MOUNTAINEER MINES LTD. - PAN OCEAN OIL LTD.

JOINT VENTURE

GEOLOGICAL REPORT

ON THE

URSUS 1-24 MINERAL CLAIMS

N.T.S. 106-D-16

64°55'N 134°15'W

YUKON TERRITORY

by

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C. K. Ikona - P.Eng.

090291

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

$ 2400.00

Resident Geologist or
Resident Mining Engineer

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

B.R. BAXTER
Supervising Mining Recorder

for Commissioner of Yukon Territory

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APPENDICES

1.0 INTRODUCTION

The URSUS 1-24 mineral claims were staked on August 26, 1976 by Harman Management Ltd. to cover uranium and copper showings discovered by prospectors Doug Fulcher and Ward Harrison 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 August 19 to August 25, 1977, a preliminary prospecting, geologic, and geophysical investigation was carried out on the property. The work program was done by Pamicon Developments Ltd. under the field supervision of R. Darney.

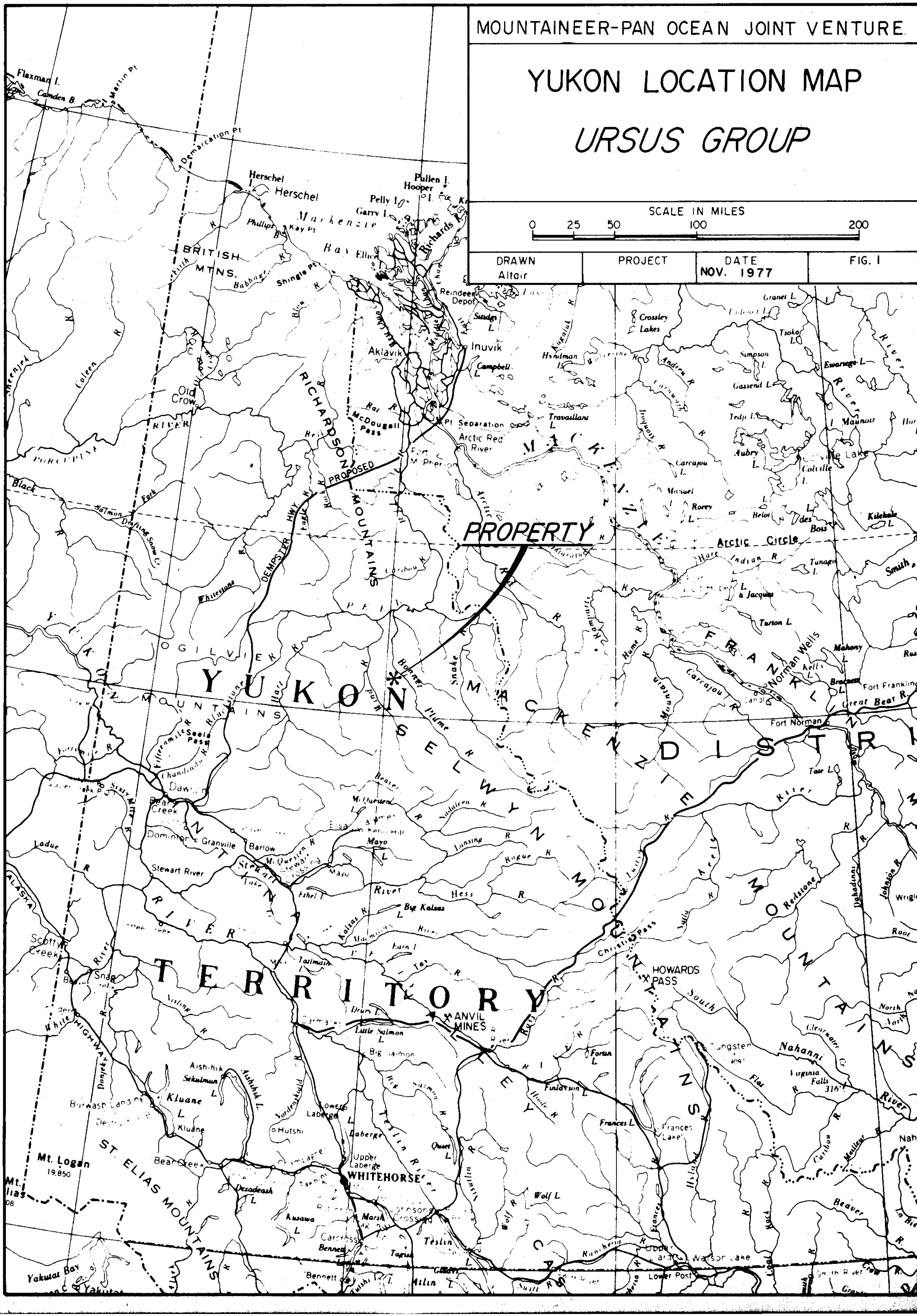
2.0 LIST OF CLAIMS

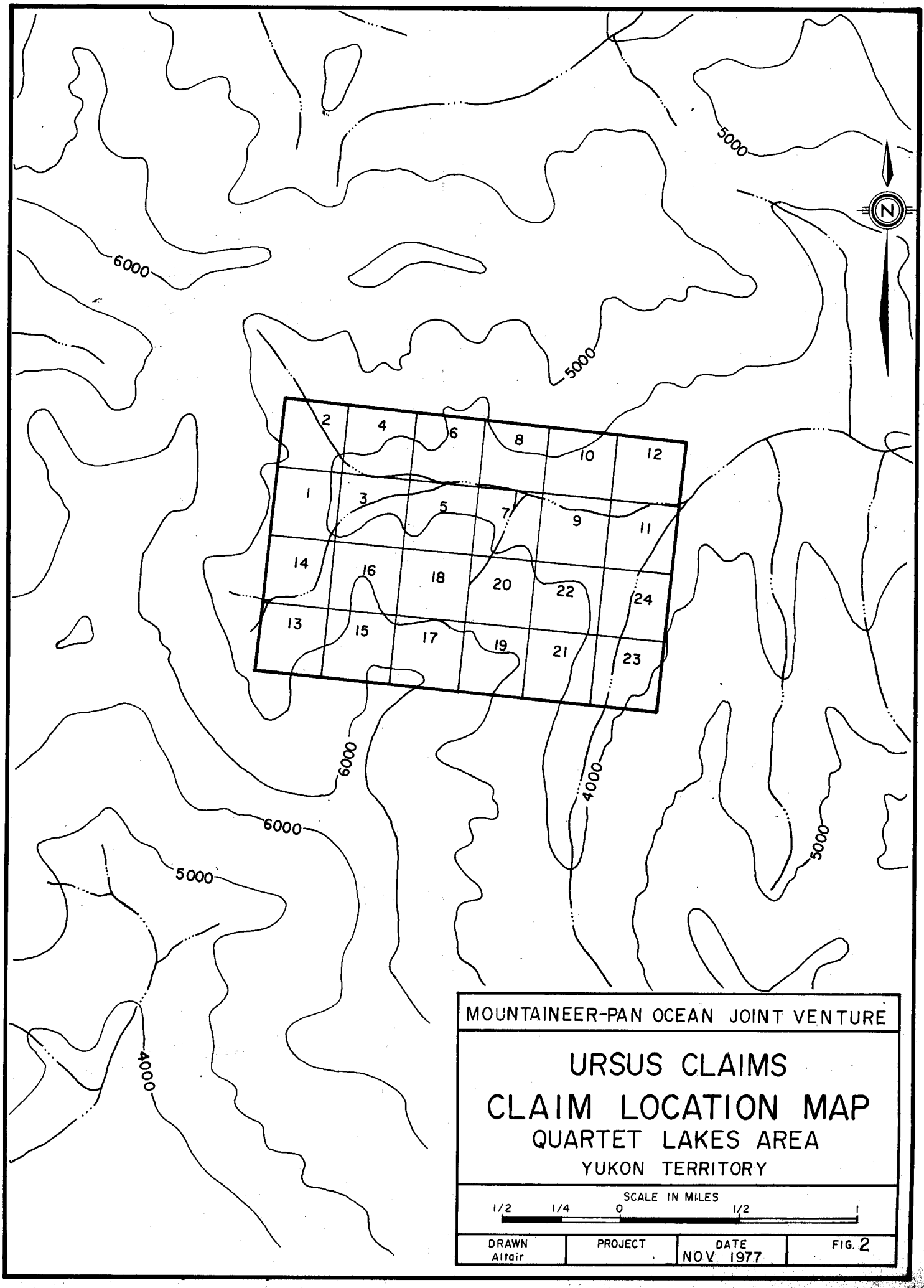
CLAIM NAME	STAKING DATE	RECORDING DATE	GRANT NO.
URSUS 1-24	August 26/76	September 16/76	YA6875-6890 incl. YA6997-7004 incl.

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

3.0 LOCATION AND ACCESS

The URSUS claims are located on N.T.S. sheet 106-D-16 approximately 100 miles north-northeast of Mayo, Y.T. The property lies 15 miles south-southeast of Quartet Lakes, 14 miles northwest of Gillespie Lake and 6 miles north of


MOUNTAINEER-PAN OCEAN JOINT VENTURE.
YUKON LOCATION MAP
URSUS GROUP
SCALE IN MILES
0 25 50 100 200
DRAWN Altair
PROJECT
DATE NOV. 1977
FIG. I
PROPERTY
YUKON TERRITORY
MACKENZIE DISTRICT
BRITISH MTNS.
RICHARDSON MOUNTAINS
OGILVIE MOUNTAINS
SELWYN MOUNTAINS
MACKENZIE MOUNTAINS
FRANKLIN
ST. ELIAS MOUNTAINS
Arctic Circle
Herschel
Inuvik
Aklavik
Old Crow
Reindeer Depot
Pt Separation
Arctic Red River
Fort McPherson
DEMPSTER HWY
PROPOSED
Dawson
Bear Creek
Dominion
Granville
Barlow
Mayo
Elsa
Keno Hill
Stewart River
Carmacks
ANVIL MINES
HOWARDS PASS
Norman Wells
Fort Norman
Fort Franklin
Whitehorse
Mt. Logan 19,850
Kluane
Burwash Landing
Upper Laberge
Carcross
Bennett
Teslin
Frances Lake
Watson Lake
Lower Post
Yakutat Bay



MOUNTAINEER-PAN OCEAN JOINT VENTURE

URSUS 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		NOV 1977	2

the Bear River airstrip at approximately 64°55'N. latitude and 134°15'W. longitude.

