REEF PROJECT
GENERAL REPORT ON FIELD WORK
1975

N.T.S. 106 B,C,D,E
N.T.S. 116 A,B,C,F,G,H,J

By
Peter M. Dean
CYPRUS ANVIL MINING CORPORATION
March, 1976

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R E E F P R O J E C T

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TABLE I

REEF CLAIM STATUS AT DECEMBER 31, 1975

Claim Group	N.T.S.	No. of Claims in Good Standing as of Dec. 31/75	Due Date	Total Expend. as of Dec. 31/75
ALE	106-C-13	6	Nov. 29/77	$ 900.00
BILBO	116-G- 7	12	Dec. 14/77	4,453.00
CLOË	106-E-2	12	Feb. 29/77	894.00
DIDLO	116-B-16	12	Jan. 4/76 (6 clms.) Jan. 4/77 (6 clms.)	1,452.00
EG	106-C-14	16	Jan. 15/78 (11 clms.) Jan. 15/81 (5 clms.)	5,568.00
FC	106-B- 8	4	July 23/76	692.00
GREMLIN	106-E- 2	12	Nov. 29/77	1,780.00
HOT	116-A-13	40	Jan. 12/76 (28 clms.) Jan. 12/79 (12 clms.)	3,991.00
JUG	116-H-10	4	Jan. 11/76 (2 clms.) Jan. 11/77 (2 clms.)	1,023.00
KIWI	116-B-10	80	Jan. 12/76 (45 clms.) Jan. 12/77 (8 clms.) Jan. 12/81 (27 clms.)	17,427.00
MAGIC	106-E- 3	1	Nov. 9/76	965.00
OZ	116-B-12 & 13	81	Feb. 13/80 (18 clms.) Feb. 13/81 (63 clms.)	83,615.00
RALPH	116-G- 7	4	Mar. 11/78	1,034.00
TART	116-B-13	80	Nov. 6/80	86,215.00
UG	116-C-16	32		1,909.00
VUG	116-A-9	40		6,853.00
WILL	106-D-7	60		4,676.00

REEF PROJECT

GENERAL REPORT ON FIELD WORK

1975

INTRODUCTION

The Reef Project was proposed during the fall of 1973 to carry out grass roots exploration for lead and zinc deposits over a vast area of little-known geologic terrain in the Ogilvie and Mackenzie Mountains, northern Yukon. During the 1974 field season, preliminary geochemical stream sediment sampling was carried out over 9,000 square miles of predominantly carbonate rock formations, resulting in the discovery of numerous mineral occurrences. Nineteen claim groups were staked during the 1974 season. During 1975, exploratory work was carried out on 8 of the 19 claim groups staked during 1974, and several regional areas covered during 1974 were explored more thoroughly with geologic mapping and more detailed geochemical sampling. In addition, 5,000 square miles of new reconnaissance silt sampling was completed, and 6 new claim groups were staked. The 1975 reconnaissance sampling emphasized areas underlain by carbonate and shale formations of Proterozoic age, which appeared, from the 1974 work, to have the best potential for hosting large, stratiform mineral deposits.

The economic viability of any mineral occurrence within the area will depend very much on transportation developments during the next few years. At the moment, road access to the area is limited to the Demster Highway in the west and the Canol Road in the southeast. Winter roads along the Bonnet Plume and Wind Rivers originate at Mayo, and pass through the center of the area covered by the Reef Project, and will probably be developed into year-round roads at some future time.

Barge transportation is available on the Mackenzie River on the eastern fringe of the Reef area, and this area will be accessible by road as well, when the

Mackenzie Valley Corridor Highway is completed. Aside from these rather limited surface routes, transportation must depend entirely on aircraft.

The inaccessibility of the Ogilvie and Mackenzie Mountains makes exploration costs high, since helicopters and fixed-wing aircraft must be used to support all phases of the day-to-day work. It also means that exploration must be directed toward finding large tonnage deposits which could be economically viable in such a remote area. On the other hand, since previous exploration through this area has been inhibited, this may be one of the few areas in North America where there is any possibility of finding large and geochemically obvious mineral deposits which are not already known.

The location of claim groups, geochemical coverage, detailed regional areas, and access routes are summarized in Figure 1. In addition, summary maps at a scale of 1 inch to 4 miles have been compiled for mapsheets 96 D, 106 A, C, D, E and F, and 116 A, B and C. These summary maps, Figures 2 to 9 respectively, outline geochemical coverage, claim group locations, mineral showing locations, and general geography of the areas in which work was done during 1975. Summary maps showing 1974 coverage are not included. This report discusses work carried out by the Reef Project on an area by area basis, with the emphasis placed on the regional part of the work. Work carried out on claim groups, in most cases, is covered by separate reports filed for assessment.

SUMMARY OF 1975 FIELD WORK

1. Claim Group Work

   (a) Oz Claims: 1,245 feet of diamond drilling, grid soil sampling survey, geologic mapping at 1 inch:400 feet, hand trenching (see separate report).

(b) Tart Claims: 1,615 feet of diamond drilling, grid soil sampling, geologic mapping at 1 inch:400 feet, hand trenching (see separate report).

(c) Kiwi Claims: Hand trenching, soil sampling survey, geologic mapping at 1 inch:400 feet (see separate report).

(d) Hot and Id Claims: Hand trenching, soil sampling (see separate report).

(e) Vug Claims: Contour soil sampling lines, geologic mapping and geologic prospecting (see separate report).

(f) Will Claims: Contour soil sampling lines, geologic mapping and geologic prospecting (see separate report).

(g) Ug Claims: Contour soil sampling lines, geologic mapping at 1 inch: 200 feet and 1 inch:1,320 feet (see separate report).

(h) Ale Claims: Soil sample lines, geological prospecting (see separate report).

(i) Cloë Claims: Soil sample lines (see separate report).

(j) Gremlin Claims: Soil sample lines, geological prospecting (see separate report).

(k) Poo Claims: Prospecting.

(l) Quak Claims: Prospecting.

(m) FC Claims: Prospecting.

2. Areas of Detailed Reconnaissance Coverage

(a) Coal Creek Dome, 116 B and C - Mapped geologically at 1 inch:2,640 feet and thoroughly covered by contour soil sampling lines.

(b) "Rae Creek Dome", 116 A - Several areas covered by contour soil sampling lines.

(c) Castle Ridge, 106 D - Covered by detailed contour soil sampling lines.

(d) Fairchild Lake, 106 C 13, 106 D 16 - Partially covered by contour soil sampling lines.

3. New Areas Covered by Low-Density Stream Sediment Sampling

(a) "Rae Creek Dome", 116 A - An area of uplifted Helikian-age rocks similar to Coal Creek Dome to the west.

(b) Fairchild Lake, 106 C, D, E, F - Underlain by Helikian rock units mainly, of many lithologies.

(c) Palmer Lake Area, 106 A - Underlain by Little Dal and H5 formations of Helikian age, considered to be favourable for sedimentary copper, as well as lead and zinc occurrences.

(d) Front Ranges Area, 96 D - Underlain by Cambrian and Proterozoic rock formations with evaporitic lithologies which commonly occur in areas of syngenetic copper mineralization.

(e) Road River Formation, 116 B, 116 A - Areas of Ordovician black shale and chert with high geochemical backgrounds occur in a belt running from near the Alaska border to north of Mayo. Geochemical coverage of this belt was partially completed near the end of the season.

RESULTS AND CONCLUSIONS

1. Claim Groups

The diamond drill program on the Tart Claims has fairly conclusively written off any possibility of finding economic zinc mineralization on that claim group. On the Oz Claims, the drilling was much less conclusive, since only one mineral showing out of several was tested. The drilling and hand trenching suggests that the main zone mineralization consists of high grade, remobilized pods in fault zones, rather than stratiform sedimentary lead-zinc accumulations. Elsewhere on the property, however, undisputable sedimentary mineralization does occur, as well as breccia-hosted sphalerite and galena which resembles Mississippi Valley style ore occurrences. More hand trenching, and detailed geologic mapping, will be required to fully understand the mineral showings on the Oz Claims, and the possibility still exists that economically tenable lead-zinc mineralization occurs on the property.

On the Kiwi Claims, very high grade lead-zinc mineralization occurs in fault breccia zones. This property is within a few miles of the Dempster Highway, and therefore the possibility of developing a small tonnage, high grade orebody may be economically feasible. The hand trenching work this year was partially successful in exposing some of the showings, but the true size and mineralogical characteristics of the showings are still obscured by talus cover, permafrost, and deep oxidation of the lead-zinc minerals. A chip sample across the main zone assayed 35% combined lead and zinc across a width of 35 feet. The Kiwi claims warrant further work which should be directed toward developing a better picture of the grade, size and shape of the main showings.

On the Hot and Id Claims, the work during 1975 failed to discover any significant new showings or enhance the previously-known ones. These claim groups

do not warrant any further work. On the Vug Claims, widespread small lead and zinc occurrences have been found, but no showings were seen which seem to have the potential for economic size or grades. Similar mineralization occurs on the Will Claims, where the best showing, which is well-exposed, could contain up to 1 million tons of zinc-lead ore grading 5 - 10% combined lead and zinc. More work will be needed to determine accurate grades and potential tonnages on this property, but it is most unlikely that sufficient tonnage can be developed to be economically mined in this area.

The geological investigations on the Ug Claims suggests that the showings are related to fault zones, and therefore are likely to be small and erratic, but the claim group is well-located relative to the Og Claims owned by Hudson Bay Exploration, and there is a possibility that continuations of the mineralization on their claim group could occur on the Ug. As well, a moderately intense soil geochemical anomaly on the north half of the claim group remains to be explained.

Several lead-zinc showings and a large geochemical anomaly occur on the Ale Claims, which received only the most cursory examination during 1975. On the Cloë Claims, zinc and lead geochemical anomalies and sphalerite mineralization occur in an area underlain by Helikian black shales. Much more work is needed to evaluate these claims. On the Gremlin Claims, chalcopyrite occurs in a massive conformable pyrite lens, in a pyritic conglomerate, and in cross cutting siderite veins. This property will be explored with detailed geologic mapping and hand trenching.

The Poo, Quak, Sourdough and FC claim groups were prospected and written off. The Bilbo, Didlo, Newt, Lingham, Magic and Eg claims were not worked

on during 1975. The status of all claim groups staked by the Reef Project in 1974 and 1975, as of December 31, 1975, is summarized in Table I.

2. Regional Work

The detailed work in the Coal Creek Dome area resulted in the discovery of several new showings, but only those on the Ug Claims were considered to be worth staking. The work in the "Rae Creek Dome" area lead to the staking of the Will and Vug Claims, and two or three other geochemical anomalies warrant additional investigation. Detailed sampling around Castle Ridge did not discover any new geochemical anomalies of major significance, but one zinc anomaly near the former Newt Claims requires prospecting. Numerous showings were detected by the geochemical work in the Fairchild Lake area. Some of these showings had already been staked by other companies, some were not considered to be worth staking, and three were acquired as the Ale, Cloë and Gremlin Claims. Showings of lead-zinc and of copper are common in this area, and at least two showings of uranium mineralization occur in association with copper and cobalt. The geology in this area is somewhat different from the balance of the Reef Area, with volcanics and black shales becoming dominant and, and a result, this area may warrant more detailed, geologically-oriented exploration during 1976.

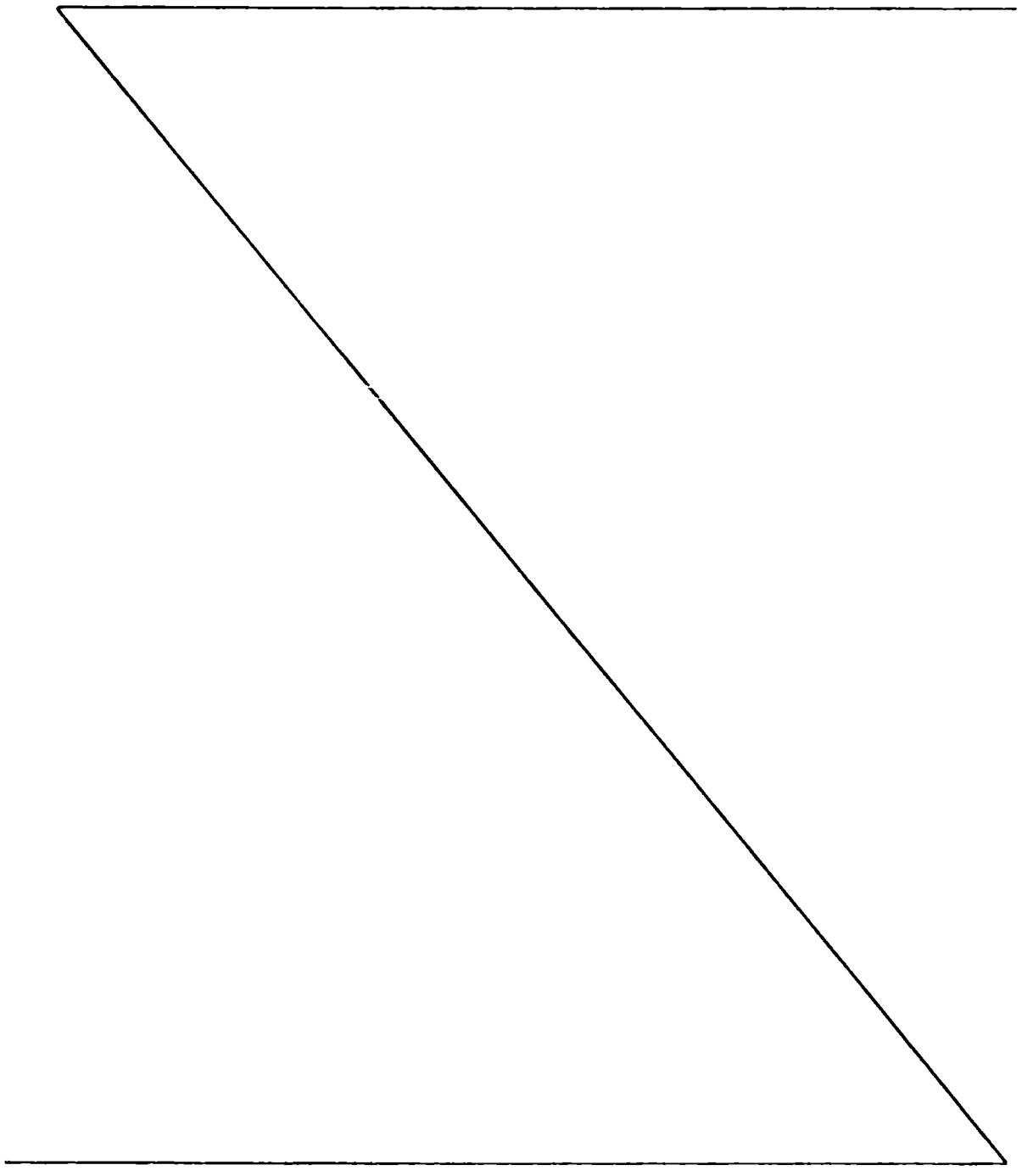
The Palmer Lake area produced disappointing results, with generally low geochemical backgrounds in all rock types, no anomalies of any significance, and no showings discovered. The Helikian age rock units in this area were thought to be similar to those of the Coal Creek Dome and Rae Creek Dome areas further west, but our results suggest that they are not similar at all, and there seems to be no justification for further exploration in these formations in this part of the Mackenzie Mountains.

The work in the Front Ranges of the Mackenzie Mountains took the form of geologic prospecting and familiarization, rather than blanket geochemical coverage. Three different rock units were considered to be of possible interest in this area. The evaporites and sediments of the Saline River and Mt. Cap Formations, of lower to middle Cambrian age, were considered to represent an environment of deposition suitable for the formation of sedimentary copper deposits. The Helikian Little Dal and H5 formations, which also include some evaporitic sequences, were also considered to be possible host rocks for sedimentary lead-zinc or copper mineralization. Finally, it was thought that the black shales of Paleozoic age in the Mackenzie Trough might have the same metallogenic potential as the black shales in the Selwyn Basin, west of the Mackenzie Arch.

One small occurrence of bedded copper mineralization was discovered in a sandstone formation within the Mt. Cap Formation, and black, pyritic shale members within this formation have moderately high contents of copper and lead, lending some support to the hypothesis that economic sedimentary copper deposits could occur in these Cambrian age rocks. In the Helikian rocks, one occurrence of bedded pyrite was discovered in a sequence of shales and siltstones within Unit H5, but there was not even geochemically significant amounts of base metals associated with this pyrite. A grab sample of Little Dal Formation silty dolomite, which was routinely analysed to determine geochemical backgrounds, proved to contain 0.18% copper as extremely fine-grained, disseminated chalcopyrite. No other work was done around the area where this sample was taken, so its significance is not known. Only one traverse was done in the Devonian black shales. The values obtained from silts and soils on this traverse suggest that these shales have a high metal background similar to the shales in the Selwyn Basin, so more

exploration may be warranted in the black shale basin on this eastern side of the Mackenzie Arch.

Sphalerite was found in a vein cutting Ordovician age black shales northwest of Dawson City. No sedimentary style mineralization or geochemical anomalies of major significance were discovered in this area.



DETAILED DISCUSSION OF 1975 EXPLORATION AREAS

1. Coal Creek Dome

Introduction

Five significant stratabound and breccia filling lead-zinc deposits were found in Helikian dolomite within the Coal Creek Dome during the 1974 field season. Hudson Bay Mining discovered and staked the Og and DEM claims containing galena-sphalerite mineralization in a tectonic dolomite breccia and low grade stratabound sphalerite-galena mineralization in black shales respectively. Dynasty (now Cyprus Anvil) staked the Kiwi claims with high grade smithsonite-galena veins; Tart claims containing high grade sphalerite in dolomite breccias and the Oz Group with sphalerite and galena mineralization in black argillaceous dolomite (with a probable sedimentary origin), as well as higher grade fillings in adjacent dolomite breccias.

Regionally, the 1975 mapping program successfully subdivided the Helikian dolomite in the Coal Creek Dome (units 2a and 2b on Dawson Map No. 1284A) into units relating to distinct environments of deposition. Lateral correlation of individual units was not difficult since most units have good aerial extent. Both tectonic and intraformational brecciation is prominent with general absence of solution collapse features. Most of the potentially economic mineralization occurs as breccia filling and as stratabound narrow bands in the oldest two dolomite units. It is also rumored that Mississippian Valley type lead-zinc mineralization has been found at depth on the Og Group which significantly adds more potential to the area.

Location and Access

The Coal Creek Dome, an eliptical shaped exposure of Helikian shale and dolomite, is situated in the northern portion of the Dawson mapsheet (N.T.S. 115 B and C). The base camp near the central area of the Dome is

roughly 50 miles north of Dawson. Access to much of the area is by helicopter from the base camp. All logistical support was by helicopter from Dawson or Clinton Creek.

Outcrop is abundant with vast amounts of talus and little vegetation cover. Weather during July and August is excellent with very low rainfall.

Regional Setting

The Coal Creek Dome, an east-west trending, 50 mile long eliptical uplifted area of Helikian shales and dolomites, is unconformably overlain by massive light grey Ordovician dolomite in the north and a thrusted block of Cambrian to Ordovician schists, grits, volcanics and black interbedded chert and argillite in the south. The units comprising the Coal Creek Dome represent the westward extension of the Hadrynian and Helikian sediments found in the curvilinear Mackenzie fold belt.

Major uplift occurred in the northern portion of the domal area along a roughly east-west trending anticline containing a core of black shale and argillite. Both limbs contain conformably overlying Helikian dolomite units although the north limb is largely covered by unconformably overlying massive Ordovician dolomite. Uplift along the southwest to west trending Mt. Harper fault formed another roughly east-west trending band of southerly dipping black shale, siltstone and argillite conformably overlain by dolomite. Submersion in the western and southern portions of the exposed domal area during Helikian to Hadrynian time formed a large blanket of unconformably overlying massive light grey dolomite.

Most dolomite units can be classed as the "blanket type" due to constant thickness and good aerial extent, probably indicating a gently sloping smooth platform or shelf environment. To date, only one rapid stromatolytic build-up

or reef has been noted.

Three major regional unconformities, produced by uplift to subaerial conditions, interrupted the carbonate depositional sequence during the Helikian within this area.

Major north-south compression appears to have caused the east-west trending fold axes and thrusts, as well as the predominant north-west trending faults, some of which have measurable right lateral movement.

Geology

The following descriptions summarize the weathering characteristics, rock types, bedding characteristics, internal structure, aerial extent, variations in lithology and probable environments of deposition of the various units mapped within the Coal Creek Dome. The units are believed to be in stratigraphic succession, although this presumption may be in error since there are only a few localities where "tops" were noted from stromatolytic rich beds.

Unit 1

Rocks of Unit 1 consist of dark grey to black weathering, thinly bedded, black to dark grey to tan, shale, argillite, siltstone and conglomerate. Dark dull weathering black shale and argillite predominate with intervals less than 10 feet thick of laminated siltstone often with graded bedding and irregular bands of conglomerate.

Although very limited mapping was done in this unit, two sub-units were noted within the upper-most portion near the contact with the overlying dolomites. Unit 1a, a light brown weathering, light brown to grey, thin bedded silty shale is prominent near the top of Unit 1 in the eastern

portion of the Dome. Thicknesses are variable but generally average 50 to 300 feet thick. A light brown weathering, massive bedded, tan to grey quartzite varying between 5 and 100 feet thick is also prominent in the upper portions of Unit 1, predominantly found in the southeast portion of Unit 1 exposures. Sections of Unit 1 were not measured but it is estimated that the thickness exceeds 3,000 feet.

Much of the area underlain by Unit 1 is mountainous with rugged steep faces and irregular sharp ridges. Talus is commonly angular due to strong jointing and axial planar cleavage. Dall sheep favour these exposures, probably because they offer protection rather than the limited vegetation.

Structural imprints, consisting of axial cleavage and tight high amplitude folds, often overturned to the north, trending roughly west to southwest, are common throughout Unit 1. The cleavage is generally at sharp angles (less than 30 degrees) to bedding.

Variations throughout this unit are common and with an absence of marker horizons, measurements of stratigraphic levels were not attempted. Deposition of various sized clastics probably represent a deep water reducing environment near the continental slope with frequent slumping of slope material. Quartzite beds near the top of Unit 1 probably are indicative of shallower water conditions caused by emergence of the continental mass to the east.



Mid-June photo of irregular dark grey to dull black weathering Unit 1 black shale, siltstone and argillite.

Units 2 and 3

Rock of Unit 2 consists of orange to tan weathering grey dolomite, fine to coarse grained dolomite conglomerate with re-crystallized pink calcite, tan finely bedded quartzite and brown to red shales. Lateral extent of this unit is very irregular and sporadic so it has been included into Unit 3 which is more predominent and of similar age. Unit 3 consists of jasper bearing quartzite and dolomite conglomerates, as well as shale. The following two sub-units have been separated due to thickness and aerial extent.

Unit 3a - a red to reddish brown jasper, dolomite, quartzite, and shale conglomerate with later fractures filled with quartz, specular hematite,

and minor chalcopyrite. Specular hematite is also found disseminated throughout the matrix of the conglomerate. Unit 3b - interbedded red jasper, tan quartzite and green shale with disseminated grains of pyrite within the quartzite. Interbeds vary in thickness from 1/8 inch to 3 feet but average 1/2 inch.

Units 2 and 3 resting unconformably on Unit 1, represent the first major regional unconformity in the Helikian exposed in the area. Bedding, when noted, was generally at low angles to bedding in Unit 1. Bedded jasper, quartzite and shale is prominent in the northeast area of the Dome, while the jasper bearing conglomerates occur in the west and south portions, suggesting a southwestward submergence. As can be noted on the accompanying "Regional Geology Map of the Coal Creek Dome", the exposures of Units 2 and 3 are very irregular and discontinuous, possibly indicating channel-type deposits rather than a continuous blanket. In the western portion of the Dome, dolomite units largely overlie black shale, also indicating the discontinuous nature of the conglomerates.

Thickness of Unit 3 is highly variable with measurements of over 400 feet made south of the Og Group. Deposition of the jasper, quartzite and dolomite represents an emergence in this area to shallow water conditions with iron and silica enrichment. The source of both silica and iron is likely volcanic. Continued rapid emergence to probable aerial conditions in the east produced conglomerates in the southwest area of the Coal Creek Dome.

Unit 4

Rocks comprising Unit 4 consist of grey weathering, dark grey to black massive to medium bedded crystalline limestone with interbeds of black chert and stromatolites. Bedding, particularly noticeable on weathered surfaces,

is outlined by carbon and silica content. This unit directly overlies Unit 1 and, in some instances, Unit 3. The lower contact with the shales shows a slight angular unconformity and consists of 10 to 300 feet of black limy shale with bright orange weathering dolomite beds (generally 2 to 4 feet thick) as distinctive markers. Unit 4 is lithologically very similar in all areas of the Coal Creek Dome, i.e. - a "blanket-type" carbonate. Bands of algal stromatolites less than 5 feet thick were found on the Tart claims in possible slump structures within the dark grey carbonaceous limestone.

Karsting or solution collapse structures were not noted, although they were reported in drill holes on the Og Group. Intra-formational breccias with little particle rotation and tectonic breccias with extreme fragmentation contain matrix fillings of secondary dolomite, calcite and often sporadic sphalerite-galena mineralization.

Low fracturing and jointing produces a coarse black, conspicuous weathering pattern noticeable for distances up to 5 miles. Thickness of Unit 4 varies between 200 and 800 feet but averages roughly 400 feet. Deposition of this carbonaceous limestone represents a period of submergence in this area probably to a shallow continental, even-sloped, continental shelf.



Good cross-section showing Unit 1 on right overlain by Unit 4 (grey weathering) in turn overlain by Unit 5 (smooth orange weathering) and that, in turn, overlain by a thick Unit 6 (rugged light orange weathering). Width of photo is estimated to be 1.5 mile.



Grey weathering Unit 4 in foreground underlying orange weathering Unit 5 further down the ridge. Similar section visible in the background on the left hand side of the picture. Central background underlain by Unit 10 - notice block of red weathering Unit 9a.

Unit 5

Orange weathering, dark and light grey interbedded dolomite with minor chert bands is the predominant rock type of Unit 5. Varying amounts of argillaceous material causes darkening of the dolomite. Major beds of black weathering argillite, shale and chert (Unit 5a) up to 20 feet thick were only noted on the Oz Group. Thickness of Unit 5 varies from 300 to 800 feet but averages roughly 500 feet. Orange weathering pattern is due to oxidation of very fine grained subhedral pyrite disseminated throughout the unit. Thin bands (< 1/4 inch) of light grey chert occur at various intervals and are conspicuous on weathered surfaces due to differential weathering. Fracturing is low with narrow fillings of quartz and secondary dolomite. Brecciation is rare and the only visible structural elements are large open folds.

Unit 5 weathers readily to blocky talus, so at distances areas underlain by this unit appear smooth. Black shale and argillite weathers recessively forming shallow linear depressions along hillsides and making actual outcrops rare. Vegetation, especially green moss and grass, thrives in areas underlain by Unit 5a.

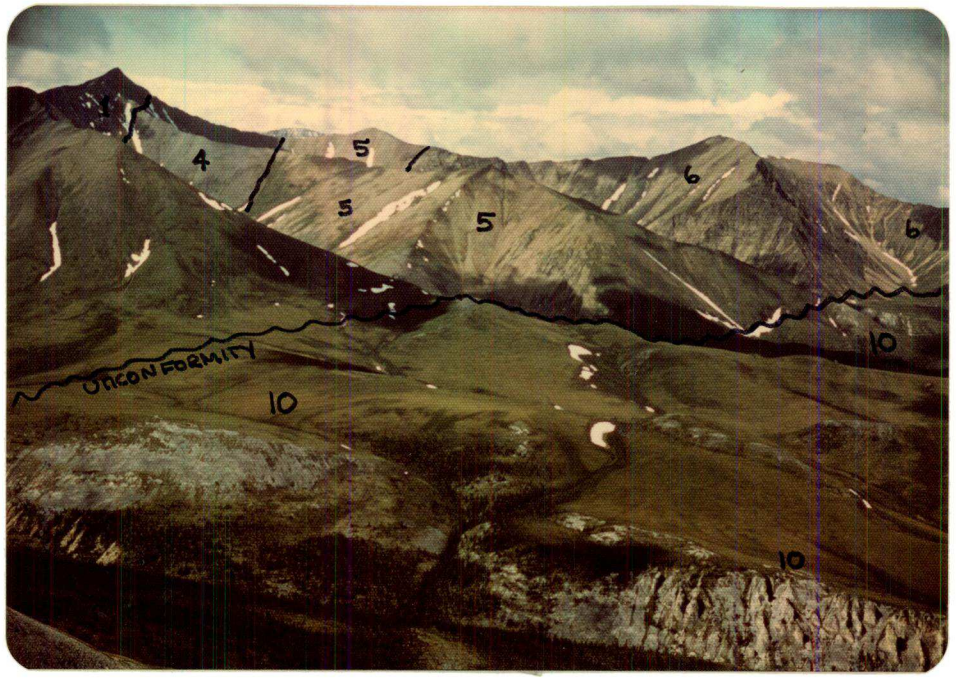
The orange weathering dolomite rests conformably on Unit 4 with a sharp contact zone. Thickness is relatively constant as is the lithology, indicating platform type deposition. Argillaceous rich beds common on the Oz Group are the only evidence of detrital material during this depositional sequence.

Possible algal stromatolitic beds occur in the orange weathering, black argillaceous dolomite with disseminated galena and sphalerite. Although the mineralization has been re-crystallized, it is believed to be of

sedimentary origin.



Syncline - Unit 4 underlying orange weathering Unit 5.



Unit 1 on the left overlain by Units 4, 5 and 6. Light grey weathering massive bedded dolomite in foreground unconformably overlies Helikian shale and dolomite.

Unit 6

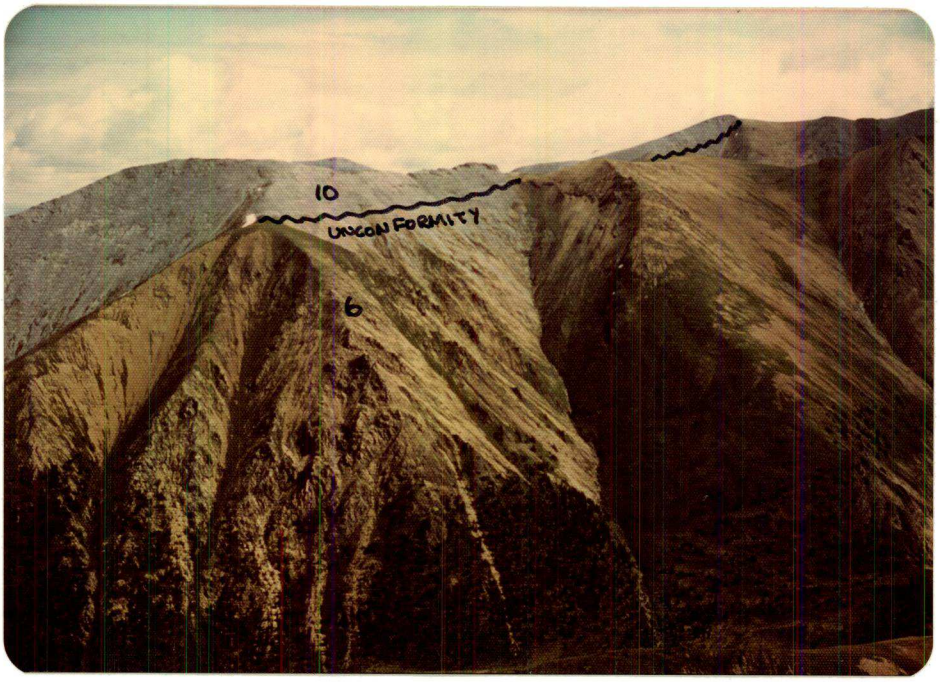
Rocks of Unit 6 consist of light orange to maroon to green weathering interbedded clacareous maroon and green shale with white to tan crystalline dolomite. Pale orange weathering interbedded shale and dolomite predominates and it is estimated that it forms 80 percent of Unit 6. Maroon weathering bands of maroon calcareous shale with thicknesses over 300 feet are common throughout the unit. Interbeds of the shale and dolomite are consistent within Unit 6 and average 1/2 to 1 inch thick. No definite depositional trends of either shale or dolomite were apparent while mapping sections of this unit. Unit 6 varies from 300 to over 1,500 feet thick, averaging roughly 600 feet, and lies conformably on darker orange weathering Unit 5.

Mountainous areas underlain by Unit 6 are commonly irregular, jagged and steep, with a minor amount of talus. The light orange weathering pattern is due to fine grained pyrite disseminated in the crystalline dolomite. Differential weathering produces ribs of shaly material.

Small scale folding with amplitudes of less than 1 inch is common throughout the unit. Large west to southwest broad, low amplitude folds were noted on the Tart Group and in the eastern portion of the domal area. Tight overturned folds probably account for the great thickness of Unit 6 at the headwaters of Mt. Harper Creek. On the Oz and Dem claims, fresh surfaces of interbedded calcareous shale and crystalline dolomite are dark and light grey respectively, due to increased carbonaceous material. Abrupt thickness changes and large displacements are caused by the many northwest and northeast trending faults.

The depositional environment for Unit 6 was likely very similar to that of

Unit 5, with an addition of detrital material. Changes in sea water chemistry are indicated by the maroon and green shales.



Rugged light orange weathering Unit 6 unconformably overlain by light grey weathering Ordovician dolomite.

Unit 7

The major rock type in Unit 7 is a buff weathering, light grey to tan massive bedded to crystalline dolomite with arenaceous and stromatolytic beds. On the Oz claims, Dickinson (1975 Report, Oz Group) has noted four prominent sub-units; Unit 7a - a buff weathering, grey to light brown quartzite to arkose, marking the unconformable base of Unit 7; overlain by Unit 7b - buff to tan weathering interbedded chert and dolomite; and in turn overlain by the bulk of Unit 7. Near the top of Unit 7, the following two sub-units are prominent: Unit 7c - black weathering, black thin bedded

graphitic shale, argillite and chert; and Unit 7d - a dark grey weathering, dark grey to black massive crystalline limestone.

Total thickness of Unit 7 on the Oz claims is estimated to be 800 to 1,500 feet thick. Laterally, this unit appears to thin abruptly to roughly 200 to 400 feet thick. Thick stromatolytic beds over 100 feet thick with individual stromatolytes over 6 feet in diameter represent a rapid reefoid type build upon the Oz claims.

