



REPORT ON PHASE I GEOLOGY,
SOIL GEOCHEMISTRY SURVEY,
INDUCED POLARIZATION SURVEY
AND DIAMOND DRILLING

EMMA PROPERTY

(Emma, Emma 1 to 22, Su 1 to 3 Claims)
Victoria, Nanaimo Mining Divisions
NTS 92F/2, 49°10'N Lat., 124°35'W Long.

for
AU RESOURCES LTD.

February 29, 1988

G.R. Cope, B.Sc.

VOLUME 3 OF 4

FILMED

LOG NO. 0331

GEOLOGICAL BRANCH
ASSESSMENT REPORT

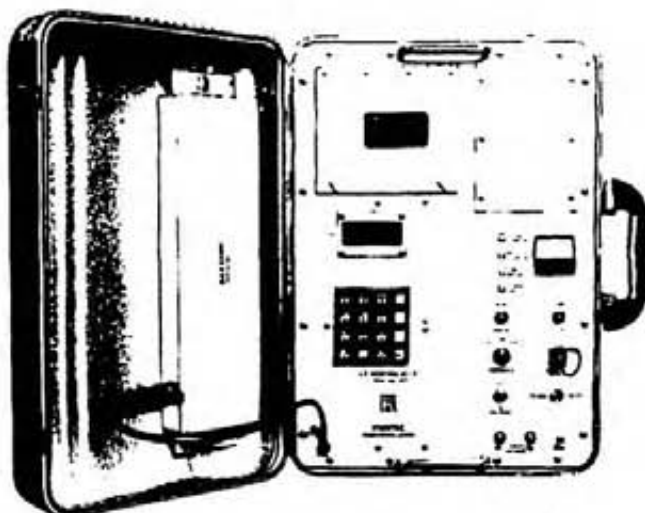
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Part 3 of 4

Appendix VIa

IP EQUIPMENT SPECIFICATIONS

M-4 Induced Polarization Receiver



DESCRIPTION

The Hunttec 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 Hunttec 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 Hunttec's new M-4 transmitters, which offer precisely timed constant-current output and both time and frequency domain waveforms, compati-

ble 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 Hunttec 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 3 1/2 digit low-temperature liquid-crystal readout
- Analogue meter for source resistance measurement
- 10⁶ 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.

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h hunttec
(70) LIMITED

SPECIFICATIONS

Inputs

Signal Channel

Range: 5×10^{-1} 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: 2×10^9 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 $3\frac{1}{2}$ 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: $3\frac{1}{2}$ 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 $+55^\circ\text{C}$

Storage: -40°C to $+70^\circ\text{C}$

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% 40Hz 2% to 80Hz	$\pm 1\%$	$\pm 1\%$	0.1% (2)	0.1% (3) full scale
0.01 milliradians	10^{-8} volts	10^{-8} volts	10^{-1} volts	10^{-1} 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.

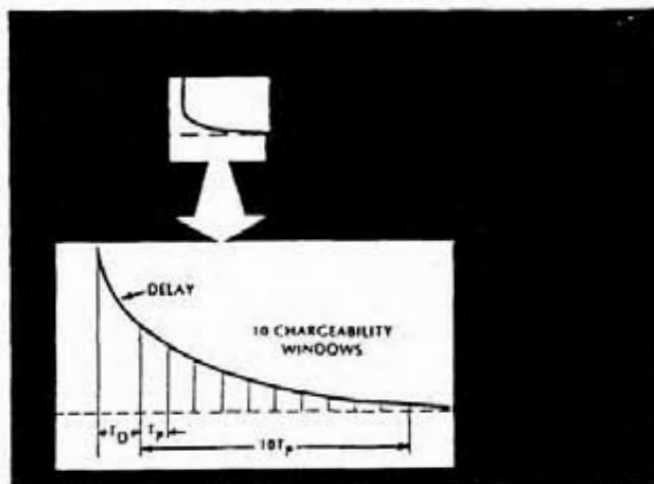
Cassette Data: recorded in ASCII, 9 digits with decimal point fixed for four decimal digits.

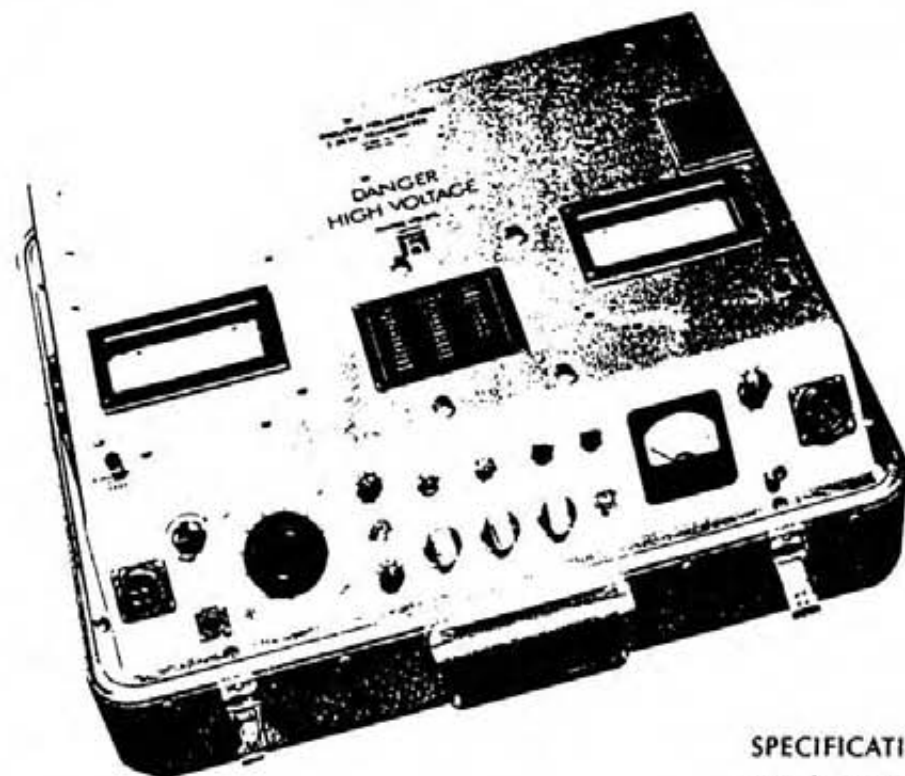
Display Data: $3\frac{1}{2}$ digits, floating decimal point

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

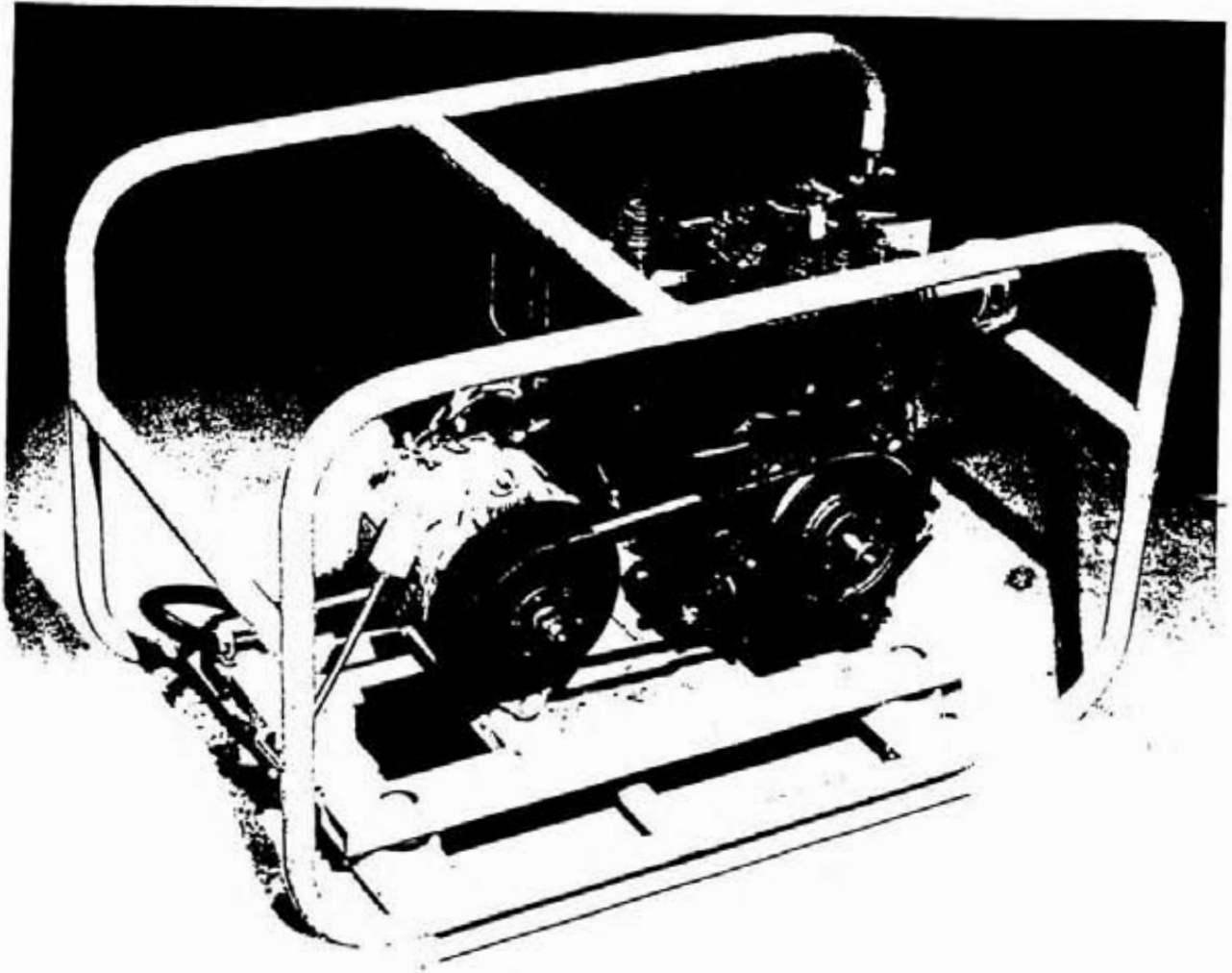
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|---|--|
| A) Power input: | 96 — 144 V line to line 3 phase 400 Hz (from Hunttec generator set) |
| B) Output: | Voltage: 150 — 2200 V dc in 8 steps
Current: 0.2 — 7 A regulated** |
| C) Current regulation: | Less than $\pm 0.1\%$ change for $\pm 10\%$ 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 $+60^{\circ}\text{C}$ |
| 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 k Ω and 0-100 k Ω |
| I) Input voltage meter: | 0-150 V |
| J) Dummy load: | Two levels: 500 W and 1.75 kW |
| K) Temperature range: | -34°C to $+50^{\circ}\text{C}$ |
| 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.



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SPECIFICATIONS

M-4 2.5 kW Engine Driven Alternator

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

Appendix VIb

NOTES ON IP/RESISTIVITY

NOTES ON IP/RESISTIVITY SURVEYS

General

Induced Polarization (IP)/resistivity surveys are commonly conducted in the time domain and frequency domain, and less frequently, as spectral or complex resistivity measurements. There are a variety of geometrical arrays that can be employed.

The present survey employed time-domain measurements using the dipole-dipole array. Measurements were made with the Hunttec Mk IV receiver and 2.5 kw transmitter.

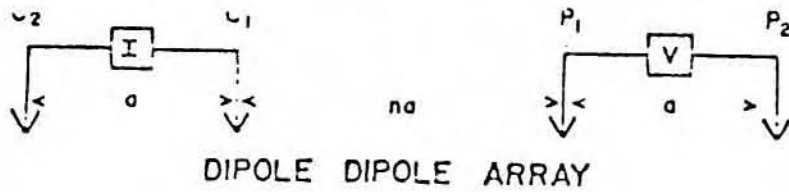
The following discussion sets out in some detail the principles and procedures of the IP method as related to the present survey.

Time Domain Method

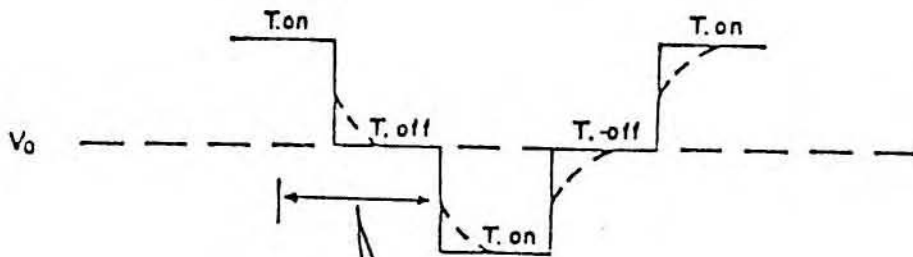
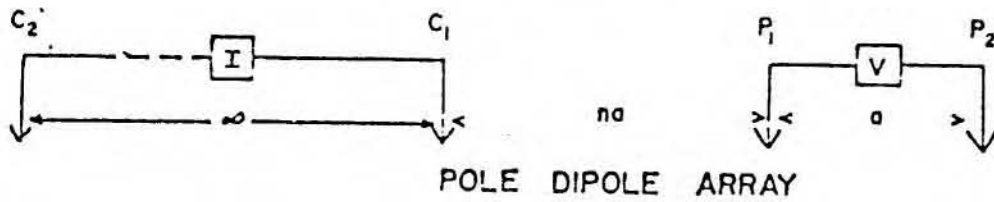
As shown in Figure 1, in the time domain a modified, square-wave current consisting of "on/off/on/off" cycles of equal duration is transmitted into the ground through a pair of electrodes (current dipole). The primary (V_p) and secondary (V_s) voltages generated in the ground are measured at another pair of electrodes (potential dipole). The primary voltage, measured during the "on" current cycles, is a function of the electrical resistivity of the ground. The secondary voltage, measured during "off" current cycles, is the IP effect which reflects the amount of polarizable minerals, such as metallic sulphides, graphite, etc., in the ground.

The apparent resistivity of the ground is not directly measured, but is obtained by a mathematical formula utilizing the primary voltage value, the current output from the transmitter at the same instant and a geometrical constant dependent on the array type being used:

$$\rho_a = \frac{V_p}{I} \times aF$$

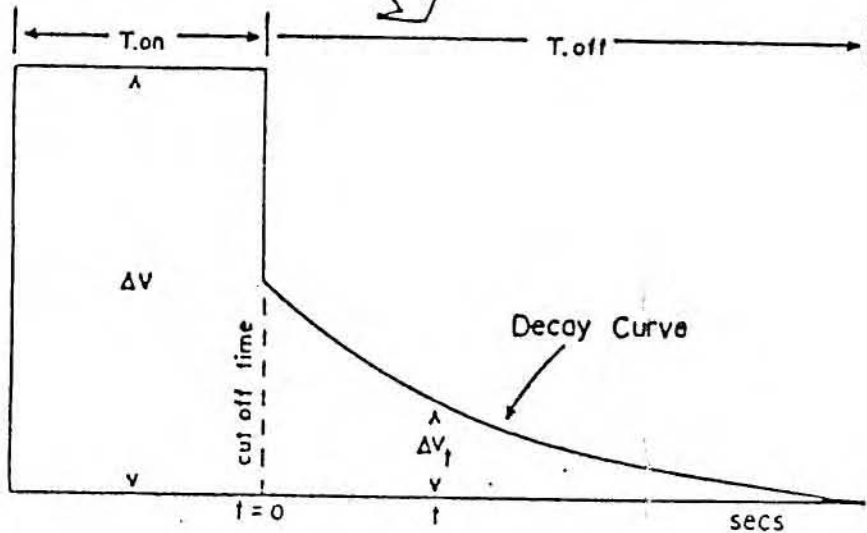


Apparent Resistivity $\rho_a = \frac{V}{I} \cdot G$
 where G is a geometrical factor
 dependant on survey array



———— Transmitter waveform
 - - - - Signal "seen" at reciever

T.on = 2 secs.
 T.off = 2 secs.



Chargeability at time t $M_t = \frac{\Delta V_t}{\Delta V}$

PRINCIPLE OF TIME DOMAIN I.P.

Figure 1

where: ρ_a = apparent resistivity in ohm-meters
 V_p = primary voltage (volts)
 I = transmitted current (amps)
 a = electrode spacing in meters
 F = geometrical factor depending on the electrode array used.

The Huntec Mk IV system measures the secondary voltage or IP effect at 10 time intervals of equal width. The width of the time window (T_p) and the length of the delay (T_d) between the start of an "off" cycle and the beginning of the IP measurement are adjustable to suit the conditions of the survey. In the present survey, these were set at 100 msec and 100 msec, respectively, and the IP effect was recorded for each of five individual time windows (M_1 , M_3 , M_5 , M_7 and M_9) and for the total decay voltage (M_T). The secondary voltage divided by the primary voltage yields the parameter chargeability in milliseconds.

The decay curve constructed from the ten chargeability observations is generally in the form of an exponential decay curve. It frequently can be split into two portions - an early fast decay portion and a later slow decay portion. The fast decay portion is generally due to inductive effects, while the later slow decay predominantly reflects true polarization effects. In theory chargeability is the value of the slow decay extrapolated backwards to the instant of transmitter shut-off.

Survey Arrays

A number of different arrays are available for carrying out IP measurements. The ones generally used in mineral exploration are the dipole-dipole, pole-dipole and the gradient array, shown graphically in Figure 2, and described further below.

(1) Dipole-Dipole Array

This array is one of the most commonly used arrays in IP and is the

only one used with time-domain, frequency-domain and spectral surveys.

The system employs four moving electrodes with a layout as shown in Figure 2. The two current electrodes C_1 and C_2 and the two potential or measuring electrodes P_1 and P_2 have the same separation, called the 'a' spacing. The interval between the current and potential pair is generally some fixed multiple 'n' of this 'a' spacing. Measurements with the dipole-dipole array are plotted at the mid-point of the array.

