

92I/2W, 7W

GEOPHYSICAL REPORT

on the

RECONNAISSANCE INDUCED POLARIZATION SURVEY
OF THE

ELKROC AND TAP CLAIMS
situated on

TYNER CREEK

11 air miles north of MERRITT

NICOLA M.D.
British Columbia

N.T.S. 92 I/7

Latitude 50° 10'N; Longitude 121°00'W.

on behalf of
SONIC-RAY RESOURCES LTD

Field work between March 7 and March 15, 1974

4931

Report by

92I/2W,
7W

D.R. Cochrane, P. Eng.
March 21, 1974
Delta, B.C.

<p>Department of Mines and Petroleum Resources</p> <p>ASSESSMENT REPORT</p> <p>NO. 4931 MAP</p>
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MERRITT, B. C.

MAR 29 1974

MINING RECORDER



Cochrane Consultants Limited
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Geotechnical Consulting / Exploration Services

geology
geophysics
geochemistry

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PART A INTRODUCTORY

A - 1: PREAMBLE

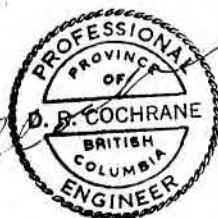
On March 7, 1974 a field crew supervised by D.R. Cochrane, P. Eng. was mobilized to Merritt, B.C. and commenced induced polarization work on the Tap and Elkroc claims held jointly by Carolin Mines and Sonic-Ray Resources Ltd. The work was a continuation of previous surveying which was left incomplete in 1972. The first few days of the survey were spent testing a 3000 foot electrode separation gradient array set-up. However, due to noise, the electrode separation had to be decreased to 1500 feet and a Wenner array was deployed. This report describes the IP procedure and discusses the results obtained. A cost breakdown of the work accompanies this report as Appendix II.

A - 2: SUMMARY AND CONCLUSIONS

1. The twenty-five (25) contiguous located Tap and Elkroc mineral claims are situated on Tyner Creek and are accessible by truck on the Aberdeen/Chataway Lakes road. The claims are situated 13.5 road miles north of the town of Merritt, B.C.
2. The area is almost entirely drift covered, in kames-and-kettle topography. The overburden is believed to thin to the west (uphill) and the property is presumed to be underlain by the Guichon variety of the Highland valley phase of the Guichon Batholith. (Northcote, 1969.)
3. The claims are owned jointly by Carolin Mines and Sonic-Ray Resources Ltd. (50% each.)



4. Approximately 4000 feet of diamond drilling was completed in 1972 by Sonic-Ray Resources and the drilling was guided by induced polarization surveys.
5. Native copper was encountered in every drill hole, however the overall grade appears to be low. Higher grade intersections were encountered in hole 72-3 (10' of 1.12% Cu) and 72-7 (40' of 0.85% Cu.)
6. A pulse type (time domain) induced polarization unit was employed in a Wenner array with an "a" spacing of 500 feet (1500 feet between current electrodes).
7. The peak chargeability response encountered was 7.3 milliseconds, and this small high is adjacent to an 8.7 m.s. bump encountered during 1972 IP work. This area is designated anomaly #2, and has as yet not been tested by drilling.
8. Correlation of 1972 and 1974 work is difficult because of the different field arrays, however a metal factor plan was prepared and values tentatively correlated. The figure (#4) which accompanies this report shows a rather extensive anomaly designated anomaly #1, which is located south of Flyner Creek. Two drill holes tested this zone and encountered short section of 0.8% copper mineralization. There is, however, a large portion of the anomaly which remains to be drilled.
9. The author recommends additional drill testing of anomaly #1, and a drill hole in the anomaly #2 area.
10. In addition to this work, a down hole-radial induced polarization survey is recommended on completion of each hole.



Respectfully submitted

D.R. Cochrane P. Eng.
March 21, 1974
Delta, B.C.



PART B: SETTING

B-1 LOCATION AND ACCESS

The Elkroc and Tap claims are situated in the Nicola Mining division, 13.5 road miles north and west of the town of Merritt, and 8.5 road miles north of the settlement of Lower Nicola.

Normal access is by car or truck from Lower Nicola, north on the black-topped Craigmont Mines access road for 4 miles, thence north again (slight right turn) onto the Aberdeen (or Chataway Lakes) gravel road, for 4.5 miles. Several logging roads provide good 4 x 4 truck access to the majority of Carolin Mines claims.

B-2 CLAIMS

The Elkroc and Tap claims form a contiguous block of located full sized mineral claims in the Nicola Mining Division and are shown on Mineral Claims Map 92 I/2 and 7W. The twenty-five (25) claims are held jointly (50% each) by Carolin Mines, Ltd. (N.P.L.) and Sonic-Ray Resources Ltd., both of Vancouver, B.C.

