GRAND NATIONAL RESOURCES INC.
GEOPHYSICAL REPORT ON AN
INDUCED POLARIZATION SURVEY
KERO-LAREDO-PUMA PROPERTIES
OSOOYOS MINING DIVISION
LATITUDE: 49°20'N LONGITUDE: 119°50'W
NTS 82E/5

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Geophysicist

DATE OF WORK: Sept.23-30,1987
DATE OF REPORT: Dec.23,1987

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ILLUSTRATIONS:

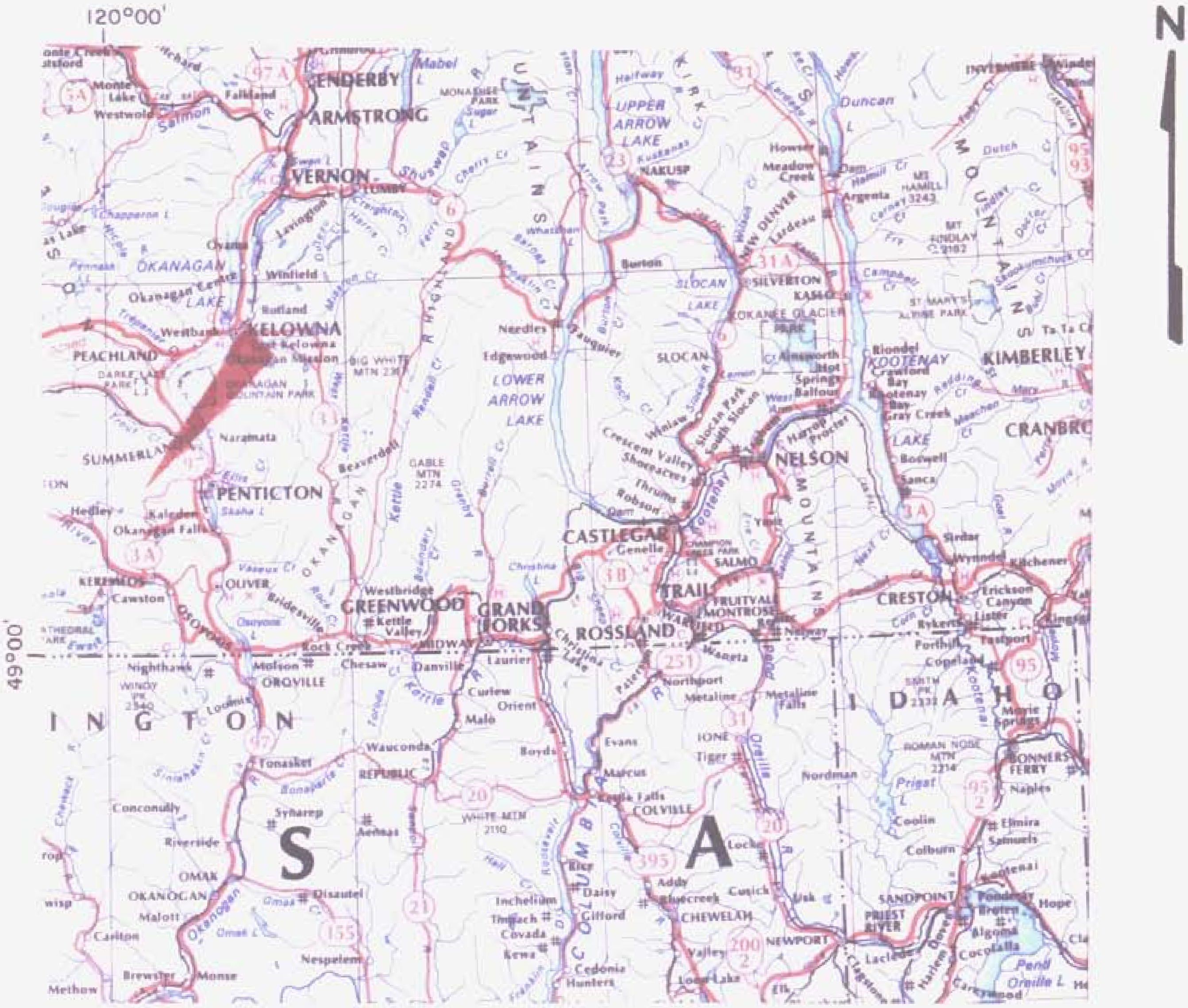
INTRODUCTION:

In September of 1987 White Geophysical Inc. was contracted by **Grand National Resources Inc.** to conduct a multipole induced polarization survey on their **Kero project.** The primary purpose of this IP survey was to attempt to locate the source of the geochemical anomaly in the soil sample grid. During the course of this survey approximately 8.5 kilometres of line were read on the **Puma** claims in a gradient array a=25m, n=11.

PROPERTY:

The **Kero-Laredo-Puma** property consists of nineteen claims totalling 155 units (see Figure 2).

CLAIM NAME	UNITS	RECORD #	RECORD DATE
LAREDO	20	1708	MAR.31/85
LAREDO #1	15	1709	MAR.31/83
KERO #1	1	1606	OCT.6/82
KERO #2	1	1607	OCT.6/82
KERO #3	1	1634	DEC.14/82
KERO #4	1	1635	DEC.14/82
PUMA	16	1937	OCT.25/83
PUMA #1	14	1954	NOV.25/83
PUMA #2	18	1955	NOV.25/83
PUMA #3	18	1961	DEC.15/83
PUMA #4	12	1975	FEB.10/84
PUMA #5	12	2118	OCT.5/84
PUMA #6	20	2243	JUNE 25/85
PUMA FR.	1	1938	OCT.27/83
FLO #1	1	2244	JUNE 25/85
FLO #2	1	2245	JUNE 25/85
FLO #3	1	2246	JUNE 25/85
LYNX #1	1	2005	APR.16/84
LYNX #2	1	2006	APR.16/84



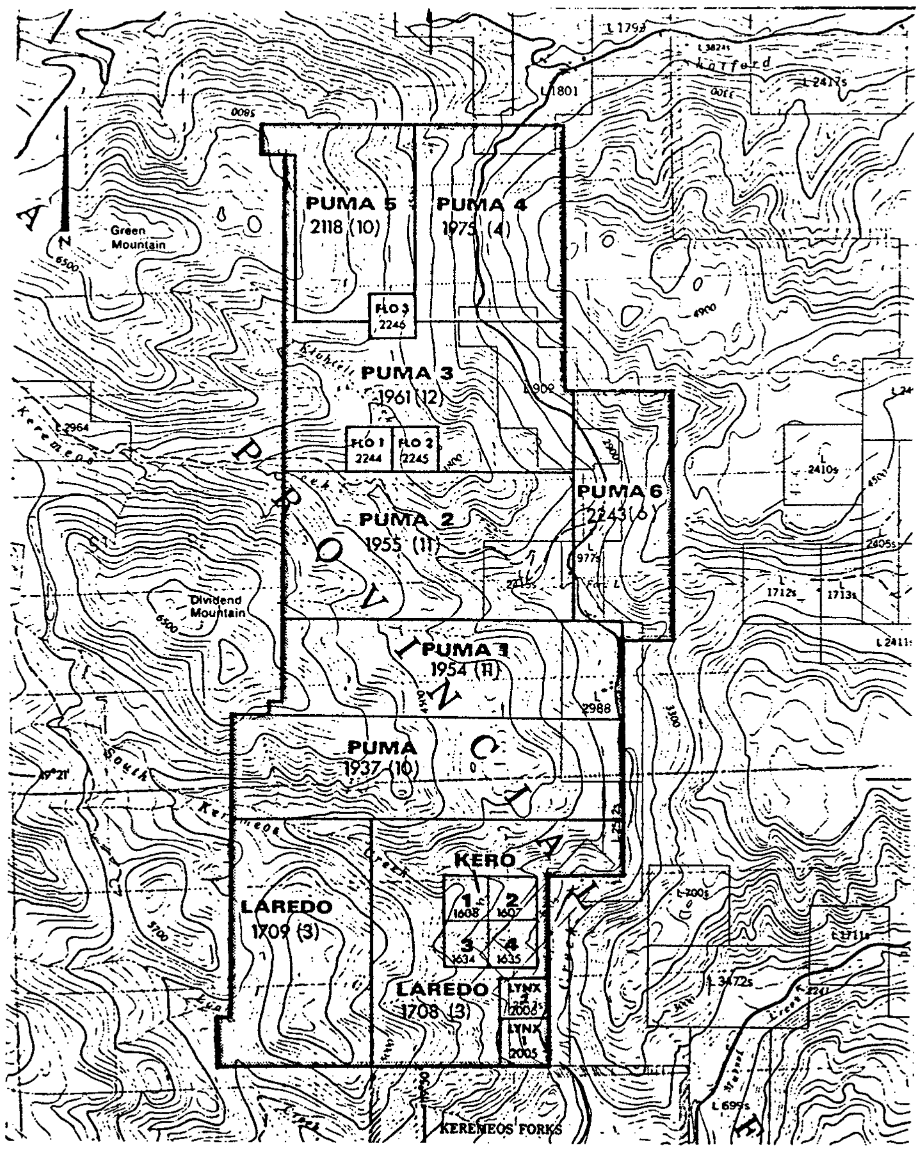
GRAND NATIONAL RESOURCES INC.

KERO PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

LOCATION MAP

N.T.S. 82E/5 SCALE : 1:2 000 000 FIG. 1



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GRAND NATIONAL RESOURCES INC.

KERO PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

CLAIMS MAP

0 1 2 3 4 5Km

N.T.S. 82E/5

FIG. 2

LOCATION AND ACCESS

The **Kero-Laredo-Puma** property is located on Keromeos Creek approximately 10 kilometres north of Keromeos. Access to the **Puma** claims is obtained from Highway 3A. Approximately 6 km north of Olalla the Green Mountain road turns west through the Keromeos Forks Indian Reserve and crosses the **Kero-Laredo-Puma** property approximately 3 kilometres from Highway 3A. The road crosscuts the property at its southeastern edge. In 1986 an access road was built into the Kero adit. The property is located in the Osooyos Mining Division at latitude 49°20'N longitude 119°50'W on NTS sheet 82E/5.

GENERAL GEOLOGY:

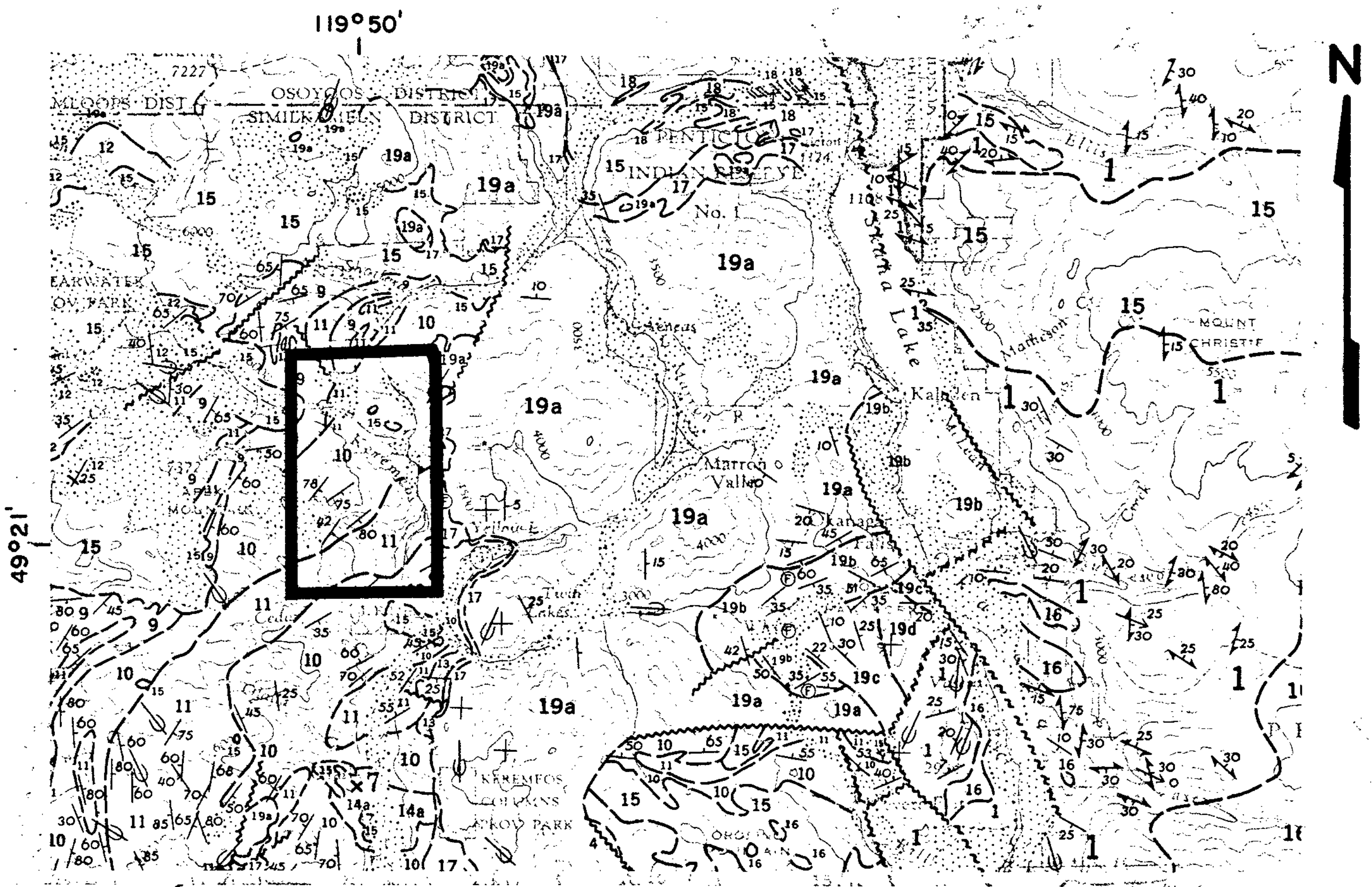
The property is underlain by three structural units, the Independence Formation, the Shoemaker Formation and the Old Tom Formation. The Shoemaker and Independence Formations consist largely of interbedded cherts and greenstones which have been intruded by dioritic intrusives while the Old Tom Formation consists of greenstone with minor diorite. The known mineralization on the **Kero** claim is associated with a tight, silicified shear zone.