Unit 7 buff weathering dolomite appears to conformably overlie Unit 6 in the northwest portion of the Coal Creek Dome but, in the northwest corner of the Oz Group, interfingerings of Units 6 and 7 suggest a rapid facies change from platform to reef type environments of deposition.

Tectonic brecciation and fracturing is prominent in this unit. Fragments have little to no rotation and all fracture fillings and matrix is orange weathering ferruginous calcite and often pyrobitumen. Breccias adjacent to the facies boundary in both Units 6 and 7 on the Oz claims often have galena-sphalerite mineralization with the calcite gangue. Open spaces produced by tectonic fracturing and brecciation hosting much of the lead-zinc mineralization on the Oz claims are small compared to the large but absent features formed by karsting. Porosity of Unit 7 is generally higher than in the underlying units.

Units 7c and 7d are restricted to the area southwest of the Oz claims where the thickest accumulation of Unit 7 occurs. Thickness and distribution of Unit 7 indicates the present of northwest trending reef in the southwest corner of the Coal Creek Dome.



Light orange weathering Unit 6 and
buff weathering Unit 7 on Oz Group.

Unit 8

Buff weathering, medium to dark grey cherty dolomite was mapped as Unit 8. Southwest of the Oz Group, the stratigraphically lower section of Unit 8 was subdivided into the following sub-units. A tan weathering, pale grey to tan arkose to quartzite, Unit 8a, unconformably overlies Units 7c and 7d. Unit 8a is overlain by dark grey weathering, dark grey to black dolomite with cherty and quartzitic intervals, Unit 8b, which is in turn overlain by Unit 8c, buff weathering, massive bedded light brown to medium grey siliceous dolomite. A band of buff to light green weathering, thin bedded grey argillaceous quartzite, Unit 8e, occurs near the top of Unit 8. The top of Unit 8 is undefined due to the large overlying regional unconformity. A measured section southwest of the Oz Group, where the largest exposure of Unit 8 occurs, yielded a thickness of roughly 1,000 feet.

Unit 8 buff weathering siliceous dolomite is confined to the south and west limits of the Coal Creek Dome. Bedding trends east-west and dips 30 degrees south in the southern exposures and trends northwest-southeast and dips 35 to 45 degrees to the southwest in the western outcrops.

The weathering characteristics of Unit 8 are very similar to those of Unit 7 such that the two units cannot be separated without detailed observations. Deposition of Unit 8 likely occurred in a shallow water near shore environment.

Unit 9

Unit 9, consisting largely of black to dark grey recessive weathering green to black thin bedded shale, argillite and siltstone, with minor orange weathering dolomite beds, marks a regional unconformity in the south and west portions of the Coal Creek Dome. Thickness of this unit varies from 50 to 400 feet, averaging 200 feet. In the western area, a discontinuous bed, roughly 50 to 100 feet thick, of dark red weathering arkose to quartzite, Unit 9a, occurs within the shale. Mud cracks noted at several localities near Unit 9a suggest very shallow to sub-aerial environments during this depositional sequence. The stratigraphic position of Unit 9a is consistently 50 feet from the base of Unit 9 in the western area of the dome. At one locality, south of the Od Group, red weathering quartzite directly overlies Unit 7 dolomite.

Thickness of Unit 9 decreases eastward. In the south-central area, the shale is absent and the unconformity is marked by Unit 9a, roughly 100 to 200 feet thick. Further eastward in Seela Pass, Unit 9a is also absent, leaving massive light grey weathering dolomite of Unit 10 unconformably overlying Units 4 and 5.

Bedding consistently trends northwest dipping 30 to 40 degrees to the southwest throughout this unit. Outcrop is generally poor due to recessive weathering. Vegetation cover is abnormally high probably caused by good soil development.

Polished bedding surface in graphitic rich beds possibly indicate some thrusting of Units 9, 10 and 11 over younger rocks. The displacement, related to post-Ordovician thrusting, was not estimated but it is expected to be minimal.

Deposition of clastic material into shallow water with both reducing and oxidizing environments and repeated emergence to sub-areal conditions, as suggested by the mud cracks, indicate an arid shoreline depositional environment.

Unit 10

Rocks comprising Unit 10 consist of massive to thick bedded, light grey weathering, light grey to white crystalline dolomite with minor arenaceous rich beds. The dolomite rests conformably on Unit 9 shale and varies in thickness from 500 to 800 feet. Thickness increases to the east. Bedding trends northwest and dips 30 to 40 degrees to the southwest.

A red weathering quartzite bed, roughly 8 miles long, located in the south-central area of the Coal Creek Dome, occurs near the top of Unit 10. With the exception of the red weathering quartzite, Unit 10 lacks significant markers or notable horizons.

In most regions, Unit 10 underlies Unit 11 but, north of the Oz claims, Unit 10 also appears to overlie Unit 11. This phenomena may be due to one of the following; an unrecognized, overturned syncline; a block of Unit 10 thrusted

over Unit 11; or a repetition of depositional environment. Since little economic mineralization was noted in Unit 10, detailed mapping was not undertaken in complex areas, i.e. north of the Oz Group.

Unit 10 weathers readily to small boulder size, sub-rounded talus which appears as smooth hillsides from a distance. Cliffs and jagged peaks are rare. Brecciation and small scale fracturing is absent.

Dark grey weathering, dark grey massive bedded crystalline dolomite, located in the central area of the dome, was mapped as Unit 10a since it appeared to unconformably overlie Units 1 and 3. It is now thought that it is equivalent to Unit 4.

Unit 10, also a "platform type", was likely deposited during stable conditions in a shallow water continental shelf environment with small influx of arenaceous material.



Light grey weathering Unit 10
on south side of Seela Pass.

Unit 11

Light grey to white weathering, white to light grey massive siliceous dolomite, mapped as Unit 11, conformably overlies Unit 10. Although sections were not measured, thickness of this unit is estimated to be between 1,000 and 2,000 feet. Silica content is largely interbedded chert and quartzite, as well as quartz fillings in dolomite breccia. Thickness of this unit decreases eastward and forms thick interbeds of cherty dolomite in Unit 10.

North of the Oz Group, two distinct beds of purple, pink, grey and white massive chert, Unit 11b, as well as black weathering, black oolitic limy chert and shale, Unit 11a, occur near the top of Unit 11. North of the Dem claims, black oolitic chert and shale appears to form the basal portion of Unit 10 marking a slight angular unconformity, with the underlying Unit 11. Due to lack of outcrop and exact measurements, the unconformity was not recognized north of the Oz claims.

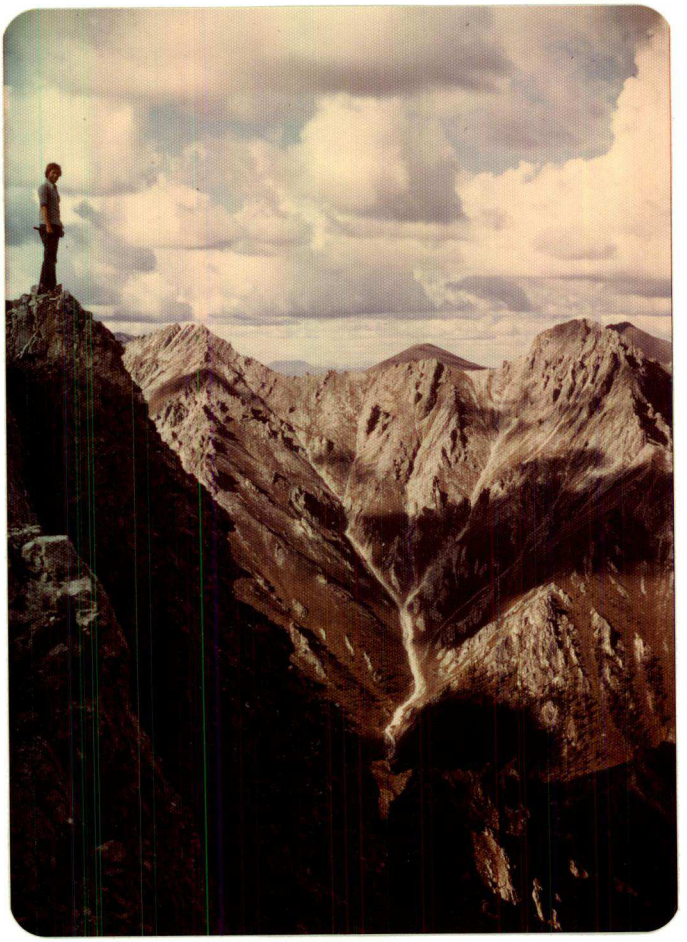
Areas underlain by Unit 11, being resistant to weathering due to high silica content, are generally mountainous, rugged, irregular with many cliff faces and have small amounts of talus. Outcrops and rock faces contain sharp and irregular surfaces, formed by differential weathering, which quickly disintegrate boot soles.

Bedding, similar to underlying Unit 10, trends northwest and dips 30 - 40 degrees to the southwest. Most exposures of Unit 11 occur to the west and south of the area mapped.

The environment of deposition of Unit 11 is probably similar to that of Unit 10 with a large influx of siliceous material and chemical precipitation of chert.



Rugged weathering cherty dolomite (Unit 11) unconformably overlain by Unit 10.



Rugged weathering light grey cherty dolomite (Unit 11).

Unit 12

In the southwest limit of the map area, a light brown to buff weathering dolomite boulder conglomerate overlies Unit 11. According to G.S.C. Memoir 364, this unit is 300 feet thick at this locality but increases to over 2,000 feet towards the northwest.

Unit 13

Light grey to white weathering, competent, massive to thick bedded light grey crystalline dolomite to limestone was mapped as Unit 13. Although no fossils were noted by the writer, the unit is believed to be Ordovician, equivalent to Unit 8 on G.S.C. Map 1284A.

Unit 13 unconformably overlies Units 1 to 7 and forms the northern edge of the Coal Creek Dome. In both the eastern and western localities, the Ordovician dolomite trends roughly east-west and dips 10 to 25 degeees to the north. In the northeast region of the mapped area, this unit is often flat lying. Very little mapping was done in Unit 13.

Unit 14

Orange to brown weathering, green diorite to gabbro dykes, mapped as Unit 14, of probable lower Cretaceous age, occur in north and northeast trending faults. The dykes are commonly 5 to 50 feet thick and often snake-like in appearance. Unit 14 weathers to cubic blocks with bright orange lichen growth on exposed surfaces.

Mineralization is commonly disseminated pyrite with traces of chalcopyrite. Contact metamorphism along the contacts of the dykes has produced deodolomitization of Units 4 to 7 - a white bleached halo, generally less than tens of feet from the dyke wall, composed largely of secondary calcite and minor amounts of an apple-green unidentified mineral.

The following table summarizes the comparison of geologic units:

Age	Cyprus Anvil	G.S.C.
Helikian	1	1
	2 - 8	2b
	9 - 11	2c
	12	2d
Ordovician	13	8
Lower Cretaceous	14	20

Structural Geology

The structure of the Coal Creek Dome does not appear to be a simple domal uplift but a complex history of repeated uplifts, folding and faulting.

Much of the tight folding in Unit 1 and broad open folding in Units 4 to 8 occurred before the Ordovician. The Mt. Harper fault, with possible northward thrust movement, also pre-dates the Ordovician dolomite. No age is estimated for displacements on northwest trending faults but north and some northeast trending structures displace Ordovician units and contain Lower Cretaceous dykes, thus they are probably Cretaceous or slightly earlier faults. The complex pattern and discontinuity of units is largely due to intense faulting.

This area has undergone many periods of uplift, as evidenced by the number of unconformities. During the Helikian, three uplifts are indicated by Units 3, 9 and 12. Major uplift forming the elliptical dome likely occurred during the early Ordovician when a great thickness of Hadrynian to Cambrian material was stripped off, followed by submergence and deposition of the Ordovician dolomite.

Economic Geology

Three potentially economic modes of zinc-lead mineralization were discovered in Helikian dolomite within the Coal Creek Dome. Probable "sedimentary type" bedded lead-zinc mineralization was noted in argillaceous stromatolytic dolomite, Unit 5a, on the Oz and Dem Groups; tectonic breccias and shear zones containing a matrix of secondary calcite and sphalerite or galena were discovered on the Kiwi, Tart, Oz, Og and Ug claims in Units 4 to 7, and rumoured "Mississippi type" colloform banded sphalerite and galena was found at depth in Unit 4 on the Og Group. Copper mineralization, primarily chalcopyrite, occurs as irregular blebs in dolomite and jasper bearing conglomerates, as well as in veins and shear zones with siderite.

High grade smithsonite and galena mineralization, located in shear zones within light grey dolomite of Unit 10, appears to have insufficient tonnage potential themselves in this remote area, but may represent re-mobilization from larger deposits at depth in Units 4 and 5. The best showing on the Kiwi claims has a known width of 35 feet grading 35 percent combined lead and zinc with 3.5 ounces per ton silver. Estimated length of mineralization is 500 feet. Considering an average width of 10 feet for a depth of 300 feet, this structure could contain roughly 150,000 tons with a gross metal value of approximately $30,000,000 at present metal prices. The Waz showing, located 6 miles southeast of the Oz Group, also contains high grade smithsonite-galena mineralization in a northeast trending fault zone. The showing has a maximum width of 5 feet and is roughly 50 feet in length.

Stratabound, low grade, disseminated, fine-grained sphalerite-galena mineralization in a thin (less than 3 feet) bed of light orange weathering, dark grey stromatolytic argillaceous dolomite, noted as showings numbers 2, 3, 7 and 9, extends discontinuously over a two mile strike length on

the Oz claims. This narrow bed occurs adjacent to a probable facies change of reef type rocks and possibly represents algal mat development in a back reef inter-tidal environment. A mineralographic study by Rob Carne of sulphide textures of mineralized samples from the Oz claims is included as Appendix I.

Intraformational and tectonic breccias and fracture zones, having large fragments and minor secondary dolomite or calcite fillings with either sporadic and irregular red brown to yellow sphalerite or galena, occur in Units 6 and 7 adjacent to the stratabound mineralization. It is thought they were formed by late remobilization into open space fillings from the proposed "source-bed". It is interesting to note that it is rare to find both galena and sphalerite in equal proportions in the breccia zones; showing No. 12 contains two stages of sphalerite mineralization and showings 1, 8, 10 and 11 are largely galena. Fragments of dolomite in the breccias are commonly bleached or altered suggesting warm ore bearing fluids. A fault zone in black carbonaceous shale, Unit 5a, in Wiz Creek, contains high grade galena and sphalerite, is also related to late stage migration of fluids. Details of Oz Group mineralization may be noted in the "Geology, Geochemical and Diamond Drilling Report on the Oz Claims".

Impressive two-stage, red-brown and honey yellow coloured sphalerite occurs with secondary dolomite and pink ferruginous calcite in a 1,600 foot long breccia zone in Unit 4 dolomite to limestone on the Tart Group. The breccia roughly parallels bedding, suggesting an intraformational breccia. High grade zones occur in breccias with algal blocks oriented at high angles to bedding. It is thought that the blocks represent slumps from an adjacent reef complex. Minor irregular blebs of galena occur in fractures within Unit 4 in the north portion of the Tart claims also indicating a

zoning pattern similar to that found on the Oz Group.

Galena and pyrite mineralization in an east-west trending tectonic breccia within Unit 4 was found by Hudson Bay Mining and staked as the Og claims. Good grade colloform red-brown and yellow sphalerite found at depth during their drilling program suggests open space filling in solution cavities similar to "Mississippi Valley type" deposits. The cavities may have been produced during uplift as indicated by the overlying unconformity, Units 9 and 9a.

Initial work on the Ug Group has outlined a breccia zone in Unit 7 dolomite with pyrite, galena and secondary dolomite fracture fillings. Roughly 1,000 feet to the north, another irregular breccia contains yellow sphalerite over narrow widths.

Minor irregular sporadic blebs of galena were discovered in fractures in Unit 4 limestone and were not staked. An unknown competitor staked the area as the Od Group.

Copper mineralization, consisting of fine-grained disseminations of chalcopyrite with pyrite in banded jasper and quartzite, irregular blebs of chalcopyrite with specular hematite in fractures and clots in jasper bearing conglomerates or breccias, and large blebs of chalcopyrite interstitial to siderite in veins, was discovered in Units 2 and 3. Mineralization was prominent although not restricted to jasper bearing conglomerates in the northeast portion of the dome. The Das and Id claims appear to be staked on copper showings.

Potentially economic lead-zinc mineralization occurs in Units 4 to 7. Unit 4 dark grey dolomite to limestone hosts the Og and Tart showings and should

be the prime target for further detailed exploration. If the Unit 9 unconformity was responsible for the karst and solution features hosting mineralization on the Og Group, this feature should be considered an excellent exploration parameter and used in further follow-up. Two other areas where Unit 9 rests unconformably on Unit 4 are located 2 miles southeast of the Das claims and 4 miles east of the Oz Group. Other specific areas where solution features may exist possibly occur in the top of Units 6, 7 and 8 where they are directly overlain by the red weathering quartzite. Two prominent locations are southwest of the Oz-Dem claims and 4 miles northeast of the Oz Group.

It is also interesting to note that all major mineralization occurs adjacent to strong northwest trending fault zones which may have served as channelways for metal bearing solutions.

Potentially economic lead-zinc mineralization is located in the southwest portion of the Coal Creek Dome where a facies change between "platform type" and "reef type" carbonates occur. Helikian reefs are absent in the central and eastern portions of the Dome.

Excluding the Og Group, all mineralized breccias found to date are generally small and irregular in outline with segregated high grade zones but with low grades overall. Open spaces were narrow and were totally filled with secondary dolomite and minor mineralization. High tonnage and grade possibilities of these deposits seems limited.

Large solution features host for major mineralization on the Og Group should encourage us in further follow-up on the Ug claims and in other potentially interesting areas previously mentioned in the western region of the Coal Creek Dome.

Geochemistry

Geochemical values have been plotted at scales of 1 inch to 1 mile, 1 inch to 2,640 feet, and 1 inch to 1,320 feet, depending on the density of sampling coverage. Reconnaissance scale stream sediment sampling is plotted on N.T.S. mapsheets at a scale of 1 inch to 1 mile, and maps at this scale are stored in Cyprus Anvil's "One Mile Files" and are not included with this report. Reconnaissance coverage was carried out during 1975 on portions of mapsheets 116 B 1, 9 and 10, and part of mapsheet 116 C 9. In addition to these one-mile mapsheets, geochemical values are plotted in the following figures:

Figure 11: Coal Creek Dome, 116 B:
Geochemical Values, 1975. Scale 1":2,640'.

Figure 12: Ug Claims Detail Area, 116 B 13 and 116 C 16:
Geochemical Values. Scale 1":1,320'.

Figure 13: Detail Area, 116 B 12 and 13:
Geochemical Values. Scale 1":1,320'.

All geochemical samples collected in the Coal Creek Dome area were analysed for copper, lead and zinc by Acme Analytical Laboratories at Dawson City. The analytical procedure used for these samples, and for all samples collected by the Reef Project during 1975, involved the following steps:

1. Air drying in Kraft paper bags.

2. Sieving to yield a -80 mesh fraction. In the case of rock samples, the rock was crushed to -80 mesh size.

3. Digestion for 20 minutes in hot nitric-perchloric acid.

4. Analysis for copper, lead and zinc using an atomic absorption instrument.

This analytical procedure is essentially a "total extraction" method which liberates all metal ions from the sample, including those bound in silicate minerals.

General Summary

Coal Creek Dome has now been quite thoroughly explored by geologic mapping, geochemical sampling, and prospecting, and all mineral showings that can be found by these methods have been found and are either staked or written off. Some further work is required on the Oz claim group to fully understand the relationships between the various types of mineral showings found there. The diamond drill results on the Oz were disappointing, but they only tested a portion of the mineralization on the claims. The Kiwi claims are also still of interest because of the high grades of mineralization and because of the location close to the Dempster Highway. Both of these claim groups have five years of assessment work recorded, so further work can be postponed for a season or two, if necessary.

2. "Rae Creek Dome"

This uplifted area of Helikian rock formations is centered on mapsheets 116 A and 106 D, north of Mayo. The geology is very similar to Coal Creek Dome except that the dolomites of Unit 2 are somewhat less abundant, being restricted essentially to a band a few miles wide along the southern fringe of the Dome area, and extending southeastward to Kathleen Lakes at the eastern edge of mapsheet 106 D.

Geology

No geologic mapping was carried out in this area, except for mapping on the Vug and Will claim groups. The best available geologic maps are Maps 1283A and 1282A, accompanying Geological Survey Memoir 364, L. H. Green, 1972.

Geochemistry

Reconnaissance scale silt sampling was carried out on portions of mapsheets 116 A 7, 8, 9, 10, 11, 15 and 16, and portions of mapsheets 106 D 5, 7, 8 and 12. These sample positions and results are plotted at a scale of 1 inch to 1 mile and are filed in Cyprus Anvil's "One Mile Files". In addition, detailed sampling was carried out in a number of areas, and the values and sample positions are plotted in the following figures:

Figure 14: Vug Claims Detail Area, 116 A 9:
Geochemical Values. Scale 1":1,320'.

Figure 15: Detail Area, 116 A 9:
Geochemical Values. Scale 1":1,320'.

Figure 16: Detail Area, 116 A 11:
Geochemical Values. Scale 1":2,640'.

Figure 17: Detail Area, 116 A 16:
Contour Soil Lines. Scale 1":2,640'.

Figure 18: Detail Area, 106 D 5:
Contour Soil Lines. Scale 1":2,640'.

Figure 19: Detail Area, 106 D 7:
Contour Soil Lines around Will Claims.
Scale 1":2,640'.

Figure 20: Detail Area, 106 D 12:
Contour Soil Lines. Scale 1":2,640'.

All geochemical samples collected in the Rae Creek Dome area were analysed by Acme Analytical Laboratories at Dawson City, using the standard analytical procedure.

Mineral Occurrences

Mineral deposits known to occur in the Rae Creek Dome area include a stratiform massive sulphide copper-zinc deposit, vein and breccia type lead-zinc mineralization in dolomites, and minor copper showings in shales. Our work resulted in the discovery of two lead-zinc deposits in carbonates which were staked as the Vug and Will claims.

The massive sulphide deposit of Hart River Mines consists of a pyrite lens with minor chalcopyrite and sphalerite, conformable to the cleavage in the enclosing shales. A detailed examination of mineralized shale at the periphery of the deposit suggests that the mineralization was originally conformable with the bedding in the sediments, but was mobilized into the nose of a fold during metamorphism. This property has been explored with an adit and several thousand feet of diamond drilling, which have proven up 600,000 tons of ore at a grade of 1.45% copper, 3.5% zinc, and a trace of lead. This is the only known deposit in the Rae Creek Dome area with massive sulphide characteristics. It is interesting to note that the stream draining this mineral showing is not geochemically anomalous, probably due to the strong acid pH of the water. Limonite staining is prominent in the stream for a distance of a mile below the mineralized outcrops.

The Vug claims and the Will claims cover showings of sphalerite and galena which are similar to the types of mineralization that occur in Coal Creek

Dome. On the Vug claims, very low grade sphalerite mineralization in black argillaceous dolomites has been mobilized into cross cutting fractures and brecciated areas to form higher grade pods. One sample of galena from a vein a few inches wide assayed 99 oz. of silver, unusually high compared to most of the other lead-zinc occurrences in the Reef area.

Several strong fault zones mineralized with sphalerite and galena cross the Will claims. The best fault zone has been traced along strike for 2,000 feet and down dip in surface outcrops for 350 feet. The average widths and grades in this main zone suggest that at least 1 million tons of ore containing 10% combined lead and zinc are present. Narrower fault zones, which parallel this main zone, are also well-mineralized with lead and zinc. The mineral showings on the property assay moderately low in silver: a ratio of 1 oz. of silver to 2% lead is typical. Some geochemical anomalies on the north half of the Will claims have not yet been prospected, and a thorough evaluation of grades and widths should be undertaken on the main fault zone mineralization.

A number of geochemical anomalies elsehwere in the Rae Creek Dome area warrant further work in the form of prospecting or detailed geochemical sampling. This work is likely to take a few days for a crew of four to complete.

Summary

A few days of regional follow-up and a few days of geological work on the Will claims will complete the work in the Rae Creek Dome area. When this has been done, it will be safe to assume that no significant showing with a geochemical expression in silts has been missed. This does not mean, however, that the area will have been "written off", since the most

interesting style of mineralization that occurs in the area, the Hart River Mines massive sulphide deposit, does not produce stream sediment geochemical anomalies. Further exploration for this type of deposit would require an exploration program with the following steps:

1. detailed mapping around the deposit to determine its geologic environment,

2. geologic mapping of all the Helikian age rocks on 116 A and 106 D to look for similar environments,

3. gossan prospecting by air, and

4. soil and water sampling in areas of favourable geology.

A program of this type would require about four to six weeks to complete, using a crew of two geologists and two samplers, with full time helicopter support. As a first step toward such a project, it may be useful to compile all stream sediment data and mineral showing locations onto an enlarged geological base map.

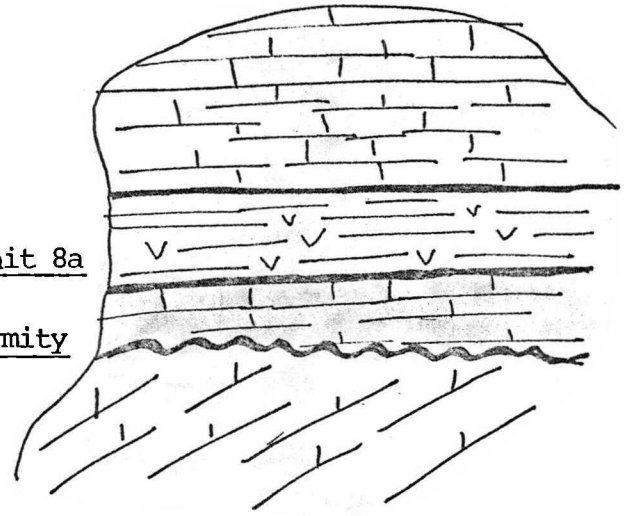
3. Castle Ridge

Castle Ridge is a small area in the west-central part of mapsheet 106 D which received some detailed work during 1974 and again during 1975. Silver bearing galena veins have been known in the area since 1914, and breccia zones and galena were discovered by the Reef Project during 1974, and staked as the Newt and Lingham claims. Geochemical sampling in the form of contour soil sample lines were completed around Castle Ridge during 1975.

Geology

No geologic mapping was carried out in this area by the Reef Project in

1974 or 1975. G.S.C. Map 1282A indicates that the geologic column in the area consists of the following formations:



Unit 2 consists of buff to orange weathering, pale green to grey algal dolomite, similar to other areas of Unit 2 in Rae Creek Dome and Coal Creek Dome. In the Castle Ridge area, it is cut by many wide diabase dikes. Unit 8 consists of massive, medium grey dolomite with few fossils. Unit 8a is an interesting formation of Middle Ordovician age, consisting of very fossiliferous black shales, tuffs, and volcanic breccias. Volcanic material in Ordovician miogeoclinal rocks is quite unusual in the Reef area. The formation is a few hundred feet thick.

Geochemistry

Geochemical values for samples taken around Castle Ridge are plotted in Figure 21. Samples were analysed for copper, lead and zinc in the usual way by Acme Analytical Laboratories at Dawson City. About one half of the samples were also analysed for silver, because of the presence of argentiferous galena and tetrahedrite showings and reported float occurrences at the east end of the ridge.

Mineral Showings and Geochemical Anomalies

Silver bearing galena and tetrahedrite veins were discovered in the Castle Ridge area shortly after the discovery of the United Keno Hill deposits in the early 1900's. The veins occur in Unit 2 dolomites close to contacts with diabase dikes. None of the known veins ever proved to contain many tons of silver ore, but there were rumors of high grade tetrahedrite float being found on Carpenter Ridge which assayed 1,100 oz. of silver per ton. Because of these rumors and because of the possibility of better grade veins sub-outcropping under overburden, we felt it was worthwhile to analyse our samples for silver, as well as copper, lead and zinc.

Preliminary work in the area during 1974 resulted in the discovery of several large veins and one breccia zone mineralized with pale yellow to brown sphalerite and galena. These showings, which contain no silver, were staked as the Newt and Lingham claims. The showings occur in Unit 8 dolomites immediately below the contact with Unit 8a shales and pyroclastics. The breccia showings looked quite small and, as a result, further work on the claims was regarded as low in priority. In fact, the claims lapsed before any additional work could be done.

Several small showings of galena and sphalerite were discovered in brecciated portions of Unit 2 dolomites during 1974. All are very minor occurrences and none were investigated further during 1975.

The sampling carried out this year was mainly intended to test for larger breccia type zinc-lead showings in the area. The work has outlined a zinc anomaly just west of the Newt claims, which is much stronger than the one resulting from the Newt showings, and which may therefore be reflecting more interesting mineralization. This geochemical anomaly was not prospected

during 1975. Two or three other anomalies in lead and zinc were also discovered which warrant a day or two of prospecting. No significant silver geochemical anomalies were found, and even the creeks draining known silver showings are only weakly anomalous in silver.

Summary

A few days of work will complete the prospecting coverage of Castle Ridge. If no new showings are discovered which are better than the showings found up to now, then no additional work is recommended for the area.

4. Fairchild Lake Area

The area of Helikian rock formations covered from the Fairchild Lake camp includes portions of mapsheets 106 C, D, E and F. These older rock units include black, sooty shales and acid volcanic rocks in this area, as well as the more usual brown shales and buff to orange weathering dolomites. Work carried out in the area included reconnaissance silt sampling, detailed contour soil sample lines in certain anomalous areas, prospecting, and examination of several showings. The Ale, Cloë and Gremlin claim groups were staked on mineral discoveries in the Fairchild Lake area.

Geochemistry

Reconnaissance silt sampling was carried out on portions of 1 mile mapsheets 106 C 12, 13, and 14; 106 D 9, 10, 15 and 16; 106 E 1, 2, 7, 8 and 9, and 106 F 2, 3, 4, 5, and 6. All samples were analysed for copper, lead and zinc at Dawson City, using the usual procedure. In addition, most of the samples on mapsheets 106 D 16, 106 E 1 and 106 E 2 were analysed for cobalt, arsenic, nickel, vanadium and uranium. These results are plotted on separate geochemical values maps in the Cyprus Anvil "One Mile Files". The histograms in Figure 22 indicate the range of values obtained for these five elements.

Areas of detailed geochemical sampling are plotted in the following figures:

Figure 23: Detail Area, 106 C 12:
Geochemical Values. Scale 1":2,640'.

Figure 24: Detail Area, 106 C 12:
Geochemical Values. Scale 1":2,640'.

Figure 25: Detail Area, 106 C 13:
Geochemical Values. Scale 1":2,640'.

Figure 26: Detail Area, 106 D 16:
Geochemical Values. Scale 1":2,640'.

Samples anomalous in cobalt and arsenic correlate well with known showings of cobaltite mineralization associated with copper-siderite-barite-hematite veins in Unit 1. Higher values in uranium do not correlate in any obvious way with known showings or rock units but the geology and rock geochemistry of the Helikian strata in this area have never been investigated.

Geology

The geology on all mapsheets in the Fairchild Lake area has been mapped in a preliminary way by the Geological Survey. Pertinent G.S.C. publications are the following:

Mapsheet 106 D - G.S.C. Memoir 364, L. H. Green, 1972.

Mapsheet 106 C - G.S.C. Open File 205, S. Blusson, 1974.

Mapsheet 106 E and F - G.S.C. Open File 279, D. K. Norris, 1974.

The usual Helikian stratigraphic pattern with a predominantly dolomite upper

unit conformably overlying a predominantly clastic lower unit still applies in much of this area. North of Fairchild Lake, however, a thick sequence of rhyolitic volcanics and black shales appear which may underlie the more typical brown and grey shales of Unit 1. These shales and volcanics, which have been lumped into Unit Ho by D. K. Norris, may be as old as Aphebian, (S. Blusson, personal communication), and may be of considerable metallogenic importance in this part of the Ogilvie Mountains.

Mineral Showings:

Mineral showings examined in the area include zinc-lead mineralization in Unit 2 dolomites, zinc-lead mineralization in Unit Ho black shales, and copper cobalt, and occasionally uranium associated with siderite, hematite, barite and pyrite in veins and lenticular bodies in the older shales, tuffs and volcanics.

The zinc-lead showings in Unit 2 dolomites are essentially similar to the zinc-lead mineralization elsewhere in the Unit 2 dolomites in the Ogilvie Mountains. Numerous breccia zones related to faults occur in the Bonnet Plume River valley in the northwest corner of mapsheet 106 C. Pyrite is the most important sulphide mineral in these fault breccias, with sphalerite and galena less abundant. This type of mineralization occurs on the CORD, DTG, QM, LAD and ALE claim groups. On the ALE claims, a zinc-lead geochemical anomaly 1,800 feet long follows a probable fault zone. Sporadic showings of sphalerite, galena and pyrite in dolomite breccias occur within the area of the soil anomaly.

Sphalerite-bearing float was found in two creeks draining a thick black shale member of Unit Ho on mapsheet 106 E 2. Both creeks are strongly anomalous in lead and zinc and the Cloë claims were staked to cover these drainages. The

float mineralization consists of dark brown sphalerite with coarse grained secondary dolomite in brecciated black shale in one creek. In the second creek, the only mineralization seen was thin films of orange smithsonite on fracture surfaces and bedding planes in the same black shale lithology. This type of mineralization is different from any seen elsewhere in the Reef Project area.

The copper-cobalt-siderite showings are quite distinctive, and include the following minerals in various proportions: chalcopyrite (malachite, azurite), pyrite, cobaltite (erythrite), uranium minerals, siderite, barite, hematite, magnetite, jasper and quartz. Associations of different minerals in this group appear in the following diverse ways:

1. Siderite veins with or without chalcopyrite, pyrite, cobaltite, siderite, barite or hematite.

2. Massive banded pyrite bodies, conformable to the enclosing rocks, with or without chalcopyrite, barite, hematite, magnetite and cobaltite.

3. Chalcopyrite with or without cobaltite and uranium in fractures and along bedding planes in tuffaceous shales.

4. Chalcopyrite in diorite stocks or diabase dikes.

All or several of these styles of mineralization may be present at any one locality. Uranium has been found in only two showings, on the Key claims property on 106 E 1 and the Igor claims on 106 E 2 (S. Blusson, personal communication). There is a good likelihood that it may occur associated with the copper and cobaltite showings elsewhere in the area, since the uranium minerals are not visually obvious and can only be detected with a

gieger counter or by analysis. The association of uranium with these iron and barite-rich rocks is unusual but not unique. Somewhat similar deposits in formations of the same age are mined for gold and uranium in Australia, and veins with similar mineralogy have been mined as a source of thorium and gold at Lehmi Pass in Idaho. Gold has not been reported from the occurrences in the Fairchild Lake area but may nevertheless be present.

The massive pyritic lenses occur only at Bond Creek and on the Gremlin claims. At both localities, the pyrite contains some associated copper values, but no lead or zinc. The pyrite lenses are conformable to the cleavage in the enclosing formations in both locations, but neither occurrence has been mapped in detail, so the overall relation between sulphides and host rocks is not known. The relationship between the massive pyrite bodies and the siderite-chalcopyrite veins, which parallel and cross cut bedding, is not known. These sulphide bodies differ from the Hart River Mines mineralization in the presence of siderite, hematite, magnetite and barite, and in the absence of sphalerite. Figure 27 shows the locations of known showings of copper, cobalt, and uranium in the Fairchild Lake area.

Summary

The abundant evidence of acid vulcanism in the older formations around Fairchild Lake, plus the presence of many copper showings in the volcanics and adjacent shales, makes this area of prime importance for further work. The exploration carried out during 1976 should be directed toward searching for massive copper-zinc sulphide deposits and vein deposits of copper, cobalt, uranium and gold, and should evaluate the possibility of finding bedded sulphide deposits in the black shale formations adjacent to centers of acid vulcanism. The exploration should involve geologic mapping of all of the area underlain by Unit 1 and Unit Ho, backed up by prospecting and detailed

contour soil sample lines.

Further work on the Ale, Cloë and Gremlin claim groups can be carried out in conjunction with this detailed regional work. About 1-1/2 months will be required to complete the regional portion of the work with a crew of two geologists and two soil samplers. A contract helicopter will be required for the regional work but not for the claim group work.

5. Palmer Lake Area

A wide belt of Helikian age rock formations outcrops in an arcuate pattern across mapsheet 106 A, north and east of Palmer Lake. The area underlain by these formations was silt sampled by chopper-hopping, and some detailed soil sampling traverses were done in areas of geologic complexity in an attempt to correlate geochemical backgrounds with specific rock formations.

Geochemistry

Reconnaissance silt sampling was carried out on portions of 1 mile mapsheets 106 A 1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15. Samples were analysed only for copper, lead and zinc. Figures 28, 29 and 30 relate geochemical values from detailed traverses with underlying geology.

Geology

No geologic mapping was carried out by us in the Palmer Lake area. The Geological Survey has published geologic maps of the area at a scale of 1:125,000 (Open File 221, by J. D. Aitken and D. G. Cook, 1974).

Summary

No anomalous values were obtained from any part of the Palmer Lake area. Background values are much lower than in Helikian formations further west, and no mineral showings were discovered in the area. No more work is

recommended in this portion of the Mackenzie Mountains.

6. Norman Wells Area

Three weeks were spent investigating certain rock formations on the east side of the Mackenzie Arch, which were considered to have some potential as hosts for sedimentary copper and possibly lead-zinc mineralization. The specific rock formations which were investigated included Unit H5 and the Little Dal Formation, of Helikian age, the Mt. Cap and Saline River Formations, of Cambrian age, and the Imperial Formation, of Upper Devonian age. These various rock units were examined in a number of prospecting traverses and typical samples were analysed geochemically. As well, some silt sampling was carried out in areas underlain by Helikian and Cambrian rocks.

Geochemistry

Reconnaissance density silt sampling was carried out on 1 mile mapsheets 96 D 1, 2, 3, 5, 7, 10, 11, 12, 14, 15 and 96 E 1. Detailed sampling traverses are plotted in Figure 31: Detail Area, 96 D 3; and Figure 32: Detail Area, 96 E 1. No significant geochemical anomalies were discovered as a result of this sampling. Stream sediment sampling in this area of canyon and plateau terrain is not an effective exploration technique however, because the rock formations of most interest are thin and incompetent and outcrop only in canyon walls where they are capped by more resistant rocks. All of the upland plateaus, which make up 95% of the country, are underlain by resistant Paleozoic dolomite.

Geology

Geological prospecting, rather than geological mapping, was carried out by the Reef Project in the Norman Wells area. The only geologic information

available during the summer was the 1:250,000 scale geological survey mapping on the Carcajou Canyon mapsheet 96 D (Paper 74-13, J. D. Aitken and D. G. Cook, 1974). Geologic maps for mapsheets 96 E and 96 F were released during January, 1976 (Open File 304). The results of geological prospecting in the Little Dal, Saline River, and other formations are discussed below. Table 2 outlines the position of the most interesting formations in the stratigraphic column.

TABLE 2

STRATIGRAPHIC COLUMN IN NORMAN WELLS AREA

ERA	PERIOD OR EPOCH		FORMATION AND MAXIMUM THICKNESS, in feet (metres)	LITHOLOGY
CENOZOIC	EOCENE (?)		*Unnamed 1,600 (490)*	*Gravel, conglomerate, sand, sandstone; minor beds of coal and volcanic ash or tuff; nonmarine*
Unconformity				
MESOZOIC	CRETACEOUS	U	*LITTLE BEAR AND EAST FORK FMS. undifferentiated: 1,000+ (300+)*	*Sandstone, shale, minor coal; marine and nonmarine*
		Disconformity		
		U L	*SANS SAULT AND SLATER RIVER FMS. undifferentiated: 2,500 (760)*	*Shale, sandstone, local conglomerate at base; marine*
Unconformity				
PALEOZOIC	DEVONIAN	UPPER	*IMPERIAL FORMATION 3,580 (1,100)*	*Shale, sandstone, minor limestone; marine*
			Conformable Contact	
			CANOL FORMATION 300 (90)	*Shale, black, siliceous, bituminous; marine*
		Disconformity		
		MIDDLE	*HARE INDIAN FORMATION 425 (130)*	*Shale, minor siltstone and limestone; marine*
			Conformable Contact	
			HUME FORMATION 565 (170)	*Limestone, fossiliferous; minor shale; marine*
		Disconformity		
		LOWER	*BEAR ROCK FORMATION 1,000 (300)*	*Dolomite, dolomite solution-breccia, anhydrite and gypsum, marine. Equivalent to the Camsell, Arnica and Landry Formations, jointly*
			LANDRY FORMATION 300± (90±)	*Limestone, thick bedded, resistant; marine*
			Conformable Contact	
			ARNICA FORMATION 300(?) (90?)	*Dolomite, brown, striped; minor solution breccia; marine*
			Conformable (?) Contact	
			CAMSELL FORMATION 988 (300)	*Limestone, massive, resistant; limestone breccia; marine*
		Relationships uncertain		
		L U	*DELORME FORMATION 890 (270)*	*Dolomite, partly sandy, silty, argillaceous; marine*
	SILURIAN	Unconformity		
	ORD	L U	*MOUNT KINDLE FM 1,025 (310)*	*Dolomite, fossiliferous, siliceous; minor chert; marine* GSC

TABLE 2 - (Cont'd)

ERA	PERIOD OR EPOCH		FORMATION AND MAXIMUM THICKNESS, in feet (metres)	LITHOLOGY
PALEOZOIC	ORDOVICIAN		Unconformity	
	CAMBRIAN	LOWER	*FRANKLIN MOUNTAIN FORMATION 1,500 (460)*	*"Cherty member": dolomite, chert, drusy quartz; marine* *"Rhythmic member": alternation of very finely crystalline dolomite with finely to medium crystalline dolomite; marine* *"Cyclic member": dolomite, conglomeratic, stromatolitic, and argillaceous, shaly; marine*
		UPPER		*"Basal red beds": sandstone, red shales, conglomerate, dolomite, chert; marine and (?) nonmarine*
			Conformable Contact	
		U	*SALINE RIVER FORMATION 2,760 (?) (841 ?)*	*Red beds: shale, siltstone, sandstone, salt, gypsum, anhydrite, dolomite; marine*
			Unconformity	
		M L	*MOUNT CAP FORMATION 354 (108)*	*Shale, thin-bedded limestone, sandstone, siltstone; marine*
	Unconformity			
PROTEROZOIC	HELIKIAN (?)		*Gabbro dykes and sills*	*Gabbro, greenish black, medium grained*
			Intrusive Contact	
			LITTLE DAL FORMATION 2,300± (700±)	*Dolomite and limestone, partly sandy, silty, and argillaceous; minor shale; marine*
			Conformable Contact	
			Unnamed unit H5 1,050 (320)	*Shale, partly red, nodular; limestone, dolomite; marine*
			Conformable Contact	
			KATHERINE GROUP *8,000± (2,400±)*	*Upper division: quartzite, shale, marine and (?) nonmarine* *Lower division: mainly quartzite; minor shale and dolomite; marine and (?) nonmarine*
			Conformable Contact	
			TSEZOTENE FORMATION 4,000+ (1,220+)	*Shale, sandstone, dolomite, local limestone; marine and (?) nonmarine*
			Conformable (?) Contact	
			Unnamed unit H1 (thickness unknown)	*Dolomite, minor chert; marine* GSC

Notes on Formations Examined During Field Work

(a) Katherine Group

In all the areas where it was observed, the Katherine group consisted predominantly of medium to coarse grained, well-rounded and well-sorted quartz arenites. Cross bedding is common and colors range from white to purple. Ken Dawson of the G.S.C. reports that a showing of low

grade disseminated copper mineralization has been discovered in the unit elsewhere in the Mackenzie Mountains (personal communication) but no copper was seen in any of our traverses. Hematite makes up 10 to 20% of the rock in two localities, but these hematite occurrences are not extensive. Rock geochemical analysis was carried out on a few samples of sandstone and three samples of black shale from the Katherine Formation (see Appendix 2). Values were very low in copper, lead and zinc in the sandstone samples, with averages of less than 10 ppm in all three metals. The black shale samples ranged from 45 to 94 ppm copper, 18 to 168 ppm lead, and 11 to 16 ppm zinc. Photo No. 1 shows typical weathering colour and outcrop characteristics.

(b) Unnamed Unit H5

In the areas we traversed, this unit was made up dominantly of very distinctive, brick red, modular shales (Photo's Nos. 2, 3 and 4). Minor lithologies encountered included dolomite, sandstone, mud chip conglomerates and gypsum (Photo No. 5). One occurrence of massive and disseminated, bedded pyrite a few feet thick was discovered in the formation, but no base metal sulphides were seen on any traverse. Geochemical analysis of 21 samples of various lithologies gave the following results:

	Range	Average
Copper	3 to 192 ppm	57.7 ppm
Lead	8 to 230 ppm	98.4 ppm
Zinc	13 to 305 ppm	70.0 ppm

The wide range in values is to be expected in a rock unit with such diverse lithologies.

(c) Little Dal Formation

This is the youngest formation of Helikian age in the Front Ranges of the Mackenzie Mountains near Norman Wells. The only lithology seen in areas we covered was silty, greenish grey, bright orange weathering dolomite. Elsewhere in the Mackenzie Mountains, sandstones, shales and evaporites occur in the Little Dal. Only one sample was analysed geochemically; this sample gave a surprising result of 1,800 ppm copper, 30 ppm lead and 10 ppm zinc. Close examination of the sample indicated that it contained very fine-grained chalcopyrite throughout. The dolomites of the Little Dal Formation may have been deposited in a Sabka environment, similar to the environment of deposition proposed by Renfro (1974), Davidson (1965), and others, for many of the world's sedimentary copper deposits. Photo No. 6 illustrates the characteristic bright red weathering color of this formation.

(d) Unconformity at Base of Mt. Cap Formation

A major unconformity at the base of the Lower Cambrian Mt. Cap Formation represents approximately one billion years of missing stratigraphy. The entire Hadrynian period is missing throughout the Front Ranges and, in some areas, portions of the Little Dal and H5 units of Helikian age are also missing due to erosion or non-deposition. On a regional scale, this unconformity is reasonably convincing, since the Mt. Cap rests on formations of different ages in different parts of the Mackenzie Mountains, but in detail it lacks credibility since, wherever it is observed, there is not the slightest indication of erosion and very rarely any angular discordance (Photo No. 7). This unconvincing billion year unconformity may argue against the Geological Survey's age of Helikian for the Little Dal and older rock formations in the

Front Ranges of the Mackenzie Mountains.

(e) Mt. Cap Formation

In the areas we examined, the Mt. Cap Formation of Lower to Middle Cambrian age was made up of bioturbated glauconitic sandstone, black, often pyritic, shale, and occasional dark micritic carbonate. Rock geochemical analyses of 30 samples gave the following results:

	Range	Average
Copper	16 to 480 ppm	69.6 ppm
Lead	9 to 220 ppm	60.7 ppm
Zinc	8 to 182 ppm	30.2 ppm

The 480 ppm copper value came from a pure white quartz arenite bed two feet thick with abundant copper stain (Photo No. 8). Shale beds with 5 to 10% pyrite also contain anomalous concentrations of copper and lead.

(f) Saline River Formation

Wherever we observed it, the Saline River Formation overlies the Mt. Cap Formation without angular or erosional unconformity. The Saline River consists of gypsum, unconsolidated gypsiferous mudstone, and thin bedded shale with salt crystal casts (Photo No. 9). Rock geochemical analysis of 48 samples from this formation gave the following results:

	Range	Average
Copper	3 to 80 ppm	20.4 ppm
Lead	16 to 120 ppm	38.9 ppm
Zinc	6 to 240 ppm	43.5 ppm

Photo No. 10 illustrates the stratigraphic relationships of the Saline River Formation at Loretta Canyon.

(g) Franklin Mountain Formation

The basal beds of the Franklin Mountain Formation were examined at one locality southeast of Palmer Lake. In this area, the Saline River, Mt. Cap, and Little Dal Formations are all missing and the Franklin Mountain Formations rests directly on Unit H5 (Photo No. 11). In some areas, the basal beds are apparently a "red bed" facies with mud cracks and salt crystal casts, possibly laterally equivalent to the Saline River Formation. In this area, however, the formation consists of brick red, medium grained sandstone, moderately bioturbated, and with bedding planes laced with gastropod grazing tracks (Photo No. 12). The presence of mud cracks on some bedding surfaces (Photo No. 13) indicates periodic emergence and desiccation, but no evidence of evaporites was seen in this area.

(h) Imperial Formation

This Devonian Formation consists predominantly of black, marine shale. The only work we did in this rock unit was one silt-soil traverse across it near Norman Wells. Silt and soil samples from this traverse peaked out at 320 ppm copper, and 1,220 ppm zinc, suggesting that these black shales may have high base metal contents similar to the shales in the Selwyn Basin on the other side of the Mackenzie Arch. Gossans are common in creeks and swamps draining the Imperial Formation.

Summary

Our work in the Mackenzie Mountains has suggested three different mineral exploration possibilities which warrant further investigation:

1. Copper mineralization occurs in Little Dal Formation silty dolomites, which may have been formed in a "Sabka" environment typical of many of the world's sedimentary copper mineral districts.

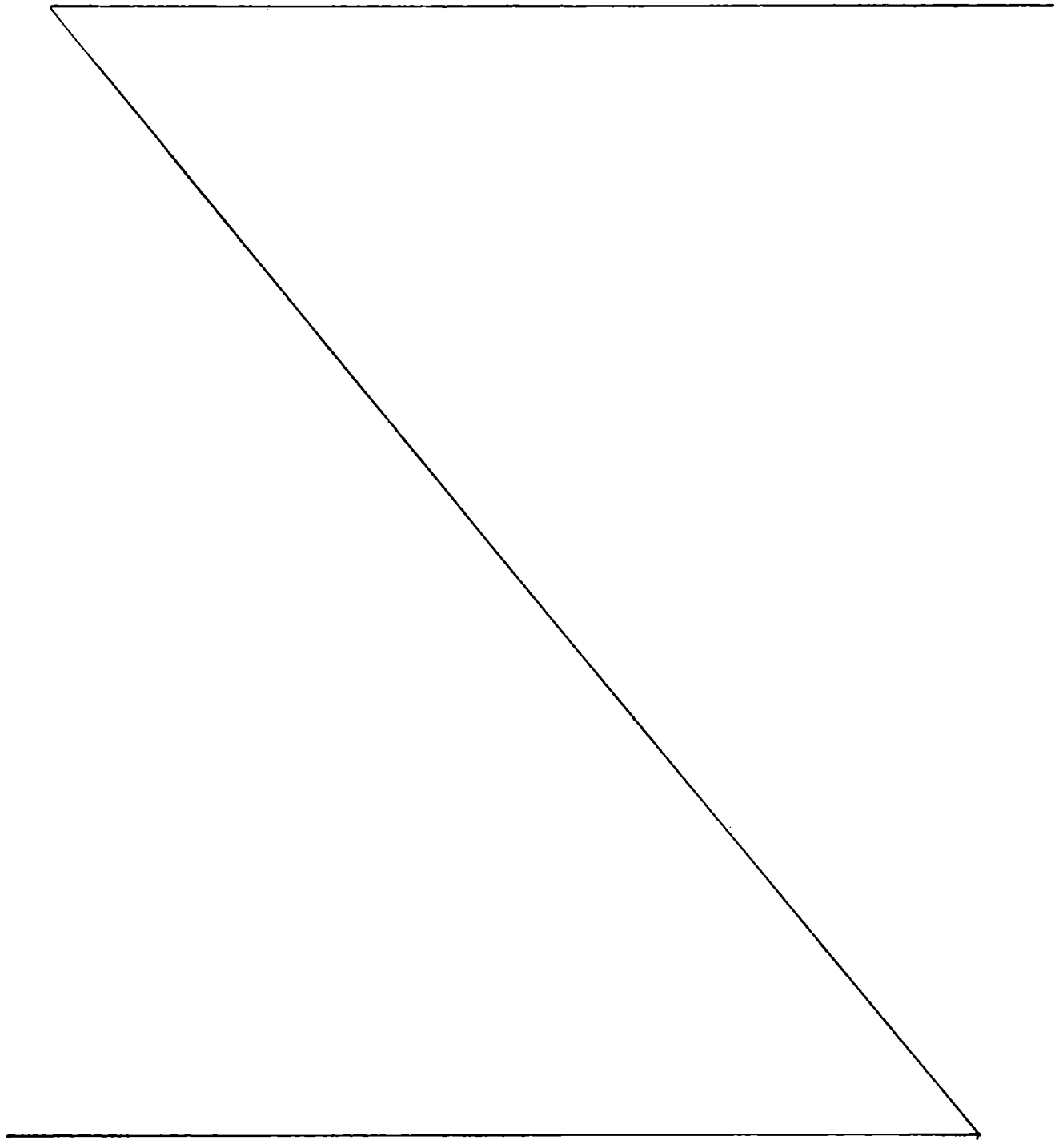
2. Stratiform copper mineralization and pyritic black shale occur in the Mt. Cap Formation of Lower to Middle Cambrian age. This formation may also represent a typical sedimentary copper environment of increasing aridity, since it is overlain by evaporites of the Saline River Formation.

3. Black, pyritic marine shales of the Upper Devonian Imperial Formation have high base metal backgrounds similar to the black shales in the Selwyn Basin, and may therefore have some potential as host rocks for sedimentary lead-zinc occurrences similar to the Tom Property, or as sources of base metals for Mississippi Valley type deposits in peripheral carbonates.

For the 1976 season, a modest program of work is proposed which will involve further prospecting around the copper bearing portion of the Little Dal Formation, and helicopter sampling of gossans in areas underlain by Devonian black shales. New areas to be investigated with geological prospecting or geochemical sampling may result from the compilation of geological information being carried out during this winter.

Logistically, the area around Norman Wells has several advantages over the central parts of the Mackenzie Mountains. For exploration purposes, helicopter and fixed wing aircraft are available at Norman Wells, fuel of all types is less expensive than in the Yukon, and daily PWA jet service provides convenient access to the "outside" for freight and personnel. Inexpensive barge freighting is available on the Mackenzie River connecting

with the railhead at Hay River, and within two or three years, the area will be accessible via the new Mackenzie Valley Corridor highway. The Canol Road, which traverses through the Mackenzies to Ross River, will also likely be re-opened in the next few years.



PHOTOGRAPHS FOR NORMAN WELLS AREA

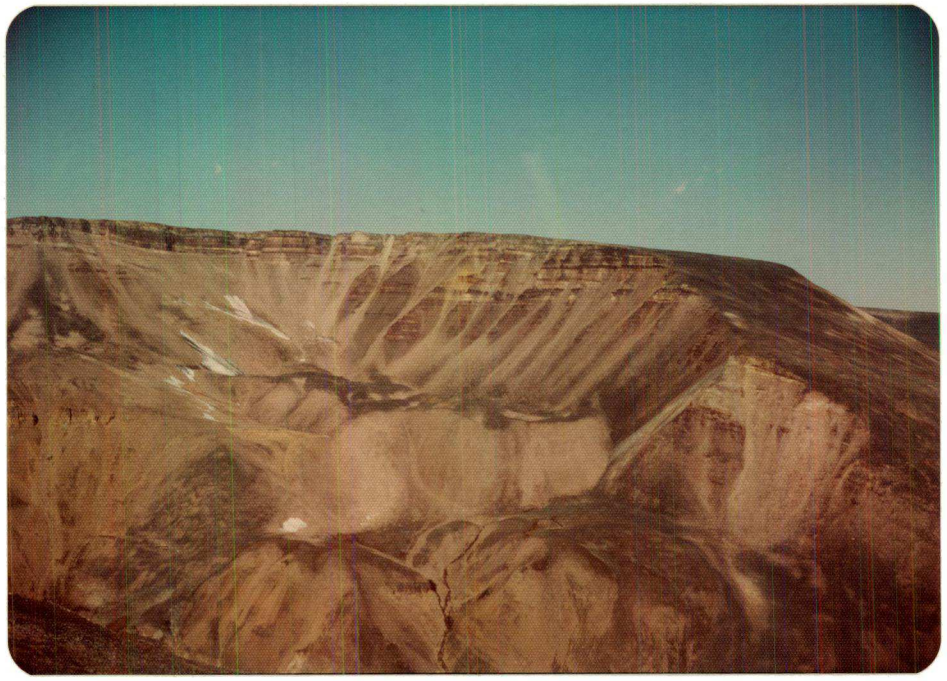


PHOTO NO. 1: Katherine Formation



PHOTO NO. 2: Dead End Shale Member of Formation H5



PHOTO NO. 3: Dead End Shale



PHOTO NO. 4: Dead End Shale

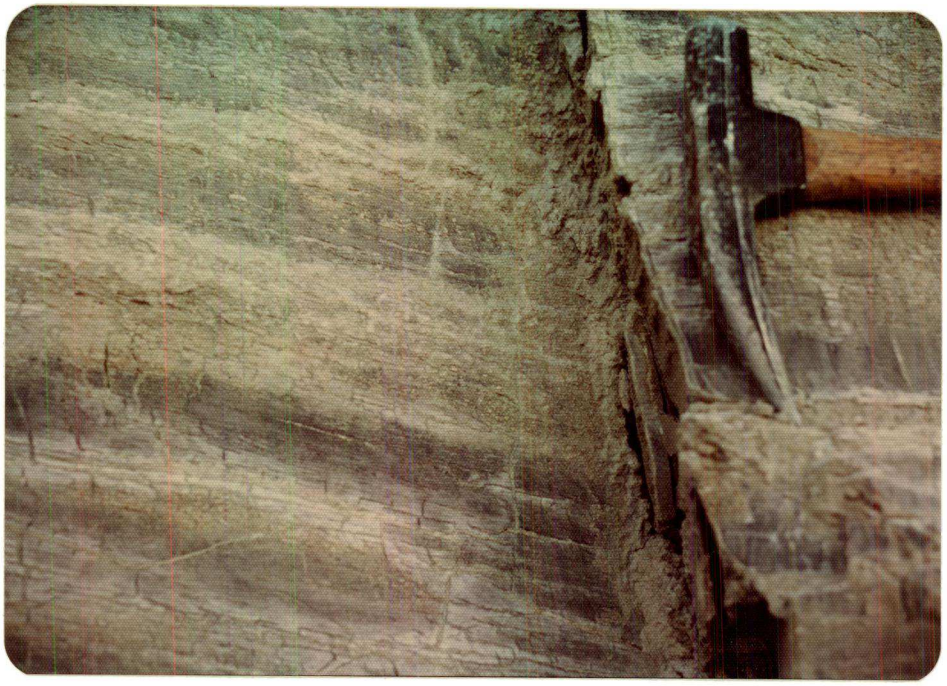


PHOTO NO. 5: Gypsum beds within Formation H5

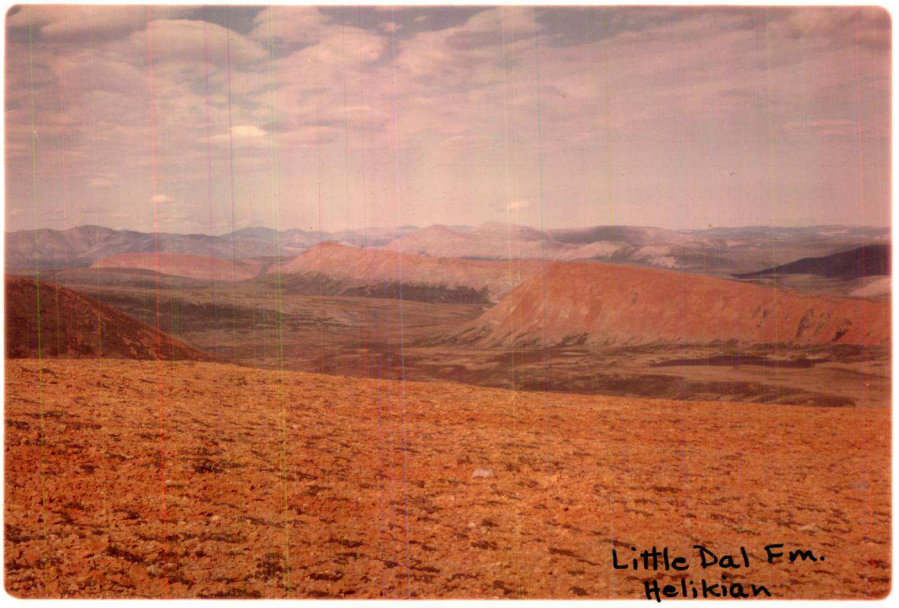
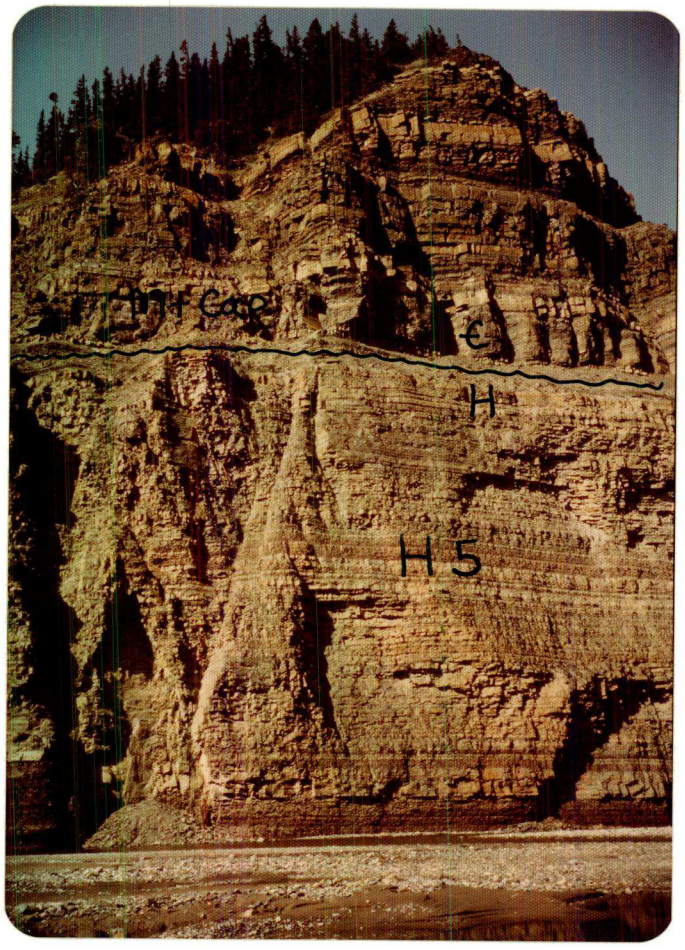


PHOTO NO. 6: Little Dal Formation south of Carcajou River



unconformity

PHOTO NO. 7: Unconformity at base of Mt. Cap, Dodo Canyon



PHOTO NO. 8: Copper stained quartz arenite, Mt. Cap Formation

PHOTO NO. 9: Saline River Formation, salt crystal casts

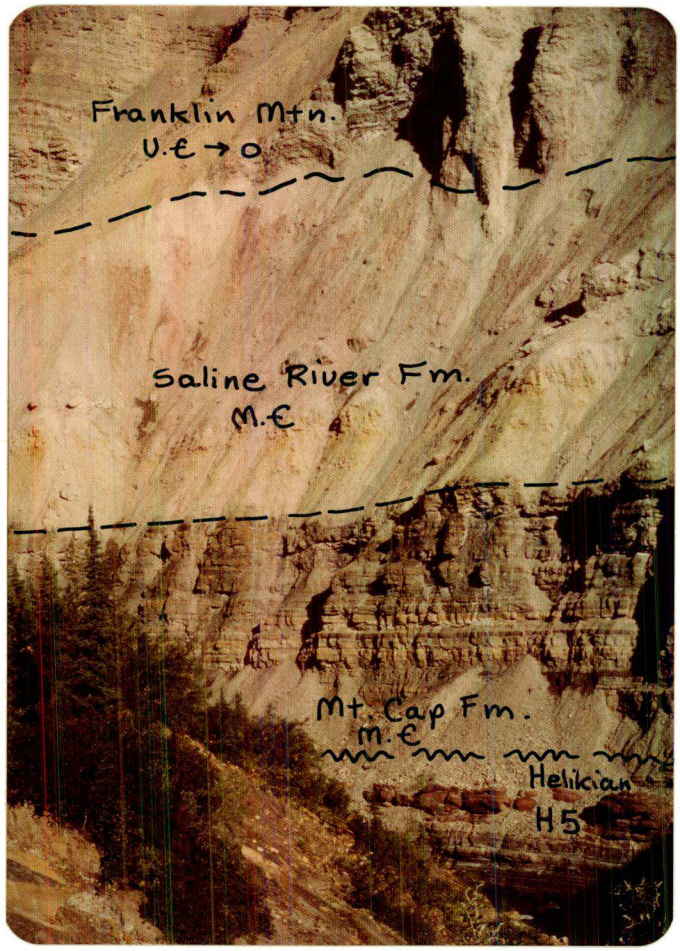


PHOTO NO. 10: Stratigraphy at Loretta Canyon

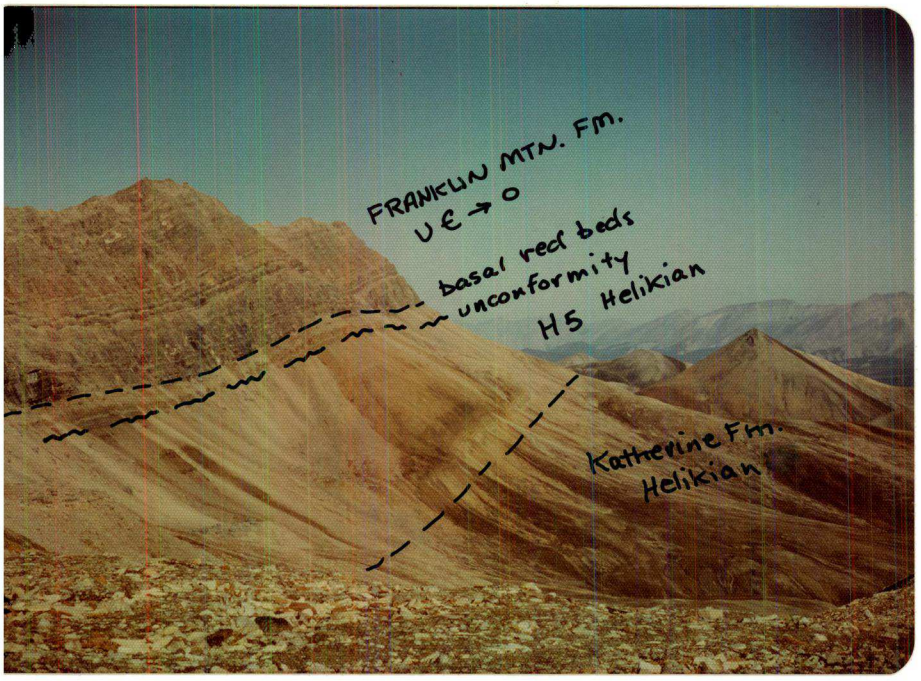


PHOTO NO. 11: Stratigraphy southeast of Palmer Lake, 106 A

PHOTO NO. 12: Basal red beds member of Franklin Mountain Formation: gastropod grazing tracks

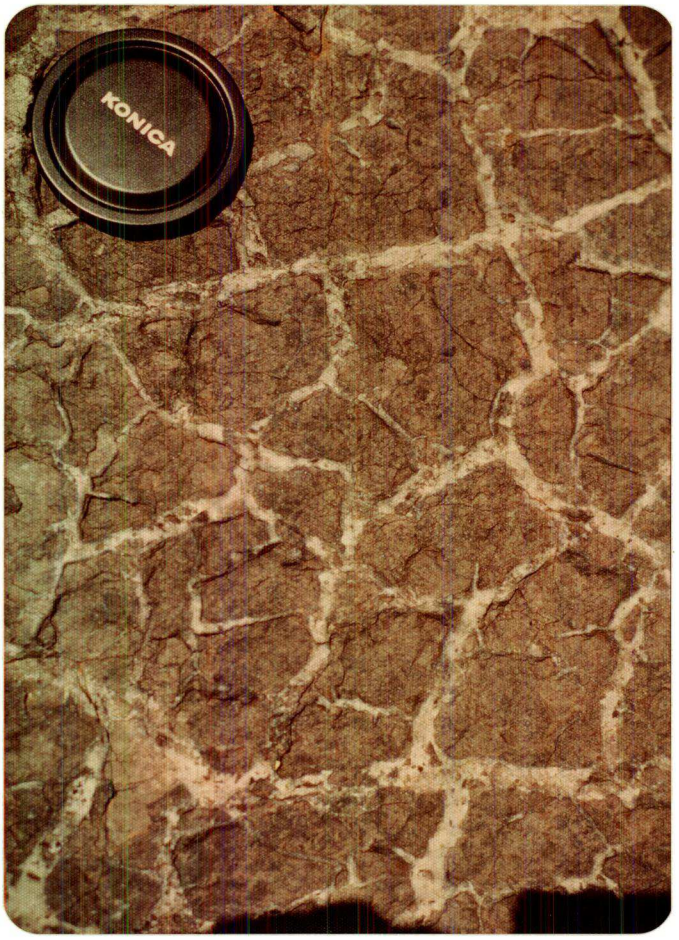


PHOTO NO. 13: Basal red beds member of Franklin Mountain Formation: mud cracks

7. Road River Formation North of Dawson

Shale and chert formations correlative with the Road River Formation of Ordovician age outcrop in three belts trending east-west across the Larsen Creek and Dawson map areas 116 A, B and C. These rock units are associated with abundant vulcanism, tentatively also assigned to the Ordovician. Volcanic flows and tuffs of undisputed Ordovician age occur 50 miles to the east of the Nash Creek mapsheet. These rock formations represent a northward extension of the Selwyn Basin, and could represent a similar environment to the Road River formations hosting the Howard's Pass and Anvil Range ore deposits. A portion of the area was sampled during 1969 by the Tintina Project, and most of the balance of the area underlain by these rocks was sampled by us this year. A few areas still have not received basic silt sampling coverage.

A few modest silt anomalies occur in areas underlain by Ordovician shales. Only the best anomaly, a 10,000 ppm zinc value from a stream on mapsheet 116 C 9, was prospected during 1975. This high value was caused by sphalerite mineralization in a narrow fault zone cutting black shales. This showing is too small to warrant further work. Two or three other zinc-lead anomalies should be prospected, and an occurrence of banded pyritic shale on Aussie Creek (Tintina Project, 1969) should be examined in some detail during 1976. A few days of field work will be required to complete this geological work. A few days of geochemical traverses will complete the silt coverage over all parts of these Road River sediments.

Respectfully submitted,

P. DEAN

APPENDIX I

MINERALOGICAL AND TEXTURAL STUDY OF THE OZ LEAD-ZINC DEPOSIT, YUKON TERRITORY

by

Robert C. Carne

A Report submitted in partial fulfillment of Geology 428 to

Dr. A. J. Sinclair

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ABSTRACT

The Oz lead-zinc deposit is located seventy kilometers of Dawson City, Yukon Territory. A mineralographic study of specimens from outcropping sulphide zones on the property reveals that mineralization can be grouped into five categories:

(i) Breccia mineralization with sphalerite, galena and pyrite forming the major part of the breccia matrix.

(ii) Sphalerite veins and veinlets.

(iii) Disseminated galena and micro-veinlets of galena along recrystallized bedding planes of banded dolomite.

(iv) Galena in disseminations and micro-veinlets in black shales along bedding planes and in fractures.

(v) Ubiquitous, euhedral cubes of pyrite in orange weathering dolomite.

Primary paragenetic relationships of sulphide minerals cannot be reconstructed due to obliteration of primary depositional textures by superimposed metamorphic textures. However, mineralization of types (ii), (iii) and (iv) may be the result of remobilization of sulphide minerals contained in type (i) breccias during metamorphism.

INTRODUCTION

Paragenesis of sulphide minerals is an important study aiding in the determination of their genesis. If the deposit is unmetamorphosed, genetic relationships interpreted from their textures are valid, however, if metamorphism has altered the primary characteristics of sulphide minerals, the value of interpretation of paragenetic sequences from these textures is diminished.

The purpose of this study is to examine the textures and mineralogy of the Oz lead-zinc deposit of Yukon Territory, and to determine the paragenetic sequence of the sulphide minerals.

Assistance in obtaining specimens for study was gratefully received from Mr. P. Dean and Mr. W. Roberts of Cyprus- Anvil Mining Corporation, Vancouver, B.C.

LOCATION

The Oz lead-zinc deposit is located seventy kilometers north of Dawson City, Yukon Territory, at an elevation of 2000 meters. Access is by helicopter from a permanent base at Dawson City.

PREVIOUS WORK

The Dawson Map Sheet (116 B-12 & 13) was first mapped by Green (1973). The Coal Creek Dome was mapped by Roberts (1975). The Oz geology was mapped by Dickinson (1975) in the summer of 1975.

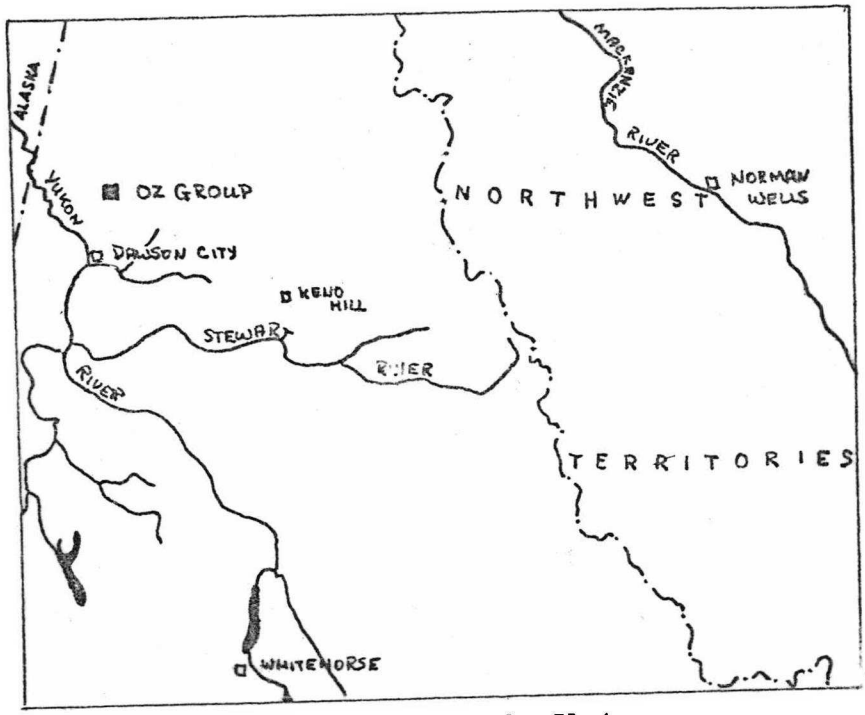

FIG. 1: Location map for the Oz Claims.

HISTORY

Mineralization at the Oz Group was first discovered during a regional geochemical exploration program in the summer of 1974. During the 1975 field season, the property was sampled, prospected, mapped and drilled by Cyprus-Anvil Mining Corporation.

REGIONAL GEOLOGY

The Oz Group is located near the centre of a structurally complex, 65 km. by 80 km. folded, faulted, and uplifted section of Proterozoic phyllites and dolomites known as the Coal Creek Dome. These rocks are bounded on the west, north and east sides by unconformably overlying dolomites and volcanics of Ordivician to Silurian age. To the south, an east-west trending thrust fault separates younger lithologies from the Proterozoic rocks. Igneous activity has been sporadic, limited to a few small stocks and north-south trending diabase dyke swarms.

PROPERTY GEOLOGY

The youngest rocks outcropping on the claim group are a sequence of massive, cherty, medium to light grey weathering dolomites. They are in fault contact contact with the older dolomites along the northwest boundary of the property and unconformably overly rhythmically banded, cherty, argillaceous dolomite. Red weathering shales and quartzite, whose stratigraphic relationship to the above is unclear, unconformably overly a thick sequence of buff weathering, sandy, arkosic quartzites, cherts and dolomites. Arkosic rocks form the base of this sequence and mark an unconformity with older reefoid rocks. Reef-type lithologies, mainly light buff, creamy weathering dolomites, in part cherty and stromatolitic, occur as a central, east-west trending belt on the property. Lead- zinc mineralization is confined to the reef-type lithologies.

Diabase dykes, in the order of 3 to 30 meters thick, form a north-south trending swarm, cross-cutting sedimentary lithologies on the property.

STRUCTURAL GEOLOGY

The structure of the Oz rocks is complex, faulting is likely more important than folding, however, due to the almost total cover of outcroppings by blocky talus, few offsets can be established. Much of the structural complexity of the rocks is likely due to faulting accompanied by rotation of fault blocks at a later time.

SULPHIDE MINERALOGY

Pyrite, galena, sphalerite and chalcopyrite are the only sulphide minerals present in the specimens studied. No silver minerals were detected. Silver assays of galena from the property range from below detectable limits to trace amounts (P. Dean, personal communication). Gangue minerals are secondary carbonates and minor quartz.

Five types of mineralization are present:

TYPE (i) Sphalerite, galena, pyrite and chalcopyrite in the matrix of breccias. Chalcopyrite occurs as exsolved blebs in sphalerite. Breccias are of two types:

(a) Breccias occurring in grey, fine-grained dolomites. The breccia framework consists of angular clasts of the host rock with well-developed, bleached alteration halos concentric with the fragment boundaries. Bleached alteration is not developed adjacent to areas where carbonate minerals form the matrix. The breccia matrix consists of a mosaic of pyrite (42%), galena (10%), sphalerite (8%) and chalcopyrite (less than 1%). Secondary carbonate minerals form the remainder.

(b) Breccias occurring in dark grey, fine-grained, siliceous dolomite. Unaltered, subrounded clasts of the host rock form the breccia framework. The matrix consists of galena (76%), pyrite (12%), sphalerite (5%) and chalcopyrite (lessthan 1%). Secondary carbonates form the remainder of the matrix.

TYPE (ii) Sphalerite and galena in relatively undeformed fine-grained, siliceous dolomites as veinlets. Veinlets are of three types:

(a) veinlets of predominately galena with small amounts of sphalerite (less than 5 %) cross-cutting veinlets of type (b).

(b) veinlets of predominately sphalerite with small amounts of galena (less than 3%).

(c) veinlets of sphalerite with less than 1% to 2% exsolved chalcopyrite.

Sphalerite from veinlets of type (a) and type (b) do not contain any exsolved chalcopyrite. Although the three types of veinlets where observed in a single specimen, no cross-cutting relationships between veinlets of type (a) and (b) and type (c) where observed.

TYPE (iii) Galena in dark grey, fine grained, banded dolomites. Galena occurs as monomineralic cavity fillings, les than 1.5 mm in size, in fine grained, banded dolomites. Galena is present along bedding planes, where recrystallization of the dolomite has occured.

TYPE (iv) Galena in fine grained black shales. Galena occurs with an unidentifiable, friable oxide(?) along bedding planes and in fractures perpendicular to bedding planes in fine grained black shales. "Veins" are commonly less than 1mm in width.

TYPE (v) Pyrite occurs as ubiquitous euhedral grains, commonly cubes, less than 0.01 mm in size, and less than 1% in overall abundance in medium grained, grey, orange weathering dolomite.

SULPHIDE TEXTURES

Mineralization Type:

(i) Breccia

(a) Sphalerite is present in two forms:

(1) as subrounded breccia fragments in the sulphide breccia matrix. The interior of the sphalerite fragments is spotted with blebs of carbonate minerals, galena and chalcopyrite (see Plate I). Carbonate minerals occur as small, irregular inclusions. The density of the inclusions increases towards the margin of the grains. Galena is present as slightly larger, 0.01 mm to 0.5 mm blebs exhibiting caries texture with respect to sphalerite (see Plate II). Caries texture of galena with sphalerite is most pronounced where galena is in contact with chalcopyrite (see Plate III). In some cases, chalcopyrite is actually surrounded by galena in the blebs. Chalcopyrite exists in sphalerite fragments in the breccia matrix as small (0.02 mm to 0.5 mm) slightly angular, regularily spaced inclusions.

(2) sphalerite is present in the fine grained breccia matrix, interstitial to carbonate minerals, pyrite and galena. Sphalerite is usually in contact with galena, with smooth mutual boundaries. The sphalerite in the breccia matrix does not contain any inclusions of foreign material.

Galena is present in the breccia matrix as fine grained (0.1 to 0.5mm) euhedral grains whose boundaries are controlled by the crystal faces of carbonate minerals and pyrite.

Pyrite occurs in the breccia matrix as euhedral grains from 0.1 to 1.0 mm in size with predominate cubic form (see Plate V). Pyrite is also present as large (up to 60mm by 10mm) clasts, with high cross-cutting fracture density, making up part of the breccia framework. Pyrite also occurs in the matrix as small (0.05 mm to 1.0 mm) rectangular-shaped fragments (see Plate VI).

(b) In this type of breccia, sphalerite occurs in two modes: as grains interstitial to pyrite, galena and carbonate minerals, similar to the mode of occurence in the type (a) breccia matrix, and as feathery rims around galena grains contained in the breccia wall rock (see Plates VII and VIII).

Galena is present, relatively uncontaminated, as the breccia matrix (up to 70%). This galena is highly sheared and exhibits flowing around breccia framework clasts of dolomite, as evidenced by cleavage traces outlined by cleavage pits. Another type of galena, this type rimmed by sphalerite, occurs in medium sized (1 mm to 2 mm) disseminations in the wall rock. The boundaries of the galena grains are controlled by secondary carbonate minerals rimming the fractures (see Plates VII and VIII). Galena also occurs as grains interstitial to pyrite and carbonate minerals in "schlieren" in the galena forming the breccia matrix.

"Schlieren" of euhedral to subhedral pyrite (60%), carbonate minerals (25%), galena (10%) and less than 5% sphalerite are present in the sheared galena part of the breccia matrix. "Schleiren" occur parallel to the curved cleavage planes of galena as elongate bodies with rounded outlines, and as lensoid bodies wrapped around the "leading edge" of breccia framework clasts of wall rock (see Plates IX and X).

(ii) Type (ii) veinlets:

(a) Veinlets of predominately galena (greater than 95%) with subordinate sphalerite (less than 5%) comprise this type of mineralization (see Plate XI). Sphalerite occurs as small (less than 0.2 mm) blebs in galena with apparently random distribution. Galenas of this type have secondary carbonate minerals filling fractures parallel to cleavage where slight deformation has occurred (see Plates XII and XIII). The carbonate minerals exhibit a caries texture with respect to galena. At the intersection of fractures, the width ofcarbonate mineral fracture filling

increases. Small, rounded blebs of galena are locked in wider portions of the carbonate mineral occurences.

(b) Veinlets of predominately sphalerite (greater than 90%) with subordinate galena (less than 10%) comprise this type of mineralization (see Plate XI). Galena occurs in the sphalerite as small (less than 0.3 mm) subrounded blebs with a concentration towards the margins of the veinlets. This type of veinlet cross-cuts veinlets of type (a).

(iii) Disseminated galena in banded dolomites:

Disseminated galena in fine grained, dark grey, banded dolomites is present as cavity fillings (less than 1.5 mm in size) and as micro-veinlets parellel to the bedding planes in the dolomite. Rims of euhedral sphalerite (less than 0.01mm in thickness) partially separate galena from secondary carbonate minerals (see Plate XIV). Sphalerite composes less than 1% of the sulphides. The galena - sphalerite disseminations are completely surrounded and controlled by the euhedral crystal faces of the secondary carbonate minerals.

(iv) Galena in black shales:

Galena occurs with an unidentified friable oxide(?) in fine grained black shales as disseminations and micro-veinlets along bedding planes and fractures perpendicular to bedding planes (see Plate XV). Disseminations are commonly less than 0.5 mm in width The walls of the disseminations and micro-veinlets are rimmed with secondary carbonate minerals, galena boundaries are controlled by the subhedral to euhedral margins of the rims. Small (less than 0.1 mm) subhedral grains of galena are locked in the carbonate mineral rims, concentrated towards the carbonate - galena boundaries.

(v) Pyrite disseminations in the wall rock:

Pyrite is present as ubiquitious euhedral cubes, less than 0.01 mm in size and less than 1% in overall abundance, in medium grained, grey, orange weathering dolomite (see Plate XVI).

SULPHIDE PARAGENESIS

A complete paragenetic sequence for the sulphide minerals of the Oz deposit cannot be reconstructed from a study of polished sections. Textures giving evidence for the original paragenetic sequence have been obliterated by superimposed textures caused by dynamic metamorphism due to folding and faulting, and possibly diagenetic textures superimposed by thermal and chemical gradients derived from the intrusion of diabase dyke swarms near mineralized zones.

The inclusions of chalcopyrite in the sphalerite which forms framework grains in breccias appear to be exsolution textures, due perhaps to constriction of the sphalerite crystal lattice during dynamic metamorphism of the sulphides. It is interesting to note that undeformed sphalerite in veinlets and interstitial sphalerite in breccia matrices do not contain any exsolved chalcopyrite.

Galena blebs in sphalerite clasts forming the framework of breccias appear to be replacing the sphalerite. The replacement of one sulphide by another is a risky assumption to make under any circumstance, however, the caries texture of galena with respect to sphalerite, which is especially well developed where chalcopyrite exsolution blebs and galena are in contact, combined with observed inclusion of chalcopyrite in the galena, lends credence to this assumption. The irregular masses of carbonate mineral in the sphalerite may also be due to a similar process.

In the veinlet mineralization (type (ii)), a time relationship between the deposition of galena and the deposition of sphalerite can be readily obtained due to the cross-cutting nature of the respective veins.Here, the deposition of galena predates the deposition of sphalerite, with a slight overlap. In the same specimen (Oz 1-B), a vein of sphalerite is observed in which the sphalerite contains exsolved blebs of chalcopyrite. This vein, however, shows a considerable extent of microscopic deformation in comparison with the relatively undeformed veinlets mentioned previously.

Some veinlets and veins of galena (Oz 5 and Oz 8) contain fractures parallel to cleavage in galena. Carbonate minerals are observed to be replacing galena along these fractures. The inclusion of galena in the carbonate as well as the caries texture and widening of the carbonate bodies at the fracture intersections is evidence for this mechanism.

Galena and sphalerite veinlets (type ii mineralization), disseminated galena in banded dolomites (type iii mineralization), and microveinlets and disseminations of galena in black shales may be a product of remobilization of earlier sulphide mineralization represented by breccias. Certainly they are later types of mineralization, since the sulphides present are relatively undeformed. The observed ratio of galena:sphalerite (i.e. galena is found more readily than sphalerite) and the lack of pyrite in the proposed "secondary" sulphide mineralization is concordant with the observed behavior of the sulphides under dynamic metamorphism. Galena is completely remobilized, flowing around fragments and clasts of more competent material. Sphalerite tends to recrystallize to a lesser degree, as shown by the partly replaced clasts of sphalerite in conjunction with the low amount of interstitial sphalerite in the breccia matrix, while pyrite reacts to increasing strain by breaking cleanly into smaller fragments. The outlines of all types of pyrite in the breccias are relatively uncorroded.

The tiny euhedral cubes of pyrite contained in the barren wall rock may be a product of the diagenesis of reefoid limestone to dolomite.

CONCLUSIONS

The Oz lead-zinc deposit contains mineralization of five types:

(i) Breccias in which sulphides form the major part of the matrix, and in which, fragments of wall rock form the framework. Clasts of pyrite and sphalerite may perform this function to a lesser degree. Sheared galena is present as a majority of the matrix in some cases.

(ii) Sphalerite and galena in relatively undeformed veinlets. Veinlets are of three types; one with uncontaminated sphalerite as its prime constituent cross-cuts veinlets with galena as the prime constituent. The third type of veinlet consists of sphalerite with a minor amount of exsolved chalcopyrite.

(iii) Galena as relatively undeformed disseminations along the bedding planes in dark grey, banded dolomites.

(iv) Galena as micro-veinlets and disseminations along the bedding planes and fractures in black shales.

(v) Pyrite as euhedral cubes in orange weathering dolomite, which forms the wall rock for some of the types of mineralization.

Primary paragenetic sequences of sulphide mineralization of the Oz deposit cannot be reconstructed from the results of mineralographic studies. Sulphide mineralization types (ii), (iii) and (iv) may be the result of remobilization of sulphides from breccia or type (i) mineralization during the metamorphic processes that formed the breccias.

BIBLIOGRAPHY

Dickinson, R., 1975, A Brief Geological Report on the Oz and Tart Groups, A private report to Cyprus-Anvil Mining Corporation, Vancouver, B.C.

Green, J., 1973, Geology of the Dawson, Larson Creek, and Nash Creek Map Areas. Geol. Surv. Canada, Mem. 364.

Roberts, W., 1975, Geological Map of the Coal Creek Dome, A private report to Cyprus-Anvil Mining Corporation, Vancouver, B.C.

APPENDIX I: DESCRIPTIONS OF POLISHED SECTIONS

Mineralization type:
(i)(a)

Oz I-A-2: Breccia with fragments of wall rock as breccia framework.

- well developed bleached alteration halos in the wall rock fragments, concentrically banded.
- breccia matrix: -40% fragmental pyrite, euhedral grains 0.1 to 1.0 mm in size. Also present as large clasts (up to 60 mm by 10 mm) with high cross-cutting fracture density. Occurs as well as small (0.05 mm to 1.0 mm) rectangular euhedral grains.

  -10% galena, fine grained (0.1 to 0.5 mm) euhedral grains whose boundaries are controlled by the crystal faces of carbonate minerals and pyrite.

  -8% sphalerite interstitial to carbonate minerals and pyrite and galena. Usually in contact with galena, with smooth mutual boundaries.

- breccia framework: 8% sphalerite as large clasts, subrounded. Interior spotted with blebs of carbonate mineral, galena and exsolved chalcopyrite. Carbonate grains small (less than 0.01 mm) Density increases towards margin of sphalerite.
  Galena (0.01 to 0.5 mm), caries texture with sphalerite, especially where in contact with chalcopyrite. In some cases, contains chalcopyrite blebs similar to those in sphalerite.
  Chalcopyrite (0.02 to 0.5 mm), slightly angular, subrounded exsolution blebs

Mineralization type (i)(a)

Oz 2-A & B Dark grey dolomitic breccia, angular fragments. Galena and coarse grained secondary carbonate matrix. Galena cleavages bent, forms about 4% of total rock.

Oz 9-B: similar to Oz 2-A and B

Oz 4-A and B: Sphalerite interstitial to pyrite, galena and carbonate minerals with smooth mutual boundaries (7%). Sphalerite feathery rims in wall rock between galena and wall rock. Rims partial, less than 0.01 mm thick.

Galena, relatively pure forms breccia matrix (about 70%). Galena as 1 mm to 2 mm disseminations in wall rock, boundaries controlled by secondary carbonate mineral crystal faces.
Galena as grains interstitial to pyrite and carbonates in schleiren in matrix galena.

"Schleiren" euhedral to subhedral pyrite (60%), carbonates (25%), galena (10%), sphalerite (less than 5%). Occur parallel to cleavage in matrix galena as elongate bodies with rounded outlines; wrapped around the leading edges of breccia framework clasts of wall rock.

Mineralization type (ii)

Oz 5 and 8: Veinlets of predominately galena (95%) with 5% sphalerite as small (less than 0.2 mm) blebs with random distribution. Galena has secondary carbonate minerals filling fractures parallel to cleavage in galena and partially replacing galena.

Oz 1-B-1: veinlets of mostly galena (95%) with less than 5% sphalerite as small blebs(less than 0.3 mm) cut by veinlet of sphalerite (90%) with small blebs of galena (less than 5%).

Vein of sphalerite with less than 2% exsolved chalcopyrite as small (less than 0.02 mm) subrounded blebs. Highly fractured.

Mineralization type (iii):

Oz 9-B, Oz 2 and Oz 3: Disseminated galena in fine grained, dark grey, banded dolomites, present as cavity fillings (less than 1.5 mm) in secondary carbonates along beddin planes. Also present in micro-veinlets, rimmed by secondary carbonates.

Mineralization type (iv):

Oz 9-A: Galena in black shales with unidentified friable oxide(?) along bedding planes and in fractures across bedding. Micro-veinlets and disseminations rimmed with secondary carbonate.

NOTE: Specimen numbers refer to the showing number. There are ten major sulphide showings on the Oz Claims. Polished sections were not studied for showings 6, 7, and 10 because of the extreme oxidation of the sulphides.

APPENDIX II: PLATES

Mineralization Type:

(i) Sphalerite, galena, pyrite and chalcopyrite in the matrix of breccias.

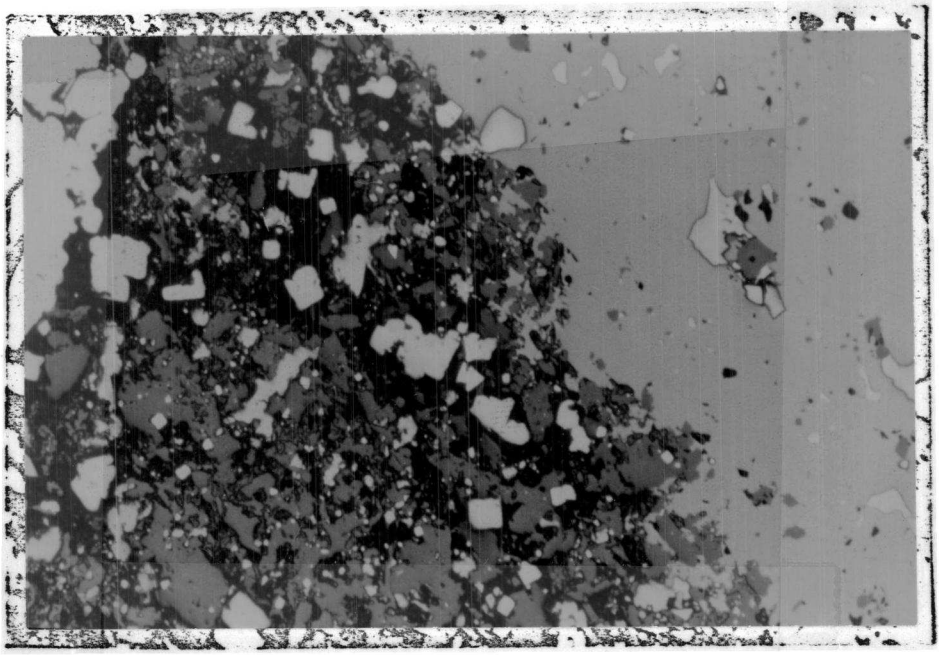

PLATE I: Oz 4-A, plane light, 80X. Sphalerite framework fragment (med. grey), breccia matrix, and a fragment of pyrite. Note: euhedral pyrite grains (white) in matrix; galena (white with dark rim), chalcopyrite (white) and carbonate (grey) grains in sphalerite.

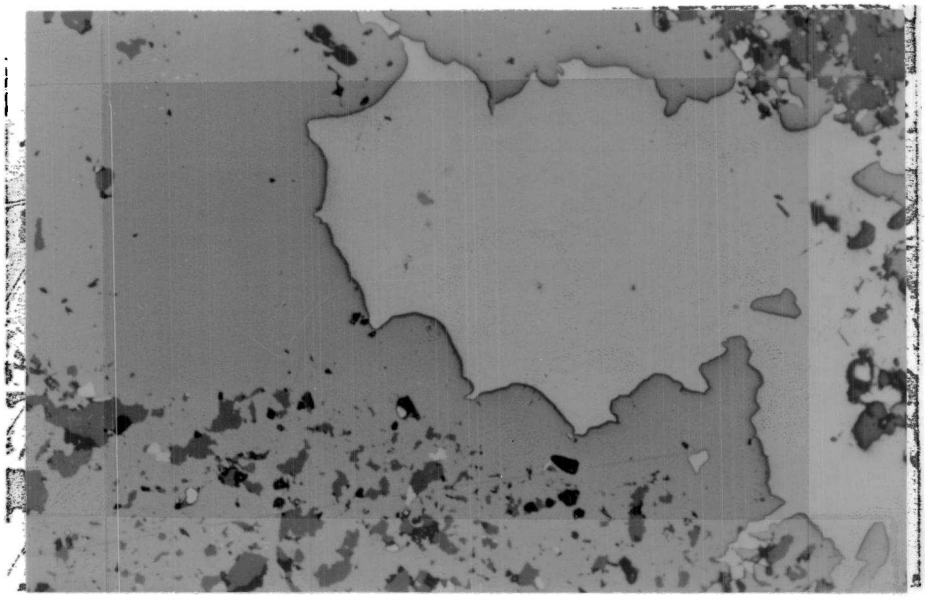

PLATE II: Oz 4-A, plane light, 320X. Galena (light grey) with caries texture in sphalerite (med. grey). Note carbonate grains (dark grey) and chalcopyrite exsolution (light grey) in sphalerite.

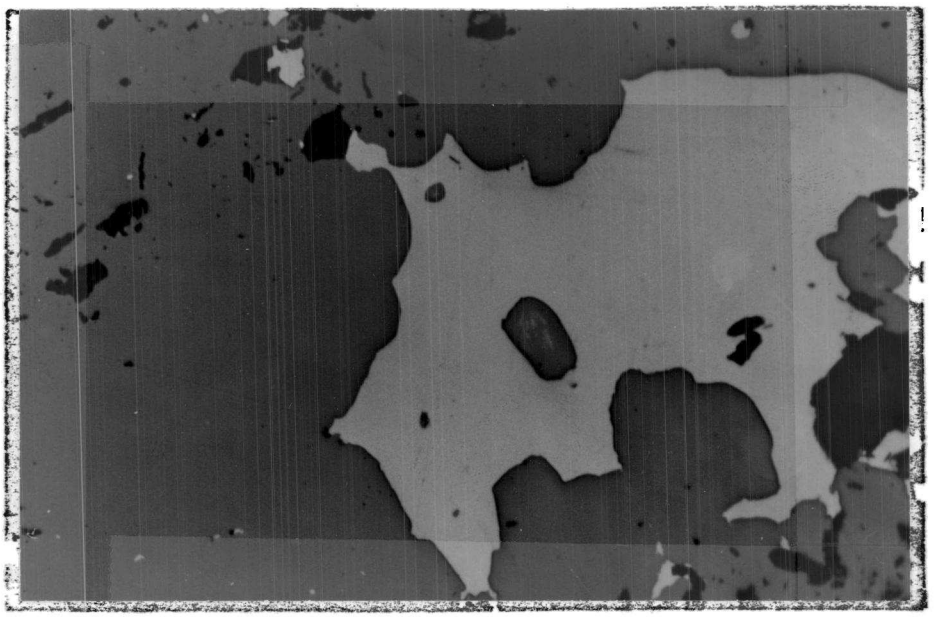

PLATE III: Oz 4-A, plane light, 320X. Caries texture of galena (light grey) in sphalerite (dark grey) is most pronounced where galena is in contact with exsolved chalcopyrite (white).

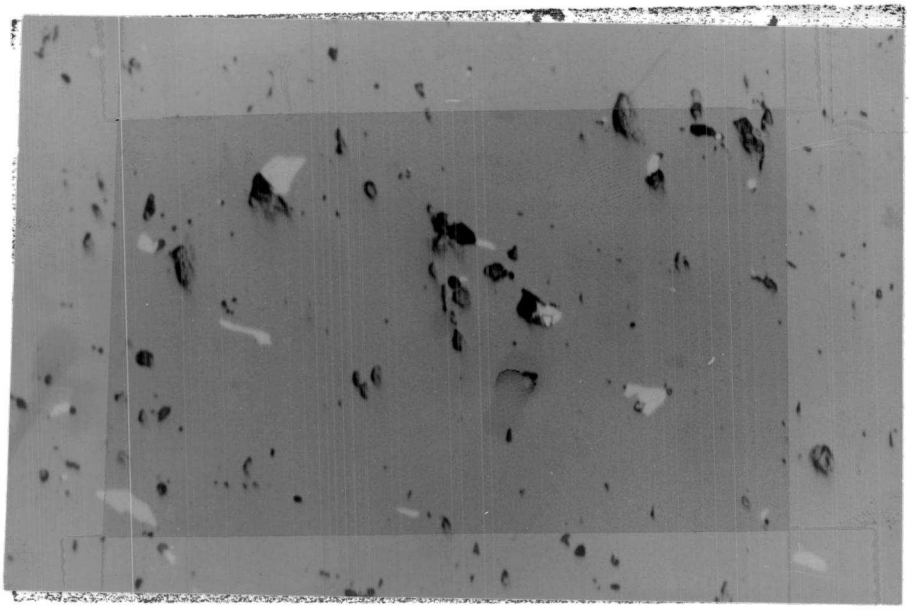

PLATE IV: Oz 4-A, plane light, 320X. Exsolution texture of chalcopyrite (light grey) in sphalerite (medium grey).

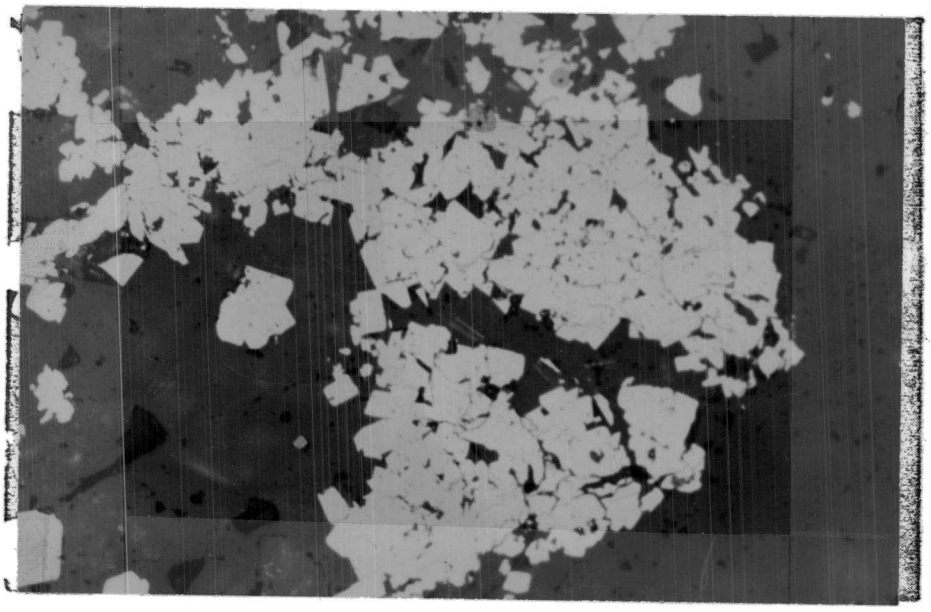

PLATE V: Oz 4-A, plane light, 80X. Euhedral grains of pyrite (light grey) in carbonate matrix of breccias.

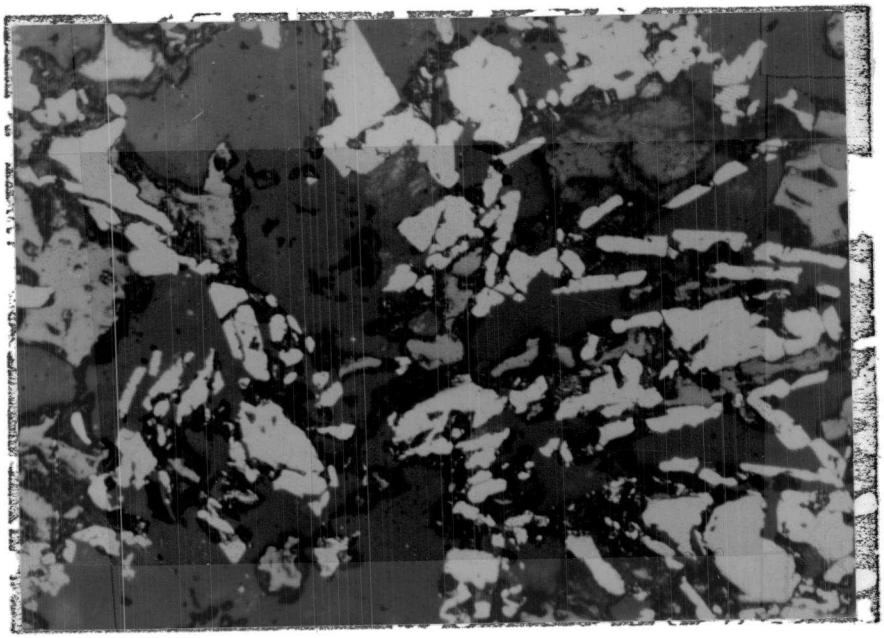

PLATE VI: Oz 1-A, plane light, 80X. Rectangular and subhedral cubic grains of pyrite (white) in carbonate mineral (dark grey) and galena (light grey) matrix of breccias.

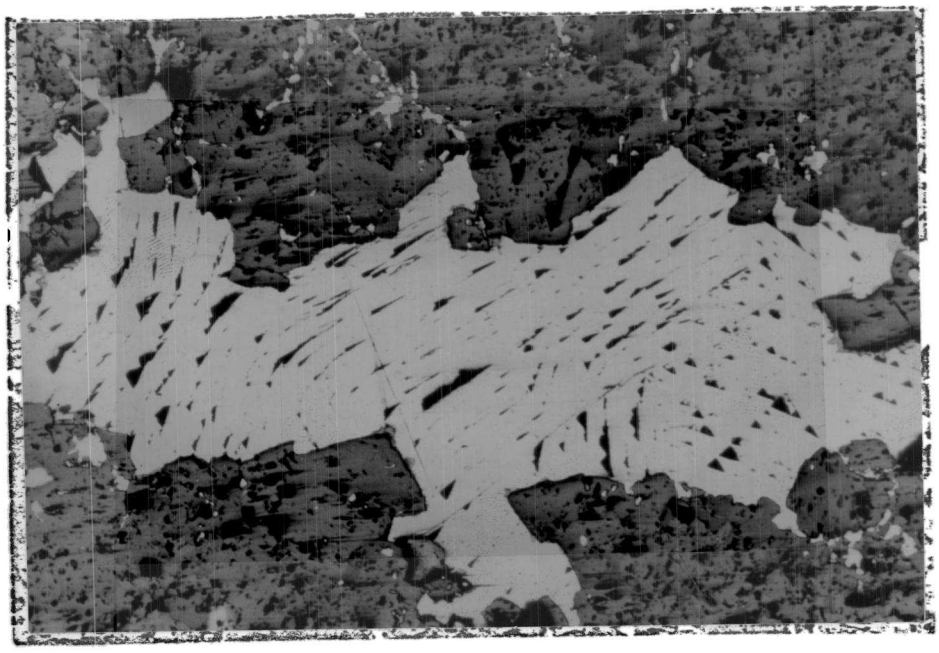

PLATE VII: Oz 4-B, plane light, 80X. Galena dissemination in wall rock of breccia showing bent cleavage traces. Note fine rims of sphalerite (light grey) partially between galena and wall rock.

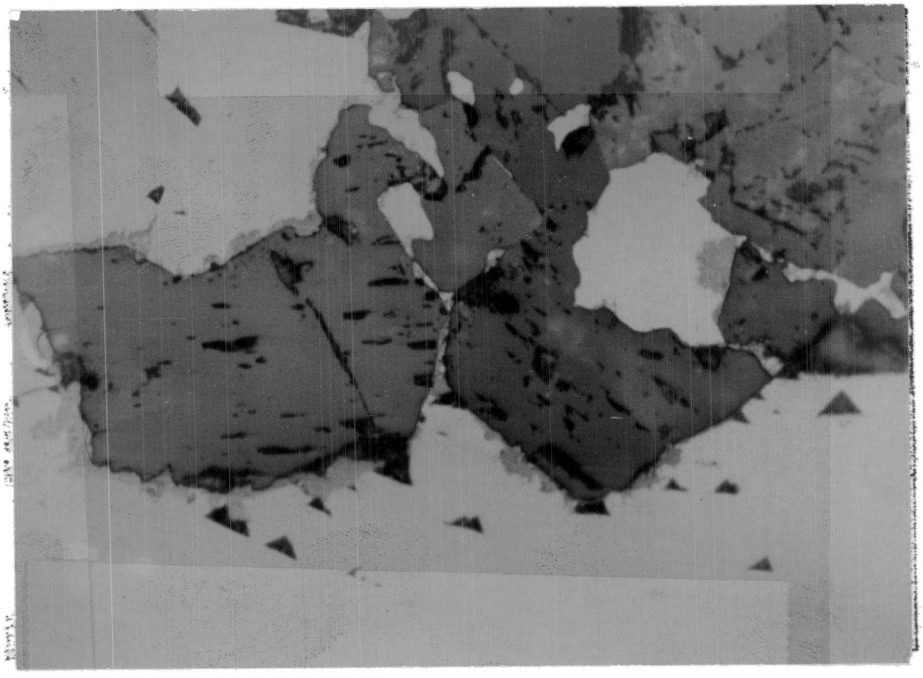

PLATE VIII: Oz 4-B, plane light, 320X. Magnification of Plate VII. Note feathery rims of sphalerite (medium grey) between galena and secondary carbonate wall rock.

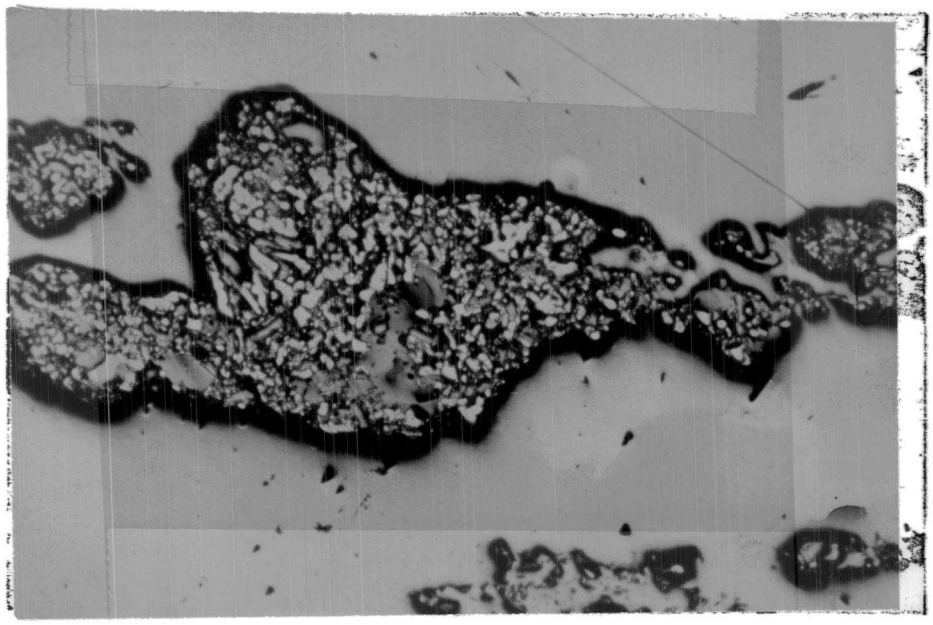

PLATE IX: Oz 4-B, plane light, 80X. "Schlieren" of pyrite (white)and galena in galena (light grey). Dark halo is due to acid polish.

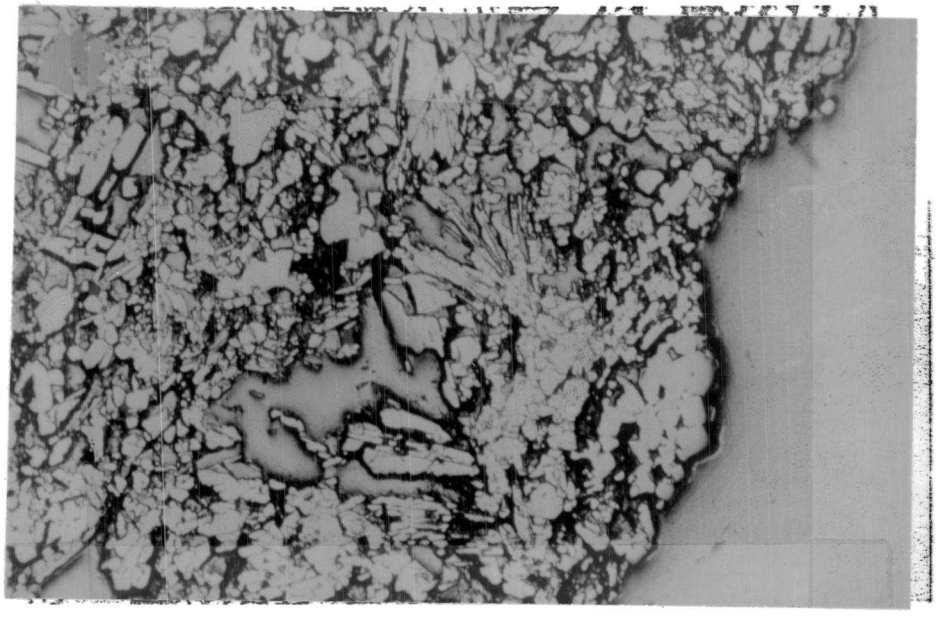

PLATE X: Oz 4-B, plane light, 80X. Pyrite (white) and galena (light grey) in "schleiren" wrapped around the "leading edge" of a breccia clast of wall rock to the left. Light grey material to the right is galena.

(ii) Veinlets of galena and sphalerite.

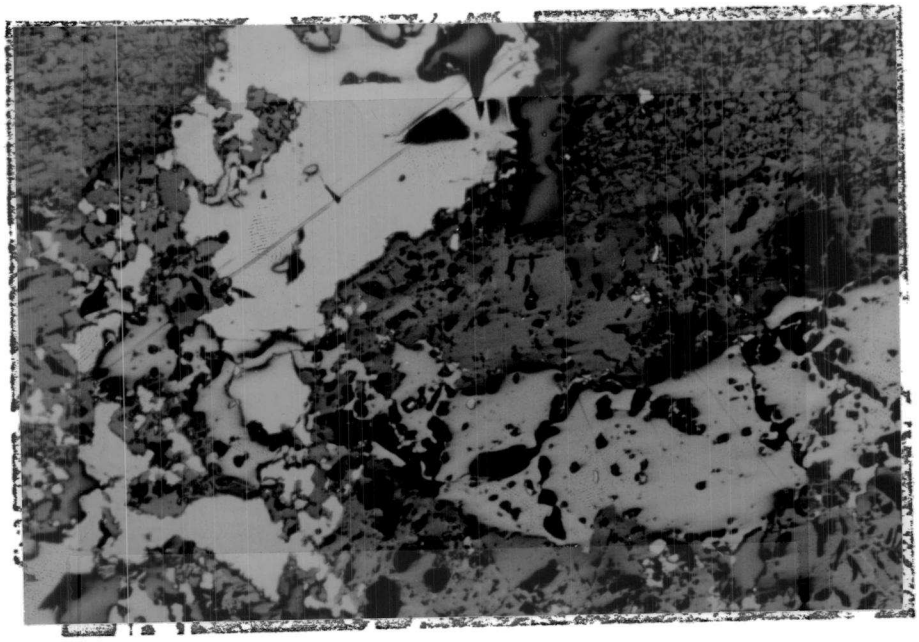

PLATE XI: Oz 1-B, plane light, 80X. Veinlet of predominately sphalerite (med. grey) cross-cutting veinlet of predominately galena (light grey). Note galena in sphalerite and blebs of sphalerite in galena veinlet.

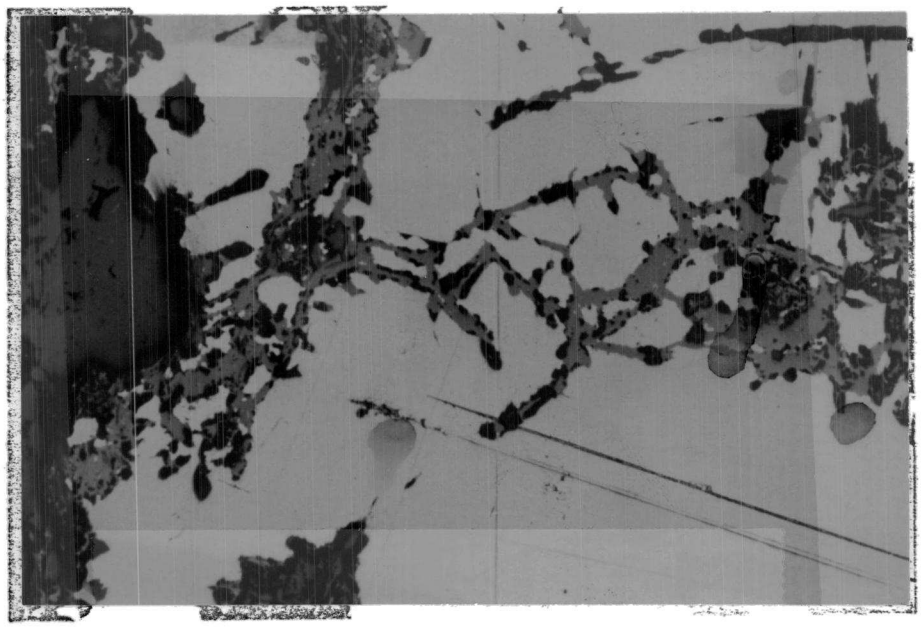

PLATE XII: Oz 8, plane light, 80X. Vein of galena (light grey) with secondary carbonate mineral (medium grey) replacing galena along fractures parallelling cleavage.

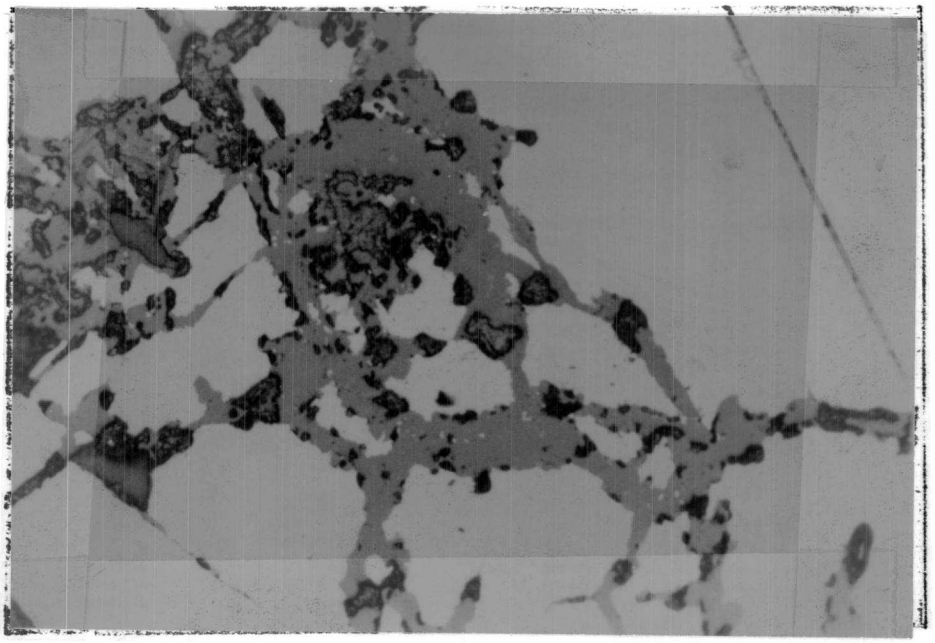

PLATE XIII: Oz 8, plane light, 160X. Magnification of Plate XII. Detail of carbonate mineral (medium grey) replacing galena along fractures parallel to cleavage. Note tiny blebs of unreplaced galena in carbonate mineral.

(iii) Disseminated galena in banded dolomites.

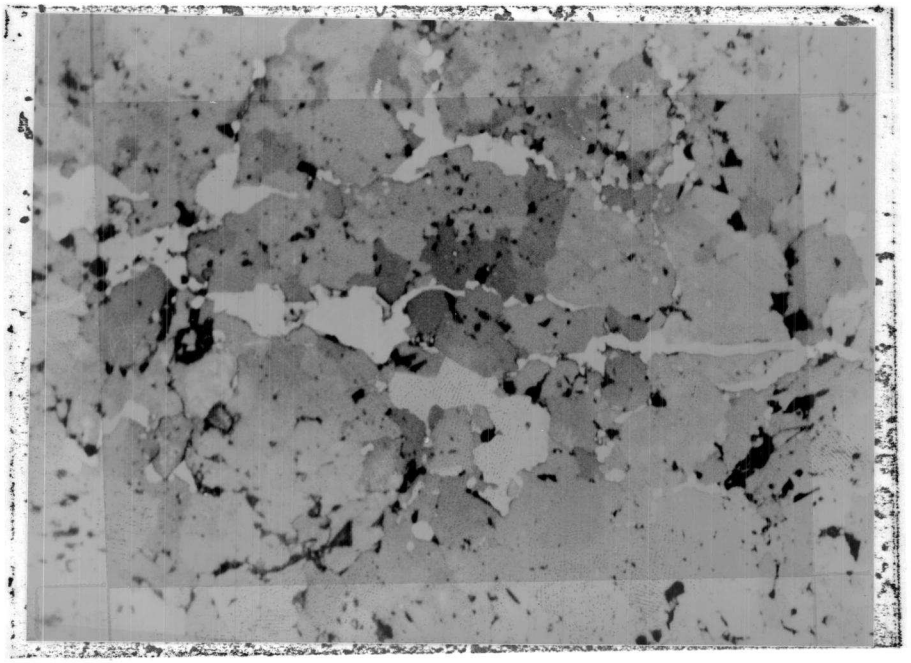

PLATE XIV: Oz 2, plane light, 80X. Galena (white) as disseminations and micro-veinlets controlled by euhedral to subhedral secondary carbonates (med. to dark grey) along the bedding planes of banded dolomite. Note the partial rims of sphalerite (light grey) between galena and carbonate.

(iv) Galena in black shales.

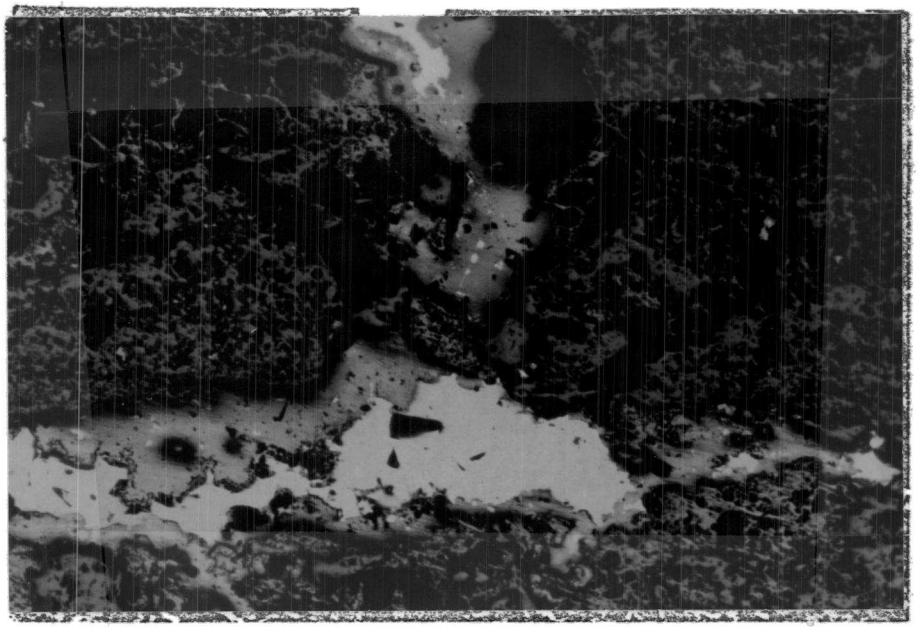

PLATE XV: Oz 9-A, plane light, 80X. Galena (white) with secondary carbonate mineral (medium grey) as micro-veinlets along the bedding planes and in fractures perpendicular to bedding in black shales. Black patches with indefinate outlines are holes left by the plucking of unidentified friable oxide(?) during polishing.

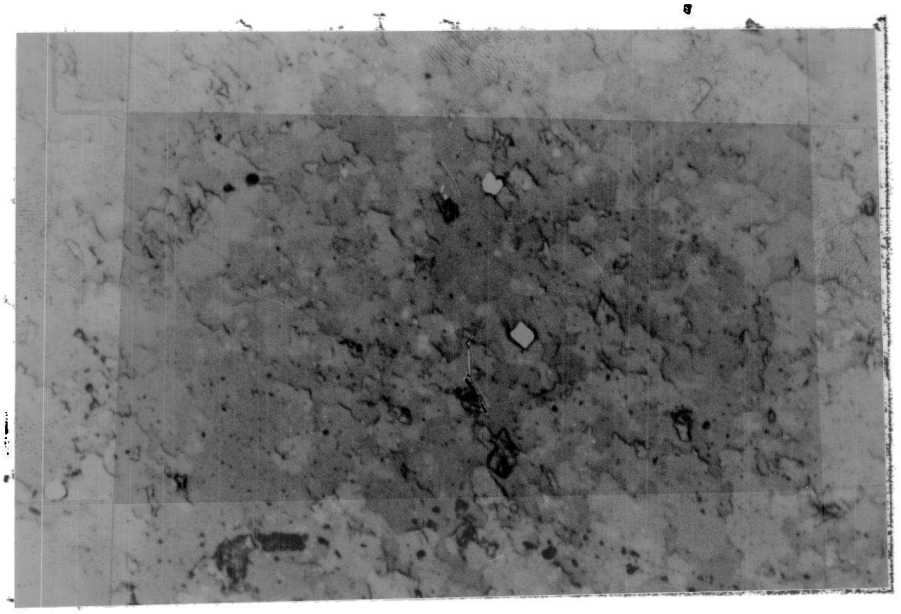

PLATE XVI: Oz 1-A, plane light, 320X. Pyrite cubes (white) in barren breccia wall rock.

APPENDIX II

ROCK GEOCHEMICAL VALUES

NORMAN WELLS AREA
MOUNT CAP FORMATION

top of Little Bear River 96D-9, 19 August 1975

Katherine Creek 96D-13, 20 August '75

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn	Mo	Ni	Fe%	Mn	Co	V	U
RY5P 231R	pyritic black shale	M€		23	9	22							
232R	"	"		56	78	14							
233R	"	"		25	66	18							
234R	"	"		220	90	18							
235R	"	"		290	104	17	12	12	6.04	160	37	21	
									(As)				
RY5P 236R	pyrite bed in dark medium gr. SS.	M€		48	166	52		43	26		130	16	1
237R	rusty seep from between bedding planes nr bse of Mt Cap.	"		31	46	43		17	2		48	12	ND
238R	qtz arenite w. glauc orch. in matrix	"	occ py.	17	14	8		27	3		41	12	0.6
RY5T 1346R	blk sh from Mt Cap nr bse	"		16	34	27							
1347R	"	"		70	200	152							
1348R	pyritic Mt. Cap.	"		12	27	12							
1349R	sooty, incomp sh band w. greenish efflor.	"		49	220	14							
1350R	brnish sh band from top of Mt. Cap.	"		21	60	182							
1351R	soft, grey-brn sh top of Mt. Cap	"		110	62	34							

NORMAN WELLS AREA
MT. CAP FORMATION

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
Probable Mt. Cap Fm from Canyon Kalls. QLD-11 10 Aug 75						
R45P-122R	grey fg ss w. blk sooty partings	ME		18	40	4
123R	grey fg ss w. blk sooty partings.	"		6	12	4
124R	pure white well sorted quartz arenite	"	weak Cu stain	480	10	12
125R	rusty black shale	"		18	30	10
126R	glauconitic quartz sandstone	"		8	20	8
127R	same as above	"		8	28	6
129R.	black sooty shale	"		44	56	29
DODO CANYON QLD-14 13 Aug 75						
R45P-169R	pyritic pale green SS float	ME	~1% py.	10	22	12
170R	middle of Mt Cap py in life-cutting grey fg ss	"	trace cp	20	106	30
171R	brown glauc. SS	"		39	46	14
		"				
LORETTA CANYON QLD-13 15 Aug 1975						
R45P-1231R	rusty Mt Cap Fm	ME		108	46	25
1233R	bright green sh w. minor py.	"		8	8	12
R45P-187R	green ish friable SS	"		3	23	10
188R	glauc SS w. pyrite	"		11	25	13
189R	soft gossanous material from Mt Cap.	"		176	43	33
192R	blk sh band from top of Mt Cap.	"		140	150	80

NORMAN WELLS AREA
Helikian age rx

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
R45P 136R	mauve fg SS from HKl	H		4	6	6
137R	slightly rusty SS congl. (SS clasts)	H		6	10	6
138R	purple HKl SS w. yellowish coatings on bedding planes	H		4	6	6
140R	purple cg w. shale clasts - base of HKu?	H		4	10	6
141R	black hematitic SS w. red chert clasts	H		6	12	6
144R	hematitic SS HKl	H		36	16	10
145R	hematitic SS HKl	H		10	12	10
R45P 142L	soil from top of L. Dal. Fm	H		8	10	18
143R	red weathering med grey ds L. Dal Fm	H	fg diss. cp throughout	1800	30	10
R45P 161R	rusty qtzite HKu or HKl	H		30	64	16
162R	purple SS.	H		2	5	2
163R	white qtz SS w. purple spots	H		2	4	2
164R	hem. cemented SS	H		3	8	6
165R	blk sh from K fm	H		94	168	16
166R	rusty weathering quartzite	H		52	17	7
167R	rusty weathering black shale	H		45	18	12
168R	well rounded m.g. qtz arenite maybe Mt Cap	H		10	31	14

Katherine Fm.

Little Dal Fm.

13 Aug. Dodo Canyon Katherine Fm.

NORMAN WELLS AREA
HELIKIAN ROCKS.

LORETTA CANYON
96D-13 15 Aug 1975

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
R45T 1228R	black shale band in upper Hku	H		52	24	11
1229R	hematite rich SS Hku	H		2	20	11
1230R	greenish shale band from Hku	H		1	5	8
R45P 190R	thin bed of hem. cemented cg uppermost Hku	H		2	12	8
R45P 230R	thin bedded SS w. graphite on bedding planes	H	Hku	27	39	26
R45P 217R	gassanous dm bx from Little Dal Fm.	H		Con[illegible]	[illegible]	[illegible]
106A 9 R45C-258R	qtz SS breccia w. lim cement	Hku	orl Flt	134	35	66

Slate Creek Prospect Fe-Cu-Ba
106D-16

Bear River Iron Formation
106D-16

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINERALOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn	Ni	Co	V	As	U
RY5P-47R	massive hematite	UNIT I PROTER.		8	12	8	12	64	8	15	2
48R	mainly hematite	Probably H		164	16	8	19	106	5	35	4
49R	hematite + barite - jasper	"		102	26	12	27	86	6	28	3
50R	barite - qtz - fspr? carbonate	"		47	9	10	10	33	2	2	3
51R	siderite	"	trace of cp	2700	40	30	32	194	3	2	ND
RY5P-84R	jasperoid cg w. hematite	UNIT H	trace cp	3200	17	12	34	60	17	2	5
85R	hematite w. barite?	"		36	4	6	24	174	10	2	1
86R	massive grey arg.	"	trace of qz on fracture	1340	15	17	40	200	9	8	27
87R	jasperoid cg w. Cu stain	"	qz-mal	460	15	14	32	76	20	4	4
88R	hematite in argillite		trace Cu stain	12600	18	16	12	66	7	29	3
89R	jasper pebble conglomerate			1480	18	14	27	64	4	8	4
90R	massive hematite			650	9	7					
91R	massive grey argillite		trace of cp	500	15	10					
92R	massive cherty argillite w. hem.			39	10	8					
93R	massive hematite w. minor barite.			13	6	5					
94R	jasper pebble cg. with hem matrix			176	6	10					

Samples from Crest Iron Formation

106 F-4

SAMPLE NUMBER	DESCRIPTION			GEOCHEMICAL VALUES									
	LITHOLOGY	AGE	MINERALOGY	Cu	Pb	Zn	Ni	Co	V	As	U		
RY5P-97R	KAPITAN dark purple greywacke w. gr shale fragments	H		47	23	80	30	68	48	4	ND		
98R	well sorted cs gn gw.	"		38	31	50	38	82	56	2	ND		
99R	cs gn greywacke	"		126	28	108	60	120	210	2	ND		
100R	black dolomitic argillite	"		56	38	128	37	76	315	2	5		
101R	Fine grained banded green and purple ss	"		66	26	74	50	90	210	2	ND		
102R	Iron formation w. spherulitic jasper in hematite.	"	hematite & jasper	17	15	12	17	70	7	2	0.4		
103R	Iron formation w. jasper and hematite.	"		58	14	8	23	66	6	3	ND		
104R	cg w. argillite pebbles floating in purple brg. matrix.	"		96	32	88	64	100	215	2	ND		
105R	brick red arg. w. ccc. clasts of green argillite or volc.	"		130	26	82	62	102	144	2	ND		
106R	Iron formation with 30% jasper, 70% hematite	"		34	17	12	23	76	15	3	ND		
107R	Iron Formation w. jasper and hematite	"		8	28	12	24	60	13	2	ND		

NORMAN WELLS AREA
UNIT H5

UPPER CARCAJOU CANYON 96D-11 10 Aug.

10GA-9

DODO CANYON 96D-13

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
R45P 130R	maroon concretionary shale	H		6	20	30
119R	green band from maroon shale	"		36	12	22
~~120R~~	~~P~~	"				
146R	pyritic H5 from near top	H		90	104	305
147R		"		5	12	23
148R		"		50	196	235
149R	sooty shale from below dead end shale	"		25	110	108
150R	pyritic black shale from SOFT below DESh	"		74	154	38
151R	glauc sh band below massive ss unit - coved be H5 or HKu	H		7	21	22
160R	pyritic black sh	"		192	178	186
R45P 179R	black sh.	"		88	74	16
180R	black sh	"		150	210	14
181R	qtz ss w. grn sh frags.	"		19	23	13
182R	ss w siltstone clasts	"	trace py	160	148	18
183R	grey to pale greenish grey shale	"	pyritic	24	36	18
184R	pyritic shale	"		168	230	30
185R	nearly massive pyrite from blk shale	"		156	215	230
186R	sid, py, cal vein material cutting H5	"		36	106	33

NORMAN WELLS AREA
UNIT H5

IEAus. 106A-9

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
R45P 218R	green glauc. SS	H				
219R	green to purple shaley SS	"				
220R	purple dom. sh	"				
221R	greenish yellow grose shale	"				
222R	pyritic SS.	"				
223R	grn SS w maure sh partings.	"	fg py throughout	3	8	30
225R	gypsum from H5	"		6	28	34
226R	gypsum with thin rusty band	"		42	74	58
~~227R~~		"				
106A-8 R45C + 245R	black shaley ls unit H5	"		35	66	28
~~228R~~						

NORMAN WELLS AREA
SALINE RIVER FORMATION

	SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
17 Aug 1975 Norman Range 96E-8	RY5P-203R	rusty S.R. fm.	ME		9	19	8
	204R	gypsum & dolomite cemented qtz granuless	"		10	32	17
	205R	rusty gypsiferous mudstone	"		15	27	12
	206R	mudchip cg w. pyrite	"		13	49	9
	207R	CROSS	"		8	32	8
	208R	SECTION	"		15	18	37
	209R	OF SR Fm	"		9	19	32
	210R	TOP	"		18	22	43
	211R	to Bottom	"		12	33	26
20 Aug 96 D-13 Katherine Ck.	RY5T-1352R	qtz ss w. greenish gyp. matrix	ME		5	17	18
	1353R	greenish gyps. mudstone	"		17	42	23
	1354R	pinkish & grnish gyp. mudstone	"		19	36	22
	1355R	rusty brecciated zone in top of SR Fm	"		25	47	19
	1356R	grnish shale from top of S.R. fm	"		31	22	40
	1357R	blk graph sh - base of FM Fm.	M→V E		25	94	1340
Sheep Mtn 96D	RY5C-278RG	rusty blk sh S.R. Fm	ME		21	42	26
	279RG	stained gypsum	"		25	58	28
	280R	rusty coarsely x/line gypsum	"		14	120	15

NORMAN WELLS AREA
SAMPLES FROM SALINE RIVER FM.
15 Aug 1975 LORETTA CANYON 96D-13

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
RY5P-191R	rusty weathering greenish shale	ME		3	22	32
193R	brown siltstone	"		34	40	18
194R	mauve dolomite with shale partings	"		5	36	20
195R	black bituminous gypsiferous siltstn	"		7	48	36
196R	red mudstone - top contact of SR Fm.	"		3	22	28
RY5T-1234R	Mt Cap contact	"		11	16	24
1235R	CROSS SECTION OF SALINE RIVER FORMATION	"		66	36	38
1236R		"		27	41	44
1237R		"		17	41	46
1238R		"		15	52	31
1239R		"		25	38	37
1240R		"		26	36	112
1241R	Franklin Mtn Fm. contact	"		26	24	36
RY5P 197R	greenish gypsiferous siltstone	ME		36	30	18
198R	greenish gypsiferous siltstone	"		13	24	43

REAR ROCK 96C-13 16 Aug

NORMAN WELLS AREA
SAMPLES FROM SALINE RIVER FORMATION
96D-11 - 10 Aug 1975

13 August.
96D-14 Dodo Canyon

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn
RY5P 109R	rusty weathering sandstone	M€		22	30	6
110R	green-grey silty shale w. mudcracks & salt x1 casts	"		20	20	22
111R	greenish, silty shale	"		32	22	20
112R	weakly rusty coarse gnd SS.	"		14	48	10
113R	black shale.	"		34	54	370
114R	buff SS w. maroon shale partings.	"		10	26	10
115R	weakly rusty dolomite	"		28	74	192
116R	as above, rusty vugs & cavities	"		14	62	240
117R	green to purple shaley conglomerate	"		28	24	30
118R	purple, friable silty sandstone	"		8	22	8
RY5P 173R	pink, unconsolidated gypsiferous mudstone from top of Saline R. Fm	M€		13	48	23
174R	salmon pink silty gypsum hr top of S.R. Fm.	"		3	32	10
175R	grey silty band from middle of SR Fm.	"		45	49	30
176R	grey gypsum cemented qtz SS from middle of S.R. Fm.	"		7	62	108
177R	black shale from near base of SR Fm	"		39	96	84
178R	petroliferous smelling blk sh from base of Form.	"		80	60	18

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINERALOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn	Cd
R45P-15R	buff weathering black argillite	Unit 2 H		54	68	68	
46R	buff weathering black argillite	Unit 2 H		22	<43	52	
R45P 55R	black shale	Unit 1 H		60	4	8	
R45P 56RG		H		23	305	22	
57RG	grasser samples breccias	H		56	1960	50	
58RG	Unit 2	H		33	345	19	
59RG		H		32	192	12	
61R	black shale	Unit 1 or Unit 2	H	8	275	300	
62RG		H		43	72	350	
63RG		H		15	86	760	
64RG	grasser samples	H		16	88	810	
65RG	Bonnet Plume	H		126	136	46	
66RG	Valley Bx's	H		70	136	68	
67RG		H		62	148	46	
68RG		H		72	1180	2100	
69RG		H					
70RG	Lad Claims	H					
71RG		H					
72R	grasser samples	H	yellowish efflorescence	12	565	2200	4.1
73R	Bonnet Plume Valley Bx's	H					

Bonnet Plume Valley 126C-13 pyritic breccias

NORMAN WELLS AREA
MISCELLANEOUS ROCK FORMATIONS.

SAMPLE NUMBER	DESCRIPTION: LITHOLOGY	AGE	MINEROLOGY	GEOCHEMICAL VALUES: Cu	Pb	Zn	Ni	Co	V	As	U
R45P 131R	green-grey shale Have Ind. or Hume Fm	Dev		32	20	124					
132R	blk sh w brachiopod fossils. Hume Fm	Dev.		78	30	520					
133R	black fossiliferous limestone	Hume Dev.	trace pyrobitumen	12	38	20					
134R	Bear Rock Breccia Ls.	Dev		8	36	10					
157R	slightly rusty Bear Rock Breccia Ls.	Dev.		7	66	23					
159R	rusty shale Di Imperial Fm	U Dev		138	32	420					
199R	ct cg w. pyrite - could be Di or Cret.	?		32	32	46					
201R	Blk shale - Imperial Fm	U Dev		[illegible]	[illegible]						
227R	yellow-brn SS w mauve shale partings basal Fm of FRANKLIN MTN	Є O		6 [illegible]	16 [illegible]	16					
228R	SS w elongate blebs of py & 2° qtz	Є O	basal Franklin Mtn	2	3	10					
229R	SS with shale partings & mudcracks	Є O.	basal F. M. Fm	5	5	14					
R45T 1270R	blk sh Imperial Fm	U Dev		39	28	250					
1272R	blk sh Imperial	U Dev.		23	24	104					
1275R	blk sh Imperial	U Dev.		9	17	38					
1287LR	blk sh Imperial Fm	U Dev		140	36	98					
1291R	blk sh Imperial Fm	U Dev.		23	31	108					
1298R	blk sh Imperial Fm	U Dev		40	34	36					
1303R	blk sh Imp. Fm	U Dev.	rusty.	305	26	1220	270	205	164	28	3

Vermillion Creek 96E-1
all in rusty weathering Imperial Fm.

NORMAN WELLS AREA
MISCELLANEOUS FORMATIONS

106A-9

SAMPLE NUMBER	DESCRIPTION			GEOCHEMICAL VALUES		
	LITHOLOGY	AGE	MINERALOGY	Cu	Pb	Zn
K45C 252	lim. cemented silt from blksh drainage	D		192	28	250
253R	blk sh	Dev		72	26	106
254R	blksh silt	Dev.		12	60	33
255RL	fine grained blue clay fault gouge	Dev?		22	33	28

LIST OF PERSONNEL

P. Dean	Project Geologist	1405 - 1011 Beach Avenue Vancouver, B.C.
W. Roberts	Geologist	124 Mundy Street Port Coquitlam, B.C.
R. Carne	Geologist	2222 Stephens Street Vancouver, B.C.
L. McLennan	Geologist	307, 8790 Cartier Vancouver, B.C.
R. Dickinson	Geologist	1395 Ottawa Street West Vancouver, B.C.
D. Davis	Field Assistant	Totem Park Residence, U.B.C. Vancouver, B.C.
M. Fretwell	Field Assistant	2135 Abbot Street Kelowna, B.C.
H. Hannigan	Field Assistant	5703 Eglinton Street Burnaby, B.C.
A. Tench	Field Assistant	755 - 13th Street West Vancouver, B.C.
M. Maser	Field Assistant	395 Sutherland Drive Toronto, Ontario
G. Burdikin	Field Assistant	2999 Surf Crescent Port Coquitlam, B.C.
R. Dawes	Cook	C/o R. S. Macey, R.R. #3 Qualicom Bay, B.C.
I. Taylor	Cook	General Delivery Whitehorse, Y.T.

CONTRACTORS

E. Caron Diamond Drilling Ltd.
7 Roundel Road
Whitehorse, Y.T.

Trans North Turbo Air
TNTA Hanger, Airport
Whitehorse, Y.T.

Acme Analytical Laboratories Ltd.
6455 Laurel
Burnaby, B.C.

FIGURES 1 - 32

Accompanying Report "REEF PROJECT
GENERAL REPORT ON
FIELD WORK - 1975"

N.T.S. 106 B,C,D,E
N.T.S. 116 A,B,C,F,G,H,J

By:
Peter M. Dean
CYPRUS ANVIL MINING CORPORATION

March, 1976 FILE

LIST OF FIGURES

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4 Summary Map: 106 C - Nadaleen River

5 Summary Map: 106 D - Nash Creek

6 Summary Map: 106 E - Wind River

7 Summary Map: 106 F - Snake River

8 Summary Map: 116 A - Larsen Creek

9 Summary Map: 116 B and C - Dawson

10 116 B - Coal Creek Dome, Geology, 1975 (Scale 1:2,640)

11 116 B - Coal Creek Dome, Geochem Values, 1975 (Scale 1:2,640)

12 116 B 13, 116 C 16 - Ug Claims Detail Area, Geochem Values (Scale 1:1,320)

13 116 B 12 and 13 - Coal Creek Dome Detail Area, Geochem Values, (Scale 1:1,320)

14 116 A 9 - Vug Claims Detail Area, Geochem Values (Scale 1:1,320)

15 116 A 9 - Detail Area, Geochem Values (Scale 1:1,320)

16 116 A 11 - Detail Area, Geochem Values (Scale 1:2,640)

17 116 A 16 - Detail Area, Geochem Values (Scale 1:2,640)

18 106 D 5 - Detail Area, Geochem Values (Scale 1:2,640)

19 106 D 7 - Will Claims Detail Area, Geochem Values (Scale 1:2,640)

20 106 D 12 - Detail Area, Geochem Values (Scale 1:2,640)

21 106 D 5, 6, 11, 12 - Castle Ridge Detail Area, Geochem Values (Scale 1:2,640)

22 Histograms of Geochemical Values for Co, Ni, As, V and U

23 106 C 12 - Detail Area, Geochem Values (Scale 1:2,640)

24 106 C 12 - Detail Area, Geochem Values (Scale 1:2,640)

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26 106 D 16 - Detail Area, Geochem Values (Scale 1:2,640)

27 106 C, D, E, F - Fairchild Lake Area - Cu, Co and U Showings in Helikian Shales

28 106 A 1, 2 - Detail Area, Geochem Values (Scale 1:2,640)

29 106 A - Detail Area, Geochem Values (Scale 1:2,640)

30 106 A - Detail Area, Geochem Values (Scale 1:2,640)

31 96 D 3 - Detail Area, Geochem Values (Scale 1:2,640)

32 96 E 1 - Detail Area, Geochem Values (scale 1:2,640)

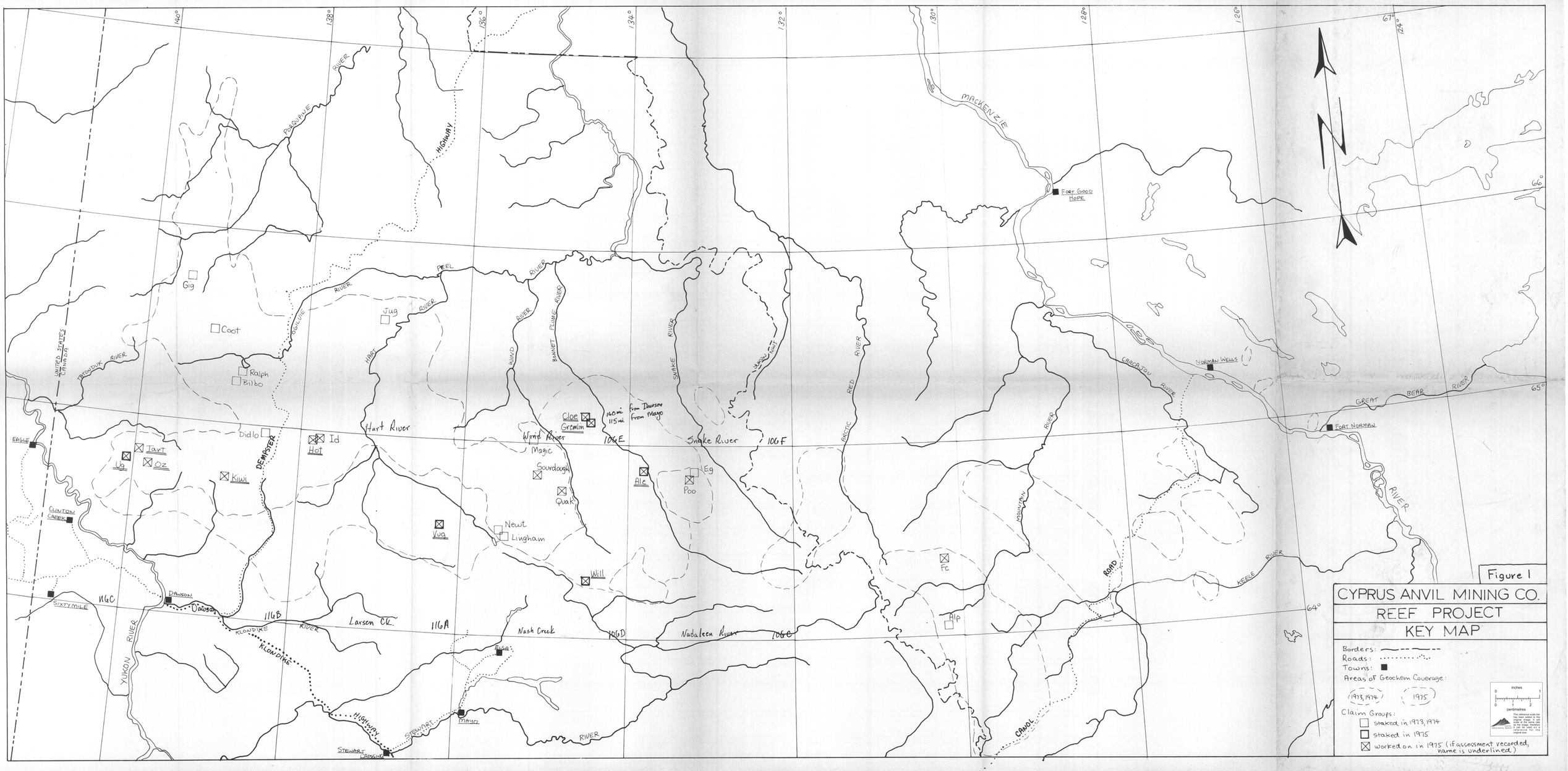

Figure 1
CYPRUS ANVIL MINING CO.
REEF PROJECT
KEY MAP
Borders:
Roads:
Towns:
Areas of Geochem Coverage:
1973, 1974
1975
Claim Groups:
staked in 1973, 1974
staked in 1975
worked on in 1975 (if assessment recorded, name is underlined)
inches
centimetres
This reference scale has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
Hart River
Wind River
Snake River
Nadaleen River
Larsen Ck.
Nash Creek
Dawson
Dawson
Mayo
Elsa
Fort Good Hope
Norman Wells
Fort Norman
Eagle
Clinton Creek
Sixtymile
Stewart Crossing
Gig
Coot
Ralph
Bilbo
Jug
Didlo
Id
Hot
Tart
Oz
Kiwi
Vug
Newt
Lingham
Will
Sourdough
Quak
Cloe
Gremlin
Ale
Poo
Eg
Fc
Alp
160 mi from Dawson
115 mi from Mayo
106E
106F
106D
106C
116A
116B
116C
Porquine River
Peel River
Ogilvie River
Hart River
Wind River
Bonnet Plume River
Snake River
Yukon River
Arctic Red River
Mountain River
Carcajou River
Great Bear River
Keele River
Mackenzie
Yukon River
Klondike River
Stewart River
Tatonduk River
Dempster Highway
Canol Road
United States
Canada
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138°
136°
134°
132°
130°
128°
126°
124°
67°
66°
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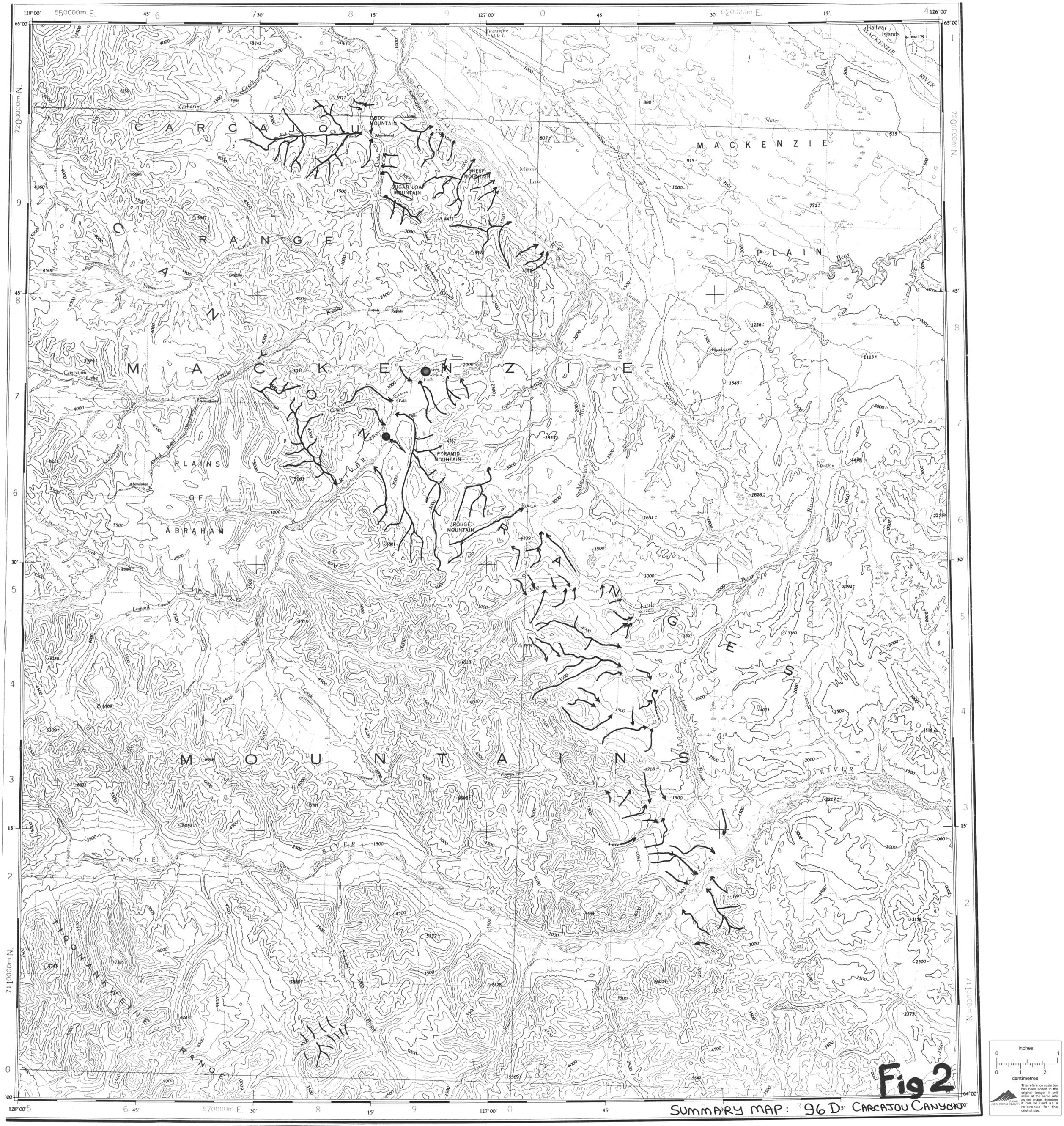
64°


128° 00'
550000m E.
45'
6
7 30'
8 15'
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127° 00'
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30'
620000m E.
15'
4
126° 00'
65° 00'
720000m N.
CARCAJOU RANGE
MACKENZIE MOUNTAINS
MACKENZIE PLAIN
PLAINS OF ABRAHAM
KEELE RANGE
TIGONANKWENTE RANGE
Carcajou Canyon
Dodo Mountain
Sugar Loaf Mountain
Sheep Mountain
Pyramid Mountain
Rouge Mountain
Mirror Lake
Twentyfive Mile L.
Halfway Islands
MACKENZIE RIVER
Katherine Creek
Echo Falls
Dodo Creek
Canyon Falls
Abandoned Road
Rapids
Keele River
Little Bear River
Carcajou Lake
Leonard Creek
Andy Creek
Grotto Creek
Jackfish Creek
Ration Creek
Summit Creek
Strunk Creek
Slater River
Mountain River
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711000m N.
570000m E.
64° 00'
inches
centimetres
YUKON GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
Fig 2
SUMMARY MAP: 96 D/5 CARCAJOU CANYON

130°00′ 45′ 30′ 15′ 129°00′ 45′ 30′ 15′ 128°00′

460000m E. 7 8 9 0 1 2 3 540000m E.

65°00′ 45′ 30′ 15′ 64°00′

7200000m N. 9 8 7 6 5 4 3 2 1 7100000m N.

106A-13 106A-14 106A-15 106A-16

106A-12 106A-11 106A-10 106A-9

106A-5 106A-6 106A-7 106A-8

106A-4 106A-3 106A-2 106A-1

MACKENZIE MOUNTAINS

RICHARDSON MOUNTAINS

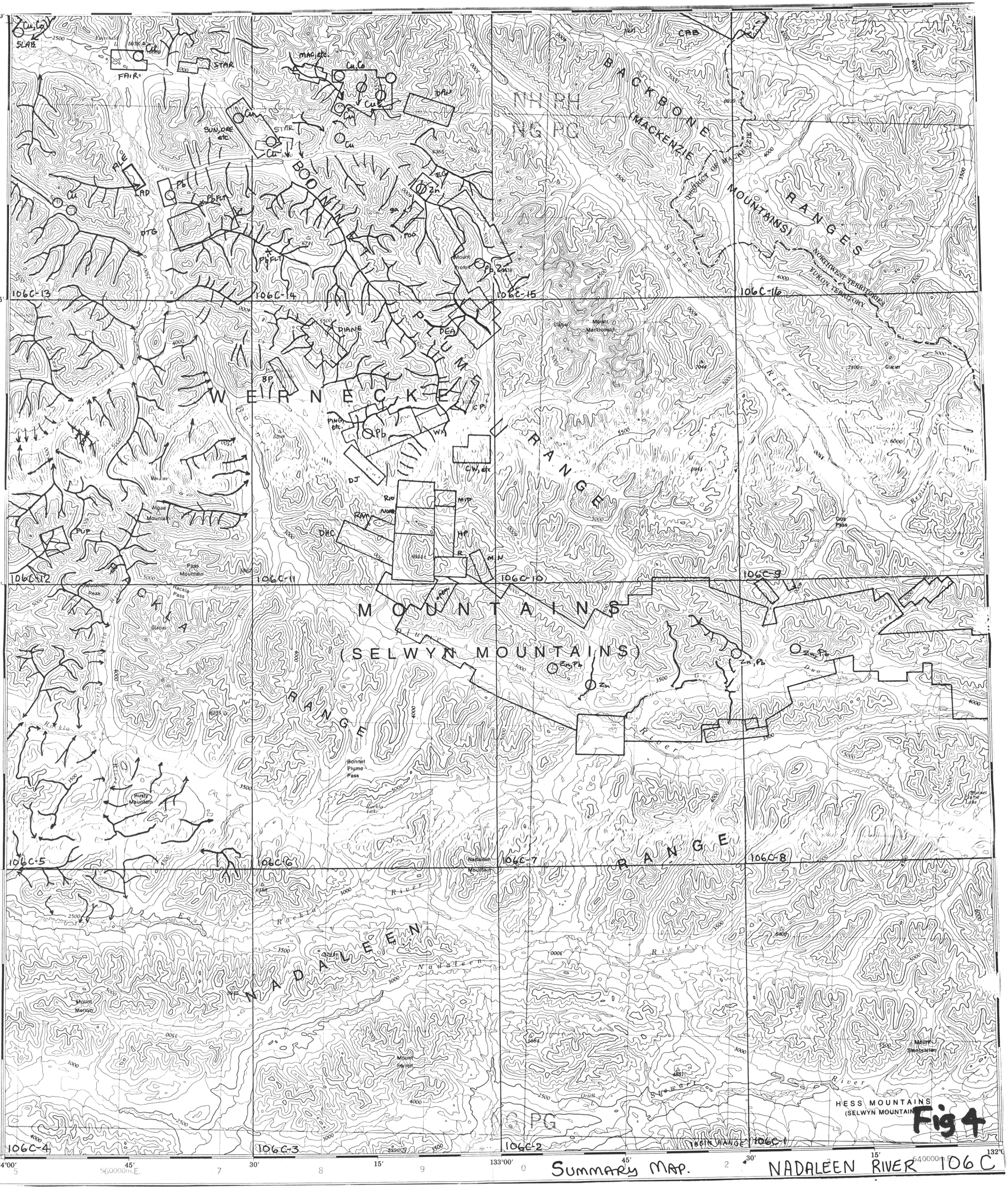
Fig 3

SUMMARY MAP: 106A—M+Eduni

inches 0 1 0 1 2 centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

YUKON GEOLOGICAL SURVEY


65°00'
45'
30'
15'
64°00'
134°00'
45'
30'
15'
133°00'
45'
30'
15'
132°00'
720000m.N.
711000m.N.
560000m.E.
640000m.E.
106C-13
106C-14
106C-15
106C-16
106C-12
106C-11
106C-10
106C-9
106C-5
106C-6
106C-7
106C-8
106C-4
106C-3
106C-2
106C-1
BACKBONE RANGE (MACKENZIE MOUNTAINS)
BOOMERANG RANGE
WERNECKE MOUNTAINS
PEEL PLATEAU
SELWYN MOUNTAINS
NADALEEN MOUNTAINS
HESS MOUNTAINS (SELWYN MOUNTAINS)
DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES
YUKON TERRITORY
SLAB
FAIR
STAR
MAC etc.
SUN, ORE etc.
DAL
LAD
DTG
DEA
DIANE
BP
DJ
DHC
CW, dk
Mount Protest
Mount MacDonald
Glacier
Algae Mountain
Pup
Pass Mountain
Rusty Mountain
Mount Mervyn
Mount Farrell
Nadaleen Mountain
Bonnet Plume Pass
Hackla Pass
Goz Pass
Mount Stanbaken
Redstone
Hackla
Nadaleen
Stewart
Orrell
Bonnet Plume Lake
Hackla Lake
Redstone Creek
Glacier
Mountain
Pass
Lake
Creek
River
Fig 4
Summary Map. NADALEEN RIVER 106 C
inches
centimetres
YUKON GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

NASH CREEK 106 D

Fig 5

65°00′
7200000m.N.
9
45′
8
7
6
30′
5
4
3
15′
2
7110000m.N.
0
64°00′
136°00′
460000m.E.
45′
7
30′
8
15′
9
135°00′
0
1
45′
2
30′
3
15′
540000m.E.
134°

106D-13
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106D-3
106D-2
106D-1

RED MOUNTAIN
SELWYN MOUNTAINS
OGILVIE MOUNTAINS
DAVIDSON RANGE
PATTERSON RANGE
BEAVER MOUNTAINS
EAGLE RIDGE
ELLIOTT RIDGE
CARPENTER RIDGE

Mount Fingerland 5991±
Mount Williams
Mount Braine
Mount Good
Mount Westman 7094±
Mount Patterson 5852±
Mount Cameron 6611±
Steamboat Mountain 6762±
Castle Mountain
Haggart Dome 4917±
Lynx Dome
Grey Copper Hill
Summer Hill
Foggy Hill
Zahn Hill
Braine Pass
Hart Lake
Ettrritt Lake
Steamboat Lake
Eagle Lake
Clark Lakes
Scruggie Lakes
Rathleen Lakes
Harrison Lakes
Ladue Lake

Bear River
Rapid River
Stone Creek
Eagle Creek
McQuesten River
South McQuesten River
Beaver River
Nash Creek
Williams Creek
Rankin Creek
Cache Creek
Scruggie Creek
Rackla River
East Rackla R.
Pelly River
Gisborne Creek
Elliott Creek
Ettrritt Creek
McLean Creek
Falls Creek
Ironrust Creek
Lynx Creek
Chrystie Creek
Haggart Creek
Summer Creek
Carpenter Creek
Honeybee Creek

SLAB/PIT
SID
JULIA
JOE
QUAK
LYNX
PAN, etc.
GWAHR
ERIN
JAY
LIN
LINGAM
NEWT
SOURDOUGH
KEER, etc.
DAGG, CON, BUD
MARGARET, LENS
MARSHALL, etc. LENS

Cu
Cu,Pb
Pb,Zn,Cu
Pb,Zn
Ag,Pb,Cu
Ag,Pb,Zn
Ag,Pb
Pb,Sb
Au
Cu,Zn
PAR
PEEP, etc

MG NG
MF NF

inches
0 1
centimetres
0 1 2
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY

RICHARDSON MOUNTAINS

PEEL RIVER

PEEL

Chappie Lake Cabin

Deception Lake

Hungry Lake

MOUNT DELAURIERS

Margaret Lake Cabin

Illoyd Creek

WIND

RAD

WINDY

GREMLIN

FLUNK

MAGIC

MOUNTAIN

Fig 6

106E-1 106E-2 106E-3 106E-4 106E-5 106E-6 106E-7 106E-8 106E-9 106E-10 106E-11 106E-12 106E-13 106E-14 106E-15 106E-16

66°00 45' 30' 15' 135°00 45' 30' 134°

136°00 45' 30' 15'

721000m N

WIND RIVER 106E

inches 0 1

centimetres 0 1 2

YUKON GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

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106F-12 | 106F-11 | 106F-10 | 106F-9

106F-5 | 106F-6 | 106F-7 | 106F-8

106F-4 | 106F-3 | 106F-2 | 106F-1

NORTHWEST TERRITORIES
YUKON TERRITORY
SNAKE RIVER
Many Beaver Lake
BALD HILL
2705
3095
5740
4618
4826
6728
6758
6558
5175
SNAKE
CANYON
AIRSTRIP
ACE Marini
CREST IRON FORMATION CLAIMS
SOURCE OF CREST IRON FORMATION ROCK & GEOCHEMISTRY SAMPLES RUSP-97R TO 107R
KOOK etc
YUKON TERRITORY
NORTHWEST TERRITORIES
DISTRICT OF MACKENZIE
EAB Wel N
UVE B. Marini
CAB Wel N
AB Wel N
BB
PAB
AB
ZK
KEN Screen
YUK

134°00′ 45′ 30′ 15′ 133°00′ 45′ 30′ 15′ 132°00′
66°00′ 45′ 30′ 15′ 65°00′
731000m N. 732000m N. 722000m N.
550000m E. 630000m E.

SUMMARY MAP.

SNAKE RIVER 106F

F97

inches 0 1
centimetres 0 1 2

YUKON GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

65°00'

7200000m.N.

45'

30'

15'

64°00'

7110000m.N.

138°00'

360000m.E.

45'

30'

15'

137°00'

45'

30'

15'

440000m.E.

136°

116A-13

116A-14

116A-15

116A-16

116A-12

116A-11

116A-10

116A-9

116A-5

116A-6

116A-7

116A-8

116A-4

116A-3

116A-2

116A-1

LH MH

LG MG

LG MG

MOUNTAINS

MOUNTAINS

WOERNECKE MOUNTAINS

ISELWYN MOUNTAINS

SYENITE RANGE

Fig 8

LARSEN CREEK 116 A

Mikalla

GOLD

RN

HOT

Two Beaver Lake

Davidson Pass

Mount Auston

Mount Hoffman

Three Fairfel Lakes

Limit of former staking

HART, CLINE, etc

JEM, etc

VUG

Cu, Pb, Zn

Cu, Pb

Cu

Cu

Cu

inches
0 1
0 1 2
centimetres

This reference scale bar has been added to the original map. It is to scale at the same ratio as the image, therefore it can be used as a reference for the original size.

GEOLOGICAL SURVEY

116C-15 116C-16 116B-13 116B-14 116B-15 116B-16

116C-10 116C-9 116B-12 116B-11 116B-10 116B-9

116C-7 116C-8 116B-5 116B-6 116B-7 116B-8

116C-2 116C-1 116B-4 116B-3 116B-2 116B-1

UNITED STATES OF AMERICA
CANADA
ALASKA
YUKON TERRITORY

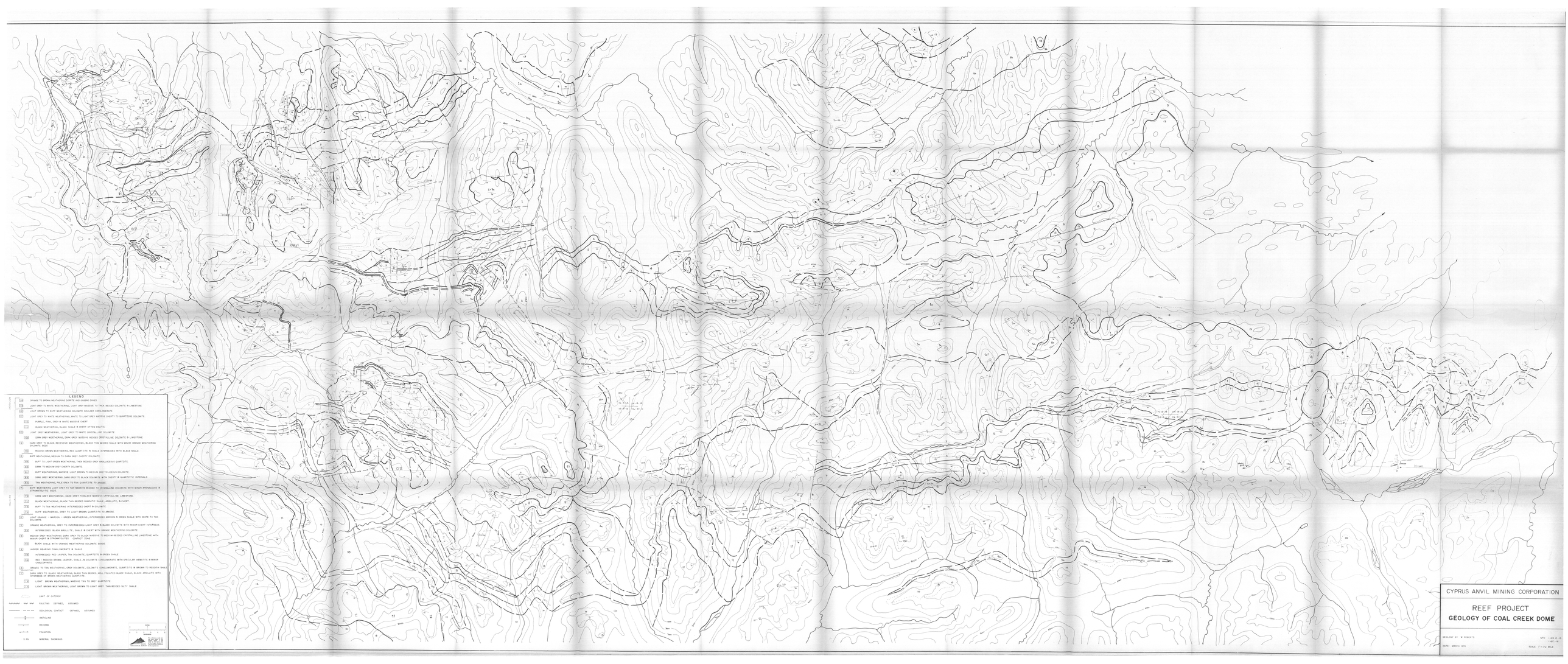
Boundary

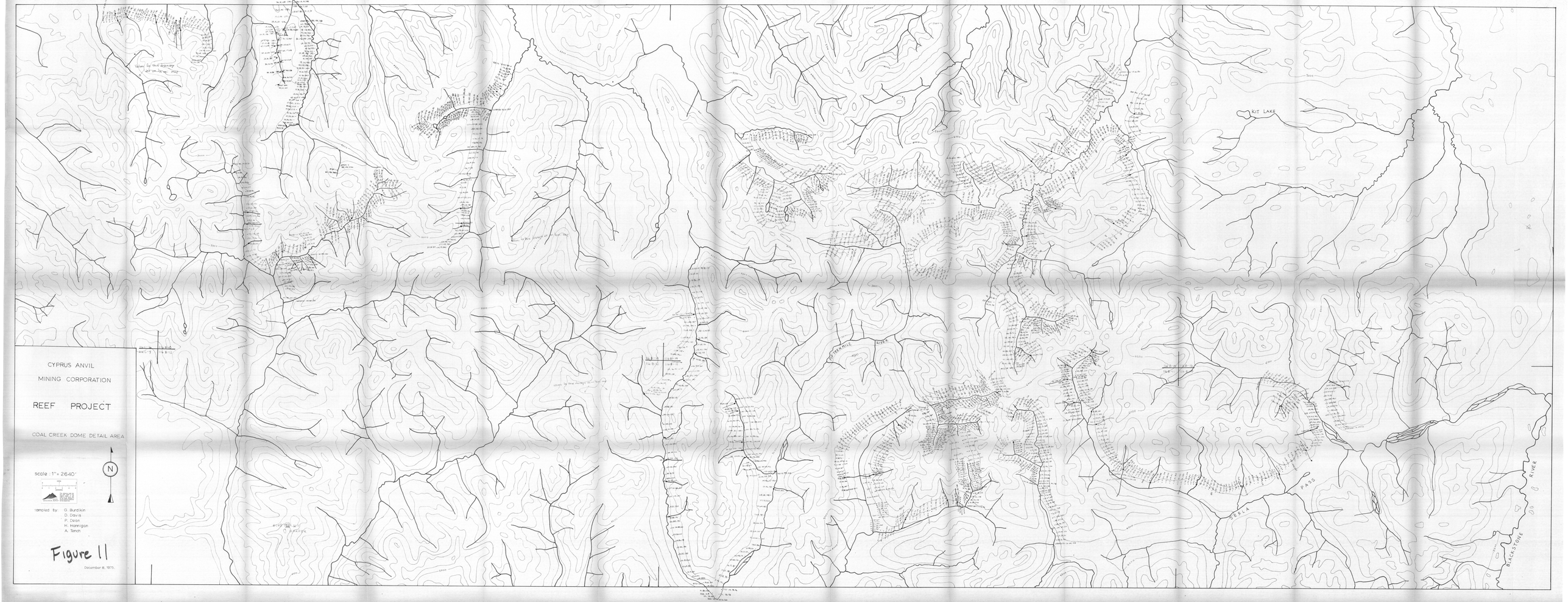
Dawson
Bonanza
Hunker
Eldorado
Sulphur
Lucky Boy
Gold Run
Gold Hill
Grand Forks
Monte Cristo
Last Chance
Gold Bottom
Quartz Gulch
Lovett Gulch
Hunker Creek
Bear Creek
Rock Creek
Moosehide
West Dawson
Fort Reliance
Forty Mile
Sixtymile
Glacier Creek
Caribou Crossing
Caribou Creek
Caribou Hill
Grouse Mountain
Lone Mtn
Tombstone Mtn
Tombstone Gap
Tombstone Range
Tombstone River
Tombstone Creek
Eureka Creek
Eureka Dome
Cassiar Dome
Sweden Dome
Baldy Mtn
Caldwell Lk
Chapman Lk
Lake Creek
Kit Lk
Kiwi
Kim
Walker
Walker Creek
Walker Fork
Walker Lk
Walker Mtn
Fossil Creek
Fossil Mtn
Fossil Ridge
Hunker Dome
Hunker Hill
Klondike Hill
Australian Hill
Dawson 1200
Dawson 1100
Dawson 1000
Dawson 900
Dawson 800
Dawson 700
Dawson 600
Dawson 500
Dawson 400
Dawson 300
Dawson 200
Dawson 100
Dawson Bar
Klondike Bar
Dawson Range
Klondike Plateau
Klondike Mountains
Yukon River
Klondike River
Indian River
Hunker Creek
Bonanza Creek
Eldorado Creek
Sulphur Creek
Lucky Boy Creek
Gold Run Creek
Gold Hill Creek
Grand Forks Creek
Monte Cristo Creek
Last Chance Creek
Gold Bottom Creek
Quartz Gulch Creek
Lovett Gulch Creek
Caribou Creek
Eureka Creek
Fossil Creek
Walker Creek
Walker Fork
Lake Creek
Tombstone Creek
Tombstone River
Tombstone Gap
Tombstone Range
Tombstone Mtn
Lone Mtn
Grouse Mountain
Fort Reliance
Moosehide
West Dawson
Rock Creek
Bear Creek
Sixtymile
Glacier Creek
Forty Mile
Caribou Crossing
Caribou Hill
Hunker Hill
Klondike Hill
Australian Hill
Hunker Dome
Eureka Dome
Cassiar Dome
Sweden Dome
Baldy Mtn
Caldwell Lk
Chapman Lk
Kit Lk
Kiwi
Kim
Walker
Walker Mtn
Fossil Mtn
Fossil Ridge
Lucky Boy
Gold Bottom
Quartz Gulch
Lovett Gulch
Gold Run
Gold Hill
Grand Forks
Monte Cristo
Last Chance
Eldorado
Sulphur
Hunker
Bonanza
Dawson