The following table lists pertinent claim details:

<u>Claim Name</u>	<u>Record Number</u>	<u>Anniversary Date</u> *
Elkroc 1 to 3	24181-24183	May 5, 1974
Elkroc 4 to 6	24460-24462	May 28, 1974
Tap 1 to 12	28581-28592	March 17, 1974
Tap 13 to 19	28657-28663	March 21, 1974

* as of March 13, 1974

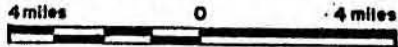


Sonic-Ray Resources Ltd.

Tyner Creek Project
Guichon Creek Area, British Columbia
Nicola Mining Division

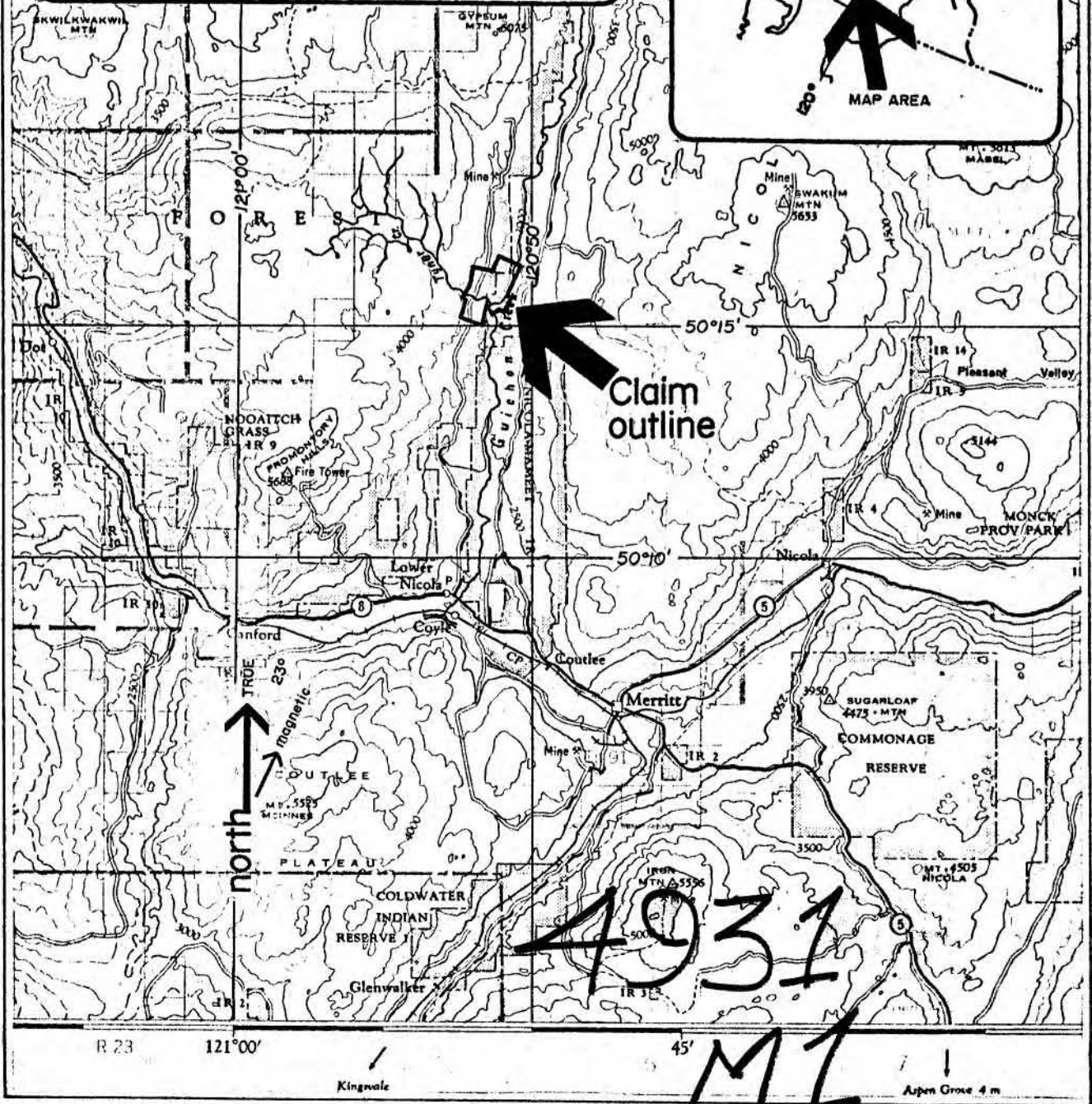
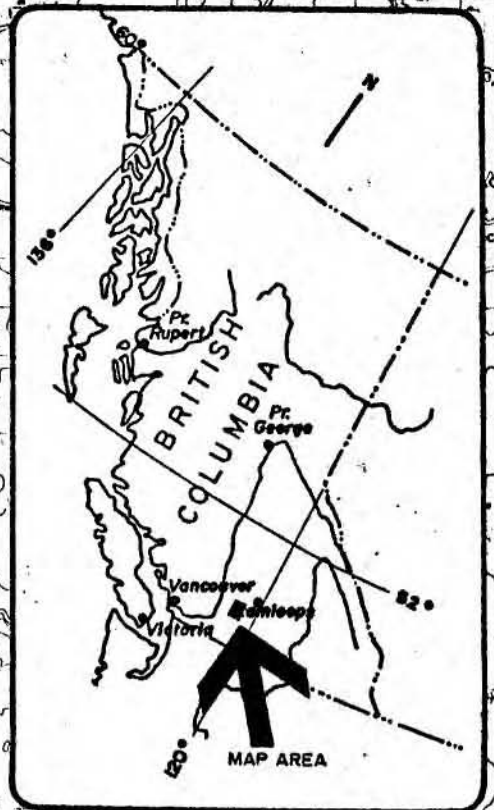
Location Map from N.T.S. 92 I (Ashcroft)

Scale: 1 to 250,000 or 1 inch = approx. 4 miles



Cochrane Consultants Limited
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figure 1



The author personally inspected claim posts in 1968, and claims, at that time appeared to have been staked in accordance with the regulations set out in the Mineral Act.

B-3 GENERAL SETTING

The Carolin Mines, Tyner Creek property, is situated in the Thompson Plateau subdivision of the Interior Plateau physiographic division of British Columbia. The Thompson Plateau is a gently rolling upland of low to moderate relief. The local Guichon Creek -Nicola Creek-Highland valley area is characterized by rounded hills up to just over 6,000 feet in elevation, and wide "U" shaped valleys.

The claims lie on the east flank of the Promontory Hills (elevation 5,688 feet), immediately east of Guichon Creek (elevation 2,500 feet). The area surveyed lies on this westerly sloping hillside and is bounded on the west by Guichon Creek. It is bisected east-west by Tyner Creek which has eroded a steep "V" shaped gorge at lower elevations. Much of the area surveyed contains gravel ridges, pot holes and moraines, which form an overall wedge-shaped mass thinning to the west and south. Well washed and sorted



gravels are observable on the eastern portion of the grid area, and several gravel terraces trend north-south parallel to Guichon Creek at the east edge of the overburden wedge.

Outcrops are sparse and restricted to the lower portion of Tyner Creek and the extreme south section of the ground control grid, and all are, evidently, phases of the Guichon batholith. The Tyner Creek valley exposes highly fractured, rusty, altered and weathered, gabbroic "grey" Guichon rocks. On line 32 south, between 18 and 19 east, outcrops are tentatively identified as gneissic biotite diorite. Between 0 and 10 west, and line 40 south, hornblende-biotite diorite with considerable accessory magnetite is exposed.

Glacial till covers the remainder of the bedrock on the Tap and Elkroc claims.

B-4 HISTORY

There is evidence of old workings in Tyner Creek and the area is presumed to have been intensively prospected about the time the Aberdeen Mine was being developed. (1907-1926). In 1965 the Tyner ground was acquired by Carolin Mines Ltd. and in the following years work included a geochemical soil sampling survey, electromagnetic survey, induced polarization survey, and magnetometer survey. A report by Dr. J.H. Montgomery on the Tyner Creek Property, dated August 1 1969, records the 1968 and 69 drill programs and 5 holes were drilled and totaled 3,500 feet.



All holes were reported to intersect native copper mineralization and erratic sections containing copper sulphides.

Early in 1972, Sonic-Ray Resources Ltd. entered into an agreement with Carolin Mines whereby interest in the property could be acquired by Sonic-Ray after expenditures in further exploration. In 1972 and 1973 Sonic-Ray conducted extensive work on the claims and earned a 50% interest in the 25 claim property. Work included drilling nine (9) drill holes, geochemical work, a claims survey and additional induced polarization surveys. The author supervised the Sonic-Ray program.



PART C: PROCEDURES

C-1 LINECUTTING

IP survey lines were layed out by compass, and flagged and blazed with numbered stations set at 500 feet intervals on all lines except 74-3 which has station intervals at 200 feet. The line positions as shown on the accompanying maps are believed to be quite accurate.

C-2 IP SURVEYING AND DATA PROCESSING

Work commenced on line 74-3 where 3000 feet of current electrode wire was layed out, with 200 feet of receiving electrode wire in a gradient array. Subsequent tests showed that the noise level was too high for the incoming signal. In order to improve the signal, a Wenner array was finally used with an "a" separation of 500 feet (current electrode separation of 1500 feet). As a consequence the signal was increased considerably and current between 0.2 and 0.8 amps was applied at voltages of 500 and 1000. A Hewitt Hew-200 IP unit was employed, and instrument specifications are appended. The current on time was 2 seconds, and current off time 2 seconds as well.



