352-06-04-043

SEISMIC REPORT

ON THE

ARROWHEAD AREA, N.W.T.

FOR

UNITED CANSO OIL & GAS CO. LTD.

CALGARY, ALBERTA

JULY 1974

PERMITS 6433, 6434

Field work carried out by Teledyne Exploration Ltd., 1974

Project 352-6-4-74-1

BY

COMER & WILSON LTD.

GEOPHYSICAL CONSULTANTS

CALGARY, ALBERTA

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INTRODUCTION

The Arrowhead Area, N.W.T. is located at 122° 30'W longitude 60° 30'N latitude, approximately 40 miles west of Trout Lake. Access to the area is by means of the Simpson Trail from Ft. Nelson. The objective of the survey was to map the structural configuration of the subsurface layers with particular attention to the Slave Point.

FIELD PROCEDURE

See Appendix A for a detailed field report by Teledyne.

Instruments	DFS 111 - 48 traces
Spread	5280-220-220-5280
Station Spacing	220'
Shotpoint Spacing	880'
Stack	600%
Geophones	Mark 10hz geophones, 10 per trace @ 25'
Charge	5#
Hole Depth	45'

The project was worked from a wheeled camp located near the centre of the project.

DATA PROCESSING

Structural sections were prepared by Sefel, J. and Associates Ltd., Calgary. These were corrected to a datum of 1,900' with a correction velocity of 9,500'/sec.. A normal processing sequence including deconvolution and automatic statics was employed.

RESULTS AND INTERPRETATION

The following maps are submitted:

1. Surface Elevations
2. Time Structure Map - Paleozoic Unconformity
3. Time Structure Map - Kotcho
4. Time Structure Map - Tetcho
5. Time Structure Map - Slave Point
6. Time Structure Map - Precambrian
7. Isochron Map - Paleozoic Unconformity to Kotcho
8. Isochron Map - Tetcho to Slave Point
9. Isochron Map - Slave Point to Precambrian

Data quality was excellent across the area and the maps are considered reliable. Reflection identification was made from the M-47 well tie on the west end of Line 1. This interpretation includes the data from the Imperial lines to the southwest, supplied to United Canso under terms of an earlier farmout agreement. The values were taken from the Imperial sections; details in the preparation of the sections (datum, correction velocity etc.) are not known.

The Paleozoic Unconformity and Kotcho time structure maps together with the isochron between the two show the structural changes before and after the post-Paleozoic erosion. The Paleozoic Unconformity map shows a general north-south strike with dip of 45 ft/mile in the northeast, becoming much steeper to approximately 120 ft/mile in the southwest. The regional dip on this horizon changes only at the M-47 test where a slight low is interpreted.

The strike on the Kotcho horizon has changed to southwest at a rate of 100 ft/mile in the north and 200 ft/mile in the southwest.

Thus the isochron between the two has a general east-west strike with the interval thickening to the south. From well data in the area it would appear that the zero edge of the Mississippian carbonates overlying the Banff should closely approximate the 0.340 isochron contour just south to the M-47 test.

. . . 3

The Slave Point is the main objective horizon in this area and it was hoped to find some evidence of reef development. Unfortunately there is no sign of this on the sections. On the southern lines the Slave Point is occasionally broken by basement faulting. The Slave Point and Precambrian events have the same southwest dip as the Tetcho. A small closure is contoured on the Slave Point just north of the L-49 test which only penetrated to the Mississippian.

The Tetcho-Slave Point isochron shows a slight thick trending north-south through the centre of the area. The Slave Point to Precambrian map has values between 0.080 and 0.100 secs.; contours have been ommitted from this map as there did not appear to be any coherent pattern to the values. The Precambrian event could not be correlated on the Imperial sections.

CONCLUSIONS AND RECOMMENDATIONS

The quality of the seismic data obtained from this survey was excellent. The area is located in an area where the beds are dipping smoothly to the southwest with no structural reversals. No evidence for Slave Point reefs was found, and although the Slave Point is occasionally broken by basement faulting these are all minor and would not likely form a trapping mechanism.

No further seismic work is recommended.

Respectfully submitted,
COMER & WILSON LTD.

RLC/jy

R.L. Comer P. Geoph.

APPENDIX A

OPERATIONS REPORT
ON
SEISMIC SURVEY
OF THE
ARROWHEAD RIVER AREA
submitted to
UNITED CANSO OIL AND GAS LTD.
by
TELEDYNE EXPLORATION LTD.

OPERATIONS REPORT
ON
SEISMIC SURVEY
OF THE
ARROWHEAD RIVER AREA
IN THE
NORTHWEST TERRITORIES, CANADA

submitted to

UNITED CANSO OIL AND GAS LTD.

by

TELEDYNE EXPLORATION LTD.

PARTY NO. 604

MARCH, 1974

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I. INTRODUCTION

This report primarily concerns the field operations performed by Teledyne Exploration Ltd., Party No. 694 in a seismic survey on the Arrowhead River Area in the Northwest Territories, Canada.

The area is located between Longitudes 122°-15'-00" and 122°-45'-00" and Latitudes 60°-30'-00" and 60°-40'-00".

The crew was headquartered in a wheeled seismic camp located in the west central portion of the area.

Recording operations commenced on March 21, 1974 and were completed on March 28, 1974.

The survey was conducted with a DFS III 48 trace, nine track, digital binary gain recording system for United Canso Oil and Gas Ltd. by Teledyne Exploration Ltd. Party No. 694. Mr. R.J. McDowell was the Party Chief and Mr. J.H. Jackson the supervisor.

Mr. R.L. Comer of Comer & Wilson Ltd. was the Geophysical Consultant for the operation.

Approximately sixty-nine miles of data was recorded on

seven separate lines designated as T1 through T7 inclusive. The survey provided reconnaissance control in the area.

II. OPERATIONS

(1) General Accessibility

The project is accessible, during the winter months only, via the Simpson Trail for a distance of approximately one hundred forty-eight miles north of Fort Nelson, British Columbia, then west along a bulldozed trail for approximately twenty seven miles then north for approximately three miles to the campsite. The total distance being approximately one hundred and seventy eight miles.

(a) Surface Conditions

The area is covered in general, with small Fir, Spruce, Poplar and Jackpine trees -- interlaced with large tracts of muskeg and light bush.

(b) Topography

The terrain consists of gently rolling hills with fairly sharp elevation changes existing along the streams that provide drainage for the area.

Surface elevations range from approximately 1650 feet to 2200 feet above sea level.

The area is drained to the west via small streams which empty into the Arrowhead River.

(c) Logistics

Fuel, food and operating supplies were transported to the crew by use of trucks traveling along the route as discussed under "General Accessibility".

Some aircraft support for transportation of personnel, mail and small parts was supplied by Tompkin's Contracting Ltd. A Cessna 185 equipped with skis was the type of aircraft furnished. A lake near the west end of Line T-1 was used for a landing strip and proved to be quite satisfactory.

Communications to the camp was provided by mobile radio telephone service. Reception was generally good. The monitoring station contacted was located in Fort Nelson, B.C. through use of the Pointed Mountain Channel.

(2) Surveying

(a) Permits and Releases

No permits or releases were necessary; other than those obtained from the government by the Client.

(b) Surveying Instruments

The surveying was accomplished by use of WILD T1A THEODOLITE.

(c) Bench Marks

Horizontal and vertical control were derived from Imperial-Sun Arrowhead M-47 wellsite with assumed co-ordinates of 73,100 East and 41,700 North. Determination of azimuth was established by Polaris and Solar observations. Elevations were double-read, using erect and inverted readings to insure utmost accuracy. Although a second point was not available to serve as a check, good bearing ties, plus the precautions taken would indicate that the survey would meet acceptable tolerance. Graphic co-ordinates were calculated using the conventional Latitude and Departure method. As requested by client, origin for Grid values was Latitude 60 degrees 30 minutes (00 feet North) and 122 degrees 30 minutes West Longitude (100,000 East).

(3) Outside Services

(a) Bulldozing

Tompkin's Contracting Ltd. - Fort St. John, B.C. provided the dozing operations on the

project. One D7E and two D6C dozers were used to open the access route north from the British Columbia - Northwest Territories boundary to the campsite, cutting line, towing vehicles, and campsite and creek fill work.

(b) Drilling

A total of four drills and two spare water trucks were contracted for drilling purposes and the concerns contracted are as follows:

Baker Drilling - Medicine Hat, Alberta
1 Conventional Drill & Water Truck

Pattern Drilling Services Ltd. - Calgary, Alta.
1 Top Drive Drill - Auger
1 Norhill Drill - Auger
1 Sewell Drill - Auger
1 Spare Water Truck

B & T Services - Fort St. John, B.C.
1 Spare Water Truck

(c) Line Cleaning

Tompkin's Contracting Ltd., Fort St. John, B.C. performed the line cleaning services.

(d) Camp and Catering

Camp and Catering services were obtained from Crown Caterers Limited, Edmonton, Alberta.

(4) Recording

(a) Equipment

Instruments - 48 trace DFS III, nine track,

Digital Binary Gain Recording System in conjunction with a TIAC tape recording unit with 48 trace capabilities, with a SW 400 Mandrel electro-static camera, along with a 168 trace input to 60 trace output rollalong switch and a Teledyne remote firing system.

Cables - ten sections of C.D.P. cables with 12 take-outs per section at 220 foot intervals.

Geophones - One hundred strings of Mark Products digital grade 10 Hz geophones with 10 geophones per string.

(4) Parameters

Type of Coverage - 600% C.D.P.

Shot Point Interval - 880 feet

Group Interval - 220 feet

Spread - 5280' - 220' - S.P. - 220' - 5280'

Geophones - Ten per trace spread over 220 feet

Charge size - 5 lbs. per shot

Shot Points - one hole per location, Drilled on every fourth geophone station. Hole depth 45 feet.

Record Filter - Low 8 Hz, High 124 Hz

Record Length - three seconds

Sample Rate - Two milliseconds.

(5) Comments

Record quality - The record quality was considered

to be generally good. In some instances the quality deteriorated, and this loss of quality appeared to be associated with holes shot in areas of thick muskeg.

Several locations were shot with a single 60 foot hole with a 5 pound charge, and a pattern shot of two holes 45 feet deep with the holes spaced 100 feet apart and shot with 2½ pound charges, in comparison with the standard hole depth of 45 feet shot with a 5 pound charge. The additional hole depth or the pattern shot did not make an appreciable difference in the record quality, even in areas of thick muskeg.

Drilling Conditions -- Drilling conditions were good, except at locations near the Arrowhead River. Water used for drilling purposes was hauled a distance of 10 to 11 miles in some instances.

III. COMPUTATION

There were no computations of the data required. The field records were labeled in Teledyne's Calgary Office and transmitted to the Client's consultant for computing and data processing.

IV. STATISTICAL DATA

SUMMARY

Party No.	694
Number of Recording Days	8
Total number of miles shot	69.3
Average number of miles shot per recording day	8.66
Total number of locations shot	423
Average number of locations shot per recording day	52.88
Total amount of explosives used (lbs)	2375
Average charge per location (lbs)	5.6
Total number of drilling days	28
Total number of drilling days lost	0
Total number of holes drilled	444
Average number of holes drilled per day per drill	15.1
Average holes drilled per recording day	52.9
Total footage drilled	20,112
Average hole depth (ft.)	45.3

V. EQUIPMENT

Teledyne Exploration Ltd.

Recording Truck	1
Shooting Truck	1
Line Trucks	3
Survey Trucks	2

Preload Truck	1
Party Chief Truck	1
Ambulance	1
TOTAL	10

VI. PERSONNEL

Teledyne Exploration Ltd.

Party Chief	1 man
Survey Crew	4 men
Recording Crew (Standard)	10 men
Recording Helpers (Extra)	2 men
Preloader (Extra)	1 man
Mechanic	1 man
Computer/clerk based in Calgary, Alberta	1 man
TOTAL	20 men

Contract Drilling (Baker & Pattern Drilling & S & T Services)

Drillers	4 men
Drill Helpers	4 men
Water Truck Drivers	2 men
Foreman	1 man
Mechanic	1 man
TOTAL	12 men

Dozing (Tompkins Contracting Ltd.)

Dozer Operators	6 men
Cook	1 man
Foreman	1 man
TOTAL	8 men

Line Cleaning (Tompkins Contracting Ltd.)

Line Slashers	2 to 6 men

Catering (Crown Caterers)

Camp Personnel	3 men

TELEDYNE EXPLORATION LTD.

J H Jackson

Supervisor

JHJ:lvb