

# MAR 19690045: NORTHEASTERN ALBERTA

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GEOLOGICAL REPORT

EXPLORATION PERMITS 132 AND 134

NORTHEASTERN ALBERTA

by

Randy Turner

October 1969

ECONOMIC MINERALS  
FILE REPORT No.  
U-AF-088(2)  
U-AF-090(2)

## INTRODUCTION

During the 1969 summer field season, the writer, with the assistance of a junior geologist, Ralph McLean, under the supervision of consulting geologists Anthony Rich and John Greig prospected Quartz Mineral Permit 132 and 134, Township 115, Range 4, 5, 6 and 7 W4M. The area, located approximately 25 miles northeast of Fort Chipewyan, Alberta was prospected primarily for uranium. Field work consisted of scintillometer prospecting, geological mapping and geobotanical sampling.

Biogeochemistry was carried out through much of Permits 132 and 134. More detailed geochemistry was done in areas where uranium 'highs' were noted in outcrop. All samples were taken from black spruce trees through the major faults and draws with an approximate spacing of 500 - 1000 feet apart. A total of 457 samples were taken in all. Location of all samples were recorded on overlay acetate corresponding to the respective airphotos.

Much of the permit area was mapped, as well, on a scale of 1" = 2/3 miles. One intention of this mapping was to check the accuracy of the mapping which had been done by Dr. Riley of the Geological Survey of Canada in 1961.

Approximately 61 square miles were covered in total in Permits 132 and 134. In addition about 4 square miles of Permit 133, Township 116, Range 4, W4M were inspected briefly.

Camps were serviced by McMurray Air Services Limited, Uranium City; Gateway Aviation, Fort Smith; and Contact Airways of Fort Chipewyan.

The area covered to date in Permit 132 and 134 has been divided into three major prospects - Loutit Lake Prospect (see attached report); Uranium Lake Prospect; and Bear Lake Prospect.

Uranium Lake Prospect

(Township 115; Range 6 and 7, W4M)

Approximately 32 square miles were covered in detail in the Uranium Lake area. Maximum relief in the area is about 100 feet. Total rock exposure is about 50% to the north and east of Uranium Lake with almost 100% exposure encountered on the south side of this lake. To the north west and south east of Uranium Lake, most of the area is covered by muskeg and swamp and there is only 10 - 15% exposure.

Biogeochemical samples were collected from the draws of most faults and 173 samples were collected.

The area has been tightly folded and many faults and tension fractures are in evidence. Many of the draws within the map area are thought to be due to the weathering of less resistant lithologies particularly noticeable to the south and east of Uranium Lake.

Geology of Uranium Lake

The map area is distinguished by three major rock types:

- (1) Metasedimentary and associated rocks
- (2) Undivided granitic plutonic rocks, and mafic gneisses (hornblende, biotite) containing scattered layers of metasediments; and
- (3) Undivided granitic and minor quartzite gneiss, pegmatitic lenses and layers of metasediments.

Rock Types:

(1) Metasedimentary and Associated Rocks

The metasedimentary band is found on the north and east sides of Uranium Lake, and is a continuation of the metasedimentary belt west of Loutit Lake. It consists mainly of impure quartzite, though some pure quartzites were noted. The quartzite is locally garnetiferous. The area has been migmatized and contains varied amounts of late-formed crystalline materials. This includes quartz lenses, feldspar megacrysts, pegmatitic and granite lenses. Granitic and pegmatitic lenses which are the most common in the metasedimentary rocks constitute about 25% of the total rock. The general strike in the area is North-South and the dip is to the west at 48-60°.

(2) Undivided Granitic Plutonic Rocks

This rock type was mapped to the south and north of Uranium Lake and constitutes about 50% of the outcrop. Mineralogically this rock type contains up to 90% potassium feldspar, 8% quartz and minor percentages of biotite, chlorite, hornblende, and epidote. Hornblende and biotite gneisses make up about 30% of this area. Small layers, up to 50 feet long and 3 feet wide, of metasedimentary rocks - impure quartzite and biotite schist - are found interbedded with the granitic material. Gneissosity dips 55° to the west and strikes almost north-south.

(3) Undivided Granitic and Minor Quartzite Gneiss

This area was mapped north and north west of both Uranium and Flett Lakes. Biotite granite gneiss as well as hornblende granite gneiss make up about 40% of the outcrop in this area. The gneissosity is approximately north-south, dipping about 50° to the west. These mafic gneisses contain up to 85% potassium feldspar, 10% quartz, and minor amounts of epidote, muscovite, biotite and hornblende. Quartzite gneisses were noted on the

north side of Flett Lake. Scattered layers of metasediments, consisting mainly of impure quartzite with and without garnetiferous zones are found interbedded with the granitic gneisses. Pegmatitic lenses as well as quartz and feldspar pods were noted.

#### Mineralization in Map Area

Only 2 radioactive occurrences were noted in the Uranium Lake area.

Occurrence #1 - This is a small, 2' x 4' zone along the east side of Flett Lake where radioactivity is extremely high; approximately 40 times background.

Occurrence #2 - This is a small pegmatitic lense, 6' x 6' where radioactivity is approximately 15 times background.

Several other 'highs', 2 and 3 foot square zones, were observed where radioactivity was found to be between 2 and 8 times background. Background in the map area was found to be very high and quite variable. The average background was found to be 2-5 times greater than that of the Loutit Lake Prospect. Mass effect and the high percentage content of potassium feldspar was thought to be responsible for much of this increased background.

Several small gossan zones were noted. Disseminated pyrite was found in almost all of these gossans. Graphite is quite common in the area. A zone containing graphite, some pyrite and a minor amount of malachite was found on the east side of Uranium Lake in the metasediments.

#### Bear Lake Prospect

(Township 115, Range 5, W4M)

An area of approximately 8 square miles north and west of Bear Lake was inspected to check an anomalous area found in the course of the airborne radiometric survey. Rock exposure to the north, and west of Bear

Lake is about 40% while to the south and east, exposure is only 10%. Maximum relief within this prospect is 100 feet.

### Geology of Bear Lake

The area has been mapped according to two major rock types:

- (1) Granite gneiss
- (2) Recrystallized mylonites

#### Rock Types:

- (1) Granite gneiss

The granite gneiss band is an eastward continuation of the granite gneiss belt mapped east of Loutit Lake. These gneisses strike approximately N10° E and dip 50 to 60° to the west. The granite gneiss is characteristically banded; narrow, 1/8" to 2.5" wide, mafic (hornblende, biotite) bands alternate with granitic material containing up to 80% potassium feldspar, 10% quartz and minor percentages of plagioclase, epidote, chlorite and biotite. The granite gneiss terrain underlies 85% of this area and the remainder is comprised chiefly of quartz veins, feldspathic pods and metasedimentary bands from 1 foot to 20 feet long and varying from a few inches to several feet in width. The metasediments, mainly impure quartzites, dip steeply to the west and strike almost due North. They were not found to contain garnetiferous zones.

- (2) Recrystallized Mylonites

Recrystallized mylonites were noted along the McLean Lake Fault which is thought to be a branch of the Allan Fault. The mylonites, are pink to red on both fresh and weathered surfaces, and parallel the gneissosity of the granite gneiss. No porphyroclasts were noted in these mylonites. The mylonites along the McLean Lake Fault are comprised chiefly of potassium feldspar - 90%; quartz - 8%; and minor percentages of plagioclase and biotite.

Mineralization in Map Area

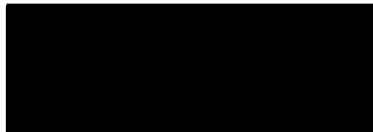
Several uranium anomalies outlined by the airborne radiometric survey were checked out near Virgin Lake and northeast of Bear Lake. Immediately to the southeast of Virgin Lake where a strong uranium anomaly was detected, the area was found to have an extremely high background. Three small zones (none greater than 15 square feet) were found where radioactivity was 6 to 8 times greater than background. Several other small zones of 2 and 3 times background were noted along with the above mentioned in the same general area. An anomalous area to the southwest of Virgin Lake also checked out. Here an 8 square foot zone of 6 times background occurs in a metasedimentary band within the granite gneiss.

Graphite was found to the west of Virgin Lake, and pyrite was noted in a quartz vein to the east of Bear Lake.

CONCLUSIONS AND RECOMMENDATIONS

The area located to the west of Loutit Lake was found to contain several zones of 'very high' radioactivity of which one was also detected by the airborne survey. Southeast of Virgin Lake an airborne uranium anomaly is thought to be due to extremely high background. Thus it would seem that a correlation between ground scintillometer work and uranium 'highs' from the radiometric survey has been established.

Respectfully submitted,

A solid black rectangular box used to redact the signature of Randy Turner.

RANDY TURNER



## LOUTIT LAKE

### PROSPECT

(Township 115, Range 5 and 6, W4M)

(Report for the period ending July 1969)

#### General Physiography and Area Covered

To date, approximately 22 square miles of Permit 132 have been covered in detail including a complete program of scintillometer surveying, biogeochemical sampling and geological mapping. Areas surrounding Loutit Lake have been covered as far south as the southern boundary of the Permit.

The exposure in the Loutit Lake area varies from 60% on the east side, to 40% on the west side. On the north side of the lake about 80% of the area is covered by glacial drift and swamp. Only 5% outcrop exposure was encountered to the south of Loutit Lake.

Lithology and structure together with radioactivity and mineralization have been mapped on a scale of 1" = 2/3 mile.

A total of 263 biogeochem samples have been taken from the covered intervals in the faults and draws, with a sample spacing of 500' - 1000'. Particularly detailed sampling has been done in areas where high radioactivity was observed. All samples have been taken from branches of the black spruce tree.

#### Geology

The Loutit Lake area was mapped according to the lithological divisions of Riley (Geological Survey of Canada) as follows: granite gneiss, granite gneiss

with an increasing amount of metasediments, metasediments and mylonite zones. Few additions were made to Riley's mapping which was found to be very accurate.

The area has been highly faulted and folded. Faulting has been particularly frequent in the granite-gneiss east of Loutit Lake. Two possible splays of the Allan Fault cross this eastern area. All rocks are tightly folded and flow folding is observed to the west. Due to the high degree of deformation and metamorphism, contacts are obscure and it is difficult to differentiate the rock types.

Each of the four lithologies are briefly discussed below.

#### Granite Gneiss

To the east of Loutit Lake, a granite gneiss belt which is disposed at approximately  $N20^{\circ}E$  is fairly uniform. Gneissosity strikes about  $N20^{\circ}E$  and dips about  $45-60^{\circ}$  to the west. This belt includes biotite granite gneiss and hornblende granite gneiss in lenses of variable size. The granite gneiss is composed of quartz, potassium feldspar, biotite, hornblende and plagioclase feldspar. Lenses of biotite and alaskite, pegmatite and quartz stringers are found within the gneiss.

#### Metasedimentary Rocks

To the west of Loutit Lake, the rock type has been mapped as metasediments. This includes quartzites, both pure and impure, with quartz the major constituent and minor amounts of muscovite and biotite, with or without garnetiferous zones. The quartzites comprise about 80% of the metasediments with pegmatitic lenses, quartz stringers and feldspathic granite masses constituting the remainder. The area has been migmatized and tightly folded. The metasediments strike  $N20-30^{\circ}E$  and dip generally to the west at  $60^{\circ}$ . Individual metasedimentary bands are of varying length and width and some bands are up to 2000 feet long and 1000 feet wide. Faulting is not as prevalent. Most draws parallel to the strike are thought to be due to weathering of the less resistive rocks.

## Granite Gneiss with included Metasediments

Along the southeast shore of Loutit Lake, a small area has been mapped as granite gneiss with increased amounts of metasediments. The metasediments which make up about 50% of this area are found alternating with the granite gneiss. Pegmatitic lenses, feldspathic and quartzose pods, and dioritic masses comprise about 5% of this area. The metasediments which include biotite schist, phyllite, sericite schist, chlorite schist and quartzite were found to contain some garnetiferous zones. The biotite schist has been deeply hematized. The granite gneiss, similar to the one already discussed, grades eastward into the main granite greiss belt.

## Mylonites

Several small zones, questionably mapped as mylonites, occur in the granite gneisses east of Loutit Lake, and appear to be related to faults. They are aphanitic to glassy and usually dark grey in colour. Some light coloured mylonites, usually pink, were found to be slightly banded. The mylonite zones are narrow and discontinuous. No mylonites were noted west of Loutit Lake.

## Mineralization in the Loutit Lake District

The level of radioactivity is classified according to a scale devised by J.D. Godfrey: "significant" when radioactivity is in the range of 2.5 to 4 times background; "high" when radioactivity is 4 to 5 times background; and "very high" when radioactivity is 6 times background or greater.

Thirteen radioactive occurrences have been found in the vicinity of Loutit Lake. A brief description of each occurrence follows. Locations are given on the accompanying map.

### Occurrence #1

A zone approximately 50' x 10' with very high radioactivity occurs in a quartzite. Yellow staining present in the area proved to be radioactive.

This zone, associated with the Midas Fault strikes northeast and dips approximately  $60^{\circ}$  to the west. Disseminated molybdenite was also found in the vicinity.

#### Occurrence #2

A zone of very high radioactivity (average 10 times background) occurs along a shear zone for approximately 100 feet. The shear zone strikes south into the draw of the Midas fault. Some yellow staining was found associated with this outcrop. Of all the occurrences in the Loutit Lake area, this occurrence was the only one observed to be structurally controlled. A grab sample GBS-2 assayed 0.06%  $U_3O_8$  radiometric and 0.008%  $U_3O_8$  chemical.

#### Occurrence #3

A radioactive zone 800' x 6' cutting across strike at a small angle was found to be of high to very high radioactivity (5 to 10 times background). This zone disappears into overburden and reappears 60 feet further to the north on strike for a further 10 feet. The rock is of granitic 'origin' and may be a fine grained pegmatitic phase. A quartzite associated with this zone is yellow stained in places.

#### Occurrence #4

Very high radioactivity was observed in a 20' x 30' quartzite lense. This quartzite is capped by granitic material. It is exposed 10' further along strike for 10 feet before grading out. Yellow staining was also observed. Several other small zones displaying significant to high radioactivity were found in the general area in 'pegmatitic' lenses and quartzites.

#### Occurrence #5

This is a small pegmatitic lense of approximate dimensions 10' x 2' which occurs in a metasedimentary unit. The radioactivity is high to very high.

Occurrence #6

Radioactivity varying from significant to very high (3 to 8 times background) was found in a quartzite unit of dimensions 100' x 25'. Several small zones of approximately 5 times background were found in metasediments in the general area but are not related to the main zone.

Occurrence #7

A garnetiferous quartzite lense, 2000' x 500' was found to have significant to very high radioactivity varying over its length. A ten foot zone of 10 times background was found in the lense. This quartzite lense was bordered by a biotite gneiss.

Occurrence #8

Slight to significant radioactivity occurs in an area of 2000' x 100' in a quartzite lense. Only a small area of 8 times background in the lense was observed. The radioactivity does not appear to be structurally controlled.

Occurrence #9

To the east of Loutit Lake, 100 yards east of Sandy Cove a 10' x 3' pegmatitic lense occurring in granite gneiss is very radioactive, up to 150 times background. A grab sample assayed 0.017  $U_3O_8$  and 0.5%  $ThO_2$ . This occurrence is believed too small to warrant further attention. The radioactive mineral has been tentatively identified as monazite.

Occurrence #10

A 3' x 1' zone of high radioactivity occurs in a small diorite lense in granite gneiss. Other small zones of significant radioactivity were found in the general area and are not related.

Occurrence #11

A 15' x 3' zone of high radioactivity in mylonite occurs on the Jane Lake Fault. Associated with this mylonite zone is a gossan zone containing pyrite and massive graphite. A minor amount of chalcopyrite and malachite was found 1 mile to the south along the same fault.

Occurrence #12

A small metasediment band with high radioactivity was found on a north-south fault. Yellow staining is present but does not appear to be radioactive.

Occurrence #13

Several small (20' x 3' max.) zones of high to very high radioactivity occur with visible pyrite. The general area was observed to have a high background 2 to 3 times normal. Hematite staining is prevalent. The host rock is granite gneiss. The radioactivity appears to be due to thorium.

A grab sample (GBS-13) assayed 0.04%  $U_3O_8$  radiometric and 0.004  $U_3O_8$  chemical

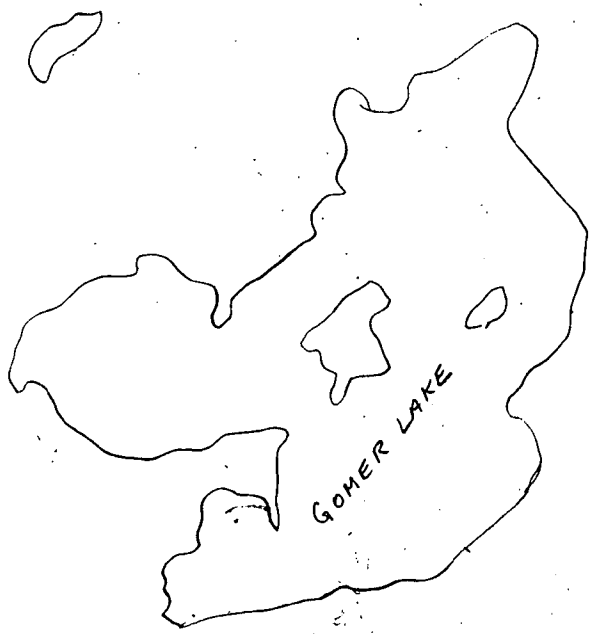
MAP 4

Geochem samples from north of Zutu  
To accompany reports: A12123 165  
: A12923 58



MAP 2

Geochem Samples for Month of June (5)  
to accompany photo A12923 167



25-13  
25-12  
25-10  
25-9



30-12  
30-11  
30-10  
30-9  
30-8  
30-7  
30-6  
30-5  
30-4  
30-3  
30-2  
30-1

□



MAP 1

Geochem samples for Monks on June (3)  
To accompany plates A12923 168  
A12923 167



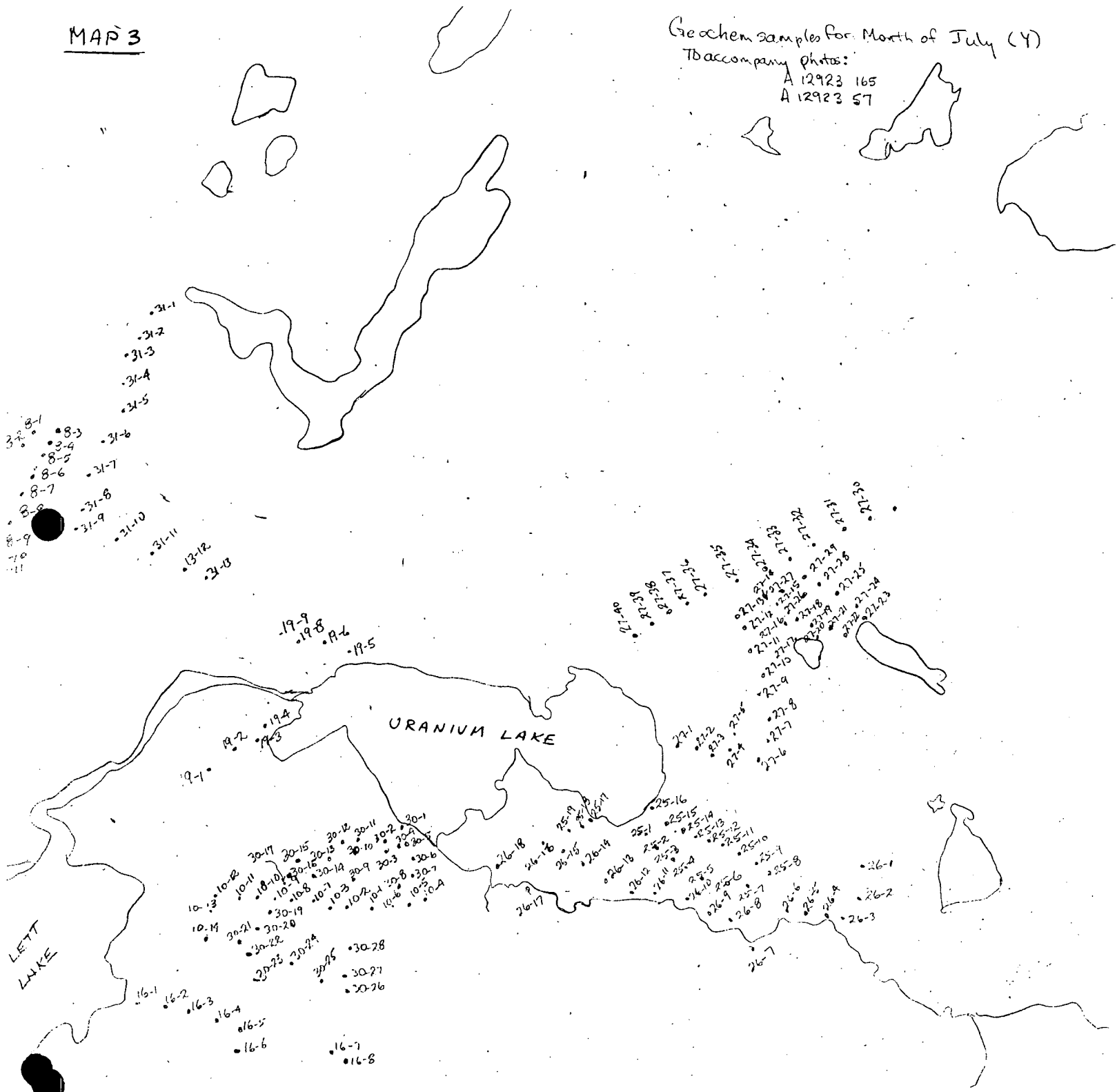
MAP 3

Geochem samples for Month of July (Y)

To accompany photos:

A 12923 165

A 12923 57



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..... Edmonton, Alberta. ....

Lab No. 229

June 24, 1969.

**I hereby certify** THAT THE FOLLOWING ARE THE RESULTS OF ASSAYS MADE BY US UPON THE HEREIN DESCRIBED SAMPLES.

MARKED	U <sup>30</sup> <sub>8</sub> Radiometric	U <sup>30</sup> <sub>8</sub> Chemical	MARKED	PERCENT	PERCENT	MARKED	PERCENT	PERCENT
Q-65-7 One sample	0.50	0.017						

**NOTE:**  
Rejects Retained One Month  
Pulps Retained Three Months  
Unless Otherwise Arranged.

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Lab No. 289  
July 16, 1969.

**I hereby certify** THAT THE FOLLOWING ARE THE RESULTS OF ASSAYS MADE BY US UPON THE HEREIN DESCRIBED SAMPLES.

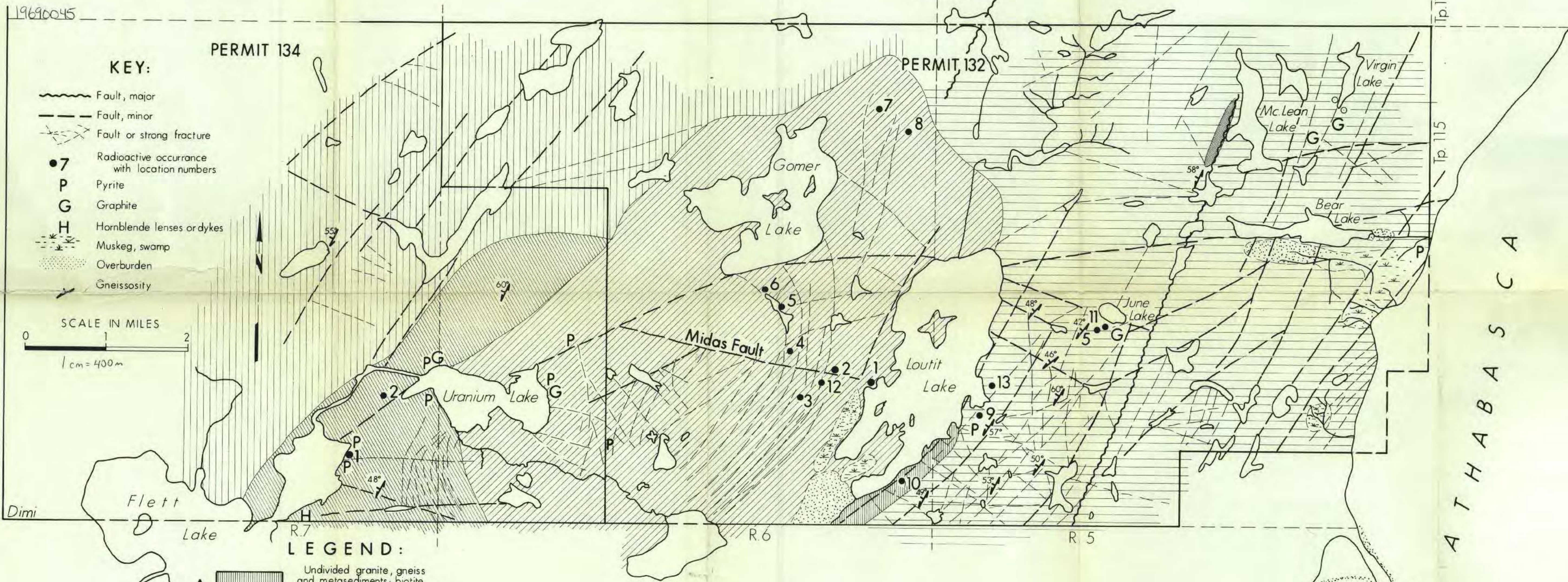
MARKED	GOLD		SILVER Ounces per Ton	U <sup>30</sup> <sub>38</sub> Radiometric		U <sup>30</sup> <sub>38</sub> Chemical		Percent	Percent	Percent	Percent	TOTAL VALUE PER TON (2000 LBS.)
	Ounces per Ton	Value per Ton		Percent	Percent	Percent	Percent					
Q 1	<0.01	----		----		----						
GBS-2	----			0.060		0.008						
GBS-13-U	----			0.040		0.004						

**NOTE:**  
Rejects retained one month.  
Pulps retained three months  
unless otherwise arranged.

Gold calculated at \$ 35.00 per ounce

  
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FIGURE 1



# GEOLOGICAL MAP OF PERMITS 132 & 134

COMPILED BY R.C. TURNER FROM FIELD TRAVERSES MADE BY R.C. TURNER & R. McLEAN  
MAY - SEPTEMBER 1969.

R.C. Turner  
March 1970.

L A K E A T H A B A S C A