MR. G. HOSS

008822

A Report on Results of 1974 Exploration Program on the HAL Claims

By

G. A. Jilson, B.Sc.

and

J. G. Simpson, Ph.D., P.Eng.

For

Cyprus Anvil Mining Corporation

April 1975

TABLE OF CONTENTS

Figures (continued)

INTRODUCTION AND SUMMARY

During the 1974 field season detailed geological, geochemical, magnetometer and induced polarization surveys were conducted over the HAL claims. These surveys show that the previously known mineralization is hosted by fine-grained acid tuffs and/or siliceous clastic rocks, which are more extensively mineralized to the east. The geophysical and geochemical surveys do not outline new zones of mineralization on the HAL claims nor do they suggest that the known showings are part of a substantially larger mineralized zone, which by itself has economic potential. More diamond drilling is planned to the east on the adjoining DANA and HALO claims of Cyprus Anvil; should this work reveal mineralization at grades substantially higher than presently indicated then drilling of the I.P. anomalies on the HAL claims would be warranted.

LOCATION AND ACCESS

The HAL claims are located in the central Yukon Territory 25 miles north of the town of Faro and 15 miles north of the Anvil Minesite. The claim group is in the Whitehorse Mining District on Claim Sheet 105 K-11. Latitude and longitude at the centre of the group is 62°34'N, 133°20'W. Access is by helicopter from Faro or by float plane from Ross River to Caribou Lake and then by foot or helicopter to the claim group, a short distance to the northeast.

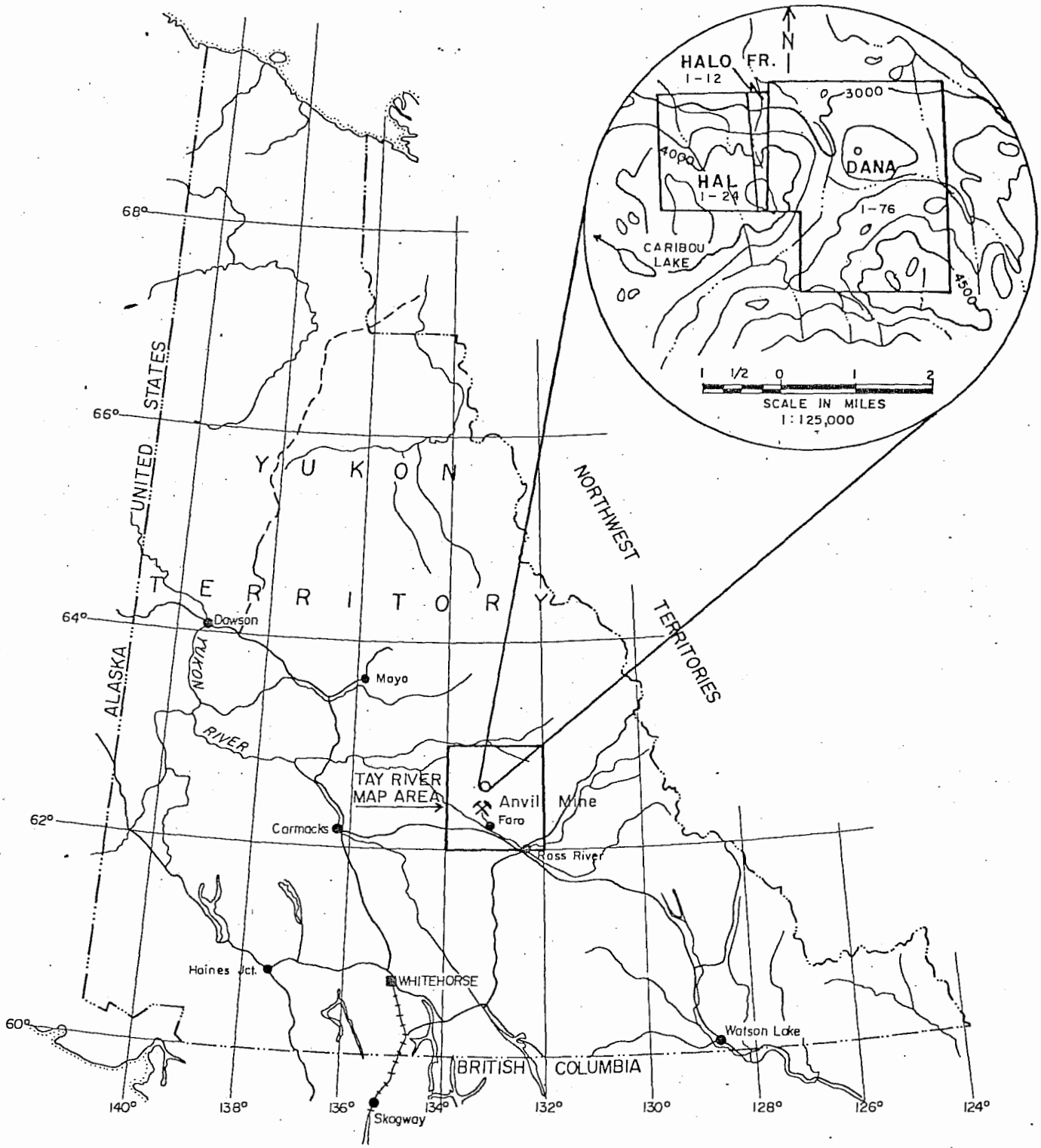
CLAIMS

The claim group is composed of the 24 full-sized claims listed on Table I.

Table I

Claim Name	Grant No.	Recording Date	Expiry Date
HAL 1-6 incl.	Y39-Y44 incl.	21 Feb. 1966	21 Feb. 1980
HAL 7	Y45	21 Feb. 1966	21 Feb. 1979
HAL 8	Y46	21 Feb. 1966	21 Feb. 1980
HAL 9-14 incl.	Y47-Y52 incl.	21 Feb. 1966	21 Feb. 1980
HAL 15	Y53	21 Feb. 1966	21 Feb. 1979
HAL 16	Y54	21 Feb. 1966	21 Feb. 1979
HAL 17-22 incl.	Y55-Y60 incl.	21 Feb. 1966	21 Feb. 1980
HAL 23	Y61	21 Feb. 1966	21 Feb. 1979
HAL 24	Y62	21 Feb. 1966	21 Feb. 1979

The claims are owned by Northern Homestake and are being explored by Cyprus Anvil under an option agreement.



CYPRUS ANVIL MINING CORPORATION

EARN PROJECT

DANA HAL and HALO Fr. CLAIMS

PROPERTY LOCATION MAP

YUKON

SCALE : 1" = 100 MILES

Figure 1

Assessment commitments have been met by filing diamond drilling from the adjoining DANA and HALO claims. Three years work has been applied to each claim.

HISTORY

The HAL claims were staked in 1965 following staking of the IVAN claims to the east by Anvil Mining Corporation. Anvil staked the IVAN claims to cover a prominent gossan which was spatially related to airborne mag and E.M. anomalies and reconnaissance geochemical anomalies. Anvil carried out ground E.M. mag, geochemical and geological surveys on part of their claims east of a prominent northerly flowing creek late in the 1966 season. Four diamond drill holes tested anomalies revealed by those surveys without intersecting significant mineralization. The HAL claims were explored by airborne geophysical, soil geochemical and geological surveys and bulldozer trenching in 1966 and 1967. This work revealed small showings of low grade, apparently stratiform, copper-zinc mineralization which were further trenched at a later date, but are not known to have been otherwise evaluated since their discovery.

The showings on the property attracted the attention of Ridgemont Mining Corporation (Cyprus Mines Corporation) during regional geochemical and geological work in the Anvil Range in 1973. Additional more encouraging showings were discovered east of the HAL group on the DANA claims, staked by Ridgemont to cover the old IVAN gossan. Cyprus Anvil is presently exploring the DANA claims under an agreement with Ridgemont and acquired an option from Northern Homestake in order to extend the surveys to cover the known showings on the HAL claims.

GEOLOGY

Regional Geology

The area of the claims was first mapped by the Geological Survey of Canada in the early 1960's during a helicopter supported regional mapping program and was again briefly studied by Tempelman-Kluit (1972) in 1968. The area is shown on G.S.C. Map 13-1961 (Roddick & Green, 1961) to be underlain by a group of rocks consisting dominantly of chert, shale, siliceous shale, quartzite and chert pebble conglomerate of upper Devonian and lower Mississippian age, apparently correlative with the Earn Group established by Campbell (1967) in the adjoining Glenlyon Map area. Regional mapping by Ridgemont in 1973 showed that the Earn Group probably contains some component of acid pyroclastic material and could include rocks substantially older than upper Devonian. Relations between the Earn group rocks and the volcanic sedimentary complex that hosts the stratiform massive sulphide deposits in the Anvil Vangorda district are

still obscure, but it appears that most of the complex, particularly the sequence containing the sulphide deposits, is older than the Earn Group rocks and the uppermost part of the Anvil-Vangorda section may be a lateral equivalent.

Property Geology

Rocks on the property are divided into six mappable units. Units A through E are probably a conformable sequence with A the oldest unit. Unit X is in fault contact with units A and B and could be either the oldest unit or the youngest unit exposed.

Description of Map Units:

Unit A

Unit A is not exposed on the HAL claims but crops out in the canyon of Ivan Creek and was penetrated by one of the 1974 drill holes on the DANA claims. On the HAL claims the unit probably underlies Unit B at relatively shallow depth at the north end of the claim block, and may be responsible for the lower resistivities at depth at the north end of lines 40W and 32W.