As the 'n' value is increased, (i.e., as the current and potential dipoles are moved farther and farther apart), this has the effect of increasing the depth of exploration. While this is typically quoted as being one half of the total array length, actual depth of exploration is strongly dependent on the distribution of resistivity in the ground and is often much less than half the array length, particularly if conductive overburden is present.

Advantages

1. The system has low inductive coupling because the current wires and reading wires can be kept separated.
2. Anomalies are symmetrical.
3. Sensitivity and resolution are good where 'a' and 'n' are chosen appropriately relative to the target dimensions and depth.

Disadvantages

1. Operations can be slow since all four electrodes are moved along the survey line.

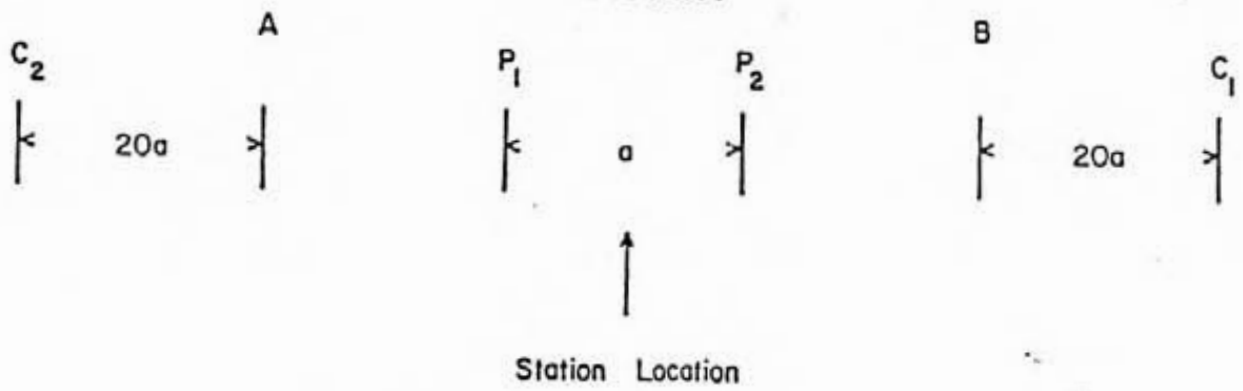
DIPOLE - DIPOLE



POLE - DIPOLE



GRADIENT



A, B = extent of survey

2. Electrical contact can be especially difficult in areas with highly resistive surficial materials, such as dry sand, permafrost or exposed bedrock.
3. Primary (V_p) and secondary (V_s) voltages are lower than with other arrays which can cause measurement difficulties and lack of penetration in areas of high surface conductivity.

(2) Pole-Dipole Array

The pole-dipole (or three electrode) array is frequently used, most often in the time-domain.

Electrodes C_1 and P_1 - P_2 move along the survey line. While C_2 , the remote current electrode, can be anywhere in the area provided it is at a large distance from the station being measured (In highly conductive ground the actual location of C_2 may be critical as current paths may be adversely distorted). The separation between C_1 and P_1 P_2 can be increased, usually at integral intervals, to achieve varying depths of exploration. Readings are plotted in several conventions between the potential dipole and the active (moving) current electrode.

Advantages

1. Faster than the double-dipole array since only three electrodes are moved.
2. In areas of bad contact, i.e. dry, frozen or outcrop areas, it is easier to use than dipole-dipole since only one current electrode has to be moved.
3. Better depth of exploration than the double-dipole array.
4. Fairly sensitive and fairly good resolution.

Disadvantages

1. Yields asymmetrical anomalies with the anomaly peak seldom directly over the polarizable source. The anomaly shape is dependent on the direction of C_2 .
2. More wire is needed because of the array length; this leads to logistical problems (moose, rabbits, etc.).
3. EM coupling is higher than with the dipole-dipole array.

Gradient Array

In the gradient array, normally only run in the time domain, two current electrodes are placed a large, fixed distance 'D' apart. The potential electrode pair are held at a constant separation 'a' and move along survey lines parallel to the line joining C_1 and C_2 . The separation between P_1 and P_2 is not rigidly specified but should not be greater than $D/10$. Greater resolution is attained with a shorter 'a' spacing, but at the cost of lower primary and secondary voltages.

Generally, survey coverage is restricted to an area comprising the middle 1/3 of C_1C_2 . The measurement is plotted at the midpoint of the potential dipole.

Advantages

1. Depth of exploration is good whilst retaining high resolution for small bodies; least susceptible to the masking effect of conductive overburden.
2. Production is fast since only two electrodes are moved; two or more receivers can be used simultaneously.
3. Less hazardous since current electrodes are not handled in moving stations.

4. Least affected by topographic variations.
5. Useful in areas of high resistivity or in frozen terrain, since fixed current electrodes can be located where electrical contact is good, or carefully built to achieve good contact.
6. Can indicate dip of simple targets.

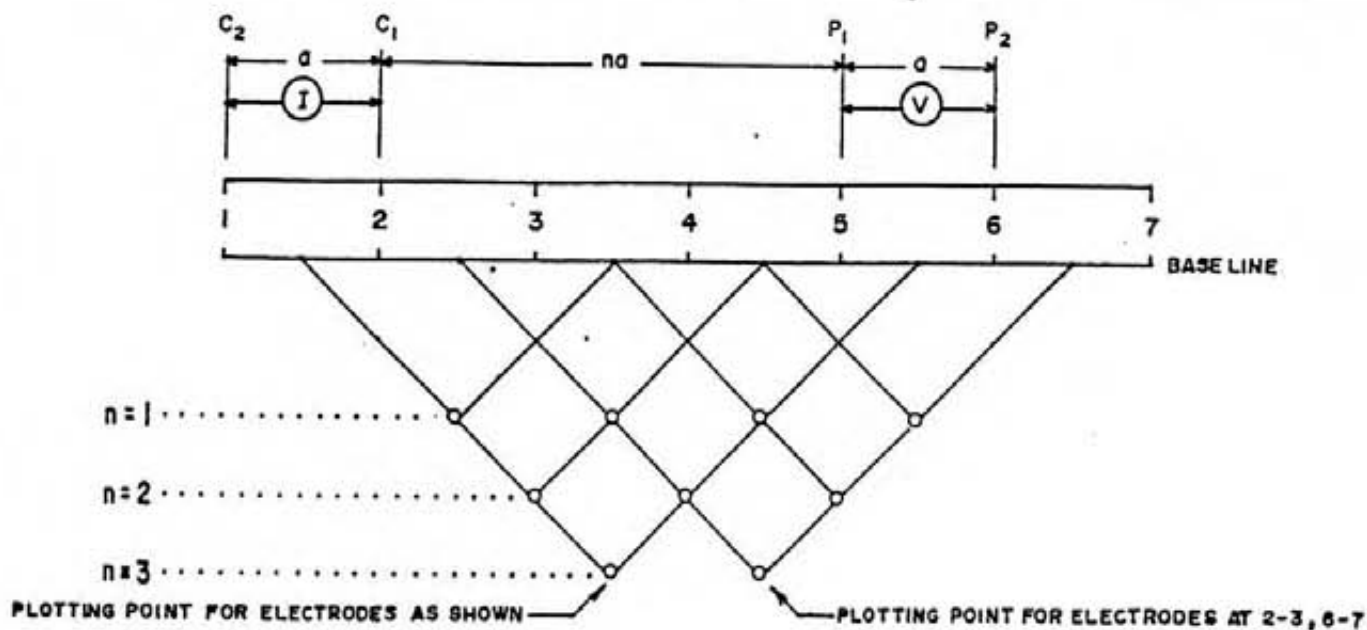
Disadvantages

1. Not practical where long profiles are desired or where survey lines are a long way apart.
2. Low V_p and V_s make the method difficult to impossible in areas of high conductivity.
3. High inductive effect is created by large current dipole.
4. Narrow conductive bodies in conducting environment can sometimes produce false resistivity highs.
5. Not readily amenable to detailed interpretation as to depth of source.

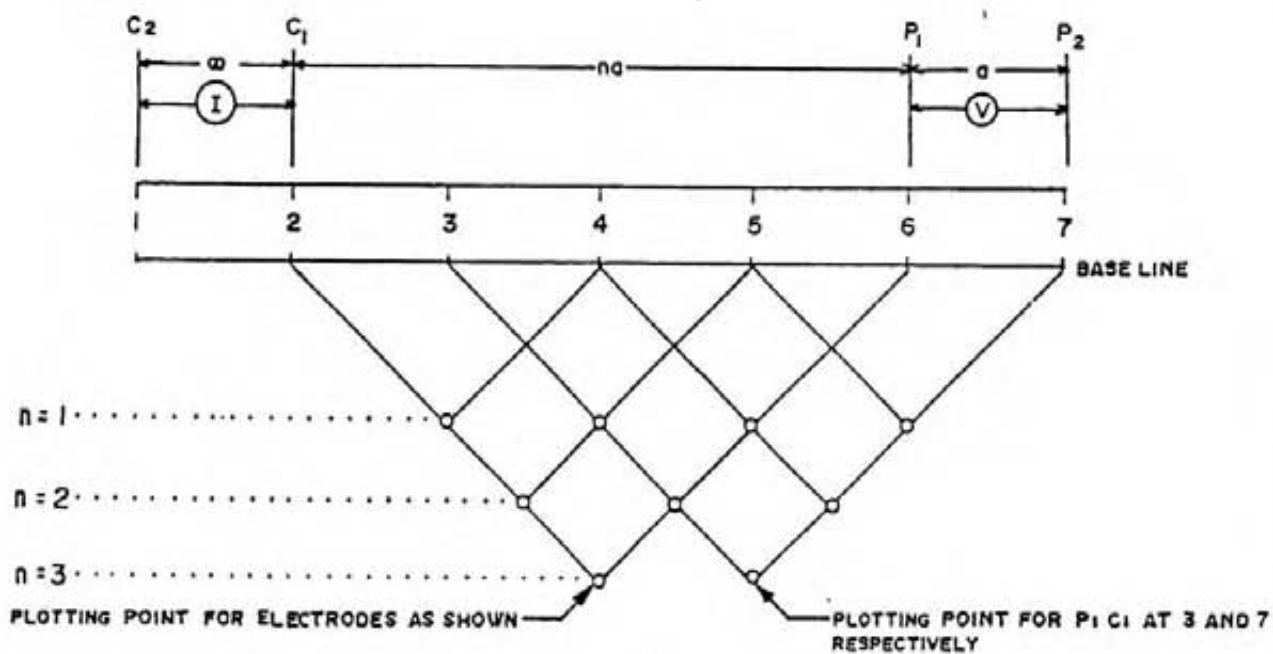
The relative performance of the different arrays in terms of various survey and target parameters is summarized in Table 1.

Presentation

Induced Polarization/resistivity data taken with a multi-spaced dipole-dipole array are generally plotted as pseudosections with each measurement plotted at the intersection of a 45° diagonal drawn from the center of the transmitting and receiving dipoles for each value of the separation, as seen in Figure 3. Plotting in this manner builds up a vertical section of data points. The term pseudo-



DIPOLE DIPOLE ARRAY



POLE DIPOLE ARRAY

Figure 3
PLOTting POINTS FOR VARIOUS ARRAYS

TABLE 1
Summary of Array Performance

<u>Characteristic</u>	<u>Dipole-</u> <u>dipole</u>	<u>Pole-</u> <u>dipole</u>	<u>Gradient</u>
Magnitude of response	B	A	C
Dip of source	C	C	A
Overburden penetration	B	A	A
Recognition of overburden irregularities	A	B	B
Freedom from interference of overburden irregularities	B	A	C
Horizontal resolution and location	B	C	A
Depth of Detection	B	A	D
Depth: Interpretability	A	B	C
Freedom from inductive coupling, layered earth	A	B	C
Freedom from inductive coupling, finite inhomo- geneties	A	B	D

section is used because the plotted depth does not represent the actual depth of exploration for that measurement. This actual depth depends on the electrical properties of the ground.

The data presented in the pseudosections is typically contoured at semi-logarithmic intervals ... 1.0, 1.5, 2.0, 3.0, 5.0, 7.5, 10.0 ... rather than at linear intervals because of the large range in the recorded data.

Data taken with a multi-spaced pole-dipole array are also typically plotted in pseudosection form, with the active (moving) current electrode and the midpoint of the potential dipole utilized to form the 45° diagonals.

Note that data taken with several different dipole lengths may be combined and plotted as a composite pseudosection, thereby displaying both shallow and deep anomalies simultaneously. Where overlapping data points are less than fully consistent, contouring (and interpretation) favours the values taken with the shorter dipole.

For the gradient array, resistivity and chargeability values are plotted as profiles at the mid-point of the potential dipole, as shown in Figure 2.

Interpretation

Multi-spaced dipole-dipole (or pole-dipole) data enable delineation of the location, depth and properties of a resistivity or chargeability anomaly. Just as the pseudosection plot is not a true depth section, it is also important to bear in mind that the values recorded and plotted are apparent resistivity and chargeability, which are the actual resistivity and chargeability of the ground only if the earth is homogeneous. In the all-important cases of narrow and/or deep targets, the recorded (apparent) values may bear only a slight indication of the intrinsic values of the target. It is a

critical part of the interpretive process to estimate the intrinsic resistivity and chargeability of the causative sources from the apparent values, in addition to determining the geometry and location of the source.

With the gradient array, interpretability as to depth and intrinsic properties is reduced, although repeat surveys with several different dipole lengths can give some qualitative indication of depth.

Additional Remarks

The detectability of a conductive and/or polarizable body with IP is a function of its size and intrinsic electrical properties vis-a-vis the size and type of electrode array. Hence, targets that are very small or deep (relative to the scale of the electrode array) may be undetectable. Consequently, multiple coverage with several different arrays may be required to define shallow, narrow sources and to detect larger targets at depth.

Since IP and resistivity are techniques that reflect the averaged response of a volume of rock, resolution is a function of the array type and size. Typically, with the dipole-dipole array, two conductors or two polarizable sources separated by less than a dipole length cannot be resolved as individual responses.

Geologic sources that yield low resistivities are fairly numerous and include: connected zones of sulphides and graphite; clays and other water-saturated unconsolidated materials; intense hydrothermal alteration; and fault gouge.

Sources of IP anomalies are more restricted. They include: most metallic sulphides, graphite, some oxides and to a lesser extent, clays and zeolites. Under favourable conditions, targets or formations containing a few tenths of a per cent sulphides are detectable.

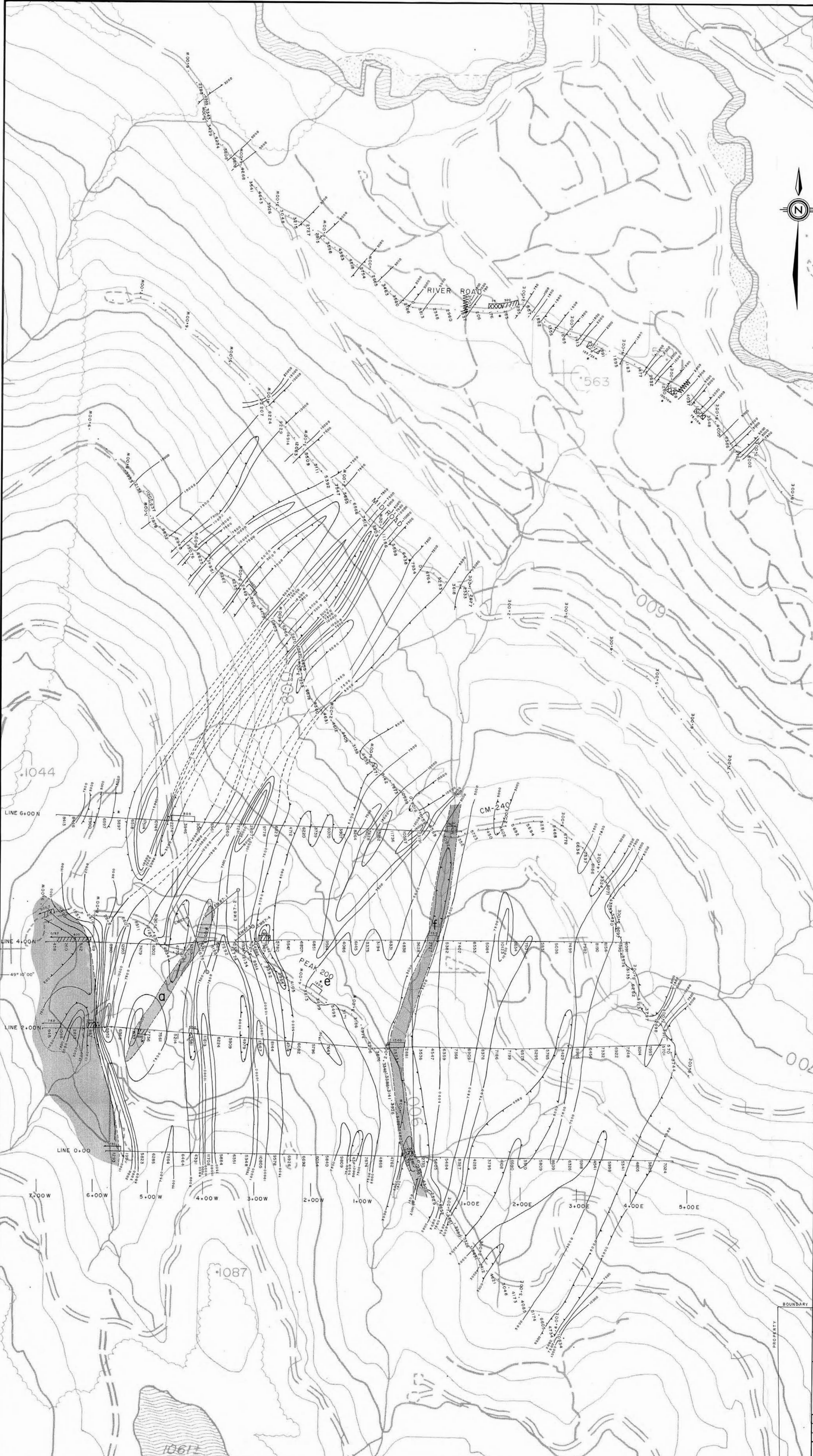
Finally, polarizable targets that are very highly resistive or very conductive may yield nil or negligible IP responses. In the former case, no current can flow through the rock mass. In the latter case, the conductor acts as a dead short, so that virtually no secondary decay voltage is observed.

