

BRENDA MINES LTD.
EXPLORATION GROUP

REPORT on the
]1980
GEOCHEMICAL SOIL SURVEY
&
GEOLOGICAL SURVEY
on the
ALCO PROPERTY

Latitude 49° 31', Longitude 118° 21'
Greenwood Mining Division
N.T.S. 82 E/9

Del W. Ferguson
December 1980

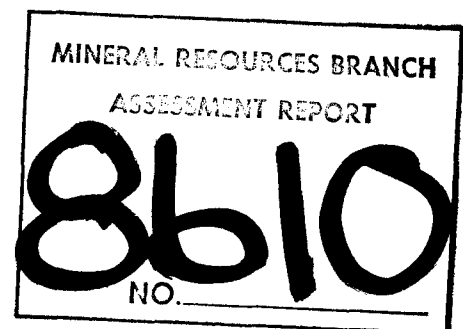


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MAPS - Cu, Mo, Pb, Zn Geochem	(in pocket)
- Geology (1:7,500), Geology (1:2,000)	(in pocket)

I INTRODUCTION

(a) History of Property

In 1968, the area now covered by the ALCO claim was staked as the BEAR-DOE group of claims and examined by Dr. G.W.H. Norman for Newmont Mining Corporation.

In 1975, blasting during construction of the Burrell Creek logging road exposed a weakly mineralized stockwork of copper and molybdenite in Nelson granodiorite over an intermittent north-south length of 700 metres. The area was subsequently staked by J. Nedokus, who optioned these claims to Rio Tinto Canadian Exploration Ltd. This company ran geological, geochemical and geophysical surveys over the claims in 1976 and their option has since been cancelled. The ALCO claim was retained by J. Nedokus and P. Koochin, and was subsequently optioned to Brenda Mines Ltd. in the spring of 1980. ALOC 4 and ALCO 5 claims were staked in May, 1980.

(b) Vegetation and Topography

The topography of the claim area between Burrell and Nicoll Creeks consists of steep sided, mound-shaped hills. The land rises steeply west and east of these two creeks respectively.

Vegetation at lower elevations is variable, consisting for the most part of grassy hills with sparse vegetation. Some hillsides are covered by dense growths of jackpine. Steep slopes to the east of Nicoll Creek are covered by dense growths of cedar

and jackpine windfalls. West of Burrell Creek, vegetation is sparse on steep slopes.

II PROPERTY DESCRIPTION

(a) Location and Access

The Alco mineral property is situated approximately 50 kilometres north of Grand Forks, B.C., immediately south of the junction of Burrell Creek and Franklin Creek.

Access is via a paved road following the Granby River northwards from Grand Forks, and then onto the gravel topped Burrell Creek logging road. The property straddles this road between the 18 km and 20 km logging signs.

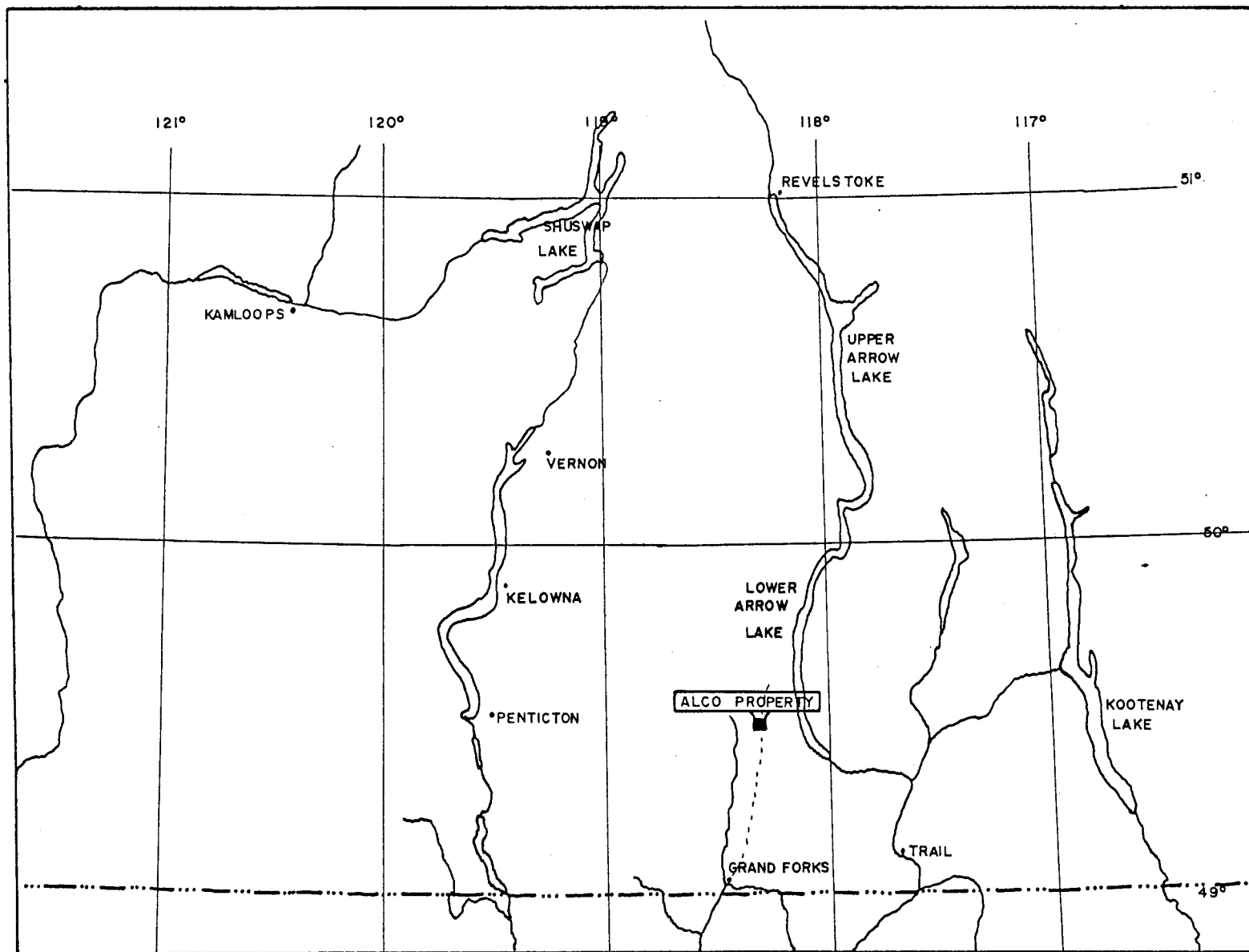
(b) Claim Inventory

<u>Claim Name</u>	<u>Record No.</u>	<u>No. of Units</u>	<u>Record Date</u>
ALCO	128	20 MG	Sept. 29/75
ALCO 4	2192	10 MG	May 23/80
ALCO 5	2193	16 MG	May 23/80
ALCO 6	2194	8 MG	May 23/80
ALCO 7	2233	1/2P	May 30/80
ALCO 8	2234	1/2P	May 30/80

III REGIONAL SETTING

Structurally, the area of the Alco claims is part of the Cariboo geanticline, a stable massif, adjoining the Quesnel trough to the west.

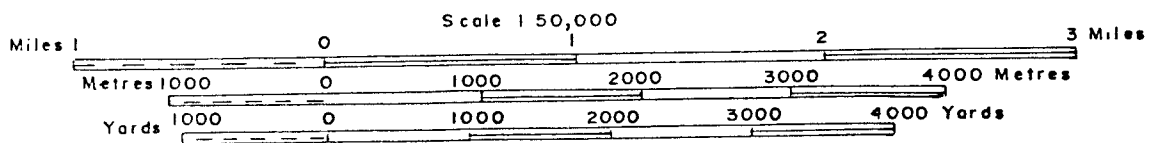
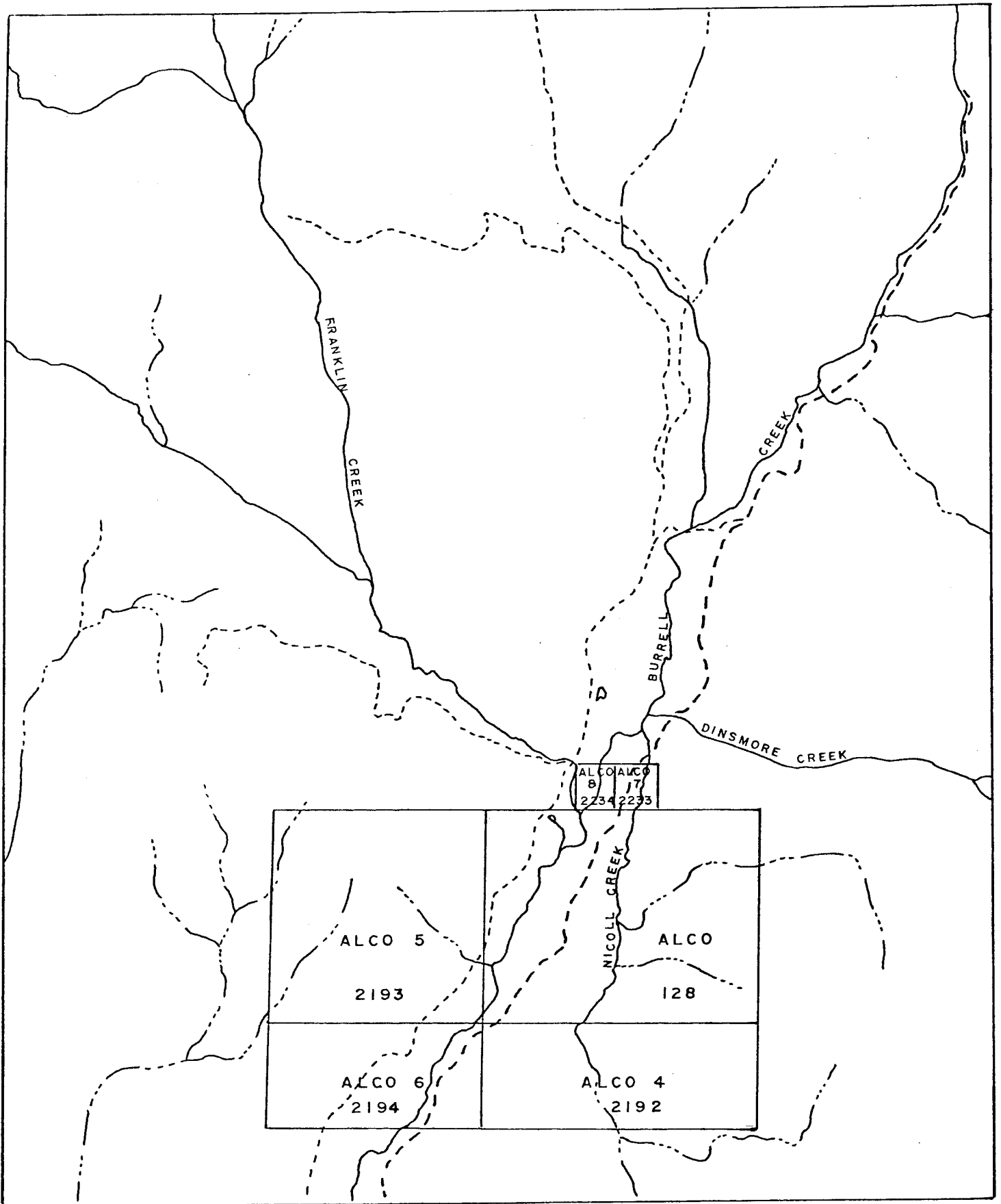
The area has been mapped by the G.S.C. (Little, 1957) and by Drysdale (1915).