LOCAL GEOLOGY:

Taken from the report by I.Borovic, P.Eng., August,1987:

KERO-LAREDO-PUMA CLAIMS

"The property is underlain by cherts, tuffs, and greenstones of the Shoemaker and Old Tom formations of the Triassic or earlier age. Jurassic limestones also outcrop on the property. All these rocks were intruded by the Cretaceous granites and granodiorites of the Nelson Plutonic complex.



LEGEND

CENOZOIC

PALEOCENE OR EOCENE

18	Porphyritic granite and rhyolite
17	Conglomerate, sandstone, shale, tuff

MESOZOIC

CRETACEOUS (?)

16	VALHALLA PLUTONIC ROCKS: granite, granodiorite
15	NELSON PLUTONIC ROCKS: granodiorite, quartz diorite, diorite; granite, quartz monzonite, syenite, monzonite

JURASSIC (?)

14	14a, pyroxenite; 14b, hornblendite; 14c, serpentinite

TRIASSIC OR JURASSIC

13	Limestone

TRIASSIC
UPPER TRIASSIC
NICOLA GROUP

12	Greenstone, tuff, quartzite, limestone, argillite, and schist

TRIASSIC OR EARLIER

8–11	8. BARSLOW FORMATION: argillite 9. INDEPENDENCE FORMATION: chert, greenstone 10. SHOEMAKER FORMATION: chert, some tuff and greenstone 11. OLD TOM FORMATION: greenstone, minor diorite

PERMIAN AND/OR TRIASSIC
ANARCHIST GROUP

7	Greenstone, quartzite, greywacke, limestone, locally paragneiss

PALAEOZOIC

PERMIAN AND (?) PENNSYLVANIAN

5,6	5. CACHE CREEK GROUP: greenstone, quartzite, argillite, limestone 6. BLIND CREEK FORMATION: limestone, limy argillite

CARBONIFEROUS (?)
KOBAU GROUP

4	Quartzite, schist, greenstone

PRECAMBRIAN OR LATER

PRE-PERMIAN

3	OLD DAVE INTRUSIONS: serpentinized ultrabasic rocks

CHAPPERON GROUP

2	Chlorite schist, quartzite

MONASHEE GROUP

1	Layered gneiss (paragneiss); minor schist, amphibolite, quartzite, marble, and pegmatite

- Drift-covered area
- Geological boundary (defined, approximate)
- Bedding (horizontal, inclined)
- Bedding, tops unknown (inclined, vertical)
- Gneissosity (inclined, vertical)
- Schistosity (inclined, vertical)
- Fault (defined, approximate, assumed)
- Lineation
- Glacial striae
- Fossil locality
- Mineral property

Geology by H.W. Little, 1958 and 1959

GRAND NATIONAL RESOURCES INC.

KERO PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

REGIONAL GEOLOGY

0 2 4 6 8 miles

N.T.S. 82E/5

PLATE 1

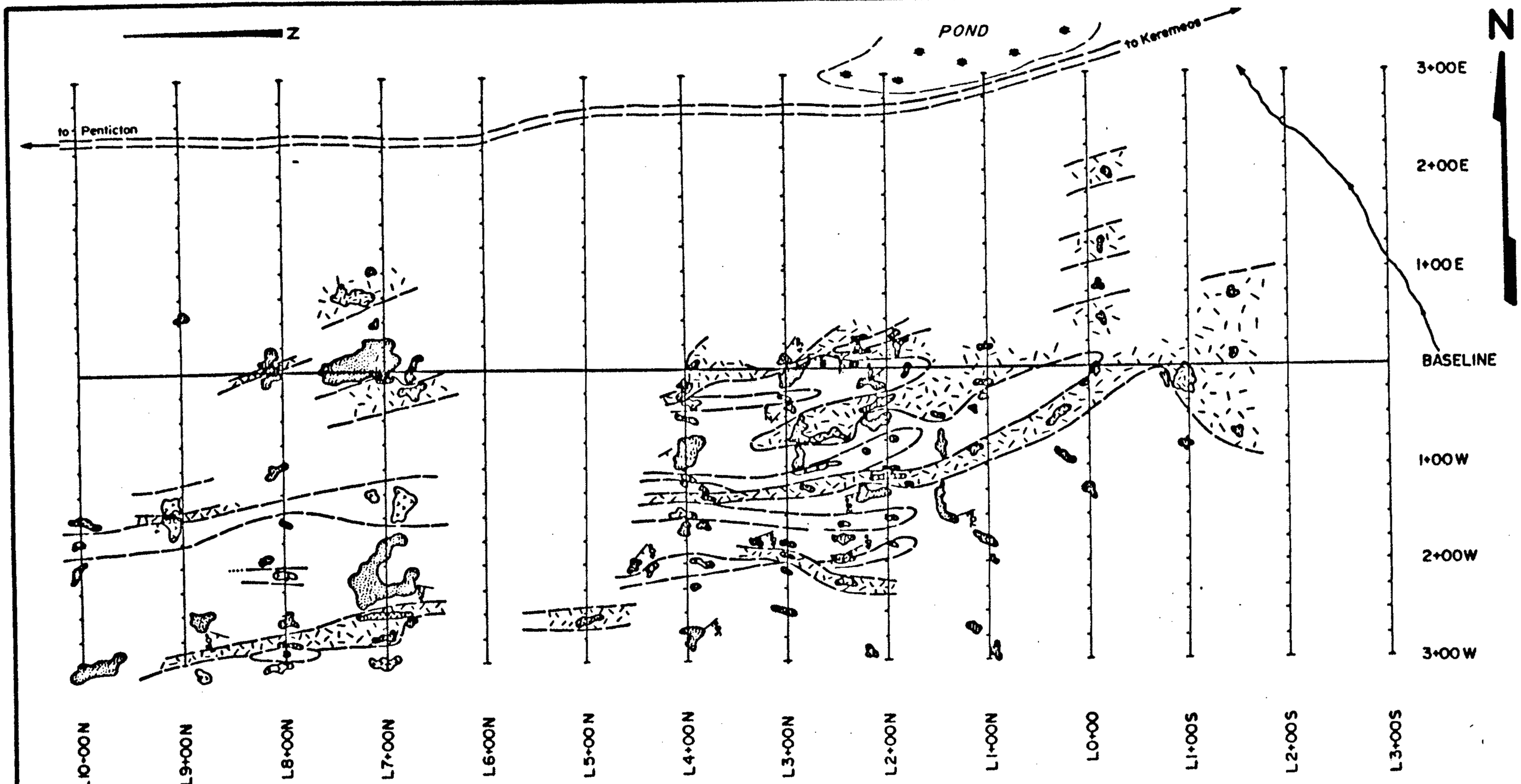
Bedding strikes NE-SW with moderate to steep dips to SE, Paleocene sediments and Eocene volcanics are unconformably capping the older units.

The Kero claims are underlain by altered volcanic soft chloritic and calcareous greenstones with pyrite, magnetite, and precious metals mineralization.

The quartz veins are filling fractures and shears in the greenstones with general trend east-west with moderate dip to the south. The vein in the Kero adit is 8 to 50 cm wide and is widening down dip. Mineralization consists of pyrite and arsenopyrite. Three chip samples taken of the vein assayed:

1. 4851 (50cm width): Ag = 0.60 oz/t; Au = 0.312 oz/t
2. 4852 (31 cm width): Ag = 1.24 oz/t; Au = 1.980 oz/t
3. 4853 (40 cm width): Ag = 0.15 oz/t; Au = 0.273 oz/t

"The widest portion of the vein exposed in the adit is 33cm (13") and is associated with a structurally strong shear zone that is at least 86.4 cm (32") wide. The vein pinches and swells along strike and is free on both the hanging and foot walls. The vein feathers up-dip into seperate stringers which is also the case for the shear zone. It appears to be 'coming in' or expanding in a down dip direction. Mineralization consists of galena, shpalerite and pyrite which occur as disseminations as well as discreet stringers in the vein. The country rock is a greenstone (altered basic igneous rock) which exhibits contact metamorphism with the vein and is pyritic. The trenching program has extended the structure and mineralization approximately 120m (400') to the east and west for a total strike length of greater than 250m (800') with an elevation difference of 97m (318'). Attitudes are quite uniform over this distance indicating and supporting a structurally strong system. Though the trenching has uncovered the vein along strike the exposure is generally poor. The character of the vein is consistent over this strike length enhancing the down dip possibility of an occurrence similar to that exposed in the adit. The vein in the trenches is a vitreous quartz that is ribbon fractured and healed with limonite with pyrite, minor chalcopyrite, and galena disseminations, locally it is vughy and gossaned" Kregosky,1985.



After R. Kregosky, 1985

GRAND NATIONAL RESOURCES INC.

KERO PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

LOCAL GEOLOGY

LEGEND

TRIASIC OLD TOM FORMATION

Diorite

Amygdaloidal Basalt (greenstone)

INDEPENDENCE FORMATION – Chert, Quartzite, Argillaceous Members

Bedding

Contact: observed / assumed

Drainage

0 50 100 200 300 400 m

N.T.S. 82E/5

PLATE 2

PREVIOUS WORK:

Work on the **Kero-Laredo-Puma** property started near the turn of the century and is described in the Annual Reports of the Ministry of Mines (B.C.) for 189901904, 1906, 1928, with most of the existing underground workings and surface development being done before 1908.

In 1964 the **Kero** claims were staked by M.Schrom of Olalla. At this time some trenching was completed. In 1983 **Grand National Resources Inc.** became owner of the **Kero-Laredo-Puma** claims.

As well in 1983, the property was visited by R.Kregosky which resulted in the quartz vein structure on the **Kero** claims being opened, mapped, and sampled. Then in late October of 1983 the strike length of the vein system was extended by drilling and blasting a series of ten trenches. This completed the work for 1983.

In May and June a VLF-EM survey and geochemical soil survey combined with a program of regional mapping was complete (Kregosky,R., July 10,1984).

No other work is known to the author.

MULTIPOLE INDUCED POLARIZATION SURVEY

The multipole induced polarization method is a technique which exploits the rapid signal acquisition and processing capabilities available with current micro computer technology. With this technique the potential field information is obtained through a multiconductor cable having 36 takeouts at 25 metre intervals. The cable is presently configured as up to six end and position interchangeable cables of 150 metre length. The takeouts are addressed by the 40 channel multiplexer assembly in a specially configured HP-3497A data acquisition system as 25 metre to 275 metre dipoles. The data acquisition system is driven by a HP-85 computer, allowing the data to be stacked in the computer for a number of cycles at full precision until a criteria is reached. Ten windows on the secondary voltage are compiled, as well as the primary voltage information. Time zero is sensed by direct reference to the transmitter timing circuitry. The cable is scanned simultaneously in groups of five dipoles and the decay curves presented graphically for acceptance and logging or rejection and rescan by the operator. The data is logged on digital tape cartridges and is readily accessed in the field in order to produce pseudo-sections. These tapes are read by a HP-9845 computer for further processing and production of final report ready sections.

The primary field power is provided by a Huntec MK IV 2.5 kw transmitter operated in time domain mode which is driven by a 400 H_z, 120 volt three phase motor generator. The transmitted signal is an alternate cycle reversing current pulse of two second on and two second off time. The current is introduced into the ground through two current electrodes for each scan of the potential cable. By scanning the cable for each of several current stake positions both along the cable and off the ends of the cable a strong measure of redundancy of coverage of a given depth point is assured. The stacking of this multiple scan information in the computer results in an improved determination of the geoelectric section.

The apparent resistivity is obtained from the ratio of the primary voltage measured on the potential dipole during the current on part of the cycle to the current flowing through the current electrodes. A geometric factor is computed from the electrode locations to arrive at the apparent resistivity, measured in ohm-metres.

The apparent chargeability is calculated from the ten secondary voltage windows as the area under the secondary decay curve and is measured in milliseconds. the integration time is 1100ms with a delay of 200ms.

DISCUSSION OF RESULTS:

The data is presented in resolution section form in Figures 3-16 and a representative sample of the data is plotted in plan map form in Figures 17 and 18.

The strongest chargeability zone detected is zone "A" (see Figure 17). This zone has a strike length of 100 metres and is centred at approximately 100E on line 700N. This zone may be sourced in Argillaceous members of the Independence Formation or may be sourced in sulphides.

Zone B is a large area of moderate chargeability values it is likely sourced in a rock type change. Within this area of elevated chargeability values are three distinct subzones (B^{I}, B^{II}, B^{III}). These zones may be sourced in an increased concentration of sulphides or in Argillaceous members of the Independence Formation.

Zone C is a small moderatly strong zone centred at 150W on line 100S and is very similar to zones E, F and G. All of which may be sourced in an increase in sulphide mineralization or an Argillaceous member of the Independence Formation.

The apparent resistivity data is presented in plan map form in Figure 18. A long linear resistivity high is apparent in the eastern portion of the grid. The high broadens toward the south. It is marked R1 on Figure 18 and may be sourced in a rock type change or a lessening of overburden thickness.

