

REPORT OF A SEISMOGRAPH SURVEY

CORBACK LAKE AREA

(PERMIT 1311)

NORTHWEST TERRITORIES CANADA

for

CANADIAN HUSKY OIL LTD.

CALGARY, ALBERTA

Submitted By:

SEISMOTECH LIMITED.

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PREFACE

The area surveyed lies between Latitudes $60^{\circ}55'$ and $61^{\circ}05'$ and Longitudes $121^{\circ}25'$ and $121^{\circ}45'$, and immediately north of Cornack Lake in the Northwest Territories.

The main objectives of the survey were to observe any anomalous occurrences in the Slave Point zone and to complement a previous survey of the area, the map results of which have been duplicated and included with this report.

A total of 65 shot points providing 21 miles of continuous subsurface coverage was achieved by Seismotech Limited Field Party No. 91 under the direction of James Dutchak during the period March 14 to March 26, 1963. Three-hole patterns were necessary to achieve desirable record quality and because near-surface gravel was encountered this somewhat curtailed production. Long refractions were shot at all locations to determine the base of drift. The crew complete with interpreter and computers was located in a trailer camp at the edge of Cornack Lake on the Simpson Trail.

REFLECTIONS AND REFLECTION IDENTIFICATION

The following maps accompany this report:

- (1) Surface Topography
- (2) "C" Horizon (assumed to be Upper Devonian reflection representing the 2nd Limestone or Island River member of the Alexandria Formation)
- (3) "D" Horizon (possibly Slave Point)
- (4) "C" - "D" Isochron.

The "C" Horizon is represented by a reflection of good continuity and stable character and is the best reflection noted on the survey. There are several continuous reflections noted above the "C" horizon but few continuous reflections are observed in the interval between the "C" and "D" horizons. The "D" reflection is difficult to resolve on some records, but is of generally fair quality.

The identification of the "C" and "D" horizons mapped on the previous survey can be in error. The "C" horizon which is assumed to be the Top of the Devonian is believed to be either the 2nd Limestone or the Island River member of the Alexandria formation or equivalent. The reasons for this belief are:

1. The Devonian outcrops 20 miles north of the prospect and if the normal dip of the area is projected it would put the top of the Devonian much higher than the reflection "C".
2. A reflection above the "C" horizon in the projected zone of the top of the Devonian with the characteristics of an eroded surface has been observed while the Horizon "C" has none of the character changes that are coincident with an eroded surface.
3. Well information projected from north and east of Trout

Lake supports the belief that the top of the Devonian is higher in the section.

The "D" reflection represents a zone in the vicinity of the Slave Point based on intervals north and east of Trout Lake.

RESULTS AND CONCLUSIONS

This complementary survey has, in effect, covered the eastern half of Permit Block No. 1311. Steep south dip through this Permit is present at both mapping horizons. The intermediate section ("C" to "D") thins to the south, or in the down dip direction.

The survey has not isolated any anomaly but the suggestion of a high conjectural nose is accompanied by a slight thinning in the vicinity of Shot Points S-28 and S-29. This is flanked on the east by a conjecturally sharp syncline at the "D" horizon and a slight thickening of the interval "C" to "D".

At the northeast extremity of the survey the isochron data increase by .038 second between Shot Points S-11 and S-23, a distance of approximately 4 miles. This change can be considered rapid enough to account for a Middle Devonian reef edge, dipping apparently northward. Although there is no overall continuity in the reflections arriving below the "D" event, there can be found some not unconvincing support of this reef theory by the sporadic dips which are associated with events from the relative Presquite level (within .120 second of the "D" reflection), on the galvanometer-density sections accompanying this report. The reader is referred to the displays of dip on these "Presquite" events at the following shot point locations:

- (1) S-17 down to S-22
- (2) S-64 down to S-67
- (3) S-28 down to S-31.

It is the writer's opinion that these events are not multiple reflections, although multiple reflections of later arrival times are in evidence.

RECOMMENDATIONS

It is respectfully suggested that the results of the original survey be transmitted to galvanometer-density sections in order to investigate the possibility of Slave Point reef presence and the more subtle occurrences at pre-Slave Point reflection times.

OPERATIONS

Recording.

Split continuous profiles were shot at all locations utilizing 1800 foot geophone cables. A 24 trace set of SIE GA-11 amplifiers and oscillograph were used in conjunction with an Electro-Tech DS-7 bias-type tape recorder. Nine EVS-2B 28 cps. geophones spaced fourteen feet apart astride flags placed at 150 foot intervals were employed throughout the survey.

The time break and uphole break were recorded on traces 17 and 18 respectively. Spreads were shortened where necessary by simply reducing the number of geophone stations.

Magnetic tapes were recorded on a 1-20-92 filter, straight circuit, fast AVC and 100% gain.

As was requested by Canadian Superior Oil of California Ltd. a shot of 5 to 10 lbs. of dynamite, 1-20-64 filter, straight circuit, fast AVC, 50 to 70% gain without magnetic tape recording was recorded at each location.

