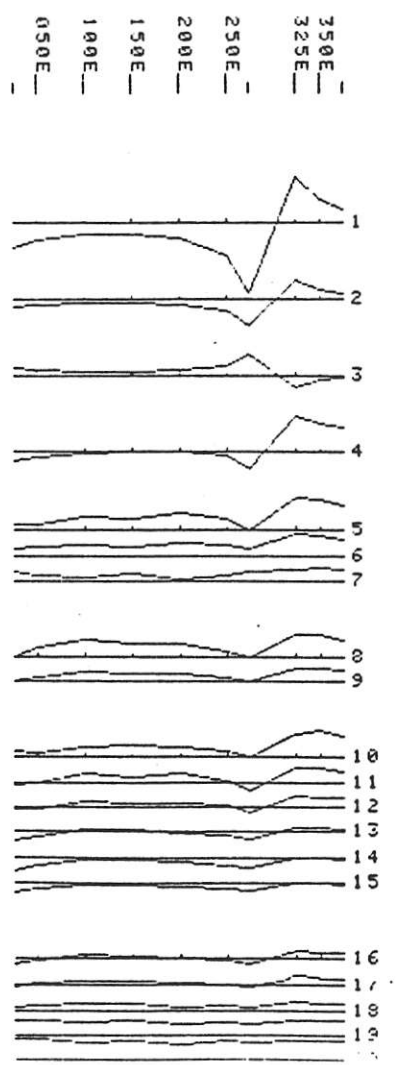
Data file 1E5HP
LINE 01E Y Component
dBy/dT (nV Am4); TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	2	100.00
3	to	4	30.00
5	to	6	10.00
7	to	8	3.00
9	to	20	1.00



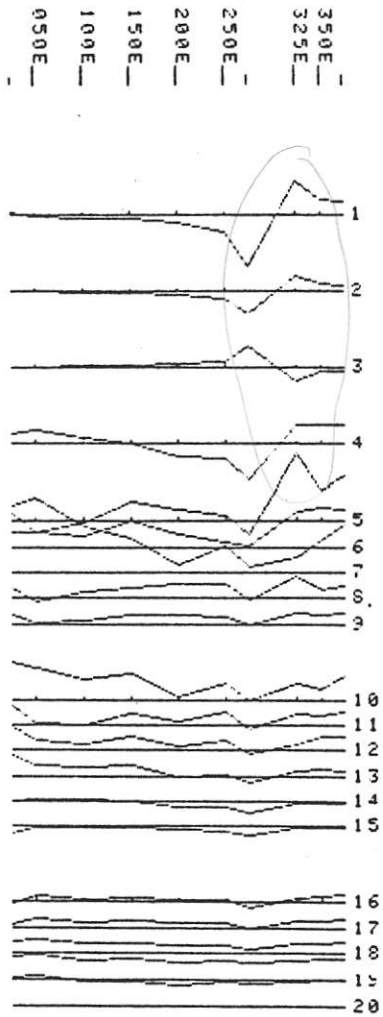
Data file 00WH1F
LINE 000 Z Component
dBZ/dT (nV/Am4/) TOFF corrected

Channels			Scale
1	to	1	3000.00
2	to	2	1000.00
3	to	3	300.00
4	to	4	20.00
5	to	7	10.00
8	to	9	3.00
10	to	15	1.00
16	to	20	.50



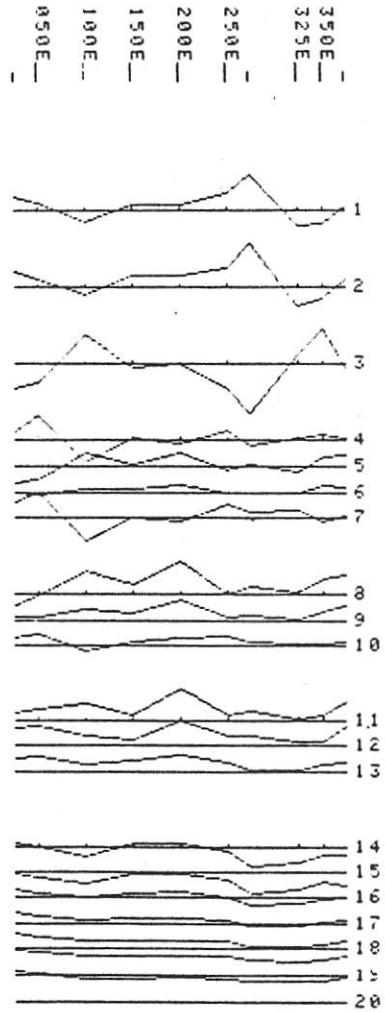
Data file 00WA1F
LINE 000 X Component
dBx/dT (nV/Am4/) TOFF corrected

Channels			Scale
1	to	1	3000.00
2	to	2	900.00
3	to	3	200.00
4	to	4	15.00
5	to	9	3.00
10	to	15	1.00
16	to	20	.50



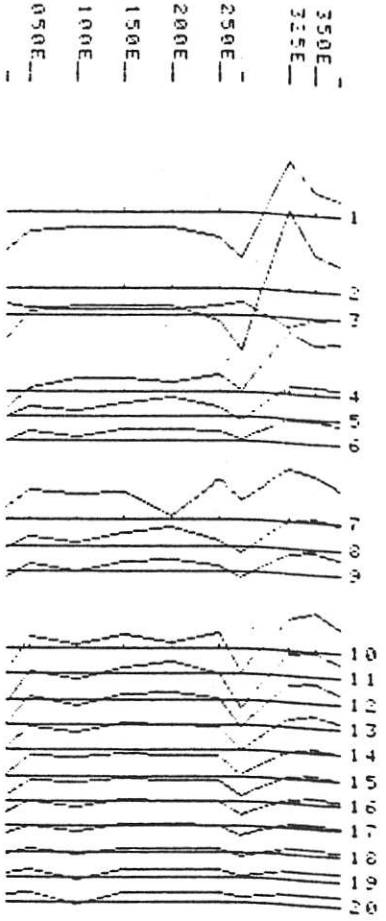
Data file 00WA1F
LINE 000 Y Component
dBy/dT (nV/Am4/) TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	100.00
3	to	3	30.00
4	to	7	10.00
8	to	10	3.00
11	to	13	1.00
14	to	20	.50



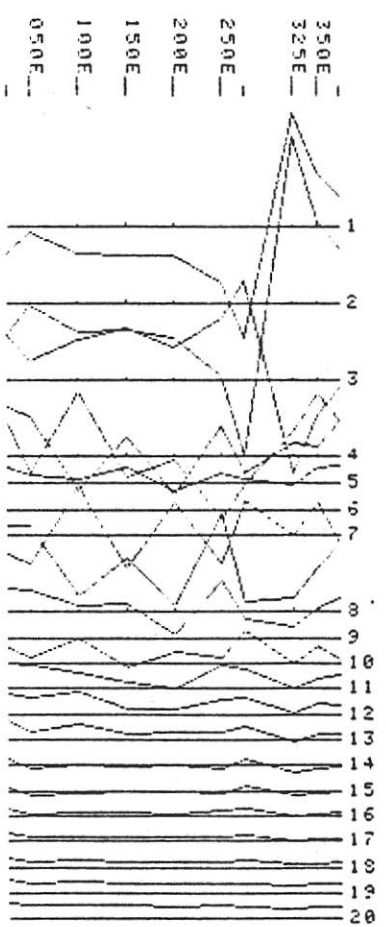
Data file 1SA1EP
LINE 01S Z Component
dBz/dT (nV/Am4) TOFF corrected

Channels			Scale
1	to	1	3000.00
2	to	3	300.00
4	to	6	10.00
7	to	9	3.00
10	to	20	1.00



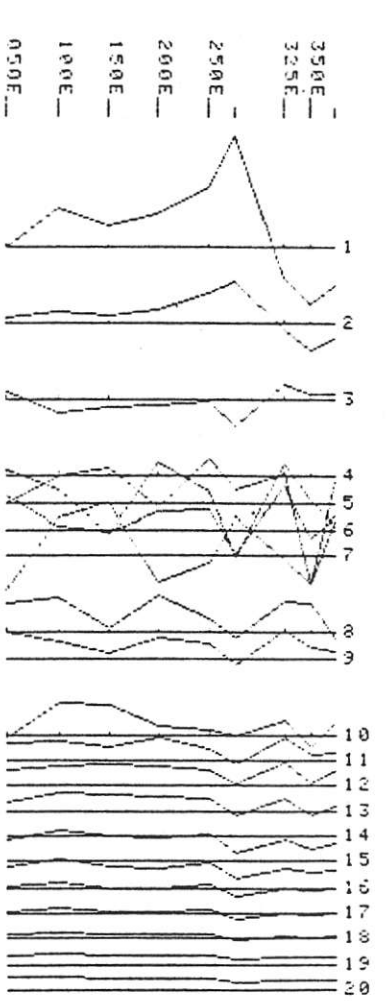
Data file 1SA1EP
LINE 01S X Component
dBx/dT (nV/Am4) TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	3	100.00
4	to	6	30.00
7	to	9	3.00
10	to	20	1.00



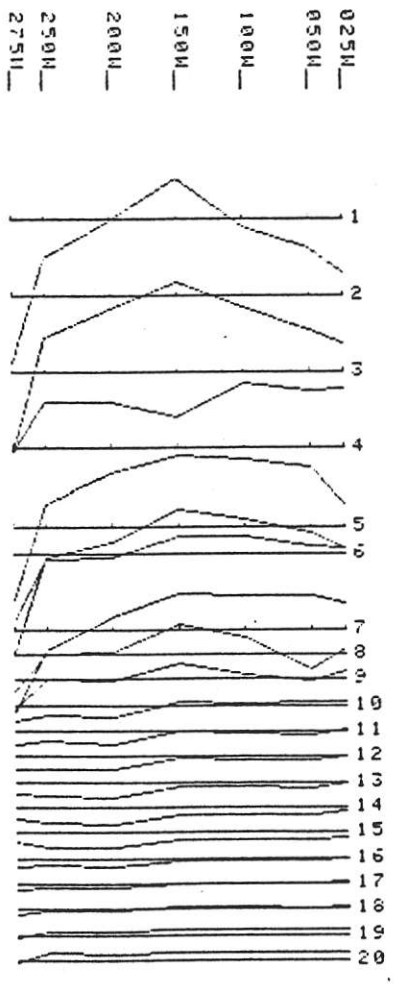
Data file 1SA1EP
LINE 01S Y Component
dBy/dT (nV/Am4) TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	3	100.00
4	to	6	30.00
7	to	9	10.00
10	to	20	1.00



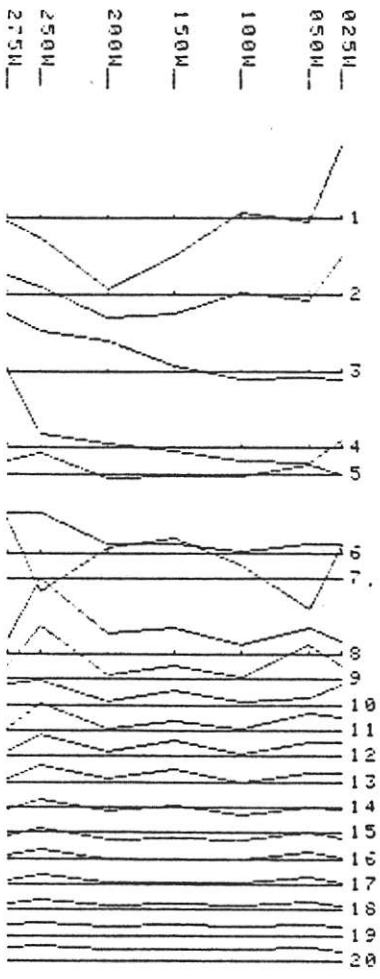
Data file 3NA1WF
LINE 03N Z Component
dBZ/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	500.00
2	to	2	100.00
3	to	3	30.00
4	to	4	10.00
5	to	6	3.00
7	to	20	1.00