SCALE 1:2 000 000

KILOMETRES 50 0 50 100 150 200 KILOMETRES

Figure 1 - Location Map



The oldest rocks on the claims are Paleozoic in age and include paragneisses and limestones of the Monashee Group and volcanics and limestones of the Anarchist Group. These Paleozoic sediments are intruded by Upper Triassic granodiorites of the Nelson Group, resulting in skarnification and mineralization of the Anarchist limestones. This was followed by the intrusion of the Valhalla granites during the Lower Cretaceous (Little, 1962).

In the Cenozoic Period, intrusive syenties of the Coryell Group and volcanics of the Kettle River Group were emplaced. Subsequently, andesites, tuffs and shales of the Phoenix Group were deposited.

IV WORK PROGRAM DESCRIPTION

a) Line Cutting and Grid Establishment

Two picket base lines trending N 30° W were established on either side of Burrell Creek. Location lines were run perpendicular to these baselines and are situated 200 metres apart. Closer line spacings of 100 metres were run over parts of the ALCO claim. A total of 60.65 line kilometres were established on the claims. All lines were well flagged and blazed, surveyed with a compass and topofil, and tagged at 50 metre interval stations for later geochemical and geological surveys.

b) Geochemical Survey

Description

The geochemical soil survey over the Alco property commenced on May 17, 1980 and was completed on May 27, 1980. A total of 1,120 soil samples, 7 silt samples and 5 rock samples were collected for analysis. Soil samples were taken at 50 metre intervals along the established grid lines previously described. Mattocks were implemented to obtain soils from BF horizons where possible. Samples were sent to the Brenda Mines Assay Lab for preparation and analysis (Appendix I).

Treatment of Results

1. Statistical Analysis

Statistical presentation of the various sample types were made so as to better compare bulk characteristics of the geochemical data. The two statistical formats used in this report are cumulative frequency distribution and histogram frequency. The histogram is the more obvious of the two, enabling the reader to make quantitative observations regarding data grouping made etc., while the cumulative frequency plot may be used to graphically derive qualitative information such as standard deviations, background values, low anomalous values and threshold values.

The following is not meant to be a definitive treatment of the statistical analysis of geochem data, but rather a guide to the more important statistical parameters considered in this report.

2. Distribution

In beginning the treatment of a large body of geochemical data, it is necessary to determine the distribution which best fits the data. It has been determined (by concentration vs. frequency plots) that most geochemical data follows a lognormal distribution often referred to as the bell-shaped curve. Natural geochemical values

often tend to form negatively skewed distribution curves when plotted. This results from the fact that it is more common to have low values in geochemical data, than high values. If, instead of the actual value itself, it's logarithm is plotted in the abscissa, the frequency curve takes a symmetrical, bell-shaped form, typical of the normal distribution. Plotting the actual geochemical values on a logarithmic graph will achieve the same results. This is the procedure used for the data considered.

3. Histogram

The histogram used in preparing this report is a plot of the interval frequency vs. interval (see Figure 3). Several important statistical parameters may be determined such as the total range of data in sample, modes, and the range with the highest frequency of values. Finally, the general form of the density distribution of the data can be determined quickly.

4. Cumulative Frequency

Cumulative frequency paper is generally constructed with a probability scale as the ordinate and a logarithmic scale as the abscissa (Figure 4). By replacing the arithmetic ordinate scale of the histogram with a probability scale, the cumulative frequency curve is represented by a straight line or a line of "best fit". This line joins

points calculated from frequencies, cumulated from the highest to the lowest values; thus the 100% will correspond to the lowest class and can be eliminated.

There are essentially three parameters defining the geochemical population, which may be obtained graphically, using the cumulative probability plots. These are:

- 1) Geometric mean or background value (b) located by the intersection of the cumulative frequency curve at the population mean (50%). Trace intersection down to ppm scale.
- 2) Low anomalous value (l) located by the intersection of the cumulative frequency curve at the 16%. Trace intersection down to ppm scale. The 16% line expresses the scatter of the values around the population mean, incorporating the addition of one standard deviation (s) to the mean.
- 3) Anomalous or threshold value (t) located by the intersection of the cumulative frequency curve at the 2.5%. Trace intersection down to ppm scale. The threshold value is a fairly complex geochemical parameter and is supposed to be the upper limit of the background fluctuation (b). This incorporates the addition of two standard deviations (2s) to the mean.

Geochemical results for each element have been plotted on accompanying maps and contoured to correspond with element distributions.

Fig. 3

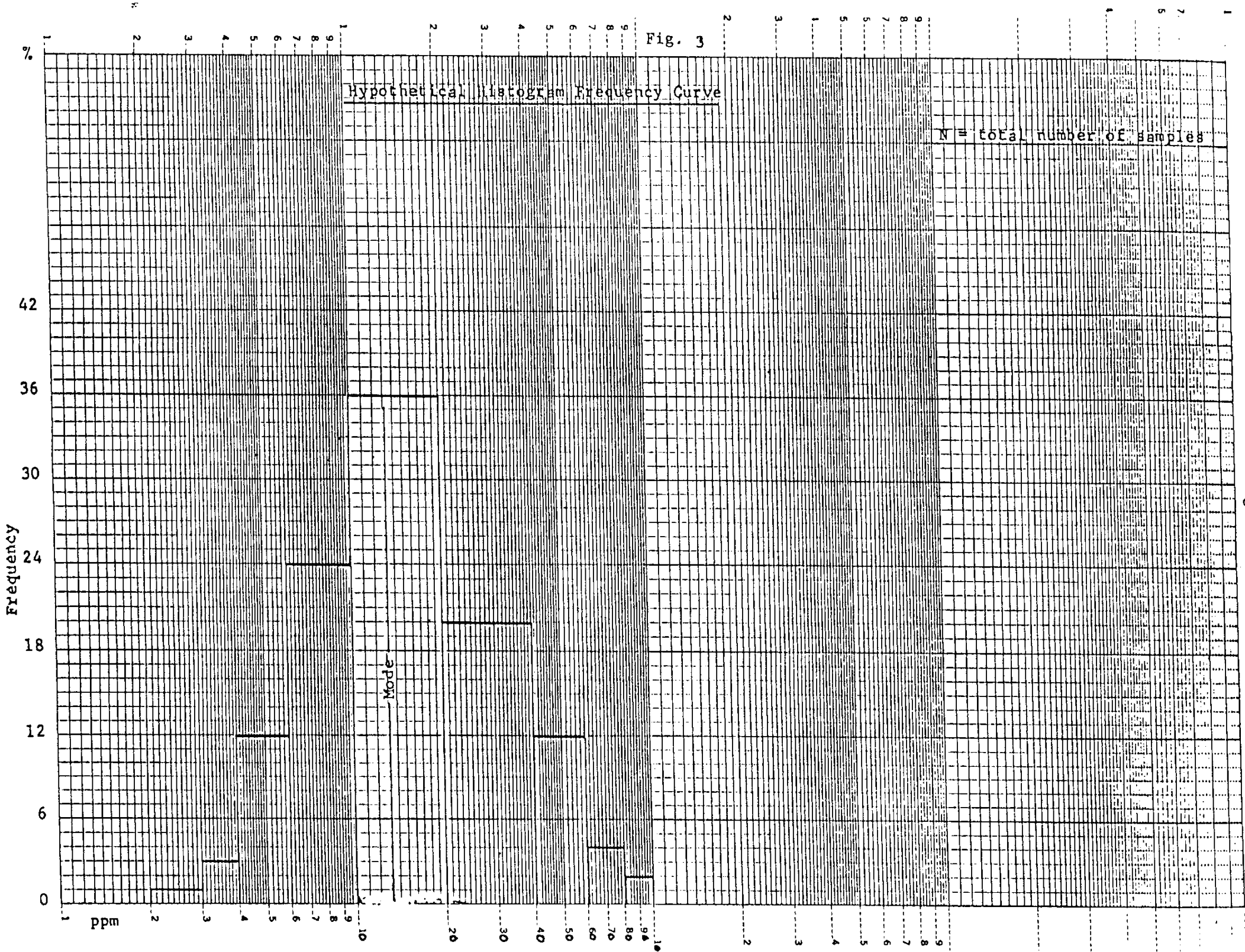
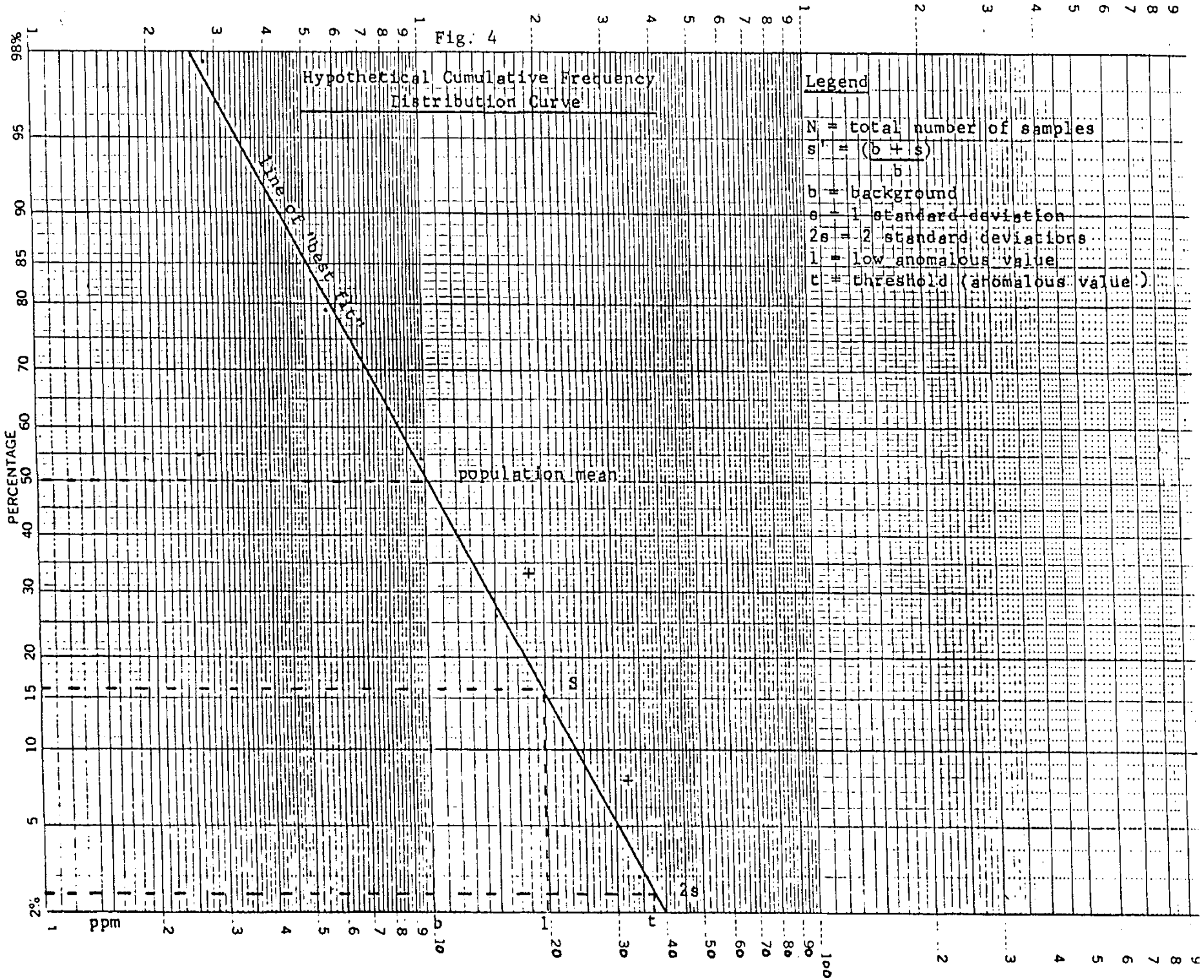


Figure 4



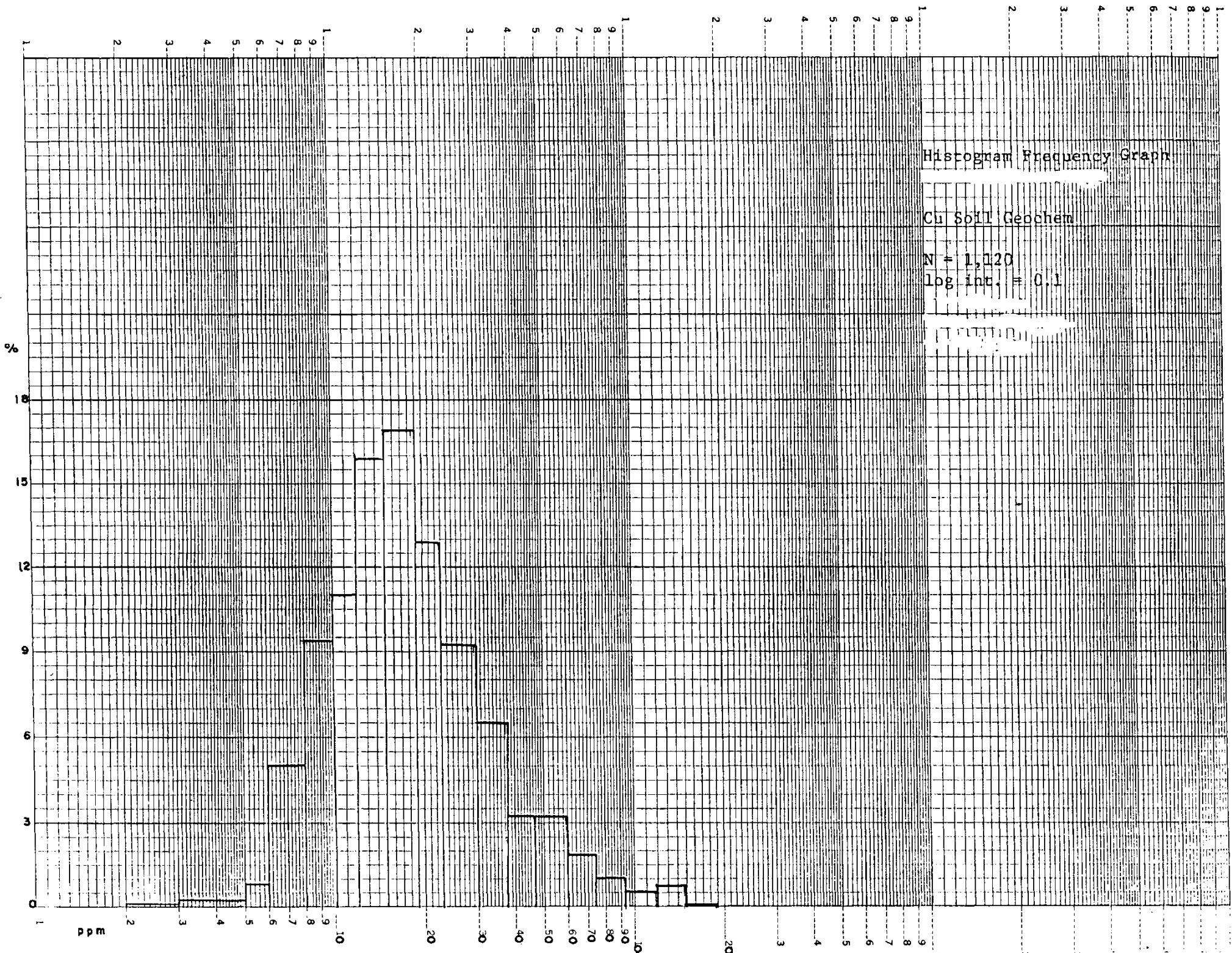


Figure 5

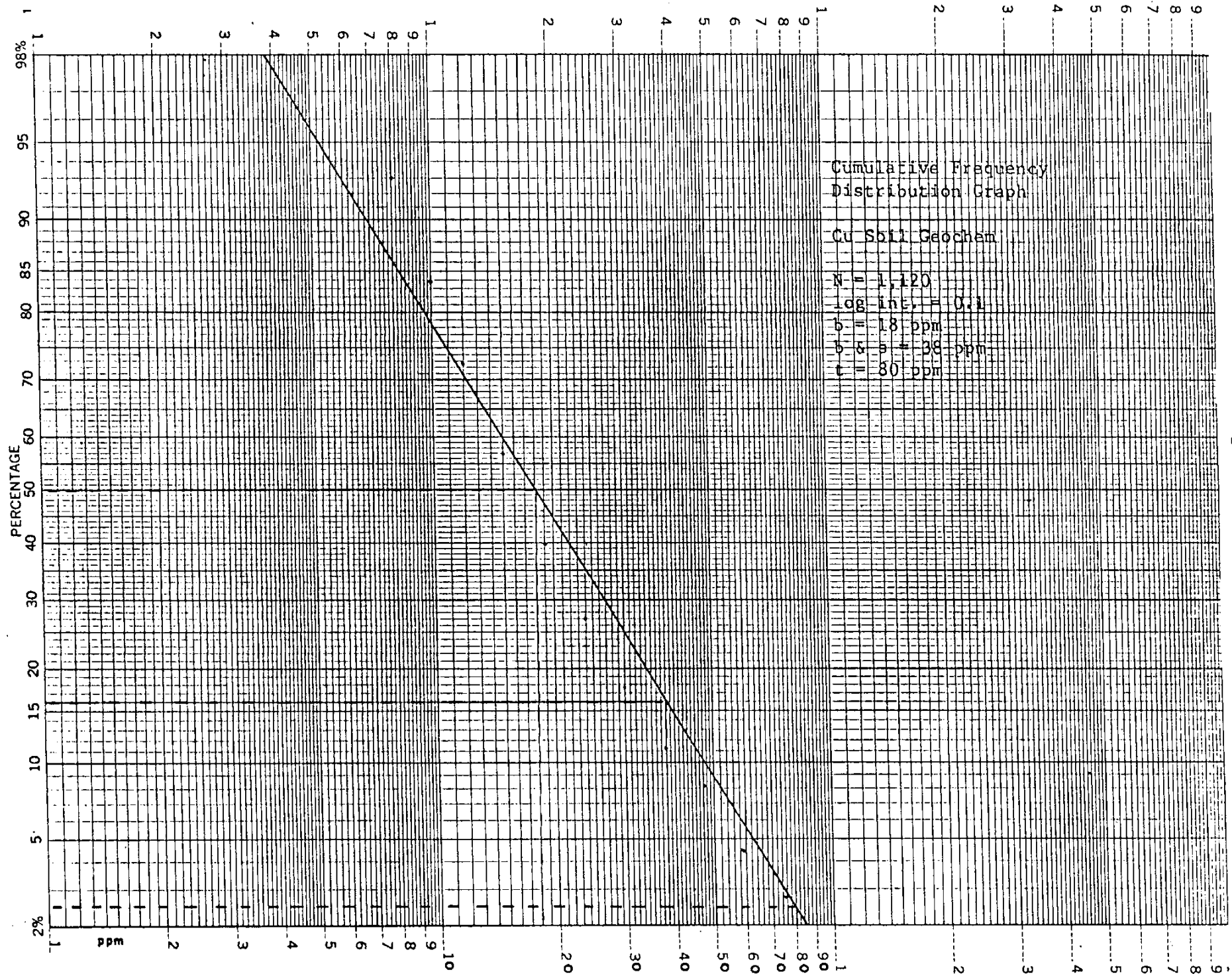
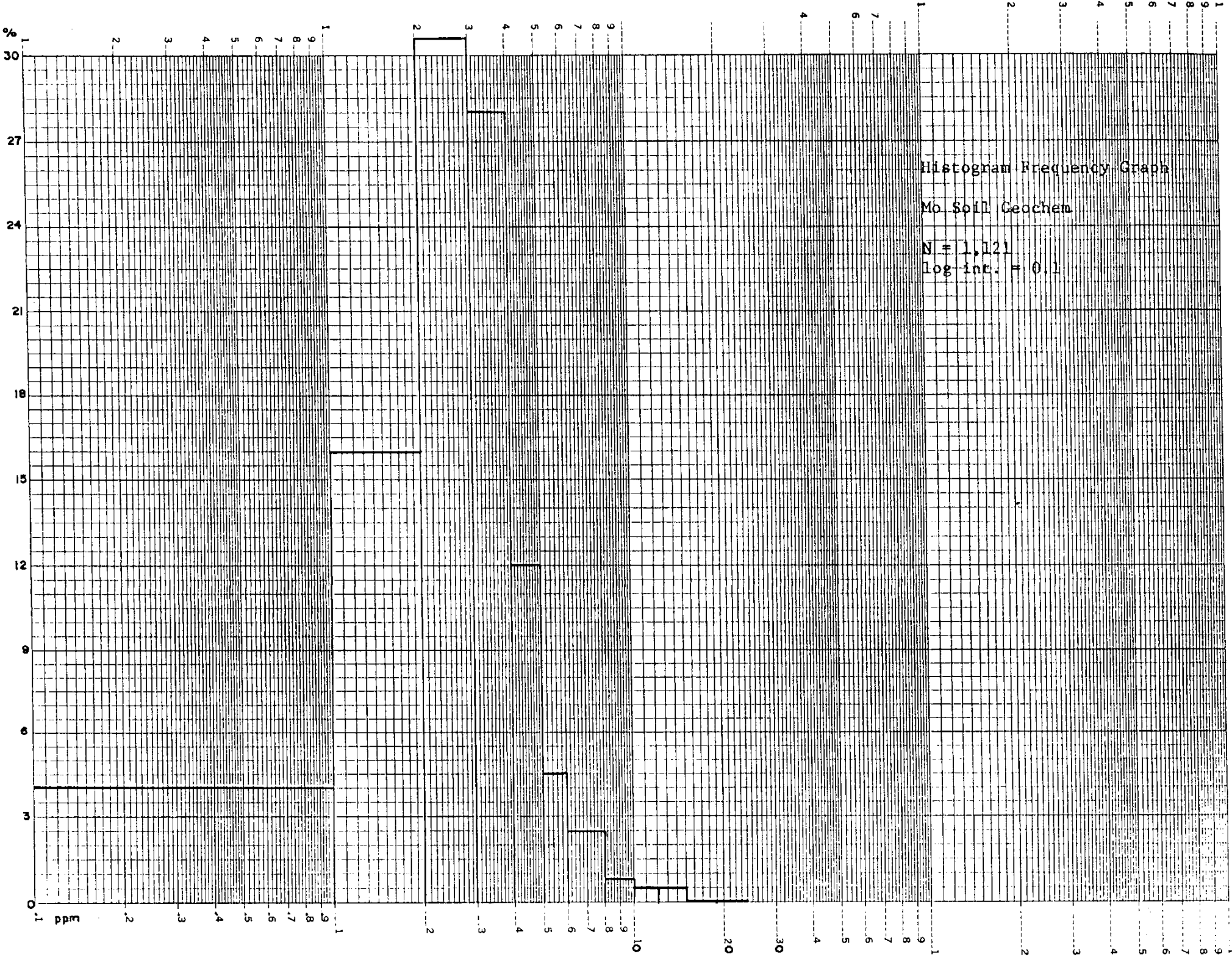


