

4043

1972  
RECEIVED

REPORT ON THE  
INDUCED POLARIZATION  
AND RESISTIVITY SURVEY  
ON THE 921/7W  
SOUTHEAST PORTION  
CHATAWAY OPTION CLAIM GROUP  
NICOLA MINING DIVISION, BRITISH COLUMBIA  
FOR  
ASELO INDUSTRIES LTD.

BY  
PHILIP G. HALLOF, Ph. D.  
AND  
ASHTON W. MULLAN, P. Eng.

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4043 MAP

NAME AND LOCATION OF PROPERTY  
SOUTHEAST PORTION, CHATAWAY OPTION CLAIM GROUP  
HIGHLAND VALLEY AREA  
NICOLA MINING DIVISION, B. C. 50°21'N, 120°53'W - NW  
DATE STARTED: JULY 3, 1972  
DATE FINISHED: JULY 23, 1972

TABLE OF CONTENTS

<u>Part A:</u>	Notes on theory and field procedure	9 pages	
<u>Part B:</u>	Report	13 pages	<u>Page</u>
1.	Introduction		1
2.	Presentation of Results		3
3.	Discussion of Results		4
4.	Conclusions and Recommendations		8
5.	Assessment Details		10
6.	Statement of Cost		11
7.	Certificate - Philip G. Hallof		12
8.	Certificate - Ashton W. Mullan		13
9.	Appendix		
<u>Part C:</u>	Illustrations	12 pieces	
	#1 Plan Map (in pocket)		Dwg. I. P. P. 3537
	#2 Claim location plan map		DWG. MISC. - 3538
	#3-13 IP Data Plots		Dwgs. IP 5971-1 to -11

# McPHAR GEOPHYSICS

## NOTES ON THE THEORY, METHOD OF FIELD OPERATION AND PRESENTATION OF DATA FOR THE INDUCED POLARIZATION METHOD

---

Induced Polarization as a geophysical measurement refers to the blocking action or polarization of metallic or electronic conductors in a medium of ionic solution conduction.

This electro-chemical phenomenon occurs wherever electrical current is passed through an area which contains metallic minerals such as base metal sulphides. Normally, when current is passed through the ground, as in resistivity measurements, all of the conduction takes place through ions present in the water content of the rock, or soil, i. e. by ionic conduction. This is because almost all minerals have a much higher specific resistivity than ground water. The group of minerals commonly described as "metallic", however, have specific resistivities much lower than ground waters. The induced polarization effect takes place at those interfaces where the mode of conduction changes from ionic in the solutions filling the interstices of the rock to electronic in the metallic minerals present

in the rock.

The blocking action or induced polarization mentioned above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a d. c. current is allowed to flow through the rock; i. e. as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the interfaces, to appreciably reduce the amount of current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

When the d. c. voltage used to create this d. c. current flow is cut off, the Coulomb forces between the charged ions forming the polarization cause them to return to their normal position. This movement of charge creates a small current flow which can be measured on the surface of the ground as a decaying potential difference.

From an alternate viewpoint it can be seen that if the direction of the current through the system is reversed repeatedly before the polarization occurs, the effective resistivity of the system as a whole will change as the frequency of the switching is changed. This is a consequence of the fact that the amount of current flowing through each metallic interface depends upon the length of time that current has been passing through it in one direction.

The values of the per cent frequency effect or F. E. are a measurement of the polarization in the rock mass. However, since the measurement of the degree of polarization is related to the apparent resistivity of the rock mass it is found that the metal factor values or M. F. are the most useful values in determining the amount of polarization present in the rock mass. The MF values are obtained by normalizing the F. E. values for varying resistivities.

The induced polarization measurement is perhaps the most powerful geophysical method for the direct detection of metallic sulphide mineralization, even when this mineralization is of very low concentration. The lower limit of volume per cent sulphide necessary to produce a recognizable IP anomaly will vary with the geometry and geologic environment of the source, and the method of executing the survey. However, sulphide mineralization of less than one per cent by volume has been detected by the IP method under proper geological conditions.

The greatest application of the IP method has been in the search for disseminated metallic sulphides of less than 20% by volume. However, it has also been used successfully in the search for massive sulphides in situations where, due to source geometry, depth of source, or low resistivity of surface layer, the EM method can not be successfully applied. The ability to differentiate ionic conductors, such as water filled shear zones, makes the IP method a useful tool in checking EM

anomalies which are suspected of being due to these causes.

In normal field applications the IP method does not differentiate between the economically important metallic minerals such as chalcopyrite, chalcocite, molybdenite, galena, etc., and the other metallic minerals such as pyrite. The induced polarization effect is due to the total of all electronic conducting minerals in the rock mass. Other electronic conducting materials which can produce an IP response are magnetite, pyrolusite, graphite, and some forms of hematite.

In the field procedure, measurements on the surface are made in a way that allows the effects of lateral changes in the properties of the ground to be separated from the effects of vertical changes in the properties. Current is applied to the ground at two points in distance (X) apart. The potentials are measured at two other points (X) feet apart, in line with the current electrodes is an integer number (n) times the basic distance (X).

The measurements are made along a surveyed line, with a constant distance (nX) between the nearest current and potential electrodes. In most surveys, several traverses are made with various values of (n); i. e. (n) = 1, 2, 3, 4, etc. The kind of survey required (detailed or reconnaissance) decides the number of values of (n) used.

In plotting the results, the values of the apparent resistivity, apparent per cent frequency effect, and the apparent metal factor

measured for each set of electrode positions are plotted at the intersection of grid lines, one from the center point of the current electrodes and the other from the center point of the potential electrodes. (See Figure A.) The resistivity values are plotted above the line as a mirror image of the metal factor values below. On a second line, below the metal factor values, are plotted the values of the per cent frequency effect. In some cases the values of per cent frequency effect are plotted as superscripts of the metal factor value. In this second case the frequency effect values are not contoured. The lateral displacement of a given value is determined by the location along the survey line of the center point between the current and potential electrodes. The distance of the value from the line is determined by the distance ( $nX$ ) between the current and potential electrodes when the measurement was made.

The separation between sender and receiver electrodes is only one factor which determines the depth to which the ground is being sampled in any particular measurement. The plots then, when contoured, are not section maps of the electrical properties of the ground under the survey line. The interpretation of the results from any given survey must be carried out using the combined experience gained from field results, model study results and theoretical investigations. The position of the electrodes when anomalous values are measured is important in the interpretation.

In the field procedure, the interval over which the potential differences are measured is the same as the interval over which the electrodes are moved after a series of potential readings has been made. One of the advantages of the induced polarization method is that the same equipment can be used for both detailed and reconnaissance surveys merely by changing the distance (X) over which the electrodes are moved each time. In the past, intervals have been used ranging from 25 feet to 2000 feet for (X). In each case, the decision as to the distance (X) and the values of (n) to be used is largely determined by the expected size of the mineral deposit being sought, the size of the expected anomaly and the speed with which it is desired to progress.

The diagram in Figure A demonstrates the method used in plotting the results. Each value of the apparent resistivity, apparent metal factor, and apparent per cent frequency effect is plotted and identified by the position of the four electrodes when the measurement was made. It can be seen that the values measured for the larger values of (n) are plotted farther from the line indicating that the thickness of the layer of the earth that is being tested is greater than for the smaller values of (n); i. e. the depth of the measurement is increased. When the F. E. values are plotted as superscripts to the MF values the third section of data values is not presented and the F. E. values are not contoured.



The actual data plots included with the report are prepared utilizing an IBM 360/75 Computer and a Calcomp 770/763 Incremental Plotting System. The data values are calculated, plotted, and contoured according to a programme developed by McPhar Geophysics. Certain symbols have been incorporated into the programme to explain various situations in recording the data in the field.

The IP measurement is basically obtained by measuring the difference in potential or voltage ( $\Delta V$ ) obtained at two operating frequencies. The voltage is the product of the current through the ground and the apparent resistivity of the ground. Therefore in field situations where the current is very low due to poor electrode contact, or the apparent resistivity is very low, or a combination of the two effects; the value of ( $\Delta V$ ) the change in potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

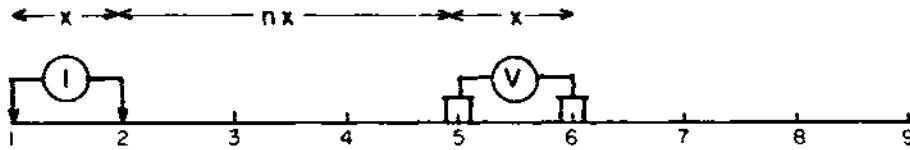
In some situations spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisy to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy, the reading is bracketed in the data plot ( ).

In certain situations negative values of Apparent Frequency Effect are recorded. This may be due to the geologic environment or spurious electrical effects. The actual negative frequency effect value recorded is indicated on the data plot, however the symbol "NEG" is

indicated for the corresponding value of Apparent Metal Factor. In contouring negative values the contour lines are indicated to the nearest positive value in the immediate vicinity of the negative value.

The symbol "NR" indicates that for some reason the operator did not attempt to record a reading although normal survey procedures would suggest that one was required. This may be due to inaccessible topography or other similar reasons. Any symbol other than those discussed above is unique to a particular situation and is described within the body of the report.

# METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS



Stations on line

$x$  = Electrode spread length  
 $n$  = Electrode separation

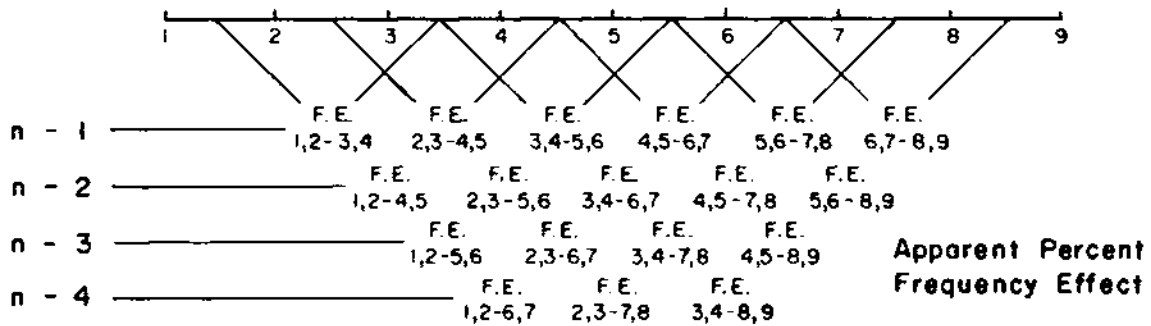
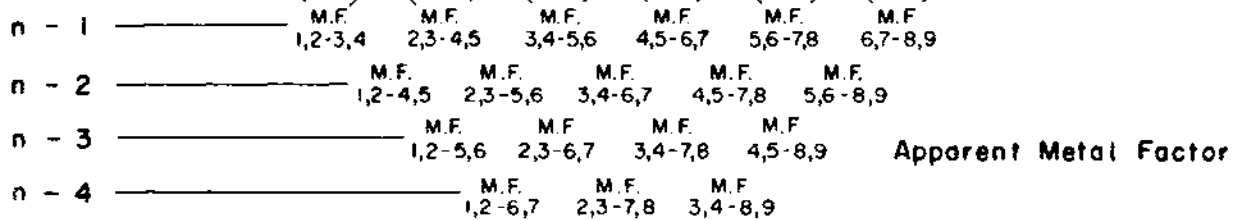
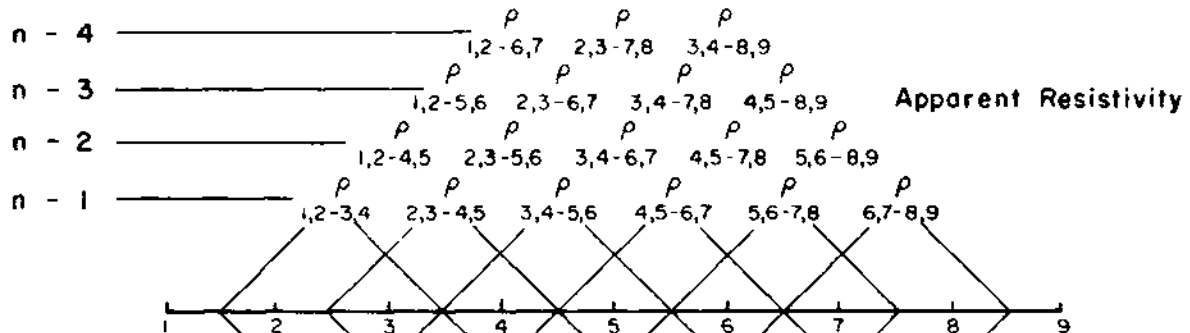


Fig. A

**McPHAR GEOPHYSICS LIMITED**

**REPORT ON THE**

**INDUCED POLARIZATION**

**AND RESISTIVITY SURVEY**

**ON THE**

**SOUTHEAST PORTION**

**CHATAWAY OPTION CLAIM GROUP**

**NICOLA MINING DIVISION, BRITISH COLUMBIA**

**FOR**

**ASELO INDUSTRIES LTD.**

---

**1. INTRODUCTION**

A large claim group in Highland Valley is currently owned by Chataway Exploration Co. Ltd. (N.P.L.). The Group lies 15 to 20 miles north-northwest of Merritt, B.C. The southeast portion of the Chataway Claim Group has been optioned by Asele Industries Ltd. The claims optioned by Asele Industries Ltd. lie in the southwest quadrant of the one degree quadrilateral whose southeast corner is at  $50^{\circ}\text{N}/120^{\circ}\text{W}$ ; they lie south of Gypsum Mountain, with the northwest corner of the claims at  $50^{\circ}21'\text{N}/120^{\circ}53'\text{W}$ .

At the request of Mr. William J. Couiter, President of the company, we have completed a brief induced polarization and resistivity survey on a portion of these claims on behalf of Asele

Industries Ltd. There has been a considerable amount of previous exploration work done on the Chataway Option Claim Group. The area of interest is underlain by the Dot Quartz Monsonite phase of the Guichen Creek Batholith. Copper mineralization, in varying concentrations, has been found in many places.

A previous report, dated April 20, 1972, by M. H. Sanguinetti of Cordilleran Engineering Ltd., describes the history, geology and mineralization of the southeast quarter of the Chataway Highland Valley Property. A major zone of fracturing and alteration extends through the quartz monsonite intrusive, striking just west of north. Widespread copper mineralization in the form of fracture fillings and veins is associated with this zone. Some disseminated mineralization is also known within altered portions of the intrusive. The purpose of the induced polarization and resistivity survey was to better evaluate the zones of mineralization known from the previous work.

The survey covered all, or portions of, the following claims held under option by Asele Industries Ltd.

WIZ	13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 30, 31, 42, 43, 44, 45, 49, 50, 88, 89, 90, 92, 93, 94, 112 FR., 113 FR., 120 FR.
INS	1, 2, 3, 11, 12, 15
SHO	7, 8

The entire claim group is shown at a scale of 1" = 1,000 feet on Dwg. Misc. 3538, which is also enclosed.

## 2. PRESENTATION OF RESULTS

The Induced Polarization and Resistivity results are shown on the following enclosed data plots. The results are plotted in the manner described in the notes preceding this report.

Line 504N	300' electrode intervals	Dwg. I.P. 5971-1
Line 496N	300' electrode intervals	Dwg. I.P. 5971-2
Line 492N	300' electrode intervals	Dwg. I.P. 5971-3
Line 488N	300' electrode intervals	Dwg. I.P. 5971-4
Line 484N	300' electrode intervals	Dwg. I.P. 5971-5
Line 480N	300' electrode intervals	Dwg. I.P. 5971-6
Line 476N	300' electrode intervals	Dwg. I.P. 5971-7
Line 472N	300' electrode intervals	Dwg. I.P. 5971-8
Line 468N	300' electrode intervals	Dwg. I.P. 5971-9
Line 464N	300' electrode intervals	Dwg. I.P. 5971-10
Line 460N	300' electrode intervals	Dwg. I.P. 5971-11

Also enclosed with this report is Dwg. I.P.P. 3537, a plan map of the Chataway Option Claim Group Grid at a scale of 1" = 400'. The definite, probable and possible Induced Polarization anomalies are indicated by bars, in the manner shown on the legend, on this plan map as well as on the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

Since the Induced Polarization measurement is essentially an

averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the electrode interval length; i. e. when using 300' electrode intervals the position of a narrow sulphide body can only be determined to lie between two stations 300' apart. In order to definitely locate, and fully evaluate, a narrow, shallow source it is necessary to use shorter electrode intervals. In order to locate sources at some depth, larger electrode intervals must be used, with a corresponding increase in the uncertainties of location. Therefore, while the centre of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

The geological and topographical information shown on Dwg. I. P. P. 3537 has been taken from maps made available by the staff of Aselo Industries Ltd.

### 3. DISCUSSION OF RESULTS

There are two areas of specific interest within the portion of the claim group covered by the Induced Polarization and Resistivity survey. The Zone IV copper mineralization (chalcopyrite, bornite, chalcocite, etc.) occurs within a strong, narrow shear. The zone is two to thirty feet in width and strikes N10°W and dips 60°SW to vertical. The mineralized zone has been proven to be 1,800 feet in length by drilling. The most concentrated mineralization occurs

within the confines of the shear, but lower grade disseminated mineralization has been found in the footwall rocks. The average grade of the mineralization is 1.26% copper.

Disseminated mineralization has also been located in an area south and southwest of Twilight Lake. A previous I.P. survey indicated a poorly-defined anomaly in this area. Subsequent trenching and percussion drilling have located widespread, disseminated mineralization containing some copper.

Elsewhere in the Highland Valley Area, disseminated copper mineralization of the "porphyry copper" type is being mined as ore. The existence of widespread copper mineralization within intrusive rocks on the Chataway Option suggests the possible presence of similar mineralization in this area. The Induced Polarization survey using 300 foot electrode intervals was planned in an attempt to locate, and outline, any large zones of disseminated sulphide mineralization that might be present. The I.P. method has been found to be very useful in this type of exploration (see Appendix).

Low magnitude to moderate magnitude I.P. anomalies were located on all of the lines surveyed. The apparent resistivity level within the intrusive rocks is relatively high so that the I.P. anomalies are fairly definite. As shown on the plan map, Dwg. I.P.P. 3537, the I.P. anomalies can be correlated from line to line to form zones. Portions of these anomalous zones correlate with the known mineralization, and they generally conform to the regional strike.



a) ZONE I

This U-shaped anomalous zone lies south and southwest of Twilight Lake. These anomalies are those probably identified previously as the Twilight Lake Zone.

Some of the anomalies that form this zone are weak and poorly defined. However, toward the southern end of the zone the anomalies are more definite. The more definite anomalies are centered at Line 488N, 478+00E and 488+50E; Line 484N, 490+00E.

The anomalous patterns are all similar, suggesting a width for the source of 200 feet to 400 feet of disseminated mineralization. All of the patterns indicate some depth to the top of the source; i. e. the anomalous effects increase for the larger values of (n). On Line 488N, the previous percussion drilling has indicated only small thicknesses of overburden. This would indicate that the sulphide concentrations could be expected to increase at depth within the intrusive.

b) ZONE II

This anomalous zone lies to the northeast of Twilight Lake. It may, in fact, be a part of Zone I. The anomalies that form Zone II are low in magnitude. At the southern end of the zone the anomalies are more definite; the anomaly centered at 499+00E to 500+00E on Line 488N is quite definite.

c) ZONE III

This anomalous zone lies along the eastern portion of the

grid surveyed. The apparent resistivities are appreciably lower in this region, suggesting either a more porous phase of the intrusive or much greater thickness of overburden. The IP anomalies are generally weak and indefinite. However, the anomalies centered at Line 472N, 544+00E and Line 464N, 538+00E appear to be important enough to warrant further interest.

d) ZONE IV

The southern portion of the western part of this complex anomalous zone (Zone IVA) correlates with the known Zone IV mineralization. The anomalies centered at Line 484N, 511+00E; Line 476N, 512+00E and Line 468N, 514+00E are typical of what we would expect to measure from a relatively narrow zone of weak mineralization using 300' electrode intervals.

The southern portion of Zone IVA has been adequately tested by the previous drilling. Where the zone crosses the Gypsum Fault, the anomalies are weak and of little interest. However, the northern end of Zone IVA is northeast of the Gypsum Fault and the anomalies are more definite. The anomalies centered at Line 504N, 506+00E and Line 496N, 508+00E are definite enough to warrant further investigation; the source of these anomalies could be the continuation of the Zone IV mineralization.

At the southern ends, Zone IVA and Zone IVB merge to form a broad, weak, indefinite anomalous zone. To the north, the zones have been separated into two distinct features. The anomalies that

form Zone IVB are weaker, and less definite, than those to the west. The most definite anomalies for Zone IVB are on Line 480N and Line 464N.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

The results of the Induced Polarization and Resistivity survey on the Chataway Option Claim Group are of definite interest. Relatively definite IP anomalies were detected correlating with the known copper mineralization in Zone IV and less definite IP anomalies were measured in the vicinity of the weakly disseminated mineralization previously located south and southwest of Twilight Lake.

There are other anomalous zones that are definite enough to be of interest, but for which the source is not known. Because of the significant amounts of copper known in the area, it is recommended that some of these anomalies be tested by drilling.

We do not know the details of the topography in the area or whether Asolo Industries Ltd. will prefer to use vertical percussion drill holes or angled diamond drill holes. Therefore, we will specify only the lateral position and depth extent at which the source of the IP anomalies should be tested.

Zone IVA            Line 496N, 505+00E to 509+00E; depth 200' to 400'

This is the most definite IP anomaly located during the survey. The source could be the northern extension of the Zone IV mineralization.

Zone II

Line 488N, 497+50E to 500+50E; depth 250' to 350'

This anomaly at the southern end of Zone II is quite definite. It could be due to greater concentrations of the native copper that was intersected in the P21 percussion drill hole, which is off the anomaly.

Zone I

Line 488N, 476+00E to 480+00E; depth 300' to 450'  
Line 488N, 486+00E to 491+00E; depth 350' to 500'  
Line 492N, 482+50E to 485+50E; depth 250' to 400'

This anomalous zone correlates with the weak copper mineralization previously located by trenching and percussion drilling south and southwest of Twilight Lake. The information available to us suggests that the strongest IP anomalies have not been tested. Further drilling is therefore warranted.

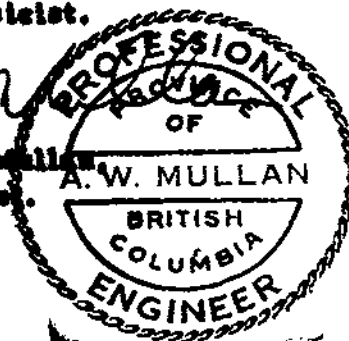
-----

There are other anomalies on the Chataway Option Claim Group that do not appear to be important enough to warrant drilling at this time. If the further drilling recommended above locates copper mineralization of economic importance, all of the data should be reviewed.

