

1972 Induced Polarization/Resistivity Survey

SPOUT LAKE PROPERTY - NORTHWEST PORTION OF THE  
CENTRAL GRID ON THE WC CLAIMS 13 and 14

Located 14 air miles north of Lac La Hache  
Latitude  $51^{\circ}49'$  Longitude  $121^{\circ}23'$  92 P 14  
Cariboo Mining Division

By G.M. Leary, G.M. DePaoli and  
J.F. Allan, P.Eng. (B.C.)

Work was carried out on September 1, 1972

92P/14W

4029

1972 INDUCED POLARIZATION RESISTIVITY SURVEY  
REPORT

4029

TITLE Spout Lake Property - Northwest  
Portion of the Central Grid on  
the WC Claims

AUTHORS G.M. Leary, G.M. DePaoli and  
J.F. Allan, P.Eng. (B.C.)

DATE November 1972

COMMODITY Cu

LOCATION-Area Lac La Hache  
-Mining Division Cariboo  
-Coordinates Latitude 51°49' Longitude 121°23'  
-NTS 92 P 14

AMAX Vancouver Office

Department of	
Mines and Petroleum Resources	
ASSESSMENT REPORT	
NO. 4029	MAP

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## SUMMARY

The Spout Lake Property (135 claims) is located within rolling terrain of the Interior Plateau on the north and south sides of Spout Lake, situated 14 air miles north of Lac La Hache, British Columbia. In 1972, an induced polarization survey, totalling 1-3/5 line miles, was conducted over a copper showing within the northwestern portion of the Central Grid that covers claims on the south side of Spout Lake.

Regionally the property is situated within a narrow belt of Upper Triassic Nicola Group rocks near the western margin of the Quesnel Trough. Claims occupy part of the southwestern segment of a large annular magnetic high that largely lies peripheral to a monzonite stock. The magnetic high coincides with areas underlain by Nicola strata and syenodiorite intrusions.

The Central Grid of the Spout Lake Property is underlain by a northeasterly dipping sequence of Nicola basalt flows overlain by basaltic breccias, tuffs, and volcanic sediments. Three skarn-type copper showings are known within the grid area. They occur in breccias, tuffs and volcanic sediments. Showings are characterized by replacement bodies of magnetite-chalcopyrite-pyrite associated with tourmaline, calcite and lime silicate minerals.

Results of an induced polarization survey over one of the copper showings located in the northwestern portion of the Central Grid were largely negative. No above background chargeable bodies were located by the survey.

## INTRODUCTION

The Spout Lake Property is located within the Interior Plateau 14 air miles north of Lac La Hache on the northwest and southeast sides of Spout Lake (Figures 1, 2 and 3). Claims are readily accessible by secondary roads. This report covers the results of an induced polarization survey carried out September 1, 1972, on the northwestern portion of the Central Grid covering claims on the south side of Spout Lake. The survey was carried out over and in the vicinity of a known copper showing exposed on WC 10 and 12 claims.

