# A REPORT ON A GEOCHEMICAL SURVEY
# ON THE NOR CLAIMS
# WHITEHORSE MINING DIVISION - YUKON



Located 23 Miles Northeast of Faro

Latitude: $62^{\circ}29'$ N

Longitude: $132^{\circ}53'$ W

Claim Sheet 105-K-7

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of $7,181.00

Resident Geologist or
~~Resident Mining Engineer~~

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

Supervising Mining Recorder

Commissioner of Yukon Territory

BY:

G. A. Jilson
J. G. Simpson

CYPRUS ANVIL MINING CORPORATION

October, 1975

## TABLE OF CONTENTS

Cyprus Anvil Mining Corporation

330, 355 Burrard Street
Vancouver, British Columbia
V6C 2G8

# A REPORT ON A GEOCHEMICAL SURVEY
# NOR MINERAL CLAIM GROUP
# OCTOBER, 1975

## INTRODUCTION

During June and August, 1975, linecutting and a geochemical soil sampling survey were carried out over the NOR claims in the Anvil Range, Whitehorse Mining District, Yukon. The geochemical survey outlined a lead-zinc anomaly approximately 2,500' x 2,000' with lesser anomalies spread throughout the almost three mile length of the grid at roughly the same stratigraphic level. The anomaly is underlain by a suite of very fine-grained,siliceous,clastic and possibly pyroclastic rocks,within which minor vein and replacement lead-zinc and more extensive disseminated to layered iron sulphide mineralization has been found. More detailed prospecting and possibly an induced polarization survey is recommended to further evaluate the anomalous area.

## LOCATION AND ACCESS

The NOR claims are located on the northeastern flank of the Anvil Range, central Yukon Territory, approximately 23 miles northeast of the town of Faro. The claims are in the Whitehorse Mining District on Claim Sheet 105-K-7. Latitude and longitude of the center of the claim group is 62°29' N, 132°53' W. Access is by helicopter from Faro or from Ross River 38 miles to the southeast.

CYPRUS ANVIL

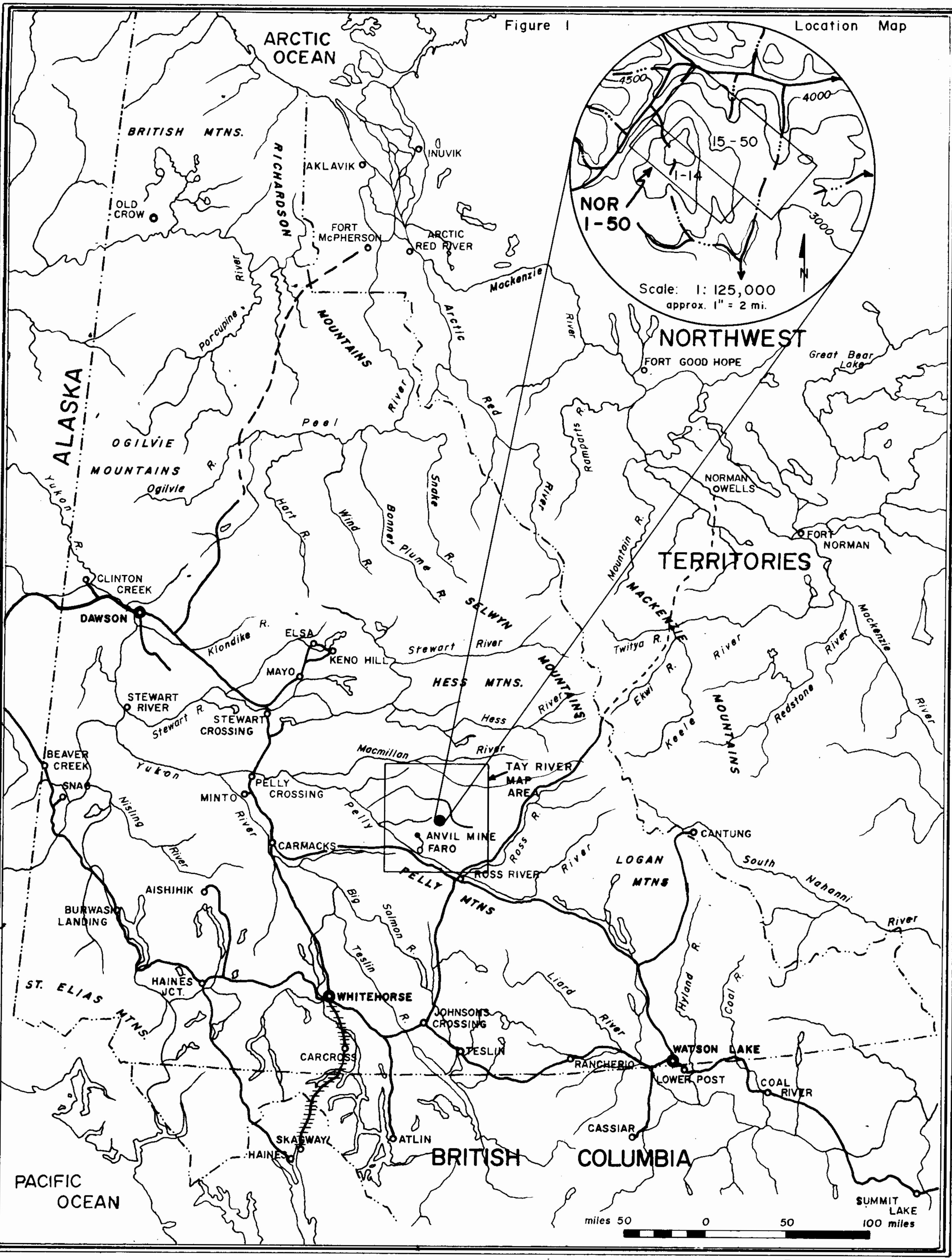

Figure 1
Location Map
ARCTIC OCEAN
BRITISH MTNS.
RICHARDSON
MOUNTAINS
AKLAVIK
INUVIK
OLD CROW
FORT McPHERSON
ARCTIC RED RIVER
Mackenzie
River
Porcupine
River
Arctic
Red
River
ALASKA
OGILVIE
MOUNTAINS
Ogilvie
R.
Peel
Snake
R.
Hart R.
Wind R.
Bonnet Plume R.
Yukon
R.
CLINTON CREEK
DAWSON
Klondike R.
ELSA
KENO HILL
MAYO
Stewart River
HESS MTNS.
SELWYN
MOUNTAINS
Hess
River
STEWART RIVER
STEWART CROSSING
Stewart R.
BEAVER CREEK
SNAG
Yukon
PELLY CROSSING
MINTO
Macmillan
River
TAY RIVER MAP AREA
Pelly
ANVIL MINE
FARO
Ross R.
ROSS RIVER
River
CARMACKS
Nisling
River
AISHIHIK
BURWASH LANDING
PELLY MTNS
Big Salmon R.
Teslin
R.
HAINES JCT.
WHITEHORSE
JOHNSONS CROSSING
TESLIN
ST. ELIAS MTNS.
CARCROSS
SKAGWAY
HAINES
ATLIN
Liard River
RANCHERIO
WATSON LAKE
LOWER POST
COAL RIVER
CASSIAR
BRITISH COLUMBIA
PACIFIC OCEAN
SUMMIT LAKE
miles 50 0 50 100 miles
NORTHWEST
TERRITORIES
FORT GOOD HOPE
Great Bear Lake
Ramparts R.
Mountain R.
NORMAN WELLS
FORT NORMAN
MACKENZIE
MOUNTAINS
Twitya R.
River
Ekwi R.
Keele
Redstone
Mackenzie
River
CANTUNG
LOGAN MTNS
South Nahanni River
Hyland R.
Coal R.
4500
4000
15-50
1-14
NOR 1-50
3000
N
Scale: 1: 125,000
approx. 1" = 2 mi.

CLAIMS

The property consists of 50 full sized claims listed in Table I. The claims were staked in September, 1974 to cover a number of weak copper-lead-zinc silt anomalies discovered in 1973. The survey described in this report is applied as annual representation work on Claims 15 - 50 as outlined in Table I.

TABLE I

| Claim Name | List of Claims Grant Number | Record Date | Years Assess. Applied For | Expiry Date |
|---|---|---|---|---|
| NOR 1 - 14 incl. | Y91141 - Y91154 incl. | 25 Sept./74 | 0 | 25 Sept./75 |
| NOR 15 - 32 incl. | Y91155 - Y91172 incl. | 25 Sept./74 | 2 | 25 Sept./77 |
| NOR 33 - 38 incl. | Y91173 - Y91178 incl. | 25 Sept./74 | 1 | 25 Sept./76 |
| NOR 39 | Y91179 | 25 Sept./74 | 2 | 25 Sept./77 |
| NOR 40 | Y91180 | 25 Sept./74 | 1 | 25 Sept./76 |
| NOR 41 - 50 incl. | Y91181 - Y91190 incl. | 25 Sept./74 | 2 | 25 Sept./77 |


LOCATED CLAIMPOST

INFERRED CLAIMPOST

CYPRUS ANVIL MINING CORPORATION

# NOR CLAIMS

*CLAIMS & GRID*

Scale: 1" = 2000'

Figure 2

## GEOLOGY

The NOR claims are underlain by a suite of complexly deformed siliceous rocks thought to be of Devonian and Mississippian age and correlative with the Earn Group established in the adjoining Glenlyon map area by Campbell (1967).

The lowest unit in the section consists of a thick sequence of monotonous dark weathering, dark grey to black chert, argillaceous chert and siliceous slate. These rocks may be wholly or in part tuffaceous. This unit grades downward into black slate and chert that may correlate with grapholite-bearing Ordovician and Silurian rocks to the west.

The overlying unit is in gradational contact and consists of similar fine-grained, highly siliceous rocks but with more varied dark to light grey colors and buff, orange or grey weathering. The argillaceous content of these rocks is lower than in the underlying unit. Distinctive white to light grey weathering, medium grained, moderately to well-sorted, well rounded, white to light grey, pure quartzite occurs in this unit and appears to become more important to the southeast. The coarser quartzites are similar to the rocks included in unit 1-a south of Tay River on G.S.C. map 13-1961 (Roddick and Green, 1961) and unit 5 on Tempelman-Kluits (1972) map. Some of the finer-grained siliceous rocks are finely laminated limy or dolomitic quartzites and the remainder of the unit may be sedimentary quartzite as well, however, some fine-grained pyroclastic rocks could be present as in the underlying unit. This unit is early Mississippian or older. The quartzite and limy or dolomitic quartzite are possibly Silurian to mid-Devonian but a younger upper-Devonian to early Mississippian age is favored by the writer.

Overlying the two siliceous units is a unit characterized by, but not dominantly composed of, limestone. This unit consists mainly of fine-grained dark grey siliceous rocks interbedded with grey limestone and siliceous limestone and lesser limy slate and slate. This unit is a useful marker horizon in regional mapping and has been traced discontinuously to a locality approximately 6 miles west of the grid where early Mississippian brachiopids were collected by Tempelman-Kluit (1972). This unit is probably correlative with Campbell's (1967) Kalzas formation. The position of the underlying quartzite bearing unit suggests that the coarser quartzites may be a lateral equivalent of the quartz-chert sandstone of the Crystal Peak formation but lacking a chert component. The lower contact of the limy unit appears gradational but an unconformable relation is possible as the limy rocks appear to lie on different varieties of siliceous rocks throughout the Anvil Range; this relationship is equally well explained by lateral variations in the underlying unit.

