

MAR 19690026: LAKE ATHABASCA

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ECONOMIC MINERALS

FILE REPORT No.

U-AF-042(4)

REPORT ON
QUARTZ MINERAL PERMITS, 82, 83, 84, 85
NORTHEASTERN ALBERTA

on behalf of

NATIONAL NICKEL LTD. (N. P. L.)

and

PIONEER EXPLORATION LTD.

June 25, 1970

Eugene P. Meyers

Peter Paulson

Calgary, Alberta

SUMMARY:

During the month of June, 1970, National Nickel sent a field crew onto their permit areas (Quartz Mineral Permit Nos. 82, 83, 84 and 85) situated in northeastern Alberta.

A total of six radiometric, ratio anomalies were covered on the ground based on a previous airborne radiometric survey.

A reconnaissance total heavy metal soil survey was conducted in conjunction with the survey.

This report outlines the equipment, procedure and results of the ground work.

HISTORY AND PREVIOUS WORK:

In December, 1968, National Nickel Ltd. of Calgary filed Quartz Mineral Permits 82 - 85 inclusive with the Government of Alberta covering an area of approximately 200,000 acres. In May, 1969, Bow Valley Industries of Calgary took an option to earn a 50% interest in the property. Bow Valley had an airborne radiometric survey conducted on the property by Geo-X Survey of Vancouver, B. C. during September, 1969. In addition, a photogeologic and magnetic evaluation was made based on govern-

ment data available. In December, 1969, Bow Valley relinquished its interest in the property. In February, 1970, Pioneer Exploration of Calgary was assigned a 50% interest in the property.

LOCATION AND ACCESSIBILITY:

The property is located in northeastern Alberta, south of Lake Athabasca and bordering the Province of Saskatchewan, (See Figure 1).

Access to the property was by fixed wing aircraft based at Ft. Chipewyan and Uranium City. During the course of the survey, the base camp was moved three times.

RADIOMETRIC AND GEOCHEMICAL EQUIPMENT:

Two McPhar TV-3A portable scintillometers were used in the ground follow-up (See appendix for specifications).

The model TV-3A is a four threshold scintillometer which permits discrimination between the radioactive sources, potassium, uranium and thorium. Readings are taken from a capacitor discharge time-averaging meter system.

The instrument also has an integral ratio indicator which may be used to indicate approximate ratios of uranium to thorium in a high yield sample. A speaker is mounted on the instrument and adjustable audio output is tied in with each threshold in use.

GEO-CHEM:

Field analyses for metals were done on location. The rapid and accurate Bloom colorimetric test for heavy metals in sediments was used on all traverses. This test provides a roughly quantitative test for copper, lead, zinc, nickel, silver and tin and is sensitive to less than one part per million. This test samples for all of these collectively but can be made specific for some metals.

As a supplement to the Bloom test, the biquinoline test for copper was also used, but less extensively. This test is specific for copper and can rapidly determine, via colorimetric matching, trace amounts of copper to $\frac{1}{2}$ part per million.

GEOLOGY:

The permit area has been mapped as being underlain by the Athabasca Sandstone of Pre-Cambrian Age (Proterozoic). Much of the permit area is covered by recent glacial-fluvial features and muskeg. Only one area of outcropping was found as a result of ground and aerial reconnaissance (See Figure 2). The outcropping consisted of red massive coarse grained (micaceous) sandstone.

FIELD PROCEDURE:

Three fly-in camps were established in the permit area during the course of the survey. The camps were situated on lakes located near the areas of interest. A total of six radiometric ratio anomalies were covered (A-F inclusive, See Figure 2). The anomalies were plotted on air photos and a traverse made on foot. An alternate route was generally used on return traverse. All terrain vehicles were used on water and over muskeg. During the course of the traverse, periodic readings covering all four thresholds were recorded. A continuous monitoring of audio counts on uranium-thorium⁺ threshold was conducted throughout the traverse. Periodic soil samples were taken in conjunction with radiometric readings. Additional radiometric coverage was conducted over boulder trains, outcrop and anomalous topographic features. Two parties, consisting of geologist and assistant, operated separately in covering the indicated areas.

DISCUSSION OF SURVEY AND RESULTS:

The results of the airborne radiometric survey over the permit area did not indicate any measurements of total gamma ray counts of sufficient magnitude to be considered anomalous.

The total intensity of radiation may be low, however,

due to limited outcropping or proximity of narrow areas of potential economic interest to flight lines.

A recent report by the Geologic Society of Canada based on airborne gamma spectrometry work indicated that uranium/thorium ratios can be useful in pinpointing potential uranium sources. It was therefore decided that the uranium to thorium ratio map of the permit area would be used as a basis for delimiting potentially anomalous areas. If the U/Th ratio exceeded twice the average, this was designated as being anomalous. A total of six ratio anomalies were covered on the ground. Figures 3 through 8 represent profiles of radiation and total heavy metal content covering airborne anomalies "A" through "F" respectfully. For clarity and as a compromise between range and detail, the vertical scales on the profiles vary as indicated.

Ground readings having a minimum magnitude of over twice background would have been designated as anomalous. Nowhere did uranium/thorium measurements in the airborne anomalous areas exceed twice background. Outcropping was lacking in all of the anomalous areas which were situated at or near topographic highs.

No explanation for the airborne anomalies could be

determined, however, these anomalies were not caused by any ground concentration of a uranium source.

The soil tests for total heavy metals also plotted along with radiometric profiles did not indicate any potential areas of interest.

CONCLUSION:

The ground follow-up of airborne radiometrics failed to indicate any concentrations of uranium.

No further work is warranted on these permit areas.

Respectfully submitted,

[REDACTED]

Eugene Meyers, B. Sc. Geol.

[REDACTED]

Peter Paulson, B. Sc. Gyps.

REFERENCES CITED

Darney, A. G., Grasty, R. L., Charbonneau, B. W.

1969 Highlits of G. S. C. Airborne Gamma
Spectrometry in 1969, Thirty Eight Annual
Prospector and Developers Assoc.

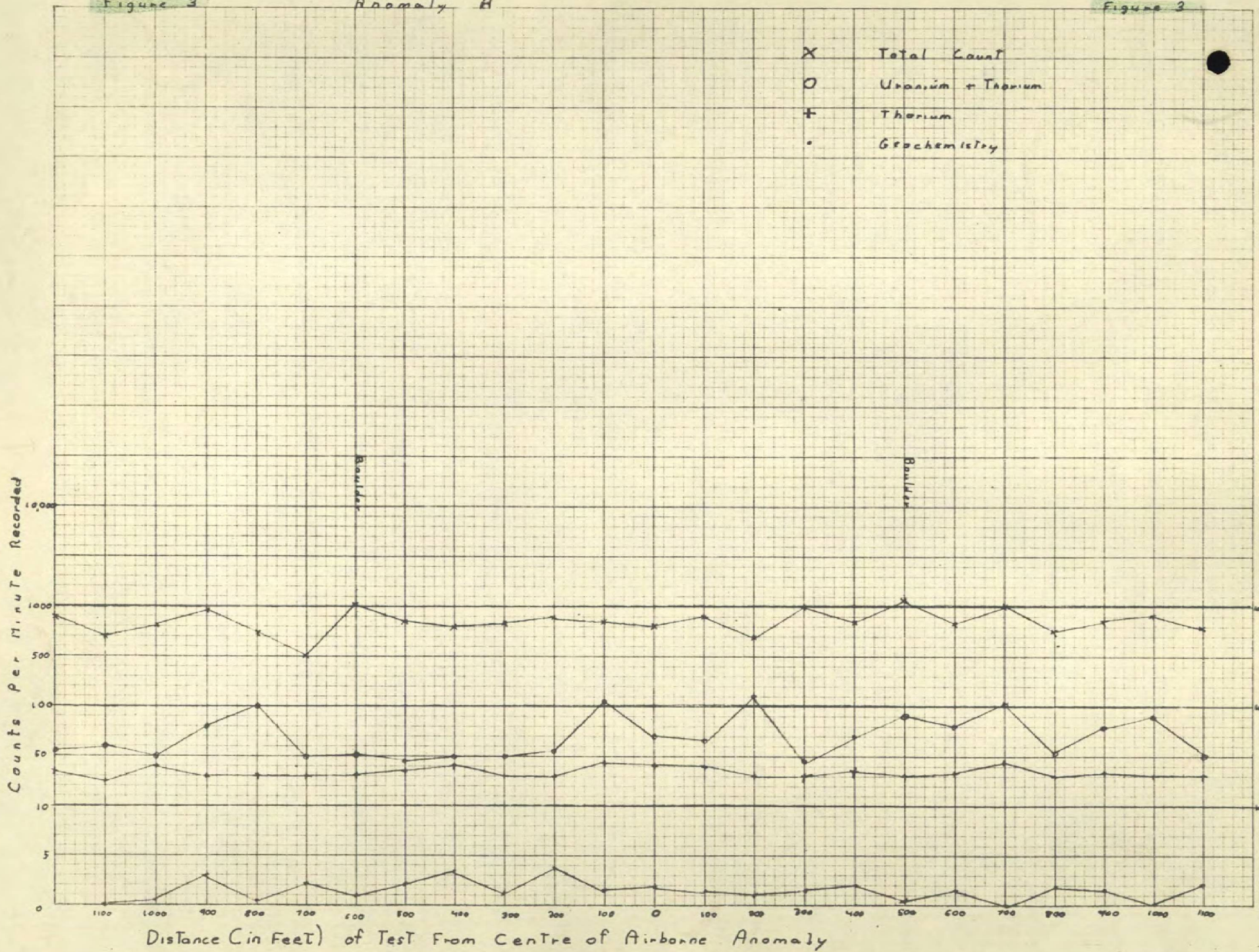
Fahrig, W. F. The Geology of the Athabasca Formation,
Geol. Surv., Canada, Bull 68.

Figure 3

Anomaly A

Figure 3

- X Total Count
- O Uranium + Thorium
- + Thorium
- Geochemistry

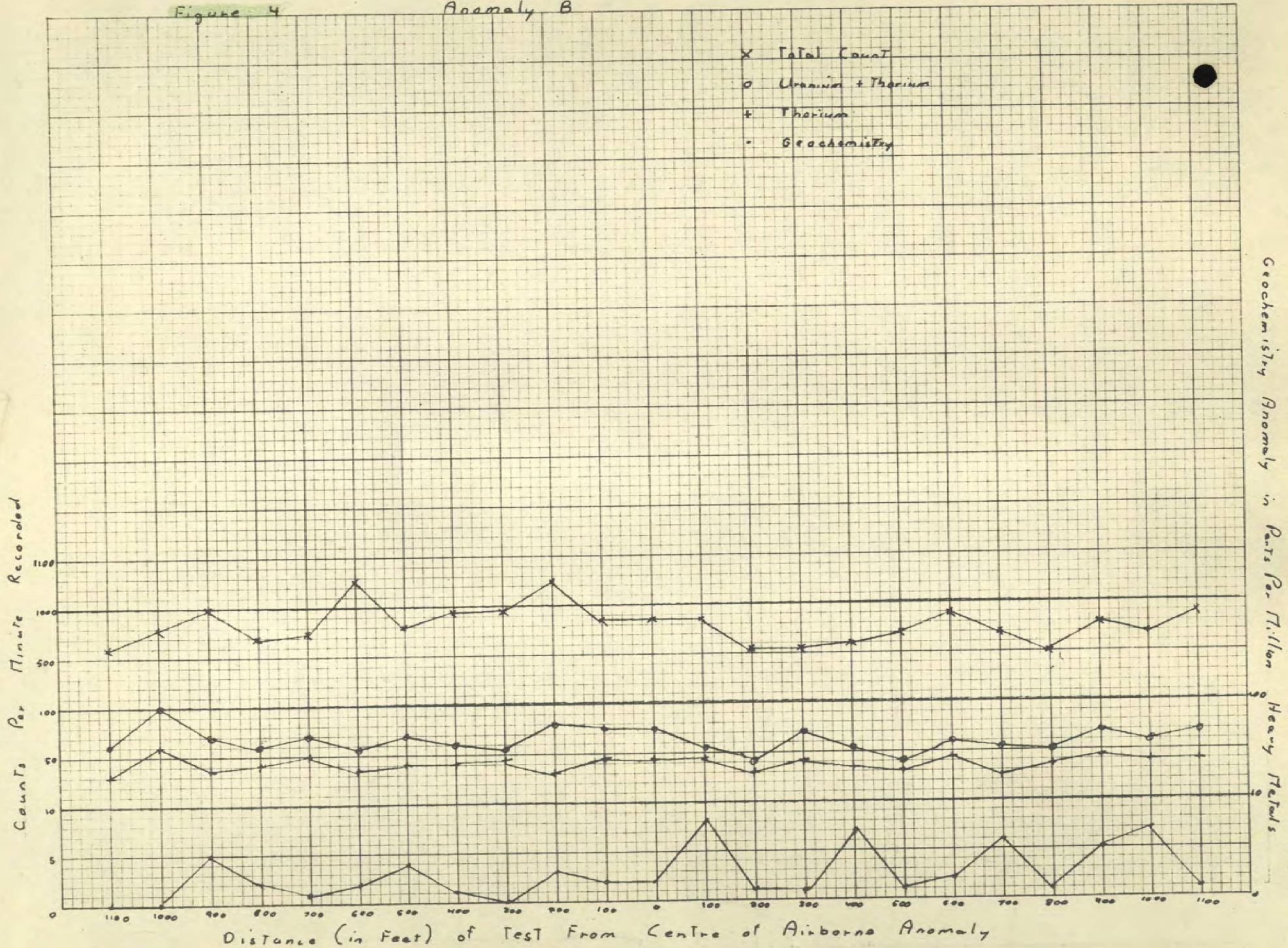


Geochemistry Anomaly in Parts Per Million Heavy Metals

19690026

Figure 4

Anomaly B



Geochemistry Anomaly in Parts Per Trillion Heavy Metals

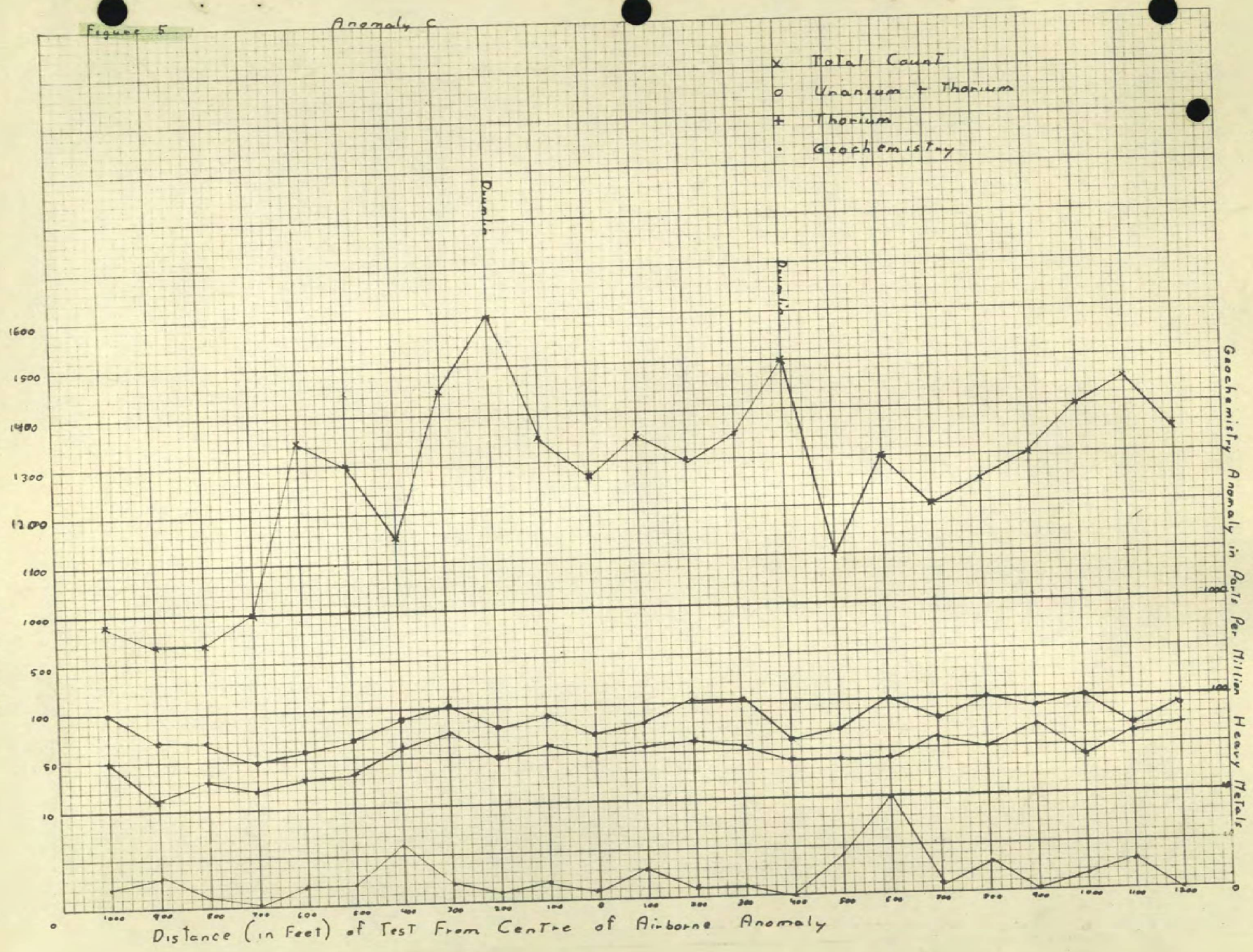
19690226

Figure 5

Anomaly C

- x Total Count
- o Uranium + Thorium
- + Thorium
- Geochemistry

Counts Per Minute Recorded



Geochemistry Anomaly in Parts Per Million Heavy Metals

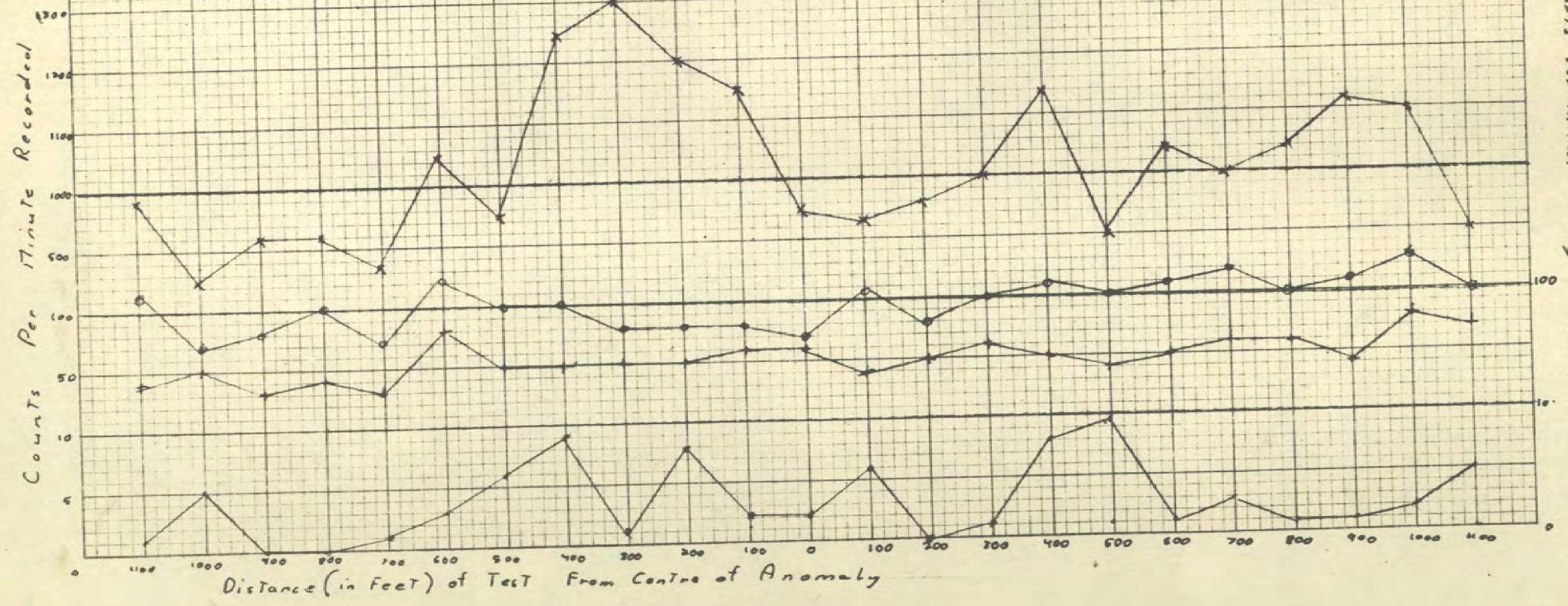
Distance (in Feet) of Test From Centre of Airborne Anomaly

19690026

Figure 6

Anomaly D

- X Total Count
- o Uranium + Thorium
- + Thorium
- Geochemistry

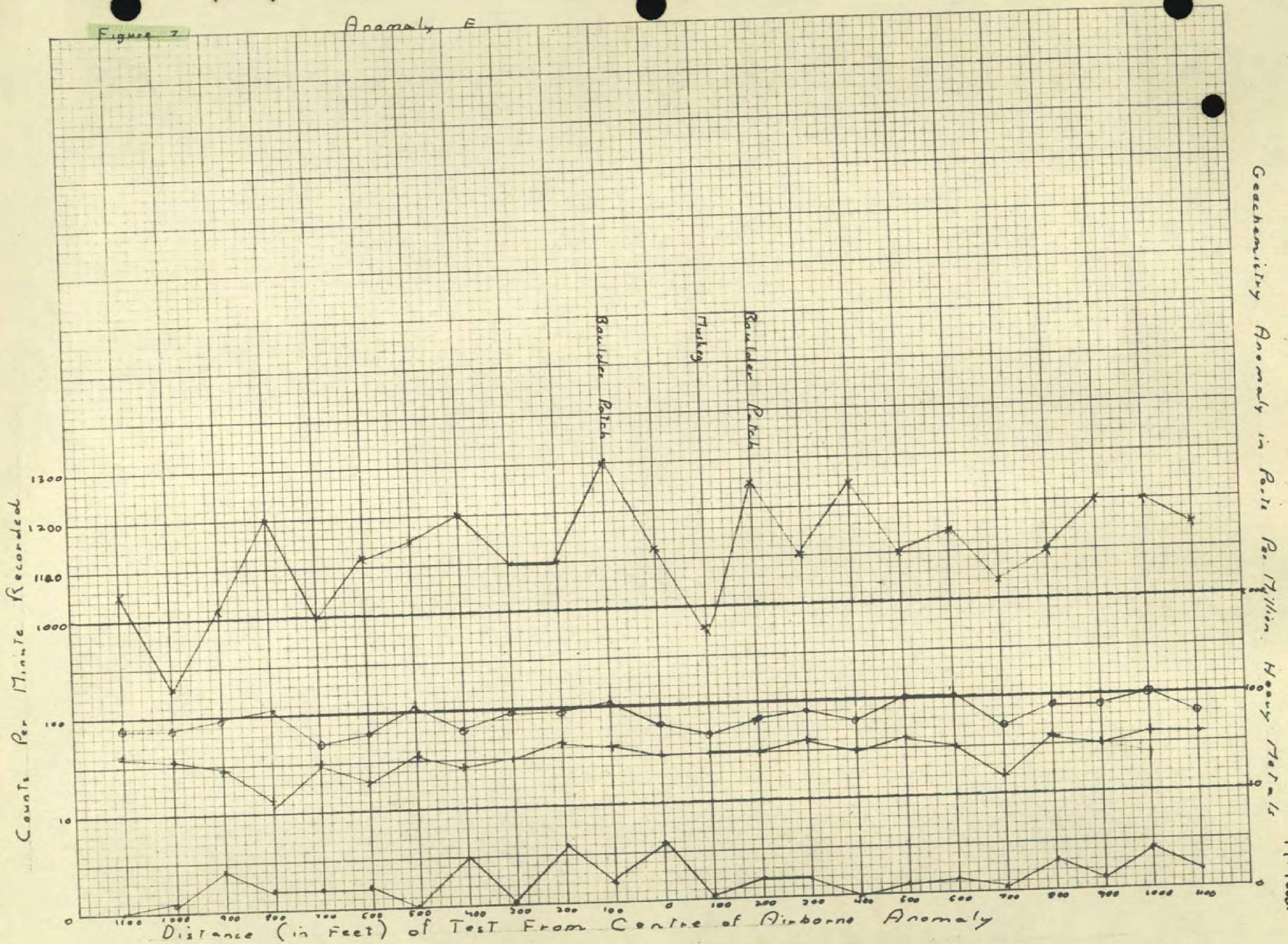


Geochemistry Anomaly in Parts Per Million Heavy Metals

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Figure 7

Anomaly E



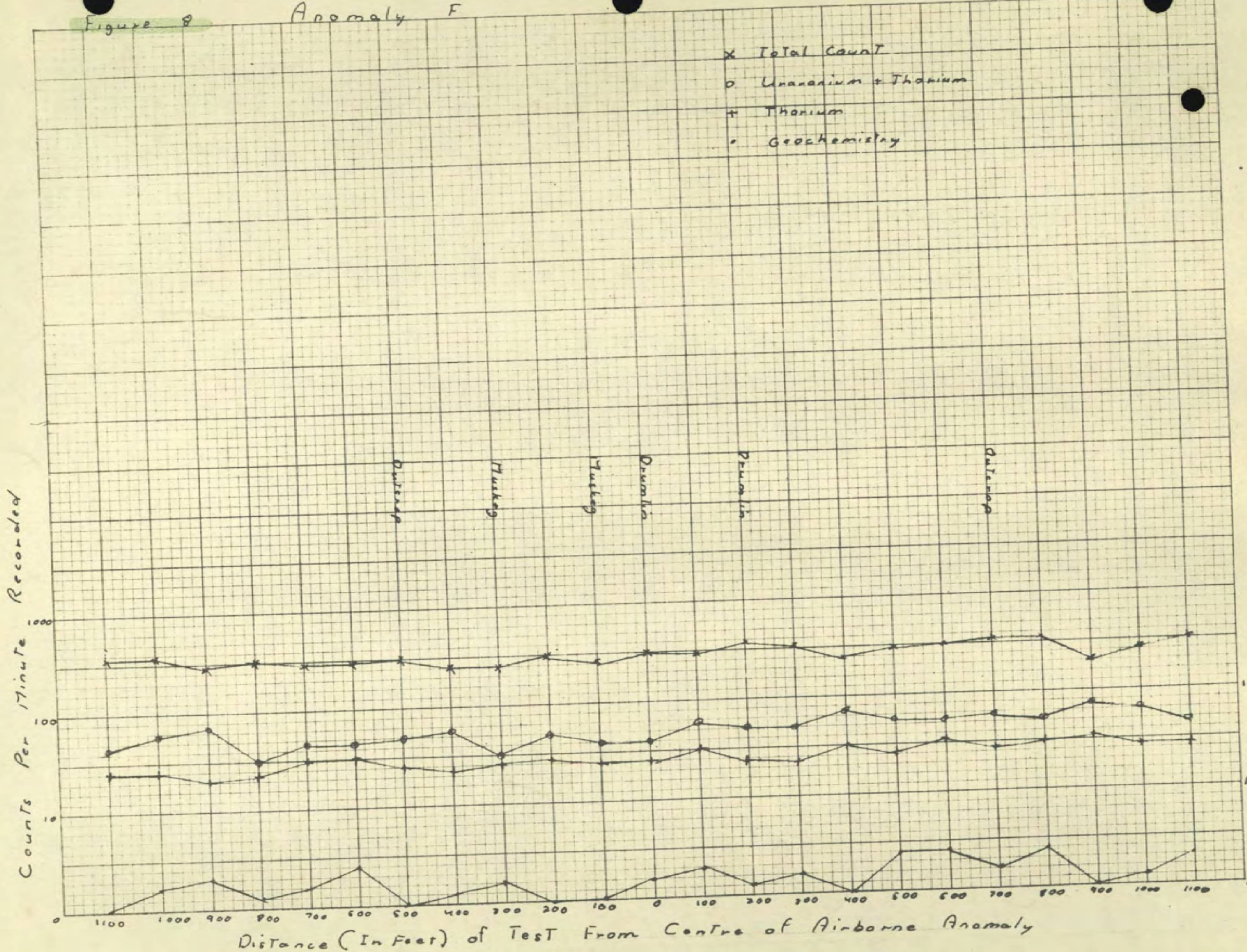
Geochronology Anomaly in R.R. R. 17/11/66 Hourly

19690026

Figure 8

Anomaly F

- x Total Count
- o Uranium + Thorium
- + Thorium
- Geochemistry



Geochemistry Anomaly in Parts Per Million Heavy Metals 1969026

SECTION 2

SPECIFICATIONS

2 - 1 THRESHOLD POSITIONS

Rate Meter

- T₀ at 0.2 Mev. - measures total count across the entire gamma energy spectrum for maximum sensitivity.
- T₁ at 1.3 Mev. - measures characteristic potassium, uranium and thorium radiations.
- T₂ at 1.6 Mev. - measures characteristic uranium and thorium radiations.
- T₃ at 2.5 Mev. - measures diagnostic thorium radiations only.

Ratio Meter

Displays the ratio of T₂/T₃ and is read directly on the ratio scale as a single number.

2 - 2 MEASUREMENT RANGES

0 - 100,000 counts per minute on rate meter.

Range Switch Position	Full Scale Counts per Minute	
100	100	black scale
300	300	red scale
1K	1,000	black scale
3K	3,000	red scale
10K	10,000	black scale
30K	30,000	red scale
100K	100,000	black scale

2 - 3 RATIO SCALE

The ratio scale displays the ratio of T₂/T₃ and is calibrated from 1 to 20. A sample of thorium, only, will register a ratio of 3.5. A sample of uranium registers 20. A mixture of uranium and

thorium will register between 3.5 and 20 depending upon the relative content.

2 - 4 TIME CONSTANTS

1, 3 and 10 seconds.

2 - 5 SPEAKER

A speaker is mounted on the side of the instrument. The output is tied in with the particular threshold in use and the loudness can be adjusted by a control.

2 - 6 BATTERY SUPPLY

The instrument operates from three "D" size flashlight type cells. Ordinary zinc carbon cells may be used. From the standpoint of long life and low temperature operation, the alkaline type are preferable and should be employed wherever available.

Both the high and low voltages, generated internally to operate the instrument, are regulated to a high degree of stability. The batteries can be allowed to drop to one half their initial voltage without any effect on the operation of the instrument. The same stability applies over an operating temperature range of -35 to +55 degrees centigrade if alkaline cells are used. See Section 5 for battery life.

2 - 7 SENSITIVITY

The instrument, on threshold 2, registers approximately 25 counts

per minute on an in-situ measurement, (2π geometry) over homogeneous material containing 1 part per million uranium.

2 - 8 TEMPERATURE RANGE

The instrument has been designed to operate over the temperature range of -35 to +55 degrees centigrade. When the temperature inside the probe unit exceeds 55 degrees, the dark current of the photomultiplier tube increases and effects the proper operation of the instrument.

2 - 9 PROBE UNIT

The probe houses a hermetically sealed unit containing the crystal and photomultiplier tube. The sodium iodide crystal is 1-3/4 inches in diameter and 2 inches thick.

2 - 10 WEIGHT

Console 4 lbs.

Probe 2 lbs.

2 - 11 DIMENSIONS

Console	width	6-3/4 inches
	depth	3-1/2 inches
	height	6-1/4 inches

Probe	diameter	2-3/4 inches
	overall length	12 inches

2 - 12 ACCESSORIES

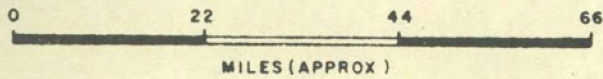
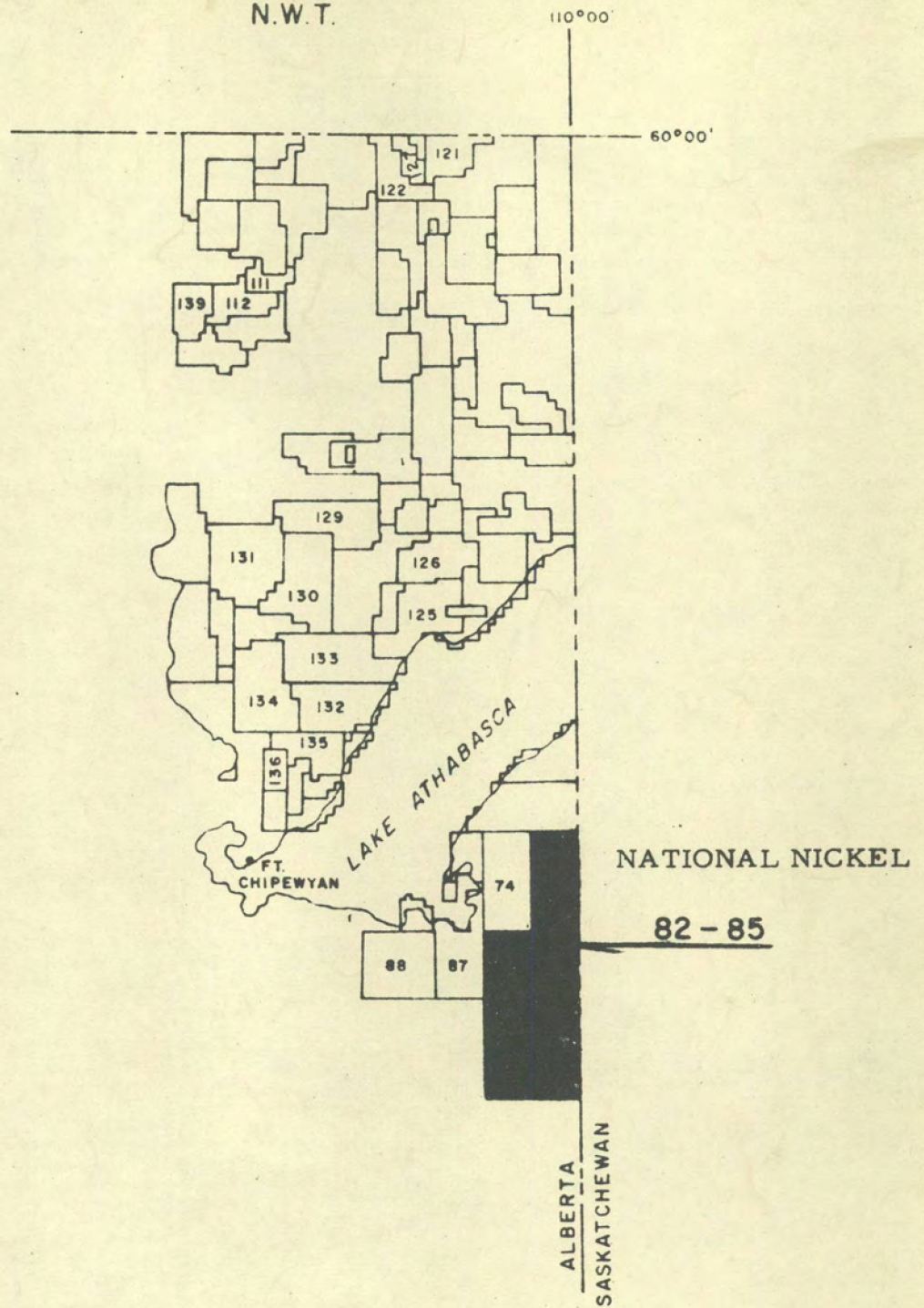
The scintillometer is supplied with a leather carrying case for the

console, a belt holster for the probe unit, a thorium calibrating source, spare batteries and an instruction manual.

2.- 13 TRANSIT CASE

The instrument is shipped in a foam fitted transit case. The case is designed to accommodate the console in its leather case, the probe unit in its leather holster, calibrating source, spare batteries, probe cable and the instruction manual.

Fig. No. 1
N.W.T.



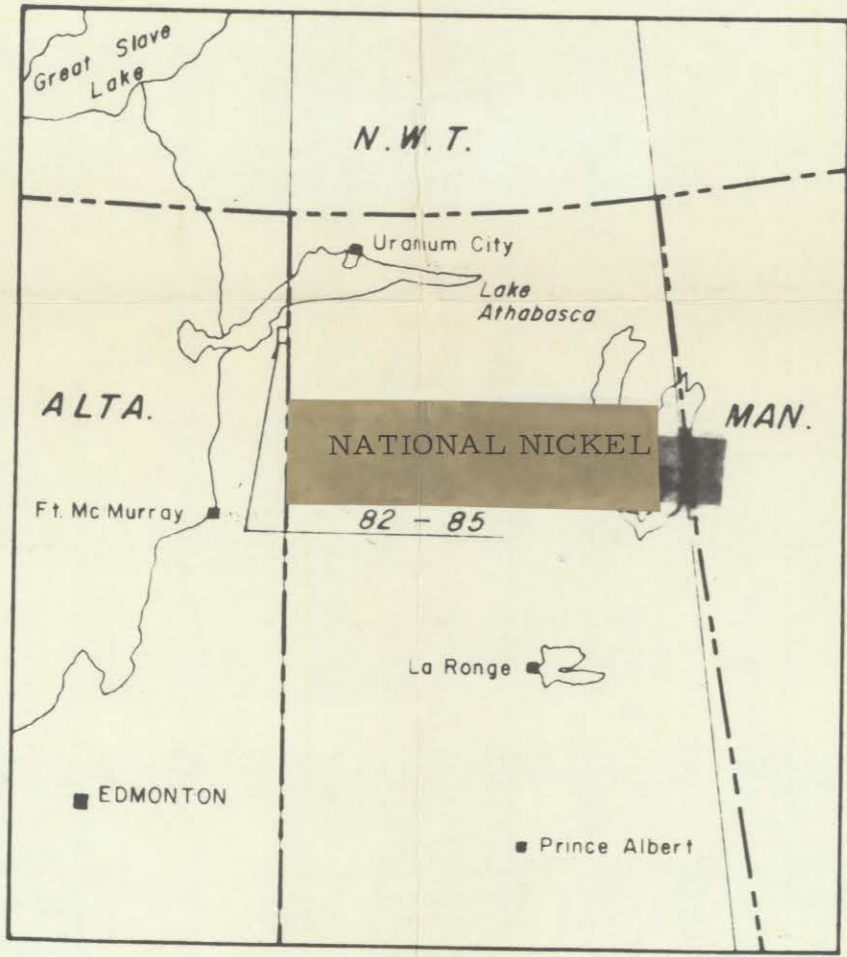
NATIONAL NICKEL LTD. (N.P.L.)
Lake Athabasca Area, Alberta

N.E. ALBERTA
MINERAL PERMITS

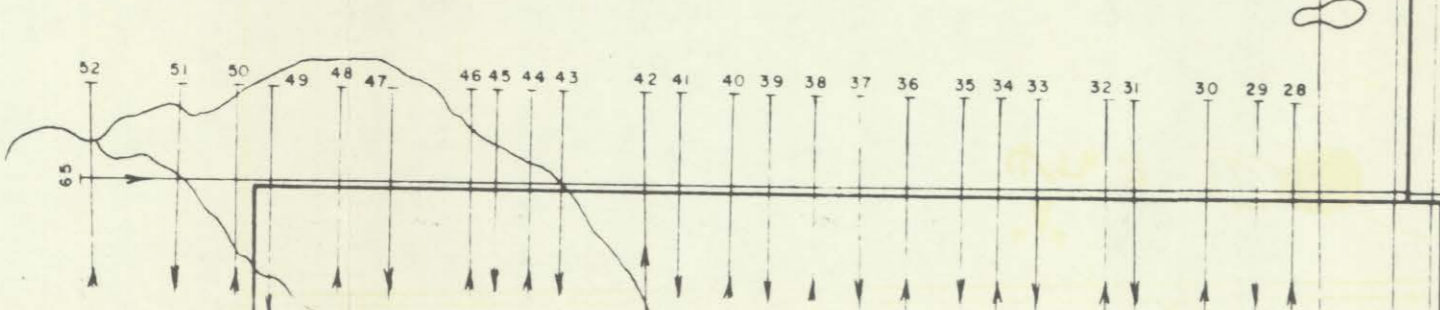
Fig. 2



INDEX MAP
SCALE: 1" = 140 MILES



2500

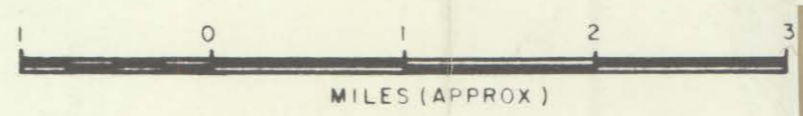


58°30'

58°30'

19690026
Fig. No. 2

NOTE
Copied From Enlarged NTS Map # 74L -
Fort Chipewyan, Alberta



NATIONAL NICKEL LTD. (N.P.L.)
Lake Athabasca Area
Alberta Permits 82 - 85 incl.
Airborne Uranium/Thorium Ratios

19690026

QUARTZ MINERAL EXPLORATION PERMIT No. 83

19680026

(744/8)

NATIONAL NICKLE LTD.,
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CALGARY 1, ALBERTA.

DATE OF ISSUE-DECEMBER 16, 1968
AREA-49,920 ACRES.

TP. 110

TP. 109

TP. 108

R. 2

R. 1 W. 4 M.