GEOLOGY, GEOCHEMISTRY, AND VLF-EM

SURVEY REPORT

Pete 1-4, Mineral Hill, Mineral Hill B, C, F, G claims

Nos. 4956, 4955, 4953, 4954, 206, 398, 1641, 5215, 5216

Omineca Mining Division, B.C.

NTS 93 L/10 E

Latitude	54° 31' N
Longtitude	126° 42½' W

Owner and Operator: Noranda Exploration Company, Limited
(No Personal Liability)
Vancouver, B.C.

Report by: Graham Gill and Del Myers
Noranda Exploration Company, Limited
Prince George, B.C.

Submitted: March 1984

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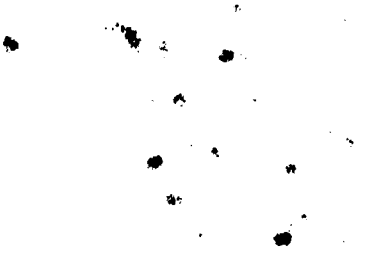

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SUMMARY

The Mineral Hill claim group is located 14 km NNW of Houston, B.C. The claims are underlain by massive and fragmental andesites to rhyolites intruded by Late Cretaceous Bulkley intrusives of dioritic to granitic compositions.

Previous work done on the Mineral Hill claims involved the excavation of adits and pits by prospectors before 1950 and geochemical, geophysical and geological surveys carried out by several different companies from 1960 to the present. Well over a hundred drill holes have been drilled on these claims searching for porphyry Mo - Cu mineralization.

Several pieces of evidence suggested that the area might be a host for syngenetic, volcanic-hosted, massive sulfide or epigenetic, "Sam Goosly" mineralization. Geological and geochemical surveys on the claims in 1983 failed to confirm the existence of such mineralization. Encouragement is still given by silt geochemical anomalies over the Pete 1-4 claims and the central swamp (@ 10,000 N, 11,000 E) and by a coincident Zn-Cu-Ag soil anomaly centered at 9000 N, 9800 E. The best mineralization found in 1983 was associated with quartz veins, and is probably not significant economically.

Additional geological mapping, rock and soil geochemical sampling, and geophysical surveying is recommended in certain areas, to attempt to locate better targets for trenching or drilling.

INTRODUCTION

Exploration work, consisting of geochemical, geophysical, and geological surveys, was done on the Mineral Hill claim group in 1983. One hundred four (104) man-days of work were done. The geochemical, geological, and VLF-EM surveys (62 man-days) are discussed in this report. A separate report by Lyndon Bradish will cover other geophysical surveys (42 man-days).

Many companies have worked on the Mineral Hill claims investigating a possible Mo - Cu porphyry deposit system. The target for 1983 work was volcanogenic massive sulfides or "Goosly-type" mineralization.

Several reasons for considering these type of targets on the property are:

1. Favorable environment i.e. Babine shelf facies of an ancient volcanic-ore setting (Tipper and Richards, 1976).

2. Adjacent to Bulkley intrusive (approx. 70 m.y.) which may have acted as a heat source for a convective cell circulating mineralizing, epigenetic fluids,

. . . 2

3. high Cu-Zn values in silt samples taken previously (and not followed up),

4. several 1978 Noranda airborne VLF-EM survey anomalies in silt anomaly source area,

5. a NNW trend of showings passing through Mineral Hill which exhibit exhalive characteristics.

Location and Access

The Mineral Hill group of claims is centered at latitude 54° 31.1' N and longitude 126° 42.6' W on map sheet NTS 93 L/10E in the Omineca Mining Division.

Mineral Hill claim group is composed of 62 units and is situated on a flat-topped hill (Mineral Hill) on the south side of Grouse Mountain, approximately 14 km NNW of Houston, B.C. (Figures 1,2).

Access to the property is by 4 km of dirt road which heads east from Highway 16 through property owned by Mr. George Murphy. The road is steep and rough. Four wheel drive vehicles are recommended.

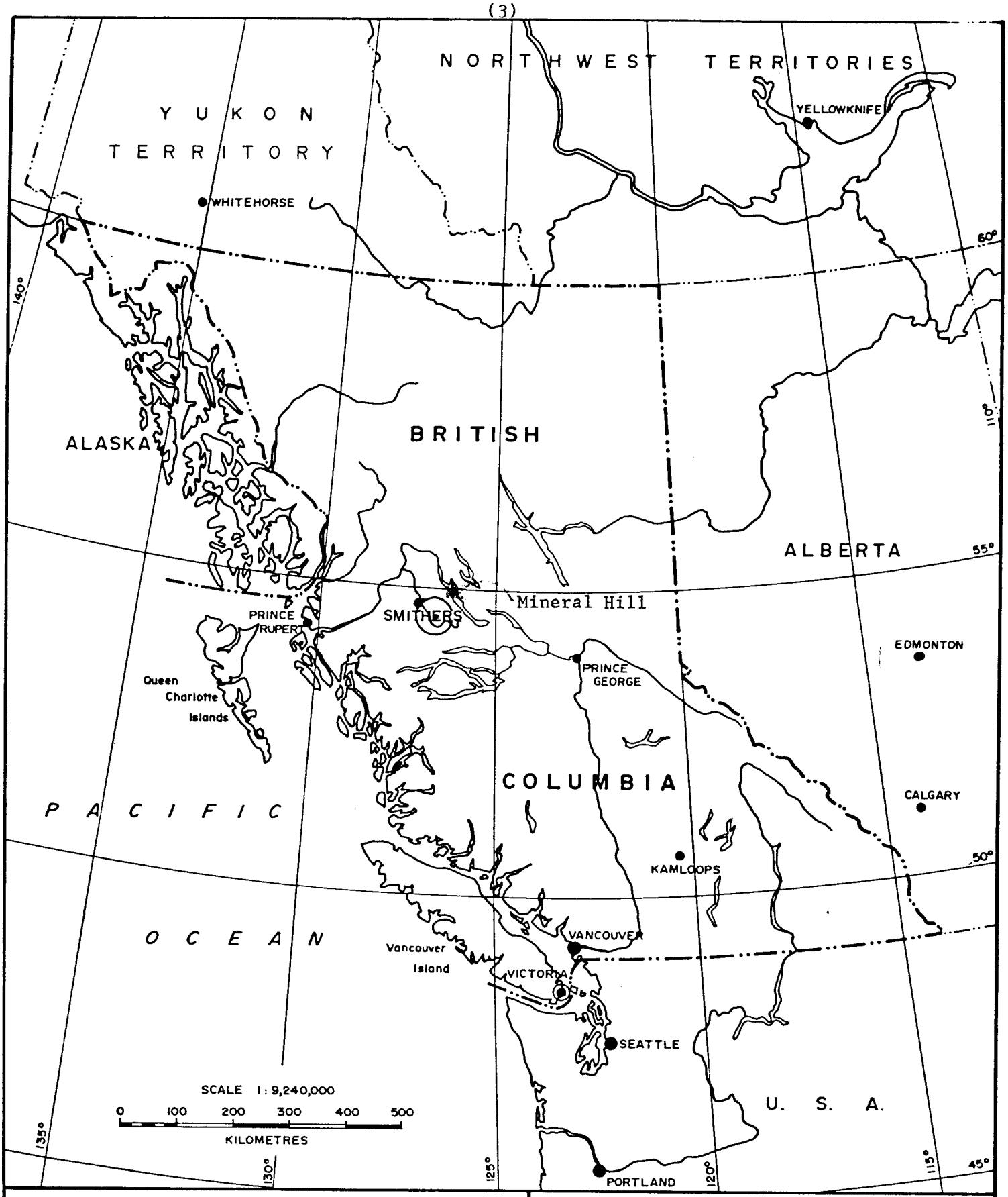


Figure 1. Location of the Mineral Hill Claim Group
NTS 93 L / 10E

noranda

NORANDA EXPLORATION COMPANY LTD.
Office : Smithers, B.C.

MAP TITLE	LOCATION MAP
PROJECT TITLE	Mineral Hill
PROJECT NO. 1039-1	SCALE 1 : 9,240,000

Figure 2. Location Map, Mineral Hill Claim Group

NTS 93 L / 10E Noranda Exploration Company Limited(NPL)

Physiography

The properties lie on a mountain (Mineral Hill) south of Grouse Mountain. Mineral Hill overlooks the broad, flat bottomed Bulkley Valley (2500'). To the NE of the Bulkley Valley the NW-SE trending Skeena Mountains rise to a local elevation of 5312 feet (benchmark on Grouse Mountain). The Skeena Mountains are rather rounded and rolling in this area.

The southern boundary of the Mineral Hill G claim runs along the base of a large cliff approximately 500 feet in height (Figure 3). The eastern and western limits of the Mineral Hill F and G claims run along steep, east and west-facing sides of Mineral Hill. Mineral Hill reaches an elevation of just over 4500 feet. The top on Mineral Hill is a small plateau. It can be described as an area of small rolling hills and valleys intersparsed with small lakes and swamps. Many of the small rises in this area of the property can be attributed to resistant trachytic cap rocks or to eskers. Trends of the eskers are roughly NW-SE which coincides with the trend of the range itself (see Figure 3).

Drainage on most of the property is basically restricted to small, intermittent creeks flowing into the major swamp located in the center of Mineral Hill and the SW flowing creek which empties the swamp. Another prominent drainage can be found in the NW corner of Mineral Hill F where a large creek drains the higher elevations of Grouse Mountain. Many smaller tributaries which feed a large creek to the east of the claim group originate from the NE-SW trending ridge located directly north of the central swamp.

Due to the glacial cover, swamps and undergrowth found on this rounded mountain, good exposure is limited. The best locations on the property for outcrop are on the steeper slopes, along the banks of creeks, and on or near small hilltops.

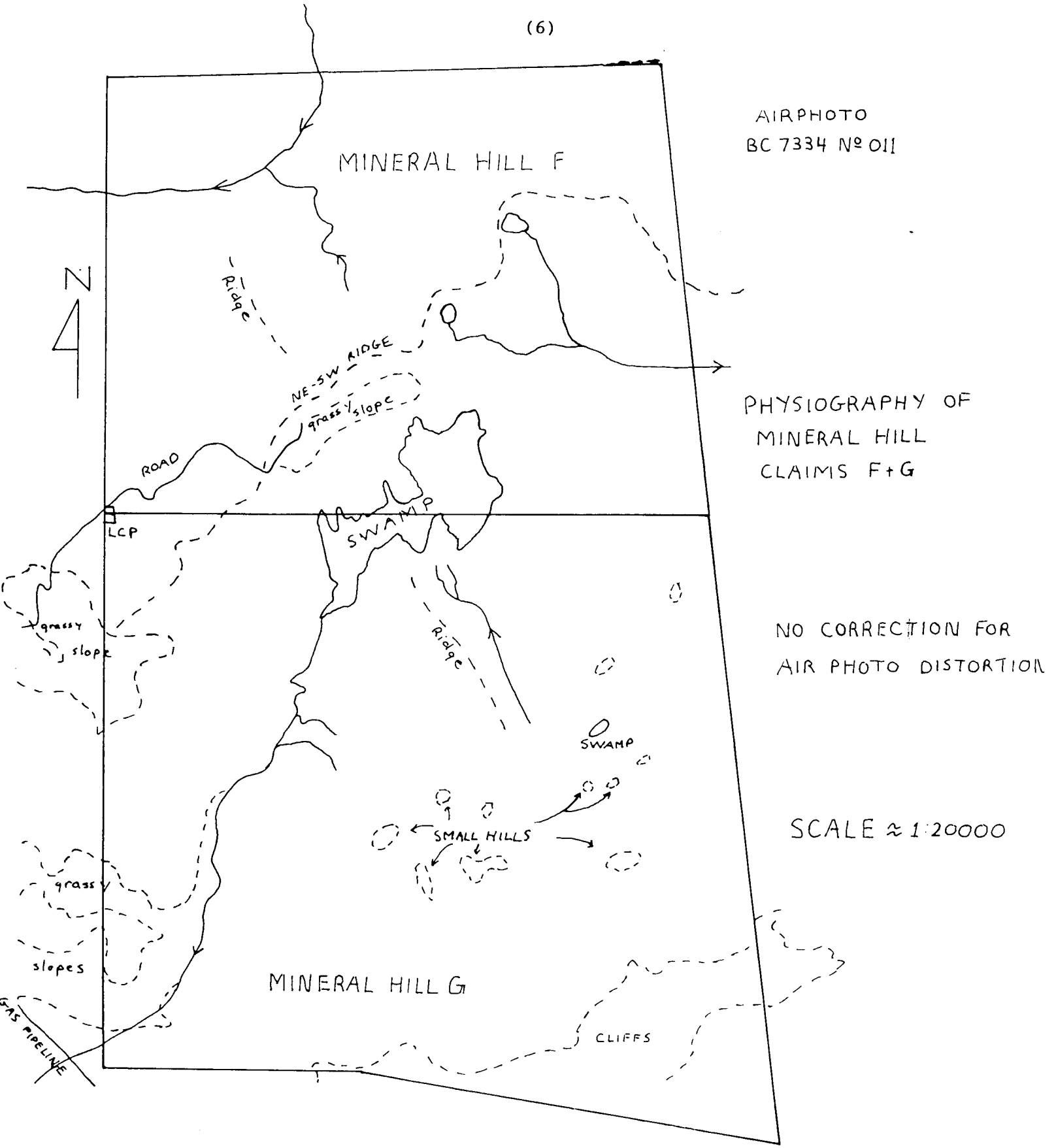


Figure 3. Physiography of the Mineral Hill F and G Claims

Property Description

The Mineral Hill claim group is composed of 12 claims consisting of 62 units (Table 1). Claims are variously owned by P.J. Huber, Lorne G. Warren, and Noranda Exploration. The Huber and Warren claims are under option to Noranda Exploration.

The locations of the various claims are shown on Figure 4. All claims are within the Omineca Mining Division of British Columbia.

TABLE 1. Claims of the Mineral Hill Claim Group

NAME	NUMBER	DATE RECORDED	DATE DUE	OWNERSHIP	UNITS
Mineral Hill	206	Jan. 22/76	Jan. 22/89	P.J. Huber	16
Mineral Hill A	397	Aug. 4/76	Aug. 4/89	P.J. Huber	2
Mineral Hill B	398	Aug. 4/76	Aug. 4/89	P.J. Huber	2
Mineral Hill C	1641	Mar. 12/79	Mar. 12/84	P.J. Huber	4
Mineral Hill D	1642	Mar. 12/79	Mar. 12/84	P.J. Huber	2
Mineral Hill E	1643	Mar. 12/79	Mar. 12/84	P.J. Huber	4
Pete 1	4956	Jan. 7/83	Jan. 7/84	Lorne B. Warren	1
Pete 2	4955	Jan. 7/83	Jan. 7/84	Lorne B. Warren	1
Pete 3	4953	Jan. 7/83	Jan. 7/84	Lorne B. Warren	1
Pete 4	4954	Jan. 7/83	Jan. 7/84	Lorne B. Warren	1
Mineral Hill F	5215	Jun. 14/83	Jun. 14/84	NORANDA EXPL.	12
Mineral Hill G	5216	Jun. 14/83	Jun. 14/84	NORANDA EXPL.	16
					62

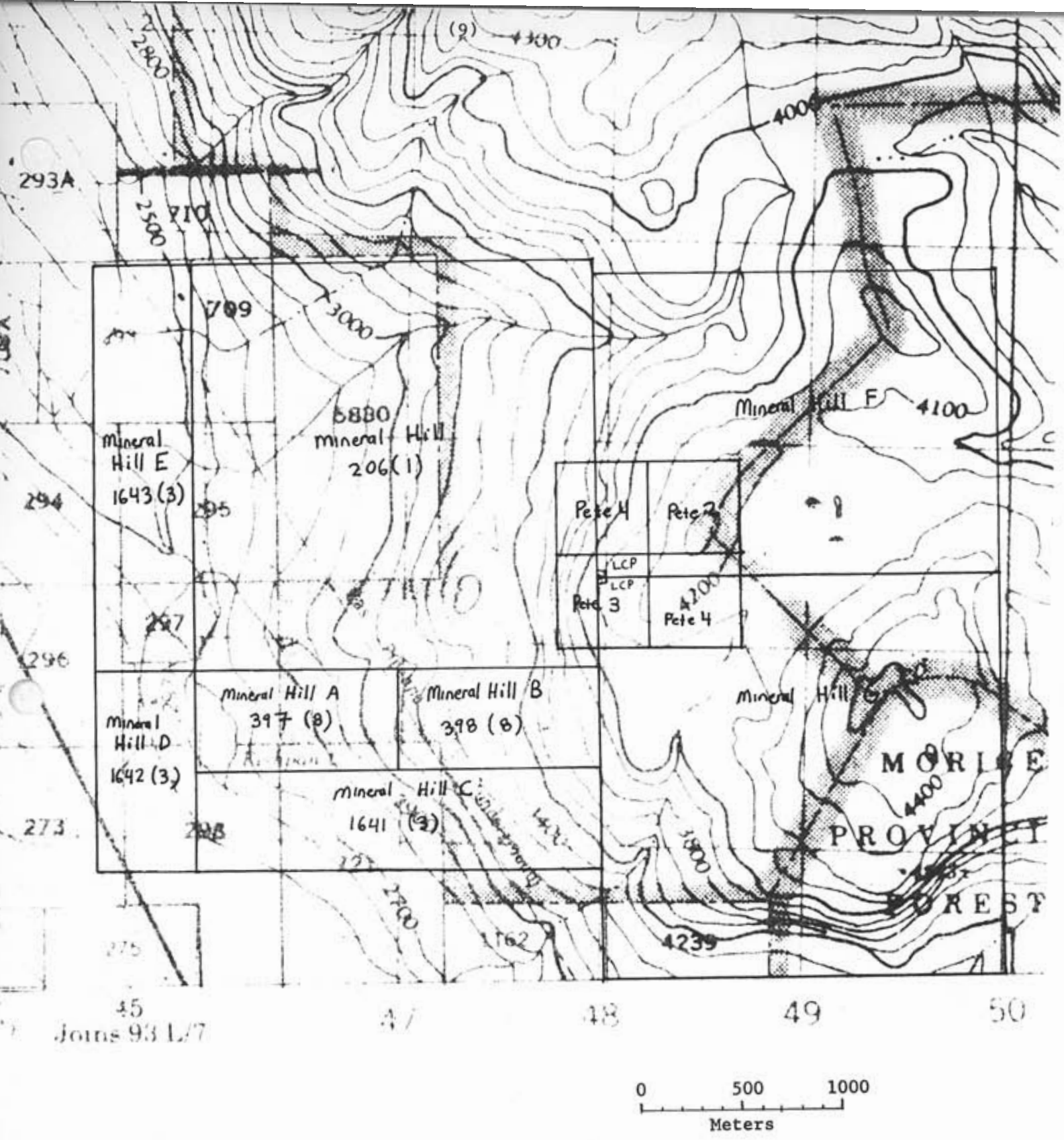


Figure 4. Claim Map, Mineral Hill Claim Group, NTS 93 L / 10E, Noranda Exploration Company, Limited(No Personal Liability)

Previous Work

Mineral Hill has a long history of mineral exploration.

In the 1950's and before, exploration for gold and silver veins was done by prospectors. The Merkley showing was trenched during this time.

Investigation of Mo-Cu porphyry mineralization began on Mineral Hill in about 1962. Since then several mining companies have carried out geological, geophysical and geochemical surveys here and have also undertaken drilling. Most of this work has been centered on the Mineral Hill and Mineral Hill A and B claims.

A four phase Bulkley intrusive (70 my) composed of porphyritic granite, alaskite, fine grained monzonite and diorite has been forceably emplaced into the Telkwa Formation, Hazelton Group volcanics. As a result, the volcanic Telkwa Formation has been altered to hornfels near the intrusive.

Molybdenum mineralization is mainly associated with quartz veins in the Alaskite zone and in quartz ± siderite cement of a fractured hornfels or breccia zone (see figure 5 for the location of these geological zones).

Listed below are the programs and some of the results of previous companies from 1959 to the present.

1959 - The original Mineral Hill group was staked by P.J. Huber and expanded to 33 claims by P.J. Huber and W.D. Yorke-Hardy between 1959 and 1962.

1960 - 1962 - Southwest Potash Corporation examined the property in 1960 and returned in 1962 to do geochemical, geological and magnetometer surveys of the South Zone (Alaskite Zone). Drilling, blasting and chip sampling of mineralized outcrop between the Alaskite and porphyritic granite was also done.

1962-1963 - Additional test-pitting and sampling was done by Mr. Yorke-Hardy.

1964 - During this year Canex Aerial Exploration carried out geological mapping and additional soil sampling. A 457 foot hole was drilled into the Alaskite zone. No results are available.

1966 - 1969 - Extensive drilling and sampling was done by Molymines Exploration Ltd. in this time period. Preliminary work was mainly focussed on shallow horizons of the alaskite - hornfels zone and on the porphyritic granite - hornfels contact. Drill core assays from these areas ranged between:

0.04 to 0.24 % MoS_2

and 0.05 to 0.10 % Cu

Preliminary exploration of the breccia zone by Molymines saw 10 trenches excavated to bedrock and 3 out of 7 holes drilled into significantly mineralized, veined and/or brecciated host rock. Average assays over 50 feet core sections ranged between 0.02 to 0.08 % MoS_2 and 0.02 to 0.41 % Cu in this zone.

Drill core assays of younger, quartz-tetrahedrite veins found in the breccia zone gave the following results:

50 foot -- at 1.21 oz/ton Ag

and 50 foot -- at 8.0 oz/ton Ag.

In 1966, Cominco optioned the property and completed 8 preliminary drill holes and trenches started by Molymines. The property was also mapped at 1" = 1000' by D. Cook.

In 1967 Molymines returned to Mineral Hill and:

1. mapped the North, South and porphyritic granite zone at 1" = 100' and 1" = 50',
2. geochemically surveyed (650 soils and 84 silts),
3. stripped and trenched 3000 and 3300 lineal feet in the South and North zones respectively,
4. drilled 10 diamond drill holes in the North zone and 2 in the South zone, and
5. drilled a total of 9,456 lineal feet of percussion drilling in 102 holes.

For further details and results of the drilling data mentioned above, the reader is referred to the Summary Geological Report on Mineral Hill and Subsidiary Exploration Projects by W.M. Sharp, March, 1968.

1971 - During this year the claims lapsed and P.J. Huber restaked the area. No work was done until Granby optioned the property in 1976 after a soil survey in an unexplored area turned up encouraging results.

1976 - Prompted by magnetic and geochemical anomalies, the Granby Mining Corporation drilled 2,240 feet of percussion holes in an area east of the Breccia (North) zone and north of the prophyritic granite. A total of 12 holes were drilled into a quartz breccia unit resembling the Breccia zone to the west, which is overlain by a thin cap of hornfels (also known as the Granby Zone).

Hole number M3 (shown on figure 5), returned grades of 0.30 % MoS_2/ 60 feet or 0.18 % MoS_2/ 110'.

For more information on the 1976 Granby drill program see B.C. Assessment Report # 6152.

1978 - Peter E. Walcott and Associates ran a magnetometer and I.P. survey over and around a known molybdenum soil anomaly and significant molybdenite intersection (Hole #M3) to see if the method could aid in planning further borehole investigation.

1979 - Exploration in this year included 6 percussion drill holes on the granite-hornfels contact (Holes M13 - M19) and 3 widely spaced diamond drill holes. Results are listed below.

DDH	G78-1	Breccia Zone	Average MoS_2 assay = 0.062%
DDH	G78-2	Alaskite Zone	Average MoS_2 assay = 0.057%
DDH	G78-3	Granite Zone	Average MoS_2 assay = 0.017%

Refer to Drilling Report Mineral Hill, Mineral Hill A + B Mineral Claims by D.H. James, 1979, for more details.

1979 - Noranda purchased all assets of the Zabata Granby Corporation.

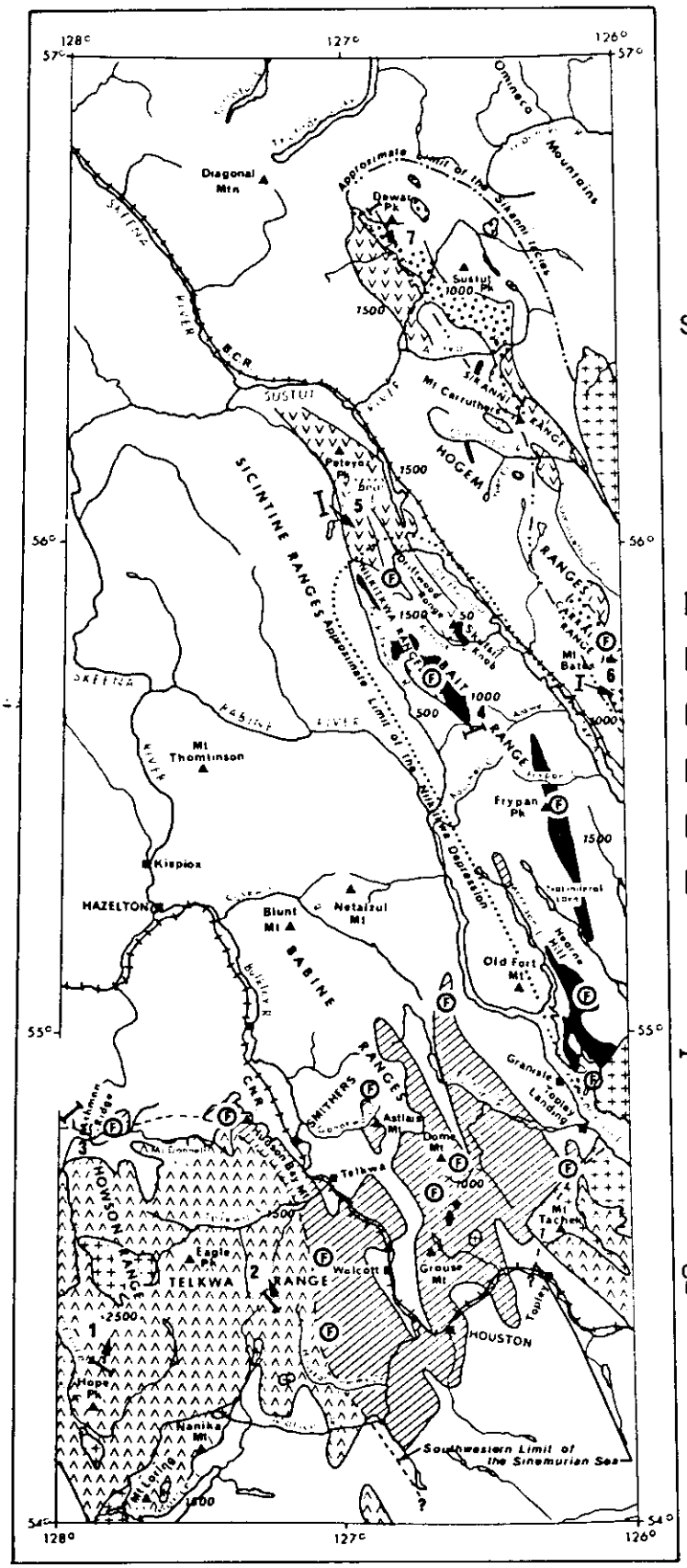
1981 - Prospecting of Mineral Hill claims C, D and E was carried out but no intrusives or mineralization was found. A VLF-EM survey over the same area found only very weak conductors.

1983 - Noranda allowed the option to lapse but reoptioned the claims in May. Field work was undertaken to the east of the previous area investigated.

REGIONAL GEOLOGY

The area covered on map sheet N.T.S. 93 L/10E is mainly underlain by the Lower Jurassic Telkwa Formation of the Hazelton Group. According to Tipper and Richards (1976) the rocks between Babine Lake and the Bulkley River valley are part of the Babine Shelf facies of the Telkwa Formation (see figure 6). These rocks are described as both subaerial and subaqueous pyroclastic rocks interbedded with marine and nonmarine sediments originating from a eugeosynclinal island arc setting. Underlying the Hazelton Group are rocks of a Triassic-aged island arc named the Takla Group. Sediments of the Bowser Lake Group overlie the Hazelton Group.

Intrusions of small granitic stocks and plugs of Early Jurassic Topley intrusives and Late Cretaceous Bulkley intrusives are also common in this area. A NW trenching dyke-like, Goosly Lake intrusion has also been mapped by the GSC near Coppermine Lake (GSC OF 351) on Grouse Mountain.



DISTRIBUTION
and FACIES of the
SINEMURIAN to LOWER PLIENSBACHIAN
TELKWA FORMATION
HAZELTON GROUP

LEGEND

- Sikanni clastic volcanic facies
- Bear Lake subareal facies
- Kotsine subaqueous facies
- Babine shelf facies
- Howson subareal facies
- Topley Hogem intrusive bodies
- Fossil locality
- 1000 Thickness in metres (approximate)
- Stratigraphic Section (Appendix III)

Kilometres

0 60 120

Figure 6

G.S.C. (Tipper and Richards, 1976)

FIGURE 6

The structural trend of the Telkwa Formation appears to be NW-NNW. Most major faults in the area have a NW-NE trend.

Mineralized areas of the Babine Shelf facies to date appear mainly as small showings involving Cu, Pb, Zn, Ag ± Mo and Au. These deposits are found within or in close proximity to the granitic intrusions mentioned above. These showings can be found in the BCDM inventory -- numbers 25, 26, 27, 28, 29, 206, 251 and 254.

Although some showings in this area reveal exhalite characteristics, no massive sulfide zones have been confirmed as such. However, the tectonic setting, facies type, structural elements and intrusions suggest favorable conditions for volcanogenic deposits in the Telkwa Formation.

WORK UNDERTAKEN

Field work done on the Mineral Hill claim group in the 1983 field season involved 3 separate stages (see Figure 7).

The initial phase began on May 26 and ended on June 3. During this period 26 field mandays were spent staking, linecutting, and rock, soil, and silt sampling on the 28 units comprising Mineral Hill F + G. Two km of both Sabre and EM-16 VLF-EM surveys were done during this period.

A grid using metric coordinates was established for sampling and mapping purposes with the LCP representing 10,000 N + 10,000 E. A total of 227 soil samples were collected at 100 m intervals around the perimeter of the claim groups and along E-W tielines totalling 10.55 km. The tielines extended approximately 2 km in length and were spaced at 500 m intervals.

Sampling of the streams on and surrounding the claims was also done in this period. Access to the streams outside the claims was obtained by a gas pipeline road to the south and an old logging road to the east. In all, 20 silts were taken.

Outcrops of Lower Jurassic Telkwa Formation volcanics and sediments, Late Cretaceous Bulkley intrusives and associated hornfels and cappings of trachytic flow rocks were sampled and mapped as they were encountered on the grid. Fifty-six (56) rocks were analysed geochemically for trace elements.

The second stage of exploration was done to define the extent of Cu, Zn and Ag soil anomalies found during the initial phase.

More soil sampling and geophysical work, including a magnetometer and HLEM survey was done along previous grid lines and along new lines to the west of Mineral Hill F and G.

Work for the second phase of the project began on June 23 when 2.5 km of linecutting and 2.0 km of both magnetometer and EM surveying was completed. Unfortunately a black bear attack on linecutter Martin Halvorson resulted in temporary postponement of further work until August 30 to September 1.

At this time 2.5 km of line was extended west from the existing grid. The EM and magnetometer surveys were continued over this area and soil sampling was done to 50 m intervals. In total, 74 soils and 6 rocks were collected during the second phase.

Although the second phase greatly helped to define the north trending Cu, Zn, Ag soil anomaly, no mineralization or geological explanation was found to account for the anomaly.

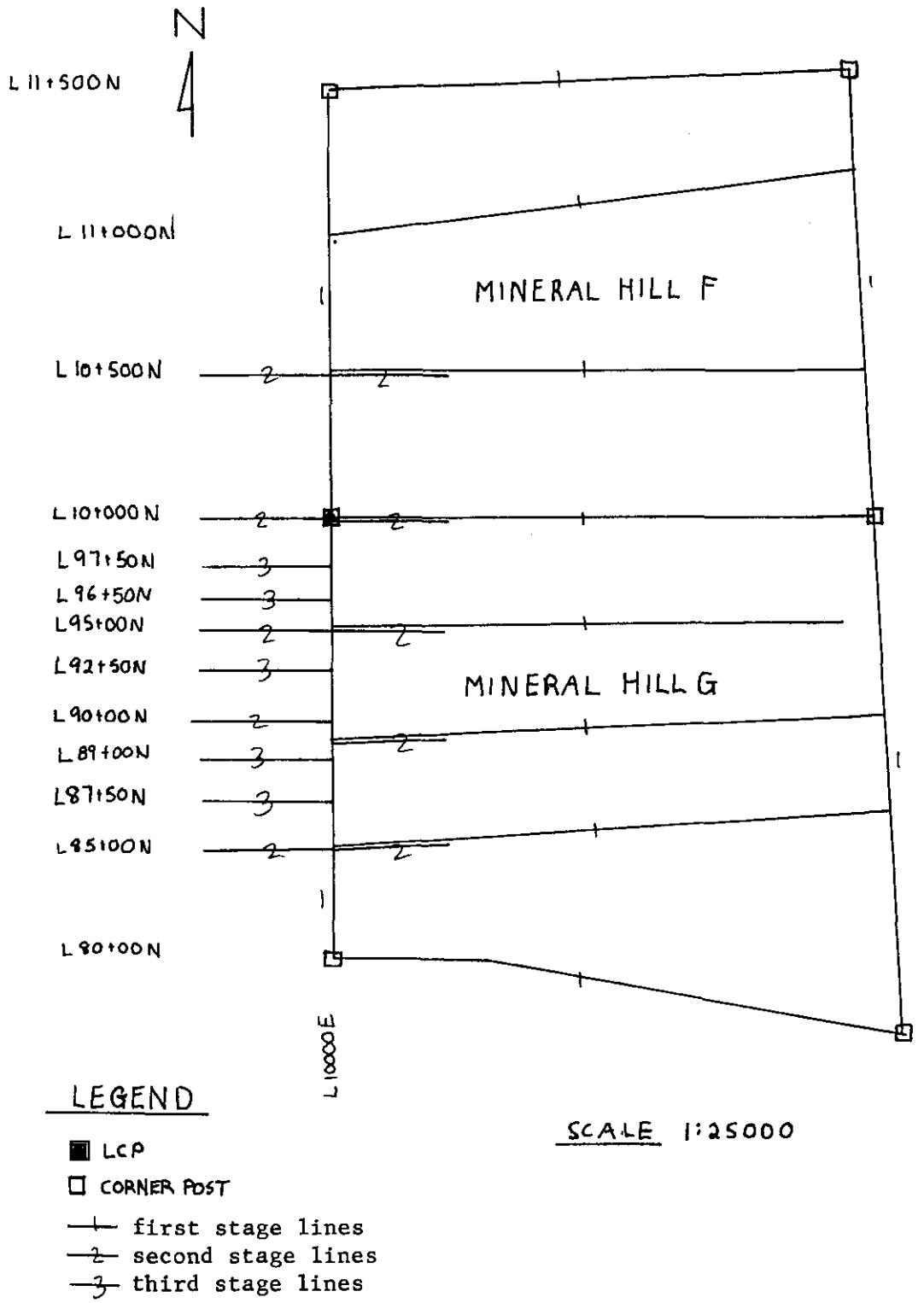


Figure 7. Work Done
26 May-3 June: Staking F&G, first stage lines, soils(100m), geology
26 June, 30 Aug.-1 Sept.: Second stage lines, mag & EM, soils(50m), geology
26 Sept., 25-29 Oct.: Third stage lines, soils(50m), IP, mag, VLFEM, geology

The third phase (Figure 7) of 1983 work on the Mineral Hill claim group involved six days of IP, magnetometer and VLF-EM surveying, soil sampling, and geological mapping. Additional lines were flagged to further define soil geochemical anomalies and to attempt to find a geological exploration for the anomalies. Soil samples were again collected at 50 m intervals. VLF-EM readings were taken at 25 m intervals along 1.65 km of line. Sixteen rock, 1 silt, and 55 soil samples were taken.

Total work done on the Mineral Hill Group in 1983 was as follows:

Staking:	28 units (700 hectares)*
Line Flagging:	33.2 km
Magnetic survey:	6.825 km*
HLEM survey:	5.0 km •
VLFEM survey:	5.65 km
IP survey:	2.7 km •
Rock geochem:	78 samples
Silt geochem:	20 samples
Soil geochem:	356 samples
Geological survey:	19.05 km

• Expenses are not claimed in this report (see Bradish, 1984 for geophysical results).

RESULTS AND INTERPRETATION

Stream Sediment Geochemistry

A total of 20 silt samples were taken from streams on or around Mineral Hill. These samples were analysed by the Noranda Geochemical Laboratory in Vancouver for Cu, Zn, Pb, Ag, Mo, As, Ni, Co, Mn, and Fe (Appendix 4) by atomic absorption spectrophotometry.

Results of the sampling are plotted on Figure 8. Four samples are regarded as anomalous, samples 17911 (Zn, Mn), 17913 (Cu, Zn, Ag), 17914 (Mo, Mn, Fe), and 17915 (Zn). All four of these samples are from streams draining the central swamp at about 10,000 N, 11,000 E or from the ridge covered by the Pete 1 to 4 claims.

The central swamp could not be tested by soil geochemistry and VLFEM was ineffective. A reconnaissance EM or IP survey should be done over it in winter to test for massive sulfides below the swamp.

The ridge covered by the Pete 1-4 claims was tested by soil, geological, EM, and IP surveys.

Property Geology

The Mineral Hill claim group is mainly underlain by rocks of the Babine Shelf facies, Telkwa Formation, Hazelton Group. These rocks are fine grained, red to green to grey to black lavas of andesitic to rhyolitic composition (Figure 9 - unit 1).

Associated with the fine grained volcanics mentioned above are coarser grained, fragmental volcanics which are mapped as Unit 2. These rocks include grey-green purple coarse ash-lapilli tuffs. This unit appears mainly on the western boundary and down-slope portion of the property west of the Mineral Hill G claim (Figure 9).

Obvious contacts between the fragmental and massive volcanics were not seen. Recognition of the tuffaceous unit was easiest on smooth, well-weathered surfaces. Outcrop percentage in the area mapped is less than 5%.

Although the Mineral Hill and Mineral Hill A + B claims cover four phases of a Late Cretaceous Bulkley intrusive, only one of these four phases is present on the Mineral Hill F + G claims. This phase is a medium grain diorite which is located mainly in the SW corner of Mineral Hill F (at the LCP) (Figure 9 - unit 3).

Scattered dykes and other small intrusions of diorite are seen to intrude the massive and fragmental volcanics elsewhere on the claim group.

Two other minor units were mapped on this property. The first one is a resistant trachytic flow which appears as cappings on small ridges and hills (Figure 9 - unit 4). This unit has a dark, fine grain matrix with cream colored feldspar laths up to 2 cm long. This unit strongly resembles rocks of the Goosly Lake volcanics seen south of Houston.

Hornfels make up the second minor rock unit mapped. This unit was seen mainly as float and only one outcrop of it is noted on Figure 9 (unit 5).

One fault zone was mapped and is located at 8500 N, 9690 E. This northerly trending fault parallels a larger, more pronounced lineament a few hundred metres west. This larger structure is well defined in airphotos and was mapped as a fault by D. Cook in 1966. It occurs near 9750 N, 9450 E.

Limited mineralization was found on the property. A north striking, flatly (12°) east dipping, 30 cm thick quartz vein was discovered in an old adit at 9750 N, 9900 E. This vein is hosted in altered, fine grained rhyolite and dacite very close to the volcanic-diorite contact. Galena, tetrahedrite, pyrite and sphalerite occur as fine grained masses within the quartz vein. Three samples were analysed and contained:

Sample No.	Rock Type	Au	Ag	Cu	Pb	Zn	Mo (ppm)
X6481	quartz vein-chip	.095	107	420	750	420	2
X6482	dacite/rhyolite	<.005	22	53	15	61	1
X6483	quartz vein-grab	.105	1824	1400	77200	334	5

In his 1968 Summary Geological Report for Molymines, W.M. Sharp describes several quartz vein occurrences in this general area. A grab sample gave the following results:

Ag	Pb	Zn
26.0 opt	2.69%	48.69%

The other quartz veins occur 150 and 300 m south of the adit respectively. These veins were not found this year but were mapped in line with the quartz veins seen on Line 97 + 50 N and Line 87 + 50 N. One of these quartz vein showings, mapped and sampled by Molymines, gave an Ag value of 52.2 oz/ton.

Smaller but similar trending quartz veins were seen in 1983 at 8750 N, 9915 E. No sulfide mineralization was seen in these veins, however.

Other mineralization found on the property in 1983 included sphalerite in a narrow rusty, pyritic veinlet within dacite. This is located at 9000 m N, 10,420 m E just above the main creek draining the central swamp. The sample contained:

Sample No.	Ag	Cu	Zn
9000 N, 10,420 E	5.0	850	14,000 ppm

A rock sample anomalous in Zn (= 840 ppm) was found at 9500 N, 10,200 E. Further prospecting in these areas is recommended as current prospecting was done on lines 500 m apart.

Small specks of molybdenite were reported by D. Hill in boulders of porphyritic granite located at the western limit of line 97 + 50 N. Minor amounts of chalcopyrite were also seen in quartz veins in an outcrop of dacitic tuff in the same location (sample X6484).

Au	Ag	Cu	Pb	Zn	Mo
<.005	12.0	84	480	62	19

This area has been previously investigated for its porphyry Mo-Cu potential by Granby Mining. If time is available, results of previous work on this part of the property should be compiled.

Soil Geochemistry

Results of the 1983 soil sampling survey done on Mineral Hill claim group are given in Figures 10-12 and Appendices 4 and 5. A total of 356 soil samples were taken from B horizon soils. Samples were analysed by the Noranda Geochemical Laboratory in Vancouver by acid attack and AA spectroscopy.

Concentration ranges for each of the elements were as follows:

Au	.010	-- .060	ppm
Ag	0.2	-- 7.4	ppm
Cu	8.0	-- 1000	ppm
Pb	2.0	-- 140	ppm
Zn	36.0	-- 7000	ppm
Mo	<2.0	-- 18	ppm
As	<2.0	-- 88	ppm

The maximum gold concentration (60 ppb @ 10,000 N, 10,150 E) in soils is not of interest (Figure 10).

Silver concentrations greater than or equal to 2 ppm are considered anomalous and are contoured in Figure 11. Ten samples were anomalous in silver. These occur as single sample highs except for a cluster of three samples on lines 9000 N and 9250 N at about 9800 E with values of 7.4, 7.0, and 3.4 ppm Ag. Three rock samples in this area (Y5183, Y5184, X6480) have low trace metal concentrations. The area is underlain by volcanics, (units 1 & 2) and by some diorite (unit 3 - Figure 9).

Copper concentrations greater than or equal to 150 ppm were considered anomalous (Figure 12). Twenty-four (24) soil samples were anomalous in copper. The largest anomalous zone (500 m X 200 m) also occurs at 9000 N, 9800 E. It is larger than the silver anomaly here. Six samples on three lines are anomalous in copper with values up to 620 ppm.

The highest copper value was found at 8750 N, 9550 N. It may represent an anomalous zone 200 m X 100 m. Other high soil copper values are from isolated samples, mainly west of 10,000 E.

Only five soil samples had lead concentrations greater than 60 ppm. These samples form five isolated anomalies west of the baseline (Figure 11). The highest lead concentration (140 ppm @ 9750 N, 9500 E) is from an area where a rock sample (X 6484) had 480 ppm Pb, 19 ppm Mo, and 12 ppm Ag. The rock sample is a dacitic tuff with mineralized quartz veinlets. This area is about 100 m east of the granite porphyry (Figure 5) in an area drilled by Granby in 1978.

About 34 soil samples were anomalous in zinc with values over 500 ppm (Figure 12). These form six anomalies, the largest of which is about 1300 m X 800 m -- by far the largest soil anomaly for any element found by 1983 sampling on the property. Other high values are nearby as well. The large zinc anomaly is coincident but more extensive than the largest copper and silver anomalies. Zinc values in rocks sampled with two exceptions were 420 ppm or less. Rock samples at 9500 N, 10,200 E (840 ppm) and 9000 N, 10,420 E (14,000 ppm Zn) are near the zinc soil anomaly and such rocks may be sources for the zinc in soils.