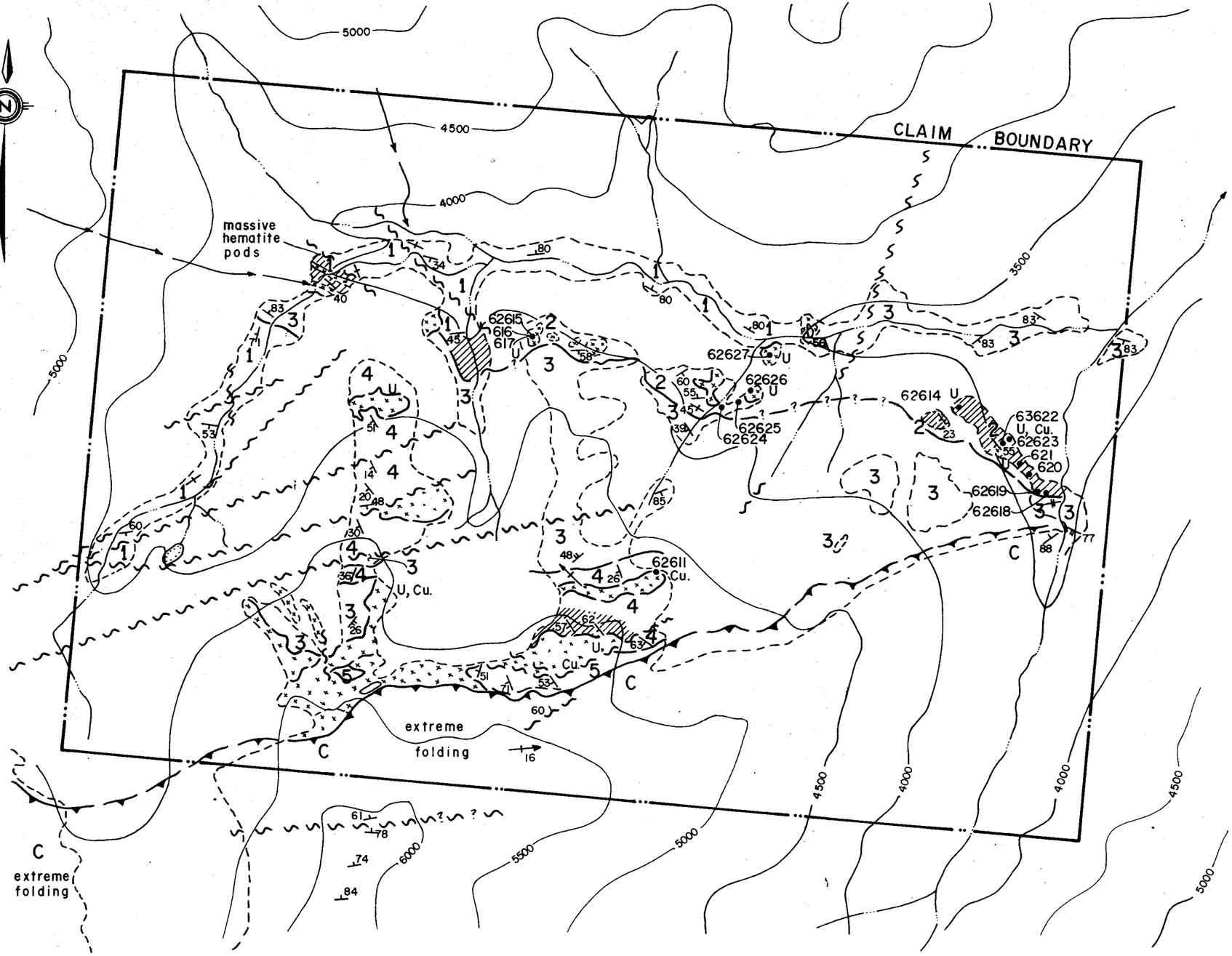
Access to the property is by float equipped, fixed wing aircraft from Mayo to either Gillespie Lake or Quartet Lakes. Wheeled aircraft may use the serviceable Bear River airstrip. Helicopter transport from any of the three fixed wing landing locations is required to reach the property. Both helicopter 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 3,400 feet to 6,200 feet A.S.L. and topography is rugged over most parts of the area. Bedrock exposure on the claim group is approximately 50% due to talus and overburden cover at the lower elevations. Outcrop is found mainly along ridge lines and eroded stream banks. The entire claim group lies above tree line so vegetation consists of low grasses and moss. There are some willow thickets in the larger stream beds.

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



LEGEND

UNIT C — Orange weathering dolomites.

UNIT A
- 5 — Dolomitic siltstone
- 4 — Interbedded lightgreen & purple siltstone
- 3 — Grey-green phyllite.
- 2 — Darkgreen siltstone, mudstone & argyllite
- 1 — Greygreen siltstone.

Intrusive breccia.

Zone of silification.

$^{20}/_{45}$ / $^{t}/_{45}$ — Bedding attitude : inclined, vertical, overturned

$^{6}/_{y}$ — Attitude of phyllitic cleavages

$\times_{5}$ — Plunge of minor fold axes

Fault, showing dip

Thrust fault, teeth on upper plate.

Geologic contact.

Outcrop limit.

62611 — Assay Sample Location.

Cu. — Copper showing.

U. — Uranium showing.

MOUNTAINEER-PAN OCEAN JOINT VENTURE

URSUS 1-24 CLAIM GROUP

NTS 106-D-16

GEOLOGY

YUKON TERRITORY

0 500 1000 FEET 2000 3000

0 200 400 METRES 600 800

PAMICON DEVELOPMENTS LIMITED

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

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.