Zones R2, R3 and R4, R5, consist of resistivity highs paired with a resistivity low. These may be sourced in silicified zones with clay alteration making them very interesting targets for further exploration.

The resistivity data does appear noisy. This is probably due to the steep hillside causing great variance in the overburden thickness.

CONCLUSIONS AND RECOMMENDATIONS:

In September of 1987 White Geophysical Inc. completed 8.5 kilometres of induced polarization surveying on **Grand National Resources Inc.'s Kero-Laredo-Puma** project. No clear drill targets were delineated but a number of anomalous zones warrant further attention. Zone A, a chargeability high, should be trenched to discover its source. The other chargeability highs are weaker and of smaller size but cannot be ruled out as possible sites of mineralization.

The apparent resistivity data, although noisy and dependent on overburden depth contains a long linear feature R1 which may be a zone of silicification and two high resistivity, low resistivity pairs (R2, R3) (R4, R5) which may be associated with zones of silicification. All three of these areas warrant trenching.

Respectfully Submitted,

Markus Seywerd,
Geophysicist

STATEMENT OF QUALIFICATIONS

NAME: SEYWERD, Markus B., B.Sc.

PROFESSION: Geophysicist

EDUCATION: University of British Columbia - B.Sc., Mathematics

EXPERIENCE: Three years of summer field work with Noranda Exploration Company Ltd. in British Columbia, Northwest Territories and Yukon Territories.

Two year Geophysicist with White Geophysical Inc. with work in British Columbia, Saskatchewan and Yukon Territories.

COST BREAKDOWN:

Personnel	Dates	Wage/diam.	Total
B.Acheson, Crew Chief	Sept.23-30	350.00	$2,800.00
L.ThorHeyden	Sept.23-30	250.00	2,000.00
B.Tate	Sept.23-30	250.00	2,000.00
G.Hyguist	Sept.23-30	250.00	2,000.00

Truck 8 days @ $100/day	800.00
Room & Board 32 days @ $70/manday	2,240.00
Mobilization 8 days @ $220/day	2,000.00
Instrument rental	1,760.00
Drafting, data plotting	750.00
Data analysis and report writing	1,250.00
Total	**$17,600.00**

REFERENCES:

Borovic, I., P.Eng.

Report on the Mineral Exploration of the Kero Project for Grand National Resources Inc. August, 1987.

Measurement Speeds

For the 3497A DVM and the relay multiplexer. Speeds are given for measurements on random channels (using software channel selection) and sequential channels (using external hardware increment). Speeds include I/O times to the indicated computers.

	Number of Digits Selected	85	Computer 9826*	1000L	1000E,F
Sequential Channels using external increment	5½ digits	39(33)**	39	39(25)	30(25)
	4½ digits	97(88)	103	108(79)	88(79)
	3½ digits	112(107)	123	127(99)	107(99)
Random Channels using software	5½ digits	13(15)	27	21(16)	22(16)
	4½ digits	14(21)	51	31(28)	35(30)
	3½ digits	14(23)	55	33(29)	35(32)

*9826 speeds for BASIC operating system
**50 Hz speeds in ( )

TIMER/REAL TIME CLOCK

Clock Format

Month:Day:Hours:Minutes:Seconds (Option 230)
Day:Month:Hours:Minutes:Seconds (Option 231)

	Maximum Time	Resolution	Accuracy	Output
Real Time Mode	1 year	1 second	±(.005% of time + .1s)	Display and HP-IB
Elapsed Time Mode	10^6 seconds	1 second	±(.005% of time + .1s)	Display and HP-IB
Time Alarm Mode	24 hours	1 second	±(.005% of time + .1s)	HP-IB SRQ
Time Interval Mode	24 hours	1 second	±(.005% of time + .1s)	50 µS TTL Pulse + HP-IB SRQ
Time Output Mode	1 second	100 µS	±(.02% of time)	16 µS TTL Pulse
Power Failure Protection: Battery back-up for >24 hours for time and elapsed time only				

3497A MAINFRAME AUXILIARY INPUTS/OUTPUTS

Ext Trig. Input: TTL Compatible
Minimum pulse width: 50 n seconds

Ext Incr. Input: TTL Compatible
Minimum pulse width: 50 µ seconds

BBM Sync: TTL Compatible
This terminal serves as a break before make synchronizing signal to the 3497A and other equipment. The terminal is both an input and output with a low level indicating a channel is closed. The 3497A will not close any additional channels until the line is sensed high and the line will float high when all channels are open.

VM Complete Output: TTL Compatible
Pulse width = 500 n seconds

Channel Closed Output: TTL Compatible
Pulse width = 500 n seconds

Timer Interval Output: TTL Compatible
Output port for the time interval and time output functions.

Physical Parameters

Size (3497A or 3498A): 190.5 mm (7½ in.) high
428.6 mm (16 7/8 in.) wide
520.7 mm (20½ in.) deep
An additional two inches in depth should be allowed for wiring.

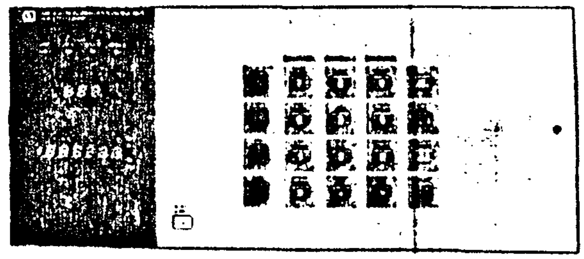
Net Weight:

	3497A	3498A
Maximum (with assemblies in all slots)	20.4 kg (45 lbs.)	20.4 kg (45 lbs.)

SPECIFICATIONS TABLES

SYSTEM ACCURACY SPECIFICATIONS

These system specifications combine individual accuracy specifications to result in a total measurement accuracy specification. For example, the resistance specifications combine the DVM, current source and acquisition assembly error terms.



Voltage Measured Through Acquisition Assembly

3497A Configuration:
DVM: 5½ digit, auto zero on
Relays Switches: Tree Switched

Accuracy: ±(% of reading + number of counts)

90 Days 23°C ± 5°C

Voltmeter Range	Digits Displayed 5½ digits	4½ digits	3½ digits
0.1V	0.007 + 5	0.01 + 2	0.1 + 1
1.0V	0.006 + 1	0.01 + 1	0.1 + 1
10.0V	0.006 + 1	0.01 + 1	0.1 + 1
100.0V	0.006 + 1	0.01 + 1	0.1 + 1

Resistance Measured Through an Acquisition Assembly

3497A Configuration:
DVM: 5½ digit, auto zero on
Current Source: As indicated
Relay Switches: Configured for a 4-terminal resistance measurement

Characteristics

Effective Resistance Range	Effective Resistance Resolution	Current Source Range	Range
100 Ω	1 mΩ	1 mA	.100000
1 kΩ	10 mΩ	100 μA	1.00000
10 kΩ	100 mΩ	100 μA	10.0000
100 kΩ	1 Ω	10 μA	10.0000

Accuracy: ±(% of reading + number of counts)

90 Days 23°C ± 5°C

Range Relays (Opt. 010)	Digits Displayed 5½ digits	4½ digits	3½ digits
100 Ω	.032 + 5	.035 + 2	0.125 + 1
1 kΩ	.032 + 5	.035 + 2	0.125 + 1
10 kΩ	.032 + 5	.035 + 2	0.125 + 1
100 kΩ	.031 + 2	.035 + 2	0.125 + 1

System Noise Rejection

Normal Mode Rejection (NMR): (50 or 60 Hz + .09%)

DVM Digits Displayed	Rejection
5½	60 dB
4½	0 dB
3½	0 dB

NMR is a function of the 3497A DVM configuration only and is not affected by the number of channels in the system.

Effective Common Mode Rejection (ECMR): The ECMR of a 3497A based system is a combination of the ECMR of the 3497A DVM and the effects of adding multiplexer assemblies and 3498A extenders.

ECMR: 1(kΩ imbalance in low lead, using tree switching, ac at 50 or 60 Hz, 25°C, <85% R.H.)

Voltmeter Configuration

Number of Acquisition Channels (Options 10,20)		5½ digits	4½ digits	3½ digits
0	AC	150 dB	90 dB	90 dB
	DC	120 dB	120 dB	120 dB
<100	AC	150 dB	90 dB	90 dB
	DC	104 dB	104 dB	104 dB
<400	AC	140 dB	80 dB	80 dB
	DC	92 dB	92 dB	92 dB
<1000	AC	130 dB	70 dB	70 dB
	DC	85 dB	85 dB	85 dB

HP-85A Specifications

OPERATING SYSTEM

ROM .... 32K bytes

USER READ/WRITE MEMORY

Standard .... 16K bytes
Expansion memory module .... 16K bytes

DYNAMIC RANGE

Real precision: -9.99999999999E499 to -1E-499, 0 and 1E-499 to 9.99999999999E499
Short precision: -9.9999E99 to -1E-99, 0, 1E-99 to 9.9999E99
Integer precision: -99999 to 99999

BUILT-IN FUNCTIONS

Mathematical and trigonometric functions are included in the following table with average execution times in msec.

Absolute (ABS)	0.83
Fractional part (FP)	1.01
Integer part (IP)	2.56
Maximum (MAX)	6.42
Minimum (MIN)	6.19
Modules (MOD)	2.21
ln (LOG)	32.11
log (LGT)	26.63
e^x (EXP)	24.54
Raise to power (Y↑X)	43.92
Random number (RND)	3.54
Sign (SGN)	0.90
Square root (SQR)	8.74
Sine (SIN)	45.62
Cosine (COS)	45.69
Tangent (TAN)	27.27
Arcsine (ASN)	43.23
Arccosine (ACS)	43.98
Arctangent (ATN)	22.76
Cosecant (CSC)	51.68
Secant (SEC)	51.72
Cotangent (COT)	27.29
+	1.08
−	1.12
÷	5.92
•	2.85
Ceiling (CEIL)	2.91
Floor (FLOOR)	3.33

Built-in Operators
Logic: AND, OR, NOT, EXOR
Relational: =, >, <, <=, >=, <> (or #)

CRT DISPLAY

Size .... 127 mm (5 in.) diagonal
Capacity:
Alphanumeric ...... 16 lines × 32 characters
Graphics .... 192 × 256 dots
Scrolling capacity ..... 64 lines
Character set .... 256 characters; set of 128 + same set underscored
Character font .... 5 × 7-dot matrix
Intensity .... adjustable to 32 ft-lamberts
Cursor .... underline

CLOCK AND TIMERS

Time is maintained as seconds since midnight, along with year and day in year. Three timers can be programmed to generate individual interrupts periodically, at intervals from 0.5 msec to 99,999,999 msec (1.16 days).

BEEPER

The beeper is programmable with parameters for duration and tone. The frequency range is approximately 0 to 4,575 Hz.

OPERATING REQUIREMENTS

Source .... 115 Vac nominal (90-127 Vac)
230 Vac nominal (200-254 Vac)
Line frequency .... 50-60 Hz
Consumption ..... 40 watts nominal

HP-85A operating
temperature .... 5° to 40°C (40° to 105°F)
HP-85A storage
temperature .... -40° to 65°C (-40° to 150°F)
HP-83A operating
temperature .... 0° to 55°C (32° to 131°F)
HP-83A storage
temperature .... -40° to 75°C (-40° to 167°F)
Ambient
humidity .... 5% to 80% at 40°C

SIZE AND WEIGHT

Height .... 15.9 cm (6.3 in.)
Width .... 41.9 cm (16.5 in.)
Depth .... 45.2 cm (17.8 in.)
HP-85A Weight:
net .... 9.1 kg (20 lbs)
shipping .... 16.8 kg (37 lbs)
HP-83A Weight:
net .... 7.3 kg (16 lbs)
shipping .... 15.0 kg (33 lbs)