Despite the complexity of survey procedures and interpretation, IP has demonstrated excellent effectiveness in exploration for various types of sulphide-bearing ore deposits in the 30 years since its original implementation. More recently, following the discovery of the Hemlo gold deposits, increasing use has been made of IP in exploration for gold.

Appendix VII

FIGURES 12 TO 15

IP/RESISTIVITY PLAN MAPS

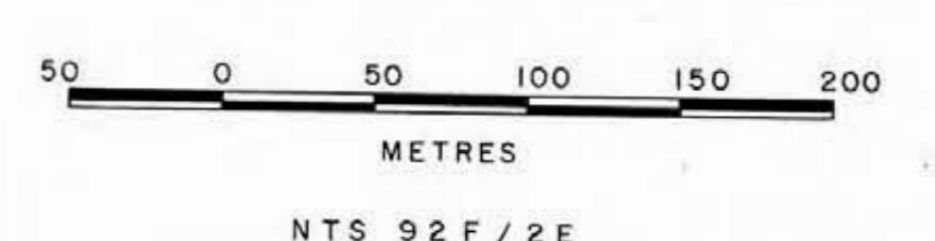


LEGEND

- TRANSMITTER : Huntec 2.5 kW
 RECEIVER : Huntec Mk IV
 DIPOLE DIPOLE ARRAY
- Station Location $n = 1.2, 3.4$
- RESISTIVITY LOW (ohm-m) CHARGEABILITY HIGH (ms)
- | | | | |
|----------------------------|---|--------------------------|--|
| Resistivity low at Surface | Estimated Intrinsic Resistivity (ohm-m) | IP Anomaly at Surface | Estimated Intrinsic Chargeability (ms) |
| 2000 | 2000 | 50 | 50 |
| 2-10 Estimated Depth (m) | 2-10 Estimated Depth (m) | 2-10 Estimated Depth (m) | 2-10 Estimated Depth (m) |
| 2000 | 2000 | 50 | 50 |
- Consisting Resistivity Low
- Faults
- Chargeability Zones: A, B, etc.
- Zone Boundary
- Strong
 - Moderate
 - Weak
- 1987 Diamond Drillhole

**GEOLOGICAL BRANCH
 ASSESSMENT REPORT**

17,207
Part 3 of 4



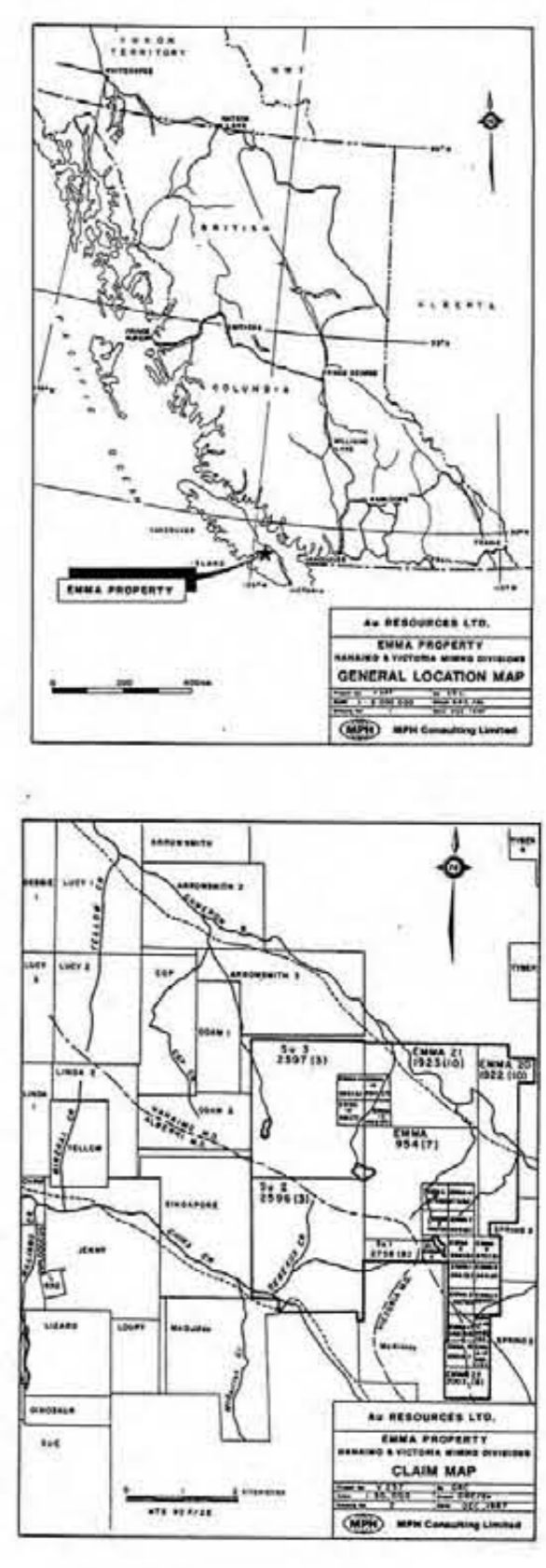
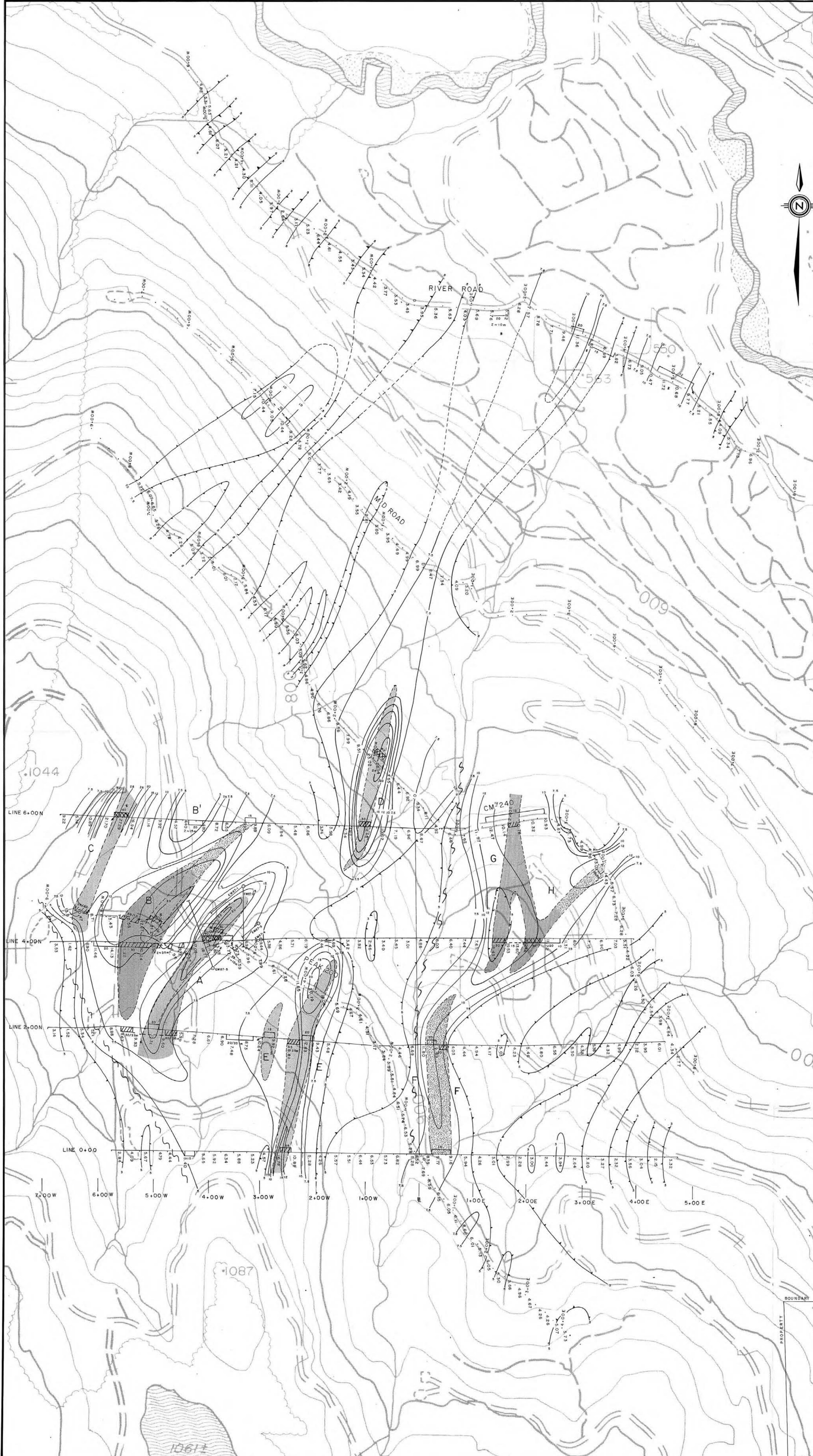
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Au Resources Ltd.

**INDUCED POLARIZATION SURVEY
 CONTOURED RESISTIVITY, N=1
 HIGH GRADE ZONE
 EMMA PROPERTY**

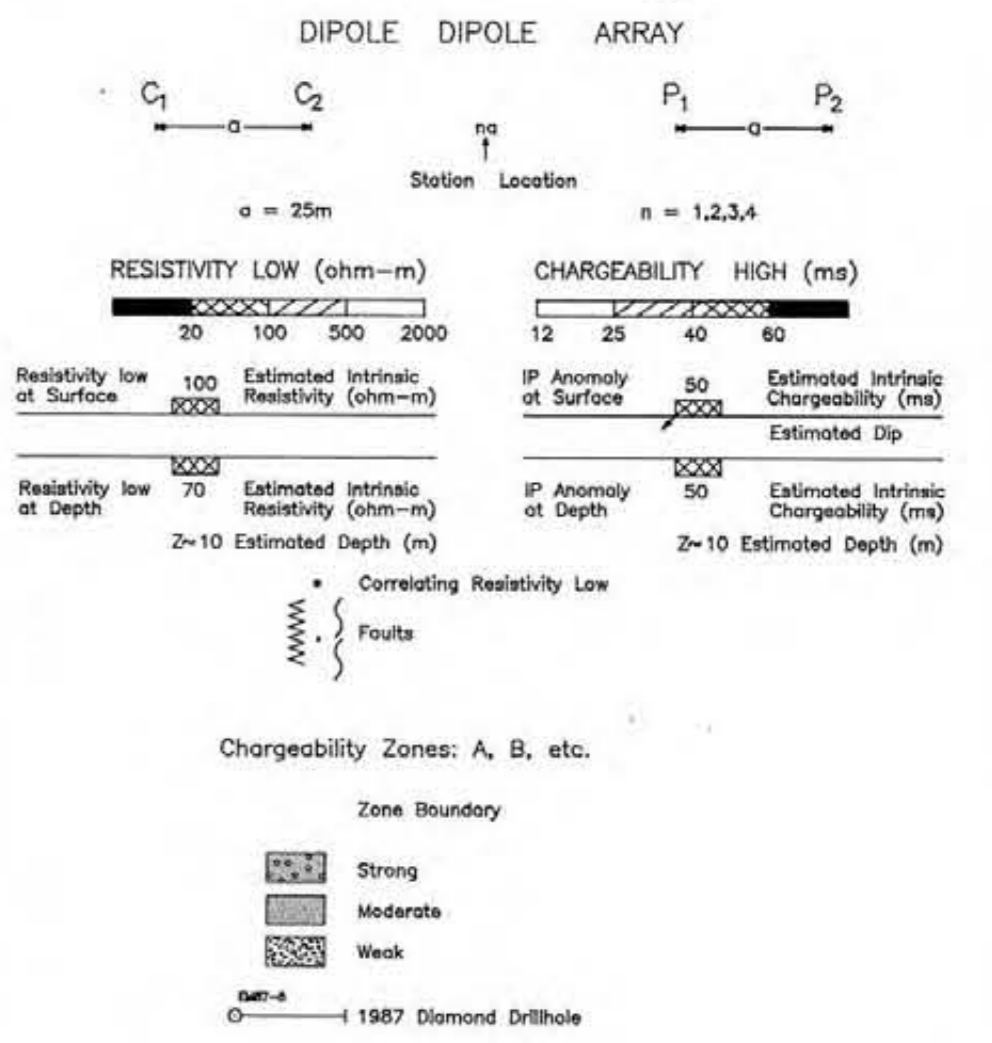
NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

Project No: V-257	By: K.D.L./J.R.
Scale: 1:2500	Drawn: K.D.L./J.R./d/w
Drawing No: 12	Date: FEBRUARY 1988



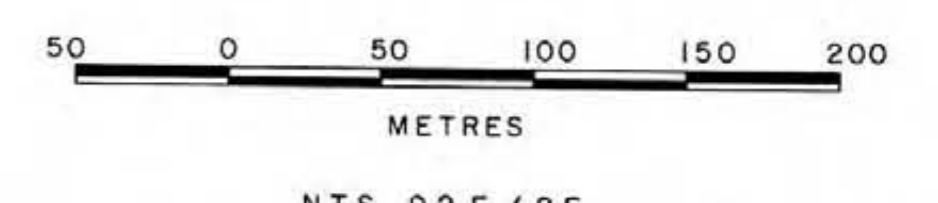
LEGEND

TRANSMITTER : Hunttec 2.5 KW
 RECEIVER : Hunttec Mk IV
 DIPOLE DIPOLE ARRAY



GEOLOGICAL BRANCH ASSESSMENT REPORT

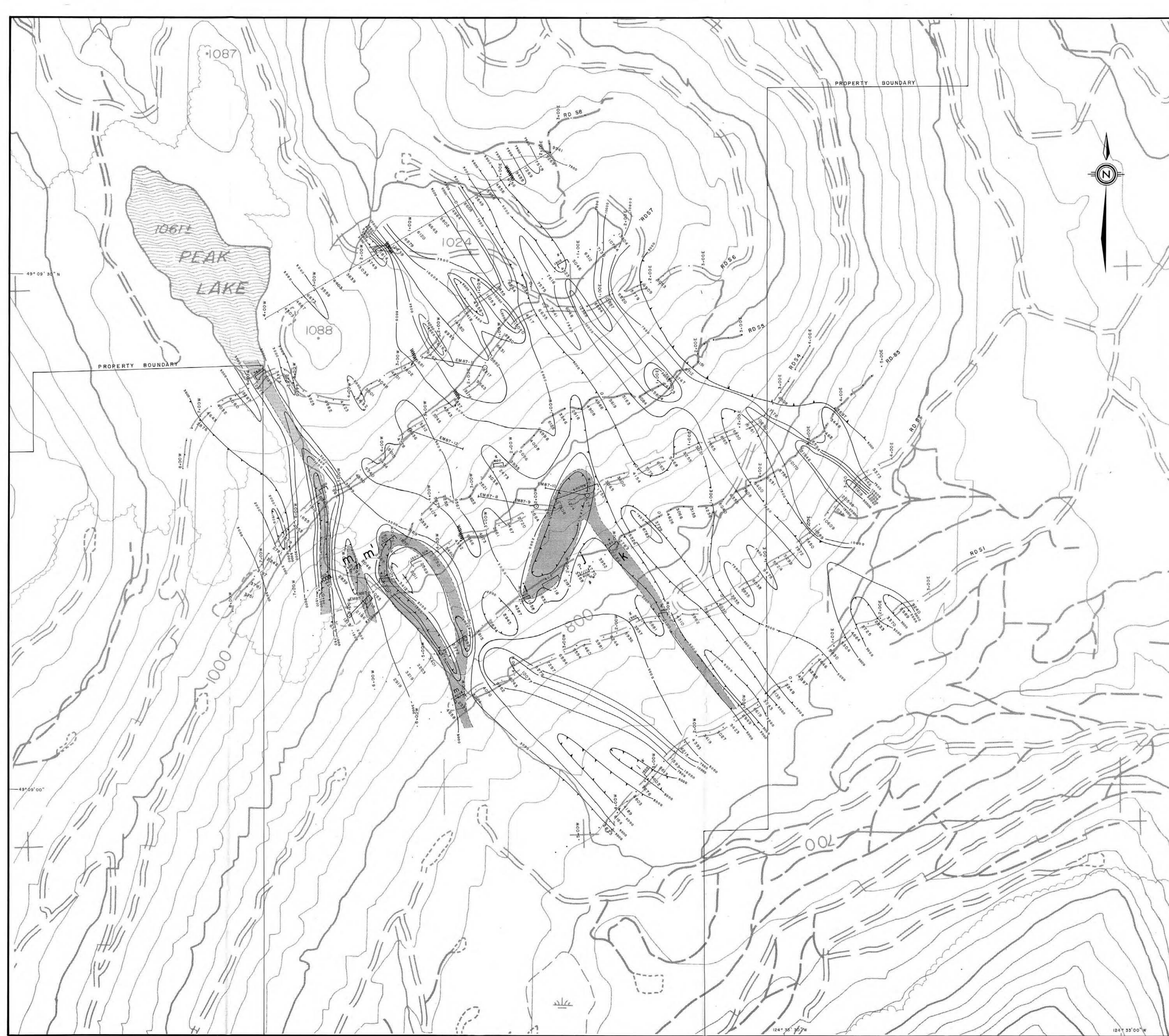
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Au Resources Ltd.
CONTOURED CHARGEABILITY, N=1
HIGH GRADE ZONE
EMMA PROPERTY
 NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

