

83 #959-12106.

REGIONAL INDUCED POLARIZATION SURVEYS

At the Tchaikazan River Project
Taseko Lake Area, B.C.

June - August 1983

This Report covers the following mineral claims
held by Suncor Inc.

922	Cougar-5	1068	Sun-10
1064	Sun-6	1143	Sun-16
1065	Sun-7	1272	Sun-26
1066	Sun-8	1276	Sun-40
1067	Sun-9		

on N.T.S. Sheets 92 0 / 4 and 5
centered on 51°11'N, 123°39'W
in the Clinton Mining Division

Part I

By: Paul A. Hawkins, P. Eng.
Suncor Inc.
Calgary, Alberta



Part II

By: Paul A. Cartwright, B.Sc.
Phoenix Geophysics Ltd.
Vancouver, B.C.

GEOLOGICAL BRANCH

October 1, 1983 **ASSESSMENT REPORT** Suncor Report #9466

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1.0 INTRODUCTION

Approximately 12.9 km Regional Induced Polarization Surveys were carried out by Phoenix Geophysics Ltd. on Suncor's Tchaikazan River Project. The purpose of these surveys was to evaluate and test new areas where there was limited outcrop and no pre-existing geophysical data base. The three lines surveyed are located on Drawing 83-241A.

The Tchaikazan River property hosts a porphyry system with copper and molybdenum mineralization and peripheral gold and silver mineralization. Work carried out for Rio Tinto in 1971 (Faminoff, P.J., and Petersen, D.B., 1971) outlined a IP anomaly associated with porphyry type mineralization which is exposed in the Hub area trenches. The IP anomaly detected by Rio Tinto is likely due to a disseminated pyrite halo surrounding a porphyry intrusive.

A program of Regional Induced Polarization was carried out with the aim of detecting any other similar anomalies to Rio Tinto IP anomaly in areas of limited outcrop such as Yohetta Valley and the ridge east of the Lord River Mine Development road near Upper Taseko Lake.

1.1 LOCATION, ACCESS AND PHYSIOGRAPHY

The Tchaikazan River project is located just west of the Taseko Lakes in south central British Columbia some 210 km (130 miles) north of Vancouver. The property is also 156 km from Williams Lake by air but can also be reached by road along the Bella Coola highway to Lee's Corners then south to the Lord River Mine development road, a distance of some 270 km. The property can also be reached by small aircraft using the Fishem Lake Airfield (800 m in length).

Weekly servicing was obtained out of Williams Lake using either 4-wheel drive trucks, a Britten Norman Islander, or a Bell Jet Ranger III depending on availability. The base camp was located on the south end of Fishem Lake adjacent to the Fishem Lake Airfield. Access to some portions of the surveyed lines covered in this report is by helicopter only. A Bell Jet Ranger III helicopter was based out of the Fishem lake airfield on an occasional short term basis.

The property is located within the Tyfaughton Trough just adjacent to the Coast Plutonic Complex. Several promising prospects are located nearby; Fish Lake (Cu, Au) 35 km to the north, Poison Mountain (Cu), 75 km to the west, Lord River (Au) 8 km to the south east and Banner (Cu) 13 km east. Several other claim blocks exist in the area held by individuals and companies but are not at an advanced stage of exploration.

The Taseko Lake area lies within the Coast Range Mountains. The area is cut by several U shaped valleys. The largest of which is the Taseko Lake Valley. It runs north-south and is one of the great U shaped valleys of the Cordilleran Interior System. This forms the eastern boundary of the property. Several other valleys

run approximately north-north-easterly and are of glacial origin. The melt water from the many glaciers in the area is very cloudy and carries a lot of sediment; causing the Tchaikazan River and the Taseko Lake to be very cloudy and almost a turquoise color. The other streams and lakes with run off or ground water sources run clear.

The wide valleys and alpine terrain in the area show a transition from a well forested valley bottom to upper open alpine slopes to glacial ice fields. Elevations range from about 4350' to RCAF Peak at 9400'. The tree line lies between 6500' and 7000'.

Discontinuous permafrost is present in many of the alpine slopes. Frost boils and mud flows are present on some slopes. During the spring run off period some areas of high angle slopes are mobile and fluid transport of soil is evident.

Most of the Induced Polarization Survey lines were confined to below the tree line. In some areas it would have been desirable to continue into the higher elevations, however, a lot of these areas are characterized by talus and high slope angles where good ground contact is difficult to obtain.

1.2 PROPERTY HISTORY AND PREVIOUS EXPLORATION

Prospecting in the Taseko Lake area in 1945 led to the discovery of gold and silver mineralization in the vicinity of the Tchaikazan River. This work was carried out under the supervision of Dr. Harry Warren of the University of British Columbia. The showings occur within the Charlie Group. The Charlie Group is located on Tchaikazan River, Zelon Option Map 81-075B. Limited sampling of these showings was undertaken and native gold, silver and hissite, a gold telluride, were found to occur in the quartz vein. Further investigations were carried on during the winter of 1946-47. The mineralization was described in a paper written by Warren in the Royal Society Transactions (Warren, Harry V., 1947). The Charlie Group was optioned to Conwest for further development, however, the option was allowed to lapse. No specific details regarding the work carried out is known.

In 1954 copper and molybdenum mineralization was located along the banks of the Tchaikazan River. Further trenching and sampling of the mineralization was also done. Harry Warren carried out a biogeochemical study of molybdenum on the property (Warren, Harry V., 1965).

Between 1966 and 1967 Falconbridge carried out limited soil sampling, a magnetometer survey, shallow trenching and eight drill holes totalling 1250 feet. In 1968 Copper Range Exploration Co. built a road from Fishem Lake to the Cu-Mo showings and carried out further trenching and a further magnetometer survey.

In 1969 Rio Tinto Exploration optioned the property and carried detailed work on the property until 1973 when it dropped its option. Rio carried out a detailed soil sampling program around the Hub area which revealed a significant Cu-Mo anomaly in

the Hub area. Further trenching on this anomaly did not intersect sufficient mineralization to explain the soil anomaly (Troup A.C., and Petersen, D.B., 1971). A magnetometer and induced polarization survey was carried out and revealed an extensive area of increased chargeability over the property with a roughly circular chargeability depression in the center of the grid area (Forminoff, P.J., and Petersen, D.B., 1971).

Rio Tinto carried out some 1501' in seven holes of diamond drilling but did not intersect sufficient mineralization to continue. In 1973 it dropped the option.

In 1979 Zelon Chemicals Ltd. (owned by John Hajek, a former Rio Tinto employee) optioned the property from Harry Warren. Zelon Chemicals carried out some limited prospecting and mapping in 1980. Late in 1980 Suncor optioned the property from Zelon Chemicals.

In 1981 a limited program of geological mapping, geochemical sampling and prospecting was carried out by a five man crew. A new grid was also cut with its origin at the Hub trenches. Additional acreage was acquired in the summer and fall of 1981 to bring the project area up to 13,000 hectares. Work carried out on the project in 1981 is covered by Suncor Report #9046 (Hawkins, P.A., 1981) and #9047 (Hawkins, P.A., 1982a). The majority of the work was confined to the Tchaikazan Valley. A limited amount of mapping was carried out elsewhere in the property.

In 1982 a 10 man crew was on site and carried out geological mapping on the property at a scale of 1:10,000; ground geophysics consisting of VLF-EM and Proton Magnetometer surveys; soil and rock geochem sampling (Hawkins, P.A., 1983a). In addition a

limited Induced Polarization Survey was carried out in the Haho area on the claim block (Hawkins, P.A., 1982b).

Exploration in 1983 consisted of further detailed mapping in the Hub area grid (Hawkins, P.A., 1983b) and during the months of August and July, a limited diamond drilling program in that area.

1.3 GENERAL GEOLOGY

The property is located just east of the margin of the coast Plutonic Complex in a basin of sedimentary and volcanic rocks called the Tyraughton Trough which forms part of the Inter-montaine Belt. Locally the property appears to be part of a NW trending belt of Cretaceous sediments and volcanics intruded by several recent felsic intrusive centres of Late Cretaceous or early Tertiary age.

Regional mapping carried out by the G.S.C. in the 1960's (Tipper, H.W., 1968) and (Tipper, H.W., 1978) was directed more towards the sedimentary rocks than the volcanics and intrusives. The sedimentary rocks are discussed extensively in G.S.C. Paper 67-54 (Jeletzky, J.A., and Tipper H.W., 1968). Therefore the G.S.C. mapping of the volcanics in the area is not reliable on a detailed scale.

The Cretaceous sediments and volcanics of the Taseko Lake area are probably part of the Taylor Creek Group. Sedimentary rocks in the project area include: shale, conglomerates, arkose, argillates, mudstone and sandstone. Volcanic and associated pyroclastic rocks in the area are: andesites, basalts, greywacke, tuff and agglomerates. Intrusive rocks of the area are: feldspar porphyry, quartz feldspar porphyry, granodiorite, diorite, pegmatite, felsite and lamprophyre dikes. The amount of alteration present sometimes hampers the field identification of rock type.

The field determinations of rock unit names appears to a consist problem in the Tchaikazan river area. A number of intrusives appear to be contemporaneous with similar composition volcanic flows. Alteration makes it difficult to distinguish

between some andesites and basalts. Another problem is with the pyroclastics where tuffs, greywacke and conglomerate grade into each other.