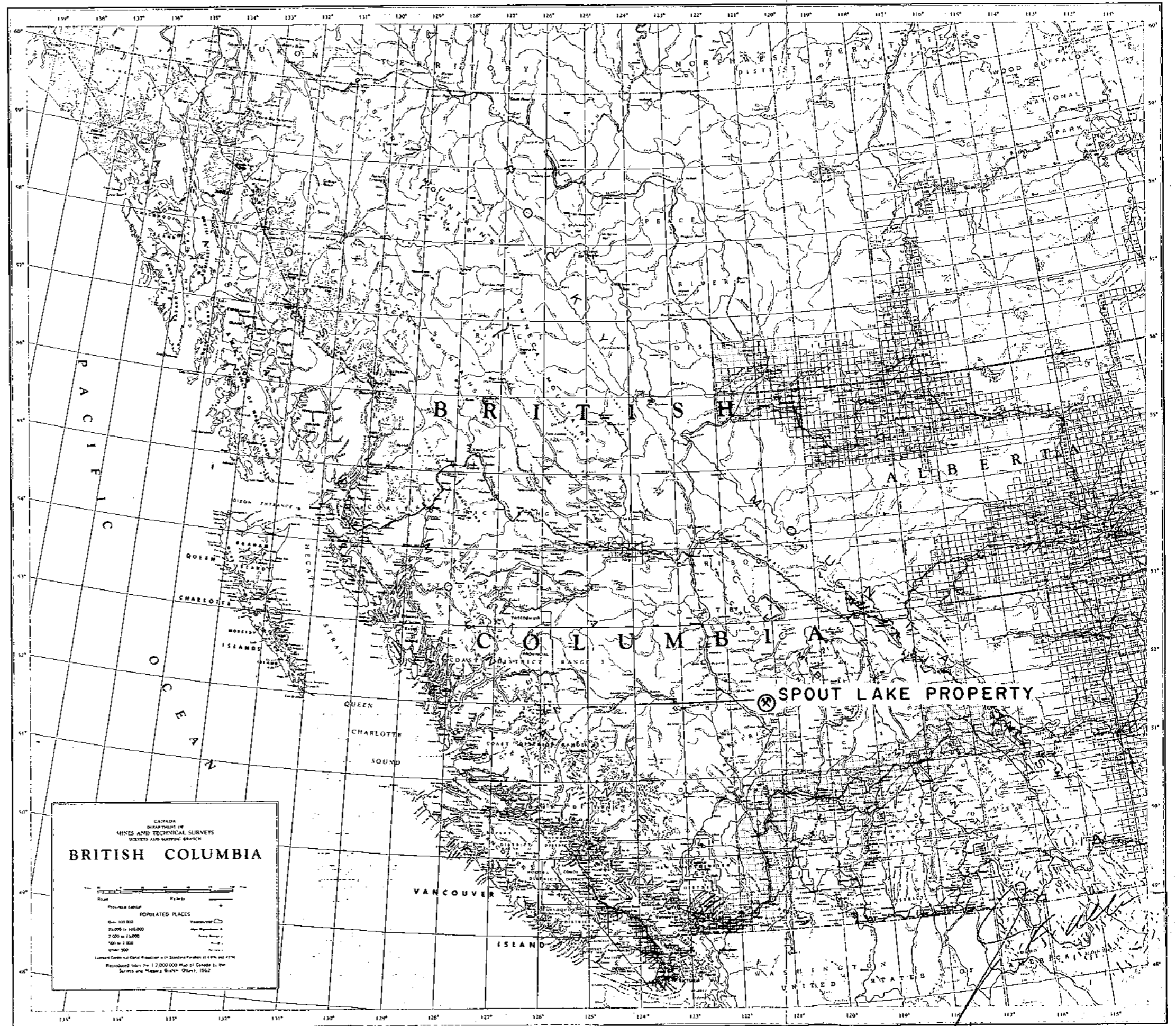
Topography of the Central Grid area consists of a few rounded hills up to 4000 feet altitude separated by low lying relatively-flat ground that gently dips towards Spout Lake on the north at an altitude of 3500 feet. Swamps and marshy ground locally occur adjacent or near northerly flowing streams in the eastern and northwestern portions of the grid area. Vegetation varies from open stands of jackpine on hill tops to small, thick stands of jackpine and deciduous trees in low lying areas.

The present survey was carried out on WC 9 - 12 claims. The area consists of open to thick timber stands with variable amounts of underbrush and open swampy areas in gently westerly-sloping to flat ground.

## REGIONAL GEOLOGY AND AEROMAGNETICS

The Spout Lake Property is regionally situated within a northwest to northsouth trending belt of Upper Triassic Nicola Group volcanic and sedimentary rocks, up to ten miles wide, located near the western margin of the Quesnel Trough (Figure 3). The belt lies between the Jurassic Takomkane batholith on the east and overlying Miocene plateau basalts to the west. Nicola rocks locally are intruded by diorite to monzonite and occasionally syenite stocks and dykes.

