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REFLECTION SEISMOGRAPH SURVEY OF THE
PEEL PLATEAU AREA, N.W.T. & YUKON
1964-65

Shell Canada Limited
Northern Division Exploration
July 1, 1965



REFLECTION SEISMOGRAPH SURVEY OF THE
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EDMONTON, ALBERTA JULY 1965

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Permits. #3406-3412 inclusive, #3456-3461 inclusive, #3490-3505 inclusive, #3572-3576 inclusive, #3602-3617 inclusive, #2428-2433 inclusive.

In compliance with Section 54, (2) (b) of the Canada Oil and Gas Land Regulations, the following is reported with regard to a geo-physical exploration program performed on the subject permits and surrounding area.

Reflection Seismograph Survey

I. AREA:

Peel Plateau, Northwest Territories and Yukon Territory

II. LOCATION:

65°31' - 66°54'N, 132°22' - 135°24'W.

Adjacent towns, etc.: Approximately 85 miles south of Fort McPherson, N.W.T.

III. DATE OF SURVEY:

From November 29, 1964, to April 11, 1965.

Number of recording days in the field: 113.

IV. EXTENT OF SURVEY:

Approximate Acreage: 1,800,000 Number of Profiles: 1,253½

Number of Locations Shot: 1,284 Miles of Traverse: 619.25

Number of Shot Holes: 2,989 Footage Drilled: 136,672'

V. FIELD CONDITIONS:

A. Surface Outcrops:

Cretaceous formation outcrop east of line running from $134^{\circ}20'$ - $66^{\circ}00'$ to $135^{\circ}40'$ - $66^{\circ}52'$. West of this line outcrops of Triassic, Mississippian, Devonian, Silurian and Ordovician have been reported.

B. Type of Terrain:

Elevations ranged from 30 feet above sea level near the Road River to 2,830 feet above sea level in the southeast portion of the prospect. A dendritic pattern of streams drains the entire area into the Snake and Peel Rivers.

C. Available Roads or Water Routes:

There are no available roads within or near the area. The area was accessible in the summer by float-equipped aircraft and river transportation. A temporary winter air strip capable of handling aircraft up to the C-46 size was constructed at approximately $66^{\circ}28'$ - $133^{\circ}45'$.

D. Weather

Extremely low temperatures and drifting snow on the open plateaus plagued the crew operation for the better part of December, January and February. Average temperatures for these months were -27° , -31° , and -43° respectively. Average snowfall was 3 to 5 feet.

E. Drilling

1. Formations:

Most holes were drilled in perma-frost. Near surface geologic formations were logged on shales and clays. Gravel and boulders were encountered on several plateaus and creek beds.

2. Hole Depths:

The average hole depth for the area was approximately 45 feet.

3. Casing, Charge Anchors, etc.:

No casing was used. No charge anchors were required.

4. Drilling Equipment, Type of Units and Type of Bits:

Drilling operations were carried out by G.W. Garrity

Drilling Company.

2 - Failing air-water CFD-100 drills mounted on 1960 GMC Model 980 trucks.

1 - Failing air-water CFD-100 drill mounted on a 1962 GMC Model 980 truck

3 - 1959 GMC Model 9100 Water Units

2 - 1964 - 3/4 ton GMC 4 x 4 Drill Support Units.

1 - 1963 - 3/4 ton Fargo Power Wagon drill support Unit.

373 - 4 $\frac{1}{2}$ " Rock bits (3 cone) used.

175 - 4-3/4" rock bits (3 cone) used.

1,041 - 4 $\frac{1}{2}$ " Insert Bits used

665 - 4-3/4" Insert Bits used

140 - 5-5/8" Starter Bits used.

E. Drilling Problems and Recommendations:

The lack of adequate summer repairs, plus being subjected to extreme sub-zero temperatures resulted in an excess of breakdown time. Additional night shifts were required to maintain adequate production. The majority of the above listed drilling equipment requires a complete and major overhaul.

F. Recording:

1. Type of Sh ing:

A 5,280 foot split continuous spread with shot arrays, 2,640 feet apart, was employed. Two 13-trace, 220 foot station interval cables with 6 seismometers per trace, spaced 25 feet apart were used. The shot point array normally consisted of three holes spaced 100 feet apart and drilled to a depth of 45 feet. A spread diagram can be found on the following pages.

On line 5-643 and the southern portion of line 5-641 the shot point and geophone station intervals were reduced to one-half of that shown on the spread diagram.

2. Influence of Hole Depth and Surface Conditions:

Normally pattern holes were shot at 45 feet resulting in good record quality. Record quality deteriorated when charges were shallower than 30 feet.

3. Charges:

Ten pounds per hole was employed in pattern shots east of the 5-609 line. West of the 5-609 line, on the east side of the Peel River, 15 pound charges were found to be necessary. West of the Peel River the charge was increased to 20 pounds per hole. Single hole charges varied from 50 pounds to 100 pounds.

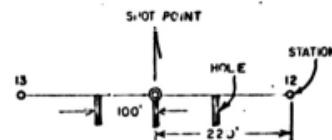
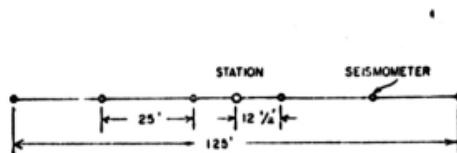
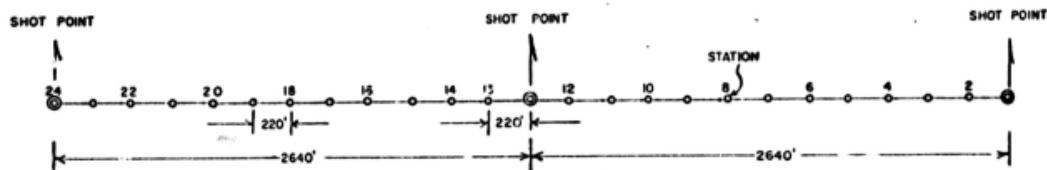
4. Type of Instruments:

Type of Amplifiers: General Geophysical Co. "KMR"

Type of Magnetic Recorder: Electro-Tech "MFR-11A"

PEEL PLATEAU AREA

SPREAD, LAYOUT



Seismometers: Electro-Tech 28 cps "EV-15"

Base Filter: 1-25-75.

G. Surveying:

The survey crew consisted of three surveyors and three rodmen. Three INC Scouts were used for transportation. One T1 and two T1-A theodolites along with a 1,320 foot chain were used for surveying. Horizontal and vertical control was based on a previous year's work which was tied to government triangulation stations. Frequent celestial observations were used to determine azimuths.

H. Office Procedure:

1. Weathering Corrections:

The uphole delay time method of computing weathering corrections was employed. These corrections were made to a 10,000 feet per second velocity.

$$Dt: \text{ Tuh} - \frac{Ds}{10,000} \quad Wx_c: -D_t$$

2. Elevation Correction:

A velocity of 10,000 feet per second was used to correct to a datum of 1,000 feet above sea level.

I. Other Corrections:

A shot point correction was obtained by adding algebraically the break correction, uphole time, weathering delay time and elevation correction. The trace corrections were obtained by adding the weathering delay time and the elevation correction. Total corrections for each trace were obtained by adding the shot point correction to the respective trace correction. These

total corrections were applied to the raw reflection times of an arbitrary event and the computed datum values were plotted, less normal move-out, on cross section paper. A best fit line was then drawn through these values. In an effort to correct for any minor weathering, depth variations corrections were recorded to bring the datum points to the best fit line. These recorded corrections were added to the total trace corrections and the result was applied to the magnetic tapes to produce "smoothed" variable area Geopac sections.

Datum values for map construction were obtained by applying the average of two center trace total corrections to the center raw times of an event to be mapped.

VI. RESULTS:

Record quality may be considered as fair to good

Maps submitted with this report include:

- (1) Topography
- (2) Base of Cretaceous
- (3) Base of Canol
- (4) Cambrian.

Prepared by Northern Division Exploration -
Geophysical Section under the supervision
of David W. Smith, Manager, Northern Division
Exploration, Shell Canada Limited, July 1, 1965

David W. Smith

Seismic Topography Map - SURFACE ELEVATION
Seismic Structural Map - LOWER PALEOZOIC
Seismic Structural Map - BASE OF CANOL
Seismic Structural Map - BASE OF CRETACEOUS