

GEOCHEMICAL REPORT 93F/15W
ON THE COUNTS LAKES PROPERTY
GEL 1-60 MINERAL CLAIMS

LOCATED 8 miles south of Fraser Lake, B.C.
53°124° SE

by N. Shepherd, P. Eng. (B.C.) &
R.A. Barker, P. Eng. (B.C.)

for AMAX EXPLORATION, INC.

Work carried out between May 29, 1967 &
August 9, 1967

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GEOCHEMICAL REPORT
ON THE
COUNTS LAKES PROPERTY
OMENICA MINING DIVISION
53°N, 124°W
B.C.
(93 F 15)

September, 1967

N. Shepherd, P.Eng.(B.C.)
R.A. Barker, P.Eng.(B.C.)

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CONCLUSIONS

The extensive Mo-Cu anomaly outlined in the western part of the grid area is underlain by highly fractured, fine-grained aplitic granite (Casey) containing 10-15 percent inclusions of intermediate to basic volcanics.

Minor molybdenite mineralization occurs 1) as smears on joint planes and 2) as finely disseminated flakes in irregular quartz veins in highly silicified and K-feldspathized zones in Casey granite and also in the pyritized volcanics. Only trace amounts of chalcopyrite have been identified, however some vugs lined with maroon limonite indicate that leaching may have taken place.

It is considered that the low content of molybdenite and chalcopyrite observed in the rock exposures in the trenches is not sufficient to adequately explain the geochemical soil anomaly.

The claims in the vicinity of the geochemical anomaly should be maintained in good standing and efforts be made to obtain better rock samples either by blasting or drilling.

INTRODUCTION

General Statement

Attention was drawn to the Counts Lakes area in September 1966 as a result of anomalous water and silt samples being obtained from streams draining an extensive aeromagnetic 'low'. Subsequent reconnaissance soil sampling outlined a large Mo-Cu anomaly in an overburden covered area flanked to the south by a ridge of diorite and to the north by aplitic granite (Casey) and coarse grained quartz monzonite (Endako). Minor molybdenite and pyrite and traces of chalcopyrite were found in float over the anomalous area.

Detailed soil sampling was conducted on a grid cut over the anomalous area in 1967. In addition, I.P. and magnetometer surveys were carried out to provide data regarding the physical characteristics of the rock causing the geochemical anomaly. Bulldozer trenching was used to expose bedrock in areas of geochemical and geophysical interest.

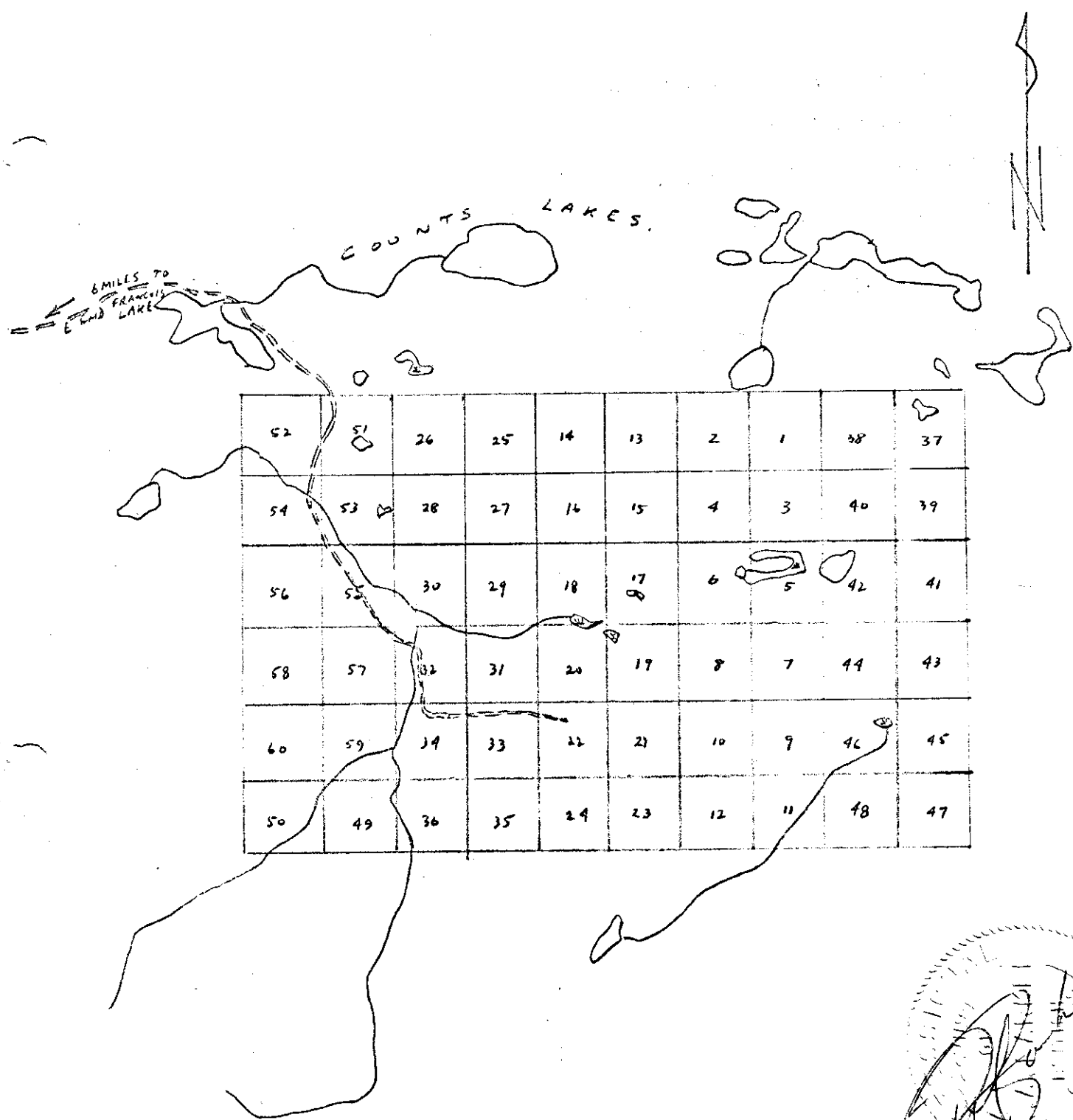
Anaconda is currently investigating a geochemical anomaly in the property adjoining to the west.

