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GEOLOGICAL REPORT

of the

KELLER LAKE AREA

by

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Imperial Oil Limited

1960

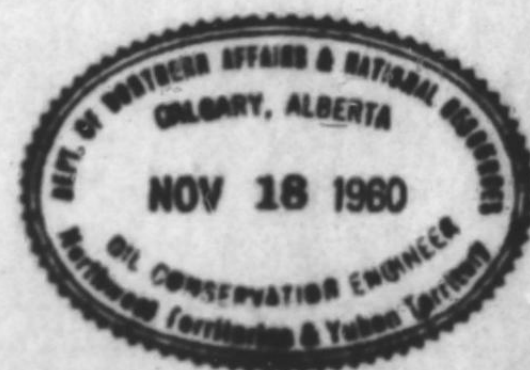


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IN POCKET

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GEOLOGICAL REPORT OF THE KELLER LAKE AREA - N.W.T.

I. INTRODUCTION

Imperial Oil Limited drilled three wells in the Keller Lake area of the Northwest Territories during the winter of 1960. These wells, Imperial Windflower G-77 in Permit 2809, Imperial Cartridge B-72 in Permit 2795, and Imperial Lac Tache C-35 in Permit 2782, are located on a glacial plain north of the Horn Mountains.

One hundred and eighty miles of winter roads were constructed from Mile 12 on the Yellowknife highway, to the Keller Lake area. An additional 167 miles of road were constructed to service the three locations (see map for roads and mileages).

Lakes near each location were cleared of snow and served as satisfactory air strips.

II. STRATIGRAPHY

A. Pleistocene

Unconsolidated sands, gravels and boulders with minor amounts of clay matrix formed the glacial drift. Drift thickness varied from about 225 feet at Lac Tache C-35 and Cartridge B-72, to about 70 feet at Windflower G-77.

B. Cretaceous/Devonian Shales

About 130 feet of dark grey brown and bituminous shales were found below the glacial drift at Windflower G-72 and Lac Tache C-35. At Cartridge B-72 three hundred feet of medium grey, fissile, bentonitic shale were found overlying about two hundred feet of the dark grey brown bituminous shale.

C. Keg River Formation

The Keg River carbonate varied in thickness from 350 feet at Cartridge B-72 and at Windflower G-77 to 120 feet at Lac Tache C-35. The uppermost 150 feet at Windflower G-77 and 270 feet at Cartridge B-72 consists of predominantly lime muds with minor local bands containing fragments of ostracods, crinoids, and brachiopods. Minor bands containing cemented pellets were found towards the base of the section.

In the lower part of the Keg River formation the limestones become partially dolomitized at Windflower G-77 and completely dolomitized at Cartridge B-72. Poor to fair, fine vuggy porosity occurs in the dolomites and both wells yielded fresh water from drill stem tests in this zone.

At Lac Tache G-35 the entire Keg River consists of dolomitized micritic skeletal limestone with some leached vugular and fine intercrystalline porosity. Fresh water was recovered from a drill stem test in this formation.

D. Chinchaga Formation

The Chinchaga formation can be divided into an upper anhydrite and a lower dolomite. The anhydrite varies from 250 to 300 feet in thickness and the dolomite from 400 to 600 feet.

Generally cryptocrystalline to microcrystalline, the dolomite has traces of fair vuggy porosity in the top 100 feet and each well tested fresh water from this zone.

E. Pre-Devonian

The thickness and lithology of the Pre-Devonian vary considerably from well to well. Based on present interpretations, Windflower G-77 has 465 feet of Pre-Devonian, consisting of interbedded shale, anhydrite, and dolomite with minor sandstone stringers at the top.

The Pre-Devonian at Cartridge B-72 is 213 feet thick and is predominantly a fine quartzitic sandstone with minor interbeds of shale and dolomite. Trace to poor intergranular

porosity with dead oil staining was encountered in the top 30 feet, and a test over this interval yielded salt water.

Since the PreCambrian was not reached at Lac Tache C-35, more than 399 feet of Pre-Devonian are present in this well. The top 100 feet are a light grey primary dolomite with scattered quartz grains. A fine to coarse pink quartzitic sandstone makes up the basal section.

