June 1974

10x

DIGITECH
DIGITAL TECHNOLOGY (CALGARY) LTD.

LINE: R-2
DIRECTION: → EAST
PROJECT: CARCAJOU MARINE
PROCESSED FOR: CANADIAN INDUSTRIAL GAS & OIL
SHOT FOR: CANADIAN INDUSTRIAL GAS & OIL
SHOT BY: TELEDYNE
SHOOTING DATE: 6/7/73 PROCESSING DATE: 9/73
PROCESSING MONITORED BY: DIGITECH LTD.

FIELD PARAMETERS
SPREAD: 1370-270-0 (12 TRACE)
GEOPHONES PER GROUP:
GROUP INTERVAL: 100'
OFFSET INTERVAL: 270'
SOURCE INTERVAL: 100'
SOURCE PATTERN: 6 POPS/S.P.
AT FOOT INTERVALS
FIELD FILTER:
GAIN MODE:
GEOPHONE TYPE:
AMPLIFIER TYPE: DFS III

007-06-09-153

[ ] ADC
[1] DDC
INPUT TYPE:
SAMPLE RATE:
No. of SAMPLES
[ ] VIBROSEIS CORRELATION
[ ] FIELD SWEEP
[ ] SYNTHETIC SWEEP
[ ] RESAMPLE TO
[5] NMO
REFERENCE:
[3] STATICS
[X] STRUCTURE DATUM: 500' AML
Wx VELOCITY:
SUB Wx VELOCITY
REPLACEMENT VELOCITY: 10,000'/sec.
[ ] FLATTENED TO:
[ ] TRIM STATICS
[ ] TRACE EQUALIZATION
GATE:
[2] AMPLITUDE RECOVERY
GATES:

[6] DIGITAL FILTER
TYPE: BANDPASS
POINTS: 93
FILTER 1: 15-20/55-60
START TIME: 0
FILTER 2: 15-20/50-55
START TIME: 1.0 sec.
FILTER 3:
START TIME:
FILTER 4:
[ ] DECONVOLUTION
GATE:
LENGTH:
NOISE SUPPRESSION:
PREDICTION LAG TIME:
[7] FB MUTE
TR-1
TR-9
TR-12
[4] TRACE GATHER
FOLD: 6
[8] STACK
FOLD: 6
[10] DAC
ANALOG FILTER:
GAIN:
[9] SPECIAL CDSA

O.C. by: J.K.

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[4] TRACE GATHER
FOLD: 6
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FOLD: 6
[10] DAC
ANALOG FILTER:
GAIN:
[9] SPECIAL CDSA

O.C. by: J.K.

MICROMAT
105 M.M.

WEST CANADIAN GRAPHIC INDUSTRIES LTD.
840 - 5th Avenue S.W. CALGARY 1, ALBERTA
Phone 263-2555

007-06-09-153

10x June 1974

MICROMAT
105 M.M.

DIGITECH
DIGITAL TECHNOLOGY (CALGARY) LTD.

LINE: R-1
DIRECTION: → EAST
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SHOT FOR: CANADIAN INDUSTRIAL GAS & OIL
SHOT BY: TELEDYNE
SHOOTING DATE: 6/7/73 PROCESSING DATE: 9/73
PROCESSING MONITORED BY: DIGITECH LTD.

FIELD PARAMETERS

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GEOPHONES PER GROUP:
GROUP INTERVAL: 100'
OFFSET INTERVAL: 270'
SOURCE INTERVAL: 100'
SOURCE PATTERN: 6 POPS/S.P.
AT FOOT INTERVALS
FIELD FILTER:
GAIN MODE:
GEOPHONE TYPE:
AMPLIFIER TYPE: DFS III

[ ] ADC
[1] DDC
INPUT TYPE:
SAMPLE RATE:
No. of SAMPLES
[ ] VIBROSEIS CORRELATION
( ) FIELD SWEEP
( ) SYNTHETIC SWEEP
( ) RESAMPLE TO:
[5] NMO
REFERENCE:
[3] STATICS
(X) STRUCTURE DATUM: 500' ASL
Wx. VELOCITY:
SUB Wx. VELOCITY:
REPLACEMENT VELOCITY: 10,000'/sec
( ) FLATTENED TO:
( ) TRIM STATICS
[ ] TRACE EQUALIZATION
GATE:
[2] AMPLITUDE RECOVERY
GATES:

007-06-09-153

[ ] DIGITAL FILTER
TYPE:
POINTS: 1-2
FILTER 1: 15/20-55/60
START TIME: 0
FILTER 2: 15-20/50-55
START TIME: 1.0 sec.
FILTER 3:
START TIME
FILTER 4:
[ ] DECONVOLUTION
GATE:
LENGTH:
NOISE SUPPRESSION:
PREDICTION LAG TIME:
[2] FB MUTE
TR-1
TR-9
TR-12
[4] TRACE GATHER
FOLD: 360
[8] STACK
FOLD: 360
[10] DAC
ANALOG FILTER:
GAIN:
[9] SPECIAL CDSA

QC by JK

1 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0

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TR-12
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FOLD: 360
[8] STACK
FOLD: 360
[10] DAC
ANALOG FILTER:
GAIN:
[9] SPECIAL CDSA

QC by JK

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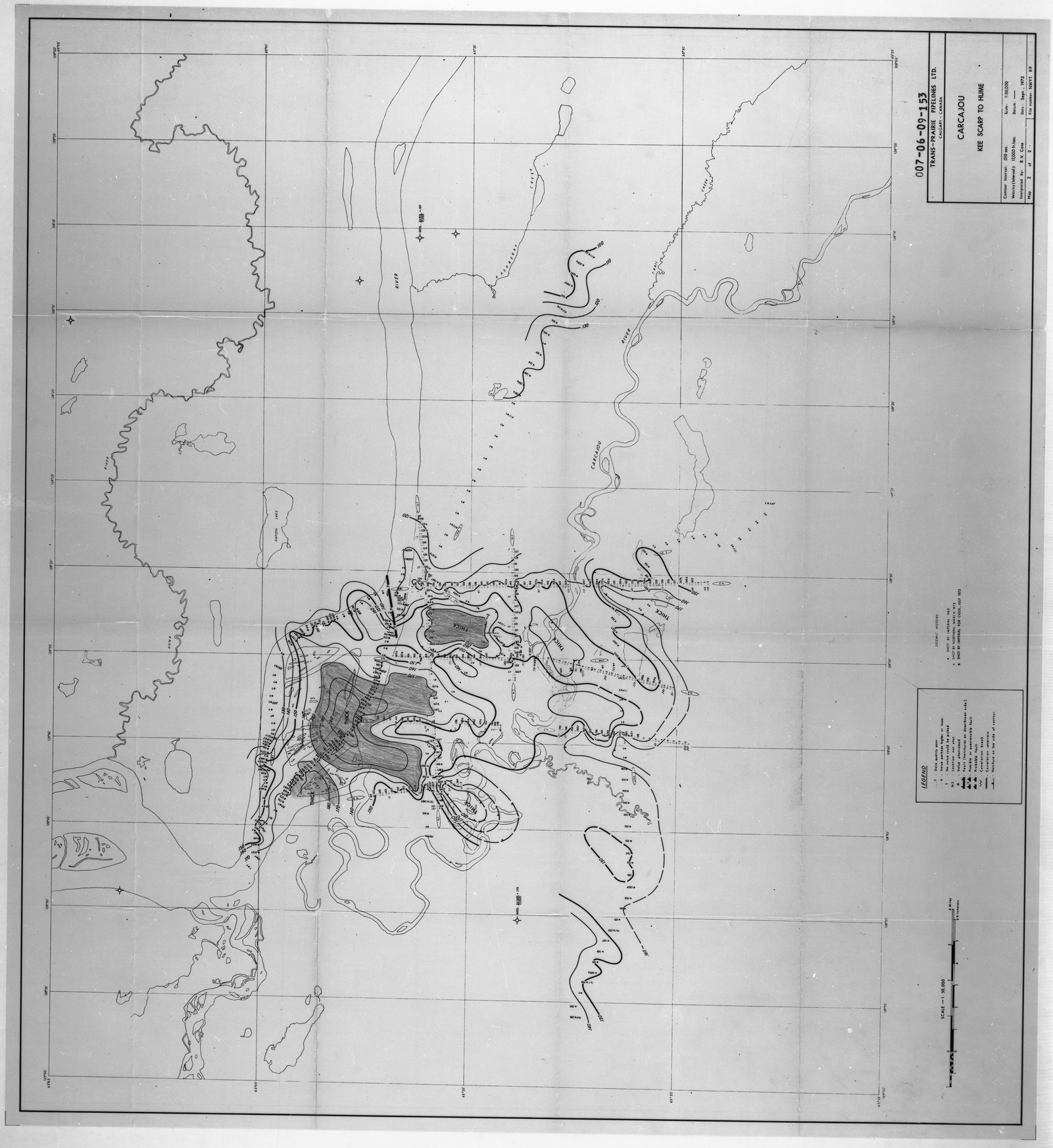

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10x
June 1974

007-06-09-153

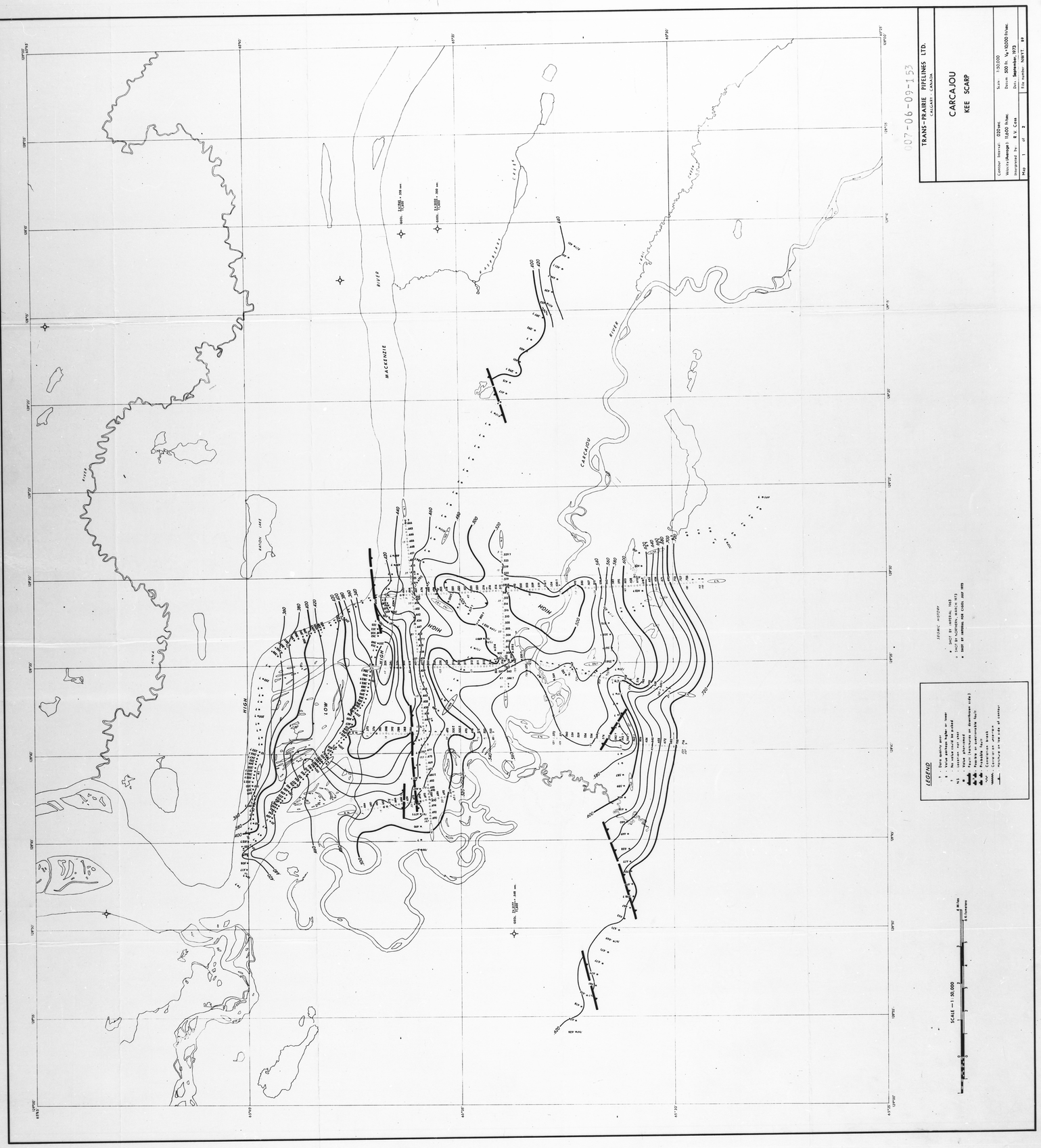
TRANS-PRAIRIE PIPELINES LTD.
CALGARY, CANADA

CARCAJOU

KEE SCARP

Contour Interval 100ft.
Velocity (Average) 11,400 ft/sec
Interpreted by R.V. Cass

Scale 1:50,000
Datum 500 ft. Sea=10000 ft/sec
Date September, 1973
Map 1 of 2
File number: NWVT 69



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10x
June 1974

007-09-06-153

REPORT TO THE GOVERNMENT

Carcajou Marine, Northwest Territories

007-09-06-153

REPORT ON A SEISMIC SURVEY

OF THE

CARCAJOU RIVER AREA, N.W.T.

CONDUCTED FOR

TRANS-PRAIRIE PIPELINES LTD.

IN JULY , 1973

BY

IMPERIAL OIL LTD.

LEASES COVERED : GROUP L-54
GOV'T PROJECT No.: 7-9-6-73-7
FILE No. : N72B108

REPORT SUBMITTED OCTOBER , 1973

BY

R.V. CASS

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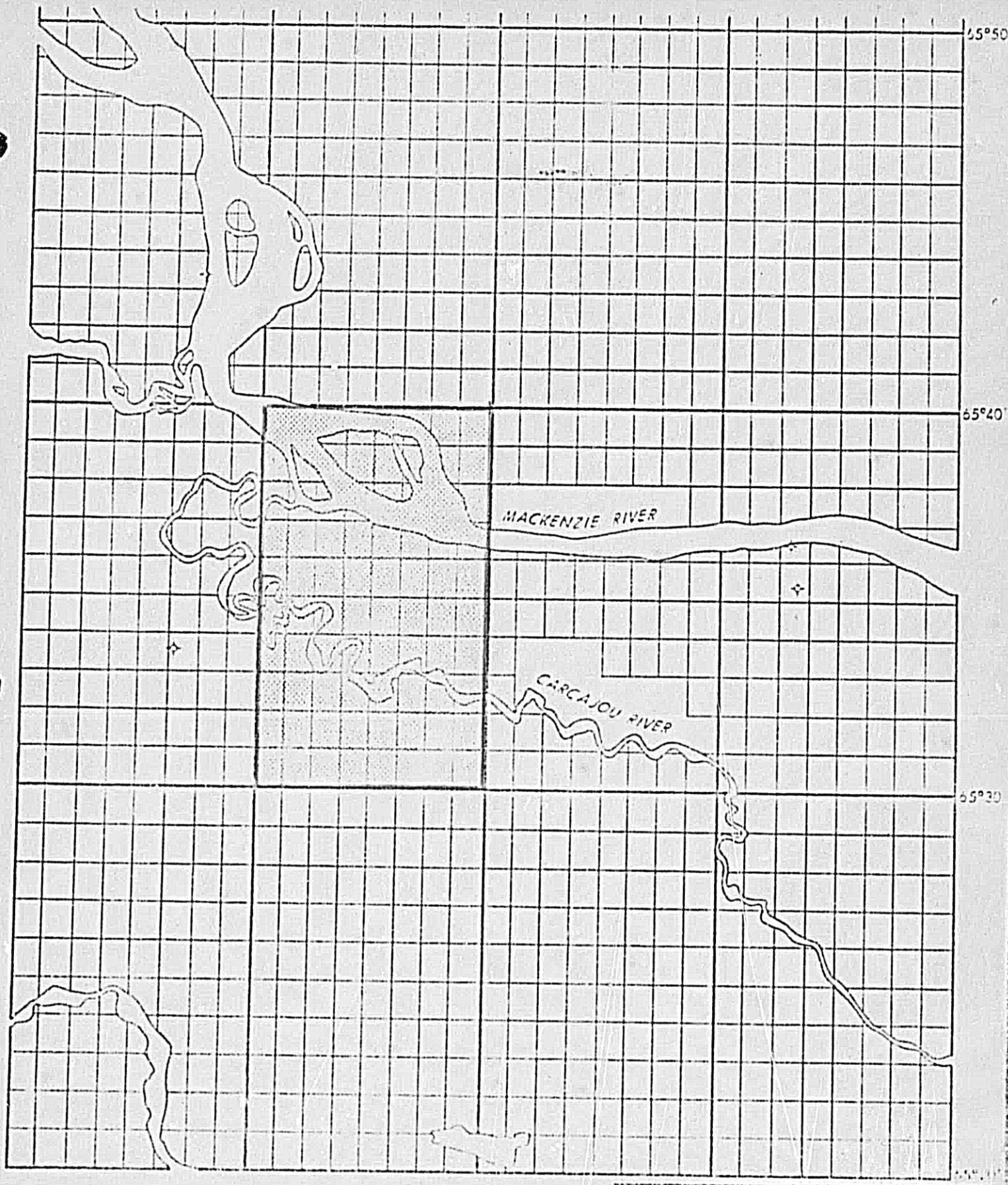

TRANS-PRAIRIE PIPELINES, LTD.

CARCAJOU RIVER AREA, N.W.T.

SCALE : 1" = 4 MILES

CARCAJOU MARINE SURVEY

This survey was shot for Trans-Prairie Pipelines by a Teledyne crew contracted to Imperial Oil Limited and using two boats leased from Kaps Transport, the Aurora Surveyor and the Aurora Explorer. This survey was shot in late June and early July, 1973 on the Mackenzie River on both sides of Axel Island.

FIELD PROCEDURES

The boats were both shallow-draft diesel-powered craft, 90' x 24' in size. Shooting equipment consisted of six gas exploders, set off simultaneously, utilizing a mixture of propane and oxygen. Six "pops" were shot at each shotpoint location, except for the first 49 shotpoints where nine "pops" were recorded at each shotpoint. For recording the energy, a 12-group bottom-drag detector cable was used which fed into a DFS III recorder which incorporated the SEG-A tape format.

Field procedures involved proceeding upstream pausing at each shotpoint while six or nine "pops" were shot and recorded, with the captain attempting to hold the boat steady against the current. During this pause, the cable should have sunk to the bottom of the river and, ideally, would be still, thus minimizing towing noise. Current noise would have been less if shooting had been done in a downstream direction, but then it would have been difficult to maintain position of boat and cable while shooting.

Where nine "pops" per shotpoint were employed, the shotpoint spacing was 200 feet, resulting in a 3-fold CDP stack. When it was decided to increase the stack multiplicity to 6-fold, the number of "pops" per shotpoint was decreased to six to conserve oxygen which was in short supply.

Line R-1, located in the main channel north of Axel Island, was shot first. At times the current was very strong making progress between shotpoints rather slow and increasing the noise level. Before shooting Line R-2, the channel was tested for navigability, with difficulty encountered at the west end of Axel Island where the boat grounded twice before sufficient depth of water was found. No difficulties were encountered while shooting the line except where leaving and re-entering the main channel where the cable was pulled out of line by the stronger current. Each of the "pops" at a shotpoint were recorded separately instead of being summed before being put on tape.

DATA PROCESSING

The data were processed by Digitech. Two sets of sections were prepared, one with a display scale of 8 tracks per inch horizontally and 7.5 inches per second vertically; the other with a scale of 24 tracks

per inch horizontally and 3.5 inches per second vertically. An attempt was made to match the existing land shooting by applying a correction designed to replace the water with a material of 10,000 feet per second velocity and then adjusting to a datum of 500 feet above sea level using an elevation correction velocity of 10,000 feet per second.

Machine procedures can be listed as follows:

- D to D conversion including vertical summation of six or nine "pops"
- Statics
- Trace Gather
- NMO
- Digital Filter
- First-break Mute
- Stack
- Coherency Scaling
- Display

STATISTICAL DATA

Dates of Operation

June 29	Boats departed from Norman Wells late in the afternoon
30	Arrived at project area and commenced shooting
July 1	Finished Line R-1 and began Line R-2
2	Finished Line R-2 and departed downstream

Production

Number of shotpoints -- 880

Number of "pops" -- 4,986

Number of miles of subsurface coverage -- 17.6

Days worked -- 2.25

Average daily production -- 7.8 miles

Equipment

Two barge-bottom diesel-powered boats 90' x 24' with super structures for accommodation and feeding of crew and seismic personnel

One diesel-powered drum for storing, laying out, and retrieving the cable

Six gas exploders together with the associated lines, regulators, etc. for controlling and exploding the gas mixture

One set of DFS III recording equipment

Motorola RPS system including transponders for deployment on shore

One optical range finder

Personnel

Ship's Crews	--	Skippers	2
		Mates	2
		Engineers	2
		Deck Hands	5
		Cooks	3
Seismic Crew	--	Party Manager	1
		Observers	2
		Jr. Observers	2
		Shooters and Helpers	8
Navigators (sub-contracted surveyors)			3

Navigation

D.O.T. navigation charts and markers

Electronic positioning method for measuring off shotpoint intervals

Range finder for distances to shore line

Conditions

Weather clear and warm, becoming overcast on July 1

Enclosures

- Seismic sections for Lines R-1 and R-2 (condensed)
- Kee Scarp horizon map
- Kee Scarp to Hume interval map

DISCUSSION OF MAPS AND SECTIONS

The data quality was much poorer than anticipated, principally because the shot energy was frequently insufficient to overcome the noise. As a result, there is no reflection which is continuous throughout. The Hume and Kee Scarp reflections can be correlated on parts of the two lines although the latter is frequently phantomed. In spite of this, the picture as presented on the two enclosed maps is considered to have a fair degree of reliability. Incorrect removal of the effect of permafrost on the land data would create a mis-tie between it and the river data. If the mis-tie exists, its effect can be minimized by subtracting .020 seconds from the river data and recontouring. Doing this enlarges the areal extent of the high feature, leaving everything else virtually unaffected.

The new data confirmed the previous results which showed that the north end of Line N-4 is the highest point on the structure. Line R-1 portrays a reversal north of this high point before the horizons rise steeply towards the north side of the river. Line R-2 drops off to the west and the interval is perhaps thickest in this vicinity.

The structure appears to be an extension of the Carcajou ridge. A predominantly tight Kee Scarp outcrops at the crest of this ridge east of our project. For the play to be a valid one, the Kee Scarp must be porous on the farmout land but become tight near the east boundary. Whether this is actually the case can be determined only by drilling. Choosing a drilling location will involve a compromise, since locally thinner reef values exist at the highest point on the structure.