

# 4701

GEOPHYSICAL, GEOCHEMICAL  
REPORT  
SPROATT SILVER MINES LTD.

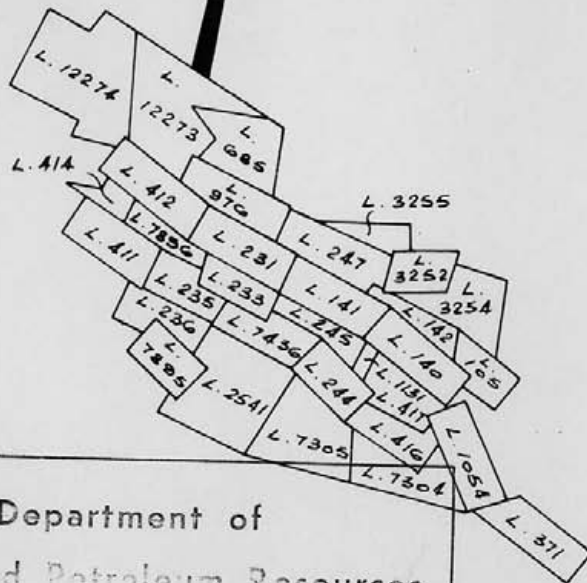
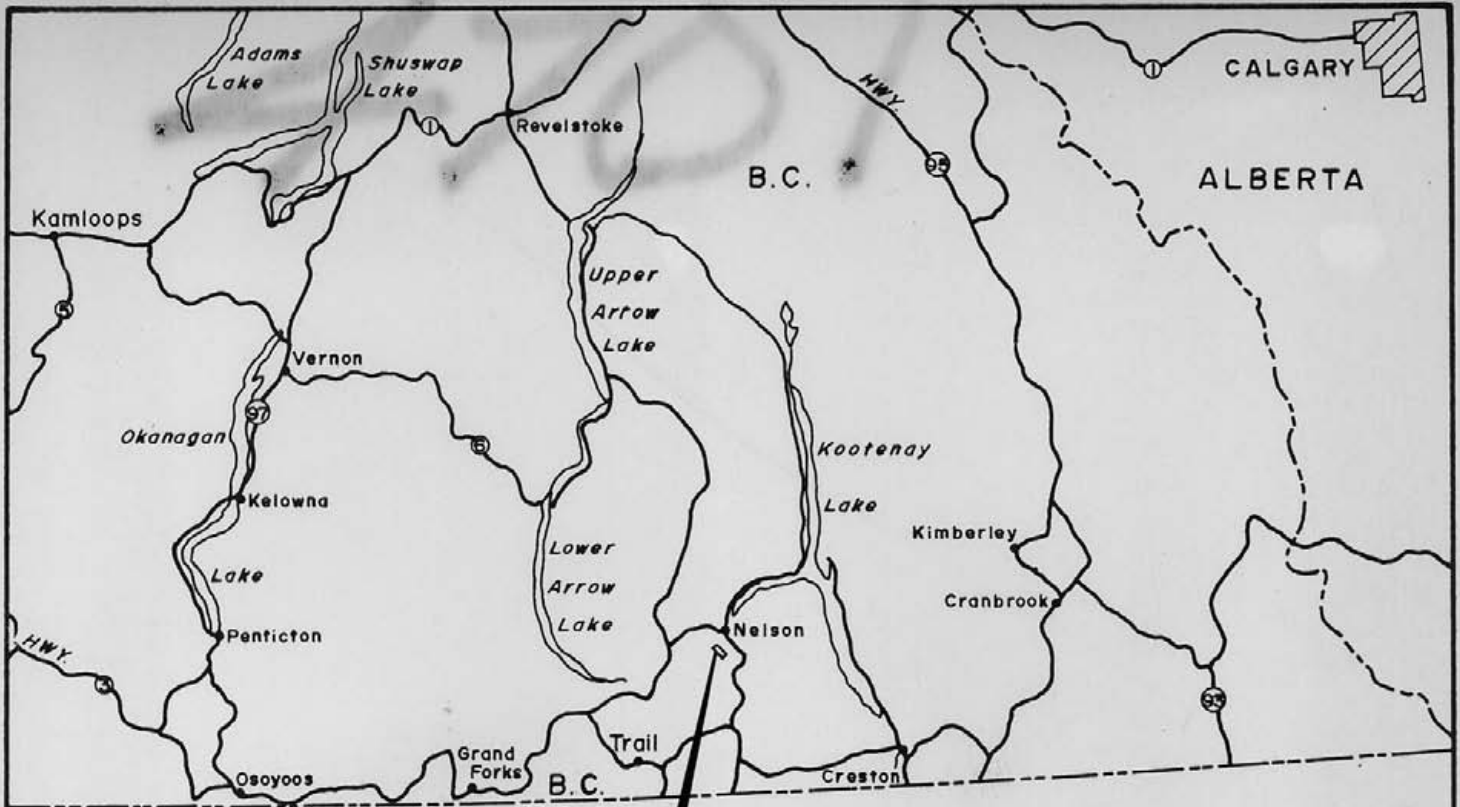
Silver King Mine property, Nelson area, B.C.  
Latitude 49°25'N Longitude 117°19'W  
N.T.S. 82 F/6

AUTHOR: Glen E. White, Geophysicist  
P. ENG: E. D. Cruz  
DATE OF WORK: September 11-25, 1973  
DATE OF REPORT: October 19, 1973

82F/6W

4701

Department of Mines and Technical Resources Assessment Report NO. <b>4701</b>
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Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. **4701** #1

**SPROATT SILVER MINES LTD.**  
**SILVER KING GROUP**  
**LOCATION AND CLAIMS MAP**

SCALE : LOCATION MAP : 1" = 40 MILES APPROX.

CLAIMS MAP : 1/2" = 1500 APPROX.

*Glen & White*  
 geophysical consulting  
 &  
 services ltd.

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## INTRODUCTION

In the interim September 11-25, 1973, Glen E. White Geophysical Consulting and Services Ltd. conducted a program of line cutting, geochemical soil sampling and induced polarization surveying over the old Silver King Mine property, Nelson area, B.C. on behalf of Sproatt Silver Mines Ltd.

The purpose of the surveys was to try and delineate any geochemical or geophysical anomalies which could be tested for copper - silver mineralization of ore grade to try and increase the known ore reserves.

## PROPERTY

The survey area covered mineral leases Nos. L140-142, L105, L231, 233, 235, 236, L244, 245, 247, L 371, 411, 412, 414, 416, 417, 685, 976, L3252, L3254, L3255, L1054, 2541, L7304, 7305, L7436, L12273, L12274 and L7895 as illustrated in Figure 1.

## LOCATION AND ACCESS

The Silver King property is located on Toad Mountain some 4.5 miles south of the town of Nelson, Nelson Mining Division, Province of British Columbia, Latitude 49°25'N, Longitude 117°19'W, N.T.S. 82 F/6.

Access is by secondary gravel road south from Nelson for some 8 road miles. The road has deteriorated to such a state that a 4x4 vehicle is required.

## GENERAL GEOLOGY

An excellent description of the Silver King Mine is contained in a report on the Silver King Mine for New Cronin Babine Mines Ltd., by M. K. Lorimer, P. ENG, January 23, 1967. He states that the area is underlain by augite porphyries of the Rosslund formation which have been intruded by fine-grained porphyritic syenites to quartz diorites. In the mine area the intrusive activity of monzonite stocks and dykes resulted in the development

of a number of strong shear and tension fractures which were later mineralized with principally copper and silver bearing solutions. Three such shears striking S60°E and dipping 60° - 70°S have been located. The productive ore bodies were found at the intersection of the above veins and a due E-W directed one.

### PHYSIOGRAPHY

The property lies at an elevation of some 6000 feet on the northern slope of a shoulder of Toad Mountain. The topography is generally hilly and steep in places with several benches and flats. Vegetation consists of a thick growth of spruce trees and buck brush.

### PREVIOUS WORK

Exploration has largely been confined to diamond drilling and underground development and mining. A limited amount of geochemistry and electromagnetic surveying have been completed; however, the surveys were reportedly completed a number of years ago and were inconclusive.

### SURVEY SPECIFICATIONS

#### Survey Grid

A new survey grid was established with the baseline trending in a NW-SE direction across the old workings and parallel to the known vein systems. Cross lines were turned off at right angles every 500 feet and were numbered at 100 foot intervals. Some 10.6 line miles of traverse grid was established.

#### Electrode Array

The data was obtained using the "three electrode" array. This array consists of one current ( $C_1$ ) and two potential electrodes ( $P_1$  and  $P_2$ ) which are moved together along the survey line at a fixed distance apart, which is known as the "a" spacing. The second current electrode ( $C_2$ ) is placed at "infinity".

For this survey, an electrode spacing of  $a = 200$  feet  $n = 1$  was used for reconnaissance. Detailing was completed with  $a = 100$ ,  $n = 1$  and  $a = 200$ ,  $n = 2$  and  $3$ . See Plates 1 and 2. Some 10 line miles of surveying were completed.

#### Induced Polarization System

The equipment used on this survey was the Hunttec pulse-type unit. Power was obtained from a JLO motor, coupled to a 2.5 KW 400 cycle three-phase generator, providing a maximum of 2.5 KW D.C. to the ground. The cycling rate is 1.5 seconds "current on" and 0.5 seconds "current off", the pulses reversing continuously in polarity. Power was transmitted to the ground through two current electrodes  $C_1$  and  $C_2$ , and measurements taken across two potential electrodes,  $P_1$  and  $P_2$ .

The data recorded in the field consists of careful measurements of the current ( $I$ ) in amperes flowing through electrodes  $C_1$  and  $C_2$ , the primary voltage ( $V_p$ ) appearing between electrodes  $P_1$  and  $P_2$  during the "current on" part of the cycle, and the secondary voltage ( $V_s$ ) appearing between electrodes  $P_1$  and  $P_2$  during the "current off" part of the cycle.

The apparent chargeability ( $M_a$ ), in milliseconds, is calculated by dividing the secondary voltage by the primary voltage and multiplying by 400, which is the sampling time in milliseconds of the receiver unit. The apparent resistivity, in ohm-feet, is proportional to the ratio of the primary voltage to the measured current, the proportionality factor depending on the geometry of the electrode array used. The chargeability and resistivity obtained are called "apparent" as they are values which that portion of the earth sampled by the array would have if it were homogeneous. As the earth sampled is usually inhomogeneous, the calculated apparent chargeability and apparent resistivity are functions of the actual chargeabilities and resistivities of the rocks sampled and of the geometry of these rocks.

## Geochemical Survey

Geochemical soil samples of the B horizon were obtained by mattock at 200 foot intervals along the cross lines and placed in soil envelopes provided by Vangeochem Lab Ltd. of North Vancouver, B.C. The soil samples were then delivered to Vangeochem Lab Ltd. where -80 mesh sieving, digestion by perchloric acid and analysis by atomic absorption were carried out under the supervision of professional geochemists. Some 200 soil samples were obtained and analysed for lead, copper and silver.

## DATA PRESENTATION

The data obtained accompany this report in contour form at a scale of 1" = 400 feet as follows:

- Figure 2 - Induced Polarization - Chargeability in milliseconds.
- " 3 - " " - Apparent Resistivity in ohm-feet.
- " 4 - Geochemical Map - Copper p.p.m.
- " 5 - " " - Lead p.p.m.
- " 6 - " " - Silver p.p.m.

- Plate 1 - Detail Induced Polarization Line 45E
- " 2 - " " " " " 40E

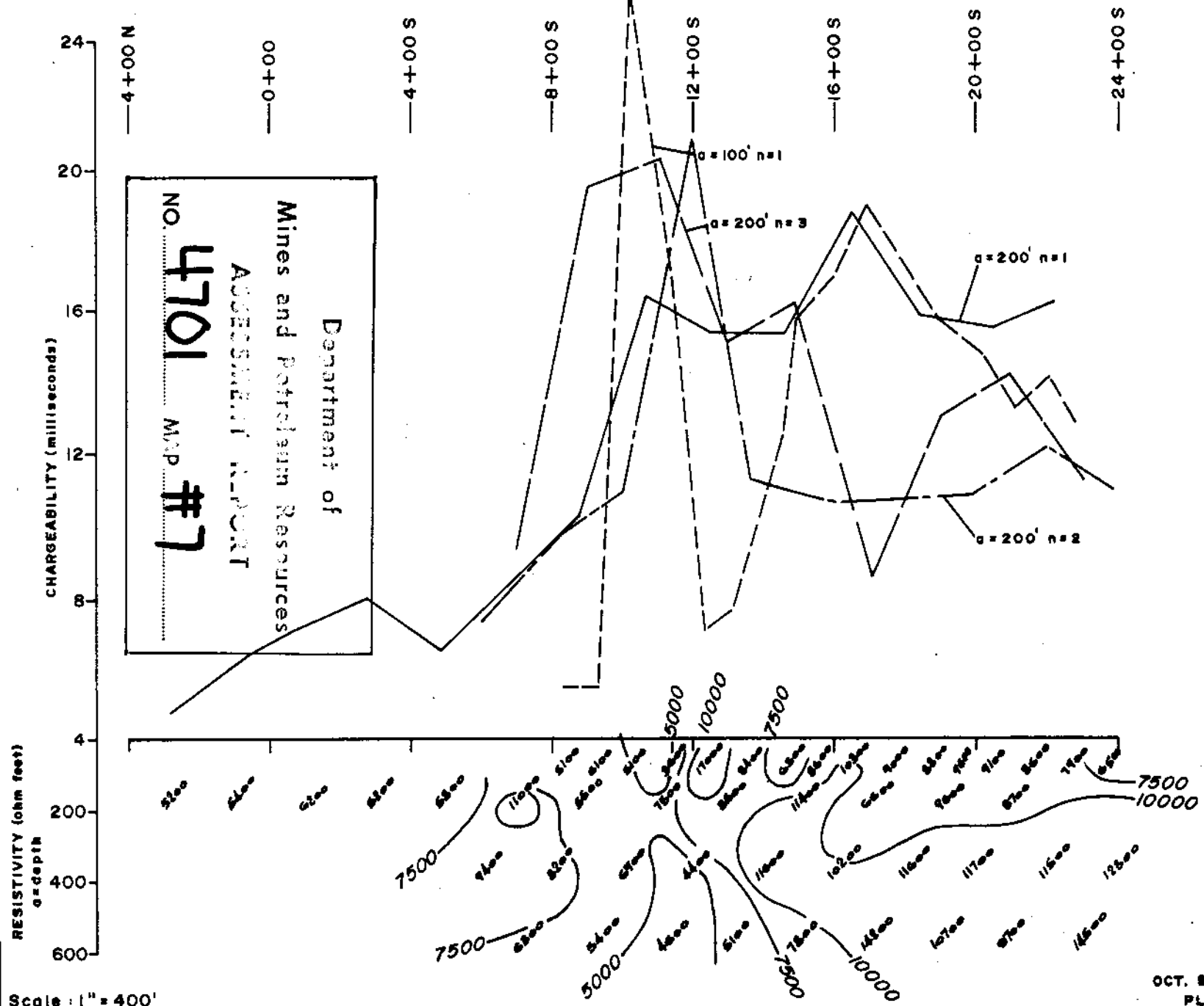
## DISCUSSION OF RESULTS

The copper geochemical results, Figure 4, depict two NW-SE trending anomalies, the strongest of which occurs along the baseline coincident with the old mine workings. The second trend occurs to the SW. It is weaker and somewhat discontinuous in places. The 160 p.p.m. contour seems to successfully delineate the old workings even though one value went as high as 80,000 p.p.m. Thus, the copper geochemical anomaly at 18S on lines 40E and 45E would appear to be of definite interest.