A complete cycle is described below:

- (a) current on for 2 seconds, positive front electrode, negative rear electrode. Output 0.2 to 0.8 amps at 500 or 1000 volts.
- (b) current off
- (c) delay of 0.4 seconds before integration of the residual voltage
- (d) integration of residual voltage for 1.2 seconds
- (e) delay for 0.4 seconds
- (f) current on for 2 seconds, negative front electrode and positive rear electrode
- (g) (b) to (e) repeated for between 2 and 10 cycles

The results were recorded on standard pre-printed IP note forms which recorded

current (I) in milliamps
primary voltage (Vp) in millivolts
secondary voltage (Vs) in millivolts
number of cycles
station number, line, operator, date, remarks, etc.

The apparent chargeability and resistivity was normalized by the following relationships:

$$\text{apparent chargeability, (a.c.)} = \frac{V_s}{V_p} \times k$$

$$\text{apparent resistivity } (\rho) = \frac{2 \pi "a" \times V_s}{I \times n}$$

Where n = number of pulses, k = a constant

Metal factor is defined as $\frac{\text{a.c.}}{\rho} \times k$.

The unit was operated and all calculations were prepared by

D.R. Cochrane, P.Eng.



PART D. DISCUSSION

D-1: APPARENT RESISTIVITY

The apparent resistivity results accompany this report in profile form and values are in units of ohm-feet. Results ranged from a low (conductivity high) of 470 to a high of 1890 ohm-feet. The arithmetic mean of the 29 recorded values is 1007 ohm-feet and this compares well with the arithmetic mean of 1130 ohm-feet recorded in the 1972 IP work.

A moderately significant change occurred on line 74-3 around station 5N where the value decreased from 1890 to 990 ohm-feet within 500 feet. This change is not observable on the adjacent line 72-1 and must therefore be considered local and may in fact be related to moisture in Tyner Creek valley.

The remainder of the apparent resistivity changes are of a minor nature only.

D-2 APPARENT CHARGEABILITY

Induced polarization apparent chargeability response ranged from a low of 1.9 to a high of 7.3 milliseconds. The arithmetic mean of the 29 values is 4.4 milliseconds which is considerably lower than the average of the 1972 work (average 8.3 milliseconds). This downward shift in apparent chargeability readings is believed to be due to at least two factors.

(a) the difference in the position of the areas surveyed in 1972/1974 and (b) the difference in the field arrays used, (i.e. gradient vs. Wenner).



The most significant value recorded was a 7.3 millisecond peak positioned at 27.5 north on line 74-3. The adjacent reading confirms this high as a 7.0 ms value was recorded at station 32.5 N. on the same line. This small bump is also adjacent and 800 feet west of a peak value of 8.7 milliseconds located in the 1972 work, and in the same area as two 6.7 millisecond high recorded in the 1968 work. This area is designated IP Anomaly #2 which, as yet has not been tested by diamond drilling. A single 6.1 m.s. reading occurring on line 74-4 at station 12.5 north appears to be part of this same chargeability feature.

Line 74-8 east failed to pick up the extension of the 13.3 millisecond high recorded on line 72.4 near station 20 north. This may in fact be due to the different arrays deployed and the corresponding difference in depth penetration and response. The remainder of the area surveyed is considered to exhibit background response only.

D-3 CORRELATION

Correlation of the 1972 and 1974 work is difficult because of the different arrays employed. It is believed however, that use of the metal factor parameter may show the two sets of results in a reasonable manner, and such a plan accompanies this report. Metal factor is herein defined as:

$$\text{m.f.} = \frac{\text{app. chargeability}}{\text{app. resistivity}} \times 1000$$

Cross line correlation must be considered tentative.



Metal factor values ranged from a low of 1.7 to a high of 29.2 milliseconds per ohm-feet. The most impressive high metal factor zone has been designated anomaly #1 and it is centered south of Tyner Creek along line 72-1. Diamond drill hole 72-7 was drilled into this anomaly and the best section ran 0.85% Cu over 40 feet. Drill hole 72-8 tested the south end of this anomaly and cut 20 feet grading 0.84% Cu.

Metal factor anomaly #2 is centered about 3000 feet north of Tyner Creek and along line 72-1. The peak metal factor value is 14.3 near station 60N on line 72-1. This anomaly has not as yet been tested by drilling. The closest drill hole is situated some 1400 feet to the south of this anomaly.

D-4 DISCUSSION

Recent induced polarization surveying has confirmed the existence of a chargeability high designated anomaly #2 and located 1400 feet north of the closest drill hole. Previously located anomaly #1 was drilled in 1972 with rather encouraging results. The author recommends an additional hole in anomaly #1, and a drill test on anomaly #2. Concurrent with the drilling, the author also recommends a down-hole-radial induced polarization survey in order to take full advantage of the holes and to geophysically investigate the anomalous area at depth.



