

GM 34411

FINAL REPORT, RICHMOND GULF, PROJECT NO 71-87

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RICHMOND GULF
PROJECT NO. 71-87
(REPORT NO. 7187-9)
FINAL REPORT - 1977

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Prepared by:
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Ministère des Richesses Naturelles, Québec	
SERVICE DE LA	
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Date:	13 JUIN 1979
No GM:	34411

SUMMARY

A fixed-wing airborne spectrometer survey flew approximately 4,000 grid kilometers across the entire Archean/Proterozoic contact of the Richmond Gulf basin. The survey outlined 248 radiometric anomalies of which 30 were briefly ground-checked. No visible uranium mineralization was encountered.

Approximately 170 combined lake sediment and water samples were collected during the survey. The geochemistry outlined two anomalous areas in the northeast section of Richmond Gulf. One sample, within one of the anomalous areas, contained 550 ppm U.

A more detailed follow-up is recommended.

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1. INTRODUCTION

The Richmond Gulf project is a venture presently financed and managed entirely by Uranerz Exploration and Mining Ltd. However, negotiations between Société Québécoise d'Exploration Minière (SOQUEM) and Uranerz Exploration and Mining Ltd. (UEM) were held throughout the year concerning a joint partnership in the venture. A letter of intent has been signed by SOQUEM with a final agreement still pending.

1.1 AREA OF INVESTIGATION

Richmond Gulf is located on the eastern coast of Hudson Bay, approximately 160 km north-east of Poste-de-la-Baleine (Great Whale River), Quebec. (Map No. 1).

1.2 PURPOSE OF INVESTIGATION

The main objective of the 1977 summer program was to evaluate, on a regional scale, the uranium potential of the Richmond Gulf sedimentary basin - particularly the unconformable contact between the Archean basement and the overlying Proterozoic sediments.

1.3 TIME OF INVESTIGATION

An airborne spectrometer survey (Calgary-system) was flown between August 8 and August 15, 1977. A follow-up reconnaissance survey commenced on August 20 and ended on September 9, 1977.

1.4 PERSONNEL

Field Personnel, Project 71-87

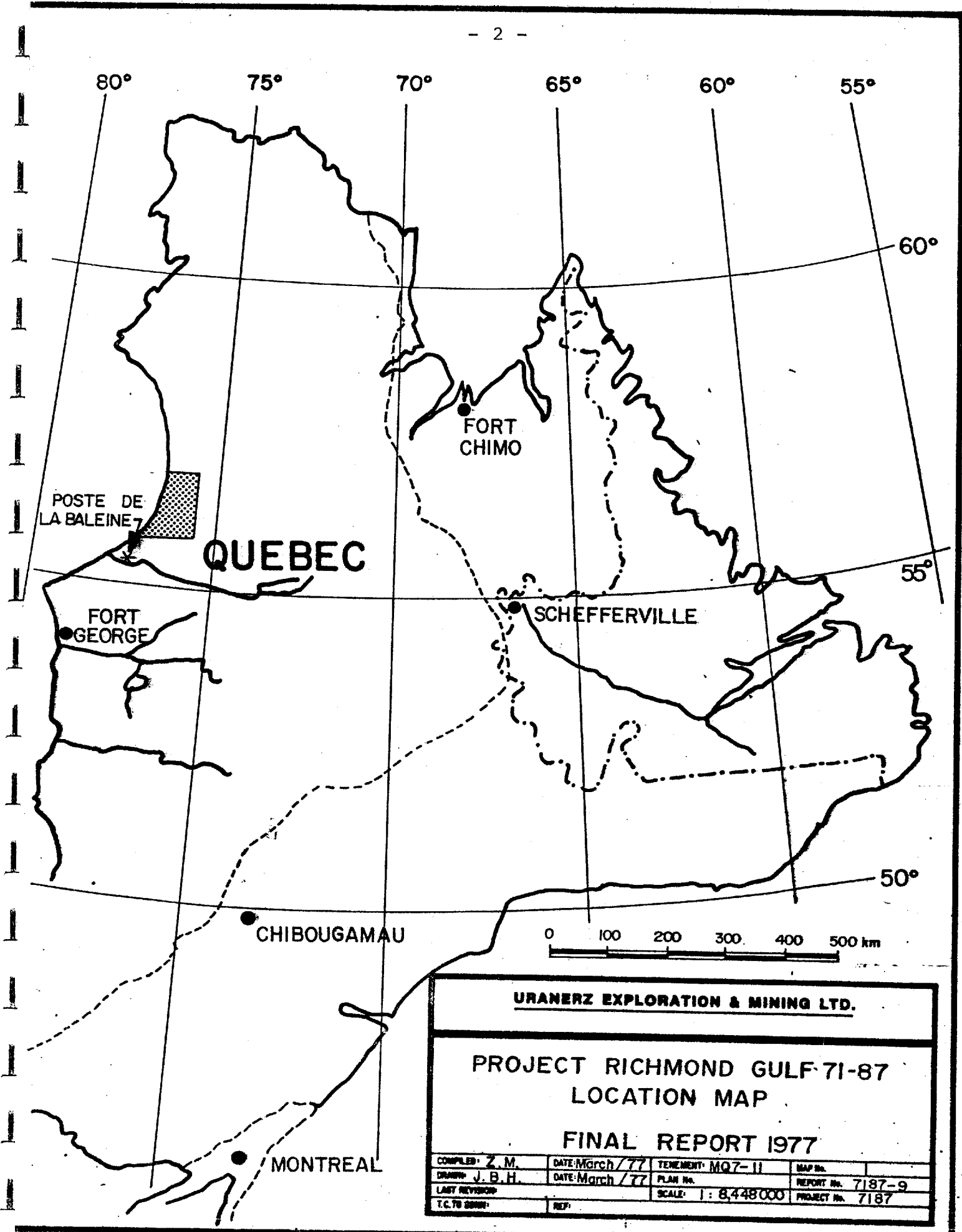
UEM:	B. Starke	Exploration Manager
	R. Lambert	Senior Geologist
	Z. Madon	Junior Geologist
	J. Grassby	Senior Assistant
	K. Hopewell	Field Foreman

CANADIAN HELICOPTERS LTD:	Helicopter Pilot
	Helicopter Mechanic

1.5 INSTRUMENTS, VEHICLES USED

1.5.1 Instruments Used

The type and number of instruments used in the follow-up reconnaissance survey (excluding instruments from the Calgary-based airborne spectrometer survey) are outlined in Table 1.



URANERZ EXPLORATION & MINING LTD.

**PROJECT RICHMOND GULF-71-87
LOCATION MAP**

FINAL REPORT 1977

COMPILED: Z. M.	DATE: March / 77	TENEMENT: MQ7-11	MAP No.
DRAWN: J. B. H.	DATE: March / 77	PLAN No.	REPORT No. 7187-9
LAST REVISION:		SCALE: 1: 8,448,000	PROJECT No. 7187
T.C. TO DRAW:	REP:		

TABLE 1

Number	Type of Instrument	UEM Serial No.
3	SPP-2NF SAPHYMO STEL SCINTILLOMETERS	AB-1-70 AB-1-72 AB-1-76
1	SCINTREX GAM-IIS DIFFERENTIAL SPECTROMETER	AA-2-5
1	SCINTREX GSA-61 SENSOR (1850 cm ³)	AC-1-5
1	EASTERLINE ANGUS CHART RECORDER	AG-7-3
1	12-VOLT BATTERY PACK	AJ-7-6

1.5.2 Aircraft Used

The following aircraft were employed in the regional survey at Richmond Gulf:

<u>AIRCRAFT</u>	<u>COMPANY</u>	<u>ACTIVITY</u>	<u>TIME/DISTANCE</u>
AERO COMMANDER 500B (CF-XDN)	Highwood Air Services Ltd.	Airborne Spec- trometer Survey	38 Hours (Plus Ferry)
OTTER (C-FJZN)	A. Fecteau Transport	Camp Mobilization (Including Fuel Transport)	2,550 Miles
OTTER (CF-BEW)	Austin Airways Ltd.	Camp Demobiliza- tion	220 Miles
BELL 206-B	Les Hélicoptères Canadiens Ltée.	Ferry	11.1 Hours
		Logistic Support	4.7 Hours
		Regional Geochem- istry	17.7 Hours
		Geology/Follow-up/ Contact Flying	25.0 Hours

2. GENERAL INFORMATION

2.1 LOCALITY

The Richmond Gulf area is confined by the geographical coordinates:

Lat: 55°30'N - 56°55'N
Long: 75°45'W - 77°15'W

The central portion of the region is approximately 160 km

2.1 LOCALITY - Cont'd

northeast of Poste-de-la Baleine (Great Whale River) on the Hudson Bay coast and 322 km north-east of Fort George on the James Bay coast.

2.2 COMMUNICATIONS AND ACCESS

2.2.1 Communications

Two CP-34 single side band radio transceivers were employed during the survey:

<u>FREQUENCY</u>	<u>COMPANY</u>	<u>COMMUNICATIONS</u>
4050 kc/s.	Fecteau Air Transport Ltd.	Lac Simon (Proj. 71-85) Chibougamau Temiscamie
4983.5 kc/s.	Laurentian Air Services Ltd.	Dieter Lake (Project 71-86) Schefferville

2.2.2 Access

The area of investigation is accessible by ski- or float-equipped aircraft from Poste-de-la-Baleine, 160 km south-west of the base camp. Rotary and fixed-wing aircraft are required for transportation within the area.

Nordair operates a scheduled air service (Boeing 737) from Montreal to Poste-de-la-Baleine, via Val d'Or and LG-2.

A road has recently been completed from Matagami to Fort George by way of LG-2 which is situated on Rivière La Grande. However, north of Matagami, a permit from the James Bay Development Corporation is required for travel on this road.

2.3 TOPOGRAPHY

The area immediately surrounding Richmond Gulf forms part of a gently rolling peneplain, sloping upwards from Hudson Bay to a maximum elevation of approximately 500 meters above sea level. The Proterozoic sediments and volcanics of the Nastapoka Group form steep east-facing scarps that separate Richmond Gulf and Hudson Bay. The Archean basement granites surrounding the Richmond Gulf sedimentary basin are characterized by gently sloping rounded hills with a topographic relief of less than 300 meters.

The area of investigation is drained by a system of rivers flowing into Hudson Bay.

2.4 CLIMATE

Richmond Gulf lies in a climatic zone transitional between sub-arctic and arctic. During the summer, west and southwest winds prevail. Annual total precipitation is about 50 cm. Average temperatures in the summer range from 5°C to 20°C. The most favourable working season is in the early summer months - mid-June to mid-August.

2.5 VEGETATION

The predominant vegetation is of the forest-tundra type characterized by scattered patches of black spruce with some jack pine, balsam fir and larch. Hilltops are normally bare to sparsely vegetated with scattered low brush and grass. In the lowlands southwest of Richmond Gulf, a thick forest cover occurs. However, north of the gulf, very little wooded vegetation exists, even within the valleys.

2.6 POPULATION AND LAND USE

The area of investigation is virtually unpopulated. No commercial land use occurs in this region.

2.7 WATER RESOURCES

A dense population of large irregularly shaped lakes characterizes the Archean basement terrain. Lakes within the sedimentary basin, however, are sparsely scattered, smaller and more rounded.

These lakes, all freshwater sources, are drained by a system of rivers and streams that flow into Richmond Gulf and Hudson Bay. Richmond Gulf, itself, is a salt water body, affected by tidal exchange from Hudson Bay.

2.8 MAGNETIC DEVIATION

Approximately 25 °W.

3. PREVIOUS SURVEYS AND ACTIVITIES

3.1 TOPOGRAPHIC MAPPING

The area of investigation is covered by the following NATIONAL TOPOGRAPHIC SERVICE (N.T.S.) sheets.

TABLE 2

1:500,000	1:250,000	1:50,000
33 N.W.	33N	33N/10W
33 N.E.	33 O	
34 S.E.	34 B	34B/4 B/5 B/12
34 S.W.	34 C	34C/1 C/8 C/9

Note: At the scale of 1:50,000, there is incomplete coverage of the area of interest.

TABLE 3

The survey area is covered by the following aerial photographs:

Flight Line	Photo Numbers	Scale
A 15340	7-18	1:40,000
A 15341	112-125	1:40,000
A 15613	3-18 82-100 105-122	1:41,000
A 15614	35-44 53-62 132-142	1:41,000
A 15618	27-32 39-50	1:40,000
A 15633	7-16	1:40,000
A 15644	123-126	1:40,000
A 15647	8-18	1:40,000
A 15658	5-17	1:40,000
A 15649	34-44 65-73	1:40,000
A 15682	10-18	1:40,000
A 15714	12-16 28-33 43-51 52-57 98-101	1:40,000
A 15816	13-18	1:40,000

3.2 GEOLOGICAL MAPPING

The following reports discuss the geology of the Richmond Gulf area:

Dimroth, E. Baragar, W., Bergeron, R., and Jackson, G.

1970: The Filling of the Circum-Ungava Geosyncline in Symposium on "Basins & Geosynclines of the Canadian Shield" A.J. Baer, Ed.
G.S.C. Paper 70-40

Eade, K.E. 1966: Fort George River and Kaniapiskau Map Areas, New Québec; G.S.C. Mem. 339

Stevenson, I.M. 1968: A Geological Reconnaissance of Leaf River Map Area, New Québec and N.W.T.; G.S.C. Mem. 356

Woodcock, J.R. 1960: Geology of the Richmond Gulf Area, New Québec, Proc. Geol. Assoc. Can. Vol. 12 pp 21-40

The report by J.R. Woodcock and its corresponding geological map (SCALE \approx 1:200,000) was proven, in most instances, to be fairly reliable.

3.3 GEOPHYSICAL SURVEYS

A federal-provincial aeromagnetic survey which covered the Richmond Gulf area has been completed recently. The data is presently being compiled at a map scale of 1:50,000 and will be available in 1978.

Previous work in the Richmond Gulf area occurred during the late forties and early fifties, involving exploration and assessment of the lead, zinc and copper potential of the area. The reports include:

Almond, L.B. 1947 Gulf Lead Mines Ltd. - Report on Mining Concession.
Report No: GM-9731

Ashton, A.S. 1950 Rock Formations - Nastapoka Group, Gulf Lead Mines Ltd. Report No:
GM-728

Harwood, T.A. 1949 The Lead-Zinc Deposits of Richmond Gulf
B.A. Sc. Thesis. Report No: GM-678

Almond, L.B.,
Moffat, W.W. 1947 A Report on the Gulf Lead Mines Property - Report No: GM-9733

3.3 GEOPHYSICAL SURVEYS - Cont'd

Moffat, W.W. 1946

A Report on the Gulf Lead Mines
Property - Hudson Bay
Report No: GM-9734

Parks, T. 1949

A Report on the Geology of the
Nastapoka Group of Sediments with
its Contained Pb-Zn Bearing Strata
Gulf Lead Mines Ltd.
Report No: GM-679

4. TENURE POSSIBILITIES

4.1 MINERAL CLAIMS

For tenure possibilities, reference is made to the "Mining Act of Quebec", Chapter 34. Mineral claims:

- a) can only be staked by an individual holding a Prospector's Licence (sections 13, 14)
- b) cover an area of 40 acres or 16 hectares (section 33)
- c) are valid for 1 year south of the 52nd parallel and two years north of the 52nd parallel (section 46)
- d) south of the 52nd parallel require assessment work of \$2 and \$4 for the first and each subsequent year and, north of the 52nd parallel, \$6 for the first and second year (section 76)
- e) require a staking fee of \$2 per claim.

4.2 LARGER CONCESSIONS

Exploration permits are granted only north of the 52nd parallel (New Quebec). Permit blocks:

- a) cannot be less than 25 square miles (65 km²)
- b) cannot exceed 150 square miles (390 km²)
- c) are valid for 3 years
- d) require an annual rental fee of \$150 per square mile
- e) require assessment work of \$250 per square mile for each year.

4.2.1 Concession Applied For

An exploration permit, covering approximately 28 square miles (75 km²) has been applied for in order to protect an area containing a number of geochemical and radiometric anomalies (Map No. 2).

4.2.2 Concessions Granted

Permits 624 and 625 covering areas of 109 square miles (280 km²) and 69 square miles (180 km²) were approved for exploration permits on June 22, 1977 (Map No. 2). The permits are valid to June 22, 1980.

5. GENERAL GEOLOGY

5.1 PETROLOGY, LITHOLOGY, STRATIGRAPHY

The Proterozoic rocks in the Richmond Gulf area, generally termed the Manitounuk Supergroup, are part of the following units (in descending order) (Map No. 3).

1. Nastapoka Group
2. Richmond Gulf Formation
3. Pachi Group

The following outline briefly describes the stratigraphy & lithology of the above formations:

AGE	FORMATION	LITHOLOGY	AVG. THICKNESS (Meters)	
	WIACHUAN SILL	Coarse Grained Gabbro		
HELIKIAN*	<u>NASTAPOKA GROUP</u>	Iron formation,	150	
	(a) Nastapoka Island Rocks	thinly bedded quartzites & shales		
	(b) Basaltic Cap Rock	Thick sills of porphyritic basalt overlain by thick basaltic flows & thin pyroclastic beds.	120	
	(c) Mainland Sedimentary Rocks	Basal breccia, quartzites, siltstones & dolomites	150	
	ANUGLAR UNCONFORMITY			
	<u>Richmond Gulf Formation</u>	Pink to grey arkoses, boulder conglomerates at base	450	
MINOR EROSIONAL UNCONFORMITY (?)				
	<u>PACHI GROUP</u>	Massive dark grey to green andesitic flows and sills	30	
	(a) Pachi Volcanic complex (b) Pachi sediments	Pinkish to light grey arkose, arkosic quartzite grit, pebble conglomerate & regolith	150	
MAJOR EROSIONAL UNCONFORMITY				
ARCHEAN	Granites	Undifferentiated		

TABLE 4 - From Woodcock (1960)

*According to Stevenson (GSC MEM. 356, p. 69-70) the age determination was considered excessively young (1385 m.y.) and possibly due to post-Hudsonian intrusion of younger dykes.

5.1 PETROLOGY, LITHOLOGY, STRATIGRAPHY - Cont'd

The Archean basement in the Richmond Gulf area consists of, essentially, medium to coarse-grained massive granites, pegmatitic granites, and minor occurrences of intermediate igneous rocks. In certain areas, foliated granites and gneisses are found as well. At least seven inliers of the Archean basement are exposed within the sedimentary and volcanic sequence of the Manitousuk Supergroup - five of which were previously mapped by Woodcock (1960) and ground checked this summer. At least two more granite inliers occur within the Pachi Group, north of Clearwater River. (See Map No. 5).

Because of an outcrop density of 80%-90%, the contact between the Archean basement and the Proterozoic sediments is often well exposed. However, upon close inspection, difficulty was encountered in distinguishing between the granite basement rock and the overlying regolith. Increasing brecciation of the granite towards the contact was observed in places and, according to Stevenson (1968), partial recrystallization of the Pachi arkoses occurs, as well, although this was not observed during the survey. In some areas, the contact is obscured by topographic depressions, possibly fault controlled.

The basal portion of the Pachi sediments consists of a very coarse-grained polymictic conglomerate containing angular to subrounded clasts of quartz and feldspar inter-layered with thin iron-oxide bands (hematite - minor ilmenite). This grades into arkoses, fine-grained sandstones, quartzites and minor argillites. The iron oxide layers often persist up into the sandstone. The Pachi sediments are characteristically reddish in color and occasionally display cross-bedding structures.

The Pachi volcanics, although aerially extensive, form only a very thin capping above the Pachi sediments (often between 10 and 30 meters). They consist of dark grey to green andesitic flows and sills and, on a weathered surface, commonly display peculiar orbicular structures.

The Richmond Gulf Formation is composed of principally white to pink arkoses with minor argillites, grey-wackes and quartzites. According to Woodcock (1960) the Richmond Gulf Formation unconformably overlies the Pachi volcanics although no such contact was observed during the follow-up survey. In contrast to the Pachi sediments, the Richmond Gulf Formation is extensively cross-bedded and ripple marked.

5.1 PETROLOGY, LITHOLOGY, STRATIGRAPHY - Cont'd

The Nastapoka Group, a topographically prominent unit, overlies the Richmond Gulf Formation along a definite angular unconformity. The rock types consist of a basal breccia and a series of quartzites, dolomites and flagstones which are overlain by a resistant cap rock of basaltic flows and thin pyroclastic lenses. This unit is fairly continuous and extends for at least 130 km along the Hudson Bay coast.

The Wiachuan sill, a branching gabbro intrusive, occurs along or near the unconformity below the Richmond Gulf Formation. It is composed of chiefly coarse-grained plagioclase poikilitically intergrown with augite. Numerous branching basaltic dikes, related to the Wiachuan sill, are known to occur.

The recent marine terraces, situated on the south-eastern and northern shores of Richmond Gulf, are a result of isostatic rebound after the latest ice retreat. (See Map Nos. 3 to 10 for the regional geology of Richmond Gulf).

5.2 STRUCTURE AND TECTONICS

The Manitounuk Supergroup of the Richmond Gulf area forms a slightly metamorphosed homoclinal sequence which dips gently to the west, usually at less than 5 degrees. Richmond Gulf is interpreted to be a fault graben (Woodcock, 1960) bounded by east-west trending faults along the north and south sides of the gulf. East of Richmond Gulf, the Archean basement forms prominent E-W trending ridges that establish the existence of relatively uplifted blocks within the graben structure. North and south of the graben structure, the reverse occurs as the Nastapoka Group forms prominent east-facing ridges above the basement granites.

According to Woodcock (1960), the block faulting which caused the general depression of the Richmond Gulf area followed the deposition of the Pachi Group. Renewed faulting, but with smaller vertical displacements, followed the deposition of the Richmond Gulf Formation. In both cases, this faulting is evidenced by a gradual increase in the dip of the sediments towards the faulted contact.

The deposition of the Nastapoka Group was followed by uplift, tilting to the southwest, gentle folding and some vertical faulting with negligible vertical displacement.

Gentle folds occur within the sedimentary sequence of the Pachi Group, particularly south of Lac Persillon. The axes of these fold belts trend approximately ENE &

5.2 STRUCTURE AND TECTONICS - Cont'd

ESE (see Map No. 3). Within the Nastapoka Group, folding increases gradually towards the center of the Belcher Basin as demonstrated by the relatively sharp folds on the Belcher Islands.

Isostatic adjustment, following removal of the glacial ice, is at present uplifting the region.

5.3 ECONOMIC GEOLOGY

Copper mineralization occurs as disseminated chalcopyrite in a fractured arkosic member of the Richmond Gulf Formation and as small patches of chalcopyrite in a dolomite of the Nastapoka Group. Lead, zinc and minor copper mineralization is found in a basal cherty dolomite of the Nastapoka Group, concentrated along fractures and in vugs.

6. PROSPECTIVE TARGETS AND AREAS

Being of a reconnaissance nature, the 1977 summer program had no well-defined targets. However, two main areas were of particular interest:

- (1) the Archean/Proterozoic unconformity
- (2) the high priority airborne spectrometer anomalies.

7. INVESTIGATIONS

7.1 AIRBORNE SURVEYS

A fixed wing airborne spectrometer survey (Calgary-system), a follow-up helicopter spectrometer survey and a helicopter-borne geochemical survey were conducted in the Richmond Gulf area. (See Map No. 17).

7.1.1 Helicopter Spectrometer Survey

7.1.1.1 Objective

The objective of this survey was to re-fly the high priority anomalies outlined by the fixed wing spectrometer survey and to fly the entire Archean/Proterozoic contact in order to outline any possible target areas.

7.1.1.2 Survey Statistics

Survey Platform: Bell-206B Jet Ranger
Charter Company: Les Helicopteres Canadiens Ltée.
Instrumentation: Scintrex GAM-IIS Differential Spectrometer
Scintrex GSA-61 Sensor (1850 cm³)
Easterline Angus Chart Recorder
12-volt battery pack.
Line Spacing: (for reflight airborne anomalies)
3 lines, 250-300 m apart and 3 km.
long (approx.)
Flying Altitude: 25-30m
Ground Speed: 100-120 km/hour
Survey Hours: (including ferry) 25.0

N.B. Flying altitude and ground speed were similar in both reflight airborne anomalies and contact flying.

7.1.1.3 Operation

The instrumentation was mounted on a rack and placed in the front seat of the helicopter next to the pilot. The crystal was placed in the luggage compartment in the left rear section of the aircraft. Aside from occasional problems with the battery pack, the instrumentation was found to be trouble free. The person seated next to the pilot performed the navigation and monitored the instrument during flight. Brief ground checks of certain airborne anomalies were performed simultaneously.

7.1.2 Helicopter Lake Geochemical Survey

7.1.2.1 Objective

The airborne geochemical survey was undertaken to outline areas with anomalous uranium values and to provide additional data for the evaluation of the potential of these areas.

7.1.2.2 Survey Statistics

Survey Platform: Bell-206B Jet Ranger
Charter Company: Les Helicopteres Canadiens Ltée.
Amount of Samples Collected:
Lake waters: 171
Lake bottom sediments: 166
Analyses:
Lake Waters: U (ppb), HCO₃, pH
Lake bottom sediments: U (ppm)
Laboratory:
Bondar-Clegg & Co. Ltd., Ottawa
(U-water, sediments)
UEM
(HCO₃, pH)
Sample density:
(i) within permit area: 1 sample/4 km²
(ii) outside permit area: 1 sample/50 km²

7.1.2.2 Survey Statistics - (Cont'd)

Cost (including ferry):
\$27 per sample site

7.1.2.3 Operation

The sediment sampler, seated in the rear, collected lake bottom sediments with a sampling dart and recorded all pertinent data in his field notes. The navigator-water sampler, seated next to the pilot, collected 2 surface water samples and plotted the location and sample number on a 1:50,000 mosaic.

7.1.3 Fixed-Wing Spectrometer Survey

7.1.3.1 Objective

The Calgary-based airborne survey was flown along the entire Archean-Proterozoic unconformity in order to outline favourable target areas for follow-up surveys.

7.1.3.2 Survey Statistics

Survey Platform: Aero Commander 500B (Twin Engine)
Charter Company: Highwood Air Services Ltd.
Instrumentation:

(i) RADIOMETRIC

The gamma ray detector system consisted of two Scintrex GSA 64's. Each unit contains four 6" x 4" thallium activated sodium iodide crystals to give a total sensor volume of 904 cubic inches.

Two Scintrex GAM 2 spectrometers process the signal from the sensors. The GAM 2 is a four channel spectrum analyzer which incorporates adjustable threshold levels and window-width controls and includes stripping circuits.

Threshold levels, window widths, stripping values and sensitivities are listed in Appendix A (Section 1).

A calibration monitor is included in the system to monitor the position of the thorium peak.

(ii) MAGNETOMETER

The magnetometer used was the Geometric's G-803 airborne proton precision magnetometer with the sensor mounted in the aircraft tail stinger. Various sensitivities, repetition rates and ranges of full scale deflections are available. For our survey the repetition rate was $\frac{1}{2}$ sec, sensitivity was 1 gamma and full scale deflection 1000 gammas.

7.1.3.2 Survey Statistics (Cont'd)

(iii) CHART RECORDERS

Two chart recorders were used. The MFE-RCM8 recorder heated stylus pens provided eight channels of analogue data, and the Hewlett Packard 7130A with ink pens provided two channels of analogue data. Both recorders contain event markers.

The channels recorded are listed in Appendix A (Section 1).

(iv) ANCILLARY EQUIPMENT

A Sperry radar altimeter measured the terrain clearance. Additional equipment includes inverters, filters, intercom, etc.

(v) BASE STATION

A Geometrics G-826 ground base station magnetometer was used to keep a record of the total magnetic field at a fixed station. The flight tapes were edited from this record.

Line Spacing: 500 meters (over most of the area)
1000 meters (at the northern and southern fringes)

Flying Altitude: 60-75 meters
Ground Speed: 180 km/hour average
Total distance flown: 4000 line km (approx)
Operating Days: August 8 to August 15, 1977
Operating Hours: 38 (plus ferry time)
Operating Cost: \$13,288.67 or \$3.32/line km

7.1.3.3 Operation

The instrumentation was mounted within the aircraft. On survey, the crew consisted of the instrument operator, navigator and pilot. The operator was seated next to the instrumentation and the navigator next to the pilot in the front. Flight recovery was obtained by line-plotting during flight on photo mosaics and by introducing fiducials onto the chart paper when crossing distinct landmarks.

Immediately after a survey flight the data was quality checked and clearly labeled with identification information and channel scalings. Anomalies were then picked, classified and plotted on the mosaics.

7.2 CARBORNE SURVEY

Nothing to report

7.3 GROUND SURVEY

7.3.1 Ground Radiometric Survey

A total of 30 selected airborne anomalies were followed-up on the ground in order to determine the rock types and possible cause for the anomaly. Most of these checks were very brief due to the limited survey time and extensive ground coverage.

7.3.2 Radon Survey

Nothing to report.

7.3.3 Geological Mapping

The entire Archean/Proterozoic unconformity was mapped from the helicopter and occasionally ground checked for verification. Additionally, ground checks were made of representative rock types (as mapped by Woodcock) from the entire sedimentary and volcanic succession in Richmond Gulf in order to become familiar with their lithologies.

Woodcock's geological interpretation (1960) of the Richmond Gulf area proves to be fairly accurate on a regional scale.

7.3.4 Geochemical Survey

Nothing to report.

7.3.5 Sampling

A total of ten rock samples were collected for rock assay and petrologic and petrographic analyses. Representative samples were also collected from the entire suite of the Richmond Gulf basin.

7.4 TRENCHING

Nothing to report.

7.5 DRILLING

Nothing to report.

7.6 MICROSCOPY

The mineralogical report will be made available in the near future.

8. RESULTS

8.1 ANOMALIES DISCOVERED

8.1.1 Radiometric Anomalies

A total of 248 radiometric anomalies were detected from the fixed-wing spectrometer survey, (Appendix A, Section 2). The initial selection of anomalies was based on the following criteria:

- (1) anomaly shape
- (2) U/th, U/K, element to background ratios
- (3) amplitudes, terrain & topographic consideration, noise level, and gradients on traces
- (4) time constants, flying speeds & stripping effects, (APPENDIX A, Section 1)

The flight charts were rechecked in the Montreal office and after imposing an additional criterion, 66 of the original 248 radiometric anomalies were put on low priority (See Appendix B, Table 1). The additional criterion is that the width of the peak at $\frac{1}{2}$ maximum amplitude must equal or exceed twice the height of the aircraft above the ground. On the average, one millimeter on the graph paper equals 30 meters on the ground. The anomalies not meeting this criterion were considered to be a result of noise. The recheck resulted in the selection of an additional 12 anomalies to bring the final total to 194 anomalies. (See report in Appendix B).

A breakdown into priorities of the 194 airborne anomalies is as follows:

TABLE 5

Priority	3	3+	2-	1
	179	12	3	

Of the original 248 anomalies, 42 were reflown with the helicopter and 30 were subsequently ground checked. The table below summarizes the brief ground checks: (See Maps 4-10).

8.1.1 Radiometric Anomalies - Cont'd

TABLE 6

ARCHEAN	Number of Anomalies	(%)
Outcrop		
Homogeneous Granite	9	(30)
Fractured &/or Brecciated Granite	7	(23)
Granite with Pegmatitic Pods	2	(7)
Gneiss	1	(3)
Boulder Clusters	2	(7)
PROTEROZOIC		
Outcrop	5	(17)
NOT RECOVERED	4	(13)

A brief description of each anomaly is found in Appendix A (Section 3).

Ground checking of airborne anomaly 180D (Map 12, 7ZM-409) resulted in the discovery of a gneissic granite with at least 2 interlayers of a highly altered (oxidized) biotite fraction. Highest counts were confined within these layers. One rock sample (ZM-409) contained 78 ppm U_3O_8 and 11 ppm ThO_2 .

Northeast of Richmond Gulf, along a 5 km stretch of the Archean/Pachi contact, substantially high counts were encountered as well (Map 11). Two ground checks of this area indicated the existence of "black sands" at the base of the Pachi unit. However, the high counts were due mainly to Thorium: sample ZM-406: 35 ppm U_3O_8 , 1078 ppm ThO_2 , 5ppb Au and ZM-407: 1 ppm U_3O_8 , 70 ppm ThO_2 .

8.1.2 Geochemical Anomalies/Analyses

The sample site and analyses of the lake bottom sediment samples, water samples and rock samples are shown on Map numbers 11, 12, 13, 14, 15, 16. Frequency histograms of the lake bottom sediment samples and water samples have been prepared (See Appendix E).

8.1.2 Geochemical Anomalies/Analyses - Cont'd

Selection of threshold values and the limits of the first, second and third order anomalies was performed statistically, using the arithmetic mean and standard deviation method. Table 7 defines these limits:

TABLE 7

BACKGROUND THRESHOLD	-	Arithmetic Mean
3rd ORDER ANOMALY	-	Arithmetic Mean + 1 Standard Deviation
2nd ORDER ANOMALY	-	Arithmetic Mean + 2 Standard Deviations
1st ORDER ANOMALY		

N.B. Due to a few excessively anomalous values, the highest two values were omitted during the statistical analyses.

Table 8 outlines the Threshold values and anomalous limits for the different populations.

TABLE 8

LOCA-TION	SAMPLE TYPE	THRESHOLD	3rd ORDER	2nd ORDER	1st ORDER
ARCHEAN	Lake Bottom Sediments	16.53	16.54-38.08	38.09-59.63	>59.63
	Lake Waters	0.24	0.25-0.47	0.48-0.70	>0.70
PROTEROZOIC	Lake Bottom Sediments	5.24	5.25-11.98	11.99-18.72	>18.72
	Lake Waters	0.21	0.22-0.42	0.43-0.63	>0.63

8.1.2 Geochemical Anomalies/Analyses - Cont'd

Table 9 outlines the number and percentage of anomalies within each interval.

TABLE 9

SAMPLE TYPE	BACKGROUND	3rd ORDER	2nd ORDER	1st ORDER
Lake Bottom Sediments	118 (71%)	23 (14%)	8 (5%)	17 (10%)
Lake Waters	106 (62%)	39 (23%)	14 (8%)	12 (7%)

The results of the regional geochemical survey are summarized below:

1. There is a fairly good positive correlation between U-sediment and U-water (correlation coefficient (r) = 0.73).
2. There is little or no correlation between HCO₃ and U-water (r) = 0.20).
3. The variation in the pH of the lakes is negligible (pH = 4.7 to 5.0) in most cases.
4. The threshold values between samples within the Archean and within the Proterozoic are distinctly different for lake bottom sediment samples. This difference is less evident for the lake water samples.

Due to the scale of the survey, the anomalies outside the exploration permits are essentially isolated points. However, within the exploration permits where the sampling density was greater, two geochemically interesting areas occur - one being east of Lac Persillon and the other being north of Caribou River (See Map No. 12).

Correlation between the airborne radiometric and geochemical anomalies is reasonably fair east of Lac Persillon. Little correlation exists in the second area.

8.2 DESCRIPTION OF MINERALIZATION

Nothing to report.

8.3 CHEMICAL ANALYSES

See Appendices C & D for details.

9. ASSESSMENT

9.1 ASSESSMENT OF POTENTIAL

9.1.1 Uranium Potential

The results of the airborne spectrometer survey and the regional geochemical survey warrant further exploration for economic uranium deposits in three different geological environments:

- (i) Unconformity - related Key Lake type deposits
- (ii) Unconformity - related strata-bound deposits within the lowermost sedimentary strata
- (iii) Hydrothermal - supergene enriched uranium deposits in the basement.

9.1.2 Potential for Other Minerals

The lead, zinc and copper occurrences in the Nastapoka Group indicate some potential for these base metals.

10. RECOMMENDATIONS

It is recommended that a follow-up program, consisting of the following surveys, be undertaken:

1. Geological Mapping
2. Geochemical Surveys
 - (a) More detailed helicopter-borne regional survey
 - (b) Detailed lake margin and stream sampling in anomalous areas.
3. Detailed Follow-Up
 - (a) of the airborne radiometric anomalies
 - (b) of the geochemical anomalies.
4. Helicopter-borne Spectrometer Survey (30 hours) - Contact flying
 - flying lines parallel to the Archean/Proterozoic contact
5. Prospecting
 - (a) along the Archean/Proterozoic contact
 - (b) in anomalous zones.(See Map No. 18).

APPENDIX A

AIRBORNE RADIOMETRIC SURVEY

APPENDIX A

SECTION 1: GAM II Survey Setting, Energy Levels,
Channels Recorded

APPENDIX A

1977 AIRBORNE GAM-2 SURVEY SETTINGS AND ENERGY LEVELS

GAM-2 B (TOP) COARSE GAIN SETTING = 1 24 v operation
 FINE GAIN SETTING \approx 5.0

CHANNEL	DESIGNATION	LEVEL & WIDTH	SETTING	ENERGY MEV (CALIBRATED)	RECORDER
1	Th 1 sec	E	8.25	2.48	RCM-8
		ΔE	5.50	0.33	
		E + ΔE		2.81	
2	U strip 1 sec	E	5.55	1.66	RCM-8
		ΔE	4.00	0.24	
		E + ΔE		1.90	
3	K strip 1 sec	E	4.60	1.38	RCM-8
		ΔE	3.00	0.18	
		E + ΔE		1.56	
4	TC > 0.05 (total count)	E	0.20	0.05 MEV	RCM-8

GAM-2 A (BOTTOM) COARSE GAIN SETTING = 1 24v operation
 FINE GAIN SETTING \approx 5.0

FOR SURVEY 1	U $\frac{1}{2}$ sec time const unstripped	E	5.55	1.66	RCM-8
		ΔE	4.00	0.24	
		E + ΔE		1.90	
FOR CALIB. ONLY	Th CAL 8.9	E	8.90	2.68	
		ΔE	1.0	0.05	
2	Th CAL 8.2	E	8.20	2.45	Calibration Monitor
		ΔE	1.0	0.05	
3	U unstrip 1 sec	E	5.55	1.66	RCM-8
		ΔE	4.00	0.24	
		E + ΔE		1.56	
4	TC > 0.5 MEV	E	1.00	0.30 MEV	7130 RECORDER

STRIPPING SETTINGS FOR ALTERNATE RANGES C.P.S.

Th 100	S ₁ = 1.20	Th 300	S ₁ = 1.20	Th 100	S ₁ = 1.20
U 100	S ₂ = 0.10	U 300	S ₂ = 0.42	U 100	S ₂ = 1.20
K 1K	S ₃ = 0.10	K 1K	S ₃ = 0.47	K 100	S ₃ = 1.40

CHANNELS RECORDED

Full scale deflection may vary depending on local radioactivity levels.

<u>CHANNEL</u>	<u>FULL SCALE</u>	
<u>RCM 8 CHART RECORDER</u>		
Magnetometer	1,000	sensitivity 1 repetition rate $\frac{1}{2}$ sec.
Altimeter	400 ft	
Total count low threshold .05 MeV	10K or 3K cps	1 sec time const.
K stripped	0-300 cps	1 sec time const.
U unstripped	0-100 cps	$\frac{1}{2}$ sec time const.
(a U/Th ratio channel was tried but proved unsatisfactory due to electronic limitations and the statistical nature of the data).		
U unstripped	0-100 cps	1 sec time const.
U stripped	0-100 cps	1 sec time const.
Event marker Th	0-100 cps	1 sec time const.
<u>HEWLETT-PACKARD 7130A</u>		
T.C. threshold .3 MeV	10K or 3K cps	1 sec time const.
Magnetometer	1,000	sensitivity 1 repetition rate $\frac{1}{2}$ sec.
Event Marker		

APPENDIX A

SECTION 2: Airborne Survey Results

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

Project No. 71-87 Flight No. 56

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AREA Richmond Gulf SURVEY DATE 8 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in. AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM		* T.C. x1000	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY
			cts/sec	background	cts/sec	background	cts/sec	background							
A	12	11.91	14	11	0	22	0	75	.4	200	1.3			Very weak edge ^{of} / hi Th, K	3
A	10	22.73	18	17	0	25	15	70	.2	350	1.05	Fair	Good	Some Th in area, Note Alt.	3
A	4	49.36	11	12	0	20	10	90	.2	200	.91	Good	Fair	Weak	3
A	2	58.19	14	10	7	11	0	25	0	280	1.4	Poor	Good	Weak	3
B	2	61.55	25	13	5	37	15	135	.2	122	1.9	"	Poor	hi Th in area	3
A	15	80.23	9	12	0	23	15	60	.2	290	.75	Fair	Poor	hi Th, K in area, very weak	3
A	19	94.44	8	11	0	10	0	45	.2	190	.72	Good	Good	Weak, Valley	3
B	"	95.45	5	13	0	15	15	60	.2	170	.38	Good	Poor	Weak, Ridge	3
C	"	95.925	6	10	0	19	20	65	.3	240	.60	Fair	Poor	Weak, Valley	3
D	"	97.11	20	14	5	22	25	75	.4	240	1.4	Poor	Poor	Strong but hi K, Th	3
A	21	102.1	13	15	3	21	0	80	0	220	.86	Fair	Fair	hi Th, K, Weak	3
B	"	103.22	12	15	5	24	10	70	.1	400+	.8	Fair	Fair	hi Th,, K Weak, Note Alt.	3
A	30	138.97	27	12	0	25	45	90	.8	180	2.25	Good	Poor	Strong but lots of K near	3
A	32	148.49	15	15	0	26	0	65	.3	200	1.0	Fair	Fair	Weak but distinct	3
B	"	150.31	13	15	3	28	14	100	0	150	.86	"	"	" " "	3
A	36	167.88	10	15	5	12	10	45	0	350	.66	Good	Good	Broad	3
B	"	168.16	20	15	2	22	40	75	.5	180	1.3	Poor	Poor	hi K, Th	
A	40	186.18	11	17	0	26	30	120	0	240	.64	Poor	Poor	Edge of hi K, Th	3
A	42	194.6	13	13	0	16	15	70	.2	150	1.0	Good	Poor	Weak	3
	44	202.3	to 202.6		hi Th, K, U.										
A	44	202.33	19	32	0	59	50	190	0	140	.59	Fair	Poor	Distinct but lots of Th, K	3
A	48	219.30	6	10	0	20	0	50	0	350	.60	Fair	Good	Note Alt.	3
B	"	219.81	13	19	9	36	10	105	.1	170	.68	Poor	Fair	Weak	3
C	"	220.32	13	13	10	20	0	90	.5	190	1.0	Fair	Poor	"	3

* TOTAL COUNT

NAME

DATE

ALTITUDE CORRECTION YES _____ NO _____

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

Project No. 71-87 Flight No. 57

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AREA RICHMOND GULF SURVEY DATE 8 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in. AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM			* T.C. x1000	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY
			cts/sec	background	cts/sec	background	cts/sec	background	cts/sec							
A	56	170.45	10	12	8	18	30	65	0	250	.83	Poor	Poor	Weak	3	
A	60	210.33	19	17	5	35	15	80	.1	200	1.1	Fair	Fair	Sharp	3	
A	62	227.95	10	10	0	25	0	90	.2	140	1.0	Fair	Poor	Weak, lots K	3	
B	62	229.37	15	11	10	27	35	100	.2	220	1.4	Poor	Poor	Strong but lots Th, K.	3	
A	65	258.15	13	11	0	25	0	80	0	170	1.2	Fair	Fair	Top of ridge, edge of Hi K	3	
B	"	258.22	14	11	0	32	0	80	0	170	1.3	Poor	Poor	Near strong Th, K bkgd.	3	
A	66	265.75	25	13	0	28	0	105	0	180	1.9	Fair	Poor	Top of ridge, K bkgd.	3	
A	67	276.47	16	12	0	35	0	95	.2	280	1.3				3	
A	69	291.26	12	15	3	27	15	110	.2	260	.8	Fair	Poor	Weak, fairly active K	3	
B	69	293.12	14	16	7	25	0	110	.5	280	.9	Fair	Poor	" " " "	3	
C	69	293.85	12	15	10	30	15	130	0	140	.8	Fair	Poor	" " " "	3	
D	69	295.66	12	15	10	24	30	90	.1	200	.8	Poor	Poor	Weak	3	
E	69	296.84	18	18	0	25	10	90	.1	150	1.0	Good	Good	Weak but distinct sharp	3	
A	74	340.27	15	13	8	25	30	60	1.1	240	1.2	Poor	Poor	Ridge, High Th.K.	3	
A	75	348.35	12	11	6	16	25	45	.2	200	1.1	Fair	Fair	Broad	3	
A	76	357.52	20	15	0	26	0	100	0	130	1.3	Good	Fair	Strong	3+	
A	77	367.57	21	16	5	28	0	110	.5	180	1.3	Fair	Fair	Strong	3+	
A	78	374.11	20	15	0	26	20	65	1.5	170	1.3	Good	Fair	Ridge Strong K	3	
B	78	374.35	12	15	0	30	50	90	1.5	170	.8	Good	Fair	" " "	3	
A	79	382.77	16	16	9	27	35	85	0	170	1.0	Poor	Poor	Edge of ridge	3	
A	92	17.95	16	16	15	26	30	90	1.4	170	1.0	Poor	Poor	Edge of cliff	3	
A	91	25.42	12	19	8	30	20	70	0	off	.63	Poor	Fair	Weak	3	
A	90	33.23	15	13	5	25	25	85	.2	off	1.2	Fair	Fair	Weak	3	
A	89	46.0	19	16	5	25	30	90	1.0	"	1.2	Fair	Poor	Strong but some Th K	3	

* TOTAL COUNT

NAME

DATE

ALTITUDE CORRECTION YES NO

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

Project No. 71-87 Flight No. 57, 58

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AREA Richmond Gulf SURVEY DATE 8 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in. AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM		* T.C. x1000	ALT. ft	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY	
			cts/sec	background	cts/sec	background	cts/sec	background								
A	88	50.605	14	25	0	36	30	160	.1	110	.6	Fair	Poor	Weak, Hi background ThK	3	
B	"	54.80	16	20	0	38	0	150	0	130	.8	Poor	"	Weak " " "	3	
C	"	55.495	17	14	5	20	0	60	.1	200	1.2	Good	Good	Distinct, good 3rd	3+	
A	87	62.77	20	15	10	38	20	90	1.0	180	1.3	Fair	Fair	Sharp distinct. 200' off TC Anom	3	
A	270	2.46	12	16	2	14	0	80	.1	270	.8	Good	Good	Very Weak	3	
B	"	2.84	15	32	0	28	25	125	.2	180	.47	Fair	Poor	Weak hi Th, K background	3	
A	269	10.55	12	28	0	35	0	120	.1	180	.43	Fair	Fair	Poor	3	
B	"	10.89	10	25	0	28	0	110	.1	230	.4	"	"	"	3	
A	268	19.50	15	25	0	45	0	145	.8	160	.6	Poor	Poor	Hi K, Th background, granites	3	
B	"	19.97	19	25	0	37	0	130	0	350	.76	Poor	Poor	" " " " "	3	
A	267	26.32	10	19	6	20	0	100	.9	230	.53	"	"	" " " " "	3	
A	266	34.8 to	35.5 hi U. background													
A	265	43.6	20	40	0	35	30	180	0	140	.5	Fair	Fair	Hi K, Th, background	3	
A	264	51.45	13	25	0	23	0	120	0	150	.52	Fair	Fair	Weak	3	
B	"	52.07	6	27	0	30	0	120	0	160	.22	Fair	Fair	"	3	
C	"	52.16	14	32	0	45	0	160	.1	230	.43	Poor	"	"	3	
D	"	52.32	30	25	0	35	0	150	1.0	240	1.2	Fair	"	Poor 2nd hi Th, K in area	2-	
A	261	75.37	12	11	0	11	0	70	0	300	1.1	Good	Good	Weak	3	
A	258	93.52	18	22	0	24	0	90	0	200	.82	Good	Good	Very Sharp	3	
A	257	104.57	21	26	0	22	30	135	.2	120	0.81	Good	Poor	Strong U. hi background gr.	3+	
A	253	129.42	15	8	0	7	0	80	0	380	2.0	Good	Fair	Edge of wide hi T.C. zone	3	
A	250	152.71	13	19	10	20	0	90	0	170	0.7	Fair	Fair	Top of Ridge	3	
B	"	152.87	20	19	5	20	35	100	1.1	125	1.0	Fair	Fair	" " "	3	
A	246	179.62	12	26	0	22	0	90	0	210	0.46	Fair	Fair	Distinct area of hi bkgd. gr.	3	

* TOTAL COUNT

NAME

DATE

ALTITUDE CORRECTION YES _____ NO _____

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

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AREA Richmond Gulf SURVEY DATE 10 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in. AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM		* T.C. x1000	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY
			cts/sec	background	cts/sec	background	cts/sec	background							
A	245	186.15	22	16	0	16	35	60	1.5	200	0.73	Good	Poor	Top of Ridge	3+
A	244	193.57	18	23	0	16	60	125	1.1	140	0.7	Good	Poor	Edge of Ridge Hi K area	3
A	238	238.57	15	15	8	25	-	60	-	200	1.0	Fair	Good	near noise level but distinct	3
A	237	244.03	14	13	-	20	-	75	.2	160	1.0	Good	Good	Ridge hi Th adjacent	3
A	234	278.23	20	18	5	15	18	80	.3	200	1.1	Fair	Fair	Strong, some Th, K in area	3+
A	232	294.29	10	10	-	10	-	50	-	250	1.0	Fair	Good	Weak	3
B	"	295.26	10	10	-	8	-	50	-	350	1.0	Good	Good	Very Weak	3
A	231	305.45	10	15	-	13	-	70	-	150	0.66	Good	Good	½ way up steep hill	3
A	230	322.26	12	25	-	17	15	75	1.0	200	0.5	Good	Fair	Broad Granitic	3
A	228	7.72	14	14	0	23	0	85	0	190	1.0	Fair	Fair	Locally hi U. Th background	3
B	"	8.0	16	18	0	35	0	120	.2	210	.89	Fair	Fair	" " " " "	3
A	227	14.46	15	11	0	18	0	95	0	180	1.36	Good	Good	Maybe ridge, good 3rd	3+
B	227	16.50	11	8	0	13	10	60	.2	190	1.38	Good	Good	Very Weak	3
A	226	26.25	10	12	0	10	0	35	0	400*	.83	Good	Good	Note Alt. Weak	3
B	"	29.40	12	6	0	18	35	75	1.0	200	2.0	Good	Poor		3
C	"	35.0	13	13	0	16	0	65	0	270	1.0	"	Good	Very Weak	3
A	225	45.91	16	10	0	15	0	95	.4	200	1.6	Good	Fair	Distinct	3
A	224	58.76	22	24	8	32	0	130	.2	170	.92	Fair	Good	Locally high U. Th background ^{granite}	3
B	"	59.21	16	20	4	30	30	95	.3	150	.80	Fair	Poor	" " " "	3
C	"	59.50	10	15	0	14	0	40	0	300	.67	Good	Good	Weak	3
D	"	59.72	10	18	5	25	10	80	0	200	.56	Fair	Fair	Weak	3
A	222	81.54	15	10	0	20	5	90	0	200	1.5	Good	Good	Weak	3
A	151	117.50	12	13	0	23	10	85	.4	270	.92	Good	Fair	Weak	3
A	150	125.25	12	12	0	29	0	70	0	360	1.0	Fair	Good	Very Sharp and distinct	3

* TOTAL COUNT

NAME _____ DATE _____ ALTITUDE CORRECTION YES _____ NO _____

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

Project No. 71-87 Flight No. 59, 60

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AREA Richmond Gulf SURVEY DATE 10 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in AIRCRAFT GXD

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM		* T.C. (x1000)	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY
			cts/sec	background	cts/sec	background	cts/sec	background							
B	150	127.18	10	19	0	25	15	60	.2	210	.53	Good	Fair	Note Alt. Strong. Near hi K, Th	3
C	"	127.68	17	20	3	33	15	105	.2	120	.83	Good	Fair	" " " " "	3
D	"	130.80	10	12	0	16	30	120	.2	200	.83	Good	Fair	Weak near hi K, Th	3
A	147	156.77	20	25	5	43	60	120	.2	120	.80	Fair	Poor	Edge of Ridge hi K, Granites	3
B	147	158.13	13	7	0	9	5	60	.2	290	1.86	Good	Fair	Distinct adjacent weak K Hi	3
A	145	173.55	17	25	0	55	0	130	.5	160	.68	Poor	Poor	(lots K, Th) Seems to be U rich dyke in area	3
A	144	179.31	14	18	5	25	15	70	.2	200	.78	Fair	Fair	Edge of cliff (mass effect)	3
A	140	206.62	18	30	0	38	0	90	0	220	.60	Fair	Fair	Edge ^{of} hi K, Th Bkgd. Granites	3
A	156	289.9	22	20	0	32	20	135	.2	150	1.1	Fair	Fair	Hi K, Th area. Ridge granitic	3
B	156	292.05	14	18	4	15	15	65	0	310	.78	Fair	Fair	Note Alt. Edge hi area	3
C	156	300.04	16	13	6	22	30	85	.1	210	1.23	Fair	Fair	Local Th, K.	3
D	"	300.51	14	13	3	27	20	80	.1	240	1.07	Fair	Fair	Poor	3
E	"	300.81	10	20	0	21	0	80	.1	230	.50	Fair	Fair	"	3
A	158	328.85	10	8	0	12	0	80	.2	200	1.25	Good	Good	Weak	3
A	161	385.30	15	16	8	35	15	110	.1	170	.93	Fair	Fair	Distinct, Edge of hi Th, K.	3
B	"	393.41	15	18	0	22	20	100	0	280	.83	Good	Fair	Note Alt. Weak, Edge of hi Th, k	3
A	162	3.22	12	12	7	15	0	30	.1	200	1.0	Good	Good	Very Weak	3
B	"	6.79	10	18	0	28	10	90	.1	140	.6	Fair	Poor	Very Weak - top of ridge	3
C	"	18.98	9	6	3	10	0	20	.1	260	1.5	Good	Good	Weak Broad	3
D	"	20.54	18	12	8	29	10	65	.3	220	1.5	Poor	Fair	" "	3
A	163	33.88	13	12	2	17	0	45	.1	400+	1.1	Fair	Good	Edge of hi Th	3
B	"	37.98	11	10	0	22	15	60	.2	400+	1.1	Fair	Fair	Hi Th background, Note Alt.	3
A	164	56.17	25	15	10	30	0	80	.2	220	1.6	Poor	Good	Hi Thi background granite	3
A	165	74.28	13	13	4	17	-	53	.2	270	1.0	Fair	Fair		3

* TOTAL COUNT

DATE

DATE

ALTIITUDE CORRECTION YES _____ NO _____

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

 Project No. 71-87

 Flight No. 60, 61

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 AREA Richmond Gulf

 SURVEY DATE 12 August 1977

 BASE Great Whale

 CRYSTAL VOLUME 904 cu.in. AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM		* T.C. x1000	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY
			cts/sec	background	cts/sec	background	cts/sec	background							
A	166	97.55	18	13	7	26	15	95	.2	150	1.5	Fair	Fair	Top of Ridge Distinct	3
A	167	120.33	22	20	-	30	-	90	-	270	1.1	Poor	Poor	Edge of Ridge hi Th K Bkgrd	3
B	"	127.49	11	12	4	26	-	100	.2	250	1.0	Fair	Poor	" " " " " "	3
B	168	147.30	17	12	8	23	10	75	.4	140	1.4	Fair	Good	Hi Th Bkgrd. Granitic	3
B	"	154.42	19	33	0	40	0	110	.2	180	0.6	Fair	Poor	" " " "	3
C	"	154.59	28	32	0	40	0	100	.2	170	.9	Fair	Poor	" " " "	3
D	"	155.07	38	26	0	30	0	95	.4	230	1.4	"	"	" " " "	3
A	169	169.38	25	28	2	30	50	120	1.5	180	.9	Poor	Poor	Very strong K Pegmatite	3
B	169	178.35	10	15	10	25	0	75	-	300	.6	Poor	Fair	Hi Th background, Granitic	3
A	170	192.23	10	10	2	17	-	60	-	400	1.0	Fair	Good	Adjoint to hi Th. Note Alt.	3
B	"	207.96	18	34	8	28	45	75	1.0	210	.5	Fair	Poor	hi K. Background Ridge Granitic	3
A	171	218.975	10	10	0	20	-	-	-	220	1.0	Good	Good	Very weak	3
B	"	220.42	35	25	0	40	60	140	1.5	150	1.4	Poor	Poor	Hi K Bkgrd. Ridge Granitic	3
A	172	255.76	20	25	20	23	30	90	2	200	.8	Poor	Poor	Hi Th K. Granitic Ridge	3
A	174	295.60	16	18	0	20	-	90	0	180	.9	Good	Good	Weak, Distinct sharp	3
B	"	306.10	20	16	8	25	20	80	1	240	1.25	Poor	Poor	Hi Th K. granitic	3
A	175	332.32	15	15	5	25	-	85	.2	160	1.0	Poor	Fair	Hi Th. Background	3
A	177	381.60	25	25	10	35	20	100	.2	160	1.0	Poor	Fair	Hi Th Background Ridge Granitic	3
B	177	385.73	10	10	0	16	0	45	0	350	1.0	Good	Good	Weak	3
A	5	3.79	15	8	4	17	-	45	-	180	1.9	Good	Good	Broad	3
B	"	7.30	12	13	-	16	20	60	-	180	.9	Good	Fair	Ridge	3
A	7	26.99	13	10	-	15	-	50	-	310	1.3	Good	Good	Note Alt. Weak, Distinct	3
A	11	51.30	5	6	-	6	-	30	-	280	.8	Good	Good	Note Alt. Very Weak	3
A	13	57.215	18	6	6	11	-	30	.2	220	3.0	Fair	Good	Near 100' hi Th	3

* TOTAL COUNT

DATE

ALTITUDE CORRECTION YES _____ NO _____

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

Project No. 71-87 Flight No. 61, 62

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AREA Richmond Gulf SURVEY DATE 12 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in. AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM		* T.C. x1000	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY	
			cts/sec	background	cts/sec	background	cts/sec	background								
A	20	79.55	17	18	-	40	-	90	-	270	.9	Fair	Fair	Granite hi Th, K background hi Th, K within 200'	3	
A	24	97.90 to 97.98	15	14	-	25		10	70	-	370	1.1	Good	Fair	Broad zone. Note Alt.	3
A	178	10.20	8	15	-	25		-	55	-	400	.5	Good	Good	Very Weak. Note Alt.	3
A	180	55.03	21	20	6	37		30	110	.4	150	1.1	Fair	Poor	Bkgd. High Granitic	3
B	180	59.75	20	18	6	21		15	75	.3	270	1.1	Fair	Fair	Hi K. Prob. Granitic	3
C	"	63.68	36	35	12	50		40	180	-	100	1.0	Poor	Poor	Hi K, Th	3
D	"	71.375	120(?) O.S.	22	39	42		75	135	0.5	120	5.5	Poor	Poor	Hi K Th. Granitic O.S. off scale	2 -
A	181	100.42	15	13	-	25		30	90	-	230	1.2	Good	Poor	Weak Edge of Ridge	3
A	132	16.28	15	18	8	22		30	100	.5	150	.83	Poor	Poor	Weak, hi Th K. Background	3
A	131	23.18	10	12	-	20		-	110	-	210	.83	Fair	Good	Weak Broad	3
B	"	25.67	17	12	3	24		20	115	.1	190	1.4	Fair	Good	Some Th.	3
A	130	32.05	16	12	6	22		15	50	.3	350	1.3	Fair	Fair	Note Alt. Edge of hi Bkgd Th K	3
B	"	34.30	10	10	-	15		-	40	-	330	1.0	Good	Good	Broad interesting, Note Alt.	3
A	128	46.04	12	8	5	15		-	30	.3	0.S.	1.5	Fair	Good	Note Alt. Broad, O.S. off scale	3
A	127	54.0	8	12	5	17		15	60	-	270	.67	Fair	Fair	Very Weak, Note Alt. Ridge	3
A	121	123.63	19	16	5	33		40	125	.2	130	1.2	Fair	Poor	Hi K. Some Th.	3
A	119	156.19	12	12	-	22		-	110	-	170	1.0	Fair	Fair	Some hi Th in area	3
A	118	169.285	21	12	6	27		-	90	.1	240	1.7	Fair	Good	Next to hi Th	3
A	117	176.52	12	12	5	20		30	80	.5	170	1.0	Poor	Poor	Sharp. hi Th K Bkgd	3
B	"	181.53	17	15	-	30		-	110	-	240	1.1	"	"	Weak " " " "	3
C	"	184.60	12	12	-	20		-	80	-	240	1.0	Good	Good	Sharp Weak	3
A	116	193.525	13	16	-	35		5	80	-	off	.8	Fair	Fair	Weak	3
B	"	197.315	10	12	-	13		-	45	.1	off	.8	Good	Good	Weak	3

* TOTAL COUNT

NAME

DATE

ALTITUDE CORRECTION YES _____ NO _____

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

Project No. 71-87 Flight No. 62, 63

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AREA Richmond Gulf SURVEY DATE 13 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM		* T.C. X1000	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY
			cts/sec	background	cts/sec	background	cts/sec	background							
A	115	205.685	10	10	2	15	-	40	-	off	1.0	Fair	Good	Weak	3
B	"	205.905	14	13	4	17	-	50	-	off	1.0	Fair	Good	Weak Broad	3
A	114	217.04	19	20	8	45	30	122	.3	off	1.0	Poor	Poor	Hi Th, K bkgd. Granitic	3
B	"	217.70	11	13	3	20	-	50	-	off	.84	Fair	Fair	O.R.	3
C	"	221.16	11	13	-	12	-	40	-	off	.84	Good	Good	Could be interesting	3
A	113	228.675	11	14	4	18	-	50	-	off	.78	Good	Good	" " "	3
A	112	241.34	15	22	-	37	-	180	-	280	.68	Poor	Poor	Hi Th, K in area granitic	3
A	111	246.30	19	19	9	26	40	110	-	180	1.0	Fair	Fair	Strong Broad. Hi Th. K.	3
A	109	266.075	19	19	10	32	30	105	.3	170	1.0	Poor	Poor	Edge of Ridge hi Th. K.	3
B	"	266.23	15	15	4	23	5	60	-	350	1.0	Fair	Poor	Weak	3
C	"	266.90	14	17	5	22	15	85	-	160	.82	Fair	Poor	Weak	3
A	105	296.04	11	22	4	29	10	85	-	220	.5	Poor	Good	Weak	3
B	"	296.31	11	20	7	25	15	80	-	170	.55	Poor	Good	Weak	3
C	"	297.62	12	19	3	21	-	80	-	370	.6	Fair	Good	Weak	3
A	94	1.22	10	12	-	15	-	30	-	150	.8	Good	Good	Very Weak	3
A	97	24.75	20	20	-	25	15	120	.5	120	1.0	Good	Good	Good Sharp. hi Th, K in area	3
B	"	25.96	20	15	-	15	-	120	.2	210	1.3	Good	Good	" " " " " "	3
A	98	36.60	12	18	-	20	-	100	-	140	.67	Good	Good	Weak	3
B	98	38.85	20	20	-	30	15	90	.5	160	1.0	Fair	Fair	Broad	3
A	99	45.26	10	12	-	20	-	50	.1	230	.83	Good	Good	Very Weak	3
A	100	55.55	12	12	-	15	25	90	-	130	1.0	Good	Good		3
A	102	81.36	18	20	9	25	20	110	.2	270	.9	Fair	Fair	Some hi Th, K.	3
A	85	4.62	15	12	5	18	-	85	-	230	1.3	Poor	Good	Weak	3
B	"	4.90	14	13	-	13	30	90	.5	190	1.1	Fair	Poor	Weak	3

* TOTAL COUNT

DATE

ALTITUDE CORRECTION YES _____ NO _____

URANERZ EXPLORATION & MINING LTD. — AIRBORNE SURVEY RESULTS

Project No. 71-87 Flight No. 63, 64

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AREA Richmond Gulf SURVEY DATE 14 August 1977 BASE Great Whale CRYSTAL VOLUME 904 cu.in. AIRCRAFT XDN

ANOMALY NUMBER	FLIGHT LINE	ANOMALY FIDUCIAL	URANIUM		THORIUM		POTASSIUM			* T.C. x1000	ALT. ft.	TIMES BACKGROUND (URANIUM)	U/TH RATIO	U/K RATIO	COMMENTS	PRIORITY
			cts/sec	background	cts/sec	background	cts/sec	background	cts/sec							
A	84	12.12	13	12	8	17	20	55	.3	330	1.1	Fair	Fair	Broad	3	
A	83	21.43	15	13	-	20	20	105	.2	230	1.2	Good	Poor	"	3	
A	81	41.795	13	10	-	20	-	90	.1	240	1.3	Good	Good		3	
A	183	4.58	14	13	-	30	30	65	.6	320	1.1	Fair	Fair	Lots of Th K in area, granitic	3	
B	"	7.62	23	23	4	35	15	140	.5	160	1.0	Fair	Fair	" " " " " "	3	
C	"	8.54	26	25	20	40	65	150	2.5	130	1.1	Poor	Poor	" " " " " "	3	
A	184	27.805	15	15	8	30	30	80	.5	200	1.0	"	"	" " " " " "	3	
B	"	35.175	20	20	6	30	-	110	-	230	1.0	Fair	Good	Better looking - sharp	3+	
A	185	50.50	20	20	19	28	50	90	1.2	150	1.0	Poor	Poor	Lots of Th, K in area, granitic	3	
B	"	62.60	18	15	10	26	35	85	.6	190	1.2	Fair	Fair	Better looking sharp	3+	
A	186	75.26	19	20	6	43	30	90	.4	180	.95	Poor	Fair	Granitic	3	
B	"	85.80	11	20	5	30	-	95	-	220		Fair	Good	Broad	3	
A	189	152.60	16	21	6	35	-	90	.3	310	.55	Fair	Good	Lots of Th, K in area granitic	3	
A	192	181.8	13	20	4	35	-	120	.2	140	.65	Fair	Good	" " " " " "	3	
	193	190 hi	U. Th, K													
	194	200.6	to end of		line, hi U. Th. K.											
	195	206.4	to 206.6,		hi U. Th, K.											
A	196	217.0	16	12	4	16	-	170	.3	180	1.3	Fair	Poor	Lots of K. granitic	3	
		218.7	to end of		line, hi U. Th. K.											
A	197	227.0	11	6	-	14	-	50	-	200	1.8	Good	Fair	Very Weak	3	
		237.4	to end of		line, hi U. Th, K.											
	199	Beginning of		Line, Hi U. Th, K.												
A	199	246.18	12	7	-	16	-	150	-	190	1.7	Good	Poor	Very Weak	3	
	200	255.5	to end,		hi U, Th, K.											

* TOTAL COUNT

APPENDIX A

SECTION 3: Ground Check of Airborne Spectrometer
Anomalies

GROUND CHECK OF AIRBORNE SPECTROMETER ANOMALIES

Page No.:1

Anomaly No.	Area		Date	CPS (in situ)		Cause of Anomaly
	N.T.S. No.	UEM Map		BKGD.	Max.	
164 A	34 c/8	B	30/9/77	150	300	High background granite (Basement)
163 A	34 c/8	B	30/9/77	100	300	Granite Inlier
226 A	34 c/8	B	30/9/77	20	20	N/R
232A	34 c/8	B	30/9/77	75-100	275	Thin grey black horizons (specularite) in the Pachi Arkoses. 11ppm U_3O_8 , 162 ppm ThO_2
150 A	34 c/8	B	31/9/77	100	200	Homogeneous Granite (Basement)
156A	34 c/8	B	31/9/77	100	150	Homogeneous Granite (Basement)
192 A	34 b/5	B	31/9/77	150	300	Highly fractured heterogeneous granite; large volcanic blocks incorporated in rock.
184 B	34 b/5	B	31/9/77	150	300	Basement granite; iron stained fractures produced slightly higher readings.
185 B	34 b/5	B	2/9/77	150	250	Basement granite with a few Pegmatitic pods.
172 A	34 c/8	B	2/9/77	100	300	Highly fractured heterogeneous granite, some brecciation at base.
167 A	34 c/8	B	2/9/77	100	700	Brecciated granite at basement/ sediment contact 8ppm U_3O_8 , 9 ppm ThO_2
215 A	34 b/12	B	2/9/77	150	350	Massive granite (basement) with a few pegmatitic pods.

N/R: Not Recovered

GROUND CHECK OF AIRBORNE SPECTROMETER ANOMALIES

Page No.:2

Anomaly No.	Area		Date	CPS (in situ)		Cause of Anomaly
	N.T.S. No.	UEM Map		BKGD.	Max.	
180 D	34 b/12	A	2/9/77	250	1500	Highly oxidized gneiss in basement; grab sample assayed 78 ppm U_3O_8 , 11ppm ThO_2
218 A	34 b/12	A	3/9/77	150	1200	Fractured basement Granite; fractures 7ppm ThO_2 produced higher readings; grab sample-21 ppm U_3O_8
184 A	34 b/12	A	3/9/77	75	150	Basement Granite, Homogeneous
171 A	34 b/12	A	3/9/77	50	150	Pachi Arkose & Grit, weathered surface appears granitic in texture.
162 C	34 c/9	A	3/9/77	50	100	Maroon colored argillite within Pachi Sequence (outcrop surrounded by swamp)
253 A	34 c/9	A	5/9/77	100	125	Richmond Gulf formation; granitic texture evident in numerous beds.
264 D	34 c/9	A	5/9/77	150	750	At contact between Nastapoka Group and highly fractured & brecciated basement granite
269 A	34 c/9	A	5/9/77	150	300	Basement granite (fractured & brecciated in places)
266 A	34 c/9	A	5/9/77	150	300	Basement granite; extensively fractured
245 A	34 c/9	A	5/9/77	100	150	Basement granite (N/R)
234 A	34 c/9	A	5/9/77	75	100	Basement Granite (N/R)
227 A	34 c/9	A	5/9/77	75	200	Basement Granite (N/R)

N/R: Not Recovered

GROUND CHECK OF AIRBORNE SPECTROMETER ANOMALIES

Page No.: 3

Anomaly No.	Area		Date	CPS (in situ)		Cause of Anomaly
	N.T.S. No.	UEM Map		BKGD.	Max.	
19 A	33 N/15	F	6/9/77	30	150	Granite boulder field on Nastapoka Volcanics
19 B	33 N/15	F	6/9/77	30	300	Granite boulder field on Nastapoka Volcanics
77 A	33 N/16	E	6/9/77	100	200	Basement Granite
88 C	33 N/16	E	6/9/77	100	300	Basement Granite
97 B	33 N/16	E	6/9/77	100	350	Basement Granite; near unconformity
117 A	33 N/16	D	6/9/77	50	75	Pachi Volcanic Ridge

N/R: Not Recovered

APPENDIX B
RICHMOND GULF
PROJECT NO. 71-87
GEOPHYSICAL REPORT 1977
AIRBORNE SPECTROMETER SURVEY

Prepared by:

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AIRBORNE SPECTROMETER SURVEY

An airborne spectrometer survey was flown during August 1977 in the Richmond Gulf area. The survey was carried out with two GAM 2 spectrometers and two GSA 64 crystals (Scintrex) mounted in a twin-engined Aero Commander 500B. Approximately 4,000 line kilometers (270 lines) were flown. According to the first interpretation of the data, 248 uranium anomalies were picked up, most of them of third priority. For exact location of the anomalies the data was checked again. In 66 cases, the half-amplitude-width of the anomalies was much less than the flight altitude, i.e. too small to be caused by ground sources. These anomalies were eliminated (see Table 1). Twelve anomalies were added (see Table 2) for a final total of 194 anomalies: 154 anomalies are of priority 3, 12 are of priority 3+ and 3 are of priority 2-, 25 are high background uranium areas. The spectrometric charts show four anomalies passed the end of the flight lines, measured while the aircraft was turning to begin a new line (see Table 3).

The location of the flight lines as well as of the anomalies is shown on Maps 4-10. Most of the anomalies are located in the Archean basement, only few are in the sediments. The accumulation of anomalies in the basement just at the contact between basement and sediments could be due to the rapid change of elevation. At the contact the Archean units form cliffs relative to the sedimentary rocks, i.e. the aircraft is in a lower altitude over the border of the basement (higher intensity of gamma radiation).

TABLE 1

ELIMINATED ANOMALIES

Anomaly No.	Flight Line	Anomaly Fiducial
32A	32	148.49
32B	32	150.31
42A	42	194.35
48E	48	222.60
33B	33	25.27
41B	41	65.59
45B	45	82.55
55A	55	159.31
62A	62	227.95
62B	62	229.37
65A	65	258.15
65B	65	258.22
66A	66	265.75
67A	67	276.47
69A	69	291.76
69B	69	293.12
69C	69	293.85
69D	69	295.66
78A	78	374.11
78B	78	374.35
79A	79	382.77
92A	92	17.95
88B	88	54.80
258A	258	93.52
250A	250	152.71
232A	232	294.29
232B	232	295.26
230A	230	322.26
228B	228	8.0
226A	226	26.25
226C	226	35.0
222A	222	81.54
151A	151	117.50
150A	150	125.25
147A	147	156.77
156B	156	292.05
156C	156	300.04
162B	162	6.79
163B	163	37.98
170A	170	192.23
171A	171	218.98
177B	177	385.78
11A	11	51.30
20A	20	79.55
178A	178	10.20
132A	132	16.28
131A	131	23.18
131B	131	25.67
127A	127	54.0
117B	117	181.53

TABLE 1 (Cont'd)

ELIMINATED ANOMALIES

Anomaly No.	Flight Line	Anomaly Fiducial
117C	117	184.60
116B	116	197.32
105A	105	296.04
105B	105	296.31
105C	105	297.62
94A	94	1.22
99A	99	45.26
83A	83	21.43
81A	81	41.8
183A	183	4.58
183B	183	7.62
183C	183	8.54
185A	185	50.50
192A	192	181.8
196A	196	217.0
199A	199	246.18

APPENDIX C

GEOCHEMICAL SURVEY

APPENDIX C

SECTION 1: Geochemical Sample Data: Lake Bottom
Sediments

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

Project No.: 71-87

Date: October, 1977

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Sample No.	Type	Size or Depth (m ² , m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
7JG-200	Lake Bottom			Clay			5.0				
201	Lake Bottom			Clay			22.0				
202	Lake Bottom			Clay			32.0				
203	Lake Bottom			Silt			61.0				
204	Lake Bottom			Silt			9.2				
205	Lake Bottom			Silt			5.4				
206	Lake Bottom			Silt			11.8				
207	Lake Bottom			Silt			2.0				
208	Lake Bottom			Silt			1.4				
210	Lake Bottom	2		Silt			5.6				
212	Lake Bottom	1		Clay			1.2				
213	Lake Bottom	4		Silt			0.9				
216	Lake Bottom	8		Clay			27.0				
217	Lake Bottom	2		Clay			4.0				
219	Lake Bottom	4		Silt			4.4				
220	Lake Bottom	2		Clay			25.0				
221	Lake Bottom	5		Silt			40.0				
222	Lake Bottom	6		Silt			3.3				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² , m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
7JG-223							59.0				High Standard
225	Lake Bottom	1		Clay/Fine Sand			2.5				
226	Lake Bottom	20		Clay/Silt			12.4				
227	Lake Bottom	5		Clay/Silt			11.8				
228	Lake Bottom	5		Clay			12.5				
229	Lake Bottom	2		Silt			63.0				
230	Lake Bottom	1		Clay/Fine Sand			4.0				
231	Lake Bottom	7		Silt			42.0				
232	Lake Bottom	3		Clay			1.3				
233	Lake Bottom	4		Silt			7.2				
234	Lake Bottom	5		Silt			21.0				
235	Lake Bottom	3		Silt			2.9				
236	Lake Bottom	6		Clay/Silt			14.2				
237	Lake Bottom	2		Clay			15.4				
238	Lake Bottom	4		Clay/Silt			13.3				
239	Lake Bottom	5		Clay/Silt			19.8				
240	Lake Bottom	12		Clay/Silt			58.0				
241	Lake Bottom	12		Clay/Silt		Dark Brown	32.0				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² , m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
7JG-242	Lake Bottom	2		Silt		Dark Brown	15.3				
243	Lake Bottom	8		Clay		Brown	12.0				
244	Lake Bottom	3		Organic		Brown	11.3				
245	Lake Bottom	4		Organic		Dark Brown	13.7				
246	Lake Bottom	2		Clay		Brown	15.3				
247	Lake Bottom	2		Organic		Dark Brown	64.0				
248	Lake Bottom	5		Organic/Clay		Dark Brown	59.0				
249	Lake Bottom	5		Fine Sand		Brown	23.0				
250	Lake Bottom	2		Organic/Silt		Dark Brown	60.0				
251	Lake Bottom	3		Organic		Dark Brown	63.0				
252	Lake Bottom	2		Organic		Dark Brown	49.0				
253	Lake Bottom	8		Organic		Dark Brown	12.0				
254	Lake Bottom	8		Organic		Dark Brown	22.0				
255	Lake Bottom	5		Organic/Silt		Dark Brown	29.0				
256	Lake Bottom	5		Organic		Dark Brown	18.9				
257	Lake Bottom	4		Organic		Dark Brown	10.7				
258	Lake Bottom	6		Organic		Dark Brown	20.0				
259	Lake Bottom	3		Organic		Dark Brown	17.8				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² , m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
7JG-260	Lake Bottom	5		Clay/Silt		Grey	3.6				
261	Lake Bottom	4		Organic		Dark Brown	4.8				
262	Lake Bottom	4		Organic		Dark Brown	9.8				
263	Lake Bottom	1		Organic		Dark Brown	2.1				
264							0.5				Low Standard
265	Lake Bottom	1		Clay/Silt		Grey	8.2				
268	Lake Bottom	4		Organic/Silt		Dark Brown	15.6				
269	Lake Bottom	1		Clay		Brown	1.3				
270	Lake Bottom	3		Organic/Silt		Dark Brown	14.0				
271	Lake Bottom	5		Organic/Silt	10	Dark Brown	7.5				
272	Lake Bottom	2		Clay		Grey	14.2				
274	Lake Bottom	3		Silt		Dark Brown	4.5				
275	Lake Bottom	5		Silt		Dark Brown	13.3				
276	Lake Bottom	7		Organic		Dark Brown	9.7				
277	Lake Bottom	8		Organic/Clay		Grey / Dark Brown	12.1				Some Silt
278	Lake Bottom	3		Organic/Silt		Dark Brown	19.8				
279	Lake Bottom	4		Organic		Dark Brown	47.0				
280	Lake Bottom	4		Organic/Silt		Dark Brown	30.0				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² , m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
7JG-281	Lake Bottom	4		Organic/Silt		Dark Brown	3.2				
282	Lake Bottom	5		Organic		Dark Brown	19.1				
283	Lake Bottom	3		Organic		Dark Brown	92.0				
284	Lake Bottom	8		Organic		Dark Brown	550.0				
285	Lake Bottom	1		Clay		Grey	1.2				
286	Lake Bottom	1		Clay		Grey	7.8				
287	Lake Bottom	1		Organic/Silt		Dark Brown	4.7				
288	Lake Bottom	8		Silt		Dark Brown	5.7				
289	Lake Bottom	6		Clay		Grey	10.0				
290	Lake Bottom	1		Clay		Grey	0.9				
291	Lake Bottom	0.2		Fine Sand		Brown	0.1				
292	Lake Bottom	1		Clay		Grey	2.4				
293	Lake Bottom	2		Clay/Silt		Grey	1.2				
294	Lake Bottom	2		Clay		Grey	2.4				
295	Lake Bottom	6		Clay		Grey	16.7				
296	Lake Bottom	3		Organic/Clay		Grey	11.0				
297	Lake Bottom			Organic/Silt		Grey Brown	13.3				
298	Lake Bottom			Silt		Grey	2.9				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² ,m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
7JG-299	Lake Bottom			Clay		Grey	1.9				
300	Lake Bottom			Organic/Silt		Brown	152.0				
301	Lake Bottom			Clay/Fine Sand		Brown	6.7				
302							60.0				High Standard
303	Lake Bottom			Clay/Silt		Brown	1.7				
304	Lake Bottom			Clay/Silt		Grey	2.6				
305	Lake Bottom			Organic/silt		Dark Brown	12.6				
306	Lake Bottom			Clay		Brown	0.7				
307	Lake Bottom			Clay/Silt		Dark Brown	105.0				
308	Lake Bottom			Clay		Grey	1.1				
309	Lake Bottom			Clay		Grey	1.5				
310	Lake Bottom			Clay/Silt		Grey/ Dark Brown	3.2				
311	Lake Bottom			Clay		Grey	0.9				
312	Lake Bottom			Organic		Dark Brown	6.3				
313	Lake Bottom			Clay/Silt		Dark Brown	0.7				
314	Lake Bottom			Clay		Brown	3.2				
315	Lake Bottom			Clay		Brown	3.4				
316	Lake Bottom			Clay/Fine Sand		Brown	0.6				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² , m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
317	Lake Bottom			Clay/Silt		Brown	0.6				
318	Lake Bottom			Clay/Silt		Dark Brown	3.1				
319	Lake Bottom			Clay/Silt		Dark Brown	3.9				
320	Lake Bottom			Silt.		Dark Brown	8.1				
321	Lake Bottom			Organic/Silt		Dark Brown	5.7				
322	Lake Bottom			Silt		Dark Brown	3.4				
323	Lake Bottom			Silt Coarse Sand		Dark Brown	3.9				
324	Lake Bottom			Clay/Silt		Grey	0.9				
325	Lake Bottom			Clay/Silt		Brown	1.0				
326	Lake Bottom			Clay/Silt		Grey	3.3				
327	Lake Bottom			Clay		Grey	1.4				
328	Lake Bottom			Clay/Silt		Brown	2.9				
329	Lake Bottom			Silt		Brown	10.1				
330	Lake Bottom			Clay/Silt		Grey	3.3				
331	Lake Bottom			Clay/Silt		Brown	0.7				
332	Lake Bottom			Organic/Silt		Dark Brown	5.5				
333	Lake Bottom			Silt		Dark Brown	3.3				
334	Lake Bottom			Clay/Silt		Grey / Dark Brown	6.9				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² ,m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
7JG-335	Lake Bottom			Organic/Silt		Dark Brown	10.6				
336	Lake Bottom			Clay		Grey	3.9				
337	Lake Bottom			Clay/Silt		Dark Brown	2.6				
338							0.2				Low Standard
339	Lake Bottom			Clay		Grey	38.0				
340	Lake Bottom			Clay		Grey	38.0				
342	Lake Bottom			Clay		Grey	0.9				
344	Lake Bottom			Clay/Silt		Grey	10.1				
345	Lake Bottom			Clay/Silt		Brown	2.3				
346	Lake Bottom			Clay		Grey	1.5				
348	Lake Bottom			Clay/Fine Sand		Grey	2.1				
349	Lake Bottom			Clay		Grey	3.8				
350	Lake Bottom			Clay/Silt		Grey	3.1				
351	Lake Bottom			Clay		Grey	1.0				
352	Lake Bottom			Clay		Grey	2.1				
353	Lake Bottom			Clay/Silt		Brown	0.7				
354	Lake Bottom			Clay		Brown	6.4				
355	Lake Bottom			Clay		Grey	9.8				

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM SEDIMENTS

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Sample No.	Type	Size or Depth (m ² ,m)	Flow Rate	Grain Size	Organic Content (%)	Color	U (ppm)				Comments
356	Lake Bottom			Clay		Grey	0.6				
357	Lake Bottom			Silt		Grey	44.0				
359	Lake Bottom			Silt		Dark Brown	80.0				
360	Lake Bottom			Clay/Silt		Grey	21.0				
361	Lake Bottom			Clay		Grey	53.0				
362	Lake Bottom			Clay		Brown	2.6				
363	Lake Bottom			Silt		Dark Brown	14.0				
364	Lake Bottom			Silt		Dark Brown	38.0				
365	Lake Bottom			Silt		Grey	15.2				
366	Lake Bottom			Organic/Silt		Dark Brown	101.0				
367	Lake Bottom			Organic		Dark Brown	3.3				
368							55.0				High Standard
369	Lake Bottom			Organic/Silt		Dark Brown	1.4				
370	Lake Bottom			Clay/Silt		Grey	0.7				
371	Lake Bottom			Organic/Silt		Grey Brown	1.4				
372	Lake Bottom			Organic/Silt		Dark Brown	1.0				
373	Lake Bottom			Clay		Grey	0.6				
375	Lake Bottom			Clay		Grey Brown	3.1				

APPENDIX C

SECTION 2: Geochemical Sample Data - Lake Waters

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

Project No.: 71-87 Date: October, 1977

Page No. 1

Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-200	Lake Water			5.0	30.5	0.78					
201	"			5.0	7.3	0.53					
202	"			5.0	65.2	1.05					
203	"			5.0	9.2	0.42					
204	"			5.3	5.5	0.56					
205	"			5.0	15.9	0.21					
206	"			5.0	9.8	0.49					
207	"			5.0	5.5	0.05					
208	"			5.3	5.5	0.05					
209	"			5.0	12.2	trace					
210	"			4.7	13.4	0.07					
211	"			5.0	14.6	0.24					
212	"			4.7	8.5	0.08					
213	"			5.0	5.5	0.14					
214	"			5.0	3.7	0.08					
215	"			5.0	4.3	0.08					
216	"			5.0	4.9	1.12					
217	"			5.0	3.1	0.25					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

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Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
72M-218	Lake Water			5.0	5.5	0.24					
219	"			5.0	5.5	0.27					
220	"			4.7	6.1	0.59					
222	"			5.0	3.7	trace					
223	"			5.0	3.7	I.S.					Insufficient Sample
224	"			4.7	0.6	N.D.					Not detected
225	"			5.0	4.3	0.34					
226	"			5.0	5.5	0.34					
228	"			4.7	0.6	0.16					
229	"			4.7	4.3	1.01					
231	"			5.0	6.7	1.00					
232	"			5.0	3.1	0.31					
233	"			4.7	3.1	I.S.					
234	"			4.7	3.7	1.02					
235	"			5.0	N.D.	0.18					
236	"			4.7	1.8	0.29					
237	"			5.0	4.9	1.52					
238	"			5.0	4.3	0.18					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

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Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-239	Lake Water			4.7	6.1	0.40					
240	"			5.0	10.4	0.38					
241	"			4.7	3.1	0.14					
242	"			4.7	3.1	0.14					
243	"			5.0	2.4	0.59					
244	"			4.7	3.1	0.14					
245	"			4.7	2.4	0.15					
246	"			4.7	3.7	0.24					
247	"			4.7	4.3	0.24					
248	"			4.7	5.5	0.54					
249	"			5.0	1.8	0.54					
250	"			5.0	4.3	0.86					
251	"			5.0	1.8	0.46					
252	"			4.7	3.1	0.56					
253	"			4.7	3.7	0.08					
254	"			4.7	3.7	0.63					
255	"			4.7	12.2	0.19					
256	"			5.0	3.1	0.19					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

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Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-257	Lake Water			5.0	4.3	0.12					
258	"			4.7	1.2	0.20					
259	"			5.0	3.1	0.13					
260	"			4.7	6.1	0.17					
261	"			4.7	1.8	0.12					
262	"			4.7	2.4	0.13					
263	"			5.0	7.9	trace					
264	"			5.0	4.9	0.30					
265	"			4.7	3.7	0.65					
266	"			5.0	2.4	0.45					
267	"			4.7	N.D.	0.15					Not detected
268	"			4.7	4.3	0.24					
269	"			5.0	4.9	0.09					
270	"			4.7	3.7	0.25					
271	"			5.0	3.7	0.06					
272	"			5.0	1.2	0.31					
273	"			4.7	1.8	0.20					
274	"			4.7	N.D.	0.08					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

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Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-275	Lake Water			4.7	1.2	0.08					
276	"			4.7	2.4	0.09					
277	"			4.7	N.D.	0.24					Not detected
278	"			4.7	2.4	0.30					
279	"			4.7	3.1	0.31					
280	"			4.7	4.3	0.19					
281	"			5.0	3.7	trace					
282	"			4.7	3.1	0.21					
283	"			5.0	2.4	0.31					
284	"			5.0	1.2	0.36					
285	"			4.7	26.8	0.28					
286	"			5.0	1.2	0.11					
287	"			4.7	1.8	0.16					
288	"			5.0	4.3	0.17					
289	"			5.0	1.2	0.19					
290	"			4.7	12.2	0.86					
291	"			5.3	3.1	0.32					
292	"			5.6	18.3	0.30					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

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Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-293	Lake Water			5.6	16.5	0.52					
294	"			5.0	4.9	0.47					
295	"			4.7	5.5	0.44					
296	"			5.0	1.8	0.58					
297	"			4.7	9.8	0.20					
298	"			5.3	1.8	0.20					
299	"			5.3	3.1	0.49					
300	"			5.0	12.2	1.27					
301	"			4.7	N.D.	N.D.					Not detected
302	"			4.7	3.7	0.21					
303	"			5.0	2.4	0.30					
304	"			4.7	2.4	0.41					
305	"			4.7	1.8	0.26					
306	"			4.7	N.D.	N.D.					
307	"			5.0	1.8	I.S.					Insufficient Sample
308	"			5.0	3.7	I.S.					
309	"			5.0	2.4	0.12					
310	"			4.7	8.5	I.S.					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

Project No.: 71-87 Date: October, 1977

Page No. 7

Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-311	Lake Water			4.7	N.D.	I.S.					Not detected Insufficient Sample
312	"			4.7	N.D.	0.09					
313	"			5.0	1.8	N.D.					
314	"			5.0	0.6	0.09					
315	"			4.7	3.7	I.S.					
316	"			5.0	3.7	0.23					
317	"			5.0	2.4	0.10					
318	"			4.7	N.D.	0.12					
319	"			4.7	1.2	trace					
320	"			4.7	3.7	0.12					
321	"			4.7	1.2	0.81					
322	"			4.7	N.D.	N.D.					
323	"			5.0	N.D.	0.05					
324	"			5.0	15.3	N.D.					
325	"			5.0	6.1	0.12					
326	"			5.0	N.D.	N.D.					
327	"			5.0	N.D.	0.36					
328	"			4.7	1.8	0.39					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

Project No.: 71-87 Date: October, 1977

Page No. 8

Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-329	Lake Water			4.7	1.8	0.23					
330	"			5.0	4.9	I.S.					Insufficient Sample
331	"			4.7	3.1	trace					
332	"			4.7	N.D.	0.10					Not detected
333	"			5.0	N.D.	0.13					
334	"			4.7	4.3	N.D.					
335	"			4.7	2.4	N.D.					
336	"			5.0	15.3	0.32					
337	"			4.7	7.9	N.D.					
338	"			5.0	11.6	0.10					
339	"			4.7	5.5	I.S.					
340	"			5.0	2.4	trace					
341	"			5.0	3.1	0.05					
342	"			5.0	3.7	0.07					
343	"			5.0	3.1	trace					
344	"			4.7	N.D.	0.10					
345	"			4.7	1.8	0.07					
346	"			5.0	2.4	I.S.					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

Project No.: 71-87 Date: October, 1977

Page No. 9

Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-347	Lake Water			5.0	6.7	N.D.					Not detected
348	"			5.0	5.5	0.13					
349	"			4.7	N.D.	trace					
350	"			4.7	6.1	0.07					
351	"			5.0	6.7	0.26					
352	"			5.0	2.4	0.25					
353	"			5.0	3.7	0.10					
354	"			4.7	2.4	0.10					
355	"			4.7	4.9	0.07					
356	"			4.7	N.D.	0.10					
357	"			4.7	4.9	0.24					
358	"			5.0	6.1	0.24					
359	"			5.0	5.5	0.30					
360	"			4.7	2.4	I.S.					
361	"			5.0	4.3	0.26					
362	"			5.0	4.3	0.96					
363	"			4.7	6.7	0.41					
364	"			4.7	N.D.	0.40					

GEOCHEMICAL SAMPLE DATA: LAKE OR STREAM WATERS

Project No.: 71-87 Date: October, 1977

Page No. 10

Sample No.	Type	Size (m)	Flow Rate	pH	HCO ₃ (ppm)	U (ppb)					Comments
7ZM-365	Lake Water			4.7	N.D.	0.43					Not detected
367	"			4.7	3.7	N.D.					
368	"			5.9	45.1	0.17					
369	"			5.0	N.D.	N.D.					
370	"			6.2	58.7	0.05					
371	"			4.7	6.1	0.04					
372	"			5.0	12.2	N.D.					
373	"			4.7	4.3	trace					
374	"			5.0	1.8	trace					
375	"			4.7	4.3	N.D.					
376	"			4.7	3.1	0.23					
377	"			5.0	N.D.	N.D.					
378	"			5.0	N.D.	N.D.					
379	"			5.0	N.D.	trace					
380	"			5.0	4.9	0.21					
381	"			5.0	14.0	0.32					
382	"			4.7	9.2	0.05					
383	"			4.7	3.1	N.D.					

APPENDIX C

SECTION 3: Rock Sampling Data

Sample No.	UEB Sample No.	Area	Rock Type	Scint cps*	U ₃ O ₈ ppm ⁸	AA *	TS *	U-Minerals present	Remarks
7ZM-400		Richmond	Massive	500	2				Granite Inlier
7ZM-401		Gulf "	Granite		8				" "
7ZM-402		" "	"		5				" "
7ZM-403		" "	"	150	N.D.				" "
7ZM-404		" "	Altered	600	21				Anomaly 218A
7ZM-405		" "	Granite	700	8				" 167A
7ZM-406		" "	Polymictic	1600	35	S.Q.			Base of Pachi
7ZM-407		" "	Cong. "	300	1				Formation " " "
7ZM-408		" "	Altered		11				Anomaly 232A
7ZM-409		" "	Granite						" 180D
			Altered Gneiss	1500	78	S.Q.			

- * Scint: Ground scintillometer reading with a SRAT SPP-2 scintillometer in cps;
 * AA: Additional analysis (#) or autoradiography (a)
 S.Q. 32 clement semi-quantative analysis
 * TS: Thin section prepared in the Bonn lab.
 * U: Uranium (fluorimetric) in ppm; B (Uranerz lab in Bonn)
 O (Bondar-Clegg in Ottawa)
 * U-Minerals: Identification by means of X-ray, lab in Bonn

APPENDIX D

CHEMICAL ANALYSES (BONDAR-CLEGG & COMPANY LTD.)



BONDAR-CLEGG & COMPANY LTD.

764 BELFAST ROAD, OTTAWA, ONTARIO, K1G 0Z5

PHONE: 237-3110

Geochemical Lab Report

Extraction U-HNO₃ Report No. 1818-7
Method Fluorimetric From Uranerz Exploration & Mining Limited
Project # 71-87
Fraction Used -80 soils Date October 11, 19 77

SAMPLE NO.	U ppm			SAMPLE NO.	U ppm		
7 JG-200	5.0			7 JG- 237	15.4		
01	22.0			38	13.3		
02	32.0			39	19.8		
03	61.0			40	58.0		
04	9.2			41	32.0		
05	5.4			42	15.3		
06	11.8			43	12.0		
07	2.0			44	11.3		
08	1.4			45	13.7		
10	5.6			46	15.3		
12	1.2			47	64.0		
13	0.9			48	59.0		
16	27.0			49	23.0		
17	4.0			50	60.0		
19	4.4			51	63.0		
20	25.0			52	49.0		
21	40.0			53	12.0		
22	3.3			54	22.0		
23	59.0			55	29.0		
25	2.5			56	18.9		
26	12.4			57	10.7		
27	11.8			58	20.0		
28	12.5			59	17.8		
29	63.0			60	3.6		
30	4.0			61	4.8		
31	42.0			62	9.8		
32	1.3			63	2.1		
33	7.2			64	0.5		
34	21.0			65	8.2		
35	2.9			68	15.6		
36	14.2			69	1.3		



BONDAR-CLEGG & COMPANY LTD.

764 BELFAST ROAD, OTTAWA, ONTARIO, K1G 0Z5

PHONE: 237-3110

Geochemical Lab Report

Extraction U-HNO₃ Report No. 1727-7
 Method Fluorimetric From Uranerz Exploration & Mining Limited
 Fraction Used -80 soils Date September 27, 19 77
 Project # 71-87

SAMPLE NO.	U ppm	SAMPLE NO.	U ppm
7-J-G-290	0.9	7-J-G-321	5.7
91	0.1	22	3.4
92	2.4	23	3.9
93	1.2	24	0.9
94	2.4	25	1.0
95	16.7	26	3.3
96	11.0	27	1.4
97	13.3	28	2.9
98	2.9	29	10.1
99	1.9	30	3.3
300	152.0	31	0.7
01	6.7	32	5.5
02	60.0	33	3.3
03	1.7	34	6.9
04	2.6	35	10.6
05	12.6	36	3.9
06	0.7	37	2.6
07	105.0	38	0.2
08	1.1	39	38.0
09	1.5	40	38.0
10	3.2	42	0.9
11	0.9	44	10.1
12	6.3	45	2.3
13	0.7	46	1.5
14	3.2	48	2.1
15	3.4	49	3.8
16	0.6	50	3.1
17	0.6	51	1.0
18	3.1	52	2.1
19	3.9	53	0.7
20	8.1	54	6.4



BONDAR-CLEGG & COMPANY LTD.

764 BELFAST ROAD, OTTAWA, ONTARIO, K1G 0Z5

PHONE: 237-3110

Geochemical Lab Report

Extraction U Report No. 1819-7
 Method _____ From Uranerz Exploration & Mining Ltd.
 Project: 71-87
 Fraction Used as received. Date October 14, 1977

SAMPLE NO.	U ppb			SAMPLE NO.	U ppb		
7ZM - 200	0.78	x		7ZM - 234	1.02	x x	
01	0.53	y		35	0.18		
02	1.05	x y		36	0.29		
03	0.42	y		37	1.52	x y	
04	0.56	y		38	0.18		
05	0.21			39	0.40		
06	0.49	y		40	0.38		
07	0.05			41	0.14		
08	0.05			42	0.14		
09	trace			43	0.59	x	
10	0.07			44	0.14		
11	0.24			45	0.15		
12	0.08			46	0.24		
13	0.14			47	0.24		
14	0.08			48	0.54	x	
15	0.08			49	0.54	x	
16	1.12	x x		50	0.86	y	
17	0.25			51	0.46	y	
18	0.24			52	0.56	y	
19	0.27			53	0.08		
20	0.59	y		54	0.63		
22	trace			55	0.19		
23	EMPTY BOTTLE			56	0.19		
24	ND Not detected			57	0.12		
25	0.34			58	0.20		
26	0.34			59	0.13		
28	0.16			60	0.17		
29	1.01	x y		61	0.12		
31	1.00	x y		62	0.13		
32	0.31			63	trace		
33	EMPTY BOTTLE						



BONDAR-CLEGG & COMPANY LTD.

764 BELFAST ROAD, OTTAWA, ONTARIO, K1G 0Z5

PHONE: 237-3110

Geochemical Lab Report

Extraction U Report No. 1728-7
 Method _____ From URANERZ Exploration & Mining Limited
 Project # 71-87
 Fraction Used as received Date September 27, 19 77

SAMPLE NO.	U ppb	SAMPLE NO.	U ppb
7 ZM 290	0.86	7 ZM 321	0.81
91	0.32	22	N.D.
92	0.30	23	0.05
93	0.52	24	N.D.
94	0.47	25	0.12
95	0.44	26	N.D.
96	0.58	27	0.36
97	0.20	28	0.39
98	0.20	29	0.23
99	0.49	30	I.S.
300	1.27	31	trace
01	N.D.	32	0.10
02	0.21	33	0.13
03	0.30	34	N.D.
04	0.41	35	N.D.
05	0.26	36	0.32
06	N.D.	37	N.D.
07	I.S.	38	0.10
08	I.S.	39	I.S.
09	0.12	40	trace
10	I.S.	41	0.05
11	I.S.	42	0.07
12	0.09	43	trace
13	N.D.	44	0.10
14	0.09	45	0.07
15	I.S.	46	I.S.
16	0.23	47	N.D.
17	0.10	48	0.13
18	0.12	49	trace
19	trace	50	0.07
20	0.12	51	0.26

Geochemical Lab Report

Report No. 1728-7

Page No. 2

SAMPLE NO.	U ppb		SAMPLE NO.				
7 ZM 352	0.25						
53	0.10						
54	0.10						
55	0.07						
56	0.10						
57	0.24						
58	0.24						
59	0.30						
60	I.S.						
61	0.26						
62	0.96						
63	0.41						
64	0.40						
65	0.43						
67	N.D.						
68	0.17						
69	N.D.						
70	0.05						
71	0.04						
72	N.D.						
73	trace						
74	trace						
75	N.D.						
76	0.23						
77	N.D.						
78	N.D.						
79	trace						
80	0.21						
81	0.32						
82	0.05						
83	N.D.						
84	I.S.						
85	0.20						
86	0.35						
	N.D.	not detected					
	I.S.	insufficient sample					



BONDAR-CLEGG & COMPANY LTD.

764 BELFAST ROAD, OTTAWA, ONTARIO, K1G 0Z5

PHONE: 237-3110

SEMI-QUANTITATIVE ANALYSIS

No: 1817-7

Sample No. 7 ZM 406

From: Uranium Exploration & Mining Ltd.

Method: XRF

Date: November 1, 19 77

No. of Elements: 32

Analyst: _____

MAJOR ELEMENTS (%)	<.003	.003-.01	.01-.03	.03-0.1	0.1-0.3	0.3-1.0	1.0-3.0	3.0-10.0	> 10.0	REMARKS
SiO ₂									X	
Al ₂ O ₃						X				
Total Fe (Fe ₂ O ₃)									X	
MgO									X	
CaO									X	
Na ₂ O					X					
K ₂ O					X					
TiO ₂			X							
TRACE ELEMENTS (%)										
V			X							
Cr				X						
Mn				X						
Co	X									
Ni	X									
Cu		X								
Zn	X									
As	X									
Sr		X								
Y	X									
Zr			X							
Nb	X									
Mo	X									
Ag	X									
Sn	X									
Sb	X									
Ba			X							
La	X									
Ce	X									
W	X									
Pb	X									
Bi	X									
Th				X						
U		X								



BONDAR-CLEGG & COMPANY LTD.

764 BELFAST ROAD, OTTAWA, ONTARIO, K1G 0Z5

PHONE: 237-3110

SEMI-QUANTITATIVE ANALYSIS

No: 1817-7

Sample No. 72M 409

From: Uranera Exploration & Mining Ltd.

Method: XRF

Date: November 1, 19 77

No. of Elements: 32

Analyst: _____

MAJOR ELEMENTS (%)	<.003	.003-.01	.01-.03	.03-.1	0.1-0.3	0.3-1.0	1.0-3.0	3.0-10.0	> 10.0	REMARKS
SiO ₂									X	
Al ₂ O ₃									X	
Total Fe (Fe ₂ O ₃)									X	
MgO						X				
CaO				X						
Na ₂ O					X					
K ₂ O								X		
TiO ₂					X					
TRACE ELEMENTS (%)										
V			X							
Cr				X						
Mn		X								
Co	X									
Ni	X									
Cu		X								
Zn		X								
As	X									
Sr		X								
Y	X									
Zr			X							
Nb		X								
Mo	X									
Ag	X									
Sn	X									
Sb	X									
Ba				X						
La		X								
Ce		X								
W	X									
Pb		X								
Bi	X									
Th	X									
U		X								

5

APPENDIX E

FREQUENCY HISTOGRAMS - GEOCHEMICAL DATA

FIG. 1

FREQUENCY HISTOGRAM (U) - LAKE BOTTOM SEDIMENT
(ARCHEAN BASEMENT)

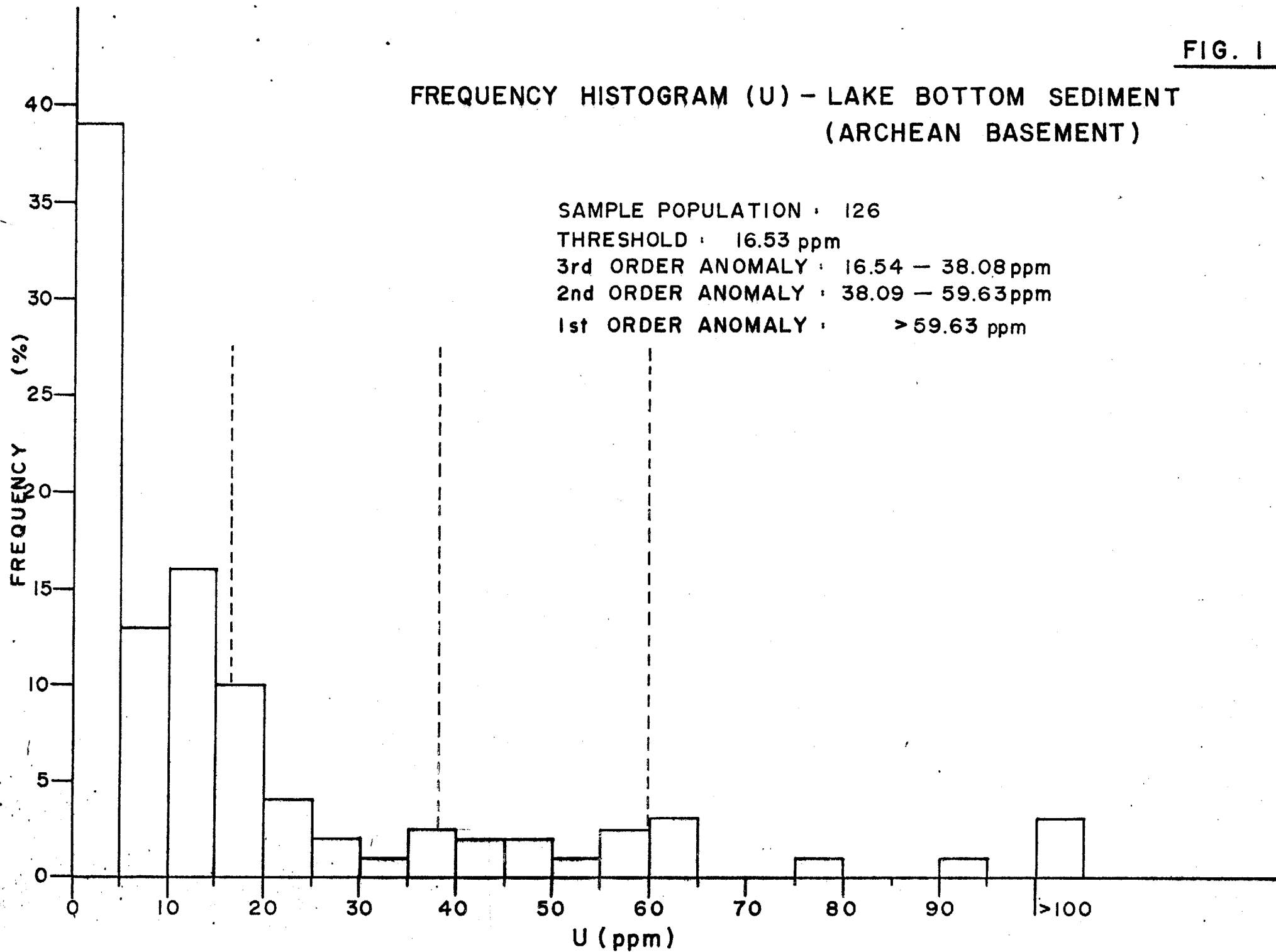


FIG. 2

FREQUENCY HISTOGRAM (U) - LAKE BOTTOM SEDIMENT
(PROTEROZOIC BASIN)

SAMPLE POPULATION : 40
THRESHOLD : 5.24 ppm
3rd ORDER ANOMALY : 5.25 - 11.98 ppm
2nd ORDER ANOMALY : 11.99 - 18.72 ppm
1st ORDER ANOMALY : > 18.72 ppm

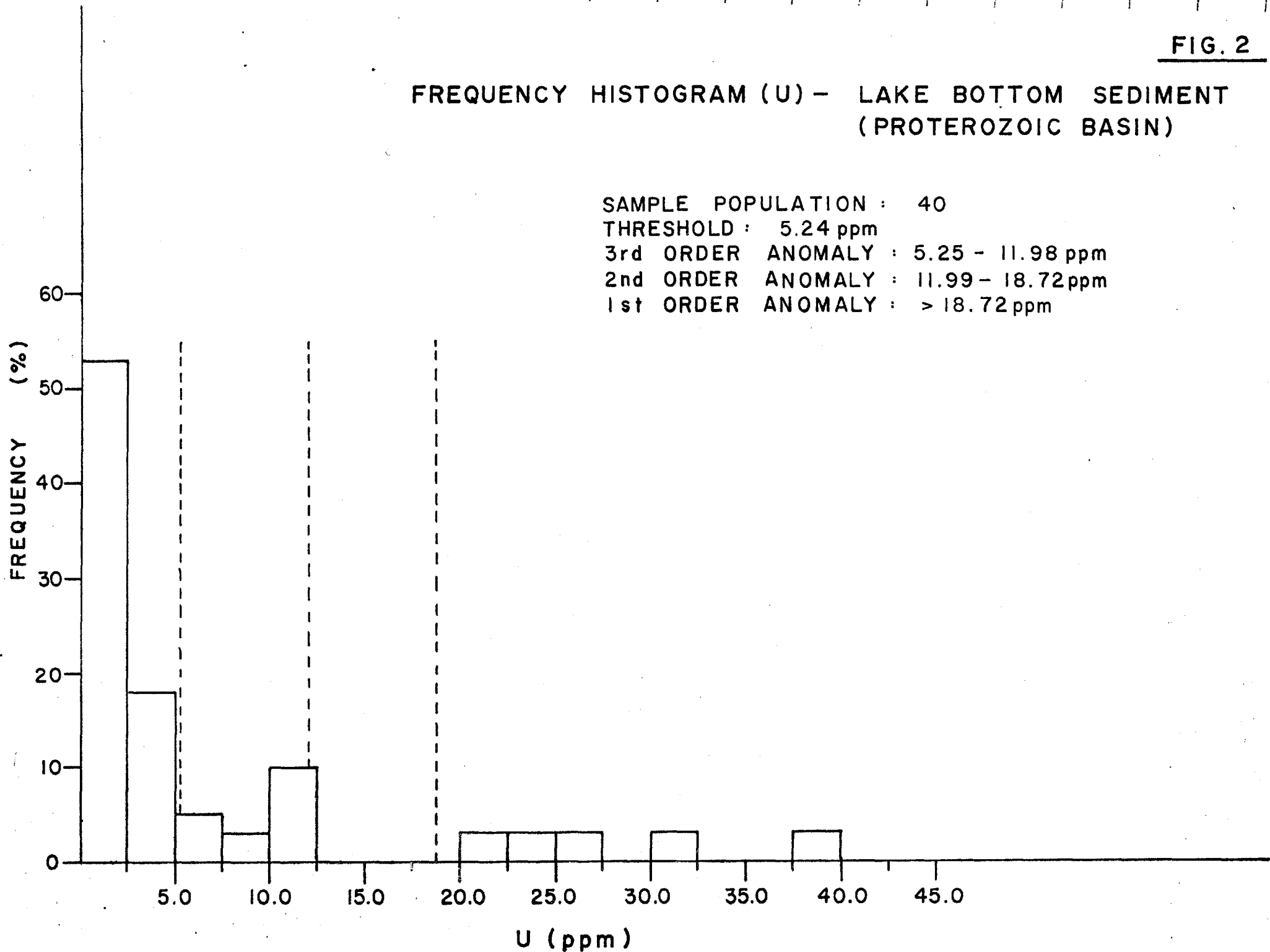


FIG. 3

FREQUENCY HISTOGRAM (U) - LAKE WATER
(ARCHEAN BASEMENT)

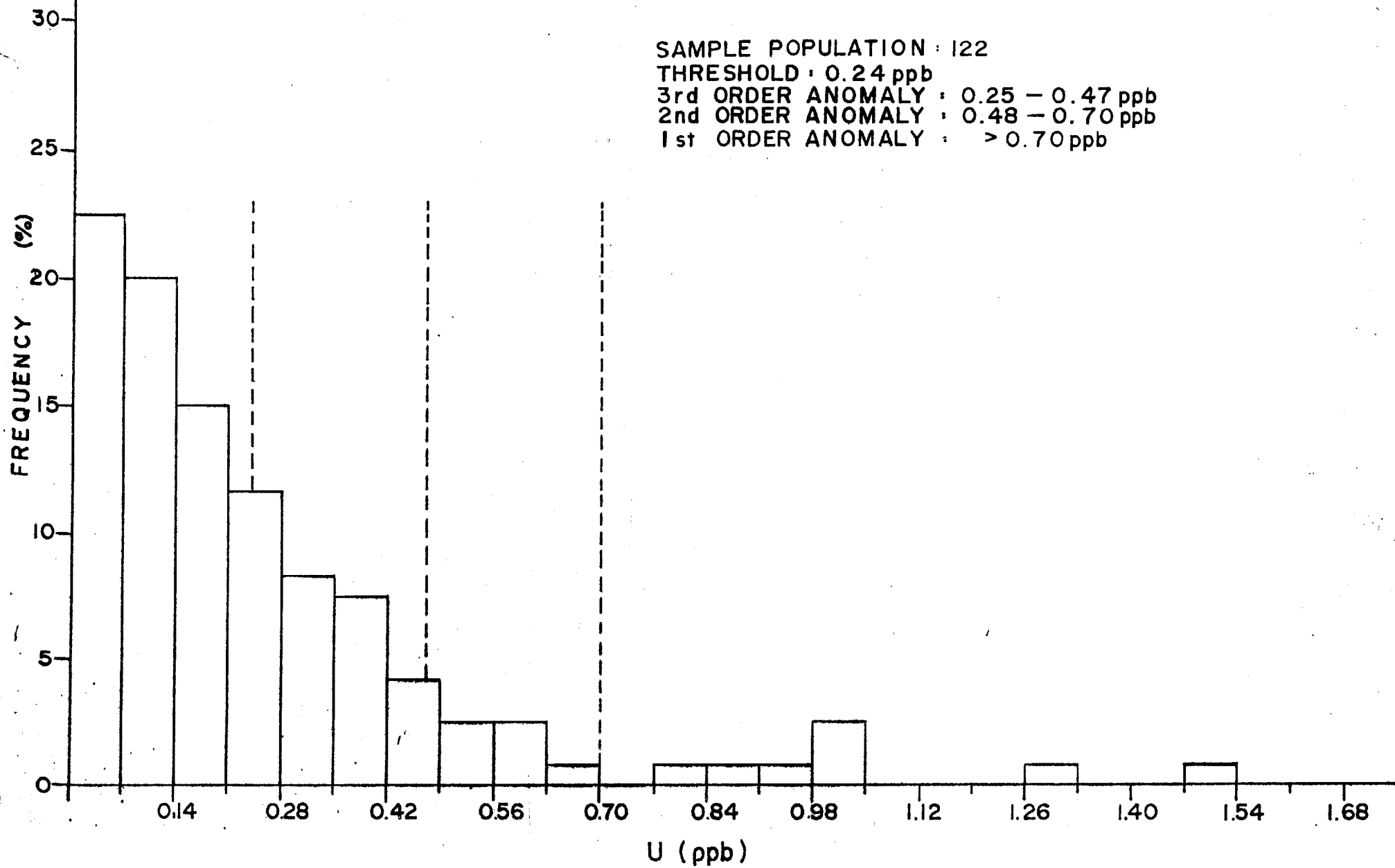
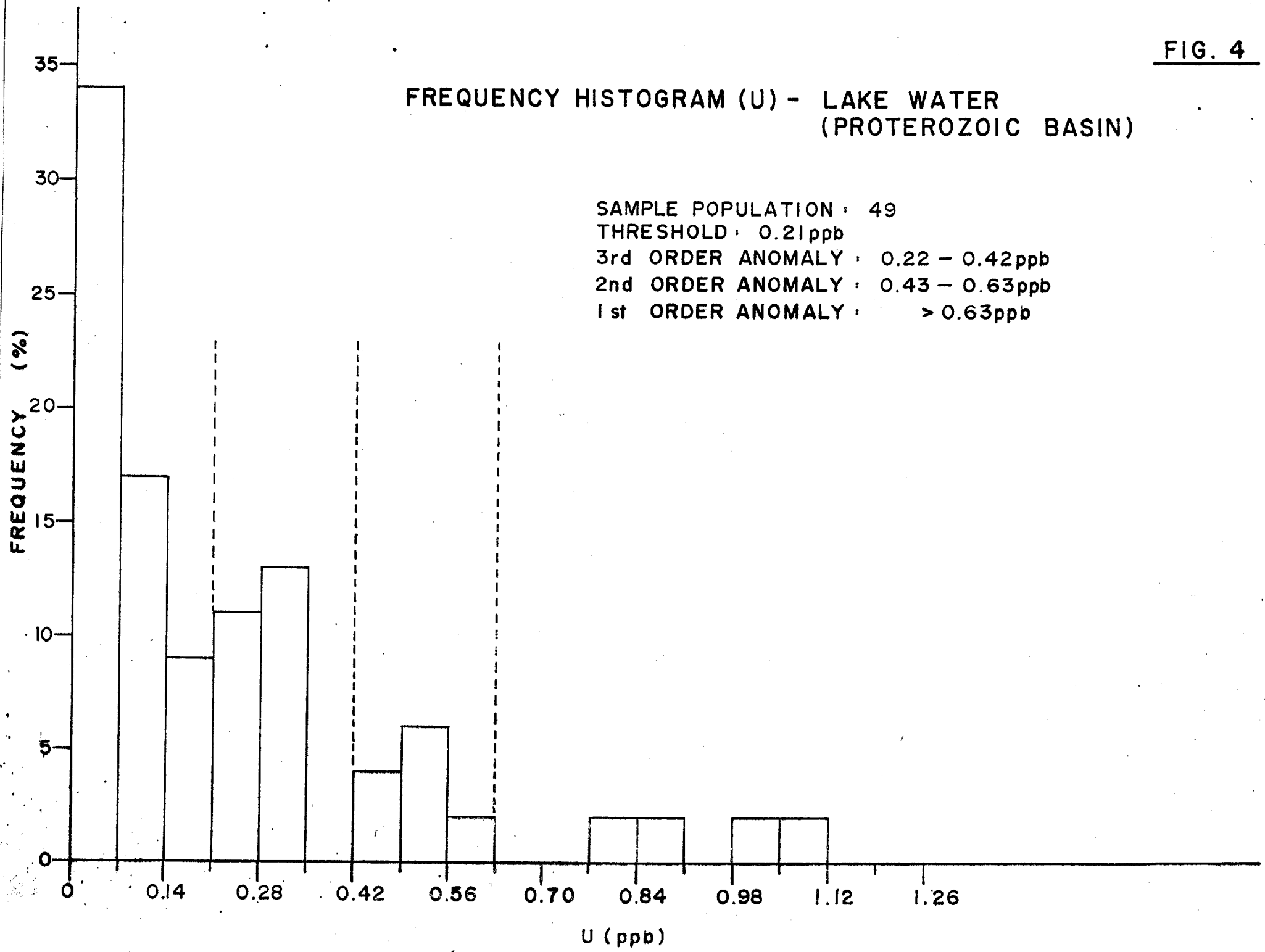


FIG. 4

FREQUENCY HISTOGRAM (U) - LAKE WATER
(PROTEROZOIC BASIN)

SAMPLE POPULATION : 49
THRESHOLD : 0.21ppb
3rd ORDER ANOMALY : 0.22 - 0.42ppb
2nd ORDER ANOMALY : 0.43 - 0.63ppb
1st ORDER ANOMALY : > 0.63ppb



URANERZ EXPLORATION AND MINING LIMITED

3633 BOUL. DES SOURCES, SUITE 211, DOLLARD DES ORMEAUX, QUEBEC, H9B 2K4

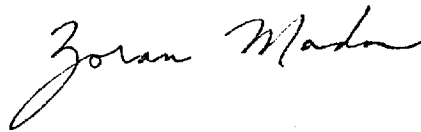
TEL.: (514) 683-9310
TELEX: 05-822746

27 January 1978

Re: Richmond Gulf - Final Report 1977
Project 71-87

As indicated under Section 7.6 of the above-mentioned report enclosed you will find a copy of the Mineralogical Report 77-28 for Project 71-87 Richmond Gulf/Quebec.

URANERZ EXPLORATION & MINING LTD.



Zoran Madon

ZM:ab

Encl.

URANERZBERGBAU GMBH

Mineralogical Report 77-28

Project No. 7187 Richmond Gulf/Quebec

Petrographic investigations on four rock samples

Date: 10.1.1978

Exploration Department

Compiled by:

Dr. V. Voultzidis

Dr. C. Clasen

URANERZ EXPLORATION & MINING LTD.

3633 BOUL. DES SOURCES, SUITE 211, DOLLARD DES ORMEAUX, QUEBEC, H9B 2K4

TEL.: (514) 683-9310
TELEX: 05-822746

Uranerz Bergbau GMBH & Co. KG
Postfach 7210
Koelnstrasse 367
53 BONN, West Germany

Attention: Dr. Voultzidis

Your Ref.

Our Ref.
ZM/ab

Your letter of

Date
26 October 1977

Dear Dr. Voultzidis:


We are sending you four (4) rock samples from the Richmond Gulf area - Project 71-87. These include:

- (1) a highly oxidized gneissic(?) rock which appears to be within the basement complex near the Archean/Proterozoic U/C. (7ZM-387)
- (2) a basal sedimentary unit with thin layers of heavy minerals (magnetite-ilmenite?) (7ZM-388)
- (3) another basal unit (?) where the contact between the granite basement and the overlying sediments is poorly defined (7ZM-389)
- (4) slightly sheared contact material between a granite inlier and the surrounding sediments (7ZM-390)

Would you be so kind as to assay the above rocks for Uranium and Thorium and to perform a 32-element semi-quantitative analysis. Petrographic and mineralogic studies of the above samples are also required. Please find enclosed a simplified geological map and short report of the Richmond Gulf area. Note that the location of the rock samples is given on the geological map. Thank you for your time and cooperation.

Best regards,

URANERZ EXPLORATION & MINING LTD.


Zoran Madon

Encls.

Samples sent by/on: UEM-Montreal / 2.9.77

Date of UEB receipt: 3.11.77

UEB-No.	UEM-No.	Type of rock	U ₃ O ₈ (ppm)
CN-	7 ZM-		
4458	387	granite	160
4459	388	arkosic sandstone	270
4460	389	arkosic sandstone	70
4461	390	arkosic sandstone	40

The investigated samples comprise one granite and three arkosic sandstones. The granite may also be designated a granitic gneiss. The U₃O₈-contents of all samples range below 300 ppm. The autoradiographs which were made to localize uranium bearing minerals did not give any positive results. Therefore it has to be assumed that the chemically detected uranium probably is hidden within the lattice structures of accessories like allanite, zircon and apatite.

1. Granite (sample CN-4458)

Under the microscope a hypidiomorphic granular texture of "granite like" appearance is recognizable (fig. 1), and the individual grains range between 2 - 3 mm in size. A clear classification of the rock as a granite remains questionable, because the microscopic observation is based only on the small area which is cut by the thin section. The sample may also derive from a basement gneiss (granitic gneiss), which has not developed a characteristic parallel texture and therefore more resembles to a granite.

Quartz, plagioclase and microcline are the main rock constituents, while biotite and muscovite occur as subordinate components. The accessories are zircon, apatite, allanite and opaque minerals. Here and there slightly bent plagioclase laths are indicating a tectonic deformation, which however did not cause a brecciation of the rock. The plagioclase crystals display a subrounded hypidiomorphic shape. Because of its optical behavior their chemical composition corresponds to an oligoclase. No zonal texture has been observed. A characteristic of the plagioclase is its strong alteration which formed aggregates of cloudy sericite, which shows a reddish colour due to Fe-containing solutions.

As a contrary the k-feldspars appear quite fresh. They display an irregular shape, and often microcline twinning is present. At the contact with plagioclase a myrmecitic intergrowth has developed.

Another strongly altered mineral is biotite.

2. Arkosic sandstone (samples CN-4459 to -4461)

As the microscopic control reveals, three different types of sandstone occur. Sample CN-4459 (7 ZM-388) is a matrix free sandstone, which consists of about 60 - 70 vol.% quartz and about 30 - 40 vol.% microcline.

The individual quartz grains show angular to subrounded shape (cf. Russel, Taylor and Pettijohn) and differ largely in size (fig. 2). Their grain size ranges between 0,01 and 2 mm.

A characteristic of the rock are the numerous rock fragments, which contribute about 15 vol.% of the total rock (fig. 2). They consist entirely of quartz and derive from a primary quartzitic rock. The individual quartz grains within the rock fragments form a mosaic texture with a moderate implication. They show a low undulatory extinction.

Of special interest are heavy mineral concentrations, which form banded layers within the rock and consist of rounded Fe-oxides (magnetite, hematite) and Fe-sulfide (pyrite). Besides a subordinate enrichment of tourmaline (up to 1,5 vol.%) was observed. The individual tourmaline crystals display a well euhedral shape, and they are distributed homogeneously within the rock. Allanite, zircon, and apatite are present as accessories.

As a difference sample CN-4460 (7 ZM-389) shows a well developed matrix, which forms about 30 - 35 vol.% of the rock. According to the X-ray diffraction analysis clay - and chlorite minerals are only present as subordinate components, whereas very fine grained quartz, opaque minerals and feldspars are prevailing. Neither tourmaline nor other heavy minerals have been observed. The opaque minerals are either part of the matrix as a very fine grained component, or they are homogeneously distributed within the rock as 0,1 mm large grains. The content of rock fragments has diminished and reaches a maximum of 2,0 vol.%. Microcline forms about 30 to 35 vol.% of the rock.

Sample CN-4461 (7 ZM-390) is also showing a very well developed matrix, which forms about 25 - 30 vol.% of

the rock and consists mainly of finest grained sericite and kaolinite. The microcline content of the rock reaches about 25 vol.%. The contact to underlying basement is documented by areas, which under the microscope appear as very strongly altered gneisses (regolith). These areas consist of a very fine grained matrix of more or less parallel aligned biotite. The biotite is altered to chlorite and may be described as bauritized ¹⁾ (fig. 3). The alteration phenomena are well comparable to those which have been observed for the altered crystalline basement at Key Lake.

V. Voultridi

J. Clasen

1) Bauerite means a biotite, of which the cations have been leached of by weathering or alteration processes.

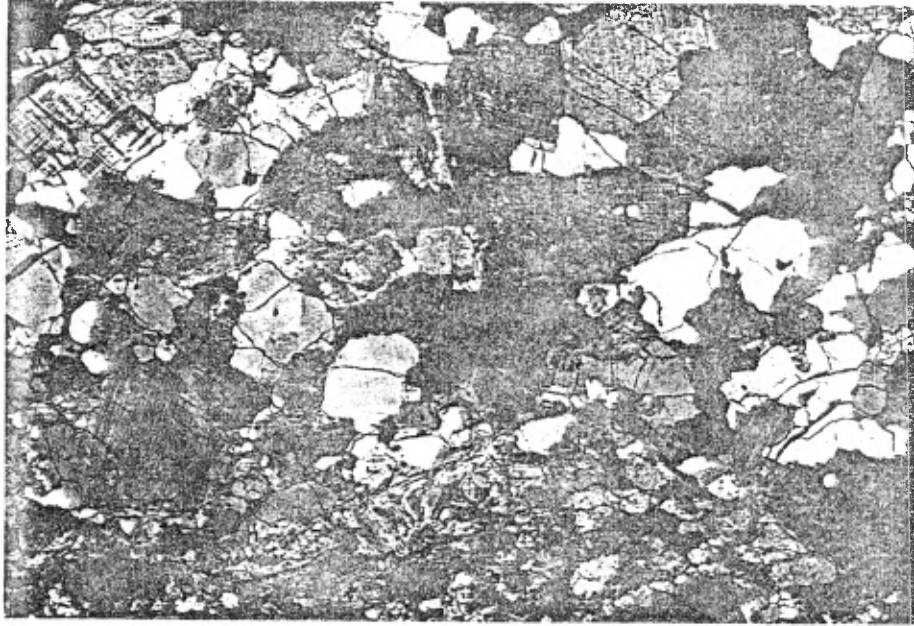


Fig. 1: Microphotograph of a thin section, CN-4458; N x; 5 x magn.;
neg.no. S 81/8

Hypidiomorphic-granular granitelike texture.

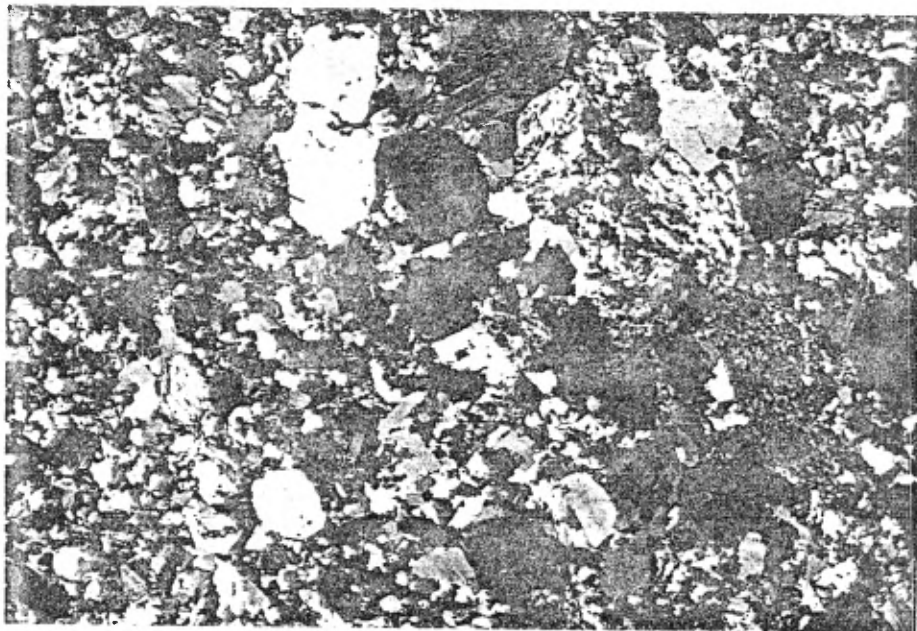


Fig. 2: Microphotograph of a thin section, CN-4459; N x; 5 x magn.;
neg.no. S 81/7

Texture of the arcose sandstone without a matrix.



Fig. 3: Microphotograph of a thin section, CN-4461; N x; 40 x magn.;
neg.no. S 81/1
Contact arcose sandstone-regolith; the regolith consists
of totally decomposed matrix with intercalations of strongly
baueritized biotites with good parallel orientation.