A number of porphyry intrusives occur on the property. They occur apparently both as plugs and as dikes or sills. Lack of good outcrop prevents complete mapping. In the Hub area trenches, where the most explored intrusive is exposed, low grade copper and molybdenum mineralization occurs. Potassic, phyllic and propylitic alteration is also present (Curtis, L.W., 1981). Several other intrusives in the area show secondary copper minerals such as malachite in isolated vein showings (Hawkins, P.A., 1983b).

A recent compilation of mineral resources and potential of the area has been completed as part of the Chilko Lake Deferred Planning Area Study (Northcote, K.E., 1982).

The geology in the area of the three Induced Polarization lines has been interpreted by the GSC (Tipper, H.W., 1978) as Felsite and Feldspar porphyry to biotite feldspar porphyry type rocks of Eocene age. Testing of the contact zones of these intrusives was considered a priority. The host rocks of the survey area are volcanic and associated pyroclastic rocks with minor amounts of sediments.

In summary, the regional IP lines were located so to attempt to cross intrusive type rocks where no outcrop was visible.

1.4 ASSESSMENT WORK SUMMARY

A total of 12.9 km of Regional Induced Polarization Surveys were carried out as part of a larger Induced Polarization program by Phoenix Geophysics Ltd. Costs for the program which included both pole-dipole and dipole-dipole (which was used on regional survey) are broken down on a per kilometer basis as shown on Table 1.1, Induced Polarization Survey Cost Breakdown.

Line cutting costs have also been included for these lines. The linecutting was carried out under contract by Roga Contracting of Williams Lake, B.C. Linecutting costs are as detailed in Table 1.2 Contract Linecutting Costs. On Table 1.3 the per claim breakdown is tabulated.

Included in all cost figures are field and operating support costs based on the number of field mandays. An estimate of \$300.00 per manday was used, however, final figures yielded a figure of \$304.73. The lower of the two was used in the preparation of Statement of Exploration and Development.

The Operating and Support cost was determined from Table 1.4 1983 Tchaikazan River Property Expenditures by taking all operating and support costs and prorated based on the number of mandays as shown on Table 1.5.

2.0 SPECIFICATIONS OF INDUCED POLARIZATION SURVEY AND EQUIPMENT

A Phoenix Model IPV-2 Phase IP and Resistivity receiver was used in conjunction with a Phoenix Model IPT-1 IP and Resistivity transmitter powered by a 2.0 kw motor-generator. IP effect is recorded directly as milliradians of phase shift between the transmitted current and the received voltage at an operating frequency of 1.0 hertz.

Apparent resistivity values are normalized in units of ohm-meters, while metal factor values are calculated according to the formula: $M.F. = (\text{phase angle} \times 10) \text{ apparent resistivity}$.

Dipole-dipole array was utilized to make all of the reconnaissance IP measurements, with a basic inter-electrode distance (dipole length) of 100 meters. Three dipole separations were recorded in every case.

Field work was carried out during June, July and August of 1983, under the supervision of Mr. Peter Gardner, geophysical crew leader. His certificate of qualifications is included with this report. P. Cartwright also made three visits to the property during the course of the survey.

2.1 PRESENTATION OF INDUCED POLARIZATION DATA

The Induced Polarization and Resistivity results are plotted using the psuedo section format as illustrated on the legends of the individual data plots.

The following data pseudo sections are included with this report:

Line	Electrode Interval	Dwg. No.
YL 54 + 75W	100 meters	5837-1
YL 47 + 25W	100 meters	5837-2
L 17 + 50N	100 meters	5837-3

The definite, probable and possible Induced Polarization anomalies are indicated by bars, in the manner shown on the legend, 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 100 meter electrode intervals the position of a narrow sulphide body can only be determined to lie between two stations 100 meters 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.

2.2 DISCUSSION OF INDUCED POLARIZATION RESULTS

Two lines were surveyed in the northwestern corner of the Tchaikazan River property across the Yohetta Creek Valley, and are shown on plan map 83-241A (Line YL 54 + 75W, Line YL 47 + 25W).

A number of anomalous IP responses are evident in the data. None of the individual anomalies display high magnitude IP values; rather, moderately to weakly anomalous values are recorded. This fact, combined with the only moderately lower than background apparent resistivity readings noted coincident with the anomalous IP effects, suggests that relatively low concentrations of stringered or disseminated sulphide mineralization are the source of the anomalous IP indications.

Because only two, widely spaced lines were surveyed, it is difficult to ascertain the correct relationships between the various anomalies. However, one interpretation of the existing data would be that 3 roughly parallel zones of mineralization are present. These zones would strike approximately east-west, with one zone being located near the northern ends of the lines, one near the centre region, and one closer to the southern ends.

Line L 17 + 50N was surveyed in an east-west direction in the southeastern quadrant of the property, and is also shown on plan map 83-241A.

Six generally low magnitude IP anomalies are outlined by the data from this line. Minor concentrations of disseminated sulphide mineralization are the probable cause of these IP responses.

