MOUNTAINEER MINES LTD. - PAN OCEAN OIL LTD.

JOINT VENTURE

GEOLOGICAL REPORT

ON THE

ARCTOS 1-16 MINERAL CLAIMS

N.T.S. 106-D-16

64°56'N 134°21'W

YUKON TERRITORY

November, 1977

M.A. Stammers - Geologist

C. K. Ikona - P.Eng.

040289

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner for the purpose of an exploration work in the amount of $1600.00

Resident Geologist or
Resident Mining Engineer

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

B. R. BAXTER
Supervising Mining Recorder

Commissioner of Yukon Territory

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1.0 INTRODUCTION

The ARCTOS 1-16 mineral claims were staked on September 15, 1976 by Harman Management Ltd. to cover copper, uranium, and cobalt showings discovered during a regional prospecting program carried out for Mountaineer Mines Ltd. A brief investigation of the property was conducted by Harman Management Ltd. subsequent to staking the ground.

Pan Ocean Oil Ltd. of Calgary acquired majority interest in the claims in the fall of 1976.

During the period July 18 to July 24, 1977, preliminary geologic mapping and detailed prospecting were carried out in the claims area by Pamicon Developments Ltd. under the field supervision of R. Darney.

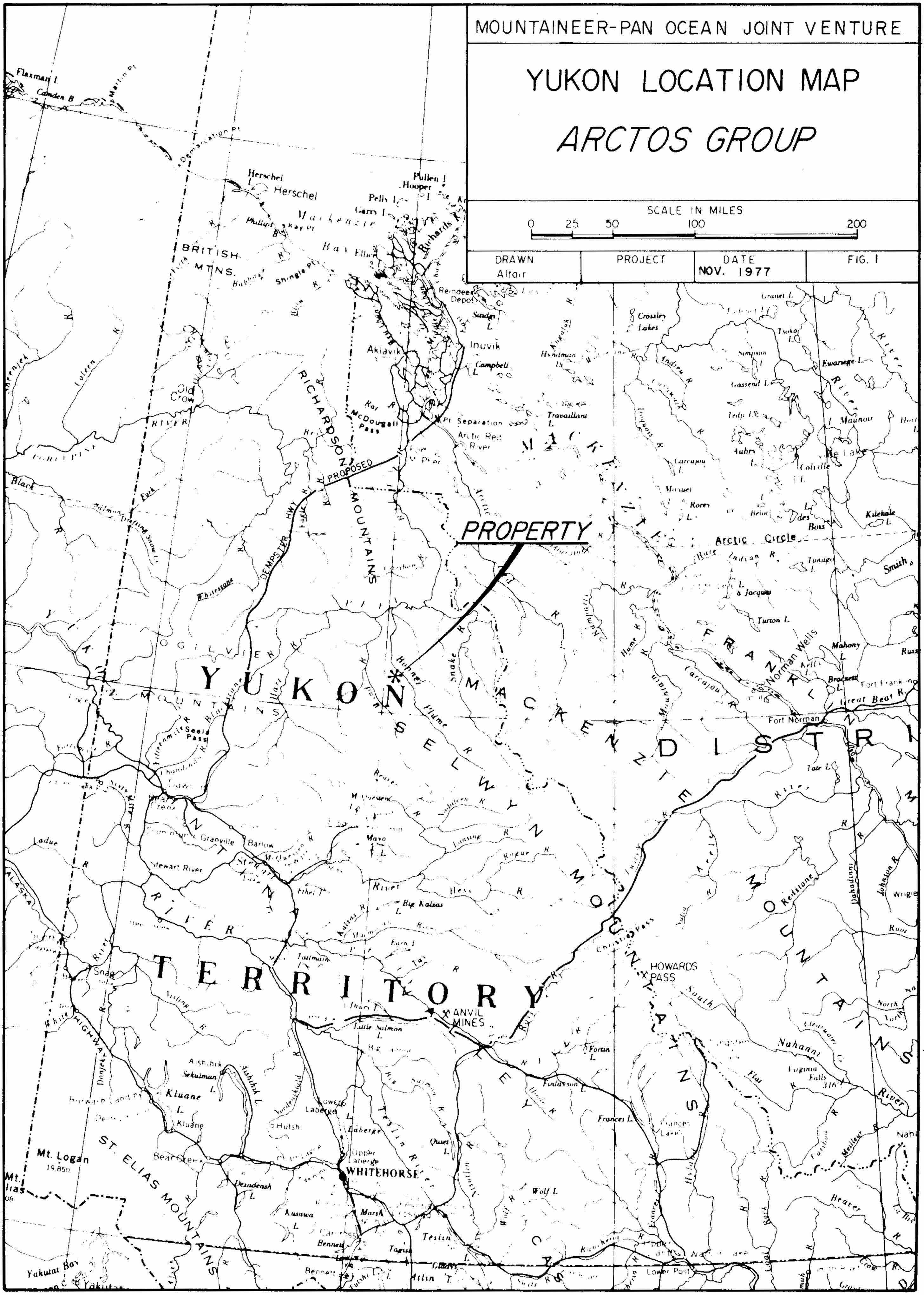
2.0 LIST OF CLAIMS

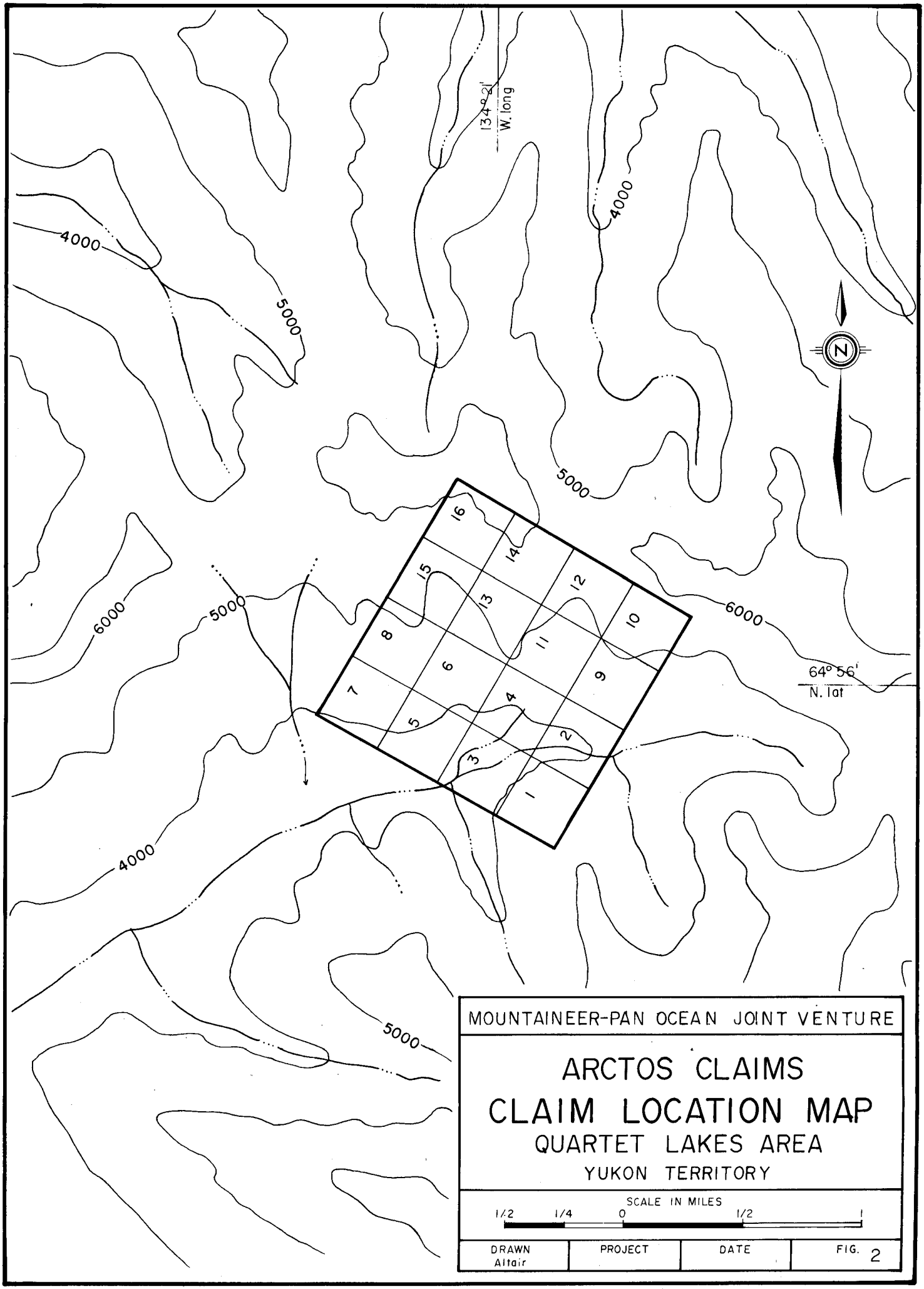
Claim Name	Staking Date	Recording Date	Grant No.
ARCTOS 1-16	September 15/76	September 24/76	YA7144-YA7159 incl.

Claim posts examined by the author appear to conform with the Yukon Quartz Mining Act regulations.

3.0 LOCATION AND ACCESS

The ARCTOS group is located 13 miles south of Quartet Lakes, 17 miles northwest of Gillespie Lake and 8 miles north-northwest of the Bear River airstrip in the northeastern Yukon Territory. The property is 100 miles northeast of Mayo. Approximate co-ordinates of the claim


MOUNTAINEER-PAN OCEAN JOINT VENTURE
YUKON LOCATION MAP
ARCTOS GROUP
SCALE IN MILES
0 25 50 100 200
DRAWN Altair
PROJECT
DATE NOV. 1977
FIG. 1
PROPERTY
YUKON TERRITORY
MACKENZIE DISTRICT
SELWYN MOUNTAINS
MACKENZIE MOUNTAINS
FRANKLIN MOUNTAINS
RICHARDSON MOUNTAINS
OGILVIE MOUNTAINS
BRITISH MTNS.
ST. ELIAS MOUNTAINS
PROPOSED
DEMPSTER HWY
Arctic Circle
Herschel
Aklavik
Inuvik
Old Crow
Norman Wells
Fort Norman
WHITEHORSE
ANVIL MINES
HOWARDS PASS
Mt. Logan
19,850
Mayo
Kluane
Teslin
Christie Pass



MOUNTAINEER-PAN OCEAN JOINT VENTURE

ARCTOS CLAIMS
CLAIM LOCATION MAP
QUARTET LAKES AREA
YUKON TERRITORY

SCALE IN MILES
1/2 1/4 0 1/2 1

DRAWN	PROJECT	DATE	FIG.
Altair			2

group are 64°56'N. latitude and 134°21'W. longitude.

Access to the property is recommended by float equipped, fixed winged aircraft to either Gillespie Lake or Quartet Lakes. Wheeled aircraft may use the serviceable Bear River airstrip. Helicopter transport from any of the three fixed winged landing locations is required to reach the property.

Both helicopter and fixed wing aircraft as well as full expediting services are available in Mayo.

4.0 TOPOGRAPHY AND VEGETATION

Elevations on the property range from 3,600 feet to 6,600 feet and topography is rugged over most parts of the area. Outcrops are found mainly along ridge lines and along eroded stream banks. The entire claim group lies above tree line so vegetation consists entirely of low grasses and moss.

5.0 REGIONAL GEOLOGY

The Quartet-Fairchild region lies in the Wernecke Mountains of the north eastern Yukon Territory. In the general area, the Werneckes consist of local ranges which include the Rackla Range, Bonnet Plume Range and Knorr Range. Topography is normally moderate to rugged with elevations ranging from 2,000 to 6,500 feet. The major river valleys are broad, timbered and extensively overburden covered, while most mountain slopes present greater than 60% outcrop above the 4,000 foot level.

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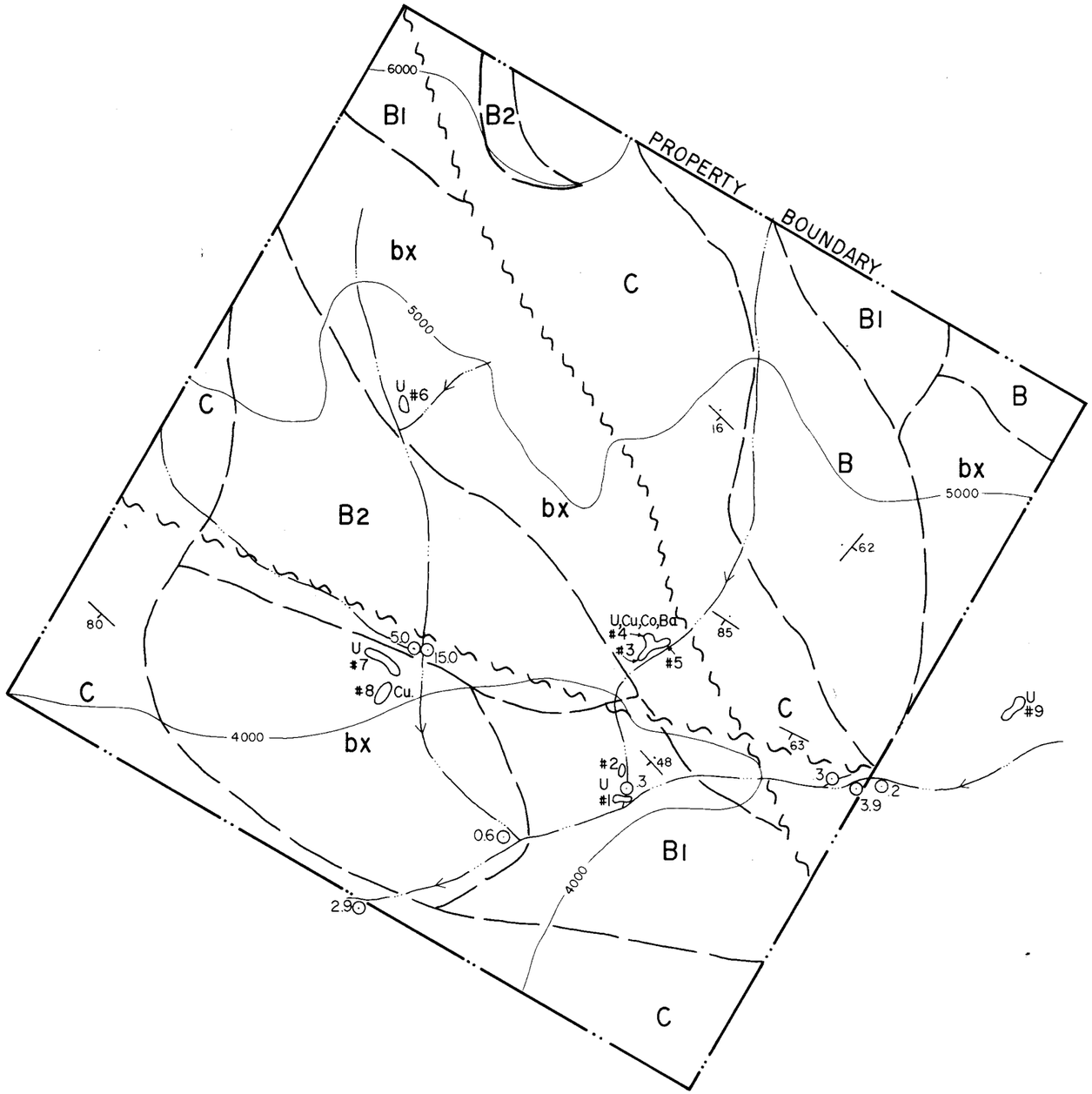

LITHOLOGY

bx	Breccia Group
C	Orange Weathering Dolomites
B2	Chloritic Metasiltstone
B1	Metasomatite
B	Shales, Siltstones, Sandstones.
Cu.	Copper Mineralization
Ba.	Barium "
Co.	Cobalt "
U	Uranium "
#9	Mineralization Location

LEGEND

- Bedding Attitude
- Geologic Contact
- Fault
- 3.9 Water Sample Location —Values in ppb Uranium in water.

MOUNTAINEER-PAN OCEAN JOINT VENTURE

ARCTOS 1-16 CLAIM GROUP

NTS 106-D-16

GEOLOGY & GEOCHEMISTRY

YUKON TERRITORY

FEET 0 500 1000 2000 3000

METRES 0 200 400 600 800

PAMICON DEVELOPMENTS LIMITED

DRAWN:	PROJECT:	DATE:	FIGURE:
Altair	Quartet-Fairchild	DEC. 1977	3

The entire area has been mapped by the Geological Survey of Canada and three separate publications are presented. The following memoir and open file reports give 1" = 4 miles geological coverage of the Nash Creek, Nadaleen River, Wind River and Snake River map areas.

(1) Geology of Nash Creek, Larsen Creek and Dawson Map-Area, Yukon Territory by L.H. Green 1972 (Memoir 364).

(2) Open File 205 (Geology of Nadaleen River and Bonnet Plume Lake Map sheets by S. Blusson) 1975.

(3) Open File 279 (Geology of Snake River and Wind River sheets by D.K. Norris) 1975.

In the Quartet-Fairchild-Gillespie Lakes region Helikian rocks are exposed over an area of some 1,500 sq. miles in a roughly circular fashion centered near Longitude 134°00W and Latitude 65°00'N.

These rocks have been described as Units 1 & 2 by L. Green on the Nash Creek Sheet.

Recent G.S.C. stratigraphic work by Bell and Delaney (1976) has redesignated Units 1a, 1 and 2 (Green 1972) as Units A, B, and C respectively. The unit designations as established by Bell and Delaney will be used in this report.

Unit A whose base is not exposed, is composed of a thick succession of moderately metamorphosed fine grained clastic sediments with interbedded carbonates. The overlying Unit B consists of thinly interbedded slates and argillites with occasional quartzite beds.

Unit C, which conformably overlies the uppermost slate-quartzite section of Unit B, consists mainly of thickly bedded orange weathering dolomites. The base of the unit is marked by a series of transitional beds of alternating buff weathering dolomites and interbedded slates and quartzites.

Erratically distributed throughout the Proterozoic metasediments are irregularly shaped breccia bodies. The breccia zones vary from tens of feet to several thousand feet in size and appear as cross cutting pipe-like features at all levels in the stratigraphic column. Several varieties exist, but all exhibit an assortment of angular clasts derived from rock types common to the area. Hornfels margins observed at several localities indicate an intrusive origin.

A common association with many of the breccia bodies are zones of veining or locally pervasive feldspar alteration seen as internal features within the breccias or in host rocks adjacent to them.

The alteration zones are pink in colour due to either K-spar or strong hematization and in some instances contain varying amounts of specularite, chalcopyrite and minor uranium mineralization.

