

REPORT OF GEOPHYSICAL SURVEY  
REPORT OF SEISMOGRAPH REFLECTION SURVEY



Conducted by  
Western Geophysical Company of Canada Ltd.  
for  
Amoco Canada Petroleum Company Ltd.

During the Period January 6, 1971 to March 26, 1971

ON CRANSWICK RIVER, N.W.T. AND YUKON PERMIT NOS. 6194 TO 6209

Prepared By:  
C.W. ALLISON  
DISTRICT GEOPHYSICIST

Submitted in support of application for credit; see affidavit made by  
\_\_\_\_\_ of \_\_\_\_\_ and in accordance  
with work obligations under Section 64 (F) of the Territorial Lands Act.

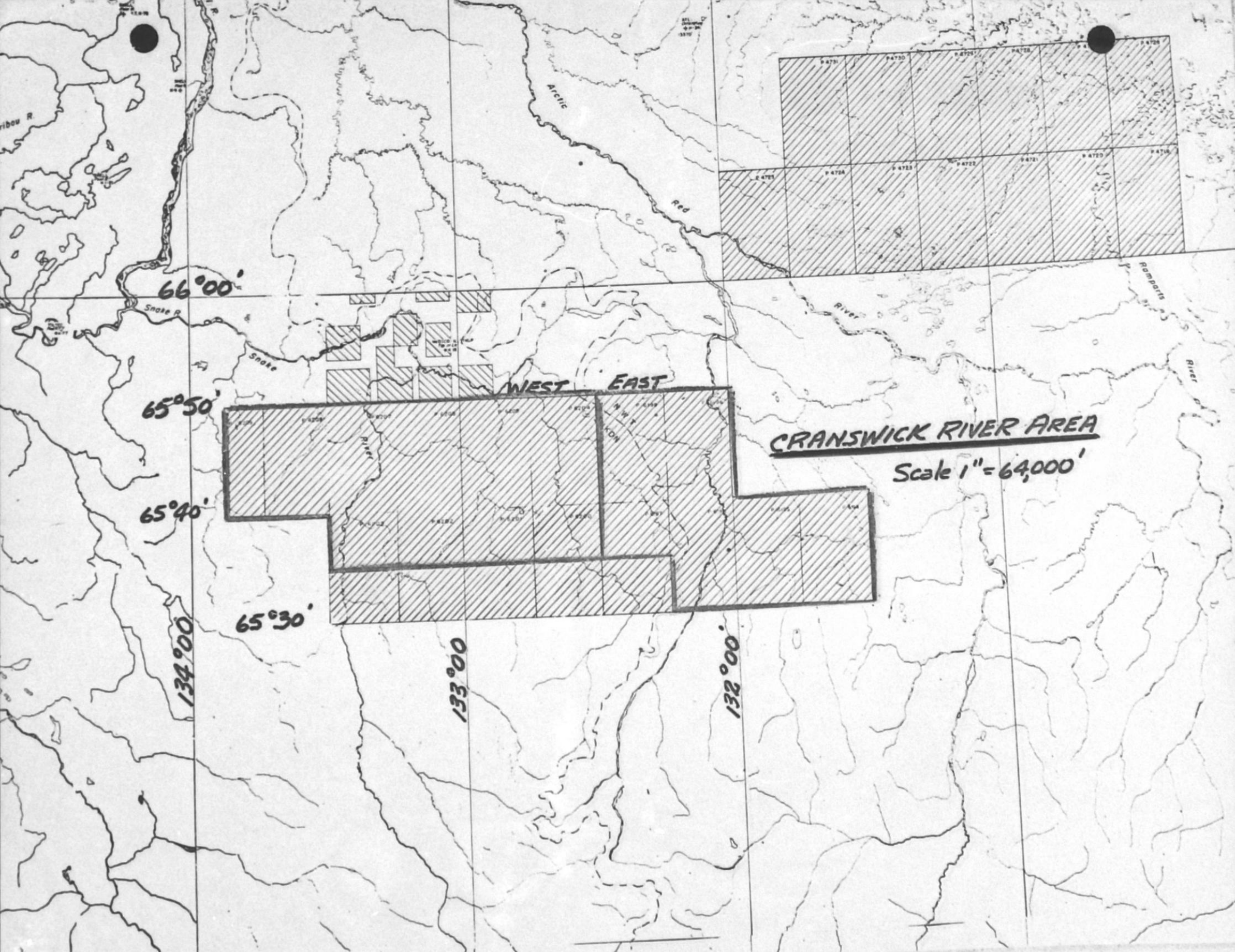
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## I N T R O D U C T I O N

