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GEOPHYSICAL EXPLORATION REPORT

246-06-04-114

LAC-A-JACQUES PROJECT  
(EXPLORATION AGREEMENT NO. 17)  
NORTHWEST TERRITORIES

PROJECT 246-06-04-80-02

Contractor  
PURCHASED DATA

Operator  
PETRO-CANADA EXPLORATION INC.

Report by H. Kim  
August, 1983

Survey Type - Reflection Seismograph (Dynamite & Vibroseis)  
Work Period - 1971 through 1975

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#### INTRODUCTION

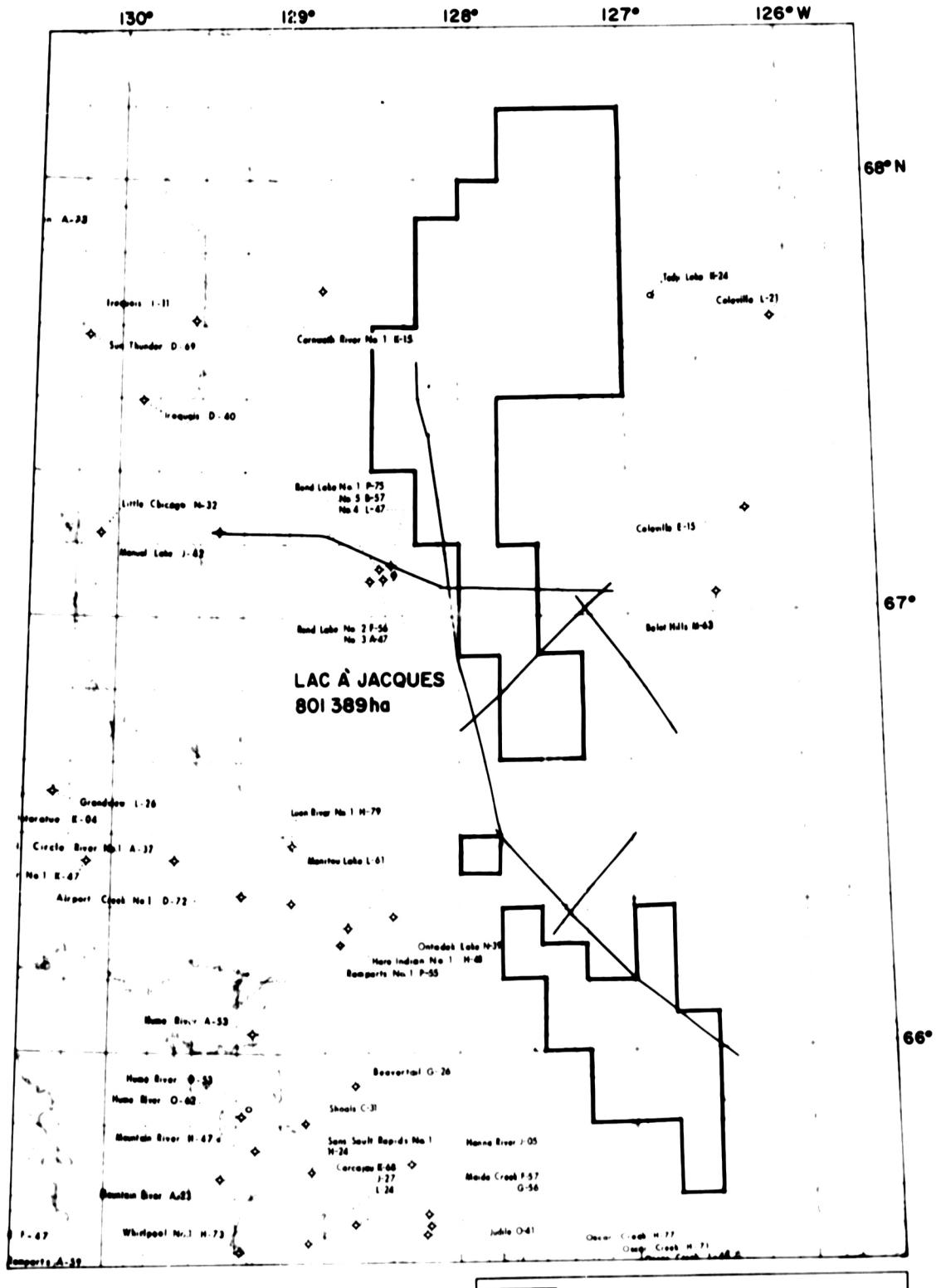
Petro-Canada Exploration Inc. purchased the reflection seismic data over the northwestern portion of the Northern Interior Plains, Northwest Territories during the summer of 1981. The seismic data cover lands of Exploration Agreement No. 17 (Lac-A-Jacques Project). Petro-Canada Exploration Inc. has nominated approximately 801,389 hectares or 1,991,389 acres of Crown lands in the Lac-A-Jacques Exploration Agreement area under Sections 33(1)(a) and 33 (1)(b) of the Canada Oil and Gas Land Regulations (Figure 1).

