

WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
1980-01-01 to 1980-12-31

I. INTRODUCTION

West Butler Unit No. 1 became effective 1972-09-01. This is the eighth annual report and represents a review of operations for the period 1980-01-01 to 1980-12-31.

II. OPERATIONS

1. Production

Oil production for the report period totalled 495.1 m<sup>3</sup>, of which 252.4 m<sup>3</sup> were produced during the first half of 1980 and 242.7 m<sup>3</sup> were produced during the second half. This compares with 309.5 m<sup>3</sup> oil produced during the second half of 1979. Average daily production rate for 1980-12 was 1.36 m<sup>3</sup>/d.

2. Injection

Water injection, which has been suspended since 1976-07-01, resumed in 1978-09. Three new injectors (4-32-9-29, 12-29-9-29 and 14-29-9-29) outside the unit, were placed on injection in 1978-09 and total injection from these wells for this report period was 22 273.3 m<sup>3</sup>. Injection within the unit totalled 1 560.3 m<sup>3</sup> for the report period. Table II summarizes water injection both within and outside the unit. Water injection was suspended in 1980-11 pending further evaluation of the waterflood project.

3. Water Supply

Prior to suspension the existing water source for the injection system was from a Devonian water source well in 1-31-9-29. Capability of the supply well is approximately 110.0 m<sup>3</sup>/d based on 1980-09, the last full month of injection.

The water source well in 7A-31-9-29 is also currently suspended. Capability is 12.7 m<sup>3</sup>.

4. General

1980-05:

Ran bottom hole pressure survey on two wells.

1980-11:

Suspended pilot waterflood injection due to lack of response.

Changed out BH pumps on two wells and hot oiled one well.

III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is presented graphically.

The status of reservoir voidage is presented in Table IV. The three outside injection wells were included in the voidage calculations.

TABLE I

WEST BUTLER UNIT NO. 1  
PRODUCTION HISTORY

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total For Period</u>
Oil ( $\text{m}^3$ )	131.9	120.5	123.0	119.7	495.1
Cum. Oil ( $\text{m}^3$ )	3 815.6	3 936.1	4 059.1	4 178.8	
Gas ( $10^3 \text{ m}^3$ )	2.8	2.6	2.6	2.5	10.5
Cum. Gas ( $10^3 \text{ m}^3$ )	80.9	83.5	86.1	88.6	
Water ( $\text{m}^3$ )	0.0	0.0	0.0	0.0	0.0
Cum. Water ( $\text{m}^3$ )	1 297.6	1 297.6	1 297.6	1 297.6	
Water Injection ( $\text{m}^3$ )	1 076.1	484.2	0.0	0.0	1 560.3
Cum. Water Inj. ( $\text{m}^3$ )	24 494.5	24 978.7	24 978.7	24 978.7	
Water Injection ( $\text{m}^3$ ) outside unit	7 238.3	5 673.2	7 892.1	1 469.7	22 273.3
Cumulative ( $\text{m}^3$ )	36 584.1	42 257.3	50 149.4	51 619.1	

Cumulative Preunit Production is as follows:

Oil: 24 145.6  $\text{m}^3$   
 Gas: 513.7  $10^3 \text{ m}^3$   
 Water: 4 229.8  $\text{m}^3$

TABLE II

WEST BUTLER UNIT NO. 1  
WATER INJECTION DATA 1980  
1980-01-01 to 1980-12-31

<u>Injection Well</u>	<u>Date on Injection</u>	<u>1980-10* Injection</u>			<u>Cumulative Injection to 1980-12-31 (m<sup>3</sup>)</u>
		<u>m<sup>3</sup>/month</u>	<u>m<sup>3</sup>/d</u>	<u>kPa</u>	
8-31	1972-09-20	-	-	-	8 550.4
16-30	1973-06-01	-	-	-	16 428.4
Subtotal		-	-	-	24 978.8
12-29	1978-09-11	530.7	17.1	8 270	25 296.2
14-29	1978-09-11	14.0	0.5	8 410	1 472.8
4-32	1978-09-11	925.0	29.8	8 000	24 850.3
TOTAL		<u>1 469.7</u>	<u>47.4</u>		<u>76 598.1</u>

\*Last month of injection.

TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	1980-09 <u>Volume (m<sup>3</sup>/d)</u>
*1-31-9-29	Reda (25 hp)	110.0
*1-31 shut in on 1980-10-14, since pressure maintenance of the field was suspended.		

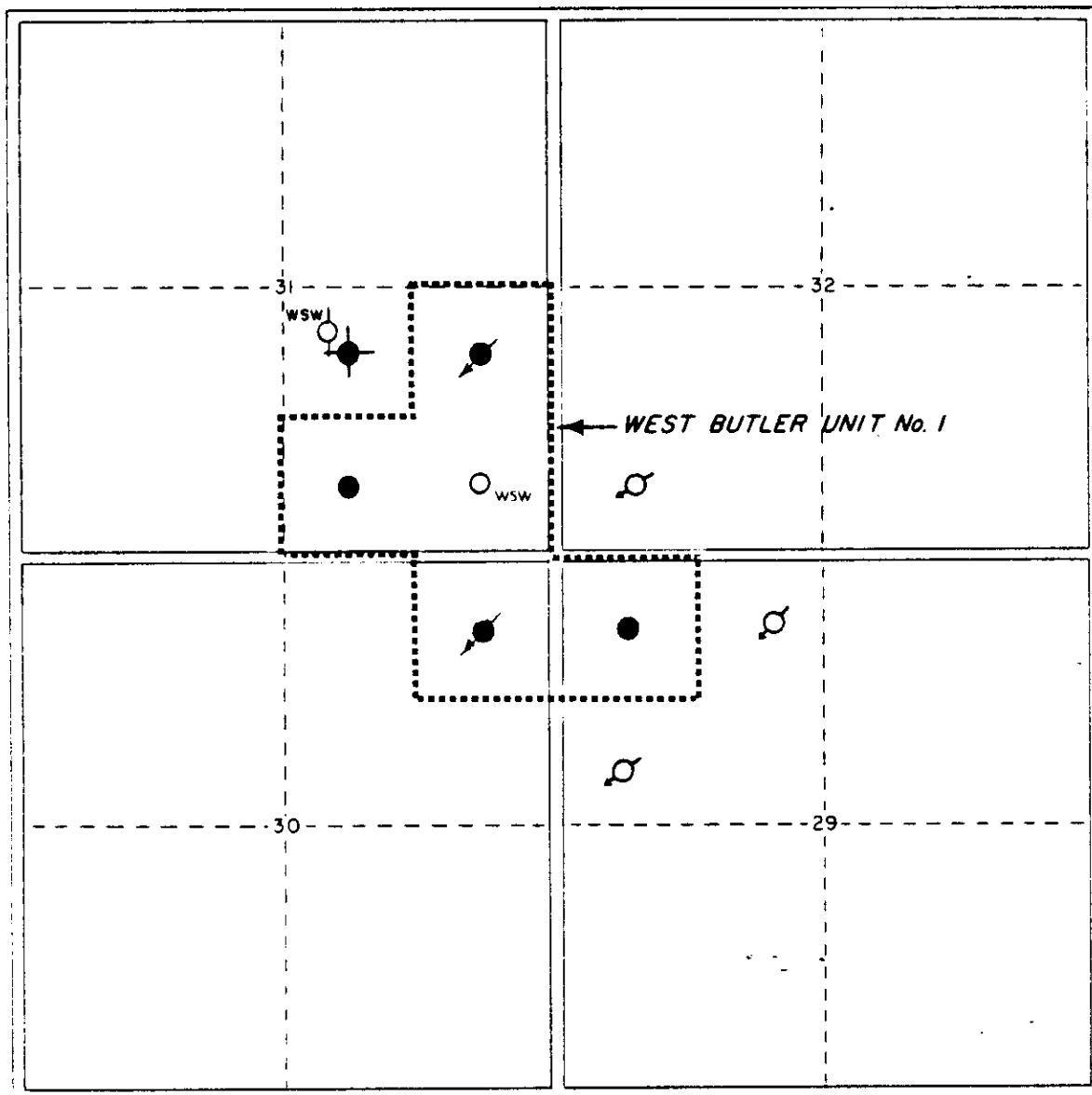
TABLE IV

WEST BUTLER UNIT NO. 1  
CALCULATION OF VOIDAGE RATES

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total For Period</u>
Oil Produced ( $\text{m}^3$ )	131.9	120.5	123.0	119.7	495.1
Gas Produced ( $10^3 \text{ m}^3$ )	2.8	2.6	2.6	2.5	10.5
Water Produced ( $\text{m}^3$ )	0.0	0.0	0.0	0.0	0.0
Average Solution GOR ( $\text{m}^3/\text{m}^3$ )	21.2	21.6	21.1	20.9	
Formation Volume Factor	1.07	1.07	1.07	1.07	
Oil Voidage (Res. $\text{m}^3$ )	141.1	128.9	131.6	128.1	529.7
Water Voidage ( $\text{m}^3$ )	0.0	0.0	0.0	0.0	0.0
Total Voidage (Res. $\text{m}^3$ )	141.1	128.9	131.6	128.1	529.7
*Water Injection ( $\text{m}^3$ )	8 314.4	6 157.4	7 892.1	1 469.7	23 833.6
Net Voidage (Res. $\text{m}^3$ )	-8 173.3	-6 028.5	-7 760.5	-1 341.6	-23 303.9
Net Voidage Rate (Res. $\text{m}^3/\text{d}$ )	-89.8	-66.3	-84.3	-14.6	-63.7
Cum. Net Voidage (Res. $\text{m}^3$ )	-55 763.0	-61 791.5	-69 552.0	-70 893.6	
Gas Produced = Solution Gas					
Cumulative Preunit Voidage: Oil	25 835.7 res. $\text{m}^3$				
Water	4 229.8 $\text{m}^3$				
Total	30 065.5 res. $\text{m}^3$				

\*Includes water injection in the three injectors outside unit.

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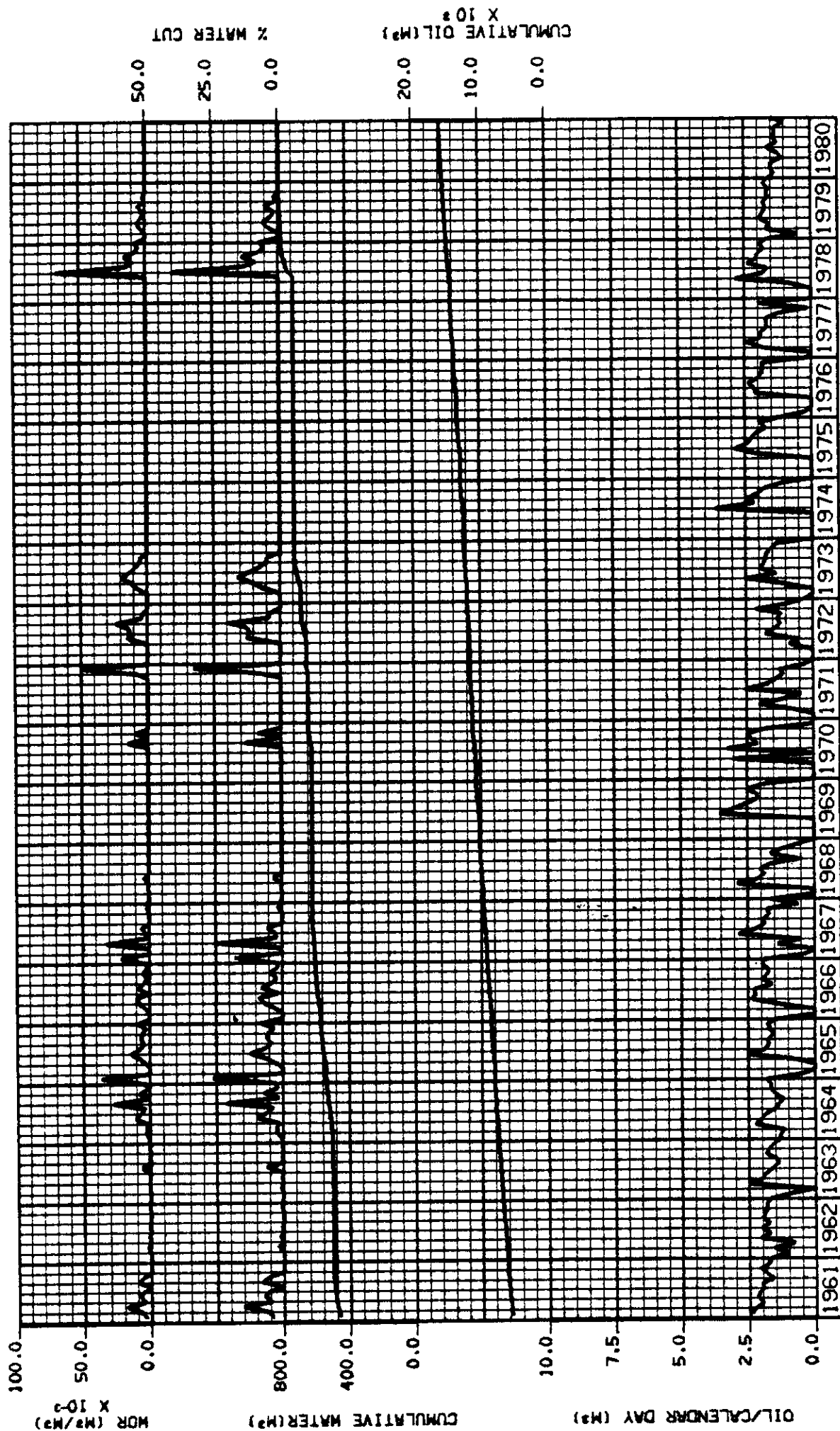


LEGEND

- INJECTION WELL
- SUSPENDED WELL
- <sup>WSW</sup> WATER SOURCE WELL

FIGURE 1  
WEST BUTLER UNIT No. 1  
AS OF 1990-12-31  
SCALE: 3" = 1 MILE

# WEST E FLER PRODUCTION PLOT SUMMARY



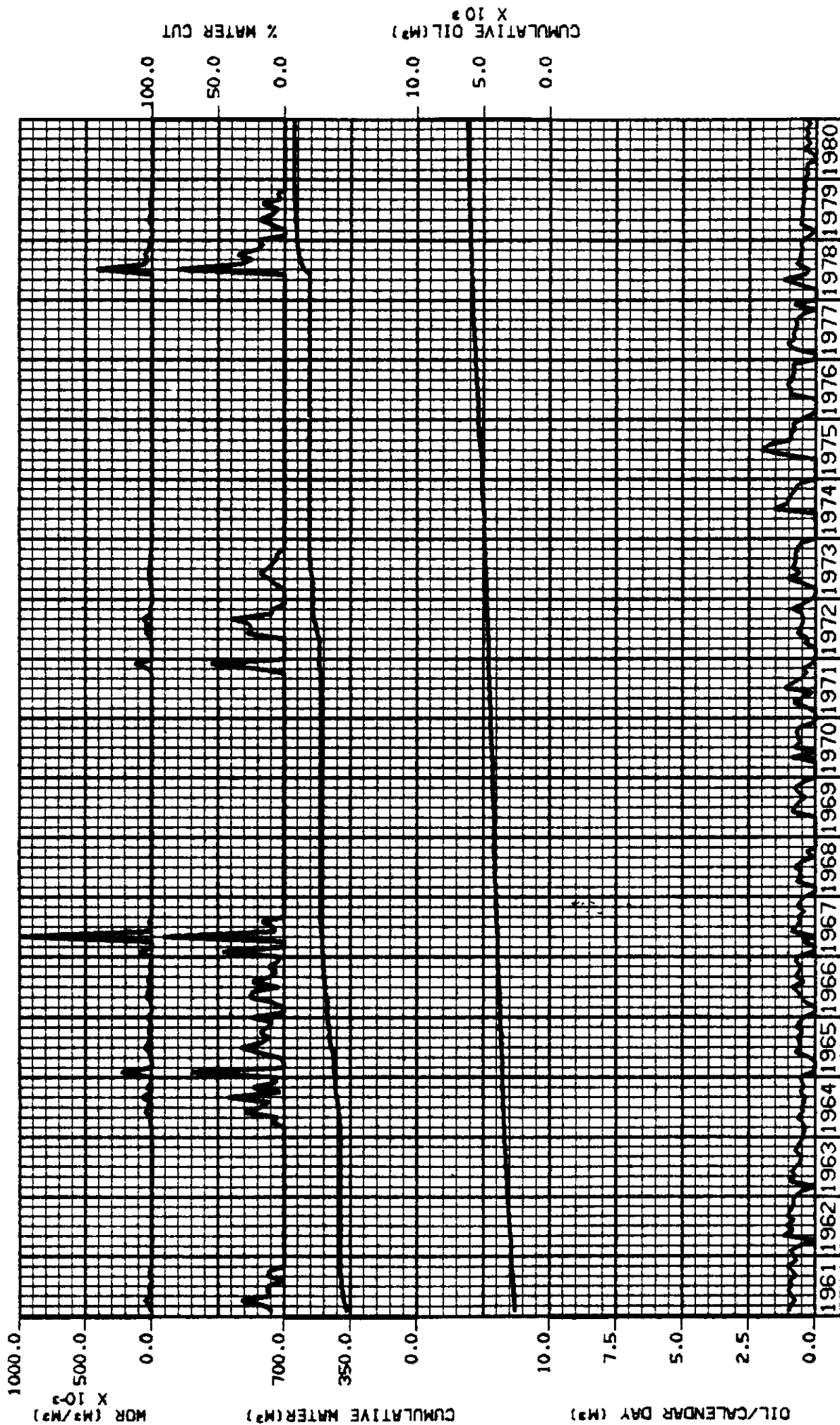


# WEST BUTLER INJECTION PLOT SUMMARY



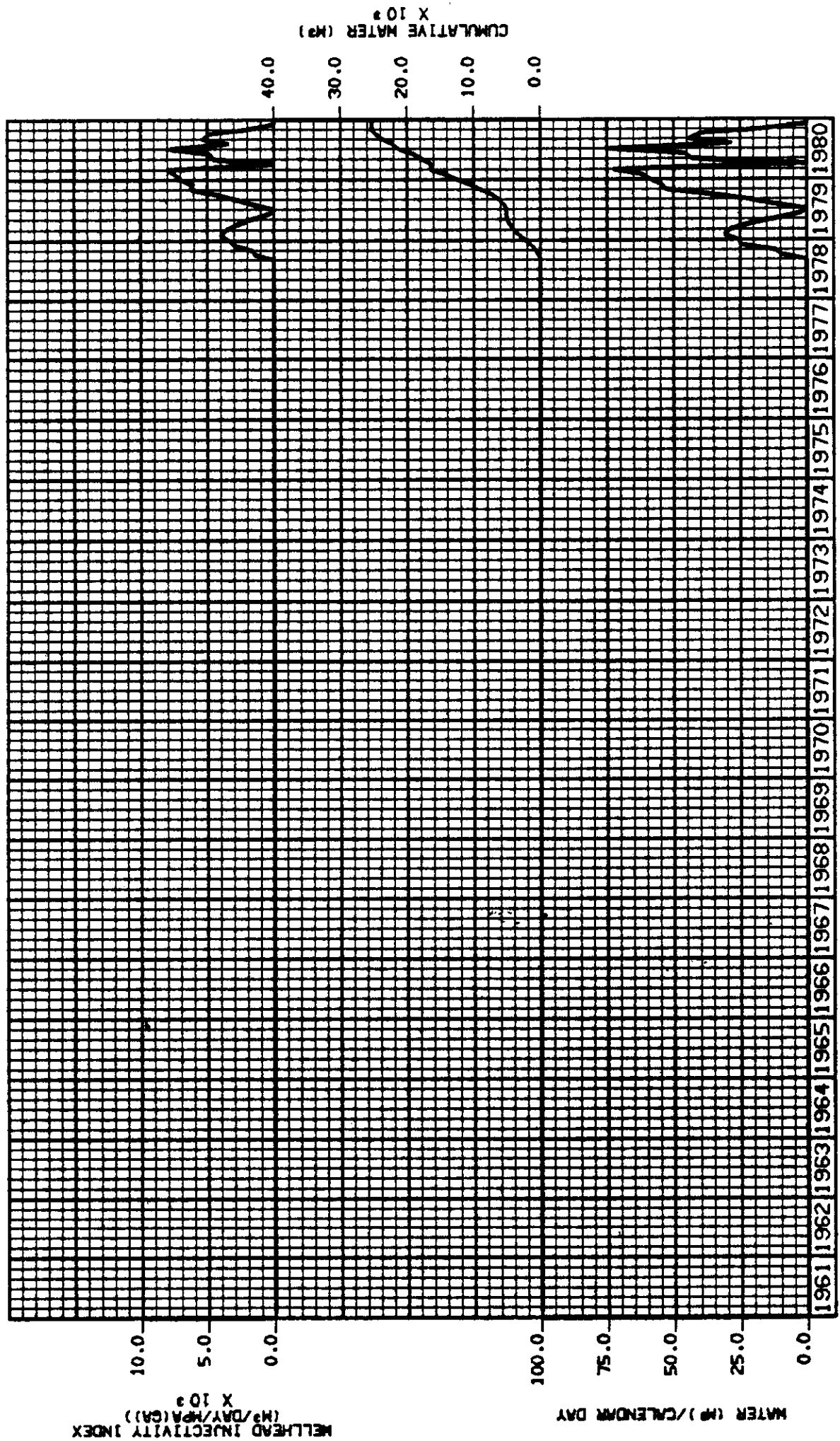
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# WEST LUTLER PRODUCTION PLOT 13-29-009-29W1



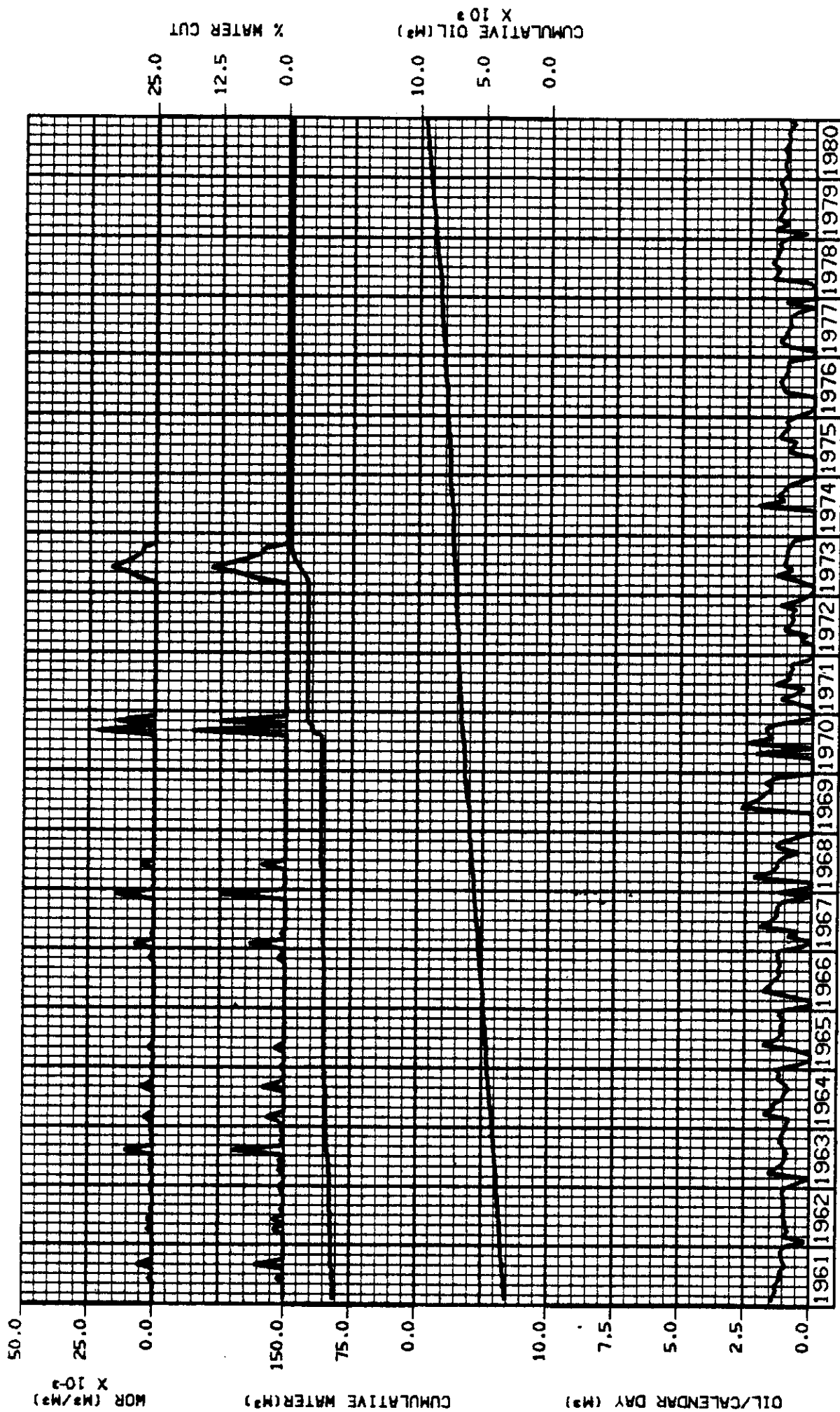
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# WEST BUTLER INJECTION PLOT 12-29-009-29W1



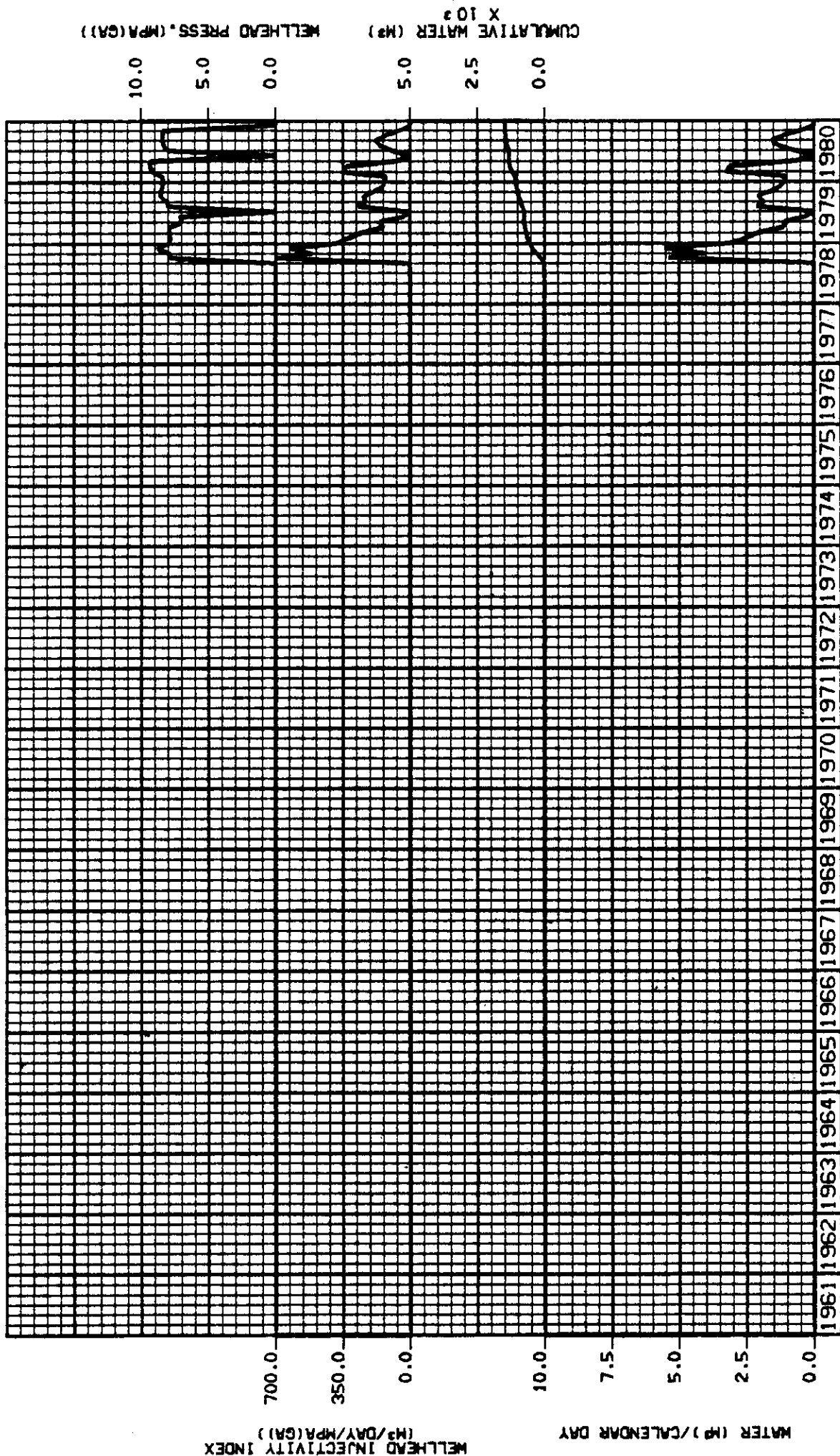
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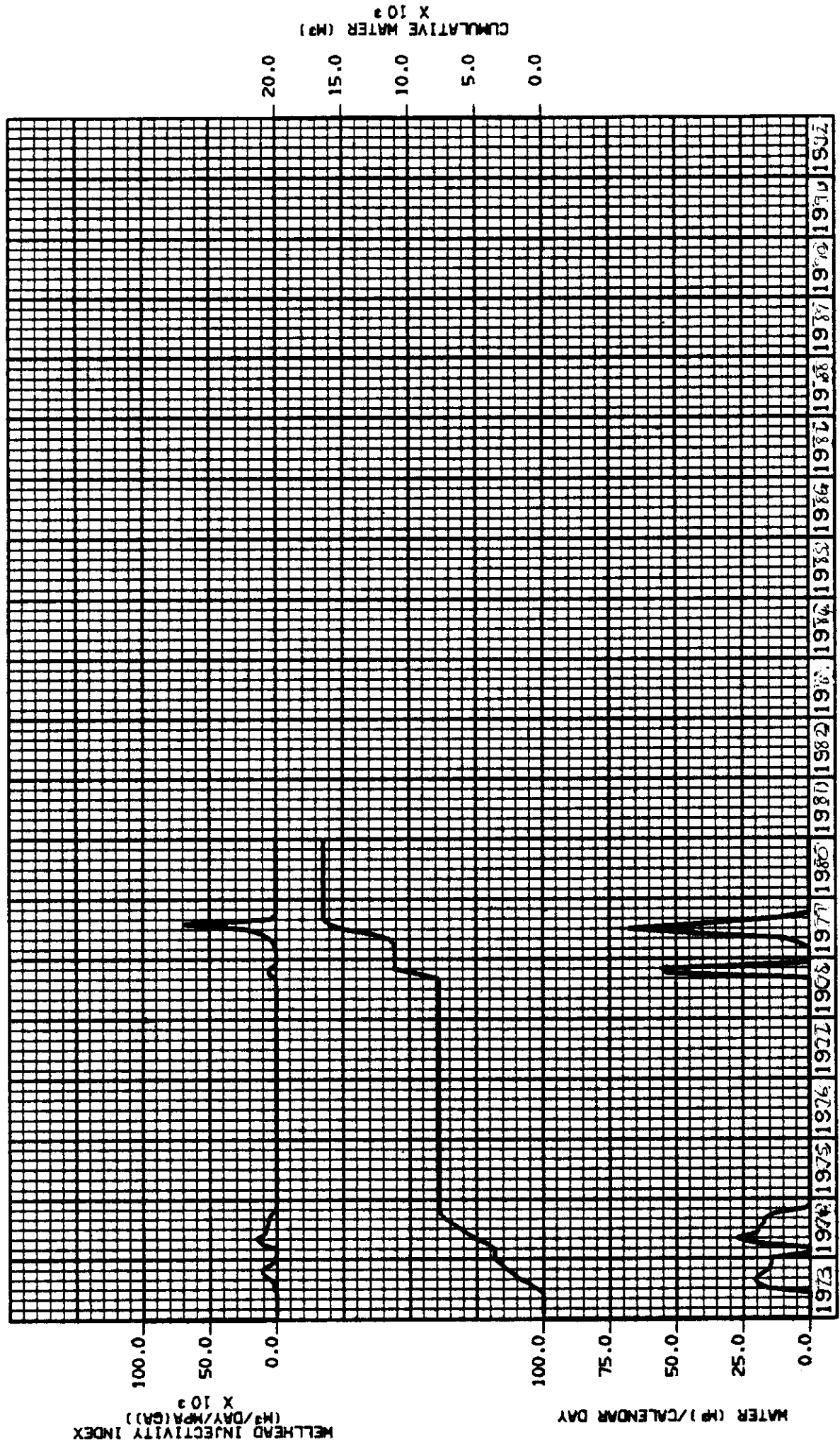
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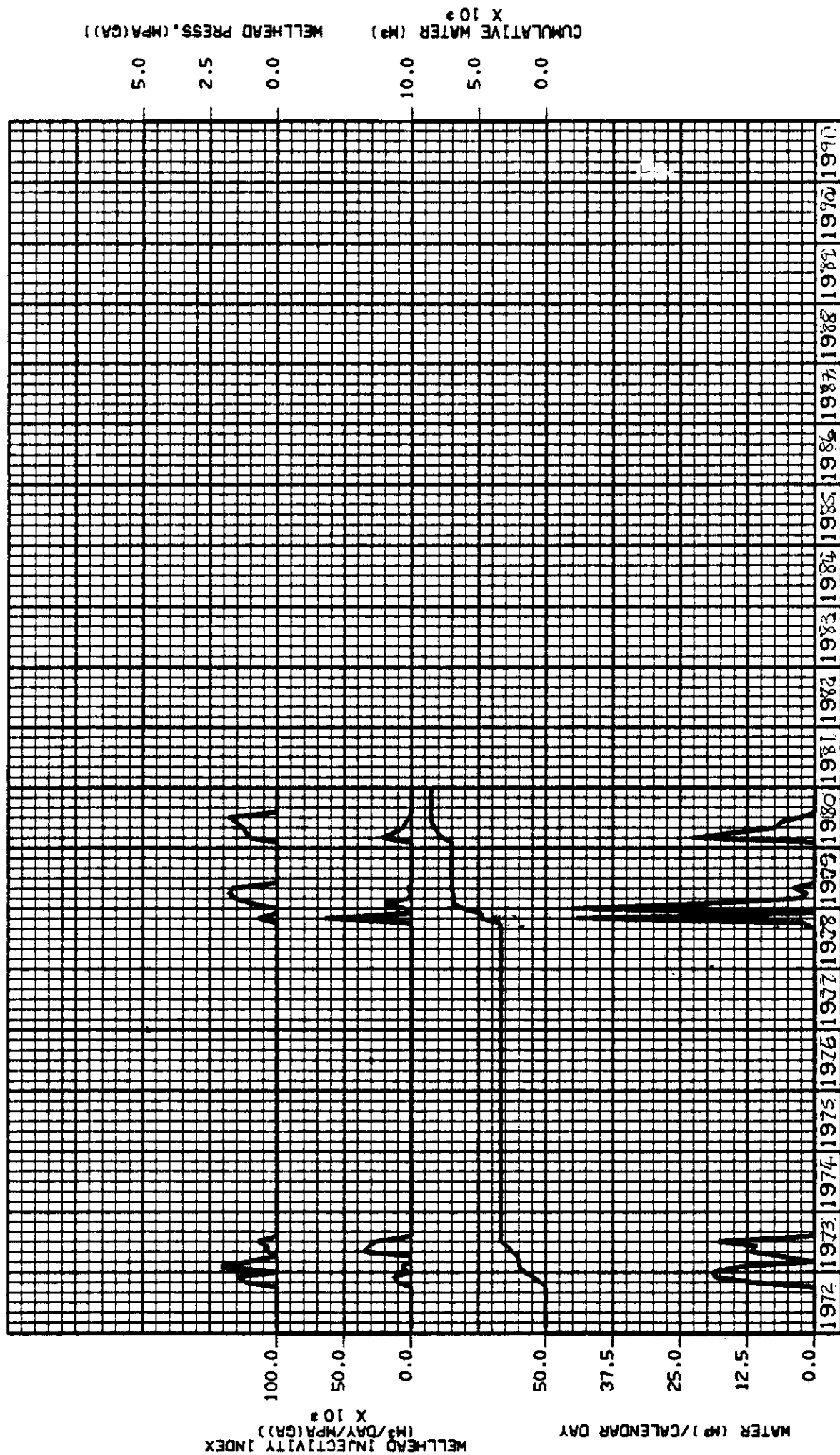
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# WEST BUTLER INJECTION PLOT 16-30-009-29W1



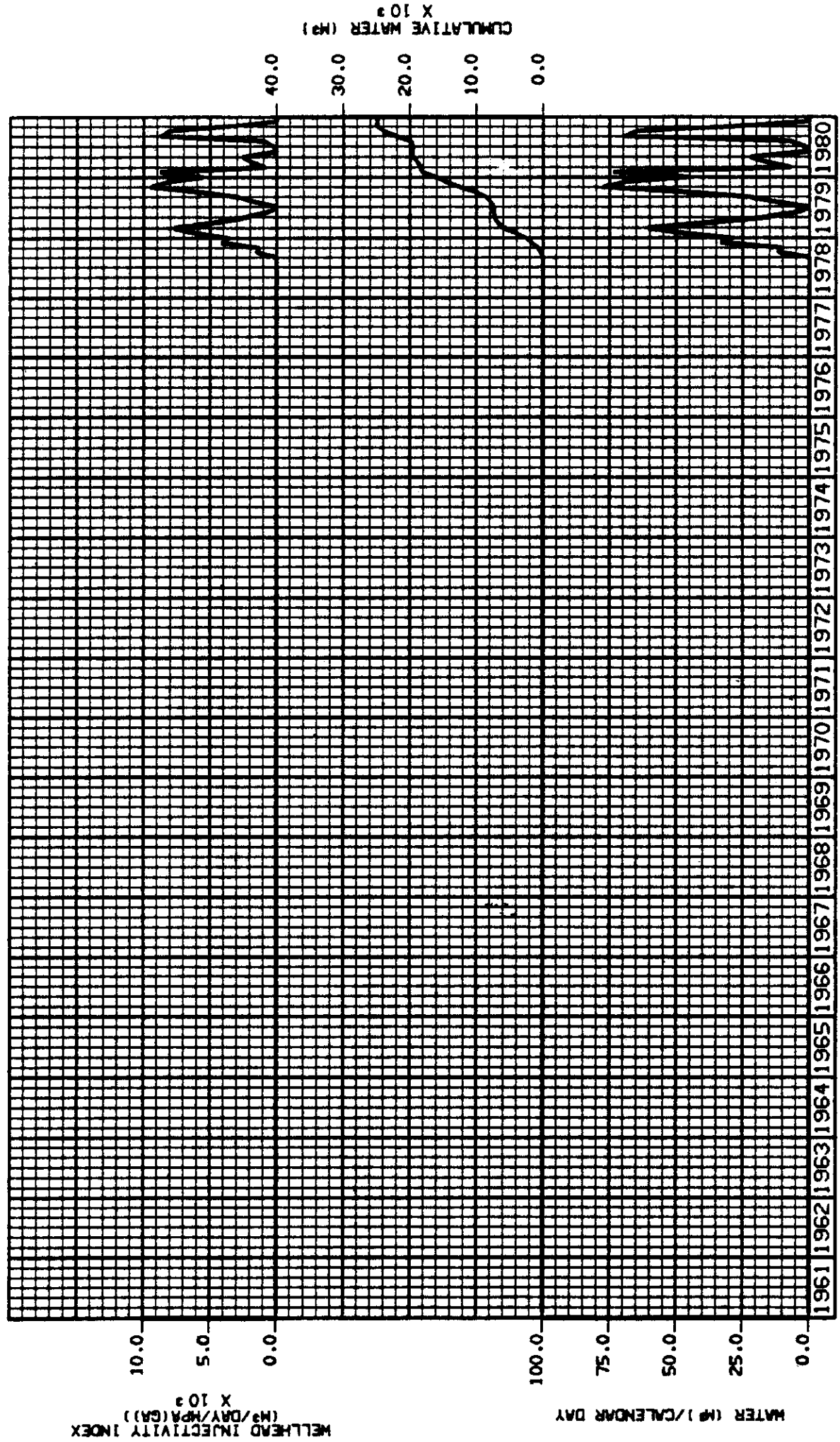
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# WEST BUTLER INJECTION PLOT 08-31-009-29W1



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# WEST BUTLER INJECTION PLOT 04-32-009-29W1





WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
1979-01-01 to 1979-12-31

I. INTRODUCTION

West Butler Unit No. 1 became effective 1972-09-01. This is the sixth annual report and represents a review of operations for the period 1979-01-01 to 1979-12-31.

II. OPERATIONS

1. Production

Oil production for the report period totalled 584.3 m<sup>3</sup>, of which 274.8 m<sup>3</sup> were produced during the first half of 1979 and 309.5 m<sup>3</sup> were produced during the second half. This compares with 361.4 m<sup>3</sup> oil produced during the second half of 1978. Average daily production rate for 1979-12 was 1.63 m<sup>3</sup>/d.

2. Injection

Water injection, which has been suspended since 1976-07-01, resumed in 1978-09. Three new injectors (4-32-9-29, 12-29-9-29 and 14-29-9-29) outside the unit, were placed on injection in 1978-09 and total injection from these wells for this report period was 24 058.7 m<sup>3</sup>. Injection within the unit totalled 6 144.9 m<sup>3</sup> for the report period. Table II summarizes water injection both within and outside the unit.

3. Water Supply

The existing water source for the injection system is from a Devonian water source well in 1-31-9-29. Current capability of the supply well is approximately 105.2 m<sup>3</sup>/d based on 1979-12.

The water source well in 7A-31-9-29 is currently suspended. Capability is 12.7 m<sup>3</sup>.

4. General

1979-02

16-30-9-29 - Reworked well. Reperforated and attempted to inject water. Program to stimulate well.

1979-03

16-30-9-29 - Acidized well and placed on injection.

1979-08

1-31-9-29 WSW - Pulled Reda pump assembly. Installed gas separator pump intake and rerun Reda pump assembly.

1979-09

1-31-9-29 WSW - Acidized well.

III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is shown on Figures 2 and 3.

The status of reservoir voidage is presented in Table IV. The three outside injection wells were included in the voidage calculations.

TABLE I  
WEST BUTLER UNIT NO. 1  
PRODUCTION HISTORY

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total For Period</u>
Oil (m <sup>3</sup> )	111.0	163.8	155.3	154.2	584.3
Cum. Oil (m <sup>3</sup> )	3 210.4	3 374.2	3 529.5	3 683.7	
Gas (10 <sup>3</sup> m <sup>3</sup> )	2.4	3.3	3.2	3.4	12.3
Cum. Gas (10 <sup>3</sup> m <sup>3</sup> )	68.2	71.5	74.7	78.1	
Water (m <sup>3</sup> )	1.9	5.7	4.3	-	11.9
Cum. Water (m <sup>3</sup> )	1 287.6	1 293.3	1 297.6	1 297.6	
Water Injection (m <sup>3</sup> )	804.1	3 788.8	1 552.0	-	6 144.9
Cum. Water Inj. (m <sup>3</sup> )	18 077.6	21 866.4	23 418.4	23 418.4	
Water Injection (m <sup>3</sup> ) outside unit	6 896.3	1 067.5	5 015.9	11 079.0	24 058.7
Cumulative (m <sup>3</sup> )	12 183.4	13 250.9	18 266.8	29 345.8	

Cumulative Pre-Unit Production is as follows:

Oil: 24 145.6 m<sup>3</sup>  
 Gas: 513.7 10<sup>3</sup> m<sup>3</sup>  
 Water: 4 229.8 m<sup>3</sup>

TABLE II

WEST BUTLER UNIT NO. 1  
WATER INJECTION DATA 1979  
1979-01-01 to 1979-12-31

Injection Well	Date on Injection	1979-12 Injection			Cumulative Injection to 1979-12-31 (m <sup>3</sup> )
		m <sup>3</sup> /month	m <sup>3</sup> /d	kPa	
8-31	1972-09-20	-	-	-	6 990.0
16-30	1973-06-01	-	-	-	16 428.4
Subtotal		-	-	-	23 418.4
12-29	1978-09-11	1 822.6	58.7	8480	12 373.4
14-29	1978-09-11	35.3	1.1	8410	1 070.6
4-32	1978-09-11	1 405.6	45.3	8200	15 901.7
TOTAL		<u>3 263.5</u>	<u>105.1</u>		<u>52 764.1</u>

TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	<u>1979-12</u> <u>Volume (m<sup>3</sup>/d)</u>
*7A-31-9-29	Conventional	12.7
1-31-9-29	Reda	105.2

\*Well is currently suspended.

