BRENDA MINES LTD.
EXPLORATION GROUP

GEOLOGICAL and GEOCHEMICAL REPORT

on the

NORTH BRENDA PROPERTY

Marn 10, 11, Locker 1, 2 Claims

Osoyoos Mining District

Lat. 49° 54', Long. 120° 04'

N.T.S. 92H/16
82E/13

A.R. Pollmer

Chief Geologist

January, 1982

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I INTRODUCTION

The area which falls directly north of the Brenda Mines operation is known as the North Brenda property. It totals 94 claims units which extends from the mine northward, almost to Pennask Lake. This area has had extensive exploration work done during 1965 to 1972 by Noranda Exploration Company. The exploration work done consisted of grass roots surveys, blast holes, trenching and some drilling. The presence of the Brenda deposit is what focused the attention to this region, for it was felt that there could be a possibility of a continuation in mineralization similar to the established deposit.

The most recent exploration surveys were done to familarize ourselves with the area geology and to obtain a multi-element soil distribution. The area described in this report covers only a portion of the entire property, and exploration surveys were conducted in areas which had only a cursory evaluation done in previous examinations. The work commenced on August 16, 1981 and continued into early September. A five man crew, operated as two man field teams, one soil sampling, the other more senior partner did the geological mapping.

II PROPERTY DESCRIPTION

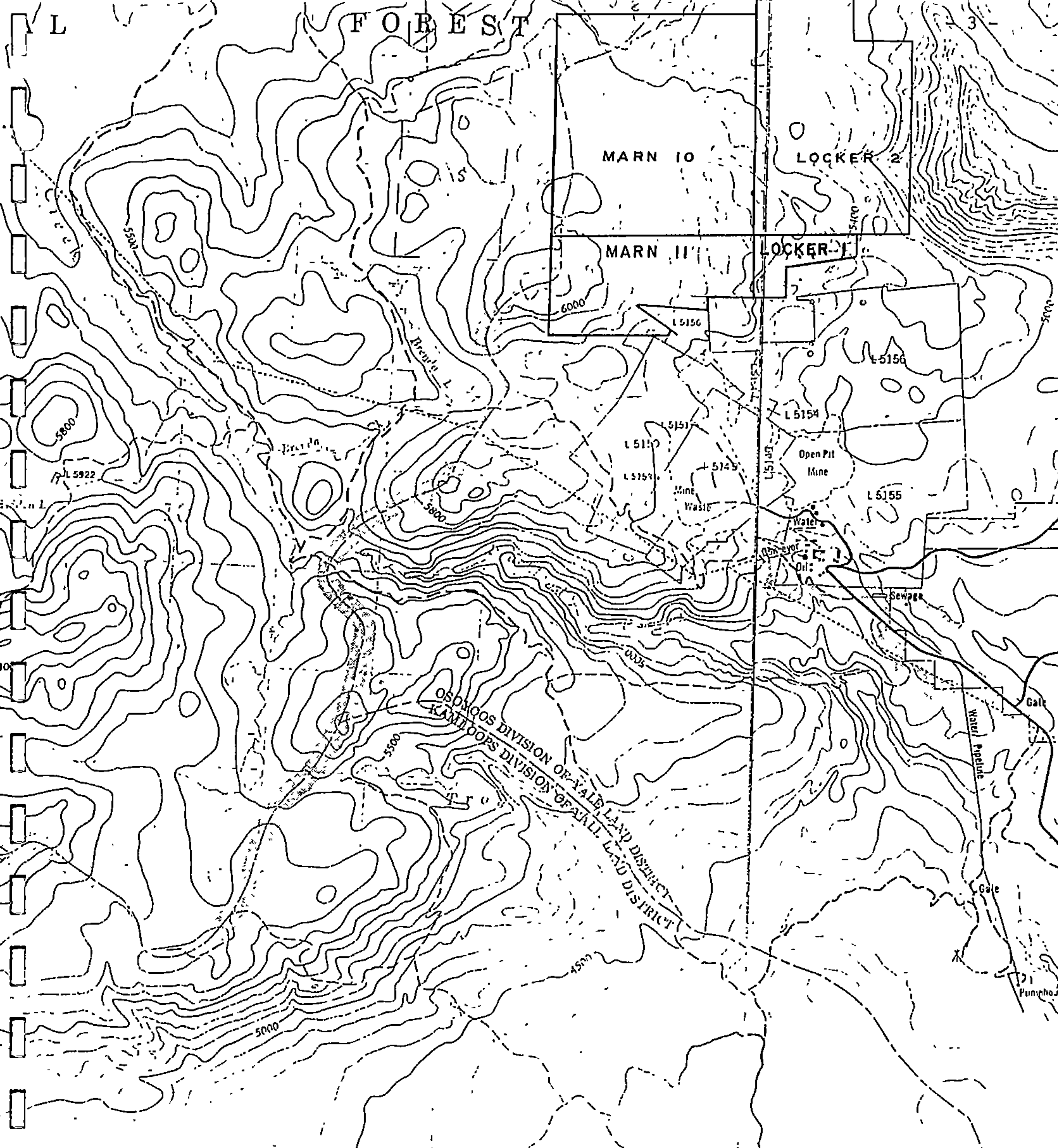
a) Location and Access

The North Brenda property is located due west of Kelowna, just north of the Brenda Mines open pit operation. It is bounded to the east by Trepanier Creek, extends northward for a distance of 8.5 kilometers, almost reaching Pennask Lake near the northwest corner.

Access is via a good gravel road which bypasses the mine site and continues north to Brenda Lake. Just past the lake is a small jeep trail which leads into the property. This road is accessible only during the summer and fall for it is not plowed during the winter months. Another access route is via the mine, which is restricted use only. Generally, road access into the central portion of the property is poor, for the main access road which cuts through the property has deteriorated to the point where four wheel drive units cannot navigate through.

b) Topography and Vegetation

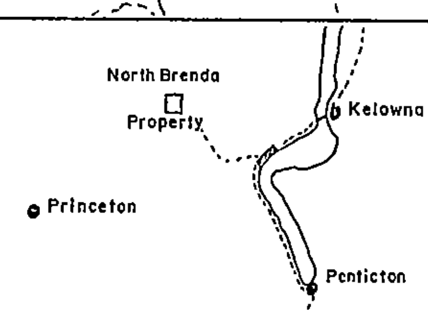
The North Brenda claims form the boundary between the Nicola and Okanagan watersheds. Mature, but small stands of fir, spruce and pine are abundant throughout most of the property. In the north, northwestern areas are a series of small grass meadows and swamps. Directly north of the mine site are several steep cliffs and abundant rock exposures, whereas the more central and northern regions have only few outcrops.



Location Map

Scale: 1:50,000

Figure 1



c) Claim Inventory

Claim Name	Record No.	Units	Record Date	Mining District
Marn 7	890	12	May 29/89	Nicola
Marn 8	891	15	May 29/80	Nicola
Marn 9	892	20	May 29/80	Nicola
Marn 10	1200	20	Aug. 20/80	Osoyoos
Marn 11	1201	8	Aug. 20/80	Osoyoos
Locker 1	766	4	June 29/79	Osoyoos
Locker 2	767	15	June 29/79	Osoyoos

This report describes work done on the following claims: Marn 10, Marn 11, Locker 1 and Locker 2.