McPHAR GEOPHYSICS LIMITED

*Philip G. Haller*  
Philip G. Haller,  
Geophysicist.

*A. W. Mullan*  
A. W. Mullan  
Geologist.



Dated: August 18, 1972.

ASSESSMENT DETAILS

PROPERTY: Chataway Option Claim Group      MINING DIVISION: Nicola  
SPONSOR: Asco Industries Ltd.                      PROVINCE: British Columbia  
LOCATION: Highland Valley Area  
TYPE OF SURVEY: Induced Polarization  
OPERATING MAN DAYS:                      55                      DATE STARTED: July 3, 1972  
EQUIVALENT 8 HR. MAN DAYS: 82.5                      DATE FINISHED: July 23, 1972  
CONSULTING MAN DAYS:                      4                      NUMBER OF STATIONS: 279  
DRAUGHTING MAN DAYS:                      7                      NUMBER OF READINGS: 2511  
TOTAL MAN DAYS:                              93.5                      MILES OF LINE SURVEYED: 15.2

CONSULTANTS:

Philip G. Hallef, 15 Barnwood Court, Don Mills, Ontario.  
Ashton W. Mullan, 1440 Sandhurst Place, West Vancouver, B.C.

FIELD TECHNICIANS:

R. Fernholm, Halleybury, Ontario.  
E. Novotny, 645 East 61st Avenue, Vancouver, B.C.  
Plus Extra Labour:  
E. Therres, General Delivery, Merritt, B.C.  
A. Tomkulak, General Delivery, Merritt, B.C.

DRAUGHTSMEN:

G. Hines, 60 Oak Avenue, Richvale, Ontario.  
B. Marr, 58 Glencrest Blvd. Toronto 16, Ontario.  
N. Lade, 299 Jasper Avenue, Oshawa, Ontario.

McPHAR GEOPHYSICS LIMITED

  
Philip G. Hallef,  
Geophysicist.

Dated: August 18, 1972

STATEMENT OF COST

Asele Industries Ltd. - Chataway Option Claim Group - IP Survey  
Nicola Mining Division, B.C.

Crew: R. Fernholm & E. Novotny

Total Survey Cost:

15.1 miles	@	15 miles	@	\$390.00/day	5,850.00	
		.1 mile	@	\$360.00/day	<u>36.00</u>	
						<u>\$5,886.00</u>

breakdown of Cost

13-3/4 days	Operating	@	\$275.00/day	\$3,781.25
1 1/2 days	Preparation )			
1 day	Travel )			
2-1/4 days	Bad Weather )	5-1/4 days	@ \$100.00/day	525.00
1/2 day	Standby )			
1/2 day	Off )	1 1/2 days	N.C.	<u>N.C.</u>
1 day	Breakdown )			<u>\$4,306.25</u>

Crew Expenses

Vehicle Expenses	\$ 58.52	
Taxi	7.08	
Meals and Accommodation	579.26	
Supplies	58.62	
Telephone and Telegraph	<u>2.50</u>	
	705.98	
Plus 10%	<u>70.60</u>	
	776.58	776.58

Extra Labour	\$675.00	
Plus 20%	<u>135.00</u>	
	810.00	<u>810.00</u>
		<u>\$5,892.83</u>

McPHAR GEOPHYSICS LIMITED

*Philip G. Hallet*  
Philip G. Hallet,  
Geophysicist.

Dated: August 18, 1972

CERTIFICATE

I, Philip George Haller, of the City of Toronto, Province of Ontario, do hereby certify that:

1. I am a geophysicist residing at 15 Barwood Court, Don Mills, Ontario.
2. I am a graduate of the Massachusetts Institute of Technology with a B.Sc. Degree (1952) in Geology and Geophysics, and a Ph. D. Degree (1957) in Geophysics.
3. I am a member of the Society of Exploration Geophysicists and the European Association of the Exploration Geophysicists.
4. I am a Professional Geophysicist, registered in the Province of Ontario, the Province of British Columbia and the State of Arizona.
5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of Aselo Industries Ltd. or any affiliate.
6. The statements made in this report are based on a study of published geological literature and unpublished private reports.
7. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

Dated at Toronto

This 18th day of August 1972.

  
Philip G. Haller, Ph. D.


**CERTIFICATE**

I, Ashton, W. Mullan, of the City of Vancouver, in the Province of British Columbia, hereby certify:

1. That I am a geologist and a fellow of the Geological Association of Canada with a business address at Suite 811, 837 West Hastings Street, Vancouver, B.C.
2. That I am registered as a member of the Association of Professional Engineers of the Provinces of Ontario and British Columbia.
3. That I hold a B.Sc. degree from McGill University.
4. That I have been practicing my profession as a geologist for about twenty years.
5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of Asolo Industries Ltd. or any affiliate.
6. The statements made in this report are based on a study of published geological literature and unpublished private reports.
7. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

Dated at Toronto

This 18th day of August 1972.

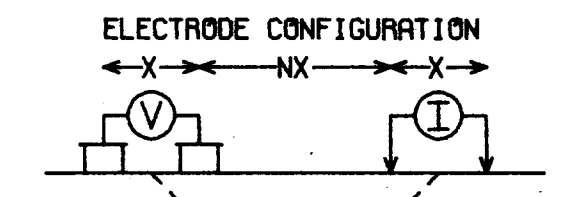
  
A. W. Mullan, B.Sc., P. Eng.



# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 50400N



PLOTTING POINT → X X = 300FT

SURFACE PROJECTION OF ANOMALOUS ZONES  
DEFINITE ———  
PROBABLE ·····  
POSSIBLE / / / /

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 1972

APPROVED: PHILIP G. HALLOF

NOTE: CONTOURS AT LOGARITHMIC INTERVALS  
1.-1.5-2.-3.-5.-7.5-10

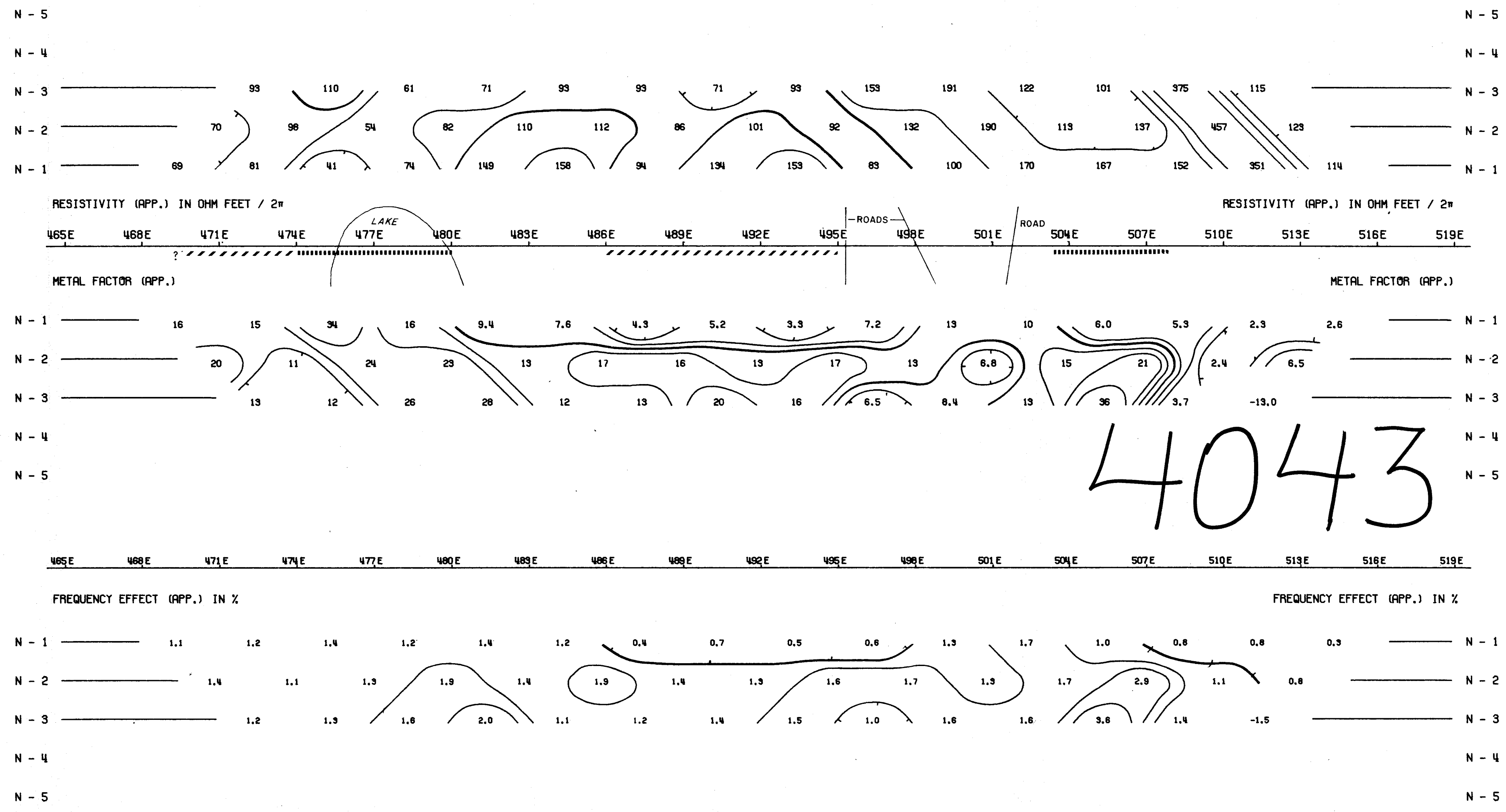
DATE: 1972

Expiry Date: February 25, 1973

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

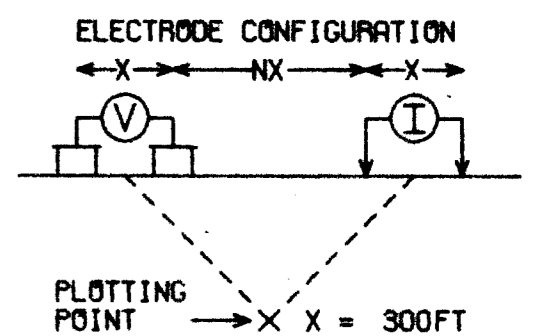
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 49600N



SURFACE PROJECTION  
OF ANOMALOUS ZONES  
DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 8/1/72

PROFESSIONAL  
APPROVED  
*Richard J. McPhar*  
REGISTERED  
ENGINEER

NOTE: CONTOURS AT  
LOGARITHMIC INTERVALS  
1.-1.5-2.-3.-5.-7.5-10

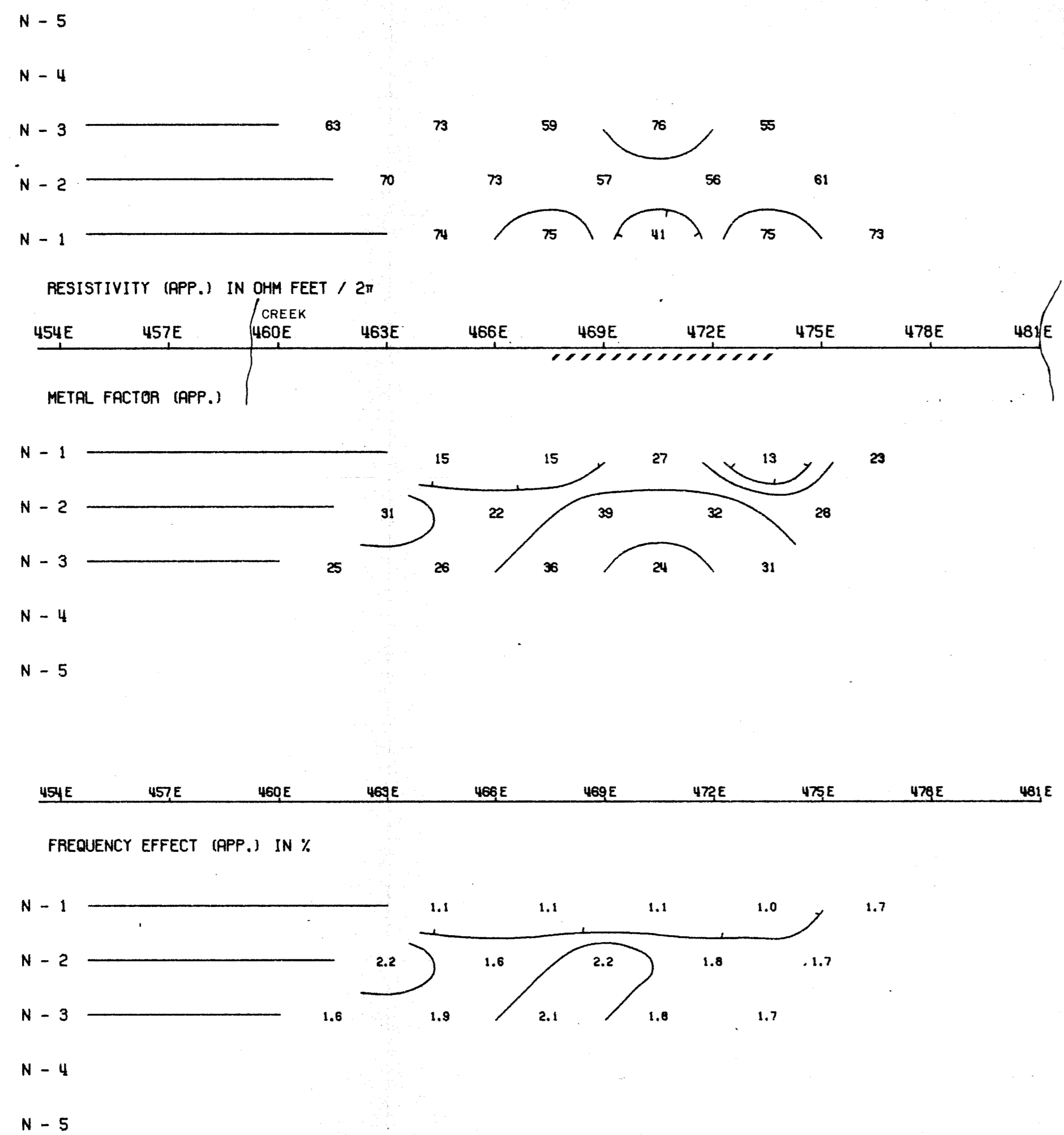
DATE: 8/1/72

Expiry Date: February 25, 1973

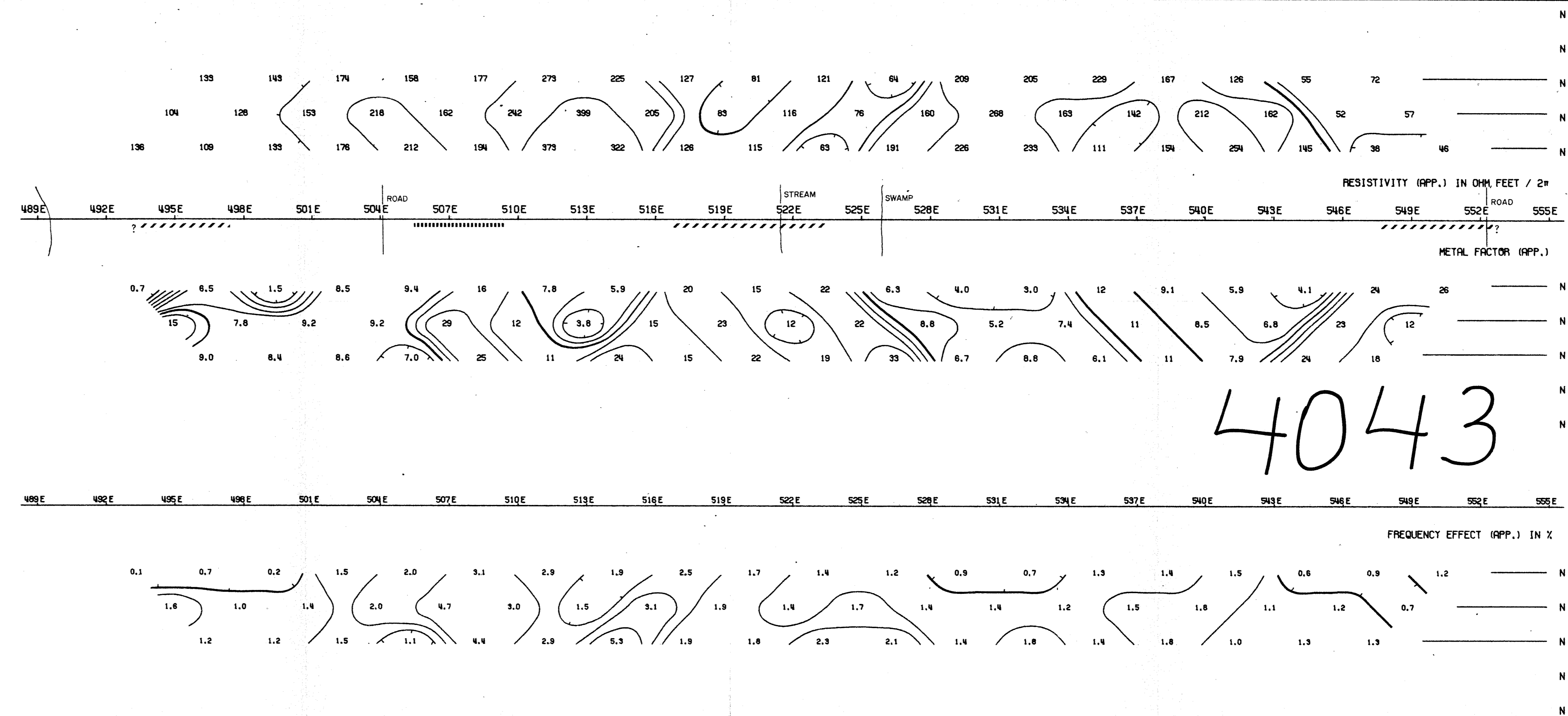
## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



LAKE



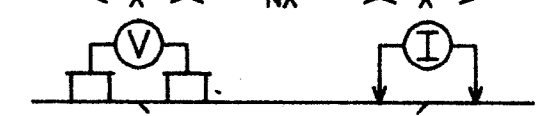
# 4043

# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 49200N

ELECTRODE CONFIGURATION



PLOTTING POINT X = 300FT

SURFACE PROJECTION OF ANOMALOUS ZONES  
DEFINITE   
PROBABLE   
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUL 1972

APPROVED: PHILIP G. HALLOF

DATE: 8/1/72

DATE: 8/1/72

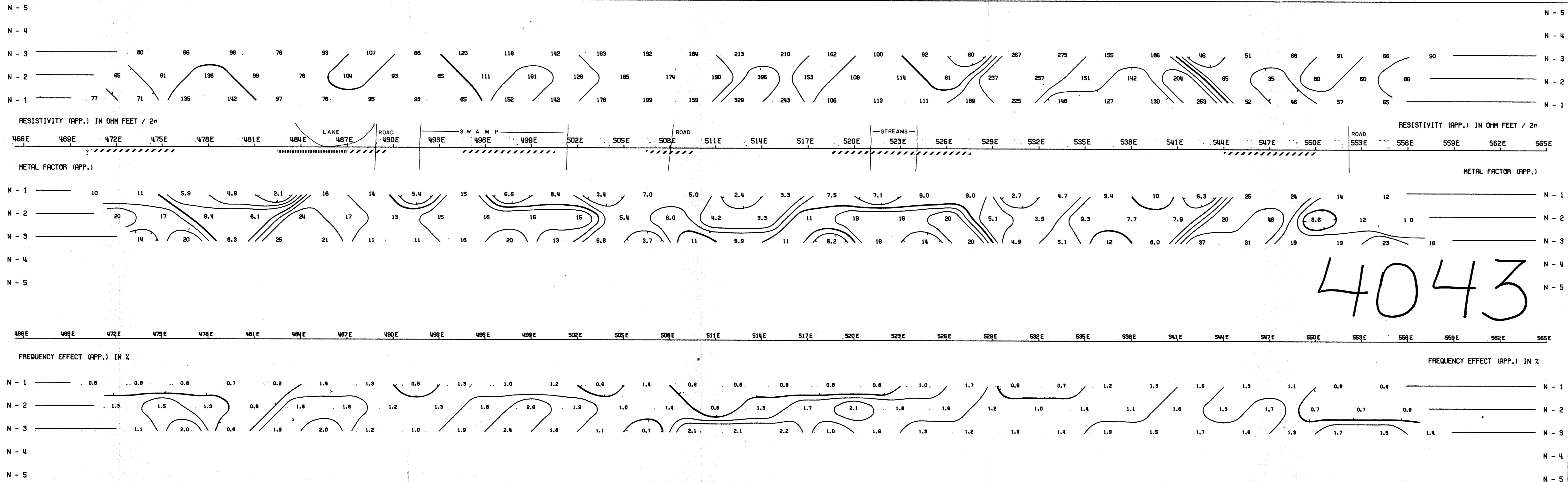
Exp. Date: February 25, 1973

NOTE: CONTOURS AT LOGARITHMIC INTERVALS  
1.-1.5-2.-3.-5.-7.5-10

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

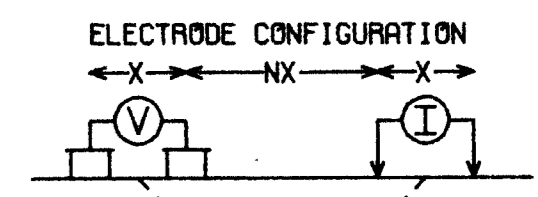
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 48800N



PLOTTING POINT X = 300FT

SURFACE PROJECTION OF ANOMALOUS ZONES  
DEFINITE   
PROBABLE   
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 10/10/72