Aeromagnetically the property occupies the southwestern



CANADA  
DEPARTMENT OF  
MINES AND TECHNICAL SURVEYS  
MAPS AND SURVEYING BRANCH

**BRITISH COLUMBIA**

Scale: 1:100,000

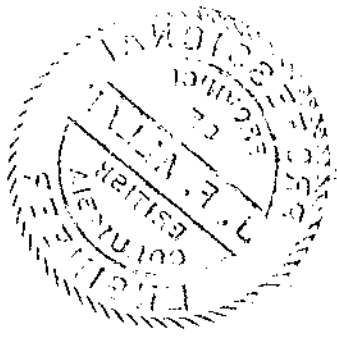
POPULATED PLACES

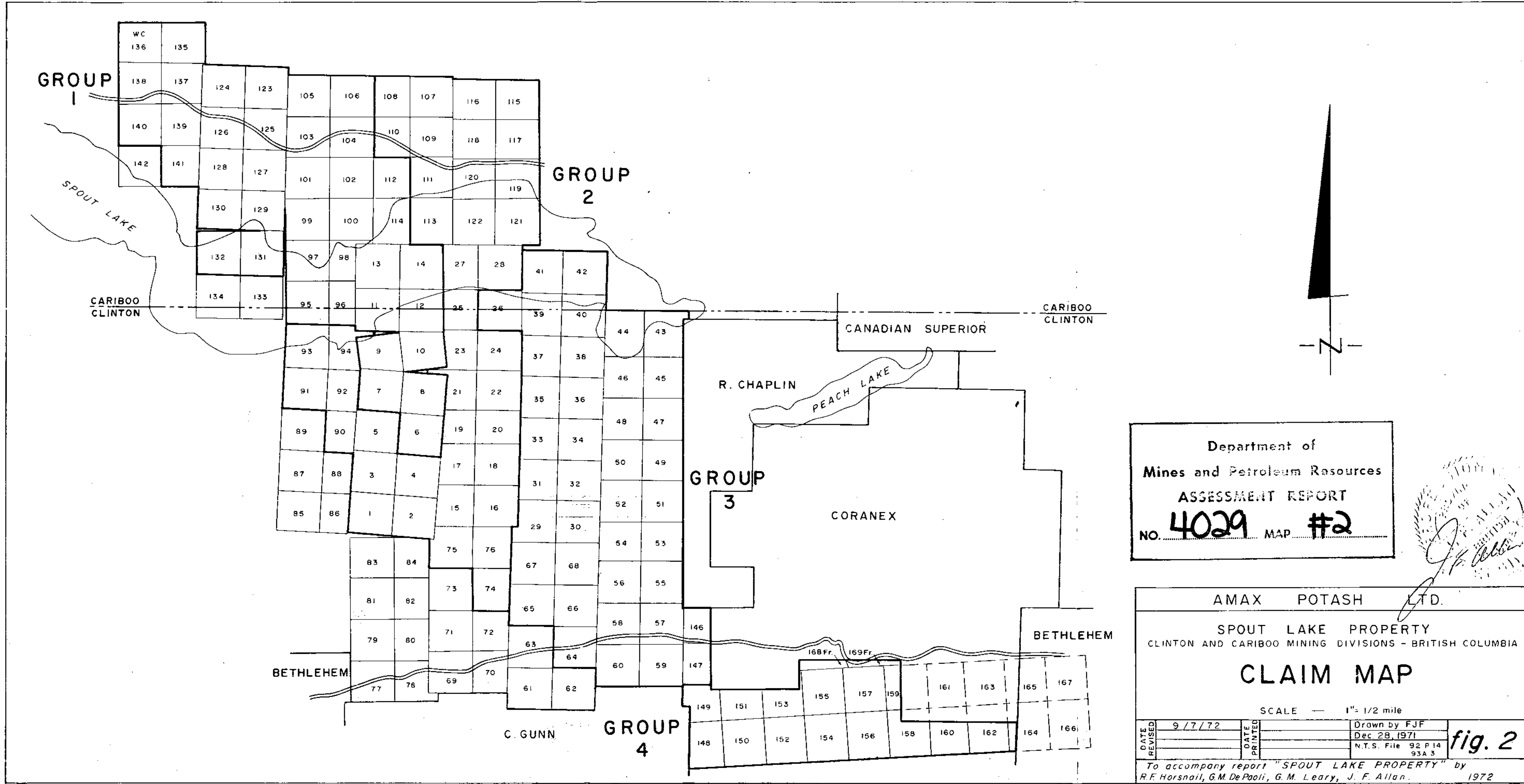
Over 100,000	Yellow
25,000 to 100,000	Orange
7,500 to 25,000	Red
1,000 to 7,500	Black
Under 1,000	White

Least Squares Central Meridian Projection with Standard Parallels at 49° and 51°N  
Reproduced from the 1:250,000 Map of Canada by the  
Survey and Mapping Branch, Ottawa, 1962

LOCATION MAP Fig. 1

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4029 MAP #1





Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. **4029** MAP #2

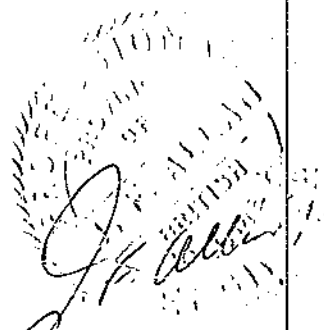
AMAX POTASH LTD.  
 SPOUT LAKE PROPERTY  
 CLINTON AND CARIBOO MINING DIVISIONS - BRITISH COLUMBIA

**CLAIM MAP**

SCALE — 1" = 1/2 mile

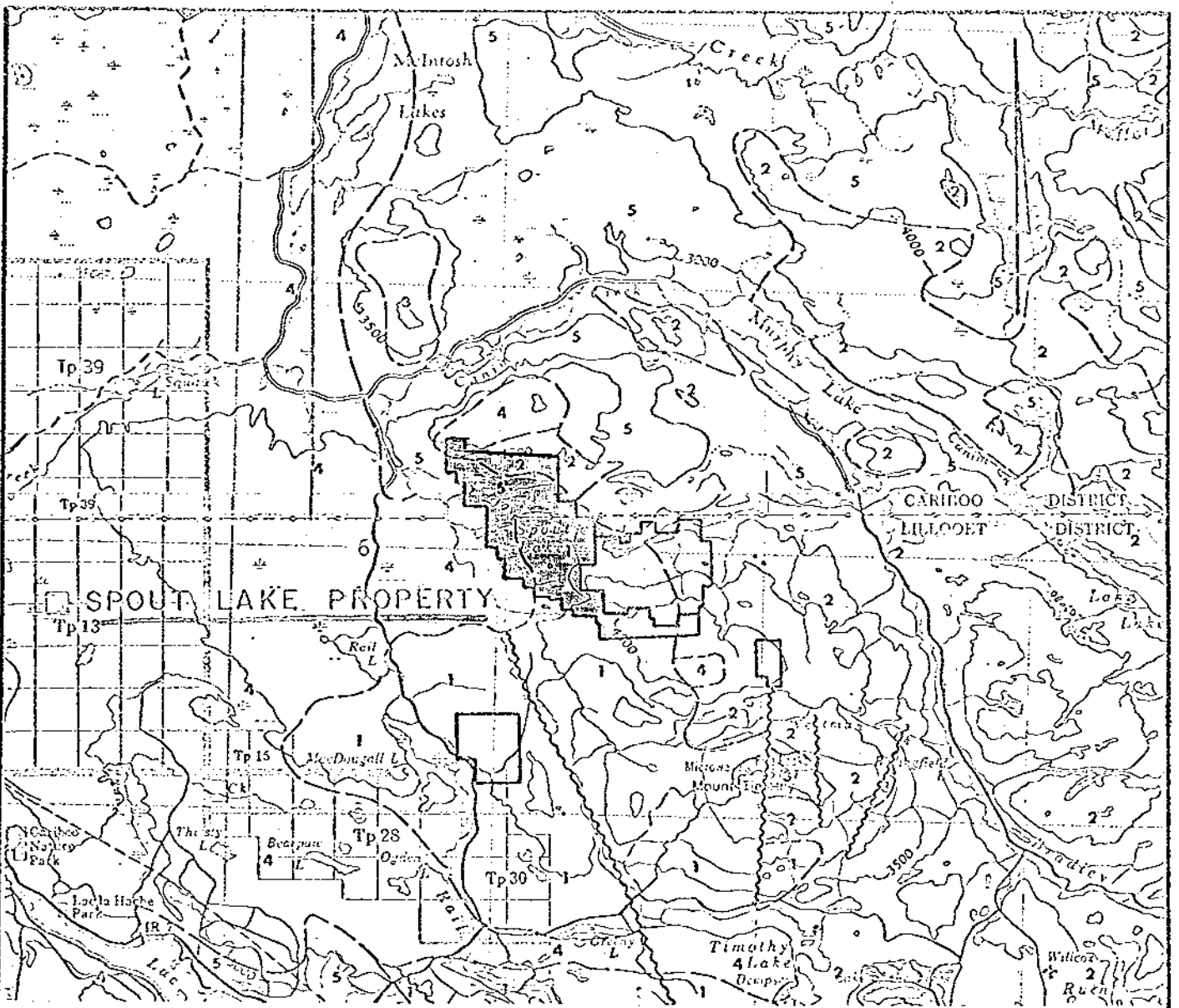
DATE REVISED	9/7/72	DATE PRINTED		Drawn by FJF
				Dec 28, 1971
				N.T.S. File 92 P14 93A.3

To accompany report "SPOUT LAKE PROPERTY" by  
 R.F. Horsnail, G.M. DePaoli, G.M. Leary, J. F. Allan. 1972



**fig. 2**





LEGEND

QUATERNARY

5 Glacial deposits and alluvium.

TERTIARY

4 Plateau basalts.

3 KAMLOOPS GROUP - Basic to acid volcanic rocks.

JURASSIC

2 TAKOMKANE BATHOLITH - Basic to acid granitic rocks.

UPPER TRIASSIC - LOWER JURASSIC

1 NICOLA GROUP - Volcanic and sedimentary rocks.

4029 M3

AMAX POTASH LIMITED

SPOUT LAKE PROPERTY  
WC CLAIMS

CLINTON AND CARIBOO MINING DIVISIONS - BRITISH COLUMBIA

REGIONAL GEOLOGICAL MAP

SCALE 1 : 250,000

H. P.

EM 4029



Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4029 MAP #3

segment of a regional annular magnetic high that largely lies peripheral to a hornblende monzonite stock. The magnetic high largely coincides with areas underlain by Nicola strata and syenodiorite intrusions (re: Sutherland-Brown, 1968 B.C. Department of Mines Annual Report, pp. 155-159). Locally, the region of the magnetic high is covered by a thin veneer of Tertiary plateau basalts.

#### PROPERTY GEOLOGY

Property geology is only briefly discussed since it was described in an earlier assessment report (i.e. 1971 Geochemical and Geophysical Report on the Spout Lake Copper - #3690 Property by C.J. Hodgson and G.M. DePaoli).

The Central Grid area is underlain by a moderately to steeply northeast-dipping sequence of Nicola rocks comprised of a "lower unit" of augite basalt flows and an "upper unit" of interbedded augite basalt flows, tuffs and breccia and volcanic sandstone, siltstone, argillite and greywacke.

Three skarn-type copper showings are present within the grid area. They consist of chalcopyrite-magnetite-pyrite mineralized horizons within the "upper unit" or within rocks interbedded with the "lower unit" that are similar to those of the "upper unit". Calcite, tourmaline and several lime silicate minerals are associated with mineralized horizons.

The best showing within the grid area occurs within claims WC 24 and 26. Here, minor sulphides occur throughout a north-south trending zone measuring up to 1000 feet wide and 2200 feet long. Sulphides mainly occur in skarned limy basaltic breccias. Higher grade magnetite-rich beds occur locally within the mineralized zone.

Minor sulphides, including pyrite, pyrrhotite and chalcopyrite with associated magnetite, occur disseminated in thinly bedded argillite and lime silicates over an area measuring

400 feet by 400 feet within claims WC 48 and 50 in the southeastern portion of the grid.

Another showing, similar to that on claims WC 24 and 26, occurs in skarned limy basaltic breccia in the northwestern portion of the grid on WC 10 and 12. Here, weak copper mineralization occurs over an area measuring 1000 feet by 500 feet. It is open to the north and west. The present induced polarization survey covered the above showing and immediate area.

### INDUCED POLARIZATION/RESISTIVITY SURVEY

#### Introduction and Theory

On September 1, 1972 approximately 1-3/5 line miles of induced polarization/resistivity surveying was completed on the Central Grid of the WC claims. The surveyed area encompasses a copper showing exposed on claims WC 10 and 12 in the northwestern portion of the grid. The survey was executed by AMAX personnel with Garry M. DePaoli operating the receiver. A dipole-dipole configuration was employed utilizing a two hundred foot dipole length and reading only the first separation ( $a = 200$  feet,  $n = 1$ ).

The term induced polarization means electrical polarization (i.e. separation of charges) induced by an applied electric field. The cause of this polarization is changes in the mobilities of ions within a rock. At the interfaces between zones of different mobilities, excesses or deficiencies of ions occur; the concentration gradients developed oppose the current flow and cause a polarizing effect. When mineral grains block the pore passages of rocks and a current is applied, a concentration of ions builds up at the electrolyte (water)-metal interface while awaiting an electrochemical reaction which must occur before the electric charge can be transferred from an ion in the electrolyte to a free electron in the metal. This storage of electrochemical energy at an electrolyte-metal interface is the most important cause of induced polarization in rocks.

In the pulse-transient or time domain method that was employed, the interfaces within the rock were polarized by applying a steady direct current. The current was then abruptly terminated and measurement was made of the small decaying voltage caused by the polarized charges returning to equilibrium.

#### Instrument and Procedure

AMAX's portable induced polarization unit was used for the survey. The equipment consists of the LPR-7 Newmont-type receiver (15 pounds) and the IPC-7 25 watt battery powered transmitter (13 pounds). The receiving dipole consisted of a 200 foot length of wire connected to porous pots filled with a saturated solution of  $\text{CuSO}_4$ . The transmitting dipole employed a 200 foot length of wire connecting four foot stainless steel rod electrodes.

Survey procedure required four men equi-spaced 200 feet apart along the line. The advance man prepared the electrode site for the lead potential electrode by digging a small hole. When moving the array the lead man advanced the potential dipole wire two hundred feet. The second man operated the receiver. He normally situated his electrode in the same site the lead man prepared. Because distance permits, the receiver operator signals moves and transmitter "on" periods by voice. The third man operates the transmitter. He establishes his current electrode and advances the 200 foot current dipole wire. The trailing man prepares the second current electrode site. Using vicegrip pliers the last two "current" men retract the stainless steel rods they have hammered into the ground and re-use them on the next set-up.

#### Results and Discussion

The chargeability in milleseconds and the resistivity in ohm-meters have been plotted and contoured in plan view as presented on Figures 4 and 5 respectively.

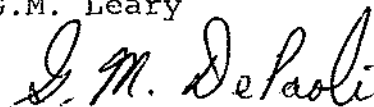
On the basis of consistency of resistivity values  $\geq 250$  ohm-meters, most or all of the data obtained has not been

significantly masked by overburden or by wet and swampy ground conditions.

No above background chargeable bodies were detected by the survey. Range of chargeability is from 7.5 to 16.5 milliseconds. A small northsouth trending resistivity high (i.e. >600 ohm-meters) broadly correlates with the surface distribution of copper mineralization. This high is probably due to resistive magnetite present in increased amounts in rocks within the region of copper mineralization.

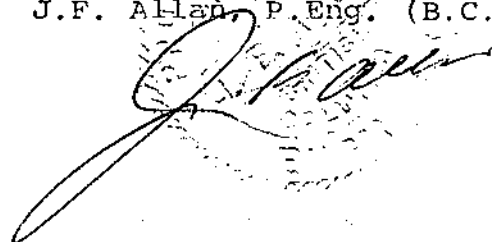
November 1972

G.M. Leary



G.M. DePaoli

J.F. Allan, P. Eng. (B.C.)



APPENDIX I

STATEMENT OF COSTS

Expenses incurred on the WC 9-12 inclusive claims (all part of Group No. 1) on September 1, 1972

Summary of Work

Induced Polarization Survey - 1 3/5 line miles

Personnel and Salaries

G.M. DePaoli, BSc. Geophysicist - 601-535 Thurlow Street, Vancouver 5, B.C.	1 day @ \$55.00/day	\$ 55.00
G.C. Stock, Junior Assistant - 1725 West 16th Avenue, Vancouver, B.C.	1 day @ \$23.00/day	23.00
Nickolas Sworyk, Junior Assistant - Box 235, Houston, B.C.	1 day @ \$25.00/day	25.00
C.J. Hodgson, M.Sc. Geologist - 601-535 Thurlow Street, Vancouver 5, B.C.	1 day @ \$60.00/day	60.00

Room and Board

4 man days @ \$10.00/day 40.00

Vehicle

1 day @ \$20.00/day 20.00

Induced Polarization Unit Rental

1 day @ \$50.00/day 50.00

Report preparation and drafting

75.00

TOTAL \$348.00

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This work is to be applied for 1 years assessment on WC 13 and 14 (all part of Group No. 1)

(over)

A handwritten signature in cursive script is written over a circular stamp. The stamp contains some illegible text, possibly a date or a reference number.

Declared before me at the *City*  
of *Vancouver*, in the  
Province of British Columbia, this *14*  
day of *December*, 1972, A.D.

*Henry W. Brown*

*S. Jeanette*  
~~A Commissioner for taking Affidavits within British Columbia or~~  
~~A Notary Public in and for the Province of British Columbia.~~

