

GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL REPORT
BILL AND JACK CLAIMS
TRAPLINE MOUNTAIN, NEAR TERRACE, B.C. NTS 1031/8
OMINECA MINING DIVISION
LATITUDE $54^{\circ} 25'$ LONGITUDE $128^{\circ} 12'$
(W. MAKOWICHUK & J. WHITTAKER OWNERS)

BY

PLACER DEVELOPMENT LIMITED
ENDAKO MINES DIVISION

FIELD WORK UNDERTAKEN DURING PERIOD
JULY 20 - 23, 1981

W. Bulmer, A.J. Peters

April 1982

100° 00'

128°

54° 45'

Kitsum Kalum L.

Hwy. 16

R
I
V
E
R

Δ Bornite Mtn.

Sleeping
Δ Beauty Mtn.

Terrace

54° 30'

Hwy. 16

Z
Y
M
O
E
T
Z
R
I
V
E
R

Hwy. 25

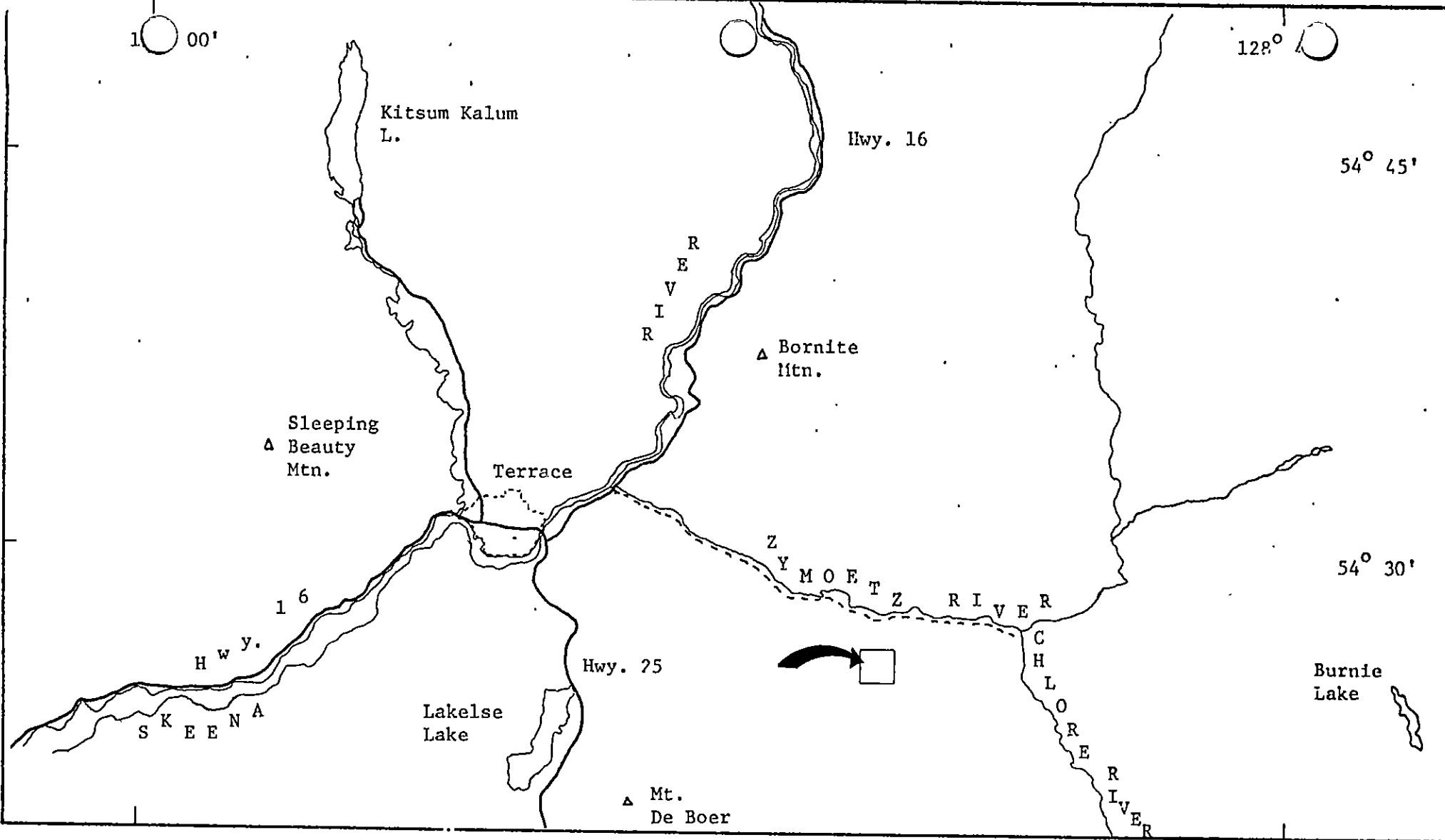
Burnie Lake

S
K
E
E
N
A

Lakelse Lake

C
H
L
O
R
E
R
I
V
E
R

Δ Mt. De Boer



TERRACE



TABLE OF CONTENTS

	<u>PAGE</u>
Index Map	
Introduction	1
Summary	1
Economic Assessment	1 - 2
Location and Accessibility	2
Mineral Claims	2
Claim Map	4
Previous Work	5
Survey Control	5
Geological Survey	
General Geology	5
Property Geology	5
Lithology, Structure and Stratigraphy	6 - 8
Mineralisation	8
Regional Geology Map	9
Geochemical Survey	
Introduction	10
Sampling	10
Assay Methods	10
Results	10-11
Endako Geochemical Analysis System	12-23
V.L.F. E.M. Radem Survey	24
Data	24
Data Presentation	25
Results	25-29
Statement of Expenditures	30
Conclusion	31

APPENDICES

Certification - W.R. Bulmer
A.J. Peters

Maps

Geology	Map 1
Soil Geochemistry Cu, Zn, Pb, Ag	Map 2
Rock Geochemistry Cu, Ag, Au	Map 3
VLF EM Plan	Map 4

INTRODUCTION:

Soil and rock geochemical, geological and geophysical surveys were conducted over portions of the Bill and Jack group of mineral claims and their surrounding areas during the period of July 20 - 23, 1981.

The work was done as follow-up to a one day property examination which was initiated on the strength of assays received from samples submitted by the owners in the spring of 1980. The property is located about twenty miles ESE of Terrace, B.C. on Trapline Mountain, (See Figure 1).

SUMMARY:

The geochemical survey revealed high order Cu and Ag values confined within the fine-grained basaltic unit, and to a lesser degree the hemaditic andesite and lappili agglomeratic tuffs. Values ranged from 9228 ppm Cu in basalt to 2872 ppm in the lapilli tuff. Abundant disseminated bornite and native copper within the basaltic unit account for the high values.

The radem survey has outlined the known areas of mineralisation in addition to possible faults and contacts

Geological information indicates several stages of volcanic activity. An older event consisting of mafic flows, is overlain by an intermediate stage of andesitic flows and ash flows. These in turn are topped by an explosive event consisting of lapilli to agglomerate size pyroclastics of intermediate to felsic composition.

Two and possible three ages and types of dykes intrude the volcanics. Due to the limits of the geological investigation it was not clear as to whether the fine-grained basaltic unit was upfaulted slices of older volcanic flow or a younger mafic dyke which intruded the volcanic sequence.

ECONOMIC ASSESSMENT:

Previous work has revealed mineralisation near the 2000 elevation, approximately 2kms north of the Bill claims. Mineralisation is restricted to fracture fillings situated in and adjacent to the contact area of a granite stock. In addition, intensely fractured rhyolite tuffs and breccias contain blebs and stringers of bornite and chalcopyrite. Massive bornite has been observed in the area, associated with intermediate to mafic volcanics. The claims examined and described in this report are between elevations 4000 and 4500 feet. Mineralisation confined to fracture fillings within rhyolite tuffs and breccias has been recognized, however bornite occurring as disseminations within a fine-grained basalt

which contains an amygdaloidal, epidotised silicified zone, bearing native copper, has been found, and is believed to be the main copper source. Neither the extent of the basalt flow, or the tenor of the mineralisation is known. Should a copper-silver deposit exist, the main deposit appears to be restricted within the basalt flows all other mineralisation is secondary.

LOCATION AND ACCESSIBILITY:

The claims are on top of Trapline Mountain, which overlooks the Zymoetz River at a point 15 to 19 miles from the Zymoetz - Skeena confluence. The claims are accessible by Highway 16 then south along the Copper River Forest Road. A B.C. Telephone service road provides access to the top of Trapline Mountain from the Copper River Forest road 27 km from the Highway 16 junction.

MINERAL CLAIMS:

The property consists of 19 - 2 Post Mineral claims, six of which are entitled Bill #1-6, eight entitled Jack #1-8 and the remaining five entitled WM #1-5. All units be within the Omineca Mining Division at Latitude 54° 25' 30'' and Longitude 128° 12'.

<u>OWNER</u>	<u>MINERAL CLAIM</u>	<u>RECORD NO.</u>	<u>RECORDING DATE</u>
Makowichuk	Bill 1-6	1202-07	June 1978
	WM 1-5	3829-32, 3908	June 1981
Whittaker	Jack 1-8	3900-3907	July 1981

ANYG 4435 VAG1 4426 VES1 4427

RES MIN 4 P-ALEX
1/2 MILE EITHER S. OR
9/2-201, 16 JUL 76.
RELEASE REQUIRED

YUG
4438

HM
4285

PY
4286

CP
4284

MT
4283

KELLY 5 4023(15)
KELLY 6 4024(15)
KELLY 7 4025(15)
KELLY 8 4026(15)
KELLY 9 4027(15)
KELLY 10 4028(15)
KELLY 11 4029(15)
KELLY 12 4030(15)

KELLY 4019(15)

HYDRO 1 3294(10)
HYDRO 2 3293(10)
HYDRO 4 3292(10)
HYDRO 1 3291(10)

NATRO 4243(9)

EPI 4244(9)

JACK 3 3904(17)	JACK 4 3903(17)	JACK 2 3901(17)	JACK 1 3900(17)
JACK 6 3905(17)	JACK 3 3902(17)	BILL 6 1207(16)	BILL 5 1206(16)
WM 1 3823(16)	WM 2 3830(16)	BILL 3 1205(16)	BILL 3 1204(16)
WM 3 3831(16)	WM 4 3832(16)	BILL 2 1203(16)	BILL 1 1202(16)
			JACK 7 3906(17)
			JACK 8 3907(17)

CALC 4245(9)

SILI 4430
SER 4431

JOHN 2 2391(11)
JOHN 1 2390(11)
QUILL FR 4240(9)

KELLY 3 4021(15)

KELLY 4 4022(15)

KELLY 2 4020(15)

AG 4265

CU 4268

BN 4266

ICC 4267

Sullivan Hill

ROAD FR.

QUILL FR

LOP LO

ZEO 4242(9)

Impire

Creek

PREVIOUS WORK:

No previous work has been recorded, although the claims were held by various individuals over the past ten years. Mr. Makowichuk staked the original claims in 1979, only minor blasting has been carried out to date.

SURVEY CONTROL:

A 1:5,000 base sheet was prepared from a 1" = 1/4" mi. map prepared by McElhanney Surveying and Engineering Ltd. for Cancel River Forest Products. Local roads were surveyed using pace and compass. Lines running east and west from a baseline trending north were used as control for the geochemical and geophysical surveys; line spacings were 400 metres. Station locations were determined by hip chain; soil and rock sample sites were flagged and given an identity.

GEOLOGICAL SURVEY:

General Geology

The claims lie entirely within a series of felsic to mafic flows belonging to the Hazelton Group, which forms a large sinuous S shape, extending from just south of Seven Sisters Peaks east of the Skeena River, to just north of Mt. Davies northeast of Kitimat, (See Figure 1). They are characterized as consisting of "a series of massive volcanic rocks, mainly andesitic, but to a lesser extent basaltic, dacitic, and rhyolitic flows and some andesite breccia. The andesite flows are vesicular, others amygdaloidal, but flow structure is poorly developed, and no pillows were observed. At least half the flows contain amygdules of calcite, epidote, or quartz, and rarely a pink zeolite. Locally amygdules make up 25 to 30 percent of the rock, and are as much as three inches in diameter, (GSC Memoir 329, S. Duffell and J.G. Souther)."

Property Geology

The property situated on the top of Trapline Mountain has about 75% rock exposure. Essentially an intermediate to felsic succession of volcanic flows and fragmentals have been intruded by dykes of mafic, intermediate and felsic compositions.

The dykes occupy faults, the north trending ones are gravity related, the east trending ones are strike slip.

Mineralisation occurs within fine-grained amygdaloidal basalt outcroppings that appear to be dyke-like, but in fact may be uplifted slivers of an older and therefore deeper mineralised flow. Malachite staining coats fractures in proximity to faulting not associated with dyke intrusion.

LITHOLOGY, STRUCTURE & STRATIGRAPHY:

Volcanics

Flows

The volcanics are essentially hematitic fine-grained andesitic flows. A major east-trending granodioritic dyke which occupies a fault bisects the flows. The northern portion, in addition to varying amounts of crystals ranging between <1 to 1mm, may contain cusped lithic fragments up to 5mm. South of the dyke, a gradation to a more massive, non-porphyrific variety to the east is observed; those portions farthest to the east may in places be friable, and therefore indicative of an ash fall unit. Amygdaloidal units occur at what appears to be the bottom of the sequence. Two separate amygdaloidal units exist, one of which is stratigraphically higher than the other and may represent a separate flow. The youngest contains quartz and calcite amygdules which are generally deformed. Only one locality is known where native copper occurs within this particular horizon.

The underlying flow is generally nondeformed, and contains, in addition to quartz and calcite, epidote filled amygdules. This horizon, more often than not is in direct contact with an underlying basaltic unit that contains large quartz - epidote amygdules and in places bears a silicified - epidotised zone that is host to native copper, bornite, (chalcopyrite) and some chalcocite. The basaltic unit, although dyke-like in outcrop, may be slivers of an older flow uplifted through faulting. The unit is fine-grained, dark green and may contain hematitic phases. A phase containing chlorite amygdules in addition to chlorite and hematite specks or possibly crystals appears to be intimately associated with a unit very much like the fine-grained mauve andesitic flow or has. Because of difficulty in determining whether this is truly a discrete unit from a phase of the fine-grained andesitic flow, they have been combined and appear as 2d, 1b on the geology map. This concludes the description for the lower mineralised portion of the stratigraphy.

Tuffs

Interbedded with the andesitic crystal flow is an intermediate to mafic poly lithic fragmental. Chloritised mafic(?) fragments give the rock a greenish tinge in spite of the ubiquitous hematite which gives the rock an overall mauve hue. Many of the fragments are large (3 cm +), rounded, and float within a matrix composed of <1 to 1 mm bits of dust, broken crystals and fragments. The unit in places is reminiscent of a poorly sorted volcanogenic conglomerate and may in fact be so.

A mafic dyke trending north, in addition to bisecting the area, is the site of a steep gravity fault. East of the dyke is a felsic to intermediate fragmental unit. The matrix is essentially a light grey rhyolitic volcanic which is host to elongated mauve andesitic lapilli and agglomerate. The elongation is parallel to the strike of the beds. The unit grades upsection into coarse to fine lithic breccia where

fragments are sharp, cusped, and in places resembles an autobreccia. Mineralisation occurs in one locality, but may be due to its proximity to a fault.

Dykes

Two major dyke swarms crosscut the area, each of which, as mentioned earlier, occupy faults.

A series of parallel north trending dykes of mafic to intermediate composition appear to parallel, or very nearly so, the strike of the volcanic units. The dykes varying in width from 3 m to over 35 m are essentially a coarse plagioclase porphyry; the plagioclase crystals ranging in size from 1 mm to 1 cm. The matrix is dark and may be amygdaloidal to vesicular.

Hematitic dust may be present, and where so, imparts a mauve colour to the rock. Five phases of this rock type are recognised. They may represent only part of a continuum, for which we have unknown end members. The phases are as follows: (A) The matrix is fine-grained, is grey mauve in colour and cloudy in texture. Small hematite crystals, chloritic specks and amygdules occur within the matrix along with plagioclase crystals. The feldspars are light green in colour, up to 15 mm in length and impart a tracytic texture to the rock. Some spars are shattered and coated with hematite. (B) The matrix is similar to the above phase however numerous tiny feldspar laths (1-2 mm) crowd the matrix with abundant hematite crystals and a few chlorite amygdules. Some vesicles/amygdules are rimmed by epidote. Larger green/cream coloured spar laths that range in size from 15 to 20 mm are present, impart a sub-tracytic texture and in places group together to form radiating clusters. Some carbonate veining may be present. (C) The matrix is dark brown to black and is host to numerous highly altered kaolinised feldspars. The feldspars are of uniform size (~ 5 mm). The rock is friable. (D) The matrix is hematitic and carries pink/cream coloured spars about 10 mm in size. Carbonate amygdules occur and are usually rimmed by epidote. (E) This phase may be part of the porphyritic flow, however it contains characteristics of the porphyritic dyke being described. The matrix is fine-grained and hematitic, the hematite imparting a mauve colour to the rock. The feldspars are from 3-5 mm in size, are cream/pink coloured and are randomly oriented about the hand specimen. There is, in addition, abundant carbonate veining and amygdules.

As mentioned earlier, the above phases may represent only part of a continuum for which we have unknown end members.

The second major series of dykes are easterly trending, appear to occupy the site of strike-slip faults and are younger than the plagioclase porphyry system just described.

This series are intermediate in composition and average 20 m in thickness. The dykes are grey-cream in colour, medium grained, porphyritic, and are reminiscent of a granodiorite. Small biotite flakes are present within the matrix along with stubby cream coloured feldspars which impart the porphyritic texture.

Other minor dykes occur and appear to be associated with (A) the porphyritic andesite flow or plagioclase porphyry dykes and (D) the granodiorite dykes.

Of the former type, it is north trending and appears to be confined to the east side of the map area, just east of the lappilli/agglo-merate tuff. The matrix is pink/grey, siliceous and fine grained. Numerous white/cream feldspar crystals about 2 mm in length occur, and are parallel to one another suggesting flowage. Thickness does not appear to exceed 10 m.

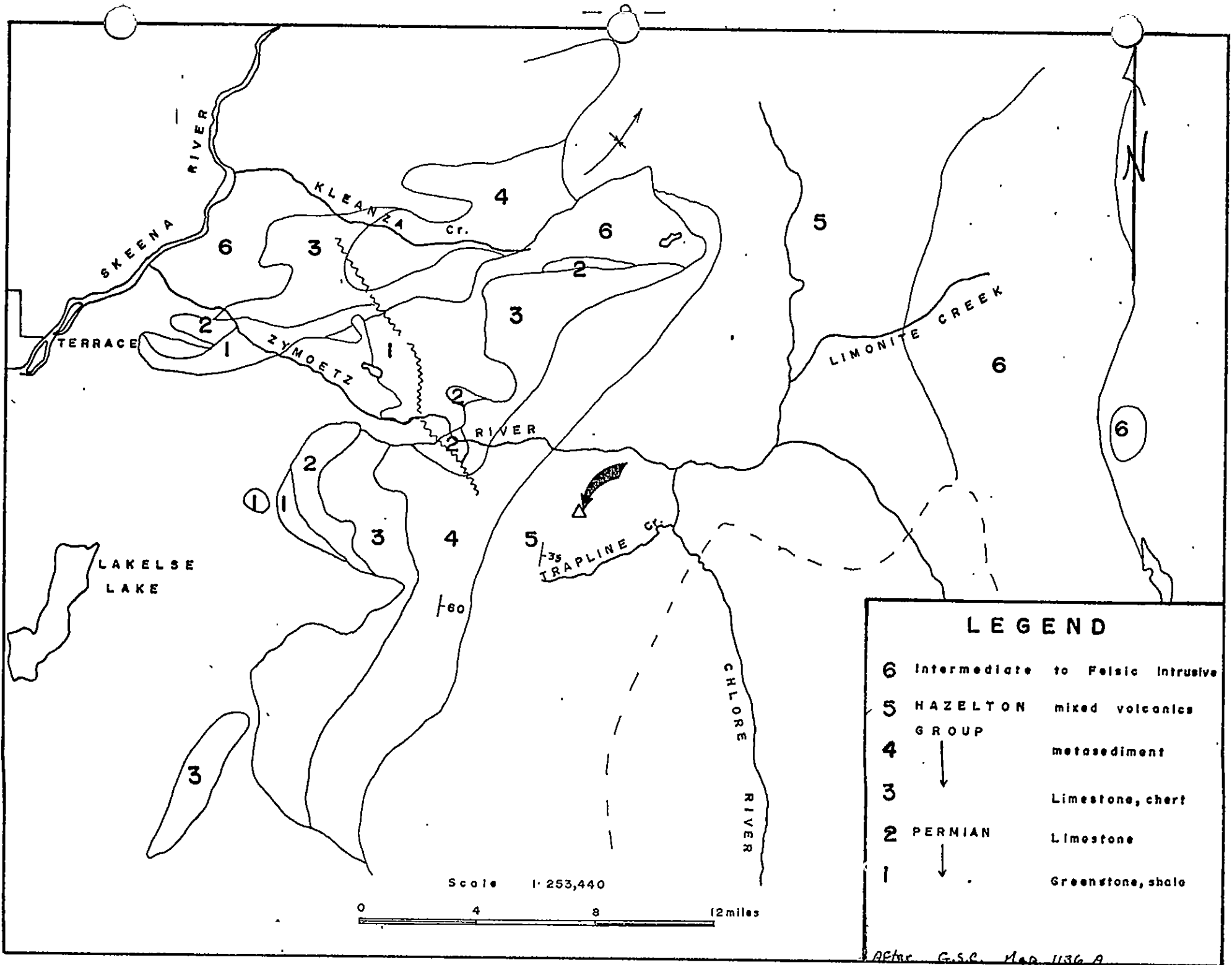
The minor dykes which appear to be associated with the larger of granodioritic composition, are extremely fine grained cream orange in colour and may in places contain discrete quartz eyes. The rock is reminiscent of a fine-grained rhyolite and may represent the aplitic phase of the granodiorite intrusive.

MINERALISATION:

Mineralisation appears to be restricted to the volcanics either as secondary stains and fracture coatings or as primary disseminations.

Malachite, the most common secondary mineralisation, coats fractures and surfaces on mineralised and non mineralised lapilli tuffs, mauve fine-grained andesites, amygdaloidal basalts and siliceous breccias. In addition, malachite occurs as halos of secondary alteration surrounding disseminations of bornite and native copper within the epidotised amygdaloidal basalts and siliceous breccias.

Chalcopyrite, bornite and native copper occur as disseminations and occasionally as tiny hairlines within the amygdaloidal epidotised basalt and siliceous breccia. Chalcocite and cuprite(?) occur within the mineralised basalt where quartz veining dominates. Native copper also occurs as fine disseminations within an amygdaloidal section of the overlying andesites. The extent of this showing is unknown. As can be seen from Map 1 major mineralisation appears to be confined within the basaltic unit. The outcroppings seem to suggest dyke-like emplacement thereby restricting the extent and possible tonnage of the ore. However, should the basalt represent slivers of mineralised basalt flow emplaced through faulting the potential for a larger tonnage orebody increases.



LEGEND

- 6 Intermediate to Felsic Intrusive
- 5 HAZELTON mixed volcanics GROUP
- 4 ↓ metasediment
- 3 ↓ Limestone, chert
- 2 PERMIAN Limestone
- 1 ↓ Greenstone, shale

Scale 1:253,440

0 4 8 12 miles

GEOCHEMICAL SURVEY:

Introduction

One hundred fourteen soil and rock samples were collected. The soils were restricted to the radem lines and collected at 100 metre intervals (See Map 2). The rocks were collected from outcrops encountered during the geological survey and are sufficiently scattered about the property to enable an adequate representation of the areas lithochemistry (See Map 3). In general C horizon samples or lithosol were collected as B horizon was not developed or available. Organic samples from bogs were not taken. The soil is essentially that of an alpine environment, immature soil with a thin organic covering.

Sampling

Soil samples were collected from holes dug with a pick-matrix to depth of 5-10 cm and scraped off the bedrock surface. About 300 gms of A/C horizon soil was sampled from each location.

Assay Methods

All soil and rock samples were analysed for Cu and Ag. Soils in addition, were assayed for Pb and Zn, whereas the rocks were analysed for Au. All samples were analysed at the Placer Geochemical Laboratory in Vancouver, B.C.

Standard analytical methods used by Placer Development Limited Geochemical Laboratory are as follows:

<u>UNITS</u>	<u>WT.G</u>	<u>ATTACH</u>	<u>USED</u>	<u>TIME</u>	<u>RANGE</u>	<u>METHOD</u>	
Cu	PPM	0.5	C	HCL04/HN03	4 Hrs.	2-4000	Atomic Absorption
Zn	PPM	0.5	C	HCL04/HN03	4 Hrs.	2-3000	Atomic Absorption
Pb	PPM	0.5	C	HCL04/HN03	4 Hrs.	2-3000	A.A. Background Cor.
Ag1	PPM	0.5	C	HCL04/HN03	4 Hrs.	0.2-20	A.A. Background Cor.
Ag2	PPM	0.5	C	HN03	2 Hrs.	0.02-4.00	A.A. Solvent Extract
Au	PPM	3.0	C	HBR/BR	12 Hrs.	0.02-4.00	A.A. Solvent Extract

Results

Results from geochemical analysis for soils and rocks are plotted on maps 3 and 4 respectively.

Geochemical analyses of the rocks revealed that the fine-grained basaltic unit or dyke contained the highest values of both silver and copper; the values ranging between <.2 to 24 ppm and 4 to 36,900 ppm respectively. The highest copper values were from samples which contained native copper.

Hematitic andesite and the lapilli tuffs also contained high values of copper averaging 3000 and 2900 ppm respectively.

A summary of the geostatistical distribution of values for copper and silver in the various rock types are available from pages 12 to 23. It is to be noted that the arithmetic mean of the natural log of the values and the median values obtained from visual inspection of the histogram do not correspond. The arithmetic mean does not recognise more than one population. Values for lead zinc and gold were not significant.

ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR SILVER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE * = ALL ROCK TYPES
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE 81 0 0 0 0 0 0 0 0 0

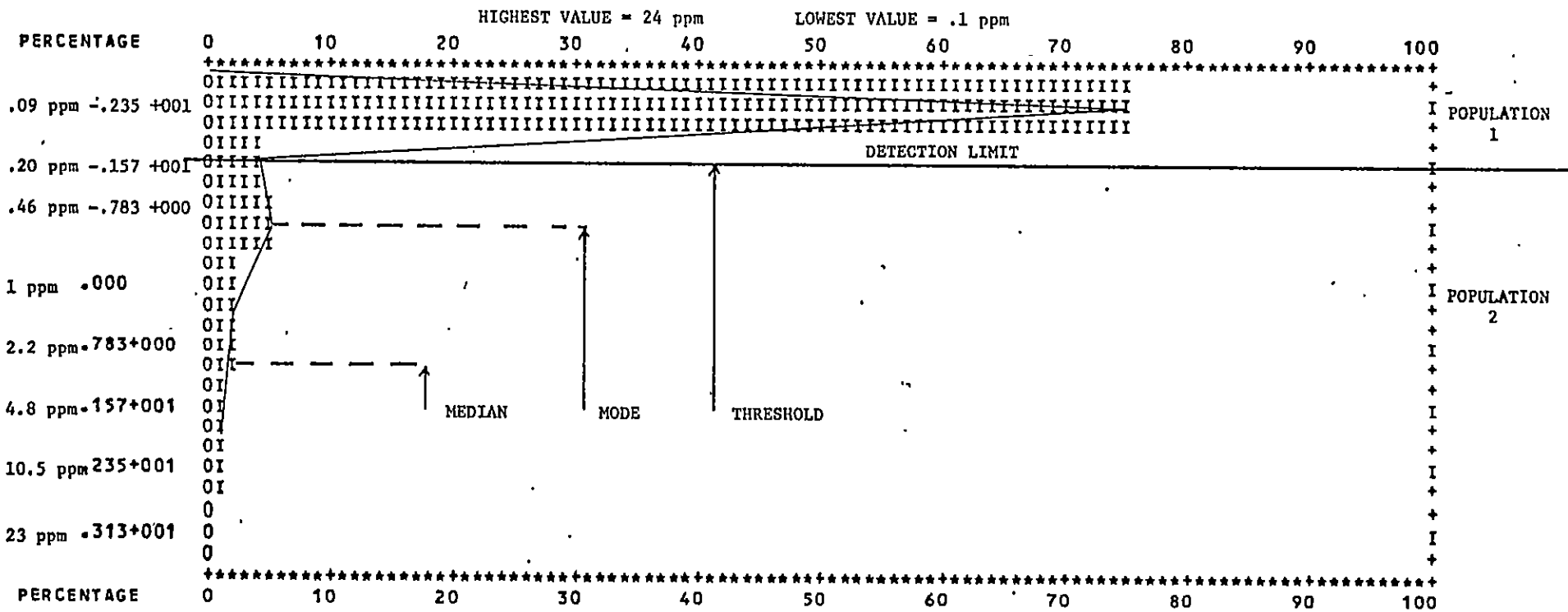
SAMPLE TYPES INCLUDED ARE R = ROCKS

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***

ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= -1.75463784 - - - - .17 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 1.21295007 - - - 3 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .69128229 - - - 69%

STEP= .782
 CENTERPOINT OF INITIAL GROUP= -2.3 = .1 ppm NO. OF OBSERVATIONS= 95
 CENTERPOINT OF FINAL GROUP= 3.13 = 23 ppm NO. OF GROUPS= 8
 K FACTOR= 1.



E N D A K O G E O C H E M I C A L A N A L Y S I S S Y S T E M

STATISTICAL CALCULATIONS FOR SILVER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE I = PORPHYRITIC DIABASE DYKE
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE 31 0 0 0 0 0 0 0 0

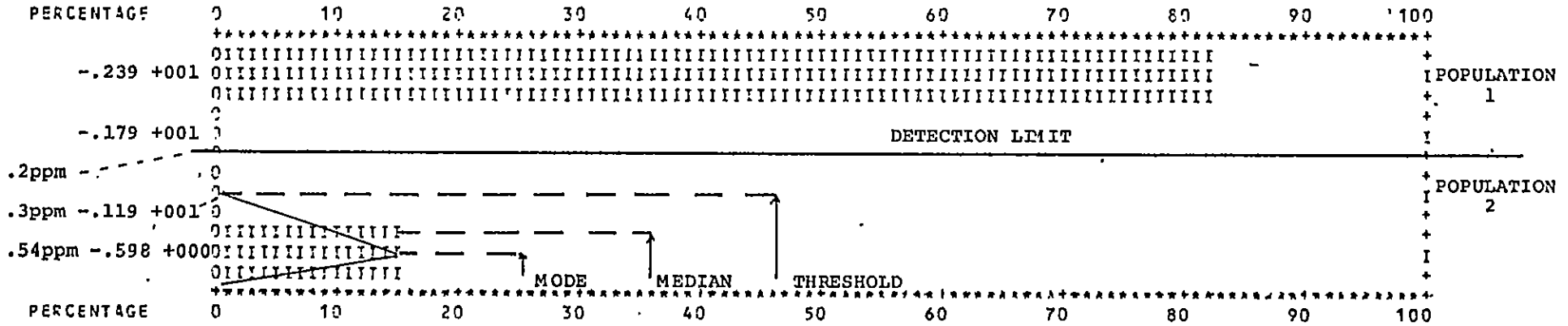
SAMPLE TYPES INCLUDED ARE R = ROCK

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***

ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= -2.00395846 - - - - - .14ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= .73148274 - - - - - 2.1ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .36501891 - - - - - 19%

STEP= .59725316
 CENTERPOINT OF INITIAL GROUP= -2.39 = .1 ppm NO. OF OBSERVATIONS= 6
 CENTERPOINT OF FINAL GROUP= -.598 = .54 NO. OF GROUPS= 4
 K FACTOR= 1.



3FIN

ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

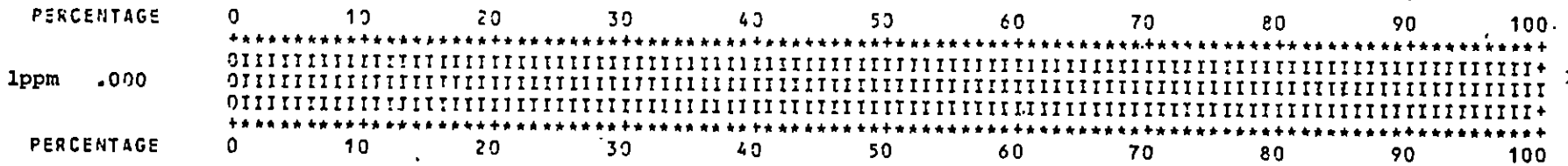
STATISTICAL CALCULATIONS FOR SILVER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
SOIL PROVIDENCE SAMPLES INCLUDED ARE *
ROCK CLASS SAMPLES INCLUDED ARE F = GRANODIORITE DYKE
SOIL HORIZON SAMPLES INCLUDED ARE *
GEOLOGISTS INCLUDED ARE TR
YEARS INCLUDED ARE 81 0 0 0 0 0 0 0 0 0

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***
ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS = -2.30258501 lppm
STANDARD DEVIATION OF NATURAL LOG OF ASSAYS = .00000010 lppm
COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS = .00000004 0%

STEP = .00000000
CENTERPOINT OF INITIAL GROUP = .000 = lppm NO. OF OBSERVATIONS = 8
CENTERPOINT OF FINAL GROUP = NO. OF GROUPS = 1
K FACTOR = 1.



FIN

ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR SILVER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SQ=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE R = ANDESITE
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE 81 0 0 0 0 0 0 0 0 0

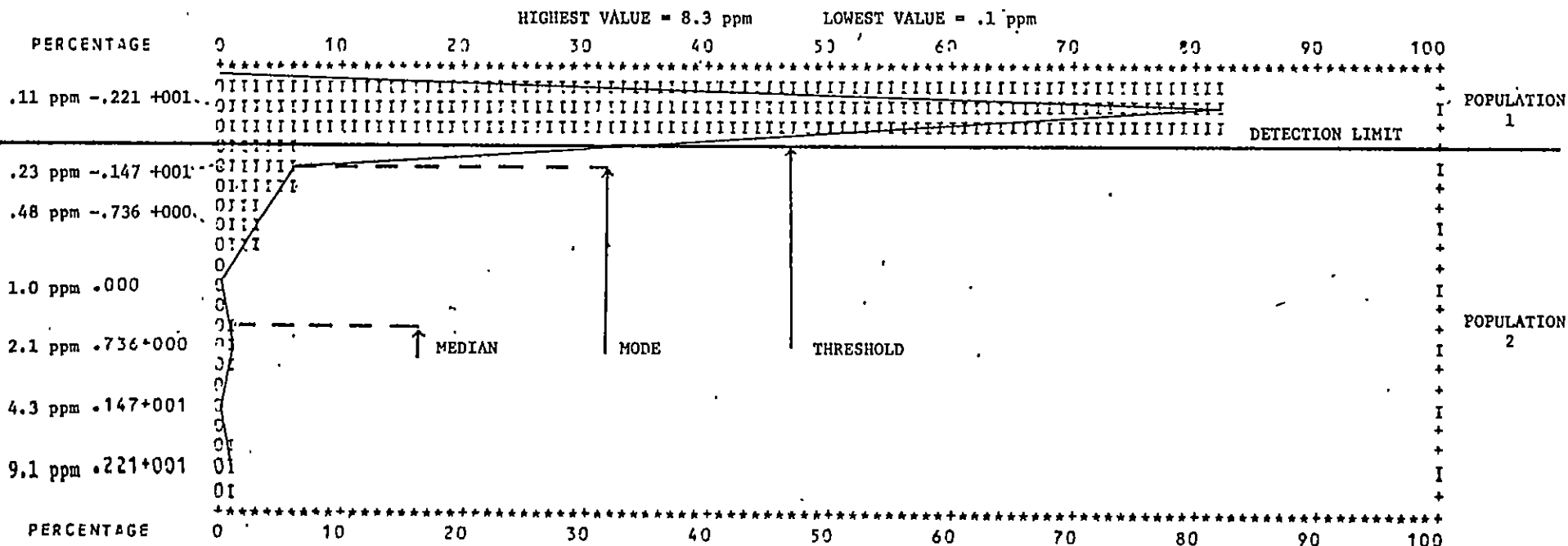
SAMPLE TYPES INCLUDED ARE P = ROCK

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***

ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS = -2.00188217 - - - - .14 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS = .87670683 - - - - 2.4 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS = .43794128 - - - - 44%

STEP = .736...
 CENTERPOINT OF INITIAL GROUP = -2.21 = .11 ppm NO. OF OBSERVATIONS = 42
 CENTERPOINT OF FINAL GROUP = 2.21 = 9.1 ppm NO. OF GROUPS = 7
 K FACTOR = 1.



ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR SILVER OVER AREA - TRAPLINE MOUNTAIN

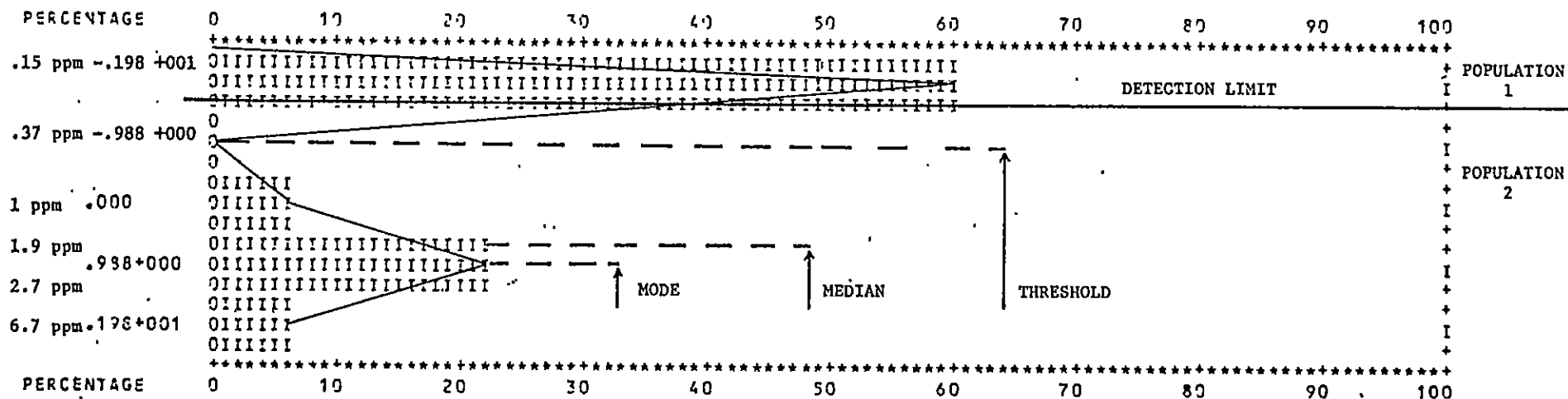
SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE W = LAPILLI + AGGLOMERATE
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE B1 0 0 0 0 0 0 0 0

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***

ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS = -1.07160310 - - - - .34 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS = 1.67837134 - - - 5.3 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS = 1.56622477 - - - 156%

STEP = .937
 CENTERPOINT OF INITIAL GROUP = -1.98 = .15 ppm NO. OF OBSERVATIONS = 13
 CENTERPOINT OF FINAL GROUP = 1.9 = 6.7 ppm NO. OF GROUPS = 5
 K FACTOR = 1.



FIN

ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR SILVER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE PCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE T = BASALT
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TP
 YEARS INCLUDED ARE 81 0 0 0 0 0 0 0 0

SAMPLE TYPES INCLUDED ARE R = ROCKS

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***

ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= -1.02449664 - - - - 2.8ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 1.83463159 - - - - 6.2ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= 1.79076389 - - - - 179%
 THRESHOLD VALUE OF NATURAL LOG OF ASSAYS= 4.47939813

STEP= 1.37

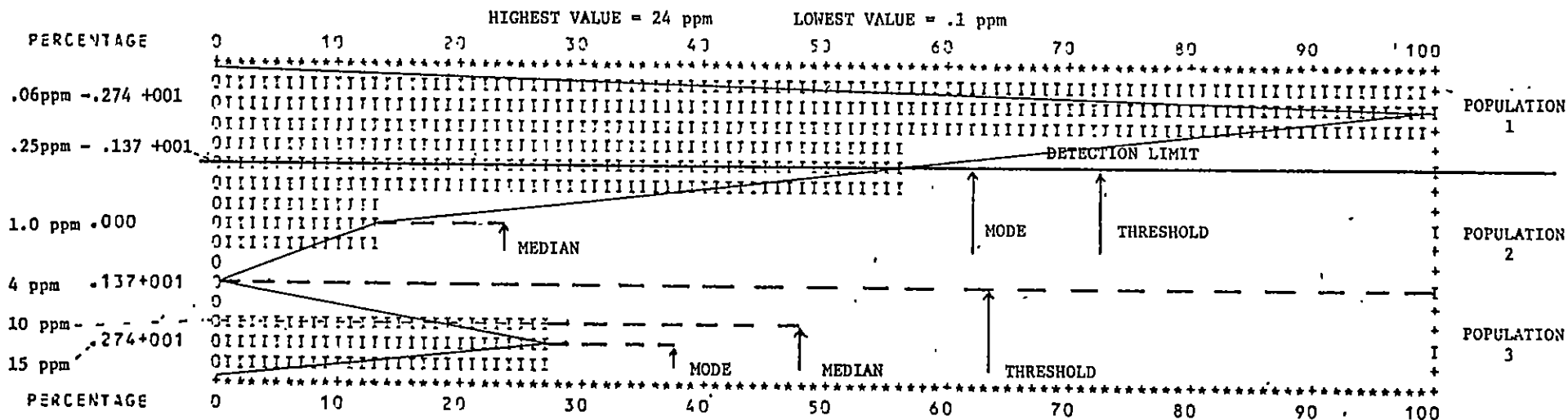
CENTERPOINT OF INITIAL GROUP= -2.74 = .06ppm

NO. OF OBSERVATIONS= 14

CENTERPOINT OF FINAL GROUP= 2.74 = 15.5ppm

NO. OF GROUPS= 5

K FACTOR= 2.



E N D A K O G E O C H E M I C A L A N A L Y S I S S Y S T E M
 STATISTICAL CALCULATIONS FOR COPPER OVER AREA TRAPLINE MOUNTAIN

 SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE * - ALL ROCK TYPES
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR

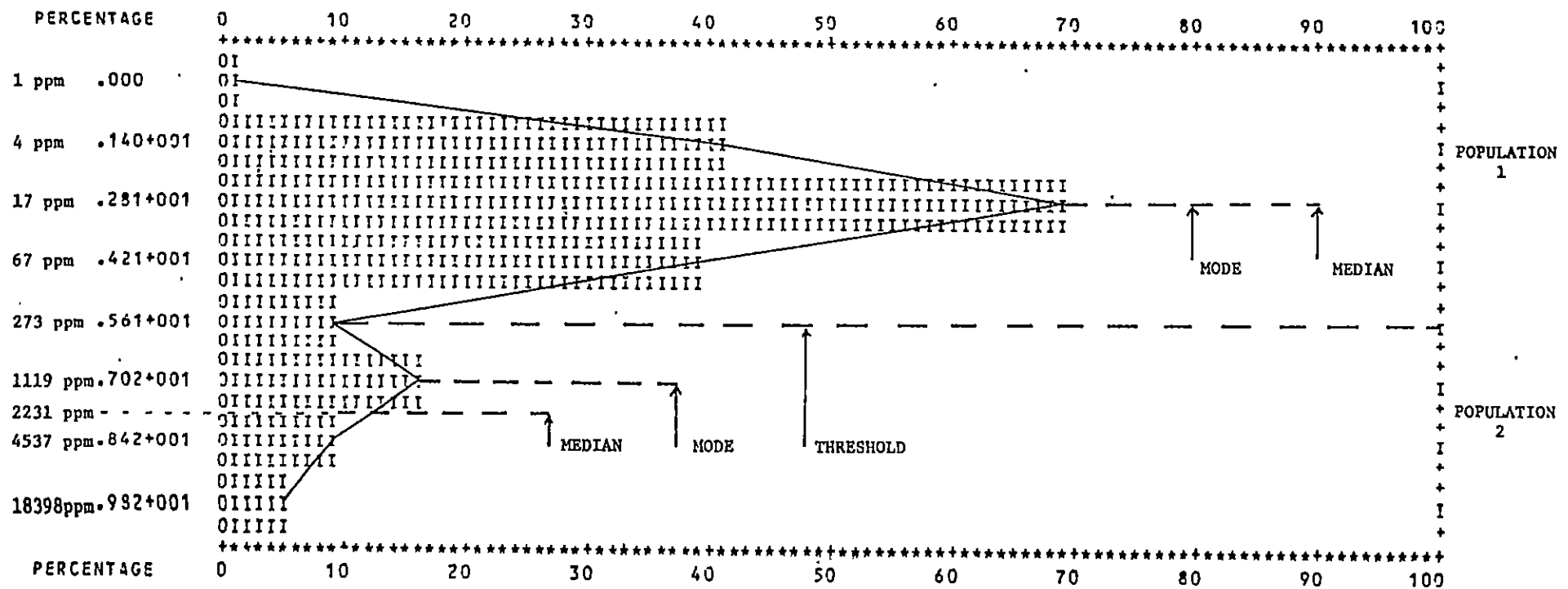
YEARS INCLUDED ARE 91 0 0 0 0 0 0 0 0 0
 SAMPLE TYPES INCLUDED ARE R = ROCKS

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***
 ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= 3.76149970 - - - - - 43 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 2.25325233 - - - - 9 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .59533545 - - - - 60%

STEP= 1.40325993
 CENTERPOINT OF INITIAL GROUP= .00 = 1 ppm NO. OF OBSERVATIONS= 94
 CENTERPOINT OF FINAL GROUP= 9.82 = 18,398 NO. OF GROUPS= 8
 K FACTOR= 2.

HIGHEST VALUE = 36,900 ppm LOWEST VALUE = 2 ppm



ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR COPPER OVER AREA TRAPLINE MOUNTAIN

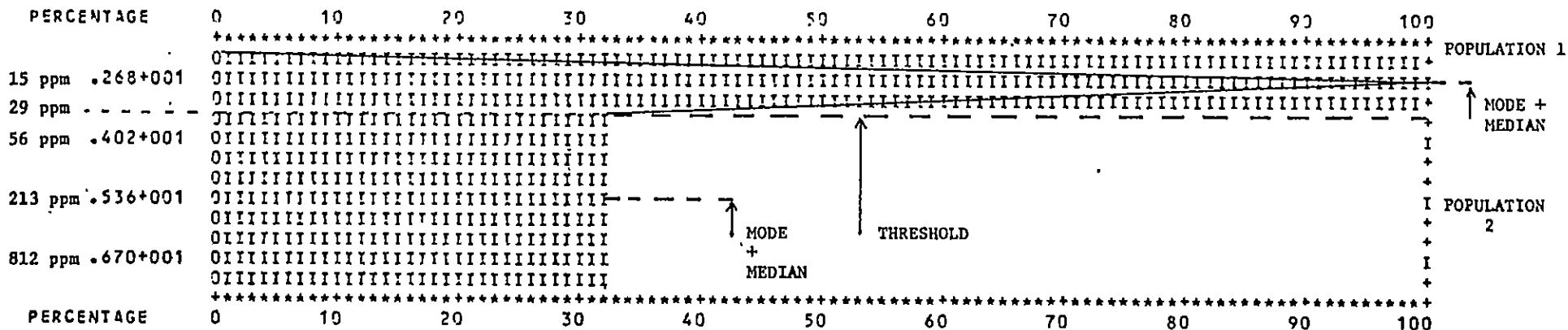
SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE I = PORPHYRITIC DIABASE
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE 81 0 0 0 0 0 0 0 0 0
 SAMPLE TYPES INCLUDED ARE R = ROCKS

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***
 ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= 3.97830606 - - - - - 53 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 1.54573061 - - - - - 5 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .35468677 - - - - - 35%

STEP= 1.34070036
 CENTERPOINT OF INITIAL GROUP= 2.68 = 15 ppm NO. OF OBSERVATIONS= 6
 CENTERPOINT OF FINAL GROUP= 6.70 = 812 ppm NO. OF GROUPS= 4
 K FACTOR= 2.

HIGHEST VALUE = 670 ppm LOWEST VALUE = 12 ppm



FIN

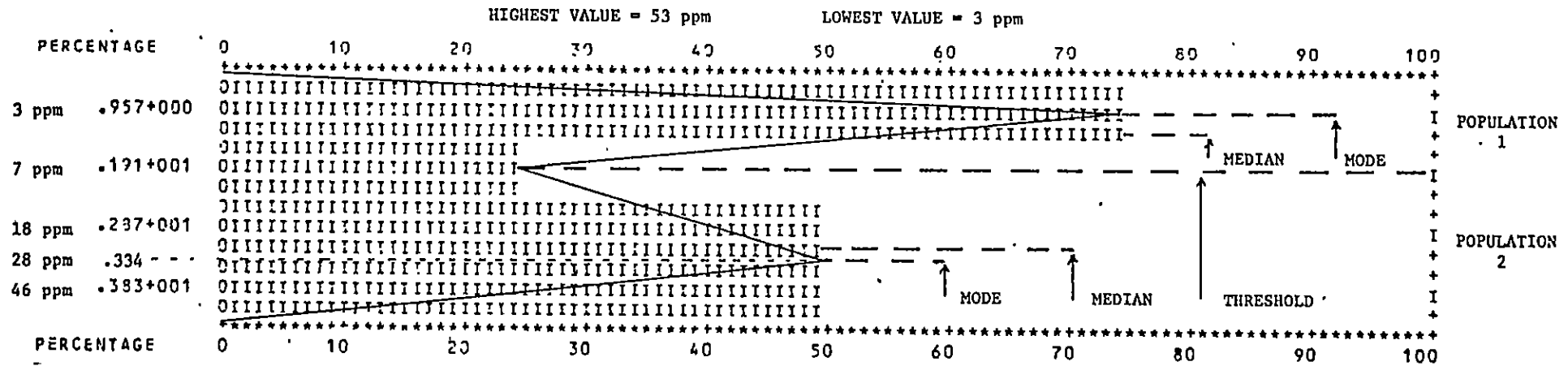
ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR COPPER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE E = GRANODIORITE DYKE
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TP
 YEARS INCLUDED ARE 91 0 0 0 0 0 0 0 0 0

SAMPLE TYPES INCLUDED ARE R = ROCK. DATE APRIL 1982
 *** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***
 ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= 2.29120460 - - - - - 10 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 1.11830930 - - - - 3 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .45676917 - - - - 46%

STEP= .95722654
 CENTERPOINT OF INITIAL GROUP= .957 = 3.0 ppm NO. OF OBSERVATIONS= 8
 CENTERPOINT OF FINAL GROUP= 3.83 = 46 ppm NO. OF GROUPS= 4
 K FACTOR= 2.



AFIN

ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR COPPER OVER AREA TRAPLINE MOUNTAIN

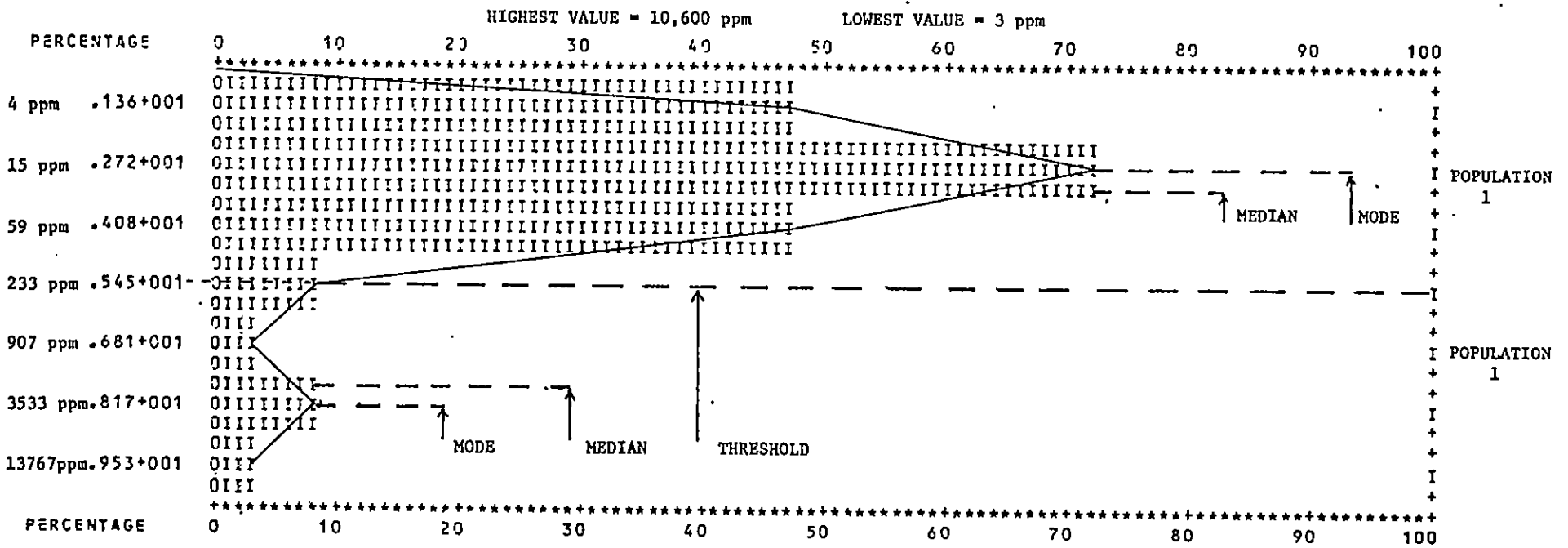
SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE R = ANDESITE
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE 91 0 0 0 0 0 0 0 0

SAMPLE TYPES INCLUDED ARE R = ROCKS.

DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***
 ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= 3.40469721 - - - - - 30 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 1.87979110 - - - - 6 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .54534227 - - - - 54%

STEP= 1.36
 CENTERPOINT OF INITIAL GROUP= 1.36 = 4 ppm NO. OF OBSERVATIONS= 41
 CENTERPOINT OF FINAL GROUP= 9.53 = 13,767 ppm NO. OF GROUPS= 7
 K FACTOR= 2.



ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR COPPER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE W = LAPILLI + AGGLOMERATE
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE S1 0 0 0 0 0 0 0 0 0

SAMPLE TYPES INCLUDED ARE R = ROCKS-

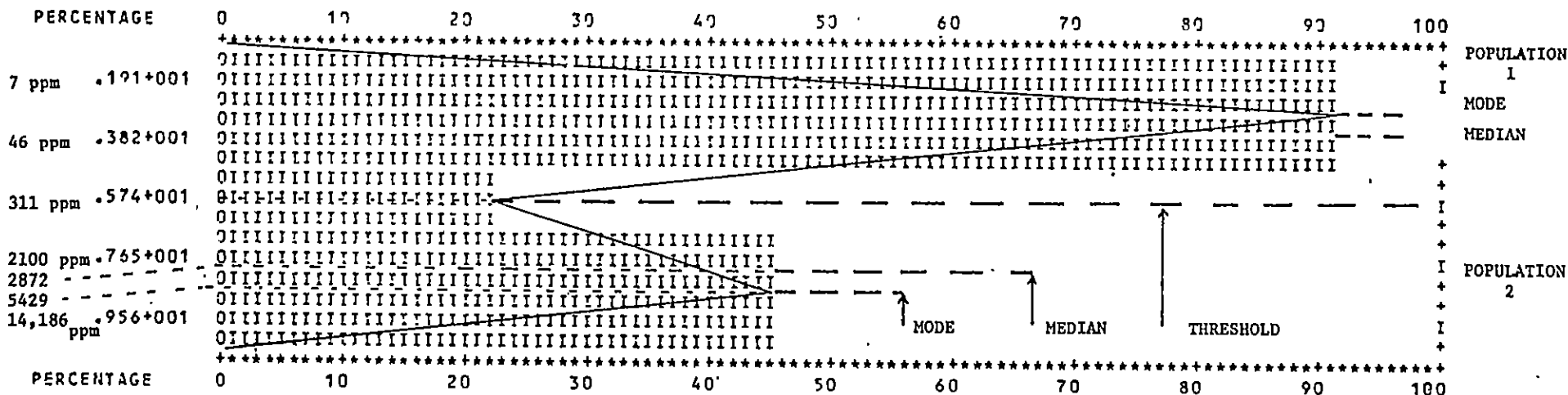
DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***

ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= 4.64865047 - - - - 104 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 2.62355434 - - - 14 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .54224889 - - - 54%

STEP= 1.91
 CENTERPOINT OF INITIAL GROUP= 1.91 = 7 ppm NO. OF OBSERVATIONS= 13
 CENTERPOINT OF FINAL GROUP= 9.56 = 14,186 ppm NO. OF GROUPS= 5
 K FACTOR= 3.

HIGHEST VALUE = 6300 ppm LOWEST VALUE = 3 ppm



ENDAKO GEOCHEMICAL ANALYSIS SYSTEM

STATISTICAL CALCULATIONS FOR COPPER OVER AREA TRAPLINE MOUNTAIN

SAMPLE DESCRIPTIONS INCLUDED ARE RCP=* SS=* SO=* V=*
 SOIL PROVIDENCE SAMPLES INCLUDED ARE *
 ROCK CLASS SAMPLES INCLUDED ARE T = BASALT
 SOIL HORIZON SAMPLES INCLUDED ARE *
 GEOLOGISTS INCLUDED ARE TR
 YEARS INCLUDED ARE 81 0 0 0 0 0 0 0 0

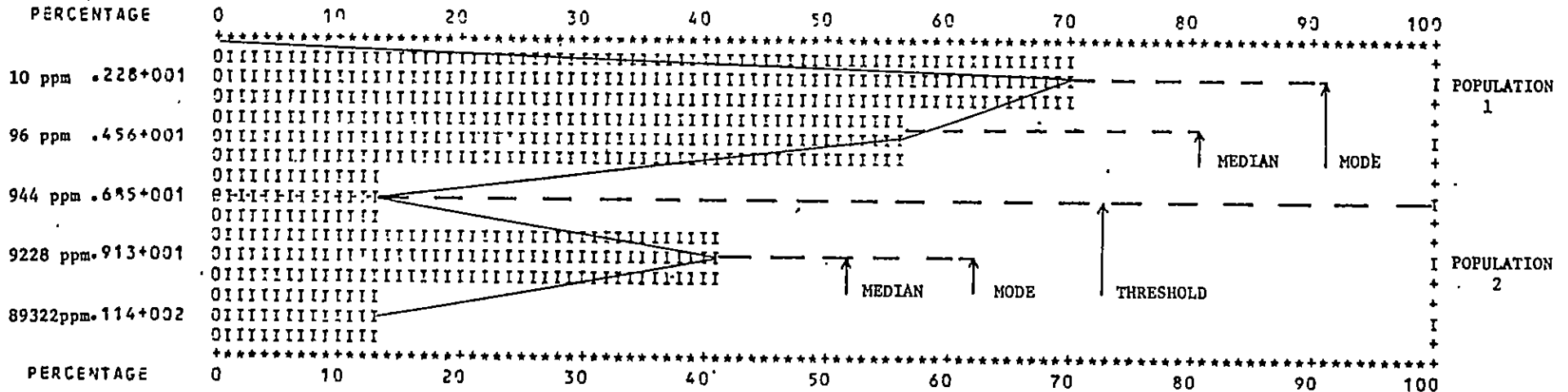
DATE APRIL 1982

*** THE FOLLOWING STATISTICS WERE CALCULATED USING THE NATURAL LOG OF ALL THE VALUES IN THE SAMPLE POPULATION ***

ARITHMETIC MEAN OF NATURAL LOG OF ASSAYS= 5.03697973 - - - - - 153 ppm
 STANDARD DEVIATION OF NATURAL LOG OF ASSAYS= 3.07095574 - - - - - 22 ppm
 COEFFICIENT OF VARIATION OF NATURAL LOG OF ASSAYS= .59748511 - - - - - 59%

STEP= 2.29241810
 CENTERPOINT OF INITIAL GROUP= 2.28 = 10 ppm NO. OF OBSERVATIONS= 14
 CENTERPOINT OF FINAL GROUP= 11.40 = 89,322 ppm NO. OF GROUPS= 5
 K FACTOR= 2.

HIGHEST VALUE = 36,900 ppm LOWEST VALUE = 4 ppm



AFIN

V.L.F. E.M. RADEM SURVEY:

A V.L.F. E.M. survey was conducted on the Bill and Jack Claims near Terrace, B.C. between July 20 and July 23, 1981. The survey was conducted in conjunction with geological mapping and soil geochemical sampling. Transmitting station was Seattle, Washington at 18.6 kHz. A Crone V.L.F. E.M. receiver was used to record tilt angle readings of east or west tilt. In addition, field strength readings as a percent of normal field strength from an established base station were recorded. Field strength at the base station was 340 percent.

DATA:

Tilt angle readings are the result of deviation from the normal horizontal incoming transmitted E.M. field which in the absence of conductors is zero. If a conductor is present, a secondary field is generated which results in readings that are positive or negative deviation from the horizontal. These readings when plotted in profile form depict conductors at the point where they cross the zero line.

Field strength readings either total or horizontal measure the strength of the horizontal E.M. field. Field strength readings should peak at crossovers and conductive zones.

Fraser Filter computations were performed on the tilt angle data to better define conductors that might otherwise be masked by the presence of stronger conductive zones. The filter is a mathematical operation which phase shifts the data 90° and allows it to be contoured. Negative results are considered to be anomaly flanks. Operation is simple and as follows: $(M3 + M4) - (M1 + M2)$ which equal a plot point midway between M2 and M3. M1, M2, M3 and M4 are any four consecutive stations.

DATA PRESENTATION:

Actual location of surveyed lines is shown in plan on Map 2. The X on Map 2 denotes the original native copper showing. Profiles are otherwise referenced by their intersection with the north-south orientated road that cuts between the numerous small lakes. Each profile shows the degrees tilt from the horizontal, percent of normal field strength from the established station and Fraser Filter computations which were performed from west (+) to east (-).

RESULTS:

Profile of Road (A) does not exhibit a tilt angle crossover. However, an increase in field strength and a positive filter response correspond fairly well with the original native copper showing.

Road (B) profile depicts increases in both field strength and filter computations where a zone of copper mineralization was mapped. Tilt angle readings inflect toward zero indicating a conductive zone which corresponds with the mapped mineralization.

Line 12 + 00 depicts a crossover with corresponding field strength and Fraser Filter peaks 50 metres west of the road. This crossover is most likely due to a faulted or sheared contact between two major rock types. A shallow inflection toward 0° tilt exists 130 metres east of the road. It is in the vicinity of a Fraser Filter peak. This expression is most likely due to the creek in this area. A small expression is evident on all profiles 460 metres west of the road. This may be due to presence of hematite rich rocks.

A crossover with a coincident field strength peak and an increase on the Fraser Filter computations exists at the point where Line 16 + 00 crosses the road. The cause for this crossover is the same as the one 50 metres west of the road Line 12 + 00.

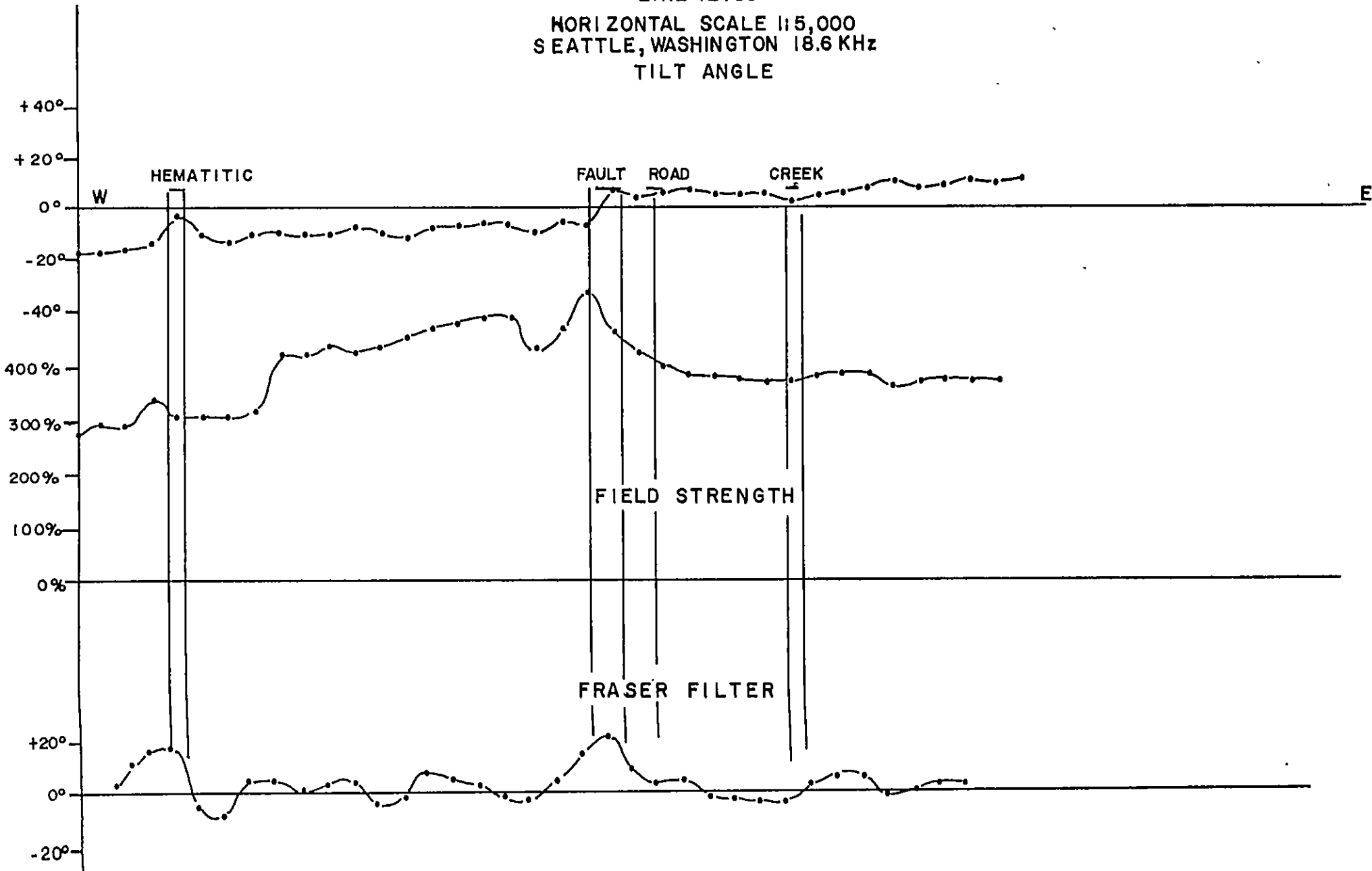
A small bornite showing tends to be depicted by the Fraser Filter 425 metres west of the road.

A zone 550 metres to 670 metres west of the road is here and there mineralized with bornite and chalcopyrite. This zone is manifested by a field strength high, two Fraser Filter peaks and a slight inflection toward zero degrees tilt.

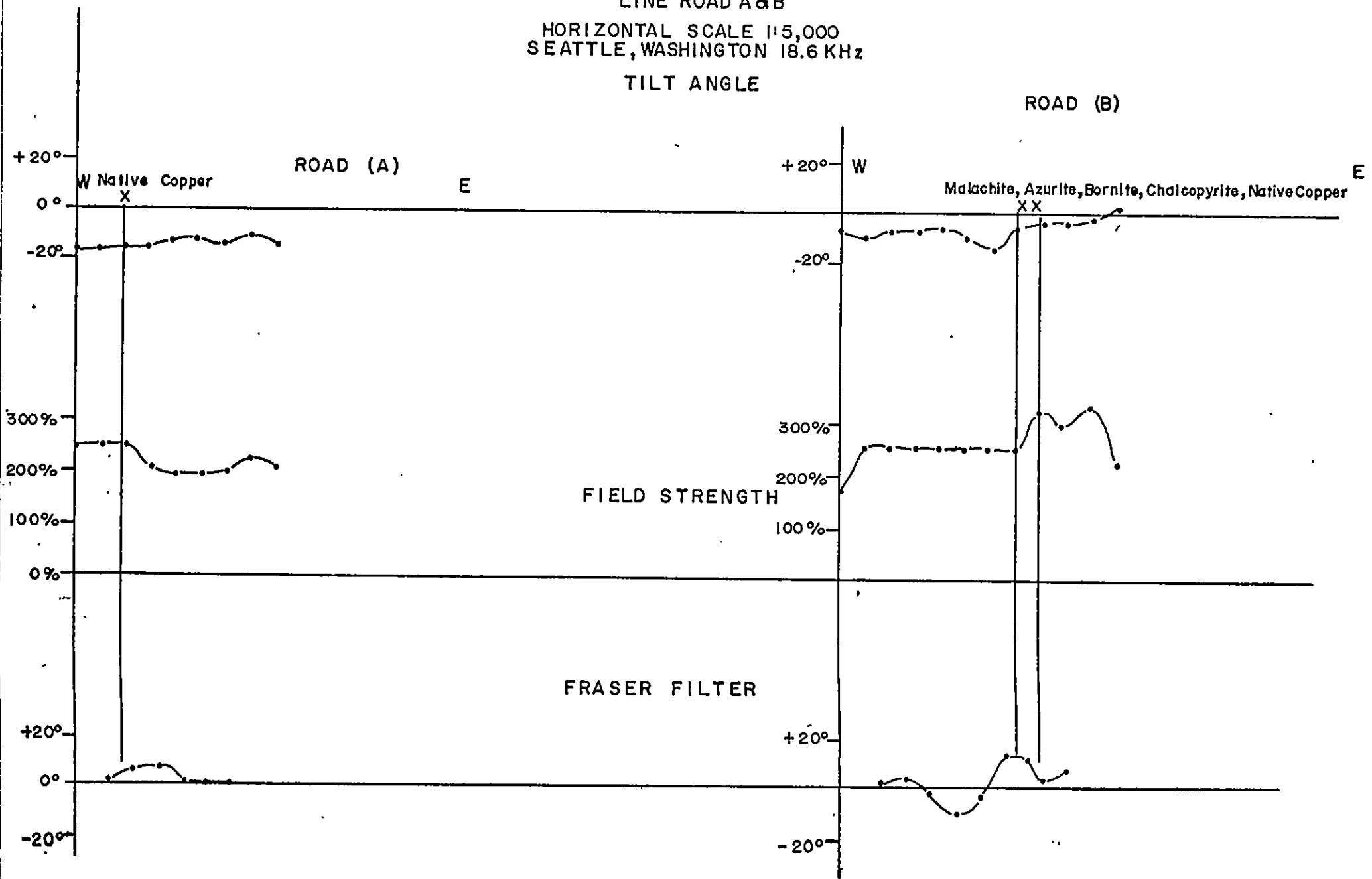
BILL & JACK CLAIMS
TERRACE, B.C. AREA

VLF EM PROFILE
LINE 12+00

HORIZONTAL SCALE 1:5,000
SEATTLE, WASHINGTON 18.6 KHz
TILT ANGLE



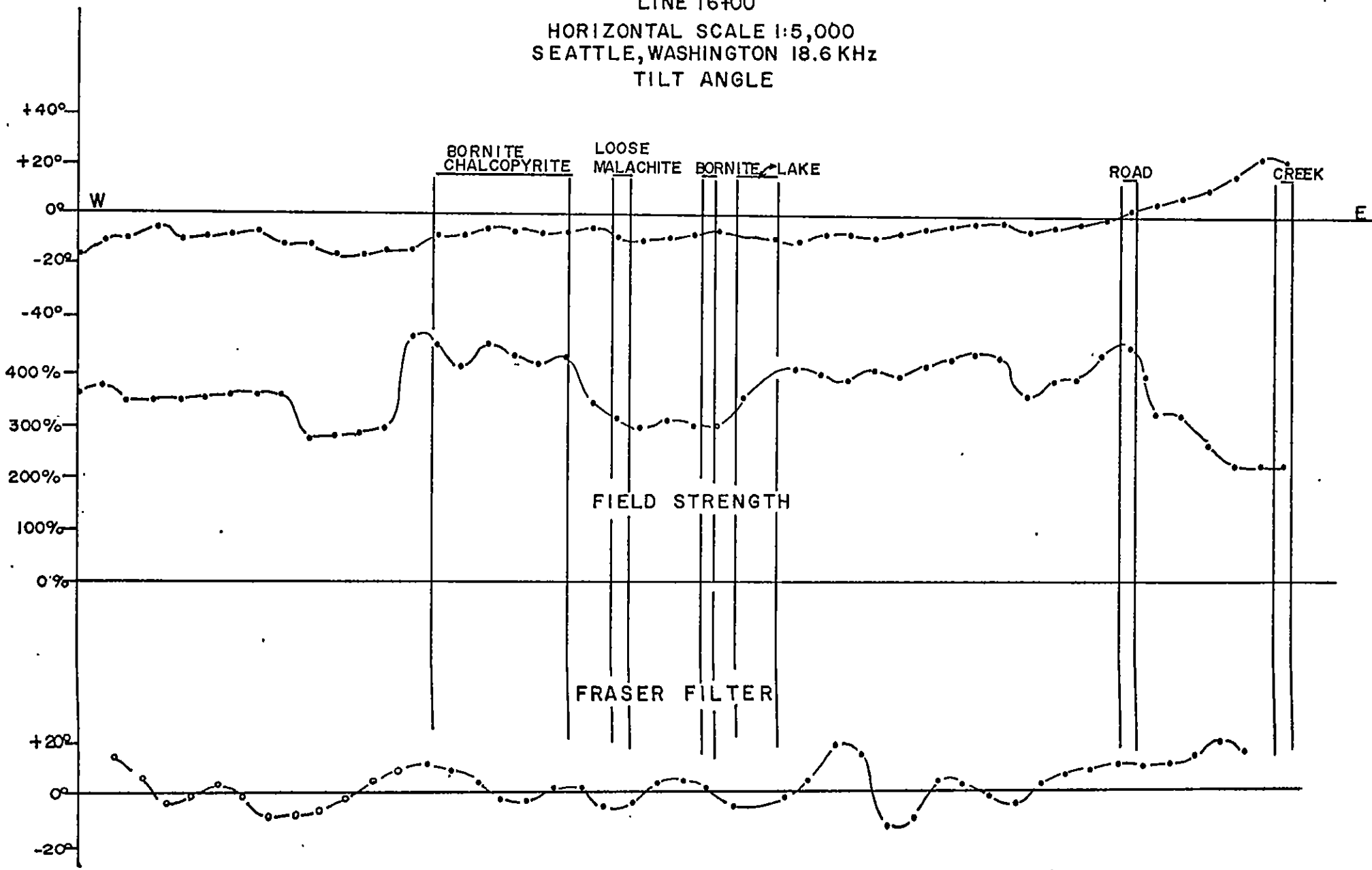
BILL & JACK CLAIMS
 TERRACE, B.C. AREA
 VLF EM PROFILE
 LINE ROAD A&B
 HORIZONTAL SCALE 1"=5,000
 SEATTLE, WASHINGTON 18.6 KHz
 TILT ANGLE



BILL & JACK CLAIMS
TERRACE, B.C. AREA

VLF EM PROFILE
LINE 16+00

HORIZONTAL SCALE 1:5,000
SEATTLE, WASHINGTON 18.6 KHz
TILT ANGLE



STATEMENT OF EXPENDITURES

The following expenses were incurred by Placer Development Limited, Endako Mines Division for conducting geochemical, geological and geophysical surveys over portions of the Bill and Jack group of claims held by Messr's. W. Makowichuk and J. Whittaker.

To facilitate field work, both surveys were carried out simultaneously, as a result the personnel costs for the surveys are lumped together.

PERSONNEL COSTS

<u>Personnel</u>	<u>Period Employed</u>	<u>Rate/Day</u>	<u>Cost</u>
W. Bulmer	July 20 - 23	200.00	800.00
J. Peters	July 20 - 23	170.00	680.00
T. Williams	July 20 - 23	90.00	360.00
L. Bruvold	July 20 - 23	85.00	340.00
M. McMahon	July 20 - 23	90.00	360.00
			<u>2540.00</u>

Accommodation & Board

Accommodation - 5 men @ 3 nights	\$ 238.50
Meals - 5 men @ 4 days	338.20

Transportation

4 x 4 Vehicle - 4 days @ \$30.00 per day	120.00
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Geochemical Analyses Costs

27 soil @ \$5.90 = \$159.00	
87 rocks @ \$10.15 = \$880.00	1039.00

Map Drafting and Report Preparation

J. Peters	3 days @ 170/day	510.00
W. Bulmer	15 days @ 200/day	3000.00

GRAND TOTAL 7785.00

CONCLUSION:

Soil, rock geochemical surveys combined with radem and geological surveys over a portion of the claims owned by W. Makowichuk and J. Whittaker on Trapline Mountain, detected Cu (Ag) mineralisation within a fine-grained basaltic unit. The unit may in fact represent a mineralised fine-grained mafic dyke. Fractures within the hematitic andesite and lapilli tuff may also contain secondary copper minerals ie. malachite.

/hh

CERTIFICATION
A.J. Peters

I, A.J. Peters, of Placer Development Limited, Endako Mines Division, Endako, B.C., do hereby certify that:

1. I am a Geological Technician.
2. I graduated from Nechako Valley Senior Secondary School in 1966 on University Entrance Programs with electives in Mathematics, Science and Social Studies.
3. My practical training from 1967 to the present has included the following:
 - a) Sampling and surveying in open pit mine;
 - b) Diamond and percussion drill sampling;
 - c) Plan, recommend, perform field work and supervise actual drilling projects;
 - d) Plan, conduct field work and interpret results on regional and detailed geo-chemical surveys;
 - e) Assist with planning, conduct field work and make preliminary interpretations on regional mapping programs;
 - f) Assist and conduct geophysical surveys; particularly induced polarisation and VLF surveys;

All of the above experience has been obtained under supervision of geologists and geophysicists.

4. I personally interpreted the geophysical data and prepared the geophysical report and accompanying maps.



A.J. Peters

STATEMENT OF QUALIFICATION

I, W.R. Bulmer, of Placer Development Limited,
Endako Mines Divison, Endako, B.C., do hereby certify that:

1. I am a Geological Technologist/Geologist.
2. I am a graduate of Cambrian College of Applied Arts and Technology with a Certificate in Geological Technology in 1973.
3. I am a graduate of University of Western Ontario with an Honours BSc. in Geology in 1976.
4. From 1971 until the present I have been engaged in mineral exploration in Ontario, Labrador Newfoundland, Yukon Territory and British Columbia.
5. I personally supervised and participated in the field work and have reviewed and assessed the data resulting from this work.

W.R. Bulmer

W.R. Bulmer

BILL & JACK CLAIMS

TERRACE B.C.

W. MAKOWICHUCK & J. WHITTAKER

GEOLOGY

Showing
 Malachite
 Bornite
 Chalcocopyrite
 Native Copper

Claim post
 Shear
 Fault
 Contact
 observed
 approximate
 assumed

Slide

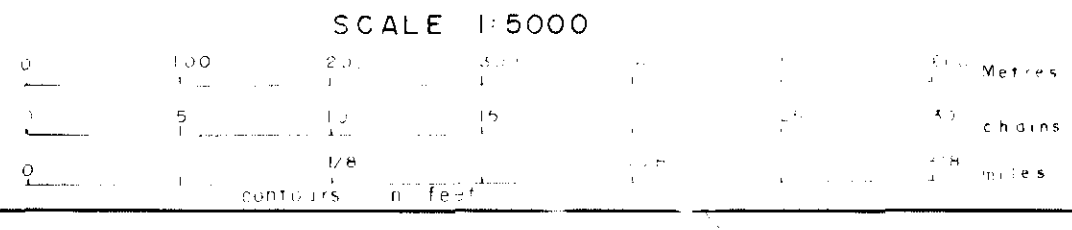
X
 Ma
 Bo
 Cpy
 Cu

- 9 FELSIC AUTOBRECCIA
 Pink to green felsic rhyolitic breccia - fragments angular, may be mineralised
- 8 FELSITE DYKE
 Fine-grained & cream-orange in colour. May contain quartz-eyes. Rhyolitic appearance.
- 7 INTERMEDIATE DYKE
 Medium-grained, porphyritic, bottle-neck & grey-cream in colour. Granodiorite-like.