III WORK DONE

a) Grid Establishment

All grid lines on this property run north-south and are spaced at 100 meter intervals. These lines originate from the main baseline which is a cut picket line. Grid lines are run by compass bearing and marked with blazes and flagging. Line stations are marked every fifty meters. A total of 88.7 kilometers of line was cut.

b) Geochemical Surveys

Geochemical surveys are conducted on the grid system by sampling the B(f) soil horizon at each line station and on the baseline.

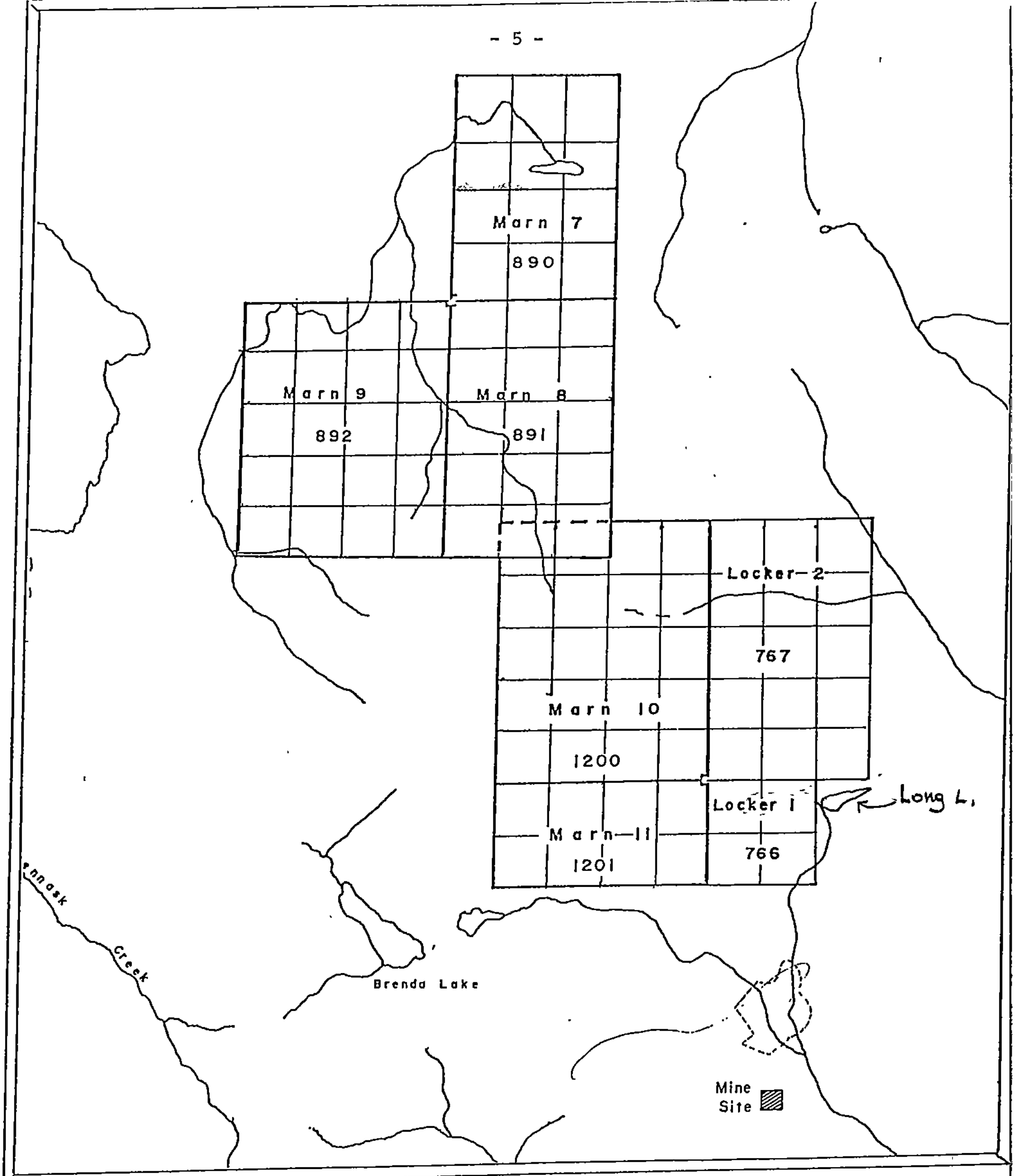


Figure 2

CLAIM MAP

Scale 1:50,000 Échelle

The soil type is noted when each sample is collected. All assaying was done in the Brenda Mines assay facilities with the procedure outlined in Appendix I. Determinations are made for the following elements: Mo, Cu, Pb, Zn, and precious metal contents are spot checked.

c) Geological Mapping

Geological mapping is done by senior student members and staff geologists. Geological traverses generally do not confine the mapping to the grid lines, but tend to follow the exposures using the grid as location tie-in points. In mapping of outcrops, lithology, alteration, structure and mineralization is noted. On the North Brenda property particular attention was paid to the fracture densities and veining orientation.

IV GEOLOGY

a) Regional Setting

The bulk of the property lies within the Pennask Batholith just east of where it comes in contact with the older Nicola group. As described by H.M. Rice, 1960, the Nicola consists predominantly of volcanics, mainly andesite and andesite porphyry, and minor metasediments , which were intruded by granodiorite, quartz diorite and diorite of the Pennask Batholith. This intrusive unit is part of the Coastal Intrusives and wraps around the Nicola at this point, and extends westward. Therefore, the Nicola appears as a large, tongue shaped body. On the extreme eastern extent of this unit, within the adjacent Pennask granodiorite, occurs the Brenda deposit.

Table of Formations

Era	Period or Epoch	Formation	Lithology
Cenozoic	Pleislocene and recent.		Glacial till, alluvial sand, gravel.
UNCONFORMABLE CONTACT			
Mesozoic	Jurassic or later.	Pennask Batholith (Coastal Intrusives)	Grey to red granodiorite, quartz diorite and diorite.
INTRUSIVE CONTACT			
	Upper Triassic	Nicola Group	Grey-green andesite, andesite flows, andesite porphyry. Minor argillite, quartzite.