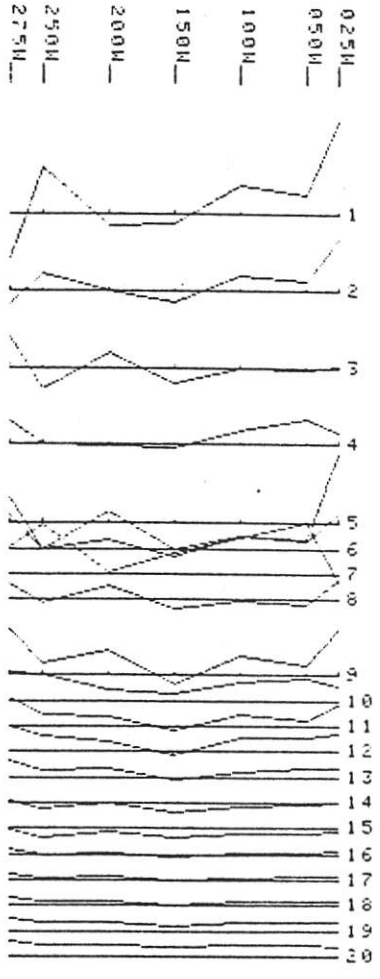
Data file 3NA1WF
LINE 03N X Component
dBX/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	2	100.00
3	to	3	30.00
4	to	5	10.00
6	to	7	3.00
8	to	20	1.00



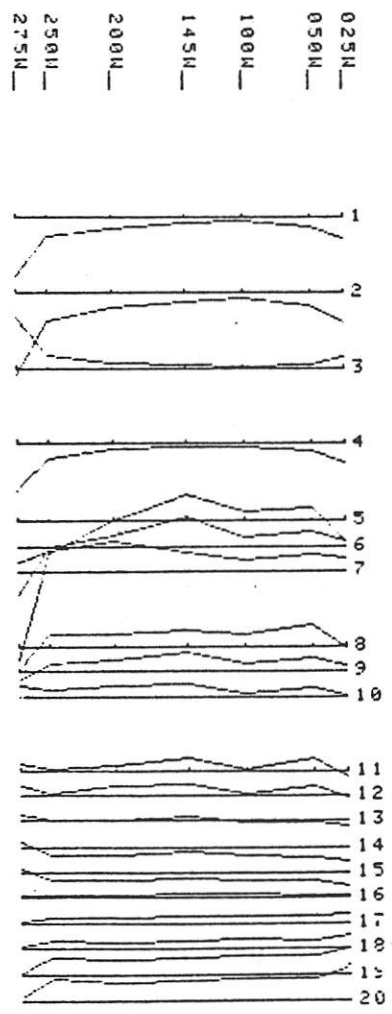
Data file 3NA1WF
LINE 03N Y Component
dBY/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	2	100.00
3	to	3	30.00
4	to	4	10.00
5	to	8	3.00
9	to	20	1.00



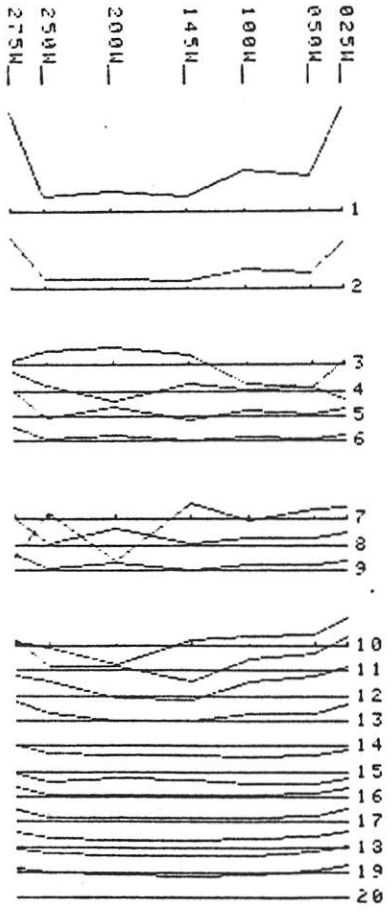
Data file 1NA1R
LINE 01N Z Component
dBz/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	3000.00
2	to	2	300.00
3	to	3	60.00
4	to	4	30.00
5	to	7	3.00
8	to	10	1.00
11	to	20	.50



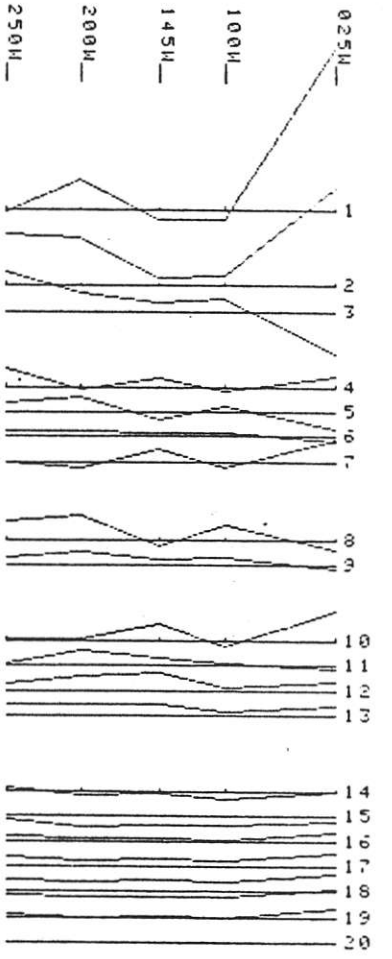
Data file 1NA1R
LINE 01N X Component
dBx/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	3	100.00
4	to	6	10.00
7	to	9	3.00
10	to	20	.50



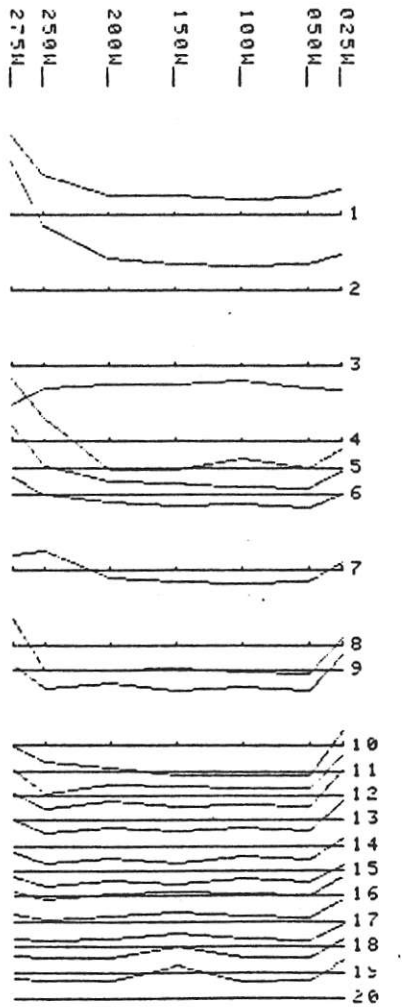
Data file 1NA1R
LINE 01N Y Component
dBy/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	100.00
2	to	3	20.00
4	to	7	10.00
8	to	9	3.00
10	to	13	1.00
14	to	20	.50



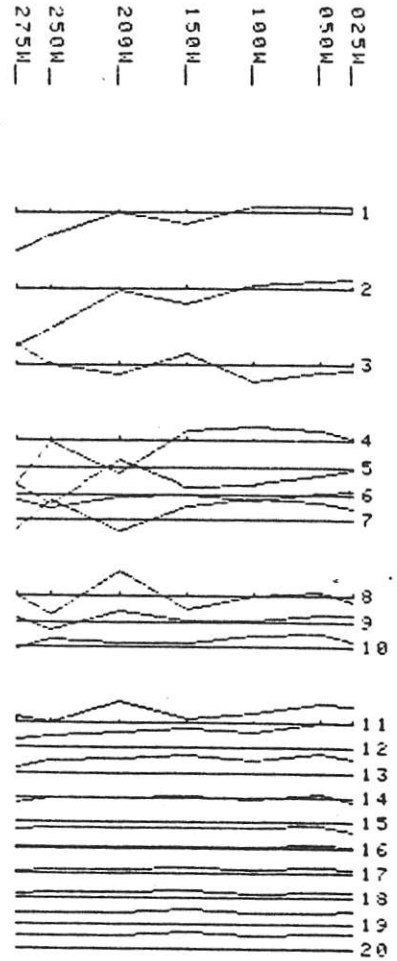
Data file 000A1F
LINE 000 Z Component
dBZ/dT (nV/Am4); TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	100.00
3	to	3	30.00
4	to	6	5.00
7	to	7	3.00
8	to	9	1.00
10	to	20	.50



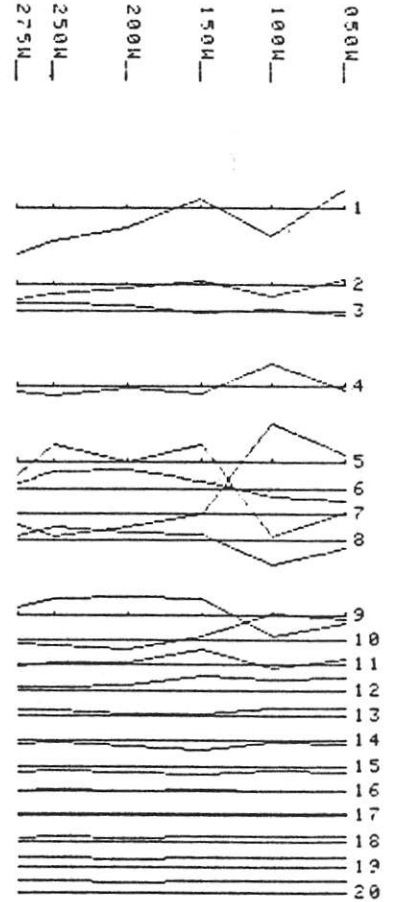
Data file 000A1F
LINE 000 X Component
dBX/dT (nV/Am4); TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	100.00
3	to	3	30.00
4	to	7	10.00
8	to	10	3.00
11	to	20	1.00



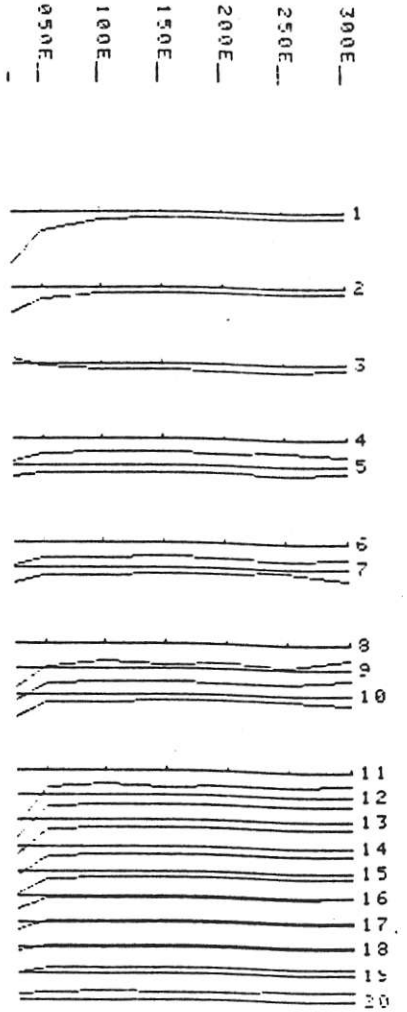
Data file 000A1F
LINE 000 Y Component
dBY/dT (nV/Am4); TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	3	100.00
4	to	4	10.00
5	to	8	3.00
9	to	20	1.00



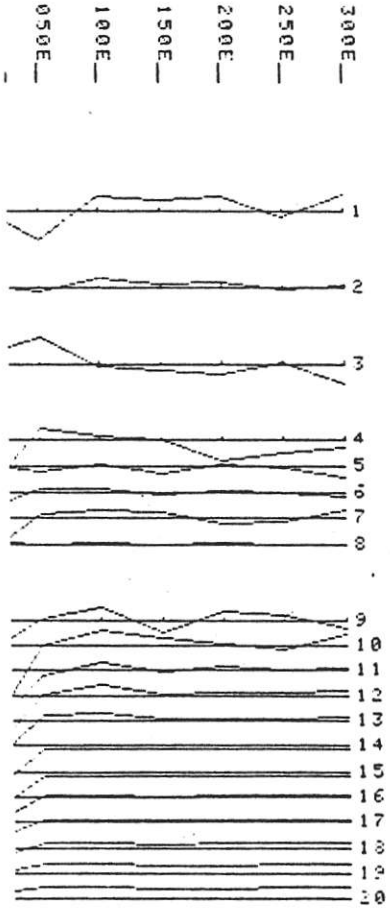
LINE 000 Z Component
dBZ/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	300.00
3	to	5	100.00
6	to	7	30.00
8	to	10	10.00
11	to	20	1.00



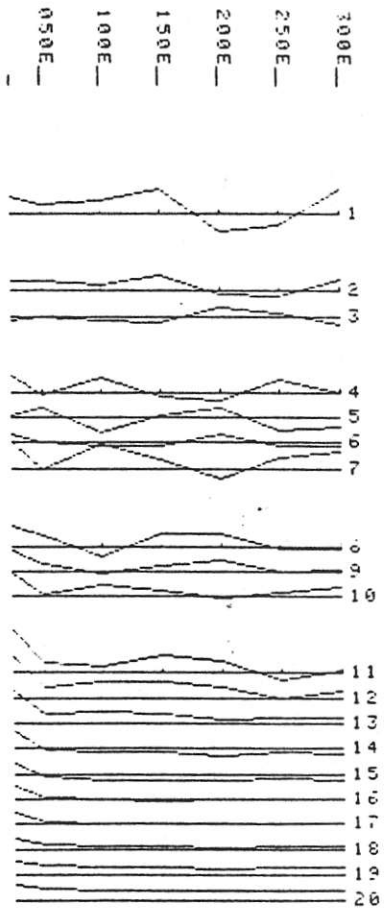
LINE 000 X Component
dBX/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	3	100.00
4	to	7	30.00
8	to	10	10.00
11	to	20	1.00



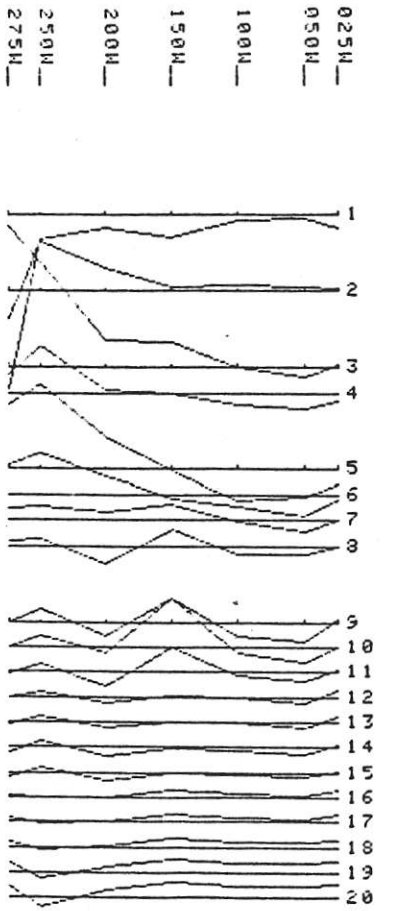
LINE 000 Y Component
dBY/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	500.00
2	to	3	100.00
4	to	7	10.00
8	to	10	3.00
11	to	20	1.00



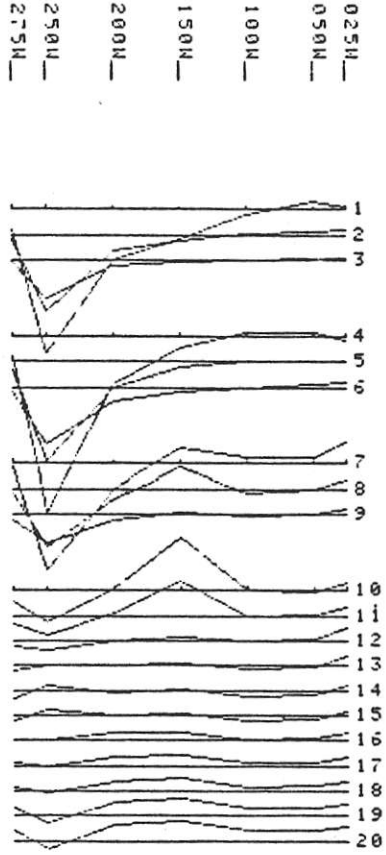
Data file 1SA1WF
LINE 01S Z Component
dBZ/dT (nV/Am⁴), TOFF corrected

Channels	Scale
1 to 1	100.00
2 to 2	20.00
3 to 4	10.00
5 to 8	3.00
9 to 20	1.00



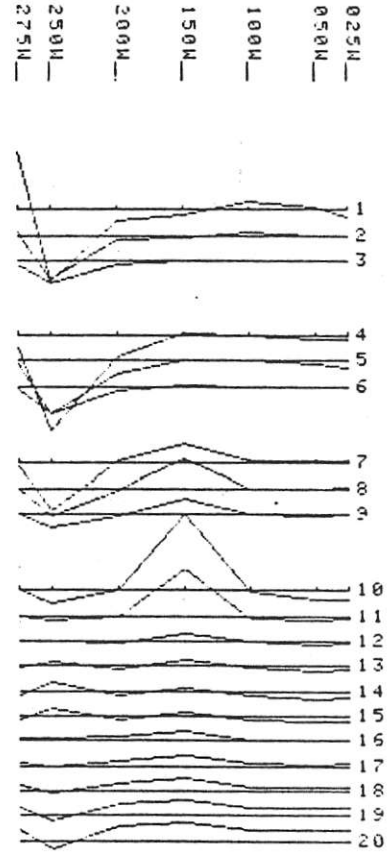
Data file 1SA1WF
LINE 01S X Component
dBX/dT (nV/Am⁴), TOFF corrected

Channels	Scale
1 to 3	100.00
4 to 6	10.00
7 to 9	3.00
10 to 20	1.00



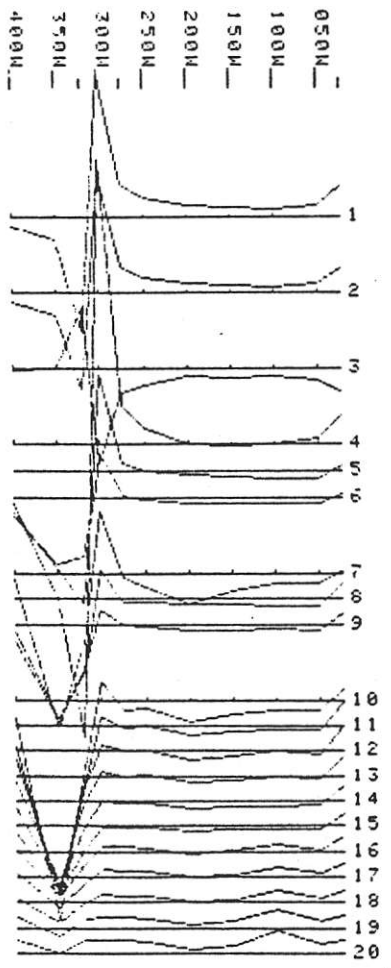
Data file 1SA1WF
LINE 01S Y Component
dBY/dT (nV/Am⁴), TOFF corrected

Channels	Scale
1 to 3	100.00
4 to 6	10.00
7 to 9	3.00
10 to 20	1.00



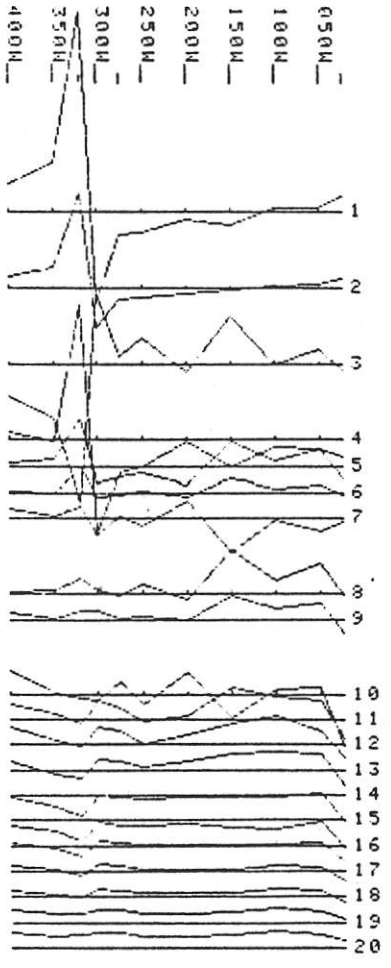
Data file 2SA1ER
LINE 02S Z Component
dBZ/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	3000.00
2	to	2	500.00
3	to	3	100.00
4	to	6	10.00
7	to	9	3.00
10	to	20	1.00



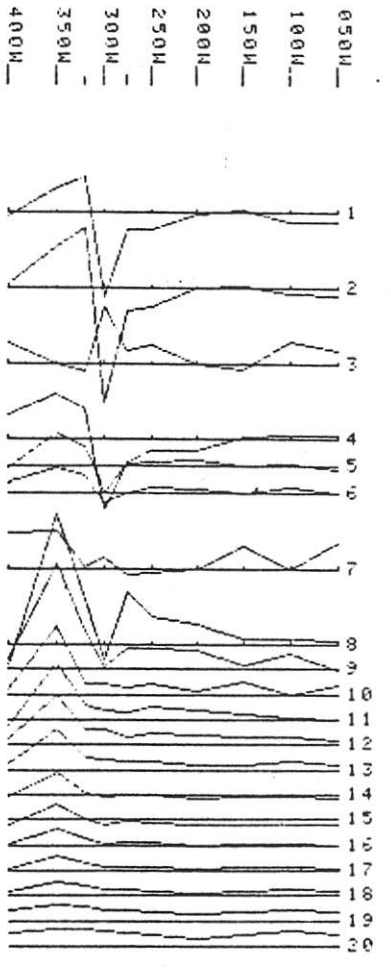
Data file 2SA1ER
LINE 02S X Component
dBX/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	300.00
3	to	3	30.00
4	to	7	10.00
8	to	9	3.00
10	to	20	1.00



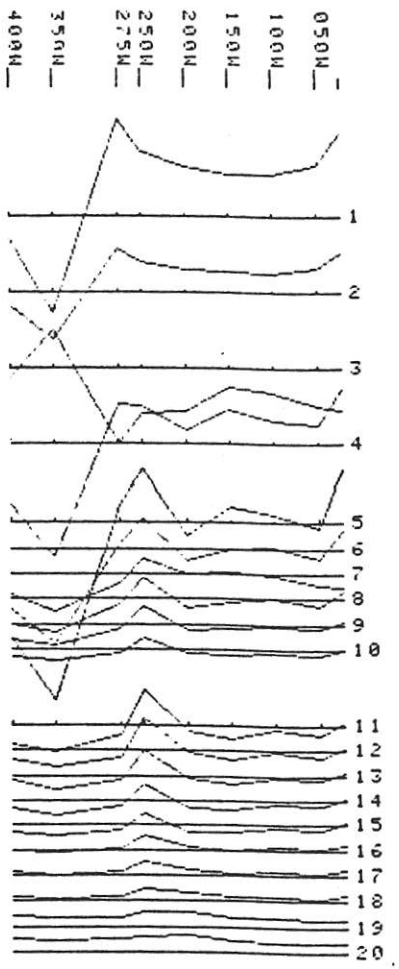
Data file 2SA1ER
LINE 02S Y Component
dBY/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	100.00
3	to	3	30.00
4	to	6	10.00
7	to	9	3.00
10	to	20	1.00



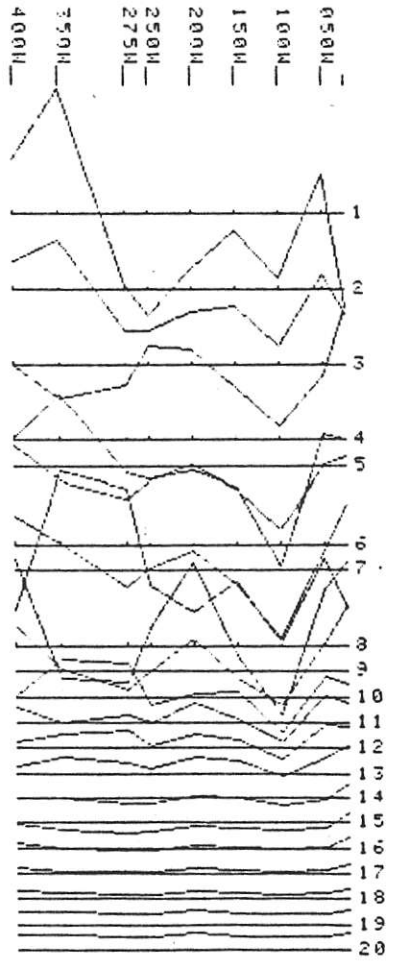
Data file 3SA1EP
LINE 03S Z Component
dBZ/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	1000.00
2	to	2	300.00
3	to	3	30.00
4	to	4	10.00
5	to	10	3.00
11	to	20	1.00



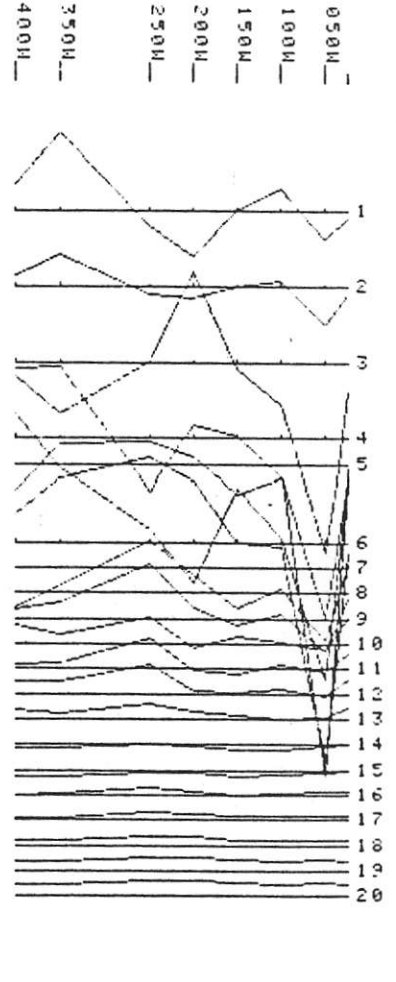
Data file 3SA1EP
LINE 03S X Component
dBX/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	2	100.00
3	to	3	30.00
4	to	5	10.00
6	to	7	3.00
8	to	20	1.00



Data file 3SA1EP
LINE 03S Y Component
dBY/dT (nV/Am4), TOFF corrected

Channels			Scale
1	to	1	300.00
2	to	2	100.00
3	to	3	10.00
4	to	5	3.00
6	to	20	1.00



APPENDIX II

Model for
Showing Area
Line 0+00

◀◀◀◀◀ Plate # 1 ◀◀◀◀◀
STRike 215
DIP -9
PLUnge 0
LENgth 240
DEPth 300
POSition 50 -50 -50
CONduct*thick 1.1

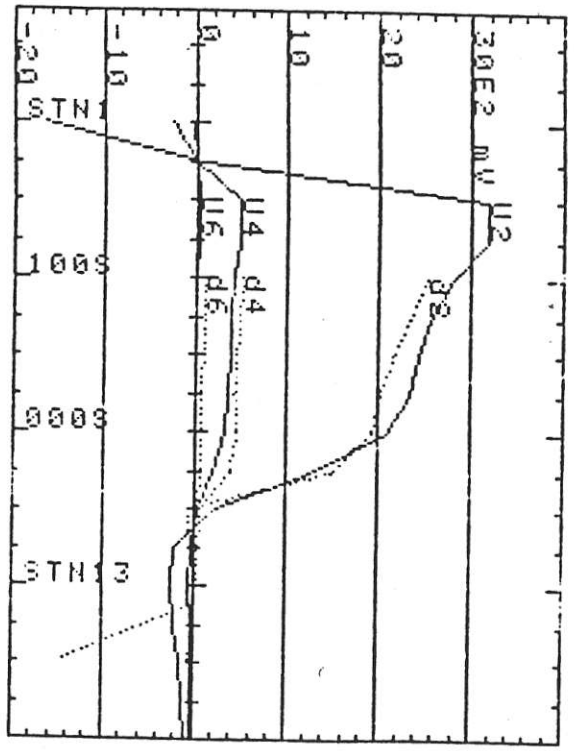
Tx-Rl M(μH) τ(ms)
-197 45 .035784

Model T
Plate # 1 *1/

0+00 Z cPt. Gain,TXC= 7 11

Model U
Plate # 1 *1/

0+00 Z cPt. Gain,TXC= 7 11



DIP -9
PLUnge 0
LENgth 150
DEPth 300
POSition 50 -50 -50
CONduct*thick 1.6

Tx-Rl M(μH) τ(ms)
-138.17 .036098

Model X
Plate # 1 *1/

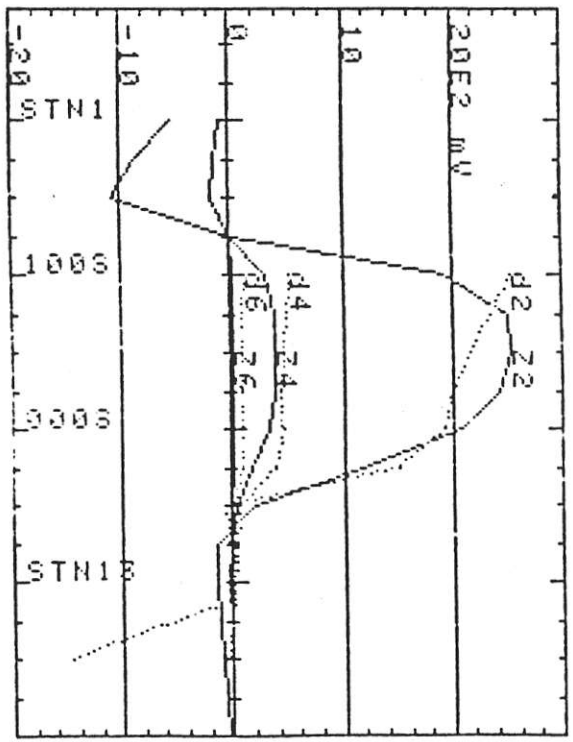
0+00 Z cPt. Gain,TXC= 7 11

Model Y
Plate # 1 *1/

0+00 Z cPt. Gain,TXC= 7 11

Model Z
Plate # 1 *1/

0+00 Z cPt. Gain,TXC= 7 11



APPENDIX III

Transient Electromagnetic Modelling Results

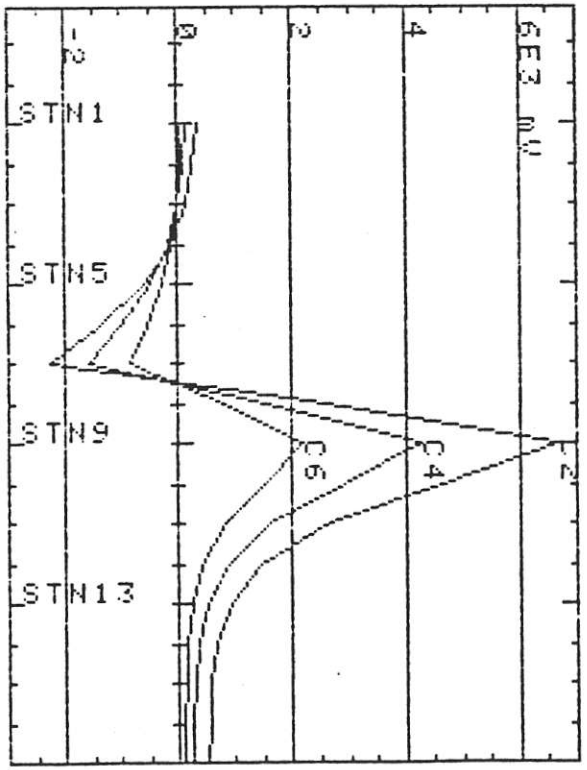
late approx'n: 1
late approx'n: 2
late approx'n: 3
◀◀◀◀◀ Plate # 1 ◀◀◀◀◀

STRike	0
DIP	45
PLUnge	0
LENgth	300
DEPth	100
POSition -36 0 -14	
CONduct*thick	10

Tx-Rl M(μH)	τ(ms)
-44.88	.15775

Model C
HHS R =2000/Plate # 1 *1/

0+00 Z cpt. Gain,TXC= 6 20



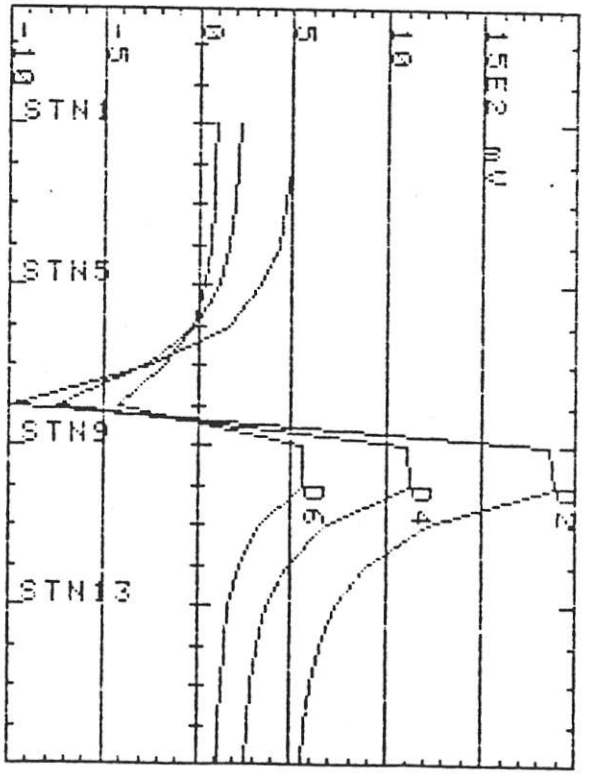
late approx'n: 1
late approx'n: 2
late approx'n: 3
◀◀◀◀◀ Plate # 1 ◀◀◀◀◀

