

005-06-05-026

Calgary

FINAL REPORT  
OF THE  
SEISMIC SURVEY CONDUCTED  
AT  
SOUTH PEEL AREA  
YUKON AND NORTHWEST TERRITORIES  
ON  
PERMIT NUMBERS 3567 THROUGH 3570

BY

DRESSER OLYMPIC GEOPHYSICAL

FOR

DOME PETROLEUM LIMITED

DURING

DECEMBER 1971 THROUGH MARCH 1972

PROJECT NUMBERS 3567, 3568, 3569 AND 3570

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1973



## INTRODUCTION

South Peel or Taylor Lake is located astride the Yukon/ Northwest Territory Border, Permit Numbers 3567 through 3570 being situated between Latitude  $65^{\circ}50'$  and  $66^{\circ}00'$  North and Longitude  $132^{\circ}00'$  and  $132^{\circ}52'30''$  West.

A total of 76 miles of Vibroseis Data were obtained during the period December 1971 to March 1972 by Dresser Olympic (formerly Canwest Geophysical) on our behalf.

## OPERATIONS

### A. GENERAL ASSESSIBILITY

Access to the prospect was via existing trails from Norman Wells. Poor river ice conditions required the construction of several ice bridges en route and heavy snow in the area made for difficult travel. The move in time was approximately two weeks.

A fuel cache had been located during the summer of 1971 on the Mackenzie River for this project, but was never able to be made use of as, on the first trip the tractors hauling fuel tanks (Sleigh Mounted) took 21 days to complete a two to three day haul arriving at the seismic camp with little remaining fuel. From this point on fuel was flown in from Norman Wells.

Movement in the Project area was extremely hazardous due to the deeply incised nature of the surface. River and Creek banks were almost vertical with varying heights of between 200 feet and 500 feet making for long and arduous detours, resulting in the discontinuity of seismic lines as can be seen from the location map. The area is lightly treed for the most part, with fairly heavy timber on the north boundary of the block where the land is gently rolling. To the south the land gently rises towards the Richardson Mountains with "Bald Hill" in the southwest as the most obvious topographic feature.

Radio contact from the area was non existent and could not be remedied by Canadian Marconi Limited whose Technician had numerous antennae and Sundry equipment flown in to noavail. A Cessna 180 was stationed on the crew to ferry personnel and supplies from Norman Wells and Inuvik providing the only outside contact. The operation was hampered by the Canadian Air Controllers strike which delayed shipment of spare parts and supplies to the camp.

#### B. SURVEYING

This may best be summed up in one word - chaotic. Initially work commenced using a Canwest/Dresser Olympic survey crew which due to personnel problems was replaced after

two weeks by a sub contracted crew. This crew also worked for approximately two weeks but subsequently walked out on their contract following a spell of minus 40-45° F. temperatures coupled with the difficulty of surveying this prospect.

A second Canwest survey crew was sent in to "Complete" the survey operation but subsequently during the early stages of interpretation it became obvious that large discrepancies existed in both horizontal and vertical control. Pressure was put on Canwest/Dresser Olympic to resurvey and during the summer of 1972 a helicopter survey team was sent to the area using an Auto-Tape system. All triangulation stations within the block were thus tied, in addition to the McDermott Northup-Taylor Lake K-15 well to the west. The wellhead was never found at this location but the seismic line tying this well was obviously in close proximity of it. All mis-ties were this resolved.

#### C. RECORDING

Initially 600% CDP Vibroseis field data were recorded using trace DFS III Binary Gain Amplifiers, in Summit Format.

A seven second sweep with a range of 57-16 Hz dragged over 330 feet by two Sedco Tandem mounted Vibrators (four vibrators in all), was used with a 1320 foot offset to the nearest

stations (ie. Traces 12 and 13). L-10 type Geophones with 10 per station at 30 foot intervals between 330 foot station intervals were used for recording and a field filter of 60-8Hz. Approximately one third of the program was recorded in this manner until one of the Tandem vibrators units was lost in 50 feet of water after breaking through the ice on a very small pothole or slough. The time involved in recovery operations alone was one week, prior to the necessary equipment overhaul, so we were effectively without its use for the remainder of the program. At this time it was determined that one Tandem Unit (2 Vibrators) recording 1200% data would carry on with the project, which was completed in this manner.

#### D. PROCESSING

Structural seismic sections were constructed in Calgary by Dome Petroleum using the facilities of "Geodigit" and used a datum of 1,000 feet above sea level, with elevation corrections only applied - no drills or shooting crew to record surface weathering accompanied the field party.

A 10/15 - 40/50 Hz Band Pass Filter was used for our final display, after deconvolution and several other minor cosmetic processes had been applied.

### E. INTERPRETATION

Identification of events present on the data were made from logs taken at the McDermott-Taylor Lake K-15 well. Data quality may be described as being from poor to fair and the jump correlations required by missing coverage did not prove to be too much of an obstacle. Two continuous Horizons were present throughout the area namely "Imperial" and "Hume" while a deeper more sporadic reflection was tentatively identified as being Cambrian.

The following maps were constructed at a scale of 1:50,000, a copy of each being enclosed.

- 1) Imperial Time Structure
- 2) Hume Time Structure
- 3) Hume to Possible Cambrian Isochron

### DISCUSSION OF MAPS

#### 1) IMPERIAL STRUCTURE (TIME)

This map generally trends from west to east southward dipping at a fairly steep and consistent rate. Two main features are apparent, firstly a "High" located at the McDermott-Taylor Lake well which appears not to have been drilled on the crest of this structure, which with limited seismic control cannot be pinpointed.

The second and more obvious feature is located in the south-central portion of these permit blocks and is shown as a High closed structure at least 100 milliseconds or approximately 550 feet higher than the aforementioned well. Good separation is seen to exist between these features.

## 2) HUME STRUCTURE (TIME)

This map would appear to confirm the existence of a long east-west trending high-angle fault, suspected to be present from the prior interpretation of old seismic lines in the area.

Data quality over the fault zone on each line where it is observed (Lines CW-1, 2 and 7) is very poor and unfortunately on Lines CW-3 and CW-4 the topography precluded us from obtainign coverage over the zone but an obvious break in continuity has occurred and is seen on these two seismic sections. Line CW-5, to the east shows no sign whatsoever of intersecting this fault trend, which either has a hinge point to the west of line CW-5 or escapes to the northeast between lines CW-4 and CW-5.

The Taylor Lake K-15 well is shown to be located close to the fault zone on the southern upside block, and again cannot be placed in respect of a possible structure crest.

The southern central feature is present on this horizon

with closure in excess of 900 feet indicated on the "UP" side of the fault while some less significant closure exists against the fault on the downthrown block.

Structurally this feature at Hume level does not appear to be as high as that drilled in the Taylor Lake K-15 well, but displays adequate separation from it. A minor high exists to the east of this feature in the same general trend. Another minor high in the northwest corner of the block may with a quite valid alternate interpretation, be removed completely, but is shown optimistically on this map.

### 3) HUME TO POSSIBLE CAMBRIAN ISOCHRON

This map which is somewhat suspect due to poor quality deep reflections, appears to indicate a general "Thick" zone which would correspond to the down side of the east-west fault trend. Thickening occurs regionally to the west or northwest.

### SUMMARY

A high structure exists in the southern half of Permits 3568 and 3569 and the closure displayed covers an area of approximately 10 miles by 5 miles. Fair evidence of the fault zone can be demonstrated, although further seismic for the



express purpose of delineating the fault as it crosses between the central and southern portions of Line CW-3 would be advantageous, but again extremely costly.

#### CONCLUSIONS

Since time does not permit further data acquisition which as pointed out would be expensive, the drilling of a well to test horizons down to the Hume level is thought to provide a good prospect, but lack of encouragement from recent tests in the general area should be weighed against this.

#### RECOMMENDATION

That a well should be located at Vibrator Point 128 of Line CW-3 if drilling is the course of action to be followed.

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