

REPORT ON LAND GRAVITY SURVEY
WINDY POINT AREA
NORTHWEST TERRITORIES
1970

By

KENTING EARTH SCIENCES
WESTERN DIVISION
CALGARY, ALBERTA

FOR

SHELL CANADA LIMITED
SOUTHERN DIVISION EXPLORATION
EDMONTON, ALBERTA

ON

PERMITS NO. 6407, 6408 AND 6410 TO 6418
ALL OF WHICH ARE INCLUDED IN GROUP NO. 530
AND
OFF-PERMIT WORK FOR WHICH PRIOR APPROVAL GRANTED

ASSIGNED GOVERNMENT PROJECT
NO. 37-8-4-70-1

TABLE OF CONTENTS

	<u>PAGE</u>
LOCATION MAP	
INTRODUCTION	
General	1
Location	1
Accessibility	1
Topography	2
SURVEY PROCEDURES	
Field Operations	3 & 4
Field Method	4, 5, 6,
Compilation of Field Data	6
DISCUSSION OF RESULTS	7
SUMMARY AND CONCLUSIONS	8
APPENDIX	
ENCLOSURES	
1. Surface Elevations Map	
2. Magnetic Intensity Values Map	
3. Bouguer Gravity Values Map	
4. Plotted Profiles showing Elevation, Magnetic Intensity & Bouguer Gravity	
a) Line A	
b) Line B South	
c) Line B North	
d) Line C	

WINDY POINT



INTRODUCTION

General

Shell Oil Company of Canada contracted with Kenting Earth Sciences, Western Division, to carry out a Gravity and Magnetic Survey on lines selected by Shell in an area west of Great Slave Lake, some sixty (60) miles south west of the City of Yellowknife. One hundred (100) miles of line were covered with stations at intervals of 500 feet. The results of this survey work have been presented as three (3) profiles along the three lines laid out by the company. Profiles show Bouguer gravity, surface elevations, and vertical field magnetics.

Location

As indicated on the accompanying map, the area in question is located to the west of Great Slave Lake in the area of Windy Point, some sixty (60) miles south west of the City of Yellowknife. The boundaries of the area lie within Latitude $60^{\circ} 25'$ north to $62^{\circ} 10'$ north, and Longitudes $115^{\circ} 10'$ west to $116^{\circ} 20'$ west.

Accessibility

The survey area is accessible from the Fort Providence-Yellowknife Highway along Line "A", bulldozed right from the said highway to Great Slave Lake. It was also accessible by means of light ski-equipped aircraft to any one of a number of lakes or dry sloughs within the survey area. In summer months, float-equipped aircraft could get to many of these lakes and as well, the area could be reached by boat from Yellowknife or Hay River across Great Slave Lake.

Topography

In general, the survey area is flat to gently rolling. There are a number of localized elevation changes of 10 to 30 feet, due in most cases to outcropping rock with a sheer side. Water availability is good from a number of small lakes and sloughs scattered throughout the property.

The timber for the most part is light; however in some areas, it is quite thick.

FIELD OPERATIONS

On March 6, 1970, two (2) geophysical Operators carrying with them a Geodetic Gravity Meter and Vertical Force Magnetometer arrived in Yellowknife for transport to the property by light aircraft. Upon arrival, it was found that the gravity meter accessories had not been offloaded by the airline company, Pacific Western, and had in fact proceeded onward with the aircraft to Inuvik. Several days of enquiry finally yielded the fact that the accessories were sitting in the Pacific Western Airlines facility at Inuvik, and were returned to Yellowknife by March 12th.

The initiation of work on the property had commenced the latter part of February with the arrival of bulldozers from Fort St. John, British Columbia, and of the survey team from Grande Prairie, Alberta. By the time the gravity crew reached the property, Line "A" had been cut out and surveyed from the Fort Providence-Yellowknife Highway to Great Slave Lake, and Line "B", south from a point near Great Slave Lake, was well on its way to completion. The camp at this time was near the intersection of Line "A" and Line "B". Since the gravity crew was dependent upon the bulldozing crew for accommodation, the result of the delay of equipment was that the gravity personnel were travelling several hours each day to get a very few hours of work done. With continued good progress by the bulldozers and surveyors, the situation did not improve and in fact worsened to the degree that it was necessary to send in a helicopter from Hay River to assist the gravity crew in catching up to the bulldozing and surveying operation. Field operations concluded on April 4th, 1970, and all personnel and equipment were out of

the project area at that time.

A further problem was encountered in that the survey notes for Line "C" were lost in transit from Yellowknife to Calgary and it was found necessary to send a crew back in May to re-survey this line. In addition, certain sections of the gravity work were thought to be of unacceptable quality and a gravity team was sent in also in May to re-do these portions of the lines.

Field Method

The lines were bulldozed using D-7 caterpillar equipment. The bulldozing crew pulled a portable camp with them, which was used as accommodation for the survey and gravity teams, in addition to the bulldozer operators.

The surveying was carried out using levels for the elevations and transits for the horizontal control.

A line was set off from the Fort Providence-Yellowknife Highway at an angle to coincide with the line laid out by Shell. This line was cleared by the bulldozer to the edge of Great Slave Lake making a trail wide enough for travel by light pickup. This Line "A" served as access to the area for fuel hauls, survey teams, etc. From the points designated by the client, Lines "B" and "C" were turned off from Line "A" and cleared and surveyed to the length prescribed, except that in the case of the south end of Line "B", the line was not carried across the Bay of Great Slave Lake for two reasons. First of all, the detour required by the bulldozers to get to the other side of the Bay was long and time consuming; and secondly, gravity observations across the Bay would have been meaningless without some means of determining ice thickness and water depth;

these means were not available to the crew, nor were they prescribed by the contractual agreement.

