MAR 19890003: MAYBELLE RIVER

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GEOLOGICAL AND GEOPHYSICAL REPORT
ON PERMIT 6879030003, N.E. ALBERTA
IN TOWNSHIP 113, RANGE 6, W4M

by

A. A. BROWN, P. Geol.
D. J. SLACK

Field work done between May 25 and June 4, 1979
Report prepared March, 1980
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1.0 SUMMARY

During late May and early June, 1979, a programme consisting of airborne electromagnetic, and gamma spectrometer surveys and ground electromagnetic and induced polarization surveys along with geologic mapping and prospecting was carried out on Quartz Mineral Exploration Permit 6879030003 in northeastern Alberta, about 12 km northeast of Ft. Chipewyan on Lake Athabasca. Interest in the property is based on the presence of airborne EM conductors in basement lithologies and along the shore of Lake Athabasca under what may be the Helikian Athabasca sandstone.

Mapping of the property has shown it to be underlain primarily by Archean(?) granitic gneisses with a minor occurrence of metasedimentary rocks in the NE end of the property. This occurrence was geophysically evaluated and found to have a VLF conductor immediately north of the outcrop, probably due to disseminated pyrite, however, poor ground contact and high magneto-telluric noise prevented conclusive IP follow-up of this zone. Two radiometric anomalies located by the airborne gamma spectrometer survey were found to be caused by minor uranium secondary mineralization in a quartz monzonite. No other uranium mineralization was found during the programme, and no Helikian sandstone was found in outcrop on the property.
2.0 CONCLUSIONS

1) The airborne radiometric anomalies located are due to uranium secondary mineralization in quartz monzonite and do not represent economic uranium mineralization.

2) The majority of airborne EM conductors located on land are due to conductive overburden effects.

3) The VLF-EM anomaly located is due to disseminated pyrite in a metaquartzite/meta-argillite unit in Archean basement rocks, and may be of further interest.

4) Ground IP results are inconclusive due to poor ground contact and high magneto-telluric noise.

5) The Helikian Athabasca sandstone does not outcrop on the property.
3.0  **RECOMMENDATIONS**

It is recommended that a winter geophysical programme, including IP, magnetometer and gravity surveys, be conducted on an offshore grid oriented to cover the airborne EM anomalies (M, N & O - Fig. 4), located in 1979 and the offshore extension of the VLF conductor located in the NE part of the permit.
4.0 INTRODUCTION

Quartz Mineral Exploration Permit #6879030003 consisting of the NW¼ of Section 3, the N½ and SW¼ of Section 4, Section 5, the W½ of Section 8, the S½ and NE¼ of Section 10, the NW¼ of Section 11, and Section 14 of Township 113, Range 6, West of the 4th Meridian, covers approximately 1,165 ha (2,880 acres) on the north shore of Lake Athabasca, NE Alberta (Fig. 1).

Hudson's Bay Oil and Gas Company Limited, of 700 Second Street S. W., Calgary, Alberta, was granted the permit by Alberta Energy and Natural Resources under the Quartz Mining Regulations on March 15, 1979.

Exploration in May and June, 1979, consisted of an airborne gamma spectrometer survey (AGS), geological mapping and prospecting, and ground electromagnetic, induced polarization and radiometric surveys.

5.0 LOCATION AND ACCESS

Permit 6879030003 is located about 12 km (7.5 mi.) north and east of Fort Chipewyan on the north shore of Lake Athabasca in northeast Alberta (Latitude 58°47'30"N, Longitude 110°55'30"W) (Fig. 1).

Access to the property is provided by float or ski equipped aircraft from Fort Smith, Fort Chipewyan or Uranium City or by helicopter from Fort Chipewyan. During the winter the property may be accessed by snow machine from Ft. Chipewyan.

The 1979 programme was mobilized on May 25, 1979, by Hughes 500D helicopter from Hudson's Bay Oil and Gas Permit 244, approximately 80 km (50 mi.) to the northeast. A tent camp was set up at the mouth of the small creek as shown in Fig. 3.

The camp was demobilized to Fort Chipewyan airport on June 4, 1979, with the aid of the Hughes 500D helicopter.
6.0 PHYSIOGRAPHY

The western half of the permit area consists of highly fractured rocky upland with sparse overburden cover, raised 15-25 m above lake level. The eastern half consists of much flatter outwash sands and gravels with numerous remnant beaches and only scattered outcrops of granitic gneiss.

7.0 CLIMATE

At the outset of the project in early May, scattered areas of snow cover were observed. The low areas were extremely wet and the small and intermittent creeks were all water-filled. The weather was generally clear with seasonable, above freezing temperatures being recorded for the entire length of the project.

8.0 HISTORY

Prior to the acquisition of the permit area by HBOG, no previous work on behalf of mineral exploration companies on the property is known to the author. Government geological mapping of the area, however, indicates that subcrops of the Helikian Athabasca formation may occur in overburden covered areas, especially in the eastern area of the property. This, coupled with the presence of known uranium showings in basement lithologies inland of the permit area, led to the acquisition of the permit.

9.0 GEOLOGY

9.1 REGIONAL GEOLOGY

Quartz Mineral Exploration Permit 6879030003 is located near the western edge of the Churchill Structural Province of the Precambrian Shield. In general, the area consists of highly metamorphosed foliated granitoid intrusives, granite gneisses and metasedimentary rocks of the Archean to upper Aphebian eras. This whole sequence is in turn unconformably overlain to the east by unmetamorphosed Helikian sediments of the Athabasca Formation (Fig. 2, Table 1).
REGIONAL GEOLOGY
Figure 2

-GRANITOID PLUTONS-

- Slave Granite
- Arch Lake Granite
- Wylie Lake Granitic Complex
- Colin Lake Granitic Complex

Metamorphic foliation

Kilometres

Minor Granitoid Masses
Granite Gneisses
High-Grade Metasedimentary Rocks
Low-Grade Metasedimentary Rocks
Athabasca Formation

Major fault

-after Godfrey ('78)
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<th>FORMATION</th>
<th>LITHOLOGIES</th>
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<td>ATHABASCA FORMATION</td>
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<td></td>
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<tr>
<td>APHEBIAN/ARCHEAN</td>
<td>ANDREW LAKE DOMAIN</td>
<td>HIGHLY METAMORPHOSED GRANITOID PLUTONICS AND MIGMATITES</td>
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TABLE OF FORMATIONS

TABLE I
The gneissic terrain probably represents a mobile zone which initially developed during the Archean. This zone has been remobilized and deformed by the Hudsonian orogeny (ca. 1800 m.y.). Subsequent uplift and erosion has exposed the deep seated plutons and disconnected the mantling gneissic and metasedimentary units.

9.2 DETAILED GEOLOGY

Detailed mapping of the permit revealed a series of highly metamorphosed granitoid and sedimentary rocks.

The property can be roughly divided into two parts along a NW/SE line represented geographically by a small creek valley immediately to the east of the campsite (Fig. 3). To the west of this line, the topography is fairly rugged and outcrop exposure is excellent. The rocks here are generally migmatitic (probably paragneisses), consisting of various admixtures of granite gneiss (1a) and chlorite gneiss (lb).

To the east, the topography is much more subdued with extensive glacial outwash deposits, and the rocks tend to be more plutonic, consisting of foliated diorites (ld) and biotite gneisses (le).

Thus, it appears that the property is underlain by a dioritic intrusive complex, overlain by a mantle of granite-chlorite paragneiss.

One minor exposure of metasedimentary rocks was located during mapping (unit 2). This outcrop consists of interbedded metaquartzite and meta-argillite with minor disseminated pyrite. The beds have nearly vertical dips and generally strike into the lake. A moderate VLF cross-over is associated with this outcrop.

The entire permit area is intensely fractured, generally along a N-S and NE-SW trend. Some fractures are hematized and display slightly above background radiometric readings. However, no uranium mineralization was observed.
in any fracture during any of the surveys carried out on the property.

10.0 GEOPHYSICS

10.1 AIRBORNE SURVEYS

(i) Airborne Electromagnetics

Hudson's Bay Oil and Gas Company Limited contracted Questor Surveys Ltd. to fly an area north and east of Fort Chipewyan, Alberta, including the area covered by Permit 6879030003 (Fig. 4). The survey was undertaken in late March, 1979, and constituted approximately 55 line km of flying over the permit area.

A total of 16 anomalies were detected by the survey*, the vast majority of which are directly attributable to conductive overburden and "swamp edge" effect, as outlined in Table II.

Anomalies M, N and O, however, are of sufficient strength that they may be related to a bedrock conductor, and are therefore of further interest.

(ii) Airborne Gamma Spectrometry (AGS)

In late May, 1979, an airborne gamma spectrometer survey was flown over the permit area (Fig. 5). The survey consisted of grid flying on lines oriented at 320° at a spacing of 250 m. A Hughes 500-D helicopter with the HBOG-AGS system was used for the survey (Appendix III).

Only two anomalies were detected, the first located between fiducials 137 and 138 and the second between fiducials 140 and 141 (Fig. 5 & 6). The AGS system was used to relocate both anomalies which were found to be caused by a single outcrop of quartz monzonite protruding from an area of wet muskeg. Full (256 channel) spectra of the anomalies were retrieved using the ground processing unit (GPU) capabilities of the HBOG-AGS system (Figures 7 & 8). This allows for a direct comparison of the Bi^{214} (U), K^{40}, and Tl^{208} (Th) content of the rock.

*NOTE: Data interpretation by HBOG personnel
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<th>ANOMALY NO.</th>
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<th>REMARKS</th>
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<tr>
<td>A</td>
<td>40080</td>
<td>2</td>
<td>Probably caused by conductive overburden</td>
</tr>
<tr>
<td>B</td>
<td>40100</td>
<td>4</td>
<td>Probably caused by conductive overburden</td>
</tr>
<tr>
<td>C</td>
<td>40100</td>
<td>2</td>
<td>Probably caused by conductive overburden</td>
</tr>
<tr>
<td>D</td>
<td>40110</td>
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<td>E</td>
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<td>F</td>
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<td>H</td>
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<td>K</td>
<td>40160</td>
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<tr>
<td>L</td>
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<tr>
<td>M</td>
<td>40200</td>
<td>6</td>
<td>Possible bedrock</td>
</tr>
<tr>
<td>N</td>
<td>40220</td>
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</tr>
<tr>
<td>O</td>
<td>40230</td>
<td>5</td>
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<tr>
<td>P</td>
<td>40310</td>
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AIRBORNE EM ANOMALIES

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<th>TIMES BACKGROUND</th>
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<tr>
<td></td>
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<td>K</td>
<td>U/K</td>
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<tr>
<td>A 13-137</td>
<td>14513</td>
<td>307</td>
<td>229</td>
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<td>A 13-140</td>
<td>9467</td>
<td>264</td>
<td>194</td>
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<tr>
<td>BACKGROUND</td>
<td>3570</td>
<td>93</td>
<td>36</td>
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Remarks
- Quartz Monzonite outcrop -
- minor U secondary mineralization
- Same outcrop
LEGEND

CH 1 - 500 cps
CH 2 - 400 cps
CH 3 - 200 cps
CH 4 - 200 cps
CH 5 - 5000 cps

Figure 6
The various ratios and the magnitudes of the anomalies are given in Table III.

10.2 GROUND GEOPHYSICS

The main emphasis of the ground geophysical programme was concentrated around the only exposure of pyritiferous metasedimentary rocks located on the property. Approximately 3 km of VLF-EM and 5 km of Induced Polarization/Resistivity survey were completed in the vicinity of this outcrop.

(i) VLF-EM

A Crone Radem VLF-EM instrument was used to take dip angle readings at 100 m intervals along pace and compass lines oriented along and subparallel to the Lake Athabasca shoreline (Fig. 9).

Dip angle readings range in value from +14 degrees to -10°. Two cross-overs were located, one at 19+50E on Line #1 and another somewhat better defined at 18+40E on Line #2 (Fig. 9). Assuming continuity between these two lines, the centre of the anomaly strikes E-W toward Lake Athabasca.

(ii) IP-RESISTIVITY

A Crone "Newmont Designed" IP-IV pulse type receiver and a Scintrex IPC-8 250 W Transmitter were used in a 200 m square array. Readings were taken at 100 m intervals on lines approximately 20 m apart along 5 km of grid. Apparent chargeability and apparent resistivity readings were plotted at 1:10,000 (Fig. 10). The high chargeabilities found along line 7+00S are suspect due to very dry ground conditions resulting in low transmitter current output with correspondingly weak receiver signal and strong magneto-telluric interference. It was therefore decided to attempt to confirm these readings by running two further lines at 8+00S and 10+00S using an expanding pole-dipole array to produce a pseudosection through the overburden to bedrock (Fig. 11). The areas of high
chargeabilities were not relocated, but high noise to signal ratios were again encountered causing the data to be suspect.
Hudbay Uranium Company
A Division of Hudson's Bay Oil and Gas Company Limited

Twp 113 R 6 W 4 M

Hudbay Uranium Company
A Division of Hudson's Bay Oil and Gas Company Limited

POINT BASSE
SHORELINE VLE-EM
DIP ANGLE

PERMIT 6897030003

Figure 9 March '80 R.C.E.

1:25000

-16-

/980003
LEGEND

12 READING SUSPECT DUE TO
VERY ACTIVE TELLURIC NOISE
AND DRY GROUND CONDITIONS

u UNRELIABLE TELLURIC NOISE

SPECIFICATIONS
200 m. SQUARE ARRAY
Tx. SCINTREX IPC-B
Rx. CRONE IP-IV NEWMONT TYPE

APPARENT
CHARGEABILITY
(milliseconds)

APPARENT
RESISTIVITY
(ohmmeters)

LAKE ATHABASCA

Hudbay Uranium Company
A Division of Hudson's Bay Oil and Gas Company Limited

POINT BASSE
I.P./RESISTIVITY

PERMIT 6879030003

Figure 10 March '80 G.I.W.

OPERATORS: R.C.E. / D.M.
POLE-DIPOLE ARRAY

- No Reading Due To High Noise Level

Rx — CRONE 1P-IV NEWMONT TYPE
Tx — SCINTREX IPC-8, .250 Watt

OPERATOR: R. Everett
M. Kilby

Hudbay Uranium Company
A Division of Hudson's Bay Oil and Gas Company Limited

POINT BASSE

1P/RESISTIVITY

PERMIT 6879030003

Figure II
March '80
G.I.W.

86L/15
REFERENCES

GODFREY, J. D., 1958

Aerial Photographic Interpretation of Precambrian Structures
North of Lake Athabasca; Research Council of Alberta; Geological
Division Bulletin 1.

GODFREY, J. D., 1978

Geology of the Wylie Lake District, Alberta;

RILEY, G. C., 1959

Geology of the Fort Fitzgerald Map-Area, Alberta;
GSC Map 12-1960.
Respectfully Submitted:

A. A. BROWN  
Manager, Uranium Exploration

D. J. SLACK  
Geologist
STATEMENT OF EXPENDITURES

APPENDIX I
HUDSON'S BAY OIL AND GAS COMPANY LIMITED

QUARTZ MINERAL EXPLORATION PERMIT 6879030003

I, ALFRED RAYMOND TRAVERS, of the City of Calgary, in the Province of Alberta, HEREBY CERTIFY:

1. THAT I am Controller for HUDSON'S BAY OIL AND GAS COMPANY LIMITED and as such have a personal knowledge of the matters herein contained.

2. THAT HUDSON'S BAY OIL AND GAS COMPANY LIMITED has incurred costs for mineral exploration work relating to the above Quartz Mineral Exploration Permit pursuant to the Quartz Mining Regulations, during the period March 15, 1979, to March 15, 1980, as follows:

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3. I hereby certify that the above statements are true.
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INSTRUMENT SPECIFICATIONS

APPENDIX III
HBOG GAMMA RAY SPECTROMETER
SPECIFICATION SHEET

Data acquisition system based on TMS 9900 Micro processor 256 channel full spectrum spectrometer with Automatic Compton Stripping

Sampling Rate 1 second

1,000 in.\(^3\) X-square NaI crystal package (Harshaw)

CRT: Allows continuous monitoring of analogue signal, digital signal and channel drift, based on a 4 minute accumulated peak of K-40

PRINTER: Programmable, prints analogue channels of Enhanced Total Count, K-40, Bi-214, Tl-208, Total Count and Altimeter

ANALOGUE CHANNEL WINDOWS:

<table>
<thead>
<tr>
<th>Enhanced Total Count</th>
<th>Total Count Channel biased to emphasize Bi-214 responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-40 - Channel 117-127</td>
<td>(1.36 MeV - 1.56 MeV)</td>
</tr>
<tr>
<td>Bi-214 - Channel 144-152</td>
<td>(1.66 MeV - 1.86 MeV)</td>
</tr>
<tr>
<td>Tl-208 - Channel 210-226</td>
<td>(2.40 MeV - 2.76 MeV)</td>
</tr>
<tr>
<td>Total Count Channel 10-255</td>
<td>(0.12 MeV - 3.05 MeV)</td>
</tr>
</tbody>
</table>

DATA STORAGE: \(\frac{1}{2}\" (900 Bits/inch) Pertec tape unit (IBM Format)

DATA STORED: 256 channels of full gamma spectrum, energy scale approximately 11.5 KeV/channel, Altimeter, Magnetometer, VLF and Real Time clock

PLATFORM: Hughes 500-D helicopter
Crystal package mounted in belly pod
GPU DATA OUTPUT

For Figures 7, 8, 9

- Marker to show start of location
- No. of sec. after R.F. that data is being summed from
- No. of sec. of data summed
- Data that is being summed
- CPS for each window
- Sample interval summed
- Summed counts for each window
- Request for printout of each accumulated X-ray channel Y-Yes N-No
- Chan No.
- Counts for each chan. accumulated for the above specified time (10 sec.)

FLTN Y065
LINE Y065
RF 6665
SF 6665 0078

COUNTS/Chan/Scan Summed

GPU - GROUND PROCESSING UNIT

RF - Random FID-A marker manually placed on the analog chart and tape using a fiducial pedal.

SF - Sequential Fid-A marker automatically placed on the analog chart and tape using a real time clock. Sequential fids increase when data is being stored on tape.

TT - Total Count Window
K - Potassium Window
U - Uranium Window
Th - Thorium Window
FLTN Y065 - Flight Number
LINE Y065 - Line Number same as flight no.
SCAN - 1 second of data
Examples of Uranium, and Thorium Spectra
Instrumentation

Induced Polarization

The Crone "Newmont Type" I.P.-IV receiver, manufactured by Crone Geophysics Limited of Mississauga, Ontario, and the Scintrex IPC-E 250W Transmitter, manufactured by Scintrex Limited of Concord, Ontario, were used for the induced polarization survey.

CRONE "NEWMONT DESIGNED" I.P.-IV PULSE TYPE RECEIVER

SPECIFICATIONS

- Primary Voltage "Vp": 0.0005 to 60 volts, accuracy ±5%
- Standard receivers set for 2.0 seconds on, 2.0 seconds off current cycle. Off period must be greater than 1.8 seconds.
- Chargeability M and N readings directly in milliseconds

- Both M and N readings are automatically corrected to the Newmont 33M1 Standard. M and N readings should be the same with a normal polarization decay. Unequal readings indicates the presence of inductive coupling and then the N reading should be used.

- Both M and N readings are taken for 3 current cycles (6 samples) then they are automatically averaged and stored for direct read out.

- Self Potential: Automatic buckout effective when SP less than .6 Vp
  Manual buckout - 0 to 1.0 volts calibrated
  (1.0 volts uncalibrated)
  Fine SP buckout for low signal levels

- Pot Resistance Check: Check of potential contacts on millisecond meter: Green - good contact; Orange - marginal contact (M-N readings are accurate, Vp and resistivity readings have error); Red - nil or unacceptable contact.
- Input Impedance: 300,000 Ohms
- Noise Filters: 30 DB at 50 or 60 Hz (factory set)
  30 DB/Octave above 8 Hz
  6 DB/Octave above 35 Hz
- Automatic Time Lock to ground signal
- Amplifier drift correction by one control

SCINTREX IPC-8 250W TRANSMITTER

SPECIFICATIONS

POWER: 250W max.
OUTPUT VOLTAGE: 150V to 850V in 5 steps 1.4 ratio
OUTPUT CURRENT: 1.5A max.
METRE RANGES: 0-0.5 A.F.S. and 0-1.5 A.F.S. ±3%
CYCLE: 1:1:1:1 on:off:reverse:off
PULSE DURATIONS: 1, 2, 4 seconds
OPERATING TEMPERATURE: -30°C to +55°C
CALCULATIONS FOR INDUCED POLARIZATION

Measurements on Receiver

M = Chargeability (channel 1)-measurement plotted (microseconds)
N = Chargeability (channel 2 - microseconds)
Vp = Voltage (volts)
K = Array Coefficient (dependent on array used) - for 200 m x 200 m square array K = 217.5
I = Current (amps)
Sp = Self Potential Gradient (microvolts)
Resistivity = \( Vp \times \frac{K}{I} \)
Source of Primary Field: VLF Communication Stations 12 to 24 KHz

Number of Stations: 7 switch selectable

Stations Available: The seven standard stations are Cutler, Maine, 17.8; Seattle, Washington, 18.6; Collins, Colorado, 20.0; Annapolis, Md, 21.4; Panama, 24.0; Hawaii, 23-4; England, 16.0. Alternative stations which may be substituted are: Gorki, Russia, 17.1; Japan, 17.4; England, 19.6; Australia, NWC, 22.3 KHz.

Check that Station is Transmitting: Audible signal from speaker.

Parameters Measured and Means:

1. DIP ANGLE in degrees, from the horizontal of the magnetic component of the VLF field. Detected by minimum on the field strength meter and read from an inclinometer with a range of ±80° and an accuracy of ±1°.

2. Field Strength (total or horizontal component) of the magnetic component of the VLF field. Measured as a percent of normal field strength established at a base station. Accuracy ±2% dependent on signal. Meter has two ranges: 0-300% and 0-600%. Switch for "keyed" or "F.S." (steady) signal.

3. Out of Phase component of the magnetic field, perpendicular in direction to the resultant field, measured without sign, as a percent of normal field strength. This is the minimum reading of the Field Strength meter obtained when measuring the dip angle. Accuracy ±2%.

Operating Temperature Range: -20° to +110°F.
SPECIFICATIONS: SCINTILLOMETER, URTEC MODEL UG-130

<table>
<thead>
<tr>
<th>Selectable Energy Levels</th>
<th>Calibration: All energy above 0.30 MEV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Count I: All energy above 0.08 MEV</td>
</tr>
<tr>
<td></td>
<td>Total Count II: All energy above 0.40 MEV</td>
</tr>
<tr>
<td></td>
<td>Potassium: All energy above 1.36 MEV</td>
</tr>
<tr>
<td></td>
<td>Uranium: All energy above 1.66 MEV</td>
</tr>
<tr>
<td></td>
<td>Thorium: All energy above 2.46 MEV</td>
</tr>
</tbody>
</table>

- Detector: NaI (TI) crystal, volume 4.0 cu. inches (66 c.c.) mechanically ruggedized.

- Spectral Shift as a function of count rate: 3% or less from 0 to 15000 CPS

- Energy Response Linearity error: less than 2%

- Visual Display: Ruggedized five digit liquid crystal display

- Display Overflow: When counts exceed 99999, two dots will indicate count rate overflow

- Sample Rate: 1.0 or 10.0 seconds continuous, for all energy levels

- Power: Three "C" size alkaline batteries provide 40 hours normal operation

- Battery Test Monitor: Battery test status can be monitored. When batteries are nearly discharged, keyed audio alarm is activated, overriding count rate audio.

- Audio: The count rate may be monitored in either the continuous mode or selectable count rate threshold mode.

- Audio Time Response: 0.5 seconds from 0 to 2500 CPS

- Temperature Range: Minus 25°C to plus 60°C.

- Dimensions & Weight: 21 cm (8.3 in.) long, 11 cm (4.2 in.) wide, 5. cm (2.0 in.) high, weight 1.5 kg - (3.31 lbs) includes batteries and handle

- Rate Meter Output (optional): 100 mV/100 CPS, available through a miniature connector

- Calibration: Switch selectable using self contained Ba 133 ISOTOPE.
LEGEND

- FLIGHT LINE WITH FIDUCIAL AND FLIGHT DIRECTION
- ALTA 13 FLIGHT NUMBER
  - DPO OPERATOR: DAN OLSON
  - MM MELVIN MOLTZAN
- ANOMALY (Followed up in 1979)
- PROPERTY BOUNDARY

LAKE ATHABASCA

Figure 5 March 1980

Hudbay Uranium Company
A Division of Hudson's Bay Oil and Gas Company Limited

PERMIT 6879030003
Twp 113 R6 W4M
AIRBORNE GAMMA SPECTROMETRY

ID 19800003
U-AR-164 (*)

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