

CELIBETA

Geophysical Report

**CELIBETA, N.W.T.**

CELIBETA N.W.T.

Lat: 60 deg. 00 min. to 60 deg. 10 min. N  
Long: 122 deg. 00 min. to 122 deg. 15 min. W

|                        |   |
|------------------------|---|
| Program Number         | 9229-N10-10E  |
| Operator's Report Name | Northcor Bovie/Celibeta<br>Seismic Program 1984     |
| Type of Survey         | Reflection Seismic                                  |
| Survey Locality        | Northwest Territories                               |
| Year of Field Work     | 1984  |
| Operator               | Northcor Energy Ltd.,<br>Calgary, Alberta           |
| Prime Contractor       | Sefel Geophysical Ltd.,<br>Calgary, Alberta         |
| Exploration Agreement  | E.A. No. 168  |
| Author of Report       | Empress Exploration Consultants<br>Calgary, Alberta |
| Date of Report         | December, 1984                                      |
| Commencement of Survey | March 2, 1984                                       |
| Completion of Survey   | March 22, 1984                                      |

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ENCLOSURES

1. Seismic Shot Point Map
2. Seismic Sections: one pre-fold paper copy and  
one film copy for Lines NCL 1-9,  
NCB-37, NCB-39, NCB-41
3. Interpretive Maps: one pre-fold paper print of each

Time Structural Maps:

- Top Devonian
- Tetcho
- Jean Marie
- Near Top Slave Point
- Chinchaga/Basal Sandstone

Isochronal Maps:

- Tetcho to Near Top Slave Point
- Near Top Slave Point to Chinchaga/Basal Sandstone

