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BY John P. [Signature] Date  
Vice President, Exploration  
UNION OIL COMPANY OF CANADA LIMITED

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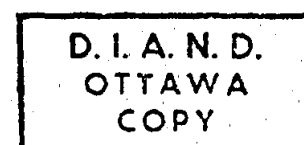
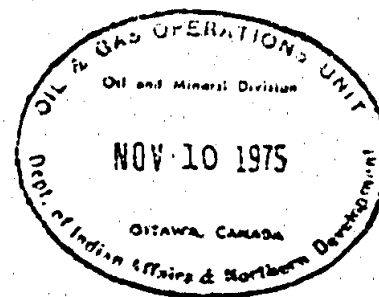
GEOPHYSICAL REPORT  
HORTON RIVER AREA  
NORTHWEST TERRITORIES

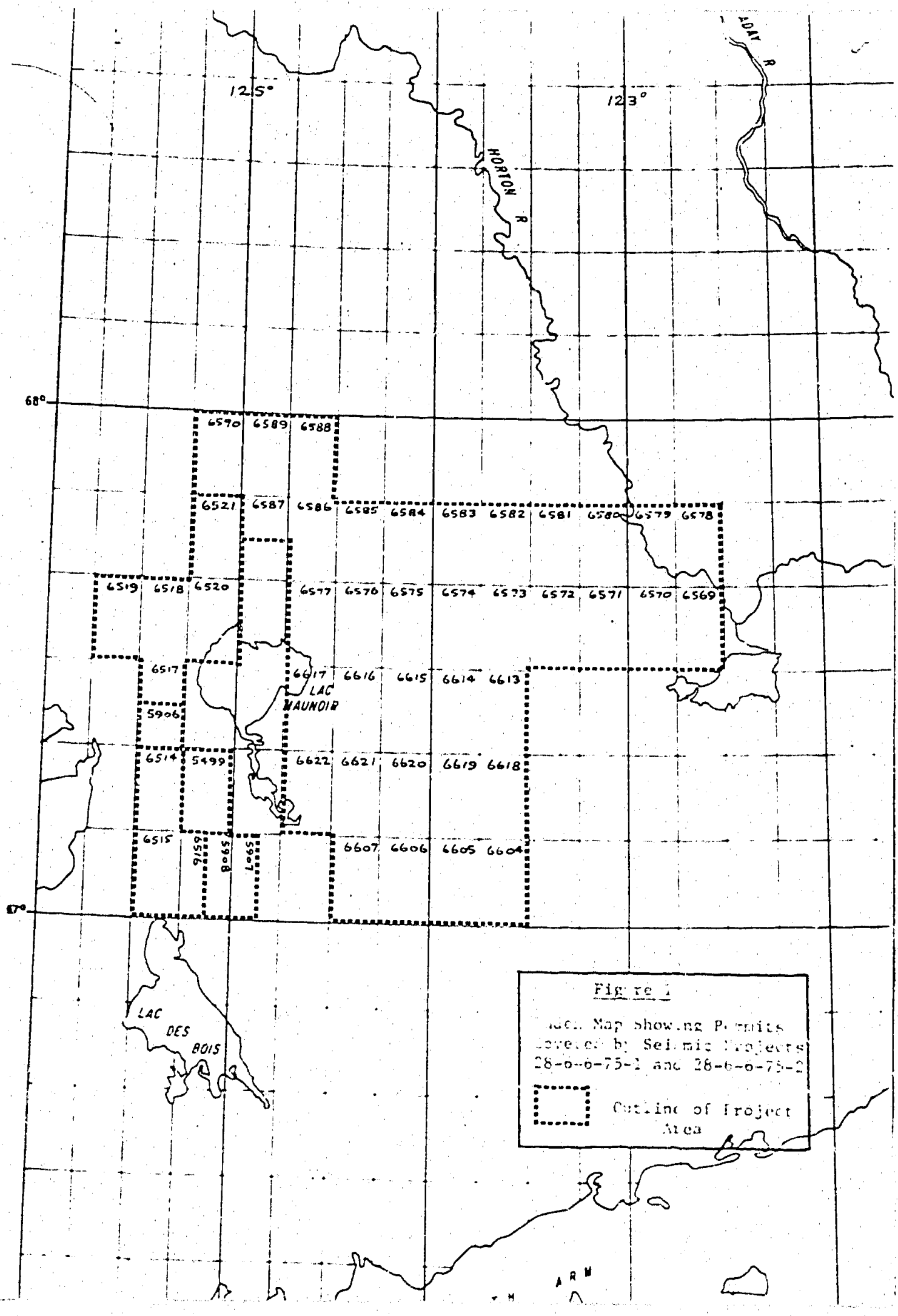
Shot by  
Western Geophysical Company of Canada Limited  
December 1974 - April 1975

Permit Nos.:  
5499, 5906-5908, 6514-6521,  
6569-6590, 6604-6607, 6613-6622

by  
R. Willott  
October 1975

Project Nos.: 28-6-6-75-1 and 28-6-6-75-2





## INTRODUCTION

From December 1974 to April 1975, Union Oil Company of Canada Limited conducted a 282 mile seismic survey in the Horton River area, N.W.T.. The project was a 400%, 600% and 800% dynamite survey designed to provide reconnaissance across large blocks of land held under option from Imperial Oil Limited and to follow up leads arising from the previous winter's shooting. The project area is within N.T.S. Grids 96-N and 96-O, between 67° and 68° North Latitude and 123° and 126° West Longitude. This includes permits 5499, 5906-5908, 6514-6521, 6569-6590, 6604-6607 and 6613-6622 (Fig. 1).

The main objective was to define the geological structure of the area, in order to evaluate its potential for hydrocarbon entrapment.

## RESULTS

Data quality varied considerably throughout the area. To the east, lines W-24 and W-25 proved to be of little value; west of Lac Maunoir and Maunoir Ridge, lines W-31, W-32 and W-33 are of very good quality; the rest of the data is generally of poor to fair quality.

Interesting structural features include:

- 1) Maunoir Ridge, a large anticline tested by the Union Mobil Colville D-45 well in 1973.
- 2) a fairly broad structure of low vertical relief southeast of Lac Maunoir and south of Kolliket Lake.
- 3) a postulated anticlinal trend east of Anderson River between lines W-7 and W-9 and north of W-9.
- 4) a domal structure at the south end of line W-8, defined by lines W-20, W-21 and W-22.
- 5) a high trend east of 124° that extends northwest past Estabrook Lake. This includes a structure that was tested by the Union IMP Stopover K-44 well in 1975.
- 6) the extension of Colville Ridge along the northwest shore of Lac Maunoir.

..... /2



### RECOMMENDATIONS

Due to the current situation regarding lack of federal land regulations, no exploratory drilling is recommended at this time, nor could further expenditure for seismic exploration be justified.

However, if the situation were to improve, a short program of about 30 miles of 800% CDP seismic coverage would be helpful in delineating some of the structural leads. This program (or parts of it) should only be conducted, however, if there is a working seismic crew very near by, otherwise the cost would be prohibitive.

### DISCUSSION

This program was conducted between December 4, 1974 and April 16, 1975. The field operations report submitted by Western Geophysical Company of Canada Limited is appended to this report.

Data processing was done by Union Oil Company of Canada Limited's Data Processing Department. Elevation corrections were made with a datum elevation of 1000 feet A.S.L. and a datum velocity of 18,000 ft/second. Exponential gain recovery was applied, and all records were filtered before stacking with a 25/30 Hz - 80/90 Hz bandpass filter. Trim statics were applied to the gathered traces before stacking.

Generally, the record sections are of fair quality except for W-24 and W-25, which are not useable. Over most of the area, the prominent reflection is the Saline River Formation, which has fair continuity and consistent character. To the east, however, where the surface is severely glaciated and the Paleozoic section is very thin, the Saline River reflection is masked by first-break noise, so a deeper reflection was mapped. This had previously been referred to as the "Top of Proterozoic", but the Union IMP Stopover well indicates that the reflection is probably coming from a contact about 100 to 150 feet above the Proterozoic; hence, the name used here is "Near Base of Cambrian".

Surface elevation maps were also constructed and are included with this report.

Structurally, several features are worthy of investigation:

- 1) Maunoir Ridge, at the intersection of lines W-6 and W-7, is a large anticline which was tested by the Union Mobil Colville D-45 well. This has been described previously and further elaboration is unwarranted.

..... /3

- 2) Following up a lead from last winter's shooting, some detailed work was done on a structure southeast of Lac Maunoir. This is a broad structure of low vertical relief. The new shooting actually reduced the apparent areal extent; nevertheless, this feature remains prospective.
- 3) An anticlinal trend is postulated on the eastern side of Anderson River between lines W-7 and W-9 and continuing beyond line W-9 to the north. This mapped high trend is as yet unsupported by seismic data.
- 4) A seismic lead at the south end of line W-8 led to the acquisition of some detailed coverage which delineated a small domal structure whose apex is near the intersection of lines W-21 and W-22. There is apparently about 200 feet of vertical relief at the base of the Cambrian, which is consistent with the Surface Structure map.
- 5) Further northeast is a high trend that extends north past Estabrook Lake. Included in this trend is the Stopover structure that was tested by the Union IMP Stopover K-44 well in the spring of 1975.
- 6) Colville Ridge, which is well defined on the surface north of Colville Lake, can be seen to extend northeast along the shore of Lac Maunoir towards Maunoir Dome. It is apparently a horst of fairly small areal extent, bounded by high angle faults.

The only two structures that have been defined adequately in this area are items 2 and 4 mentioned above. Neither of these is of sufficient quality to warrant drilling in the present economic and political climate.

*Richard Willott*

R. Willott  
Area Geophysicist

A P P E N D I X

Field Operations Report

submitted by

Western Geophysical Company of Canada, Ltd.

Report of Reflection Seismograph Survey

HORTON RIVER  
Northwest Territories

Permit No. N74B895  
N.T.S. Map No. 96N & 96O

Dates of Shooting  
December 4, 1974 thru April 16, 1975

For  
UNION OIL COMPANY OF CANADA LIMITED

Report by  
W.J. Cherniak - Party Manager  
Party F-35

WESTERN GEOPHYSICAL COMPANY OF CANADA, LTD.  
Calgary, Alberta

April, 1975

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*Western*



# TABLE OF CONTENTS

	<u>PAGE</u>
INTRODUCTION . . . . .	1 & 2
LOGISTICS. . . . .	3 & 4
TECHNIQUES . . . . .	5 & 6
RECORDING. . . . .	5
DRILLING . . . . .	5
SURVEY . . . . .	5 & 6
BULLDOZING . . . . .	6
EQUIPMENT AND PERSONNEL. . . . .	7, 8 & 9
STATISTICS . . . . .	10

## INTRODUCTION

The Horton River Prospect is located approximately 165 miles north-northeast of Norman Wells. The project itself encompassed a large area extending from Colville Lake to the west to Stopover Lake to the east; Raymond Lake to the south to Estabrook Lake to the north. The surface conditions in this area consisted mostly of rolling hills with sparse covering of black spruce timber and many small lakes. Elevation varied from 1000' above sea level in the west to 1100' above sea level in the east; 900' above sea level in the south to 1200' above sea level in the north.

The survey was conducted by Western Geophysical Company of Canada, Ltd., License No. 1-1823 working on behalf of Union Oil Company of Canada Limited.

The work period was from December 4, 1974 to April 16, 1975. There were normally 55 men, including all contractors, involved in all phases of the field operation.

The men were stationed in three camps, with the drill camp and recording camp joining up occasionally. All camp units in all three camps were sleigh-mounted. The line cutting camp consisted of four sleighs; the drilling crew consisted of six sleighs; and the recording crew consisted of four sleighs. Also, a fuel haul camp was used which consisted of a sleeper/kitchen unit with its own source of power so it could operate independently.

The operation was under the supervision of Dick Willott and Barry Lundy, client representatives of Union Oil Company of Canada Limited, and Mr. Gerry Schneider of Western Geophysical Company. The field operation was co-ordinated by Party Manager W.J. Cherniak.

Bulldozing operations were conducted by MacMillan Construction Ltd. of Peace River, Alberta.

Catering was provided by Western Geophysical Company, owners of the seismic camp.

### LOGISTICS

It required a great deal of moving to bring the crew into the prospect due to its location. The layout of the prospect, short daylight hours, and cold temperatures produced a great deal of lost time in production in the early stages of the survey (ie. December and January). As daylight hours increased and temperatures warmed up the production time increased. However, the program layout did hinder production to a degree because it was so spread out.

Fuel and supplies were brought in by aircraft. Aircraft used were a ski-equipped Cessna 185, for hauling men and supplies, as well as scouting. The early part of the winter Twin Otters had to be used for hauling fuel; however, when ice reached a thickness of 24" a DC3 was used for flying fuel and supplies. A twin engine Islander, capable of carrying 2000+ lbs., was used for hauling supplies and men. Since no direct routes exist between Norman Wells and the prospect, aircraft proved to be the best means of supplying camp.

A full time expediter was on duty in Norman Wells, with communication to camp via single sideband radio and VHF radio telephone. The communications between Norman Wells and the field crew were very unreliable due to distance and location of work area, and also poor atmospheric conditions.

A complete storage complex in Norman Wells was used for groceries and parts in transit from Calgary. The office in Norman

Wells was equipped with a telephone and a telex for direct communication with Calgary.

Most of the supplies and personnel were flown into Norman Wells via twice weekly flights with a charter Hawker Sidley 748 aircraft. This charter moved personnel and supplies between Calgary and Norman Wells every Tuesday and Friday; additional supplies were sent in via P.W.A. schedule. The charter was shared by three crews.

## TECHNIQUES

### FIELD RECORDING:

The recording instruments used were 48 trace DFS III, manufactured by Texas Instruments. Coverage of 600% was obtained with a 110' group interval, with shot points located at 440' intervals except for lines 31, 32 & 33 which were 800% obtained with a 160' group interval, with shot points located at 480' intervals, and 400% coverage was obtained with 110' group interval with shot points located at 660' intervals on lines 17, 18 & 19. Seismometers used were Mark L-10, 10 cycle, and record length was 3 seconds. Used were 18 geophones per trace with partial overlapping of groups.

### DRILLING:

The drilling equipment consisted of seven conventional air drills which belonged to Western Geophysical Company. All the drills were mounted on Flextrac Nodwell vehicles.

Single holes were drilled to a depth of 45' and the holes were preloaded with 10 lbs. of dynamite. The drilling conditions basically were in permafrost clay and gravel, however occasionally running into shale in the lower, flat areas and sandstone on higher areas.

### SURVEYING:

The survey instruments used were two T-16 instruments, which were calibrated constantly, and all of the lines were located from existing data and topographical features.



Star and Sun Shots were taken on various lines for line bearing checks. All instrument set ups and turns were double read off both faces of the vertical venier (ie.  $90^{\circ}$  -  $270^{\circ}$ ). Elevation ties were based on elevations of lakes as well as elevation of work done previously.

Chaining was done by use of a Chicago steel chain at 110' intervals and 160' intervals for lines 31, 32 & 33.

BULLDOZING:

Dozing was conducted by MacMillan Construction, using five dozers: two Caterpillar D7F's, one Caterpillar D7E, and two Caterpillar D6C tractors. With the assistance of the surveyors and topo-maps the program lines were cut in accordance with the Forestry Department specifications and the assigned program. Lines approximately 33 feet wide were cut using half of the width to pile and walk down the timber to meet Forestry requirement.

D7E and D7F cats were used to move Recording Camp and Drill Camp respectively, as well as cutting line. One D6C was used to build airstrips for fuel hauling as well as transferring fuel between airstrip and camps. It also assisted wherever required during moves.

## EQUIPMENT

### RECORDING CREW:

- 1 - Recording Unit - RN110
- 1 - Shooting Unit - RN75
- 2 - Cable Units - RN110

### SURVEY CREW:

- 1 - Survey Unit - RN75
- 1 - Chaining Unit - RN110

### DRILLING CREW:

- 2 - Western Model 1200 Drills mounted on RN110 units
- 5 - Mayhew Model 1000 Drills mounted on RN110 & CF110 units

### CAMP UNITS (TWO CAMPS):

#### RECORDING:

- 1 - Power Plant/Shop/Storage
- 1 - Kitchen/Utility
- 1 - 12-Man Sleeper
- 1 - 6-Man Sleeper/Recreation Room

#### DRILL:

- 1 - Party Manager Unit - Half-track
- 1 - Water/Supply Unit - RN110
- 1 - Shop Unit - RN110
- 1 - Power Plant/Shop Storage
- 1 - Kitchen
- 1 - Utility/2-Man Sleeper

DRILL (CONT'D.):

- 1 - Office/8-Man Sleeper
- 2 - 12-Man Sleepers
- 1 - Powder & Cap Magazine/Storage - sleigh
- 1 - Incinerator/Storage - sleigh

DOZING:

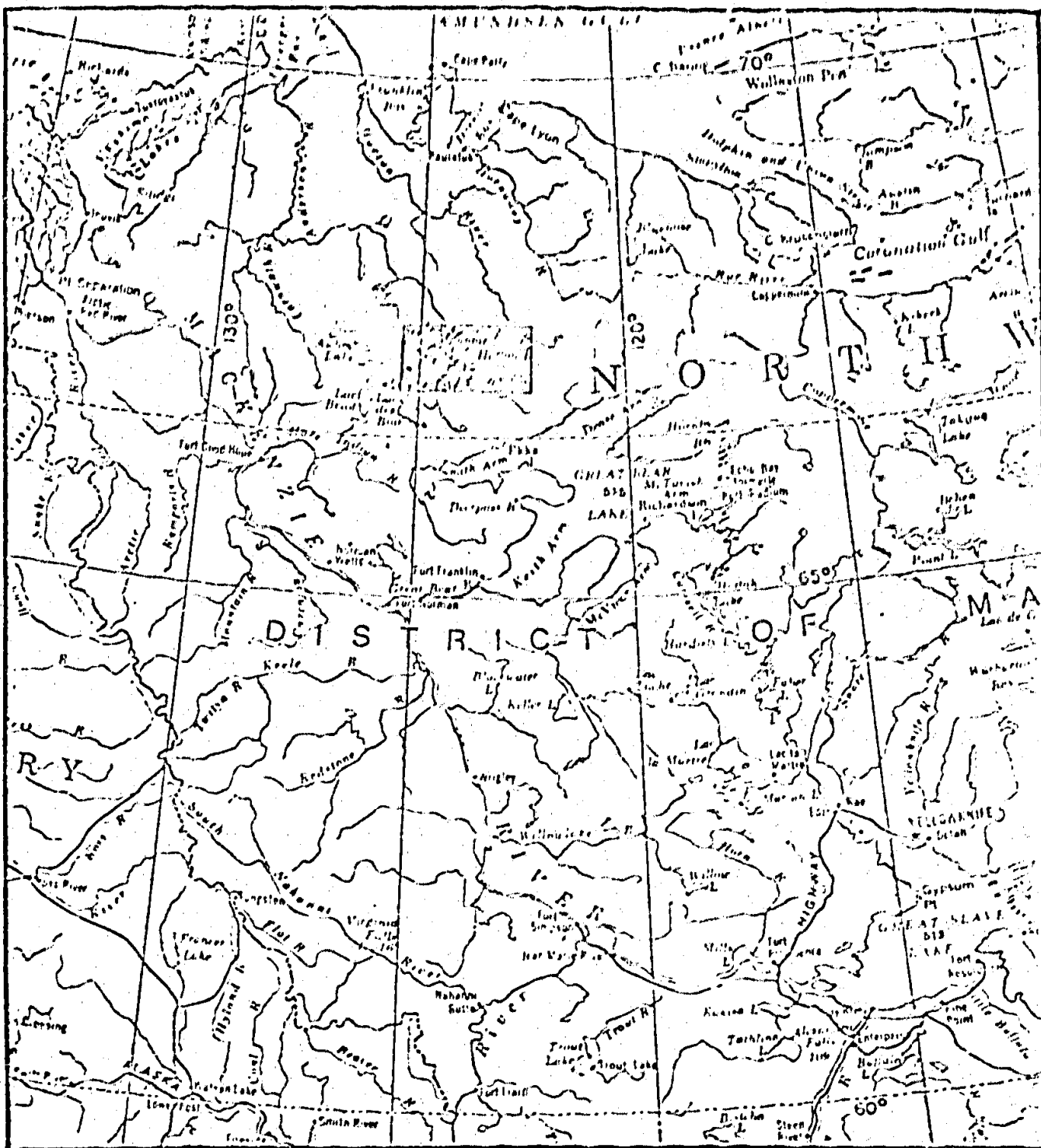
- 2 - D6C Cats
- 2 - D7F Cats
- 1 - D7E Cat
- 1 - Kitchen/Diner
- 1 - Kitchen/Diner/Sleeper
- 1 - Utility/Sleeper
- 1 - Power Plant/Shop
- 2 - 3000 gallon sleighs
- 1 - 3000 gallons on fuel haul
- 1 - 2000 gallons on cat camp

PERSONNEL

- 1 - Party Manager
- 1 - Field Clerk
  
- 1 - Observer
- 1 - Junior Observer
- 1 - Shooter
- 1 - Shooter's Helper
- 2 - Cable Truck Drivers
- 6 - Cable Crew Helpers
  
- 1 - Drill Push Mechanic
- 7 - Drillers
- 7 - Drill Helpers
  
- 2 - Surveyors
- 2 - Chainmen
- 1 - Rodman
  
- 2 - Cooks
- 2 - Cook Helpers
- 1 - Camp Attendant
- 1 - Supplyman
- 2 - Mechanics
  
- 10 - Dozer Operators
- 1 - Dozer Foreman
- 1 - Cook
  
- 2 - Spare Helpers (occasionally)

# STATISTICS

Production, calendar days . . . . .	62½
Miles recorded (included tail spreads). . . . .	281.09
Shot points recorded. . . . .	2818
Average dynamite per hole (pounds). . . . .	12.17
Average shot points per day . . . . .	45.09
Average miles per day . . . . .	4.50
Recording hours (including drive time but not including move time) . . . . .	801.0
Number of holes drilled . . . . .	2963
Total footage drilled . . . . .	132491
Average hole depth (feet) . . . . .	44.72
Average footage per drilling hour . . . . .	43.64
Total drilling hours (including ride time but not including move time . . . . .	4994.5



SCALE: 1"=100 MILES

— HORTON RIVER —

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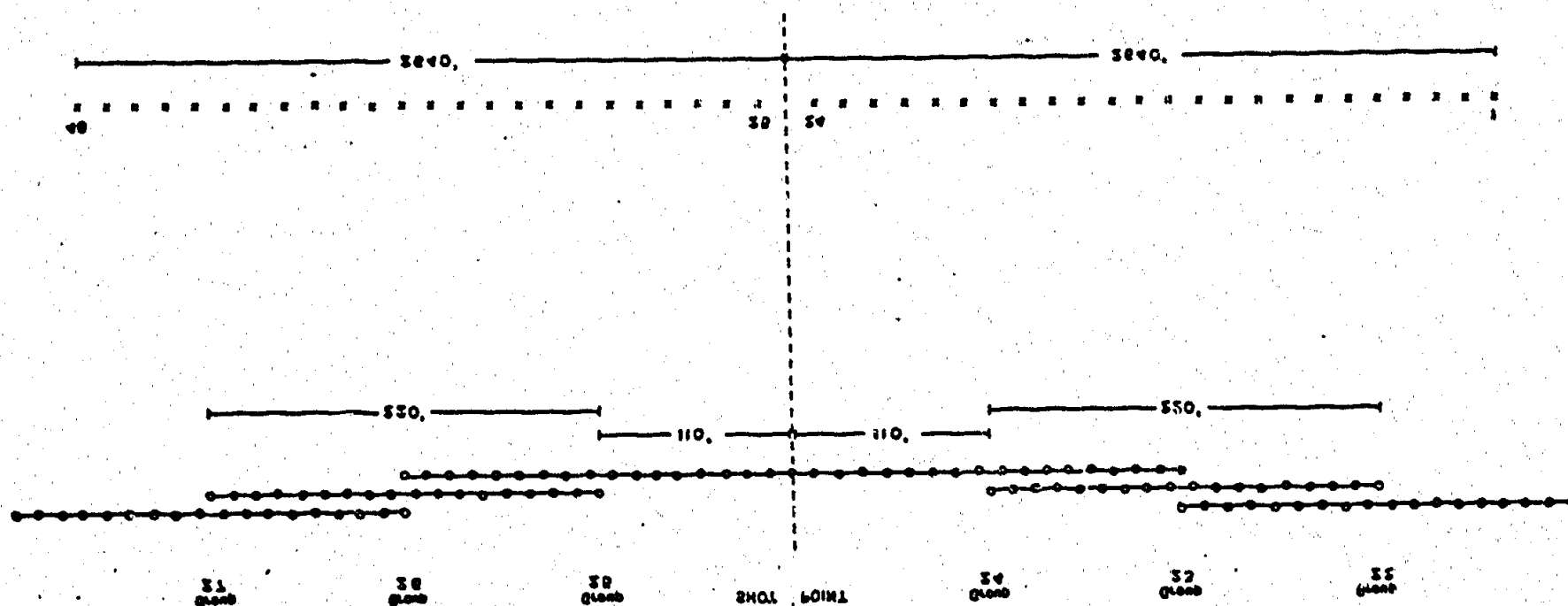
Метод

ЧИСЛО МОДЕ БАТТЕРИ ----- ЧИСЛО  
 ЧИСЛО МОДЕ \ ЧИСЛО ----- 18  
 ЧИСЛО ИНТЕРВАЛ ----- 110,  
 ЧИСЛО ГЕНДИН ----- 350,  
 ЧИСЛО ПОИМ ИНТЕРВАЛ ----- 220, (40000)  
 ЧИСЛО ПОИМ ИНТЕРВАЛ ----- 440, (20000)

CONFIGURATION

SPREAD and GEOPHONE

STAGE 3

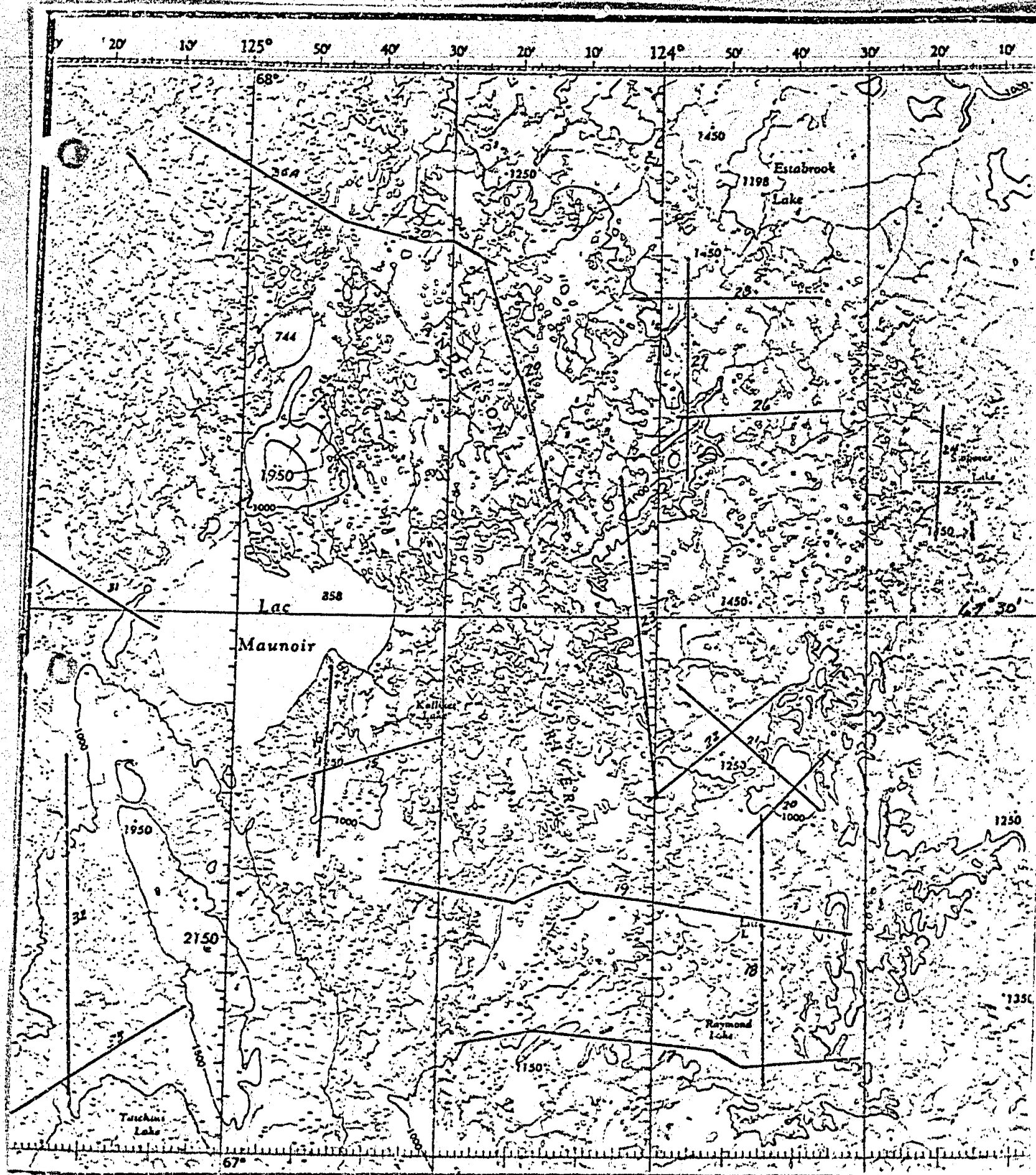


CROPS DROPPED AT SHOLBOIN  
 CROPS FEMOLN  
 CROPS INTERAVT  
 SHOL HOPE BALLEIN  
 SHOLBOIN INTERAVT  
 MINIMUM OFFSEL (CROPS 52 & 57)  
 MAXIMUM OFFSEL (CROPS 1 & 78)

J .  
 (J8 GEORHOMES JAE) SOO.  
 JEO.  
 ZINGRE  
 J80: (800X)  
 JEO: EIVG EO: FIRST GEORHOMES  
 J8JO: EIVG J8JO: IVSL GEORHOMES

Diagram illustrating a target layout for a shooting competition. The target is divided into six groups (S1, S2, S3, S4, S5, S6) by a central vertical line labeled "SHOT POINT".

Each group contains horizontal lines representing distances (100, 500, 100, 100, 100, 100) and "X" marks indicating shot positions. The layout shows a series of horizontal lines with "X" marks, likely representing the positions of shots or targets, with distances marked between them.



HORTON RIVER

1" = 500,000'

*Western*