Figure 6

Figure 7



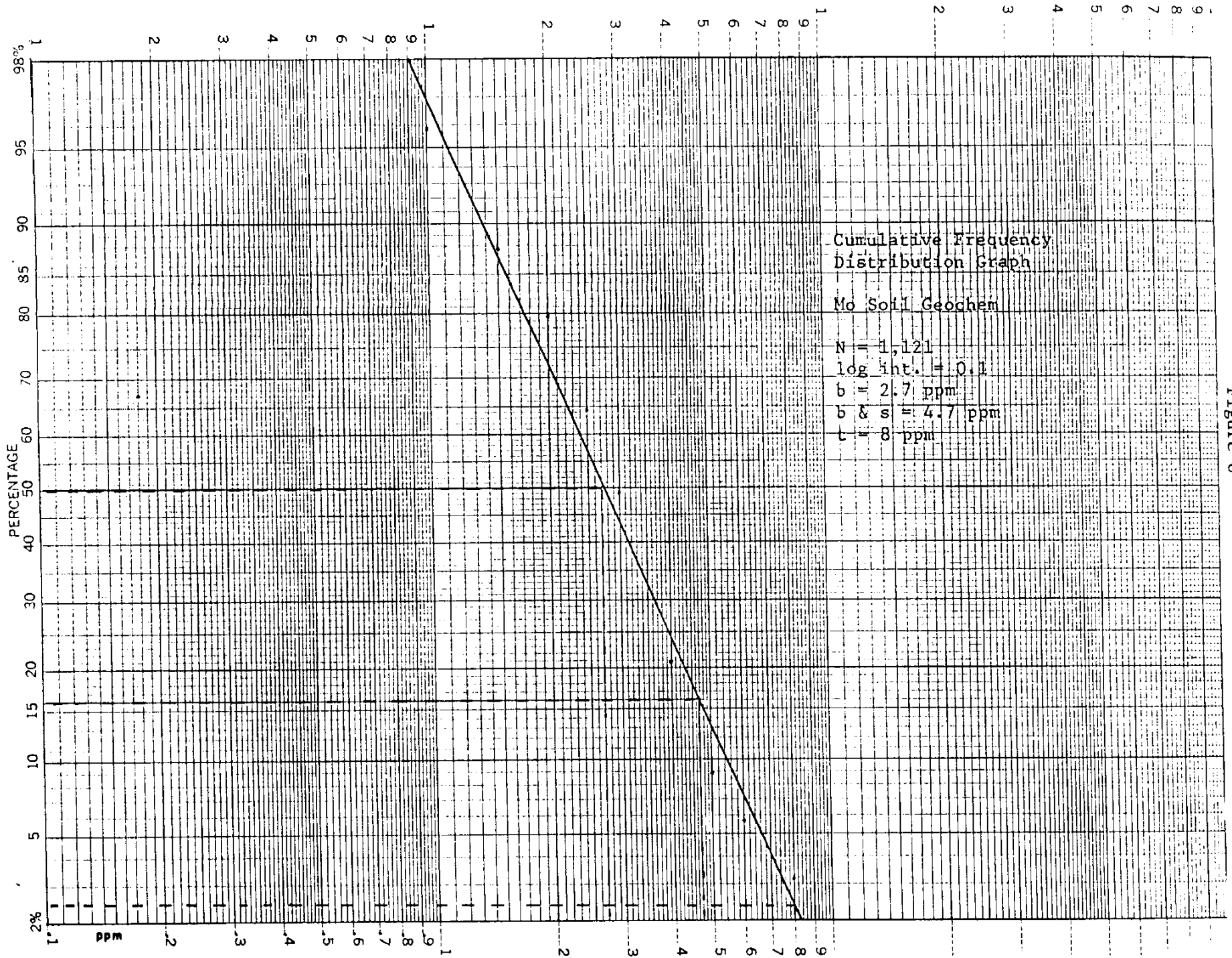


Figure 8

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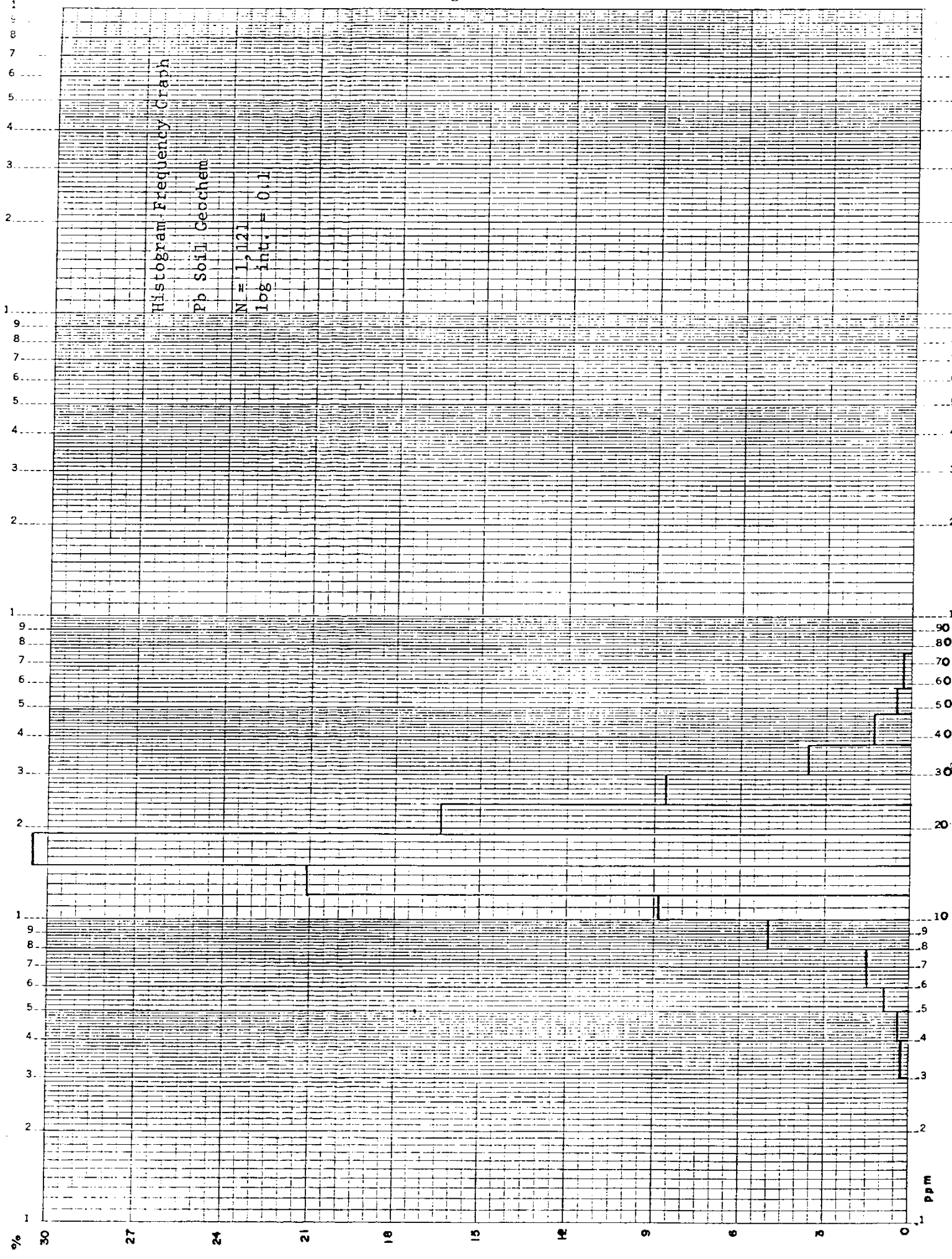
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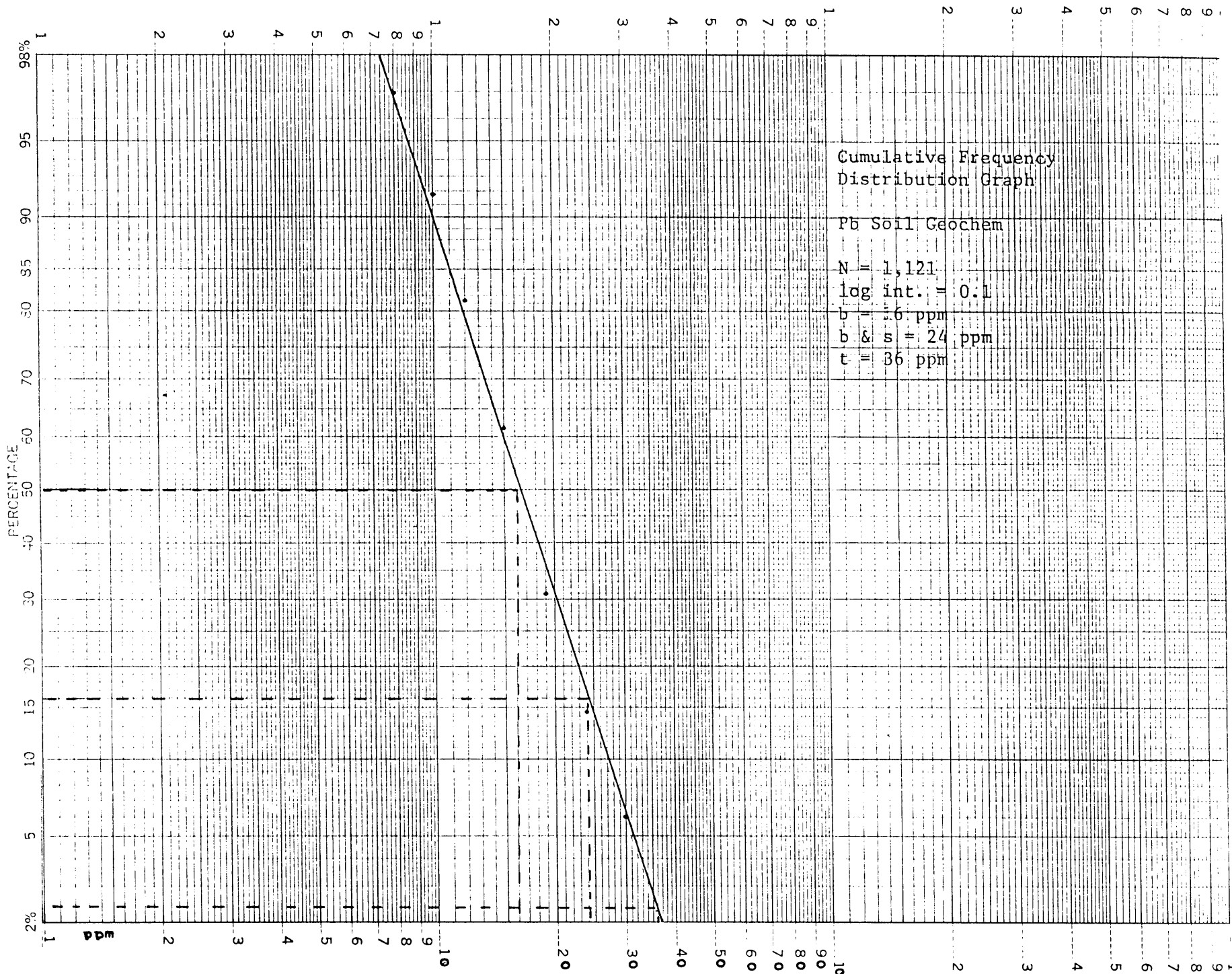


Figure 10

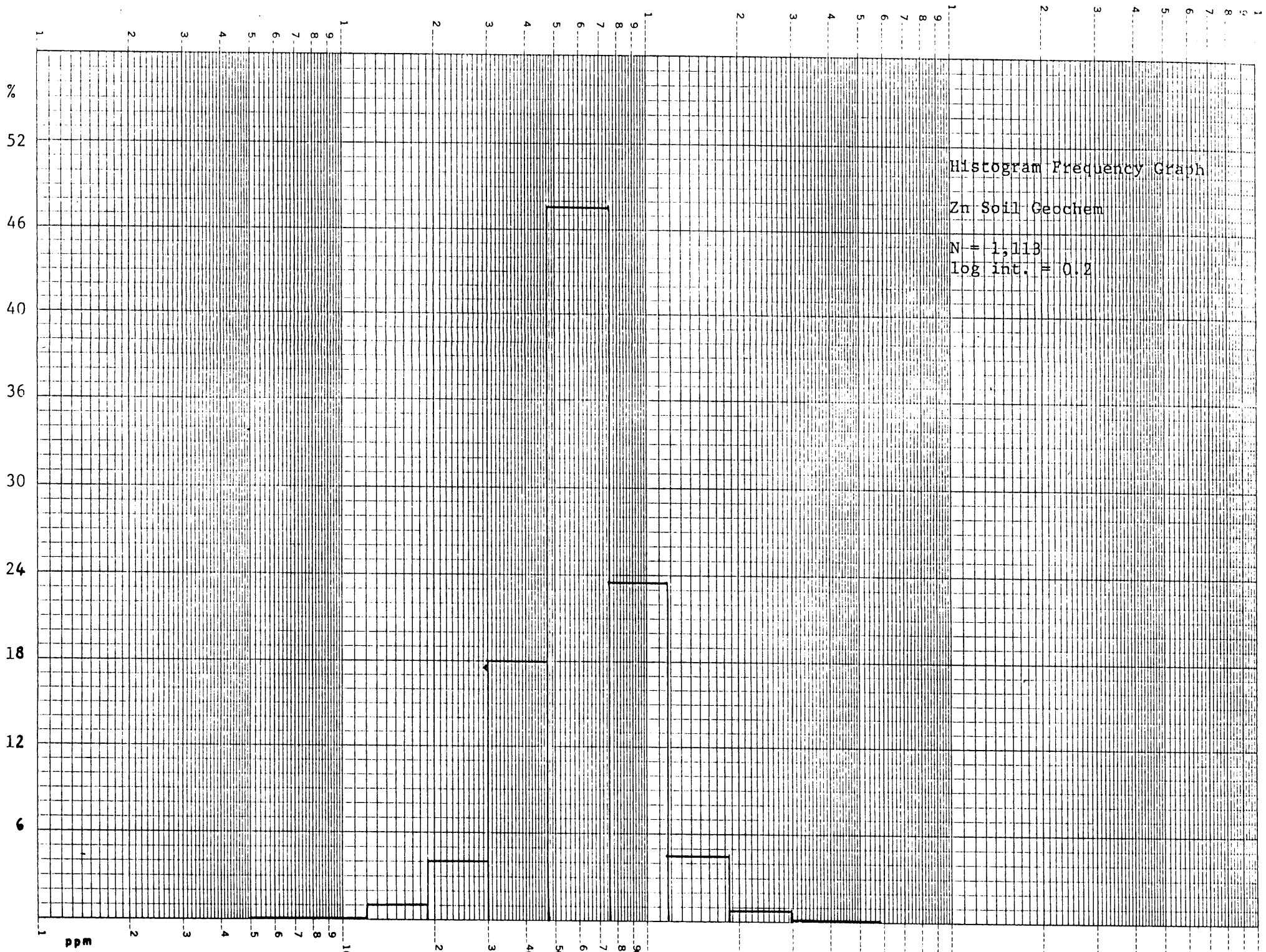
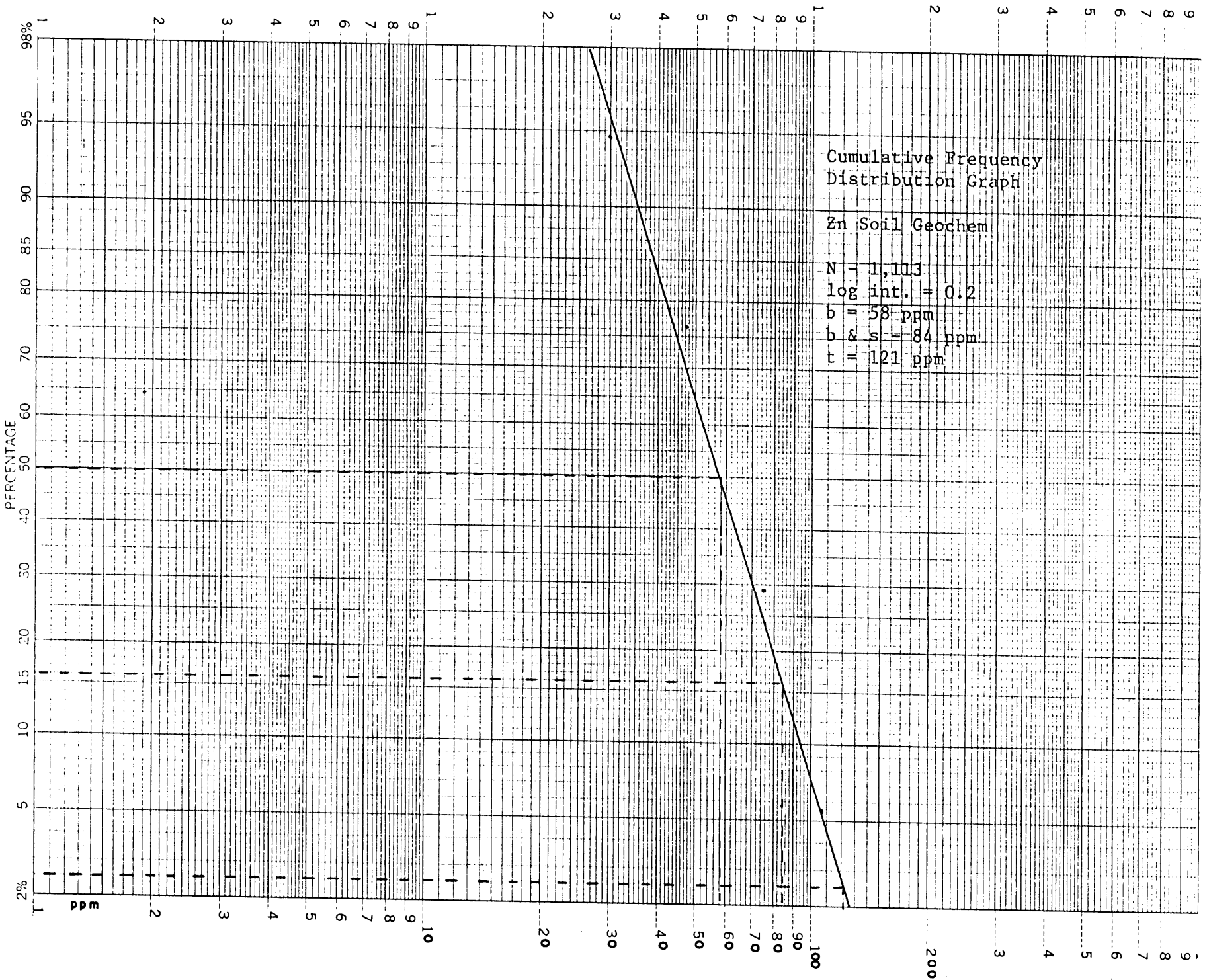


Figure 11

Figure 12



Outline of Results

Cu Geochem

- Strong Anomalies -
- 1) Line 20N to 23N from 0E to 1 + 00E
- over granodiorite bounded by large hill of limestone on east, and volcanic tuffs on west.
 - 2) Line 20N to 21N from 3 + 00W to 3 + 00W
- over granodiorite.
 - 3) Line 18N to 19N from 2 + 50E to 3 + 00E
- over granodiorite, southeast of large hill of limestone.
 - 4) Southwest corner of ALCO 6 claim
- over granodiorite.

Moderate Anomalies

- 1) Line B-10N to B-14N (2 areas) from B-0E to B-6 + 00E - over granodiorite to south of volcanic agglomerate unit.
- 2) Line B-72N to B-22N from B-7 + 00E to B-12E - over volcanic agglomerate unit.
- 3) Line B-12N, B-3 + 00W and B-4 + 50W
- over granodiorite.

Weaker Anomalies

- 1) Line 16N to 20N from 3 + 00W to 3 + 50W
- over granodiorite.
- 2) Isolated locations across property.

Mo Geochem

Moderate Anomalies

- 1) Line 18N to 19N from 0 + 50W to 2 + 00W
- over granodiorite.
- 2) Line 18N to 19N from 0E to 5 + 00E
- over and bounding large hill of limestone, specifically L21N from 0 + 50E to 1 + 00E → immediately west of limestone (over granodiorite) and L18N to 19N at 2 + 50E → southeast of limestone unit (in granodiorite).
- 3) Line 19N to 24N from 3 + 00W to 4 + 00W
- over granodiorite.

- 4) Isolated locations across property
ie: L21N at 2 + 00E - over volcanic
tuff, LB-10N at 7 + 00E - over grano-
diorite, L23N at 1 + 50E - near contact
of granodiorite and volcanic agglomerate.
- 5) Southwest corner of ALCO 6 claim over
granodiorite.

Weaker Anomalies 1) Isolated locations across property.

Pb Geochem

Lead soil values across the property are generally low, and occur in isolated patches. The largest anomalies (areal extent) occur in the eastern portion of the ALCO claim over the Valhalla granites.

Zn Geochem

Zinc values are also low across the property. The strongest anomalies occur:

- 1) Line 18N to 22N from 1 + 00E to 5 + 00E - over and bounding large limestone outcrop.
- 2) Eastern portion of ALCO claim over the Valhalla granites.
- 3) North end of property over the volcanic agglomerate unit.

Conclusions

Cu and Mo soil geochem anomalies appear to be strongest over the granodiorite unit, especially between Burrell and Nicoll Creeks from line 18N to line 23N. Three specific zones within this area have been outlined by roughly, corresponding Cu - Mo anomalies.

These are:

- 1) Line 20N to 23N from 0E to 2 + 00E.
- 2) Line 20N to 21N from 3 + 00W to 4 + 00W.
- 3) Line 18N to 19N from 0E to 5 + 00E.

A separate Mo anomaly also occurs within this general area along lines 18N to 19N from 0 + 50W to 2 + 00W. A relatively isolated, combined Cu - Mo anomaly appears to be taking form in the southwest corner of the property, but there is not yet enough data to substantiate its extent.

Both Pb and Zn geochem soil values are relatively weak across the property and appear to be more extensive over the granites in the eastern portion of the property.

c) Geological Survey

1) Introduction

The geological survey over the Alco property was initiated during the May 17th to May 20th, 1980 period and was completed during the period of October 14th to October 23rd, 1980. The observed lithologies and mineral occurrences have been drafted on a map on the scale of 1:7,500.

Subsequently, the area of strongest mineralization, and its lithologies, alteration types and mineral occurrences, have been drafted on the scale of 1:2,000.

2) Geology

The area east of Nicoll Creek is underlain predominantly by gneissic granites, referred to as the Valhalla granites (Little, 1962). Granodiorite of the Nelson Group predominates to the west of Nicoll Creek. This unit has intruded limestones of the Anarchist Group, resulting in widespread skarnification and pyritization of these sediments. The largest area of limestones occurs

to the east of the OE baseline from 19N to 22N. Limestone is also present as remnant pods throughout the granodiorite between Burrell and Nicoll Creeks from 12N to 20N.

