

MAR 19780003: ATHABASCA SANDSTONE BASIN

Received date: Dec 31, 1978

Public release date: Jan 01, 1980

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URANERZ EXPLORATION AND MINING LTD.

SUMMARY OF EXPLORATION PROGRAM - ALBERTA

QUARTZ MINERAL EXPLORATION PERMITS

189, 190, 193, 194

APRIL 1978

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- from file 169851

This report, in conjunction with Uranerz' application for Mineral Lease (permits 189, 190, 193 and 194), is a compilation of all exploration activities dating from August 1974 to April 1978.

1. INTRODUCTION

1.1 AREA OF INVESTIGATION

Target of investigation is the northwest rim of the Athabasca sandstone basin, between Shelter Point and Sand Point (Permits 193, 194), as well as between Cypress Point and Grey Willow Point (Permits 189, 190).

1.2 PURPOSE OF INVESTIGATION

To locate uranium deposits of supergene or hypogene origin associated with the Helikian unconformity.

1.3 TIME OF INVESTIGATION

From August 1974 to March 2, 1978.

2. GENERAL INFORMATION

2.1 LOCALITY

The present area of investigation comprises 39,680 acres and extends from:

| | | |
|-------------------|------------|--------------------------|
| Permits 193, 194: | Longitude: | 110° 48' W to 110° 52' W |
| | Latitude: | 58° 49' N to 59° 05' N |
| Permits 189, 190: | Longitude: | 110° 00' W to 110° 15' W |
| | Latitude: | 59° 10' N to 59° 19' N |

2.2 COMMUNICATION AND ACCESS

During the summer months, boats and float equipped aircraft provide ready access. During the winter, ski equipped aircraft and snowmobiles can be used. Heavy freight and supplies can be transported to the area via various barge services which connect Lake Athabasca to the rail head at Fort McMurray, Alberta.

Single side band transceivers provide radio communication with the operational base in Uranium City.

2.3 TOPOGRAPHY

Lake Athabasca has an elevation of 700 feet above sea level. The country is rugged except for the region along the shoreline which is covered by sand plains, raised beaches and swamps.

2.4 CLIMATE

The climate is extreme continental with temperatures in winter to -60° C and $+30^{\circ}$ C in summer.

2.5 VEGETATION

Jackpine and spruce are abundant.

2.6 POPULATION AND LAND USE

No settlements are located within the area of investigation.

2.7 WATER RESOURCES

Lake Athabasca plus numerous inland lakes are adequate for float plane operations, drinking water and diamond drilling operations.

2.8 MAGNETIC DEVIATION

The magnetic deviation is 26° east.

3. PREVIOUS SURVEYS AND ACTIVITIES

3.1 TOPOGRAPHIC MAPPING

The area is covered by the National Topographic System at a scale of 1:250,000

74-M Fort Fitzgerald

74-L Fort Chipewyan

Airphotos may be obtained from the Alberta Research Council in Edmonton, Alberta. Photos covering permits 189, 190 and 193, 194 include:

A-15163-4,-5,-6

A-15166-55,-56

A-20644-4,-5

A-20699-6,-7,-36,-49,-50,-77

-78,-153,-154

3.2 GEOLOGICAL MAPPING

Alberta -

G.S.C. Map 12 - 1960, Fort Fitzgerald

J.D. Godfrey 1959, Aerial Photographic
Interpretation of
Precambrian Structures
of Lake Athabasca.
Research Council of Alberta,
Geology Division, Bulletin 1.

3.3 GEOPHYSICAL SURVEY

The area is covered by aeromagnetic maps
1:63,360, surveyed by Canadian Aero Service Ltd.,
in 1961, as part of the Federal Provincial program
for aeromagnetic coverage of the Precambrian
Shield. The lines were flown at an altitude of
1,000 feet at half mile intervals.

3.4 ASSESSMENT WORK

The area of investigation was subject to
repeated exploration work starting in the early
fifties. Very little positive information can be
gathered from the old files, the only important
one being the report on the uranium mineralized
float found near Fidler Point, Alberta.

Four assessment submissions covering these permits, dated April 1976, April 1977, February 1978 and April 1978, have been submitted to the Department of Energy and Natural Resources, Edmonton, Alberta.

4. TENURE POSSIBILITIES

According to the mineral regulations in Alberta quartz mineral permits and claims can be acquired at the present time.

Permits 189, 190, 193 and 194 are being held under joint venture disposition during 1977 with the following participation:

| | |
|---------------------------------------|---------|
| Saskatchewan Mining Development Corp. | 33 1/3% |
| Inexco Mining Co. (Canada) Ltd. | 33 1/3% |
| Uranerz Exploration and Mining Ltd. | 33 1/3% |

5. GENERAL GEOLOGY

Rocks underlying the area of investigation belong to the Churchill Structural Province, which contains a wide variety of Precambrian units. Detailed investigations by the Saskatchewan Geological Survey around the south rim of the Athabasca sandstone have shown the existence of a number of distinct structural domains of Aphebian age. Located on the very west side of Saskatchewan, the Clearwater domain is felt to represent an Hudsonian mobile belt.

During the Lower Proterozoic (Aphebian), sediments derived from bordering Archean uplands were deposited and subjected to deformation and metamorphism during the Hudsonian orogeny. Present evidence indicates that the Clearwater domain may extend north along the Alberta-Saskatchewan boundary covering the area of permits 193 and 194 and north into the Northwest Territories.

Weakly metamorphosed younger sediments overlying the basement rocks maybe related to the Thluicho Lake Group.

Extensive peneplanation of the supracrustal and basement complexes in late Aphebian times preceded the deposition of the Athabasca sandstone. This sequence of sandstones and conglomerates has remained virtually undisturbed for 1350 million years. Both pre-and post-Athabasca faulting have been recognized.

6. TARGETS

"Unconformity vein type" deposits are our prime exploration goal. In the past decade significant deposits of this type have been located around the edge of the Athabasca basin. Maurice Bay, located 10 km east of the Alberta border within Saskatchewan is the closest deposit of this type.

7. LAND STATUS

On April 14, 1975, Uranerz Exploration and Mining Ltd., acquired 7 permits totalling 89,120 acres under the Alberta Quartz Mineral Permits Act.

Since that time, Uranerz operating under Joint Venture partnership has lapsed permits 191,192 and 195.

8. HISTORY OF ACTIVITY

Based on favourable geology and the reported discovery of a uranium mineralized sandstone erratic 7.5 km northwest of Fidler Point, Alberta, a preliminary exploration program was initiated to evaluate the possibility of uranium mineralization.

1974:

Investigations

- a) radiometric survey using a Scintrex Gam-2s spectrometer, helicopter mounted.
- b) geochemical sampling of lake waters and lake sediments using a fixed wing aircraft.

Results

- no uraniferous boulders were found during the spectrometer survey, the region was marked by high background levels within granitic terrain of high relief.
- anomalous geochemical values up to 150 ppm U_3O_8 were returned as a result of lake sediment sampling.
- geological reconnaissance indicated some 70 miles of a partially exposed unconformity between the crystalline basement complex and the Athabasca Formation.

1975:

Based on the results obtained through investigations in 1974, seven permits (189, 190, 191, 192, 193, 194, 195) were requested and granted by the Alberta Government 1975.

Investigations

The following exploration methods were employed:

- a) Airborne fixed wing spectrometer and magnetometer survey.
- b) Helicopter borne spectrometer rim survey.
- c) Helicopter mapping for exact delineation of the surficial trace of the Helikian unconformity.
- d) Ground prospecting down glacial strike from the Helikian unconformity.
- e) Geochemical muskeg clay sampling.
- f) Linecutting, followed by ground geophysical survey (magnetics, electromagnetics).
- g) Alpha cup radon survey.

Results

47 radiometric anomalies were located as a result of the airborne spectrometer surveys. All but one of these occurred within the basement and were later explained as contrast anomalies.

Favourable results were gained through ground prospecting, these include:

- a) 11 uraniferous glacial boulders were found in the Belinda-Sebastian Lake area.
- b) one mineralized outcrop revealing spotty uranium mineralization along the contact between Athabasca conglomerate and regolith was found just west of Falling Sand Point.
- c) one mineralized outcrop showing spotty uranium mineralization within sandstone resting unconformably on exposed regolith in the Grey Willow Point area.
- d) more than 300 uraniferous sandstone boulders were located between Cypress Point and Grey Willow Point, 200 of these were located within a well confined area near Falling Sand Point.
- e) 26 uraniferous sandstone boulders were found in the Goose Bay area close to the Alberta-Saskatchewan border.
- f) one uraniferous boulder was found in the Fishcamp Bay area (near Shelter Point, Alberta).

No significant anomalies were encountered through either the geochemical or the geophysical surveys carried out.

Recommendations

Based on the promising results of ground prospecting the following recommendations were made:

- a) the cutting of an additional grid extending from Falling Sand Point northeast into Saskatchewan.

- b) follow up ground magnetics.
- c) diamond drilling in the Falling Sand Point area.
- d) further geological, geochemical and ground prospecting investigations.

1976:

During 1976, the following exploration methods were employed:

- a) diamond drilling
- b) linecutting
- c) ground geophysical survey
- d) airborne geophysical survey
- e) glaciology
- f) ground prospecting

Results

- a) Linecutting and ground magnetics (encompassing permits 189 and 190 only).

From March 1975 to December 1976, 300 km were cut and chained. A ground magnetometer survey was performed over the lines of the above grid with no significant magnetic responses.

- b) Glaciology -

Glacial consultant L. Bayrock, investigated permits 189, 190 and postulated on the basis of over 350 uraniferous boulders two individual mineralized zones lying within the Falling Sand Point area.

- c) Airborne geophysical survey (encompassing permits 189, 190, 193 and 194).

The airborne input (EM) and magnetic survey flown by Geoterrex in April 1976, failed to indicate any trends or systematic groupings of anomalies.

d) Ground Prospecting.

Permit 191 - 36 airborne radiometric anomalies were investigated, only 5 were explained by outcropping basement rock with anomalous background.

Permit 193 - two uraniferous sandstone boulders were found as well as one sandstone outcrop, possibly Martin Formation, was also located.

e) Diamond Drilling.

Permit 190 -

24 holes, totalling 2,497 feet, were drilled in the period April-June 1976. No uranium mineralization was found. All drill holes intersected Athabasca sandstone, covered by overburden up to 39 feet thick. The drilling results showed that the thickness of Athabasca sandstone is increasing to the east and local changes are due to the paleorelief of the basement. The base of the Athabasca series is made up of conglomerate of variable composition. Below the unconformity, the strata consists of regolith, locally interbedded with partly kaolinized and chloritized basement. In only one drill hole (#5), hydrothermally altered and fractured sandstone overlying chloritized and kaolinized regolith was found. This can be interpreted as an indication of possible mineralization in the vicinity. The first nine holes were drilled with AQ equipment and due to the small diameter, only four of these holes were logged radiometrically.

1977:

The following exploration methods were employed:

a) Linecutting and Geophysics (permit 189,190)

Ground magnetics was performed over 110 km of ice off the eastern shore of Lake Athabasca ranging from Falling Sand Point into Saskatchewan. No anomalous magnetic anomalies were located.

b) Geochemical Survey.

A geochemical sampling survey was carried out within permits 189, 190, 193 and 194. No significant anomalies or anomalous trends were delineated.

c) Ground Prospecting, Geological Mapping.

Falling Sand Point - Grey Willow Point Area
(permits 189, 190).

Prospecting in this areareveiled additional boulders in already known areas. Further discoveries were made west of Grey Willow Point, where 18 uraniferous Athabasca sandstone boulders have been picked up. Not enough boulders have been located to suggest the existence of a fan; however, the source area seems to be just north of Grey Willow Point, where outcropping uranium mineralized Athabasca Formation was located in 1975.

Sand Point Area (permits 193, 194) -

Geological mapping could not prove whether Athabasca Formation underlies the sand-covered plains along the shoreline of Lake Athabasca. However, outcrops of regolith found in this area suggest a glacial erosion of the sandstone. the unconformity is thought to be semi-coincident with the shoreline.

An additional six uraniferous sandstone boulders, of which four were located in 1976, were found during prospecting, which is severely restricted in this area due to a cover of outwash sands. The source of these boulders is thought to be located under Lake Athabasca.

1978:

Uranerz' discovery of a uranium ore body at Maurice Bay, Saskatchewan, located about 20 km northeast of Grey Willow Point in May 1977, opened new and promising perspectives as to the potential of further unconformity vein-type uranium deposits along the northwest rim of the Athabasca sandstone basin.

Further linecutting and detailed ground magnetics within Falling Sand Point and Grey Willow Point were performed. Station readings were done at 10m intervals. No anomalous magnetic responses were detected.

A systematic diamond drilling program was undertaken both at Falling Sand Point and Grey Willow Point. The diamond drilling performed had a two-fold purpose:

- 1) to detect the source of the numerous uraniferous sandstone boulders found in the area.
- 2) to detect post-Athabasca fault structures displacing the base of the Athabasca Formation, similar to that observed at Maurice Bay, Saskatchewan.

Results:

106 diamond drill holes totalling 12,384 feet were drilled during the winter of 1978. Based on drilling, the following geological information was gained:

- 1) Athabasca sandstone-basement contact is quite gradual. The Helikian paleosurface shows gentle, undulating relief.
- 2) Athabasca sandstone thicknesses range from 0 to 110 feet towards the northeast.
- 3) Minor peaks (90-125 cps) occur in Athabasca sandstone within 5 feet of the basement contact. Fracturing within basal sections of sandstone ranges from weak to moderate.

- 4) Chloritic and hematitic alteration (regolithization) is ubiquitously present extending to depths in excess of 200'.
- 5) Fresh unaltered basement is primarily composed of biotite rich granitic gneiss.

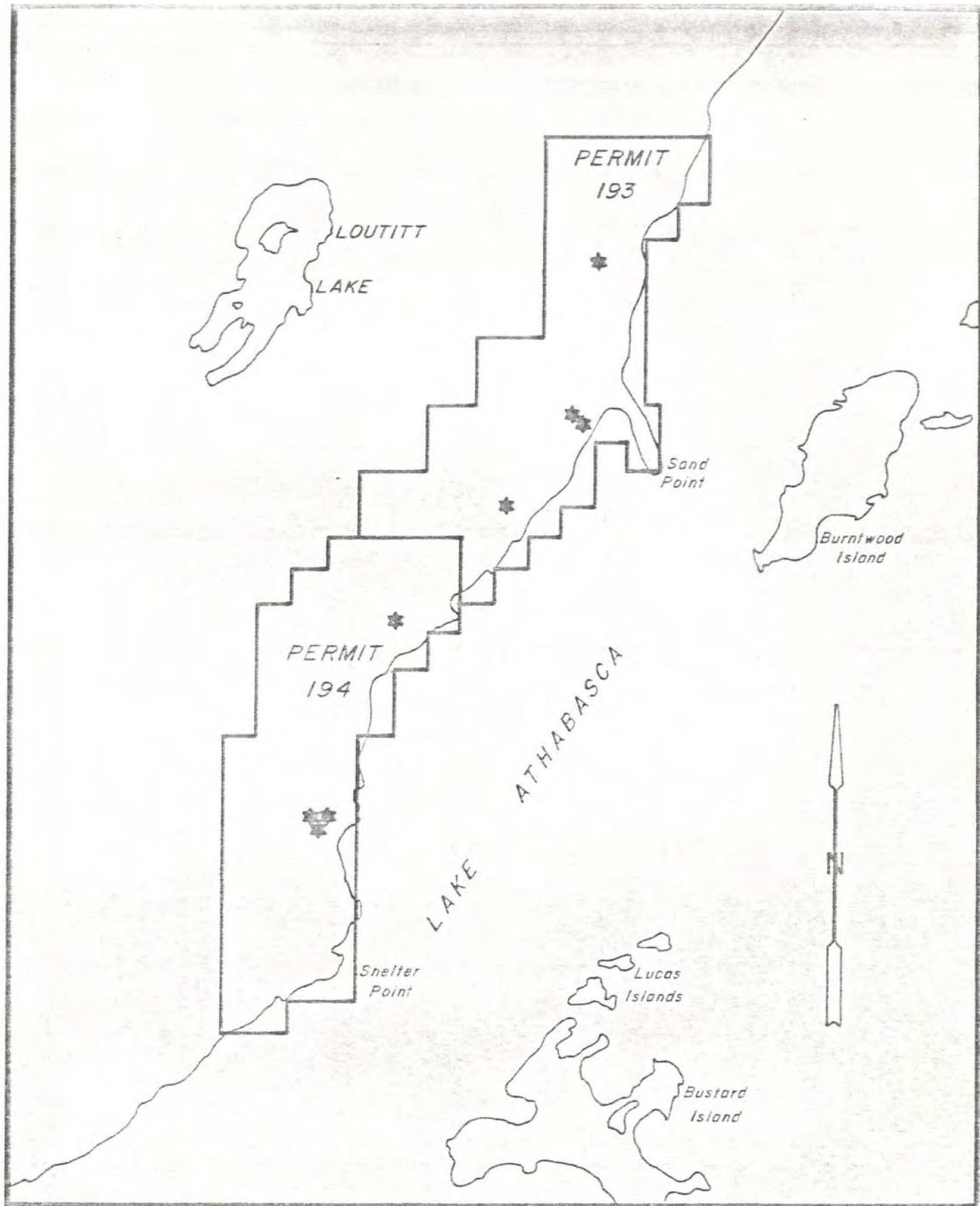
Evaluation

Although no uranium mineralization was found nor were there any vertical displacements intersected, the potential for the Falling Sand Point-Grey Willow Point area is regarded as excellent.

It is indeed possible to assume lateral rather than vertical displacements of a presumably mineralized fault zone making the discovery of a uranium deposit more difficult.

Investigations are presently underway regarding overburden drilling and heavy mineral analyses to delineate uranium dispersion fans in glacial till overlain by muskeg, glacial outwash and beach sands. From past experience, new geophysical techniques are under consideration which would produce more definite or positive results than those already employed. These new methods could also be used within permits 193 and 194 for further delineation of the boulder fans.

It is strongly recommended to convert the existing permits into leases.



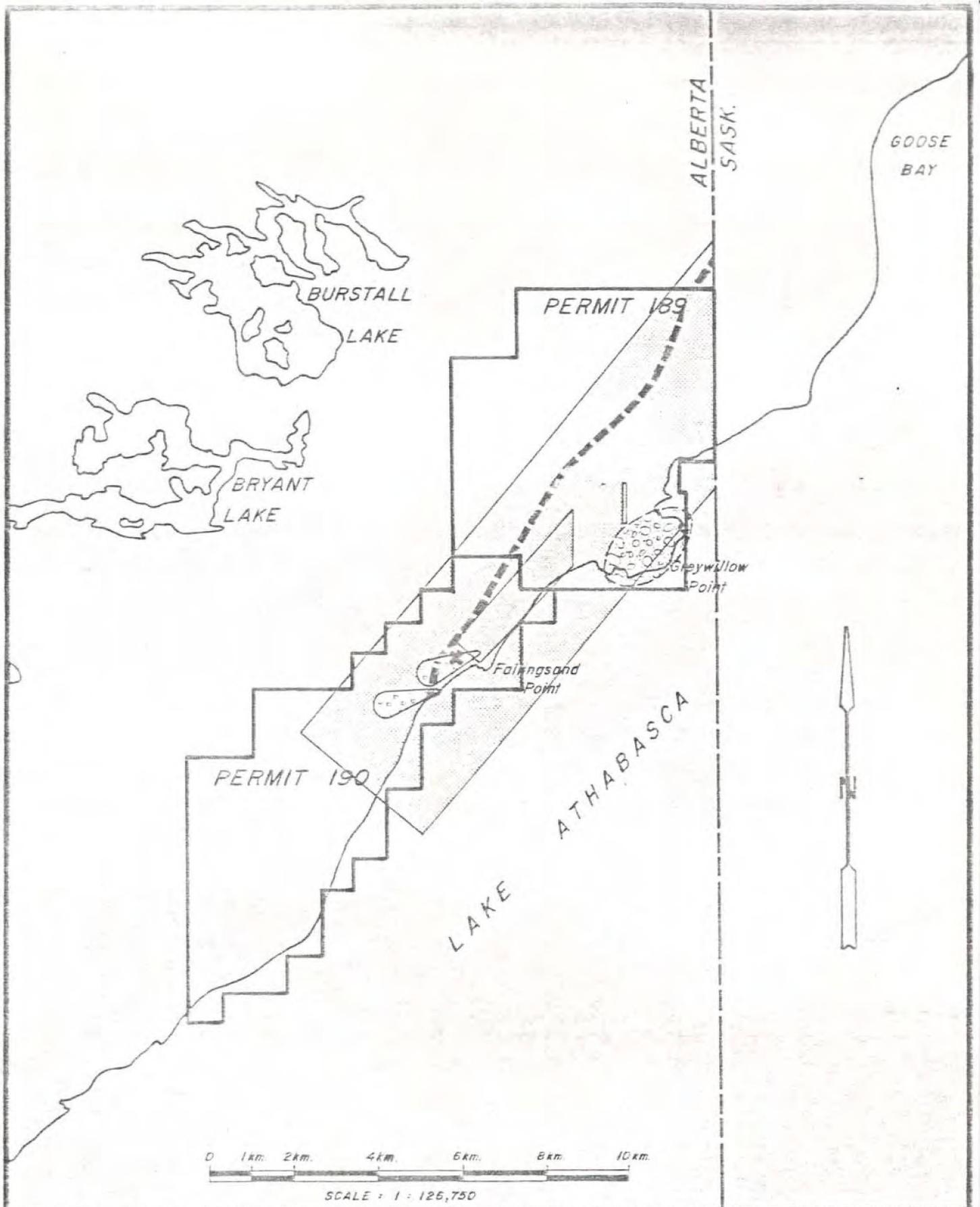
★ — LOCATION OF MINERALIZED BOULDERS FOUND BY PROSPECTING



SCALE : 1 : 125,750

T.C. 04 78

Map No. 1
 Results of Exploration
 Activities
 July 1976 - Aug. 1977
 Northwest Athabasca 7141



-  - OUTLINE OF REFERENCE GRID
-  - AREA INVESTIGATED BY DIAMOND DRILLING
-  - URANIFEROUS MINERALIZED OUTCROP
-  - OCCURRENCE OF MINERALIZED BOULDERS
-  - ASSUMED HELIKIAN UNCONFORMITY
-  - DETERMINED BOULDER FAN

Map No. 2
 Results of Exploration
 Activities
 Aug. 1974 - April 1978
 Northwest Athabasca 7141