

76-6-4-15
(Gr Rains)

GEOPHYSICAL REPORT

of a

REFRACTION SEISMIC SURVEY

in the

MILLS LAKE, NORTHWEST TERRITORIES
AREA

Latitude $61^{\circ} 40'$ and Longitude $117^{\circ} 00'$

January, 1970

for

NORTHERN OIL EXPLORERS LTD.

and

J.M. HUBER OIL CORPORATION

by

SEISMOTECH 64 LTD

Permits #4492, #4493, #4497



Report by

L.R. BAXENDALE SEISMIC CONSULTANTS LTD.

May, 1971

Project # 76-6-4-70-2

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ABSTRACT

Ninety miles of seismic refraction was completed in January, 1970 as the best exploration tool for locating any subsurface reef build-ups because the geological sedimentary section was too shallow (1500 ft.) to use the seismic reflection method.

STATISTICAL DATA

The seismic work was done on a "turn-key" basis meaning that no statistical or production records were supplied by the contractor. The ninety miles of program was completed in about twelve days. A camp occupied by about 40 men was used and all work was done on bulldozed trails by wheeled vehicles. The main highway to Yellowknife was used for access because the permits bordered this road. No operation problems were encountered.

The seismic data was acquired using dynamite as an energy source and a S.I.E. binary gain system to record the data, although the binary gain was not required for the refraction type of work.

FIELD PROCEDURES

The refraction spreads were shot using a $1\frac{1}{2}$ mile cable with 24 traces and one geophone every 330 feet with the following configurations used to ensure measuring all the required velocity information:

- a) $1/3 \times 2/3$ weathering spreads
- b) $1\frac{1}{2}$ mile single ender
- c) $1/2$ mile offset and $1\frac{1}{2}$ mile single ender

Good first arrivals were obtained using 10# of powder in 55 foot holes with two separate holes drilled at each shot point for reversed spreads and each shot point was spaced 2640 feet apart. The seismic lines were spaced about two miles apart and were shot in a NW/SE direction over two of the permits (4492 & 4493) and an E/W direction on the other permit (4497).

RESULTS

No data processing was necessary because the first arrival breaks on the field records were used for the final interpretation.

The data was interpreted using both the delay time method which is a common refraction interpretation procedure and the refraction intercept times. The three wells in the area used to check the results showed errors of about 2% or less so that the results were considered satisfactory.

Only one map on the high velocity refractor could be made for the area. If a reef were present under one of the refraction lines a distinct speed-up in velocity and a resultant decrease in delay time would be mapped.

Maps (Scale 1" = 1 mile) included in the report are:

- 1) Surface elevation map
- 2) Delay times from Seismic Refraction Survey
- 3) Total Intercepts from Seismic Refraction Survey

CONCLUSIONS

Although no outstanding anomalies were mapped from the seismic refraction work the control lines are probably too far apart to locate the really small reefs that could grow in this geologic setting. However, statistically it would seem that at least one reef should have been located if any were to grow in this area.

L.R. Baxendale

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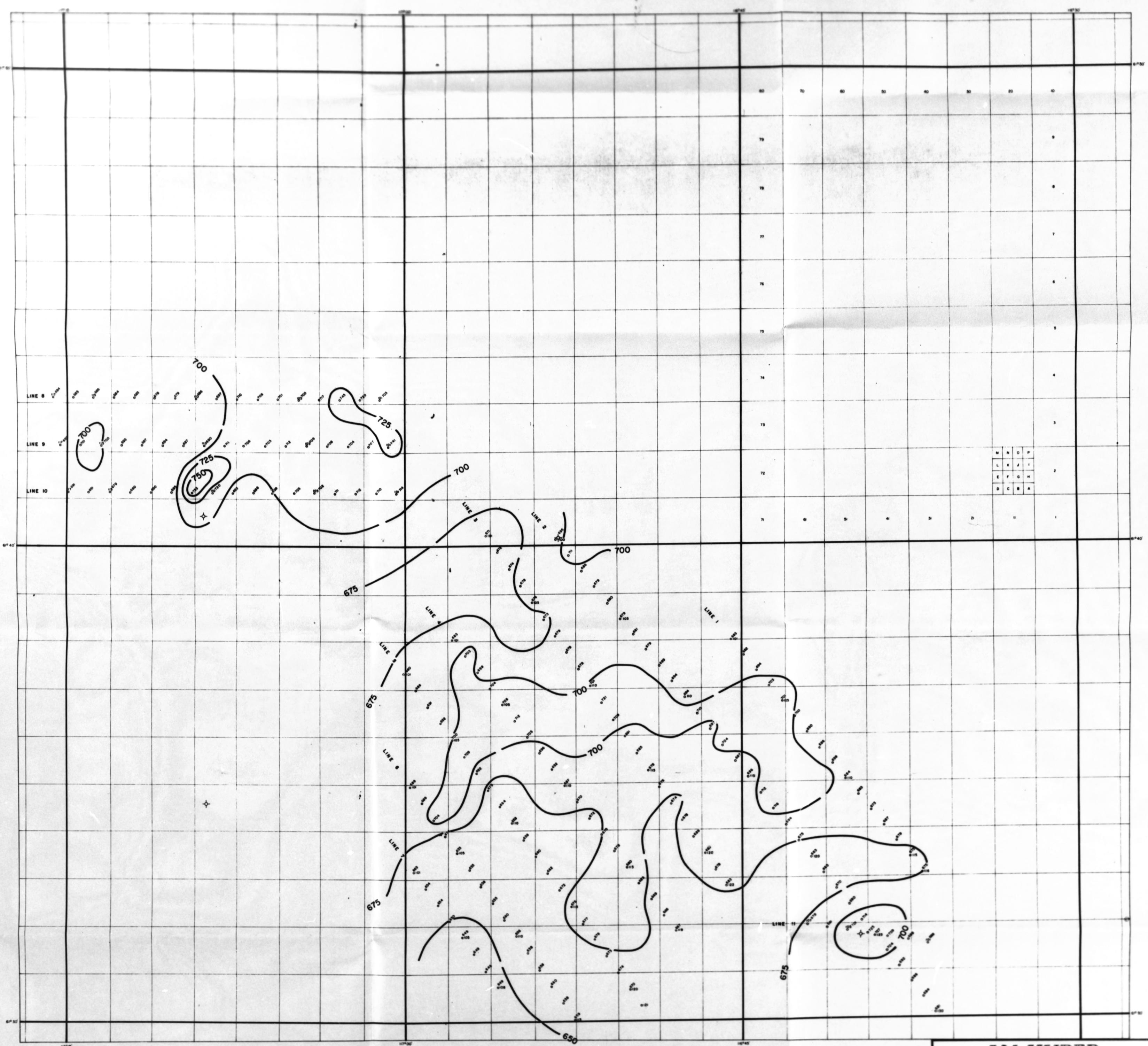
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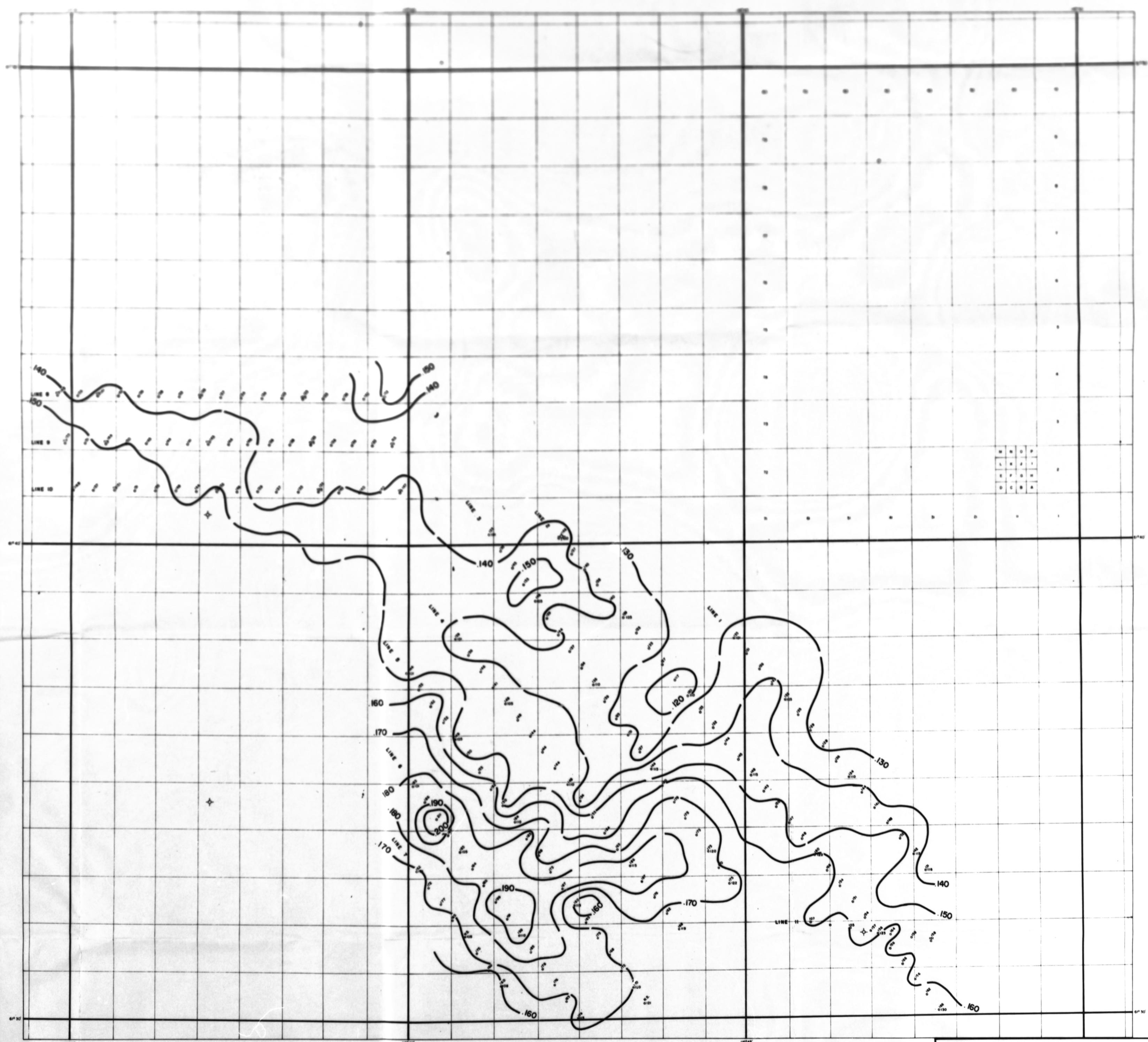
CALGARY ————— ALBERTA ————— CANADA

MILLS LAKE
NWT

SURFACE ELEVATIONS



SCALE: 1/4 MILE



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CALGARY ————— ALBERTA ————— CANADA

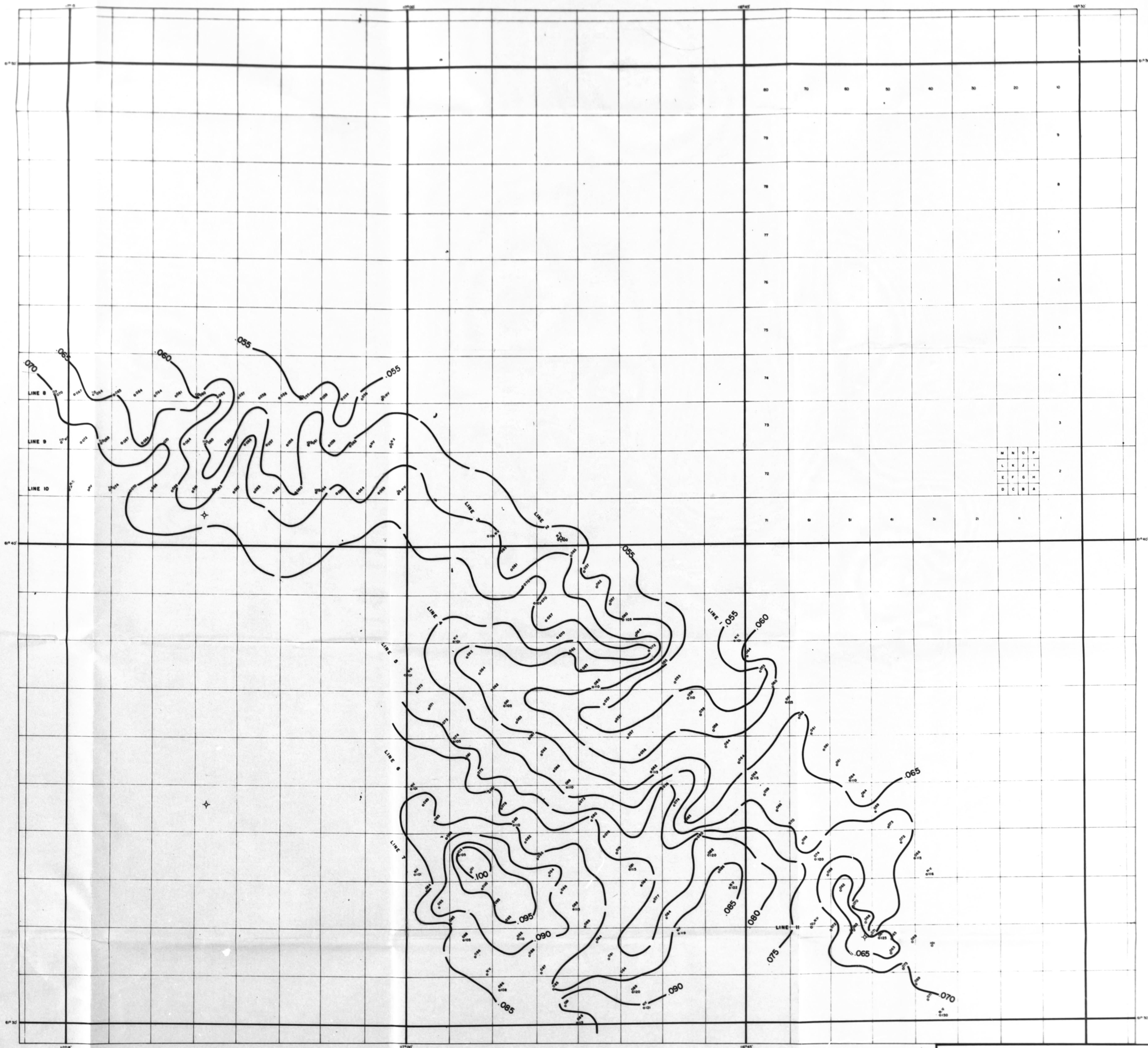
MILLS LAKE
NWT

**TOTAL INTERCEPTS
FROM**

ISMIC REFRACTION SURV

AUTHOR L. PRIEUR

SCALE: 1:1 MILE



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CALGARY ————— ALBERTA ————— CANADA

MILLS LAKE
NWT
DELAY TIMES

SEISMIC REFRACTION SURVEY



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