DPW CAMP 10 MILE 67

Fig 9

141°00' 45' 30' 15' 140°00' 45' 30' 15' 139°00' 45' 30' 15' 138°0
64°00' 710000m N. Fairbanks 335 m


LEGEND
ORANGE TO BROWN WEATHERING DIORITE AND GABBRO DYKES
LIGHT GREY TO WHITE WEATHERING, LIGHT GREY MASSIVE TO THICK BEDDED DOLOMITE & LIMESTONE
LIGHT BROWN TO BUFF WEATHERING DOLOMITE BOULDER CONGLOMERATE
LIGHT GREY TO WHITE WEATHERING, WHITE TO LIGHT GREY MASSIVE CHERTY TO QUARTZOSE DOLOMITE
PURPLE, PINK, GREY & WHITE MASSIVE CHERT
BLACK WEATHERING, BLACK SHALE & CHERT OFTEN OOLITIC
LIGHT GREY WEATHERING, LIGHT GREY TO WHITE CRYSTALLINE DOLOMITE
DARK GREY WEATHERING, DARK GREY MASSIVE BEDDED CRYSTALLINE DOLOMITE & LIMESTONE
DARK GREY TO BLACK, RECESSIVE WEATHERING, BLACK THIN BEDDED SHALE WITH MINOR ORANGE WEATHERING DOLOMITE BEDS
REDDISH BROWN WEATHERING, RED QUARTZITE & SHALE INTERBEDDED WITH BLACK SHALE
BUFF WEATHERING, MEDIUM TO DARK GREY CHERTY DOLOMITE
BUFF TO LIGHT GREEN WEATHERING, THIN BEDDED GREY ARGILLACEOUS QUARTZITE
DARK TO MEDIUM GREY CHERTY DOLOMITE
BUFF WEATHERING, MASSIVE, LIGHT BROWN TO MEDIUM GREY SILICEOUS DOLOMITE
DARK GREY WEATHERING, DARK GREY TO BLACK DOLOMITE WITH CHERTY & QUARTZITIC INTERVALS
TAN WEATHERING, PALE GREY TO TAN QUARTZITE TO ARKOSE
BUFF WEATHERING, LIGHT GREY TO TAN MASSIVE BEDDED TO DIVISIBLE DOLOMITE WITH MINOR ARENACEOUS & STROMATOLITIC BEDS
DARK GREY WEATHERING, DARK GREY TO BLACK MASSIVE CRYSTALLINE LIMESTONE
BLACK WEATHERING, BLACK THIN BEDDED GRAPHITIC SHALE, ARGILLITE, & CHERT
BUFF TO TAN WEATHERING INTERBEDDED CHERT & DOLOMITE
BUFF WEATHERING, GREY TO LIGHT BROWN QUARTZITE TO ARKOSE
LIGHT ORANGE - MAROON - GREEN WEATHERING, INTERBEDDED MAROON & GREEN SHALE WITH WHITE TO TAN DOLOMITE
ORANGE WEATHERING, GREY TO INTERBEDDED LIGHT GREY & BLACK DOLOMITE WITH MINOR CHERT INTERBEDS
INTERBEDDED BLACK ARGILLITE, SHALE & CHERT WITH ORANGE WEATHERING DOLOMITE
MEDIUM GREY WEATHERING, DARK GREY TO BLACK MASSIVE TO MEDIUM BEDDED CRYSTALLINE LIMESTONE WITH MINOR CHERT & STROMATOLITES CONTACT ZONE
BLACK SHALE WITH ORANGE WEATHERING DOLOMITE BANDS
JASPER BEARING CONGLOMERATE & SHALE
INTERBEDDED RED JASPER, TAN DOLOMITE, QUARTZITE & GREEN SHALE
RED - REDDISH BROWN JASPER, SHALE, & DOLOMITE CONGLOMERATE WITH SPECULAR HEMATITE & MINOR CHALCOPYRITE
ORANGE TO TAN WEATHERING, GREY DOLOMITE, DOLOMITE CONGLOMERATE, QUARTZITE & BROWN TO REDDISH SHALE
DARK GREY TO BLACK WEATHERING, BLACK THIN BEDDED, WELL FOLIATED BLACK SHALE, BLACK ARGILLITE WITH INTERBEDS OF BROWN WEATHERING QUARTZITE
LIGHT BROWN WEATHERING, MASSIVE TAN TO GREY QUARTZITE
LIGHT BROWN WEATHERING, LIGHT BROWN TO LIGHT GREY, THIN BEDDED SILTY SHALE
LIMIT OF OUTCROP
FAULTING - DEFINED, ASSUMED
GEOLOGICAL CONTACT - DEFINED, ASSUMED
ANTICLINE
BEDDING
FOLIATION
MINERAL SHOWINGS
CYPRUS ANVIL MINING CORPORATION
REEF PROJECT
GEOLOGY OF COAL CREEK DOME
GEOLOGY BY: W. ROBERTS
DATE: MARCH 1970
NTS 105P-12-15
105O-16
SCALE 1"=1/2 MILE



CYPRUS ANVIL

MINING CORPORATION

REEF PROJECT

COAL CREEK DOME DETAIL AREA

scale : 1" = 2640'

N

compiled by: G. Burdikin
D. Davis
P. Dean
H. Harrington
A. Tench

Figure 11

December 8, 1975.

CYPRUS ANVIL MINING CORPORATION

REEF PROJECT

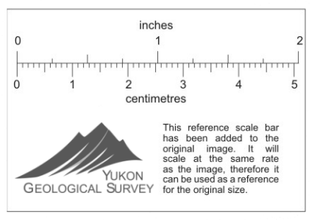
COAL CREEK DOME DETAIL AREA

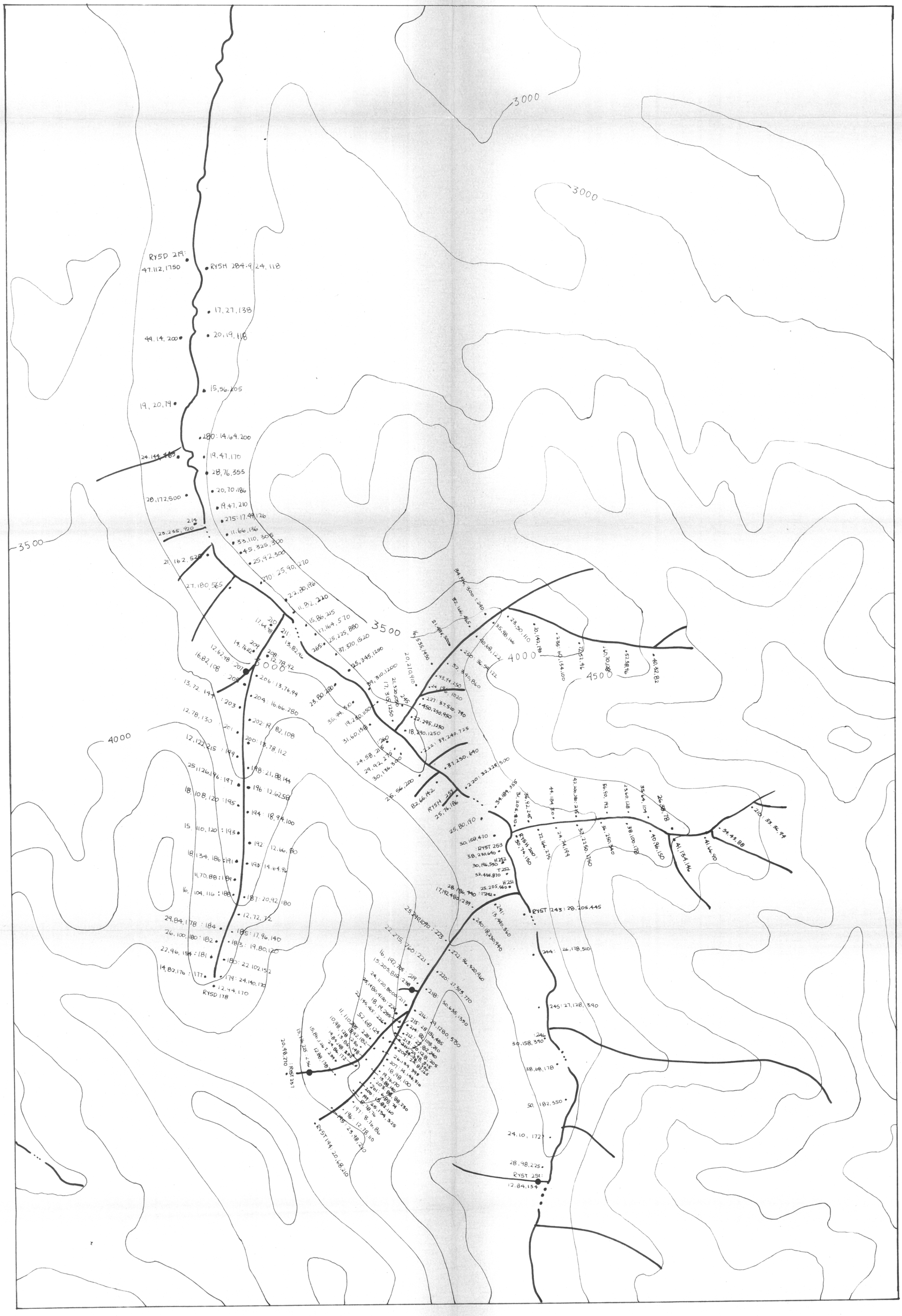
n.t.s. : 116 B-13 & 116 C-16 scale: 1" = 1320'

Sampled by: D. DAVIS, H. HANNIGAN, A. TENCH

DECEMBER 11, 1975.

Fig 12





inches
0 1 2
0 1 2 3 4 5
centimetres
YUKON GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

CYPRUS ANVIL MINING CORPORATION

REEF PROJECT

Fig 13

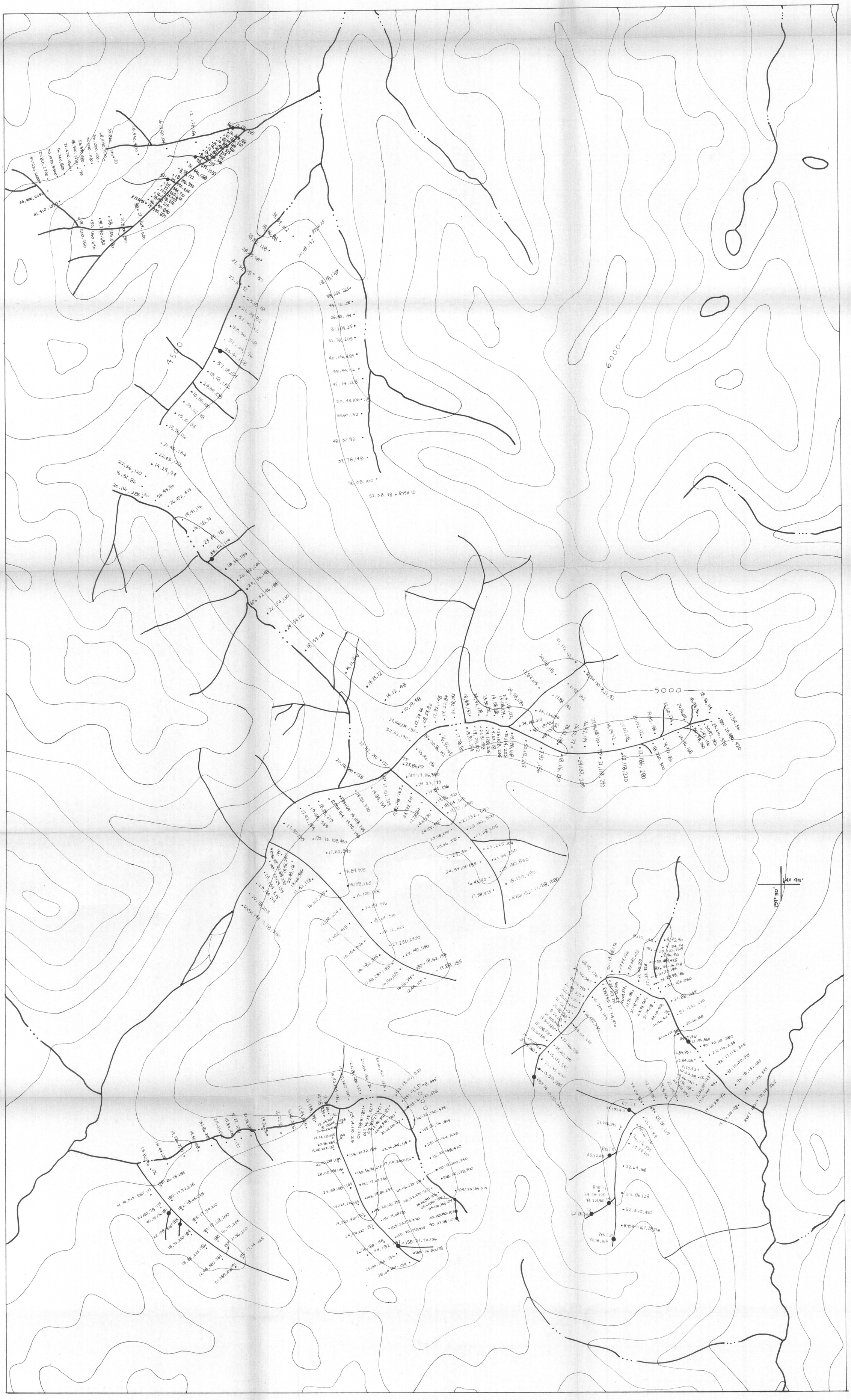
COAL CREEK DOME DETAIL AREA

n.t.s.: 116 B-12 & 13 scale: 1" = 1320"

sampled by: G. BURDIKIN, H. HANNIGAN, A. TENCH

DECEMBER 11, 1975.

N



CYPRUS ANVIL MINING CORPORATION
REEF PROJECT

N.T.S. 116 A - 9

VUG CLAIM GROUP
GEOCHEM MAP

SCALE: 1" = 1320'

SAMPLED BY: D. DAVIS
M. FRETWELL

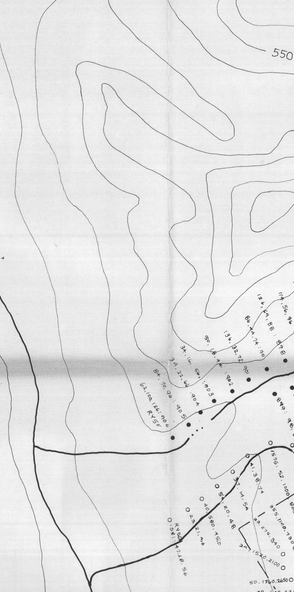
NOVEMBER 17, 1975.

Fig 14
~~1 OF 2~~

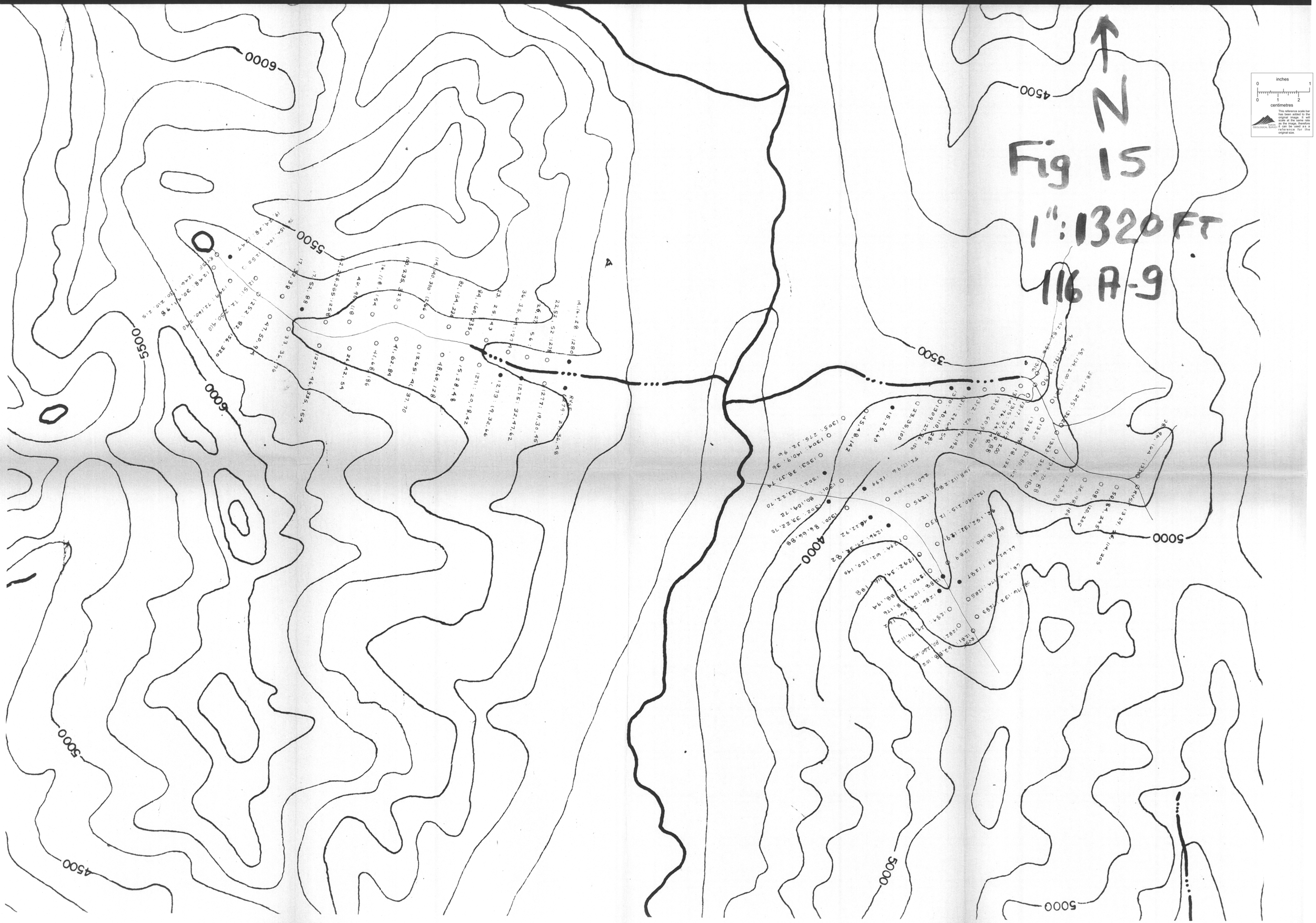
~~FIGURE 3~~

~~Figure 3~~

N



64°30'


N
Fig 15
1":1320 FT
116 A-9
6000
5500
5000
4500
4000
3500
inches
centimetres
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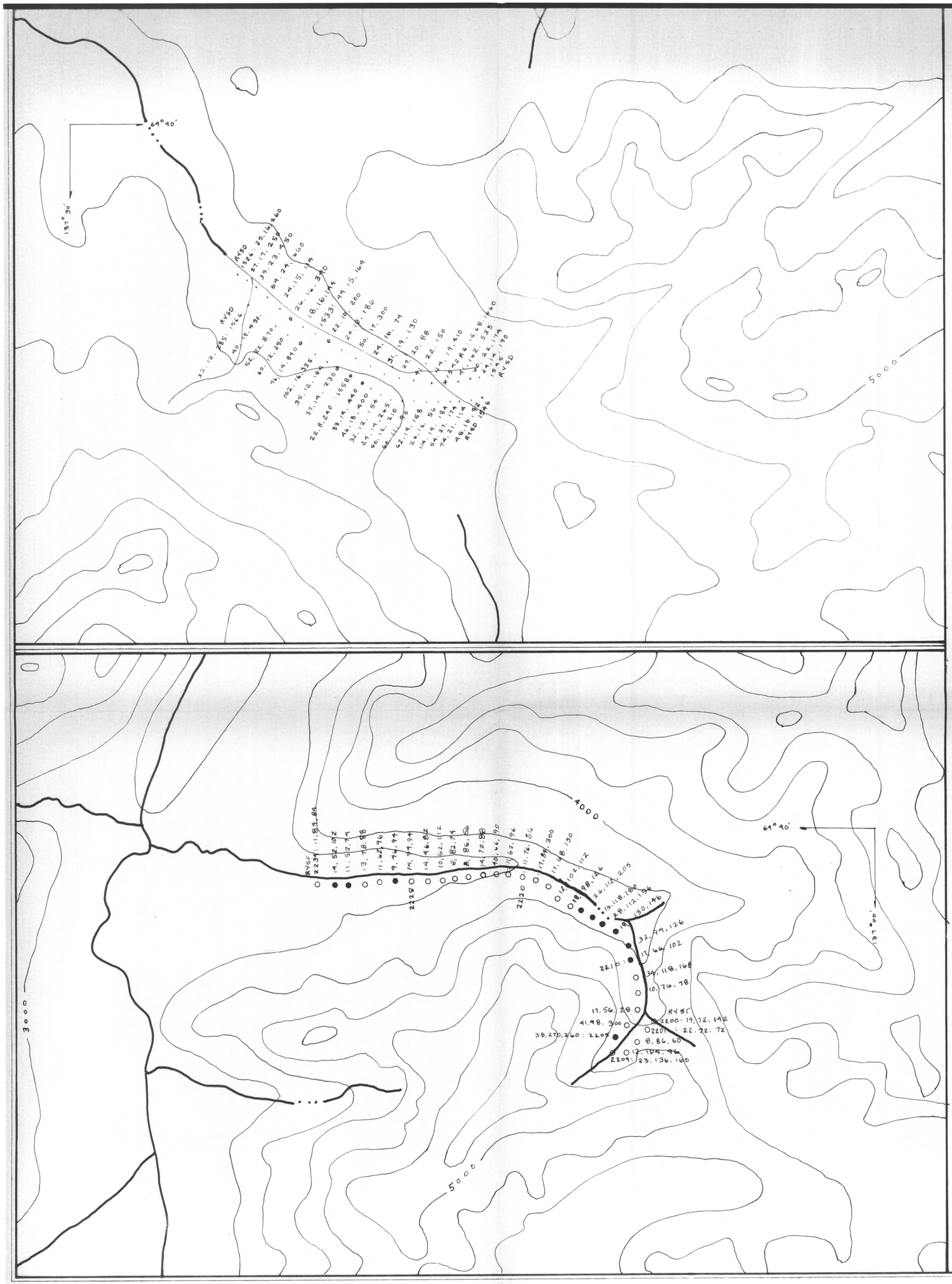
GEOLOGICAL SURVEY



CYPRUS ANVIL MINING CORPORATION

REEF PROJECT

N.T.S. 116A-11

Fig 16

SCALE: 1" = 2640'

SAMPLED BY:

D. DAVIS

M. FRETWELL

NOVEMBER 10, 1975

inches

0 1 2

0 1 2 3 4 5

centimetres

YUKON GEOLOGICAL SURVEY

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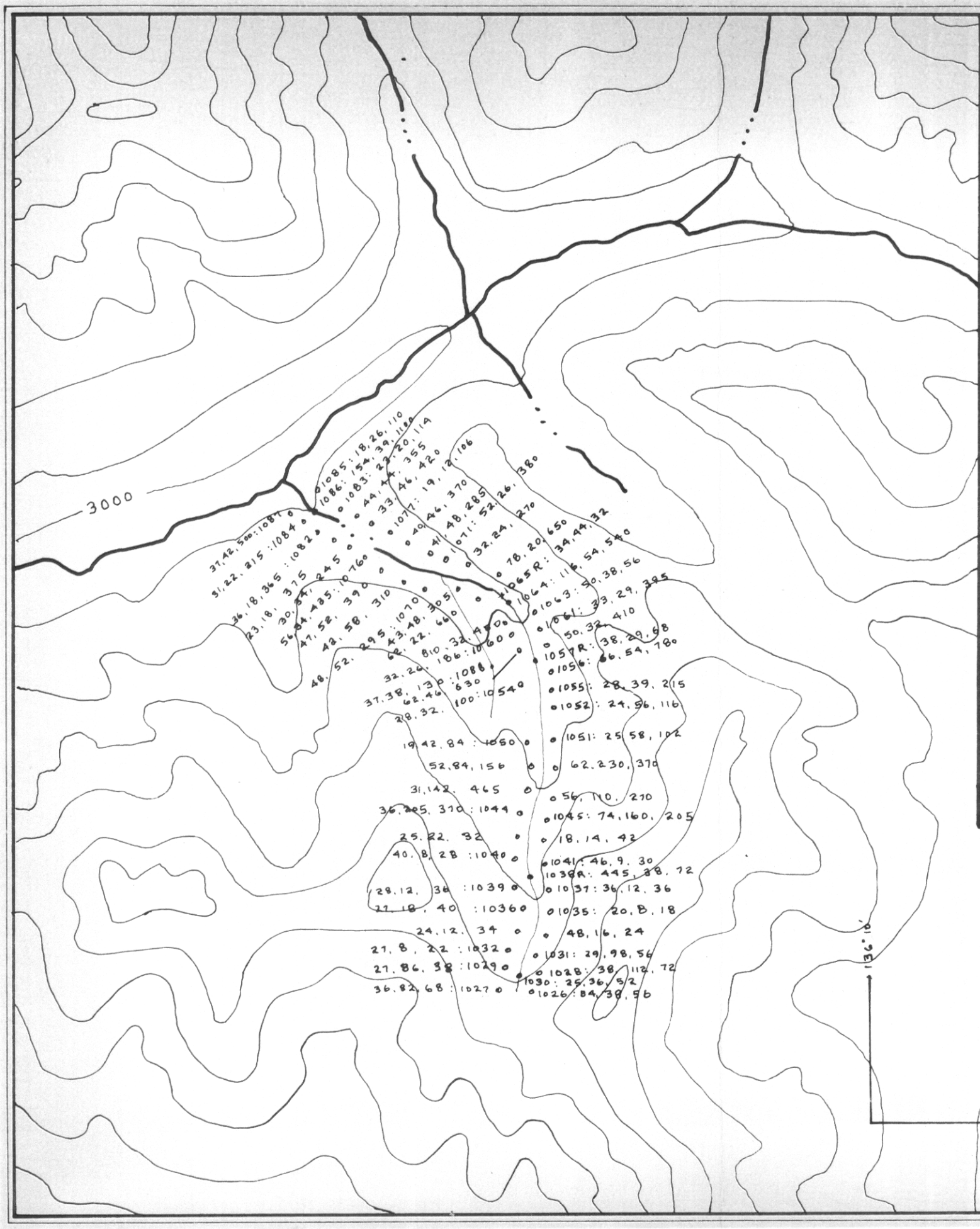


N

CYPRUS ANVIL MINING CORP

REEF PROJECT

n.t.s. 116A-16

Fig 17

SCALE: 1" = 2640'

SAMPLED BY:
M. FRETWELL

OCTOBER 31, 1975.

inches
0 1
0 1 2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY

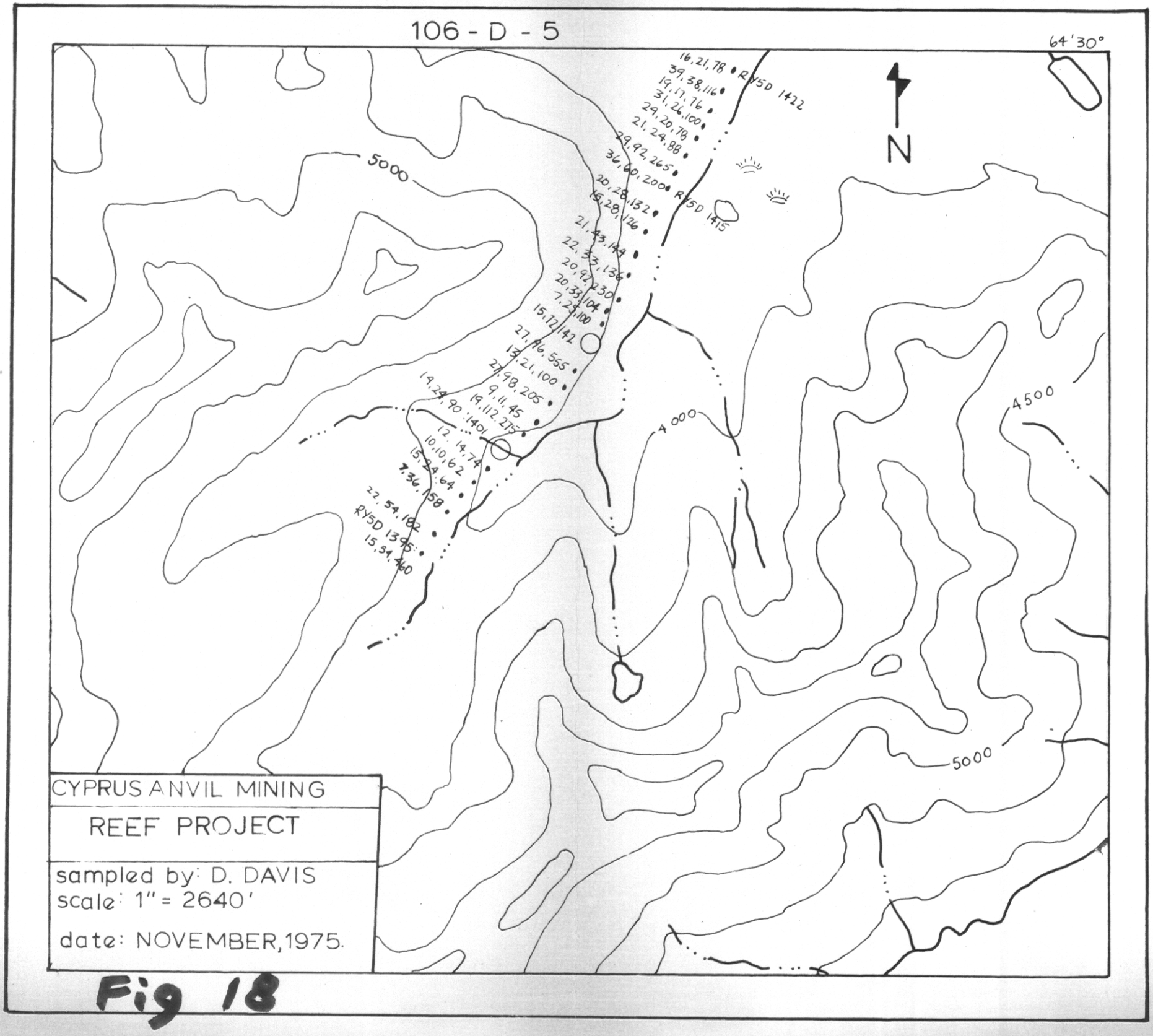


Fig 18

inches
0 1
0 1 2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY

BRAINE CR.

WILLIAMS CREEK

BEAVER

WILL

CYPRUS ANVIL MINING CORP
SHEET 106-D-7
REEF PROJECT

SCALE : 1 INCH = 2640 FEET
SAMPLED BY : D. DAVIS, P. DEAN, M. FRETWELL
OCTOBER 17, 1975.

