Interpretation Report on INDUCED POLARIZATION, HORIZONTAL LOOP ELECTROMAGNETIC, AND MAGNETIC SURVEYS

performed on

BONANZA CREEK AREA,
Yukon Territory

for

ARBOR RESOURCES INCORPORATED

GEOTERREX LIMITED
Sidney, B.C.

October, 1984

Job 4-125

geoterrex LTD

100160

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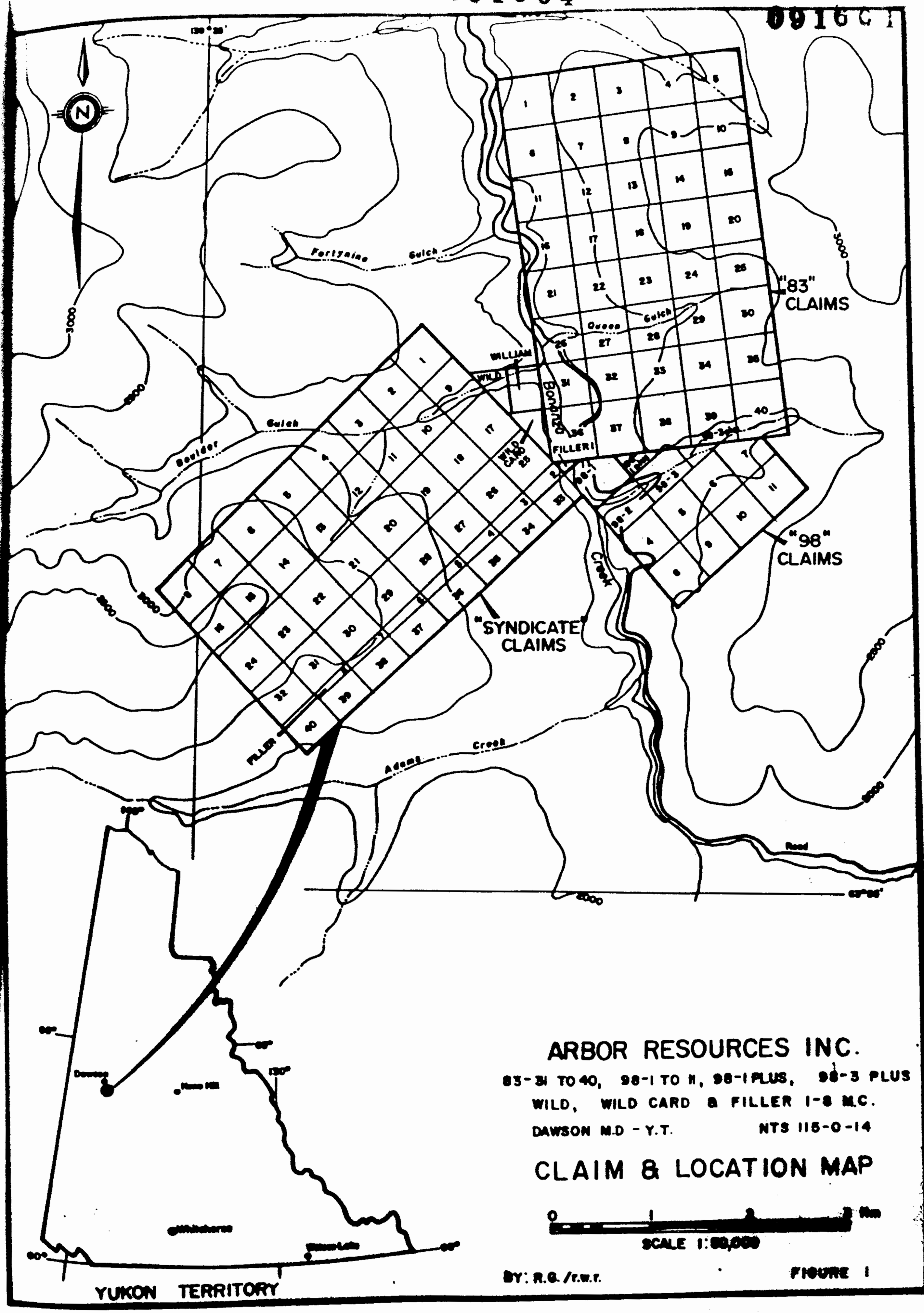


N
Fortynine Gulch
Queen Gulch
Boulder Gulch
Adams Creek
Bonanza Creek
WILLIAM
WILD
WILD CARD 25
FILLER I
FILLER
"83" CLAIMS
"98" CLAIMS
"SYNDICATE" CLAIMS
3000
2000
Road
Dawson
Whitehorse
YUKON TERRITORY
ARBOR RESOURCES INC.
83-31 TO 40, 98-1 TO 11, 98-1 PLUS, 98-3 PLUS
WILD, WILD CARD & FILLER 1-8 M.C.
DAWSON M.D - Y.T.
NTS 115-O-14
CLAIM & LOCATION MAP
SCALE 1:50,000
BY: R.G./r.w.r.
FIGURE 1

I INTRODUCTION

During the period September 21 to September 30, 1984, Geoterrex Limited of 9865 West Saanich Road, Suite 107A, Sidney, British Columbia, V8L 3S1 conducted an induced polarization, horizontal loop electromagnetic, and magnetic survey on behalf of Arbor Resources Incorporated, 675 West Hastings Street, Suite 1500, Vancouver, British Columbia, V6B 1N2.

Five lines were completed on three separate areas known as Boulder Creek, Upper Boulder Creek, and the Plinc Claims. These areas are located west of Bonanza Creek, near the town of Dawson City, Yukon Territory, (see Figure 1).

The survey was designed to follow-up an airborne INPUT survey to delineate possible gold bearing sulphide deposits. Lines were established by Arbor Resources personnel.

II PERSONNEL AND EQUIPMENT

A. Personnel

Geoterrex Limited provided the following personnel for the completion of survey related tasks:

James P. Hawkins	Geophysicist/Party Manager
Brian G. Branting	Geophysicist/Operator

In addition, Arbor Resources supplied the following helpers:

Perry Grunenberg
Larry Zecchel

Curriculum vitae for Mr. Hawkins can be found in Appendix A, following the report.

B. Equipment

Geoterrex Limited provided the following equipment for field operations:

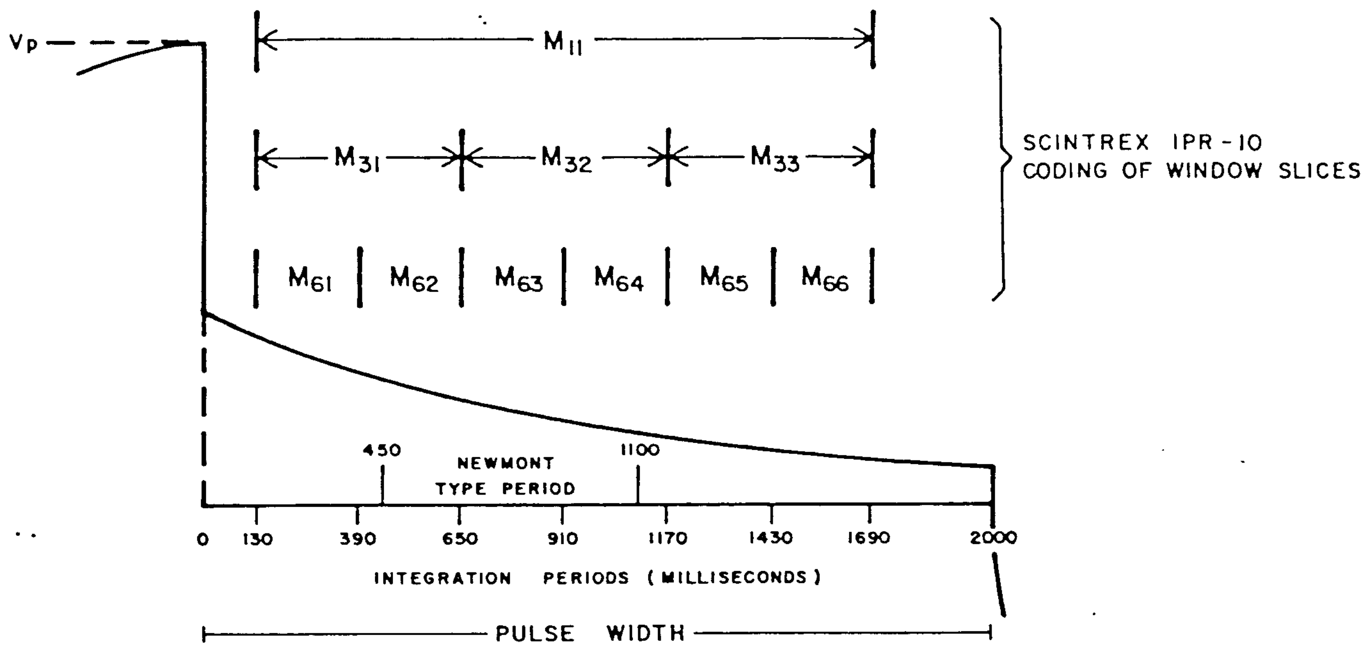
1	Scintrex IPR-10A induced polarization receiver
1	Scintrex IPR-7 induced polarization receiver
1	Elliot 15A induced polarization transmitter and motor generator
1	Apex Parametrics Max-min II+ horizontal loop electromagnetic unit
1	Scintrex MP-2 proton precession magnetometer
2	Motorola FM radio transceivers
1	Four wheel drive Suburban

All tools, wire, and ancillary equipment necessary for safe and efficient field operations.

Instrument specifications can be found in Appendix B, following the report. A diagram of the Scintrex IPR-10A induced polarization receiver measurements is shown in Figure 2.

FIGURE 2

SCINTREX IPR-10 TIME DOMAIN INDUCED POLARIZATION MEASUREMENTS



NEWMONT TYPE CHARGEABILITY IS APPROXIMATED BY: $Mn = \frac{M_{32}}{0.7}$

III SURVEY PROCEDURES

A. Induced Polarization

1. Method

The induced polarization method (IP) is based on the electrochemical phenomenon of "over-voltage", that is; on the establishment and detection of double layers of electrical charge at the interface between ionic and electronic conducting material when the electrical current is caused to pass across the interface.

All natural occurring sulphides of metallic lustre, some oxides and graphite give marked induced polarization responses when present in sufficient volume even when such materials occur in low concentrations and in the form of discrete unconnected particles. Thus, induced polarization has general application to the direct detection of disseminated sulphide deposits. Each rock and soil type also exhibits an induced polarization response, usually confined to a relatively low amplitude range, which is characteristic of the mineral or soil. However, certain clays and "laminar" materials including serpentine, sericite and chlorite may give rise to an anomalous response. These effects are attributed largely to "membrane" polarization.

In order to measure IP effects in a volume of rock, a current is caused to flow through it via two current electrodes contact points and the resulting potential differences are measured across two potential electrode contact points.

In practice, two different techniques are used, namely "Time Domain" and "Frequency Domain". For the Time Domain technique, which was used for this survey, a direct current is allowed to flow for several seconds and then cut off. The decay of the polarization voltages built up during the passage of the current is studied during the time after the current is switched off. In the Frequency Domain technique, a Sine wave current form of two low, but well separated frequencies, is used. Since polarization effects take an appreciable time to build up, the response at the lower frequencies will be greater so that apparent resistivities or transfer impedances between the current and measuring circuits will be larger at lower frequency.

The field measurements taken with the Time Domain technique are as follows:

1. the applied current, Ia, flowing through the two current electrodes;

2. the difference in potential, Vp, existing between the potential electrodes while the current is flowing;

3. the apparent chargeability, Ma, which is the observed IP effect for a single current pulse.

The IP effect measured for the present survey is the normalized integrated decay voltage between 0.45 seconds and 1.10 seconds following the current shut off time. The transmitted current cycle timing was 2 seconds on, 2 seconds off. Figure 3 illustrates an aspect of the induced polarization method.

2. Data Reduction and Presentation

The apparent chargeability, Ma, in milliseconds or millivolt seconds per volt is read directly on the IP receivers used.

From observations of the difference in potential and the applied current, the apparent resistivity may be calculated at each station as follows:

$$\rho a = \frac{Vp}{Ia} \cdot K$$

where: Vp = the difference in potential in volts;

Ia = applied current in amperes;

K = constant depending on array geometry

The apparent resistivity, ρa, is in ohm-metres. For this particular survey, the dipole-dipole array was employed. The K factor for this array is:

$$K = na\,(n+1)\,(n+2)$$

where: a = the dipole length in metres;

n = 1,2,3, etc.;

na = the distance between the near potential electrode and the near current electrode.