Fifteen molybdenum soil anomalies were found. Most are isolated one sample highs (Figure 12). Three anomalies contained two or more samples with molybdenum greater than or equal to 4 ppm. Only one anomaly had molybdenum values greater than 10 ppm. This is centered at 9750 N, 9500 E where there is also a Zn anomaly. This is an area of known, low grade molybdenum mineralization in rocks associated with the granite porphyry (Figure 5).

Arsenic values in soils are generally low, only 7 weak anomalies were found -- all single samples. The highest was 88 ppm as at 9600 N, 10,000 E. Arsenic and gold were not analysed in all soil samples however.

In summary, most impressive soil anomaly is centered on 9000 N, 9800 E. It consists of a 400 X 200 m Ag anomaly (3 samples $\geq$ 3.4 ppm Ag), a 550 X 200 m Cu anomaly (6 samples $\geq$ 160 ppm Cu), and a 1300 X 800 m Zn anomaly (26 samples $\geq$ 500 ppm Zn). The soil anomaly is elongate on a N-S axis and lies mainly on a steep west-facing hillside underlain by fine grain, massive, intermediate volcanic and coarser grain, intermediate pyroclastic rocks. Minor bedrock mineralization has been found here, mainly as narrow quartz veins (30 cm thick) with Ag-Pb-Zn mineralization. It is not known if a network of such veins is responsible for the extensive Zn-Cu-Ag soil anomaly or not. Further mapping, rock, and soil geochemistry are recommended in this area to better define a target. The hillside is rather steep in this area making trenching difficult, especially with such a large area to test.

VLF-EM Survey

VLF-EM surveying was done as manpower permitted. In total 5.65 line-km were surveyed. Two instruments, a Sabre Model 27 VLF-EM Receiver and a Geonics EM-16 VLF-EM Receiver, were used on line 10,000 N. All the remaining lines were surveyed using just the Geonics EM-16 VLF-EM Receiver. A description of these instruments and the survey procedures is given in Appendix 6.

The Fraser-filtered in-phase readings from the Geonics EM-16 survey are plotted in Figure 13. The strongest single filtered value (90%) is associated with the central swamp near 10,000 m N, 11,000 m E. As the lines surveyed are far apart, no contouring was done, as anomaly trends would be highly suspect.

Examining Figure 13 and the soil geochemical surveys shows little correlation between the Zn-Cu-Ag soil anomaly and Fraser-filtered VLF-EM data. The two strongest anomalies (at 9750 N, 9500 E and 8750 N, 9670 E) appear to be associated with linear features either fault zones, draws (small valleys), or airphoto linears. The VLF-EM anomaly at 8750 N, 9670 E does occur uphill from a Zn-Cu-Ag soil anomaly (1000, 2.4 ppm, respectively) at 8750 N, 9550 E. Some additional surveying nearby is warranted to better define the anomaly and to determine if there is a bedrock source for the soil anomaly.

A comparison of the Geonics EM-16 and the Sabre Model 27 VLF-EM Receiver surveys of line 10,000 N are given in Figure 14. Note the similarity of the Geonics In-Phase profile to the Sabre Dip Angle profile, as would be expected.

CONCLUSIONS AND RECOMMENDATIONS

Silt sampling in 1983 indicated a Zn, Mn, Cu, Ag, Mo, Fe anomaly coming from either or both the Pete 1-4 claims and the central swamp (10,000 m N, 11,000 m E). The central swamp area should be geophysically tested in winter to see if massive sulfides might underlie it (p. 18).

The area investigated in 1983 is underlain by fine grain massive andesitic to rhyolitic (mainly andesite and dacite) volcanics and coarser grain fragmental volcanics of similar composition. These are intruded by a medium grain diorite. Mineralization found in 1983 consisted of either disseminated iron sulfides throughout wide areas or sulfides associated with quartz veinlets or veins to 30 cm thick. Although several good grade samples were taken, these samples do not represent economic mineralization (inferred tonnages too low). Further prospecting near mineralization found in 1983 is recommended, especially because of the reconnaissance nature of 1983 work (p. 20). Specifically, further mapping and rock geochemistry (coupled with soil geochemistry) is recommended near:

9750 N, 9900 E
9500 N, 10,200 E
9000 N, 10,420 E

Compilation of the extensive data from previous work done in the area for porphyry Mo-Cu deposits is recommended (p. 20).

A soil geochemical anomaly up to 1300 m long (N-S) and 800 m wide for Zn is centered near 9000 N, 9800 E. Smaller Cu and Ag anomalies coincide with this center. Further geological mapping and rock and soil geochemistry are recommended in this area, before trenching (p. 22).

The VLF-EM survey lines are too far apart to correlate results from line to line. Additional geological mapping and geochemical sampling are recommended near 8750 N, 9550 E, because of related VLF-EM and Zn-Cu-Ag soil anomalies (p. 23).

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APPENDIX 1

Summary of Personnel

NAME	OCCUPATION	ADDRESS	PERIOD WORKED
Del Myers	District Geologist	Noranda Explor. Co. Ltd., P.O. Box 2169, Smithers, B.C.	26 May - 26 Sept./83
Daryl Hill	Field Supervisor	" "	26 May - 1 Sept./83
Doug M. Shearer	Field Supervisor	" "	26 May - 25 Oct./83
D. Graham Gill	Field Geologist	" "	26 May - 26 Oct./83
Martin Halvorson	Field Assistant	" "	28 May - 23 June/83

APPENDIX 2

Statement of Cost

DEC 2 0 1983

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

DATE December 12, 1983

PROJECT - Mineral Hill
TYPE OF REPORT Geology and Geochem

a) **Wages:**

No. of Days -	62 mandays	
Rate per Day -	$99.99	
Dates From -	November 1 1982 - November 1 1983	
Total Wages	62 X $99.99	$6,199.47

b) **Food and Accommodation:**

No. of Days -	62	
Rate per Day -	$38.13	
Dates From -	November 1 1982 - November 1 1983	
Total Cost -	62 X $38.13	$2,363.78

c) **Transportation:**

No. of Days -	62	
Rate per Day -	$21.50	
Dates From -	November 1 1982 - November 1 1983	
Total cost	62 X $21.50	$1,332.96

d) Analysis $2,705.60

e) **Cost of Preparation of Report:**

Author	$ 200.00
Drafting	$ 720.00
Typing	$ 100.00

e) Other:

Total Cost $13,621.81

UNIT COSTS

Unit Costs for Geochem

No. of Days -	15	
No. of Units -	411 Samples	
Unit Costs -	10.14 / Sample	
Total cost	411 X 10.14	$4,165.72

Unit Costs for Geology

No. of Days -	47	
Unit Costs -	201.19 / manday	
Total Cost -	47 X 201.19	$9,456.09

Total Cost	$13,621.81

NORANDA EXPLORATION COMPANY, LIMITED

DETAILS OF ANALYSES COSTS

Project: Mineral Hill

Element	No. of Determinations	Cost per Determination	Total
Cu	392	1.60	627.20
Zn	411	.60	246.60
Pb	411	.60	246.60
Mo	411	.60	246.60
Ag	411	.60	246.60
Au	238	4.00	476.00
As	154	2.00	616.00
Total			$2,705.60

APPENDIX 3

Statement of Qualifications

STATEMENT OF QUALIFICATIONS

Relevant Training

B. Sc. (1970) - Pennsylvania State University
Geological Sciences

M. Sc. (1973) - University of Toronto
Geochemistry

Relevant Experience

1973 - 1980 - Exploration and Mine Geologist
Cominco Limited
Vancouver and Yellowknife

1980 - 1982 - Project Geologist
Noranda Exploration Company, Limited
Yellowknife

1982 - 1983 - District Geologist
Noranda Exploration Company, Limited
Smithers

1983 - present - Project Geologist
Noranda Exploration Company, Limited
Prince George

Professional Affiliations

Fellow, Geological Association of Canada

Founding Member, Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories.

GEOLOGICAL ASSOCIATION OF CANADA
DEL MYERS
FELLOW

REGISTERED PROFESSIONAL GEOLOGIST
Delbert E. Myers Jr.
N.W.T.

Delbert E Myers Jr

DELBERT E. MYERS, JR.
Project Geologist

STATEMENT OF QUALIFICATIONS

I, D. Graham Gill, of the City of Vancouver, Province of British Columbia, do certify that:

1. I have been an employee of Noranda Exploration Company, Limited since May 1983.

2. I am a graduate of the University of British Columbia with a Bachelor of Science Major in Geology (1983).

D. GRAHAM GILL
Field Geologist
Noranda Exploration Co. Ltd.
(no personal liability)

APPENDIX 4

Description of Samples and Analytical Results

JUN 16 1983

NORANDA GEOCHEM LABORATORY

LOCATION MINERAL HILL PROJECT 1039-1 COLLECTOR DM DATE RECEIVED June 13 83 CODE 8306-007 SHEET 1

MATERIAL Soil DATE ANALYSED June 9 83 ANALYST RF

REMARKS Cu Zn Pb Ag Mo As in ppm

0.2g / 2ml $HClO_4$-HNO_3 → 5ml All soils N.T.S 93L/10 G.C.F. 00193.

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
1.	CHECK NL-3		60	60	8	0.6	6	290							
2	100E - 101N	✓	140	220	✓ 8	1.0	✓ 2	4							
3	102	✓	76	84	✓ 4	0.6	✓ 2	2							
4	103	✓	80	230	✓ 8	2.4	✓ 2	< 2							
5	104	✓	12	140	✓ 2	0.2	✓ 4	< 2							
6	105	✓	18	88	✓ 4	0.2	✓< 2	< 2							
7	106	✓	38	130	✓ 6	0.4	✓< 2	< 2							
8	107	✓	14	170	✓ 6	0.2	✓< 2	< 2							
9	108	✓	36	100	✓ 4	0.2	✓ 2	8							
10	109	✓	14	76	✓ 2	0.2	✓< 2	6							
11	110	✓	28	120	✓ 6	0.2	✓< 2	4							
12	111	✓	20	170	✓ 14	0.2	✓< 2	16							
13	112	✓	24	290	✓ 16	0.2	✓< 2	18							
14	113	✓	28	170	✓ 10	0.2	✓< 2	8							
15	100E - 114N	✓	32	190	✓ 8	0.2	✓< 2	12							
16	95N - 101E	✓	10	170	✓ 4	0.2	✓< 2	< 2							
17	102	✓	56	500	✓ 4	0.2	✓< 2	6							
18	103	✓	210	7000	✓ 26	3.8	✓< 2	6							
19	104	✓	16	170	✓ 20	0.2	✓< 2	8							
20	105	✓	14	160	✓ 10	0.2	✓< 2	6							
1	106	✓	8	130	✓ 6	0.2	✓< 2	< 2							
22	95N - 107E	✓	56	230	✓ 6	0.4	✓< 2	2							

NORANDA GEOCHEM LABORATORY

LOCATION MINERAL HILL PROJECT 1039-1 COLLECTOR DM DATE RECEIVED June 13 83 CODE 826-009 SHEET 2

MATERIAL Soil DATE ANALYSED June 23 83 ANALYST RF

REMARKS Cu Zn Pb Ag Mo As in ppm

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
23	95N - 108E	✓	84	200	✓ 2	1.6	✓ < 2	4							
4	109	✓	80	250	✓ 6	0.8	✓ 2	10							
5	110	✓	12	78	✓ 2	0.2	✓ < 2	< 2							
6	111	✓	70	250	✓ 8	0.4	✓ 6	8							
7	112	✓	8	40	✓ 2	0.2	✓ < 2	< 2							
8	113	✓	14	66	✓ 2	0.2	✓ < 2	6							
9	114	✓	12	50	✓ 2	0.2	✓ < 2	6							
10	115	✓	10	50	✓ 2	0.2	✓ < 2	< 2							
11	116	✓	14	44	✓ 4	0.2	✓ < 2	6							
12	117	✓	10	46	✓ 4	0.2	✓ < 2	2							
13	118	✓	20	48	✓ 2	0.2	✓ < 2	< 2							
14	119	✓	16	50	✓ 4	0.2	✓ < 2	4							
15	95N - 120E	(B) ✓	14	60	✓ 2	0.2	✓ < 2	20							
16	120E - 80N	✓	8	52	✓ 2	0.2	✓ < 2	< 2							
17	81	✓	10	42	✓ 2	0.2	✓ < 2	< 2							
18	82	✓	210	220	✓ 2	2.8	✓ < 2	6							
19	83	✓	30	160	✓ 2	0.6	✓ < 2	4							
20	84	✓	26	120	✓ 2	0.2	✓ < 2	4							
21	85	✓	18	210	✓ 2	0.2	✓ < 2	2							
22	86	✓	14	160	✓ 2	0.2	✓ < 2	< 2							
23	87	✓	10	66	✓ 4	0.2	✓ < 2	< 2							
24	120E - 88N	✓	20	150	✓ 2	0.2	✓ < 2	4							

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR DM DATE RECEIVED June 13 '88 CODE 83.6-007 SHEET 3

MATERIAL Soil DATE ANALYSED June 17 '88 ANALYST KF

REMARKS Cu, Zn, Pb, Ag, Mo, As in ppm

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
45	120E-89N	✓	10	70	< 2	0.2	< 2	< 2							
6	90N	✓	10	80	✓ 2	0.2	✓ < 2	< 2							
7	91	✓	22	84	✓ 4	0.2	✓ < 2	8							
8	92	✓	14	64	✓ 2	0.2	✓ < 2	4							
9	93	✓	18	120	✓ 4	0.2	✓ < 2	< 2							
50	94	✓	12	100	✓ 2	0.2	✓ < 2	14							
1	95	✓	32	130	✓ 2	0.4	✓ < 2	6							
2	96	✓	32	130	✓ 4	0.2	✓ < 2	2							
3	97	✓	14	68	✓ 2	0.2	✓ < 2	< 2							
4	98	✓	14	80	✓ 2	0.2	✓ < 2	< 2							
5	99N	✓	30	100	✓ 2	0.2	✓ < 2	< 2							
6	101N	✓	14	56	✓ 2	0.2	✓ < 2	4							
7	102N	✓	20	88	✓ 2	0.2	✓ < 2	2							
8	103	✓	20	76	✓ 2	0.2	✓ < 2	6							
9	104	✓	16	120	✓ 2	0.2	✓ < 2	4							
60	105	✓	18	88	✓ 2	0.2	✓ < 2	< 2							
1	106	✓	16	82	✓ 2	0.2	✓ < 2	< 2							
2	107	✓	16	90	✓ 2	0.2	✓ < 2	< 2							
3	108	✓	14	50	✓ 2	0.2	✓ < 2	< 2							
4	109	✓	16	92	✓ 2	0.2	✓ < 2	< 2							
5	110	✓	10	68	✓ 4	0.2	✓ < 2	6							
66	120E-111N	✓	24	86	✓ 4	0.2	✓ < 2	18							

NORANDA GEOCHEM LABORATORY

LOCATION MINERAL HILL PROJECT 85J-1 COLLECTOR D.A.J. DATE RECEIVED June 13 '85 CODE 826-SOIL SHEET 4

MATERIAL Soil DATE ANALYSED June 19 '85 ANALYST AF

REMARKS Cu Zn Pb Ag Mo As in ppm

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
67	12cE - 112N	✓	12	60	<6	0.2	<2	6							
8	113	✓	22	90	<6	0.2	<2	8							
9	114	✓	14	62	<4	0.2	<2	12							
70	12cE - 115N	✓	18	78	<4	0.2	<2	<2							
1	9cN - 10cE	✓	34	900	<4	0.4	<2	<2							
2	102	✓	24	360	<4	0.2	<2	4							
3	103	✓	18	260	<8	0.2	<2	<2							
4	104	✓	12	310	<6	0.4	<2	2							
5	105	✓	18	160	<4	0.4	<2	<2							
6	106	✓	16	250	<6	0.2	<2	<2							
7	107	✓	12	90	<6	0.2	<2	<2							
8	108	✓	18	130	<6	0.2	<2	12							
9	109	✓	16	100	<8	0.4	<2	<2							
80	110	✓	16	100	<6	0.2	<2	14							
1	111	✓	20	100	<8	0.2	<2	<2							
2	112	✓	18	100	<12	0.2	<2	<2							
3	113	✓	28	140	<8	0.2	<2	8							
4	114	✓	14	110	<2	0.2	<2	8							
5	115	✓	18	90	<2	0.2	<2	22							
6	116	✓	12	62	<4	0.2	<2	4							
7	117	✓	12	96	<2	0.2	<2	<2							
88	9cN - 118E	✓	12	58	<2	0.2	<2	<2							

NORANDA GEOCHEM LABORATORY

LOCATION MINERAL HILL PROJECT 039-1 COLLECTOR DM DATE RECEIVED Jun / 3 / 93 CODE 8306-007 SHEET 5

MATERIAL SOIL DATE ANALYSED Jun / 9 / 93 ANALYST RF

REMARKS Cu Zn Pb Ag Mo As in ppm

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
89	96N-114E	✓	36	220	✓6	0.2	✓<2	6							
90	120	(B) ✓	12	60	✓4	0.2	✓<2	6							
1	96N-121E	✓	18	140	✓4	0.2	✓<2	<2							
2	96N-122E	✓	30	460	✓12	0.2	✓<2	<2							
3	101	✓	20	330	✓12	0.2	✓<2	6							
4	102	✓	70	260	✓26	0.2	✓4	12							
5	103	✓	38	270	✓44	0.2	✓2	10							
6	104	✓	30	280	✓30	0.2	✓<2	8							
7	105	✓	16	180	✓8	0.2	✓<2	12							
8	106	✓	48	120	✓26	0.2	✓<2	14							
9	96N-107E	✓	84	180	✓14	0.4	✓<2	<2							
100	CHECK NO.3		60	60	8	0.6	4	310							
1	96N-108E	✓	66	180	✓18	0.6	✓<2	10							
2	109	✓	18	330	✓4	0.2	✓<2	<2							
3	110	✓	40	300	✓6	0.2	✓<2	4							
4	112	✓	14	160	✓4	0.2	✓<2	2							
5	113	✓	10	130	✓2	0.2	✓<2	<2							
6	114	✓	14	120	✓4	0.2	✓<2	4							
7	115	✓	20	72	✓6	0.2	✓<2	<2							
8	116	✓	26	130	✓4	0.2	✓<2	4							
9	117	✓	64	160	✓4	0.2	✓<2	<2							
110	96N-118E	✓	14	80	✓2	0.2	✓<2	<2							

NORANDA GEOCHEM LABORATORY

LOCATION MINERAL HILL PROJECT 1039-1 COLLECTOR Dan DATE RECEIVED June 13 83 CODE 836-003 SHEET 6

MATERIAL Soil DATE ANALYSED June 15 83 ANALYST RF

REMARKS Cu Zn Pb Ag Mo As - ppm

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
111	84.2 - 112E	✓	16	66	✓2	0.2	✓<2	<2							
2	84.2 - 124E	✓	18	68	✓4	0.2	✓<2	4							
3	115N - 101E	✓	220	360	✓14	1.0	✓6	4							
4	101	✓	46	240	✓10	0.2	✓<2	<2							
5	102	✓	18	120	✓6	0.2	✓<2	<2							
6	103	✓	22	100	✓6	0.2	✓<2	<2							
7	104	✓	12	68	✓2	0.2	✓<2	<2							
8	105	✓	34	130	✓14	1.8	✓<2	16							
9	106	✓	12	66	✓8	0.2	✓<2	<2							
120	107	✓	40	150	✓36	0.8	✓4	64							
1	108	✓	8	36	✓6	0.2	✓<2	<2							
2	109	✓	66	170	✓12	1.0	✓<2	<2							
3	110	✓	54	140	✓10	0.4	✓<2	<2							
4	111	✓	46	110	✓12	0.4	✓<2	8							
5	112	✓	32	90	✓12	0.2	✓<2	2							
6	113	✓	12	50	✓6	0.4	✓<2	<2							
7	114	✓	12	44	✓16	0.4	✓<2	<2							
8	115	✓	40	120	✓24	1.0	✓<2	<2							
9	116	✓	24	120	✓12	0.4	✓<2	<2							
130	117	✓	10	76	✓4	0.4	✓<2	<2							
1	118	✓	8	60	✓4	0.2	✓<2	<2							
132	115N - 119E	✓	16	100	✓8	0.2	✓<2	<2							

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1034-1 COLLECTOR Dorn DATE RECEIVED June 13 83 CODE 83.6-003 SHEET 7

MATERIAL Soil DATE ANALYSED June 17 83 ANALYST KF

REMARKS Cu Zn Pb Ag Mo As in ppm

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
133	115 N - 120 E	(B) ✓	42	150	✓10	0.4	✓< 2	< 2							
4	100 N - 100 E	✓	16	90	✓8	0.4	✓< 2	< 2							
5	101	✓	14	54	✓4	0.2	✓< 2	< 2							
6	102	✓	12	70	✓6	0.4	✓< 2	< 2							
7	103	✓	42	330	✓10	0.4	✓< 2	< 2							
8	103.65	✓	14	68	✓2	0.4	✓< 2	< 2							
9	104	✓	10	48	✓4	0.2	✓< 2	< 2							
140	105	✓	10	80	✓2	0.4	✓< 2	< 2							
1	106	✓	14	140	✓6	0.4	✓< 2	< 2							
2	107	✓	16	74	✓4	0.2	✓< 2	< 2							
3	108	✓	12	160	✓6	0.2	✓< 2	< 2							
4	113	✓	20	58	✓6	0.4	✓< 2	< 2							
5	114	✓	26	80	✓4	0.4	✓< 2	< 2							
6	115	✓	16	50	✓6	0.4	✓< 2	< 2							
7	116	✓	20	40	✓6	0.2	✓< 2	4							
8	117	✓	18	60	✓6	0.2	✓< 2	< 2							
9	100 N - 118 E	✓	18	58	✓4	0.2	✓< 2	< 2							
150	CHECK NL-3		60	56	10	0.8	4	300							
—	—		—	—	—	—	—	—							
1	Check NL-3		64	60	10	0.8	6	310							
2	100 N - 119 E	✓	12	44	✓6	0.2	✓< 2	2							
3	100 N - 120 E	✓	16	54	✓8	0.2	✓< 2	8							

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1037-1 COLLECTOR D-M DATE RECEIVED June / 1 / 87 CODE Nice col SHEET 8

MATERIAL Soil DATE ANALYSED June / 10 / 87 ANALYST RF

REMARKS As Cu Zn Pb, Ag Mo in ppm.

(0.2g / 2 ml $HClO_4$ - HNO_3 → 5 ml)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
4	81 N - 100 E	✓	28	200	✓10	0.4	✓<2	16							
5	82	✓	100	270	✓22	0.6	✓4	16							
6	83	✓	18	270	✓6	0.4	✓2	2							
7	84	✓	16	150	✓6	0.2	✓<2	<2							
8	85	✓	38	390	✓10	0.4	✓<2	8							
9	86	✓	150	180	✓22	0.6	✓2	2							
10	87	✓	42	300	✓80	0.8	✓2	46							
1	88	✓	16	120	✓8	0.2	✓<2	<2							
2	89	✓	30	400	✓40	0.2	✓2	2							
3	90	✓	130	7000	✓22	1.8	✓2	18							
4	91	✓	46	1000	✓10	0.2	✓<2	6							
5	92	✓	140	1200	✓100	1.8	✓<2	8							
6	93	✓	34	340	✓12	0.2	✓<2	8							
7	94	✓	52	440	✓10	0.2	✓<2	4							
8	95	✓	32	600	✓10	0.2	✓<2	12							
9	96	✓	150	700	✓140	5.2	✓2	88							
20	97	✓	22	190	✓6	0.2	✓<2	<2							
1	98	✓	20	100	✓6	0.2	✓<2	8							
2	99 N - 100 E	✓	40	240	✓10	0.2	✓<2	14							
3	85 N - 101 E	✓	80	360	✓16	0.4	✓4	4							
4	102	✓	130	750	✓26	0.4	✓<2	2							
25	85 N - 103 E	✓	30	100	✓12	0.4	✓<2	8							

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR D.M. DATE RECEIVED June / 3 /8: CODE 8306 COY SHEET 9

MATERIAL Soil DATE ANALYSED June / 10 /8: ANALYST KF

REMARKS Cu Zn Pb Ag Mo As in ppm.

(0.2g / 2 ml $HClO_4$, HNO_3 → 5 ml)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As							
26	85 N - 104 E	✓	18	100	✓10	0.2	✓< 2	4							
7	105	✓	16	130	✓8	0.2	✓< 2	2							
8	106	✓	80	370	✓10	1.0	✓< 2	32							
9	107	✓	22	150	✓6	0.2	✓< 2	4							
30	108	✓	16	120	✓6	0.2	✓< 2	< 2							
1	109	✓	16	80	✓6	0.2	✓< 2	< 2							
2	110	✓	18	260	✓8	0.2	✓< 2	22							
3	111	✓	14	110	✓10	0.2	✓< 2	6							
4	112	✓	16	230	✓12	0.2	✓< 2	6							
5	113	✓	16	170	✓6	0.2	✓< 2	10							
6	114	✓	14	72	✓8	0.2	✓< 2	< 2							
7	115	✓	14	72	✓8	0.2	✓< 2	< 2							
8	116	✓	8	42	✓6	0.2	✓< 2	< 2							
9	117	✓	12	64	✓6	0.2	✓< 2	< 2							
40	118	✓	10	80	✓4	0.2	✓< 2	< 2							
1	119	✓	76	190	✓12	1.2	✓2	8							
2	85 N - 120 E	(B) ✓	14	110	✓6	0.2	✓< 2	< 2							
3	85 N - 122 E	✓	14	84	✓4	0.2	✓< 2	< 2							
4	105 N - 101 E	✓	38	170	✓14	0.6	✓< 2	2							
5	102	✓	20	140	✓20	1.4	✓2	12							
6	103	✓	120	260	✓16	2.0	✓2	12							
47	105 N - 104 E	✓	20	130	✓10	0.6	✓2	14							

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR D.M. DATE RECEIVED June / 3 / 83 CODE 83-C-009 SHEET 10

MATERIAL Soil - Silt DATE ANALYSED June / 10 / 83 ANALYST KF

REMARKS Cu Zn Pb Ag Mo As Ni Co Mn in ppm Fe in %

(0.2g / 2 ml $HClO_4$ HNO_3 → 5 ml)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As	(Ni)	(Co)	(Mn)	(Fe)		NTS	GCI
48	105 N - 105 E	Soils ✓	34	100	✓10	0.4	✓2	10						93 L/10	00197
9	106	✓	12	58	✓8	0.4	✓<2	4							
50	107	✓	36	190	✓12	0.4	✓<2	12							
1	108	✓	14	54	✓8	0.2	✓<2	2							
2	109	✓	10	120	✓2	0.2	✓2	2							
3	110	✓	12	44	✓4	0.2	✓<2	4							
4	111	✓	14	54	✓4	0.2	✓<2	<2							
5	112	✓	14	130	✓10	0.2	✓<2	<2							
6	105 N - 113 E	✓	10	68	✓10	0.2	✓<2	10							
7	105 N - 115 E	✓	18	86	✓10	0.4	✓<2	14							
8	116	✓	14	66	✓4	0.2	✓<2	6							
9	117	✓	18	78	✓6	0.2	✓<2	<2							
60	118	✓	14	120	✓10	0.2	✓<2	8							
1	119	✓	14	200	✓10	0.4	✓<2	12							
2	105 N - 120 E	✓	14	100	✓6	0.2	✓2	8	↓	↓	↓	↓			
3	17901	Silts	58	120	6	0.8	4	16	36	18	2100	3.2			
4	2		42	180	6	1.2	2	8	32	16	2100	3.4			
5	3		40	170	6	0.4	<2	12	30	16	1000	3.3			
6	4		28	80	6	0.2	2	10	28	18	4000	4.3			↓
7	5		28	100	8	0.2	2	18	30	14	700	3.4			00193
8	6		30	150	14	0.6	<2	26	26	16	1900	3.8		↓	00195
69	17907		30	120	6	0.4	<2	2	28	14	750	3.0		93 L/10	00195

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR P M. DATE RECEIVED June / 5 /83 CODE 83CC 003 SHEET 11

MATERIAL Silt DATE ANALYSED June / 10 /83 ANALYST R F

REMARKS Cu, Zn Pb, Ag, Mo, As, Ni, Co, Mn in ppm; Fe in %.

(0.2g / 2 ml $HClO_4$ · HNO_3 → 5 ml)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As	Ni	Co	Mn	Fe		NTS	GCI
70	17908	Silts	36	140	8	0.6	< 2	2	26	14	800	2.8		93 L/10	00102
1	9		28	96	8	0.2	< 2	< 2	22	14	700	2.7			00194
2	10		32	120	10	0.4	4	6	26	16	1200	3.3			00194
3	11		34	460	4	0.4	8	10	30	32	30,000	6.2			00193
4	12		36	170	8	0.4	2	8	30	16	1300	3.2			
5	13		300	440	36	2.2	2	< 2	50	18	800	3.5			
6	14		30	250	2	0.6	18	16	34	42	14,000	13.			
77	17915		80	500	14	1.8	8	22	40	20	1100	3.9		93 L/10	00193

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 10391 COLLECTOR P.M. DATE RECEIVED June 18 /83 JUN 20 1983 CODE 8306-015 SHEET 1

MATERIAL Silt DATE ANALYSED June 14 /83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo, Mn, Ni, Co, As in ppm; Fe in %.
(0.2 g / 2 ml $HClO_4 \cdot HNO_3$ → 5 ml)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	Mn	Fe	Ni	Co	As		NTS	GCI
1	Check NL-3		66	54	8	0.6	6	400	2.8	26	18	320		—	—
2	17917		24	130	4	0.2	< 2	600	5.0	30	20	< 2		93L/10	195
3	17918		50	110	6	0.4	< 2	670	4.3	24	16	< 2		↓	193
4	17919		36	100	6	0.6	< 2	730	4.4	28	16	4		93L/10	193
5	17916		30	86	4	0.2	< 2	1000	5.0	34	18	6		93L/7	194

NORANDA GEOCHEM LABORATORY

JUN 2 0 1983

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR D.M. DATE RECEIVED June / 8 / 83 CODE 8306-06 SHEET 1

MATERIAL Soil DATE ANALYSED June / 14 / 83 ANALYST R.F.

REMARKS Cu, Zn, Pb, Ag, Mo, As in ppm;
(0.2 g / 2 ml $HClO_4 \cdot HNO_3$ → 5 ml.)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	As						N.T.S.	G.C.I
6	110N-101E	✓	36	68	✓4	0.4	✓<2	<2						93L/10	197
7	110N-102E	✓	14	56	✓4	0.2	✓<2	<2							
8	110N-103E	✓	32	110	✓8	0.2	✓<2	<2							
9	110N-105E	✓	16	120	✓4	0.2	✓<2	<2							
10	110N-106E	✓	14	76	✓4	0.2	✓<2	2							
11	110N-107.25E	✓	60	120	✓6	1.0	✓2	6							
12	110N-108E	✓	18	94	✓4	0.2	✓<2	<2							
13	110N-109E	✓	30	90	✓8	0.2	✓<2	<2							
14	110N-115E	✓	14	70	✓12	0.2	✓<2	<2							
15	110N-112E	✓	16	100	✓6	0.2	✓<2	<2							
16	110N-114E	✓	14	94	✓6	0.2	✓<2	<2							
17	110N-116E	✓	12	76	✓4	0.2	✓<2	<2							
18	110N-117E	✓	14	64	✓8	0.2	✓<2	<2							
19	110N-118E	✓	16	100	✓10	0.2	✓<2	6							
20	110N-119E	✓	16	150	✓8	0.2	✓<2	4							
21	110N-120E	(B) ✓	20	120	✓14	0.2	✓<2	<2							
22	110N-121E	✓	20	90	✓14	0.4	✓<2	<2							
23	110N-110E	✓	68	120	✓10	0.8	✓<2	2							
24	110N-111E	✓	88	120	✓12	1.2	✓<2	<2						↓	↓
25	110N-113E	✓	36	110	✓8	0.6	✓<2	<2						93L/10	193

dm

NORANDA GEOCHEM LABORATORY

AUG 25 1983

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR DM DATE RECEIVED July / 6 / 83 CODE 8307-040 SHEET 1

MATERIAL Rock DATE ANALYSED Aug / 8 / 83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb.

(0.2g / 4 ml $HClO_4 \cdot HNO_3$ → 10 ml; 10g / Aqua Regia - MIBK / A.A.)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo		Au						
48	110 N - 114.3 E		48	140	2	0.2	2		10						
9	110N - 112.26 E		48	30	16	0.2	2		10						
50	105N - 114 E		40	32	2	0.2	< 2		10						
1	117		64	36	2	0.2	< 2		10						
2	108		44	74	12	0.2	< 2		10						
3	106.1		8	84	2	0.2	2		10						
4	105.5		96	90	6	0.2	2		10						
5	101 #4		14	86	2	0.2	2		10						
6	101 #3		10	150	4	0.2	< 2		10						
7	105		8	72	2	0.2	< 2		10						
8	102		16	92	2	0.2	2		10						
9	100.2		16	86	2	0.2	< 2		10						
60	105N - 100 E		48	64	2	0.2	< 2		10						
1	100N - 121.12 E		14	66	2	0.2	< 2		10						
2	120.46		18	80	2	0.2	< 2		10						
3	118.69		16	92	2	0.2	< 2		10						
4	107.58		10	110	2	0.2	< 2		10						
5	107.05		8	66	2	0.2	< 2		10						
6	106.09		12	60	4	0.2	< 2		10						
7	105.67		12	80	2	0.2	< 2		10						
8	105.55		10	66	2	0.2	< 2		10						
69	100N - 105.14 E		8	66	2	0.2	2		10						

9/8/83

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR DM DATE RECEIVED July / 6 / 83 CODE 8307-040 SHEET 2

MATERIAL Rock DATE ANALYSED Aug / 8 / 83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb.

(0.2g / 4 ml $HClO_4 \cdot HNO_3$ → 10 ml ; 10g / Aqua Regia - MIBK/A.A.)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo		Au						
70	100N - 101.62 E		10	94	2	0.2	< 2		10						
1	101.5		20	92	2	0.2	< 2		10						
2	100.96		30	66	2	0.2	8		10						
3	100.9		44	96	2	0.4	< 2		10						
4	100N - 100.48 E		88	90	2	0.4	< 2		10						
5	95N - 119.5 E		76	100	6	0.2	< 2		10						
6	114.15		8	68	2	0.2	< 2		10						
7	111.3		82	86	4	0.4	2		10						
8	111		26	58	2	0.4	< 2		10						
9	110.5		16	46	2	0.2	< 2		10						
80	109.5		26	70	2	0.4	< 2		10						
1	104.75		6	78	2	0.2	< 2		10						
2	102		38	840	4	0.4	< 2		10						
3	101.2		22	130	2	0.4	< 2		10						
4	95N - 100 E		20	400	10	0.4	< 2		10						
5	90N - 119.58 E		24	110	2	0.2	< 2		10						
6	119.07		18	150	70	0.2	< 2		10						
7	118.57		6	160	2	0.2	< 2		10						
8	117.23		36	130	4	0.2	< 2		10						
9	116.39		10	44	2	0.2	< 2		10						
90	112.6		46	72	6	0.2	< 2		10						
91	90N - 112.1 E		60	200	10	0.8	< 2		10						

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039-1 COLLECTOR DM DATE RECEIVED July / 6 / 83 CODE 8307-040 SHEET 3

MATERIAL Rock DATE ANALYSED Aug / 8 / 83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb.

(0.2g / 4 ml $HClO_4$: HNO_3 → 10 ml ; 10g / Aqua Regia - MIBK / A.A.)

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo		Au						
92	90N - 110.17E		6	30	2	0.2	< 2		10						
3	106.67		12	58	2	0.2	< 2		10						
4	106.5		18	56	2	0.2	< 2		10						
5	104.2		850	14000	18	5.0	< 2		40						
6	103.85		24	160	4	0.2	< 2		10						
7	101.96		10	100	4	0.4	< 2		10						
8	100.55		6	300	2	0.2	< 2		10						
9	90N - 100.3 E		8	280	2	0.2	< 2		10						
100	Check NL-3		66	60	8	0.8	8		—						
1	85N - 111.3 E		12	120	2	0.2	< 2		10						
2	103		6	120	4	0.4	< 2		10						
3	85N - 100.4 E		12	86	2	0.4	< 2		10						
104	83.5N - 100 E		8	140	2	0.2	< 2		10						

Dec 05 JM

NORANDA GEOCHEM LABORATORY

(Rerun 8309-023)

LOCATION Rerun 8309-023 PROJECT 1039-1 COLLECTOR DM DATE RECEIVED Oct / 13 / 83 CODE 8310-029 SHEET 1

MATERIAL Pulp DATE ANALYSED Nov / 17 / 83 ANALYST R.F.

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb;

0.2g/4ml $HClO_4 \cdot HNO_3 \rightarrow$ 10 ml. 10g./Aqua Regia - MIBK/AA

T.T. NO.	SAMPLE NO.		Pb	Zn	Cu	Mo			Ag	Au					
55	Y-5179		2	88	6	<2			0.2	10					
6	80		32	86	8	<2			0.2	10					
7	81		2	62	6	<2			0.2	10					
8	82		2	280	42	<2			0.2	10					
9	83		2	240	8	<2			0.2	10					
40	Y-5184		2	200	4	<2			0.2	10					
—	———		—	—	—	—			—	—					

24/11/83

NORANDA EXPLORATION COMPANY, LIMITED

PROPERTY Mineral Hill 10391

N.T.S. 93L/10E

DATE Sept 1/83

SAMPLE REPORT

SAMPLE NO.	LOCATION & DESCRIPTION	TYPE	WIDTH	ASSAYS Au	Ag	Cu	Pb	Zn	Mo		SAMPLED BY
15179	(L8500N Δ 97+90E) - Sg grey, green, rhyodacite	grab									DGG
5180	(L8500N Δ 97+25E) - Sg, grey-green, rhyo-dacite	grab									DGG
15181	(L8500N Δ 96+50E) - Sg, black, magnetic andesite	grab									DGG
15182	(L9000N Δ 96+50E) - Sg, rhyo-dacite with minor blebs of pyrite along fractures.	grab									DGG
5183	(L9000N Δ 98+10E) Sg, green andesite - dacite	grab									DGG
15184	(L9000N Δ 99+25E) red-grained, green volcanic tuff - epidote - light volcanic frags.	grab									DGG

Border-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
Canada V7P 2R5
Phone: (604) 985-0681
Telex: 04-352667

Certificate of Analysis

REPORT: 423-2595 PROJECT: 1039-1 #9-23

Mineral Hill

SAMPLE NUMBER	ELEMENT UNITS	Au GMT	As GMT	Cu PCT	Mo PCT	Pb PCT	Zn PCT	NOTES
R Y-5179		<0.07	<0.7	<0.01	0.003	<0.01	<0.01	
R Y-5180		<0.07	<0.7	<0.01	0.002	<0.01	<0.01	
R Y-5181		<0.07	<0.7	<0.01	0.002	<0.01	<0.01	
R Y-5182		<0.07	0.7	<0.01	0.001	<0.01	0.03	
R Y-5183		<0.07	1.4	<0.01	0.001	<0.01	0.02	
R Y-5184		<0.07	1.0	<0.01	0.002	<0.01	0.02	

Registered Assayer, Province of British Columbia

dm

NORANDA GEOCHEM LABORATORY

NOV 25 1983

LOCATION Mineral Hill PROJECT 10394 COLLECTOR DM DATE RECEIVED Sept / 6 / 83 CODE 8309-024 SHEET 1

MATERIAL Soil DATE ANALYSED Sept / 13 / 83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb;

0.2g / 2ml. $HClO_4 \cdot HNO_3$ → 5 ml. 1 g. / Aqua Regia - MIBK / AA

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo		Au					NTS	GCI
28	85N - 95 E		62	1000	16	0.4	< 2		10					93L/10E	12
9	95.5E		30	480	10	0.2	< 2		10						
30	96 E		16	250	8	0.2	< 2		10						
1	96.5E		30	320	8	0.2	< 2		10						
2	97 E		14	180	10	0.2	< 2		10						
3	97.5E		170	230	16	1.4	< 2		10						
4	98 E		34	160	16	0.2	< 2		10						
5	99 E		70	290	14	1.0	< 2		10						
6	99.5E		36	290	10	0.2	< 2		10						
7	100.5E		58	700	24	0.6	< 2		10						
8	102.5E		78	750	14	0.4	< 2		10						
9	103.5E		18	98	10	0.2	< 2		10						
40	104.5E		12	86	8	0.2	< 2		10						
1	85N - 98.5E		34	180	14	0.2	< 2		10						
2	95N - 95 E		32	290	8	0.4	< 2		10						
3	95.5E		46	230	6	0.4	< 2		10						
4	96 E		50	120	10	0.2	< 2		10						
5	96.5E		240	500	18	2.2	< 2		10						
6	97 E		38	230	10	0.2	< 2		10						
7	97.5E		64	320	18	0.4	< 2		10						
8	98 E		230	800	62	0.8	< 2		10						
49	95N - 98.5E		54	470	18	0.6	< 2		10					93L/10E	1267

16/9/83

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039H COLLECTOR DM DATE RECEIVED Sept / 6 /83 CODE 8309-024 SHEET 2

MATERIAL Soil DATE ANALYSED Sept / 13 /83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb;

0.2g/2ml. $HClO_4$ · HNO_3 → 5ml. 10g / Aqua Regia - MIBK/AA

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo		Au					NTS	GCI
50	95N - 99E		22	350	10	0.2	< 2		10					93L/10E	126
1	99.5 E		44	230	8	0.2	< 2		10						
2	100.5 E		20	250	8	0.2	< 2		10						
3	101.5 E		20	230	10	0.2	< 2		10						
4	102.5 E		14	300	10	0.2	< 2		10						
5	103.5 E		24	350	12	0.6	< 2		10						
6	95N - 104.5 E		50	530	20	0.6	4		10						
7	100N - 95 E		170	390	16	2.8	6		10						
8	95.5E		48	190	12	0.2	4		10						
9	96 E		48	290	8	0.2	2		10						
60	96.5E		22	170	10	0.2	2		10						
1	97 E		40	240	8	0.2	2		10						
2	97.5E		190	440	20	1.2	4		10						
3	98 E		26	340	8	0.4	2		10						
4	98.5E		20	140	10	0.2	2		10						
5	99 E		20	110	8	0.2	< 2		10						
6	99.5E		16	98	10	0.2	< 2		10						
7	100.5E		36	120	10	0.2	< 2		10						
8	101.5E		14	58	12	0.2	< 2		60						
9	102.5E		44	310	12	0.2	< 2		10						
70	103.5E		14	74	6	0.2	< 2		10						
71	100N - 104.5E		10	82	4	0.2	< 2		10					93L/10E	1267

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 1039H COLLECTOR DM DATE RECEIVED Sept / 6 /83 CODE 8309-024 SHEET 3

MATERIAL Soil DATE ANALYSED Sept /13 /83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb;

0.2g / 2ml. $HClO_4 \cdot HNO_3 \rightarrow$ 5 ml. 10g / Aqua Regia – MIBK/AA

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo		Au					NTS	GCI
72	90 N – 95 E		12	150	6	0.2	< 2		10					93L/10E	126
3	95.5 E		110	400	10	1.8	< 2		10						
4	96 E		18	330	8	0.2	< 2		10						
5	97 E		170	2200	24	1.6	< 2		10						
6	97.5 E		110	2500	16	1.8	< 2		10						
7	98 E		180	1900	14	1.8	< 2		10						
8	98.5 E		620	2100	16	2.4	< 2		10						
9	99 E		480	1300	16	2.0	< 2		10						
80	100.5 E		160	6000	10	1.0	< 2		10						
1	101.5 E		22	340	6	0.2	< 2		10						
2	102.5 E		18	200	4	0.2	< 2		10						
3	103.5 E		24	380	34	0.2	< 2		10						
4	90 N – 104.5 E		28	230	14	0.4	< 2		10						
5	105N – 95 E		16	98	10	0.2	< 2		10						
6	95.5 E		40	210	16	0.2	< 2		10						
7	96 E		30	190	10	0.2	< 2		10						
8	96.5 E		24	230	8	0.2	< 2		10						
9	97 E		140	390	6	0.2	2		10						
90	97.5 E		560	310	38	3.6	4		10						
1	98 E		64	220	12	0.8	< 2		10						
2	98.5 E		130	380	14	1.2	4		10						
93	105N – 99 E		34	180	10	0.2	2		10					93L/10E	1267

NORANDA GEOCHEM LABORATORY

LOCATION Mineral Hill PROJECT 10394 COLLECTOR DM DATE RECEIVED Sept / 6 /83 CODE 8309-024 SHEET 4

MATERIAL Soil DATE ANALYSED Sept / 13 / 83 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb;

0.2g / 2 ml. $HClO_4 \cdot HNO_3 \rightarrow$ 5ml. 10g. / Aqua Regia – MIBK / AA

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo		Au					NTS	GCI
94	105N-99.5E		48	180	8	0.2	< 2		10					934/10E	1267
5	100.5E		42	140	10	0.4	< 2		10						
6	101.5E		130	270	20	1.4	2		10						
7	102.5E		170	140	10	2.0	4		10	(5.0)					
8	103.5E		46	160	10	0.2	2		10					↓	↓
9	105N-104.5E		16	90	10	0.2	< 2		10					934/10E	1267
100	CHECK NL-4		24	66	26	0.2	8		—					—	—
—	———		—	—	—	—	—		—					—	—

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
Canada V7P 2R5
Phone: (604) 985-0681
Telex: 04-352667

BONDAR-CLEGG

Geochemical Lab Report

Mineral Hill

REPORT: 123-3035

PROJECT: 1039-1 #10-11 PAGE 1

SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Pb PPM	Zn PPM	Mo PPM	As PPM	Au PPB	NOTES
R X6476		24	7	94	1	<0.2	<5	
R X6477		28	4	12	1	<0.2	<5	
R X6478		2	3	60	1	<0.2	<5	
R X6479		9	3	66	1	<0.2	<5	
R X6480		20	3	106	1	0.2	<5	
R X6481		420	750	420	2 >	50.0	95	
R X6482		53	15	61	1	2.2	<5	
R X6483		1400 >	10000	334	5 >	50.0	105	
R X6484		84	480	62	19	12.0	<5	

chm

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
Canada V7P 2R5
Phone: (604) 985-0681
Telex: 04-352667

BONDAR-CLEGG

Certificate of Analysis

Mineral Hill

REPORT: 623-3035

PROJECT: 1039-1 #10-11 PAGE 1

SAMPLE NUMBER	ELEMENT UNITS	As GMT	Pb PCT	NOTES
R X6481		107.7		
R X6483		1824.0	7.72	

dm

OCT 1983

NORANDA GEOCHEM LABORATORY

OCATION MINERAL HILL PROJECT 1039-1 COLLECTOR DM DATE RECEIVED SEPT 29/83 CODE 8319-012 SHEET 1

IATERIAL SILT - SOIL DATE ANALYSED OCT 13 83 ANALYST AP

EMARKS Cu Zn Pb Ag Mo in ppm Au in ppb

0.2g / 2ml $HClO_4$-HNO_3 → 5ml 10g / AQUA REGIA - MIBK / A.A.

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	Au							MS	GCI
69	17601	SILT	120	380	10	1.2	< 2	10	(5.0)						93 4/10	001.
70	97.5 N - 100 E		46	190	2	0.2	< 2	10								
1	97.5		200	250	4	0.2	< 2	10								
2	99.		88	260	24	0.6	< 2	10								
3	98.5		74	350	22	0.6	< 2	10								
4	98.		54	370	16	0.4	< 2	10								
5	97.5		34	330	6	0.2	< 2	10								
6	97.		42	240	10	0.2	< 2	10								
7	96.5		28	170	8	0.2	2	10								
8	96.		60	440	46	0.4	8	10								
9	95.5		48	360	26	0.2	10	10								
80	97.5 N - 95 E		110	650	140	0.8	14	10								
1	87.5 N - 100 E		76	450	190	1.8	< 2	10								
2	99.5		52	310	18	0.6	< 2	10								
3	99		78	370	8	0.4	< 2	10								
4	98.5		180	800	22	0.4	< 2	10								
5	98.25		52	370	14	0.2	< 2	10								
6	98		38	450	12	0.2	< 2	10								
7	97.5		90	440	12	0.2	< 2	10								
8	97		62	2500	14	0.4	< 2	10								
9	96.5		40	900	10	0.2	< 2	10								
90	87.5 N - 96 E		160	800	16	1.8	2	10								

6/10/83

NORANDA GEOCHEM LABORATORY

LOCATION MINERAL HILL PROJECT 1039-1 COLLECTOR DM DATE RECEIVED SEPT / 29 / 83 CODE 8310-012 SHEET 2

MATERIAL SOIL DATE ANALYSED OCT / 3 / 83 ANALYST RF

REMARKS

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	Au							
91	97.5N-95.5E		1000	1000	26	2.4	2	10							
2	95E		66	360	10	0.8	<2	10							
3	92.5N-100.44E		36	400	10	0.2	<2	10							
4	100		32	650	10	0.2	<2	10							
5	99.5		110	650	12	0.6	<2	10							
6	99		68	1400	16	0.6	2	10							
7	98.5		480	2300	20	3.4	2	10							
8	98		46	260	12	0.4	2	10							
9	92.5N-97.5E		48	350	12	0.6	<2	10							
100	CHECK NL-4		26	72	22	0.4	10	—							
1	92.5N-97E		140	800	8	1.0	2	10							
2	96.5		60	300	8	0.4	2	10							
3	96		18	250	6	0.2	2	10							
4	95.5		94	800	14	1.8	2	10							
105	92.5N-95E		110	390	8	1.0	2	10							

NORANDA EXPLORATION COMPANY, LIMITED

N.T.S. 93L/10

PROPERTY Mineral Hill (10391)

DATE OCT 25/85

SAMPLE REPORT

SAMPLE NO.	LOCATION & DESCRIPTION	TYPE	WIDTH	~~ASSAYS~~ geochem Au	Ag	Cu	Pb	Zn	Mo		SAMPLED BY
6485	L 89+00N Δ 101+00E - green, red → coarse ash tuff - minor diss. py and unknown metallics	grab.									DGG
6486	L 89+00N Δ 99+30E - light green rhyo-dacite coarse ash tuff. - hematite staining?	grab									DGG
6487	L 89+00N Δ 99+00E dark green, dacite - andesite tuff with minor carbonate veinlets.	grab									DGG
6488	L 89+00N Δ 98+00E green, med gr, ash tuff - epid + carb.	grab									DGG
6489	dark green coarse ash tuff - carb. veinlets + pods - iron sulfides present L 89+00N Δ 97+85E	grab									DGG
6490	L 89+00N Δ 96+85E purple lapilli tuff - carbonate veinlets - diss py + minor cpy?	grab									DGG
x6491	L 96+50N Δ 98+20E grey lapilli tuff with epid. - iron stained	grab.									DGG

NORANDA GEOCHEM LABORATORY

OCATION Mineral Hill PROJECT 1039-1 COLLECTOR DM DATE RECEIVED Oct. / 31 / 83 CODE 8311-005 SHEET 1

IATERIAL Rock DATE ANALYSED NOV. / 23 / 83 ANALYST RF

EMARKS Cu Zn Pb Ag Mo in ppm Au in ppb

0.2 g/4 ml $HClO_4$ - HNO_3 ——→ 10 ml 10 g/Agua regia - MIBK / AA

T.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag_3	Mo		Au					NTS	GCI
35	X 6491		30	38	8	0.4	2		10					93L/10	132
6	x 6490		12	82	2	0.4	<2		10						
7	X 6489		8	140	2	0.2	<2		10						
8	x 6488		22	120	2	0.4	2		10						
9	X 6487		32	140	2	0.2	2		10						
40	X 6486		16	74	2	0.2	<2		10						
41	X 6485		38	140	4	0.4	<2		10						
-	—		-	-	-	-	-							-	-

DEC 22 1983

NORANDA GEOCHEM LABORATORY

LOCATION MINERAL HILL PROJECT 1039-1 COLLECTOR DM DATE RECEIVED OCT / 31 / 83 CODE 8311-005 SHEET 1

MATERIAL SOIL DATE ANALYSED NOV / 9 / 83 ANALYST RF

REMARKS Cu Zn Pb Ag Mo in ppm Au in ppb

0.2g / 2-1 $HClO_4$-HNO_3 → 5-1 10g / AQUA REGIA-MIBK / A.A.

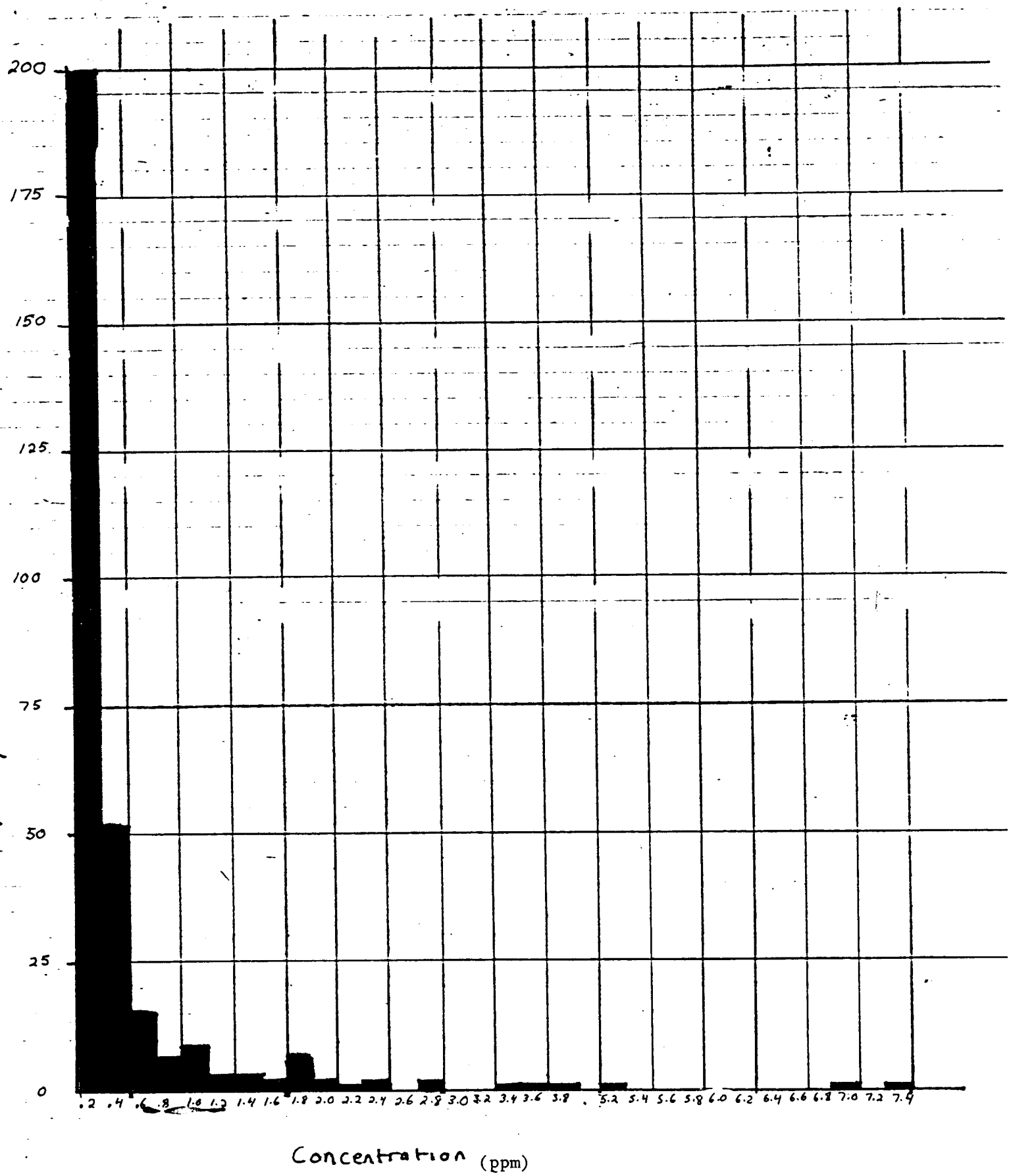
I.T. NO.	SAMPLE NO.		Cu	Zn	Pb	Ag	Mo	Au						NTS	GLI
120	89N-10E		20	180	4	0.2	2	10	(4.7)					93L/10	013-W
1	99,50		26	140	8	0.2	2	10	(4.4)						
2	99		58	96	6	0.6	4	I.S.							
3	98.50		22	200	4	0.2	4	10	(4.0)						
4	98		24	270	6	0.2	2	10	(2.9)						
5	97.50		16	190	4	0.2	2	10	(3.4)						
6	97		20	220	4	0.2	2	10	(4.9)						
7	96		16	150	4	0.2	2	10	(5.0)						
8	95.50		18	220	4	0.2	2	10	(4.4)						
9	95 E		16	280	4	0.2	2	10	(3.5)						
130	96.50N-95E		50	320	28	0.4	18	10	(5.0)						
1	95.50		58	500	6	0.4	4	10	(4.1)						
2	96		170	320	6	0.6	4	10	(5.0)						
3	96.50		120	550	6	0.8	2	10	(4.5)						
4	97		58	220	10	0.4	2	10	(5.0)						
5	97.50		88	410	6	0.6	4	10	(5.0)						
6	98		68	240	8	0.4	4	10	(3.2)						
7	98.50		120	600	8	0.4	4	10	(4.5)						
8	99		44	350	26	0.8	2	10	(4.9)						
9	96.50N-99.50E		32	200	4	0.2	2	10	(3.8)						
140	CHECK NL-4		26	68	72	0.4	12	—							