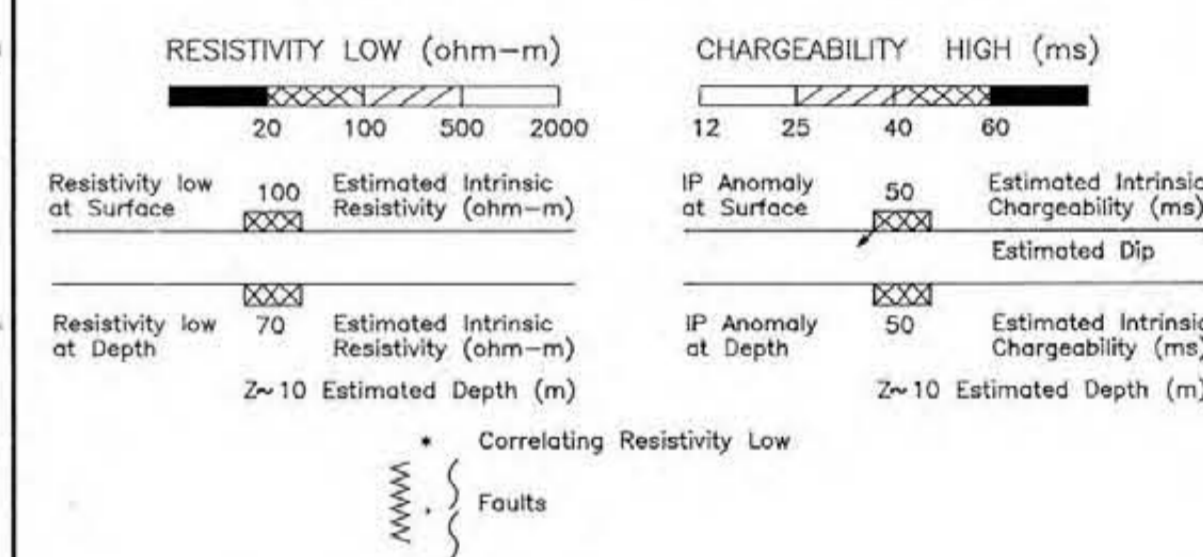
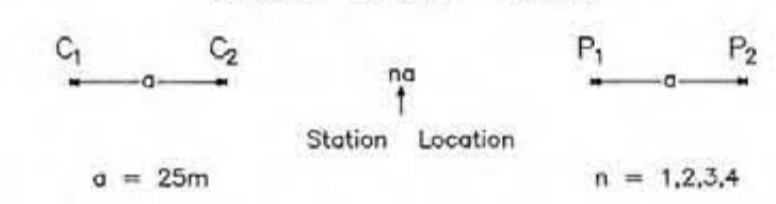
Project No: V-257	By: K.D.L./J.R.
Scale: 1:2500	Drawn: K.D.L./J.R./dw
Drawing No: 13	Date: FEBRUARY 1988

MPH MPH Consulting Limited

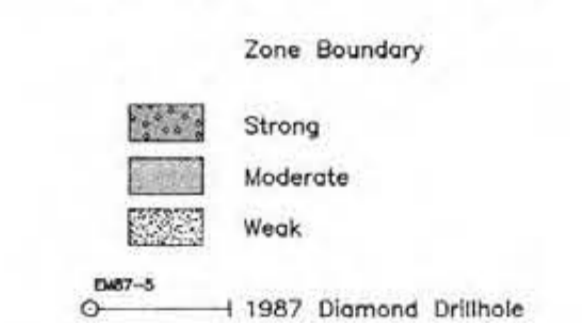


LEGEND

TRANSMITTER : Huntec 2.5 kW
 RECEIVER : Huntec Mk II
 DIPOLE DIPOLE ARRAY



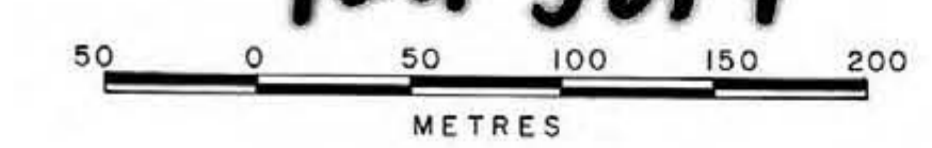
Chargeability Zones: A, B, etc.



1987 Diamond Drillhole

**GEOLOGICAL BRANCH
 ASSESSMENT REPORT**

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NTS 92 F / 2E

Au Resources Ltd.
CONTOURED RESISTIVITY, N=1
PEAK LAKE ZONE
EMMA PROPERTY
 NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

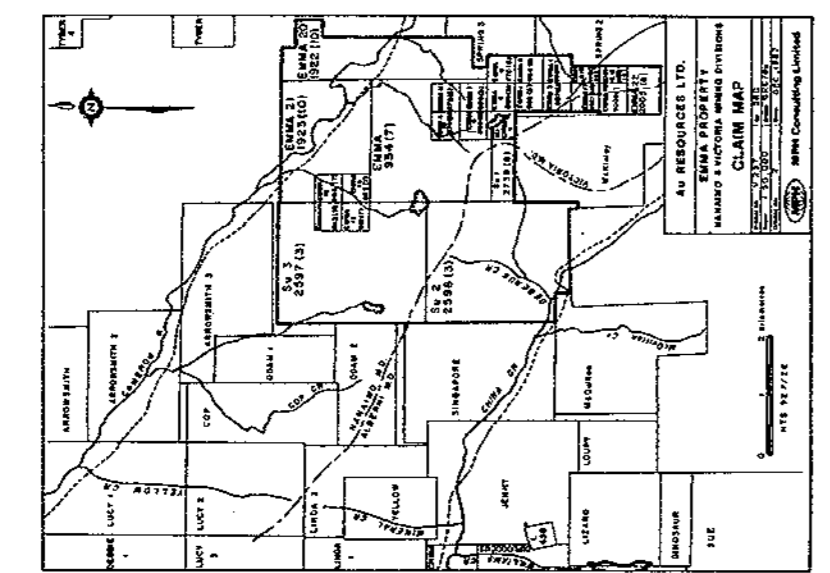
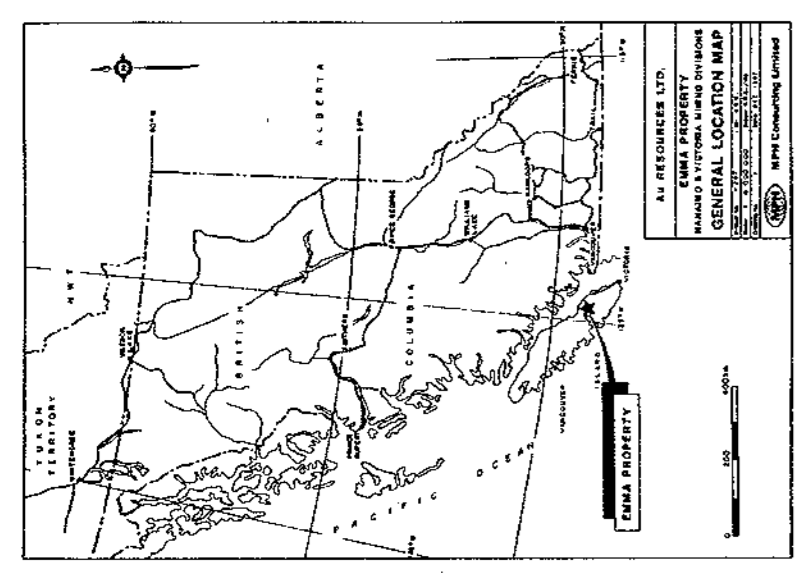
Project No: V-257	By: K.D.L./J.R.
Scale: 1:2500	Drawn: K.D.L./J.R./d.w.
Drawing No: 14	Date: FEBRUARY 1988

MPH Consulting Limited

Appendix VIII

FIGURES 16 TO 21

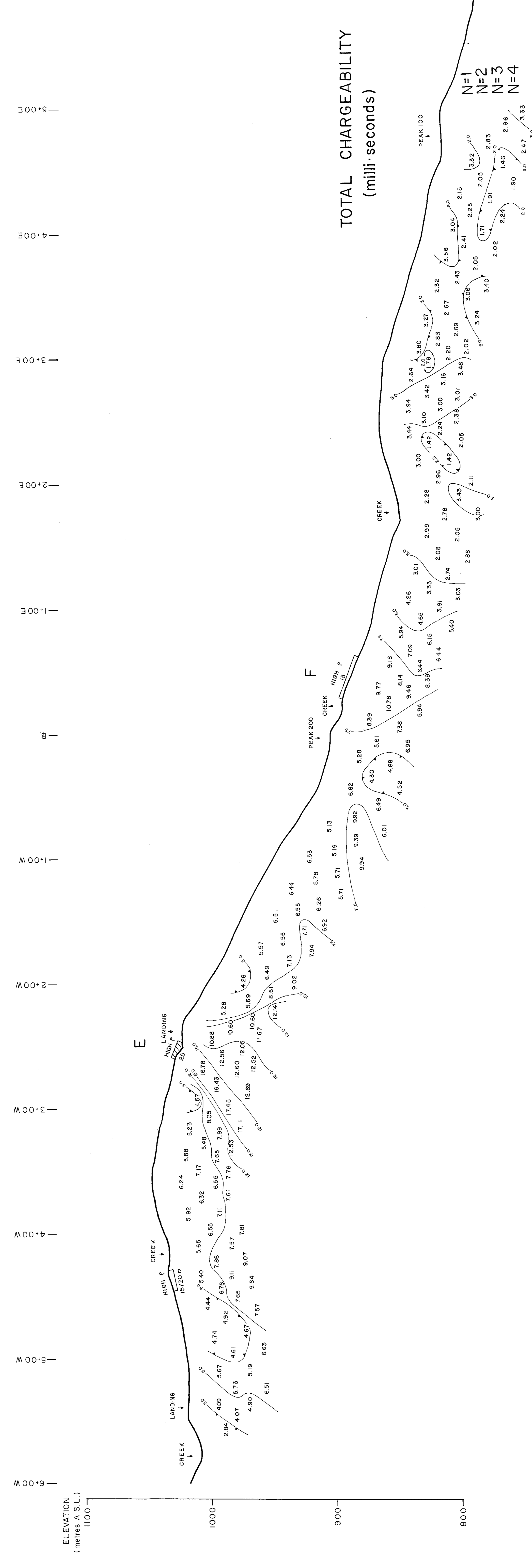
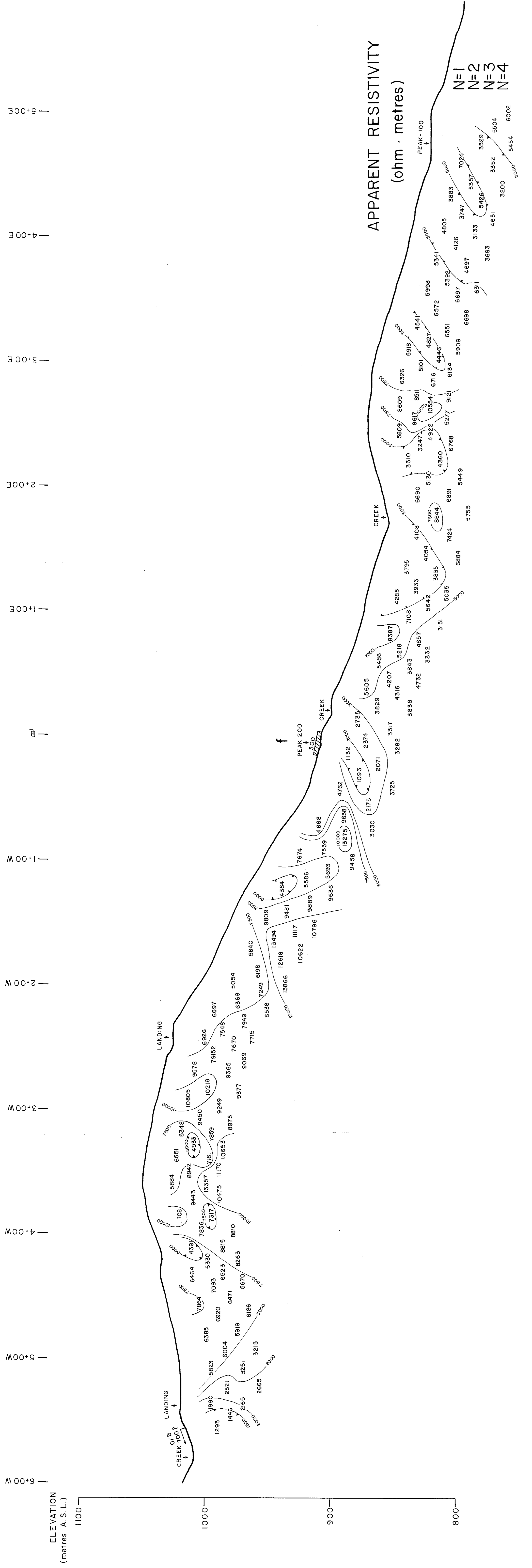
IP/RESISTIVITY PSEUDOSECTIONS

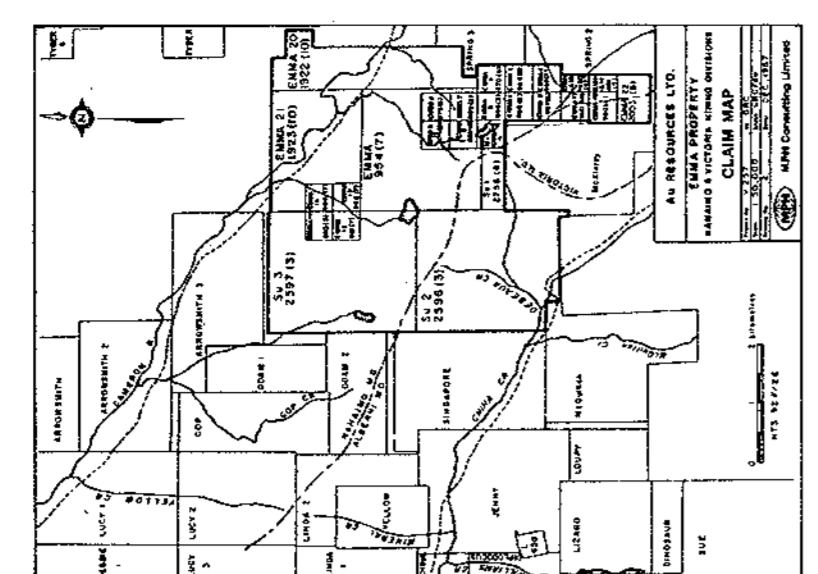
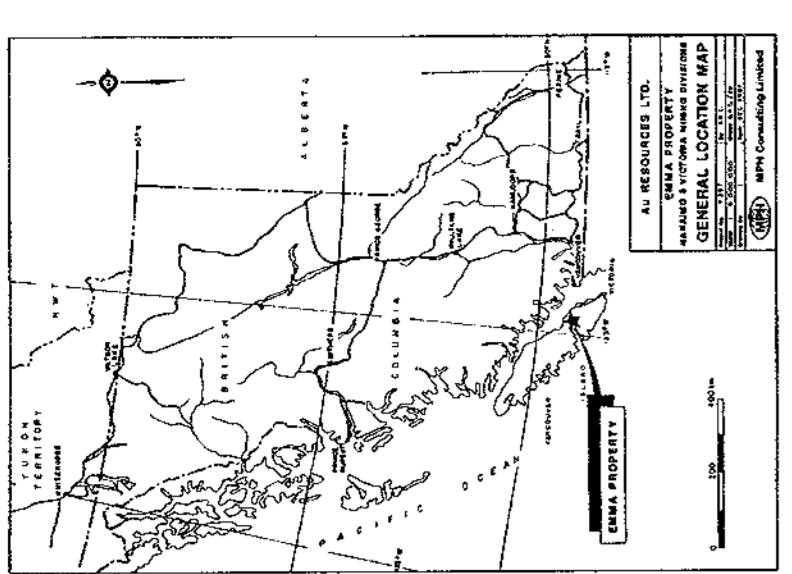


L.E.G.E.N.D.
 TRANSMITTER : HURDIS 2.5 MW
 RECEIVER : HURDIS MK II
 DIPOLE DIPOLE ARRAY
 Station Location
 $a = 25m$
 $n = 1.2, 3.4$
 RESISTIVITY LOW (ohm-m) 20 100 500 2000
 CHARGEABILITY HIGH (ms) 12 25 40 60
 Resistivity low 100 Estimated resistivity at Surface
 Chargeability high 100 Estimated resistivity at Depth
 Resistivity low 70 Estimated resistivity at Depth
 Chargeability high 50 Estimated resistivity at Depth
 Chargeability high 2-10 Estimated resistivity at Depth
 Correlating Resistivity Low
 Fault

GEOLOGICAL BRANCH
 ASSESSMENT REPORT
 17,207
 Part 3 of 4
 NTS 92 F / 2 E
 25 0 25 50 75
 metres

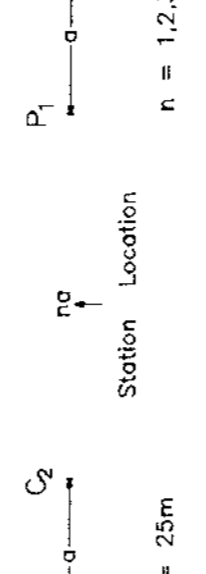
Au Resources Ltd.
INDUCED POLARIZATION SURVEY
LINE 0-00
HIGH GRADE ZONE
EMMA PROPERTY
 NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS
 Project No. V-857 By: KOL/CJC/JR
 Scale: 1:1250 Drawn: CJC/JR
 Drawing No: 16 Date: FEBRUARY, 1988
MPH **MPH Consulting Limited**





J.E.G.E.N.D.