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 moderatley 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 bodes. 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 bodes 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 PROPERTY GEOLOGY

6.1 Introduction

Preliminary mapping of the URSUS claims was carried out at a scale of 1 inch to 1,000 feet (see Fig. 3 this report . Assay samples were taken from any zones of mineralization encountered and locations and results are presented in Fig. 3 and Table 6.4.1 respectively. The property is underlain entirely by Units A and C. Faulting is very common

in the area and breccia intrusion with resultant folding, shearing and metasomatism was noted in many localities. Uranium and copper mineralization were found mainly in the breccias and their related alteration zones.

6.2 Lithology

The lowest rocks exposed on the claim group, Unit 1, are composed of thin to medium bedded, variably limonitic, grey-green siltstone. This unit is only exposed in the main creek cut that runs through the western portion of the property then bends and runs across the northern part of the claims. The unit in places has phyllitic partings and exhibits gradational contacts with the phyllites in the area.

Unit 2 is made up of a number of smaller sub-units of dark green siltstones, mudstones, argillites and related transitional rock types. Bedding thicknesses range from laminar banding to several inches. Several mineralized breccia bodies occur within Unit 2.

Unit 3 is composed of grey-green phyllites. Original bedding features are sometimes preserved in the phyllites as compositional layering, however generally only phyllitic cleavages could be measured. The phyllites exhibited kink banding and cleavage plane crenulations; minerals mainly noted were chlorite and sericite.

Unit 4 consists of thinly interbedded light green and purple siltstones. The unit mainly occurs at higher elevations on the property, close to the contact with the overlying Unit C.

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Clasts of Unit 4 rocks appear in a number of the breccia bodies at higher elevations.

Unit 5 is a dark brown to grey weathering, medium to thick bedded dolomitic siltstone. The unit was only observed near the contact with the Unit C orange weathering dolomites and was the major rock type in most of the breccias mapped in that area. Many large blocks (up to 300 feet) of the dolomitic siltstone were seen as breccia fragments. The unit is variably metasomatized, resulting in obliteration of bedding features, migration and flooding of dolomite, and occasionally dissemination of dolomite in tiny rhombohedral porphyroblasts throughout the rock.

The overlying Unit C dolomites are grey to orange weathering, thin to thick bedded, and contained occasional sections with shale interbeds.

A large number of intrusive breccia bodies outcrop within the claims boundary. They were noted to intrude all the lithologic types found on the property with the exception of the Unit C dolomites. They are made up of clasts derived from stratigraphically nearby rock types and in many cases resulted from nothing more than a shattering and re-orientation of material virtually in situ. It appeared the the breccia bodies having a greater variety of size and composition of clasts (hence greater transport distances?) were accompanied by more obvious indications of hydrothermal activity. These indications included chloritic and/or siliceous alteration haloes in the country

rock around the bodies as well as feldspathization, hematization, silicification, and dolomitization within and immediately adjacent to the bodies themselves. Copper and uranium mineralization were noted in several of the breccia bodies or in altered rocks contacted by the breccias.

6.3 Structure and Stratigraphy

As is commonly the case in areas of intense breccia emplacement, extreme structural deformation has occurred in the rocks within the URSUS claims. The folding is very complex. In many cases the folds can be seen to be the result of warping and dragging along fault surfaces, however they more commonly appear to be a chaotic style of deformation related to the breccia intrusions. This folding has resulted in extreme fracturing in many locations on the property with resultant quartz, feldspar, and dolomite veining and flooding. Minor fold axes in the Unit C dolomites on the other hand tend to parallel the strikes of beds within the unit and are therefore thought to be drag folds related to the underlying thrust fault.

The thrust fault bringing the Unit C dolomites in contact with the Unit A siltstones is the most predominant fault feature in the area and extends for many tens of miles in either direction from the property. The prevailing fault direction in the Unit A rocks is 070° to 080°, roughly parallel to the large regional fault. A large number of faults and shears with other orientations were noted during the mapping, the most important of which are plotted in Figure 3.

The portion of Unit A found on the claims is thought to be stratigraphically high in the section as the dolomitic siltstones of unit 5 resemble those which lie just beneath Unit B.

6.4 Mineralization

A number of copper and uranium showings are located along a band of Unit 2 siltstones trending in an east-west direction through the central part of the property. The showings are associated with breccia bodies or their alteration haloes and mostly occur near the contact with the overlying Unit 3 phyllites. Assay results are presented in Table 6.4.1.

The East Showing is exposed on a talus covered knob near the middle of the eastern boundary of the property. Chalcopyrite and brannerite occur sporadically in a bleached metasiltstone bed within Unit 2. The bed has been significantly altered by silicification, feldspathization, and hematization to a white to pink weathering slicified siltstone resembling a quartzite in outcrop. The brannerite occurs along small shear zones and in associated fractures, as well as disseminated through the more heavily feldspathized parts of the siltstone bed. Disseminated chalcopyrite also occurs in the feldspathized uranium rich pods. Shattering has taken place along some of the shear zones in the area resulting in occasional breccia lenses in the siltstone. Chalcopyrite fills spaces in the breccia matrices up to several millimeters in size between breccia fragments

ranging from 2 m.m. to 15 m.m. in size. The mineralized pods were generally less than 5 feet by 5 feet in size and were spaced from 75 feet to 200 feet apart.

The Central Showing is located in the deeply incised cut of a northerly flowing stream crossing the central part of the property. This is approximately 2,400 feet west-northwest of the East Showing. Chalcopyrite was seen associated with quartz/feldspar flooding in an interlaminated siltstone/silty dolomite bed within Unit 2. The flooding has occurred along fractures and bedding planes and locally contains good grade copper mineralization. Immediately overlying the copper mineralized siltstone/silty dolomite bed, uranium mineralization occurs as find grained brannerite particles in fracture controlled hematite stringers as well as discrete grains of brannerite up to 1 m.m. in size in and around a breccia body intruding a silicified siltstone. The mineralization is associated with quartz veining and feldspar flooding. Discrete grains of chalcopyrite up to 2 m.m. in size also occur in the feldspathized rocks. Pods of reddish brown barite up to 1 foot in size were noted in several localities in the breccia. The mineralized pods appeared to be in the order of 5 feet by 5 feet in size and were spaced approximately 150 feet apart.

Two other showings were sampled during the mapping: In the first, brannerite was found in a feldspathized zone at the edge of a breccia body approximately 2,000 feet west-northwest of the Central Showing. Three uraniferous pods, each

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several square feet in size, were noted within a 20 foot by 20 foot alteration zone. In the second showing, chalcopyrite occurs in fractures in a breccia body as well as in the adjacent silicified siltstone. The mineralized zone was approximately 50 feet by 10 feet in size.

A number of other breccia related uranium and copper occurrences were noted during the mapping but were too limited in size and grade to warrant sampling.

Table 6.4.1. - Assays

Sample No.	% U_3O_8	Description
62611	-	Assays 1.07% Cu. Selected grab sample from talus of better grade material. Source in grey-brown weathering siltstone breccia and in silicified siltstone.
62614	0.011	Continuous chip sample across 3 feet of bedding in outcrop of white, silicified siltstone. Rock heavily fractured, exhibits hematized alteration haloes. Sample from East Showing.
62615	0.036	Random grab sample from sub-outcrop across 2 foot mineralized pod in silicified siltstone breccia. Located approx.2,000 feet WNW of Central Showing.
62616	0.003	Continuous chip sample from outcrop along 3 feet of 2 inch to 6 inch thick silicified, hematized zone in metasomatized, breccia flooded siltstone. Approx. 2,000 feet WNW of Central showing.
62617	0.002	Continuous chip sample from outcrop across 4 foot wide hematized pod in siltstone breccia. Approx.2,000 feet WNW of Central Showing.

Table 6.4.1 Continued..

Sample No.	% U_3O_8	Description
62618	0.008	Continuous chip sample across 4.5 feet of outcrop of silicified, hematized siltstone. Entire hematized area is approx. 8 feet in size. From East Showing.
62619	0.024	Continuous chip sample from outcrop across 1 foot by 1 foot pod of limonitic silicified siltstone. Abundant chlorite, specular hematite in surrounding rocks. Approx. 40 feet from 62618. From East Showing.
62620	0.016	Random grab sample from 10 foot by 10 foot talus train of abundantly hematized silicified siltstone. Approx. 200 feet NW of 62619. From East Showing.
62621	0.046	Selected grab sample of better grade material from sporadically mineralized talus train approx. 5 feet by 150 feet in size. Specular hematite and brannerite noted in silicified siltstone. Approx. 100 feet NW of 62620. From East Showing.
62622	0.020	Grab sample from talus from 10 foot by 100 foot area of pink, silicified siltstone. Mineralization associated with approx. 6 inch wide. From East Showing.
62623	0.042	Selected grab sample of better grade material from lower end of same talus train as 62622. From East Showing.
62624	0.007	Grab sample from talus train of tan to pink, hematized, silicified siltstone at west end of Central Showing. Brannerite with specular hematite on fractures.

Table 6.4.1 Continued..

Sample No.	% U_3O_8	Description
62625	0.030	Grab sample from 40 foot long talus train at approx. mid-point of Central Showing. Siltstone has been progressively metasomatized, brecciated and specular hematite flooded.
62626	0.016	Grab sample from talus train of breccia boulders containing 6 inch wide dykelet of syenitic material. Rocks abundantly hematized. This from east end of Central Showing.
62627	0.212	Grab sample from mineralized pods in talus train of breccia boulders at extreme NE end of Central Showing. Visible brannerite in hematized pods.

7.0 DISCUSSION AND CONCLUSIONS

The mineralized zones of both the East and Central Showings were largely obscured by talus and were therefore difficult to accurately assess. However, where it was not possible to isolate outcrop sources for mineralized float trains, an attempt was made to obtain representative or at least indicative samples of the talus material. From careful investigations of the showings both in outcrop and in talus it appears that the mineralization occurs in isolated feldspathized pods within the breccias and/or altered siltstone rather than disseminated throughout them. As all but one of the samples from these pods assayed below 0.05% U_3O_8, it would at first appear that the showings on the URSUS claims lack sufficient continuity to be of economic interest. It is felt, however, that the degree of structural deformation,

chemical alteration and breccia intrusion noted during the mapping of the property has created a suitable geologic environment for uranium deposition. The property should be retained until a better understanding of the stratigraphy and controls for uranium deposition in the Quartet/Fairchild area is reached.

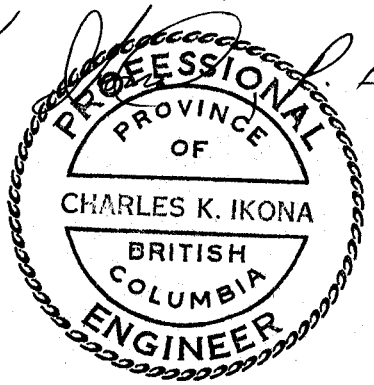
8.0 RECOMMENDATIONS

It is recommended that the URSUS 1-24 claims be retained on assessment credits and that a geochemical program consisting of close spaced silt and water sampling be undertaken.

Respectfully submitted,

David A Yeagn

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

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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.

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CHEMEX LABS LTD.

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CERTIFICATE OF ASSAY

CERTIFICATE NO. 32970

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

INVOICE NO. 21884

RECEIVED September 6, 1977

ANALYSED September 16, 1977

ATTN: c.c. Mr. Darney - Mayo

SAMPLE NO. :	% Copper	% U_3O_8	oz/ton Gold
62556	0.96	0.595	
62581		0.007	
62582		1.08	
62583		0.147	
62584		0.079	
62585		0.092	
62611	1.07	-	
62612	0.07	0.242	<0.003
62613	0.95	0.650	<0.003
62614		0.011	
62615		0.036	
62616		0.003	
62617		0.002	
62618		0.008	
62619		0.024	
62620		0.016	
62621		0.046	
62622		0.020	
62623		0.042	
62624		0.007	
64626		0.016	
64627		0.212	

CTA MEMBER CANADIAN TESTING ASSOCIATION

Ken Arnacini
REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA