

15-6-4-9
SEISMIC REFLECTION SURVEY
See Report No. 10 for maps
UNION OPTION PROSPECT

NorthWest Territories
N.E.Klinck & Associates Ltd. Calgary
Scoury Rainbow Oil Ltd.

Abstracted for
Geo-Science Data Index

Date _____

UNION OPTION PROSPECT

Lat. $60^{\circ}50'$ to $61^{\circ}00'N$ Long. $120^{\circ}15'$ to $121^{\circ}00'W$

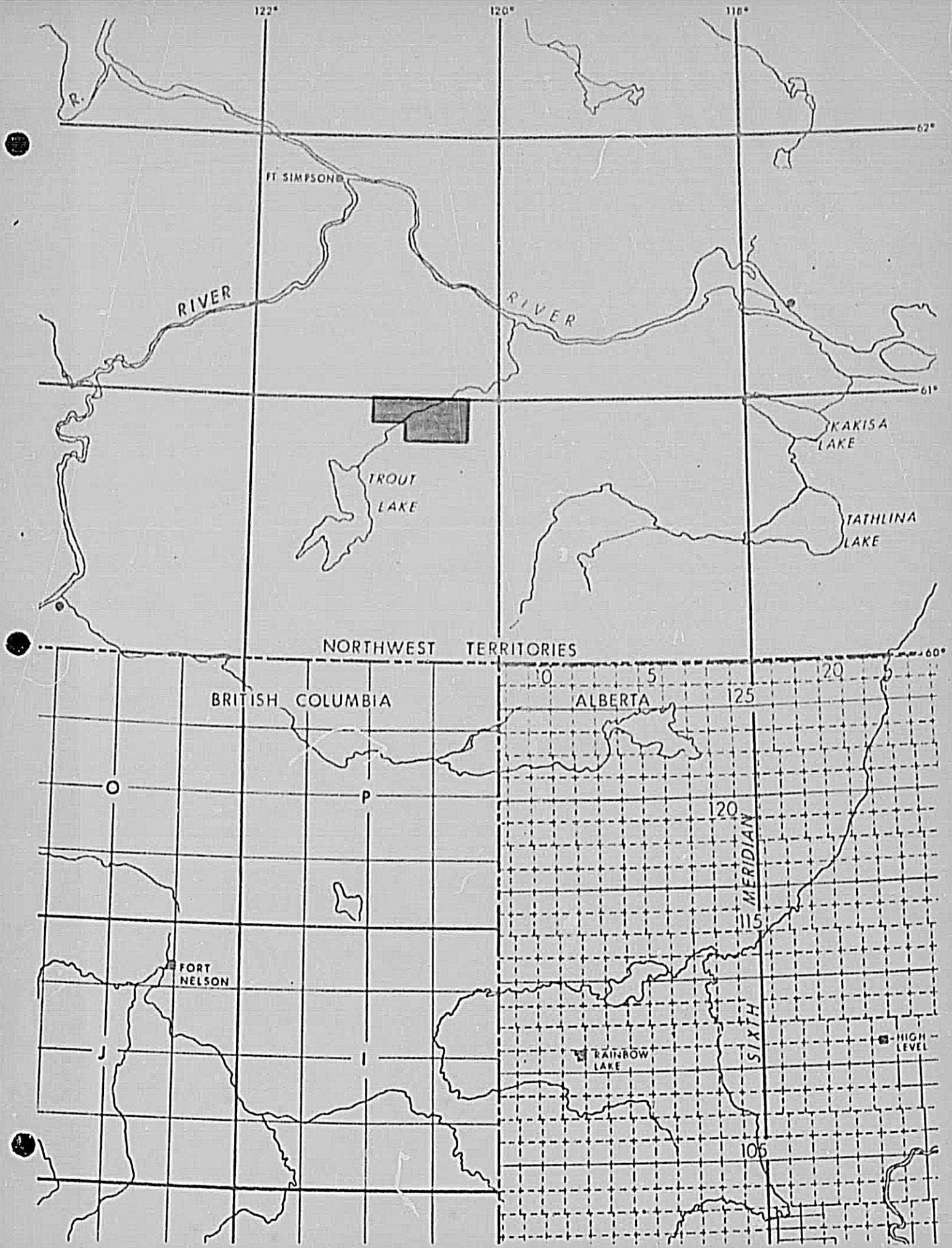
SEISMIC REFLECTION SURVEY

- May 1970 -



N.E. Klinck & Associates Ltd.

CALGARY, Alberta



UNION OPTION PROSPECT

Lat. 60°50' to 61°00'N Long. 120°15' to 121°00'W

The prospect lies in that part of the Northwest Territories approximately seventy miles south of the Town of Fort Simpson and approximately twenty-five miles northwest of Trout Lake.

The survey was undertaken to study anomalous subsurface conditions, primarily the Devonian.

Party 102 of Globe Universal Sciences Ltd. (formerly Centennial Geophysical Co.) under the supervision of N.E. Klinck & Associates Ltd., Calgary, Alberta, began field operations in January, 1970. A total of twenty-one days were worked during which time approximately one hundred and fifteen miles of six hundred percent CDP continuous subsurface coverage were surveyed. Field work was completed in March, 1970.

Record quality remained good over the Area. The character and definition of the Mississippian (where not eroded), the Tetcho, and the Slave Point energy returns remained consistently strong and correlative; the Jean-Marie Event did not exhibit consistency. A Basement reflection was not recorded although at times, an energy return from this zone is suspected.

R E S U L T S

The results of the survey are presented in the form of the following:

Tetcho Structural Time Map

Slave Point Structural Time Map

Tetcho to Slave Point Isochronal Map

One set of CDP Flattened Sections (Flattened at the
TETCHO)

One set of CDP Structural Sections

One set of Computational Control Hand Sections

The Mississippian erosional edge exists within the area, at the southern end of the surveyed lines; although the Mississippian occasionally appears, it is too shallow to map.

A prominent east-west strike is exhibited in conjunction with a sixty feet per mile dip by the Tetcho structural time presentation; a more irregular strike and dip in the fore-reef area by the Slave Point structural map is indicated.


In general, the Tetcho Structural Time Map is not anomalous save for a positive feature on Line 12 between Shot Points 647 and 657. The Slave Point Structural Time Map depicts the main reefal edge quite clearly, an outlier with approximately one hundred feet of relief being suggested by Lines 15, 15½, and 16. Positive on-reef rim anomalies are shown to exist along the entire reefal front. The Tetcho to Slave Point Isochron substantiates the structural presentations and in addition suggests a build up on the reef on Line AJ (previously shot and processed by Union Oil Co.) of some two hundred feet.

CONCLUSIONS

As noted in previous reports for adjacent areas, the absence of a reliable basement reflection poses a difficulty in determining the origin and age of the anomalies noted. However, as the feature on Lines 15, 15½, and 16 is not expressed by either the Tetcho or the Isochronal Maps, its origin is concluded to be basal movement post Tetcho time.

The necessity of manufacturing structural sections is illustrated by the possible reefal build-up at Shot Point 494 to 500, Line 13, suggested by anomalous thinning of the Tetcho to Slave Point interval. Actually, the feature is a Mississippian and Tetcho low.

No anomalous reefal conditions are concluded to exist in the area other than the main reef mass to the south. In view of known gas accumulation in positive features within the reef mass (Celibeta, Island River, etc.), the near rim anomalies could be of interest. These would require detailing.


N.E. Klinck P. Eng.

EVALUATION OF DATA

REFLECTION IDENTIFICATION

The geological identification of the events recorded is based upon a study of the following:

Murphy B.O.C. Muskeg River #1 Lat. $60^{\circ}43'38''$ N.
Long. $122^{\circ}03'45''$ W.

Murphy B.O.C. Arrowhead River #1 Lat. $60^{\circ}50'22''$ N.
Long. $122^{\circ}05'50''$ W.

The data acquired during the winter of 1968-69 allows correlation of this Area to that of the above wells.

SURFACE TOPOGRAPHY

The Area has a consistant northeast slope. The elevation ranging from 1000 feet asl to 1475 feet asl.

The surface does not necessarily express the subsurface attitudes.

NEAR SURFACE VELOCITIES

The weathered zone appears to be minimal. The sub weathering velocities measure 6,000 to 7,000 feet per second.

DEPTH CONVERSION FACTORS

The average velocity to the Tetcho Reflector approximates 10,000 feet per second (i.e. 0.010 seconds represents 50 feet); to the Slave Point Reflector approximates 12,000 feet per second (i.e. 0.010 seconds represents 60 feet). The interval velocity for the Tetcho to Slave Point section measures 12,000 feet per second (i.e. 0.010 seconds represents 60 feet).

COMPUTATIONS

All mapped and cross sectioned data, unless otherwise noted, have been referred to an arbitrarily chosen datum of 1,000 feet above sea level by employment of 9,000 feet per second correlational velocity.

To determine the time and depth required to be removed to refer the data to that plane where the datum velocity of 9,000 feet per second commences, the following formulae were used:

$$tw = \frac{t2}{2 \cos \theta} + \frac{tuh}{2}$$

$$dw = ds + V1 (tw - tuh)$$

where: tw = time in seconds to datum velocity

$t2$ = datum velocity intercept in seconds

tuh = up-hole time in seconds

dw = depth in feet to datum velocity plane

ds = shot hole depth in feet

$V1$ = initial velocity in ft./sec.

θ = angle whose sine = $V1/Vd$

COMPUTATIONAL HAND SECTIONS

To ensure complete control of the weathering etc. computations, permanent type hand sections were manufactured showing surface elevations, drift computations and plot of drift, and a plot of a control (flattened) horizon obtained by applying the total computational corrections derived for each and every shot point to the raw time picked from the NMO displays.

This permanent type control section is rolled with the respective film section.

In addition, each flattened film section indicates the surface and the structure of the flattened event for each shot point; each structural film section indicates the surface for each shot point.

F I E L D P A R A M E T E R S

| | |
|--------------------------------|--|
| <u>INSTRUMENTATION</u> | digital, binary gain, 9 track, Geospace |
| <u>GEO PHONES</u> | 14 cps digital grade |
| <u>GEO PHONES / TRACE</u> | 8 at 15 feet intervals |
| <u>SPREAD</u> | 2640 - 0 - 2640 feet |
| <u>GEOPHONE GROUP INTERVAL</u> | 220 feet |
| <u>SHOT POINTS/MILE</u> | 12 |
| <u>DEPTH OF HOLE</u> | 45 feet |
| <u>CHARGE</u> | 1½ pounds |
| <u>STACK</u> | 600% |
| <u>EXPERIMENTATION</u> | single, two, and three hole in line patterns, varying hole spacing (30', 50', 75'), varying charges (¼ to 10 pounds), varying spreads. |

PLAYBACK PARAMETERS AND SEQUENCE

| | |
|-------------------------|---|
| CENTRE | CDP COMPUTER DATA PROCESSORS LTD., CALGARY, ALBERTA |
| NMO CURVE DESIGNED | |
| DATA DEMULTIPLEXED | |
| BINARY GAIN APPLICATION | |
| NMO APPLICATION | |
| DECONVOLUTION | |

DIGITAL FILTERING

STATICS PICKED FROM PAPER DISPLAY

SEQUENTIAL TRACE MUTING

RESIDUAL NMO AND STATICS, if and where required

GATHERSTAC

FLATTENED PAPER DISPLAY (for checking above procedures)

TIME VARIANT TRACE SCALING

TRIM STATICS, if and where required

STATIC APPLICATION FOR STRUCTURAL SECTION

FILM DISPLAY OF FLATTENED SECTION

FILM DISPLAY OF STRUCTURAL SECTION