

on an

Induced Polarization Survey of the

FLUG CLAIMS situated near

DESMOND LAKE

some 22 air miles southwest of Kemloops Kamloops Mining Division British Columbia Latitude 50°25: North; Longitude 120°40; West N.T.S. 92 I/7

and on behalf of

TEXADA MINES LTD.

of

Vancouver, B.C.

Field Work between September 12 and October 3, 1972

Report by:

A. Scott, B.Sc. D. R. Cochrane, P.Eng. Delta, B.C. October 24, 1972.



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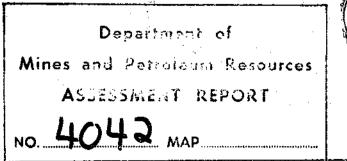
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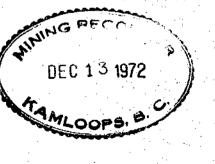
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PART A:

A-1 SUMMARY:

Between September 11 and October 3, 1972, a field crew employed by Cochrane Consultants Ltd. completed some 10 line miles of linecutting, 5.1 line miles of gradient array and 8.9 line miles of Wenner array induced polarization surveying.

The work was conducted on the Plug claims located near Desmond Lake, some 20 air miles southwest of Kamloops, B.C. and was done on behalf of Texada Mines Ltd.

A Hewitt 200 automatic cycling time domain unit was used on the survey. Wenner array readings were taken at an "a" spacing of 1,000 feet and Gradient array readings were taken at "a" spacings of 400 and 800 feet. A 3 k.w. power pack was used to obtain gradient array readings (current stake separation was 8,000 feet).

This report describes the field and data processing procedures and discusses the results obtained. Most of the geophysical information is shown in graphic form on maps located at the end of the report.

A-2 CONCLUSIONS:

 Two induced polarization field arrays were utilized on the Plug claims survey -- 1,000 feet "a" Wenner



array and 400 feet and 800 feet "a" gradient array. The gradient array results tend to emphasize anomalous areas, offer somewhat better resolution (because of the smaller "a" spacing) and reflect conditions at a somewhat deeper horizon (because of the much larger current stake separation) than Wenner array results.

2. Self potential survey results are of relatively low amplitude. Statistically those zones of greater than +15 millivolts (m.v.) or less than -15 m.v. have been defined as weakly anomalous. These zones correspond very well with high chargeability zones and suggest a sulphide-type source of the polarization highs.

3. Resistivity results show the best range and resolution of the three measured parameters. Results vary from a high of 31,000 ohm feet to a low of 157 ohm feet.

4. At least two families of apparent resistivities were detected on the plug claim survey. These families are believed to represent the response of distinct lithologic units. Group A (less than 1500 ohm feet resistivity) material forms the bulk of the survey area while Group B/C material lies in the southeast and northwest sectors of the grid area.



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5. Chargeability response is of low to moderate amplitude. Values greater than 8.0 milli-seconds (Wenner Array) are identified as weakly to moderately anomalous on the plan (Figure 5). Three such zones were detected.

<u>Anomaly No. 1</u> is situated immediately south of the baseline between lines 58E and 70E. This anomaly is coincident with SP Anomaly No. 1 and exhibits complex chargeability and resistivity response. Complex subsurface conditions are indicated, perhaps some folding and/or faulting.

<u>Anomaly No. 2</u> lies in the extreme southeast sector of the grid and is coincident with SP Anomaly No. 2 and Group C high apparent resistivities.

<u>Anomaly No. 3</u> trends south-southeast across line 12E near station 8S. It is coincident with SP Anomaly No. 3 and lies near the contact of groups A to B/C resistivities as does Anomaly No. 1.

6. Investigation by percussion drilling and/or trenching of Anomaly No. 1 is recommended and if these results are encouraging, Anomaly No. 3 is the next highest priority target.



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7. Anomaly No. 2 has abundant outcroppings nearby and should a geological examination be encouraging this anomaly should also be further investigated.

Respectfully submitted,

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A. Scott, B.Sc.



D. R. Cochrane, P.Eng., Delta, B.C. October 24, 1972.



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PART B:

B-1_LOCATION AND ACCESS:

The Plug Claims straddle Meadow and Melba Creeks immediately north of Desmond Lake, some 22 air miles southwest of Kamloops, B.C. Access is gained from the Logan Lake road which heads south from Highway 97/1 some 4 miles west of Kamloops. The normal procedure is along the Logan Lake road some 17 miles to the Surrey Lake road, which provides access to the central claims area. (See Figure 1)

The claims are centered about Latitude $50^{\circ}25$ 'N by longitude $120^{\circ}40$ 'W and the N.T.S. code for the area is 92 I/7.

B-2_CLAIMS AND OWNERSHIP:

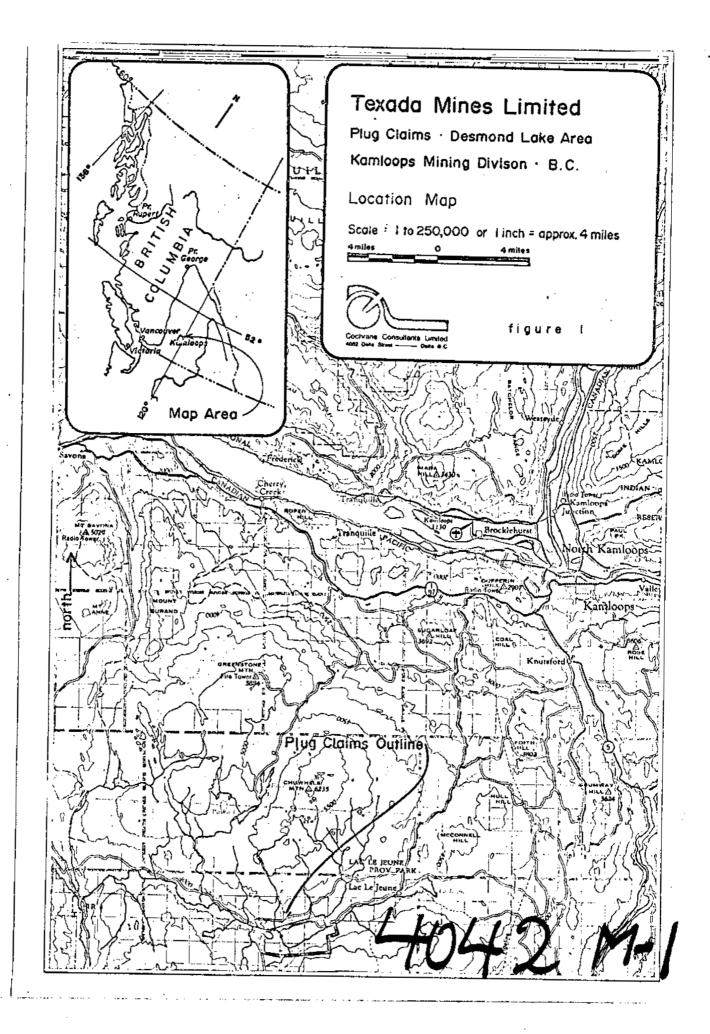
Texada Mines Ltd. owns title to the Plug claims by option. Claims information is tabulated below:

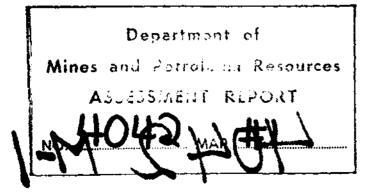
<u>Claim Names</u>	Record Numbers	Anniversary Dates
Plug 1 - 10 (incl.)	103373 - 103382	January 25
Plug 11 - 50 (incl.)	104616 - 104655	February 10
Plug 51 - 60 (incl.)	105514 - 105523	February 16
Plug 61 & 72 - 77 Fr.	121213 & 121463-121468	Aug. 8 & Aug. 17

Figure 2 is a base map showing the location of the claims. The claims are also indicated on B.C. Department of Mines Mineral Claim Map 82 I/7e (M).



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B-3 GEOLOGY:

The property was geologically mapped by Mr. Gary Nordeen of Texada Mines Ltd. and the detailed geology is discussed in a separate report. W. E. Cockfield (G.S.C. Map 886A, Nicola Sheet) has mapped the claims area as being underlain by the Upper Triassic Nicola Group, consisting primarily of basic to intermediate volcanics with intercalated sediments. The claims lie between the Guichon Batholith (to the west) and the Central Nicola Batholith (located to the east of the claims). Pleistocene ice covered this area of British Columbia, and an extensive mantle of drift covers the vast majority of the bedrock.