Unit A consists of argillaceous and silty thin bedded limestone with minor black argillite beds, probably several hundred feet thick, underlain by banded black and gray chert and slate or argillite of unknown thickness. The limestones are a potentially important host to mineralization at depth, in light of the skarn-like nature of much of the known mineralization. This limy horizon would probably lie at depths in excess of 1000' beneath the main showings on the HAL claims.

Unit B

Unit B is host to most of the known mineralization and all of the better showings in the area. The unit crops out in the northern portion of the claim block and is exposed in many of the northern trenches.

The unit is characterized and dominated by light gray to off-white, fine to very fine-grained, massive to weakly banded, hard siliceous rocks. The unit, as is true of all units on the HAL claims, crops out poorly in general, but locally forms large cliff outcrops on the steep north escarpment. The rocks generally weather buff to rusty and form boulder to gravel sized angular talus blocks and rubble. The highly siliceous nature of the rocks and peculiar wavy banded textures on the weathered surface, reminiscent of textures of rhyolite tuffs, have led to the suggestion that much or all of these rocks are fine acid pyroclastics. Brief examination of thin sections did not show conclusive textural or compositional evidence of a pyroclastic origin; indeed most observed features were consistent with the rocks being highly siliceous angular siltstones in which case the wavy lenticular banding could be scour bedding.

In the lower part of the section the rocks are slightly limy and contain layers and irregular masses of carbonate rock locally containing fibrous, colourless tremolite. The siliceous rocks in this section also exhibit relief weathering due to thin (5mm) interbands of very fine, medium gray and lighter, slightly coarser sucrose siliceous rocks, perhaps interbedded siliceous siltstone and fine siliceous arenite. The more sucrose layers also tend to have a very slight carbonate content and locally contain feathery tremolite. The carbonate component of the lower part of the section would seem to support the concept of the fine siliceous rocks being sedimentary, but it is also possible that the carbonate is volcanic exhalative material rather than sedimentary, thus the lithologic association is not particularly diagnostic of either environment.

The upper portion of Unit B is generally free of carbonate and commonly contains minor disseminated sulphide which is so fine-grained that it is very difficult to identify; locally the sulphide is definitely pyrrhotite but elsewhere appears to be arsenopyrite or pyrite. The uppermost portion of this horizon generally contains up to several percent pyrrhotite with traces of chalcopyrite and at the top of the unit this sulphide is locally bedded. The sulphide beds are 2-5mm thick separated by 2-20mm of barren, very fine, medium to light gray siliceous material. In places the sulphide beds are graded.

Unit B is on the order of 1000' thick. The lateral extent of Unit B is not known with certainty but it appears that it may lens out along strike, both to the east and west, and down-dip to the south into rocks of Unit D. Laterally equivalent rocks in Unit D would probably be exposed between the southwestern corner of the grid and Caribou Lake.

Unit C

Unit C is a thin distinctive marker horizon which is similar to rocks of Unit B and comprises very dense cherty rocks of purplish brown to slightly pinkish cast. The hard, highly siliceous rocks of the unit are very resistant and crop out well; they weather light to medium brown, commonly with a light coloured weathering rind, and form large tabular scree blocks. The rocks are commonly massive but locally have poorly developed layering accentuated by weathering. The layering is caused by light/dark colour banding with no significant corresponding differences in composition or texture. The rocks do not generally contain disseminated sulphide, but contain thin veinlets of pyrrhotite $\pm$ chalcopyrite probably mobilized from the immediately underlying sulphide zone in Unit B.

Unit C is about 50 feet thick and appears to lens out along strike into Units B or D. Unit C appears to conformably overly Unit B but its contact with Unit D is faulted where exposed, thus its relations with that unit are not known.

Unit D

Unit D is assumed to overly Unit C; it is a thick unit composed of dark gray to black chert, argillaceous chert and mixed cherty and calc-silicate rocks. The rocks are massive and banded; in their southerly outcrops the bands are composed of sucrose quartz and diopside ± calcite interlayered with dark argillaceous cherty material. The calc-silicate bands are highly lenticular and of unknown origin; they may be caused by a metasomatic addition or they may reflect a limy component in the original rock.

Some of the impure cherts in this unit may contain a tuffaceous component. One to a few percent disseminated pyrite is common in this unit but apparently not sufficient to cause an I. P. effect.

Unit D appears to grade into Unit E through change in relative concentration of lime and silica.

Unit E

Unit E forms a synclinal cap on the hill at the east edge of the grid. The rocks there are argillaceous and silty limestone, black argillaceous chert and black argillite. The argillaceous component of these rocks causes the strong resistivity low on line 8E. The rocks are well exposed in trenches on the above mentioned hill where they are cut by sphalerite-bearing calcite veinlets, apparently responsible for the associated geochemical anomalies.

The limy rocks of Unit E have yielded two fossil localities but in both cases the specimens were poorly preserved. One was a crinoid ossicle, the other a fragment of a Brachiopod(?) valve.

Unit X

Unit X is in fault contact with Units A and B thus its stratigraphic relations are unknown; it may overly the limy rocks of Unit E or may underly the limy rocks of Unit A, perhaps in part equivalent to the lowest exposed part of Unit A.

The rocks of the unit are dark gray to black, thinly bedded to massive argillite and argillaceous siltstone. In Ivan Creek canyon, the only exposure, the rocks contain thin pyrrhotite ± pyrite beds. Iron sulphides locally comprise several percent of the rocks but no base metal sulphides are known. These rocks apparently account for the lower resistivity at depth and higher magnetic readings at the north end of all the grid lines and a strong coincident airborne E.M. and mag anomaly (east of the HAL claims) recorded during the original survey of the area by Yukon Copper.

Structure:

The rock sequence on the HAL claims forms a faulted open syncline with an axis trending approximately 115° and plunging probably in the order of 20° to the southeast. The axial trend of this major structure is in accord with measurements of sparse minor structures in Unit 7 in the grid area, and much more extensive measurements off the grid, where well bedded and more argillaceous strata occur which are more conducive to formation and preservation of minor structures. Only a small portion of the southwesterly limb of this structure is exposed on the claim block.

Three fault sets occur on the property striking 045°, 100° and 150°, all probably steeply dipping. Shearing, known displacement or lithologic truncation is known along each of these trends, but some faults are inferred on the basis of linear airphoto traces. Sense of displacement on the faults is generally not known but some generalizations can be made. The 150° and 100° sets appear to be normal faults, the southwestern block is downdropped on the 150° set; the southern block appears to be downdropped on the 100° set. The 045° set has unknown sense of displacement. It may be related to a later period of folding and have opposite senses of normal displacement or possibly northwesterly directed reverse movement. The fault deformations are apparently not related to uplift of the metamorphic core zone of the Anvil Range nor to the emplacement of the Anvil Batholith, which crops out near Caribou Lake approximately one mile southwest of camp. No systematic radial sense of downdropping is noted that might be interpreted as an effect of intrusion of an unroofed pluton beneath the mineralized showings and altered zones on the property.

Alteration:

Two areas on the HAL claims are heavily altered but there appears to be no relation between the known mineralization and the alteration. The largest area is in the vicinity of the small lake near camp where the rocks are light gray to white and have a coarser sucrose texture than the presumed unaltered equivalents. Most of the rocks are highly siliceous and appear to be only bleached and recrystallized, but others have well developed calc-silicate mineralogy and are coloured light green by fine crystals of diopside. Some of the more recrystallized examples have light green and light brown mottling, apparently due to discrete crystals of diopside and idocrase. Locally the rocks have dark gray streaks, possibly due to concentration of carbonaceous material during the pronounced bleaching that must have occurred to obtain the light coloured altered rocks from the generally dark coloured Unit D rocks. Light coloured carbonate rich rocks with a distinctive feathery texture, possibly due to colourless tremolite, also occur widely in the altered zone. The rocks involved in this altered zone appear to have originally been part of Unit D. Where these rocks have been examined they do not seem to be particularly carbonate rich as they do not fizz when tested with acid even when scratched but they do exhibit rough weathering surfaces

typical of limy rocks. The apparent lack of carbonate in the protolith is puzzling in light of the widespread calc-silicate alteration; extensive metasomatism may have accompanied the alteration to develop the calc-silicate rocks. Another possibility is that a carbonate rich horizon is present in Unit D but everywhere this horizon is developed it is altered, thus no protolith is recognized; this possibility is a reflection of the uncertainty of the internal stratigraphy of Unit D. If such a carbonate rich horizon exists then it would appear to be relatively high in the section and substantial truncation would be required by the 100° trending faults south of the baseline to explain the observed distribution of rock types.

The second altered zone is well exposed in trenches on line 24W; it is of a similar nature to that described above, but not as strongly developed. Strong calc-silicate zones are not as obvious here, but calc-silicate mineralogy is developed. At the west end of the arcuate trench on line 24W at 114N Unit C is clearly seen to have been variably attacked by this alteration, leaving both the remnant distinctive purplish-brown coloured cherty rocks and coarser sucrose light greenish, highly siliceous rocks probably containing fine diopside. The conversion of Unit C rocks to calc-silicate mineralogy would seem to demand at least some metasomatism as Unit C rocks mostly seem to be nearly pure silica where unaltered. In this same trench minor pyrrhotite+chalcopyrite bearing diopside idocrase skarn with traces of scheelite is developed. The main showings on line 20W are near the edge of the altered zone, but no relationship is apparent between the alteration and this mineralization. The remaining altered rocks are exposed in trenches near 124N on 24W where the calc-silicate mineralogy is not particularly well developed, but the rocks are nonetheless originally partly limy. Around the periphery (particularly near 12E on TL 70N) of the strongly altered zone less completely recrystallized rocks occur with lenses of calc-silicate mineralogy enclosed in a fine siliceous matrix. The tremolite needles common in Unit E limy rocks are probably also related to the alteration process.

Mineralization:

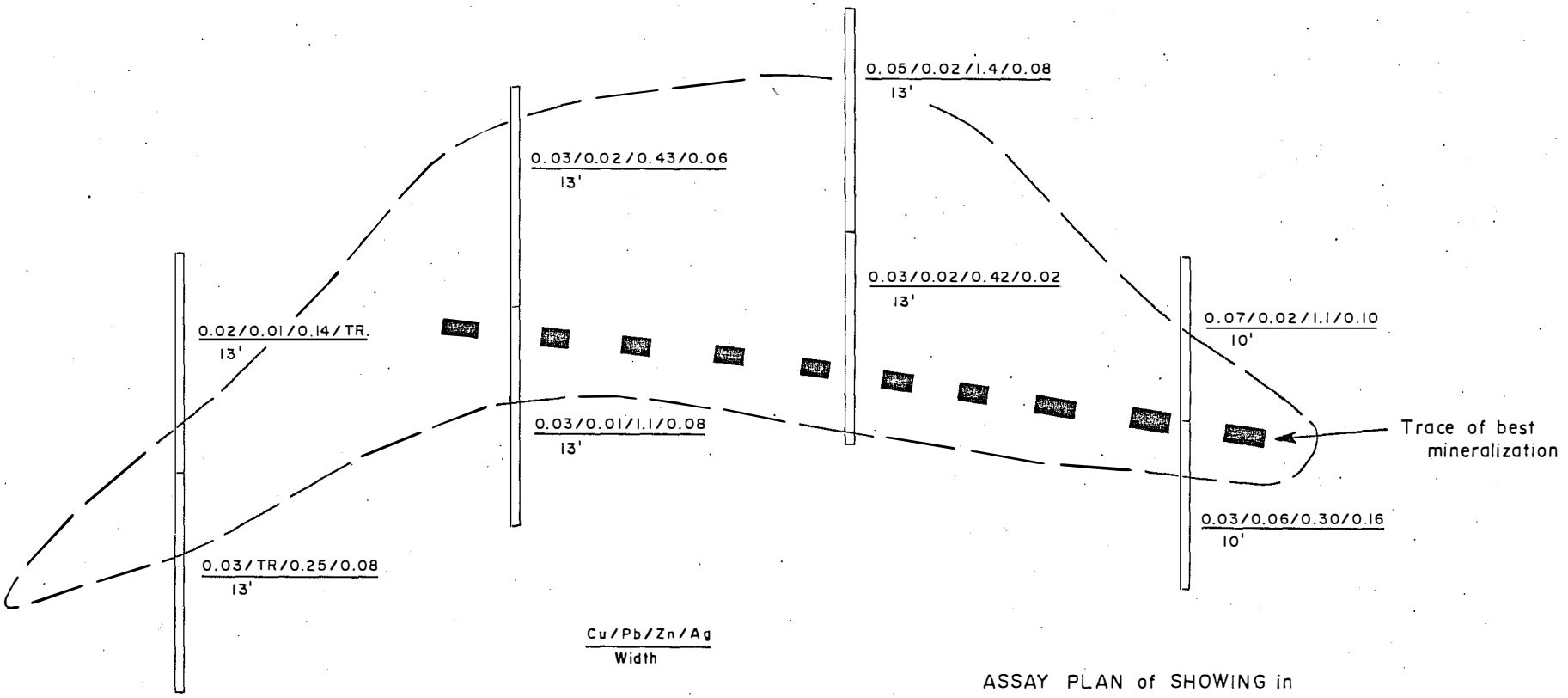
Three mineralized zones are known on the HAL claims; located in the vicinity of 4W 110N, 8E 85N and the largest one around 20W 116N. All the mineralized zones have been trenched to some degree.

The mineralization at the top of the hill on 8E at 85N appears to be confined to sparse thin stringers of black calcite following and cross-cutting bedding in limy rocks of Unit E. The veinlets contain minor amounts of sphalerite locally. This mineralization is not sufficient to explain the observed geophysical response, thus additional detailed surface examination will be conducted in this area in 1975. The intense resistivity low and frequency effect high here should not be entirely attributed to mineralization since some rocks in the area are carbonaceous and would be moderately good conductors.

The mineralization in trenches on line 4W near 110N is Cathro's (1968) A zone - location 1. Cathro extensively sampled this zone and his results are reproduced here in Figure 2 as they post date his reports on the property. Cathro described the zone as being up to 10' thick and less than 50' long which is in accord with recent observations. Most of the mineralization occurs in short (10'-20') thin (about 1"-2") lenses of heavily disseminated pyrrhotite with minor sphalerite and chalcopyrite, within a zone of sparsely disseminated mineralization with dimensions in the order described by Cathro. The host is a bleached(?), light coloured, fine-grained siliceous rock of Unit B. No pronounced geophysical response is associated with this mineralization and undisturbed soils do not contain strongly anomalous amounts of metal, suggesting that the showings exposed are the best that can be expected of this area.

The last mineralized zone is the largest and is associated with the best geophysical response on the claim block. It is exposed in trenches from 18W 117N to 24W 114N; this zone is Cathro's A zone - location 2. Two types of mineralization are present, the lower one is exposed in trenches just east of line 20W and the upper one in trenches on line 24W. The lower zone appears stratiform from a distance in that it is a shallow dipping lens possibly conformable with layering of the enclosing rocks. In detail the mineralization is highly irregular and has many features suggestive of an epigenetic replacement origin. The zone is best described as one of heavily disseminated pyrrhotite with subordinate black sphalerite and lesser chalcopyrite. The showing is heavily oxidized and probably considerably leached; minor amounts of fine smithsonite crystals are present on the weathered surfaces of rubble. The heavily disseminated mineralization is locally finely laminated, with laminations paralleling the general trend of the zone and elsewhere crosscutting it. Massive pods or blocks of pyrrhotite occur within the disseminated zone. These blocks could be highly disrupted beds of massive mineralization, but they appear to be joint bounded blocks with lateral continuity no greater than presently exposed. Numerous other examples of apparently fracture controlled mineralization are present. It is possible that the observed fracture controlled features are secondary and result from mobilization of originally stratiform mineralization, but a strong case can be made for an origin by replacement of a horizon within the upper part of Unit B by solutions travelling along steep fractures. The zone is about 10' thick but the base is not exposed. The zone was not resampled in 1974 but Cathro (1968) reports an 8 foot chip sample across the horizon averaging 2.84% Zn, 0.37% Cu, 0.01% Pb and a trace of gold and silver. The I.P. results show a pronounced, though weak, metal factor anomaly over this showing and indicate that more mineralization could occur just downhill from the exposed mineralization.

The upper showing in this area is very small and consists of pods of diopside-idocrase skarn replacing highly siliceous rocks of the uppermost portion of Unit B or Unit C. Some of the small pods contain considerable pyrrhotite and minor amounts of chalcopyrite. No assays were obtained on this material but the copper values are very low. Very minor scheelite was



ASSAY PLAN of SHOWING in TRENCH at 6W — 112N

Scale: 1" = 10'

Figure 2

noted in some samples of the skarn. The pyrrhotite+chalcopyrite mineralogy is reminiscent of the sulphide mineralogy prevalent at the top of Unit B, and may indicate that the small sulphide showings originate by mobilization of small amounts of sulphide already in that horizon during the formation of the altered zone in this area. This showing provides the only obvious link between alteration discussed previously and mineralization on the claims; and may be nothing more than redistribution of pre-existing sulphides. The I.P. results suggest that the rocks in the layered showing may be present at depth downhill from the skarn showings.

GEOCHEMICAL SURVEY

Methods and Procedure

At the onset of the survey it was planned to collect the B horizon but in practice this proved to be difficult because of thick organic material and/or volcanic ash, and shallow permafrost. On the steep north slope it commonly proved impossible to get an adequate sample.

Due to this problem every line was walked at least twice and generally three times in order to remove the moss and start the underlying material to thaw, thus getting the hole as deep as possible and hopefully reaching the B horizon. In many cases a B horizon sample was obtained, but often the lowest level reached was still in the A horizon. The samples were dug with a mattock and placed in a wet strength Kraft paper bag. The samples were partly air dried in camp then shipped to the Whitehorse laboratory of Barringer Research where analyses were done by Doug Read.

The sample was oven dried at 75°C and sieved to minus 80 mesh. Two hundred and fifty milligrams of the minus 80 mesh fraction was digested in perchloric acid ($HClO_4$) and the resultant solution submitted to atomic absorption spectrophotometry. The perchloric acid extraction is essentially a total extraction. Duplicate samples were submitted to Barringer as a check on precision of their analyses; the results of these checks showed good reproducability.

Description of Soils

The soils developed on the claim group fall into two main categories depending mainly on topography and drainage; all the soils are immature. On the rolling upland surface two sequences of soil horizons are found. In well drained areas a few inches of virtually undecomposed organic material (A_o) is underlain by slightly decomposed black organic material with a slight to moderate content of mineral matter (A_1) up to two or more feet thick but usually less than one foot thick. The A_1 is locally underlain by a lighter coloured leached horizon (A_2) but it is usually very thin and often absent.

A prominent layer of white volcanic ash is commonly found in the soil profile usually at the base of the A_1 but also can occur within the A_1 horizon. The B horizon is light-medium brown to orange-brown or dark brown and free of organic material, except where buried horizons are found.

The second type of upland soil is found in less well drained areas, and consists of gray to greenish-gray clay rich material overlain by the A horizons described above, including the ash layer. This material is thought to be a weakly developed gley horizon and will be referred to as the G horizon.