Fig 19

134° 45'

64° 7.5'

106D-7

CYPRUS ANVIL
MINING CORPORATION

REEF PROJECT

n.t.s.: 106-D-12

scale: 1" = 2640'

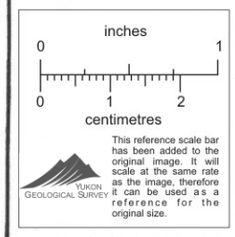
Fig 20

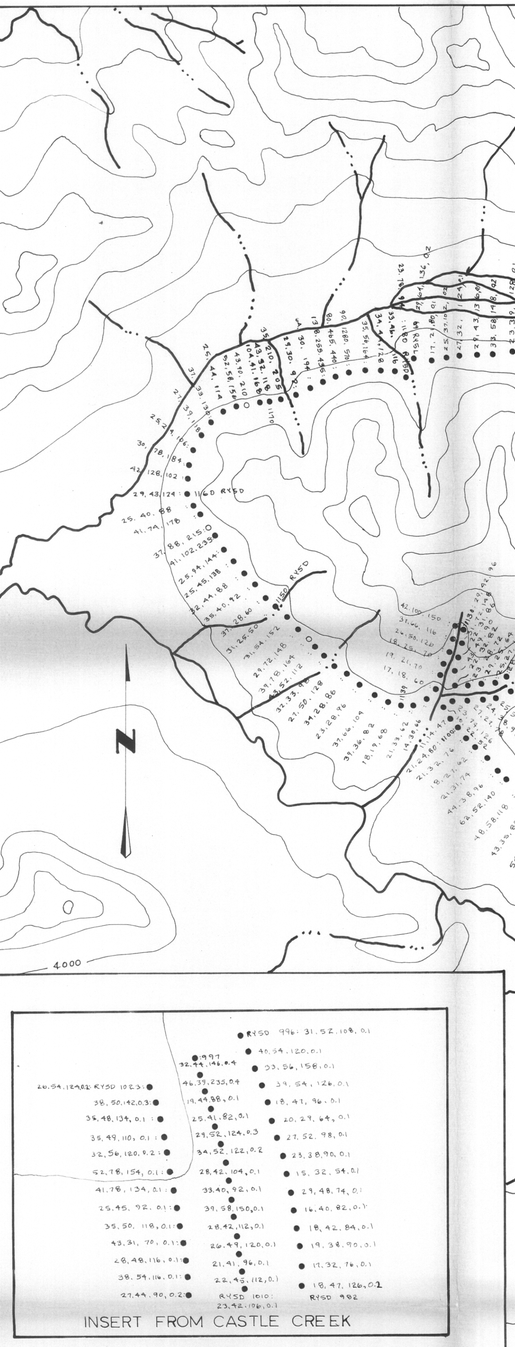
sampled by:

D. Davis

M. Fretwell

date: November 7, 1975.





CYPRUS ANVIL MINING CORPORATION REEF PROJECT

CASTLE RIDGE GEOCHEM

N.T.S. 106 D-5,6,11,12

SAMPLED BY: D. DAVIS
M. FRETWELL
L. MCLENNAN

SCALE: 1" = 2640'

VALUES PLOTTED FOR Cu, Pb, Zn, & Ag

Ag VALUES LESS THAN 1.0 PPM NOT PLOTTED

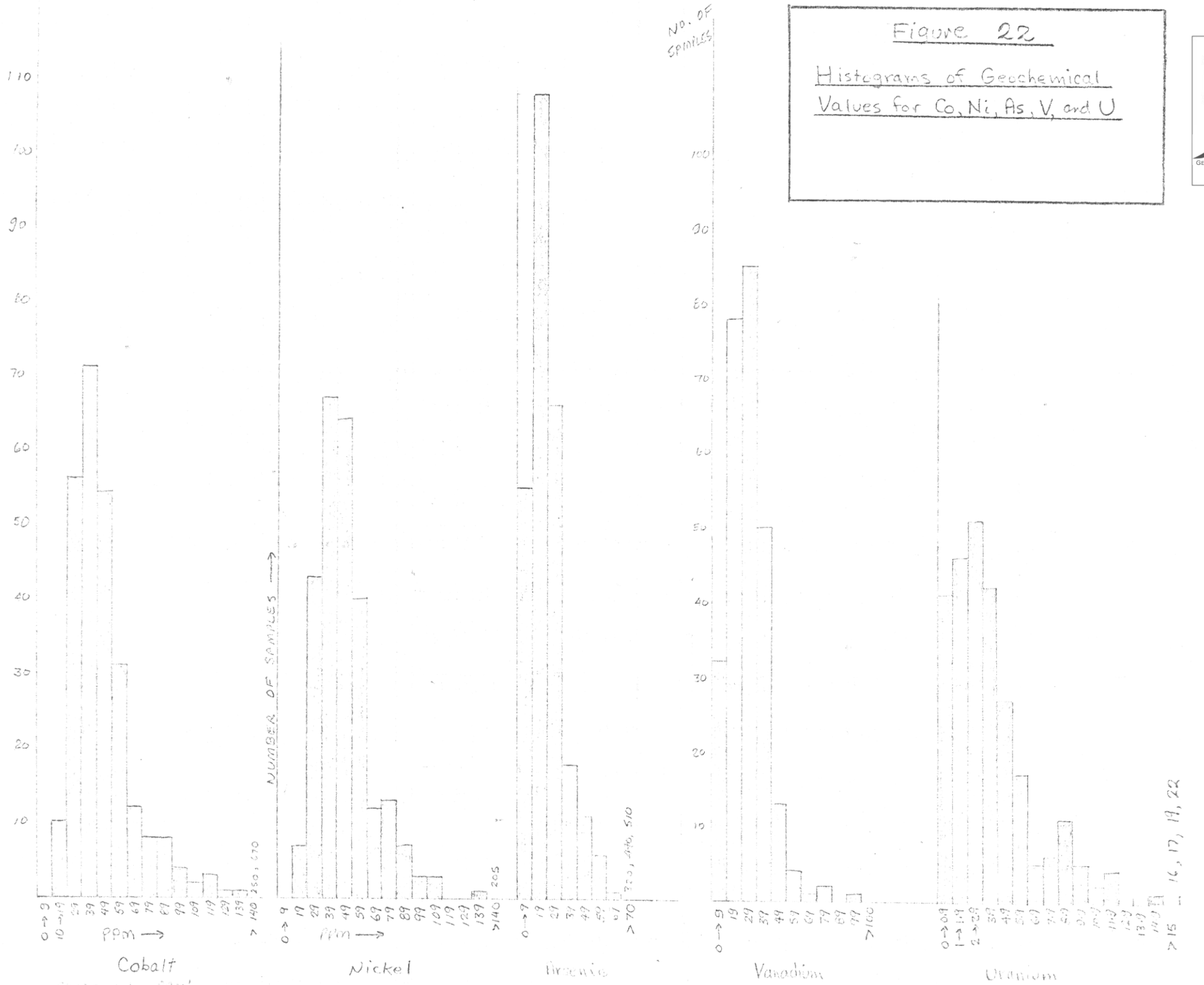
NOVEMBER 27, 1975

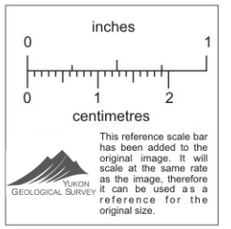
Fig 21

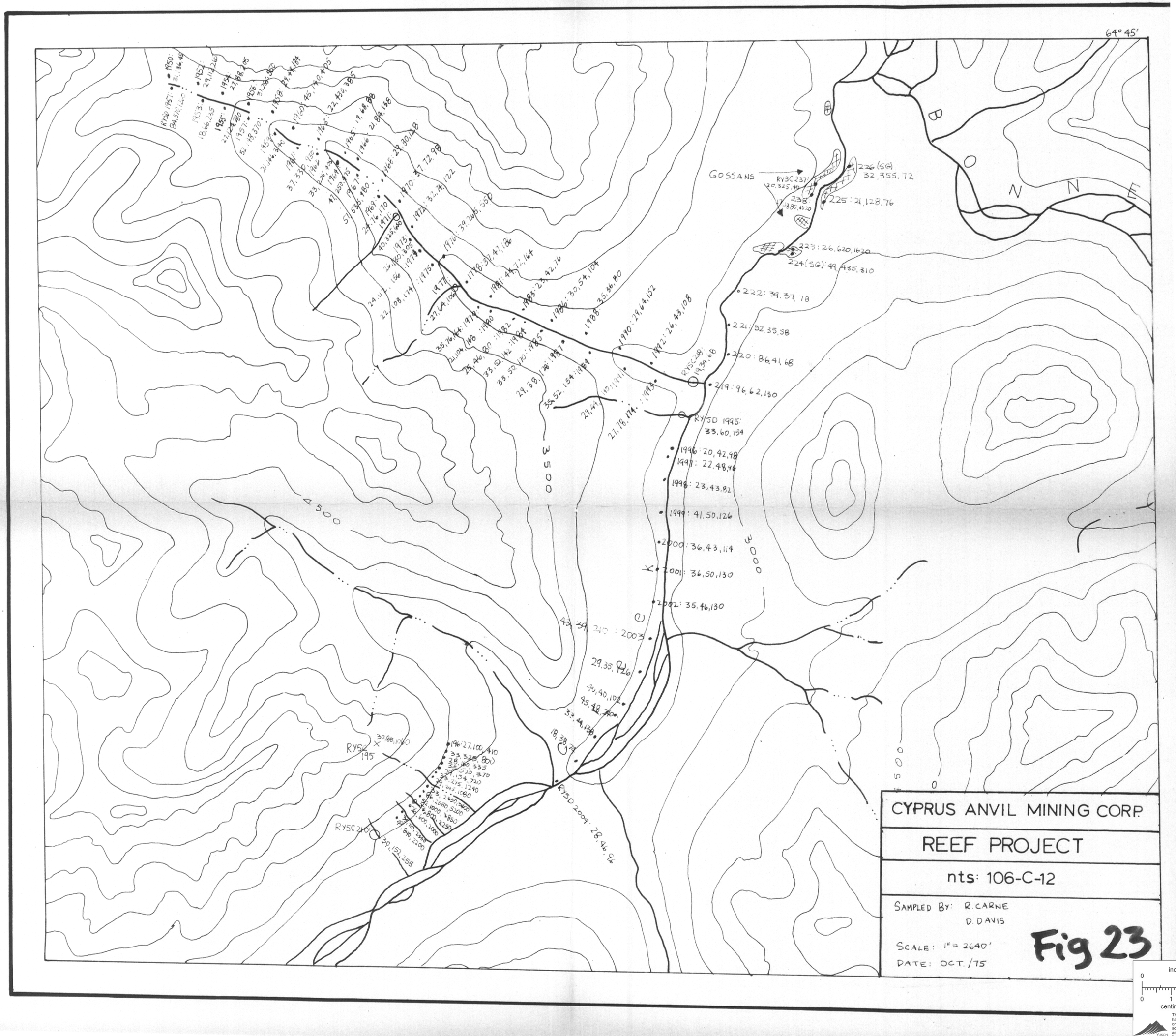
inches
0 1 2
0 1 2 3 4 5
centimetres
YUKON GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will change if the image is resized as the image, therefore it can be used as a reference for the original size.

Figure 22

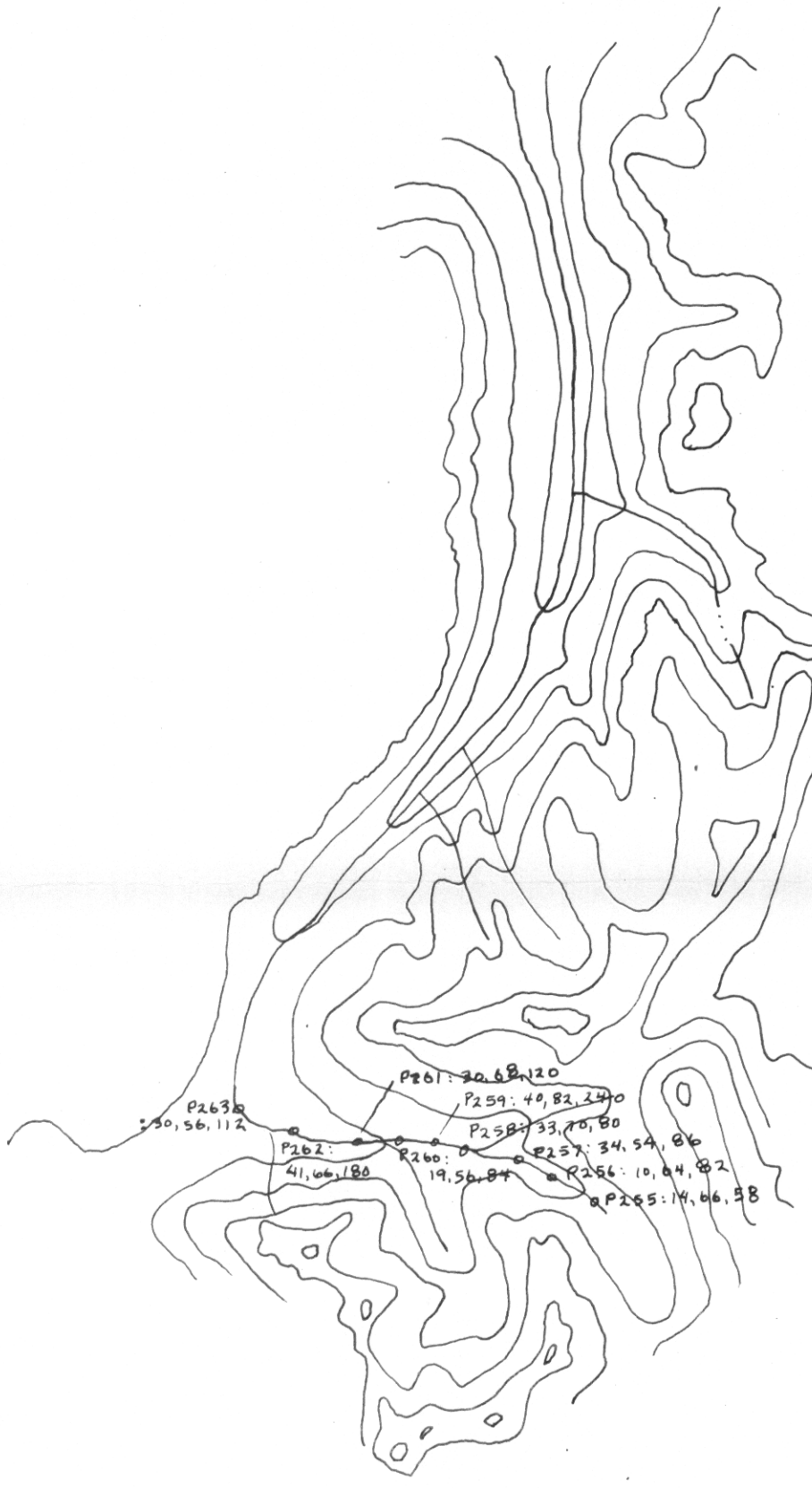
Histograms of Geochemical Values for Co, Ni, As, V, and U







inches
0 1
0 1 2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
YUKON GEOLOGICAL SURVEY



CYPRUS ANVIL MINING CORPORATION

REEF PROJECT

106-C-12 - AREA "A"

CYPRUS RESULTS ('P')

Fig 24

inches
0 1
0 1 2
centimetres

YUKON GEOLOGICAL SURVEY

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inches
0 1
0 1 2
centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

YUKON GEOLOGICAL SURVEY

Fig 25

CYPRUS ANVIL MINING CORPORATION

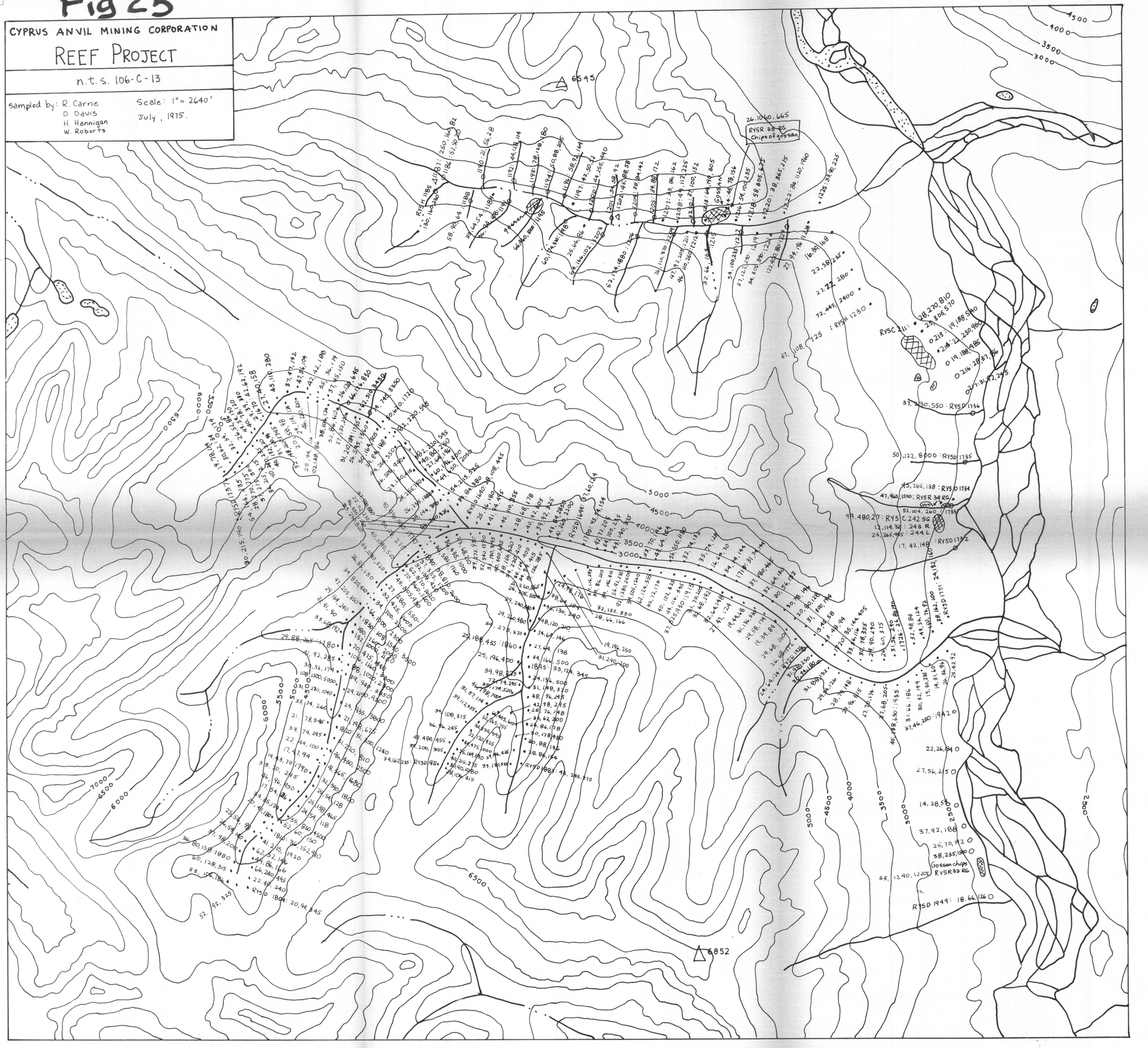
REEF PROJECT

n.t.s. 106-C-13

sampled by: R. Carne
D. Davis
H. Hannigan
W. Roberts

Scale: 1" = 2640'

July, 1975.



BONNET PLUME RIVER

CYPRUS ANVIL MINING

REEF PROJECT

n.t.s. 106-D-16

SAMPLED BY: M. FRETWELL
H. HANNIGAN
A. TENCH

SCALE: 1"=2640'

OCTOBER, 1975.

Fig 26

inches
0 1 2
0 1 2 3 4 5
centimetres

YUKON GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

MARGARET LAKE

CORRELATION OF FORMATIONS UNCERTAIN

Gremlin Claims

RAPITAN CREEK

Key Claims

Igor Claims

WIND RIVER

Slab Mtn.

106E

106F

106C

106D

65°00'N

Slate Creek

FAIRCHILD LAKE

ROYAL CREEK

BEAR CREEK

Mammoth Claims

134°00'

DOLORES CREEK

Bear Creek

Sourdough Claims

Joe Claims

GILLESPIE CREEK

BONNET PLUME RIVER

Bond Creek Showings

inches
0 1
0 1 2
centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

YUKON GEOLOGICAL SURVEY

Fig 27

CYPRUS-ANVIL MINING CORPORATION

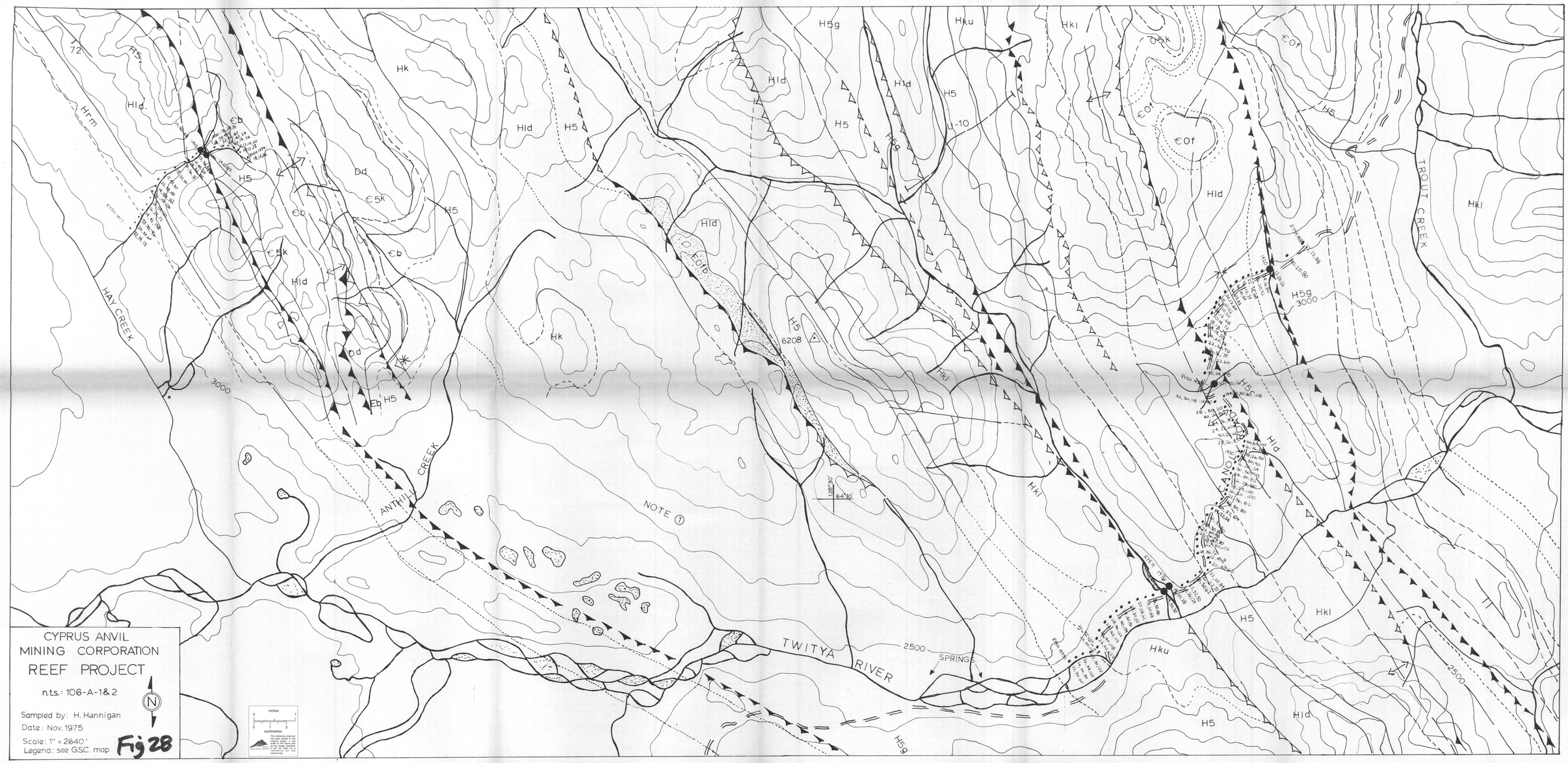
REEF PROJECT

Copper, Cobalt, and Uranium Showings in Helikian Shales, Fairchild Lake Area.

○ COPPER ONLY ◑ COPPER + COBALT ● COPPER + COBALT + URANIUM

STREAMS ANOMALOUS IN COPPER: (over ~~500~~ 150 ppm Cu)

Scale: 1:250,000


CYPRUS ANVIL
MINING CORPORATION
REEF PROJECT
n.t.s.: 106-A-1&2
Sampled by: H. Hannigan
Date: Nov. 1975
Scale: 1" = 2640'
Legend: see G.S.C. map
Fig 28
HAY CREEK
ANTHILL CREEK
TWITYA RIVER
TROUT CREEK
NOTE 1
SPRINGS
3000
2500
6208
Hk
Hld
H5
H5g
Hku
Hkl
Dd
Eb
Hrm
72
U-10

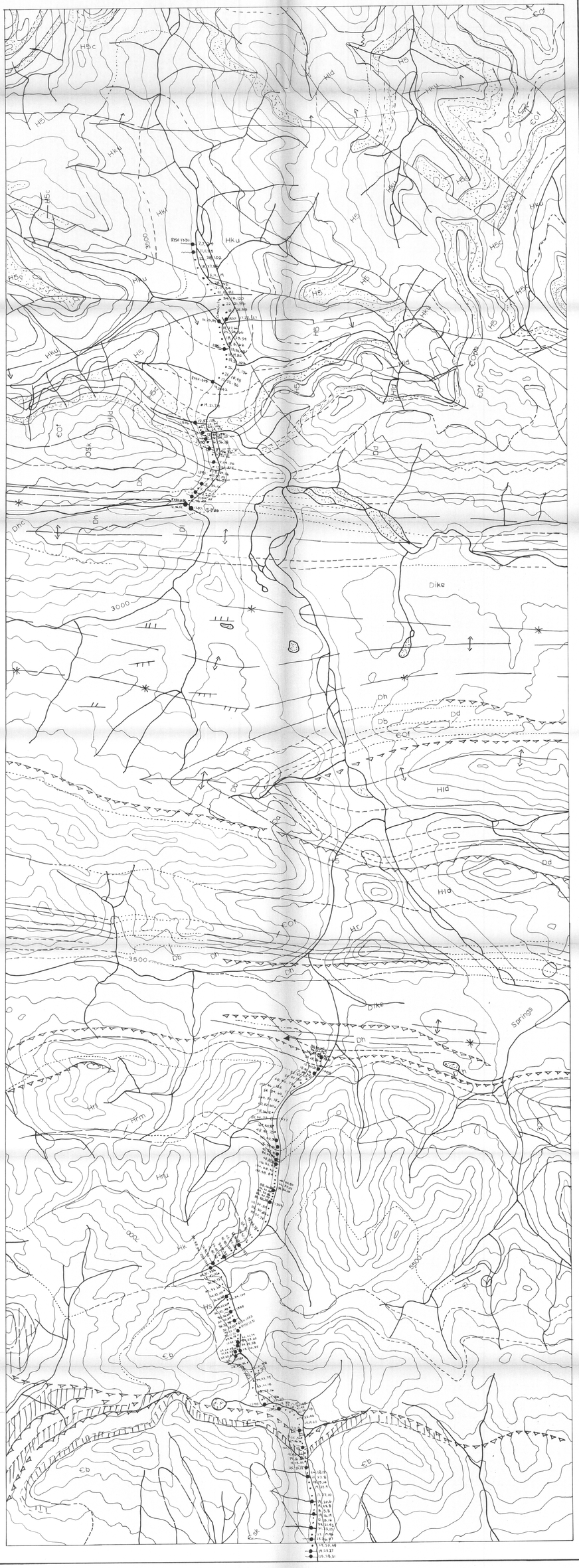
CYPRUS ANVIL MINING CORPORATION

REEF PROJECT

n.t.s. 106 - A scale: 1" = 2640' legend: see G.S.C. map

sampled by: H. Hannigan date: Nov. 19, 1975.

Fig 29



inches 0 1 — 0 1 2 centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

YUKON GEOLOGICAL SURVEY

CYPRUS ANVIL MINING CORPORATION

REEF PROJECT

n.t.s. 106-A scale: 1"= 2640' legend: see G.S.C. map

Fig 30

sampled by: H. Hannigan date: Nov. 22. 1975.

N

18,38,62 RYSH 1495
18,40,70 1494
14,40,60
22,40,60
16,30,52
20,32,72
20,32,50
16,30,48
22,30,50
28,30,78
18,30,132
18,30,164 RYSH 1505
22,36,80
16,30,82
24,30,108
24,30,82
26,30,58
38,30,60 1516
30,28,112
50,28,52
28,30,64 RYSH 1515
70,50,64
54,30,74
26,22,88
36,22,88
54,30,52
32,32,70 RYSH 1521
34,30,90
24,32,58
30,30,82
32,32,70
26,40,60
26,38,70
32,90,180
24,20,32
28,30,60
34,32,250
28,40,52
40,20,22
30,24,60
20,32,20
20,34,22
28,50,18
14,38,12
13,30,18
15,29,36
11,30,20
16,33,21
21,52,27
17,35,28
18,28,58
18,37,60
15,38,58
29,27,74
17,39,56
18,33,36
19,30,80
24,49,285
25,47,166
1555: 23,74,265
21,37,138
33,36,94
11,27,84
13,34,66
29,38,120
24,20,126
13,43,33
26,41,116
13,33,120
23,36,124
23,32,148
41,56,100
19,27,78
38,38,104
21,35,74
19,39,88
17,30,60
21,29,96
19,22,132
1575: 17,30,28
32,32,76
20,43,86
27,37,64
22,22,50
25,35,130
25,42,112
23,66,94
37,56,86
22,29,114
1585: 25,37,144
19,39,120
22,114,415
23,29,68
13,30,78
11,23,64
13,27,66
15,23,78
13,30,86
21,21,128
20,26,114
23,27,148
31,35,154
13,25,124
20,86,510
25,18,178 :1600
25,27,184
16,39,365
18,36,94
13,31,54
11,30,66
7,15,64
5,17,14
21,35,66
8,23,58
19,41,92
13,39,194
26,47,78 RYSH 1612

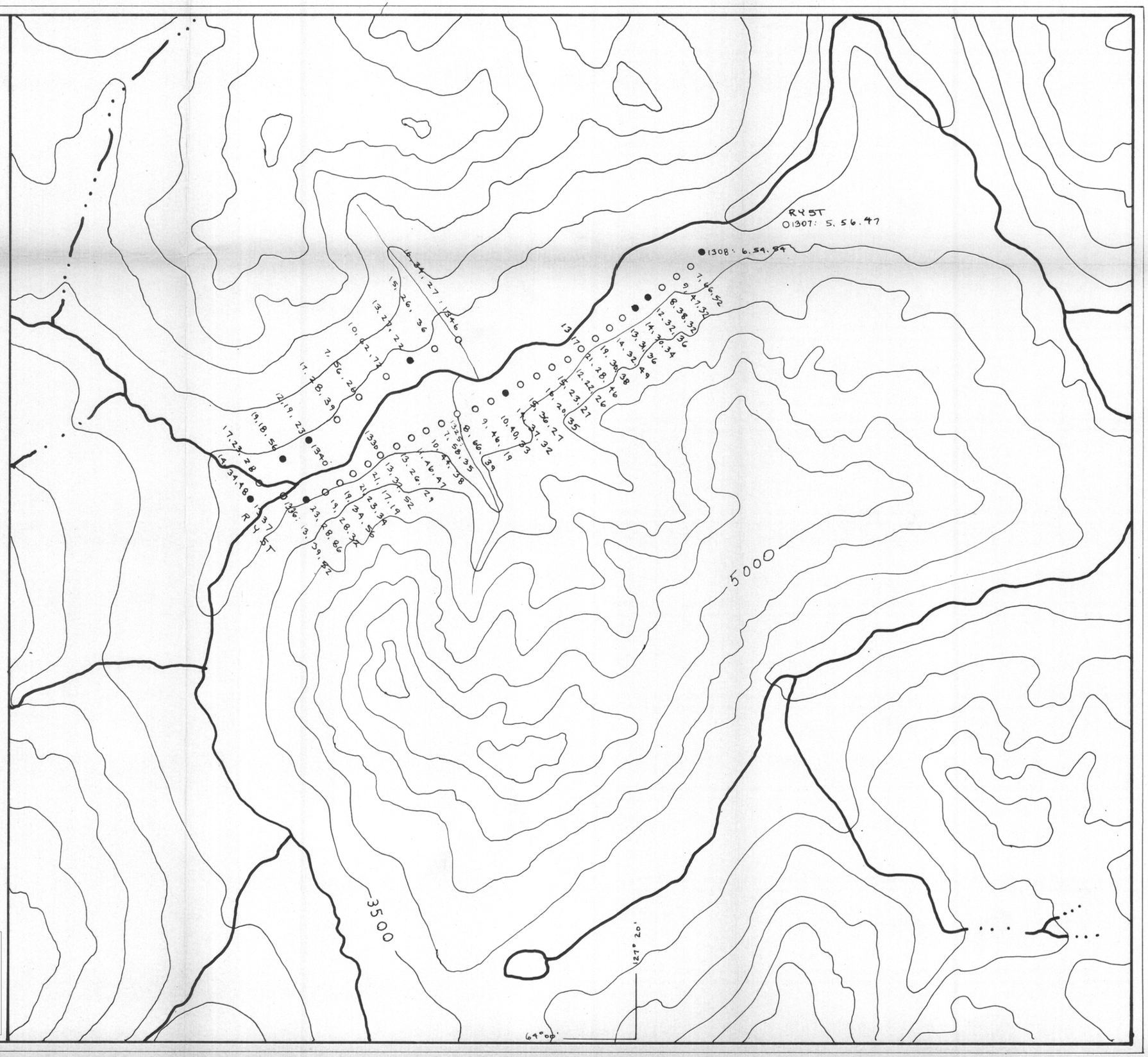
H5g
H1d
4000
Hr
Hk
Hs
HSC
6000
€sk
€b
€Dr
3500
129°45'
64°30'

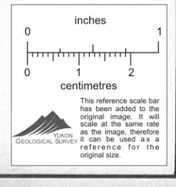
CYPRUS ANVIL MINING CORPORATION REEF PROJECT

N.T.S. 96D-3

SCALE: 1" = 2640'
SAMPLED BY A. TENCH
NOVEMBER 20, 1975

Fig 31





CYPRUS ANVIL MINING CORPORATION REEF PROJECT

N.T.S. 96E-1

Fig 32

SCALE: 1" = 2640'

SAMPLED BY: A. TENCH

NOVEMBER 18, 1975.