TRANSMITTER : HURTEC 2.5 KW
 RECEIVER : HURTEC MA II
 DIPOLE DIPOLE ARRAY



RESISTIVITY LOW (ohm-m)	CHARGEABILITY HIGH (ms)				
	20	100	500	2000	12 25 40 60
Resistivity low	100	Estimated Intrinsic	50	Estimated Intrinsic	50
at Surface	0000	Resistivity (ohm-m)	0000	Resistivity (ohm-m)	0000
Resistivity low	70	Estimated Intrinsic	50	Estimated Intrinsic	50
at Depth	2-10	Estimated Depth (m)	2-10	Estimated Depth (m)	2-10
		Estimated Depth (m)		Estimated Depth (m)	

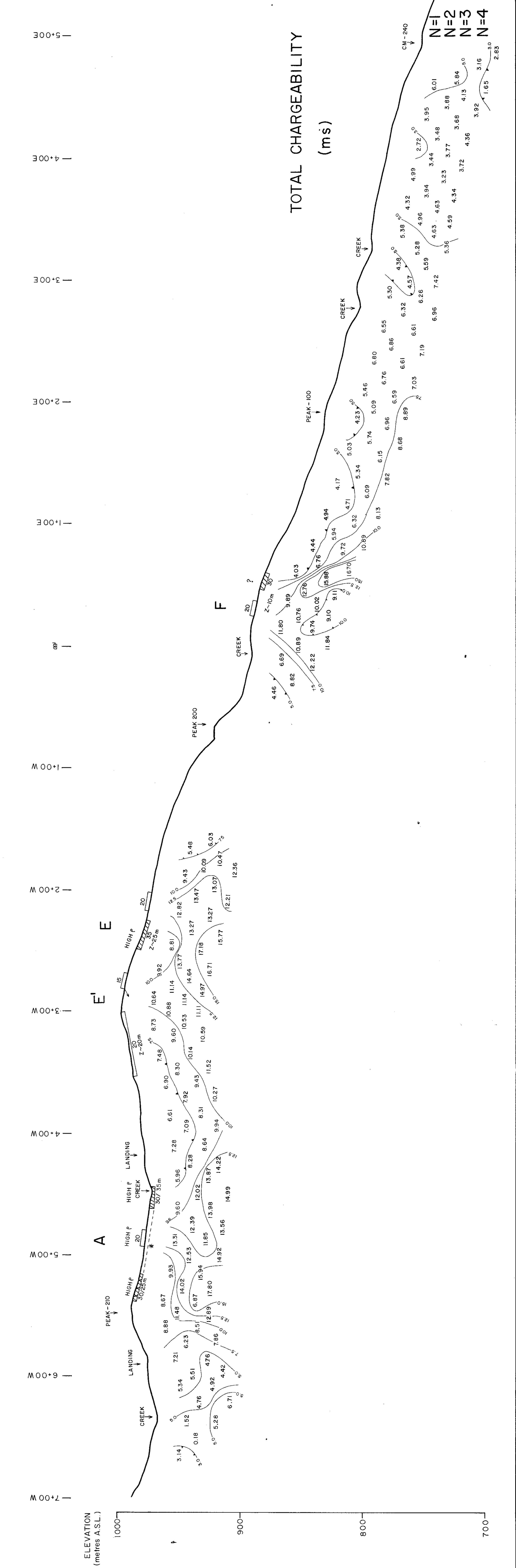
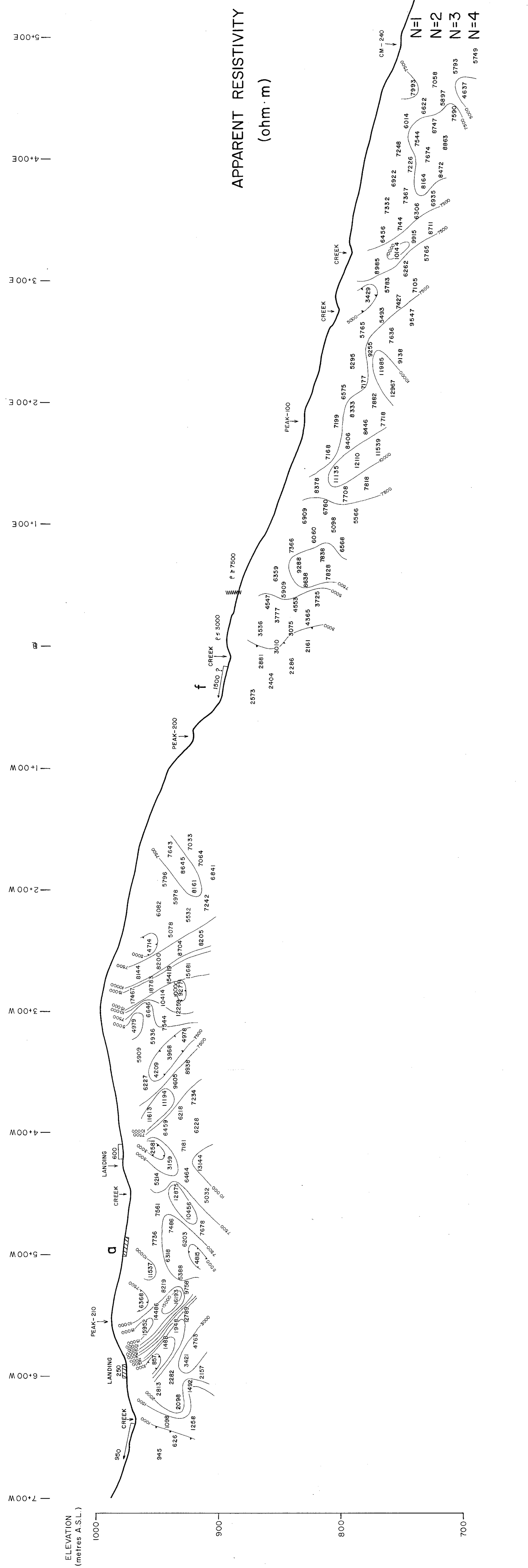
17 2007
 20 FEB 2007
 Part 3 of 4

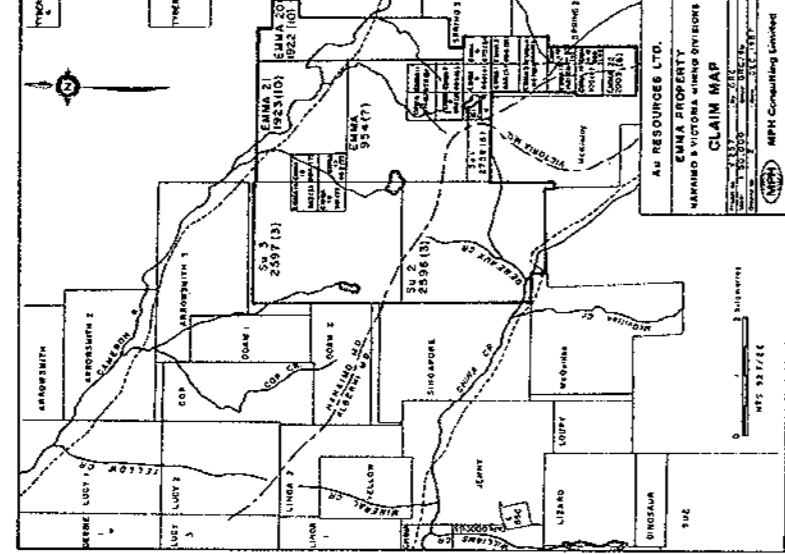
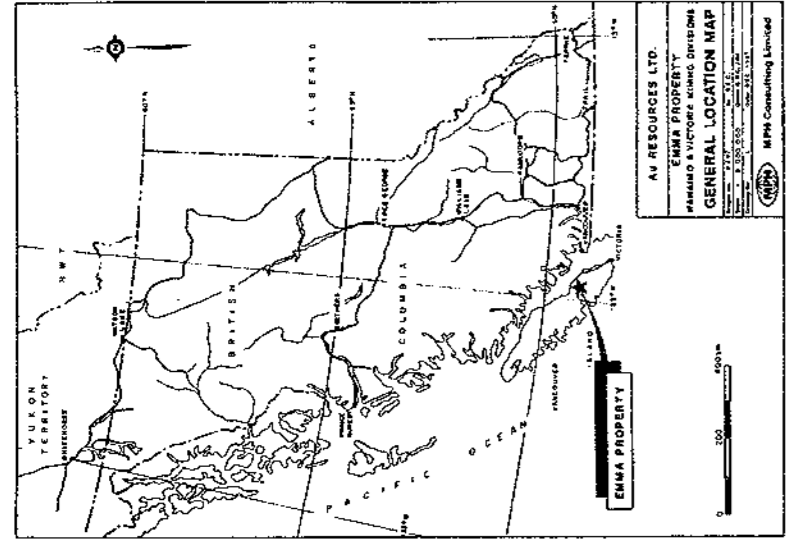
Au Resources Ltd.

INDUCED POLARIZATION SURVEY
LINE 2+00N
HIGH GRADE ZONE
EMMA PROPERTY
 NANAIMO, VICTORIA, ALBERTA MINING DIVISIONS

Project No. V-237 By: K.L.C./C.J.R.
 Scale: 1:1250 Drawn: C.J.C./J.R.
 Drawing No. 17 Date: FEBRUARY, 1988

MPH Consulting Limited





J.L.E.C.E.L.L.

TRANSMITTER : Huntlec 2.5 KW
 RECEIVER : Huntlec Mk II
 DIPOLE DIPOLE ARRAY

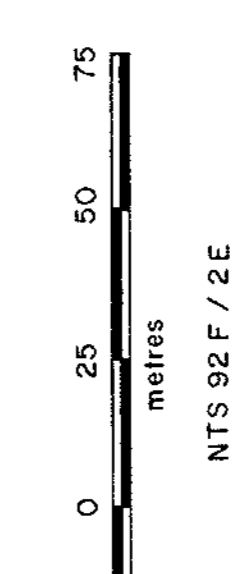
Station Location
 a = 25m
 n = 1.2, 2.4

RESISTIVITY LOW (ohm-m)	CHARGEABILITY HIGH (ms)
200	12
100	25
50	40
25	60

Relativity low 100 Estimated periodic at Surface 2000 Estimated Dip
 Relativity low 500 Estimated periodic at Depth 10000 Estimated Chargeability (ms)
 2-10 Estimated Depth (m) 2-10 Estimated Depth (m)
 Correlating Resistivity Low
 Fault

GEOLOGICAL BRANCH
 ASSESSMENT REPORT

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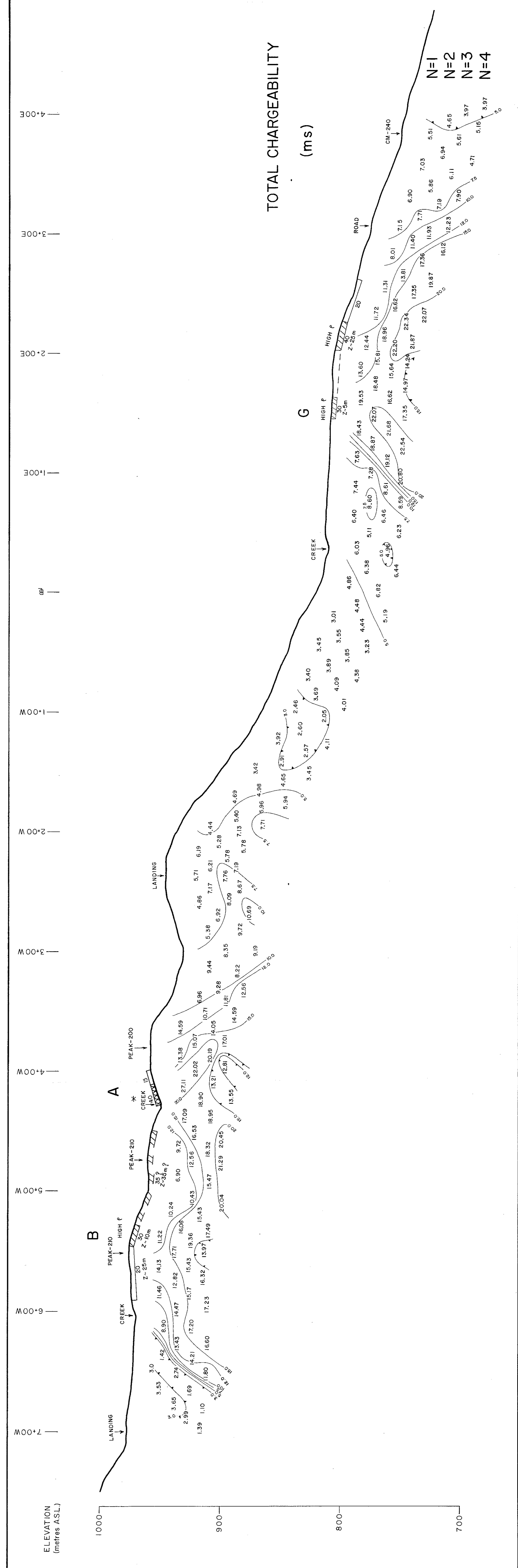
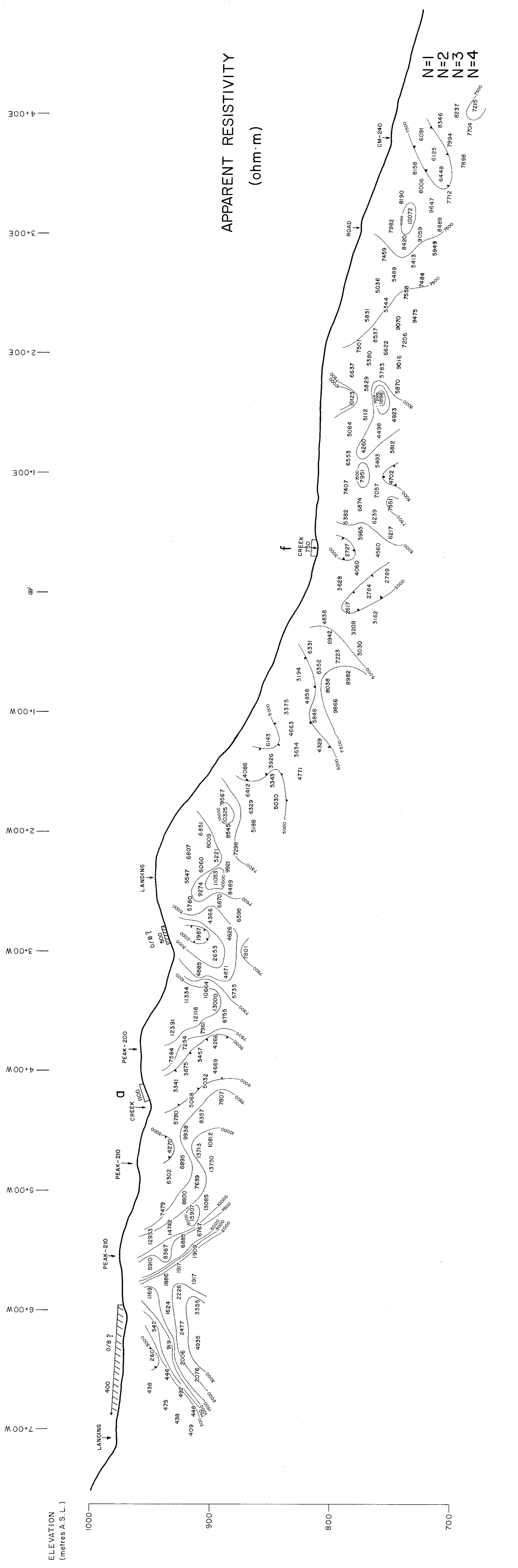
Au Resources Ltd.