B-4 FIELD PROCEDURE:

Two field arrays were utilized on the Plug Claims survey and they are discussed separately below: <u>Wenner Array</u> - Some 8.9 line miles were surveyed using a standard Wenner Array with, an "a" spacing of 1,000 feet. For this array, the distance between the electrodes is equal, as illustrated below:

 $\begin{array}{c} E_1 & \cdots & a & \cdots & P_1 & \cdots & a & \cdots & P_2 & \cdots & a & \cdots & E_2 \\ \downarrow & & & \downarrow & & & \downarrow & & & \downarrow & & & \downarrow & & \downarrow & & \downarrow & \\ \end{array}$

transit direction



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where Current is introduced into the ground across E_1 and E_2 and the impressed EMF (V_p) and integrated decay voltage (V_s) is measured across P_1 and P_2 .

<u>Gradient Array</u> - Some 5.1 line miles of gradient array surveying was completed at "a" spacings (distance between receiving electrodes) of 400 and 800 feet. This array gives better "along line resolution" than the Wenner Array and, with the two "a" spacing, better depth information is available. The array was used to give a more detailed picture of relatively high chargeability zones detected with the Wenner Array.

For the gradient array the current electrodes were set up 8,000 feet apart along the survey line and readings were taken within the central 4,000 feet of a given spread.

current		area	surveyed	2000*	current electrode
electrode	2000*		40001	2000*	electrode
V		•			V

A 3 k.w. power pack was used for the gradient array surveying.

B-5 DATA PROCESSING:

The IP data was normalized and the apparent resistivities were calculated by slide rule in the field and were



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checked in the office with an electronic calculator.

The chargeability is defined by dividing the residual decay voltage (V_g) by the impressed EMF (V_p) .

The apparent resistivity is calculated from the

formula:

apparent resistivity = $\frac{K\pi a V}{T}$

where K is a constant depending on the relative position of the electrodes. For the Wenner grray K equals 2.

The chargeability data from the 1000 feet "a"

Wenner array survey and the 800 feet "a" Gradient array survey have been plotted and contoured on the following basis:

- line 78E was surveyed using both arrays

- the coefficient of correlation of the 1000 feet Wenner chargeability results is plus 0.89 indicating very good linear correlation of the two data sets.

- the regression line for gradient to Menner results is:

chargeability (Wenner) = 0.31 chargeability (gradient)

+ 4.41

- the 800 feet "a" gradient results have been adjusted on the plan by the above formula for contouring purposes.

Note: This procedure is a purely statistical one, and is used solely for contouring purposes. It is not intended to indicate a physical equivalence between the two arrays.



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The plotted apparent resistivity results are those obtained from the 1000 foot Wenner and 800 foot Gradient surveys. These results have not been adjusted.

The unadjusted gradient array results are presented in Profile Form as Figures 6 and 7.

B-6 LINECUTTING-GROUND CONTROL GRID:

Lines were compassed and chained as indicated on the base map (Figure 2). (All lines are cut, blazed and flagged). The baseline runs true east-west and is numbered and flagged at 200 foot intervals. Crosslines run true north-south and are numbered and flagged at 200 foot intervals in northings and southings (in one hundreds) from the baseline.

Positions of the lines and some of the linecutting was conducted by Texada Mines personnel. Cochrane Consultants personnel completed some 10 line miles of additional linecutting to complete the grid.



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PART C:

C-1 SELF POTENTIAL GRADIENT RESULTS:

The self potential gradient values are plotted on Figure 3. The plotted values represent the natural potential difference (in millivolts) between a point 400 feet to the north and 400 feet to the south of the plotted point for those lines surveyed with the 800 foot "a" gradient array; and 500 feet to the north and south for lines surveyed with the 1000 foot "a" Wenner array.

The inset figure shows the relative frequency of occurrence of the self potential values. The arithmetic mean of the SP values is plus 1 millivolts and the standard deviation is +15 millivolts.

Statistically the following classes of self potential gradient values are defined:

-15 to +15 millivolts background -30 to -15 and/or +15 to +30 m.v. weakly anomalous Less than -30 or greater than +30 m.v. moderately anomalous

Zones of greater than +15 m.v. and less than -15 m.v. SP gradient have been outlined on the plan. While there are many variables that can account for strong SP gradients, for example changes in topography



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and ground water conditions, strong gradients that are associated with high chargeability values often indicate a sulphide-type polarizing body.

A discussion of those zones characterized by weak to moderate anomalous response follows: <u>SP Gradient Anomaly No. 1</u> - trends east-southeast in the vicinity of the baseline and between lines 36E and 70E. The anomaly is positive, peaks at 35 m.v. and together with the small negative anomaly at 4N line 70E, is very nearly coincident with chargeability anomaly no. 1. <u>SP Gradient Anomaly No. 2</u> - lies in the extreme southeast section of the survey area. It is negative and peaks at -55 m.v. at station 255 line 112E. This SP anomaly is associated with chargeability anomaly no. 2. <u>SP Gradient Anomaly No. 3</u> - trends southeasterly across the

baseline near line 12E and has a peak value of plus 25 m.v. This anomaly is associated with chargeability anomaly no. 3.

Other weakly anomalous SP gradient values occur which are not associated with high chargeability zones as shown in Figure 3.



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C-2 APPARENT RESISTIVITY RESULTS:

The apparent resistivity results from the 1000 foot "a" Wenner array and 800 foot "a" gradient array surveys are presented in contoured plan form in Figure 4.

The gradient array results are presented in profile form as Figure 6.

The inset diagram in Figure 4 is a relative frequency distribution histogram of the resistivity results. There are three distinct groupings of apparent resistivities as outlined below:

Group A	 less than 1500 ohm feet
Transitional	 1500 to 2000 ohm feet
Group B	 2000 to 3500 ohm feet
Transitional	 3500 to 4500 ohm feet
Group C	 greater than 4500 ohm feet

Groups A and C are thought to represent the resistivity response of two distinct rock types. Group B may represent a third rock type or may (in some areas) simply represent a transitional (averaged) response of the two rock types in and around the contact. (i.e. families A & C together)

Group A resistivities cover most of the survey area. Response between lines 58E and 78E stations 16S to 16N is quite complex and some folding and/or faulting is believed to have occurred in this area.



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Group "C" resistivities occur in the southeast sector of the survey area and are marked by a very steep resistivity gradient between Group Λ resistivities.

The contact between the two gephysically indicated rock types is apparently steeply dipping.

Group B resistivities occur in the northwest corner of the survey area and one group C reading was obtained at 20N; line 0 + 00. These readings may represent the response of a third distinct rock type or it may be a similar rock type to that represented by Group C resistivities. The relatively gentle resistivity gradient in this area suggests a more shallow dip to the geophysically indicated contact.

C-3 CHARGEABILITY RESULTS:

The chargeability results from the 100 foot "a" Wenner survey and the adjusted values from the 800 foot "a" gradient array survey (as explained in the data processing section of this report), are presented in contoured plan form in Figure 5. The unadjusted 400 foot "a" and 800 foot "a" gradient

array values are presented in profile form in Figure 7.



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Discussion of Plan (Figure 5)

The inset diagram shows the relative frequency distribution of the Wenner Array chargeability values. The mode lies in the 6 to 6.9 m.s. class and this class encompasses 26 percent of the values. The arithmetic mean is 6.5 m.s. and the standard deviation is 1.5 m.s.

Statistically the following categories of chargeability are herein defined:

less than 8.0 m.s.	background
8.0 - 9.5 m.s.	weakly anomalous
greater than 9.5 m.s.	moderately anomalous

Three zones of weakly to moderately anomalous chargeability response are indicated on the plan, and are described below:

<u>Chargeability Anomaly No. 1</u> is situated immediately south of the baseline between lines 58E and 70E. This anomaly has two peaks, one at 5S; 58E (9.5 m.s. - Wenner array) and the other at 5S; 70E (9.6 m.s. adjusted gradient value, 16.7 m.s. unadjusted gradient value). Both the chargeability and resistivity plans and profiles are complex within and around this anomaly and some folding and/or faulting is suggested by the complexity of data.



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<u>Chargeability Anomaly No. 2</u> lies in the extreme southeast sector of the survey area. This anomaly is coincident with the Group C resistivities and self potential anomaly No. 2. The increase in chargeability in this area may simply represent an increase in "background" response, perhaps due to a change in rock type (i.e. an increase in volume percent sulphides or other polarizing material).

<u>Chargeability Anomaly No. 3</u> trends south-southeast across line 12E near station 8S, and is open to the south. The anomaly peaks at 8.6 m.s. at 12E; 5S, is coincident with SP anomaly No. 3, and lies near the assumed contact of resistivity groups A and C. This anomaly may be similar to Anomaly No. 1 and should be investigated if the results from the subsequent investigation of Anomaly No. 1 are encouraging.

C-4 CORRELATION OF DATA - DISCUSSION OF PROFILES:

The gradient array survey results are presented in profile form. Figure 6 is the apparent resistivity results and Figure 7 is the chargeability results.

Apparent Resistivity Profile (Figure 6)

Points to be noted from the apparent resistivity profile that provide additional information to that already



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discussed in Section C-2 are:

 A northerly dip to the contact of the group C resistivity material along line 78E and the contact of the group A and group C material is near vertical.

 Response along line 67E and near the baseline on lines 70E and 78E is complex and some folding and/or faulting is indicated.

3. The contact of the group A to group B/C material on line 0 has a more gentle southerly dip. The group B/C material dips northerly.

Chargeability Profile (Figure 7)

The gradient array results are of a somewhat higher amplitude than those indicated on the plan (Figure 5), as discussed in the data processing section of this report.

Chargeability anomaly no. 1 peaks at 16.7 m.s. on the profile at 4S; 70E as opposed to 9.6 m.s. on the plan. Chargeability response here is very complex and some folding and/or faulting is indicated.

Chargeability anomaly No. 2 peaks at 15.0 m.s. at 42S; 78E and a northerly dip to the polarizing zone is indicated.



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Weakly anomalous chargeability response is indicated at 10N; OE on the profile. This may be an extension of chargeability anomaly No. 3.

Correlation of Data

Figure 8 is a compilation plan of the features discussed in this report. The apparent resistivity groups (A, B, & C) are indicated by heavy dashed lines, areas of greater than +15 m.v. SP gradient are indicated by stipling within a fine continuous line and those of less than -15 m.v. SP gradient are indicated by stipling within a fine dashed line. The 7, 8, and 9 milli-second chargeability contours are included on the compilation plan.

The three anomalous chargeability and SP gradient zones discussed in Sections C-1 and C-3 of this report are numbered on the plan.

Respectfully submitted,

HRANE

D. R. Cochrane, P.Eng.

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A. Scott, B.Sc. Delta, B.C., October 24, 1972.



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APPENDIX I

Certificates

NAME: Education: Professional Associations: Experience:	COCHRANE, Donald Robert B.A. Sc U. of T., M.Sc. (Eng.) - Queen's Professional Engineer of B.C., Ontario, and Saskatchewan. Member of C.I.M.M., G.A.C., M.A.C., Geological Eng. Engaged in the profession since 1962 while employed with Noranda Exploration Co. Ltd., Quebec Cartier Mines Ltd., and Meridian Exploration Syndicate.
NAME: Education: Professional Associations: Experience:	SCOTT, Alan R. B.Sc Geophysics, U.B.C. Member of S.E.G. With Cochrane Consultants for 3 years - Geophysicist.
NAME: Age: Education:	ROSSIER, Jean-Claude 27 Secondary and Vocational School - Architectural Drafting
Experience:	Courses Since 1965 - General Drafting Geophysical Drafting - Seigel Associates - 1969 - 1972 Employed with Cochrane Consultants since April, 1972
NAME: Age:	FORRESTER, Greg
Education:	Grade 12 Diploma 1 year Douglas College
Experience:	Cochrane Consultants Ltd summer, 1971 Montgomery-Wolfe & Associates & Cochrane Consultants - summer, 1972
NAME:	ESTACAILLE, N. 26
Age: Education:	Grade 12 Diploma
Experience:	year exploration experience with Huntec With Cochrane Consultants Ltd. for two field seasons
NAME:	HANBURY, Richard
Experience:	partial summer with D.R. Cochrane, P.Eng 1970

APPENDIX II Survey Details

PROPERTY:	Plug Claims	MINING DIVISI	ON: Kamloops
SPONSOR:	Texada Mines Ltd	• ;	
LOCATION:	Near Desmond Lak	e, 22 air miles sw of i	Kamloops, B.C.
SURVEY:	Induced Polariza	tion (time domain), li	necutting
SURVEY MAN DAT	YS: 20 x 3 + 1	5 x 1 = 75 man days	
STAND-BY-MOBI	LIZATION MAN DAYS	: 4 x 2 = 8 man days	
DATA PROCESSI	NG & REPORT PREPA	RATION: A. Scott - 4 D. R. Cochran	
DRAFTING:	J. C. Rossier -	6 days	
LINE MILES:		gradient array surveyi: Wenner array surveying line cutting	-
DATA PROCESSI	NG & REPORT BY:	A. Scott D. R. Cochrane	
FIELD CREW:			
	A. Scott		
	N. Estacaille		
	G. Forrester		
	R. Hanbury		

COCHRANE CONSULTANTS LTD.

HŘANE

D. R. Cochrane, President.

APPENDIX III

Cost Breakdown

By contract, dated September, 1972, between Cochrane

Consultants Ltd. and Texada Mines Ltd.

5.1 line miles of gradient array induced polarization 8.9 line miles of Wenner array induced polarization

Total 14.0 line miles

(a) 10 line miles @ \$450.00/line mile	\$ 4,500.00
(b) 4 line miles @ \$420.00/line mile	1,680.00
(c) 20 days room and board - Mr. G.	·
Nordeen @ \$6.00/day	120.00

TOTAL \$ 6,300.00



D. R. Cochrane, P.Eng.

APPENDIX IV

Instrument Specifications

for HEW-200 Pulse Type (Tome Domain) Induced Polarization Unit Receiver-Transmitter Package:

15 " x 13" x 10" Weight: 38 lbs

Transmitter Power Supply:

30 volt rechargeable battery 5-RF 680 Central Lab. Primary Power Supply: 1 #420ER dry cell timer battery

Receiver:

Common Mode rejection 100DB (DC-60 Hz) Low pass filter input 100 DB 60 Hz Input impedence 1 x 10 ohms Operation temperature: -20°C to +75°C Sealed galvanometer type meters for very humid or wet climates Polarity automatically read on meter dial Three input combinations Sealed switches and panel for wet climate (dessicant incl.)

Transmitter:

24 - 30 volt DC-DC transistorized converter Power output 500 watts maximum Timer two second or four second pulse intervals Automatic reverse current cycling Operating temperature: - 20°C to +75°C Sealed switches and panel for wet climates (dessicant incl.) Sealed meter for very humid or wet climates

TIME CONSTANTS

The following table lists current on times, and corresponding delay and integration times

Current On (seconds)	Delay Time (seconds)	Integration Time (seconds)
2.0	0.4	1.2
2.5	0.5	1.5
3.0	0.6	1.8
3.5	0.7	2.1
	0.8	2.4
4.5	0.9	2.7
5.0	1.0	3.0
5.5	1.1	3.3
6.0	1.2	3.6

Manufactured by: Hewitt Enterprises and Terra Physics 12215 South 900 East Draper, Utah



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GEOPHYSICAL REPORT

on an

Induced Polarization Survey of the

PLUG CLAIMS

situated near

DESMOND LAKE

some 22 airmiles southwest of Kamloops Kamloops Mining Division British Columbia Latitude 50°25' North; Longitude 120°40' West N.T.S. 92 I/7

and on behalf of

TEXADA MINES LTD.

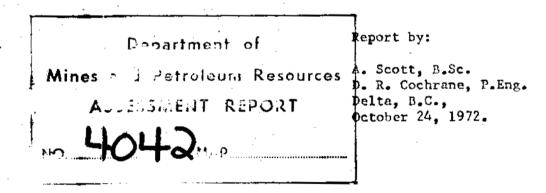
of

DEC 13 1972

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Vancouver, B.C.

Field Work Between September 12 and October 3, 1972





Gochrane Consultants Limited 4882 Delta Street, Delta B.C. (604) 946-9221