Amphibolite and gabbro units occur throughout the granodiorite in several places, the largest area being along either side of Burrell Creek logging road at the extreme north end of the property. Small scattered outcrops of amphibolite also occur along Burrell Creek logging road between 19 and 20 km. The relationship of this unit to other nearby lithologies is not certain, but it appears to interfinger with granodiorite and may be tectonically related to this unit.

A small syenite plug intrudes the granodiorite at the north end of the ALCO claim adjacent to Burrell Creek logging road.

The northern half of the ALCO 5 claim and the northwest half of the ALCO claim is covered by extensive flows of volcanic agglomerate. Tuff and andesite units related to, and in gradational contact with, the volcanic agglomerate, overlie and intersect granodiorite outcrops in the south.

3) Mineralization

Mineralization over the Alco property appears to be confined largely to fractures within altered granodiorite. Fractures of variable directions are often coated with malachite and chalcopryrite and sometimes minor amounts of molybdenite, pyrite and azurite. Few iron-stained zones and quartz veins also exhibit Cu, Mo mineralization. One galena, chalcopryrite,

pyrite showing occurs within the granodiorite at B-4N - 17 + 00W along the Union Mine road.

Weak pyrite, chalcopyrite and molybdenite has been documented in a few locations throughout the amphibolite-gabbro unit. The strongest mineralization in this unit is found between 21 and 22 km on the Burrell Creek logging road.

Skarnification and pyritization is common throughout limestone outcrops. Weak malachite mineralization is also found along quartz veins cutting through the limestones at 21N - 1 + 00E.

4) Alteration

Propylitic alteration, characterized by calcite-epidote-chlorite mineral assemblages, is common throughout the granodiorite underlying the Alco property. Numerous areas of phyllic alteration (quartz-sericite-pyrite) are also present over the property. Argillic alteration (quartz-kaolinite-chlorite) is not well defined and has been identified in only a few locations. Mineralization appears to be more abundant within areas of moderate to strong propylitic and phyllic alteration.

5) Conclusions

The area of strongest mineralization is confined to the Nelson granodiorite, between the Union Mine road and Nicoll Creek. This zone forms an elongate structure, stretching NNW for approximately 1,000 metres, exhibiting an average width of

400 metres. Mineralization of chalcopyrite, malachite and minor amounts of molybdenite generally occur along fractures within the granodiorite.

References:

Drysdale, C.W., 1915, Geology of Franklin Mining Camp, British Columbia: Canada Dept. of Mines Mem. 56.

Little, H.W., 1957, Kettle River (East Half): G.S.C. Prelim. Map 6-1957.

Little, H.W., 1960, Nelson Map - Area, West Half, British Columbia: G.S.C. Mem. 308.

Little, H.W., 1962, Geological Map of British Columbia: G.S.C. Map 932 A.

McCance, J.A., 1976.

Norman, G.W.H., 1969, Geological Report on the Bear-Doe Group, Franklin District: B.C. Dept. of Mines and Pet. Resources Assessment Rpt. 1845.

Reesor, J.E., 1965, Structural Evolution and Plutonism in Valhalla Gneiss Complex, British Columbia: G.S.C. Bull. 129.

APPENDICIES

PREPARATION of SOILS and SILTS for GEOCHEMICAL ANALYSIS

1. Empty soil sample into the pan and then place the sample packet into the pan with the sample.
2. Place the pan containing the sample into the oven (Temp=105 C) and leave until dry approx. 2 hours.
3. Remove from the oven when dry and remove rocks and twigs etc.
4. Break up the clay lumps with a rubber bung and then transfer the sample to an 80 mesh screen.
5. Screen approx. 50 - 100 grams of sample through the screen and transfer to the original packet and seal.
6. Discard the +80 mesh fraction of the sample.

ANALYSIS by A.A. for Cu, Pb, Zn, Ag and Mo.

1. Weigh 2.00 GM on the top pan balance into a 150 ML beaker (check that beaker No. is the same as written on work sheets)
2. Add 15 MLS Nitric Acid, cover with watchglass and heat on low heat until brown Nitrous fumes are gone.
3. Remove beakers from hot plate, cool for 5 minutes.
4. Add 10 ML Hydrochloric Acid. Place on hot plate. When all brown Nitrous fumes are gone, remove watchglasses and take just to dryness on a low plate.
5. Remove from plate, cool, add 20 MLS distilled water, 5 MLS Conc. Hydrochloric Acid and boil salts into solution.
6. Cool in water bath, when cold transfer to 100 MLS Volumetric flask, add 1 MLS Superfloc solution and dilute to 100 MLS with distilled water.
7. Mix thoroughly and then transfer to original beaker.
8. When all samples ready, transfer to A.A. room for reading.
9. If Mo is required, 10.00 MLS of this solution is transferred to a test tube and 1.00 MLS of ALC_3 solution added.

Statement of Costs

Geochemical Survey

Assaying

1,120 soils, 7 silts and 5 rocks assayed for
Cu, Mo, Pb, Zn @ \$7.00/sample \$7,924.00

Geological Survey

Labour

1 Geologist - 10 days @ \$90.00/day 900.00
1 Assistant - 10 days @ \$60.00/day 600.00

Food

\$9.00/day/man x 10 days x 2 men 180.00

Transportation

Truck Rental - Two 4 x 4's @ \$16.57/day/truck
x 10 days 331.40
Fuel & maintenance - \$10.00/day/vehicle x 2
trucks x 10 days 200.00

Field Camp Expenses

Propane 43.12

Report Preparation

Drafting - 8 days @ \$90.00/day 720.00
Report - 2 days @ \$90.00/day 180.00
Typing - 1 day @ \$60.00/day 60.00

\$11,138.52

Cost Breakdown

Geochem - no. of line km over ALCO A group = 40.65 = 67% 5,309.08
no. of line km over ALCO B group = 20.00 = 33% 2,614.92
60.65 100% 7,924.00

Geology - ALCO A - 4 days = 40% of 3,214.52 1,285.81
ALCO B - 4.5 days = 45% of 3,214.52 1,446.53
ALCO 7 & 8 - 1.5 days = 15% of 3,214.52 482.18
10 days 100% 3,214.52

ALCO A - \$6,594.89 to be applied - \$4,000 to ALCO claim - 1 yr.

\$2,000 to ALCO 4 claim - 2 yrs.

ALCO B - \$4,061.45 to be applied - \$3,200 to ALCO 5 claim - 2 yrs.

\$800 to ALCO 6 claim - 1 yr.

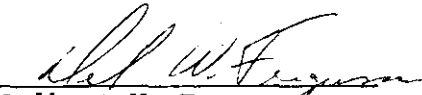
ALCO 7 & 8 - \$482.18 to be applied - \$200 to ALCO 7 claim - 2 yrs.

\$200 to ALCO 8 claim - 2 yrs.

STATEMENT OF QUALIFICATIONS

I, Delbert W. Ferguson of Peachland, Province of British Columbia, do certify that:

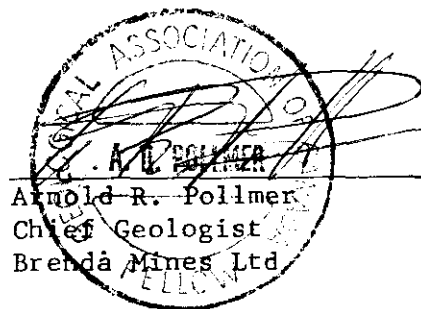
- 1) I am presently employed as an exploration geologist by Brenda Mines Ltd.
- 2) I am a graduate of the University of Western Ontario with an Honours Bachelor of Science Degree in geology (1979).

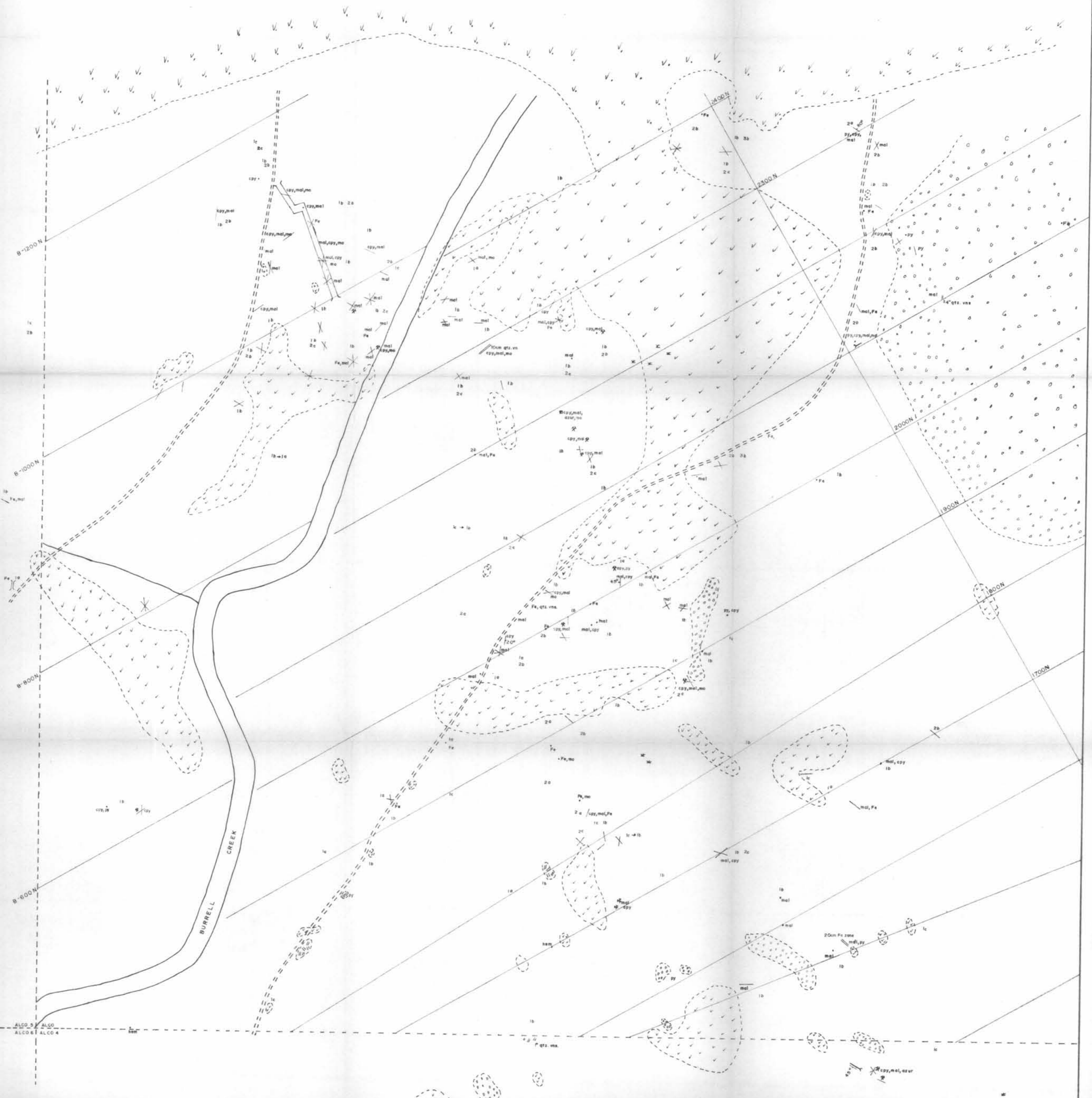

Delbert W. Ferguson
Exploration Geologist
Brenda Mines Ltd.

STATEMENT of QUALIFICATIONS

I, Arnold R. Pollmer of Peachland, Province of British Columbia,
do certify that:

- 1) I have been employed as a geologist by Noranda Mines Limited from December 1973 to June 1977; I am presently employed as the chief geologist by Brenda Mines Ltd.
- 2) I am a graduate of the University of Wisconsin with a Bachelor of Science Degree in Geology (1972).
- 3) I am a member of the Canadian Institute of Mining and Metallurgy.
- 4) I am a fellow of the Geological Association of Canada.





LEGEND

ROCK TYPES

- Volcanic agglomerate
- Volcanic tuffs and andesite
- Amphibolite and Gabbro
- Granodiorite
- Limestone

ALTERATION

- 1 PROPYLITIC - 1a strong 1b moderate 1c weak
- 2 PHYLIC - 2a strong 2b moderate 2c weak
- 3 ARGILLIC - 3a strong 3b moderate 3c weak

MINERALIZATION

- cpy chalcopyrite
- py pyrite
- mo molybdenite
- mal malachite
- azur azurite
- hem hematite
- Fe iron stain

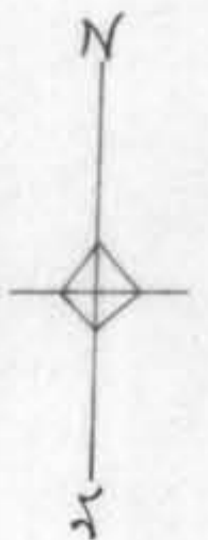
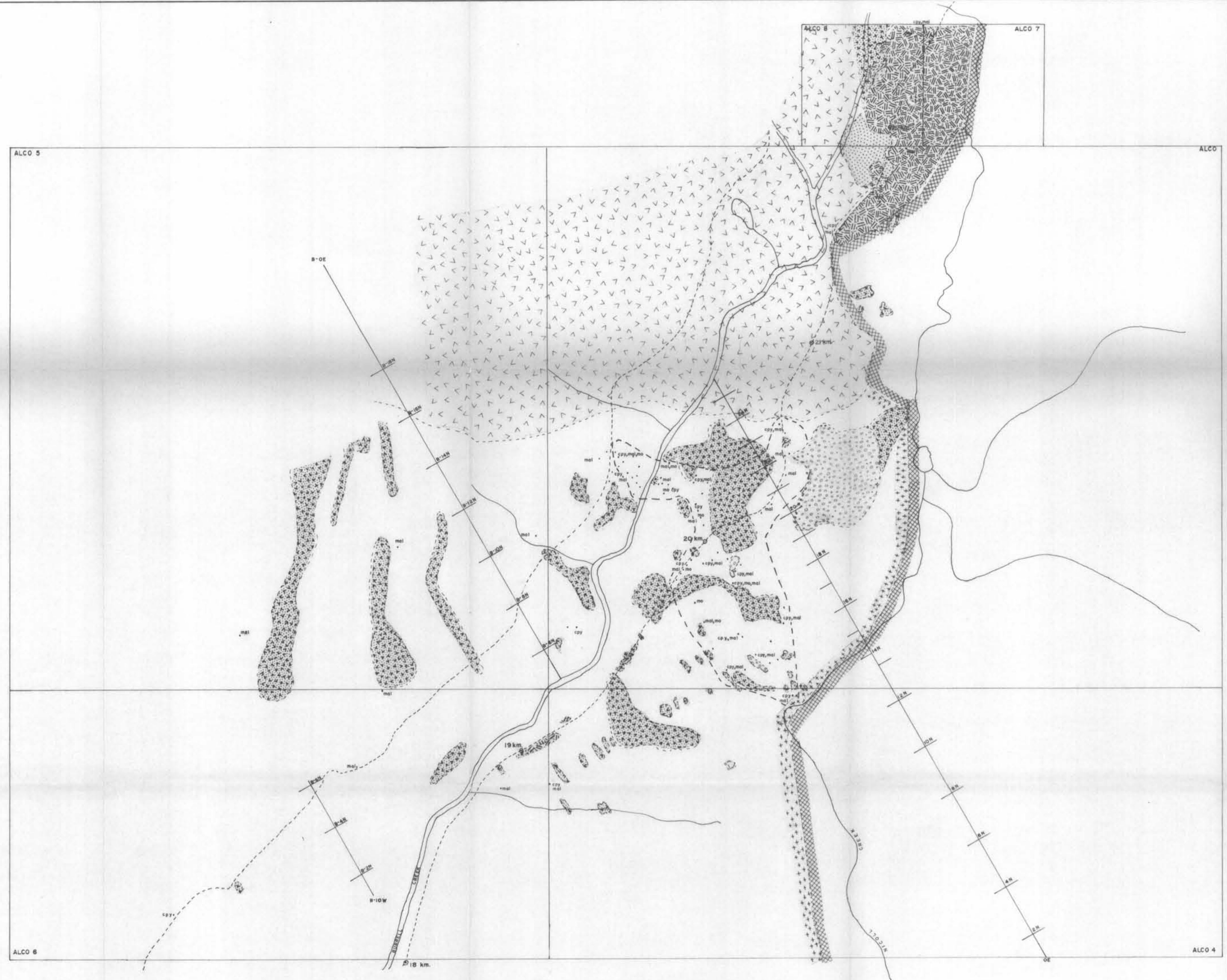
SYMBOLS

- vein
- strike of fractures
- strike & dip of fractures
- old diggings
- vertical shaft
- adit
- trench

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8610
NO.



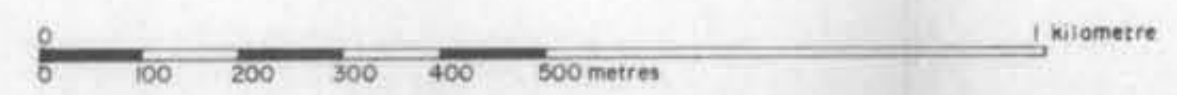
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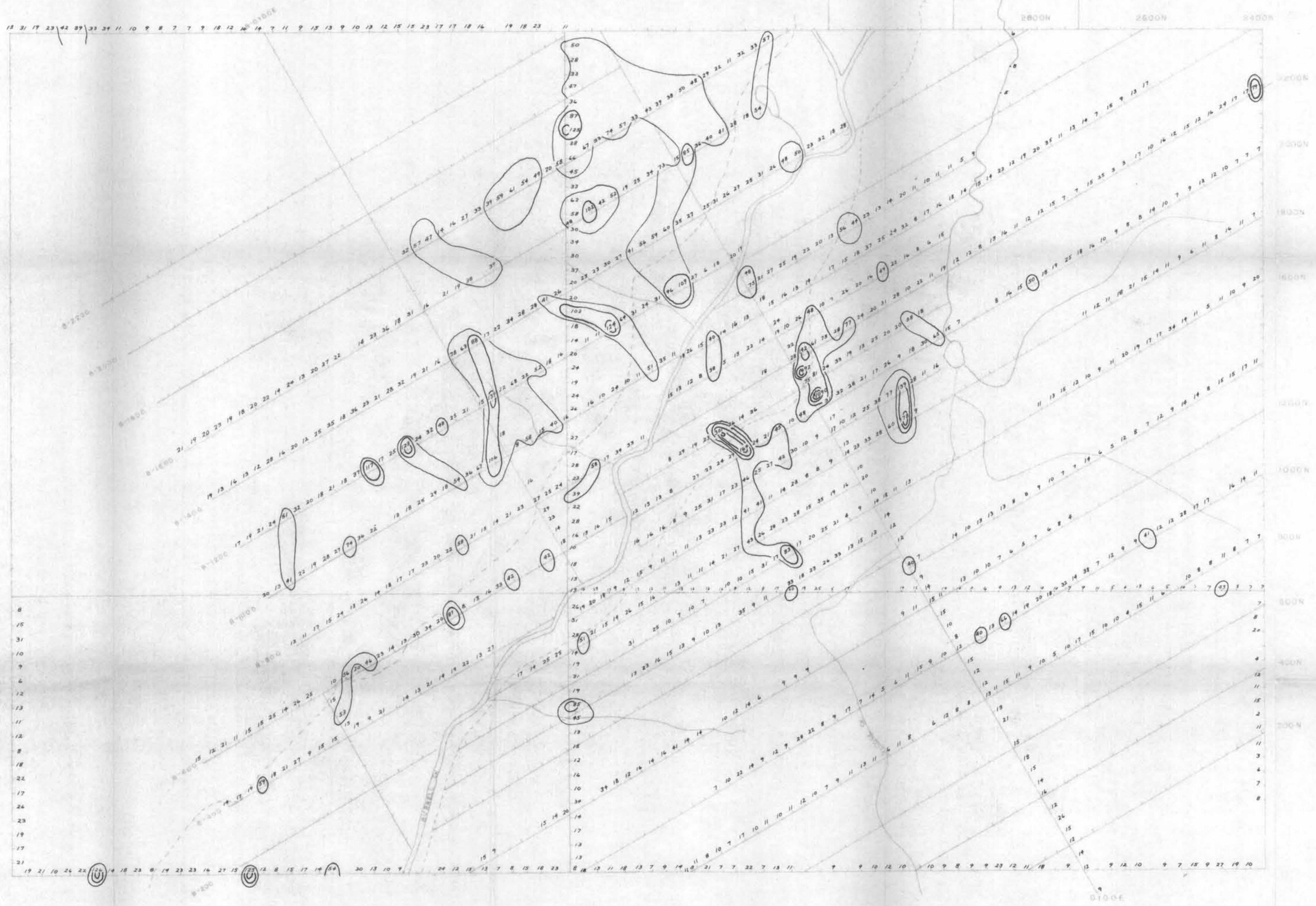
LEGEND

- Volcanic agglomerate
- Volcanic tuffs and andesite
- Syenite
- Amphibolite and Gabbro
- Granite
- Granodiorite
- Limestone
- area of strongest mineralization
- chalcopyrite
- malachite
- molybdenite