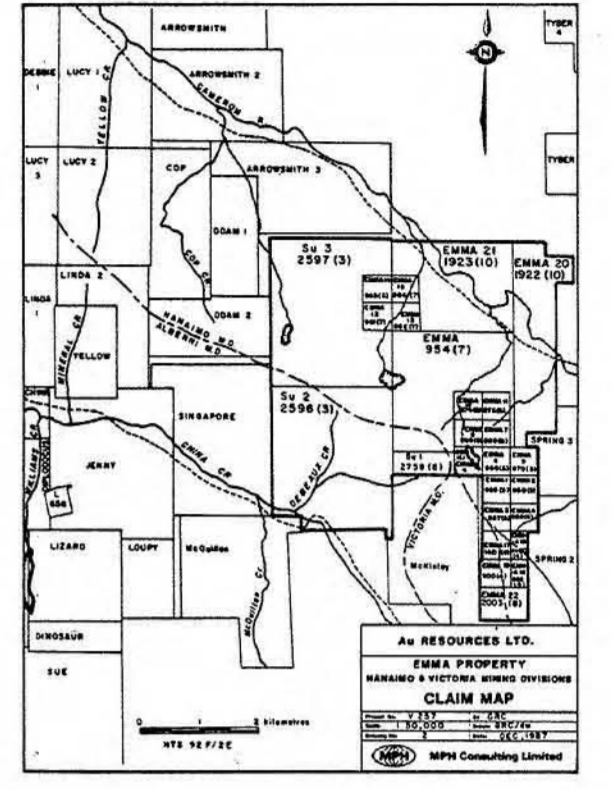
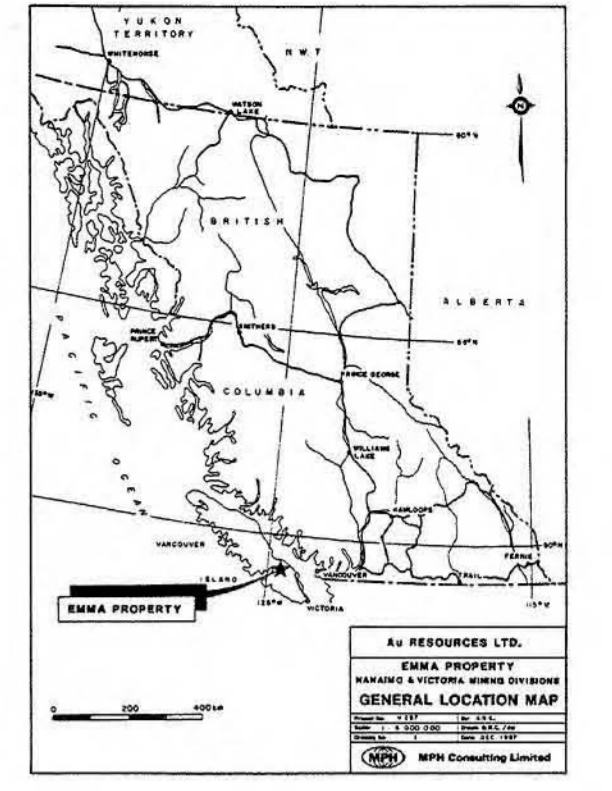
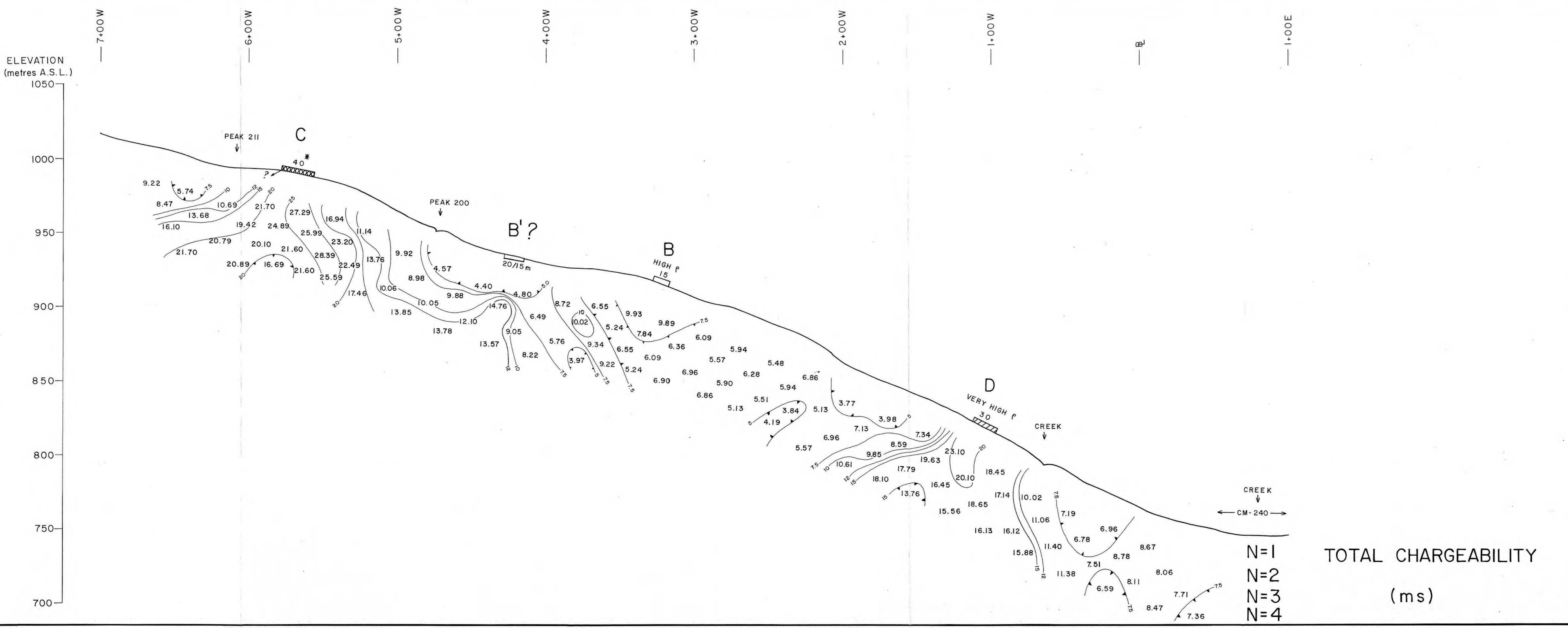
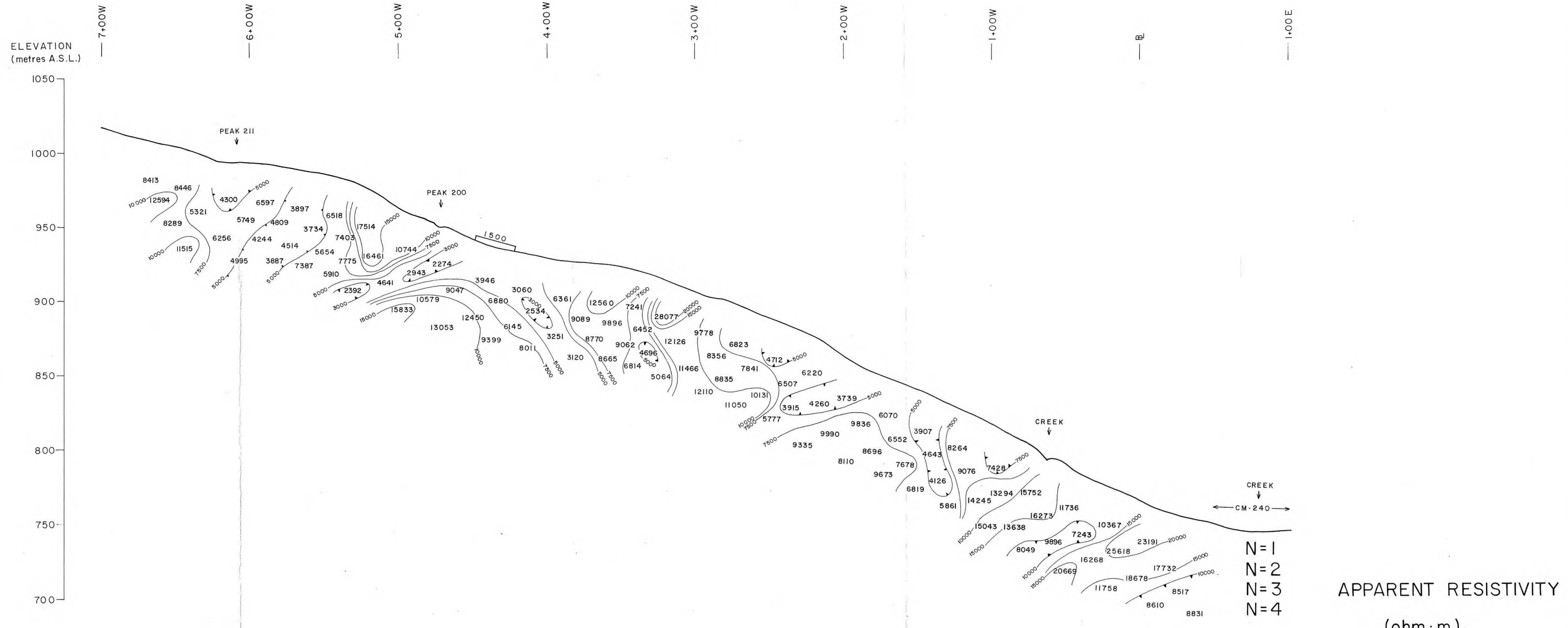
INDUCED POLARIZATION SURVEY
LINE 44-00N
HIGH GRADE ZONE
EMMA PROPERTY

NANAIMO, VICTORIA, ALBERTA MINING DIVISIONS

Project No. V-257 By: KCL/JR
 Scale: 1:1250 Drawn: CJC/JR
 Drawing No. 18 Date: FEBRUARY, 1988

MPH **MPH Consulting Limited**





LEGEND

TRANSMITTER : Hunttec 2.5 kW
RECEIVER : Hunttec Mk IX
DIPOLE DIPOLE ARRAY

Station Location

$a = 25m$ $n = 1,2,3,4$

RESISTIVITY LOW (ohm-m)	CHARGEABILITY HIGH (ms)
20 100 500 2000	12 25 40 60
Resistivity low at Surface	Estimated Intrinsic Resistivity (ohm-m)
Resistivity low at Depth	Estimated Intrinsic Resistivity (ohm-m)
Estimated Dip	Estimated Dip
Estimated Depth (m)	Estimated Depth (m)

Correlating Resistivity Low
Fault

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25 0 25 50 75
metres
NTS 92 F / 2 E

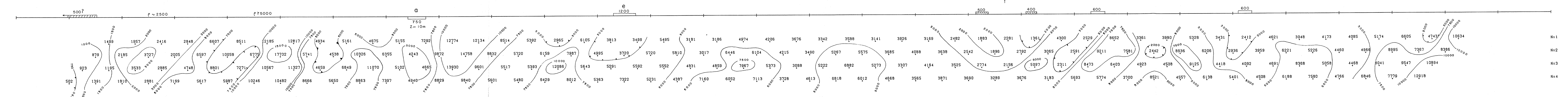
Au Resources Ltd.

INDUCED POLARIZATION SURVEY
LINE 6+00N
HIGH GRADE ZONE
EMMA PROPERTY
NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

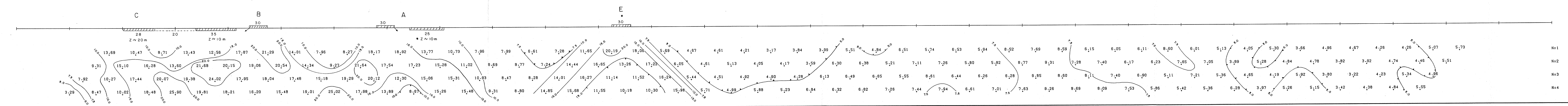
Project No: V257	By: KL / GRC / JR
Scale: 1:1250	Drawn: GRC / JR
Drawing No: 19	Date: FEBRUARY, 1988

MPH Consulting Limited

950W 900W 850W 800W 750W 700W 650W 600W 550W 500W 450W 400W € 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E 300E 350E 400E 450E 500E



APPARENT RESISTIVITY OHM-M



TOTAL CHARGEABILITY MT (MSEC)

L E G E N D

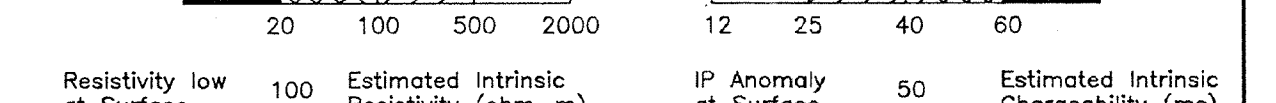
TRANSMITTER : Hunttec 2.5 kW
RECEIVER : Hunttec MK IZ

DIPOLE DIPOLE ARRAY



Station Location n = 1,2,3,4

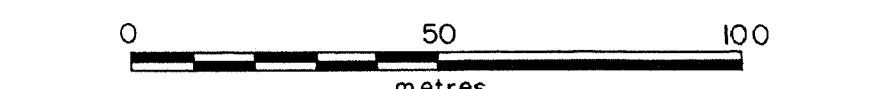
RESISTIVITY LOW (ohm-m) CHARGEABILITY HIGH (ms)



Estimated Intrinsic Resistivity (ohm-m) Estimated Intrinsic Chargeability (ms)

Estimated Dip Estimated Dip

Correlating Resistivity Low Fault



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AU RESOURCES LTD.

INDUCED POLARIZATION SURVEY

PEAK 200

HIGH GRADE ZONE-EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

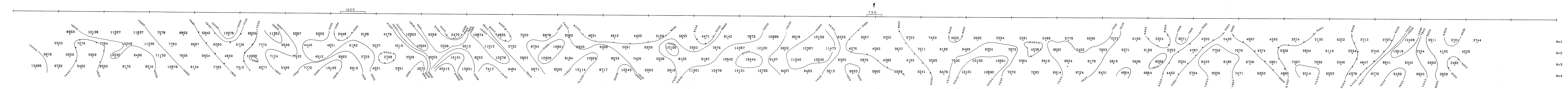
Project No: V 257 By: KDL/JR

Scale: 1:1250 Drawn: KDL/JR

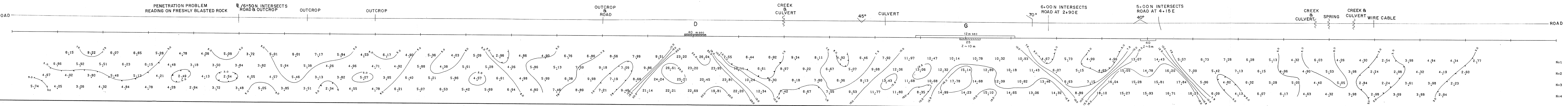
Drawing No: 20 Date: FEBRUARY 1988

MPH Consulting Limited

850W 800W 750W 700W 650W 600W 550W 500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E 300E 350E 400E 450E 500E 550E 600E 650E 700E 750E 800E 850E



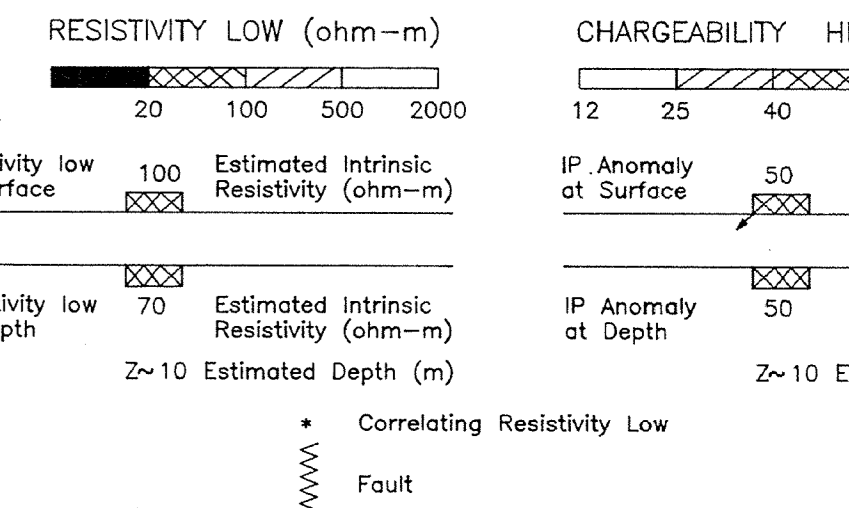
APPARENT RESISTIVITY OHM-M



TOTAL CHARGEABILITY MT (MSEC)

L E G E N D

TRANSMITTER : Hunttec 2.5 kW
 RECEIVER : Hunttec Mk IV
 DIPOLE DIPOLE ARRAY
 Station Location
 $a = 25m$
 $n = 1,2,3,4$



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 ASSESSMENT REPORT
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AU RESOURCES LTD.

INDUCED POLARIZATION SURVEY

CM-240

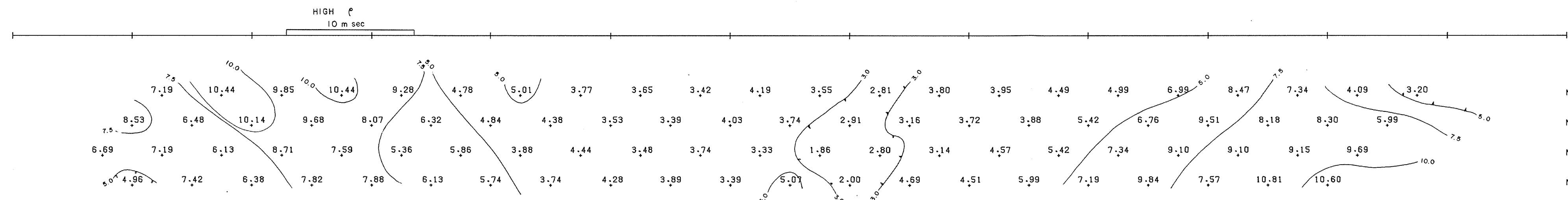
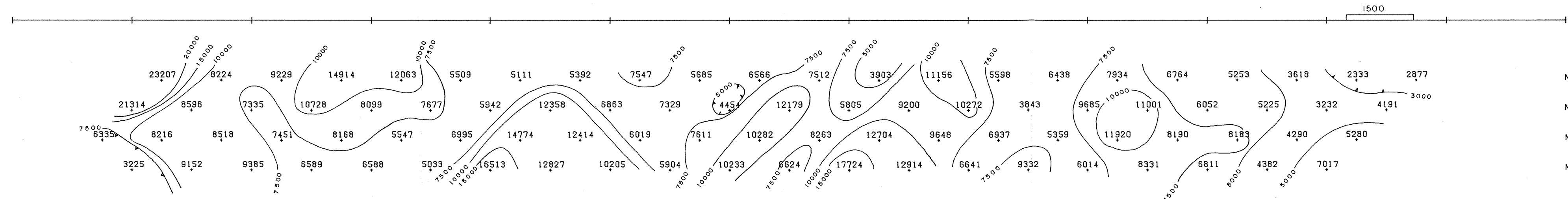
HIGH GRADE ZONE-EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

Project No: V 257	By: KDL / JR
Scale: 1:1250	Drawn: KDL / JR
Drawing No: 21	Date: FEBRUARY 1988

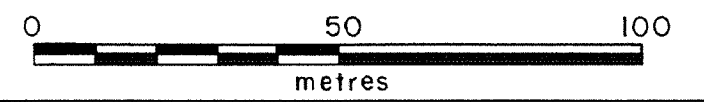
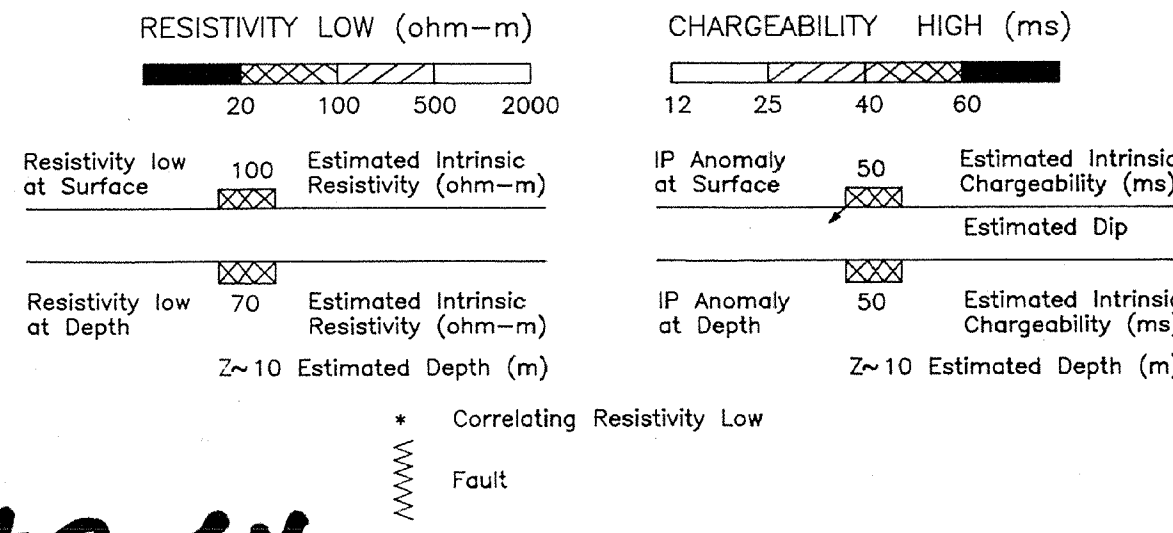
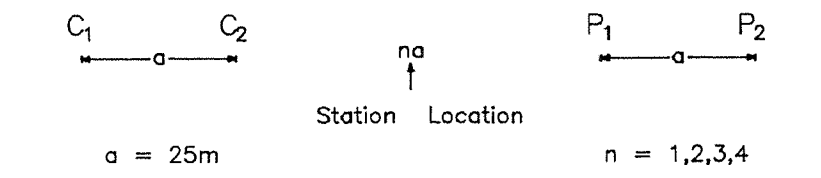
MPH **MPH Consulting Limited**

500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E



LEGEND

TRANSMITTER : Hunttec 2.5 kW
RECEIVER : Hunttec Mk IV
DIPOLE DIPOLE ARRAY



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AU RESOURCES LTD.

