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GEOLOGICAL REPORT

EXPLORATION PERMITS 132 AND 133

NORTHEASTERN ALBERTA

by

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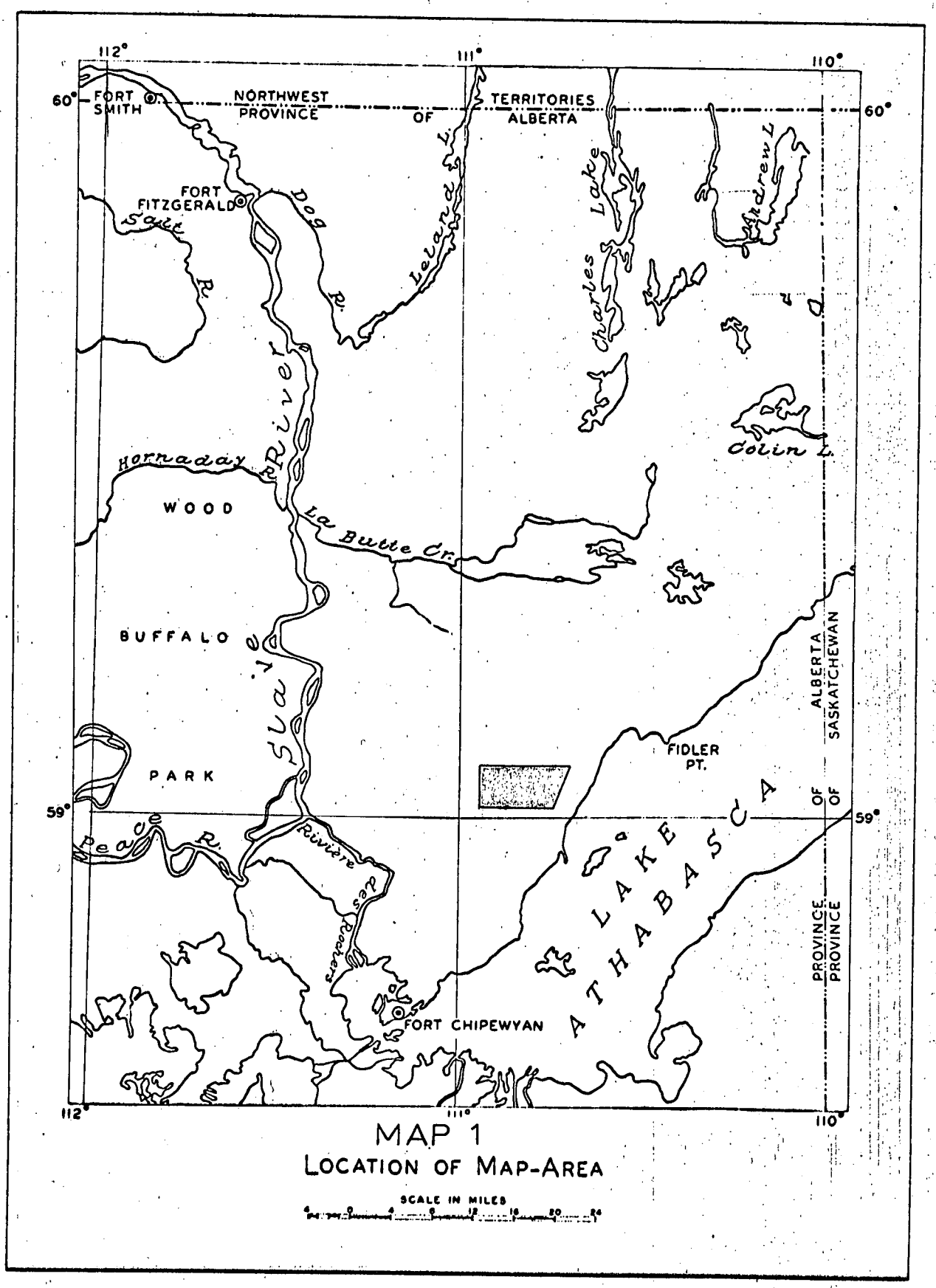

MAP 1

LOCATION OF MAP-AREA

SCALE IN MILES

SUMMARY

Quartz Mineral Permits 132 and 133 were mapped and prospected on a reconnaissance basis during August of 1970. Results of this work have outlined seven radiometric anomalies.