BASIC FUNCTIONS AND STATEMENTS

System Functions

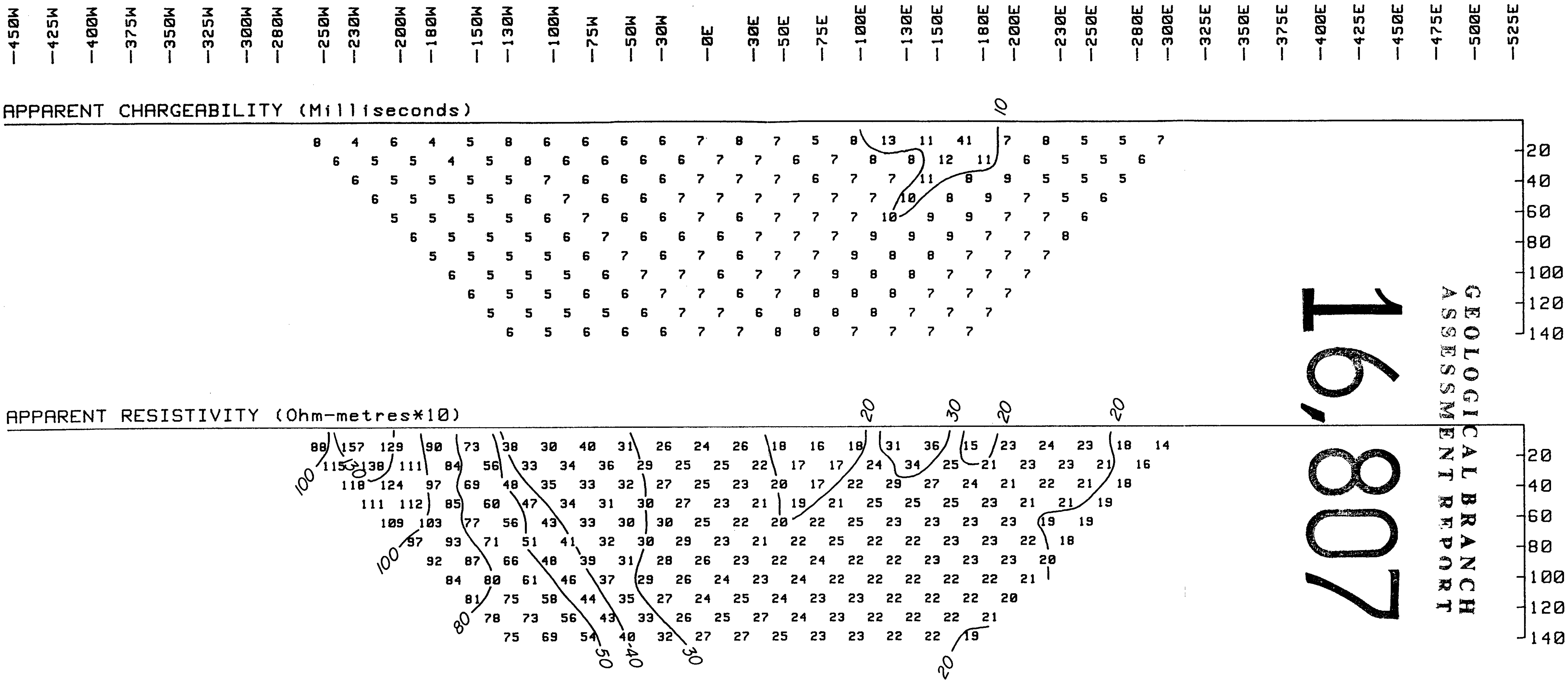
ABS—Absolute value of the numeric expression.
ACS—Principal value (1st or 2nd quadrant) of the arccosine of the numeric expression in the current angular units.
ASN—Principal value (1st or 4th quadrant) of the arcsine of the numeric expression in the current angular units.
ATN—Principal value (1st or 4th quadrant) of the arctangent of the numeric expression in the current angular units.
ATN2—Arctangent of Y/X in proper quadrant.
CEIL—Smallest integer greater than or equal to the numeric expression.
COS—Cosine.
COT—Cotangent.
CSC—Cosecant.
DATE—Julian date in the format YYDDD, assuming system timer was set.
DTR—Converts the value of the numeric expression from degrees to radians.
EPS—A constant equal to the smallest positive real precision number, 1E-499.
ERRL—Line number of latest error.
ERRN—Error number of latest error.
EXP—Value of Napierian e raised to the power of the computed expression.
FLOOR—Largest integer less than or equal to the evaluated expression.
FP—Fractional part of the evaluated expression.
INF—A constant equal to the largest real number possible, 9.99999999999E499.
INT—Largest integer less than or equal to the evaluated expression (equivalent to FLOOR).
IP—Integer part of the numeric expression.
LGT—Common logarithm (base 10) of a positive numeric expression.
LOG—Natural logarithm (base e) of a positive numeric expression.
MAX—Larger of two values.
MIN—Smaller of two values.
PI—Numerical value of pi.
RMD—Remainder resulting from a division operation according to X-(Y*IP(X/Y)).
RND—Generates a number that is greater than or equal to zero and less than one, using a predetermined, pseudo-random sequence.
RTD—Converts the value of the numeric expression from radians to degrees.
SEC—Secant.
SGN—Returns a 1 if the expression is positive, -1 if negative, and 0 if exactly 0.
SIN—Sine.
SQR—Square root of a positive numeric expression.
TAN—Tangent.
TIME—Returns the time in seconds since midnight if the timer is set, or since machine turn-on otherwise, resetting automatically after 24 hours.

String Functions

CHR$—Converts a numeric value between 0 and 255 into a character corresponding to that value.
LEN—Returns the number of characters in a string.
NUM—Returns the decimal value corresponding to the first character of the string expression.
POS—Returns the position of the first character of a substring within another string or 0 if the substring is not found.
UPC$—Converts all lowercase letters in a string to uppercase letters.
VAL—Returns as a numeric value, including exponent, a string of digits so that the value may be used in calculations.
VAL$—Returns the value of a numeric expression as a string of digits.

General Statements and Programmable Commands

BEEP—Outputs a tone of specified frequency for a specified duration.
CLEAR—Clears the CRT.
COM—Dimensions and reserves memory so chained programs can access the same data.
CRT IS—Allows the definition of either a printer or the actual CRT as the current CRT.
DATA—Provides constants and text characters for use with READ statements.
DEFAULT ON—Makes numeric overflows, underflows, and the use of uninitialized variables non-fatal by substituting an appropriate approximate value.
DEFAULT OFF—Makes numeric overflows, underflows, and the use of uninitialized variables fatal.
DEF FN—Defines a single- or multiple-line function.
DEG—Sets degree mode for evaluation and output of the arguments and results of trigonometric functions.
DIM—Declares the size and dimensions of array and string variables.
DISP—Outputs the values or text on the current CRT.
DISP USING—Displays values and text according to format specified by IMAGE statement or literal IMAGE.
END—Terminates program execution (same as STOP).
FLIP—Changes the keyboard from BASIC mode to typewriter mode or vice versa.
FN END—Terminates a multiple-line function.
FOR/NEXT—Defines a program loop and the number of iterations.
GOSUB—Transfers program control to a subroutine and allows subsequent return of control.
GOTO—Transfers program execution to the specified line.
GRAD—Sets grad mode for evaluation and output of the arguments and results of trigonometric functions.
IF...THEN...ELSE—Allows statements to be either executed or bypassed depending on the outcome of a logical expression.
IMAGE—Specifies the format used with PRINT USING or DISP USING statements.
INPUT—Allows entry of values or text from the keyboard during program execution.
INTEGER—Declares variables as integers as well as the size and dimensions of integer arrays.
KEY LABEL—Displays in the lower portion of the CRT, an eight-character prompt for each Special Function Key defined by an ON KEY statement. Also returns cursor to upper left corner of the CRT.
LET—Assigns a value to a variable or array element.
LIST—Lists the program on the CRT IS device. Also outputs bytes remaining at the end of a program.
NORMAL—Cancels the effect of the PRINT ALL, AUTO, or TRACE statements.
ON ERROR—Sets up a branch to the specified line or subroutine anytime an error occurs.
OFF ERROR—Cancels any ON ERROR statement previously executed.
ON KEY #—Sets up a branch to the specified line or subroutine each time the Special Function Key is pressed.



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

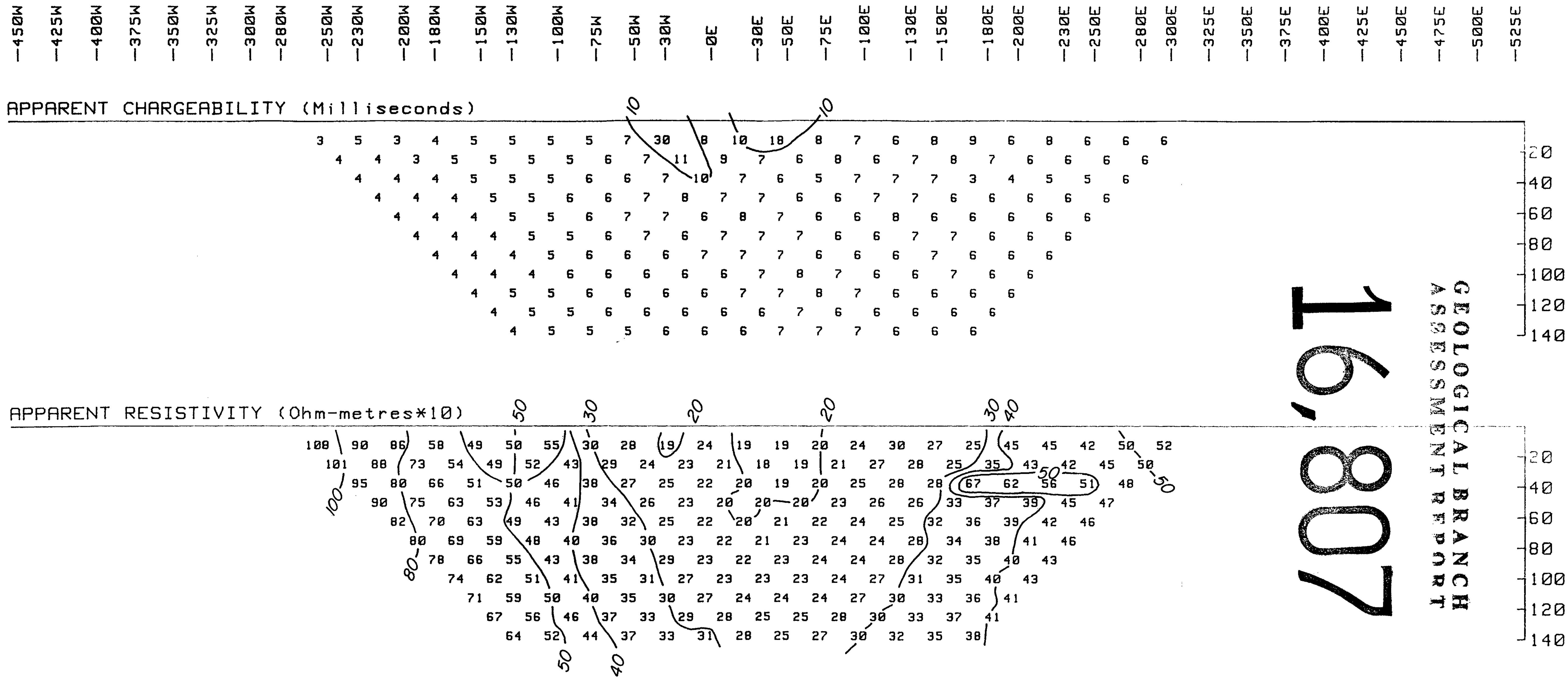
METRES
0 25 50 75 100

GRAND NATIONAL RESOURCES INC.
KERO PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 300S

WHITE GEOPHYSICAL INC.

DATE: SEPT/87

FIG.: 3



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

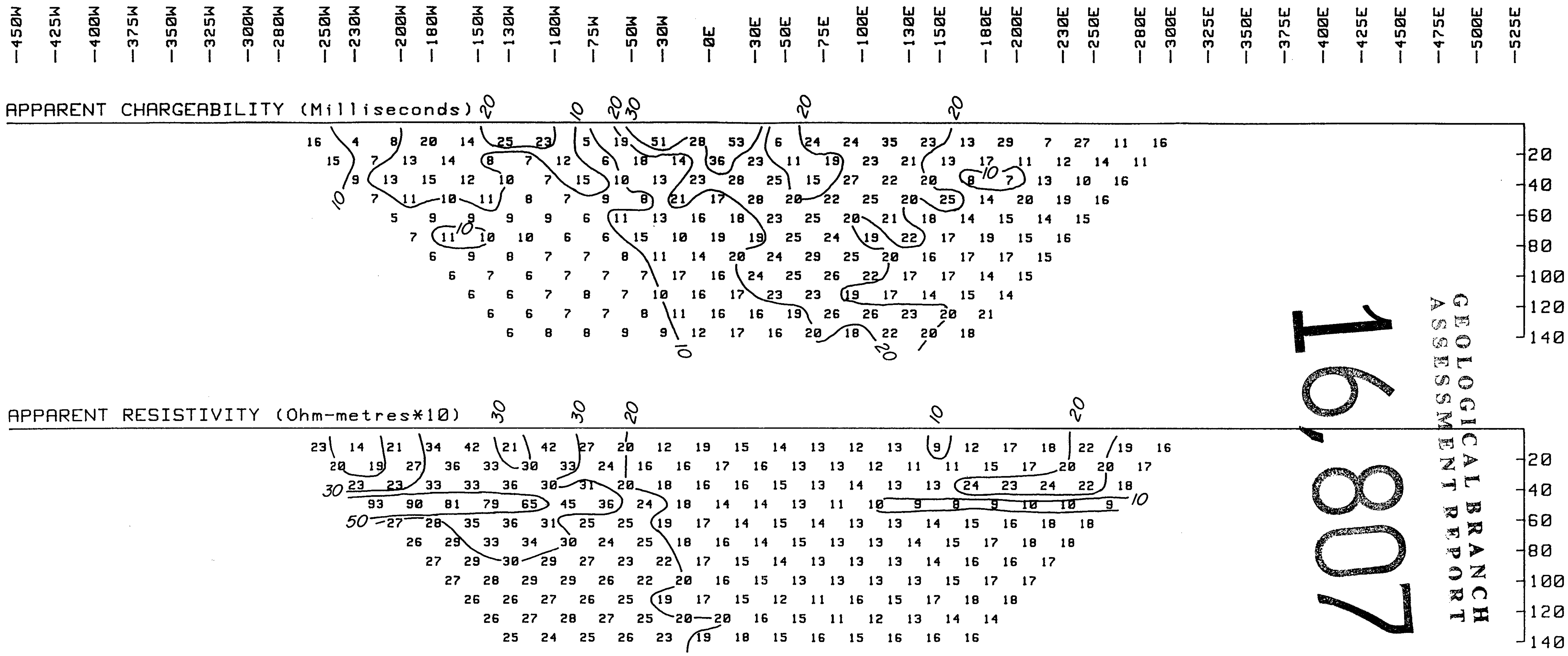
METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

GRAND NATIONAL RESOURCES INC.
KERO PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 200S

