

028-06-06-049

COLVILLE LAKE AREA

A Geophysical Survey on and off Permits  
6518 and 6519

by

Union Oil Company of Canada Limited

N.T.S. Grid 96N  
67°28' to 67°36' North Latitude  
125°25' to 125°47' West Longitude  
Northwest Territories

Field Work by Northern Geophysical Limited, Party 4  
March 15 to 20, 1972.

Compiled by:

KENNETH L. SHAW  
October 3, 1973

Department of Indian and Northern Affairs  
Project Number

28-6-6-72-2

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Figure 1

UNION OIL COMPANY OF CANADA LIMITED

COLVILLE LAKE PROSPECT

LAND USE PERMIT N71B001

Geophysical Program

Completed - March 20, 1972

Existing trails

Scale 1:250,000

PROJECT 28-6-6-72-2

PERMIT 6521

PERMIT 6519

PERMIT 6518

PERMIT 6520

PERMIT 6517

LAC

MAUNOIR

COLVILLE

LAKE



ABSTRACT

In order to supplement geophysical data obtained through a participation survey in the Colville Lake Area of the Northwest Territories, Union Oil Company undertook a short, exclusive seismic survey during March, 1972. Field work was conducted by Northern Geophysical Limited, Party 4 and a total of 12.93 miles of 400% CDP data on a single line were obtained. The seismic event associated with the Cambrian Saline River was the only reflection consistently mappable throughout the area. Very little structural relief could be demonstrated on this exclusive seismic data.



TEXT

In order to supplement data obtained through participation in a geophysical survey conducted by Sigma Explorations Limited in the general Colville Lake area, Union Oil Company of Canada Limited undertook a survey consisting of a single seismic line on and off Permits 6518 and 6519, held exclusively by Union Oil.

Northern Geophysical Limited, Party 4, which was under contract to Sigma Explorations Limited, was in the Colville Lake area and because of its proximity to the Union Oil Permits, arrangements were made with Sigma to conduct the exclusive Union survey. Access to the Union Oil program was gained utilizing an existing trail.

Operations commenced in the field on March 15, 1972 when surveyors and bulldozers moved in, and concluded on March 20, 1972. A total of 12.93 miles of 400% CDP data were obtained in three days of recording time (March 18 - 20, 1972). A total of 142 vibroseis profiles and 16 refraction profiles were obtained. Average daily production was 4.31 miles. No time was lost by the crew as a result of weather or equipment problems.



Equipment, as listed below, was track mounted, on skids or on large terra balloon type low pressure tires:

Track Mounted Units

Recorder	Office-Sleeper Trailer
5 Vibrator Power Units	Powder Magazine Trailer
2 Cable Units	Fuel Storage Foremost with Trailer
2 Survey Units	Three D-6 Caterpillar Bulldozers
Shothole Drill	
Gravity Meter Unit	
Camp Kitchen - Diner - Sleeper (Fold Out)	

Terra-Tire Mounted Trailers

5 Vibrator Source Units

Skid Mounted Units

1 Power Unit  
2 Sleepers  
Utility Unit

The crew consisted of approximately 35 men, a party Manager, Observer, Junior Observer, Four Vibrator Operators, Shooter, Five Recording Helpers, Driller and Helper, Two Surveyors, Two Rodmen, five in camp



consisting of Cook, Cook's Helper, Camp Attendant and Helper, Mechanic, Field Clerk, Gravity Meter Operator, Bulldozing crew of eight, Expeditor and Supply Man. In addition, a Field Supervisor and Vibrator Supervisor were attached to the crew.

The recorder was equipped with a 24-trace set of DFS-III instruments and recorded 10 seconds of data at a 2 milli-second sample rate in SEG-A format. Total length of the spread was 5,440 feet, with an offset to the inside traces of 800 feet and an offset to the outer traces of 2720 feet. Mark L-2 geophones, having a frequency response of 10 H2 were used. Eighteen geophones per group, laid out inline and spaced at 9 feet, were used. The group interval was 160 feet and the vibration points were spaced at 480 feet. Four vibrators were generally utilized and 32-7 second sweeps of 65-15.875 H2 were obtained over a drag distance of 320 feet at each vibration point. For the refraction data, coverage was obtained by spacing shotholes at 3680 feet and drilling to a depth of 25 feet. A 10 pound charge was utilized as an energy source. The same spread as above was used for the refraction work, but the offset to the inside trace was moved to 80 feet to provide near surface control. In addition to the seismic work, gravity stations were occupied at each vibration point. Data was reduced by Thomas Exploration Surveys to Bouguer values and a Bouguer Profile plotted. No gravity map was prepared because of the restricted amount of data.



The seismic data was processed through the facilities of the Union Oil Company of Canada Limited Digital Processing Center. A datum elevation of 1,000 feet above sea level and a datum velocity of 18,000 feet per second was used. After correlation of the vibroseis data, normal moveout was removed and a time variant digital filter applied. From 0 to 600 milliseconds, a 25/30 - 60/65 H2 filter was applied; from 600 to 1000 milliseconds, 20/25 - 55/60 and from 1000 to 1500 milliseconds, the frequency range was 17/22 - 40/50 H2. The data was then stacked and after editing of the gather plots and correction for residual normal moveout, a final stacked section was produced.

Two seismic reflections were visible on the seismic cross section, a consistent one originating from the top of the Saline River Formation and another less consistent one from the Old Fort Island Formation, both of which are of Cambrian Age. Only minor reflection segments were noted within the Siluro-Ordovician and Proterozoic. Identifications were determined through reference to information from Mobil Colville E-15 as well as regional geological information. Since the Saline River and Old Fort Island seismic events are only separated by approximately 140 milliseconds, and since the Old Fort Island event is not mappable over much of the general area, only the Saline River was mapped structurally. For time to footage conversions for Saline River structure, an average velocity of 18,000 feet per second was assumed. Very little structural relief was apparent on Line 25,

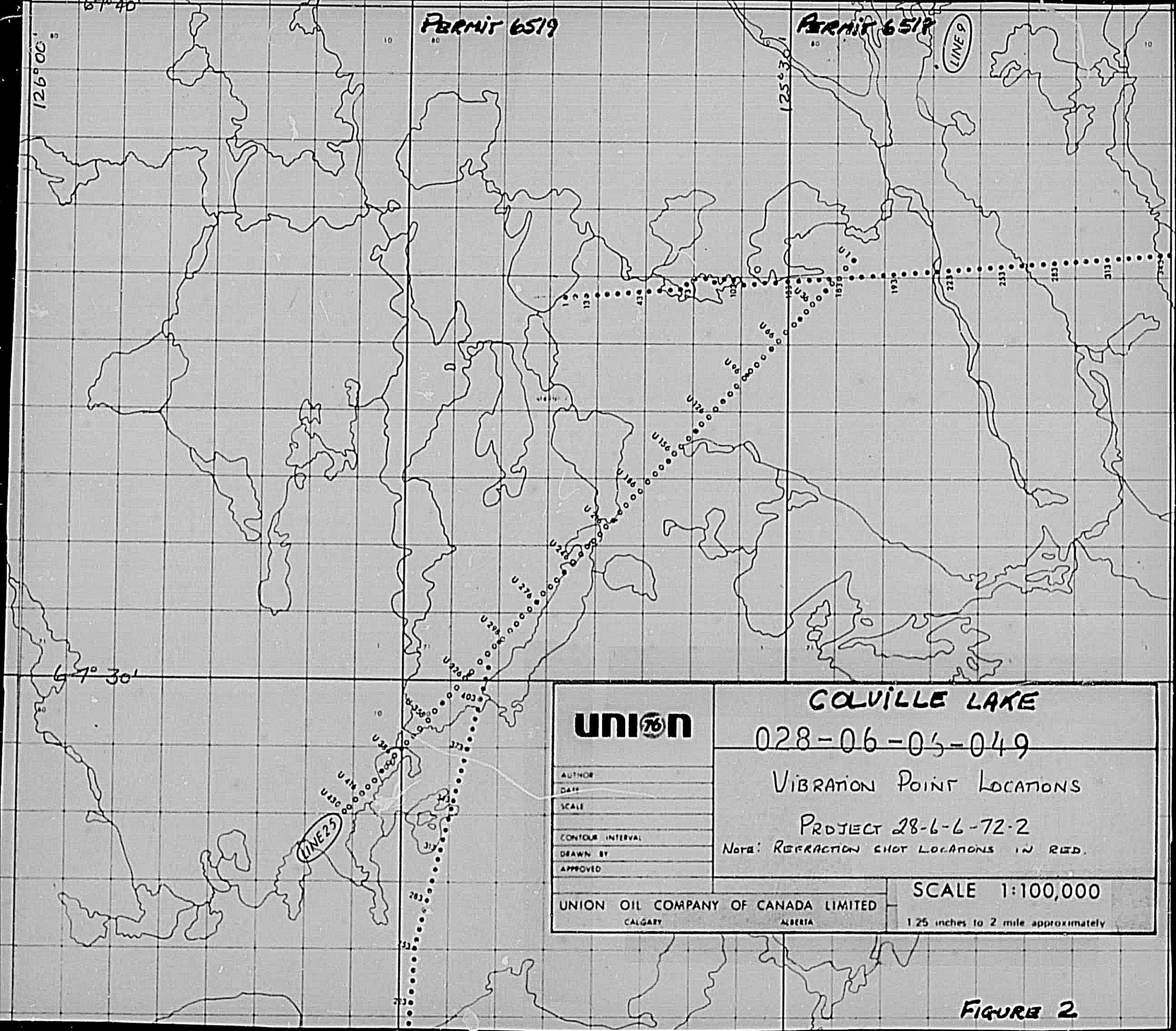
although a well defined, low relief graben was apparent on the southwest end of the line.

To summarize, the data obtained demonstrated a lack of significant structure in the portion of the area studied. The apparent lack of structure may be explained by the orientation of the seismic line, which was laid out approximately parallel to the Colville Ridge structure, located some 8 miles to the southeast. The line would thus essentially parallel strike.



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October 3, 1973





union

AUTHOR

DATE

SCALE

CONTOUR INTERVAL

DRAWN BY

APPROVED

UNION OIL COMPANY OF CANADA LIMITED  
CALGARY ALBERTA

COLVILLE LAKE

028-06-05-049

VIBRATION POINT LOCATIONS

PROJECT 28-6-6-72-2

NOTE: REFRACTION SHOT LOCATIONS IN RED.

SCALE 1:100,000

1/25 inches to 2 mile approximately

FIGURE 2







