

507-06-05-001

REPORT ON A SEISMIC SURVEY
OF THE
CARCAJOU RIVER AREA, N.W.T.
CONDUCTED FOR
TRANS- PRAIRIE PIPELINES LTD.
IN MARCH, 1973
BY
NORTHERN GEOPHYSICAL LTD.

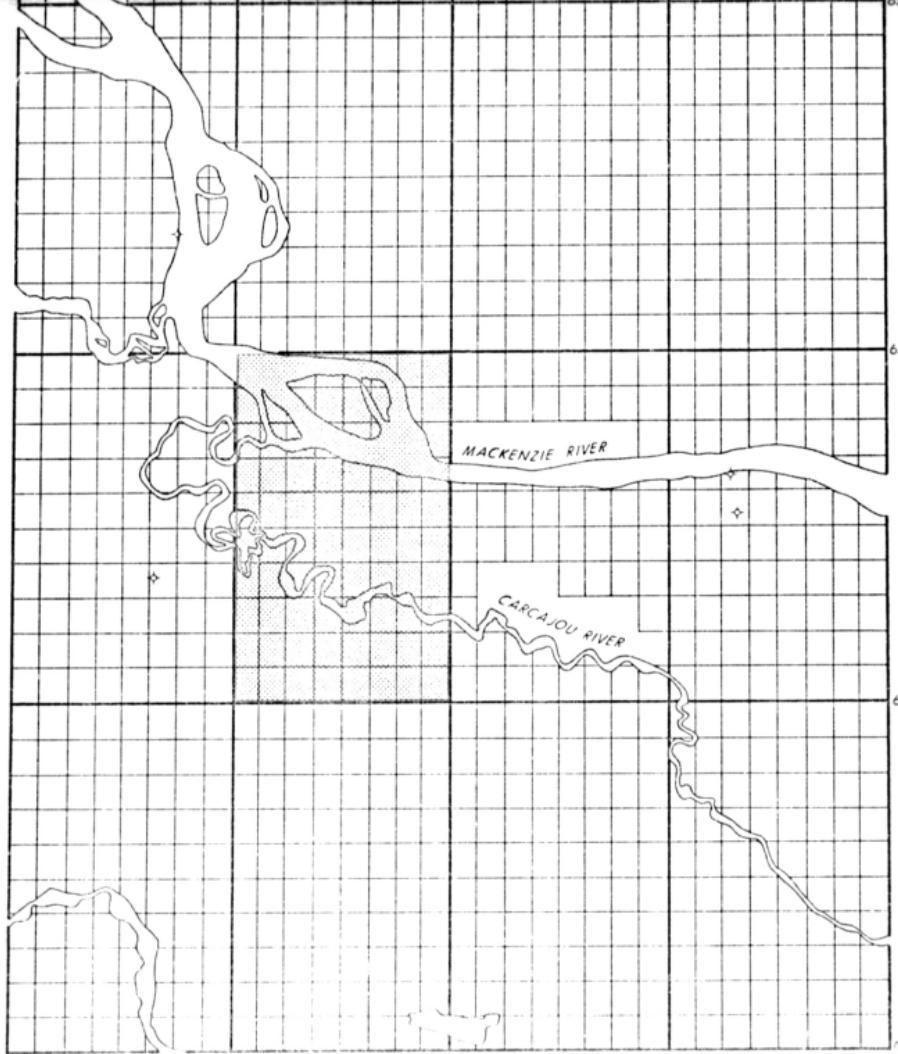
LEASES COVERED : GROUP L-54
GOV'T PROJECT No.: 507-6-5-73-1
FILE No. : N72B108

REPORT SUBMITTED SEPTEMBER, 1973
BY
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TRANS- PRAIRIE PIPELINES, LTD.

CARCAJOU RIVER AREA, N.W.T.

SCALE : 1" : 4 MILES

STATISTICAL DATA

Dates

March 4 - two cats moved to project
5-11 - cats cleared seismic lines
12 - two drills began move to project
15 - third cat moved to project
16 - recording vehicles moved to project from Norman Wells
- drills began drilling
17 - third drill moved to project
20 - remaining two drills moved to project
- recording commenced
25 - two cats released
27 - recording suspended
28 - recording recommenced
29 - recording suspended
30 - recording recommenced

April 1 - one drill released
2 - two more drills released
3 - recording completed
4 - remainder of crew and equipment began move back to Norman
Wells

Production

| | |
|---|--------|
| Number of shots | - 501 |
| Number of Miles of subsurface coverage | - 35.1 |
| Days worked | - 12.5 |

Production

| | |
|--------------------------|------------------------------------|
| Days waiting on drills | - 5.5 |
| Average daily production | - 2.8 miles/day or 20 shots/day |

Equipment

-- Production

8 Nodwell vehicles
3 Bombardier vehicles
1 top drive drill
2 air drills, conventional drive drills
2 air-water conventional drills
3 cats
SIE PT-800 digital recording instruments
Remote firing system

-- Support

2 Nodwell-mounted camp units
1 track mounted camp unit
3 sleigh-mounted camp units
1 sleigh-mounted power plant
3 sleigh-mounted fuel sloops
6 pick-ups

Personnel

| | |
|---------------------|-----------------------------|
| 7 drillers | 7 cat operators and helpers |
| 7 driller's helpers | 2 line cleanup men |
| 2 party managers | 2 linemen (and helpers) |
| 1 field clerk | 4 line helpers |
| 1 mechanic | 1 shooter |
| 1 mechanic's helper | 1 shooter's helper |
| 1 surveyor | 1 cook |
| 1 rodman | 1 cook's helper |
| 1 observer | 1 camp attendant |
| 1 Jr. observer | |

Navigation

Methods used to locate position:

- Polaris observations
- Tie to existing lines and survey markers

Conditions

- Radio communication with Norman Wells intermittent
- Weather cold with some snow

FIELD PROCEDURES

A 600% roll-along stack technique was employed. The spread configuration placed 12 groups on either side of the shotpoint with 220 feet between groups. The distance to the nearest group was 440 feet; to the farthest 2,860 feet. Centered on each group location was a string of nine geophones covering 200 feet.

Shotpoints were 440 feet apart. With a few exceptions, notably on Line N-4 south of the Carcassou River where drilling was difficult, there were two holes at each shotpoint with a distance of 100 feet between them. They were drilled to an average depth of 60 feet and an average charge of 5 pounds was loaded in each.

Recording was by means of SIE Model PT 800 binary gain amplifiers feeding into a PDR-89 9-track tape recorder employing the SEG-A recording format. A 16 to 124 Hz band-pass filter was used during recording.

Vehicle deployment was as follows:

- 1 Nodwell as instrument truck
- 1 Bombardier snowmobile as shooting truck
- 1 Nodwell and 1 Bombardier as line trucks, usually with one leading and the other bringing up the rear
- 1 Bombardier as surveyor's transportation
- Up to 5 Nodwells as drill transports
- 1 Nodwell water truck transporting water for the camp and for drilling support where conversion to mud drilling became necessary on southern Line N-4
- 2 D6C and 1 D7E cats for clearing and snowploughing
- 2 Ford 4x4 pickup for party manager's transportation and/or occasional supply runs
- 2 fold-down camp units mounted on Nodwells
- 1 Ski-doo for transporting line-cleanup personnel
- Pickup trucks used by drill and cat operators for transportation from camp to field

DATA PROCESSING

Preparation for, and supervision of, processing was carried out by a division of Northern Geophysical. The actual processing was performed

by Digitech. Two sets of sections were derived, one flattened and the other with elevation corrections applied. The elevation datum was 500 feet above sea level and the correction velocity was 10,000 feet per second. Machine procedures involved were demultiplex, resample, structure statics application, NMO removal, deconvolution, digital filter, amplitude recovery, digital-analog conversion for display, trace gather, first-break mute, trim statics and residual NMO removal, stacking, digital filter, amplitude recovery, digital-analog conversion for display. The flattened sections were prepared later by applying suitable adjustments to the stacked tape.

DESCRIPTION OF ENCLOSURES

- Shotpoint elevations
- Kee Scarp
- Hume
- Cambrian
- Pre-Cambrian
- Kee Scarp to Hare Indian
- Kee Scarp to Hume
- Hume to Cambrian
- Cambrian to Pre-Cambrian

- Seismic sections for Lines 1 to 3
- Seismic sections for Lines N-1 to N-6
(structural and flattened versions)

DISCUSSION OF MAPS AND SECTIONS

Purpose

The purpose of the survey in the Carcajou area was to look for a thickening of the Kee Scarp reef, preferably located on a structural high.

Project History

The interpretation was done in two phases. The first involved reinterpretation of 40 miles of 100% data obtained from Imperial Oil through the Farmout arrangement. The second required shooting 37 miles of new 600' CDP data late last winter which are underlined in red on the Kee Scarp map. Although the quality of both sets of data varied from good to unusable, the new data were more generally reliable. For this reason, the new data have been used as the basic interpretation with the old data used for fill-in and extension.

Identifications and Correlations

Identification of the shallow reflections was by means of a sonogram for the Triad BP et al Carcassou dry hole located along the west side of the project. Times for the two deeper reflections were derived by computing interval times based on thicknesses from V. Z. Smith's geological report and adding them to the time for the Hume reflection. The fit was amazingly good.

Correlations are believed to be quite reliable. The Hare Indian reflection, although correlatable over only a very limited area, is thought to be reliable where it is mapped.

Interpretation

The Kee Scarp and Hume horizons are the most important. The Kee Scarp to Hume interval includes both the Kee Scarp and Hare Indian units. The Hare Indian is expected to change both in thickness and velocity, hence a map of the Kee Scarp to Hare Indian will be more diagnostic of the Kee Scarp development than the Kee Scarp to Hume will be. As the Hare Indian can be correlated only in the northeast part of the project, the value of the interval is limited. Where it can be mapped, however, it confirms that the thicks on the Kee Scarp to Hume map are at least partially due to the Kee Scarp alone. A particularly good example of this exists on Line N-1 between Lines N-3 and N-4 where a thickening of the larger interval is very noticeable. Near to Line N-3, the thickening is predominantly in the Kee Scarp whereas, near Line N-4, the Hare Indian accounts for most of the thickening. Flattened sections were prepared to make the interval changes more readily distinguishable.

The contouring along the northern edge is, in some places, reversible. The Kee Scarp to Hume thick between Lines N-4 and N-5 should perhaps lie to the north of Line N-1. This would then agree better with the structural high on the two horizon maps. That high is best explained by thrusting even though the fault associated with the high and crossing Lines N-5 and N-6 lacks some of the usual characteristics of thrust-faulting.

The maps of the Cambrian and Pre-Cambrian horizons and the intervals between provide a little background to the configurations of the Kee Scarp and Hume. Some minor faults exist at the Pre-Cambrian level. One of them lies immediately to the east of the thick Kee Scarp development mentioned above. Along the south edge of the project, the Pre-Cambrian has somewhat less dip than the horizons above it. This condition is reflected in the dramatic thinning of the Cambrian to Pre-Cambrian interval which takes place there. It is believed to be the result of a salt flow in the Cambrian. It is difficult to date this salt flow. The flow may have occurred prior to Kee Scarp time leaving the area north of it suitably enhanced for Kee Scarp development.

Conclusions

A high area exists between Line N-1 and the Mackenzie River which appears to be related to a thickening of the Kee Scarp reef. There is no reversal shown to the north. Data on or across the river are required to see if such reversal does exist.