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SUMMARY  
REPORT

ON

1964 EXPLORATION  
AT ST. EUGENE PROPERTY  
MOYIE, B.C.

                  
FORT STEELE

MINING DIVISION

A. Burgoyne  
Geologist

SUMMARY REPORT OF 1964 EXPLORATION

AT ST. EUGENE PROPERTY, MOYIE, B.C.

A. BURGOYNE

Vancouver, B.C.  
February 2, 1965

A. Burgoyné,  
Geologist.

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### MAPS ACCOMPANYING THIS REPORT:

- IN 1" = 1500' Claim Map of Moyie Area, illustrating location of 1964 field work.
- 1B 1" = 200' Geology, Baltimore Grid  
 2B 1" = 200' Structure, -Anomaly, Baltimore Grid  
 3B 1" = 200' Geochemistry (lead), Baltimore Grid  
 4B 1" = 200' Geochemistry (zinc), Baltimore Grid  
 5B 1" = 200' Magnetometer Survey, Baltimore Grid  
 6B 1" = 200' Self-Potential Survey, Baltimore Grid  
 7B 1" = 200' Electromagnetic Survey, Baltimore Grid
- 1A 1" = 200' Anomaly Map, Aurora Grid  
 2A 1" = 200' Geochemistry (lead), Aurora Grid  
 3A 1" = 200' Geochemistry (zinc), Aurora Grid  
 4A 1" = 200' Geochemistry (copper), Aurora Grid  
 5A 1" = 200' Magnetometer Survey, Aurora Grid  
 6A 1" = 200' Self-Potential Survey, Aurora Grid  
 7A 1" = 200' Electromagnetic Survey, Aurora Grid

SUMMARY REPORT OF 1964 EXPLORATION  
AT ST. EUGENE PROPERTY, MOYIE, B. C.

A. BURGOYNE

The St. Eugene Mining Corporation property is at Moyie, in the East Kootenay district of British Columbia, 20 miles southwest of Cranbrook, B.C. and 40 miles north of the U.S. border at Kingsgate. The property consists of 112 claims, either owned or under lease, which include and surround the old mine workings.

This year's exploration program had five objectives. They were:

1. To test 10,000 feet of diamond drill core drilled by Cominco in 1962-63 on the east side of Moyie Lake for mercury content, employing a Lemaire S-1 mercury detector.
2. To locate possible vein extensions east of the Upper Workings and parallel fault-vein structures within the Creston Formation.
3. To locate westerly and easterly extensions of the Society Girl Vein.
4. To locate vein extensions to the west, and parallel to the Aurora and Guindon veins.
5. To do geochemical prospecting on gulches, lineaments, and reads in the Moyie area.

MERCURY:

It was hoped that a measurable content of mercury would be present in the argillites and quartzites and that this metal would form an aureole or dispersion halo about sulfide mineralization. Sampling was done at 50-foot intervals with much closer sampling in proximity of known veins, faults, lithologic contacts, etc. Subsequent testing with the mercury detector (sensitive to 1 ppb) gave nil or very low readings.

It can only be concluded that there was little or no mercury dispersed into the country rock by the vein-forming fluids and/or any mercury so dispersed has since been removed by metasomatic processes.

#### I. BALTIMORE GRID

A 2800-foot baseline was cut and surveyed between the Upper Society Girl tunnel and the Upper St. Eugene workings and approximately 50,000 feet of cross-lines were cut from which detailed mapping, geochemical and geophysical work was completed. The geological mapping was done on a scale of 100 feet to 1 inch; the geophysics consisted of electromagnetic, magnetometer and self-potential; the geochemistry consisted of lead, zinc and minor copper and mercury testing of soil samples.

The following is a list of the significant conclusions ascertained by the above work:

1. Magnetometer and self-potential methods both defined the Creston (argillaceous-quartzites) - Aldridge (quartzites) contact, and both these methods appear to give useful structural information (Note Maps 5B, 6B).
2. Sulfide-bearing fractures and shears do not appear to be of sufficient amount and concentration to give electromagnetic (ronka) anomalies.
3. The Upper Workings and the area close by are geophysically distinct (anomalous) to the magnetometer and self-potential methods. This is a reflection of known sulfide veins, dumps and bedding (Note Maps 5B, 6B).
4. The magnetometer has defined the hornblende-diorite dykes in the Baltimore grid area (Note Map 5B).
5. Copper content in the soil was not anomalous over the hornblende-diorite dykes.
6. Mercury content in the soil was not anomalous over sulfide veins.

7. Lead and zinc testing of soil samples appears to be a very successful method for delimiting sulfide-carrying fractures, veins and faults. Lead testing is the better of the two methods. The following points are significant from the geochemical work:

- a) A broad above-background lead zone (100-400 feet wide and approximately 1200 feet long) trends easterly (in the general vein trend) across the Baltimore grid from the Upper Workings and ending abruptly in a gulch at the northwest corner of the Baltimore claim. Within this zone there are seven or eight distinct lead anomalies. These lead anomalies would seem to be an expression of fractures which are probably an extension of the St. Eugene veins. The sharpest and highest value anomalies are on the Aldridge Quartzites and close to the Aldridge-Creston contact. Anomalies of lower value and greater areal extent are found in the relatively incompetent Breccia<sup>+</sup> Creston/Argillaceous-Quartzites. In this zone there are several zinc anomalies coincidental with lead anomalies. At the anomalous termination of this zone as noted above, there appears to be a confluence of at least three faults, a dyke, and the Aldridge-Creston contact is close by. (Note Maps 1B, ^3B).
- b) This above zone appears to be cut off by a north-south trending fault. To the west of this fault background lead values are five to six times greater and zinc values two to three times greater than values east of the fault. (Note Maps 1B, 3B, ^4B).
- c) A strong anomalous zinc zone 50 to 100 feet wide and 1000 feet in length coinciding with line 16W is present. This anomaly is in part coincidental with a hornblende-diorite dyke and a slight gulch.

(topographic expression of the dyke) which trends northerly.

However, for the most part, the anomaly is west of and uphill from the dyke. The anomaly ends in the gulch to the north, joining the anomalous zone discussed in (a) above. (Note Map 4B).

- d) A lead and zinc anomalous zone 750 feet in length extends west of the underground termination of the Society Girl vein. This anomalous zone is terminated by a northerly-trending fault; topographically expressed as part of the Society Girl Gulch. This anomalous zone is undoubtedly a westerly extension of the Society Girl vein.

(Note Maps 2B, 3B, 4B).

- e) There are numerous other lead and zinc anomalous areas, some representing known fractures and veins; others the result of contamination, and drainage accumulation; finally there are several isolated anomalies which can only be explained by fractures and shears carrying above normal amounts of heavy metals.

8. There appears to be several instances of relations between the heavy metal content of the soil and topography:

- a) Well exposed and weathered bedrock knolls and ridges have above normal content of lead.
- b) Faults expressed as topographic depressions are geochemically defined.
- c) Above background zinc and lead content in drainage basins and flat low-lying areas.

#### RECOMMENDATIONS

1. The most promising prospect is the above-background lead zone noted previously in 7(a). The eastern termination of the zone at the northwest corner of the Baltimore Claim where anomalous lead and/zinc values

coincide is where further exploration work should be given first priority. This area is structurally and chemically favourable. A minimum of one diamond drill hole of approximately 400 feet depth should be drilled in an effort to penetrate the more competent Aldridge quartzites.

2. Trenching of the anomalous zinc zone centered on line 16W.
3. Packstack drilling and trenching to ascertain westward continuation of Society Girl vein (as outlined by geochemical work). If a sparsely sulfide mineralized fault-vein or fracture pattern is found, a deep hole should be drilled to test for ore in Aldridge Quartzite near proximity of Society Girl gulch.
4. Packstack drilling, pitting and trenching on lead anomalies situated between lines 13 to 15W at 200S - 400N.
5. Trenching of coincidental lead and zinc anomalies in gulch and southwestern side-slope of gulch that traverses northwestern part of grid.
6. Further detailed geochemical work centered about northwestern area of grid.

### II. AURORA GRID

A baseline was surveyed for a distance of 1600 feet west of the lake and covered the Aldridge and part of the Creston Formation. Geochemical and geophysical work was done on 55,000 feet of crosslines located by pace and compass.

The geochemical survey consisted of lead, zinc and minor copper testing. The geophysical survey consisted of magnetometer, self-potential and minor electromagnetic work.

CONCLUSIONS

1. The most significant area of interest is located between lines 16W (1200-1300S) and 36W (1200-1300S) and is known as the Etna Zone. This zone is characterized for the most part by coinciding magnetometer, self-potential, zinc and copper anomalies. This anomalous Etna Zone is outstanding because of the coinciding geophysical and geochemical anomalies, its length (1500-2000 feet), its width (50-200 feet) and the fact that it is trending in the general vein directions.

Note Maps 1A, 3A, 4A, 5A, 6A.

At line 32W - 1200S and east along the trend of the Etna zone there are six or seven shallow pits and trenches over a distance of 400 feet. On examination traces of sphalerite and minor amounts of secondary iron minerals in quartz are seen along small shears, fractures and joints.

The complete significance of the Etna anomalous zone is not yet clear. There is the possibility that the anomalous zone is representative of very deep and/or meagre sulfide mineralization. On the other hand the anomalous zone could represent a particular lithologic horizon relatively rich in the respective metals to give the geophysical and geochemical anomalies.

Five claims were staked to the west of the most westerly St. Eugene claims to cover projection of the Etna Zone.

2. A medium-strong magnetometer anomaly was obtained over lines 12W (775N), 11W (700N) and 16W (600N). The anomaly is a minimum of 500 feet in length and 25 feet in width. It appears that the anomaly is parallel and coincidental with the vein fault in Tunnels No. 5 and No. 6 on the Guindon claim and could indicate a minimum of a 400-foot westward extension to the vein. Note Map 5A.

j. There are other weak geochemical anomalies which are a result of drainage phenomena and close proximity to old workings. Finally, there are two or three anomalies which probably indicate previously unknown fracture-shear zones. Note Map 3A.

RECOMMENDATIONS

1. Clear and extend logging road (on south side of Etna Creek) to eastern end or centre of anomalous Etna Zone. This would require three or four days of bulldozer work.
2. a) Survey a baseline over centre of Etna Zone.  
b) Run an electromagnetic survey over the zone.  
c) Pack sack drilling and trenching of geochemical and geophysical highs in the Etna Zone.
3. Pack sack drilling of the magnetometer anomaly near Tunnels No. 5 and No. 6 on the Quindon claim.

GENERAL PROSPECTING IN THE MOYIE AREA

1. Farrell Creek and tributary streams from its confluence at John D creek to top of Lookout Mountain were panned and sediment tested for heavy metal content. From results of this work a group of four claims were staked.
2. Area north and east of Farrell - John D creeks confluence was prospected in detail.
3. Several small pace and compass grids were located on old workings in the Moyie vicinity and soil samples taken for lead, zinc and copper testing. No significant results obtained.
4. Approximately 30 miles of roads in the Moyie area were soil sampled every 1/10 mile and tested for cold extractable heavy metal

content. This was done with a Land Rover and was found to be a good method for geochemical reconnaissance in the area. One possible significant anomaly was located.

RECOMMENDATIONS

Heavy metal testing (and panning, etc. where necessary) of stream sediments and road side soils should be continued and accelerated for the coming field season. Exploration efforts should be directed south of Moyie, extending to Yahk and into northern Idaho and Montana within the Aldridge Formation and in proximity to the north-south anticlinal axis.

This area in recent years has had the development of numerous logging roads, making it readily accessible.

The reported tourmaline concentration in Coal Creek should be investigated.

With two student assistants working solely on this phase of exploration a reasonably large area should be covered.

This geochemical reconnaissance survey would be done in conjunction with the follow-up work given in recommendations for Baltimore and Aurora grids.

Vancouver, B. C.  
February 2, 1965

A. Burgoyne  
A. Burgoyne,  
Geologist.

**PROPOSED DIAMOND DRILLING SETUPS FOR 1965 EXPLORATION PROGRAM AT ST. EUGENE  
MINING CORP. PROPERTY, MOYIE, B.C.**

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**A. Baltimore Grid**

Hole #1 B Location: L14W, 425' south      Direction: N35°E  
Dip: -45°    Depth: 300 feet

Purpose: Test for extension of Society Girl Vein in Aldridge Quartzites

Hole #2 B Location: 40' easterly (S55°E) of L16W, 350' north  
Direction: N13°E  
Dip: -73°    Depth: 500'

Purpose: Test for sulfide carrying vein(s) (as indicated by geochemical anomalies) in underlying Aldridge quartzites in proximity to northerly trending fault.

Hole #3 B Location: L15W, 685' north      Direction: N30°W  
Dip: -70°    Depth: 100'

Purpose: Same as for Hole #2

Hole #4 B Location: L16W, 325' south      Direction: N3°E  
Dip: -52°    Depth: Minimum of 500'

Purpose: Test for ore in Aldridge Quartzites on small (3" wide) surface, zinc-carrying vein

Extra Holes - 300' of pack-sack drilling for possible testing of small lead anomalies.

Aurora Grid

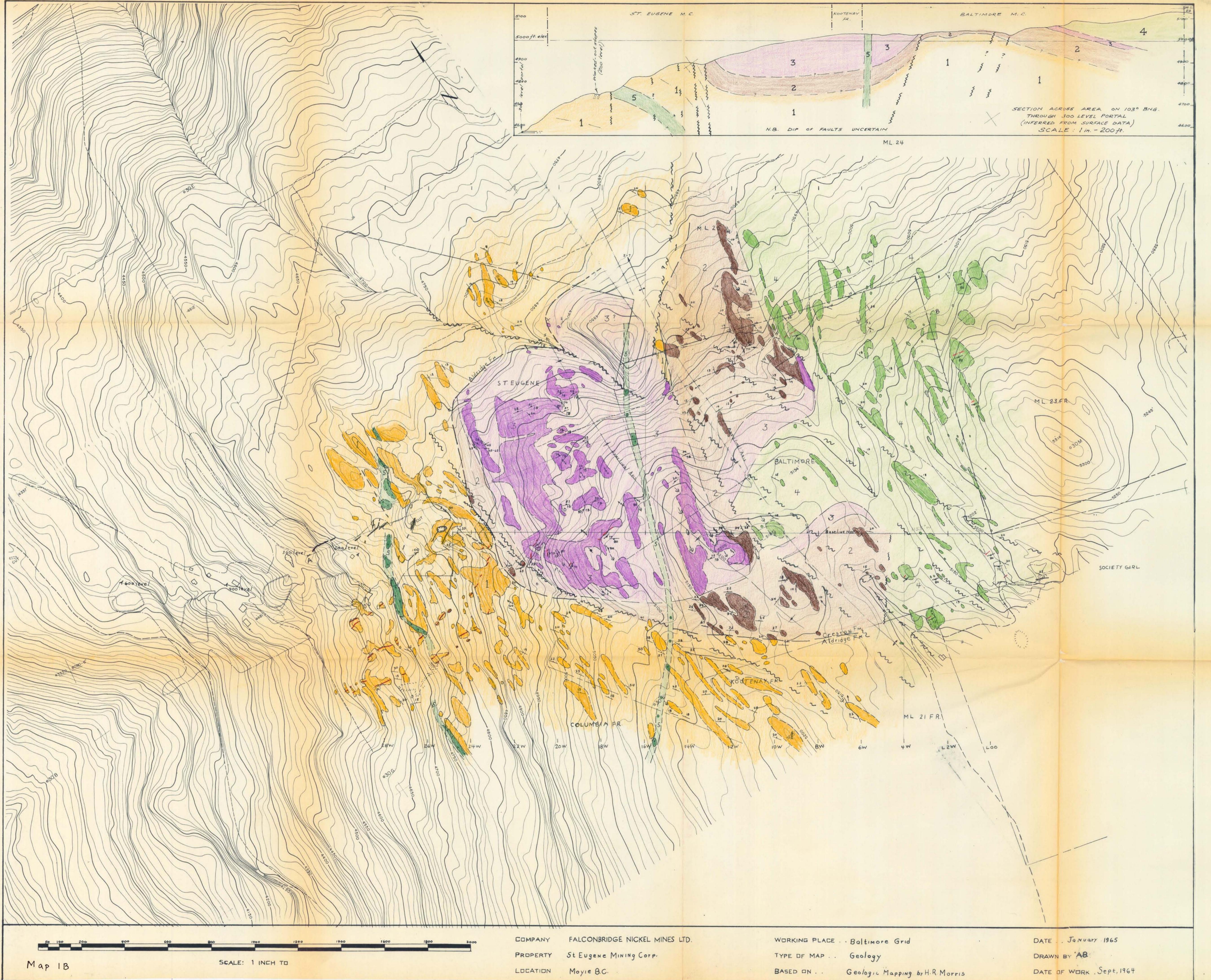
- 1A Location: L14W, 600' north      Direction: N11° E  
Dip: -60°      Depth: 150'
- Purpose: to drill westward trending magnetometer anomaly and for westward extension of vein from No. 5 & No. 6 Tunnels on Guindon Claim.
- 2A Location: L16W, 550' north      Direction: N11° E  
Dip: -65°      Depth: 100 - 150'
- Purpose: same as for Hole 1A
- 3A Location: L32W, 1330' south      Direction: N14° E  
Dip: -60°      Depth: 150'
- Purpose: to determine cause of coinciding geochemical and geophysical highs within anomalous Etna Zone in vicinity of old pits and trenches (L29W-L33W, 1200-1300 south) and to test for possible south dipping vein.
- 4A Same depth, dip and direction as Hole 3A  
Location: 100' further east on L31W, 1330' south  
Purpose: same as for 3A.
- 5A Location: L24W, 1440' south      Direction: N14° E  
Dip: -45° (approx.)      Depth: 125-150'
- Purpose: to drill coinciding geophysical and geochemical highs within anomalous Etna Zone and to test for possible vein.
- 6A Location: L26W, 1440' south      Direction: N14° E  
Dip: -45°      Depth: 150'
- Purpose: to drill 400 gammas magnetometer anomaly for possible south dipping vein.
- 7A Location: L22W, 720' south      Direction: N40° E  
Dip: -45°      Depth: 150'
- Purpose: to drill 300 gammas magnetometer anomaly and high self-potential zone. This would be coupled with trenching.

<u>1965 EXPLORATION PROGRAM AND COSTS AT ST. EUGENE MINING CORP. PROPERTY, NOVIE, B.</u>			
A. Diamond Drilling	(a) Baltimore		
	5 or 6 holes over 1700' @ \$5/ft.	\$ 8,500	
	(b) Aurora		
	7 holes over 1050' @ \$5/ft.	<u>5,250</u>	
			\$13,750
B. Pitting, blasting	(a) Baltimore	\$ 500	500
C. Trenching, road clearing			
	(a) Baltimore - 70 hours trenching on anomalous zinc zone, road improvement @ \$12/hr.	\$ 840	
	(b) Aurora - extending & clearing logging road on south side of Etna Ck. and trenching at L20N, 800 S.	<u>720</u>	
			1,560
D. Exploration other than diamond drilling which will include mapping, geochemical and geophysical surveys on the St. Eugene property. Reconnaissance geochem prospecting extending to American border.			
	Transportation for 6 months (rental & mileage costs)	\$ 1,500	
	Board & Room for Party Chief (6 months) and 2 students assistants (3 months)	2,160	
	Salaries - Party Chief (6 months) and 2 student assistants (3 months)	4,800	
	Chemicals, field, office supplies	<u>700</u>	
			9,160
	TOTAL EXPENDITURES		<u>\$ 24,970</u>

MAP REF. NO.:

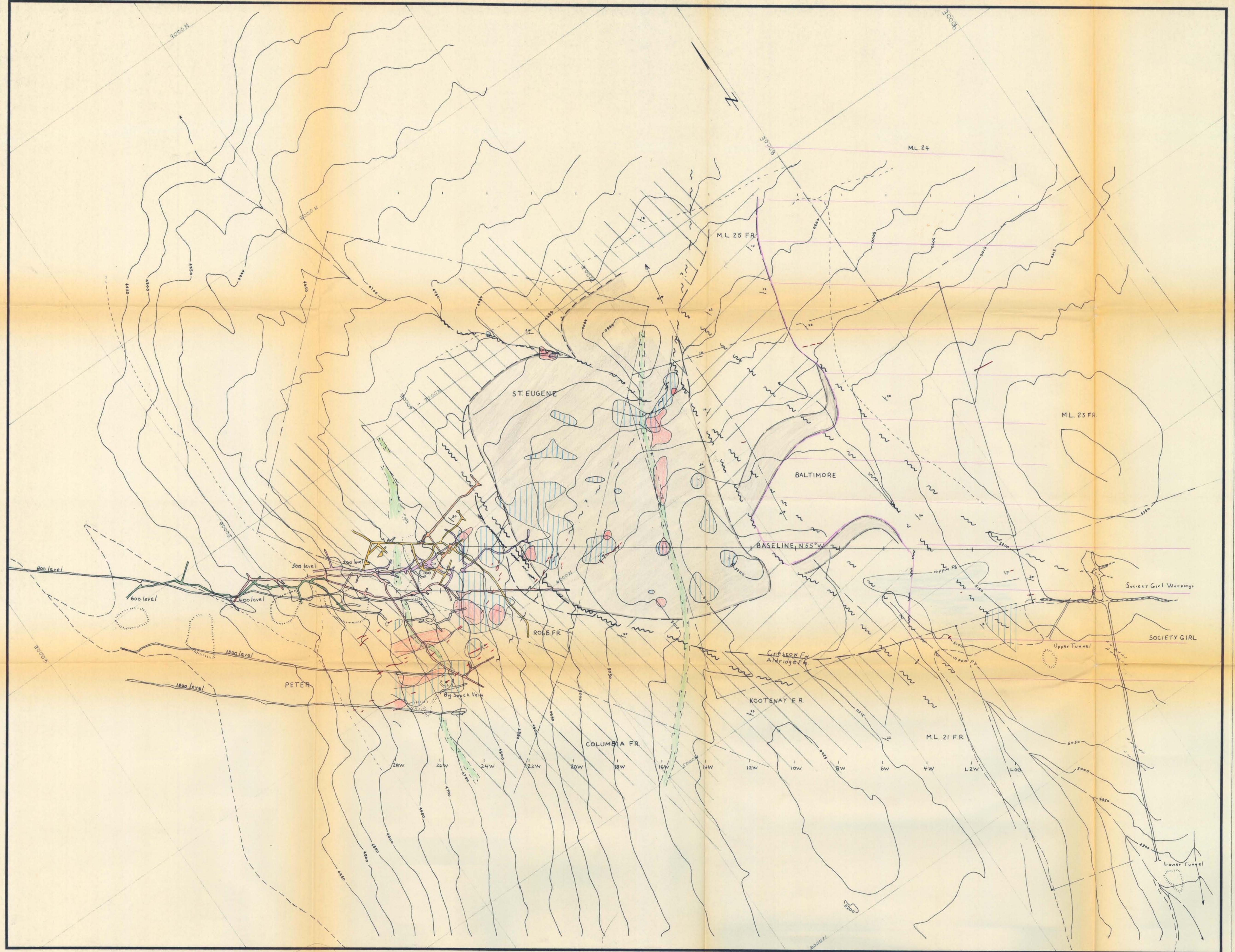
## LEGEND

- 5 [Hornblende-diorite dykes and sills.
- 4 [Cresson Formation: Medium to dark grey and pale greenish-grey interbedded argillite and fine quartzite; finely bedded in argillaceous layers; Moderate parting; Mud cracks.
- 3 [Massive, medium grey to dark grey argillite; no bedding or parting; contains small ( $\frac{1}{4}$ " -  $\frac{3}{4}$ ") scattered breccia fragments (probably equivalent to Gifford's conglomerate).
- 2 [Silty argillite and fine quartzite; finely bedded, poor or thick parting; flaggy, massive weathering; light grey to black.
- 1 [Aldridge Formation: Shaly, black and dark grey argillite; thin parting, moderate to good bedding; rusty weathering.
- Fracturing; inclined, vertical.
- Bedding: inclined, vertical, horizontal.
- Strike and dip of quartz vein.
- Joining, inclined.
- Fold plunge.
- Fault: defined, inferred.
- Formation Contact: defined, approx.
- Adit, dump.
- Trench, pit.
- Claim boundary.
- Road, trail.
- Glacial scree.
- Vein: Quartz, Quartz-Sulphide, average width less than 3".



## LEGEND

- Hornblende-diorite dykes and sills
- Creston Formation - Argillaceous Quarries, Quartzites
- Creston Transition - Massive bedded Argillites with breccia fragments
- Creston Transition - thin bedded Argillaceous Quarzites, Aldridge Formation - Quarzites, Argillaceous Quarzites, Argillites
- Lead soil anomaly, greater than 200 ppm
- Zinc soil anomaly, greater than 750 ppm
- Bedding, inclined
- Fault, defined, approx., inferred
- Formation Contact, defined, inferred
- Ambient Axis indicating plunge
- Quartz-Vein-fractures with minor amounts of sulphides, All vein-fractures dipping steeply south and less than 5" width
- To topographic contour
- Stream \*
- Claim boundary
- Road, trail
- Adic, drift and dump
- Pit, trench



50 100 200 400 600 800 1000 1200 1400 1600 1800 2000

SCALE: 1 INCH TO 200 FEET

Map 28

COMPANY . . FALCONBRIDGE NICKEL MINES LTD.

PROPERTY . . St. Eugene Mining Corp.

LOCATION . . Moyie B.C.

WORKING PLACE . . Baltimore Grid

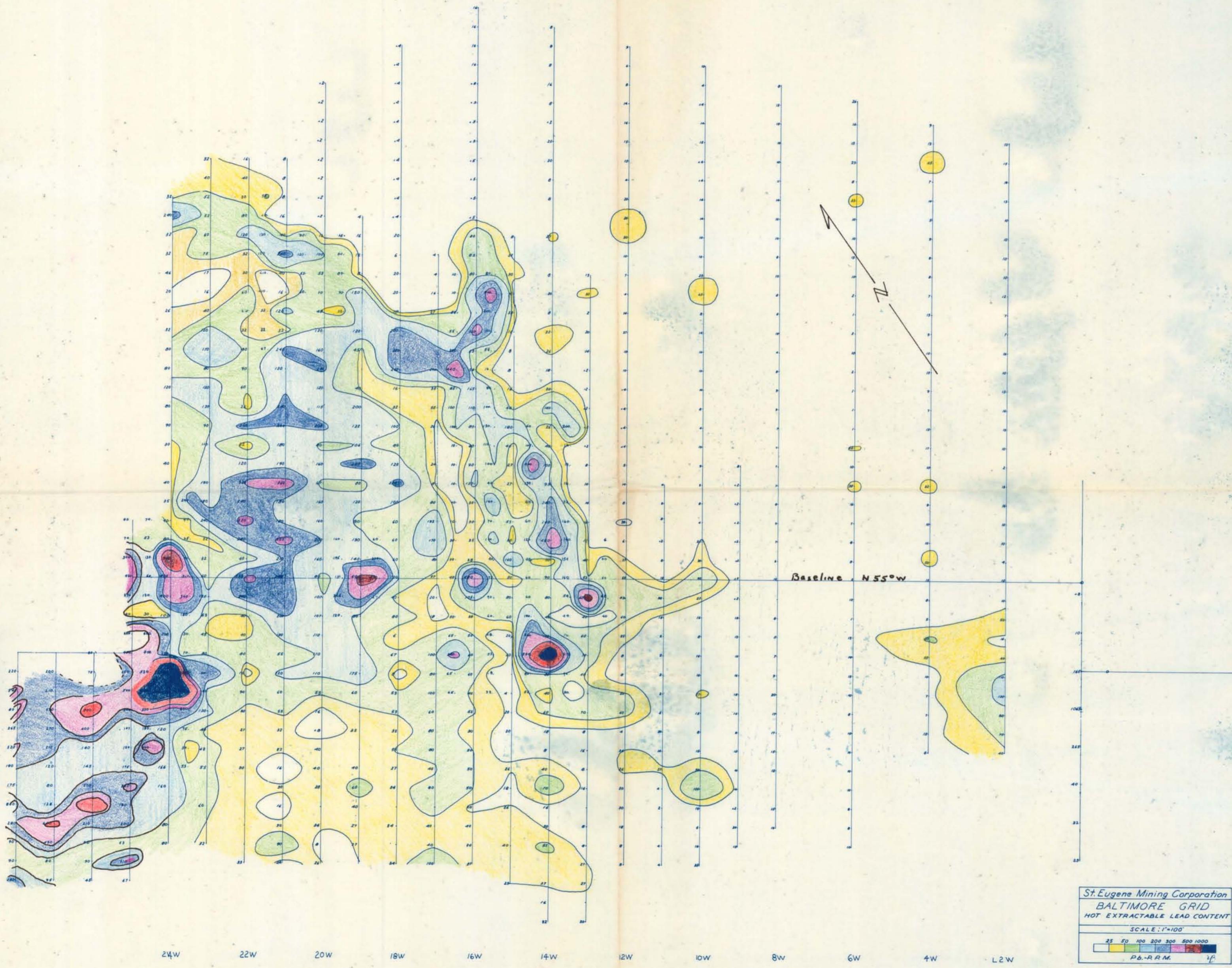
TYPE OF MAP . . Structure-Anomaly

BASED ON . .

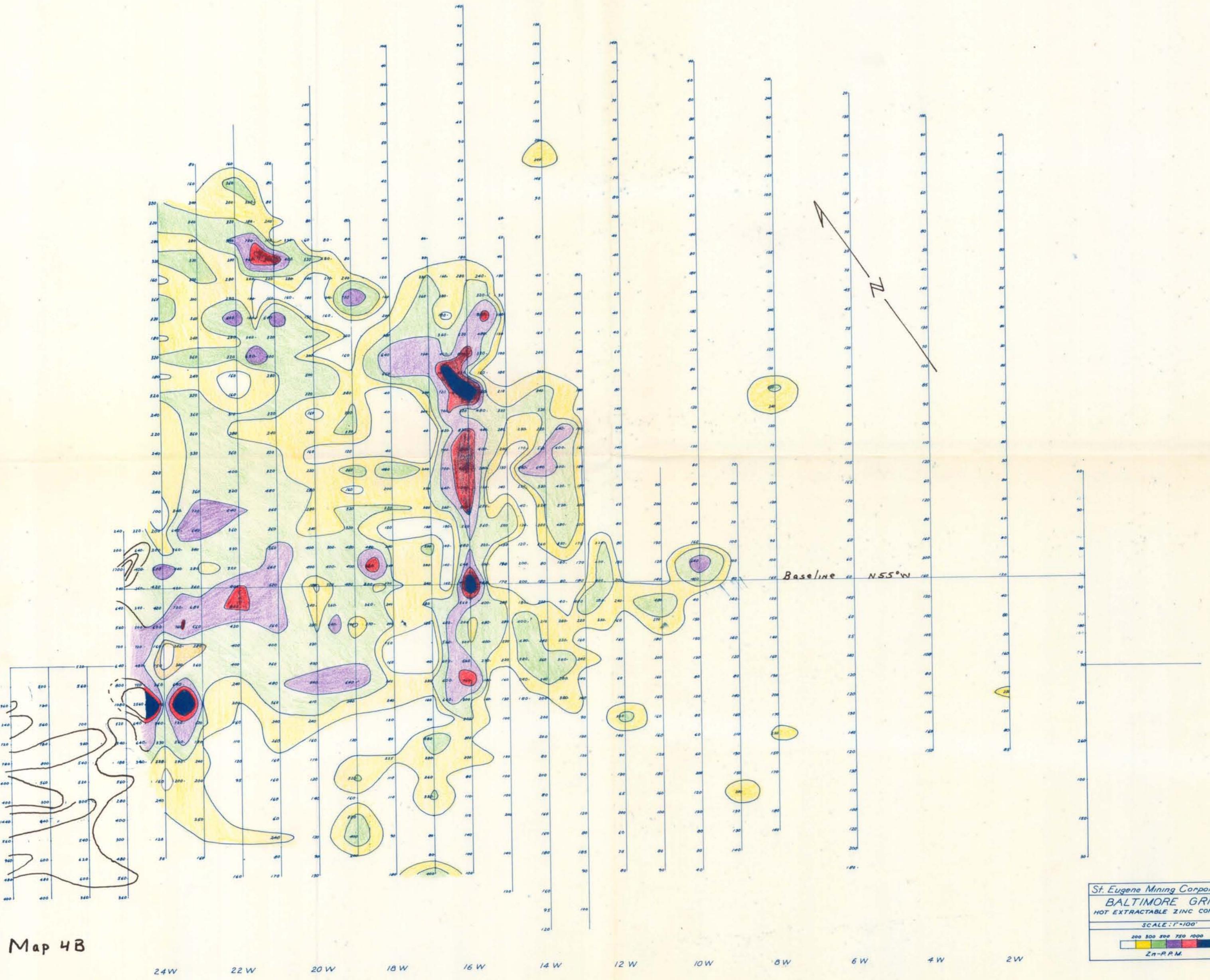
DATE . . JANUARY 1965

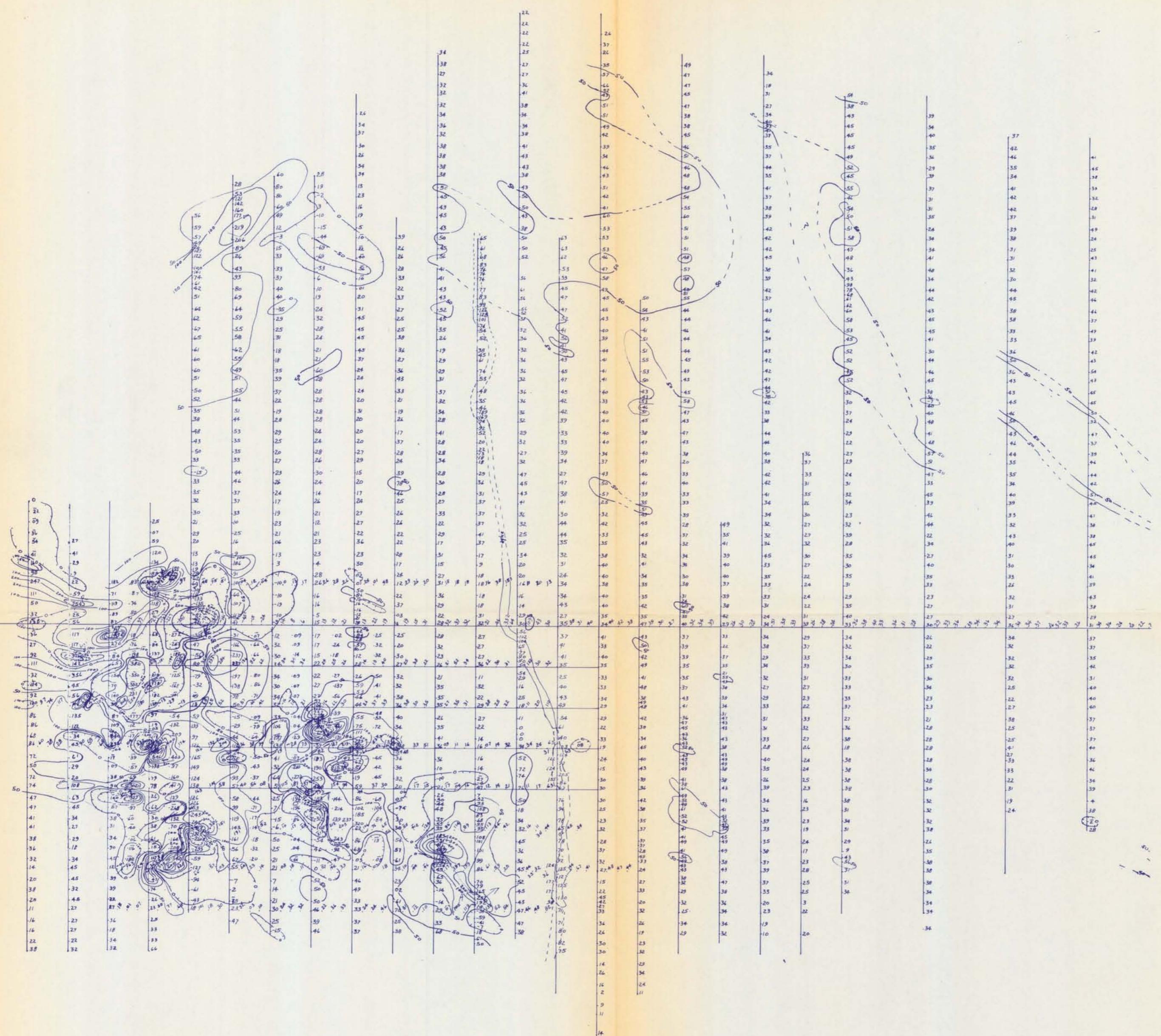
DRAWN BY . . A.B.

DATE OF WORK . . July-August 1964



Map 3B

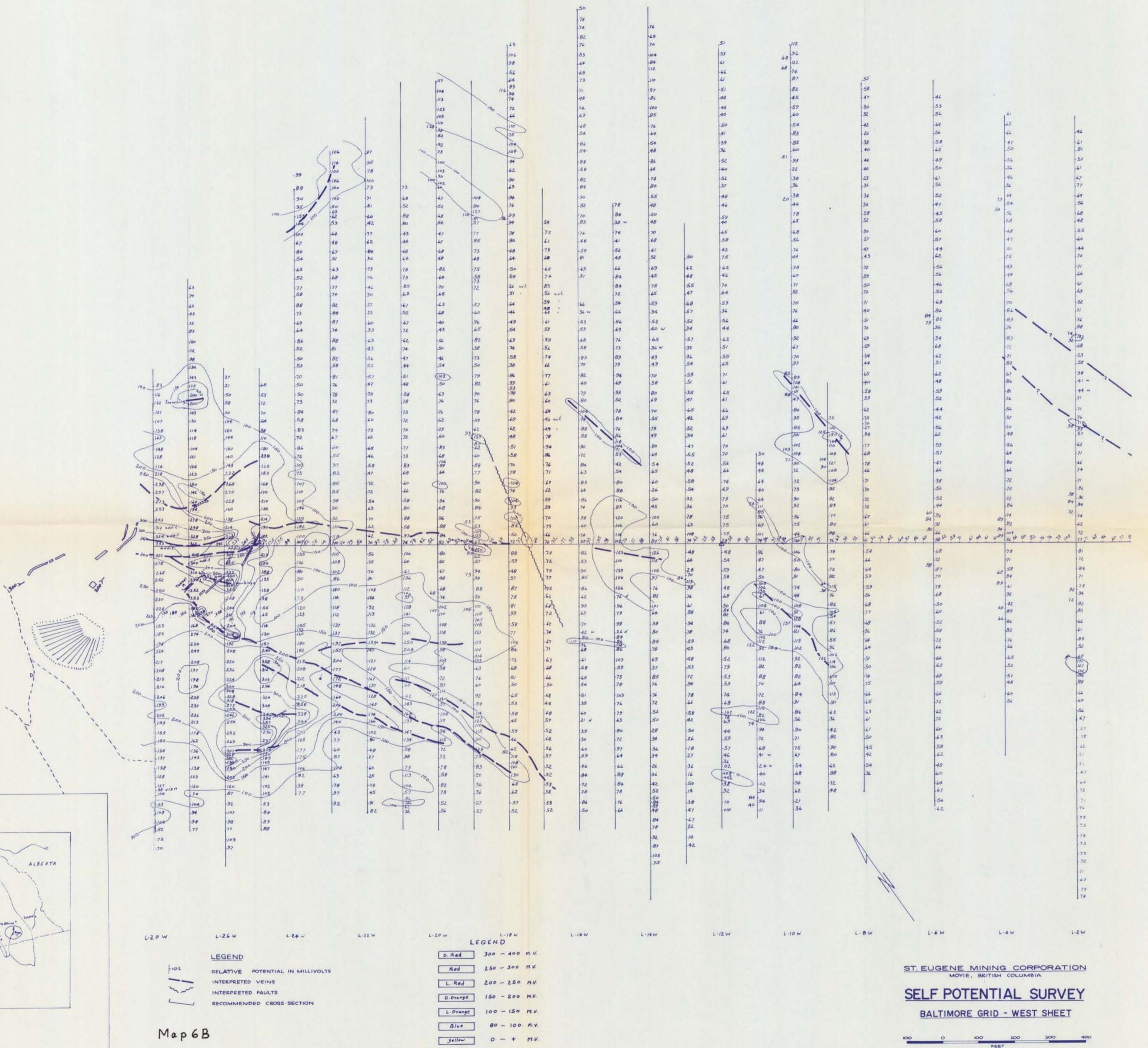


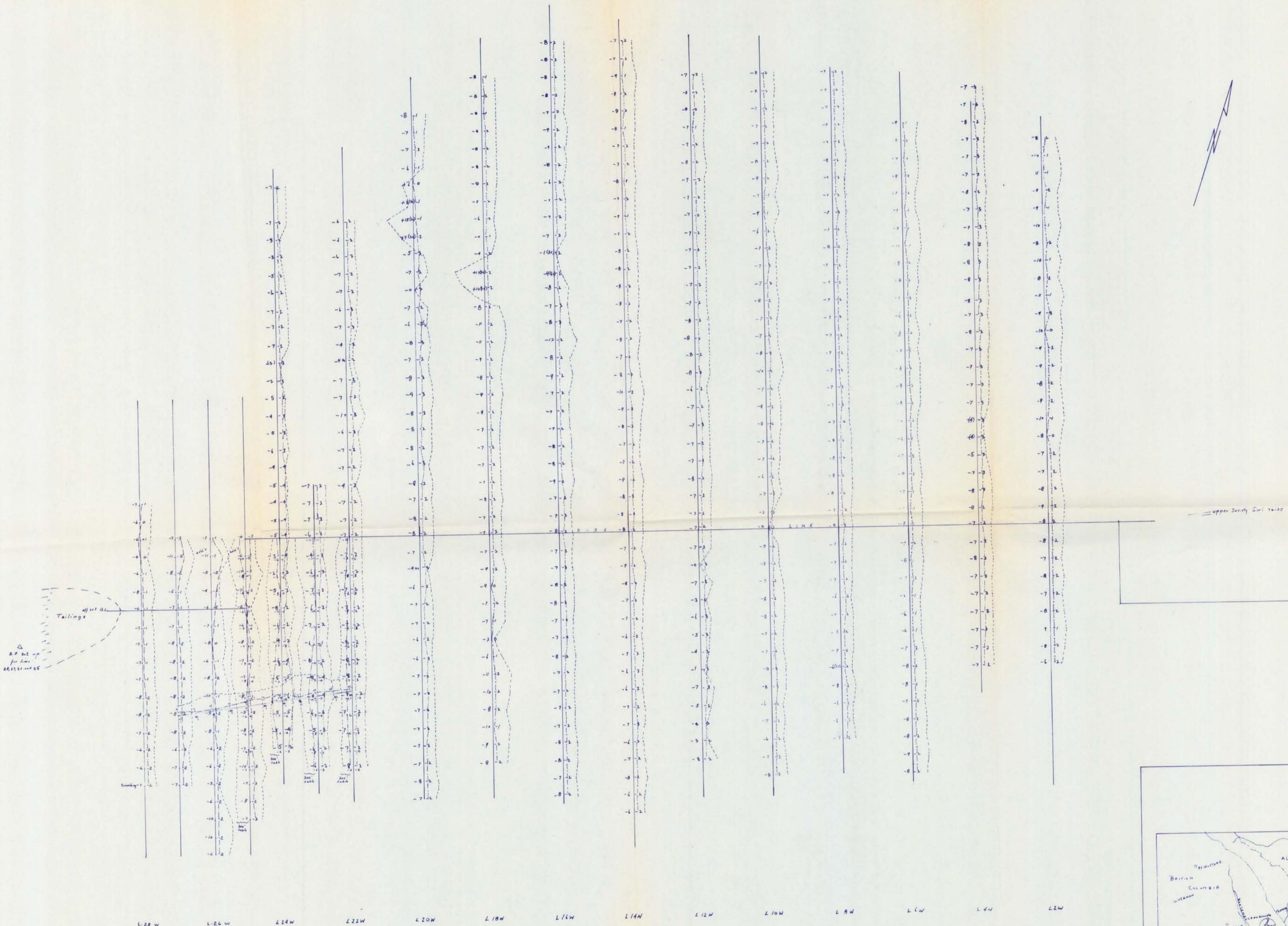


Map 5B

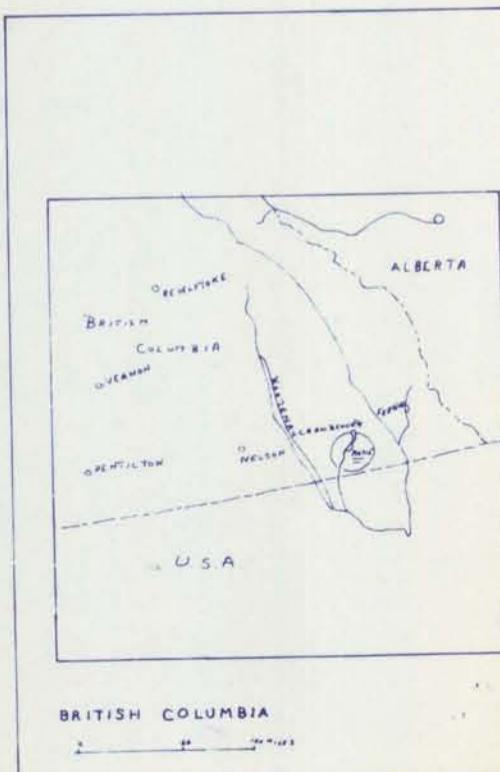
ST EUGENE MINING CORPORATION  
MOSIE, BRITISH COLUMBIA  
**MAGNETOMETER SURVEY**  
(ASKANIA)  
BALTIMORE GRID - WEST SHEET

100 0 100 100 300 400





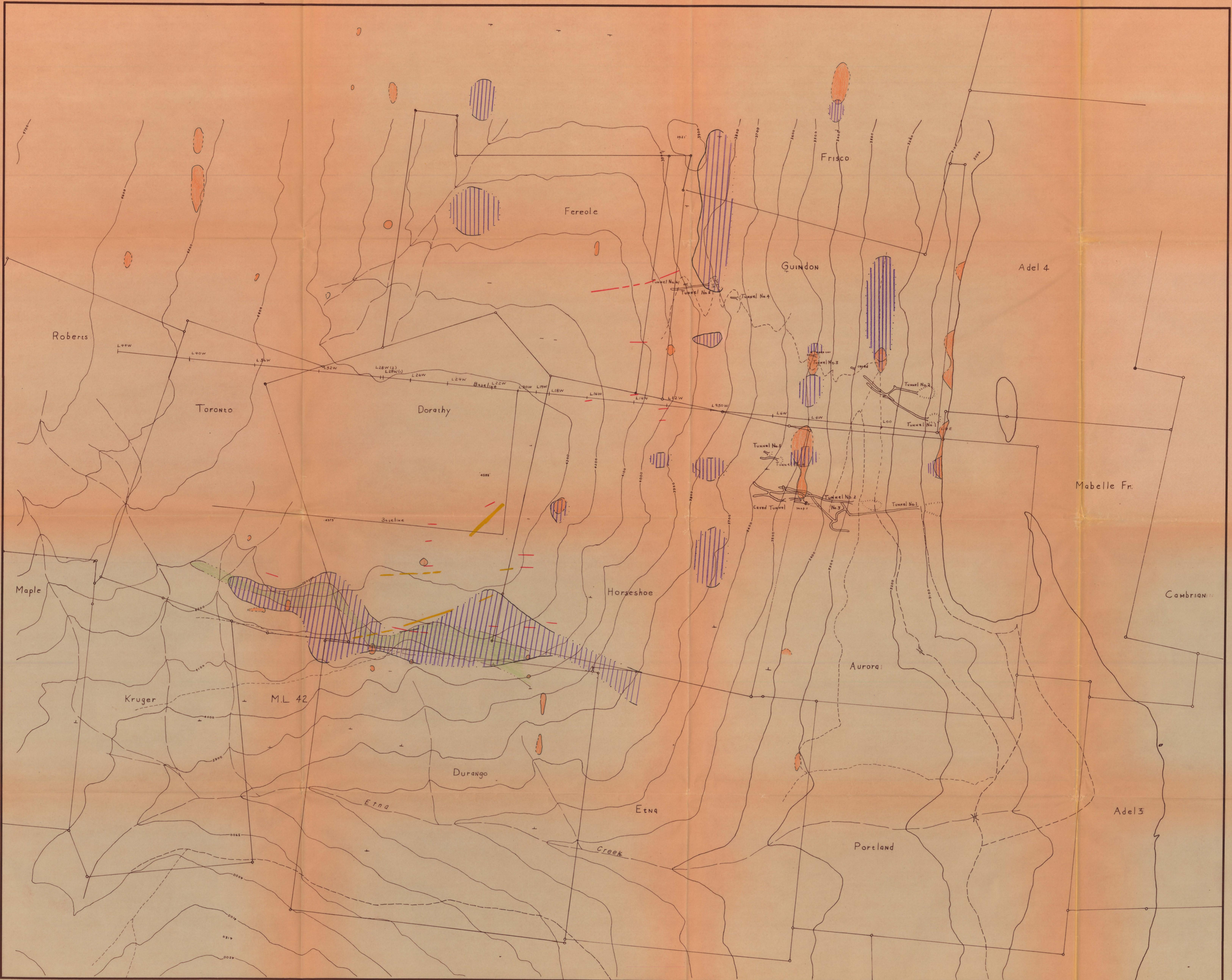
100 0 100 200 300 400  
FEET



MAP REF. NO.:

## LEGEND

- claim line
- addit and dump
- copper anomaly - 30 ppm contour
- zinc anomaly - 150 ppm contour unless noted
- lead anomaly - 10 ppm contour
- magnetometer anomaly - greater than 1000 n.v.
- self-potential anomaly - greater than 200 m.v.
- road
- trail
- stream



SCALE: 1 INCH TO 200 FEET

Map 2A

COMPANY . . FALCONBRIDGE NICKEL MINES LTD.

PROPERTY . . St. Eugene

LOCATION . . Mayo, B.C.

WORKING PLACE . . Aurora Grid

TYPE OF MAP . . ANOMALY (geochemistry - geophysics)

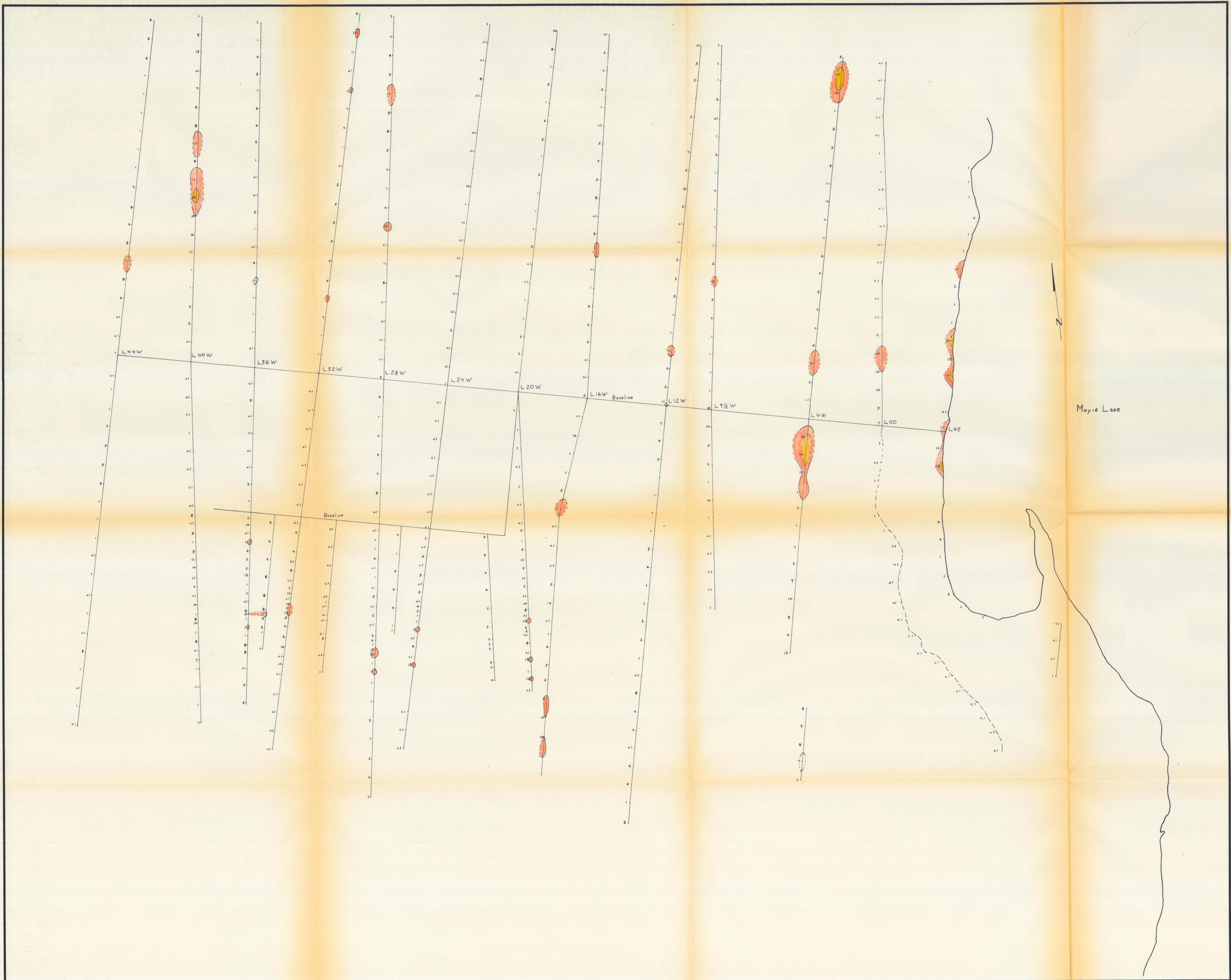
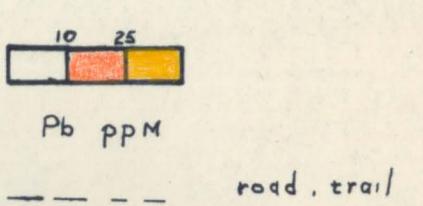
BASED ON . .

DATE . . January 1965

DRAWN BY . . A.B.

DATE OF WORK . . Oct.-Nov. 1964

## LEGEND



Map 2A

60 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

COMPANY . . FALCONBRIDGE NICKEL MINES LTD.

PROPERTY . . St Eugene

LOCATION . . Moyie B.C.

WORKING PLACE . . Aurora Grid

TYPE OF MAP . . Geochemistry - Lead (hot aqua-regia digestion)

Place &amp; compass &amp; alidade survey

Crosslines tied-in by trends &amp; chain survey of baselines

DATE . . January 1965

DRAWN BY . . A.B.

DATE OF WORK . . Oct.-Nov. 1964

## LEGEND

 greater than 50 ppm Cu


Map 4A

20 100 200 400 600 800 1000 1200 1400 1600 1800 2000  
SCALE: 1 INCH TO 200 FEET

COMPANY . . FALCONBRIDGE NICKEL MINES LTD.

PROPERTY . . St Eugene

LOCATION . . Moyie B.C.

WORKING PLACE . . Aurora Grid

TYPE OF MAP . . Geochemistry - Copper (hot aqua-regia digestion)

BASED ON . . Pace &amp; compass &amp; ultrameter survey

Crosslines tied-in by transit &amp; chain survey of baselines

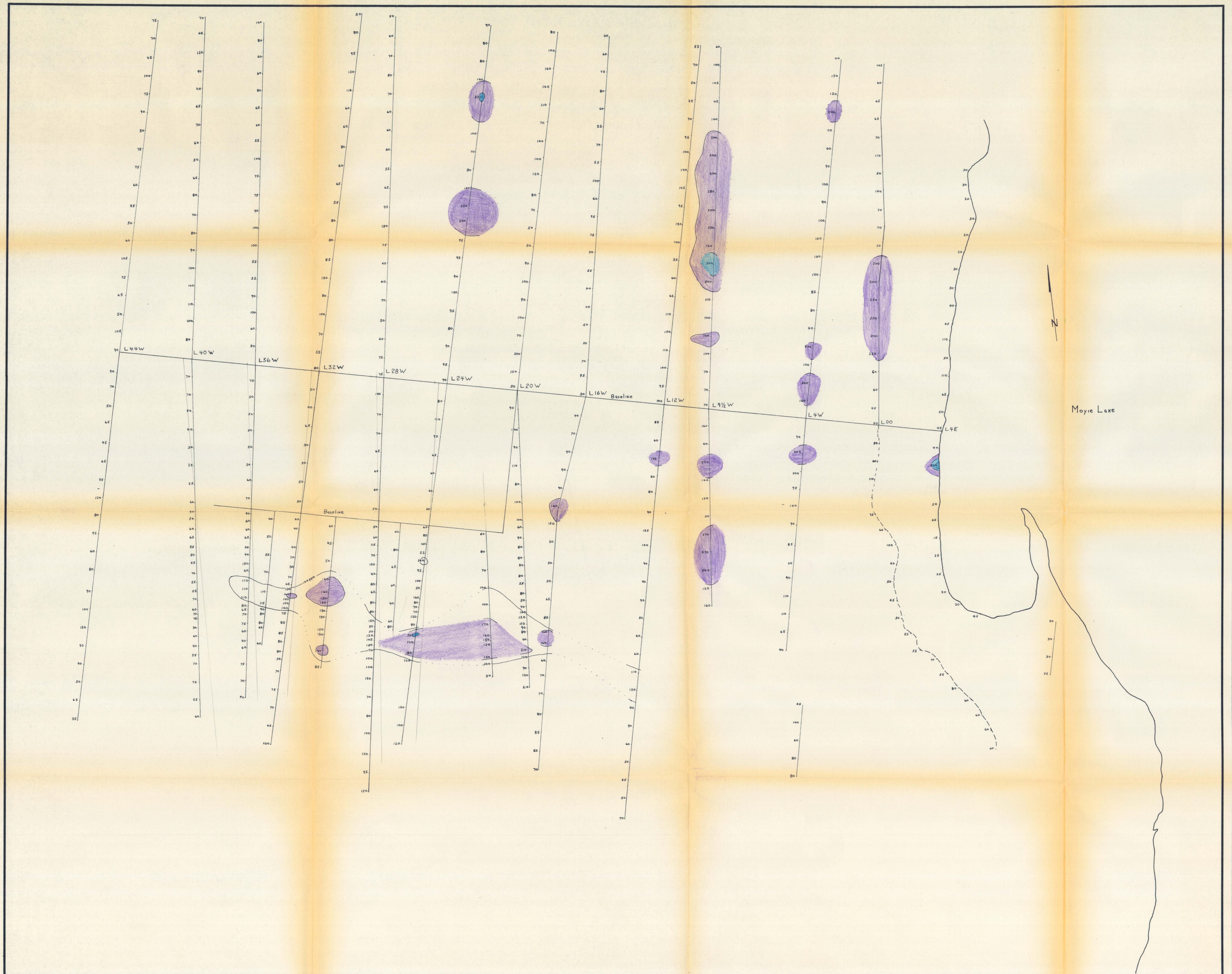
DATE . . January 1965

DRAWN BY . . A.B.

DATE OF WORK . . Oct.-Nov. 1964

## LEGEND

150 300  
Zn ppm  
— road, trail



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

SCALE: 1 INCH TO 200 FEET

Map 3A

COMPANY . . FALCONBRIDGE NICKEL MINES LTD.

PROPERTY . . St. Eugene

LOCATION . . Moyle B.C.

WORKING PLACE . . Aurora Grid

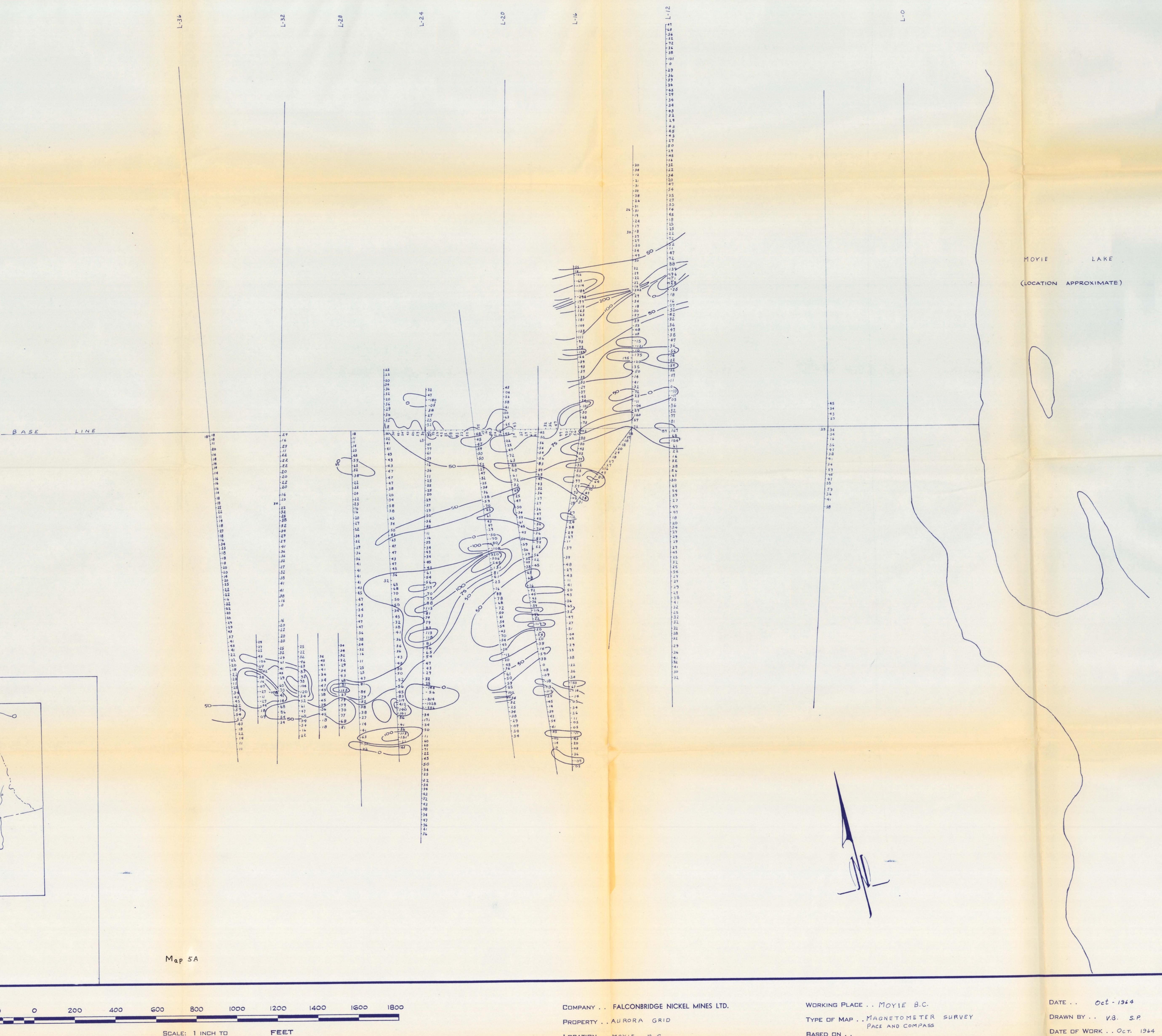
TYPE OF MAP . . Geochimistry - Zinc (hot aque-regidigession)

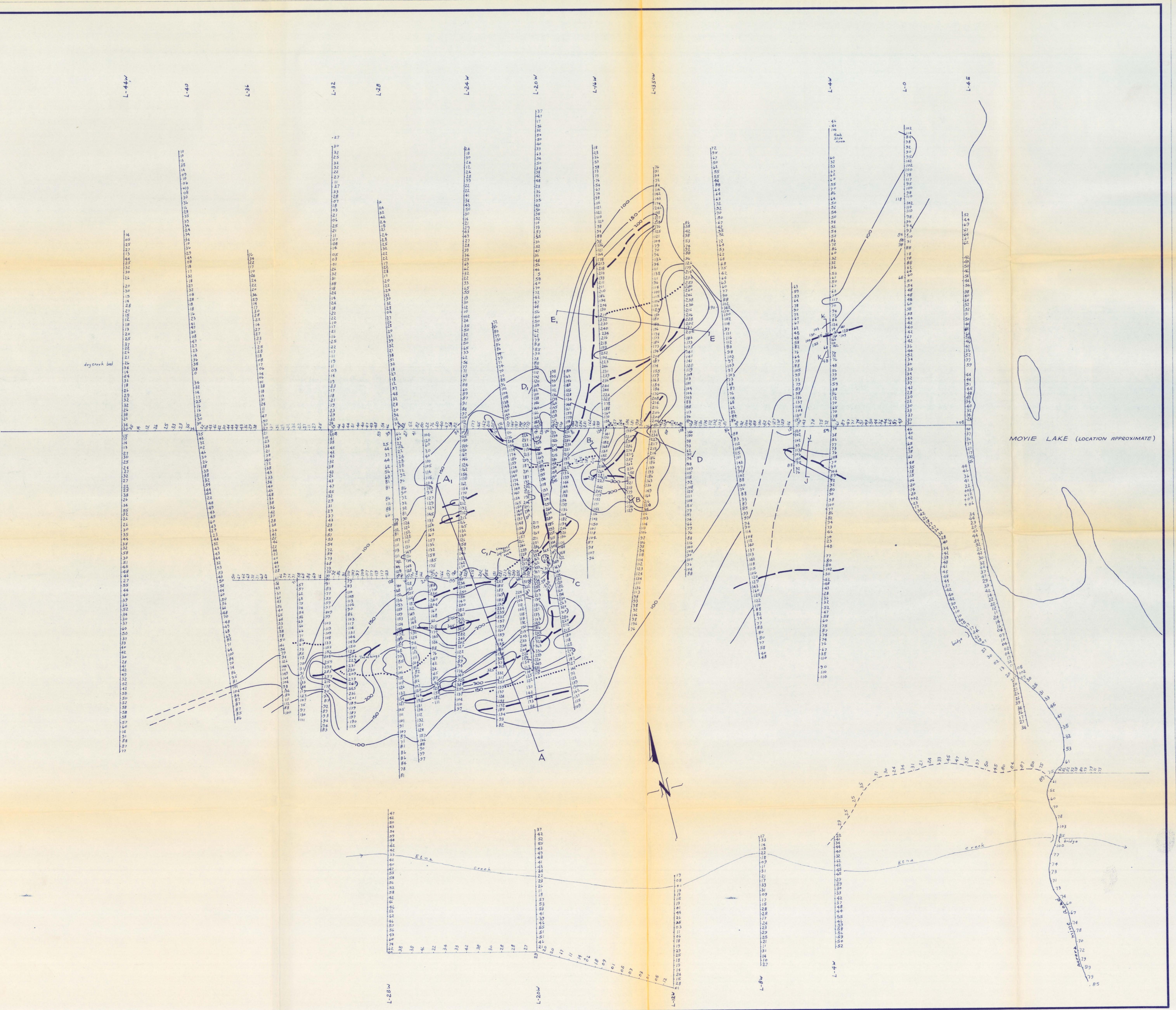
BASED ON . . Pace of compass & slamer surveys.  
Cross lines tied-in by transit & chain survey of baselines

DATE . . JANUARY 1965

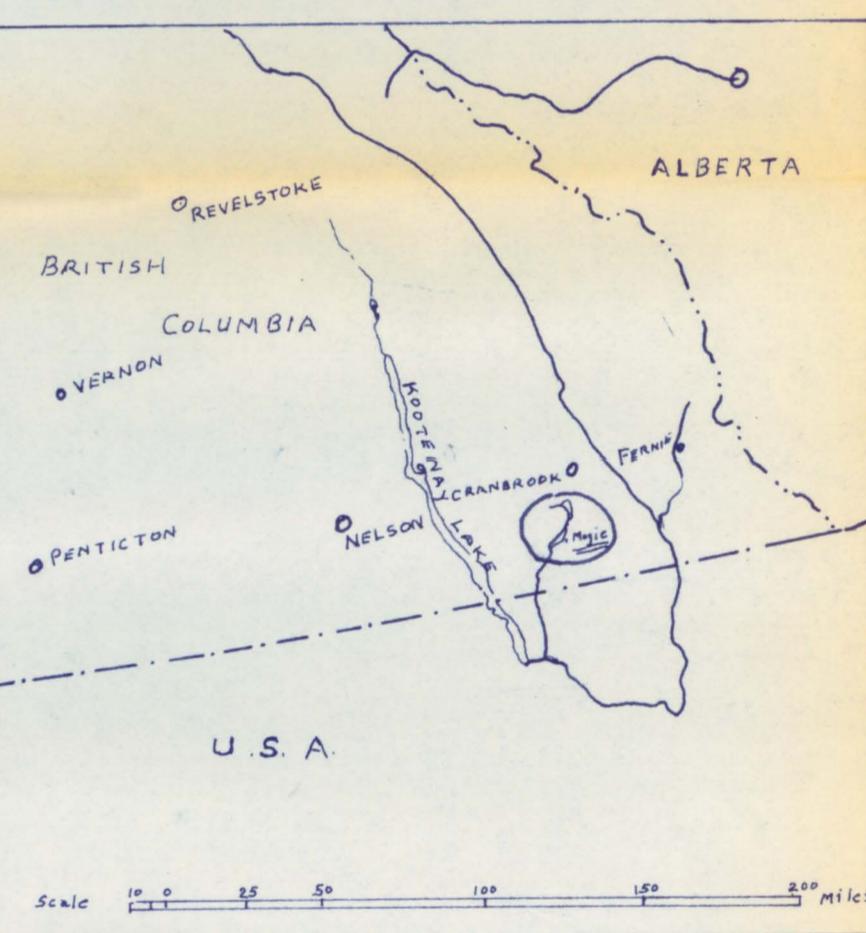
DRAWN BY . . A.B.

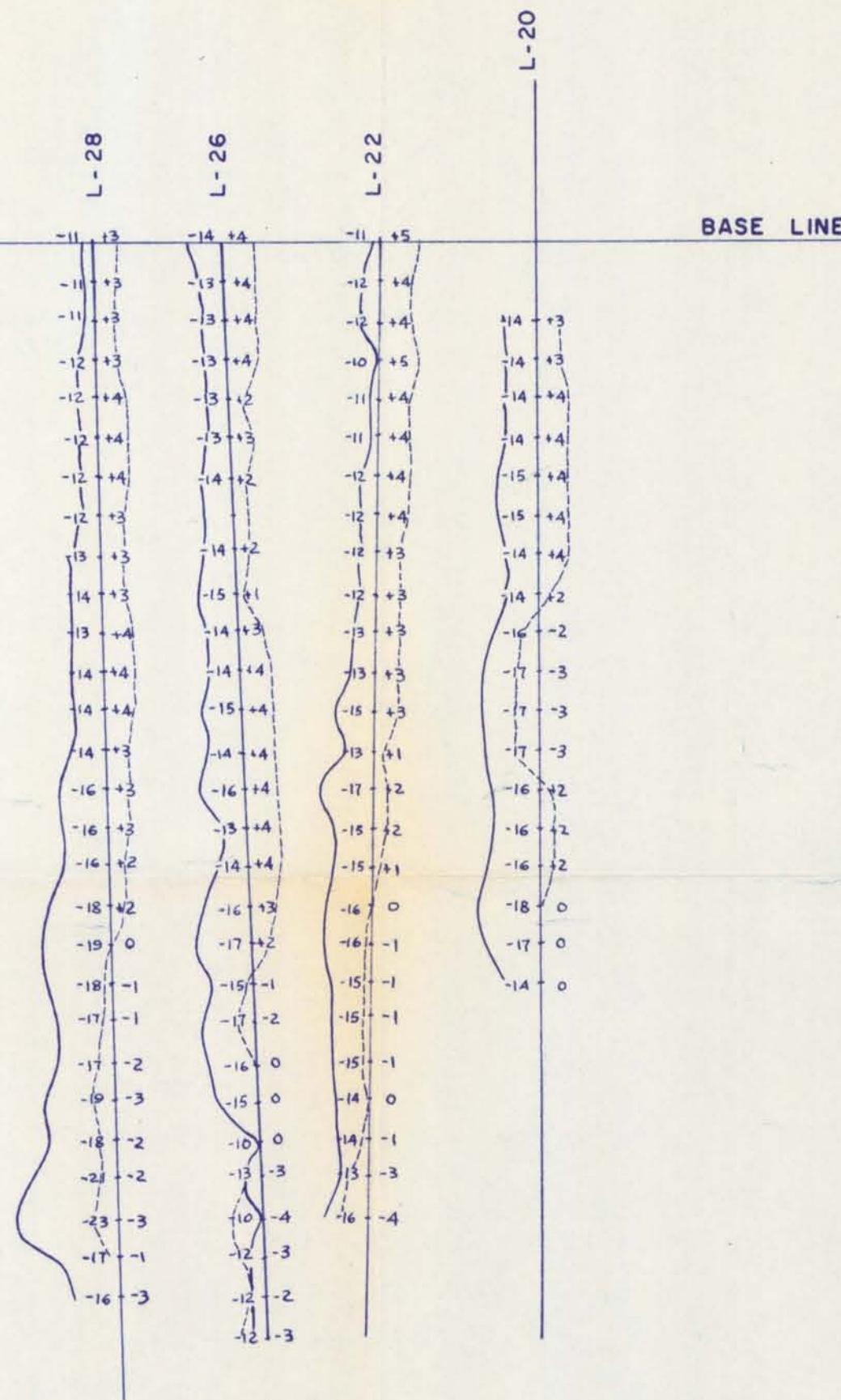
DATE OF WORK . . Oct.-Nov. 1964





MOYIE LAKE (LOCATION APPROXIMATE)





LEGEND

-5 <sup>2</sup> In phase on left.  
Out of phase on right.

In phase.  
Out of phase. } 1 in. = 20 degrees.

Receiver on south end of 300' cable.

FALCONBRIDGE NICKEL MINES LTD.

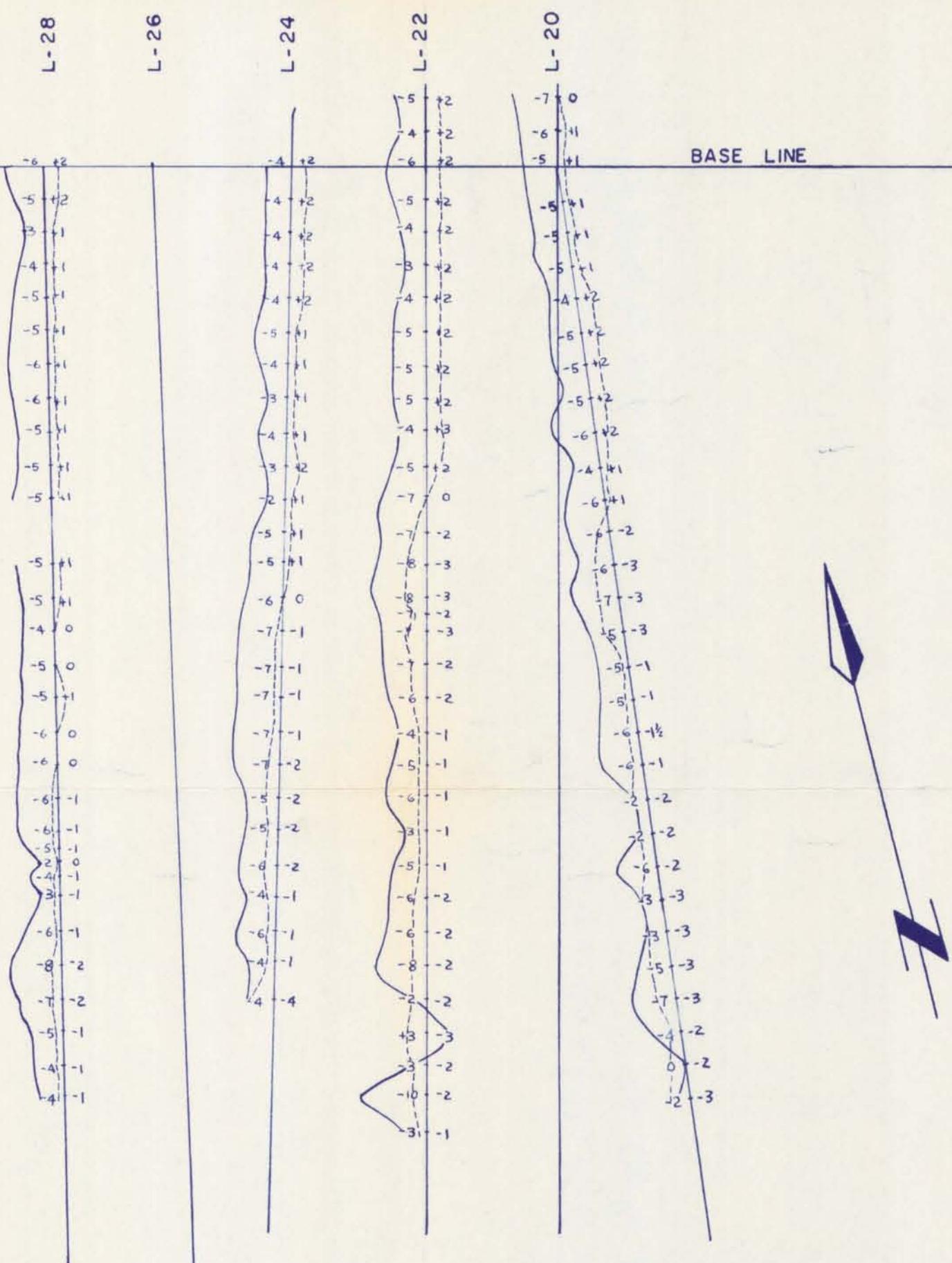
RONKA ELECTROMAGNETIC  
SURVEY

AURORA GRID

200 100 0 200 400  
FEET

DEC. 1964

Map 7A



LEGEND

-5 +2 In phase on left.  
-5 -2 Out of phase on right

In phase  
Out of phase } 1 in. = 20 degrees

Receiver on south end of 200 foot cable

Map 7A

FALCONBRIDGE NICKEL MINES LTD.

RONKA ELECTROMAGNETIC SURVEY

AURORA GRID

200 100 0 200 400  
FEET

DEC. 1964