The lead geochemical map also encloses the old workings quite precisely with a contour level of 60 p.p.m. The secondary lead trend to the SW, though it is not as well defined as the copper trend, has a number of interesting values such as 425 p.p.m. at 12S on line 60E.



LINE 45+00 E

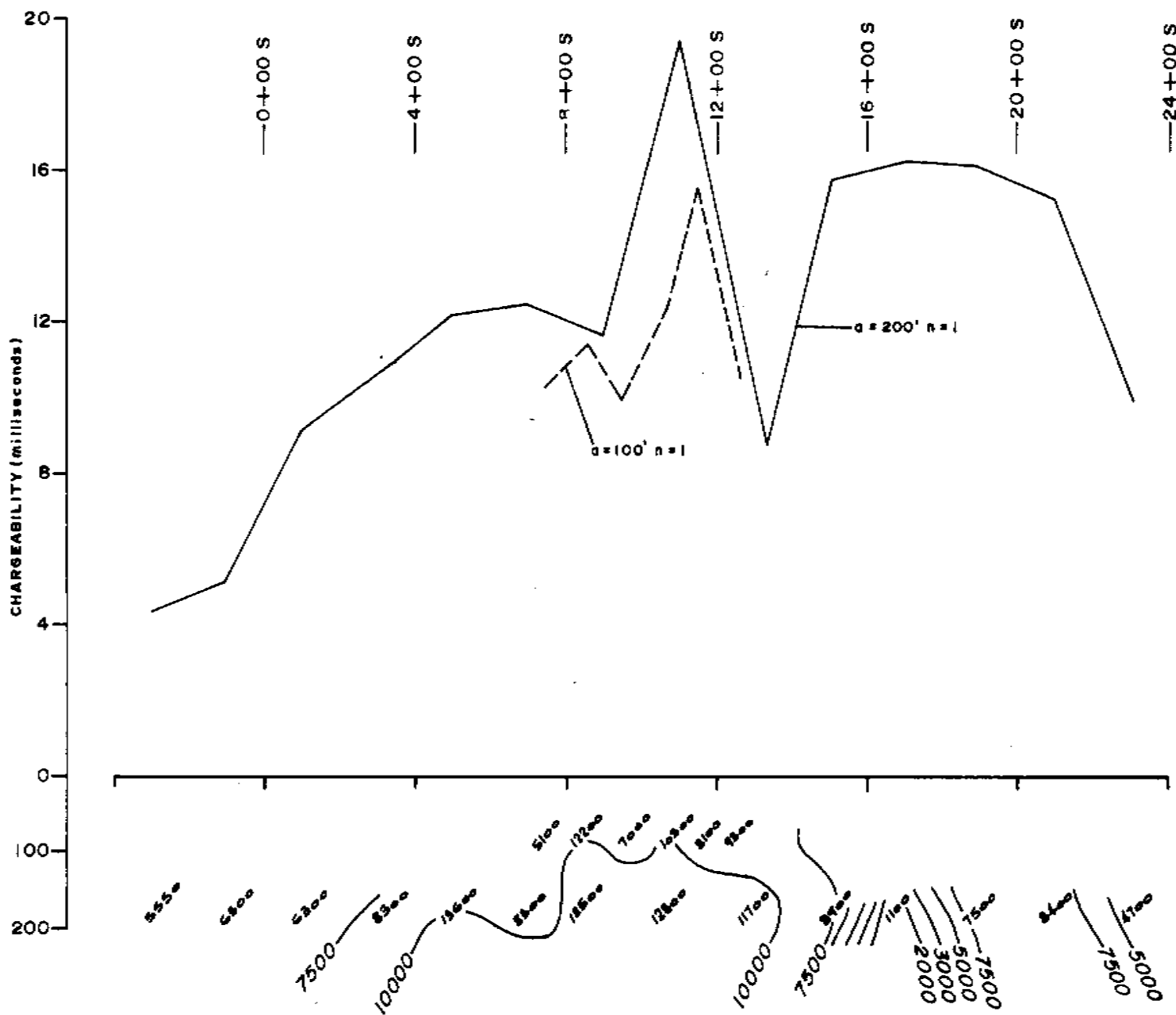


Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 4701 MAP #7

Glen E. White  
geophysical consulting  
services Ltd.

Scale: 1" = 400'

LINE 40+00 E



Department of  
Mines and Petroleum Resources  
Assessment Report  
NO 4701 #8

Glyn C. White  
geophysical consulting  
services Ltd

Scale: 1" = 400'

The silver geochemical map, Figure 6, shows excellent correlation with the copper and lead geochemical data. The secondary silver geochemical anomaly to the SW of the main zone is very interesting in that it links the seemingly scattered high lead and copper values to form a continuous anomaly from 40E 10S to 60E 12S.

The apparent resistivity values, Figure 3, are relatively high, typical of shallow overburden-covered granitic rocks. The smaller variations in resistivity can in general be attributed to changes in the conductivity of the overburden and depth to bedrock. A number of the chargeability highs are associated with resistivity lows which would suggest possibly a structural control of the chargeability features.

The chargeability map, Figure 2, shows a general background chargeability level of some 4.0 milliseconds. In the area of the old workings a high of 11.7 milliseconds was obtained. The most pronounced feature is the linear chargeability high trending SE from 20E 9S to 70E 11S which reaches a high of 22.6 milliseconds on Line 25E 11S. A second interesting feature is the broad chargeability anomaly surrounding the high values on lines 40 and 45E at 17S. Plate 1 shows a number of detail profiles illustrating various "a" spacings across the chargeability high on line 45E. Two definitely anomalous zones are shown; between 10-12S and 16-18S. The zone between 10-12S appears to show an increase in response with depth. This zone shows excellent correlation with low apparent resistivity data. Plate 2 shows sharp inflections of chargeability associated with the zone between 10-12S on 40E. The sharp minimum response may possibly indicate a narrow near surface vein of massive sulphide mineralization. Old geological information shows the presence of a NW trending monzonite dike and what may possibly be the Iroquois vein in this area but the location is uncertain at this time.

Correlation of the geophysical and geochemical data shows values of copper and lead associated with the pronounced SE chargeability trend from 20E 9S to 70E 11S. The silver geochemical values show excellent correlation from 40E 10S to 60E 12S. The lead and particularly the copper values show excellent correlation with the chargeability high at 17S on line 45E. A weak copper geochemical response is also shown in the area of the highest chargeability value on line 25E 11S. The

chargeability data on line 40E is quite broad and may possibly indicate a hidden mineralized structure extending from the Dandy Andy dump southward to line 55E 23S. The lead geochemical values also appear to reflect this feature.

#### CONCLUSIONS

During the month of September, 1973, a program of induced polarization surveying and geochemical soil sampling was conducted over the Silver King property, Nelson area, on behalf of Sproatt Silver Mines Ltd.

The surveys located a strong NW trending chargeability anomaly SW of the old mine workings that is associated with definitely anomalous values of p.p.m. copper, lead and silver. This zone reached a high of 22.6 milliseconds on Line 25E 11S where it is associated with weak values of copper in p.p.m. A second interesting chargeability anomaly extending from 40E 17S to 50E 17S is coincident with strong copper geochemical values.

RECOMMENDATIONS

It is recommended that a minimum of four diamond drill holes be undertaken as follows to test the various geochemical and chargeability anomalies:

Hole #1 - collared at 45E - 13S, drilled NE at an angle of  $-50^{\circ}$  for a length of 500 feet.

Hole #2 - collared at 55E - 11S, drilled NE at an angle of  $-50^{\circ}$  for a length of 500 feet.

Hole #3 - collared at 45E - 19S, drilled NE at an angle of  $-50^{\circ}$  for a length of 500 feet.

Hole #4 - collared at 25E - 13S, drilled NE at an angle of  $-50^{\circ}$  for a length of 500 feet.

Since the geology is reportedly dipping some  $60-70^{\circ}$  to the south and the topography is sloping northward, the final collar position and drilling inclination will depend upon the local topography.

Respectfully submitted,  
GLEN E. WHITE GEOPHYSICAL  
CONSULTING AND SERVICES LTD.



Glen E. White B. Sc.  
Geophysicist

STATEMENT OF QUALIFICATIONS

Name: WHITE, Glen E.

Profession: Geophysicist

Education: B.Sc. Geophysics - Geology  
University of British Columbia

Professional Associations: Associate member of Society of Exploration Geophysicists.  
Active member B.C. Society of Mining Geophysicists.

Experience: Pre-Graduate experience in Geology - Geochemistry - Geophysics with Anaconda American Brass.

Two years Mining Geophysicist with Sulmac Explorations Ltd. and Airborne Geophysics with Spartan Air Services Ltd.

One year Mining Geophysicist and Technical Sales Manager in the Pacific north-west for W. P. McGill and Associates.

Two years Mining Geophysicist and supervisor Airborne and Ground Geophysical Divisions, with Geo-X Surveys Ltd.

Two years Chief Geophysicist Tri-Con Exploration Surveys Ltd.

Two years Consulting Geophysicist.

Active experience in all Geologic provinces of Canada.

INSTRUMENT SPECIFICATIONS  
Induced Polarization System

A. Instruments

- (a) Type - Pulse
- (b) Make - Hunttec
- (c) Serial No. - transmitter #107 - receiver #207

B. Specifications

- (a) Size and Power - 2.5 KW
- (b) Sensitivity - 300 x 10.5 volts
- (c) Power Sources - 2.5 KW 400 cycle - three-phase generator
- (d) Power by JLO motor, 5.2 H.P. @ 3,600 R.P.M.
- (e) Timing - electronic, remote and direct
- (f) Readings - (i) amps (ii) volts primary and secondary
- (g) Calculate (i) Resistivity - ohm-feet  
(ii) Chargeability - milliseconds

C. Survey Procedures

- (a) method - power supplied to mobile probe along TW 18 stranded wire from stationary set-up.
- (b) Configuration - pole - dipole (three electrode array) Plot point midway between  $C_1$  and  $P_1$ .

D. Presentation

- Contour Maps (i) Chargeability - milliseconds  
(ii) Resistivity - ohm-feet

C E R T I F I C A T E

I, Ernesto D. Cruz, DO HEREBY CERTIFY AS FOLLOWS:

- (1) That I am a Consulting Mining Engineer and reside at 8596 Terrace Dr., Delta, B.C.
- (2) That I am a Graduate of Mapua Institute of Technology Phillipines (B.A.Sc.) and University of Washington (M.A.Sc.) in the Faculty of Mining Engineering.
- (3) That I am a registered P. ENG in the Association of Professional Engineers in the province of British Columbia.
- (4) That I have practised geological engineering for ten (10) years.
- (5) That I have reviewed a report dated October 19, 1973 based on work conducted by Glen E. White Geophysical Consulting and Services Ltd. under the supervision of Glen E. White, B.Sc., Geophysicist, and concur with the findings therein.
- (6) That this report consists of 10 typewritten pages and five maps.
- (7) That I have no interest directly or indirectly in the Silver King Mine property or the securities of Sproatt Silver Mines Ltd. nor do I expect to acquire or receive any.

DATED at Vancouver, British Columbia, this 19th day of October, 1973.

ERNESTO D. CRUZ, P. ENG



Ernesto D. Cruz, P. ENG



DOMINION OF CANADA:  
PROVINCE OF BRITISH COLUMBIA.  
To Wit:

In the Matter of An Induced Polarization  
Survey, Geochemical Soil Sampling,  
Silver King Claims Group

I, Glen E. White

of Glen E. White Geophysical Consulting and Services Ltd.

in the Province of British Columbia, do solemnly declare that the costs for the above surveys were as follows:

<u>PERSONNEL</u>	<u>PERIOD</u>	<u>WAGES</u>	<u>TOTAL</u>
T. Ashworth.....	September 11-25/73.....	\$55/day.....	\$825.00
P. MacKenzie.....	".....".....	45/day.....	675.00
A. Poile.....	".....".....	45/day.....	675.00
T. Baldry.....	".....".....	40/day.....	600.00
Meals and Accomodations @ \$20/day/man.....			1200.00
Materials.....			65.00
Vehicle 4x4 @ \$20/day and 20¢/mile including gas.....			516.00
Instrument Lease \$50/day.....			700.00
Geochemical analysis for 3 elements.....			450.00
Geochemical, geophysical interpretation maps and reports....			<u>850.00</u>
Total.....			\$6556.00

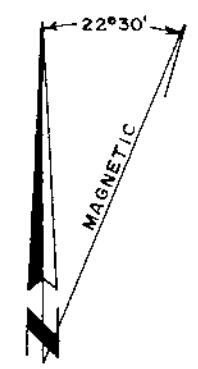
And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the *Ciig*  
of *Unalaska*, in the  
Province of British Columbia, this *24*  
day of *October* *1973*, A.D.

*Glen E. White*

*Julie Turner*  
A Commissioner for taking Affidavits for British Columbia or  
A Notary Public in and for the Province of British Columbia.

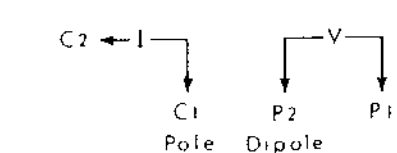
Department of  
Mines and Petroleum Resources  
ANNUAL REPORT  
NO. **4701** MAP



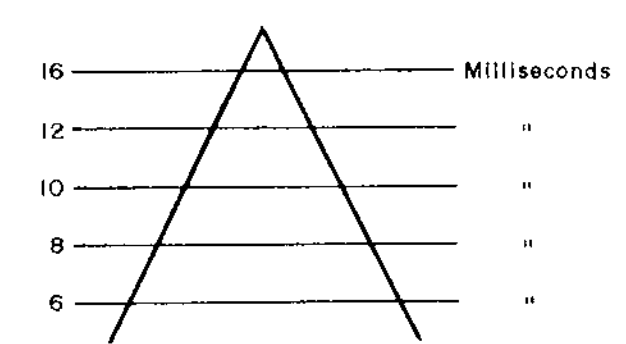
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- Contour Line Contour Interval 4, 6, 8, 10, 12, 16, 18 Milliseconds
- Stations
- Outline of Claims
- Claim Posts
- Unpaved Roads

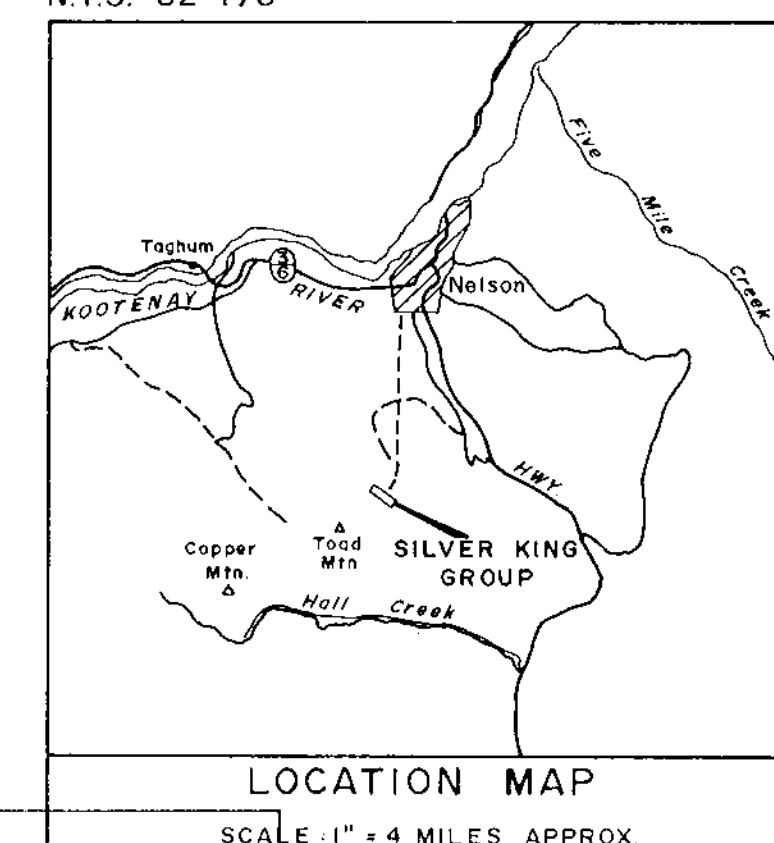
INSTRUMENT HUNTEC 2.5 KW TIME DOMAIN (n=200')



**CHARGEABILITY KEY**



N.T.S. B2 F/6

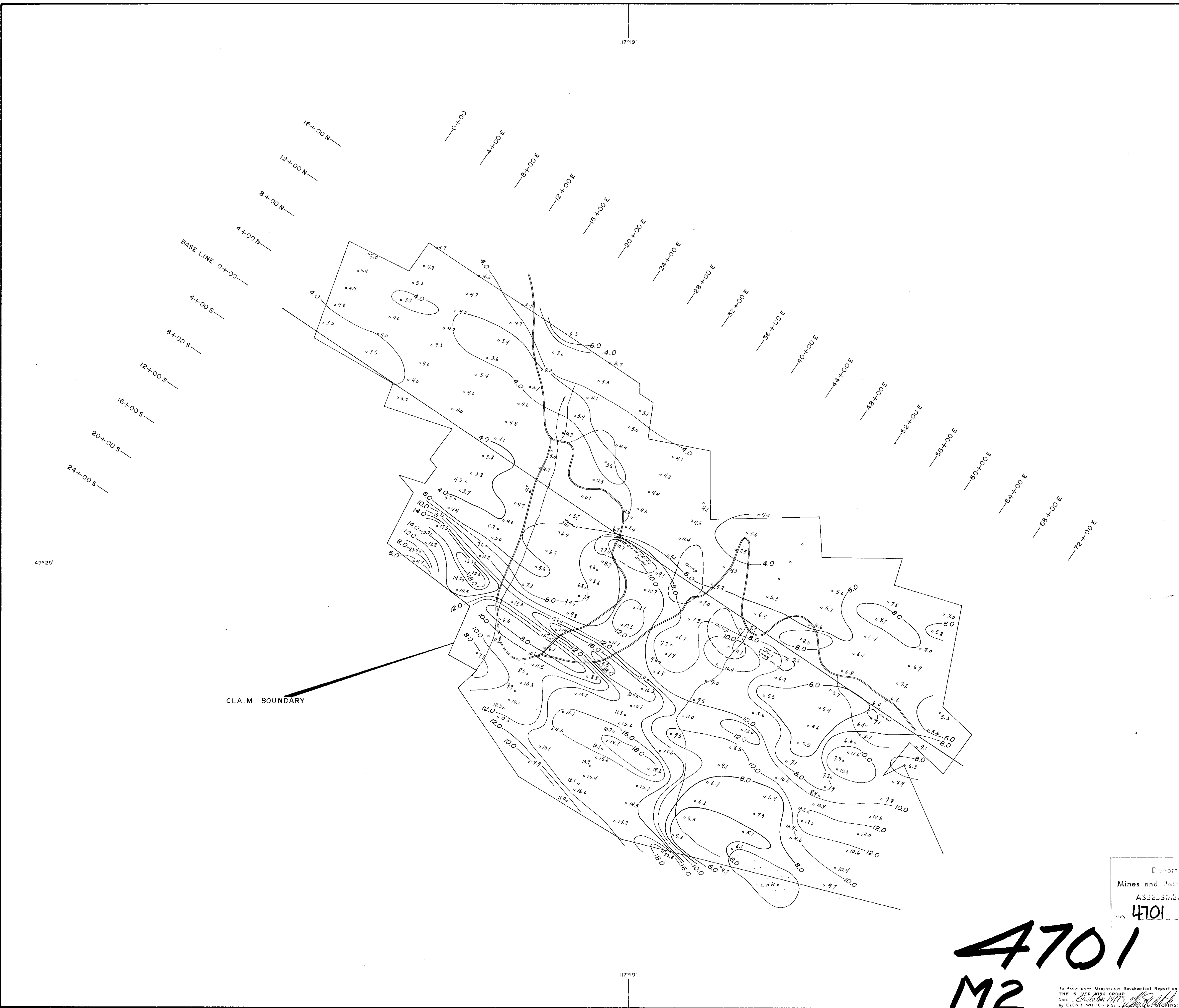


Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
#2  
4701

SPROATT SILVER MINES LTD.  
THE SILVER KING GROUP  
NELSON MINING DIVISION—BRITISH COLUMBIA  
GEOPHYSICAL MAP  
INDUCED POLARIZATION  
PERCENT CHARGEABILITY (milliseconds)

Interpreted by: G.E.W.  
Checked by: [Signature]  
Date: OCT 15, 1973  
FIG. No. 2

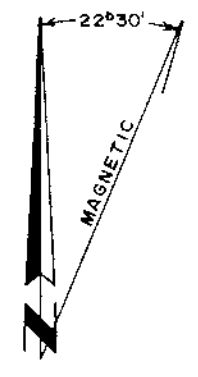
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M2**



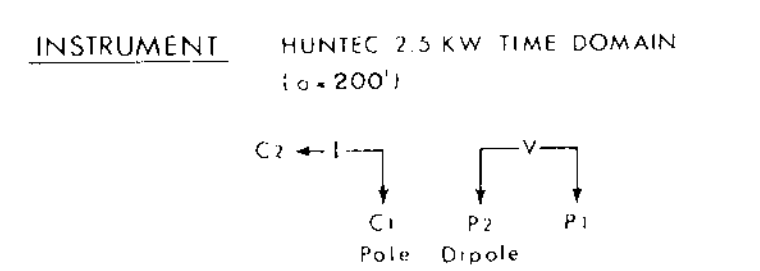
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117°19'

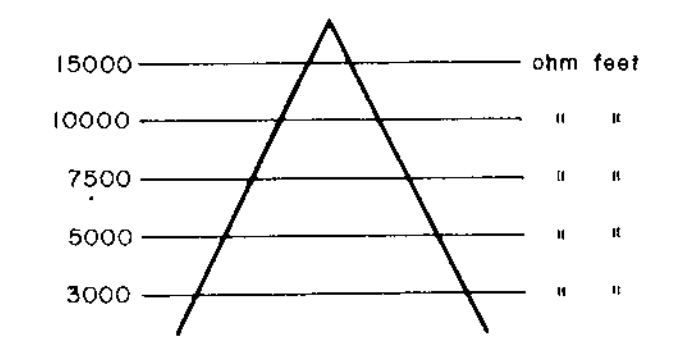
117°19'



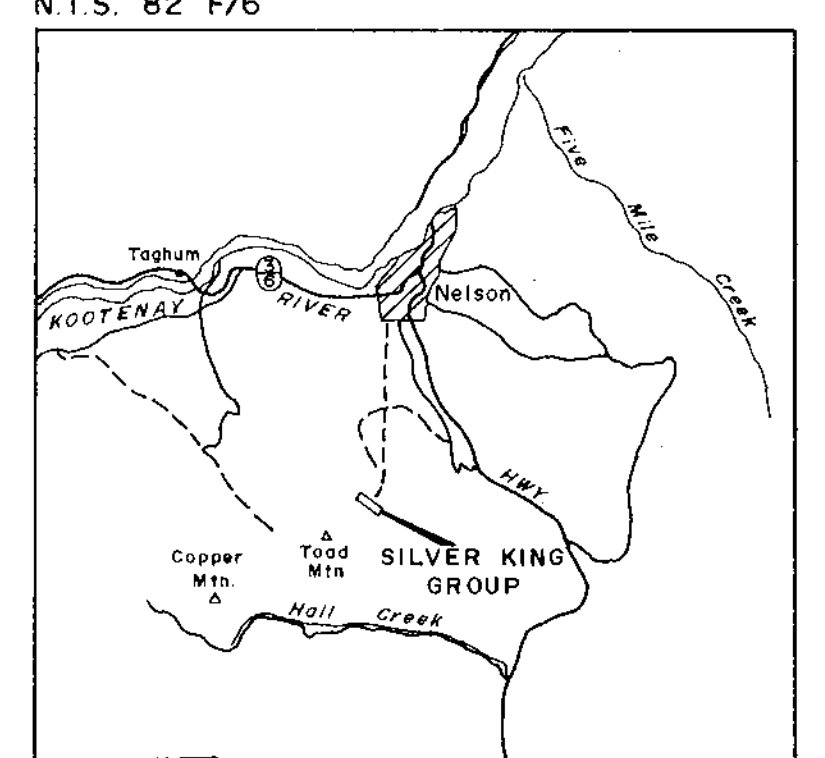
- LEGEND**
- Contour Line Contour Interval: 3000, 5000, 7500, 10000, 15000 ohm feet
  - o Stations
  - - - Outline of Claims
  - Claim Posts
  - == Unpaved Roads



**RESISTIVITY KEY**



**NTS. 82 F/6**



**LOCATION MAP**

SCALE: 1" = 4 MILES APPROX.

Mines and Minerals Resources  
ASSESSMENT REPORT

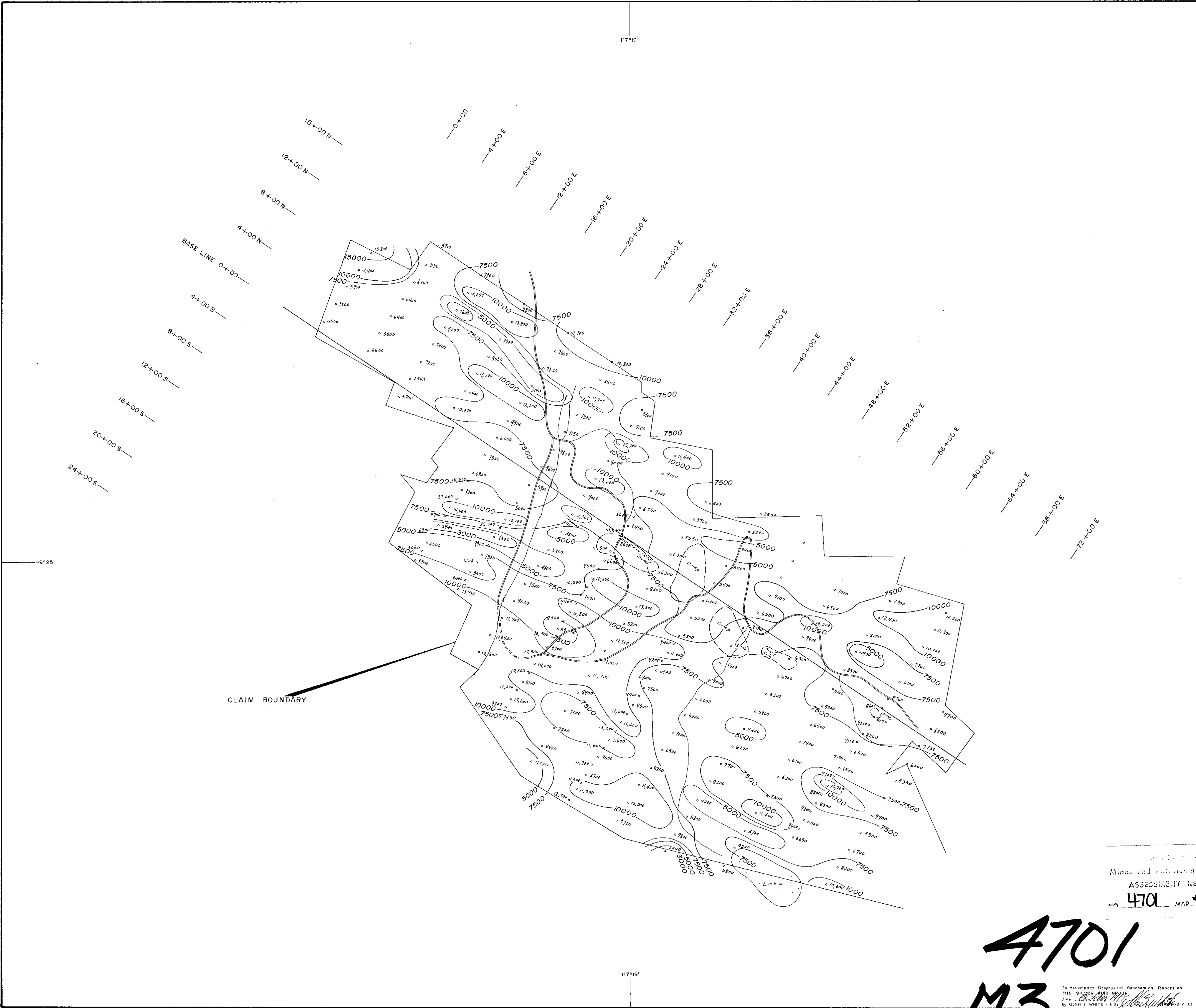
NO. **4701** MAP #3

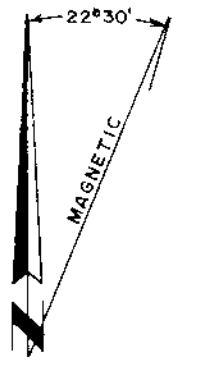
**SPROATT SILVER MINES LTD.**  
THE SILVER KING GROUP  
NELSON MINING DIVISION—BRITISH COLUMBIA  
GEOPHYSICAL MAP  
INDUCED POLARIZATION  
APPARENT RESISTIVITY (ohm feet)

Interpreted by: G.E.W.  
Drawn by: [Signature]  
Checked by: [Signature]  
Date: OCT. 16, 1973  
FIG. No. 3

**4701**  
**M3**

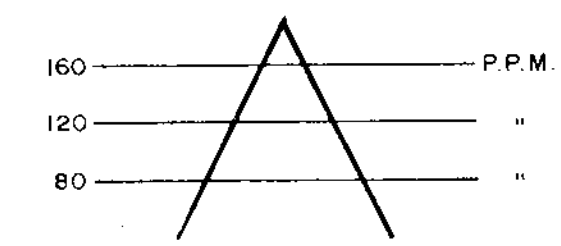
To Accompany Geophysical/Geochemical Report on  
THE SILVER KING GROUP  
Date: *Oct 1973*  
By: GLEN F. WHITE - R.S. Geophysicist



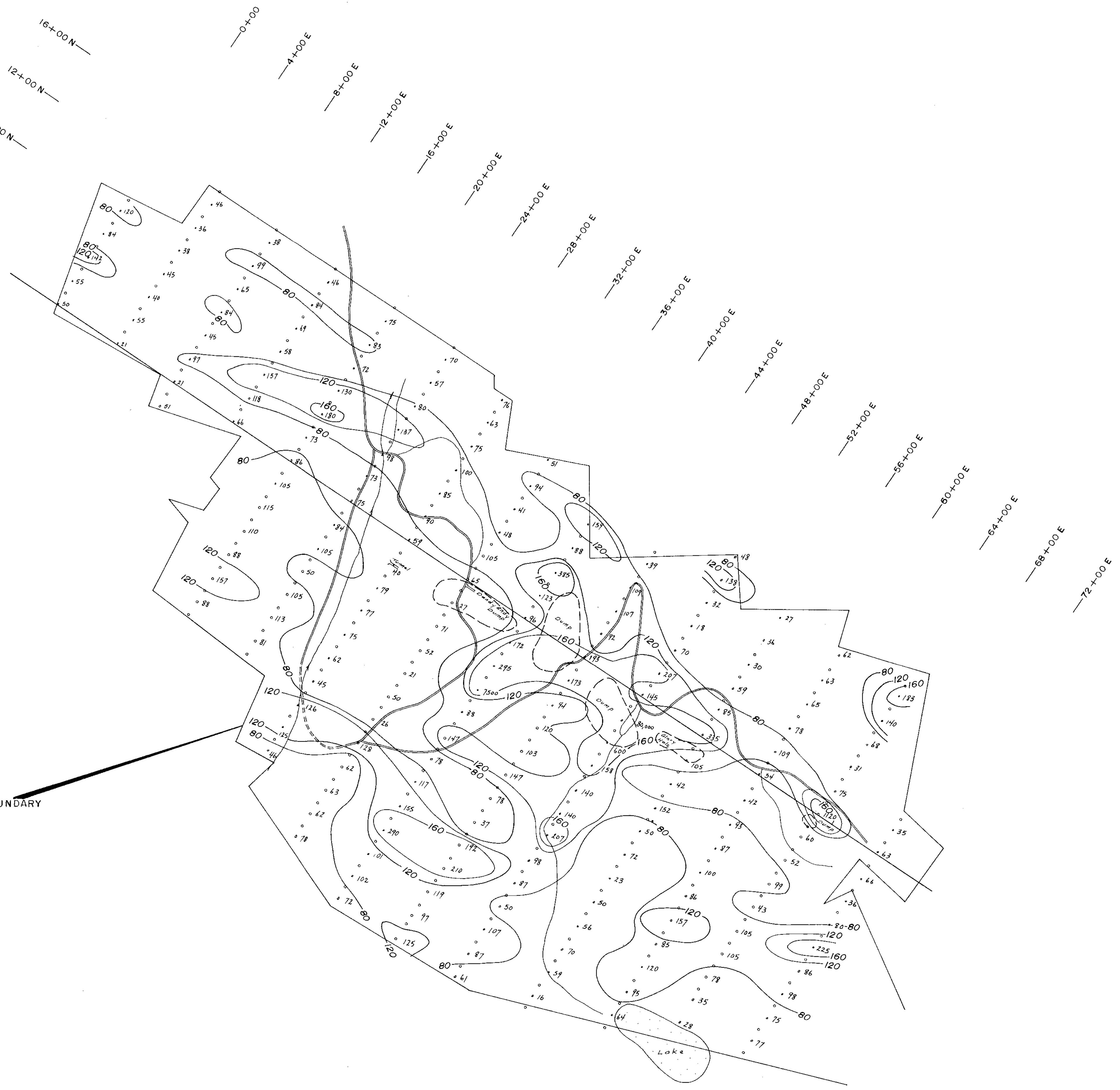


- LEGEND**
- Contour Line. Contour Interval: 80, 120, 160 P.P.M.
  - Stations
  - Outline of Claims
  - Claim Posts
  - Unpaved Roads

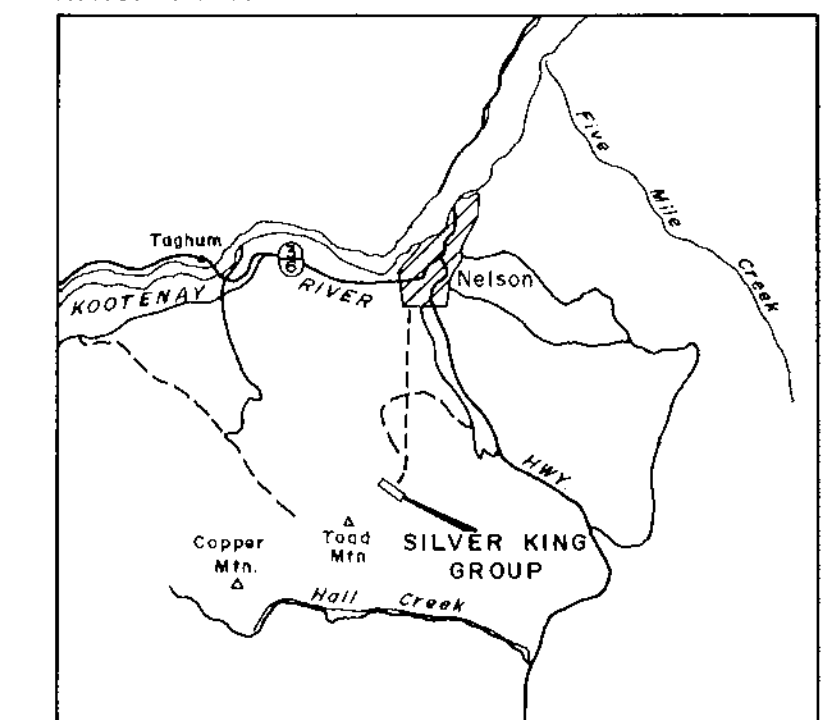
**COPPER KEY**



CLAIM BOUNDARY



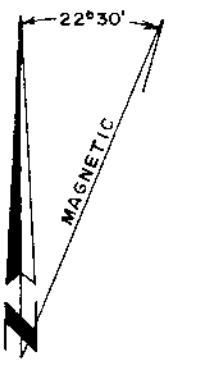
N.T.S. 82 F/6



Department of Mines and Petroleum Resources	LOCATION MAP SCALE: 1" = 4 MILES APPROX.
ASSESSMENT REPORT NO. 4701	MAP #4
SPROATT SILVER MINES LTD. THE SILVER KING GROUP NELSON MINING DIVISION—BRITISH COLUMBIA	
GEOCHEMICAL MAP COPPER P.P.M.	
Glen E. White geophysical consulting	INTERPRETED BY: G.E.W. DRAWN BY: CHECKED BY: [Signature] DATE: OCT. 16, 1973 FIG. NO. 4

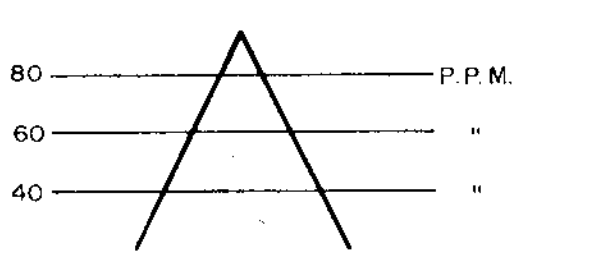
**4701**  
**MA**

To Accompany Geophysical Geochemical Report on  
THE SILVER KING GROUP  
Date: October 1973  
By: GLEN E. WHITE - B.S. Geophysicist

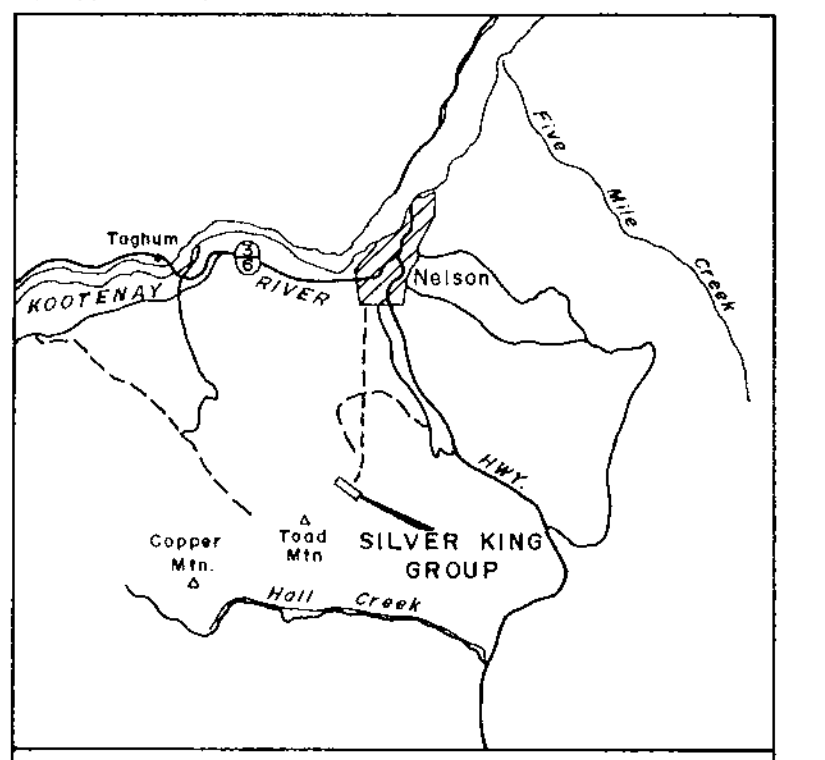


- LEGEND**
- Contour Line, Contour Interval 40, 60, 80 P.P.M.
  - Stations
  - Outline of Claims
  - Claim Posts
  - Unpaved Roads

**LEAD KEY**

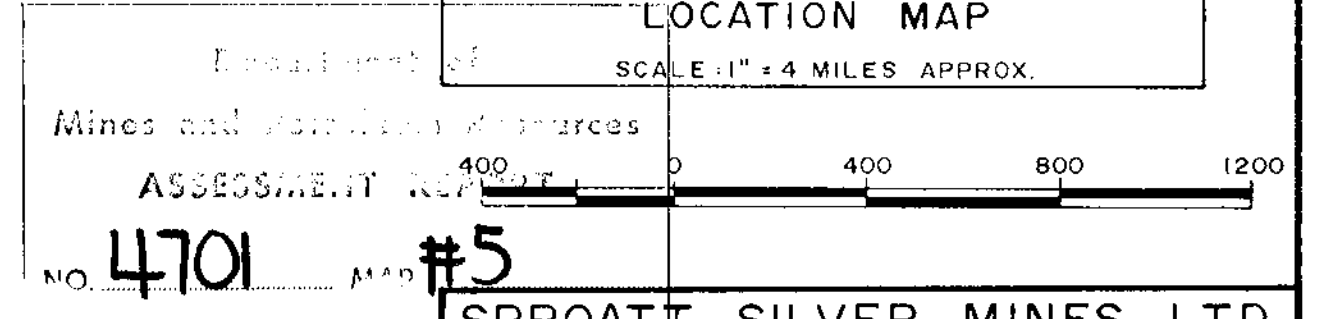


N.T.S. 82 F/6



**LOCATION MAP**

SCALE: 1" = 4 MILES APPROX.



NO. **4701** MAP # **5**

**SPROATT SILVER MINES LTD.**  
 THE SILVER KING GROUP  
 NELSON MINING DIVISION—BRITISH COLUMBIA  
 GEOCHEMICAL MAP  
 LEAD P.P.M.

Interpreted by: G.E.W.  
 Drawn by: G.E.W.  
 Checked by: G.E.W.  
 Date: OCT. 15, 1973  
 FIG. No.: 5

**4701  
M5**

To Accompany Geophysical Geochemical Report on  
 THE SILVER KING GROUP  
 Date: **28.2.1973**  
 By: GLEN E. WHITE - G.S. GEOCHEMIST

Glen E. White  
 geophysical consulting  
 services Ltd.



117°19'

117°19'

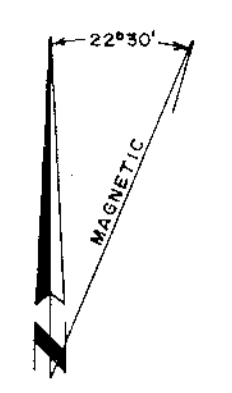
49°25'

CLAIM BOUNDARY

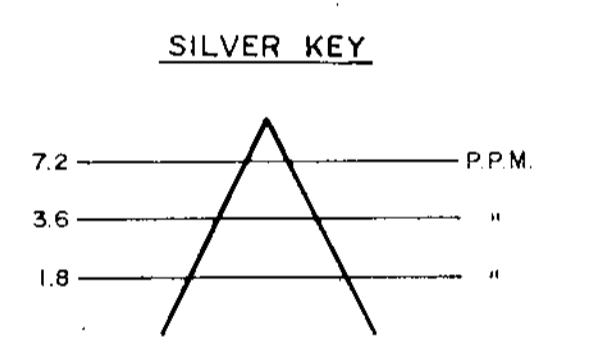
16+00N—  
 12+00N—  
 8+00N—  
 4+00N—  
 BASE LINE 0+00—  
 4+00S—  
 8+00S—  
 12+00S—  
 16+00S—  
 20+00S—  
 24+00S—

0+00  
 4+00E  
 8+00E  
 12+00E  
 16+00E  
 20+00E  
 24+00E  
 28+00E  
 32+00E  
 36+00E  
 40+00E  
 44+00E  
 48+00E  
 52+00E  
 56+00E  
 60+00E  
 64+00E  
 68+00E  
 72+00E

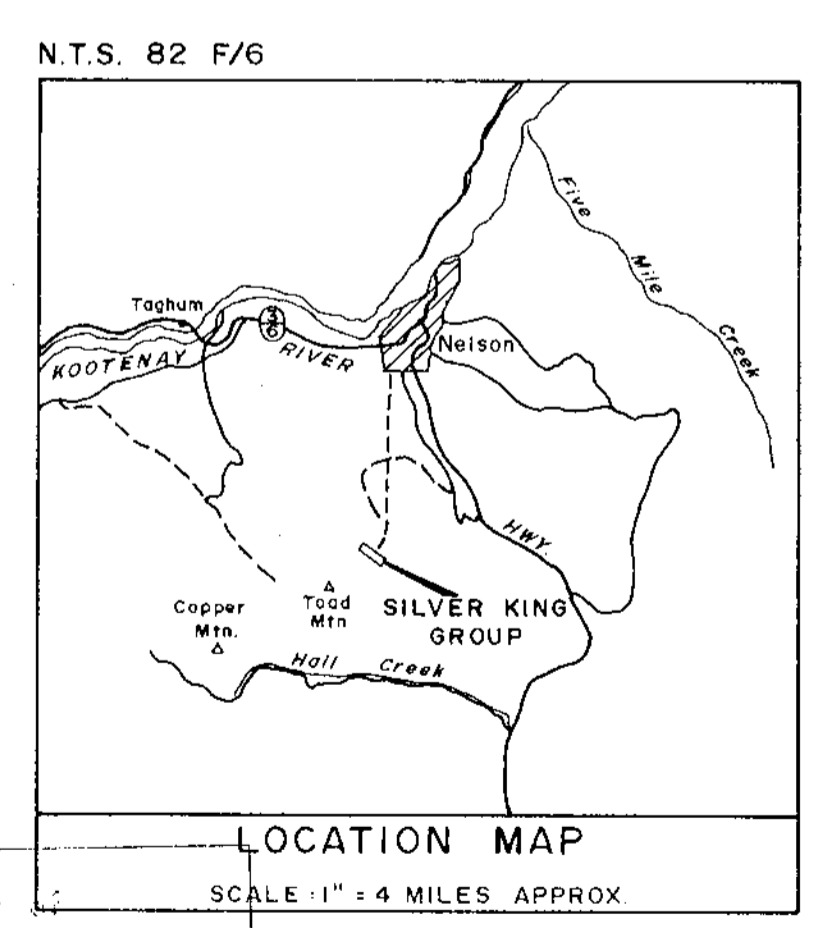
117°19'



- LEGEND**
- Contour Line Contour Interval 1.8, 3.6, 7.2 P.P.M.
  - Stations
  - Outline of Claims
  - Claim Posts
  - Unpaved Roads



49°25'



Department Mines and Petroleum ASSESSMENT REPORT	400 800 1200
NO. 4701	SPROATT SILVER MINES LTD. THE SILVER KING GROUP NELSON MINING DIVISION—BRITISH COLUMBIA GEOCHEMICAL MAP SILVER P.P.M.
Glenn E. White geophysical consulting services Ltd.	INTERPRETED BY: G.E.W. DRAWN BY: CHECKED BY: DATE: OCT. 16, 1973 FIG. NO. 6

**4701  
M6**

To Accompany Geophysical Geochemical Report on  
THE SILVER KING GROUP  
Date: Oct. 16, 1973  
By: Glenn E. White - G.S.