10/11/83

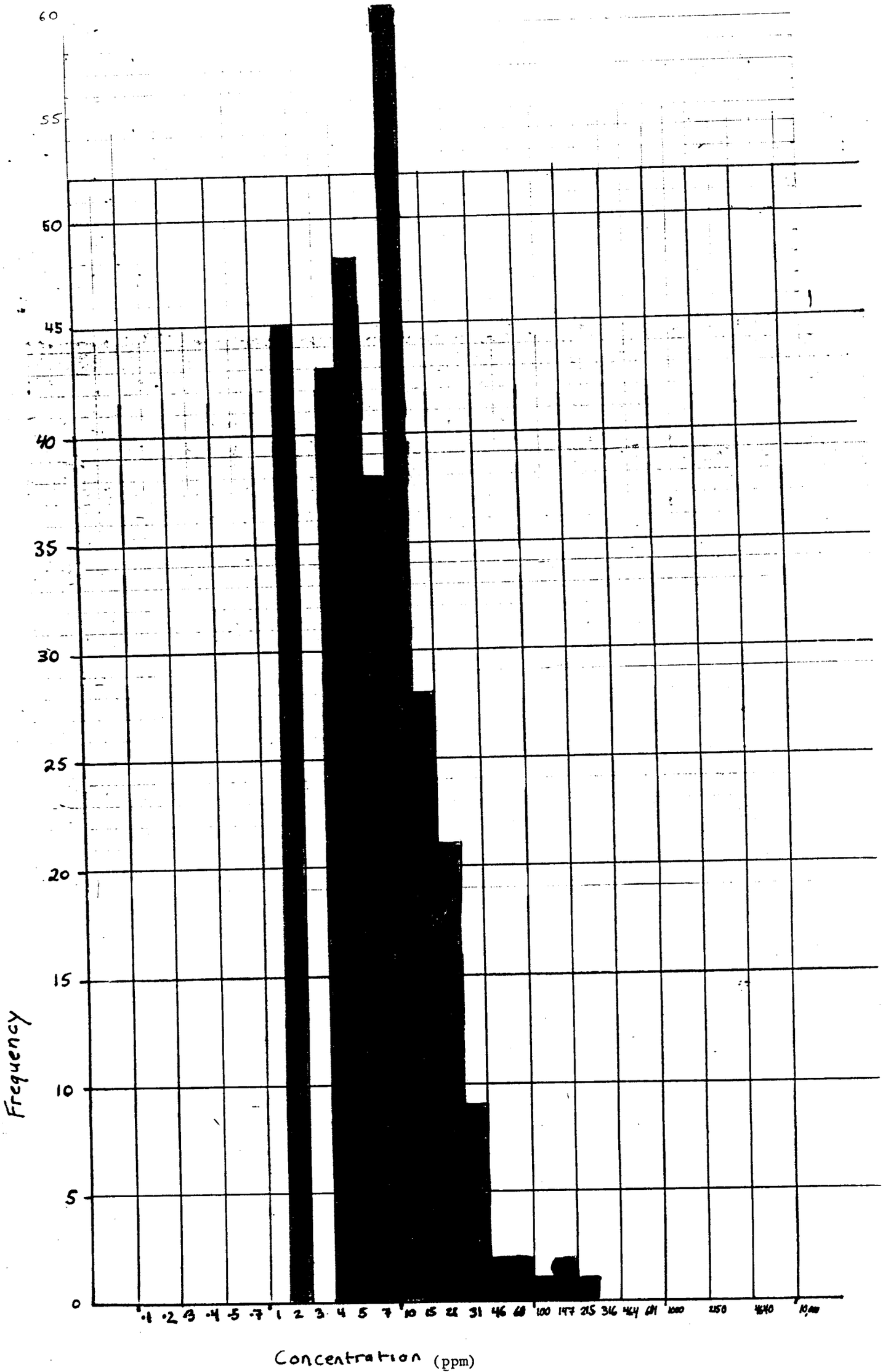
APPENDIX 5

Histograms of Trace Element Concentrations

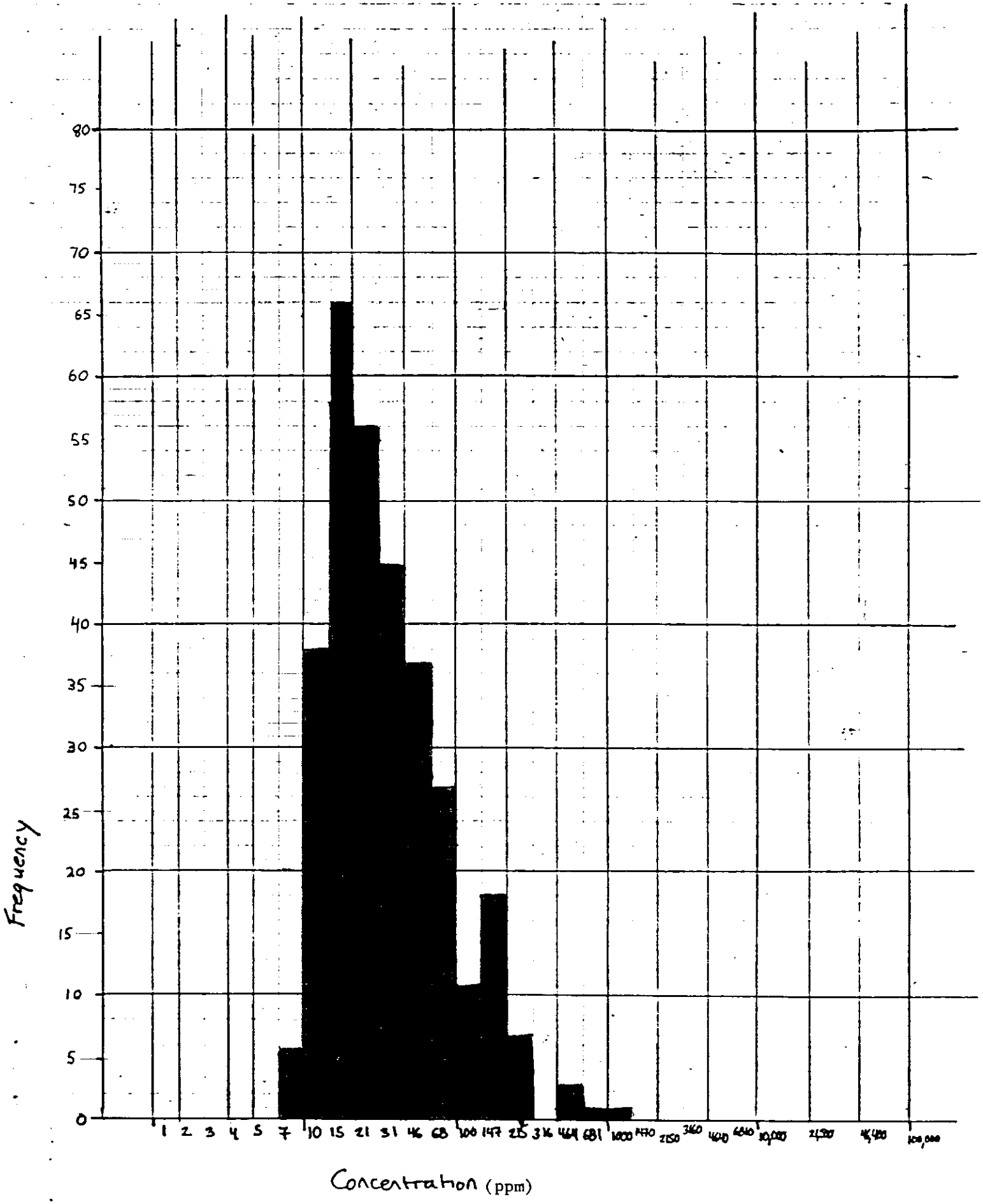
in Soil Samples



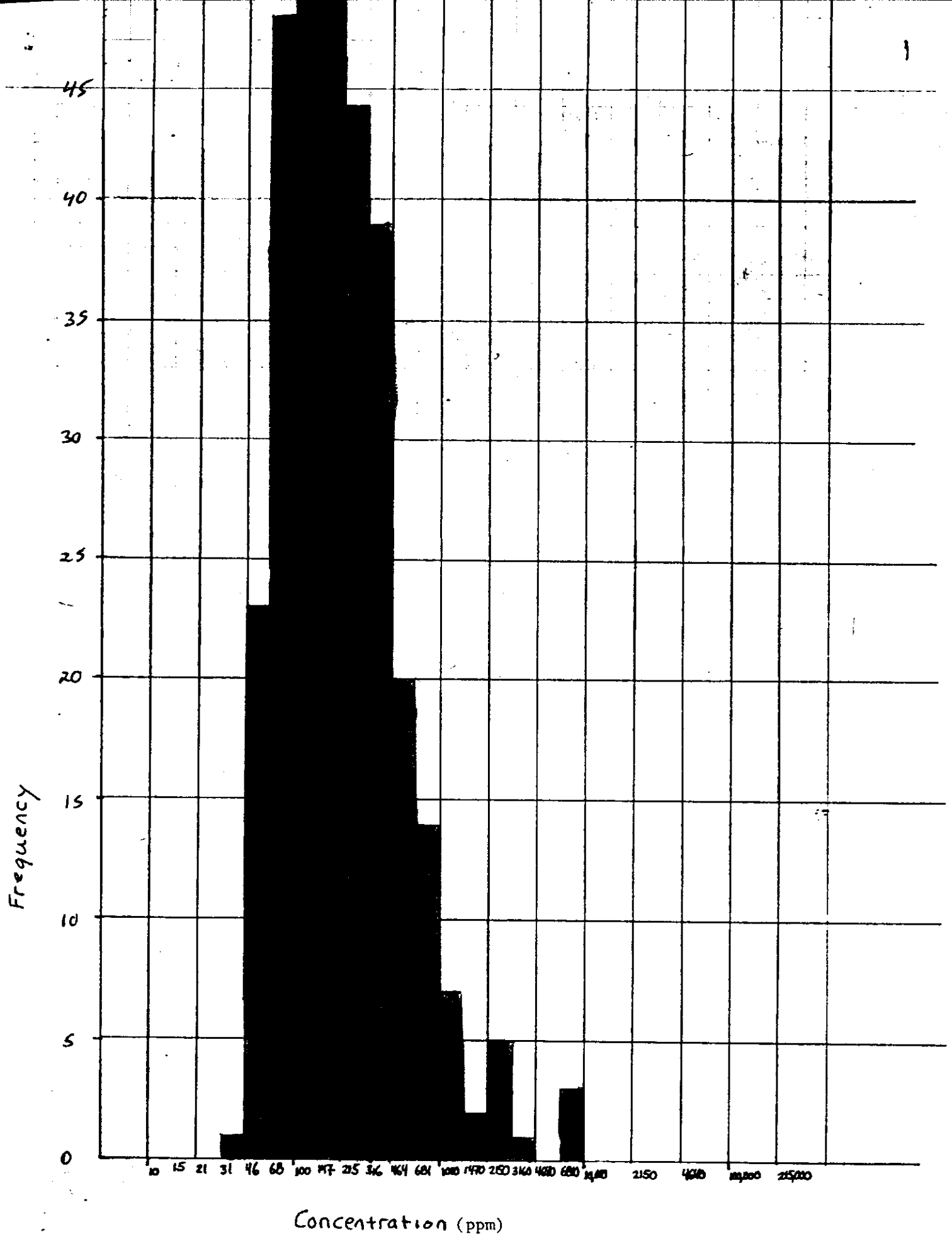
Silver in soils, Mineral Hill, 1983



Lead in soils, Mineral Hill, 1983



Copper in soils, Mineral Hill, 1983



Zinc in soils, Mineral Hill, 1983

APPENDIX 6

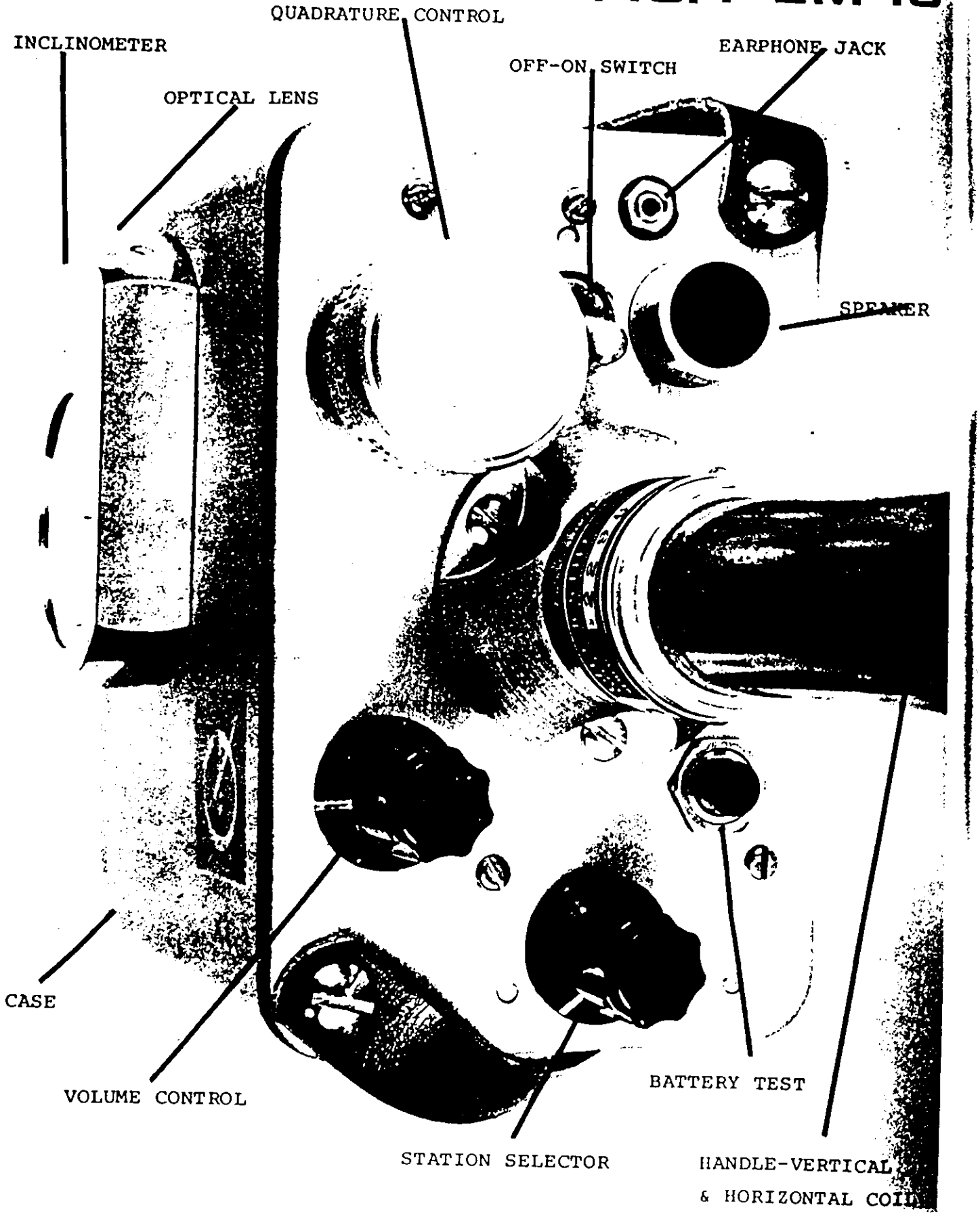
VLF-EM Survey Instruments and Procedures

VLF-EM

EM16 SPECIFICATIONS

MEASURED QUANTITY	In-phase and quad-phase components of vertical magnetic field as a percentage of horizontal primary field. (i.e. tangent of the tilt angle and ellipticity).
SENSITIVITY	In-phase :±150% Quad-phase :± 40%
RESOLUTION	±1%
OUTPUT	Nulling by audio tone. In-phase indication from mechanical inclinometer and quad-phase from a graduated dial.
OPERATING FREQUENCY	15-25 kHz VLF Radio Band. Station selection done by means of plug-in units.
OPERATOR CONTROLS	On/Off switch, battery test push button, station selector switch, audio volume control, quadrature dial, inclinometer.
POWER SUPPLY	6 disposable 'AA' cells.
DIMENSIONS	42 x 14 x 9cm
WEIGHT	Instrument: 1.6 kg Shipping : 4.5 kg
MANUFACTURER	Geonics Limited 1745 Meyerside Drive, Unit 8 Mississauga, Ontario L5T 1C5 (416) 676-9580

FIG. 1 EM 16


QUADRATURE CONTROL
INCLINOMETER
EARPHONE JACK
OFF-ON SWITCH
OPTICAL LENS
SPEAKER
CASE
VOLUME CONTROL
BATTERY TEST
STATION SELECTOR
HANDLE-VERTICAL
& HORIZONTAL COIL

PRINCIPLES OF OPERATION

The VLF-transmitting stations operating for communications with submarines have a vertical antenna. The Antenna current is thus vertical, creating a concentric horizontal magnetic field around them. When these magnetic fields meet conductive bodies in the ground, there will be secondary fields radiating from these bodies. (See Figures 3 & 4). This equipment measures the vertical components of these secondary fields.

The EM16 is simply a sensitive receiver covering the frequency band of the VLF-transmitting stations with means of measuring the vertical field components.

The receiver has two inputs, with two receiving coils built into the instrument. One coil has normally vertical axis and the other is horizontal.

The signal from one of the coils (vertical axis) is first minimized by tilting the instrument. The tilt-angle is calibrated in percentage. The remaining signal in this coil is finally balanced out by a measured percentage of a signal from the other coil, after being shifted by 90°. This coil is normally parallel to the primary field,(See instrument Block Diagram - Figure 2).

Thus, if the secondary signals are small compared to the primary horizontal field, the mechanical tilt-angle is an accurate measure of the vertical real-component, and the compensation ¶/2-signal from the horizontal coil is a measure of the quadrature vertical signal.

Some of the properties of the VLF radio wave in the ground are outlined by Figures 4 thru 9.

SELECTION OF THE STATION

The magnetic field lines from the station are at right angles to the direction of the station. Always select a station which gives the field approximately at right angles to the main strike of the ore bodies or geological structure of the area you are presently working on. In other words, the strike of geology should point to the transmitter. (See Figure 3). Of course, $\pm 45^{o}$ variations are tolerable in practice.

Tuning of the EM16 to the proper transmitting station is done by means of plug-in units inside the receiver. The instrument takes two selector-units simultaneously. A switch is provided for quick switching between these two stations.

To change a plug-in unit, open the cover on top of the instrument, and insert the proper plug. (Figure 10) Close the cover and set the selector switch to the desired plug-in.

On the following pages is a variety of information on the most commonly used (i.e. reliable) VLF Transmitters including transmission frequency, geographical location and their scheduled maintenance periods.

NOTES ON VLF TRANSMISSIONS

	STATION	LOCATION	FREQUENCY (kHz)	CO-ORDINATES
N.AMERICA	NAA	Cutler, Maine	17.8	67W17-44N39
	NLK	Seattle, Washington	18.6	121W55-48N12
	NSS	Annapolis, Maryland	21.4	76W27-38N59
EUROPE	GBR	Rugby, England	16.0	01W11-52N22
	FUO	Bordeaux, France	15.1	00W48-44N65
	JXZ	Helgeland, Norway	16.4	13E01-66N25
	UMS	Moscow, U.S.S.R.	17.1	37E01-55N49
PACIFIC	NWC	North West Cape Australia	22.3	114E09-21S47
	NDT	Yosami, Japan	17.4	137E01-34N58
	NPM	Lualualei, Hawaii	23.4	158W09-21N25

Fig.10

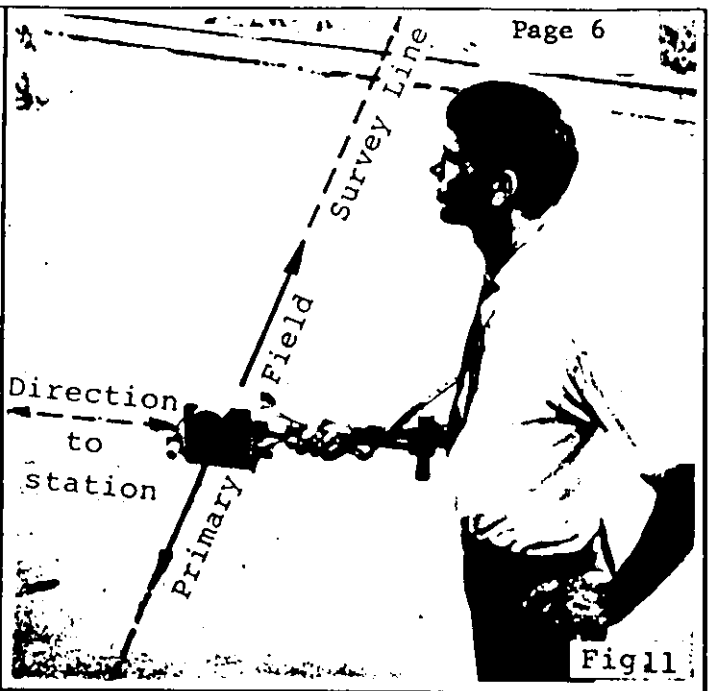


Fig11

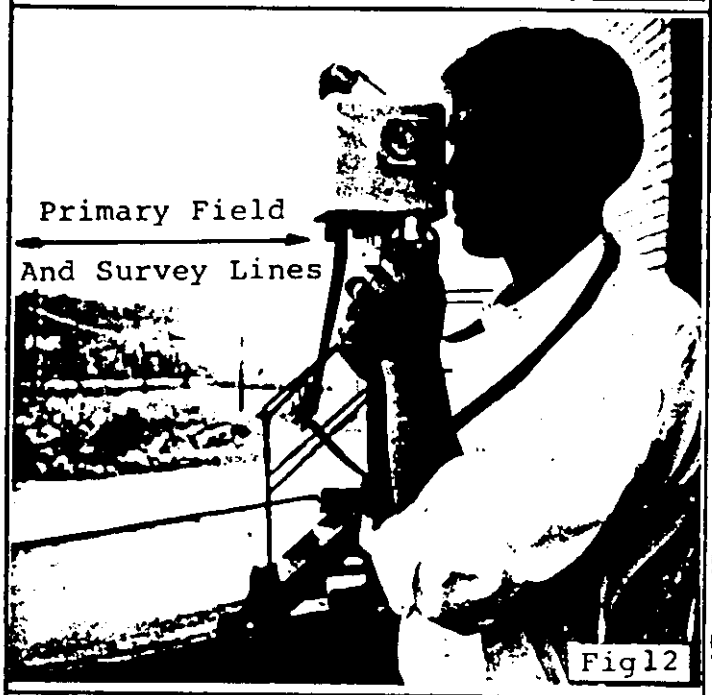


Fig12

Fig.13

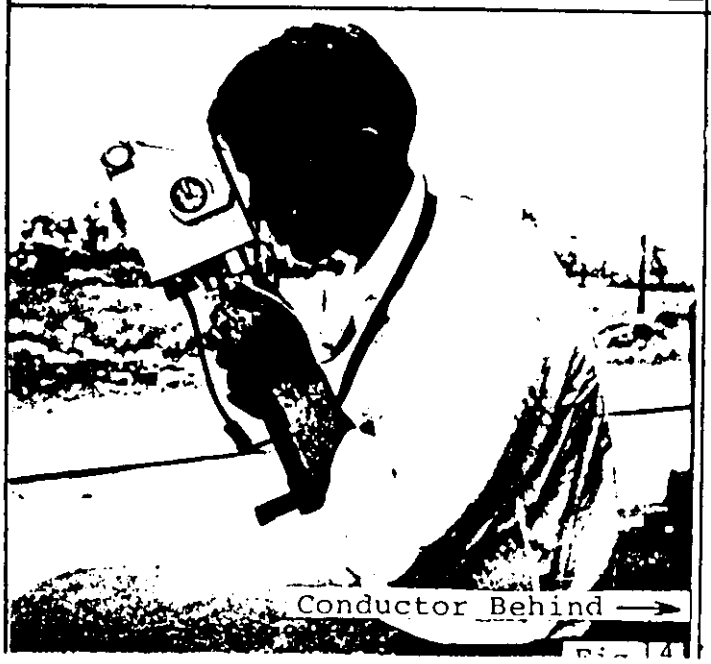


Fig.14

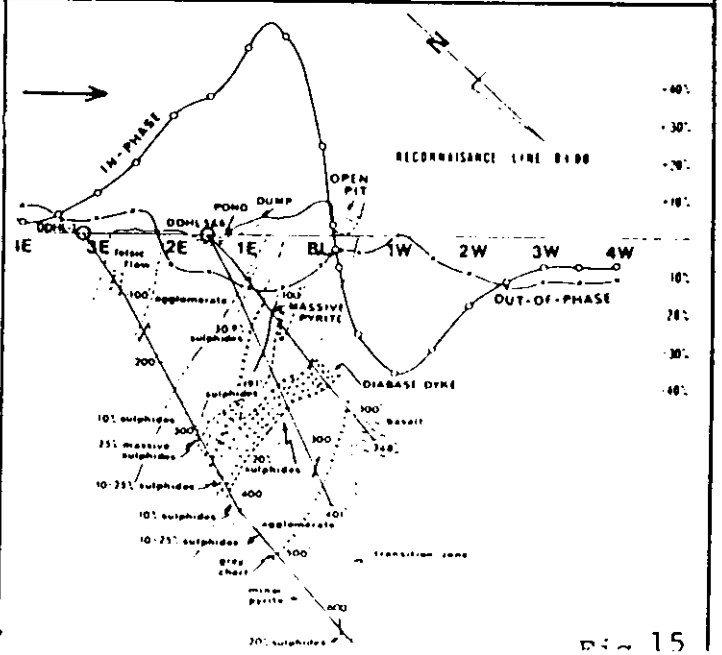


Fig. 15

FIELD PROCEDURE

Orientation & Taking a Reading

The direction of the survey lines should be selected approximately along the lines of the primary magnetic field, at right angles to the direction to the station being used. Before starting the survey, the instrument can be used to orient oneself in that respect. By turning the instrument sideways, the signal is minimum when the instrument is pointing towards the station, thus indicating that the magnetic field is at right angles to the receiving coil inside the handle.(Fig.11).

To take a reading, first orient the reference coil (in the lower end of the handle) along the magnetic lines.(Fig.12) Swing the instrument back and forth for minimum sound intensity in the speaker. Use the volume control to set the sound level for comfortable listening. Then use your left hand to adjust the quadrature component dial on the front left corner of the instrument to further minimize the sound. After finding the minimum signal strength on both adjustments, read the inclinometer by looking into the small lens. Also, mark down the quadrature reading.

While travelling to the next location you can, if you wish, keep the instrument in operating position. If fast changes in the readings occur, you might take extra stations to pinpoint accurately the details of anomaly.

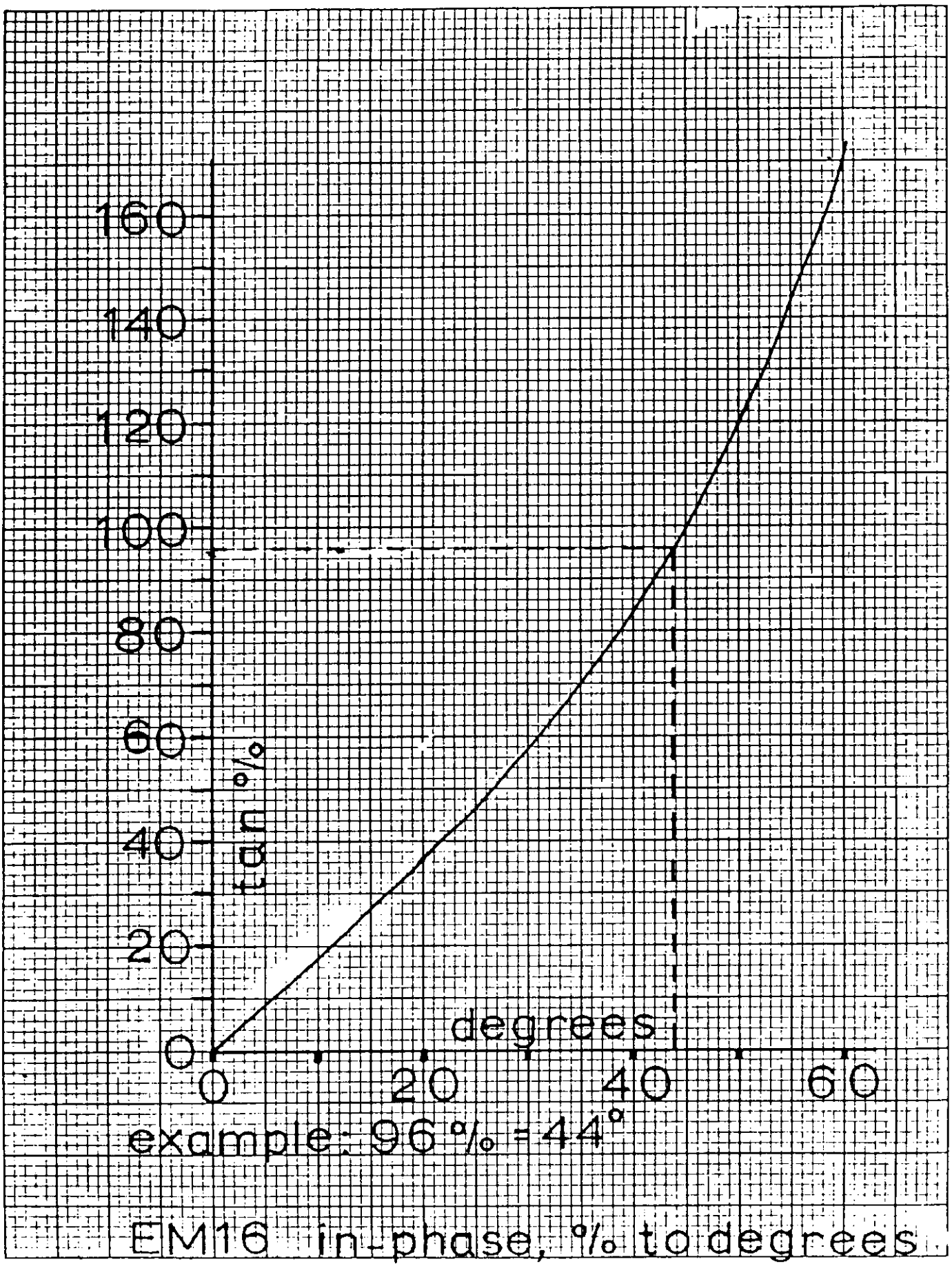
The dials inside the inclinometer are calibrated in positive and negative percentages. If the instrument is facing 180° from the original direction of travel, the polarities of the readings will be reversed. Therefore, in the same area take the readings always facing in the same direction even when travelling in opposite way along the lines.

The lower end of the handle, will as a rule, point towards the conductor. (Figs.13 & 14) The instrument is so calibrated that when approaching the conductor, the angles are positive in the in-phase component. Turn always in the same direction for readings and mark all this on your notes, maps, etc.

THE INCLINOMETER DIALS

The right-hand scale is the in-phase percentage(ie.Hs/Hp as a percentage). This percentage is in fact the tangent of the dip angle. To compute the dip angle simply take the arctangent of the percentage reading divided by 100. See the conversion graph on the following page.

The left-hand scale is the secant of the slope of the ground surface. You can use it to "calculate" your distance to the next station along the slope of the terrain.



(1) Open both eyes.

(2) Aim the hairline along the slope to the next station to about your eye level height above ground.

(3) Read on the left scale directly the distance necessary to measure along the slope to advance 100 (ft) horizontally.

We feel that this will make your reconnaissance work easier. The outside scale on the inclinometer is calibrated in degrees just in case you have use for it.

PLOTTING THE RESULTS

For easy interpretation of the results, it is good practice to plot the actual curves directly on the survey line map using suitable scales for the percentage readings. (Fig.15) The horizontal scale should be the same as your other maps on the area for convenience.

A more convenient form of this data is easily achieved by transforming the zero-crossings into peaks by means of a simple numerical filtering technique. This technique is described by D.C. Fraser in his paper "Contouring of VLF-EM Data", Geophysics, Vol. 34, No. 6. (December 1969)pp958-967. A reprint of this paper is included in this manual for the convenience of the user.

This simple data manipulation procedure which can be implemented in the field produces VLF-EM data which can be contoured and as such provides a significant advantage in the evaluation of this data.

OPERATING INSTRUCTIONS
SABRE VLF-EM RECEIVER

INTRODUCTION:

The VLF-EM method utilizes electromagnetic fields transmitted from radio stations in the 15-25 K Hz range. The signals are propagated with the magnetic component of the field being horizontal in undisturbed areas.

Conductivity contrasts in the earth create secondary fields, producing a vertical component and changes in the field strength or amplitude. These conductive areas may be located, and to a degree, evaluated by measuring the various parameters of this electromagnetic field.

The Sabre VLF-EM receiver is tuned to receive any 4 transmitter stations: usually C-Cutler Maine, S-Seattle, H-Hawaii and P-Panama.

The station used in the survey should be selected so that the direction of the signal is roughly perpendicular to the direction of the grid lines which, in turn, should be laid out perpendicular to the regional strike.

Measurements:

The Sabre VLF-EM receiver can be used to measure the following characteristics of the VLF field.

(a) Tilt angle of resultant field;

(b) Field strength of (a) horizontal component of field
(b) vertical component of field

Field Procedure

The following procedure should be followed to measure the dip angle of null and the field strength of the horizontal component of the VLF field.

Initial Field Strength Adjustment

Adjust the gain control to provide a suitable relative field strength measurement, as follows:-

(a) hold receiver in horizontal position (meter faces horizontal) and rotate in a horizontal plane until a null is indicated on the F.S. meter; (rotate 90° in this horizontal plane, F.S. meter reads maximum).

(b) adjust gain control so that the F.S. meter reads 100

(c) record gain control setting (000 to 999). Close guard over gain control and do not readjust unless a major field strength occurs.

The above procedure should be carried out at the beginning of each day's survey and checked during the day.

Dip Angle Measurement Procedure

1. Hold receiver in horizontal position and rotate in the horizontal plane until a null is observed. This aligns receiver in the field and the operator should be facing southerly or easterly depending on transmitter location.

2. Bring receiver up to the vertical position (meter faces vertical) and rotate the receiver in the vertical plane perpendicular to the transmitter direction until a null or minimum reading is observed on the field strength meter.

3. Hold the receiver in this field strength null position and read the inclinometer in degrees. Record this dip angle of null along with sign (+ or -).

Horizontal Field Strength Measurement Procedure

1. Return receiver to the horizontal position.
2. Re-establish null bearing in horizontal plane.
3. Rotate receiver 90° in the horizontal plane.
4. Depress damp push button switch and observe field strength meter reading for sufficient time to obtain an average F.S. meter reading. (depressed damp switch slows needle action and reduces meter reading by half. The reading will normally range around 50).
5. Record F.S. reading.

Filtering Technique For VLF-EM Dip Angle Data

The standard profile method of presenting dip angle data may be difficult to interpret. A filtering technique, described by D.C. Fraser 1969 (Geophysics, V.34 No. 6,P. 958-967) enables the data to be presented on a plan map with conductive areas defined by contours.

The following explains the calculation:-

Line	Station	Null		Filter
8N	0 E	+ 3		
			+3+4= +7	
	1 E	+ 4		+7-(+10)= -3
			+4+4= +8	
	2 E	+ 4		+8-(+13)= -5
			+4+6= +10	
	3 E	+ 6		+10-(+16)= -6
			+13	
	4 E	+ 7	+16	-8
	5 E	+ 9	+21	-12
	6 E	+ 12	+28	+3
	7 E	+ 16	+18	+30
	8 E	+ 2	-2	+32
	9 E	- 4	-14	+14
	11 E	- 6	-16	-14-(-7)= -7
			-6-1= -7	
	12 E	- 1		

Fig. 1 is an example of a field sheet showing null angle reading, filtered reading and relative field strength. Fig. 2 shows the field sheet with filter card overlaid. The small window in the side of the card shows the four readings used to calculate the filtered reading, and an arrow showing that the filter reading is to be plotted between station 8E and 9E as indicated in fig. 1. The card is moved down the field sheet, one reading at a time as a guide while carrying out the filtering procedure. Throughout the survey care must be taken to ensure that the filtered data has the correct sign. The positive values only are plotted and contoured while for negative values, only the negative sign is plotted.

Crone suggests in instructions for the Radem VLF-EM, the use of N-S or E-W notation instead of (+ or -) signs, however for filtering a sign must be substituted.

The following convention may be used to ensure the correct sign of filtered data and to provide a consistent crossover pattern for plotting the profiled null angle data.

1. When taking a reading, always face southerly, on east-west lines, and always face easterly on north-south lines.

2. Record data on field sheets (top to bottom) as follows: on N-S lines record from south to north
: on E-W lines record from west to east

3. Plot and profile dip angle data on plan maps facing map north or map west.

The above convention will provide correct data regardless of the property location relative to the transmitter being used.

J.T. WALKER

MAY 17, 1974

2623-1

NORANDA EXPLORATION

VLF-EM SURVEY

Geonics EM-16 LINE 9750N

PROPERTY Min Hill TRANS Seattle PAGE 3

OPERATOR Dem GAIN — DATE Sept 26/83

Stn.	I.P. F.S.	O.P. Null	Filtered	
10000	-54	-13		
9975	-63	-18	-117	
50	-66	-22	-129	+8
25	-59	-24	-125	-2
9800	-68	-26	-127	0
75	-57	-25	-125	-17
50	-53	-22	-110	-24
25	-48	-20	-101	-17
9800	-45	-19	-93	-9
75	-47	-20	-92	-3
50	-43	-16	-90	-7
25	-42	-18	-85	-15
9700	-33	-12	-75	-16
75	-36	-12	-69	+3
50	-42	-12	-78	+10
25	-37	-10	-79	+9
9600	-32	-5	-69	+5
75	-52	-13	-84	+27
50	-44	-11	-96	+1
25	-41	-11	-85	-27
9500	-28	-5	-69	-43
75	-14	+4	-42	-53
50	-2	+8	-16	-2
25	-38	-2	-40	+62
9400	-40	-2	-78	

2623-1

NORANDA EXPLORATION

VLF-EM SURVEY

Geonics Ex-16 LINE 9250N

PROPERTY Min Hill TRANS Seattle PAGE 2

OPERATOR Dem GAIN — DATE Sept 26/83

facing E

Stn.	I.P. F.S.	O.P. Null	Filtered	
9500	+32	+5	-15	
25	-17	-6	+32	29
50	-15	-4	+14	-41
75	+1	-1	-9	48
9600	+8	+4	-34	-45
25	+26	+14	-54	-18
50	+28	+10	-52	+6
75	+24	+6	-48	-3
9700	+24	+8	-55	-3
25	+31	+10	-51	+6
50	+25	+3	-49	+1
75	+24	+3	-50	+3
9800	+26	+4	-46	+4
25	+20	+2	-46	9
50	+26	+4	-55	-15
75	+29	+10	-61	-12
9900	+32	+8	-67	-8
25	+35	+8	-69	-4
50	+34	+10	-71	-4
75	+37	+11	-73	-1
10000	+36	+9	-72	+5
025	+36	+10	-68	
050	+32	+7		

2623-1

NORANDA EXPLORATION 1983

VLF-EM SURVEY

Geonics EM-16 LINE 8750N

PROPERTY Min Hill TRANS Seattle PAGE 1

OPERATOR Dem GAIN — DATE 26 Sept 83

facing W

Stn.	I.P. F.S.	O.P. Null	Filtered	
10000 E	-37	-16	-72	1
9975	-35	-11	-70	0
9950	-35	-16	-72	+4
9925	-37	-14	-74	-5
9900	-37	-17	-67	-14
9875	-30	-18	-60	-6
9850	-30	-16	-61	-1
25	-31	-12	-59	-3
9800	-28	-15	-58	+13
9775	-30	-16	-46	-19
50	-16	-9	-39	-34
25	-13	-6	-12	-19
9700	+1	+2	-20	+74
9675	-21	-9	-86	+82
50	-65	-28	-102	-14
25	-37	-21	-72	37
9600	-35	-17	-65	-22
9575	-30	-14	-50	27
50	-20	-8	-38	-7
25	-18	-6	-43	
9500	-25	-14		

v2623-1

NORANDA EXPLORATION 1983

VLF-EM SURVEY

GEONICS EM-16 LINE 10,000 N

PROPERTY MINERAL HILL TRANS NLK PAGE 1

OPERATOR DS GAIN _____ DATE 03/06/83

	Stn.	F.S.	Null	Filtered	
	10,000 E	+ 35	+ 13		
	10,050 E	+ 20	+ 3	+ 55	
	10,100 E	+ 14	+ 2	+ 34	+ 25
	10,150 E	+ 16	+ 4	+ 30	+ 15
	10,200 E	+ 3	0	+ 19	+ 25
	10,250 E	+ 2	+ 1	+ 5	+ 17
	10,300 E	0	0	+ 2	+ 5
	10,350 E	0	+ 3	0	- 2
	10,400 E	+ 4	+ 2	+ 4	- 5
	10,450 E	+ 1	+ 2	+ 5	+ 3
	10,500 E	0	- 3	+ 1	+ 5
	0N,1E	0	- 4	0	+ 1
	10,550 E	0	- 7	0	- 1
	10,600 E	+ 1	- 6	+ 1	+ 1
	10,650 E	- 2	- 4	- 1	+ 28
SWAMP	10,700 E	- 25	- 14	- 27	+ 31
"	10,750 E	- 7	- 8	- 32	- 20
"	10,800 E	0	- 8	- 7	- 45
"	10,850 E	+ 13	- 3	+ 13	- 6
"	10,900 E	- 14	- 2	- 1	+ 44
"	10,950 E	- 17	- 4	- 31	+ 41
"	11,000 E	- 25	- 2	- 42	- 41
"	0N,2E	+ 35	+ 4	+ 10	- 92
"	11,050 E	+ 15	+ 2	+ 50	0
"	11,100 E	- 5	+ 4	+ 10	+ 90
"	11,150 E	- 35	+ 2	- 40	+ 65
	11,200 E	- 20	+ 6	- 55	- 2
				- 38	- 27

v2623-1

NORANDA EXPLORATION

VLF-EM SURVEY

GEONICS EM-16 LINE 10,000 N

PROPERTY MINERAL HILL TRANS NLK PAGE 2

OPERATOR DS GAIN _____ DATE 13/06/83

	Stn.	F.S.	Null	Filtered	
	11,250 E	- 18	+ 1	- 38	- 27
	11,300 E	- 10	+ 8	- 28	- 22
	11,350 E	- 6	+ 6	- 16	- 26
CREEK AT	11,400 E	+ 4	+ 9	- 2	- 19
11,425 E	11,450 E	- 1	0	+ 3	+ 2
	11,500 E	- 3	- 2	- 4	0
	11,550 E	0	0	- 3	- 9
	11,600 E	+ 5	0	+ 5	- 19
	11,650 E	+ 11	+ 2	+ 16	+ 1
	11,700 E	- 7	- 2	+ 4	+ 38
	11,750 E	- 15	0	- 22	+ 45
	11,800 E	- 26	- 2	- 41	+ 31
	11,850 E	- 27	0	- 53	+ 17
	11,900 E	- 31	- 7	- 58	- 6
	11,950 E	- 16	0	- 47	- 21
	12,000 E	- 21	0	- 37	
	facing East i.e. filtered E				

V2623-3

NORANDA EXPLORATION

· SABRE VLF-EM SURVEY LINE 10,000 N

PROPERTY MINERAL HILL TRANS NLK PAGE 2
OPERATOR MH GAIN DATE 03/06/83

	Stn.	Null F.S.	Null	Filtered	
	11,250E	-13	-10	~~-23~~	~~+1~~
	11,300E	-11	-1	-24	-11
	11,350E	-1	-1	-12	~~-27~~
CREEK AT	11,400E	+4	+4	+3	~~-17~~
11,425 E	11,450E	+1	+2	+5	~~+6~~
	11,500E	-4	+2	-3	~~+7~~
	11,550E	+2	+2	-2	~~-7~~
	11,600E	+2	+4	+4	~~-12~~
	11,650E	+8	+8	+10	~~+2~~
	11,700E	-6	+3	+2	~~+24~~
	11,750E	-8	-6	-14	~~+28~~
	11,800E	-18	-11	-26	~~+18~~
	11,850E	-19	-12	-32	~~+15~~
	11,900E	-27	-12	-41	~~+7~~
	11,950E	-12	-9	-39	~~-6~~
	12,000E	-23	-9	-35	
	facing E				
	ie. filtered			E	

· SABRE VLF-EM SURVEY LINE 10,000 N

PROPERTY MINERAL HILL TRANS NLK PAGE 1
OPERATOR MH GAIN DATE 03/06/83

	Stn.	Null F.S.	Null	Filtered	
	10,000E	+23	+16		
	10,050E	+15	+11	+48	
	10,100E	+14	+10	+29	+24
	10,150E	+10	+8	+24	+23
	10,200E	-4	+4	+6	+21
	10,250E	+7	+4	+3	0
	10,300E	-1	+3	+6	+5
	10,350E	-1	+2	-2	+4
	10,400E	+3	+4	+2	-4
	10,450E	-1	+5	+2	+2
	10,500E	+1	+3	0	+2
	ON,1E	-1	+4	0	-6
	10,550E	+7	+4	+6	-10
	10,600E	+3	+1	+10	-2
	10,650E	+5	-3	+8	+15
SWAMP	10,700E	-10	-6	-5	+14
"	10,750E	+4	+2	-6	-12
"	10,800E	+3	+5	+7	-23
"	10,850E	+14	+10	+17	-17
"	10,900E	+10	+8	+24	+2
"	10,950E	+5	+6	+15	+5
"	11,000E	+14	+11	+19	-20
"	ON,2E	+21	+19	+35	-14
"	11,050E	+12	+11	+33	+42
"	11,100E	-19	-8	-7	+62
"	11,150E	-10	-2	-29	+13
	11,200E	-10	-4	-20	-6
				-23	+1

MINERAL HILL F

MINERAL HILL G

LOCATION MAP 93 L/10

SCALE 1:50,000

LEGEND

- LAKE / STREAM
- SWAMP
- ROAD
- OUTCROP BOUNDARY
- CONTACT, APPROXIMATE
- FAULT (DEFINED, ASSUMED)
- PORTAL OF ADIT
- TRENCH
- QUARTZ VEIN, APPROX. POSITION OF QUARTZ VEIN MAPPED BY MOLYMINES, 1967
- DYKE
- ROCK SAMPLE
- SILT SAMPLE
- TRAVERSE WITH STATION LOCATION
- CORNER POST, LEGAL CORNER POST

NOTE: LOCATION OF ROAD IS CORRECT

ROCK TYPES

1. MASSIVE FINE GRAINED LAVA (RHYOLITIC TO BASALTIC COMPOSITION)
2. GREY - GREEN - PURPLE COARSE ASH - LAPILLI TUFF
3. MEDIUM GRAINED DIORITE
4. TRACHYTE
5. HORNFELS

GEOLOGICAL BRANCH ASSESSMENT REPORT

12,180

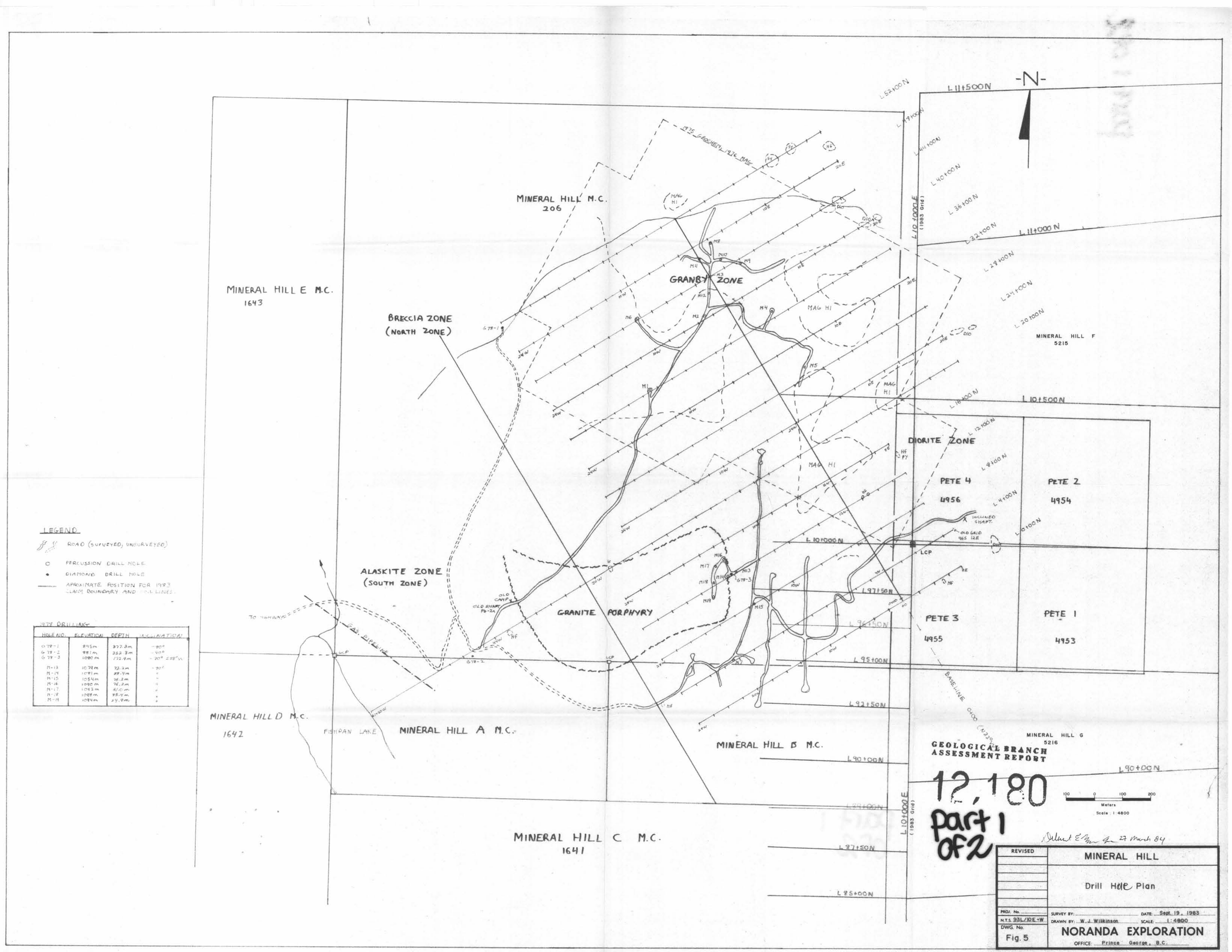
Part of 2

METRES

1 : 5000

27 March 84

REVISED	MINERAL HILL
	GEOLOGY
PROJ. No. 10391	SURVEY BY DEM Jr., G.G., D.S. DATE OCT. 83
N.T.S. 93 L/10 E	DRAWN BY E.C., G.G. SCALE 1:5,000
DWG No. Fig. 9	NORANDA EXPLORATION
	OFFICE SMITHERS, B.C.


