

REPORT OF GEOPHYSICAL AND SEISMOGRAPH  
REFLECTION SURVEY

Conducted by: United Geophysical Co. of America  
For; Pan American Petroleum Corporation

On Permit Nos. 1001, 1007 and 1472  
Period of July to October 1963

REPORT OF GEOPHYSICAL AND SEISMOGRAPH REFLECTION SURVEY

Conducted by

UNITED GEOPHYSICAL COMPANY OF AMERICA

For

PAN AMERICAN PETROLEUM CORPORATION

-- --  
On

PERMIT NUMBERS - 1001, 1007, 1472

During the period July to October, 1963

Prepared By

M. A. Knock  
Exploration Group Supervisor

Submitted in accordance with Government Regulations under  
Section 30 (c) of the Territorial Lands Act.

Abstracted for  
**Geo-Science Data Index**

Date \_\_\_\_\_

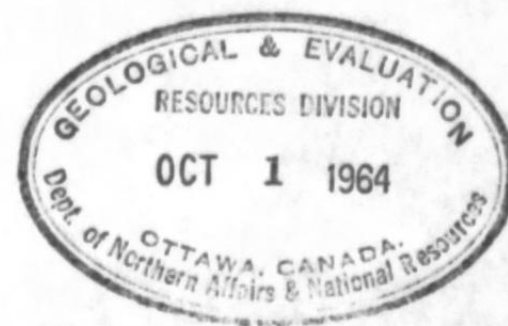


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Maps (Enclosures in envelope rear cover of report)

Shot Hole Plan and Elevation Map  
Structure Contour Map

## TEXT

### INTRODUCTION

During the months of July, August, September and October, 1963, a seismograph reflection program was conducted by United Geophysical Company of America for Pan American Petroleum Corporation, et al. The move of Party U-559 from Fort Nelson, B. C. to the operations site, via river barge, was commenced July 18th and completed by July 27th. Actual seismic operations were started July 28th. Operations continued through October 13th, exclusive of time off periods, for a total of 65.71 operating days. Of this time, 28.11 operating days were spent on Permit 1007 and 37.60 days were spent on Permits 1472 (California Standard Company) and 1001 (Pan American Petroleum Corporation).

The seismic program was conducted on existing lines in part, but mostly on lines cleared as the program progressed. Line cutting and clearing were done by a D-6 cat owned by Bruce Rome Ltd. This unit was also used to clear shotpoints and to tow vehicles where required.

The operation of United Geophysical Party U-559 was under the supervision of Mr. J. H. Lebeau.

Interpretation of the data obtained by the field crew was carried on simultaneously by Pan American's interpretative staff (located in Edmonton at first, and later in Calgary).

The operation in this area utilized track type equipment exclusively. Field equipment consisted of three "Nodwell" track units;



drill, water truck and recorder; the camp comprised a "Nodwell" tracked kitchen sleeper combination unit, a "Nodwell" tracked supply unit and a "Bombardier" tracked parts and power unit. A tent provided additional sleeping accommodation.

It was necessary to supply the camp by aircraft, adding to the overall cost of the operation. No other unusual operating problems were encountered in the area.

#### SEISMIC TECHNIQUE

Shot holes averaged 60 feet in depth. Shot depth was determined by near surface lithology with best results obtained when the shot was detonated in shale or clay.

Normal charge size averaged 20 pounds per shot. Three hole patterns were normally used throughout the area. The average spread length used was 3020 feet. The energy was recorded on split spreads as diagrammed on Figure #1.

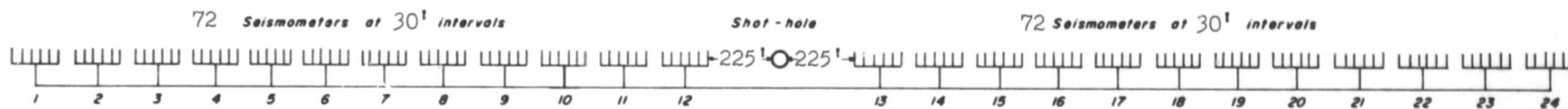
The instruments used by the Party were UGC 1-38 type manufactured by United Geophysical Company. Data was recorded on Techno type magnetic tapes.

Reflection methods were used to obtain subsurface information throughout the area.

The data appearing on the submitted subsurface map are vertical two-way times between an arbitrary reference plane and the horizon mapped.

Respectfully submitted,  
PAN AMERICAN PETROLEUM CORPORATION

by   
M. A. Knock  
Exploration Group Supervisor



Where three-hole patterns were used - shot holes were 100' apart.

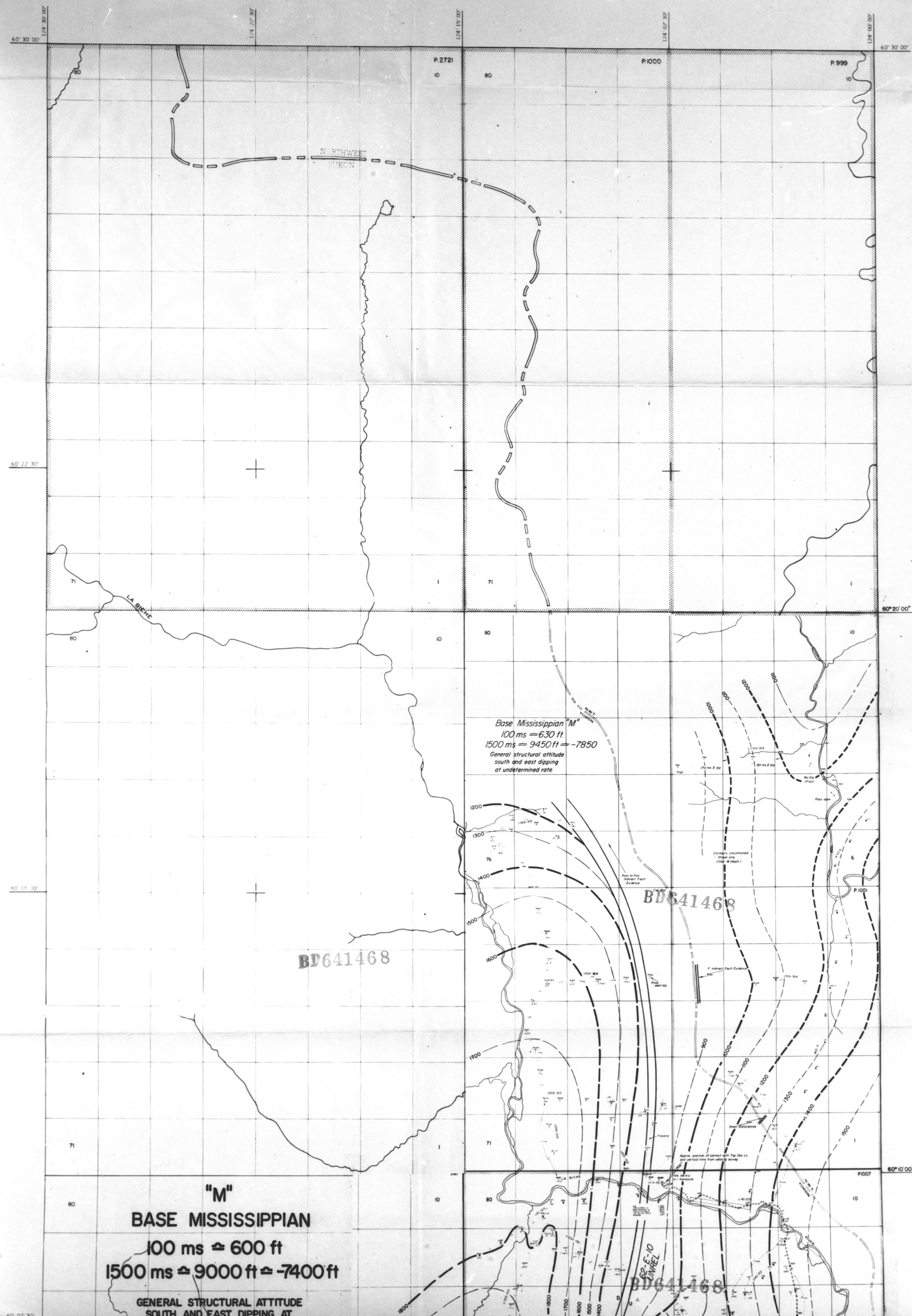
Party UGC U-559

Area - Beaver - Kotaneelee

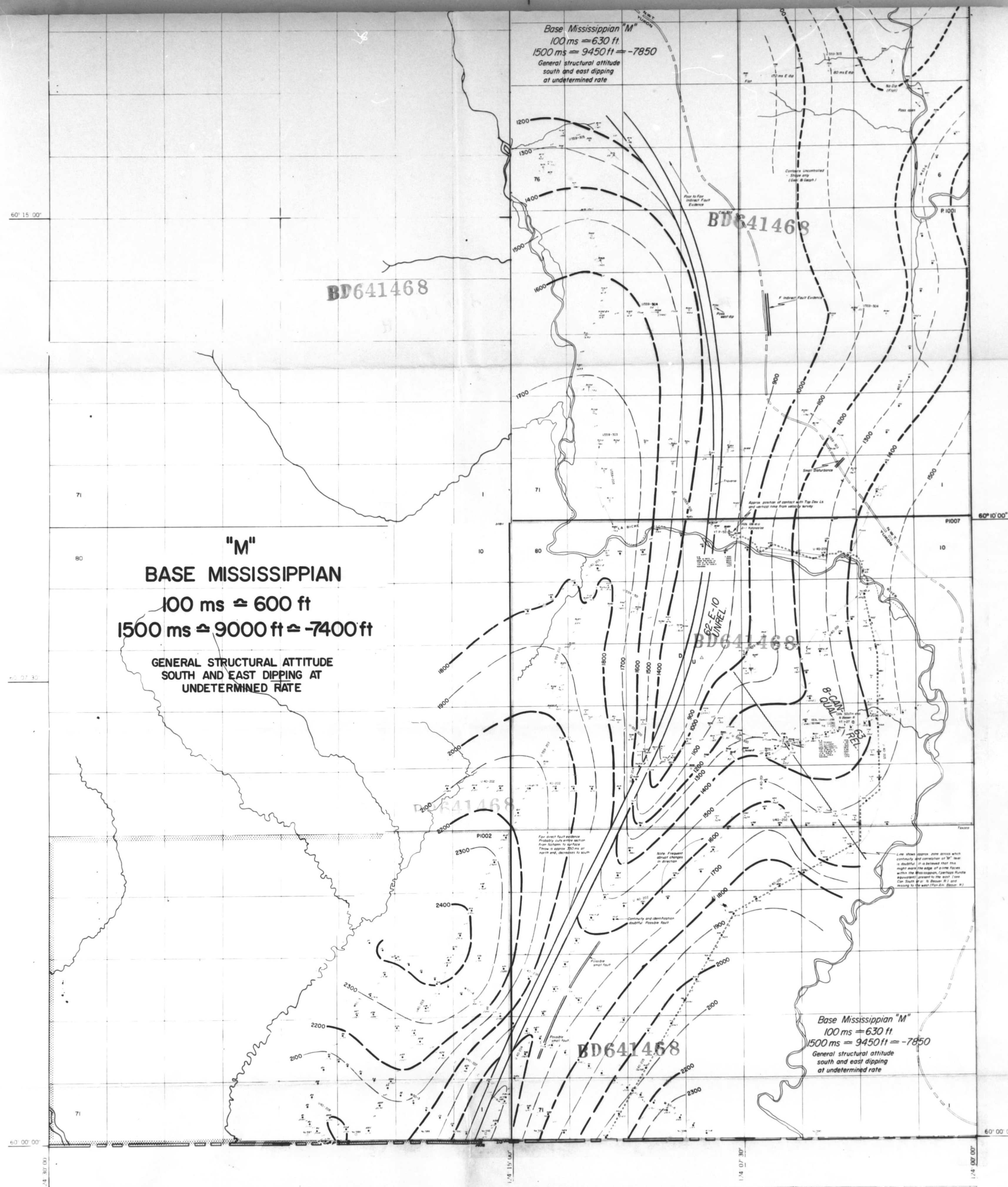
Permits - 1001, 1007

Spread Length - 3020'





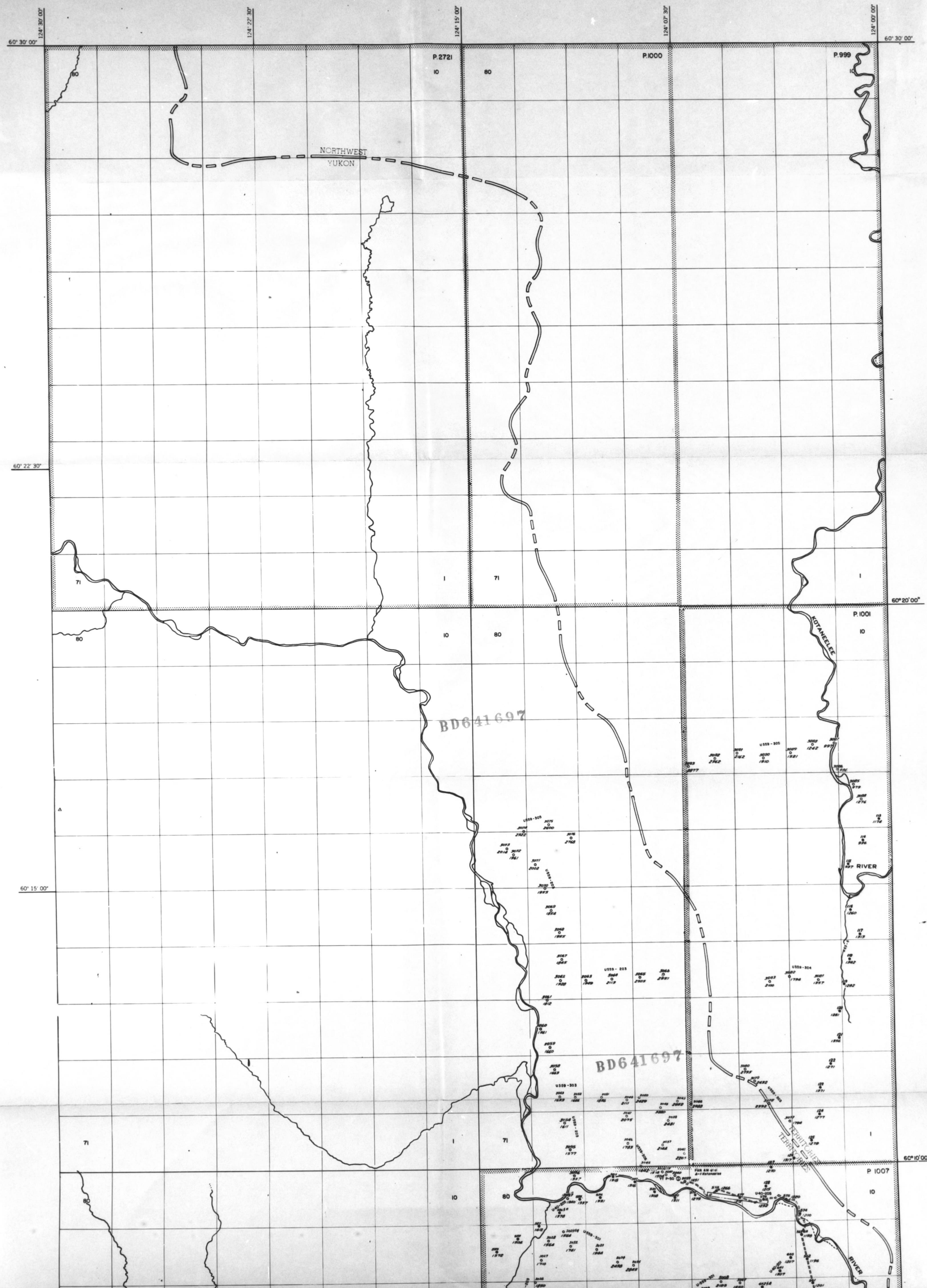




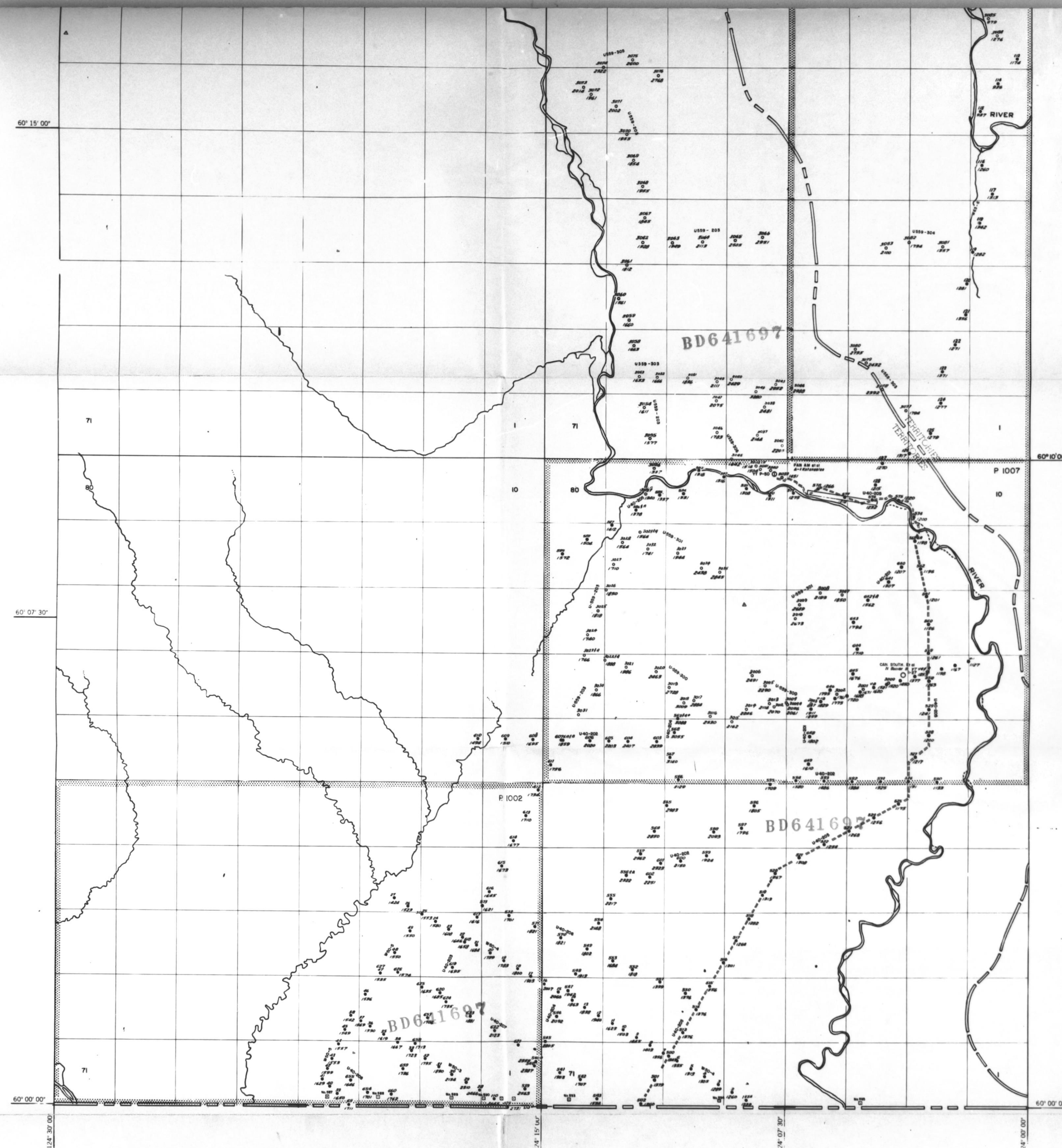
| MAP EVALUATION                                                                                                                                                                                                                                                                                                               |  |  |  | SHOOTING HISTORY (Not in detail)                                                                                                                                      |  |  |  | INTERPRETIVE HISTORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  | PAN AMERICAN PETROLEUM CORPORATION |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------|--|--|--|
| <p>Qualification considers type of map or play, amount of relief considered critical, quality of data and density of control, (geophysical or geological).</p> <p>Geological data</p> <p>Reliable Geophysical Data</p> <p>Qualitatively Reliable Geophysical Data</p> <p>Unreliable Geophysical Data</p> <p>POOR TO FAIR</p> |  |  |  | <p>INCL DATES</p> <p>SHOT BY</p> <p>SHOT FOR</p> <p>SP AND/OR LINE No's</p> <p>FINAL REPORT No</p> <p>DATE</p> <p>INTERP</p> <p>CO AFFIL</p> <p>APPROX LOC ON MAP</p> |  |  |  | <p>JAMES K. KOTARSKI</p> <p>PROVINCIAL YOUNG AND NWT</p> <p>HORIZON: Base Mississippian</p> <p>TYPE OF MAP: Structure</p> <p>CONTOUR INT: 100 ms</p> <p>SHOT BY: U.S.C. 559</p> <p>FOR: Pan Am</p> <p>INCL DATES: Aug-Oct 1963</p> <p>INTERP BY: J.H. Harding</p> <p>CO AFFIL: Pan Am</p> <p>REPORT No: C-1-64</p> <p>DATE: Jan 2, 1964</p> <p>REMARKS: Figures on dip symbols indicate milliseconds dip per thousand feet. Migrated at 10,000 ft/s migration velocity.</p> <p>CLASS I</p> |  |  |  |                                    |  |  |  |

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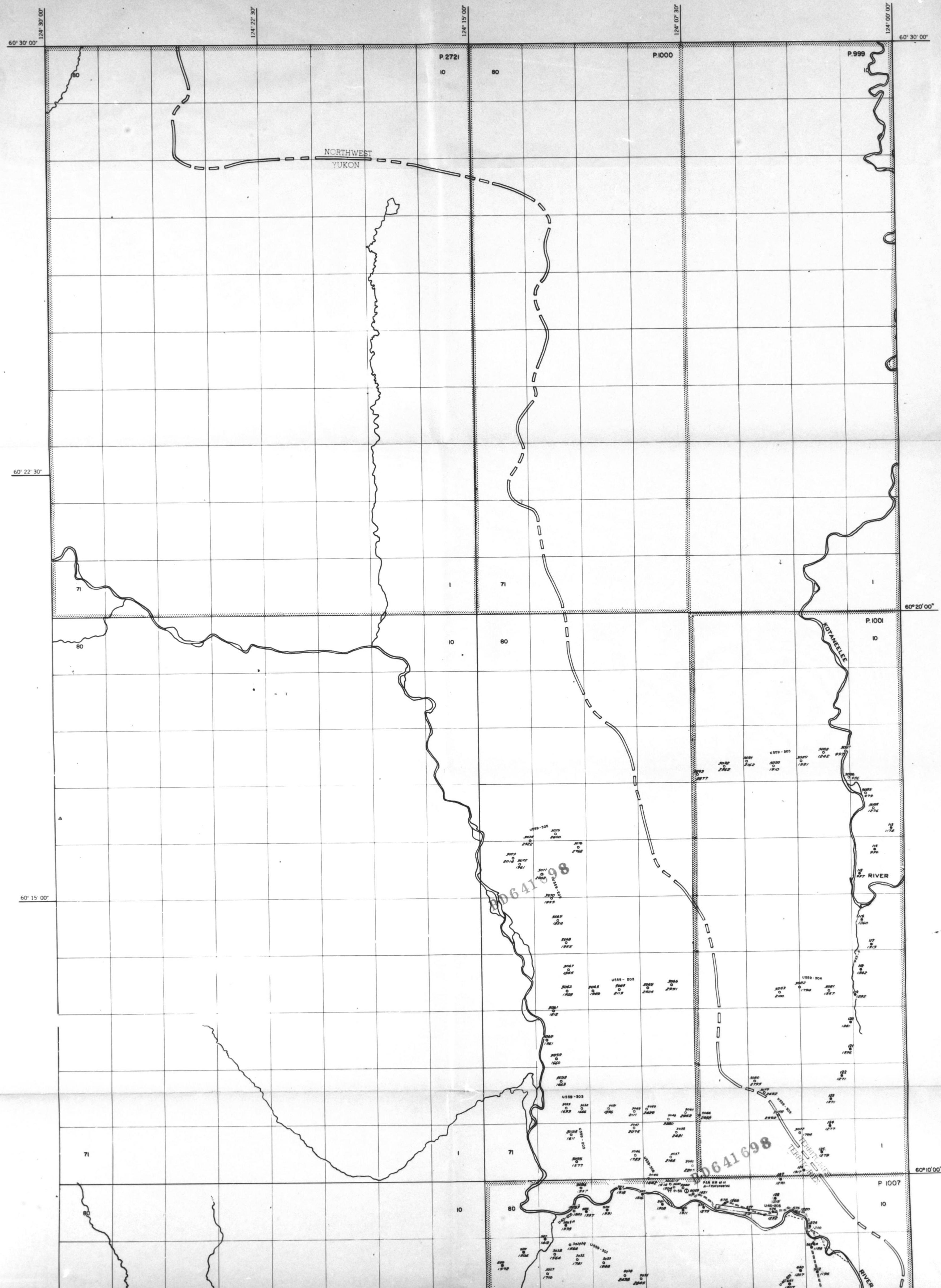




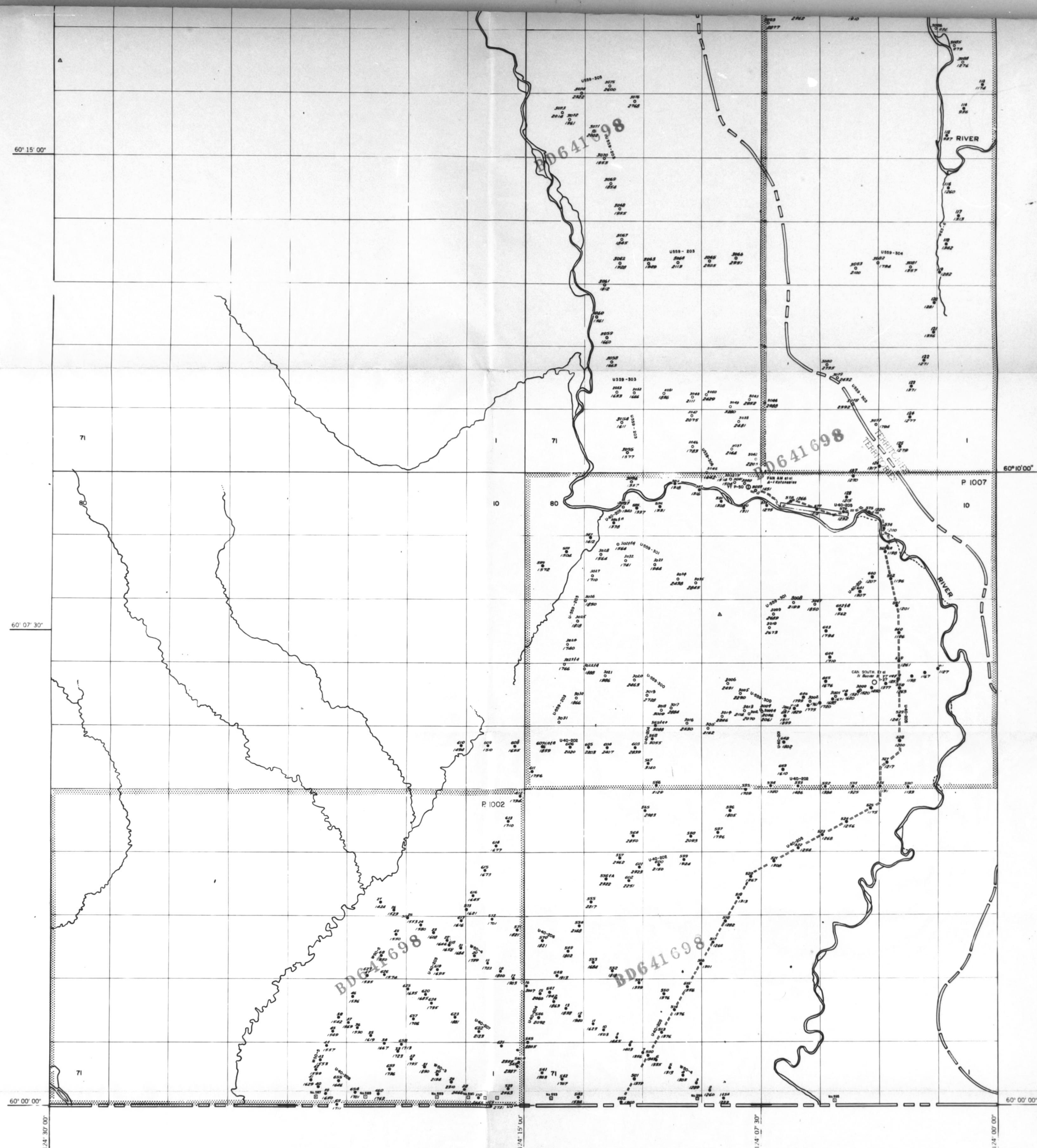


[illegible]



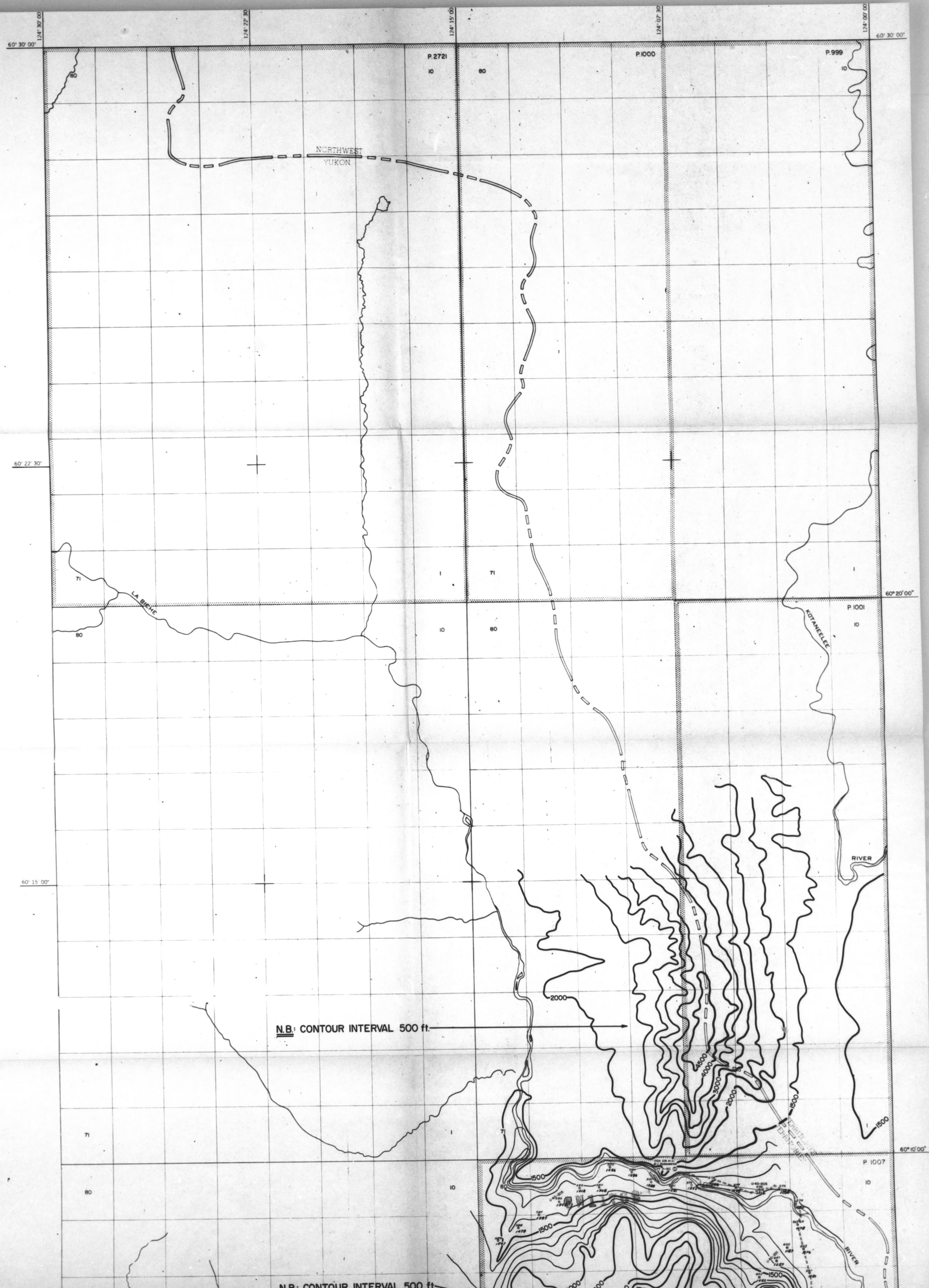




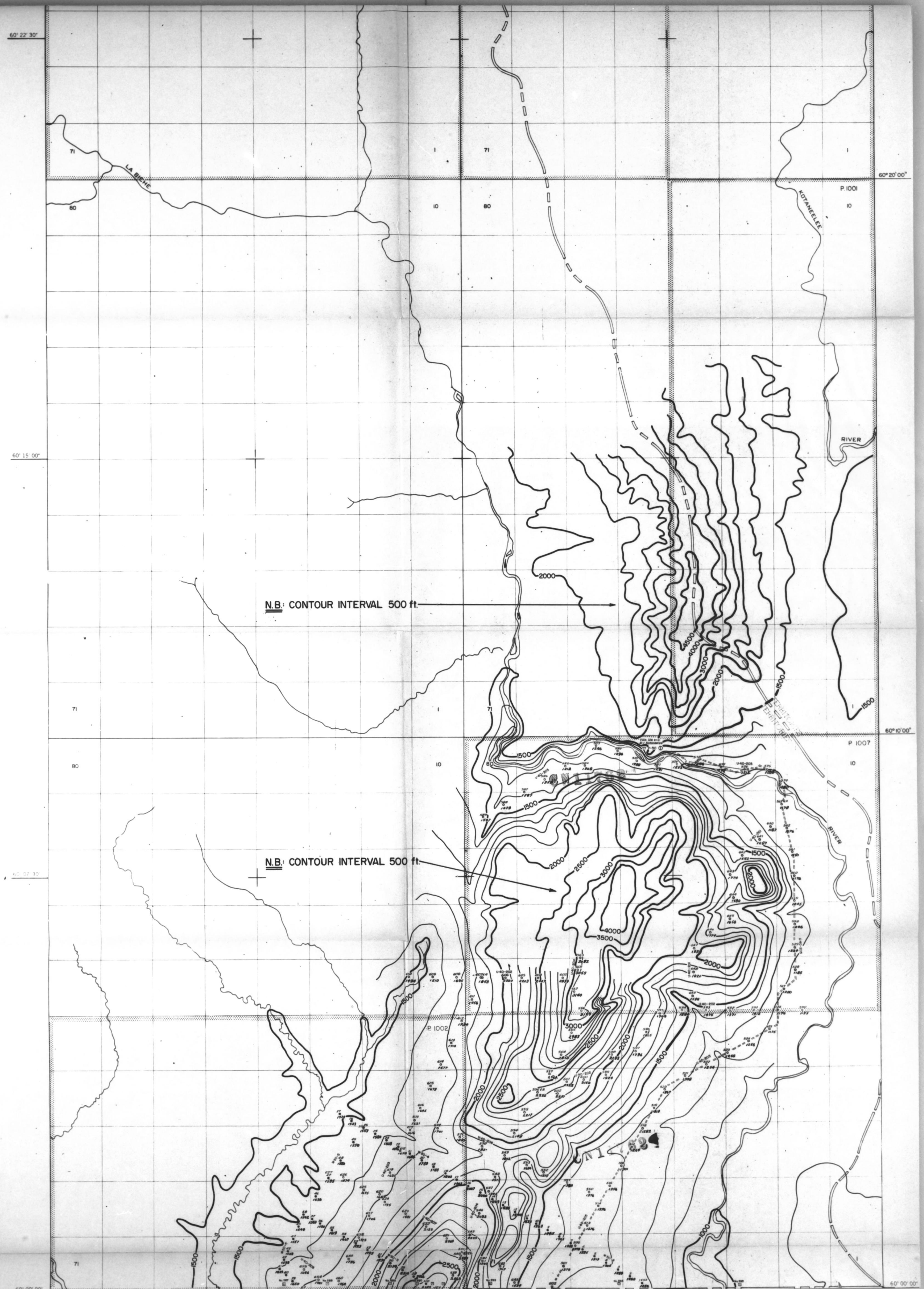


| MAP EVALUATION                                                                                                                                                                                                                                                                                            |         | SHOOTING HISTORY (Not in detail)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      | INTERPRETIVE HISTORY |             | PAN AMERICAN PETROLEUM CORPORATION |                  |                   |         |           |                   |            |         |        |                  |    |             |               |     |            |              |         |        |                  |   |             |             |         |            |               |         |        |          |   |             |               |        |            |  |  |  |  |  |         |             |        |            |  |  |  |  |  |  |             |        |            |                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                                                                                                                                         |  |
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| INCL DATES                                                                                                                                                                                                                                                                                                | SHOT BY | SHOT FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | S.P. AND/OR LINE NO. | FINAL REPORT NO.     | DATE        | INTERP.                            | CO AFFIL.        | APPROX LOC ON MAP |         |           |                   |            |         |        |                  |    |             |               |     |            |              |         |        |                  |   |             |             |         |            |               |         |        |          |   |             |               |        |            |  |  |  |  |  |         |             |        |            |  |  |  |  |  |  |             |        |            |                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                                                                                                                                         |  |
| MARCH 1957                                                                                                                                                                                                                                                                                                | WAG 100 | PAN AM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | LINE 100-101-102     | 46                   | AUG 11 1957 | J. H. JOHNSON                      | WAG              | SOUTH EDGE        |         |           |                   |            |         |        |                  |    |             |               |     |            |              |         |        |                  |   |             |             |         |            |               |         |        |          |   |             |               |        |            |  |  |  |  |  |         |             |        |            |  |  |  |  |  |  |             |        |            |                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                                                                                                                                         |  |
| JAN/FEB 1958                                                                                                                                                                                                                                                                                              | WAG 100 | PAN AM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | LINE 100-101-102     | 1                    | MAY 31 1958 | R. H. WHITE                        | WAG 100          | SOUTH EDGE        |         |           |                   |            |         |        |                  |    |             |               |     |            |              |         |        |                  |   |             |             |         |            |               |         |        |          |   |             |               |        |            |  |  |  |  |  |         |             |        |            |  |  |  |  |  |  |             |        |            |                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                                                                                                                                         |  |
| JULY-SEP 1958                                                                                                                                                                                                                                                                                             | WAG 100 | PAN AM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | LINE 100             | 1                    | MAY 31 1958 | A. H. JOHNSON                      | PAN AM           | SOUTH EDGE        |         |           |                   |            |         |        |                  |    |             |               |     |            |              |         |        |                  |   |             |             |         |            |               |         |        |          |   |             |               |        |            |  |  |  |  |  |         |             |        |            |  |  |  |  |  |  |             |        |            |                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                                                                                                                                         |  |
|                                                                                                                                                                                                                                                                                                           |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                      | 6-12-57     | W. F. WHITE                        | PAN AM           | SOUTH EDGE        |         |           |                   |            |         |        |                  |    |             |               |     |            |              |         |        |                  |   |             |             |         |            |               |         |        |          |   |             |               |        |            |  |  |  |  |  |         |             |        |            |  |  |  |  |  |  |             |        |            |                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                                                                                                                                         |  |
|                                                                                                                                                                                                                                                                                                           |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                      |             | R. H. WHITE                        | PAN AM           | SOUTH EDGE        |         |           |                   |            |         |        |                  |    |             |               |     |            |              |         |        |                  |   |             |             |         |            |               |         |        |          |   |             |               |        |            |  |  |  |  |  |         |             |        |            |  |  |  |  |  |  |             |        |            |                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                                                                                                                                                                                         |  |

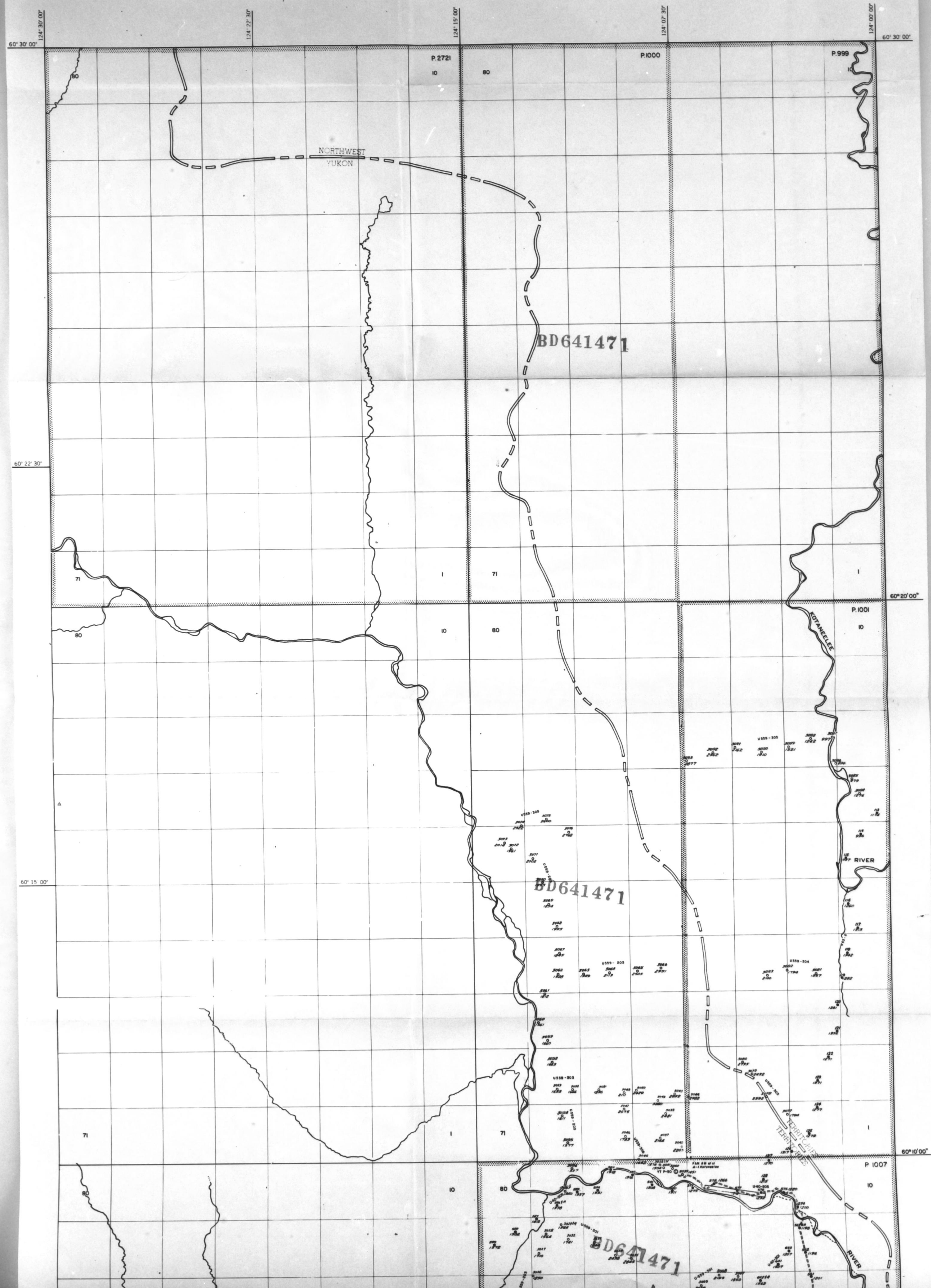




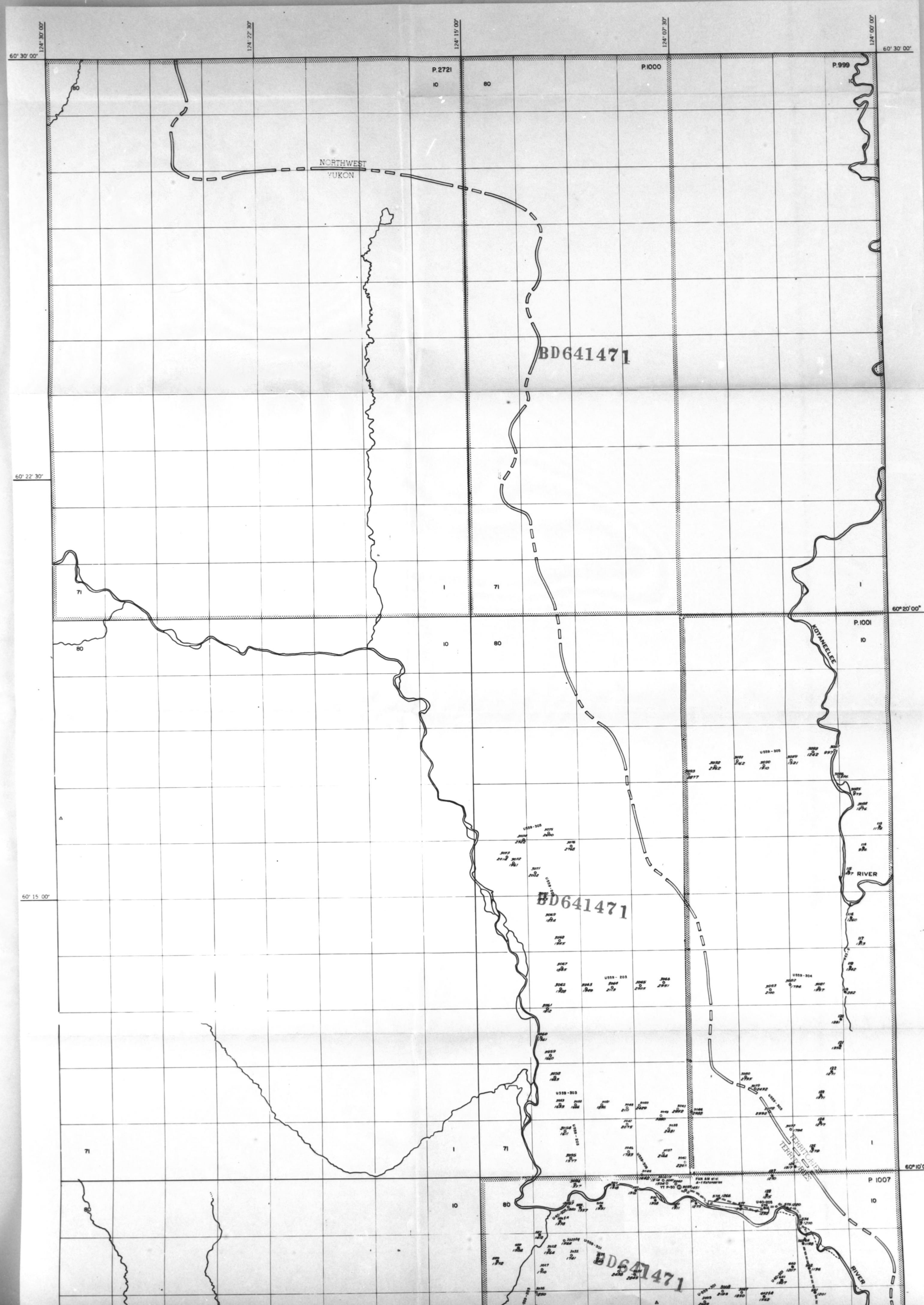




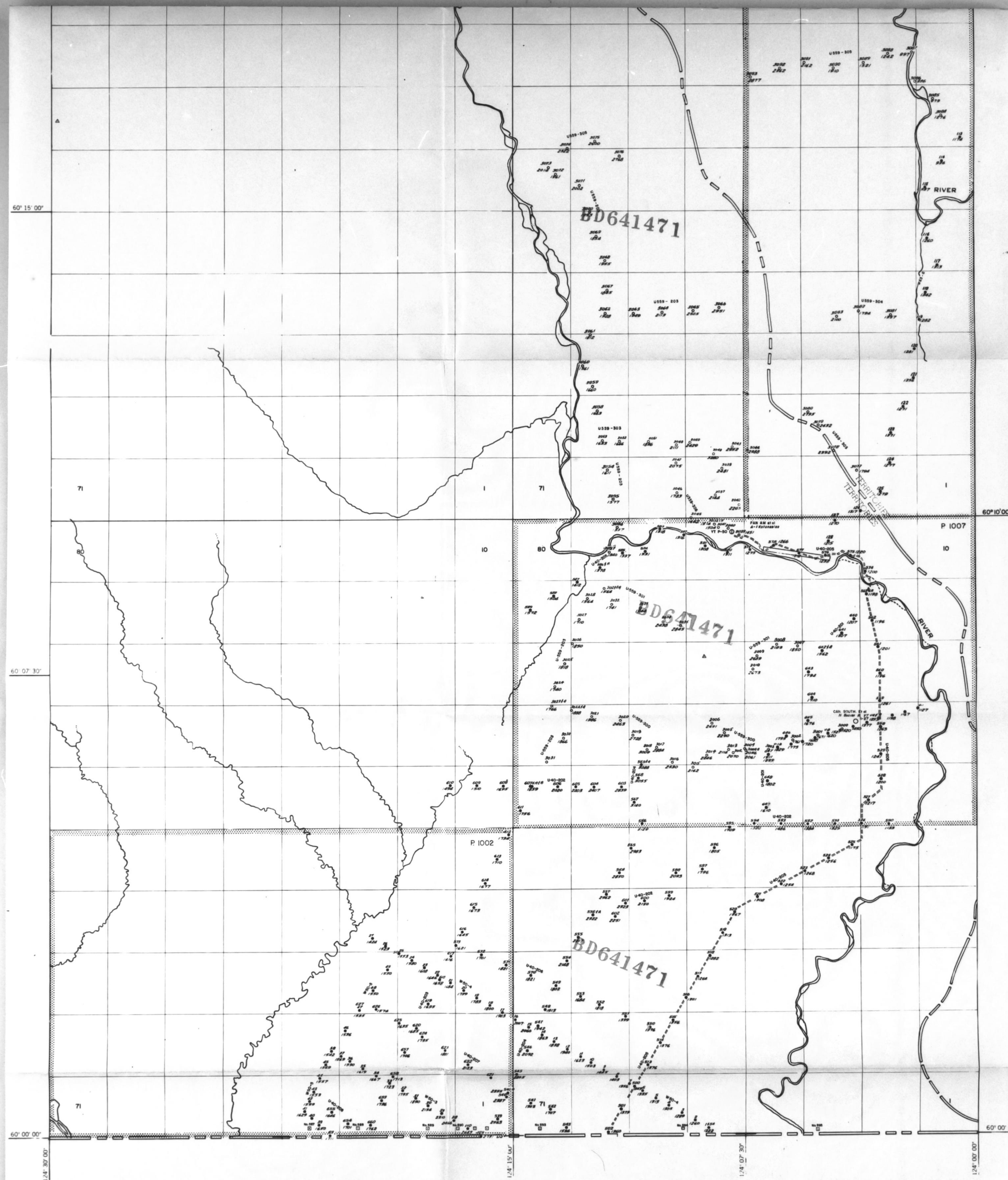






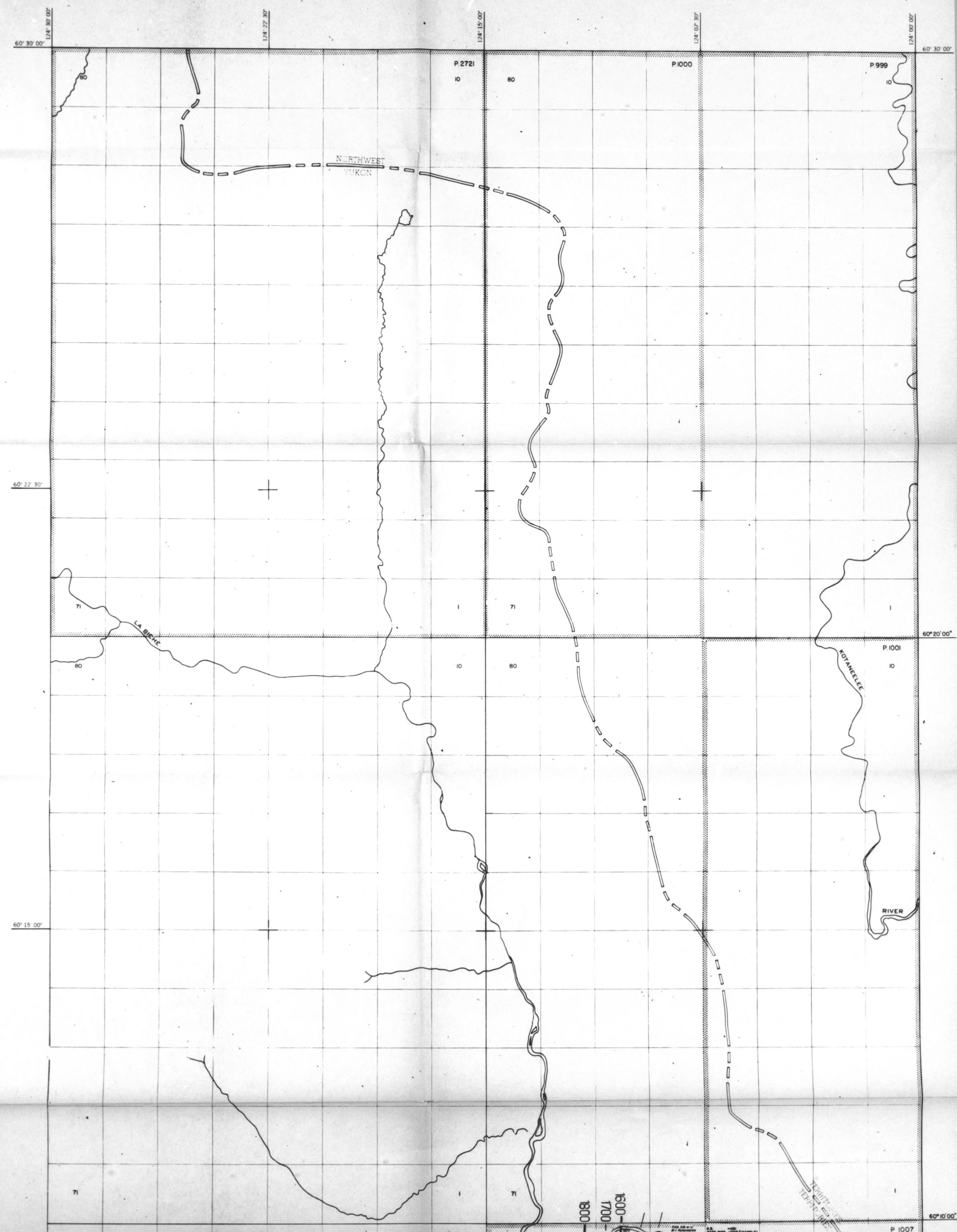






| MAP EVALUATION                                                                                                                                                                                                                                                                                                  |  |  |  | SHOOTING HISTORY (Not in detail)                                                                                                                                                                             |  |  |  | INTERPRETIVE HISTORY                                                                                                                                                                                                       |  |  |  | PAN AMERICAN PETROLEUM CORPORATION                                                                                                                                                                                                                          |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Qualification considers type of map or play, amount of relief considered critical, quality of data and density of control, (geophysical or geological).<br>————— Geological data<br>————— Reliability Geophysical Data<br>————— Qualitatively Reliability Geophysical data<br>————— Unreliable Geophysical Data |  |  |  | INCL. DATES: SHOT BY: SHOT FOR: SP AND/OR LINE NO.:<br>1980-1982 WSC WSC PAN AN LINE 1-100-100-100-100<br>1981-1982 WSC WSC PAN AN LINE 1-100-100-100-100<br>1982-1982 WSC WSC PAN AN LINE 1-100-100-100-100 |  |  |  | DATE: INTERP: CO AFFIL: APPROX LOC ON MAP:<br>1980-1982 4th. JOHNSON WSC SOUTH EDGE<br>1981-1982 4th. JOHNSON WSC SOUTH EDGE<br>1982-1982 4th. JOHNSON WSC SOUTH EDGE                                                      |  |  |  | AREA: Kananaskis DISTRICT: EDMONTON DISTRICT<br>PROVINCE: Yukon and NWT GRID: CM-17/85<br>HORIZON: SURFACE SCALE: 1" = 4000'<br>TYPE OF MAP: CONTOUR INT. FOR:<br>SHOT BY: DATE:<br>INCL. DATES: CO AFFIL: INTERP BY: DATE:<br>REPORT NO: DATE:<br>REMARKS: |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                                              |  |  |  | This map is the property of Pan American Petroleum Corporation and is loaned to you for your use only. It is not to be reproduced or used in any way without the written permission of Pan American Petroleum Corporation. |  |  |  | REMARKS:<br>BD641471<br>GEOLOGICAL INT. DATE:<br>FROM GEOPH. REPORT NO. (S) DATED:                                                                                                                                                                          |  |  |  |

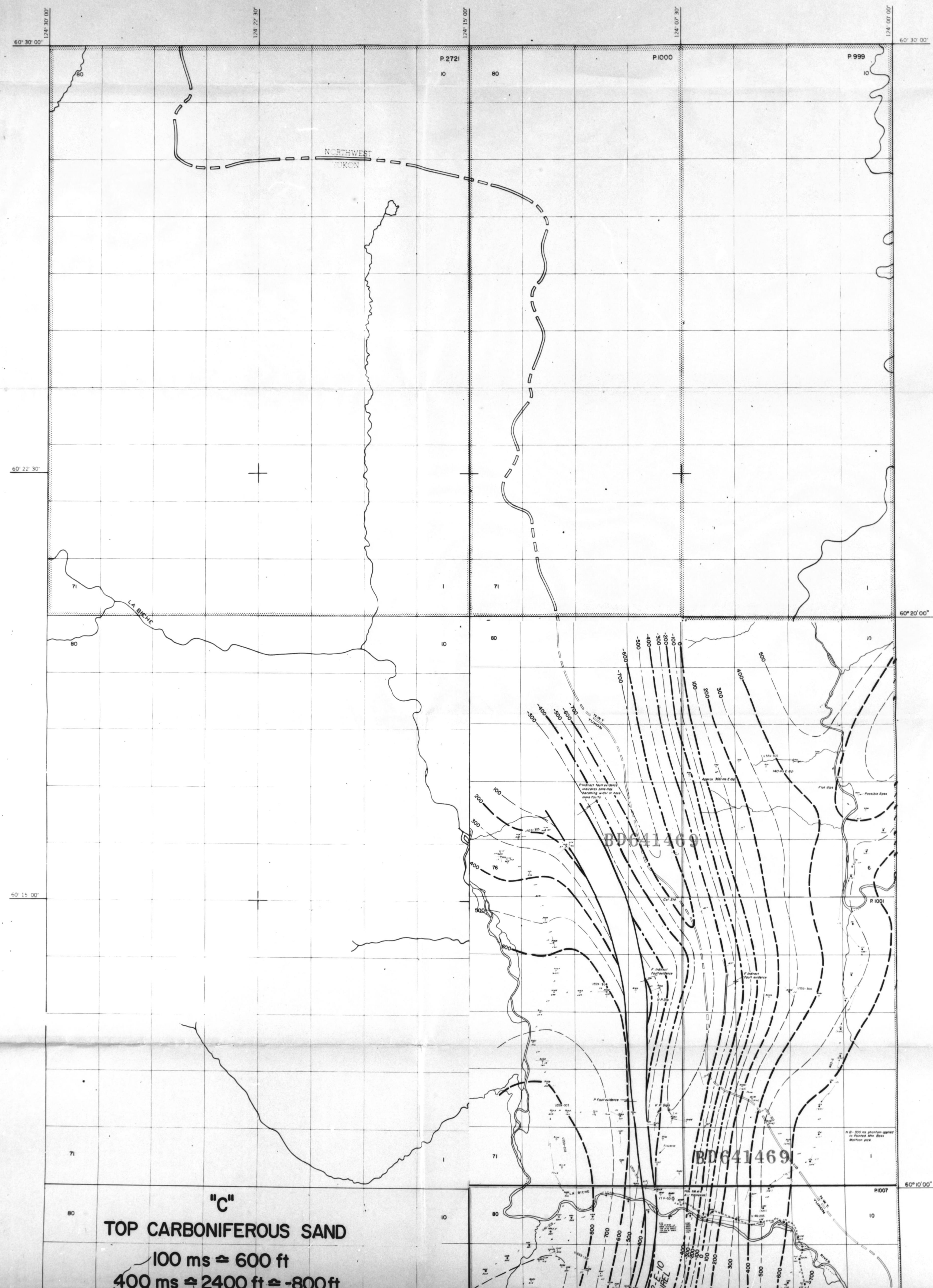








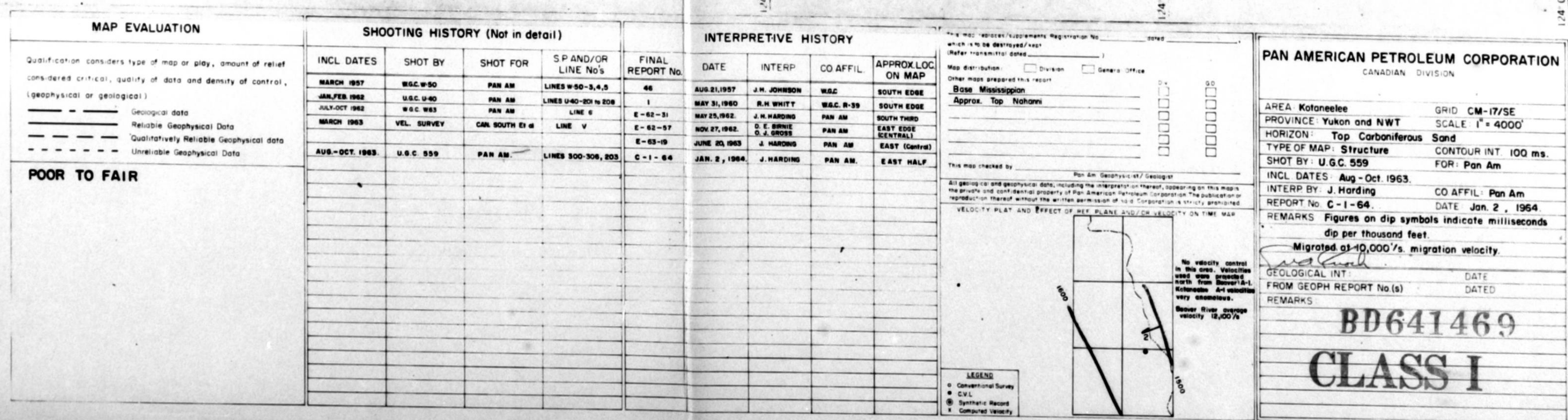




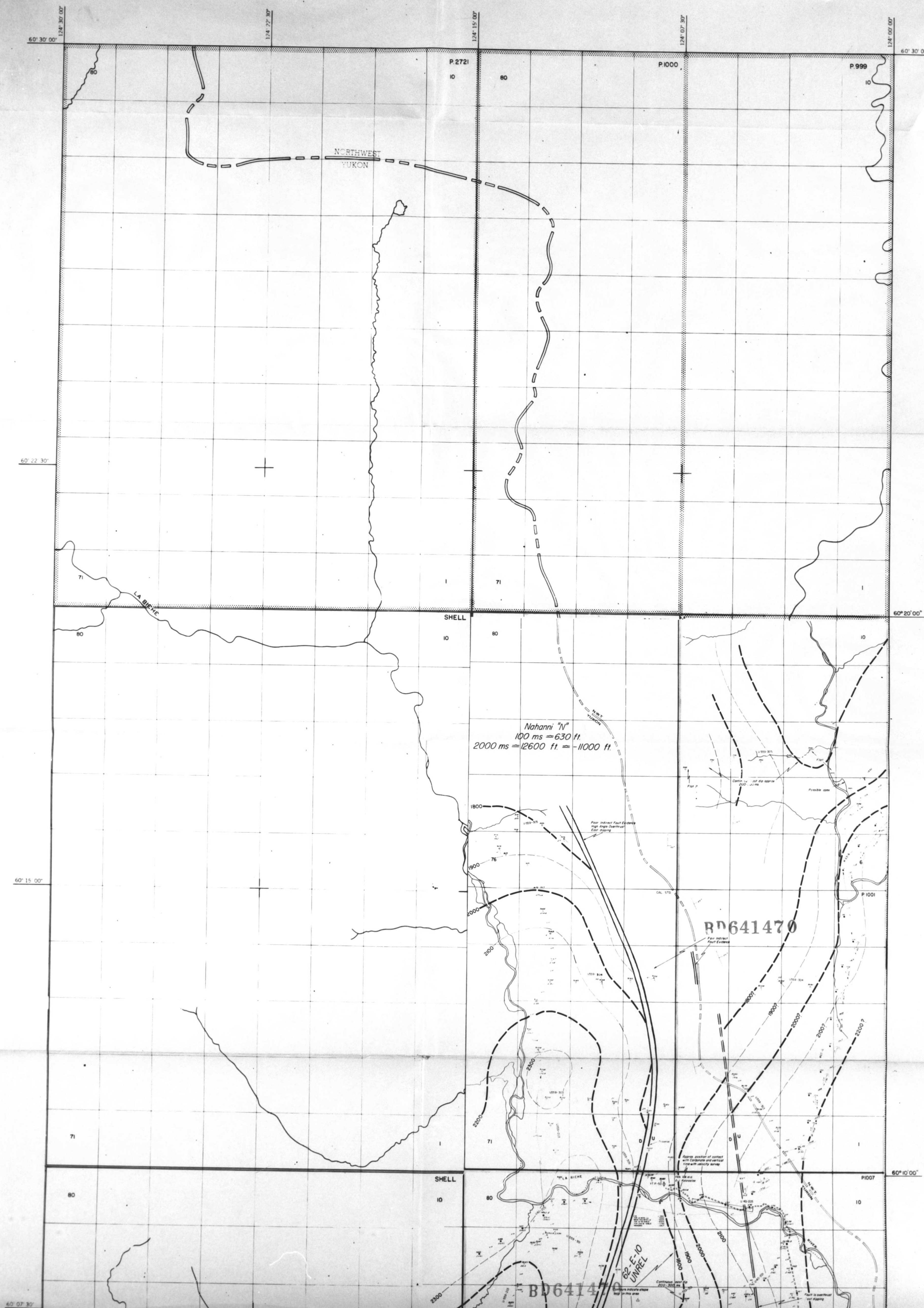
"C"  
TOP CARBONIFEROUS SAND

100 ms  $\approx$  600 ft  
400 ms  $\approx$  2400 ft  $\approx$  -800 ft

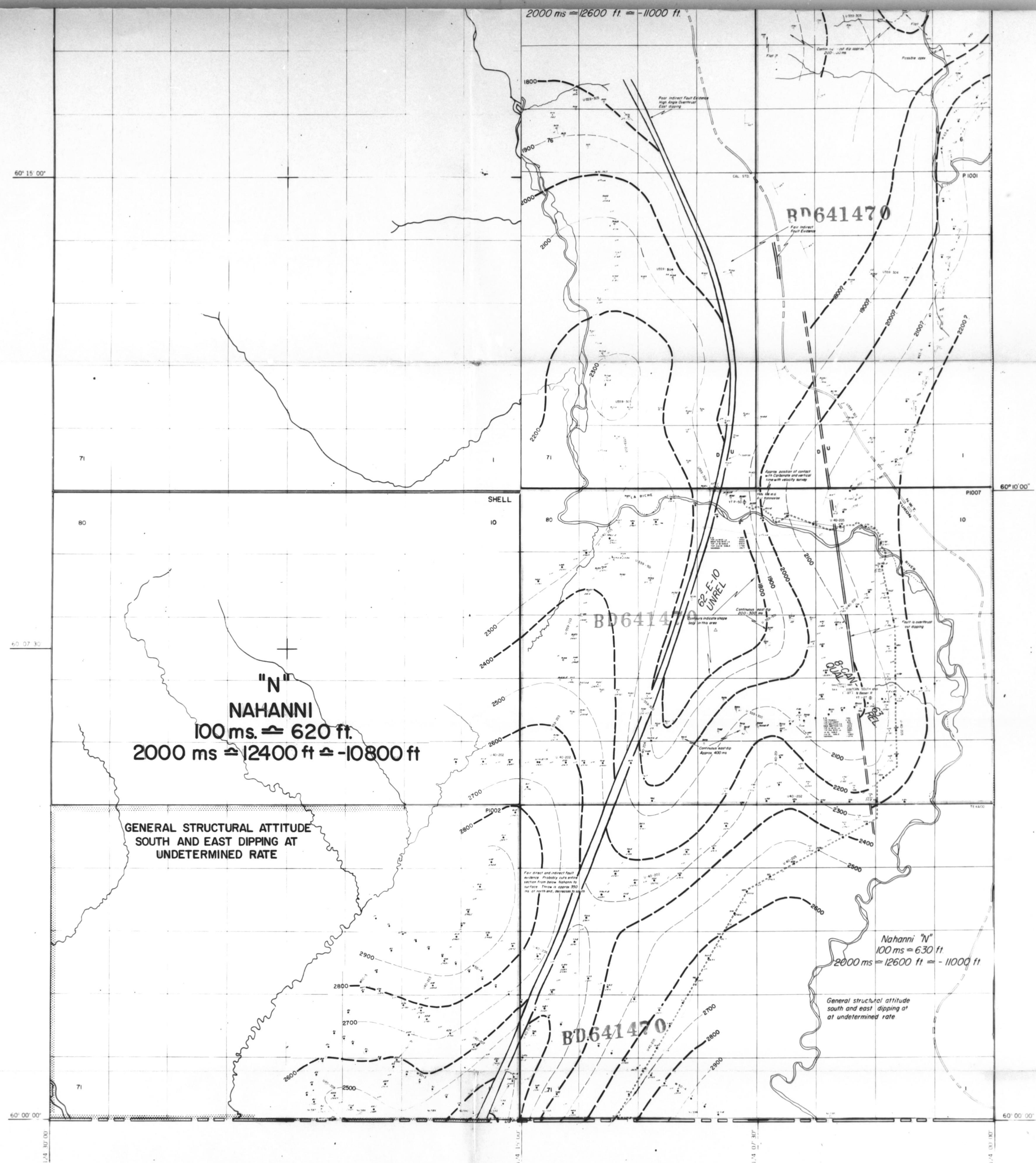












#### MAP EVALUATION

Qualification considers type of map or play, amount of relief considered critical, quality of data and density of control, (geophysical or geological).

Geological Data  
 - - - - - Reliability Geophysical Data  
 - - - - - Quasi-Reliability Geophysical Data  
 - - - - - Unreliable Geophysical Data

VERY POOR TO POOR

#### SHOOTING HISTORY (Not in detail)

| INCL DATES    | SHOT BY     | SHOT FOR      | S AND/OR LINE NO.    | FINAL REPORT NO. |
|---------------|-------------|---------------|----------------------|------------------|
| MARCH 1957    | W.G. W30    | PAN AM        | LINES W-30-S-2,3     | 46               |
| JAN 7/58      | W.G. W30    | PAN AM        | LINES W-30-S-1,2,3,4 | 1                |
| JULY-OCT 1963 | W.G. W30    | PAN AM        | LINE 6               | E-62-51          |
| MARCH 1963    | VEL. SURVEY | CAN SOUTH E-W | LINE 6               | E-62-51          |
| AUG-OCT 1963  | U.S.G. 559  | PAN AM        | LINES 500-508, 505   | E-11-54          |

#### INTERPRETIVE HISTORY

| DATE         | INTERP       | CO AFFIL  | APPROX LOC ON MAP   |
|--------------|--------------|-----------|---------------------|
| AUG 21, 1957 | J.M. JOHNSON | W.G.      | SOUTH EDGE          |
| MAY 31, 1960 | R.H. WHITT   | W.G. W-30 | SOUTH EDGE          |
| MAY 31, 1960 | J. JOHNSON   | PAN AM    | SOUTH EDGE          |
| NOV 21, 1962 | E. E. BURKE  | PAN AM    | EAST EDGE (CENTRAL) |
| JUN 10, 1963 | J. JOHNSON   | PAN AM    | EAST HALF           |
| JAN 2, 1964  | J. JOHNSON   | PAN AM    | EAST HALF           |

This map was prepared by the Canadian Geophysical Service, Department of Mineral and Technical Surveys, Ottawa, Ontario, Canada.

Geophysical Data  
 - - - - - Reliability Geophysical Data  
 - - - - - Quasi-Reliability Geophysical Data  
 - - - - - Unreliable Geophysical Data

Geological Data  
 - - - - - Reliability Geological Data  
 - - - - - Quasi-Reliability Geological Data  
 - - - - - Unreliable Geological Data

PAN AMERICAN PETROLEUM CORPORATION  
 CANADIAN DIVISION

AREA: Nahanni  
 PROVINCE: Yukon and N.W.T.  
 HORIZON: Approx. Top Nahanni  
 TYPE OF MAP: Structure  
 SHOT BY: U.G.C. 559  
 INCL DATES: Aug-Oct 1963  
 INTERP BY: J. JOHNSON  
 REPORT NO: C-11-54  
 DATE: Jan 2, 1964  
 REMARKS: Figures on dip symbols indicate milliseconds dip per thousand feet.  
 Migrated at 10000 ft migration velocity.

Geological Data  
 - - - - - Reliability Geological Data  
 - - - - - Quasi-Reliability Geological Data  
 - - - - - Unreliable Geological Data

BD641470  
 CLASS I

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