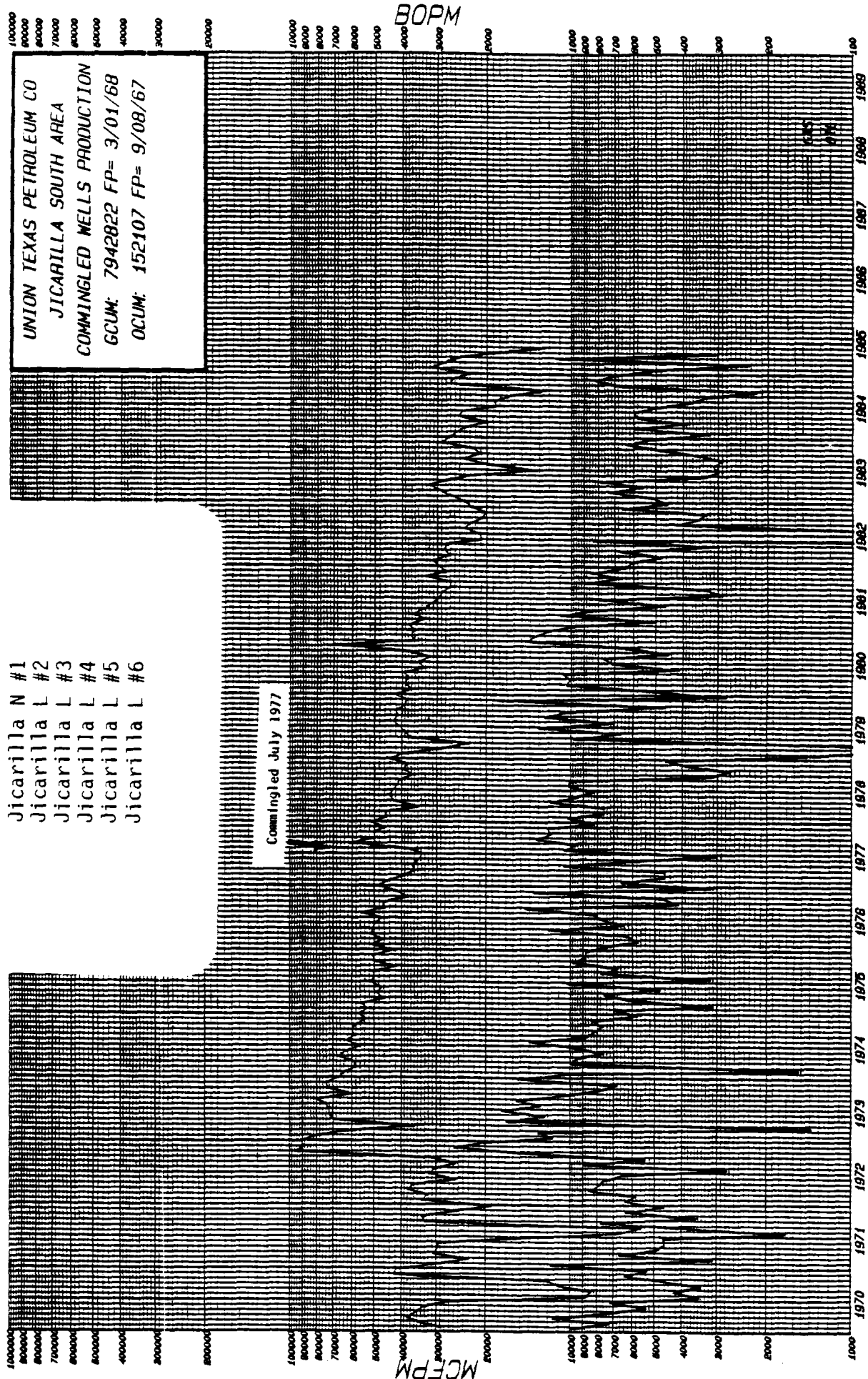


Total Production For Six
Gallup Dakota Wells Commingled
In July 1977

- Jicarilla N #1
- Jicarilla L #2
- Jicarilla L #3
- Jicarilla L #4
- Jicarilla L #5
- Jicarilla L #6



PRODUCTION YEAR

Examiner _____

Case No. 8744

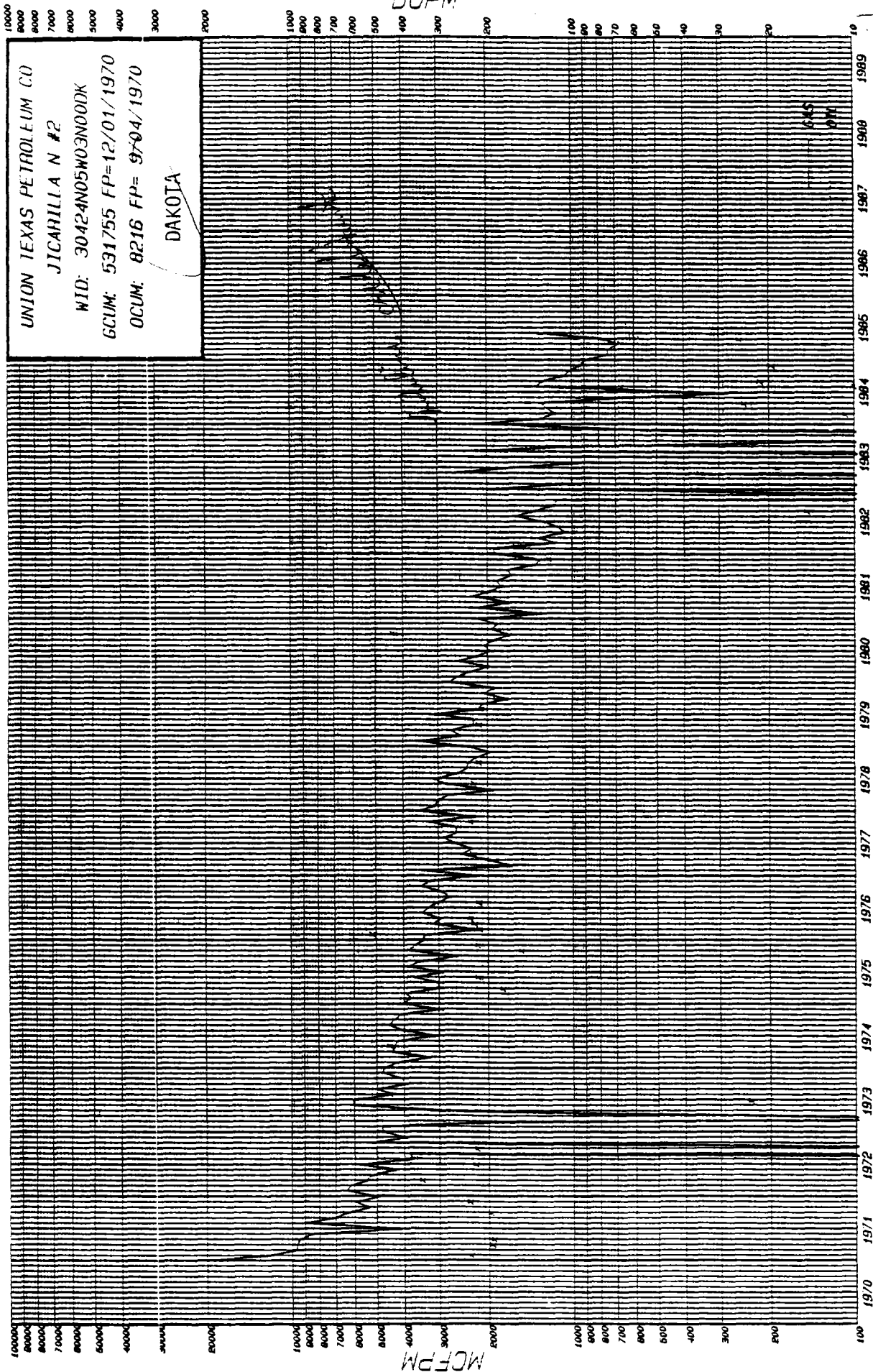
EXHIBIT NO. 6

BEFORE EXAMINER STOGNER

Oil Conservation Division

51P Exhibit No. 6

Case No. 2744



UNION TEXAS PETROLEUM CO
 JICARILLA N #2
 WID: 30424N05W03N00DK
 GCUM: 531755 FP=12/01/1970
 OCUM: 8216 FP= 97-04/1970
 DAKOTA

Examiner _____
 Case No. 8744
 EXHIBIT NO. 7A

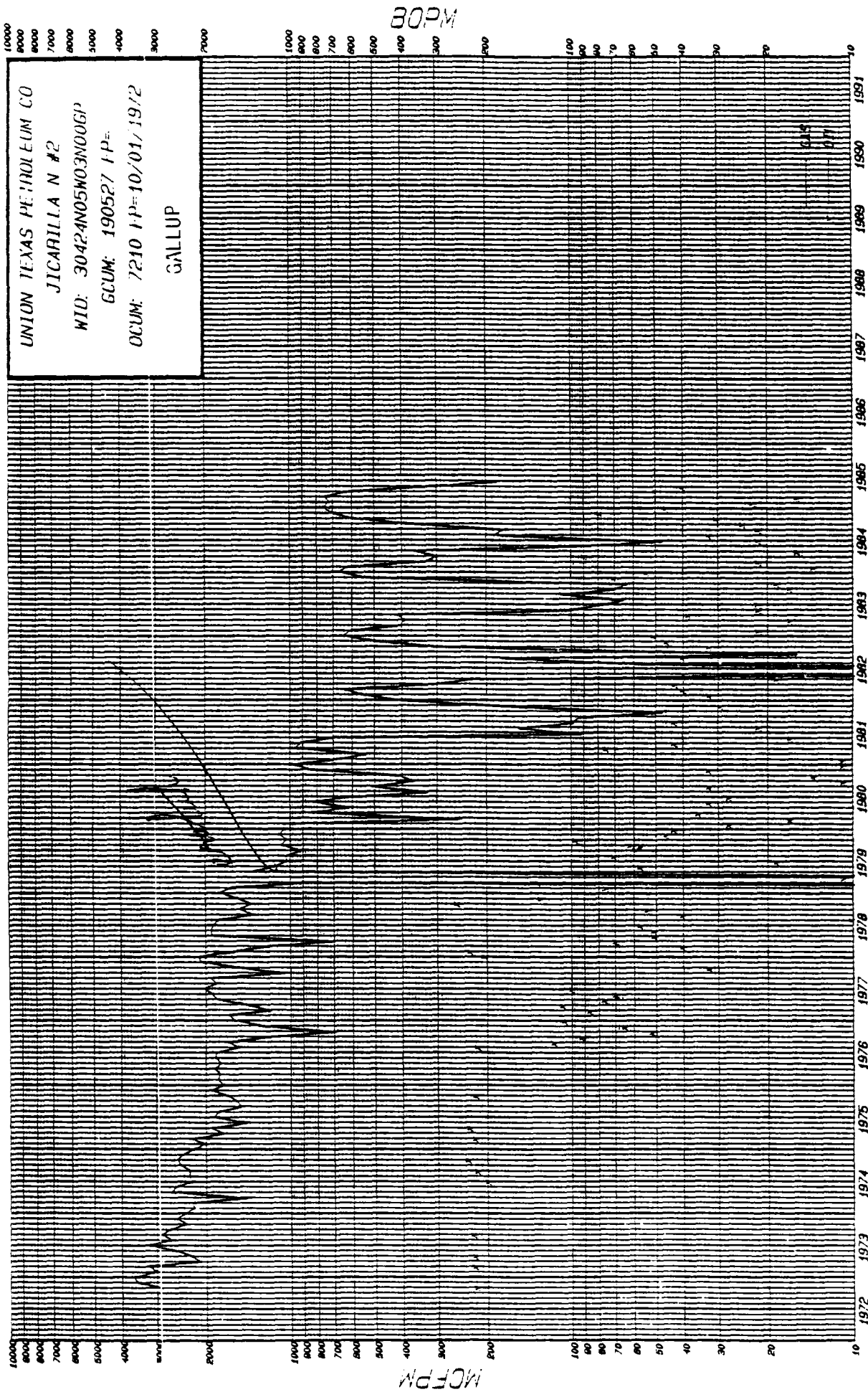
PRODUCTION YEAR

BEFORE EXAMINER STOGNER

OIL COMPANY'S EDITION

~~178~~ Edition No. 7A

Case No. 8744



UNION TEXAS PETROLEUM CO
JICARILLA N #2
WID: 30424N05W03N00G/P
GCUM: 190527 I.P.
OCUM: 7210 I.P. 10/01/1972
GALLUP

PRODUCTION YEAR

Examiner

Case No.

