

J. Ray McDermott Canada, Ltd.
Technical Report
Norman Prospect, N.W.T.
632-6-6-68-1

TransOcean Oil, Inc.

217 ROYALITE BUILDING - 615 - 2nd STREET S.W. - CALGARY 2, ALBERTA

TITLE PAGE

Type of Report: Technical Report of a Reflection Seismograph Survey

Survey Area: Norman Prospect, Northwest Territories

Year Done: 1968

Name of Operator: J. Ray McDermott Canada Ltd.

Name of Contractor: Electronic Logging & Velocity Co., Ltd.

Permits over which work was done: 4381, 4382, and 4383

Name of Author: F.F. Foster

Date of Report: 25 July 1972

Project Number: 632 - 6 - 6 - 68 - 1 *

*This is one portion of the project. (See report on "Taylor Lake - 1968")



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INTRODUCTION

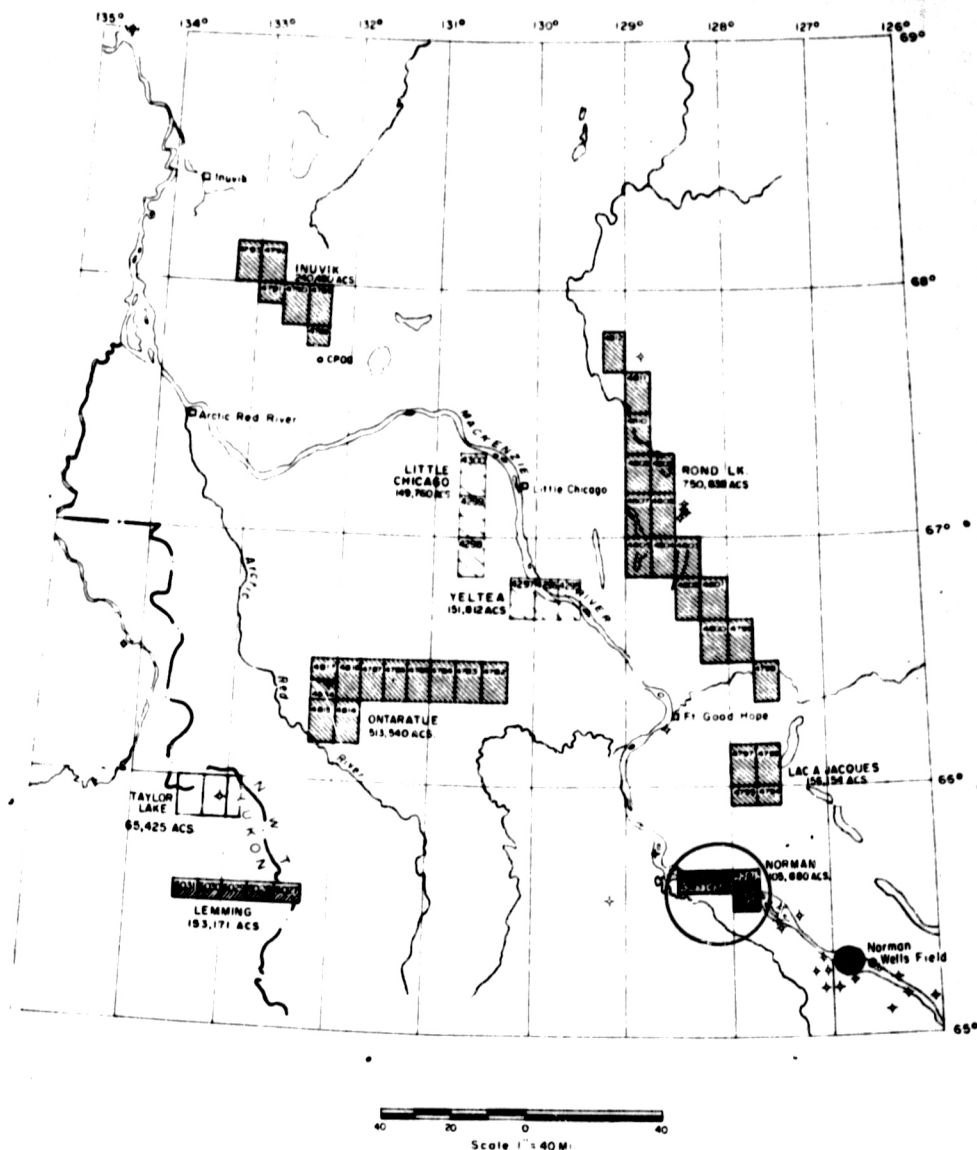
This survey was conducted by Electronic Logging & Velocity Co., Ltd. for J. Ray McDermott Canada Ltd. as a reconnaissance line, with the hopes of getting a preliminary look at the potential of the permit without having to go into a full-scale and expensive operation.

We had just finished the Taylor Lake work and the data had looked reasonable, so it was decided to attempt the same procedure using the MacKenzie River and its banks. The crew had just demobilized out to Norman Wells, and after a short break at the wells we mobilized for the Norman Area. Since this prospect is only 50 miles downriver to the north of Norman Wells we decided to helicopter the crew back and forth each day. This dispensed with a camp and cook, etc. so the cost of staying at the MacKenzie Mtn. Lodge was equitable.

Since we had left the boats at Taylor Lake we had to lease boats there at Norman Wells. This was accomplished, and with the availability of fuel, stores, and planes at Norman Wells this particular operation went very smoothly and with practically no discomfort or inconvenience to the personnel.

The operation as a whole was much more successful than Taylor Lake from the field standpoint, and indeed the seismic data recovered led us to eventually follow up with more shooting and to drilling two wells.

This crew was similar in makeup to Taylor Lake crew. It was a six man crew, no motorized vehicles, transport to prospect by helicopter, transport along lines by outboard motorboat for recorder, and row boat for shooter. Remainder of crew walked with back or chest pack equipment. No holes were drilled (used the river to shoot), and no dozing needed (used the river bank to lay spreads).



LOCALITY MAP

NORMAN PROSPECT, NORTHWEST TERRITORIES
 23.25 MILES OF RECONNAISSANCE REFLECTION SEISMOGRAPH SHOOTING
 COVERS PERMITS # 438], 4382, and 4383
 PROJECT NUMBER: 632-6-6-68-] (PARTIAL)

STATISTICAL DATA

Dates:

Crew left by plane and boat on September 13, 1968, from Norman Wells to the Norman Prospect, approximately 50 miles downriver to the North. Used Northward Aviation Otter float plane.

Operations commenced September 14, 1968. (First Shot)
Operations completed October 2, 1968. (Last Shot)

Crew completed moveout to Norman Wells October 2, 1968.
Crew demobilized to South, via PWA approximately October 5, 1968.

Production:

Miles of Coverage -----	23.25
Number of Profiles Shot -----	186
Average Miles per day Recorded -----	1.29
Average Profiles per day Recorded -----	10.33
Days Worked -----	18
Down-days -----	1
Dynamite Used -----	825 pounds
Caps Used -----	875 pounds
Holes Drilled -----	None

Equipment:

1 Recording Boat w/ outboard motor - Wooden Flat Bottom 25'
1 Shooting Boat w/ oars - 12'
1 Helicopter - Bell G2 - Bullock
1 Helicopter - Alouette - Bullock

Camp:

Used Mackenzie Mountain Motor Lodge at Norman Wells.

Recording:

1 Analog portable recording system, using SIE P-100 portable amplifiers converted for use with the Fortune Techno Tap transport.
30 strings of geophones - each 9 geophones.
2 portable 12 trace recording cables w/ chest reels 660 ft. long.
1 battery operated remote/radio shooting system
1 portable battery charger

<u>Personnel:</u>	<u>Name or Number</u>	<u>Position or Title</u>
	A.B. Barlow	Supervisor/Party Chief
	1	Observer/Manager
	1	Shooter
	3	Observers Helpers

Surveying: The survey crew was non-existent. The original setup was shot in by transit by A.B. Barlow, using as a fixed point an indisputable recognizable feature from the air photos. Horizontal control was then run to the Mackenzie River Bank. All shotpoint distances were then chained and plotted directly on the air photos of the river bank. Vertical control was assumed to be constant and at the same elevation as the river. All surface shotpoints plotted in the field were later moved back (south or west) 2 spreads to indicate the proper sub-surface location of the data. This was necessary since we shot inline offset/single-enders.

Conditions: The climatic conditions were generally fair throughout the survey. The weather was sufficient to allow helicopters to fly continually throughout the survey, back and forth between Norman Wells and the Prospect.

The only major factor that became a problem was a sand bar at shotpoint 139, which caused us to move across the river to the northeast and continue our line on that bank. Another limiting factor with the mud flats, located on the west end of the project immediately adjacent to shotpoint 100, caused us to stop shooting in that direction, approximately 1 mile sooner than programmed. A driving rain on the night of September 28, 1968, wet our magnetic tapes and as a result we shot 10 profiles the following day on paper records only.

FIELD PROCEDURES

Method Employed: Reflection seismograph surveying.

Charge size: Seven 1# charges separated but fired as a common shot.

Hole depth: No holes drilled. All shot set off in the river. Average water depth 2 - 5 feet. Individual 1 pound charges spaced 25ft. apart, and attached by separate caps to common firing line. (See diagram below)

Filters: Tape recorded 20-92 cps
Field playback 30-64

Geophone Spread: SP - 1320' - 2640' in-line offset single enders. Cable 1320'/24 groups
Group interval = 60 feet
9 geophones per group, spaced 7.5 ft. apart
Shots in river, spread on bank. Negligible perpendicular offset.

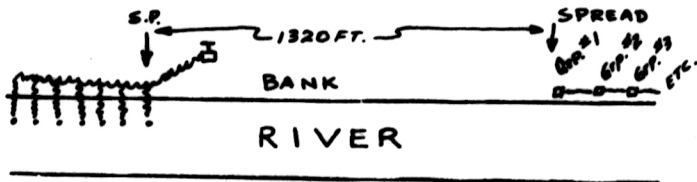
Percentage Stack: 100%

Shothole Spacing: 660 feet

Recording: All data was recorded using a analog portable battery operated recording system. The SIE P-100 amplifiers were modified for use with a Fortune tape transport. All data was stored on Techno tapes. Field playbacks were made for immediate quality check and some limited field interpretation.

Diagram:

Plan View



DATA PROCESSING

Initially the new work was picked and evaluated on the field playback paper records, and indeed even after processing into record sections these paper records were continually used as a check.

Computing: The near surface velocity was in the range of 11000 ft/sec, and the offset and data correction to the +90' plane was based on this velocity. With the spread layout as it was, we were able to check the near surface refractions for velocity.

Digital Processing:

Stage 1: - using field tapes - November, 1968

1. Normal Moveout Removal
2. Deconvolution: 23 pts
Autocorrelation Window: .350-.700 WF=3
3. Digital Filter: 18/23 - 40/45
4. Static corrections
5. Stack 100%
6. Analog variable area/wiggletrace record section.
Structurally hung. Total reflection time 1.5 secs.

Name of Processing Agency: Computer Data Processors Ltd.,
Calgary, Alberta, Canada

Stage 11: - using CDP processed tapes - January, 1970

1. Demultiplex and Edit
2. Velocity Filtered: Fan=3ms/Trace 7 channels
3. Multiplex
4. Stack 100%
5. Analog variable area/wiggletrace record section.
Structurally hung. Total reflection time 1.5 secs.

Name of Processing Agency: Western Geophysical Co. of Canada Ltd.
Calgary, Alberta, Canada

RESULTS AND INTERPRETATION

The following maps are included in this report, and represent the interpretation as of the date shown:

1. Shotpoint Location Map
2. Reef Shape Map - Kee Scarp

As you can see, the shotpoint location map does not have any posted elevations since the entire line was shot along the river bank and has been assumed to be the same elevation throughout (approximately +90' above sea level).

Possible Reef Shape Map - Kee Scarp

This was a reconnaissance line and as such did not offer an indepth interpretation throughout the area. Our main objective was to see if we could recognize, by seismic evidence, the presence of a reef buildup. The seismic data along this line was hampered somewhat by shallow refractions from the Cretaceous beds, however, between .300 - .400 secs. there was evidence of a reef buildup. Essentially the main evidence was located between SP's 50 and 105, however, it is possible that additional buildup happens between SP's 60 and 85. Since there was no north-south control this reef front was sketched in as shown. The highest area appeared to be between SP's 19 and 35 and would approximate -1550' below sea level. The main evidence southwest of SP 120 was not considered to be of significant reliability at this time.

The deeper section below reef was relatively poor and the signal to noise ratio was quite poor.

CONCLUSIONS

Based on the evidence observed we feel that there is a reef located on these Permits and is generally bounded along the south bank of the Mackenzie River as shown. Extension of this reef to the south and north is speculative. It is our recommendation that full detail shooting be programmed for the immediate future.