2.3 SUMMARY AND RECOMMENDATIONS

Three lines have been surveyed using the Induced Polarization and Resistivity technique on the Tchaikazan River Property, operated by Suncor Inc.

Anomalous IP responses are evident in the data from every line. Disseminated metallic mineralization probably accounts for most of the interesting IP effects, with generally greater concentrations of mineralization being detected in the Yohetta Valley portion of the survey.

Additional Induced Polarization and Resistivity surveying is required to better define the anomalies outlined by the 1983 surveying. It is recommended that several widely spaced lines, parallel to the existing lines, be surveyed to first determine the extent of any anomalous zones. More detailed work could then be planned.

Paul A. Cartwright
Geophysicist

December 12, 1983

CERTIFICATE

I, Paul A. Cartwright, of the City of Vancouver, Province of British Columbia, do hereby certify that:

1. I am a geophysicist residing at 4238 W. 11th Avenue, Vancouver, B.C.
2. I am a graduate of the University of British Columbia, B.C. with a B.Sc. Degree.
3. I am a member of the Society of Exploration Geophysicist and the European Association of Exploration Geophysicists.
4. I have been practising my profession for 13 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 Suncor Inc. 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 VANCOUVER, B.C., this 12th day of December, 1983.

Paul A. Cartwright

Paul A. Cartwright, B.Sc. *Per [Signature]*

CERTIFICATE

I, Peter Gardner, of the City of Toronto, Province of Ontario, do hereby certify that:

1. I am a geophysical crew leader residing at 393 Connaught Avenue, Willowdale, Ontario.
2. I am a graduate of Radio College of Canada in Electronics Technology.
3. I have been practicing my vocation about six years.
4. I am presently employed as a geophysical crew leader by Phoenix Geophysics Ltd., of 200 Yorkland Blvd., Willowdale, Ontario.

DATED AT VANCOUVER, B.C., this 12th day of December, 1983.

Peter Gardner

TABLE 1.1
 1983 TCHAIKAZAN RIVER PROJECT
 INDUCED POLARIZATION SURVEY
COST BREAKDOWN

CONTRACTORS PRORATED SURVEY COSTS

Mobilization - Demobilization	\$ 1,920.00
Weather Days 5.25 days @ \$660	3,465.00
Travelling Expense Geophysicist	347.16
Report Preparation	1,500.00
	\$ 7,232.16

SUNCOR'S PRORATED FIELD COSTS

Supervision and Camp Operating Costs 216 mandays @ \$300.00	\$64,800.00
Fuel and Oil 1200 litres @ 53¢	636.00
Helicopter Support 21 hours @ \$500.00	10,500.00
	\$75,936.00

POLE-DIPOLE SURVEY (27.30 km)

29.25 days @ \$350	\$10,237.50
27.3 km @ \$425	11,602.50
57% of Contractors Prorated Survey Costs	4,122.33
57% of Suncor Prorated Field Costs	43,283.52
	\$69,245.85
All Up Cost Per Km	\$ 2,536.48

DIPOLE-DIPOLE SURVEY (20.65 km)

17.5 days @ \$890.00	\$15,575.00
43% of Contractors Prorated Survey Costs	3,109.83
43% of Suncor Prorated Field Costs	32,652.48
	\$51,337.31
All Up Cost Per Km	\$ 2,486.07

P.A. Hawkins
 Oct. 1, 1983

TABLE 1.2
 1983 TCHAIKAZAN RIVER PROJECT
CONTRACT LINECUTTING COSTS

	TOTAL	PER KM
Linecutting Invoice Cost	\$20,383.05	\$ 355.73
Operating and Support Costs (128 x \$300)	38,400.00	670.16
Fuel and Oil	1,210.00	21.12
Helicopter Support	<u>5,000.00</u>	<u>87.26</u>
	\$64,993.05	\$1,134.27

P.A. Hawkins
 Sept. 5, 1983

TABLE 1.3
 1983 TCHAIKAZAN RIVER PROJECT
 REGIONAL INDUCED POLARIZATION
SURVEY APPLICATION

RECORD #	CLAIM NAME	KM	LINECUTTING COSTS	IP SURVEY	TOTAL
1064	SUN-6	3.4	3856.52	8452.64	12,309.16
1065	SUN-7	0.5	567.14	1243.04	1,810.18
1066	SUN-8	2.6	2949.10	6463.78	9,412.88
1067	SUN-9	0.7	793.99	1740.25	2,534.24
1068	SUN-10	1.4	1587.98	3480.50	5,068.48
1143	SUN-16	2.0	2268.54	4972.14	7,240.68
1272	SUN-26	1.0	1134.27	2485.07	3,680.34
1276	SUN-40	0.9	1024.84	2237.46	3,262.30
922	COUGAR-5	<u>0.4</u>	453.71	994.43	<u>1,448.14</u>
		12.9			46,766.05

