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(a) WRITTEN REPORTS:

(1) Operations Report

Number: _____

(2) Interpretation Reports

Number: 1

-SEISMIC INTERPRETATION REPORT

(b) MAPS:

(1) Shotpoint Maps

Number: _____

(2) Interpretation Maps

Number: 3

-CANOL TIME STRUCTURE
-HUME TIME STRUCTURE
-CANOL TO HUME ISOCHRON

(3) Other Maps

Number: _____

(c) SEISMIC SECTIONS

Number: _____

PROJECT ACTION SHEET

RESOURCE EVALUATION BRANCH

PROJECT NUMBER:..... 8229-840-1P 9227 ⁷ CSS-10A

COMPANY:..... CANTERRA ENERGY LTD

REPORT TITLE:..... INTERP. NORMAN WELLS FORT GOOD HOPE AREA

The following action has been taken:

Receipt acknowledged NO

Reports and maps date-stamped YES

Memo sent to Land Management

Reports for review list edited YES

Inventory sheet made YES

Mylar NO

REVIEW AND APPROVAL made by:

L. Richards oct/86

COMMENTS:

Canada Oil
 Administ
 JUL 2 1986
 Direction
 Ressources
 Project #

Seismic Interpretation

**Norman Wells Fort Good Hope Area
Northwest Territories**

1985

Operator: Canterra Energy Ltd.
Data: Purchase of MacKenzie Plain (1985) Program
From Sigma Exploration Ltd.

COGLA Program: #9229-S40-1P

Author of Seismic Interpretation

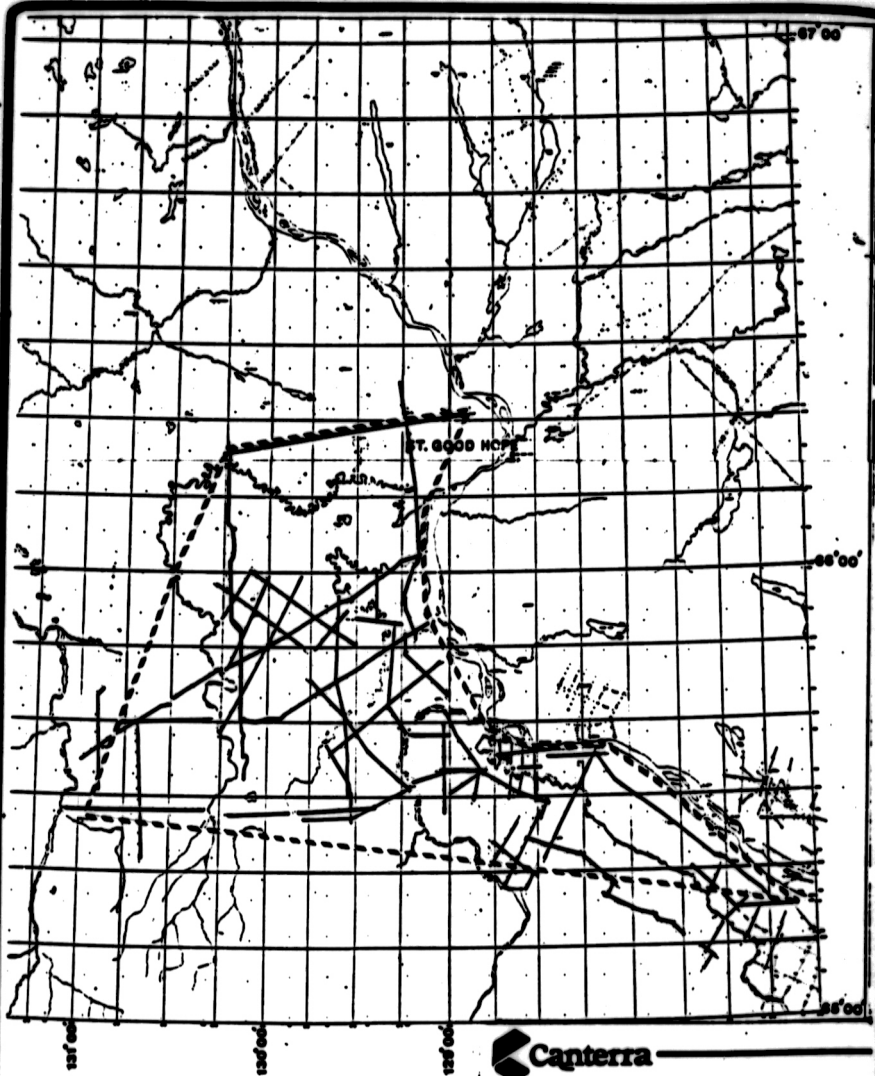
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May 1986

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 **Canterra**

Area Study May, 1986

**MOUNTAIN
RIVER**

Geophysical Assessment of the Mountain River Area

Purpose

The purpose of the Mountain River study was to determine if seismic data could be used to define the extent of the major Kee Scarp reef complex, to try to define separate reef atolls or pinnacles, and to try to define the tight and porous reef facies by the study of the seismic character.

Scope

The study area referred to as the Mountain River area is encompassed by a line from Norman wells west to the Ramparts I-77 well, north to latitude 66°16' and longitude 130°15', east to the Manitou Lake L-61 well, and south along the west bank of the MacKenzie River, back to Norman Wells.

Data

The 1985 Sigma participation survey was used as part of the broad reconnaissance seismic grid, infilled with various vintages of older in-house data.

The 1985 Sigma survey was shot using the following parameters:

- 120 trace split spread, 9 geophones per trace, over 25 metres
- 100 metre source spacing
- 2 nine-metre holes spaced at 25 metres
- 1 kg charge in each hole
- 1500% subsurface coverage

The various data sets were all corrected to the same datum of 400 metres above sea level and the same correction velocity of 3700 metres per second as used on the Sigma 1985 data. The polarity varied between the various data sets and the weathering corrections were all calculated differently, but by using a bulk shift of minus .025 seconds to the older data, all the ties were reasonable. The weathering changes over the area are very great and even on the Sigma 1985 data there is the occasional static shift.

The map that is used as the key indicator for the possible occurrence of Kee Scarp reef development is the Canol to Hume isochron. This isochron is based on the correlation of two fair to good seismic

reflectors that can be mapped over most of the area. The Canol to Hume isochron thickens are areas of potential Kee Scarp reef development, but could also be areas containing anomalously thick Canol or Hare Indian section. In the Canol to Hume isochron thin areas, there may be only Kee Scarp platform, thin Canol, or thin Hare Indian section.

The two time/structure maps of Canol and Hume show the present structural attitude of the formations. The Canol reflector is fair to good over most of the area with the exception of the northeastern portion where the Canol is very shallow or eroded by the pre-Cretaceous unconformity. The Hume is the best reflector in the sequence and therefore the structure based on this reflector is the best approximation of the present-day structural relief of the reef and associated formations.

Conclusions and Recommendations

The seismic data shot in 1985 in the Mountain River area has sufficient resolution to be able to map the extent of the major Kee Scarp reef complex. The reefal interval, with its high velocity, has only a thickness of .050 to .065 seconds two-way time. No good template lines were shot over a porous reef in the Norman wells field, so no direct comparison could be made between porous and tight Kee Scarp reef. If the porosity change or the amount of porosity is great enough, a different seismic signature should be detectable.

To the west of the north-south barrier reef, pinnacle reefs may exist and a closer seismic grid would be required to map their location.

In the study area of approximately 1.05 million hectares, a total of 1,311 kilometres of seismic was utilized. This averages out to one kilometre of seismic for every 801 hectares or about seven miles per township.

In any future detailed study within the area, all the seismic data should be processed in a similar manner to enable character correlation maps to be made. The character maps of the Kee Scarp, Hare Indian, as well as the Hume reflectors, would greatly assist in the mapping of reefal changes.

Discussion of Maps

1. Canol Time Structure Map:

The Canol time structure map is based on the correlation of the shallowest seismic reflector that is present over most of the area.

2. Hume Time Structure Map:

The most consistent seismic reflector that can be correlated over most of the area is the reflector that originates at or near the top of the Hume Formation in the lower middle-Devonian section. The time structure of the Hume ties all the wells that penetrated the horizon.

The time structure of the Hume displays a monoclinial south-southwest dip that is interrupted by a thrust fault or faults in the area from the Ramparts A-59 well through the Whirlpool H-73 well to the area to the north of the Carcajou L-24 well. The second fault trend exists further south in front of the Powell Creek structure. In the Hoosier N-22 well area, a transform fault, as well as thrust faults, complicate the structural grain.

No Hume reefs have been mapped in the area, but it is highly likely that reefs could exist and be missed by the coarse reconnaissance seismic grid that was shot in the area.

3. Canol to Hume Isochron Map:

Canol to Hume isochron is a good indicator for the presence of or absence of Kee Scarp reef. The two reflectors that are used for the isochron are generally fair to good. The negative aspect of using this isochron as a direct measure of the Kee Scarp reef thickness is the possible changes in thickness of the Canol and/or the Hare Indian. The Canol to Hume isochron displays a thick area from the Airport Creek D-72 well south to the Carcajou L-24 well, then breaking up into isolated thick areas to the southeast. The Canol to Hume isochron value of over .135 seconds two-way time has the potential of having some Kee Scarp reef buildup. In the area to the west of the postulated barrier reef buildup, the isochron values vary from .110 to .130 seconds two-way time and probably indicate an area of only Kee Scarp reef platform. Further to the west near the Ramparts A-59 well, the change in isochron to less than .100 seconds two-way time is possibly the result of the Hare Indian thinning, as well as the edge of the Kee Scarp platform.

In any future work in the area, a template line should be obtained over the producing Norman Wells reef to calibrate the seismic response to a porous reef section.

Respectfully Submitted

R.M. Probst