EXHIBIT NO.

5744

7B

BEFORE JAMES STONER

Oil Conservation Division

118 Exhibit 118

Case No. 8744

MCFPM

Commenced July 1977

UNION TEXAS PETROLEUM CO
JICARILLA L #6
COMMINGLED PRODUCTION
GCUM: 825018 FP= 10/01/72
OCUM: 14403 FP= 10/01/72

BOPM

PRODUCTION YEAR

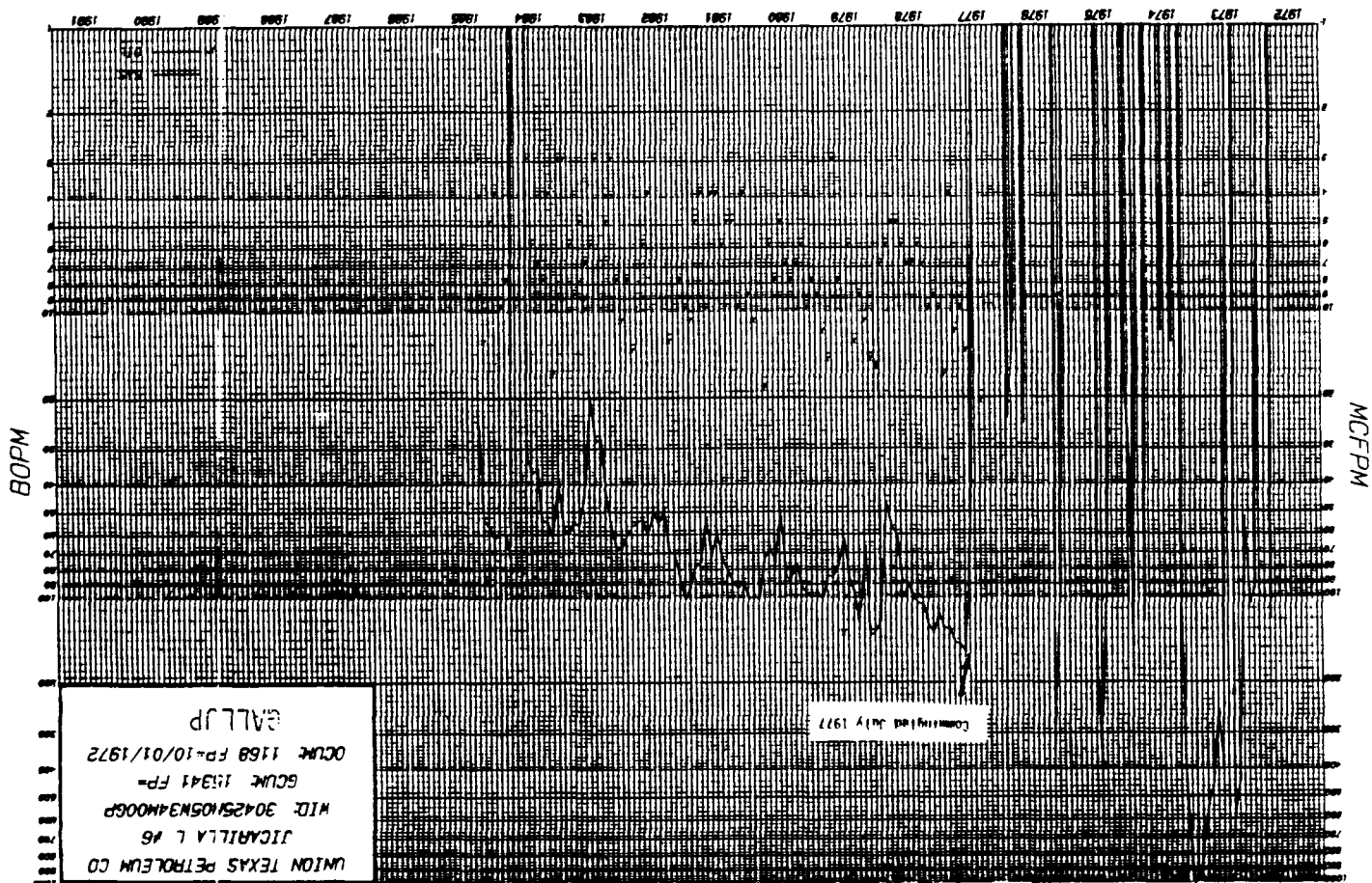
REPORT EVANNEE STOGNER

OF CORPORATION Division

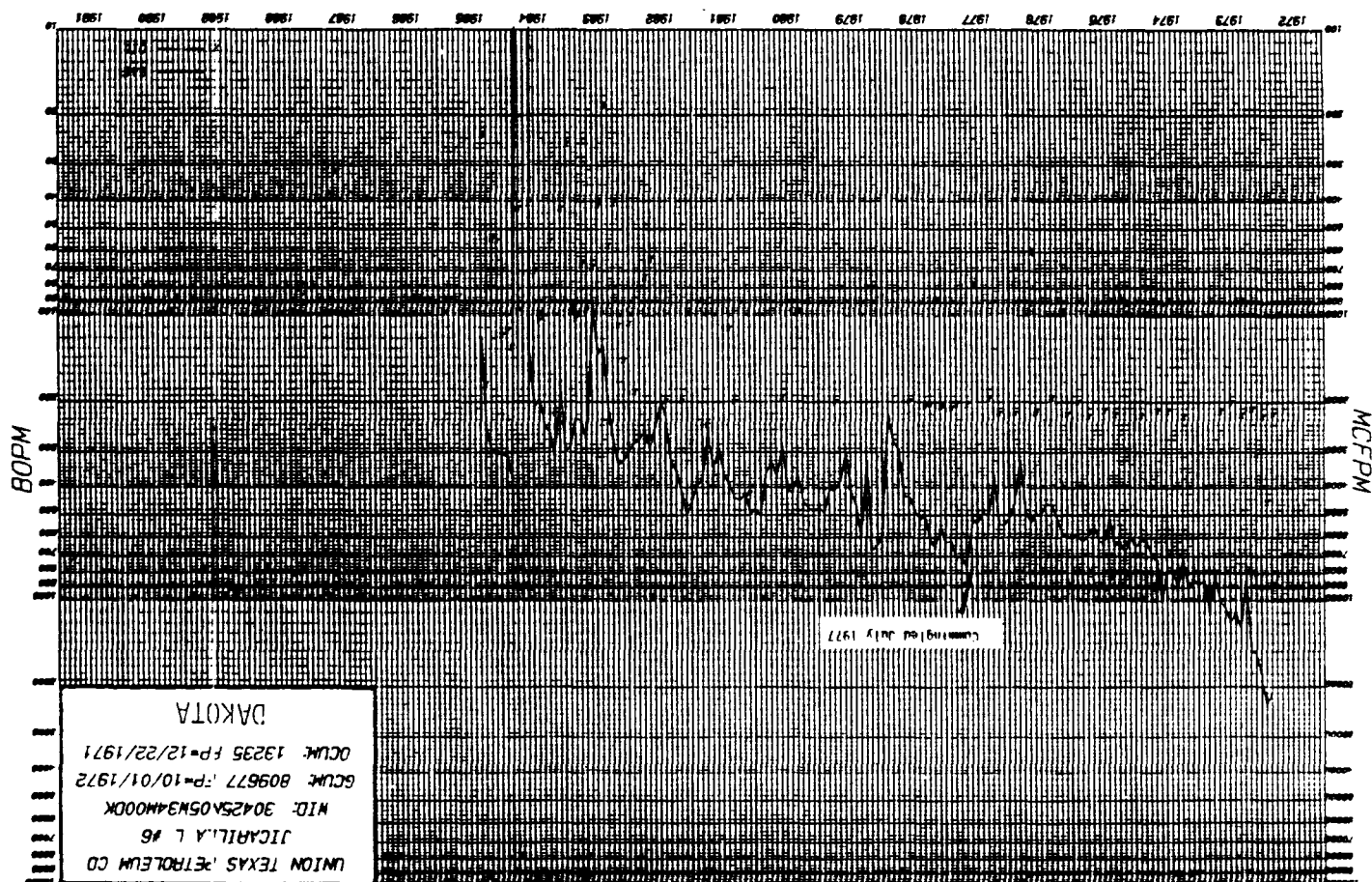
VP Exhibit No. 8

Case No. 8744

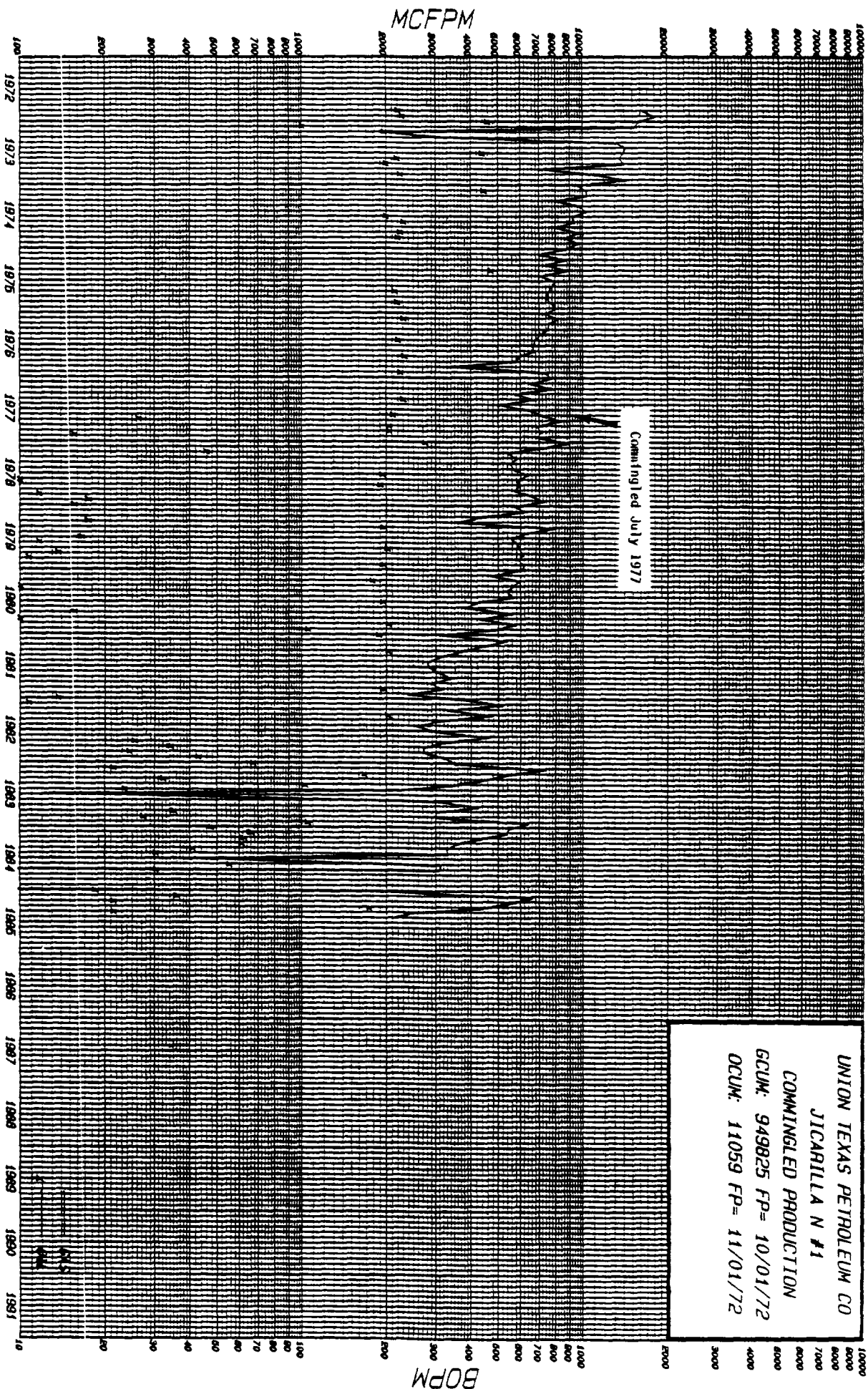
PRODUCTION YEAR

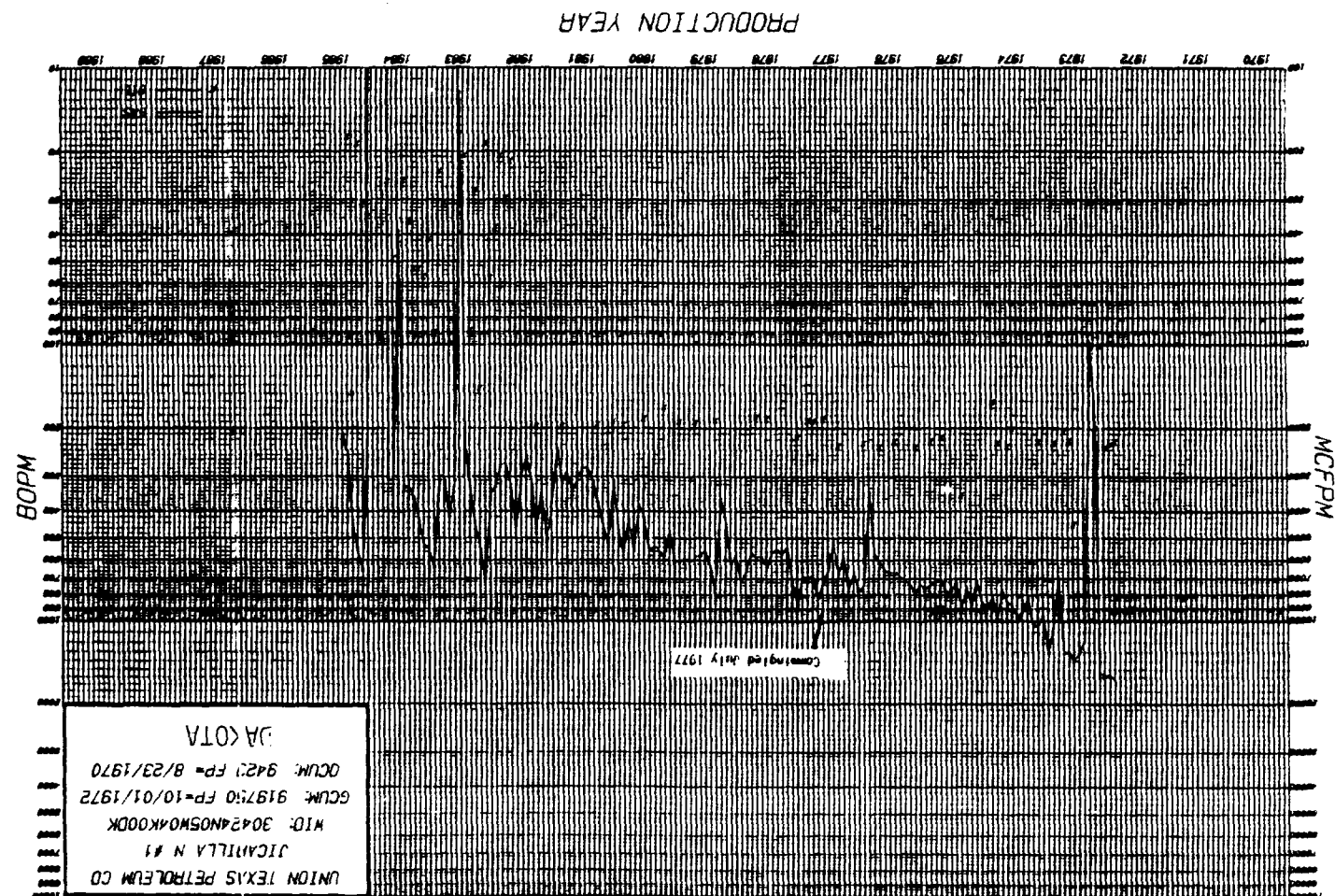
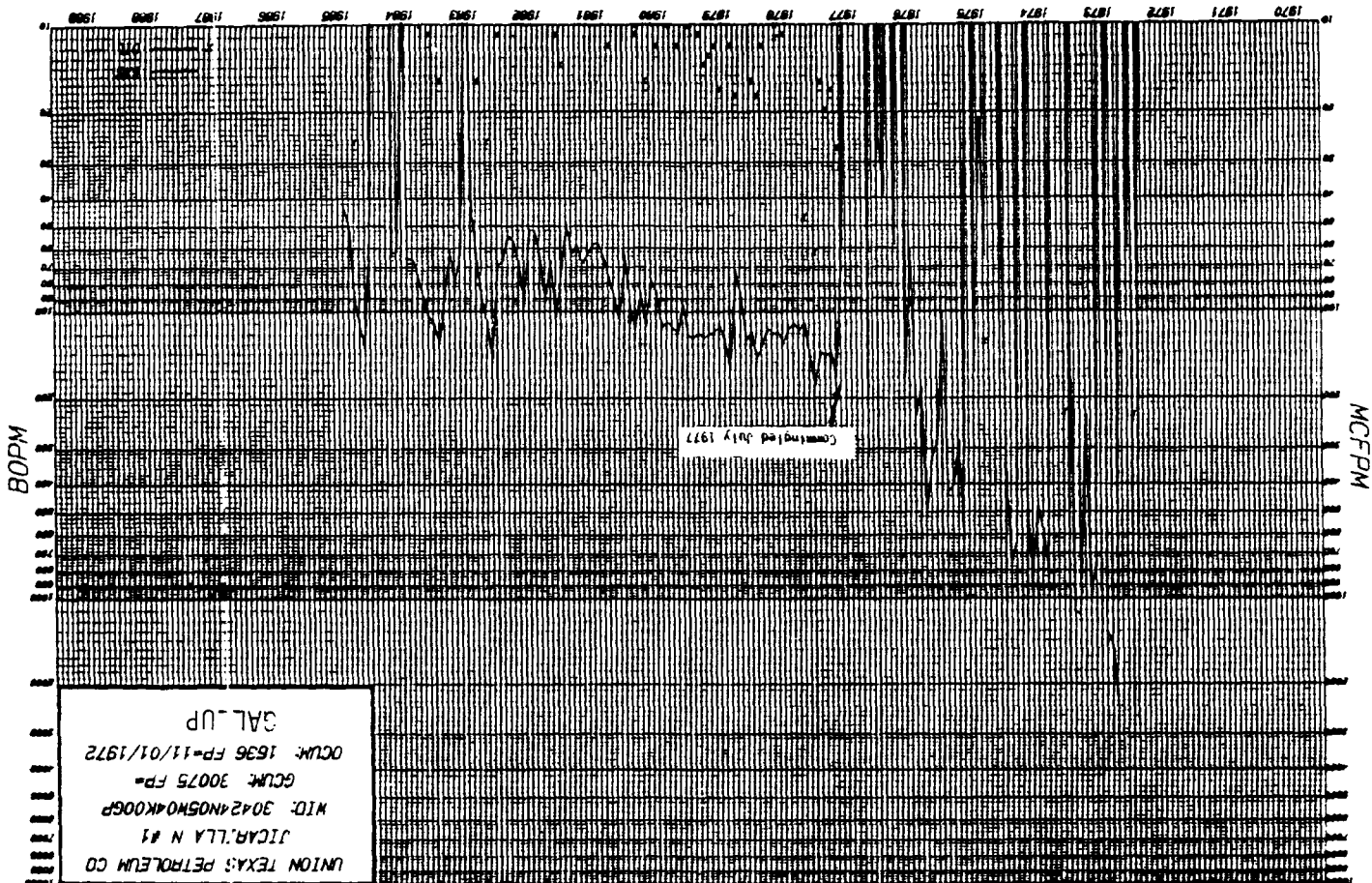