Location And Access (Fig.1)

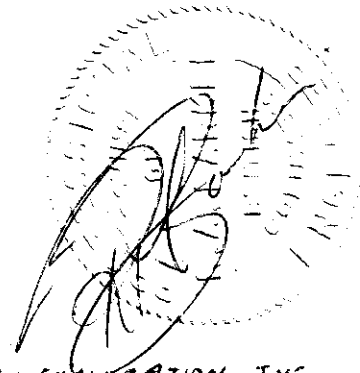
The Counts Lakes claim group is located 4 miles southeast of Nithi Mountain and 8 miles south of the community of Fraser Lake. Access to the property is by the Nithi River road which branches off the Stellako road at a point 1/2 mile from the east end of Francois Lake. The grid area on the property is approximately 10 miles from this junction.

Property (Fig.2)

The Counts Lakes property consists of 60 claims (Gel 1-60) staked by the Company and recorded on September 9th 1966. A strong geochemical soil anomaly in a favorable geological setting occurs in the southern half



GEL CLAIMS 1-60



AMAX EXPLORATION INC
 COUNTS LAKES PROPERTY
 UMINCO MINING DIVISION
 CLAIM MAP
 SCALE: 1" = 1/2 MILE

FIG. 2

of the claim group.

GEOLOGY

The Counts Lakes claim group is situated near the southwest contact of a large batholithic mass of Topley Intrusions (L. Jurassic) composed of rocks varying from granite to diorite in composition with the more acid phases predominating.

A massive fine-medium grained diorite intrusive dominates the southeast corner of the property. This diorite is flanked to the northwest by a fine grained leucocratic granite with typical aplitic texture. (Casey Granite). Numerous pyritized or epidotized inclusions of older Takla volcanics (basalts and andesites) occur in this aplitic granite especially towards the diorite contact. Silicification, K-feldspathization and kaolin alteration are noticeable in scattered zones in this highly fractured acid rock, the intensity of alteration being strongest near the basic inclusions. Pyrite with minor molybdenite smears along joint planes or in irregular quartz veinlets is widely distributed in both the volcanics and altered intrusive rock.

A band of quartz monzonite (Endako) trends southeast across the central part of the property. It is in contact with the aplitic granite in the western half of the grid area, and abuts against the diorite further east as the younger aplitic granite pinches out. Minor kaolin alteration occurs locally in the medium grained equigranular quartz monzonite.

Veinlets of aplite related to the mass of Casey granite intrude for short distances into the diorite. Elsewhere only a few narrow, north trending quartz porphyry dykelets have been observed to cut the diorite.

A few grey-brown quartz feldspar porphyry dykes ranging from 1-10 feet in width cut the Casey Granite. North trending basic dykes were mapped along the creek near the west boundary of the property. Recognition of similar dykes in the trenched area is extremely difficult due to the elongate dyke-like form of inclusions of the Takla volcanics.

GEOCHEMISTRY (Fig.3a and 3b)

A detailed soil sample survey was conducted over the southern half of the claim group where anomalous amounts of molybdenum were obtained in water and silt samples collected from streams draining the area. Soil samples were collected at 100 foot intervals along lines 500 feet apart. Poorly developed podzolic profiles were encountered at most sample sites. Parent material is fine sandy gravel of glacial origin. Drainage in the area is fair to moderate with prevalent gradual north slope, steepening towards the diorite mass in the south. The soils are weakly acid with pH values ranging from 5.0 to 6.5 and averaging 5.8.

A 2500' x 5000' area of anomalous soils with higher than 10 ppm Mo was outlined in the western half of the grid area. Well defined sub-parallel bands containing 25-50 ppm Mo with peaks in excess of 100 ppm occur within the anomaly. A similar pattern is shown by the Copper with values of 100-650 occurring in narrow east-west bands within the anomaly. High copper values are generally associated with soils containing high molybdenum.

A zone of moderately anomalous copper in soils was obtained in the extreme east part of the grid area. Molybdenum values in this area are background.

The area of the geochemical anomaly is completely blanketed by glacial overburden. Minor molybdenite was found in angular float of Casey Granite and porphyritic andesite.

Bulldozer trenching was carried out to expose bedrock in the anomalous area. Overburden varied from 2 feet to in excess of 15 feet and averaged 10 feet. Massive highly fractured Casey granite was exposed in most trenches west of line 12E. Inclusions of pyritized and epidotized intermediate to basic volcanics constitute about 10-20 percent of the exposed bedrock in the trenches. The percentage of inclusions in the Casey Granite increases towards the diorite contact. It is also apparent that the silicification and K-feldspathization in the granite is most intense in the vicinity of the volcanics. Minor molybdenite is widely distributed in the highly altered zones of Casey Granite and also in the pyritized volcanic inclusions. Two types of molybdenite are recognized. 1) Smears along joint planes, and 2) finely disseminated flakes in irregular quartz veinlets.

East of line 12E the geochemical anomaly extends for 700 feet into an area mapped as diorite with several volcanic inclusions. Minor molybdenite occurs as smears on the joint planes in both rock types.

Rock chip samples of Casey Granite and pyritized volcanics from trenches in the anomalous area contained from 50 to 1000 ppm Mo and 25-80 ppm Cu. Higher copper values were contained in two samples - 600 and > 1600 ppm.

The geochemical analytical procedure is described in Appendix I. Half the soil samples were analyzed by Bondar-Clegg & Company Ltd., North Vancouver. The water, silt, rock chip and the remainder of the soils were analyzed at the Amax Laboratory in N. Burnaby.

SUMMARY OF WORK & PERSONNEL INVOLVED

May 31 - June 20 - 115,000' Line Cutting & Chaining
 May 31 - June 5 - Access Road - 2 miles
 June 27 - Aug. 9 - 9000' Bulldozer Trenching D.7 Cat
 June 12 - June 26) - 2 square miles Geochemical Soil Survey
 July 8 - July 18) -
 June 22 - July 6 - 9.62 line miles I.P. Survey

Personnel Involved - May 29 - August 9, 1967

Bulldozer Supervision - C. Birt, Quesnel Dr. W. Vancouver, B.C.
 - RA Kingsley, Vanderhoof, B.C.

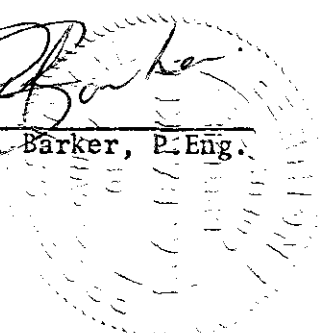
I.P. Assistants - L. Watt, Box 703, Vanderhoof, B.C.
 - G. Keith, Engen, B.C.
 - D. Dillon, Fort Fraser, B.C.

Soil Sampling - JE Christoffersen, 100 Mineola Rd. E, Port Credit, Ont.
 - C. Birt, Quesnel Dr. W. Vancouver, B.C.
 - R. Harvey, RR#4, Bluebird Rd. Kelowna, B.C.
 - P. Vaughan, 15015 Raven Place, North Surrey, B.C.
 - L. Watt, P.O. Box 703, Vanderhoof, B.C.

September, 1967

Norman Shepherd
 N. Shepherd, P.Eng

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APPENDIX I

GEOCHEMICAL ANALYTICAL PROCEDURE

FOR

MOLYBDENUM DETERMINATION

STREAM SEDIMENTS AND SOILS

Drying and Sieving

Sample boxes should be opened as soon as they arrive in the laboratory. If dryer is full, spread samples to air dry. As soon as possible, samples should be placed in dryer.

After drying, samples are to be sieved to minus 35 mesh. As much -35 material as possible is recovered from sample. Dump the -35 mesh material on a square of brown paper and mix by rolling several times. Place mixed -35 mesh material in a coin envelope and place envelope in original sample bag. Arrange samples in units of 40, if possible, and in numerical order.

ROCK AND CORE SAMPLES

General Handling

Rock or core samples need, usually, to be only air dried. If samples seem particularly wet they may be force dried by placing in numbered pans in the drying oven. No attempt is made to completely dry rock samples, that is, expel all the water from the pores of the rock. The samples are ready to crush when the outside surfaces are dry.

Crushing and Pulverizing

Rock and core samples are to be processed in such a manner that a representative 1/2 gram sample can be obtained. The entire amount of each sample is to be passed through the jaw crusher. At jaw crusher size the smallest sample that can be split out is 5 pounds. If sample is five pounds or less in size, pass the entire sample through pulverizer with plates set to

produce material of a maximum 8 mesh size. If sample is larger than 5 pounds then pass sample through Jones splitter to produce a sample of approximately 5 pounds. Pass this sample through pulverizer to produce -8 mesh material as above.

When the approximate 5 pound split has been pulverized to -8 mesh, then sample can be split to smaller size for final pulverizing. Using the Jones splitter, split sample down until a portion weighing 100 - 200 grams is obtained. This portion is then passed through the pulverizer, with plates pulled up tight so that product will pass 100 mesh screen. Regular checks, by screening, should be made to be sure the pulverizer, with plates pulled up tight, is producing a product 95% of which will pass a 100 mesh screen. After pulverizing, the sample should be mixed by rolling on brown paper or rubberized cloth. Rejects should be saved according to instruction from sampler.

WEIGHING FOR COPPER AND MOLYBDENUM

Digestion tubes (100 x 16 mm) should be marked at 5 ml level. Using diamond pencil, mark each tube carefully at bottom of meniscus.

Samples for digestion and analysis should be handled in units of 40 where possible. Prepare a laboratory data sheet for each batch of 40 samples.

Weigh accurately on balance 1/2 gram sample and put in marked test tube.

DIGESTION AND DILUTION FOR COPPER AND MOLYBDENUM

To each of the samples prepared above add 1:1 HNO₃ to the 5 ml mark. Place samples in the digestion racks in order. Adjust heat so that samples are gently boiling. Digest for three hours at this gently boiling rate. Remove from digestion rack and bring volume back to 5 ml with demineralized water. Mix well and then centrifuge for 1 minute. Use clear upper layer for copper and molybdenum determination.

MOLYBDENUM TESTProcedure for Silt, Soil and Rock

1. Transfer a 1 ml aliquot of digested solution from above into clean test tube for determination.
2. Add 1.0 mls KSCN shaking gently - 5%
3. Add 1.0 mls SnCl₂ shaking gently - 15% in 2NHCl
4. Make up to 10 mls with water.
5. Add 1 ml isopropyl ether, add stopper and shake for 45 seconds.
6. Match colour of ether layer with standards against a white background and record ppm.

Standard Molybdenum Solutions

Stock Standard Solution (100 μ /ml) - Dissolve .015 gms of MoO₃ in 5 ml conc. NaOH and make up to 100 ml with demineralized H₂O. This solution must be made up bi-monthly.

Working Standard Solution (10 μ /ml) - Pipette 10 ml of 100 μ /ml stock solution in a 100 ml volumetric flask and make up to 100 ml with demineralized H₂O.

Molybdenum Standards for Soil, Silt and Rock Chip - based on 1/2 gm sample aliquot.

1. Take 15 clean 100 x 16 test tubes which are calibrated to 5.0 ml mark by a diamond pencil.
2. Pipette the following aliquots;

	<u>10 γ/ml</u>	gammas	Factor Used	ppm
a)	0.2 ml	2 γ	} X 2	4
b)	0.4 ml	4 γ		8
c)	0.6 ml	6 γ		12
d)	0.8 ml	8 γ		16
e)	1.0 ml	10 γ		20
 <u>100 γ/ml</u>				
f)	0.125 ml	12.5 γ	} X 2	25
g)	0.150 ml	15 γ		30
h)	0.20 ml	20 γ		40
i)	0.30 ml	30 γ		60
j)	0.40 ml	40 γ		80
k)	0.50 ml	50 γ		100
l)	0.75 ml	75 γ		150
m)	1.00 ml	100 γ		200
n)	1.50 ml	150 γ		300
o)	2.00 ml	200 γ		400

3. Make up to 5 ml mark with distilled water.
4. Now take 15 clean 150 x 16 test tubes calibrated to the 10 ml mark. With a pipette take 1 ml out of each of the previous test tubes and pipette them into the new set of test tubes.
5. (A) To the set of 16 x 150 mm test tubes then add the following:
 - a) 1 ml HCl 6N
 - b) 1 ml 1% FeCl₃ - add more if color development is poor
 - c) 1 ml 5% KSCN
 - d) 1 ml 15% SnCl₂
 - e) Make up to 10 ml mark with demineralized water.
 - f) 1 ml iso-propyl ether.
 - g) Shake for 20 - 30 seconds.
 - h) Allow to settle and read.
- (B) Save the original 16 x 100 test tubes with the remaining solutions in them. Stopper them by corks on which the respective concentrations are marked in ppm. Use these in future preparations.

BIQUINOLINE COPPER TEST FOR SILT, SOIL AND ROCK CHIP

This test is selective for copper and is not subject to any metal interferences. Reference: U.S.G.S. Bulletin 1152.

Reagents

1. Buffer solution: dissolve 400 gms sodium acetate and 100 gms sodium tartrate and 20 gms of hydroxylamine hydrochloride in 1 litre of water. Adjust to pH 6.5.
2. Biquinoline solution: add .2 gms 2,2' biquinoline in 900 mls isoamyl alcohol. Heat on hot plate to dissolve. Cool and make to 1 litre with isoamyl alcohol.

Procedure

1. Take a 1 ml aliquot from digestion solution above and transfer to large test tube for determination.
2. Add 10 mls copper buffer.
3. Add 2 mls biquinoline-isoamyl alcohol solution.
4. Stopper tube and shake vigorously for 45 seconds.
5. Allow phases to separate, then compare colour to standards against a white background and record ppm.

Standards

Stock Standard Solution (100% /ml) - Dissolve .2 gms blue CuSO_4 in 400 mls H_2O . Add 5 mls conc. HCl and H_2O to 500 mls.

Working Standard Solution (10% /ml) - Dilute 10 mls stock standard and 1 ml conc. HCl to exactly 100 mls with H_2O

Preparation of Standards

This procedure is the same as the preparation for molybdenum standards except for 5 (A). The section 5 (A) which applies to the preparation for standards of copper is as follows:

- 5 (A) To a set of 16 x 150 mm test tubes then add 1 ml 1:1 HNO_3 , 10 ml copper buffer, 2 ml 2,2' - Biquinoline in isoamyl alcohol. Shake for 5 minutes vigorously. Allow to settle, then read.

THM (Total Heavy Metals) TEST

Test mainly sensitive to zinc, copper and lead (especially zinc). Reference: Bloom, H., Economic Geology, Volume 50-1955.

Reagents

1. Demineralized H_2O

2. Dithizone (diphenylthiocarbazone) Reagent grade.
3. Dithizone/chloroform 0.1% solution, dissolve 0.147 gm dithizone in 100 mls chloroform. (Dithizone is more soluble in CHCl_3 than in Benzene).
4. Dithizone stock solution .01% - Dilute 10 mls of 0.1% solution to 100 mls with Benzene.
5. Dithizone working solution .001%: dilute 10 ml of stock solution to 100 ml with benzene; should be made daily; yellow hue indicates breakdown of dithizone.
6. Buffer solution: take 50 gms of ammonium citrate and 8 gms hydroxylamine hydrochloride, making up to 1000 mls with water; adjust pH to 8.5 w/conc. NH_4OH ; purify w/dithizone solution if necessary.

Procedure

1. Measure out with volumetric scoop .5 gm of sample into a test tube.
2. Add 5 mls buffer then 5 mls .001% dithizone solution.
3. Shake for 30 seconds.
4. Observe color against a white background and record ppm from standard chart.

pH MEASUREMENTS

Soil and Silt Samples

The soil and silt samples should be dampened with demineralized water to a pasty consistency. Demineralized water should be used for this purpose because it is thought that water deprived from its ionic content has a low buffer capacity and thus will not influence the pH of the sample.

Experience has borne out the fact that 30 seconds time is sufficient for the meter to come to a reasonable stability. The meter needle will keep on drifting slowly but this will be much slower than at the beginning and therefore can be ignored.

Store electrodes in buffer overnight. When starting in the morning allow 15 minutes warm up for the instrument.

Water Samples

You may use either a sample aliquot from the bottle or simply measure pH right in the bottle by using a combination electrode. If the latter method is chosen, take care that samples have already been analyzed for Mo to avoid contaminations by the

electrode. Use 30 second intervals here as well as between each consecutive measurement.

MOLYBDENUM IN WATER

1. Transfer 50 mls. of sample into 125 ml separatory funnel.
2. Add 10 mls dilute (1:1) HCl
3. Add 1 ml 1% ferric ammonium sulphate or FeCl_3
4. Add 3 ml 10% KSCN and shake.
5. Add 3 ml 15% SnCl_2 in 2NHCl
6. Add 2 ml isopropyl ether, shake for 30 seconds and allow phases to settle.
7. Drain off water layer, retaining organic ether layer in funnel with a little of the aqueous layer remaining.
8. Drain small amount of water plus organic layer into 16 x 150 mm test tube. Compare with standards against white background.

Molybdenum Standards - label 12 clean test tubes 0, 2, 4, 10, 16, 20, 30, 40, 50, 60, 70 and 80 ppb. To the respective tubes pipette the following volumes of 1% /ml Mo work solution.

<u>mls of 1% /ml Mo Solution</u>	<u>ppb</u>
.20	4
.50	10
.80	16
1.00	20
1.50	30
2.00	40
2.50	50
3.00	60
3.50	70
4.00	80

After the standard solutions have been added, make up to 50 ml mark with demineralized water then add the following:

1. 10 ml 1:1 HCl solution.
2. 1 ml of 1% FeCl_3
3. 1 ml of 10% KSCN solution.
4. 1 ml of 15% SnCl_2 solution.
5. 2 ml of isopropyl ether.
6. Stopper and shake for 45 seconds.

Standards must be made up at least three times a week.

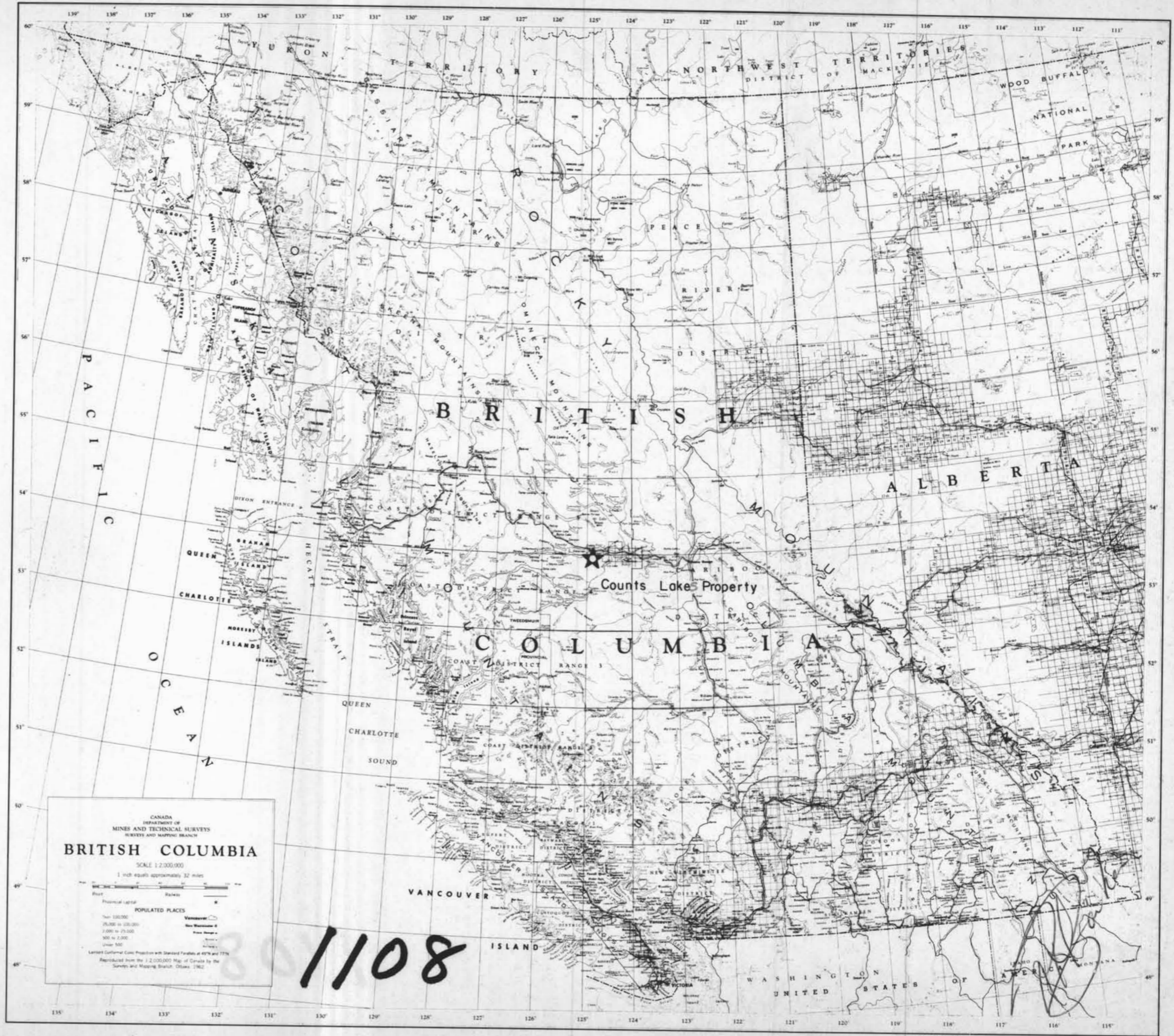
APPENDIX II

STATEMENT OF QUALIFICATIONS

J.E. Christoffersen - B.Sc. Geological Engineering - University of Toronto

R.M. Harvey - 2nd Year Geophysics - University of British Columbia.

Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 1108 MAP 1



CANADA
 DEPARTMENT OF
 MINES AND TECHNICAL SURVEYS
 SURVEYS AND MAPPING BRANCH
BRITISH COLUMBIA
 SCALE 1:2,000,000
 1 inch equals approximately 32 miles

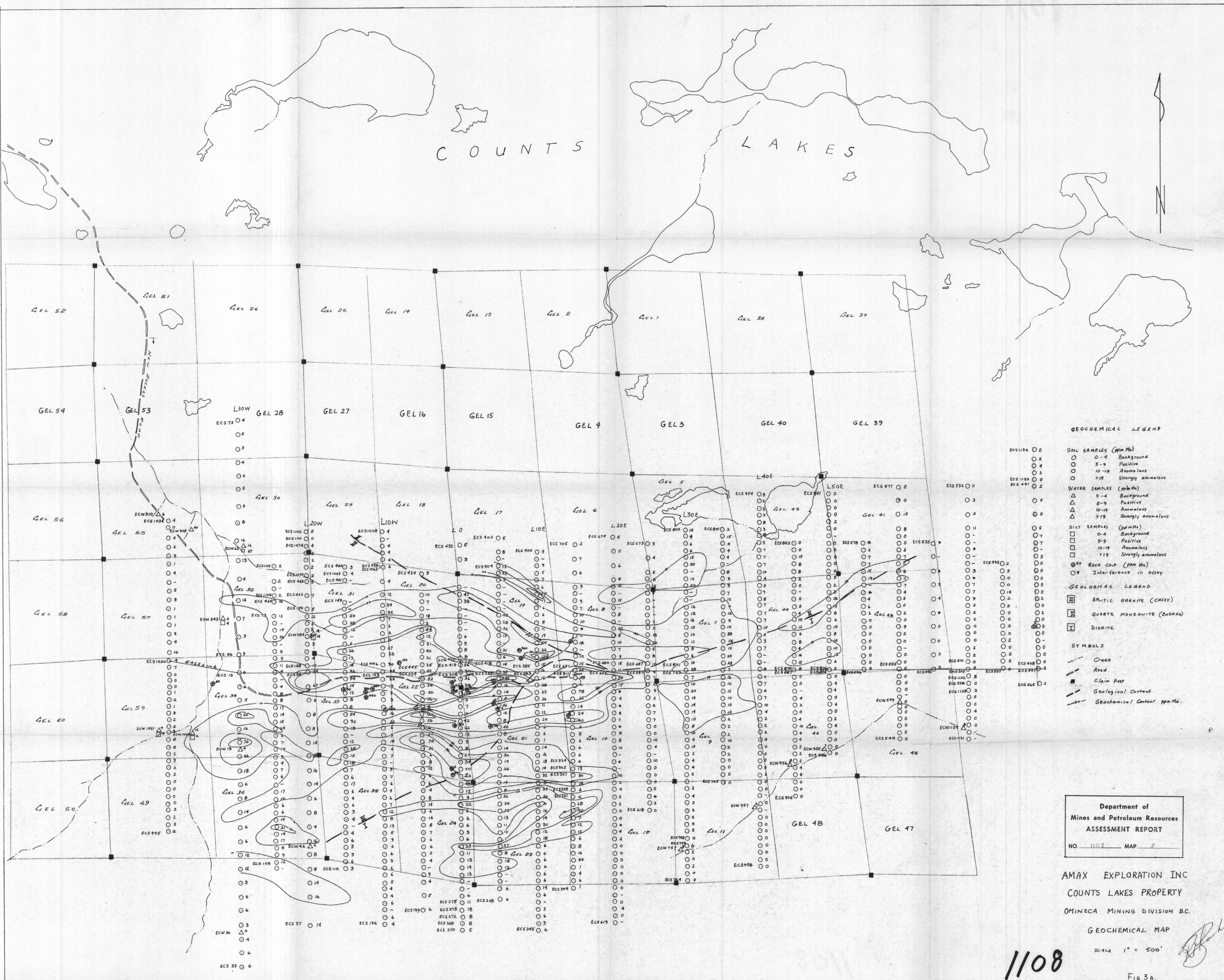
POPULATED PLACES

Over 100,000	Star
25,000 to 100,000	Star with circle
7,000 to 25,000	Star with square
500 to 7,000	Star with triangle
Under 500	Star

Reprinted from the 1:2,000,000 Map of Canada by the
 Surveys and Mapping Branch, Ottawa, 1962.

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LOCATION MAP



COUNTS LAKES

GEOCHEMICAL LEGEND

- SOIL SAMPLES (ppm Mo)**
- 0-4 Background
 - 5-9 Positive
 - 10-19 Anomalous
 - >19 Strongly anomalous
- WATER SAMPLES (ppb Mo)**
- △ 0-4 Background
 - △ 5-9 Positive
 - △ 10-19 Anomalous
 - △ >19 Strongly anomalous
- SILT SAMPLES (ppm Mo)**
- 0-4 Background
 - 5-9 Positive
 - 10-19 Anomalous
 - >19 Strongly anomalous
- ROCK CHIP (ppm Mo)**
- ⊙ Interference in assay
- GEOLOGICAL LEGEND**
- ▣ ARCTIC GRANITE (CASEY)
 - ▣ QUARTZ MONZONITE (ENDAKO)
 - ▣ DIORITE
- SYMBOLS**
- Creek
 - Road
 - Claim Post
 - Geological Contact
 - Geochemical Contour ppm Mo

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 1108 MAP 3

AMAX EXPLORATION INC
COUNTS LAKES PROPERTY
OMINECA MINING DIVISION B.C.

GEOCHEMICAL MAP

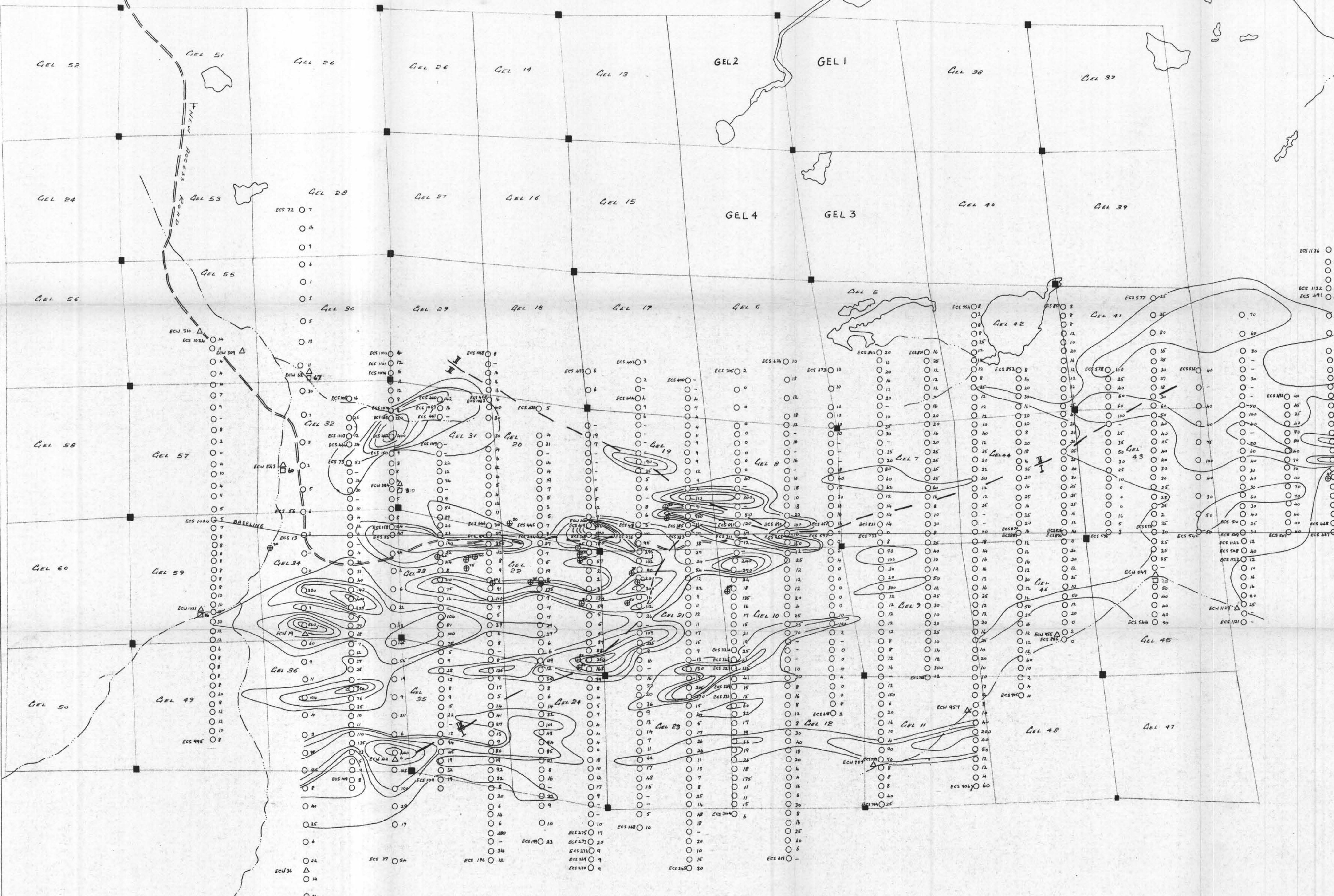
SCALE 1" = 500'

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FIG 3A.

COUNTS

LAKES



- GEOCHEMICAL LEGEND**
- SOIL SAMPLES (ppm Cu)**
- 0-9 BACKGROUND
 - 10-19 POSITIVE ANOMALOUS
 - 20-50 ANOMALOUS
 - >50 STRONGLY ANOMALOUS
- SILT SAMPLES (ppm Cu)**
- 0-9 BACKGROUND
 - 10-19 POSITIVE ANOMALOUS
 - 20-50 ANOMALOUS
 - >50 STRONGLY ANOMALOUS
- WATER SAMPLE**
- △ WATER SAMPLE
- ROCK CHIP (ppm Cu)**
- ⊙ ROCK CHIP (ppm Cu)
- GEOLOGICAL LEGEND**
- ▨ APLITIC GRANITE (CASEY)
 - ▨ QUARTZ MON ZONITE (ENDRKO)
 - ▨ DIORITE
- SYMBOLS**
- - - CREEK
 - == ROAD
 - CLAIM POST
 - GEOLOGICAL CONTACT
 - - - GEOCHEMICAL CONTOUR (ppm Cu)

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 1108 MAP 9

AMAX EXPLORATION INC
COUNTS LAKES PROPERTY
OMINECA MINING DIVISION B.C.
GEOCHEMICAL MAP

SCALE 1" = 500'

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Fig 3B.