STRike	0
DIP	80
PLUnge	0
LENgth	300
DEPth	100
POSition -8.6 0 -.8	
CONduct*thick'	10

Tx-Rl M(μH)	τ(ms)
-10.711	.15775

Model D
HHS R =2000/Plate # 1 *1/

0+00 Z cpt. Gain,TXC= 6 20

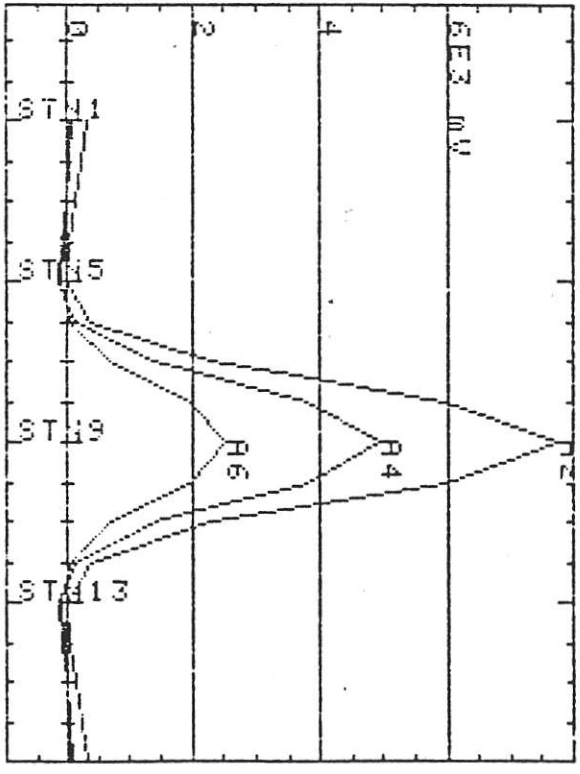


late approx'n: 1
late approx'n: 2
late approx'n: 3
◀◀◀◀◀ Plate # 1 ◀◀◀◀◀
STRike 0
DIP 0
PLUnge 0
LENgth 300
DEPth 100
POSition -50 0 -50
CONduct*thick 10

Tx-Pl M(μH)	τ(ms)
-65.055	.15775

Model A
HHS R =2000/Plate # 1 *1/

0+00 Z cpt. Gain/TXC= 6 20

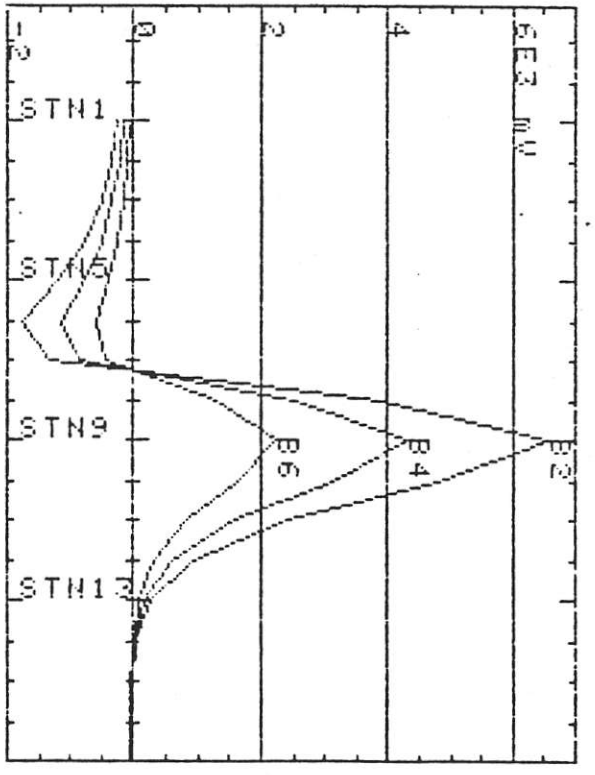


◀◀◀◀◀ Plate # 1 ◀◀◀◀◀
STRike 0
DIP 30
PLUnge 0
LENgth 300
DEPth 100
POSition -42.5 0 -25.5
CONduct*thick 10

Tx-Pl M(μH)	τ(ms)
-55.437	.15775

Model B
Plate # 1 *1/

0+00 Z cpt. Gain/TXC= 6 20

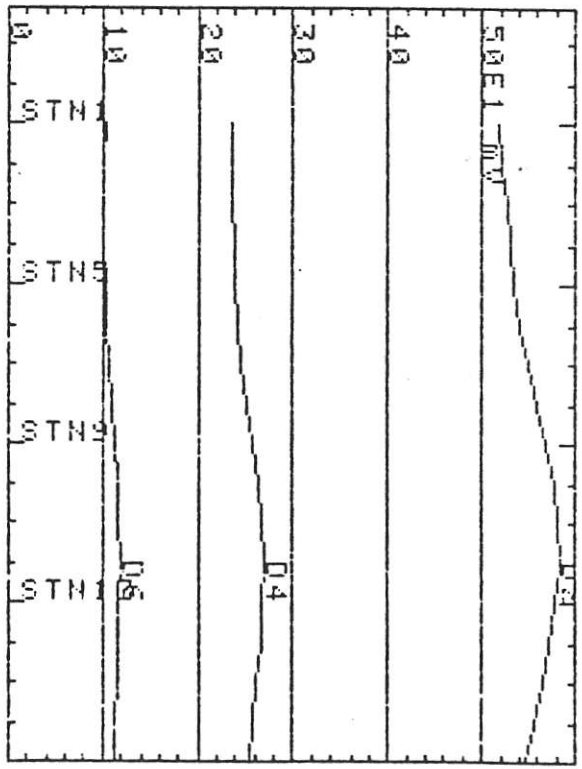


late approx'n; 1
late approx'n; 2
late approx'n; 3
◀◀◀◀◀ Plate # 1 ◀◀◀◀◀
STRike 0
DIP 80
PLUnge 0
LENgth 300
DEPth 100
POSition -8.6 0 -150.8
CONduct*thick 10

Tx-pl M(μH) τ(ms)
-6.0925 .15775

Model D
HHS R =2000/Plate # 1 *1/

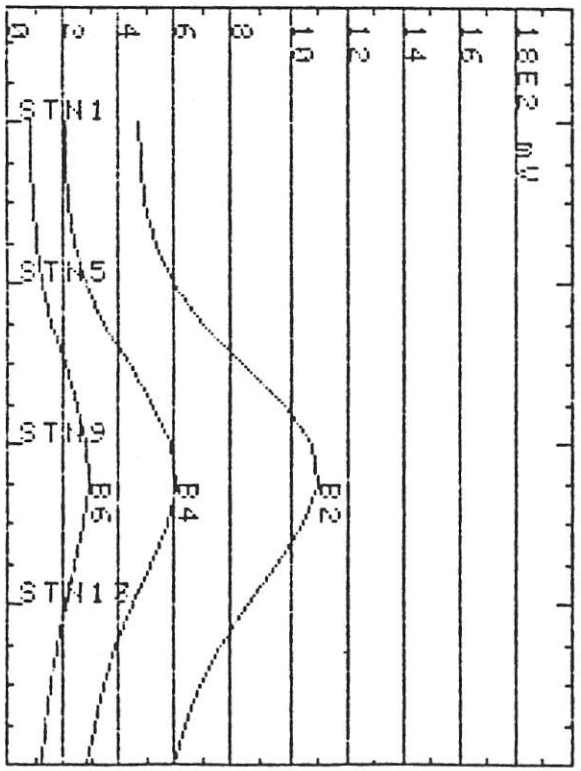
0+00 Z cpt. Gain,TXC= 6 20



```
late approx'n; 1
late approx'n; 2
late approx'n; 3
◀◀◀◀◀ Plate # 1 ◀◀◀◀◀
STRike                    0
DIP                       30
PLUnge                    0
LENgth                    300
DEPth                     100
POSition  -42.5   0 -125.5
CONduct*thick             10

 Tx-pl M(μH)              τ(ms)
-37.922                   .15775
```

Model B
HHS R =2000/Plate # 1 *1/

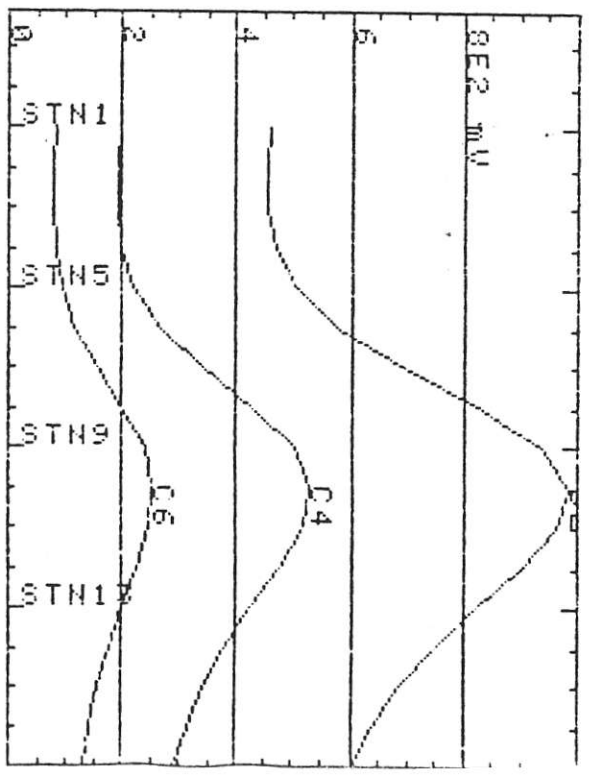
0+00 Z cpt. Gain,TXC= 6 20




```
late approx'n; 1
late approx'n; 2
late approx'n; 3
◀◀◀◀◀ Plate # 1 ◀◀◀◀◀
STRike                    0
DIP                       45
PLUnge                    0
LENgth                    300
DEPth                     100
POSition  -36   0 -114
CONduct*thick             10

 Tx-pl M(μH)              τ(ms)
-31.423                   .15775
```