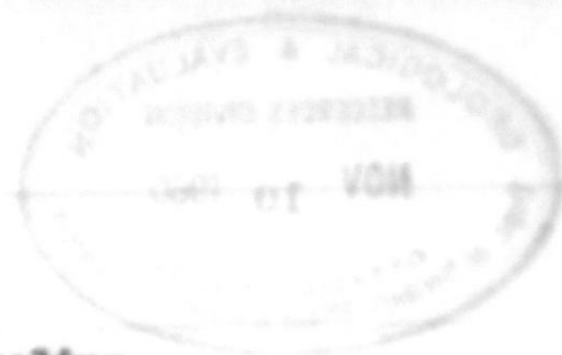
F. PreCambrian

Basement at Windflower G-77 and Cartridge B-72 is highly weathered granite. The PreCambrian was not reached at Lac Tache C-35.

III. CONCLUSIONS

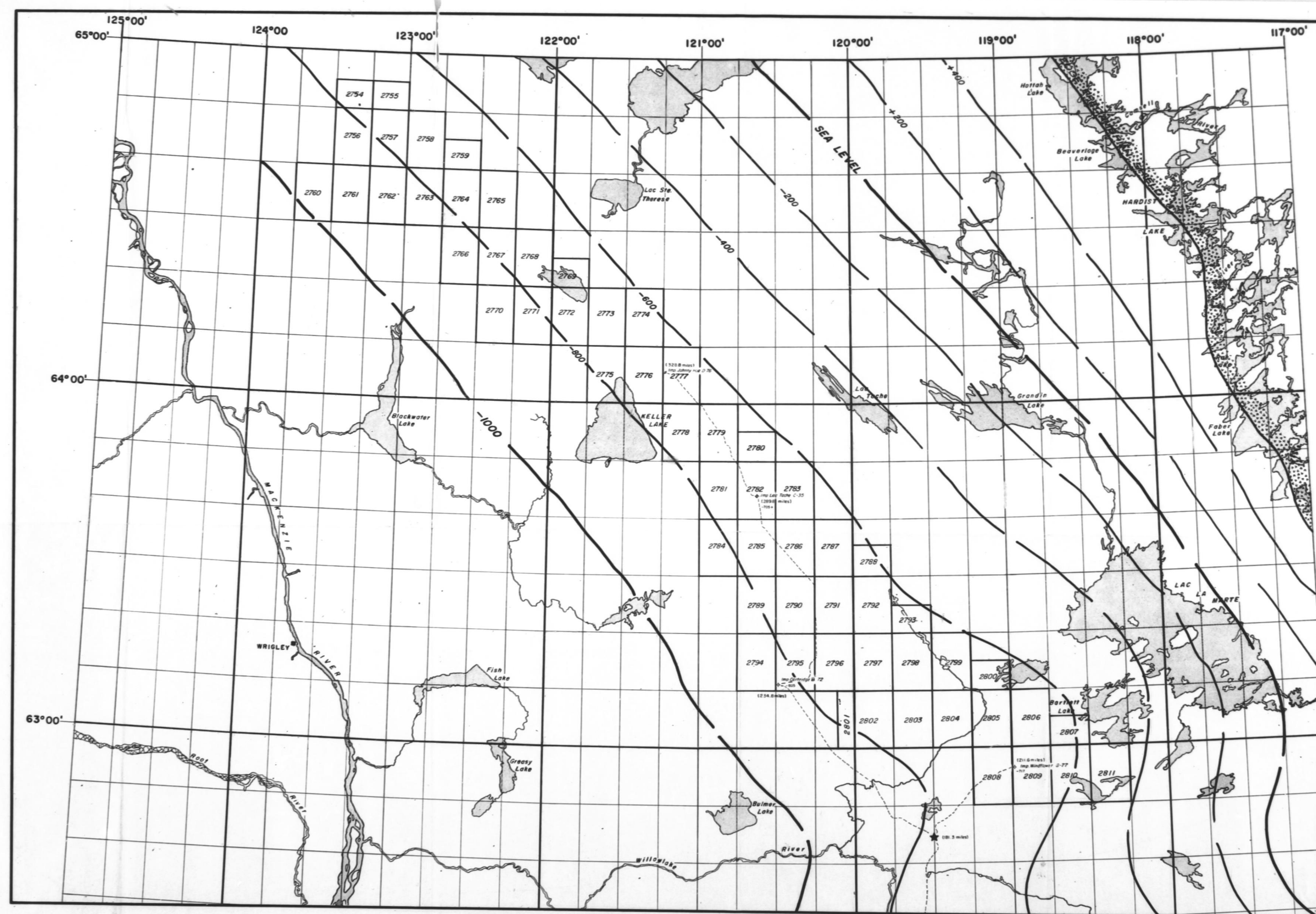
Although the Keg River carbonates are porous in the Keller Lake area, the Cretaceous/Devonian shale cover is too thin to form an adequate seal for hydrocarbon pooling. In addition, drill stem test results indicate that the reservoirs have been flushed by meteoric waters.