The playback system allowed the procurement of a normal moveout corrected record on an O-64 filter, fast AVC and 20% bilateral resistive mix.

Normal moveout corrected playbacks with the "C" horizon flattened were made through a variable density galvanometer on an O-64 filter, fast AVC and 20% bilateral resistive mix. These were laid in-line to form variable density galvanometer record sections.

Three-hole patterns were dug to fifty feet at all locations. Optimum records were obtained by using fractional charges in three holes

in the 40 to 50 foot range.

Surveying

The surveying was initiated from SP E-6B of the previous survey, and all lines were either run back on themselves or loops closed to ensure vertical control of less than three feet on all traverses. A determination of azimuth was also effected from a star shot of Polaris.

The survey was executed by Gurley Transit and chain.

All geophone stations and shot points were chained and flagged.

Drilling

Two truck-mounted Mayhew 1000 rotary drilling rigs complete with two 650 gallon capacity water trucks were used on the project.

Water for drilling purposes was obtained from Cornack Lake and Poplar Creek.

Muskey 0-5, clay and boulders with sand gravel seams to 50 feet comprised the usual drilling medium.

Three-blade, insert type finger bits, and three-cone rock bits were found satisfactory for drilling.

Blind hole conditions required the use of bran and mud as drilling additives.

Computing

All records were referred to a datum plane of +1000 feet above sea level by a correctional velocity of 9000 feet per second.

Split shots failed to penetrate the base of the drift which has a velocity of 6500 feet per second, making it necessary to shoot

long refractions. A drift computation was effected by calculation using first arrival information in the following formula:

$$t_w = \frac{l}{2\cos\theta} + \frac{t_{uh}}{2}$$

where

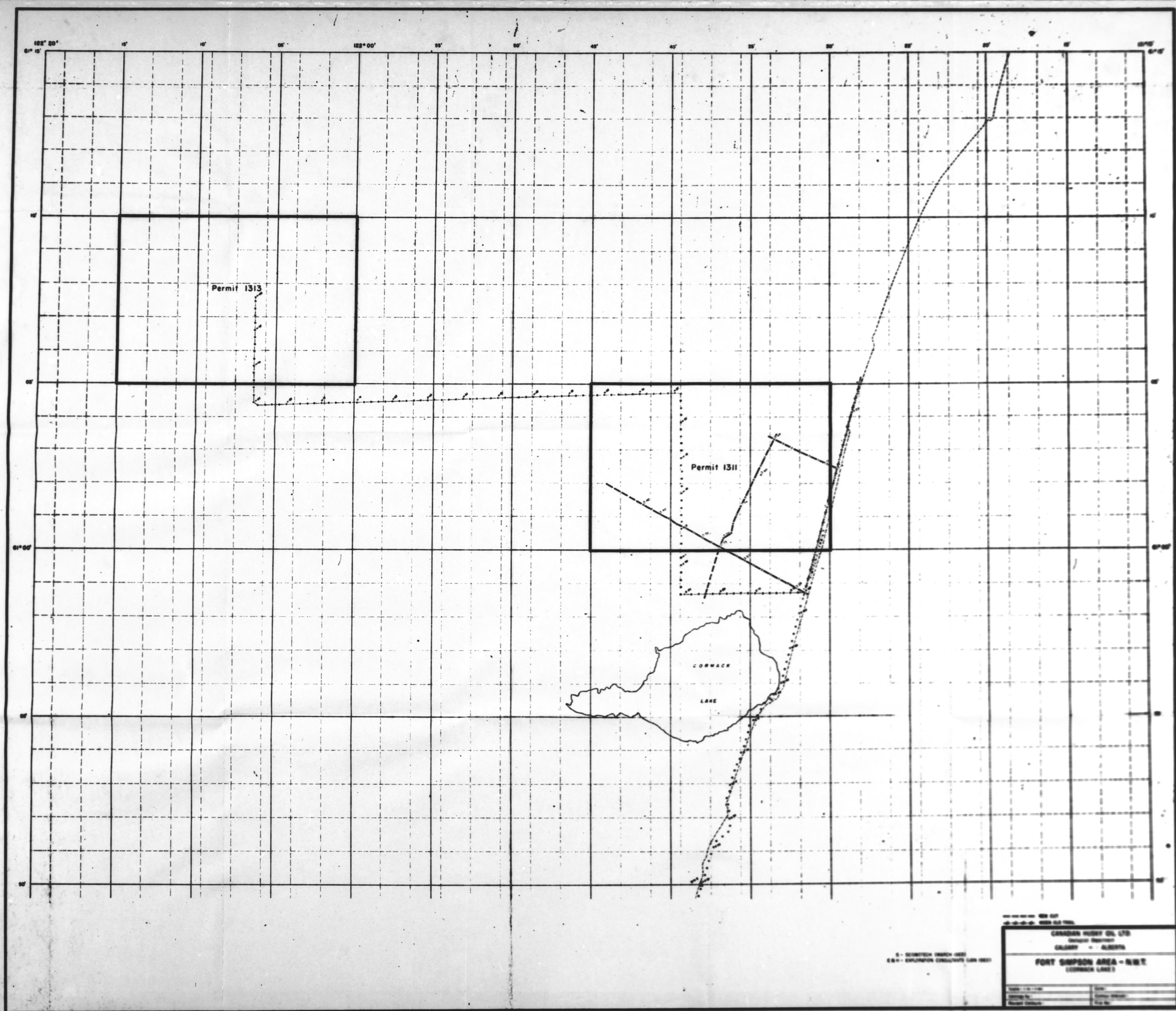
t_w = time from surface to base of drift.

t_1 = the intercept at the origin of the sub-drift

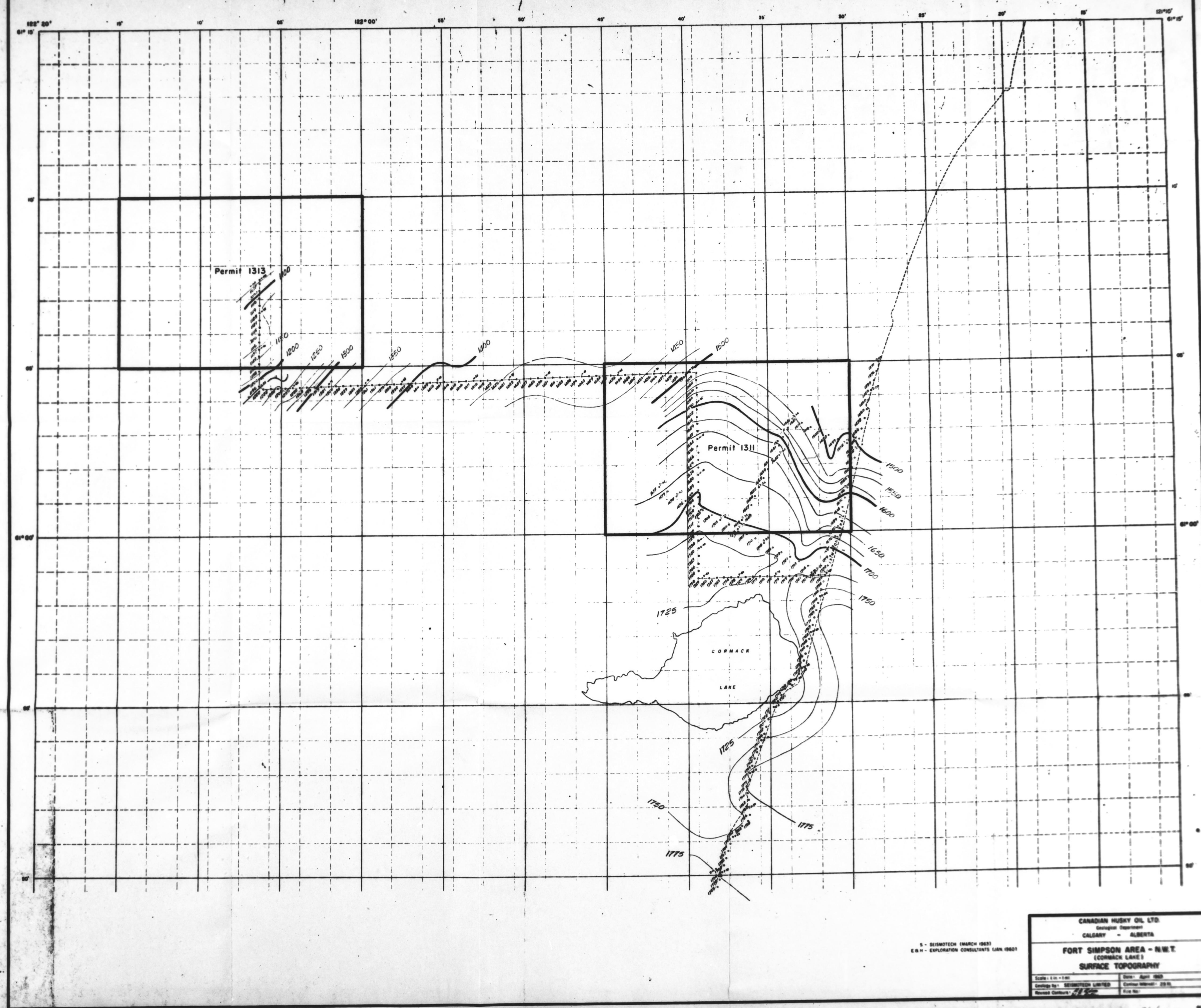
velocity taken from a time distance plot of the first arrivals of each profile.

All seismograms have been corrected to the 1-20-92 filter considered the "base" filter in this project.

A quasi-factor of +0.012 seconds was necessary to effect a tie with the previous survey.



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CANADIAN MUSKY OIL LTD.
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FORT SIMPSON AREA - N.W.T.
(CORMACK LAKE)

SURFACE TOPOGRAPHY

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S - SEISMOTECH (MARCH 1960)
E & M - EXPLORATION CONSULTANTS (JAN 1960)

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