

Other

REPORT ON A SEISMIC SURVEY
of
WEST TATHLINA LAKE AREA
NORTHWEST TERRITORIES
for
NEW D. TODD BRIGGS ACCOUNT
DALLAS, TEXAS
by
HEILAND EXPLORATION CANADA (1959) LTD.

from
December 7th, 1959 to February 12th, 1960

Submitted by

James Barron, Supervisor

on

April 14th, 1960



Table of Contents

Introduction	1
Location of Work	1
Topography	1
Discussion of Results	2
Conclusions	2
Appendix	
Equipment and Recording Technique	4
Surveying	5
Computing Procedure	5
Data on Time Expended	7
Supervision	7
Location Plat	8
Subsurface Coverage Diagram	9
Detector Spread Diagram	10
Material in attached pocket	
✓ Shot Point Location Map	
Slave Point Map	Not released
✓ Surface Topography Map	
Shot Hole Logs	Not released
List of Field Tape and Transfer Tape Numbers	Not released



Introduction

The following is a final report of a reflection seismic survey of the West Tathlina Lake Area in the Northwest Territories for New D. Todd Briggs Account, Dallas, Texas. This survey was conducted by Heiland Exploration Canada (1959) Ltd., Party 105 from December 7th, 1959 to December 20th, 1959, and from February 3rd to February 12th, 1960, by Party 108.

The following maps accompany this report.

1. Surface Topography
2. Slave Point
3. Shot Point Location

Location of Work

The area covered by this report is located northwest of Tathlina Lake in the Northwest Territories and lies between $60^{\circ} 35'$ and $60^{\circ} 45'$ latitude and between $117^{\circ} 30'$ and $118^{\circ} 00'$ longitude. The crew was quartered in a trailer camp which was located near the site of Briggs West Tathlina Lake No. 1 for the work conducted by Party 105. Party 108 located their camp near the site of Briggs West Tathlina Lake No. 3.

Topography

Very little topographical relief was encountered in the area covered by this survey. The contoured surface topography map which accompanies this report shows the area sloping gently northward. The highest elevation encountered was at Shotpoint 682 where an elevation of 999 feet was recorded. The lowest elevation encountered in the survey was 875 feet which occurs at Shot Point 663.

The area was partially covered by small stands of light spruce.

Numerous muskegs were present in the area and caused some difficulty early in December before colder weather set in. Crawler tractors with dozer blades were used to clear lines in the area.

Discussion of Results

Lines H - 11 and H - 12 located north of Tathlina Lake tend to verify the existence of a normal fault as indicated on the Slave Point map which accompanies this report. Although record quality across the fault is very poor, the reflection correlations between the syncline on the down side and points on the up side are quite good.

The predominant feature on the Slave Point map is a narrow anticline which lies along a northeast - southwest axis. Good north dip indications are evident on the records obtained from Shot Points 633, 634 and 635, on Line H - 13, and Shot Points 651, 670, 650 and 669 on Line H - 14. A study of the corrected record section for Line H - 13 suggests that even more dip is present along the north flank of the anticline than is indicated on the map. This feature has been tested by Briggs West Tathlina Lake No. 1 located near Shot Point 8 - 313 on Line No. F - 8, Briggs West Tathlina Lake No. 2 located near Shot Point 636 on Line No. H - 13, and Briggs West Tathlina Lake No. 3, which is located near Shot Point 7 - 132 on Line F - 7.

Line H - 15 which was shot after the drilling of Briggs West Tathlina Lake No. 3 encountered considerably higher Slave Point values at Shot Points 690 and 692. A northwest - southeast line shot across the anomaly near these high values would be desirable to give a more complete evaluation.

Conclusions

The Slave Point structure discussed above has been tested by

the three Briggs West Tathlina Lake wells which failed to find commercial production. If further drilling is planned in this area, it is felt consideration should be given to a location near Shot Point 692 which is located two and one half miles northeast of Briggs West Tathlina No. 3.

Respectfully submitted,

HEILAND EXPLORATION CANADA (1959) LTD.



James Barron,
Supervisor.

APPENDIX

Equipment and Recording Technique

Southwestern Industrial Electronics Company (S.I.E.) truck mounted equipment was used to obtain the seismograms.

The amplifiers were Model GA-7H with a PRO - 11 - 10 oscillograph. All shots fired were recorded on magnetic tape by a Model MR-4 magnetic tape recorder.

Winter-Weiss and Mayhew truck mounted drills were used to drill the shot holes. The remainder of the equipment used was also truck mounted.

Continuous subsurface control was obtained by using a split spread with an effective distance of 1440 - 120 - 0 - 120 - 1440 feet. Two detectors per group (Electro-Tech Model EVS-2A 28 cycle) spaced 30 feet apart were used with this spread distance.

All shots were recorded with no mix and a filter setting of 1 - 38 - 0. The AVC setting was F - 3, and gain setting was generally 70%. An unmixed playback using a 1 - 38 - 0 filter setting, F-3 AVC, and 40% gain was made from each tape. A 20% bi-directional mixed playback using the same settings was also made from each tape.

Most holes were drilled into limestone and charges averaging 1 - 2 pounds were used. Poor record quality in the area was generally attributed to muskeg and a variable layer of extremely low velocity material which blankets the limestone in the area.

Experiments were conducted using multiple geophones at various intervals. The results of these tests indicated that two geophones spaced 30 feet apart generally gave the best results. Some experimenting was also

done with multiple shot holes, the results of which were inconclusive.

Surveying

The survey was conducted with a Wild T - 1 Theodolite. Horizontal and vertical control were carried from previously surveyed shot points in the area. Several star shots were taken to obtain azimuth control in the area.

Computing Procedure

Corrections to a datum of plus 950 feet were applied to the records by the use of the Uphole Time method.



$$E_s = E_{sp} - D_s$$

$$D_{sd} = E_s - E_d$$

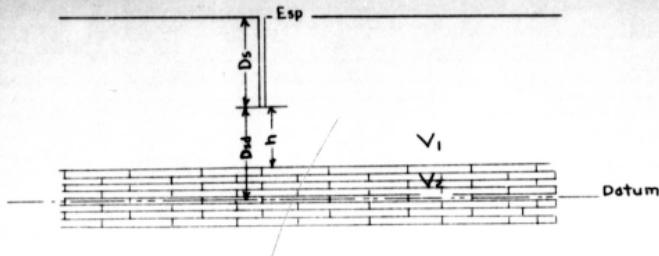
$$T_{sd} = \frac{D_{sd}}{V_D} \quad \text{where } V_D = 15,000' \text{ / sec.}$$

$$T_{gd} = T_{sd} + T_{uh}$$

$$T_{cd} = T_{sd} + T_{gd}$$

In a few isolated instances the holes were shot in the low velocity material overlaying the limestone formation. First arrival time vs detector distance plots were made in these instances and the delay time ΔT was then calculated using the formula.

$$\frac{1}{2} \Delta T = \frac{t_i}{2 \cos \theta} \frac{(1 - V_1)}{V_2} \quad \text{which is derived as follows.}$$



V_1 = observed velocity of material overlaying limestone (from plot)

V_2 = observed velocity of Limestone (from plot)

V_D = velocity used to correct to datum

h = distance from E_s to B_w

$$\theta = \sin^{-1} \frac{V_1}{V_2}$$

$$\frac{1}{2} \Delta T = \frac{h}{V_1} - \frac{h}{V_D}$$

$$= \frac{h(1 - \frac{1}{V_D})}{V_1}$$

$$\text{Now } h = \frac{t_1 V_1}{2 \cos \theta}$$

and by substitution we get:

$$\begin{aligned} \frac{1}{2} \Delta T &= \frac{t_1 V_1}{2 \cos \theta} \times \frac{1}{V_1} - \frac{t_1 V_1}{2 \cos \theta} \times \frac{1}{V_D} \\ &= \frac{t_1}{2 \cos \theta} - \frac{t_1}{2 \cos \theta} \times \frac{V_1}{V_2} \end{aligned}$$

$$\frac{1}{2} \Delta T = \frac{t_1}{2 \cos \theta} \left(1 - \frac{V_1}{V_2} \right)$$

Corrected record sections of all lines shot were produced by

Canadian Magnetic Reductions Ltd. from data supplied by Heiland.

Data on Time Expended

Party 105 worked fourteen days on the project and spent five days moving into the area and setting up camp.

Party 108 spent three days moving in and out of the project and worked ten days in the field.

The crew consisted of four office personnel, fourteen men in the field, and three camp employees.

Supervision

Mr. J. A. Legge, Jr., a geophysical consultant with offices in Calgary, Alberta was supervisor on behalf of New D. Todd Briggs Account and kept in close touch with the progress of the work by visits to the site of operations. Weekly and monthly reports were mailed to Mr. Legge's office, and bi-weekly telegraph reports were dispatched from the field offices by radio.

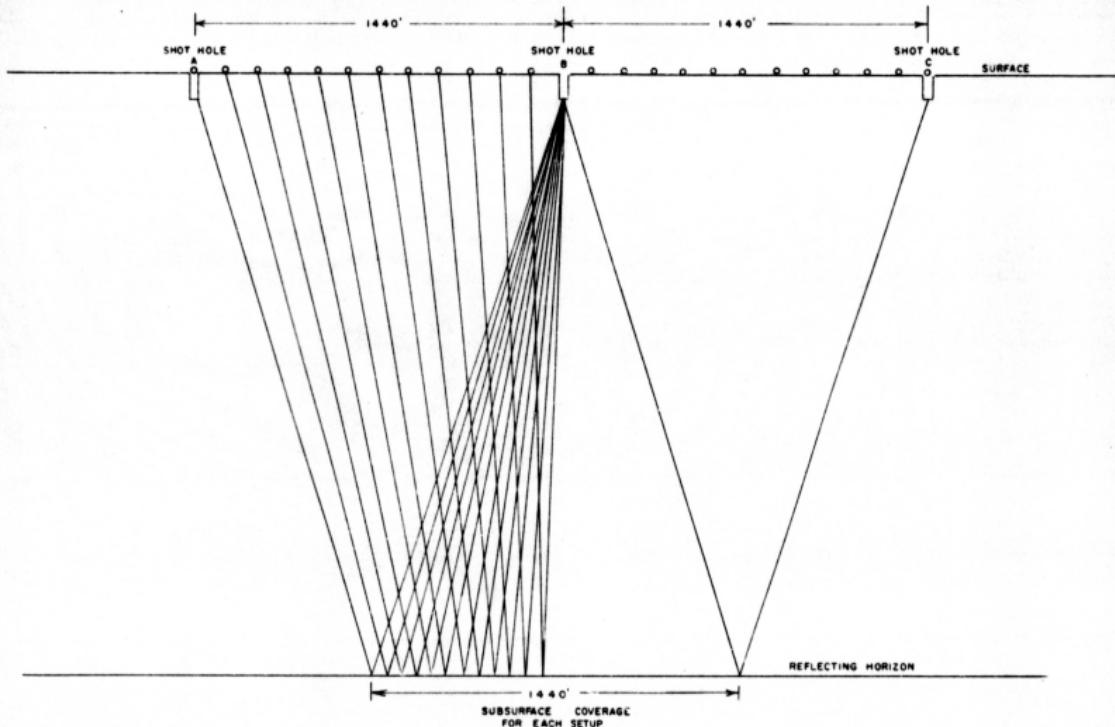
Supervision on behalf of Heiland Exploration was carried out by Mr. James Barron who maintained close contact with the field crew while the work was being carried out.



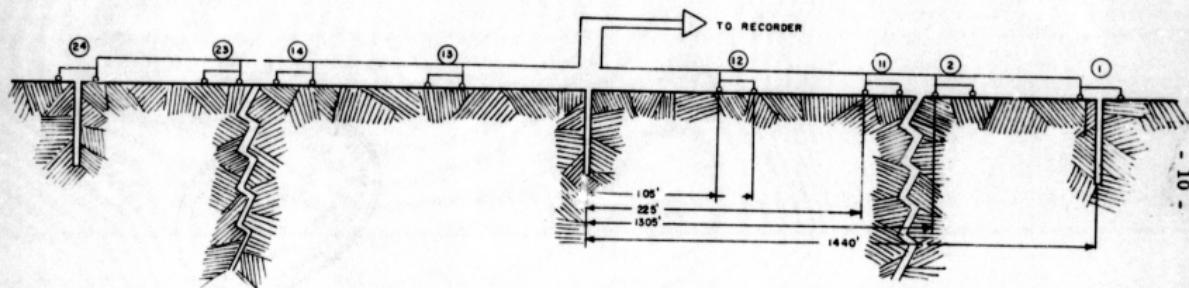


LOCATION PLAT
WEST TATHLINA LAKE AREA
NORTHWEST TERRITORIES
CANADA

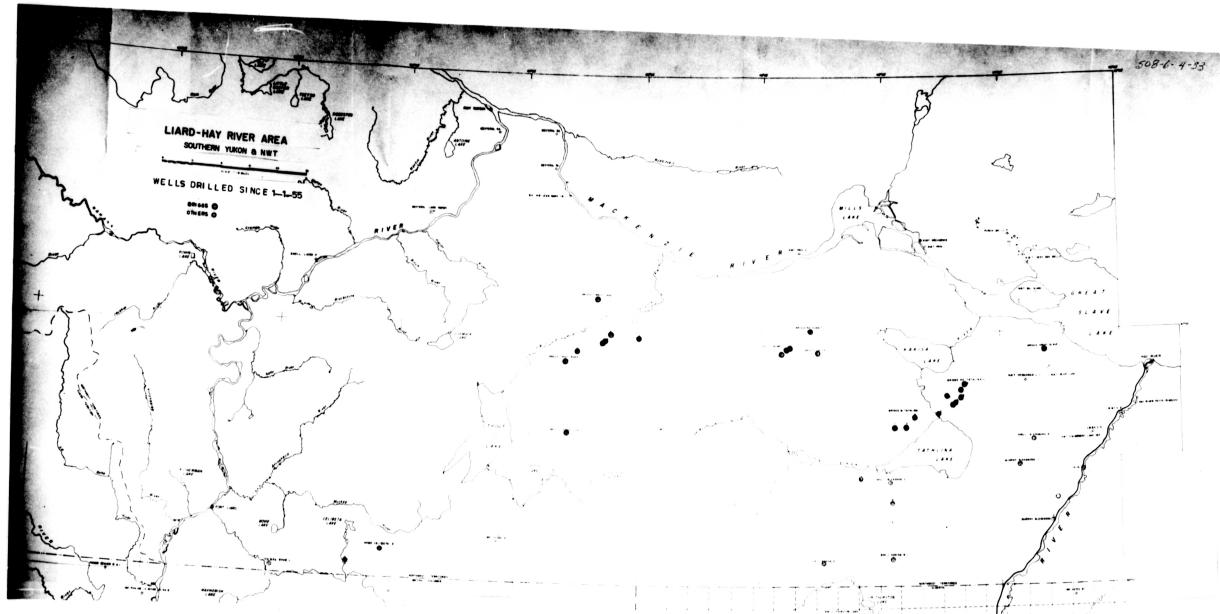
AREA SHOT

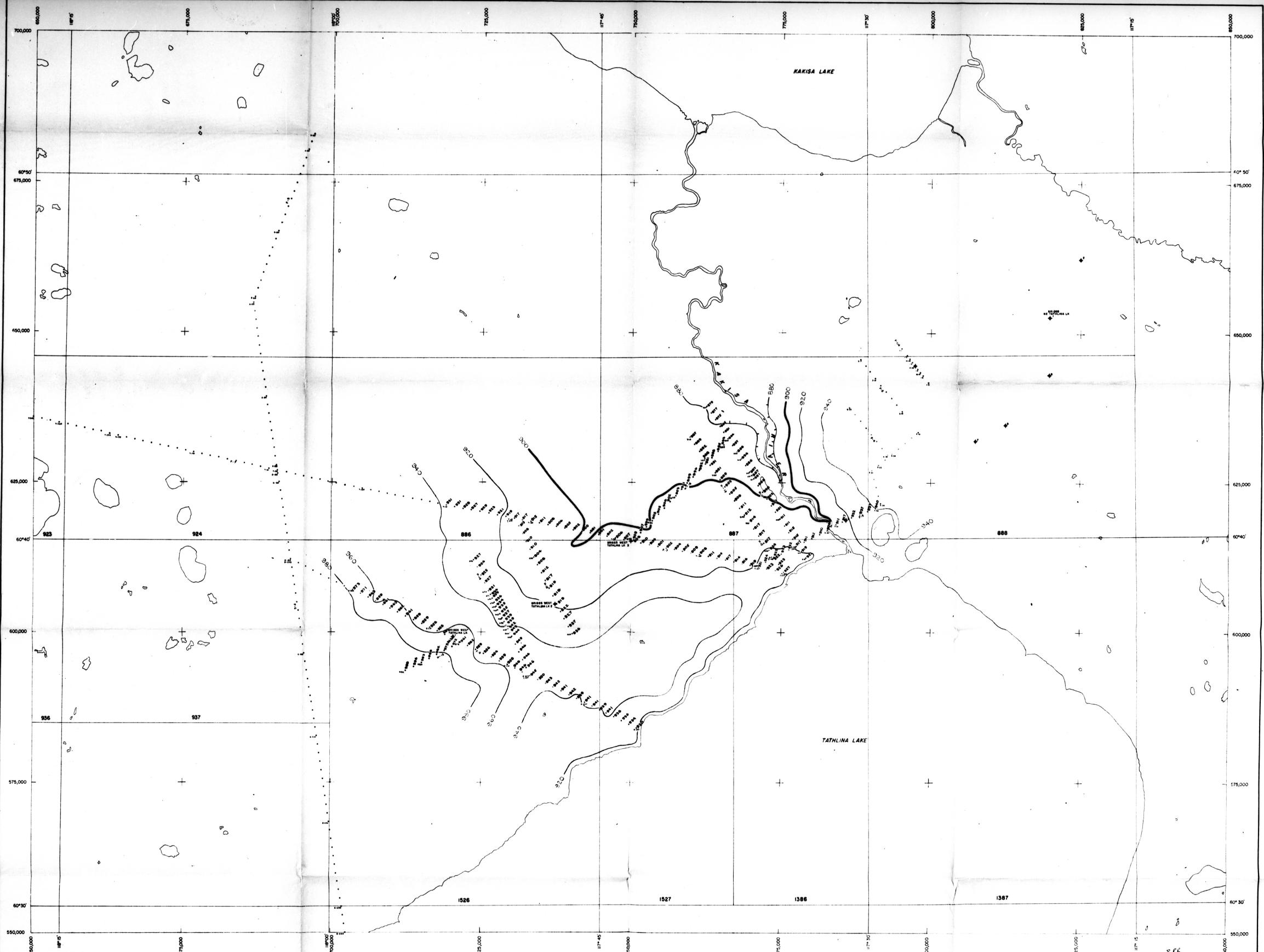


O SYMBOL FOR DETECTOR GROUP
 FOR DETAILS OF GROUP SEE
 DIAGRAM ON DETECTOR SPREAD



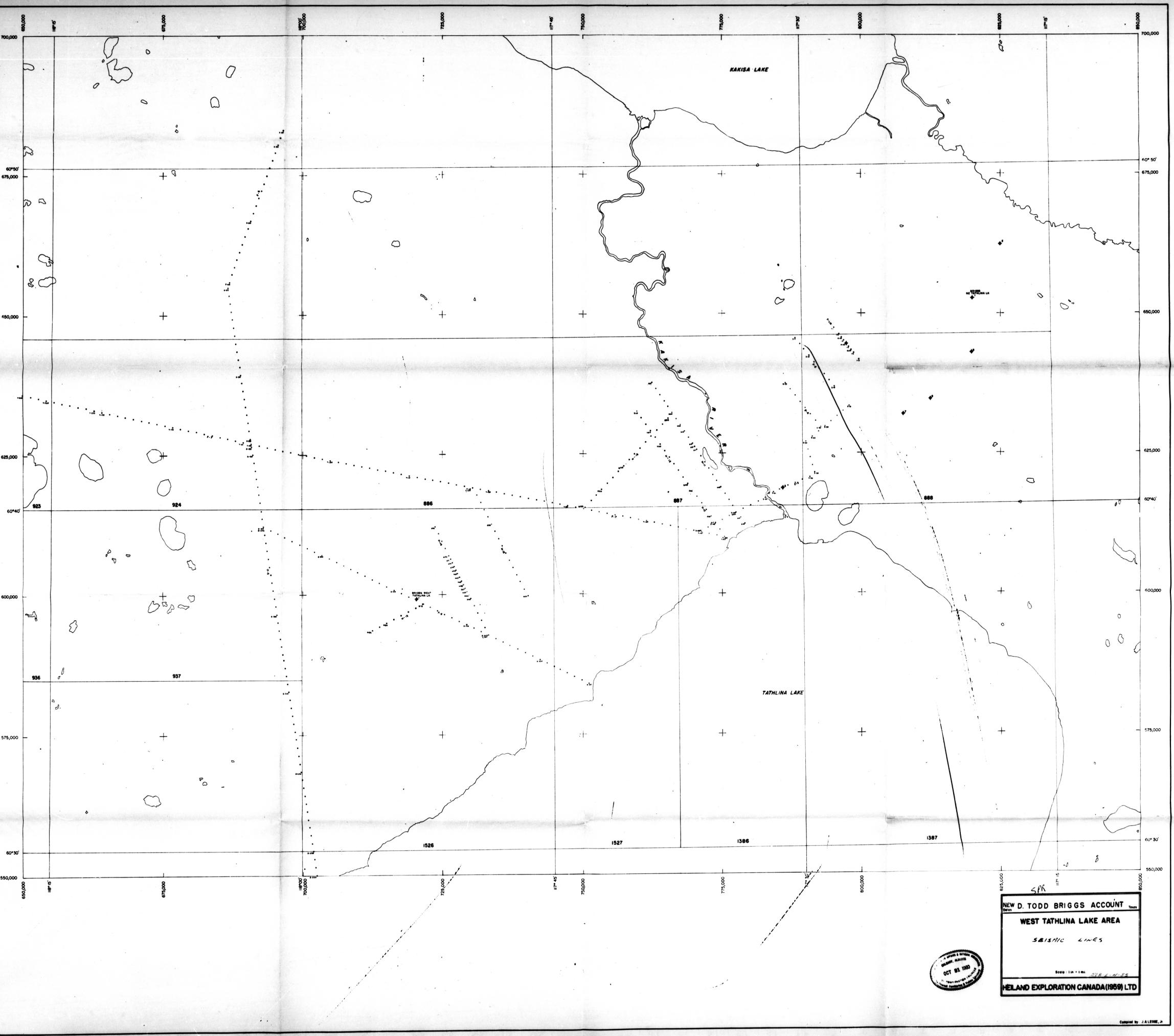
DETECTOR SPREAD DIAGRAM
2 GEOPHONES PER TRACE





NEW D. TODD BRIGGS ACCOUNT
 DRAFT
 WEST TATHLINA LAKE AREA
 SURFACE TOPOGRAPHY
 DATUM: SEA LEVEL
 CONTOUR INTERVAL: 20 FEET
 DATE: APRIL 14, 1960
 Scale 1 in 1 mi. *Scale 1 in 1 mi.*
 HEILAND EXPLORATION CANADA (1959) LTD





30x