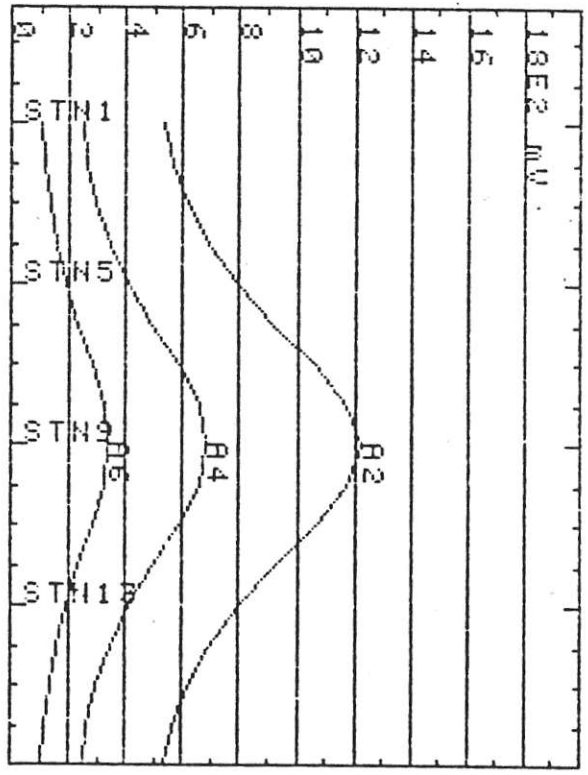
Model C
HHS R =2000/Plate # 1 *1/

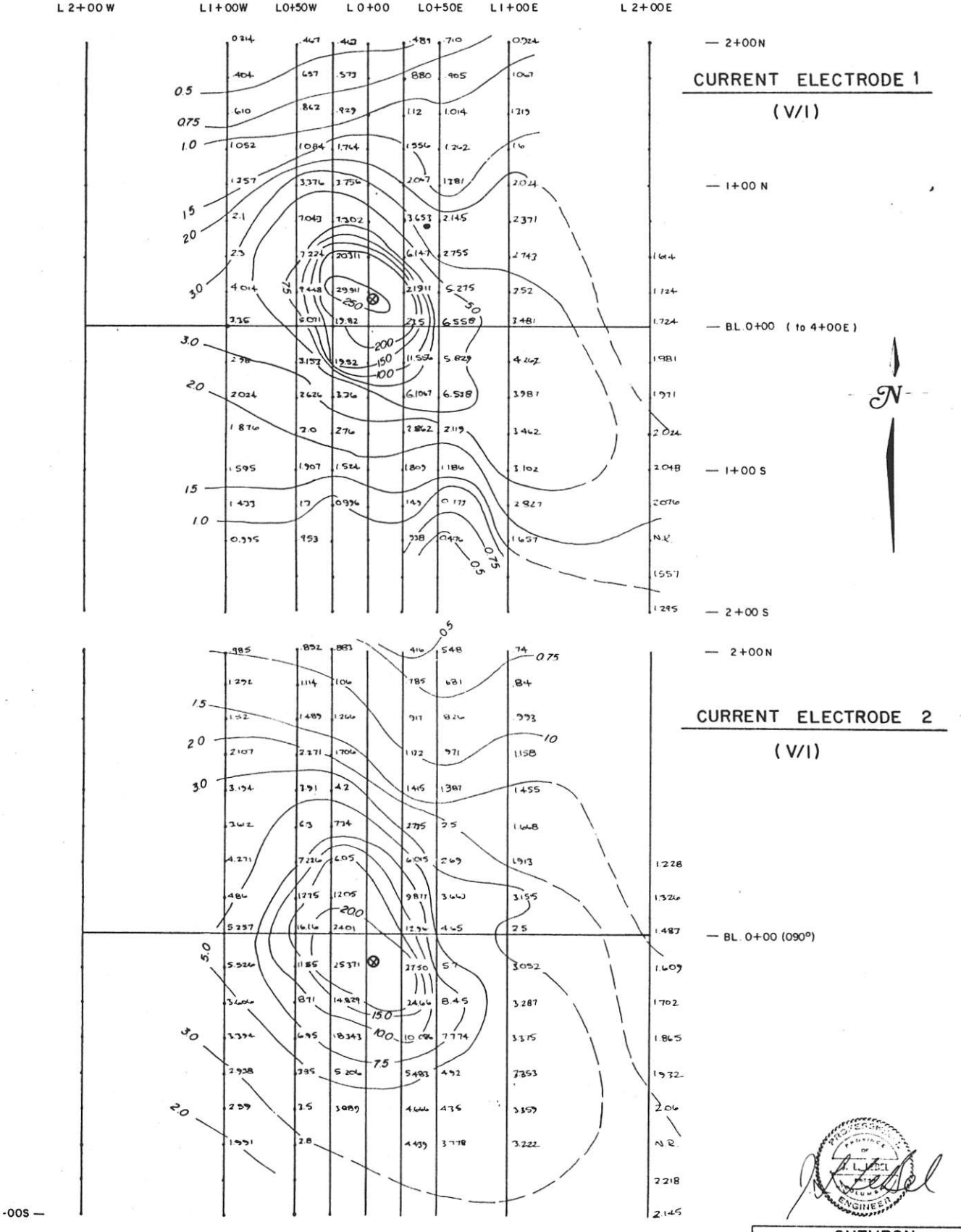
0+00 Z cpt. Gain,TXC= 6 20



```
HSSHOW    HHS OVER SHOWING ON HE
ATHER PROPERTY

      TXX,TXY,TXA= 400,800,0  TX
P=0 0 0   t/σ min,max,density= .
0001,1,3

LINES:
0+00

MAX # GATES =  11
MAX # PLATES =  5

0+00
 Index     Stn    X      Y
   1      STN1   -200   0
   2      STN2   -175   0
   3      STN3   -150   0
   4      STN4   -125   0
   5      STN5   -100   0
   6      STN6   -75    0
   7      STN7   -50    0
   8      STN8   -25    0
   9      STN9   0      0
  10      STN10  25     0
  11      STN11  50     0
  12      STN12  75     0
  13      STN13  100    0
  14      STN14  125    0
  15      STN15  150    0
  16      STN16  175    0
  17      STN17  200    0
```

```
late approx'n; 1
late approx'n; 2
late approx'n; 3
◀◀◀◀◀ Plate # 1 ◀◀◀◀◀
STRike                    0
DIP                       0
PLUnge                    0
LENgth                    300
DEPth                     100
POSition  -50  0 -150
CONduct*thick             10

 Tx-pl M(μH)              τ(ms)
-43.724                   .15775


Model A
HHS R =2000/Plate # 1 *1/

0+00    Z cpt.  Gain,TXC= 6  20
```





CONTOUR INTERVAL

.....1.0,1.5,2.0,3.0,5.0,7.5,10.0..... V/I (volt/amp)

⊗ Current Electrode

CHEVRON
CANADA RESOURCES LTD

HEATHER PROPERTY
SHOWING AREA
MISE A LA MASSE SURVEY
VICTORIA MINING DIVISION

Project No C-639	By: J.L Lebel
Scale: 1:2500	Drawn GCS Ltd
Drawing No Map 1	Date: January 1984

MPH Consulting Limited

APPENDIX IV

Equipment Specifications

GEONICS LIMITED

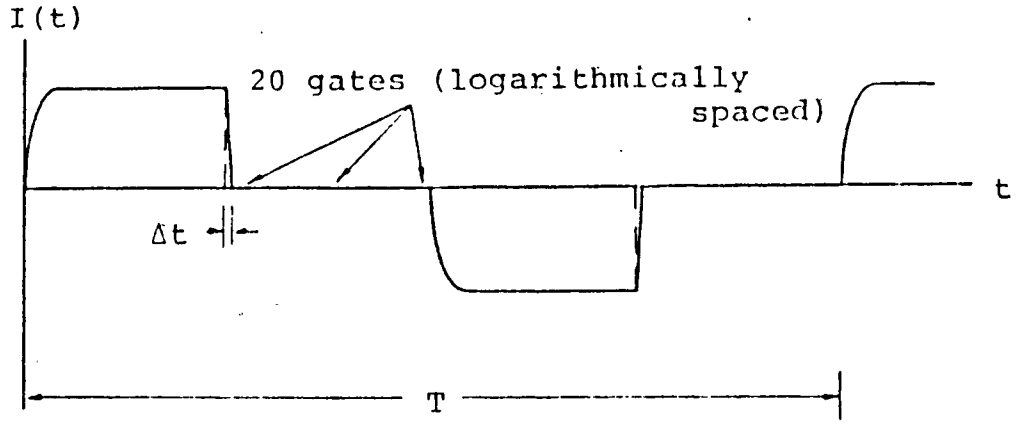
EM37 Ground Transient Electromagnetic System
Technical Specifications

Transmitter

Current Waveform	-	See Fig. 1
Repetition rate	-	3Hz or 30Hz in countries using 60Hz power line frequency; 2.5Hz or 25Hz in countries using 50Hz power line frequency; all four base frequencies are switch selectable.
Turn-off time (Δt)	-	fast linear turn-off of maximum 300 μsec. at 20 amps into 300x600m loop. Decreases proportionally with current and (loop area)$^{\frac{1}{2}}$ to minimum of 20 μsec. Actual value of Δt read on front panel meter.
Transmitter loop	-	any dimensions from 40x40m to 300x600m maximum at 20 amps. Larger dimensions at reduced current. Transmitter output voltage switch adjustable for smaller loops. Value of loop resistance read from front panel meter; resistance must be greater than 1 ohm on lowest voltage setting to prevent overload.
Transmitter protection	-	circuit breaker protection against input overvoltage; instantaneous solid state protection against output short circuit; automatically resets on removal of short circuit. Input voltage, output voltage and current indicated on front panel meter.
Transmitter output voltage	-	150 volts (zero to peak) maximum; 20 volts (zero to peak) minimum
Transmitter output power	-	2.8 kw maximum
Transmitter wire supplied	-	1800m. #10 copper wire PVC insulated with nylon jacket; transmitter wire contained on 6 reels (supplied); 2 reel winders supplied.
Transmitter motor generator	-	5 HP Honda gasoline engine coupled to 120 volt, 3 phase, 400Hz alternator. Approximately 8 hours continuous operation from full (built-in) fuel tank.

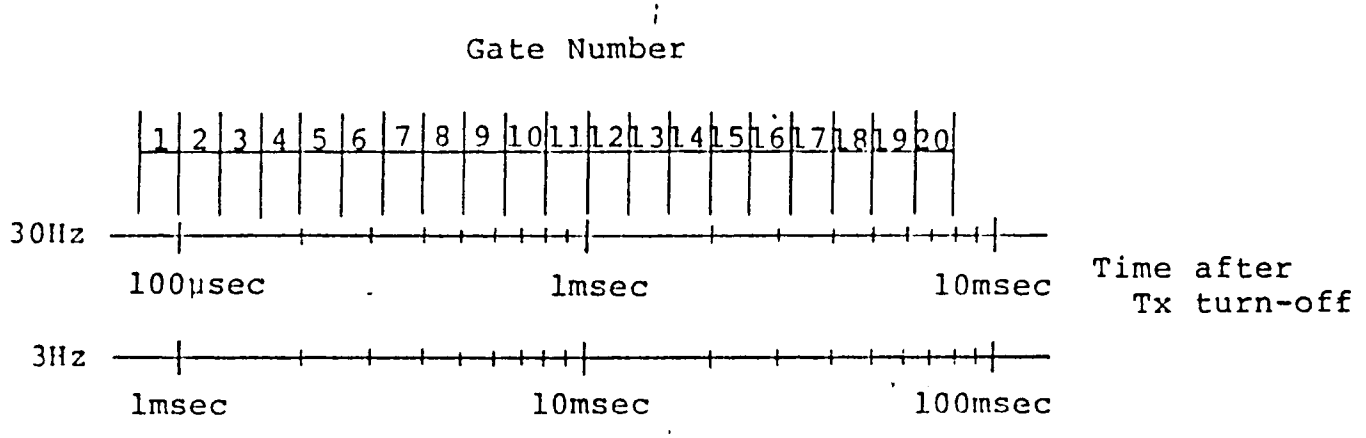
Receiver

Measured quantity	-	time rate of decay of magnetic flux along 3 axes.
Sensor	-	air-cored coil of bandwidth 40 kHz; 100cm dia. by 7x5cm cross-section. Coil holder supplied to facilitate measurement along 3 axes.
Time channels	-	20 time channels with locations and widths as shown in Fig. 2. Successive operation at 30Hz, then 3Hz, effectively gives 30 channels covering range from 80 μsec. to 80 msec.
Output display	-	4 digit plus sign LED display; display also shows channel number and gain.
Integration time	-	2^n cycles at 30Hz; n=4,6,8,10,12,14 (switch selectable); similar integration times at other base frequencies.
Receiver output noise referred to input	-	typically 1.5×10^{-10} volt/m^2 at last gate at 30Hz with integration time of 34 seconds. Noise will be higher during intense local spherics activity.
Output connector	-	all 20 channels in analogue format and housekeeping functions in digital format available from output connector.
Synchronization to Tx	-	any of the following (switch selectable) (1) reference cable (2) primary pulse (3) 27 MHz radio link (40 channels) (4) high stability (oven controlled) quartz crystals.
Noise rejection circuitry	-	Selective clipping of atmospheric noise pulses at all times. Audio output of Rx coil (transmitter pulse blanked out) is available on built-in loud speaker for ready identification of interference.
Receiver batteries	-	12 volt rechargeable Gel-cell; 9 hours continuous operating time at 17°C. Two batteries and a battery charger supplied to permit charging of second battery from transmitter motor-generator during survey.