Respectfully submitted

D.R. Cochrane P. Eng.
March 21, 1974
Delta, B.C.



APPENDIX II

Survey Details and Cost

PROPERTY: Tyner Creek Grid MINING DIVISION: Nicola
SPONSOR: Sonic-Ray Resources
LOCATION: 15 air miles northwest of Merritt B.C.
SURVEY: Hewitt 200 (Pulse type) IP with 0.5 k.w. power pack
SURVEY MAN DAYS: March 7 (1/2), March 8 to 13 (6), March 14 (1/2)
total 3 men, 7 days, = 21 man days
MOLILIZATION MAN DAYS: 3 x 1 = 3 man days
DATA PROCESSING, REPORT PREPARATION MAN DAYS:
D. R. Cochrane - 3
DRAFTING MAN DAYS: 1 x 5 = 5 days
NO. ALONG LINE READINGS: 29
LINE MILES: 3.3 line miles
DATA PROCESSING:
D.R. Cochrane, M.Sc, P. Eng., U. of T., Queen's
FIELD CREW: Bruce Cochrane
D.R. Cochrane
G. Elliott
DRAFTING: B.A. Cochrane
COSTS: By agreement between Sonic-Ray Resources, Ltd, and
Cochrane Consultants, Ltd.

7 field days @ \$550 per day -----\$3,850
Mobilization/Demobilization ----- 200
Data Processing and Report Preparation - 950
Total --\$5,000



D.R.Cochrane, P. Eng.
Cochrane Consultants Ltd.



SPECIFICATIONS

"Time Constant Modified"

HEW 200 Induced Polarization Unit

Receiver-Transmitter Package: (less power supply)

15" x 13" x 10" Weight - 38 lbs.

Power Supplies:

- (a) 0.5 k.w. supply; 30 volt rechargeable batteries five (5) Globe CG-680s
- (b) 1.5 k.w. supply; 50 Eveready Y5169 rechargeable NiCad Batteries
- (c) 3.0 k.w. supply; two units as in (b) above, in series

Receiver:

Common mode rejection 100DB (DC-60 Hz)

Input impedance 1×10^6 ohms

Operation temperature: -20°C to $+75^{\circ}\text{C}$

Integrating V_o and V_s - Sealed galvanometer type meters for wet climates

Three input combinations (P_o , P_1 , P_2)

Sealed switches and panel for wet climate (dessicant incl.)

PC Board integrated circuits, V plug in board construction limited

Transmitter:

24 - 30 volt DC-DC transistorized converter

Power output, 0.5, 1.5 or 3.0 k.w.

Two second to six second pulse times in $\frac{1}{2}$ sec. intervals

Automatic reverse current cycling

Operating temperature: -20°C to $+75^{\circ}\text{C}$

Sealed switches and panel for wet climates (dessicant incl.)

Sealed current meter for very humid or wet climates

TIME CONSTANTS:

The following table lists current on times, and corresponding delay and integration times for each $\frac{1}{2}$ cycle.

Current On (seconds)	Delay Time (seconds)	Integration Time (seconds)
2.0	0.4	1.2
2.5	0.5	1.5
3.0	0.6	1.8
3.5	0.7	2.1
4.0	0.8	2.4
4.5	0.9	2.7
5.0	1.0	3.0
5.5	1.1	3.3
6.0	1.2	3.6

$\frac{1}{2}$, 1 or multiple cycling with automatic reverse polarity every $\frac{1}{2}$ cycle.

Manufactured for Cochrane Consultants Ltd. by Terra Physics, Draper, Utah.



APPENDIX I

PERSONNEL AND DATES WORKED

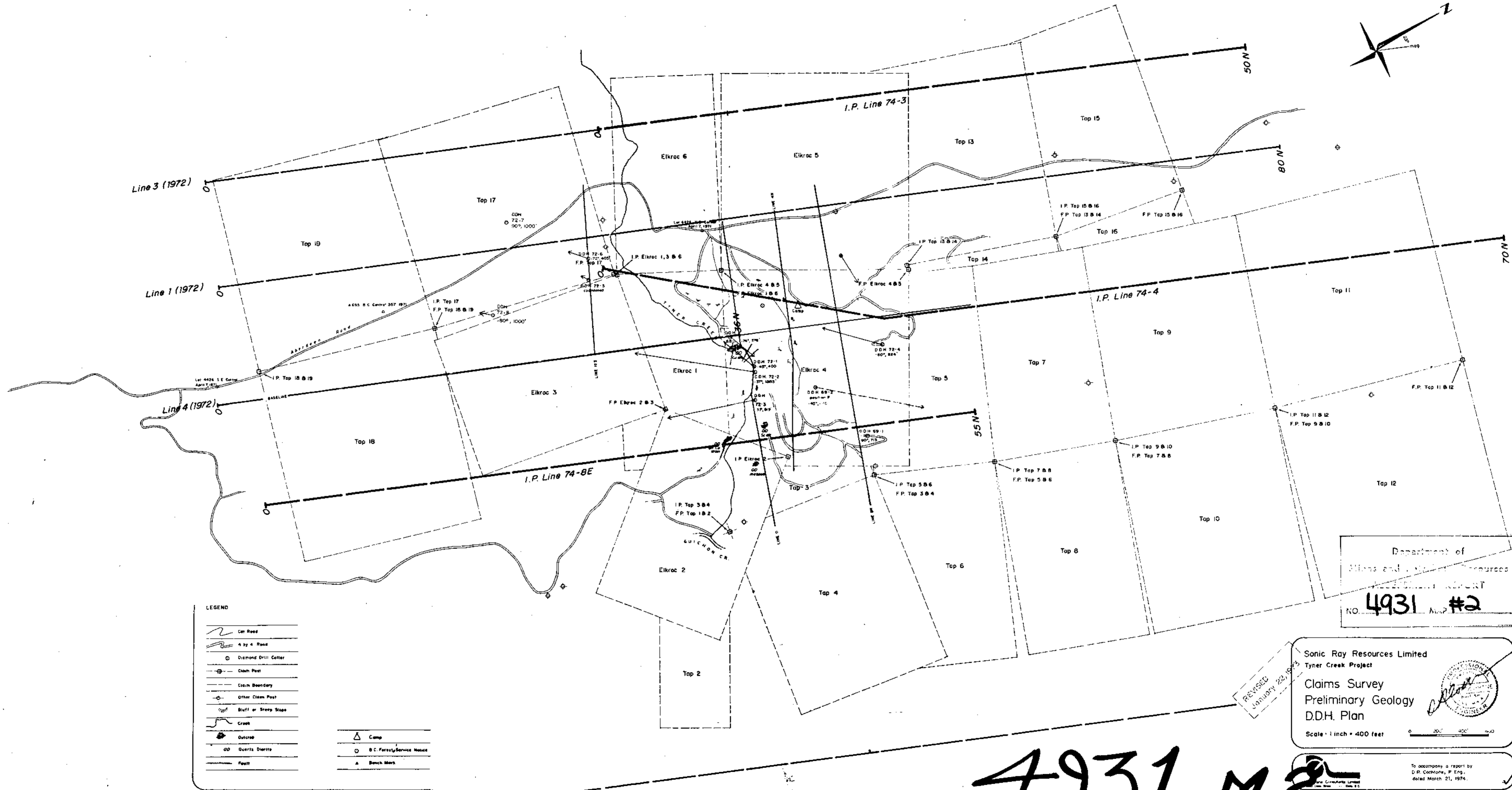
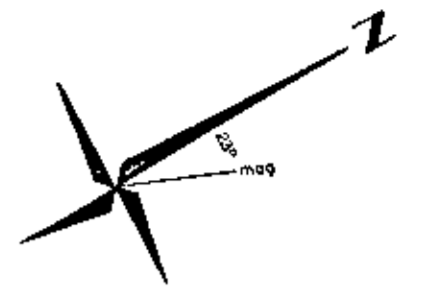
D.R. Cochrane, P. Eng. (M. Sc. Queen's 1964)

Instrument operator March 7 to March 14 inclusive
Report preparation March 18, 19, 20

G. Elliot, (B.A. U.B. C.) IP helper March 7 to March 14

B.A. Cochranè (A.O.C.A.) IP helper March 7 to March 14,
drafting March 18 to 22, 1974





LEGEND

	Car Road
	4 by 4 Road
	Diamond Drill Collar
	Claim Post
	Claim Boundary
	Other Claim Post
	Bluff or Steep Slope
	Creek
	Outcrop
	Quartz Diarite
	Fault
	Camp
	B.C. Forest Service House
	Bench Mark

Department of
Mines and Technical Resources
PROSPECT REPORT
NO. **4931** #2

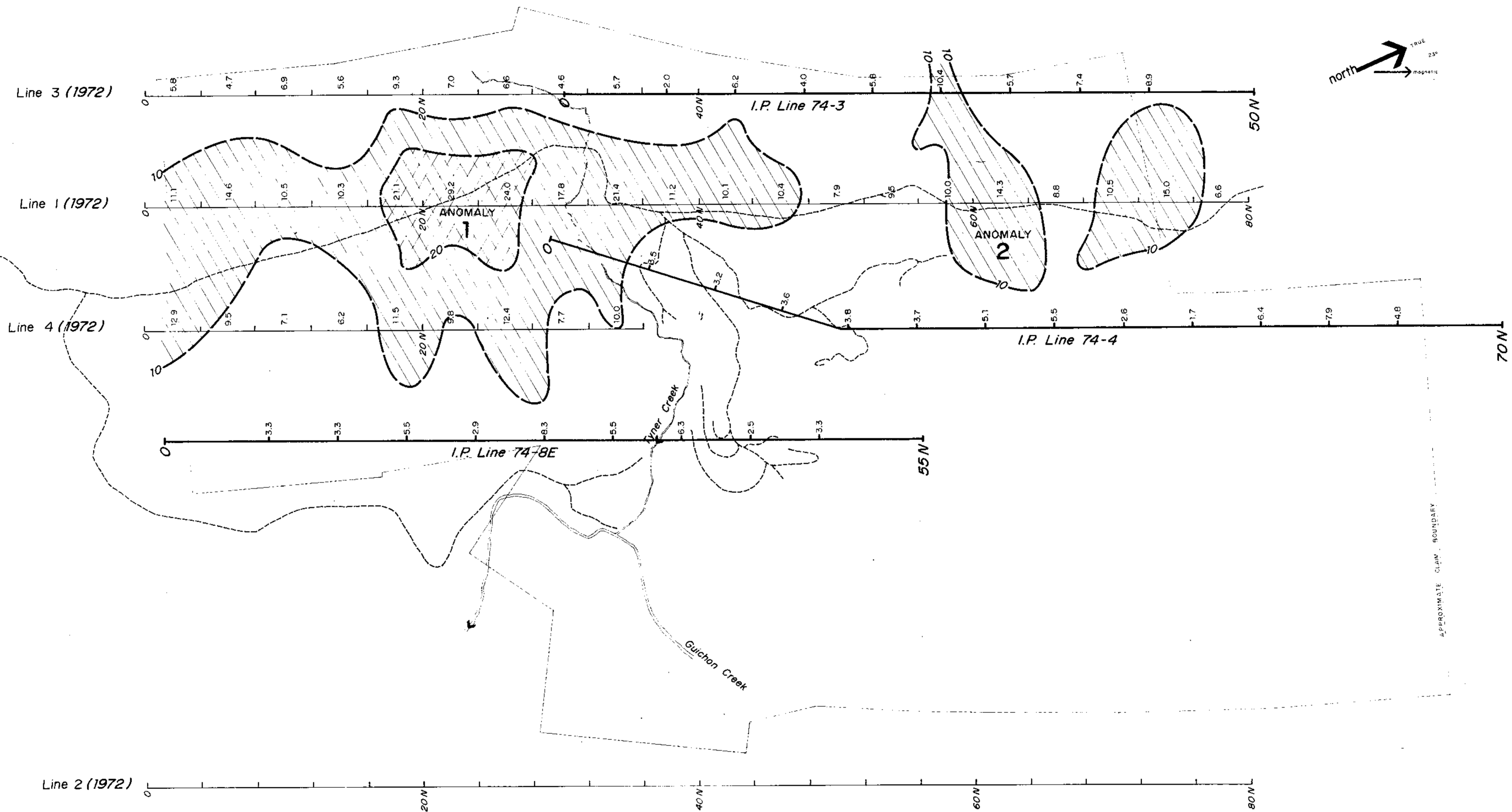
REVISSED
January 22, 1973

Sonic Ray Resources Limited
Tyner Creek Project
Claims Survey
Preliminary Geology
D.D.H. Plan

Scale: 1 inch = 400 feet

4931 M2

To accompany a report by
D.R. Cochrane, P. Eng.,
dated March 21, 1974.



