FINAL REPORT ON THE 1975

EXPLORATION PROGRAM AT HOWARDS PASS

YUKON - NWT

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TABLE OF CONTENTS

TABLE OF CONTENTS

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF PLATES

LIST OF FIGURES

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INTRODUCTION

Location

The Howards Pass area (Fig. 1) (lat. 62° 27'N., long. 129° 12'W.) is situated along the Yukon Territory - Northwest Territories border approximately 50 miles northwest of Cantung (Tungsten). The extreme south end of the property and a small area on the north edge of the Anniv block are in the Northwest Territories; otherwise the majority of the property is located in Yukon Territory (Figure 2).

Topography & Climate

The topography of the area is quite variable, ranging from broad glaciated valleys to sharp alpine type peaks. Elevation of the studied area ranges from 3,600 feet near the Pelly River to 6,514 feet on the Yara Peak. Major valleys are wide and U shaped, while many of the peaks are barren, glaciated, and alpine in nature. Most of the area is above the 4,700 foot tree line in the region. Dense vegetation consisting of thick grass, brush and stunted timber was only encountered in the large valleys below 4,500 feet. Much of the area studied in detail consists of gently rolling hills with sparse outcrops. See Appendix I.

Climate in the area is typical for this portion of the Yukon and Northwest Territories - wet cool summers and cold winters. The field season runs mid-June to mid-September in an average year. Summers are cool with temperatures ranging from 35°F to 85°F June through September with moderate shower activity frequent in the afternoons.

At the end of April 1975, the snow was level with the roofs of the kitchen and office, or about eight feet deep. Thawing commenced by mid May and by the end of June most of the property was bare. Snow depth at 4,700 feet (base camp) ranges from 8 to 15 feet in drifts based on three years of observations, while temperatures average +10°F from October to May. Temperature recorded during January 1974 average - 20° with a low of -30°F.

...2/

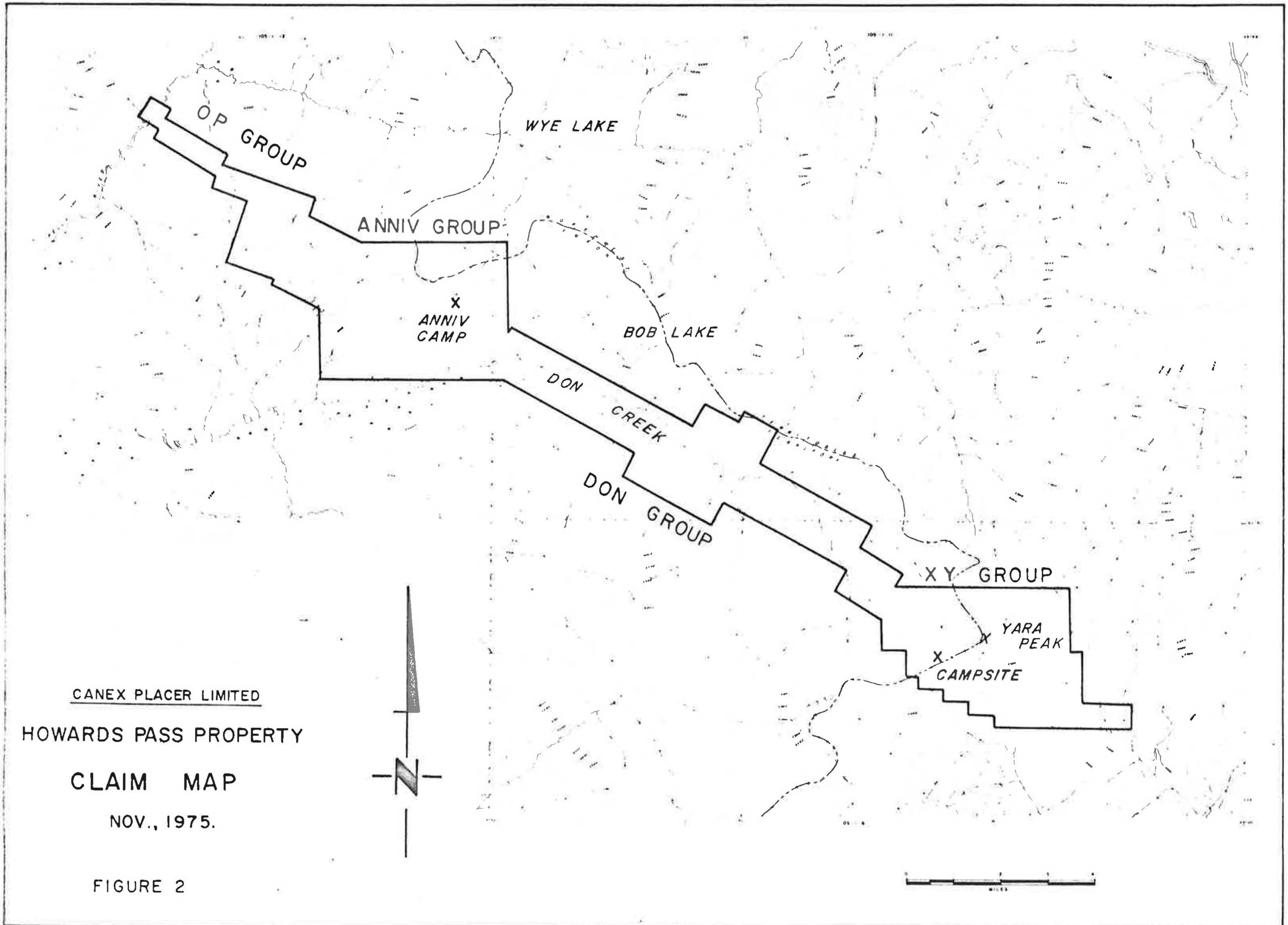
FIGURE I

CANEX PLACER LIMITED

LOCATION MAP OF

HOWARDS PASS

PROPERTY



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HOWARDS PASS PROPERTY

CLAIM MAP

NOV., 1975.

FIGURE 2

Access (Figure 3)

Present access is primarily by air. Ground transport is limited to tracked vehicles for the relatively short period when the ground is frozen and the snow is shallow.

Air transport was used for movement of all personnel and supplies in the 1975 season. Heavy freight was flown from the Cantung airstrip to the 1,800 foot strip at Howards Pass with a Twin Pioneer operated by Terr-air Limited of Ross River. This aircraft performed excellently, hauling a 4,500 pound payload in the marginal conditions that existed in the early part of the season (see Appendix I). Unfortunately, the Twin Pioneer is not approved for use with skis.

Personnel and regular supplies were air lifted to Howards Pass from Watson Lake, a distance of 164 miles. When the air strip surface was firm, a twin-engined Aztec was used but during soft conditions, a Beaver was used. Other aircraft that have operated out of Howards Pass include Cessna 206s, a Cessna 185, a Cessna 180 and single Otters.

Winter transportation has been limited so far to ski-equipped Beavers and Otters. Larger aircraft on skis have not been used because they have not been available from local carriers. Should large scale winter flying program be necessary, it might be worthwhile to ferry in a larger aircraft for that specific purpose.

The Anniv area is accessible from the XY area only by helicopter at present. It is planned to move heavy equipment and supplies into this area via ski-equipped aircraft this winter using a snow strip.

Access by land from Cantung to Howards Pass would be advantageous for movement of heavy equipment and supplies when the project reaches the stage where underground testwork is required. The groundwork for this road is presently being prepared through contact with the appropriate Federal Government Departments that would ultimately approve and possibly aid in financing and construction of this "resource road" link.

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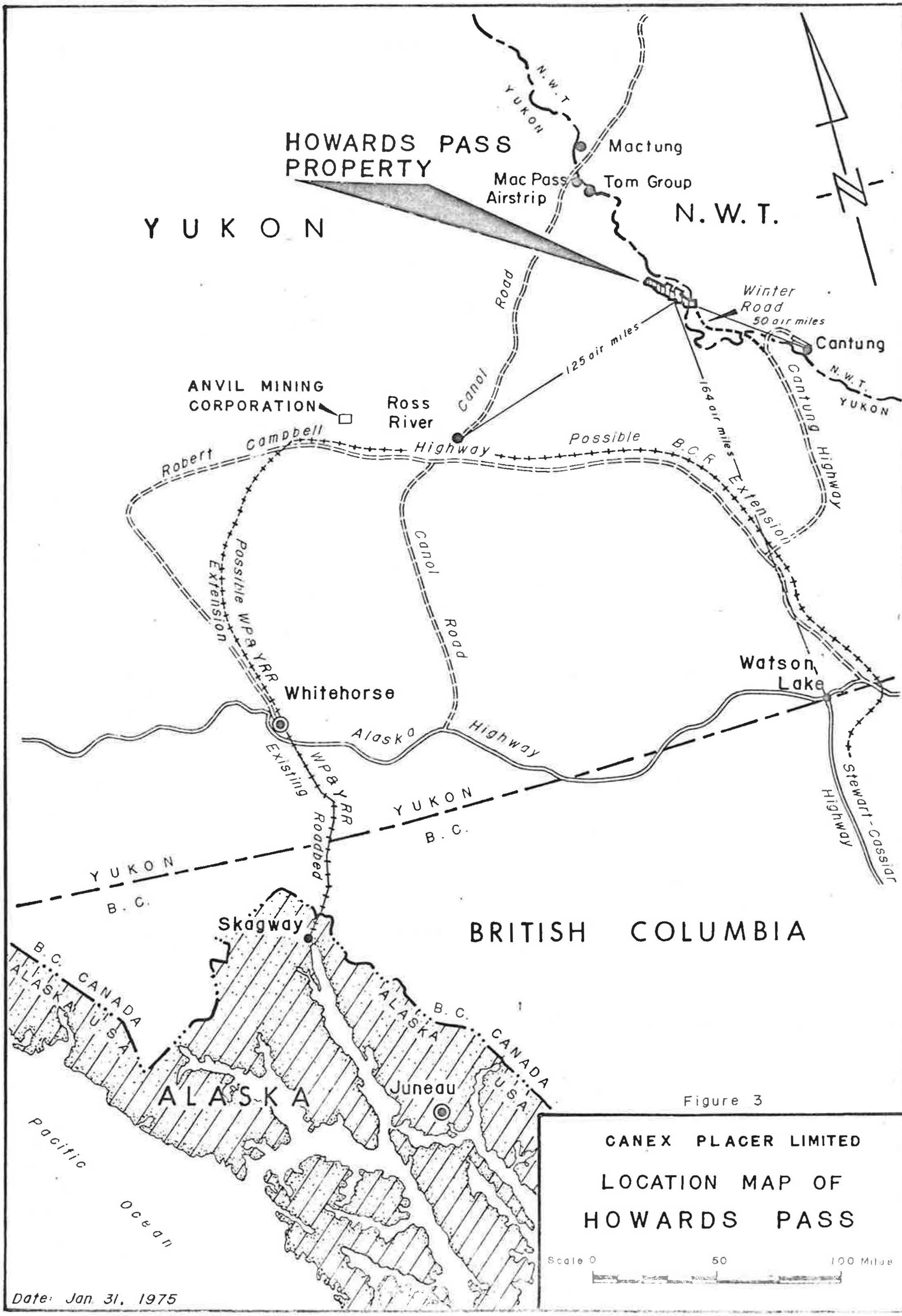

HOWARDS PASS PROPERTY
YUKON
N.W.T.
Mactung
Mac Pass Airstrip
Tom Group
Canol Road
Winter Road
50 air miles
Cantung
125 air miles
164 air miles
ANVIL MINING CORPORATION
Ross River
Cantung Highway
Robert Campbell Highway
Possible B.C.R. Extension
Possible WP & YRR Extension
Canol Road
Whitehorse
Watson Lake
Alaska Highway
Existing WP & YRR Roadbed
Stewart-Cassiar Highway
YUKON
B.C.
Skagway
BRITISH COLUMBIA
B.C. CANADA
ALASKA U.S.A.
ALASKA
Juneau
Pacific Ocean
Figure 3
CANEX PLACER LIMITED
LOCATION MAP OF HOWARDS PASS
Scale 0 50 100 Miles
Date: Jan. 31, 1975

History

Following the discovery of vanadium in the shales near Flat Lake, N.W.T. by Canex in 1968, a broad scale geochemical reconnaissance program was carried out to the north in areas underlain by black shales.

In 1971, it was decided to expand this reconnaissance to cover a 300 mile long belt extending from south of the Toad River Lodge on the Alaska Highway to Macmillan Pass on the Canol Road. During the course of this work, a more detailed investigation was aimed at the anomalous areas indicated by earlier work. The program was carried out using the company Hughes 500 helicopter, operating out of Lower Liard, Watson Lake, the Iso Tungsten camp and the Flat Lake camp. About 2,500 square miles underlain largely by Ordovician to Mississipian black shales were investigated. This geologic environment was considered comparable to the Flat Lake vanadium discovery area and it also was thought that it had a potential for sedimentary base metal deposits. The results of the program indicated an outstanding anomaly in the vicinity of Howards Pass.

Detailed stream sampling and prospecting was carried out in the area of geochemically anomalous drainages in 1972 in order to determine the cause of the anomalies. Routine chip samples were taken of any interesting rocks and analyzed in the base camp with an X-ray fluoresence mineral analyzer for Pb-Zn. The textures and colours of the few mineralized float samples gave the first basis from which mineralized float and outcrop could be recognized, since very little sulphide could be seen in the weathered rock. The discovery of a long, intermittent belt of mineralized float with a few mineralized outcrops in the belt, confirmed the probable stratabound nature of the source of the original geochemical anomalies. Hand and bulldozer trenching was carried out to evaluate the grade and widths of the mineralization. Soil sampling was carried out in areas of grass and moss cover to determine possible extensions. At the same time, some prospecting was carried out to check the northwest extension of the favourable horizon. (Howard 1973).

...6/

Exploration during 1973 consisted of 15,400 feet of diamond drilling and 24 cat trenches in the XY claim area. Regional 1" to 1,000' mapping on the Howards Pass area was done. At the end of the 1973 field season the mineralized horizon had been intersected by some drill holes, but lack of understanding of sedimentation, structure and the mineralization was cause for concern.

In 1974, exploration activities included 5,162 feet of diamond drilling, 15 cat trenches on the XY claims, 12 trenches on the OP claims. 1" to 400' scale mapping was completed on the XY claims and trench mapping completed on the Anniv claims. Based on this information the present sedimentation-basin model was developed for the XY, Anniv and OP claims as was a structural model for the XY claims. These concepts set the scene for the 1975 section drilling to check grade, continuity and structure in the XY sub-basin and grade and continuity in the Anniv sub-basin.

1975 PROGRAM

The 1975 program included 12,334 feet of drilling on the XY, 833.5 feet of drilling on the Anniv and OP claims (Figure 4), mapping on the XY, Dons and Anniv claims (Figure 5), geochemical survey on the Don claims (Figure 6), prospecting in various areas of the of the claim group (Figure 7), and trenching on the XY claims. Additional work included improvements on the airstrip, improvements on the Don Creek road and the location of a road from the XY claims to the Anniv claims, along the Don claims. At the end of the field season the main camp was moved from the Northwest to the Yukon Territories (Figure 2).

1975 Drill Program

The main objective of the 1975 drill program was to check continuity of mineralization and basin geometry across the major syncline in the XY area (Plate I). Additional holes were drilled on two sections to better define mineralization gradients. Drill holes in the area of DDH-36-74 were added to this program to check grade in that area. A list of drill holes and their depth is given in Table 1.

...7/

Table I

Diamond Drill Hole Summary

Drill Hole No.	Core Size	Length of Hole (feet)	Initial Dip (degrees)
39	N.Q.	885	-90
40	N.Q.	1,312	-90
41	N.Q.	2,091	-90
42	N.Q.	1,662	-90
43	N.Q.	1,637	-90
44	N.Q.	2,028	-90
45	N.Q.	1,387	-90
46	N.Q.	767	-90
47	N.Q.	565	-90
OP - 1	B.Q.	66	-70
A - 1	B.Q.	242.5	-90
A - 2	B.Q.	137.5	-90
A - 3	B.Q.	159	-90
A - 4	B.Q.	129	-90

...8/

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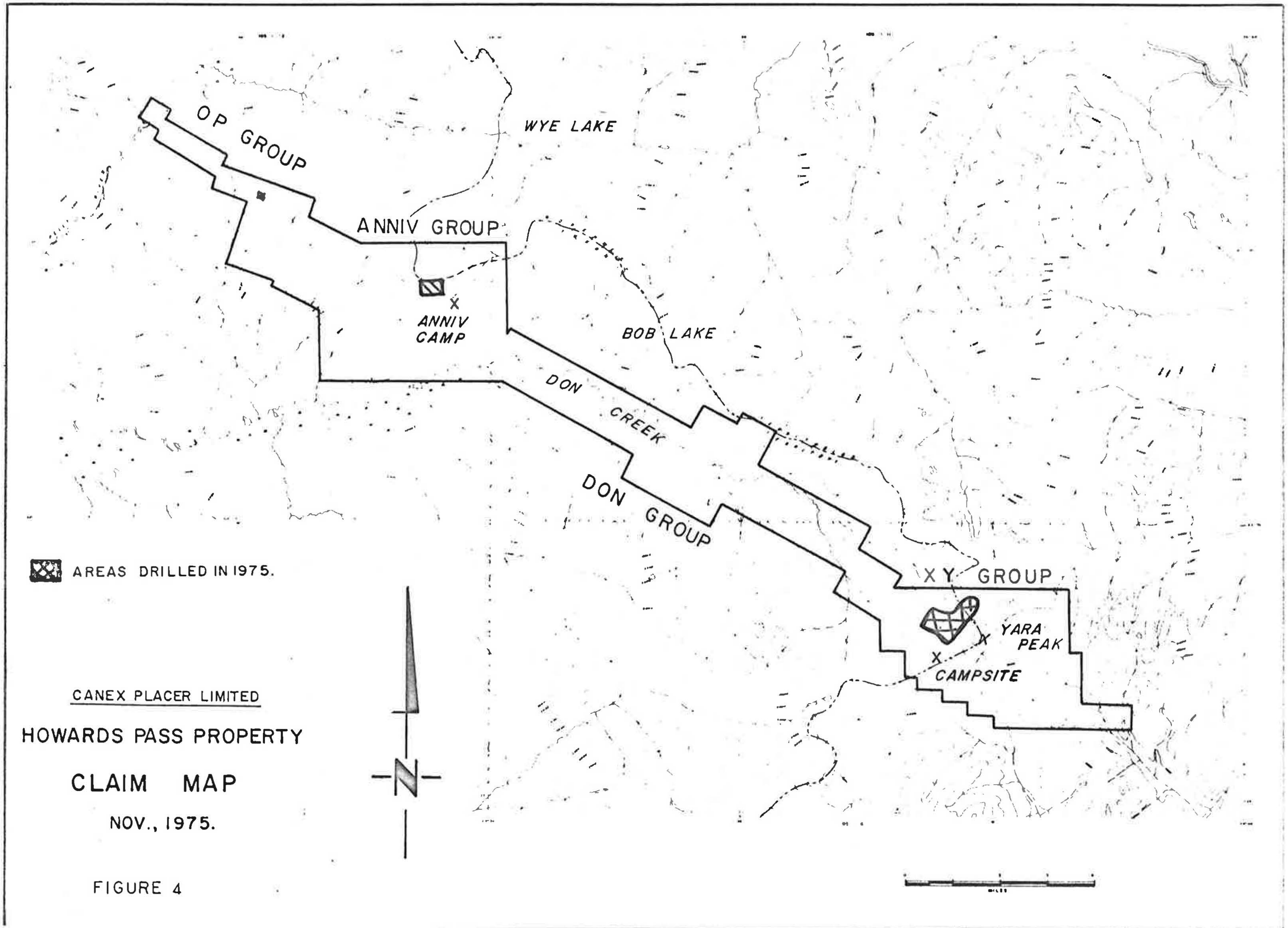

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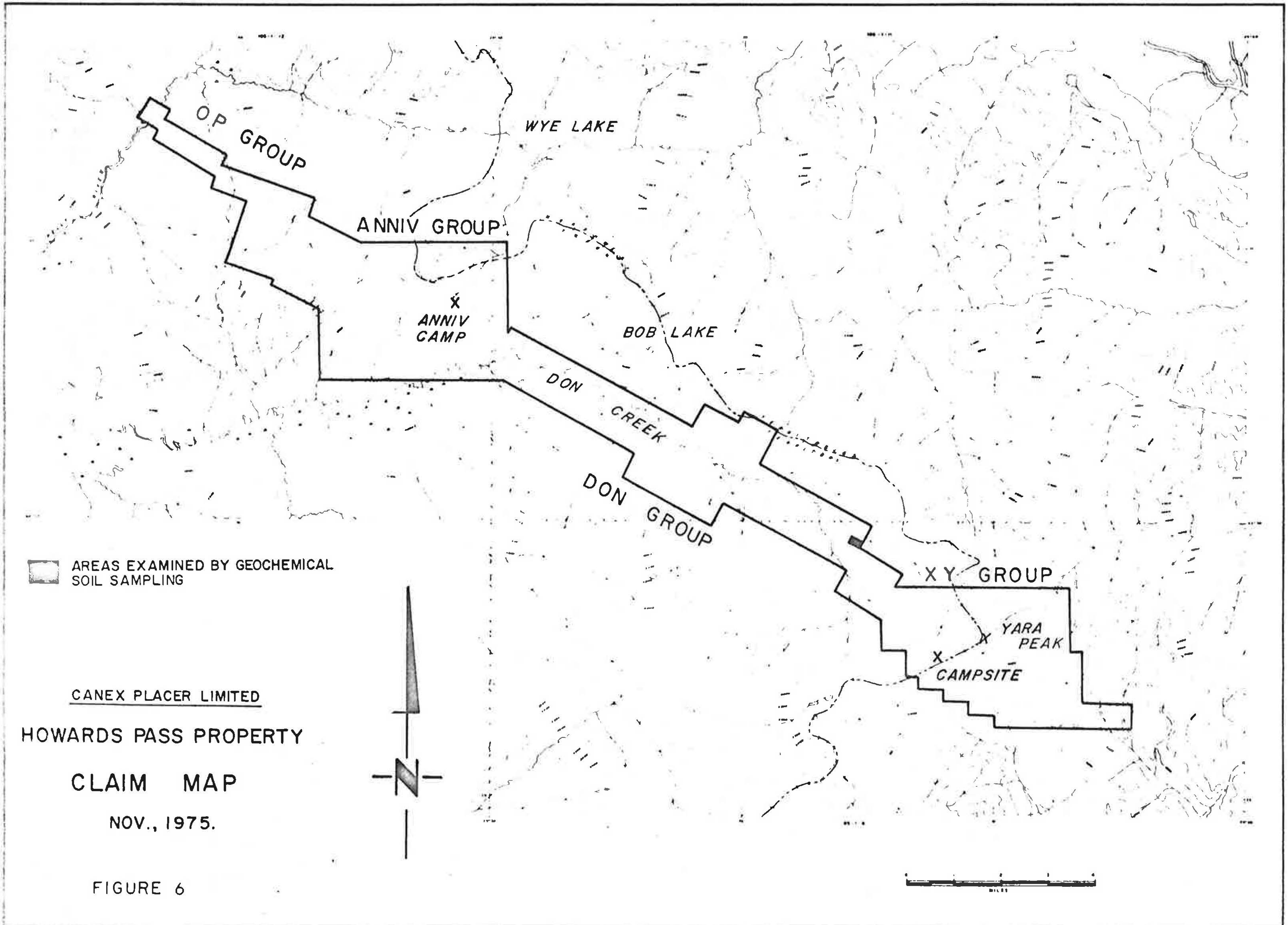
HOWARDS PASS PROPERTY

CLAIM MAP

NOV., 1975.

FIGURE 4



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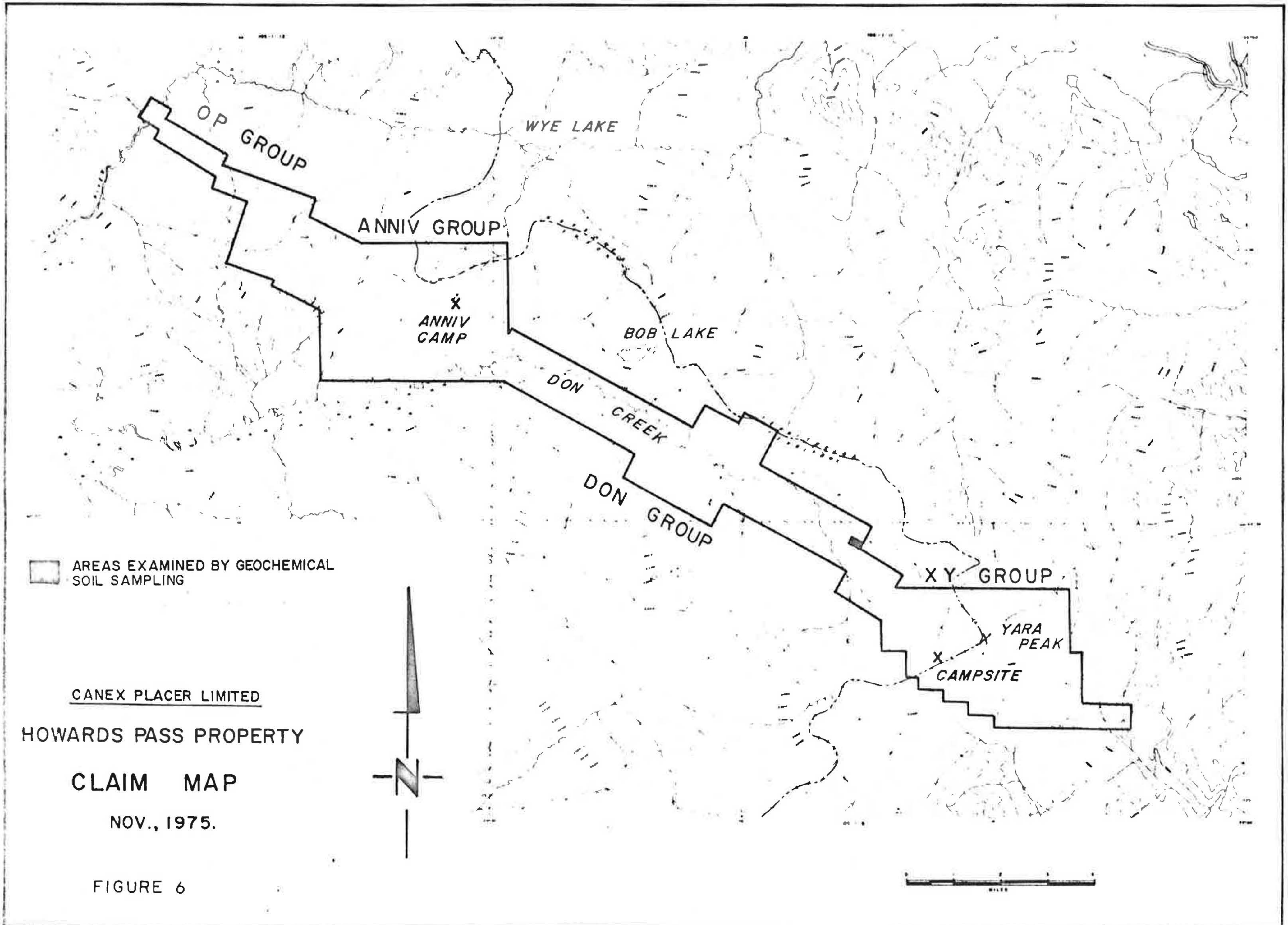
HOWARDS PASS PROPERTY

CLAIM MAP

NOV., 1975.

FIGURE 6



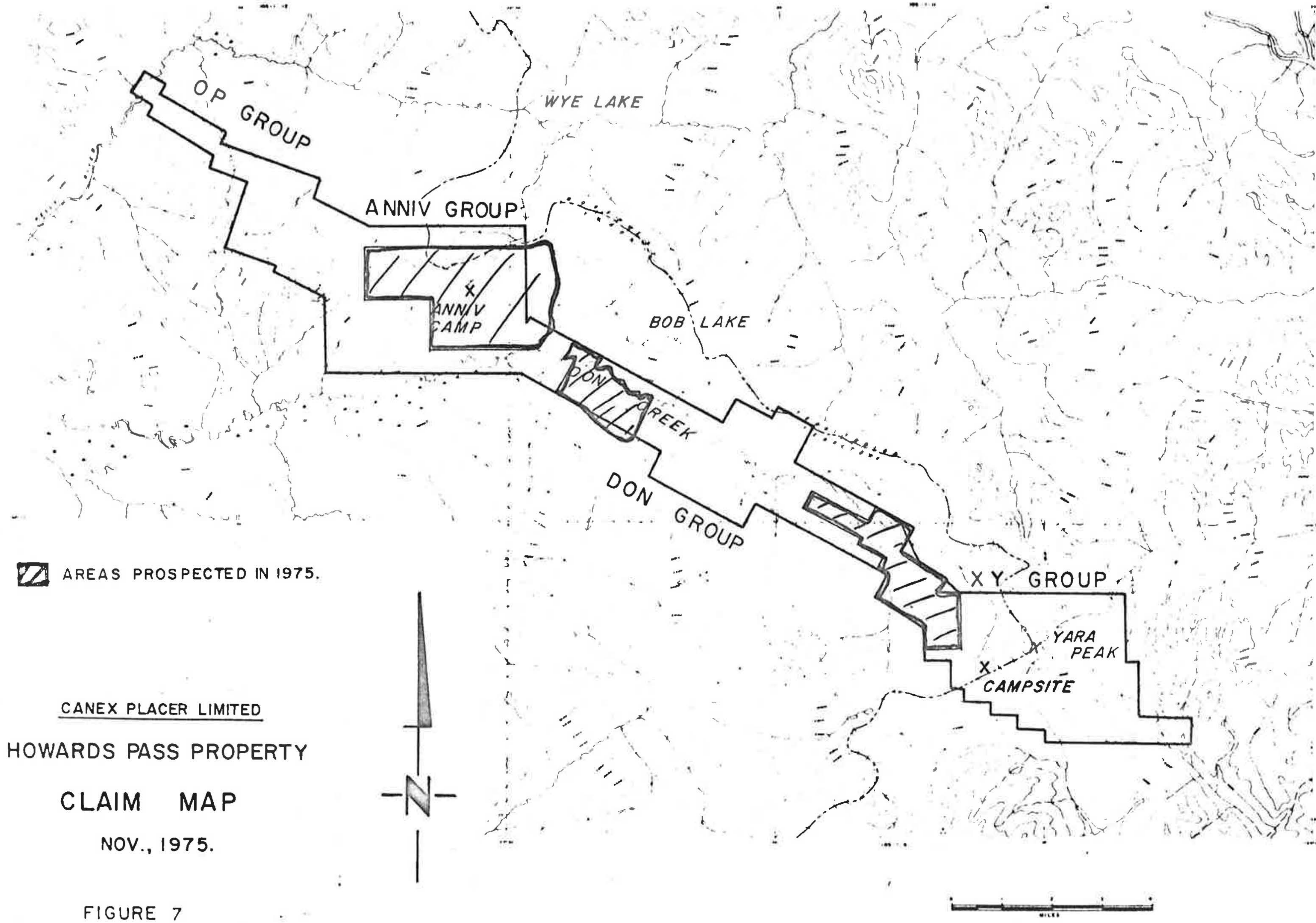
CANEX PLACER LIMITED

HOWARDS PASS PROPERTY

CLAIM MAP

NOV., 1975.

FIGURE 6



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HOWARDS PASS PROPERTY

CLAIM MAP

NOV., 1975.

FIGURE 7

Two sections (93 + 90, and 109 + 00) were used to test basin geometry; of these DDH 40, 41, 42 and 43 intersected the mineralized horizon (see Plates II and III). DDH 43 and 44 show structural complexities which prohibit a confident interpretation of these two drill holes. The results of the two drill sections indicate that the Active Zone and Pb-Zn mineralization are present toward the centre of the syncline, but structural complications cloud the picture of the basin geometry at present, although it is thought by the present authors that the southern part of the sub-basin has greater potential than the northern part. Drill holes 39, 46 and 47 were located in the area of DDH-36-74. Drill hole 47 (see Plate III) showed grades and a thickness comparable to 36. Holes 39 and 46; again showed structural complication mostly faults, although an interpretation of northwest plunging folds is a probable interpretation of this area.

Anniv - OP Drilling Program

A drill program using a B.B.S.-1 was conducted on the Anniv and OP claims. The purpose of the drilling was to test the Pb-Zn showings exposed in trenches completed in 1974 and to satisfy assessment requirements on the OP, Anniv and part of the Don claims.

There were four holes drilled on the Anniv claims, two of which intersected significant Pb-Zn mineralization (Anniv 1 and 2, see Plate V), Anniv - 3 was abandoned in the hanging wall due to drilling problems and Anniv -4 intersected broken rock in the top 100 feet and may have only intersected the base of the active zone. Plates V and VI summarize drill results of the Anniv drilling.

One drill hole was attempted on the OP claims but this hole was abandoned at 77 feet and appears not to have intersected bed rock. The small drill was unable to set casing deep enough to permit continuation of this hole.

...13/

1975 MAPPING PROGRAM

Mapping on the XY and Don claims connect the Brodell showing with 1974 mapping of the Yara Peak area (Plate I). The mapping was compiled on 1"=400' orthophotographs. Cross sections and longitudinal section (Plates VIII to XV) indicate that to the northwest of this year's drilling on the XY claims, the sub-basin is folded into a syncline and anticline; which is somewhat different than the synclinorium containing the sub-basin near Yara Peak. The mapping further demonstrates that the major longitudinal structures are broken by late stage cross-faults which divide the area into structural blocks (Plate VII). This year's mapping further indicates potential in the Don Creek area since the sparce outcrops noted appear to be above the Active Zone although the position of the sub-basin edge in this area is unknown.

The geologic model developed on the Anniv claims is similar to that developed in 1974 when the Anniv trenches were mapped. In this area outcrops were surveyed by transit and stadia and plotted at 1" = 200', later reduced to 1"=400'. In general, the stratigraphic units appear to dip to the southwest (Plate XVII); within this monocline the Howards Pass Formation shows slump and fold structures similar to those seen on the XY claims, with the exposures of the Active Zone apparently related to "windows" in the overlying rocks due to folding.

TRENCHING

One trench was completed in 1975 (Trench 40, south of 148+00 NW along the Reference Line, Plate I). The trench was situated on a geochemical anomaly with traces of mineralized float and, after completion, showed Pb-Zn mineralization in place. Mapping and sampling show the mineralization to be in the Active Zone, although differences in the Pb-Zn ratios from the trench compared to drill holes is most likely due to weathering (2.3% Zn and 3.07% Pb over 70' with one 10' section containing 10.6% Pb). Trench 40 confirms the presence the Active Zone and Pb-Zn mineralization west of previously known Pb-Zn mineralization in the area of DDH-36. This adds confidence to the mapping based geologic picture of the southwestern perimeter (see page 50) area.

Prospecting

Approximately 40 man days were spent prospecting, most of which was done by Hugo Brodell, a professional prospector living in Watson Lake. The area covered by prospecting is shown in Figure 7. A major showing was discovered as a result of Mr. Brodell's efforts (see Brodell Zone, Plate I).

The showing consists of "high grade" lead-zinc mineralization as float extending over 500 feet along strike. The significance of this showing is obvious in light of geologic mapping,in that the Brodell Zone appears to be a continuation of the XY sub-basin as proposed in 1974, adding 8,000 feet of strike to the known sub-basin.

Geochemistry

A small follow up geochemical soil sampling program was completed on the Brodell Zone. Approximately one line mile was completed consisting of 5 lines 400 feet apart and a 50 foot sample interval (Plates XVIII and XIX). Results of the geochemical sampling show anomalous Pb-Zn values, some of which are over 1% Zn and Pb. The geochemical pattern suggests that the anomaly represents a band of mineralization trending northwest, which supports the interpretation from mapping in the area. The Brodell showing is significant in that it now represents an extension of the XY sub-basin, which adds approximately 8,000 feet of strike length to the presently known limits of the sub-basin.

Airstrip Improvement

During the spring breakup, some portions of the airstrip were too soft to permit safe operation. To alleviate this problem in the future the "gravelled" portion of the strip was extended to a total length of 1,000 feet. The remaining 800 feet is a clay-pebble mixture that can become soft and slippery after extended periods of rain. More work is planned in the 1976 season to upgrade this section.

...15/

Due to its location on a gently sloping sidehill, it was necessary during initial construction to follow the contour of the hillside in order to keep the airstrip as level as possible. This resulted in a slight curvature which further complicated use of the airstrip under marginal conditions. Some reduction of curvature was accomplished this year, further work is planned for the 1976 season.

The airstrip drainage system was also improved with the construction of a deeper ditch on the west side which drains through a "barrel" culvert constructed across the central strip area. This improved the drainage of sub-surface water along the west central area of the strip.

Camp Relocation

The camp was relocated in the fall to an area near the north end of the strip. This move serves a number of purposes:

1) Closer by over 1 mile to the area where most work will be carried out in the future.

2) Closer to the airstrip, and accessible with less difficulty during the winter and spring breakup.

3) More room for expansion.

4) The campsite is now in the Yukon where less restrictive land use regulations exist.

GEOLOGY

Stratigraphy

Summary

Rocks present in the Howards Pass area range from Cambrian to Mississippian in age (Plate XX). The stratigraphy is best known in the XY claim block, but similar stratigraphy occurs on the Anniv Claim block and the OP claim block.

...16/

Knowledge of the stratigraphic section at Howards Pass is based on core data, surface mapping and detail trench mapping. The section presented here is consistant with the regional stratigraphy developed by the Geological Survey of Canada (Figure 8), references to the region include Gabrielse, 1967, Green et al 1967 and Gabrielse et al 1973. These provide excellent background to the Nahanni area.

Lower Paleozoic sedimentary rocks unconformably overlie Precambrian phyllites and clastic sedimentary rocks. Cambrian siltstones and massive limestone form the base of the section on the property. Proceeding up section; Wavy Banded Limestone and Transition Zone occur just below the Howards Pass Formation a unit consisting of siliceous and calcareous mudstone, cherts with minor limestone, and siltstone. The Howards Pass Formation contains the major Pb-Zn sulphide occurrences in the area. Overlying the Howards Pass Formation is the light coloured Flaggy Mudstone which contains siltstone lenses. Locally, Fetid Limestone containing abundant fossils occur above the Flaggy Mudstone. These rocks are in turn overlain by a sequence of monotonous cherty mudstones of the Backside Siliceous Mudstone and the turbidite Iron Creek Formation. This unit contains the MacMillan Pass Barite Horizon as one of its members. The top of the section at Howards Pass is the Yara Peak Formation a Devonian-Mississippian unit which unconformably overlies the lower formations. The major stratigraphic units are correlatable with regional units (Figure 8).

Pre-Wavy Banded Limestone Units

Rocks which span the base of the section to the base of the Wavy Banded Limestone, include Precambrian phyllites and clastic rocks which appear to be equivalent to the Grit Unit (Gabrielse, et al 1973). The Lower Siltstone overlies the Precambrian rocks. This unit is a dolomite siltstone and is lithologically and stratigraphically equivalent to the Sekwi Formation (Blusson, 1972).

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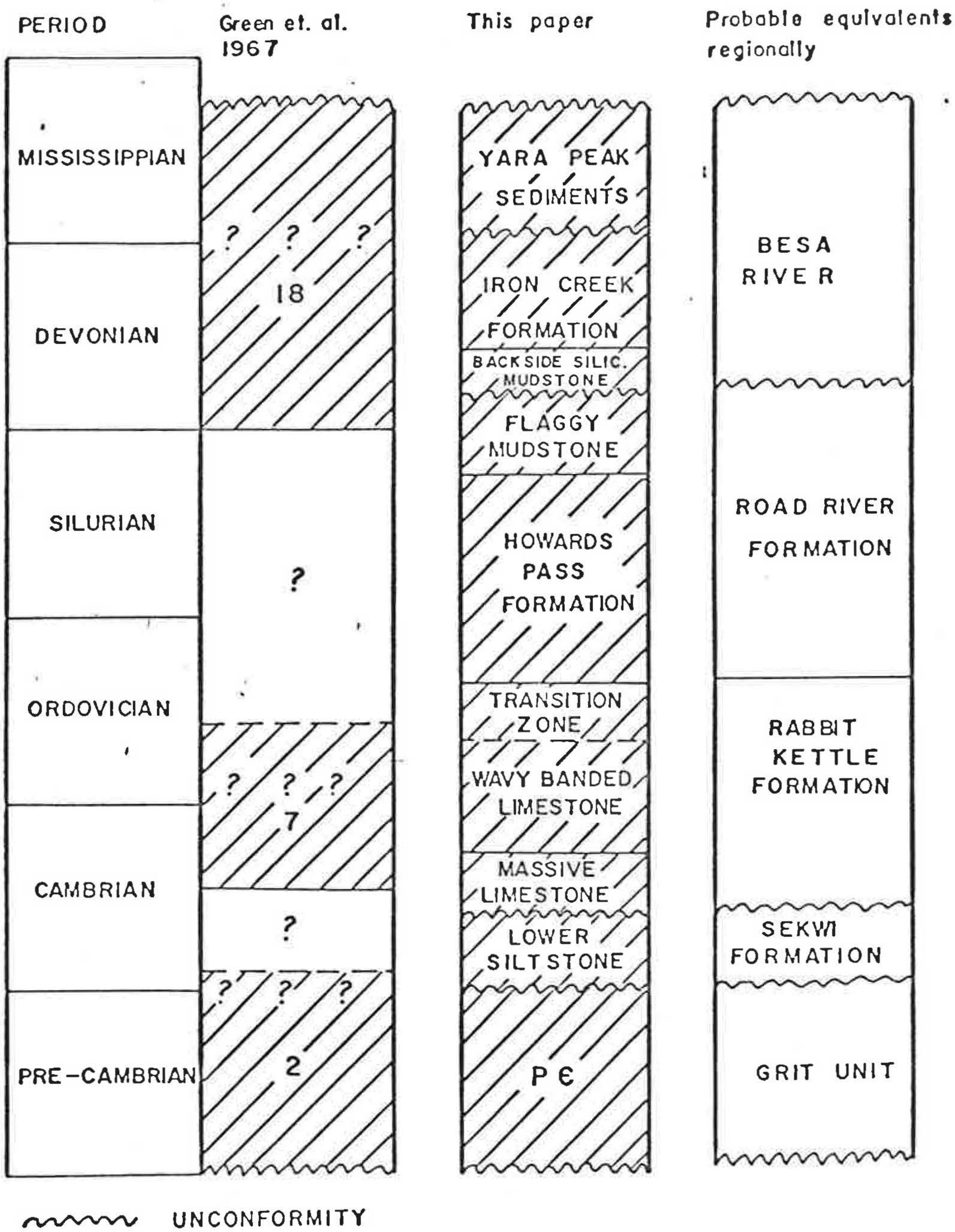


Figure 8 - Stratigraphic section at Howards Pass compared to regional formations and previous work.

Wavy Banded Limestone & Transition Zone

The Wavy Banded Limestone, is a 500'-1,000' thick complex consisting of limestones with some intercalated mudstone which increases towards the top.

The basal 300-400 feet of the unit consists of intercalated gray and dark gray micrite. The upper 150-300 feet consists of intercalated light gray micrite and calcareous mudstone which have a wavy appearence due to cleavage (Figure 9).

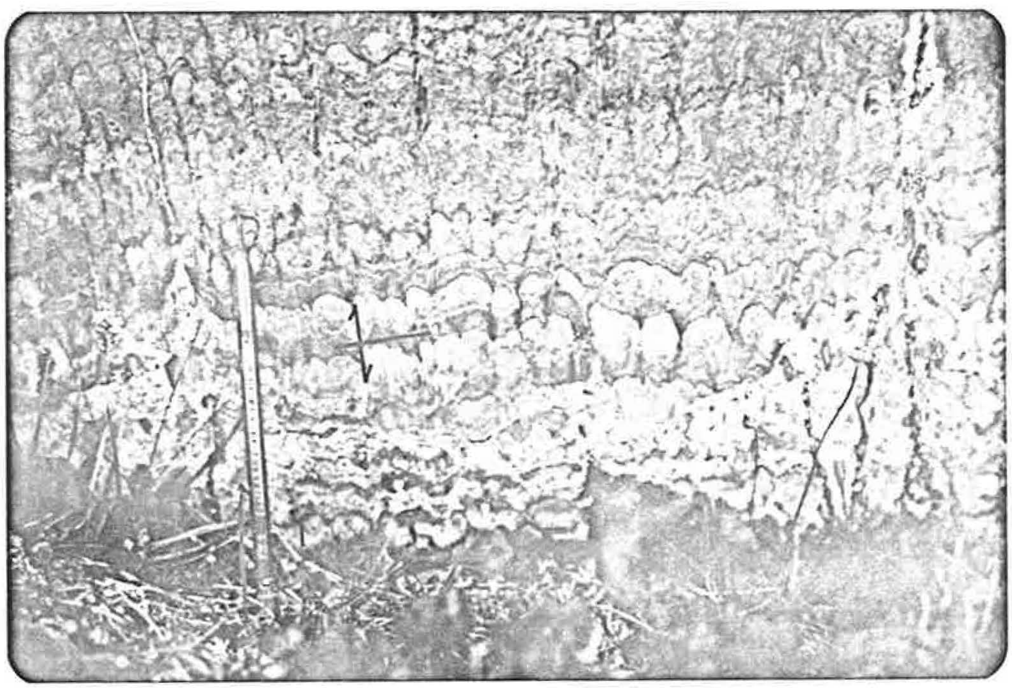


FIGURE 9 - Photograph showing Wavy Banded Limestone. Light gray limestone is interbedded with darker thin-bedded mudstone. Weak cleavage cuts the bedding at 90^{o} suggesting that the cleavage developed prior to major folding. Pencil is scale

——— Bedding

⌊- - -⌉ Cleavage

The Wavy Banded Limestone is overlain by the Transition Zone. As the name implies, this unit is transitional between the platform-deposited limestone below and the slope-deposited black shale above. The unit consists of interbedded siliceous siltstone and carbonaceous silt to mudstone.

Howards Pass Formation

The Howards Pass Formation, consists of a package of carbonaceous mudstones. The Active Zone, which contains all significant lead and zinc mineralization found to date, is part of the Howards Pass Formation, making it the key unit in this area. The Howards Pass Formation may be separated into 5 members. These include Pyritic Siliceous Shale, Calcareous Mudstone, Lower Cherty Mudstone, Active Zone and Upper Siliceous Mudstone.

Pyritic Siliceous Shale

The Pyritic Siliceous Shale member forms the base of the formation. This unit is a gray-black carbonaceous shale which shows well developed fissility and some cleavage. Pyrite is abundant and occurs as small lenses .2 to 8 mm long parallel to fissility. The unit is 5 to 25 feet thick.

Calcareous Mudstone

Overlying the pyritic siliceous shale is the Calcareous Mudstone. Typically the unit consists of carbonaceous mudstone containing 5 to 25% carbonate minerals. Calcite beds consisting of 1 mm to 5 mm elongate pods of calcite have been rotated into the cleavage producing a "feathery" appearance.

Lower Cherty Mudstone

The Lower Cherty Mudstone overlies the Calcareous Mudstone with the contact being gradational over 40 to 90'. The unit is very monotonous with the entire thickness of 100 to 250' being black, carbonaceous cherty mudstone. Bedding is very weak although quartz veins (termed pseudo-beds) do mimic bedding.

...20/

Active Zone

The Active Zone contains all significant Pb-Zn sulphide mineralization found to date in the Howards Pass claim block. The unit shows a large variation in thickness ranging from 0 to 200 feet thick. The presence of the Active Zone defines the XY sub-basin. Identification of the Active Zone is simple in drill core since the presence of limestone beds and clasts, thin framboidal pyrite beds, micro-folding and large quantities of sphalerite and galena all are indicative of the Active Zone. The lower contact with the Lower Cherty Mudstone is sharp, usually less than 10 cm although in some instances the broken nature of the contact may be confusing. The upper contact with the Upper Siliceous Mudstone is gradational over 10 to 50'.

The Active Zone may be subdivided into nine units which are considered cyclic in nature. Each unit contains associated grades and types of Pb and Zn occurrence. The units of the Active Zone are described below. It should be emphasized that the order of presentation represents an ideal cycle, with various combinations and sequences noted in the field.

Garbage Rock

The Garbage Rock is present in some drill core. It is thought that the rock type represents a slump zone consisting of highly folded and disrupted beds. The presence of the unit locally suggests that the active zone has slumped relative to the Lower Cherty Mudstone.

Basal Light Gray Limestone

The Basal Light Gray Limestone usually occurs at the base of the cylical Active Zone. The rock type is an argillaceous limestone which, as the name implies is light gray. Sphalerite and galena have only been noted in cleavage. Thickness of the unit varies ranging from 5 to 35' thick.

...21/

Graded Limestone

In an ideal cycle the Basal Light Gray Limestone is overlain by the Graded Limestone which is similar except that the more argillaceous beds have a graded appearence. Pb-Zn sulphide mineralization has only been noted in cleavage within this unit. Where present, this unit is typically less than 7 feet thick.

