

# 3309

1971 Geophysical Report

**TITLE** Coles Creek Copper Property  
Fab # 1-11, #33-92 Claims

**AUTHORS** D.A. Silversides, G.M. DePaoli and  
J.F. Allan, P. Eng. (B.C.)

**DATE** September 30, 1971

**COMMODITY** Copper

**LOCATION-Area** Houston  
Mining Division  
Coordinates Omineca  
NTS Latitude 53°31'N, Longitude 127°13'W  
93 E 11

AMAX Vancouver Office

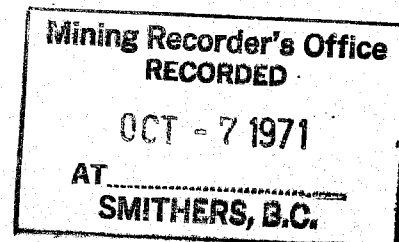
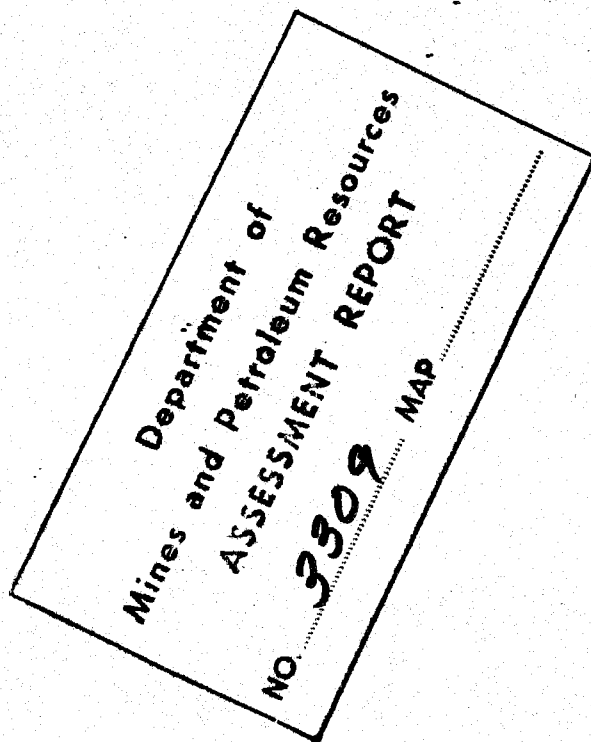


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## SUMMARY

The Coles Creek Copper Property is situated in West Central British Columbia, at latitude  $53^{\circ}31'N$ , longitude  $127^{\circ}13'W$ . A program of line cutting, and magnetometer and induced polarization/resistivity surveys were carried out June 23 to August 11, 1971.

A Scintrex fluxgate magnetometer (MF-2) was used for the ground magnetic survey. Readings were obtained at stations 100 feet apart, along picket lines 400 to 800 feet apart. Twenty line miles were surveyed.

A portable battery powered I.P. unit was used for the induced polarization/resistivity survey. The equipment consists of the IPR-7 Newmont-type receiver and the IPC-725 watt transmitter. A total of 14.3 line miles were surveyed, using 200 foot dipoles in a dipole-dipole array. One separation ( $n=1$ ) was used throughout the survey.

The magnetic and induced polarization/resistivity surveys aided in extending the geologic observations made in outcrop to areas covered by overburden. The most significant magnetic anomaly is a circular shaped zone, 1000 feet in diameter, of 300 to 400 gammas positive relief. The induced polarization/resistivity survey outlined a zone of 30% to 90% chargeability (up to perhaps 9% sulphide by volume) which is coincident with the magnetic anomaly. Outcrop along the southern edge of this coincident magnetic-induced polarization anomaly is feldspar-biotite porphyry containing a well developed quartz vein stockwork of chalcopyrite-bornite-molybdenite-pyrite-magnetite. The geophysical surveys thus imply that this "mineralization" is considerably larger than bedrock observations.

## INTRODUCTION

### General Statement

A program of line cutting, trenching, magnetometer and induced polarization surveys was carried out on the Coles Creek Copper-Molybdenum Property between June 23 and August 11, 1971. The program was supervised in the field by D.A. Silversides, geologist employed by Amax Exploration, Inc. This report gives the results of the geophysical surveys.

### Location and Access (See Figure 1)

The Coles Creek property is situated in West Central British Columbia, at latitude 53°31'N, longitude 127°13'W. The nearest town is Houston, sixty-six miles to the northeast.

Access is via the Houston-Tahtsa Lake forestry access road, then via helicopter to the claims. Helicopter flight distance is twelve miles.