APPROVED:   
DATE: 8/18/72

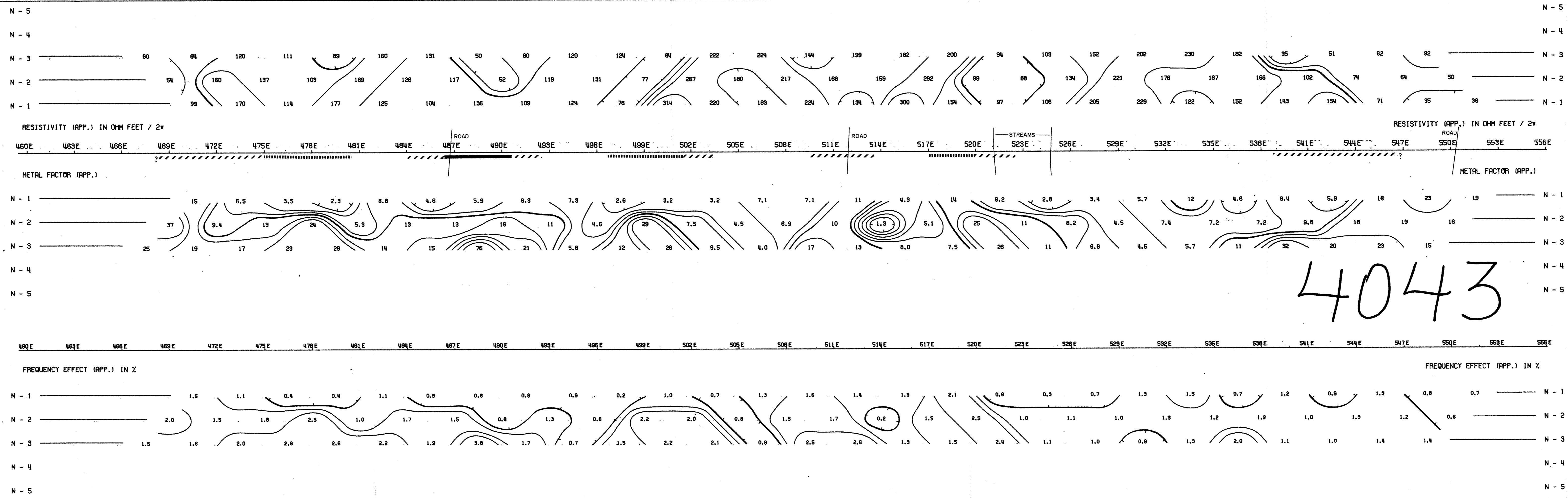
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

Exp. Exp. Form 25, 1972

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

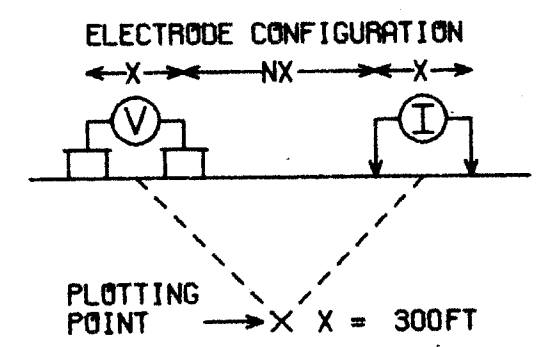
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 48400N



SURFACE PROJECTION  
OF ANOMALOUS ZONES  
DEFINITE ———  
PROBABLE - - - - -  
POSSIBLE / / / / /

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 04-1972

APPROVED: *[Signature]*  
OF  
DATE: *[Signature]*  
ENGINEER

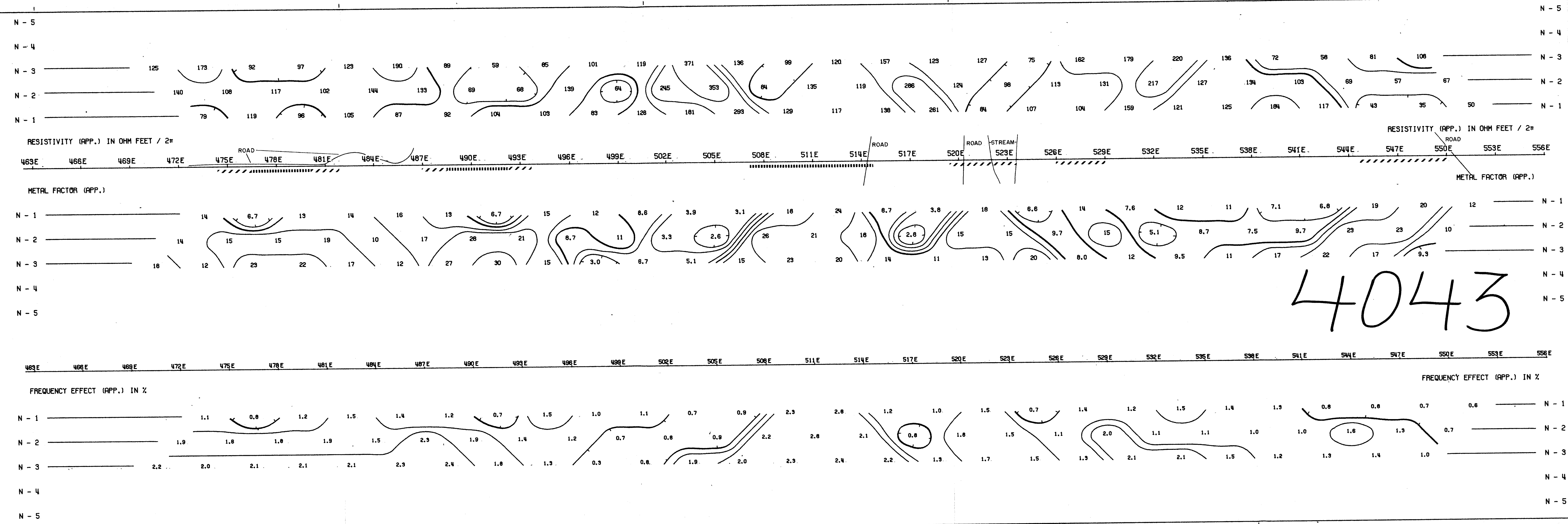
Expiry Date: February 20, 1973

NOTE: CONTOURS AT  
LOGARITHMIC INTERVALS  
1.-1.5-2.-3.-5.-7.5-10

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

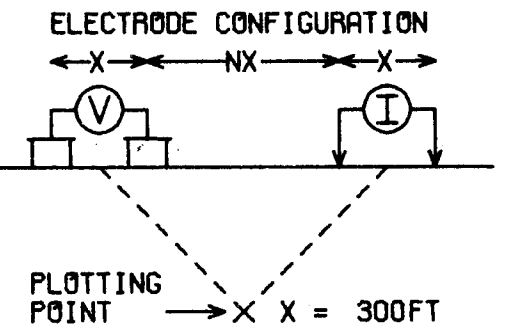
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 48000N



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 5/10/72

APPROVED

BRITISH COLUMBIAN ENGINEER

DATE: 8/1/72

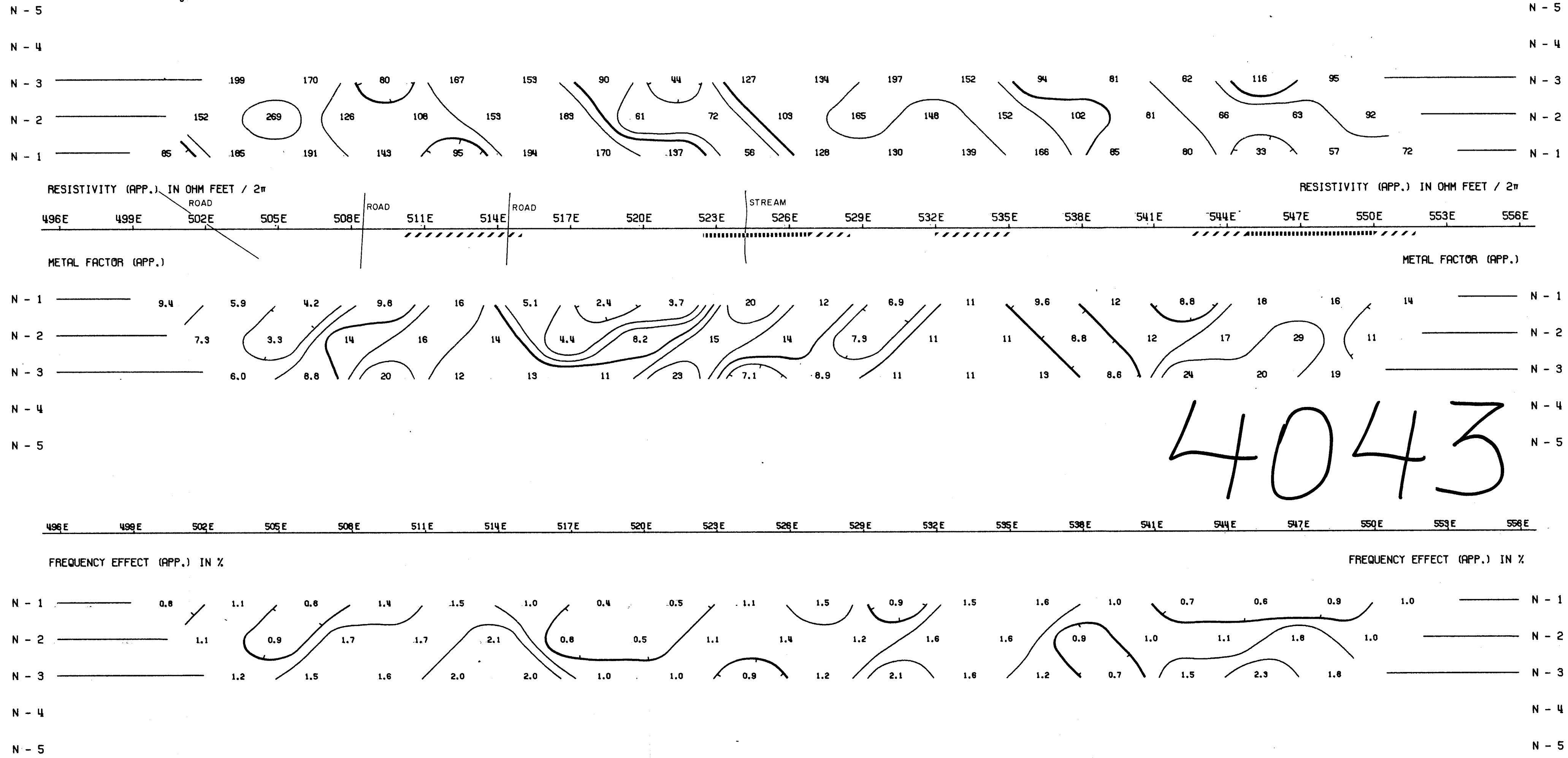
NOTE: CONTOURS AT LOGARITHMIC INTERVALS  
1.-1.5-2.-3.-5.-7.5-10

Expiry Date: February 25, 1973

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

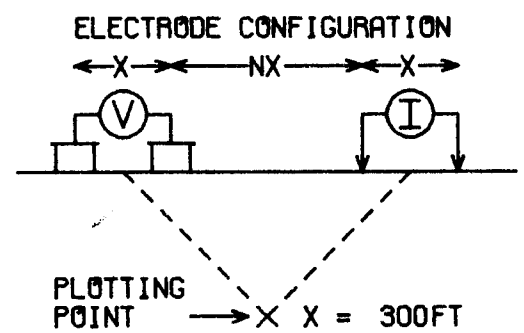
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 47600N



SURFACE PROJECTION OF ANOMALOUS ZONES  
DEFINITE   
PROBABLE   
POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 1972

APPROVED:

DATE:

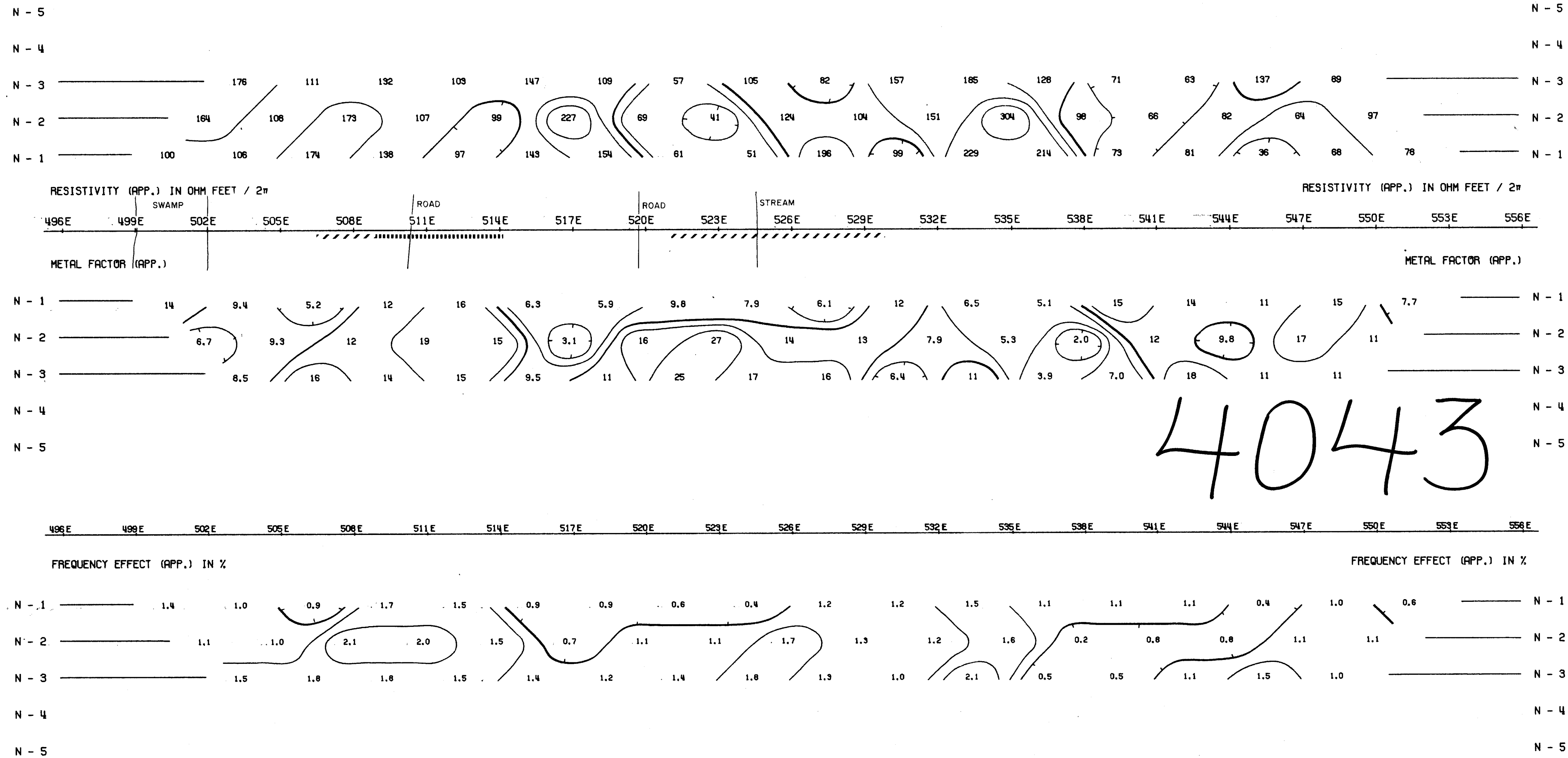
Expiry Date: February 20, 1973

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION

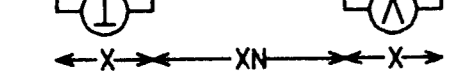


**RSELQ INDUSTRIES LTD.**

CHATWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 4200N

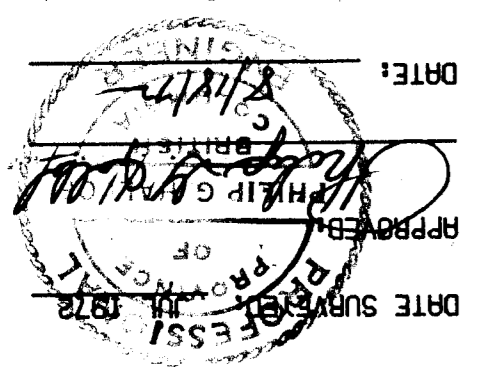
ELECTRODE CONFIGURATION



PLOTTING POINT  
X = 300 FT

SURFACE PROJECTION  
OF ANOMALOUS ZONES

DEFINITE  
PROBABLE  
POSSIBLE



DATE SURVEYED: 11-19-78  
FREQUENCIES: 0.31-5.0 HZ

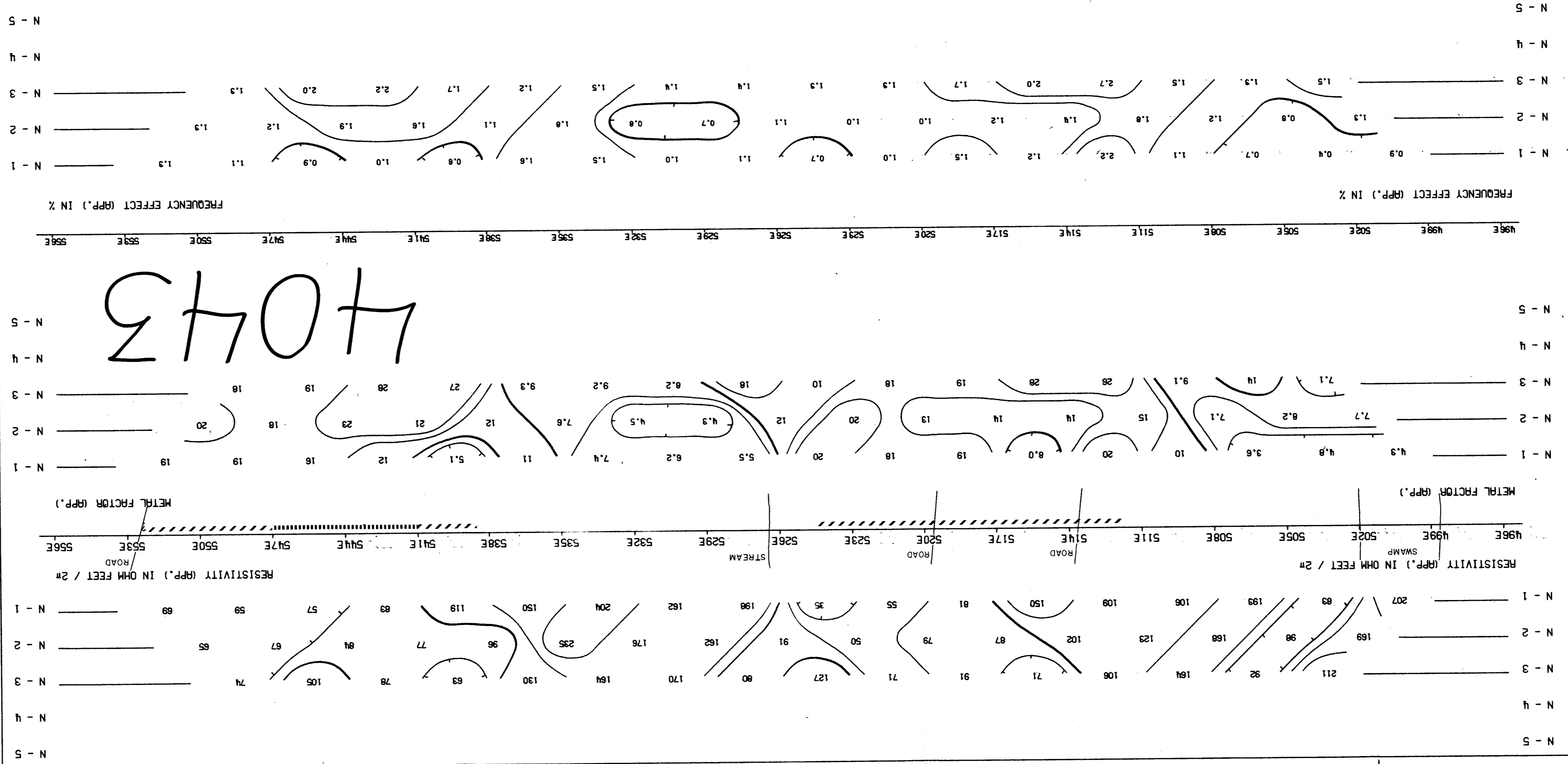
NOTE: CONTOURS AT  
LOGARITHMIC INTERVALS

1-1-5-2-3-5-7-5-10

**McPHAR GEOPHYSICS**

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION

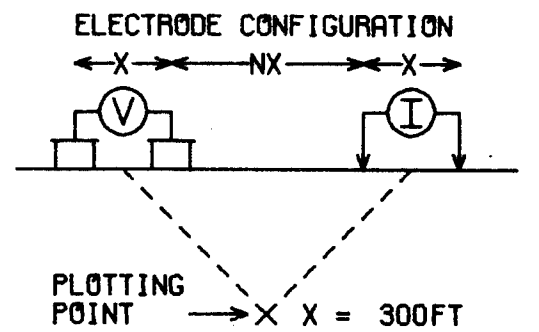




# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 46800N



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: \_\_\_\_\_

APPROVED:

DATE: \_\_\_\_\_

PROFESSIONAL ENGINEER

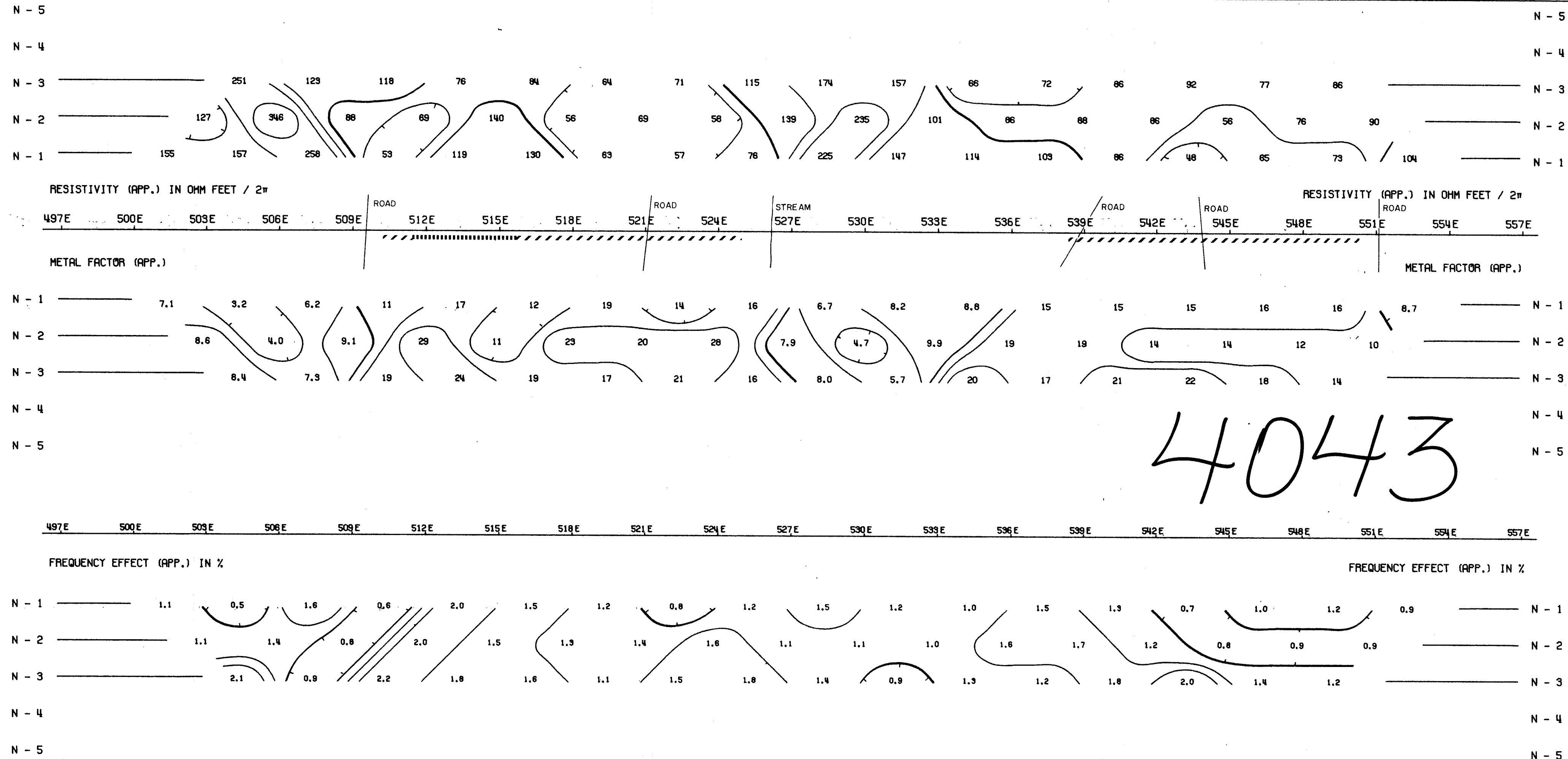
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