Transmitter Current Waveform

FIG. 1



Gate Location and Widths (30 and 3Hz)

FIG. 2

GEONICS LIMITED

DAS 40 Data Acquisition Unit
Technical Specifications

Storage medium	-	special low-temperature Philips-type cassette
Maximum storage	-	212 kilobytes
Data format	-	2 channel NRZI
Keyboard	-	two (sealed); one for header information, one for numerals.
Display	-	16 character alphanumeric LCD
Temperature range (operating)	-	-30°C to +60°C
Power source	-	power taken from EM37 receiver console
Dimensions	-	16x23x21 cm
Weight	-	2 kg

GEONICS LIMITED

Datel LPR 16 Tape Reader
Technical Specifications

GENERAL

Function	Read Only
Media	Standard Philips-type certified digital tape cassette
Number of Tracks	Two
Tape Motion	One direction, capstan stepper motor drive
Tape Speed	2.75 inches per second
Reading Format	Complementary NRZI
Reading Density	615 bits per inch
Bit Rate	1700 bits per second
Bit Capacity	2.2 million bits per cassette (including all gaps)
Word Length	8, 12 or 16 bits
Record, Word or Intercharacter Gap	2 bits
File gap	16 bits
Words per File	Any (Standard is 64 words per file)
Power Required	100, 115 or 230 VAC, 47 to 63 Hz, 60 Watts max.

LOGIC OUTPUT CHARACTERISTICS (Computer Interface)

Logic Levels	TTL compatible "0" = (LO) = 0 to +0.4 Volts "1" = (HI) = +2.4V to +5.0 Volts
Output Loading	Optional Open Collector 7406 TTL Hex driver *or* with 1KΩ pullup to +5V *or* with 330Ω pullup to +5V and 470Ω pulldown to ground
Output Coding	Selectable positive or negative true coding using Level Control Inputs.

LOGIC OUTPUTS (Computer Interface)

(All outputs are selectable as positive or negative true unless otherwise noted.)

Data Format	16 lines: Normally 12 A/D lines and 4 address lines. However a 16 bit digital word can also be used.
Word Sync Output	1 line
End of File (EOF) Output	1 line, normally flags every 64 words.
Rewind Status Output	1 line
Busy Status Output	1 line
Load Forward Status Output	1 line
Cassette-in-Place Status Output	1 line
Head Down Status Output	1 line
EOT/BOT Status Output	1 line
Shift Clock Output	1 line, positive pulse
Tape Clock Output	1 line, positive pulse
Serial Data Output	1 line, positive true, NRZI coding

LOGIC INPUT CHARACTERISTICS (Computer Interface)

Logic Levels	TTL Compatible "0" = (LO) = 0 to +0.8 volts "1" = (HI) = +2.0V to +5.0 volts
Input Loading	Optional one TTL load, *or* 1 TTL load with 1KΩ pullup to +5V, *or* 1 TTL load with 330Ω pullup to +5V and 470Ω pull down to ground.

LOGIC INPUTS (Computer Interface)

Start Input	1 line, positive true
Start Input	1 line, negative true

OUTPUT LEVEL CONTROL INPUTS 1	2	OUTPUT CODING
1	1	POS. TRUE
1	0	NEG. TRUE
0	1	Jammed LO
0	0	ONE'S*

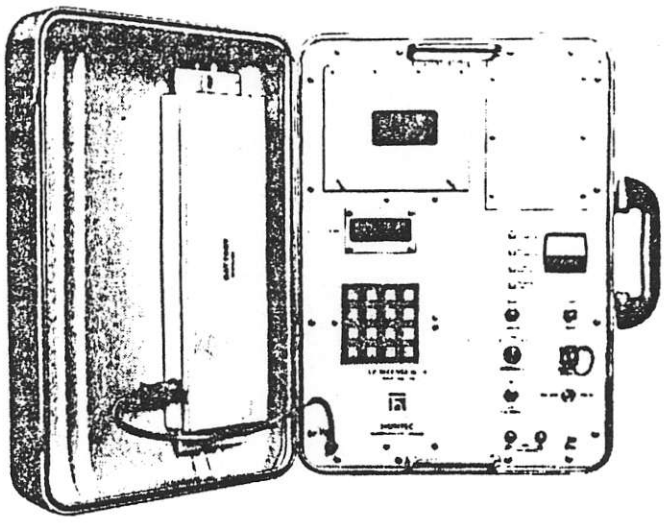
The output Level Control Inputs control the coding of most outputs as shown in the chart – see the listing of outputs.

*With both Output Level Control Inputs at zero, most outputs whose coding is controlled by these inputs will have cutoff open collectors. In this state, external open collector devices sharing the same data buss lines as the LPR 16 may be multiplexed onto these lines.

CONTROLS AND INDICATORS

Power On/Off (Pushbutton Switch)	Turns power on and off. Illuminates when power is on.
EOT/BOT (LED indicator)	Illuminates when on clear leader beginning of tape or at clear end of tape.
Load Forward (Pushbutton Switch)	Depressed to cause tape to load forward from clear leader to oxide portion of tape. (EOT/BOT lamp will extinguish over oxide).
Rewind (Pushbutton switch)	Depressed to cause tape to rewind to the beginning of tape clear leader.
Busy (LED Indicator)	Illuminates when the tape is in motion.
Rewind (LED Indicator)	Illuminates while tape is rewinding.
Run/Standby (Toggle Switch)	When in "RUN", tape will continuously read. When in "STANDBY" tape will read one file each time the START switch is depressed.
Start (Pushbutton Switch)	When in standby mode, this switch will cause one file to be read each time it is depressed.
Size	19"W x 5.25"H x 19"D (16.25" chassis width)
Connector Type	Dual 25/pin PC Brd type, 0.1" Centers, Viking 3VH25/1JN-5 (1 included with unit)

M-4 Induced Polarization Receiver



DESCRIPTION

The Huntec M-4 is a microprocessor based receiver for time and frequency domain IP and complex resistivity measurement. It is

Easy to operate. One switch starts a measurement, of up to 29 quantities simultaneously. The optional Cassette DataLogger records them all in seconds. Calibration, gain setting and SP buckout are all automatic.

Reliable. Using advanced digital signal processing techniques, the M-4 delivers consistently accurate data even in noisy, highly conductive areas. For mechanical reliability it is packaged in a rugged aluminum case for backpack or hand carrying.

Versatile. The operator may adjust delay and integration times, operating frequency and other measurement parameters, to adapt to a wide range of survey conditions and requirements. An independent reference channel facilitates drillhole and underground work, and guarantees transmitter-receiver synchronization in high-noise conditions.

Highly accurate. With a frequency bandwidth of 100 Hz and noise-cancelling digital signal stacking, the M-4 delivers very precise results. The details are summarized in a table overleaf.

Sensitive. The same features that make the M-4 accurate allow detection of very weak signals. The Huntec receiver requires lower transmitter power than any other, for a given set of operating conditions. Automatic correction for drifts in self-potential and gain allow long stacking times for significant signal-to-noise improvements.

Intelligent. Under the control of a powerful 16-bit microprocessor, the M-4 calibrates and tests itself between measurements. Coded error messages, flashed onto the display, inform the operator of any malfunction.

The M-4 Receiver is complemented by Huntec's new M-4 transmitters, which offer precisely timed constant-current output and both time and frequency domain waveforms, compatible with the receiver's accuracy and multi-mode measurement capabilities. The RL-2 Reference Isolator connects any IP transmitter to the receiver's reference channel. The GeoDataBase field computer reads, stores and processes data from M-4 cassettes.

Contact Huntec for more information on the benefits offered by the M-4 product line.

FEATURES

- Time and Frequency domain IP and Complex Resistivity operation
- Simultaneous Time domain and Complex Resistivity measurement
- Automatic calibration
  - gain setting
  - SP cancellation
  - fault diagnosis
  - filter tuning
- Independent reference channel for drillhole and underground work
- 33 quantities, displayable on large 3½ digit low-temperature liquid-crystal readout
- Analogue meter for source resistance measurement
- 10^9 ohms differential input resistance
- 8 hours continuous operation with replaceable, rechargeable nickel-cadmium battery pack (2 supplied)
- Optional Cassette DataLogger fits inside case, has read-after-write error checking. Up to 350 stations per tape.
- Conveniently packaged for backpacking or hand carrying
- 100 Hz bandwidth, fine time-resolution
- Advanced digital signal stacking
- Delivers reliable, accurate data in noisy, highly conductive areas.

huntec (70) LIMITED

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Scarborough,
Ontario, Canada
M1R 5A6
Phone (416) 751-8055
Telex 06-963640
Cables Huntof
Toronto

Inputs

Signal Channel

Range:	5×10^{-5} to 10 volts. Automatic ranging. Overload indication
Resistance:	Greater than 10^9 ohms differential
Bandwidth:	100 Hz
SP Cancellation:	−5 to +5 volts (automatic)
Protection:	Low-leakage diode clamps, gas discharge surge arrestors, replaceable fuses.

Reference Channel

Level:	500 mV minimum, 10 volts peak maximum, overload indication
Resistance:	2×10^5 ohms differential

Controls and Functions

Operating Controls

Keypad:	16 keys, calculator format, function associated with each key.
Reference Registers:	Keypad may be used to store up to ten 3½ digit numeric values with floating decimal point, to represent station number, line number, operator, time, date, weather, transmitter current, etc. for recording on cassette.

Programming Controls

Sub-panel:	All programming controls are on a covered sub-panel, not accessible during normal operation.
Thumbwheel Switches:	Select delay time t_D in milliseconds, chargeability window t_p in milliseconds; operating frequency; PFE frequency ratio.

Displayable Quantities

Time domain:	Primary voltage; self-potential; chargeability (total or each of 10 windows of equal width); phases of odd harmonics 3 to 15; amplitudes of odd harmonics 1 to 15; cycle count; repeating display of polarization potential and total chargeability.
Freq.domain:	Primary amplitude; Percent Frequency Effect; self-potential; cycle count.
Complex Resistivity:	Phases of odd harmonics 3 to 15; amplitudes of odd harmonics 1 to 15; fundamental phase (with ref. input); cycle count.
Any mode:	Battery voltage, Frequency error.

Outputs

Displays

Digital Display:	3½ digit, low-temperature liquid crystal display. Indicates measurement results and diagnostic error messages.
Analogue Meter:	Ohms scale for source resistance; also gives qualitative indication of signal-to-noise ratio.

Cassette DataLogger (Optional)

Description:	Accommodated within M-4 chassis. If not acquired with receiver, may be retrofitted by user at any time. Two recording modes:
Partial:	All sub-panel settings, measurement results, and contents of reference registers are recorded (2 seconds recording time).
Full:	As in partial mode, but also recorded is one cycle of averaged signal waveform (28 seconds recording time). If external reference is used, one cycle of reference waveform is also recorded (60 seconds recording time). Extra memory and software available to average and store the reference waveform for advanced offline resistivity computation.
Format:	ANSI/ECMA/ISO standard for saturation recording: 80 bytes/record, all data recorded in ASCII code.
Verification:	Read-after-write data verification (automatic)

Mechanical

M-4 Receiver with battery pack:	45 cm x 33 cm x 14 cm, 10.0 kg
M-4 Receiver with battery pack and Cassette DataLogger:	Dimensions as above, 11.0 kg
Replaceable Battery pack:	33 cm x 11 cm x 4.5 cm, 3 kg

Environmental

Temperature:	Operation: −20°C to +55°C Storage: −40°C to +70°C
Humidity:	Moisture-proof, operable in light drizzle.
Altitude:	−1,525 m to +4,775 m
Shock,Vibration:	Suitable for transport in bush vehicles.