2) Nicola Group

i) Volcanics: Andesite is dark green to buff green on weathered surfaces. In areas near the contact, this unit is slightly metamorphosed and displays a slight increase in pyrite. The largest area of exposure is within the area bounded by (L 00+00, 8+00W to 14+00W and to 4+00N). Minor amounts of mineralization present are specular hematite, pyrite and sphalerite. Several barren quartz veins were mapped, cutting the andesite.

ii) Metasediment: Argillite is the predominant rock type in this category and occurs primarily in the north-west corner of the property (L 14+00N). It is black to brown in colour, generally limonite stained and has a slaty cleavage. In areas, this unit is quite cal-careous.

iii) Quartz Biotite Schist: This unit can also be described as a schistose hornfel. It occurs as a marker unit outlining the contact region and occurs directly adjac-ent to the Pennask Batholith granodiorites. The texture variation between large to small mafic crystals appears as a function to how close to the contact the outcrop is. Exposures directly adjacent to the contact have much coarser textures, which appear to become finer grained away from the contact. No outcrop was located which showed the actual contact. In a number of places this unit is cut by barren quartz veins, aplite dykes and pegmatites.

3) Pennask Batholith

Although there are slight textural changes and minor compositional variations, for the most part the dominant rock type has been classified as a granodiorite. In some small areas this unit appears more as a quartz diorite, but this subdivision appears to have little or no effect on the mineralization. The granodiorite unit is the main host to fracture and vein mineralization. For the most part, this unit has an equal granular texture and appears very massive. Many of the outcrops are glacially polished.

Within the better mineralized areas in the granodiorite, alteration is present along fractures and veining only. The presence of secondary biotite along tight fractures and minor potassic flooding along quartz veins, is the only evidence of hydrothermal alteration on the property.

In the southern most region of the property and along the contact area, the granodiorite is moderately fractured. These fractures are very tight and can be seen only on close examination. Often associated with these fracture zones are small subvertical quartz veins which strike parallel to the dominant fracture set.

The mineralization found on the property is chalcopyrite and molybdenite. Both are hosted within the granodiorite unit and occur as either fracture coatings or within the quartz veins. Sub-vertical fractures and veining striking to the northeast are the best mineral host. Fractures lined with secondary biotite commonly host chalcopyrite and minor molybdenite. The better molybdenite is hosted within the quartz veins as small pods or rosetttes. The mineralization on the property is identical in occurrence to the Brenda deposit, except it lacks the continuity and frequency of veining and fracturing. The better zones of mineralization found were on the southern most portion of the property and on the west end of Long Lake.

V SOIL GEOCHEMICAL SURVEY

a) Soil Cover

Most of the area surveyed is covered with glacial till which generally doesn't exceed 10 meters in depth. On some areas of the property, outcrop is abundant and soil cover is minimal. Glacial tills are typical for the region, composed of grey clay and silt, mixed with small to large boulders. In the northwestern area are a number of small swamps and grassy marshes. In and surrounding these are a thick layer of organic soils.

b) Treatment of Results

A statistical presentation of molybdenite, copper, lead and zinc were made so as to better compare bulk characteristics of the geochemical data. The determinations made for precious metal content were not included, for values were only trace or not within detectable range. The four base metals determined were plotted and contoured on figures 12, 13, 14 and 15.

c) 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.

d) 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, its 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.

e) <u>Histogram</u>

The histogram used in preparing this report is a plot of the interval frequency vs. interval (see Figure 5). 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.

f) <u>Cumulative Frequency</u>

Cumulative frequency paper is generally constructed with a probability scale as the ordinate and a logarithmic scale as the abscissa (Figure 6). 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:

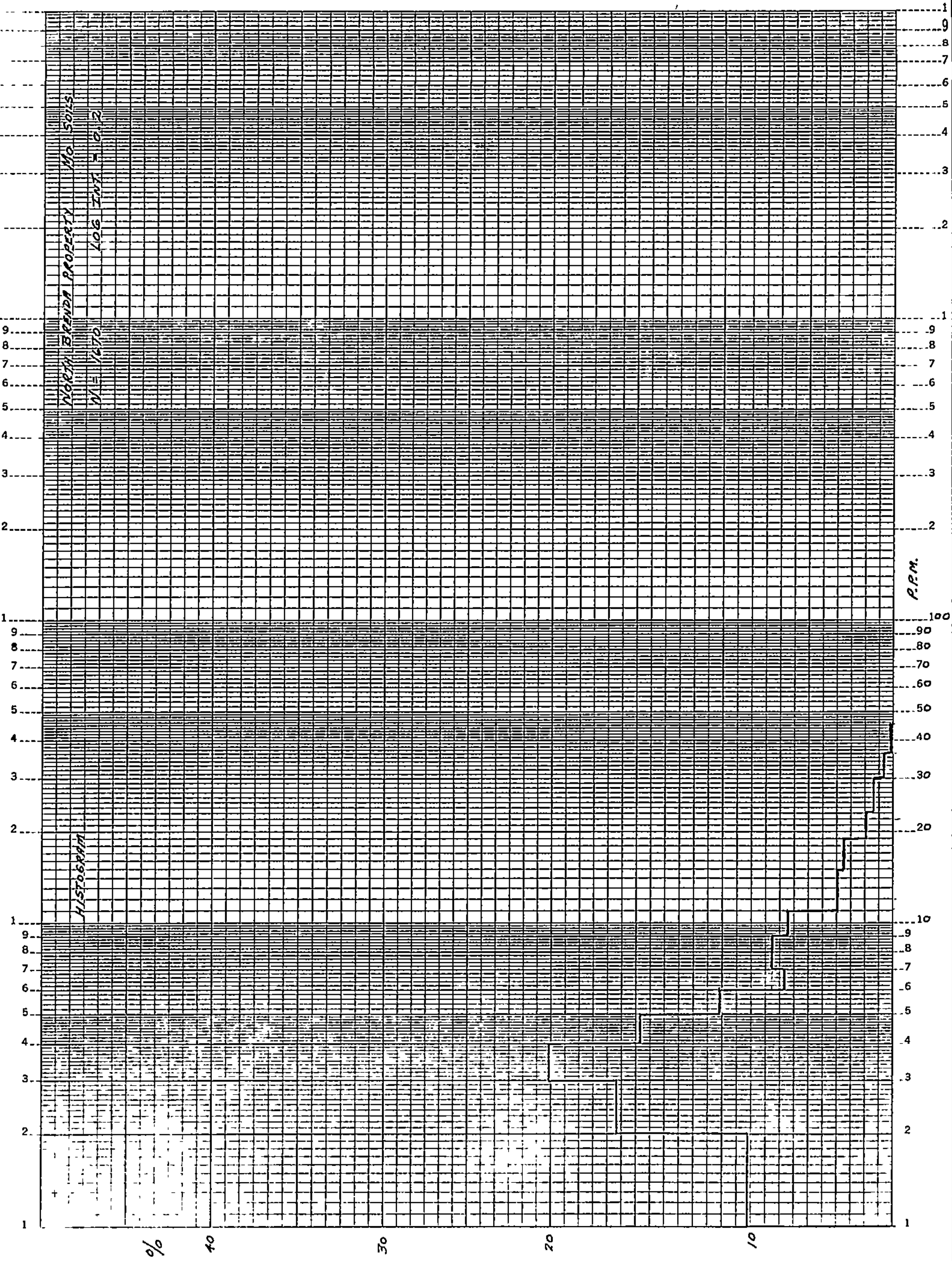
a) Geometric mean or background value (b) located by the intersection of the cumulative frequency curve at the population mean (50%). Trace intersection down to ppm scale.