DATE: SEPT/87

FIG.: 4



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

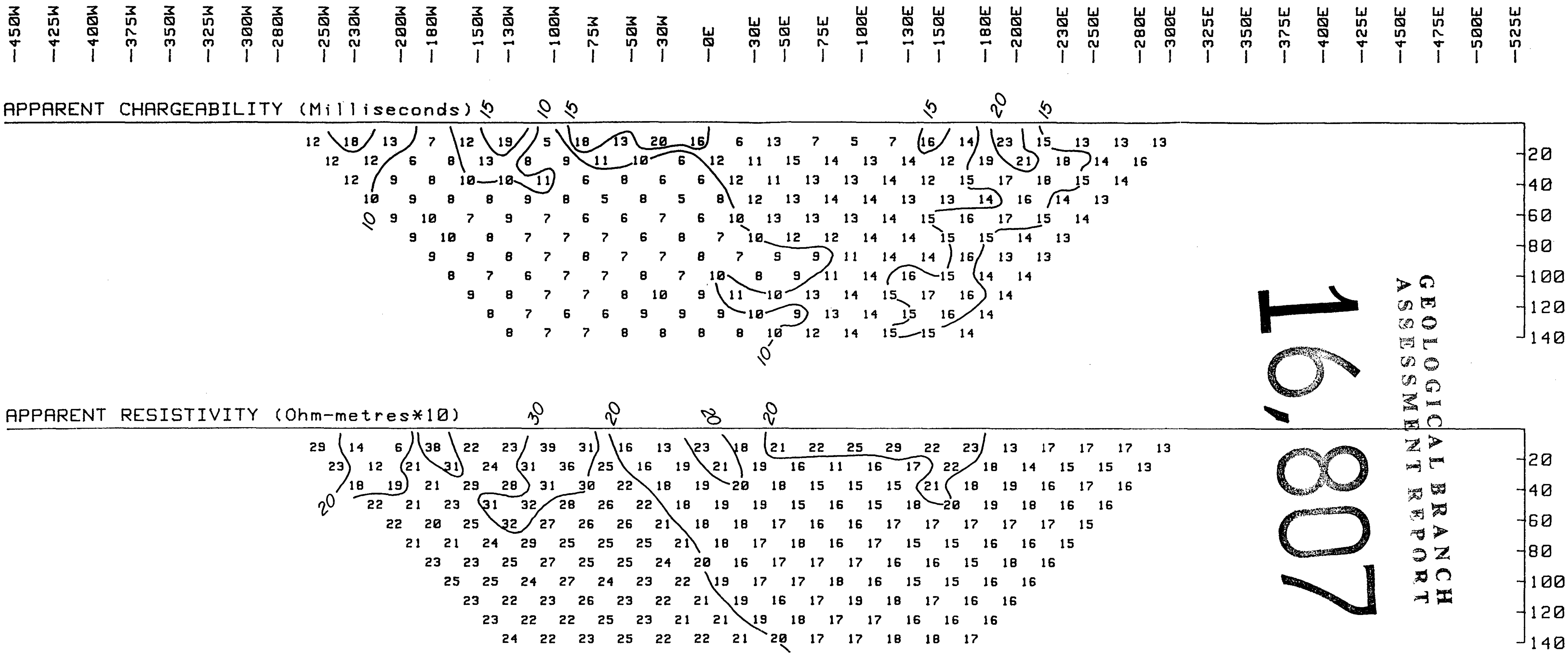
METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

GRAND NATIONAL RESOURCES INC.
KERO PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 100S

DATE: SEPT/87

FIG.: 5



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

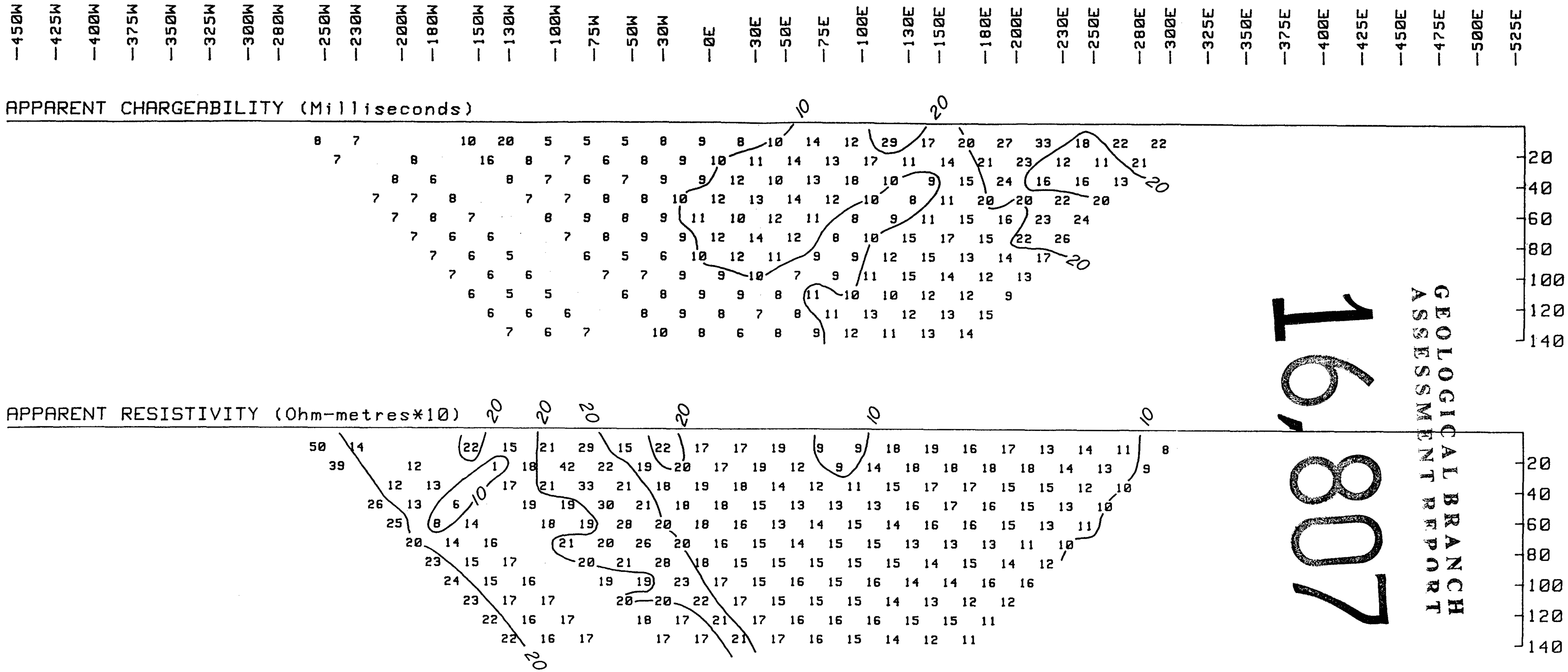
METRES
0 25 50 75 100

GRAND NATIONAL RESOURCES INC.
KERO PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 00N

WHITE GEOPHYSICAL INC.

DATE: SEPT/87

FIG.: 6



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

WHITE GEOPHYSICAL INC.

GRAND NATIONAL RESOURCES INC.

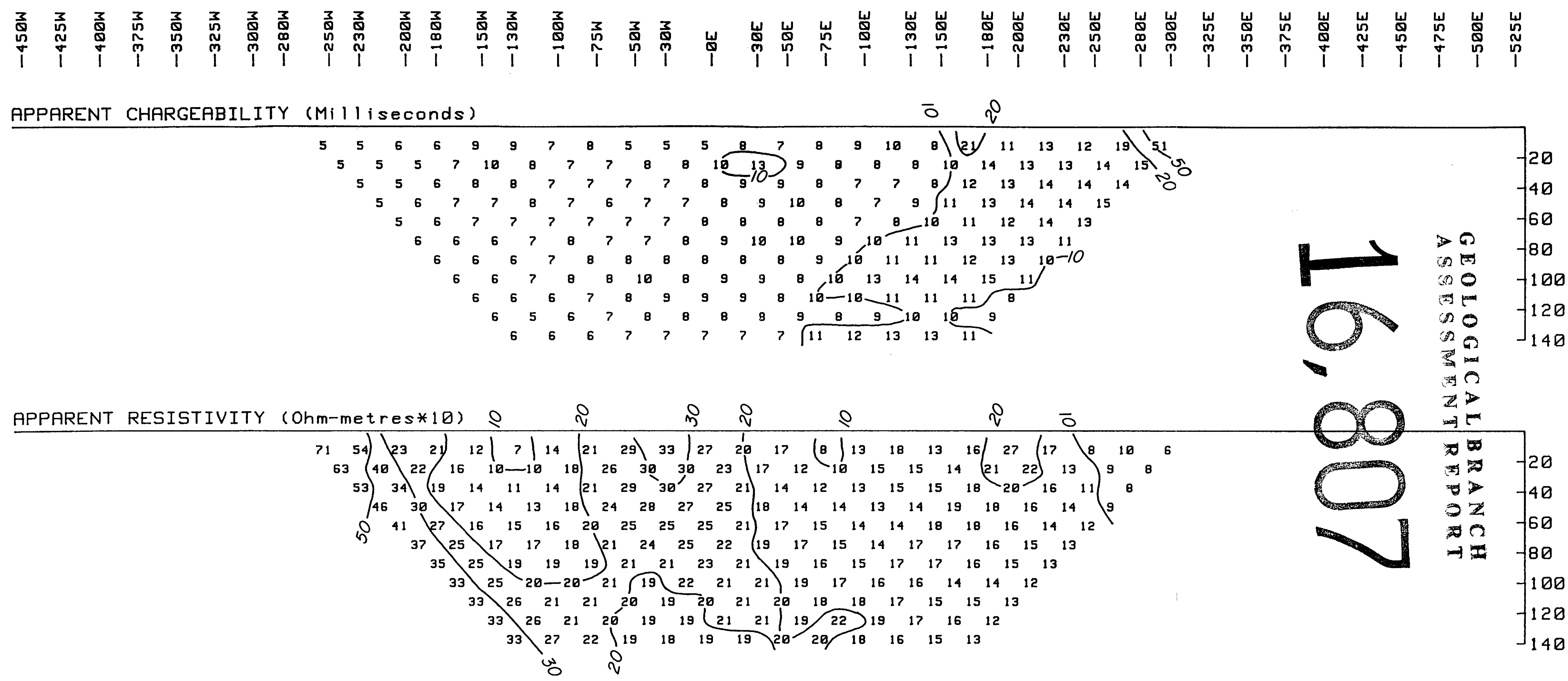
KERO PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 100N

DATE: SEPT/87

FIG.: 7



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

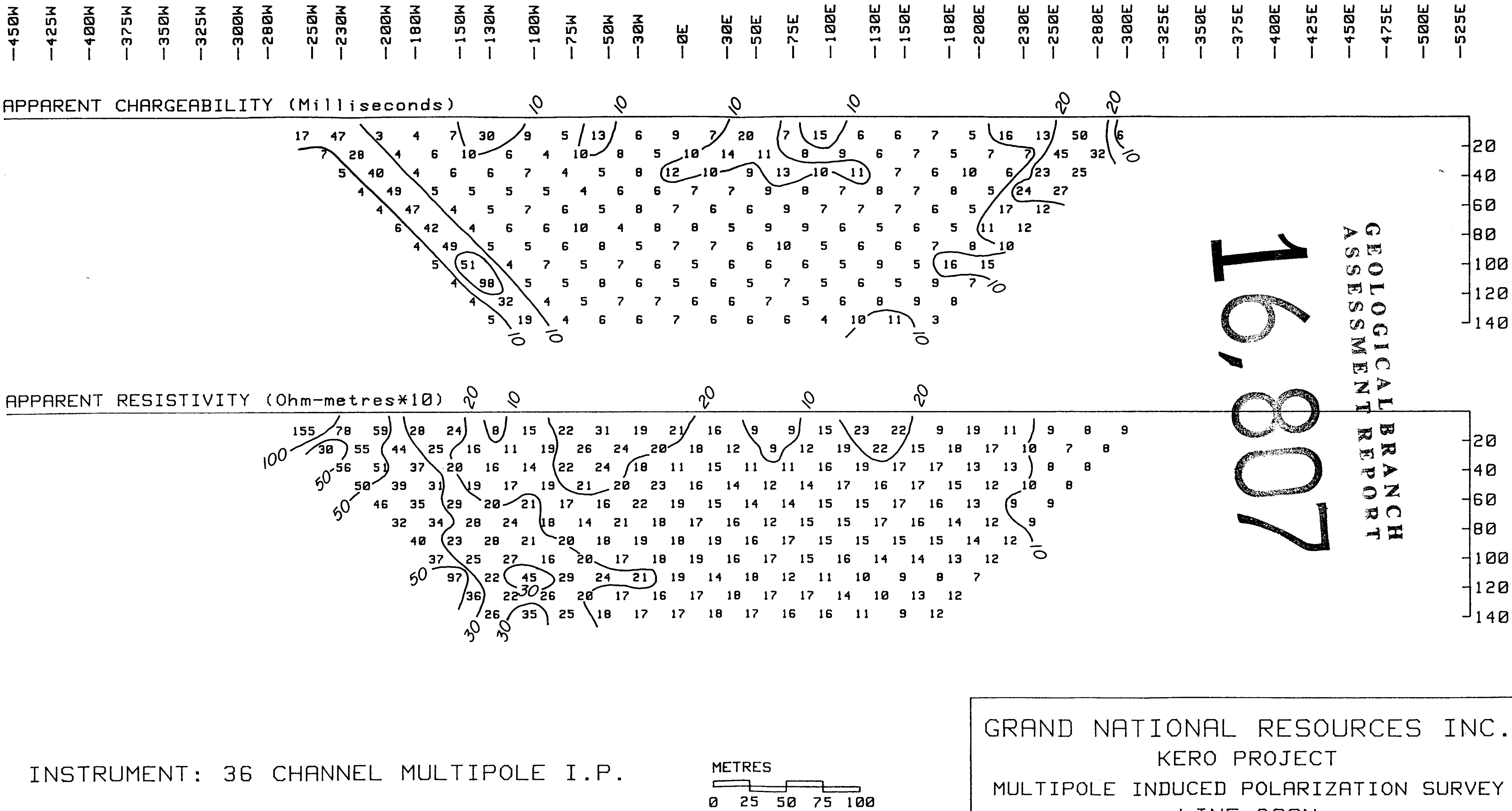
METRES
0 25 50 75 100

GRAND NATIONAL RESOURCES INC.
KERO PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 200N

WHITE GEOPHYSICAL INC.