OUTPUT ACCURACY AND SENSITIVITY

	milliradians	volts	volts	volts	seconds	%
	2 milliradians(1)	1% , 40Hz 2% to 80Hz	±1%	±1%	0.1%(2)	0.1%(3) full scale
	0.01 milliradians	10^{-6} volts	10^{-6} volts	10^{-3} volts	10^{-3} seconds	0.001% full scale

1) Frequency domain mode: at harmonic frequencies up to 15 Hz, increases to not more than 5 milliradians at 80 Hz.
Time domain mode: at harmonic frequencies up to 7.5 Hz, increases to not more than 5 milliradians at 30 Hz.

2) of total OFF time

3) Full scale defined as 100% PFE.

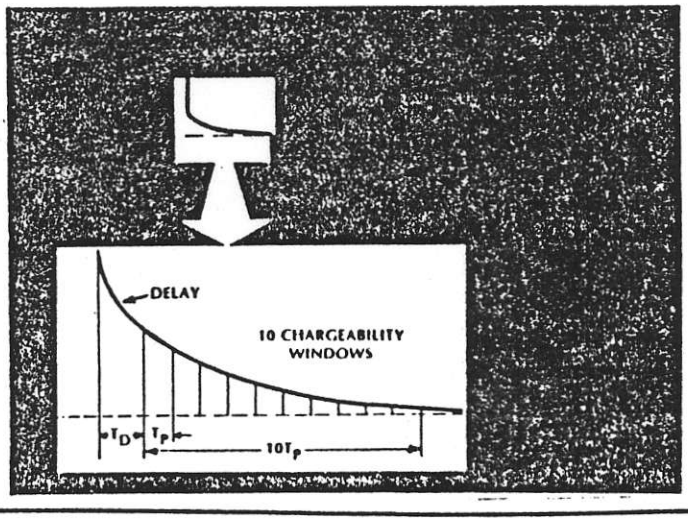
Cassette Data: recorded in ASCII, 9 digits with decimal point fixed for four decimal digits.

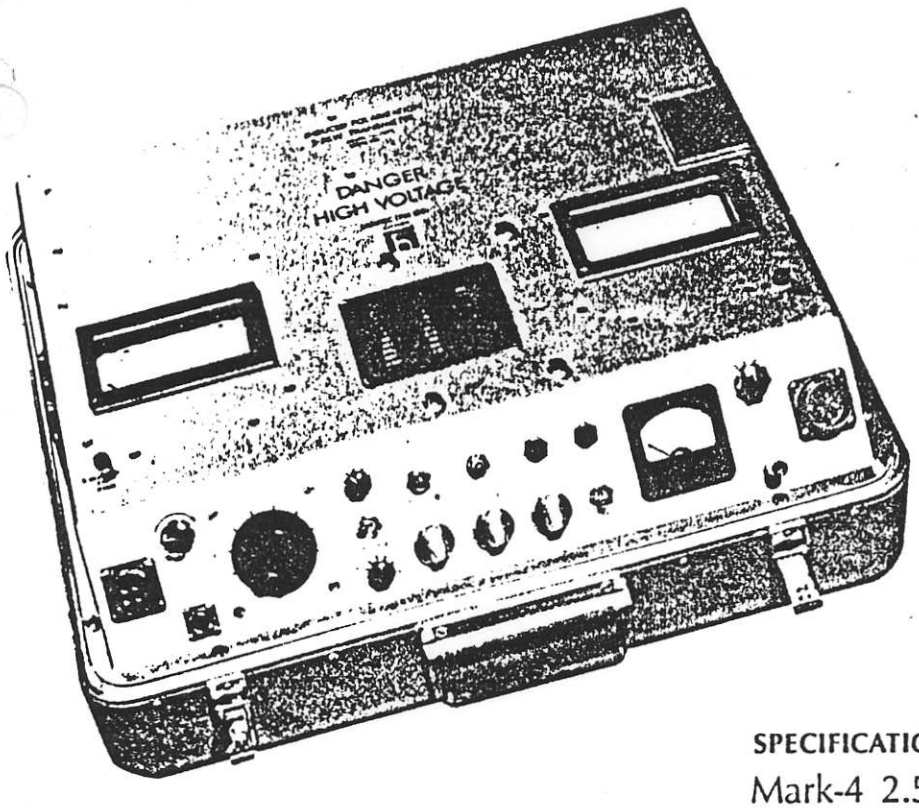
Display Data: 3½ digits, floating decimal point

Resolution of averaged waveform limited by A/D converter to one part or 4096 x (square root of cycle count).

Resolution of reference waveform (not averaged) limited by available memory to one part in 256. Additional memory and averaging software available as option.

CHARGEABILITY WINDOWS





M-4 SERIES

Induced Polarization/ Resistivity 2.5 kW Transmitter

DESCRIPTION

The HUNTEC M-4 2.5 kW Induced Polarization transmitter is designed for time domain, frequency domain (PFE) and complex resistivity applications. The unit converts primary 400 Hz ac power from an engine-alternator set to a regulated dc output current, set by the operator. Current regulation eliminates output waveform distortion due to electrode polarization effects. It is achieved in the transmitter by varying the alternator field currents. The transmitter is equipped with dummy loads to smooth out generator load variations.

FEATURES

- Solid-state switching for long life and precise timing.
- Open circuit during the "off" time ensures no counter current flow.
- Resistance measurement for load matching.
- Precision crystal controlled timing.
- Failsafe operation protects against short-circuit and overvoltage.
- Automatic regulation of output current eliminates errors due to changing polarization potential and load resistance.

SPECIFICATIONS

Mark-4 2.5 kW Transmitter

A) Power input:	96 — 144 V line to line 3 phase 400 Hz (from Huntec generator set)
B) Output:	Voltage: 150 — 2200 V dc in 8 steps Current: 0.2 — 7 A regulated**
C) Current regulation:	Less than ±0.1% change for ±10% load change
D) Output frequency:	0.0625 Hz to 1 Hz (time domain, complex resistivity) 0.0625 Hz to 4 Hz (frequency domain) selectable from front panel An additional range of frequencies between 0.78 and 5.0 Hz is available and can be selected by an internal switch.
E) Frequency accuracy:	±50 ppm −30°C to + 60°C
F) Output duty cycle: $T_{on}/(T_{on}+T_{off})$	0.5 to 0.9375 in increments of 0.0625 (time domain) 0.9375 (complex resistivity) 0.75 (frequency domain)
G) Output current meter:	Two ranges: 0-5 A and 0-10 A
H) Ground resistance meter:	Two ranges: 0-10 kΩ and 0-100 kΩ
I) Input voltage meter:	0-150 V
J) Dummy load:	Two levels: 500 W and 1.75 kW
K) Temperature range:	−34°C to + 50°C
L) Size:	53 cm x 43 cm x 29 cm
M) Weight:	26 kg

**Smaller currents are obtainable, but outside the current regulation range the transmitter voltage is regulated, not the current.

huntec

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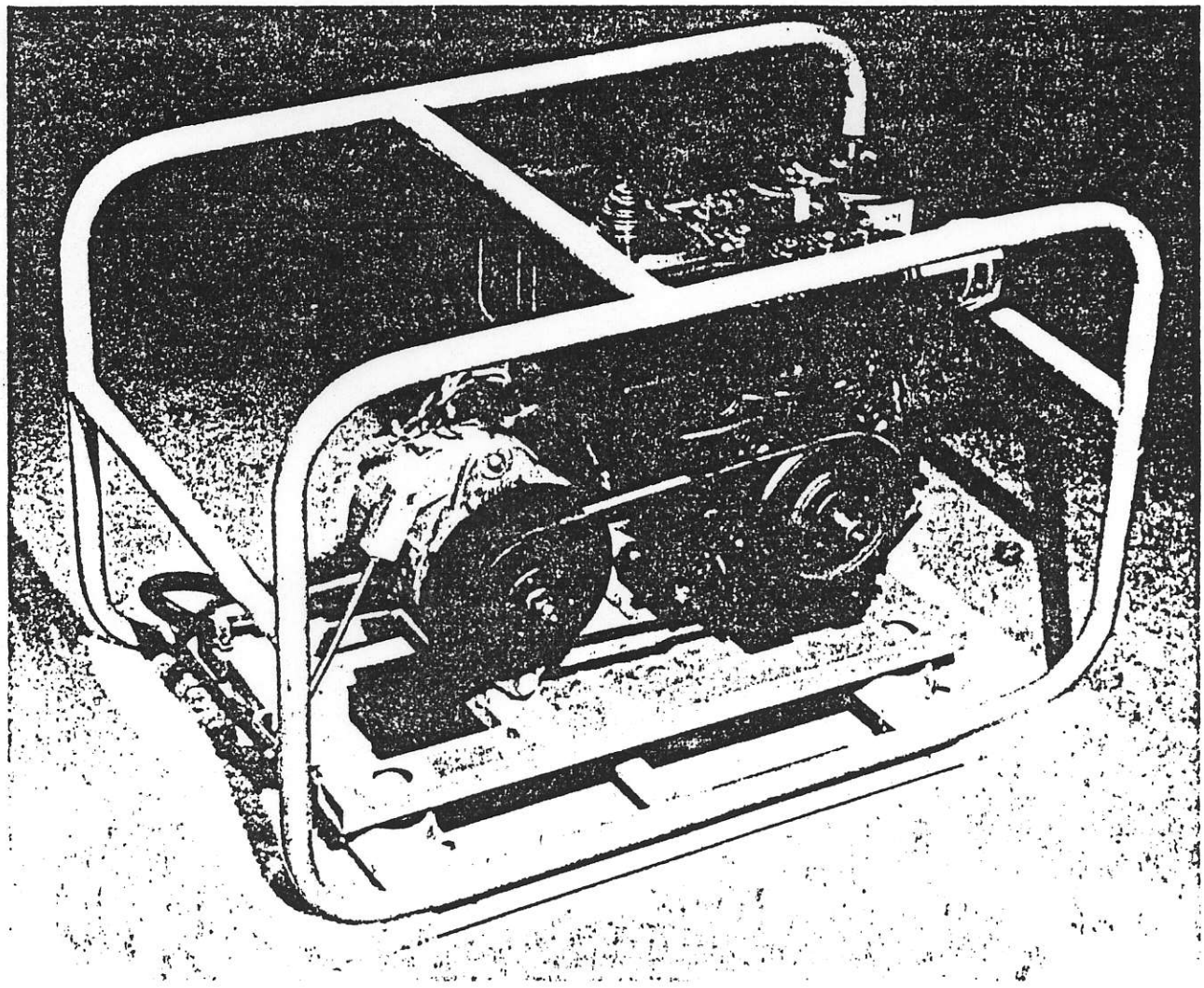
TELEX 06-963640



SPECIFICATIONS

M-4 2.5 kW Engine Driven Alternator

Output:	**120 V ac 400 Hz 3.5 kVA maximum**
Engine:	**6 kW air cooled, single cylinder four cycle piston engine with manual start**
Fuel:	**Regular grade gasoline, tank capacity 3.8 L to give 4 h duration**
Alternator:	**Delta connected heavy duty automobile type, belt driven, air cooled**
Construction:	**Tubular protective carrying frame with resiliently mounted engine and alternator**
Size:	**51 cm x 48 cm x 76 cm**
Weight (dry):	**61 kg**