Geologic mapping on a scale of 1" = 2/3 mile has delineated several shear zones cutting a complex of metamorphosed Precambrian igneous rocks. Seven lithologic units have been distinguished.

INTRODUCTION

This report presents the results of a geological investigation of Quartz Mineral Permits 132 and 133 in the northeastern corner of Alberta.

The primary objectives of the investigation were :

1) To carry out a ground geological and radiometric survey to locate areas of uranium mineralization.
2) To map, on a scale of 1" = 2/3 mile, the geology of selected portions of permits 132 and 133.
3) To prospect for base metal mineralization.

LOCATION AND ACCESSIBILITY

Quartz Mineral Permits 132 and 133 are situated approximately 35 miles northeast of Fort Chipewyan, Alberta. The areas investigated in this report fall within Twp 115, Range 5 W4M and Twp 116, Range 6 W4M.

Access to the area is by float equipped aircraft based in Fort Chipewyan (35 miles southwest), Fort Smith (75 miles northwest) or

Uranium City (90 miles northeast), to numerous lakes within the area. The easternmost area investigated is accessible by boat from Fort Chipewyan.

PHYSIOGRAPHY

The topography of the area is relatively flat, consisting of low, rounded hills. Elevation ranges from approximately 690 feet to 1000 feet, giving a maximum relief of 310 feet. Steep fault scarps on the order of 100 to 200 feet occur locally.

Numerous rock-basin lakes, muskegs and valleys are present, generally occupying glacially eroded fault zones. Alignment of lakes often delineates major fault zones.

Vegetation in the area is quite variable. Muskeg and valley areas are generally heavily vegetated; whereas, the higher areas are sparsely vegetated to barren. Travel by foot through the areas investigated is relatively easy.

GENERAL GEOLOGY

The northeast corner of Alberta consists of a Precambrian complex of metamorphic rocks, varying in metamorphic grade from greenschist to possible granulite facies (Godfrey; 1958a, 1958b, 1966). Previous mapping in the area was carried out by Riley (1960) on a reconnaissance basis. Rock types outlined by Riley (1960) are very general and consist of a series of ortho and paragneisses, granitic rocks, and metasediments.

Structures in the area are complex although general northerly

to northeasterly trends are evident. Isoclinal folding is common in the metasediments and the gneisses often contain plastic flow structures. Northerly and northeasterly striking faults cut most of the rock types, with intense shearing resulting in mylonitization.

The Allen fault is the most prominent structural feature within the permit areas, having a general northeast-southwest strike. East-west cross faults transect the Allen fault system.

GEOLOGY OF PERMITS 132 AND 133

A series of metamorphosed Precambrian igneous rocks form the rock complex of the area mapped. Many of the characteristics of these rocks are the result of extensive metamorphism and deformation.

The most striking feature of the area is the general north-northeast trend of all major geologic features; such as schistosity, foliation, banding, mylonite zones, faults, and the eleongate nature of the pegmatites.

Several major fault zones have been mapped in the area. This predominant series of faults strikes N 10°E to N 35°E with dips from 55°NW to 73°NW; one fault having a steep 84°SE dip. Sheared and mylonitized rocks occur in the fault zone, with deformation generally decreasing away from the axis of the fault zones. The prevailing north-northeast strike and steep dips of the rock fabric are largely the result of faulting and associated metamorphism. Plastic deformation is prevalent throughout most of the rock units.

The major shear zone through Dismal Lake diverges into several faults, the point of divergence being centered near the northwest

corner of Dismal Lake.