On the south facing slopes where drainage is better and permafrost is deeper or absent the A-B soils predominate although A-G soils are found locally.

On the north and east facing slopes soils are very poorly developed and frozen poorly decomposed organic material often directly overlies large talus boulders. Where mineral rich soils are developed they commonly consist of fine rock fragments and mixed fine rock and ash or ash alone.

Permafrost, or at least frozen ground, is widespread on the property with the exception of the south slopes and more exposed portions of the upland surface. Frost is usually encountered at depths of a few inches just below the moss cover and in many cases prevents obtaining a sample below the A horizon or the ash where this is thick. In some cases heavily frozen A horizon material proved to be underlain at a depth of 2-3' by completely thawed B or C horizons. These relations suggest that a substantial blanket of impermeable frozen humus overlying a permeable B horizon might effectively blank out a geochemical response over mineralization by channeling the metal rich waters beneath the frozen humus. This would deny metal contribution to the overlying A horizon soils which in routine sampling are difficult to avoid. In such a case however, a substantial anomaly should be found downhill from mineralization, thus it seems unlikely that permafrost will completely eliminate signs of mineralization, but it could easily confuse the detailed picture.

The ash layer noted above is ubiquitous in the south-central Yukon and was avoided as a sample media. Where samples of ash were taken they yield unusually low metal values.

The B horizon was the desired sample media but in areas of poor drainage a G horizon sample was taken. Where the A horizon was unusually thick or well frozen it was sampled. On the north slopes A_o horizon samples were taken where nothing else was available, but these usually proved to have insufficient -80 mesh material for an analysis.

Results

Fourteen percent of the samples taken were from the A horizon; the rest are split evenly between the B and G horizons. Fewer than 14% of the values plotted on Maps 3, 4 and 5 and A horizon since duplicate samples were obtained on later traverses from the B or G horizons.

The results are displayed in plan form on Maps 3, 4 and 5 and in histogram form as Figures 3-11 on the following pages. The statistics of the metal concentrations of various horizons are found in Table II. These results show that all metals, particularly zinc, are somewhat depleted in the A horizon and that the B and G horizons are very similar in metal content. The B horizon samples contain more highly anomalous copper and zinc values than the A or G either due to enrichment, or possibly because in well drained areas where B soils develop the active layer is thicker and mineralization more easily contributes copper and zinc to the soils than in heavily frozen ground. No highly anomalous lead values were obtained from the A horizon.

The results show that B and G horizons are probably equally good sample media and that anomalies can be obtained from the A horizon. Anomalies, or lack of anomalies, defined solely by A horizon samples should be approached with extra care as they may be false or misleading. Highly organic samples are noted on the accompanying maps with parenthesis.

Table II

Statistics of Geochemical Results

	Crude Mode	Median	Mean $\bar{x}$	Standard Deviation σ	Threshold $\bar{x} + 2\sigma$	Threshold $2\bar{x}$
Copper						
A	28	37	45	31	107	90
G	28	32	39	28	95	78
B	23	33	39	26	91	78
Lead						
A	23	27	34	16	56	68
G	33	32	37	20	97	74
B	23	36	43	24	91	86
Zinc						
A	30	97	117	105	327	234
G	70	148	166	98	362	332
B	110	147	170	102	374	340

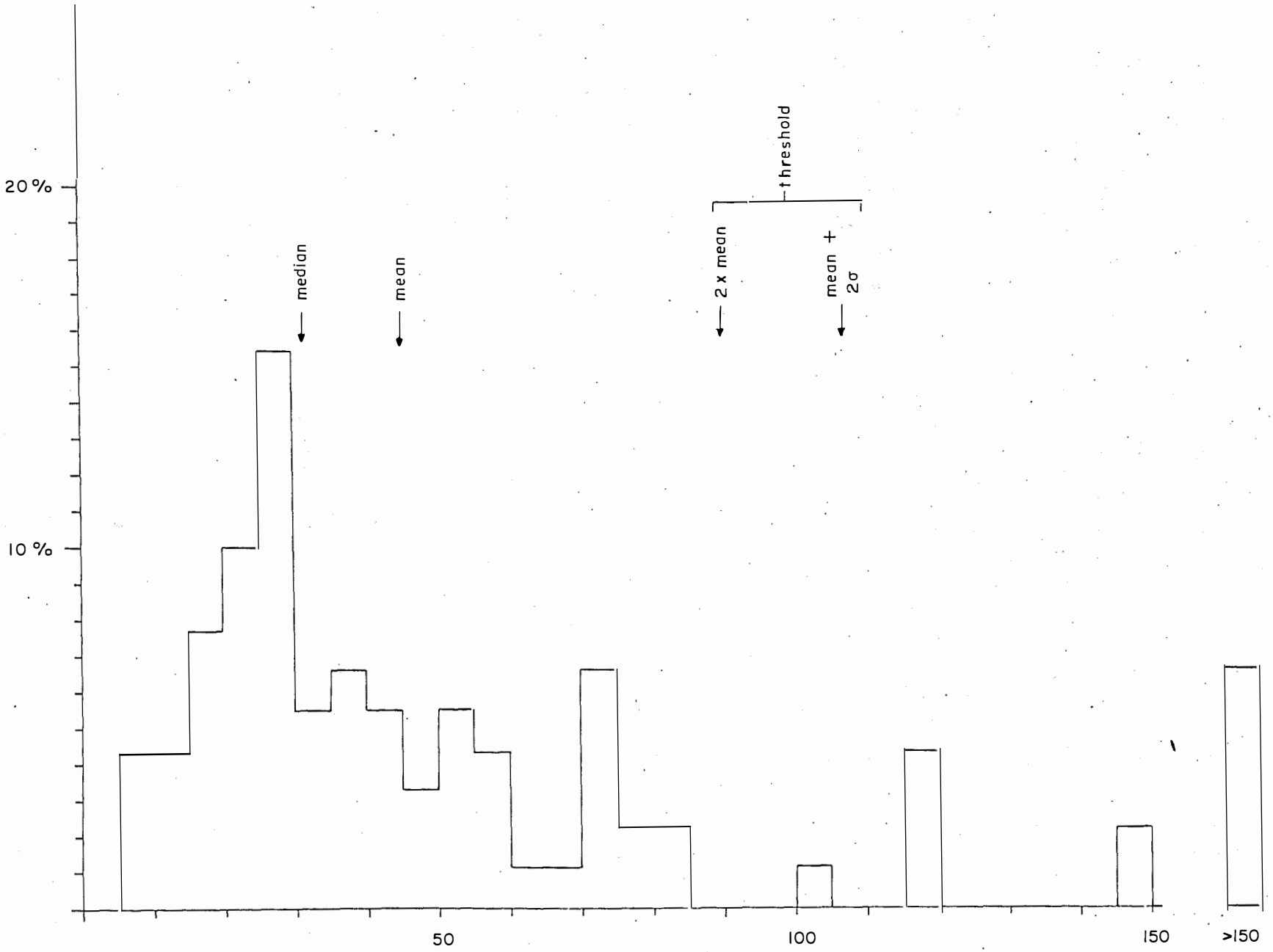


Figure 3 Histogram of Results: Copper — A Horizon

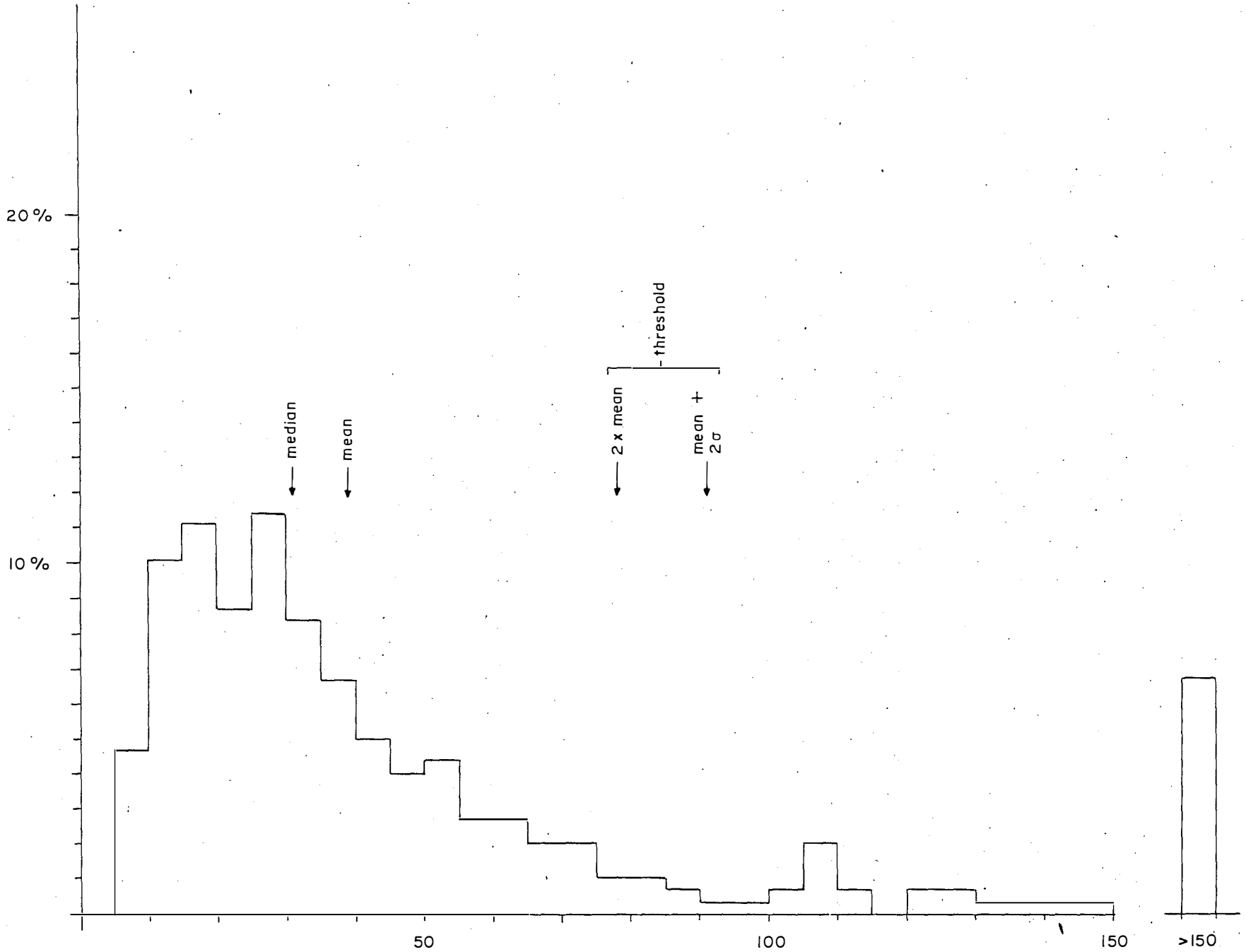


Figure 4 Histogram of Results: Copper — G Horizon

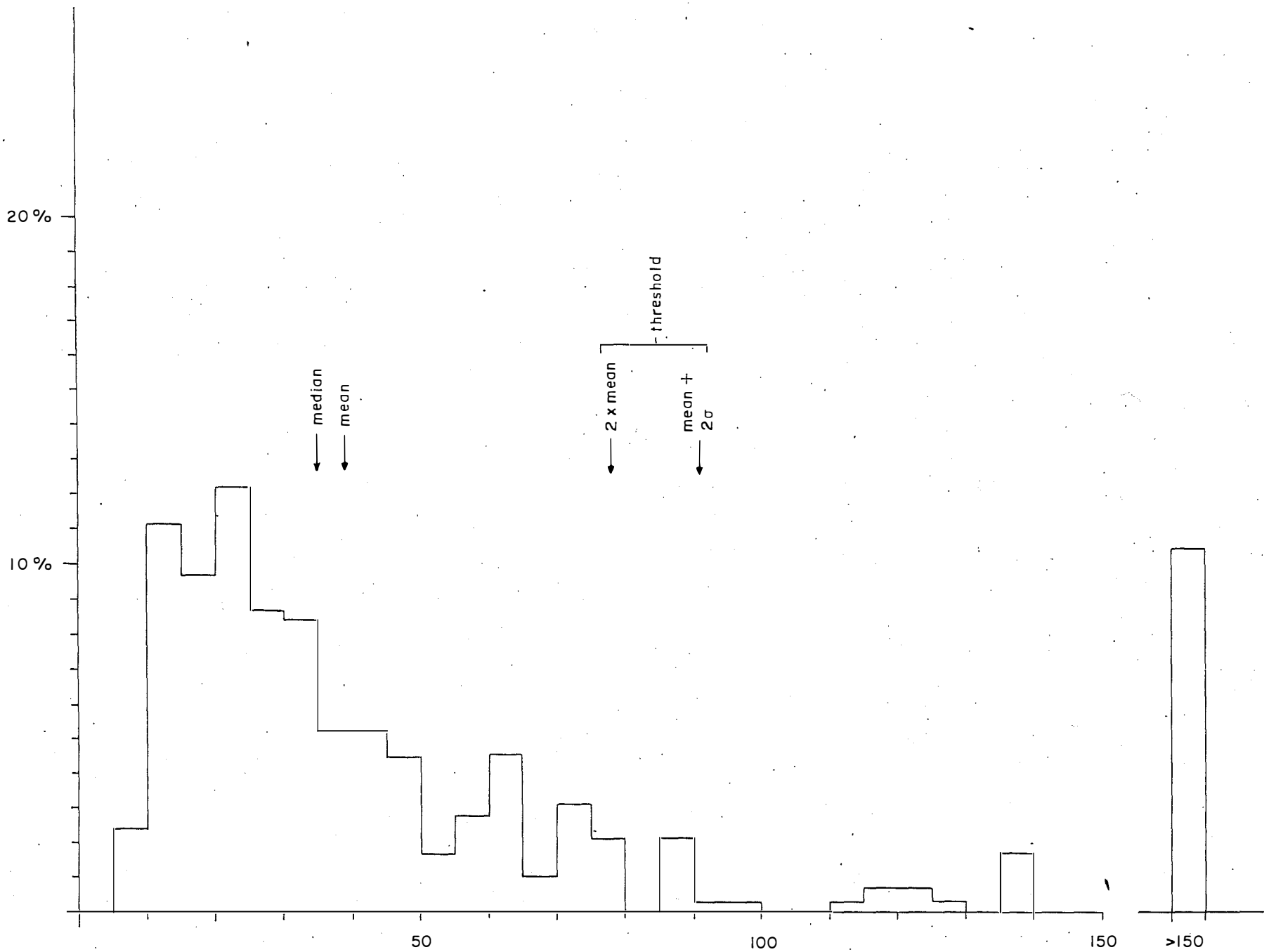


Figure 5 Histogram of Results: Copper — B Horizon

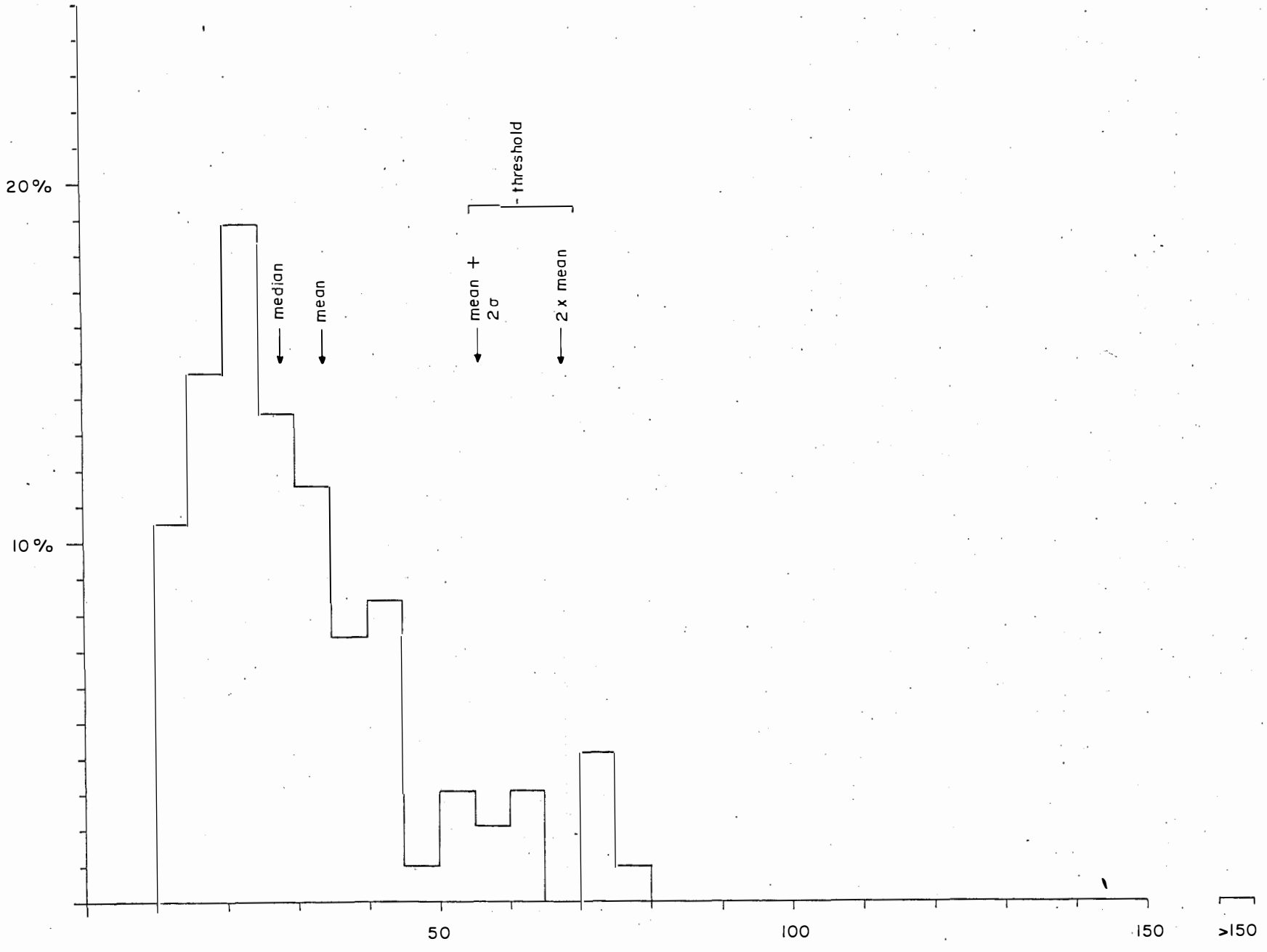


Figure 6 Histogram of Results: Lead – A Horizon

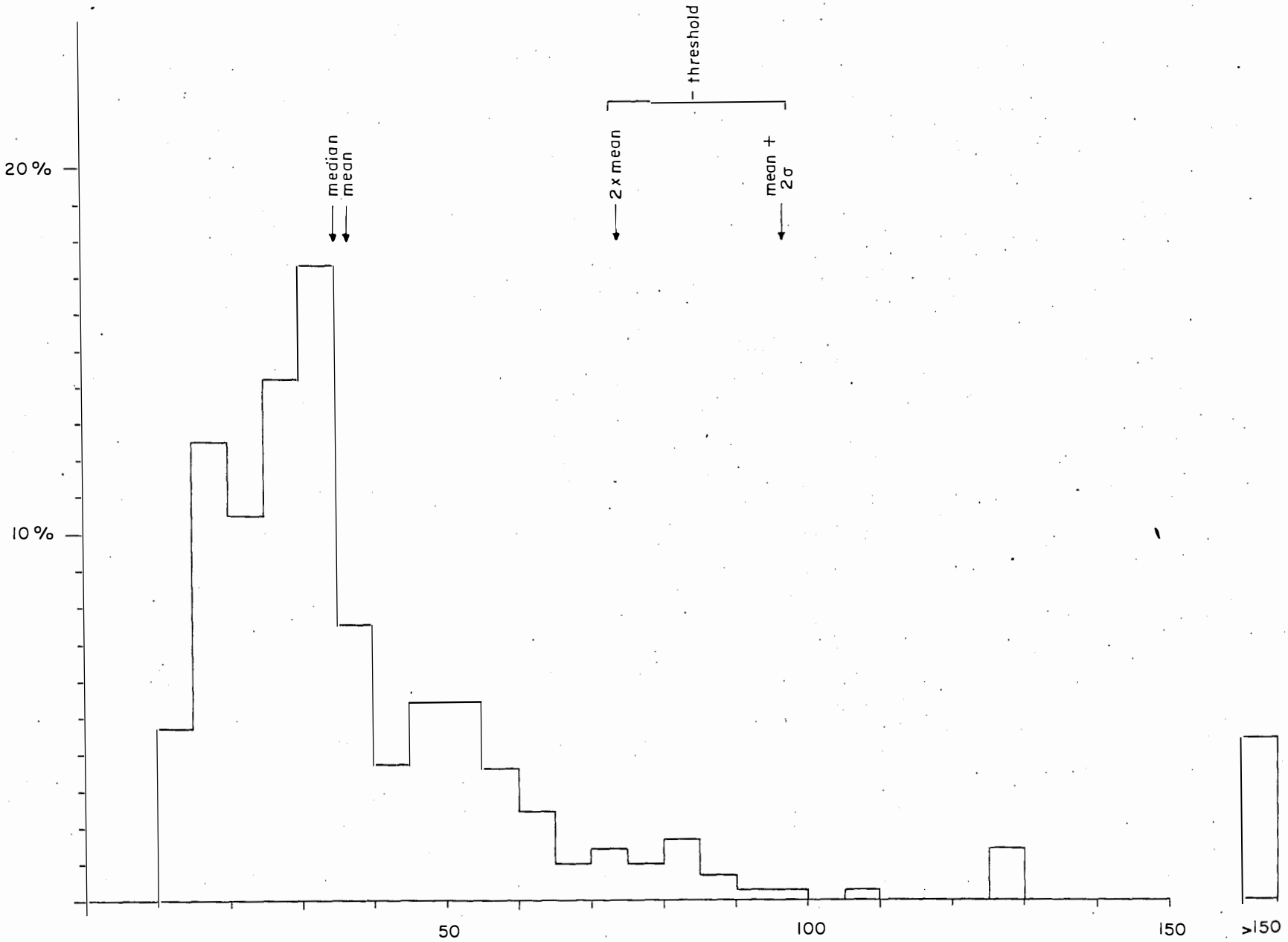


Figure 7 Histogram of Results: Lead — G Horizon

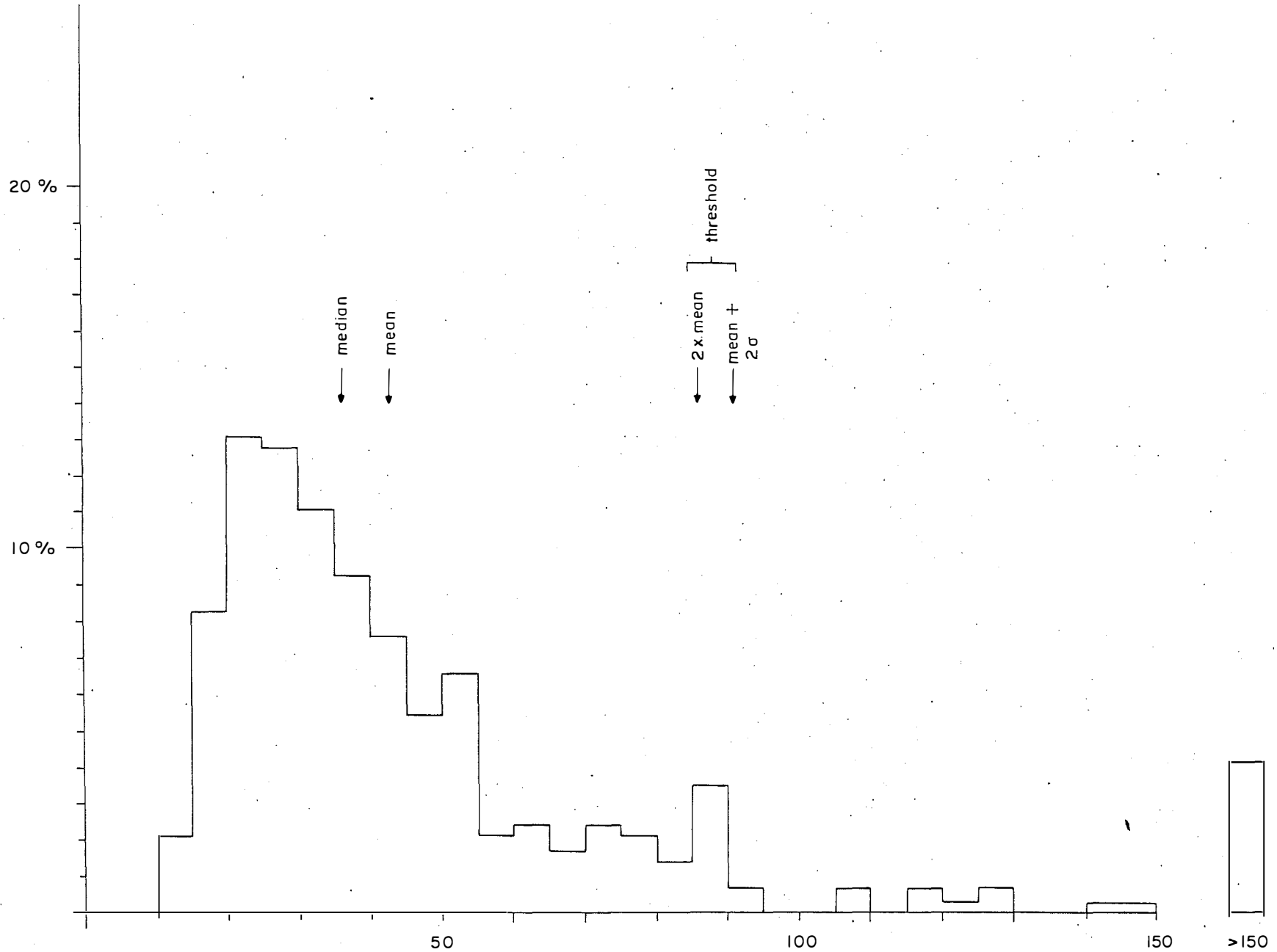


Figure 8 Histogram of Results: Lead – B Horizon

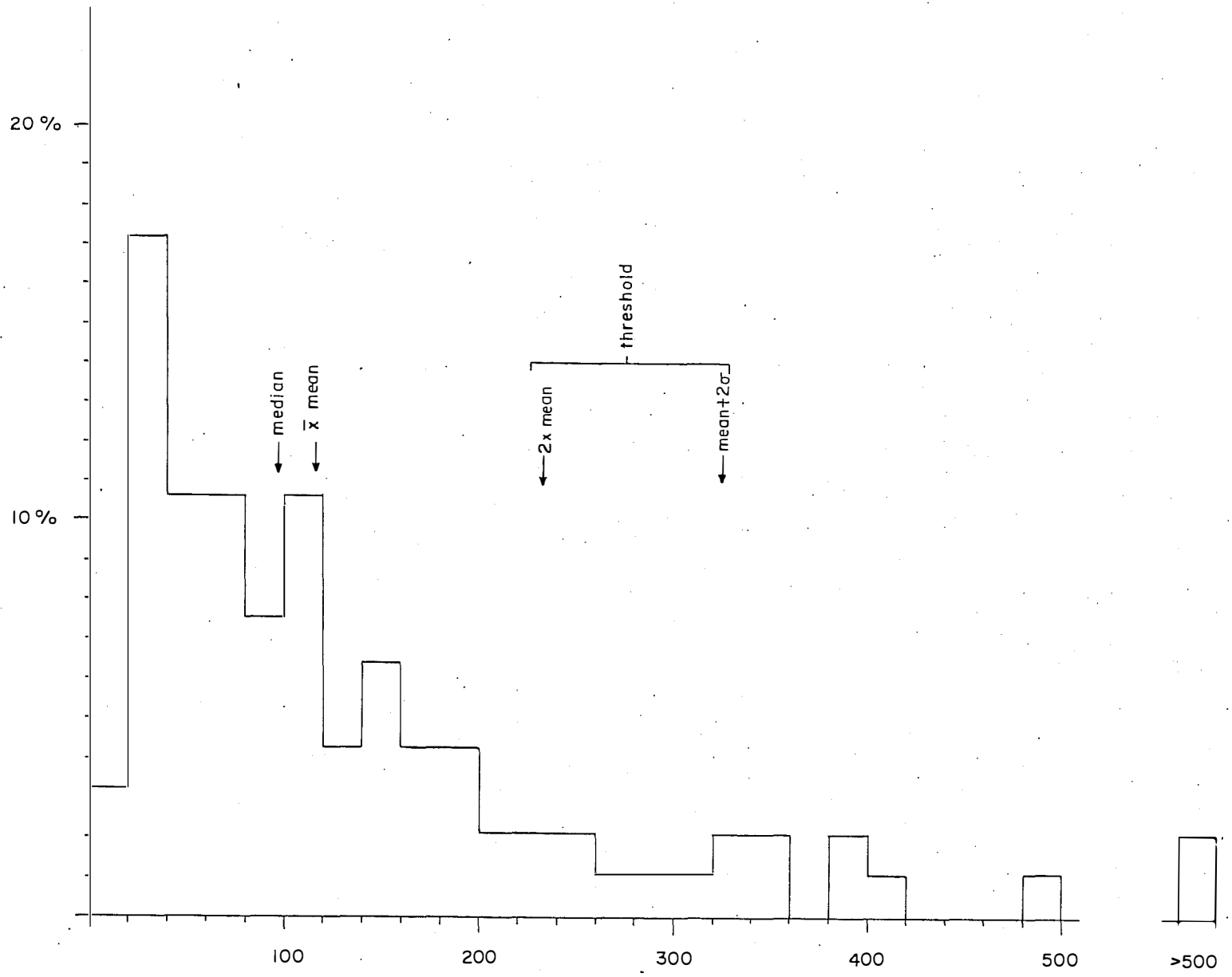


Figure 9 Histogram of Results: Zinc — A Horizon

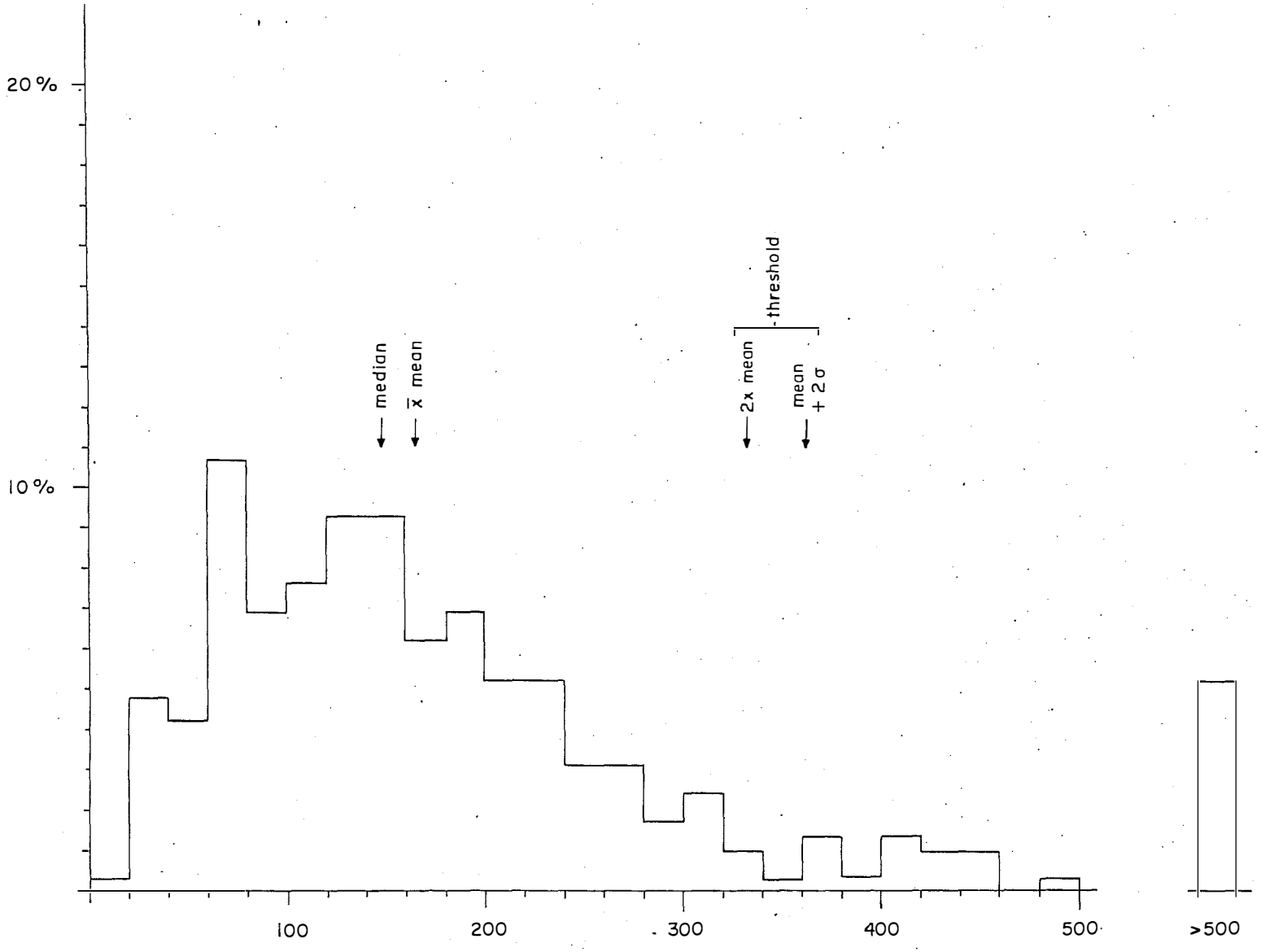


Figure 10 Histogram of Results: Zinc — G Horizon

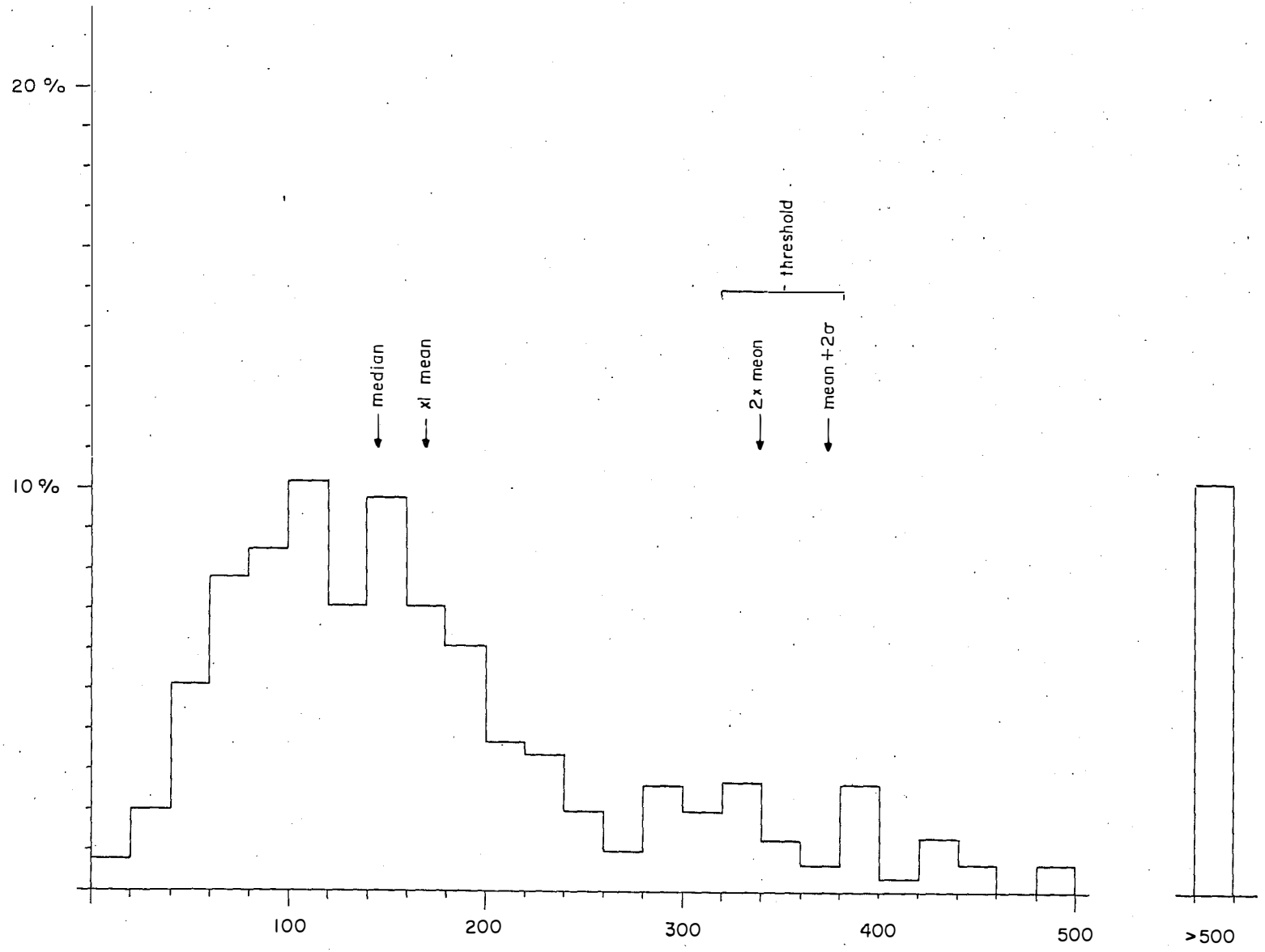


Figure 11 Histogram of Results: Zinc — B Horizon

Four main zones of interest can be outlined on the basis of the geochemical survey. These are lettered A through D on the accompanying maps (3, 4 and 5).

