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Department of Indian Affairs & Northern Development
Northern Natural Resources and Environment Br
MAY 14 1975
Mining Recorder and Land Agent

ARCTIC RED PROJECT

GEOLOGICAL, GEOCHEMICAL AND DIAMOND DRILLING REPORT.

ON THE

AB MINERAL CLAIMS

Latitude 64° 59'N Longitude 132°17'W

MAYO MINING DISTRICT, Y.T.
AND
MACKENZIE MINING DISTRICT, N.W.T

N.T.S. 106-C-16, 106F-1
CANADA

Work Conducted: May 18, 1974 - December 31st, 1974

by

J.S. Brock
and
J.D. Guild, P.Eng.

December, 1974

RECEIVED
MAY 20 1975
MINING
INSPECTORS OFFICE
WHITEHORSE, Y.T.

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

$ 7200.00

D. R. Craig

Resident Geologist ~~or~~
~~Project Mining Engineer~~

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

Commissioner of Yukon Territory

7200.00

Office Of The Supervising Mining Recorder
MAY 20 1975
WHITEHORSE
Yukon Territory

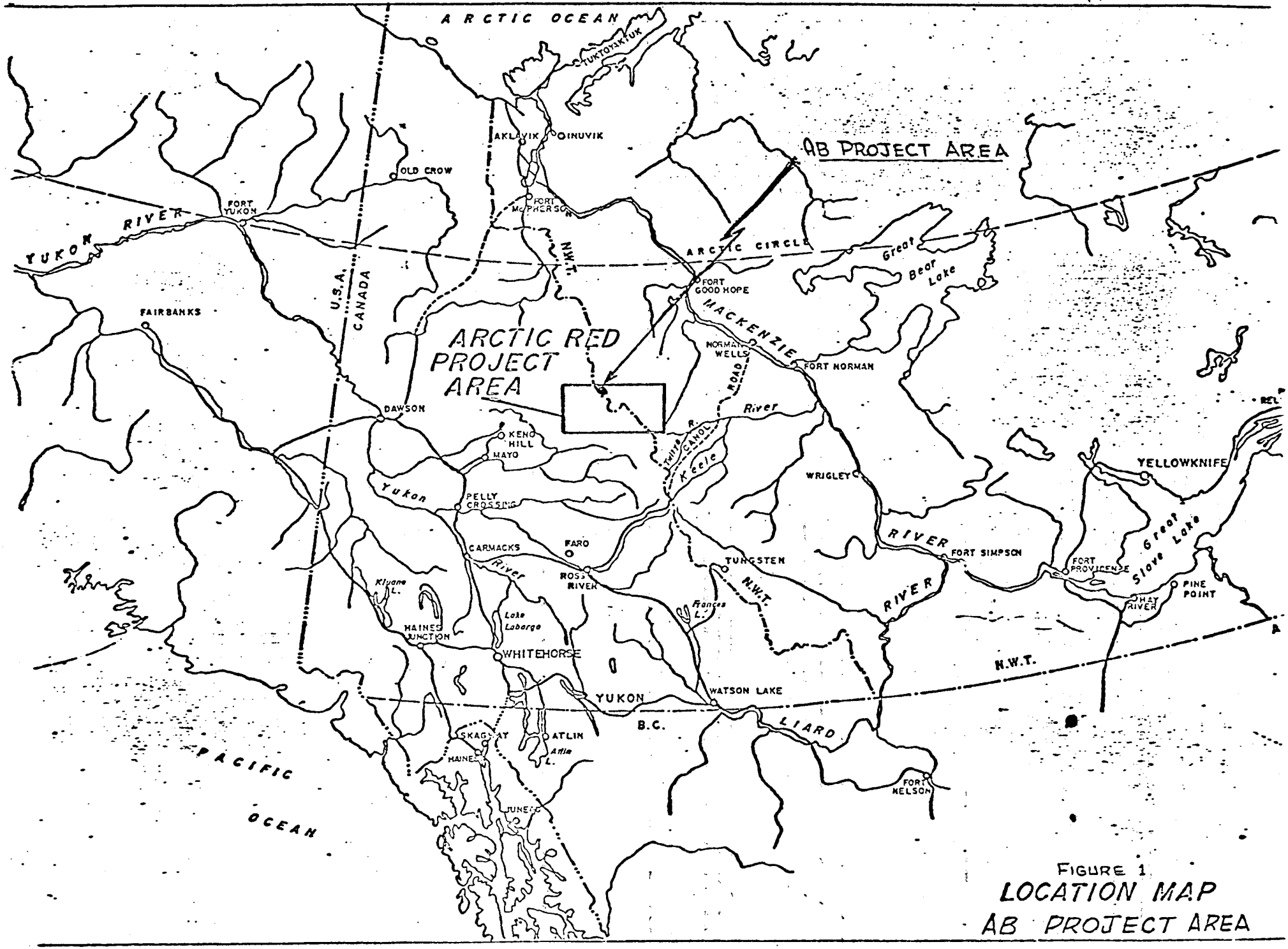

FIGURE 1
LOCATION MAP
AB PROJECT AREA

AB PROJECT AREA

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AB PROJECT AREA

INTRODUCTION

The AB zinc-lead occurrences were discovered by Welcome North Mines Ltd. on behalf of the Arctic Red Joint Venture in May of 1974. Although the main mineralized zone is not well exposed, it was considered sufficiently attractive to form the core of the AB Project Area.

The main AB Zone was drilled in the fall of 1974 with inconclusive results. Mineral sections in the core do not appear to correspond in grade or width with those seen at the surface of the deposit.

Both the AB Mineral Zone and the AB Project Area are considered by the authors to fully warrant the further exploration programs recommended herein.

SUMMARY AND CONCLUSIONS

The main AB Mineral Zone was discovered in the course of reconnaissance prospecting in late May of 1974, by the Welcome North prospecting crew directed by Mr. Pete Risby.

The zone consists of zinc-rich, near "in-place" rubble which covers an area some 100 feet in apparent width and can be traced along strike-dip dimensions for approximately 800 feet. The zone is contained within and enclosed by Sekwi carbonate rocks. The geological character of the mineralized rubble and the available outcrop evidence indicates that a strataform zinc deposit of potential economic interest may be present.

After examination by a Management Committee representing the Arctic Red Joint Venture in July, 1974, the adjacent region was declared a "Project Area". The then existing AB claim group was increased in size to include tracts of adjacent ground known to be underlain by similar favourable rock units and to contain additional mineral occurrences. The original block of 6 mineral claims was expanded to the present total of 212 claims.

The AB Showing was examined by various project geologists and visiting government personnel during the 1974 field season and this report attempts to incorporate their various findings. The priority of ground acquisition and the on-going 1974 regional exploratory program necessitated the delegation of lower priorities to properties once discovered and staked. As a result, no concerted effort was made to geologically map the AB zone in detail, nor was the AB Project Area, apart from initial prospecting, the subject of further exploratory attention.

In September, 1974, three BQ diamond drill holes totalling in composite 866 feet were drilled on the AB Zone. This drilling while intersecting short sections of zinc-rich material did not encounter mineralized sections which can be equated to those indicated on surface. In hindsight and with the aid of recent geochemical interpretations it must be concluded that the drill program was premature in the light of the then insufficient knowledge of the surface showings.

A survey-controlled, detailed geological mapping and trenching program is recommended for the AB Zone in 1975. In addition, the AB Project Area should be the subject of further geologically controlled prospecting, geological mapping and geochemical surveys. Any contemplated future diamond drilling should remain contingent upon this more basic evaluation.

As of December 31, 1974, approximately $75,500.00 has been spent on the AB mineral claim group, of which $22,470.00 represents staking and acquisition costs. Assessment work will be filed during the spring of 1975 to hold all claims until the summer of 1977.

LOCATION AND ACCESS

The AB Project Area is located in the Mackenzie District of the Northwest Territories at latitude 64°59'N. and longitude 132°17'W; 144 miles to the northeast of Mayo, Yukon Territory (Figure 1).

Access to the property can best be gained by helicopter from Mayo. Topography on the property is such that convenient landing sites are present at or near most locations. Alternately, Guildersleeve Lake, at an elevation of 4,000 feet and suitable for fixed-wing aircraft, is situated 5 miles to the southwest of the property. This lake has an effective length of 2,000 feet and was ice free by the last week of June in 1974.

The AB Mineral Zone occurs at an elevation of 5,000 feet on a low ridge which forms the divide between two forks of an upper tributary of the Arctic Red River. Sidehill slopes over the showing range from 18 to 20 degrees while local stream gradients approximate 7 degrees. Talus forms a greater part of the slopes except at the creek margins where nivation has bared the rock and caused small steep gullies to form. Gullies in the vicinity which provide best prospecting access remain snowbound until mid June. The property is well above treeline, which occurs at 4,000 feet in the region. Creeks have ample runoff and good silt content. Frost shattering and subsequent weathering produces noticeable rust and hydrozincite staining of mineralized talus blocks. Rock exposure in the area is about 60% of which 30% is outcrop; however, outcrop on the main AB Zone is limited to less than 5%.

MINERAL CLAIMS

The AB Project Area consists of the following 250 contiguous located mineral claims in the Mackenzie Mining District of the Northwest Territories (Plate No. 1), and 40 claims located in the Mayo M.D., Yukon (Plate No. 1).

CLAIMS	TAG NUMBERS	RECORDING DATE
MACKENZIE MINING DISTRICT, N.W.T.		
AB 1- 6	A56737-A56742	July 8, 1974
AB 17- 42	A86141-A86166	Aug. 19, 1974
AB 43- 46	A86167-A86170	Aug. 19, 1974
AB 49- 54	A86173-A86178	Aug. 19, 1974
AB 57- 64	A86181-A86188	Aug. 19, 1974
AB 67- 70	A86191-A86194	Aug. 19, 1974
AB 73- 76	A86197-A86200	Aug. 19, 1974
AB 79- 96	A86203-A86220	Aug. 19, 1974
AB 97- 98	A86263-A86264	Aug. 19, 1974
AB 99-100	A65499-A65500	Sept. 4, 1974
AB 101-202	A90601-A90702	Sept. 4, 1974
AB 203-252	A90703-A90752	Sept. 6, 1974
AB 253-270	A86403-A86420	Dec. 23, 1974
	TOTAL MACKENZIE M.D.	250 claims
MAYO MINING DISTRICT, Y.T.		
AB 203-242	Y96276-Y96314	Aug. 22, 1974
	TOTAL MAYO M.D.	40 claims

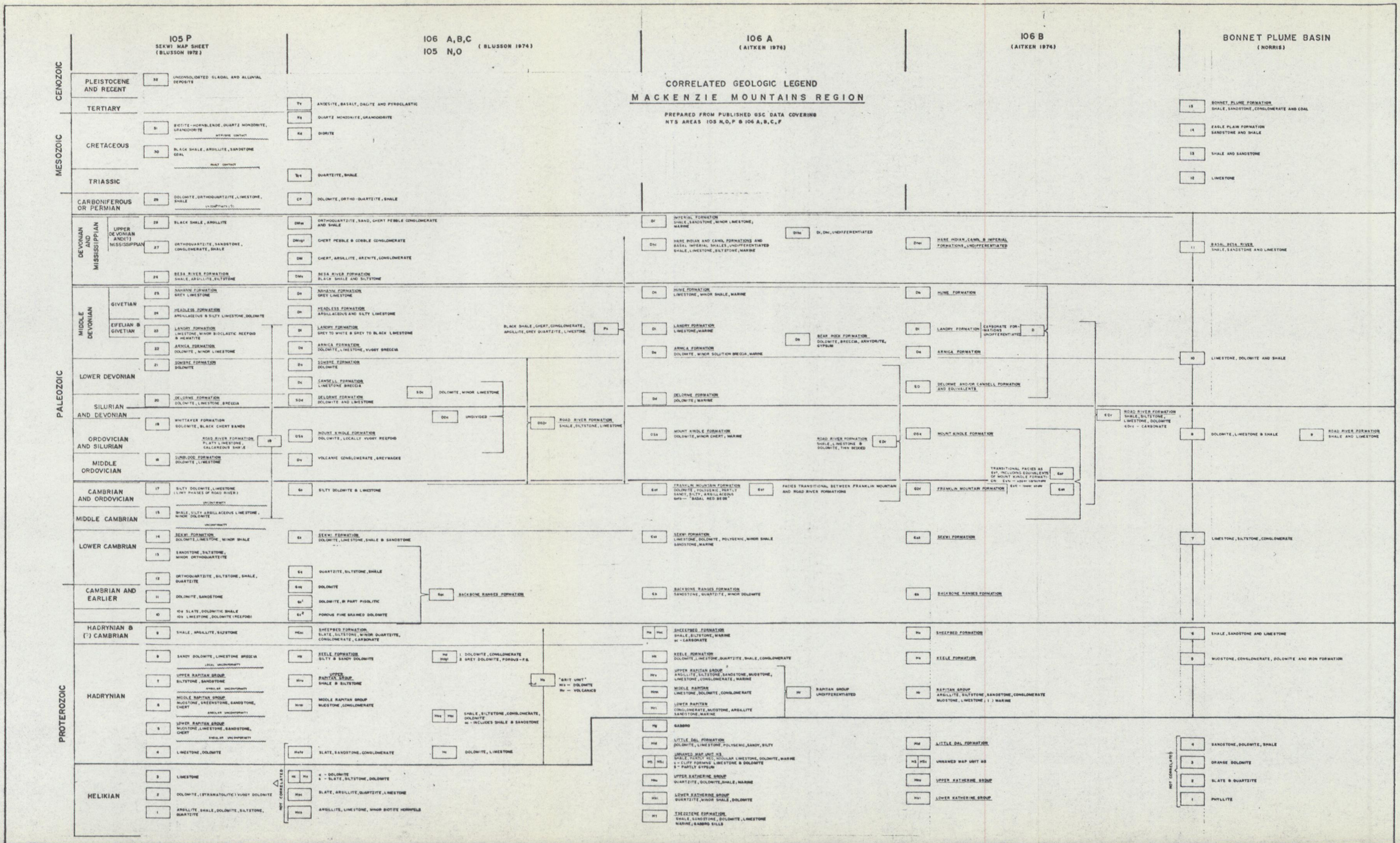
REGIONAL GEOLOGY

The AB Project Area is generally underlain by a discontinuous sequence of lower Cambrian to Devonian carbonates and some clastic equivalents. On a broad regional scale the AB group is situated at the northwestern extremity of the Mackenzie Arch, at which point the Cambro-Devonian sedimentation shows rapid time-facies distribution, equated to the Snake River facies changes (Aitken-personal communication, 1974). Paleo shorelines of Cambrian age are of an estuarian nature, and are at their northern limit here before reaching the margins of the Hadrynian grit units of the Peel Plateau.

Stratigraphic continuity is interrupted by regional tectonics and at least two unconformities (Cambro-Ordovician and Ordovician-Devonian). Regional reverse thrusting, to the northeast, has created a local series of sympathetic east-west trending normal(?) faults, north side down. Locally, one such fault system has placed Ordovician-Devonian carbonates in the north part of the claims against Sekwi, lower Cambrian to the south, an estimated displacement of some 1,500 feet.

Within the claims, the following units, as mapped by Blusson of the Geological Survey of Canada, have been recognized:

> Attention is drawn to the correlated geologic legend (Figure 2) for stratigraphic positioning of the units described (ref. 106-A B C, Blusson, 1974.).