### Claims

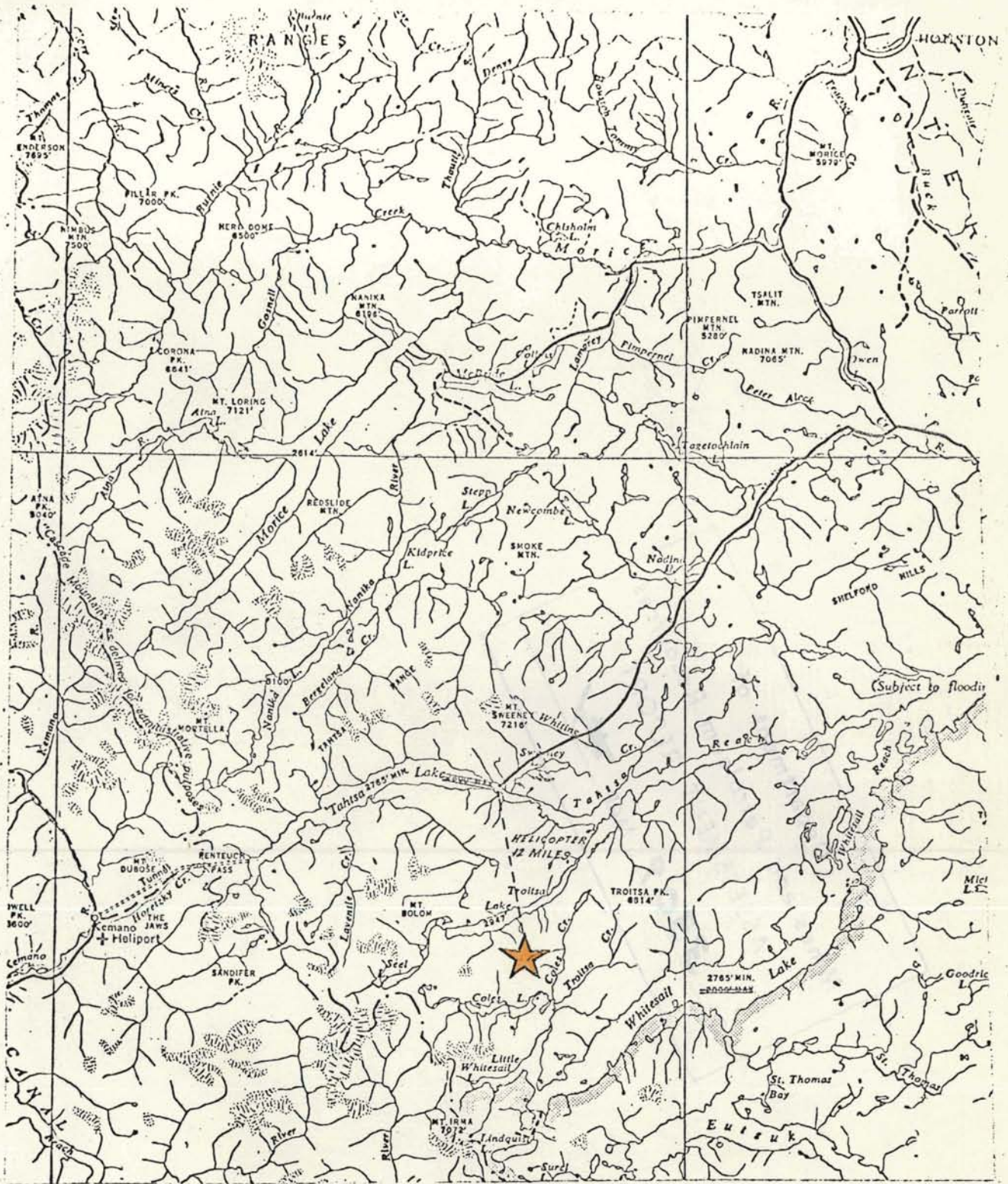
Seventy-one claims comprise the Coles Creek Property.

These are:            Fab # 1-#11 inclusive  
                         Fab #33-#92 inclusive

These were assembled as two groups, recorded at Smithers on August 30, 1971. The location of the Fab claims is shown in Figure 2; the status is given in Table I.

Table I - Status of Fab Claims

<u>Orange Group</u>		<u>Yellow Group</u>	
	<u>Record Numbers</u>		<u>Record Numbers</u>
Fab #1-11	43429-43439	Fab #33-40	43461-43468
Fab #41	80524	Fab #42	80525
Fab #43	80526	Fab #44	80527
Fab #45	80528	Fab #46-48	80529-80531
Fab #49	80532	Fab #50-59	80533-80542
Fab #68-92	100014-100038	Fab #60-67	93828-93835
Total Claims	40	Total Claims	31

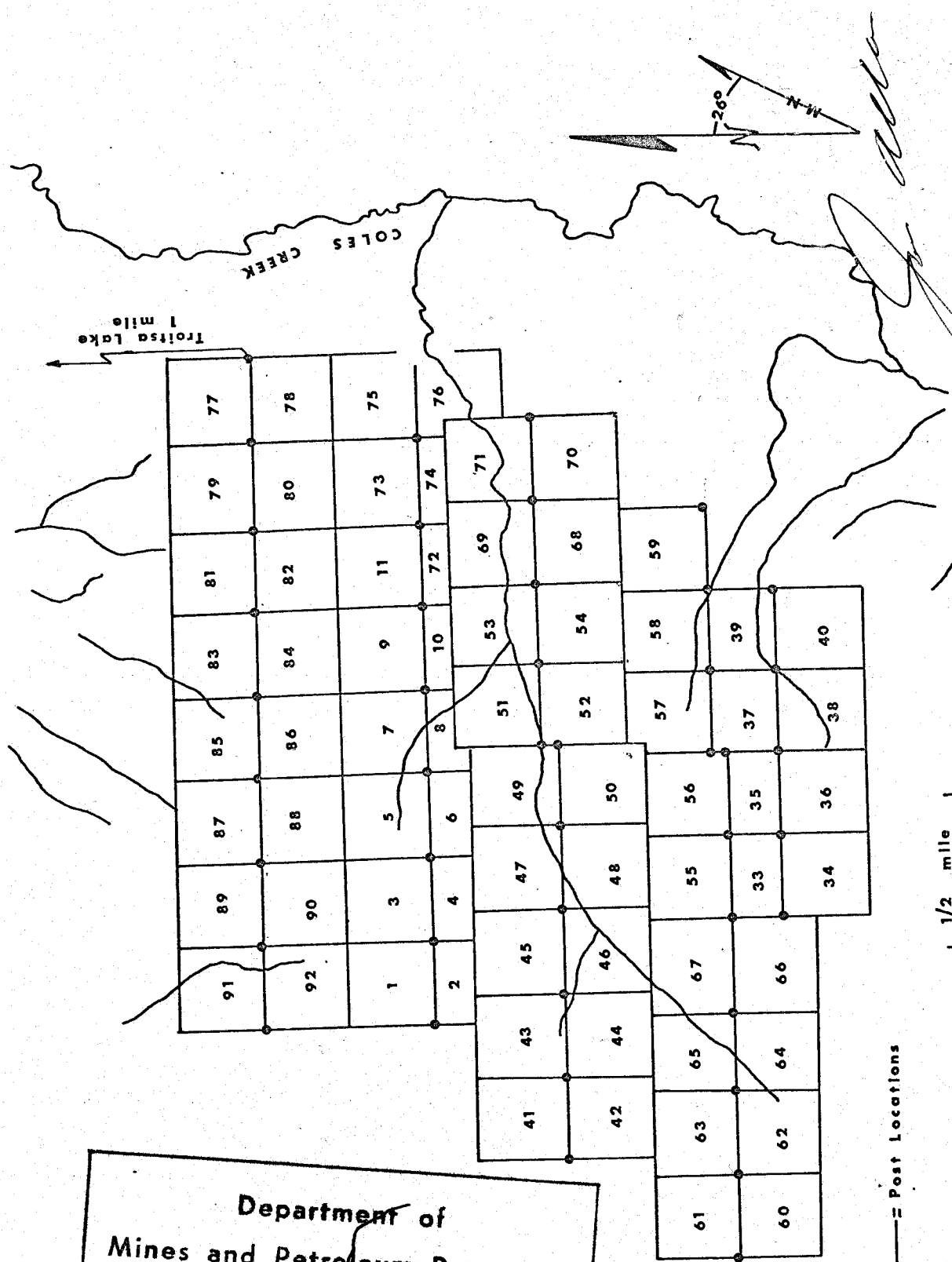


0 5 10 15 miles

Location of Coles Creek Property

Fig. 1

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 3309 MAP # 2



AMAX EXPLORATION, INC.  
 F&E CLAIMS

Figure 2

Anniversary dates on acceptance of this report

Fab #1-11, #33-40	September 9, 1973
Fab #41-59	September 29, 1974
Fab #60-67	September 30, 1973
Fab #68-92	July 14, 1974

#### GEOLOGICAL SUMMARY

The Fab claims of the Coles Creek Copper Prospect cover an Early Tertiary (?) intrusive-extrusive complex and Middle Jurassic volcanic and sedimentary rocks. The Middle Jurassic rocks are assigned to the Hazelton Group and are predominantly andesite flows, breccias, and tuffs, with minor greywacke and argillite.

Intrusive rocks of possible Tertiary Age occur as dykes and small, irregular stocks. These intrusions include three types:

- i) Porphyritic quartz diorite
- ii) Quartz-feldspar porphyry (quartz monzonite)
- iii) Feldspar-biotite porphyry (monzonite)

The feldspar-biotite porphyry is the most significant because of spatially related copper mineralization. This rock type is exposed in the western tributary of Coles Creek, within Fab claims #47 and #49, and is probably a small stock of less than 1000 feet in diameter. It intrudes a stock of quartz-feldspar porphyry, which is approximately 3000 feet in diameter. Porphyritic quartz diorite occurs as a large (800 x 4800 feet) northeast trending dyke in the western part of the claims.

Chalcopyrite, molybdenite, minor bornite, and pyrite occur in a quartz vein stockwork within and immediately adjacent to the feldspar-biotite porphyry. (The sulphide-quartz stockworks is cut by a lesser developed stockworks of magnetite-quartz.)

Abundant pyrite occurs in the vicinity of the feldspar-biotite porphyry. Rock exposure in the western tributary of Coles Creek indicates a zone of 3% to 10% pyrite by volume, with

an east-west dimension of 2800 feet, is present. Data collected to date indicates that this area (Fab claims #47 and #49) is the "core" of the property, in terms of copper mineralization, total sulphides, and alteration.

Outcrop on the Coles Creek Property is restricted to creek gulleys and the higher portion of ridges. As such, it is difficult to determine distribution of rock types, and mineralization. Therefore, a program of magnetometer and induced polarization surveys was carried out. The following sections discuss the method and results of these surveys.

### GEOPHYSICAL SURVEYS

#### General Statement

Because glacial overburden covers much of the Coles Creek Property to the extent that it is difficult to obtain a comprehensible picture of distribution of rock types and mineralization, magnetometer and induced polarization/resistivity surveys were carried out. Twenty miles of line were cut, chained, and picketed at 100 foot intervals. These lines were spaced 400 to 800 feet apart, and provided control for the geophysical surveys.

The magnetometer survey was employed for two reasons -

- i) to map the distribution rock types
- ii) to map the quartz-magnetite stockwork in the area of Fab claims #47 and #49, which appears to be coincident with the copper-bearing sulphide stockwork.

The induced polarization/resistivity survey was employed for two reasons -

- i) to map the distribution and amount of total sulphides (induced polarization),
- ii) to map the distribution of rock types and alteration (resistivity).