**SUB-MINING RECORDER**





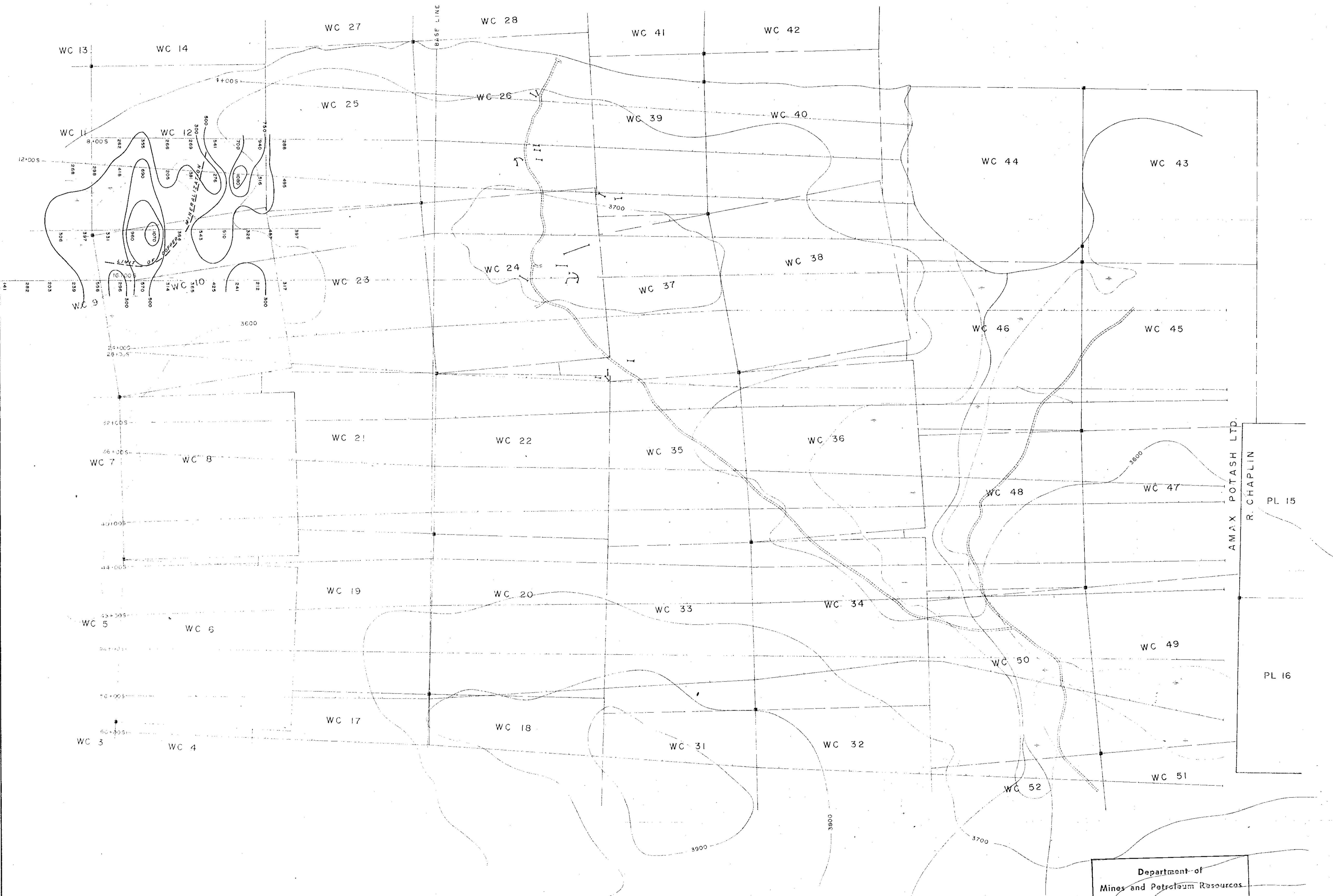
APPENDIX II

CLAIM DATA

<u>Claim Name</u>	<u>Record Number</u>	<u>Recording Date</u>	<u>Anniversary Date</u>
WC #13	63318	June 29, 1971	June 29, 1974
WC #14	63319	June 29, 1971	June 29, 1974

Claims are all part of Group No. 1

SPOUT LAKE  
(Elev. 3535')



LEGEND

- Picket line, resistivity readings in ohm meters.
- Claim post, claim location line.
- Claim boundary line.
- Road.
- Stream.
- Swamp, swamp boundary.
- 3500 - Topographic contour, contour interval 100'.

Receiver I.P.R. - 7  
 Transmitter 25 Watt  
 Array Dipole - dipole q = 200' n = 1  
 Operator G.M. DePaoli  
 Date Sept. 1, 1972.  
 Contour interval 2 milliseconds.

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 4029 MAP #5

SCALE 1" = 400'

