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CHARLES LAKE URANIUM PROJECT

(QUARTZ MINERAL EXPLORATION PERMIT NO. 36)

DYNALTA OIL & GAS CO. LTD.

Calgary, Alberta

November, 1968

R.M.P. Jones,
P. Geol.

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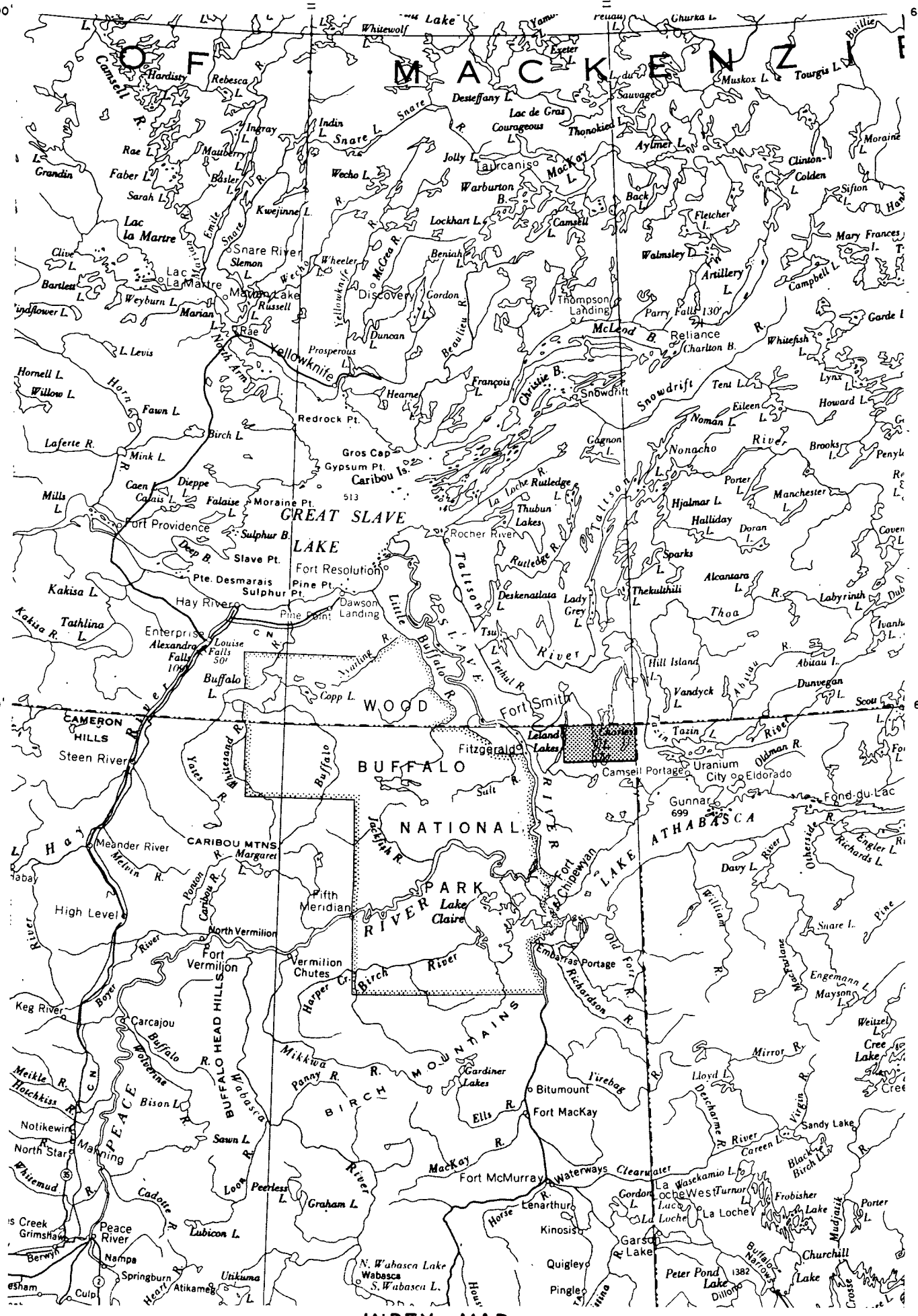

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CHARLES LAKE PROJECT

MAP NO. 1

INTRODUCTION

This project was planned as an aeroradiometric survey of a north-south trending area of igneous and highly metamorphosed Precambrian sediments lying east and west of Charles Lake in northeastern Alberta. Quartz Mineral Exploration Permit No. 36, consisting of 49,920 acres (78 square miles), had previously been taken by the Company in the fall of 1967 in this general area.

The aeroradiometric program was started on June 10th and finished on June 21st, 1968. The party consisted of five men - an air crew comprising pilot, navigator and instrument operator, and a geologist and draftsman on the ground.

Aeroradiometric survey equipment and procedures are described in Appendix A.

BACKGROUND ON PROJECT AREA

Location and Access

The project lies in the extreme corner of northeastern Alberta between Latitude 59°45' to 60°00' North and Longitude 110°00' to 110°45' West, with Permit No. 36 in the northwestern portion of the area. This permit centers on Charles Lake - a narrow north-south elongated lake.

The area was readily accessible for survey flying from the Fort Smith airport.

Access for development would probably be initially by float plane. (The project area would be about 40 to 50 miles from the Slave River or Lake Athabasca.) However, a road survey has apparently been started east of the Slave River at Fort Smith probably to terminate in Fort Reliance. It is reported that a photo study has already been made by the Federal Government of the route to Fort Reliance.

Geology

Sediments in the northeast corner of Alberta consist mainly of granites - often porphyritic, granite gneisses, metamorphosed sediments (quartzites and schists), mylonites and minor amphibolites.

There are a number of apparently major north-south faults and several

northwest-southeast faults. The north-south faults are marked by strongly mylonitized zones.

Mineralization

Molybdenite is found in several occurrences to the east of the Permit (near Andrew Lake area), possibly in association with the Bonny (northwest-southeast) Fault. Arsenopyrite and minor chalcopyrite have also been found in the general area. No mineral occurrences - other than radioactive - have been noted within Permit No. 36.

Radioactive Occurrences

Radioactive occurrences (probably uranium) have been noted in the general area particularly along the Bonny Fault where (apparently) McIntyre Porcupine have done some drilling. Within or near Permit No. 36, two radioactivity shows were mapped by the Research Council in the granite west of Charles Lake, one west of Selwyn Lake in the quartzite, and two northwest of Dawson Lake in or near the quartzite.

References

1. Geological Survey of Canada Preliminary Map 10-1959 (Fort Fitzgerald, 4 mile, G.C. Riley, 1960).
2. Research Council of Alberta, Geological Division Bulletin No. 1 - "Aerial Photographic Interpretation of Precambrian Structures North of Lake Athabasca" (J.D. Godfrey, 1958).

3. Research Council of Alberta Preliminary Report 58-3 - "Geology of the Andrew Lake, North District" (J.D. Godfrey, 1961).
4. Research Council of Alberta Preliminary Report 58-4 - "Mineralization in the Andrew, Waugh and Johnson Lakes Area, Northeastern Alberta" (J.D. Godfrey, 1958).
5. Research Council of Alberta Preliminary Report 61-2 - "Geology of the Andrew Lake, South District, Alberta" (J.D. Godfrey, 1963).
6. Research Council of Alberta Preliminary Report 62-1 - "Geology of the St. Agnes Lake District, Alberta" (J.D. Godfrey, E.W. Peikert, 1963).
7. Research Council of Alberta Preliminary Report 62-2 - "Geology of the Colin Lake District, Alberta" (J.D. Godfrey, E.W. Peikert, 1964).
8. Research Council of Alberta Preliminary Report 65-6 - "Geology of the Bayonet, Ashten, Potts and Charles Lakes District, Alberta" (J.D. Godfrey, 1966).
9. Geological Survey of Canada, Geophysics Paper No. 7161 (Fitzgerald, 4 mile, Airborne Magnetic Series).

   (N.B. - This area also available on 1" = 1 mile airborne magnetometer sheets.)

RESULTS

Aeroradiometric Survey (For details on airborne anomalies, see Appendix B.) The aeroradiometric survey of Permit No. 36 and the adjacent area covered a total of 887 surveyed flight miles on one-quarter mile spacing.

A total of 9 individual anomalous high kicks or zones of related high kicks were recorded (see Map No. 2 in pocket). A reading on the tape was considered anomalous if it registered 50 counts per second or more on the uranium log above the background which, in this case, was about 25 counts per second, i.e. anomalies were only considered that registered three times background or more. This rather high criteria of 50 counts per second excess uranium over background used in anomaly selection was found necessary as the "noise" kick or apparent meaningless variation in background appeared to run well above 25 counts per second above background. However, a number of clean kicks running less than 50 counts per second above background have also been plotted on the maps and are noted in Appendix B as it was thought they might have some signifcance in extending the radiation patterns around the main anomalies.

Geologically, the rocks in this anomalous area are mapped as mainly porphyritic red granites. They vary from coarse to fine grained, and are foliated and lineated - possibly gneissic. The aeromagnetic map (Geophysics Paper 7161 Aeromagnetic Series) shows a prominent fault zone (the Warren

Fault) directly west of this anomalous area. High magnetic values are also present on the east in the Mercredi Lake area, with the trend running north-south.

CONCLUSIONS AND RECOMMENDATIONS

The limited number of airborne radiometric anomalies within most of Permit No. 36 is not too encouraging. However, there are a number of anomalies on the extreme west of this permit near the east slope of Mercredi Lake which are interesting. It must be remembered that the aeroradiometric survey, in practice at least, is often more qualitative than quantative. Thus any distinct kicks on the tapes regardless of size are worth a detailed investigation on the ground.

It is, therefore, recommended:

1. That the major portion of Permit No. 36 be dropped with retention (or later acquisition) of mineral rights in the following acreage:

   Sections 7, 8, 20, 28, 30, 31, Township 126, Range 4, W4M.

   N.B. Some additional acreage - notably Sections 7, 17, 18, 19 and 29 of the above Township - may be required to keep this acreage within a single block, if this is considered necessary.

2. That the aeroradiometric anomalies east of Mercredi Lake be investigated in detail by a geological party equipped with a ground spectrometer.

[redacted]

R.M.P. Jones, P. Geol.

RMPJ:aad

November, 1968

SEIGEL ASSOCIATES LIMITED
GEOPHYSICAL CONSULTANTS & CONTRACTORS
A DIVISION OF SCINTREX LIMITED

APPENDIX "A"

AERO-RADIOMETRIC SURVEY EQUIPMENT AND PROCEDURES

The reconnaissance aero-radiometric survey was executed using the following equipment installed in a Beechcraft Baron twin-engined aircraft.

1. Dual Scintrex SC-1 single channel, threshold-type, integral spectrometers were employed. One of these was set with its threshold at about 1.65 MeV level, i.e. to exclude all K40 gamma radiation but to accept uranium and thorium radiation. The threshold of the second SC-1 was set at about 2.50 MeV level, i.e. to exclude all K40 and uranium energy but to accept the higher energy thorium radiation. By means of an analogue computer network the output of the second SC-1 was used to "strip", from the output of the first SC-1 the gamma radiation component due to thorium, thus leaving only uranium radiation. In this fashion two channels of information are recorded, one reflecting only uranium gamma radiation and the second only thorium radiation.

   The sensor-detector system for the dual channel spectrometer consisted of three matched thallium-activated sodium iodide crystals 4" in thickness by 5" in diameter each coupled to a photomultiplier tube assembly.

2. Bonzer radio altimeter. This was fed into an encoder which converted the altimeter output from analogue form to a series of timed impulses. The pulse interval is proportional to the altimeter output, i.e. to the height of flight.

3. Moseley two-channel graphic recorder, each channel recording one channel of the spectrometer output. The radio altimeter output pulse train was expressed by one side-pen marker.

4. Vinten 16 mm continuous recording positioning camera.

5. Intervalometer synchronizing the camera exposures and one side-pen marker on the Moseley trace.

The following survey specifications were employed:

a) Spectrometer time constant - 1 second.

b) Mean survey terrain clearance - 150 ft.

c) Mean survey velocity - 170 m.p.h.

d) Mean reconnaissance line spacing - 2 miles.

In order to check on the complete system conditions a standard sample of refined Th was placed in a standard position relative to the detector heads approximately once per hour. In addition a "zero drift" check was made at the same time and with the same frequency.

The flight crew consisted of a pilot, navigator, and instrument operator. Whereas the continuous strip 16 mm camera film provides a precise record of the aircraft survey path, the navigator, for expediency, also makes a record of visual "fixes" on his navigation plan (National Topographic Plan on scale 1" = 4 miles) and on the Moseley chart. These visual fixes have been employed for the actual reconnaissance flight path recovery, as the abundance of easily recognizable land features renders this form of recovery both adequate and expeditious for the widely spaced reconnaissance lines. It has been planned that, for the detail flying at more closely spaced intervals, the photographic

flight path recovery would be employed as a matter of routine.

There is no easy quantitative relationship between the observed counts per second output of the gamma ray spectrometer and the grade in U or Th of the source material. Factors such as the geometry of the source, its position and distance relative to the detector, the amount and nature of the surface cover and leaching, etc., will all markedly affect the observed response. Only minimum grades, assuming very broad disseminations (semi-infinite case) can be established. For example, with the present equipment, it is estimated that 0.01% U will give rise to about 300 c.p.s. on Channel 1 and 0.01% Th will give rise to about 100 c.p.s. on Channel 2.

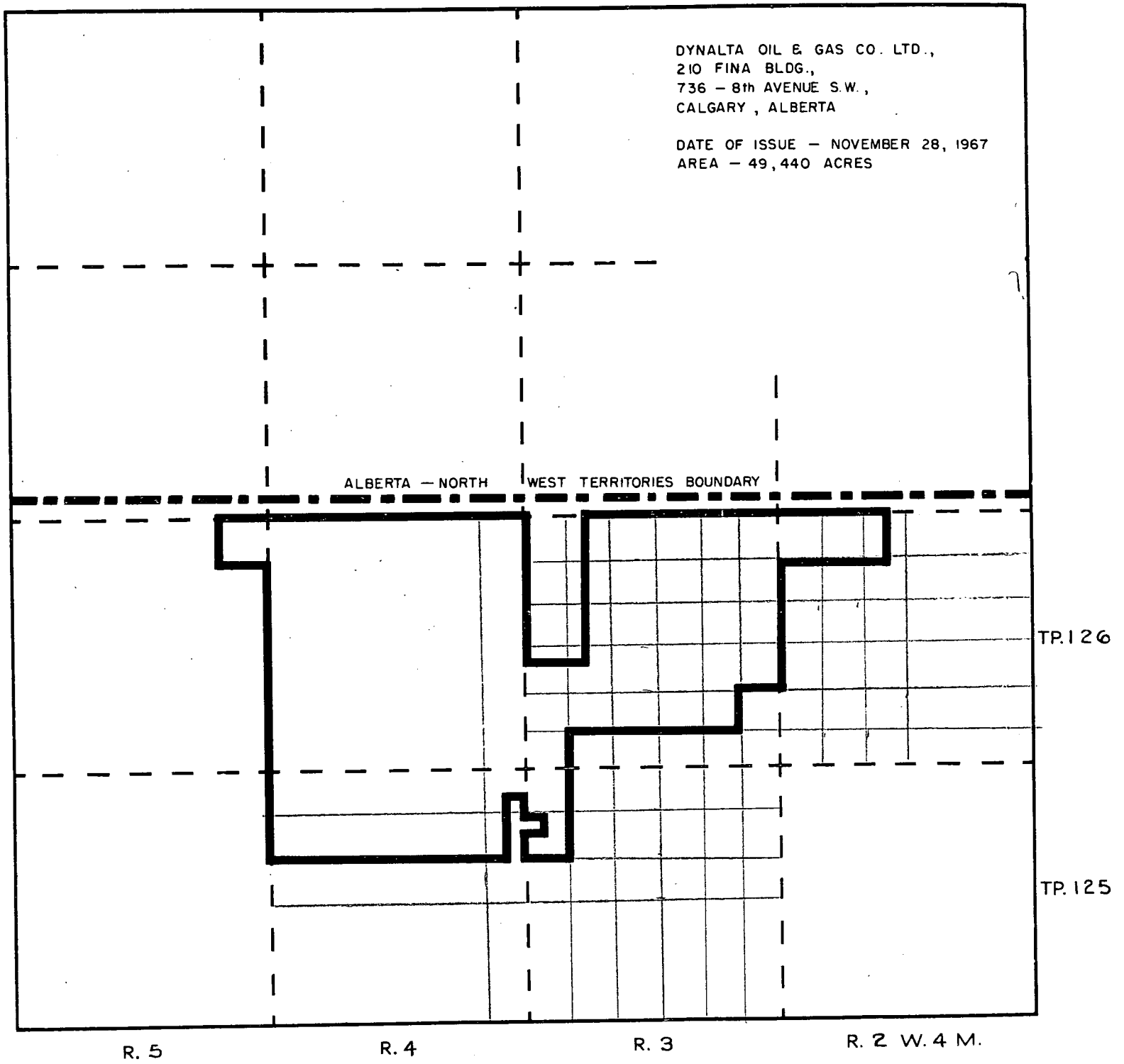
On this basis, a doubling of the usual background count levels could be caused by a uniform dissemination of as little as .0001% U or Th (1 part per million). This testifies to the high degree of sensitivity of this detection system. Because of the various limitations mentioned above, the actual in-situ grade will usually be considerably in excess of this figure.

APPENDIX B - LIST OF ANOMALIES

CHARLES LAKE AERORADIOMETRIC SURVEY

Line No.	Surveyed Mileage	Film Roll No.	*List of Anomalies
			*First figure or figures represent the fiducial number or numbers on film and tape. Second figure (bracketed) represents the amount of excess uranium radiation in counts per second (cps.) above the background of 25 cps.
59- 2E	33.0	51	3610-3618-(>25<50)
59- 3W	34.0	51	4631-(35), 4654-(40), 5430-(39), 5440-(40)
59- 4E	33.0	51	6675-6679-(>25<50), 7177-(35)
59- 5W	34.0	51	7357-(38), 7573-(34), 8149-(39)
59- 6E	32.0	52	458-464-(>25<50), 472-478-(>25<50), 500-(53), 668-(36)
59- 7W	33.0	52	1897-(35)
59- 9W	32.0	60	1420-(35), 1448-(35), 1656-(40)
59-12E	31.5	60	5646-(56), 6228-(35)
59-13W	32.0	61	824-(36)
59-14E	32.5	61	797-(34), 800-(35), 806-(40), 831-(35), 1313-(35)
59-15W	32.5	61	1959-(39), 2188-(35), 2512-(37)
59-16E	33.0	67	1199-(38), 1483-(35)
59-17W	33.5	67	2136-(41), 2365-(45), 2440-(69)
59-18E	33.5	67	3392-(51), 3427-(38), 3916-(40)
59-19W	34.0	67	4595-(37), 4654-(38)
59-20E	33.0	67	6721-(39)
59-22E	33.0	68	810-815-(>25<50), 1016-(35), 1090-(35)
59-23W	33.5	68	1786-(50), 2009-(55), 2039-(35), 2236-(47)
59-24E	34.0	68	3278-(36), 3319-3328-(>25<50), 3606-3613-(>25<50), 3822-(47)
59-25W	34.0	68	4730-(36), 4836-(38), 4849-(42), 5211-(36)
59-26E	33.5	69	712-717-(>25<50), 738-759-(>25<50), 1070-(63), 1234-(51)
59-27W	33.5	69	1739-(35), 1978-(35), 2029-(35), 2301-(41), 2319-(41)
59-28E	27.0	69	3510-3523-(>25<50), 3606-3623-(>25<50)
59-29W	33.5	69	5043-(40), 5047-(35)
59-30E	33.5	74	439-(37), 1013-(41)
59-31W	34.0	74	1458-(57), 1697-(50), 2186-(45)
59-33W	33.0	74	4546-(46), 4736-(42)
59-35W	32.0	74	7162-(42), 7452-(45), 7489-7503-(>25<50)

QUARTZ MINERAL EXPLORATION PERMIT No. 36



111°00′ 45′ 30′ 15′ 110°00′ 60°00′

QUARTZ MINERAL EXPLORATION PERMIT NO 36

Lake

Mercredi Lake

Arch Lake

Charles Lake

Potts Lake

Ashton Lake

Harker Lake

Swimmerton Lake

Bayonet Lake

Wallace Island

Inkster I.

Lake Andrew

Split Lakes

Hutton Lake

Doze Lake

Waugh Lake

Spider L.

Johnson L.

Ney L.

59-1 W
59-2 E
59-3 W
59-4 E
59-5 W
59-6 E
59-7 W
59-8 E
59-9 W
59-10 E
59-11 W
59-12 E
59-13 W
59-14 E
59-15 W
59-16 E
59-17 W
59-18 E
59-19 W
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59-26 E
59-27 W
59-28 E
59-29 W
59-30 E
59-31 W
59-32 E
59-33 W
59-34 E
59-35 W
59-36 W
59-37 E
59-38 W
59-39 E
59-40 W
59-41 E

45′

LEGEND

X 25-49 Counts Per Second Of Excess Uranium

▲ 50-74 " " " " " "

( ) >25< 50 Local Background Rise Above Regional (Count Per Second)

2640 Fiducial Number

DYNALTA OIL & GAS CO. LTD.
CALGARY, ALBERTA

AERORADIOMETRIC MAP
CHARLES LAKE PROJECT
(QUARTZ MINERAL EXPLORATION PERMIT NO 36)

MAP NO 2

Date: August, 1968	Drawn By: A.P.Smith	Geologist: R.M.P Jones
Rev. Date:	Scale: 1"=1 Mile	Drawing No

19680010