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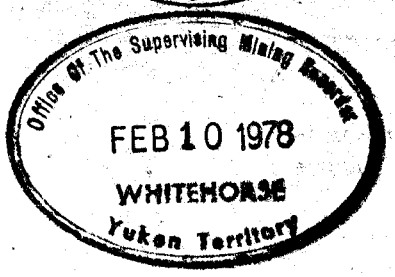


MOUNTAINEER MINES LTD. - PAN OCEAN OIL LTD.

JOINT VENTURE

PRELIMINARY GEOLOGICAL REPORT

ON THE

BREAK 1-32 MINERAL CLAIMS

N.T.S. 106-E-1 & 106-D-16

65°00'N 134°19'W

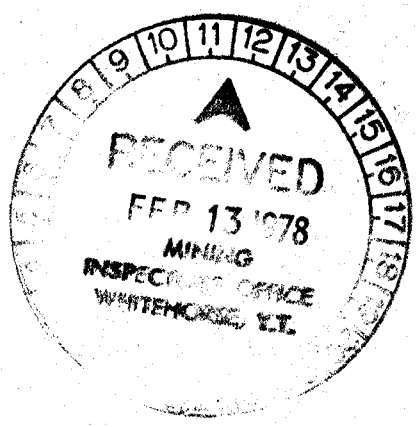
YUKON TERRITORY

by

D. A. Yeager - Geologist

C. K. Ikona - P.Eng.

December, 1977



This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work to the amount of $3200.00

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 BREAK 1-32 mineral claims were staked on September 16, 1976 by Harman Management Ltd. to cover copper 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 June 1 to 17, 1977, preliminary geologic mapping and additional 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.
BREAK 1-32	September 16/76	September 24/76	YA7104-7135 incl.

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

3.0 LOCATION AND ACCESS

The BREAK claims are located on N.T.S. sheets 106-E-1 and 106-D-16, approximately eight miles south-southeast of Quartet Lakes in the northeastern Yukon Territory. Approximate co-ordinates of the claim group are $65^{o}00'$N latitude, $134^{o}19'$W longitude.