Expiry Date: February 25, 1973

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

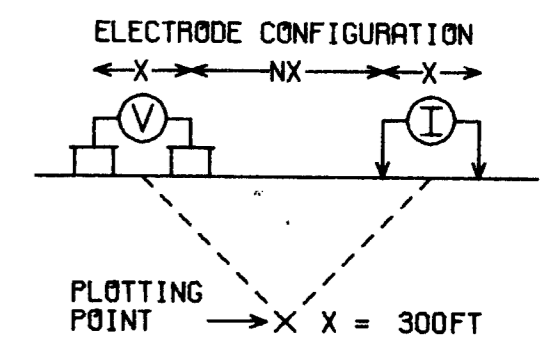
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



# ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 46400N



SURFACE PROJECTION  
OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: 11/10/72

APPROVED:

BRITISH  
ENGINEER

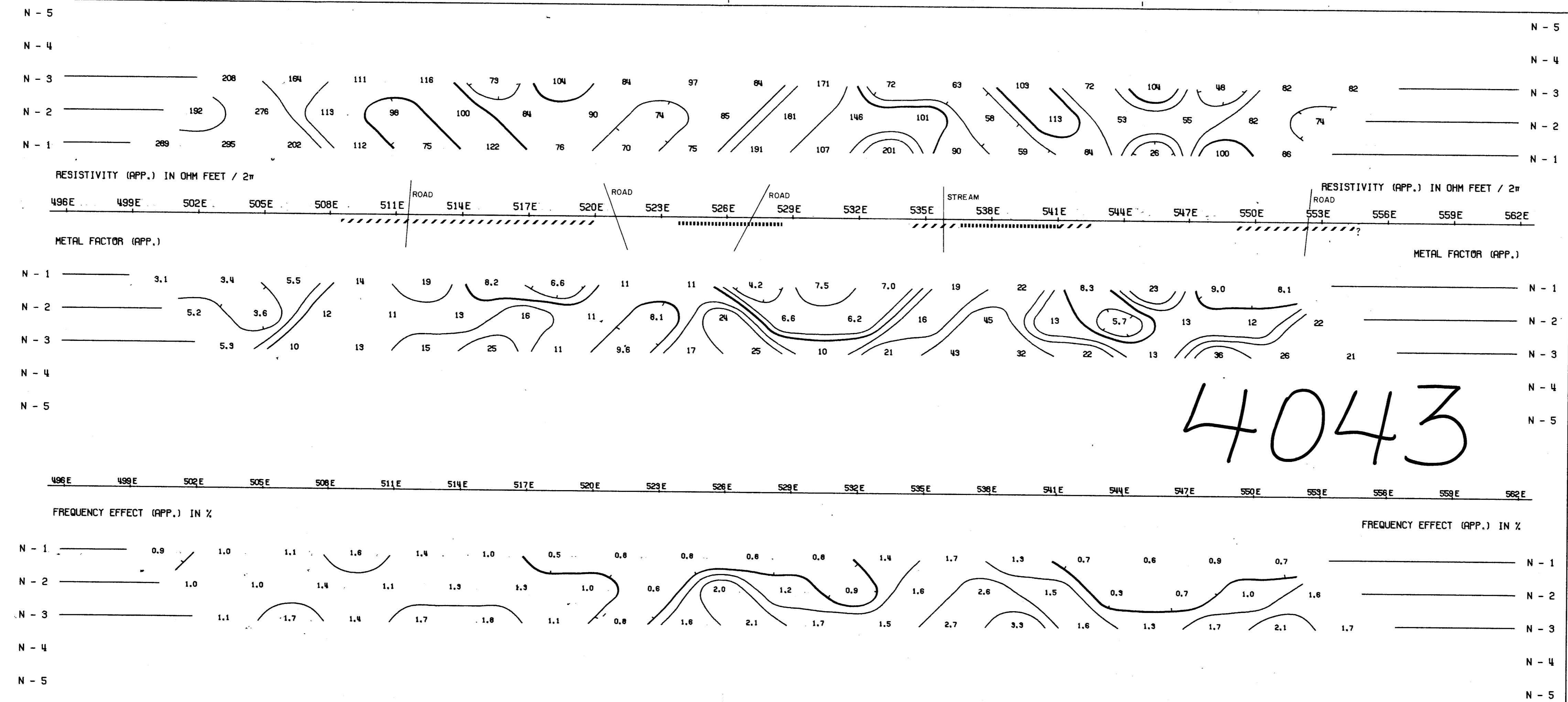
DATE: 8/18/72

NOTE: CONTOURS AT  
LOGARITHMIC INTERVALS  
1.-1.5-2.-3.-5.-7.5-10

## McPHAR GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

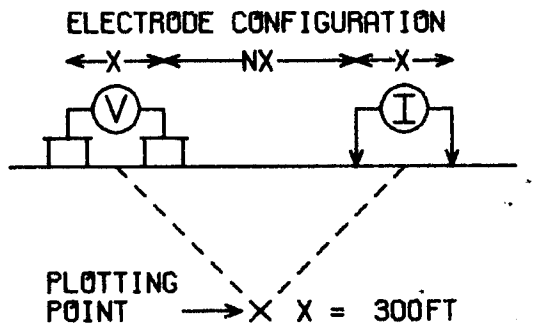
NOTE: THIS PLOT WAS PRODUCED BY McPHAR COMPUTER DIVISION



**ASEL0 INDUSTRIES LTD.**

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., B.C.

