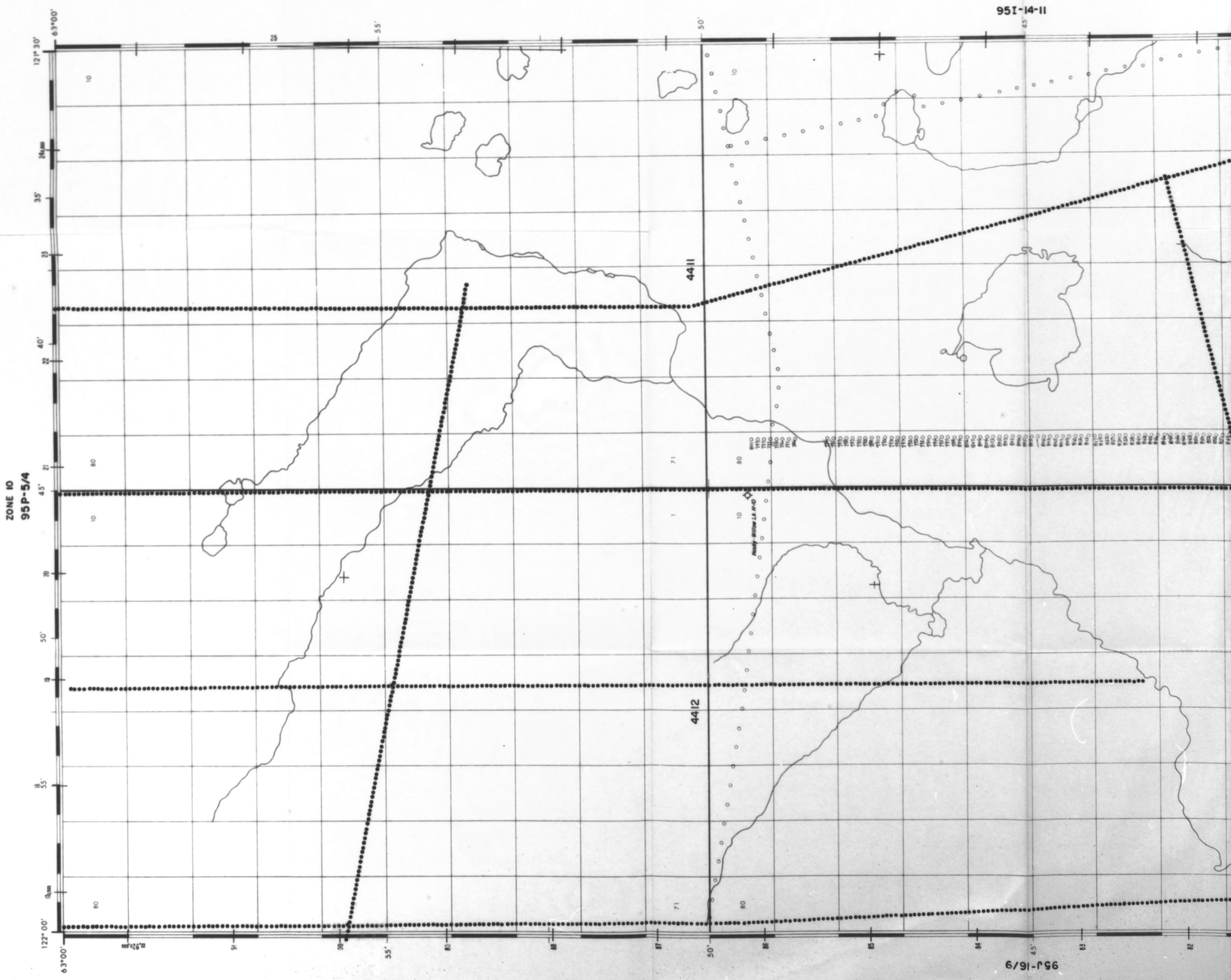
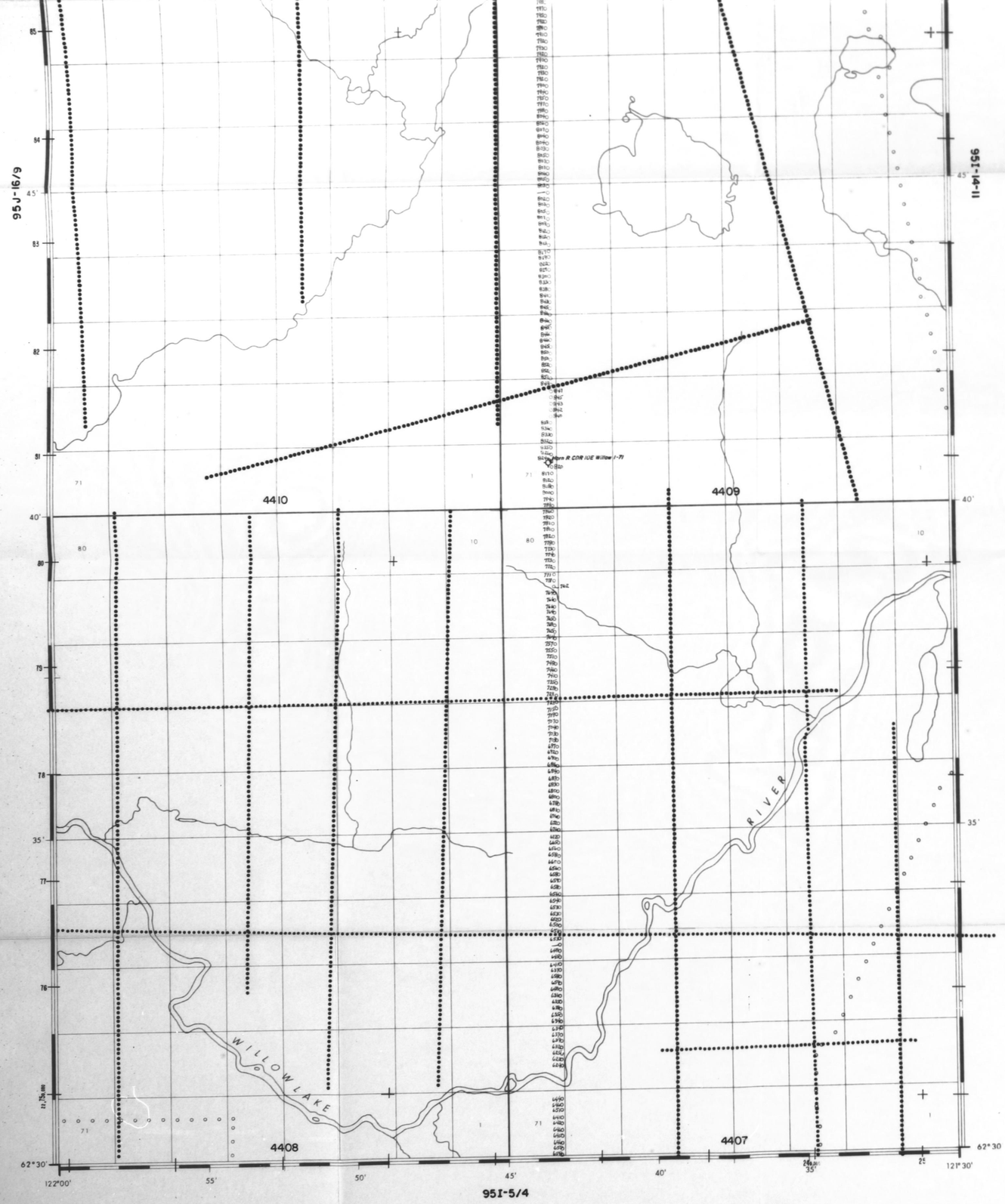
1 of 2


95I-14-11
95J-16/9
44I1
44I2
ZONE 10
95P-5/4
63°00'
122°30'
122°00'
55'
50'
45'
40'
35'
25
20
15
10
5
0
Hay River



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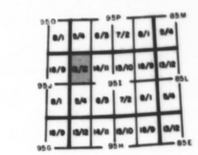

SEISMOGRAPH MAP

SURFACE ELEVATIONS

Contour Interval _____

Datums: Plane SEA LEVEL *Velocity* _____

BULMER LAKE 95 I-13/12

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

PROPRIETARY

2 of 2

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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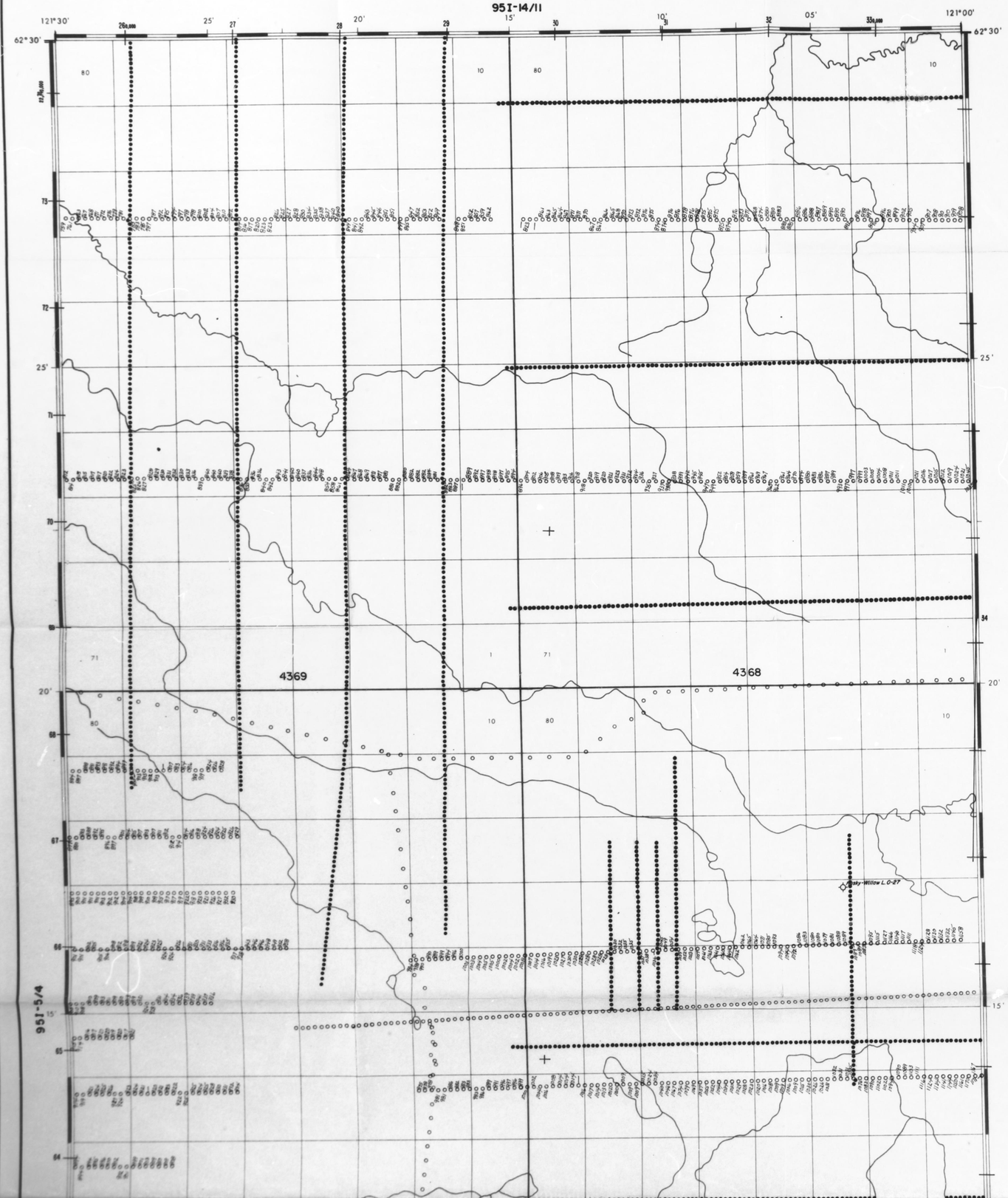
716 8th Avenue S.W.
Phone 265 7514 CALGARY, ALBERTA, CANADA

Seismic Revised _____
Values Revised _____
Contours Revised _____
Wells Revised May 22, 1977

Gp	95I-13/12	3	V			

ZONE 10

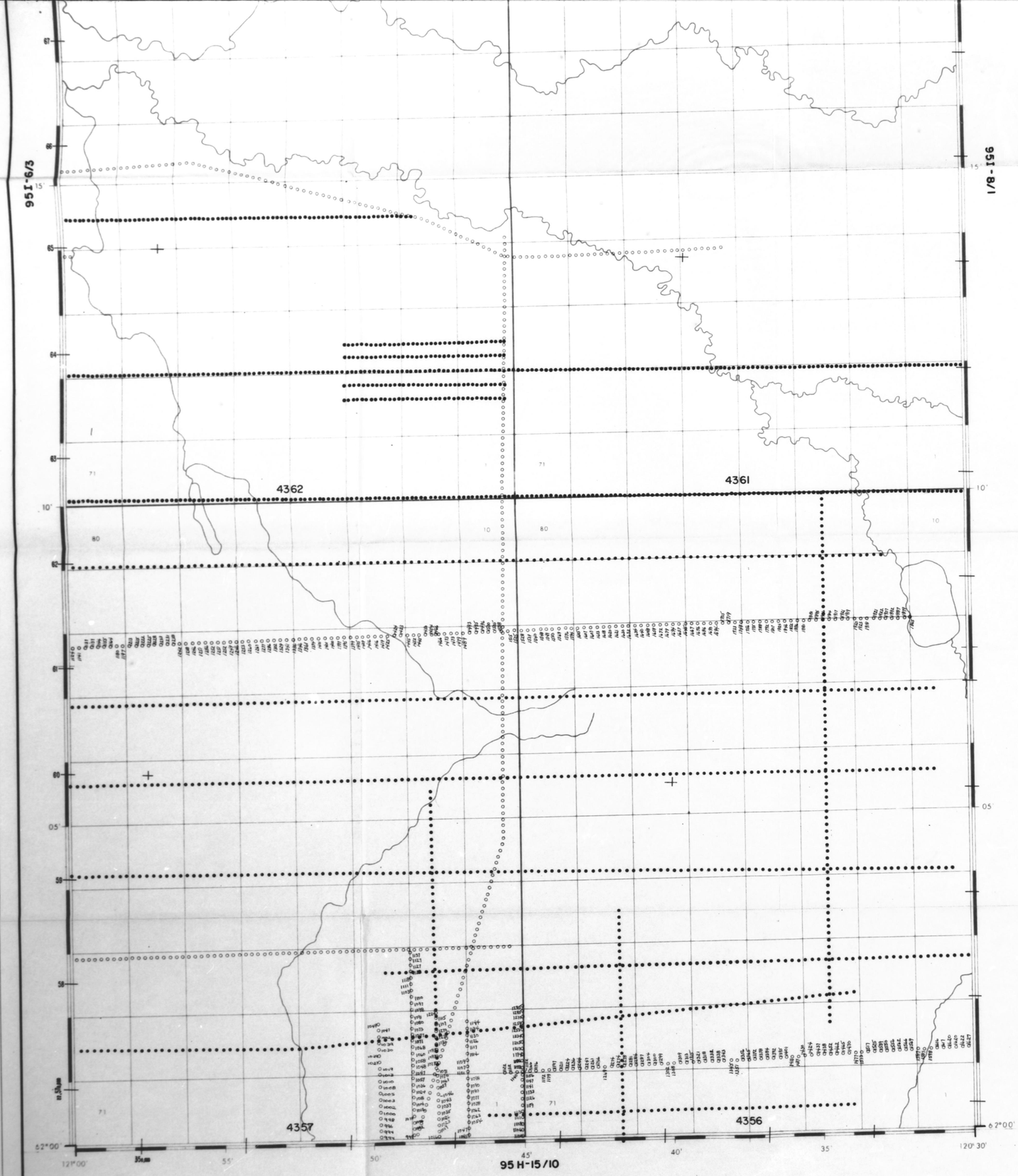
95I-14/11



ZONE 10

95I-15/10

1 of 2



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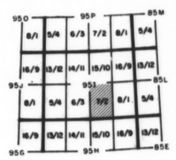

SEISMOGRAPH MAP

SURFACE ELEVATIONS

Contour Interval .....

Datums: Plane ..... *Velocity* .....

BULMER LAKE 95 I - 7/2

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

PROPRIETARY

2 of 2

North American Datum 1927
Universal
Transverse Mercator Projection
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Transverse Mercator Projection, 6 Zones.

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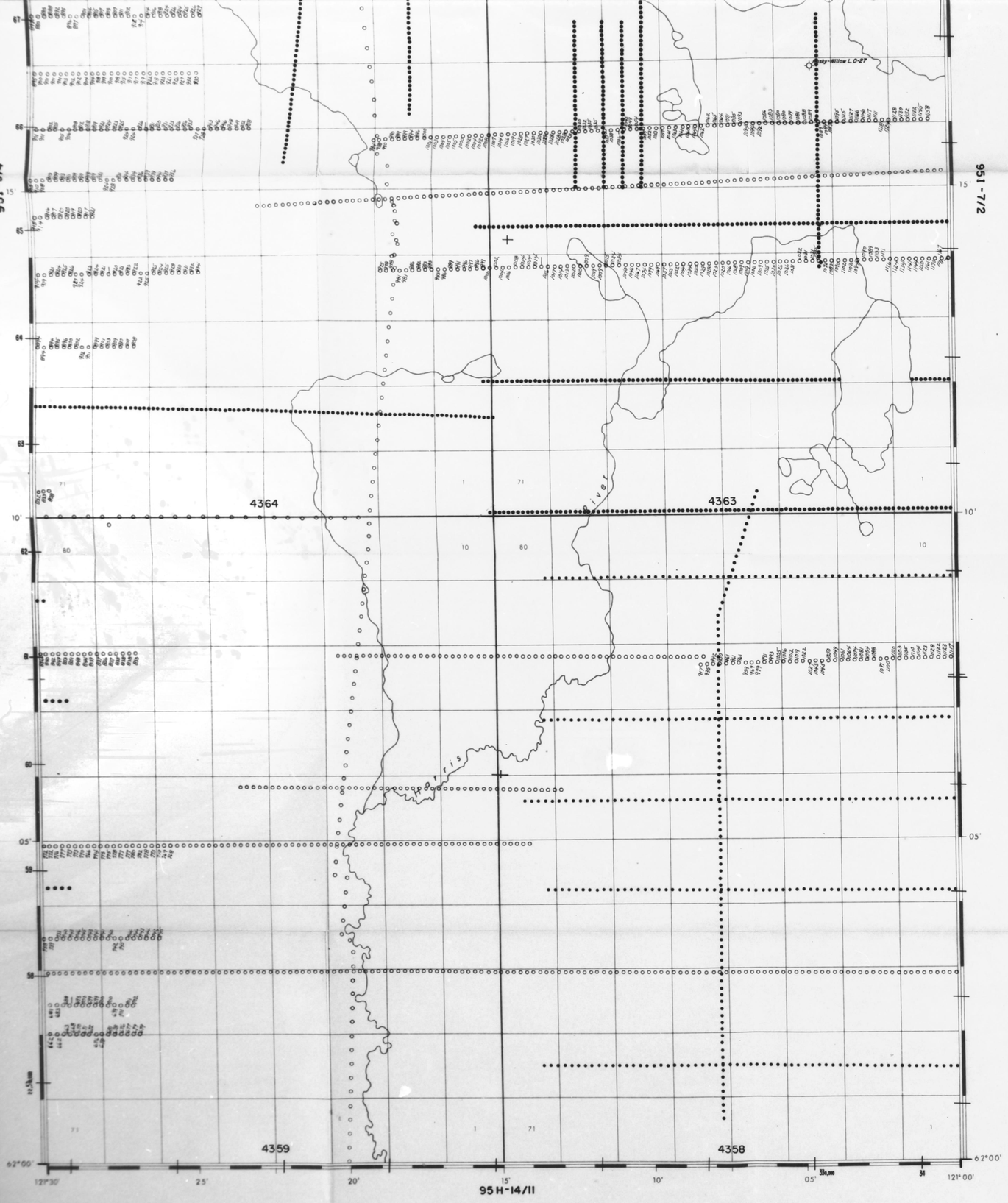
Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised .....

Gp	951-7/2	6	V			



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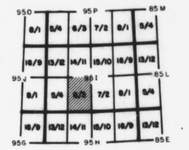

SEISMOGRAPH MAP

SURFACE ELEVATIONS

Contour Interval _____

Datums: Plane _____ *Velocity* _____

BULMER LAKE 95 I-6/3

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

PROPRIETARY

2 OF 2

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Universal
Transverse Mercator Projection
(Gauss-Kruger)

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Transverse Mercator Projection, 6 Zones.

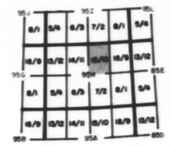
Seismic Revised *September 1970*
Values Revised
Contours Revised
Wells Revised *Apr. 27, 1970*

Gp	951-6/3	6	V			

ZONE 10
121° 00'
120° 30'
62°00'
55'
50'
45'
40'
35'
Hanson Island
Berens Landing
Strong Pt.
4351
.450
.445
.440
.435
.430
.425
.420
.455
.460
.465
.470
.475
.480
.485

1 OF 2

INDEX TO MAP SHEETS



TIME STRUCTURE

PRE-DEVONIAN

SEISMOGRAPH MAP

Contour Interval .....100 MSEC.....

Datums: Plane ..1000'..... Velocity ..12,000'/sec.

FORT SIMPSON 95 H - 15 / 10

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 .....
Values Revised .....
Contours Revised ..OCT. 7, 1971.....
Wells Revised .....

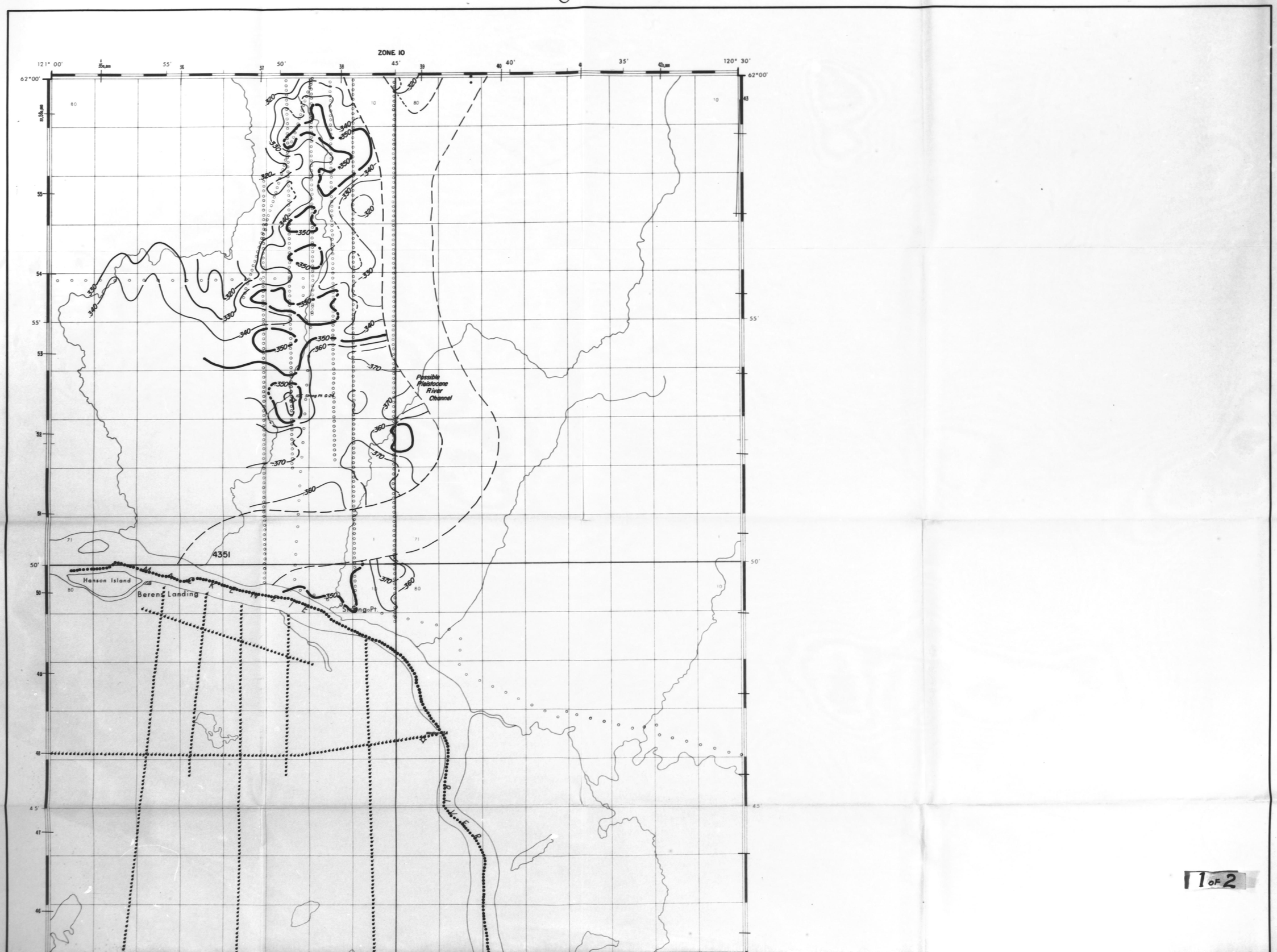
PROPRIETARY

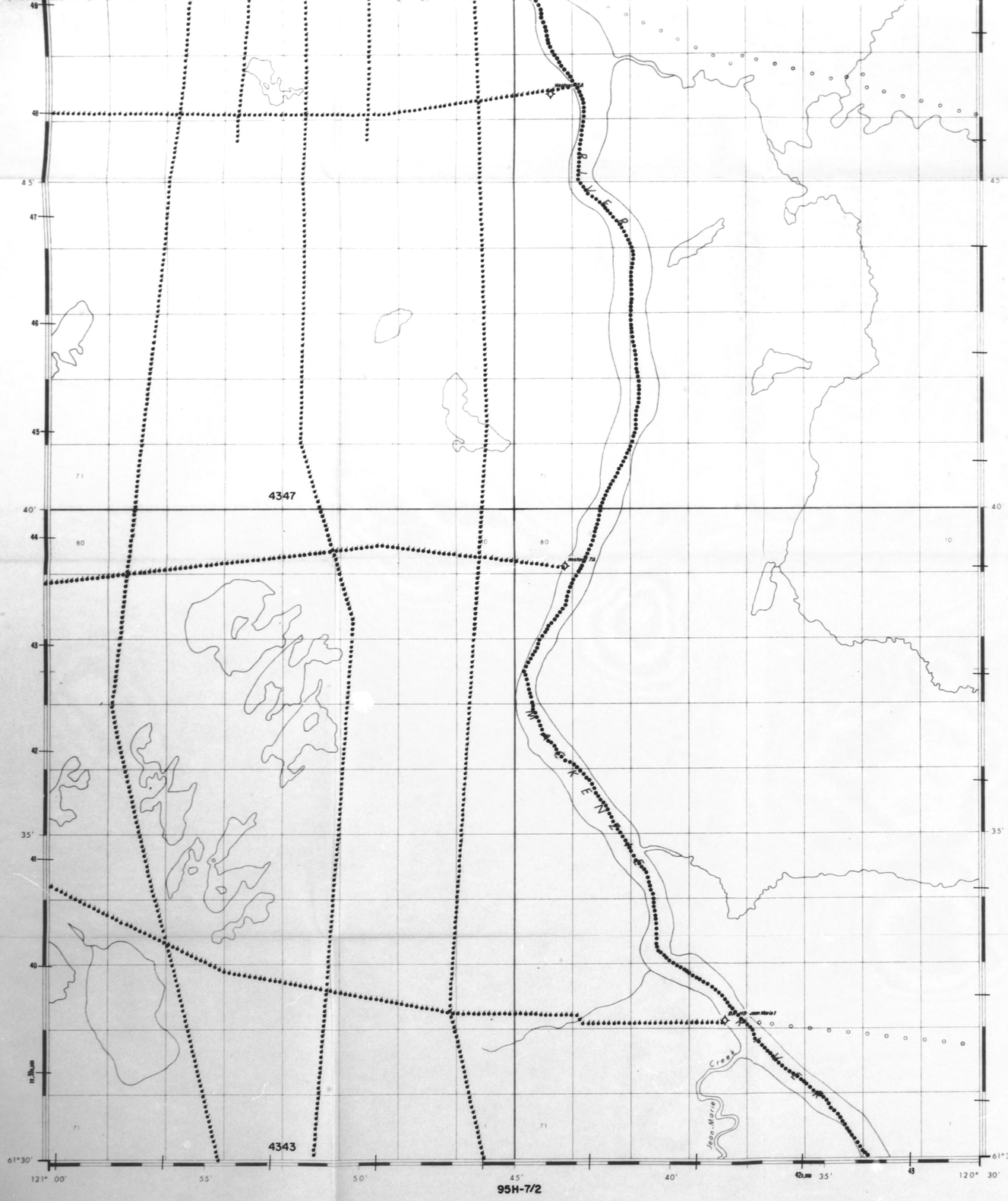
2 of 2

Gp	95H-15/10	2		C		

ZONE 10

951-13/12


ZONE 10
121° 00'
55'
50'
45'
40'
35'
120° 30'
62°00'
55'
50'
45'
Possible Pleistocene River Channel
4351
Hanson Island
Berens Landing
Pt
1 OF 2



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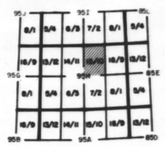

TIME STRUCTURE

HUME

SEISMOGRAPH MAP

Contour Interval 0.010 SECS.
Datums: Plane _____ Velocity _____

FORT SIMPSON 95 H - 15 / 10

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)

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Transverse Mercator Projection, 6 Zones.

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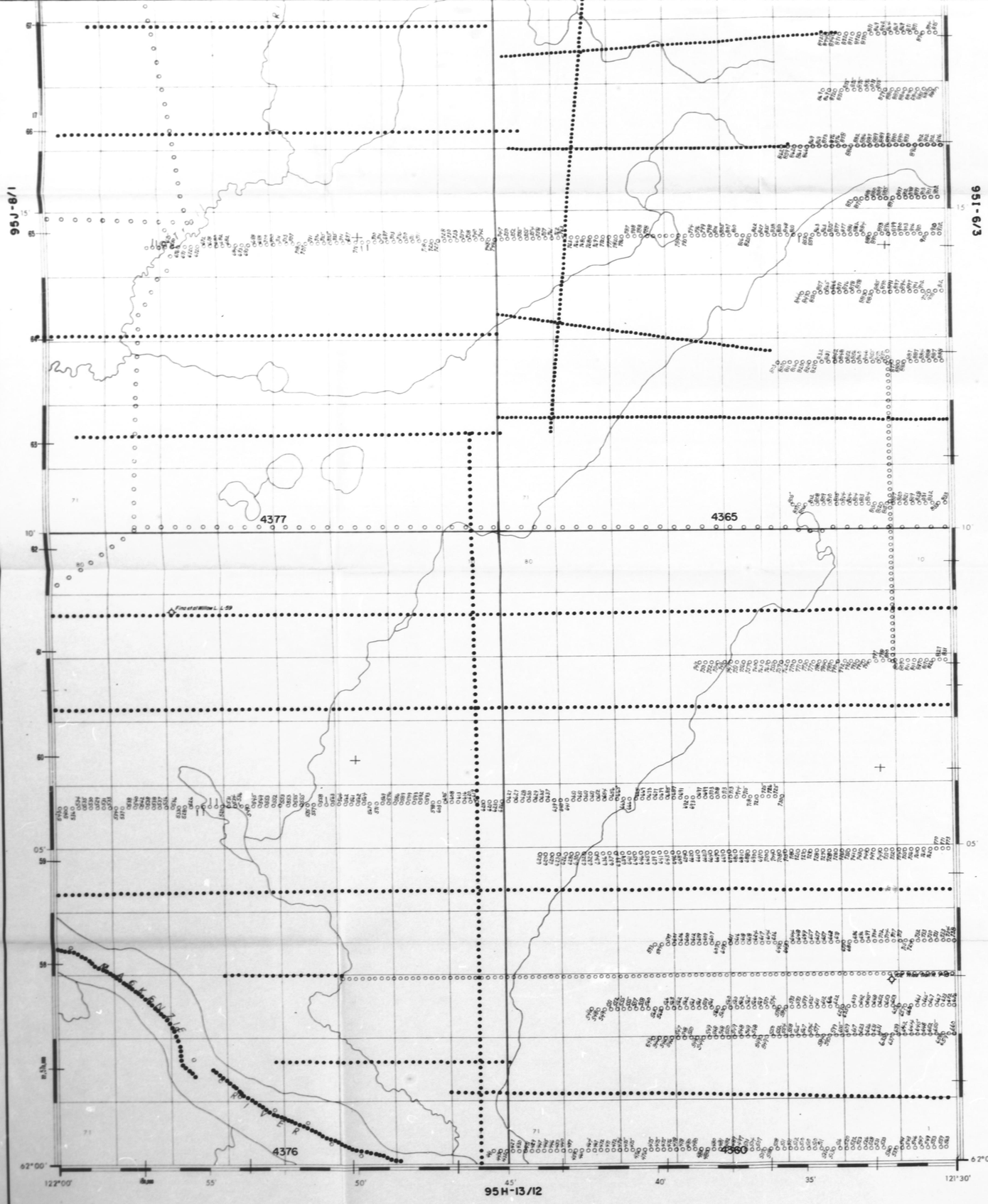
Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised .....

PROPRIETARY

2 of 2

Gp	95H-15/10	I	V	C		



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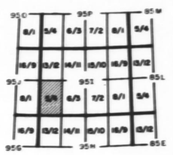

SEISMOGRAPH MAP

SURFACE ELEVATIONS

Contour Interval _____

Datums: Plane SEA LEVEL *Velocity* _____

BULMER LAKE 95 I-5 / 4

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

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Universal
Transverse Mercator Projection
(Gauss-Krugar)

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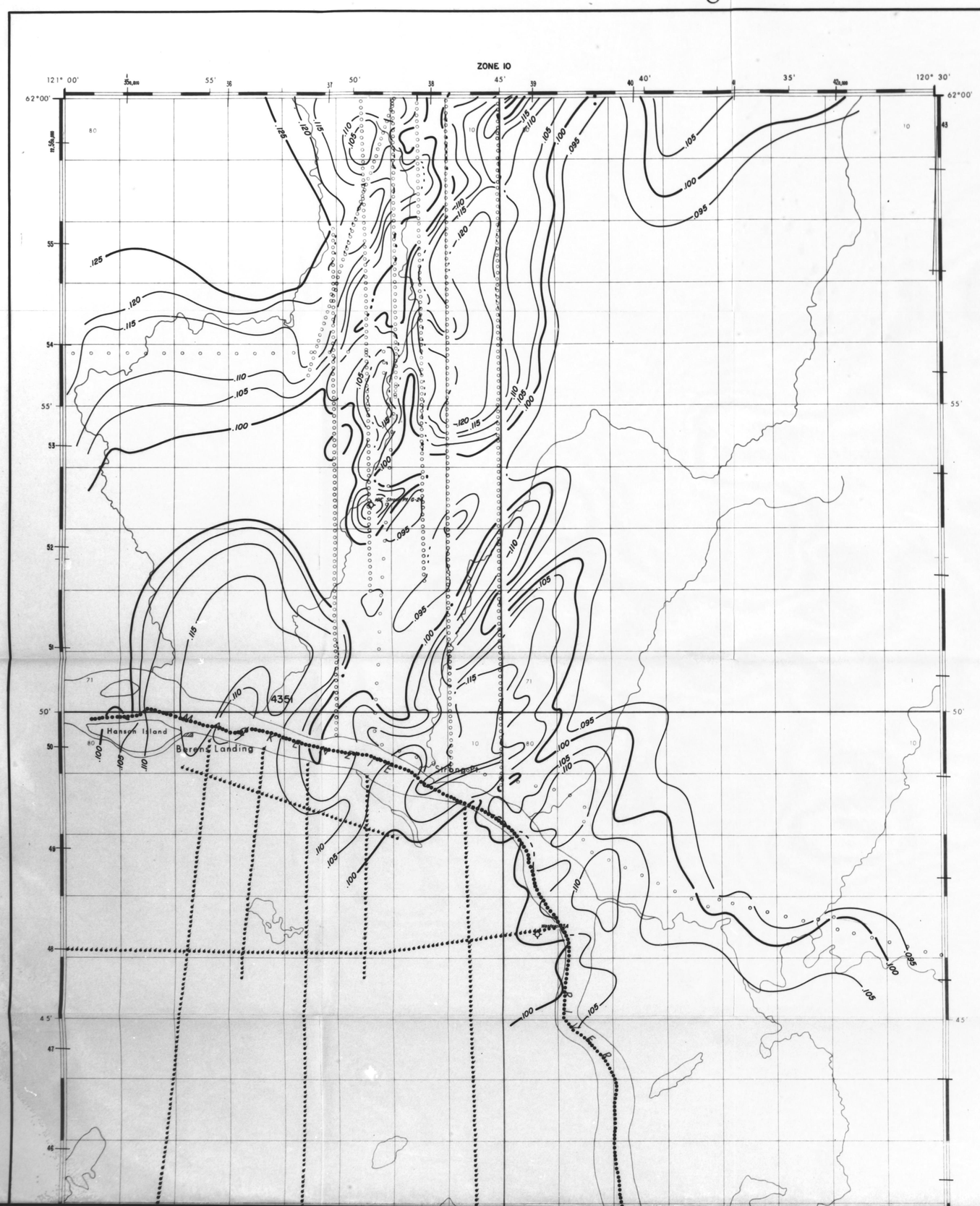
Transverse Mercator Projection, 6 Zones.

Seismic Revised _____
Values Revised _____
Contours Revised _____
Wells Revised May 28, 1971

PROPRIETARY

2 of 2

Gp	95I-5/4	6	V			


ZONE 10
121° 00'
55'
50'
45'
40'
35'
120° 30'
62°00'
55'
50'
45'
Hanson Island
Burrard Landing
4351

1 OF 2

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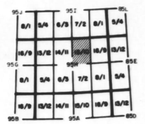

ISOCHRON

HUME to PRE-DEVONIAN

SEISMOGRAPH MAP

Contour Interval ..... 100, 250 .....
Datums: Plane ..... *Velocity* .....

FORT SIMPSON 95 H - 15 / 10

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

PROPRIETARY

2 of 2

Seismic Revised .....
Values Revised .....
Contours Revised ... OCT. 8, 1971 .....
Wells Revised .....

Gp	95H-15/10	4		C		

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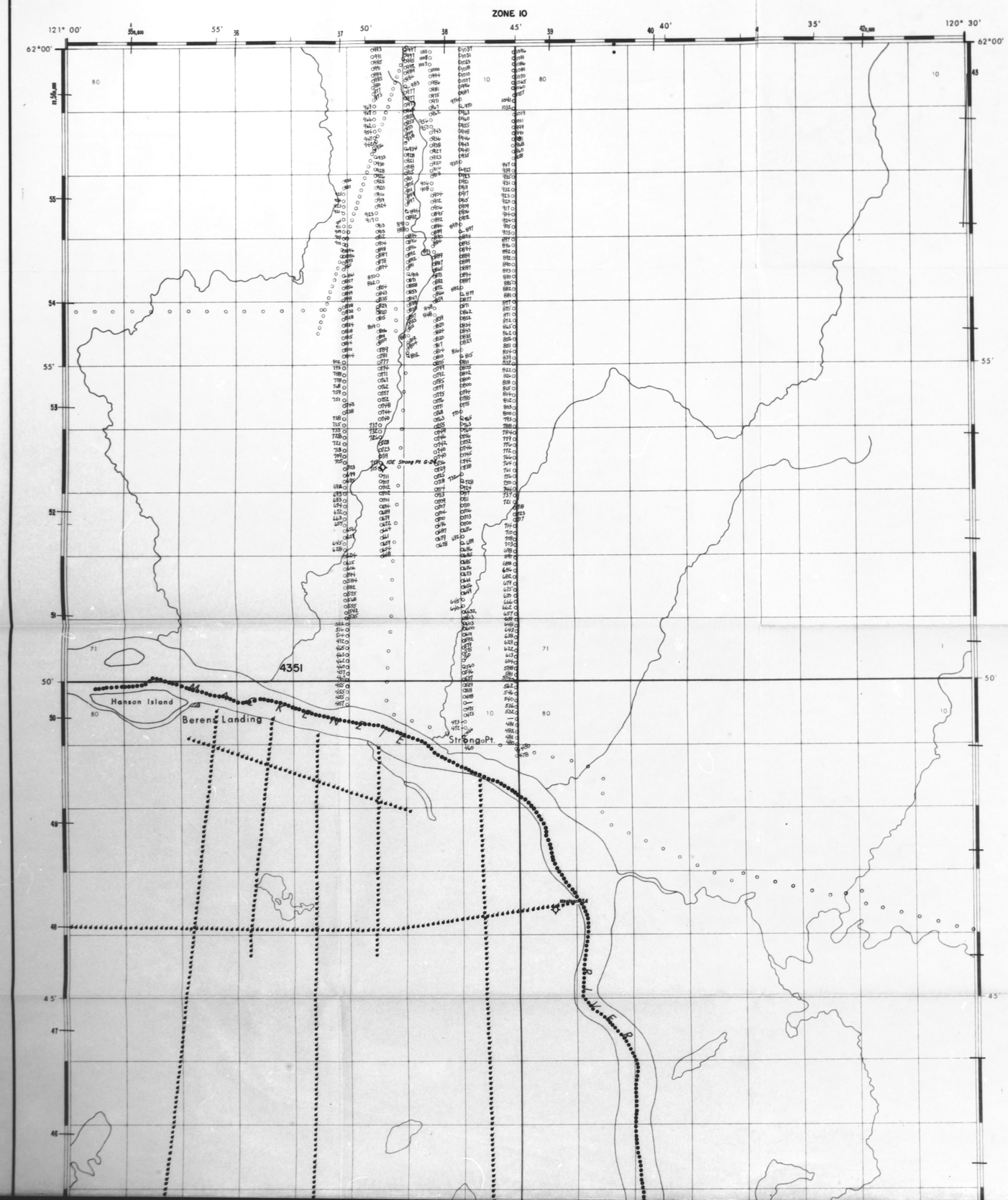
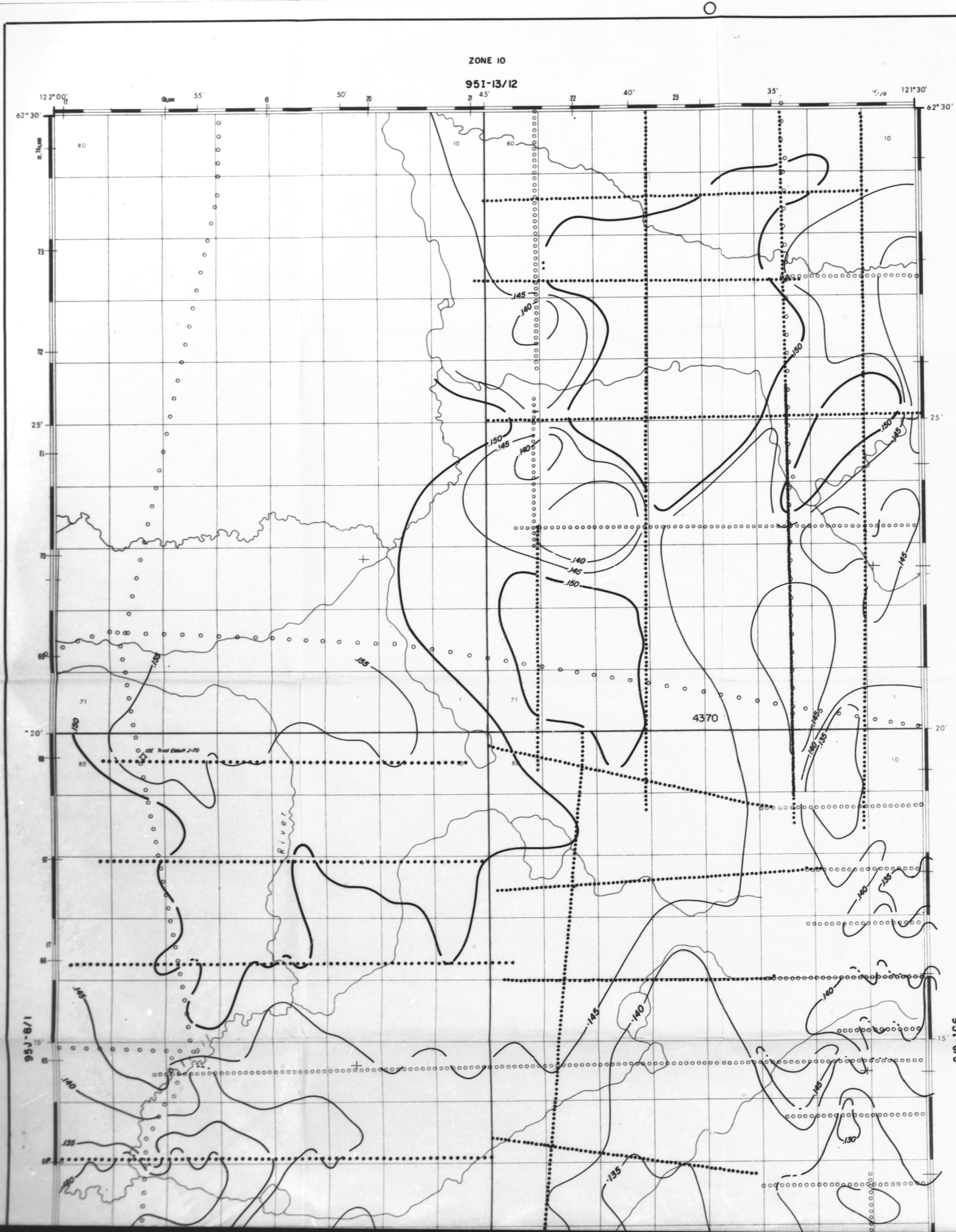
North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

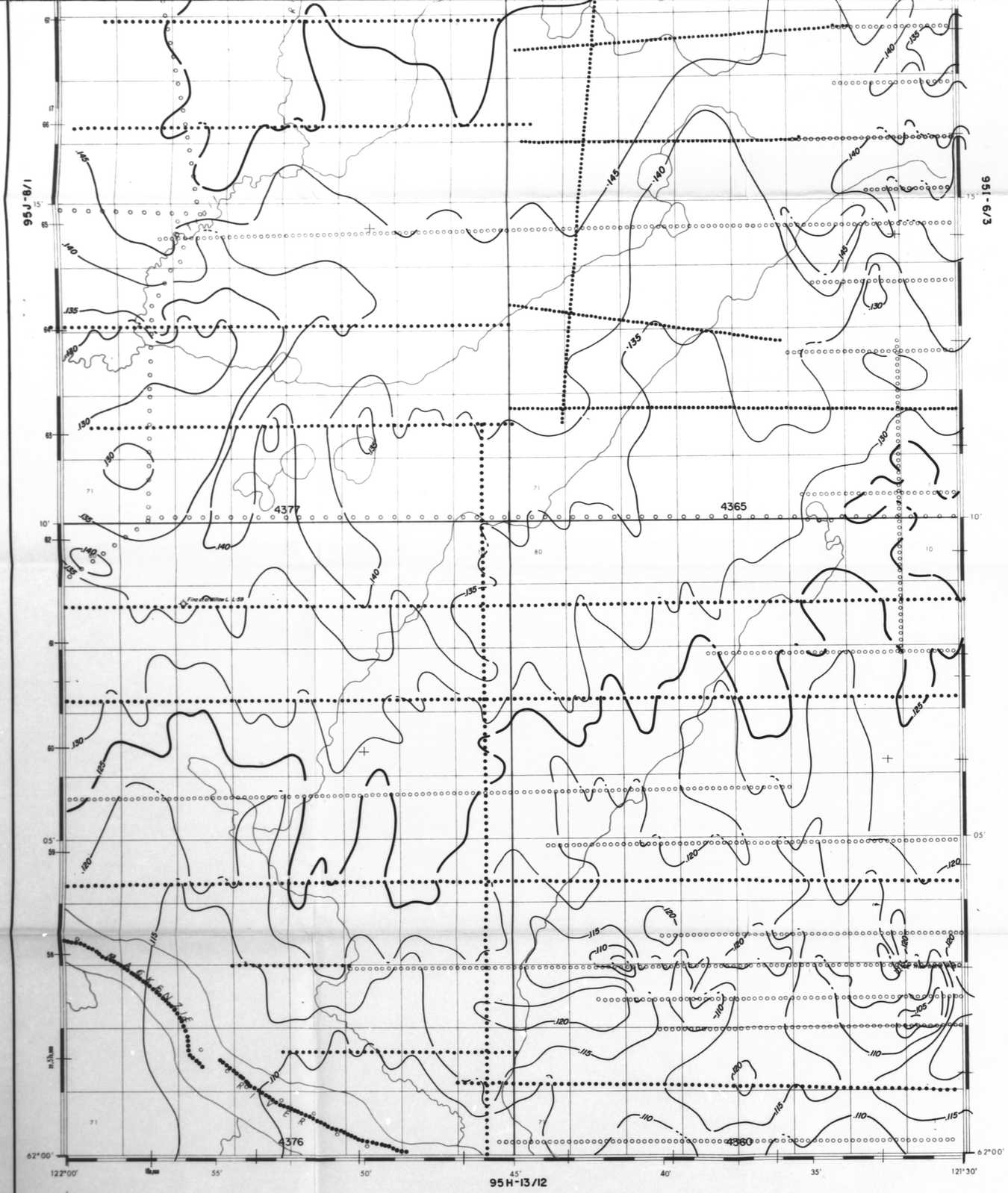
10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.


ZONE 10
121° 00'
55'
50'
45'
40'
35'
120° 30'
62°00'
55'
50'
45'
4351
Hanson Island
Berens Landing
Strongo Pt.
Lake Winnipeg

1 OF 2


ZONE 10
95I-13/12
122°00'
55'
50'
45'
40'
35'
121°30'
62°30'
25'
20'
15'
73
72
71
70
69
68
67
66
65
64
80
10
71
.145
.140
.150
.155
.135
.130
4370
IOE Triad Ebbutt J-70
River
95J-8/1
95I-6/3

1 of 2



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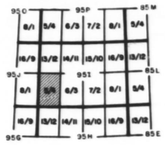

SEISMOGRAPH MAP

Contour Interval ....0.005 sec....
Datums: Plane ..... Velocity .....