## Magnetometer Survey

### Instrument and Procedure

The instrument employed was the Model MF-2 magnetometer manufactured by Sharpe Instruments, a division of Scintrex Limited, Downsview, Ontario. It operates on the fluxgate principle measuring the vertical component of the earth's magnetic field.

The MF-2 circuitry is temperature compensated to less than 1 gamma per °C from -40°C to +40°C.

The MF-2 measurement range is from +100,000 gammas to -100,000 gammas and, on the most sensitive scale, the sensitivity is 20 gammas per scale division or a readability of 10 gammas.

The MF-2 is a hand held instrument requiring only coarse levelling.

To enable surveying on the most sensitive scale on the magnetometer, the earth's field was "bucked out" using the instrument's latitude control switch. Station 116+00E, 100+00N was adjusted to read zero gammas. The earth's total field at this point is approximately 55,000 gammas.

The base line and the north tie line were then surveyed at 100 foot station intervals and diurnal corrections were made after periodically checking back on the station at 116+00E on the base line. The north-south oriented picket lines were then surveyed at 100 foot stations and diurnal corrections were made by obtaining readings at the intersections of the picket lines and base and north tie lines. The entire grid was surveyed in this manner and corrected values were plotted on a scale of 1"=400 feet. These results are shown in Figure 3.

### Results and Discussion

The magnetic survey covered 108,000 lineal feet (20.3 miles) at 100 foot station intervals. All cut, chained, and picketed lines were surveyed. Lines were extended north and to

the east by chain and compass after the cut lines were surveyed in order to extend magnetometer coverage in a few areas. The area covered by the magnetic survey is approximately 1.8 miles by 1.4 miles.

The most prominent feature on Figure 3 is a large 8000 gamma high at the western edge of the area surveyed. This high area trends northeasterly and is approximately 1500 feet wide. The length dimension has not been established by the survey. This anomaly corresponds to a stockworks of magnetite veining in Hazelton Group rocks.

A large low area (0 to -1140 gammas) occurs at the southwestern side of the high area. The 0 gamma isomagnetic contour defines a triangular-shaped low with one apex pointed to the southeast. The -500 isomagnetic contour defines a more restricted area trending northeasterly, with an extension to the southeast. The -500 isomagnetic contour, including the southeastern projection, closely corresponds to the outcrop distribution of porphyritic quartz diorite.

Two areas of high (1000 to 5200 gammas) magnetometer readings are indicated south of the base line in the vicinity of lines 108+00E and 116+00E, and in the vicinity of the north tie line between lines 100+00E and 108+00E. Outcrops in the vicinity of these two highs are Hazelton Group andesite. In areas outside these highs, Hazelton Group rocks strike north-northwesterly, with dips variable, but generally over  $-70^{\circ}$ . Outcrop distribution of the Hazelton Group andesite in the area of the two highs imply a relatively thick flow (over 500 feet). The andesite readily attracts a hand-held magnet, due to disseminated grains of magnetite. Thus, the two highs possibly are the reflection of a relatively thick, north-northwest striking flow of Hazelton andesite with a high magnetic susceptibility.

If this interpretation is valid, the magnetic

susceptibility of the flow has been changed north of the base line, where an isolated high of 500 to 880 gammas occurs. This particular area is covered by overburden, thus no examination of rocks is available to explain the isolated high and the possible change in magnetic susceptibility of the postulated flow.

A large area of readings of 0 gamma and less occur in the eastern half of the survey area. This area has relatively little magnetic relief and corresponds to the area of Tertiary (?) quartz-feldspar porphyry and tuff outcrops.

A small isolated high (isomagnetic contours -100 gammas to +300 gammas) occurs in the western part of this large low area. The small high coincides with the feldspar-biotite porphyry and its spatially related quartz-magnetite veining.

Hazelton Group rocks (with the exception of the thick andesite flow) underlie areas of 0 to 1000 gammas.

### Induced Polarization/Resistivity Survey

#### Instrument and Procedure

The induced polarization method relies on the detection of electrical surface polarization of metallic minerals, which is induced by electrical currents applied to the ground. When these minerals block the pore passages of a rock and an electric current is passed through the rock, an electrochemical barrier must be overcome by the current in order to flow through the interface between the metallic minerals and the solution in the core passage. The forces which oppose the current flow are said to polarize the interface; and the added voltage necessary to drive the current across this barrier is sometimes known as the "over voltage". When the inducing current is turned off, the over voltage that is set up decays in time.

A portable I.P. unit was used for the survey. The equipment consists of the IPR-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.

The Newmont-type IPR-7 Receiver employs measurements in the time domain. The current source is turned on for two seconds then abruptly turned off for two seconds before commencing a new cycle with opposite polarity. The voltage that is found to remain in the "off" period is measured and compared to the "on" period voltage. The decay voltages are integrated over a specified interval (0.45 sec. to 1.1 sec.) after the interruption of the primary current. The ratio, given in milliseconds is designated by the letter M or "chargeability".

Survey procedure required four men equispaced 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 reuse them on the next set-up.

The survey was executed by AMAX personnel with Larry J. Lebel and Garry M. DePaoli alternating daily in operating the equipment. The main objective was to map the near surface sulphide distribution in an attempt to recognize any lateral change in the total sulphide content of the rock type. A total of 14.3 miles were surveyed using 200 foot dipoles in a dipole-

dipole array. One separation ( $n=1$ ) was used throughout the survey. The inherent flexibility of the procedures allowed extension of lines 108+00E and 120+00E beyond the end of the cut line and also a traverse along the creek bed.

#### Results and Discussion

The data has been presented in plan form. The chargeabilities (Figure 4) and resistivities (Figure 5) are contoured at ten millisecond and 100 ohm-meter intervals respectively.

The contoured chargeability outlines a central boomerang-shaped anomaly that extends from line 116+00E to 130+00E. This anomaly is locally coincident with sulphides exposed in the creek bed and reveals an extension of the sulphides under the overburden in a north-westerly direction. The anomaly is also coincident with the largest resistivity low in the survey area (less than 100 ohm-meters in a background of 300 ohm-meters). Anomalous apparent chargeabilities are as high as 90 milliseconds, suggestive of perhaps 9% sulphides by volume. The center of the anomaly is coincident with a subtle 200-300 gamma magnetic high.

Surrounding the main anomaly, three other areas have chargeabilities in excess of 30 milliseconds. The largest occurs northwest of the main anomaly and straddles the ridge top. The background resistivities are considerably higher (300 ohm-meters) than the main anomaly suggesting a change in rock type.

A small anomaly occurs to the northeast on line 140+00E in an area of no bedrock exposure. It is associated with a discreet resistivity low (200 ohm-meters).

The third area lies to the south on line 124+00E in an area of high resistivity with some bedrock exposure.

D. A. Silversides  
D.A. Silversides

G.M. DePaoli  
G.M. DePaoli

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

APPENDIX I - STATEMENT OF COSTS

Summary of Work

Trenching in bedrock - 260 feet by 3 feet by 4 feet  
Line cutting, chained, and picketed - 20 line miles  
Magnetometer survey - 20 line miles  
Induced polarization survey - 14 line miles

Personnel

D.A. Silversides - Project Geologist I/C; 601-535 Thurlow Street,  
Vancouver 5, B.C.  
G.M. DePaoli - Staff Geophysicist; 601-535 Thurlow Street,  
Vancouver 5, B.C.  
L. Lebel - Geophysicist; R.R. #4, Belleville, Ontario  
L. Watt - Junior Assistant; 794 Columbia Street, Kamloops  
B. Munday - Labourer; P.O. Box 2342, Smithers, B.C.  
H. Lund - Labourer; Wistaria, B.C.

Costs

Trenching - July 21 - August 8, 1971

D.A. Silversides	3 days @ \$69.50/day	\$208.50
L. Watt	3 days @ \$22.00/day	66.00
B. Munday	22 days @ \$27.00/day	594.00
H. Lund	22 days @ \$27.00/day	594.00
Board	50 man days @ \$ 5.00/day	<u>250.00</u>

\$1712.50

Line Cutting - July 1 - July 20, 1971

D.A. Silversides	20 days @ \$69.50/day	1390.00
L. Watt	20 days @ \$22.00/day	440.00
H. Lund	20 days @ \$27.00/day	540.00
B. Munday	20 days @ \$27.00/day	540.00
Board	80 man days @ \$ 5.00/day	<u>400.00</u>

\$3310.00

Magnetometer Survey - July 21 - July 26, 1971

D.A. Silversides	6 days @ \$69.50/day	417.00
L. Watt	6 days @ \$22.00/day	132.00
Board	12 man days @ \$ 5.00/day	60.00
Rental of Scintrex Fluxgate Magnetometer MF-2		<u>167.50</u>

776.50

Induced Polarization Survey - July 27 - August 8, 1971

D.A. Silversides	13 days @ \$69.50/day	903.50
G.M. DePaoli	13 days @ \$50.00/day	650.00
L. Lebel	13 days @ \$30.00/day	390.00
L. Watt	13 days @ \$22.00/day	286.00
Board	52 man days @ \$ 5.00/day	260.00
Rental of I.P. units (1PR-7 Receiver, 1PC-7/25W Transmitter)		<u>634.00</u>

3123.50

Total of Line Cutting, Magnetometer and I.P. Surveys

\$7210.00

Helicopter - June 23 - August 11, 1971  
 -Transportation of gear and crews, Smithers to  
 Property and Return  
 -Twenty-two hours Jet Ranger 206-B (Okanagan)  
 @ \$250.00/hour

\$ 5500.00

TOTAL \$14,422.50

1772  
2710

A total of \$14,200 is being applied as assessment work, distributed as follows:

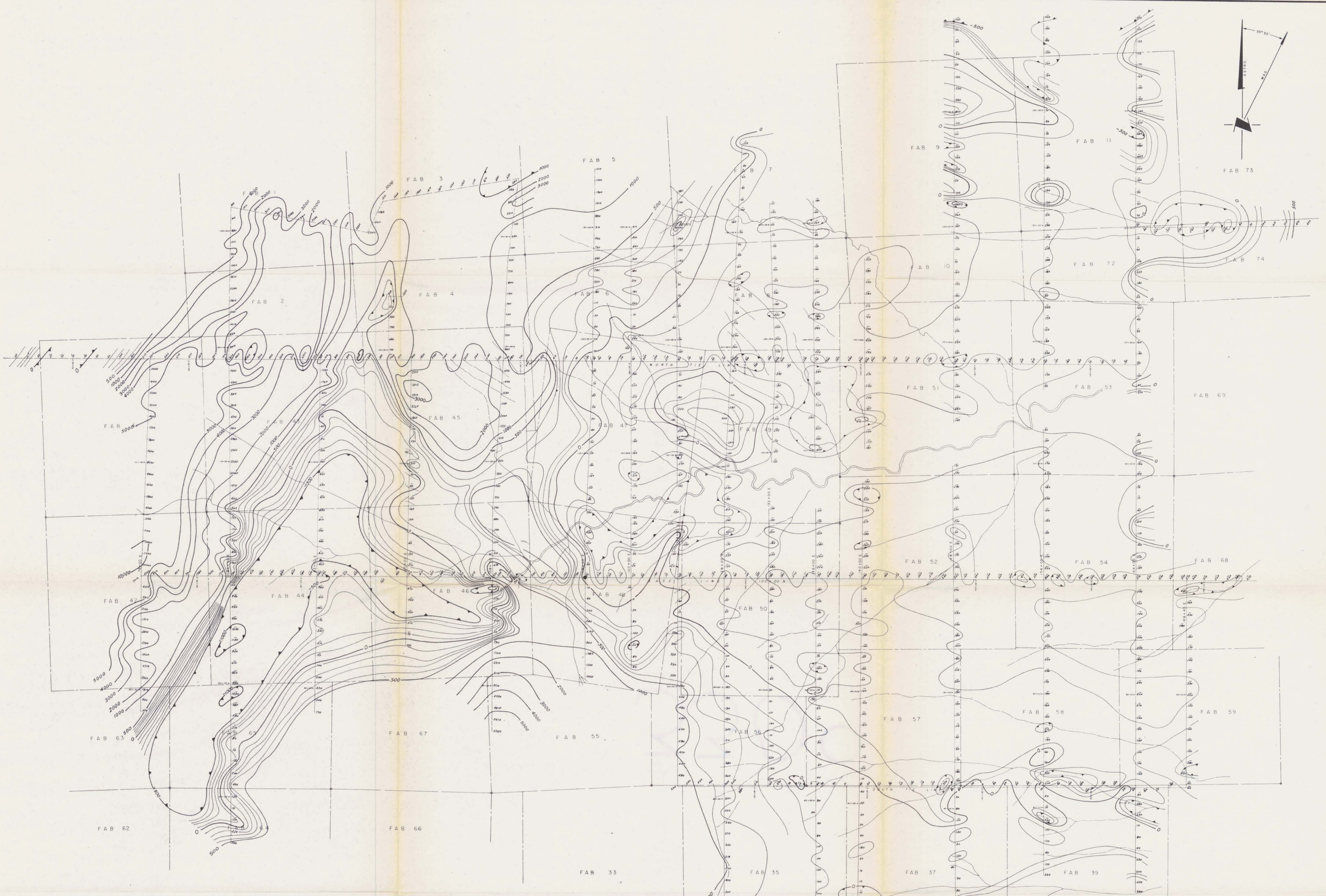
Two years assessment work to be applied on the Fab #1-11, #41, #43, #45, #49, #68 to #92 inclusive mineral claims. The total number of claims is 40, the cost filed is \$8000.00, derived as follows:

i) Trenching - total amount	\$1712.50
ii) Line cutting, magnetometer survey, I.P. Survey - \$3550 of the total \$7210	3550.00
iii) Helicopter - \$2800 of the total \$5500	<u>2800.00</u>
	\$8062.50



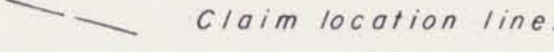
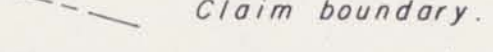
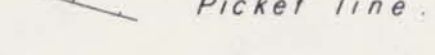
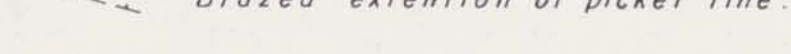




6360  
1770

Two years assesment work to be applied on the Fab #33-#40 inclusive, #42, #44, #46, #47, #48, #50-59 inclusive, #60-67 inclusive mineral claims. The total number of claims is 31, the cost filed is \$6200.00, derived as follows:

i) Line cutting, magnetometer and I.P. survey - \$3660 of the total \$7210	\$3660.00
ii) Helicopter - \$2700 of the total \$5500	<u>2700.00</u>
	\$6360.00



**LEGEND**

-  Stream
-  Claim post.
-  Claim location line.
-  Claim boundary.
-  Picket line.
-  Blazed extension of picket line.
-  Point at which magnetometer calibrated to zero.
-  Corrected magnetometer survey readings in gammas (positive, negative).
-  Isomagnetic contour.
-  Magnetic low.

