

REFLECTION SEISMOGRAPH AND GRAVITY SURVEY
PEEL PLATEAU AREA, NORTHWEST TERRITORIES.

1962-63

SHELL CANADA LIMITED
NORTHERN DIVISION EXPLORATION
EDMONTON, ALBERTA
NOVEMBER 1, 1963



REFLECTION SEISMOGRAPH AND GRAVITY SURVEY
PEEL PLATEAU AREA, NORTHWEST TERRITORIES

Permits #1805, #1806, #1811-1813 inclusive, #1819, #1820, W/2 #1232, E/2 #1233, #3406-3412 inclusive, #2428-2433 inclusive.

In compliance with Section 54 (1), 2(a) (b) of the Canada Oil and Gas Land Regulations, the following is reported with regard to a geophysical exploration program performed on the subject permit and surrounding area.

Reflection Seismograph Survey

Location: 66°00'N - 67°25'N; 132°30'W - 135°50'W.

Adjacent towns, etc: Approximately 43 miles southeast of Fort McPherson, N.W.T. and approximately 110 miles southwest of Inuvik, N.W.T.

Date of Survey: From December 13, 1962 to April 15, 1963.

Number of working days in Field: 96.

Extent of Survey:

Approximate Acreage: 4,000,000 Number of Profiles: 991

Miles of Traverse: 435 Number of Shot Holes: 2,654

Field Conditions:

Surface Outcrops:

Muskeg and glacial drift cover most of the area. Cretaceous formations outcrop east of a line running from 134°20', 66°00' to 135°40', 66°52'. West of this line outcrops of Triassic, Mississippian, Devonian, Silurian and Ordovician were noted.

Type of Terrain:

East of the Peel River elevations ranged from 100 feet above sea level near the Peel River to 1,200 feet above sea level but generally can be considered to be flat. West of the Peel River elevations ranged from 100 feet above sea level at river level to 2,500 feet above sea level. This terrain was crossed by several rivers and large creeks. Most dozed lines were extremely crooked and rough. Ninety percent of the area worked was drained by a dendritic pattern of creeks and rivers into the Peel River with the remaining ten percent draining into the Arctic Red River.

Available Roads or Water Routes:

There are no available roads within or near the area. The area was accessible in the summer by float-equipped aircraft and river transportation. Ski-equipped aircraft was solely used in the winter.

Weather:

Temperatures during the first month of the operation averaged near 50 degrees below zero. Sub-zero temperatures prevailed for the remainder of the operation. Average snowfall (3 to 5 feet) was encountered. Drifting snow on the barren plateaus hampered field operations.

Drilling:**a. Formations**

Most holes were drilled in perma-frost. Near surface geologic formations were shales and clays. Gravel and boulders were encountered near creek beds throughout the area.

b. Hole Depths:

The average hole depth for the area was 50 feet. A comparison of single holes, 3 hole inline patterns and 5 hole inline patterns, all at variable depths (15 to 100 feet), was carried out upon commencement of the survey. A 3 hole inline array with holes bottomed at 50 feet was chosen.

c. Casing, Charge Anchors, Etc.:

No casing was used. No charge anchors were needed.

d. Drilling Equipment, Type of Units and Type of Bits:

2 - Mayhew air-water drills mounted on 1962 I.H.C. tandems

2 - 1953 F750 Ford water units with no-spin rear ends

2 - 1957 G.M.C. 1-ton drill support panels

2 - Failing air-water drills mounted on a 1962 5-ton

G.M.C. and a 1959 - 5-ton G.M.C.

2 - 1962 - 5-ton G.M.C. water units

1 - 1959 - 1-ton Fargo power wagon drill support

1 - 1959 - 1/2-ton G.M.C. pick-up drill support.

Type of bits used: $4\frac{1}{2}$ " 3-cone rock bits, 4-3/4" starter type rock bits, $4\frac{1}{2}$ " and 4-3/4" starter bits and finger starter bits. Approximately 1100 bits of the above type were used to drill approximately 2700 holes.

e. Drilling Problems and Recommendations:

No changes in the above listed drilling equipment is recommended. No major drilling problems were encountered.

Recording:

a. Type Shooting, Number of Traces Recorded, Spread Length, Group Interval, Number of Seismometers and Interval, Shot Point Interval:

A 5,280 foot split continuous spread with shot point arrays 2,640 feet apart was employed. Two 13 trace, 220 foot station interval cables with 6 seismometers per trace, spaced 25 feet apart, were used. The shot point array consisted of three holes spaced 100 feet apart and drilled to a depth of 50 feet. A spread diagram can be found on the following page.

b. Influence of Hole Depth and Surface Conditions:

Hole depth was not critical if holes were well tamped.

c. Charges:

Charge size proved to be more critical than hole depth. East of the access road on the east side of the Peel River charges of 10 pounds per hole were used. West of the access road, on the east side of the Peel River, 15 pound charges in each hole were used. West of the Peel River 20 pound charges in each hole were employed.

d. Type of Instruments:

Type of Amplifiers: General Geophysical Co. "JMH"

Type of Magnetic Recorder: S.I.E. "MR-4"

Seismometers: Electro-tech 27 cycle frequency

Base Filter: 1-25-180

Surveying:

The initial survey crew consisted of two surveyors and two rodmen but due to the number of crooked spreads and sparse survey control an additional surveyor and two chainmen were added later in the survey. Two T1-A theodolites and a 1,320 chain were used for surveying. An additional T-16 theodolite were used during the last month of the survey. Initial horizontal and vertical

control was based on a bench mark located at the Arctic Red River post. Periodical star shots were taken throughout the survey and wherever possible lines were tied to triangulation stations. The resultant survey will be adjusted to Shoran control in the area.

Office Procedure:

Weathering Correction:

The uphole delay time method of computing weathering corrections was employed. These corrections were made to a 10,000 feet per second velocity.

$$D_t : T_{uh} - \frac{D_s}{10,000} \qquad Wx_c : = D_t$$

A velocity of 10,000 feet per second was used to correct to a datum of 1,000 feet above sea level.

Other Corrections:

A shot point correction was obtained by adding algebraically the break correction, uphole time, weathering delay time and elevation correction. The trace corrections were obtained by adding the shot point correction to the respective trace correction. Tape corrections for the variable area cross sections (sections supplied to the field crew by client) were obtained by using the above total corrections less the respective break correction.

Results:

Record quality varied from very poor to good and generally is considered as fair.

Maps submitted with this seismic report include:

- ✓(1) Topography (3)
- (2) Base of Cretaceous
- (3) Base of Canol
- (4) Cambrian.

GRAVITY SURVEY
PEEL PLATEAU AREA
NORTHWEST TERRITORIES, 1963.

I. INTRODUCTION

In conjunction with the 1962-63 seismic survey in the Peel Plateau Area, a reconnaissance gravity survey was carried out along most of the seismic lines. Bouguer gravity values were calculated on seven control lines which make up a total of 778 stations at half mile intervals.

II. FIELD PROCEDURE

A Warden temperature controlled gravimeter was used to measure the gravity. The operator conducted the survey using a truck during the extremely cold weather and a motorized toboggan ("Ski-Doo") in the relatively warmer weather.

The method of looping consisted of taking off from one station and reading each station along a line until it was necessary to return to and re-read the first station within 2 hours. The next series of readings would begin at one of the stations previously read and a new loop would be obtained. In this way, gravity base stations were carried throughout the area along and between the lines of control so that all readings are tied to the value obtained at the first location measured. Every seismic shotpoint was used as a gravity station and all seismic lines were read for gravity except the west end of the 605 line, and other scattered locations which were inaccessible due to drifted snow.

A. Computations

(1) Drift corrections

Drift curves were plotted for all gravity loops run in the survey.

This consisted of plotting the gravity readings against time for the various stations in a loop. Since the first station was read twice within two hours, the difference of these two readings would be the drift of the instrument during that time. Since drift is assumed to be linear with time, the amount of drift to be applied to each intervening station would be taken from a point on this curve corresponding to the time each station was read.

(2) Latitude Corrections

All stations were corrected to a base latitude of $66^{\circ}45'$. The corresponding latitude correction factor applied was .948 milligals per mile.

(3) Elevation and Bouguer Corrections

Three density profiles were run in the area and although the results were poor and inconclusive, a suggested surface density of 2.2 grams per c.c. was used. The corresponding combined Elevation and Bouguer correction factor of 0.06599 milligals per foot was used to correct all readings to the + 1000 A.S.L. datum.

(4) Map Values

All gravity readings were tied to shotpoint 1-601-1. To make all values positive, a constant was added to all corrected readings and resultant values were posted and contoured.

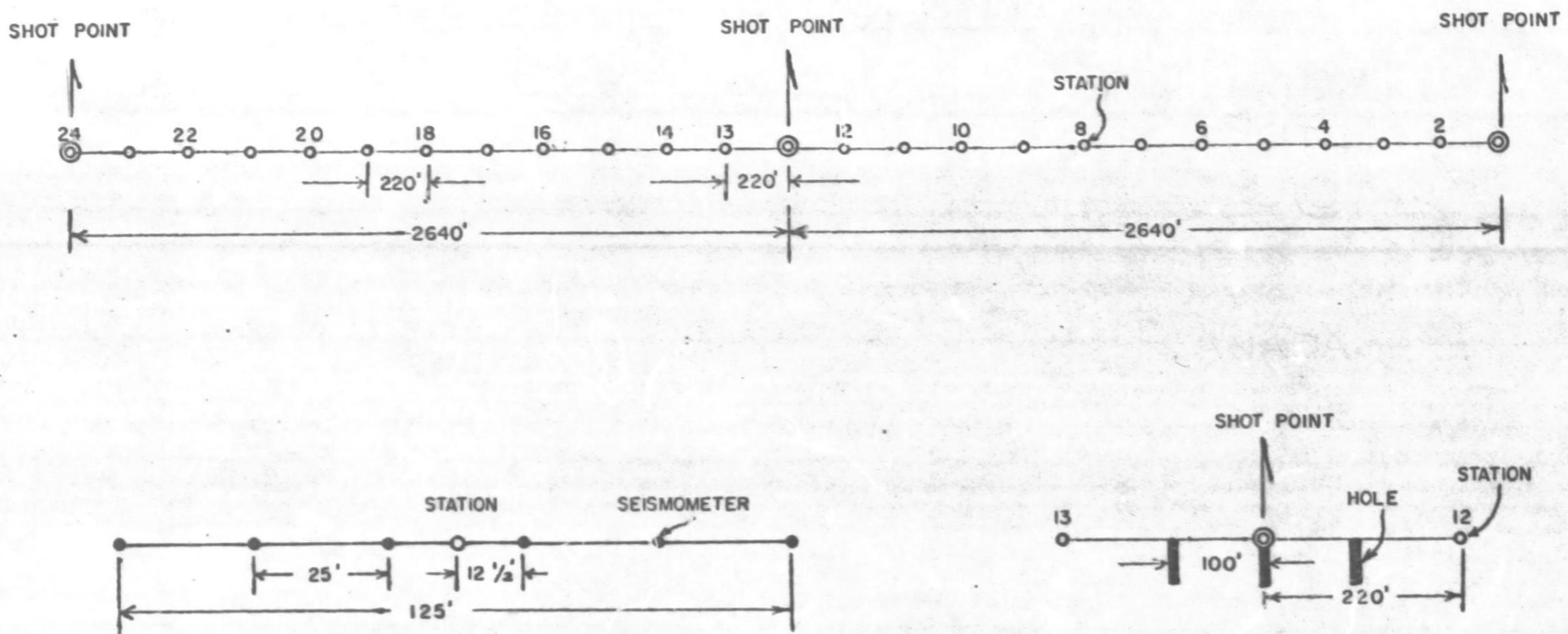
III. RESULTS

The following maps accompany this report:

- ✓ 1. Gravity station location and elevation map (3)
- 2. Bouguer Gravity Map.