Overlying the limy unit is a sequence of well bedded grey, black, brown, creme, green and minor red chert and argillaceous chert. The basal half of the unit is mainly black and grey

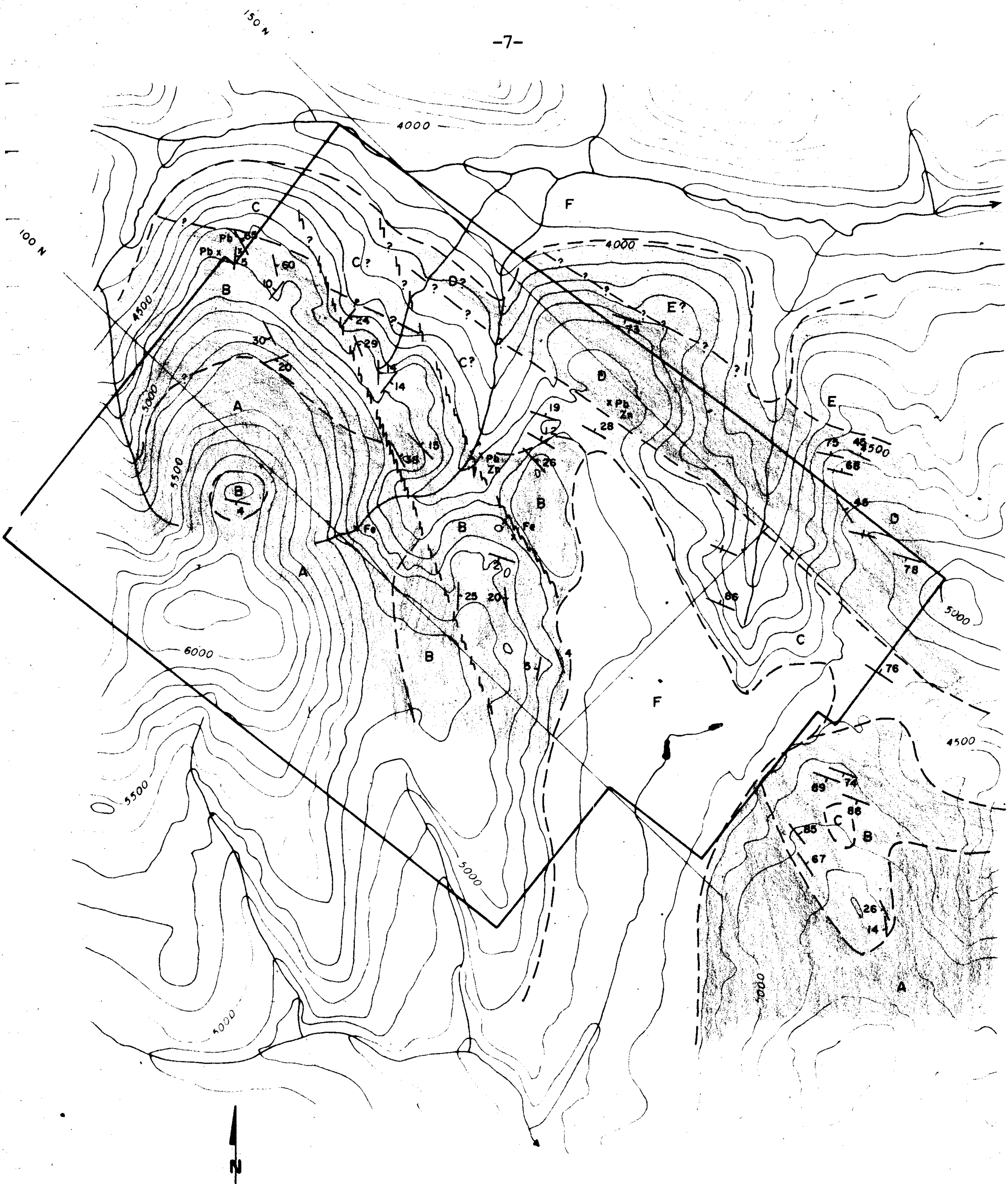


Figure: 3 Sketch map of the geology of the Nor Claims 1" = 2000' chert and the upper half varicolored chert.

The chert unit is overlain by brown weathering grey sandy limestone. The age of the upper two units is unknown but may be Mississippian and could be as young as Pennsylvanian or Permian and equivalent with the base of the Anvil Range Group as defined by Tempelman Kluit (1972).

Two periods of fold deformation have affected the rocks on the NOR claims. The earliest observable mesoscopic folds range from close to tight parallel folds inclined $50^{o}$ - $60^{o}$ to the northeast with nearly horizontal axes trending approximately $110^{o}$ to recumbent similar folds with the same axial trend. The north half of the grid appears to be located in the axial region and overturned limb (where steep dips predominate) of a major phase one fold and the south half on the upper (shallowly dipping but refolded) limb of the fold. Second phase folds trend $150^{o}$ - $180^{o}$ with variable plunge; they are open to close parallel folds inclined to the east with steeply dipping western limbs and shallow eastern limbs.

Normal faults probably down dropped to the east approximately parallel the trend of second phase folds.

Lead-zinc mineralization of vein and replacement type has been found on the northwest half of the NOR claims. The most northwesterly showings consist of galena thinly coated on sparse fractures in light grey banded siliceous rocks of Unit B and a few inch thick bands of calc. silicate mineralogy containing a few percent fine galena. A boulder of coarse high grade galena sphalerite pyrite mineralization, probably from a vein, was found in terrace deposits flanking the northerly flowing stream through the center of the grid. Finely disseminated to layered pyrite $\pm$ pyrrhotite with minor sphalerite is common in units A and B and is best developed where noted as Fe occurrences in Figure 3.

## GEOCHEMICAL SURVEY

### Methods and Procedure

Two baselines, 100N and 150N, were cut 5,000' apart with a connecting cross line at 136E. Sampling traverses were compassed and paced at 800' intervals between the two baselines with a few short traverses south of 100N. Samples were collected every 200' along the cross lines.

Samples were dug with a Mattock and placed in a wet strength kraft paper bag. The intended sampling media was the B horizon, but this horizon was only reached at 25% of the sites, although holes were usually dug at least 1.5 to 2 feet deep.

The samples were partially air dried in camp at the prevailing outdoor temperature and shipped to the Ross River laboratory of Acme Analytical.

At Acme's lab, the samples were air dried at 50°C and sieved to minus 80 mesh. 500 mg. of the minus 80 mesh fraction was digested in hot aqua regia and metal content of the resultant solution determined by atomic absorption spectrophotometry. A-A unit used was a Perkin Elmer 305; the analyst was H. P. Chung.

Description of Sample Media and Conditions

Figure 4 shows the NOR grid in relation to the topography and certain geomorphic elements of the area. The grid falls mostly in an incised plateau, part of the MacMillan Plateau of Bostock (1948). The plateau remnants designated $A_1$ and $A_2$ on Figure 4 are areas of gently rolling topography with a few steep sections, especially between the $A_1$ and $A_2$ levels. The lower levels of the plateau are covered by extensive and, at least locally, thick glacial till and fluvial deposits. Overburden cover is thin and patchy on the upper and steeper portions of the plateau where most of the till has been removed exposing sporadic outcrops. The plateau has been incised by a major easterly flowing stream and its tributaries forming a steep north slope, B on Figure 4. Outcrop is good at the crest of this slope but practically nonexistent on the lower portions where bedrock is covered by widespread till, reworked till and colluvium. The two northerly flowing streams in Area B (Figure 4) are locally flanked by fluvial terrace deposits. Area C on Figure 4 is part of the highlands of the Anvil Range standing above the incised plateau. The steep slopes of this area are marked by a few large outcrops, but generally outcrop is poor and surficial material is loose or stabilized talus or felsenmeer with some reworked glacial deposits.

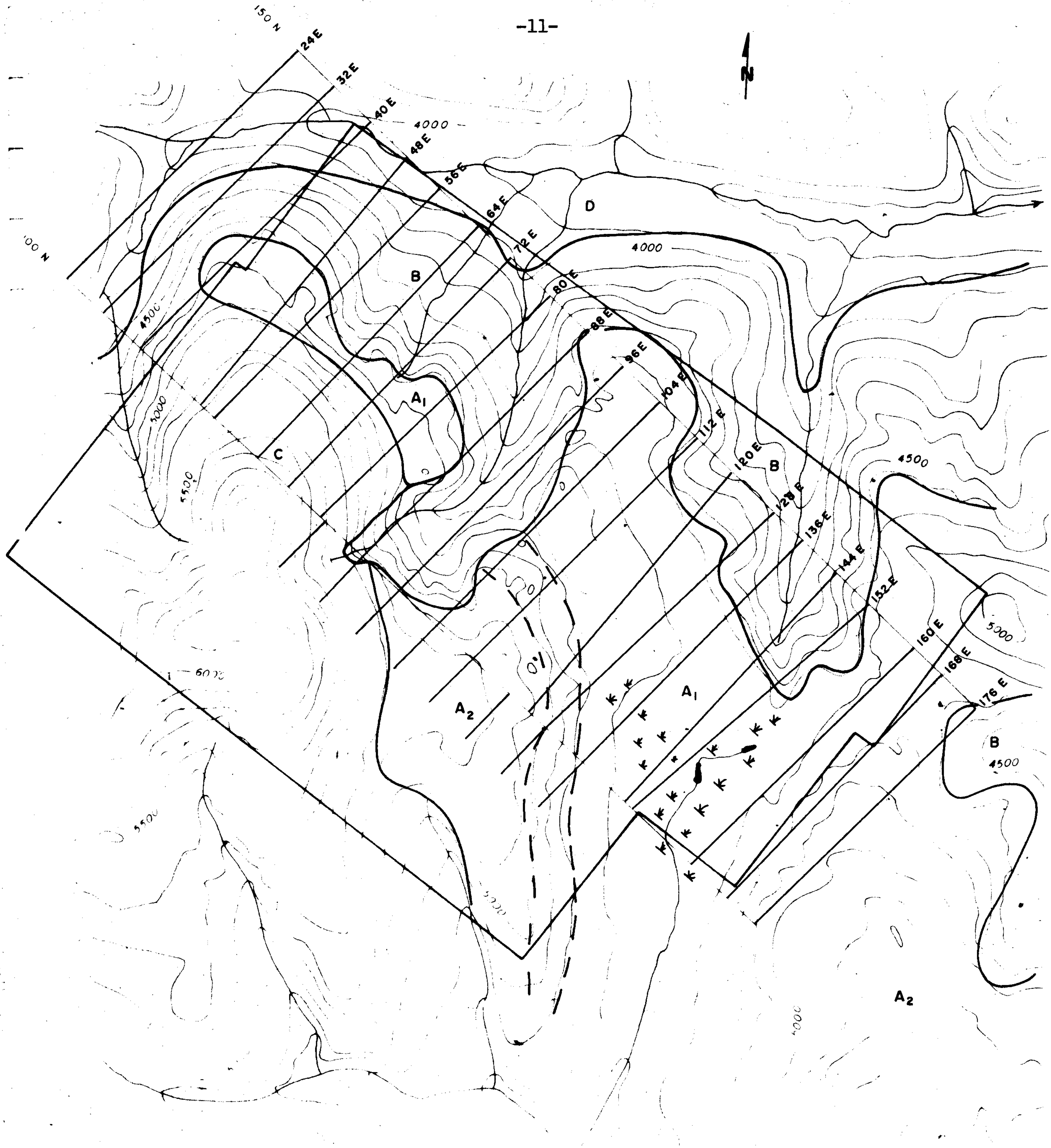


Figure: 4 Distribution of geomorphic elements on the Nor Claims 1" = 2000'

The major stream valley (D on Figure 4) is filled by thick glacio-fluvial deposits.

Soils on the NOR claims are very immature and consist essentially of organic matter overlying till, talus or colluvium relatively little-altered by soil forming processes. A typical soil profile consists of moss overlying black, partly decomposed moss virtually free of mineral matter forming a layer a few inches thick. The above material grades down into more highly decomposed black organic rich soils containing small amounts of mineral matter. This horizon is usually at least a few inches thick and can range up to two feet or more in low, poorly drained areas. Within this horizon, a few inches of white, volcanic ash is found, usually near the base. These soils constitute the A horizon.

The A horizon may be underlain by a layer a fraction of an inch thick of brown, very mineral-rich and relatively organic-free soil which passes downward into grey, grey-green or light to medium brown, mineral-rich, non-organic soil which is essentially little-altered till and colluvium. These soils are collectively referred to as the B horizon.

On the higher plateau, the A horizon is usually only a few inches thick and ash is locally absent; here good B horizon samples are easily obtained. Soil geochemistry should be quite effective here. The lower plateau levels are locally swampy with a thick A horizon making B horizon samples difficult to obtain; this area corresponds to heavier overburden cover (unit F on Figure 3) and geochemistry might be ineffective here. Ash is usually present here, two layers being found locally. Permafrost is usually not encountered on the plateau.

The steep north slopes (B on Figure 4) are characterized by thick A horizon and shallow permafrost; good B horizon samples are difficult to obtain generally because the organic material or especially the ash is frozen. Nonetheless, geochemistry should be effective here because of considerable downslope movement and mixing of the soil. Anomalies might be considerably displaced from their source here.

Soils in Area C, Figure 4, usually consist of thin A horizon covering stabilized talus or felsenmeer or are absent in loose talus areas. Where soils can be obtained here, anomalies should reflect bedrock mineralization; however, they will be complicated by extensive downhill creep and dilution.

## Results

The results of the geochemical survey are plotted on Maps 1, 2 and 3 at the rear of the report, and are summarized in histogram form as Figures 5, 6 and 7. Table II summarizes the populations using common statistical parameters. The calculated values of mean and standard deviation ignore those values greater than the lower boundary of first empty class. The threshhold is calculated using two common conventions and compares favorably to the threshhold determined visually; thus contours are based on multiples of the mean plus two standard deviations.

TABLE II

Statistical Parameters of Geochemical Results

| | Copper | Lead | Zinc |
|---|---|---|---|
| Low Value | 2 | 4 | 6 |
| High Value | 174 | 3,800 | 1,390 |
| Mean Value | 23 | 28 | 120 |
| Standard Deviation | 15 | 20.6 | 87 |
| Threshhold $\bar{x} + 2\ v$ | 53 | 69 | 294 |
| $2\ \bar{x}$ | 46 | 56 | 240 |

The outstanding problem in the interpretation of the results is the mixture of sampling media. Experience elsewhere in the Anvil Range shows that anomalies are obtained in all sampling media over known mineralization and that the anomalies are sufficiently intense that a highly anomalous value in one media will not be mistaken for a background sample in another media.

Table III shows a comparison of the lead and zinc content of the various sample media with that of the total population. It can be seen that a weakly anomalous A horizon sample would be a background B horizon value but the differences in metal content are not large enough to create a great deal of confusion. Thus, while the detailed interpretation of a survey containing mixed sample media may be

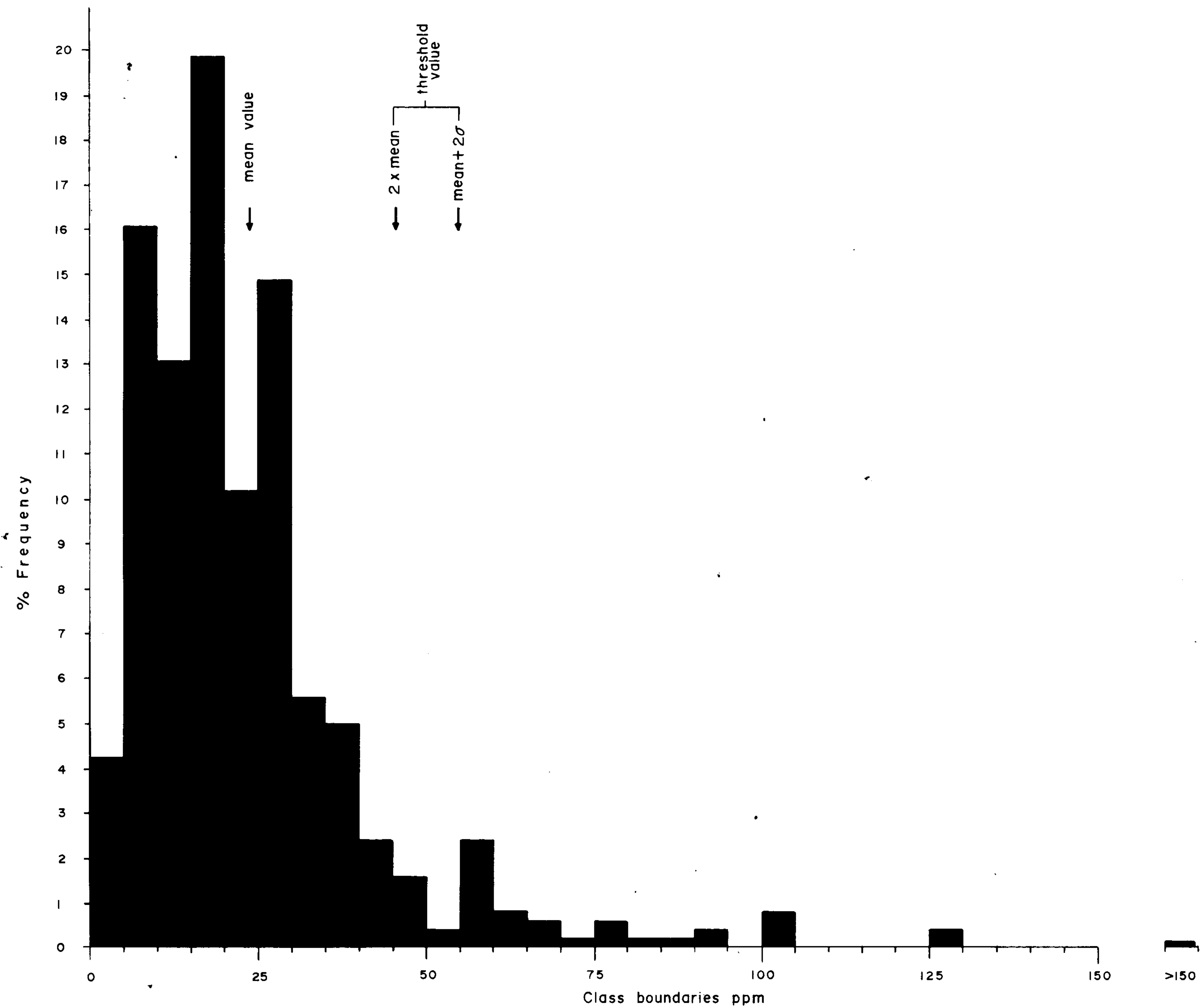


Figure 5 — Histogram of Results — Copper

Drawn by: C. L. C.

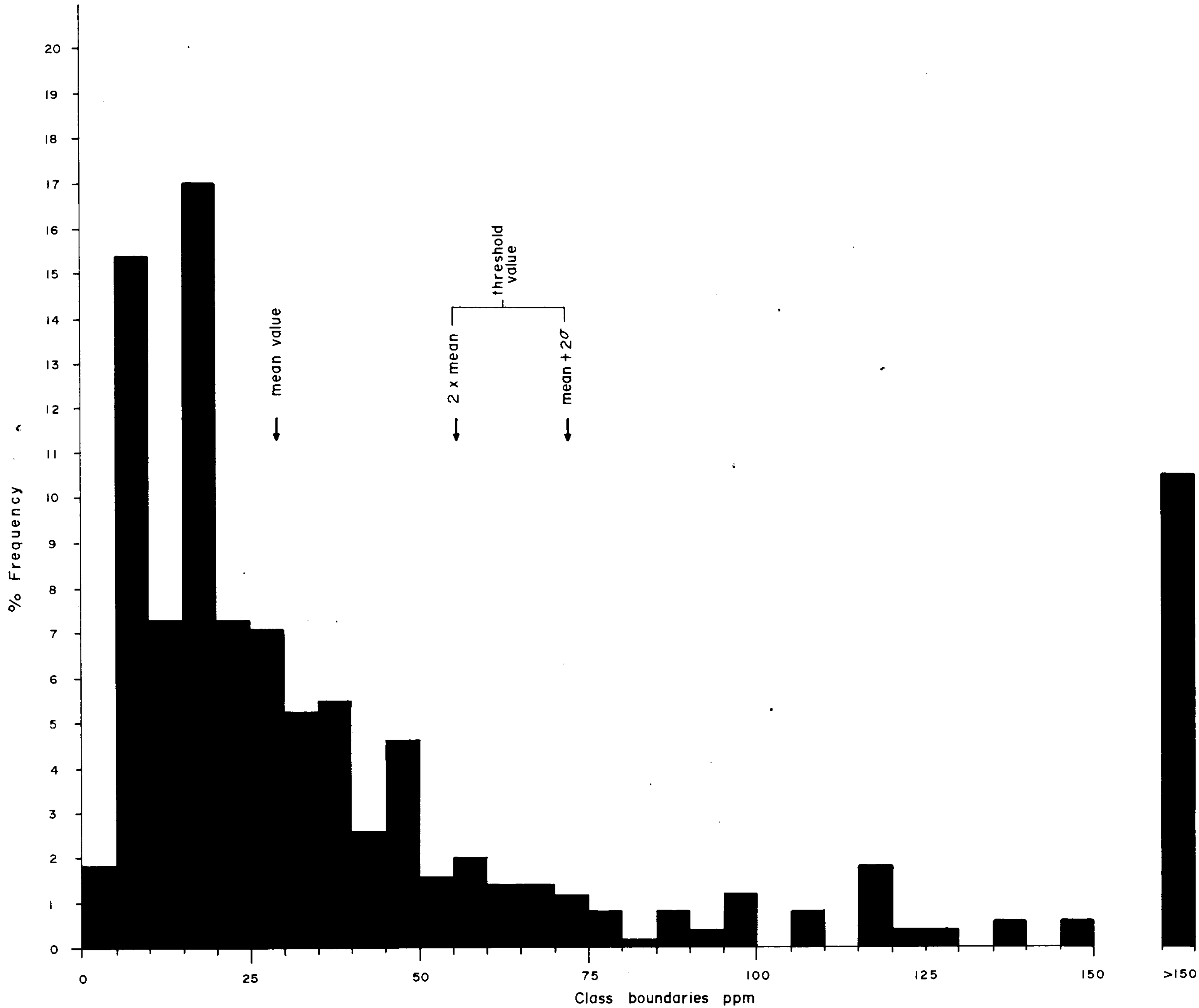


Figure 6 — Histogram of Results — Lead

Drawn by. C. L. C.

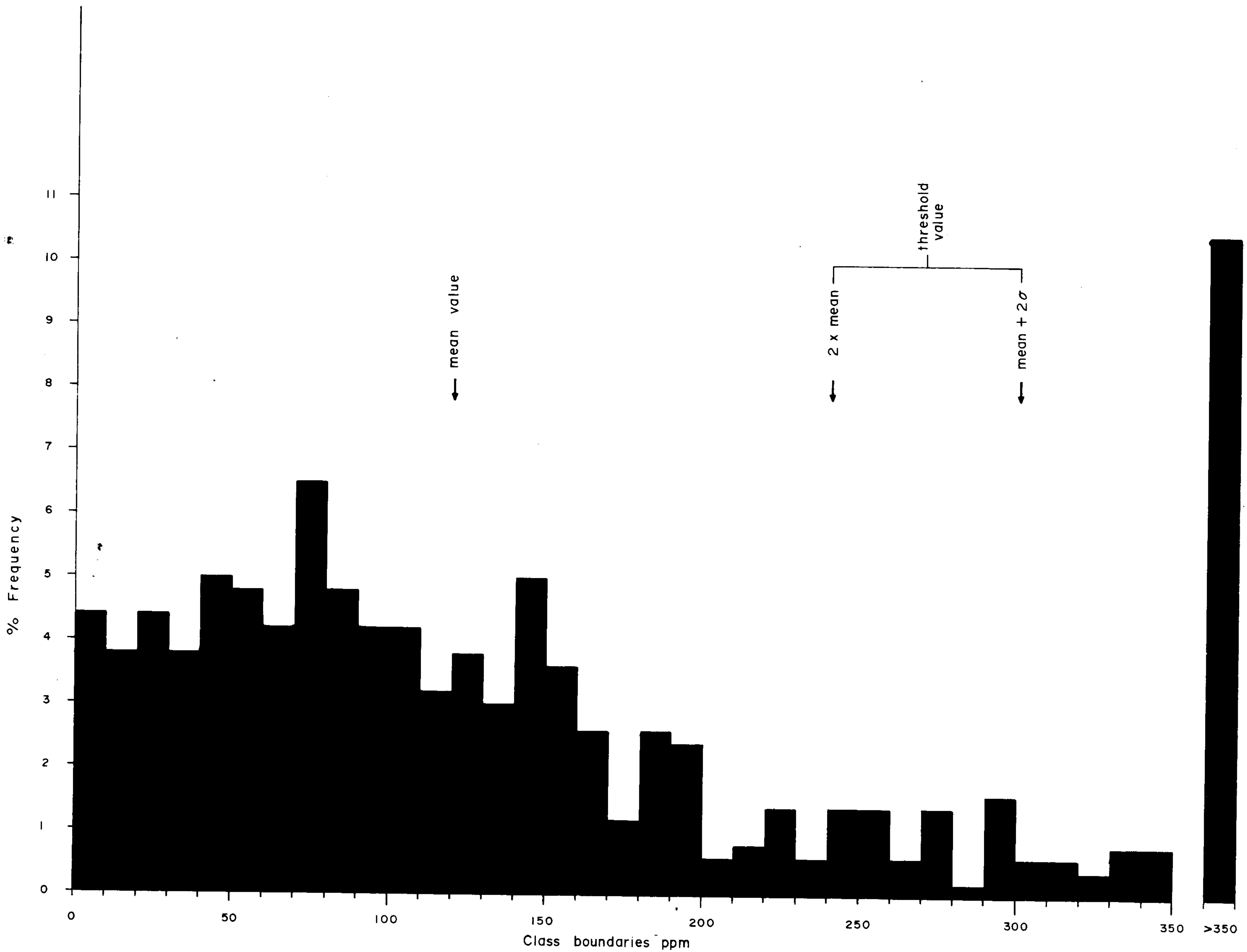


Figure 7 — Histogram of Results — Zinc

Drawn by: C. L. C.

quite difficult, it is not likely that a significant anomaly could be left unnoticed by bulk treatment of the data.

TABLE III

Comparison of Horizons

| | % of Samples | Lead Content (ppm) Mean | St. Dev. | $\bar{x} + 2\nabla$ | Zinc Content (ppm) Mean | St. Dev. | $\bar{x} + 2\nabla$ |
|---|---|---|---|---|---|---|---|
| A | 67 | 24 | 17 | 58 | 118 | 84 | 286 |
| B | 18 | 41 | 34 | 109 | 149 | 88 | 325 |
| A Mixed with Ash | 9 | 17 | 14 | 45 | 80 | 57 | 194 |
| B Mixed with Ash | 6 | 20 | 18 | 56 | 68 | 63 | 194 |
| Total Survey | 100 | 28 | 20.6 | 69 | 120 | 87 | 294 |

A more serious problem which cannot be evaluated on the claim block is the possibility of a lack of expression of bedrock mineralization or creation of false anomalies in the A horizon, the dominant media. As noted above, the A horizon has produced meaningful anomalies elsewhere in the Anvil Range and it is assumed that the same will hold true on the NOR claims.

The survey outlines a string of anomalies extending the length of the grid following roughly the unit B - unit C contact.

The largest anomaly, at the northwest end of the zone, is 2,000' x 2,500' and reaches peak values of 2,700 ppm lead and

1,390 ppm zinc with a slight copper anomaly. Lead and zinc values are generally coincident, although on line 40E the zinc peak is displaced downhill from the lead high. The two lead highs, 1,800' and 3,000' south of 150N, probably reflect two mineralized zones from which the anomalies further north are derived. The string of high lead-zinc values extending downhill on line 32E probably reflect dispersion from an uphill source. The mineralization discovered to date occurs near the southerly zone but none has been found on the larger, more intense northern zone where no outcrop is presently known.

Between 56E and 104E are small, patchy, lead-zinc anomalies unlikely to be of significance unless unexpected complications are preventing establishment of an anomaly in the soils.

East of 104E are similar anomalies but here they are developed in a more overburden-covered area where a large and intense anomaly might not be expected to develop over mineralized bedrock. Copper response in both of these latter two areas is absent.

Figure 8 shows a comparison of silt and soil sample results obtained from the NOR claims. The silt values plotted are cold extractable (EDTA) copper-lead-zinc content of -80 mesh fraction. The low lead and zinc results are comparable to values obtained over other mineralized areas in this belt. The low values in the stream draining the southeast end of the claim block suggest no significant mineralization is

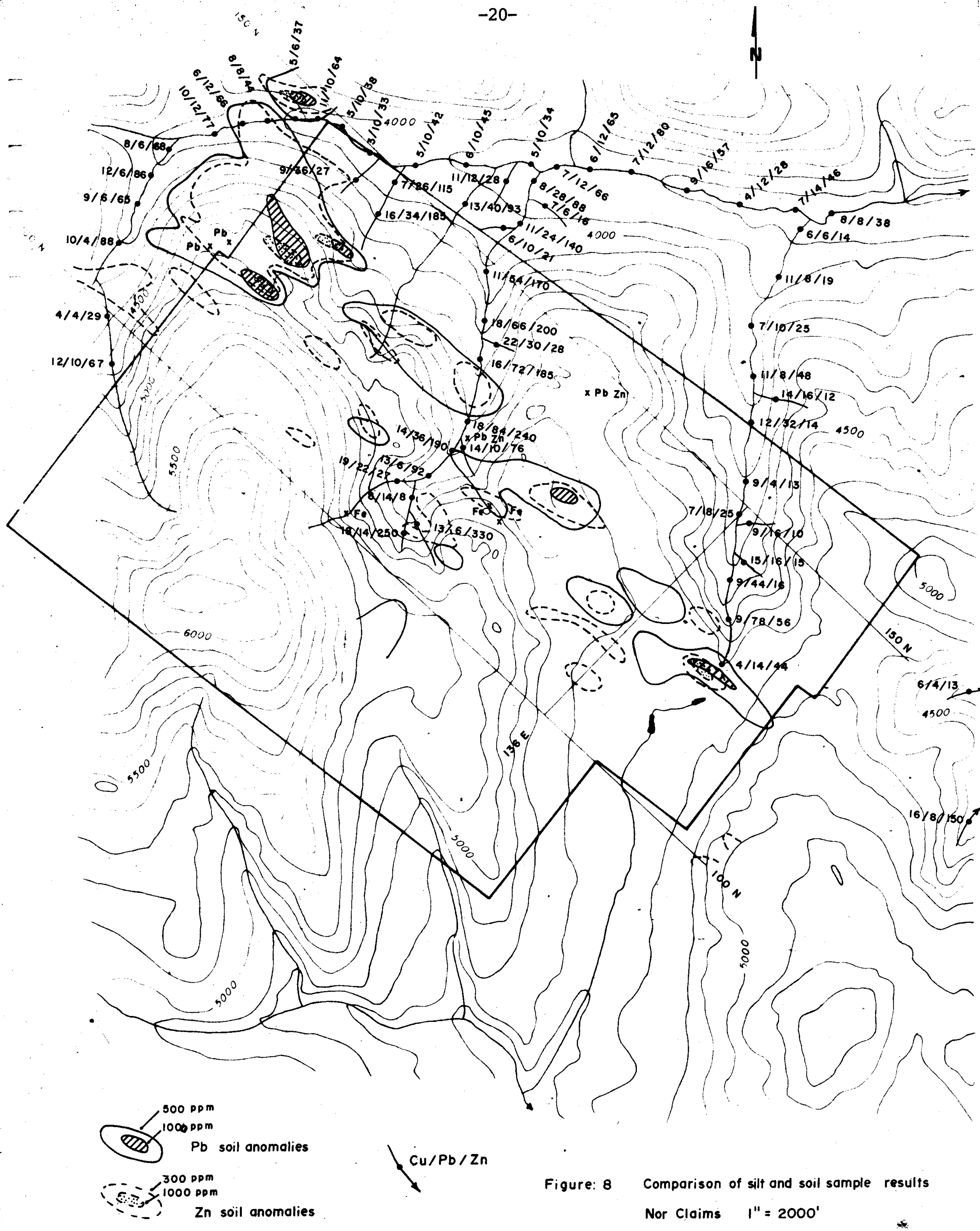


Figure: 8 Comparison of silt and soil sample results

Nor Claims 1" = 2000'

present beneath the overburden there, of course, much of the drainage is to the south.

## CONCLUSIONS AND RECOMMENDATIONS

The geologic setting of the NOR claims is similar to that of the Dana and Halo claims 16 miles to the northwest, where extensive zinc-lead-silver-copper mineralization has been drilled. At Dana, syngenetic stratiform base metal mineralization appears to have been mobilized to form vein and replacement mineralization. At NOR, a similar situation is possible with the known vein and replacement lead-zinc concentrated in fault zones and possibly low pressure zones in the axial region of the large phase 1 fold. The syngenetic stratiform mineralization is represented here by the disseminated to layered zinc-bearing sulphides in unit B.

Although the main anomaly on the NOR claims is relatively small and of only moderate intensity, more work is warranted to discover the source of the northern portion of the zone. The north zone occurs over suspected limy rocks of unit C rather than the siliceous unit B, thus a larger zone of replacement mineralization is possible there.

More detailed prospecting is needed over the entire anomaly; should this work fail to provide a satisfactory explanation, then an I.P. survey should be carried out over the area to locate and evaluate the extent of metallic mineralization present.

Respectfully submitted,

G. A. JILSON

J. G. SIMPSON

October, 1975

REFERENCES:

Bostock, H.S. (1948) Physiography of the Canadian Cordillera with special reference to the area north of fifty-fifth parallel, Geol. Surv. Can., Mem. 247.

Campbell, R.B. (1967) Reconnaissance geology of the Glenlyon map area, Yukon Territory; Geol. Surv. Can., Mem. 352.

Roddick, J.A. and Green, L.H. (1961) Tay River, Yukon Territory, Geol. Surv. Can., Map 13-1961.

Tempelman-Kluit, D.J. (1972) Geology and Origin of the Faro, Vangorda, and Swim concordant zinc-lead deposits, Central Yukon Territory; Geol. Surv. Can., Bull. 208.

CYPRUS ANVIL MINING CORPORATION
NOR CLAIMS
GEOCHEMICAL SURVEY
Values Contoured For Copper
Claim Outline
Cu / Pb / Zn
All values are aqua regia
extractable metal
in -80 Mesh Fraction
of B or A horizon
low value 2 ppm
high value 174 ppm
mean value 23 ppm
standard deviation 15.2 ppm
Threshold
m + 2σ 53 ppm
2 x m 46 ppm
Contour Intervals
106
53
To accompany:
A report on a geochemical survey on the
Nor Claims, Whitehorse M.D., Yukon
by G. A. Jilson; October 1975.
Designed by: G. J.
Drawn by: C. L. C.
Date: October 1975
Scale 1" = 500'
Map No. 1
NTS 105/K/7
Whitehorse M.D.
150 N
100 N


N
Claim Outline
150 N
100 N
Pb Zn
Pb Zn
Pb
Fe
Fe
Contour Intervals
2208
1104
552
276
138
69
low value 4 ppm
high value 3800 ppm
mean value 28 ppm
standard deviation 20.6 ppm
Threshold
m + 2σ 69 ppm
2 x m 56 ppm
Cu / Pb / Zn
All values are aqua regia
extractable metal
in - 80 Mesh Fraction
of B or A horizon
To accompany:
A report on a geochemical survey on the
Nor Claims, Whitehorse M.D., Yukon
by G. A. Jilson; October 1975.
CYPRUS ANVIL MINING CORPORATION
NOR CLAIMS
GEOCHEMICAL SURVEY
Values Contoured For Lead
Designed by: G. J.
Drawn by: C. L. C.
Date: October 1975
0 200 400 600 800 1000
Scale 1" = 500'
Map No. 2
NTS 105/K/7
Whitehorse M. D.


CYPRUS ANVIL MINING CORPORATION
NOR CLAIMS
GEOCHEMICAL SURVEY
Values Contoured For Zinc
Designed by: G. J.
Drawn by: C. L. C.
Date: October 1975
Scale 1" = 500'
Map No. 3
NTS 105/K/7
Whitehorse M.D.
Claim Outline
N
150 N
100 N
Contour Intervals
1176
588
294
low value 6 ppm
high value 1390 ppm
mean value 120 ppm
standard deviation 87 ppm
Threshold
m + 2σ 294 ppm
2 x m 240 ppm
Cu / Pb / Zn
All values are aqua regia extractable metal in -80 Mesh Fraction of B or A horizon
To accompany:
A report on a geochemical survey on the Nor Claims, Whitehorse M.D., Yukon
by G.A. Jilson; October 1975.