LINE NO. - 4600N



SURFACE PROJECTION OF ANOMALOUS ZONES  
DEFINITE ———  
PROBABLE ———  
POSSIBLE - - - - -

FREQUENCIES: 0.31-5.0 HZ

DATE SURVEYED: JUL 1972

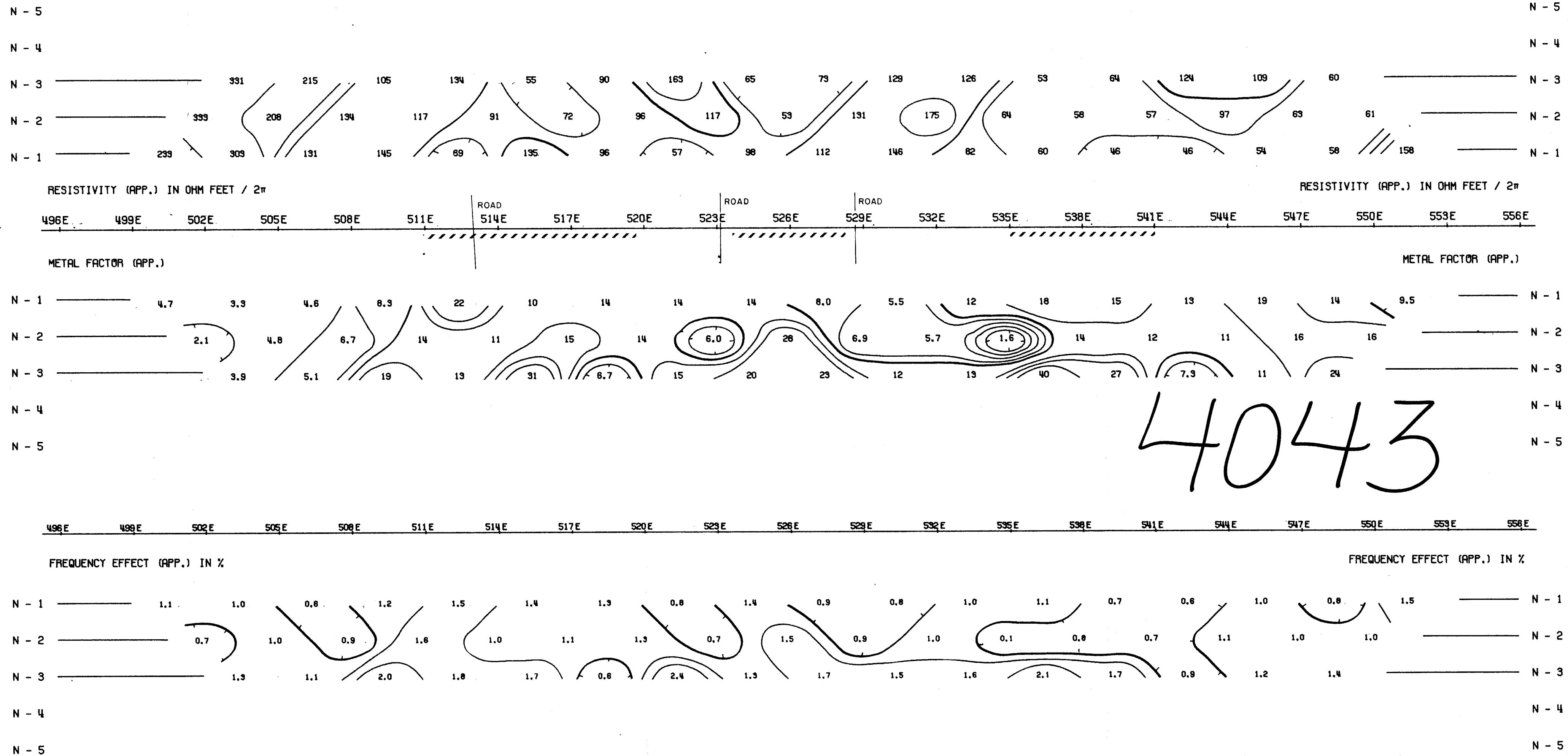
APPROVED: *[Signature]*  
DATE: 8/18/72

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

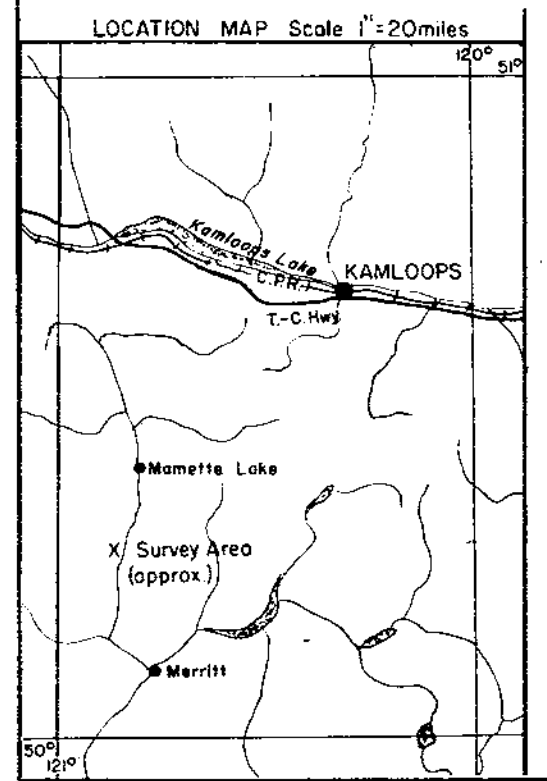
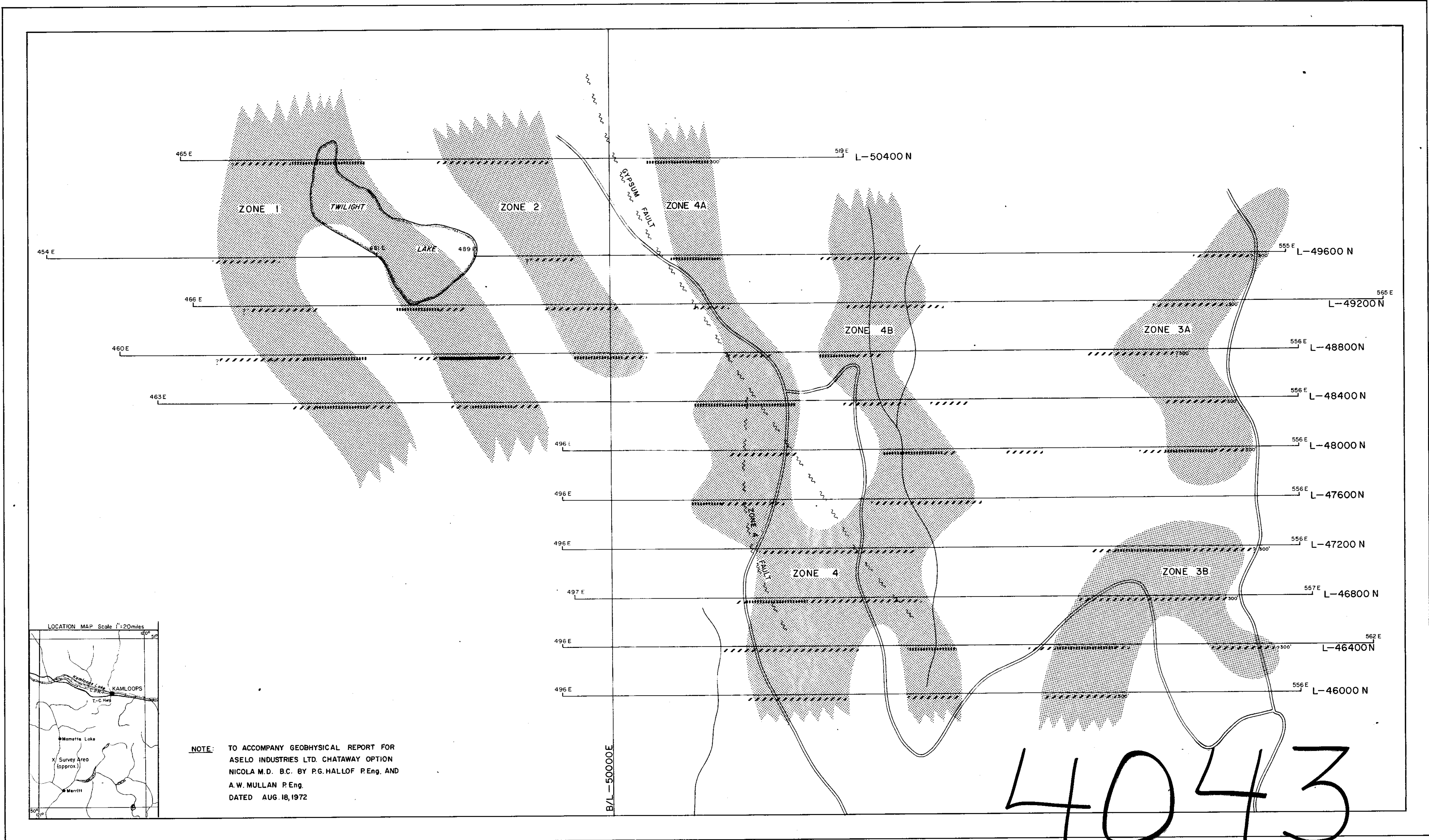
**McPHAR GEOPHYSICS**

INDUCED POLARIZATION AND RESISTIVITY SURVEY

NOTE: THIS PLOT WAS PRODUCED BY MCPHAR COMPUTER DIVISION

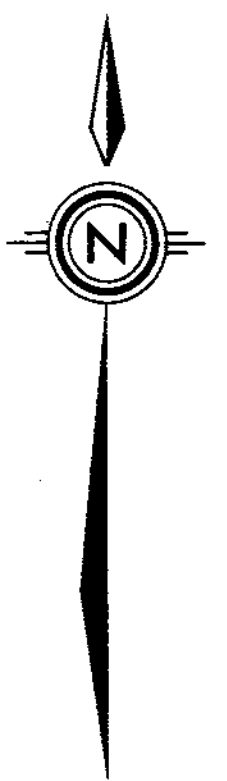


McPHAR GEOPHYSICS  
INDUCED POLARIZATION AND RESISTIVITY SURVEY  
PLAN MAP



NOTE: TO ACCOMPANY GEOPHYSICAL REPORT FOR  
ASELO INDUSTRIES LTD. CHATAWAY OPTION  
NICOLA M.D. B.C. BY P.G. HALLOF P.Eng. AND  
A.W. MULLAN P.Eng.  
DATED AUG. 18, 1972

4043

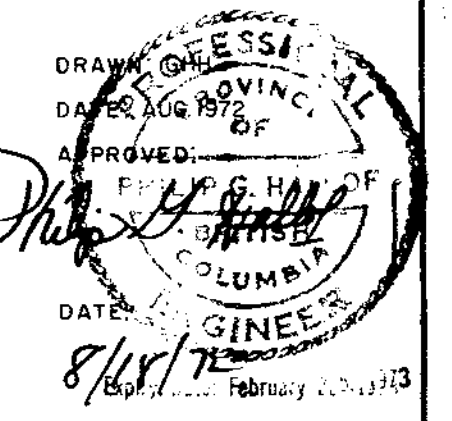


SURFACE PROJECTION  
OF ANOMALOUS ZONES  
DEFINITE   
PROBABLE   
POSSIBLE   
Number at the end of anomaly  
indicates electrode interval

ASELO INDUSTRIES LTD.  
CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., BRITISH COLUMBIA  
SCALE  
ONE INCH EQUALS FOUR HUNDRED FEET

Department of  
Mines and Petroleum Resources  
ACCESSIBLE REPORT  
NO. 4043 #1

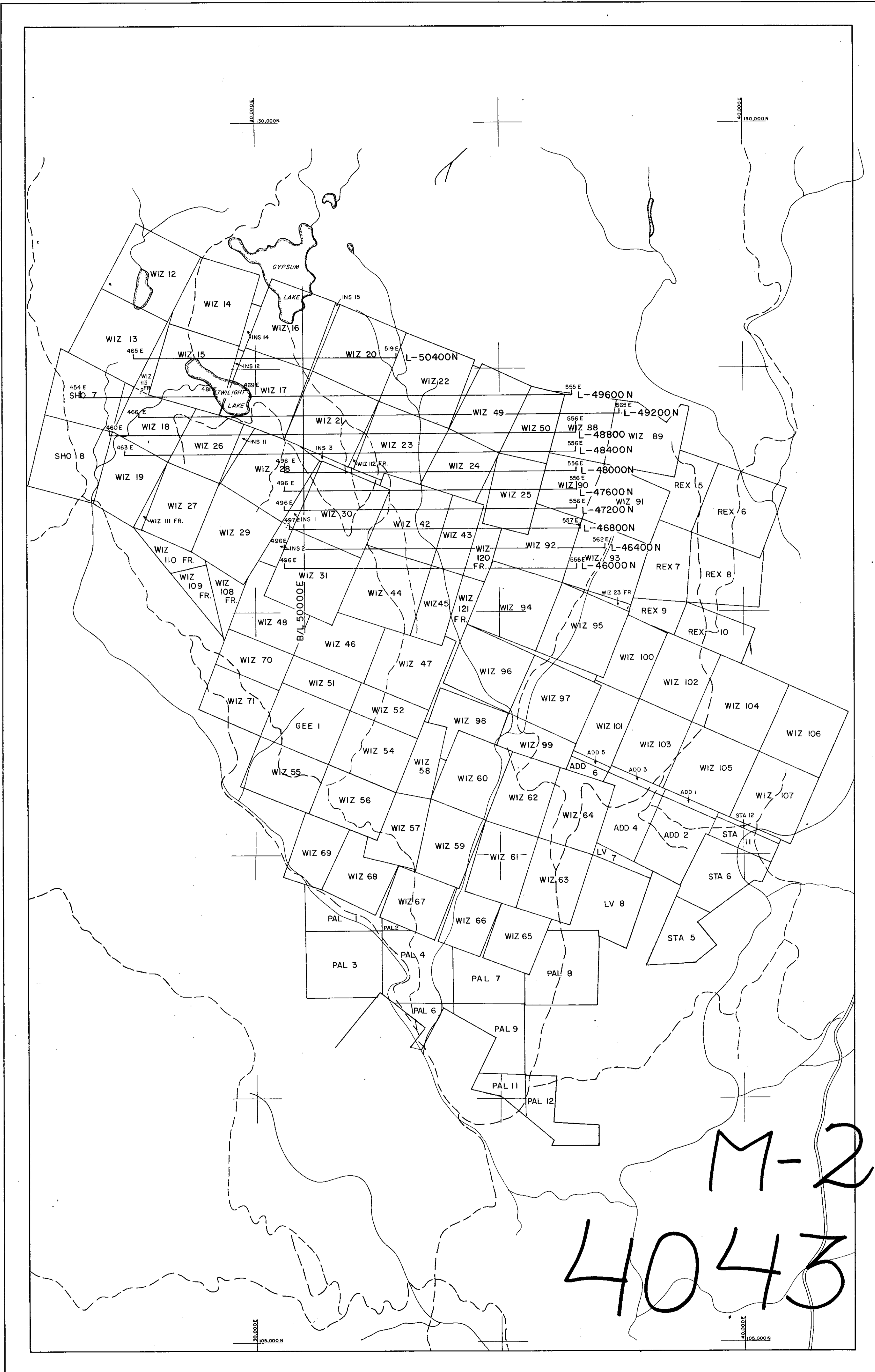
M-1



McPHAR GEOPHYSICS

CLAIM LOCATION

PLAN MAP



M-2  
4043

ASELO INDUSTRIES LTD.

CHATAWAY OPTION, MERRITT AREA  
NICOLA M.D., BRITISH COLUMBIA

SCALE

ONE INCH EQUALS ONE THOUSAND FEET

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4043 MAP #2

PROFESSIONAL  
ENGINEER  
PHILIP J. McPHAR  
BRITISH COLUMBIA  
DATE: 8/10/79  
EXPIRY DATE: February 25, 1973