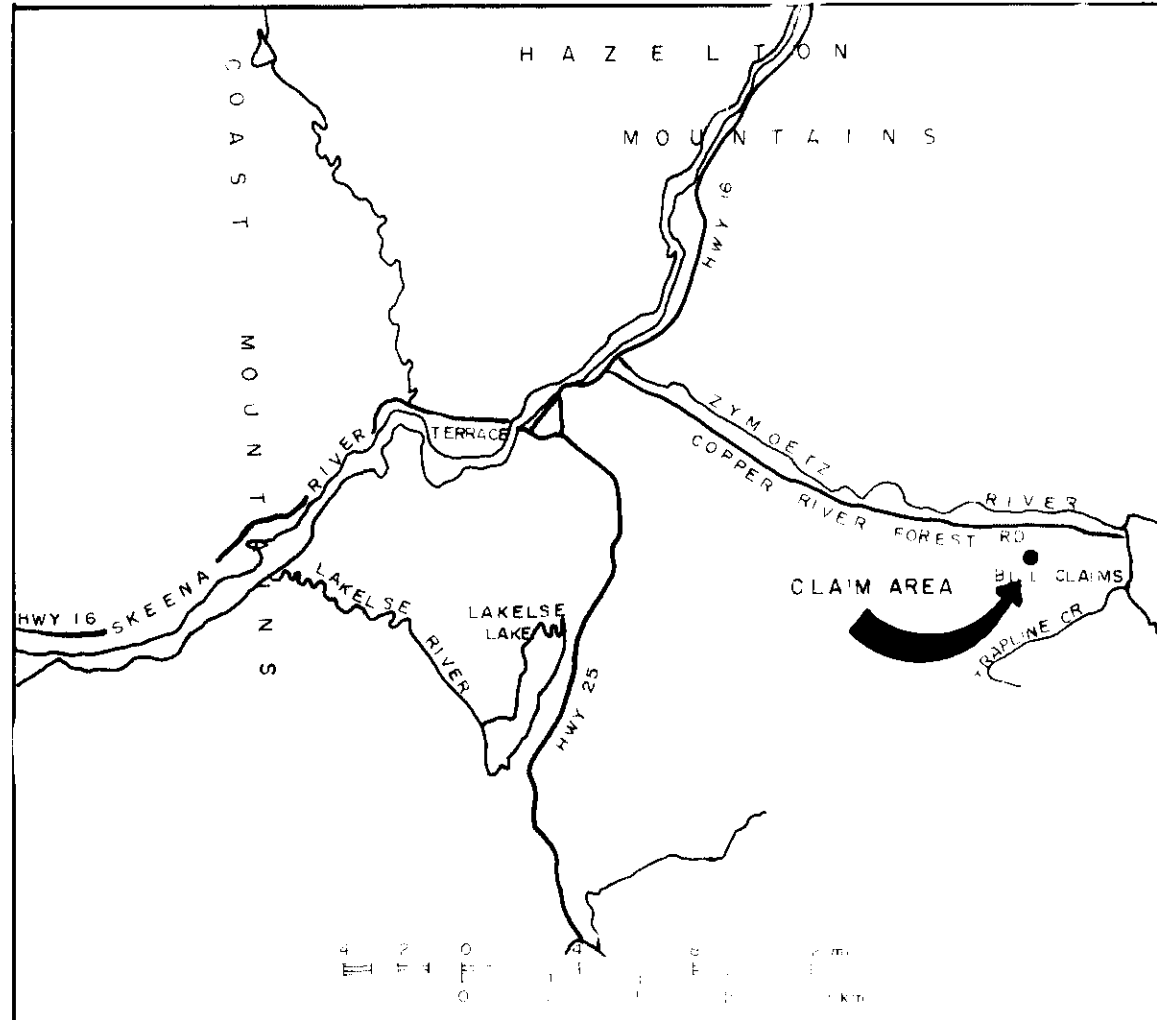
- 6 PORPHYRYTIC DIABASE
 Black to mauve plagioclase porphyry dyke - frothy texture, may be vesicular to amygdaloidal.
 a Long (15mm) plagioclase laths, frothy texture in fine-grained matrix.
 b Long (15-20mm) laths in vertical to amygdaloidal matrix, frothy texture in fine-grained matrix.
 c Laths 5mm long, kadonised & in friable brown-black matrix.
 d Laths 10mm long in hematitic matrix. Epidote rims calcite amygdalae.
 e Laths 3.5mm, randomly oriented in hematitic matrix - part of porphyritic flow?

- 5a FELSIC FRAGMENTAL
 Medium to fine-grained poly-titic breccia, fragments 10mm may be identified with 9.
 b Hematitic (spinel) agglomerate tuff, light cream-pink matrix with elongated flattened fragments.
- 4 FELSIC CRYSTAL DYKE
 Small (2mm) oriented cream plagioclase in fine-grained pink-grey siliceous matrix.
- VOLCANIC MUDFLOW
 Grey-green poly-titic rhyolitic chertic fragments - volcanogenic conglomerate.

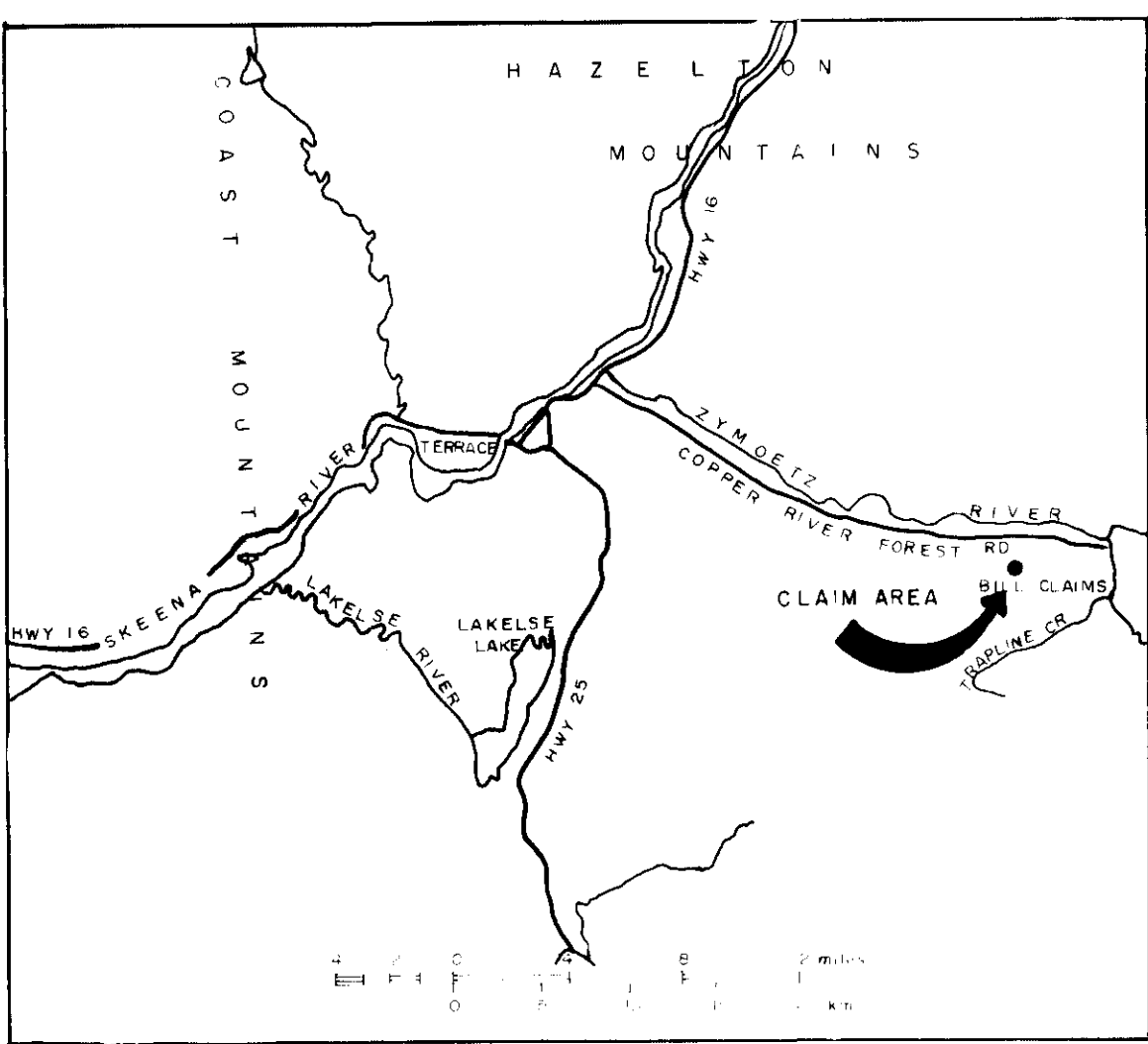
- 2a MAUVE ANDESITE FLOW
 Fine-grained crystal flow, sparsely mineralised.
 b Fine-grained, more vesicular, ash-buff.
 c Amygdaloidal calcite, quartz, epidote, hematite.
 d Amygdaloidal calcite, quartz deformed.
- BASALT (Greenstone)
 Very fine grained, dark green, may have hematitic calcite. Most is amygdaloidal calcite, matrix includes numerous hematite & quartz. Blocks weathered to a brownish red soil. Slide shown, contains Native copper host.



103 I



MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
10,541



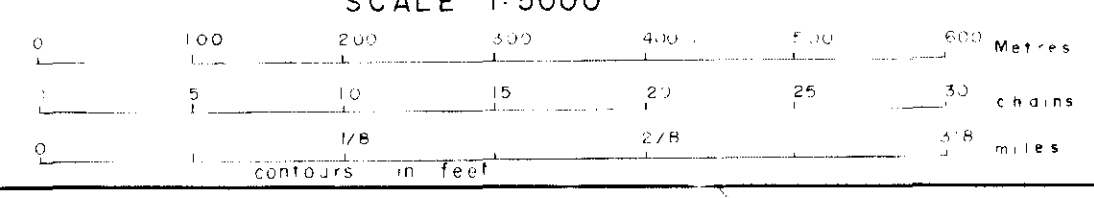
BILL & JACK CLAIMS
TERRACE B. C.
W. MAKOWICHUCK & J. WHITTAKER

SOIL GEOCHEMISTRY

BITRX33

ppm Cu	ppm Zn
ppm Pb	ppm Ag

SCALE 1:5000



103 I

X 73
 97 220
 390 .1

X 72	X 71	X 70	X 69	X 68	X 67	X 66	X 65	X 61	X 62	X 63	X 64	
26 56	10 16	19 63	16 13	67 73	11 33	12 28	18 41	11 32	15 38	38 93	13 27	
5 .1	8 .1	8 .1	9 .1	10 .1	9 .1	6 .1	7 .1	8 .1	4 .2	10 .2	6 .1	
X 76	X 75	X 74	X 60	X 59	X 58	X 57	X 56	X 51	X 52	X 53	X 54	X 55
18 63	8 34	7 30	13 58	23 47	14 14	23 32	7 43	13 32	28 46	35 60	22 41	19 71
7 .1	7 .1	6 .2	9 .1	7 .2	9 .2	4 .3	8 .3	9 .1	2 .2	4 .1	3 .2	3 .1
X 77												
10 65												
8 .1												

MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
10541
 No.

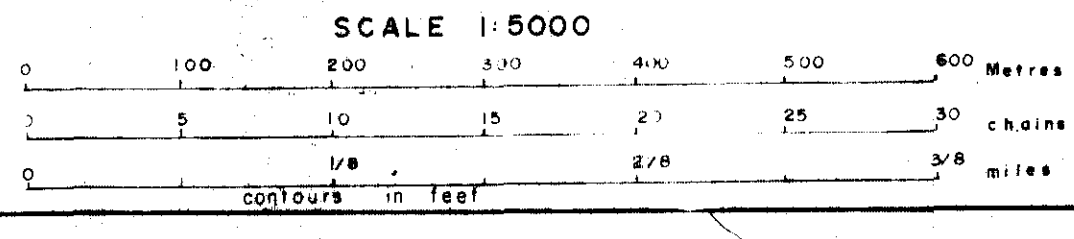
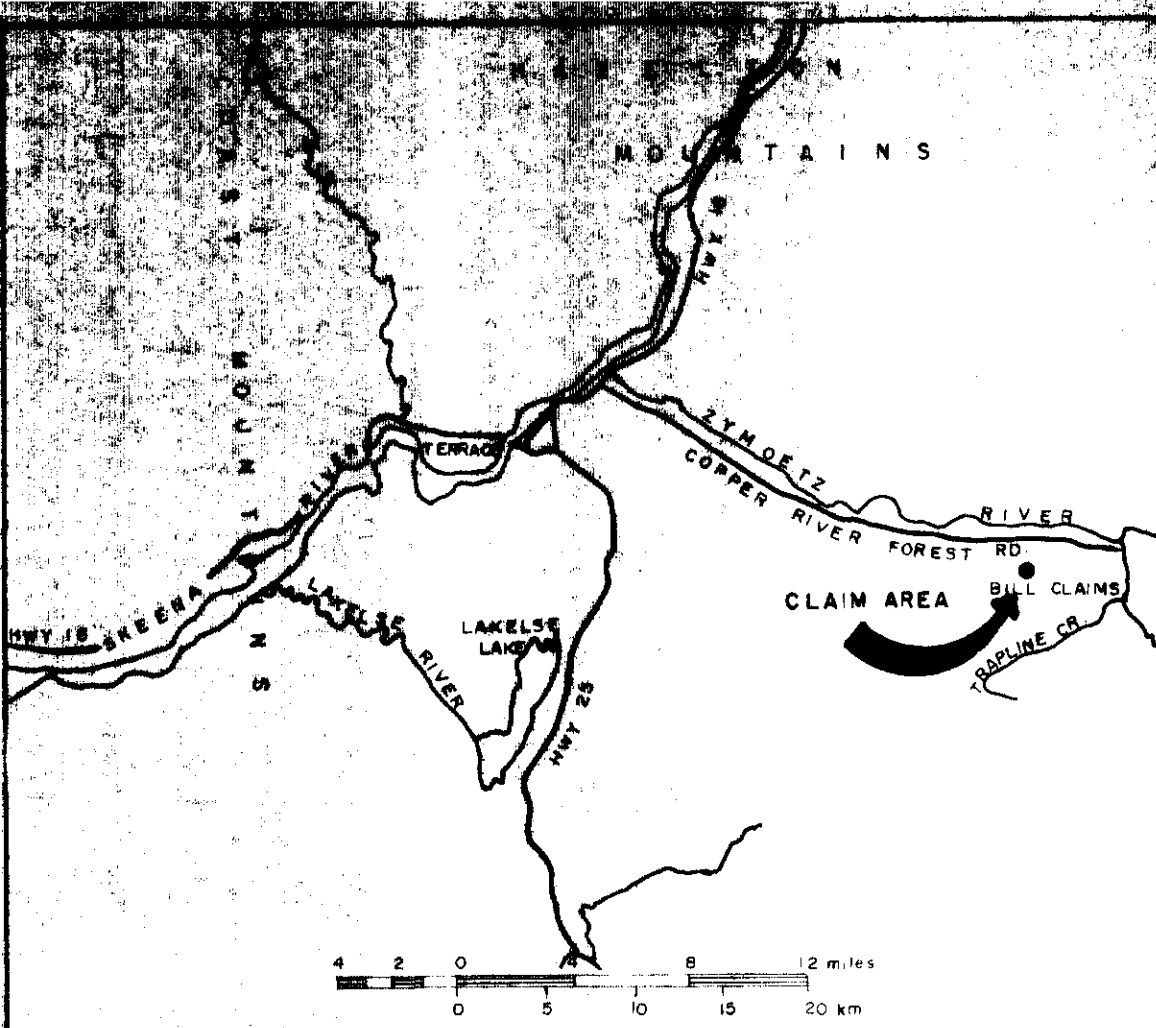
BILL & JACK CLAIMS

TERRACE B. C.

