

REPORT ON  
AN INDUCED POLARIZATION SURVEY  
ASPEN GROVE AREA, BRITISH COLUMBIA  
ON BEHALF OF  
WHITE RIVER MINES LTD. (N.P.L.)

92H/15E

by

Peter J. Fominoff, B.A.Sc.

and

Jon G. Baird, B.Sc., P.Eng.

June 9, 1972

CLAIMS:

- Name
- DAGO 1 - 9 (inclusive)
- DAGO 15, 16
- DATE 21
- OPEN 16 - 21 (inclusive)
- EMERALD 13 - 15 (inclusive)

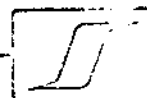
LOCATION:

About 13 miles south of Merritt, B. C.  
Just east of Highway No. 5  
Nicola Mining Division  
120° 49' NW

DATES: May 12 to May 23, 1972

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ITEMIZED STATEMENT OF  
WORKMEN'S TIME DISTRIBUTION AND  
EXPENDITURES INCURRED  
C.A.R. LAMMLE PENG DAGU-OPEN PROPERTY

1972

		DATES	TIME DAYS	COSTS \$	GROUND SUBTOTAL \$	DAGU GP PRORATED LINE M: 60% \$	OPEN GP PRORATED LINE M: 40% \$	
<b>TECHNICAL WORK</b>								
Linecutting	Lammle R.	May 4-9 '72	5 1/2 @ 75	413				
	Tancoony D.	May 4-9 '72	6 @ 35	210				
	Tancoony E.	May 4-9 '72	6 @ 35	210				
	Anderson B.	May 5-9 '72	5 @ 40	200				
	Brock L.	May 5-9 '72	5 @ 40	200				
	Krause H.	May 5-9 '72	5 @ 40	200	1433	860	573	
	Geology	Lammle R.	May	16 @ 75	1200	1200	720	480
		Geochem	Lammle R.	May 10-13/72	4 @ 75	300		
	Tancoony D.		May 10-15/72	6 @ 35	210			
	Tancoony E.		May 10-15/72	6 @ 35	210			
Magnetom.	Chemex Analyses			970	1690	1013	677	
	Lammle R.	May 17-21/72	5 @ 75	375				
	Tancoony D.	May 23-30/72	8 @ 35	280				
	Rental	2 weeks		170	825	495	330	
I.P.	Siegel Assoc.	May 13-23/72		4877				
	Tancoony D.	May 13-23/72	10 @ 35	350				
	Lammle R.	May 13-16 '72	4 @ 75	300	5527	3320	2207	
Gravity	C.A. Agar	May 24-29 '72	11 @ 150	1650				
	Rentals	June 29 - July 3/72		856				
	Lammle R.	May 24-25-72	2 @ 75	150	2656	1590	1066	
Transport	Rentals	3 mo.		1200				
	Gas, Oil	3 mo.		252	1452	872	580	
Meals, etc	Groceries	3 mo.		1217	1217	730	487	
	<b>TECHNICAL WORK TOTAL</b>					16000	9600	6400
<b>PHYSICAL WORK</b>								
Bulldozing	Nesbitt D.2	Intermittent	40 hr @ 10	400				
	Poolley Bros D.7	June 6-7 '72	20 hr @ 25	500				
	Lammle R.	June 6 & intermit.	3 dy @ 75	225	1125	580	540	
D. Drilling	HAW Hayworth	(1963')		12012				
	Connors D.D.	(4355')		27392				
	Walley & Sons Box	(Core boxes)		630				
	Lammle	JUNE JULY '72	34 dy @ 75	2550				
	Tancoony D.	May 29 - JUNE 15		690				
	Smith W.J.	May 29 - June 19	3 wk @ 300	900				
	Assays	Chemex - Crest Labs		604	44,780	24,400	22,500	
<b>PHYSICAL WORK TOTAL</b>					46,905			
<b>PHYSICAL + TECHNICAL TOTAL</b>					\$ 62,905			

Declared before me at the city of Vancouver, in the province of British Columbia, this day of August 1972, AD.

SEE OVER

Declared before me at the *City*  
of *Vancouver*, in the  
Province of British Columbia, this *17<sup>th</sup>*  
day of *August* *1972*, A.D.

*Chas. H. L. Lamme*

*E. P. Phillips*  
A Commissioner for taking Affidavits within British Columbia or  
A Notary Public in and for the Province of British Columbia,

**SUB-JUDICIAL RECORDER**

### SUMMARY

Three areas of increased chargeability responses have been located by the present survey. These areas may be underlain by up to 4 percent by volume of metallicly conducting material such as sulphides, graphite or other material that is known to show increased chargeability responses.

Two of the areas are not yet completely delimited, and it is recommended that further induced polarization surveying be carried out to delimit these areas. Four drill holes totalling 1200 feet have been suggested. If the results of these drill holes are favourable, further drilling targets may be recommended based upon the present induced polarization results.



1

REPORT ON  
AN INDUCED POLARIZATION SURVEY  
ASPEN GROVE AREA, BRITISH COLUMBIA  
ON BEHALF OF  
WHITE RIVER MINES LTD. (N.P.L.)

INTRODUCTION

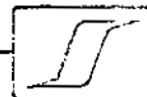
During the period May 12 to May 23, 1972, a geophysical field party under the direction of Mr. Ron Gibbins executed an induced polarization survey in the Aspen Grove area, British Columbia on behalf of White River Mines Ltd. (N.P.L.).

The property lies about 18 miles south of Merritt, B. C. and is reached by truck over the well paved Highway No. 5. The topography consists of low rolling grassland and forested hills of the Thompson Plateau.

The claims covered, wholly or in part, by this survey are listed on the front cover of this report and are shown on Plate 5, on the scale of 1 inch = 200 feet.

Scintrex Mk VII time-domain (pulse-type) induced polarization equipment has been employed on this property. The transmitting unit had a rating of 2.5 kilowatts and equal on and off times of 2.0 seconds. The receiving unit was a remote, ground-pulse type triggered by the rising and falling primary voltages set up in the ground by the transmitter. The integration of the transient polarization voltages takes place for 0.65 seconds after a 0.45 second delay time following the termination of the current on pulse.

The purpose of an induced polarization survey is to map the subsurface distribution of metallicly conducting mineralization beneath the grids covered. In the present area such mineralization could include chalcopyrite, pyrrhotite, pyrite and other metallic sulphide minerals. Metallic conductors such as graphite and magnetite as well as non-metallic minerals such as



chlorite, sericite and serpentinite can give responses not always distinguishable from sulphide mineralization.

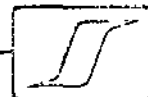
The three electrode array was employed for the survey. For this electrode array, one current electrode and two potential electrodes traverse the profiles with an interelectrode spacing called "a". The second or "infinite" current electrode is placed a distance greater than  $5a$  from the measuring point which is defined as the midpoint between the moving current electrode and the near potential electrode. For the reconnaissance survey observations were taken for  $a = 200$  feet and  $a = 400$  feet with 200 foot station intervals.

An expanding Wenner array was also carried out over one station to obtain some information regarding the variation of chargeability and resistivity with depth.

The present grid consisted of a 6400 foot base line oriented north-south with grid lines of various lengths cut perpendicular to it at 400 foot intervals. One line was surveyed along the eastern side of Kidd Lake. The grid layout is shown on Plates 4 and 5. The induced polarization survey totalled 10.0 line miles.

#### GEOLOGY

A description of the regional geology of the area including and surrounding the present claims is found in G.S.C. Memoir 243 by H.M.A. Rice, 1960. The area covered by this property is shown to be underlain by rocks of the Upper Triassic Nicola Group consisting mainly of intermediate volcanics. Bornite and chalcopyrite occurrences have been noted in shear zones in volcanic rocks of the Nicola Group in the Aspen Grove area. The major Allison Fault projects northerly under Kidd Lake on the Dago Claims.



The local geology has been mapped by C.A.R. Lammle, P.Eng., for White River Mines Ltd. (N.P.L.) and described in a report dated April 30, 1972. The report and map have been made available to the writers.

The rocks on the property are mainly volcanic and sedimentary members of the Nicola Group. At surface these rocks are oxidized and weathered. Copper sulphide mineralization is exposed in a zone over the Dago 6 and Open 21 claims. Its northern projection is covered by overburden.

The target of the present survey was a large tonnage disseminated copper sulphide or native copper body that may be the extension of the outcropping mineralization.

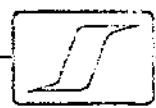
A map of a ground magnetometer survey and partial results of a gravity survey executed over the present grid have been made available to the writers by White River Mines Ltd. (N.P.L.).

DISCUSSION OF RESULTS

Plate 2, on the scale of 1 inch = 200 feet shows the chargeability (the induced polarization characteristic of the rock). The vertical scale for the profiles is 1 inch = 10.0 milliseconds. Plate 3, on the scale of 1 inch = 200 feet shows the resistivity profiles. The vertical scale is 2 inches = 1 logarithmic cycle with line trace taken as 100 ohm-meters.

Plates 3 and 4, on the scale of 1 inch = 200 feet are contour maps of chargeability and resistivity values respectively. The contour interval for chargeability is 2.0 milliseconds. To accommodate the large variations in resistivity, but still show the changes, a logarithmic contour interval has been utilized. The contour values are as shown on Plate 5.

The chargeability contour map reveals background chargeabilities north of L 48 N to average about 6.0 to 8.0 milliseconds. South of L 48 N the average background drops to about 4.0 to 6.0 milliseconds. From the





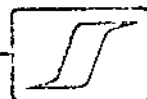
profiles, the background chargeabilities for a = 400 feet are generally higher than for a = 200 feet. The chargeability difference may be caused by a few tens of feet of non-polarizable overburden covering the bedrock. Alternatively, the concentration of metallicly conducting material increases with depth.

A uniform distribution of 1 percent by volume of metallicly conducting material may be expected to add around 10.0 milliseconds to the observed chargeability responses. Since low concentrations of sulphides of sufficient dimensions or small high grade bodies may be economically valuable, areas exhibiting greater than 10.0 milliseconds of chargeability may be worthy of further investigations.

All areas showing chargeabilities in excess of 10.0 milliseconds have been shaded on Plate 4. However within these areas there are three areas of special interest. These areas exhibit chargeabilities in excess of 20.0 milliseconds. The three areas have been labelled Areas I, II and III.

Area I, located between Lines 56 N and 84 N west of the base line, exhibits the most anomalous chargeability responses. The peak chargeability obtained with the 200 foot electrode spacings reaches 45.0 milliseconds at 5 W on L 72 N. The area is not delimited to the west along Lines 60 N to 76 N. Generally, the profiles show that the chargeability responses are higher in amplitude with a = 400 feet implying a depth extent of at least 200 feet for the chargeability source. The electronically conducting material content of the source may be in excess of 4 percent by volume of sulphides, graphite or other minerals known to give increased chargeability responses.

An expanding Wenner array centred at 2 W on L 64 N was carried out to investigate the chargeability and resistivity changes with depth. The data obtained indicates a change in both chargeability and resistivity



at a depth of about 40 feet. This result suggests that overburden depth is about 40 feet.

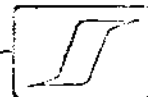
The apparent resistivities over Area I, averaging about 400 ohm-meters, are generally lower than those surrounding the area. The decrease in resistivity may be due to either a change in rock type or to the content of polarizable material, which may also be a conductor, lowering the resistivities of the area. There is no direct correlation between chargeability increases and resistivity decreases.

The ground magnetometer map supplied by White River Mines Ltd. shows Area I to be underlain by rocks of generally lower magnetic susceptibility than those outside the area. A long narrow zone of increased magnetic response trends northwesterly through the eastern part of Area I. The zone may be the result of a dyke containing more magnetically susceptible material than the country rock.

Area II is located west of the base line and extends from Line 24 N to 32 N. It is open to both the north and south. A zone of chargeabilities in excess of 20.0 milliseconds extends from 4 + 50 W to 10 W on L 28 N and from 0 + 50 E to 7 + 50 W on L 24 N. The chargeabilities reach a peak of 30.0 milliseconds at 3 W on L 24 N.

According to the chargeability responses, Area II is underlain by a polarizable source containing the equivalent of 3 percent by volume of electronically conducting material or greater amounts of other minerals such as carbonaceous material or sericite which are also known to give induced polarization responses.

The lateral extent of the chargeability increases obtained with the wider electrode spacings is greater than that obtained with the narrower spacings indicating a depth extent of the order of 200 feet. An overburden



cover of a few tens of feet may also contribute to some lower chargeabilities obtained with the narrower electrode spacings.

The apparent resistivity results over Area II average about 550 ohm-meters for both electrode spacings and are fairly uniform over the area. There is no definite correlation between the resistivity and chargeability results.

The magnetometer survey shows a decreased magnetic response over Area II suggesting that the increased chargeabilities are not due to a magnetically susceptible source.

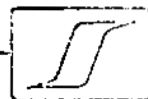
Area III is actually present on L 84 N only. This zone is not delimited to either the north, south or west. The chargeability responses obtained with the 400 foot spacings are seen to be more extensive than those with the 200 spacings indicating an increase in the concentration of chargeable material with depth.

The apparent resistivities over this area average 200 to 300 ohm-meters with 200 foot electrode spacings. The chargeabilities obtained with the 400 foot electrode spacings show a uniform gradient decreasing from 3000 ohm-meters at 12 W to 800 ohm-meters at 16 W. The sharp increase in resistivity along the western part of L 84 N may indicate either a change in rock type or alteration. There is no definite correlation between the chargeability increases and the resistivity responses on either of the two spacings.

Magnetic data have not been obtained west of 12 W on L 84 N.

#### CONCLUSIONS AND RECOMMENDATIONS

The present induced polarization survey has revealed three areas, as indicated on Plate 4, exhibiting more than 20.0 milliseconds of chargeability. Areas II and III are not completely delimited thus their total



areal extent is not known.

For the following reasons, Area I is geophysically the most attractive area for further exploration work.

The chargeability increases indicate a concentration of about 4 percent by volume of metallicly conducting material. The low magnetic relief indicates that the source of increased chargeability is probably not magnetite or any other magnetic material. Lower resistivities in the area can be expected from the concentration of material giving the chargeability anomaly. The chargeability anomaly in Area I appears to be truncated by a fault or contact between Line 56 N and 60 N. An indication of some structural truncation is present in all the available data including resistivity, magnetics and chargeability.

Area II shows similar chargeability and resistivity responses to those in Area I. Further induced polarization surveying may be warranted to delimit the extent of chargeability increases. The area investigated thus far may be underlain by up to 3 percent by volume of metallicly conducting material.

Area III, which is only a one line anomaly, shows similar geophysical characteristics to those over the first two areas. More induced polarization surveying to delimit the area is recommended.

Based upon the present geophysical results, and pending correlation with the most recent geological data, the following drill holes are suggested:

<u>Collar</u>	<u>Dip</u>	<u>Direction</u>	<u>Minimum Depth</u>
L 72 N; 7 + 00 W	-45°	East	300 feet
L 76 N; 2 + 25 W	-45°	West	300 feet

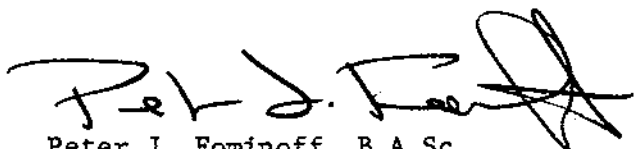


<u>Collar</u>	<u>Dip</u>	<u>Direction</u>	<u>Minimum Depth</u>
L 68 N; 2 + 00 W	-45°	West	300 feet
L 28 N; 10 + 00 W	-45°	East	300 feet

Further drilling can be recommended based on the present induced polarization survey results.

Respectfully submitted,

SEIGEL ASSOCIATES LIMITED

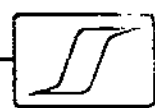


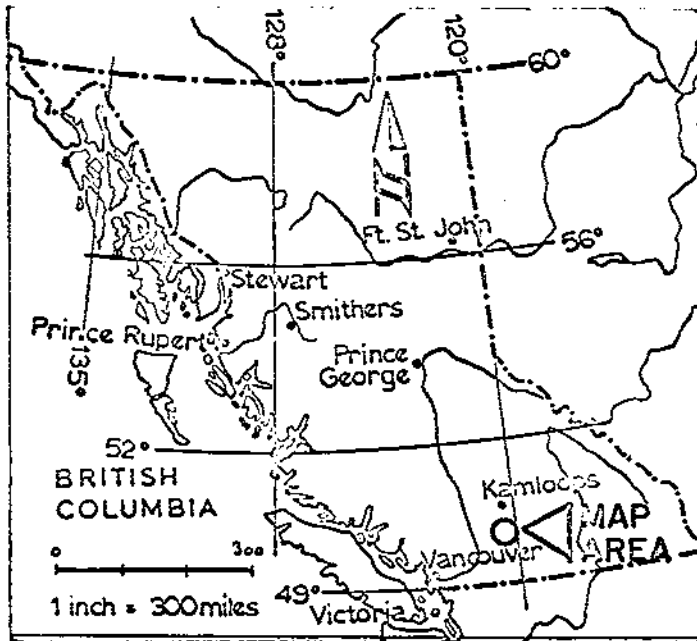
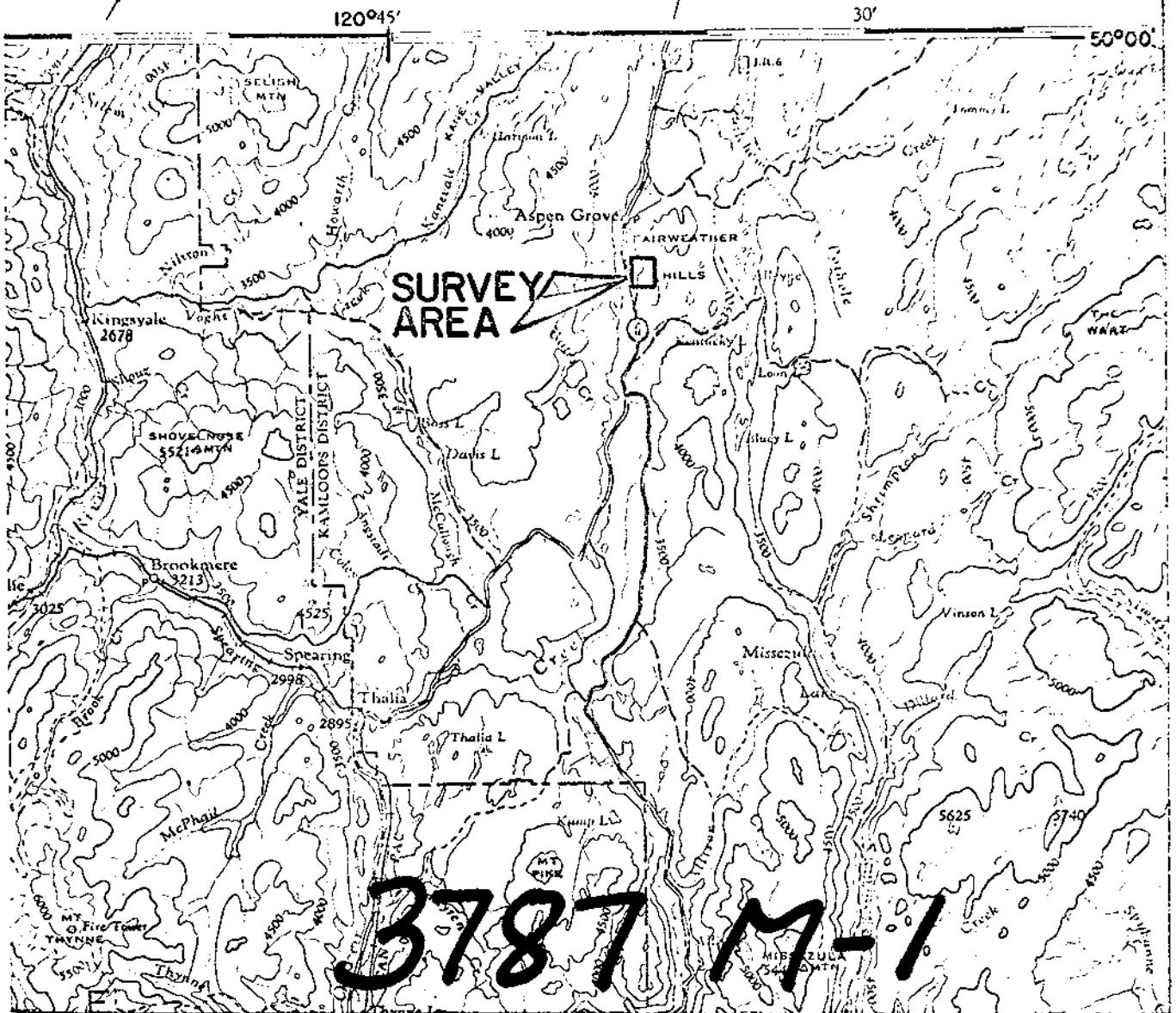
Peter J. Fominoff, B.A.Sc.  
Geophysicist



Jon G. Baird, B.Sc., P.Eng.  
Consulting Geophysicist

Vancouver, B. C.  
June 9, 1972





WHITE RIVER MINES LIMITED

LOCATION MAP

ASPEN GROVE AREA B.C.