TABLE IV

WEST BUTLER UNIT NO. 1  
CALCULATION OF VOIDAGE RATES

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total For Period</u>
Oil Produced (m <sup>3</sup> )	111.0	163.8	155.3	154.2	584.3
Gas Produced (10 <sup>3</sup> m <sup>3</sup> )	2.4	3.3	3.2	3.4	12.3
Water Produced (m <sup>3</sup> )	1.9	5.7	4.3	-	11.9
Average Solution GOR (m <sup>3</sup> /m <sup>3</sup> )	21	21	21	21	
Formation Volume Factor	1.07	1.07	1.07	1.07	
Oil Voidage (Res. m <sup>3</sup> )	118.7	175.2	166.1	165.0	625.0
Water Voidage (m <sup>3</sup> )	1.9	5.7	4.3	-	11.9
Total Voidage (Res. m <sup>3</sup> )	120.6	180.9	170.4	165.0	636.9
*Water Injection (m <sup>3</sup> )	7 700.4	4 856.3	6 567.9	11 079.0	30 203.6
Net Voidage (Res. m <sup>3</sup> )	-7 579.8	-4 675.4	-6 397.5	-10 914.0	-29 566.7
Net Voidage Rate (Res. m <sup>3</sup> /d)	-84.2	-51.3	-69.5	-118.6	-81.0
Cum. Net Voidage (Res. m <sup>3</sup> )	-25 602.8	-30 278.2	-36 675.7	-47 589.7	
Gas Produced = Solution Gas					
Cumulative Pre-Unit Voidage: Oil	25 835.7 res. m <sup>3</sup>				
Water	4 229.8 m <sup>3</sup>				
Total	30 065.5 res. m <sup>3</sup>				

\*Includes water injection in the three injectors outside unit.

WEST BUTLER  
PILOT WATERFLOOD PROJECT  
PROGRESS REPORT TO 1979-08-31

I. INTRODUCTION

An application to conduct a pilot waterflood in West Butler was submitted to the Oil and Natural Gas Conservation Board on 1978-06-27. Approval was received on 1978-08-22, and injection commenced in 1978-09.

The original West Butler waterflood project commenced in 1972-09 when well 8-31-9-29 was placed on injection. An additional well, 16-30-9-29 was placed on injection in 1973-06. The waterflood project was suspended in 1976-07 due to problems associated with obtaining an adequate water supply from the Ashville water source well in Lsd. 7-31-9-29.

An alternate water source in the Devonian was developed in 1977-10. Since the success or failure of a waterflood project is difficult to evaluate unless a pattern configuration is developed in which the injection of water can be controlled, a pilot waterflood project was proposed to provide a confined five spot injection pattern. Two existing wells were incorporated in the pattern, which was completed by drilling three injection wells (see Figure 1).

This is the first annual progress report for the pilot waterflood, and represents a review of operations from 1978-09-01 to 1979-08-31.

II. OPERATIONS

1. Production

Oil production for the report period totalled 167.3 m<sup>3</sup>. Monthly production statistics are presented in Table I. A production history plot for well 13-29-9-29 is also included in the report.

2. Injection

Three new injectors (12-29-9-29, 14-29-9-29, and 4-32-9-29) were placed on injection on 1978-09-11. Water injection was resumed into the previously suspended injection well in Lsd. 16-30-9-29 on 1978-09-19. The injection pressure for each of the three new injection wells increased to 7600 kPa within a week of injection at rates of approximately 30 m<sup>3</sup> per day per well.

The injection well 16-30-9-29 is performing unsatisfactorily. Attempts to cement squeeze the "thief zone" were unsuccessful.

Injection for the pilot project totalled 24 251.9 m<sup>3</sup> for the report period. Table II summarizes the water injection data.

### 3. Water Supply

The present water source for the injection system is from a Devonian water source well in 1-31-9-28. Current capability of the supply well is approximately 59 m<sup>3</sup>/d

The water source well in 7A-31-9-29 is currently suspended. Capability is 12.7 m<sup>3</sup>.

### 4. General

#### Injection Wells:

4-32-9-29 W1M: Drilled to 840.9 m. Landed 139.7 mm casing at 817.78 m. Acidized open hole interval with 26 495 L 15% MSR acid and 4731 L WF-100, W/J 237 and J227 diverters.

14-29-9-29 W1M: Drilled to 840.9 m. Landed 139.7 mm casing at 816.56 m. Acidized open hole interval with 15 140 L 15% MSR acid and 5678 L WF-100, W/J 237 and J227 diverters.

12-29-9-29 W1M: Drilled to 837.9 m. Landed 139.7 mm casing at 837.9 m. Acidized open hole interval with 26 495 L 15% MSR acid and 4731 L WF-100, W/J 237 and J227 diverters.

#### Well Reconditioning

16-30-9-29 W1M: 1978-09

Well was treated with 15.9 m<sup>3</sup> of 10 000 ppm acetic acid prior to being placed on injection.

1978-10 to 1979-03

Ran a tracer, flow, and temperature survey to determine the intervals into which the water was being injected. Although inconclusive, the survey indicated that all the injected fluid is probably leaving the casing through the bottom perforations.

Perforated well from 837.9 m to 838.2 m with 13 shots per metre. Performed cement squeezes of 75 sacks, 100 sacks and 60 sacks. Cement plug was tagged at 833.3 m.



Acidized interval 815.3 m to 833.3 m with 1893 L mud acid.

Attempts to divert the injected water from flowing into the bottom perforations were unsuccessful, since the well continues to take a large volume of water at low injection pressures.

4-32-9-29 WLM: 1978-10

Ran tracer, temperature and caliper surveys. The tracer and temperature surveys implied that the fluid is being accepted evenly by the formation.

The caliper survey shows no abnormal formation damage.

#### Pressure Survey

Pressure measurements were taken in 1978-07 on the three new injection wells. The results are summarized as follows:

<u>Well</u>	<u>Datum Depth Pressure</u> <u>(kPa)</u>
4-32-9-29	7102
14-29-9-29	6915
12-29-9-29	7336

The estimated original reservoir pressure for West Butler is 7653 kPa.

### III. RESERVOIR PERFORMANCE

The status of reservoir voidage for the West Butler pilot waterflood project is presented in Table IV. Water injection during the report period exceeded withdrawals by 15 391.4 m<sup>3</sup> for an average net voidage rate of -42.2 reservoir m<sup>3</sup>/d. Water injection exceeded withdrawals by 1391.8 m<sup>3</sup> in 1979-08, for a net voidage rate of -44.9 reservoir m<sup>3</sup>/d.

Water injected into well 16-30-9-29 has been excluded from voidage calculations. This well was on injection at approximately 7000 kPa injection pressure and a low injection rate. This changed suddenly to a high injection rate with virtually no back pressure. Since remedial attempts have been unsuccessful, it is believed that water injection into the well is not contributing to voidage replacement for the project.

The project net voidage at the start of the pilot waterflood from previous production is estimated to be 6833 reservoir m<sup>3</sup>.

Injection during the past year exceeded withdrawals by 15 391.4 m<sup>3</sup>. The cumulative project net voidage at 1979-08-31 is estimated to be -8558.4 reservoir m<sup>3</sup>.

Despite a voidage replacement factor of 74 during the past year, a cumulative net voidage of -8558.4 reservoir m<sup>3</sup>, and an enclosed five spot pattern, the pilot waterflood project has not responded to injection. Production for 13-29-9-29 continues at 0.5 m<sup>3</sup> oil per day.

A one year extension for the pilot waterflood project has been approved.

TABLE I  
WEST BUTLER PILOT WATERFLOOD  
MONTHLY PRODUCTION

<u>Month</u>	<u>Oil Production m<sup>3</sup></u>	<u>Water Production m<sup>3</sup></u>	<u>Water Cut %</u>	<u>Days On Production</u>	<u>Production Rate m<sup>3</sup>/d</u>
1978-09	17.2	9.5	35.6	30	0.6
1978-10	15.9	4.4	21.7	30	0.5
1978-11	16.4	3.2	16.3	30	0.5
1978-12	16.2	4.0	19.8	31	0.5
1979-01	6.3	0	0	14	0.5
1979-02	2.4	0	0	4	0.6
1978-03	17.4	1.9	9.8	26	0.7
1978-04	15.5	3.5	18.4	30	0.5
1979-05	15.5	1.4	8.3	31	0.5
1979-06	15.4	0.8	4.9	30	0.5
1979-07	14.8	3.0	16.9	31	0.5
1979-08	<u>14.3</u>	<u>0.5</u>	<u>3.4</u>	31	0.5
TOTAL	167.3	32.2	16.1		

Cumulative Production Prior to Pilot Flood:  
5919.9                  615.6

Cumulative Production to 1979-08-31:  
6087.2                  647.8

TABLE II  
WEST BUTLER PILOT WATERFLOOD  
WATER INJECTION DATA  
1978-09-01 TO 1979-08-31

<u>Injection</u> <u>Well</u>	<u>Date On</u> <u>Injection</u>	<u>Injection</u> <u>1978-09-01 to</u> <u>1979-08-31 (m<sup>3</sup>)</u>	<u>Cumulative</u> <u>Injection to</u> <u>1979-08-31 (m<sup>3</sup>)</u>	<u>1979-08 Injection</u>		
				<u>m<sup>3</sup>/month</u>	<u>m<sup>3</sup>/d</u>	<u>kPa</u>
16-30-9-29	1973-06-01	8 649.6	16 428.2	386.5	12.5	2 760
12-29-9-29	1979-09-11	6 149.3	6 149.3	683.3	22.0	8 140
14-29-9-29	1979-01-11	884.8	884.8	56.6	1.8	8 070
4-32-9-29	1979-09-11	<u>8 568.2</u>	<u>8 568.2</u>	<u>703.8</u>	<u>22.7</u>	8 000
		24 251.9	32 030.5	1 830.2	59.0	

TABLE III  
WEST BUTLER PILOT WATERFLOOD  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	<u>Volume (m<sup>3</sup>/d)</u>
*7A-31-9-29	Conventional	12.7
1-31-9-29	Reda	59.0 .

\*Well is currently suspended.

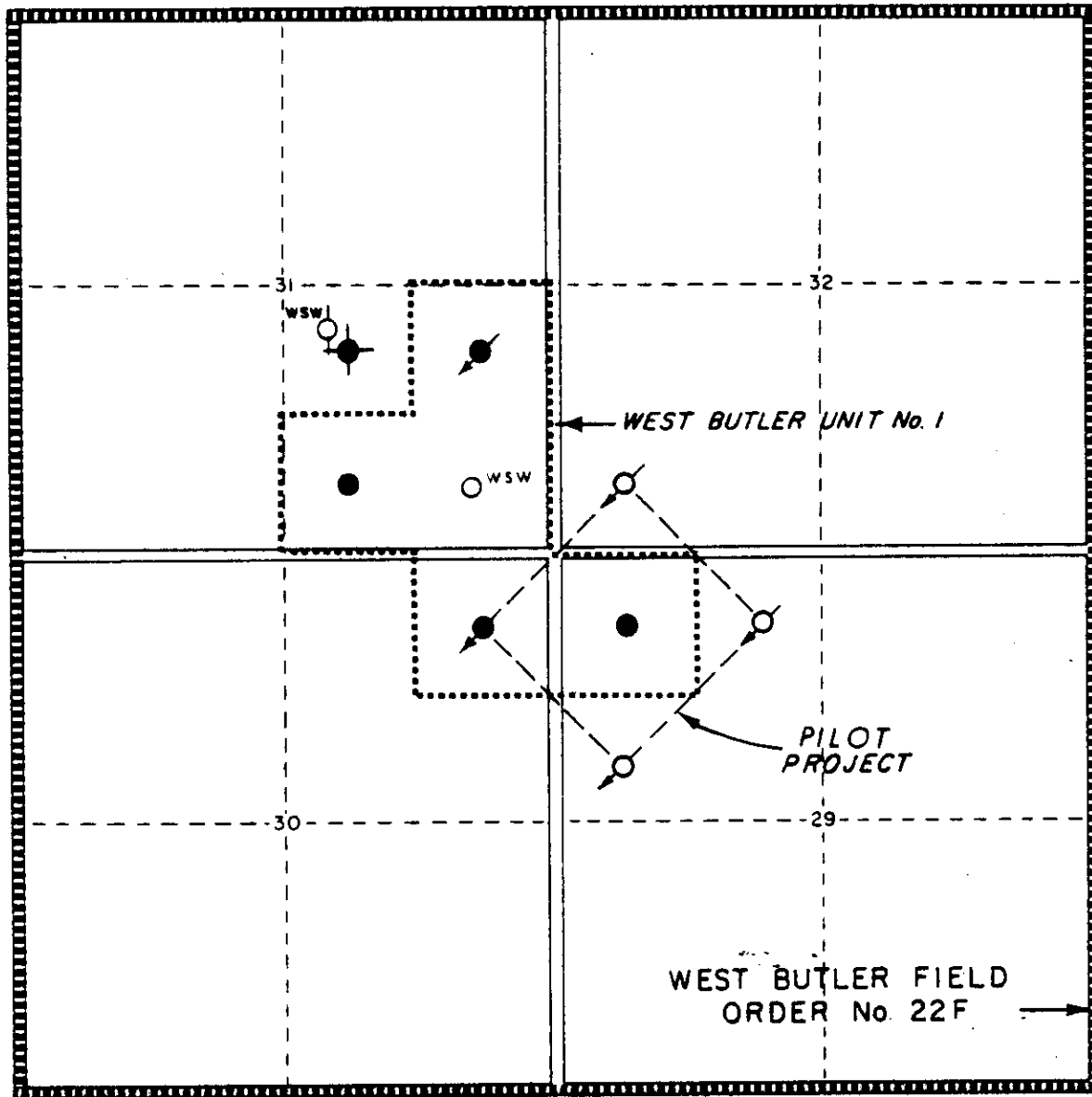
TABLE IV  
WEST BUTLER PILOT WATERFLOOD  
CALCULATION OF VOIDAGE RATES

	<u>QUARTER ENDING</u>				<u>Total For Period</u>
	<u>1978-11</u>	<u>1979-02</u>	<u>1979-05</u>	<u>1979-08</u>	
Oil Produced (m <sup>3</sup> )	49.5	24.9	48.4	44.5	167.3
Gas Produced (10 <sup>3</sup> m <sup>3</sup> )	1.0	0.5	1.0	0.9	3.4
Water Produced	17.1	4.0	6.8	4.3	32.2
Average Solution GOR (m <sup>3</sup> /m <sup>3</sup> )	21	21	21	21	
Formation Volume Factor	1.07	1.07	1.07	1.07	
Oil Voidage (m <sup>3</sup> )	53.0	26.6	51.8	47.6	179.0
Water Voidage (m <sup>3</sup> )	17.1	4.0	6.8	4.3	32.2
Total Voidage (Res. m <sup>3</sup> )	70.1	30.6	58.6	51.9	211.2
Water Injection (m <sup>3</sup> )*	3 521.7	6 865.2	2 864.2	2 351.5	15 602.6
Net Voidage (Res. m <sup>3</sup> )*	-3 451.6	-6 834.6	-2 805.6	-2 299.6	-15 391.4
Net Voidage Rate (Res. m <sup>3</sup> /d)*	-37.9	-75.9	-30.5	-25.0	-42.2
Cum. Net Voidage (Res. m <sup>3</sup> )**	3 381.4	-3 453.2	-6 258.8	-8 558.4	

\*Water Injection into 16-30-9-29 is excluded.

\*\*Net voidage at the start of pilot waterflood 6833 Reservoir m<sup>3</sup>.

R. 29 W.P.M.



LEGEND

- INJECTION WELL
- SUSPENDED WELL
- WSW WATER SOURCE WELL

WEST BUTLER PILOT WATERFLOOD PROJECT

WEST BUTLER FIELD

SCALE: 3" = 1 MILE

WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
1978-01-01 to 1978-12-31

I. INTRODUCTION

West Butler Unit No. 1 became effective 1972-09-01. This is the sixth annual report and represents a review of operations for the period 1978-01-01 to 1978-12-31.

II. OPERATIONS

1. Production

Oil production for the report period totalled 577.2 m<sup>3</sup>. Both wells were shut in during 1978-01 and 1978-02 due to problems associated with operating the gas engines in cold weather.

2. Injection

Water injection, which had been suspended since 1976-07-01, resumed in 1978-09. Three new injectors (4-32-9-29, 12-29-9-29 and 14-29-9-29) outside the unit, were placed on injection in 1978-09 and total injection from these wells for the report period was 5 287.1 m<sup>3</sup>. Injection within the unit totalled 6 133.1 m<sup>3</sup> for the report period. Table II summarizes water injection both within and outside the unit.

3. Water Supply

The existing water source for the injection system is from a Devonian water source well in 1-31-9-29. Current capability of the supply well is approximately 158.9 m<sup>3</sup>/d.



The water source well in 7A-31-9-29 is currently suspended. Capability is 12.7 m<sup>3</sup>.

#### 4. General

##### Injection Wells:

4-32-9-29 WIW: Drilled to 840.9 m. Landed 139.7 mm casing at 817.78 m. Acidized open hole interval with 26 495 L 15% MSR acid and 4 731 L WF-100, W/J 237 and J227 diverters.

14-29-9-29 WIW: Drilled to 840.9 m. Landed 139.7 mm casing at 816.56 m. Acidized open hole interval with 15 140 L 15% MSR acid and 5 678 L WF-100, W/J 237 and J227 diverters.

12-29-9-29 WIW: Drilled to 837.9 m. Landed 139.7 mm casing at 837.9 m. Acidized open hole interval with 26 495 L 15% MSR acid and 4 731 L WF-100, W/J 237 and J227 diverters.

##### Well Reconditioning

13-29-9-29: Acidized interval 818.39 m to 837.9 m with 26 495 L 15% MSR acid and 4 731 L WF-100 W/J 237 and J227 diverters.

##### Pressure Survey

Pressure measurements were taken in 1978-07 on one producing well in the Unit and the three new injection wells outside the Unit. The results are summarized below.

<u>Well</u>	Datum Depth Pressure
	(kPa)
2-31-9-29	883
4-32-9-29	7 102
14-29-9-29	6 915
12-29-9-29	7 336

### III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is shown on Figures 2 and 3.

The status of reservoir voidage is presented in Table IV. The three outside injection wells were included in the voidage calculations.

TABLE I

WEST BUTLER UNIT NO. 1  
PRODUCTION HISTORY

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total For Period</u>
Oil (m <sup>3</sup> )	26.5	189.3	196.6	164.8	577.2
Cum. Oil (m <sup>3</sup> )	2 548.7	2 738.0	2 934.6	3 099.4	
Gas (10 <sup>3</sup> m <sup>3</sup> )	.6	4.0	4.2	3.5	12.3
Cum. Gas (10 <sup>3</sup> m <sup>3</sup> )	54.1	58.1	62.3	65.8	
Water (m <sup>3</sup> )	-	32.6	26.4	11.6	70.6
Cum. Water (m <sup>3</sup> )	1 251.1	1 247.7	1 274.1	1 285.7	
Water Injection (m <sup>3</sup> )	-	-	1 676.6	4 456.5	6 133.1
Cum. Water Inj. (m <sup>3</sup> )	11 140.4	11 140.4	12 817.0	17 273.5	
Water Injection (m <sup>3</sup> ) outside unit	-	-	795.9	4 491.2	5 287.1

Cumulative Pre-Unit Production is as follows:

Oil	24 145.6 m <sup>3</sup>
Gas	513.7 10 <sup>3</sup> m <sup>3</sup>
Water	4 229.8 m <sup>3</sup>

TABLE II

WEST BUTLER UNIT NO. 1  
 WATER INJECTION DATA 1978  
1978-01-01 to 1978-12-31

Injection	Date on	1978-12 Injection			Cumulative Injection
<u>Well</u>	<u>Injection</u>	<u>m<sup>3</sup>/month</u>	<u>m<sup>3</sup>/d</u>	<u>kPa</u>	<u>to 1978-12-31 (m<sup>3</sup>)</u>
8-31	1972-09-20	1 383.3	44.6	-	6 185.4
16-30	1973-06-01	-	-	-	<u>11 088.1</u>
Subtotal		1 383.3	44.6		17 273.5
12-29	1978-09-11	786.6	25.4	7 580	2 186.8
14-29	1978-09-11	97.6	3.1	8 000	549.9
4-32	1978-09-11	<u>881.2</u>	<u>28.4</u>	8 000	<u>2 550.4</u>
TOTAL		3 148.7	101.5		22 560.6

TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	<u>Volume (m<sup>3</sup>/d)</u>
*7A-31-9-29	Conventional	12.7
1-31-9-29	Reda	158.9

\*Well is currently suspended.

TABLE IV

WEST BUTLER UNIT NO. 1  
CALCULATION OF VOIDAGE RATES

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total For Period</u>
Oil Produced (m <sup>3</sup> )	26.5	189.3	196.6	164.8	577.2
Gas Produced (10 <sup>3</sup> m <sup>3</sup> )	.6	4.0	4.2	3.5	12.3
Water Produced (m <sup>3</sup> )	-	32.6	26.4	11.6	70.6
Average Solution GOR (m <sup>3</sup> /m <sup>3</sup> )	21	21	21	21	
Formation Volume Factor	1.07	1.07	1.07	1.07	
Oil Voidage (Res. m <sup>3</sup> )	28.4	202.6	210.4	176.3	617.7
Water Voidage (m <sup>3</sup> )	-	32.6	26.4	11.6	70.6
Total Voidage (Res. m <sup>3</sup> )	28.4	235.2	236.8	187.9	688.3
*Water Injection (m <sup>3</sup> )	-	-	2 472.5	8 947.7	11 420.2
Net Voidage (Res. m <sup>3</sup> )	28.4	235.2	-2 235.7	-8 759.8	-10 731.9
Net Voidage Rate (Res. m <sup>3</sup> /d)	.3	2.6	-24.3	-95.2	-29.4
Cum. Net Voidage (Res. m <sup>3</sup> )	-7 262.7	-7 027.5	-9 263.2	-18 023.0	
Gas Produced = Solution Gas					
Cumulative Pre-Unit Voidage:	Oil	25 835.7 res. m <sup>3</sup>			
	Water	4 229.8 m <sup>3</sup>			
	Total	30 065.5 res. m <sup>3</sup>			

\*Includes water injection in the three injectors outside unit.

WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
1977-01-01 TO 1977-12-31

I. INTRODUCTION

West Butler Unit No. 1 became effective 1972-09-01. This is the fifth annual report and represents a review of operations for the period 1977-01-01 to 1977-12-31.

II. OPERATIONS

1. Production

Oil production for the eleven month period in 1977 when the wells produced a total of 3,167 barrels. The wells are shut-in for the winter months because of problems associated with operating the gas engines in cold weather.

2. Injection

Water injection has been suspended for a maximum period of two years commencing 1976-07-01. There was no water injected during 1977. The water supply is insufficient to permit continuous injection. Cumulative water injected into each well as of 1977-12-31 is as follows:

8-31-9-29	21,148 barrels
16-30-9-29	48,926 barrels

Water injection was suspended on 1974-10-06.

3. Water Supply

The existing water source for the injection system is from an Ashville water source well in 7A-31-9-29. Current capability of the supply well is approximately 80 BWPD.

In 1977-10 the suspended well 1-31-9-29 was deepened to 4,166 feet. The well swab tested at 40 barrels of water per hour from the Souris Valley and Dawson Bay.

Injection should resume during the second quarter of 1978.

4. General

No pressure measurements were taken in 1977.

### III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is shown in Figure 2. The status of reservoir voidage is presented in Table IV. There was no water injected during 1977.

No water flood response has been experienced to date.



TABLE I

WEST BUTLER UNIT NO. 1  
PRODUCTION HISTORY

	<u>First</u> <u>Quarter</u>	<u>Second</u> <u>Quarter</u>	<u>Third</u> <u>Quarter</u>	<u>Fourth</u> <u>Quarter</u>	<u>Total for</u> <u>Period</u>
Oil Prod. (Bbls.)	784	1,045	881	457	3,167
Cum. Oil Prod. (Bbls.)	13,489	14,534	15,415	15,872	-
Gas Prod. (MSCF)	94	125	106	55	380
Cum. Gas Prod. (MSCF)	1,613	1,738	1,844	1,899	-
Water Prod. (Bbls.)	-	-	-	-	-
Cum. Water Prod. (Bbls.)	7,643	7,643	7,643	7,643	7,643
Water Inj. (Bbls.)	-	-	-	-	-
Cum. Water Inj. (Bbls.)	70,074	70,074	70,074	70,074	-

NOTE: Cumulative Pre-Unit Production is as follows:

Oil - 151,945 Barrels  
Gas - 18,233 MSCF  
Water - 26,606 Barrels

TABLE II

WEST BUTLER UNIT NO. 1  
WATER INJECTION DATA  
1977-01-01 TO 1977-12-31

<u>Injection Well</u>	<u>Date On Injection</u>	<u>Water Injected During December</u>	<u>December Injection Rate - BWPD</u>	<u>December Maximum Injection Pressure</u>	<u>Cumulative Injection to 12-31-77</u>
8-31	72-09-20	Nil	-	-	21,148
16-30	73-06-01	Nil	-	-	48,926
TOTAL					70,074

TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	<u>Volume - BWPD</u>
7A-31-9-29	Conventional 2½" x 2½" x 10'	30

The well was inhibited and pump and rods pulled on 1974-11-25.

TABLE IV

WEST BUTLER UNIT NO. 1  
CALCULATION OF VOIDAGE RATES  
1977-01-01 TO 1977-12-31

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total for Period</u>
Oil Prod. (Bbls.)	784	1,045	881	457	3,167
Water Prod. (Bbls.)	-	-	-	-	-
Gas Prod. (MSCF)	94	125	106	55	380
Average Solution GOR	120	120	120	120	-
Formation Volume Factor	1.07	1.07	1.07	1.07	-
Voidage Oil (Res. Bbls.)	839	1,118	943	489	3,389
Voidage Water (Res. Bbls.)	-	-	-	-	-
Total Voidage (Res. Bbls.)	839	1,118	943	489	3,389
Water Injected (Res. Bbls.)	-	-	-	-	-
Net Voidage (Res. Bbls.)	839	1,118	943	489	3,389
Net Voidage Rate (Res. B/D)	14	12	11	8	11
Unit Cumulative Net Voidage (Res. Bbls.)	(48,432)	(47,314)	(46,371)	(45,882)	-

Gas Produced = Solution Gas

Cumulative Pre-Unit Voidage:

Oil - 162,581 Res. Bbls.  
Water - 26,606 Res. Bbls.  
Total - 189,187 Res. Bbls.

1976

WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
1976-01-01 TO 1976-12-31

I. INTRODUCTION

West Butler Unit No. 1 became effective 1972-09-01. This is the fifth annual report and represents a review of operations for the period 76-01-01 to 76-12-31.

II. OPERATIONS

1. Production

Oil production for the eight month period in 1976 when the wells produced totalled 2,302 barrels. The wells are shut-in for the winter months because of problems associated with operating the gas engines in cold weather.

2. Injection

Water injection has been suspended for a maximum period of two years commencing 1976-07-01. There was no water injected during 1976. The water supply is insufficient to permit continuous injection. Cumulative water injected into each well as of 76-12-31 is as follows:

8-31-9-29	21,148 barrels
16-30-9-29	48,926 barrels

Water injection was suspended on 1974-10-06.

3. Water Supply

The existing water source for the injection system is from an Ashville water source well in 7A-31-9-29. Current capability of the supply well is approximately 80 BWPD.

4. General

A bottom hole pressure survey was run on the following wells during 1976. The results were as follows:

<u>Well Location</u>	<u>Bomb Runs</u> <u>Final Measured</u> <u>Run Depth</u> <u>Pressure (psig)</u>	<u>Static Datum Depth</u> <u>Pressure (psig)</u>
8-31-9-29 WIW	979.5	979.5
1-31-9-29	1085.7	1085.7
16-30-9-29 WIW	1085.7	1085.7

Sonic Survey

2-31-9-29	320' of pump submergence	128
13-29-9-29	303' of pump submergence	112

### III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is shown in Figure 2. The status of reservoir voidage is presented in Table IV. There was no water injected during 1976.

No waterflood response has been experienced to date.

TABLE I  
WEST BUTLER UNIT NO. 1  
PRODUCTION HISTORY

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total for Period</u>
Oil Produced (Bbls.)	51	808	1,205	738	2,802
Cumulative Oil Produced (Bbls.)	9,954	10,762	11,967	12,705	-
Gas Produced (MSCF)	6	97	145	87	335
Cumulative Gas Produced (MSCF)	1,190	1,287	1,432	1,519	-
Water Produced (Bbls.)	-	-	-	-	-
Cumulative Water Produced (Bbls.)	7,643	7,643	7,643	7,643	7,643
Water Injected (Bbls.)	-	-	-	-	-
Cumulative Water Injected (Bbls.)	70,074	70,074	70,074	70,074	-

NOTE: Cumulative Pre-Unit Production is as follows:

Oil	-	151,945 Barrels
Gas	-	18,233 MSCF
Water	-	26,606 Barrels

TABLE II

WEST BUTLER UNIT NO. 1  
WATER INJECTION DATA  
1976-01-01 TO 1976-12-31

<u>Injection Well</u>	<u>Date On Injection</u>	<u>Water Injected During December</u>	<u>December Injection Rate - BWPD</u>	<u>December Maximum Injection Pressure</u>	<u>Cumulative Injection to 12/31/76</u>
8-31	9/20/72	N11	-	-	21,143
16-30	6/01/73	N11	-	-	43,926
TOTAL					70,074



TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	<u>Volume BWPB</u>
7A-31-9-29	Conventional 2½" x 2¼" x 10'	30

The well was inhibited and pump and rods pulled on 1974-11-25.

TABLE IV

WEST BUTLER UNIT NO. 1  
CALCULATION OF VOIDAGE RATES  
1976-01-01 TO 1976-12-31

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total for Period</u>
Oil Produced (Bbls.)	51	808	1,205	738	2,802
Water Produced (Bbls.)	-	-	-	-	-
Gas Produced (MSCF)	6	97	145	87	335
Average Solution GOR	120	120	120	120	-
Formation Volume Factor	1.07	1.07	1.07	1.07	-
Voidage Oil (Res. Bbls.)	55	865	1,289	790	2,999
Voidage Water (Res. Bbls.)	-	-	-	-	-
Total Voidage (Res. Bbls.)	55	865	1,289	790	2,999
Water Injected (Res. Bbls.)	-	-	-	-	-
Net Voidage (Res. Bbls.)	55	865	1,289	790	2,999
Net Voidage Rate (Res. Bbls./Day)	7	14	14	7	12
Unit Cum. Net Voidage (Res. Bbls.)	(52,215)	(51,350)	(50,061)	(49,271)	-

Gas Produced = Solution Gas

Cumulative Pre-Unit Voidage:

Oil - 162,581 Res. Bbls.  
Water - 26,606 Res. Bbls.  
Total - 189,187 Res. Bbls.

WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
JANUARY 1, 1974 TO DECEMBER 31, 1974

I. INTRODUCTION

West Butler Unit No. 1 became effective September 1, 1972. This is the third annual report and presents a review of operations for the period January 1, 1974 to December 31, 1974.

II. OPERATIONS

1. Production

Oil production for the six month period in 1974 when the wells produced totalled 2,530 barrels. The wells are shut-in for the winter months because of problems associated with operating the gas engines in cold weather.

2. Injection

Total water injected in 1974 was 26,134 barrels.

The water supply is insufficient to permit continuous injection into both injection wells. Cumulative water injected into each well as of December 31, 1974 is as follows:

8-31-9-29 - 21,148 barrels  
16-30-9-29 - 48,926 barrels

The injection plant was rebuilt and was started up on March 12, 1974. Water injection was suspended on October 6, 1974.

3. Water Supply

The water source for the injection system is from an Ashville water source well in Lsd. 7-31-9-29. Current capability of the supply well is approximately 80 BWP.

4. General

7A-31-9-29 - Pump change in August 1974.

### III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is shown in Figure 2. The status of reservoir voidage is presented in Table IV. Water injection exceeded reservoir withdrawals by 23,861 barrels for an average net voidage rate of -64 reservoir barrels per day for 1974.

No waterflood response has been experienced to date.

The two oilwells in the unit were sonologged on May 28, 1974 after being shut-in all winter. Results were as follows:

13-29-9-29 - 270' of pump submergence  
2-31-9-29 - 213' of pump submergence

TABLE I

WEST BUTLER UNIT NO. 1  
PRODUCTION HISTORY

	<u>First</u> <u>Quarter</u>	<u>Second</u> <u>Quarter</u>	<u>Third</u> <u>Quarter</u>	<u>Fourth</u> <u>Quarter</u>	<u>Total for</u> <u>Period</u>
Oil Produced (Bbls.)	-	702	1,209	559	2,530
Cumulative Oil Produced (Bbls.)	4,170	4,872	6,141	6,700	-
Gas Produced (MSCF)	-	83	150	66	299
Cumulative Gas Produced (MSCF)	501	584	734	800	-
Water Produced (Bbls.)	-	-	-	-	-
Cumulative Water Produced (Bbls.)	7,643	7,643	7,643	7,643	7,643
Water Injected (Bbls.)	4,057	12,580	9,116	381	26,134
Cumulative Water Injected (Bbls.)	47,997	60,577	69,693	70,074	-

NOTE: Cumulative Pre-Unit Production is as follows:

Oil - 151,945 Barrels  
Gas - 18,233 MSCF  
Water - 26,606 Barrels

TABLE II

WEST BUTLER UNIT NO. 1  
WATER INJECTION DATA  
JANUARY 1, 1974 TO DECEMBER 31, 1974

<u>Injection Well</u>	<u>Date On Injection</u>	<u>Water Injected During December</u>	<u>December Injection Rate - BWPD</u>	<u>December Maximum Injection Pressure</u>	<u>Cumulative Injection to 12/31/74</u>
8-31	9/20/72	Nil	-	-	21,143
16-30	6/01/73	Nil	-	-	22,792
TOTAL					43,940

TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	<u>Volume BWP/D</u>
7A-31-9-29	Conventional 2½" x 2¼" x 10'	80

TABLE IV

WEST BUTLER UNIT NO. 1  
CALCULATION OF VOIDAGE RATES  
JANUARY 1, 1974 TO DECEMBER 31, 1974

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total for Period</u>
Oil Produced (Bbls.)	-	702	1,269	559	2,530
Water Produced (Bbls.)	-	-	-	-	-
*Gas Produced (MSCF)	-	83	150	66	299
Average Solution GOR	120	120	120	120	-
Formation Volume Factor	1.07	1.07	1.07	1.07	-
Voidage Oil (Res. Bbls.)	-	751	1,358	598	2,707
Voidage Water (Res. Bbls.)	-	-	-	-	-
Total Voidage (Res. Bbls.)	-	751	1,358	598	2,707
Water Injected (Res. Bbls.)	4,057	12,580	9,116	381	26,134
Net Voidage (Res. Bbls.)	(4,057)	(11,829)	(7,758)	(217)	(23,861)
Net Voidage Rate (Res. Bbls./Day)	(45)	(130)	(84)	(2)	(64)
Unit Cum. Net Voidage (Res. Bbls.)	(35,893)	(47,722)	(55,480)	(55,697)	-

\*Gas Produced = Solution Gas

Cumulative Pre-Unit Voidage:

Oil - 162,581 Res. Bbls.  
Water - 20,606 Res. Bbls.  
Total - 139,187 Res. Bbls.



WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
JANUARY 1, 1973 TO DECEMBER 31, 1973

I. INTRODUCTION

West Butler Unit No. 1 became effective September 1, 1972. This is the second annual report and presents a review of operations for the period January 1, 1973 to December 31, 1973.

II. OPERATIONS

1. Production

Oil production for the nine month period in 1973 when the wells produced totalled 3,015 barrels. The wells are shut-in for the winter months because of problems associated with operating the gas engines in cold weather.

The suspended oilwell in Lsd. 1-31-9-29 was placed on production in March 1973. The well was re-suspended in August 1973 because of very high water production.

2. Injection

Total water injected in 1973 was 34,551 barrels. This total includes 27,023 barrels of Ashville water, and 7,528 barrels of produced Mississippian water.

The well in Lsd. 16-30-9-29 was placed on injection in June 1973.

The water supply is insufficient to permit continuous injection into both injection wells. Cumulative water injected into each well as of December 31, 1973 is as follows: .

8-31-9-29 - 21,148 barrels  
16-30-9-29 - 22,792 barrels

The injection plant burned down on December 15, 1973.

3. Water Supply

The water source for the injection system is from an Ashville water source well in Lsd. 7-31-9-29. This supply is supplemented by produced Mississippian water.

The water source well continues to perform unsatisfactorily. In an attempt to improve productivity, a clay-loc treatment was performed in May 1973, and a 25,000 lb. sand frac was performed in November 1973. The performance of the source well was still being evaluated at the time of the injection plant fire.

4. Well Reconditioning

16-30-9-25 - The well was treated with 250 gals. Paran, followed by 500 gals. 15% HCl. Injection rate was increased from 100 BWPd at 1220 psi to 130 BWPd at 1220 psi.

III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is shown in Figure 2. The status of reservoir voidage is presented in Table IV. Water injection exceeded reservoir withdrawals by 23,722 barrels for an average net voidage rate of -65 reservoir barrels per day for 1973.

No waterflood response has been experienced to date.

TABLE I

WEST BUTLER UNIT NO. 1  
PRODUCTION HISTORY

	<u>First</u> <u>Quarter</u>	<u>Second</u> <u>Quarter</u>	<u>Third</u> <u>Quarter</u>	<u>Fourth</u> <u>Quarter</u>	<u>Total For</u> <u>Period</u>
Oil Produced (Bbls.)	267	1,163	1,026	559	3,015
Cumulative Oil Prod. (Bbls.)	1,422	2,585	3,611	4,170	
Gas Produced (MSCF)	32	140	123	67	362
Cumulative Gas Produced (MSCF)	171	311	434	501	
Water Produced (Bbls.)	697	6,593	313	0	7,603
Cumulative Water Produced (Bbls.)	737	7,330	7,643	7,643	7,643
Water Injected (Bbls.)	4,053	10,683	11,262	8,553	34,551
Cumulative Water Injected (Bbls.)	13,442	24,125	35,387	43,940	

NOTE: Cumulative Pre-Unit Production is as follows:

Oil - 151,945 Barrels  
Gas - 18,233 MSCF  
Water - 26,606 Barrels

TABLE II

WEST BUTLER UNIT NO. 1  
WATER INJECTION DATA  
JANUARY 1, 1973 TO DECEMBER 31, 1973

<u>Injection Well</u>	<u>Date On Injection</u>	<u>Water Injected During December</u>	<u>December Injection Rate - BWPD</u>	<u>December Maximum Injection Pressure</u>	<u>Cumulative Injection to 12/31/73</u>
8-31	9/20/72	Nil	-	-	21,148
16-30	6/01/73	2,821	91	1,020	22,792
TOTAL		2,821			43,940

TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

<u>Source</u>	<u>Type of Pump</u>	<u>December 1972</u> <u>Volume - BWPD</u>
7A-31-9-29	Conventional 2½" x 2¼" x 10'	91

TABLE IV

WEST BUTLER UNIT NO. 1  
CALCULATION OF VOIDAGE RATES  
JANUARY 1, 1973 TO DECEMBER 31, 1974

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total For Period</u>
Oil Produced (Bbls.)	267	1,163	1,026	559	3,015
Water Produced (Bbls.)	697	6,593	313	0	7,603
*Gas Produced (MSCF)	32	140	123	67	362
Average Solution GOR	120	120	120	120	
Formation Volume Factor	1.07	1.07	1.07	1.07	
Voidage Oil (Res. Bbls.)	236	1,244	1,098	598	3,226
Voidage Water (Res. Bbls.)	697	6,593	313	0	7,603
Total Voidage (Res. Bbls.)	983	7,837	1,411	598	10,829
Water Injected (Res. Bbls.)	4,053	10,683	11,262	8,553	34,551
Net Voidage (Res. Bbls.)	(3,070)	(2,846)	(9,851)	(7,955)	(23,722)
Net Voidage Rate (Res. Bbls./Day)	(34)	(31)	(107)	(86)	(65)
Unit Cum. Net Voidage (Res. Bbls.)	(11,184)	(14,030)	(23,881)	(31,836)	

\*Gas Produced = Solution Gas

Cumulative Pre-Unit Voidage:

Oil - 162,581 Res. Bbls.  
Water - 26,606 Res. Bbls.

                      
Total - 189,187 Res. Bbls.

WEST BUTLER UNIT NO. 1  
PROGRESS REPORT  
SEPTEMBER 1, 1972 TO DECEMBER 31, 1972

I. INTRODUCTION

West Butler Unit No. 1 became effective September 1, 1972. This is the first semi-annual report and presents a review of operations for the period September 1, 1972 to December 31, 1972.

II. OPERATIONS

1. Production

The cumulative production for the Unit area to September 1, 1972 was 151,945 barrels of oil and 26,606 barrels of water. Production from September 1, 1972 to December 31, 1972 totalled 1,155 barrels of oil and 40 barrels of water.

All producing wells were shut-in for the winter months on December 6, 1972.

2. Injection

Chevron West Butler WIW 3-31-9-29 was placed on injection on September 20, 1972. Prior to placing on injection, the well was perforated and treated with 500 gals. Paran and 500 gals. 15% HCl.

Cumulative Ashville water injected to December 31, 1972 was 9,389 barrels. The average injection rate for December 1972 was 113 BWPD.

Conversion of 16-30-9-29 to a water injection well has been delayed because of insufficient water supply.

3. Water Supply

The water source for the injection system is from an Ashville water source well on Lsd. 7-31-9-29. The supply well is equipped with a Cabot B-7 pumping unit, a Fairbank-Morse 208 gas engine, 2-7/8" tubing and a 2½" bottom hole pump.

A "Variperm" sand screen assembly was installed in October in an attempt to eliminate problems caused by sand being produced with the water. Other methods of controlling sand production are currently being evaluated.

4. Construction

Construction of the permanent injection plant was completed in November. The injection plant facilities consist of a Hi-500 barrel plastic lined water storage tank, a PG-3B Gardener-Denver triplex pump and a Climax C-66 gas engine.

Installation of injection lines and the water supply line was completed in October.

5. General

Bottom hole producing equipment was installed on Chevron West Butler 1-31-9-29.

III. RESERVOIR PERFORMANCE

The reservoir performance of West Butler Unit No. 1 is shown in Figure 2. The status of reservoir voidage is presented in Table IV. For the four month period, water injection exceeded withdrawals by 8,114 barrels for an average net voidage rate of -67 reservoir barrels per day.

No waterflood response has been experienced to date.



TABLE I  
 WEST BUTLER UNIT NO. 1  
 PRODUCTION HISTORY  
SEPTEMBER 1, 1972 TO DECEMBER 31, 1972

	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
Monthly Oil Prod. (Bbls.)	355	448	278	74	1,155
Cumulative Oil Prod. (Bbls.)	355	803	1,081	1,155	
Monthly Gas Prod. (MSCF)	43	54	33	9	139
Cumulative Gas Prod. (MSCF)	43	97	130	139	
Monthly Water Prod. (Bbls.)	20	20	0	0	40
Cumulative Water Prod. (Bbls.)	20	40	40	40	
Monthly Water Injected (Bbls.)	1,252	987	3,479	3,671	9,389
Cumulative Water Injected (Bbls.)	1,252	2,239	5,718	9,389	

Note: Cumulative Pre-Unit Production is as Follows:

Oil - 151,945 Barrels  
 Gas - 18,233 MSCF  
 Water - 26,606 Barrels

TABLE II

WEST BUTLER UNIT NO. 1  
WATER INJECTION DATA  
SEPTEMBER 1, 1972 TO DECEMBER 31, 1972

<u>Injection Well</u>	<u>Date on Injection</u>	<u>Water Injected During December</u>	<u>December Injection Rate BWPD</u>	<u>December Maximum Injection Pressure</u>	<u>Cumulative Injection to 12/31/72</u>
3-31	9/20/72	3,671	118	0	9,309

TABLE III

WEST BUTLER UNIT NO. 1  
WATER SUPPLY DATA

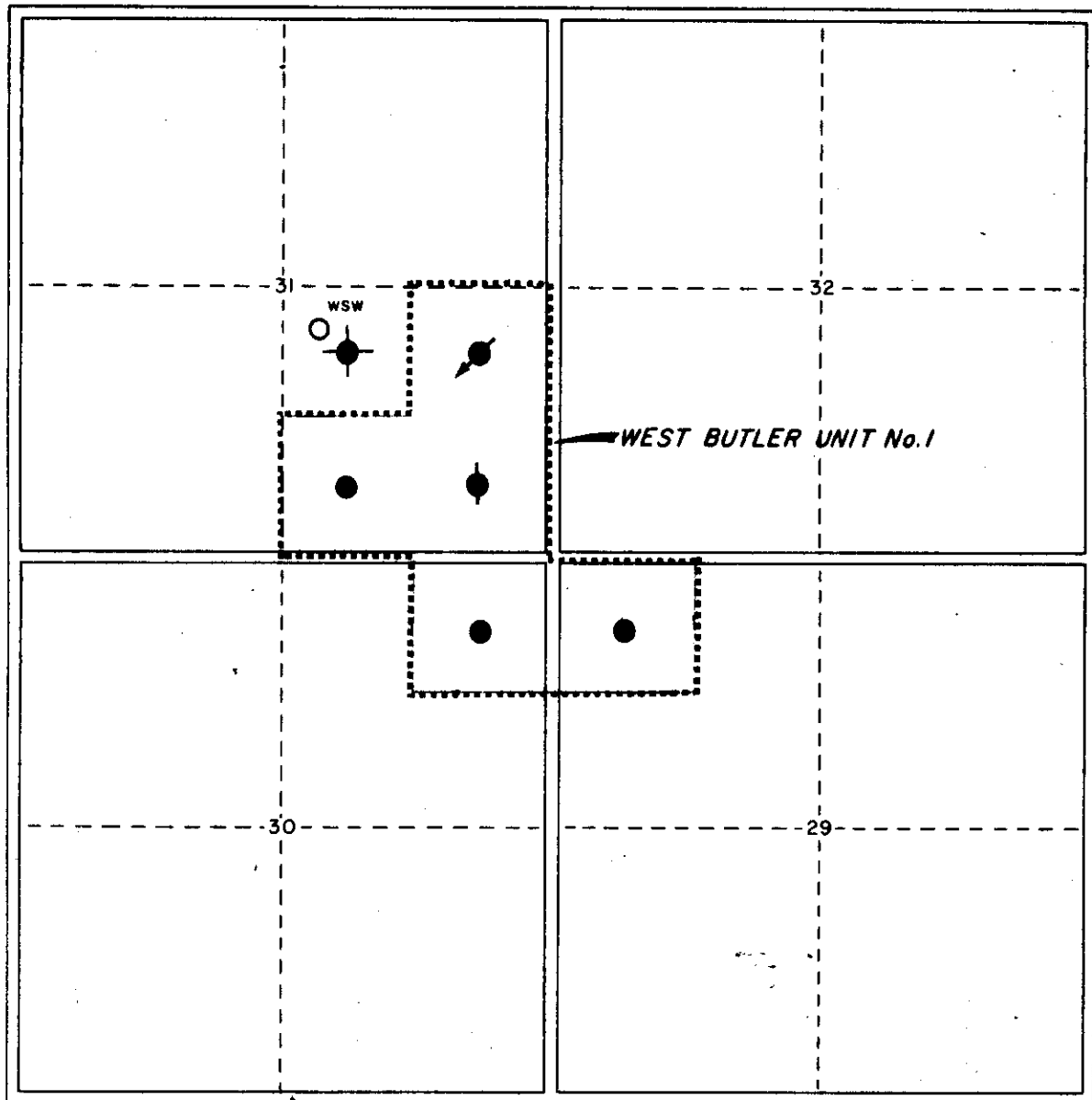
<u>Source</u>	<u>Type of Pump</u>	<u>Pump Submergence Feet</u>	<u>December 1972 Volume BWPD</u>
7A-31-9-29	Conventional 2½"x2½"x10'	510	118

TABLE IV  
 WEST BUTLER UNIT NO. 1  
 CALCULATION OF VOIDAGE RATES  
SEPTEMBER 1, 1972 TO DECEMBER 31, 1972

	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
Oil Produced (Bbls.)	355	448	273	74	1,155
Water Produced (Bbls.)	20	20	0	0	40
*Gas Produced (MSCF)	43	54	33	9	139
Average Solution GOR	120	120	120	120	
Formation Volume Factor	1.07	1.07	1.07	1.07	
Voidage Oil (Res. Ebbls.)	380	479	297	79	1,235
Voidage Water (Res. Bbls.)	20	20	0	0	40
Total Voidage (Res. Bbls.)	400	499	297	79	1,275
Water Injected (Res. Bbls.)	1,252	987	3,479	3,671	9,389
Net Voidage (Res. Bbls.)	(852)	(488)	(3,182)	(3,592)	
Net Voidage Rate (Res. Bbls./Day)	(28)	(16)	(106)	(116)	(67)
Unit Cum. Net Voidage (Res. Bbls.)	(852)	(1,340)	(4,522)	(8,114)	

\*Gas Produced = Solution Gas

R.29 W.P.M.



LEGEND



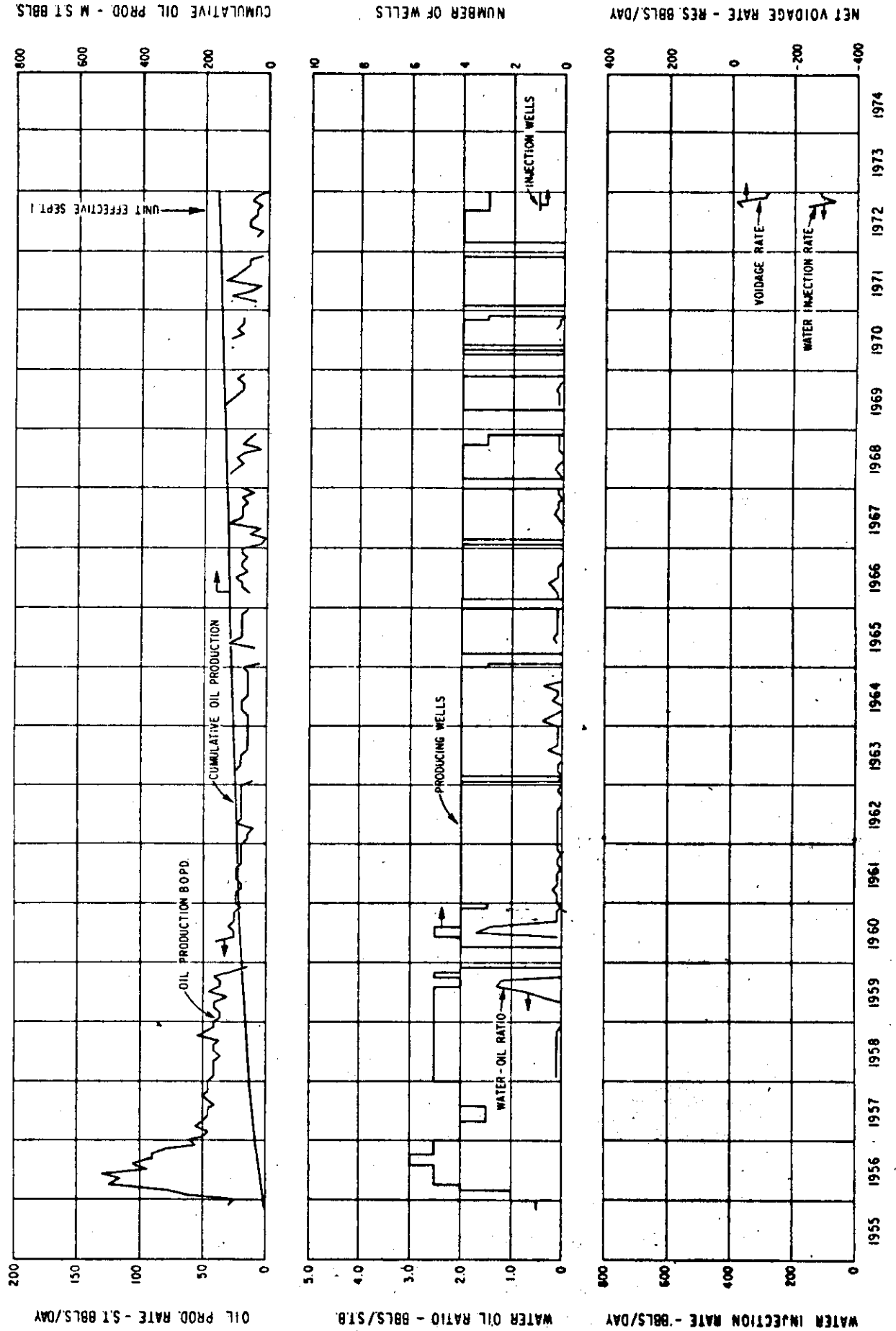
-  INJECTION WELL
-  SUSPENDED WELL

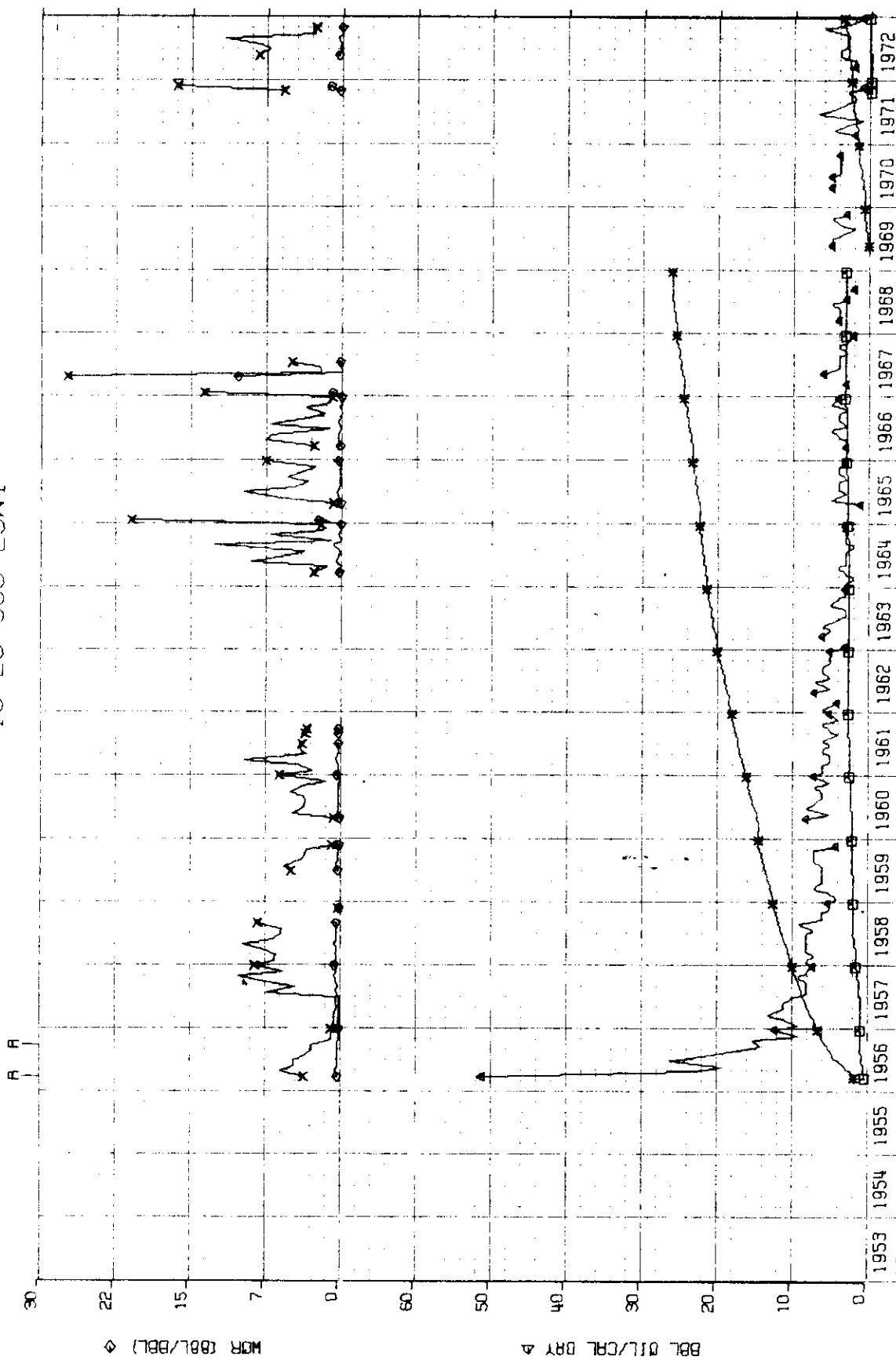
FIGURE 1  
WEST BUTLER UNIT No. 1  
AS OF DECEMBER 31, 1972  
SCALE: 3" = 1 MILE

FIGURE 2  
WEST BUTLER UNIT No.1  
RESERVOIR PERFORMANCE



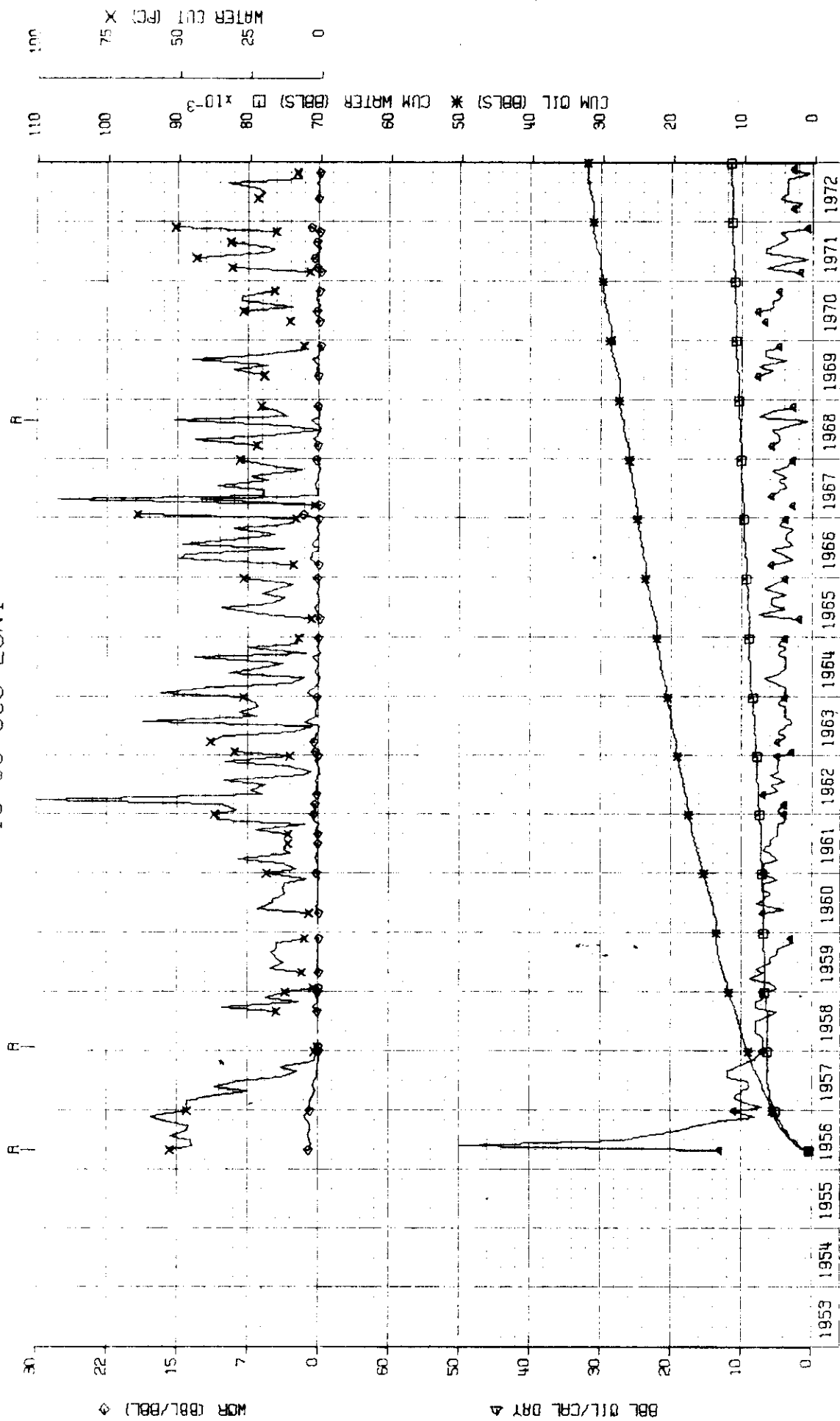
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13-29-089-29W1



## W BUTLER UNIT

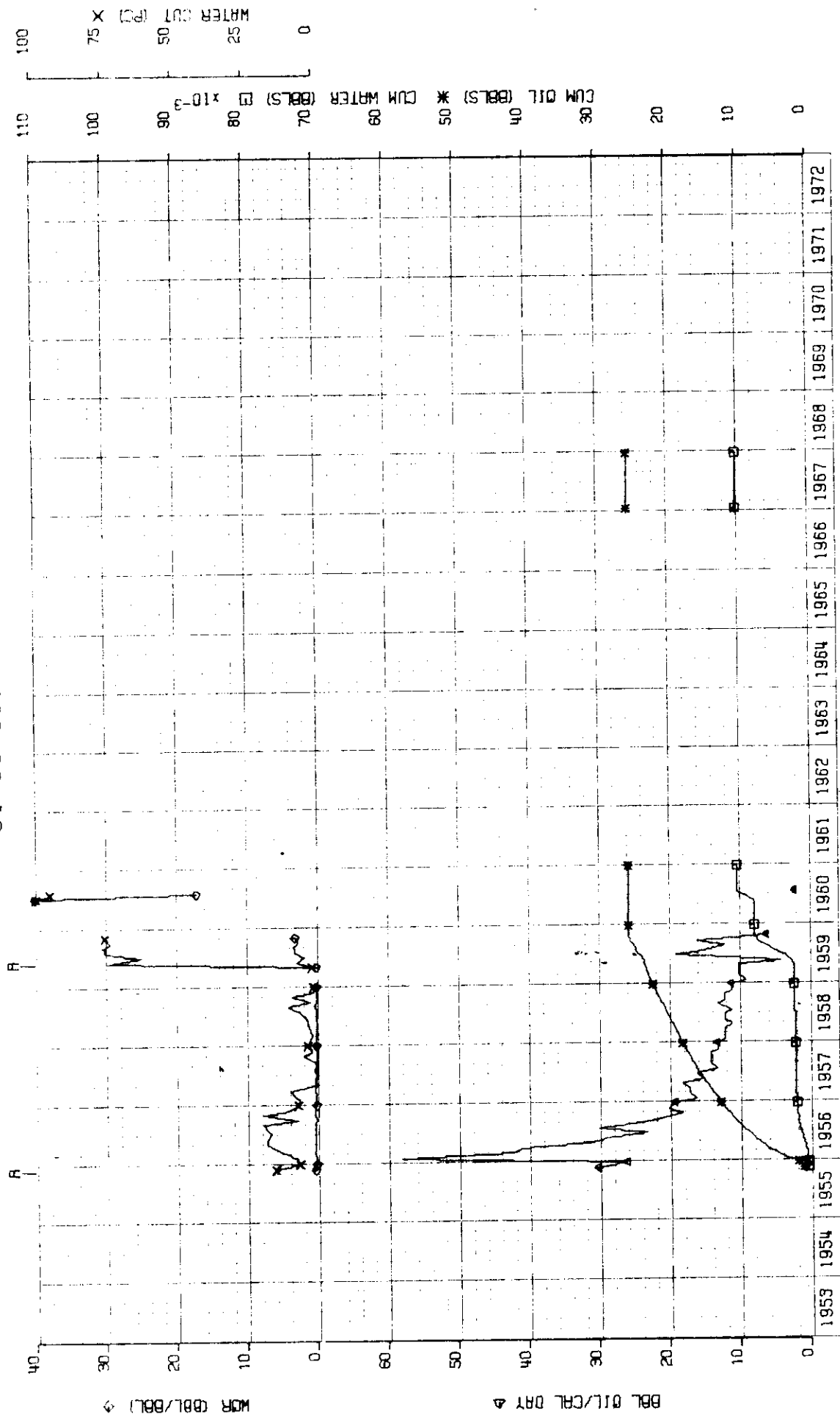
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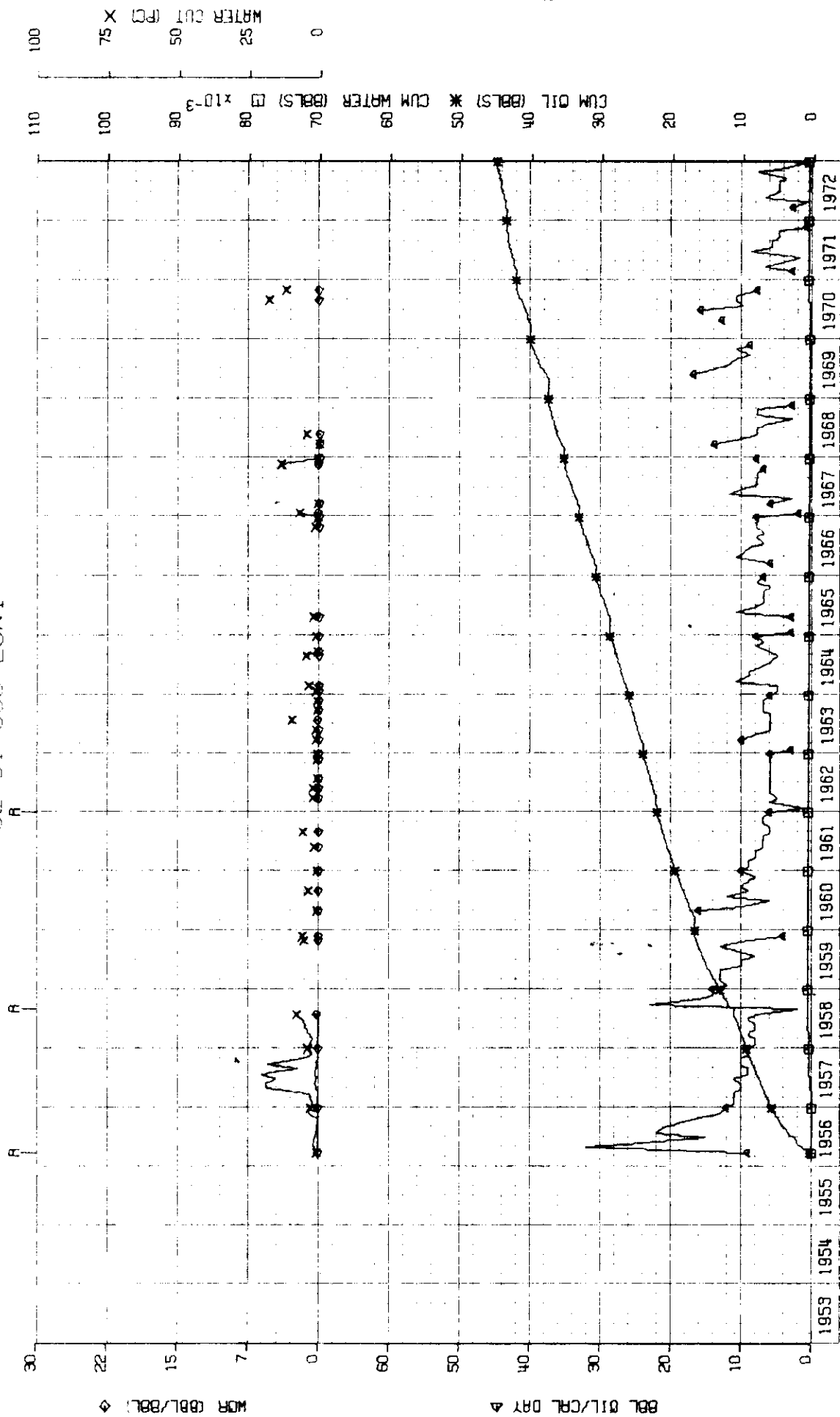
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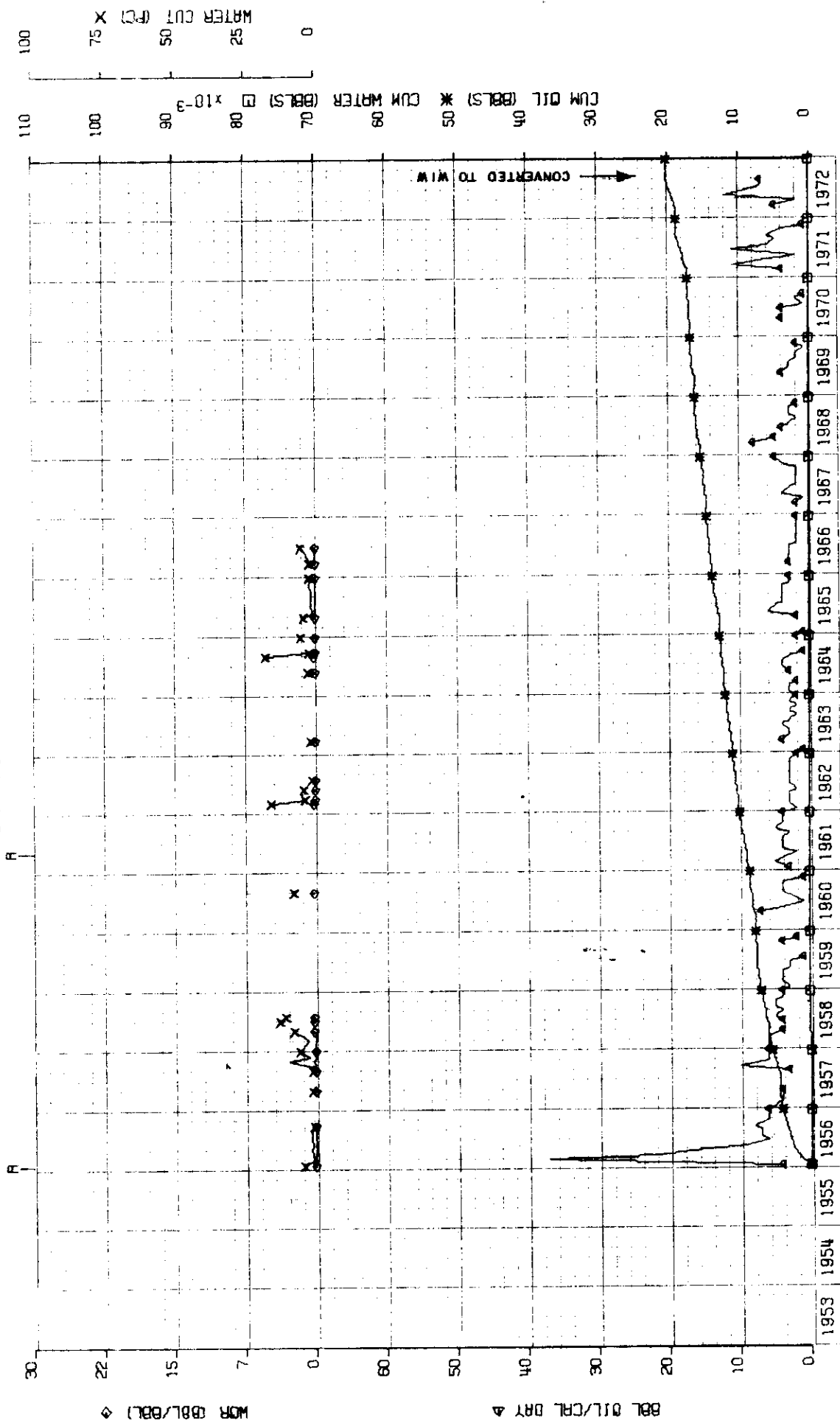
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02-31-009-29W1



# W BUTLER UNIT

08-31-009-29W1



# WEST BUTLER UNIT 8-31-9-29WPM