DATE: SEPT/87

FIG.: 8



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

GRAND NATIONAL RESOURCES INC.

KERO PROJECT

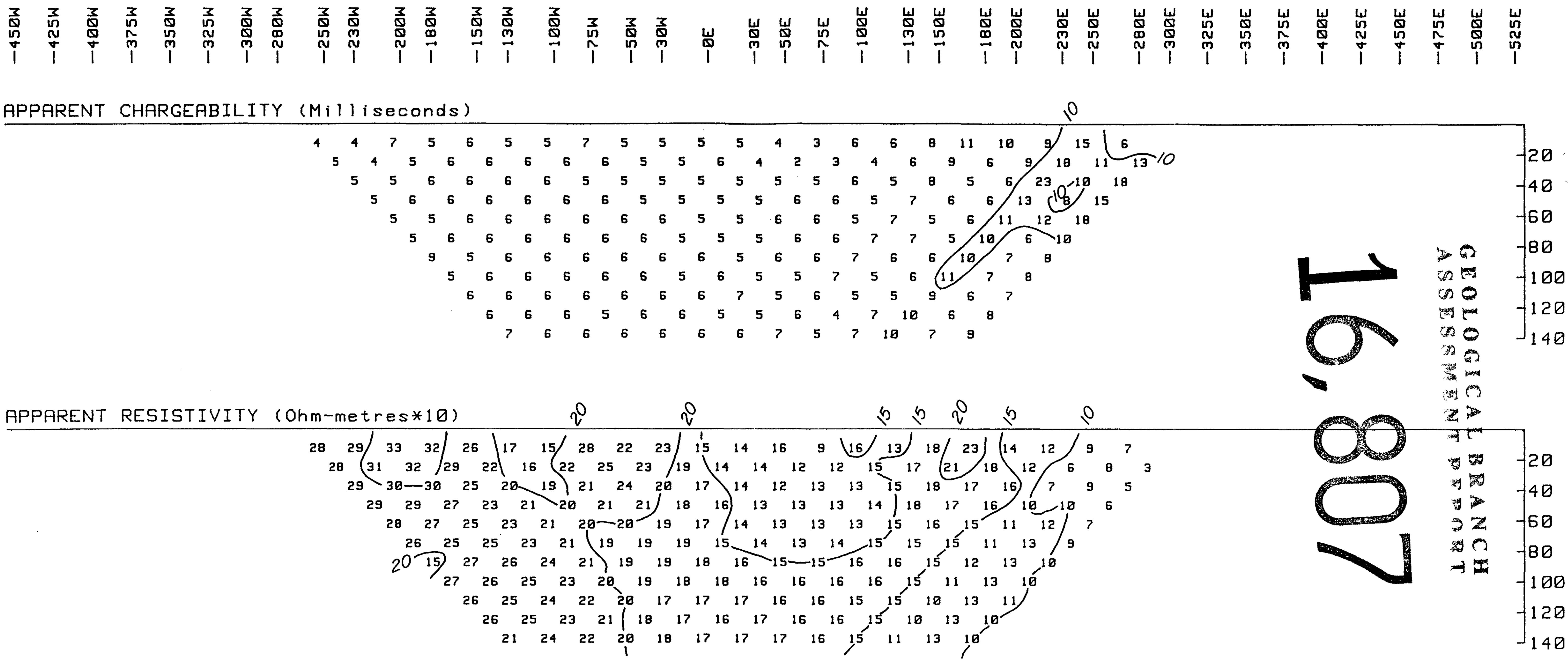
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 300N

DATE: SEPT/87

FIG.: 9

WHITE GEOPHYSICAL INC.



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

GRAND NATIONAL RESOURCES INC.

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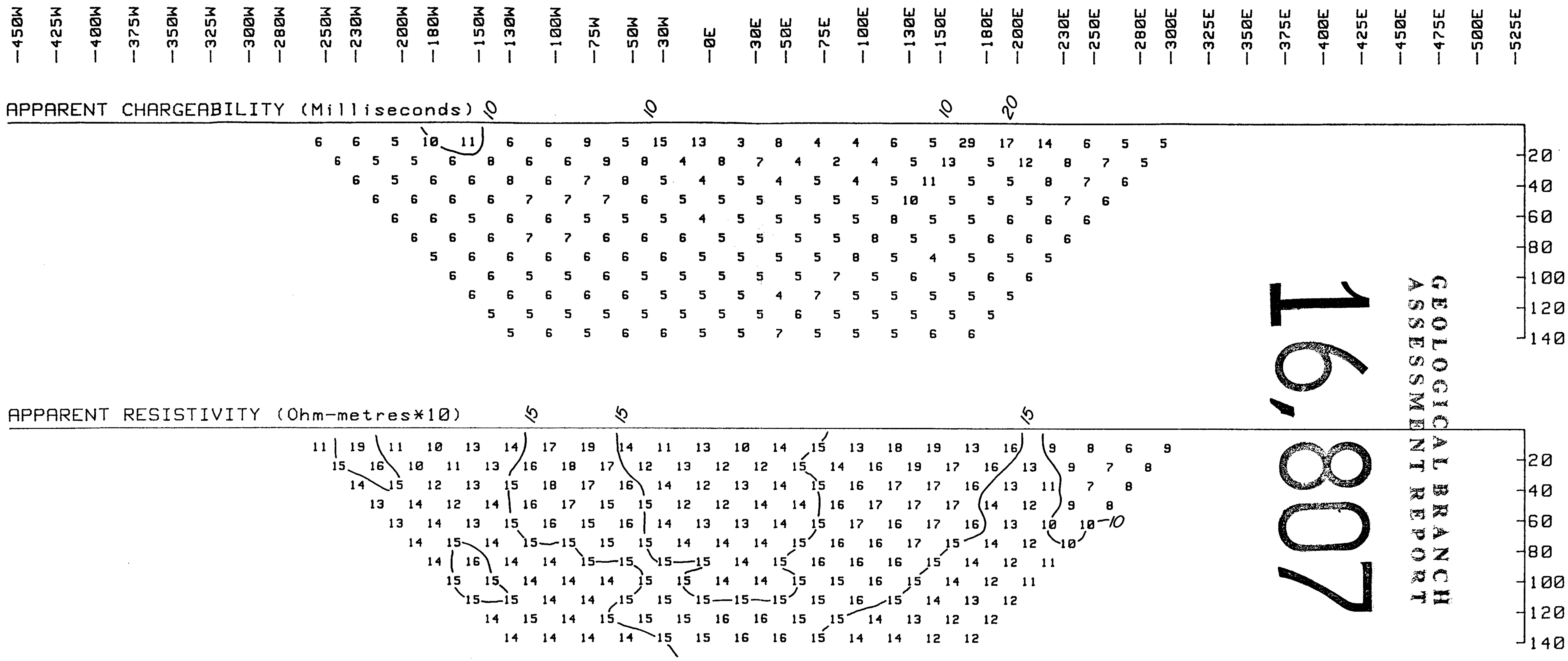
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 400N

DATE: SEPT/87

FIG.: 10



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

GRAND NATIONAL RESOURCES INC.
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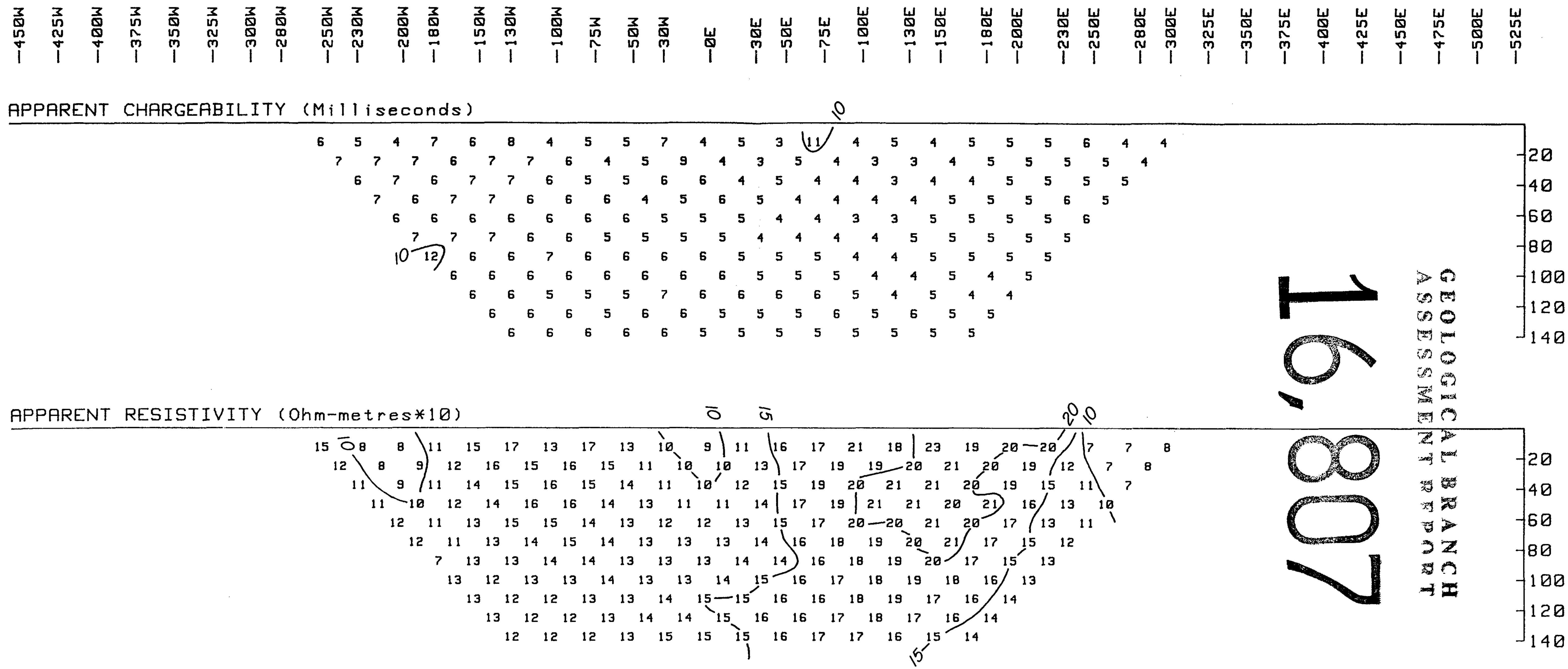
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 500N

DATE: SEPT/87

FIG.: 11



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

GRAND NATIONAL RESOURCES INC.

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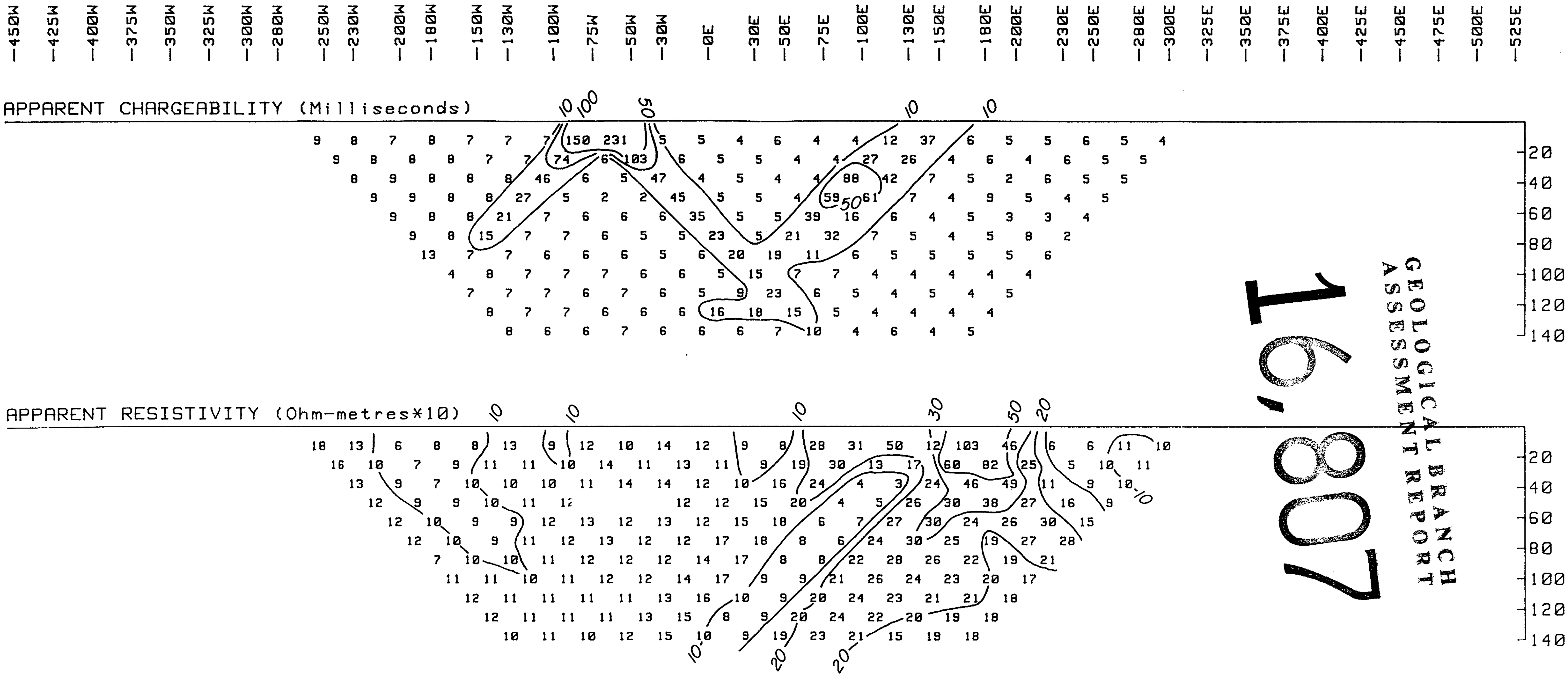
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 600N

DATE: SEPT/87

FIG.: 12



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

GRAND NATIONAL RESOURCES INC.
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LINE 700N

WHITE GEOPHYSICAL INC.