Thin Bedded Calcareous Mudstone

Stratigraphically above the Graded Limestone is the Thin Bedded Calcareous Mudstone which is locally massive. Visual estimates indicate that this unit contains between zero and 10% combined Pb-Zn, although intercalated thin beds of whitish grey Pb-Zn mudstone may increase the apparent grade in the unit. Generally the amount of calcareous component in the sub-unit decreases upsection while the amount of Pb-Zn increases.

Mixed Limestone & Cherty Mudstone

Overlying and in gradational contact with the Thin Bedded Calcareous Mudstone is a unit consisting of mixed limestone beds and clasts in a carbonaceous,cherty mudstone matrix. Bedding is weakly defined with contacts between limestone and mudstone usually being a cleavage plane.

The carbonaceous mudstone in the unit may contain up to 5% combined Pb + Zn with the limestone acting as a dilutant bringing Pb + Zn values down to less than 2%. As with all other units in the Active Zone, the thickness of the unit varies throughout the XY sub-basin ranging from 0 to 10 or 15 feet where found.

Thin Bedded Cherty Mudstone

The Thin Bedded Cherty Mudstone consists of thin beds (laminae) of carbonaceous mudstone varing in carbon, silica, and pyrite. Beds are typically 1 to 5 mm thick. Locally light gray limestone clasts up to 2 cm across are present.

...22/

The unit shows abundant slump-compaction folds. Spalerite, galena and pyrite are abundant and average 2 to 10% Pb and Zn in grade, occurring typically as bedded sulphide. Pb-Zn sulphide may also occur in cleavage planes. The thickness of the unit ranges from 6 cm to .7 meters thick.

Whitish Gray Pb-Zn Mudstone

The Whitish Gray Pb-Zn Mudstone is a distinctive unit which consistently contains the highest grade lead and zinc values in the section. The main rock type is a quartzose siltstone to mudstone with sphalerite and galena, traces of pyrite and carbonaceous matter are also present. The unit represents over 90% of the presently known Pb-Zn surface showings in the Howards Pass area. Typically the unit contains types IV and V mineralization (see Page 26). Evidence such as mineralogy and textures suggest that the Whitish Gray Pb-Zn mudstone is a brine deposit similar to Red Sea brine deposits. The stratigraphic thickness of the unit varies from less than 1 cm to over 10 feet. Contacts with other units are generally sharp.

Grey Chert

The Grey Chert typically occurs at the top of the Active Zone, although it is sometimes present in the transitional contact between the Upper Siliceous Mudstone and the Active Zone. The unit consists of medium grey chert containing up to 96% S_1O_2. The unit contains no significant Pb-Zn mineralization except traces of phase VI. (see page 26)

Upper Siliceous Mudstone

The Upper Siliceous Mudstone overlies the Active Zone and shows a gradational contact over 9-30 feet. The unit is characterized by thin beds with fetid limestone balls, many of which show a radiating texture (Figure 10).

...23/

The top ten meters of the unit contains a distinct graptolite horizon. The unit contains traces of phase VI mineralization locally. This unit ranges from 150 to 300 feet thick on the XY claims, and 15 to 60 feet in the Anniv claim area.

Flaggy Mudstone

The Flaggy Mudstone Formation overlies the Howards Pass Formation. The contact between the two units is sharp over less than 1 meter. The unit consists of grey mudstone showing carbonaceous clasts throughout. Most of these clasts have been deformed into the cleavage. Worm burrows have been noted which cut the cleavage suggesting that the cleavage developed prior to lithification. The unit appears to have been deposited in a medium to deep water depth, and separates the euxinic Howards Pass Formation from the flysch Backside Siliceous and Iron Creek Formations.

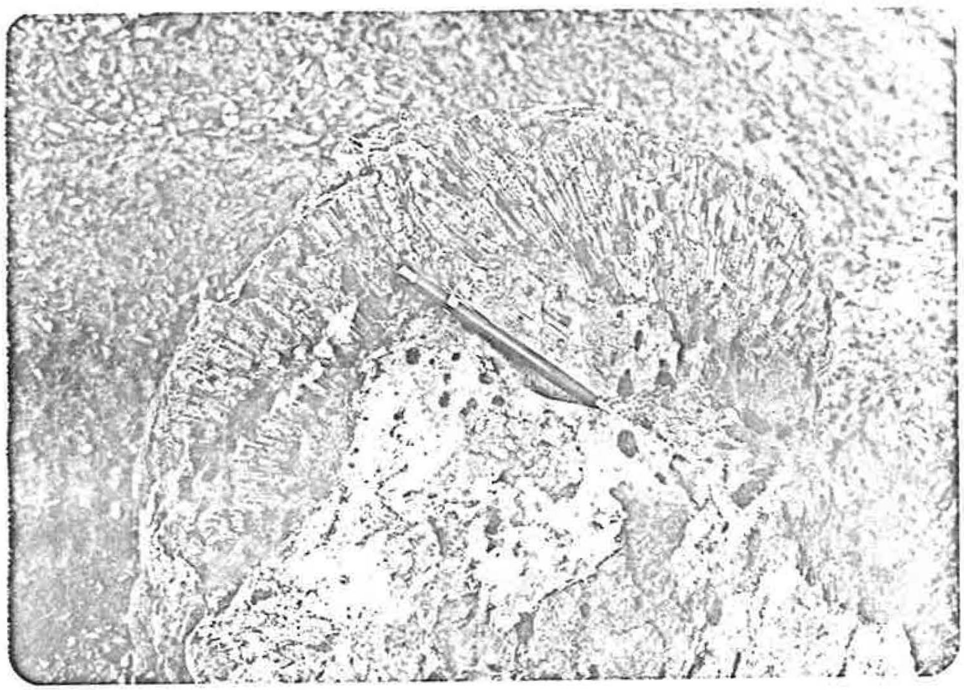


Figure 10 - Photograph of Limestone ball, typical of the Upper Siliceous Mudstone. Note the characteristic radiating texture.

...24/

Backside Siliceous Mudstone

The Backside Siliceous Mudstone is a cherty unit which overlies the Flaggy Mudstone. The unit consists of distinctly bedded cherts with 2 to 6 cm thick beds. The upper portions of the unit are less siliceous but still show the same nature of bedding. The thickness of the Backside Siliceous Mudstone varies slightly and is typically 200 to 600 feet thick. This unit cannot at present be distinguished from the Iron Creek Formation in drill core.

Iron Creek Formation

The Iron Creek Formation consists of carbonaceous clastics ranging from mudstone to greywacke. Load casts, tool marks and graded bedding all indicate turbidite deposition, typical of the flysch environment. Within the upper part of the unit a barite horizon occurs. The stratigraphic thickness of the barite horizon is quite variable suggesting small ponds were the sites of barite deposition. At present this horizon in the Howards Pass area is correlated with the MacMillan Pass Barite Horizon, which may locally contain Pb and Zn (for example the Tom Property). The Iron Creek Formation is 600 to 900 feet thick in the Howards Pass area but may be more variable regionally.

Yara Peak Sediments

The Yara Peak Sediments consist of flysch clastics which unconformably overlie the Iron Creek Formation. The unit contains mudstones, siltstone, and greywackes with a chert pebble conglomerate noted a few hundred feet above the unconformity. The rocks of this formation are only slightly carbonaceous when compared with units below the unconformity. Greywacke clastic dikes follow cleavage in the unit suggesting a high hydrostatic pressure during folding.

Structure

The structural history of the Howards Pass area is complex. The main tectonic features of the area are folds, faults and cleavage.

...25/

Folds and cleavage appear to be related. Microscopic folds and some larger folds in the Howards Pass Formation appear to be slump and/or compaction features. Spiral folds, closed microfolds and related cleavage and growth faults are included in this phase of deformation. Subsequent mesoscopic folding and macroscopic folding appear to have been produced after deposition of the Yara Peak sediments. Slaty cleavage in the Yara Peak sediments and related fracture cleavage in the units below suggest that the Yara Peak sediments still contained much interstitial water during folding. This last phase of folding produced the major syncline (Plate I) in the XY area.

Evidence of brittle deformation consists of bedding plane faults, longitudinal faults and late stage cross faults. Bedding plane faults appear to be related to folding (differential slip between formations) and carbonaceous zones such as the Upper Siliceous Mudstone Formation's graptolite zone. The amount of relative movement along these faults is unknown. Longitudinal faults are present within the XY syncline. The only one apparent to date is along the southern portion of the XY syncline (see Plate I, near DDH 25, 33 and 40). Relative movement along this fault appears to be less than 600 feet. Thrust faults are visible regionally and have been mapped locally (Plate I), although the affect on the mineralized horizon is unknown at present. Cross-faults are present in the XY area. These divide the XY longitudinal structures (Plate I and VII) in to coherent blocks.

Structure of the Anniv claims may be of a similar nature (Plate XVI), although more work is necessary to confirm or reject this proposal. At present the apparent shallow structure in the Anniv area offers an excellent possibility of an open pit, although more drill information is required to confirm this.

Ore Microscopy

Summary

The sulphide mineralization occurring at Howards Pass may be divided into six descriptive phase assemblages based on textural evidence. Phase I through III represent bedded sulphides with minor structural control, phase IV and V show both structural and sedimentary control, while phase VI shows mostly structural control. The phases and their characteristics are as follows:

1. Phase 1 shows open microfolding of pyrite beds. This phase includes nonfolded to slightly folded beds with no or weakly developed cleavage.

2. Phase II shows closed folds outlined by pyrite beds. Cleavage is strongly developed subparallel to axial planes. Sphalerite is concentrated in the cleavage.

3. Phase III shows flow microfolding of pyritic beds. Most planar features are aligned parallel to cleavage.

4. Phase IV shows massive sphalerite in cleavage and disseminated sphalerite away from cleavage. No pyritic beds are evident.

5. Phase V is characterized by large irregular masses of sphalerite and galena.

6. Phase VI is represented by pods of galena-sphalerite-pyrite within the Howards Pass Formation, but not restricted to the Active Zone.

Phases I through III appear to be gradational and continuous as do Phases IV and V although no intermediate phase between Phases III and IV have been found. Phase VI is a separate phase although locally it may be gradational with the other phases. Mineralogical assemblage variation accompanies textural variation, the most obvious changes being increases in sphalerite/pyrite, galena/sphalerite ratios. Two features appear to control the localization of sulfides; these are microbedding and microfolding and associated cleavage. Structural control increases in importance in phases III, IV and V suggesting that mobilization has occurred.

...27/

Purpose

The purpose of this section is to describe and discuss mineralogy and textural relationships present in the Howards Pass Pb-Zn sulfide mineralization.

Method of Study

Photomicrographs presented here were taken with Kodacolor-II color film ASA 80. Point counts presented here, were made by visual estimate with the help of a grid system and an automatic point counting system. Over 600 points were counted for a set for statistical correctness. It should be stressed that the points are frequency counts and not weight or volume percents.

Samples from Howards Pass can be divided into phase-assemblages for descriptive purposes. The phases are based on textural relationships, but there are also mineralogical differences between phases.

Description

Phase I is represented by open microfolding of pyrite rich beds. This phase includes undeformed to slightly deformed beds, although unfolded beds were not noted.

Weakly developed cleavage is present subparallel to axes of the microfolds. Opaque minerals present are pyrite, sphalerite, galena and graphite. Table II gives the frequency counts for Phase I.

Table II

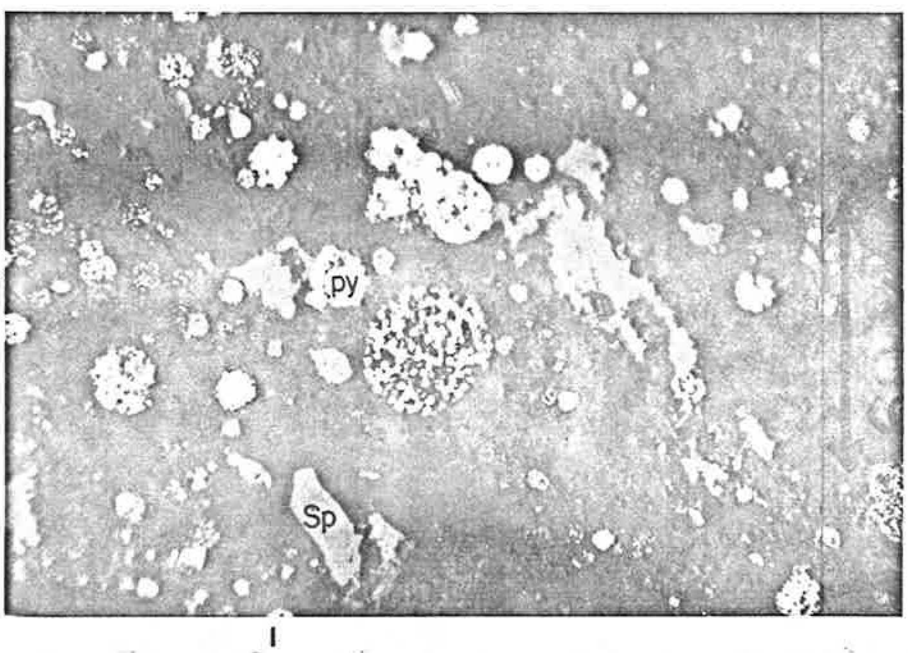
	Pyrite	Sphalerite	Galena	Gangue*	Total
1. Counts	121	31	1	605	758
%	15.9	4.0	0.1	79.8	
2. Counts	151	36	1	523	711
%	21.2	5.1	0.1	63.6	
3. Counts	47	30	0	216	293**
%	16.0	10.2	0	73.7	

* gangue includes all non-opaque minerals
** not enough space on section for 600 counts

...28/

It follows from Table II that pyrite is the most abundant sulfide with minor amounts of sphalerite and trace amounts of galena. Pyrite occurs as spherical grains, some of which show raspberry texture (Figure 11). Typically the framboids show modified raspberry texture giving much of the pyrite a "dirty" appearance. Framboids occur along discrete planes and represent diagenetic layering here defined as bedding (Figure 12). Individual framboids range in size from less than 5u to greater than 40u across (average 20u-25u). Pyrite also appears as atolls surrounding quartz and sphalerite. Coalescing framboids and massive pyrite grains are 10u to 90u across. Sphalerite also occurs as elongate grains.

Grain sizes for sphalerite range from slightly less than 10u to 60u, although some elongate grains are over 200u in length. Approximately 50% to 60% of the sphalerite occurs as free grains in gangue; 40% to 50% are intergrown with pyrite. Locked particles range from simple intergrowths of pyrite add sphalerite (sphalerite most abundant) to disseminated pyrite. Trace amounts of galena which shows a brown tint are present in fractured areas. In some instances, galena shows more typical whitish colour. Grain sizes of galena range from less than 5u to 80u on the few grains noted. Locally, galena fills fractures in graphite which occurs in trace amounts as individual grains 20u to 60u across. Table IIb summarizes the above data.



'IGURE 11: Photomicrograph showing types of framboidal pyrite discussed in text. Note raspberry texture framboidal pyrite consisting of individual 1u cubes of pyrite. Dirty pyrite shown is a modification of the raspberry texture. Pyrite-sphalerite intergrowths are also present. Section M-15-254. Scale 60u

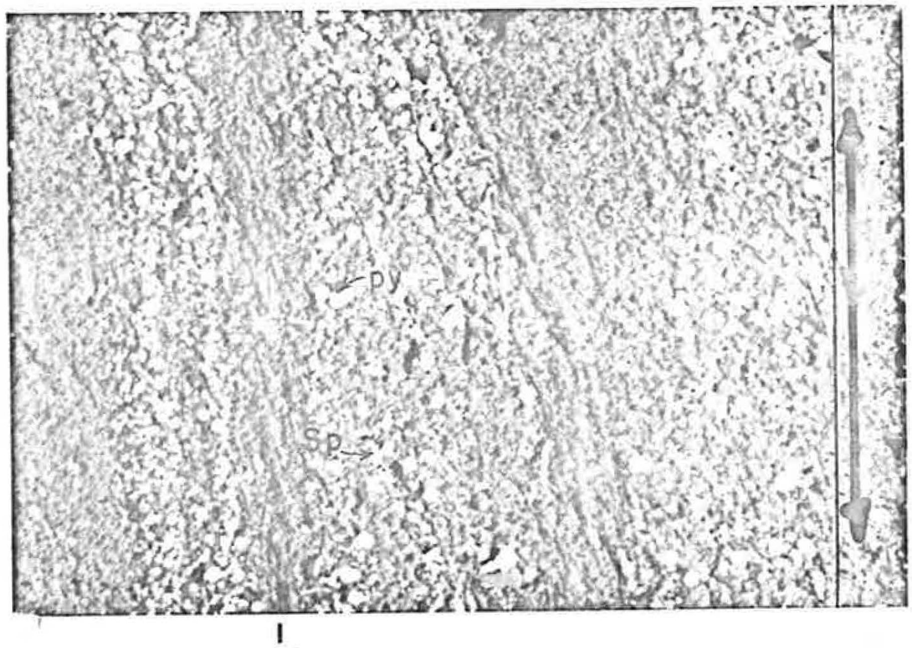


Figure 12: Photomicrograph showing pyrite defined bedding and associated sphalerite. Note that sphalerite is related to bedding although still enlongate parallel to cleavage. Centre band is 350u across. Locally, pyrite is intergrown with sphalerite. Section M-2-178

Scale - 1 mm

...30/

Table IIb

Mineral	Grain (s)	intergrown with
Pyrite	1) framb. 5u - 40u	Sphalerite, galena
	2) massive - 10u -	Sphalerite, galena
Sphalerite	10u - 60u	Pyrite, sphalerite
Galena	5u - 80u	Pyrite, sphalerite graphite
Graphite	10u - 80u	Galena

Phase II

Phase II shows closed folds outlined by pyritic beds. This phase grades into Phases I and III. Cleavage is strongly developed subparallel to axial planes of microfolding with concentrations of sphalerite accenting cleavage areas. Sulphide minerals include pyrite, sphalerite and galena. Table III gives the frequency counts for Phase II.