Good reservoirs exist in the lower dolomite of the Chinchaga formation, but again these reservoirs appear to be flushed by meteoric waters. If a suitable structure could be



located, this horizon may be favourable for hydrocarbon pooling.

Structural closure is also necessary for hydrocarbon pooling in the Pre-Devonian reservoirs, although the rapid facies changes suggest that some stratigraphic traps could exist.



GEOLOGICAL MAP
KELLER LAKE AREA
STRUCTURE CONTOURS ON PRECAMBRIAN
CONTOUR INTERVAL 200'

————— Permit Outline
----- Winter Trail

(300 miles) Distance from FT. PROVIDENCE

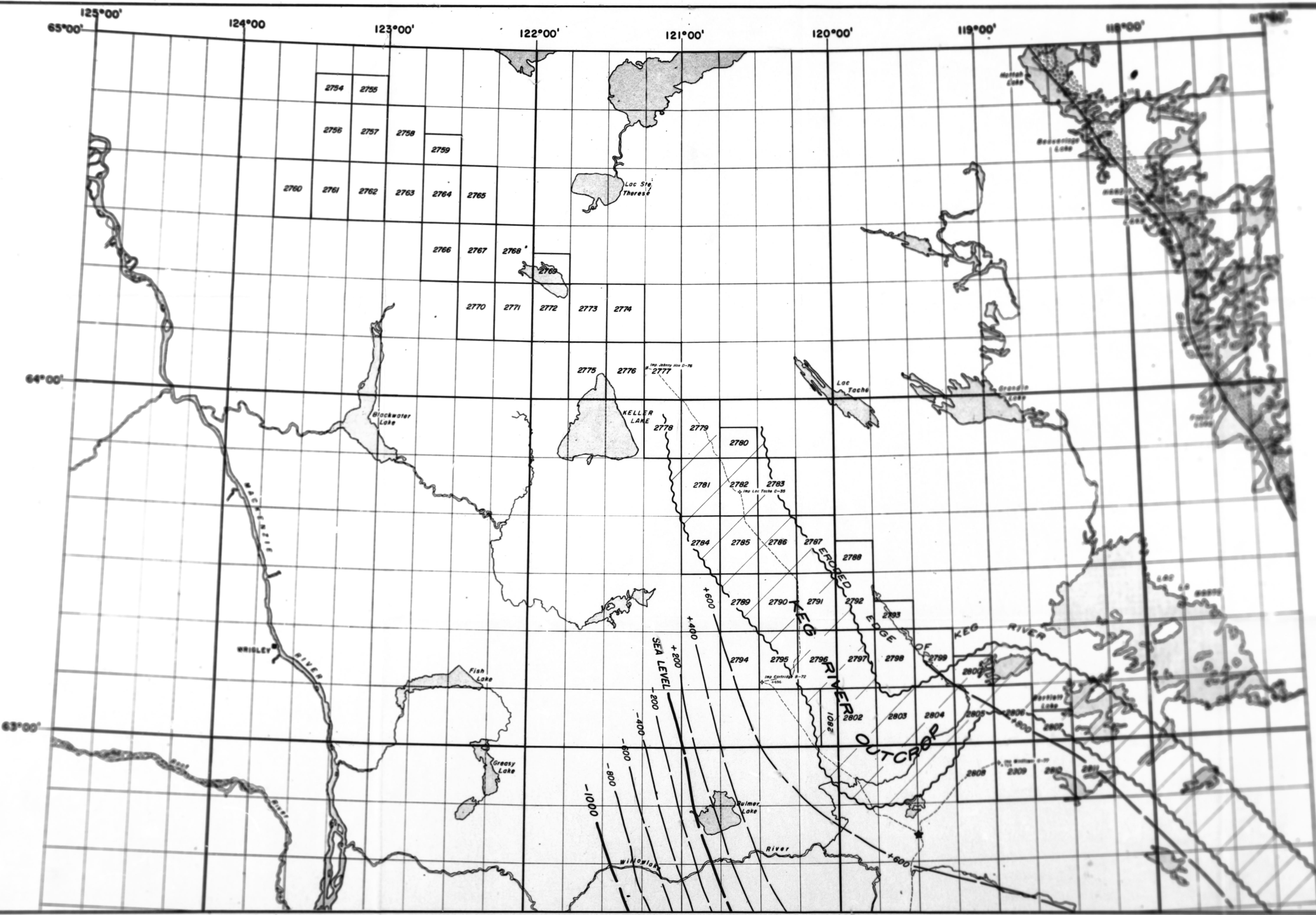
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APRIL 25, 1960

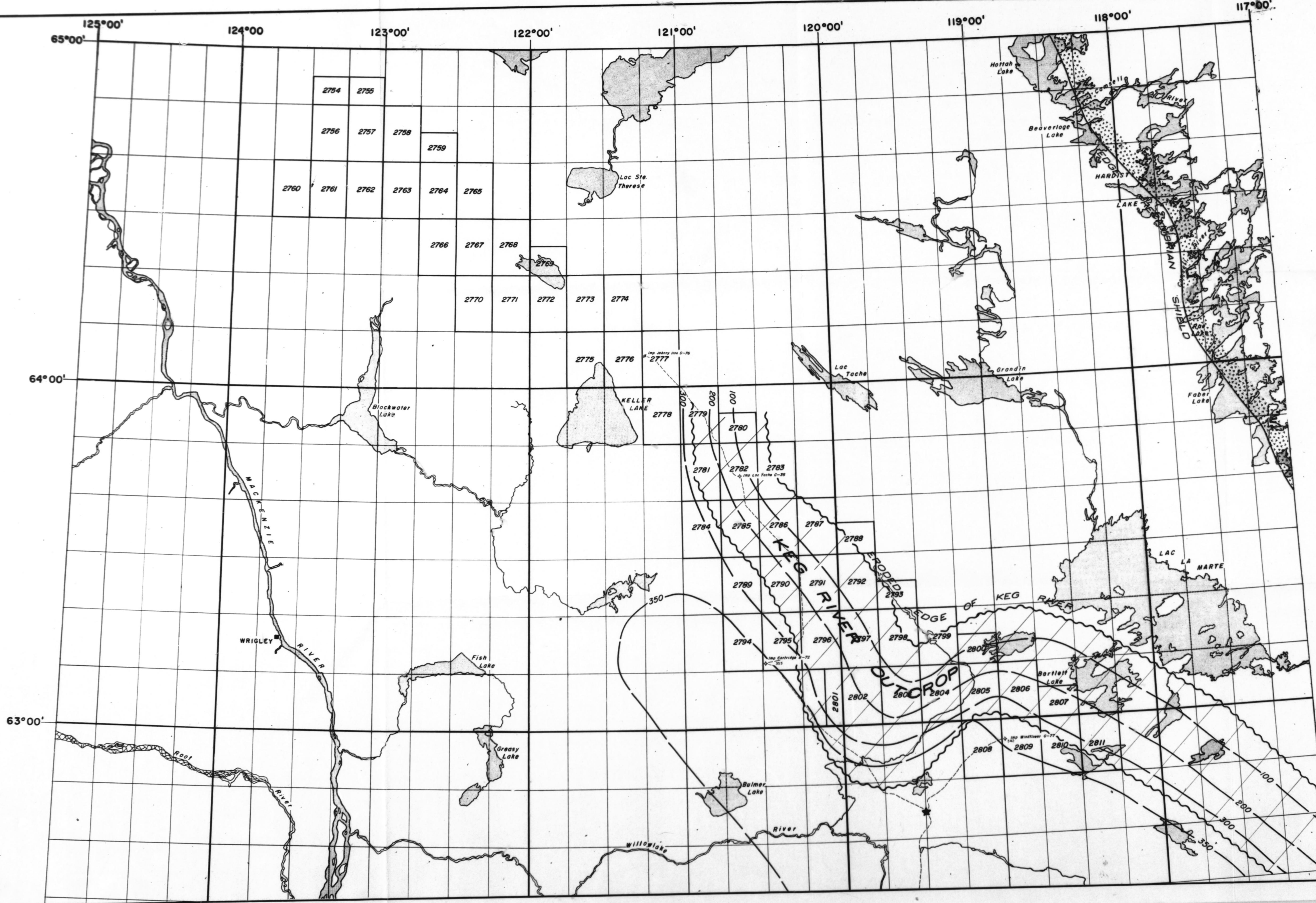
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GEOLOGICAL MAP
KELLER LAKE AREA
STRUCTURE CONTOURS ON KEG RIVER FORMATION
CONTOUR INTERVAL, 200'

1:50,000 Scale
1:50,000 Scale
1:50,000 Scale
1:50,000 Scale

1950



GEOLOGICAL MAP
KELLER LAKE AREA
ISOPACH OF KEG RIVER FORMATION
CONTOUR INTERVAL 100'

— Permit Outline
--- Winter Trail
(300 miles) Distance from FT. PROVIDENCE
SCALE : 8 MILES TO 1 INCH