Zone A is spatially related to known mineralization and well defined though weak I. P. anomalies, with strong magnetic response. Anomalous amounts of metal are found in soil here, but in general the values are not particularly high, especially in comparison with more extensive mineralization exposed on adjoining claims. This area is one where permafrost might be supressing anomalies.

Zone B is weakly connected to Zone A and again is related to known mineralization, but with poor geophysical response. The very highly anomalous samples on line 4W are from the edge of the trenched area where mineralization is exposed and scattered by the diggings.

Zone C is the most attractive zone because of its higher and more widespread anomalous values, its stronger metal factor anomaly and its relation to known mineralization off the claim block. This zone is the western extension of a much larger and more intense geochemical and geophysical anomaly on the Cyprus Anvil DANA claims, which drilling in 1974 has shown to be caused by extensive low grade copper-lead-zinc-silver mineralization similar to that exposed in trenches on 4W and 20W. Some of the high metal values in soils in Zone C may originate from mineralization further uphill to the east, as the values build in that direction, but the coincident geophysical response suggests some mineralization will be found in place.

Zone D is a broad zone of patchy, moderately anomalous values with a core of fairly high values near 85N on lines 8E and 12E. The high values in the core of this zone are associated with highly anomalous I. P. and magnetic results. As noted previously sphalerite bearing veins are present but it is considered that insufficient mineralization has been found to account for all observed features. The high metal factors and low resistivity may not be due to mineralization as graphitic argillites crop out. A sample of argillite was taken to test the possibility of metal rich bedrock but yielded low results.

Zone E is defined by low order anomalous geochemical values with no coincident geophysics. The values here may represent accumulation of metal in the secondary environments; dispersion from mineralization uphill or the presence of a small mineralized lens similar to that exposed on line 4W.

Zone F occurs at the base of the north slope and is also an extension of more anomalous conditions further east on the DANA claims with coincident Turam, I. P. and magnetic anomalies. The source of these metals may be downhill dispersion from the main mineralized zone, but in light of the coincident geophysics this zone will be drill tested in 1975 on the DANA claims.

Several other patchy low order anomalies are present. Some, such as the higher copper values just north of the base line at the east edge of the grid, can be related to known very sparse mineralization (in this case the bedded and fracture bound pyrrhotite and chalcopyrite at the top of Unit B) but are too low to indicate the presence of significant mineralization.

GEOPHYSICAL SURVEYS

Induced polarization and magnetometer surveys were conducted over the HAL claims during the 1974 field season. The magnetometer survey was carried out by Cyprus Anvil personnel and the I.P. survey by P.E. Walcott and Associates under contract.

Methods and Procedure

The I.P. technique will be described in a separate report by P.E. Walcott and Associates. A dipole-dipole array with a 200' spread and McPhar P-660 frequency domain equipment was used for the survey. A pole-dipole array was tried but proved unsatisfactory because of coupling effects.

The magnetic survey was conducted using a McPhar M-600 fluxgate magnetometer. This instrument measures the relative intensity of the vertical component of the earth's magnetic field. Drift during the survey was compensated for by reading base stations at less than two hour intervals, generally about one hour. The base stations were set up along the base line and tie lines using carefully controlled loops on a magnetically quiet day. A main base station at 16+20W 88+80N with assumed value of 1550 gammas was used as the starting point of the loops defining the base station network and the background level of the survey. All readings were taken at about three feet above the ground level with the instrument facing north, all magnetic material and non-aluminum metal was removed from the operator's apparel.

Any drift noted during the survey was linearly distributed back through the loops in which it occurred. Numerous stations especially on the base line were reread during the survey with good reproducability. Where more than one hundred gammas per hour drift was encountered the drift was often erratic and these loops were usually discarded and reread.

Results

The results of the geophysical surveys are shown in plan form as Maps 6 through 9 and in section form as Figures 12 through 18 all of which are in the pockets at the rear of this report.

Magnetometer Survey:

The magnetic survey gave very erratic results due to close intense dipole anomalies as can be best seen in profile. The erratic anomalies are probably caused by shallow pyrrhotite masses of small size. The magnetic response on the claim block is not suggestive of large masses of magnetic sulphide mineralization, but accurately reflects the presence of known small pod or veinlike masses of pyrrhotite. In plan view a distinct zone of higher values and high relief cuts across the grid in a northwest-southeast trend.

This zone does not parallel lithologic trends nor does it parallel any of the major faults inferred to be present on the property. The zone boundaries are, however, parallel to a pronounced joint set developed on the claims and roughly parallel the fold axis inferred just southwest of the zone. This feature suggests major, structurally controlled, epigenetic emplacement of pyrrhotite and/or magnetite into features cross-cutting lithologic units. The trend of this zone also appears vaguely on the resistivity plan (Map 7). The presence of this zone may indicate that an important fault set parallel to the axial plane of folding has not been recognized.

I. P. Survey:

The I. P. survey defines three zones possibly related to mineralization and two more to lithologic features. The strongest I. P. zone is on line 8E at 88N where trenches expose dark argillaceous rocks containing minor mineralization. This zone has a roughly coincident magnetic response and moderately to strongly anomalous geochemical response. Most of the I. P. response here is probably due to conductive lithologies rather than mineralization.

The second strongest zone is located on line 8E at about 110N and is associated with very strong geochemical response and weak magnetic response. This zone is part of a large more intense zone to the east, where it is known to be caused by sulphide mineralization.

A third zone also caused by sulphide mineralization is found on lines 16W and 24W between 115N and 120N. This zone forms a good bullseye target around the known mineralization exposed in trenches. The axis of the metal factor anomaly on 16W falls just north of the known showing in an area where trenching failed to expose bedrock, thus mineralization may be more extensive than presently known; the magnetic survey supports this interpretation. The weak geochemical response here however, barring complications due to permafrost, suggests that the mineralization will be very low grade and may consist only of pyrrhotite with minor chalcopyrite as is commonly found on the property. On line 24W an extension of this zone at shallow depth is located north of the known chalcopyrite pyrrhotite skarn mineralization in an area where trenches also fail to expose bedrock.

South of the above zone on line 24W between 95N and 105N, and on 32W between 100N and 110N is a weak resistivity low and consequent metal factor high, which is probably due to conductive overburden or water saturated rock in the stream valley rather than sulphide mineralization. At the north ends of all the lines a persistent resistivity low and frequency effect high is apparent at depth and thought to be caused by graphitic argillites of Unit X in fault contact with Unit B beneath a moderately thick cap of overburden. A weak magnetic high is developed over this conductive lithology probably due to the small pyrrhotite content. A weak geochemical response (Zone F) also occurs over the eastern portion of this anomaly. As noted above this feature will be drill tested in 1975 on the DANA claims where all types of anomalies are also coincident and much stronger.

CONCLUSIONS AND RECOMMENDATIONS

The surveys conducted in 1974 outline three zones that may be worthy of further investigation, although none of these zones appears to have good potential for the discovery of substantial tonnages of massive or disseminated mineralization.

The zones are centered at:

1) 20W 117N
2) 8E 88N
3) 8E 110N

The first zone has somewhat limited strike length (~2000') and is defined by weak I. P. and geochemical anomalies with locally strong magnetic response. The available evidence suggests the presence of pyrrhotite+ chalcopyrite mineralization more widespread than the trenched showings, but still low to very low grade and of limited tonnage potential.

The second zone is not completely explained but the available data suggests the intense I. P. effects are caused by graphitic argillites, while the erratic magnetic and geochemical anomalies are caused by sparse vein or replacement material the bulk of which is not exposed.

The third zone is part of a more extensive mineralized system presently being investigated on the adjoining DANA and HALO claims of Cyprus Anvil. The anomalies here are considerably weaker than those on the DANA claims and cannot be considered priority targets for further work when viewed in context. The best mineralization to be found on the HAL claims will likely be found here.

It is recommended that more detailed surface examination in the area of Zone 2 should be carried out to more adequately explain the anomalies. The nature of mineralization in the remaining zones can be reasonably inferred from the present data and no further work appears warranted at the present time. Should drilling on the adjoining DANA claims indicate significant improvement in grade of the already widespread mineralization then drilling of these low priority targets might be warranted.

Respectfully submitted,

G. A. Jilson, B.Sc.

J. G. Simpson, Ph. D., P. Eng.

REFERENCES

Campbell, R. B. (1967) Glenlyon Map Area, Geological Survey of Canada Memoir 352.

Cathro, R. J. (1968) Summary Report, Caribou Lake Property, unpublished report for Northern Empire Mines Ltd.

Roddick, J. A. & Green, L. H. (1961) Tay River Map Area, Geological Survey of Canada Map 13-1961.

Tempelman-Kluit, D. J. (1972) Geology and Origin of the Faro, Vangorda and Swim concordant zinc-lead deposits, central Yukon Territory, Geological Survey of Canada Bulletin 208.

Walcott, P. E. (1975) Report on I. P. Survey Dana, Halo and Hal Claims, unpublished report in preparation for Cyprus Anvil Mining Corporation.

Appendix I

Statement of Costs

Salaries and Wages	$ 4,000
Linecutting - 19 1/2 miles @ $130/mi.	2,500
I. P. Survey - 8 miles	6,770
Mag Rental - 1 month	100
Geochemical Analyses - 760 samples @ $1.95	1,480
Rotary Wing Charter - 14 hrs. @ $200/hr.	2,800
Drafting and Report Preparation	300
	$17,950