Line "A" was elevated from a Bench Mark 89 near Mile 90 on the Fort Providence-Yellowknife Highway and tied to a Bench March on a Township and Range survey extending along the west side of Great Slave Lake from the Hay River Area. The length of Line "A" was approximately 31.5 miles. Line "B", at the easterly extremity of Line "A" proceeded northwards for approximately 15 miles and southward for 28.25 miles. Line "C" was turned off from a point 54,500 feet east of the Yellowknife Highway on Line "A" and was cut in a northerly direction for approximately 14 miles and to the south for approximately 11 miles.

Points were chained along all Lines at 500 foot intervals and leveled to closure accuracy of 1.5 feet.

The geophysical observations were made using a Scintrex Geodetic Gravity Meter with a scale constant of 0.10349 milligals, while the magnetic observations were made with a Sharpe A-2 Vertical Force Magnetometer with a scale constant of 20.0 gammas.

The geophysical survey commenced with the locating of Base Stations at convenient intervals along the lines using the A B, A B method for looping. The same base stations were used for both the gravity and magnetic observations.

Transportation for the surveying and gravity teams was supplied in most

DISCUSSION OF RESULTS

The survey and magnetic information is in standard form and presents no particular problem.

The gravity data on the other hand shows, in instances, an apparent "noise" level above the designated specifications. It is thought that in most, if not all, instances this "noise" is due to lateral variations in surface density as represented by outcropping rock vs unconsolidated overburden. The effect of bodies of water, whose density contrasts with the surrounding land, has also been noted in the course of the survey. Such variations as described above cannot be eliminated by normal surveying techniques; however the effect can be reduced by applying a 3 or 5 point averaging calculation to the data.

SUMMARY AND CONCLUSIONS

The gravity survey program discussed herein was in difficulty from the initiation of the survey due to the problem of equipment described earlier in the Report. This problem was compounded by the loss of survey notes for Line "C" and by the apparent susceptibility of the meter to "set" during the travel on rough trails from camp to the survey location.

In spite of the above considerations, the data is thought to be of good quality and should serve the purpose for which the survey was designed.

Respectfully submitted,

KENTING EARTH SCIENCES
Western Division

A handwritten signature in black ink, appearing to read 'J. B. Prendergast', with a large, stylized initial 'J' and a long, sweeping horizontal stroke at the end.

J. B. Prendergast, M.A., P.Eng.
Division Manager.

Calgary, Alberta
June 11, 1970.

APPENDIX

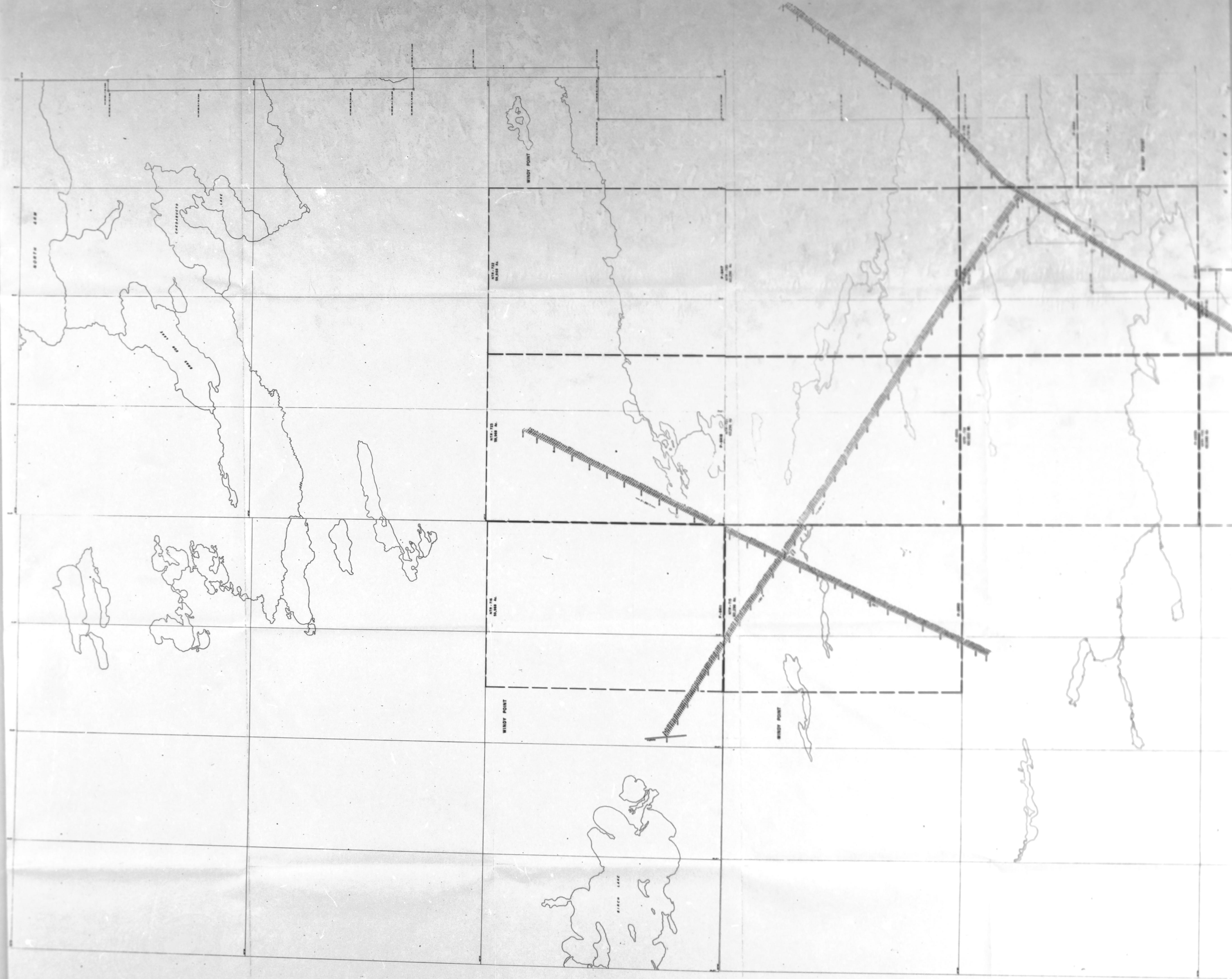
Statistical Summary

Initiation of Field Operations, Bulldozing and Surveying	February 1970
Gravity and Magnetic Surveying	March 12, 1970
Termination of Field Operations, Bulldozing and Surveying	March 1970
Gravity and Magnetic Surveying	April 4, 1970
Total Number of Gravity Observations	1,022 Stations
Total Number of Magnetic Observations	1,023 Stations

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

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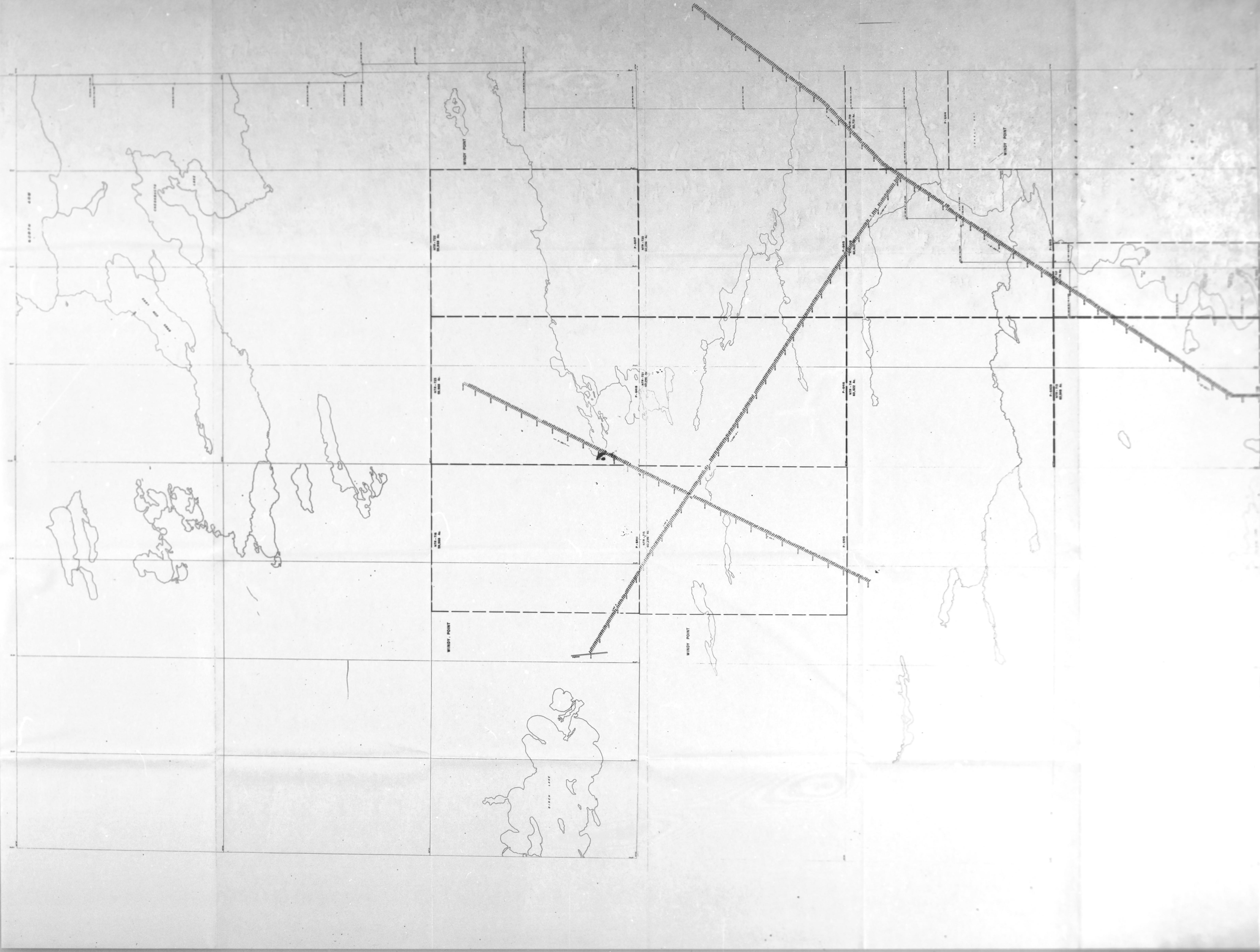


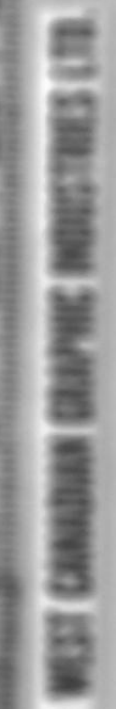
MAP SHOWING
SURFACE ELEVATIONS
BY
SHELL CANADA LIMITED
KENTING EARTH SCIENCES
Western Division
WINDY POINT AREA
NET

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

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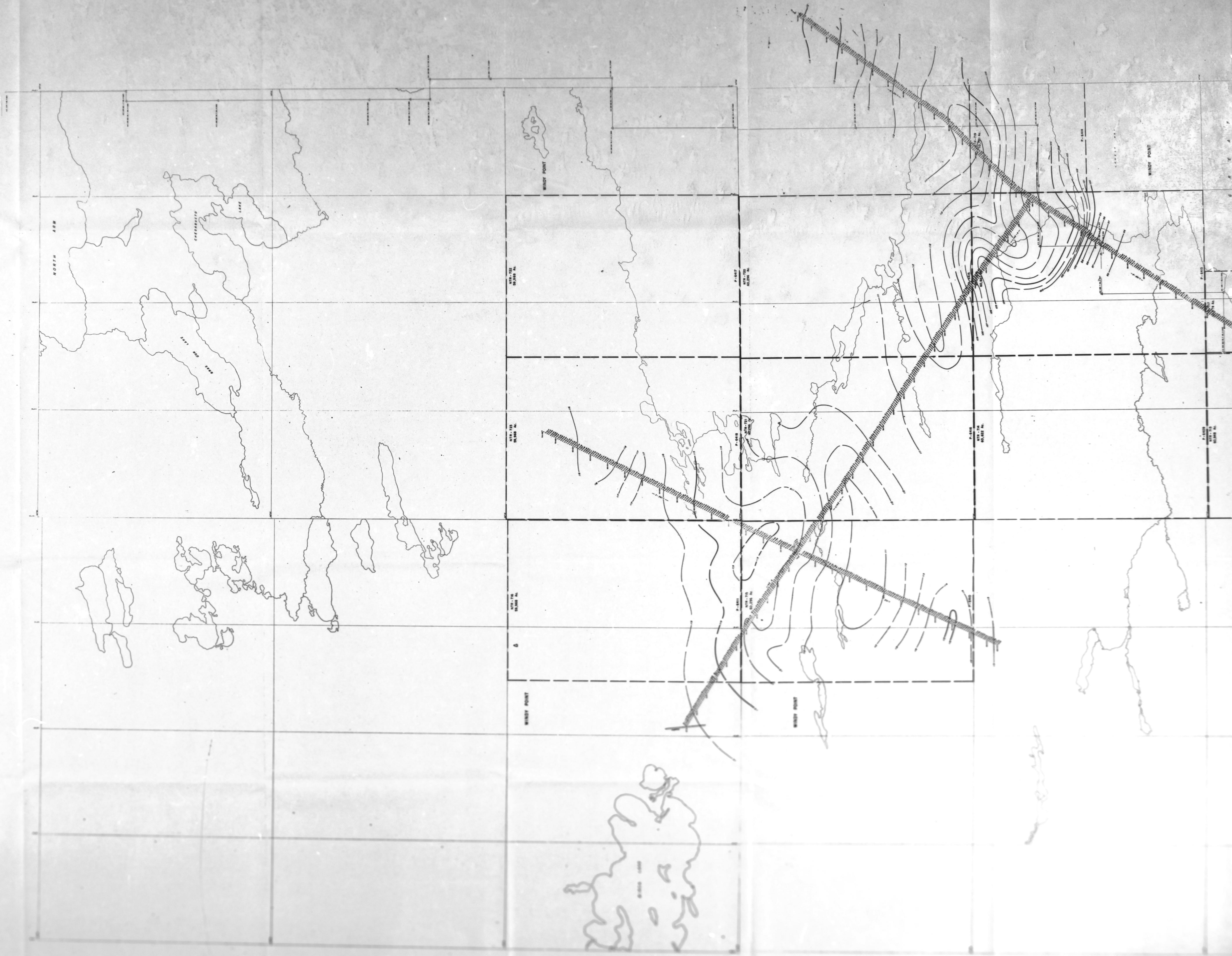


NEW JERSEY
MAGNETIC INTENSITY
NO
SHELL CANADA LIMITED
NO
STANDARD EARTH SCIENCES
WARRING GUYANA
WARRING GUYANA
WARRING GUYANA
WARRING GUYANA



WEST CANADIAN GRAPHIC INDUSTRIES LTD.

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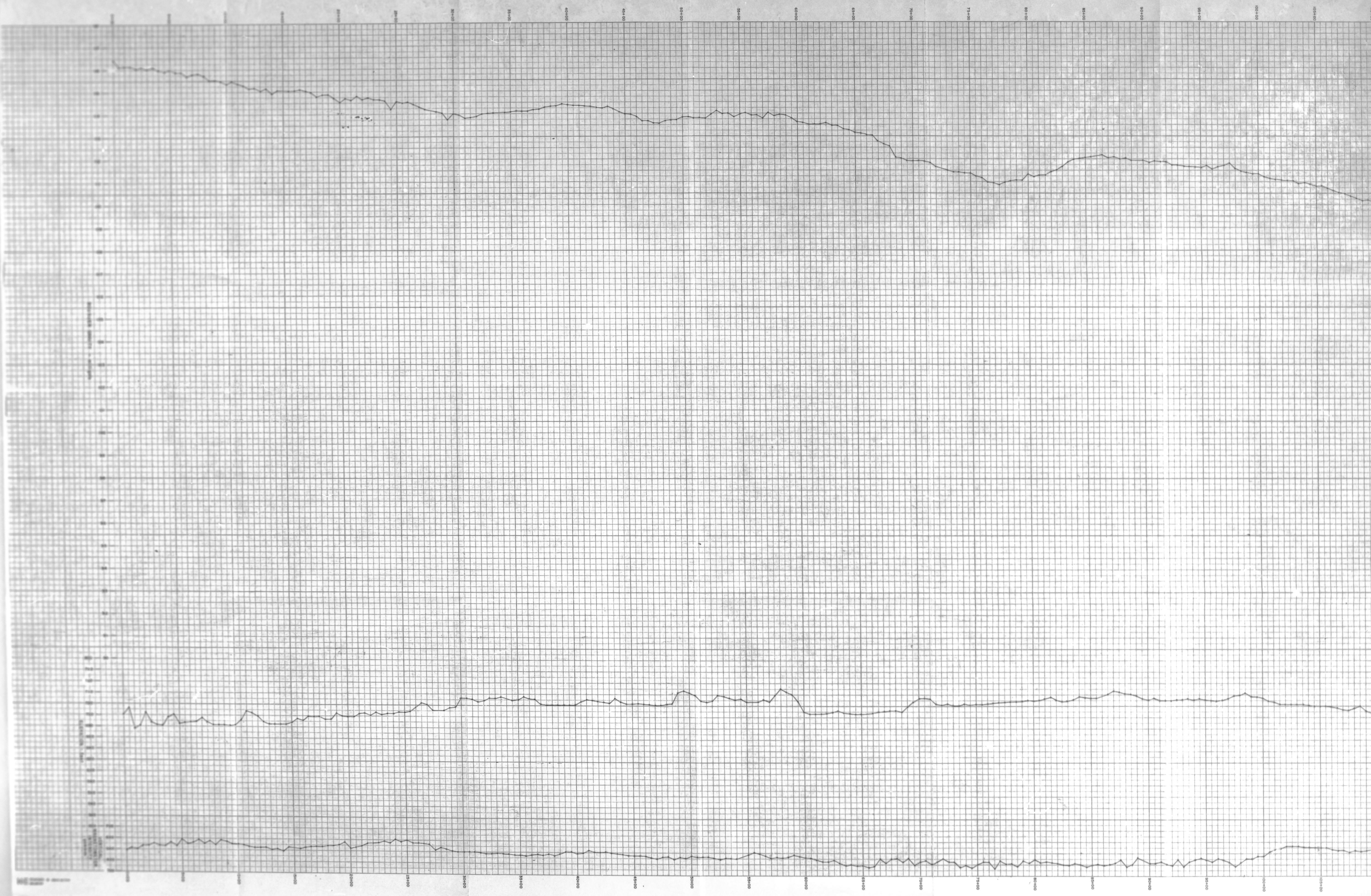
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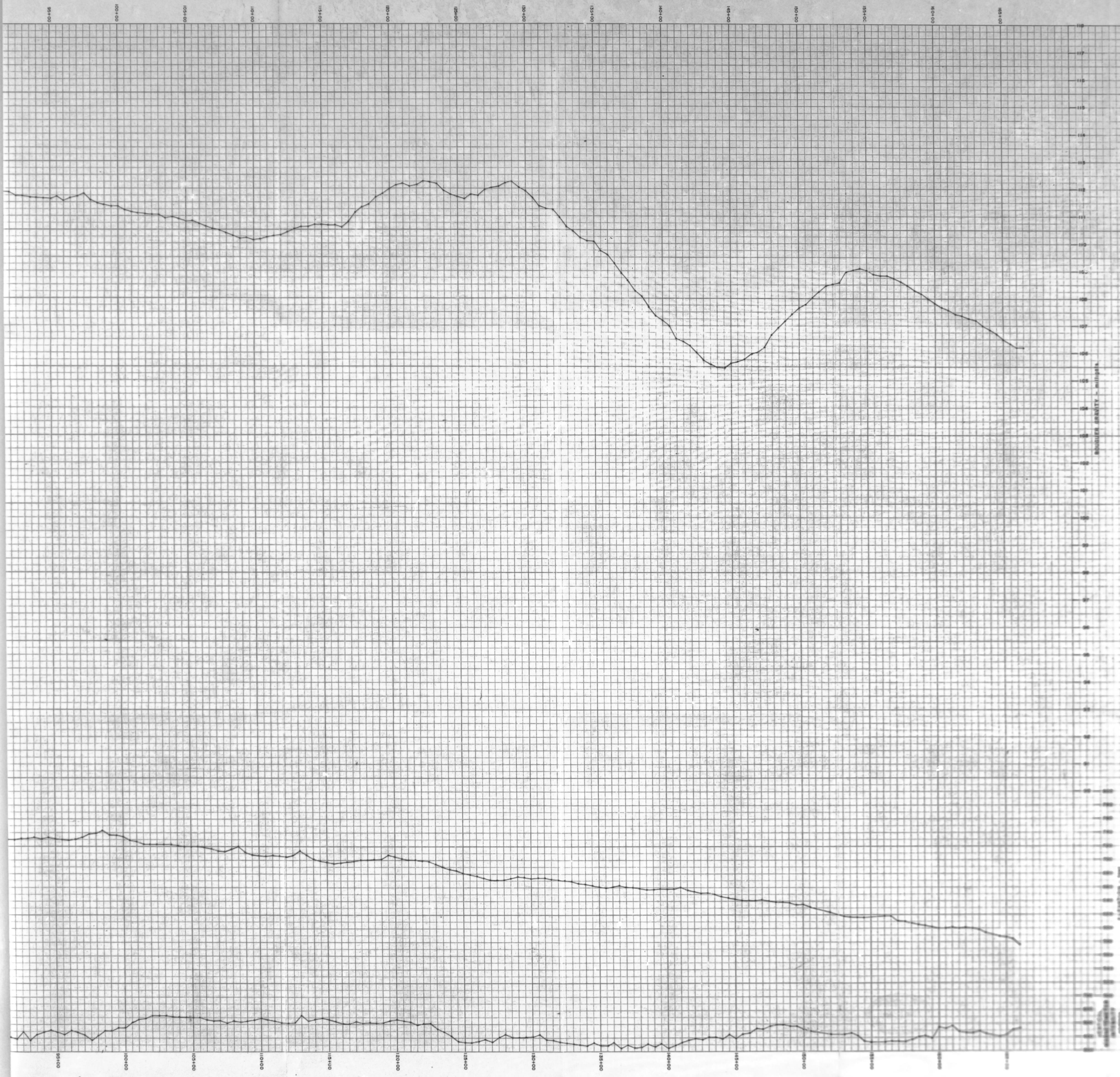
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WEST CANADIAN GRAPHIC INDUSTRIES LTD.



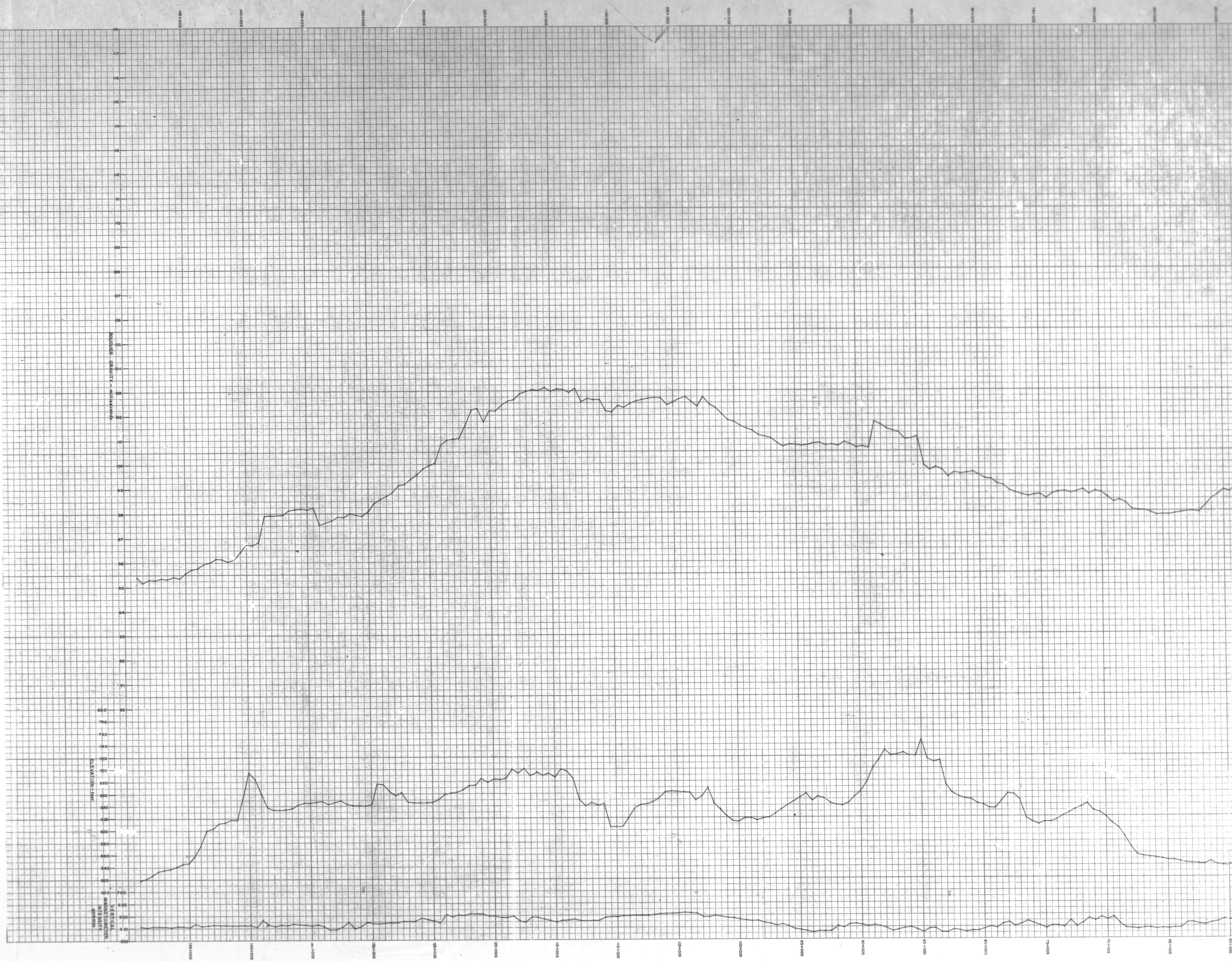
LINE A

PROFILE
Report made by
SHELL CANADA LIMITED
Western Earth Sciences
Western Division
Winnipeg, Manitoba
S.W.T.
Date: 1964
Project: 100-1000
Sheet: 100-1000

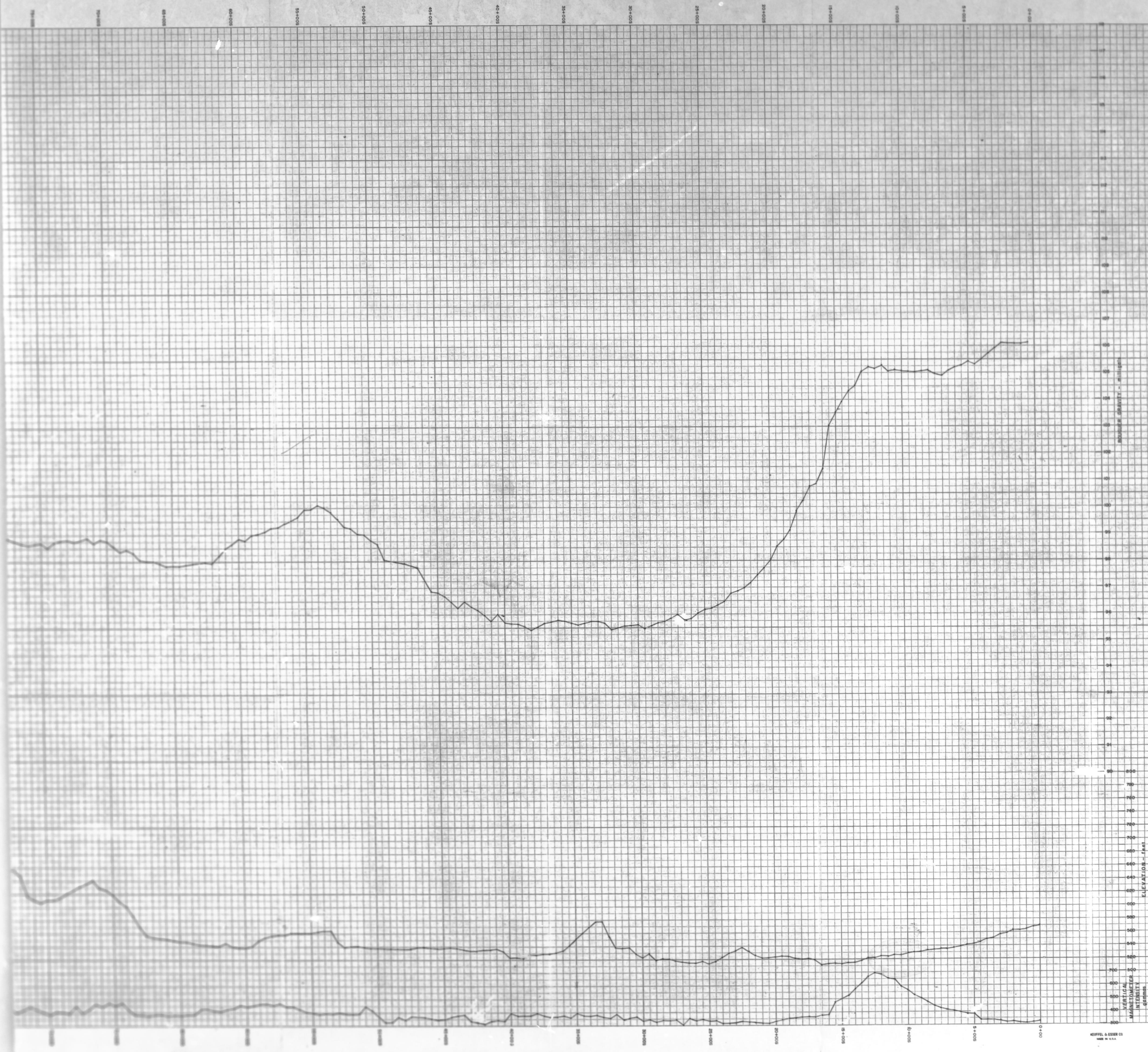
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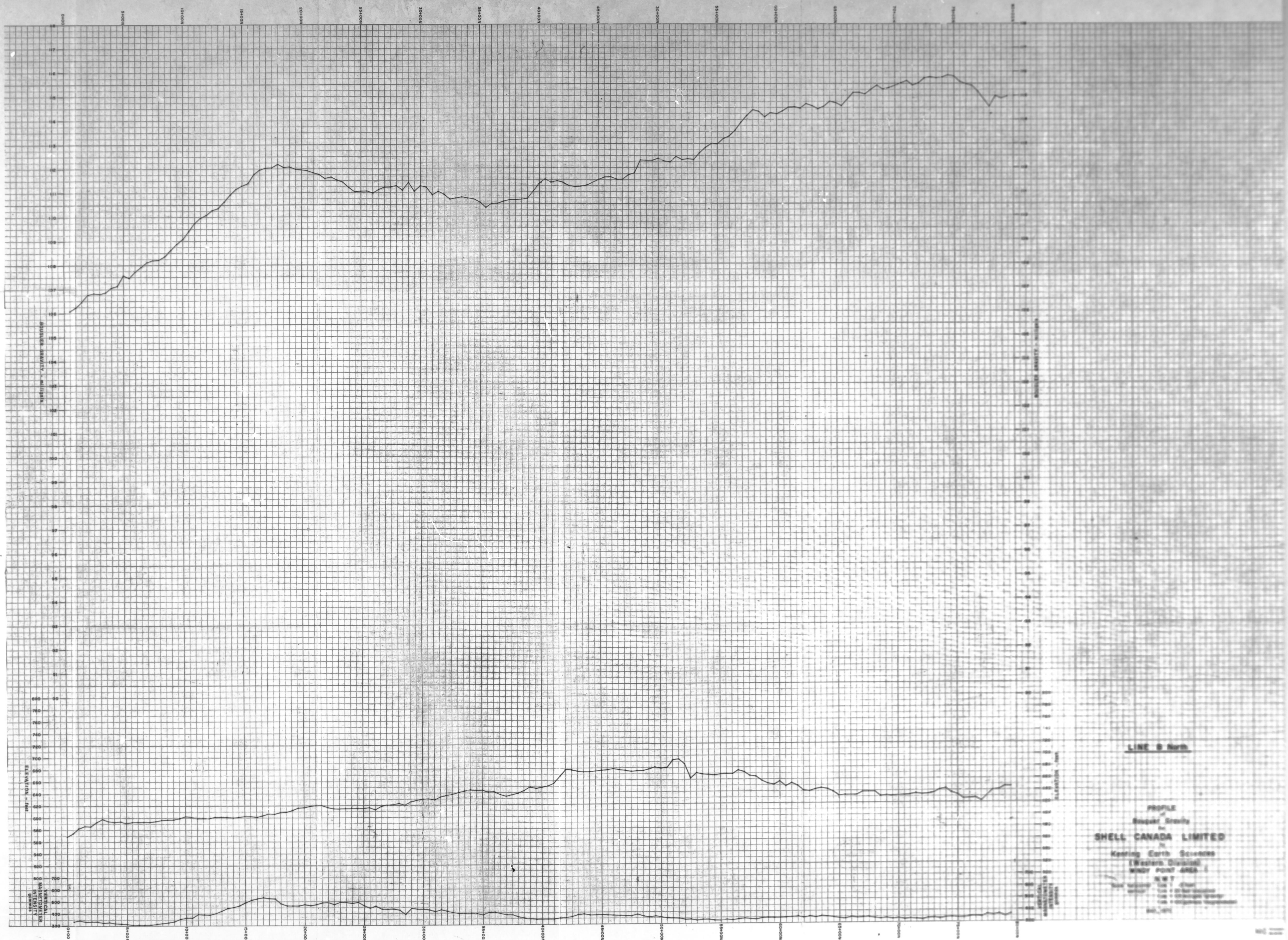
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LINE B South

PROFILE
of
Bouguer Gravity
for
SHELL CANADA LIMITED
by
Kenting Earth Sciences
(Western Division)
WINDY POINT AREA
NW-1
Scale: Horizontal 1 cm = 10 feet
Vertical 1 cm = 20 feet (Bouguer)
1 cm = 50 milligauss (magnetic)
1 cm = 100 gamma (magnetic)
MAY 1970

KENTING & EARTH SCI
MAY 1970

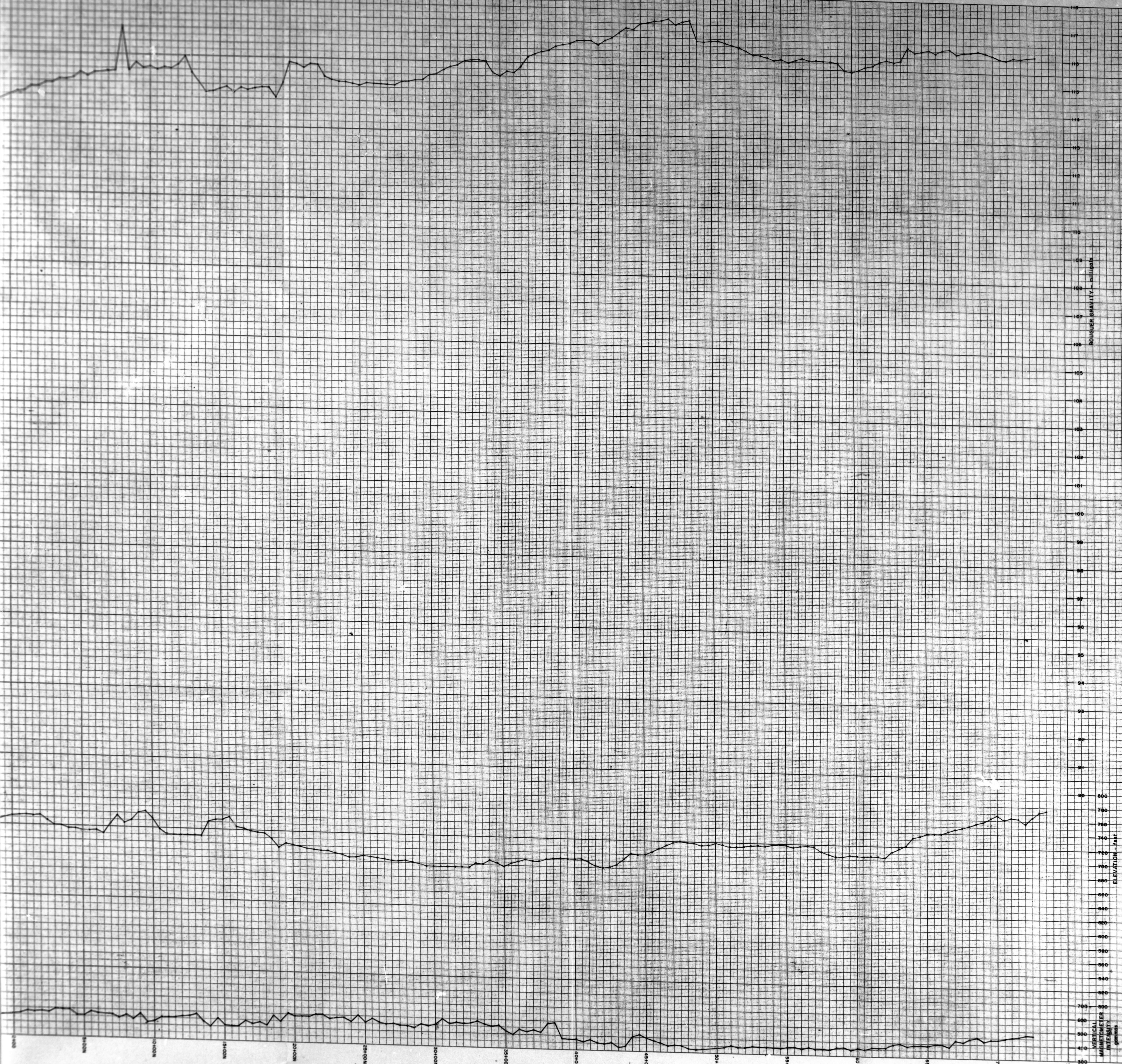


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

WEST CANADIAN GRAPHIC INDUSTRIES LTD.

30x





BOUGUER GRAVITY - milligals

ELEVATION - feet

VERTICAL MAGNETOMETER INTENSITY - gamma

LINE C

PROFILE
of
Bouguer Gravity
for
SHELL CANADA LIMITED
by
Kenting Earth Sciences
(Western Division)
WINDY POINT AREA
N.W.T.
Scale: horizontal 1cm = 10 feet
vertical 1cm = 20 feet (elevation)
1cm = 0.5 milligals (gravity)
1cm = 100 gamma (magnetometer)
MAY, 1970