The southern portion of Lac-A-Jacques area represents the physiographic area contained in the Norman Ranges of the Franklin Mountains. The geological structures are dominated by anticlines and thrust faults which were emplaced during the Laramide orogeny. The northern part of the area has mostly a low relief topography that is highly glaciated and covered with gravels.

The prime prospect for hydrocarbon accumulation in the area is the basal Cambrian sand draping the Proterozoic highs. The Proterozoic topography is the main structural control for deposition of Cambrian strata.

A total of 442.4 kilometers of seismic data was purchased from Sigma Exploration Limited at a cost of \$179,309.77. The interpretation of this data was used by Petro-Canada to assist in selecting lands to be under Section 33(1)(a) of the Canada Oil and Gas Land Regulations, where Cambrian sands are viewed as prospective. The technical information developed from these lines will also be used for guidance when planning future seismic programs. The trade seismic lines included dynamite and vibroseis data shot from 1971 to 1975 by various geophysical companies. The data comprises 37.6 kilometers of 1200Hz, 59.2 kilometers of 800Hz, 64 kilometers of 600Hz and 281.6 kilometers of 400Hz.

Description of the data acquisition and processing, source, detector equipment, recording system, recording parameters and data processing procedures are shown on the seismic sections. No statistical summary is included, because Petro-Canada Exploration Inc. was not an operator. No gravity and magnetic survey is available in the area.



## LEGEND

\_\_\_\_\_ PURCHASED DATA (DURING 1981)

**SIGNED EXPLORATION AGREEMENTS**



NORTHWEST TERRITORIES

## LOCALITY MAP (FIGURE 1)

AUTHOR N. S. M  
SERIAL 11000000  
DATE FEBRUARY, 1933  
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#### DISCUSSION

In the Lac-A-Jacques Project area, two prominent reflectors at relatively shallow depth (down to approximately one second) have been identified and mapped on the basis of amplitude character, reflection termination and seismic character correlation with well data in the Colville Plains area. The upper horizon is identified as the Saline River formation (Upper Cambrian) and the lower one is as top of the Proterozoic. Top of the Saline River formation shows strong amplitudes caused by the velocity contrast between Ordovician to Silurian carbonates and underlying clastic sediments. The top of the Proterozoic can be identified by the reflection terminations indicating truncation or an unconformity.

Time structure maps for the Saline River formation and the top of the Proterozoic have been constructed. Because of sparse seismic coverage (approximately 40 kilometers apart) they show only the regional attitude of the structure with several local, unclosed highs and lows along the seismic lines.

While several wells have been drilled in the area, none have penetrated basal Cambrian sands. The only sonic log

available is from Manuel Lake J-42 well. The synthetic seismogram generated from this sonic log shows the top of the Saline River formation and top and bottom of the salt (Figure 2). However, this synthetic can not be used for interpretation of the Cambrian section as the well did not penetrate these sediments.

No velocity information is available for the seismic sections. Therefore, time to depth conversion is not applicable.

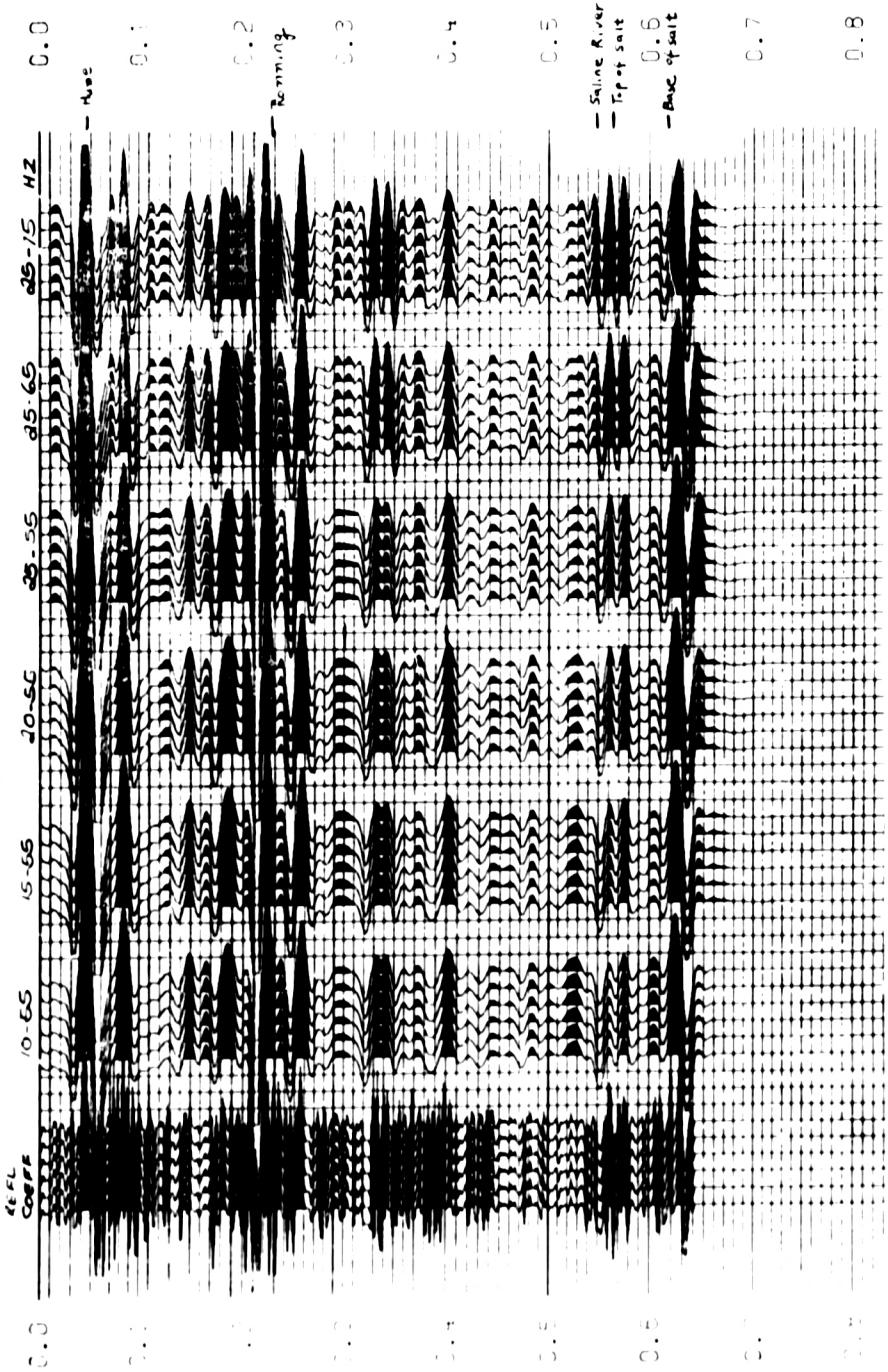
The corrections applied for the seismic data during the interpretation are as follows:

<u>LINE</u>	<u>CORRECTION</u>
Line 12	+115 ms.
Line 13	+115 ms.
Line 53	0 ms.
Line 27	0 ms.
Line 63-13	+ 40 ms.
Line 63-31	+ 40 ms.
Line 63-12	+ 40 ms.
Line 63-11	0 ms.
Line 63-10	0 ms.
Line GSI-1	+230 ms.

Figure 2. J-42 MANUEL LAKE

NORMAL POLARITY

FILTERS: BANDPASS,  
ZERO PHASE



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