MINERAL RESOURCES BRANCH
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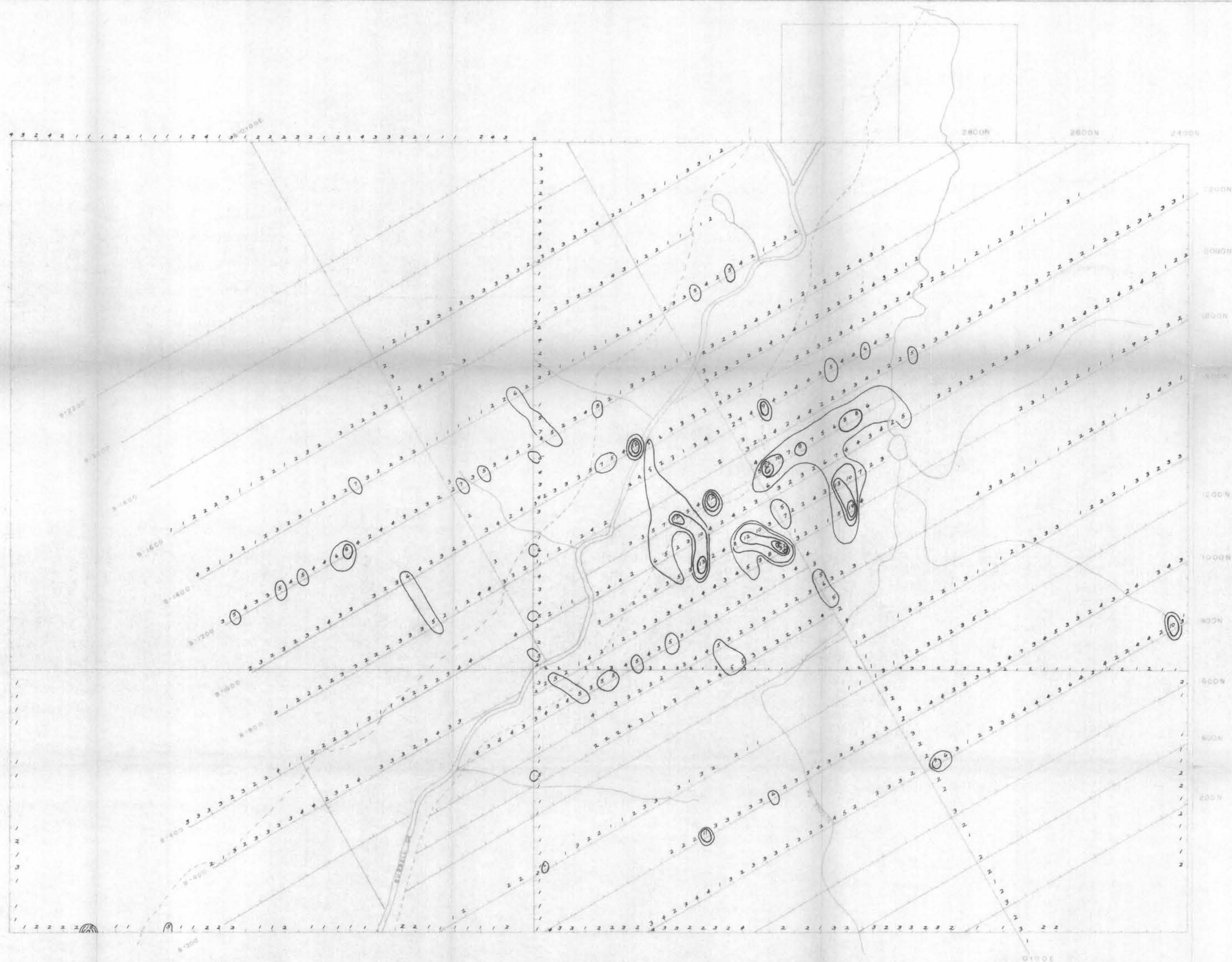


LEGEND
 ——— anomalous (> 38 ppm)
 - - - high anomalous (> 80 ppm)

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BRENDA MINES LTD. EXPLORATION GROUP		
Date:	BLAD PROPERTY	GEOCHEM CU
Drawn:		
Scale:	1:2500	PLAN & SECTION



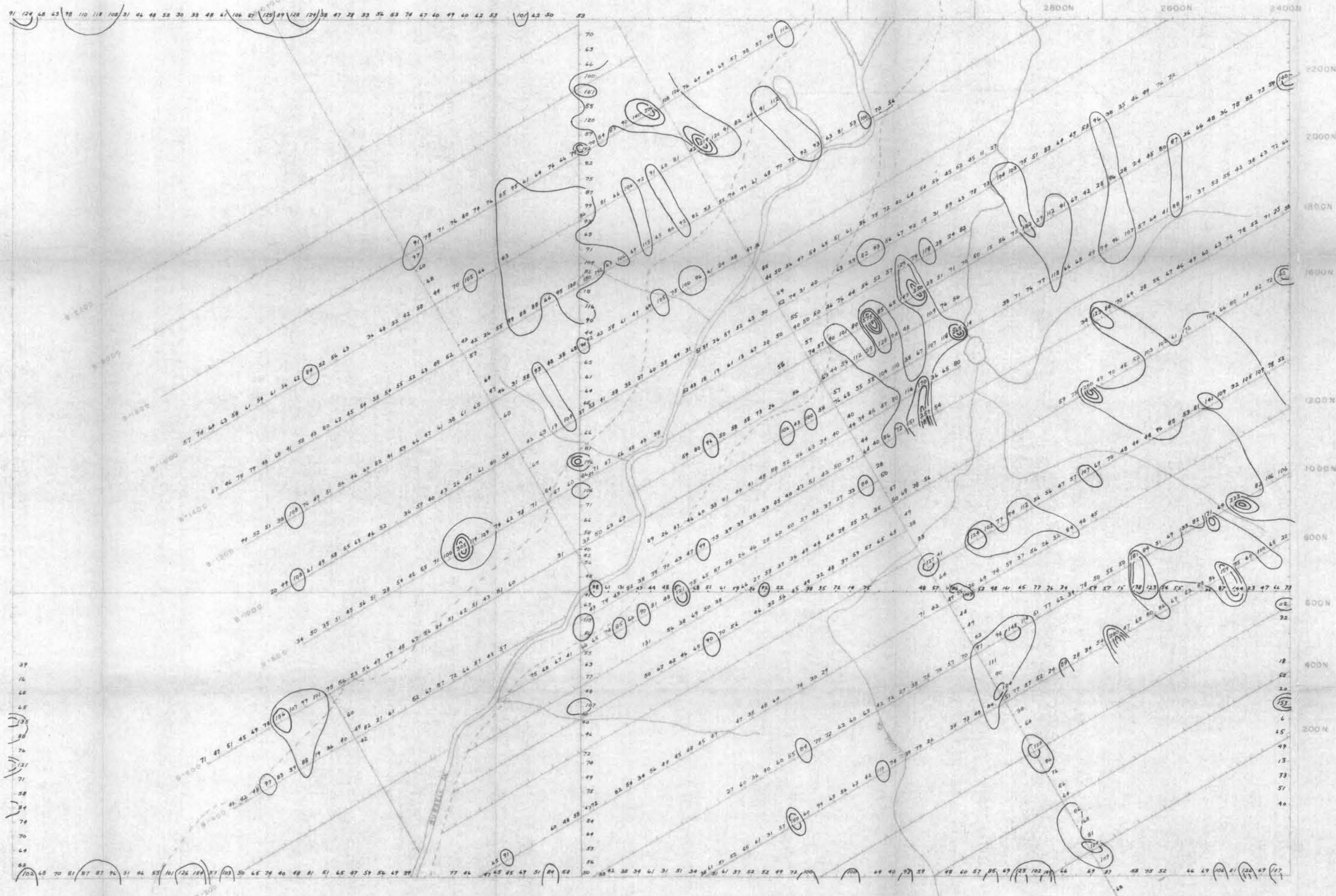


LEGEND
 ~ anomalous (> 5 ppm)
 ~ high anomalous (> 8 ppm)

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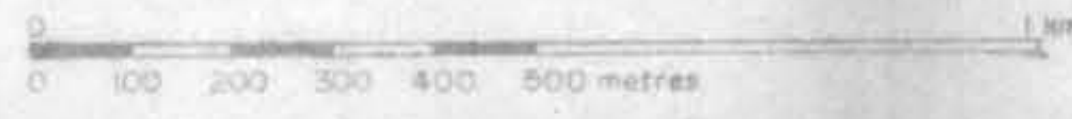
BRENDA MINES LTD EXPLORATION GROUP	
Plan:	ALCO PROPERTY GEOCHEM No
Date:	
Scale:	1:500

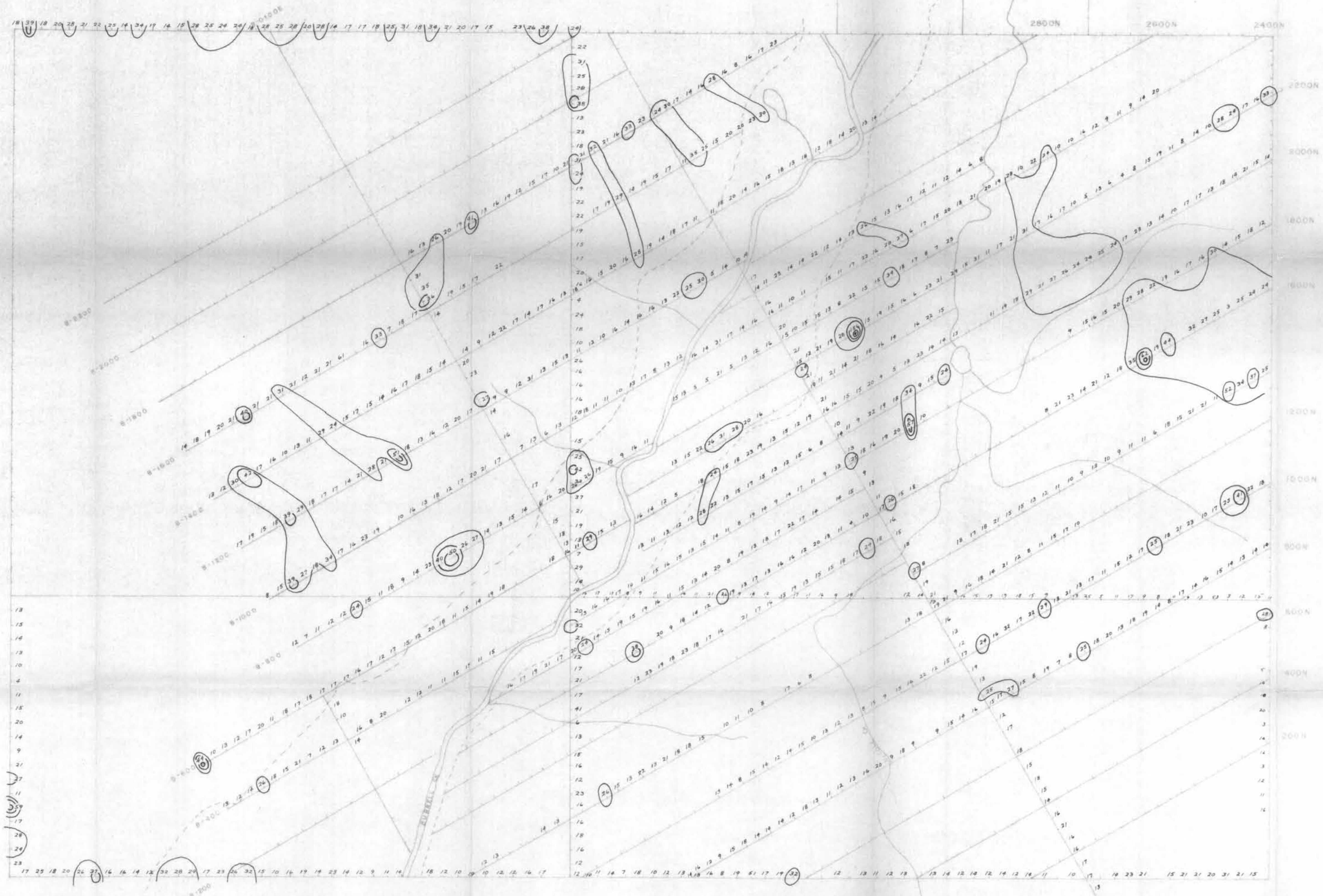


LEGEND
 ~ anomalous (> 84 ppm)
 ~ high anomalous (> 121 ppm)

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 NO.

BRENDA MINES LTD. EXPLORATION GROUP	
Sheet	ALCO PROPERTY GEOCHEM 2a
Check	
Scale	1:2500 FILE NO. B-90-25





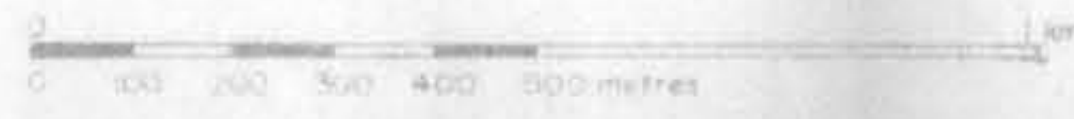
LEGEND

~ anomalous (> 24 ppm)

~ high anomalous (> 36 ppm)

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Drawn:	ALCO PROPERTY	GEOCHEM	Pb
Scale:	1:5000	Sheet:	B-97-23