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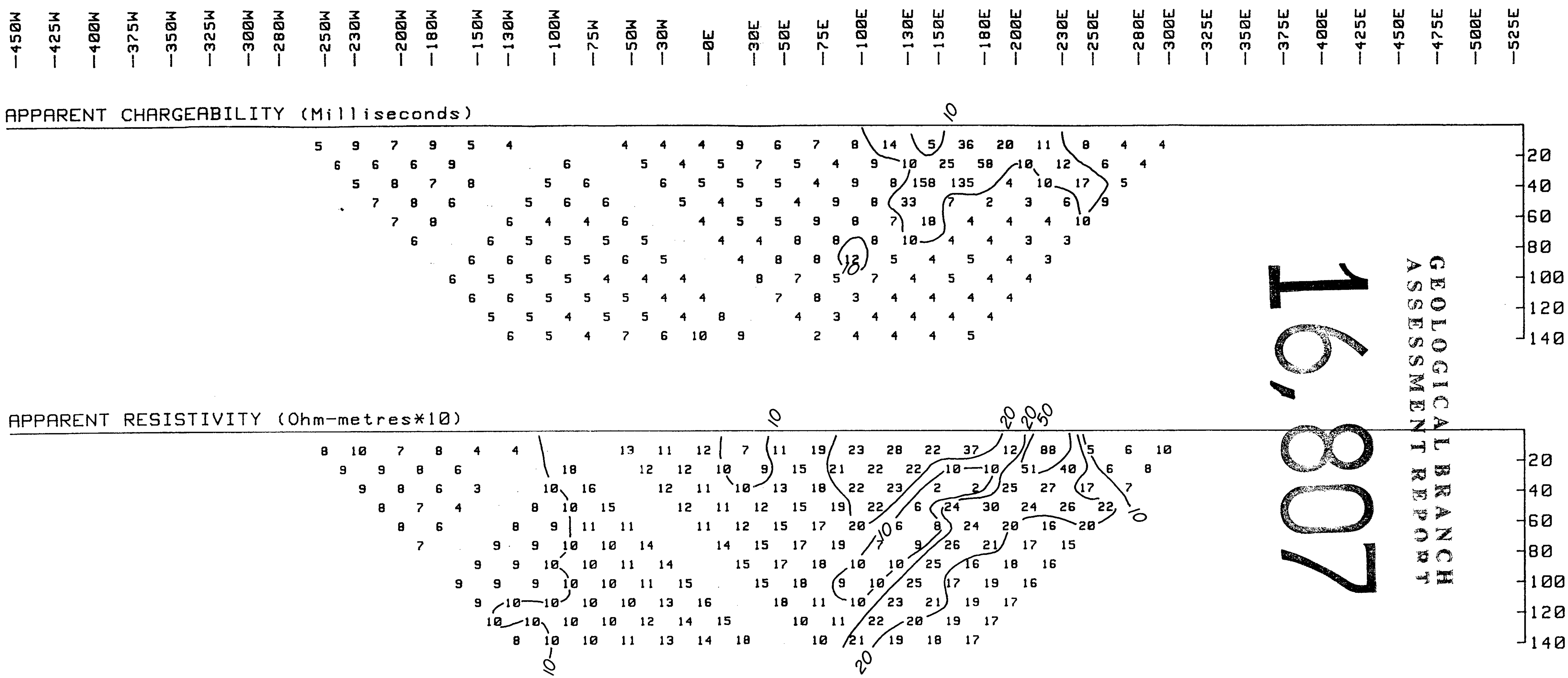
FIG.: 13



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES

0 25 50 75 100

GRAND NATIONAL RESOURCES INC.

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LINE 800N

WHITE GEOPHYSICAL INC.

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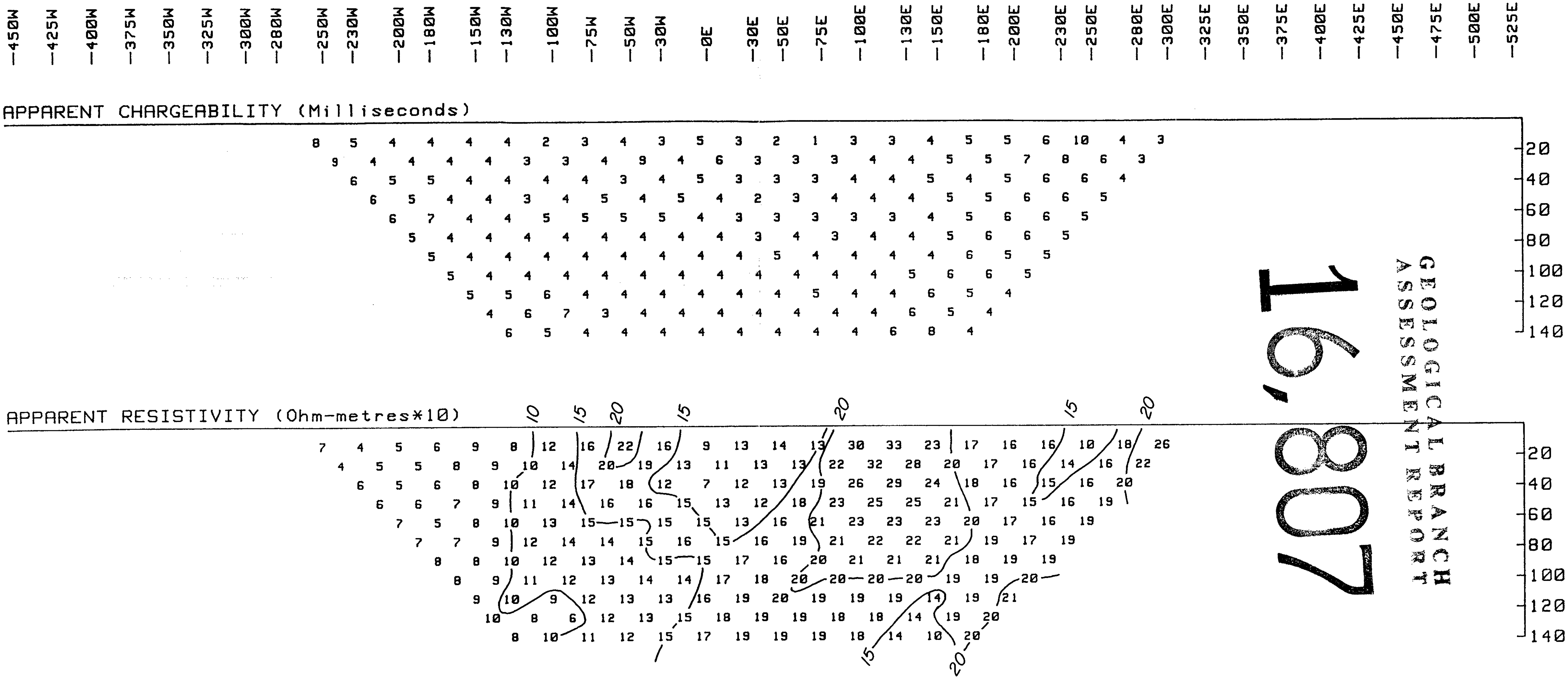
FIG.: 14



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

GRAND NATIONAL RESOURCES INC.
KERO PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 900N

WHITE GEOPHYSICAL INC.

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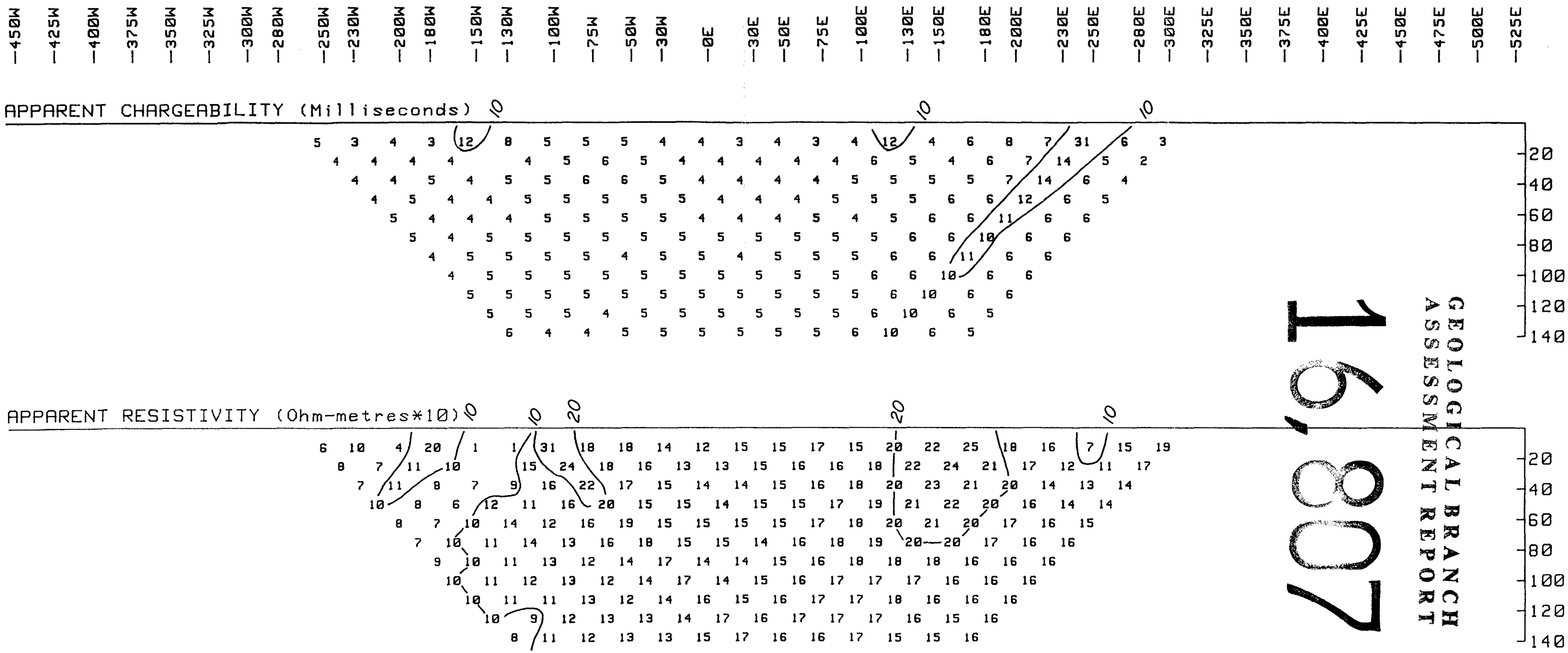
FIG.: 15



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

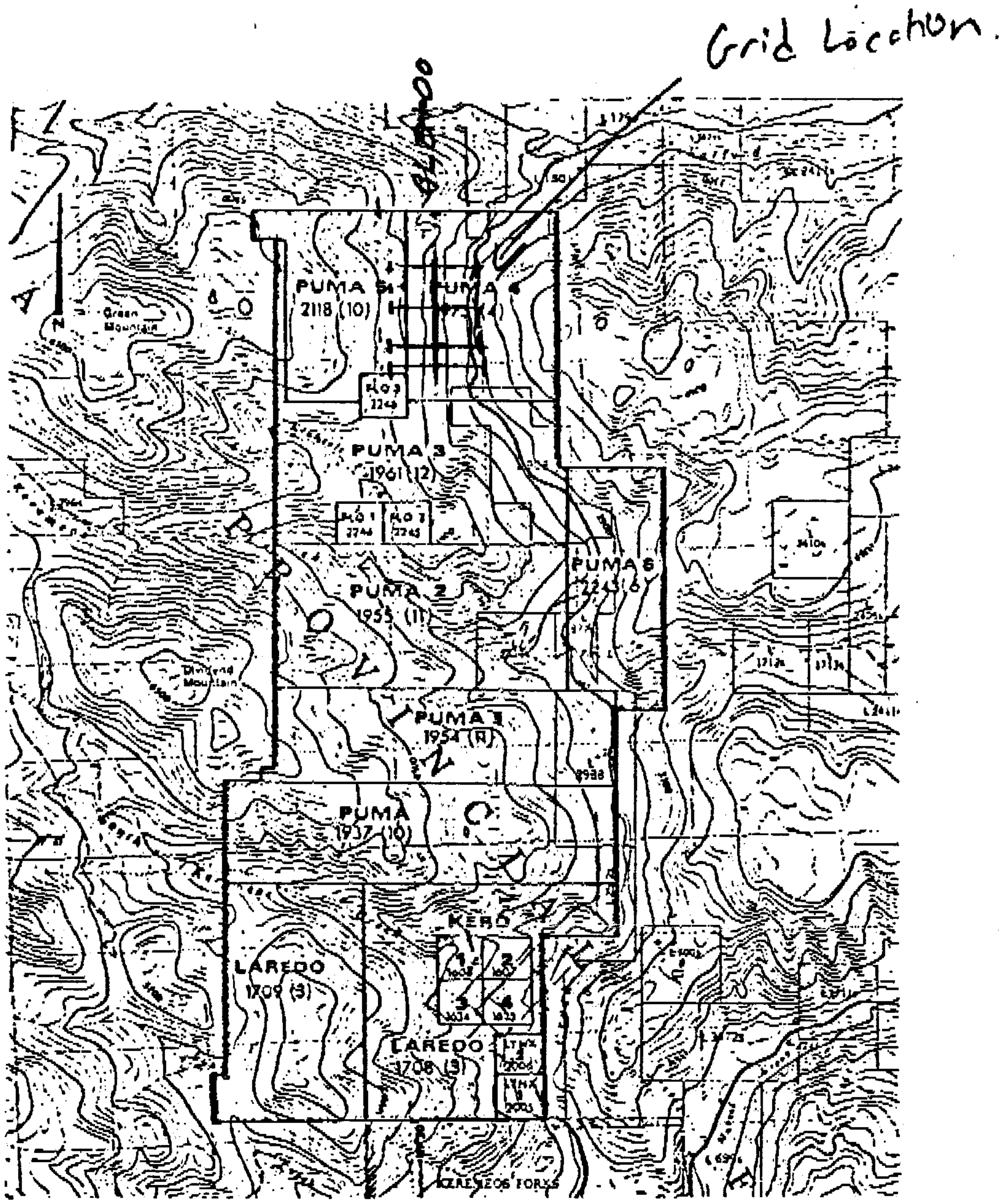
GRAND NATIONAL RESOURCES INC.
KERO PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 1000N

WHITE GEOPHYSICAL INC.

DATE: SEPT/87

FIG.: 16

N



GRAND NATIONAL RESOURCES INC.

KERO PROJECT

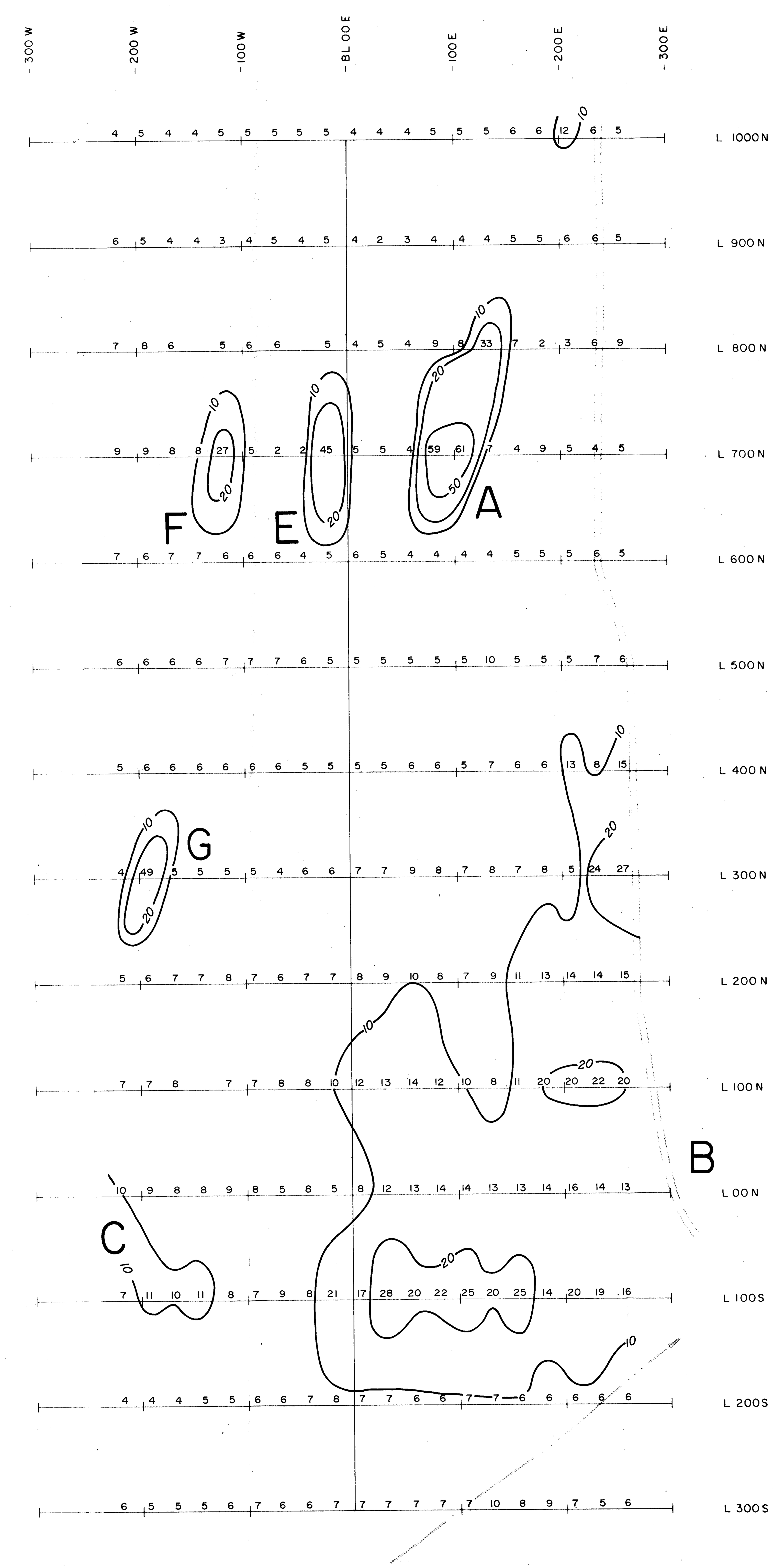
MULTIPOLE INDUCED POLARIZATION SURVEY

CLAIMS MAP

0 1 2 3 4 5Km

N.T.S. 82E/5

FIG. 2

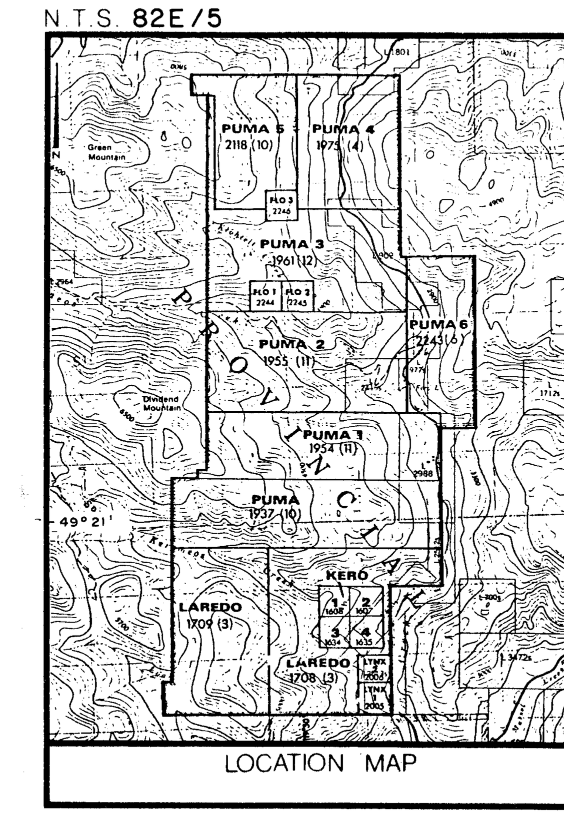


LEGEND

GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,807

N.T.S. 82E/5



0 50 100 150 200 250 m

GRAND NATIONAL RESOURCES INC.

KERO PROJECT

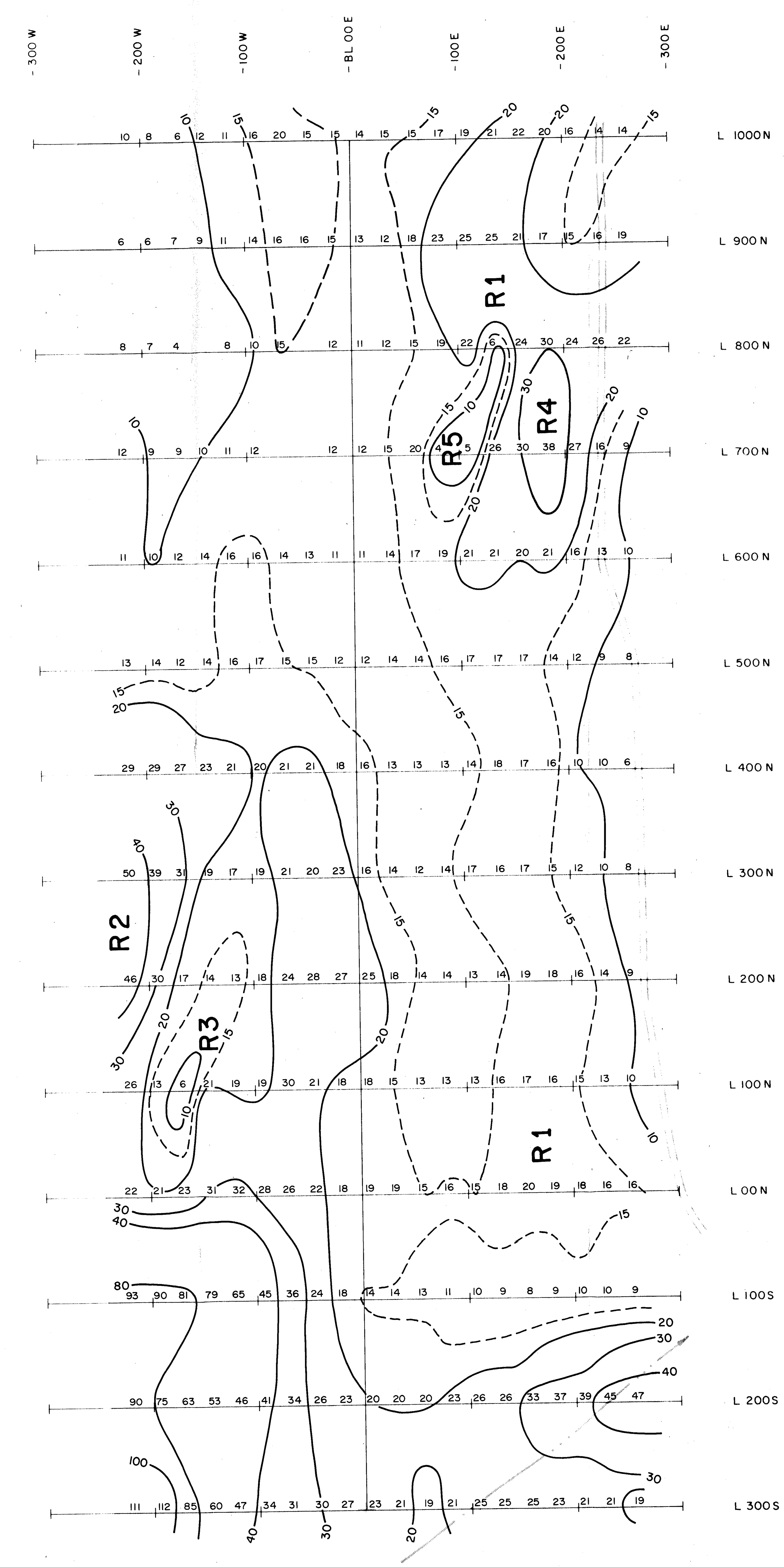
MULTIPOLE INDUCED POLARIZATION SURVEY

APPARENT CHARGEABILITY

a = 25, n = 4

WHITE GEOPHYSICAL INC.	Interpreted By: M.S.
	Drawn By: R.D.
	Checked By: M.S.
	Date: DEC. 23/87
	Fig. No.: 18

VANCAL

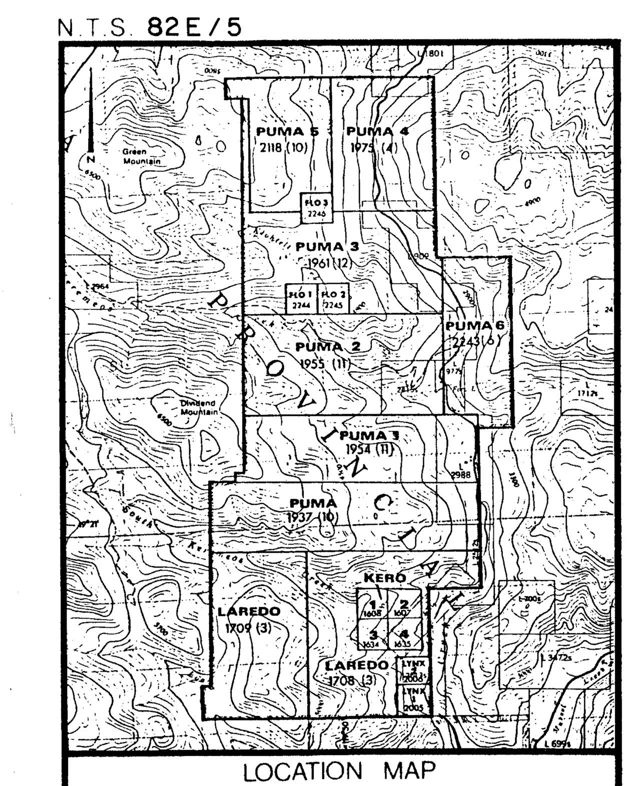


LEGEND

GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,807

N.T.S. 82E/5



LOCATION MAP

0 50 100 150 200 250m

GRAND NATIONAL RESOURCES INC.

KERO PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

APPARENT RESISTIVITY

a=25, n=4

WHITE GEOPHYSICAL INC.

Interpreted By: M.S.
Drawn By: R.D.
Checked By: M.S.
Date: DEC. 23/87
Fig. No.: 17

VANCAL