Seven rock types have been distinguished in the area mapped (Map 2): Porphyroblastic Granite Gneiss, Banded Granite Gneiss. Pink Granite Gneiss, Biotite Granite Gneiss, Granite Gneiss, Mylonite, and Pegmatite. Boundaries between the rock types are, in most cases, gradational and somewhat obscure due to the high degree of deformation and metamorphism. In some cases division of rock units is based predominantly on the physical characteristics of the rock resulting from metamorphism and deformation, the mineralogical compositions being very similar.

Descriptions of the major rock types follow.

ROCK TYPES

Banded Granite Gneiss

This unit is characterized by its banded appearance, with alternating bands, from fractions of an inch to several inches wide, of pink medium to coarse grained equigranular granitic material and a fine to medium grained grey-green mylonite. Lenses of quartz and granitic material are common. Composition is variable; biotite varying from less than 3% to 15%, approximately 20% quartz, the remainder of the rock being potassium feldspar.

The unit is locally schistose, migmatitic, and has some flow folding developed. Foliation strikes approximately N 30^{0} - 35^{0}E and dips range from vertical to 75^{0}NW.

Mylonite

A broad zone of schistose to mylonitic rock grades into the Banded Granite Gneiss. A banded appearance, small (up to $\frac{1}{2}$") feldspar augen, and lenses and pods of granite gneiss are characteristic. This

unit is very fine to medium grained, grey-green in color, highly altered and locally garnetiferous and appears to be a highly sheared phase of the Banded Granite Gneiss.

Strike of the foliation varies from N 28°E to N 48°E with dips from 77°NW to vertical.

Porphyroblastic Granite Gneiss

This unit is characterized by its grey (locally pink) color on both fresh and weathered surfaces, large (up to 1½") parallel to subparallel aligned feldspar porphyroblasts and banded appearance. The banded appearance is the result of 1' - 3' bands of light grey porphyroblastic to pegmatitic gneiss, parallel to foliation, in the slightly darker gneiss. The bands are similar in composition; the color difference resulting from different mafic content.

Dark Bands -	≈5% biotite	≈8% quartz
Light Grey Bands -	< 3% biotite	≈15% quartz

Garnets occur along the sharp eastern scarp near the contact with the Banded Granite Gneiss.

Strike of the foliation ranges from N 5°E to N 48°E with dips from 70°NW to vertical.

Pink Granite Gneiss

The porphyroblastic grey granite gneiss grades northwestward into a medium grained, equigranular, pink granite gneiss. Foliation is weak, with the unit being massive in places. Strike of foliation is approximately N 30°E, with dips of 70°NW to vertical.

The rock consists of 5 - 8% biotite and 10 - 30% quartz, the remainder being pink to red potassium feldspar.

Granite Gneiss

This unit consists of a medium to coarse grained pink granite gneiss characterized by stringers and lenses of very coarse grained material (pegmatitic, in part migmatized) flow folds, local mafic banding, and highly variable texture. Development of flow folds is more intense in the Esker Lake area. The composition is : 5% mafic (biotite, in part chloritized), 10 - 20% quartz, the remainder of the rock being potassium feldspar.

Foliation is well developed with a general N 10°W to N 35°E strike and dips of approximately 60°NW to vertical.

Pegmatite

A massive, uniform coarse grained, grey pegmatite has been mapped as a separate unit. This pegmatite consists of 10% - 25% quartz, < 2% mafics, and 75 - 90% potassium feldspar. The massive nature and light grey weathered surface characterized this unit. Foliation is absent.

The pegmatite is intimately associated with shear zones, occurring predominantly on the southwestern end of Dismal Lake. One band 50' to 200' wide occurs only along the eastern margin of a shear zone (10' - 50' wide), and was traced for approximately two miles along this shear zone.

Biotite Granite Gneiss

Rocks of this unit consist of a medium grained, equigranular, dark grey, biotite granite gneiss. Composition is approximately 30 - 50% biotite, 30 - 50% feldspar, and 10 - 20% quartz in various combinations.

Small lenses and dykes of granites and pegmatitic rock (containing less than 2% mafics) cut this unit, approximately parallel

to foliation. Feldspar augen, flow folds, locally schistose nature, and dark grey weathering are characteristic.

Foliation strikes N 8°E to N 32°E with dips of 70°NW to vertical.

Contacts with the Granite Gneiss unit are broad zones, up to several hundred feet, of interbanded Biotite Granite Gneiss and Granite Gneiss. Pegmatitic material is abundant with shearing and flow folding.

MINERALIZATION

Uranium Mineralization

Seven radioactive occurrences were found in the Dismal Lake - Esker Lake[1] area. Locations of all occurrences are given on Map 3. Six of the occurrences are in the Dismal Lake area, with only one occurrence in the Esker Lake area. Radiation readings are expressed as counts per minute (cpm) measured at waist level, unless specifically indicated otherwise. A description of each occurrence follows.

Dismal Lake Area

Mineralization is confined to the major shear zone trending NE-SW through Dismal Lake and the divergent faults along this shear zone. The uranium mineralization occurs predominantly in a pegmatite phase associated with the faults, and consequently may have considerably more extent than indicated by this reconnaissance survey.

Occurrence 1

A zone approximately 18 feet by 50 feet measured 2000 cpm;

1. The names "Dismal Lake" and "Esker Lake" have been arbitrarily assigned, by the author, for two unnamed lakes in the area mapped, to be used as reference points.

background in the area was 550 cpm. The extent of this show is difficult to estimate due to the very limited outcrop in the immediate area, particularly on strike.

This show is near the eastern boundary of a mapped fault zone (see Map 2) and occurs in the Granite Gneiss unit, being locally pegmatite. Minor iron staining was noted; however, no yellow staining was found. Structural control is indicated for this occurrence.

No other uranium shows were found along strike; however, a pegmatite zone, approximately 500 yards NE along the same fault zone, was mapped and had a radioactivity of 900 - 1000 cpm. The possibility of uranium mineralization along this trend appears to be good but chances of locating the mineralization are poor because of the very limited outcrop.

Occurrence 2

This occurrence is located immediately east of a NE trending shear zone (see Map 2). The shear zone is variable from 10 feet to 50 feet in width, with a broad zone (several hundred feet) of Banded Granite Gneiss to the west. The size of this occurrence is approximately 20 feet by 250 feet; 100 feet of the estimated length being covered by overburden.

Radiation varied from 2000 cpm to 3000 cpm, background radiation being 450 cpm. At ground level radiation was 4400 cpm with a background of 800 cpm. Radioactive yellow staining was present.

The show occurs in a grey, coarse grained pegmatite, apparently injected into the Granite Gneiss unit, along the eastern margin of the shear zone.

Occurrence 3

A zone 30 feet wide and 40 feet long measured 2000 cpm to 3000 cpm; background in the area was 400 cpm to 500 cpm. Radiation at ground level measured 5400 cpm. The occurrence noted was entirely exposed on a small outcrop. Other showings on strike could not be located because of the sparse outcrop in the area.

This show occurs in the Granite Gneiss unit. Abundant radioactive yellow staining was noted. A 10 foot wide, brown, iron stained shear zone is located approximately 200 feet due east of the show. The fault strikes N 35°E and dips 55°NW. No mineralization was found in the shear zone. The proximity of the radioactive zone to the shear zone suggests a structural control.

Occurrence 4

This show is located, 1½ miles NE along strike, on the same shear zone as occurrence 2. The radioactive zone measured approximately 15 feet by 30 feet with radiation up to 2000 cpm, background radiation measuring 400 cpm ro 500 cpm. Radioactive yellow staining was noted. The brown, iron stained shear zone strikes N 28°E with a dip of 85°NW and is 50 feet wide at this location.

Mineralization occurs in a coarse grained grey pegmatite similar to occurrence 2. Although the area of this occurrence is small, it is significant that the show is along a major fault zone where other occurrences have been noted. Structural control is indicated for this occurrence.

Occurrence 5

An extensive area of coarse grained grey pegmatite (see Maps 2 and 3) with radiation of 2000 cpm to 4000 cpm was noted; background radiation in the pegmatite being 400 cpm to 500 cpm. Radioactive yellow staining is abundant over the area.

The mineralized pegmatite occurs in association with two shear zones (see Map 2) along which other radioactive occurrences have been noted. It is inferred that this occurrence is structurally controlled.

Occurrence 6

A relatively small zone of radioactive pegmatite, 10 feet wide by 20 feet long, occurs within the Granite Gneiss unit. Minor radioactive yellow staining was noted. Radiation measured 1800 cpm to 2800 cpm with background radiation measuring 450 cpm. This zone could not be traced along strike because of sparse outcrop. A larger area of mineralization may be present.

This occurrence is very similar in nature to occurrences 2, 3, 4, and 5 but the brown, iron stained shear zone was not found. However, the presence of the coarse grained grey pegmatite in a highly altered phase of the Granite Gneiss unit suggests the presence of a shear zone. A structural control is probable.

Esker Lake Area

Occurrence 7

A small zone 10 feet by 30 feet measured 2800 cpm with background radiation being 400 cpm. Radiation at ground level is 14,000 cpm. No yellow staining was noted; however, the radioactive zone was strongly

iron stained with minor disseminated pyrite. The show was not traceable along strike.

This show occurs within the Granite Gneiss unit. The small radioactive zone is a highly altered mafic rock presumably derived from the Granite Gneiss. Some mafic bands are present within the Granite Gneiss unit in the area; although these bands are not radioactive. There is no evidence suggesting the presence of a major shear zone. This occurrence does not appear to be structurally controlled.

Base Metal Mineralization

No base metal mineralization was noted in the Dismal Lake - Esker Lake areas.

CONCLUSIONS

Reconnaissance ground mapping and prospecting has outlined seven radiometric anomalies in the Dismal Lake - Esker Lake area of Quartz Mineral Permits 132 and 133. The radiometric anomalies are on the order of 5 to 8 times normal background.

Six anomalies were mapped along a prominent shear zone in the Dismal Lake area. Mineralization occurs within a pegmatite localized along shear zones. Occurrences were noted along the shear zone for a distance of about 2 miles, indicating a large potential zone of uranium mineralization. These radiometric anomalies are structurally controlled.

One small, isolated radiometric anomaly in the Esker Lake area was mapped. There appears to be little potential in the immediate area of this anomaly.

RECOMMENDATIONS

It is recommended that :

1) More detailed follow-up mapping and prospecting be carried out over the area of uranium mineralization to the south-southwest of Dismal Lake.

2) Detailed mapping and prospecting be carried out to the northeast of Dismal Lake along the major shear zone.

3) Trenching be done on some of the better radiometric anomalies to further evaluate the mineralized zones.

4) Mapping and prospecting be carried out along the prominent lineaments to the southeast of Esker Lake.

Respectfully submitted,

[redacted]

HAROLD H. WILLIAMS PhD.

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N

DISMAL L.

ESKER L.

Twp 116

Twp 115

Rge 6

Rge 5-W4

LEGEND

- A BANDED GRANITE. GNEISS
- B PORPHYROBLASTIC GRANITE GNEISS
- C PINK GRANITE GNEISS
- D GRANITE GNEISS
- E BIOTITE GRANITE GNEISS
- F PEGMATITE
- G MYLONITE
- FAULT
- GEOLOGIC BOUNDARY
- CAMP
- STRIKE OF FOLIATION

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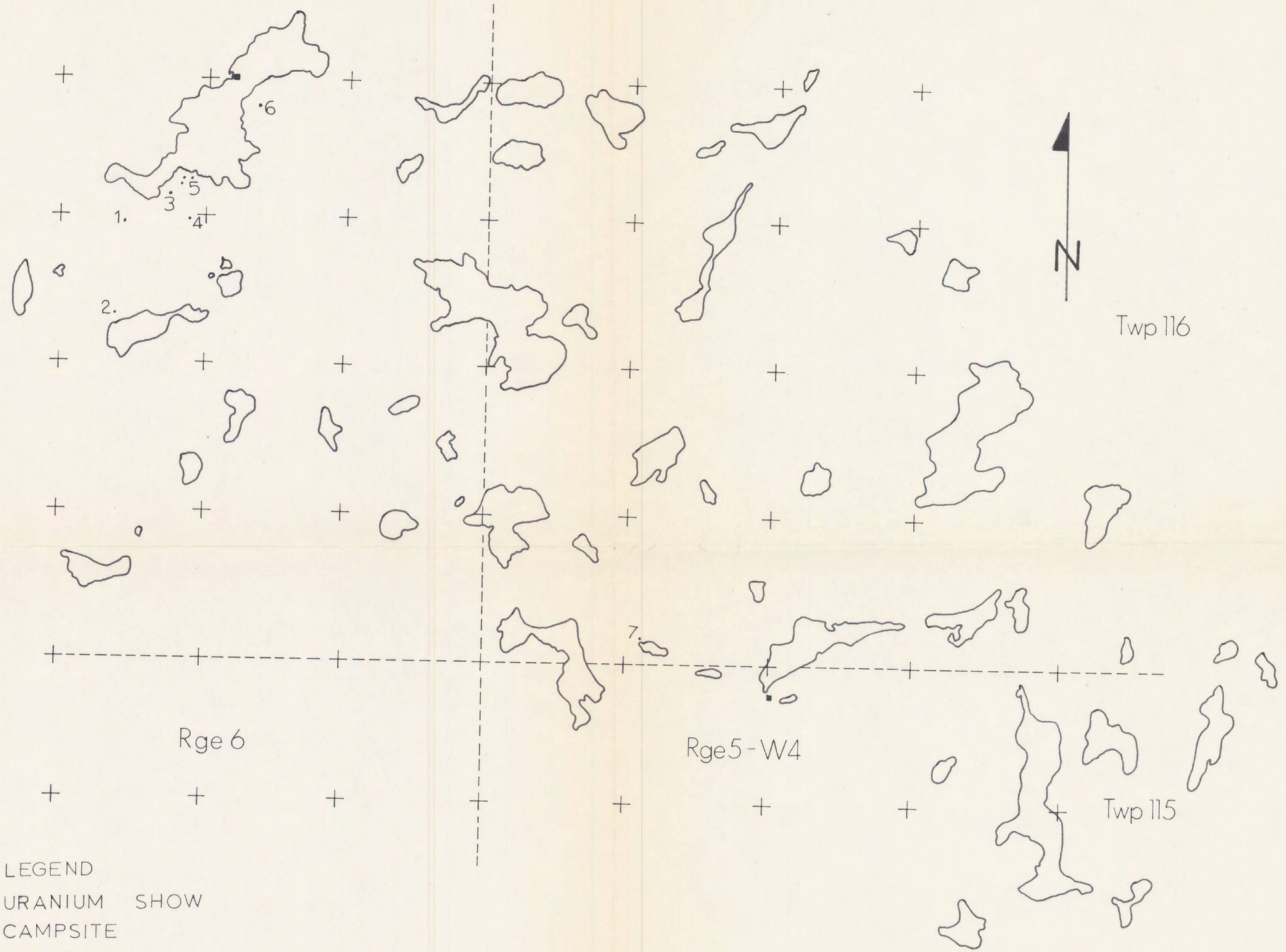
SCALE: 1 INCH = 2/3 MILE

MAP 2

19700013



LEGEND

.1 URANIUM SHOW

▪ CAMPSITE

SCALE

1 INCH = 2/3 MILE

CHIPEWYAN EXPLORATIONS LTD.

LOCATION MAP OF URANIUM SHOWS

MAP 3