During the period of January 6, 1971 to March 26, 1971, a "Vibroseis" reflection seismograph survey was conducted in the Cranswick River Area, on and off N.W.T. and Yukon Permit Nos. 6194 to 6209, held jointly by Amoco Canada Petroleum Company Ltd. and Canadian Pacific Oil and Gas Limited.

The survey was conducted by Western Geophysical Company of Canada Ltd. (Party V-12) for Amoco Canada Petroleum Company Ltd.





## Statistical Data

### Production

Party V-12 spent sixty-four (64) calendar days working on seismic lines cut and cleared at the same time as the seismic work was being done. Party V-12 surveyed one hundred ninety (190) miles of multifold coverage (600%).

The location of the program is shown on the surface contour map in the pocket of the Report. Geophone, station and vibrator arrangements are shown on a spread diagram in the pocket.

The average daily production was approximately 3.5 miles per day. Weather down time amounted to three (3) days, equipment down time was insignificant, but moving time to the widely spread program cut down production.

Western Party V-12

The contract crew was under the supervision of J.T. Coull and party managed by K. Dobson.

Track mounted equipment consisted of a digital recorder, two dual vibrator units, two cable trucks, a supply unit, a water truck-personnel carrier and a party manager's unit.

The track mounted camp consisted of four expandable trailer units and a power work shop.

The seismic line cutting and clearing was done by MacMillan Construction of Peace River, Alberta and consisted of a portable camp, fuel sleighs and three bulldozers.

The operation was supported by fixed wing aircraft out of Norman Wells, N.W.T. and a helicopter stationed on the crew.

Crew Personnel

|       |                     |
|-------|---------------------|
| 1     | Party Manager       |
| 1     | Computer Clerk      |
| 1     | Observer            |
| 1     | Assistant Observer  |
| 1     | Surveyor            |
| 1     | Assistant Surveyor  |
| 2     | Surveyors Helpers   |
| 1     | Mechanic            |
| 1     | Mechanic's Helper   |
| 3     | Vibrator Operators  |
| 2     | Cable Truck Drivers |
| 4     | Recorder Helpers    |
| 1     | Cook                |
| 1     | Cook's Helper       |
| 1     | Camp Attendant      |
| 1     | Night Man           |
| <hr/> |                     |
| 23    | TOTAL MEN           |

### Surveying

The survey was conducted using a Wilde Theodolite T1A and steel tapes, and was tied into government triangulation stations, the previous years seismic control and tellurometer survey.

### Field Procedures

All the lines were surveyed using the "Vibroseis" technique obtaining 600% multifold coverage.

The vibrator energy source at each shotpoint consisted of two vibrator units, with each unit consisting of a front and back mounted Wabco Y-600D vibrator. The two vibrator units were separated by 85 feet and moved 240 feet in 16 sweeps, giving a total vibrator pattern of 325 feet.

The vibrating points were 650 feet apart, while the geophone stations were 325 feet apart with 9 geophones (Mark L-10B-8 cps) per group. A 56-14 cps pilot was used for a 7 second duration.

The 24 channel data was digitally recorded on 9 track magnetic tapes in the Western format, using binary gain through SDS-1010 amplifiers and summed in a Western summer. Random analogue correlations were made in the field for quality control.

Velocity spreads were obtained at five predetermined locations. These involved the same shooting procedure, but over an approximate 4 mile range.

### Data Processing

The data processing was performed by Amoco Canada Petroleum Company Ltd. and by Geodigit in Calgary.

The digital field tapes were cross correlated, edited and programmed into structural sections with elevation corrections applied to a +2000 datum using a 10,000 feet/second replacement velocity.

Normal moveout, trace muting, frequency filtering, deconvolution, trace equalization and stacking were applied to the data.

Time migrated sections were made on some of the lines.



### Results and Interpretation

Record quality in the area is generally fair to good. The data that appears on the subsurface maps are vertical two way structural times between the datum and the horizon mapped. The objective geological zone in the area is the Mid Devonian Carbonates. The Top of Carbonate (Hume) map is the main map. The Mid Devonian Carbonate (Hume) map shows a fairly continuous reflection and is one of the strongest reflections present. Other reflections from the Base of Ordovician, Cretaceous, Mississippian and Upper Devonian are present.

Four out of the five velocity spreads shot in the area gave information for identifying the carbonate section, but were limiting in that no good refraction information was obtained using the "vibro seis" method.

The Top of Carbonate map shows regional dip to the south, with an east west trending anomalous high towards the southern half of the acreage, then steep north dip into the MacKenzie Mountains. Faulting is present over much of the area, with major faulting to the south and east.

Respectfully submitted by

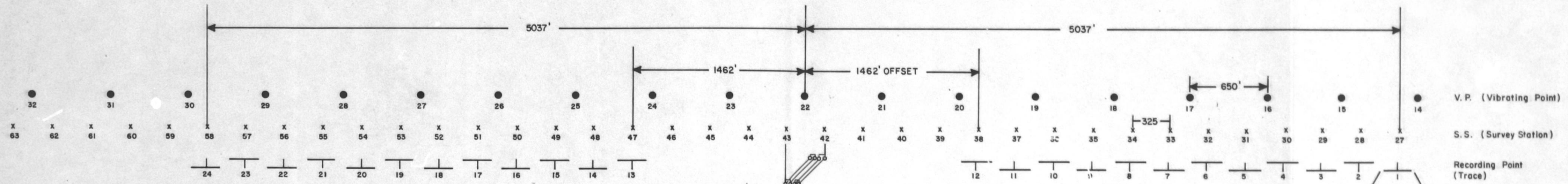
AMOCO CANADA PETROLEUM COMPANY LTD.



C.W. Allison  
District Geophysicist



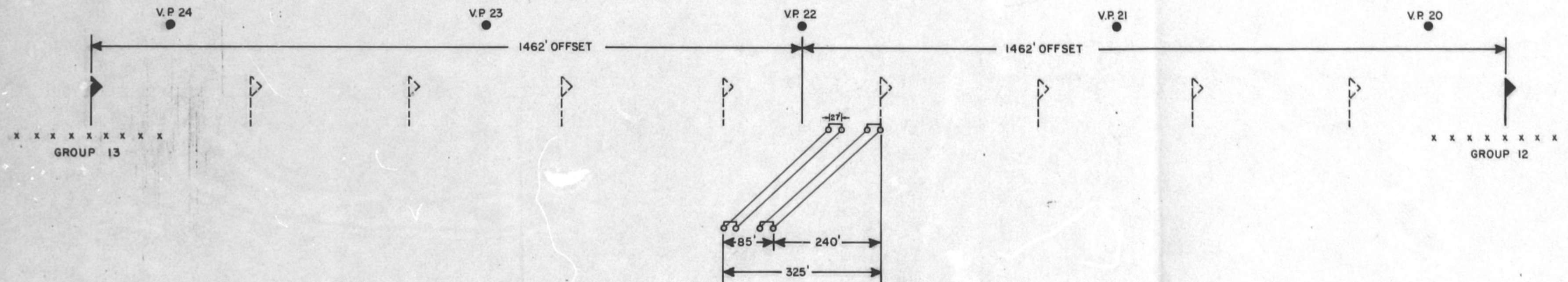
**CRANSWICK RIVER**  
**WESTERN V-12 VIBROSEIS**  
**JAN '71 — APRIL '71**  
**600% SYMMETRICAL SPREAD**  
 Scale 1" = 650'



**VIBRATOR PATTERN (DETAIL)**

Scale 1" = 200'

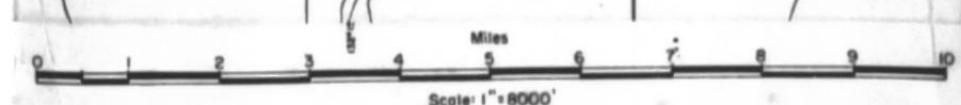
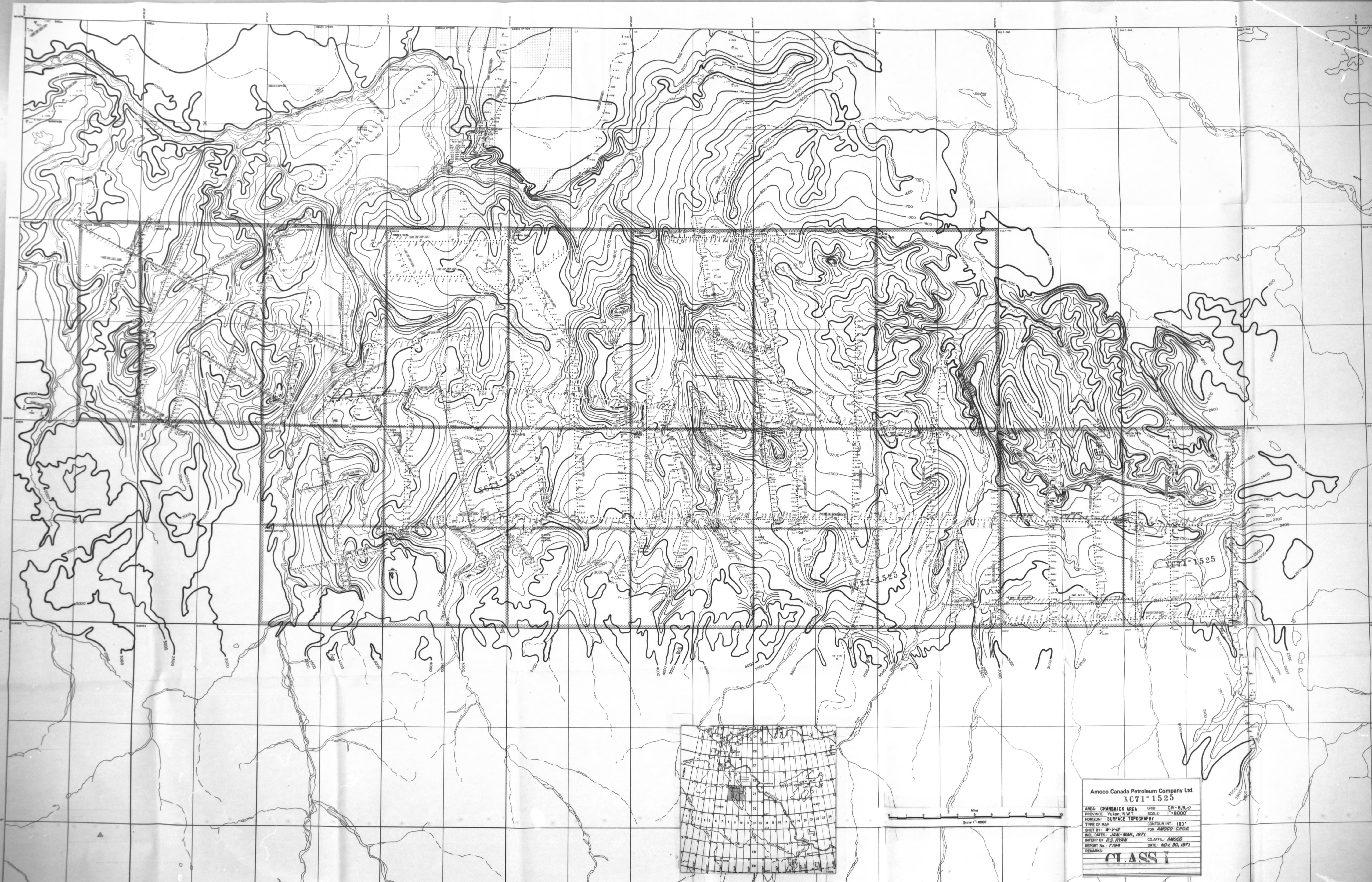
4 VIBRATORS TAKING 16 SWEEPS COVERING 240' = 16' BETWEEN SWEEPS WITH 1462' OFFSET.



9 GEOPHONES / GROUP  
 GEOPHONES 36' APART.

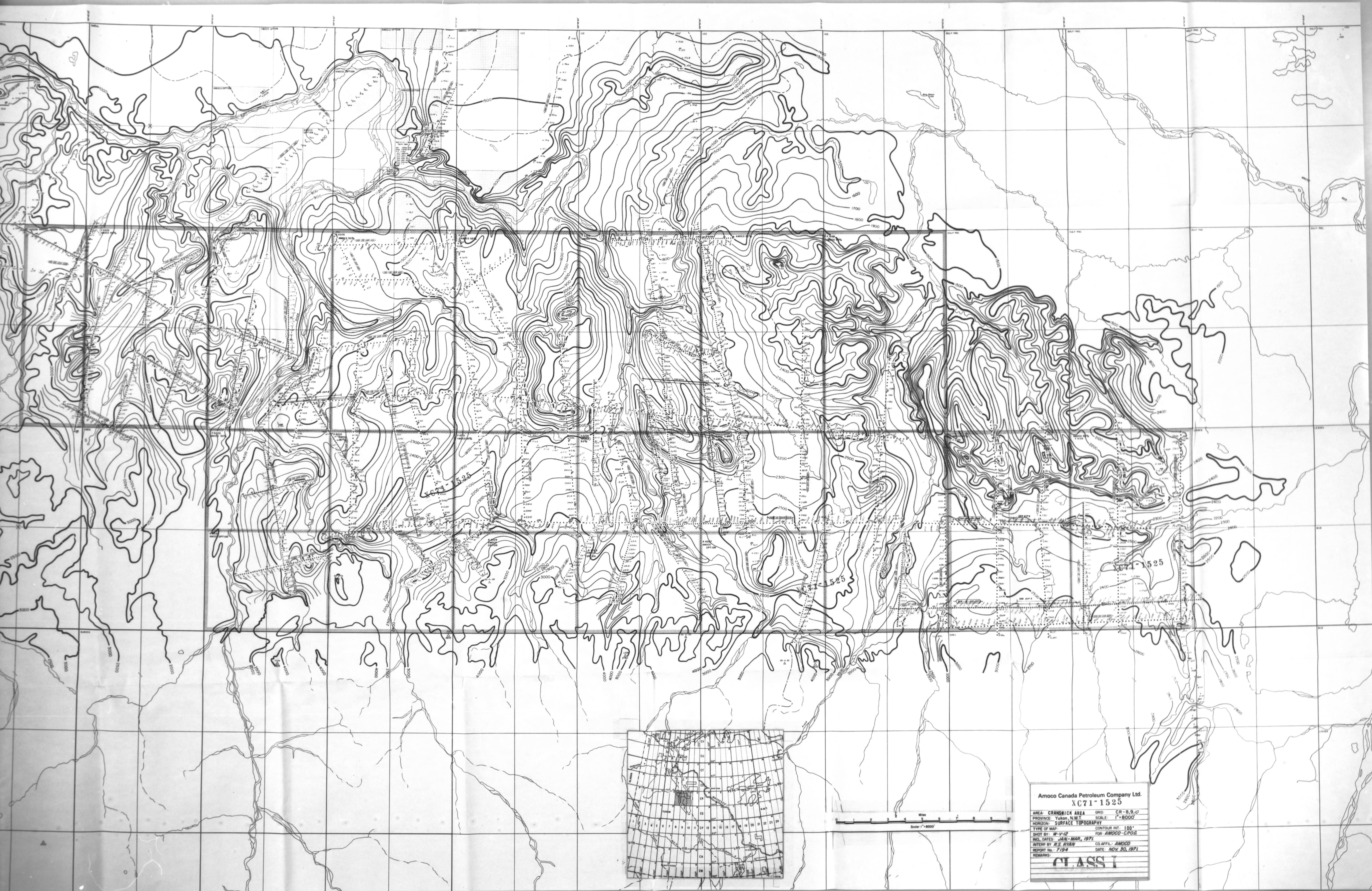
Scale 1" = 100'





Amoco Canada Petroleum Company Ltd.  
XC71-1525  
AREA: CRANWICK AREA GRID: CR-8.9.0  
PROVINCE: YUKON, N.W.T. SCALE: 1"=8000'  
HORIZON: SURFACE TOPOGRAPHY  
TYPE OF MAP: CONTOUR INT: 100'  
SHOT BY: W.V.42 FOR: AMOCO-C.P.O.B.  
INCL. DATES: JAN-MAR, 1971 CO. AFFL.: AMOCO  
INTERP. BY: R.S. RYAN DATE: NOV. 30, 1971  
REPORT NO.: 7194  
REMARKS:  
**CLASS I**











CONTINUOUS CARB  
TIME STRUCTURE  
(WEST OF SHALE-OUT ZONE)

NOTE  
SOUTH OF MAJOR FAULT CONTOUR  
INTERVAL CHANGES TO 50ms

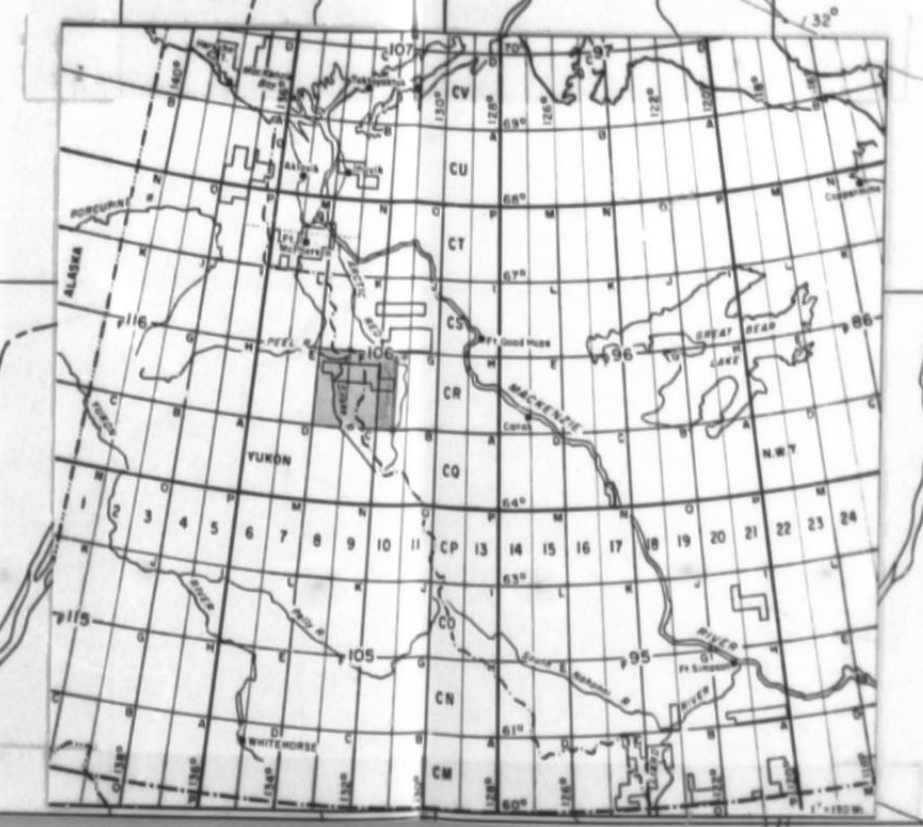
Upper Devonian & Miss

Mid Dev Carbonate & Older

Mackenzie Mtns.

TOP MID-DEVONIAN CARBONATE (HUME)  
TIME STRUCTURE

25ms = 150ft  
X:Z:10 STRUCTURAL STATICS RRS +2000  
V=12,000ft/s V<sub>2</sub>=13,000ft/s



27-C-71  
Q R

UPPER DEVONIAN & MISS  
MID-DEVONIAN CARB & OLDER

Amoco Canada Petroleum Company Ltd.  
XC71-1522  
AREA CRANSWICK RIVER GRID CR-6,9,10  
PROVINCE Yukon, N.W.T. SCALE 1"=8000'  
HORIZON TOP CONTINUOUS CARBONATE  
TYPE OF MAP TIME STRUCTURE CONTOUR INT. 25 & 50ms  
SHOT BY W-V-12 FOR AMOCO-CPOG  
INCL. DATES JAN-MAR, 1971  
INTERVIEW BY R.E. RYAN CO. AFFILI. AMOCO  
REPORT NO. 7194 DATE NOV. 30, 1971  
REMARKS  
**CLASS I**