Metal Factor in
Milliseconds per ohm-foot. 20

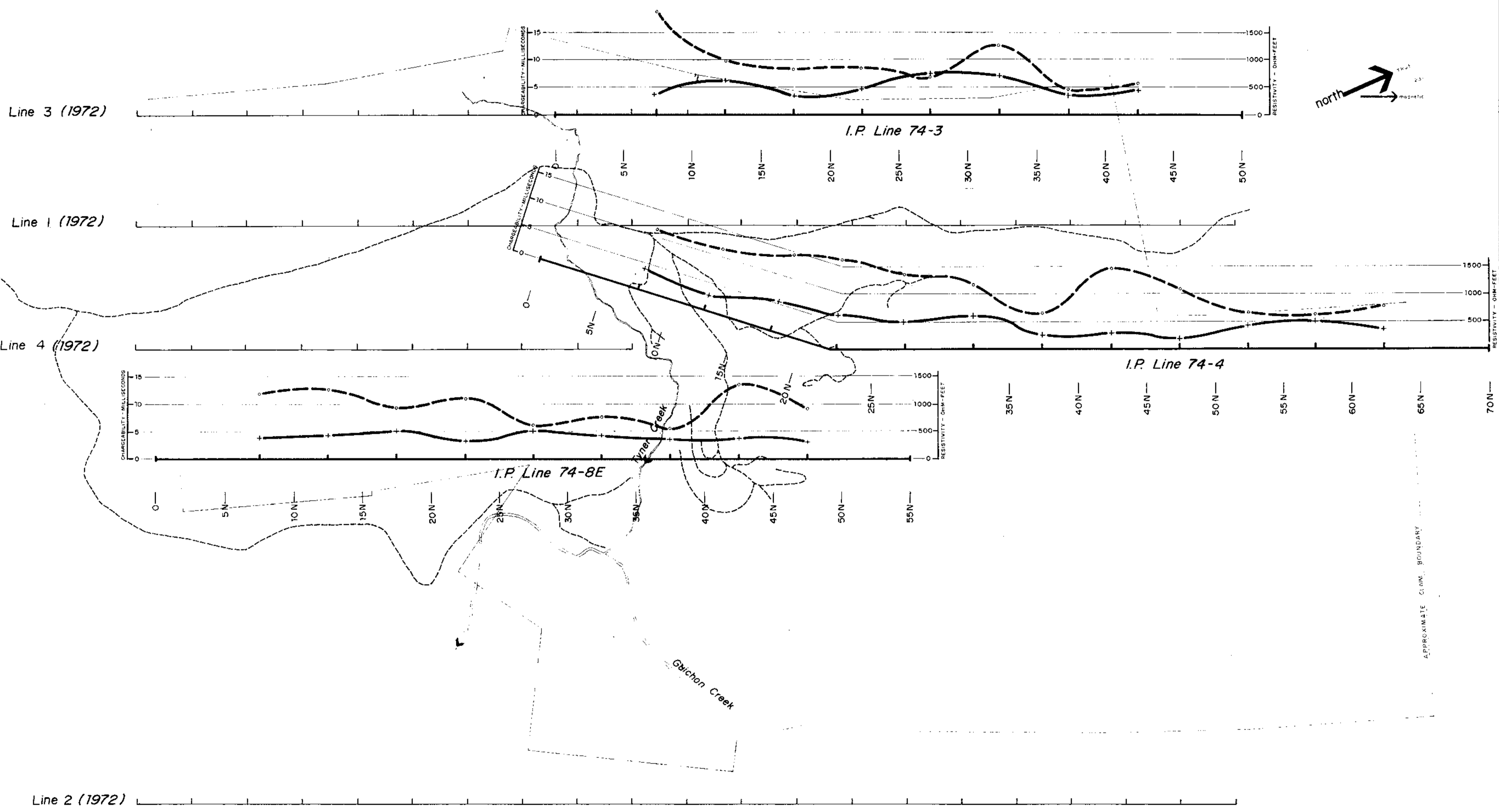
Sonic-Ray Resources Ltd.
Tyner Creek Project
Guichon Creek Area, British Columbia
Nicola Mining Division

NO. 4931 #4

Metal Factor
Compilation of 1972 & 1974 I.P. Data
Correlation Tentative

Scale: 1 inch = 400 feet

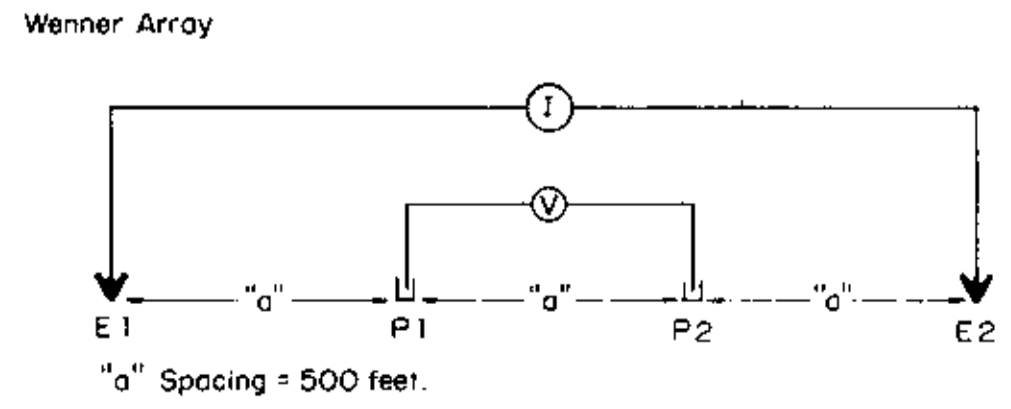
To accompany a report by
D.R. Cochrane, P. Eng.,
dated March 21, 1974



Legend:

- Chargeability Profiles
- Resistivity Profiles

Notes:



Sonic-Ray Resources Ltd.
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 Nicola Mining Division

Chargeability and
 Apparent Resistivity Profiles

MINING
 NO. 4931 #3

Scale: 1 inch = 400 feet

To accompany a report by
 D.R. Cochrane, P. Eng.,
 dated March 21, 1974.

Cochrane Consultants Limited
 4102 Delta Street Delta B.C.

4931 #3 Figure M3