FIGURE 3

INDUCED POLARIZATION – RESISTIVITY

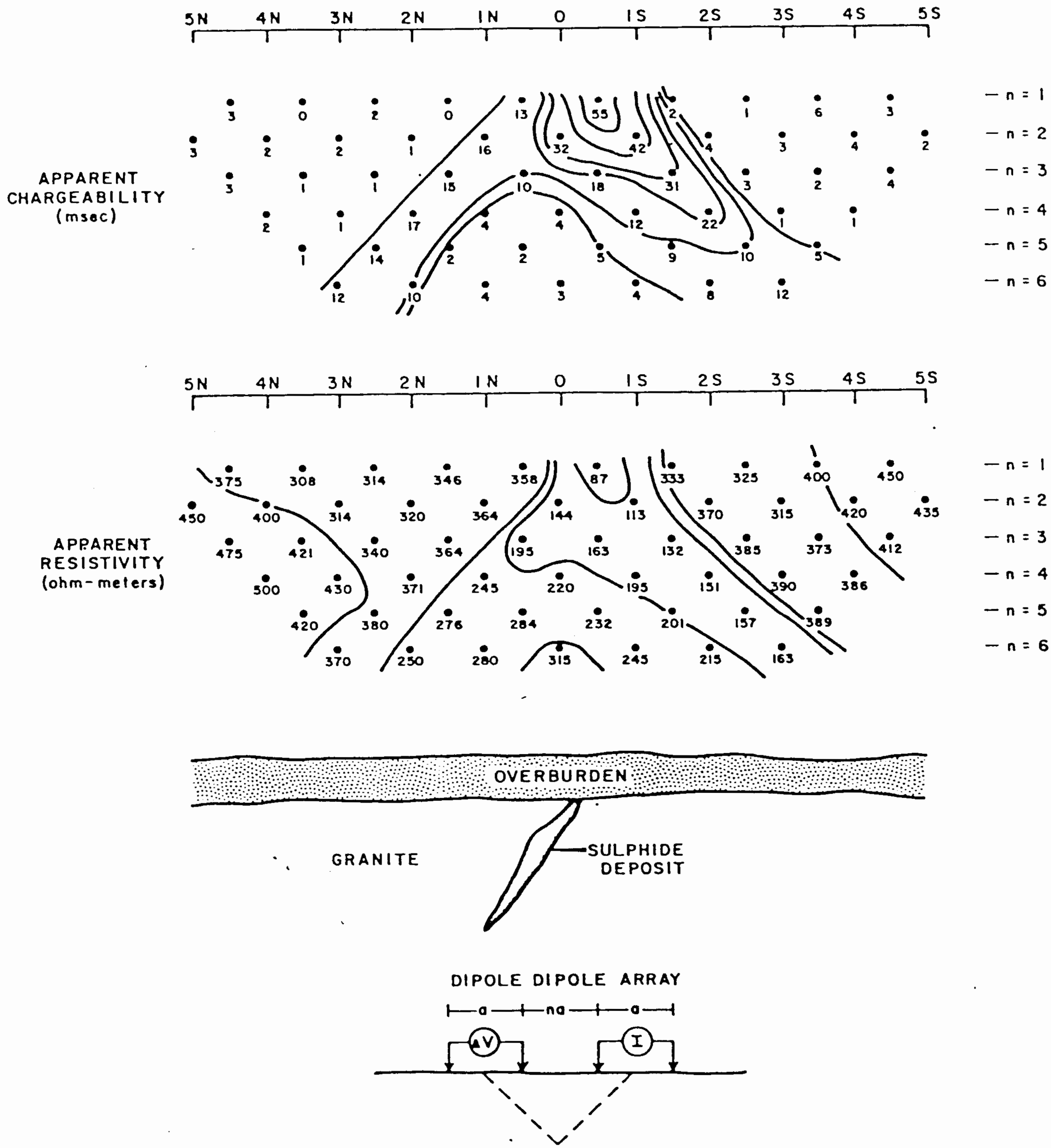
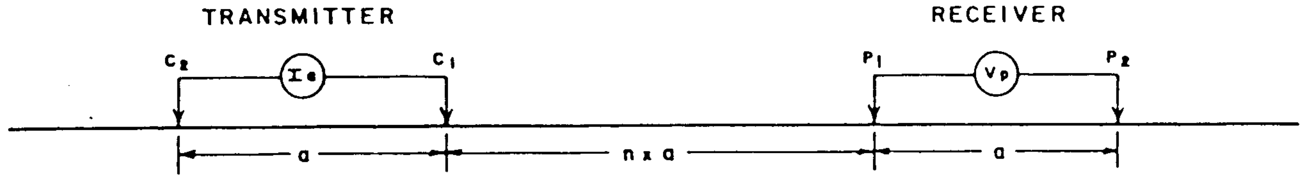


Figure 4 illustrates the dipole-dipole configuration and pseudo-section plotting positions.

Induced polarization pseudo-sections are appended to this report.

FIGURE 4

DIPOLE-DIPOLE ELECTRODE CONFIGURATION



C_1, C_2 .... CURRENT ELECTRODES

P_1, P_2 .... POTENTIAL ELECTRODES

Ia .... APPLIED CURRENT

Vp .... PRIMARY VOLTAGE

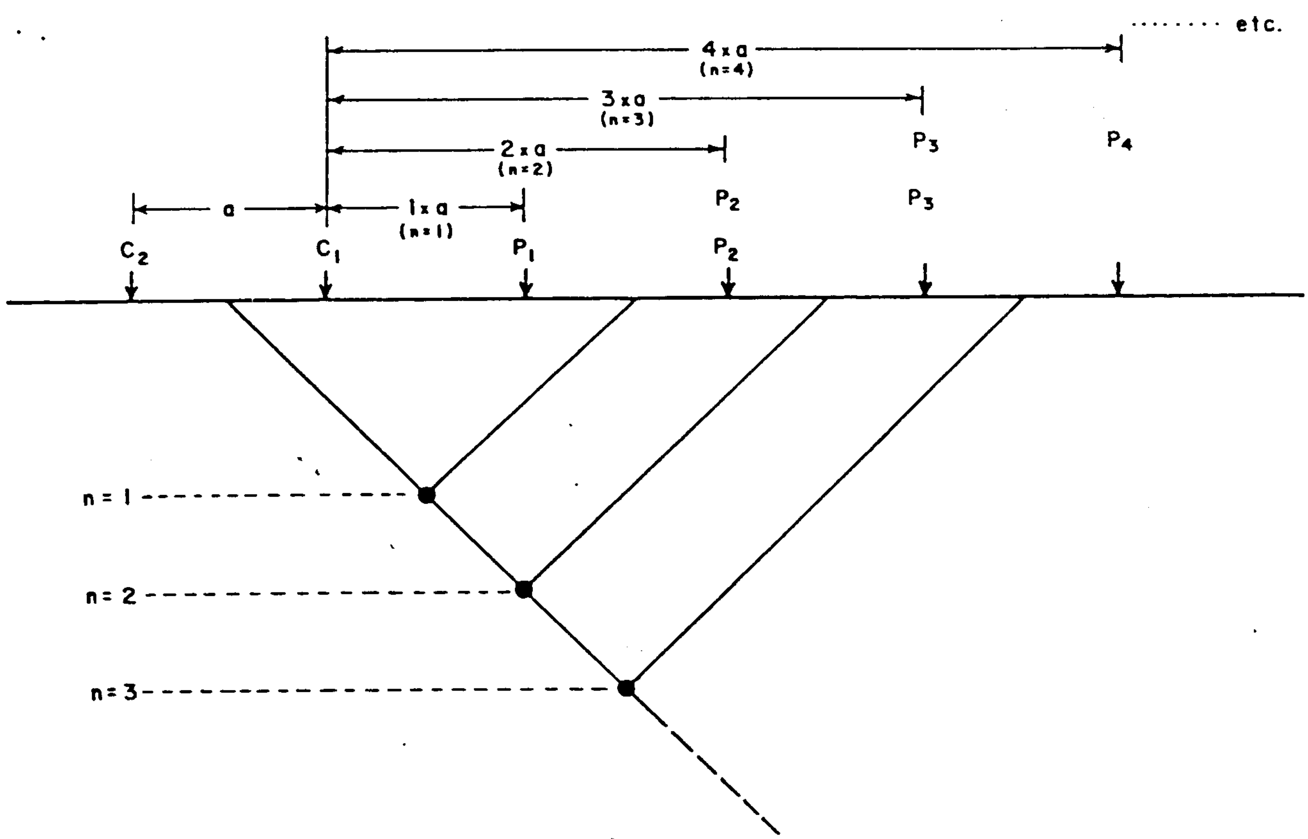
a .... DIPOLE LENGTH

n .... 1, 2, 3, . . . etc.

APPARENT RESISTIVITY $\rho_a = Kn \; Vp/Ia$

WHERE $Kn = \pi an(n+1)(n+2)$

PLOTTING OF MEASUREMENTS ON PSEUDO-SECTIONS



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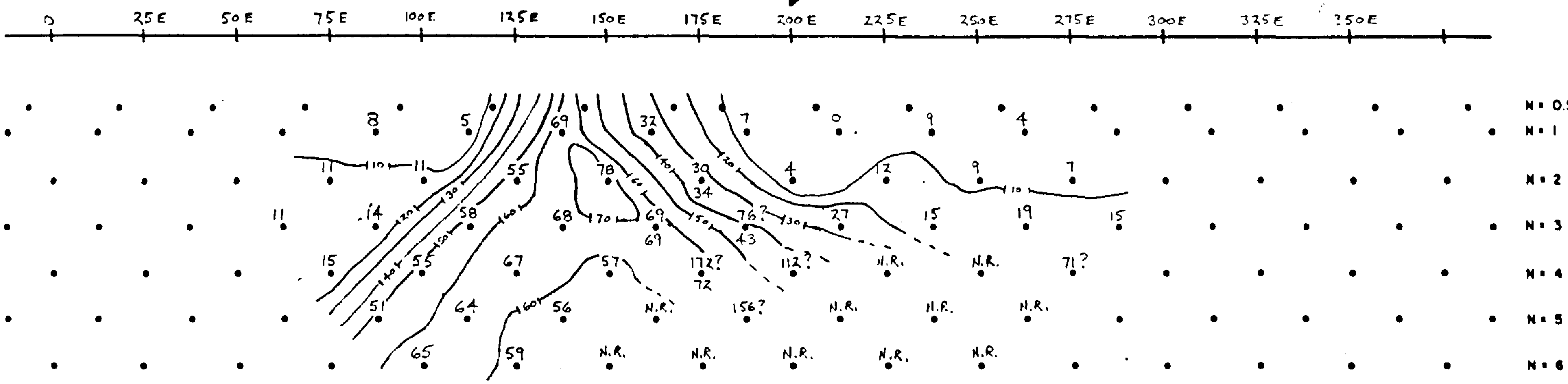
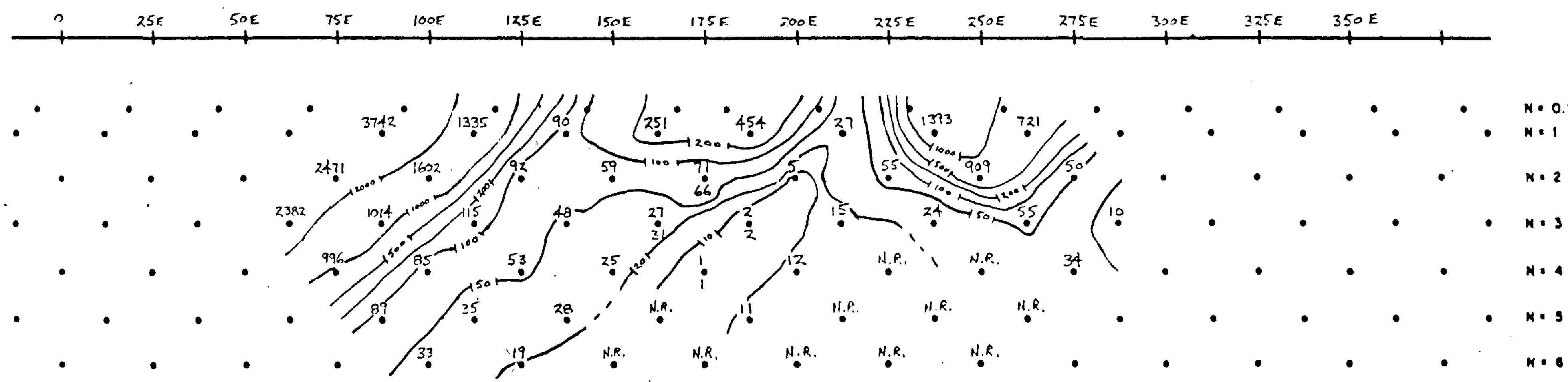
APPARENT CHARGEABILITY