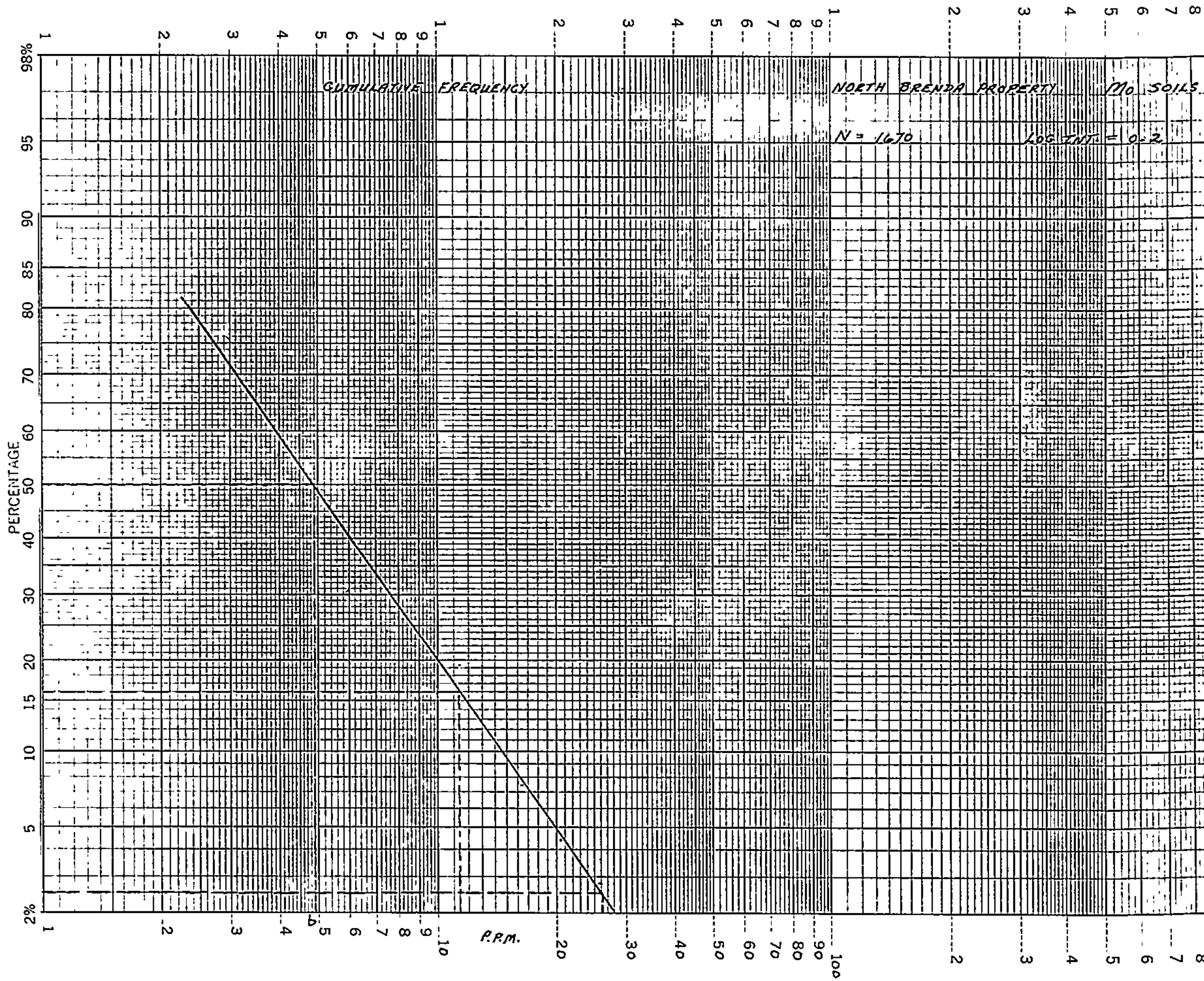
b) Low anomalous value (l) located by the intersection of the cumulative frequency curve at the 16%. Trace intersection down to ppm scale. The 16% line expresses the scatter of the values around the population mean, incorporating the addition of one standard deviation (s) to the mean.

c) 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.

46 5890


NORTH BRENDA PROPERTY   Mo SOILS
N = 1670   LOG INT. = 0.2
HISTOGRAM
P.P.M.
%
KEUFFEL & ESSER CO MADE IN U.S.A.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NORTH BRENDA PROPERTY
Mo SOILS
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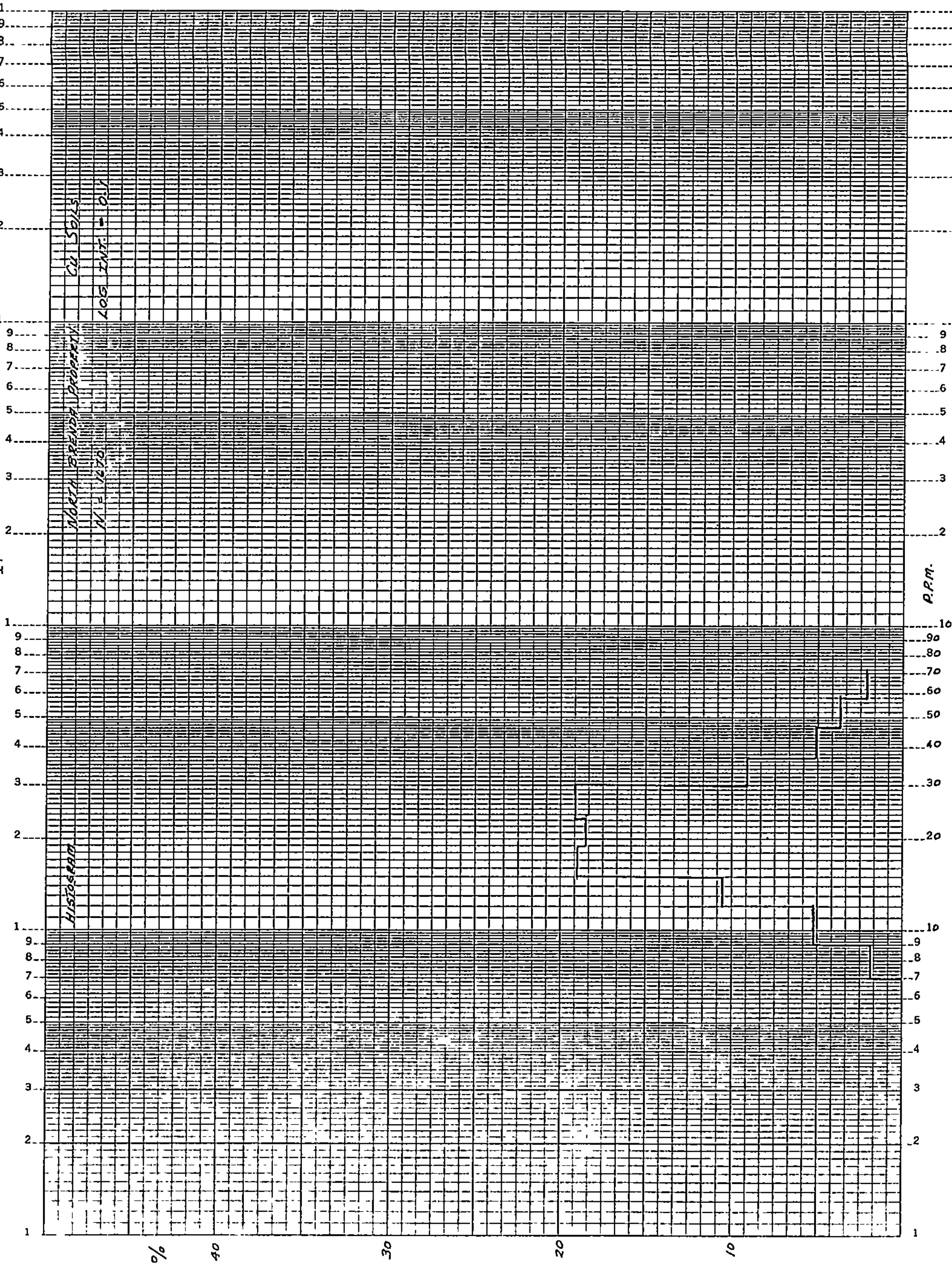
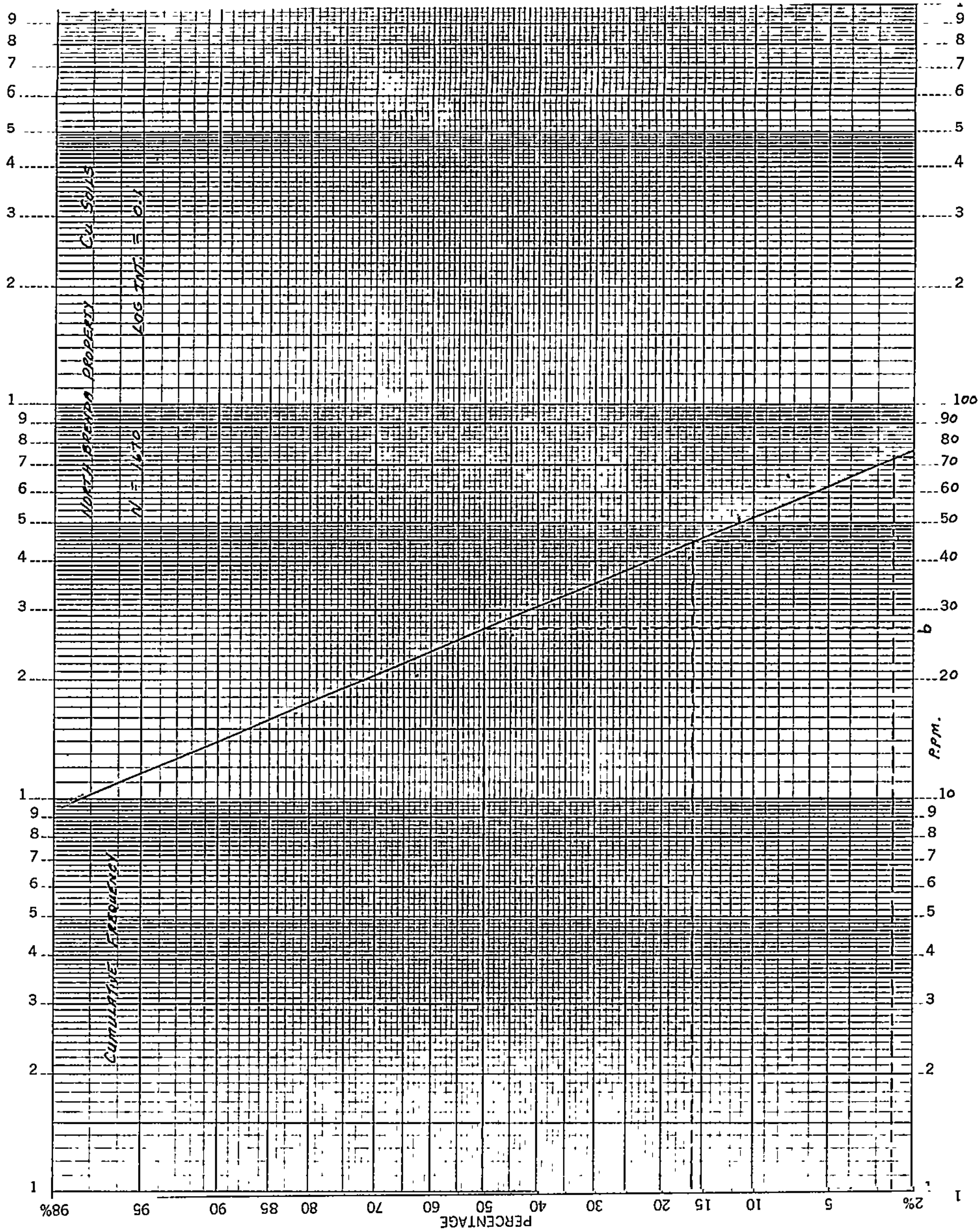
LOG INT. = 0.2
PERCENTAGE
P.P.M.
b



Cu SOILS
NORTH BRENDA PROPERTY
N = 1670
LOG INT. = 0.1
HISTOGRAM
P.P.M.
100
90
80
70
60
50
40
30
20
10
%
40
30
20
10

46 5890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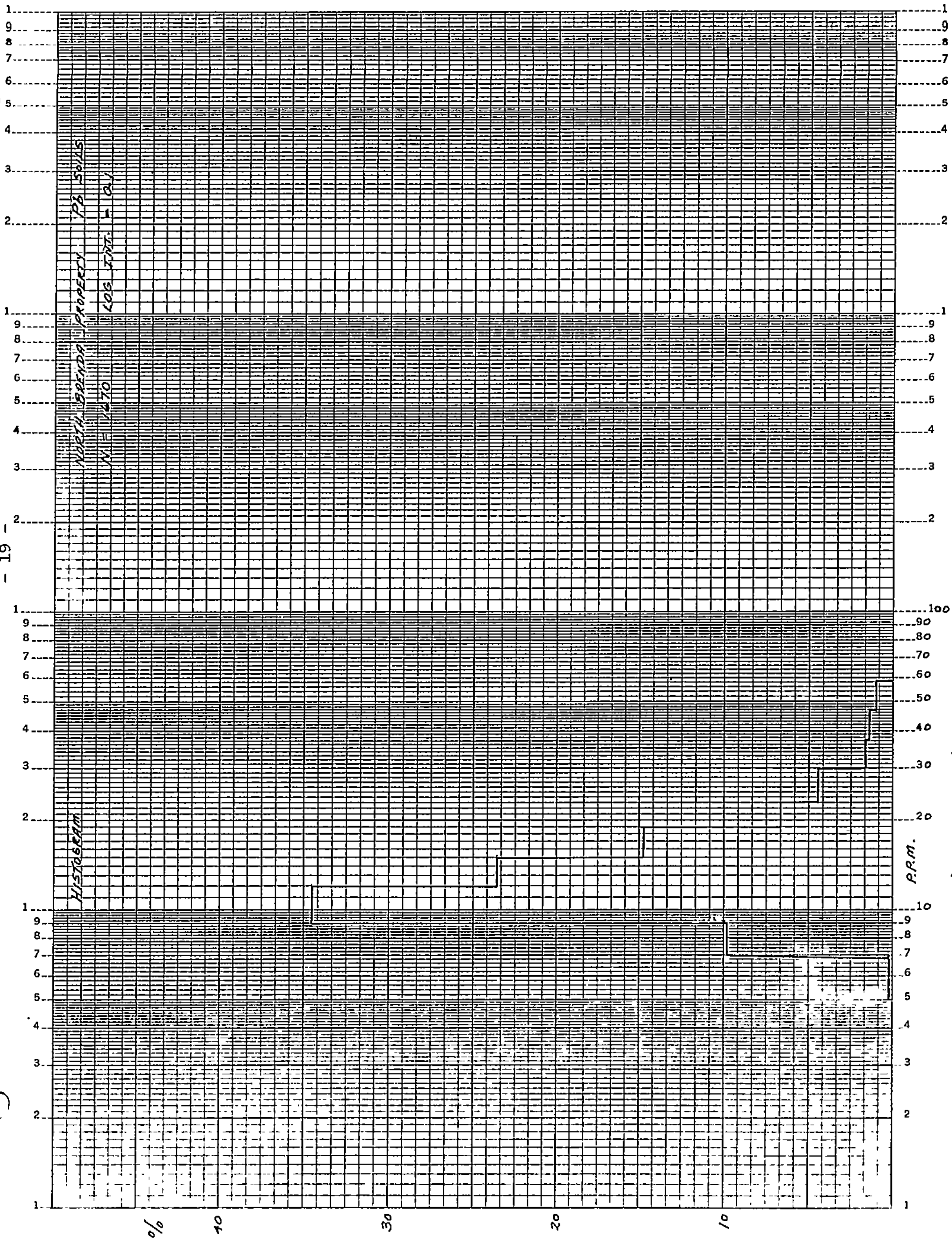
CUMULATIVE FREQUENCY
P.P.M.
PERCENTAGE


NORTH BRENDA PROPERTY PB SOILS
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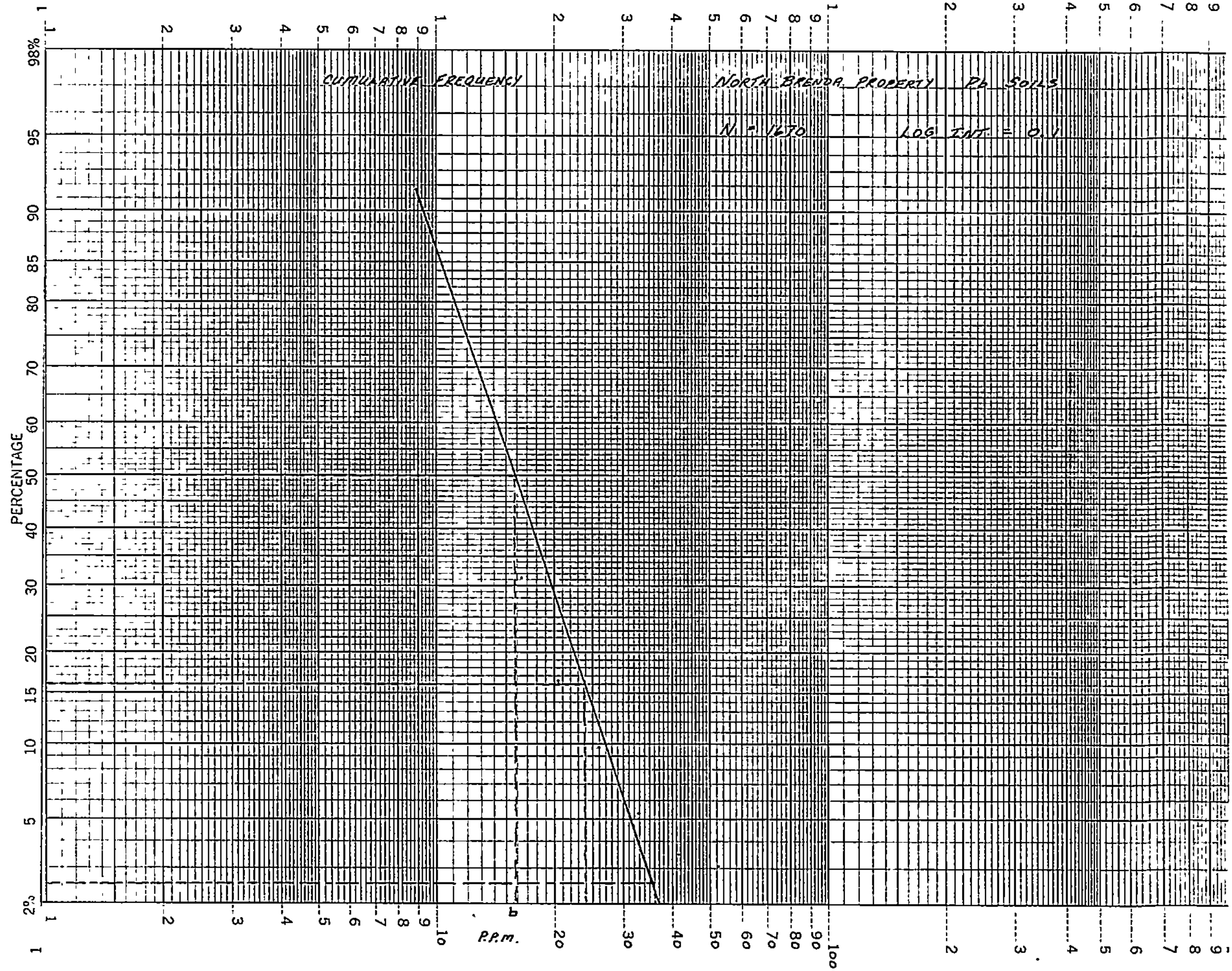
HISTOGRAM
P.P.M.
%
40
30
20
10

46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LOG INT = 0.1
PERCENTAGE
98%
95
90
85
80
70
60
50
40
30
20
15
10
5
2%
P.P.M.
b
10
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30
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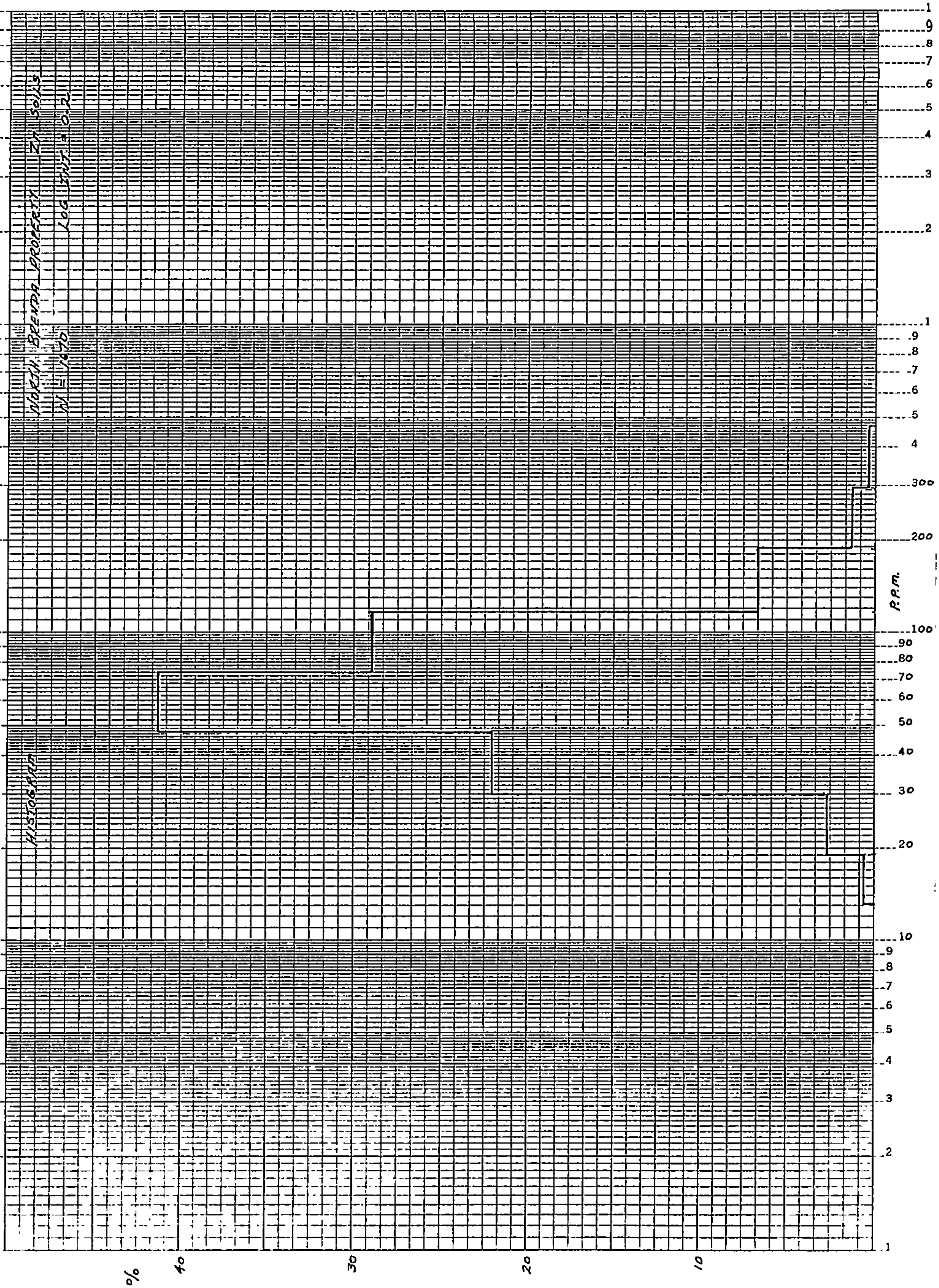
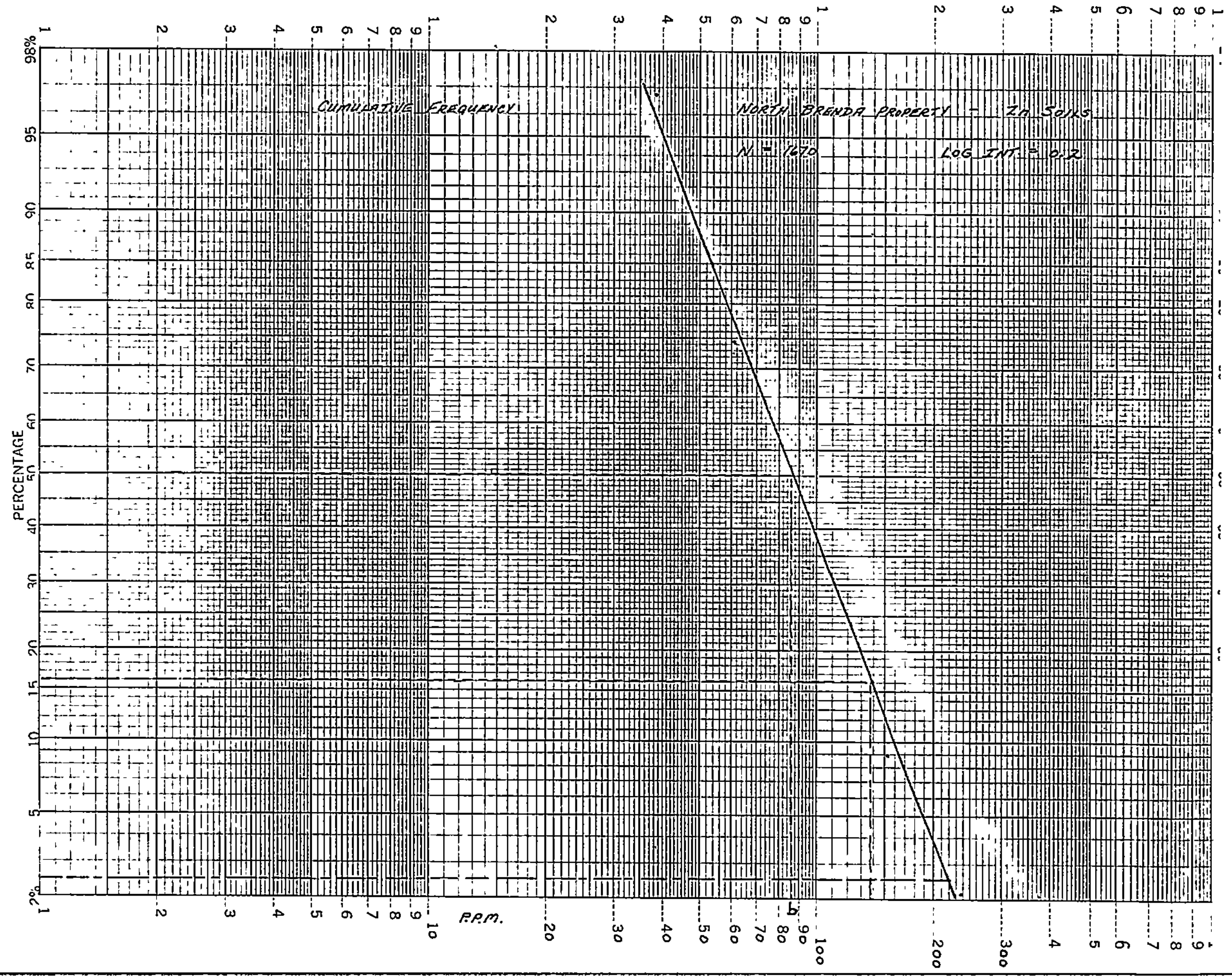
50
60
70
80
90
100


