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REPORT OF NORTHWEST TERRITORIES INVESTIGATIONS - 1953

BY

SHELL OIL COMPANY

Introduction

Surface mapping in the Great Slave Lake area during the summer of 1953 was undertaken by Shell Oil Company's Field Party No. 60, composed of three geologists. Paleozoic exposures were examined along the shores of Great Slave Lake, Slave, Buffalo, Little Buffalo, Hay, Kakisa and Horn Rivers.

General Structure and Topography

The Great Slave Lake area is underlain by Paleozoic sediments dipping gently to the southwest off the Precambrian Shield. Bedrock exposures are generally restricted to river banks and the shores of larger lakes, the surface deposits almost everywhere consisting of post-glacial fine sands, clay, and minor amounts of boulder till varying up to a thickness in the order of several hundred feet. The land surface is a low, gently rolling plain whose elevation is less than 1,000 feet above sea level. It is dotted with many muskeg swamps and poorly drained by the Mackenzie drainage system.

Stratigraphy

Precambrian: The western border of the Shield roughly coincides with Slave River and the North Arm of Great Slave Lake in this area. Exposures of porphyritic granite and metagreywacke were mapped on Caribou Island some 16 miles south of Fitzgerald on Slave River. Three exposures of flesh-colored granite were mapped north of Redrock Point on the west side of Great Slave Lake's North Arm.

Ordovician: Overlying the basement is a sequence of orthoquartzite, reddish-brown dolomitic mudstone, and reddish-grey fossiliferous dolomite, the latter carrying a Trenton or Richmond fauna. These strata compose the Redrock formation, the type locality of which is at Redrock Point mentioned above.

Silurian: The Precambrian is overlain directly by the Silurian on Caribou Island, south of Fitzgerald. The dolomites at this locality carry a Middle Silurian fauna and presumably belong to the so-called Fitzgerald formation (only Precambrian rocks are exposed at Fitzgerald which is the logical place to search for the unknown type locality). Included with the fossiliferous dolomites in the Great Slave Lake area is a 400-foot sequence of banded anhydrites which crop out at Gypsum Point on the North Arm of the Lake.

Middle Devonian: Overlying the Fitzgerald formation is a sequence of argillaceous limestones, dense to coarsely crystalline dolomites, and calcareous shales carrying a Middle Devonian fauna and termed the Pine Point formation. The strata of this formation are in part petroliferous and the coarse dolomite yields heavy crude oil seepages where it crops out near Windy Point on the north shore of the Lake. Galena, sphalerite and native sulphur occur as secondary minerals in the "Presqu'île" or dolomite facies of the Pine Point formation.

The Slave Point limestone overlies the Pine Point formation. It is approximately 200 feet in thickness and the Middle-Upper Devonian contact is placed at its upper surface.

Upper Devonian: The Hay River formation disconformably overlies the Slave Point formation. It comprises some 1,300 feet of greenish-grey shale with limestone interbeds common in the upper 300 feet. The lower 150 feet of this formation can be distinguished over a wide area by its dark grey, black, or brown color; this lower unit is termed the Frobisher member of the Hay River formation.

A well bedded cliff-forming limestone unit 100 feet in thickness overlies the Hay River formation disconformably. This unit is named the Alexandra formation. Disconformably overlying the latter is the Grumbler formation, a 200 to 300-foot sequence of fossiliferous limestones containing local small bioherms. This is the youngest Paleozoic formation in the Great Slave Lake area; its upper surface is eroded.

Cretaceous: Early Cretaceous dark grey shales of the Meander formation extend a short distance northward from the 60th parallel. Scattered outcrops of this formation occur along Hay River south of Grumbler Rapids and in the vicinity of Cameron Hills. The thickness of the formation is not known. It is overlain, in the Cameron Hills, by approximately 100 feet of conglomerate of either Cretaceous or Tertiary age.

Potentially Useful Minerals

Gypsum deposits crop out along the Little Buffalo River Falls road, some 25 miles west of Fort Smith, and at Gypsum Point on Great Slave Lake.

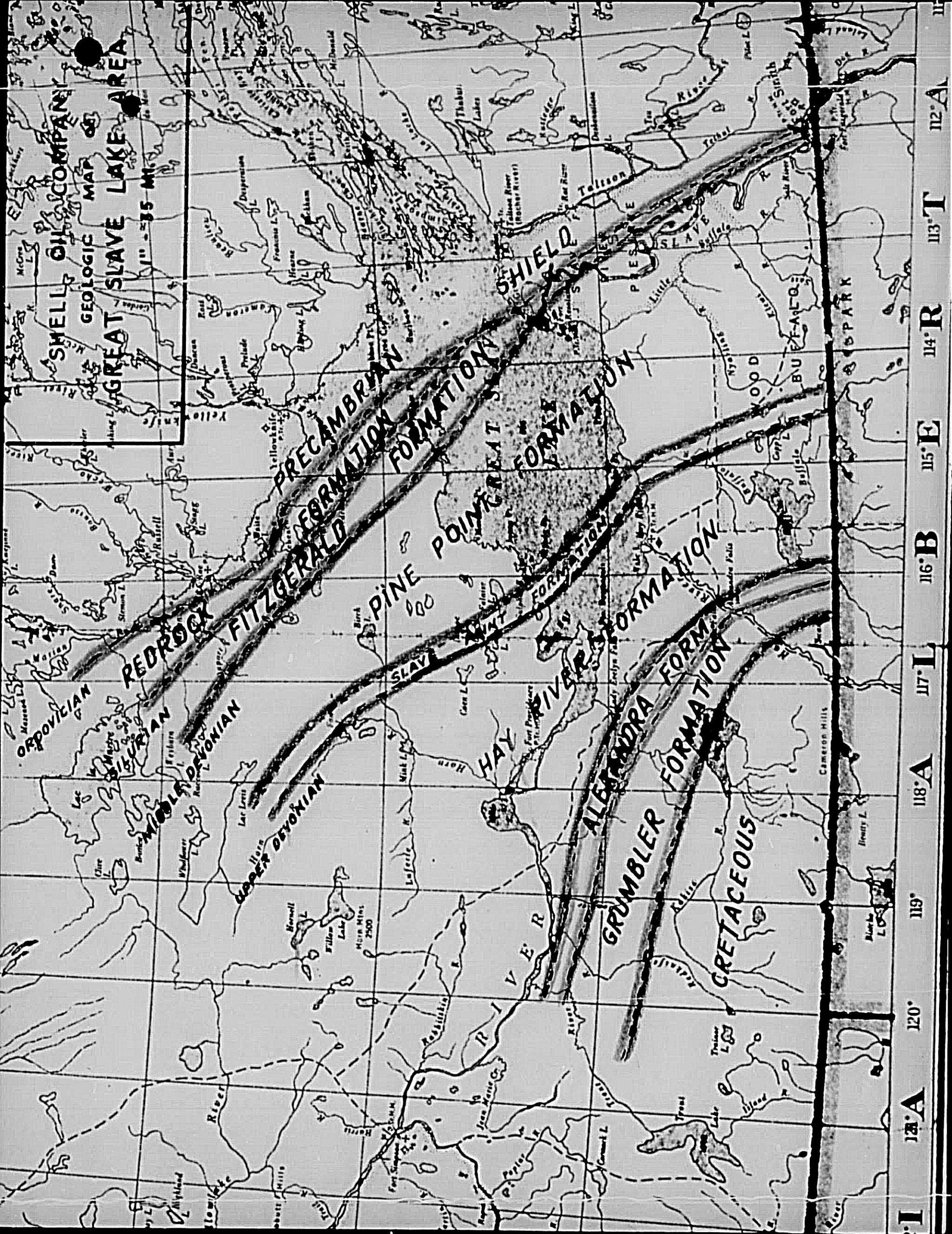
Secondary galena mineralization was noted in exposures of the dolomite facies of the Pine Point formation at Sulphur Bay on the north shore of the Lake.

Native sulphur is present as vug fillings and veinlets in the Slave Point and Pine Point formations. There is no reason to suspect its presence in commercial quantities.

With the exception of the limestone bedrock exposed in parts of the area which could be used for road material, no other mineral or rock of commercial importance was noted.

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SHELL OIL COMPANY
GEOLOGIC MAP OF
GREAT SLAVE LAKE AREA

1" = 35 M.

120°

119°

118°A

117°L

116°B

115°E

114°R

113°T

112°A