CONTOUR INTERVAL - 10 msec



APPARENT RESISTIVITY

CONTOUR INTERVAL - 1, 2, 5 PER DECADE OHM-METRES



LINE # : LB - 1150S

LINE DIRECTION :

DIPOLE LENGTH : 25 METRES

DATE : SEPT 24, 1984

PRELIMINARY COPY

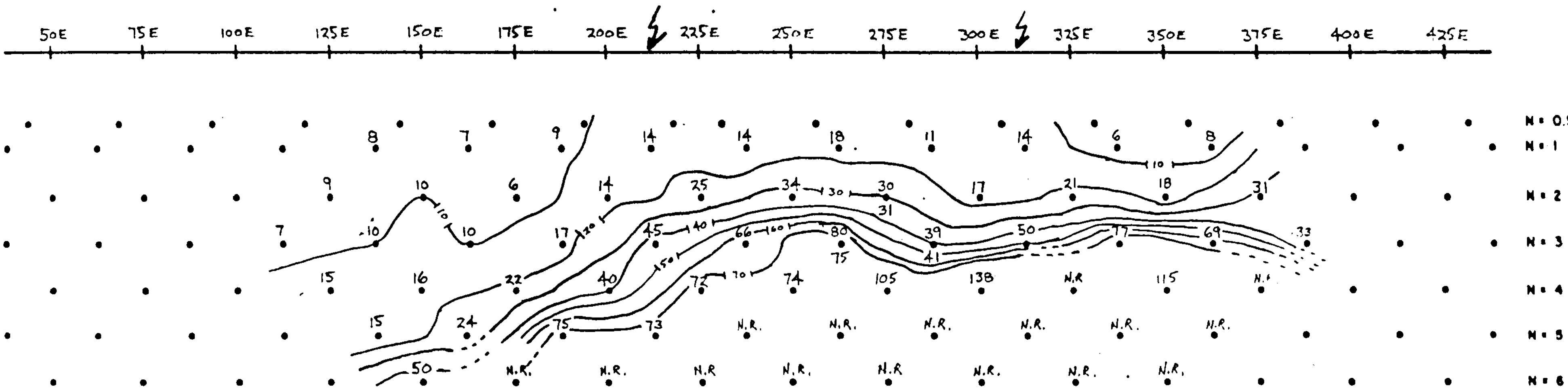
INDUCED POLARIZATION AND RESISTIVITY SURVEY

(DIPOLE - DIPOLE ARRAY)

PROJECT # 4-125

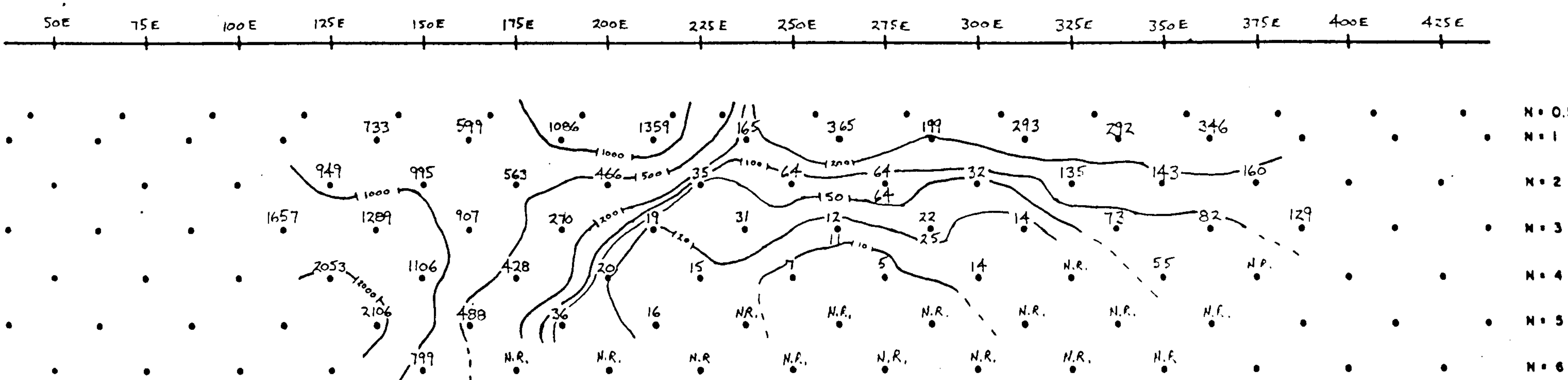
APPARENT CHARGEABILITY

CONTOUR INTERVAL - 10 msec



APPARENT RESISTIVITY

CONTOUR INTERVAL - 1,2,5 PER DECADE OHM-METRES



PRELIMINARY COPY

LINE # : LB-0

LINE DIRECTION :

DIPOLE LENGTH : 25 METRES

DATE : SEPT 23, 1984

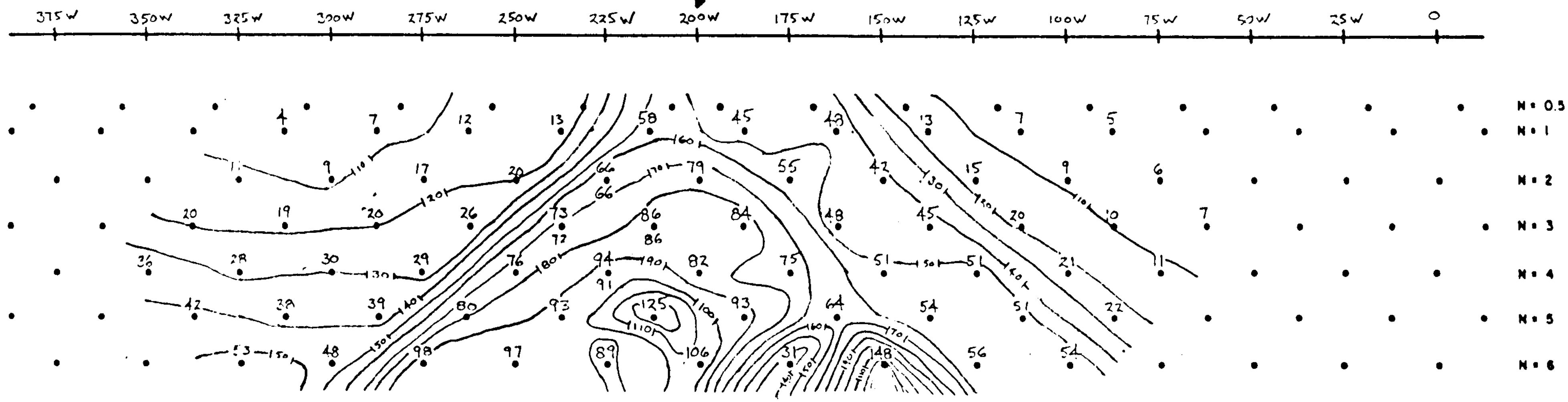
INDUCED POLARIZATION AND RESISTIVITY SURVEY

(DIPOLE - DIPOLE ARRAY)

PROJECT # 4-125

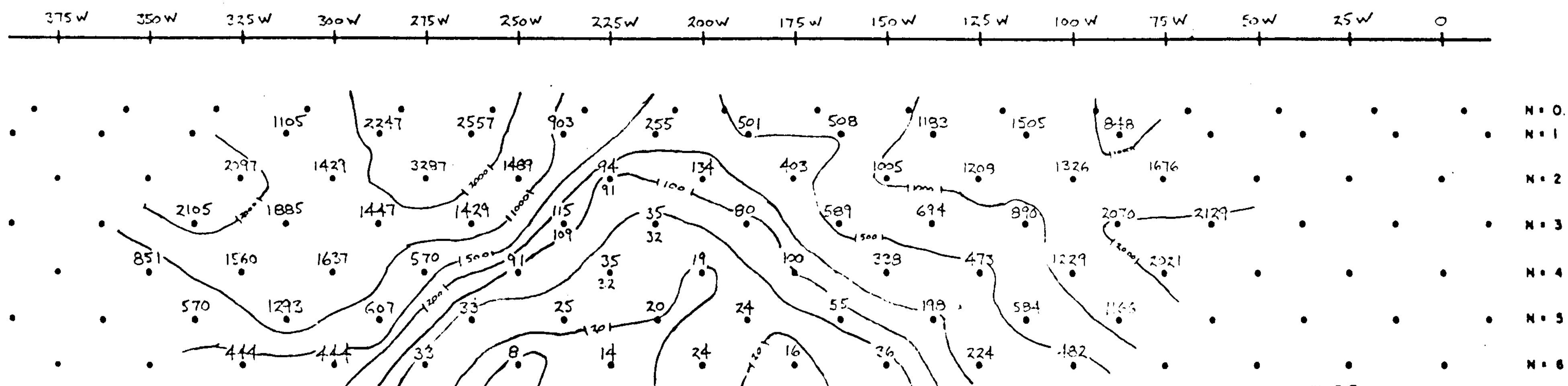
CONTOUR INTERVAL - 10 msec

APPARENT CHARGEABILITY



CONTOUR INTERVAL - 1, 2, 5 PER DECADE OHM-METRES

APPARENT RESISTIVITY



PRELIMINARY COPY

LINE # : UB-0

LINE DIRECTION :

DIPOLE LENGTH : 25 METRES

DATE : SEPT 25, 1984

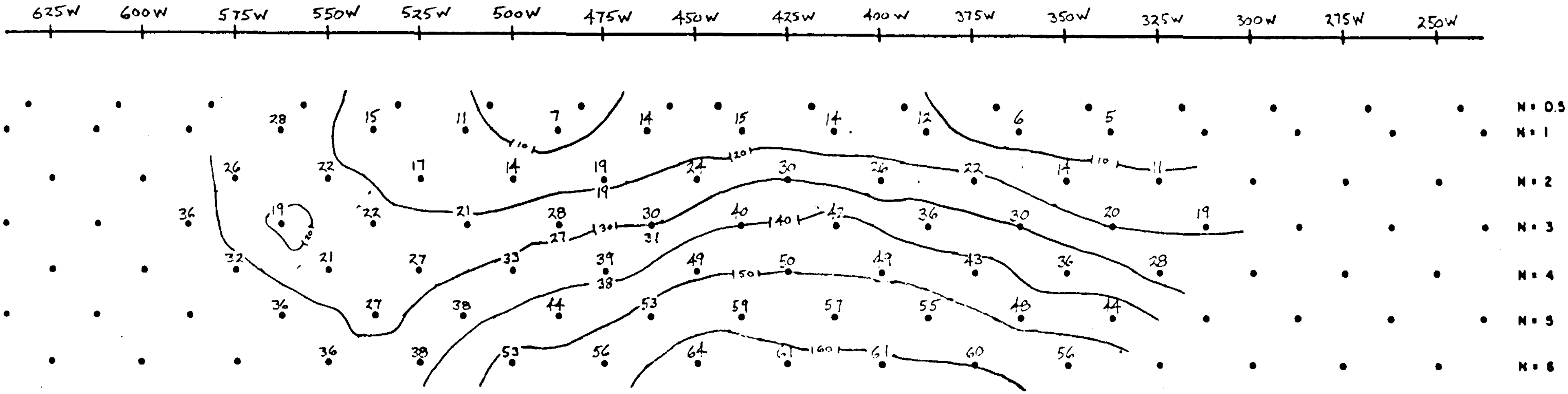
INDUCED POLARIZATION AND RESISTIVITY SURVEY

(DIPOLE - DIPOLE ARRAY)

PROJECT # 4-125

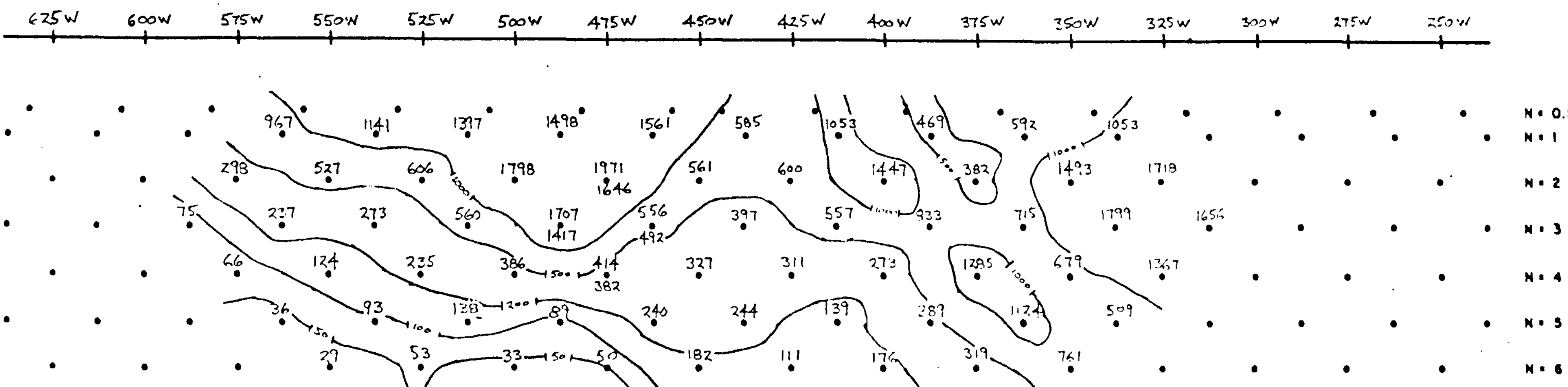
APPARENT CHARGEABILITY

CONTOUR INTERVAL - 10 msec.



APPARENT RESISTIVITY

CONTOUR INTERVAL - 1,2,5 PER DECADE OHM-METRES



PRELIMINARY COPY

LINE # : UB-0

LINE DIRECTION :

DIPOLE LENGTH : 25 METRES

DATE : SEPT 27 1984

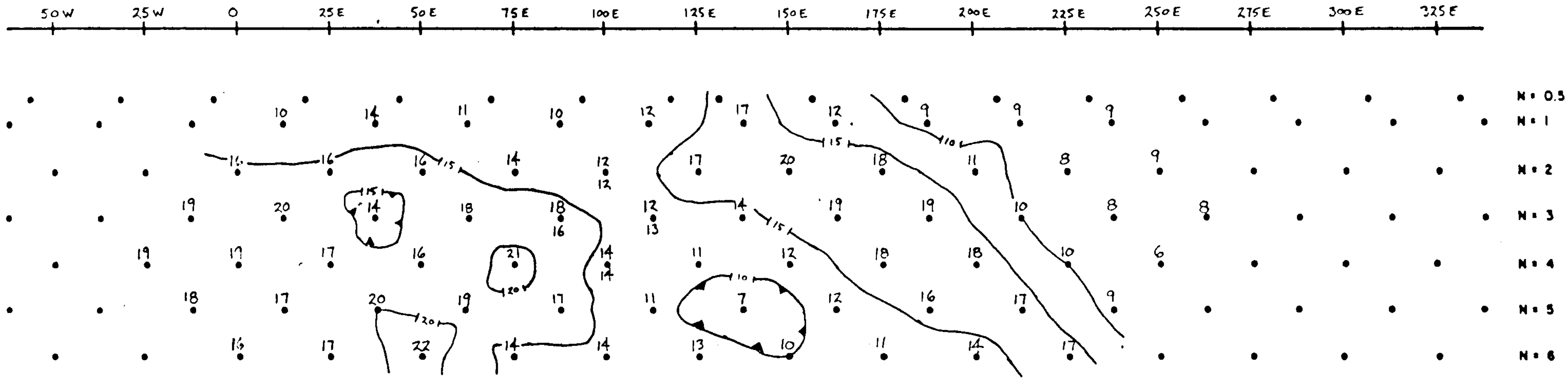
INDUCED POLARIZATION AND RESISTIVITY SURVEY

(DIPOLE - DIPOLE ARRAY)

PROJECT # 4-125

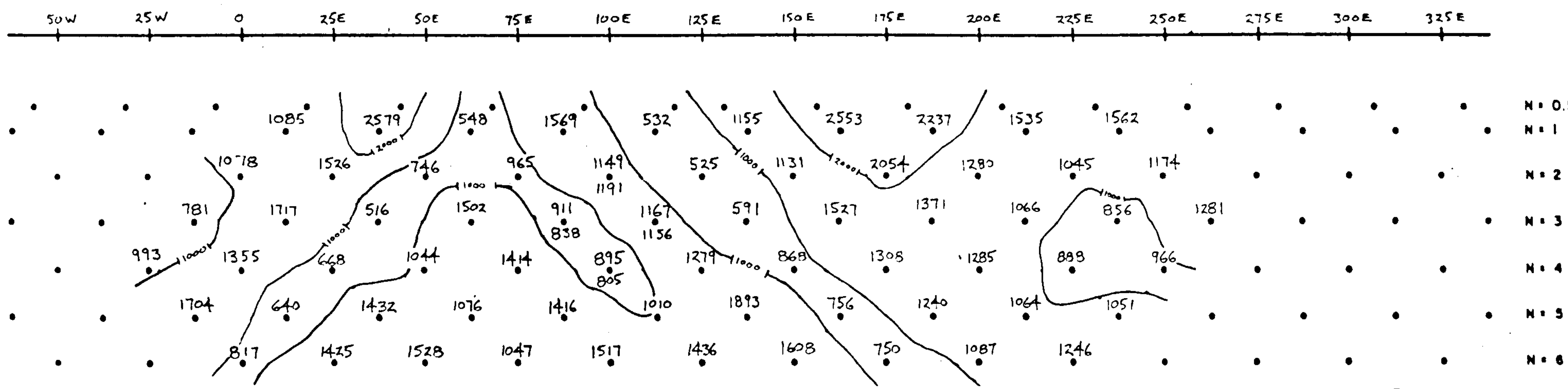
CONTOUR INTERVAL - 5 msec.

APPARENT CHARGEABILITY



CONTOUR INTERVAL - 1,2,5 PER DECADE OHM-METRES

APPARENT RESISTIVITY



PRELIMINARY COPY

INDUCED POLARIZATION AND RESISTIVITY SURVEY

(DIPOLE - DIPOLE ARRAY)

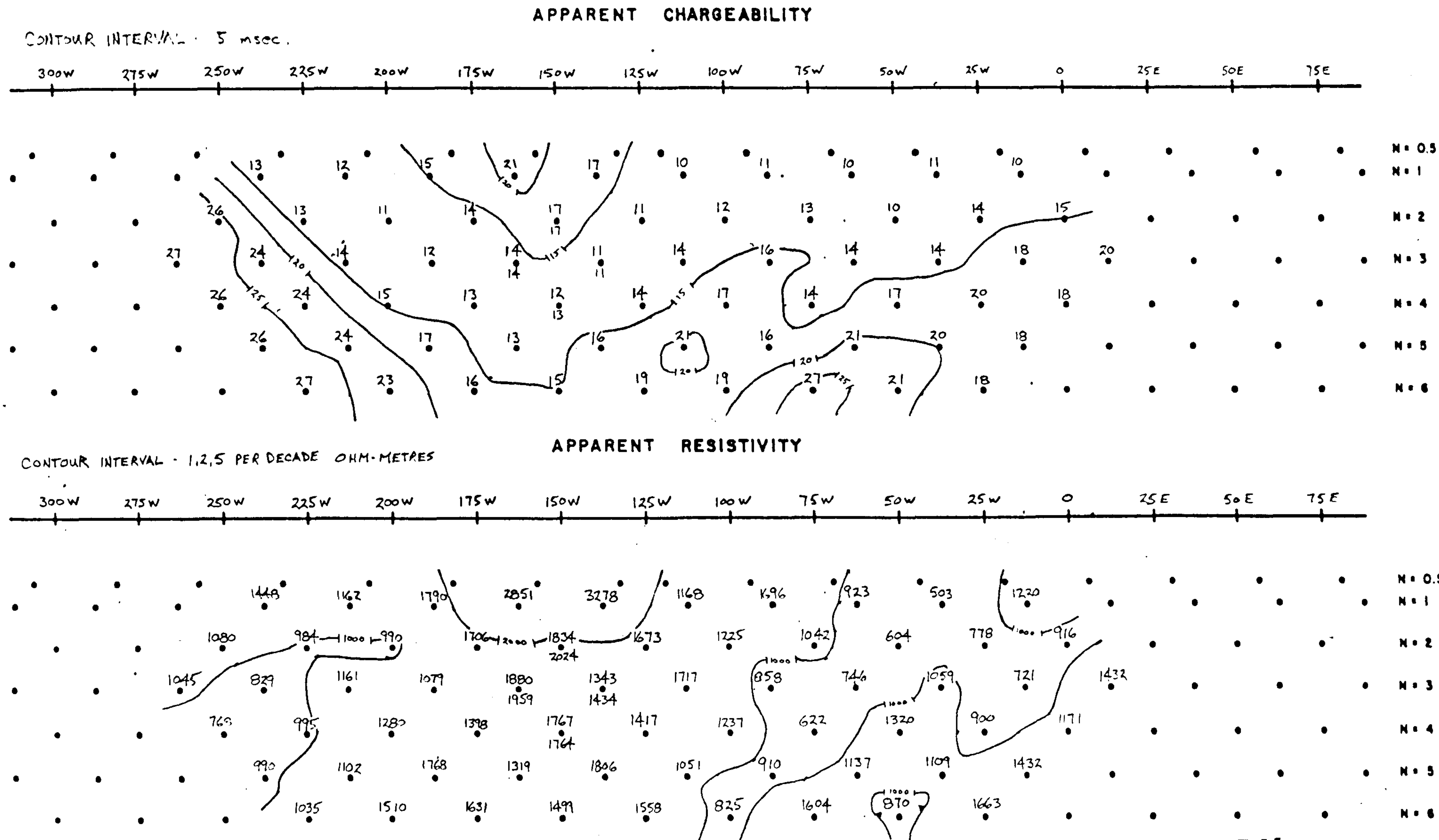
PROJECT #: 4-125

LINE #: LP-0

LINE DIRECTION:

DIPOLE LENGTH: 25 METRES

DATE: SEPT 26, 1984



LINE # : LP-O

LINE DIRECTION :

DIPOLE LENGTH : 25 METRES

DATE : SEPT 26, 1984

PRELIMINARY COPY

INDUCED POLARIZATION AND RESISTIVITY SURVEY

(DIPOLE - DIPOLE ARRAY)

PROJECT # 4-125

B. Horizontal Loop Electromagnetic

1. Method

For the horizontal loop EM method, two modes of operation are possible. The "maximum" mode requires that two coils, one receiving and one transmitting, are held on a coplanar position and at a fixed distance apart. For the "minimum" mode, the transmitting coil is again held in the horizontal position, but the receiving coil is held in the vertical position, the axis of which contains the transmitter coil. In both cases, the receiver measures the intensity of both the in-phase and quadrature components of the secondary field due to the eddy currents induced in the ground. These measurements are read as a percentage of the primary field intensity. A cable connects the two coils in order to provide a reference signal from the transmitter to the receiver so that the primary field can be cancelled and the phase determined. For the present survey only the "maximum" mode was used.

The results are presented in profiles showing the variation of the in-phase and quadrature components of the secondary field plotted at the midpoint between the coils. The survey procedures using the horizontal loop method requires that the two coils move progressively, as a pair, along the same traverse line. Readings were taken every 25 metres.

The horizontal loop coil configuration gives results which allow a quanitative interpretation of a particular conductor's parameters. The profile over a single vertical conductor shows a negative trough on either side of which the shoulders exhibit positive results. Determinations of depth and conductivity thickness products can readily be made by comparing the maximum amplitude of the negative trough of the in-phase and quadrature components. The relative thickness of a conductor along the survey traverse may also be determined from the profiles. The shape of the profile over a conductor is sensitive to the direction of the dip.

The operating frequencies and coil separation used are chosen at the geophysicist's discretion. These choices are dependent upon factors such as anticipated depth to the conductor source and the conductivity of the overburden. The coil separation used for the present surveying was 100 metres, with part of line LB-0 being resurveyed with a coil separation of 50 metres to detail the conductor. The frequencies employed were 222 Hz, 444 Hz, 888 Hz, 1777 Hz, and 3555 Hz to provide additional information to improve the interpretation.

Of the frequencies used, the lower frequencies are generally considered more reliable for quantitative depth and conductivity-thickness determination because they are less distorted by the "inductive thickness effect" of the conductor and "current gathering", the galvanic effect caused by a relatively conductive host rock.

2. Data Reduction and Presentation

The horizontal loop electromagnetic system is sensitive to the transmitter-receiver (Tx-Rx) coil separation and the coplanarity of these coils. In flat terrain, the units are levelled using bullseye levels to achieve coplanarity and as the coil separation is constant, the primary field strength can be effectively tuned out by adjusting the coil separation control, located on the receiver front panel, to the correct coil separation. In rough terrain, however, it is necessary to tilt the coils to the proper inclination to achieve coplanarity and to mathematically correct the EM responses for the effects of the primary field.

Line chainage is important to correct the effects. The accepted practice is to employ a hand held clinometer and determine a constant horizontal station separation through secant chaining. The inclinations are recorded to calculate the inclination for the Tx-Rx coil separation and as the horizontal separation is maintained between the coils allows the following corrections to be applied.

For the in-phase only, the following correction is first added:

$$IP = +\left[1 - \left\{\mathrm{Cos} \cdot \tan^{-1}\left(\frac{\%\ \mathrm{slope}}{100}\right)\right\}^3\right] \times 100$$

then the following correction must be applied to both the in-phase and quadrature response.

$$\times \left\{\frac{1}{\mathrm{Cos} \cdot \tan^{-1}\left(\frac{\%\ \mathrm{slope}}{100}\right)}\right\}^3$$

Chainage errors can cause variations in the base level of the in-phase component which appears to be anomalous responses. These can be mathematically corrected once the inclination and slope distance over the mischained line segment have been checked. In some cases, it may be necessary to resurvey the line with the EM system, but this is not always the case. In extremely rough topography, chainage errors become more prevalant due to large numbers of inclination and slope distance measurements that have to be made.

Horizontal loop electromagnetic profiles are appended to this report.

C. Magnetics

1. Method

A magnetometer has a sensor coil which is wrapped by a coil or wire and filled with any dipolar liquid, such as water, kerosene, alchohol, etc. Essentially, protons in the liquid act as small spinning magnetic dipoles which are temporarily aligned when a current is generated in the coil of wire. When the current is removed, the spin of the protons causes them to precess about the direction of the earth's magnetic field, generating a small signal in the same coil used to align the protons. This signal is proportional to the total magnetic field intensity and is accurate within ± 1 gamma.

Variations in the earth's magnetic field may occur from magnetic storms, micropulsations, solar wind, etc. Therefore when conducting magnetic surveys, a field base station is commonly designated and all data is corrected with this station as a reference to diurinal variations. Data is collected along survey "loops" of under two hours duration.

2. Data Reduction and Presentation

As stated above, magnetic data is corrected for diurinal variations with the field base station initial value taken as the base reading.

Magnetic profiles are presented with the horizontal loop electromagnetic profiles, and are appended to the report.

IV SURVEY STATISTICS

A. Boulder Creek

Three parallel lines, LB-0, LB-1+50S, and LB-4+00S were established. Geophysical coverage on these lines are as follows:

I.P.   LB-0, one array, 300 metres, 100E to 400E
       LB-1+50S, one array, 250 metres, 50E to 300E

HLEM   LB-0, 5 frequencies, 100 metre coil separation, 525 metres, 50E to 575E.

       LB-0, 5 frequencies, 50 metre coil separation, 375 metres, 75E to 450E

       LB-1+50S, 5 frequencies, 100 metre coil separation, 425 metres, 50E to 475E

       LB-4+00S, 5 frequencies, 100 metre coil separation, 375 metres, 50E to 425E

MAG	LB-0	-	625 metres, 0 to 625E
	LB-1+50S	-	525 metres, 0 to 525E
	LB-4+00S	-	475 metres, 0 to 475E

B. Upper Boulder Creek

One line, UB-0, was established. Two induced polarization arrays were surveyed, covering 550 metres, from 50W to 600W. Horizontal loop electromagnetic coverage, on five frequencies, was 450 metres, from 50W to 500W. Magnetic coverage was 550 metres, from 0 to 550W.

C. Plinc Claims

One line, LP-0, was established with hip chain and topofil. Two induced polarization arrays were surveyed, covering 550 metres from 275E to 275W. No horizontal loop electromagnetic or magnetic surveying were conducted.

V. DISCUSSION OF RESULTS

A. General

Three geophysical methods, namely induced polarization, horizontal loop electromagnetic, and magnetic, were used to follow-up airborne anomalies, or in one case, a soil geochemical anomaly, with varying success. Generally speaking, the induced polarization method proved the most successful, readily delineating polarizable bodies. The horizontal loop electromagnetic surveys confirmed the induced polarizable anomalies, but seemed to respond to the edges of the polarizable body, and not the centre. Valuable information on the dip of the bodies was gathered from the electromagnetic data.

The magnetic data shows little or no correlation with either of the other methods, and is generally featureless. The magnetic data was not used in the interpretation of the results.

B. Boulder Creek

Three lines, LB-0, LB-1+50S, and LB-4+00S, were established to follow up a broad, three channel airborne anomaly at 20270E and 20281E.

An anomalous zone is present on all three lines. The results from the electromagnetic survey can best be described as a "zone" of conductivity from 150E to 375E on LB-0, from 100E to 300E on LB-1+50S, and from 125E to 300E on LB-4+00S. Zones of low resistivity and high polarizability roughly correlate.

On LB-0, the electromagnetic survey delineates two distinct current axes, at 212E and 325E. This is apparent on profiles from both the 100 metre coil separation and 50 metre coil separation surveys. The distinction is seen only on the higher frequencies, indicating weak conductivity. Interpretation indicates a conductor with a conductivity thickness of less than two siemens at a depth of less than ten metres. The induced polarization survey confirms the presence of polarizable material, with the electromagnetic anomalies corresponding to the edges of the induced polarization surface high.

On LB-1+50S the electromagnetic survey has an axis at 200E while the induced polarization anomaly is centred at 150E, indicating a west dip and the possibility of the polarizable material being in the hanging wall of the "conductor". The electromagnetic interpretation is similar to that of LB-0, a conductor at less than ten metres, but a slightly larger conductivity-thickness. A hole to test both anomalous regions should be drilled; collar at 150E, dip of 45°, azimuth grid east.

On LB-4+00S the electromagnetic profiles have an axis of 262E. It is interpreted as being near surface, less than ten metres depth, with a conductivity-thickness of 4 siemens, and dipping to the west at approximately 60°. No induced polarization was done on this line.

To summarize, an anomalous zone of approximate two hundred metres width extends across the four hundred metres of line separation on the Boulder Creek grid. The zone is likely disseminated sulphides with current channeling along faults or increased sulphide concentrations. Emphasis should be placed on the induced polarization results, with electromagnetic anomalies being drilled only in conjunction with induced polarization anomalies.

C. Upper Boulder Creek

One line, UB-0, was established to follow up two conductors; 20290J, a five channel airborne anomaly, and 20290K, a three channel airborne anomaly.

A anomalous area is located at 200W on UB-0. The electromagnetic results appear to be a "contact" anomaly, representing the contact between a more resistive unit and a more conductive unit. The more conductive terrain is to the west, and the current axis is at 200W. No quantitative interpretation, such as dip, conductivity-thickness, or depth is possible.

The induced polarization results reflect the high conductivity background on the western part of the line. Polarizable material is however, apparent at 200W, and is associated with a resistivity low. This anomaly should be drilled at 200W on UB-0, drilling from west to east.

D. Plinc Claims

One line, LP-0, was established to follow up a soil geochemical anomaly.

A subtle induced polarization anomaly exists between approximately 37W and 37E, with chargeabilities of about five milliseconds above background and resistivities about several hundred ohm-metres below. To test this anomaly a hole should be drilled at 12E, to a depth of approximately fifty metres.

Another area of possible interest is, of course, located just off the end of the line that was surveyed, at approximately 300W. The last two set-ups on the induced polarization array had higher chargeabilities/low resistivities than average.

IV CONCLUSIONS AND RECOMMENDATIONS

Anomalous areas are readily apparent from the induced polarization data. The horizontal loop electromagnetic survey also detects anomalous areas, but seems to reflect the edges of the polarizable bodies. No response is apparent from the magnetics data.

If further work in this area is warranted, it is suggested that just the induced polarization method be used. A gradient array survey with an electrode separation (AB) in the order of three kilometres would allow an area one kilometre by two kilometre to be surveyed quickly and efficiently. Anomalous areas would then be detailed with dipole-dipole.

Consideration should also be given to having the INPUT airborne survey results re-interpreted. Many of the noted conductors appear to be from overburden sources, while some bedrock conductors were overlooked. Re-interpretation may help assign priorities for ground follow-up work, and would save money in the long run.

Geoterrex Limited would like to thank Arbor Resources, and especially Art Troup, Perry Grunenberg, and Larry Zecchel for their assistance and support throughout the survey.

Respectfully submitted
James P Hawkins
James P. Hawkins,
Geophysicist

APPENDIX A

Curriculum Vitae

CURRICULUM VITAE

NAME: HAWKINS, James P.

POSITION: Western Manager, Ground Geophysics Surveys

NATIONALITY: Canadian

DATE OF BIRTH: 23 July, 1954

EDUCATION:

1973 - 1977	University of Western Ontario B.Sc. Geophysics
1977 - 1978	University of New Brunswick extended studies in Geology

EXPERIENCE:

1975 - 1978 (summers)	Geophysical assistant on Geological Surveys of Canada seismic crews in Ontario, Quebec, Maritimes, and Western and high Arctic. Eventually acting as party chief on permafrost projects; using resistivity, radiometric, land based and marine seismic surveys.
1978 - 1982	Field Geophysicist with Geoterrex Limited conducting, supervising and interpreting various types of ground surveys including regional and detailed gravity, I.P., seismic, magnetic, and frequency and time-domain E.M. These projects have involved work from the Canadian Arctic to the American Southwest, with special emphasis on the Canadian and American Cordillera.
1982-present	Geoterrex' Western Manager of Ground Geophysical Surveys responsible for all phases of management, interpretation, scheduling, supervision and long range planning.

geoterrex LTD

APPENDIX B

Instrument Specifications

geoterrex LTD

SPECIFICATIONS

SCINTREX IPR-10A
INDUCED POLARIZATION RECEIVER

MANUFACTURER:	Scintrex Limited 222 Snidercroft Road, Concord, Ontario, Canada L4K 1B5
USE:	Induced Polarization/Resistivity
TYPE:	Time Domain-Digital/Analog Recording Capability
INPUT IMPEDANCE:	3 megohms
PRIMARY VOLTAGE RANGE:	30 microvolts to 30 volts - 12 steps
ACCURACY:	±3% full scale; 0.1% resolution
CHARGEABILITY	
RANGE:	100 milliseconds (100% full Scale)
ACCURACY:	±3% full scale; 0.1 milliseconds resolution
PRIMARY SP BUCKOUT	
RANGE:	±1 volt with 1% accuracy, 1 millivolt resolution
AUTOMATIC SP TRACKING	
RANGE:	20 times, Vp, 30 microvolts to 1 volt
ANALOG RECORDER	
OUTPUT:	±4 volts full range, 1 K ohm source resistance
DIGITAL DISPLAY:	LCD continuous (above -10°C) LED flashing (below -10°C)
TRANSMITTER TIMING	
STABILITY:	Need only exceed measuring program 1,2,4,8 quarter periods
POWER SUPPLY:	4 D size dry cells, 1 alkaline dry cell-penlight
OPERATING RANGE:	15°F to 140°C/ -10°C to + 60°C
DIMENSIONS:	12 x 6 x 7 inches/31 x 15 x 17 centimeters
WEIGHT:	8 pounds / 3.6 kilograms

SPECIFICATIONS

SCINTREX IPR-7

INDUCED POLARIZATION RECEIVER

MANUFACTURER: Scintrex Limited,
222 Snidercroft Road,
Concord, Ontario

USE: Induced Polarization/Resistivity

TYPE: Time Domain, Analog Newmont type

INPUT IMPEDANCE: 300 K ohms

PRIMARY VOLTAGE RANGE: 300 microvolts to 30 volts

ACCURACY: ±3% full scale

CHARGEABILITY (M)

RANGE: 0 to 100 and 0 to 300 milliseconds

ACCURACY: ±5% full scale

CURVE FACTOR (L)

RANGE: 0 to 100 and 0 to 300 milliseconds

ACCURACY: ±5% full scale

DELAY TIME BEFORE
INTEGRATION: 0.45 seconds

INTEGRATION PERIOD: 0.65 seconds

SP AND VLF NOISE
COMPENSATION: Manual: ± 1.5 millivolts
Automatic: 1 m^V range ± m^V total
30 m^V range ± m^V total

OPERATING TEMPERATURE: -20°F to 130°F/-29°C to 55°C
(to 100% humidity non-condensing)

POWER SUPPLY: Internal rechargeable Nicad batteries
12 volts external charger

DIMENSIONS: 14 x 11 x 6.5 inches/35.5 x 28 x 16.5 centimeters

WEIGHT: 13.5 pounds/6.1 kilograms including batteries

SPECIFICATIONS

ELLIOT 15A

INDUCED POLARIZATION TRANSMITTER

MANUFACTURER:	Elliot Geophysical Company 4653 East Pima Street, Tucson, Arizona 85712
USE:	Induced Polarization/Resistivity
TYPE:	TimeDomain - Solid State
INPUT POWER:	Single Phase - 400 cps, 115 volts, 2 KVA
OUTPUT POWER	
VOLTAGE:	200 to 3000 volts in 12 taps
CURRENT:	5 amperes maximum
TIMING CYCLE:	On and off periods adjustable
OPERATING TEMPERATURE:	+5°F to 140°F /-15°C to + 60°C
DIMENSIONS:	10.5 x 16 x 11.5 inches/26.7 x 40.6 x 29.2 centimeters
WEIGHT:	45 pounds/20.4 kilograms

SPECIFICATIONS

ELLIOT 15A

INDUCED POLARIZATION TRANSMITTER POWER SUPPLY

MANUFACTURER:	Elliot Geophysical Company 4653 East Pima Street, Tucson, Arizona 85712
TYPE:	Alleco Brushless, single phase, 400 cps, 120 volts, shaft driven
OUTPUT:	2 KVA
ENGINE:	Briggs and Stratton type 100232, gasoline 4 hp, aircooled, recoil start
DIMENSIONS:	17 x 25 x 18 inches/ 43.2 x 63.5 x 45.7 centimeters
WEIGHT:	72 pounds/ 32.7 kilograms

SPECIFICATIONS

APEX PARAMETRICS MAXMIN II+

HORIZONTAL LOOP ELECTROMAGNETIC UNIT

MANUFACTURER:	Apex Parametrics Limited 200 Steelcase Road East Markham, Ontario, Canada L3R 1G2
USE:	a) Horizontal Loop Coplanar System (Max) b) Horizontal Loop Minimum Coupled System (Min c) Vertical Loop-Fixed Transmitter (VL)
TYPE:	1) In phase and Quadrature components of secondary measured in Max and Min modes. 2) Tilt angle of total field measured in VL mode. 3) Direct readout on analog meters.
FREQUENCIES:	222,444,888,1777 and 3555 cps
SCALE RANGES:	In phase: ±20% normal, ±100% by switch Quadrature: ±20% normal, ±100% switch, Tilt: ±75% slope, Null: null sensitivity adjustable by separation switch.
COIL SEPARATIONS:	Metres: 50,100,150,200,250, and 300 (MM II) Feet: 200,300,400,600,800 and 1000 (MM II F)
PENETRATION:	Up to 0.75 coil separation
READING REPEATABILITY:	±0.25% to ±1%, dependent on coil separation and frequency used.
TRANSMITTER DIPOLE MOMENT:	275 Atm^2 at 222 cps, 250 Atm^2 at 444 cps, 200 Atm^2 at 888 cps, 110 Atm^2 at 1777 cps and 55 Atm^2 at 3555 cps.

POWER SUPPLY:	Receiver : 4 - 9 volt alkaline transistor radio type Transmitter: 12 volt 6 amp-hour Gel-cell rechargeable battery.
OPERATING TEMPERATURE:	- 40°F to + 140°F / -40°C to 60°C
WEIGHTS:	Receiver: 13 pounds/6 kilograms Transmitter: 30 pounds / 13.5 kilograms

SPECIFICATIONS

SCINTREX MP-2

GROUND MAGNOMETER

MANUFACTURER:	Scintrex Limited 222 Snidercroft Road, Concord, Ontario, Canada L4K 1B5
TYPE:	Portable proton precession
RANGE:	20,000 to 100,000 gammas (25 overlapping steps)
SENSITIVITY:	1 gamma
ACCURACY:	±1 gamma over full range
SAMPLE RATE:	Manual -3.7 seconds, automatic -3.7 seconds repetitive
GRADIENT TOLERANCE:	Up to 1500 gammas/foot or 5000 gammas/metre
OUTPUT:	5 digit LED readout in gammas
POWER SUPPLY:	8 alkaline "D" dry cells (flashlight type)
TEMPERATURE RANGE:	-30°F to +140°F/-35°C to +60°C
SENSOR:	Omnidirectional, shielded, noise-cancelling dual coil, optimized for high gradient tolerance
DIMENSIONS:	Console: 3 x 6 x 10 inches/8 x 16 x 25 centimeters Sensor: 3 x 6 inches/8 x 15 centimeters Staff: 1 x 61 inches/3 x 155 meters
WEIGHT:	Console: 3.96 pounds/1.8 kilograms Sensor: 2.9 pounds/1.3 kilograms Staff: 1.3 pounds/0.6 kilograms

TABLE I

CLAIM STATUS

CLAIM NAME	RECORD NO.	DATE CLAIM RECORDED
Syndicate 1	YA 79198	16 September, 1983
Syndicate 2	YA 79199	16 September, 1983
Syndicate 3	YA 79200	16 September, 1983
Syndicate 4	YA 79201	16 September, 1983
Syndicate 5	YA 79202	16 September, 1983
Syndicate 6	YA 79203	16 September, 1983
Syndicate 7	YA 79204	16 September, 1983
Syndicate 8	YA 79205	16 September, 1983
Syndicate 9	YA 79206	16 September, 1983
Syndicate 10	YA 79207	16 September, 1983
Syndicate 11	YA 79208	16 September, 1983
Syndicate 12	YA 79209	16 September, 1983
Syndicate 13	YA 79210	16 September, 1983
Syndicate 14	YA 79211	16 September, 1983
Syndicate 15	YA 79212	16 September, 1983
Syndicate 16	YA 79213	16 September, 1983
Syndicate 17	YA 79214	16 September, 1983
Syndicate 18	YA 79215	16 September, 1983
Syndicate 19	YA 79216	16 September, 1983
Syndicate 20	YA 79217	16 September, 1983
Syndicate 21	YA 79218	16 September, 1983
Syndicate 22	YA 79219	16 September, 1983
Syndicate 23	YA 79220	16 September, 1983
Syndicate 24	YA 79221	16 September, 1983
Syndicate 25	YA 79222	16 September, 1983
Syndicate 26	YA 79223	16 September, 1983
Syndicate 27	YA 79224	16 September, 1983
Syndicate 28	YA 79225	16 September, 1983
Syndicate 29	YA 79226	16 September, 1983
Syndicate 30	YA 79227	16 September, 1983
Syndicate 31	YA 79228	16 September, 1983
Syndicate 32	YA 79229	16 September, 1983
Syndicate 33	YA 79230	16 September, 1983
Syndicate 34	YA 79231	16 September, 1983
Syndicate 35	YA 79232	16 September, 1983
Syndicate 36	YA 79233	16 September, 1983
Syndicate 37	YA 79234	16 September, 1983
Syndicate 38	YA 79235	16 September, 1983
Syndicate 39	YA 79236	16 September, 1983
Syndicate 40	YA 79237	16 September, 1983

CLAIM STATUS (continued)

CLAIM NAME	RECORD NO.	DATE CLAIM RECORDED
Filler 1	YA 84252	16 July, 1984
Filler 2	YA 04253	16 July, 1984
Filler 3	YA 84254	16 July, 1984
Filler 4	YA 84255	16 July, 1984
Filler 5	YA 84256	16 July, 1984
Filler 6	YA 84257	16 July, 1984
Filler 7	YA 84258	16 July, 1984
Filler 8	YA 84259	16 July, 1984
'83' 1	YA 79509	1 December, 1983
'83' 2	YA 79510	1 December, 1983
'83' 3	YA 79511	1 December, 1983
'83' 4	YA 79512	1 December, 1983
'83' 5	YA 79513	1 December, 1983
'83' 6	YA 79514	1 December, 1983
'83' 7	YA 79515	1 December, 1983
'83' 8	YA 79516	1 December, 1983
'83' 9	YA 79517	1 December, 1983
'83' 10	YA 79518	1 December, 1983
'83' 11	YA 79519	1 December, 1983
'83' 12	YA 79520	1 December, 1983
'83' 13	YA 79521	1 December, 1983
'83' 14	YA 79522	1 December, 1983
'83' 15	YA 79523	1 December, 1983
'83' 16	YA 79524	1 December, 1983
'83' 17	YA 79525	1 December, 1983
'83' 18	YA 79526	1 December, 1983
'83' 19	YA 79527	1 December, 1983
'83' 20	YA 79528	1 December, 1983
'83' 21	YA 79529	1 December, 1983
'83' 22	YA 79530	1 December, 1983
'83' 23	YA 79531	1 December, 1983
'83' 24	YA 79532	1 December, 1983
'83' 25	YA 79533	1 December, 1983
'83' 26	YA 79534	1 December, 1983
'83' 27	YA 79535	1 December, 1983
'83' 28	YA 79536	1 December, 1983
'83' 29	YA 79537	1 December, 1983
'83' 30	YA 79538	1 December, 1983

CLAIM STATUS (continued)

CLAIM NAME	RECORD NO.	DATE CLAIM RECORDED
'83' 31	YA 79539	1 December, 1983
'83' 32	YA 79540	1 December, 1983
'83' 33	YA 79541	1 December, 1983
'83' 34	YA 79542	1 December, 1983
'83' 35	YA 79543	1 December, 1983
'83' 36	YA 79544	1 December, 1983
'83' 37	YA 79545	1 December, 1983
'83' 38	YA 79546	1 December, 1983
'83' 39	YA 79547	1 December, 1983
'83' 30	YA 79548	1 December, 1983
'98' 1 PLUS	YA 84260	16 July, 1984
'98' 3 PLUS	YA 84261	16 July, 1984
WILD 1	YA 79608	5 December, 1983
WILD CARD	YA 79609	5 December, 1983

COST STATEMENT
WILLIAM T. DAWSON
GEOPHYSICAL, DIAMOND DRILLING, TRENCHING & ROAD BUILDING
BONANZA CREEK PROPERTY
15 October - 11 November 1984

RECEIVED NOV 26 1984 MINING RECORDER DAWSON, Y.T. I.A. & N.D.

GENERAL COSTS

FOOD & ACCOMMODATION		
3 persons, 62 mandays @ $54.01		$ 3,348.58
FUEL		772.22
SUPPLIES		263.58
SHIPPING & POSTAGE		120.06
REPAIRS		308.75
FIELD TELEPHONE SERVICE		64.20
TAXIS		15.40
AIR FARES (CP Air) 2 Vcr/Wth, 3,8 Nov		900.00
RENTALS		
NORCAN 4wd PU, 1-11 Nov, 11 days @ $43	$473.00	
EZEKIEL Field/Camp Equipment,62 mandays @ $6	372.00	845.00
CONSULTANT FEES, ARCHEAN ENGINEERING		495.00
REPORT PREPARATION		3,385.30
TOTAL GENERAL COSTS		$10,518.09

ROAD BUILDING & TRENCHING

SALARIES & WAGES	
2 persons, 7 man days @ $95.65	$ 669.55
BENEFITS @ 20%	133.91
CONTRACTOR	
WAYNE HAWKS D8K, 20-25 Oct	5,700.00
ASSAYS/ANALYSES - Chemex Labs	
3 Rocks for Cu, Pb, Zn, Ag, W, Sn, Au	77.49
GENERAL COSTS APPORTIONED	
7/57 X $10,518.09	1,291.69
TOTAL ROAD BUILDING & TRENCHING COST	$7,872.65

I.P. HORIZONTAL LOOP ELECTROMAGNETIC & MAGNETIC SURVEY

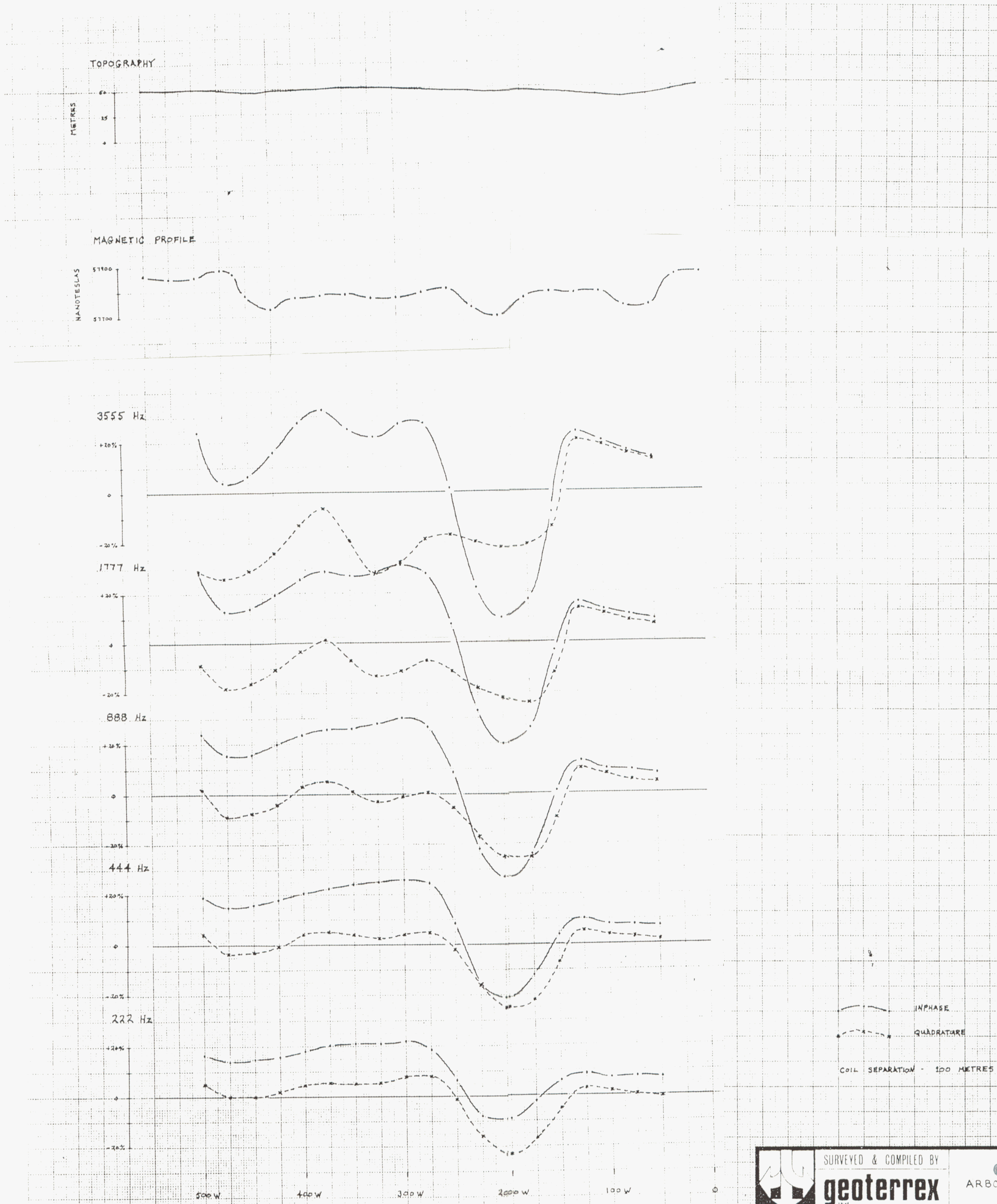
CONTRACTOR	
GEOTERREX, 7 - 30 Sep	$23,985.49

DIAMOND DRILLING COST

SALARIES & WAGES	
3 persons, 50 mandays @ $95.65	$ 4,782.50
BENEFITS @ 20%	956.50
CONTRACTOR	
PHIL'S DIAMOND DRILLING, 464' @ $40	18,560.00
ASSAYS & ANALYSES, Chemex Labs	
100 Core for Cu, Pb, Zn, Ag, Sn, W, Au	2,583.00
SUPPLIES (Mud, Rods, Bits)	2,200.00
FOOD & ACCOMMODATION, 52 mandays @ $55	2,860.00
GENERAL COSTS APPORTIONED	
50/57 X $10,518.09	9,226.39
TOTAL DIAMOND DRILLING COST	$41,168.39

COSTS APPORTIONED TO CLAIMS

Claim		Road Trenching	Drilling	Geoterrex	Total
Syndicate	23	$ 633.88	$	$	$ 633.88
Syndicate	24	933.88	26,794.94	1,042.85	28,771.67
Syndicate	31	633.88			633.88
Syndicate	39	633.88			633.88
Syndicate	46	633.88			633.88
Syndicate	54	633.88			633.88
Syndicate	60			1,042.85	1,042.85
Syndicate	61	633.88		1,042.85	1,676.73
Syndicate	62	633.88		1,042.85	1,676.73
Syndicate	71			1,042.85	1,042.85
Syndicate	72			1,042.85	1,042.85
Syndicate	73			1,042.85	1,042.85
Syndicate	74			1,042.85	1,042.85
Syndicate	75			1,042.85	1,042.85
Syndicate	76			1,042.85	1,042.85
Syndicate	77			1,042.85	1,042.85
Syndicate	78			1,042.85	1,042.85
Syndicate	79			1,042.85	1,042.85
Syndicate	80			1,042.85	1,042.85
Syndicate	81			1,042.85	1,042.85
Syndicate	82			1,042.85	1,042.85
"83"	26		4,258.80		4,258.80
"83"	27			1,042.84	1,042.84
"83"	31		10,114.65	1,042.84	11,157.49
"83"	32			1,042.84	1,042.84
"98"	17			1,042.84	1,042.84
"98"	22			1,042.84	1,042.84
"98"	28			1,042.84	1,042.84
Plinc	21	933.87		1,042.84	1,976.71
Plinc	22	933.87			933.87
Filler	8	633.87			633.87
TOTALS		$7,872.65	$41,168.39	$23,985.49	$73,026.53



SURVEYED & COMPILED BY
geoterrex ltd

091604

ARBOR RESOURCES INC.

UPPER BOULDER CREEK, DAWSON CITY, YUKON

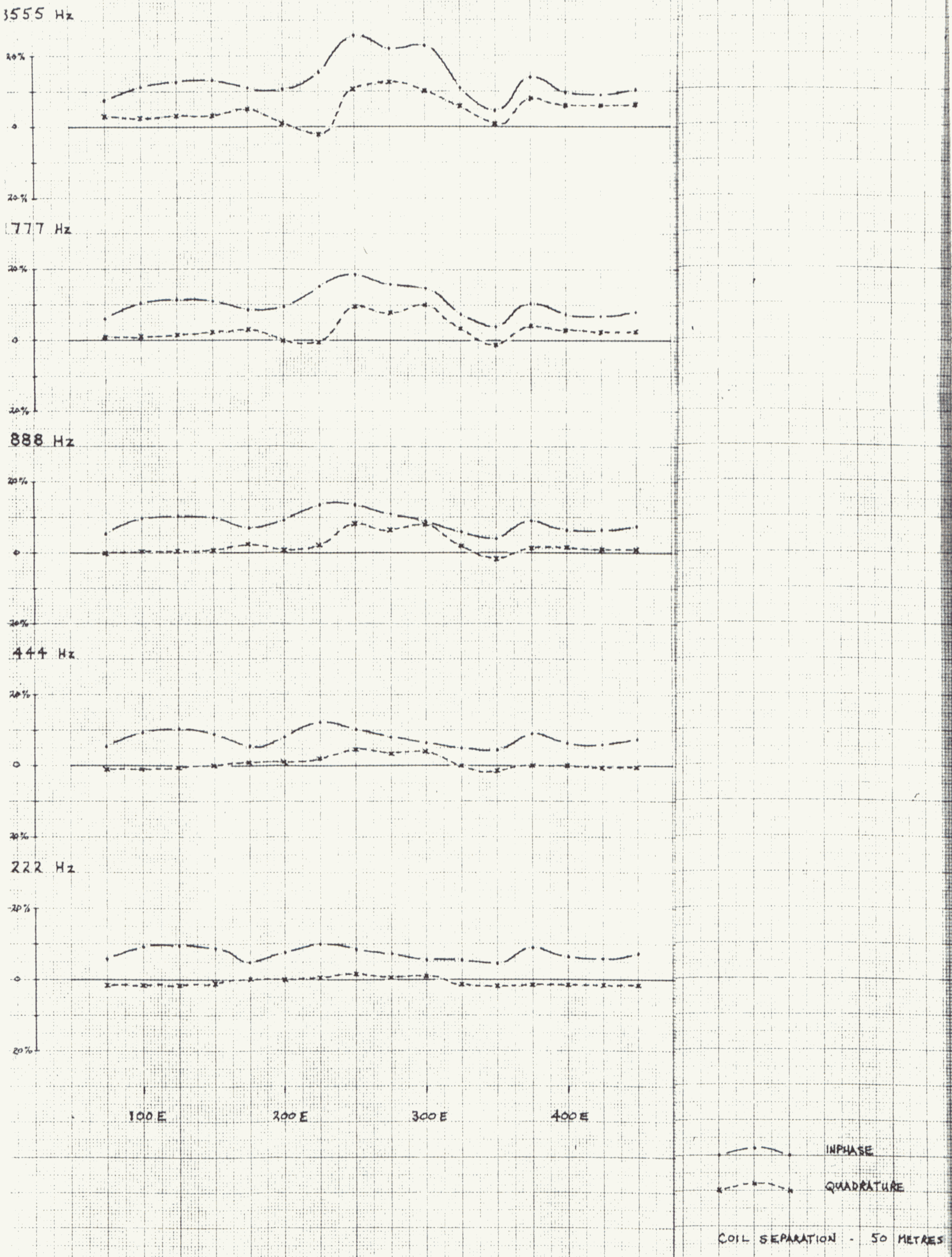
Scales:
HORIZONTAL - 1:2500
VERTICAL - MAG. 1 cm : 100 N.T.
E.M. 1 cm : 10 %

Instruments:
APEX PARAMETRICS MAX-MIN II+
SCINTREX MP-2 MAGNETOMETER

HORIZONTAL LOOP
ELECTROMAGNETIC PROFILES

LINE UB-0

J.H. BB. L.Z. J.H.



SURVEYED & COMPILED BY

geoterrex ltd

FOR

ARBOR RESOURCES INC.

091604

BOULDER CREEK, DAWSON CITY, YUKON

Scales:

HORIZONTAL 1:2500

VERTICAL 1 cm = 10 %

HORIZONTAL LOOP ELECTROMAGNETIC PROFILES

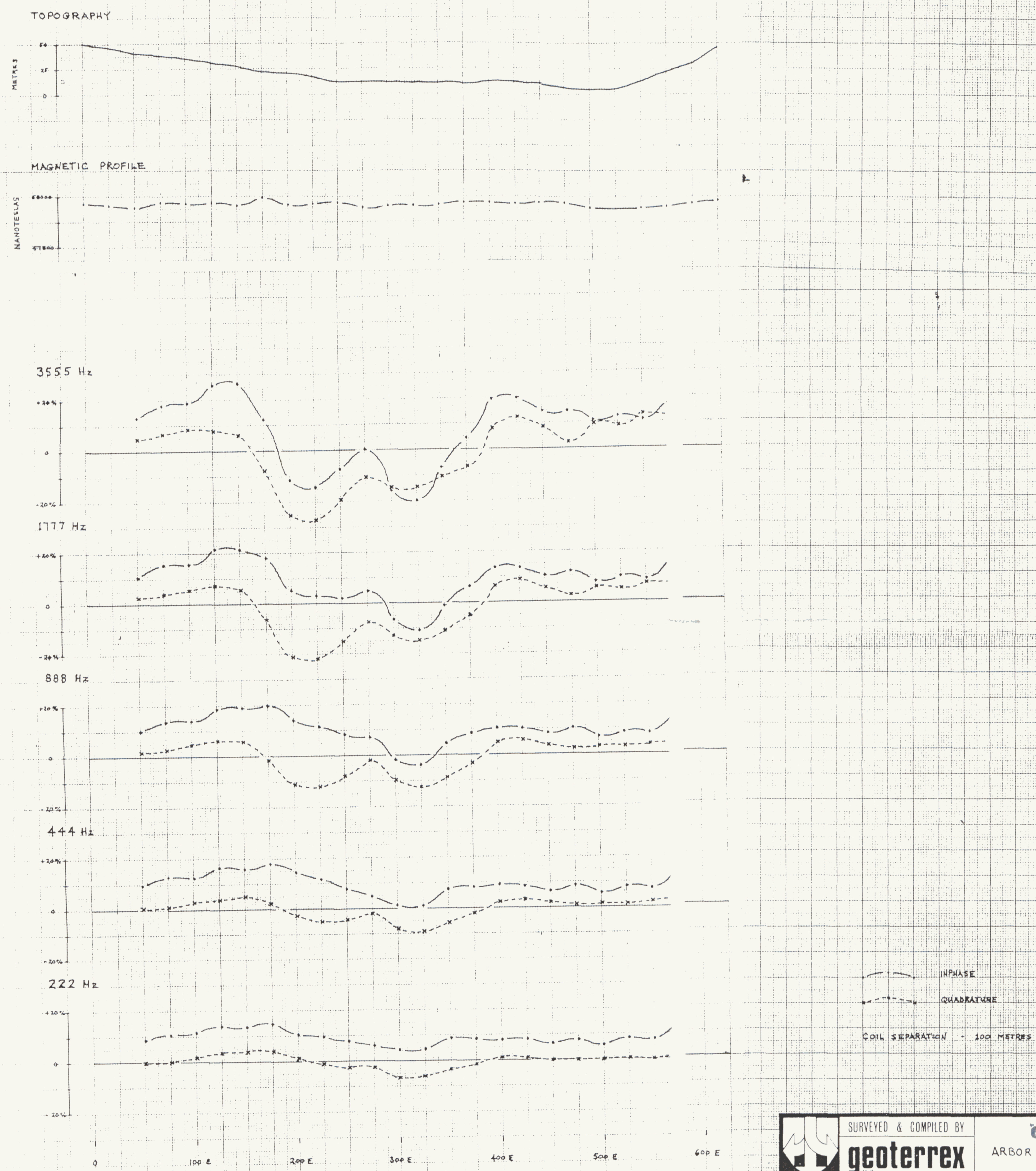
LINE LB-0

Instruments:

APEX PARAMETRICS MAX-MIN II+

SURVEY BY J.H. B.B. L.Z. PLOTTED BY J.H.

DATE SEPT. 1984 GEOTERREX PROJECT No. 125



SURVEYED & COMPILED BY

geoterrex ltd

091601

ARBOR RESOURCES INC.

BOULDER CREEK, DAWSON CITY, YUKON

Scales:
HORIZONTAL - 1:2500
VERTICAL - MAG. - 1 cm = 100 NT.
E.M. - 1 cm = 10 %

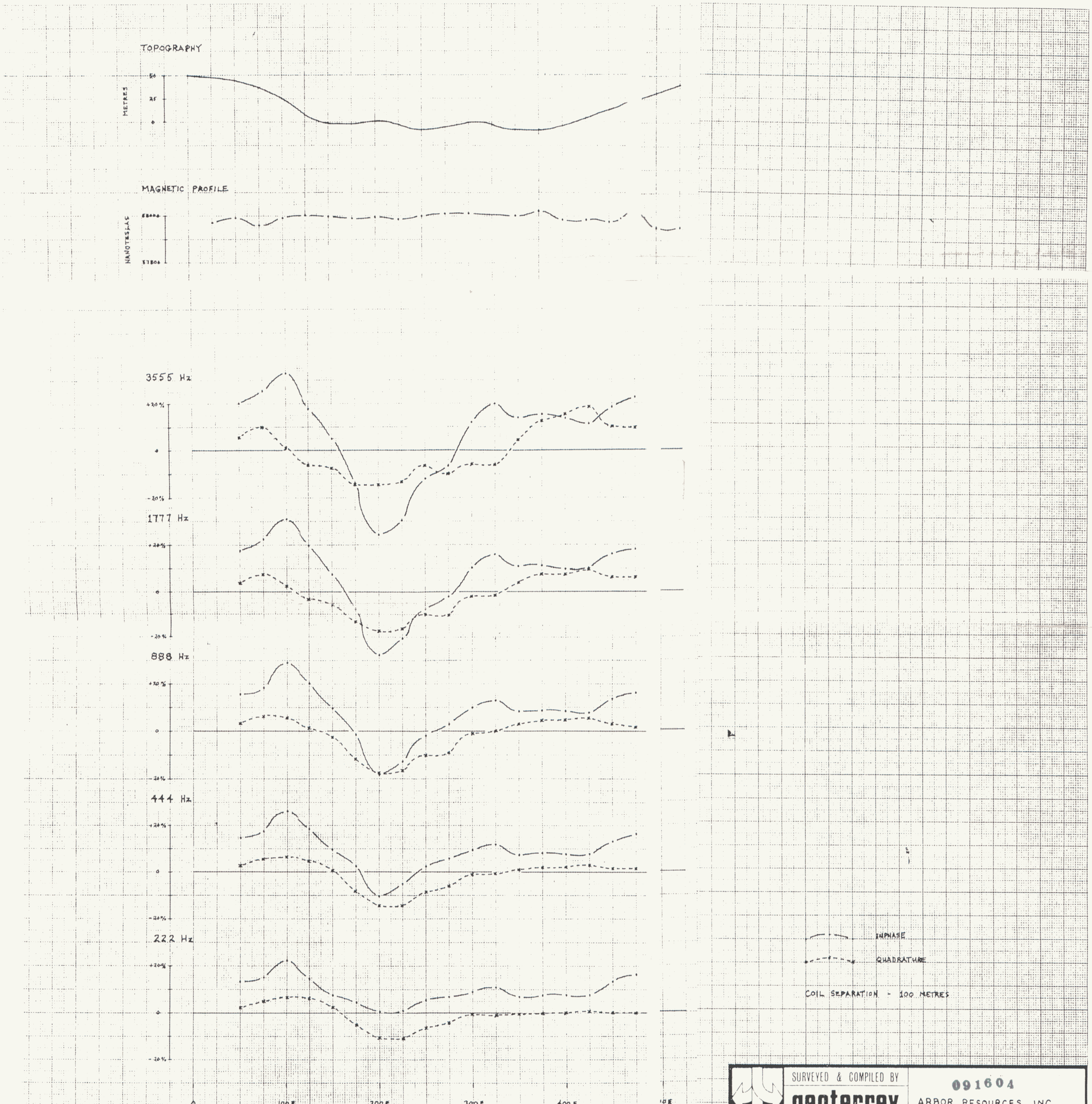
HORIZONTAL LOOP
ELECTROMAGNETIC PROFILES

LINE - LB-0

Instruments
APEX PARAMETRICS MAX-MIN II +
SCINTREX MP-2 MAGNETOMETER

SURVEY BY J.H. B.B. L.Z. PLOTTED BY J.H.
DATE SEPT. 1984

125



SURVEYED & COMPILED BY geoterrex ltd

091604

ARBOR RESOURCES INC.

BOULDER CREEK, DAWSON CITY, YUKON

Scales:

HORIZONTAL - 1:2500

VERTICAL - MAG. - 1 cm = 100 N.T.

E.M. - 1 cm = 10 %

HORIZONTAL LOOP ELECTROMAGNETIC PROFILES

LINE LB - 1+50 S

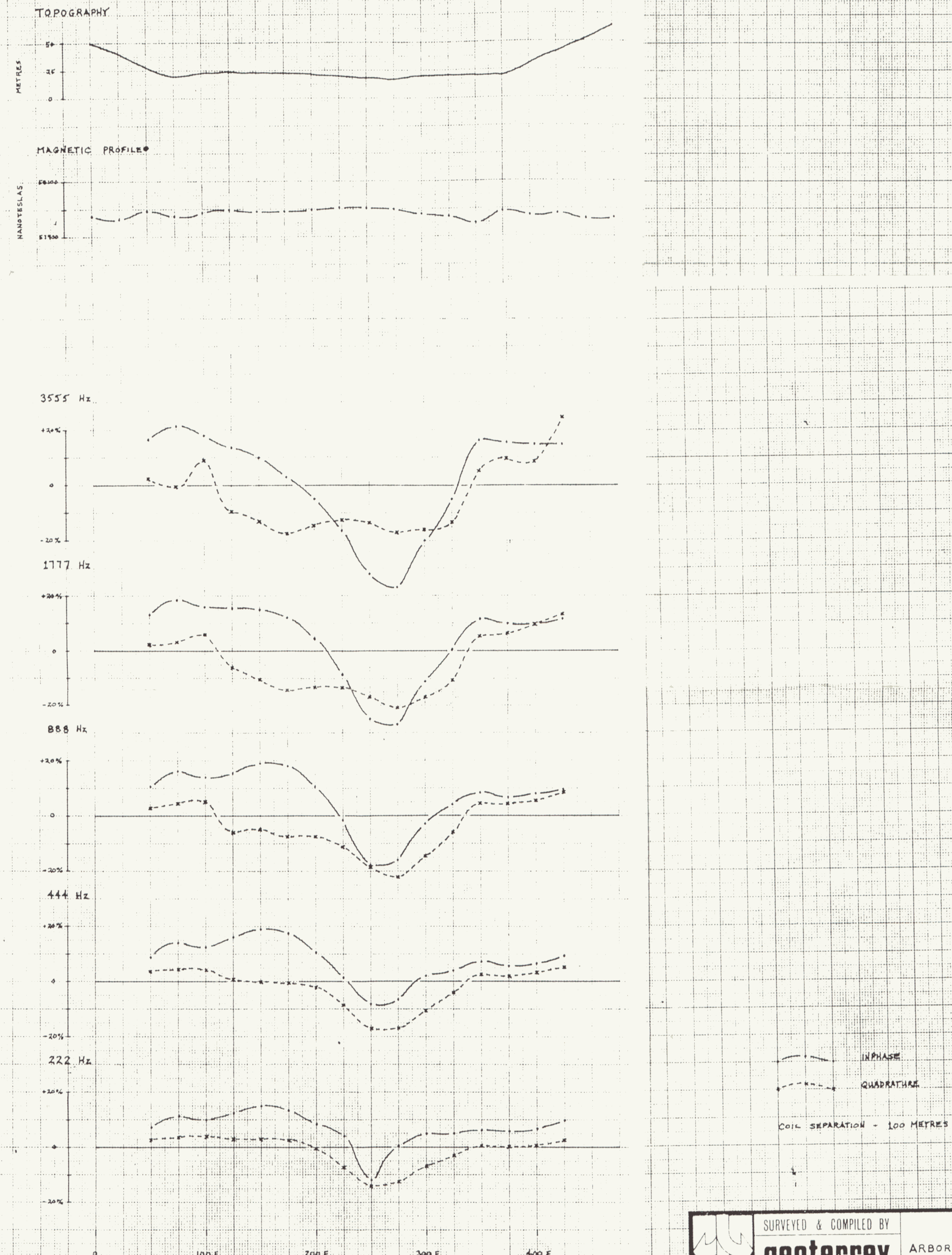
Instruments

APEX PARAMETRICS MAX-MIN II+

SCINTREX MP-2 MAGNETOMETER

J.H. B.B. L.Z. PLOTTED BY J.H.

SEPT. 1984



SURVEYED & COMPILED BY

geoterrex ltd

ARBOR RESOURCES INC.

091604

BOULDER CREEK, DAWSON CITY, YUKON

Scales:

HORIZONTAL - 1:2500

VERTICAL - MAG. 1 cm = 100 N.T.

E.M. 1 cm = 10%

HORIZONTAL LOOP
ELECTROMAGNETIC PROFILES

LINE LB-4+00 S

Instruments

APEX PARAMETRICS MAX-MIN II +

SCINTREX MP-Z MAGNETOMETER

J.H. B.B. L.Z. PLOTTED BY J.H.

SEPT. 1984 125