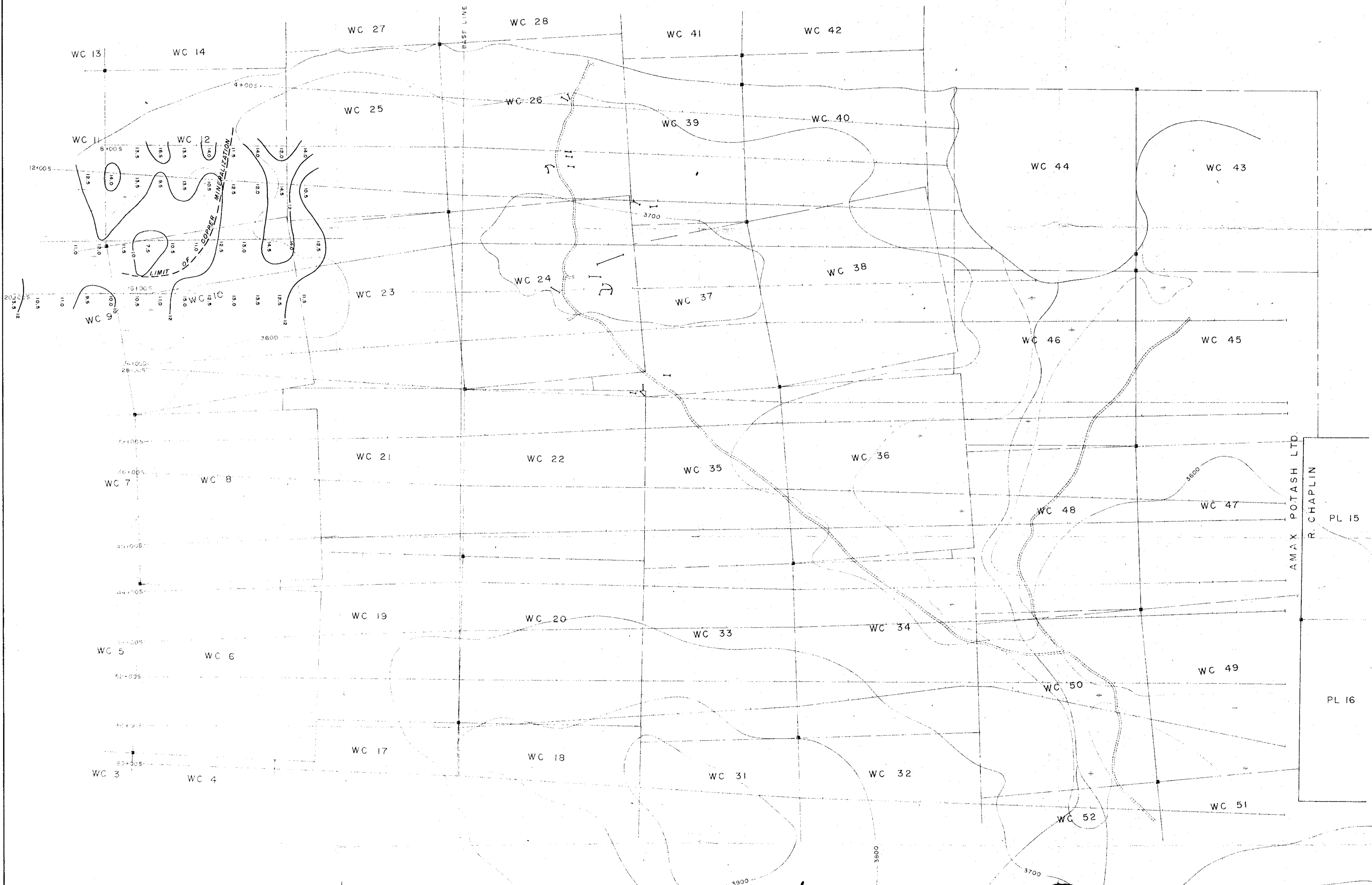
**AMAX POTASH LIMITED**  
**SPOUT LAKE PROPERTY**  
 CENTRAL GRID  
 CLINTON MINING DIVISION — BRITISH COLUMBIA  
**INDUCED POLARIZATION SURVEY**  
 BATTERY I.P. EXTENSION  
**RESISTIVITY MAP**

DATE REVISION	DATE PRINTED	Drawn by: F.J.F. Date: Nov. 7, 1972 N.T.S. File 92 P 14	FIG. 5
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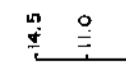
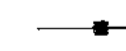
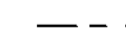
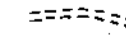

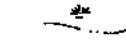
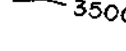
To accompany report "SPOUT LAKE PROPERTY" by:  
 G.M. De Paoli, G.M. Leary, J.F. Allan. 1972.

AMAX POTASH LTD.  
 R. CHAPLIN  
 PL 15  
 PL 16

SPOUT LAKE  
(Elev. 3535')



SYMBOLS

-  Picket line, chargeability readings in milliseconds.
-  Claim post, claim location line.
-  Claim boundary line.
-  Road.
-  Stream.
-  Swamp, swamp boundary.
-  Topographic contour, contour interval 100'.

Receiver I.P.R. - 7  
 Transmitter 25 Watt  
 Array Dipole - dipole  $q = 200'$   $n = 1$   
 Operator G.M. DePaoli  
 Date Sept. 1, 1972.  
 Contour interval 2 milliseconds.

4029

M-4

Department of  
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 ASSESSMENT REPORT  
 NO. 4029 MAP #4

SCALE 1" = 400'

AMAX POTASH LIMITED  
 SPOUT LAKE PROPERTY  
 CENTRAL GRID  
 CLINTON MINING DIVISION — BRITISH COLUMBIA  
 INDUCED POLARIZATION SURVEY  
 BATTERY I.P. EXTENSION  
 CHARGEABILITY MAP

DATE REVISED	DATE PRINTED	Drawn by: F.J.F. Date: Nov. 7, 1972 N.T.S. File 92 P 14	FIG. 4
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To accompany report "SPOUT LAKE PROPERTY" by:  
 G.M. De Paoli, G.M. Leary, J.F. Allan. 1972.