Table III

		Pyrite	Sphalerite	Galena	Gangue	Total
1.	Counts	99	121	2	487	709
	%	13.9	17.1	0.3	68.7	
2.	Counts	79	150	0	642	871
	%	9.1	17.2	0	73.7	
3.	Counts	98	97	0	535	730
	%	13.4	13.3	0	73.3	

...31/

Pyrite occurs in two ways, most frequently as framboidal grains which commonly show raspberry texture ranging in size from less than 3u to 30u and also as cubes and irregular masses 100u to 260u across. All gradations exist between raspberry framboidal and massive pyrite, showing micropits (termed dirty pyrite).

Sphalerite occurs in two distinct ways. Disseminated grains of sphalerite are small (5u to 20u, average 10-15u), and are associated with some pyritic beds, although intergrowth with pyrite are uncommon. Larger grains (i.e., 15u to 20u) are typically aligned parallel to the cleavage. Approximately 60% to 70% of large sphalerite grains show intergrowths with pyrite, as simple locking and disseminated pyrite in sphalerite.

Sphalerite also occurs in massive irregular elongate grains 150u to 200u across and 1,000u long. These masses are restricted to cleavage areas (Figure 13). Intergrowths of trace amounts of galena 10u to 40u are present and are intergrown with pyrite spheres and masses 10u to 30u in diameter. Although elongated parallel to cleavage, sphalerite is concentrated in certain beds which are usually high in pyrite. Sphalerite is locally associated with low pyrite beds (Figure 14) also.

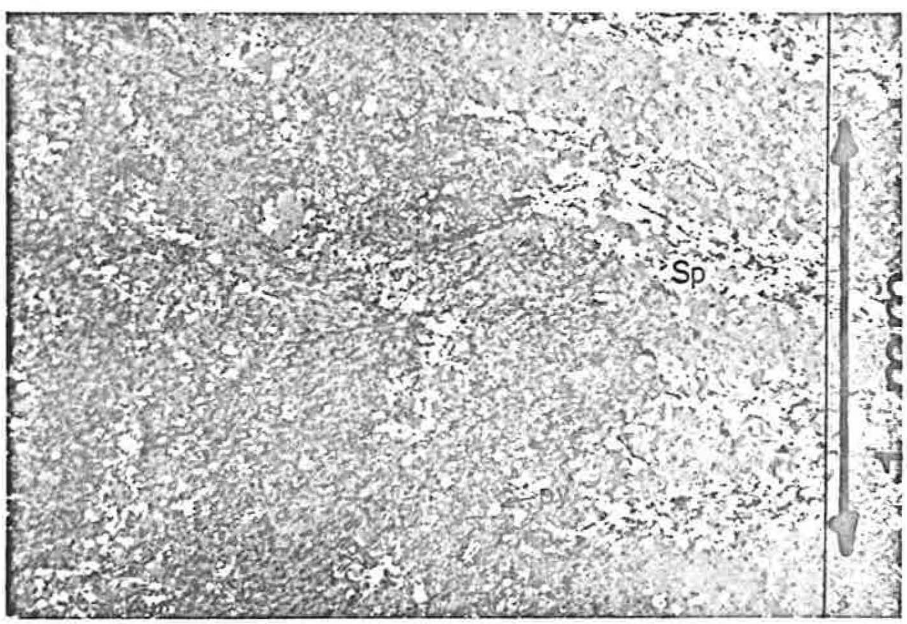


FIGURE 13 - Photomicrograph of microfold axial zone. Axis of fold is oriented east-west. Fold hinge is defined by beds of framboidal pyrite. Sphalerite is related to pyrite rich beds and cleavage. Note that the sphalerite contained in the cleavage shows only trace amounts of disseminated pyrite, while sphalerite associated with beds shows disseminated pyrite and simple intergrowths with pyrite. Scale - 1 - mm

Table IIIb summarizes the above data.

Table IIIb

mineral		grain size (s)	intergrown with
pyrite	1)	framb. - 50u - 30u	sphalerite, galena
	2)	massive - 100u - 260u	
sphalerite	1)	5u - 20u	pyrite, galena
	2)	150u - 1000u	
galena		10u - 40u	sphalerite, pyrite

Phase III

Phase III shows flow microfolding of pyritic beds. Relic bedding is noted only locally. Most planar features are parallel to cleavage (i.e., bedding has been transposed into the cleavage) except at crests of microfolds. Opaque minerals present are pyrite, sphalerite, chalcopyrite and galena. Table IV gives the frequency counts for Phase III.

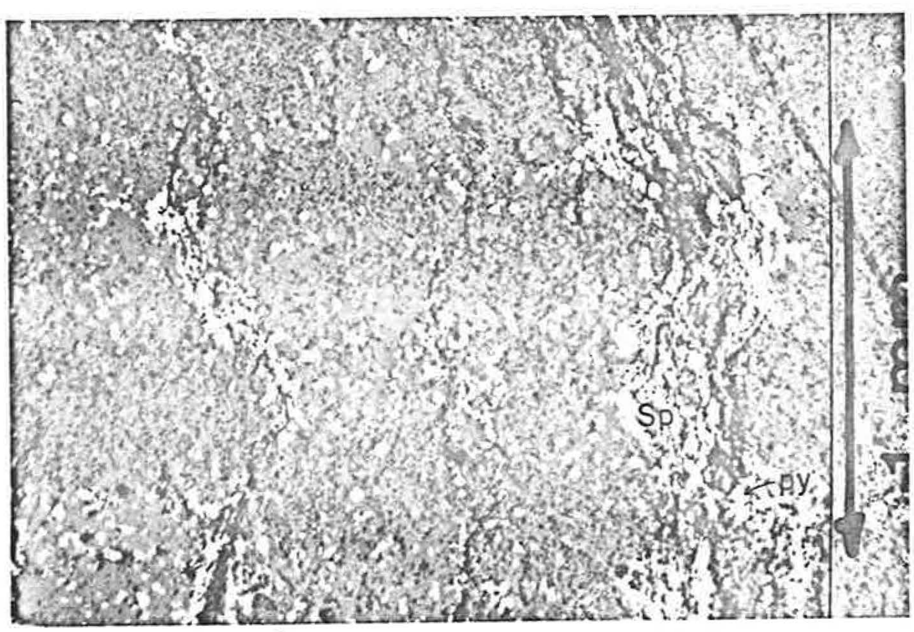


FIGURE 14 : Photomicrograph of sphalerite associated with bedding. Bedding is defined by framboidal pyrite. In this instance sphalerite is associated with cleavage where the cleavage cuts pyrite. Scale 1 - mm

...33/

Pyrite occurs in two ways. Framboidal pyrite accounts for 70% to 75% of the mineral in this phase. Dirty framboidal pyrite is most common, but smooth surface pyrite occurs in major amounts. Grain sizes for framboidal pyrite range from 5u to 30u (average 15-20u). Pyrite also occurs as masses which transgress framboidal pyrite alignment.

Sphalerite occurs as irregular grains elongate parallel to cleavage which are 10u to 40u across and 20u to 200u long, and in large equidimentional 20u across and over 100u long, (Figure 15). Sphalerite forms intergrowths with pyrite, galena and chalcopyrite, (Figure 16). Approximately 60% to 70% of the sphalerite shows simple intergrowth with pyrite; 10% to 20% shows disseminated pyrite framboids occurring within grain boundaries. Sphalerite intergrown with galena, is mostly of the massive variety.

Sphalerite surrounds galena grains and in turn occurs as disseminated grains (10u-15u) in galena; less than 5% of the sphalerite occurs this way. Trace amounts of chalcopyrite 10u to 50u are locally disseminated in massive sphalerite (Figure 8). Galena occurs as small grains 10u to 40u across (average 20u) and in larger masses 250u to 300u across. Sixty to 65% of the galena occurs as simple intergrowths with pyrite, (Figure 17) while 10% occurs in sphalerite, which in some instances in turn contains disseminated sphalerite. Twenty-five to 30% of the galena occurs in gangue material. Table IVb summarizes the above date.

Table IVb

mineral	grain size (s)	intergrown with
pyrite	1) framb. - 5u-30u	sphalerite, galena
	2) massive - 40u-1000u	
sphalerite	1) 10u-15u	pyrite, galena
	2) 20u-200u long	chalcopyrite
chalcopyrite	10u-50u	sphalerite
galena	1) 10u-40u	pyrite, sphalerite
	2) 250-300u	

...34/

Phase IV

Phase IV shows massive sphalerite in cleavage and disseminated sphalerite away from cleavage. Host rock may be limestone, siliceous mudstone or argillaceous chert.

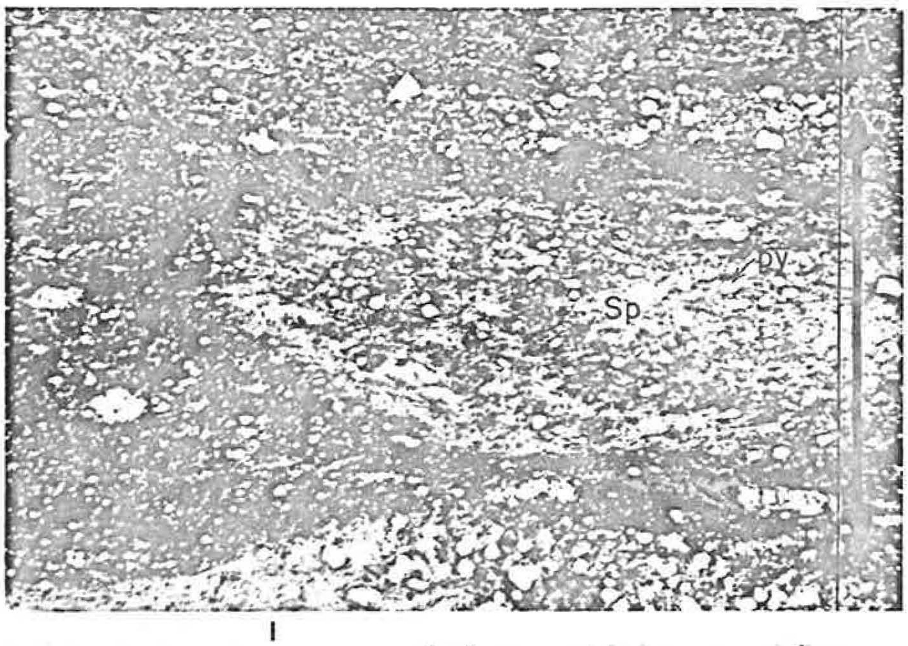


FIGURE 15: Photomicrograph showing crest of microfold. Note concentration of sphalerite in crest. Sphalerite is aligned parallel to a cleavage. This particular fold is 600u across. Section 6-425.

Scale - 1 - mm

...35/

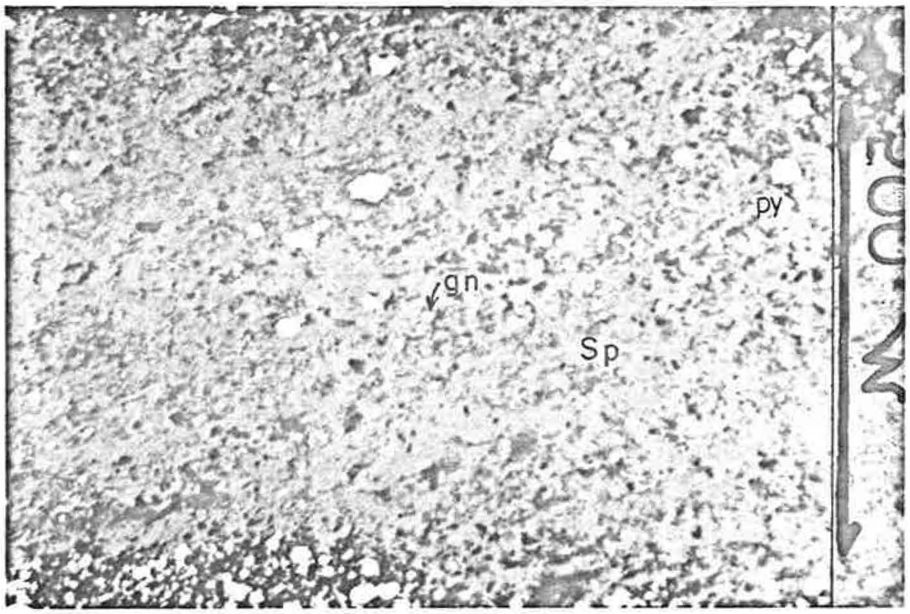


FIGURE 16: Photomicrograph showing area of massive sphalerite. Note 20u to 40u galena disseminated in areas of massive sphalerite. Pyrite shown in picture has lost much of its framboidal nature. Pyrite is disseminated in sphalerite. Section 6-425

Scale - 500u

...36/

Table IV

		pyrite	sphalerite	galena	chalcopyrite	gangue	total
1.	Counts	194	64	0	8	464	730
	%	26.6	8.8	0	1.1	63.6	
2.	Counts	199	171	0	0	399	769
	%	25.9	22.2	0	0	51.9	
3.	Counts	190	146	0	3	392	731
	%	26.0	20.0	0	0.3	53.6	
4.	Counts	77	345	18	1	183	624
	%	12.3	55.3	2.9	0.2	29.3	
5.	Counts	68	375	16	3	279	741
	%	9.2	50.6	2.2	0.4	37.7	

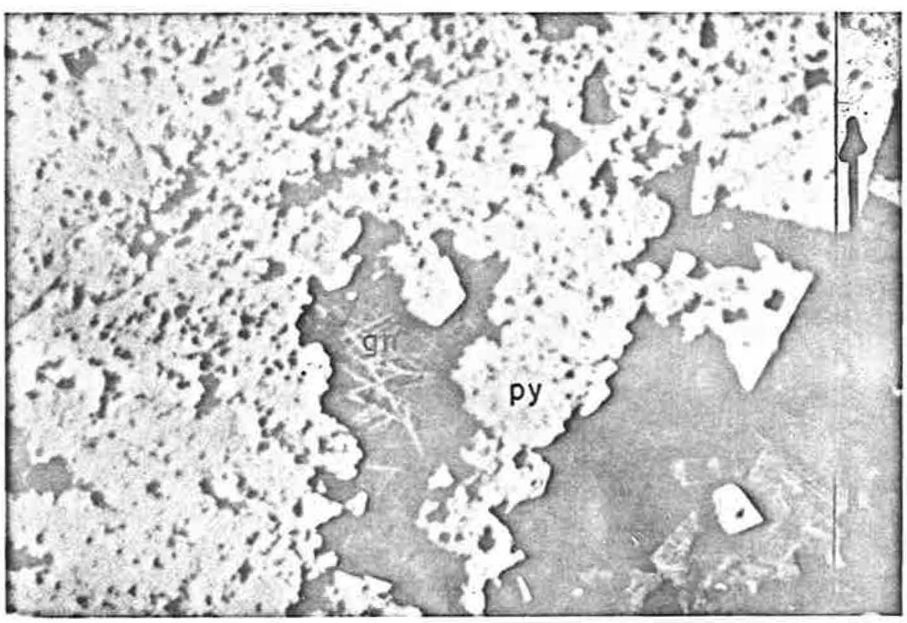


FIGURE 17: Photomicrograph of brown tinted galena in dirty pyrite. Irregular grain of galena 240u across shows white lines, the colour of which are more typical of galena. Section 6-425

Scale - 500u

...37

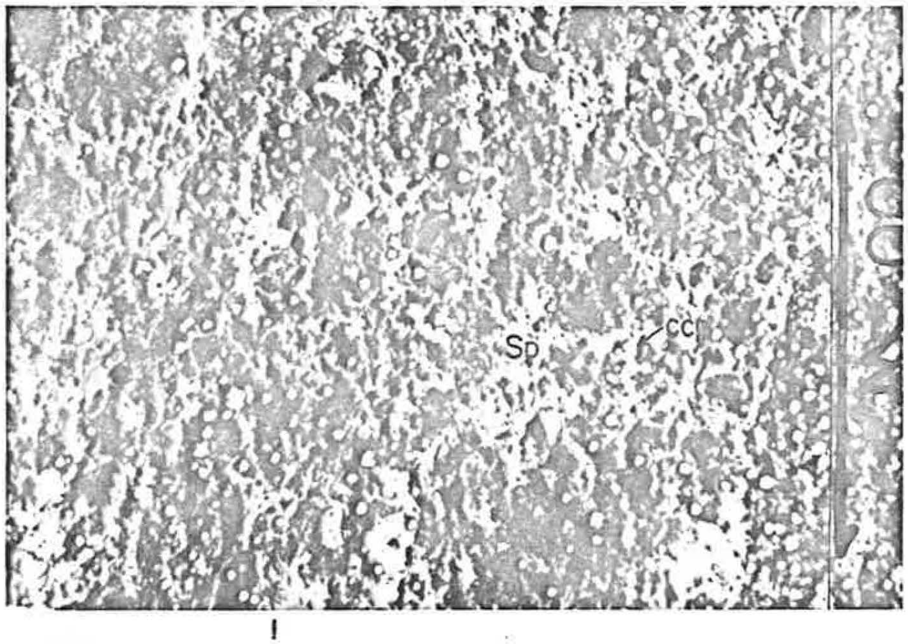


FIGURE 18: Photomicrograph of chalcopyrite grains in sphalerite. Note the 5 grains in the picture are 20u to 60u across and are surrounded by massive sphalerite. Galena in sphalerite is also shown. Section 18-456.