NORTH BRENDA PROPERTY Zn SOILS
N = 1670 LOG INT = 0.2
HISTOGRAM
P.P.M.
%
40
30
20
10
10
20
30
40
50
60
70
80
90
100
200
300


CUMULATIVE FREQUENCY
NORTH BRENDA PROPERTY - Zn SOILS
N = 1670
LOG INT = 0.2
PERCENTAGE
P.P.M.

g) Discussion of Results

Based on the cumulative frequency curves established on the Mo, Cu, Pb and Zn anomalies, the following values are anomalous:

	Low Anomalous	Anomalous	High Anomalous
Molybdenite	10 - 24	24 - 39	< 40
Copper	45 - 74	75 - 109	< 110
Lead	25 - 34	35 - 49	< 50
Zinc	140 - 219	220 - 299	< 300

As indicated by the plotted Mo and Cu goechemical maps, there exists a very close correlation between the soil anomalies of these two elements and the mapped mineral occurrences. Both Mo and Cu anomalies are confined to the southern portion of the property. One Pb anomaly occurs in the central region generally overlying the contact. Zinc values generated are considered low. Only one small anomaly is situated just northwest of the Pb anomaly in an area underlain by argillite metasediments.

VI CONCLUSION

Both the geological and geochemical surveys produced little more than expected. Although there is mineralization present, supported by soil geochemical anomalies, the veining and fracturing is far too widespread to be of economic interest. Several small, narrow zones host sufficient mineralization to be of interest, but these alone are of little value. It would appear that the North Brenda occurrences constitute the peripheral margins of the main mineralizing system responsible for the Brenda deposit.

APPENDIX I

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 transfered to a test tube and 1.00 MLS of ALC_3 solution added.

APPENDIX II

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.

GEOLOGICAL ASSOCIATION OF CANADA
A. R. POLLMER
FELLOW

Arnold R. Pollmer
Chief Geologist
Brenda Mines Ltd.

APPENDIX III

Statement of Costs

Labour	
1 Geologist, 15 days @ $90/day	$1,350.00
4 Labourers, 15 days @ $70/day	4,200.00
Assaying	
1,060 samples @ $5.96/sample	6,314.00
Transportation	
2 trucks @ $25/day x 15 days	750.00
Fuel	58.00
Accommodation & Meals	1,200.00
Camp Supplies	91.33
Report Preparation	150.00
Total	$14,113.33


20+00W
15+00W
10+00W
5+00W
0+00E
5+00E
10+00E
15+00E
20+00N
15+00N
10+00N
5+00N
5+00S
10+00S
LEGEND
ROAD
STREAM
GRID LINE
SWAMP
POND OR LAKE
45-74 LOW ANOMALOUS
75-109 ANOMALOUS
<110 HIGH ANOMALOUS
CONTOUR INTERVAL PPM
CONTOUR INTERVAL PPM
10,131
GEOLOGICAL ASSOCIATION OF CANADA
A. R. POLLOCK
FELLOW
0 200 400 600 800 1000 METERS
BRENDA MINES LTD
EXPLORATION GROUP
North Brenda Property
Cu. Soil Geochemistry
Scale 1:7,500

20+00W
15+00W
10+00W
5+00W
0+00E
5+00E
10+00E
15+00E
20+00N
15+00N
10+00N
5+00N
BL
5+00S
10+00S
LEGEND
ROAD
STREAM
GRID LINE
SWAMP
POND OR LAKE
10-24 LOW ANOMALOUS
25-39 ANOMALOUS
<40 HIGH ANOMALOUS
CONTOUR INTERVAL PPM
CONTOUR INTERVAL PPM
10,131
GEOLOGICAL ASSOCIATION OF CANADA
A. R. POLLMER
FELLOW
1000 METERS
BRENDA MINES LTD
EXPLORATION GROUP
North Brenda Property
Mo Soil Geochemistry
Drawn
Check
Approv.
SCALE 1:7500
FILE NO.


20+00W
15+00W
10+00W
5+00W
0+00E
5+00E
10+00E
15+00E
20+00N
15+00N
10+00N
5+00N
B.L.
5+00S
10+00S
10,131
LEGEND
ROAD
STREAM
GRID LINE
SWAMP
POND OR LAKE
140-219 LOW ANOMALOUS
220-299 ANOMALOUS
<300 HIGH ANOMALOUS
CONTOUR INTERVAL PPM
CONTOUR INTERVAL PPM
A. B. FOLLMER
GEOLOGICAL ASSOCIATION OF CANADA
FELLOW
BRENDA MINES LTD
EXPLORATION GROUP
North Brenda Property
Zn Geochemical Survey
SCALE 1:7,500
FILE No. 8-90-23


20+00W
15+00W
10+00W
5+00W
0+00E
5+00E
10+00E
15+00E
20+00N
15+00N
10+00N
5+00N
BL
5+00S
10+00S
LEGEND
ROAD
STREAM
GRID LINE
SWAMP
POND OR LAKE
25-34 LOW ANOMALOUS
35-49 ANOMALOUS
<50 HIGH ANOMALOUS
CONTOUR INTERVAL PPM
CONTOUR INTERVAL PPM
10131
GEOLOGICAL ASSOCIATION OF CANADA
FELLOW
BRENDA MINES LTD
EXPLORATION GROUP
North Brenda Property
Pb Geochemical Survey
SCALE 1: 7500
FILE NO.

N
GEOLOGIC LEGEND
PENNASK BATHOLITH (JURASSIC)
GRANODIORITE
NICOLA GROUP (UPPER TRIASSIC)
ANDESITE
HORNFEL SCHIST
ARGILLITE
STRUCTURE
NICOLA - PENNASK CONTACT (INFERRED)
HORNFEL SCHIST CONTACT (GRADATIONAL)
FAULT ZONE (INFERRED)
MINERALIZATION
MOLYBDENITE
CHALCOPYRITE
MALACHITE
PYRITE
HEMATITE
VEINING and FRACTURING
20+00W
15+00W
10+00W
5+00W
0+00E
5+00E
10+00E
15+00E
20+00N
15+00N
10+00N
5+00N
B.L.
5+00S
10+00S
LONG LAKE
LEGEND
ROAD
STREAM
GRID LINE
SWAMP
POND OR LAKE
10,131
FIGURE II
GEOLOGICAL ASSOCIATION OF CANADA
A. R. POLLMER
FELLOW
0
200
400
600
800
1,000 METERS
B R E N D A M I N E S L T D.
E X P L O R A T I O N G R O U P
North Brenda Property (South)
GEOLOGY MAP
Drawn
Check
Approv
SCALE 1 7,500
FILE No.