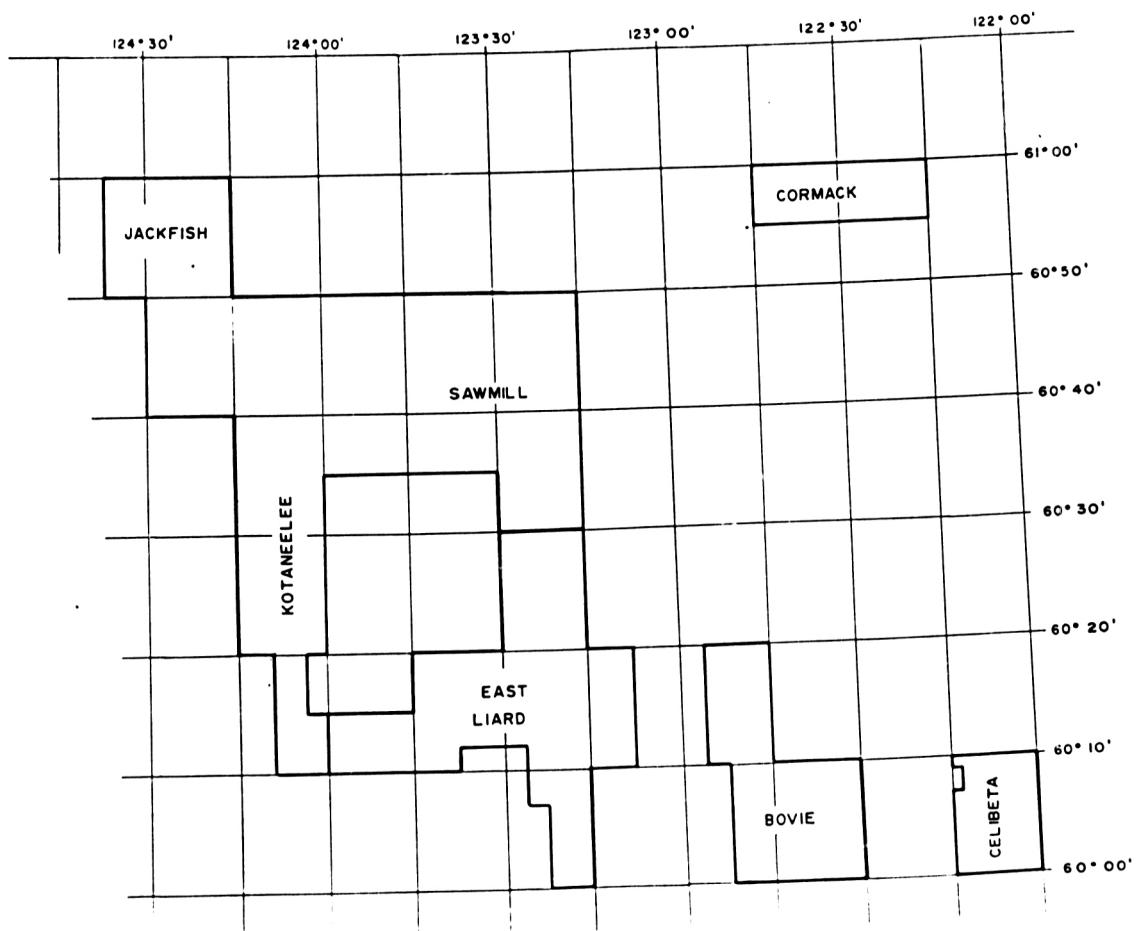
#### INTRODUCTION

The Prospect lies immediately north of the southern boundary of the Northwest Territories, some 140 kilometers north of Fort Nelson B.C., and some 70 kilometers southeast of Fort Liard, N.W.T.

The survey was undertaken to study the geological section of the Area, primarily the attitude and nature of the Slave Point and to determine the presence of a Carbonate front. The association of the H-78 test to the general configuration of the Celibeta High was to be ascertained.

Party 506 of Sefel Geophysical Ltd., under the direction of Empress Exploration Consultants, Calgary, Alberta, began recording operations March 10, 1984. A total of approximately twenty-one (thirteen recording) days were worked, during which time one hundred and seventy-two kilometers of twelve hundred percent CDP continuous sub-surface coverage were surveyed. Field work was completed March 22, 1984. The data were processed by Sefel Geophysical Ltd., Calgary, Alberta.

Reflection quality is good. The character, amplitude and definition of most events are correlative.



#### STATISTICAL SUMMARY

Tractors arrived at the program site March 2, 1984, drilling began immediately upon completion of the Bovie assignment and recording commenced March 10, 1984. The field survey was completed March 22, 1984 - a total of twenty-one days being worked, of which thirteen were recording days.

Forty-three Canadian personnel - the total field complement - were employed on the program.

#### Basic Crew

- 1 - Party Manager
- 1 - Clerk
- 1 - Mechanic
- 3 - Camp Staff (Cook, Helper and Camp Attendant)
- 4 - Survey Crew
- 1 - Observer
- 1 - Junior Observer
- 1 - Shooter
- 1 - Shooter's Helper
- 4 - Line Truck Drivers
- 8 - Recording Helpers
- 4 - Drillers
- 4 - Drill Helpers
- 2 - Water Truck Drivers
- 4 - Cat Skinners
- 1 - Tractor Operator
- 1 - Cat Foreman
- 1 - Cat Supervisor

One hundred and seventy-two kilometers of seismic coverage were obtained, the daily production averaging thirteen kilometers. No delays were experienced.

The muskeg-covered terrain is comprised of rolling hills which, at times, resulted in a slowing of normal vehicular movement. Sufficient ice accumulated on the lakes and rivers to allow safe travel for equipment and air-servicing.

The weather remained reasonably cold, winds relatively light and snowfall average. No weather-related delays were experienced.

f. DESCRIPTION OF DATA ACQUISITION EQUIPMENT AND FIELD PROCEDURES

(see also the attached section label)

energy/source array: 2 kg dynamite charge in a single hole 11 m deep, holes spaced 100 m apart in-line with spread

detector type/array: 10 Hz Mark L-15 geophones using an in-line pattern grouping 9 geophones at 3 m intervals in a symmetrical split spread 1200 m - 25 m x 25 m - 1200 m with groups 25 m apart

recording system: 96 channel MDS-10 recording instrument employing the SEGB format recording 4 seconds of data at 2 ms sampling interval. The recording filter was 12/18 - 172/72 Hz.

g. DESCRIPTION OF DATA PROCESSING

(see also the attached section label)

1. Seismic Reflection

- demultiplex with gain removal, 2 ms sample rate
- instrument and geophone phase compensation
- CDP trace gathers - (1200%)
- gain application
- spiking deconvolution; 60 ms operator,  
1% pre-whitening, window 200-1650 ms
- weathering statics; datum 500 m above sea level,  
weathering velocity 610 m/sec.
- datum velocity 3700 m/sec.
- velocity analysis
- normal move-out
- automatic residual statics -  
(300-2000 ms window, + - 20 ms lag)
- common offset stack
- residual NMO
- mute
- stack - (1200%)
- wave equation migration
- bandpass filter - (10/20 - 60/70 Hz)
- trace equalization - (400 - 2000 ms window)

## FIELD RECORDING

|                     |                        |
|---------------------|------------------------|
| DATE SHOT           | SEFEL GEOPHYSICAL LTD. |
| SHOT BY             | PARTY NO. 506          |
| SOURCE TYPE         | DYNAMITE               |
| SOURCE PATTERN      | SINGLE HOLE            |
| CHARGE              | 2 KG AT 11 M           |
| GEOPHONE TYPE       | GEOSPACE 10 HZ         |
| GEOPHONE PATTERN    | 9 AT 3 M INTERVALS     |
| DATA CHANNELS       | 96                     |
| GROUP INTERVAL      | 25 M                   |
| SHOT POINT INTERVAL | 100 M                  |
| SPREAD GEOMETRY     | 1200-25-X-25-1200      |
| INSTRUMENT TYPE     | MDS-10                 |
| TAPE FORMAT         | SEG B                  |
| FIELD FILTER        | 12/18-125/72 HZ/DB     |
| NOTCH               | OUT                    |
| SAMPLE INTERVAL     | 2 MS                   |
| RECORD LENGTH       | 3 SEC                  |

## DIGITAL PROCESSING

|  |                        |
|--|------------------------|
| 1 DEMULTIPLEX WITH GAIN REMOVAL        |                        |
| PROCESSING SAMPLE RATE                 | 2 MS                   |
| 2 GEOMETRY                             |                        |
| 3 AUTOMATIC GAIN CURVE APPLICATION     |                        |
| 4 INSTRUMENT PHASE COMPENSATION        |                        |
| 5 GEOPHONE PHASE COMPENSATION          |                        |
| 6 SPIKING DECONVOLUTION                |                        |
| OPERATOR LENGTH                        | 60 MS                  |
| OPERATOR DESIGN WINDOW                 |                        |
| MIN OFFSET                             | 200-1650 MS            |
| MAX OFFSET                             | 850-2300 MS            |
| PREHIGHLIGHTING                        | 1 PERCENT              |
| 7 EQUALIZATION                         |                        |
| 8 WEATHERING CORRECTIONS               |                        |
| DATUM ELEVATION                        | 500 M ASL              |
| DATUM VELOCITY                         | 3700 M/SEC             |
| WEATHERING VELOCITY                    | 610 M/SEC              |
| 9 AUTOMATIC RESIDUAL STATIC            |                        |
| WINDOW                                 | 500-1700 MS            |
| MAX. CORRELATION LAG                   | + 40 MS                |
| 10 VELOCITY ANALYSIS                   |                        |
| 11 NORMAL MOVEOUT                      |                        |
| 12 AUTOMATIC RESIDUAL STATIC           |                        |
| WINDOW                                 | 300-2000 MS            |
| MAX CORRELATION LAG                    | + 20 MS                |
| 13 COMMON OFFSET STACK                 |                        |
| 14 RESIDUAL NMO                        |                        |
| 15 MUTE                                |                        |
| 16 STACK                               |                        |
| 17 BANDPASS FILTER                     | 10/20-60/70 HZ         |
| 18 EQUALIZATION                        |                        |
| WINDOW                                 | 400-2000 MS            |
| 19 TIME DOMAIN WAVE EQUATION MIGRATION |                        |
| 20 FILM DISPLAY                        | 16 TR/IN<br>7.5 IN/SEC |
| POLARITY (1) NORMAL (1) REVERSE        |                        |

PROCESSING PARAMETERS SELECTED BY  
EMPRESS EXPLORATION CONSULTANTS

2. Gravity not applicable

3. Magnetics not applicable

h. SEISMIC SHOT POINT MAP - enclosed

i. PROCESSED SECTIONS

one paper pre-fold copy and one film copy  
of sections for Lines:

|       |        |
|-------|--------|
| NCL-1 | NCL-7  |
| NCL-2 | NCL-8  |
| NCL-3 | NCL-9  |
| NCL-4 | NCB-37 |
| NCL-5 | NCB-39 |
| NCL-6 | NCB-41 |

j. BATHYMETRY not applicable

k. INTERPRETIVE MAPS

time structural maps:

- Near Top Devonian
- Tetcho
- Jean Marie
- Slave Point
- .- Chinchaga/Basal Sandstone

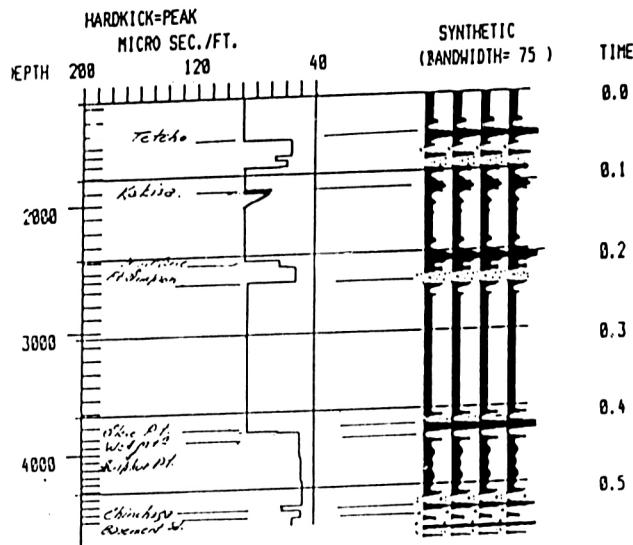
isochronal maps:

- Tetcho to Slave Point
- Slave Point to Chinchaga/Basal Sandstone

1. RELATED INTERPRETIVE INFORMATION

A synthetic seismogram for the Dome Pan Am CSP Celibeta C-77 well (Lat: 60 deg. 06 min. 12 sec. N, Long: 122 deg. 14 min. 29 sec. W) was prepared and is presented below:

SONIC LOG AND SYNTHETIC  
WELL NAME DOME PAN AM CSP [CELIRETA C-77]  
LOCATION 60, 6, 12/ 122, 14, 29  
PROV/ST MNT  
1st DEPTH 1150  
LST DEPTH 5800  
KB 1581.5  
SD 0



#### DISCUSSION OF STUDY

The Celibeta anticline is the predominant feature - its relief diminishing slightly in the shallower horizons. An increase in the incidence of faulting is noted in that area between the Celibeta and Bovie Prospects.

The Slave Point structural map exhibits several narrow northeast trending features similar to and associated with that anomaly successfully tested by the H-78 well. A Slave Point Carbonate ledge is crossed at Shot Point 157 Line NCL-9 and at Shot Point 637 Line NCL-3; no further delineation is noted. Additional Celibeta-High flank anomalies are shown on Line NCB-39 Shot Points 697 to 737 and on Line NCB-37 Shot Points 933 to 1000.

The following Jean Marie anomalies exist:

- a) Line NCL-1 S.P. 229 to 313: a build-up at the top (rather than within) of the section - possibly porous  
S.P. 583 to 618
- b) Line NCL-2 S.P. 563 to 618: also indicating a "soft" Jean Marie top
- c) Line NCL-3 S.P. 483 to 575  
S.P. 600 to 644
- d) Line NCL-7 S.P. 130 to 197
- e) Line NCL-8 S.P. 443 to 489
- f) Line NCL-9 at S.P. 179 : an increase in section
- g) Line NCB-37 at S.P. 753: Jean Marie shaling out

COMMENTS AND CONCLUSIONS

The continuous Slave Point Carbonate front, extending northward from Petitot, does not traverse the Celibeta Block. The phenomena shown on Lines NCL-3 and NCL-9 represent localized Carbonate edges.

The increase in faulting in that area between the Celibeta and Bovie blocks, as shown by the relatively incompetent upper Devonian and later bedding, is a result of the growth of the anticline in Devonian times. Although the major feature frequently increased and decreased in relief, it is believed to have remained a positive.

The narrow Slave Point anomalies at the crest of the Celibeta anticline, in the vicinity of the H-78 test are considered good. Detailed seismic would be necessary to determine the structural axis and extent of each feature.

The Jean Marie anomalies described may be reefal or may be bar-type limestone accumulations. Their general characteristics suggest the latter explanation, but further geological studies are warranted.

The "Basement" in this Prospect is sedimentary - and therefore may consist of conformable Devonian clastics. Geologically it is difficult to differentiate the Chinchago from the Basal Sandstones.

  
N.E. Klinck, P. Eng.  
Empress Exploration Consultants