Scale - 500u

...38/

The lack of bedded pyrite and sphalerite is also notable. Minerals identified in polished section include sphalerite, pyrite, galena, chalcopyrite and graphite. Table V gives the frequency counts for Phase IV.

Table V

		pyrite	sphalerite	galena	pits*	gangue	total
1.	Counts	3	226	24	95	342	690
	%	0.4	32.8	3.5	13.8	49.6	
2.	Counts	9	251	46	46	292	644
	%	1.4	39.0	7.1	7.1	45.3	
3.	Counts	7	284	20	64	463	838
	%	0.8	33.9	2.4	7.6	55.3	
4.	Counts	0.0	444	66	1	345	856
	%	0	51.9	7.7	0.1	40.3	

* pits represent plucked sphalerite and/or galena.

Pyrite occurs in minor amounts as 10u to 30u irregular to cubic grains, while only trace amounts of dirty pyrite are present. Sphalerite occurs in two distinct ways. Most (60% to 65%) of the sphalerite occurs in cleavage as massive grains 75u to 450u across with lengths of 1,000u to 1 cm, (Figure 19). Less than 5% of the massive sphalerite is intergrown with pyrite grains and/or simple intergrowths with pyrite. Disseminated sphalerite constitutes 40% of the sphalerite, (figure 20). This type shows grain sizes ranging from 5u to 40u (average 5u to 15u). Galena is associated with sphalerite and/or pyrite. Most (70% - 80%) galena occurs as disseminated grains of 30u to 100u in cleavage associated with sphalerite. Generally individual grains are connected forming stringers within the sphalerite bands; these can occur along the edge of the cleavage or as a medial feature (Figures 21, 22, and 23).

...39/

Ten to 15% of the galena occurs as grains locked in disseminated sphalerite (both 15u to 250u), (Figure 24). Minor (10%) amounts of galena occur with rims of pyrite; these grains are 5u to 15u across. Only a trace (less than 5 grains within one section) of chalcopyrite is present. Grains of 20u to 25u show simple intergrowths with sphalerite and galena. Minor amounts of graphite are present associated with massive sphalerite. Graphite grains range in size from 10u to 200u and are intergrown with galena in many instances. Table V summarizes the above data.

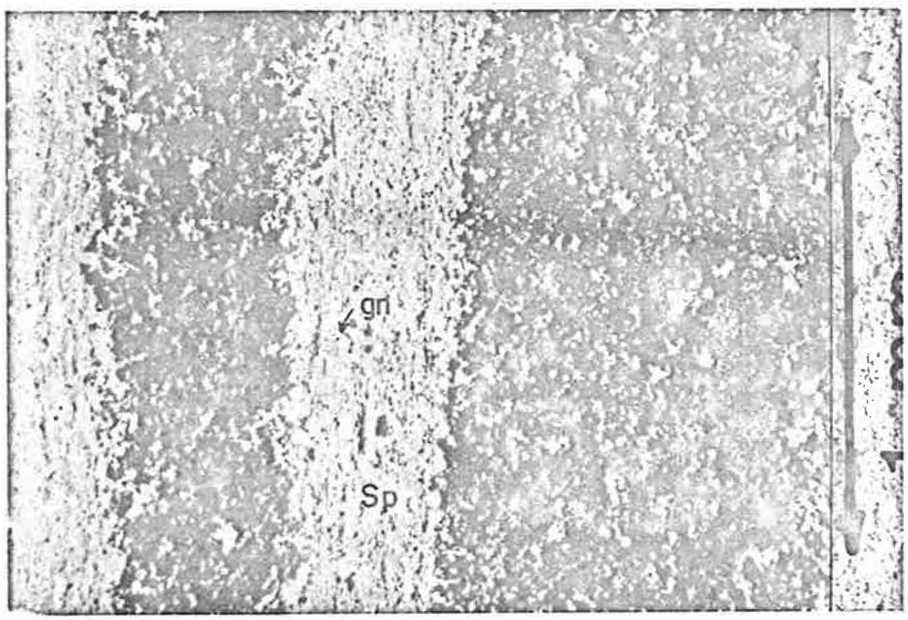


FIGURE 19: Photomicrograph shows cleavage bands of sphalerite in limestone. Features of note are: bimodal nature of sphalerite grain size, association of galena within cleavage. Sphalerite bands are 300u to 600u across and run length of section. Section HP-2

Scale - 1 mm

...40/

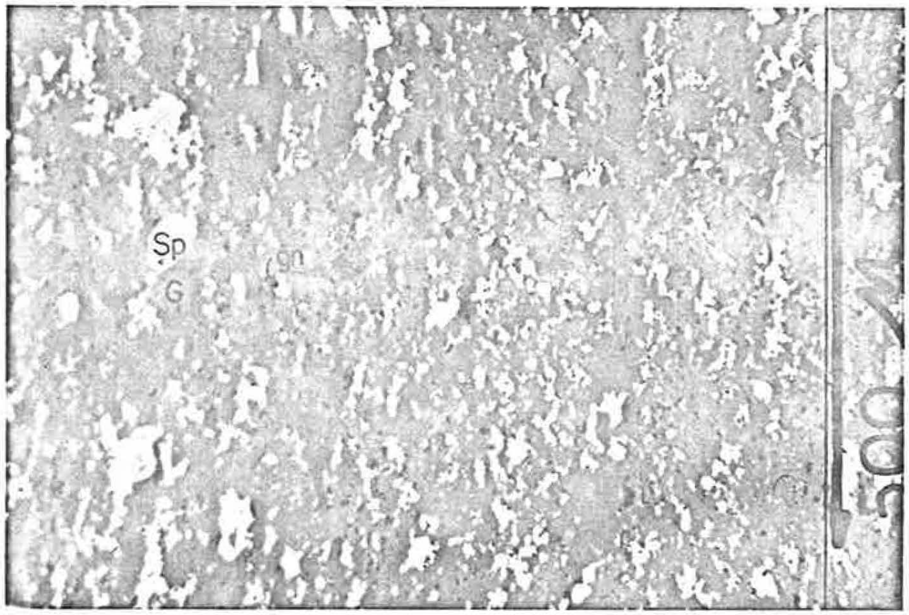


FIGURE 20: Photomicrograph showing ~~is~~ area of disseminated sphalerite between two areas of massive sphalerite. Note that sphalerite is 5u to 45u across. Some of the sphalerite grains contain disseminated galena grains and simple intergrowths with galena. Section HP-2

Scale - 500u

...41/

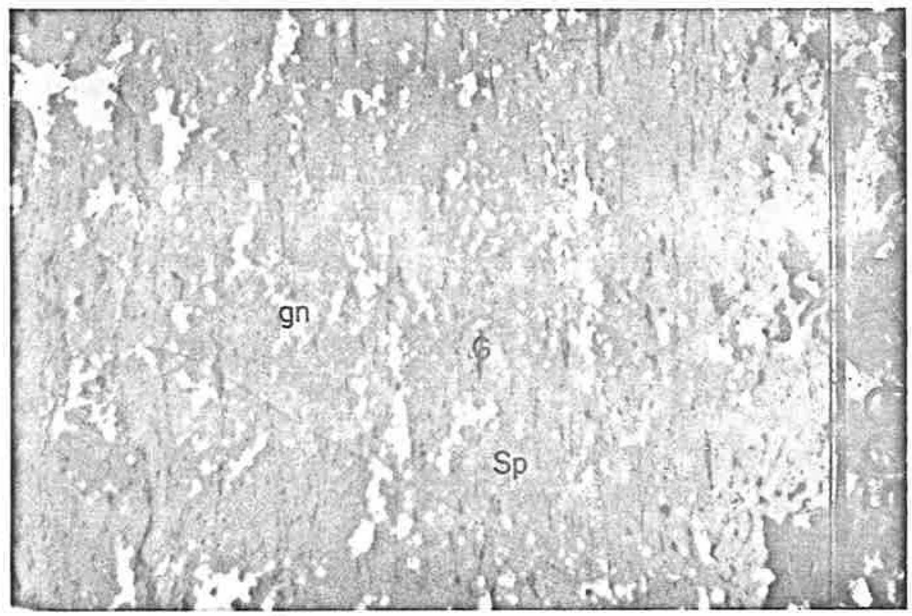


FIGURE 21: Photomicrograph showing cleavage area with massive sphalerite. Note alignment of micas and alignment of segregation of galena. Galena grains are 10 to 30u across. Section HP-2

Scale - 500u

...42/

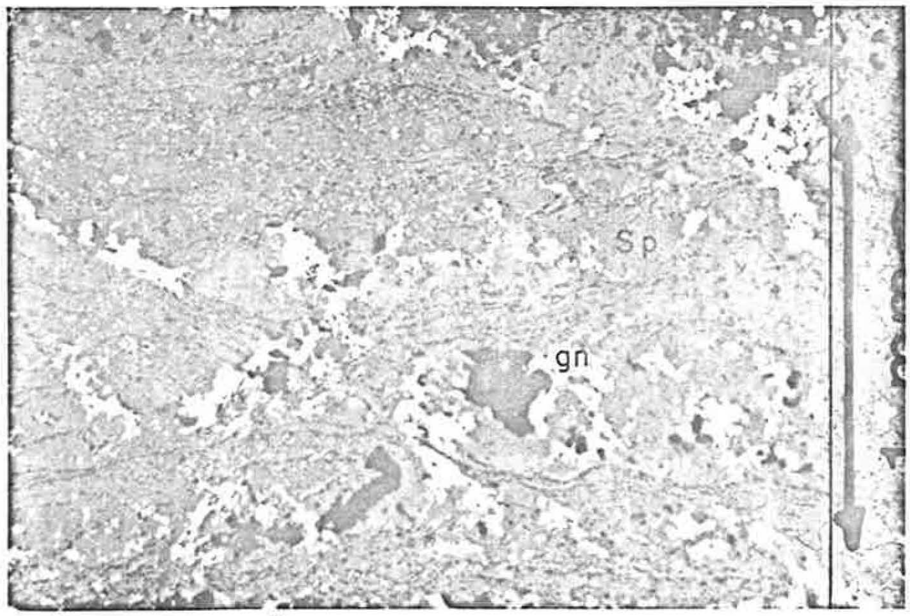


FIGURE 22: Photomicrograph showing galena in sphalerite. Massive sphalerite is contained within cleavage. Note how galena concentrations are associated with silicates. This appears similar to pressure shadows found in metamorphic garnets. Note that alignment of micas support this analogy. Section HP-2

Scale - 1 mm

...43/

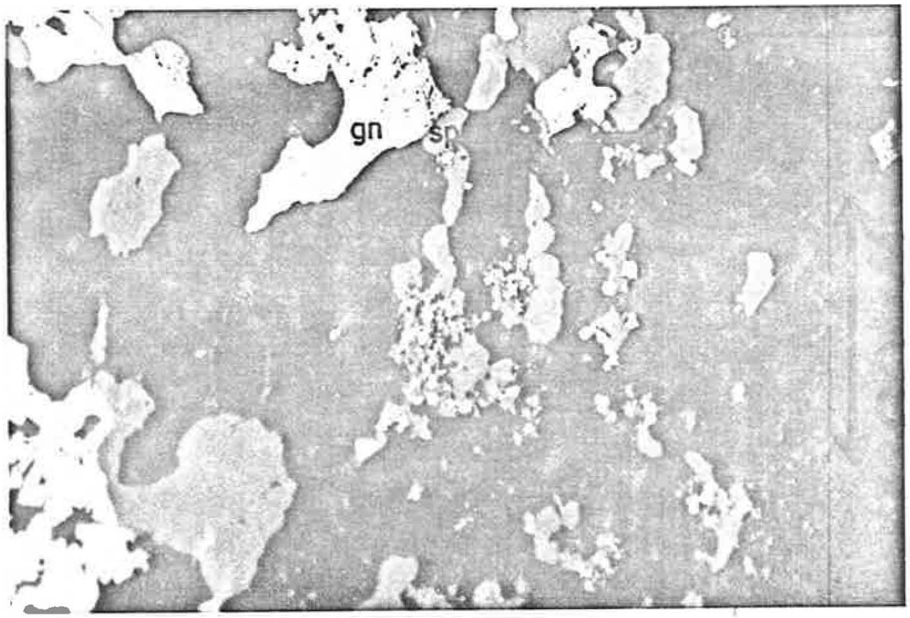


FIGURE 23: Photomicrograph showing individual sphalerite grain from disseminated area of section. Grain is 50u across. Note complex form of disseminated galena 5u to 10u across.

Scale - 60u

...44/

Table Vb

mineral		grain size (s)		intergrown with
pyrite		10u-30u		sphalerite
sphalerite	1)	75u-1000u	(60%)	galena, pyrite, graphite
	2)	5u-40u	(40%)	
mineral		grain size (s)		intergrown with
galena	1)	30-250	(80%)	sphalerite, graphite
	2)	<5-15u	(20%)	
graphite		10u-250u		sphalerite, galena

Phase V

Phase V is characterized by large irregular masses of sphalerite and galena may be related to cleavage as in Phase IV. Minerals present include pyrite, sphalerite, galena, chalcopyrite and graphite. Table VI summarizes point count data.

Table VI

		pyrite	sphalerite	galena	graphite	gangue	total
1.	Counts	86	171	107	3	197	564
	%	15.2	30.3	19.0	0.5	34.9	
2.	Counts	9	403	309	0	26	748
	%	1.2	53.9	41.3	0	3.5	
3.	Counts	13	322	290	0	21	650
	%	2.0	40.3	44.6	0	3.2	
4.	Counts	73	157	142	27	374	703
	%	.4	22.3	20.2	3.8	53.2	
5.	Counts	3	196	173	16	335	723
	%	.4	27.1	23.9	2.2	46.3	

...45/

Pyrite occurs in euhedral to massive grains 30u to 200u across. Sphalerite occurs as irregular masses 20u to 300u (average 100u to 150u) which are mostly equidimensional although elongate grains are present. Sphalerite is intergrown with pyrite, galena and graphite (Figure 25).

Ten percent of the sphalerite is locked with pyrite, mostly as disseminated sphalerite (30u to 50u) in pyrite or with lesser amounts of pyrite (20u to 50u) disseminated in sphalerite. Galena occurs in irregular grains 5u to 1200u (average 150u-400u). Sphalerite mantles galena and also occurs as blebs in galena 10u-60u across (Figure 17). Galena occurs in simple intergrowths within and disseminated in pyrite (Figure 18). Trace amounts of galena fill fractures in graphite.