PEEL PLATEAU AREA

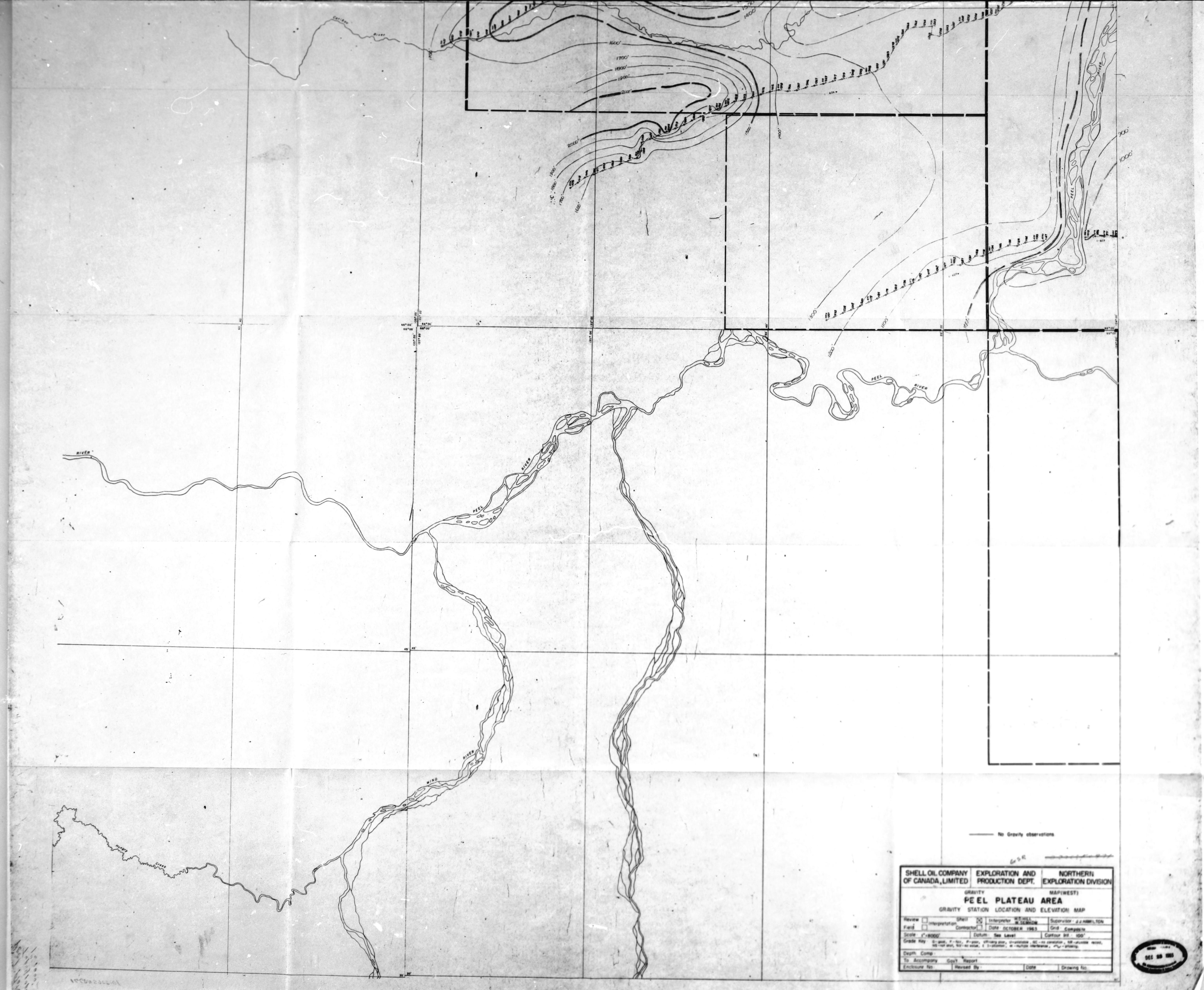
SPREAD, LAYOUT



Prepared by Northern Division
Exploration - Geophysical Section
under the supervision of Fred A. Kidd,
Manager, Northern Division Exploration,
Shell Canada Limited, November 1, 1963

WEST CANADIAN GRAPHIC INDUSTRIES LTD.

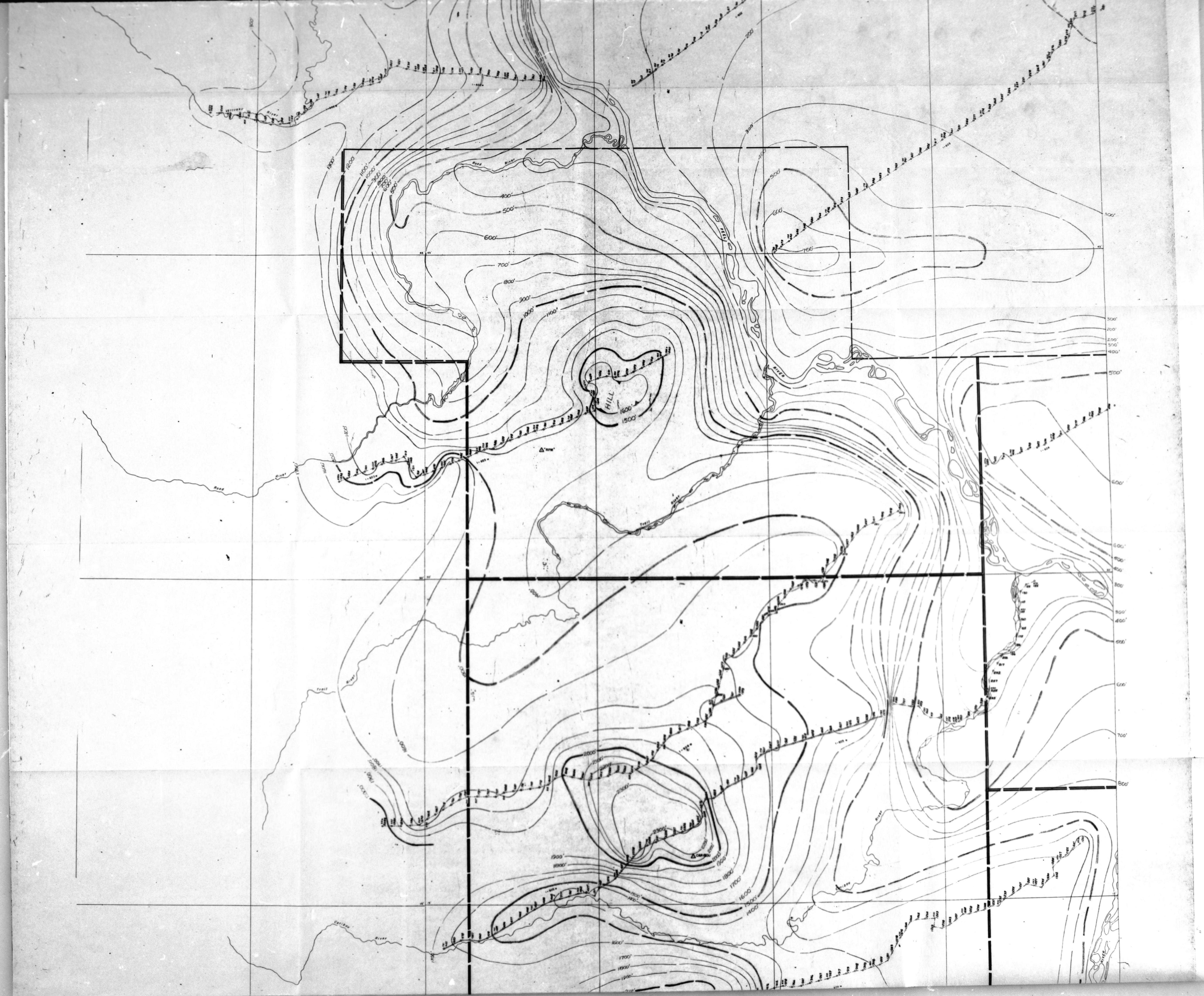
30x



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

WEST CANADIAN GRAPHIC INDUSTRIES LTD.