P.A. Hawkins
 Oct. 1, 1983

1983 TCHAIKAZAN RIVER PROJECT
PROPERTY EXPENDITURES

ITEM	TOTAL	PRORATEABLE OPERATING AND SUPPORT COST	APPLICABLE TO FOOTAGE RATE FOR DRILLING
Salaries	92,464.05	48,006.00	
Travel, Accommodation and Freight	15,923.57	15,923.57	
Food	21,977.58	21,977.58	
Camp Costs and Equipment	16,429.99	16,429.99	
Communication Expense	7,049.69	7,049.69	
Office Supplies	1,535.79	1,535.79	
Warehouse Rental	7,334.20	7,334.20	
Fuel and Oil	28,895.40	18,895.40	8,000.00
Operational Costs	2,849.16	2,849.16	
Helicopter Support	92,562.31	46,281.16	
Fixed Wing Support	31,800.65	31,800.65	
Truck Rental and Maintenance	19,158.23	12,772.23	6,386.00
Equipment Rental	1,476.75	1,475.75	
Technical Equip Rental	7,075.84	--	
Technical Equip Purchase	3,720.72	3,720.72	
Heavy Equipment	56,111.49	--	
Linecutting	24,983.05		
Location Survey	8,244.47		
Geophysical Survey (IP)	42,698.45		
Analyses	25,723.59		
Contract Labour	25,159.41	25,159.41	
Diamond Drilling	121,166.39		121,166.39
Environmental Studies	1,128.54	1,128.54	
Reclamation Activities	518.42		518.42
Subtotal	655,987.74	262,340.84	136,070.81
Off Property Operating Cost	65,598.77	26,234.08	13,607.08
TOTAL PROPERTY EXPENDITURES	721,586.51	288,574.92	149,677.89

P. A. Hawkins
November 10, 1983

TABLE 1.5

1983 TCHAIKAZAN RIVER PROJECT
PRORATED FIELD OPERATING AND SUPPORT
COST CALCULATION

Total Field Operating and Support Costs (as per 1983 Property Expenditures)	\$288,574.92
Total Field Mandays (as per Prorated per Manday Summary)	947.0
Calculated Prorated per Manday Field and Operating Support Cost (Operating and Support Costs Field Mandays)	\$ 304.73

P.A. Hawkins
Nov. 10, 1983

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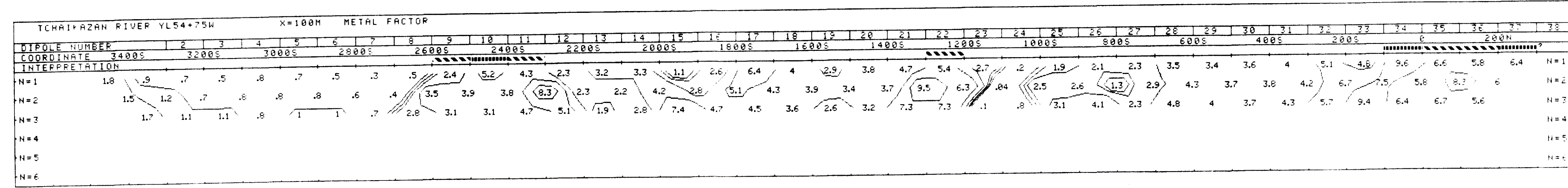
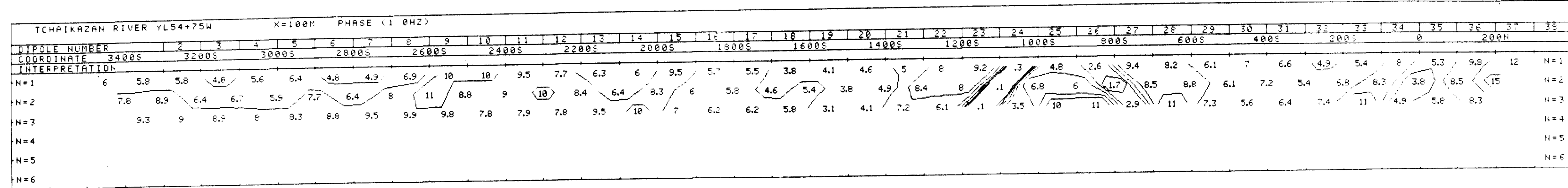
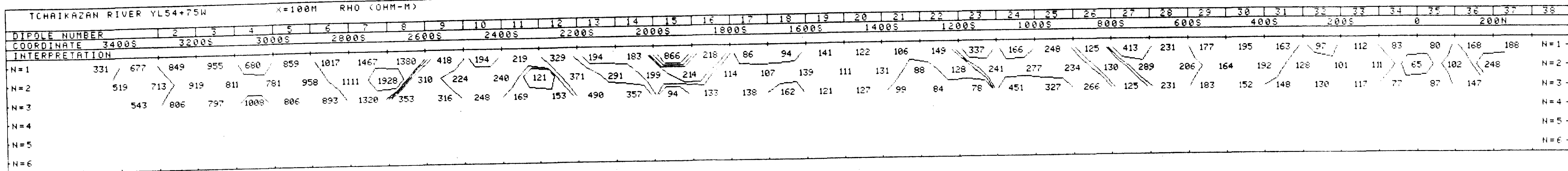
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GEOLOGICAL BRANCH ASSESSMENT REPORT

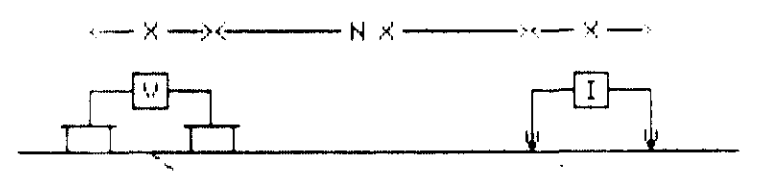
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SUNCOR INC.

TCHAIKAZAN RIVER PROJECT

CLINTON M.D. B.C.

LINE NO. -YL54+75W



PLOTTING POINT X X=100M

SURFACE PROJECTION OF ANOMALOUS ZONE

DEFINITE
 PROBABLE
 POSSIBLE

FREQUENCY (HERTZ) 1.0 DATE SURVEYED: AUG 1983
 APPROVED

NOTE - CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5 -2.-3.-5.-7 5.-10
 DATE DEC 12/83

PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

SUNCOR INC.

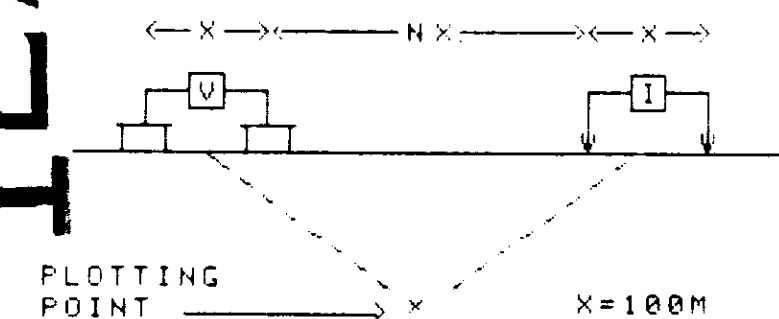
TCHAIKAZAN RIVER PROJECT

CLINTON M.D. B.C.

LINE NO - YL47+25W

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SURFACE PROJECTION OF ANOMALOUS ZONE

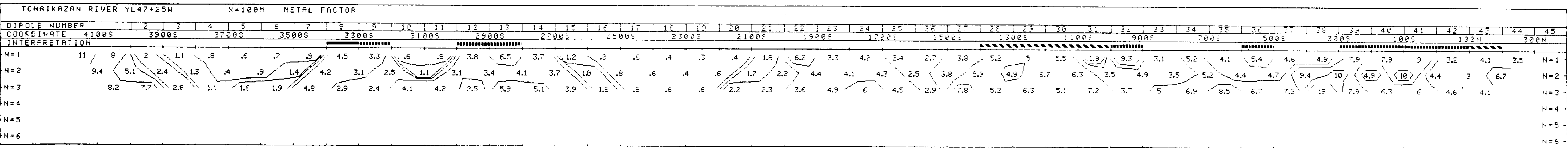
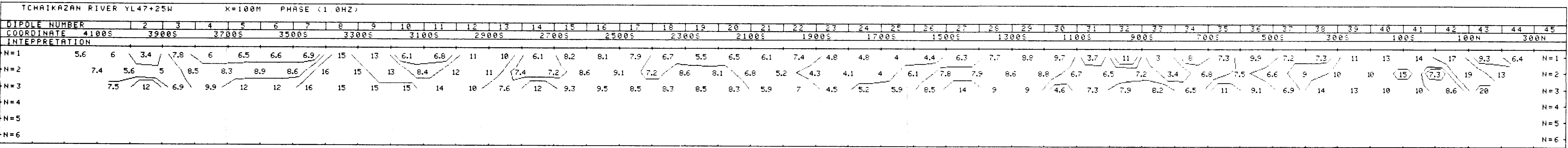
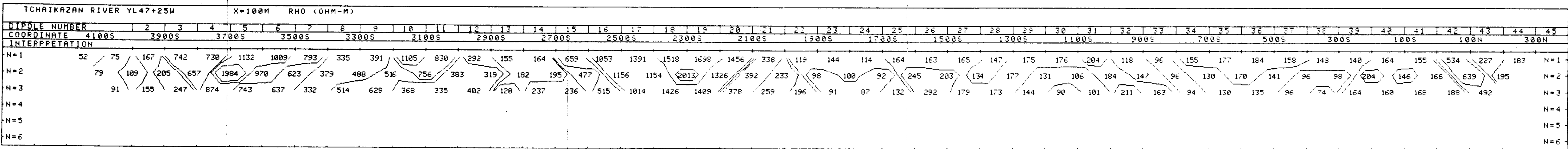
DEFINITE
 PROBABLE
 POSSIBLE

