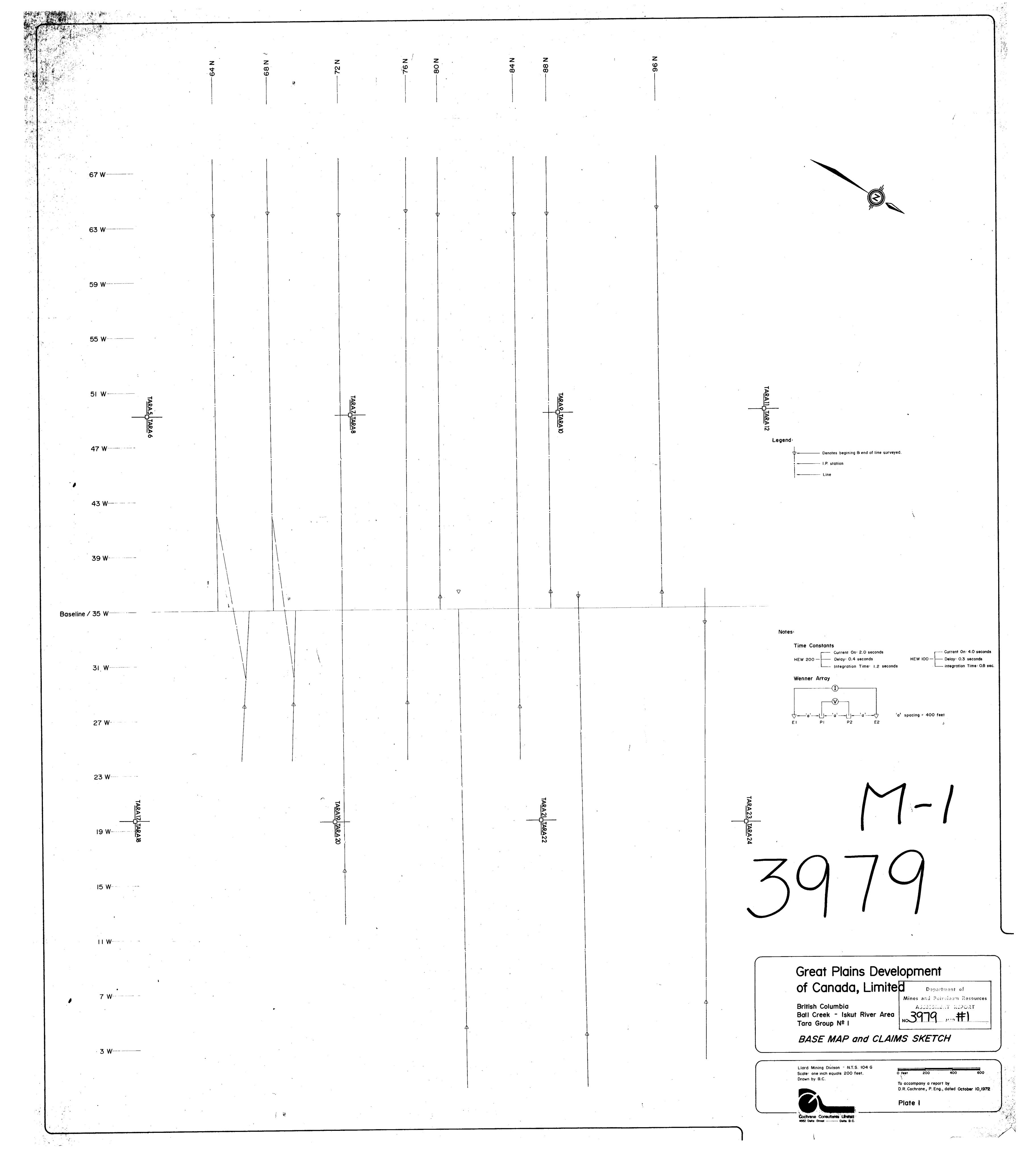
CREAT PLAINS DEVELOPMENT COMPANY OF CANADA, LTD. GEOPHYSICAL REPORT ON THE TARA 1 - 27 CLAIMS BALL CREEK - ISKUT RIVER AREA LIARD M.D. 57°17' W, 130°25' N

D.R. Cochrane, P.Eng. Aug. 1-30, 1972 M.D. McInnis 1046/8W

3979

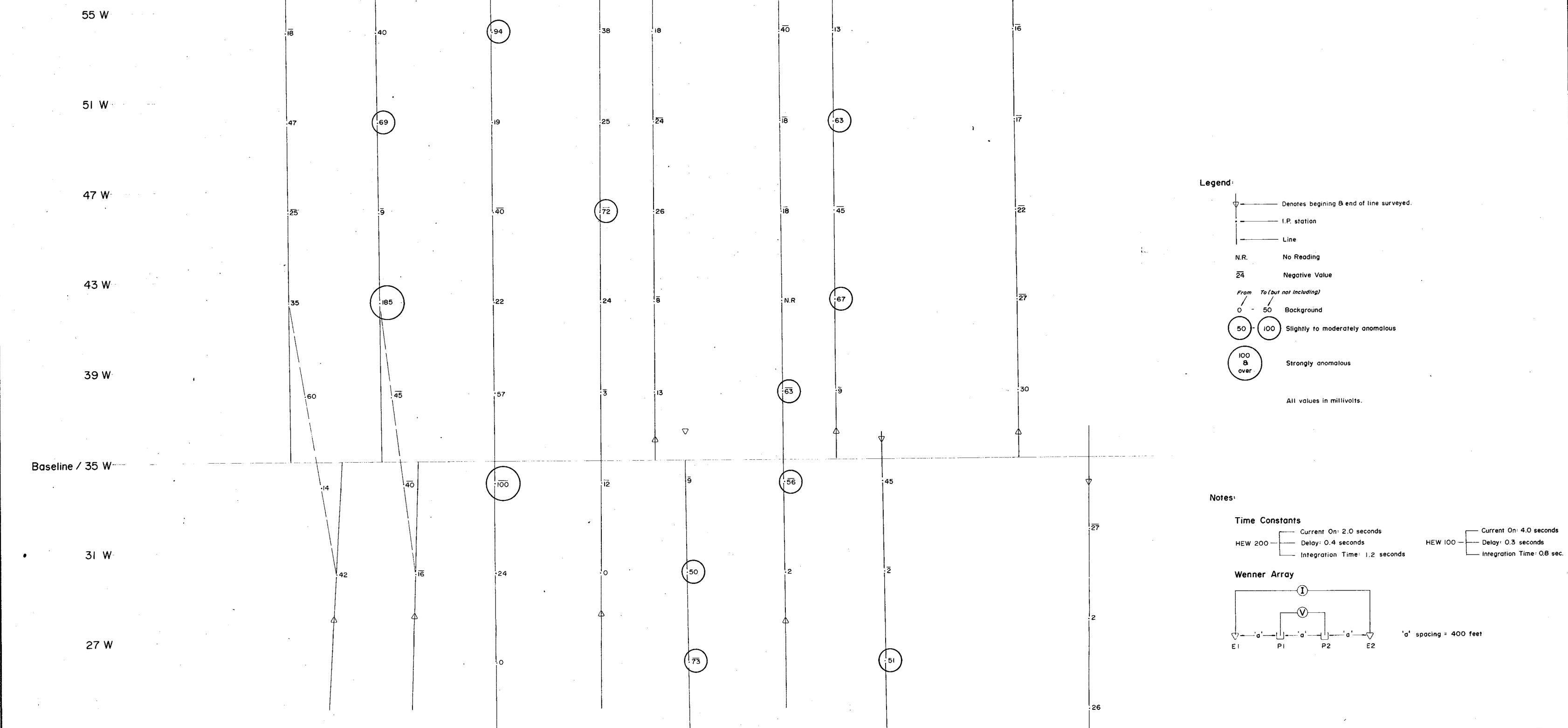
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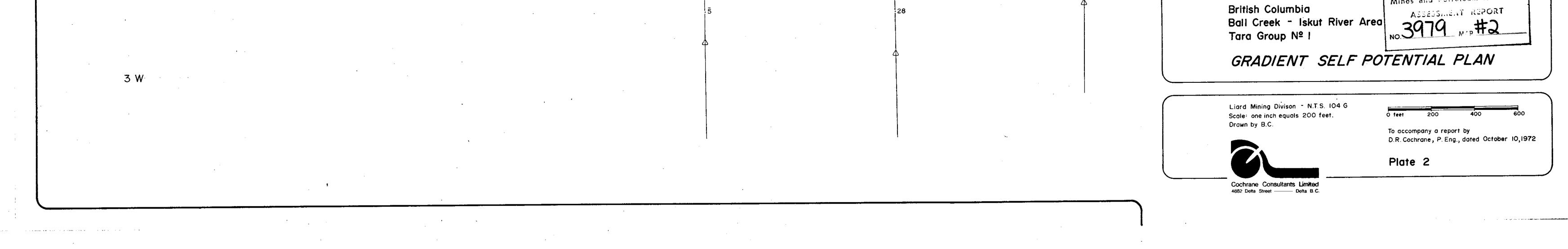
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15 W

11 W--

7 W

Great Plains Development of Canada, Limited Department of Mines and Petroloum Resources



GEOFHYSICAL REFORT

on the

Induced Polarization Survey

of the

TARA CLAIMS (No. 1 to No. 27 inclusive)

known as the BALL CREEK PROJECT situated

52 air miles south of

Telegraph Creek

and 6 air miles west

of the Iskut River

Liard Mining Division British Columbia

Latitude 57°17'W; Longitude 130°25'N

N.T.S. 104 G/8 (W12)

on behalf of

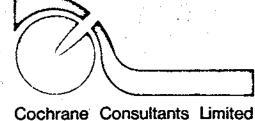
GREAT PLAINS DEVELOPMENT CO. LTD.

Department of Mines and Policipum Resources ADDESSING AREPORT

MAP

REPORT BY:

D. R. Cochrane, P.Eng. M. D. McInnis October 10, 1972, Delta, B.C.



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

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# Plat #] Plat #3 Plat #4 Plat #5 Plat #5 LC	e II e III e IV e V	Claims and Base Map Gradient Self Potential Values Apparent Resistivity Plan Apparent Chargeability Plan Correlation Map

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A-1 INTRODUCTION:

During the month of August 1972, a Cochrane Consultants operator and equipment joined a field crew employed by Great Plains Development Co. Ltd. and completed 7 line miles of an induced polarization survey on portions of the TARA claims, situated on Ball Creek in the Liard Mining Division.

The purpose of the survey was to explore the northern extension of a belt considered geologically favourable for sulphide deposits. This report describes the instrumentation, field and data processing procedures and discusses the results obtained. It is divided into 4 parts as follows:

```
Part A - Summary and Conclusions
Part B - Setting
Part C - Procedures
Part D - Results
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Appendices I through IV contain the personnel certificates, survey details, cost breakdown and instrument specifications respectively.

A-2 SUMMARY AND CONCLUSIONS:

During the latter half of August, 1972, seven
 line miles of time domain (pulse) induced polarization surveying
 was completed on the Tara claims Eddontenejon area, Liard Mining
 Division. The claims are owned by Great Plains Development



Company of Canada Ltd.

2. The property lies on the Spectrum Mountain range near the transitional physiographic zone between the rugged northern coast mountains and the Stikine and Klastline plateaus. Access is by helicopter from the Eddontenejon road 10 miles to the east of the property.

3. A Hewitt Enterprises HEW-100 IP unit was employed in a Wenner field array with an "a" spacing of 400 feet. The time constants were as follows:

(a) 4 seconds "current on" period

- (b) 0.3 seconds delay after (a) above
- (c) 0.8 seconds integration of residual voltage.

IP surveying was conducted along eight parallel cross lines averaging just under one mile each.

4. Gradient self potential, apparent resistivity and apparent chargeability data were recorded, and the information is presented in plan form in Plates II to V inclusive (map pockets).

5. Gradient self potential response ranged up to 185 millivolts per 400 feet. Two strongly anomalous values were recorded, and 12 weak to moderately anomalous values were recorded.



6. Apparent resistivity response ranged from a low of 490 to a high of 17,600 ohm-feet and averaged 2800 ohmfeet. Two resistivity families are present, one below the 5500 ohm-foot level and one above. The two families may represent response from two distinct lithologic units.

7. Apparent chargeability response ranged from a low of 0.7 to a high of over 50 milliseconds. The average is 12 m.s. - 0 to 10 m.s. represents background; 10 to 20 slightly anomalous; 20 to 30 moderately anomalous; and greater than 30 strongly anomalous chargeability response.

8. The anomalous chargeability band is arcuate shaped and centered about a low chargeability/resistivity "core" zone located near the center of the west sector of the survey area.

9. Fair positive correlation exists between the apparent resistivity and apparent chargeability data and the strongly anomalous gradient SP values lie on the flank of a strongly anomalous chargeability zone.

10. The data suggests that anomalous SP and chargeability response is due to the presence of sulphides of roughly 4 volume percent or more.



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11. The polarizing body is near surface, and investigation as to the cause of the anomalous chargeability zone is recommended.

Respectfully submitted,

RANE INF

D. R. Cochrane, P.Eng., October 10, 1972, Delta, B.C.

M. D. McInnis.



PART B: SETTING

B-1 LOCATION AND ACCESS:

The Tara claim group is located along the eastern front of the Goast Range Mountains approximately fifty-two air miles south of Telegraph Creek, B.C. The claims lie six miles west of the Iskut River near the confluence of Ball Creek and a creek locally known as Devil Creek on the flank of a steep-sloped mountain between elevations 2500 feet and 5500 feet (see Figure 1).

Supplies and equipment can be obtained from a supplier at Eddontenejon Lake and can be freighted south by truck to within ten miles of the property. From here, helicopters are required to ferry the supplies into the property. Rugged terrain precludes servicing with fixed wing aircraft.

B-2 CLAIMS AND OWNERSHIP:

The Tara Claim Group consists of 27 contiguous, located, full sized claims situated in the Liard Mining Division, and owned by Great Plains Development Company of Canada, Ltd., of 736 Eights Avenue Southwest, in Calgary Alberta.



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The following table lists pertinent claims

information:

<u>Claim Name(s)</u>	Record No.(s)	Anniversary Date(s)
Tara No. 1 to 4 (incl.) Tara No. 11 to 27 (incl.) Tara No. 5 to 10 (incl.)	55799 to 55802 55809 to 55825 55803 to 55808	September 28

A drafted copy of B.C. Department of Mines Claims Map of the area shows the various claim locations.

B-3 PHYSIOGRAPHY:

The Tara claims are situated in the Spectrum Mountain Range, close to the transitional physiographic zone between the rugged Northern Coast Mountain Range (to the west of the claims region) and the relatively gentle upland surface of the Stikine and Klastline Plateaus which lie to the northeast of the claims region. Ball Creek flows southerly and then casterly into the Iskut River, and drains the center of the Spectrum Range. The highest peak in the general vicinity is Hankin Peak which rises to 8386 feet and is situated on the south side of Ball Creek. In general, the local terrain is steep and rugged.

The Ball Creek Valley and environs has been mapped (See G.S.C. Map 9-1957, Stikine River Area) as underlain by



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Triassic sediments and a complex Permian and (?) Earlier sequence of sediments and volcanics. The sequence in turn has been intruded by small stocks of acidic rocks, and is, in some areas capped by Tertiary volcanic flows. The predominant geological trend in this area is northerly.



PART C: PROCEDURES

C-1 IP FIELD PROCEDURE:

A standard Wenner Array with an "a" spacing of 400 feet was used for the I.P. survey on the Ball Creek Project. For this array, the distance between the electrodes is equal, as illustrated below:



"E" positions are current electrodes and "P" positions receiving electrodes.

transit direction

The front positions are alternately electrically positive and negative with the HEW-200 unit and normally positive with the HEW-100 unit.

A description of the actual "in field procedure" follows: The field crew move to their appropriate positions on the survey line and pot men excavate a small hole beneath the humus and clear the hole of rocks for the receiving pots (position P). The stakemen clear a small strip of ground (roughly one square foot) of grass, leaves and rocks, and spread aluminum foil over the cleared area and buried the foil (positions "E"). Salt



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water is normally poured over the foil to assure good ground contact.

Communication with electrode men and the instrument operator is facilitated by portable transceivers, and when all positions are "ready" the operator commences measurement. Firstly, the self potential of the ground between the two receiving pots is balanced and this value is recorded (in millivolts) on standard pre-printed note forms. With the HEW-200, a 4 cycle 2 second current on period sequence is then initiated; and with the HEW-100 a 4 second current on period is initiated during which time the transmitter current (I) and the impressed EMF (V_p) between receiving pots is noted. On cessation of the current pulse the receiver automatically integrates the residual decay voltage (V_g). This value is recorded along with notes on the position of the instrument, terrain, road locations, etc.

The order is then given to move on 400 feet to the next station.

C-2 DATA PROCESSING:

The I.P. data was normalized and the apparent resistivities were calculated by slide rule in the field and were



spot checked in the office with an electronic calculator. The chargeability is defined by dividing the residual decay voltage (V_s) by the impressed EMF (V_p) .

The apparent resistivity is calculated from the formula:

apparent resistivity (ohm-feet) = $\frac{2 \hat{n} a \times V}{I}$

The chargeabilities and apparent resistivities were plotted and contoured and accompany this report. The grouping of the data and calculation of the

arithmetic mean, standard deviation and coefficient of correlation was done with the aid of an electronic calculator.

SP data was "sign" corrected for directional bias.

C-3 PRESENTATION OF DATA:

The reconnaissance induced polarization results are presented in "plan" views all drafted to a scale of 1 inch:200 feet. Plate I is a plan of the grid and claims; Plate II shows the Gradient SP data; Plate III, the Apparent Resistivity results; Plate IV, the Apparent Chargeability results; and Plate V is a compilation of the geophysical data. All "plates" are located in map pockets at the rear of the report.



PART D: DISCUSSION OF RESULTS

D-1 SELF POTENTIAL:

The gradient self potential values, in millivolts (m.v.) are presented in Plate II. The results represent the natural potential measured at the surface between two receiving electrodes placed 400 feet apart. The values are plotted midway between the receiving pots and are gradient results (i.e. a +25 m.v. reading means 25 m.v. per 400 feet), and each line is free floating, and not "tied" to adjacent lines.

Individual values ranged in amplitude from a high of +185 to a low of -100 m.v. per 400 feet. The average is very close to zero. Based on experience in the general area, the following categories of SP values may be established.

From	To (but not inleading)	Category
0 ≏50	±50 ±100 100 and greater	Background Slightly to Moderately Anomalous Strongly Anomalous

There were two strongly anomalous SP responses recorded on the Tara grid, and thirteen slightly to moderately anomalous responses. The anomalous readings are circled in Plate II, and are shown together with chargeability and resisitivity in Plate V.



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The most common cause of anomalous SP gradient readings is from the presence of oxydizing sulphides, and often SP gradient highs are situated on the flanks of sulphide zones. However, lithologic changes, faults and some shaley or platey rocks will also cause large self potential charges. The largest number of anomalous SP gradients on the Tara grid fall on the flanks of high apparent chargeability zones and therefore sulphides are believed to be responsible for the large majority of anomalous SP results.

D-2 APPARENT RESISTIVITY RESULTS:

A contoured plan of the apparent resistivity results (in units of ohm-feet) accompanies this report as Plate III. The results range in value from a low of 490 to a high of 17,600 ohm-feet. The arithmetic mean of 73 readings is 2836 and the standard deviation is 1557 ohm-feet. A frequency histogram of the resistivity results accompanies Plate III and shows a "two family" distribution with one "normal" family dominating. The primary mode lies in the 2000 to 3000 ohm-foot range. This modal class encompasses 41 percent of the total population. The second "family" of apparent resistivities lies above the 5500 ohm-



foot level but only represents a few percent of the total population. These two "families" of values may represent responses from two different rock units, and the boundary between the two will be close to the 6000 ohm-foot level.

The following categories of resistivity values may be arranged.

Range (ohm-feet)

0 to 1000 1000 to 5000 Above 5000 Anomalously Low Family "A"

Category

Family "B"

The iso-apparent resistivity plan suggests a relatively complex subsurface situation. The plan is domainted by a fairly "low amplitude" resistivity core situated near the center of the survey area (grid) west of the base line. This low is flanked to the "grid" north and south by high resistivity zones. A second relatively low amplitude area is present on the grid east side of the survey area.

The single "anomalously low" value lies 2000 feet north of the base line on line 84N. Highly conductive subsurface conditions exist in this area.



D-3 APPARENT CHARGEABILITY:

The apparent chargeability results are presented in contoured plan in Plate IV. Plotted values are in units of milliseconds (m.s.) or millivolt seconds per volt.

Response ranged from a low of 0.7 m.s. to over 50 m.s., and several high values are plotted simply as E.H.V. (excessively high value). Several negative chargeabilities were also recorded, and these are plotted as N.V. (negative value). Most lie close to the base line, on lines and between line 72N and line 84N. Mr. Jacques Bertin in a paper entitled "Some Aspects of Induced Polarization" (in Geophysical Prospecting Vol. XVI) has delt extensively with negative IP response, and concludes that a highly conductive near surface layer causes a skin effect that creates negative IP response. The near surface conduction sheet could be a damp clay layer, or patches of permafrost, or swampy muskeg areas.

A frequency histogram of the apparent chargeability results accompanies Plate IV. Distribution is multimodal and several families exist. The primary mode lies in the 8-12 millisecond range and the arithmetic mean and standard deviation are 12.3 and 10.1 m.s. respectively.



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Based on the histogram and statistics, the following

categories have been devised:

Range (milliseconds)	Categories
0 to 10	Background
10 to 20	Slightly Anomelous
20 to 30	Moderately Anomalous
over 30	Strongly Anomalous

The iso-chargeability plan shows a large arcuate, horseshoe shaped band of anomalous values centered mainly in the grid west section of the survey area. The anomalous zone is distributed about the previously mentioned resistivity low. The arcuate band could be response from a "pyrite halo" and the polarizing zone is near surface and quite extensive. Normally values in excess of 30 milliseconds represent response from subsurface material containing in excess of 4 volume percent sulphides or equivalent polarizing material.

D-4 CORRELATION:

The apparent chargeability and apparent resistivity data shows "fair" correlation. The coefficient of correlation between the two data sets is +0.27 (Note: a coefficient of correlation value of +1.0 indicates perfect positive correlation; one of 0.0 no correlation; and one of -1.0 perfect inverse correlation).



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There is then, a slight tendency for high chargeability values to occur in areas of relatively high apparent resistivity. In addition, both data sets show a band of high response centered around a very low response zone centered on the west end of line 84N. The two strongly anomalous SP gradients lie on the flank of a strongly anomalous apparent chargeability zone situated in and around 72N near the base line.

The geophysical information suggests that anomalous SP and chargeability response is due to the presence of sulphides.

Respectfully submitted,

D. R. Cochrane, P.Eng. October 10, 1972, Delta, B.C.

M. D. McInnis.



APPENDIX I

Certificates

COCHRANE, Donald Robert NAME: EDUCATION: B.A.Sc. - U. of T., M.Sc. (Eng.) - Queen's University PROFESSIONAL Professional Engineer of B.C., Ontario, and ASSOCIATIONS: Saskatchewan. Member of C.I.M.M., G.A.C., M.A.C., Geological Engineer. EXPERIENCE: Engaged in the profession since 1962 while employed with Noranda Exploration Co. Ltd., Quebec Cartier Mines Ltd., and Meridian Exploration Syndicate. NAME: ROSSIER, Jean-Claude Secondary and Vocational School - Architectural Drafting EDUCATION: Degree EXPERIENCE: Since 1965 - General Drafting Experience Geophysical Drafting, Seigel Associates - 1969-1972 27 AGE: NAME: COCHRANE, Bruce EDUCATION: Ontario College of Art Diploma Two field seasons - Geo-X Surveys Ltd. EXPERIENCE: With Cochrane Consultants Ltd. since spring 1972. 26 AGE: GRIFFITH, David NAME: B.A. (English), Queen's, 1970 EDUCATION: EXPERIENCE: 1 Field Season, general experience in mining exploration 2 Field Seasons with Cochrane Consultants Ltd. PARADIS, Robert NAME: Seigel Associates Ltd. EXPERIENCE: 1 Field Season with Cochrane Consultants Ltd. 24 Age:

APPENDIX II

Survey Details

	GRID:	Ball Creek	MINING DIVISION:	Liard
	CLAIMS:	Tara No. 1 to 27 inclusi	ve	
	SPONSOR:	Great Plains Development	Co. of Cenada Ltd.	
	SURVEY:	Induced Polarization (SP	, resistivity and c	hargeability)
	INSTRUMENT:	HEW-100 Time Domain (P	ulse) unit	
	FIELD ARRAY	: Wenner with "a" = 400	feet	
	NO. OF LINE	E MILES: 7		
	NO. OF REAL	91NGS: 91		
	SURVEY MAN	DAYS: 8		
	STANDBY/MOD	BILIZATION MAN DAYS: 16		
	DRAFTING MA	IN DAYS: 6 1/2 DAS		
DATA PROCESSING & REPORT PREPARATION MAN DAYS: 3				
	COCHRANE CO	NSULTANTS PERSONNEL:		
	A	. Field D. Griffith,Instru R. Paradis "	ment Operator	
	E	. Office		_
		D. R. Cochrane, P.	Eng., Data Processi Preparation	ng, Report
		B. A. Cochrane	Drafting, Dat	a Processing

J. C. Rossier

Drafting, Data Processing Drafting, Data Processing

mis Cm.D

M. D. McInnis

S\$10 0 11 0f **BCERNINE**

D. R. Cochrane Cochrane Consultants Ltd.

APPENDIX III

Statement of Expenditures

Geophysical Survey on the Tara Claim Group Liard Mining Division

Salaries

N. McInnis, Exploration Geologist Field Supervision for 10 days at \$35/day	\$ 350.00
G. Mitchell, 3rd year Geophysics student Field Supervision for 14 days at \$30/day	420,00
K. Wing, Cook	420,00
Cooking for 8 days at \$25/day	200,00
J. Wyman, Cook	
Cooking for 9 days at \$25/day	225.00
M. Abou, Cook	50.00
Cooking for 2 days at \$25/day	50.00
K. Koser, Expeditor	300,00
Expediting - 12 days at \$25/day	300.00
P. Dennis, Exploration Assistant 18 days at \$25/day	450,00
R. Dennis, Exploration Assistant	
10 days at \$25/day	250,00
C. Dennis, Exploration Assistant	
18 days at \$25/day	450.00
E. Quock, Exploration Assistant	
10 days at \$25/day	250.00
L. Quock, Exploration Assistant	
4 days at \$25/day	100.00
E. Dennis, Exploration Assistant	200.00
8 days at \$25/day	200.00
	\$3245.00
Supervision	<u> </u>
Supervision	
N. W. Reynolds, Exploration Manager	
5 days at \$70/day	350.00
Transportation	
Helicopter Charges - 9.8 hours at \$258/hr.	2528.00
Drafting Supplies	125.00

Consultant Charges

Rental of Hewitt 200 I.P. Unit and Operator2100.00Camp Supplies1875.00

TOTAL \$ 10223.00

Declar	red before me at the Varcoured	City	, in the	m. In forms
Province of	British Columbia, this November,			
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APPENDIX IV (a)

Instrument Specifications - IP

Transmitter Unit

Current pulse	period (D.C.	Pulse)
Manual initi	ated timer	
Current measur	ing ranges	

1 - 10 seconds 0 - 500 0 - 1000 milliam-0 - 5000 250 500 volts D.C. 1000 Nominal

Internal voltage converter 27 volt D.C. 350 watt output with belt pack batteries

500 watts using 27 volt aircraft batteries

Transmitter can switch up to 3 amps at 1000 volts from generator or battery supply with resistive load. The switching is done internally in the transmitter unit. Remote control output can switch up to 10 kilowatts of power by using a separate control unit. A remote control cord is supplied with auxiliary equipment.

Receiver Unit	
Self Potential Range	0 - 1000 millivolts
	l millivolt
	resolution
Integration time periods	
	1.6 seconds
Tandem Integration time	
	3.2 seconds
Input filtering	3 ranges plus 4
	integration
	combinations
Delay time from cessation	on of current
pulse	.3 seconds
(Combined Fhoto Electric	: Coupled Receiver and Transmitter)
Operation 'l'emperature	$.25^{\circ}F - 120^{\circ}F$
POWER SUPPLY	
Receiver Unit	4 Eveready E136 Mercury Batteries
	2 Eveready E134 " "
	2 Eveready 5401 " "
Transmitter Unit (recon.	. mode) Sealed Rechargeable 8 amp. hr. belt pack capable of driving the converter at 350 watts for a minimum of one day's operation before recharge.

Transmitter Unit (med. power mode) Aircraft 11 amp. hr. Battery

Battery Charger

Custom Automatic cutoff for charging sealed batteries.





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