Table VIb summarizes the above data.

mineral	grain size (s)	intergrown with
pyrite	30u-200u	sphalerite, galena, graphite
sphalerite	20u-300u	galena-pyrite, graphite
galena	20u-600u	sphalerite, pyrite, graphite
graphite	10u-700u	sphalerite, galena, graphite

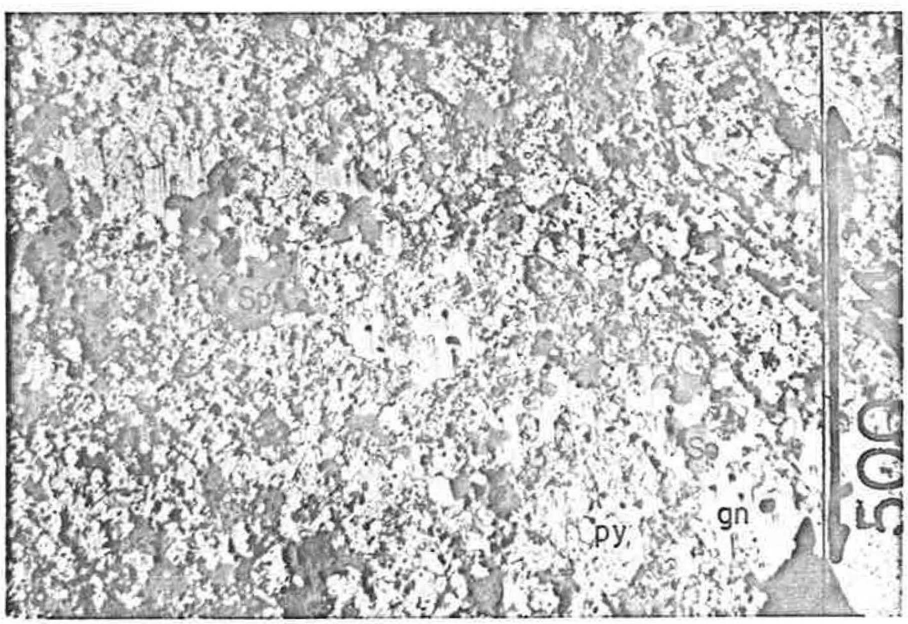


FIGURE 24: Photomicrograph of pyrite-sphalerite-galena intergrowths. Note galena in pyrite, sphalerite blebs in galena and sphalerite matrix surrounding other minerals. Section 12-229. Scale - 500u

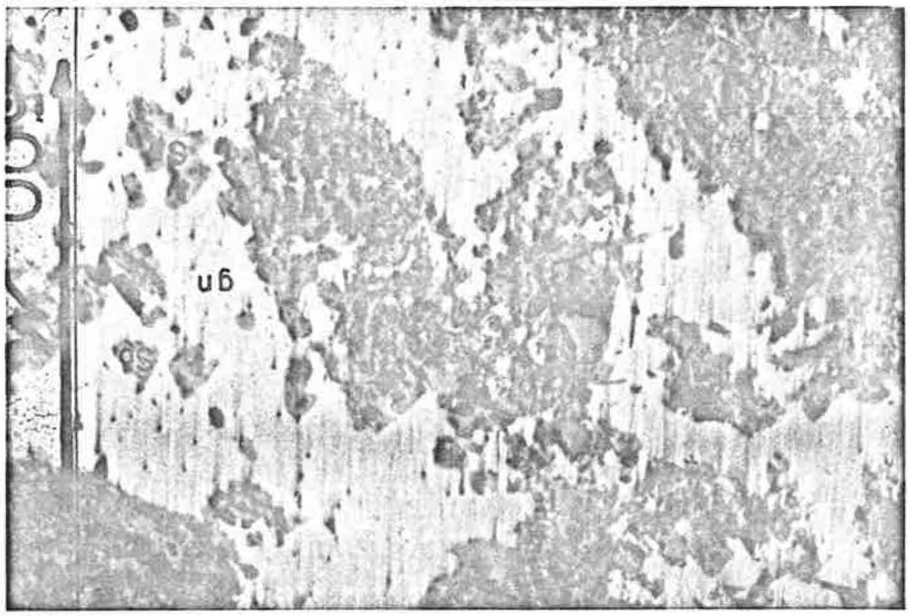


FIGURE 25: Photomicrograph of intergrown sphalerite and galena. Note simple intergrowths and disseminated sphalerite in galena. Section 17-138

Scale - 500u

...47/

Phase VI

Phase VI is characterized by blebs and pods of galena and/or sphalerite associated with pyrite. This phase-assemblage differs from the other 5 phases in many respects. It may occur within the active zone, but is also present in the upper siliceous mudstone and in two instances in the lower cherty mudstone. Occurrence of this phase is sporadic although a strong association with pyrite pods and blebs is obvious.

Blebs range from $<$ 1 mm to 5 mm across and may be elongate parallel to cleavage. Pods are 5 mm to 2 cm across, and may be elongate parallel to cleavage where they may be up to 5 cm long.

Grains of galena and sphalerite are coarse, usually 500u across and are intergrown with pyrite galena and/or sphalerite typically replaces pyrite. At present it appears that phase VI constitutes only trace amounts of the Pb-Zn present in the Howards Pass formation. The fact that it is the only phase that shows replacement textures, and the association of this phase with secondary features suggest that it represents a mobilized phase. Further more the presence of greater quantities of this phase above cyclic-Active Zone sulphide mineralization may be used to support the generalization that the origin of the phase is related to load-dewatering.

Discussion and Conclusions

The mineralization occurring at Howards Pass can be divided into six descriptive phases based on textural evidence. Phases I thru III appear to be gradational and continuous as do Phases IV and V although no intermediate phase between Phase III and IV have been found.

Phase VI is separate from the other phases although locally the phase can be gradational with the other five phases. Mineralogical assemblage variation accompanies textural variation, the most obvious changes being increases in sphalerite/pyrite, galena/pyrite and galena/sphalerite ratios proceeding from phases 1 thru 5.

...48/

Two features appear to control the localization of sulphides. These are microbedding and microfolding (and associated cleavage). Micro-structural control increases in importance in phases I, II, III respectively. Phase IV shows sedimentary controls although cleavage controls much of the sulphides. Phase VI again shows much structural control and related high grade. Phase VI is related mostly to cleavage and shows a slight relation to sedimentation.

ORE POTENTIAL & 1976 PROGRAM

See Appendices III and IV for drilling and budget summaries.

XY Area Potential

Results obtained from the 1975 program, combined with previous seasons results, suggest that the southeast and southwest perimeter areas have greater potential than the remainder of the XY area (figure 26). This conclusion is based on the following observations:

1) The best core assays have all come from the "southeastern" perimeter (e.g., Holes 2,6,12,13,15,17,18,20,24,26,30,32,34,36,40,41,& 47.)

2) The "southwestern" perimeter, while not yet drilled, has (1) favourable stratigraphy, (2) Pb-Zn mineralization in Trench 40, and (3) the Brodell Zone.

With respect to the northeast and northwest perimeter areas, disappointing results have been obtained from drilling.

Two holes drilled in 1974 (DDH 37 and DDH 38) did not intersect mineralization of encouraging grade and thickness. The Active Zone was intersected in DDH 37, but the best interval was only 10 feet of 0.74% Pb and 4.76% of Zn. DDH 38, located approximately 600 feet to the west on Section 60 + 30 NW, did not intersect the Active Zone. It was stopped at 667 feet after deflecting and subsequently following the bedding of the Upper Siliceous Mudstone. DDH's 43, 44 and 45 were drilled in the 1975 season. DDH's 43 and 44 returned anomalous stratigraphy at the horizon where the Active Zone should have been intersected, and no mineralization was intersected. The Active Zone was intersected in DDH 45, but the best interval was only 10 feet of 1.2% Pb and 2.54% Zn.

...49/

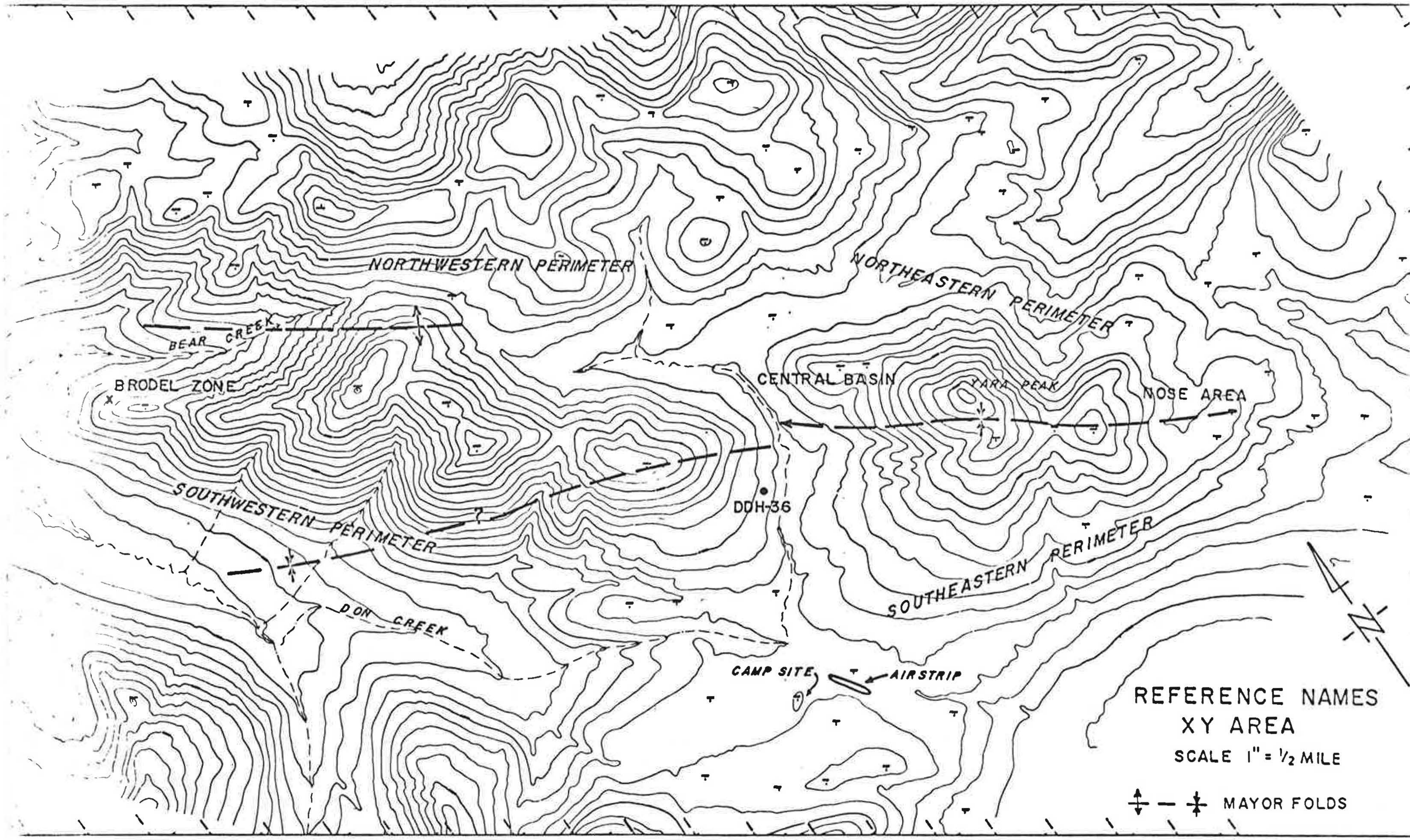


FIGURE 26: Topographic map of XY area showing areas and major structures and referred to in the text.

In 1974, Dynasty Exploration drilled four short holes in an area on the northwest perimeter, about 1 mile north of DDH 45. The intersections in these holes were similar in thickness and grade to the intersections in DDH 45.

The above drill information, combined with mapping of the northeast perimeter in 1975, suggests that there is less potential here than there is on the southwest and southeast perimeter areas. For this reason, testing of this area is not recommended for the 1976 season, although it should be tested at some future time when funds permit. Therefore, based on the above data, it is recommend that drilling in the 1976 season be directed toward the southeast and southwest perimeter.

Considering the areas with the most favourable terrain for open-pit mining, the nose area and the area between 70 + 00 NW and 120 + 00 NW are preferred. For this reason, top priority has been placed on the drilling in these areas. To put the area in perspective with respect to potential tonnage; the region from 70 + 00 NW to 120 + 00 NW (Figure 26) could contain 35,000,000 tons assuming continuity and an average thickness of 55 feet and a width of 1,400 feet. The total south perimeter from the nose area to the Brodell Zone, could have a potential of roughly 165,000,000 tons using the same parameters. Over one half of the area covered by the above generalization has not been drilled, therefore, it is stressed that this tonnage is strictly a potential tonnage, and must not be considered as a reserve of any type.

Anniv Area Potential

Four short holes were drilled on the Anniv claims during the 1975 season. Two of these holes intersected thicknesses of 75 feet each of mineralization with an average grade of 2.55% Pb and 6.35% Zn. These results warrant an expanded program of drilling for the 1976 season in view of the open potential existing in this area.

...52/

The area recommended to be tested in 1976 is roughly 2,500 feet by 2,000 feet. Assuming complete continuity and a thickness of 45 feet, a potential for 20,000,000 tons exists. While this is not a sufficient tonnage to warrant a production decision, the grade found to date is high enough to provide a good start on proving up a "plum" to provide higher grade in the early production period.

1976 Drill Program - XY Area

The objectives of the 1976 drill program in the XY area are to develop in some detail shallow tonnage potential and to explore for and, hopefully expand known areas of higher grade Pb-Zn mineralization. This two fold objective is the bases of a four point program with two primary and two secondary sub-programs. The sub-programs (Plate XXI include:

1) detail drilling
2) south-western perimeter drilling

3) geophysical anomaly drilling
4) optional drilling

1) Detail grid drilling is proposed to test an area where previous drilling has indicated the greatest potential for shallow ore grade material. This program will consist of approximately seven drill holes on 500 foot centres within the area between lines 93+90 and 144+00 (see plates II and III). The total footage allotted to this part of the program is 4,000 feet. If results warrant, additional footage will be transferred to this aspect of the program from the southwest perimeter drilling.

2) Southwest perimeter drilling. The purpose of this program is to test for the Active Zone (Pb-Zn) in the favourable area between DDH-36 and the Brodell Zone. Drilling should test the XY basin along where it is found in the major fold system on the XY claims. The drill lines proposed in Plates VIII, X and XII will also test the Active Zone within the structural blocks produced by cross-faults (Plate I, Plate VII). Total footage for this part of the program is approximately 10,000 feet, but will be reduced if the detail drilling results indicate that additional footage is required there.

...53/

3) Two drill holes are proposed to test a gravity anomaly obtained in the XY area. Gravity test work completed in 1973 (Syberg, 1974) showed an anomaly in the area indicated in Plate XXI. A reanalysis of this date (Rivera and Saydam, 1975) suggests that two holes be drilled to test this anomaly; with the second drill hole to be conditional based on results of the first. The proposed depths of these holes are 300 and 500 feet respectively.

4) The drilling proposed above may require more footage than is proposed here, but optional drilling should still be considered if extra footage were to become available. Targets of this nature include testing of the central part of the XY sub-basin between Yara Peak and DDH-37-(74).

1976 Drill Program - Anniv Area

The objective of the Anniv drill program is to test for shallow Pb-Zn mineralization at grades acceptable for developement. This program consists of two parts. The first, and most important part is to test the mineralization in the area of 1975 drill holes (Plates XVI and XVII). This drilling will test the Active Zone from the Wavy Banded Limestone on the north and down dip to the south. Sections A and B would be drilled first with sections D and/or E locations dependent on the first two line-sections. The second part of the program would be a preliminary test of the Active Zone to the south-east on section C; consisting of two holes. Total footage would be in the order of 6,000 feet. This program would be expanded if results warrant.

OP Drill Program

One drill hole is proposed for the OP claims. This would be at the same location as OP-1 in 1975. The drill hole would be approximately 400-500 feet deep, although the actual amount of drilling done on the OP claims would depend on results and assessment requirements.

...54

GENERAL PROGRAM

Mapping

The general mapping is important in that it will guide evaluation of the total claim block, and also help in any decision as to individual claim status. In areas of known mineralization, plane table - survey mapping similar to that completed in the Anniv area may help guide drilling.