CORRELATED GEOLOGIC LEGEND
MACKENZIE MOUNTAINS REGION
PREPARED FROM PUBLISHED GSC DATA COVERING
NTS AREAS 105 N,O,P & 106 A,B,C,F
105 P
SEKWI MAP SHEET
(BLUSSON 1972)
106 A,B,C
105 N,O
(BLUSSON 1974)
106 A
(AITKEN 1974)
106 B
(AITKEN 1974)
BONNET PLUME BASIN
(NORRIS)
CENOZOIC
MESOZOIC
PALEOZOIC
PROTEROZOIC
PLEISTOCENE AND RECENT
TERTIARY
CRETACEOUS
TRIASSIC
CARBONIFEROUS OR PERMIAN
DEVONIAN AND MISSISSIPPIAN
UPPER DEVONIAN AND(?) MISSISSIPPIAN
MIDDLE DEVONIAN
GIVETIAN
EIFELIAN & GIVETIAN
LOWER DEVONIAN
SILURIAN AND DEVONIAN
ORDOVICIAN AND SILURIAN
MIDDLE ORDOVICIAN
CAMBRIAN AND ORDOVICIAN
MIDDLE CAMBRIAN
LOWER CAMBRIAN
CAMBRIAN AND EARLIER
HADRYNIAN & (?) CAMBRIAN
HADRYNIAN
HELIKIAN
32
UNCONSOLIDATED GLACIAL AND ALLUVIAL DEPOSITS
31
BIOTITE-HORNBLENDE, QUARTZ MONZONITE, GRANODIORITE
INTRUSIVE CONTACT
30
BLACK SHALE, ARGILLITE, SANDSTONE COAL
FAULT CONTACT
29
DOLOMITE, ORTHOQUARTZITE, LIMESTONE, SHALE
UNCONFORMITY (?)
28
BLACK SHALE, ARGILLITE
27
ORTHOQUARTZITE, SANDSTONE, CONGLOMERATE, SHALE
26
BESA RIVER FORMATION
SHALE, ARGILLITE, SILTSTONE
25
NAHANNI FORMATION
GREY LIMESTONE
24
HEADLESS FORMATION
ARGILLACEOUS & SILTY LIMESTONE, DOLOMITE
23
LANDRY FORMATION
LIMESTONE, MINOR BIOCLASTIC REEFOID & HEMATITE
22
ARNICA FORMATION
DOLOMITE, MINOR LIMESTONE
21
SOMBRE FORMATION
DOLOMITE
20
DELORME FORMATION
DOLOMITE, LIMESTONE, BRECCIA
19
WHITTAKER FORMATION
DOLOMITE, BLACK CHERT BANDS
ROAD RIVER FORMATION
PLATY LIMESTONE, CALCAREOUS SHALE
18
16
SUNBLOOD FORMATION
DOLOMITE, LIMESTONE
17
SILTY DOLOMITE, LIMESTONE (LIMY PHASES OF ROAD RIVER)
UNCONFORMITY
15
SHALE, SILTY ARGILLACEOUS LIMESTONE, MINOR DOLOMITE
UNCONFORMITY
14
SEKWI FORMATION
DOLOMITE, LIMESTONE, MINOR SHALE
13
SANDSTONE, SILTSTONE, MINOR ORTHOQUARTZITE
12
ORTHOQUARTZITE, SILTSTONE, SHALE, QUARTZITE
11
DOLOMITE, SANDSTONE
10
10a SLATE, DOLOMITIC SHALE
10b LIMESTONE, DOLOMITE (REEFOID)
9
SHALE, ARGILLITE, SILTSTONE
8
SANDY DOLOMITE, LIMESTONE BRECCIA
LOCAL UNCONFORMITY
7
UPPER RAPITAN GROUP
SILTSTONE, SANDSTONE
ANGULAR UNCONFORMITY
6
MIDDLE RAPITAN GROUP
MUDSTONE, GREENSTONE, SANDSTONE, CHERT
ANGULAR UNCONFORMITY
5
LOWER RAPITAN GROUP
MUDSTONE, LIMESTONE, SANDSTONE, CHERT
ANGULAR UNCONFORMITY
4
LIMESTONE, DOLOMITE
3
LIMESTONE
2
DOLOMITE, (STRAMATOLITIC) VUGGY DOLOMITE
1
ARGILLITE, SHALE, DOLOMITE, SILTSTONE, QUARTZITE
NOT CORRELATED
Tv
ANDESITE, BASALT, DACITE AND PYROCLASTIC
Kq
QUARTZ MONZONITE, GRANODIORITE
Kd
DIORITE
TRq
QUARTZITE, SHALE
CP
DOLOMITE, ORTHO-QUARTZITE, SHALE
DMoc
ORTHOQUARTZITE, SAND, CHERT PEBBLE CONGLOMERATE AND SHALE
DMcgl
CHERT PEBBLE & COBBLE CONGLOMERATE
DM
CHERT, ARGILLITE, ARENITE, CONGLOMERATE
DMs
BESA RIVER FORMATION
BLACK SHALE AND SILTSTONE
Dn
NAHANNI FORMATION
GREY LIMESTONE
Dh
HEADLESS FORMATION
ARGILLACEOUS AND SILTY LIMESTONE
Dl
LANDRY FORMATION
GREY TO WHITE & GREY TO BLACK LIMESTONE
Da
ARNICA FORMATION
DOLOMITE, LIMESTONE, VUGGY BRECCIA
Ds
SOMBRE FORMATION
DOLOMITE
Dc
CANSELL FORMATION
LIMESTONE BRECCIA
SDd
DELORME FORMATION
DOLOMITE AND LIMESTONE
SDc
DOLOMITE, MINOR LIMESTONE
ODc
UNDIVIDED
OSk
MOUNT KINDLE FORMATION
DOLOMITE, LOCALLY VUGGY REEFOID
Ov
VOLCANIC CONGLOMERATE, GREYWACKE
BLACK SHALE, CHERT, CONGLOMERATE, ARGILLITE, GREY QUARTZITE, LIMESTONE
Ps
ODSr
ROAD RIVER FORMATION
SHALE, SILTSTONE, LIMESTONE
Co
SILTY DOLOMITE & LIMESTONE
Cs
SEKWI FORMATION
DOLOMITE, LIMESTONE, SHALE & SANDSTONE
Cq
QUARTZITE, SILTSTONE, SHALE
Cq
DOLOMITE
Cr¹
DOLOMITE, IN PART PISOLITIC
Cr²
POROUS FINE GRAINED DOLOMITE
Cqc
BACKBONE RANGES FORMATION
HEsc
SHEEPBED FORMATION
SLATE, SILTSTONE, MINOR QUARTZITE, CONGLOMERATE, CARBONATE
Hk
KEELE FORMATION
SILTY & SANDY DOLOMITE
Hd
Hcgl
1 DOLOMITE, CONGLOMERATE
2 GREY DOLOMITE, POROUS-F.G.
Hru
UPPER RAPITAN GROUP
SHALE & SILTSTONE
Hrm
MIDDLE RAPITAN GROUP
MUDSTONE, CONGLOMERATE
Hs
"GRIT UNIT"
Hs — DOLOMITE
Hv — VOLCANICS
Hsq
Hsc
SHALE, SILTSTONE, CONGLOMERATE, DOLOMITE
sc - INCLUDES SHALE & SANDSTONE
Hsfe
SLATE, SANDSTONE, CONGLOMERATE
Hc
DOLOMITE, LIMESTONE
a - DOLOMITE
s - SLATE, SILTSTONE, DOLOMITE
SLATE, ARGILLITE, QUARTZITE, LIMESTONE
ARGILLITE, LIMESTONE, MINOR BIOTITE HORNFELS
Di
IMPERIAL FORMATION
SHALE, SANDSTONE, MINOR LIMESTONE, MARINE
Dhc
HARE INDIAN AND CANOL FORMATIONS AND BASAL IMPERIAL SHALES, UNDIFFERENTIATED
SHALE, LIMESTONE, SILTSTONE, MARINE
Dihc
Di, Dhc, UNDIFFERENTIATED
Dh
HUME FORMATION
LIMESTONE, MINOR SHALE, MARINE
Dl
LANDRY FORMATION
LIMESTONE, MARINE
Db
BEAR ROCK FORMATION
DOLOMITE, BRECCIA, ANHYDRITE, GYPSUM
Da
ARNICA FORMATION
DOLOMITE, MINOR SOLUTION BRECCIA, MARINE
Dd
DELORME FORMATION
DOLOMITE, MARINE
OSk
MOUNT KINDLE FORMATION
DOLOMITE, MINOR CHERT, MARINE
ROAD RIVER FORMATION
SHALE, LIMESTONE & DOLOMITE, THIN BEDDED
CDr
COf
FRANKLIN MOUNTAIN FORMATION
DOLOMITE, POLYGENIC, PARTLY SANDY, SILTY, ARGILLACEOUS
COfb — "BASAL RED BEDS"
Cst
FACIES TRANSITIONAL BETWEEN FRANKLIN MOUNTAIN AND ROAD RIVER FORMATIONS
Cst
SEKWI FORMATION
LIMESTONE, DOLOMITE, POLYGENIC, MINOR SHALE
SANDSTONE, MARINE
Cb
BACKBONE RANGES FORMATION
SANDSTONE, QUARTZITE, MINOR DOLOMITE
Hs
Hsc
SHEEPBED FORMATION
SHALE, SILTSTONE, MARINE
sc - CARBONATE
Hk
KEELE FORMATION
DOLOMITE, LIMESTONE, QUARTZITE, SHALE, CONGLOMERATE
Hru
UPPER RAPITAN GROUP
ARGILLITE, SILTSTONE, SANDSTONE, MUDSTONE, LIMESTONE, CONGLOMERATE, MARINE
Hrm
MIDDLE RAPITAN
LIMESTONE, DOLOMITE, CONGLOMERATE
Hrl
LOWER RAPITAN
CONGLOMERATE, MUDSTONE, ARGILLITE
SANDSTONE, MARINE
Hr
RAPITAN GROUP
UNDIFFERENTIATED
Hg
GABBRO
Hld
LITTLE DAL FORMATION
DOLOMITE, LIMESTONE, POLYGENIC, SANDY, SILTY
HS
HSc
UNNAMED MAP UNIT HS
SHALE, PARTLY RED, NODULAR LIMESTONE, DOLOMITE, MARINE
c - CLIFF FORMING LIMESTONE & DOLOMITE
g - PARTLY GYPSUM
Hku
UPPER KATHERINE GROUP
QUARTZITE, DOLOMITE, SHALE, MARINE
Hkl
LOWER KATHERINE GROUP
QUARTZITE, MINOR SHALE, DOLOMITE
Ht
TSEZOTENE FORMATION
SHALE, SANDSTONE, DOLOMITE, LIMESTONE
MARINE, GABBRO SILLS
Dhci
HARE INDIAN, CANOL & IMPERIAL FORMATIONS, UNDIFFERENTIATED
Dh
HUME FORMATION
Dl
LANDRY FORMATION
CARBONATE FORMATIONS UNDIFFERENTIATED
D
Da
ARNICA FORMATION
SD
DELORME AND/OR CANSELL FORMATION AND EQUIVALENTS
CDr
ROAD RIVER FORMATION
SHALE, SILTSTONE, LIMESTONE, DOLOMITE
CDrc - CARBONATE
OSk
MOUNT KINDLE FORMATION
TRANSITIONAL FACIES AS Cst, INCLUDING EQUIVALENTS OF MOUNT KINDLE FORMATION
Cstu — upper carbonate
Cstl — lower shale
COf
FRANKLIN MOUNTAIN FORMATION
Cst
SEKWI FORMATION
Cb
BACKBONE RANGES FORMATION
Hs
SHEEPBED FORMATION
Hk
KEELE FORMATION
Hr
RAPITAN GROUP
ARGILLITE, SILTSTONE, SANDSTONE, CONGLOMERATE
MUDSTONE, LIMESTONE, ( ) MARINE
Hld
LITTLE DAL FORMATION
HS
HSc
UNNAMED MAP UNIT HS
Hku
UPPER KATHERINE GROUP
Hkl
LOWER KATHERINE GROUP
15
BONNET PLUME FORMATION
SHALE, SANDSTONE, CONGLOMERATE AND COAL
14
EAGLE PLAIN FORMATION
SANDSTONE AND SHALE
13
SHALE AND SANDSTONE
12
LIMESTONE
11
BASAL BESA RIVER
SHALE, SANDSTONE AND LIMESTONE
10
LIMESTONE, DOLOMITE AND SHALE
8
DOLOMITE, LIMESTONE & SHALE
9
ROAD RIVER FORMATION
SHALE AND LIMESTONE
7
LIMESTONE, SILTSTONE, CONGLOMERATE
6
SHALE, SANDSTONE AND LIMESTONE
5
MUDSTONE, CONGLOMERATE, DOLOMITE AND IRON FORMATION
NOT CORRELATED
4
SANDSTONE, DOLOMITE, SHALE
3
ORANGE DOLOMITE
2
SLATE & QUARTZITE
1
PHYLLITE

ODC - Undivided OSK (Mount Kindle) and SDd (Delorme buff to orange weathering brown and grey platy to thin bedded fine grained dolomite and limestone.

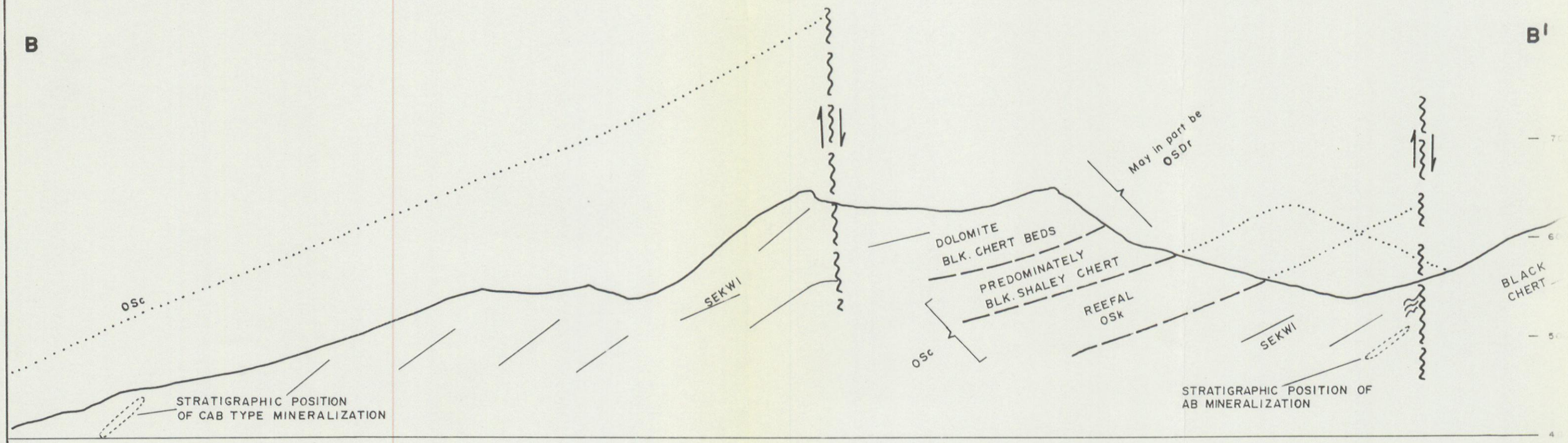
OSK - Mount Kindle Formation, thick bedded, dark grey to black and minor light grey weathering dolomite, locally massive, vuggy and reefoid.

OSDr - Road River Formation, black shale, siltstone commonly calcareous, minor argillaceous dark limestone, some chert, Cambro-Devonian clastic equivalent.

Ꞓs - Sekwi Formation, brown and orange weathering thin bedded dolomite, grey and buff mottled limestone, brown shale and sandstone.

Ꞓq - Backbone Ranges Formation, varicoloured quartzite, siltstone and shale, minor silt and sandy dolomite.

The main AB Zone and the "east" AB Zone occur in lower Cambrian Sekwi Formation. Other scattered zinc occurrences are found within all other time-rock groups on the property.



(LOOKING WEST)

SECTION APPROXIMATELY ALONG WEST SIDE OF AB CREEK

FIG. 3

WELCOME NORTH MINES LTD.

AB PROJECT AREA

NTS 106 F/1, 106 C/16

SECTION B-B'

SCALE 1" = 1000 FEET

DEC. 1974

PROPERTY GEOLOGY

The AB Mineral Zone was discovered by Welcome North personnel by prospecting stream beds which cut through a southerly dipping section of Sekwi Formation with the Backbone Range of the Mackenzie Mountains. Subsequent, more detailed prospecting and reconnaissance geological mapping led to the location of other zinc ocurrences in the locality within both the Sekwi rocks and the younger, more gently dipping carbonates juxtaposed to the north by regional faulting (Plate 2). The region is one of rugged topography with the elevations ranging from 4,000 to 6,000 feet. Talus covers much of the area and bedrock exposure is, in general, confined to creek bottoms and upper mountain ridges. Exploratory methods employed the prospecting of stream beds and talus slopes after aerial spotting of anomalous discolouration and/or structural complexities within favourable rock units.

Zinc is the principal metal found. Sphalerite, smithsonite and hydrozincite are common to all of the occurrences within the AB Project Area, with galena, barite, pyrite and fluorite being accessory minerals.

In common with many mineral deposits within the Mackenzie Mountains, surface exposures of the AB occurrences are poor. Mineral zones can rarely be observed in continuous outcrop over any distance. Mineralized float in talus or frost heave rubble in conjunction with structural guidelines derived from adjacent barren rock outcrops must, therefore, be utilized in determining the extent and, in many cases, the mode of occurrence of the deposits.

AB MINERAL ZONE

The AB Mineral Zone which is the principal occurrence of interest in the project area, lies on a low, gently sloping talus and/or rubble covered knoll. Outcrop in the vicinity is confined to the main creek banks, sidehill washes and occasional resistant crops within the loose material. Cover is believed to range from three to ten feet in thickness.