ISOCHRON

HUME to PRE-DEVONIAN

BULMER LAKE 95 I-5 / 4

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 ¾ 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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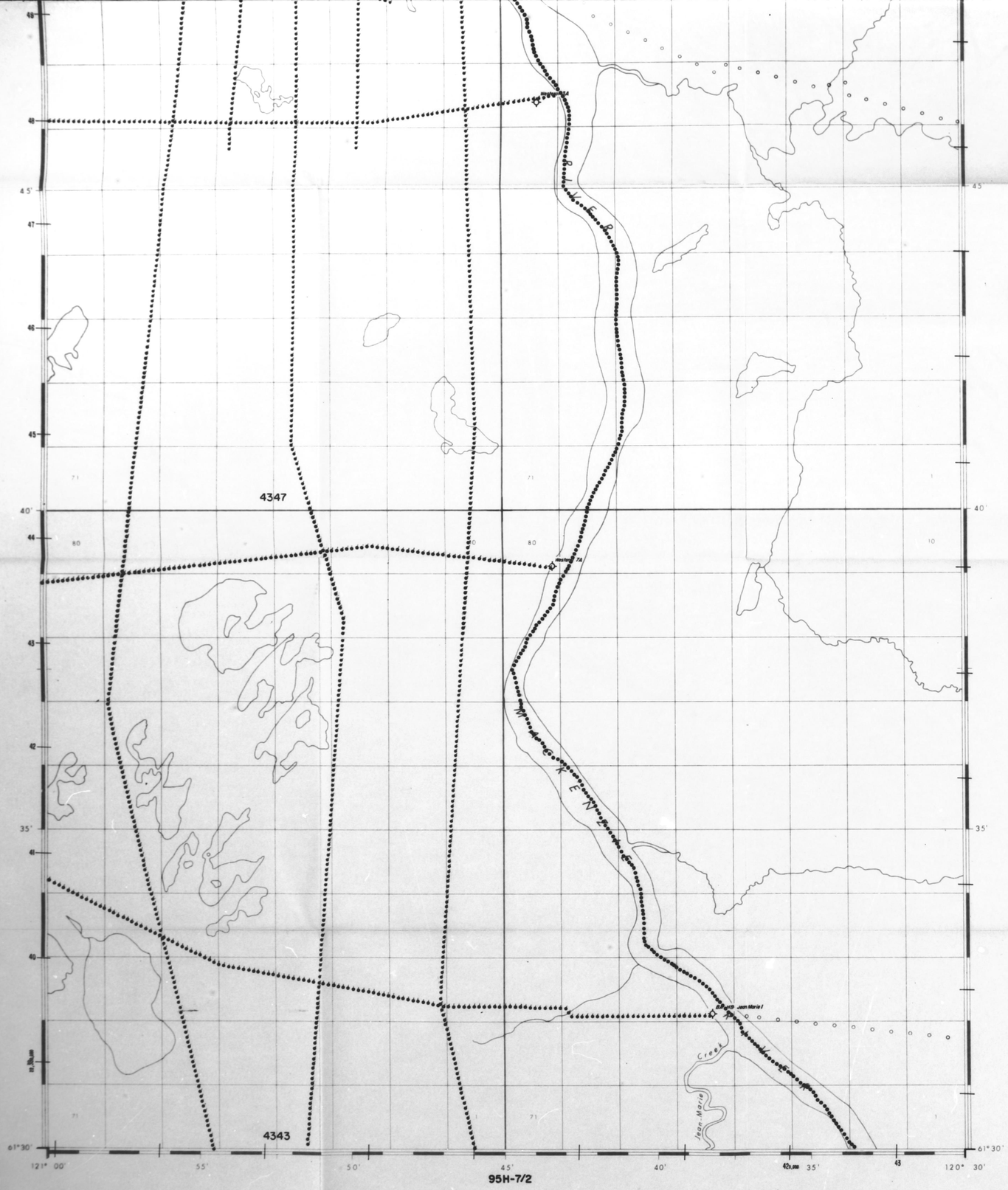
Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised May 20, 1971

PROPRIETARY

2 of 2

Gp	95I-5/4	1		C		



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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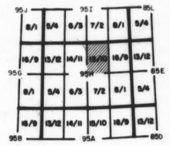

SEISMOGRAPH MAP

SURFACE ELEVATIONS

Contour Interval _____
Datums: Plane SEA LEVEL *Velocity* _____

FORT SIMPSON 95 H - 15 / 10

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

PROPRIETARY

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

Gp	95H-15/10	3	V			

2 of 2

IMPERIAL OIL ENTERPRISES LTD.

CONSOLIDATED REPORT

FORT SIMPSON AREA, N.W.T.

1968 - 1971

7-6-4-101

IMPERIAL OIL ENTERPRISES LIMITED
Producing Department - Western Region

REFLECTION SEISMIC AND DRILLING PROGRAM

FORT SIMPSON AREA

Parts 1 and 2

by

O. Friesen

Southern Exploration District
Edmonton, Alta.

Date: October, 1971

PART 1

Reflection Seismic Program

Fort Simpson Area

Permits 4343 - 4372, 4376, 4377, 4407 - 4412.

Field work performed by:

Imperial Oil Enterprises Ltd. Party #23 from January 7 to March 30, 1968.

IOE P.W.O. No:	A00-0423
Department Code No:	7-6-4-67-2

Heiland Exploration Ltd. Party #27 from February 1 to March 14, 1968.

IOE P.W.O. No:	A00-2223
Department Code No:	7-6-4-67-2

Ray Geophysical Ltd. Party #13 from January 7 to January 29, 1969.

IOE P.W.O. No:	A00-0223
Department Code No:	7-6-4-69-3

Re-Interpretation

IOE P.W.O. No:	A00-1523
Department Code No:	86-6-4-69-1

List of Enclosures

- In Attached Pocket -

SEISMIC (32 Maps, 1:50,000 scale)

		Map Sheets:
1.	Surface Elevations	95H -13/12, -14/11, -15/10
2.	Hume Time Structure	95I -7/2, -6/3, -5/4,
3.	Pre-Devonian Time Structure	-13/12, -14/11.
4.	Hume to Pre-Devonian Isochron	

GEOLOGICAL

1. Isopach Top Hume Fm. to Pre-Devonian
2. Structure Top Hume Fm.
3. Structure on PreCambrian.

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Permits 4343 - 4372, 4376, 4377, 4407 - 4412.

Wells Drilled:

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I.O.E. Trail River P-13

Fina et al Willow Lk. J-66

Fina et al Willow Lk. L-59

Husky et al Willow Lk. O-27A

Husky H.B. et al Willow Lk. G-32

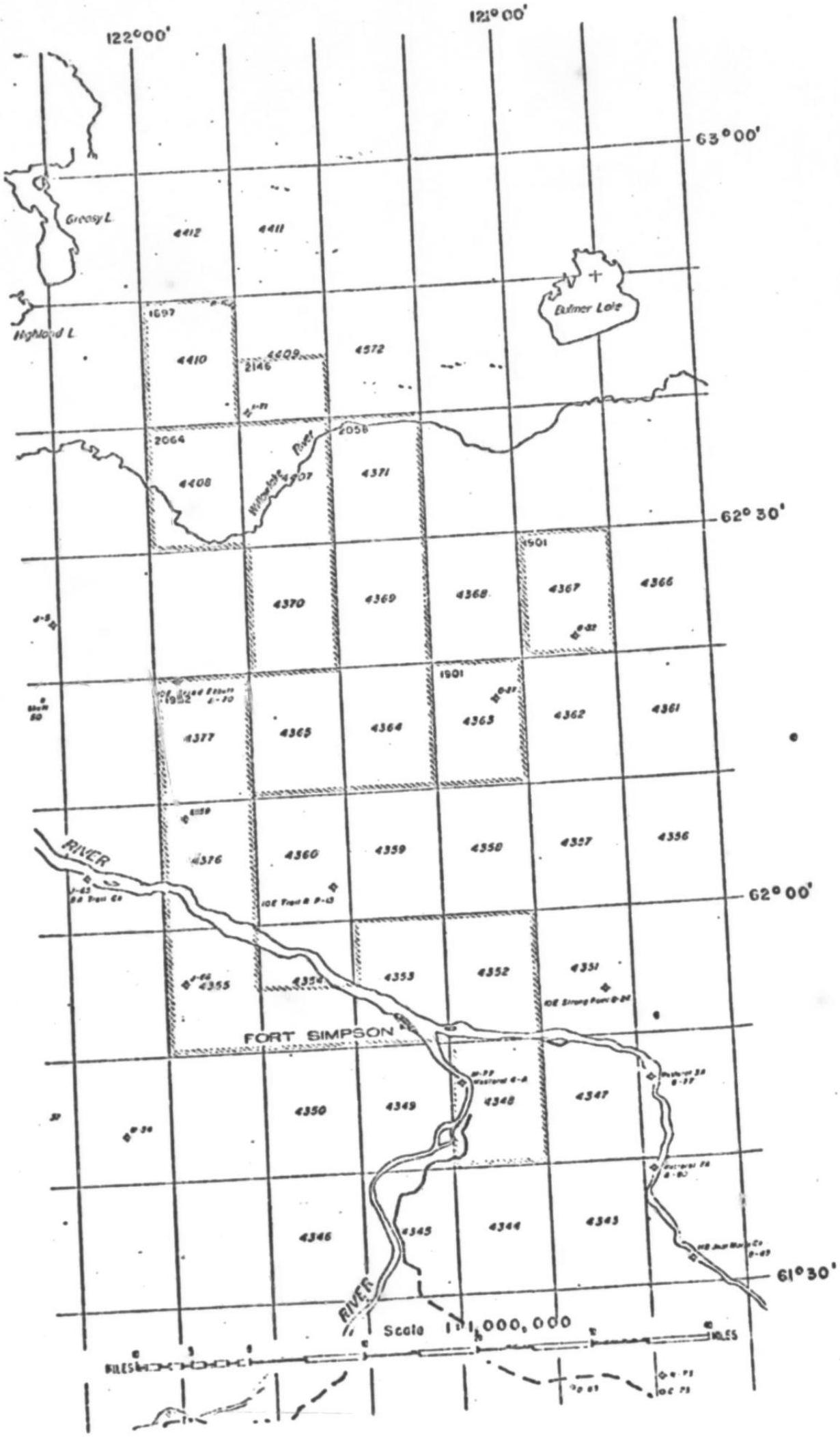
H.R., C.D.R., I.O.E. Willow Lk. I-71

Husky H.B. et al Willow Lk. H-10

Introduction

This is a consolidated report covering Imperial's operations in the Fort Simpson area since 1968. The report is broken into two parts. Part one, is a report on seismograph operations conducted by Imperial Oil Enterprises Ltd. Party #23, Heiland Exploration Ltd. Party #27 and Ray Geophysical Ltd. Party #13 on Imperial Oil Enterprises Ltd. Permits 4343 - 4372, 4376, 4377, 4407 - 4412 during the winter seasons of 1968 and 1969. Included in this section of the report are details of re-interpretation of seismograph operations carried out by farmee companies during the winter seasons of 1969, 1970 and 1971. These companies are Amoco Canada Petroleum Company Limited, Central-Del Rio Oil Limited, Canadian Fina Oil Limited and Husky Oil Limited. Reports of their field operations have been filed by the companies involved.

Part two of this report deals with the wells that have been drilled on the lands since 1968. In all eight wells have been drilled and abandoned. The results of these tests and their geological significance is discussed.



FORT SIMPSON AREA

Part 1 - Reflection Seismic Program

Statistical Data

Imperial Oil Enterprises Ltd. Party #23

Dates: The move to the Fort Simpson area was completed on January 6, 1968. Recording commenced on January 7 and was completed with the equipment moved to another assignment on March 30, 1968.

Production: 196 miles, 1840 shot points, average daily production was 3.1 miles per day. The crew worked 64 days on these permits. There were 19 down days because of time off and 1 down day because of instrument problems.

Equipment: Recorder, 2 shooting trucks, 2 calbe trucks, 2 survey trucks, 1 pary manager vehicle, 2 water trucks, 4 shot hole drills, 3 bulldozers, 1 personnel carrier. The I.O.E. Aztec aircraft and grand transport were used for supervisory trips and supplies. Twenty-four trace digital equipment was used.

Personnel: Party manager, operator and assistant, shooter and assistant, 2 surveyors, 2 rodmen, 5 line helpers, 4 helpers, 4 drillers, 4 drill helpers, 2 water truck drivers. 6 dozer operators, 1 dozer foreman, dozer camp cook, seismic camp cook, cook's helper and camp attendant.

Surveying: Horizontal angles measured to + or - 20 seconds with a Wilde T-16 theodolite. Horizontal control was based on baseline and previous seismic control.

Conditions: Conditions were normal for the time of year. Temperatures varied from 0°F to -50°F.

Field Procedures

A 300% C.D.P. method of shooting was used. Single holes were used, with shot hole spacing of 600', stations were spaced 150' apart with 8 geophones over 150'. Charge sizes varied from 2 1/2 to 20 pounds of "Geogel" per hole. The most common charge size was 5 pounds. The average hole depth was 40 feet. Drilling was fair to good.

Data Processing

All of the seismograms were corrected to a datum of +1000' A.S.L. using a datum velocity of 12,000 ft./sec. 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. All the data was filtered with selective filters used to remove low frequency interference energy. Multiple interference did not seem to be a problem, therefore the data was not deconvolved. The processing was done in Imperial Oil's Process Centre.

Results and Interpretation

The results and interpretation of all shooting will be discussed in the final portion of this report.

Statistical Data

Heiland Exploration Ltd. Party #27.

Dates: The move to the Fort Simpson area was completed February 1, 1968. Recording commenced on February 2nd and was completed with the equipment released on March 14, 1968.

Production: 128 miles, 532 shot points, average daily production was 3.1 miles per day. The crew worked 42 days on these permits. There were no down days.

Equipment: Recorder, 2 shooting trucks, 2 cable trucks, 2 survey trucks, 1 party manager vehcile, 2 water trucks, 4 shot hole drills, 3 bulldozers, 1 personnel carrier. I.O.E. Aztec aircraft and ground transport were used for superviosry trips and supplies. Twenty-four trace digital equipment was used.

Personnel: Party manager, operator and assistant, shooter and assistant, 2 surveyors, 2 rodmen, 5 line helpers, 8 drillers, 8 drill helpers, 2 water truck drivers, 6 dozer operators, 1 dozer foreman, dozer camp cook, seismic camp cook, cook's helper and camp attendant.

Surveying: Horizontal angles measure to + or - 20 seconds with a Wilde T-16 theodolite. Horizontal control was based on baseleine survey. Vertical control based on baseline and previous seismic control.

Conditions: Conditions were normal for the time of year. Temperatures varied from 0°F to -50°F.

Field Procedures

A 100% method of shooting was used. 3 holes over 110' were used, with shot hole spacing of 1320' stations were spaced 110' apart with 8 geophones over 110'. Charge sizes varied from 2 1/2 to 20 pounds of "Geogel" per hole. The most common charge size was 5 pounds. The average hole depth was 40 feet. Drilling was poor to good.

Data Processing

All of the seismograms were corrected to a datum of +1000' A.S.L. using a datum velocity of 12,000 ft./sec. 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. All the data was filtered with selective filters used to remove low frequency interference energy. Multiple interference did not seem to be a problem, therefore the data was not deconvolved. The processing was done in Imperial Oil's Process Centre.

Results and Interpretation

The results and interpretation of all shooting will be discussed in the final portion of this report.

Statistical Data

Ray Geophysical Ltd. Party #13.

Dates: The move to the Fort Simpson area was completed January 6, 1969. Recording commenced on January 7 and was completed with the equipment released on January 29, 1969.

Production: 53 miles, 476 shot points, average daily production was 2.3 miles per day. The crew worked 23 days on these permits. There were no down days.

Equipment: Recorder, 2 shooting trucks, 2 cable trucks, 2 survey trucks, 1 party manager vehicle, 2 water trucks, 6 shot hole drills, 3 bulldozers, 1 personnel carrier. I.O.E. Aztec aircraft and ground transportation were used for supervisory trips and supplies. Twenty-four trace digital equipment was used. (D.F.S. 200)

Personnel: Party manager, operator and assistant, shooter and assistant, 2 surveyors, 2 rodment, 5 line helpers, 6 drillers, 6 drill helpers, 2 water truck drivers, 6 dozer operators, 1 dozer foreman, dozer camp cook, seismic camp cook, cook's helper and camp attendant.

Surveying: Horizontal angles measured to + or - 20 seconds with a Wilde T-16 theodolite. Horizontal control was based on baseline survey. Vertical control based on baseline and previous seismic control.

Conditions: Conditons were cold for the time of year. Temperatures varied from -10°F to -55°F.

Field Procedures

A 300% C.D.P. method of shooting was used. Single holes were used, with shot hole spacing of 600', stations were spaced 150' apart with 8 geophones over 150'. Charge sized varied from 2 1/2 to 20 pounds of "Geogel" per hole. The most common charge size was 5 pounds. The average hole depth was 40 feet. Drilling was fair to good.

Data Processing

All of the seismograms were corrected to a datum of +1000' A.S.L. using a datum velocity of 12,000 ft./sec. 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. All the data was filtered with selective filters used to remove low frequency interference energy. Multiple interference did not seem to be a problem, therefore the data was not deconvolved. The processing was done in Imperial Oil's Process Centre.

Results and Interpretation

The quality of seismograms obtained by all crews was comparable. Quality was good in the higher elevation areas and deteriorated steadilty to almost unuseable close to the rivers and in the sand dune area south and east of Fort Simpson. Two consistent reflectors could

be carried. These were from the Middle Devonian Carbonate top (Hume) and the pre-Devonian unconformity. Time structure maps of each of these reflectors were constructed together with the isochron between the two reflectors. Certain areas of these maps are blank. These areas are where the quality of the seismograms obtained or the corrections applied were considered unreliable. Reflections corresponding to the Precambrian top and the Cold Lake Salt were noted on some lines. The Precambrian reflection was sporadic and not carried. A map showing the presence or absence of Cold Lake Salt as interpreted from the seismic control was constructed. The seismic coverage was tied to all velocity surveys taken at wells in the area. The interpretation was made from the maps prepared and the stacked seismic cross-sections, with assistance of geological control in the area.

As a result of the interpretation made from the seismic coverage in the area, the following anomalies were observed.

1. Low velocity near surface zones which appear to be abandoned pleistocene channels of the Mackenzie River. These channels have eroded into the Middle Devonian Carbonate in places, thus severely downgrading any hydrocarbon prospects in the Middle Devonian Carbonate in this area. These channels are indicated on the Hume structure map and where erosion of the Middle Devonian Carbonate has taken place corresponding thin values of the Hume to pre-Devonian isochron are observed.

2. Thin values of the Hume to pre-Devonian isochron with associated low values (stratigraphically high) of the pre-Devonian structure have been interpreted as either basement highs or possible

reefing of the Ernestina Lk. formation. The latter possibility was tested unsuccessfully in the I.O.E. Trail River P-13 well.

3. A few thick values of the Hume to pre-Devonian isochron exist which are interpreted as possible Arrowhead pinnacle reefs.

No other significant anomalies have been observed. A regional thickening of all intervals to the northwest of the area is apparent from the maps. It is known from geological control that the beds below the pre-Devonian unconformity thicken and that a potential reservoir exists in the Ronning. However, the velocity contrast between these horizons is insufficient to produce a consistent reflection.

Summary and Conclusions

A total of 1705 miles of seismic coverage has been obtained in this area since 1967, 377 miles of which was shot for I.O.L. and the remainder by farmees. Most of the seismic anomalies considered to have hydrocarbon potential have been tested.

JT:gw

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A total of 1705 miles of seismic coverage has been obtained in this area since 1967, 377 miles of which was shot for I.O.L. and the remainder by farmees. Most of the seismic anomalies considered to have hydrocarbon potential have been tested.

JT:gw

Part 2 - Drilling Program

Introduction

Since 1968 the following wells have been drilled on the subject lands by or on behalf of Imperial Oil:

	Well Name	Location	Rig Release Date
1.	I.O.E. Strong Pt. G-24	G-24, 62°-00'N, 120°-45'W	16/02/69
2.	I.O.E. Trial River P-13	P-13, 62°-10'N, 121°-30'W	15/03/69
3.	Fina et al Willow Lk. J-66	J-66,62°-00'N 121°-45'W	26/01/71
4.	Fina et al Willow Lk. L-59	L-59, 62°-10'N 121°-45'W	25/02/71
5.	Husky et al Willow Lk 0-27A	0-27, 62°-20'N 121°-00'W	22/02/70
6.	Husky H.B. et al Willow Lk. G-32	G-32, 62°-30'N 120°-45'W	05/04/70
7.	H.R., C.D.R., I.O.E. Willow Lake I-71	I-71, 62°-50'N 121°-30'W	17/03/71
8.	Husky H.B. et al Willow Lk. H-10	H-10, 62°-50'N 121°-45'W	27/03/70

In our opinion these tests represent a good sampling of the general geology of the area. All the wells bottomed in PreCambrian rocks and were abandoned. No major or significant hydrocarbon shows were encountered in the wells drilled. Several definitive drill stem tests did however indicate reservoir in that substantial water recoveries were recorded.

Results and Interpretation

In all cases the drilled wells encountered 100± feet of glacial sands, gravels and clays. Underlying these deposits were shales with minor sands and silts of the Devonian Imperial formation. Basically this formation, in the area, is a greenish grey to dark grey slightly calcareous shale. These are fissile and soft. Varying amounts of interbedded silts and very fine sands are noted in the section. Ocassional fossils (brachiopods and ostracods) have been noted in samples. The thickness of this formation varies from 300 feet upwards depending upon the amount of erosion to which it has been subjected.

Immediately below the Imperial formation is a recognizable dark brown to very dark grey shale unit. This unit is the Canol formation and is characterized by it general dark colour and highly bituminous nautre. The formation averages about 94 feet in thickness in the area and varies from 82 to 115 feet. Occassional thin limestone interbeds, which are dark brown and very shaly, are noted in the lower portion of the section.

From the base of the Canol formation down to the top of the Pre-Devonian sediments the section consists mainly of evaporites with minor carbonates. The evaporites are anhydrite and halite while the carbonates are limestones and minor dolomites. The attached Isopach map (Top Hume to PreDevonian) indicates a general thickening in a north to north-westerly direction and a thinning in a southerly direction. The southward thinning reflects the effect of the Tathlina high on sedimentation while the northward thickening indicates the direction of greatest subsidence or basining. Also shown on this map is the

edge of the Cold Lake salt. The significance of this line is that it very roughly approximates the boundary of the Ernestina Lake carbonate which has been considered prospective. This dolomite varies in thickness from 50± feet to 110± feet. The wells which have penetrated it indicate an interbedded carbonate and anhydrite sequence. The carbonate is interpreted tobealgal in origin and a shallow water facies. Mechanical logs of the wells which have penetrated the formation indicate it to be tight. Two wells, Husky H.B. et al Willow Lake G-32 and Husky et al Willow Lake 0-27A, tested the section with minor mud recoveries only. In the G-32 test a very slight trace of oil was noted in the mud. Consequently from all data available one must conclude that conditions during the time of deposition never became fresh enough to provide extensive reservoir facies.

The control wells show the total thickness of carbonates above the evaporites to vary between 330 and 604 feet. In the main this section is limestone with minor dolomites and shales. The dolomites are present in the basal one-third to one-half of the interval and are interpreted to be of a shallow water, algal origin. They are light brown, fine crystalline, trace argillaceous and contain minor fossil debris. Poor porosity is noted in these dolomites. The limestones in the upper portion of the interval are also interpreted to be shallow water in origin. They do however suggest slightly deeper water conditions near the top of the Hume. As a rule these limestones are brown to dark brown, argillaceous and have a variable fossil content. Fossils noted are brachiopods, crinoids and corals. Some beds exhibit a fragmental appearance. The limestones are generally tight;

however traces of minor oil stained porosity have been recorded. When tested this porosity has proven to be ineffective since only mud has ever been recovered. Drill stem tests of the porous dolomite sections, at the base of the interval, have also returned only mud and indicate poor, ineffective reservoir.

The Silurian-Ordovician Ronning formation underlies approximately the northern two-thirds of the area under permit to Imperial Oil. Where seen this formation consists of a very fine to fine crystalline, grey to buff dolomite. Variable amounts of chert have been noted throughout the section. This chertification appears to be concentrated in the more fossiliferous zones. Vuggy and some intercrystalline porosity is noted in samples of the Ronning and can be graded fair to good, reduced somewhat in quality by chertification. Further evidences of fair reservoir characteristics in this carbonate are shown in the water rises obtained on drill stem test of several wells in the area. The wells testing the Ronning and test results are listed below.

Well Name	D.S.T. Results
1. I.O.E. Strong Pt. G-24	No Ronning present.
2. I.O.E. Trail River P-13	No test.
3. Fina et al Willow Lk. J-66	No Ronning present.
4. Fina et al Willow Lk. L-59	900' salt water.
5. Husky et al Willow Lk. O-27A	1596' salt water, 360' mud cut salt water.
6. Husky H.B. et al Willow Lk. G-32	475' mud.
7. H.R., C.D.R., I.O.E. Willow Lk. I-71	200' salt mud.
8. Husky H.B. et al Willow Lk. H-10	5' mud.