Mapping (1"= 400') on orthophotos should cover all present 616 claims in the Howards Pass area. Also, 1"=1,000' scale mapping should be completed on any claims which would be of interest and which may be open for staking in 1976-77.

Geochemistry

Geochemical soil sampling has proven valuable to indicate mineralization on areas where little geology is available. A small soils program of 12,800 line feet (8 lines with 400' spacing on lines and 50' spacing on samples) is proposed to further outline the Brodell Zone to the northwest. The exact location of this grid would be based on geologic mapping to be completed early in the season. However, soil geochemistry could be used if an area of potential near surface mineralization is indicated by mapping and prospecting during the coming field season.

Geophysics

Although the gravity surveys done to date have not been definitive, gravity may be still considered a possibility for locating shallow high grade Pb-Zn mineralization.

A gravity survey is proposed for the Anniv drill area. The size of this survey will be dependent upon results of the test drilling in the XY area. (See 1976 XY drill program). If the results are positive in the XY area, approximately 1 line mile of gravity lines will be completed in the Anniv Area.

An electromagnetic survey is proposed for the same area as the gravity survey in the Anniv area if warranted. This would depend on results of orientation surveys run on areas of better known structure (i.e., line 93+90 and 109+00) in the XY area. If the orientation surveys are successful, approximately 2 line miles of E.M. would be attempted in the Anniv area to delineate structures there.

Legal Survey

A legal survey is recommended for the Yukon claims in 1976. The Northwest Territory claims have been previously surveyed but they have not yet been brought to lease status. Diamond drilling during 1975, as well as prospecting and trenching, greatly upgraded the economic potential of the Yukon claims, both in the XY-Don areas and in the Anniv area. This increased potential strongly suggests that the tenor of the ground be strengthened by surveying.

In addition to the above, it is becoming apparent that the location of the border and that of the adjoining claims are becoming of importance in the upper part of the Don Creek Valley. The longer a claim survey is postponed the more difficult it becomes because of posts being misplaced by snow slides and the writing on the posts becoming difficult to read. It is recommended that the following claims be surveyed during 1976:

The X Group 1-46
Don 1-16, 10-16, 21-81, 101-164
The Anniv Group 1-16
The R Group 1-66, 155-161
Don 34-81, 114-164

Metallurgical Research

Metallurgical work done to date has indicated that some difficulty can be expected with respect to producing clean, separate lead and zinc concentrates with acceptable recovery rates. Better recovery was experienced when a combined concentrate was produced. In order to improve on the flotation work done to date, additional samples of drill core will be made available for continued metallurgical studies. These samples will be drawn from previous seasons core and from next seasons core as it becomes available.

A literature search and assessment of possible pyrometallurgical and/or hydrometallurgical methods should be undertaken early in the season. Then, when sufficient concentrate has been accumulated from flotation testwork, lab testing of the most suitable methods can commence.

Camp Expansion

With the 1976 program significantly expanded over the 1975 program, some expansion on the XY camp will be required. This will consist mainly of constructing additional buildings and an extension to the cookhouse. Improvements will also be made to the core storage area, the dry facilities and cooking facilities.

Airstrip Improvement

As noted earlier in this report, more work is required to improve the safety and availability of the airstrip. This will consist of the following:

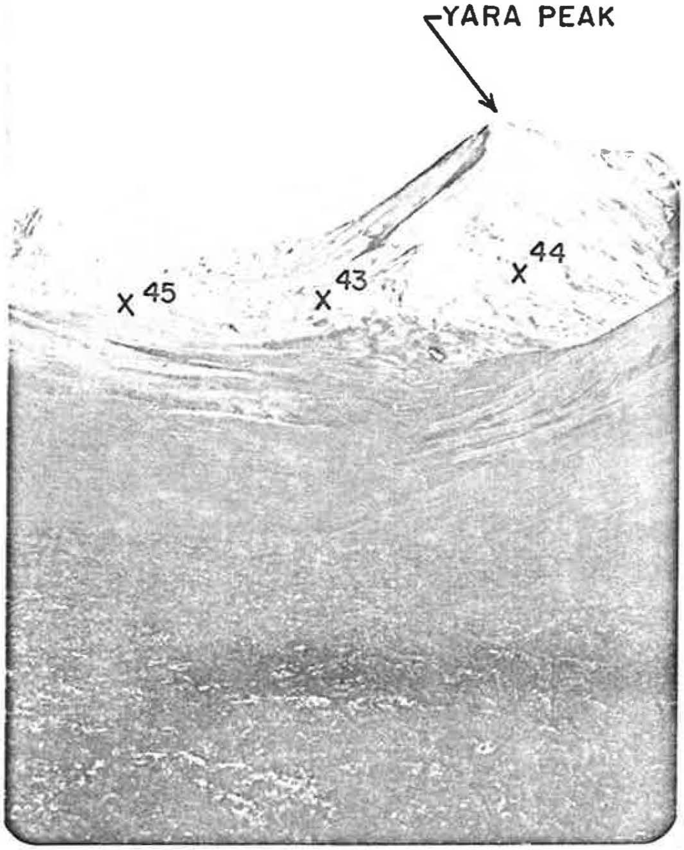
1) improve drainage
2) extend all-weather (gravelled) surface
3) reduce curvature of strip
4) construct small storage shed adjacent to strip storage area
5) improve marking of strip perimeter

Access Road

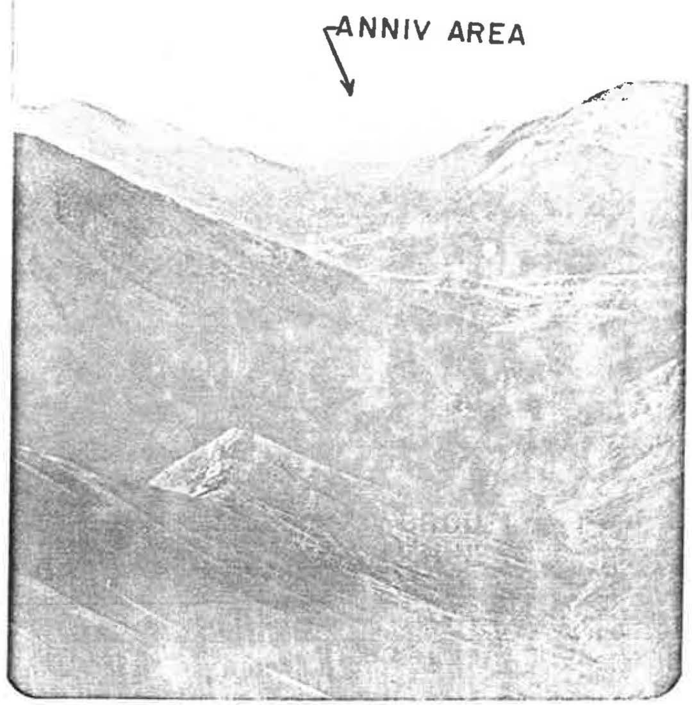
It is planned to establish a ground link between the XY area and the Anniv area in 1976. Initially this would consist of a tote-road passable to tracked vehicles such as the Nodwell and bulldozers. This road would provide an alternate means for hauling heavy freight during the summer when the winter strip would not be available for air transport.

An access road from Cantung will be of great benefit for a continuing program of exploration, underground sampling and underground exploration because of the larger freight tonnage involved in future seasons. The Federal Government through the Department of Indian and Northern Affairs, plans to commence a survey of possible routes in the 1976 season. Unfortunately, actual construction cannot commence next season due to lack of funds. However, construction may commence in 1977 if the Government is able to divert funds for this purpose. Efforts to convince them of the necessity of this road continue.

...57/

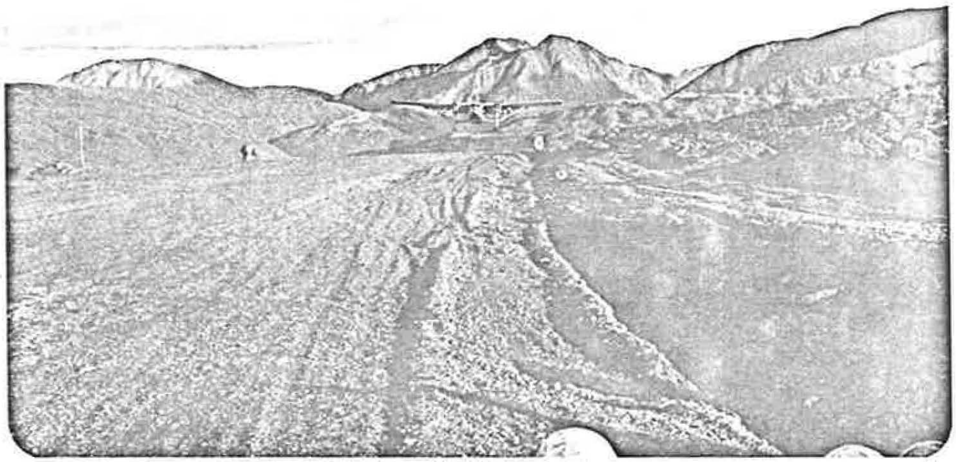


Left: Photograph looking southeast to Yara Peak. Note DDH-44 on southside of knob before Yara Peak.

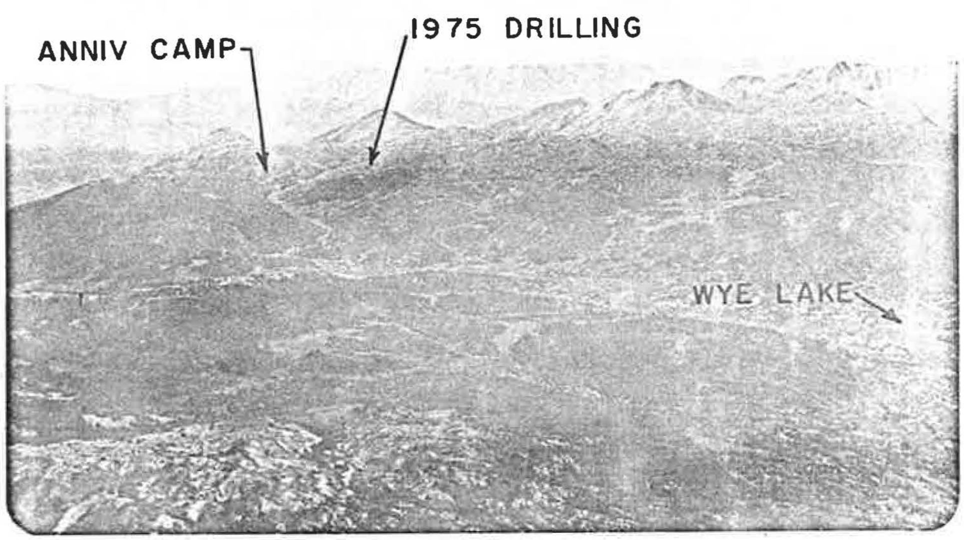


Right: Looking northwest (180^{o} rotation from above). Brodell Zone is on knob in foreground Anniv area is indicated by arrow.

APPENDIX I (cont'd)

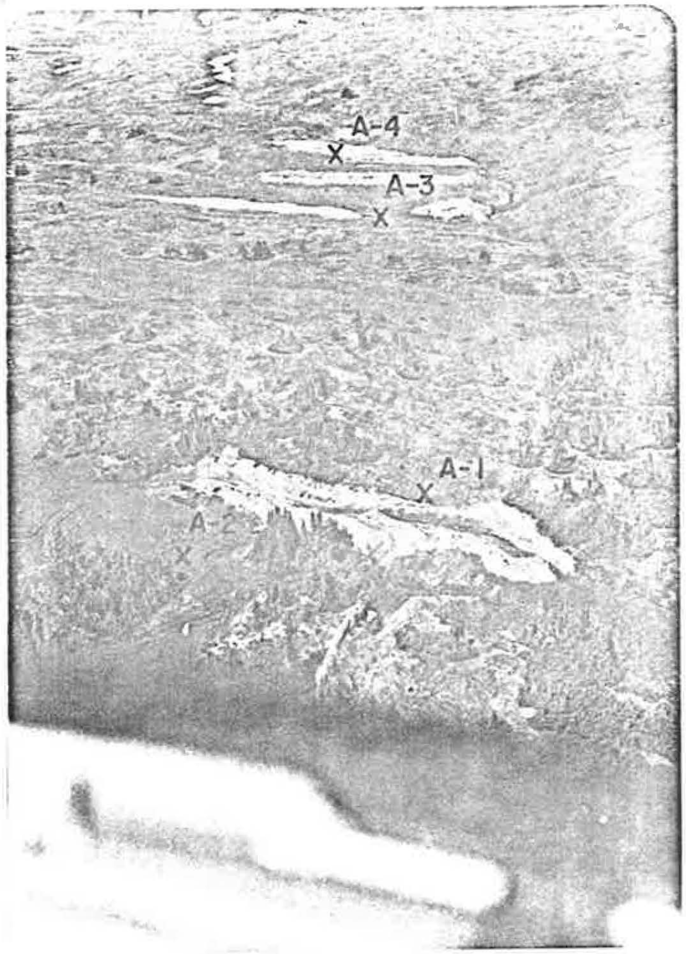


- Twin Pioneer Landing on 1,800 foot runway at Howards Pass. This particular flight was from Tungsten, although most Beaver and Aztec flights are from Watson Lake.



- The Anniv area looking west, Wye Lake is in lower right corner. Note 75 drilling area and camp.

APPENDIX I (cont'd)



- Anniv drill area. Trenches were completed in 1974, while drill holes were completed in 1975.

APPENDIX II

Summary of 1975 Program Expenses January to October 1975 inclusive.

	January to April 15, 1975	April 16 to October 31, 1975	
	CANEX PLACER	U.S.S.	TOTAL
Administration	1,100	37,200	38,300
Camp Operation	1,900	62,800	64,700
Communication	100	1,300	1,400
Drilling	2,300	225,000	227,300
Geology	13,100	51,000	64,100
Geophysics	1,000	900	1,900
Property Expense	2,900	14,000	16,900
Roads	-	16,000	16,000
Sampling	-	700	700
Trenching	-	5,500	5,500
Transportation	3,100	102,700	105,800
Total to 31 October 1975	25,000	517,100	542,600
Estimated expenses remaining for Nov. & Dec. (late billings due to mail strike, continuing geological work, camp maintenance etc.)		32,700	
Total for 1975	25,500	549,800	575,300

Note: extra staking in October 1975 cost approximately $23,000.

...61/

APPENDIX IV

Summary of 1976 Drill Proposal

XY Area	Section A-A'	3 holes	2,400	
	Section C-C'	4 holes	5,100	
	Section E-E'	3 holes	2,500	
	Section 109 + 00	3 holes	1,900	
	Section 93 + 90	2 holes	1,100	
	North of Reference Line between 93 + 90 and 109 + 00	2 holes	1,000	
	Gravity Anomaly	2 holes	800	
	TOTAL FOOTAGE			14,800'
Anniv Area	Section A-A'	5 holes	2,500	
	Section B-B'	8 holes	2,500	
	Section C-C'	2 holes	1,000	
	TOTAL FOOTAGE			6,000'
OP Area		1 hole	500	
GRAND TOTAL				21,300'

...62/

APPENDIX III

Summary of Proposed 1976 Budget

XY Area		
Drilling	690,000	
Geophysics	1,000	
Camp Expansion	10,000	
Total XY Area		701,000
Anniv Area		
Drilling	500,000	
Anniv Road	10,000	
Geophysics	9,000	
Total Anniv Area		519,000
OP Area		
Drilling	50,000	50,000
General		
Survey	270,000	
Metallurgy	15,000	
Airstrip	10,000	
Access Road	10,000	
Geochem	8,000	
General Contingency	17,000	
Total General		330,000
GRAND TOTAL		$1,600,000

REFERENCES

1) Blusson, S.L. 1968 Nahanni, District of Mackenzie and Yukon Territory; Geol. Surv. Can. Map 8-1967.

2) Blusson, S.L. 1971 Sekwi Mountain Map - Area, Yukon Territory and District of Mackenzie, Geol. Surv. Can. Paper 71-22 and Map 1333A.

3) Ganrielse 1967 Tectonic Evolution of the Northern Canadian Cordillera; Can. J. Earth Sci. V-4, No - 2, P. 271 - 298

4) Gabrielse, H. Blusson, S.L. and Roddick, J.A. 1973. Geology of Flat River, Glacier Lake, and Wrigley Lake Map - Areas, District of Mackenzie and Yukon Territory. Geol. Surv. Can. Memoir 366

5) Howard, S.A. 1973 Report of 1973 Howards Pass Exploration Program

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