PRODUCTION YEAR

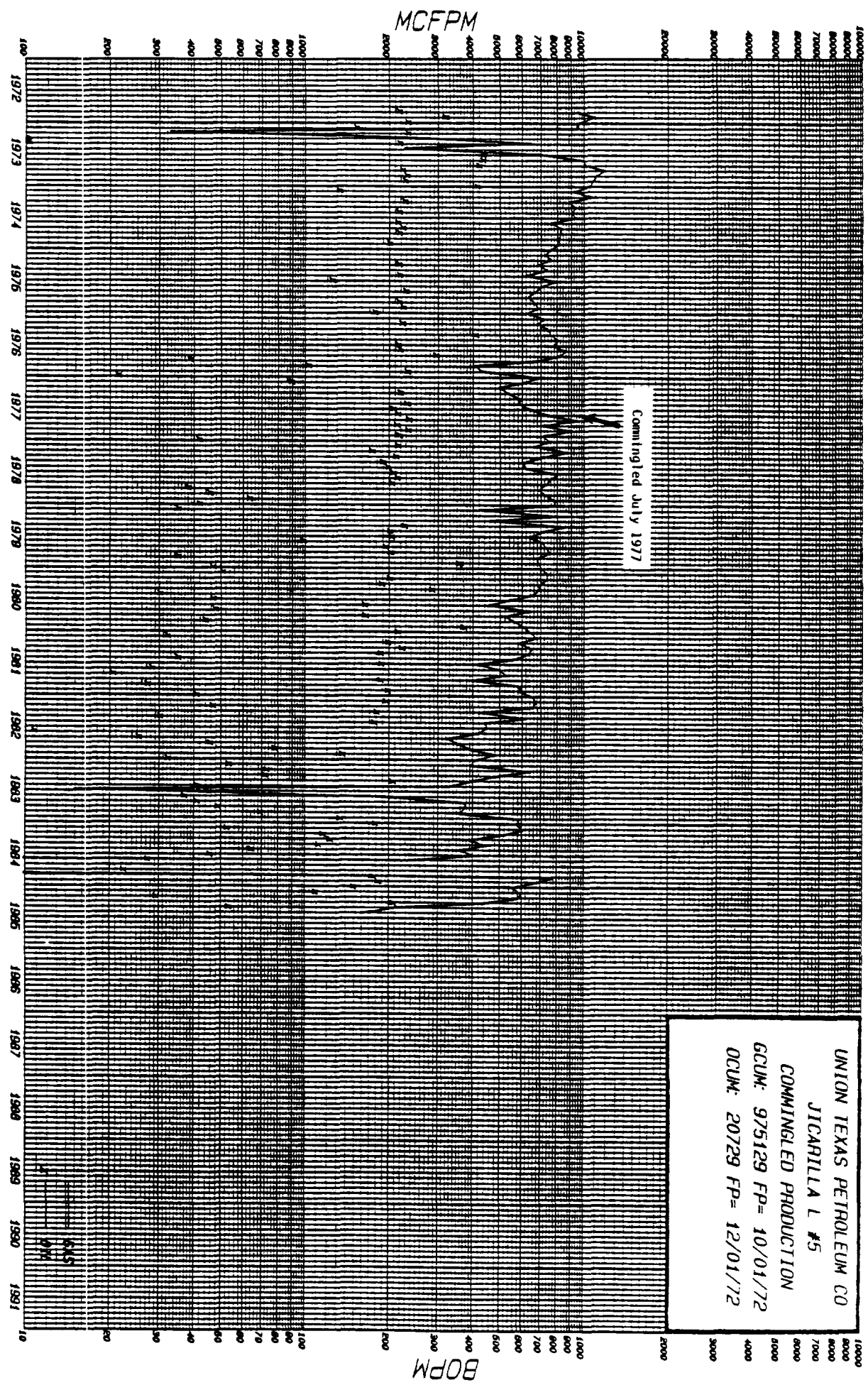


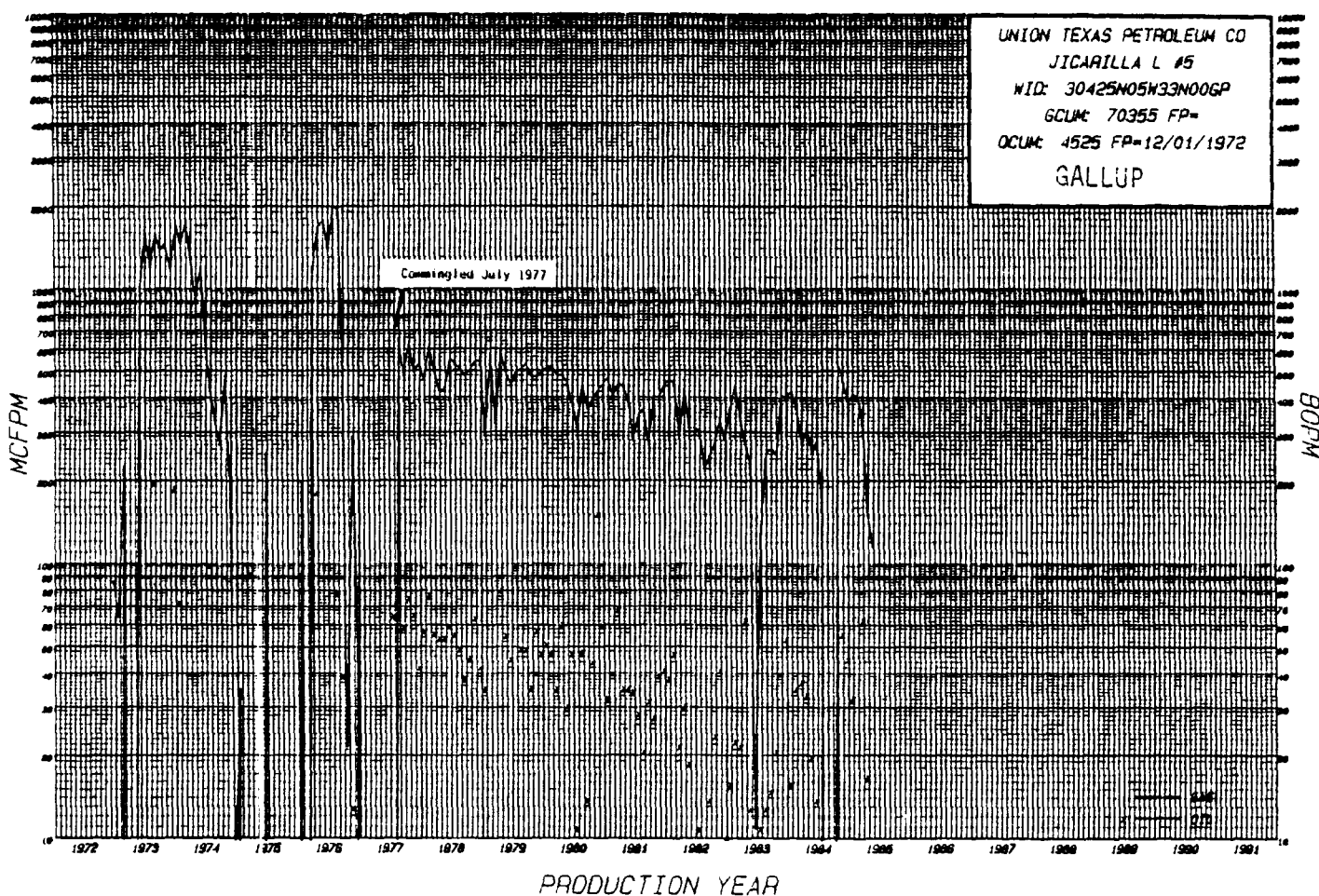
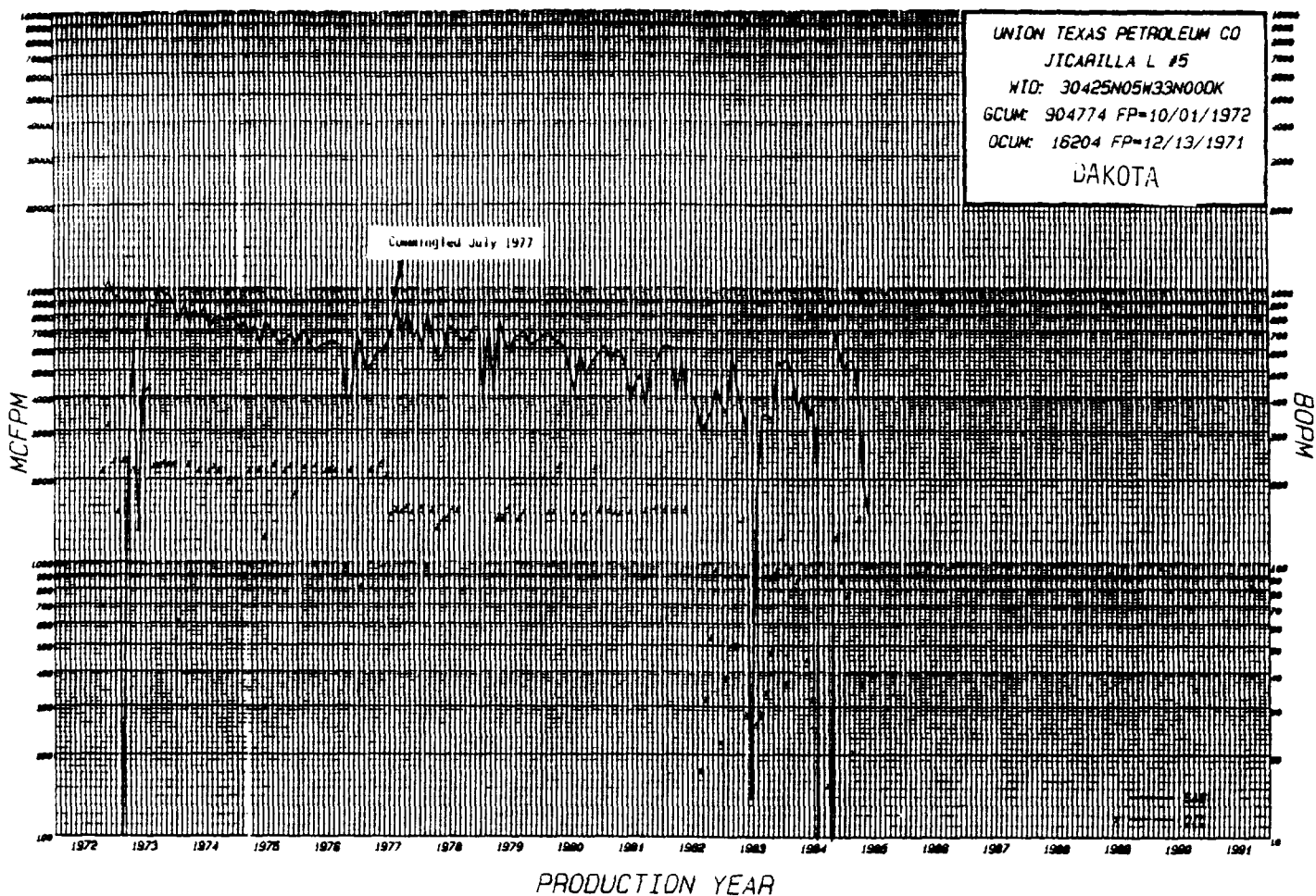
PRODUCTION YEAR



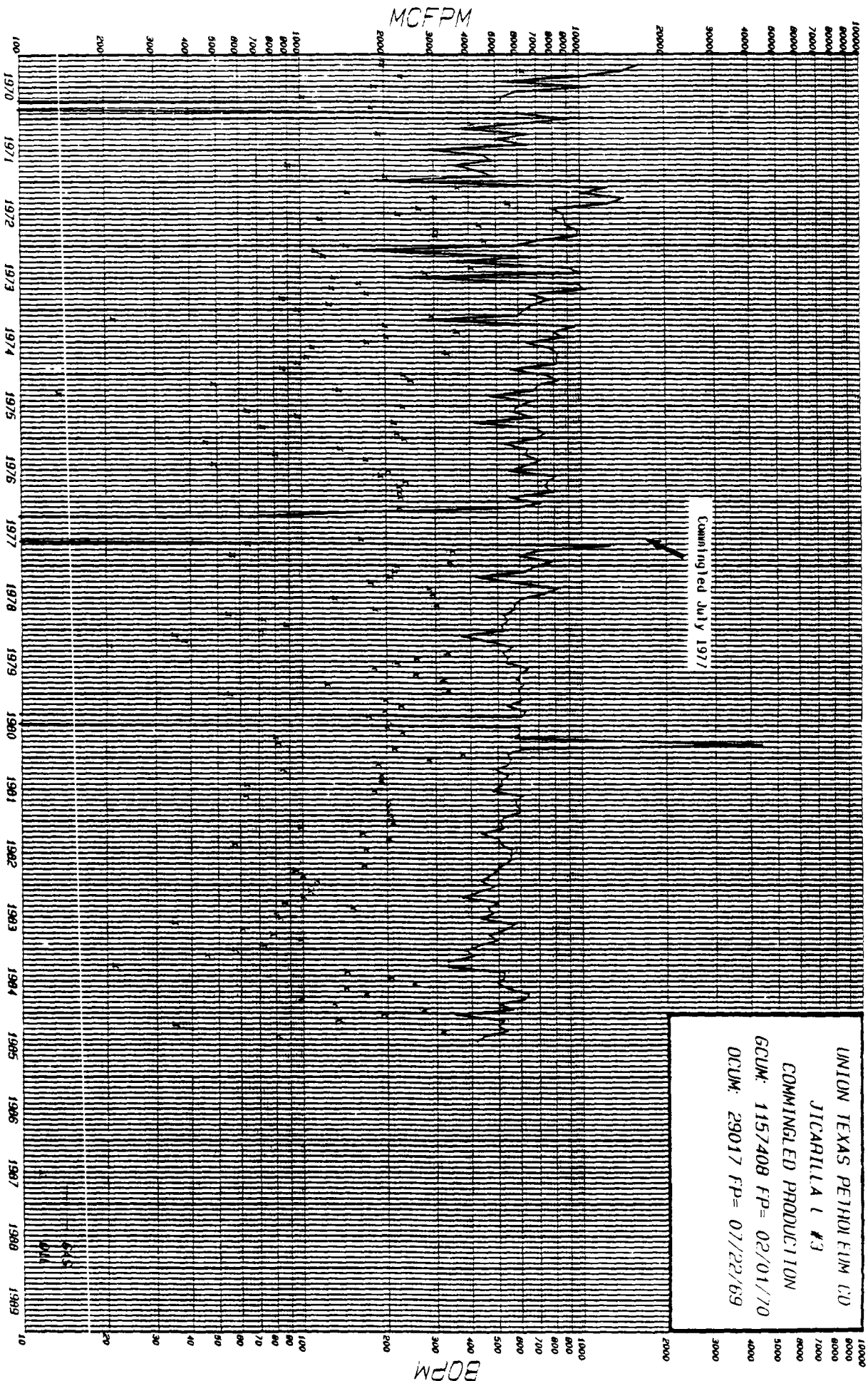


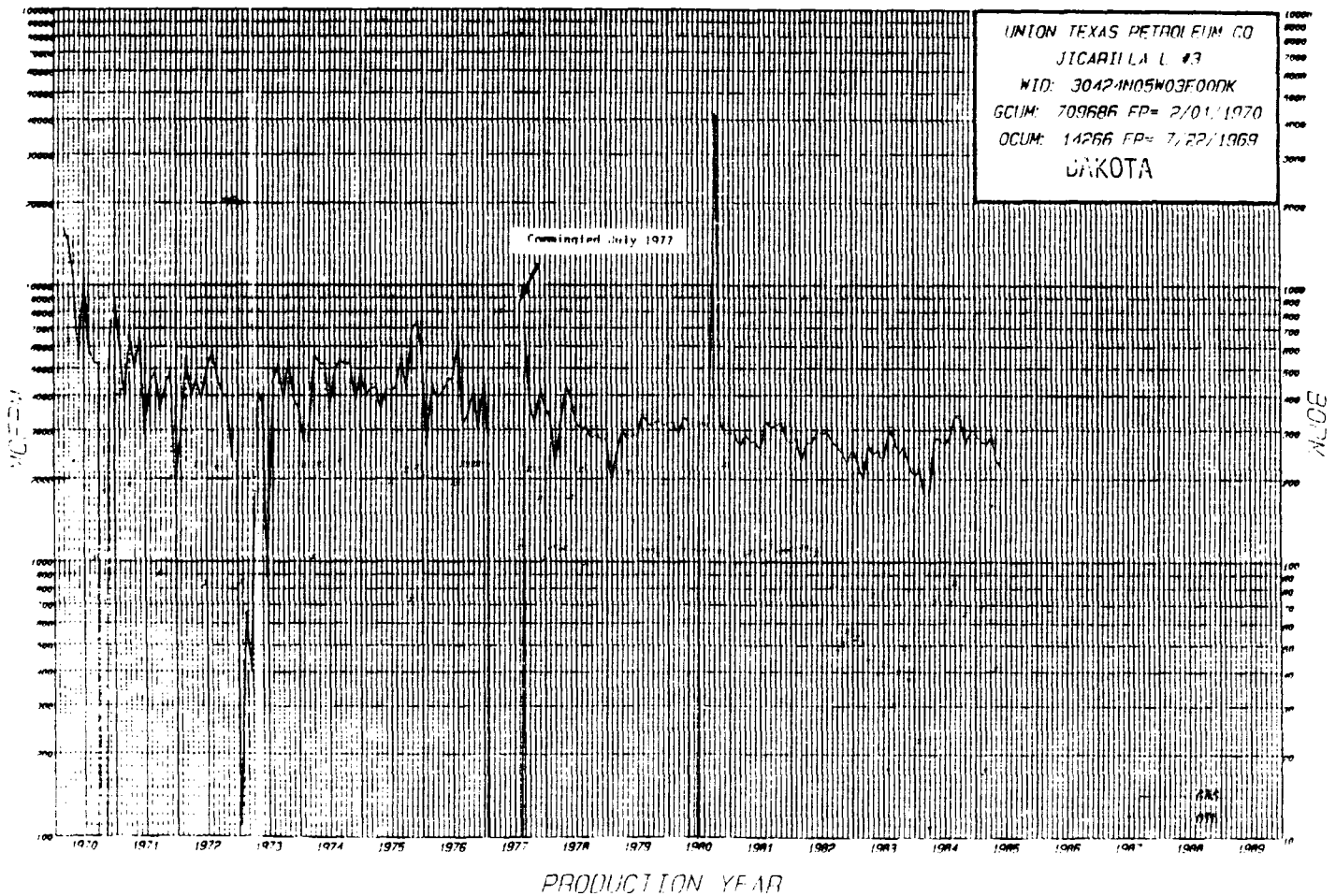
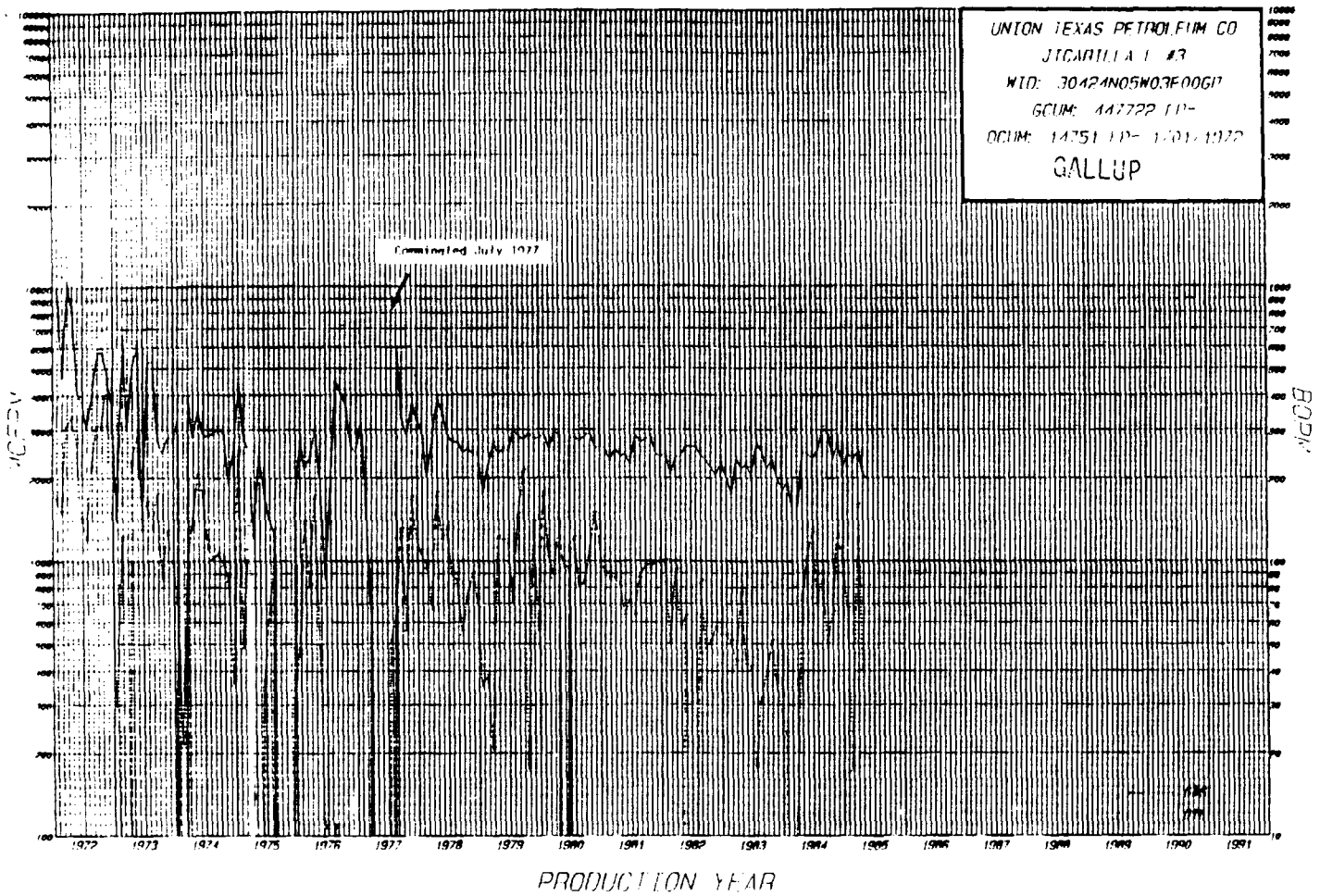
PRODUCTION YEAR

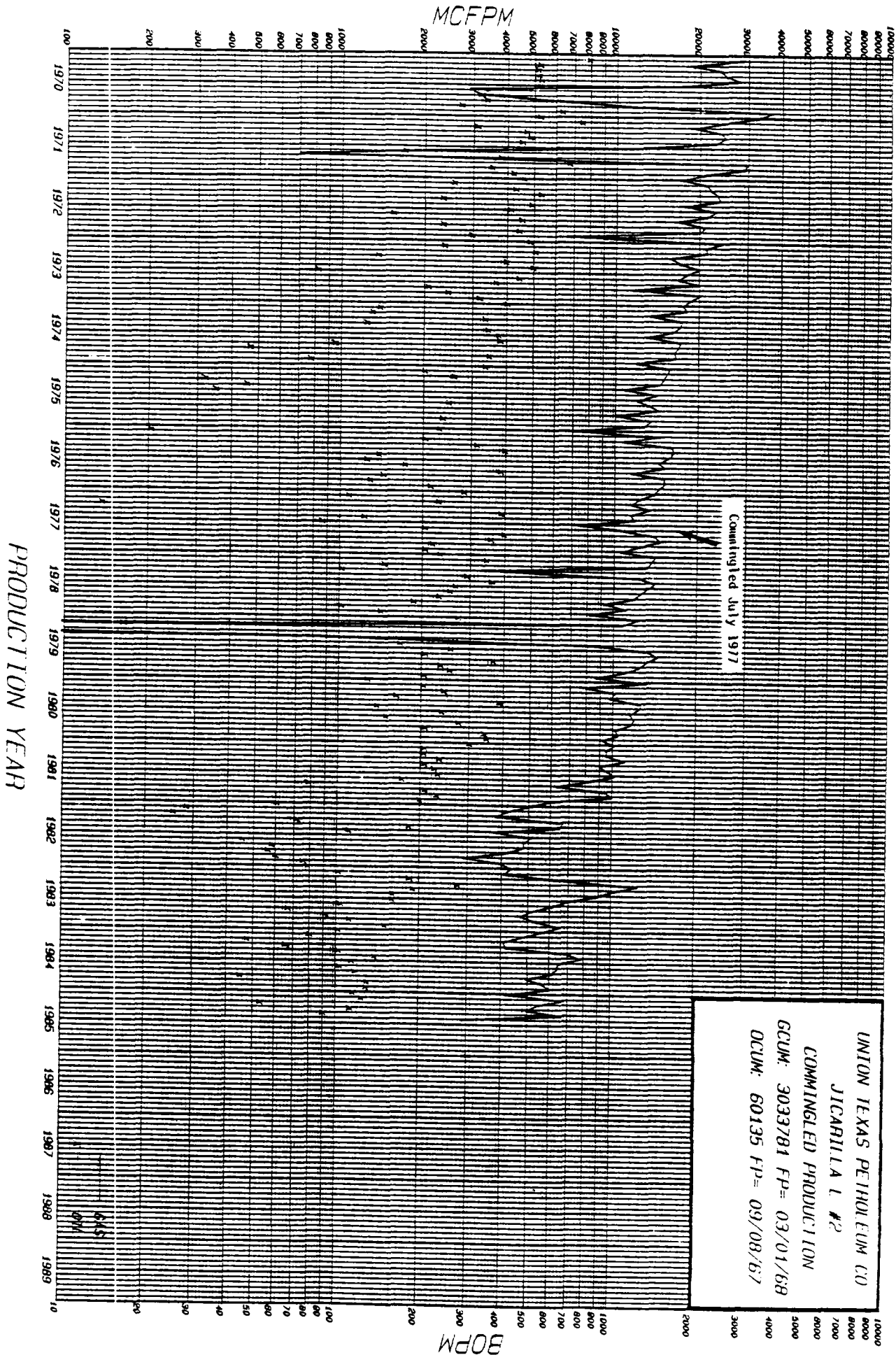




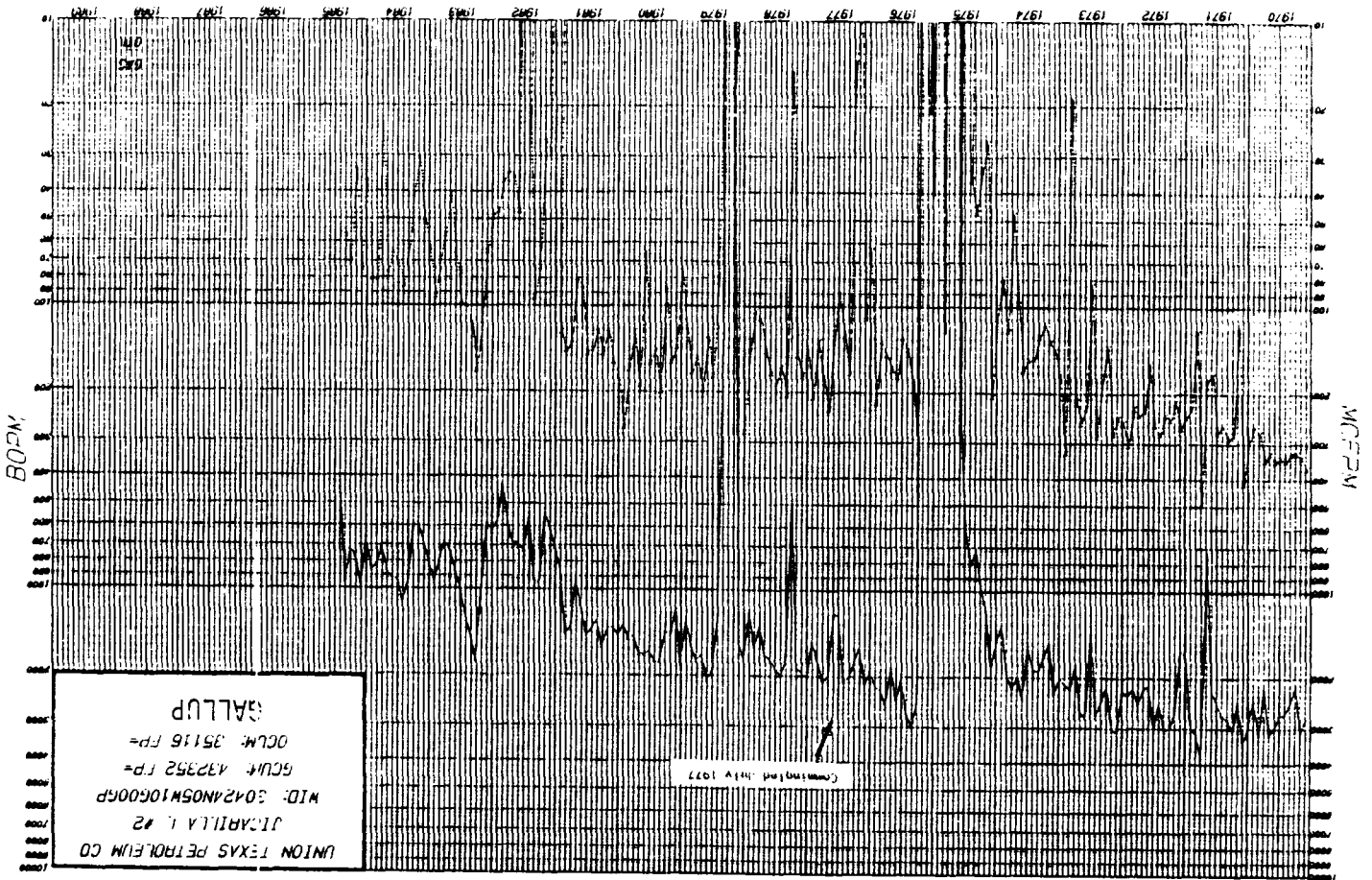
PRODUCTION YEAR



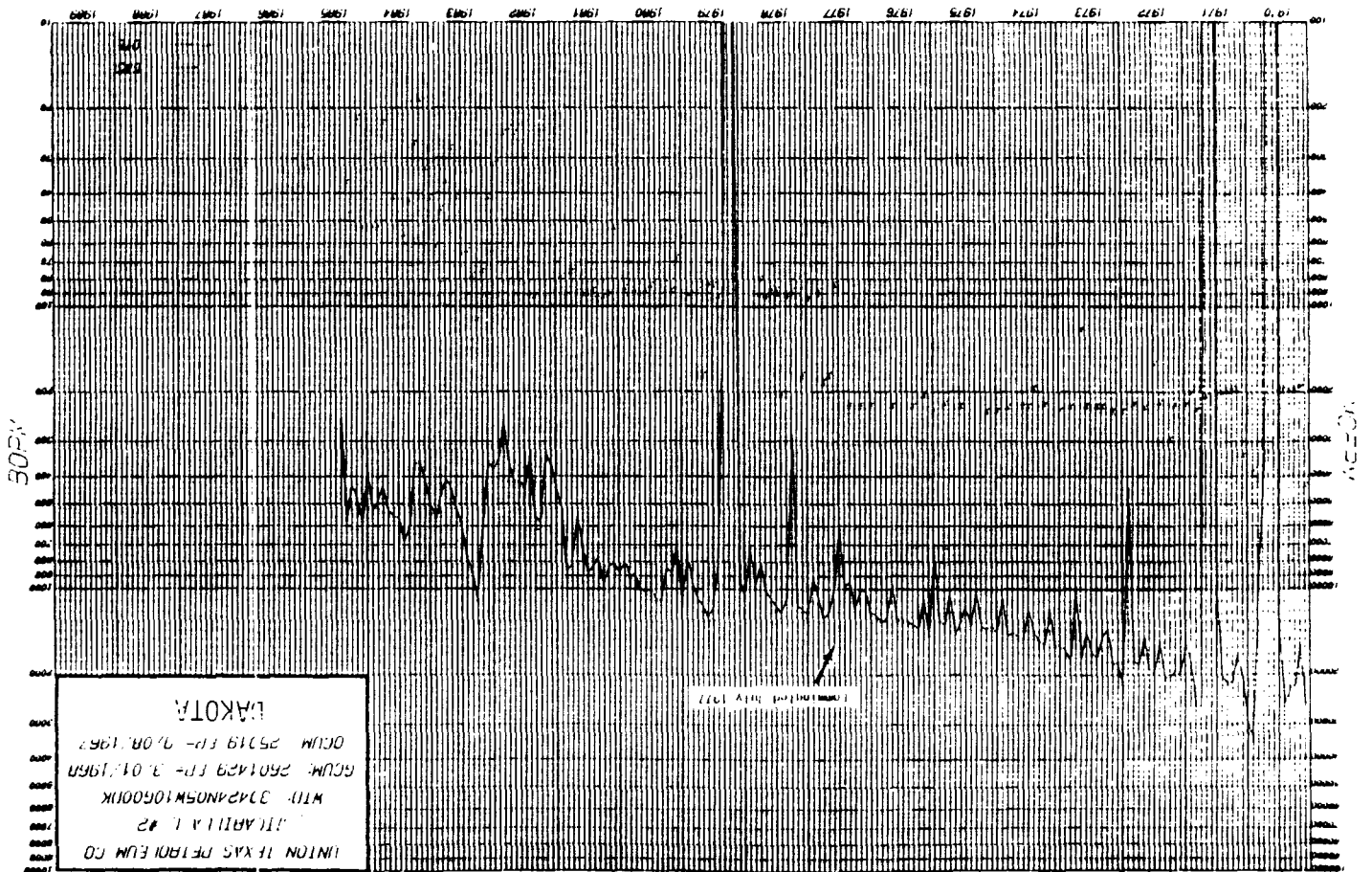




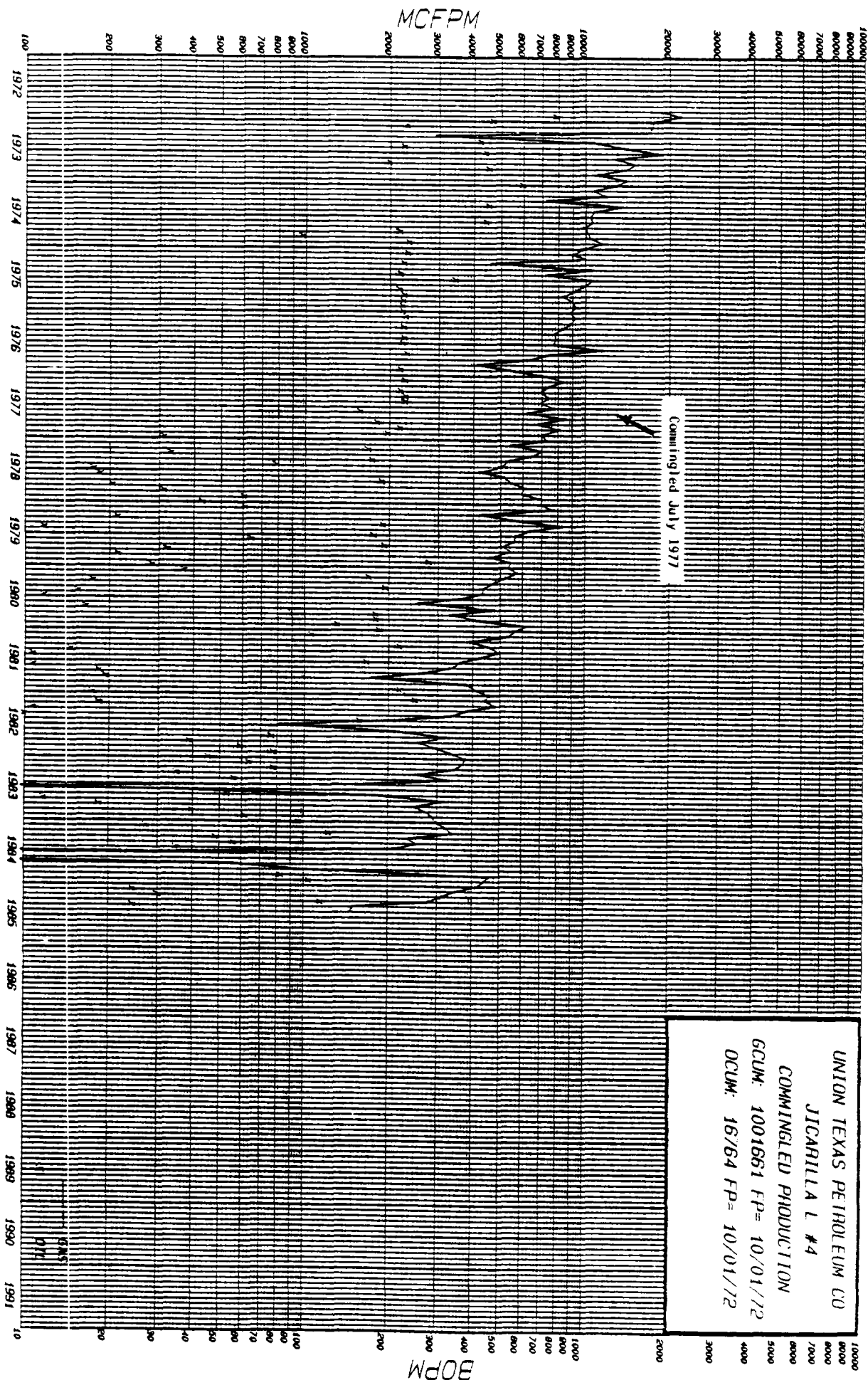
PRODUCTION YEAR

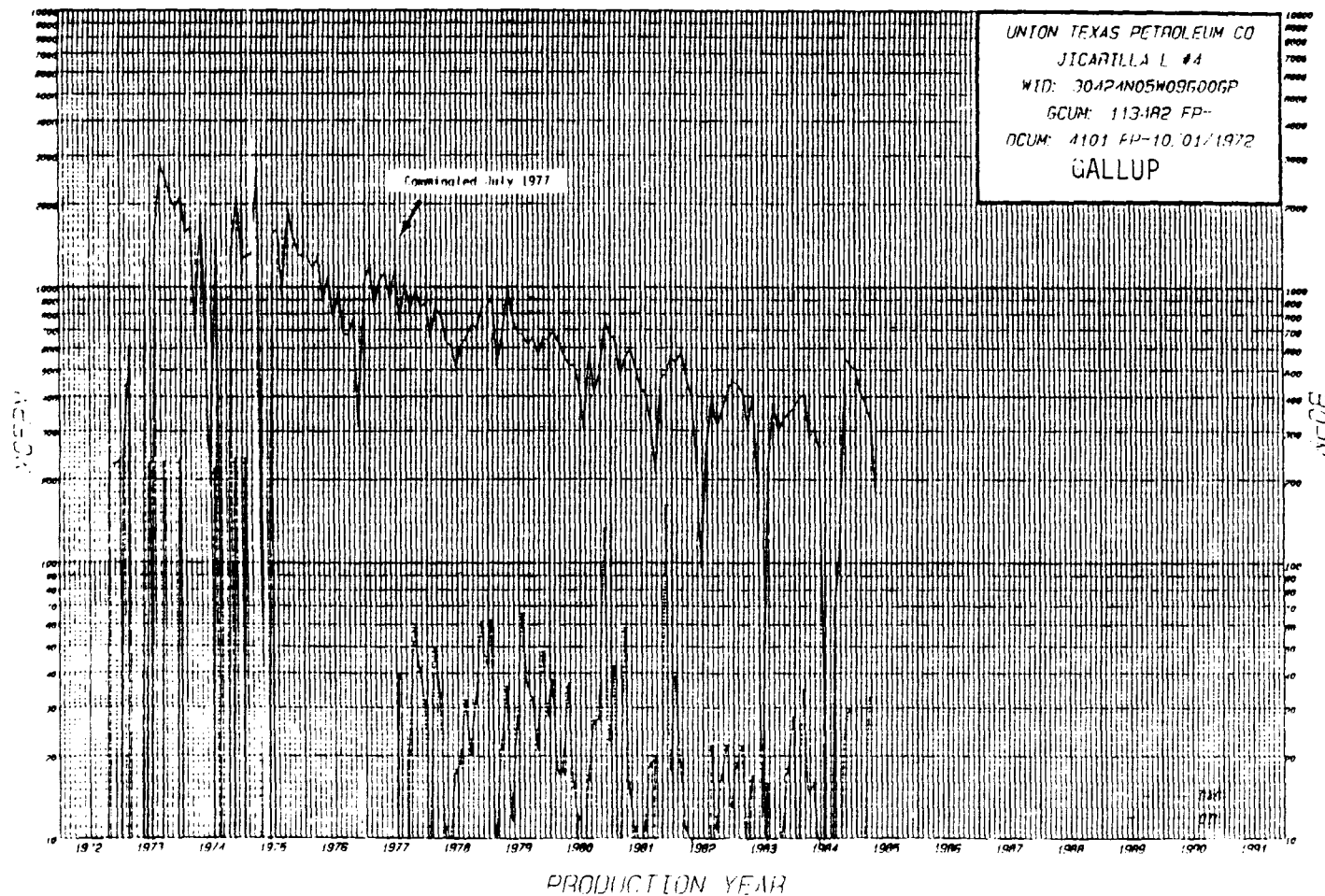
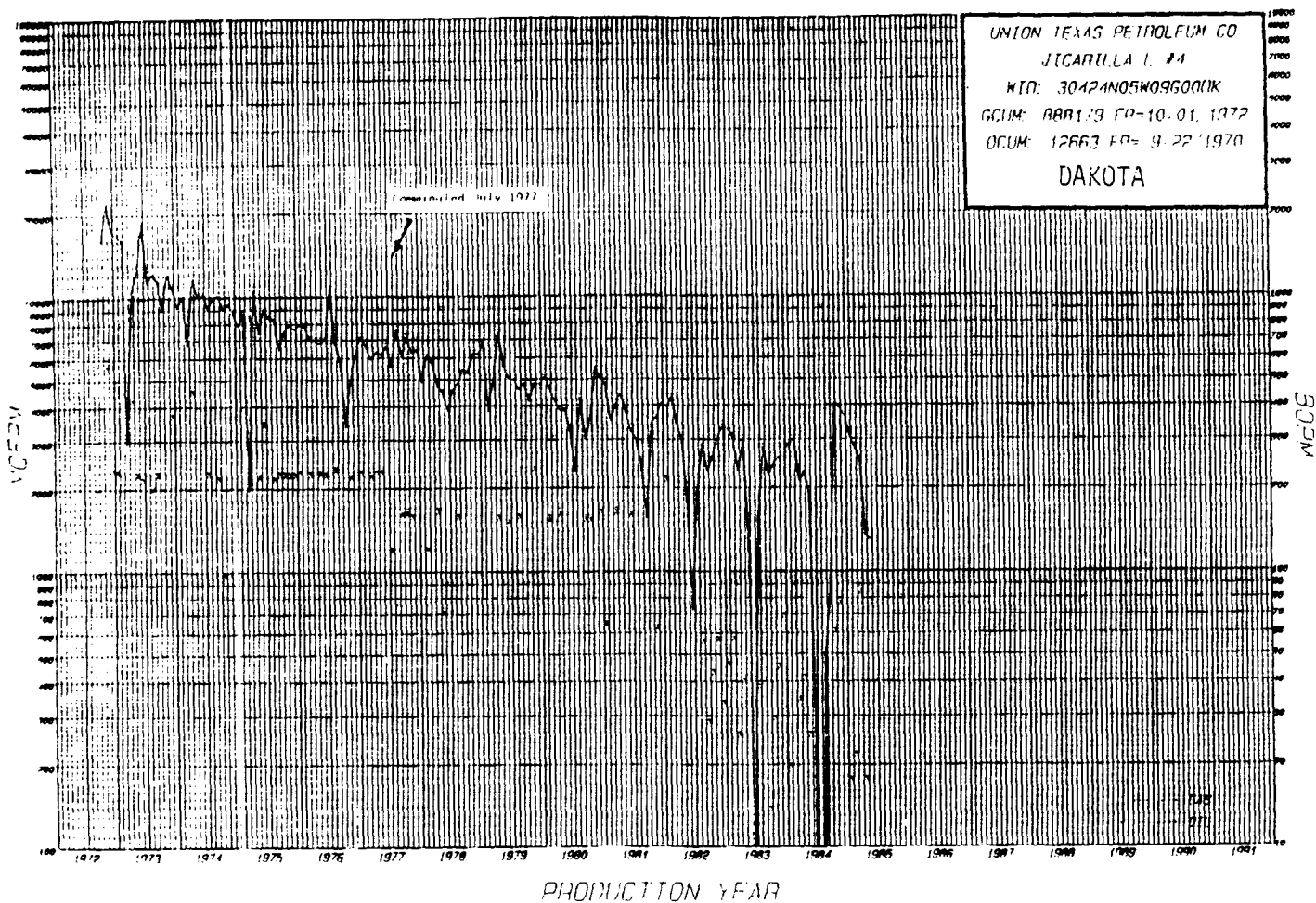


PRODUCTION YEAR



PRODUCTION YEAR





JICARILLA L & N AREA
RIO ARriba COUNTY, NEW MEXICO
GALLUP & DAKOTA WELLS

Wellname	Location	Average Gallup Prod. MCF/D-BOPD	Average Dakota Prod. MCF/D-BOPD	Gallup Cumulative MMCF-MBO	Dakota Cumulative MMCF-MBO	Prod. Status	Oil Allocation %Gal/%DK	Gas Allocation %Gal/%DK	1st Delivered
Jic L #2	G10	26-1.9	152-1.2	432-35	2601-25	Commingled	60/40	14/86	3/68
Jic L #3	E3	78-2.4	87-2.2	448-15	710-14	Commingled	50/50	47/53	2/70
Jic L #4	G9	10-.4	61-1	113-4	888-13	Commingled	28/72	12/88	10/72
Jic L #5	N33	10-.9	115-1.8	70-5	905-16	Commingled	30/70	7/93	10/72
Jic L #6	M34	1-.2	62-2.6	15-1	816-13	Commingled	7/93	2/98	10/72
Jic N #1	K4	2-.2	72-.8	30-2	920-9	Commingled	15/85	2/98	10/72
Jic N #2	N3	13-1.6	39-.4	191-7	532-8	Dual	--	--	12/70
Jic #27E	R33	29-1.4	81-4.8	27-2	81-5	Dual	--	--	9/82
Jic #28	B34	3-.4	89-2.3	46-8	158-4	Dual	--	--	11/81
Jic 10 #1	M33	55-1.3	--	613-81	--	Single Gal.	--	--	N/A
Jic 10 #1	D4	--	14-0	--	406-5	Single DK	--	--	10/60
NE #1	L9	26-1.1	149-0.5	349-24	1655-17	Commingled	67/33	15/85	12/61
NE #7	L10	16-1.2	90-0.6	147-12	1787-13	Commingled	67/33	15/85	11/63
NE #7E	J10	--	117-0.5	--	146-1	Single DK	--	--	10/81
Jic #27	E33	--	17-0.1	--	125-2	Single DK	--	--	7/75
Jic L #6E	J34	--	48-4.8	--	116-9	Dual w/Chacra	--	--	9/81
Jic N #2E	P3	--	108-0.6	--	94-1	Single DK	--	--	8/82
Jic L #4E	D9	--	58-0.4	--	40-1	Single DK	--	--	9/82
NE #1E	O9	11-2.2	191-2.9	2-1	259-3	Commingled	60/40	7/93	10/84
Jic L #2E	P3	--	49-0.4	--	94-1	Single DK	--	--	1/83

TOTAL

280-15.2 1599-27.9 2483-197 12333-160

AVERAGE

21.5-1.2 84-1.5 191-15 649-8.4

DETROIT EXAMINER STOGNER

Oil Conservation Division

Exhibit No. 9

Case No. 8744

JICARILLA L & N AREA
UNICON OPERATED GALLUP-DAKOTA WELLS

Well Name	Location	Formation	Gas BTU/SCF	Oil Gravity	GOR SCF/STB	Gas Gravity	Date	Pressure Gradient PSI/FT	Bottom Hole Pressure at Datum:	
									Top Dakota (PSI)	
Jicarilla N #2	N3-24-5	Dakota	1228	58.2	8216	.71	10/85	.160	1110	
Jicarilla N #2	N3-24-5	Gallup	1265	39.8	7210	.73	10/85	.115	673	
Jicarilla N #1	K4-24-5	Gallup-Dakota	1279	54.7	28513	.75	10/85	.157	1083	
Jicarilla L #2	G10-24-5	Gallup-Dakota	1239	45.0	46503	.72	8/85	.106	730	
Jicarilla L #3	E3-24-5	Gallup-Dakota	1274	47.2	19600	.74	8/85	.097	670	
Jicarilla L #4	G9-24-5	Gallup-Dakota	1231	47.5	23714	.71	10/85	.135	918	
Jicarilla L #5	N33-25-5	Gallup-Dakota	1244	56.6	20700	.72	10/85	.140	987	
Jicarilla L #6	M34-25-5	Gallup-Dakota	1287	48.0	13425	.74	10/85	.140	993	

BEFORE EXAMINER STOGNER

Oil and Gas Division

UTR, Exhibit No. 10

Case No. 8744

WATER ANALYSIS

Company: UNION TEXAS PETROLEUM
Address: 375 U.S. HWY 64
FARMINGTON, NM 87401
Attention: MIKE PIPPIN
Date Sampled: 10/8/85

Report No: 1
Date: 10/11/85
County: RIO ARRIBA, N.M.
Field: BASIN
Formation: DAKOTA
Lease: JICARILLA N
Well: #2

Specific Grav: 1.002
Chloride 7,498 mg/l
Bicarbonate: 244 mg/l
Sulfate: 100 mg/l
Sulfide: 0
Total Hardness:
(as CaCO₃) 500 mg/l
Resistivity: 0.74
Potassium: 0

pH 8.50
Calcium: 80 mg/l
Magnesium: 73 mg/l
Total iron: 3 mg/l
Sodium: 4,768 mg/l
Total Dissolved
Solids: 12,766 mg/l
Ohm Meters @: 70 F
Carbonate: 180 mg/l

Sample Source: Bottom of Dakota Condensate Tank

Remarks:

Dakota water production is less than 1 BPD.

Dakota and Gallup waters from this well are compatible, i.e. there should be no detrimental effects such as a precipitate.

BERNARD E. ALANER, ENGINEER

Oil Conservation Division

WPE Exhibit No. 11

Case No. 8744


LOREN L. DIEDE
SMITH ENERGY ENGINEER

WATER ANALYSIS

Company: UNION TEXAS PETROLEUM
Address: 375 U.S. HWY 64
FARMINGTON, NM 87401
Attention: MIKE PIPPIN
Date Sampled: 10/8/85

Report No: 2
Date: 10/11/85
County: RIO ARRIBA, N.M.
Field: OTERO
Formation: GALLUP
Lease: JICARILLA N
Well: #2

Specific Grav: 1.000
Chloride 1,800 mg/l
Bicarbonate: 366 mg/l
Sulfate: 0
Sulfide: 0
Total Hardness
(as CaCO₃) 300 mg/l
Resistivity: 2.00
Potassium: 0

pH 7.50
Calcium: 40 mg/l
Magnesium: 49 mg/l
Total iron: 3 mg/l
Sodium: 1,164 mg/l
Total Dissolved
Solids: 3,421 mg/l
Ohm Meters @: 70 F
Carbonate: NONE

Sample Source: Bottom of Gallup Condensate Tank

Remarks:

Gallup water production is less than 1 BPD.

Dakota and Gallup waters from this well are compatible, i.e. there should be no detrimental effects such as a precipitate.


LOREN L. DIEDE
SMITH ENERGY ENGINEER

DATE

10/4/85

Union Texas Petro Jic N-2 (Gallup)

taken: 10-3-85

WATER PRESSURE	GRAVITY 7318	CORROSION TEST (COPPER STRIP) (SP. GR.) (API)
WATER TEST - PROPANE	RESIDUE TEST - LPG	WEATHERING TEST - LPG °F @ 95% BP
WATER ACETATE TEST	BTU 1265.42	DOCTOR TEST
WATER SULFIDE gr/100 ft. ³	MERCAPTANS gr/100 ft. ³	GRADE

CHROMATOGRAPHIC ANALYSIS			COMMENTS		DISTILLATION	
	MOLE %	G.P.M.	LIQUID VOLUME %		%	TEMPERATURE
CARBON DIOXIDE	.558				IBP	
ETHYLENE	.442				5	
ETHANE	77.948				10	
PROPANE	12.056	3.217			20	
ISOBUTANE	5.768	1.586			30	
N-BUTANE	.645	.211			40	
ISOBUTANE	1.515	.477			50	
PENTANE	.410	.150			60	
HEXANE	.395	.143			70	
HEPTANE	.264	.108			80	
					90	
					E.P.	
TOTAL		5.890			LOSS	RESIDUE

TEMPERATURES, PRESSURES AND VOLUMES ARE
CONVERTED TO INDUSTRY STANDARDS.

TESTED BY

S.U. Pro Lab - Ernest

REMARKS AND ADDITIONS



LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATIONS

Rocky Mountain Region

LABORATORY INVESTIGATION
OF
JICARILLA N #2
DAKOTA AND GALLUP FORMATIONS
OCTOBER 10, 1985

PREPARED FOR

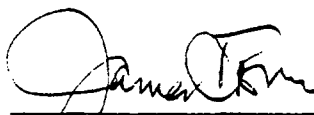
UNION TEXAS PETROLEUM
MIKE PIPPIN
PETROLEUM ENGINEER

PREPARED BY



Russell S. Pyeatt
THE WESTERN COMPANY OF NORTH
AMERICA-FARMINGTON DISTRICT

DISCLOSURE STATEMENT
Oil & Gas Division
WPP Exhibit No. <u>13</u>
Case No. <u>8744</u>



James C. Terry
Senior Tech Sales
WESTERN COMPANY OF NORTH
AMERICA-FARMINGTON DISTRICT

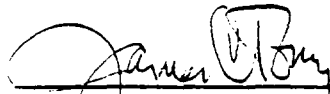
LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATIONS

SUMMARY OF RESULTS

1. No precipitation of materials was observed from the admixture of oils under consideration.
2. No emulsion testing was performed. Emulsion effects was not a concern as very little water accompanies hydrocarbon production. The little water that is produced is easily separated in normal surface operations.
3. The initial paraffin deposition dropped markedly with increased dilution.
4. Adiabatic cooling due to gas expansion was investigated and found not to alter paraffin deposition significantly.



Russell S. Pyeatt
Western Company of North America
Farmington District



James C. Terry, Sr. Tech Sales
Western Company of North America
Farmington District

LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATIONS

On Monday, October 7, 1985, a request for laboratory work on the Dakota and Gallup produced oils from the Jicarilla N #2 was placed by Mike Pippin, Petroleum Engineer of Union Texas Petroleum Corporation.

PURPOSE

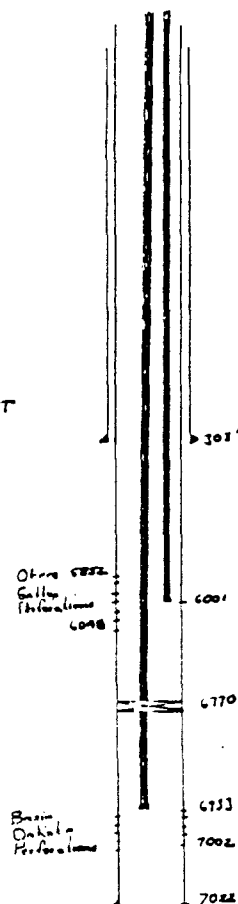
Mike requested that we investigate the concern of possible detrimental effects due to comingling of the Dakota and Gallup produced oils from the Jicarilla N #2.

INVESTIGATION

1. Background Information

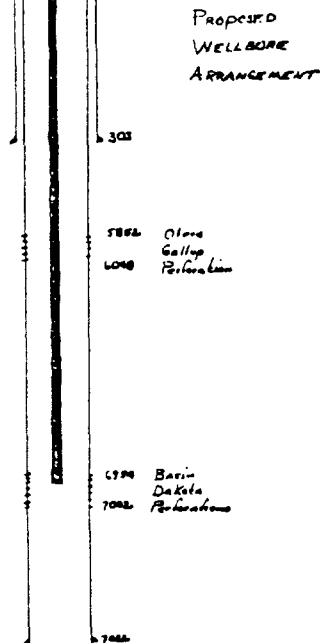
(A)

Existing
Wellbore
Arrangement



(B)

LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATIONS



- (C) BHST Gradient: 2.0° F/100 ft depth
- (D) Paraffin deposition problems occur mainly from surface down to 1000 ft. of depth.
- (E) No appreciable amounts of water accompany hydrocarbon production in these wells.
- (F) Paraffin deposition increases with decreasing temperature.

LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATION

2. Concerns to be addressed in analysis:
 - a. The precipitation of materials produced by the admixture of oils of potentially different constitution.
 - b. The formation of emulsion due to the admixture of different fluids.
 - c. Increased paraffin deposition by additive properties of oils.
 - d. Increased paraffin deposition due to the decrease in temperature as a result of accompanying gas expansion.
3. Steps taken in analysis
 - a. API Analysis of oils including: API Gravity
Cloud Point
Pour Point
Paraffin Content
Asphaltene Content
 - b. Mixing of oils in appropriate cases with additional paraffin testing to determine resulting fluid characteristics.
 - c. Discussion with Mike Pippen regarding the well bore production and conditions.

LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATION

DATA

WELL NAME JICARILLA N #2
LEGAL DESCRIPTION 790' FSL 1850' FWL Sec. 3 T24N R5W
Rio Arriba County, N.M.

SAMPLE #1

Formation	Otero-Gallup
Perforation Depth (ft)	5852-6048
API Gravity @ 60°F	39.8°
Cloud Point	Unable to determine due to the color of the oil
Pour Point	26°F
Paraffin Content	8.84%
Asphaltene Content	5.10%

SAMPLE #2

Formation	Basin-Dakota
Perforation Depth (ft)	6934-7002'
API Gravity @ 60°F	58.2°
Cloud Point	Unable to detrmine due to the color of the oil
Pour Point	<-30°F
Paraffin Content	No paraffins observed
Asphaltene Content	Not enough to measure

LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATION

CALCULATIONS

Cool down effects due to gas expansion:

Reference: Perry's Handbook of Chemical Engineering

Re: Adiabatic Expansion of Ethane, Methane

$$T_s = T_r \left(\frac{P_s}{P_r} \right)^{\left(\frac{K-1}{K} \right)}, \text{ where}$$

T_s = Surface Temperature

T_r = Reservoir Temperature

P_s = Surface Pressure

P_r = Reservoir Pressure

$K = \frac{\text{Specific Heat at Constant Pressure}}{\text{Specific Heat at Constant Volume}}$

Assumed values for maximum cool down due to gas expansion:

T_s = Unknown

$T_r = 138^{\circ}\text{F}$

$P_s = 300 \text{ psi}$

$P_r = 1150 \text{ psi}$

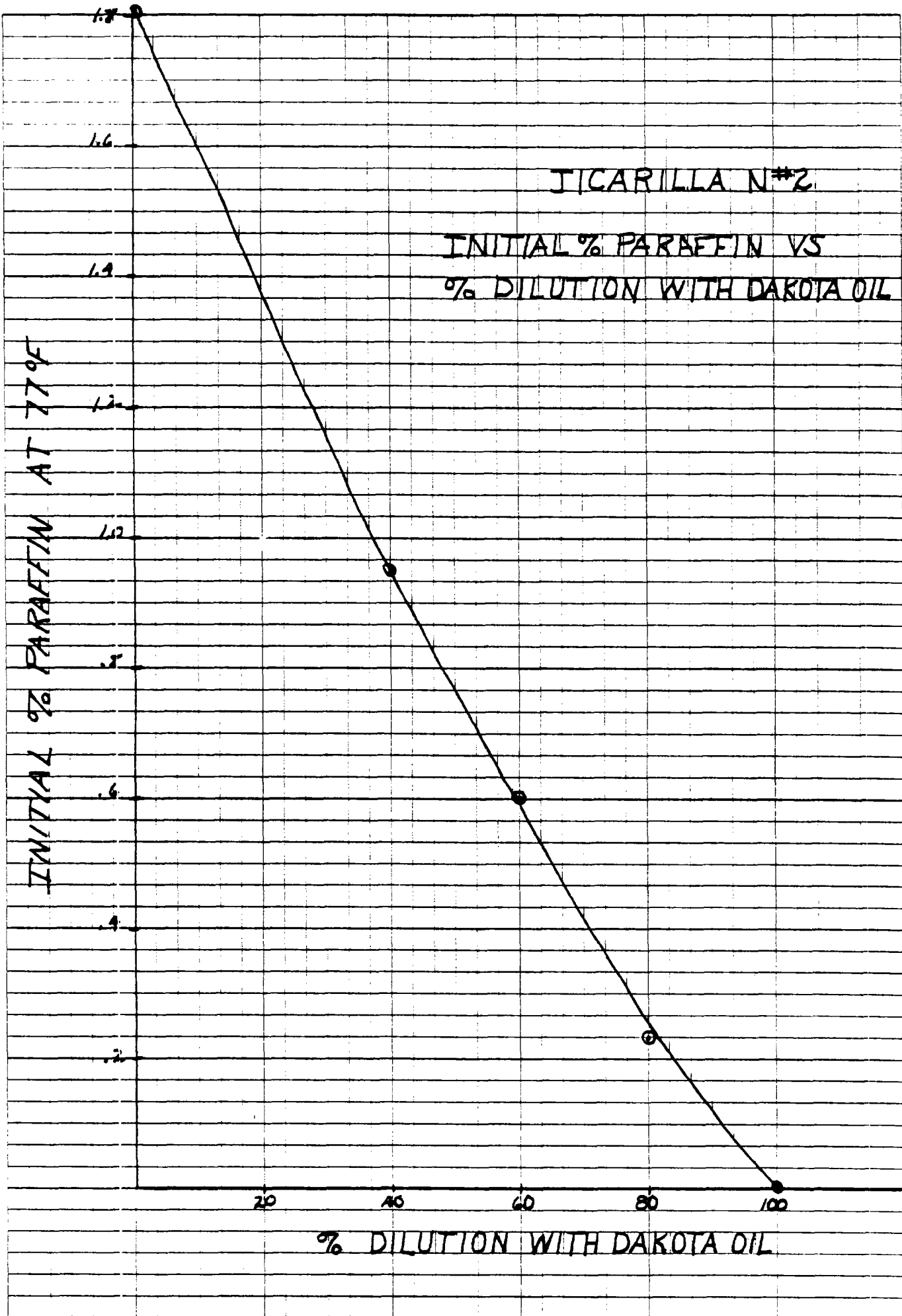
$K = 1.2$

$$T_s = 138 \left(\frac{300}{1150} \right)^{0.1667}$$

$T_s = 110^{\circ}\text{F}$

NOTE:

A total cooldown of 28°F would be expected



LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATION

DISCUSSION

The API analyses conducted resulted in the awareness that the possible paraffin deposition would increase with increasing volume fraction of Gallup produced oil. Any addition of Dakota oil would only serve to decrease the possible amount of paraffin deposition.

The knowledge that no appreciable water production accompanies any hydrocarbon production in the wells eliminated the concern over emulsion formation. The small amount of water produced is easily separated under normal surface operations.

The problems of precipitations was eliminated after mixing oils from the Dakota and Gallup formations. No precipitates was observed at room temperature. The various mixtures, by volume, of the oil was further tested by the addition of methyl ethyl Ketone (MEK) and filtered through (1) one micron paper at room temperature. The results are presented on Figure 3. It is assumed that no precipitates would occur at elevated temperatures due to increased solvency effects of temperature increases.

With all other concerns alleviated the potential problems surrounded only paraffin deposition with admixture of Dakota and Gallup oils in varying proportions and in paraffin deposition with decreases in temperature due to the adiabatic expansion of gas from the solutions.

The fact that the Dakota zone from the Jicarilla N #2 was producing 1/2 bopd and 40 Mcfd and the Gallup zone producing 1 bopd and 24 Mcfd brought about a concern regarding increased paraffin deposition due to the cool down of fluids through gas expansion. Using a relationship for temperature change with adiabatic expansion of gases from Perry's Handbook of Chemical Engineering a calculation was made that would account for maximum cool down of fluids due to gas expansion. This cool down assumes adiabatic conditions and does not take into account

LABORATORY INVESTIGATION
JICARILLA N #2
DAKOTA AND GALLUP FORMATION

temperature effects imposed by other zones. Therefore, a decision was made to test the Dakota/Gallup oils in varying proportions and determine the initial paraffin depositions at room temperature to evaluate the increased or decreased deposition efficiency of paraffin resulting from mixing.