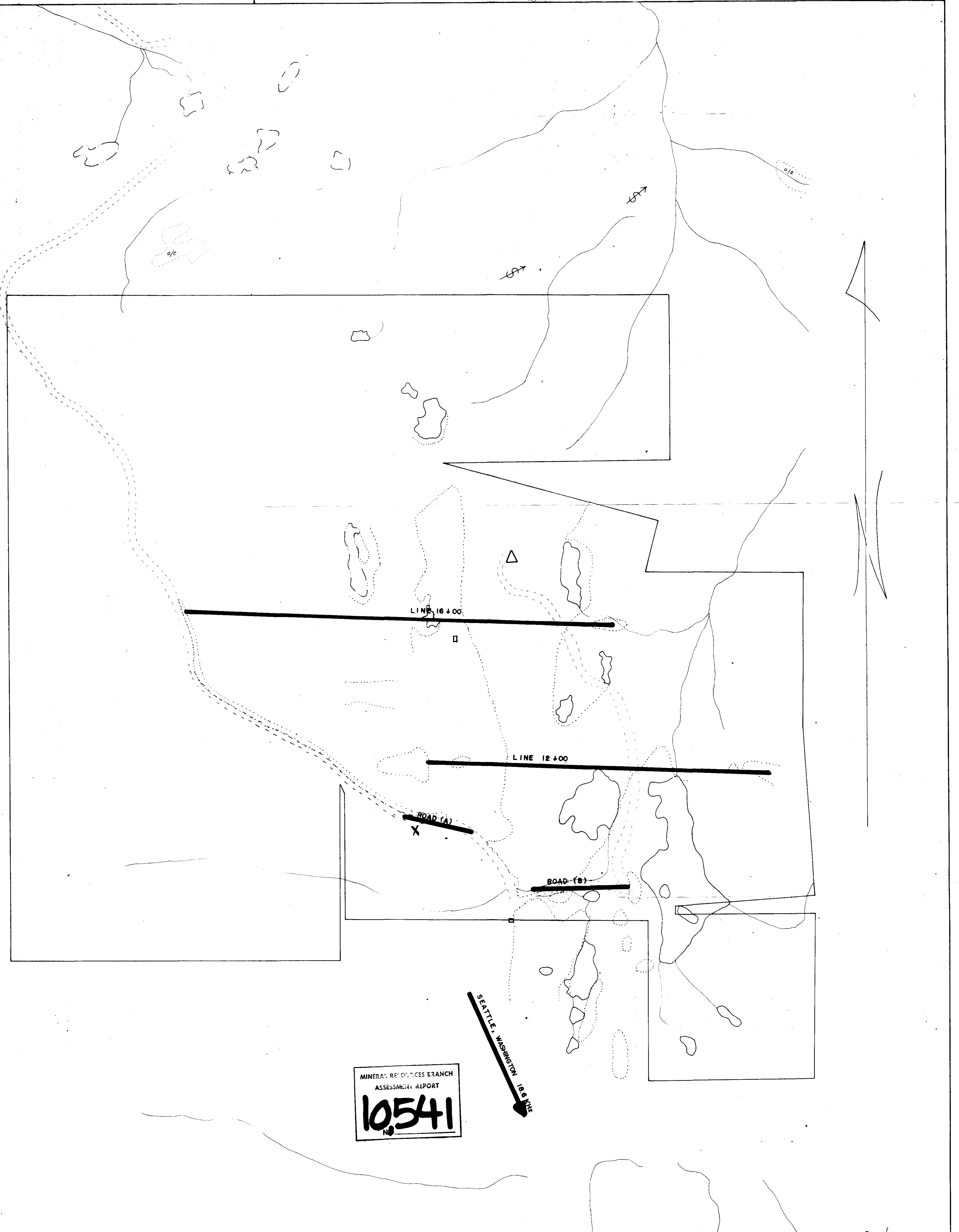
W. MAKOWICHUCK & J. WHITTAKER

VLF SURVEY LINES

Profiles in text



103 I



MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
10541
NO.

DRAWN A. J. PETER	SCALE 1:5000	PLACER DEVELOPMENT LIMITED ENDAKO MINES DIVISION	VLF EM PLAN	MAP 4
TRACED	DATE FEB 82	BILL & JACK CLAIMS	FILE No.	REV No.
CHECKED	APPROVED			

BILL & JACK CLAIMS
TERRACE B.C.
W. MAKOWICHUCK & J. WHITTAKER

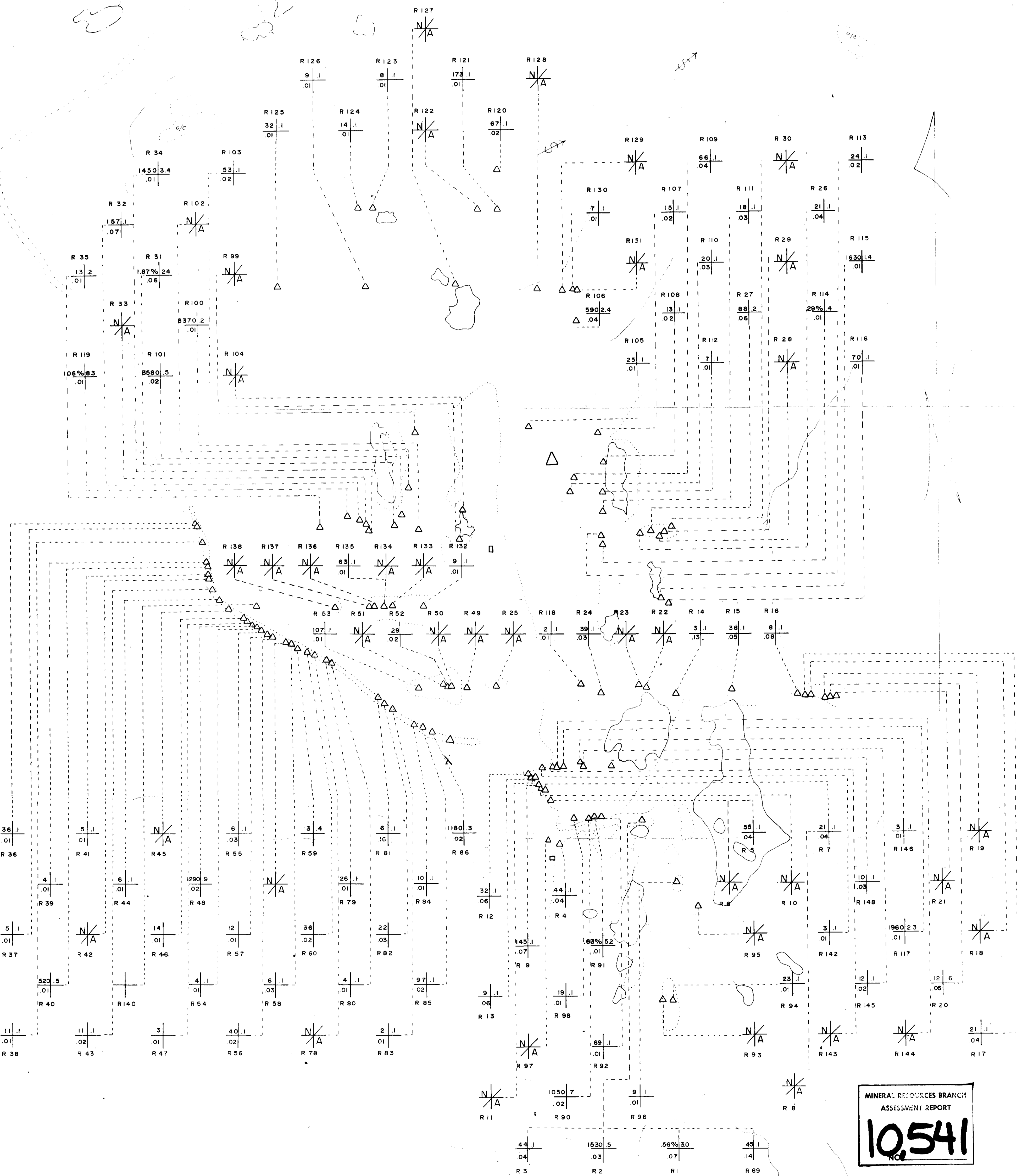
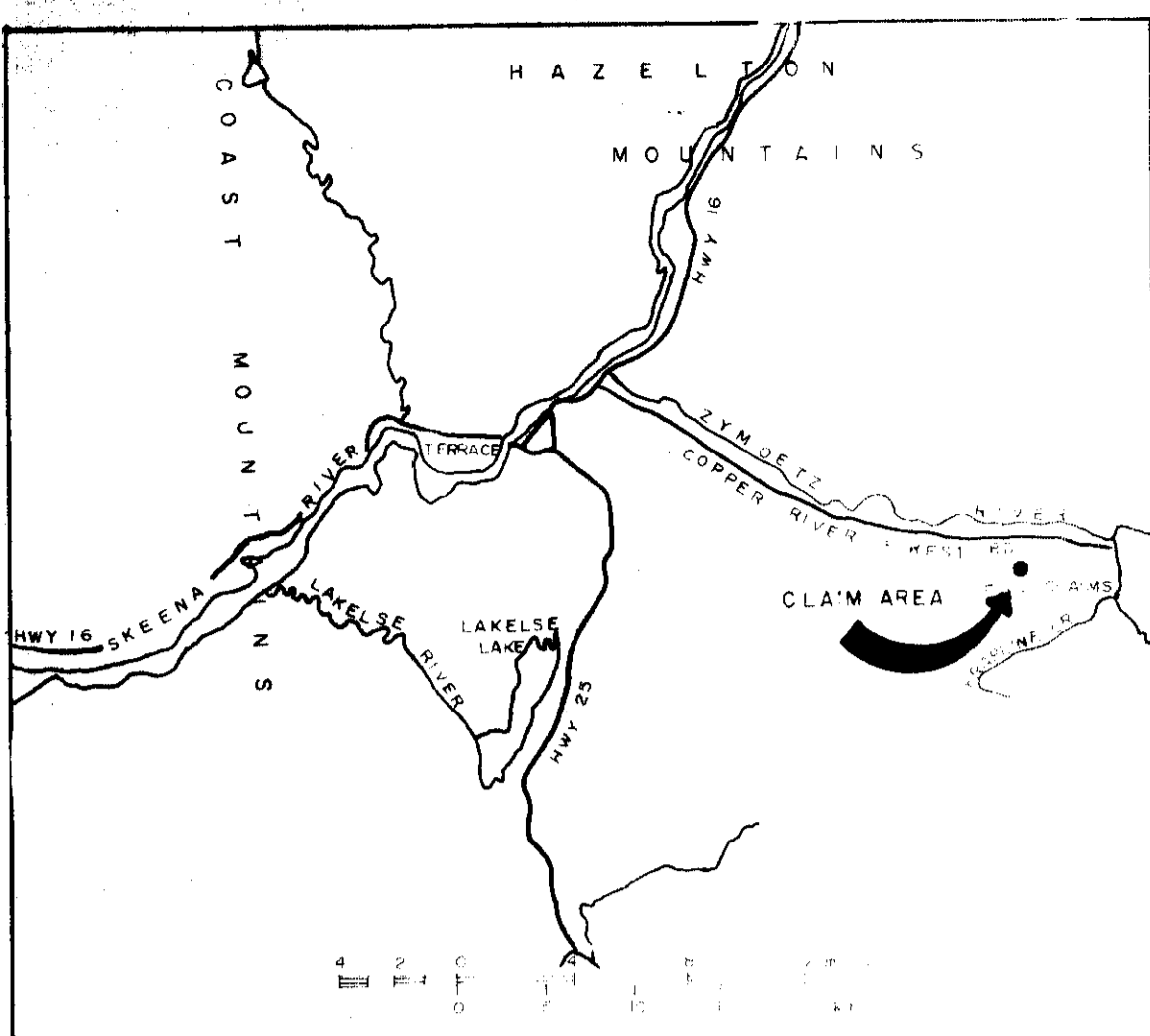
ROCK GEOCHEMISTRY

81TRR33

ppm Cu	ppm Zn
ppm Pb	ppm Ag

SCALE 1:5000

103 I



MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
10541
 NO.