SCALE 1 : 250,000  
4 miles 0 4 miles

Survey by  
SEIGEL ASSOCIATES LIMITED  
MAY 1972

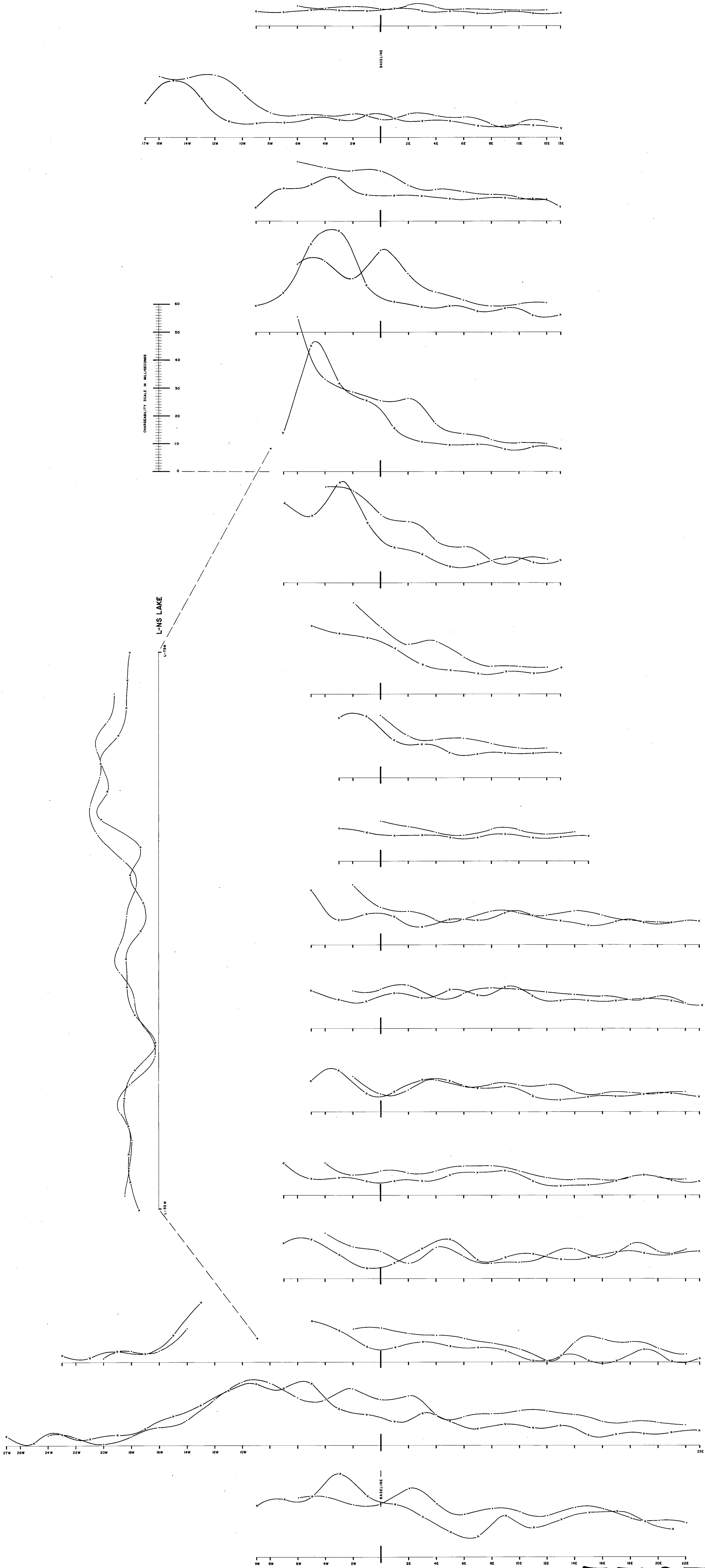
PLATE 1



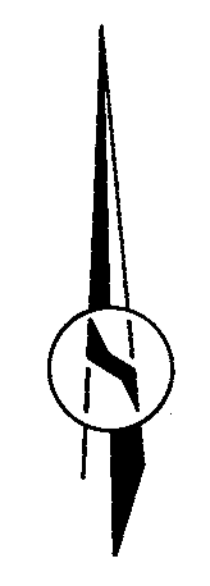
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Department of	
Mines and Petroleum Resources	
ASSESSMENT REPORT	
NO. 3787	MAP #1

L-88 N  
L-84 N  
L-80 N  
L-76 N  
L-72 N  
L-68 N  
L-64 N  
L-60 N  
L-56 N  
L-52 N  
L-48 N  
L-44 N  
L-40 N  
L-36 N  
L-32 N  
L-28 N  
L-24 N



3787 M-2



**LEGEND**  
 CHARGEABILITY SCALE 1 inch = 10 MILLISECONDS  
 ELECTRODE SPACING 100' 200' 300'

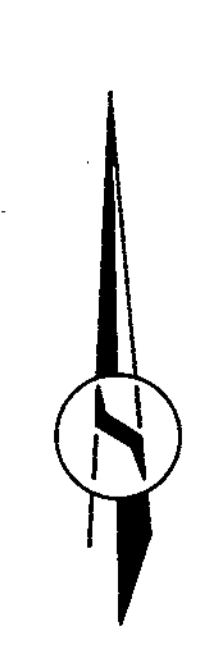
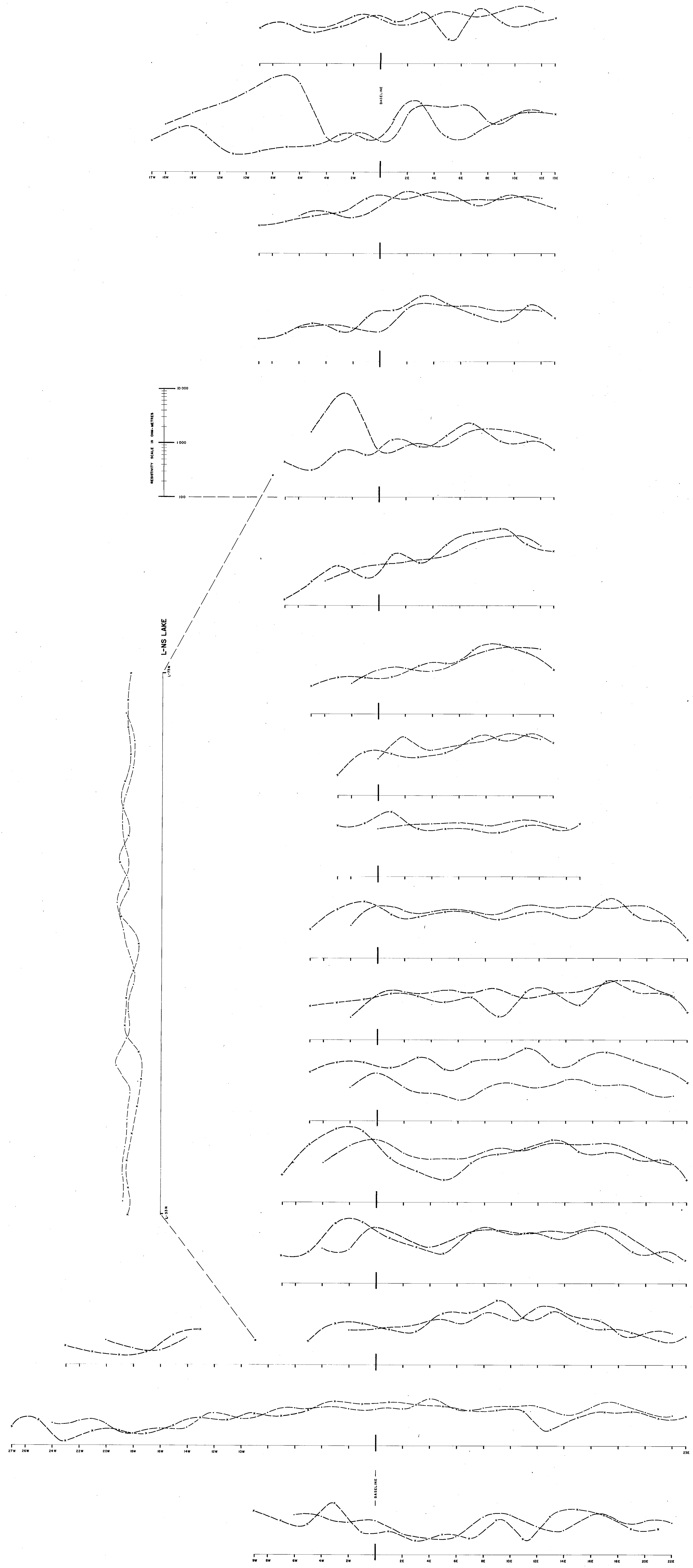
**NOTES**  
 SONTREX MK VII INDUCED POLARIZATION INSTRUMENTATION.  
 THREE ELECTRODE ARRAY  
 CURRENT ELECTRODE: C1, C2, C3  
 MEASURING CURRENT ELECTRODE: P1, P2  
 POTENTIAL MEASUREMENT POINTS: P1, P2  
 INTERLINE SPACING NOT TO SCALE.

PLATE 2  
**WHITE RIVER MINES LTD.**  
 ASPEN GROVE AREA, B.C. Department of Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 3787 FILE #2  
 CHARGEABILITY PROFILES OF  
**INDUCED POLARIZATION SURVEY**  
 SCALE 1" = 200'  
 BY SEIGEL ASSOCIATES LIMITED VANCOUVER B.C.

TO: ACCOMPANY A GEOPHYSICAL REPORT BY P.E. FURNESS AND J.E. BIRD  
 WORK COMPLETED: 24 MAY 1972  
 DATED: 9 JUNE 1972  
 JOB NUMBER 871 SHEET NUMBER 1 OF 1



L-88 N  
L-84 N  
L-80 N  
L-76 N  
L-72 N  
L-68 N  
L-64 N  
L-60 N  
L-56 N  
L-52 N  
L-48 N  
L-44 N  
L-40 N  
L-36 N  
L-32 N  
L-28 N  
L-24 N



**LEGEND**  
RESISTIVITY SCALE: 2 inches = 1 OHM-METER  
ELECTRODE SPACING: 400 METERS  
DOTTED LINE: LOGARITHMIC CYCLE WITH LINE TRACE

**NOTES**  
SINTREX MK VII INDUCED POLARIZATION INSTRUMENTATION  
THREE ELECTRODE ARRAY  
INFLUENCE OF SURFACE CURRENTS  
MOVING CURRENT ELECTRODES  
POTENTIAL MEASUREMENTS  
P<sub>1</sub> P<sub>2</sub> P<sub>3</sub>  
POTENTIAL POINTS  
INTERLINE SPACING NOT TO SCALE.

PLATE 3  
**WHITE RIVER MINES LTD.**  
ASPEN GROVE AREA, B.C.  
Department of Mines and Petroleum Resources  
ASSESSMENT REPORT  
RESISTIVITY PROFILES 3787 #3  
OF INDUCED POLARIZATION SURVEY  
SCALE 1" = 200'  
BY SEIHEL ASSOCIATES LIMITED  
VANCOUVER B.C.



27W 26W 24W 22W 20W 18W 16W 14W 12W 10W 8W 6W 4W 2W 2E 4E 6E 8E 10E 12E 14E 16E 18E 20E 22E 23E

L-88 N

L-84 N

L-80 N

L-76 N

L-72 N

L-68 N

L-64 N

L-60 N

L-56 N

L-52 N

L-48 N

L-44 N

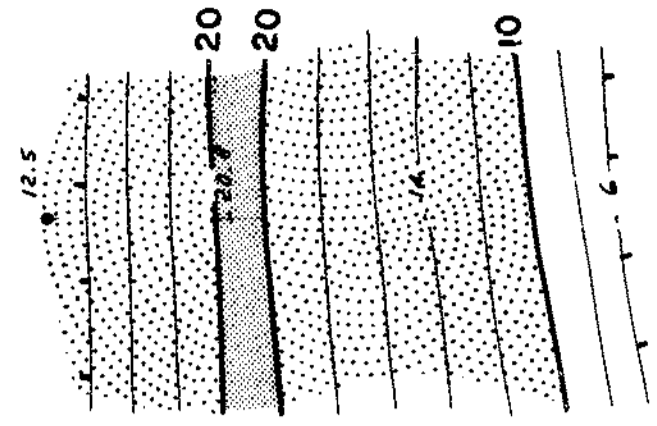
L-40 N

L-36 N

L-32 N

L-28 N

L-24 N



L-NS LAKE

KIDD LAKE

27W 26W 24W 22W 20W 18W 16W 14W 12W 10W 8W 6W 4W 2W 2E 4E 6E 8E 10E 12E 14E 16E 18E 20E 22E 23E

**LEGEND**

2 MILLISECONDS CONTOUR INTERVAL

— LINE TRACE WITH CHARGEABILITY VALUES IN MILLISECONDS

▨ AREAS EXHIBITING MORE THAN 100 MILLISECONDS OF CHARGEABILITY

▨ AREAS EXHIBITING MORE THAN 20.0 MILLISECONDS OF CHARGEABILITY



PLATE 4

**WHITE RIVER MINES LTD.**

ASPEN GROVE AREA, B.C.

Department of  
Mines and Petroleum Resources

ASSESSMENT REPORT

NO. 3187 PLAN #4

CHARGEABILITY CONTOUR  
OF  
INDUCED POLARIZATION SURVEY

200' ELECTRODE SPACING  
SCALE 1" = 200'

BY  
SEIGEL ASSOCIATES LIMITED  
VANCOUVER B.C.

TO ACCOMPANY A GEOLOGICAL REPORT BY  
P.J. FOMMHOFF AND I.B. BARD  
DATED 9 JUNE 1972

WORK COMPLETED: 24 MAY 1972  
DRAFTED: 5 JUNE 1972  
REV.

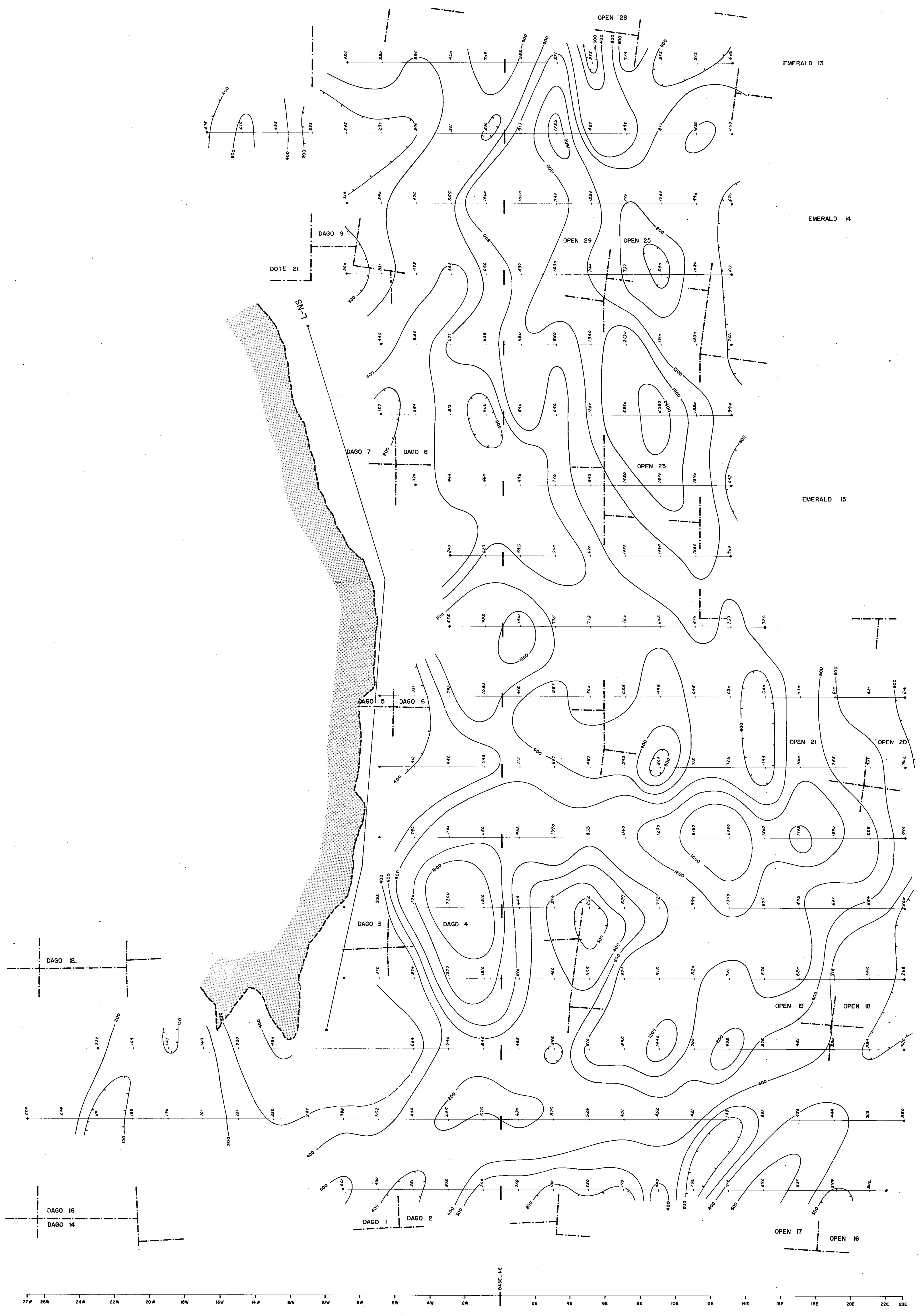
JOB NUMBER  
871

SHEET NUMBER  
1 OF 1



27W 26W 24W 22W 20W 18W 16W 14W 12W 10W 8W 6W 4W 2W 2E 4E 6E 8E 10E 12E 14E 16E 18E 20E 22E 23E

L-88 N  
L-84 N  
L-80 N  
L-76 N  
L-72 N  
L-68 N  
L-64 N  
L-60 N  
L-56 N  
L-52 N  
L-48 N  
L-44 N  
L-40 N  
L-36 N  
L-32 N  
L-28 N  
L-24 N



EMERALD 13  
EMERALD 14  
EMERALD 15

**LEGEND**

— LINE TRACE WITH RESISTIVITY VALUES IN OHM-METRES

— LOGARITHMIC CONTOUR INTERVAL AS INDICATED.

--- CLAIM BOUNDARY

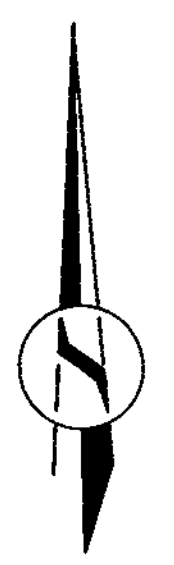


PLATE 5

**WHITE RIVER MINES LTD.**

ASPEN GROVE AREA, B.C. Department of Mines and Petroleum Resources

ASSESSMENT REPORT NO. 3787 MAP #5

CLAIM LOCATION AND RESISTIVITY CONTOUR PLAN OF INDUCED POLARIZATION SURVEY

200' ELECTRODE SPACING  
SCALE 1" = 200'

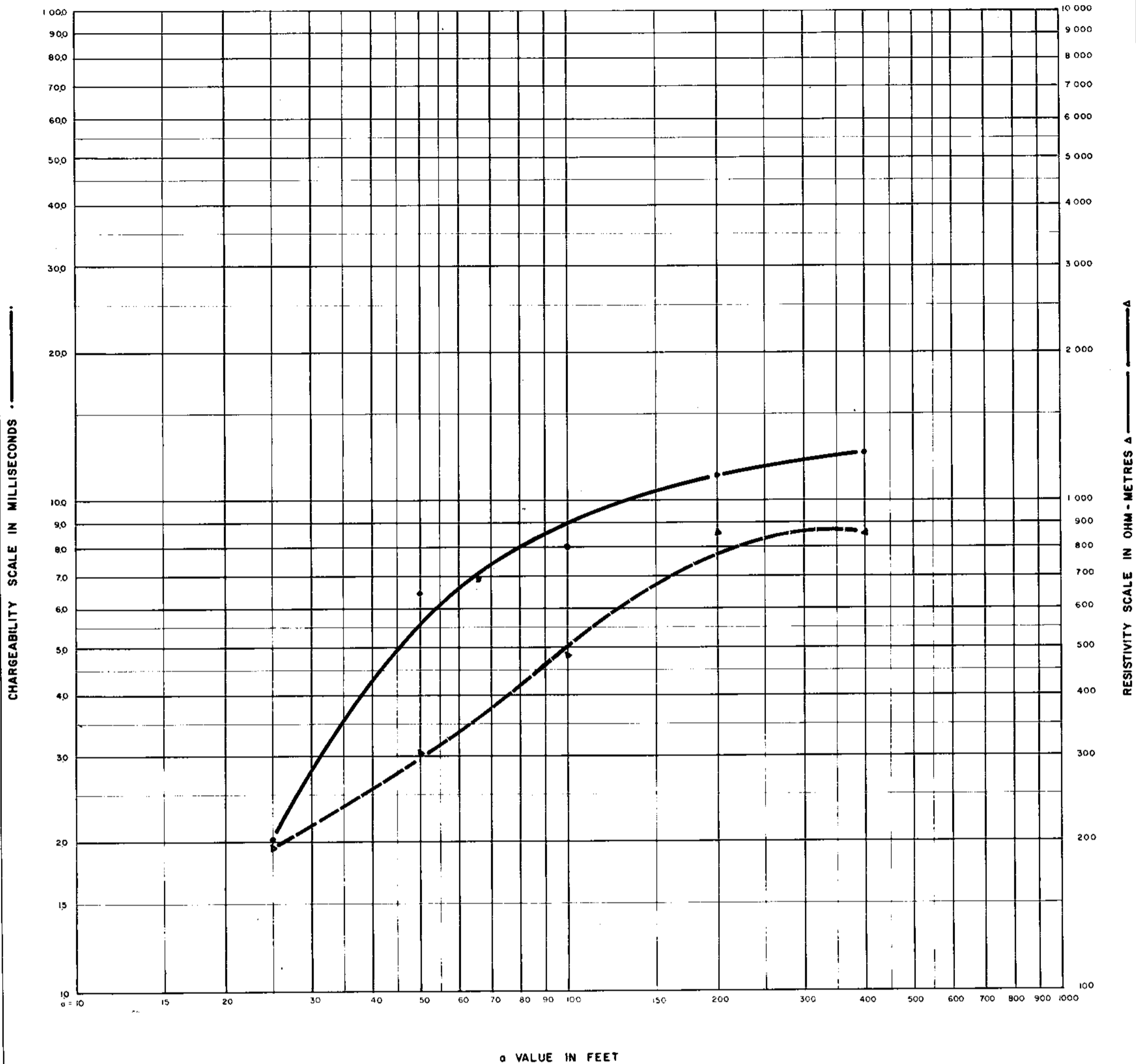
BY SEIGEL ASSOCIATES LIMITED VANCOUVER B.C.

TO ACCOMPANY A GEOPHYSICAL REPORT BY R.J. FOMINOFF AND J.G. BARRD  
DATED 5 JUNE 1972

WORK COMPLETED 24 MAY 1972  
DRAWN 5 JUNE 1972 BY REV

JOB NUMBER 871  
SHEET NUMBER 1 OF 1

ARRAY CENTER: L-64N STN. 2W



WENNER ARRAY:

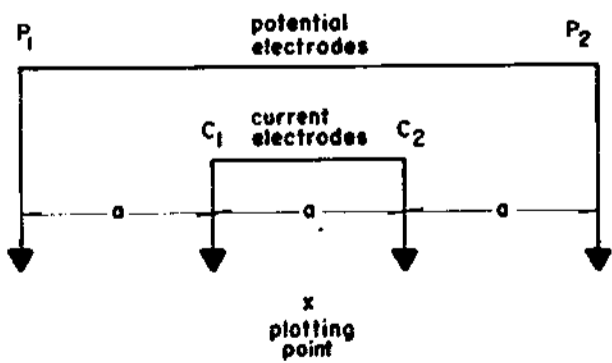


PLATE 6

WHITE RIVER MINES LTD.  
ASPEN GROVE AREA, B.C.

RESISTIVITY AND CHARGEABILITY PROFILES  
OF  
WENNER EXPANDER DEPTH PROBE  
BY  
SEIGEL ASSOCIATES LIMITED  
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TO ACCOMPANY A GEOPHYSICAL REPORT  
BY P. J. FOMINOFF AND J. G. BAIRD  
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*J. Baird*

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