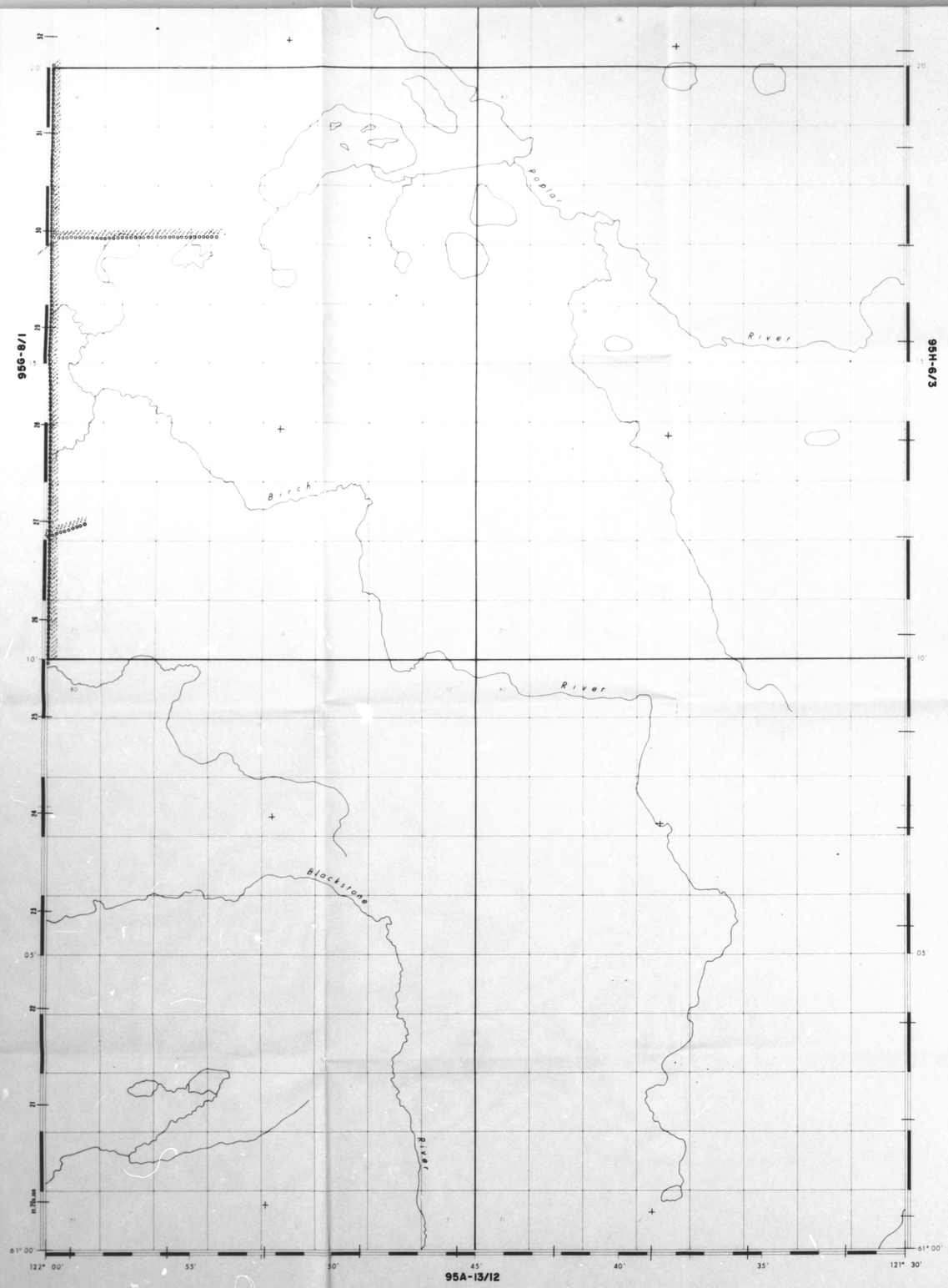


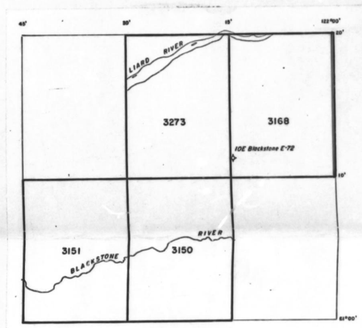


**BLACKSTONE AREA**
**IMPERIAL OIL ENTERPRISES LIMITED**

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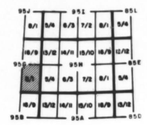


## SURFACE ELEVATIONS

# FORT SIMPSON 95 H - 5/4

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

Oxford's Reproductions & Photocopying Ltd.



North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Wells Revised .....

| Gp | 95H-5/4 | 4 | V | | | |
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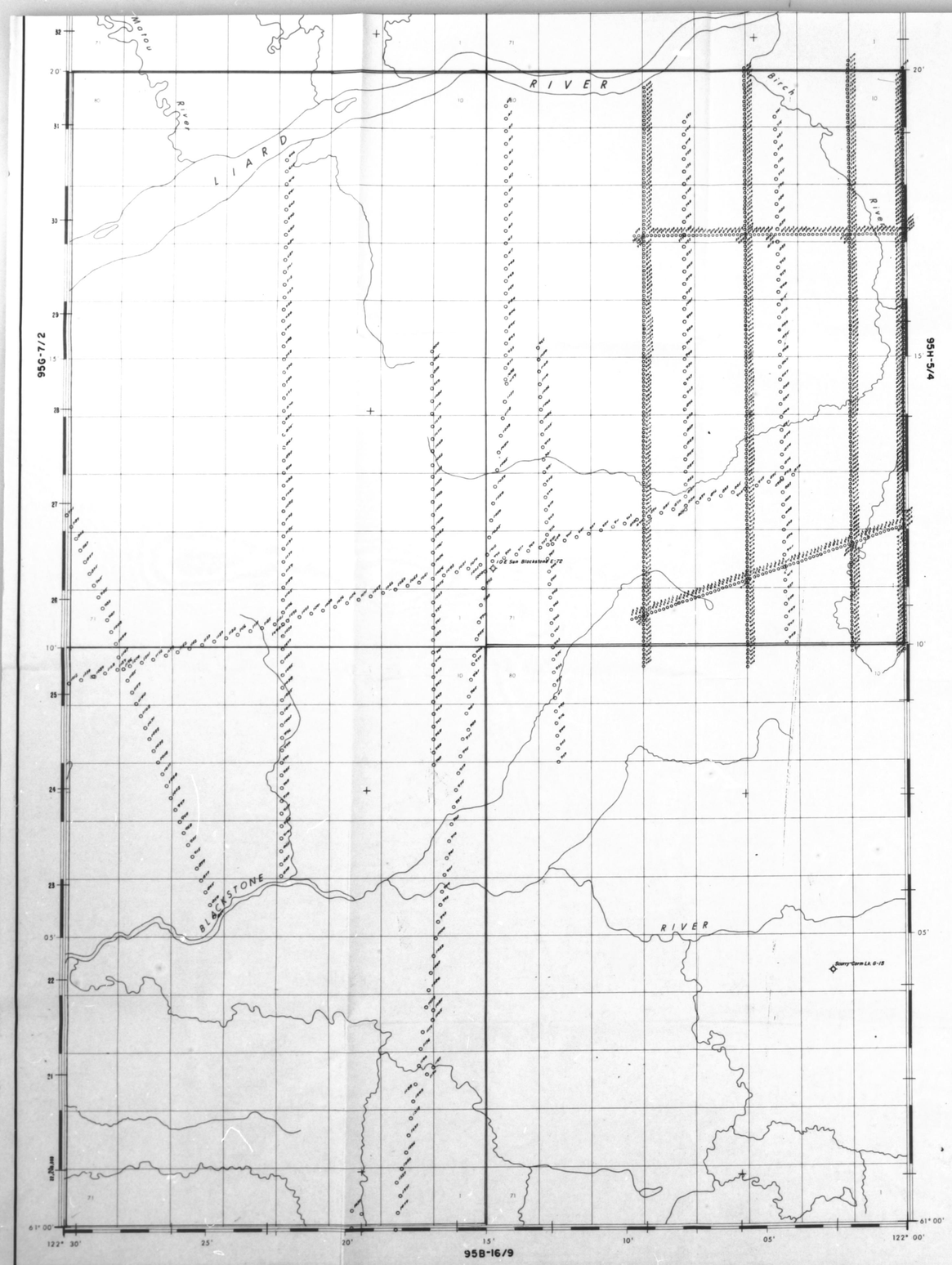


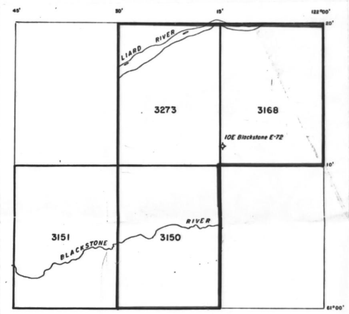


BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED

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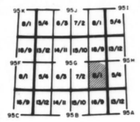


SEISMOGRAPH MAP

Contour Interval .....
Datums: Plane ..... Velocity .....

SURFACE ELEVATIONS

# SIBBESTON LAKE 95 G - 8/1

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 ½ 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

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Seismic Revised Feb 21/79
Values Revised .....
Contours Revised .....
Wells Revised Jan 25/1979

PROPRIETARY

| Gp | 95G-8/1 | 6 | V | | | |
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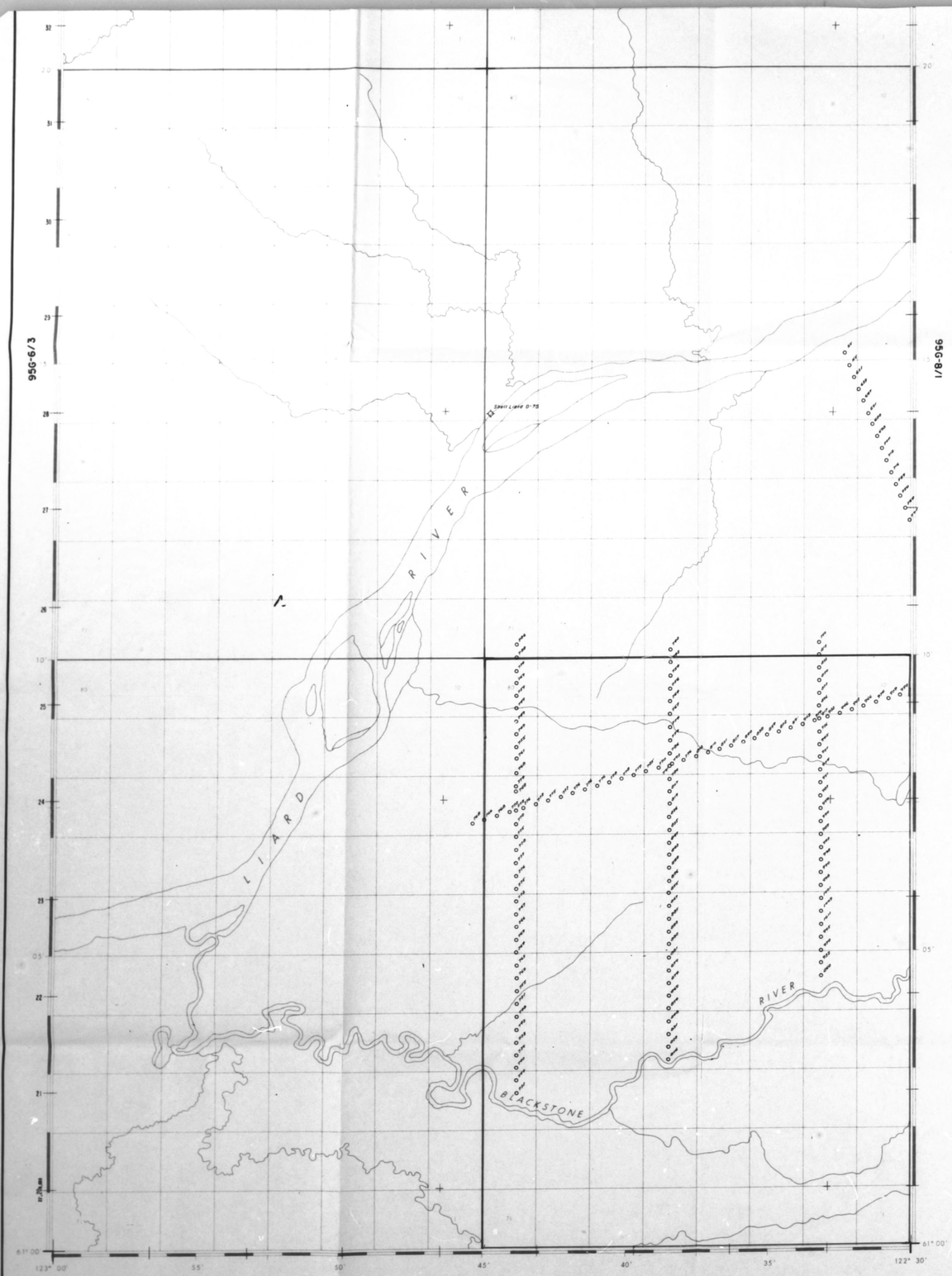


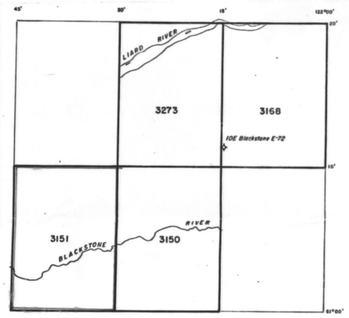


BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED

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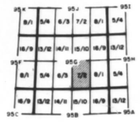



SEISMOGRAPH MAP

Contour Interval .....
Datums: Plane ..... Velocity .....

SURFACE ELEVATIONS

# SIBBESTON LAKE 95 G - 7/2

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Orkan's Reproductions & Photomapping Inc.



Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised .....

PROPRIETARY

| Gp | 95G-7/2 | 2 | V | | | |
|---|---|---|---|---|---|---|

Imperial Oil Enterprises Ltd.
Producing Department - Western Region

# Report on Reflection Seismic Programs on Blackstone N.W.T. Area

By: O. Friesen

October 23, 1970

Department Project Nos.: 7-6-4-70-3
7-6-4-67-4

76-4-92

IMPERIAL OIL ENTERPRISES LTD.
Producing Department - Western Region

# Reflection Seismic Program

## Blackstone Area

## Permits 3150, 3151, 3168 & 3273

STAGE I: Heiland Exploration Canada (1959) Ltd. Party 27D
from February 5, 1968 to March 14, 1968

IOE P.W.O. No: A5193-05

Department Code No: 7-6-4-67-4

STAGE II: Imperial Oil Enterprises Ltd. Party 11
from February 5 to 19, 1970

IOE P.W.O. No: A500133

Department Code No: 7-6-4-70-3

by

O. Friesen

Southern Exploration District
Edmonton, Alta

Date: October 23, 1970

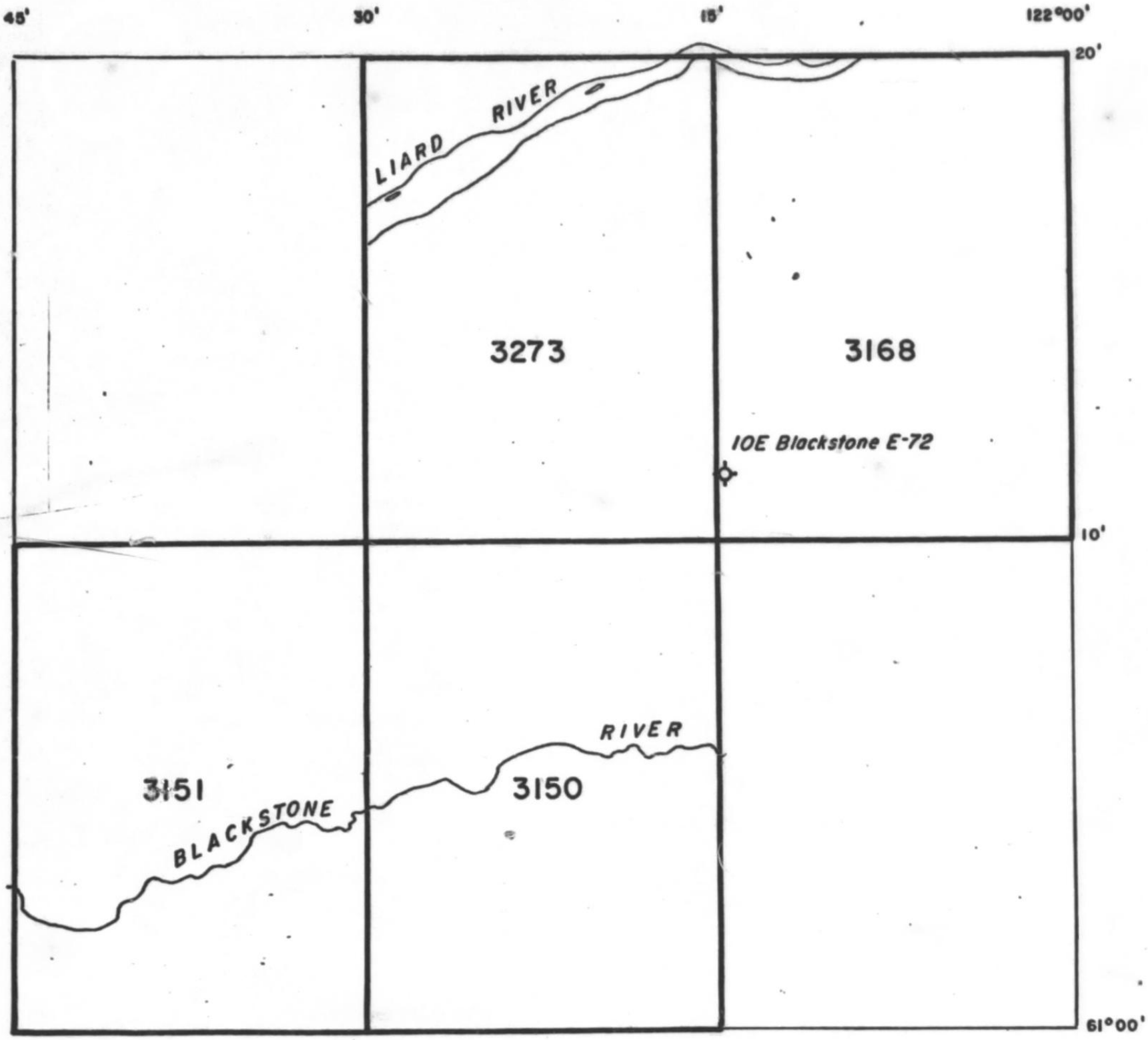
## Contents

## Introduction

This is a report on seismograph operations conducted by Heiland Exploration Canada (1959) Ltd. Party 27D on behalf of Imperial Oil Enterprises Ltd in the Blackstone Area during the period of February 5 to March 14, 1968.

Included in this report is the seismograph survey conducted by Imperial Oil Enterprises Party 11 in the Blackstone area during the period of February 5 to 19, 1970.

The Statistical Data, Field Procedures, and Data Processing will be treated separately for each seismograph party, since the surveys were conducted at different times, with different techniques employed.




# BLACKSTONE AREA
## IMPERIAL OIL ENTERPRISES LIMITED

SCALE: 1:250,000

## - Statistical Data -

**Stage I** : Heiland Exploration Party 27D.

**Dates** : The move to the Blackstone River area was completed on February 5, 1968. Recording commenced on February 6 and completed with the vehicles released on March 14, 1968.

**Production**: 118 miles, 467 shot points, average daily production 4 miles, 38 days worked. No down-days.

**Equipment**: Recorder, shooting truck, reel truck, 2 survey trucks, 4 shot hole rigs. All vehicles were mounted on wheels. The recording equipment was analog and recorded on "Carter Type" magnetic tape. The Imperial Aztec Aircraft was used for scouting and supervisory work. Crew supplies for the most part were supplied by truck. Three D-7 caterpillar tractors were used for Bulldozing and camp moves.

**Personnel**: Party Manager, Operator and Assistant, Shooter and Helper, two surveyors, two rodmen, four line helpers, six drillers, six drill helpers, cook and helper and camp attendant.

**Surveying**: The survey crew consisted of four men with two vehicles. Horizontal angles were measured with a WILD T-16 theodolite and calculations carried to the nearest one-half minute of arc.

The survey for the program was tied to the Dominion Government base line which is located near Fort Simpson.

Conditions: Weather conditions for the arèa were typical for February and March. Deep snow, windy and cold.

## - Field Procedures -

A 100% C.D.P. method of shooting was used with 3-hole pattern shots, spaced 1320' apart. Station distance was 110' with 8 geophones between stations. Charge sizes varied from 5 to 10 pounds of "Geogel" per location. Drilling was difficult as many holes struck gravel, rocks and sandstone. The average shot depth was 45 feet.

## - Data Processing -

All of the seismograms were corrected to a datum of +1500' A.S.L. using a datum velocity of 9000'/sec. Weathering corrections were applied where the base of shot did not reach the base of the weathered layer.

The field tapes were played back on a Carter playback machine giving a variable density film presentation of each line of seismograms.

The analog playback system employed filters to eliminate noise and low frequency interference energy.

The processing was done in the Imperial Oil processing centre.

## - Results and Interpretation -

The results of Party 27D's shooting and interpretation are incorporated with the results of the Party 11 shooting in the final portion of this report.

## - Statistical Data -

**Stage II:** Imperial Oil Enterprises Party 11.

**Dates :** The move to Blackstone was completed February 4, 1970. Recording began February 5 and was completed on February 19, with the vehicles released on February 20, 1970.

**Production:** 62 miles, 752 shot points, average daily production was four miles, 15 days worked, no weather days or equipment failures.

**Equipment:** Recorder, two shooting trucks, two cable trucks, two survey trucks, one panel truck, one water truck, five shot hole drills, three dozers (2-6C's & 1-7E), one shift truck. I.O.E. Aircraft Caribou was used to bring in personnel and the I.O.E. Aircraft Aztec was used for supervisory trips.

Digital recording equipment was used. Supplies were brought in by both aircraft and truck.

**Personnel:** Party Manager, Operator and Assitant, Shooter and Assistant, two surveyors, two rodmen, five geophysical helpers, five drillers, five drill helpers, water truck driver, six dozer operators and one foreman, two cooks, one cook's helper and one camp attendant.

**Surveying:** Horizontal angles measured to one minute with T1A WILD theodolite. Horizontal control based on transit and chain traverse from Hunt's survey from Ft. Nelson to Ft. Simpson and Canadian Engineering Surveys aerodist tied into government aerodist control. Vertical based on Hunt's control.

Conditions: Weather was typical for the area with temperatures ranging from 0° - 50°.

## - Field Procedures -

A 300% C.D.P. method of shooting was used with single hole shots, spaced 440' apart. Station spacing was 110' with 16 geophones over 220'. Charge sizes varied from 2½ lbs to 20 lbs of "Geogel" per location. Drilling was good with some gravel holes near creek bottoms. Average hole depth was 40'. Recording was digital.

## - Data Processing -

All of the seismograms were corrected to a datum of +1500' A.S.L. using a datum velocity of 9000'/s. Weathering corrections were applied where the base of shot did not reach the base of the weathered layer.

The data was played back digitally with 3-fold stacked sections produced on variable density film. The data was filtered and some lines were deconvolved where it was felt necessary to remove multiple energy. The processing was done in Imperial Oil's Process Centre.

## - Results and Interpretation -

The quality of the Party 27D single-fold shooting was not as good as the Party 11 300% C.D.P. coverage. This of course may have been expected since the 300% fold stack enhanced the data considerably.

The quality of the single fold data however was sufficient to carry the major reflector which was the top of the Middle Devonian carbonate (Hume) and the Island River reflection as far north as it outcropped. An attempt was made to also carry the Canol-Hare Indian reflection, but this was only possible on the 300% fold data. A basement reflection could not be carried on any of the data.

As a result of the variation in quality of the data, the maps that were constructed were time maps for:

1. Hume Structure
2. Island River to Hume Isochron
3. Hume to Canol-Hare Indian Isochron
4. Canol-Hare Indian Structure
5. Surface Elevation map.

Due to lack of velocity control in the area, no depth maps were constructed.

The most prominent anomaly observed occurred in the southwest corner of Permit 3168. Here a closed high on the Hume structure map and a corresponding thin between the Island River and Hume reflectors. This anomaly was drilled as IOE Sun Blackstone E-72, 61°20', 122°00' and encountered what had been anticipated as approximately 400' of Hume reefal buildup. Unfortunately the reef was water-laden.

The next most prominent anomaly observed was on the Hume to Canol-Hare Indian isochron map on the east side of Permit 3168. This anomaly is believed to be due to clinoforming within the section above the Hume and the prospectiveness of this anomaly is dubious at this time.

There were no other anomalies with enough relief to warrant any further investigation.

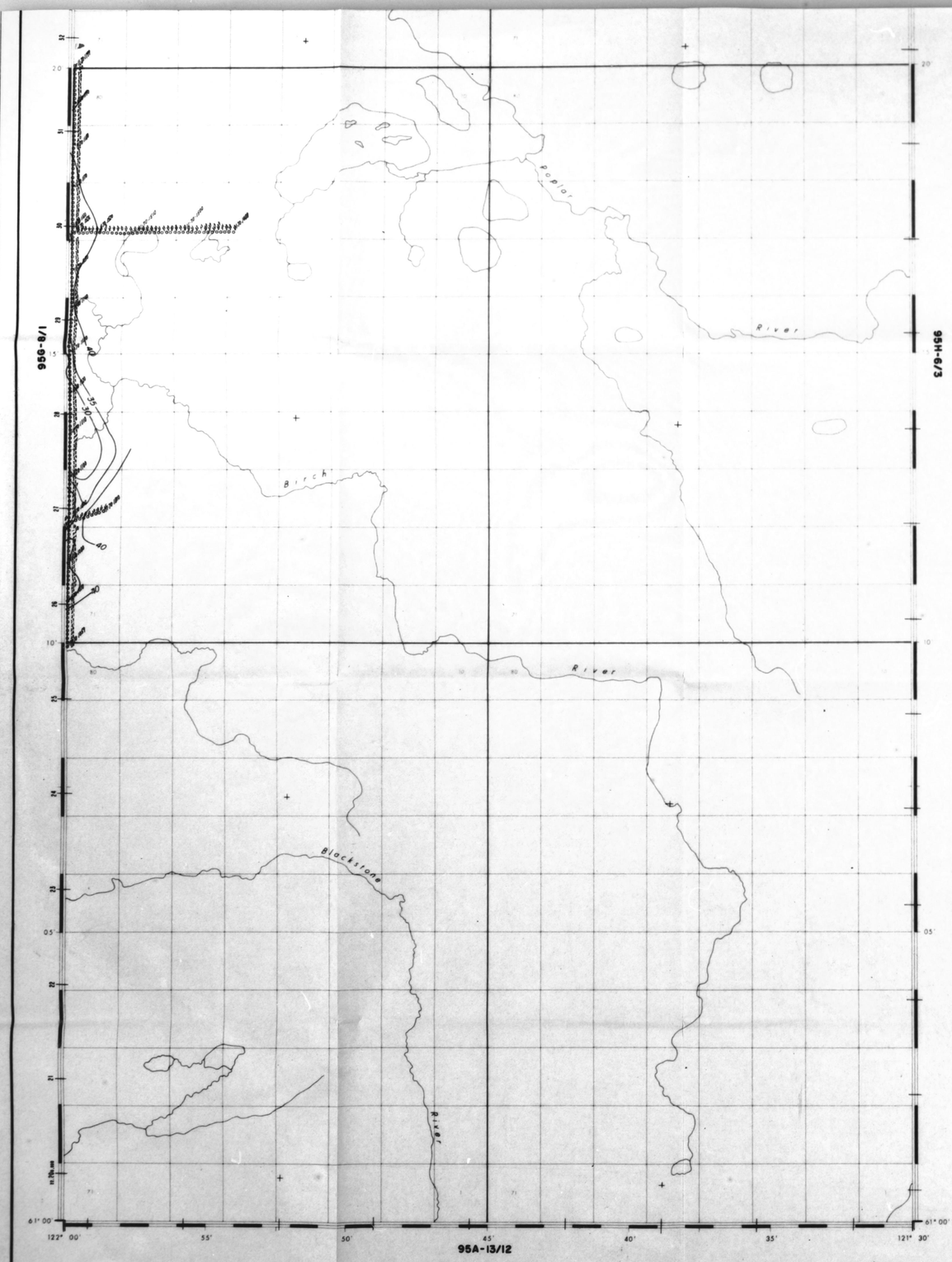
There is the occurrence of minor post-Hume faulting in the area.

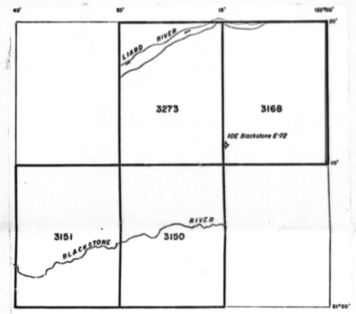
## - Summary and Conclusions -

With the amount and pattern of seismic coverage done in the Blackstone area and the fact that a Middle Devonian reef with approximately 400' of relief was drilled without any oil shows, one must conclude that at this time the area must rate as non-prospective.

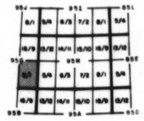
O. Friesen P. Eng.

O. Friesen
Southern Exploration District Manager
Imperial Oil Enterprises Ltd.
Edmonton, Alberta




BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED
CANOL-HARE INDIAN TO HUME ISOCHRON
INDEX TO MAP SHEETS




# FORT SIMPSON 95 H - 5/4

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

North American Datum 1927
Universal
Transverse Mercator Projection
(Boaz-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

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Wells Revised .....

| Gp | 95H-5/4 | I | V | C | | N |
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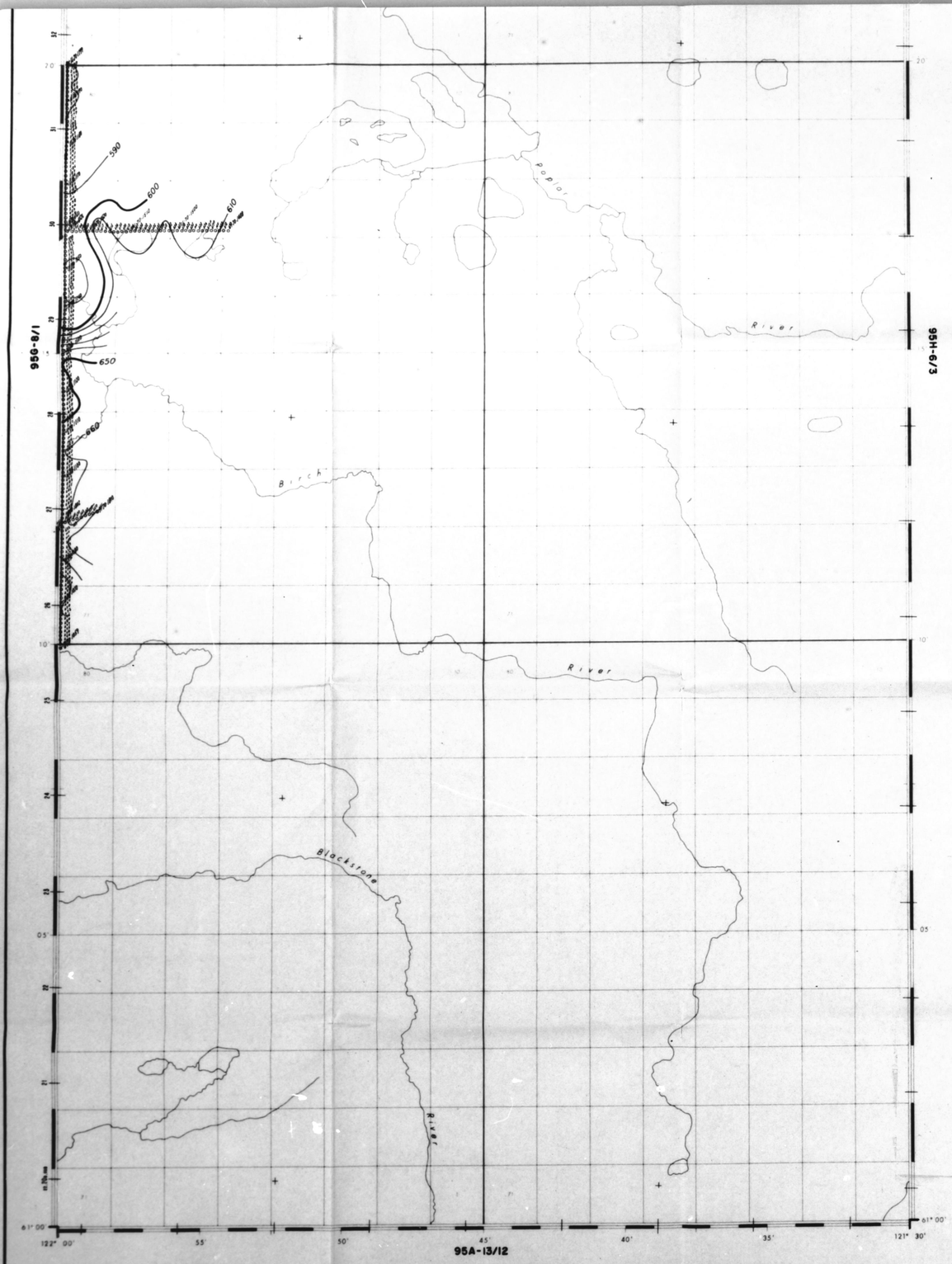


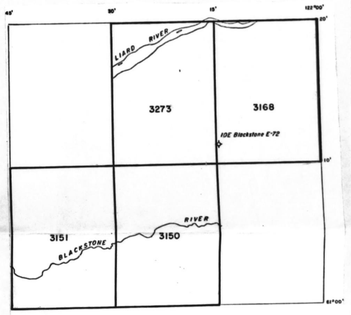


BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED

CANOL-HARE INDIAN STRUCTURE
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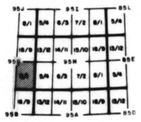



# FORT SIMPSON 95 H - 5/4

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 5 6 7 8 Miles

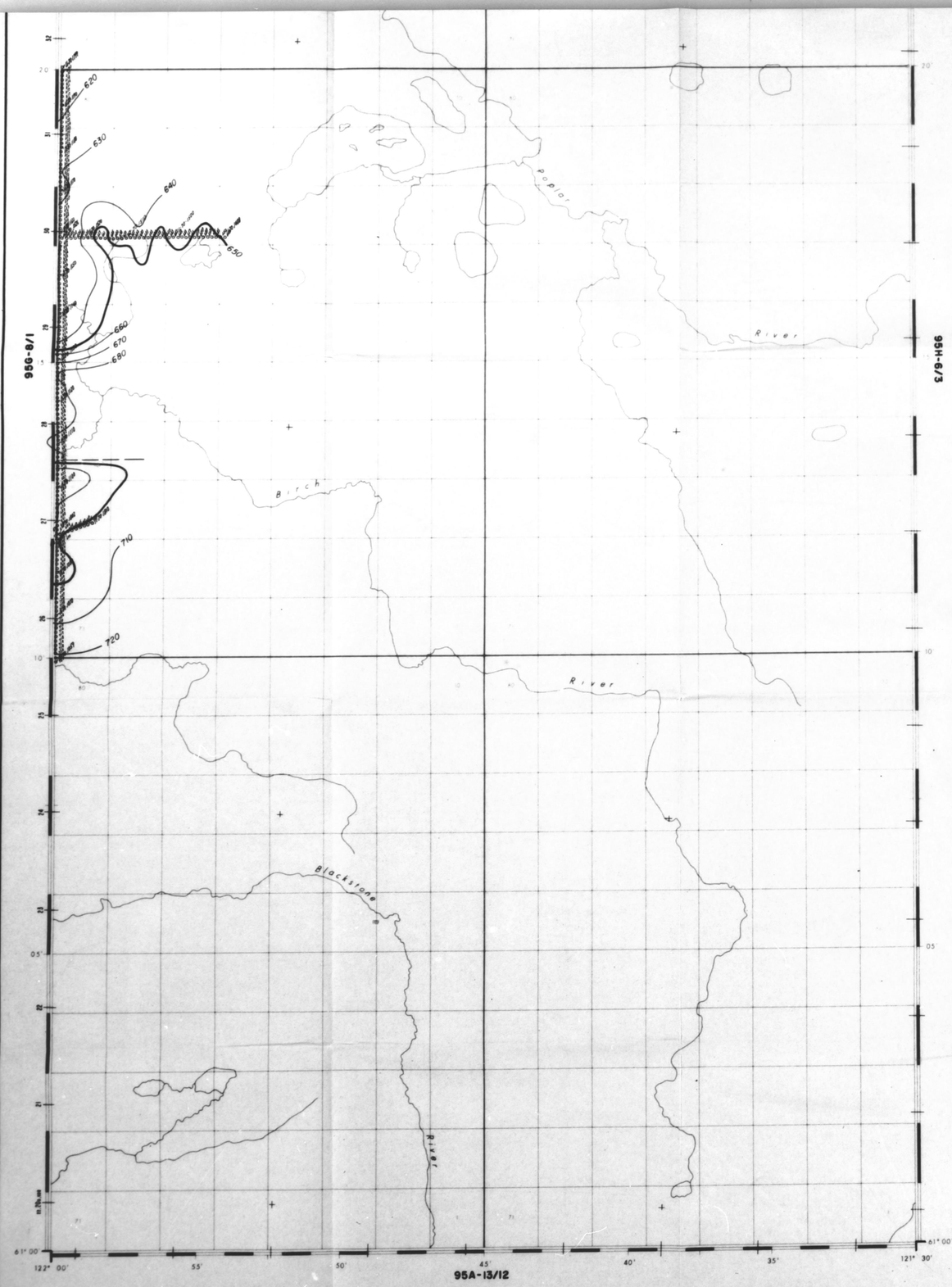
Feet 5000 0 5000 10000 15000 20000 Feet

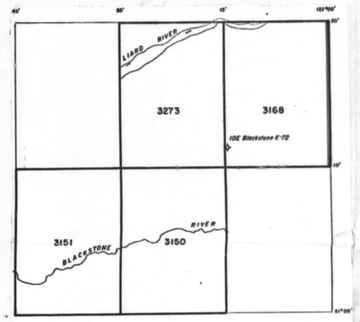
North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Wells Revised .....

Gp 95H-5/4 2 V C N




BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED

HUME STRUCTURE
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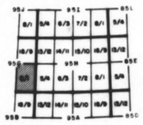



# FORT SIMPSON 95 H - 5/4

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 0 1 2 3 4 5 6 7 Miles

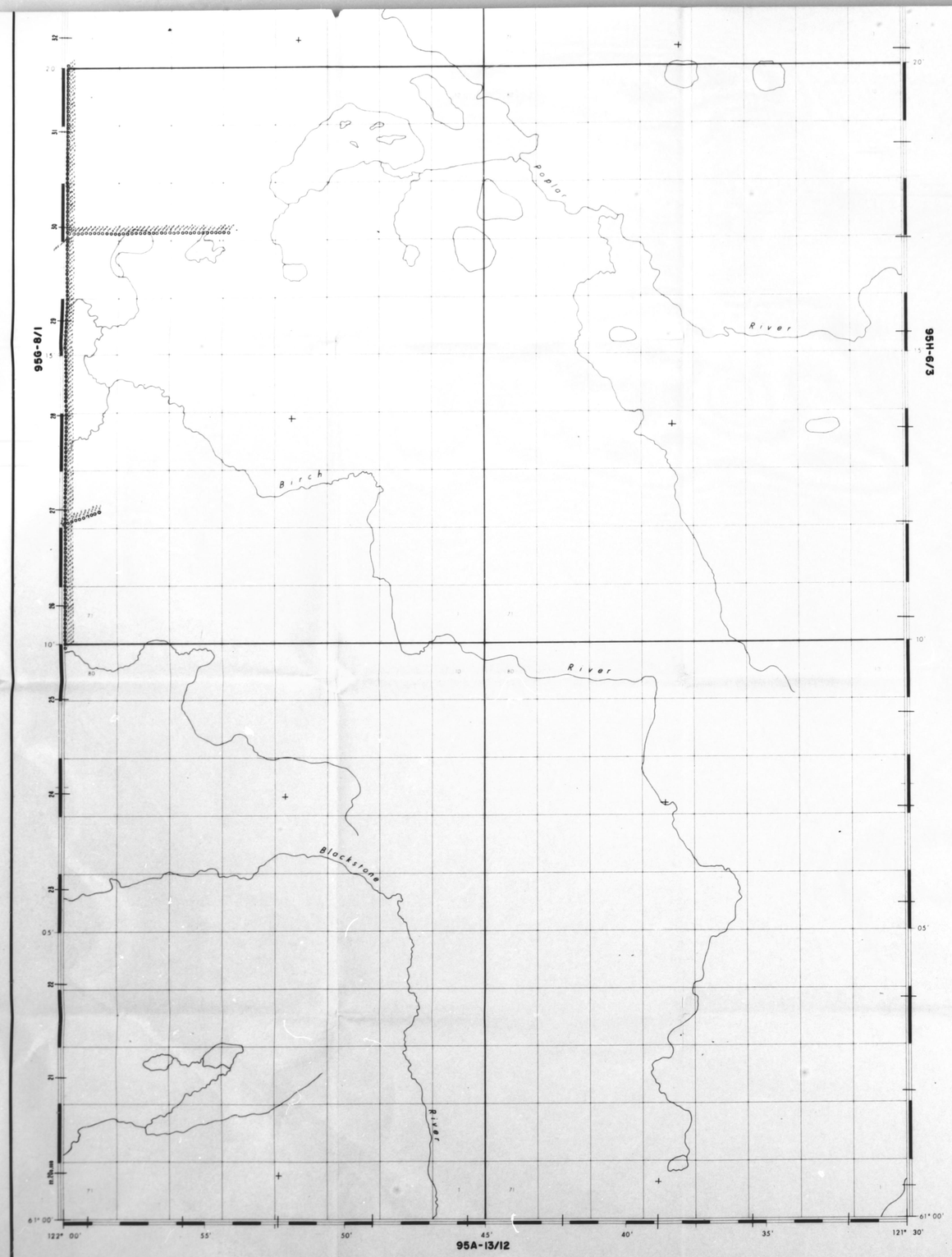
Feet 5000 0 5000 10000 15000 20000 Feet

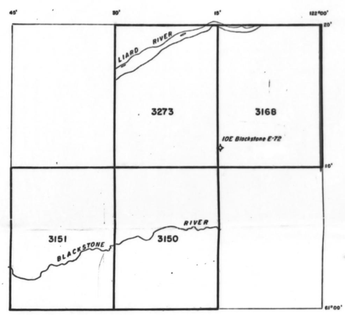
North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Wells Revised .....

Gp 95H-5/4 3 V C N




BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED

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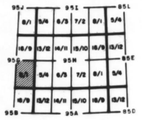


SURFACE ELEVATIONS

# FORT SIMPSON 95 H - 5/4

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 5 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Krüger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Wells Revised .....

| Gp | 95H-5/4 | 4 | V | | | |
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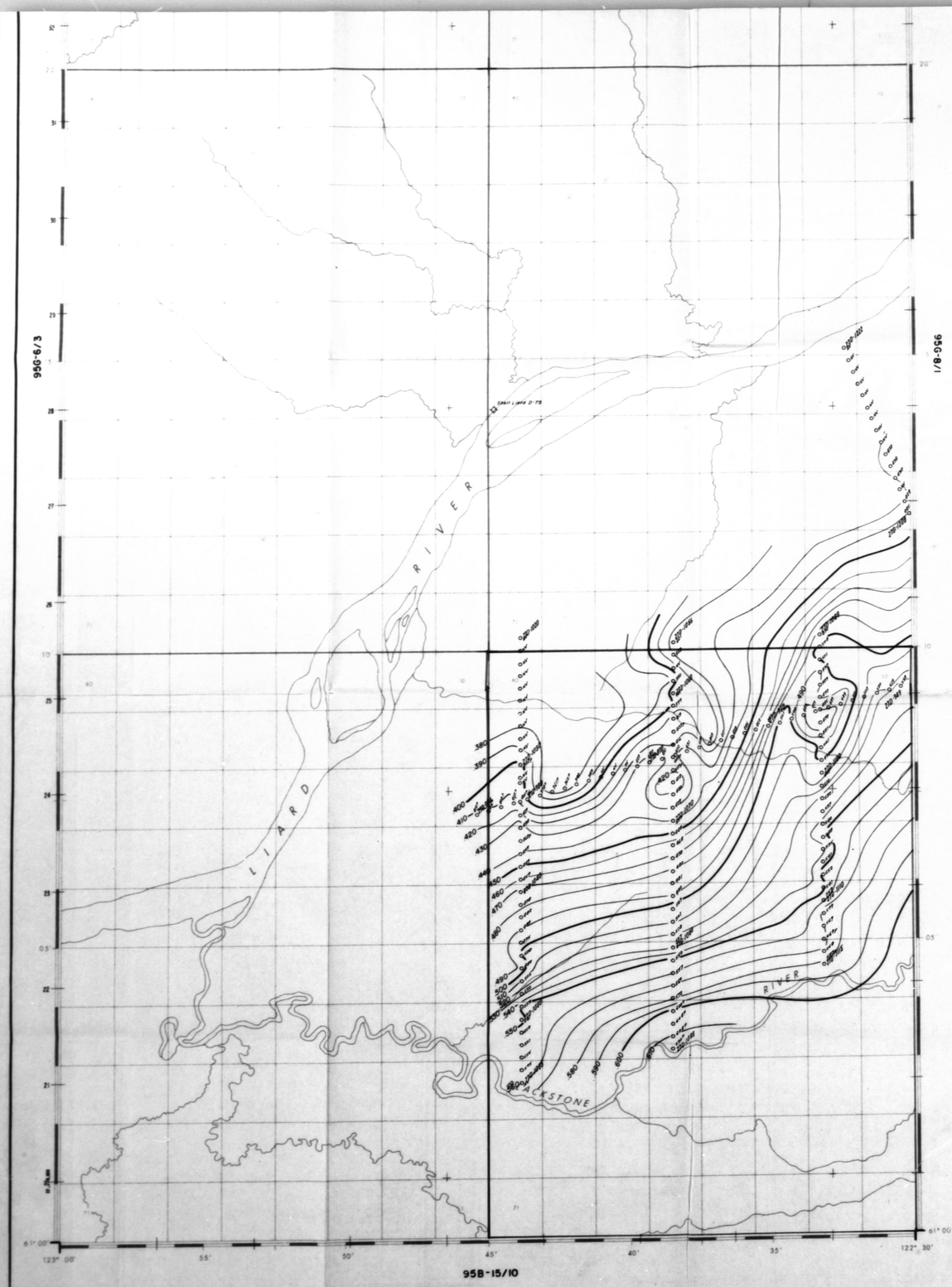


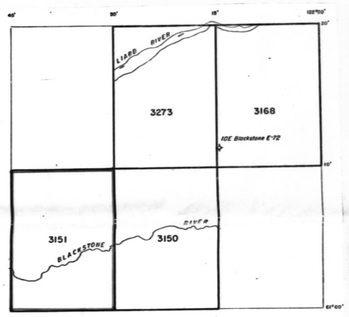


BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED
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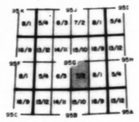

SEISMOGRAPH MAP
STRUCTURE
HUME

Contour Interval ..... 0.01 sec.
Datum: Plane ..... Velocity .....

# SIBBESTON LAKE 95 G - 7/2

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 5 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

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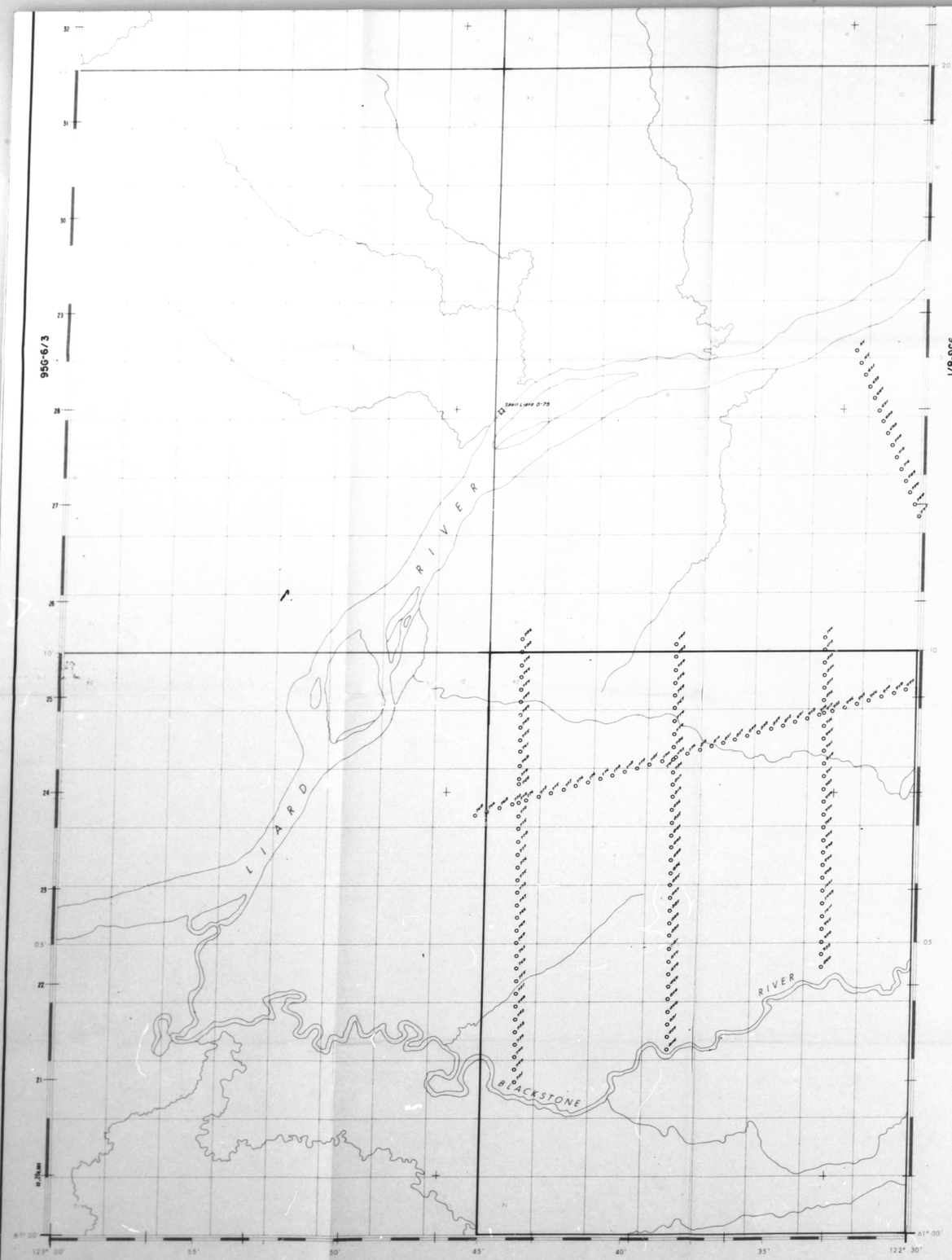
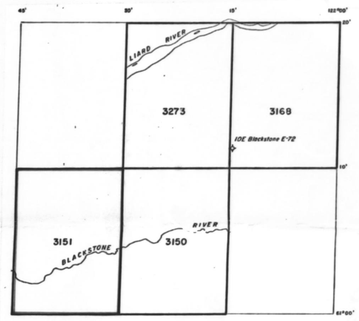
Universal
Transverse Mercator Projection
(Bessel-Krueger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised .....

| Gp | 95G-7/2 | I | V | C | | N |
|---|---|---|---|---|---|---|




**BLACKSTONE AREA**
**IMPERIAL OIL ENTERPRISES LIMITED**

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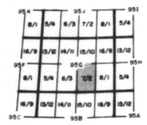


**SEISMOGRAPH MAP**

*Contour Interval* .....
*Datums: Plane* ..... *Velocity* .....

## SURFACE ELEVATIONS

# SIBBESTON LAKE 95 G - 7/2

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

PROPRIETARY

95B-15/10

North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

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Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised .....

| Gp | 95G-7/2 | 2 | V | | | |
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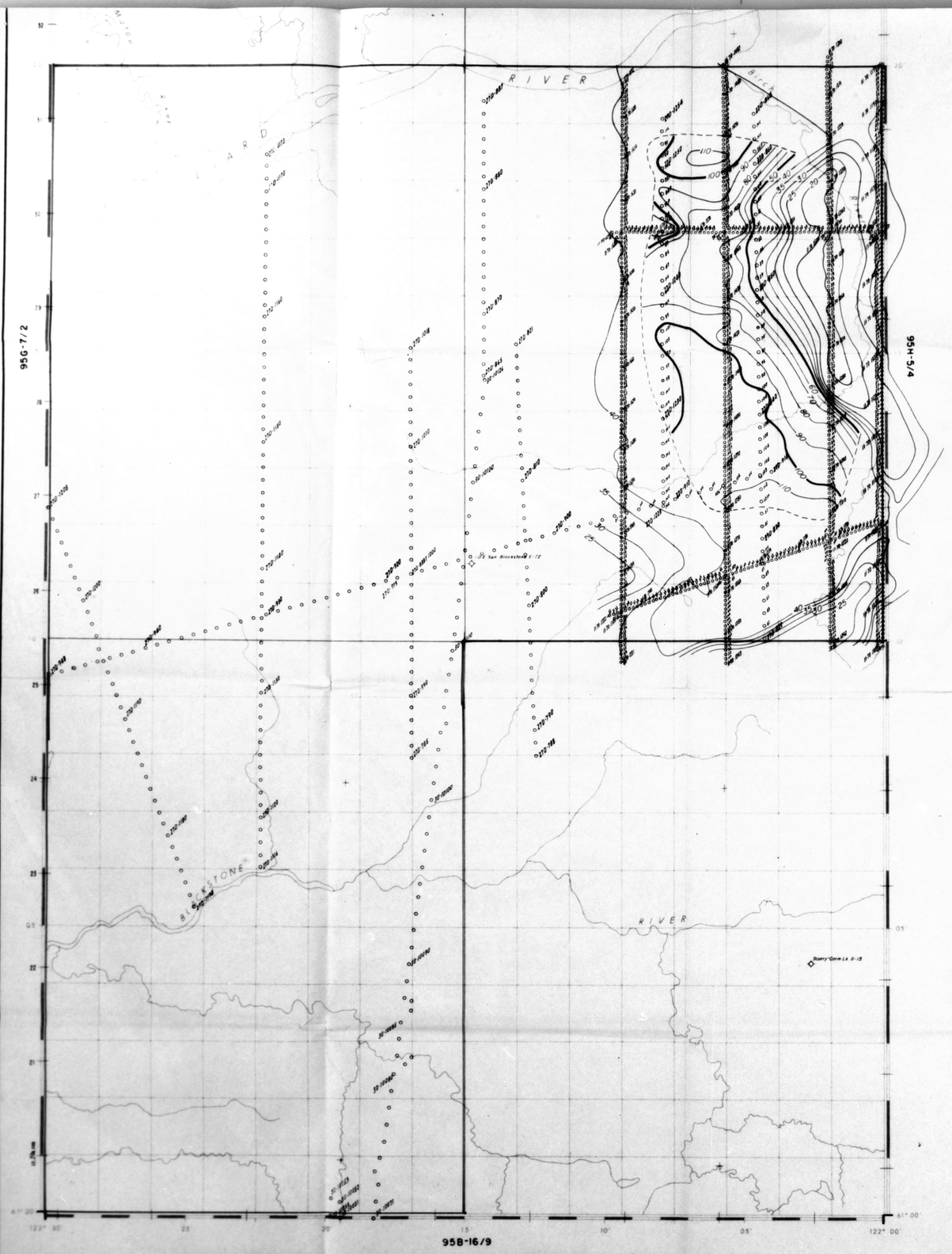


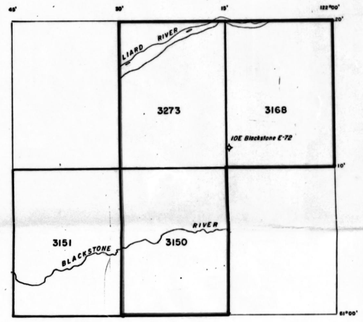


**BLACKSTONE AREA**
**IMPERIAL OIL ENTERPRISES LIMITED**

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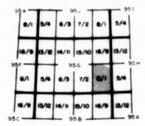


**SEISMOGRAPH MAP**
**ISOCHRON**
**HUME TO CANOL-HARE INDIAN**

Contour Interval ____ S.D. OF MILLISECONDS ____
Datums: Plane _____ Velocity _____

# SIBBESTON LAKE 95 G - 8/1

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 5 Kilos
Feet 5000 0 5000 10000 15000 20000 Feet

Orkan's Reproductions & Photocopies Ltd.



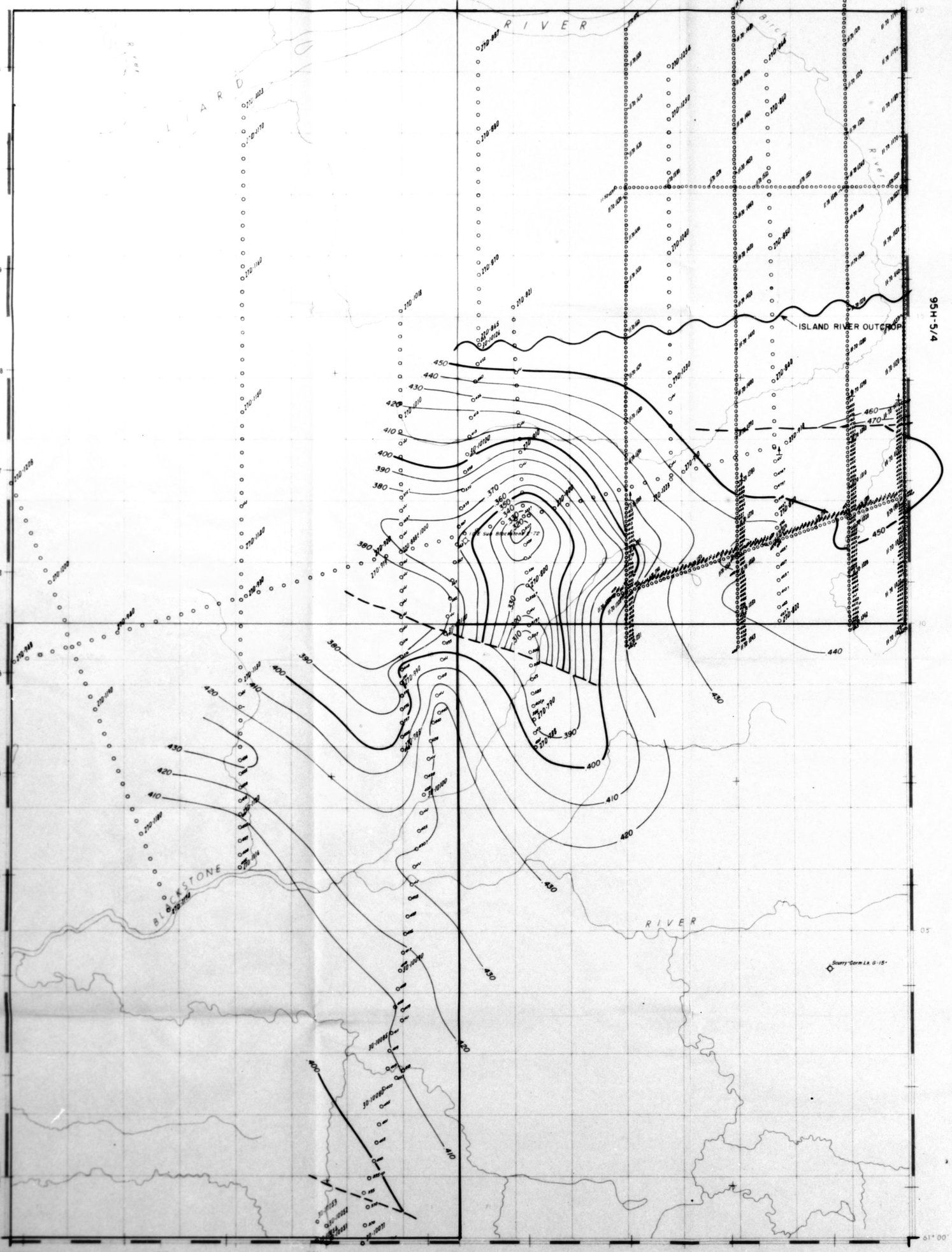
North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

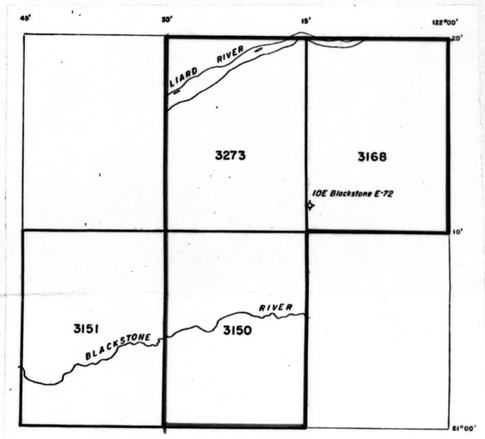
10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised ..... Feb 27/78 .....
Values Revised .....
Contours Revised .....
Wells Revised ..... Apr 25/1980 .....

PROPRIETARY

| Gp | 95G-8/1 | I | V | C | | N |
|---|---|---|---|---|---|---|




**BLACKSTONE AREA**
**IMPERIAL OIL ENTERPRISES LIMITED**

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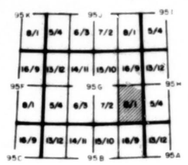


**SEISMOGRAPH MAP**
**ISOCHRON**
**ISLAND RIVER TO HUME**

*Contour Interval* ---500 MS---
*Datums: Plane* ---------- *Velocity* ----------

# SIBBESTON LAKE 95 G - 8/1

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised ..... Feb 25/70 .....
Values Revised ..... March 23/70 .....
Contours Revised ..... June 30/70 .....
Wells Revised ..... Nov 23/1970 .....

PROPRIETARY

| Gp | 95G-8/1 | 5 | V | C | | N |
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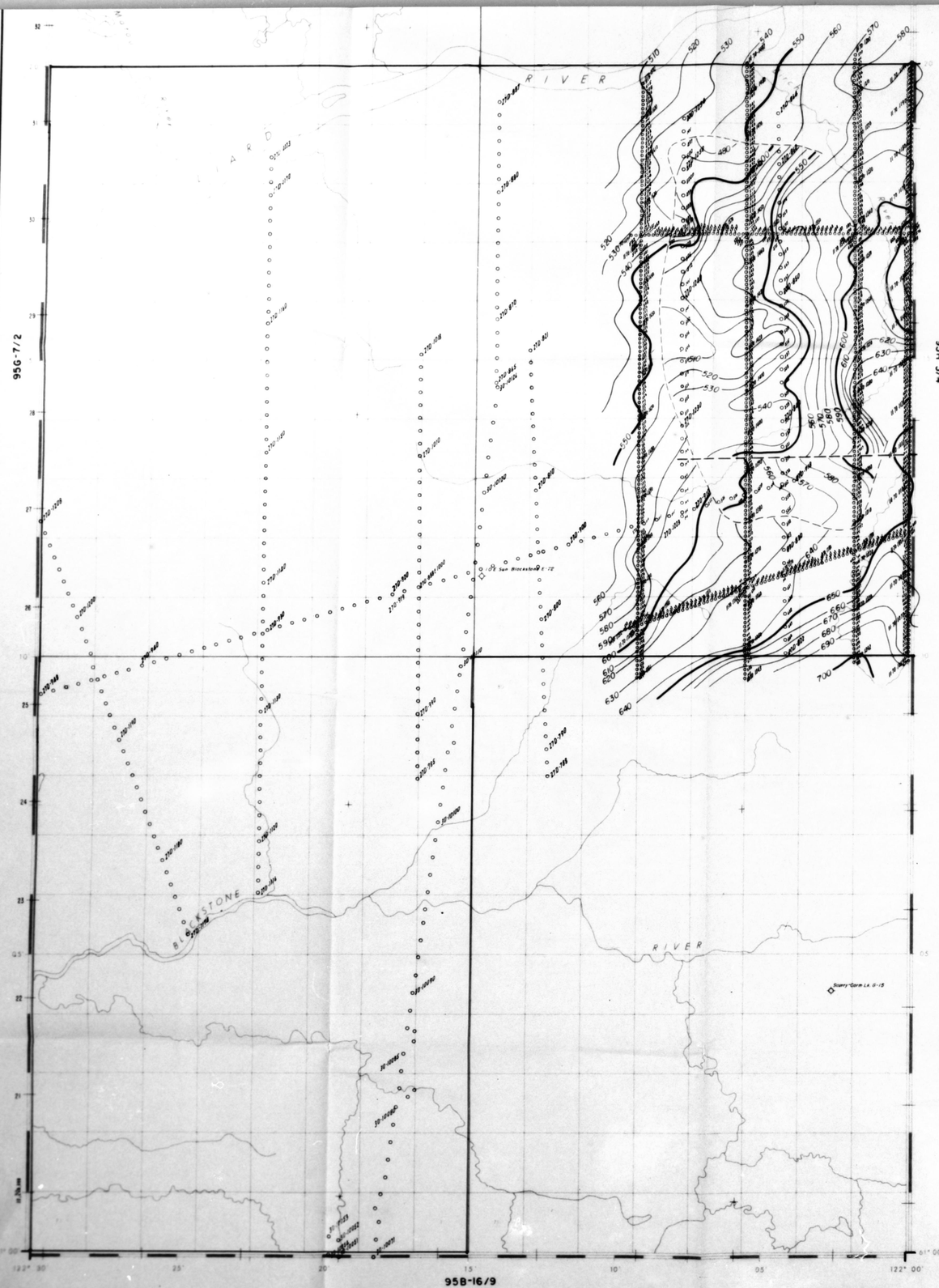


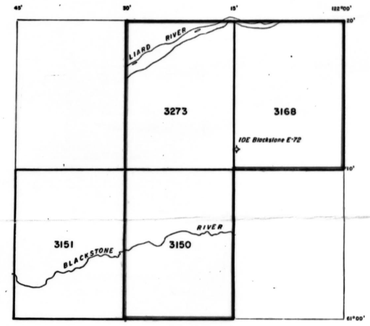


BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED
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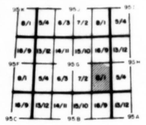

SEISMOGRAPH MAP
STRUCTURE
CANOL-HARE INDIAN

Contour Interval ____
Datums: Plane ____ Velocity ____

# SIBBESTON LAKE 95 G - 8/1

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

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Seismic Revised ....FEB 25 /78....
Values Revised ....MARCH 24 /1978....
Contours Revised ....MARCH 24 /1978....
Wells Revised ....Nov 25 /1977....

| Gp | 95G-8/1 | 2 | V | C | | N |
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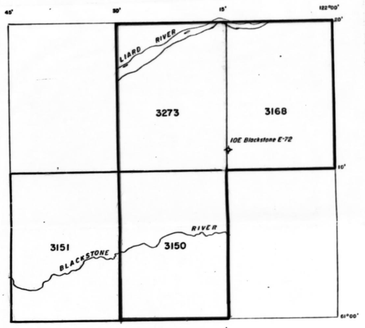


BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED

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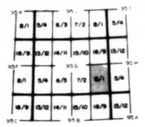


SEISMOGRAPH MAP
STRUCTURE
HUME

Contour Interval ..... 20 MILLISECONDS .....
Datums: Plane ..... Velocity .....

# SIBBESTON LAKE 95 G - 8/1

SCALE 1 50,000

1.25 inches to 1 mile approximately

Miles 1 0 1 2 3 4 5 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

PROPRIETARY

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(Gauss-Kruger)

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Transverse Mercator Projection, 6 Zone.

Seismic Revised ..... Feb 28 /78 .....
Values Revised ..... MARCH 15/78 .....
Contours Revised ..... AUGUST 22, 1978 .....
Wells Revised ..... Jan 25 / 1979 .....

| Gp | 95G-8/1 | 3 | V | C | | N |
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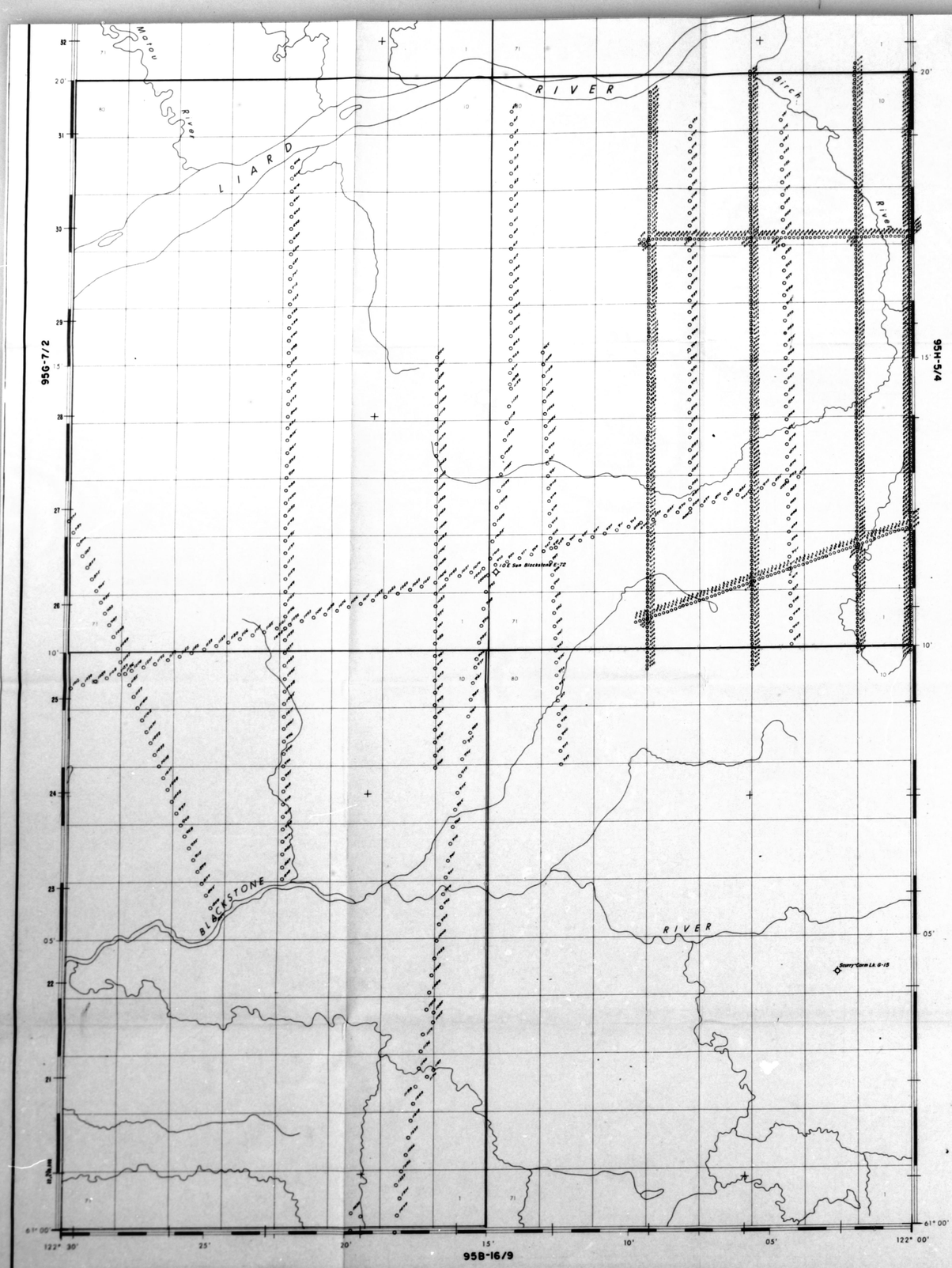


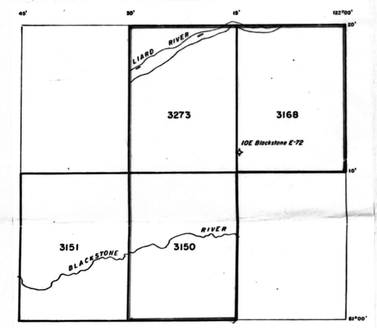


BLACKSTONE AREA
IMPERIAL OIL ENTERPRISES LIMITED

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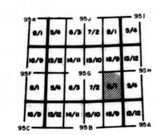


SEISMOGRAPH MAP

Contour Interval .....
Datums: Plane ..... Velocity .....

SURFACE ELEVATIONS

# SIBBESTON LAKE 95 G - 8/1

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 ½ 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised .....

PROPRIETARY

| Gp | 95G-8/1 | 6 | V | | | |
|---|---|---|---|---|---|---|