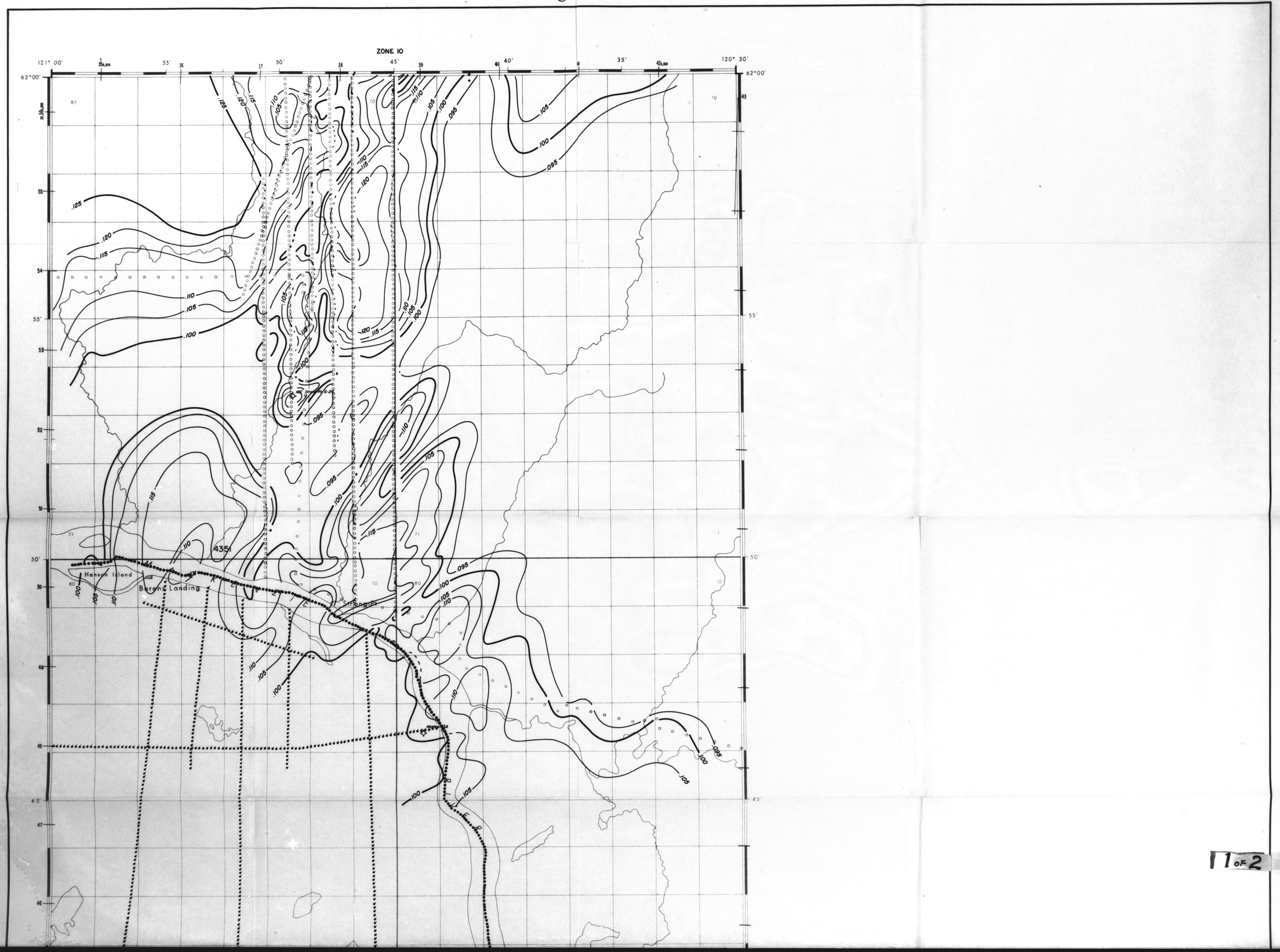
The Basal Paleozoic sandstone unit is interpreted to be present in all wells, drilled in the area, except two. These are I.O.E. Strong Point G-24 and Husky H.B. et al Willow Lake H-10. In the other wells, situated on the subject lands, the thickness of this unit is variable from 10± feet to 84 feet. The thickest development appears in the Husky et al Willow Lake 0-27A test where 84 feet of sand are present. Descriptions of this unit indicate it as composed of an argillaceous and dolomitic siltstone at the top grading downward to a well sorted clean sandstone at the bottom. The sandstone portion of the unit is essentially tight; however streaky poor intergranular porosity is present in some wells. Silica cement appears to be the main agent of porosity destruction. A drill stem test was run over this potential reservoir at Husky et al Willow Lake 0-27A. The recovery was 150 feet of mud cut salt water. Analysis of mechanical logs of the other control wells suggests a similar result (i.e. poor water bearing porosity).

Summary & Conclusions

Drilling to date has failed to find commercial hydrocarbons. Several formations have indicated the potential for reservoir development (i.e. Ronning and Basal Cretaceous Sandstone) and these will require further drilling for a proper evaluation. The known seismic anomalies considered to have hydrocarbon potential have been tested.

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

PS:gw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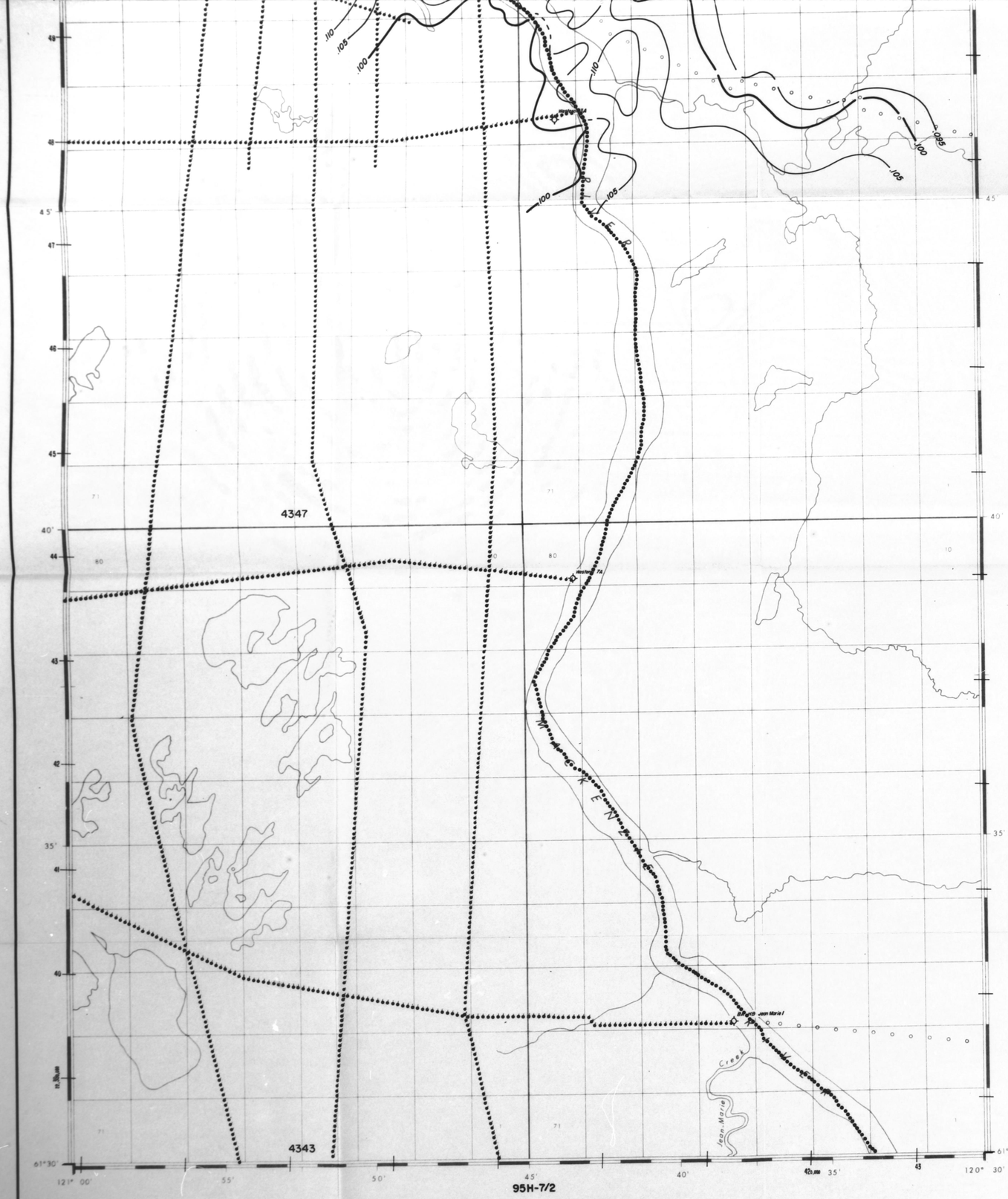
55'
50'
45'
40'
35'
120° 30'
62°00'
55'
50'
45'
Hanson Island
Berens Landing
Sifton Pt.
435

1 OF 2



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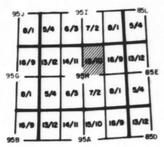

ISOCHRON

HUME to PRE-DEVONIAN

SEISMOGRAPH MAP

Contour Interval .005 SEC.

Datums: Plane _____ *Velocity* _____

FORT SIMPSON 95 H - 15 / 10

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

PROPRIETARY

2 of 2

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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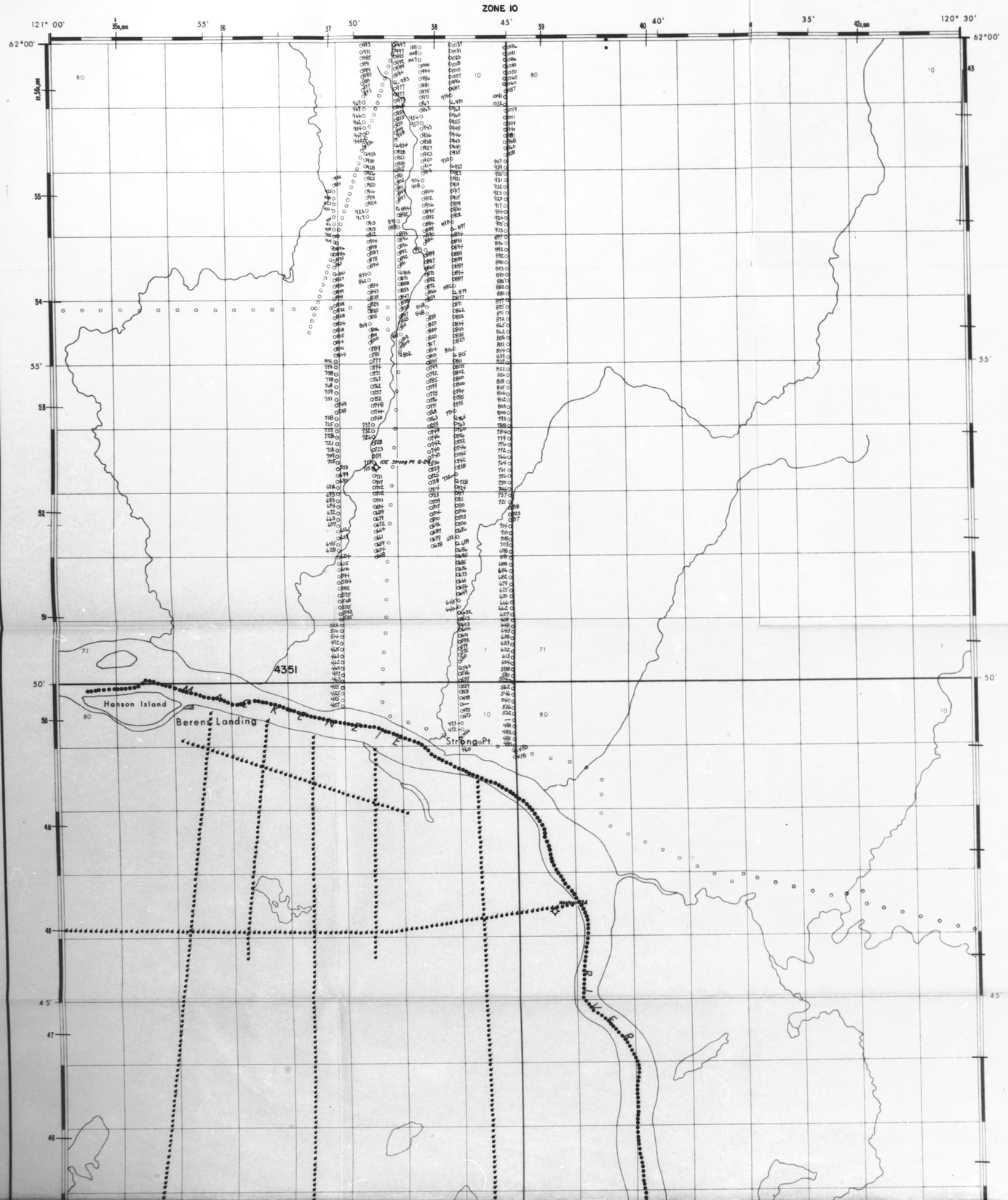
Seismic Revised ..N.T.S.R.....
Values Revised .....
Contours Revised ... OCT. 8, 1971.....
Wells Revised ..N.T.S.R.....

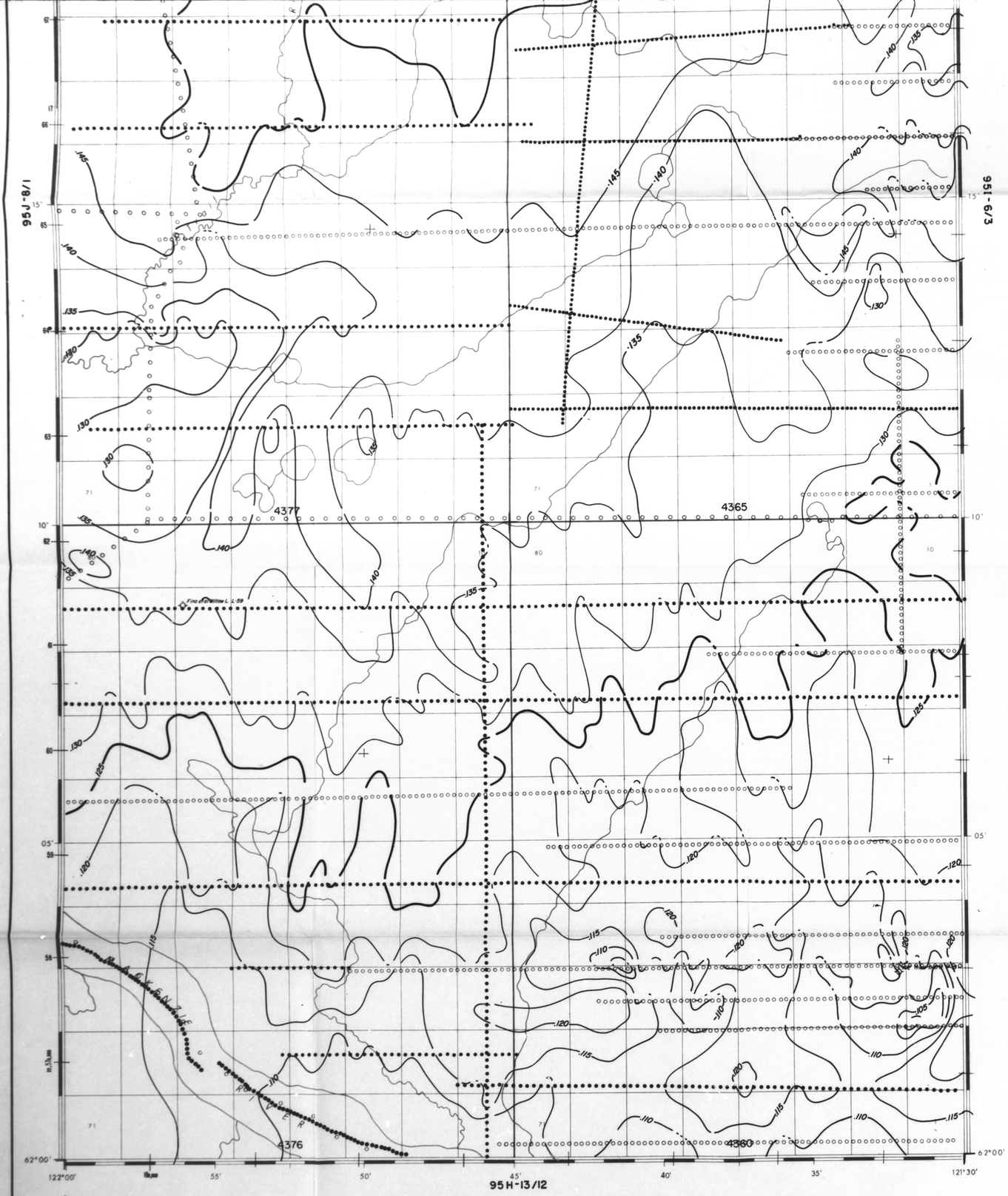
Gp	95H-15/10	4		C		


ZONE 10
121° 00'
55'
50'
45'
40'
35'
120° 30'
62°00'
55'
50'
45'
4351
Hanson Island
Berens Landing
Strong Pt.
Red River

1 of 2

ZONE 10

95I-13/12



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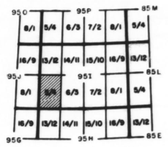

SEISMOGRAPH MAP

Contour Interval 0.005 sec.

Datums: Plane _____ Velocity _____

ISOCHRON

HUME to PRE-DEVONIAN

BULMER LAKE 95 I-5/4

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

PROPRIETARY

2 of 2

Gp | 95I-5/4 | 1 | | C | | |

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 [illegible]
Values Revised [illegible]
Contours Revised [illegible]
Wells Revised May 26, 1971

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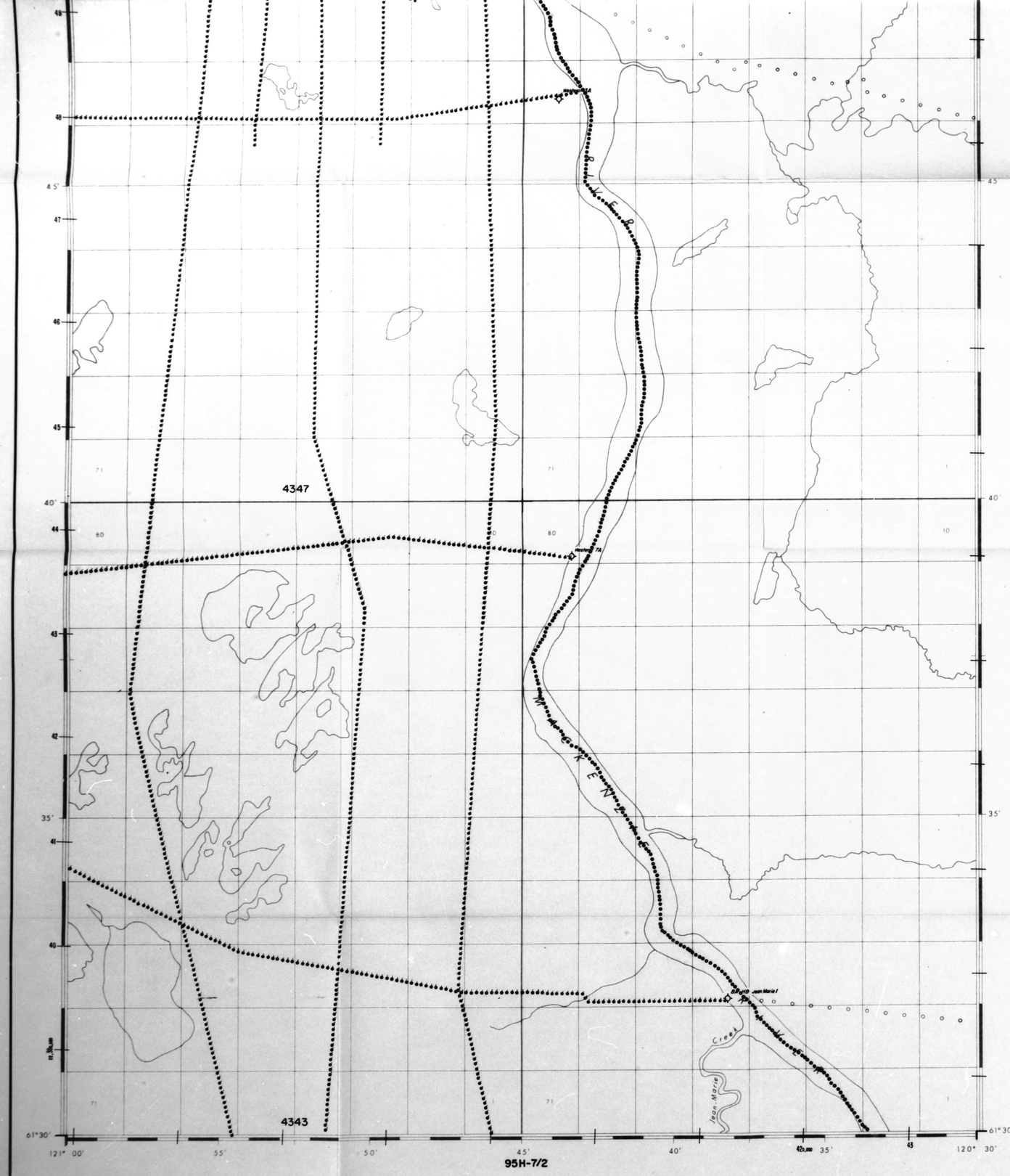

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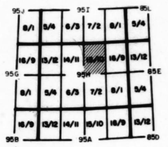


SEISMOGRAPH MAP

SURFACE ELEVATIONS

Contour Interval _____

Datums: Plane SEA LEVEL *Velocity* _____

FORT SIMPSON 95 H - 15 / 10

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

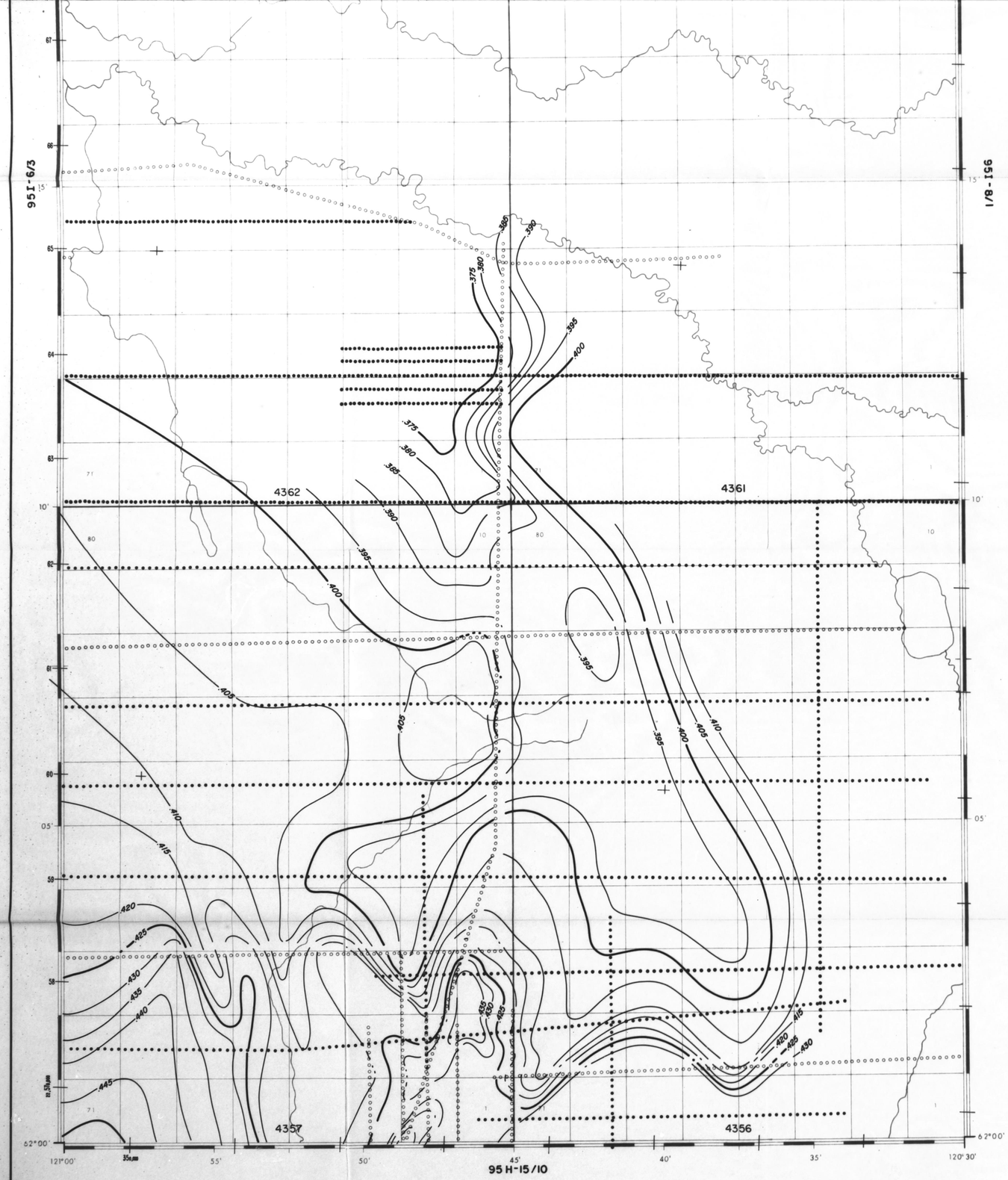
2 of 2

Gp	95H-15/10	3	V			

ZONE 10

951-15/10

1 of 2



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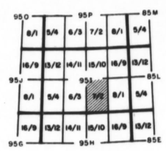

SEISMOGRAPH MAP

Contour Interval .005 SEC.
Datums: Plane 1000' *Velocity* 18,000'/sec.

TIME STRUCTURE

PRE-DEVONIAN

BULMER LAKE 95 I - 7/2

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

PROPRIETARY

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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 ... OCT. 7, 1971 .....
Wells Revised .....

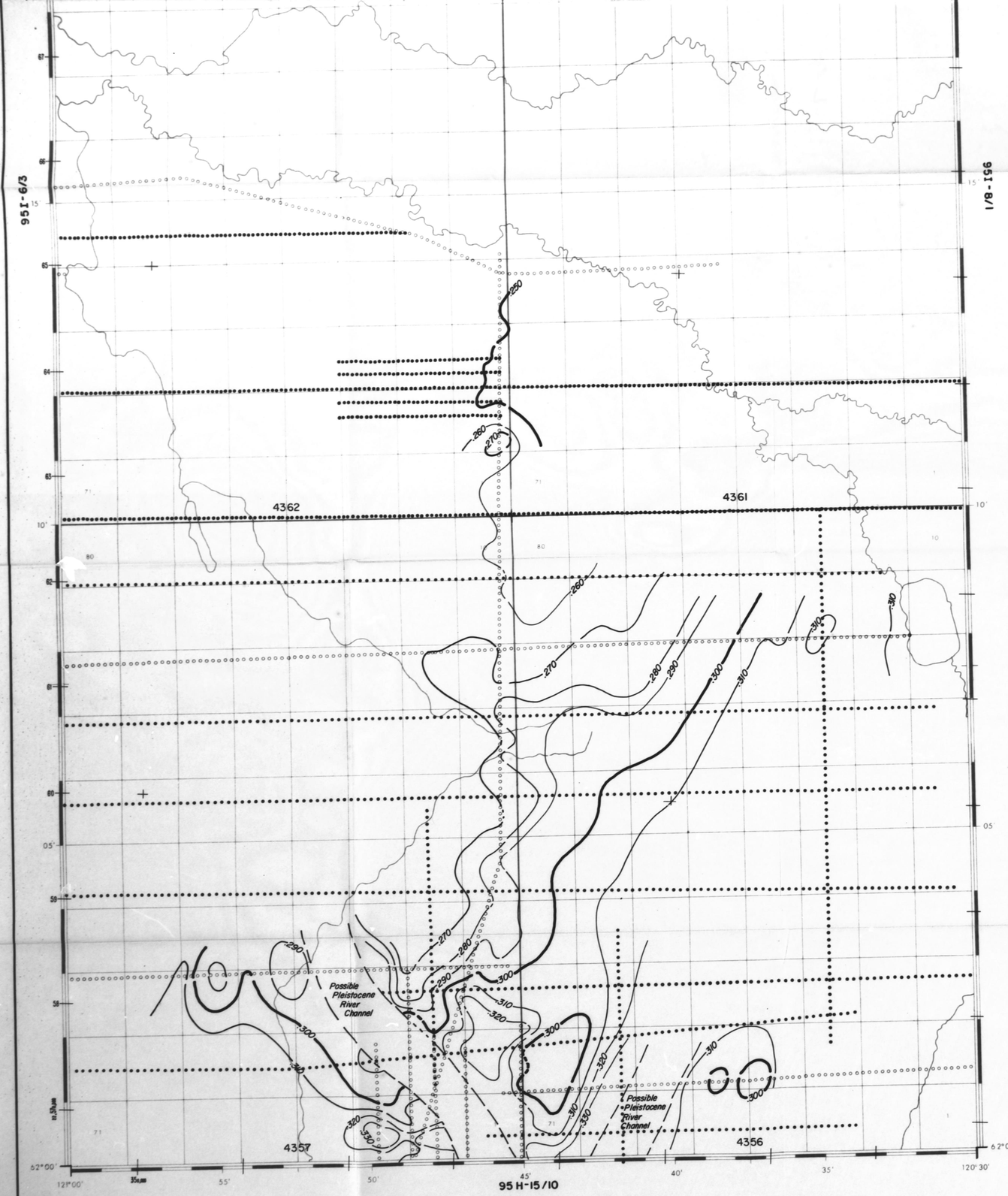
Gp	95I-7/2	5		C		

2 of 2

ZONE 10

951-15/10

1 OF 2



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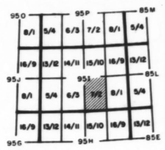

SEISMOGRAPH MAP

Contour Interval 0.010 SECS.
Datums: Plane ..... Velocity .....

TIME STRUCTURE

HUME

BULMER LAKE 95 I - 7/2

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

PROPRIETARY

2 of 2

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Universal
Transverse Mercator Projection
(Gauss-Kruger)

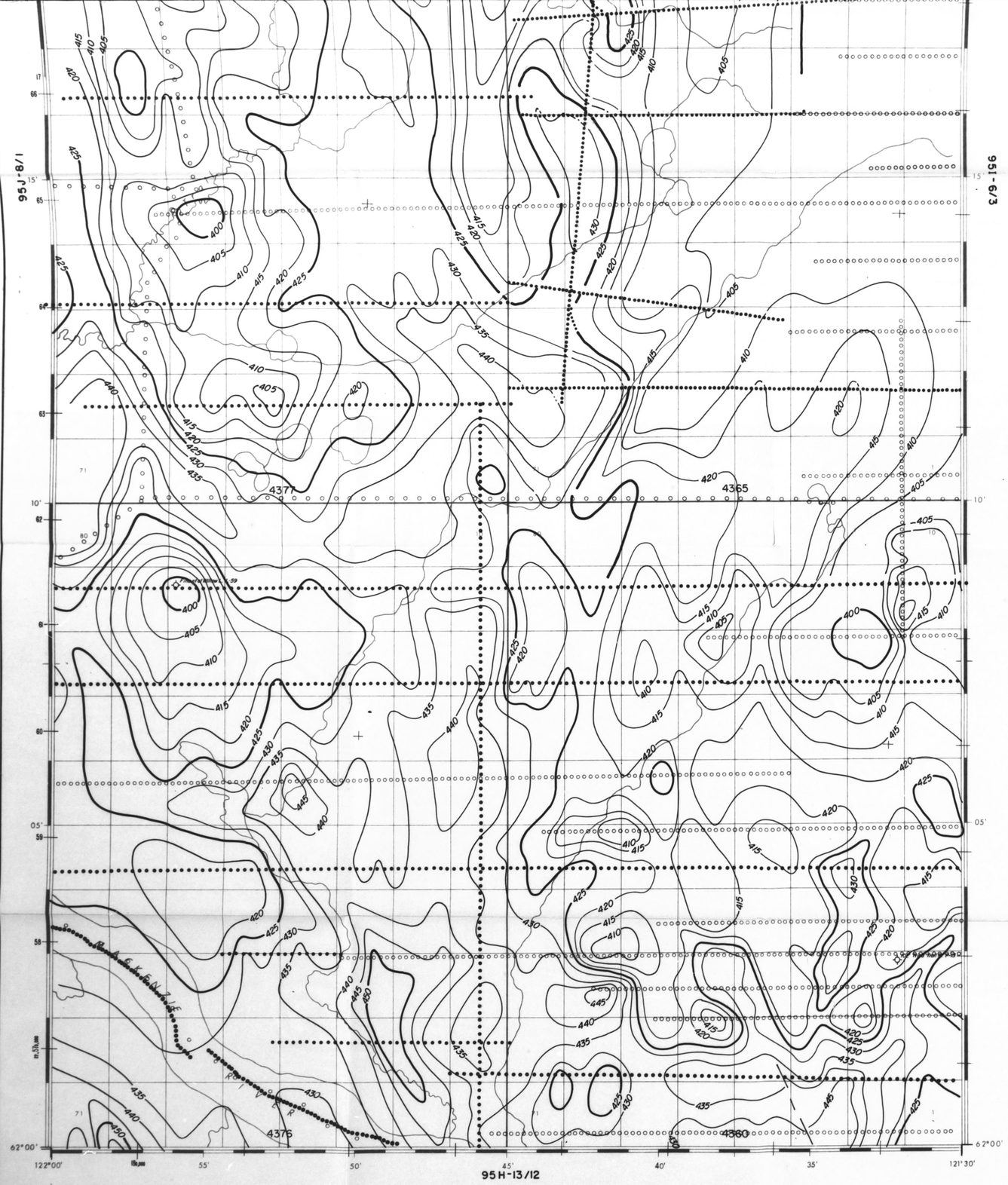
10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

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

Gp	951-7/2	4	V	C		

ZONE 10

95I-13/12



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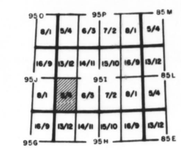


SEISMOGRAPH MAP

Contour Interval 0.005 SECS.
Datums: Plane _____ *Velocity* _____

TIME STRUCTURE

PRE-DEVONIAN

BULMER LAKE 95 I-5/4

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 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)

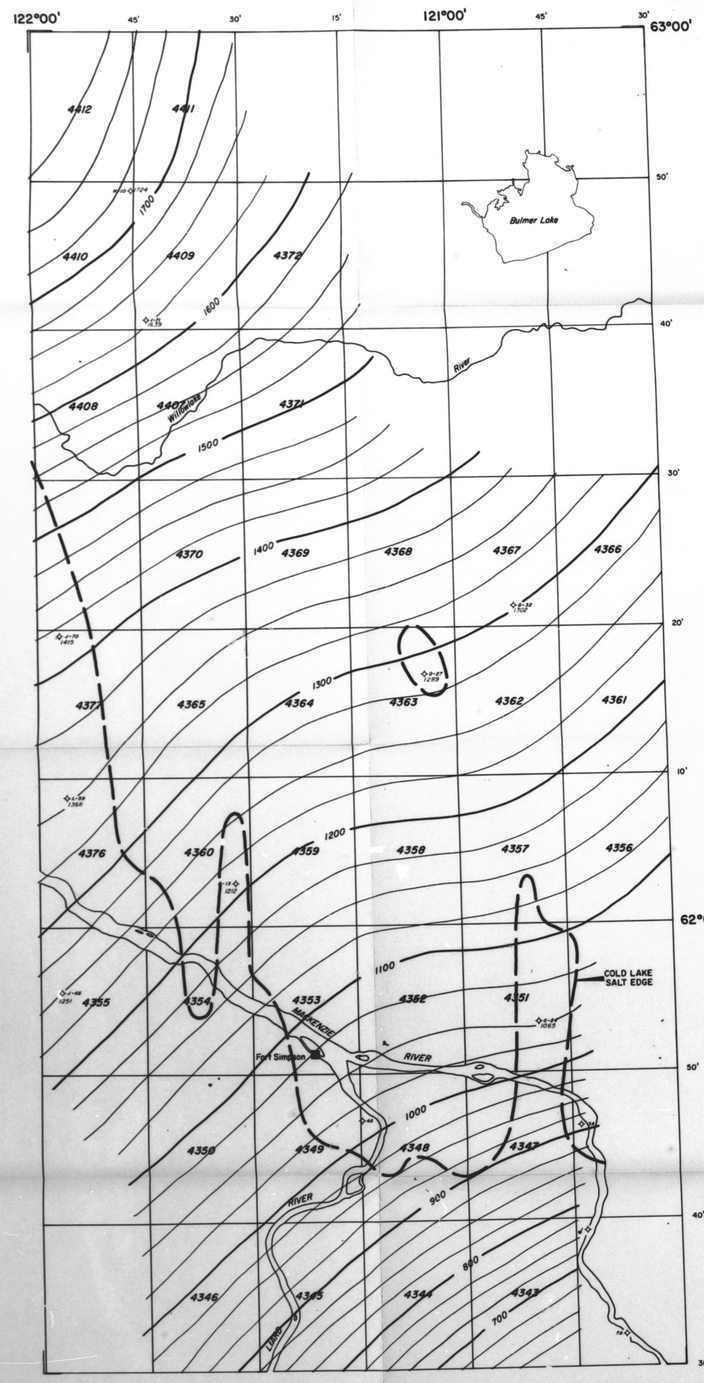
10,000 ft. Coordinates Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised SEPTEMBER 1970
Values Revised .....
Contours Revised MARCH 27/70
Wells Revised May 28, 1971

2 of 2

PROPRIETARY

Gp	95I-5/4	5	V	C		



FORT SIMPSON AREA N.W.T.

ISOPACH TOP HUME FM. TO PRE DEVONIAN

CONTOUR INTERVAL 25 FEET

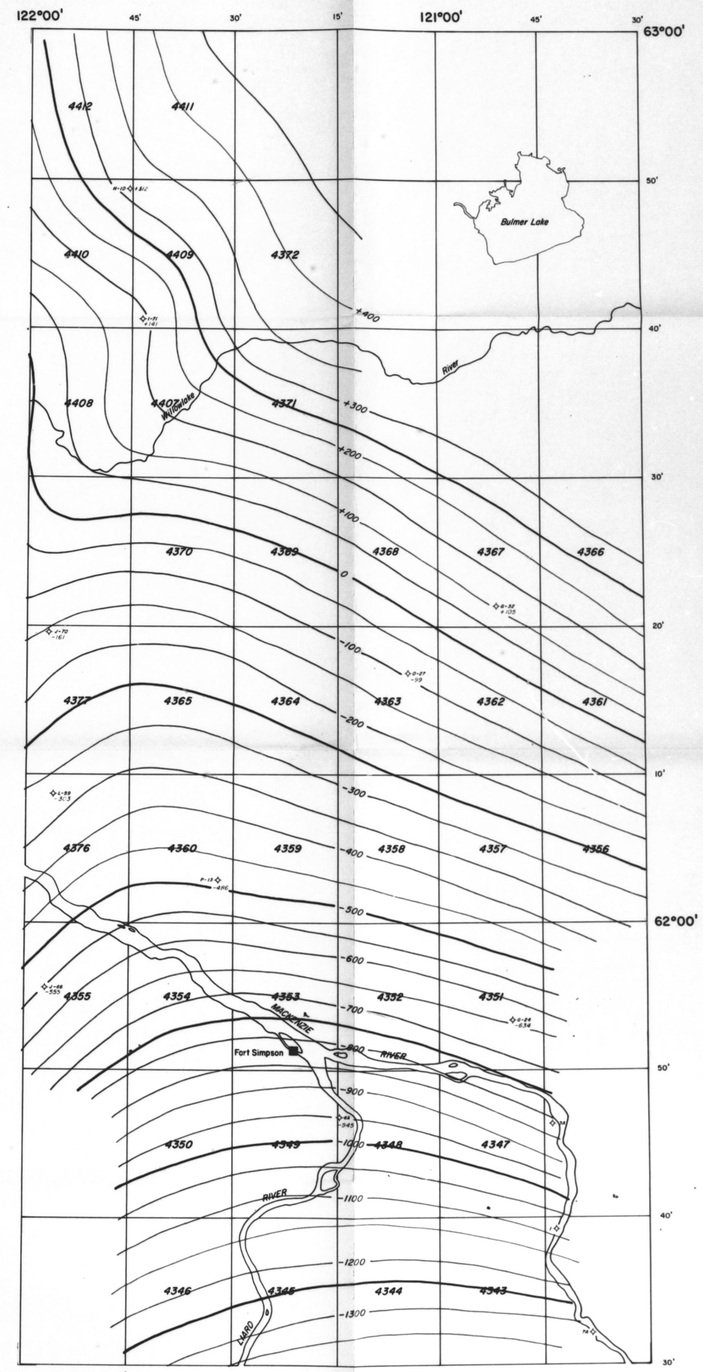
SCALE 1:250,000

0 5 10 15 MI.

P. SANDOMIRSKY — SEPT. 1971

F30.317-1

F30.317-1



FORT SIMPSON AREA N.W.T.

STRUCTURE TOP HUME FM.

CONTOUR INTERVAL 50 FEET

SCALE 1:250,000

0 5 10 15 MI.

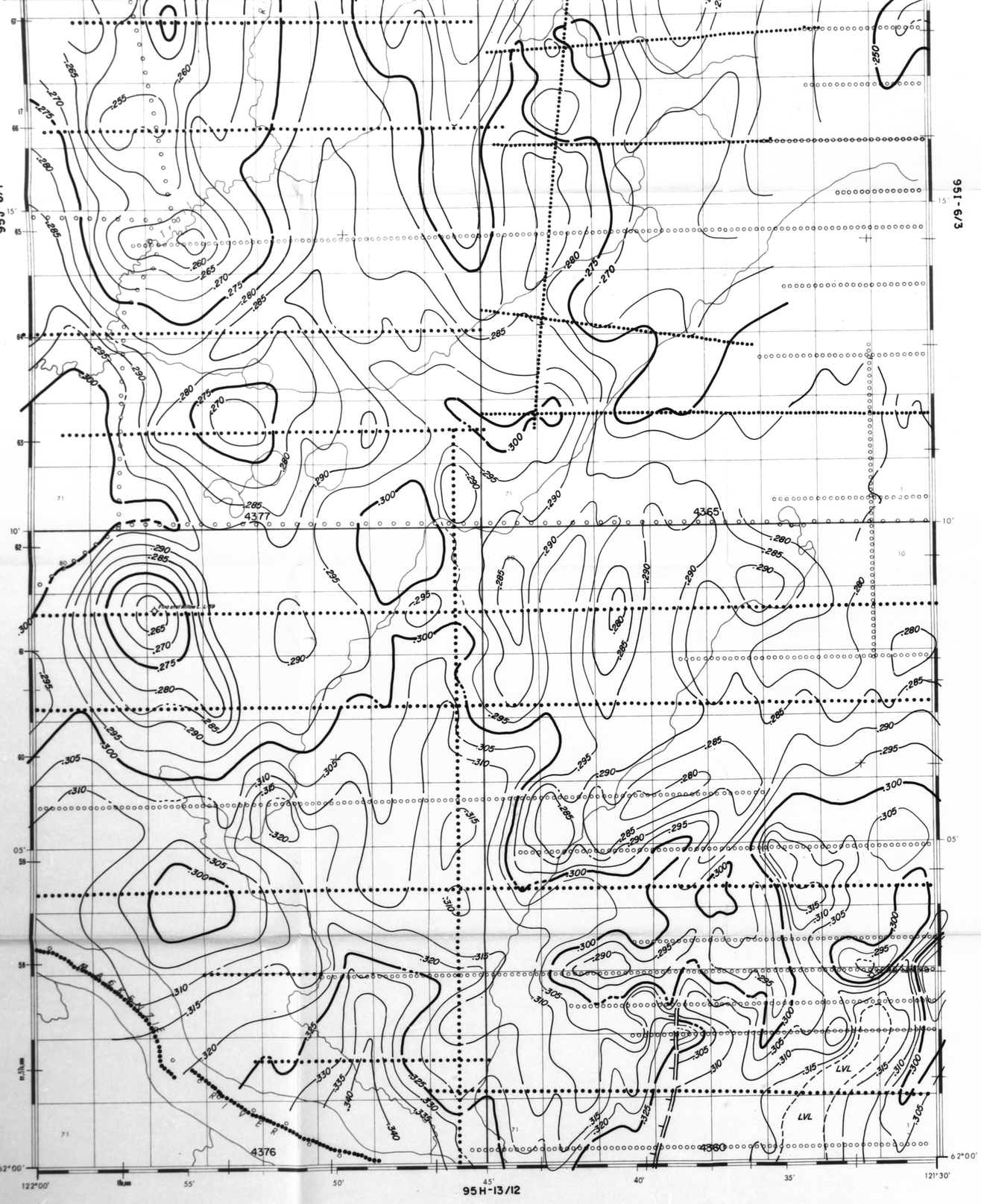
P. SANDOMIRSKY — SEPT. 1971

F30.317-2

F30.317-2

ZONE 10

95I-13/12



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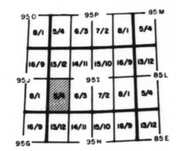

SEISMOGRAPH MAP

Contour Interval 0.005 SECS.
Datums: Plane _____ Velocity _____

TIME STRUCTURE

HUME

BULMER LAKE 95 I-5/4

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

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

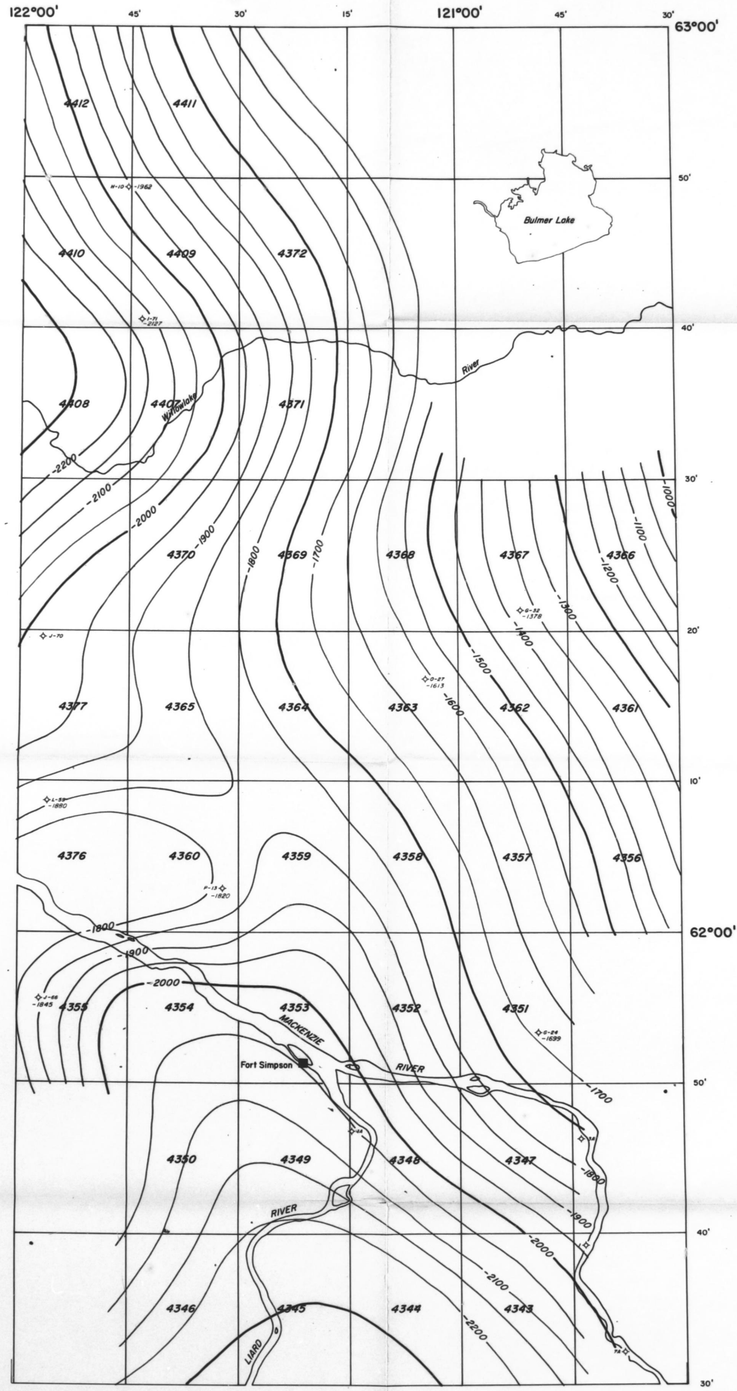
10,000 ft. Coordinates Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised SEPTEMBER 1970
Values Revised
Contours Revised NOV. 27/70
Wells Revised May 28, 1971

PROPRIETARY

2 of 2

Gp	95I-5/4	4	V	C		



FORT SIMPSON AREA N.W.T.

STRUCTURE ON PRECAMBRIAN

CONTOUR INTERVAL 50 FEET

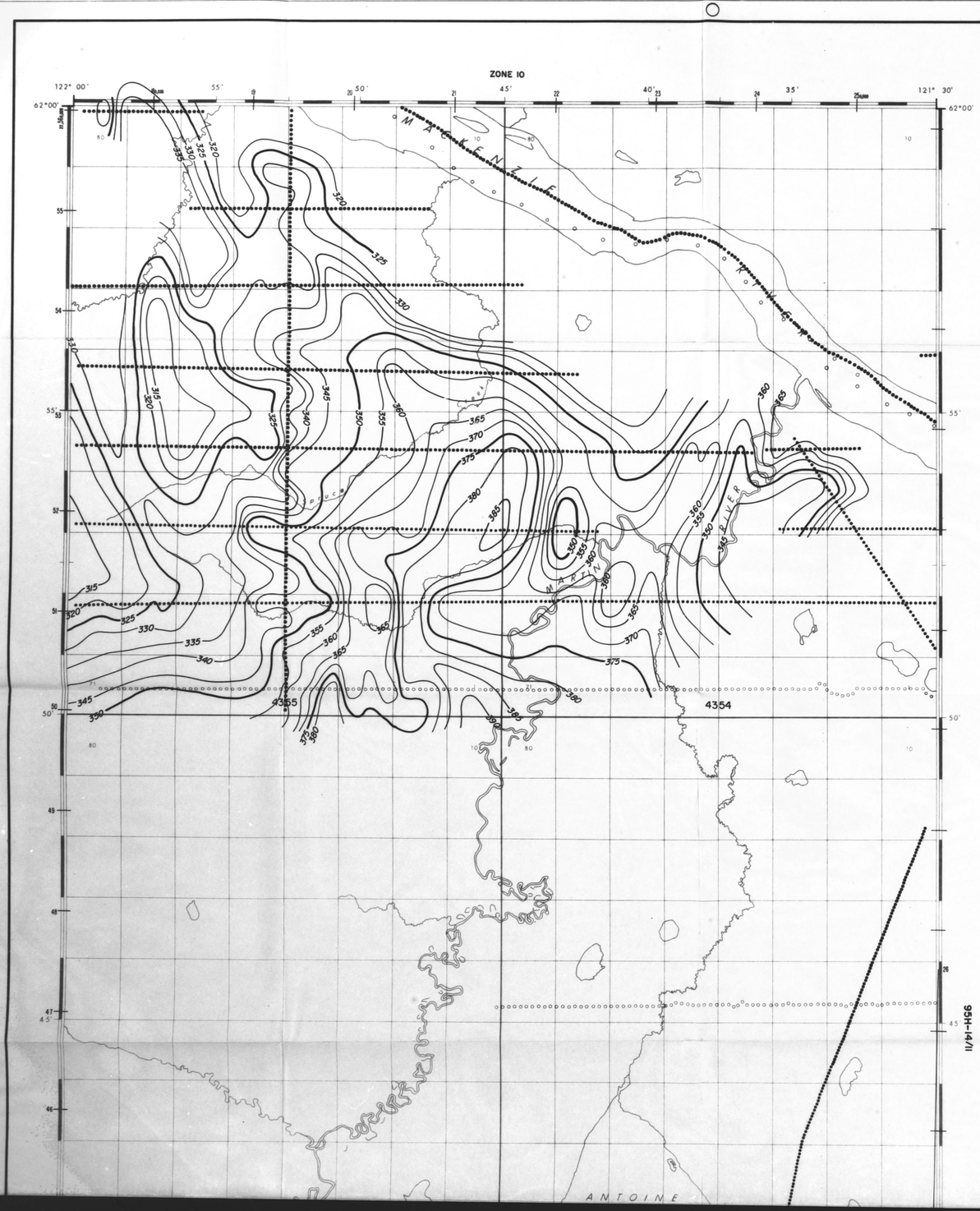
SCALE 1:250,000

0 5 10 15 MI.

P. SANDOMIRSKY — SEPT. 1971

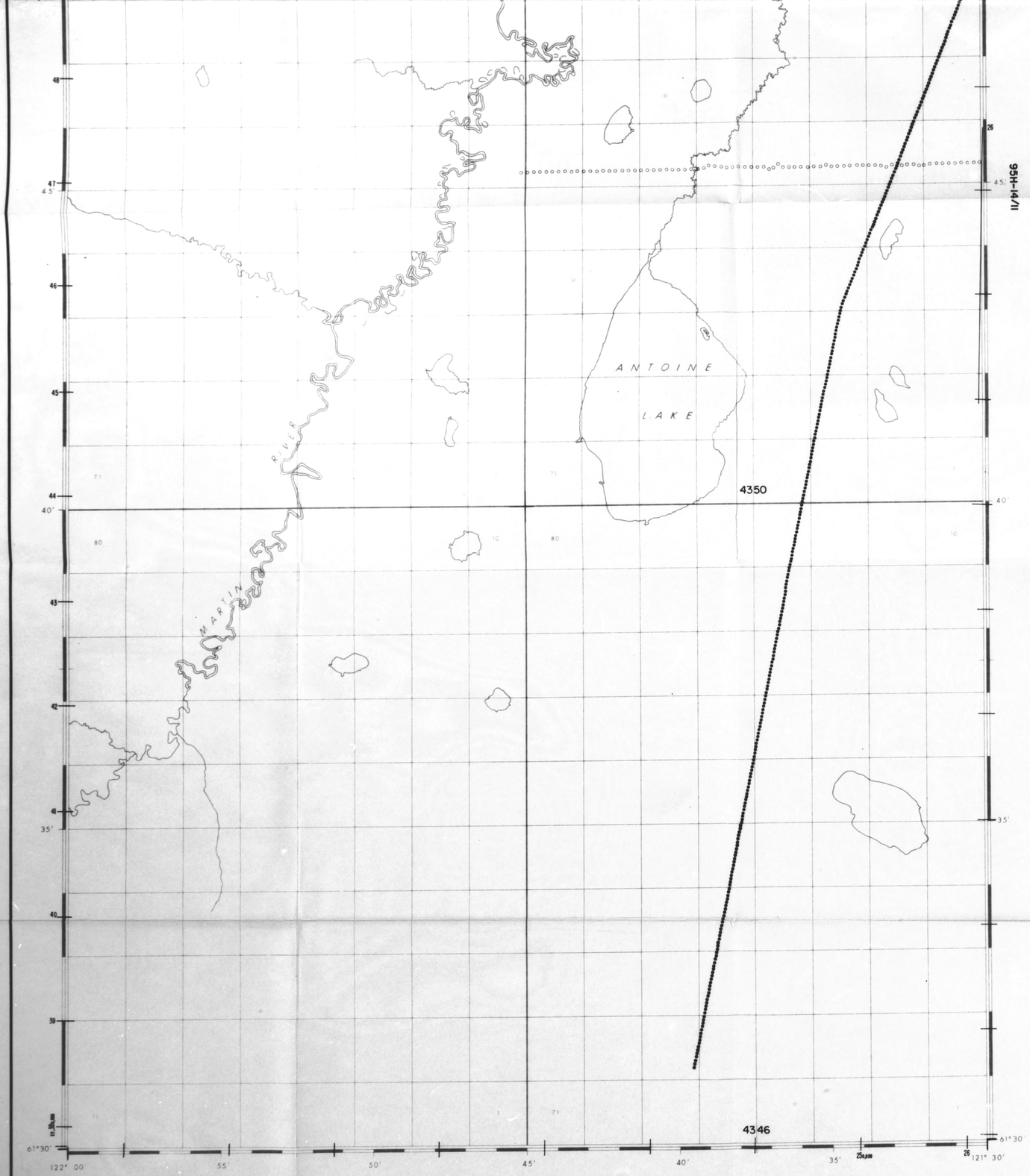
F30.317-3

F30.317-3



95H-14/11

1 OF 2



95H-14/11

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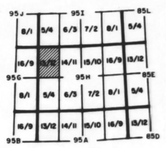


TIME STRUCTURE

HUME

SEISMOGRAPH MAP

Contour Interval 5 MILLISECONDS
Datums: Plane 1000' *Velocity* 12,000'/s

FORT SIMPSON 95 H - 13/12

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,

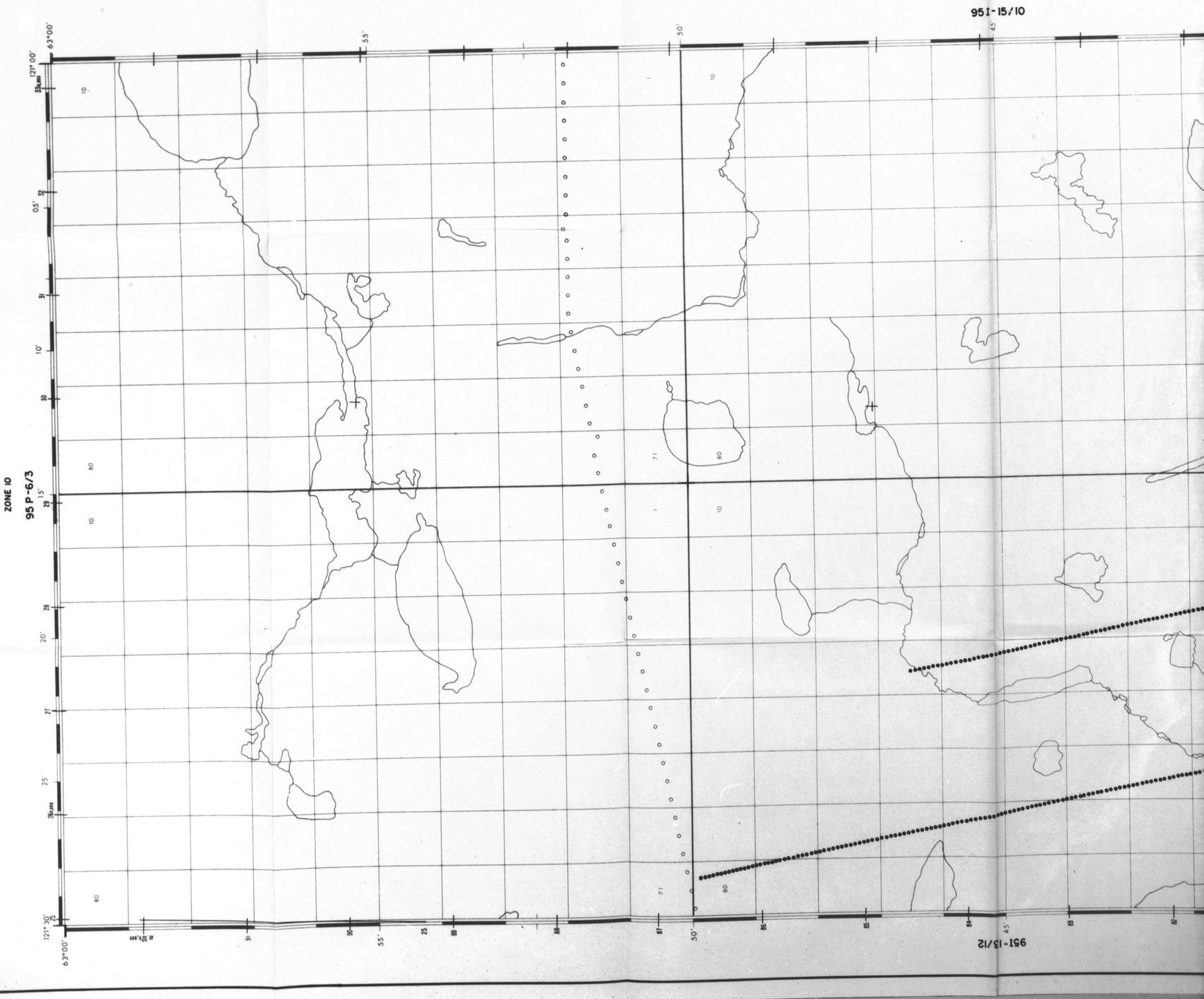
Seismic Revised MAY 18, 1971
Values Revised
Contours Revised
Wells Revised OCT 20/70

PROPRIETARY

2 of 2

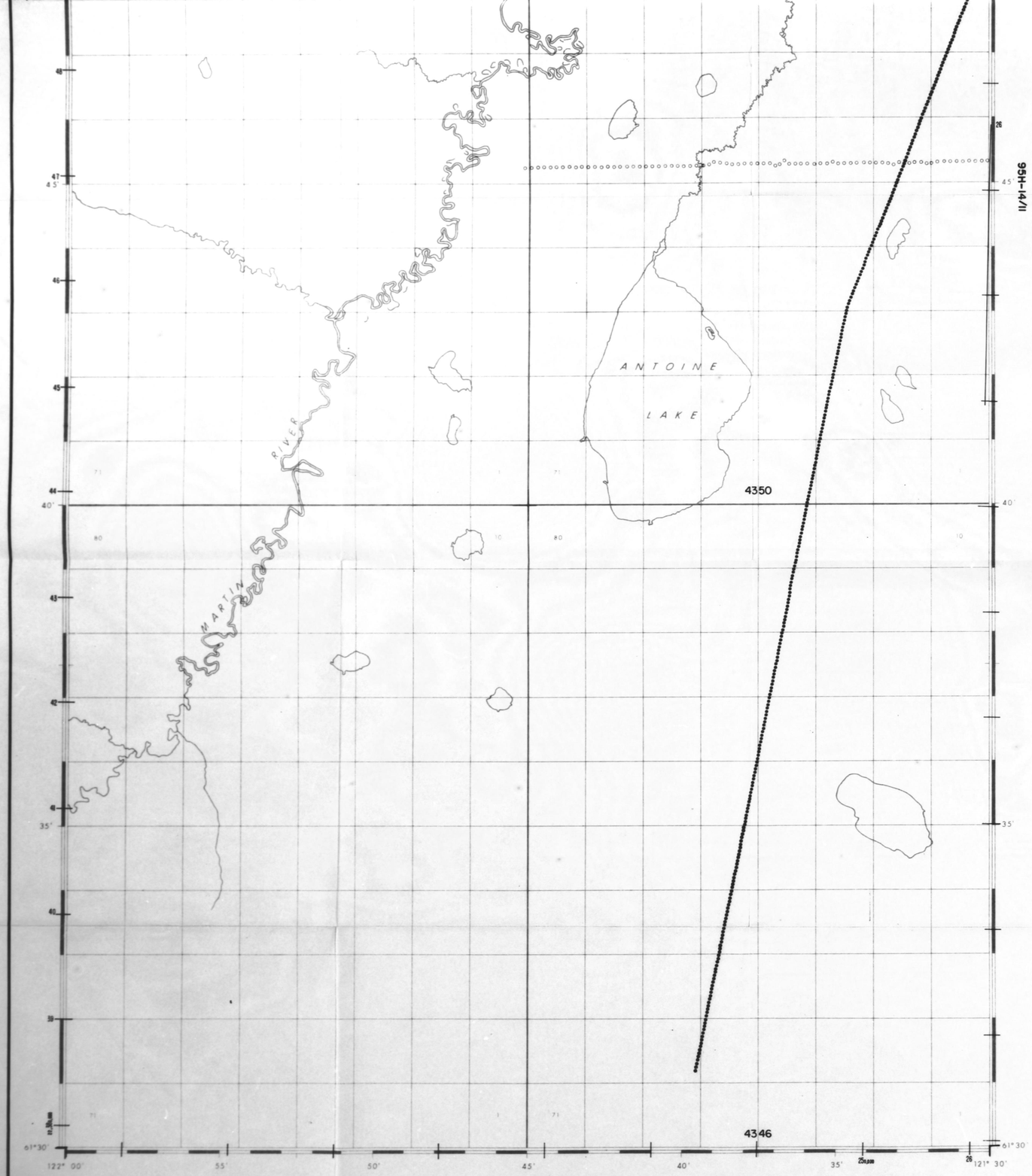
Gp	95H-13/12	3		C		

1 OF 2


ZONE 10
95 P-6/3
63°00'
121°00'
55'
50'
45'
05'
10'
15'
20'
25'
30'
121°30'
63°00'
951-15/10
951-15/12

ZONE 10
122° 00'
55'
50'
45'
40'
35'
121° 30'
62°00'
55'
50'
45'
MACKENZIE
HIGHWAY
MARTIN
RIVER
Spruce
Creek
ANTOINE
4355
4354
.115
.110
.105
.100
95H-14/11

1 OF 2



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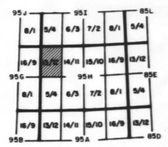


ISOCHRON

HUME to PRE-DEVONIAN

SEISMOGRAPH MAP

Contour Interval 0.005 .005

Datums: Plane ..... Velocity .....

FORT SIMPSON 95 H - 13/12

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.

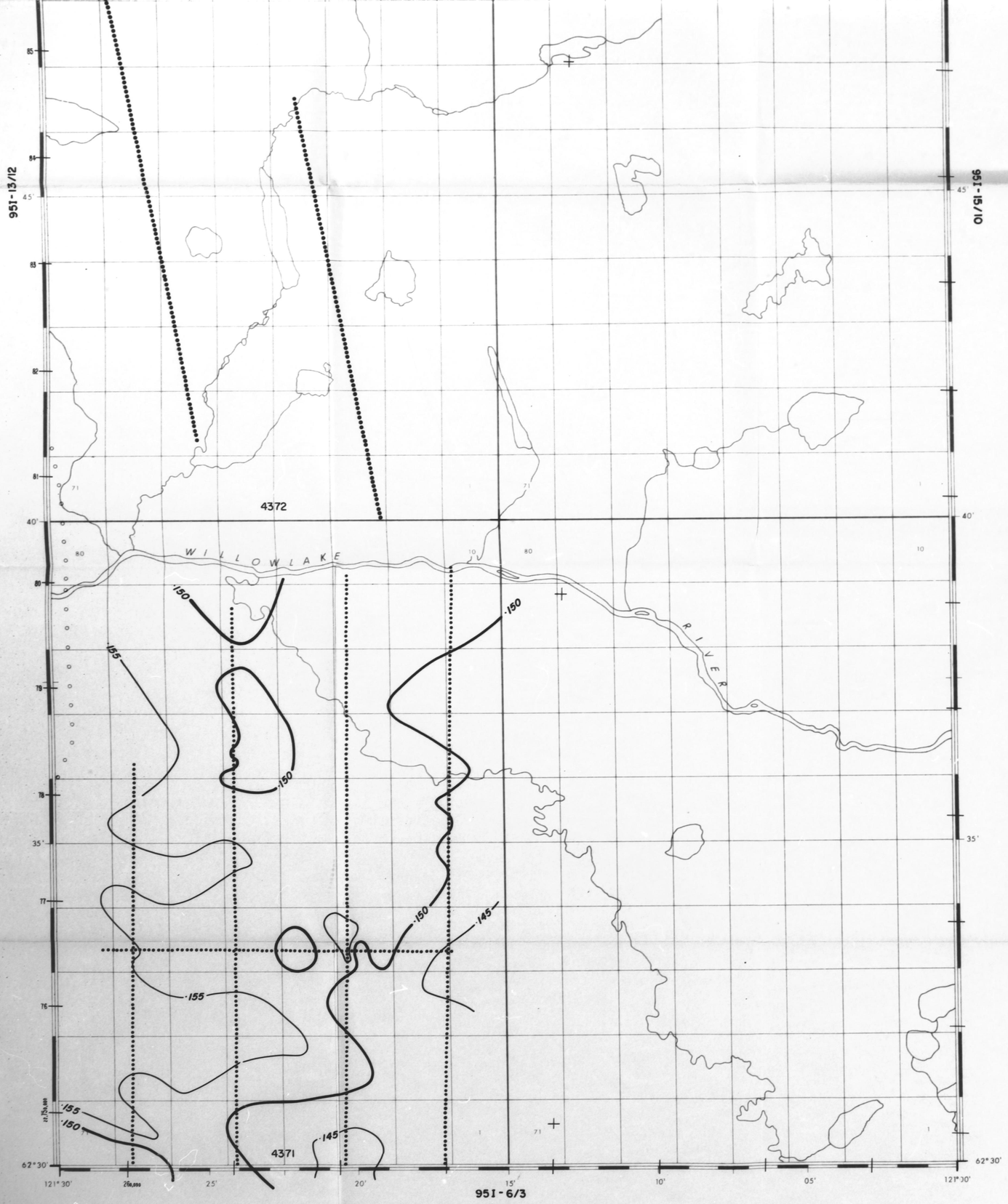
Orban's Reproductions & Photomapping Ltd.
FOR AN ANSWER B.W.
PHONE 243-7414 CALGARY ALBERTA CANADA

Seismic Revised MAY 18 '82
Values Revised .....
Contours Revised AUG 24/79
Wells Revised .....

2 of 2

PROPRIETARY

Gp	95H-13/12	1		C		



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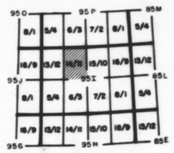


SEISMOGRAPH MAP

Contour Interval .005 secs.
Datums: Plane _____ *Velocity* _____

ISOCHRON

HUME to PRE-DEVONIAN

BULMER LAKE 95 I-14/11

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

PROPRIETARY

2 of 2

Orhan's Reproductions & Photomapping Ltd.
738 8th AVENUE S.W.
PHONE 265-7574 CALGARY ALBERTA CANADA

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

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

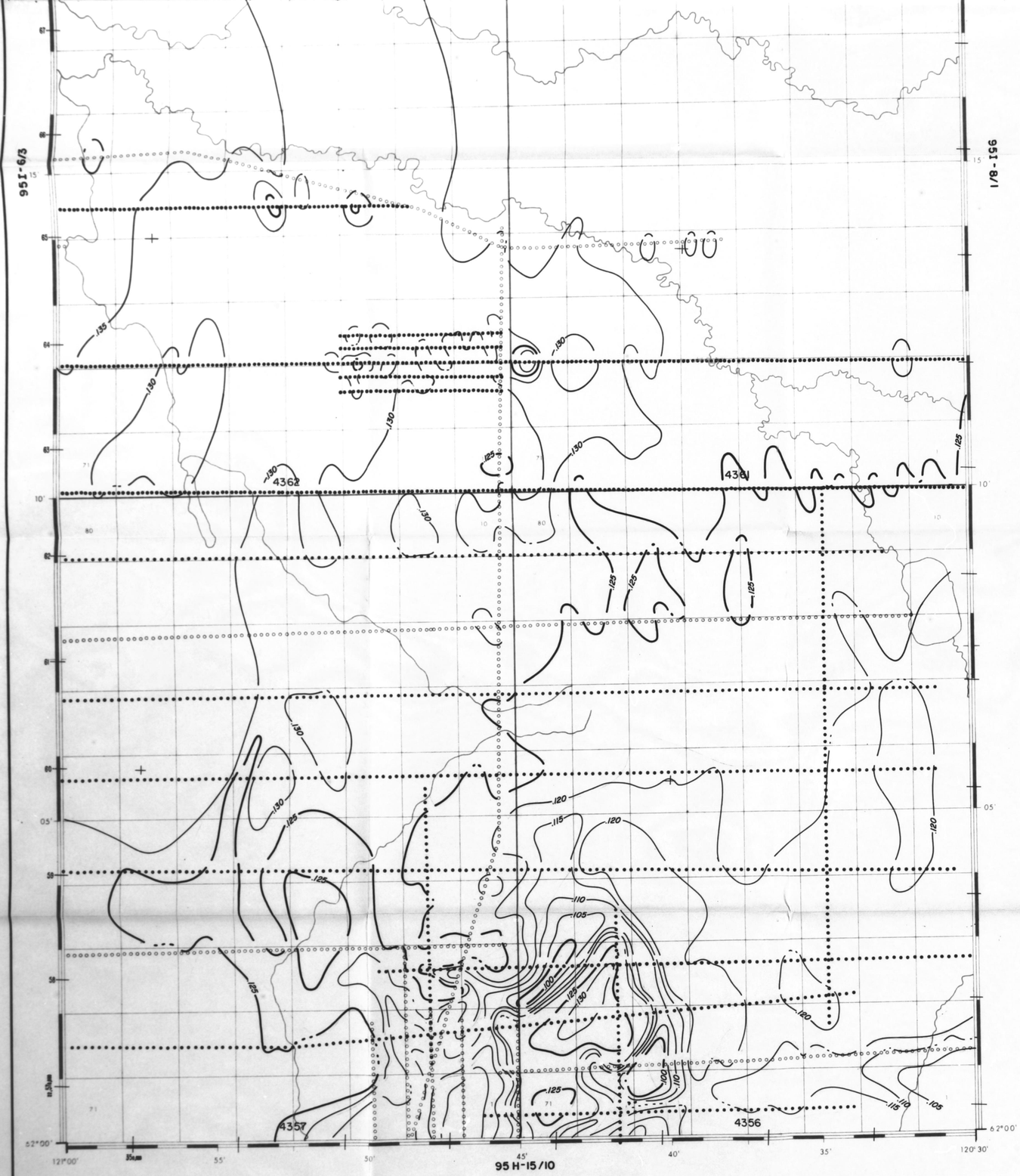
Seismic Revised .....
Values Revised .....
Contours Revised Nov. 21/70
Wells Revised .....

Gp	95I-14/11	2	V	C		

ZONE 10

951-15/10

1 OF 2



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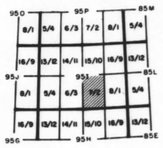

SEISMOGRAPH MAP

Contour Interval _____

Datums: Plane _____ *Velocity* _____

ISOCHRON

HUME to PRE-DEVONIAN

BULMER LAKE 95 I - 7/2

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 ¾ ½ 0 1 2 3 4 Miles

Feet 5000 0 5000 10000 15000 20000 Feet

PROPRIETARY

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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P.O. BOX 6100 S.W.
PHONE 243-7514 CALGARY ALBERTA CANADA

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

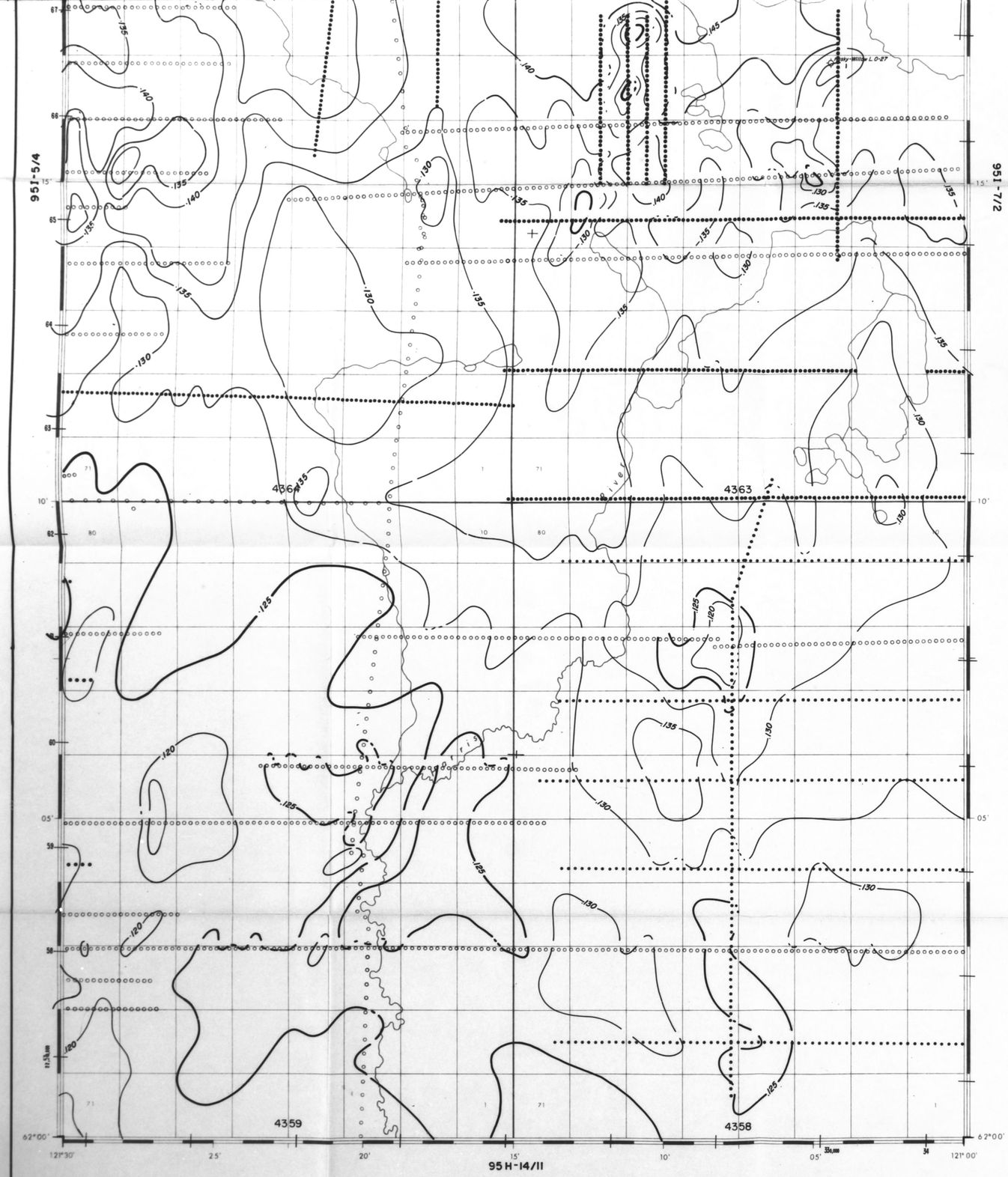
Gp	95I-7/2	1		C		

2 of 2

ZONE 10

95I-14/11

1 OF 2



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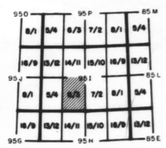


SEISMOGRAPH MAP

Contour Interval .005 SEC.
Datums: Plane — *Velocity* —

ISOCHRON

HUME to PRE-DEVONIAN

BULMER LAKE 95 I-6/3

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 ¾ ½ 0 1 2 3 4 Miles
Feet 5000 0 5000 10000 15000 20000 Feet

PROPRIETARY

2 of 2

Orman's Reproductions & Photomapping Ltd.
FOR AN ANSWER BY
PHONE 243-7214 CALGARY ALBERTA CANADA

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

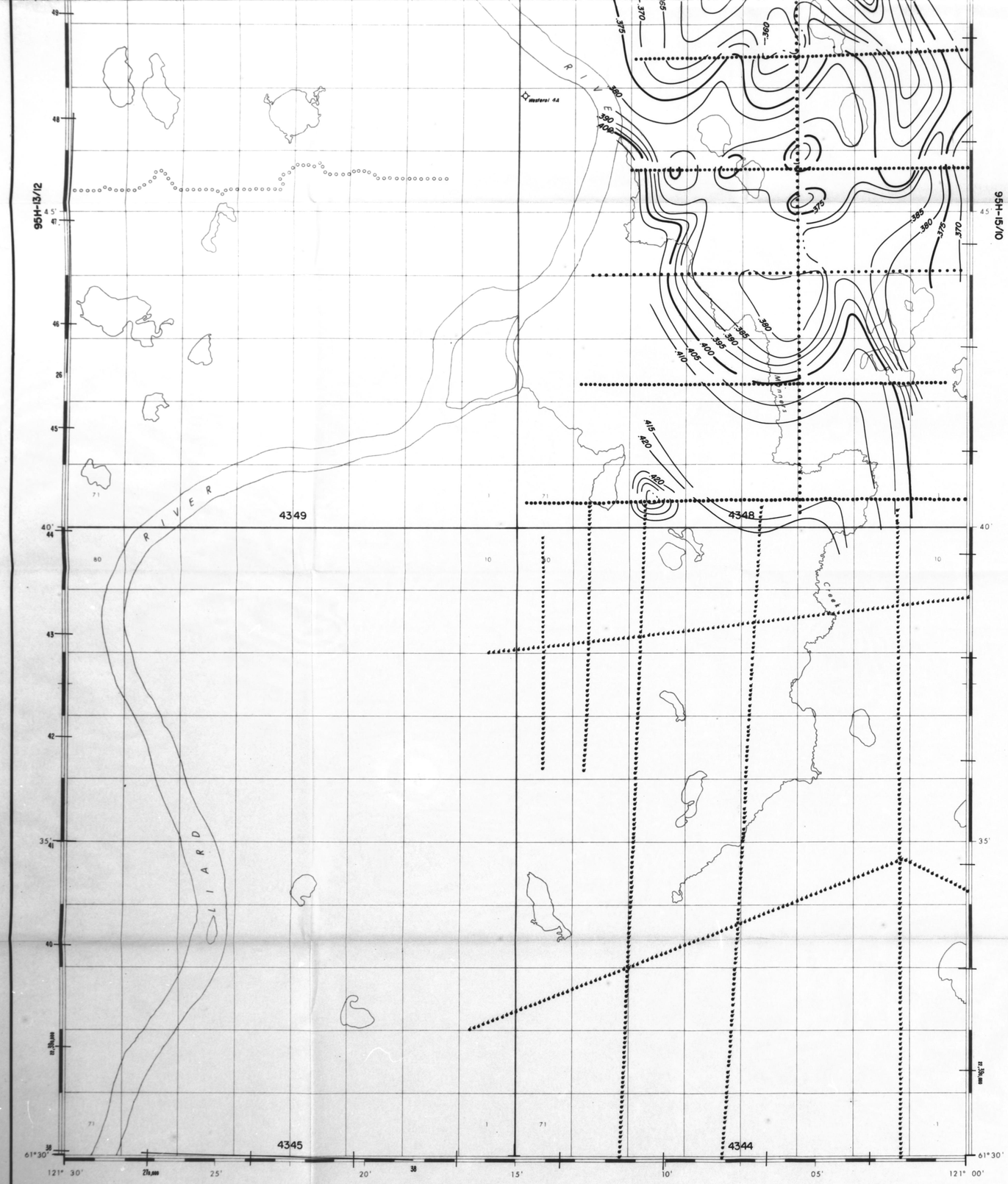
10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised OCTOBER 1/70
Values Revised
Contours Revised DEC 7, 1970
Wells Revised Apr 27, 1970

Gp	951-6/3	1		C		

ZONE 10
121° 30'
121° 00'
62°00'
Harris
River
Mackenzie
River
Liard
River
Fort Simpson
4353
Westerol 4A
95H-13/12
95H-15/10

1 of 2



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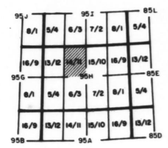


TIME STRUCTURE

HUME

SEISMOGRAPH MAP

Contour Interval .005 SEC

Datums: Plane 1000' *Velocity* 12,000'/sec

FORT SIMPSON 95 H - 14/11

SCALE 1 : 50,000

1.25 inches to 1 mile approximately

Miles 1 ¾ 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.

Orban's Reproductions & Photomapping Ltd.
FOR 8th AVENUE S.W.
PHONE 262-7514 CALGARY ALBERTA CANADA

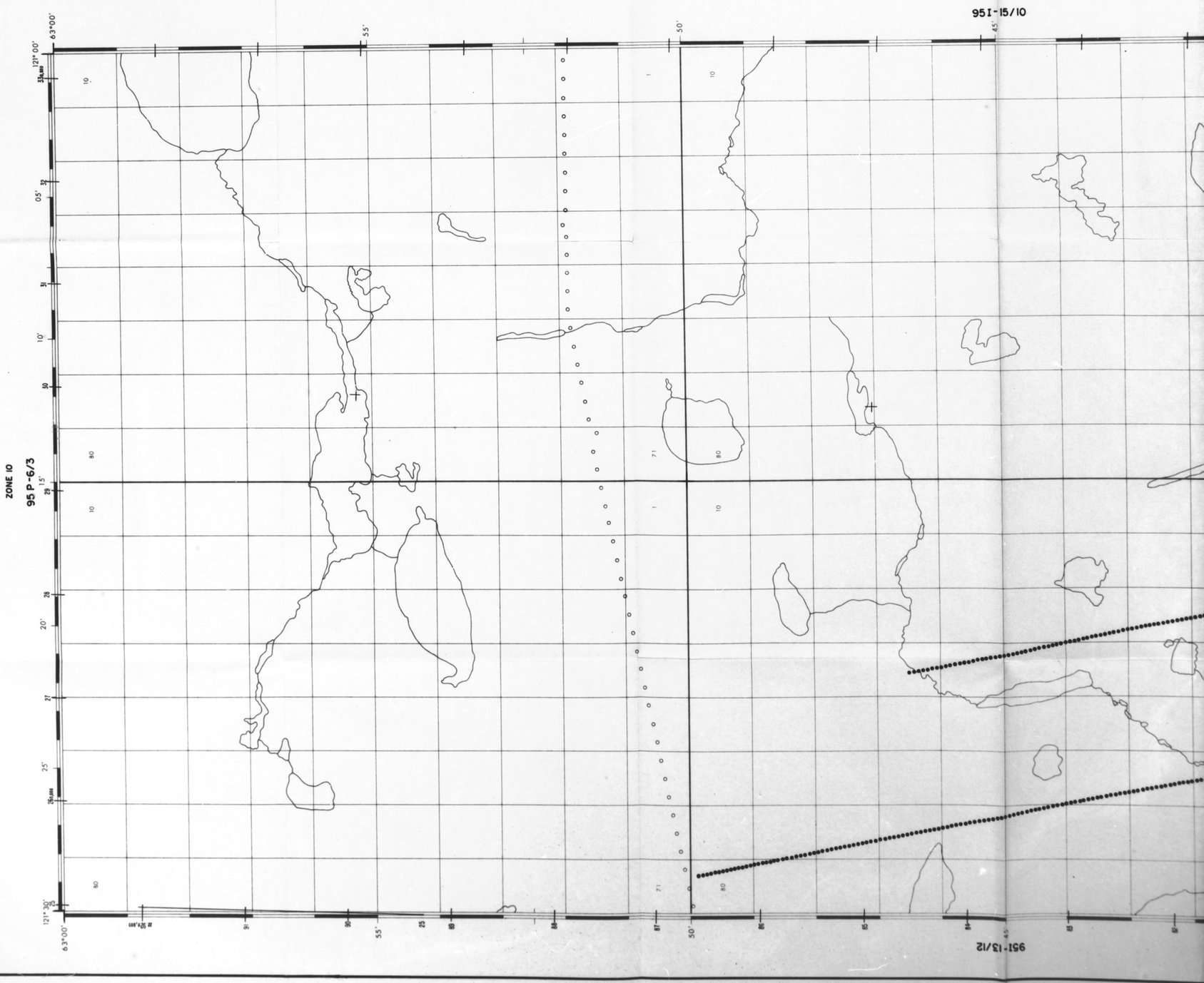
Seismic Revised JULY 21/70
Values Revised
Contours Revised OCT. 7, 1971
Wells Revised OCT. 29, 69

PROPRIETARY

2 OF 2

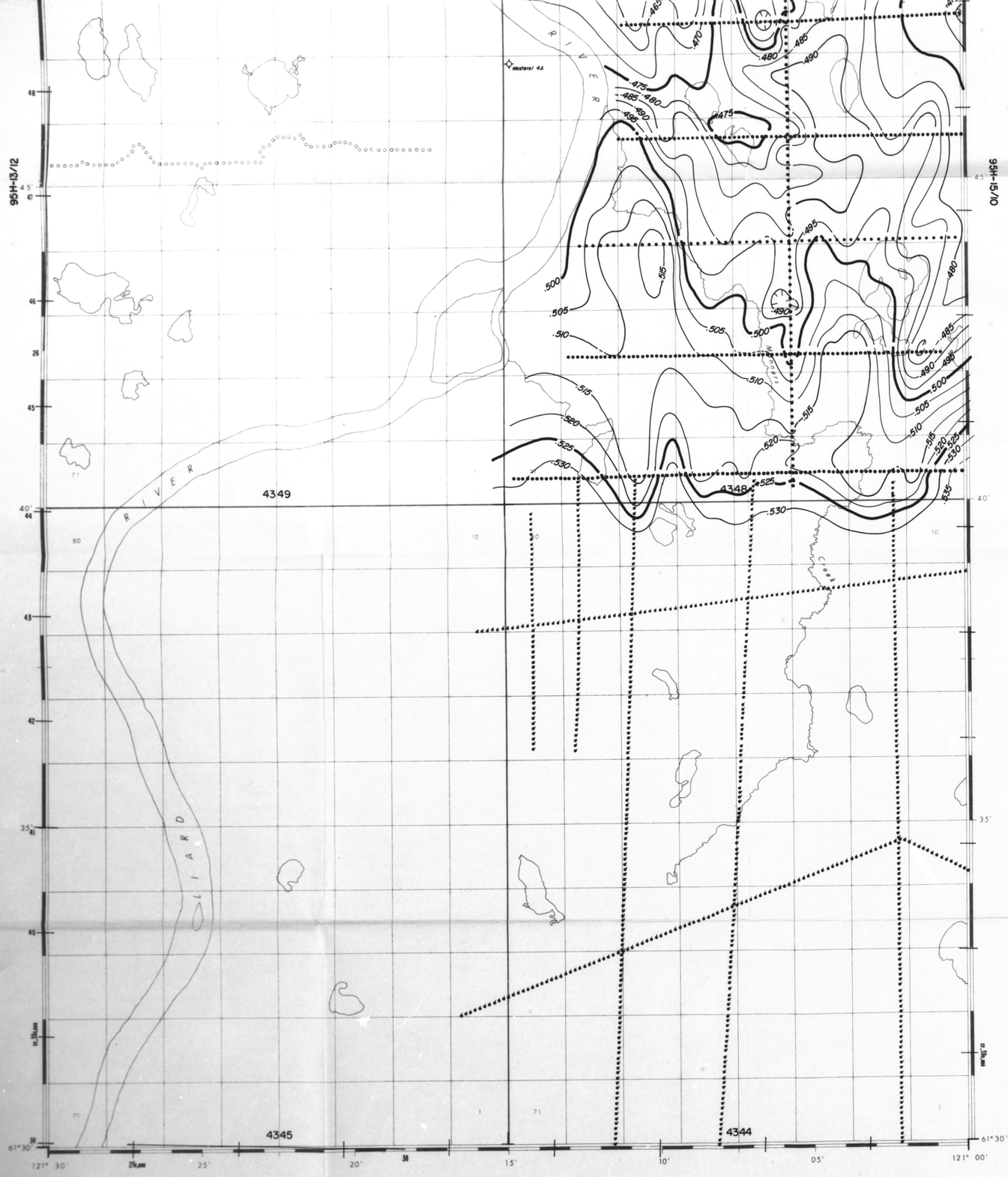
Gp	95H-14/11	3		C		

1 of 2


ZONE 10
95 P-6/3
951-15/10
951-13/12
121° 00'
63°00'
55'
50'
45'
121° 30'
63°00'
55'
50'
45'

ZONE 10
121° 30'
121° 00'
62°00'
55'
50'
45'
95H-13/12
95H-15/10
MACKENZIE
RIVER
LARD
RIVER
Harris
Fort Simpson
4353
4352
Wesleyville 4A

1 OF 2



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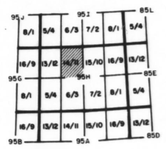


TIME STRUCTURE

PRE-DEVONIAN

SEISMOGRAPH MAP

Contour Interval 0.005 SECS.
Datums: Plane ..... Velocity .....

FORT SIMPSON 95 H - 14/11

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

PROPRIETARY

2 of 2

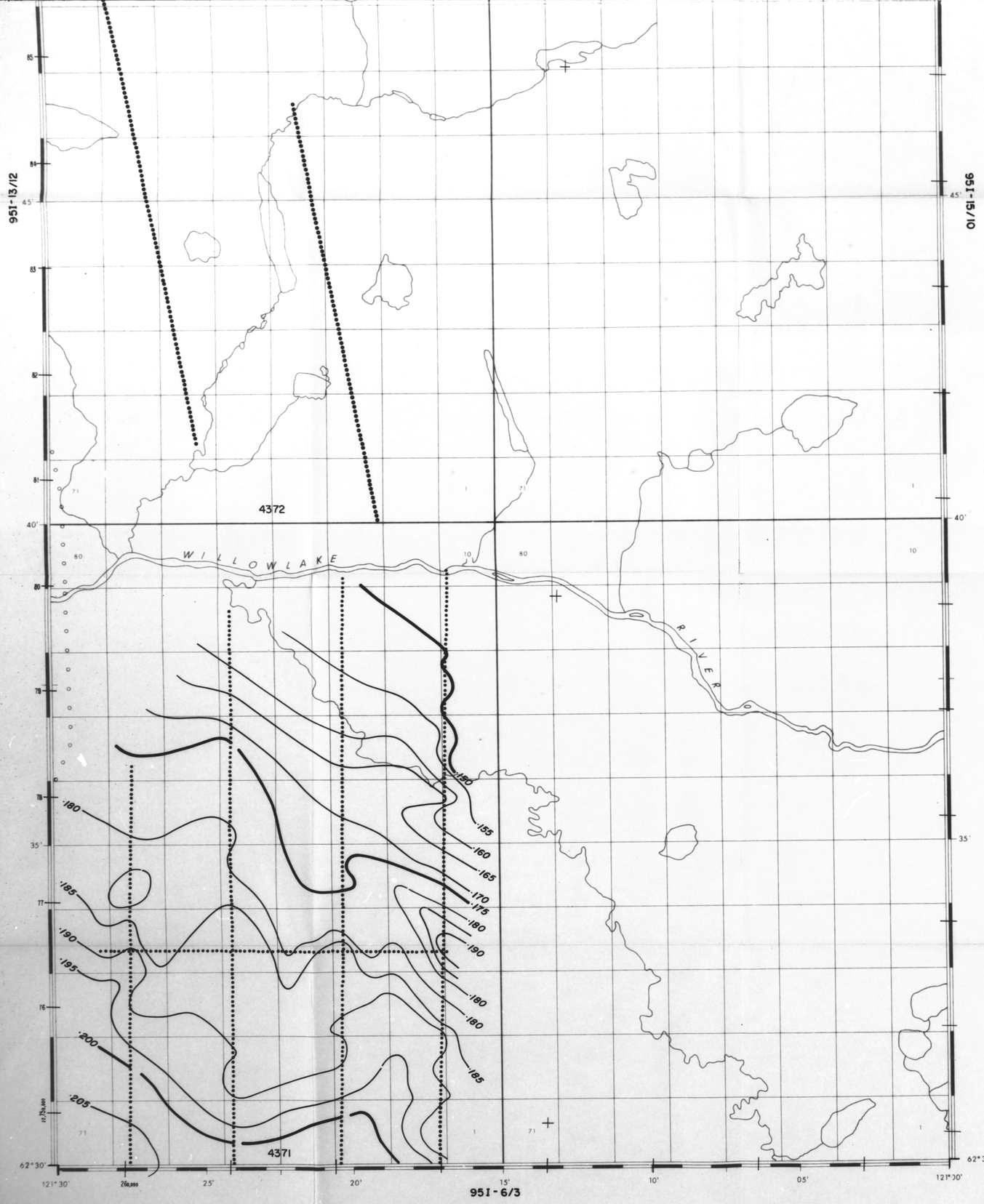
North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

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

Orhan's Reproductions & Photomapping Ltd.
710 5th AVENUE S.W.
PHONE 265-7514 CALGARY, ALBERTA, CANADA

Seismic Revised ..... JULY 21/70 .....
Values Revised .....
Contours Revised ..... AUGUST 14/70 .....
Wells Revised ..... OCT 20/70 .....

Gp	95H-14/11	2	V	C		



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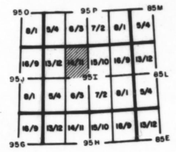


SEISMOGRAPH MAP

Contour Interval .005 secs.
Datums: Plane 1000' Velocity 12,000'/s

TIME STRUCTURE

HUME

BULMER LAKE 95 I-14/11

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 .....

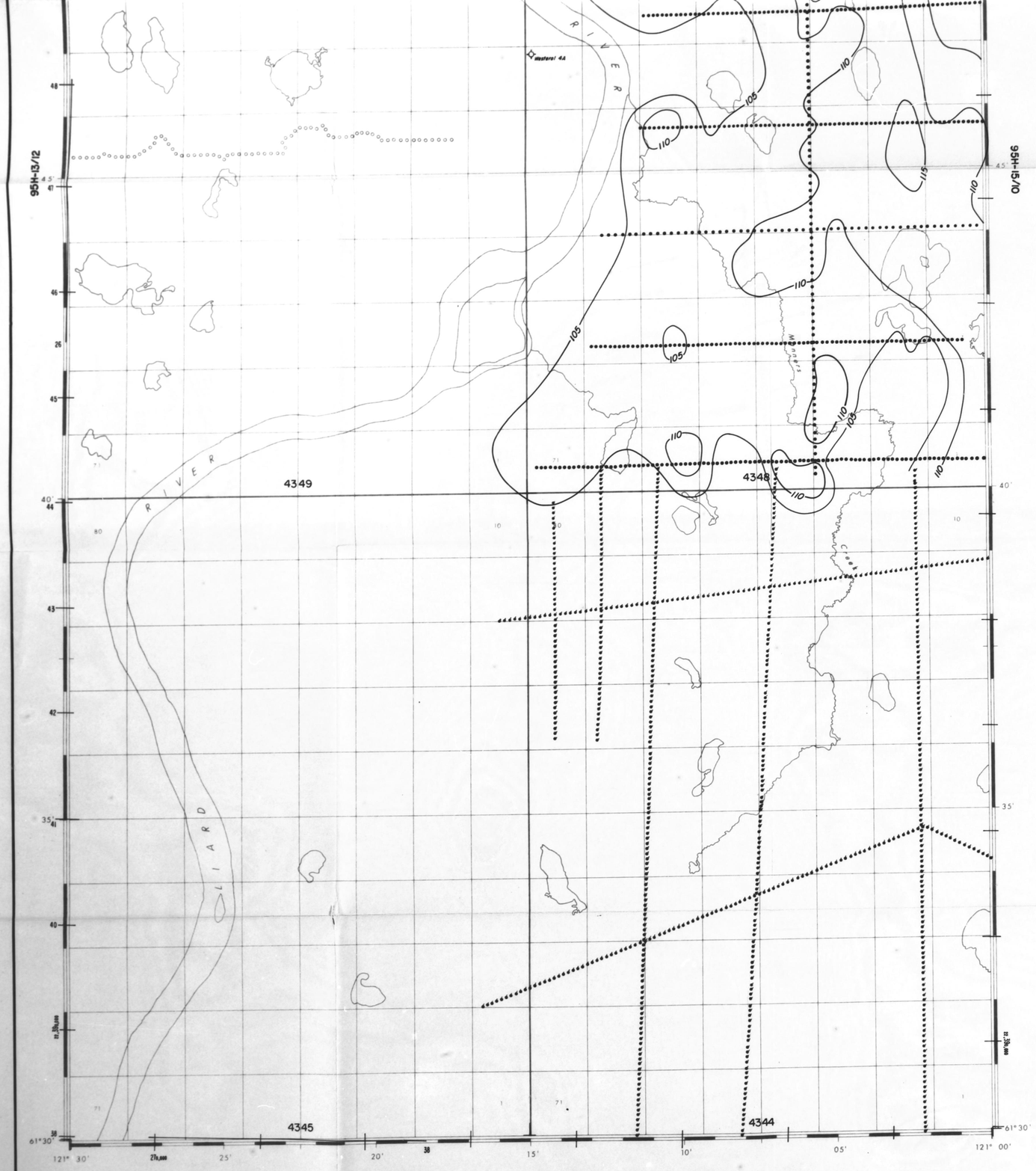
PROPRIETARY

2 of 2

Gp	95I-14/11	4	V	C		

ZONE 10
121° 30'
121° 00'
62°00'
50'
55'
Harris
River
MACKENZIE
RIVER
Fort Simpson
LIARD
RIVER
4353
4352
95H-13/12
95H-15/10
125
120
115
110
105

1 of 2



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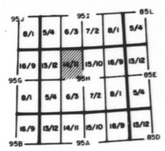


ISOCHRON

HUME to PRE-DEVONIAN

SEISMOGRAPH MAP

Contour Interval .005 SEC.
Datums: Plane — Velocity —

FORT SIMPSON 95 H - 14/11

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

Orban's Reproductions & Photomapping Ltd.
PHONE 265-7519 FIG. 400 AVENUE S.W. CALGARY, ALBERTA, CANADA

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

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

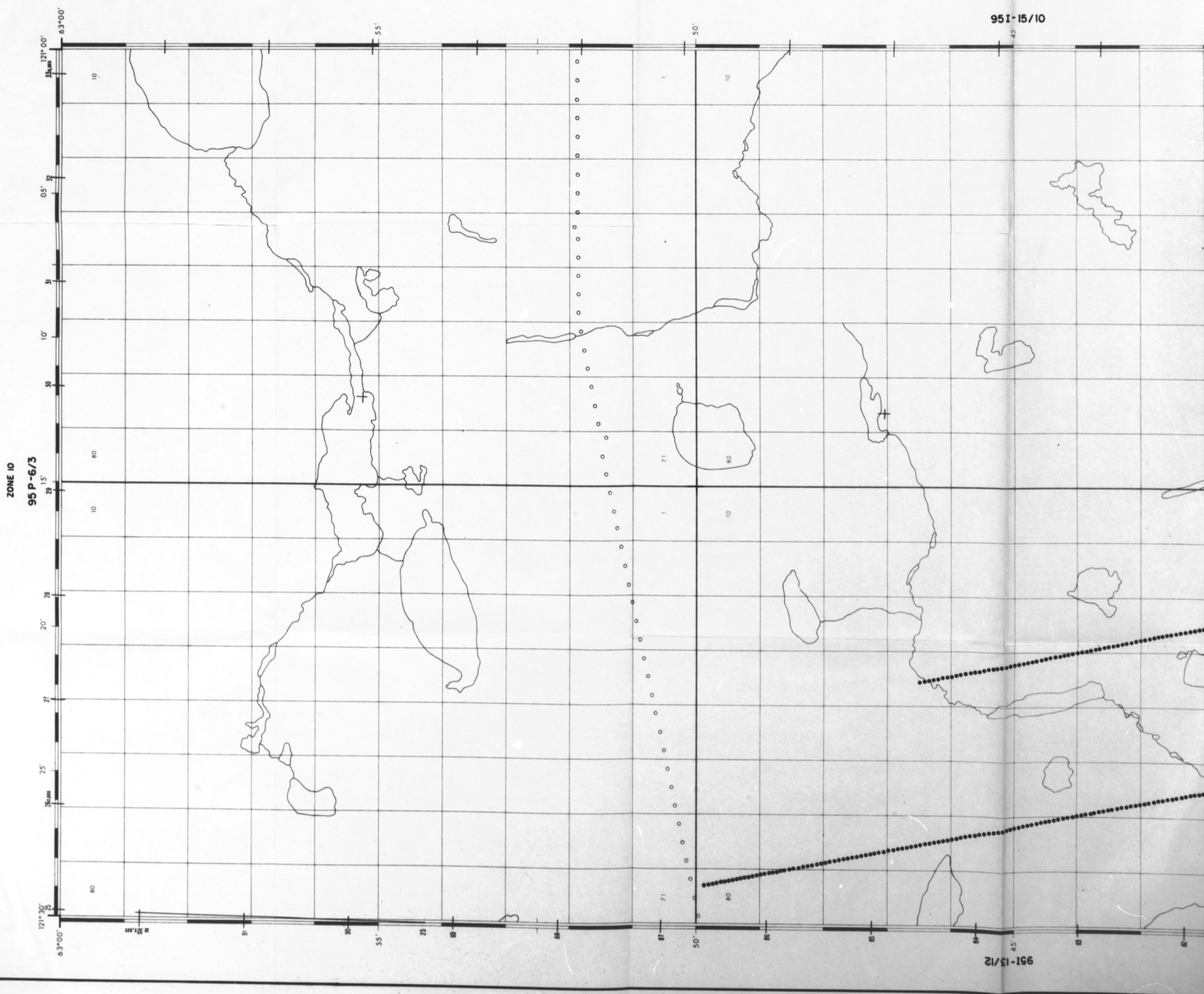
Seismic Revised July 21/70
Values Revised
Contours Revised
Wells Revised

2 of 2

PROPRIETARY

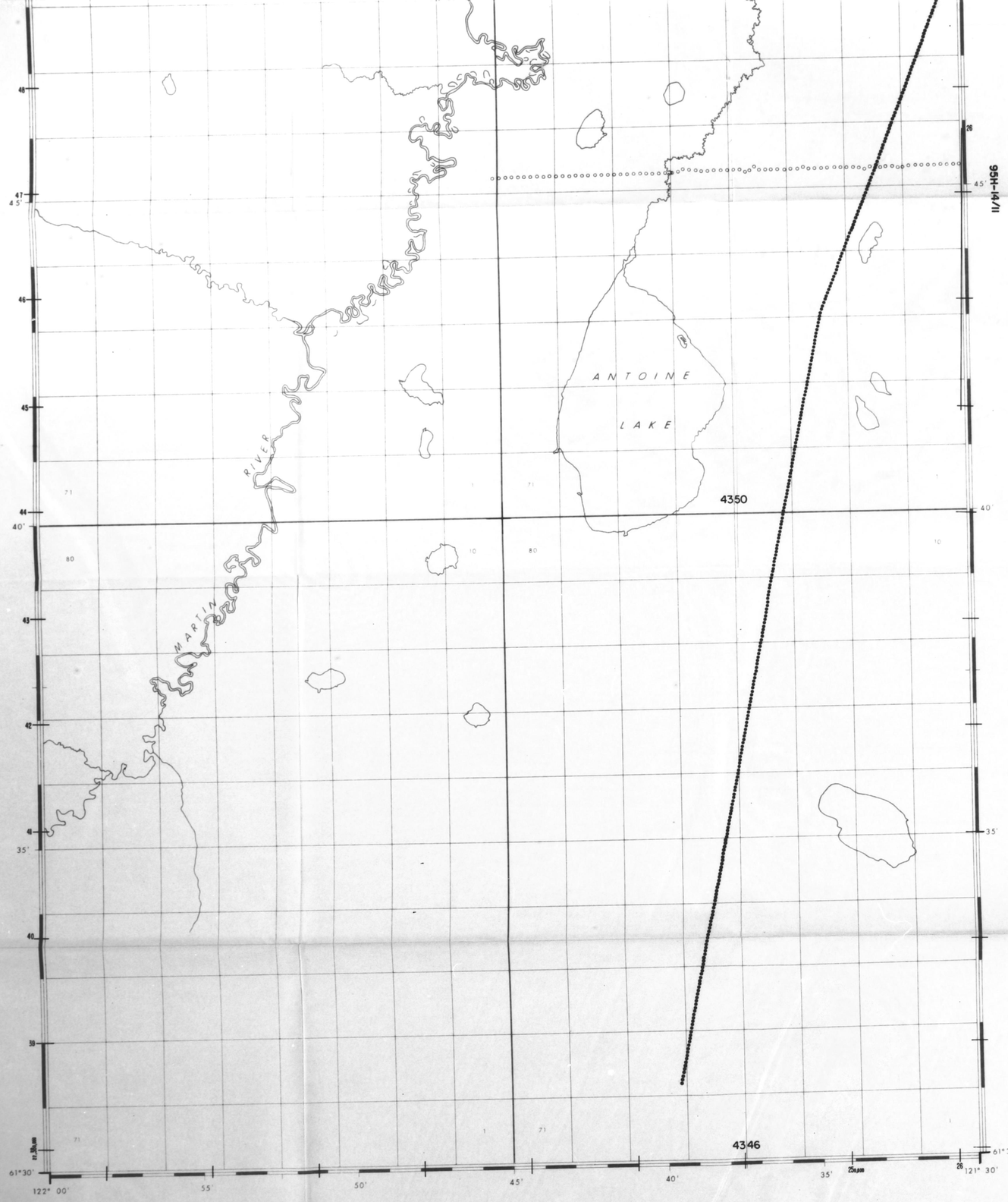
Gp	95H-14/11	1		C		

1 of 2


ZONE 10
95 P-6/3
95I-15/10
95I-13/12
63°00'
121°00'
55'
50'
45'
05'
10'
15'
20'
25'
121°30'
63°00'
55'
50'
45'

ZONE 10
122° 00'
121° 30'
62°00'
55'
50'
45'
40'
35'
MACKENZIE
HIGHWAY
Spruce
Creek
MARTIN
RIVER
ANTOINE
4355
4354
95H-14/11

1 OF 2



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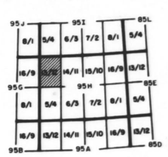


TIME STRUCTURE

PRE-DEVONIAN

SEISMOGRAPH MAP

Contour Interval .....005 SEC.....
Datums: Plane ..1000'..... Velocity ..12,000'/sec..

FORT SIMPSON 95 H - 13/12

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

PROPRIETARY

2 of 2

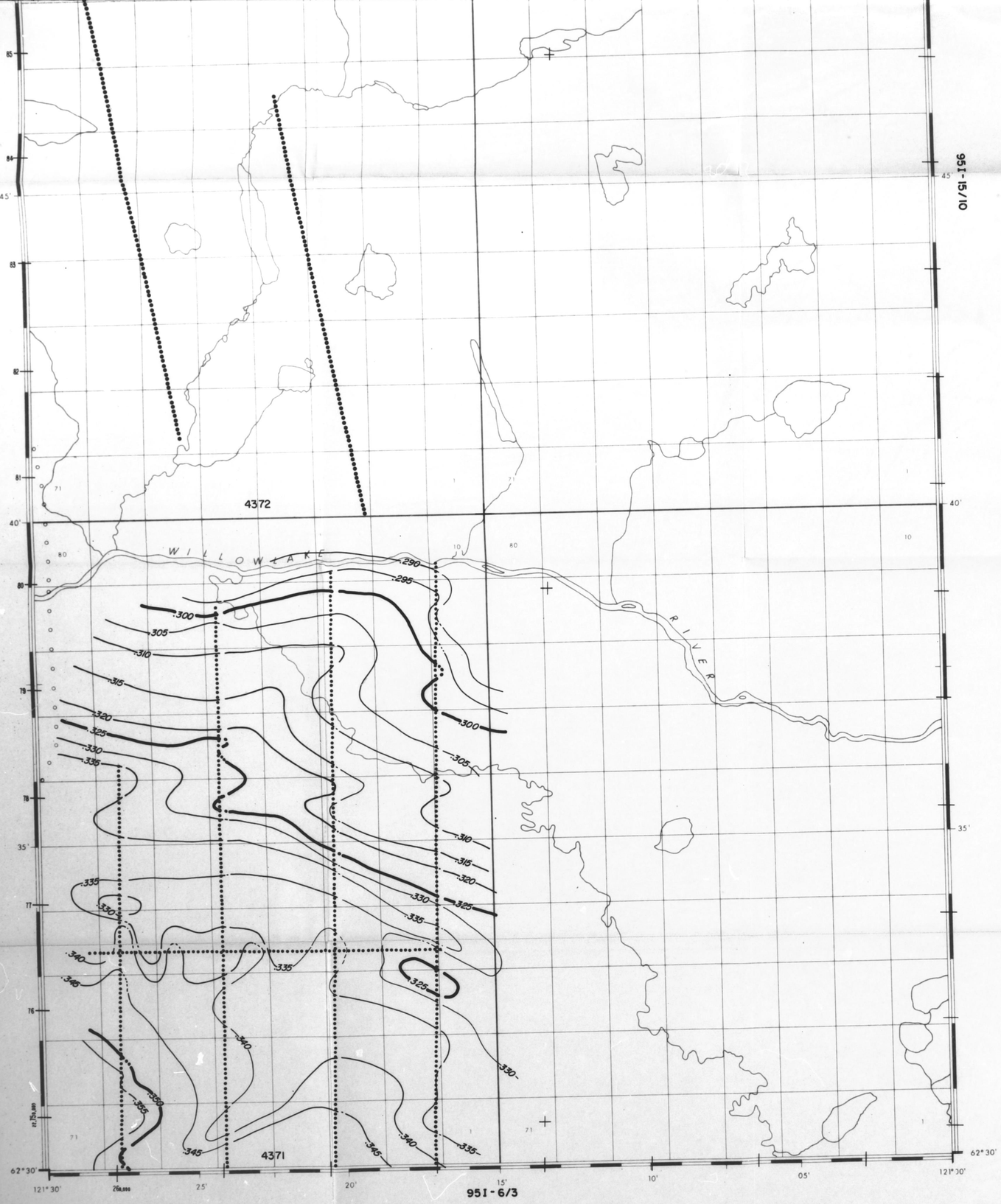
North American Datum 1927
Universal
Transverse Mercator Projection
(Gauss-Kruger)

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

Orman's Reproductions & Photomapping Ltd.
P.O. BOX 2070 STN. M
PHONE 262-7616 CALGARY ALBERTA CANADA

Seismic Revised .MAY 18 1971.....
Values Revised .....
Contours Revised ....OCT. 7, 1971.....
Wells Revised .OCT. 20/70.....

Gp	95H-13/12	4		C		



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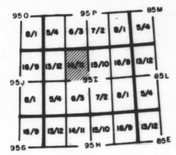

SEISMOGRAPH MAP

Contour Interval ..... 0.005 SECS.
Datums: Plane ..... Velocity .....

TIME STRUCTURE

PRE-DEVONIAN

BULMER LAKE 95 I-14/11

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

2 of 2

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718 8th AVENUE S.W. CALGARY ALBERTA CANADA
PHONE 265-7214

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

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

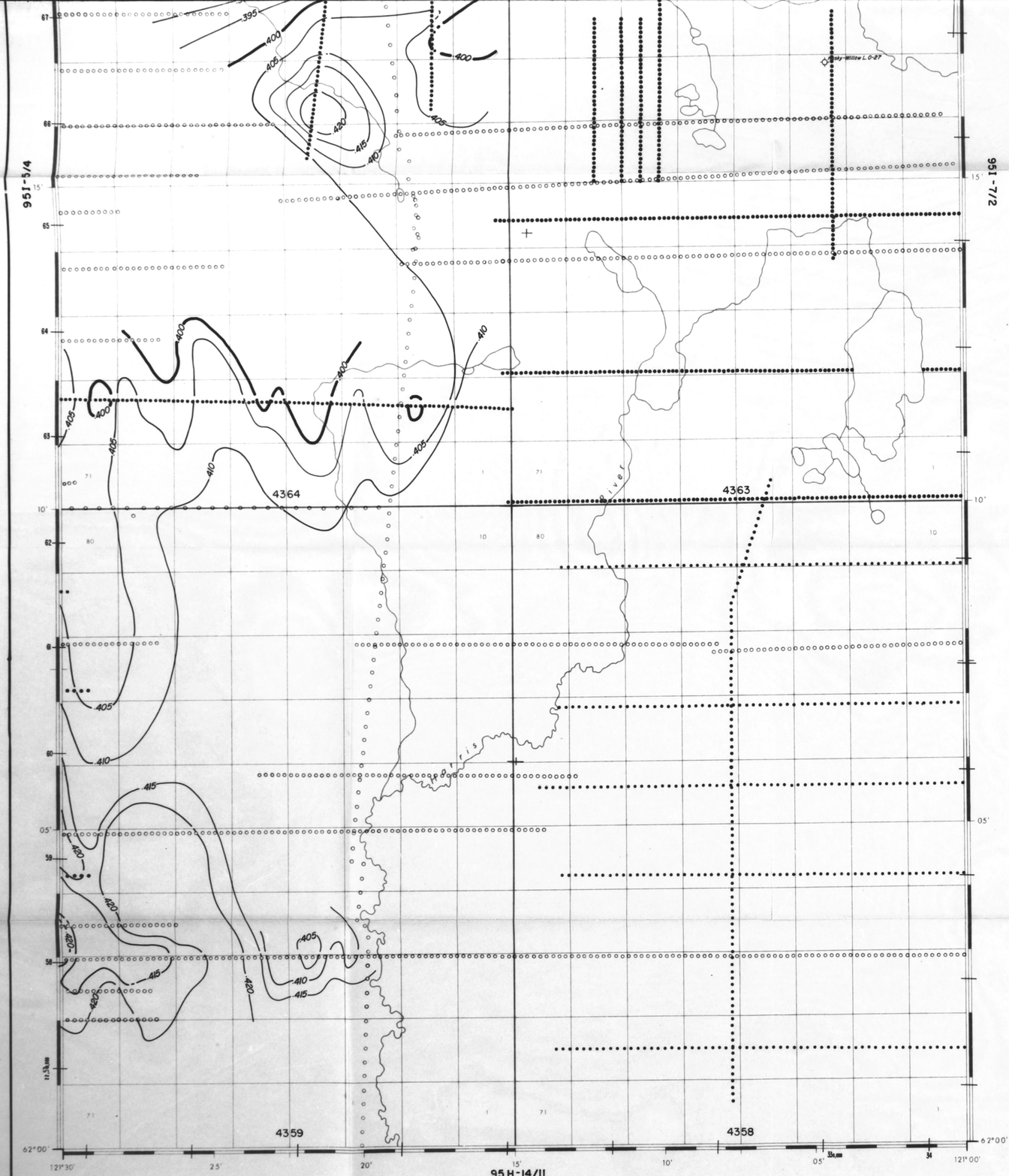
Seismic Revised ..... DECEMBER 1976
Values Revised ..... NOVEMBER 30/78
Contours Revised ..... NOVEMBER 30/78
Wells Revised ..... DECEMBER 30/78 (recast)

Gp	95I-14/11	3	V	C		

ZONE 10

95I-14/11

1 of 2



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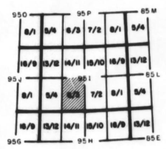

SEISMOGRAPH MAP

Contour Interval 0.005 SECS.
Datum: Plane ..... Velocity .....

TIME STRUCTURE

PRE-DEVONIAN

BULMER LAKE 95 I-6/3

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

PROPRIETARY

2 of 2

Seismic Revised SEPTEMBER 10/70
Values Revised .....
Contours Revised NOVEMBER 20/70
Wells Revised Apr. 27, 1970

Gp	95I-6/3	5	V	C		

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P.O. BOX 6000 S.W.
PHONE 242-7214 CALGARY ALBERTA CANADA

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

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

95I-14-11

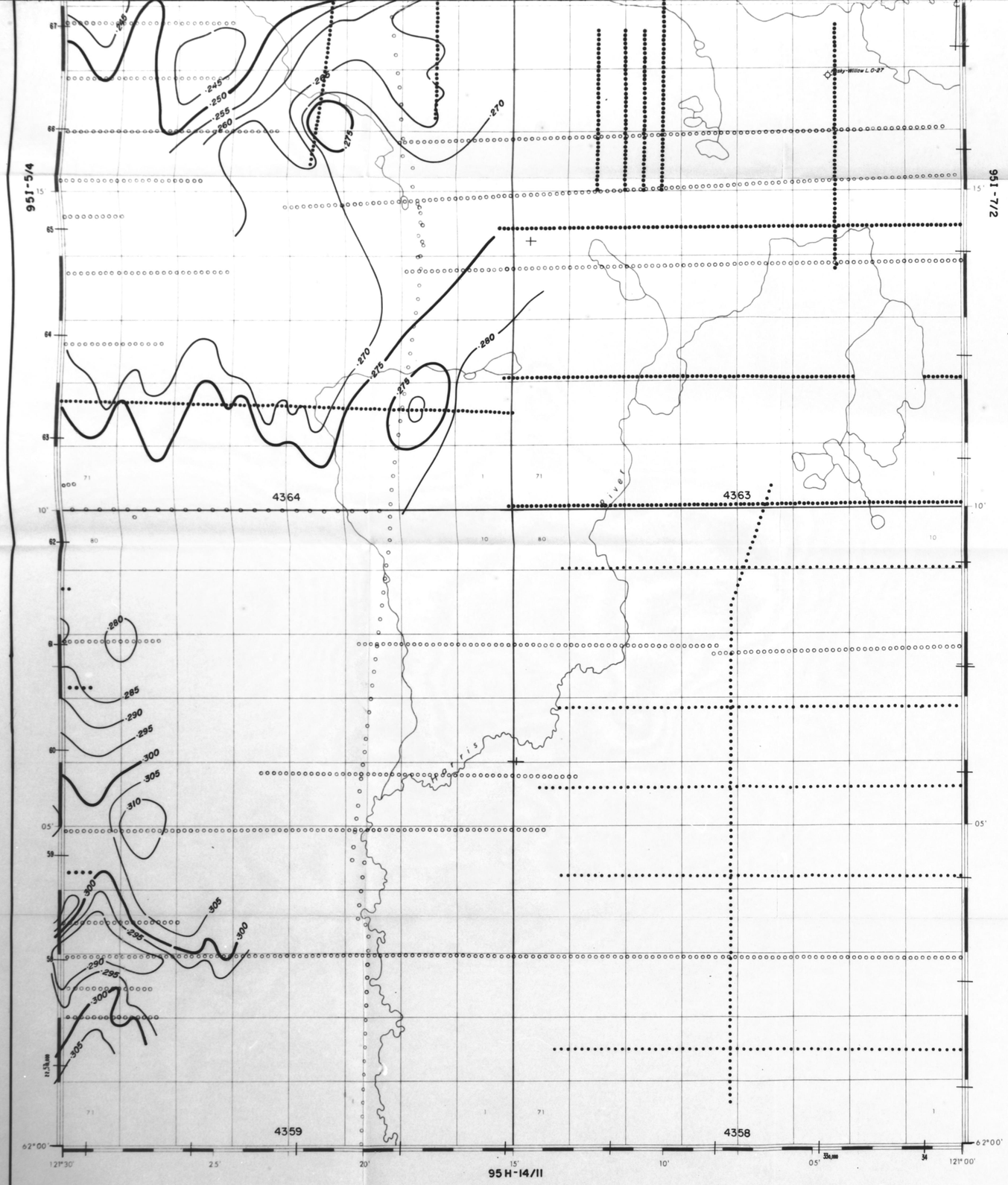
ZONE 10
95P-5/4

95J-16/9

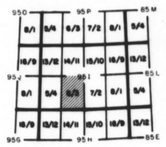
ZONE 10

95I-14/11

1 of 2



INDEX TO MAP SHEETS



SEISMOGRAPH MAP

Contour Interval .005 SECS.
Datums: Plane ..... Velocity .....

TIME STRUCTURE

HUME

BULMER LAKE 95 I-6/3

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)

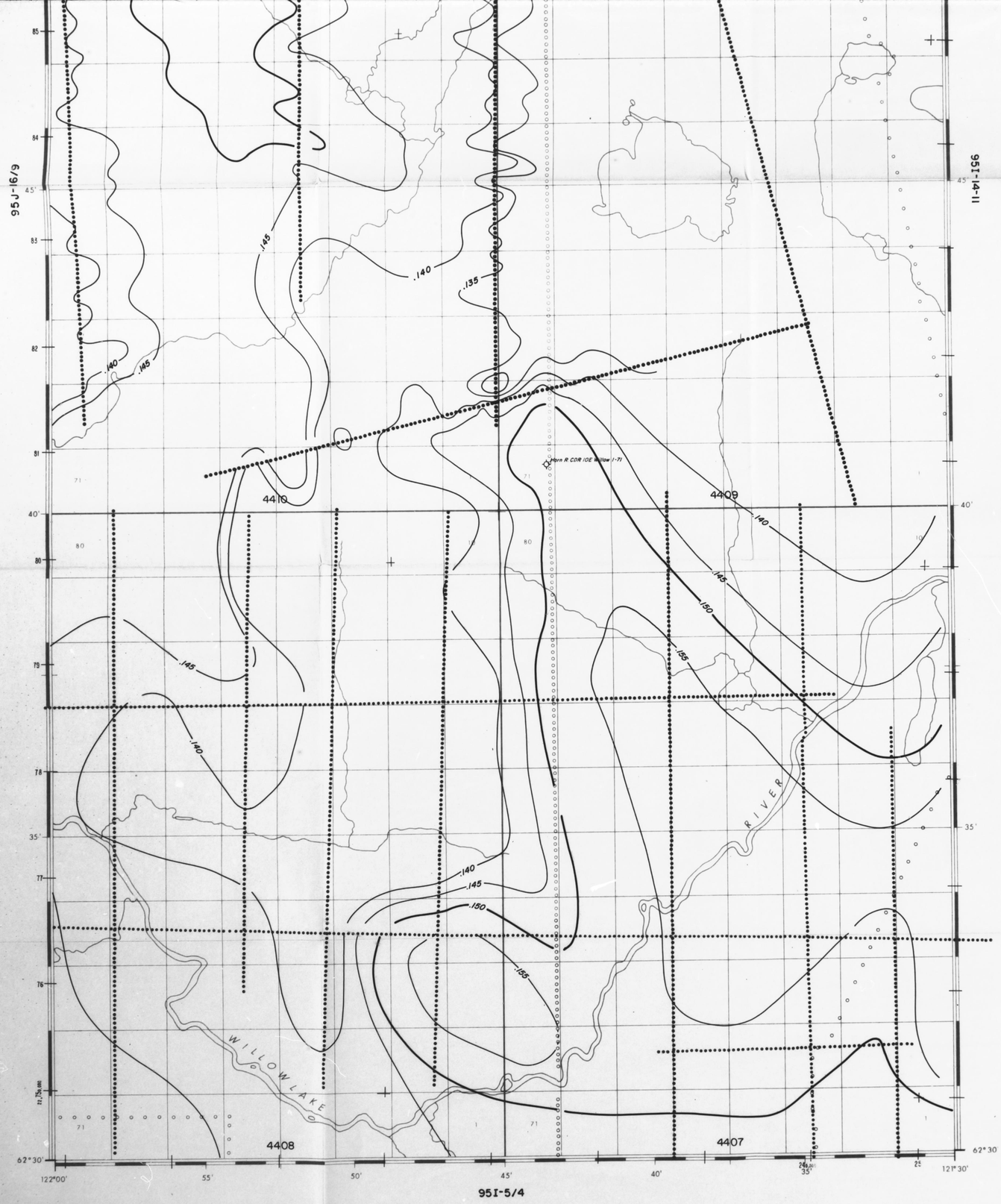
10,000 ft. Coordinates, Territorial Plane Coordinate System.
Transverse Mercator Projection, 6 Zones.

Seismic Revised .....
Values Revised .....
Contours Revised .....
Wells Revised Apr 27, 1970

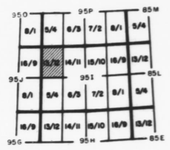
PROPRIETARY

2 of 2

Gp	951-6/3	4	V	C		



INDEX TO MAP SHEETS



SEISMOGRAPH MAP

Contour Interval 0.005 SECS.
Datums: Plane _____ Velocity _____

ISOCHRON

HUME to PRE-DEVONIAN

BULMER LAKE 95 I-13/12

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.

Orhan's Reproductions & Photomapping Ltd.
PHONE 262-7514 714 8th AVENUE S.W. CALGARY ALBERTA CANADA

Seismic Revised [illegible]
Values Revised
Contours Revised Oct 12 1971
Wells Revised May 28, 1971

PROPRIETARY

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Gp	95I-13/12	2		C		