INDUCED POLARIZATION SURVEY
MID-RD

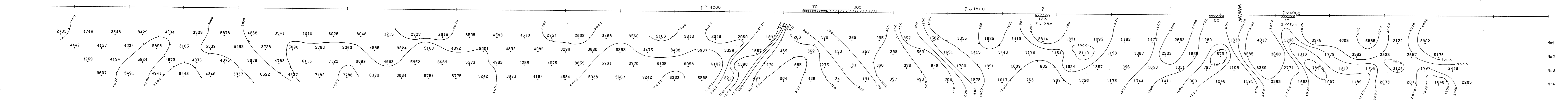
HIGH GRADE ZONE-EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

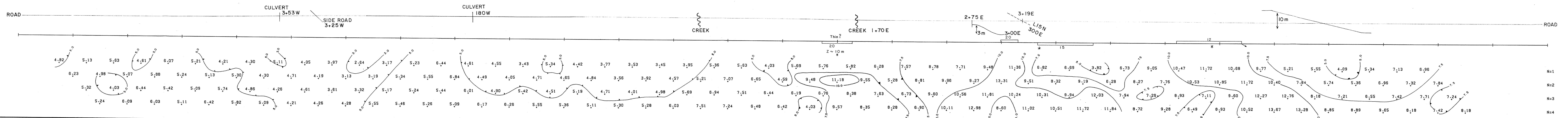
Project No: V 257	By: KDL / JR
Scale: 1 : 1250	Drawn: KDL / JR
Drawing No: 22	Date: FEBRUARY 1988



600W 550W 500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E 300E 350E 400E 450E 500E 550E 600E 650E 700E 750E 800E



APPARENT RESISTIVITY OHM-M



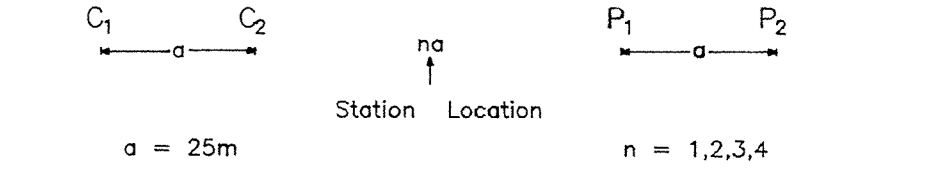
TOTAL CHARGEABILITY MT (MSEC)

L E G E N D

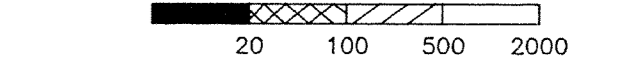
TRANSMITTER : Huntec 2.5 kW

RECEIVER : Huntec MK IZ

DIPOLE DIPOLE ARRAY



RESISTIVITY LOW (ohm-m)



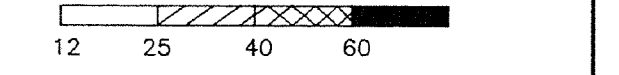
Resistivity low at Surface

Estimated Intrinsic Resistivity (ohm-m)

Resistivity low at Depth

Z ~ 10 Estimated Depth (m)

CHARGEABILITY HIGH (ms)



IP Anomaly at Surface

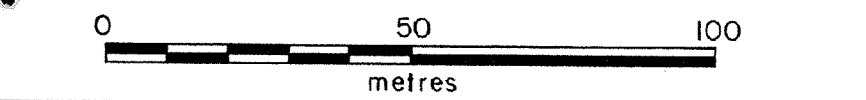
Estimated Intrinsic Chargeability (ms)

IP Anomaly at Depth

Z ~ 10 Estimated Depth (m)

Correlating Resistivity Low

Fault



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AU RESOURCES LTD.

INDUCED POLARIZATION SURVEY

RIVER ROAD

HIGH GRADE ZONE-EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

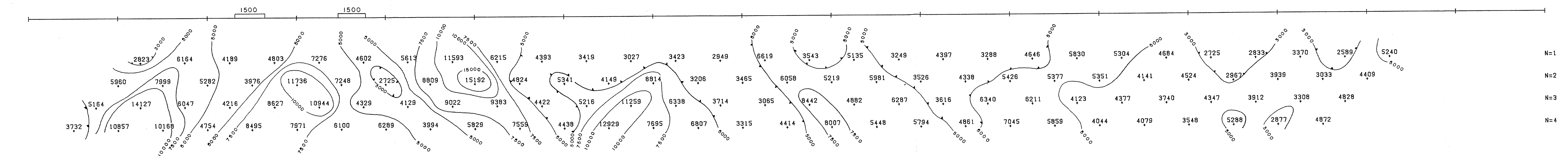
Project No: V 257 By: DM/KDL/JR

Scale: 1:1250 Drawn: KDL/JR

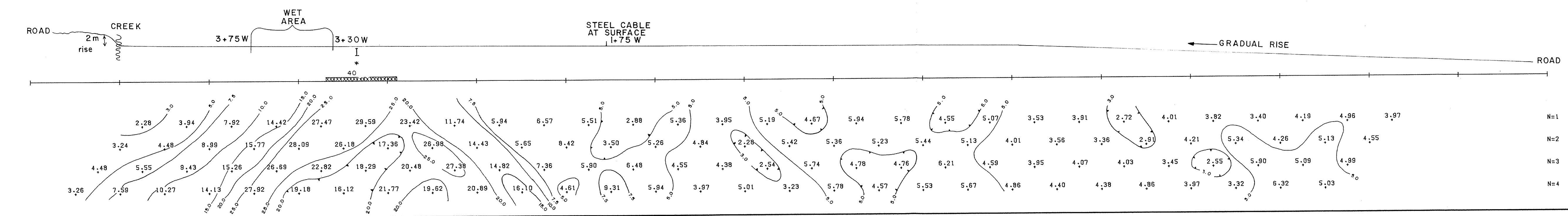
Drawing No: 23 Date: FEBRUARY 1988



500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E 300E 350E



APPARENT RESISTIVITY
OHM-M



TOTAL CHARGEABILITY
MT (MSEC)

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LEGEND

TRANSMITTER : Huntec 2.5 kW
 RECEIVER : Huntec MK IX
 DIPOLE DIPOLE ARRAY

Station Location n = 1,2,3,4
 a = 25m

RESISTIVITY LOW (ohm-m)	CHARGEABILITY HIGH (ms)
20 100 500 2000	12 25 40 60
Resistivity low at Surface	IP Anomaly at Surface
Estimated Intrinsic Resistivity (ohm-m)	Estimated Intrinsic Chargeability (ms)
Resistivity low at Depth	IP Anomaly at Depth
Estimated Intrinsic Resistivity (ohm-m)	Estimated Intrinsic Chargeability (ms)
Z ~ 10 Estimated Depth (m)	Z ~ 10 Estimated Depth (m)

* Correlating Resistivity Low
 Fault

0 50 100 metres

AU RESOURCES LTD.

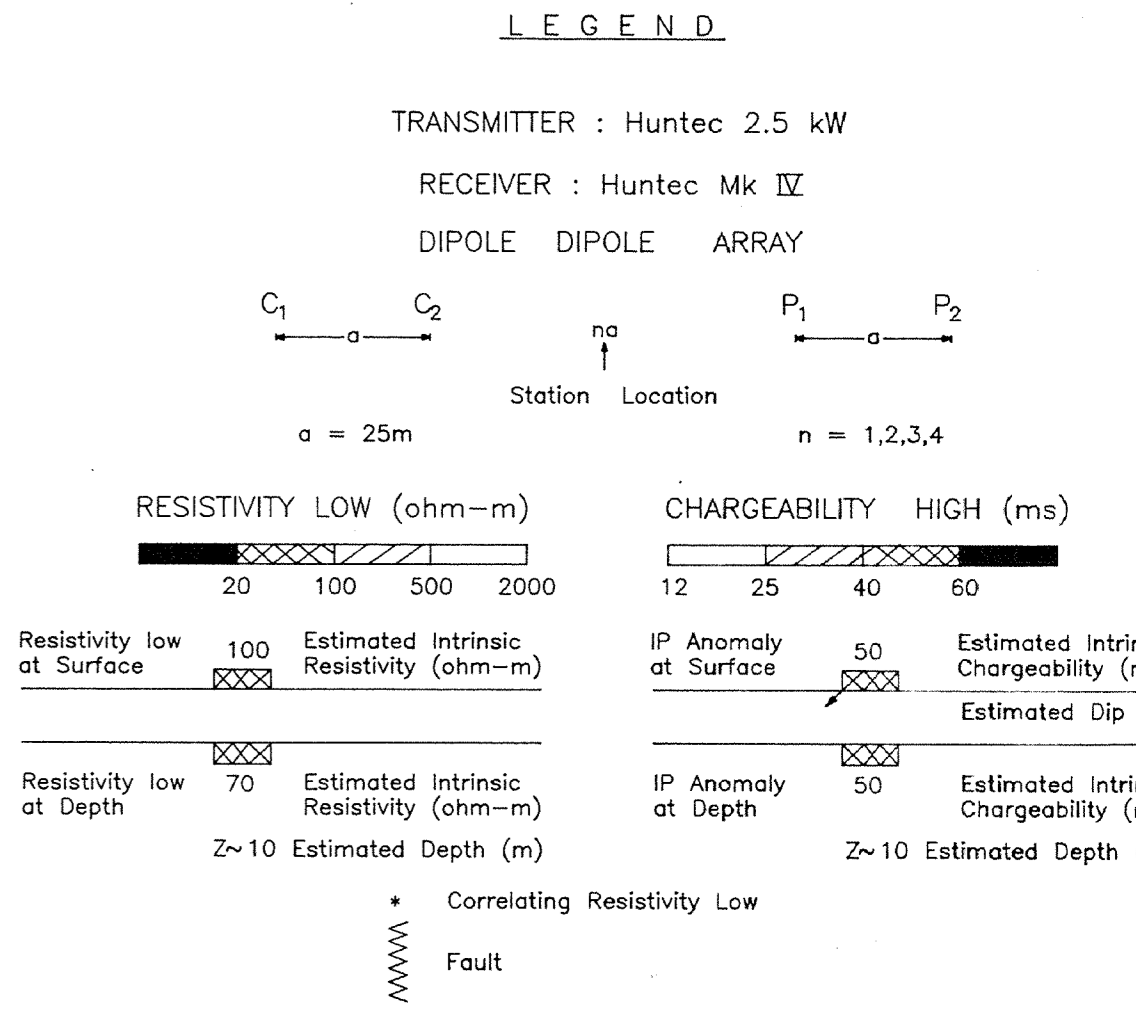
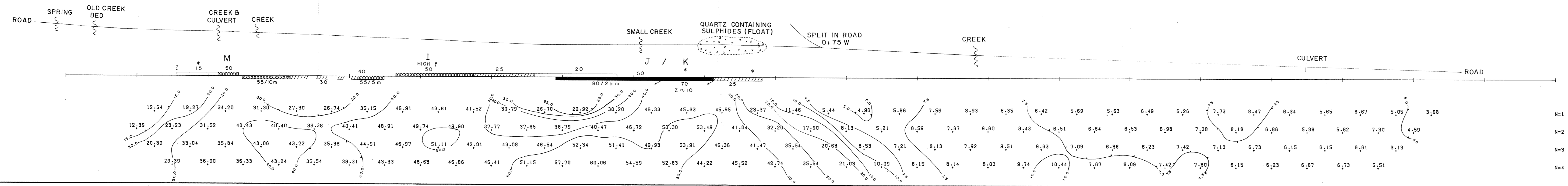
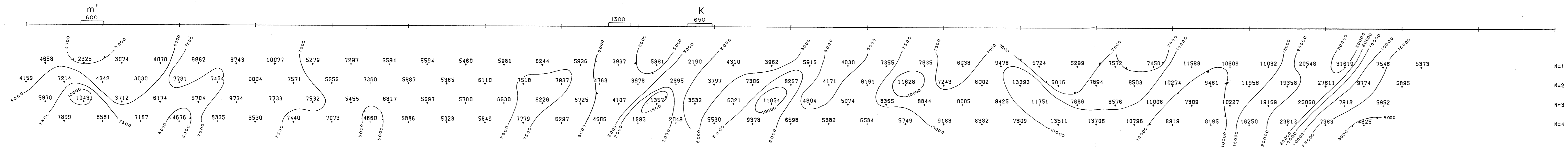
**INDUCED POLARIZATION SURVEY
RDS1**

PEAK LAKE ZONE-EMMA PROPERTY
 NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

Project No: V 257	By: DM / KDL / JR
Scale: 1:1250	Drawn: KDL / JR
Drawing No: 24	Date: FEBRUARY 1988

MPH Consulting Limited

600W 550W 500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E 300E 350E 400E 450E



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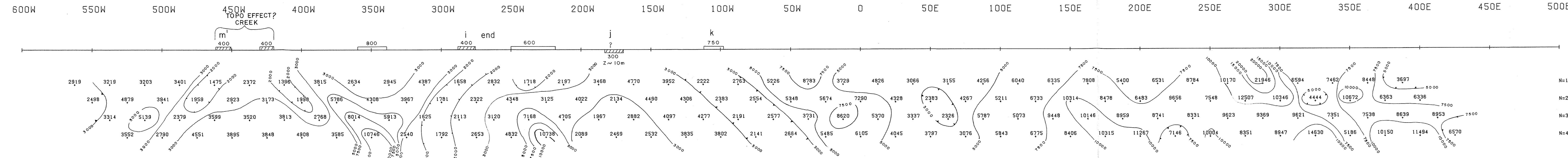
AU RESOURCES LTD.

**INDUCED POLARIZATION SURVEY
ADS2**

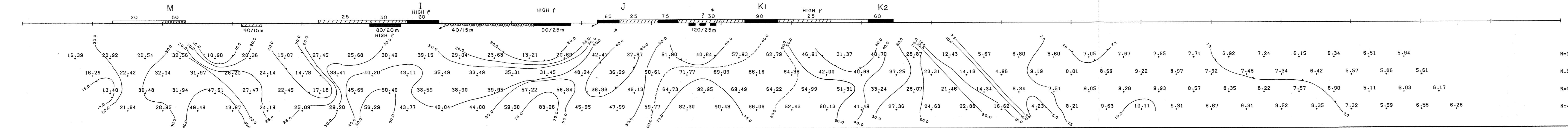
PEAK LAKE ZONE-EMMA PROPERTY
NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

Project No: V257	By: DM/KDL/JR
Scale: 1:1250	Drawn: KDL/JR
Drawing No: 25	Date: FEBRUARY 1988

MPH Consulting Limited



APPARENT RESISTIVITY
OHM-M



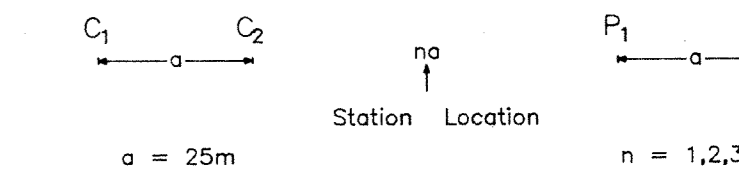
TOTAL CHARGEABILITY
MT (MSEC)

LEGEND

TRANSMITTER : Huntec 2.5 kW

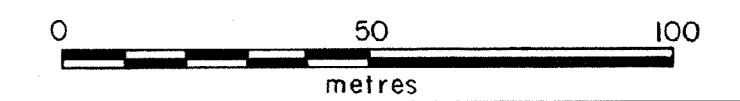
RECEIVER : Huntec Mk IV

DIPOLE DIPOLE ARRAY



RESISTIVITY LOW (ohm-m)	CHARGEABILITY HIGH (ms)
20 100 500 2000	12 25 40 60
Resistivity low at Surface	IP Anomaly at Surface
Estimated Intrinsic Resistivity (ohm-m)	Estimated Intrinsic Chargeability (ms)
Resistivity low at Depth	IP Anomaly at Depth
Estimated Intrinsic Resistivity (ohm-m)	Estimated Intrinsic Chargeability (ms)
Z~10 Estimated Depth (m)	Z~10 Estimated Depth (m)

- Correlating Resistivity Low
- Fault



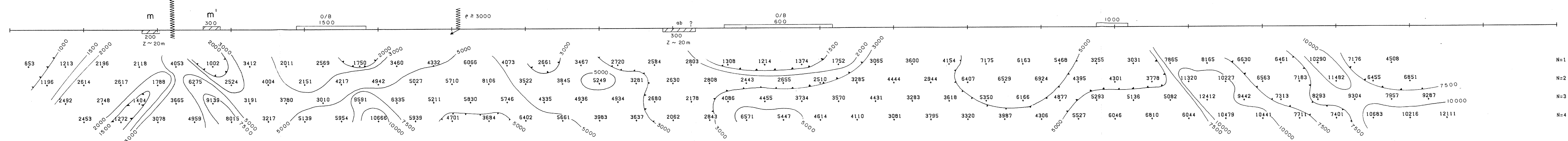
GEOLOGICAL BRANCH ASSESSMENT REPORT

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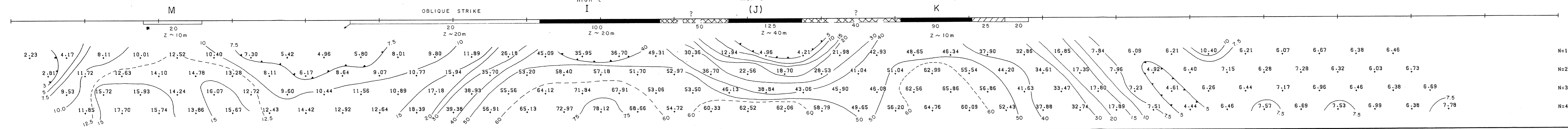
Part 3 of 4

AU RESOURCES LTD.	
INDUCED POLARIZATION SURVEY	
RDS3	
PEAK LAKE ZONE-EMMA PROPERTY	
NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS	
Project No: V 257	By: KDL / JR
Scale: 1 : 1250	Drawn: KDL / JR
Drawing No: 26	Date: FEBRUARY 1988
MPH Consulting Limited	

650W 600W 550W 500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E 300E 350E 400E



APPARENT RESISTIVITY OHM-M

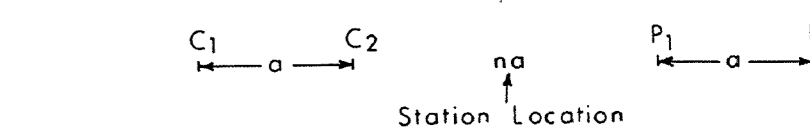


TOTAL CHARGEABILITY MT (MSEC)

LEGEND

TRANSMITTER : Huntec 2.5 kW
RECEIVER : Huntec Mk IV

DIPOLE DIPOLE ARRAY

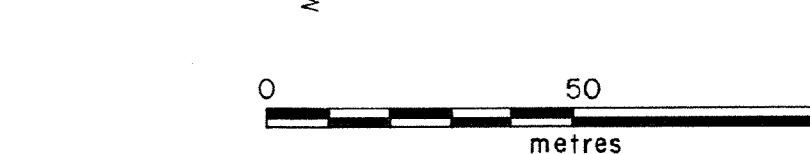


Station Location
a = 25m n = 1, 2, 3, 4

RESISTIVITY LOW(ohm-m)	CHARGEABILITY HIGH(ms)
20 100 500 2000	12 25 40 60
Resistivity low at Surface	IP Anomaly at Surface
Estimated Intrinsic Resistivity(ohm-m)	Estimated Intrinsic Chargeability(ms)
Resistivity low at Depth	IP Anomaly at Depth
Estimated Intrinsic Resistivity(ohm-m)	Estimated Intrinsic Chargeability(ms)
Z ~ 10 Estimated Depth(m)	Z ~ 10 Estimated Depth(m)

* Correlating Resistivity Low

MMA Fault



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INDUCED POLARIZATION SURVEY RDS4

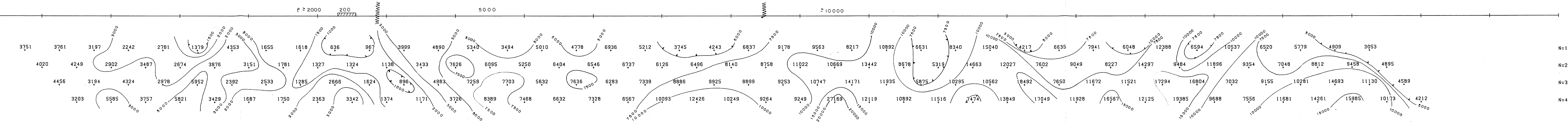
PEAK LAKE ZONE - EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

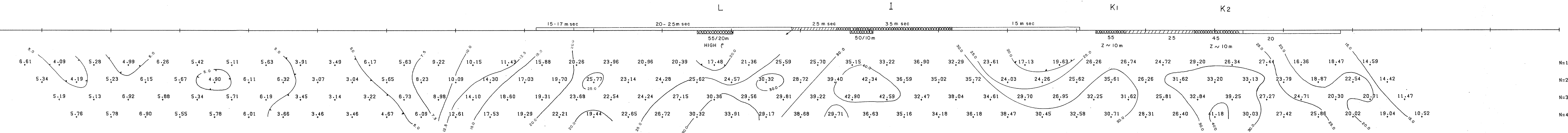
Project No: V 257	By: K.D.L., J.R.
Scale: 1:1250	Drawn: K.D.L., J.R.
Drawing No: 27	Date: FEBRUARY, 1988

MPH Consulting Limited

800W 750W 700W 650W 600W 550W 500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E 300E 350E

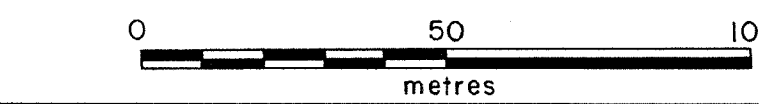
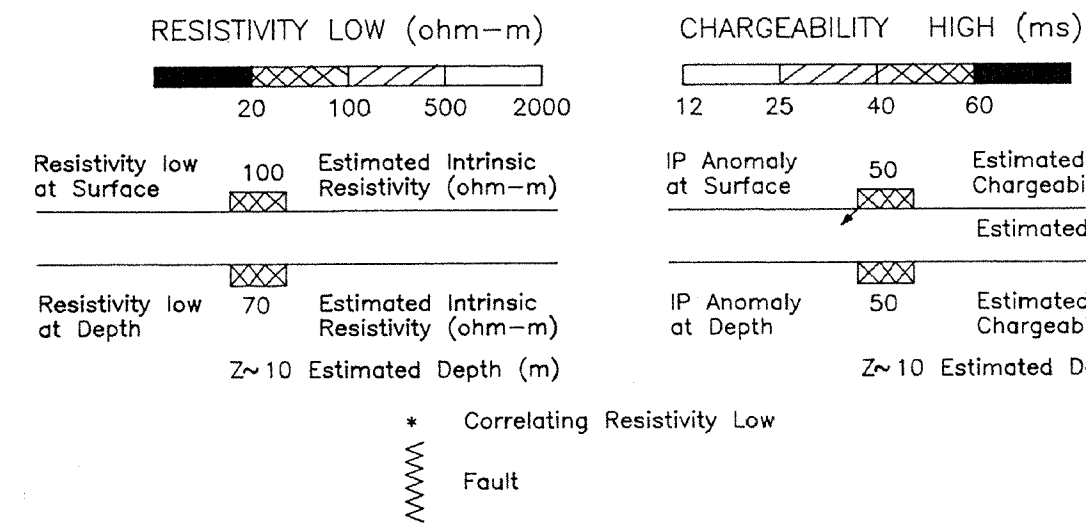
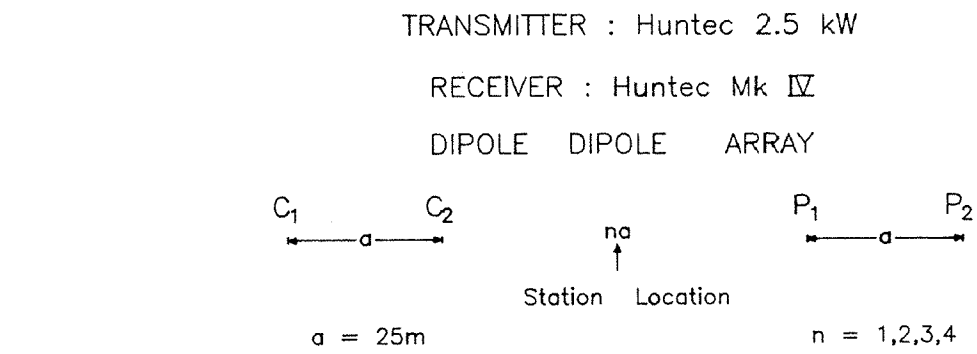


APPARENT RESISTIVITY
OHM-M



TOTAL CHARGEABILITY
MT (MSEC)

LEGEND



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AU RESOURCES LTD.

INDUCED POLARIZATION SURVEY

RDS6

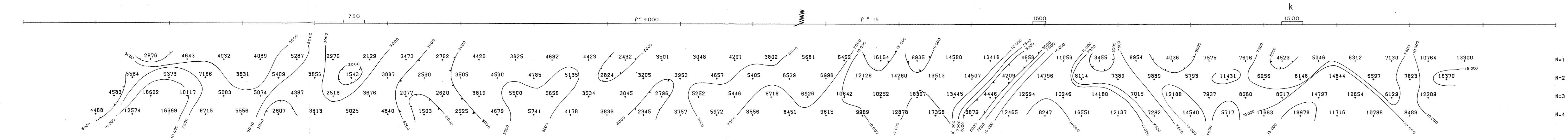
PEAK LAKE ZONE-EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

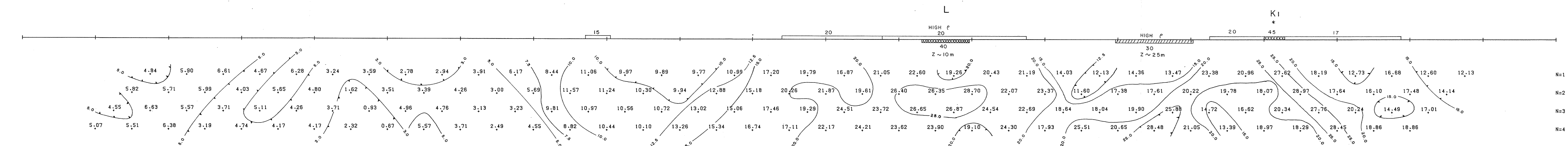
Project No: V 257	By: KDL / JR
Scale: 1:1250	Drawn: KDL / JR
Drawing No: 29	Date: FEBRUARY 1988

MPH Consulting Limited

800W 750W 700W 650W 600W 550W 500W 450W 400W 350W 300W 250W 200W 150W 100W 50W 0 50E 100E 150E 200E 250E



APPARENT RESISTIVITY OHM-M



TOTAL CHARGEABILITY MT (MSEC)

LEGEND

TRANSMITTER : Hunttec 2.5 kW
 RECEIVER : Hunttec Mk IV
 DIPOLE DIPOLE ARRAY

Station Location $n = 1, 2, 3, 4$
 $a = 25m$

RESISTIVITY LOW (ohm-m)	CHARGEABILITY HIGH (ms)
20 100 500 2000	12 25 40 60
Resistivity low at Surface	IP Anomaly at Surface
Estimated Intrinsic Resistivity (ohm-m)	Estimated Intrinsic Chargeability (ms)
70	50
Resistivity low at Depth	IP Anomaly at Depth
Z ~ 10 Estimated Depth (m)	Z ~ 10 Estimated Depth (m)

* Correlating Resistivity Low
 Fault

0 50 100 metres

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AU RESOURCES LTD.

INDUCED POLARIZATION SURVEY

RDS7

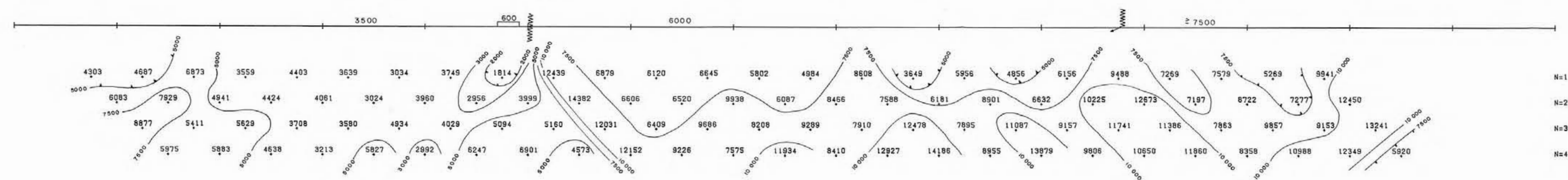
PEAK LAKE ZONE-EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

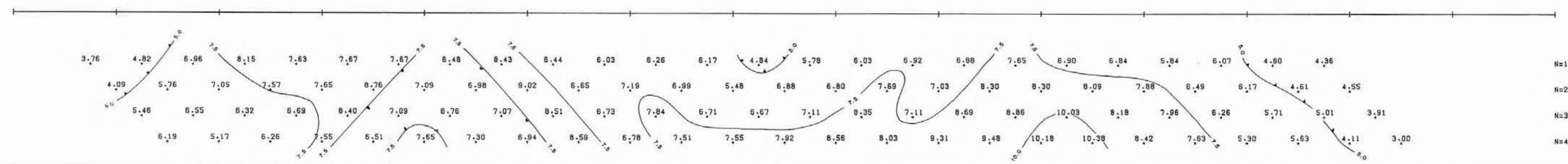
Project No: V 257	By: KDL / JR
Scale: 1 : 1250	Drawn: KDL / JR
Drawing No: 30	Date: FEBRUARY 1988

MPH Consulting Limited

400W 350W 300W 250W 200W 150W CONTACT 100W 50W 0 50E 100E 150E 200E 250E 300E 350E

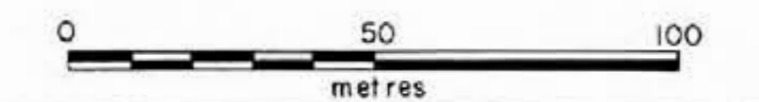
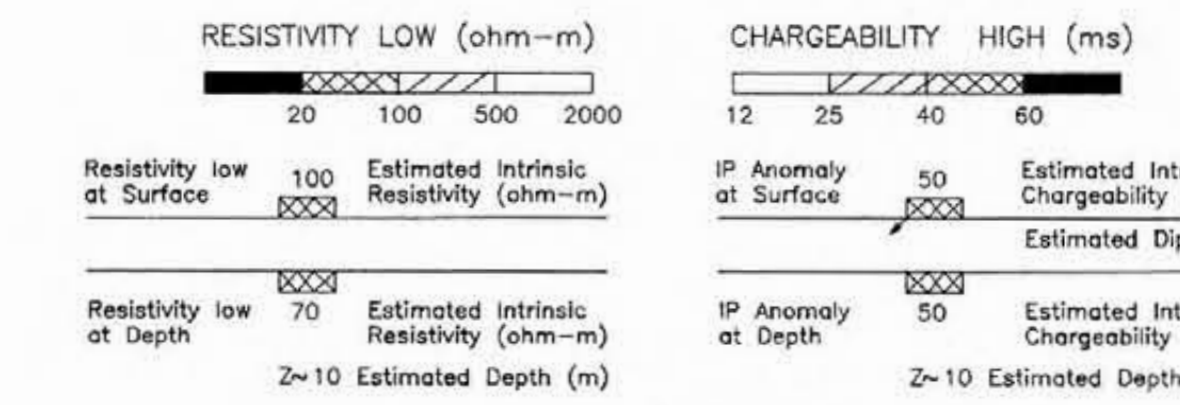
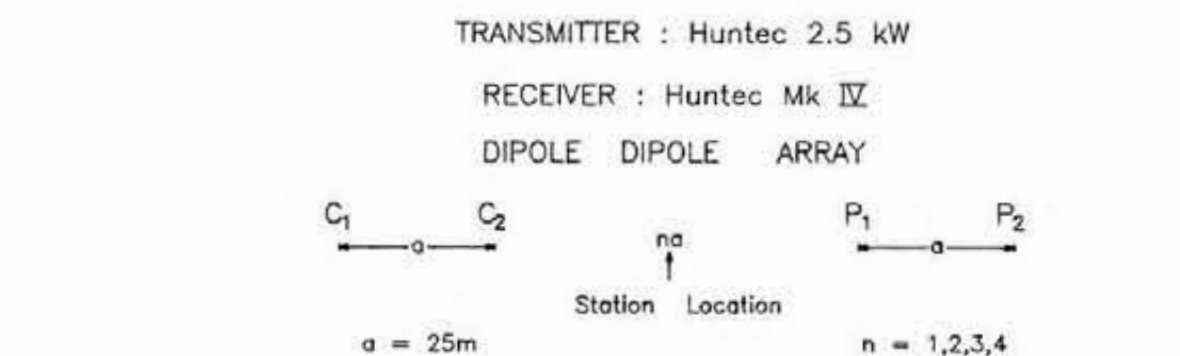


APPARENT RESISTIVITY OHM-M



TOTAL CHARGEABILITY MT (MSEC)

LEGEND



AU RESOURCES LTD.

INDUCED POLARIZATION SURVEY RDS8

PEAK LAKE ZONE-EMMA PROPERTY

NANAIMO, VICTORIA, ALBERNI MINING DIVISIONS

Project No: V 257	By: KDL / JR
Scale: 1 : 1250	Drawn: KDL / JR
Drawing No: 31	Date: FEBRUARY 1988



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