FREQUENCY (HERTZ) 1.0 DATE SURVEYED AUG 1983
 APPROVED

NOTE - CONTOURS AT LOGARITHMIC INTERVALS 1:-1.5 -2:-3, -5:-7.5, -10
 DATE DEC 12/83

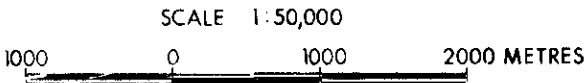
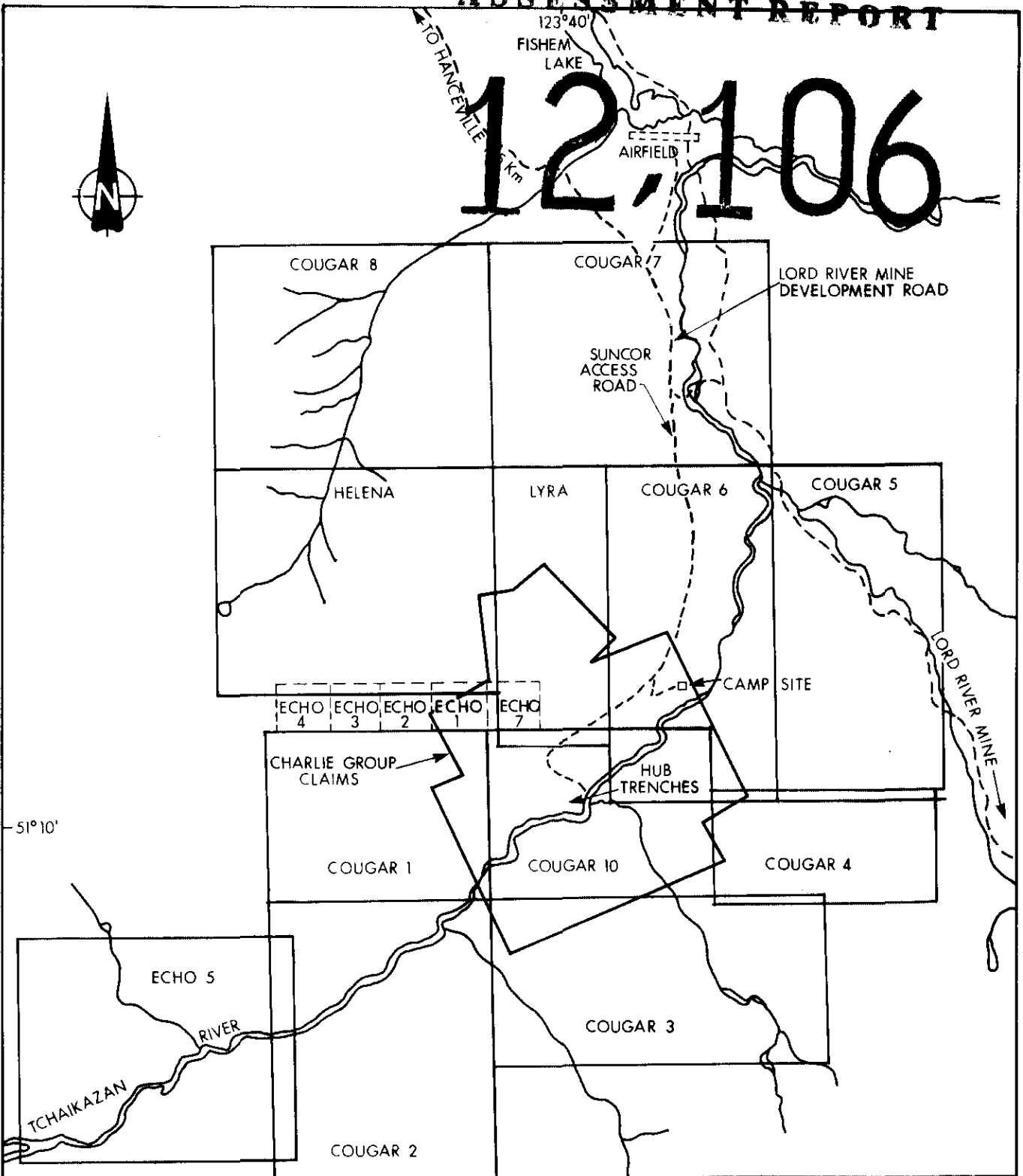
PHOENIX GEOPHYSICS LTD.

INDUCED POLARIZATION
 AND RESISTIVITY SURVEY

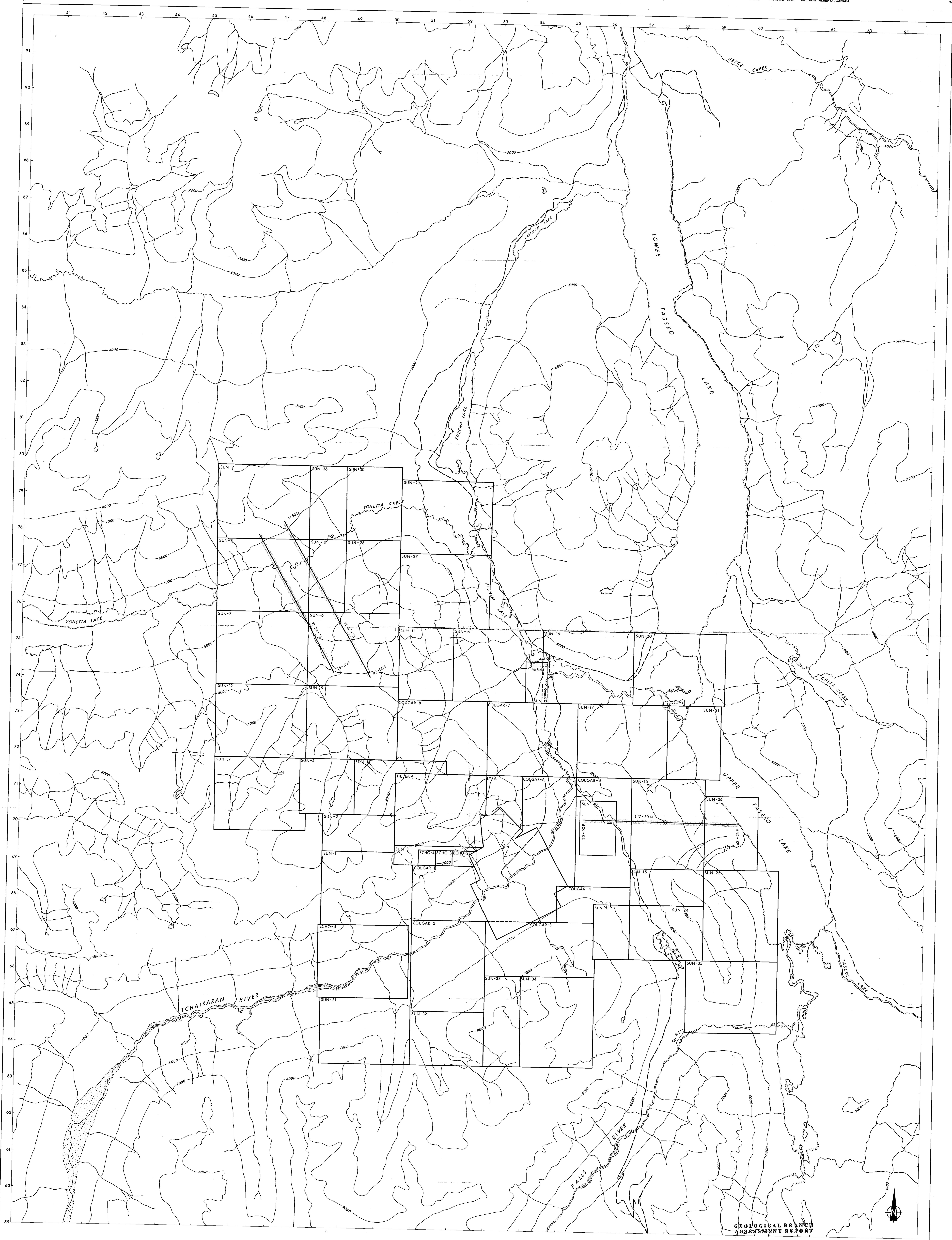


GEOLOGICAL BRANCH ASSESSMENT REPORT

12,106



SUNCOR Inc. Resources Group		COAL AND MINERALS DEPARTMENT	
TCHAIKAZAN RIVER ZELON OPTION			
LOCATION MAP			
TASEKO LAKE AREA, BRITISH COLUMBIA			
DATE	SCALE	N.T.S.	DRAWING No.
APR 81	1:50,000	92-0/4	81-075-B



GEOLOGICAL BRANCH
4385-57 SWINT REPORT

12,106

Metres 1000 0 1500 2000

Suncor Resources Group		COAL AND MINERALS DEPARTMENT	
LOCATION MAP			
REGIONAL INDUCED POLARIZATION SURVEYS			
TCHIKAZAN RIVER PROJECT			
TASEKO LAKE AREA, B.C.			
DATE	SCALE	INT'D.	DRAWING No.
83-08	1:25,000	920/4	83-241-A