5.1 Structure

Two major periods of deformation have taken place within the Wernecke Mountain region. During the first period or Racklan Orogeny, the Proterozoic rocks of Units A, B, and C underwent intense folding and faulting. Folds are tight to isoclinal with the development of strong axial plane

cleavage and commonly an almost vertical foliation.

A major unconformity of Lower Hadrynian age forms the upper contact of Unit C. In many localities, erosion beneath this unconformity has resulted in the complete removal of Unit C and the strong angular relationship between the relatively flat lying Cambrian and younger rocks directly overlying Units A and B is apparent.

Further unconformities near the Upper Hadrynian, Lower Cambrian and Upper Cambrian margins leave Devonian carbonates directly over the Helikian section.

The second period of deformation, which involves both Paleozoic and Proterozoic strata, is weak compared to the first. This is particularily evident in the younger Carbonate sections to the west and southwest where deformation consists mainly of broad open folding and minor overthrusting.

6.0 GEOLOGY

6.1 Introduction

The ARCTOS 1-16 mineral claims are underlain by Proterozoic sedimentary rocks belonging to map units B and C. The rocks have undergone intensive structural reshaping and Unit B rocks are abundantly metasomatized. A related intrusive/tectonic period of brecciation is evidenced in the region. Uranium, cobalt and copper mineralization appears to be related to structural and metasomatic events. Light grey

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weathering Devonian dolomites are found to the south and west of the property.

6.2 Lithology

Shaley, siliceous siltstones with minor sandstone interbeds of upper Unit B outcrop in the northern end of the property. A thick (approx. 100 feet) series of thinly bedded black shales are found in the uppermost part of the Unit B section. The majority of Unit B rocks on the claim group appear to be heavily altered or metasomatized to either a purple-red weathering "metasomatite" or a medium green weathering chloritic metasiltstone.

The purple-red weathering unit contains several recognizable rock lithologies ranging in colour from purple-red to purple-brown. Crude bedding is generally preserved. Minor brecciation or weakly developed brecciation may be present. Shaley beds and occasional brick red chert bands are found throughout the unit.

The medium green weathering metasiltstone is fine grained and contains mainly quartz and chlorite. The unit is massively bedded, showing only weak bedding features. The possibility of an igneous origin should not be ruled out. Petrographic and/or geochemical analysis is recommended for composition determination. No uranium or copper mineralization were identified within this unit. Occasional specular hematite is present.

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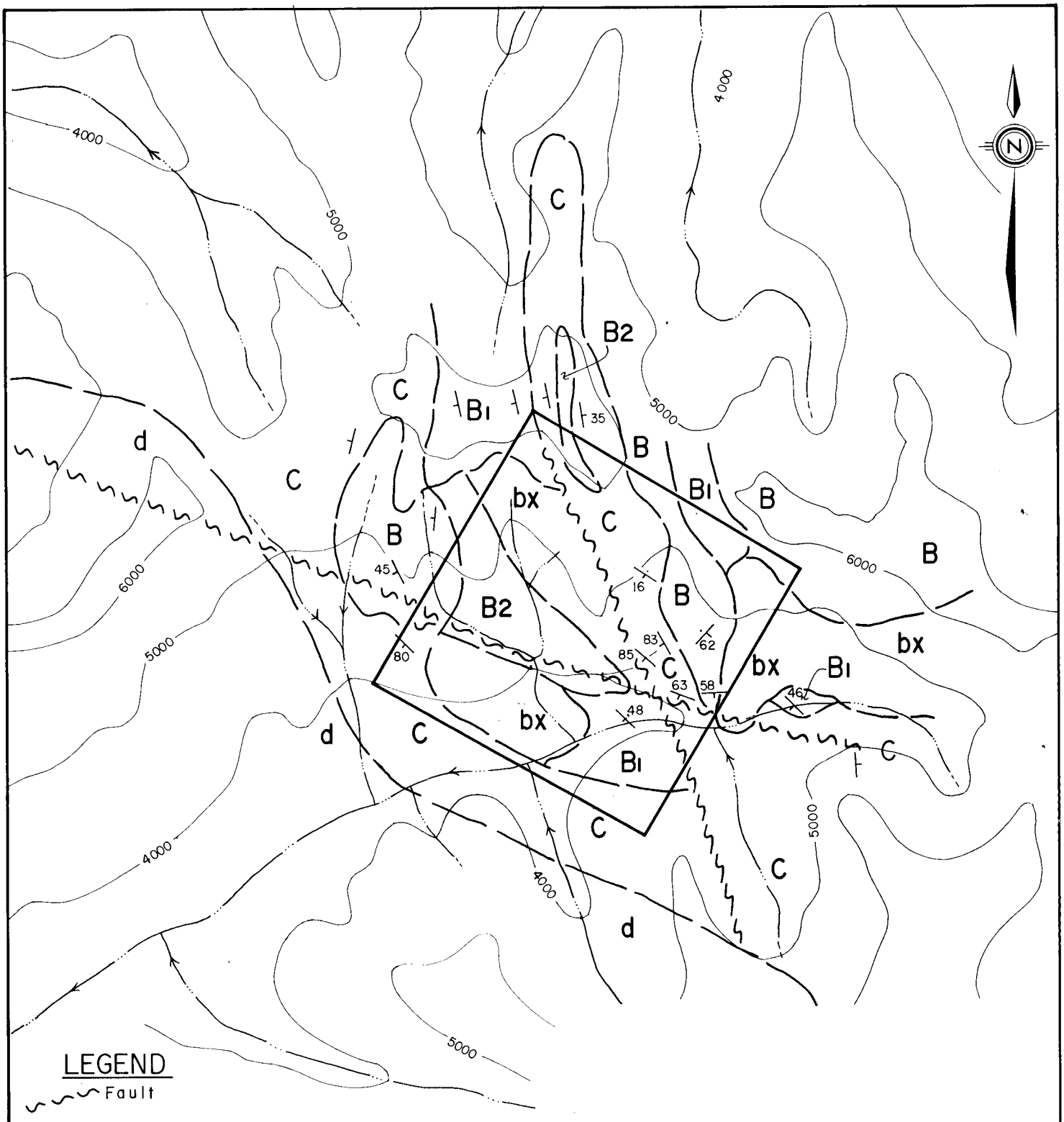

LEGEND

Fault

Geologic Contact

Bedding attitude

LITHOLOGY

bx	Breccia
d	Grey weathering Devonian Dolomites.
C	Orange weathering Dolomites
B2	Chloritic Metasiltstone
B1	Metasomatized UNIT B : "Metasomatite"
B	Shales, Siltstones, Sandstones

MOUNTAINEER-PAN OCEAN JOINT VENTURE

ARCTOS CLAIMS

NTS 106 E I

GEOLOGY

YUKON TERRITORY

MILES 0 1/4 1/2 1 1 1/2

0 0.5 1 1.5 2.0 2.5 KILOMETRES

PAMICON DEVELOPMENTS LIMITED

DRAWN:	PROJECT:	DATE:	FIGURE:
Altair	Quartet-Fairchild	DEC. 1977	3

A fairly thick sequence of interbedded shales and dolomites are found off the western claim boundary and are designated as the B/C transition map unit.

The orange-brown weathering Unit C dolomites are generally massively bedded with a medium grey, finely crystalline appearance on the fresh surface. The majority of Unit C occurs in two bands on the property; one to the south and one running diagonally to the south-east from the northwest corner of the property.

The common form of breccia occurring on the claim group weathers purple-brown and contains distinquishing blood-red clasts of altered silicified siltstones. The matrix is strongly chloritized, hematized and fine-grained. Observed mineralization in the breccia unit includes hematite, chalcopyrite, pyrite, and brannerite.

Light grey weathering, medium-grained, massively bedded dolomites of probable Devonian age are found to the south and west of the ARCTOS claim group.

6.3 Structure and Stratigraphy

Stratigraphically, the Unit B clastic sediments are the oldest rocks exposed on the property. Unit C dolomites overlie Unit B and a 200' thick zone of B/C transition zone lithology separates the two principal rock groups. Overall strike is along a northwest trend with bedding dipping to the southwest. Locally bedding attitudes may vary with structural disturbances.

Two major regional faults intersect on the property. The north-northwest trending fault appears to have uplifted Unit C dolomites into what was previously mapped as a synclinal fold belt, however structural examination of strata lying in this dolomite belt indicates an uplifted thrust wedge as opposed to a synclinal fold. A second major fault trending west-northwest intersects the aforementioned fault in ARCTOS mineral claim #2. The fault trace displaces all lithological boundaries. However, brecciation and metasomatism appear to intensify in the proximity of the faulting.

Stratigraphically, the metasomatic rocks lie within Unit B strata; also, they invariably occur adjacent to the breccia group. The actual lithological boundary between these three defined units is vague and highly transitional. When combined, the three units cover 70% of the property's ground.

6.4 Mineralization

Several vein and pod-type occurrences of uranium, copper, cobalt and barium mineralization were located and investigated. All occurrences were found in either the breccia group or the Unit B metasiltstones. Preliminary investigation indicates a crude lineation of mineralization along two observed fault linears. Nine mineralized zones have been located to date.

Uranium mineralization occurs in pods within the purple-brown breccia group and in the purple-red metasiltstones. Identification of localities was made with hand-held scintillometers and by visual recognition of the red albitized alteration zones.

Table 6.4.1 demonstrates the approximate size and strength of uranium occurrences. Table 6.4.2 lists assay results for selected sample locations.

Table 6.4.1

Showings: ARCTOS claims

Showing No.	Scintillometer Readings (cps BGS-ISL)	Size	Associated Minerals	Host Unit
1	500-1000	2 pods @ 1'x2'	Cu, Fe	B
2	500-1000	1 pod @ 1'x10'	Cu, Fe	B
3	3000-10,000	1 pod @ 3'x3'	Cu, Fe, Co, Ba	bx
4	3000-10,000	1 pod @ 2'x2'	Cu, Fe, Ba	bx
5	3000-10,000	1 pod @ 1'x1'	Cu, Fe	bx
6	1000-3000	4 pods @ 2'x3'	Cu, Fe	bx
7	1000-3000	several pods, ~ 1'x3'	Cu, Fe	bx
8	copper only	1'x12'	Fe	bx
9	1000-3000	several pods, ~1'x3'	Cu, Fe	bx

Copper occurs as disseminated and podiform chalcopyrite; disseminated bornite and secondary malachite. One large pod (showing #8) approximately 12'x1' of massive

chalcopyrite was reported by the prospector. Most of the copper showings are associated with the two main faults and occur within the breccia group or in the Unit B metasiltstone.

Cobalt occurs as finely disseminated silver grey cobaltite and secondary pink erythrite in a small vein in showing location number 3. Coarsely crystalline barite ($BaSO_4$) is present in bedding plane veins. Total barite found to date is minor.

Table 6.4.2

Assays (1976)

Sample No.	$\%U_3O_8$	% Cu	Description
50657	<0.001		Sample across 2'-3' wide chert band in chloritic metasiltstone 1700' NW of showing #3.
50658	0.002	0.14	Random rock chip sample across 10' of altered siltstones adjacent to chert bed in showing #3.
50659	0.007	0.82	Grab sample of float material from shear zone on SE side of creek in showing #3 area.
50688	0.005	3.85	Continuous rock chip sample across 5' of middle section of chert bed, taken approximately halfway up showing #3.
50689	0.011	0.31	Continuous rock chip sample across 10' of chert bed, sample taken at top of showing #3.
50691	0.237		Chip sample from lower 2' of chert bed, sample taken halfway up showing #3.

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Table 6.4.2. (cont'd)

1977

Sample No.	% U_3O_8	% Cu	Description
62551	0.094	0.52	Grab sample from outcrop, showing #4.
62552	1.20	0.26	Grab sample from outcrop, showing #4.
62553	0.957	0.87	Grab sample from outcrop, showing #4.
62554	0.080	0.79	Grab sample from outcrop showing #3. Also assayed 0.27% Co.
62555	0.034	0.51	Grab sample from outcrop showing #9.

7.0 GEOCHEMISTRY

During prospecting on the property eight water geochemistry samples were taken from active streams. Samples were collected in numbered, acid cleansed, plastic sample bottles. Samples were sent for analysis to Chemex Labs Ltd. in North Vancouver, B.C. and upon receipt were analysed for uranium using standard fluorometric procedures. (See Appendix II for complete descriptions of procedures.)

Results of the survey ranged from <0.2 to 15.0 parts per billion uranium. Four values of 15.0 ppb., 5.0 ppb., 3.9 ppb., and 2.9 were considered anomalously high in uranium content. The results are encouraging in that they confirm known zones of mineralization and indicate new zones in which uranium showings have not yet been encountered.

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8.0 DISCUSSION AND CONCLUSIONS

The ARCTOS mineral claims lie in a belt of structurally prepared and chemically altered Proterozoic sediments. Uranium mineralization occurs throughout the property in small podiform showings in breccia bodies and breccia related alteration zones. Due to the extent of overburden cover on most parts of the property, the showings seen to date have been limited in size. It is felt, however, that the degree of structural and chemical alteration combined with the encouraging assays and promising tenor of some of the showings seen indicates a need for further work on the property.

Investigation of those areas of interest in which overburden cover is extensive would be facilitated by a soil sampling program using either a grid or a contour system of sample locations. The samples should be analysed for both copper and uranium.

A follow-up stream sampling program is indicated as several of the anomalous samples were taken from drainages in which there are no known showings.

9.0 RECOMMENDATIONS

1. A close spaced silt and water sampling program should be undertaken on all drainages in the property area.
2. A detailed soil sample survey should be undertaken in the overburden covered areas of interest. Location

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and spacing of the grid should be decided in the field.

3. Detailed mapping of the showing areas should be carried out on a scale of 1 inch = 200 feet. Assay samples should be taken on all showings.

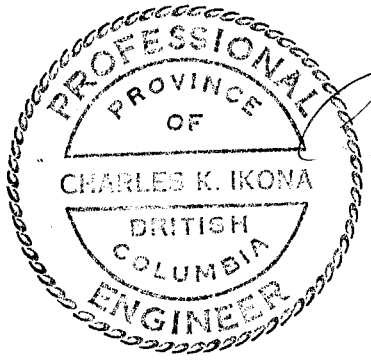
4. Hand trenching should be carried out on selected showings as an aid to assay sampling and to test for size and continuity of showings in the overburden covered areas. Location and size of the trenches should be decided in the field.

Respectfully submitted,

M. A. Stammers, Geologist

M S.

C. K. Ikona, P.Eng.



URANIUM

Analytical methods for uranium presently in use at Chemex have been modified from procedures developed by the USGS and GSC. For uranium at PPB and PPM level, fluorometric methods of analyses are highly acceptable in terms of accuracy, cost and turn around time.

The following methods are used extensively to determine uranium potential in a variety of material.

(a) Water Samples - By Fluorescence Analysis

Clean 100 or 200 ml plastic bottles are provided for field use. If a portion of the water is to be stored we require a 200 ml sample.

A 75 ml aliquot is transferred to a clean 100 ml pyrex beaker. 3 ml of concentrated HNO_3 is added and the solution is evaporated to dryness at low uniform temperature. The dry residue after ashing is dissolved in 3 ml of warm 4M HNO_3. An aliquot of the dissolved residue is transferred to a small platinum dish, dried, and fused with an 0.50g tablet of carbonate-fluoride flux at 650° C. The fused disc is removed from the platinum dish and uranium fluorescence is determined using a G. K.Turner III Fluorometer or Jarrell-Ash 26-000 Fluorometer. Detection limit is 0.20 PPB U. Analytical capability approx. 200 samples per day including check samples and quality control standards.

(b). Soil, Silt, Lake Bottom Sediments & Rocks - By Fluorescence Analysis

These materials normally arrive unprepared. Preparation requires drying @ 60° C and screening to obtain the -80 mesh fraction. Coarse material is retained if the screened fraction is small. A 0.25 gm sample of -80 mesh material is weighed into a 100 ml pyrex beaker. The sample is ashed at 550° C to remove organics. The ashed residue is digested in 5 mls 4M HNO_3 and taken to dryness twice. The residue is leached in 50 mls 1% HNO_3. The solution is swirled and allowed to settle. A few microlitres of

. . . .

the clear solution is transferred by micropipette to a platinum dish. The sample is evaporated to dryness and an 0.50 gm tablet of carbonate - fluoride flux is added to the sample dish. Fusion and fluorometric determination of uranium is as described for water samples. Detection limit is 0.50 PPM U. Analytical volume approx. 400 samples per day including duplicates and quality control standards. Upper limit of analytical method - 400 PPM U.

(c). Assay Materials (% U_3O_8) By Colorimetric Methods

1 gram of homogenized sample pulp is weighed into a Teflon dish and digested with 10 mls 52% HF, 5 mls 70% $HClO_4$ and 5 mls conc. HNO_3 to dryness. The residue is dissolved in 25 mls 9M HCl. The uranium is separated from interfering elements by anion exchange procedures. The adsorbed uranium is eluted form the resin and a suitable portion of the uranium bearing solution is reduced, filtered and then complexed using Arsenazo III reagent. Absorbance is measured using "Spectronic 700" Spectrophotometer. The U_3O_8 concentration is evaluated by correlation with a standard reference curve. Analytical volume - 40 samples/day. Concentration range 0.001% U_3O_8 to 10.0% U_3O_8.

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 985-0648
AREA CODE: 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 31806

TO: Harman Management
907 - 675 W. Hastings,
Vancouver, B. C.

INVOICE NO. 18452

RECEIVED Sept. 23/76

ATTN:

ANALYSED Oct. 1/76

SAMPLE NO. :	% Copper	% U_3O_8
50656		0.001
50657		<0.001
50658	0.14	0.002
50659	0.82	0.007
50660	0.10	0.006
50661		<0.001
50678	2.14	
50679	0.25	
50680		0.021
50681	0.90	
50682	10.4	
50683	4.50	
50684	0.65	
50685	1.48	
50686	1.80	
50687	1.22	
50688	3.85	0.005
50689	0.31	0.011
50690		0.047

CTA MEMBER CANADIAN TESTING ASSOCIATION

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 985-0648
AREA CODE: 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 32846

INVOICE NO. 21550

RECEIVED August 15/77

ANALYSED August 25/77

TO: Pamicon Developments Ltd.
610 - 850 W. Hastings St.
Vancouver, B.C.

ATTN: CC: Mr. Yeager

SAMPLE NO. :	% Copper	% Cobalt	% U_3O_8
62551	0.52		0.094
62552	0.26		1.20
62553	0.87		0.957
62554	0.79	0.27	0.080
62555	0.51		0.034

SECTS

CTA MEMBER CANADIAN TESTING ASSOCIATION

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA