



Abstracted for
Geo-Science Data Index

Date _____

FINAL SEISMIC REPORT

on

CAMSELL BEND AREA

NORTHWEST TERRITORIES

for

CANADA-CITIES SERVICE PETROLEUM CORPORATION

by

VELOCITY SURVEYS LIMITED

Headquarters:

1323 - 48th Avenue Northeast
Calgary, Alberta

Seismologist:

H. de Boer

Supervisors:

F. C. McConnel
C. W. Fredrek

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3. Nahanni to Mt. Clark Isochron
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SPREAD DIAGRAM

FINAL REPORT
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INTRODUCTION

This report and the enclosed documents are, herewith, submitted as the final report for a seismograph survey conducted in the Camsell Bend Area between January 23rd and March 25th, 1967. The survey was primarily one of reconnaissance and only two lines of detail control (Lines 16 & 17) were shot.

Field headquarters were in a trailer camp which was moved to the area with the seismic crew in January following a survey in northern Alberta for Canada-Cities Service Petroleum Corporation.

All of the field equipment was on wheeled units, there being no tracked units, helicopter equipment or helicopter support.

An agreement and contract covering the usage of the road system from Fort Providence to Ft. Simpson, the prospect and Willowlake River was made between Canada-Cities Service Petroleum Corporation and Calgary Exploration Services Ltd., prior to the survey.

CONCLUSIONS

Current seismic data of the area reveal:

(See Nahanni and Mt. Clark Structure Maps.)

a.) The most pronounced high occurs along Line 17, trending about northeast-southwest and is approximately one mile wide,

measuring the last closing contour line.

b). This feature is associated with possible faulting. The subsurface to the west is of relatively low dip. To the east, there are steep east dipping beds and the high trend terminates rather abruptly to form a subsequent low associated with faulting. (See Mt. Clark Structure and Nahanni to Mt. Clark Isochore Map.)

c). This feature was semi-detailed by shooting Line 16 and is an indication of the possibilities. From the Nahanni and Mt. Clark Structure Maps the anticlinal trend looks very interesting. Although reefal conditions are not apparent, the possibility of a reservoir still exists and depends greatly on the traps formed by faulting in conjunction with the structural high feature along and east of Line 17.

The above mentioned geophysical leads are governed by limited control, however, the area surely merits serious consideration as to structural possibilities and additional shooting is recommended to verify or condemn the area of interest.

GENERAL INFORMATION

PROJECT LOCATION

The Camsell Bend Area is located in the Northwest Territories, approximately 60 miles northwest of Ft. Simpson. Data were obtained between $62^{\circ} 10'$ and $62^{\circ} 35'$ North Latitude and

between 122° 00' and 123° 00' West Longitude.

PURPOSE OF SURVEY

The purpose of the survey was to evaluate by reflection seismograph Canada-Cities Service's acreage block in the Camsell Bend Area.

TOPOGRAPHY

The prospect is located between the Willowlake River to the north and the MacKenzie River to the south and west. The Camsell Range and the Nahanni Range flank the MacKenzie River to the west.

The Ebbut Hills border the prospect to the northeast where heavy timber was encountered.

The elevations in the area ranged from 2226 feet above sea level in the Ebbut hills to 378 feet above sea level on the MacKenzie River.

The surface cover was usually muskeg or moss with medium to light bush cover.

ACCESSIBILITY, SUPPORT & WEATHER

The existing Calgary Exploration Services Ltd. winter road from Ft. Simpson to the Willowlake River was used as access to the prospect. This road was maintained during the entire operation by Calgary Exploration Services Ltd.

Approximately 14,000 gallons of gas and 11,000 gallons of diesel fuel was transported by barges to the Willowlakes River Cache No. 2, in late 1966 and 11,000 gallons of gas and 7,000 gallons of diesel fuel was transported by truck to the camp site in January, 1967.

All of the crew and camp support was handled by Velocity Surveys Limited from Ft. Simpson.

Occasional flights from Ft. Simpson to the camp site by light aircraft took place, however, most of the supplies were transported by truck.

Drinking water was obtained 20 miles from camp. Water obtained nearby in various small sloughs was contaminated.

Temperatures were normal for the winter months, ranging from -45° to -20°.

DRILLING

Three Mayhew 1000 (Air-Water Combination) shot hole rigs were used.

Drilling was fair in the area, however, water shortage necessitated drilling by air throughout the prospect.

Single holes at 40 feet were used over the entire area.

A typical hole log follows:

0-15' Brown Clay & Boulders or Muskeg
15-40' Blue Clay & Boulders

SURVEYING

Vertical and horizontal control was run with
a T-1A Theodolite.

The triangulation station No. 63-A-194,
Latitude $62^{\circ} 16' 50.36''$ Longitude $122^{\circ} 03' 45.37''$ was used as a
basis for horizontal and vertical control. Various polaris
observations were taken throughout the prospect to check bearings.

All shot points were referred to the northeast
corner of Grid Areas. These Grid Areas are defined by their
latitude and longitude and contain 5 minutes of latitude and 7.5
minutes of longitude. They are numbered consecutively from the
lower right hand corner of the map.

CAMP & PERSONNEL

The camp consisted of six (mainly 10 x 52')
Atco trailers on wheels.

The field crew assigned for this survey consisted of
twenty-six men in the following capacities:

Party Chief	K. Schulte
Seismologist	
Computer	H. de Boer

Party Manager	E. Lorenowicz
Operator	D. A. McKay
Junior Operator	
Reel Truck Driver No. 1	
Reel Truck Driver No. 2	
Shooter	D. Hoffman
Helpers No. 1	
No. 2	
No. 3	
No. 4	
Surveyor	
Assistant Surveyor	
Rodman	
Three Driller	
Three Water Jacks	
Mechanic	
Helper	
Camp Attendant	
Cook	

COMMUNICATION

The internal crew communication consisted of the following units:

Internal System

- 1 DJ30 25 Watt 110 Volt AC Base Station
- 5 DT 34 25 Watt 12 Volt DC Mobile Radios
- 1 DT 34 Spare Mobile Radio

Antenna & Tower Equipment:

- 1 LG-7 60' Tower
- 1 201 Sinclair Antenna

Common Carrier Equipment

- 1 DJ30 25 Watt 110 Volt AC Base Station
- 1 CH25 100 Watt 110 Volt AC Single Side Band Transceiver
- 1 DT 34 25 Watt Mobile Radio for Party Chief Vehicle.

Excellent communication between camp and
Calgary was maintained throughout the winter operation by the use

of a DT 34 25 Watt Mobile Radio installed in the Party Chief's truck.

RECORDING EQUIPMENT &
FIELD TECHNIQUES

Recordings were made with a set of S. I. E. P. D. R. 70 and PT 700 amplifiers synchronized with an S. I. E. / P. M. R. -20 FM magnetic tape system.

The geophones were Electro-Tech, 14 cycle, nine per trace over 120 foot intervals.

On all locations 1760' split spreads with 400% subsurface coverage were utilized to enhance signal level at the zone of interest and provide V_2 penetration. (See Spread Diagram.)

The monitor records and tapes were recorded on a 1-15-100 filter setting with fast AVC. The playback records were on a 1-28-60 filter setting and fast AVC.

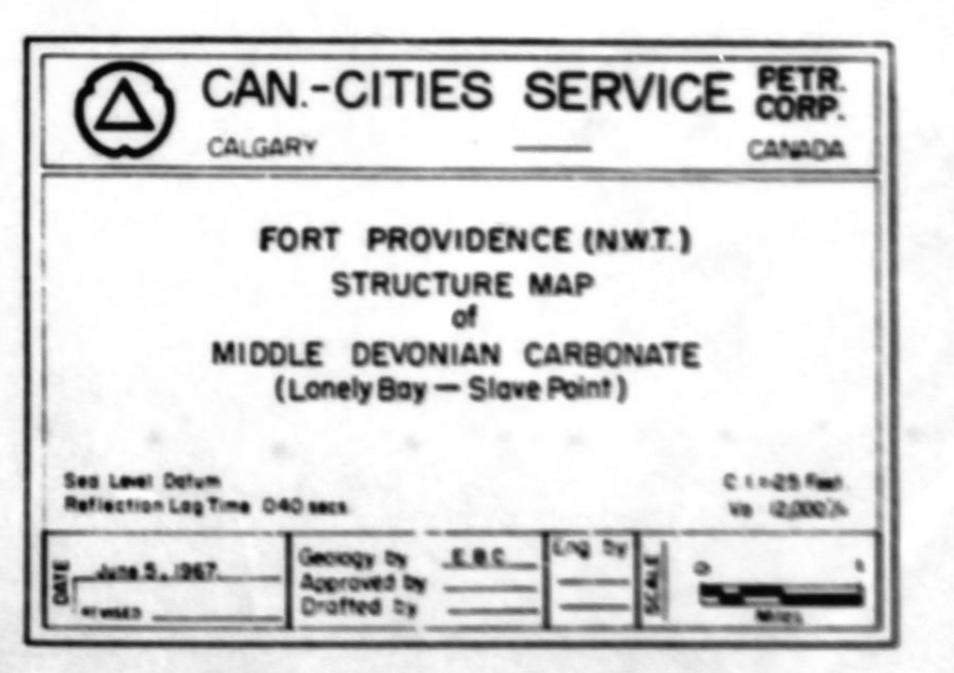
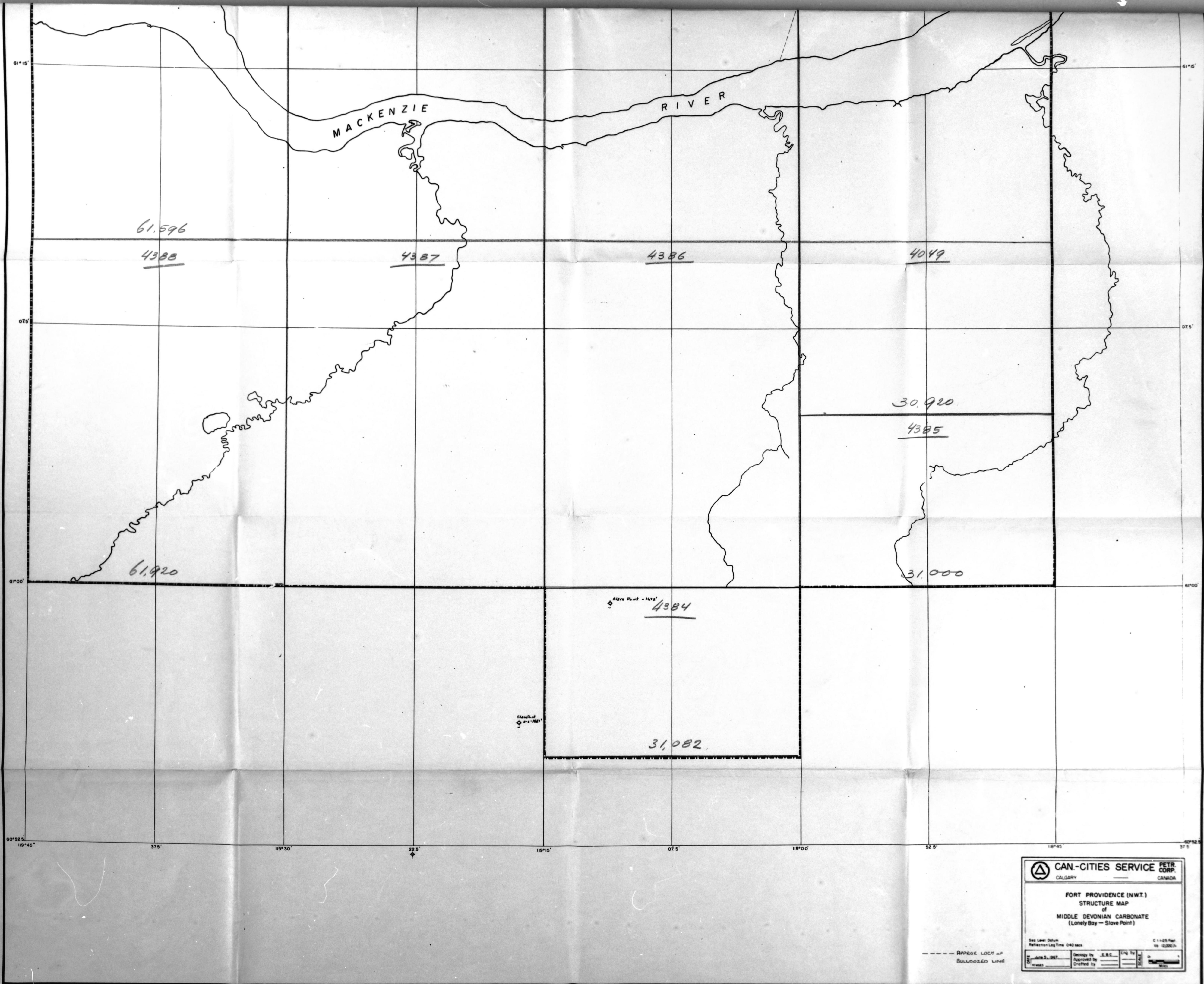
Experimental shots were taken at various locations along Line 1. The final analysis of the experimental work resulted in adopting a single pole at 40 feet and a charge size of ten pounds.

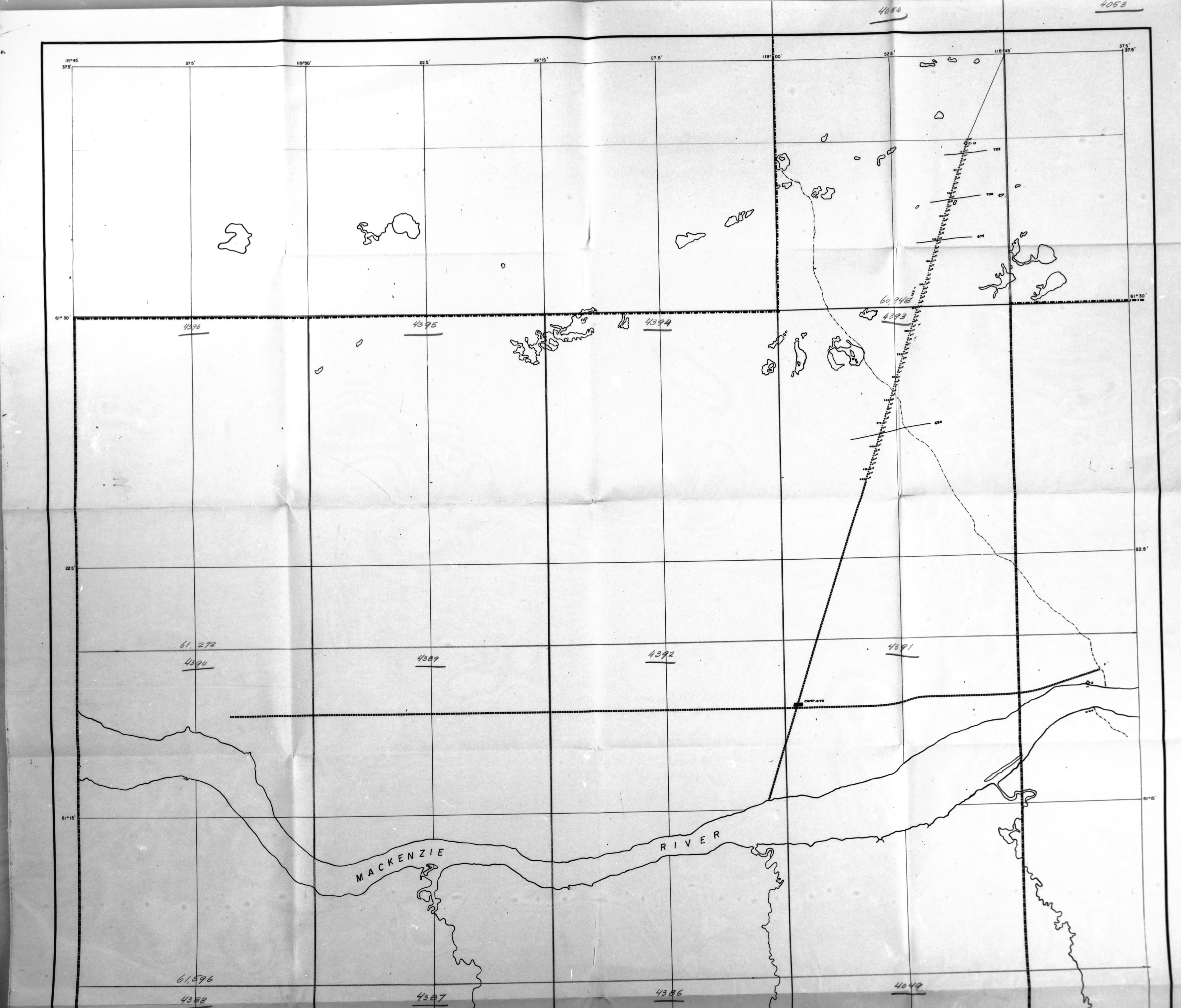
RECORD QUALITY

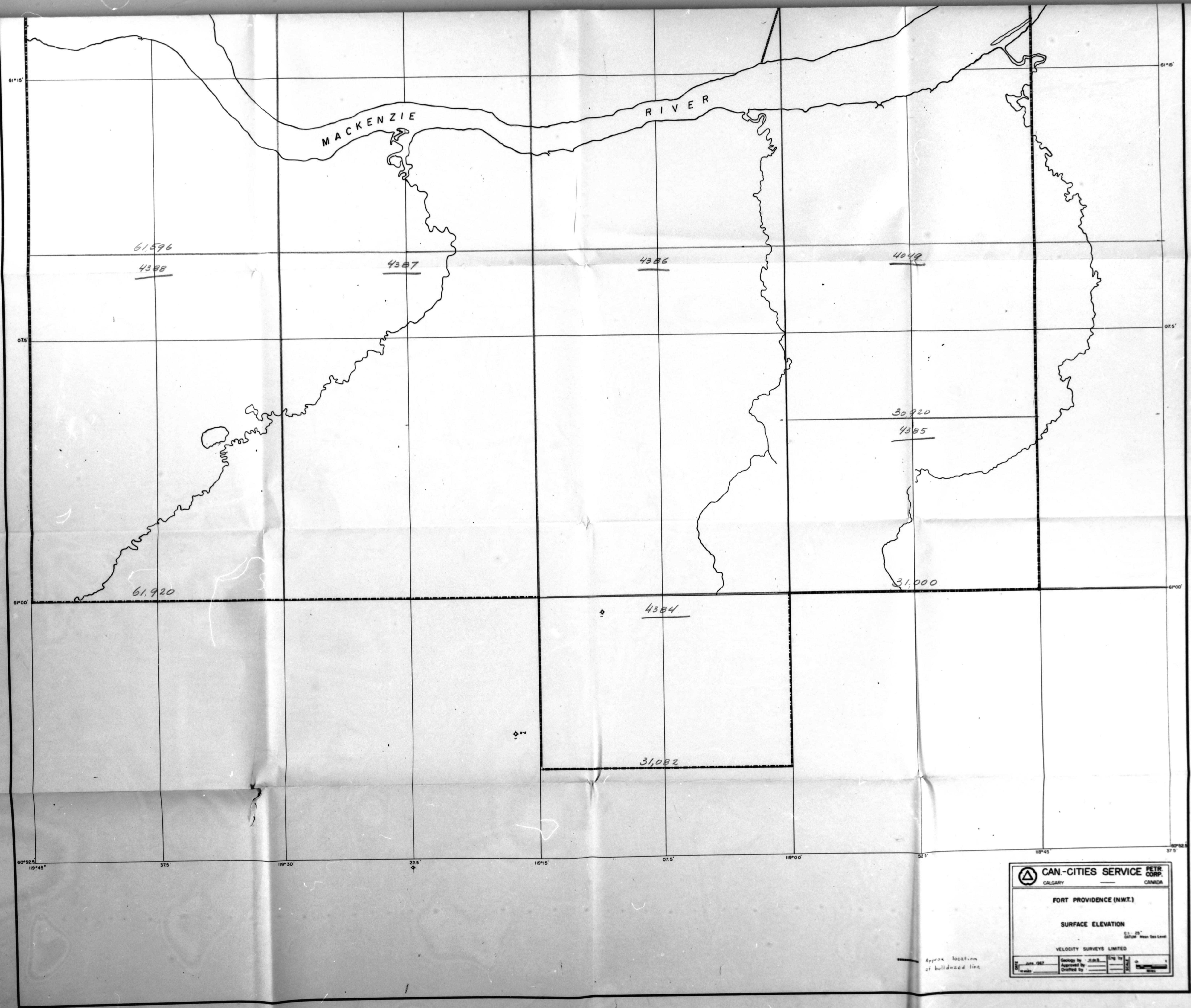
Record quality varied from good to poor, with the majority of the records being fair.

The Nahanni yielded generally good reflections.











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NORTHWEST TERRITORIES

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CANADA-CITIES SERVICE PETROLEUM CORPORATION

by

VELOCITY SURVEYS LIMITED

Headquarters:

**1323 - 48th Avenue Northeast
Calgary, Alberta**

Seismologist:

H. de Boer.

Supervisors:

**F. C. McConnell.
C. W. Fredrek.**

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GEOGRAPHIC LOCATION

The Fort Providence area is located in the Northwest Territories, approximately 90 miles north of the Alberta Border. Data were obtained between $61^{\circ} 22.5'$ and $61^{\circ} 37.5'$ North Latitude and between $118^{\circ} 45'$ and $119^{\circ} 00'$ West Longitude.

INTERPRETATION

RESULTS

(Interpreted by the Geophysical Department of Canada-Cities Service Petroleum Corporation.)

(See Page 7.)

COMPUTATION PROCEDURE

Reflection times were corrected to a datum plane of 600 feet above sea level, with a datum velocity of 12,000 feet per second.

A graphical plot of first arrival times indicated near surface velocities (V_1) from about 6400 to 9000 feet per second, hence a weathering constant of .45 was used in conjunction with the standard uphole method.

A uniform V_2 of 12,000 feet per second was drawn through all plots and fitted very well.

PLAYBACK DATA

The 400% CDP theoretical structure section was constructed from the analogue field tapes and corrected to a 600 feet above sea level datum.

(See Results - Page 7.)

GENERAL INFORMATION

TOPOGRAPHY

The prospect is located approximately 12 miles north of the MacKenzie River.

The elevations in the area ranged from 631 feet to 731 feet above sea level. Muskeg exists mainly in the northern portion of the seismic line and depletes toward the MacKenzie River. Generally throughout the prospect the bush cover is medium.

ACCESSIBILITY & WEATHER

The approximate seventy miles of access road from Fort Providence were fair after initial snow plowing and partial widening by the dozers.

During the working period, maximum-minimum temperatures were +30° to -10°.

DRILLING

Two Mayheww 1000 (Air-Water Combination) shot hole rigs were used from March 26th to April 1st, 1967.

Drilling was fair in the area. Single holes at 40 feet were used over the entire line.

A typical hole log follows:

0-10'	Muskeg
10-25'	Clay & Boulders
25-40'	Shale & Sandstone

SURVEYING

Vertical and horizontal control was run with a T-1A Theodolite.

The CS Laferte River 0-15 well was used as a basis for horizontal & vertical control.

All shot points were referred to the north east corner of Grid Areas.

DOZING

Bulldozers were required to cut new lines and plow snow.

Locations of bulldozed lines not shot by Velocity Surveys Limited are shown on the surface elevation map.

The bulldozing was conducted and supervised by the Production Department of Canada-Cities Service Petroleum Corporation and assisted by a surveyor of Velocity Surveys Limited.

RECORDING EQUIPMENT & FIELD TECHNIQUES

Recordings were made with a set of S.I.E. P.D.R. 70 and PT 700 amplifiers synchronised with an S.I.E. P.M.R. - 20 FM magnetic tape system.

The geophones were Electro-Tech, 14 cycle nine per trace over 120 foot intervals.

On all locations 1760' split spreads with 400% subsurface coverage were utilized to enhance signal level at the zone of interest and provide V_2 penetration. (See Spread Diagram.)

The monitor records and tapes were recorded on a 1-15-100 filter setting with fast AVC. The playback records were on a 1-28-60 filter and fast AVC.

Experimental shots were taken at V-1, 4, 7, 37, 40 and 43. The final analysis of the experimental work resulted in adopting a single hole at 40' and a charge size of five pounds.

RECORD QUALITY

Record quality varied from good to poor, with the majority of the records being fair or better.

Respectfully submitted,

VELOCITY SURVEYS LIMITED

Approved:


F. C. McConnell, P. Eng.


H. de Boer - Seismologist


C. W. Fredrek - Supervisor

Date: June 27, 1967
Calgary, Alberta, Canada.

RESULTS

The results of the seismic program are presented on two contour maps. These maps are labelled as follows:

Surface Elevation

Structure Map of Middle Devonian Carbonate

Both maps have been contoured with a 25 ft. contour interval with sea level being the reference datum.

The purpose of the survey was to determine if possible, the location where the Slave Point formation begins to build up on top of the Lonely Bay (or Pine Point) formation.

A synthetic seismogram made from the sonic log of the CS Laferte River 0-15 well was used to identify the Lonely Bay (or Pine Point) reflection. (A copy of this synthetic seismogram is included with this report and is labelled Fig. R-1).*

The 400% CDP record section made from the field tapes is considered to be good in quality. The Lonely Bay reflection event is continuous the entire length of the line. As the record section was made structural to a 600 ft. A.S.L. datum, a depth in two way time was picked at every fifth shot point. Using a reflection delay time of .040 seconds (See Fig. R-1) and an average velocity of 12,000 ft. per second, the time depths were converted to depths in feet subsea.

An average dip rate of 32 feet per mile to the southwest is exhibited by the entire length of the line. This dip rate however, is not uniform along the line.

Due to an increased rate of dip between shot points 190 and 250, there is a resultant area of flattening near shot point 280. This flat area has been contoured as a possible closure to the east of the seismic line.

SUMMARY

The 400% CDP seismic line shot in the Fort Providence Area gave data of good quality. The structural record section made it possible to readily map the top of the Lonely Bay carbonate formation. The average rate of dip of 32 ft. per mile to the southwest is locally interrupted by areas of steeper dip, flattening, and reversal. An area of possible closure was indicated approximately 9 miles south of the CS Laferte River 0-15 well. A sharp buildup of Slave Point carbonate on top of the Lonely Bay was not indicated by the data shot.

Respectfully submitted,

E.B. Claunch
E.B. Claunch
CHIEF GEOPHYSICIST

CANADA-CITIES SERVICE PETROLEUM CORPORATION

Dated this 20th day of June, 1967
Calgary, Alberta, Canada:

STATISTICAL ANALYSIS

<u>RECORDING CREW</u>	March	April	Total
Number of days worked	4	1	5
Number of shot points	95	52	147
Total hours worked	50 $\frac{1}{2}$	14	64 $\frac{1}{2}$
Travel hours	11 $\frac{1}{4}$	2 $\frac{1}{2}$	13 $\frac{1}{2}$
Recording hours	39 $\frac{1}{4}$	11 $\frac{1}{2}$	50 $\frac{1}{4}$
Average shot point per recording hour	2.4	4.5	2.9
Total dynamite used	580	390	970
Number of caps used	130	101	241
 <u>DRILLING CREWS</u>			
Total Footage:			
Velocity # 75:	1480	640	2120
G & B	1730	560	2290
C. T. & T.	520		520
# 75 Night	1327		1327
Travel Hours:			
Velocity # 75	11 $\frac{1}{2}$	2 $\frac{3}{4}$	14 $\frac{1}{4}$
G&B	11 $\frac{1}{2}$	2 $\frac{3}{4}$	14 $\frac{1}{4}$
C. T. & T.	4 $\frac{1}{2}$		4 $\frac{1}{2}$
# 75 Night	10 $\frac{1}{4}$		10 $\frac{1}{4}$
Drilling Hours:			
Velocity # 75:	22 $\frac{1}{2}$	9 $\frac{1}{2}$	32 $\frac{1}{2}$
G&B	24	9 $\frac{1}{2}$	33 $\frac{1}{2}$
C. T. & T.	7 $\frac{1}{2}$		7 $\frac{1}{2}$
# 75 Night	23 $\frac{1}{4}$		23 $\frac{1}{4}$
Total Hours:			
Velocity # 75:	34	12 $\frac{1}{2}$	46 $\frac{1}{2}$
G&B	35 $\frac{1}{2}$	12	47 $\frac{1}{2}$
C. T. & T.	12		12
# 75 Night	34		34