-N-
L 11+500N
L 11+000N
L 10+500N
L 10+000N
L 9+500N
L 9+000N
L 8+500N
L 8+000N
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L 7+000N
L 6+500N
L 6+000N
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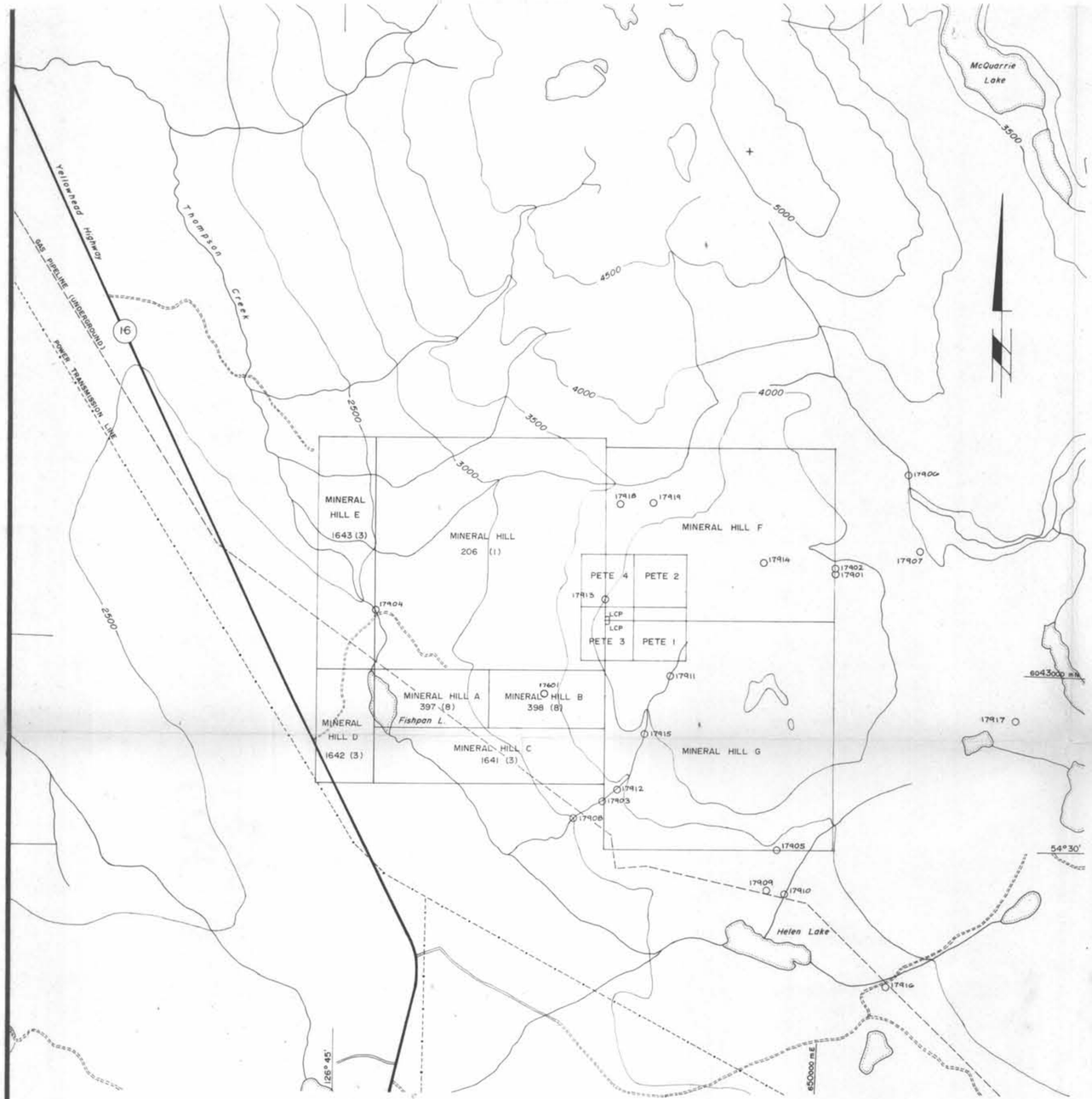
L 4+500N
L 4+000N
L 3+500N
L 3+000N
L 2+500N
L 2+000N
L 1+500N
L 1+000N
L 0+500N
L 0+000N
L 10+000E (1983 Grid)
L 10+000E (1983 Grid)
MINERAL HILL M.C. 206
MINERAL HILL E M.C. 1643
MINERAL HILL F 5215
MINERAL HILL G 5216
MINERAL HILL D M.C. 1642
MINERAL HILL A M.C.
MINERAL HILL B M.C.
MINERAL HILL C M.C. 1641
GRANBY ZONE
BRECCIA ZONE (NORTH ZONE)
ALASKITE ZONE (SOUTH ZONE)
GRANITE PORPHYRY
DIORITE ZONE
MAG HI
1975 GEOCHEM / 976 MAG
PETE 4 4956
PETE 2 4954
PETE 3 4955
PETE 1 4953
INCLINED SHAFT
OLD GRID 16S 12E
OLD CAMP
OLD SHAFT Pb-2A
LCP
GAS PIPELINE
TO HIGHWAY
FISHPAN LAKE
BASELINE 0+00 N 329° E
G78-1
G78-2
G78-3
679-3
M1
M2
M3
M4
M5
M7
M9
M10
M11
M12
M13
M14
M15
M16
M17
M18
M19
D10
HF
FY
LEGEND
ROAD (SURVEYED, UNSURVEYED)
PERCUSSION DRILL HOLE
DIAMOND DRILL HOLE
APPROXIMATE POSITION FOR 1983 CLAIM BOUNDARY AND GRID LINES
1978 DRILLING
HOLE NO. | ELEVATION | DEPTH | INCLINATION
G 78-1 | 895m | 377.8m | -90°
G 78-2 | 881m | 352.3m | -90°
G 78-3 | 1080m | 172.9m | -70° 258°W
M-13 | 1079m | 73.2m | -90°
M-14 | 1081m | 88.4m | "
M-15 | 1054m | 36.2m | "
M-16 | 1090m | 76.2m | "
M-17 | 1093m | 61.0m | "
M-18 | 1088m | 85.4m | "
M-19 | 1094m | 54.9m | "
GEOLOGICAL BRANCH ASSESSMENT REPORT
12,180
part 1 of 2
100 0 100 200 Meters
Scale : 1:4800
Dulcet E Mr Gr 27 March 84
REVISED
MINERAL HILL
Drill Hole Plan
PROJ. No.
N.T.S. 93L/10E+W
DWG. No. Fig. 5
SURVEY BY:
DRAWN BY: W.J. Wilkinson
DATE: Sept. 19, 1983
SCALE: 1:4800
NORANDA EXPLORATION
OFFICE: Prince George, B.C.



SILT ANALYSES

SAMPLE NO.	Cu ppm	Zn ppm	Pb ppm	Ag ppm	Mo ppm	As ppm	Ni ppm	Co ppm	Mn ppm	Fe in %
17901	58	120	6	.8	4	16	36	18	2100	3.2
17902	42	180	6	1.2	2	8	32	16	2100	3.4
17903	40	170	6	.4	<2	12	30	16	1000	3.3
17904	28	80	6	.2	2	10	28	18	4000	4.3
17905	28	100	8	.2	2	18	30	14	700	3.4
17906	30	150	14	.6	<2	26	26	16	1900	3.8
17907	30	120	6	.4	<2	2	28	14	750	3.0
17908	36	140	8	.6	<2	2	26	14	800	2.8
17909	28	76	8	.2	<2	<2	22	14	700	2.7
17910	32	120	10	.4	4	6	26	16	1200	3.3
17911	34	460	4	.4	8	10	30	32	30000	6.2
17912	36	170	8	.4	2	8	30	16	1300	3.2
17913	300	440	36	2.2	2	<2	50	18	800	3.5
17914	30	250	2	.6	18	16	34	42	14000	13.0
17915	80	500	14	1.8	8	22	40	20	1100	3.9
17916	30	86	4	.2	<2	6	34	18	1000	5.0
17917	24	130	4	.2	<2	<2	30	20	600	5.0
17918	50	110	6	.4	<2	<2	24	16	670	4.3
17919	36	100	6	.6	<2	4	28	16	730	4.4
17601	120	380	10	1.2	<2					

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,180
part 1 of 2

0 1 2 3
KILOMETRES

SCALE 1 : 25,000

27 March 84

REVISED	MINERAL HILL
	SILT GEOCHEMISTRY
PROJ. No. 10391	SURVEY BY: DATE: JULY 1983
N.T.S. 93 L/10 E,W	DRAWN BY: E.C. SCALE: 1 : 25,000
DWG. No. Fig. 8	NORANDA EXPLORATION
	OFFICE: SMITHERS, B.C.

VANCAL 8303

MINERAL HILL F

MINERAL HILL G

Creek

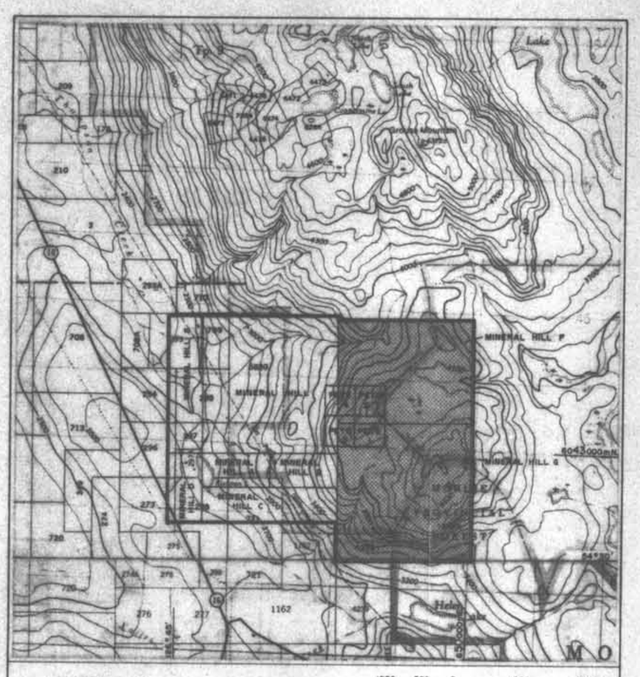
Road

LCP

Creek

100+00 E
105+00 E
110+00 E
115+00 E
120+00 E

115+00 N
110+00 N
105+00 N
100+00 N
97+50 N
96+50 N
95+00 N
92+50 N
90+00 N
89+00 N
87+50 N
85+00 N
80+00 N



LEGEND

- Legal Corner Post
- Claim post (corner)
- Identification post
- Silt sample
- Soil sample location (Au (ppb) | Mo (ppm) | As (ppm))
- Mo contour ≥4 ppm
- As contour ≥20 ppm
- Values for Au are all 10 ppb - 60 ppb

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,180

Part 2 of 2

0 100 200 300 400 500
METRES
1 : 5000

27 March 84

REVISED
Oct. 83 GG., E.C.
NOV. 83 E.C.
JAN. 84 DEMJr.

MINERAL HILL

SOIL GEOCHEMISTRY :
MOLYBDENUM, ARSENIC, GOLD
MINERAL HILL F & G CLAIMS

PROJ. No. 10391
N.T.S. 93 L/10 E
DWG. No. Fig. 10

SURVEY BY:
DRAWN BY E.C., G.G.
DATE: JULY 1983
SCALE 1:5,000

NORANDA EXPLORATION
OFFICE SMITHERS, B.C.

MINERAL HILL F

MINERAL HILL G

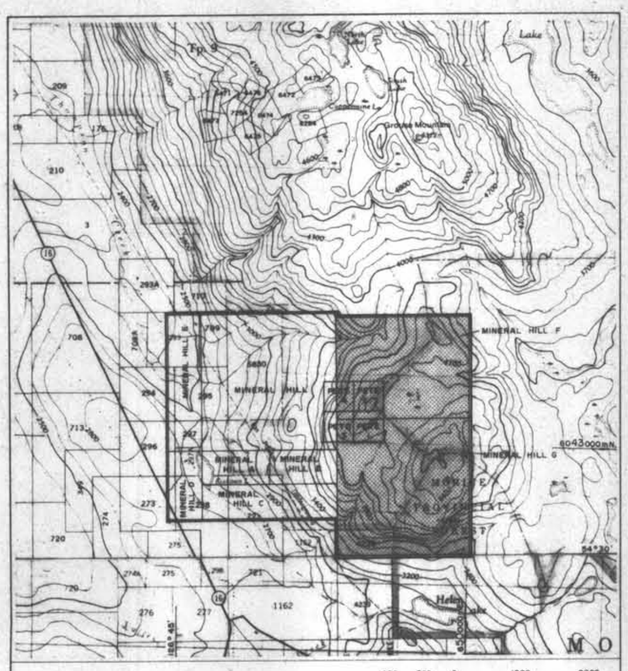
Creek

Road

LCP

100+00 E
105+00 E
110+00 E
115+00 E
120+00 E

115+00 N
110+00 N
105+00 N
100+00 N
97+50 N
96+50 N
95+00 N
92+50 N
90+00 N
89+00 N
87+50 N
85+00 N
80+00 N



LEGEND

- Legal Corner Post
- Claim post (corner)
- Identification post
- Silt sample
- Soil sample location with values in ppm
- Pb contour ≥60 ppm
- Ag contour ≥2.0 ppm

0 100 200 300 400 500
METRES
1:5000

27 March 84

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,180

Part 1 OF 2

REVISED	
Oct. 83	G.G., E.C.
NOV. 83	E.C.

MINERAL HILL

SOIL GEOCHEMISTRY :
LEAD, SILVER
MINERAL HILL F & G CLAIMS

PROJ. No. 10391
N.T.S. 93 L/10 E
DWG No
Fig. II

SURVEY BY
DRAWN BY E.C., G.G.
DATE JULY 1983
SCALE 1:5,000

NORANDA EXPLORATION
OFFICE SMITHERS, B.C.

MINERAL HILL F

MINERAL HILL G

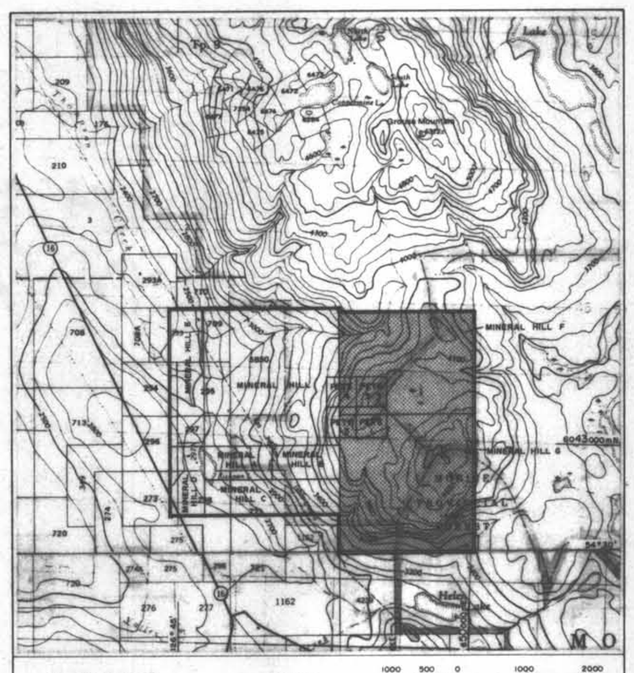
Creek

Road

LCP

100+00 E
105+00 E
110+00 E
115+00 E
120+00 E

115+00 N
110+00 N
105+00 N
100+00 N
97+50 N
96+50 N
95+00 N
92+50 N
90+00 N
89+00 N
87+50 N
85+00 N
80+00 N



GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,180
part 1 of 2

LEGEND

- Legal Corner Post
- Claim post (corner)
- Identification post
- Silt sample
- Soil sample location with values in ppm (Cu / Zn)
- Cu contour ≥ 150 ppm
- Zn contour ≥ 500 ppm

0 100 200 300 400 500
METRES
1 : 5000

Dillmut E. ... 27 March 84

REVISED
Oct. 83 GG., E.C.
NOV. 83 E.C.
PROJ. No. 1039
N.T.S. 93 L/10 E
DWG. No
Fig. 12

MINERAL HILL

SOIL GEOCHEMISTRY :
COPPER, ZINC
MINERAL HILL F & G CLAIMS

SURVEY BY: ... DATE: JULY 1983
DRAWN BY: E.C., G.G. SCALE: 1:5,000

NORANDA EXPLORATION
OFFICE SMITHERS, B.C.

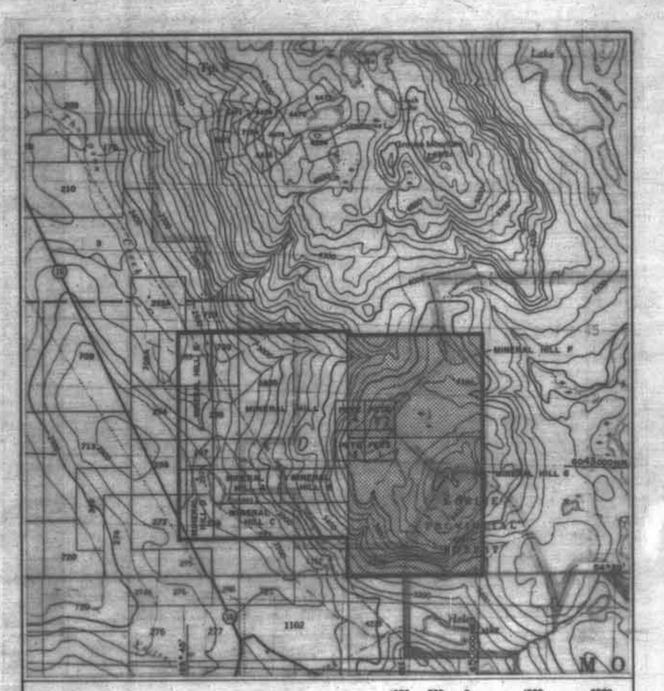
100+00 E
105+00 E
110+00 E
115+00 E
120+00 E

115+00 N
110+00 N
105+00 N
100+00 N
97+50 N
95+00 N
92+50 N
90+00 N
87+50 N
85+00 N
80+00 N

LCP

MINERAL HILL F

MINERAL HILL G



LEGEND

INSTRUMENT	GEONICS EM-16
OPERATORS	DEL MYERS, DOUG SHEARER
DATE SURVEYED	JUNE 3, SEPT. 26, 1983
READINGS	DIP ANGLES IN %
RESULTS	FRASER FILTERED
CONTOUR VALUES	
TRANSMITTING STATION	SEATTLE
FREQUENCY	24.8 kHz

SYMBOLS

- LEGAL CORNER POST
- CLAIM POST (CORNER)
- IDENTIFICATION POST
- SILT SAMPLE
- TRAVERSE WITH STATION LOCATION
- ROAD
- SWAMP
- LAKE / STREAM

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,180

part 1 of 2

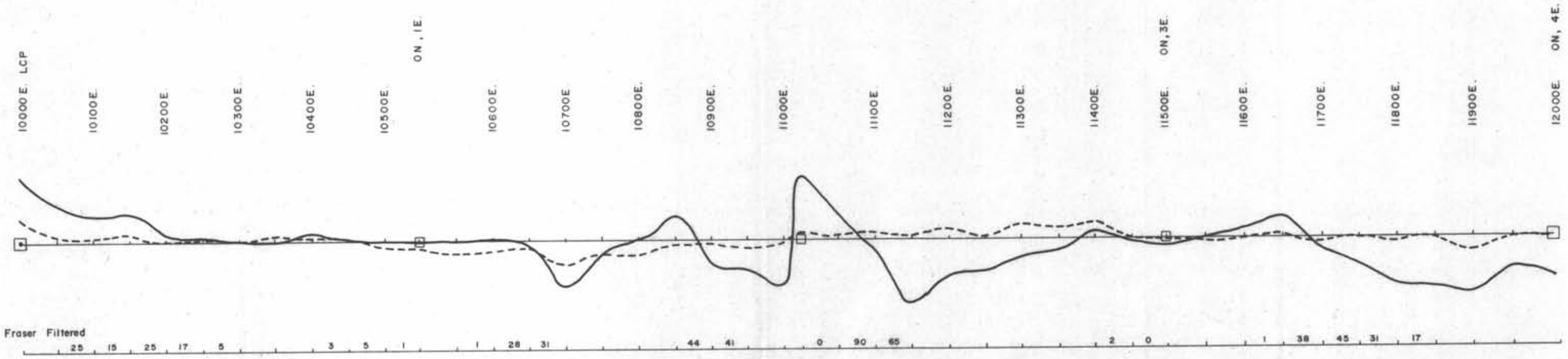
0 100 200 300 400 500
METRES
1 : 5000

Dillon E... 27 March 84

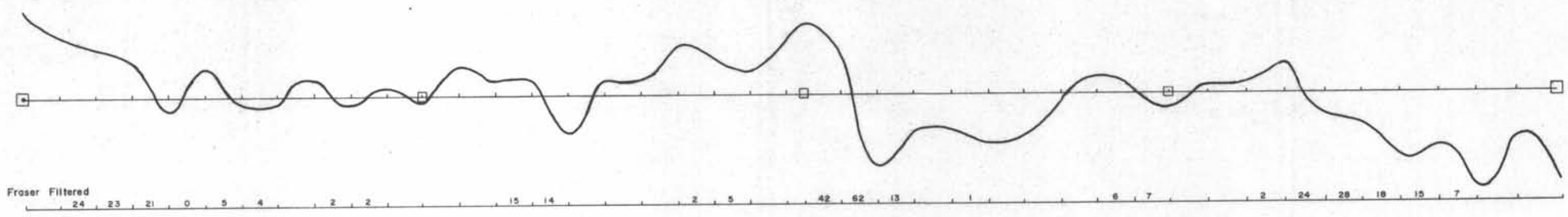
REVISED	MINERAL HILL
	FRASER FILTERED VLF SURVEY
PROJ. No. 10391	SURVEY BY: DEMJr., D.S. DATE: OCT. 1983
N.T.S. 93 L/10 E	DRAWN BY: E.C. SCALE: 1:5,000
DWG. No. Fig. 13	NORANDA EXPLORATION
	OFFICE: SMITHERS, B.C.

GEONICS EM-16 AND SABRE VLF-EM SURVEY PROFILES CONDUCTED ON THE MINERAL HILL F AND G CLAIMS JUNE 3, 1983

Line 10,000N.



GEONICS EM-16 — IN-PHASE ---- OUT-PHASE



SABRE VLF-EM — DIP ANGLE

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,180

part 1 of 2

LEGEND
VLF SURVEY

Instrument . . . . . GEONICS EM-16
Operators . . . . . D. Shearer
Date surveyed . . . . . June 3, 1983
Readings . . . . . DIP ANGLES IN Percent
Results . . . . . PROFILES AT 1cm = 20% Slope
Contour values . . . . .
Transmitting station . Seattle
Frequency . . . . . 24.8 KHz.

LEGEND
VLF SURVEY

Instrument . . . . . SABRE VLF-EM
Operators . . . . . M. Halvorson
Date surveyed . . . . . June 3, 1983
Readings . . . . . DIP ANGLES IN Degrees
Results . . . . . PROFILES AT 1cm = 10° Slope
Conductor . . . . . .
Transmitting station . Seattle
Frequency . . . . . 24.8 KHz.

0 100 200 300 400 500
SCALE 1 5,000 Meters

Dehart E Glynn & 27 March 84

REVISED	MINERAL HILL
	COMPARISON OF VLF-EM SURVEYS
PROJ. No.	SURVEY BY: D. Shearer, M Halvorson DATE: MAR. 1984
N.T.S. 93L/10E.	DRAWN BY: S.K.B. SCALE: 1:5000
DWG. No. Fig. 14	NORANDA EXPLORATION OFFICE: PRINCE GEORGE, B.C.

VANCAL 11919