3309 M-3

Instrument SCINTREX FLUXGATE MF-2 MAGNETOMETER

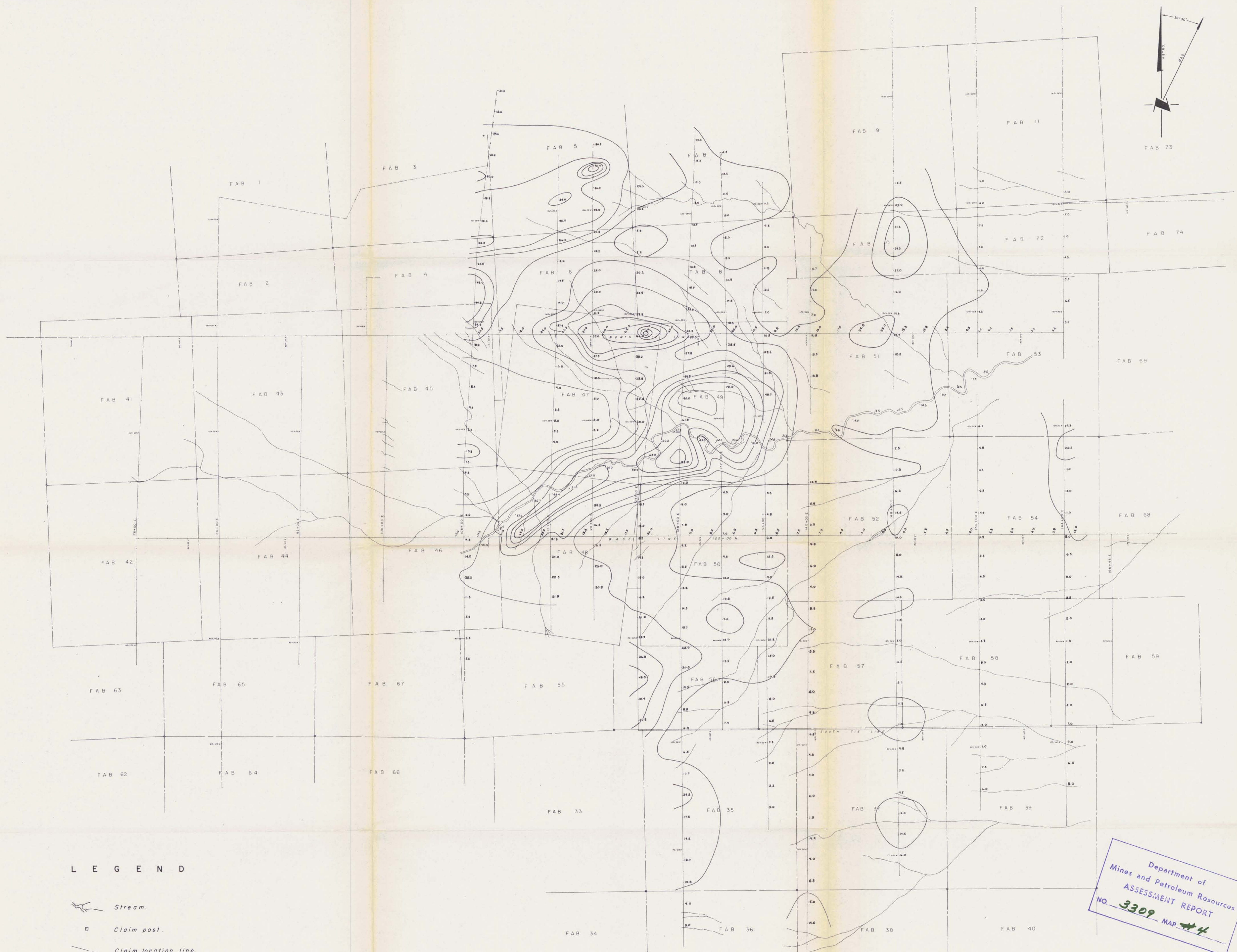
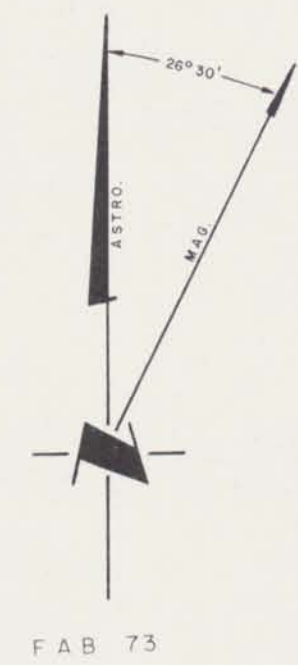
**NOTE**

Contour interval:  
 -1,000 — 100 gammas spacing  
 -500 to 500 — 100 gammas spacing  
 1000 to 5,000 — 1,000 gammas spacing  
 10,000 — 1,000 gammas spacing

Department of  
 Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
 NO. 3309 MAP #3

AMAX EXPLORATION INC.			
COLES CREEK COPPER PROPERTY			
OMINECA MINING DIVISION — BRITISH COLUMBIA			
<b>MAGNETIC SURVEY</b>			
SCALE 0 400 800 1200 FEET			
DATE PRINTED	30 / 9 / 71	Drawn by	H. C. P.
DATE REVISED		Date	27 / 9 / 71
		N.T.S. File	93 E II
FIG. 3			
To accompany "1971 REPORT ON MAGNETOMETER AND I.P. SURVEYS" by D. A. Silversides, G. M. DePaoli and J. F. Allan. Sept. 30, 71			





**LEGEND**

- Stream.
- Claim post.
- Claim location line.
- Claim boundary.
- Picket line.
- Blazed extension of picket line.
- I.P. survey chargeability readings (milliseconds).
- Chargeability contour (contour interval 10 milliseconds).

Instrument SCINTREX IPR-7  
 Dp - Dp n = 1 Dipole Length 200'

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 3309 MAP #4

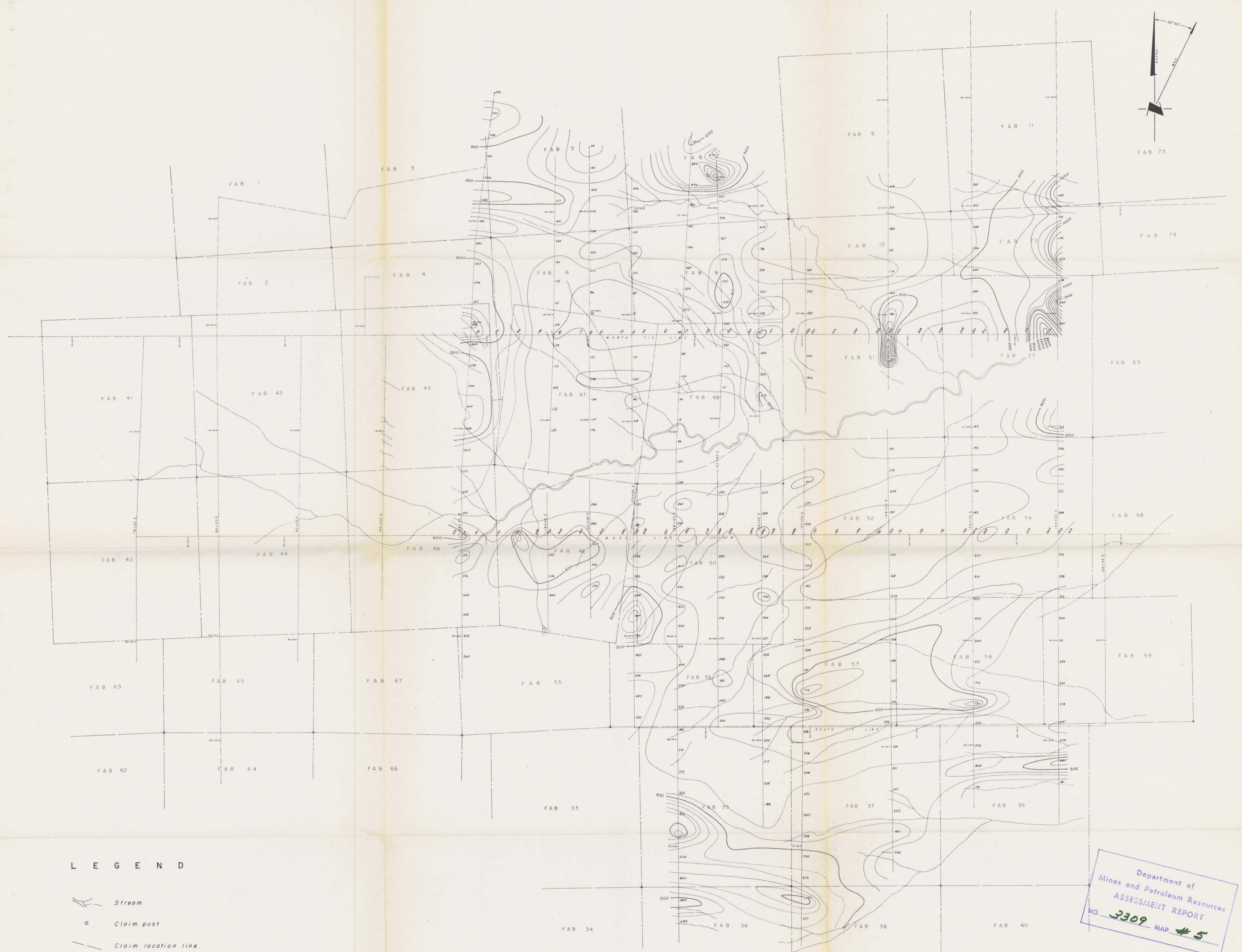
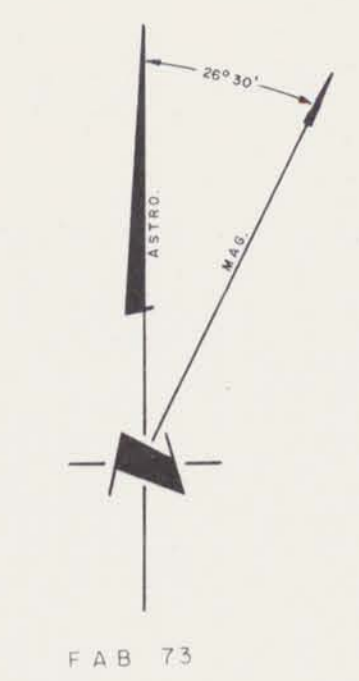
AMAX EXPLORATION INC.  
 COLES CREEK COPPER PROPERTY  
 OMINECA MINING DIVISION - BRITISH COLUMBIA  
**I. P. SURVEY**  
**CONTOURED CHARGEABILITY**

SCALE 0 400 800 1600 FEET

DATE REVISION	DATE PRINTED	30/9/71	Drawn by: H. C. P.	FIG. 4
			Date: 29/9/71	
			N.T.S. File 93 E 11	

To accompany "1971 REPORT ON MAGNETOMETER AND I.P. SURVEYS" by: D.A. Silversides, G.M. DePaoli and J.F. Allan Sept 30, 71

*J. Allan*



**L E G E N D**

- Stream
- Claim post
- Claim location line
- Claim boundary
- Picket line
- Blazed extension of picket line
- I.P. survey resistivity readings (ohm - meters).
- Resistivity contour (contour interval 100 ohm - meters).

Instrument SCINTREX IPR-7  
 Dp - Dp n=1 Dipole Length 200'

Department of  
 Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
 NO. **3309** MAP # **5**

**AMAX EXPLORATION INC.**  
**COLES CREEK COPPER PROPERTY**  
 OMINECA MINING DIVISION — BRITISH COLUMBIA

**I. P. SURVEY**  
**CONTOURED RESISTIVITY**

SCALE 0 400 800 1200 FEET

DATE	30 / 9 / 71	Drawn by: H.C.P.	
REVISION		Date: 28/9/71	<b>FIG. 5</b>
PRINTED		N.T.S. File	
		93 E II	

To accompany "1971 REPORT ON MAGNETOMETER AND I.P. SURVEYS" by D. A. Silversides, G. M. DePaoli and J. F. Allan Sept 30, 71

J. Allan