MOUNTAINEER-PAN OCEAN JOINT VENTURE

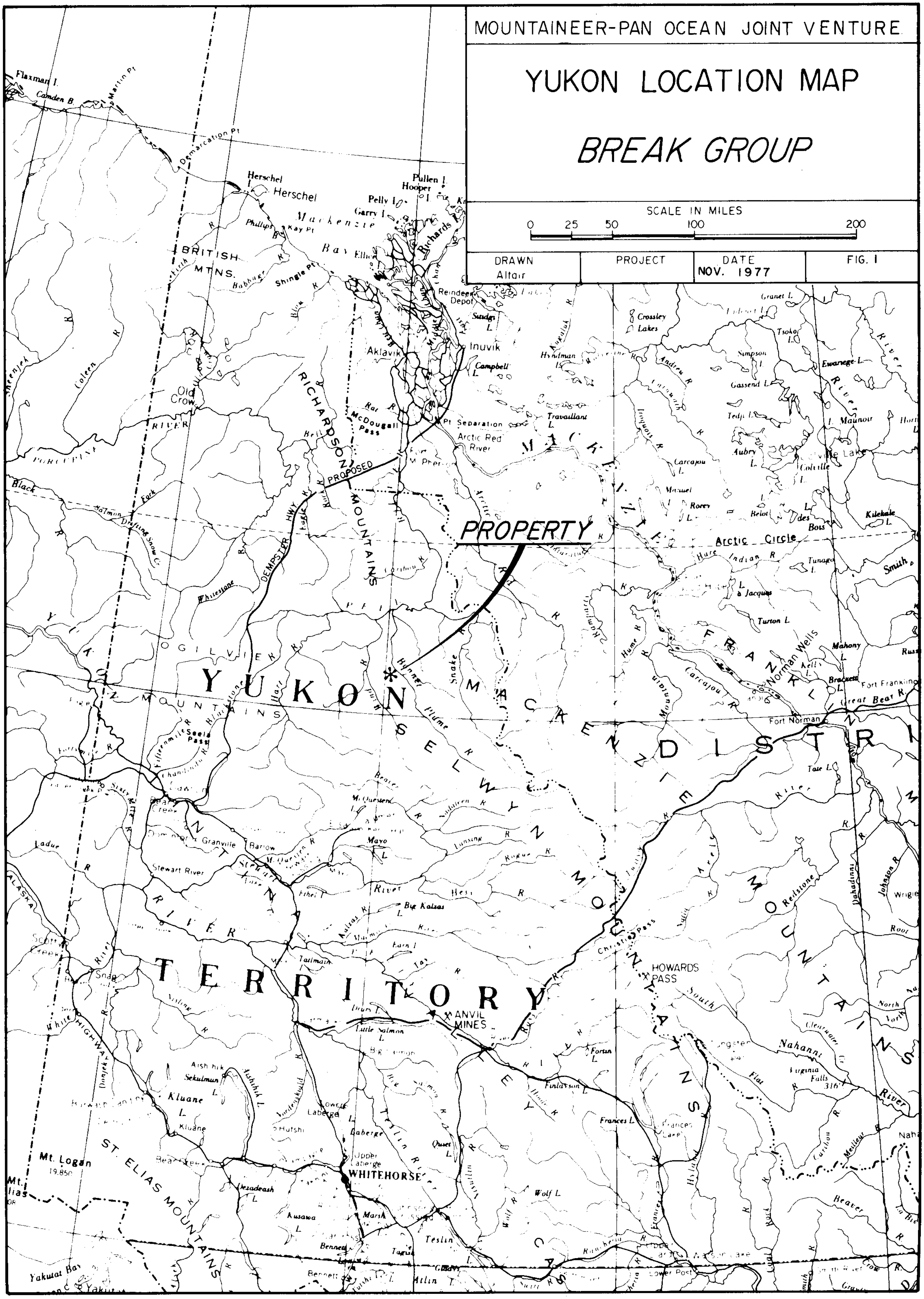
YUKON LOCATION MAP

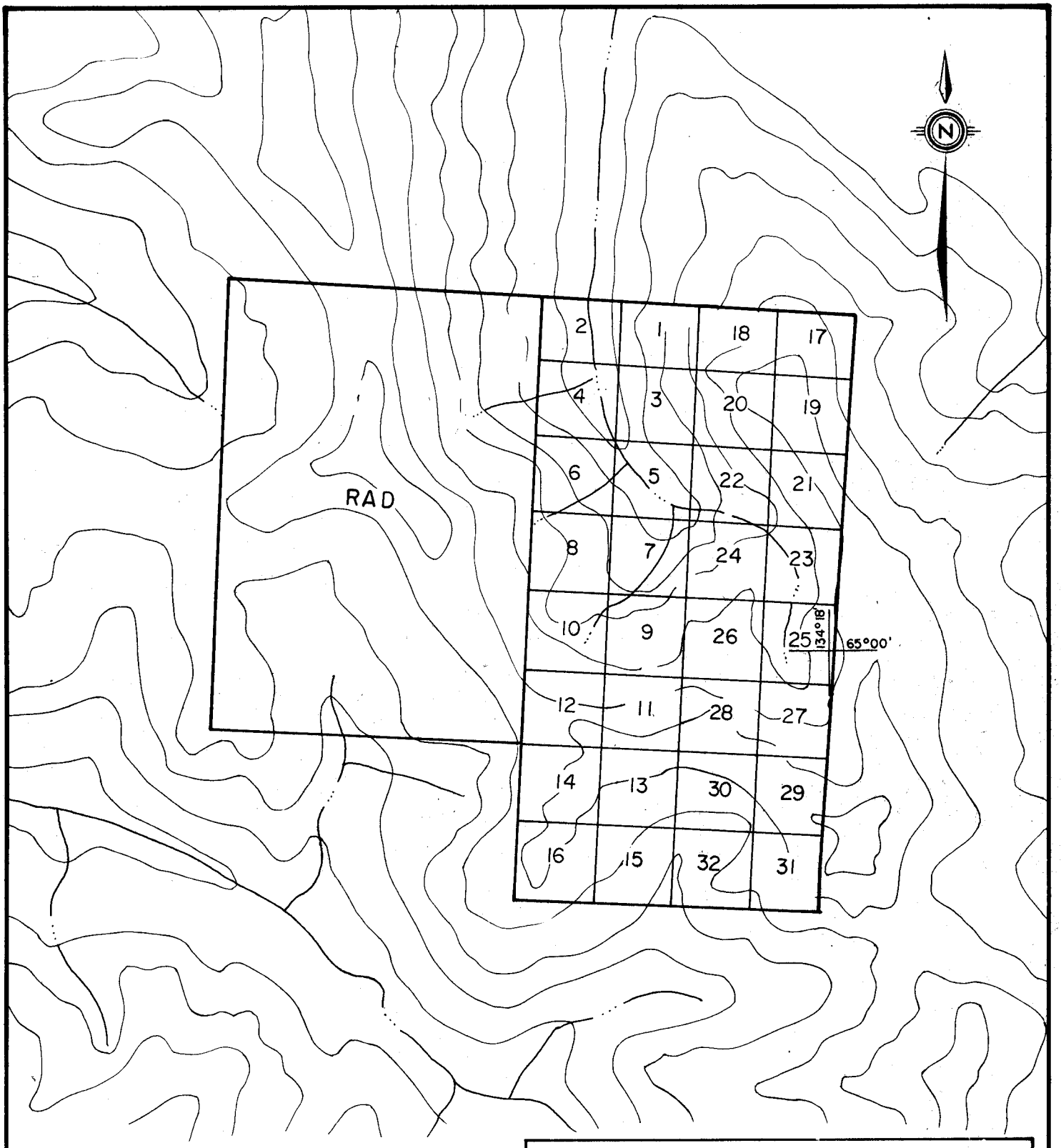
BREAK GROUP

SCALE IN MILES

0 25 50 100 200

DRAWN	PROJECT	DATE	FIG. 1
Altair		NOV. 1977	





MOUNTAINEER-PAN OCEAN JOINT VENTURE

BREAK CLAIMS

CLAIM MAP

106-E-1

QUARTET LAKES AREA

YUKON TERRITORY

SCALE IN MILES

1/2 1/4 0 1/2 1

DRAWN	PROJECT	DATE	FIG.
Altair			

Access to the property is by fixed wing aircraft from Mayo to Quartet Lakes, a distance of approximately 120 miles, then by helicopter to 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 2,500 feet to 6,000 feet A.S.L. and topography is rugged over the entire area. Exposure is good on most of the group although large areas are obscured by talus cover.

The entire property lies above tree line so vegetation consists entirely of lichens, mosses and low grasses.

Snow cover is extreme on the higher levels; often staying into July and usually falling in late August. This factor should be considered in planning any work programs.

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.

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°00'W and Latitude 65°oo'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 PROPERTY GEOLOGY

6.1 Introduction

Preliminary mapping of the BREAK claims was carried out at a scale of 1 inch to 1/2 mile and is presented in Figure 3 of this report. The property is underlain by a variety of rock types, all assigned to map units A and B of the Proterozoic

6 ..

geologic column. A mineralized vein swarm was mapped as well well as major faulting and folding. Copper mineralization appears to be related to the vein swarm structure. Assay samples were taken of all copper showings encountered and the locations and results are presented in Figure 3 and Table 6.4.1 respectively.

6.2 Lithology

The northern portion of the claims is underlain by limonitic black slates corresponding to the lowermost pyritic black shale sequence at the base of Unit B. The slatey cleavage generally has developed parallel to bedding but was seen intersecting bedding at several localities.

The Unit A rocks in the southern two thirds of the claims consist mainly of siltstones and slatey siltstones, interbedded siltstone and dolomite, and dolomite. The siltstones and slatey siltstones generally weather dark grey to black and exhibit bedding thicknesses from 1/4 inch to 2 inches. The interbedded siltstone/dolomite units weather grey-brown in colour and have bedding thicknesses in the 1/4" to 1/2" range. The siltstone/dolomite units usually deform easily and in the vicinity of the fold axes are minor folded to the point where original bedding features are lost. The dolomite units weather rusty brown and are generally thick bedded; with thicknesses ranging from 3 inches to 1 foot. A grey weathering chert bed was noted at several localities on the property and ranged from 5 feet to 12 feet in thickness.

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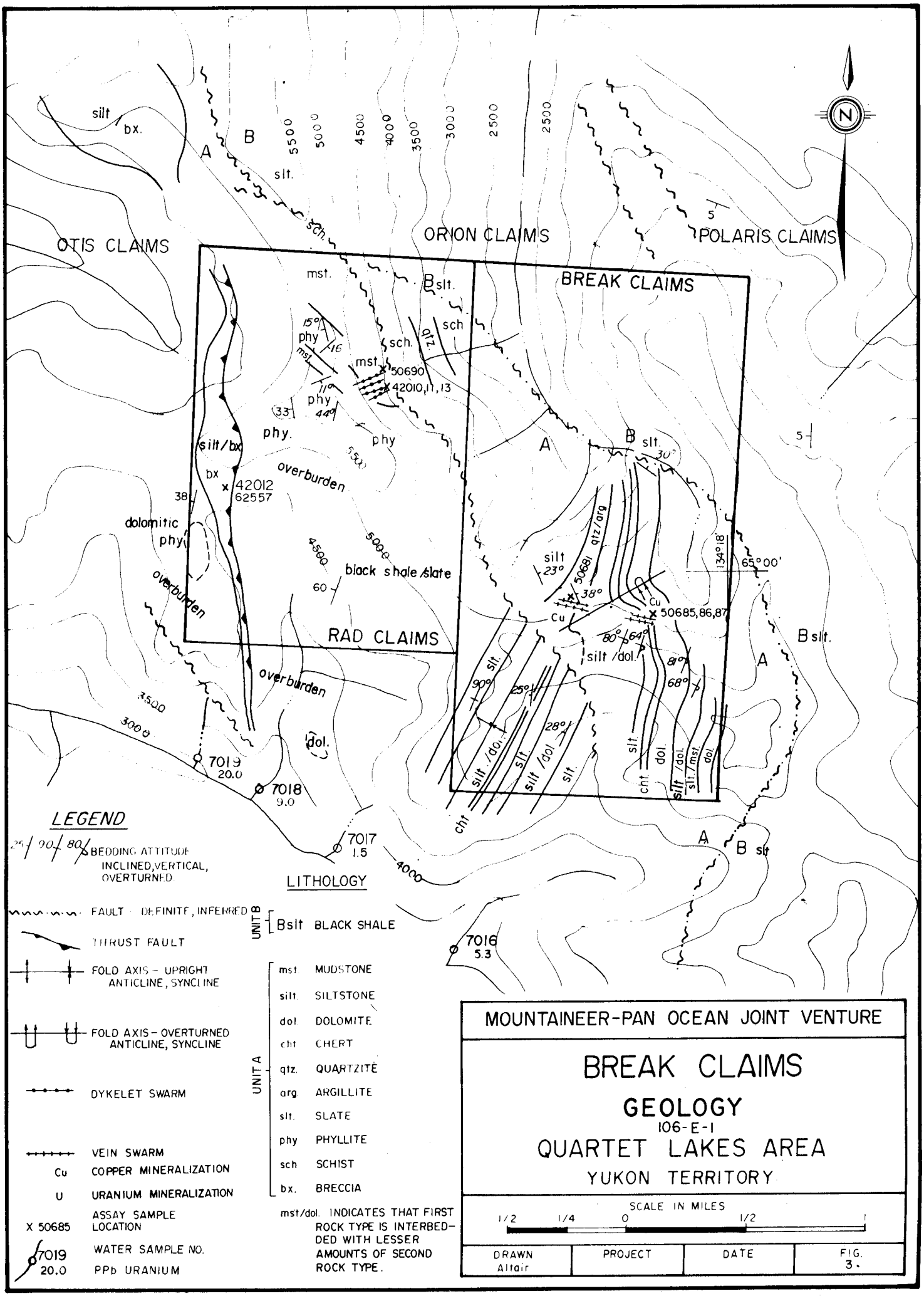
OTIS CLAIMS
ORION CLAIMS
POLARIS CLAIMS
BREAK CLAIMS
RAD CLAIMS
N
silt
bx.
B
A
slt.
sch.
5500
5000
4500
4000
3500
3000
2500
mst.
B slt.
15°
phy
16
sch.
qtz.
sch
mst
50690
42010,11,13
11°
phy
44°
33
phy.
silt/bx
bx
42012
62557
overburden
38
dolomitic phy
black shale/slate
60
silt
23°
qtz/arg
50681
38°
Cu
50685,86,87
80°
64°
silt/dol.
90°
25°
28°
68°
slt.
cht
dol.
silt/mst.
134°18'
65°00'
7019
20.0
7018
9.0
7017
1.5
7016
5.3
dol.
3500
3000
4000
5
LEGEND
BEDDING ATTITUDE INCLINED, VERTICAL, OVERTURNED
FAULT - DEFINITE, INFERRED
THRUST FAULT
FOLD AXIS - UPRIGHT ANTICLINE, SYNCLINE
FOLD AXIS - OVERTURNED ANTICLINE, SYNCLINE
DYKELET SWARM
VEIN SWARM
Cu COPPER MINERALIZATION
U URANIUM MINERALIZATION
X 50685 ASSAY SAMPLE LOCATION
7019 20.0 WATER SAMPLE NO. PPb URANIUM
LITHOLOGY
UNIT B
Bslt BLACK SHALE
UNIT A
mst. MUDSTONE
silt. SILTSTONE
dol. DOLOMITE
cht CHERT
qtz. QUARTZITE
arg. ARGILLITE
slt. SLATE
phy PHYLLITE
sch SCHIST
bx. BRECCIA
mst/dol. INDICATES THAT FIRST ROCK TYPE IS INTERBEDDED WITH LESSER AMOUNTS OF SECOND ROCK TYPE.
MOUNTAINEER-PAN OCEAN JOINT VENTURE
BREAK CLAIMS
GEOLOGY
106-E-1
QUARTET LAKES AREA
YUKON TERRITORY
SCALE IN MILES
1/2 1/4 0 1/2 1
DRAWN Altair
PROJECT
DATE
FIG. 3.

6.3 Structure and Stratigraphy

The property geology is roughly divided into three parts by two southeasterly trending faults that cross the claim group. The southernmost fault is a southwesterly dipping, high angle reverse fault felt to be an extension of a major reverse fault shown on the G.S.C. map of the area to extend some twelve miles to the WNW of the property. Evidence seen to the northwest on the adjoining RAD claims indicates that the fault strikes 145° and dips approximately 57° SW. Lying to the southwest of the fault is a sequence of thin bedded slate and interbedded mudstone/dolomite units approximately 1,500 feet thick. The sequence is folded about a northeasterly striking synclinal fold axis. The eastern limb of the fold dips approximately 25° to the northwest and the western limb dips vertically.

The presence of the northernmost fault is inferred from the topography and the sudden change in lithology and bedding attitudes evident in the northern portion of the claims. No direct evidence indicating directions of relative movement was seen. Lying to the north of the fault is a large area of intensely deformed limonitic black slates.

Lying between the two faults is a thick sequence of sedimentary rocks including mudstones, siltstones, dolomites, argillite, quartzite, chert, and slates. The sequence is folded about a northeasterly trending synclinal fold axis. The northern limb of the fold strikes northwesterly and dips 23° to 38° to the northeast. Bedding in the southern limb

is overturned, striking northeasterly and dipping 64° to 81° to the northwest. This folded sedimentary sequence is intruded by a vertical quartz/calcite/dolomite vein swarm trending approximately 105°. Copper mineralization was seen associated with the vein swarm in two locations on the property.

6.4 Mineralization

The westernmost showings occur in interbedded grey quartzites and argillites in the BREAK 11 area. The quartzites are massive and thick bedded; and are alternately interbedded with thinly laminated, thin bedded argillites. The rock is heavily fractured at 105/90° and is intruded by quartz/calcite/dolomite veins associated with chlorite and sericite alteration. Veins range in width from hairline to 6 inches and the entire vein swarm is 20' to 25' in width. Vein spacing averages approximately 6 inches to 1 foot. Chalcopyrite mineralization has occurred in the veins, in the vein walls, and as leakages into the surrounding host rocks. Malachite and azurite were noted on weathered outcrops.

The second showing occurs in the BREAK 28 area in a 10' to 15' thick light grey chert bed approximately 2,000' E of the west showing. The chert is heavily fractured by the vein swarm and shattering in some of the vein walls has led to the formation of 6 inch wide chert breccia bands. Breccia fragments range up to 1/2 inch in size. Chalcopyrite occurs in the veins, in the vein walls, and in the chert breccia matrixes.

Table 6.4.1 - Assays

Sample #	% Cu	Description
50681	0.90	Continuous rock chip sample across 5' of bedding. Sample taken in interbedded quartzite/ argillite intruded by quartz/ calcite/dolomite vein swarm. West showing.
50685	1.48	Random chip sample across 15' thick chert bed intruded by quartz/calcite/dolomite vein swarm. East showing.
50686	1.80	Continous rock chip sample across top 7.5' of 15' thick chert bed intruded by vein swarm. Sample location: 30' north along strike from sample 50685 in east showing.
50687	1.22	Continuous rock chip sample across bottom 7.5' of 15' thick chert bed intruded by vein swarm. Sample location: 30' north along strike from sample 50685 in east showing.

7.0 GEOCHEMISTRY

During prospecting in the claims area, a water geochemistry sample was taken from the stream draining the southern portion of the property. The water was collected in a numbered, acid cleansed plastic sample bottle. The sample was sent for analysis to Chemex Labs. Ltd., in North Vancouver, B.C. and upon reciept was analysed for uranium using standard fluorometric procedures (see Appendix II for complete descriptions of procedures.)

The sample, number 7016, contained 5.3 parts per billion uranium. This is considered anomalous for the region.

8.0 DISCUSSION AND CONCLUSIONS

Although fairly good assays were obtained from sampling the copper occurrences on the vein swarm, prospecting between the two showings failed to discover more mineralization. It would appear that except for the quartzite/argillite unit and the chert bed, none of the rock types are brittle enough to develop the degree of shattering required to create traps for copper mineralization. The copper showings therefore lack sufficient continuity to be of economic interest.

Of far greater importance is the high uranium value in water in the stream draining the southern portion of the claims. The stream drains an area largely covered by overburden and talus but underlain by Unit A rocks known to be associated with uranium occurrences elsewhere in the area. Follow-up geochemical work in the area is definitely indicated.

9.0 RECOMMENDATIONS

It is recommended that a close spaced silt and water sampling program be carried out in the streams draining the south end of the property. Detailed prospecting using hand held scintillometers should be done at the same time.

Respectfully submitted,

David A. Yeager

P.K. [illegible] 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

INVOICE NO. 18452

RECEIVED Sept. 23/76

ANALYSED Oct. 1/76

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

ATTN:

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

B. Swaine

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA