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7/86

AGIO RESOURCES CORP.

GEOPHYSICAL REPORT

ON A

MULTIPOLE INDUCED POLARIZATION SURVEY

CRUMP GROUP OSOYOOS MINING DIVISION

LAT.49°37'N LONG.119°52'W NTS82E/13

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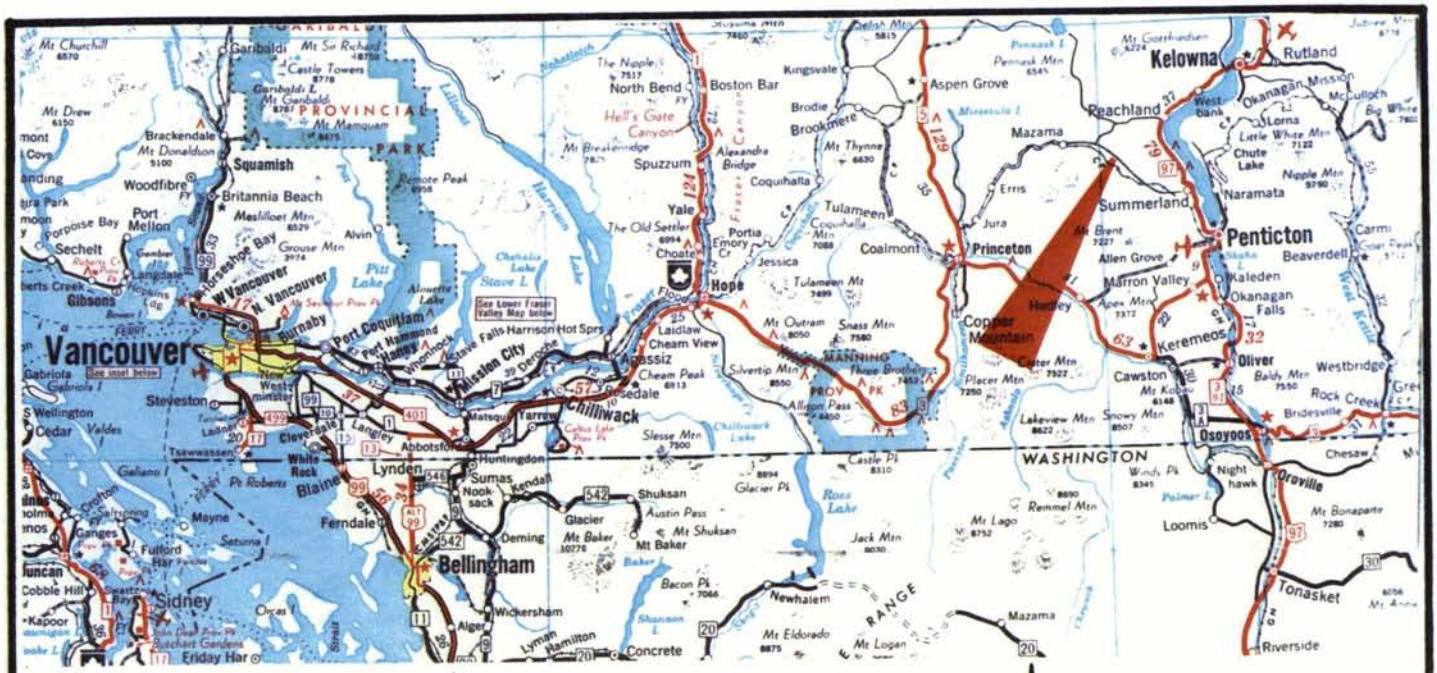
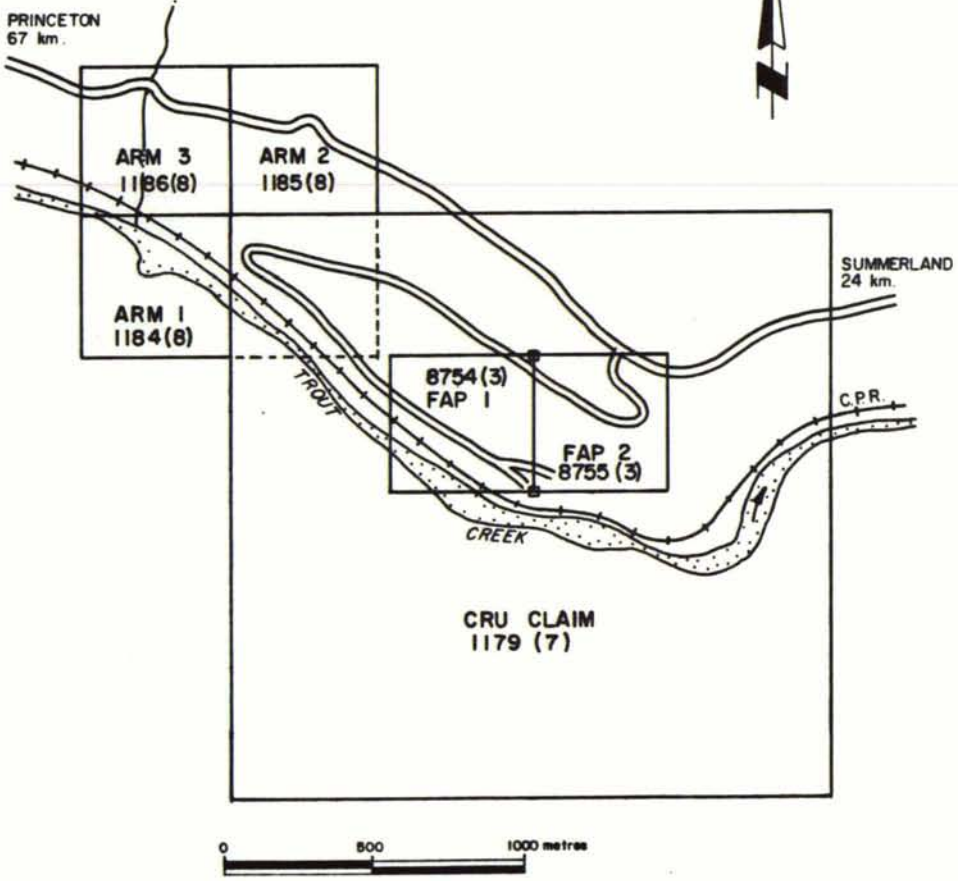
TABLE OF CONTENTS PAGE

INTRODUCTION..... 1
LOCATION AND ACCESS 1
PROPERTY 2
HISTORY 2-3
GENERAL GEOLOGY 4-5
MULTIPOLE INDUCED POLARIZATION SURVEY. 6-7
DISCUSSION OF RESULTS 8-9
SUMMARY AND CONCLUSIONS 9
RECOMMENDATIONS 10
INSTRUMENT SPECIFICATIONS 11-13
STATEMENT OF QUALIFICATIONS .....
CLIFF CANDY B.SC..... 14
GLEN E. WHITE B.SC.,P.ENG..... 15
REFERENCES 16
COST BREAKDOWN 17

ILLUSTRATIONS

FIGURE 1 - LOCATION AND CLAIMS MAP
FIGURE 2 - INDUCED POLARIZATION INTERPRETATION MAP
FIGURES 3-7 MULTIPOLE I.P. PSEUDO-SECTIONS





AGIO RESOURCES CORPORATION

—CRUMP GROUP—

LOCATION AND CLAIMS MAP

WHITE GEOPHYSICAL INC.

FIGURE 1

INTRODUCTION

DURING JULY OF 1985, WHITE GEOPHYSICAL INC., CONDUCTED A PROGRAM OF MULTIPOLE INDUCED POLARIZATION ON THE CRUMP GROUP CLAIMS ON BEHALF OF AGIO RESOURCES CORP. THIS BRIEF SURVEY CONSISTED OF APPROXIMATELY FIVE KILOMETRES OF ELEVEN SEPARATION COVERAGE.

LOCATION AND ACCESS

THE CRUMP PROPERTY IS LOCATED AT AN ELEVATION OF 700 METERS ABOUT 50 KILOMETERS NORTHWEST OF PENTICTON IN SOUTH CENTRAL BRITISH COLUMBIA.

ROAD ACCESS FROM ROUTE 97, WHICH PASSES THROUGH PENTICTON AND KELOWNA, IS NORTHWEST FROM SUMMERLAND FOR 24 KILOMETERS ON THE GOOD GRAVEL ROAD TO PRINCETON WHICH APPROXIMATELY FOLLOWS THE KETTLE VALLEY (CANADIAN PACIFIC) RAILROAD. DISTANCE BY CAR WEST AND SOUTH WEST TO PRINCETON FROM THE PROPERTY IS 67 KILOMETERS. THIS MAIN ROAD CROSSES THE CRUMP PROPERTY AND A GOOD DIRT ROAD PROVIDES ACCESS DOWN TO THE MINERAL SHOWINGS AT THE VALLEY BOTTOM, IN WHICH IS LOCATED TROUT CREEK.

THE CLAIMS ARE SITUATED AT APPROXIMATE LATITUDE 49°37'N BY LONGITUDE 119°52'W ON NTS MAP SHEET 82E/13 IN THE OSOYOOS MINING DIVISION.

PROPERTY

THE CRUMP PROPERTY CONSISTS OF THE FOLLOWING CLAIMS:

CLAIM	DATE STAKED	RECORD NO.	EXPIRY DATE
FAP 1	FEB.8,1963	8754 (3)	MAR.14,1986
FAP 2	FEB 8,1963	8755 (3)	MAR.14,1986
ARM 1	AUG.9,1980	1184	AUG.11,1985
ARM 2	AUG.9,1980	1185	AUG.11,1985
ARM 3	AUG.9,1980	1186	AUG.11,1985
CRU (16 UNITS)			
	JULY 30,1980	1179	AUG.1,1985

HISTORY

THE HISTORY OF THE CRUMP PROPERTY IS DESCRIBED BY R.W.PHENDLER,P.ENG., IN HIS REPORT DATED MAY 26, 1982 AS FOLLOWS:

"IT IS BELIEVED THAT MINERALIZATION WAS FIRST DISCOVERED ON THE CRUMP PROPERTY IN THE 1930'S WHEN A LOW LEVEL EXPLORATION CROSSCUT WAS DRIVEN. NO DATA ON THIS CROSSCUT IS AVAILABLE AT PRESENT AND THE PORTAL IS NOW LOST.

IN THE 1960'S THE SHOWINGS WERE STAKED FOR AUSTRO-CAN EXPLORATIONS LTD. AND SOME TRENCHING AND DIAMOND DRILLING WAS CARRIED OUT. IN 1969 A TOTAL INTENSITY AIRBORNE MAGNETOMETER SURVEY COVERING 59 LINE MILES WAS COMPLETED ON THE 60 CONTIGUOUS CLAIMS HELD BY THE COMPANY. THIS WORK WAS CARRIED OUT BY GEO-X SURVEYS LTD.

IN 1970 R.B. NELSON CARRIED OUT GEOLOGICAL MAPPING AND CONDUCTED DETAIL TESTING ON SPECIMENS FROM THE PROPERTY INCLUDING MICROSCOPE WORK, X-RAY DIFFRACTOMETER WORK AND X-RAY SPECTROGRAPHIC ANALYSIS. IN ADDITION, A GROUND MAGNETOMETER SURVEY AND A GEOCHEMICAL SURVEY WAS CONDUCTED OVER THE AREA.

IN 1970 THREE DRILL HOLES TOTALLING 1,115 FEET WERE DRILLED. SPOTTY VALUES IN AU,AG,PB AND CU WERE RECEIVED. COMPLETE LOG SHEETS ARE NOT AVAILABLE.

IN 1972 THE PROPERTY WAS EXAMINED BY GETTY MINES LTD. G. DELANE,P.ENG. MADE THE EXAMINATION AND SAMPLES TAKEN BY HIM AVERAGED 0.49% CU ACROSS 25 FEET ON THE PRINCIPAL (LOWER) SHOWING; (OR 0.29% CU ACROSS 55').

IN 1973 AN ELECTROMAGNETIC SURVEY USING A RONKA EM-16 V.L.F. SYSTEM WAS CARRIED OUT BY G. WHITE GEOPHYSICAL LTD. COVERING 5.7 LINE MILES OF GRID OVER THE CENTRAL AREA OF THE PROPERTY."

A GEOLOGIC EXAMINATION WAS MADE OF THE PROPERTY BY R.W. PHENDLER, P.ENG. ON MAY 6, 1982, AND THE ABOVE QUOTED REPORT PREPARED.

GENERAL GEOLOGY

THE AREA IN WHICH THE CRUMP PROPERTY IS LOCATED IS UNDERLAIN BY A LARGE LENTICULAR BODY OF AMPHIBOLITE GNEISS SURROUNDED BY DIORITE AND QUARTZ DIORITE OF THE NELSON BATHOLITH OF CRETACEOUS AGE.

THE AMPHIBOLITE GNEISS HAS BEEN DERIVED FROM A HORNBLENDE GNEISS THAT HAS UNDERGONE POLYMETAMORPHISM. IT HAS A WELL DEVELOPED FOLIATION WITH A NORTHEASTERLY TREND AND IS BELIEVED TO BE PRECAMBRIAN IN AGE. OTHER SIMILAR MASSES OCCUR 16 KILOMETRES TO THE EAST NEAR SUMMERLAND.

MINERALIZATION CONSISTS OF COPPER-LEAD-ZINC-SILVER-GOLD AND MAGNETITE THROUGHOUT A NORTHEASTERLY STRIKING BAND OF CARBONATITE.

CARBONATE AND ASSOCIATED SILICA-DEFICIENT ROCKS CREATED FROM PREVIOUS IGNEOUS AND METAMORPHIC ROCKS BY A SERIES OF METASOMATIC EVENTS ARE THE NORMAL TYPE OF CARBONATITE. THIS TYPE OF ALTERATION IS PRESENT ON ALL THE EXPOSED BORDERS OF THE AMPHIBOLITE GNEISS BODY BUT IS BEST DEVELOPED IN THE MAIN MINERALIZED SHEAR ZONE ON THE CRUMP PROPERTY. THE CARBONATITE IS BELIEVED TO HAVE BEEN FORMED BY A SUCCESSION OF ALTERATION FLUIDS THAT CREATED THE MINERALIZED HOST ROCK FROM ORIGINAL HORNBLENDE GNEISS AND SUBSEQUENTLY ALTERED, FRACTURED AND MINERALIZED THIS SECONDARY ROCK.

IT IS PROBABLE THAT A DEEP SEATED SHEAR ZONE EXISTED THROUGH WHICH POTASSIUM AND CARBON DIOXIDE RICH FLUIDS PENETRATED TO CREATE THE CARBONATITE BODY. SIGNIFICANT AMOUNTS OF TITANIUM AND IRON WERE INTRODUCED AT THAT TIME. LATER DISSEMINATED CHALCOPYRITE WAS INTRODUCED THROUGHOUT THE CARBONATITE ZONE.

A THIRD PHASE OF ALTERATION INTRODUCED QUARTZ CARBONATE VEINS WITH ASSOCIATED PYRITE, CHALCOPYRITE, GALENA, SPHALERITE, SILVER AND GOLD.

THE CARBONATITE BODY ON THE CRUMP PROPERTY HAS BEEN TRACED FOR ABOUT 200 METERES. ITS HIGH MAGNETITE CONTENT HAS ENABLED ELECTROMAGNETIC SURVEYS TO IDENTIFY CONDUCTORS IN THE AREA.

OBSERVATION BY THE WRITER SUGGESTS THAT THE NORTHERLY STRIKING SHEARED CARBONATITE ZONE DIPS EASTERLY BETWEEN 30° AND 50°D AND HAS BEEN HEAVILY LEACHED AT SURFACE.

THE 150 METRE LONG EM CONDUCTOR LOCATED BELOW THE CARBONATITE ZONE IS PART OF A LARGER CONDUCTOR THAT EXTENDS IN A NORTHEASTERLY DIRECTION FOR 300 METRES.

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 1V 2.5 Kw TRANSMITTER" OPERATED IN TIME DOMAIN MODE WHICH IS DRIVEN BY A 400 Hz, 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 MULTIPOLE 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.

DISCUSSION OF RESULTS

THE MULTIPOLE INDUCED POLARIZATION DATA IS PLOTTED ON PSEUDO-SECTION FIGURES 3-7. THE TRENDS AND ANOMALOUS ZONES ARE ILLUSTRATED IN PLAN ON FIGURE 2. THE APPROXIMATE LOCATIONS OF THE VLF-EM CONDUCTOR AXES FROM THE 1973 SURVEY ARE ALSO MAPPED FOR COMPARISON.

SEVERAL TRENDS HAVING MODERATE TO STRONG CHARGEABILITY EXPRESSIONS ARE EVIDENT IN THESE DATA. THE STRONGEST OF THESE IS ZONE A WHICH OCCURS IN THE SOUTHWEST CORNER OF THE SURVEY AREA. THIS ZONE INCLUDES THREE AREAS HAVING STRONGLY ANOMALOUS EXPRESSIONS; NEAR 600W ON LINE 250S, 800W ON LINE 190S AND IF CORRELATION FROM LINES 100S TO 150N IS CORRECT; 775W ON LINE 150N. THIS ZONE IS WELL CORRELATED WITH AN APPARENT RESISTIVITY LOW OF 500 Ω-METRES OR LESS.

ZONE C IS STRONGLY PRESENT ON LINES 250N AND 150N AND IS TENTATIVELY CORRELATED ALONG STRIKE TO LINES 100S AND 190S WHERE UPON IT APPEARS TO COALESCE WITH ZONE A. ZONE C IS WELL CORRELATED WITH AN APPARENT RESISTIVITY LOW OVER THE TESTED STRIKE LENGTH. THE ANOMALOUS AREAS OF THIS TREND, ILLUSTRATED ON FIGURE 2, OCCUR AT 525W ON LINES 250N AND 150N. ROUGH CORRELATION OF THE VLF-EM TREND IS PRESENT ON THE EASTERN FLANK OF THIS ZONE.

ZONE B IS A WEAKER FEATURE FLANKING THE ABOVE ZONES. IT IS CORRELATED WITH AN APPARENT RESISTIVITY LOW ON LINE 100S. THE STRONG VARIATION IN CHARACTER FROM LINE TO LINE REQUIRES THAT THE CORRELATION FROM LINES 150N TO 100S BE CONSIDERED TENTATIVE.

ZONES G AND I, THE LATTER OF WHICH COINCIDES WITH A VLF-EM TREND, OCCUR IN THE VICINITY OF THE MINERALIZED SHEAR ZONE DESCRIBED BY R.W. PHENDLER. APART FROM THIS, NO DEFINITIVE RESPONSE IS EVIDENT IN THE APPARENT RESISTIVITY OR CHARGEABILITY DATA TO TRACE THE ZONE.

LINES 250N AND 150N TERMINATE TO THE EAST IN ZONE H, A WEAKLY CHARGEABLE AND LOW APPARENT RESISTIVITY FEATURE. IN ADDITION TO THIS SEVERAL ISOLATED ZONES ARE PRESENT, LABELLED D,E,F,AND J ON FIGURE 2. ZONES D AND E ARE ASSOCIATED WITH COMPACT BUT ANOMALOUS CHARGEABILITY EFFECTS.

OF INTEREST AS AN AID TO GEOLOGIC MAPPING ARE A NUMBER OF HIGH APPARENT RESISTIVITY TRENDS, THE CENTRES OF WHICH ARE LABELLED ON FIGURE 2.

SUMMARY AND CONCLUSIONS

A MULTIPOLE INDUCED POLARIZATION SURVEY WAS UNDERTAKEN ON THE CRUMP PROPERTY. THIS BRIEF SURVEY WAS RECONNAISSANCE IN NATURE. THE COVERAGE OBTAINED SHOWS THE PRESENCE OF A NUMBER OF ZONES DISTINGUISHABLE BY THEIR MODERATE CHARGEABILITY EXPRESSIONS. A SUBSET OF THESE ZONES ARE CORRELATED WITH MODERATE APPARENT RESISTIVITY LOWS. WITHIN THE BOUNDARIES OF SEVERAL ZONES THERE EXIST STRONGER CHARGEABILITY FEATURES INDICATING INCREASED LOCAL CONCENTRATION OF POLARIZABLE MATERIALS SUCH AS DISSEMINATED SULPHIDES OR GRAPHITE. SOME CORRELATION OF VLF-EM CONDUCTORS AND CHARGEABLE ZONES IS OBSERVED. THE MINERALIZED SHEAR ZONE IN THE VICINITY OF THE TRENCHES DOES NOT APPEAR TO HAVE A DEFINITIVE RESPONSE IN EITHER THE APPARENT RESISTIVITY OR CHARGEABILITY DATA.

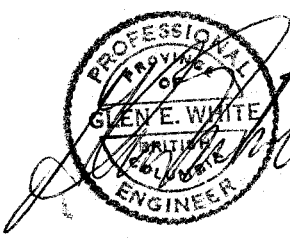
RECOMMENDATIONS

IT IS RECOMMENDED THAT GEOLOGICAL MAPPING AND PROSPECTING BE UNDERTAKEN, WHERE POSSIBLE, IN ORDER TO DISCOVER THE SOURCE OF THE STRONGER CHARGEABILITY ANOMALIES, OR AT LEAST THE LITHOLOGY WITHIN WHICH THEY OCCUR. TRENCHING MAY BE NECESSARY IN SOME LOCATIONS. ALTHOUGH THE KNOWN MINERALIZED ZONE DOES NOT MANIFEST ITSELF IN THE DATA, MORE STRONGLY MINERALIZED ZONES SHOULD BE EXPECTED TO PROVIDE A RESPONSE. THE PRIORITY FEATURES OF FOLLOW UP INTEREST ARE THE ZONE A ANOMALIES AT 800W ON LINE 190S AND 600W ON LINE 250S. AS WELL THE STRONG RESPONSE WITHIN ZONE C AT 530W ON LINES 250N AND 150N DESERVE CONSIDERATION. SECONDARILY, THE ISOLATED ZONE D AREA SHOULD BE PROSPECTED.

RESPECTFULLY SUBMITTED,

Cliff Candy

CLIFF CANDY B.SC.,
GEOPHYSICIST



GLEN E. WHITE B.SC.,P.ENG.
CONSULTING GEOPHYSICIST

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.

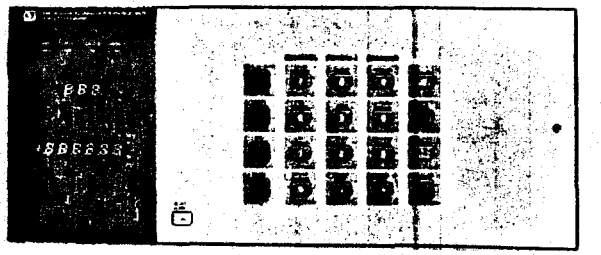
General Statements and Programmable Commands

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.

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

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.)

STATEMENT OF QUALIFICATIONS

NAME:	CANDY, CLIFFORD E.
PROFESSION:	GEOPHYSICIST
EDUCATION:	UNIVERSITY OF BRITISH COLUMBIA B.SC., GEOPHYSICS
PROFESSIONAL ASSOCIATIONS:	SOCIETY OF EXPLORATION GEOPHYSICISTS BRITISH COLUMBIA GEOPHYSICAL SOCIETY.
EXPERIENCE:	EIGHT YEARS GEOPHYSICIST WITH WHITE GEOPHYSICAL INC., WITH WORK IN BRITISH COLUMBIA, QUEBEC, SASKATCHEWAN, SOUTH-WESTERN U.S.A. AND IRELAND.

STATEMENT OF QUALIFICATIONS

NAME: WHITE, GLEN E., P.ENG.

PROFESSION: GEOPHYSICIST

EDUCATION: B.Sc. GEOPHYSICIST - GEOLOGY
UNIVERSITY OF BRITISH COLUMBIA

PROFESSIONAL ASSOCIATIONS:
- REGISTERED PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA.
- ASSOCIATE MEMBER OF SOCIETY OF EXPLORATION GEOPHYSICISTS.
- PAST PRESIDENT OF B.C. SOCIETY OF MINING GEOPHYSICISTS.

EXPERIENCE:
- PRE-GRADUATE EXPERIENCE IN GEOLOGY - GEOCHEMISTRY - GEOPHYSICS WITH ANACONDA AMERICAN BRASS.
- TWO YEARS MINING GEOPHYSICIST WITH SULMAC EXPLORATION LTD. AND AIRBORNE GEOPHYSICS WITH SPARTAN AIR SERVICES LTD.
- ONE YEAR MINING GEOPHYSICIST AND TECHNICAL SALES MANAGER IN THE PACIFIC NORTH-WEST FOR W.P. McGILL AND ASSOCIATES.
- TWO YEARS MINING GEOPHYSICIST AND SUPERVISOR AIRBORNE AND GROUND GEOPHYSICAL DIVISIONS WITH GEO-X SURVEYS LTD.
- TWO YEARS CHIEF GEOPHYSICIST TRI-CON EXPLORATION SURVEYS LTD.
- FOURTEEN YEARS CONSULTING GEOPHYSICIST ACTIVE EXPERIENCE IN ALL GEOLOGIC PROVINCES OF CANADA.

REFERENCES

1) COCHRANE, D. (P.ENG.), CERNE, J. AND WHITE, G. - "GEOPHYSICAL REPORT COVERING AN AIRBORNE MAGNETOMETER SURVEY OVER THE CRUMP PROPERTY, OSOYOOS MINING DIVISION, B.C.": - APRIL 29, 1969.

2) NELSON, R.B. -"GEOLOGY OF THE CRUMP PROPERTIES, SUMMERLAND, B.C." - 1970.

3) PHENDLER, R.W., REPORT ON THE CRUMP PROPERTY, OSOYOOS MINING DIVISION, B.C., MAY 26, 1982.

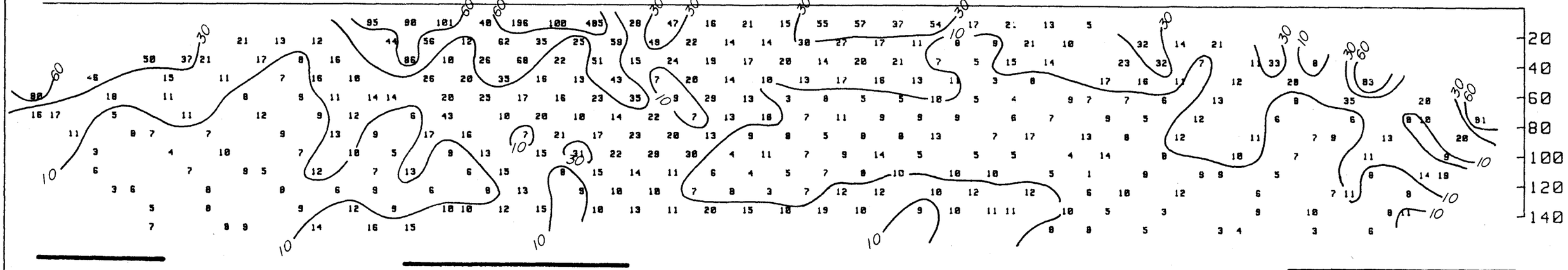
4) WHITE, G. - " GEOPHYSICAL REPORT ON AN ELECTROMAGNETIC SURVEY, FAP CLAIMS, OSOYOOS MINING DIVISION, B.C." - JULY 9, 1973.

COST BREAKDOWN

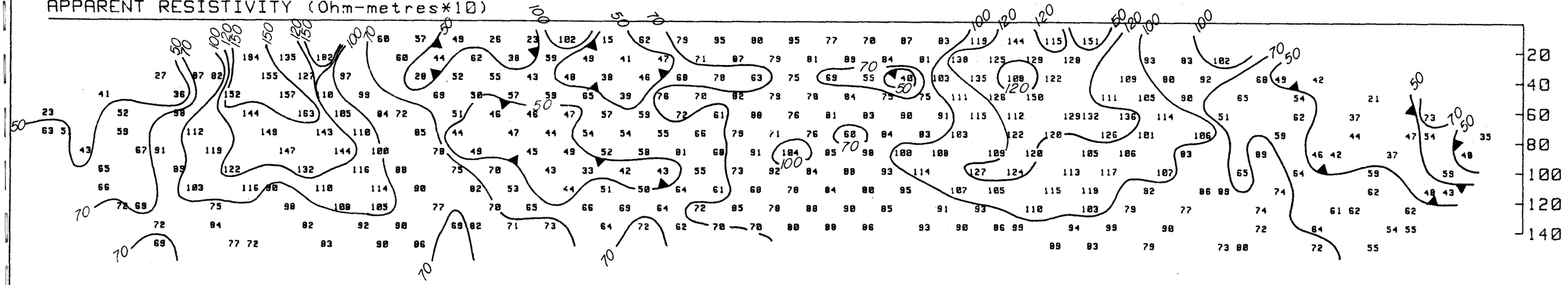
JULY 9-13 ..... 4 DAYS/4 MAN CREW	$3,400.00
VEHICLE 4 DAYS/125/DAY	500.00
MEALS & ACCOMMODATIONS ...$60/MAN/DAY	960.00
COMPUTER PROCESSING	300.00
DRAFTING	400.00
INTERPRETATION & REPORT	850.00
SUNDRY	90.00
	$6,500.00

900W 875W 850W 825W 800W 775W 750W 725W 700W 675W 650W 625W 600W 575W 550W 525W 500W 475W 450W 425W 400W 375W 350W 325W 300W 280W 250W 230W 200W 180W 150W 130W 100W 75W 50W 30W 0E 30E 50E 75E

APPARENT CHARGEABILITY (Milliseconds)



APPARENT RESISTIVITY (Ohm-metres*10)



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

AGIO RESOURCES CORP.

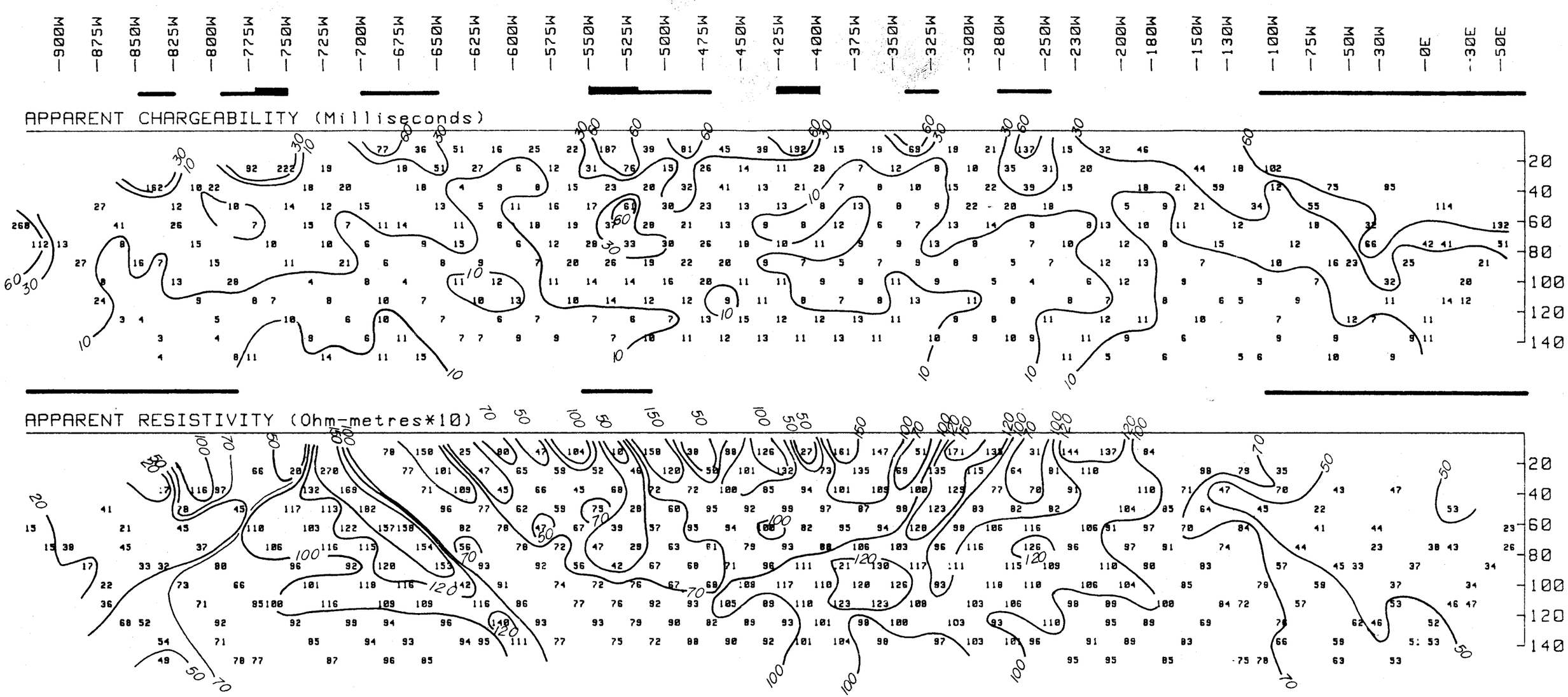
GRUMP CROUP

MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 250N

DATE: JULY/85

FIG.: 3



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES

0 25 50 75 100

WHITE GEOPHYSICAL INC.

AGIO RESOURCES CORP.

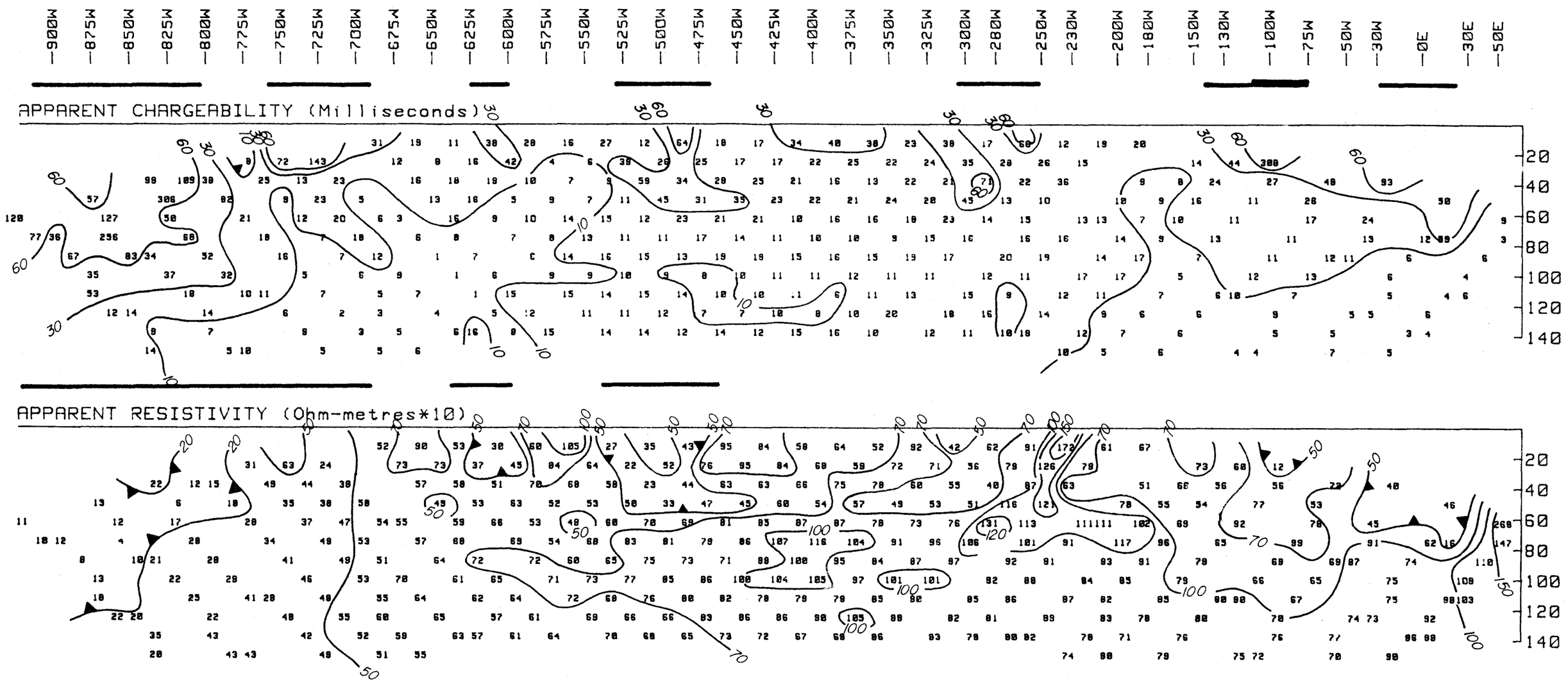
CRUMP GROUP

MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 150N

DATE: JULY/85

FIG.: 4



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES

0 25 50 75 100

WHITE GEOPHYSICAL INC.

AGIO RESOURCES CORP.

GRUMP GROUP

MULTIPOLE INDUCED POLARIZATION SURVEY

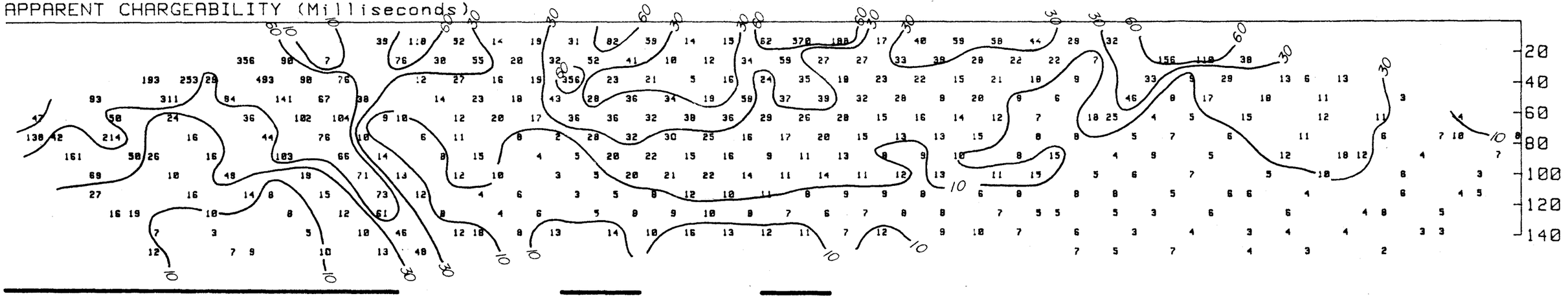
LINE 100S

DATE: JULY/85

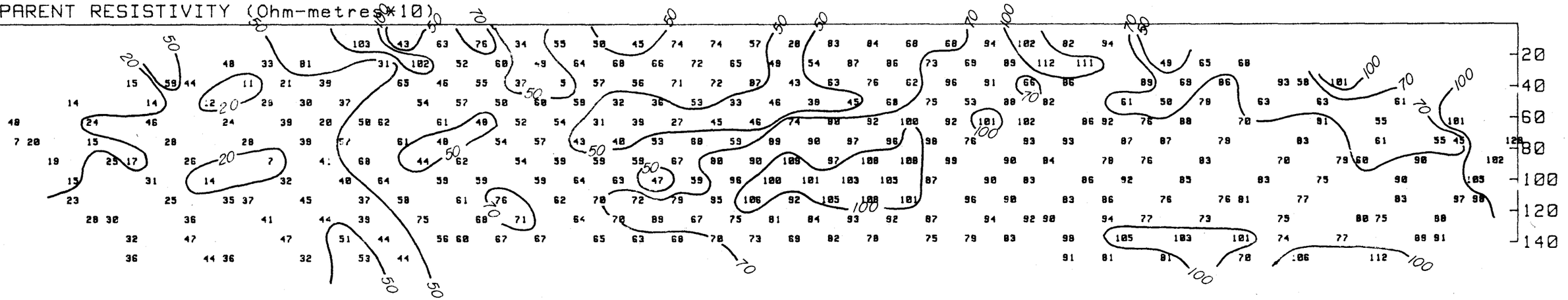
FIG.: 5

925W 900W 875W 850W 825W 800W 775W 750W 725W 700W 675W 650W 625W 600W 575W 550W 525W 500W 475W 450W 425W 400W 375W 350W 325W 300W 280W 250W 230W 200W 180W 150W 130W 100W 75W 50W 30W 0E 30E 50E

APPARENT CHARGEABILITY (Milliseconds)



APPARENT RESISTIVITY (Ohm-metres*10)



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

AGIO RESOURCES CORP.

CRUMP GROUP

MULTIPOLE INDUCED POLARIZATION SURVEY

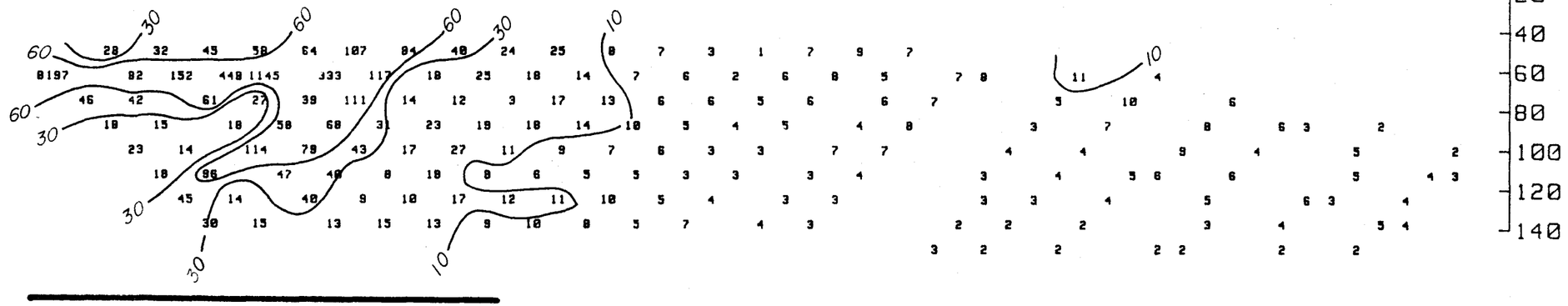
LINE 190S

DATE: JULY/85

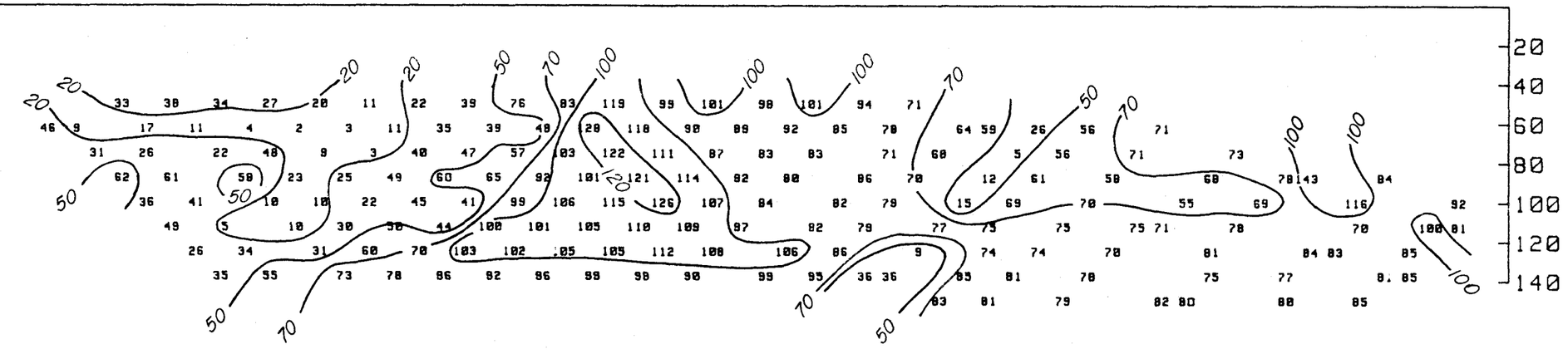
FIG.: 6

925W 900W 875W 850W 825W 800W 775W 750W 725W 700W 675W 650W 625W 600W 575W 550W 525W 500W 475W 450W 425W 400W 375W 350W 325W 300W 280W 250W 230W 200W 180W 150W 130W 100W 75W 50W 30W 0E 30E 50E

APPARENT CHARGEABILITY (Milliseconds)



APPARENT RESISTIVITY (Ohm-metres*10)



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

AGIO RESOURCES CORP.

CRUMP GROUP

MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 250S

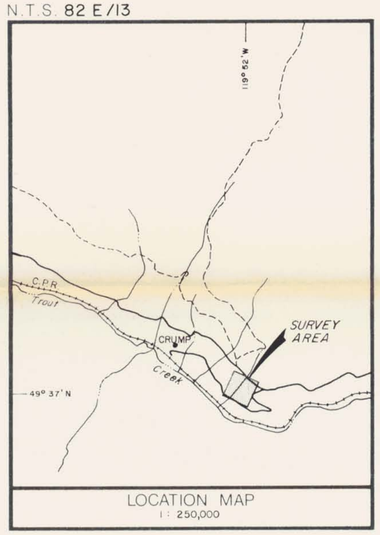
DATE: JULY/85

FIG.: 7

LEGEND:

- ROAD
- TRENCH
- SURVEY STATION
- CLAIM POST
- VLF-EM CONDUCTOR – 1973 SURVEY
- CHARGEABILITY TRENDS
- CHARGEABILITY HIGHS
- APPARENT RESISTIVITY LOW
- CENTRE OF APPARENT RESISTIVITY

N.T.S. 82 E/13



LOCATION MAP
1 : 250,000

50m 25m 0 50m 100m 150m 200m
1 : 2500

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA GLEN E. WHITE

AGIO RESOURCES CORP.
— CRUMP GROUP —
OSOYOOS MINING DIVISION — BRITISH COLUMBIA

MULTIPOLE INDUCED POLARIZATION SURVEY
INTERPRETATION MAP

WHITE GEOPHYSICAL INC.

Interpreted By:	C.E.C.
Drawn By:	FINELINE DRAFTING LTD.
Checked By:	C.E.C.
Date:	AUGUST / 85
Fig. No.:	2