The zone consists of mineralized rubble lying in and, in part, rilling down the knoll. It measures some 100 feet in width and extends approximately 800 feet up the hill, at which point it is covered by talus from higher elevations (Plate 3). The mineralized rubble is believed to locally reflect a trace on the hill of an underlying mineral zone. This belief is substantiated by the few isolated zinc-rich outcrops which are found on the lower slopes. Local bedding attitudes determined from adjacent rock exposures range from N.40°W. to N.60°W. in strike with dips of 20° to 40° to the south.

The outline of the mineral zone appears to conform to the model of a tabular, conformable band which would produce the existing topographic trace and would reflect the presence of a stratabound deposit.

Referring to the AB Mineral Zone, R.F. McLoughlin, Geologist, Arctic Red Venture, in his report dated July 22, 1974, writes,

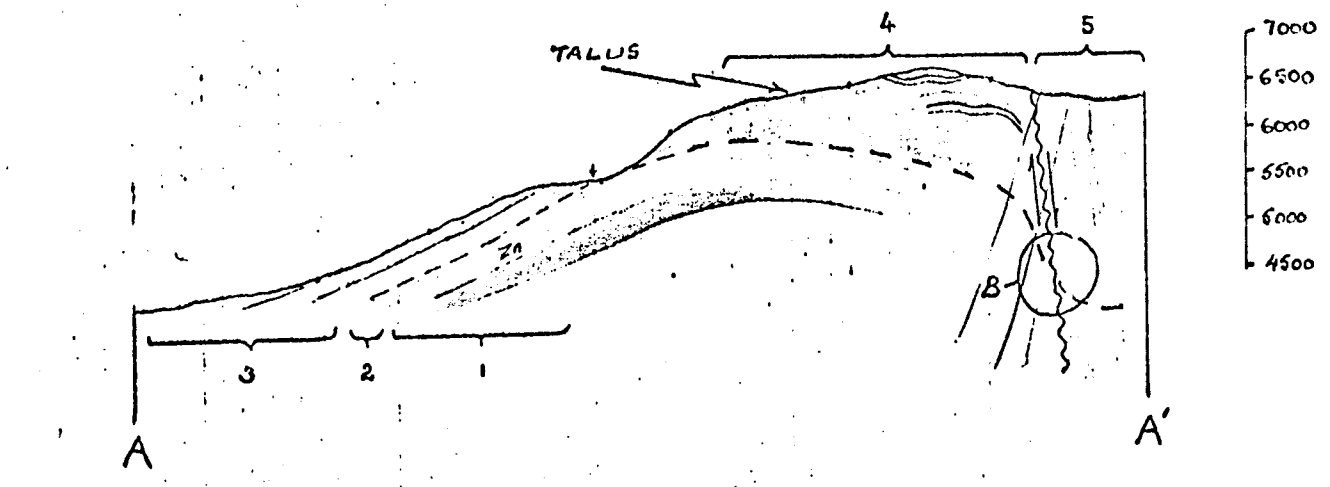
"The AB mineral property occurs in Sekwi Formation according to published available evidence. Locally the dips are 35° to the south-southwest, with individual dips ranging from 18° to 40°. Close to the fault margin the dips go to

80° NNE and are steeply overturned where drag folding occurs. The fault is a steeply dipping normal fault with downthrows to the north. Its trace is not simple, as the fault traces within the property appear to bifurcate at both ends, causing the formations to step down to the north. Upsection, in the Sekwi Formation on the property, the beds are contorted away from the general trend as a result of faulting movement. North of the fault, an undetermined sequence of cherts or argillitic mudstones and limestones with a blue-grey weathering colour, are noted (Unit 5, Figure 4). The Sekwi Formation is found south of the fault. On the property, the formations begin as a light grey weathering dolomitic limestone and dolomite occasionally pyritic and gossany. These grade upsection into a medium grey dolomitic limestone sequence with a 10-15 foot thickness of hard, grey dolomitic limestone containing richly disseminated sphalerite. Occasionally, the visible sphalerite content reaches 60% (ie., 40% zinc). More commonly, the unit contains 10% to 15% visible sphalerite (ie., 9% zinc). Galena is more abundant upsection in the mineralized unit. Hydrozincite is a common oxidation product. Smithsonite is occasionally present but not to a significant extent. A consistent gossan zone downsection from the mineralized unit may be associated with the latter. Some remobilizing action of sphalerite has occurred with secondary filling of fractures with calcite and sphalerite. An earlier barren fluid phase deposited calcite in fractures which were later cross cut by the mineralized fractures. The galena mineralization, mentioned previously, is almost sphalerite-free. Common associate of the galena is barite.

"The mineralized unit is immediately overlain by a soft, dark grey-green, easily fractured bed. This, in turn, grades upsection to a dark grey-buff weathering muddy limestone sequence with occasional gossan zones which appear as small lenses (Unit 3).

"Unit 4, as shown on Section A-A (Figure 4), is a sequence of medium brown and buff weathering coloured dolomitic limestones and sandstones, often flaggy and thinly parted, which form a low knoll 1,000 feet to the east of the main showing. This sequence is unmineralized."

S.C. CLASSIFICATION	SECTION NUMBER	DESCRIPTION
ODc	5	UNDETERMINED SEQUENCE OF CHERTS OR ARGILLITIC MUDSTONES AND LIMESTONES. BLUE GREY WEATHERING COLOUR.
FAULT		
Es	4	MEDIUM BROWN AND BUFF COLOURED DOLOMITIC LIMESTONES, SANDSTONE AND LIMESTONES, OFTEN THINLY PARTED AND SHATTERING EASILY
	3	DARK GREY - BUFF WEATHERING MUDDY LIMESTONE WITH OCCASIONAL GOSSAN ZONES IN BASE OF UNIT.
	2	MEDIUM GREY DOLOMITIC LST. BUFF WEATHERING SURFACE. GOSSAN DOLOMITIC LIMESTONE BASAL UNIT. SPHALERITE OCCURS IN DISSEMINATIONS AND FRACTURE FILLINGS.
	1	LIGHT GREY WEATHERING DOLOMITIC LIMESTONE. OCCASIONALLY PYRITIC AND HARD.



500'

WELCOME NORTH MINES LTD
AB GROUP
SECTION A-A'
JULY 1974 F.M.

FIG. (4)

The following surface samples were taken from the AB Mineral Zone (for locations the reader is referred to Plate 3):

Sample	Sample No.	Width	Type	Sample Interval	Pb %	Zn %	Comment
J	WN 11	"Specimen Sample"			79.3	2.4	"Steel" galena
K	WN 12	"	"		0.03	41.0	Clear sphalerite.
L	WN 13	"	"		0.03	18.9	Disseminated sphalerite and pyrite in dark carbonate.

The above three samples are selected specimens and represent some of the best possible values obtainable on the talus slope.

HI	WN 21	100'	Talus chip	Every 2 feet	1.03	8.64	Sub crop below
GH	WN 22	100'	" "	" "	0.01	0.65	" " " "
EF	0029A	6'	o/c chip	Continuous	0.03	23.4	Weighted average across 90 feet total width: 0.02% Pb 10.10% Zn
	0030A	7'	Float chip	" " "	0.01	3.72	
	0031A	17'	o/c chip	" " "	0.03	8.52	
	0032A	4'	o/c chip	" " "	0.01	18.5	
	0033A	7'	o/c chip	" " "	0.01	4.50	
CD	0039A	20'	o/c chip	Every foot	0.01	1.28	Trench true thickness 12'
AB	WN 23	400'	Float	Every 5 ft.	0.01	1.06	

Samples HI & GH: These samples were taken from talus blocks and frost heaved blocks which were assumed to be almost in place. Chips were taken every two feet from the nearest available large boulder, irrespective of type or visible Zn oxidation products.

Samples EF Series: These samples were taken from mineralized rock in place. Continuous chip sampling over 41 feet of mineralized rock was divided up as shown on the table.

GEOCHEMICAL SURVEYS

Silt and soul surveys were conducted in the vicinity of the main AB showing as an orientation effort to test the effectiveness of geochemical response to known mineralization in the area, as well as an exploration aid toward location of extensions to known mineralization. Reference should be made to Plates 4, 5 and 6.

All samples were analyzed by Acme Analytical Laboratories who maintain laboratory facilities at Ross River, Yukon. Samples are dried and sieved to -80 mesh, the fines being retained for analysis, 0.5 grams of sample are digested in a hot aqua-regia attack and element determinations made by atomic absorption.

Silt Sample Survey

An arbitrary threshold was determined for lead (80 ppm) and zinc (500 ppm). It is recognized that broader geochemical coverage is required to effectively determine true threshold values for anomalous lead and zinc in silts from the AB area.

Lead and zinc do not appear to be spatially related. The main stream, below the main showing, is considered to be anomalous in zinc. Anomalous zinc values can be expected from the tributary draining the AB 3 mineral claim. Of particular interest are anomalous leads (104 ppm) from the southern tributary (AB 5 mineral claim) and the area of AB 4 mineral claim.

Soil Sample Survey

A geochemical soil survey with samples collected on lines spaced 200 feet apart and at 100 foot intervals along the lines was conducted over the known AB Mineral Zone and short distances into the adjoining terraine.

Soil development is generally poor, with the B horizon profile usually absent because of the active erosion layer and development of talus within the area.

Statistical analysis of lead and zinc in soils has not been attempted; arbitrary threshold values of 200 ppm for zinc and 100 ppm for lead have been chosen as a base contourable value.

Both the soil and silt sampling indicate the anomalous zinc and lead values known to be present at the surface of the AB deposit. In addition, relative values in both zinc and lead to the west of the main AB Creek can be interpreted to reflect projected traces of the zone in this direction. Possible projections of the zone to east are not geochemically indicated but probably masked by active talus cover which inhibits diagnostic geochemical results. Higher values to the north and northwest of the zone may indicate mineralization coincident with the regional fault which traverses this section of the property.

It is concluded that the usefulness of both silt and soil geochemistry in the area has been amply demonstrated by the results obtained and that these exploratory tools should be utilized in on-going evaluation of the project area. It is also concluded that extension of the AB Zone may be represented by geochemically anomalous areas west of AB Creek, and that these zones should be further explored.

DIAMOND DRILLING - AB MINERAL ZONE

During the period September 6th to 11th, 1974, ~~866~~ 960 feet of BQ diamond drilling, in three holes, was conducted on the AB Mineral Zone. A description and the results of this drilling are tabulated below and illustrated on the accompanying drawings (Figure No's. 5, 6 and 7 and Plate No. 3). The drill logs are appended hereto.

Diamond Drill Hole Locations

Hole No.	Length	Lat.	Long.	Brg.	Dip	Elev. Relative to DDH AB#2	Location From CP #1 AB #6 M.C.
AB #1	333'	64°59'	132°17'	036°	-61°	4696	637' Brg. 250½°
AB #2	258'	64°59'	132°17'	030°	-60½°	4945	231' Brg. 186°
AB #3	275'	64°59'	132°17'	030°	--°	4853	379' Brg. 219°

Significant Diamond Drill Hole Assays

Hole No.	From	To	Interval	Av. Assay % Zinc
AB #1	25'	35'	10'	1.55
AB #2	13'	50'	37'	0.63
	70'	85'	15'	8.66
	13'	85'	72'	2.14
	135'	145'	10'	1.02
AB #3	47.5'	85'	32.5'	0.88

Of the three holes drilled, AB No. 1 appears to have collared and drilled in the barren dolomites which lie in the footwall of the mineral zone. Hole No's. AB 2 and 3 drilled through the projection of the mineral zone and each intersected concentrations of zinc which can be said to correlate geometrically with corresponding zones at the surface. The widths and particularly the grades of zinc intersections in the drill holes, however, do not appear to correlate with those seen at the surface. Unfortunately, due to the overburden cover and to the insufficient detailed surface mapping, correlation between lithologic units logged in the drill core and those which may be apparent at the surface cannot be satisfactorily carried out.

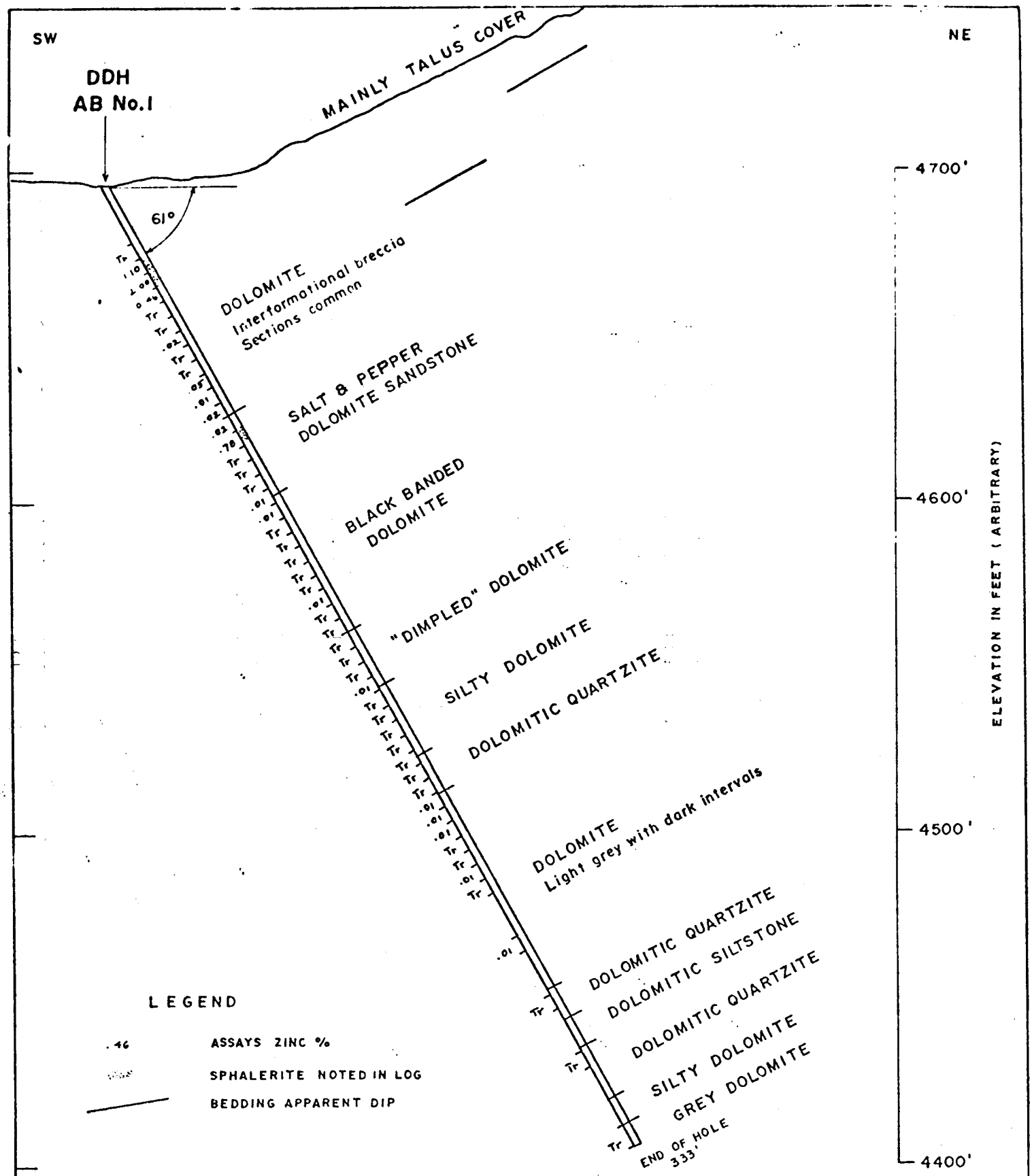
It can be concluded that the preponderance of high grade zinc material at the surface of the AB Zone is due either to:

1. Some erosional or gravitational phenomenon which concentrates zinc mineralization beyond that which would appear in true outcrop,

2. or a geological complexity much greater than previously surmised.

In the latter case, which is favoured by the authors, one must resort to sedimentary "channel runs" or structurally controlled shoots to explain the drill results. In either case, the AB Zone remains a very attractive, albeit somewhat tarnished, surface prospect which amply justifies further exploration.

The zone and adjacent area should be geologically mapped at a scale of 1" = 40', with close survey control and, in addition, selectively trenched or ground sluiced to increase exposure. Geochemistry should be utilized to delimit possible extensions. No further diamond drilling should be conducted until all details of the surface showing and the present drilling have clearly been spacially and geologically related. Any possible future drilling should await the completion of the above program and should, in addition, proceed cautiously away from the firmly established geological facts to test future concepts.



WELCOME NORTH MINES LTD.

ARCTIC RED PROJECT

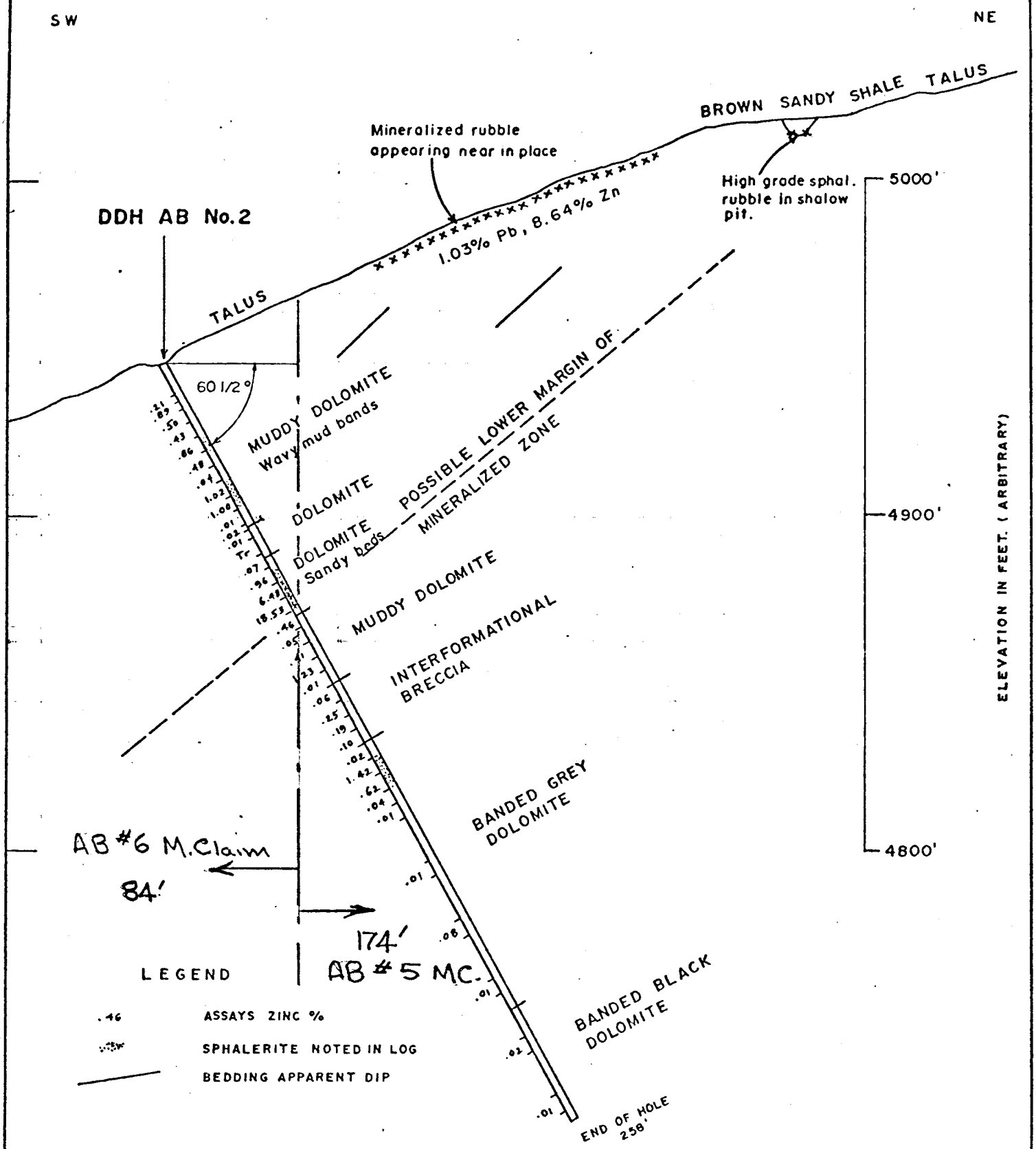
AB PROJECT AREA

NTS 106 C/16

VERTICAL CROSS SECTION

DDH–AB No.1 (BEARING 036°)

SCALE	DATE	FIG.
1" = 40'	DEC. 1974	5



WELCOME NORTH MINES LTD.

ARCTIC RED PROJECT

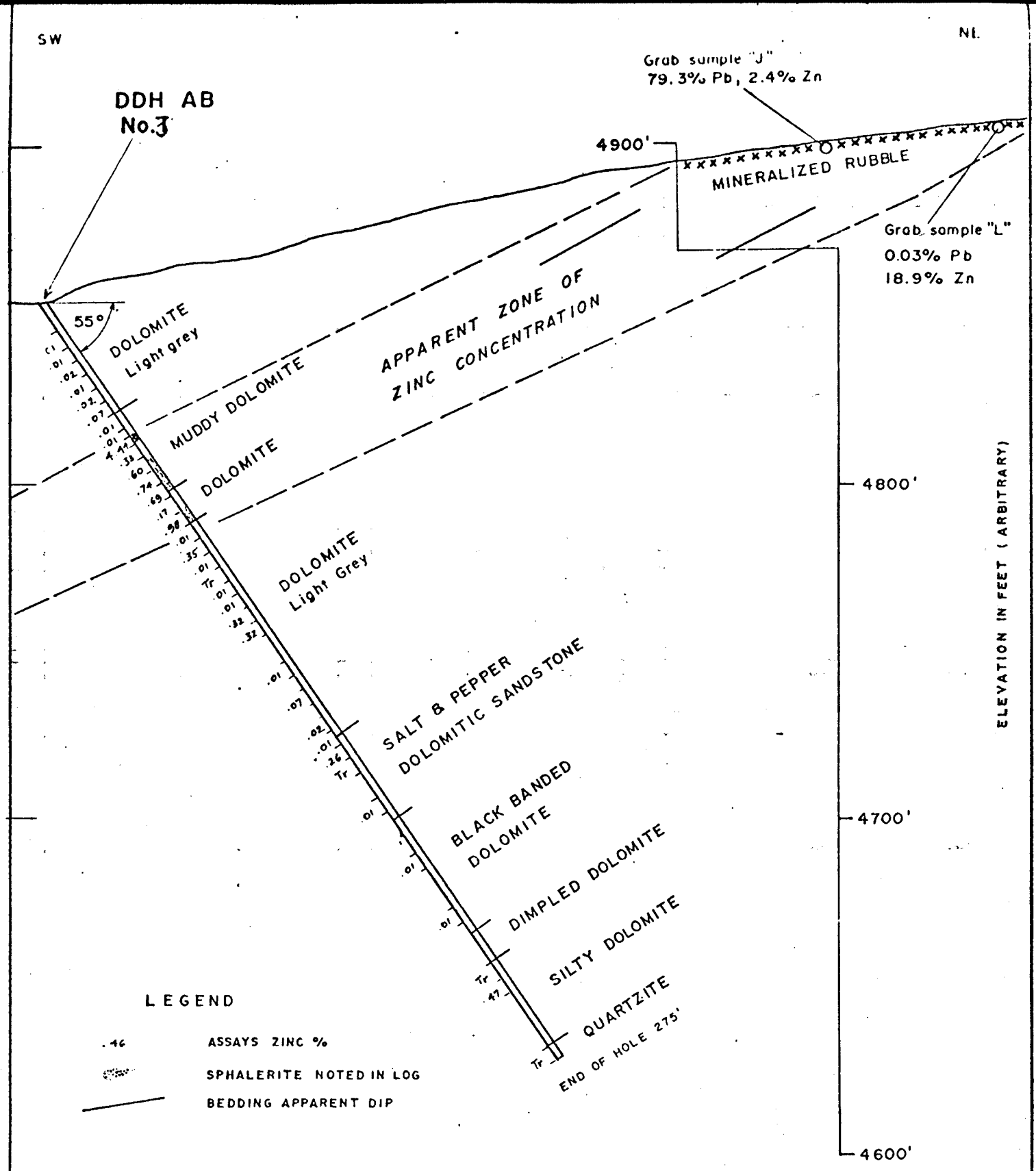
AB PROJECT AREA

NTS 106 C/16

VERTICAL CROSS SECTION

DDH – AB No. 2 (BEARING 030°)

SCALE	DATE	FIG.
1" = 40'	DEC. 1974	C



WELCOME NORTH MINES LTD.

ARCTIC RED PROJECT

AB PROJECT AREA

NTS 106 C/16

VERTICAL CROSS SECTION

DDH — AB No. 3

(BEARING 030°)

SCALE	DATE	FIG.
1" = 40'	DEC. 1974	7

OTHER SHOWINGS - AB PROJECT AREA

In addition to the AB Mineral Zone described above, other zones of zinc concentration exist within the AB Project Area. These zones, while having been assigned degrees of lesser importance than the main AB Zone, are nevertheless considered by the authors to warrant further exploratory attention, especially in the context of future geological mapping programs.

The following descriptions are extracts from field notes compiled during the 1974 field season. Many of the descriptions are those of the initial finder, while others were made after an examination by one of the project geologists. The showing locations are illustrated on the accompanying AB Project Area Geology (Plate 2). The showings are further discussed under part "A" of the report, "Regional Exploration", in sections 106-C-16 and 106-F-1 under the appropriate showing numbers.

Zinc Occurrences in Mount Kindle Formation

Many of the zinc occurrences noted within the limits of the AB Project Area occur within Mount Kindle Formation which contains pervasive zinc mineralization and locally zinc concentrations approaching economic tenor. These types of occurrences, with more detailed descriptions and suggested exploration techniques, are discussed in the "Geological Report on the BB-DAB Project Area"; a report included herein.

The project boundaries between the AB and BB-DAB Areas have been rather arbitrarily chosen and are not based upon geologic divisions. Proposed exploration programs in the Mount Kindle Formation within the BB-DAB Area should logically carry over to similar geologic areas within the AB Project Area.

F-1 #7

Location - exposed in side-cliffs of a small easterly flowing side creek, approximate elevation 5,800 feet.

Minerals - sphalerite, locally colloform, fine grained galena and barite in a grey weathering vuggy dolomite; essentially flat-lying.

Type - shattered, brecciated beds recemented with calcite-barite and accompanying lead-zinc.

Exposure - mineralization can be traced over an area 300 feet in length in a bed 40 feet thick. Talus covers outside of these dimensions.

Sphalerite with lesser galena in association with calcite and barite stringers, blebs and vug fillings. This type of mineral assemblage is common to the rocks in this area where the zinc mineralization is widespread and sparse. At the point indicated showing (7) the mineralization is more extensive and locally approaches economic tenor due to a more intense breakage of the dolomitic host rock.

Same general locality - down valley, same side, approximately 500' talus rills of reefoid Mount Kindle - silicified fossils - some chunks containing 5% subtle clear sphalerite (flagged).

Assay No.	Pb %	Zn %	
0074	0.18	25.3	Selected specimen.

Specimen - filed Vancouver Office.

Interesting occurrences worthy of some geochemistry in adjacent soils. Present exposure appears too low grade, ie. about 1%-3% zinc overall.

F-1 #15

Occurs at juncture of small westerly flowing side creek with main creek, some 3,000 feet to the south of #7, above.

Pieces of nearly massive pyrite containing large calcite blebs and very subtle fine grained greyish sphalerite.

Source of float unknown - seems anomalous to immediate area - probably came from up the small side creek but may have come down main creek where highly ferruginous zone occurs up stream. (The latter was not recognized to contain zinc.)

Assay No.	Pb %	Zn %	
0038	0.05	11.3	Specimen of float.

Specimen - filed Vancouver Office.

Float should be followed to its source.

Bak Zone

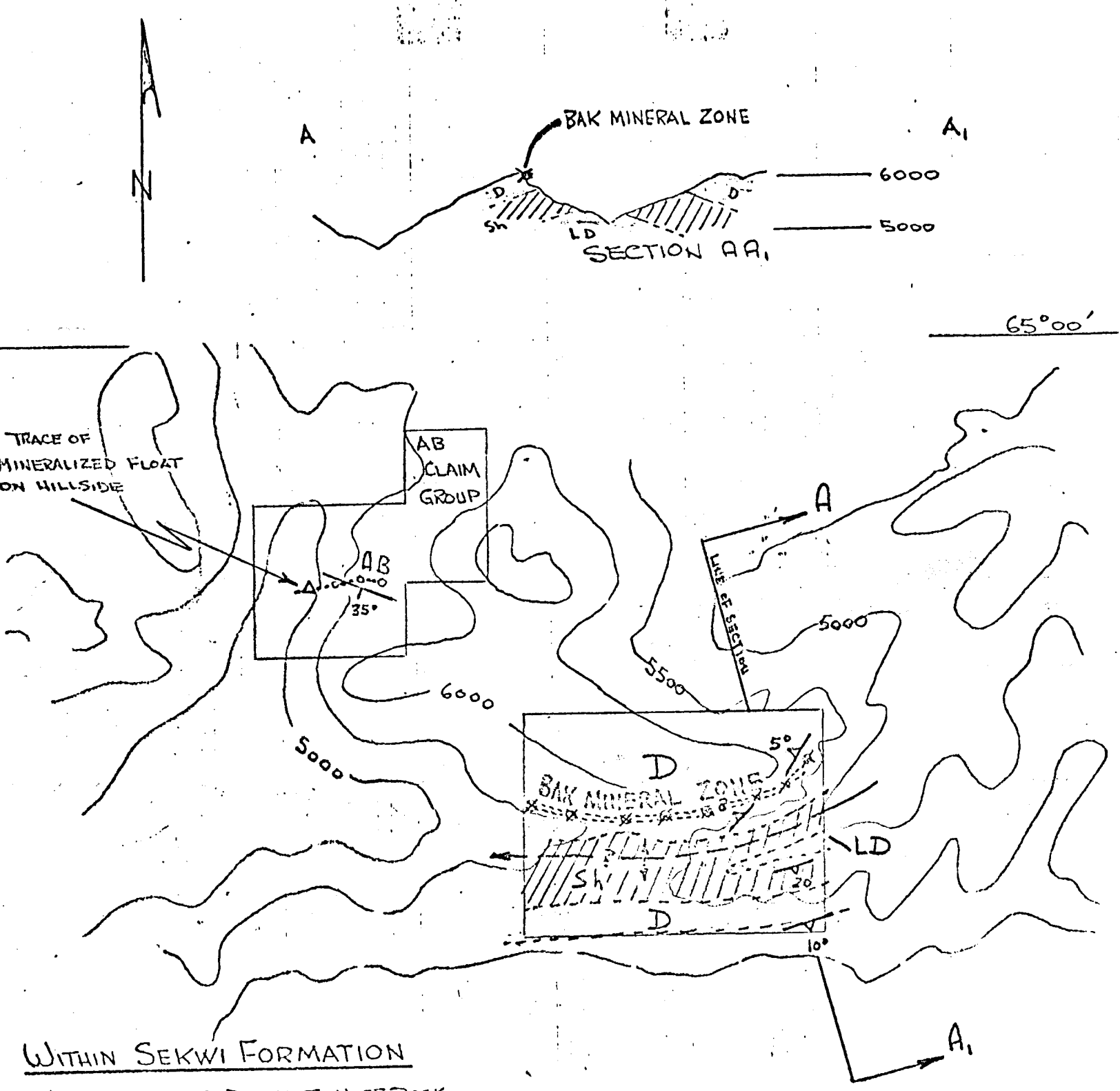
The mineralized bed in the Bak Zone consists of a thick succession of vuggy dolomites at least 300 feet thick (Figure 8 and 10). The rock is to varying degrees shot through with irregular webs and veinlets of white, fine grained calcite which locally acts as a matrix to fragments of the grey-brown dolomite. The flat-lying dolomite is, in general, blocky and coarsely bedded. Interstices, voids and coarse vugs in the rock are filled with a brown-rusty iron carbonate, or possibly smithsonite. No sphalerite was observed within the stratum. The degree of calcite and rusty carbonate mineralization varies from bed to bed within the sequence, and locally calcite with accompanying rust makes up to 40% of the rock mass.

The rock, to a consistent degree, gives a positive zinc reaction when tested with "dope", although this reaction may be explained by the interference of elements other than zinc.

The abovementioned mineralized band appears to lie on the north limb of an anticline, illustrated in Section AA (Figure 8). The same bed is repeated on the south side of the local valley which traverses the property. The band on the south side of the valley was snow covered and was not examined.

The pertinent samples are listed below and illustrated on the accompanying sketch (Figure 9):

Sample No.	Thickness Represented	Pb %	Zn %
WN #1	36.0'	Tr	0.34
WN #2	40.0'	Tr	0.50
WN #3	60.0'	Tr	0.42
WN #4	100.0'	0.01	0.48
WN #5	30.0'	Tr	1.60
WN #6	50.0'	Tr	0.16
WN #7	Specimen	Tr	5.64
WN #8	Specimen	Tr	4.44



WITHIN SEKWI FORMATION

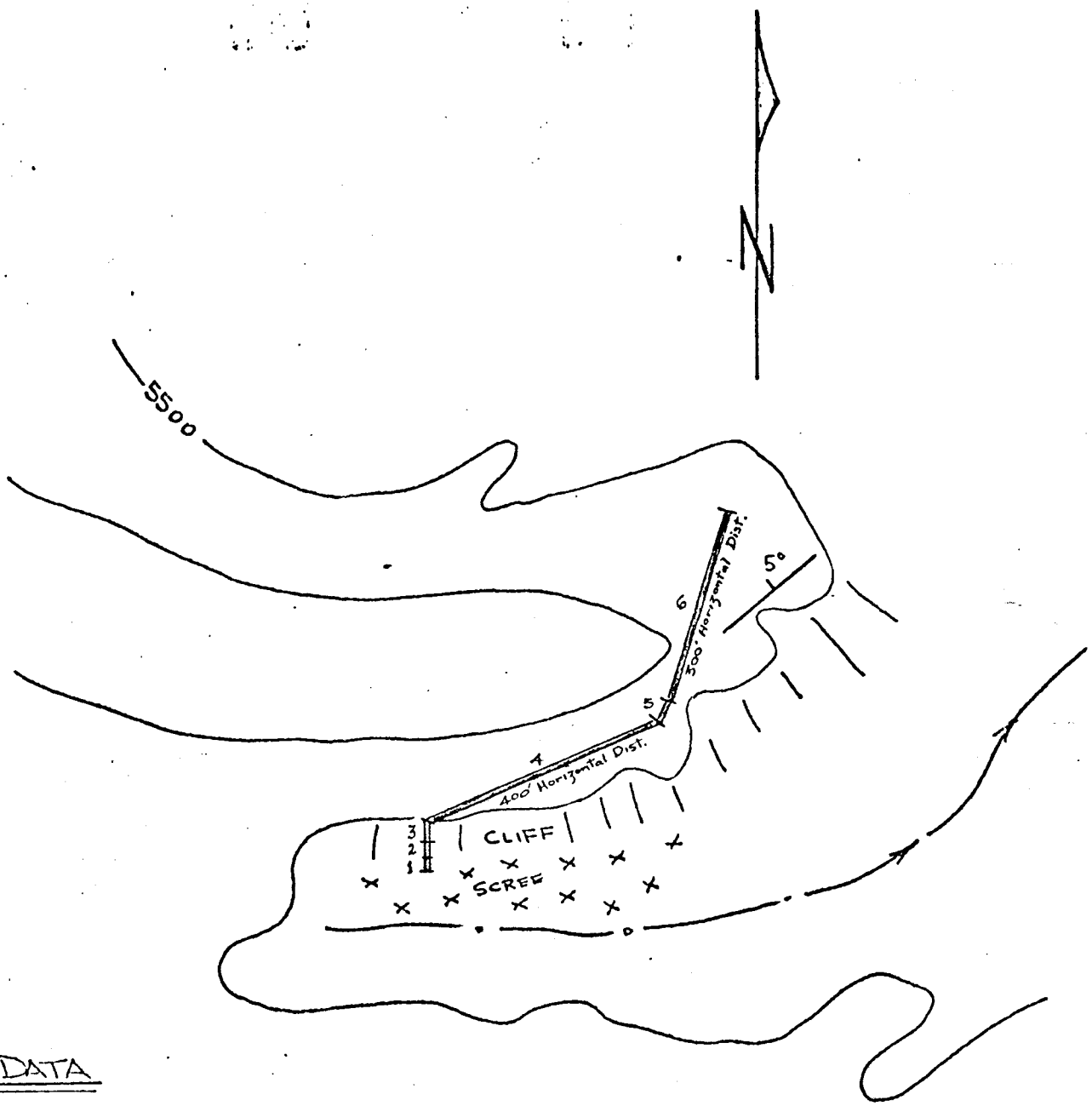
- D — UPPER DOLOMITE HOST ROCK
- Sh — BROWN WEATHERING SHALEY CARBONATE, SANDY INTERBEDS
- LD — LOWER DOLOMITE
- MINERAL OCCURRENCE

MINERAL OCCURRENCE LOCATION

BAK MINERAL ZONE

N.T.S. 106 C - 16

1" = ½ MILE JUNE 7/71



ASSAY DATA

SAMPLE No.	THICKNESS REPRESENTED	% LEAD	% ZINC
WN 1	36'	Tr	0.34
2	40'	Tr	0.50
3	60'	Tr	0.42
4	100'	0.01	0.48
5	30'	Tr	1.60
6	50'	Tr	0.16

ARCTIC RED PROJECT

AB PROJECT AREA

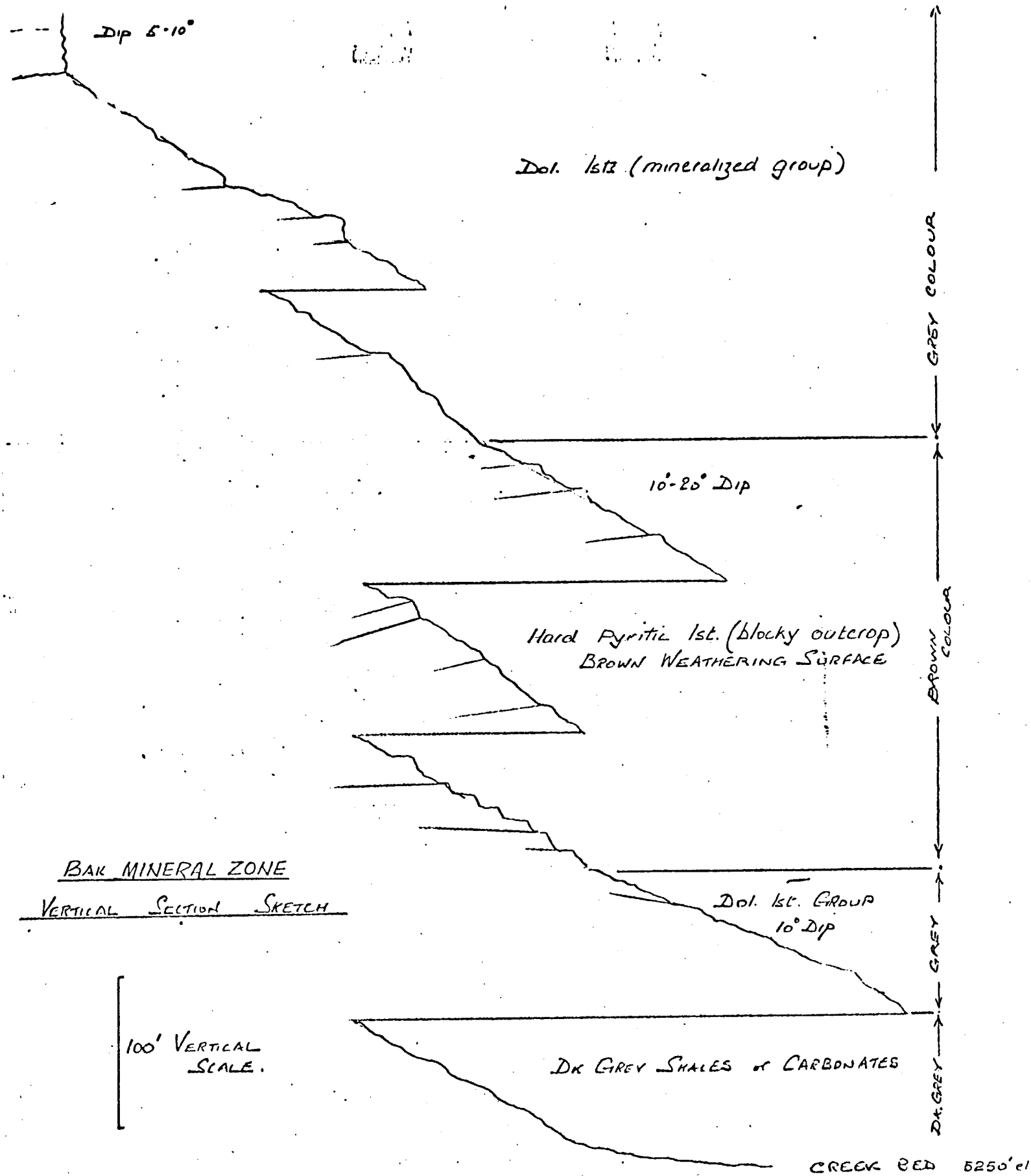
N.T.S. 106C-16

BAK MINERAL ZONE

SAMPLE SKETCH

NOT TO SCALE

FIGURE NO 3



BAK MINERAL ZONE

VERTICAL SECTION SKETCH

FIGURE NO 16

The first six samples are representative chips (chip taken every 2 feet), mainly from outcrop, but locally from near "in-place" rubble.

Specimens - on file Vancouver Office.

Mineralization discovered to date in the Bak area has been too low grade to be of economic interest. The area, however, lends itself to soil geochemistry, a tool which may indicate higher zinc concentrations within the demonstrated hospitable geologic environment.

AB East Zone

The AB East Zone was examined by Welcome North prospectors early in the spring of 1974. Partial snow cover at the time caused the showing to be passed over as local high grade veinlets not worthy of follow up.

Personnel from Cordilleran Engineering examined the showing which lay within staked ground, later in the summer and were of the opinion that the showing was a worthy one. This information was not available to Welcome North until after the end of the field season.

The showing should be re-examined in 1975.

RECOMMENDED EXPLORATION - 1975

Further exploration of the property should involve an estimated one month program of geochemical surveys, trenching and mapping. This would require an exploration crew consisting of:

1 - Party Chief/Geologist
1 - Assistant
1 - Blaster/Labourer.
1 - Labourer
1 - Cook

A camp would be established in the vicinity of the AB No. 1 Showing, logistical support would be by helicopter from the outside exploration (prospecting) camp. Some consideration may have to be given to temporarily basing a second helicopter at the property to aid in daily crew movements. This will depend on the availability of such a machine on a casual charter basis.

Details concerning the emphasis to be given specific target areas will be decided by the Venturers, however recommended priorities are:

1) Detailed mapping (1" = 40') of the main and East AB showings.
2) Trenching of the Main AB and East AB showings.
3) Geochemical grid (soils) between Main AB and East AB.
4) Contingent short-hole drilling.

PROPOSED BUDGET - AB MINERAL CLAIMS

(See overall Arctic Red '75 Budget for details)

Period: 1 Month - May 15 to June 15, 1975

Geology		
Property Geologist - Wages	$1,296	
Field Supplies	100	
Maps/ Prints/Drafting	200	
Assays	200	$ 1,796.00
Geochemistry		
Field Assistant - Wages	$1,080	
Maps/Prints/Drafting	200	
Assays/Analysis - say, 2,000 samples	3,200	$ 4,480.00
Trenching		
1 month	$5,320	$ 5,320.00
Drilling (Contingent on Results)		
Say, 10 short holes, or 500 feet	$8,800	$ 8,800.00
Freight & Transportation		
Assume 20% of overall budget	$5,000	$ 5,000.00
Camp Operation		
5 men x 30 days @ $27/day	$4,050	$ 4,050.00
	Sub-Total	$29,446.00
Admin		
@ 5%		1,473.00
	Total	$30,919.00
	Say,	$31,000.00

Respectfully submitted

John S. Brock
Vice-President Exploration

J.D. Guild, P.Eng.
Geologist

Occasional transitional phases between sphalerite and smithsonite can be seen. Fresh sphalerite is best preserved at showing 106-F-2 #13, where a more concentrated zinc section 55 feet thick can be seen in a stream cut (Figure 11). The fine red sphalerite, in company with fine grained galena, occurs as irregular and discontinuous hairline veinlets and smears along fracture and bedding planes within the silica rock.

The band has been somewhat randomly prospected and sampled throughout its known length. The grade of lead and zinc indicated to date appears well below levels of economic interest with maximums in selected specimen of 3.08% lead and 9.36% zinc (for details of sampling, the reader is referred to Plate 2). The persistence of mineralization, however, remains intriguing.

It is recommended that the band be further prospected in an effort to outline zones of mineral concentration. The band enters an area of thin overburden cover in the valley floor on the western end. A geochemical soil survey in this area could indicate zones of higher grade. The question of whether surface showings present only a "leached cap" which may mask better grade at depth could be resolved by either short diamond drill holes, or blasted pits.

106-C-16 #5

The showing is exposed in a small outcrop but is indicated by a trace of mineralized float in the valley floor to extend along strike for approximately 10,000 feet from the main river in the west to Cab Creek in the east.

The zone consists of a sphalerite mineralized band of dark grey to black silica rock which occupies approximately the same stratigraphic position as Robert's Silica Band, described above. The band follows the regional strike and dips at 50° to the south. The only mineralized outcrop is on a dip slope so that the true thickness cannot be accurately measured; the band, however, appears to be at least 30 feet thick and possibly as much as 100 feet. The stronger mineralization occurs in the footwall of the band which becomes more shaley and barren towards the hanging wall.

Zinc mineralization consists of very subtle, fine grained dark chocolate brown sphalerite "eyes" which appear to form an integral part of the host rock.

Assay No.	Pb %	Zn %	Comments
41	0.01	0.49	Specimen
42	0.01	0.46	Specimen
0012	0.03	6.60	Specimen
J.B.	-	5.40	Specimen

Specimen - filed Vancouver Office.

A geochemical soil survey was conducted in the overburden filled valley bottoms which cover the strike projections of the zone. The survey covered an area 6,500' x 1,000' to the west of the showing and an area 10,500' x 1,500' to the east.

Anomalous lead and zinc values, indicated in the survey and illustrated on the accompanying Plates 4, 5, and 6, suggest a continuity of mineralization within the outline surveyed. It appears, however, that the area has been subject to marked down-hill dispersion of both zinc and lead ions and that the source may not have been directly covered.

It is recommended, therefore, that the geochem soils survey be extended, throughout its length, for an additional 1,000 feet to the north prior to any contemplated trench or drill programs.

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

Horiz. Dist. 160'

SHEET No.

Property AB GROUP-ARCTIC RED J.V. Hole No. AB #1 Bearing 036 Elevation 4696' relative AB #2 Logged by D. A. LYMAN

District MACKENZIE, N.W.T. Length 333' Dip -61° Overburden 0-20', cased to 20' Date 11 Sept. 1974

Commenced 6 Sept. 1974 Latitude 64° 59'N Location: 637' on bearing Recovery

Completed 7 Sept. 1974 Departure Longitude : 132°17'W 250.5° from #1 post, AB #6 Purpose Test gossan zone below creek level

DESCRIPTION	SULPHIDES	OXIDES	FAULTS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz. Au	Oz. Ag	RE
Overburden: cased to 20'				0	20	NS					
Dolomite (20'-80') Light grey, very fine grain, highly variable	some very	light Fe.Ox.		20	25	14183		Tr			
weak banding, interformational breccia intervals common and often with blurred appearance	weak to trace very fine grain py.	stains on fracs. to 74'		25	30	14184		1.10			
26' - 1' strongly broken	throughout bed			30	35	14185		2.00			
28'-40' Brecciated interval, thin dark grey fragments in very fine grain light grey matrix, minor white dolomite vug filling	28-38' with mod. very fine-med.gr. tan sph in			35	40	14186		.46			
40'-65' Wavy banded interval, medium grey weak thin bands, much white dolomite along bedding and in very weak hairline veinlets 30° to core axis	dk.dolo.bands and in thin random fracs.			40	45	14187		Tr			
	38-45'-very weak fine gr. sph dis-			45	50	14188		Tr			
	appears with depth			50	55	14189		.02			
66' - 2' Breccia with flattened irregular fragments, weak pyrite in matrix				55	60	14190		Tr			
72'-78' Increasing intervals of fine grain dolomite sandstone alternating with very fine grain weakly banded dolomite				60	65	14191		Tr			
				65	70	14192		.05			
75' Medium grain pyrite in ¼" vugs common locally				70	75	14193		.01			
78'-80' [illegible]				75	80	[illegible]		.02			

RILL HOLE LOG — BETHLEHEM COPPER CORPORATION LTD. — SHEET No. 2

Property AB GROUP-ARCTIC RED J.V. Hole No. AB #1 — Logged by D. A. LYMAN — Date 11 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz. Au.	Oz. Ag.		% RECOV.
Salt and Pepper" Dolomite Sandstone (80'-108') Med.-dark grey overall color, fine-very fine grain dark grey dolomite sand with white-light grey dolomite matrix				80	85	14195		.02				100
	85-88 med. brown coarse sph.			85	90	14196		.78				100
87' Sphalerite veinlets cut by 20° white dolomite-filled ¼" fractures	in 1/8" uneven fracs. 0-20°, minor py.			90	95	14197		Tr				100
				95	100	14198		Tr				100
Black Banded Dolomite (108'-155') Dark grey-black, very fine gr.,	weak very			100	105	14199		Tr				100
Illaceous 1/16" or smaller black banding (70-80°) is generally planar, but some wavy and thin stylitized banding with carbon trace occurs, white dolomite fills hairline low	fine gr.py. along black bands, also			105	110	14200		.01				100
angle gash fractures and sparse vugs, scattered barite	in small vugs											
113' - Locally sparse thin barite(?) needles on weak				110	115	14201		.01				100
20° fractures, also 8" broken zone with black very fine grain matrix and 1/8" pyrite rims around fragments				115	120	14202		Tr				100
121'-125' Fine grain dolomite sandstone lens				120	125	14203		Tr				100
				125	130	14204		Tr				100
				130	135	14205		Tr				100
138'-152' Black very fine grain dolomite with high				135	140	14206		Tr				100
carbon content, fine pyrite in blebs along bedding, bed contains thin dolomite sandstone lenses				140	145	14207		.01				100

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 3

Property AB GROUP-ARCTIC RED J.V. Hole No. AB #1 Logged by D. A. LYMAN Date 11 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz Au.	Oz Ag.		% FE
151' - ½" very fine pyrite band, 75°				145	150	14208		Tr				10
Dimpled Dolomite (155'-164') Medium-dark grey, fine-very fine	weak fine			150	155	14209		Tr				10
grain, 1/3" dimpled ripple pattern forms comma-or pollywog-shaped structures in cross section, dimples define 1/8"-½" laminae, 70-80°, some carbon(?) in dimples	gr. pyrite in small vugs and in			155	160	14210		Tr				10
161' - Very fine grain pyrite replacing dimples	dimple structures			160	165	14211		Tr				10
				165	170	14212		Tr				10
Silty Dolomite (164'-198') Light grey, very fine grain, variable quartz silt content, weak erratic stylitized banding with thin carbon trace	very weak spotty vugs of fine gr.			170	175	14213		.01				10
164'-168' - 4' transition from darker very fine grain	pyrite along bedding			175	180	14214		Tr				10
dolomite to light grey dolomite with no apparent textural differences				180	185	14215		Tr				10
164'-175' - Locally much white dolomite filling irregular vugs along bedding and lesser low angle fractures.				185	190	14216		Tr				10
193' - Irregular low angle fractures with minor bluish chalky calcite				190	195	14217		Tr				10
				195	200	14218		Tr				100
Dolomitic Quartzite (193'-211') Light grey, very fine-fine rounded clear quartzite sand, with light grey dolomite matrix, bed grades from very fine quartzite sand at top	weak fine gr. dissem. py. through-			200	205	14219		Tr				10
to fine grain quartzite at 208', 1' of dolomite pebble conglomerate at 210' with 1/3" or smaller rounded light grey dolomite pebbles	out			205	210	14220		Tr				5

LL HOLE LOG — BETHLEHEM COPPER CORPORATION LTD. — SHEET No. 4

erty AB GROUP-ARCTIC RED J.V. Hole No. AB #1 — Logged by D. A. LYMAN — Date 11 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz. Au.	Oz. Ag.		% REC
sy Silty omite - (211'-278') Light grey with 2' dark grey intervals, very fine grain, white dolomite in ¼" or smaller irregular vugs along 1/3" or less banded intervals, many vugs have earlier rims of clear to white very fine grain to crystalline quartz; this quartz introduction may account for the silty texture and hardness, erratic very fine to medium grain pyrite postdates white dolomite fillings and in many cases occupies the bottom of vugs especially around 265', minor 1/8" or less open vugs common throughout. Also around 265' dark fine grain dolomite occupies vug bottoms; some barite may be present but no crystal forms were positively identified	scattered fine grain pyrite in vugs and fractures throughout			210	215	14221		.01				1
				215	220	14222		.01				1
				220	225	14223		.01				1
				225	230	14224		Tr				1
				230	235	14225		Tr				1
				235	240	14226		.01				1
				240	245	14227		Tr				1
				245	250	NS						
				250	255	NS						
255' - Chalky calcite in 10° hairline fracture				255	260	NS						
				260	265	14228		.01				1
				265	270	NS						1
				270	275	NS						1

'ILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

perty AB GROUP-ARCTIC RED J.V. Hole No. AB #1 Logged by D. A. LYMAN Date 11 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz Au.	Oz Ag.		% REC
mitic rtzite (278'-288') Light grey, very fine grain rounded				275	280	NS						10
quartz sand with dolomite matrix, no bedding features, weak white dolomite gash fractures, 10°				280	285	14229		Tr				10
mitic tstone (288'-298') Light grey-medium grey mottling elongate				285	290	NS						10
along bedding plane, 75°, quartz silt to very fine grain sand with light grey dolomite matrix	292-fine gr.			290	295	NS						100
omitic artzite (298'-316') As above, light medium grey, weakly	pyrite along weak styli-tized fracs. 15°			295	300	NS						100
banded 80°, fine grain quartz sand				300	305	14230		Tr				100
				305	310	NS						10
				310	315	NS						10
y omite (316'-325') Light grey, very fine grain, erratic				315	320	NS						10
stylitized banding with very thin carbon trace (or dark dolomite ?), much white dolomite filling small vugs, gash fractures and bedding fractures				320	325	NS						100
omite (325'-333') Similar silty dolomite above, but no silt				325	333	14231		Tr				10
and having dark grey color					EOH							

L HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

Horiz Dist. 125'

SHEET No. 1

ty AB GROUP-ARCTIC RED J.V.	Hole No. AB #2	Bearing 030	Elevation 4945' approx.	Logged by D. A. LYMAN	
MACKENZIE, N.W.T.	Length 258'	Dip -60½	Overburden 11', casing to 13'	Date 10 Sept. 1974	
enced 8 Sept. 1974	Latitude 64° 59'N	Location: 231' on bearing	Recovery		
eted 9 Sept. 1974	Departure Longitude - 132°17'W	186° from #1 post, AB #6	Purpose Test upper sulfide showings		

DESCRIPTION	SULPHIDES	OXIDES	FAULTS	FROM	TO	SAMPLE No.	% Pb.	% Zn	Oz. Au	Oz. Ag		% RECOV
burden (0'-11')				0	11	NS						0
mite (11'-13') Overburden boulder?, light grey, very fine	3% py. in	py. partly	small faults	11	13	2667		.21				70
grain, partly silicified, stylitized bedding 1-2" with thin carbon trace, 1/8" thick pyrite blebs along bedding.	thin blebs	oxidized along fracs. to 25'	70 to 90° to core axis at 13',15', 17',18-19'	13	15	2668		.89				50
ddy" Dolomite (13-15') Dark grey, very fine grain argillaceous irregular wavy bedding				15	20	2669		.50				55
mite (15-17') Light grey, broken irregularly and healed with black very fine grain dolomite	17'-57' straw-coloured		moderately broken with some move-	20	25	2670		.43				80
ddy" Dolomite (17'-57') Dark grey-black, very fine grain irregular wavy bedding 50-90° to core axis with zones of breccia and flattened mud roll and flow structures, spotty sphalerite throughout along bedding structures and in matrix	sph.aggre-gates occurring		ment to 23'	25	30	2671		.86				90
of brecciated zones, weak barite needles on fractures	along bed-ding cracks primarily, also in re-		31'-minor left lateral movement on	30	35	2672		.48				90
30'-1' sphalerite concentration along 45° bedding structures	lated fracturing and vugs		fracs. parallel core axis	35	40	2673		.04				95
				40	45	2674		1.02				95
45'-1' sphalerite concentration with 1/16" galena blebs having very fine grain pyrite rims	45' mod. galena	48' minor Fe. Ox. in		45	50	2675		1.00				95
56' - 4" fault, 80°, partly dolomite healed	dissem. in blebs to 1/8" locally	broken zone	56'-4", 80°	50	55	2676		.01				98
lomite (57'-67') Light grey, fine grain, 1/16" or smaller	<<1% py.	minor Ox. of		55	57	2677		.02				95
laminations, 70-90°, above 64' banded with darker grey partings, some very fine grain pyrite disseminated common, also minor pyrite in fractures and on bedding planes, some		dissem. Py.		57	60	2678		.01				98

LL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 2

erty AB GROUP-ARCTIC RED J.V. Hole No. AB #2 Logged by D. A. LYMAN Date 10 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	FAULTS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz Au.	Oz Ag.		% RECOV.
67'-½" black clay fault 80°				60	65	2679		Tr				98
mite (67'-87') Light-dark grey, very fine-fine grain, highly variable bedding styles: massive in sandy zones, wavy banding in darker areas, and planar laminae in short 1' intervals,	70-77' strong fine gr. Py. in vugs, weak			65	70	2680		.07				98
				70	75	2681		.96				98
71'-83' - Heavy fine grain pyrite and sphalerite in vugs, disseminated along bedding features and partly filling fractures, mineral sequence: pyrite-white dolomite-sphalerite	coarse gr. Sph. 77-79&83-85			75	80	2682		6.48				95
72' - Light grey, very fine grain, sandy dolomite interval	strong fine-med. gr. tan Sph. concentrated along bedding and frac. surfaces.			80	85	2683		18.53				80
dv" Dolomite (87'-110') Dark grey to black, very fine grain, argillaceous, wavy banded throughout, small breccia and slump features common	87-110 weak fine gr. tan			85	90	2684		.46				80
				90	95	2685		.05				90
87' - 1' brecciated section at contact	Sph. dissem. throughout, also in vugs and 45° fracs below 100'			95	100	2686		.41				90
98' - white dolomite in gash fractures and along bedding trace locally												
101-103' - Medium grain sphalerite in vugs and fractures to 1/3"				100	105	2687		1.23				90
105'- 4" normal fault zone, 75°				105	110	2688		.01				95
110' - 1' highly fractured, 70°, some movement				110	115	2689		.06				100
cia (110'-130') Interformational breccia, in upper part of bed mostly light grey dolomite fragments from bed below, rounded to angular, also medium-dark grey very fine grain	trace-weak fine grain			115	120	2690		.25				100
dolomite fragments, ¼ to 1", common in lower part of bed, no graded bedding apparent, light grey very fine grain dolomite matrix in lower bed; darker matrix higher up with	dissem. tan Sph., trace Py. dissem.			120	125	2691		.19				100
white dolomite vug filling												

LL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 3

erty AB GROUP-ARCTIC RED J.V. Hole No. AB #2 | Logged by D. A. LYNAN | Date 13 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	FAULTS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz. Au.	Oz. Ag.		% RECO.
				125	130	2692		.10				10
ed Light Grey Dolomite (130'-221') Light grey, very fine grain, hairline dark grey wavy banding, stylitized bedding with thick carbon common below 165', moderate-strong silt	rare py.			130	135	2693		.02				10
content (silicification?) below 150', flaky appearance on core cut surface 137' - 1' muddy breccia interval, some fine sphalerite disseminated				135	140	2694		1.42				9
				140	145	2695		.62				98
				145	150	2696		.04				98
				150	155	2697		.01				98
				155	160	NS		-				100
				160	165	NS						100
				165	170	NS						100
ew 185' - cut by weak white dolomite filled fractures 20°,			174' 18" fault zone	170	175	2698		.01				95
75° (bedding)			20-30°	175	180	NS						100
				180	185	NS						100
				185	190	NS						100

RILL HOLE LOG — BETHLEHEM COPPER CORPORATION LTD. — SHEET No. 4

Property AB GROUP-ARCTIC RED J.V. Hole No. AB #2 — Logged by D. A. LYMAN — Date 13 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	FAULTS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz Au.	Oz Ag.		% FeCO
nded Light Grey Dolomite (130'-221') as above				190	195	2699		.08				10
"				195	200	NS						10
205' - bedding slump resulting in stacking of dark grey ½" band				200	205	NS						10
206' - 18" coarse angular breccia, dark grey matrix				205	210	NS						10
				210	215	2700		.01				9
				215	220	NS						9
nded Black (221'-258') dark grey-black, very fine grain, olomite 1/32" to 4" banding, very thin bands are black partings, thicker bands have	very weak very fine grain,			220	225	NS						100
rounded, flattened mud balls (1/16"-1") with black very fine grain matrix above 235'; below 235' thicker (1"-6") bands are 1/16" rounded dolomite fragments and debris piles with	dissem. Py. and elongate Py. blebs			225	230	NS						10
white dolomite matrix	along bedding throughout bed			230	235	8351		.02				10
230' - NOTE change in sample numbers				235	240	NS						100
below 234' - low angle 0-40° gash fractures filled with white dolomite common, also along				240	245	NS						10
bedding plane fractures 80°				245	250	NS						100
				250	255	8352		.01				10

Horiz Dist 157'

ILL HOLE LOG — BETHLEHEM COPPER CORPORATION LTD. — SHEET No. 1

erty AB GROUP-ARCTIC RED J.V.	Hole No. AB #3	Bearing 030	Elevation 4853' relative to AB#2	Logged by D. A. LYMAN
ict MACKENZIE, N.W.T.	Length 275'	Dip -55°	Overburden 0-9', casing to 12'	Date 11 Sept. 1974
menced 10 Sept. 1974	Latitude 64°59'N	Location: 379' on bearing	Recovery	
pleted 11 Sept. 1974	Longitude 132°17'W	219° from #1 post, AB #6	Purpose	

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz. Au.	Oz. Ag	% RECOV.
erburden (0-9')				0	9	NS					0
omite (9'-40') Light-medium grey, fine grain, sugary texture,	very fine	Py. lightly		9	15	14232		.01			80
some light silicification, very fine grain disseminated pyrite common, white dolomite and later pyrite to 1/3" thick in blebs subparallel bedding, also in vugs in broken zones	dissem. Py. < 2%, also Py. blebs	oxidized to 40'		15	20	14233		.01			85
and hairline veinlets, laminated bedding trace above 20' at 45-75° to core axis, very thin irregular bedding below 20' with some carbon (pyrobitumen) stylitized trace, weak-moderate irregular fracturing throughout, weak 1/16" white dolomite veinlets below 23'.	and veins to 10% locally			20	25	14234		.02			90
18'-25' - moderate fracture, with irregular broken zones partly healed with white dolomite and pyrite, some open vugs remaining				25	30	14235		.01			95
23'&28' - 1" faults with gouge 70° to core axis				30	35	14236		.02			95
39' - 8" highly broken (fault?)				35	40	14237		.07			85
ddy" Dolomite (40'-68') Dark grey to black, fine-very fine grain, argillaceous, very thinly laminated bedding to 50', 70° to core axis; wavy, irregular bedding below 50' with	weak very fine grain pyrite plus variable			40	45	14238		.01			98
elongate dolomite blebs shingled parallel bedding, some straight lamination, and lesser mud dikes and interformational breccia, some white dolomite mostly as blebs and	fine grain sphalerite			45	47.5	14239		.01			95
veinlets parallel bedding, also in gash fractures 45° some disseminated sphalerite throughout.	48-50' locally 10% straw-			47.5	50	14240		4.44			95
40'-45' - Laminated bedding with very thin white dolomite bands and sparse pyrite, 70°	colored										
44' - 3" wedge-shaped mud dike	sphalerite			50	55	14241		.33			98
45-68' - muddy beds with mud balls common, lesser wavy lamination having very fine grain pyrite in thin wisps and very weak disseminated, straw and tan colored sphalerite disseminated along bedding trace 65-75°	as oatmeal appearing crystal aggregates dissem.			55	60	14242		.60			95
	along bedding with			60	65	14243		.74			93

LL HOLE LOG — BETHLEHEM COPPER CORPORATION LTD. — SHEET No. 2

erty AB GROUP-ARCTIC RED J.V. Hole No. AB #3 — Logged by D. A. LYMAN — Date '11 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz Au.	Oz Ag.		% RECOV.
66'-68' - interformational breccia, 20% fragments of overlying light grey dolomite consisting of bent pieces of bedding	3-5% dissem. tan sphalerite in			65	70	14244		.69				95
laminae and rounded irregular fragments, dark grey-black muddy, very fine grain matrix containing some dark grey round mud pebbles, disseminated sphalerite in matrix as 1/16" crystal aggregates	breccia with med. very fine grain Py., later			70	75	14245		.17				98
8' - 8" rubble (fault?)	sphalerite											
lomite (68-70') Light grey, fine grain, sparse white-dolomite filled vugs, indistinct wavy bedding	dissem. in breccia matrix and			75	80	14246		.98				98
ddy" Dolomite (70-79') Interformational breccia as above, disseminated sphalerite in black matrix and surrounding fragments, more rarely in fragments	along bedding features			80	85	14247		.01				98
ar Grey Dolomite (79'-158')	below 79' -											
ight-medium grey, fine grain sugary texture; wavy, irregular indistinct bedding, 65-70°, thin carbon stylitized trace common, white dolomite healing small irregular vugs and hair-	minor Py. along bedding			85	90	14248		.35				98
ine gash fractures, 20°, no mineralization apparent, some 1' intervals dark grey sugary dolomite	86' - mod. Spn. dissem. in 10"											
w 95'- Light grey dolomite with no dark grey partings present, increased white	brecciated zone			90	95	14249		.01				98
olomite healing of zones fractured mostly parallel bedding, 5°-65°		96' - minor Fe.Ox. and siderite in 8" broken zone		95	100	14250		Tr				95
E: SAMPLE # CHANGE				100	105	2651		.01				98
				105	110	2652		.01				95
13-115' and 116-117' - Dark grey sugary dolomite intervals, closely fractured along bedding and some earlier formational brecciation, white dolomite healed apparently after (?)	113-115 and 116-117			110	115	2653		.32				95
sphalerite mineralization	fine-med. gr. sparse dissem. tan			115	120	2654		.32				98
25-130' - formational breccia with small angular fragments,	Spn. lesser very fine gr. dissem.			120	125	NS						98
white dolomite healed, tight with no sphalerite	Py.			125	130	NS						98

Property AB GROUP-ARCTIC RED J.V. Hole No. AB #3 Logged by D. A. LYMAN Date 13 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz Au.	Oz Ag.		% RECOV.
30' - Formation slumps cause breaking and sliding of laminae 1/8" or smaller alternating light grey and dark grey bands to 140'	very weak fine grain dissem. Py. throughout			130	135	2655		.01				
				135	140	NS						
0'-158' - 1" to 1' irregular bedding separated by hairline stylitized carbon trace				140	145	2656		.07				100
				145	150	NS						100
0'-180' - Hairline white-dolomite filled fractures, 0-20°				150	155	2657		.02				100
alt and Pepper" Dolomite Sandstone (158'-188') Medium -dark ey homogenous fine grain salt and pepper texture due to fine k grey irregular grains surrounded by light grey to white rix as visible on core cut; this texture is not apparent fresh broken rock; carbon stylitized trace separates 1" to beds; very fine grain pyrite disseminated in trace amounts	very weak, very fine grain dissem. Py. throughout 164'-three 1/16" tan Sph veinlets 30°			155	160	2658		.01				80
				160	165	2659		.26				85
				165	170	2660		Tr				95
	cut white dolo. veinlets, weak very fine			170	175	NS						90
	gr. Py. in vugs and veinlets			175	180	NS						90
ck Banded Dolomite (188'-229') Black, very fine grain, gillaceous 1/16" to 3" planar and wavy banded bedding with e 1-2" brecciated intervals healed with dark very fine grain rix; banding has some light grey fine-medium grey wavy inter- s to 2" overlying very fine grain bands with irregular rtly eroded) surfaces	occurs after Py. Sparse very fine gr.Py. in breccia matrix and in rare 1/32" low			180	185	2661		.01				90
				185	190	NS						98
	angle fract			190	195	NS						98

Property AB GROUP-ARCTIC RED J.V. Hole No. AB #3 Logged by D. A. LYMAN. Date 13 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz. Au.	Oz. Ag.		% RECOV.
ack Banded Dolomite (188'-229') black, very fine grain, argillaceous, as above				195	200	NS						95
				200	205	2662		.01				100
				205	210	NS						100
				210	215	NS						100
				215	220	NS						98
				220	225	2663		.01				98
				225	230	NS						100
mpled" Dolomite (229'-239') Dark grey, very fine grain, very thin 1/16"-¼" bedding defined by 1/3" comma-shaped (in cross-section) traces. When viewed in plan section the commas are				230	235	NS						98
arbon-filled dimples spaced irregularly 1/3-½" apart, minor white dolomite filled seams and vugs along bedding 75°.	very sparse			235	240	NS						100
ty Dolomite (239'-271') Light grey, crypto to very fine grain, some weak medium grey banding and irregulary stylitized bedding trace, 70-80°, rounded vugs elongate	very fine gr.Py. in small vugs			240	245	2664		Tr				100
along bedding plane and filled with white dolomite common throughout bed. Weak silicification towards bottom of bed, white flaky appearance on core cut is characteristic of	and along bedding trace			245	250	2665		.47				100
silica-rich zones, tight rock except for fractures	247' - 1" bleb of tan crystalline			250	255	NS						100
	Sph. in vug partly			255	260	NS						100

PILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 5

perty AB GROUP-ARCTIC RED J.V Hole No. AB #3 Logged by D. A. LYMAN Date 13 Sept. 1974

DESCRIPTION	SULPHIDES	OXIDES	OTHERS	FROM	TO	SAMPLE No.	% Pb.	% Zn.	Oz Au.	Oz. Ag.		% RECOV.
lty Dolomite (239'-268') as above				260	265	NS						100
Silty dolomite grades abruptly into dolomitic quartzite				265	270	NS						100
lomitic (268'-274') Light grey, fine-medium round quartz artzite grains, ½ to 3" bedding sets with some grading apparent	Py. in vugs			270	275	2666		Tr				100
lomite (274'-275' EOH) Light grey, fine grain, some stylitized bedding visible, 2" vug filled with fine grain yrite, some small fracture slippage along bedding angle 70°, crystalline quartz and later white dolomite filling fracture vug at 275'				EOH								

APPENDIX II

ARCTIC RED PROJECT

CLAIM SUMMARY AS AT DECEMBER, 1974
YUKON TERRITORIES

N.T.S. AREA	CLAIMS	GRANT NUMBERS	RECORDING DATE
106F-1	AB 203-242	Y96275-Y96314	Aug. 22, 1974
	TOTAL	40 Mineral Claims	

APPLICATION FOR CERTIFICATES OF WORK - MAYO MINING DISTRICT

In accordance with the provisions of the Quartz Mining Act in the Yukon Territory, we the recorded owners of the mineral claims listed below, hereby apply for the following certificates of work, as per Appendix IV of this report, "Statement of Costs" attached hereto:

TOTAL REPRESENTATION WORK - As per Appendix IV $7,279.00

ALLOCATION OF REPRESENTATION WORK

AB CLAIM GROUP			
AB 203-234	Y96275-Y96306		
	32 claims - 2 years each	$6,400.00	
AB 235-242	Y96307-Y96314		
	8 claims - 1 year each	800.00	
	TOTAL AB- 40 claims	$7,200.00	$7,200.00
	Balance Unapplied		$ 79.00

APPENDIX III

PERSONNEL AND DATES WORKED

The following pages tabulate the personnel and dates worked on the AP Mineral Claims.

Please note that "Camp Operation" and "Expediting" wages have been pro-rated and are included in the costs for individual claim groups - under camp costs (see Appendix IV "STATEMENT OF COSTS").

Also the OEX (Outside Exploration) costs have been pro-rated to individual claim groups as shown in Appendix IV.

AB GROUP

PERSONNEL AND DATES WORKED

1974 FIELD SEASON

C.L. (Pete) Risby, Ross River, Y.T. Chief Prospector, $1200/month	Aug. 29. Dec. 8, 9. 10.
Harold Barker, c/o General Delivery, Whitehorse, Y.T. Field Assistant $800/month	June 24. July 2, 15. Sept. 5.
Richard F. McLoughlin, c/o # 1010, 2055 St. Matthew St., Montreal, PQ. Geologist, $1200/month	June 5-6, 8, 13, 19-20, 23-24. July 2, 4, 15-16, 23, 25. Aug. 4-5, 10-11, 17.
John D. Guild, 13291 Woodcrest Drive, White Rock, B.C. Party Chief, $65/day	June 4, 8, 18, 21. July 17. Sept. 6, 9. Dec. 4-9, 12, 18-20, 23, 24, 30.
John S. Brock, 3029 Procter Avenue, West Vancouver, B.C. Field Supervisor $71/day	June 9-11. July 23-24. Aug. 29. Sept. 12.
Joan Stickney, c/o General Delivery, Whitehorse, Y.T. Cook, $900/month	Duration of Program. Wages pro-rated to all projects - under camp costs.

OEX

PERSONNEL AND DATES WORKED

1974 FIELD SEASON

Harold Barker, c/o General Delivery, Whitehorse, Y.T. Field Assistant $800/month	May 15-26. June 25, 30.
Richard F. McLoughlin, c/o #1010, 2055 St. Matthew St., Montreal, PQ. Geologist $1200/month	May 15-26. June 2-4, 10, 14, 22, 25, 30. July 1, 19, 20, 24, 31. Aug. 22, 31. Sept. 3, 23-27, 30. Oct. 1-4.
John D. Guild, 13291 Woodcrest Dr., White Rock, B.C. Party Chief, $65/day	March 26-29. April 1-5, 8-12. May 7-10, 13-17, 20-26. June 3, 5, 9-11, 19, 20, 22-30. July 1-4, 8, 10-11, 14-15, 19-21, 23-36, 30, 31. Aug. 6, 8, 10, 14-15, 18, 20, 23, 30-31. Sept. 3, 4, 5, 7, 10-17. Dec. 10, 11, 13.
John S. Brock, 3029 Procter Ave., West Vancouver, B.C. Field Supervisor, $71/day	Jan. 3-5, 16-18, 21-22. Feb. 18, 21, 25-28. March 14-16, 21-22, 25-26, 29-30. April 1-5, 22-26. May 6-10, 13, 29, 31. June 3-4, 9-12, 25, 31, 22. Aug. 1-2, 8, 13-14, 17-18, 20-21. Sept. 3-4, 10, 13, 16, 23, 24-25. Oct. 1, 3, 4, 13, 16, 23, 27, 28, 29, 31.

CAMP OPERATION

PERSONNEL AND DATES WORKED

1974 FIELD SEASON

Joan Stickney, c/o General Delivery, Whitehorse, Y.T. Cook $900/month	May 13-31. June 1-16, 21-30. July 1-19, 25-31. Aug. 1-6, 13-31. Sept. 1.
C.L. (Pete) Risby, Ross River, Y.T. $1200/month	May 19, 29. July 27.
Arthur John, Ross River, Y.T. $1100/month	July 26, 27.
Robert Etzel, Ross River, Y.T. $1100/month	July 1, 26, 27.
Esau Dick, Ross River, Y.T. $800/month	July 1, 26, 27.
Walter Etzel, Ross River, Y.T. $800/month	July 1, 26, 27.
Harold Barker, c/o General Delivery, Whitehorse, Y.T. $800/month	June 2-8, 11-23. July 1, 4, 13, 16, 22-25,31. Aug. 1, 3, 5-7, 13-20, 22.
Richard McLoughlin, c/o #1010, 2055 St. Matthew St., Montreal, PQ. $1200/month	July 26, 27.

N.B. Wages pro-rated to all projects worked under 1974 program - under camp costs.

EXPEDITING

PERSONNEL AND DATES WORKED

1974 FIELD SEASON

C.L. (Pete) Risby, Ross River, Y.T.	Aug. 20-24. Sept. 7-8.

$1200/month

N.B. Wages prorated to projects worked.

APPENDIX IV

AB CLAIM GROUP

STATEMENT OF COSTS

The following pages show a distribution of the total costs incurred by Welcome North Mines Ltd. (N.P.L.), on behalf of the Arctic Red Joint Venture in carrying out exploration work on the AB claims during the 1974 field season. These costs can be invoice supported or in the case of internal costs documented.

The costs can be summarized as follows:

Claim Group	Direct Property Cost	Outside Exploration Cost Related to Property	Total
AB	$3,094.20	$4,184.80	$7,279.00

NOTE: The allocation of these costs for purposes of representation work is shown in Appendix II

Total Representation Work Applied for	$7,200.00
Balance Unapplied	$ 79.00

APPENDIX IV

ARCTIC RED PROJECT - 1974

GROUP: AB

EXPENDITURES - AB GROUP

	GEOLOGY/ GEOCHEM $	PROSPECTING $	DRILLING $	STAKING & ACQ. $	PROPERTY MAINT. $	CAMP OP. $	EXPEDI-TING $	ADMIN $	SUB-TOTAL $	GRAND TOTAL $
SALARIES										
Wages	1,980.90	82.30	30.80	1,069.61	-	534.54	20.45	-	3,718.60	
Finder Fees	-	-	-	1,000.00	-	-	-	-	1,000.00	4,718.60
CONTRACT PAYMENTS	-	-	15,852.96	19,770.00	-	-	158.48	680.67		36,462.11
FIELD & MISC. EXP.	-	-	-	630.34	-	1,096.58	118.89	49.38		1,895.19
MAPS/PRINTS/ DRAFTING	109.77	-	-	-	-	-	-	-		109.77
ASSAYS/ ANALYSES	482.57	-	697.50	-	-	-	-	-		1,180.07
FREIGHT/ TRANSPORT										
Helicopter	15,233.23	-	6,701.28	-	-	-	-	-	21,934.51	
Fixed Wing	2,030.95	-	6,588.47	-	-	336.38	-	-	8,955.80	
ajor Transp.	-	-	-	-	-	129.93	-	-	129.93	
Misc.Freight	-	-	-	-	-	117.97	-	-	117.97	31,138.21
TOTAL $	19,837.42	82.30	29,871.01	22,469.95	-	2,215.40	297.82	730.05		75,503.95

AB CLAIMS - Y.T. - 40 CLAIMS
AB CLAIMS N.W.T. - 250 CLAIMS
TOTAL AB 290 CLAIMS

LESS: TOTAL COSTS NOT ALLOWED (STAKING/ACQ & ADMIN) = $23,200.00
DRILLING COSTS TO BE APPLIED AT LATER DATE 29 871 01 - 53 071.01
BALANCE OF APPLICABLE DIRECT COSTS $ 22 432.94

PORTION APPLICABLE TO YUKON CLAIMS
= $\frac{40}{290}$ x $ 22,432.94 = $ 3094.20 $ 3,094.20
PLUS: PRO-RATED PORTION OF OEX COST (SUMMARY ATTACHED) 4,184.80
TOTAL TO BE APPLIED AS REPRESENTATION WORK - Y.T. $ 7,279.00

APPENDIX IV

Costs related to properties - distrbuted among 400 Yukon Claims as follows:

AXE-NEST	CLAIMS	= 46 Claims	x $104.62	$ 4,812.52
CAB	CLAIMS	= 314 "	x $104.62	$ 32,850.68
AB	CLAIMS	= 40 "	x $104.62	$ 4,184.80
				$ 41,848.00

ARCTIC RED PROJECT - 1974

GROUP: OEX

EXPENDITURES - OEX

	GEOLOGY/ GEOCHEM $	PROSPECTING $	DRILLING $	STAKING & ACQ. $	PROPERTY MAINT. $	CAMP OP. $	EXPEDI-TING $	ADMIN $	SUB-TOTAL $	GRAND TOTAL $
SALARIES										
Wages	14,027.52	19,615.39	-	-	-	6,721.34	257.11	-	40,621.36	
Finder Fees	-	-	-	-	-	-	-	-	-	40,621.36
CONTRACT PAYMENTS	-	-	-	-	-	-	1,992.81	8,558.80		10,551.61
FIELD & MISC. EXP.	-	-	-	-	-	13,789.15	1,495.01	621.02		15,905.18
MAPS/PRINTS/ DRAFTING	3,487.29	-	-	-	-	-	-	-		3,487.29
ASSAYS/ ANALYSES	595.81	-	-	-	-	-	-	-		595.81
FREIGHT/ TRANSPORT										
Helicopter	30,971.30	-	-	-	-	-	-	-	30,971.30	
Fixed Wing	4,948.59	-	-	-	-	4,229.70	-	-	9,178.29	
Major Transp.	-	-	-	-	-	1,633.86	-	-	1,633.86	
Misc.Freight	-	-	-	-	-	1,483.37	-	-	1,483.37	43,266.82
TOTAL $	54,030.51	19,615.39	-	-	-	27,857.42	3,744.93	9,179.82		114,428.07

Less: Total Costs not allowed (Admin Costs) ..... - 9,179.82

BALANCE APPLICABLE AS REPRESENTATION WORK ..... $ 105,248.25

Note: Costs related to properties distributed on pro-rata basis among 400 Yukon Mineral Claims and 606 N.W.T. claims = $\frac{\$105,248.25}{1006 \text{ claims}}$ = $104.62052 per claim

WELCOME NORTH MINES LTD. (N.P.L.)
Suite 8, 1161 Melville St., Vancouver, B.C. V6E 2X7 Telephone (604) 687-1658

AFFIDAVIT SUPPORTING SUMMARY OF COSTS

I, John S. Brock, Vice President, Welcome North Mines Ltd. (N.P.L.), of Vancouver, British Columbia, do hereby state that, to the best of my knowledge and belief, the statement of costs presented in this report (Geological, Geochemical and Diamond Drilling Report on the AB Mineral Claims) is both correct and true.

J.S. Brock

May 7/75
Date

Notary Public in and for the
Province of British Columbia.

BB – DAB PROJECT AREA

AB PROJECT AREA

AB CLAIMS

BB CLAIMS

YUKON N.W.T.

65°00'

CAB CLAIMS

DAB 1-20

AB CLAIMS

AB PROJECT AREA

BB – DAB PROJECT AREA

106 F/1

106 F/16

N

BB – DAB PROJECT AREA

BB CLAIMS	TAG. Nos
BB 1 – 12	A 56759 – A 56770
BB 13 – 50	A 56797 – A 56816
BB 51 – 80	A 86101 – A 86130
DAB CLAIMS	
DAB 1 – 20	A 56777 – A 56796
AB CLAIMS	
AB 67 – 70	A 86191 – A 86194
AB 73 – 76	A 86197 – A 86200
AB 79 – 96	A 86203 – A 86220
AB 97 – 98	A 86263 – A 86264
AB 203 – 252	A 90703 – A 90752

AB PROJECT AREA

AB CLAIMS	TAG. Nos
AB 1 – 6	A 56737 – A 56742
AB 17 – 42	A 86141 – A 86166
AB 43 – 46	A 86167 – A 86170
AB 49 – 54	A 86173 – A 86178
AB 57 – 64	A 86181 – A 86188
AB 99 – 100	A 65499 – A 65500
AB 101 – 202	A 90601 – A 90702
AB 253 – 270	A 86409 – A 86420
AB 203 – 242	(YUKON GRANT Nos NOT RETURNED)

PLATE I

061279

WELCOME NORTH MINES LIMITED

AB & BB – DAB PROJECT AREAS

NTS 106 C/16, 106 F/1

MACKENZIE M.D.

CLAIM MAP

REVISED: Dec. 1, 1974

SCALE 1" = 1/2 mile

N

LEGEND

ODc	ORD.—DEV. CARBONATES
	Interbedded black chert & grey dolomites
	Light grey well bedded dolomites
OSk	MOUNT KINDLE FORMATION dolomite, locally reefoid
OSDr	ORD.—SIL.—ROAD RIVER SHALE Black shale in part cherty
Ɛs	CAMBRIAN — SEKWI DOLOMITE
G.Dol	GREY DOLOMITE
MLs	MUDDY LIMESTONE
G Sh	GREY SHALE
q	QUARTZITE
Ɛq	CAMBRIAN — QUARTZITE

REGIONAL GEOLOGY IS TAKEN BASICALLY FROM PUBLISHED GSC MAPS. CONTACTS ARE APPROXIMATE.

SYMBOLS

— — — —	GEOLOGICAL CONTACT APPROXIMATE
∿∿∿ ∿∿∿	FAULT (DEFINED, PROBABLE)
Fl	FLOAT
4 3 □ 6 5	CLAIM POST LOCATED
	BEDDING
	CLAIM GROUP BOUNDARY
✕ Zinc	LOW GRADE ZINC OCCURRENCES
DDH I ←—o	DIAMOND DRILL HOLE

WELCOME NORTH MINES LTD.

ARCTIC RED PROJECT

AB, DAB & BB MINERAL CLAIMS

NTS 106 F/1, C/16

AB PROJECT AREA
BB—DAB PROJECT AREA

SCALE 1" = 1000'

SEPT. 1974

061279

PLATE 2


ODc (UNIT 5)
ODc (UNIT 5)
ODc (UNIT 5)
Єs
DOLOMITIC LIMESTONE
TALUS
COVER
TALUS
AB Creek
CR (SKETCHED)
PROJECTED TRACE ON WEST SIDEHILL ASSUMING CONFORMABLE PLANEAR CONFIGURATION
SEMI - CONTINUOUS TRACE OF ZINC-RICH NEAR IN PLACE RUBBLE
TRACES OF SPHALERITE IN UNDERLYING BEDS
Pyritic Gossan
BARREN DOLOMITE
FOREIGN TALUS COVER
APPROXIMATE CONTACT VUGGY HANGING WALL DOLOMITE (UNIT 3)
APPROXIMATE CONTACT SANDY SHALE (UNIT 4)
UNIT 2
SANDY SHALE Brown Weathering
AB CLAIMS
Sphal. Fl
Pit
DDH AB 1
DDH AB 2
DDH AB 3
Trench
LINE OF SECTION A-A' (FIG.4)
BASE LINE
MAGNETIC
NOTE: TOPOGRAPHY APPROXIMATE. ENLARGEMENT OF 1:50,000 MAP. RELATIVE POSITIONS OF DRILL HOLES & MINERAL OCCURRENCES BASED ON COMPASS & CHAIN OR PACE SURVEYS.
LEGEND
CREEK
TOPOGRAPHICAL CONTOUR (PER 100')
SURVEY STATION (APPROXIMATE)
CLAIM POST
CLAIM BOUNDARY
SILT SAMPLE LOCATION
GEOLOGY
ORDOVICIAN & DEVONIAN
ODc UNDIVIDED MOUNT KINDLE FORMATION & SILURIAN & DEVONIAN GREY BEDDED DOLOMITES
LOWER CAMBRIAN
Єs SEKWI FORMATION DOLOMITES, LIMESTONES, SHALE & SANDSTONE
NOTE: REGIONAL GEOLOGY IS TAKEN FROM PUBLISHED GSC MAPS. CONTACTS ARE APPROXIMATE. INDIVIDUAL GEOLOGIC UNITS MORE FULLY DESCRIBED ON SECTION A-A' (FIG.4)
FAULT
CONTACT
BEDDING
MINERAL ZONE / OUTCROP
MINERALIZED FLOAT
SAMPLE LOCATIONS
FEET
100 0 100

SAMPLE DATA

SAMPLE	SAMPLE No.	WIDTH	% LEAD	% ZINC	
AB	WN 23	400'	0.01	1.06	Chip mainly talus
CD	0039	20'	0.01	1.28	Trench wall
EF	0029-33	90'	0.02	10.1	Weight Av. Bedrock chip
GH	WN 22	100'	0.01	0.65	Chip of rubble
HI	WN 21	100'	1.03	8.64	Chip of minerlz'd rubble
J	WN 11	Grab	79.3	2.4	Selected grabs
K	WN 12	"	0.03	41.0	of mineralized
L	WN 13	"	0.03	18.9	material

WELCOME NORTH MINES LIMITED

ARCTIC RED PROJECT

AB No. I SHOWING

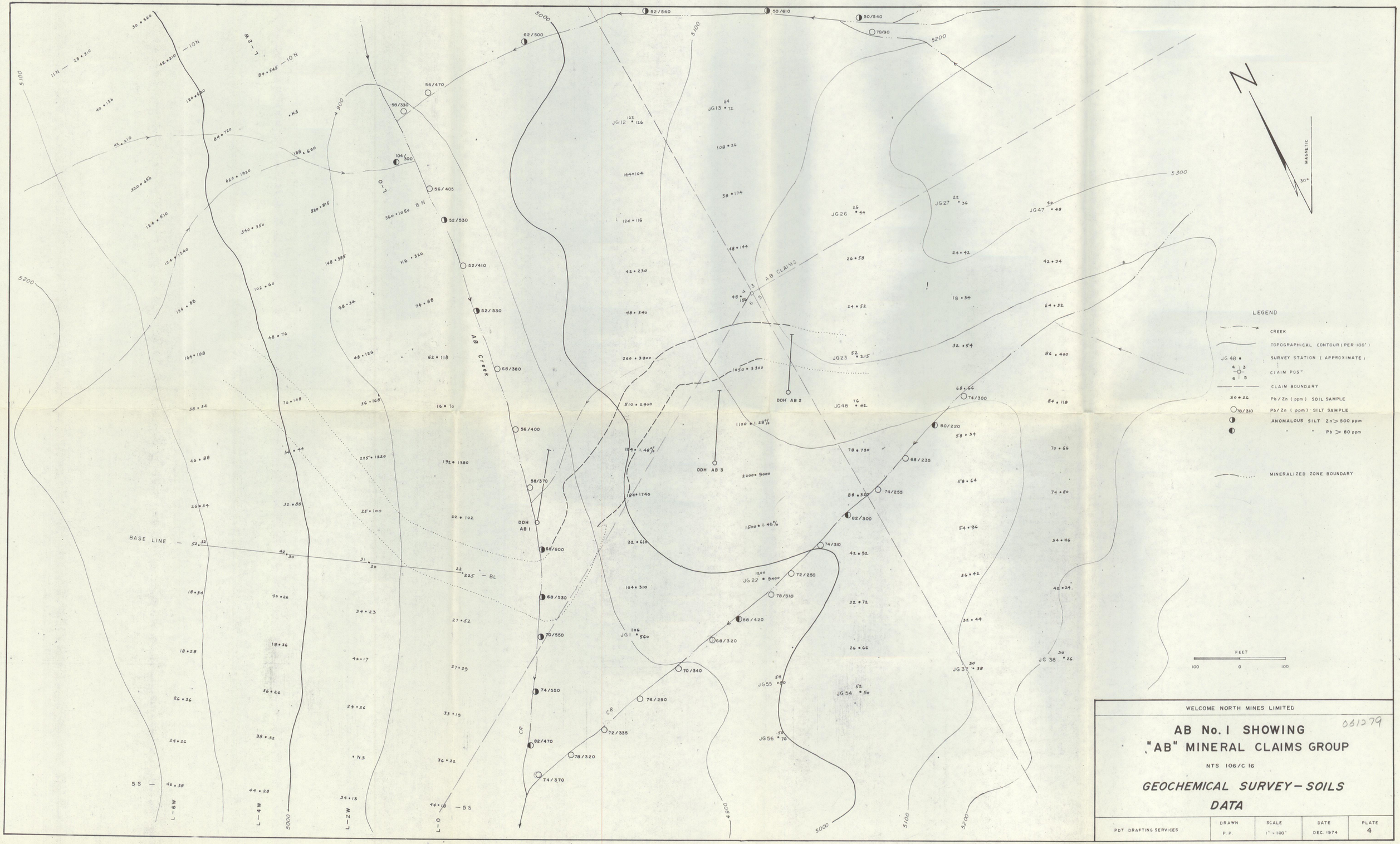
"AB" PROJECT AREA

NTS 106/C 16

GEOLOGY OF "AB" ZONE

061279

PDT DRAFTING SERVICES	DRAWN	SCALE	DATE	PLATE
	P P	1" = 100'	DEC. 1974	3



WELCOME NORTH MINES LIMITED

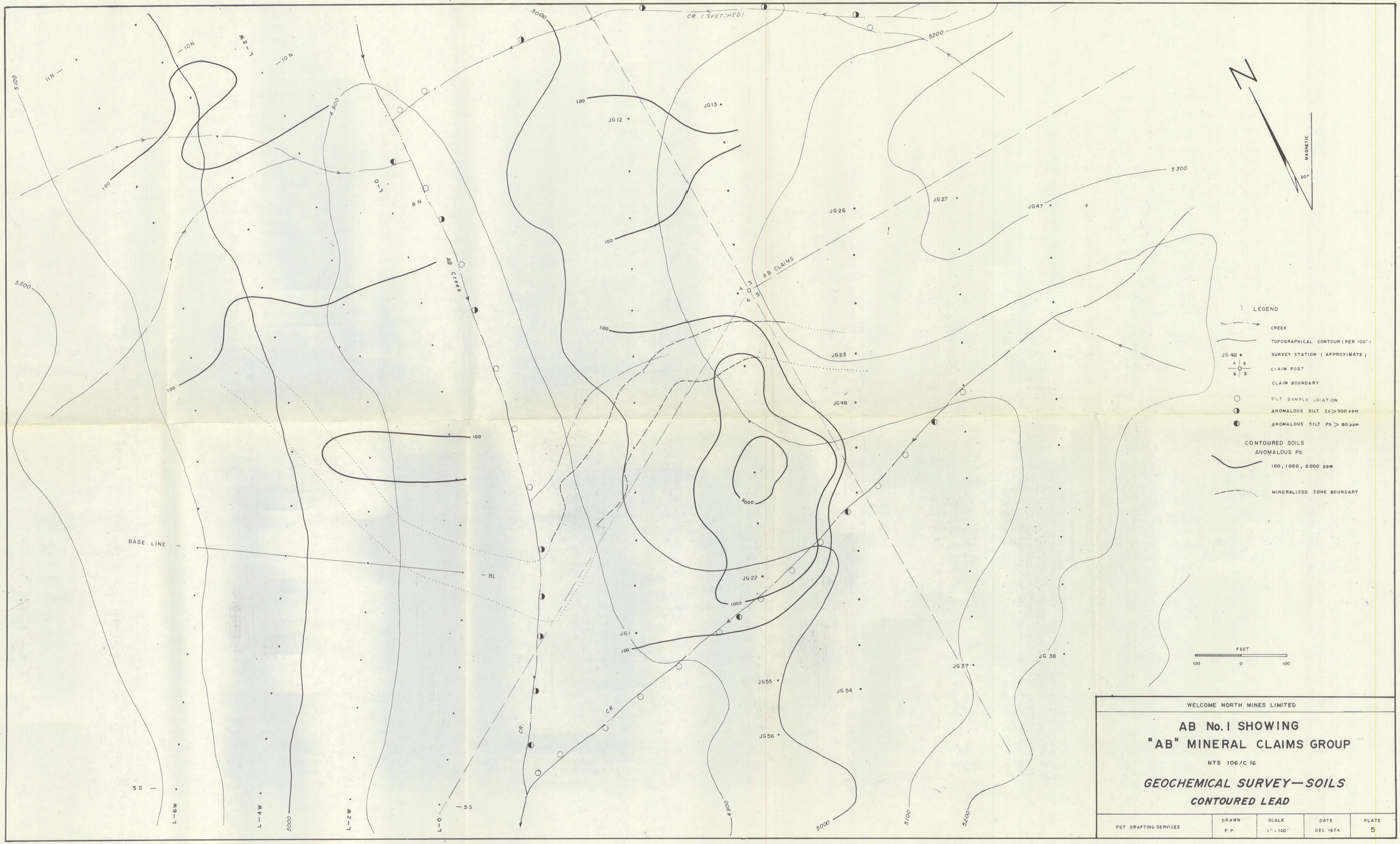
AB No. 1 SHOWING "AB" MINERAL CLAIMS GROUP

061279

NTS 106/C 16

GEOCHEMICAL SURVEY – SOILS DATA

PDT DRAFTING SERVICES	DRAWN	SCALE	DATE	PLATE
	P.P.	1" = 100'	DEC 1974	4



WELCOME NORTH MINES LIMITED

AB No. 1 SHOWING
"AB" MINERAL CLAIMS GROUP

NTS 106/C 16

GEOCHEMICAL SURVEY—SOILS

CONTOURED LEAD

PDT DRAFTING SERVICES	DRAWN P. P.	SCALE 1" = 100'	DATE DEC 1974	PLATE 5


CR. (SKETCHED)
AB CLAIMS
AB Creek
CR.
BASE LINE
BL
DDH AB 1
DDH AB 2
DDH AB 3
JG12
JG13
JG26
JG27
JG47
JG23
JG46
JG22
JG1
JG55
JG54
JG56
JG37
JG 38
L-6W
L-4W
L-2W
L-0
5S
10N
11N
8N
MAGNETIC
30°
LEGEND
CREEK
TOPOGRAPHICAL CONTOUR (PER 100')
SURVEY STATION (APPROXIMATE)
CLAIM POST
CLAIM BOUNDARY
SILT SAMPLE LOCATION
ANOMALOUS SILT Zn > 500 ppm
ANOMALOUS SILT Pb > 80 ppm
CONTOURED SOILS
ANOMALOUS Zn
200, 500, 1000, 2000, 10,000 ppm
MINERALIZED ZONE BOUNDARY
FEET
100 0 100

WELCOME NORTH MINES LIMITED

AB No. I SHOWING
"AB" MINERAL CLAIMS GROUP

NTS 106/C 16

GEOCHEMICAL SURVEY—SOILS
CONTOURED ZINC

061279

PDT DRAFTING SERVICES	DRAWN	SCALE	DATE	PLATE
	P. P.	1" = 100'	DEC. 1974	6