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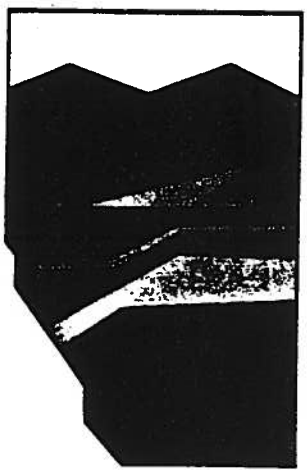

Alberta
RESEARCH COUNCIL
Natural Resources Division

REPORT ON THE GEOLOGY AND ECONOMIC POTENTIAL OF LANDS AROUND THE WESTERN END OF LAKE ATHABASCA, ALBERTA

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INTRODUCTION

This report deals with the geology, past exploration activity and future economic potential of two areas of land at the western end of Lake Athabasca. The smaller area (Area A) covers Old Fort Bay and comprises Township 111, Range 3. The larger block of land (Area B) is on the north shore of Lake Athabasca and comprises

Township 113, Ranges 5 and 6
Township 114, Ranges 4, 5 and 6
Township 115, Ranges 5 and 6

and includes Burntwood island (Fig. 1).

GEOLOGY

The blocks of land in question lie over a very diverse bedrock geology, the major features of which are shown in Figure 1. Area A lies well within the boundary of the Athabasca Basin and is entirely underlain by Helikian Athabasca Group rocks, probably largely of the upper member of the Wolverine Point Formation (Wilson, in prep.). Two drill holes were put down in 1975 on the southwest edge of the area (FC-053-001; FC-054-001) but both were abandoned after only 150 metres without reaching the base of the sandstone (MacLeod, 1976). Holes drilled to the east and north of the area suggest an Athabasca Group thickness of the order of 1,000 metres beneath Old Fort Bay.

Area B is predominantly underlain by crystalline rocks of the Canadian Shield although both Bustard and Burntwood Islands are underlain by the Athabasca Group. A drill hole put down on Burntwood Island (FC-009-062-T) penetrated 359 metres of Athabasca Group rocks without intersecting their base. The edge of the Athabasca Group probably lies close to the shore of Lake Athabasca. Rocks of the Canadian Shield underlying the rest of the area comprise the Chipewyan Red Granite, Fishing Creek Quartz Diorite, High Grade Metasedimentary Rocks and Granite Gneisses (Godfrey, 1980). An area covering parts of Townships 113 and 114, Range 6 is covered by glaciolacustrine sands and may be underlain by an outlier of the Athabasca Group.

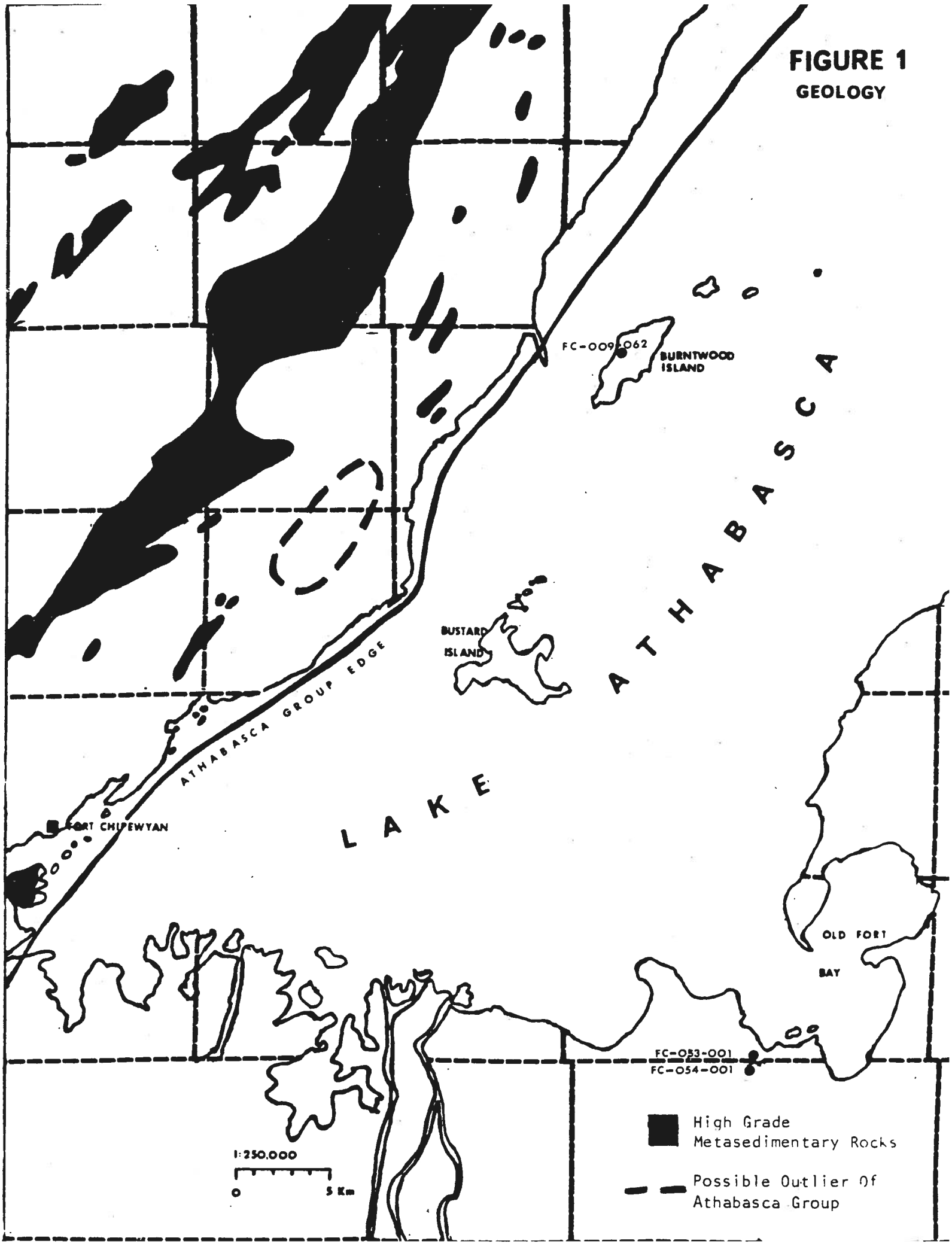
FIGURE 1
GEOLOGY
FC-009-062
BURNTWOOD ISLAND
LAKE ATHABASCA
BUSTARD ISLAND
ATHABASCA GROUP EDGE
FORT CHIPEWYAN
OLD FORT BAY
FC-053-001
FC-054-001
1:250,000
0
5 Km
High Grade Metasedimentary Rocks
Possible Outlier Of Athabasca Group

PAST ACTIVITY

No leases are currently active in or close to areas A or B. Figure 2 shows past leases in the area. Exploration over the areas has been for uranium and the four generations of permits marked in Figure 2 show broad periods of exploration activity as follows:

1968-1969	black outline	10 permits
1969-1970	red outline	8 permits
1974-1976	blue outline	10 permits
1976-1983	green outline	8 permits

Where permits lie over the Athabasca Group the exploration has been for unconformity-type uranium deposits and where the permits lie over the shield were for Beaverlodge-type deposits. The general inaccessibility of the region combined with the often thick drift over the Athabasca Group combine to make this a difficult area to work in. Exploration work has, apart from the drill holes marked on Figure 1, been of a general nature.

FUTURE POTENTIAL

The prime regional target for exploration is the unconformity at the base of the Athabasca Group. It is with this feature that the uranium deposits in Saskatchewan are associated. The unconformity underlies Area A but at a depth of around 1000 metres. With current technology we can probe the unconformity to depths of 150 metres so that 1000 metres of sandstone effectively prohibits exploration for unconformity uranium deposits in this area. The upper member of the Wolverine Point Formation subcrops in Area A beneath some 40 metres of glaciolacustrine sands. It has been suggested by workers in Saskatchewan that phosphates present in the upper Wolverine Point might be found in economic concentrations (Paul Ramaekers, personal communication). This is not borne out by anything seen in Alberta where the phosphates only occur locally and in minor amounts. This combined with the inaccessibility of the area combine against the possibility of the phosphates being economic beneath Old Fort Bay.

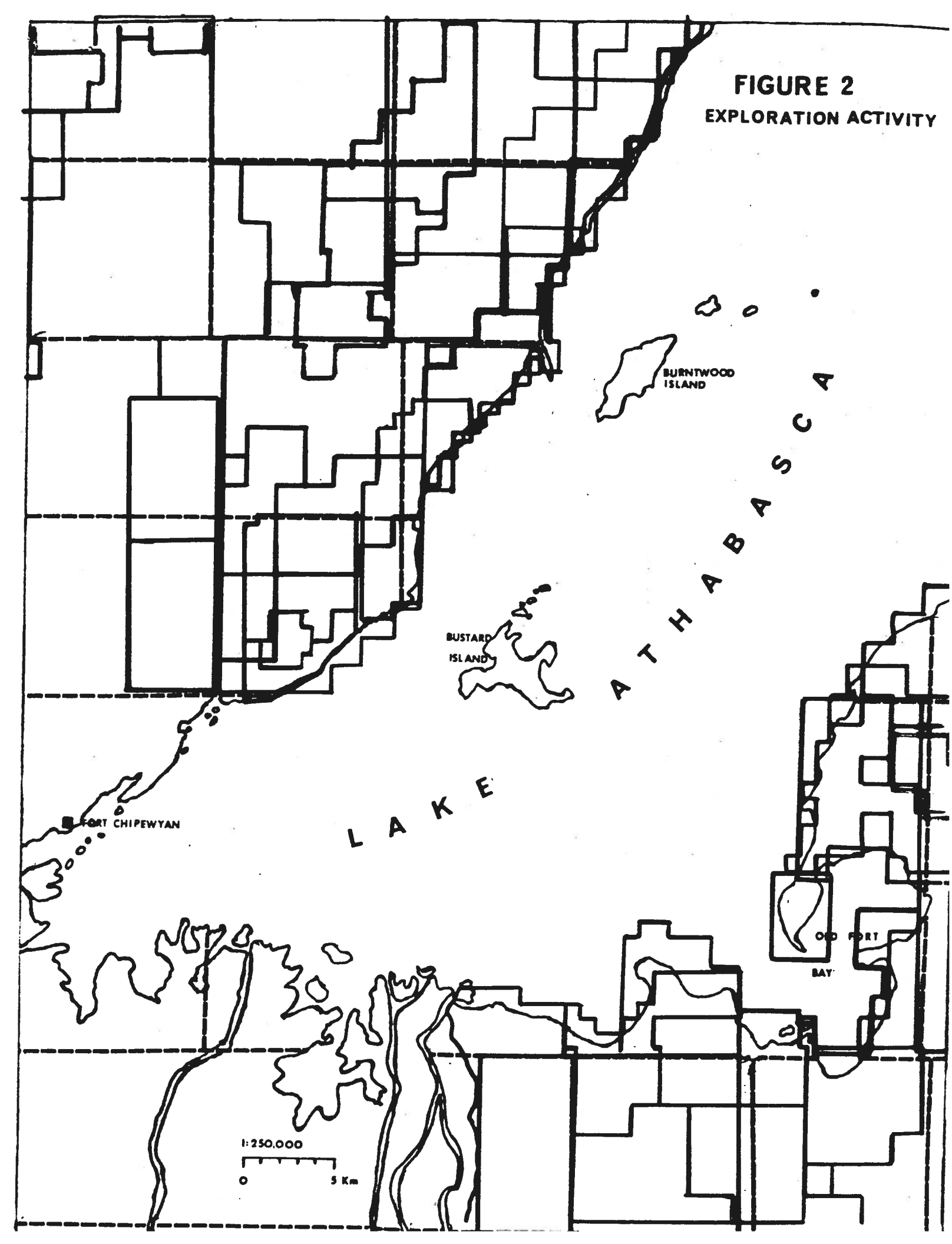
FIGURE 2
EXPLORATION ACTIVITY
BURNTWOOD ISLAND
BUSTARD ISLAND
LAKE ATHABASCA
FORT CHIPEWYAN
OLD FORT BAY
1:250,000
0
5 Km

The sandstone/basement unconformity also is present beneath Bustard and Burntwood Islands, but again the depths (in excess of 359 metres on Burntwood Island) combine against any economic potential. The unconformity comes to the surface close to the north shore of Lake Athabasca but beneath the waters of the Lake, making this area unattractive. The area of the possible sandstone outlier (Fig. 1) presents a different picture. If Athabasca Group rocks are present in this area, they would be thin and thus the unconformity would be close to the surface. This would make the outlier a prime initial target for uranium exploration.

There are no indications of great economic potential within the exposed basement rocks seen in Area B. However, mineralization tends to be associated with the high grade metasediments of which a band runs across the area (Fig. 1).

CONCLUSIONS

Interest in both Areas A and B has in the past been related to the search for uranium and it is certain that this would be the mineral of prime interest for the future. Area A is underlain by thick overburden and a thick sequence of Athabasca Group sediments. Area A is thus of little or no economic interest in the foreseeable future.

Area B is underlain by a wide variety of rocks. If interest in uranium exploration revives the possibility of an outlier of Athabasca Group rocks within this area would warrant investigation and if present could have potential as a uranium host. In addition, the zone of high grade metasediments crossing Area B represents the rock type within the shield which has the best potential for economic mineralization. These two factors make these two areas within area B attractive initial exploration targets.

REFERENCES

Godfrey, J.D. (1980): Geology of the Fort Chipewyan district; Alberta Research Council Earth Sciences Report 77-3.

MacLeod, J.W. (1976): Report on Quartz Mineral Exploration Permit 199 at Old Fort Bay, Lake Athabaska, Alberta; Alberta Research Council Quartz Mineral Open File 199-U-AF-125.

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