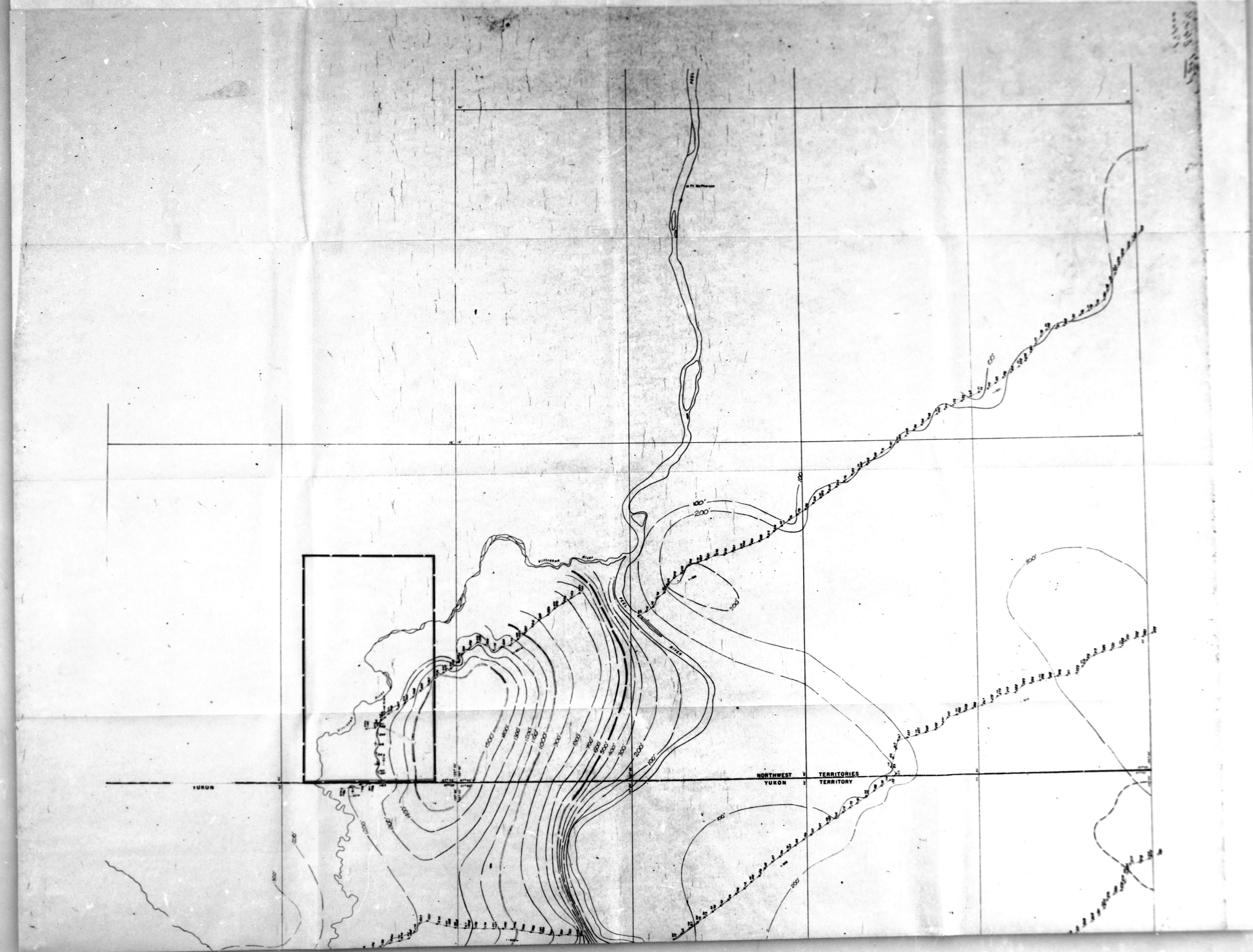
30 X



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

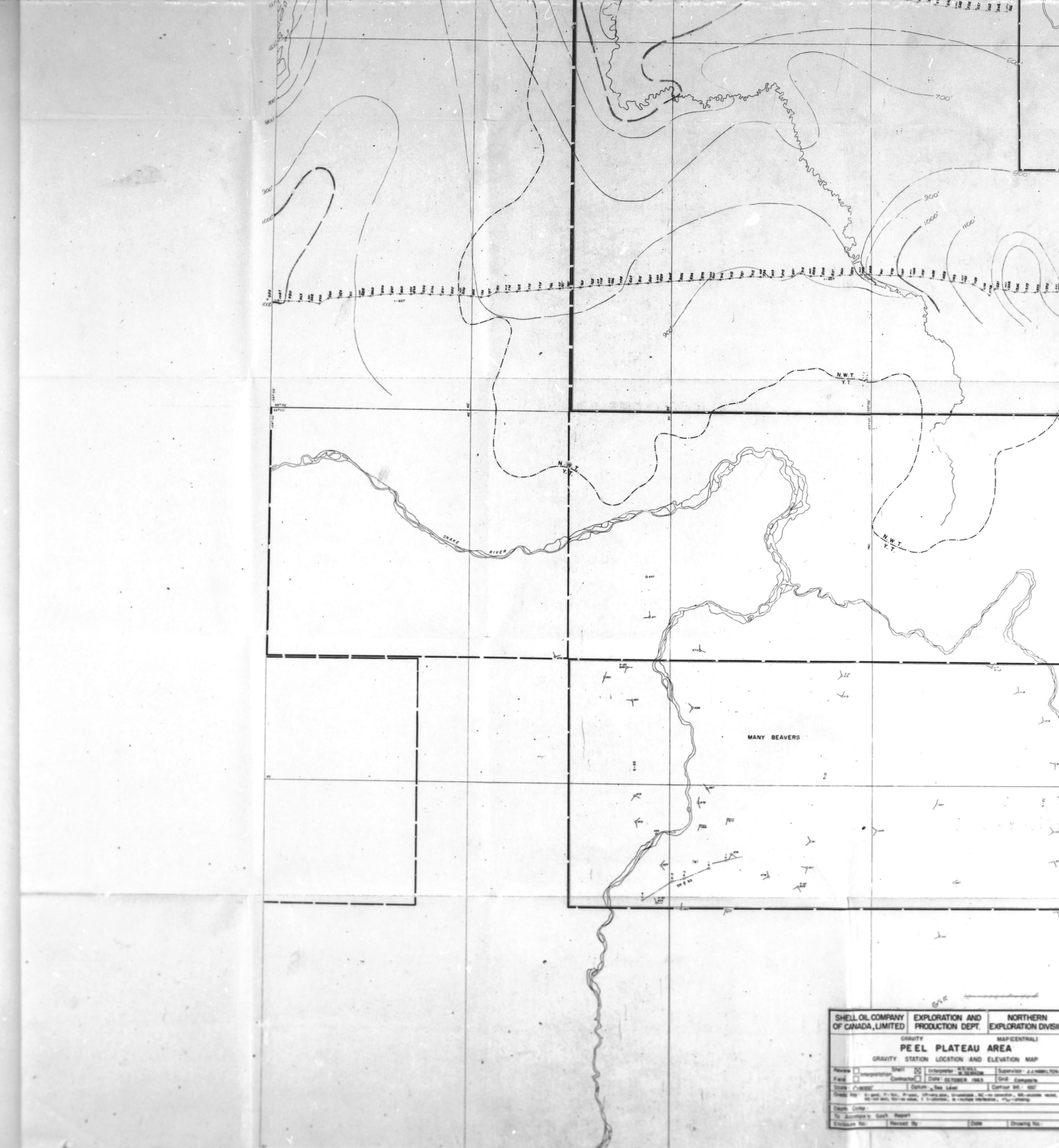
WEST CANADIAN GRAPHIC INDUSTRIES LTD.

30 X



WEST CANADIAN GRAPHIC INDUSTRIES LTD.

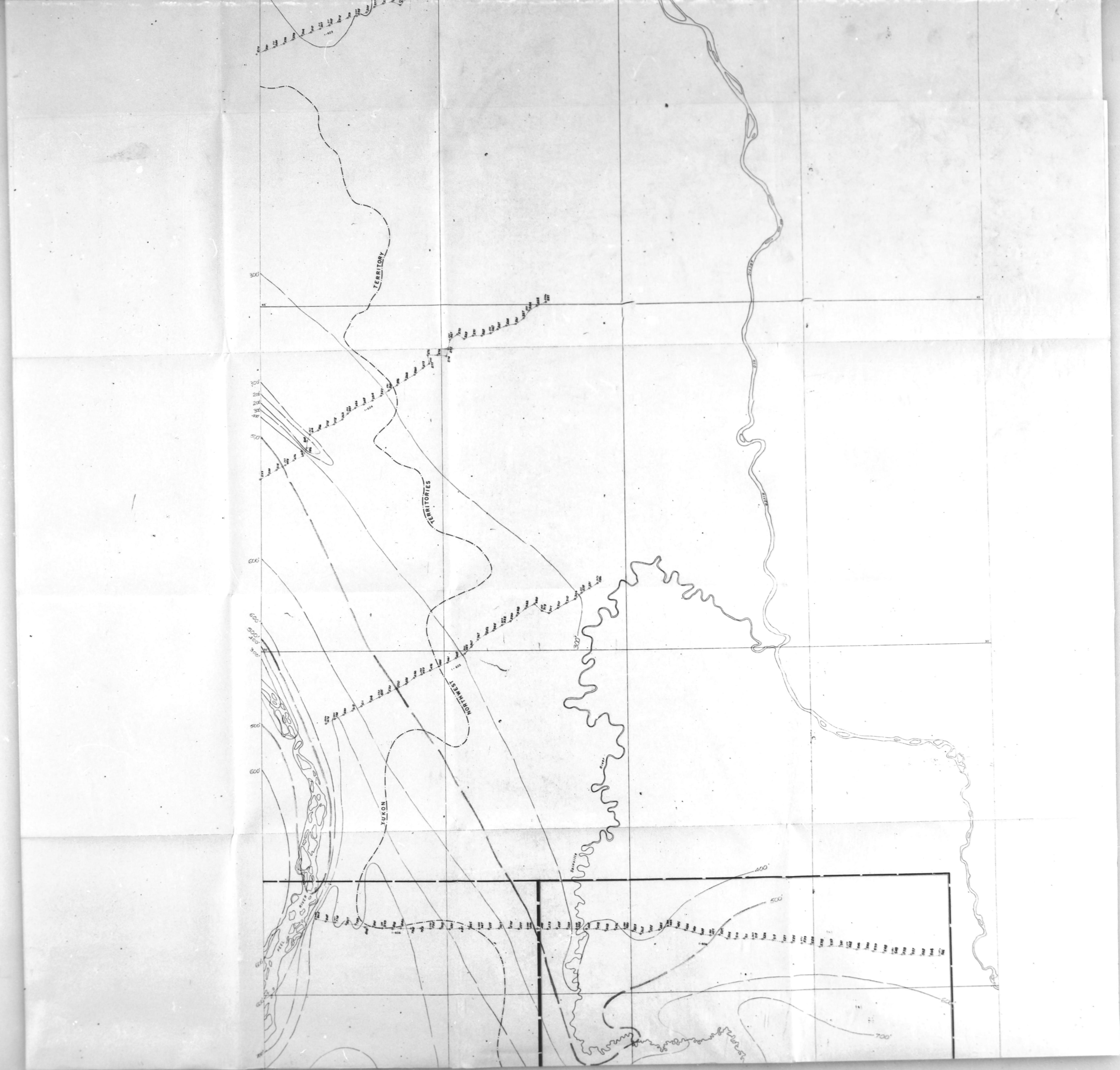
30 X



27.1 28.1 29.1 30.1 31.1 32.1 33.1 34.1 35.1
26.1 27.1 28.1 29.1 30.1 31.1 32.1 33.1 34.1 35.1
25.1 26.1 27.1 28.1 29.1 30.1 31.1 32.1 33.1 34.1 35.1

WEST CANADIAN GRAPHIC INDUSTRIES LTD.

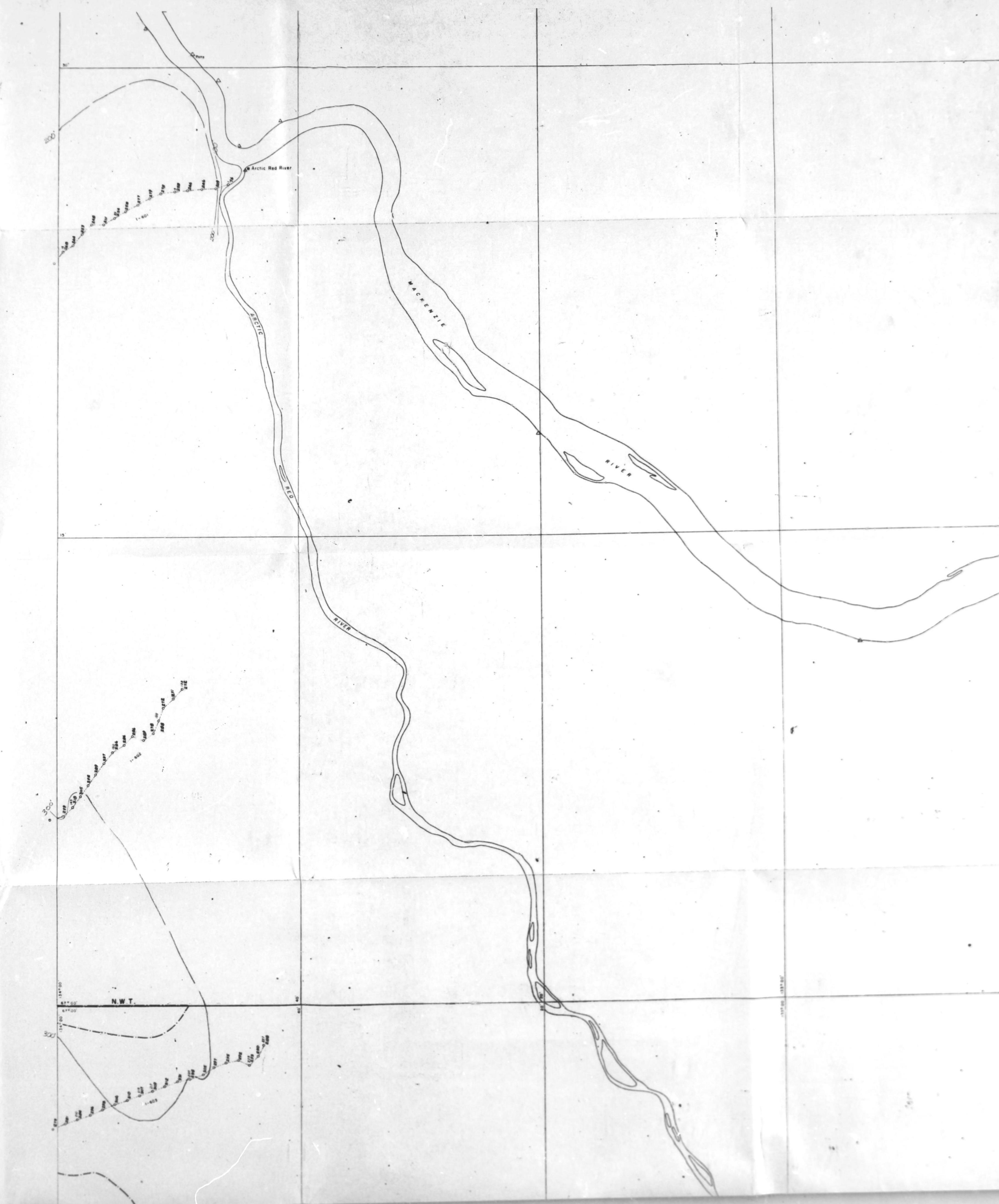
30X



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

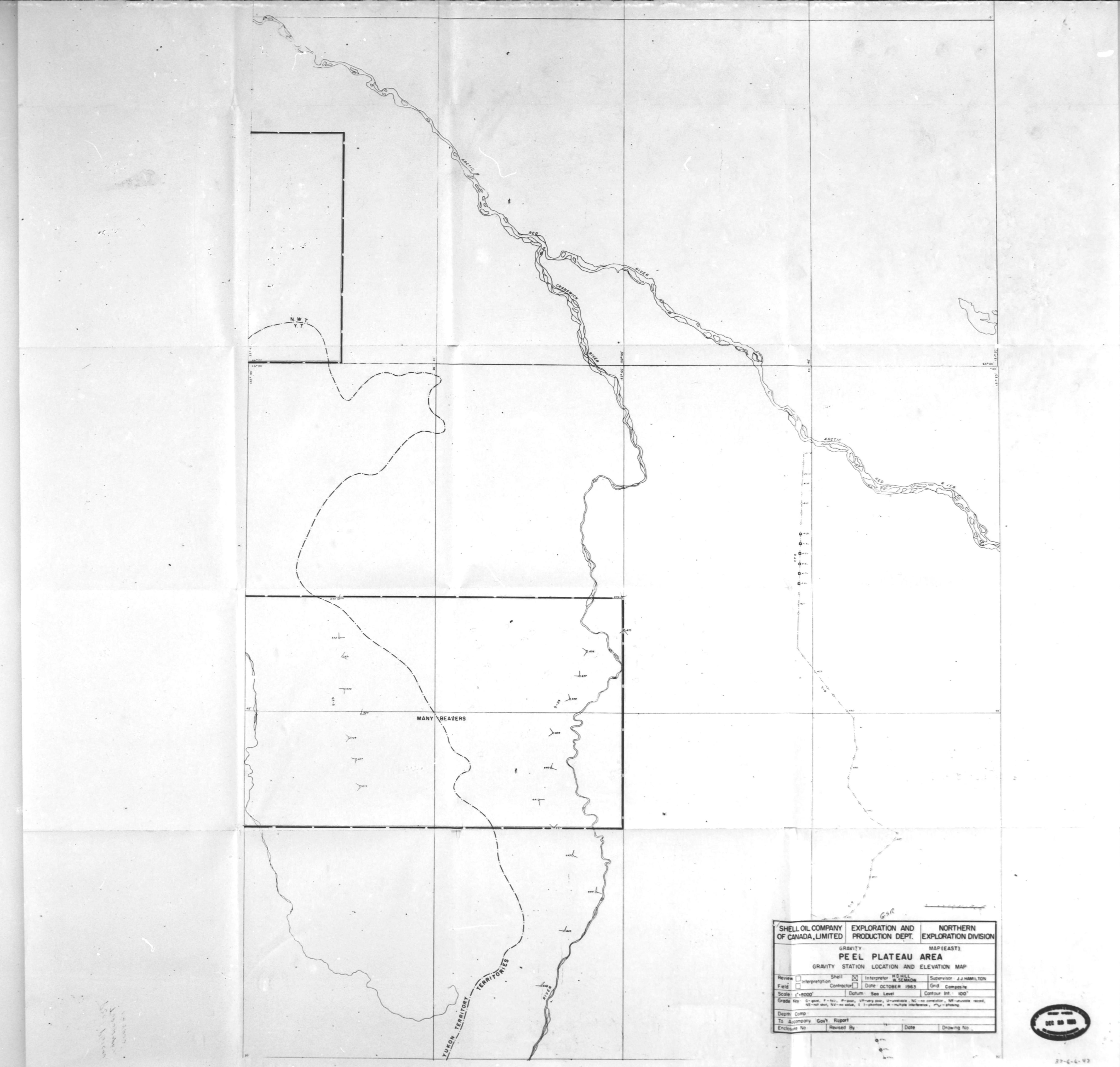
WEST CANADIAN GRAPHIC INDUSTRIES LTD.

30 X



WEST CANADIAN GRAPHIC INDUSTRIES LTD

30X



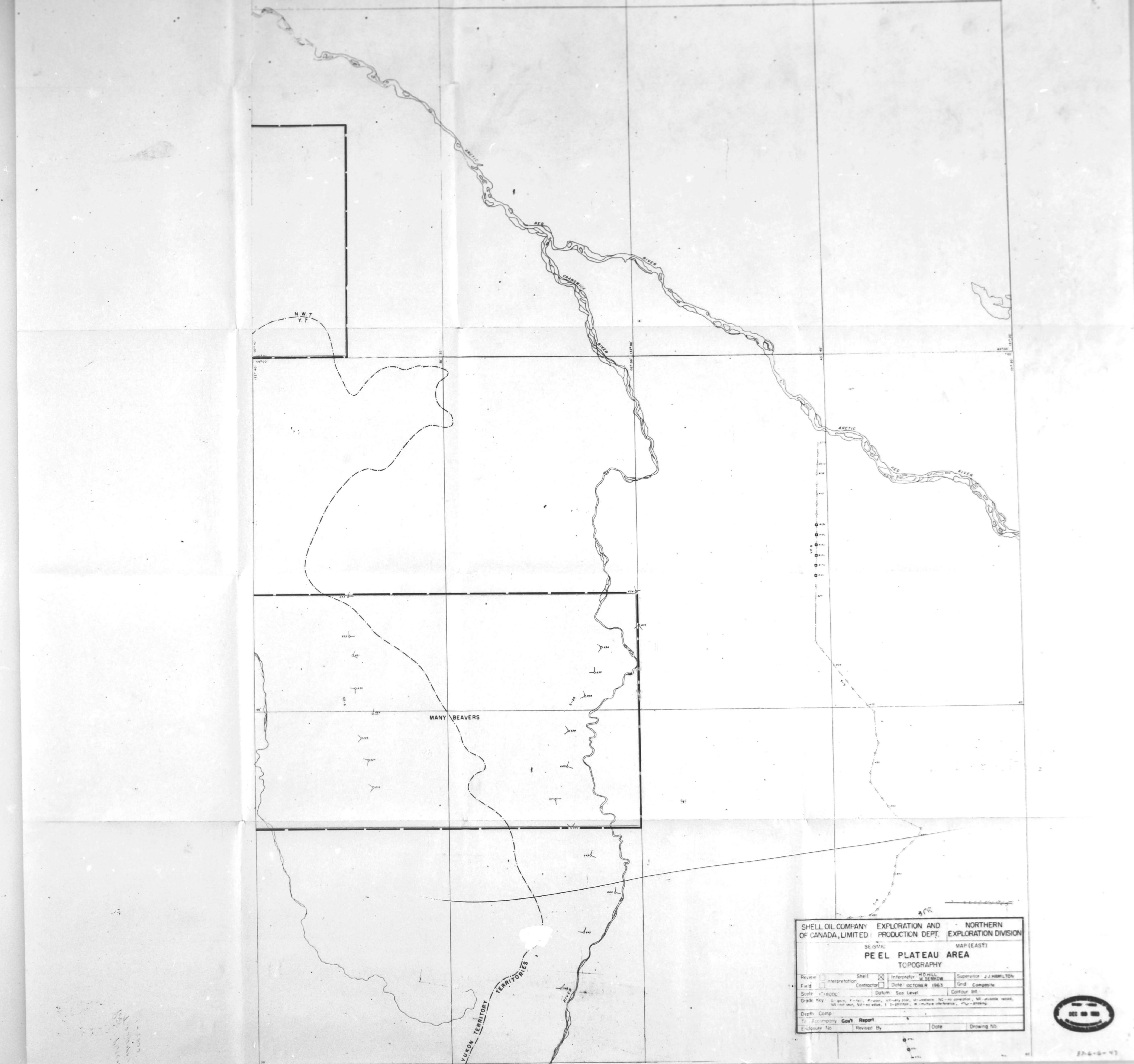
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

WEST CANADIAN GRAPHIC INDUSTRIES LTD.

30 X



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

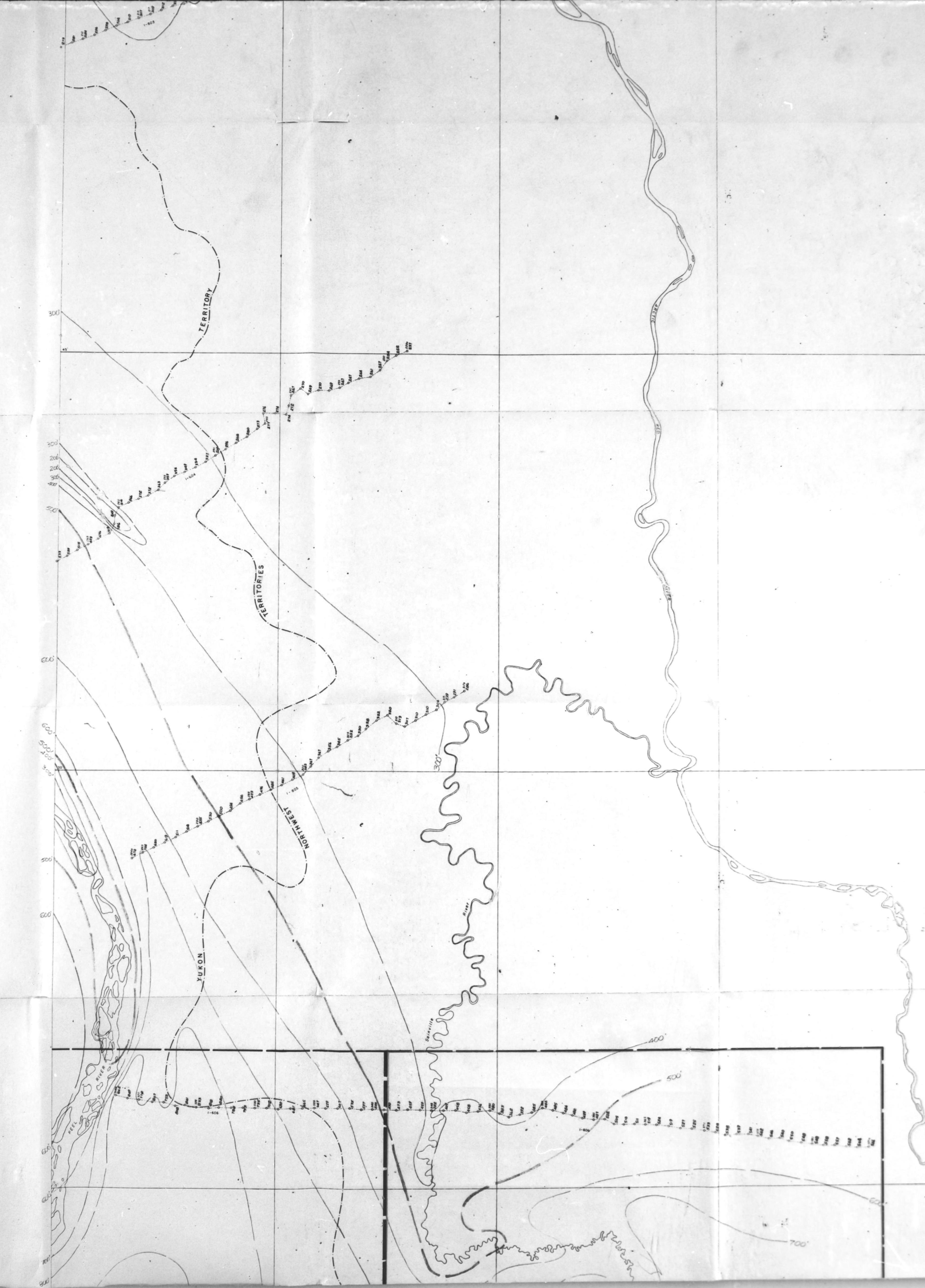




30X

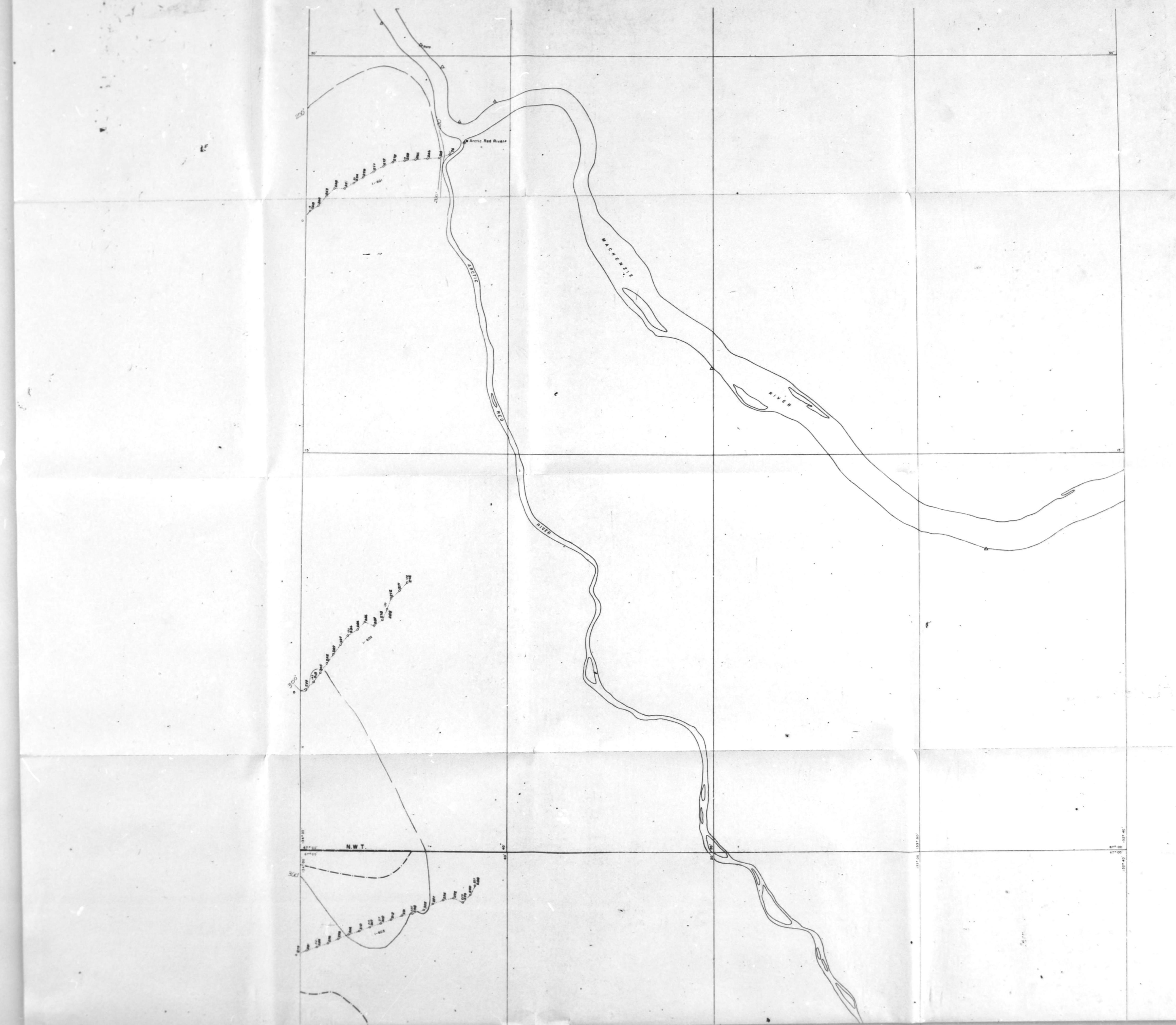
WEST CANADIAN GRAPHIC INDUSTRIES LTD.

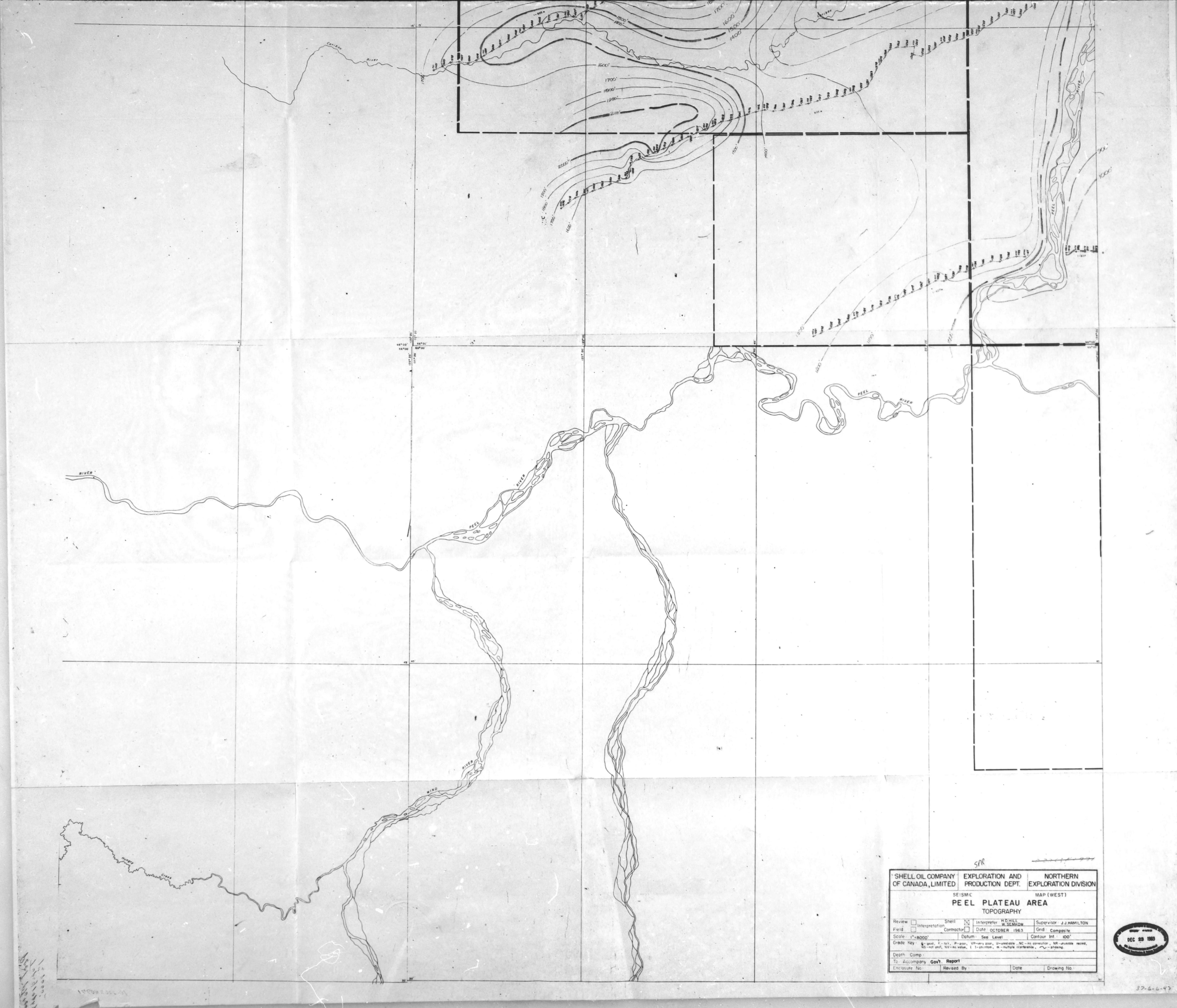




WEST CHINIAN GRAPHIC INDUSTRIES LTD.

30X





1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

WEST CANADIAN GRAPHIC INDUSTRIES LTD.

30 X



