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COMMERCIAL SCALE DEMONSTRATION ENHANCED OIL RECOVERY BY MICELLAR-POLYMER FLOOD

Eighth Annual Report for the Period October 1984—September 1985

By
L. M. Mueller

February 1986

Work Performed Under Contract No. AC03-78ET13077

For
U. S. Department of Energy
Bartlesville Project Office
Bartlesville, Oklahoma

By
Marathon Oil Company
Findlay, Ohio

Technical Information Center
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INTRODUCTION

A contract was executed between the United States Energy Research and Development Administration (now Department of Energy) and Marathon Oil Company, Findlay, Ohio, on September 30, 1976, for the purpose of a commercial scale test of enhanced oil recovery by the Maraflood™ oil recovery process.

This commercial scale test, known as the M-1 Project, is located in Crawford County, Illinois. It encompasses 407 acres of Robinson sand reservoir and covers portions of several waterflood projects that were approaching economic limit. The project includes 248 acres developed on a 2.5-acre five-spot pattern and 159 acres developed on a 5.0-acre five-spot pattern.

Development work commenced in late 1974 and has previously been reported.[1,2] Micellar solution (slug) injection was initiated on February 10, 1977, and was completed November 21, 1978. The 10% pore volume slug was followed by a concentration tapered solution of Dow 700 Pusher™ polymer. At the end of this reporting period, fresh water was being injected into the 2.5-acre pattern and 411 ppm polymer was being injected into the 5.0-acre pattern.

After 18% of a pore volume injection, the 2.5-acre pattern oil cut increased from 5% to a peak of 12.2% at 37.5% of a pore volume. The oil cut remained relatively flat until 55% pore volume had been injected. The oil cut has gradually decreased to 1.5% in September of 1985. This compares to 2.7% in September of 1984.

The initial response in oil cut at the 5.0-acre pattern area occurred after 23% of a pore volume had been injected. A second and much sharper increase in oil cut was observed after 34% pore volume injection. By 46% pore volume injection, the oil cut had peaked at 13.3%. This occurred in October of 1982 and since that time the oil cut of the 5.0-acre pattern area has steadily decreased. As of September, 1985, the oil cut at the 5.0-acre pattern area is 5.2%.

As a result of project operations, 1,223,464 barrels of oil have been recovered from the project area. Oil cuts remain relatively high in the 5.0-acre pattern, and significant additional recovery is expected from the project.

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[1] Commercial Scale Demonstration - Enhanced Oil Recovery by Micellar-Polymer Flooding, M-1 Project - Facilities Report (BERC/TPR-77/2), DOE Technical Information Center (Bartlesville, Oklahoma, 4/77).

[2] Commercial Scale Demonstration - Enhanced Oil Recovery by Micellar-Polymer Flooding, M-1 Project - Design Report (BERC/TPR-77/1), DOE Technical Information Center (Bartlesville, Oklahoma, 4/77).

Pusher™ - Trademark of Dow Chemical Company
Maraflood™ - Trademark of Marathon Oil Company

SUMMARY

This Eighth Annual Report covers the interim from October 1, 1984 through September 30, 1985. Information is presented under the Work Breakdown Structure (WBS) elements: WBS 2100 - Fluid Injection, WBS 2300 - Performance Monitoring, and WBS 2400 - Economic Monitoring.

WBS No. 2100 - Fluid Injection

1) In an effort to increase injection in some of the 5.0-acre pattern area injection wells, a treatment program was undertaken in late 1984. A discussion of the treatment program and its results is given.

2) Water softening was discontinued in the 2.5-acre pattern area during the year.

3) In December, 1984, the biocide used at the M-1 was switched from Tretolite X-CIDE 510 to Tretolite X-CIDE 215.

4) Polymer concentration was reduced from 625 ppm to 411 ppm at the 5.0-acre pattern area during 1985.

WBS No. 2300 - Performance Monitoring

1) Present oil cuts at the 2.5- and 5.0-acre pattern areas are 1.5% and 5.2%, respectively.

2) The final annual transient test results for the six injection wells and their offsetting producing wells are reported. The results are compared to previous years' results and are presented in tabular form.

3) Subsequent to the injection of tritiated water into ten injection wells, all producing wells are being analyzed regularly for the presence of tritiated water. To date, 132 project wells have shown the presence of tritiated water.

4) Samples of produced water have been analyzed bi-monthly for sulfonate (a micellar slug component) content. Data from the most recent analysis is presented and compared to earlier data collected.

WBS No. 2400 - Economic Monitoring

1) Two producing wells in the 2.5-acre pattern area of the M-1 Project were abandoned during the year.

2) With the 2.5-acre pattern area nearing its economic limit, several of the producing wells in this area have been temporarily shut-in pending an evaluation of their remaining potential. A discussion of the economics justifying the shut-ins, as well as future plans for the wells, is presented.

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077-112

FLUID SUMMARY DATA SHEET
September, 1985

	2.5-Acre Spacing	5.0-Acre Spacing	Total Project
Oil Production			
B/D	81	111	192
B/M	2,435	3,319	5,754
Cumulative, Bbls.	778,444	445,020	1,223,464
% PV	7.32	7.42	7.36
Oil Cut, %			
This Month	1.5	5.2	2.6
Last Month	1.5	5.1	2.6
Cumulative	6.2	7.3	6.6
Total Fluid Production			
B/D	5,315	2,134	7,449
B/M	159,438	64,022	223,460
Cumulative, Bbls.	12,492,429	6,056,225	18,548,654
% PV	117.55	101.00	111.58
Fluid Injection			
B/D	5,053	1,328	6,381
B/M	151,839	39,828	191,667
Cumulative, Bbls.	14,202,517	4,320,317	18,522,834
% PV	133.64	72.05	111.42
Injection/Production Ratio*			
This Month	0.93	0.80	0.89
Last Month	0.94	0.82	0.91
Cumulative	1.09	0.98	1.05

*Injection includes allocated peripheral water injection and allocated micellar-polymer injection. Production is actual production as shown above.

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077-112

FLUID SUMMARY DATA SHEET (Continued)
September, 1985

	2.5-Acre Spacing	5.0-Acre Spacing	Total Project
Reservoir Pore Volume	10,627,513	5,996,535	16,624,048
Plant Pressure, psig	632	631	--
Polymer Viscosity, cp @ 77° F	--	19.8	--
Polymer Screen Factor @ 77° F	--	16.5	--
Injection Rate (BPDPNF)	1.95	1.78	--
Wells			
Producers	89	41	130
Injectors			
Micellar Fluid	85	29	114
Water	6	6	12
Water Disposal	1	1	2
Abandoned	8	0	8

Fluid Injection Schedule

		Polymer, ppm							
	Slug	1156	800	625	411	200	100	50	Water
2.5-Acre									
Starting Date	2/10/77	11/21/78	5/20/79	7/28/80	5/26/82	1/20/83	8/20/83	2/24/84	9/6/84
% PV	10.0	11.0	19.0	32.0	12.0	10.7	10.0	10.0	18.9
% PV Ultimate	10.0	11.0	19.0	32.0	12.0	11.0	10.0	10.0	*
Cumulative, Bbls.	1,063,446	1,169,677	2,019,170	3,401,604	1,274,500	1,132,183	1,062,679	1,067,112	2,012,146
5.0-Acre									
Starting Date	2/10/77	11/21/78	1/14/80	3/5/82	9/26/85				
% PV Actual	10.0	11.0	19.0	32.0	0.0				
% PV Ultimate	10.0	11.0	19.0	32.0	12.0				
Cumulative, Bbls.	599,679	658,999	1,139,370	1,919,714	2,555				

*%PV Ultimate will be determined by the pattern's economic limit.

WBS No. 2100 - FLUID INJECTION

INJECTION WELL TREATMENT

Introduction

In October of 1984, 12 injection wells in the 5.0-acre pattern area of the M-1 Project were treated with hydrogen peroxide in an effort to improve injection by removing skin damage at the wells.

Discussion

Hydrogen peroxide has been used in Maraflood injection wells to dissolve concentrated polyacrylamide which may be insoluble to water. Much of the skin damage at the M-1, 5.0-acre pattern area is believed to be due to microgels and poorly mixed polymer. As stated previously, a total of 12 injection wells were treated, and initial injection rates subsequent to the work showed the treatments to be effective in increasing the injection rates. However, after monitoring M-1 injection for several months, this method of treatment was found to be only temporarily effective.

The location of the 12 treated injection wells can be seen in Figure 16.

WATER SOFTENING

Discussion

Since polymer injection ceased in September of 1984 at the 2.5-acre pattern area of the M-1, it was no longer necessary to soften the water being injected into these patterns. Softening of the M-1, 2.5-acre injection water stopped in December of 1984 and was expected to result in an annual cost savings of approximately $20,000.

BACTERIA CONTROL

Discussion

In December, 1984, the biocide used in both the 2.5- and 5.0-acre injection fluids was changed from Tretolite X-CIDE 510 to X-CIDE 215. Study had shown that the bacteria had begun to develop a resistance to the X-CIDE 510 and that lower concentrations of the X-CIDE 215 could be used to provide adequate bacteria kill. In addition, the method of treatment was switched from continuous to semi-continuous treating at the 2.5-acre pattern area where polymer was no longer injected. Following these changes, the 2.5-acre pattern area has injection with 120 ppm X-CIDE 215 for three days per week while the 5.0-acre pattern area's injection contains 120 ppm X-CIDE 215 continuously.

POLYMER INJECTION

Introduction

The polymer concentration at the 5.0-acre pattern area was reduced from 625 ppm to 411 ppm on September 26, 1985. Injection of the 411 ppm polymer will continue until a target pore volume of 12.0% is reached.

Discussion

Injected polymer concentration has been reduced from 625 ppm to 411 ppm at the 5.0-acre pattern area as the target pore volume of 32% was reached in late September, 1985. A total of 1,919,714 barrels of 625 ppm polymer had been injected in this area. After injecting 12% pore volume of 411 ppm polymer, the concentration will again be reduced, this time to 200 ppm.

WBS No. 2300 - PERFORMANCE MONITORING

OIL CUT MONITORING

Introduction

In order to detect production responses from the Maraflood process, individual oil cuts are monitored on a monthly basis.

Discussion

During September, 1985, 7 of 89 (8%) producing wells in the 2.5-acre patterns and 21 of 41 (51%) in the 5.0-acre patterns produced at or above a 5% oil cut. This compares to 21 of 91 wells and 25 of 41 wells, respectively, in September, 1984. Currently, the 2.5- and 5.0-acre patterns are producing at oil cuts of 1.5% and 5.2%, respectively. Individual well oil cuts are reported on the five-spot report, pages 52 to 63.

TRANSIENT TESTING

Introduction

In compliance with contractual requirements, transient testing is conducted yearly on six producing and six injection wells at the M-1 Project. As per the contract, 1985 will be the final year of M-1 transient testing. Figure 17 shows the location of the wells tested.

Discussion

During the third quarter of 1985, six injection wells were transient tested. These tests were conducted as part of a continuing effort to determine the effect of Maraflood fluids on well conditions and reservoir parameters. Amerada pressure gauges were set either at surface or at 800 feet below surface to enable falloff and injectivity data to be collected for each well. Results were then analyzed using a Miller-Dyes-Hutchinson plot.

Tables 1 and 2 summarize the results of this and past years' injection well testing. The latest series of transient testing was conducted with 625 ppm polymer being injected at the 5.0-acre patterns and water injection at the 2.5-acre patterns. Analysis shows that mobilities appear to have dropped slightly in the injection wells since last year's tests. Only one well (S-7) appeared to show any significant change in skin factor, falling from approximately +0.8 to -4.2. Another well (QQ-13) yielded data that was unanalyzable due to very small pressure changes over the entire test period.

Producer pressure buildup data was obtained by first measuring the annulus fluid level acoustically, and later by measuring the well shut-in pressure once the fluid reaches the surface. This eliminates the need for pulling

rods and tubing. Data collected from the producing wells are also analyzed using Miller-Dyes-Hutchinson plots.

Table 3 shows a comparison of this and previous years' test results and, again, there is little change in both skin factors and mobilities.

TRITIATED WATER INJECTION PROGRAM

Introduction

In order to analyze parameters controlling fluid communication such as directional permeability, fracture orientation, and fluid conformance, a radioactive tracer (tritiated water) was injected into selected injection wells prior to slug injection. Produced fluid samples are analyzed monthly to determine the presence of radioactive material.

Discussion

A computer printout listing all wells showing the presence of tritiated water during the past year is shown on pages 72 to 75. In August, 1985, 12 of 132 (9%) project wells showed some presence of tritiated water in a produced sample, but there were an additional 29 wells for which no sample was available. Fifty-two wells have shown a tritium level higher than background levels for six months or more. Of these 52 wells, 35 are offsetting producers of an injection well in which tritiated water was injected.

The locations of tritiated water injection wells are shown in Figure 18. Additional information on these wells can be found in Table 4.

HIGH SULFONATE CONTENT WELLS

Introduction

As part of routine performance analysis, produced water samples are analyzed bi-monthly for sulfonate at Marathon's Denver Research Center.

Discussion

Since March, 1977, produced water samples have been analyzed to determine sulfonate content. The values are equivalent to the concentration of sulfonate in water divided by the concentration of standard 1% solution of crude oil sulfonate slug (COSS). Because of the characteristics of surfactant components interacting with the reservoir, these analytical data are not suitable for exact material balance calculations. However, these data are useful for observing trends.

For the month of August, 1985, 54 of 89 wells in the 2.5-acre pattern area showed sulfonate levels higher than the background level of 0.5. No data was available for 28 wells of the 2.5-acre producing wells. For

comparison, 81 of these wells (total of 91 wells at the time) showed sulfonate levels higher than the background level in August, 1984.

Thirty-eight of 41 wells in the 5.0-acre pattern area showed sulfonate levels higher than the background level during August, 1985. In August, 1984, 39 of these wells had sulfonate levels of 0.5 or greater. Sulfonate data for both the 2.5- and 5.0-acre pattern areas are included on pages 64 through 67 of this report.

PRODUCING WELL ABANDONMENTS

Introduction

Two producing wells were abandoned in the 2.5-acre pattern area of the M-1 Project during 1985. Both wells were low volume oil wells which were environmental hazards.

Discussion

In the second quarter of 1985, two producing wells (J-2 and EB-5) in the 2.5-acre pattern area were abandoned. Both wells produced very low volumes of oil and had been labeled as "problem" wells because fluid flow to the surface could not be controlled when they became inactive for any length of time (due to holes in the casing string). With little or no uphole potential apparent, the wells were abandoned for both economic and environmental reasons.

The locations of these wells are shown in Figure 19.

2.5-ACRE PATTERN AREA PRODUCTION STATUS

Introduction

Production levels from the 2.5-acre pattern area has been steadily falling. With 18.9% of a pore volume of water now injected (133.6% pore volume since initial slug injection), the 2.5-acre area appears to be approaching its economic limit.

Discussion

In early 1985, with the average production of the 2.5-acre area approaching 1.0 GBOPD per producing well, this area was rapidly approaching an uneconomic status. As such, it became necessary to base a decision of each well's continued operation on its current production level.

In setting minimum production rates for a well to remain active, it was decided to use two economic limit cutoffs. The first or lower economic limit of 0.3 GBOPD was determined using the absolute minimum oil production that a well could have to remain active as long as no repair work became necessary. All production wells producing below this limit were to be shut-in immediately. Twelve wells fell into this category and are listed below.

B-0	D-2	F-8	H-2
B-6	D-8	F-10	H-12
B-8	D-10	F-12	J-0

A second or upper economic limit of 1.3 GBOPD was determined for the minimum production allowed in order to permit remedial or repair work. Wells which produced above the first cutoff but below this limit were allowed to remain active and will be kept active until the lower limit is reached or repair work is required. A total of 29 2.5-acre wells fell into this category and are listed below.

AA-11	H-0	L-14	R-0	T-10
XA-14	H-6	N-0	R-2	T-12
B-10	H-10	N-2	R-14	V-0
D-6	H-14	N-8	T-0	V-2
F-0	L-2	N-12	T-2	V-10
F-14	L-6	N-14	T-8	

The locations of both groups of wells listed above are shown in Figure 20.

Initially, these minimum production rates were expected to affect only a few wells. However, with 29 wells determined to have an uneconomic status, an evaluation of workover potential was soon done for each well (producing wells and injection wells) in the 2.5-acre area. Several factors were considered in these evaluations such as well histories, past production (or offsetting production in injection well evaluations), net footage of pay in the well, etc. Upon completion of the evaluations, there were no recommendations for any treatment work in the 2.5-acre area. As such, several of these wells have remained inactive for six months or more and will probably have no further production from the Main Robinson Sandstone.

Presently, there are no plans to begin permanently abandoning any of the shut-in 2.5-acre wells. In addition, so as to take advantage of the possible flooding of previously unswept pay, all injection wells have remained active for several months regardless of the number of their offsetting producing wells shut-in. It was suspected in some cases that injection may have been channeling through the pay directly to a producing well, and shutting in such a producer might improve sweep efficiency in the area. In a few instances, this is still believed to be true as production from wells adjacent to the shut-in producers did increase slightly. However, there are several other cases where no such production increase occurred, and injection wells have been shut-in. As production from the 2.5-acre area continues to decline, periodic evaluations will be done to determine whether possible treatment work is needed or additional wells should be shut-in.

MARATHON OIL COMPANY
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CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077-112

TABLE 1

Injection Well Transient Test
Mobility, k/u (md/cp)

Well No. Stimulation	Test	Water 12/76	Slug 4/77	Slug 10/77	Slug 3/78	Slug 10/78	1156 ppm 6/79	800 ppm 8/80	800 ppm 9/81	625 ppm 9/81	625 ppm 9/82	411 ppm 9/82	625 ppm 9/83	200 ppm 9/83	625 ppm 9/84	50 ppm 9/84	625 ppm 9/85	Fresh Water 9/85
S-7	BU	10.4	8.1	4.8	2.4	4.0	2.4	1.6		2.9		4.0		9.1		8.7		1.1
S, F	FO	7.1	5.3	5.4	2.3	4.0	1.8	1.2		1.6		2.9		2.9		8.7		1.5
GG-13	BU	7.8	1.0	2.5	0.6	1.8	1.1	2.0	2.2		2.5		5.8		5.7		3.1	
S, F	FO	6.2	3.0	3.5	0.5	2.7	1.2	1.4	1.3		2.1		2.2		5.7		2.0	
C-3	BU	5.0	1.1	2.3	1.4	1.7	3.8	2.7		1.9		1.6		1.9		0.9		0.7
S, F	FO	6.5	2.5	0.7	0.4	0.4	3.2	2.6		1.2		2.4		2.1		1.7		0.4
QQ-13	BU	2.7	0.6	0.7	0.9	2.5	3.4	7.5	*		6.8		18.7		4.2		*	
F, F	FO	3.8	0.8	0.6	0.6	2.5	2.3	8.1	*		*		18.7		12.7		*	
O-13	BU	5.8	3.2	0.9	1.1	4.5	*	2.3		2.3		3.4		8.2		5.3		2.1
S	FO	5.2	2.2	0.8	1.7	2.8	1.9	2.8		1.4		4.9		5.7		2.5		1.5
I-7	BU	4.6	3.4	1.4	1.7	1.8	1.3	0.6		1.0		0.6		1.0		1.2		0.6
S, F, D	FO	3.9	3.5	3.7	3.3	2.5	1.2	1.0		0.6		0.4		0.5		0.5		0.3

S = Shot
F = Fracture
D = Decentralized Jetting
BU = Buildup
FO = Falloff
* = Data Uninterpretable

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CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077-112

TABLE 2

Injection Well Transient Test
Skin Factor, S

Well No. Stimulation	Test	Water 12/76	Slug 4/77	Slug 10/77	Slug 3/78	Slug 10/78	1156 ppm 6/79	800 ppm 8/80	800 ppm 9/81	625 ppm 9/81	625 ppm 9/82	411 ppm 9/82	625 ppm 9/83	200 ppm 9/83	625 ppm 9/84	50 ppm 9/84	625 ppm 9/85	Fresh Water 9/85
S-7	BU	-4.0	-1.2	-2.1	-3.5	0.7	-2.1	-2.3		0.4		-1.2		3.1		0.8		-3.0
S, F	FO	-2.5	0.6	-3.0	-3.2	0.6	-3.3	-2.3		-2.6		-3.0		-2.7		0.8		-4.9
GG-13	BU	-2.7	-2.6	6.4	-2.4	-2.7	-2.7	-1.8	-3.4		-2.7		-1.3		-2.4		-2.6	
S, F	FO	-3.0	1.4	6.9	-2.6	-0.8	-2.9	-3.3	-3.7		-3.6		-4.2		-4.1		-2.9	
C-3	BU	-3.1	-2.5	1.5	1.6	-0.2	-3.6	-2.1		-2.0		-2.7		2.1		-1.1		-1.5
S, F	FO	-3.1	3.7	-2.7	-3.8	-4.2	-3.8	-2.3		-3.1		-1.5		2.1		-0.7		-2.1
QQ-13	BU	-4.9	-5.1	-4.7	-4.4	-4.1	-4.2	-4.1	*		-5.3		-3.8		-3.6		*	
F, F	FO	-4.8	-5.0	-4.6	-4.7	-4.7	-5.3	-4.7	*		*		-4.8		-5.3		*	
O-13	BU	-4.1	0.7	-2.3	-2.4	2.7	*	1.8		-2.3		-0.8		4.5		-0.8		-2.7
S	FO	-3.5	-2.0	-3.4	-2.7	-1.3	-3.5	-1.6		-3.4		0.5		1.6		-2.0		-4.6
I-7	BU	-3.7	-2.6	-3.1	-2.9	-1.6	-2.0	-2.1		-1.1		-0.8		1.1		1.9		-0.4
S, F, D	FO	-4.0	-2.4	1.0	-0.5	-1.1	-2.4	-1.4		-2.8		-2.2		-2.2		-2.2		-3.2

S = Shot
F = Fracture
D = Decentralized Jetting
BU = Buildup
FO = Falloff
* = Data Uninterpretable

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077-112

TABLE 3

Production Well Transient Test
Mobility, K/u (md/cp) and Skin Factor, S

Well No. Stimulation	Test		11/76	12/77	11/78	8/79	9/80	9/81	9/82	9/83	9/84	9/85
D-4	BU	Mobility, k/u (md/cp)	6.4	1.3	1.1	0.5	0.6	0.2	0.6	1.1	1.3	1.8
F		Skin Factor, S	2.4	-5.2	-5.6	-4.8	-4.4	-4.6	-4.7	-5.7	-5.0	-4.5
H-8	BU	Mobility, k/u (md/cp)	2.6	5.4	2.0	3.6	0.6	0.9	0.7	2.1	1.5	3.1
F		Skin Factor, S	0.9	-4.6	-5.7	-3.8	-3.7	-1.8	-1.7	-2.6	-2.3	-2.3
P-12	BU	Mobility, k/u (md/cp)	11.3	4.1	1.8	2.2	1.1	2.2	3.2	7.3**	1.9	1.5
S, S, F		Skin Factor, S	-1.3	-3.6	-5.3	-3.3	-1.0	-4.3	-1.8	10.8**	-1.6	-1.7
PP-12	BU	Mobility, k/u (md/cp)	1.9	5.9	6.2	2.0	4.4	2.0	2.5	1.7	1.6	2.7
F		Skin Factor, S	0.8	-6.5	-6.7	-5.6	-3.9	-4.7	-3.8	-3.4	-3.5	-2.9
HH-12	BU	Mobility, k/u (md/cp)	5.5	19.8	9.4	8.8	4.7	4.1	4.9	4.9	1.7	2.2
F		Skin Factor, S	1.7	-6.4	-6.3	-4.9	-4.5	-2.0	2.6	1.7	0.3	2.5
T-8	BU	Mobility, k/u (md/cp)	15.0	*	4.2	5.3	1.2	1.1	15.0	4.1	4.2	6.3
F		Skin Factor, S	*	*	-2.7	-0.5	-2.8	0.1	-5.3	-3.7	-4.9	-4.0

S = Shot
F = Fracture
BU = Buildup
* = Data Uninterpretable
** = Well Pressure Parted During Test

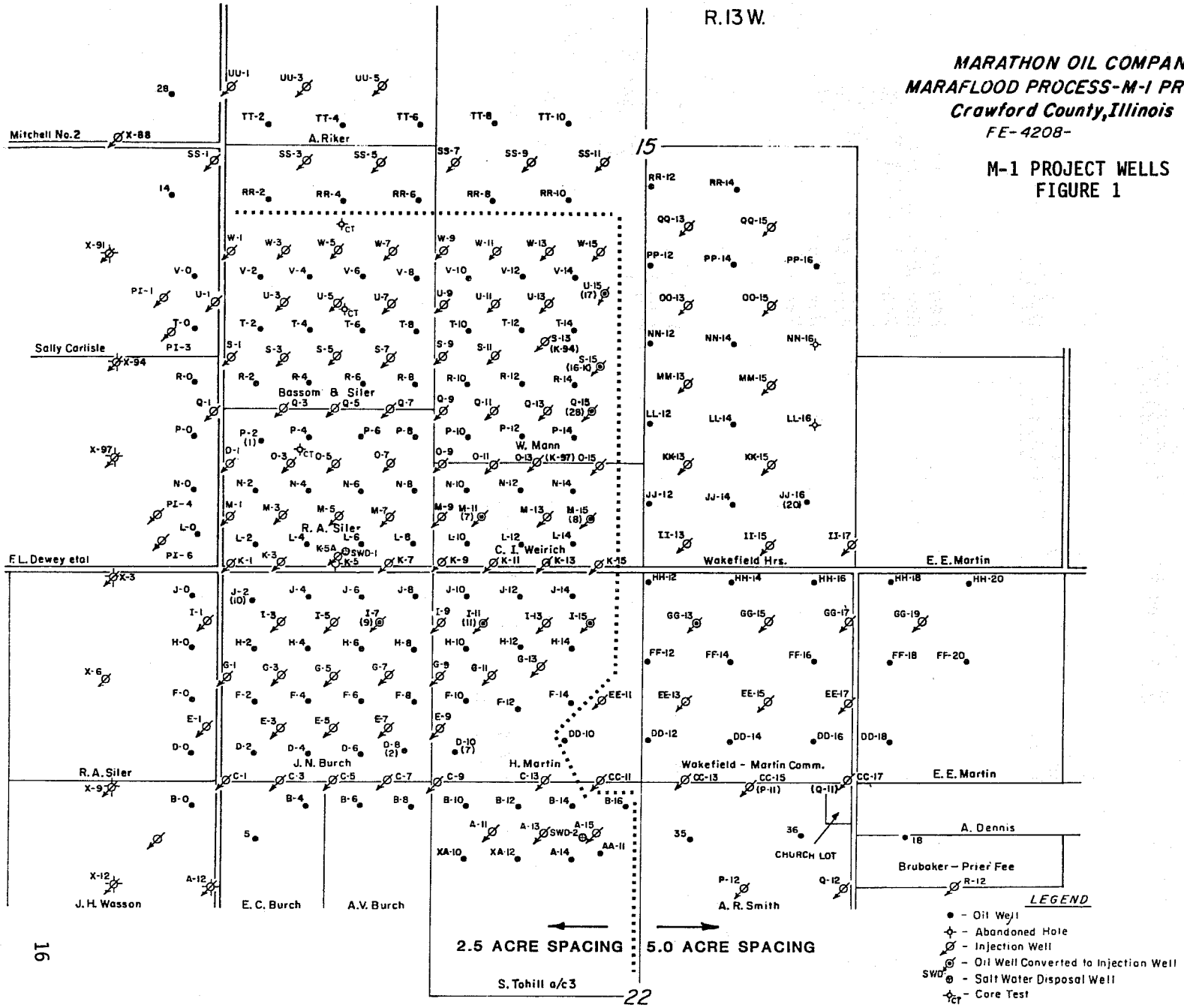
MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

TABLE 4

Tritiated Water Injection Wells

	Isogeometric Permeability K, md	Net Thickness h, ft	Pre-Slug Stimulation*	Well Status	Dosage Curies
2.5-Acre					
A-13	85	21	S, ST	New Well	10
E-5	115	11	S, H	New Well	5
I-7	75	29	S, L	Conv. Oil Well	10
K-13	85	29	S	New Well	10
O-13	100	54	S	Conv. WF Inj.	20
M-5	70	46	S, ST	New Well	15
S-5	30	16	S, ST	New Well	5
5.0-Acre					
GG-15	90	39	S	New Well	25
SS-3	65	21	G, H	New Well	15
QQ-13	60	32	G, H	New Well	25

*G = Gauge
S = Shot
L = Fractured with low viscosity fluids
H = Fractured with high viscosity fluids
ST = Staged frac with moth balls



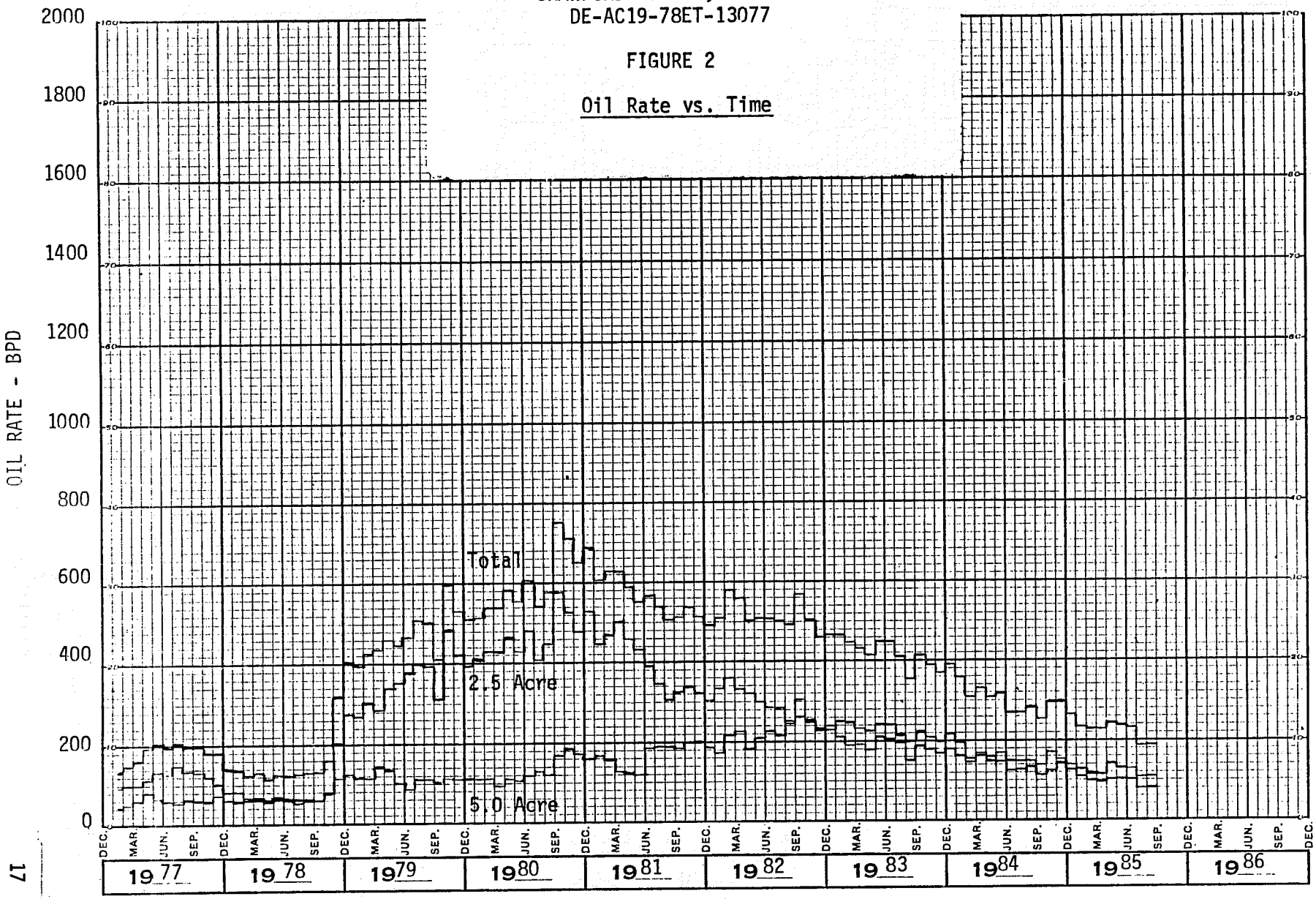
MARATHON OIL COMPANY
MARAFLOOD PROCESS-M-1 PROJECT
Crawford County, Illinois
FE-4208-

M-1 PROJECT WELLS
FIGURE 1

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 2

Oil Rate vs. Time

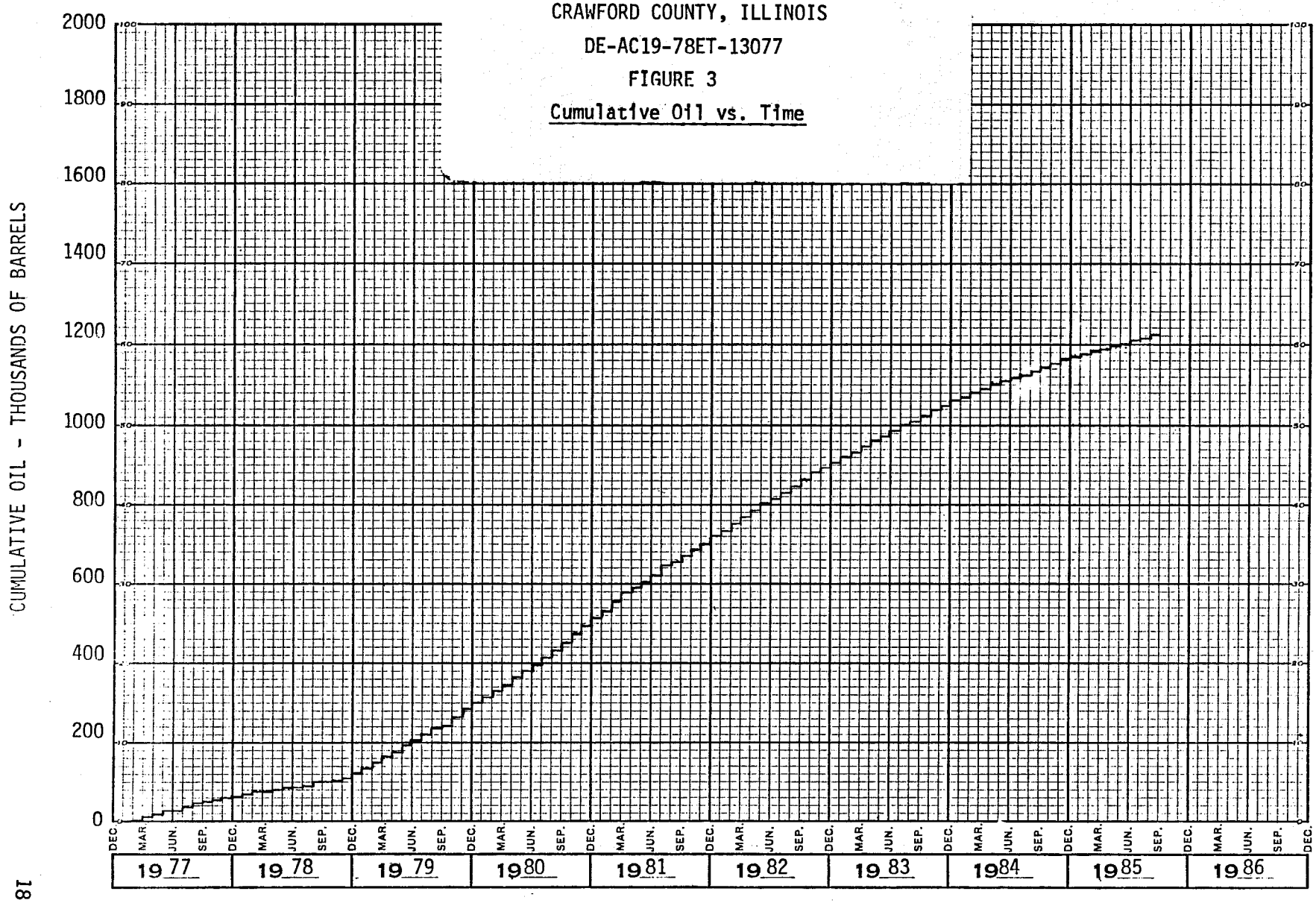


MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS

DE-AC19-78ET-13077

FIGURE 3

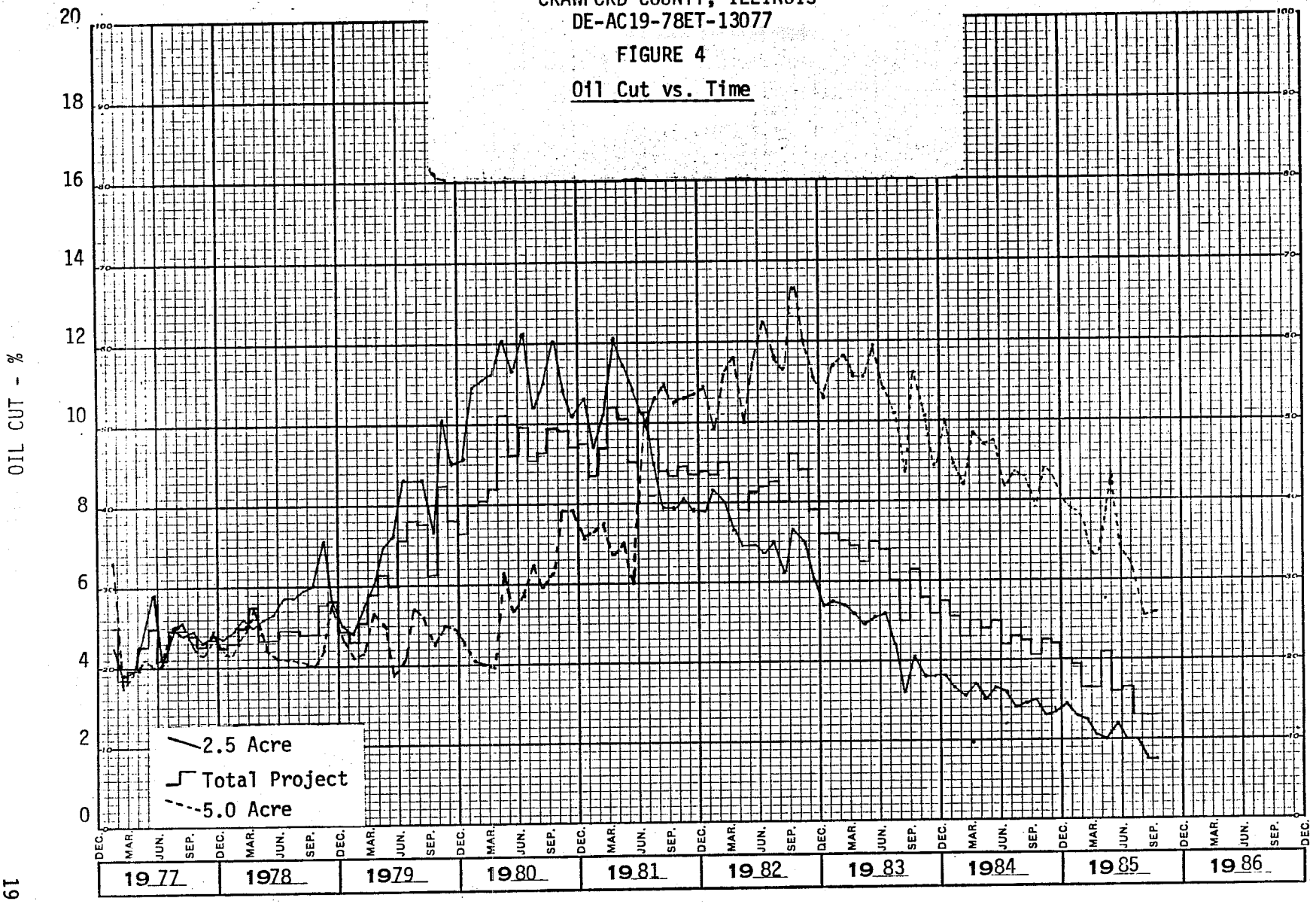
Cumulative Oil vs. Time



MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 4

Oil Cut vs. Time

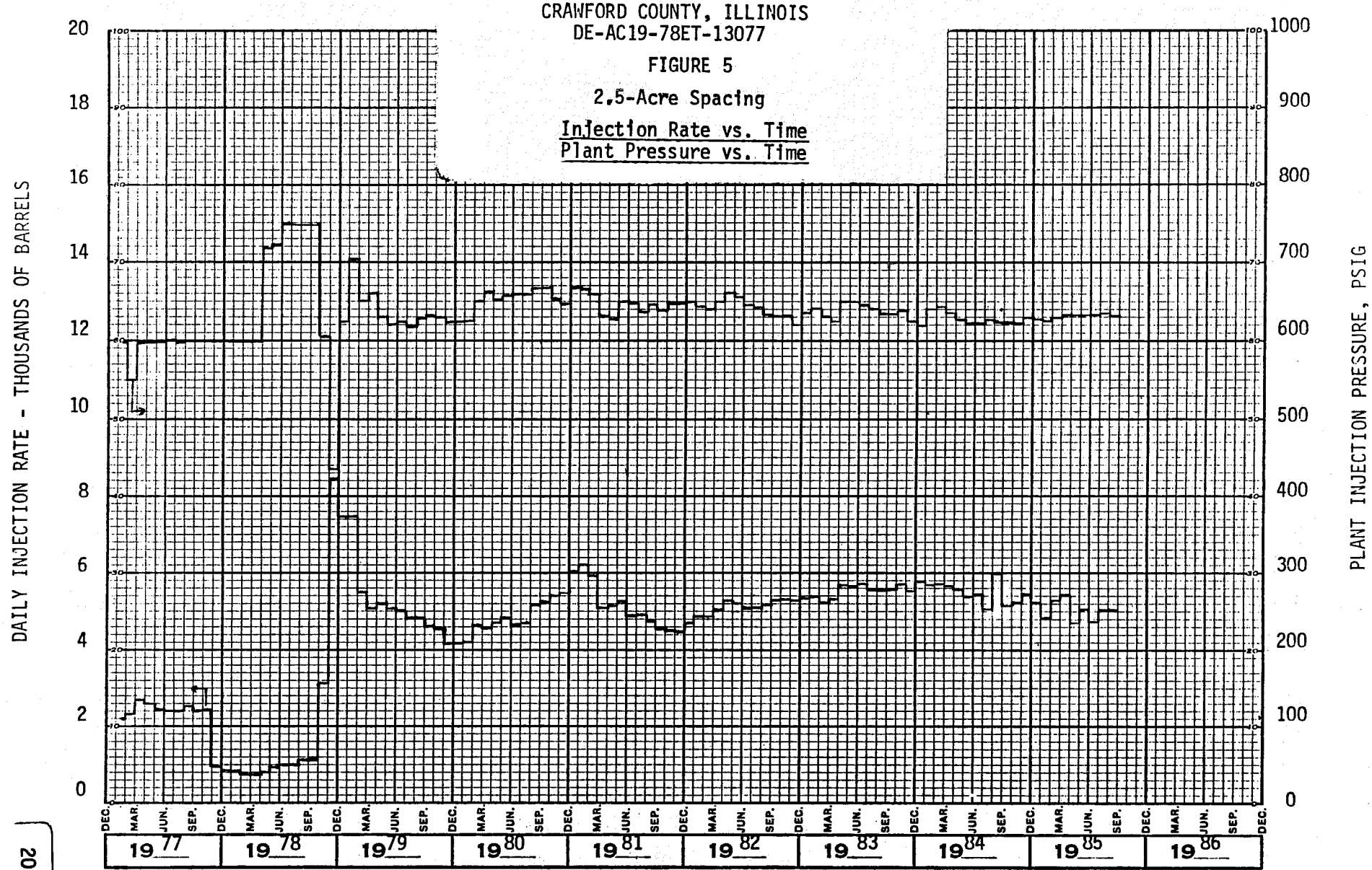


MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 5

2.5-Acre Spacing

Injection Rate vs. Time
Plant Pressure vs. Time

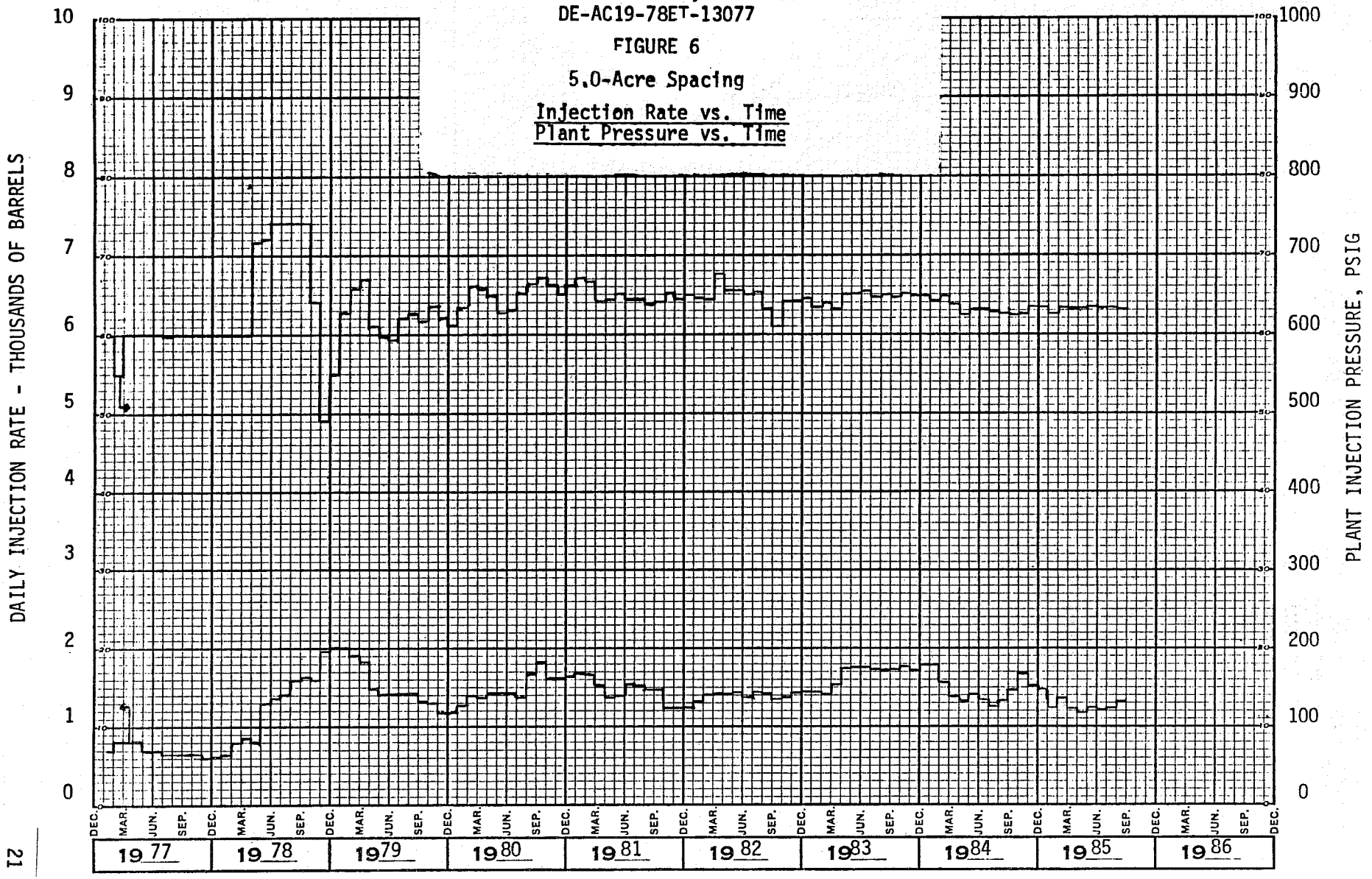


MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 Project
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 6

5.0-Acre Spacing

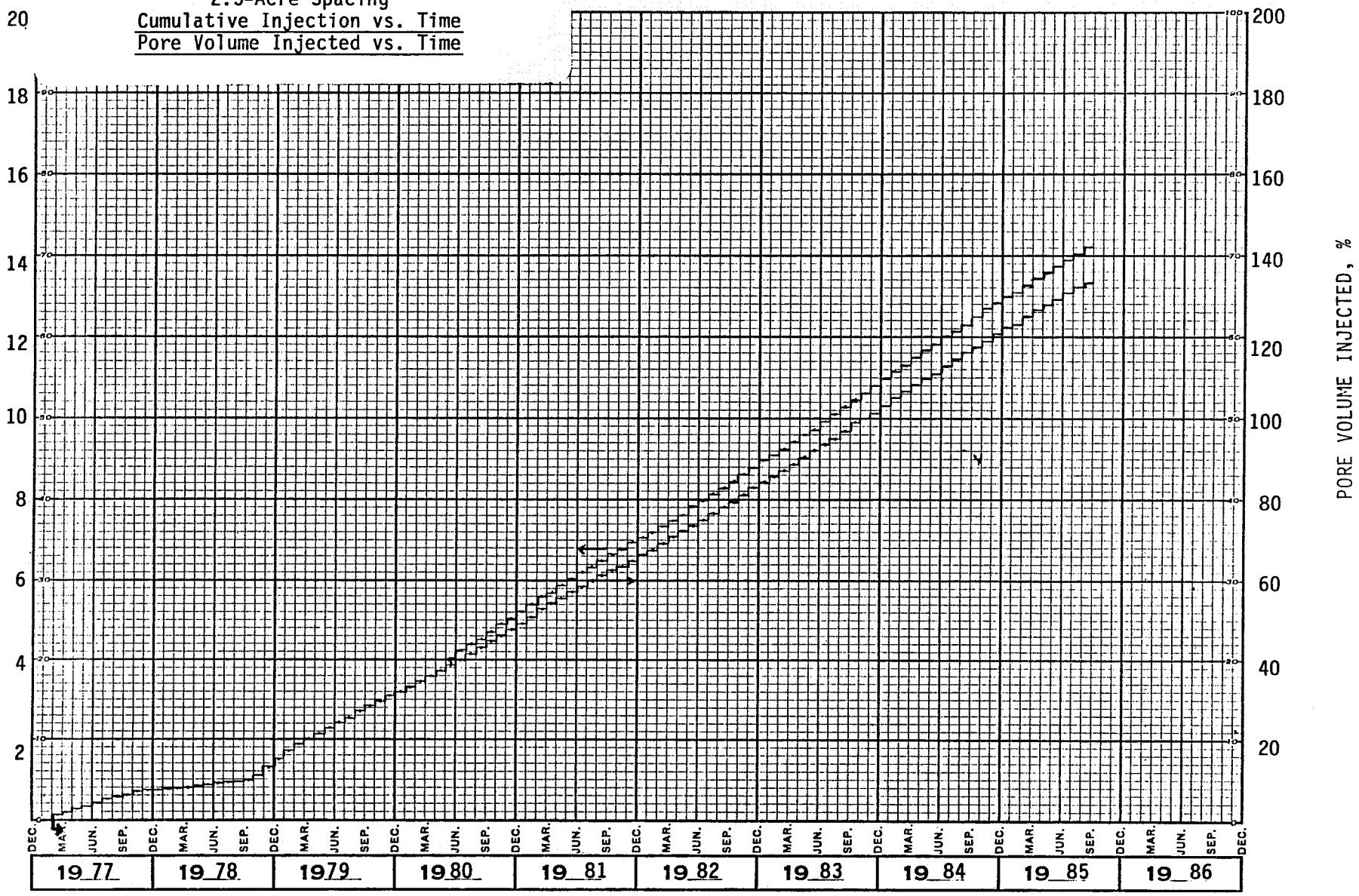
Injection Rate vs. Time
Plant Pressure vs. Time



MARATHON OIL COMPANY
MARAFLOOD PROCESS-M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 7

2.5-Acre Spacing
Cumulative Injection vs. Time
Pore Volume Injected vs. Time



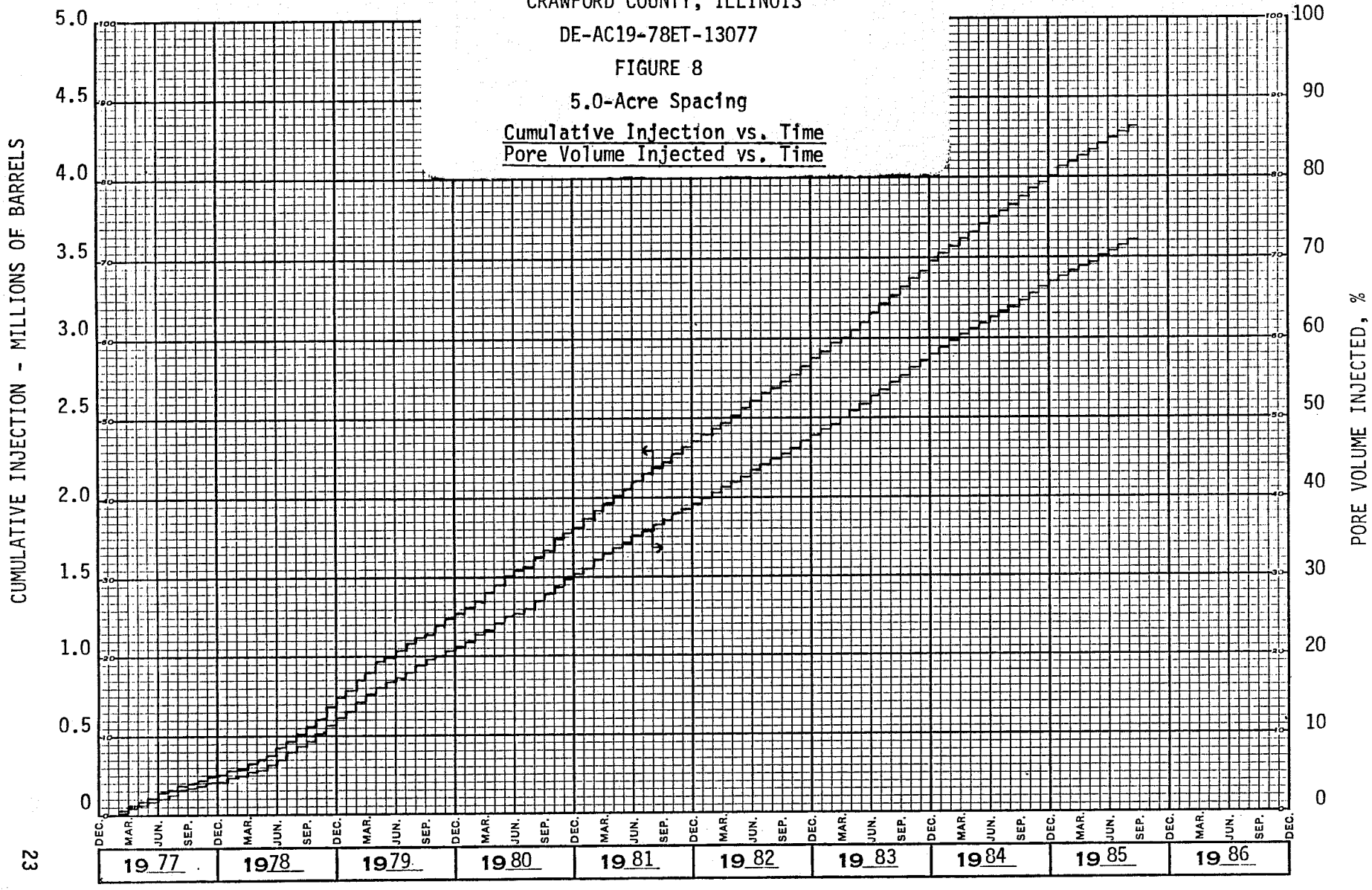
MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS

DE-AC19-78ET-13077

FIGURE 8

5.0-Acre Spacing

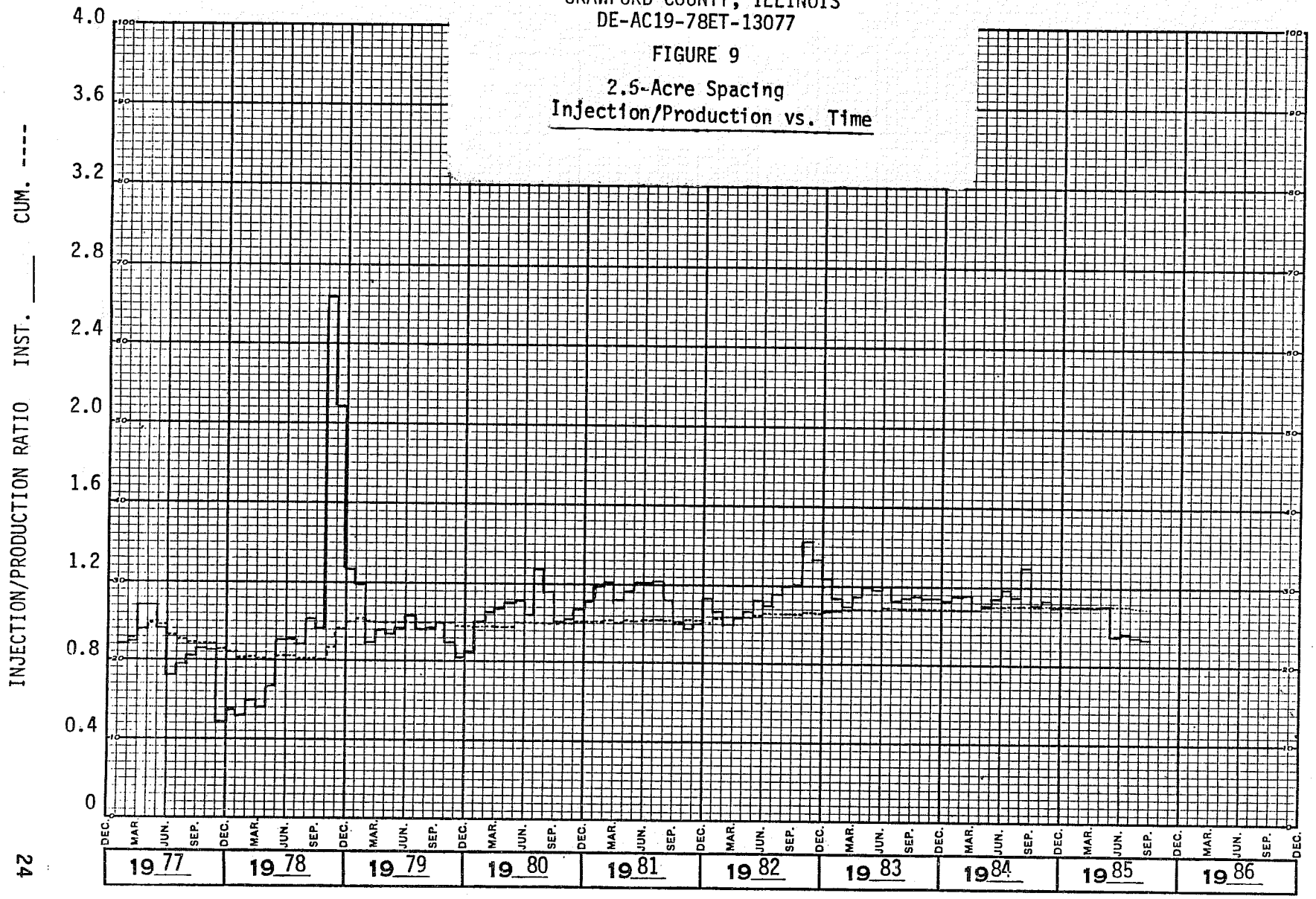
Cumulative Injection vs. Time
Pore Volume Injected vs. Time



MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 9

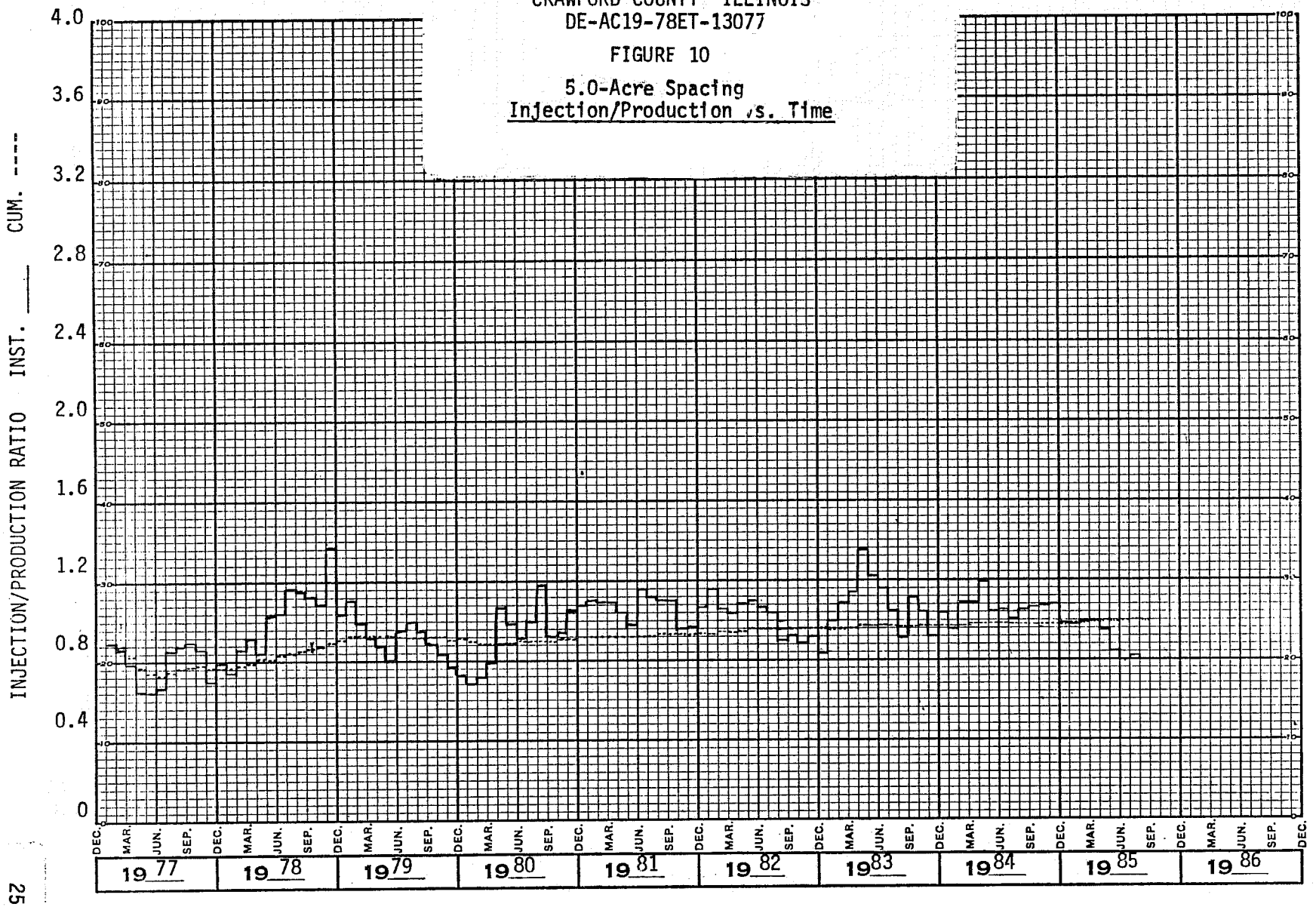
2.5-Acre Spacing
Injection/Production vs. Time



MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY ILLINOIS
DE-AC19-78ET-13077

FIGURE 10

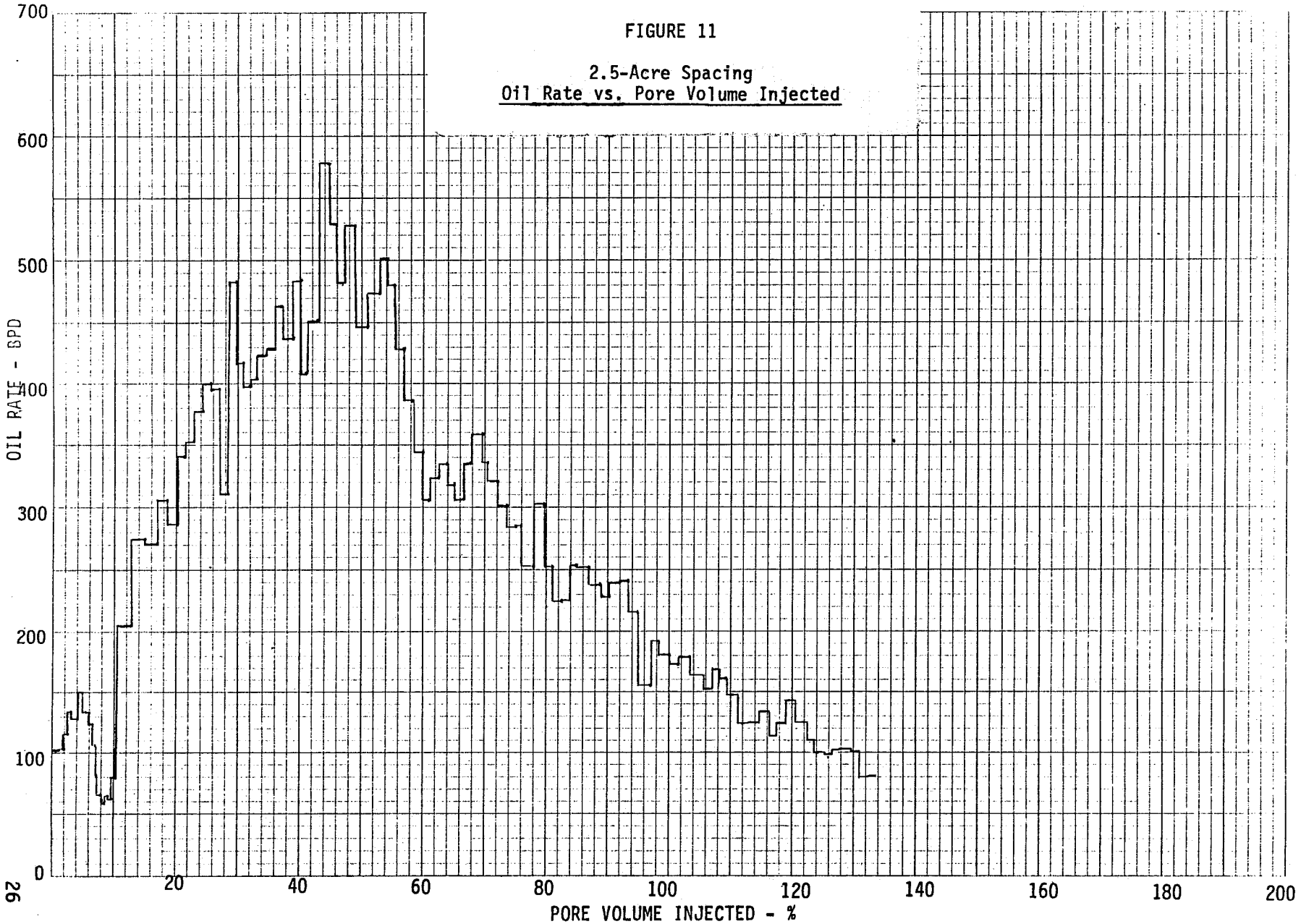
5.0-Acre Spacing
Injection/Production vs. Time

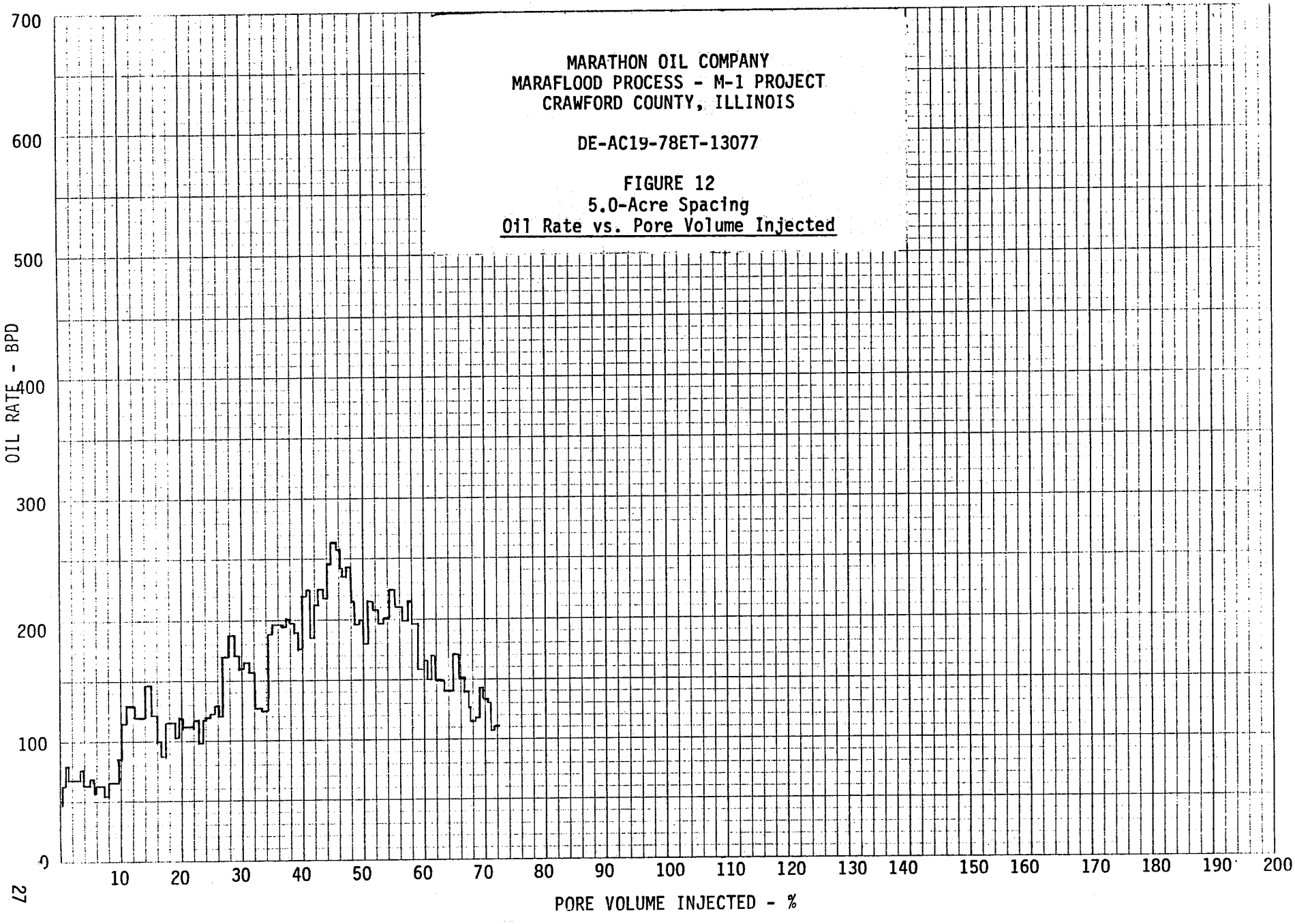


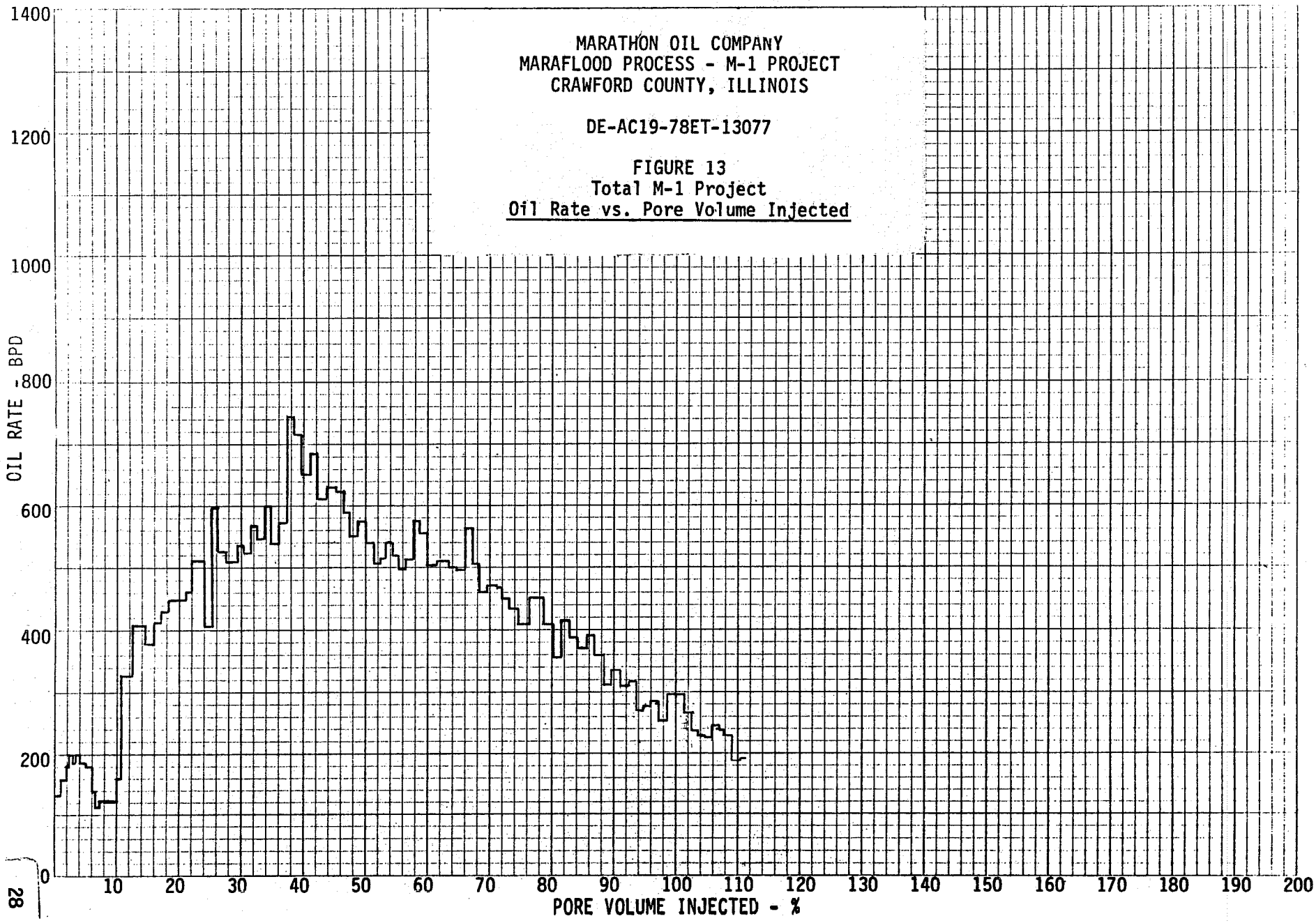
MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

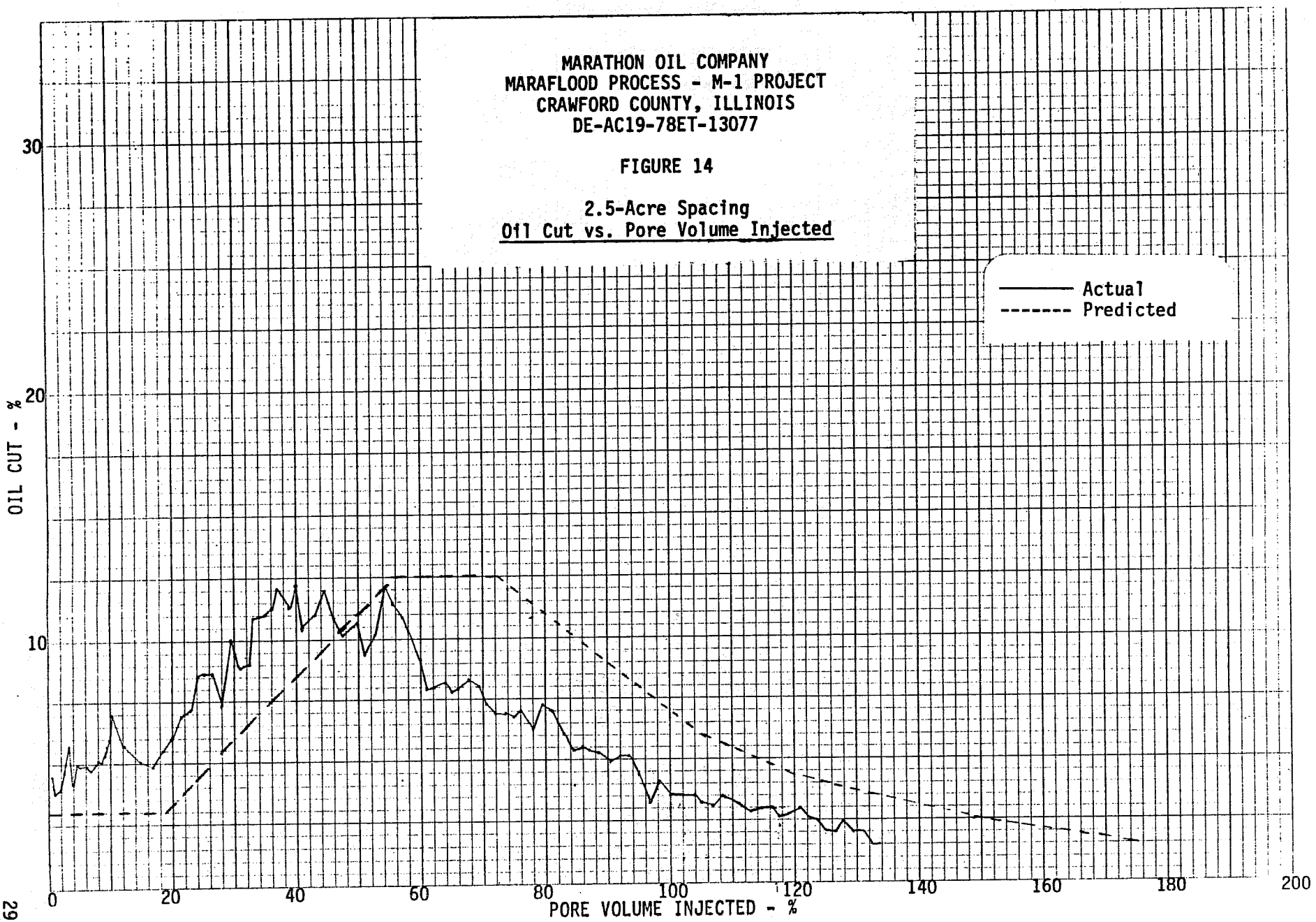
FIGURE 11

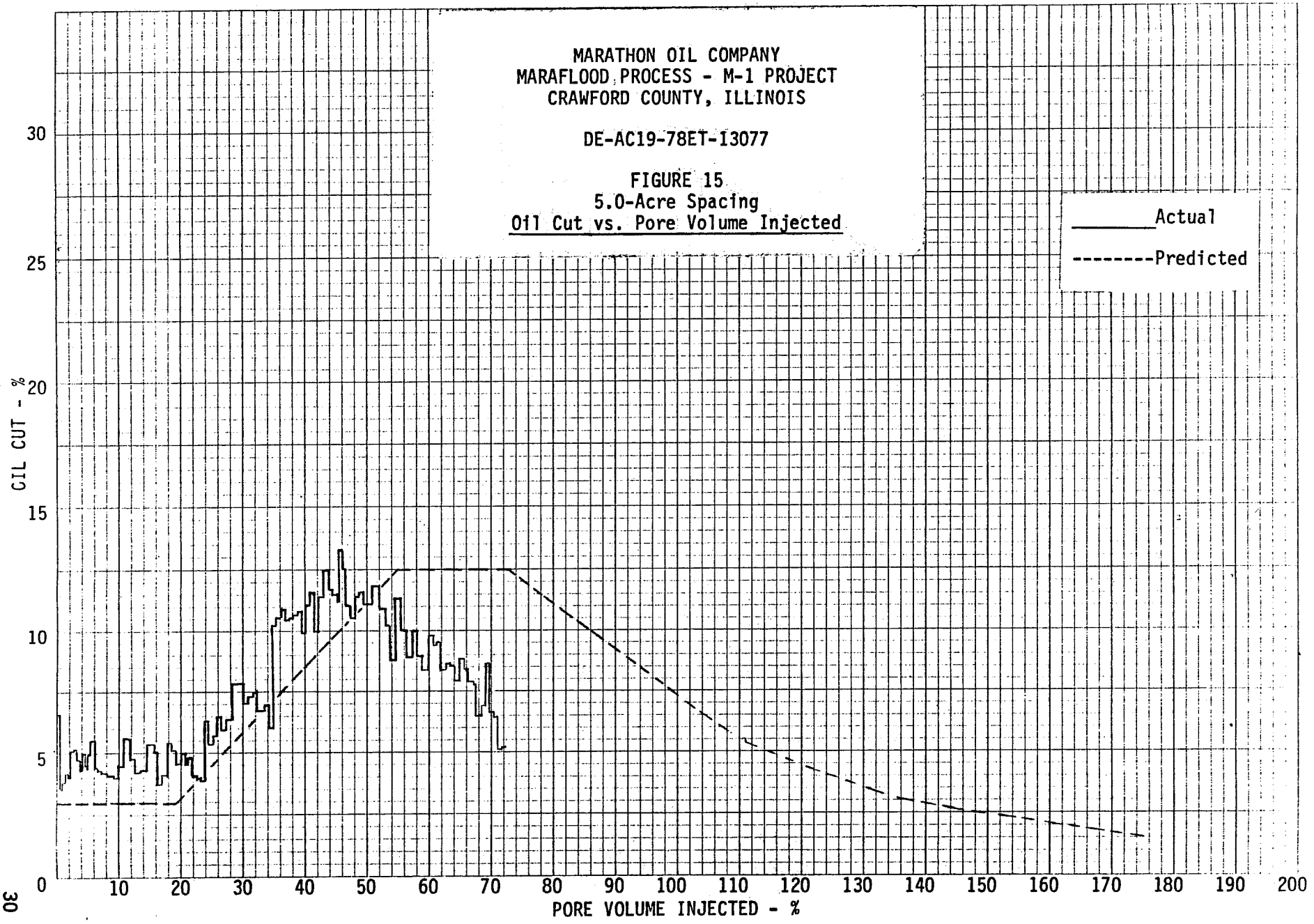
2.5-Acre Spacing
Oil Rate vs. Pore Volume Injected

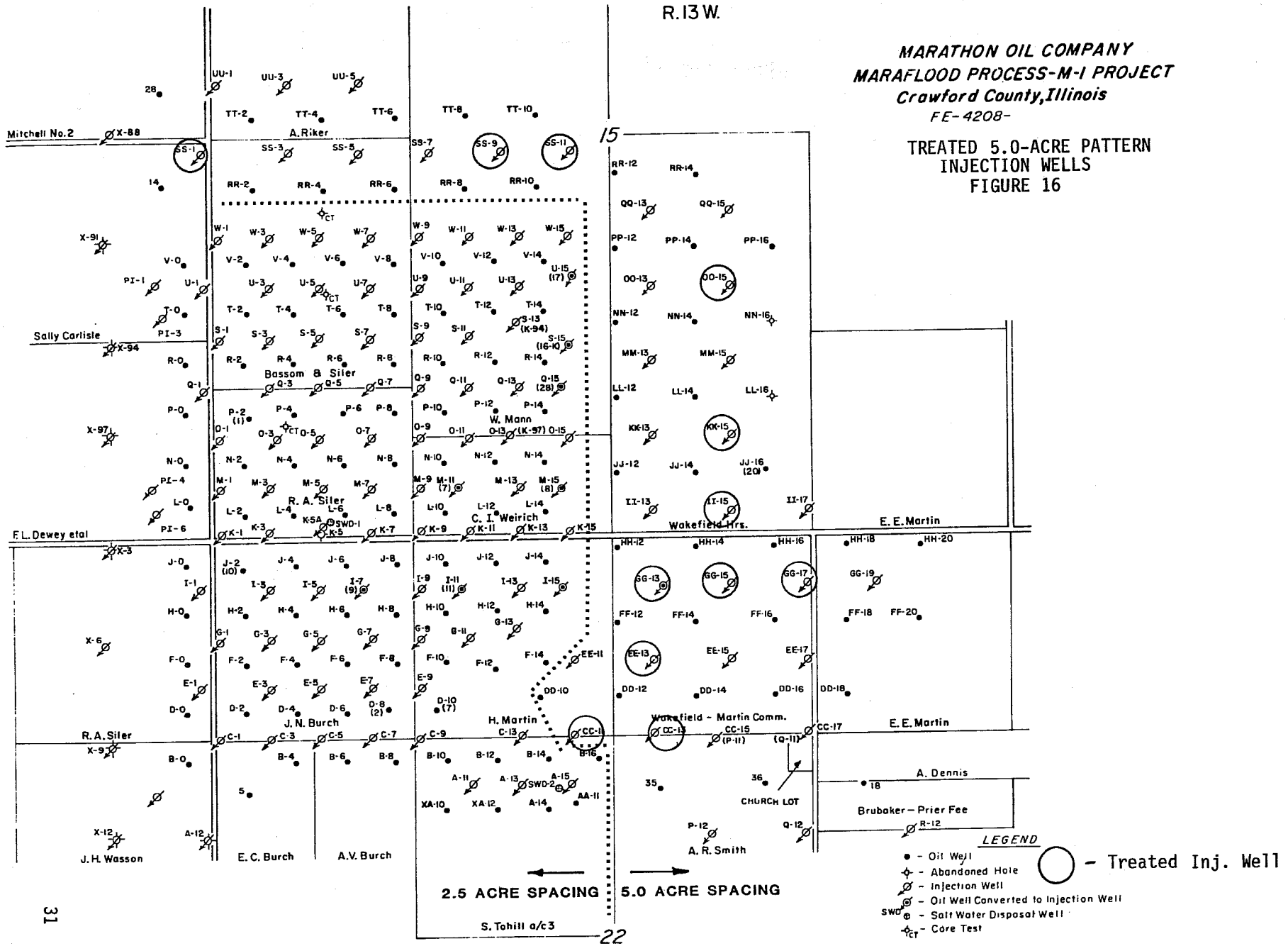



MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077
FIGURE 12
5.0-Acre Spacing
Oil Rate vs. Pore Volume Injected
OIL RATE - BPD
0
100
200
300
400
500
600
700
PORE VOLUME INJECTED - %
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200


MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077
FIGURE 13
Total M-1 Project
Oil Rate vs. Pore Volume Injected
OIL RATE - BPD
1400
1200
1000
800
600
400
200
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
PORE VOLUME INJECTED - %

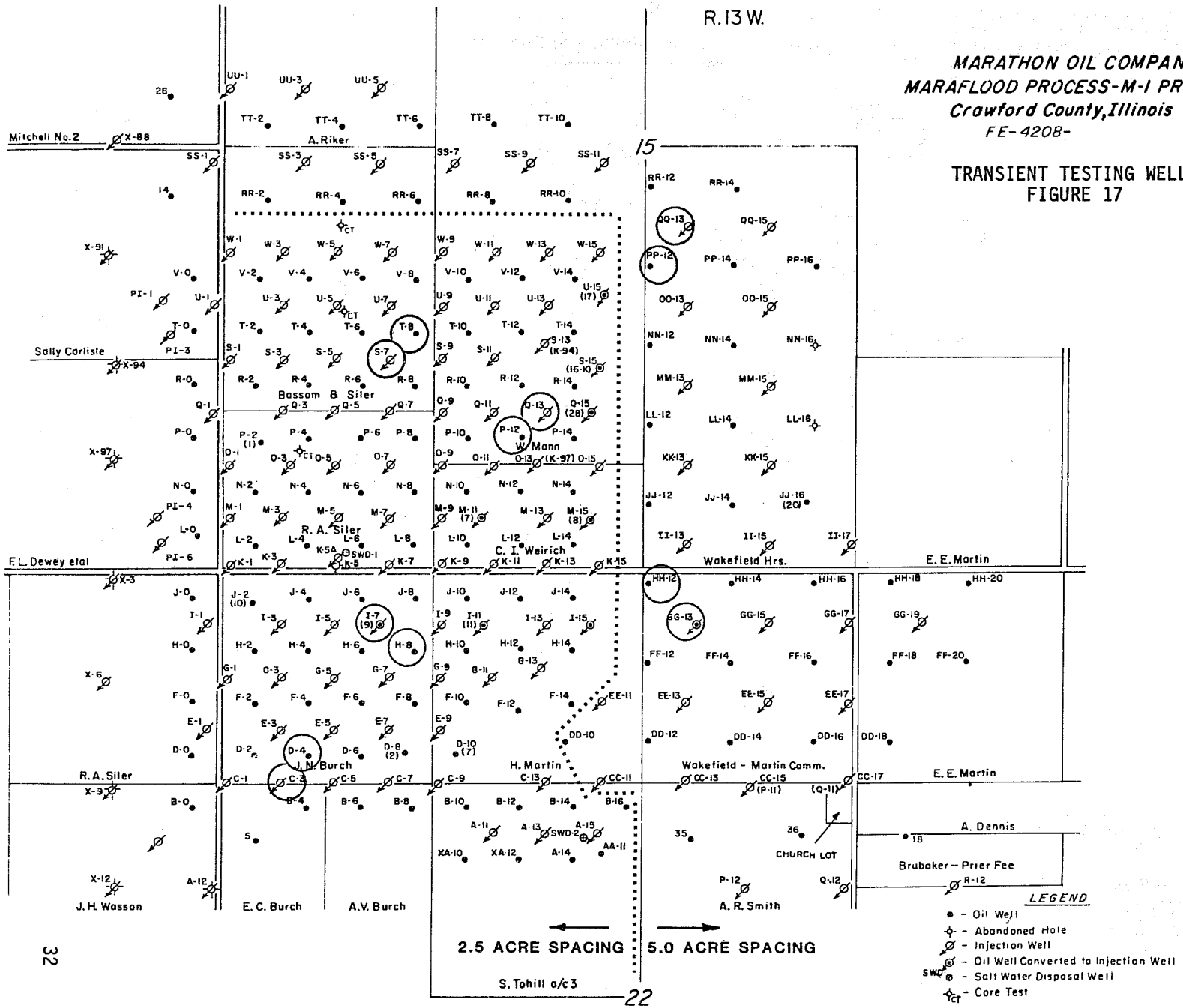

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077
FIGURE 14
2.5-Acre Spacing
Oil Cut vs. Pore Volume Injected
Actual
Predicted
OIL CUT - %
30
20
10
0
20
40
60
80
100
120
140
160
180
200
PORE VOLUME INJECTED - %

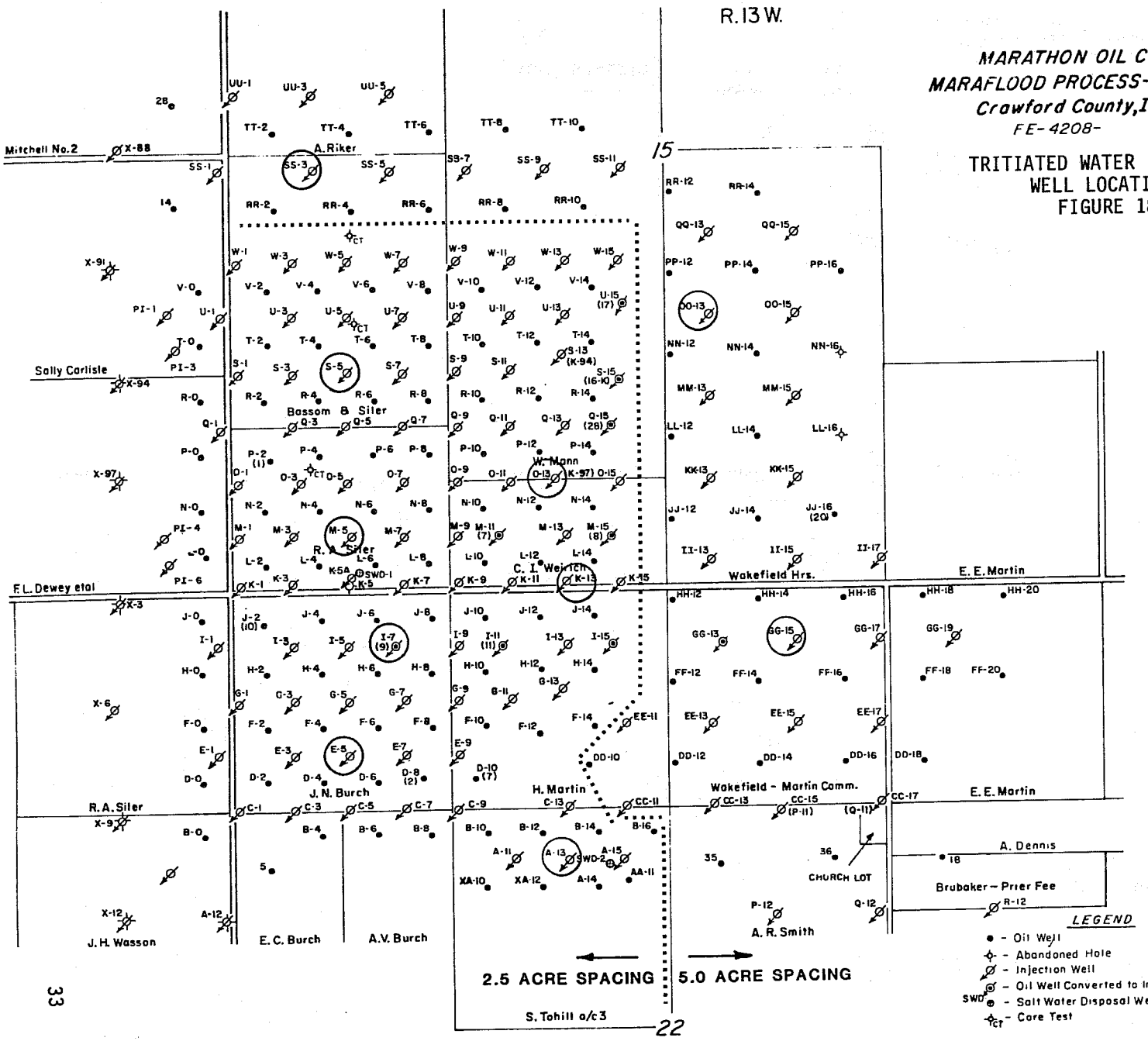

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077
FIGURE 15
5.0-Acre Spacing
Oil Cut vs. Pore Volume Injected
Actual
Predicted
OIL CUT - %
0
5
10
15
20
25
30
PORE VOLUME INJECTED - %
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200



MARATHON OIL COMPANY
MARAFLOOD PROCESS-M-1 PROJECT
Crawford County, Illinois
FE-4208-

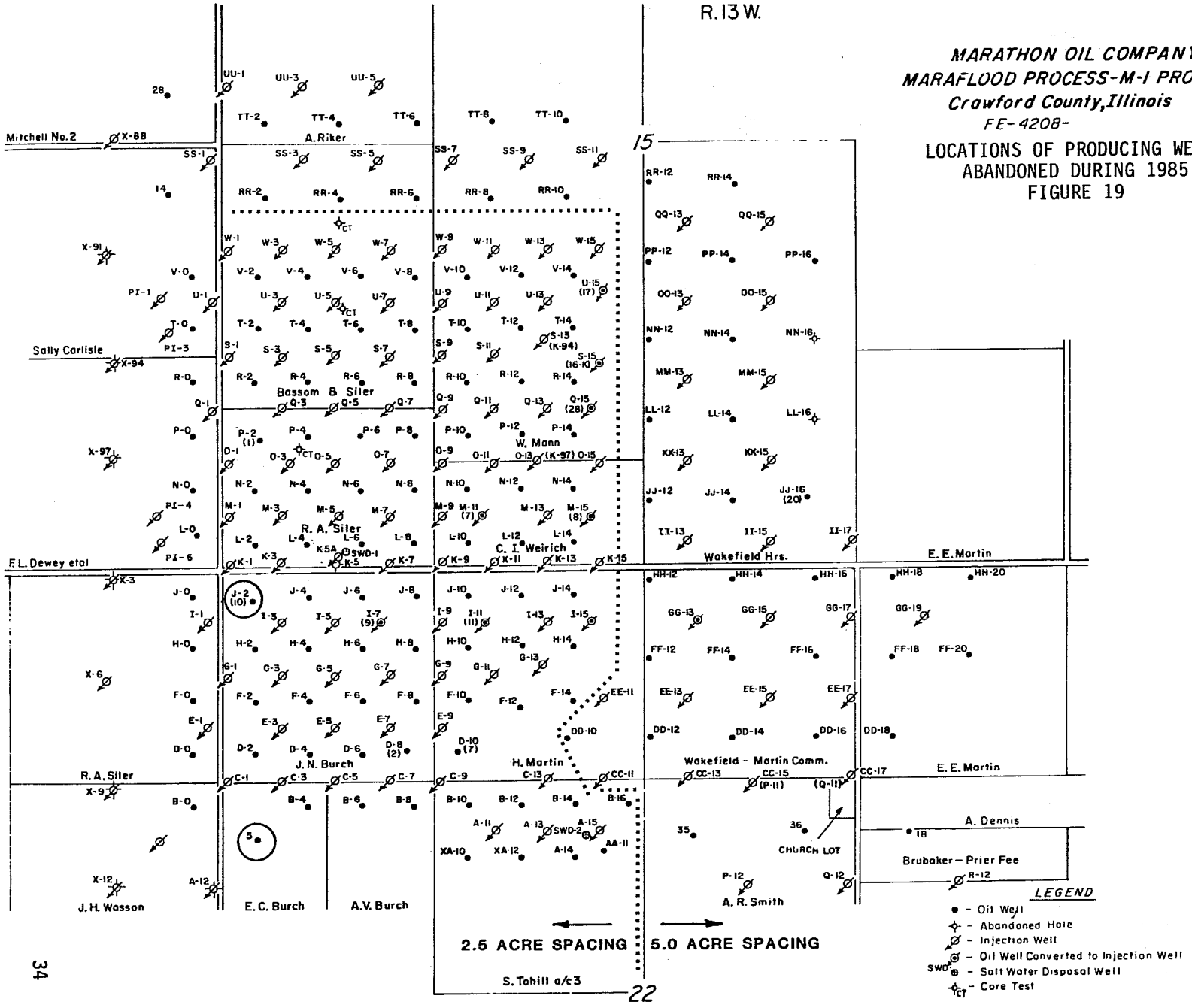
TREATED 5.0-ACRE PATTERN
INJECTION WELLS
FIGURE 16


R.13 W.
MARATHON OIL COMPANY
MARAFLOOD PROCESS-M-I PROJECT
Crawford County, Illinois
FE-4208-
TRANSIENT TESTING WELLS
FIGURE 17
Mitchell No.2
A. Riker
Sally Carliste
Bassom & Siler
W. Mann
R. A. Siler
C. I. Weirich
F.L. Dewey etal
Wakefield Hrs.
E. E. Martin
J. M. Burch
H. Martin
Wakefield - Martin Comm.
R. A. Siler
A. Dennis
Brubaker - Prier Fee
CHURCH LOT
J. H. Wasson
E. C. Burch
A.V. Burch
A. R. Smith
S. Tohill a/c3
2.5 ACRE SPACING
5.0 ACRE SPACING
15
22
LEGEND
- Oil Well
- Abandoned Hole
- Injection Well
- Oil Well Converted to Injection Well
- Salt Water Disposal Well
- Core Test



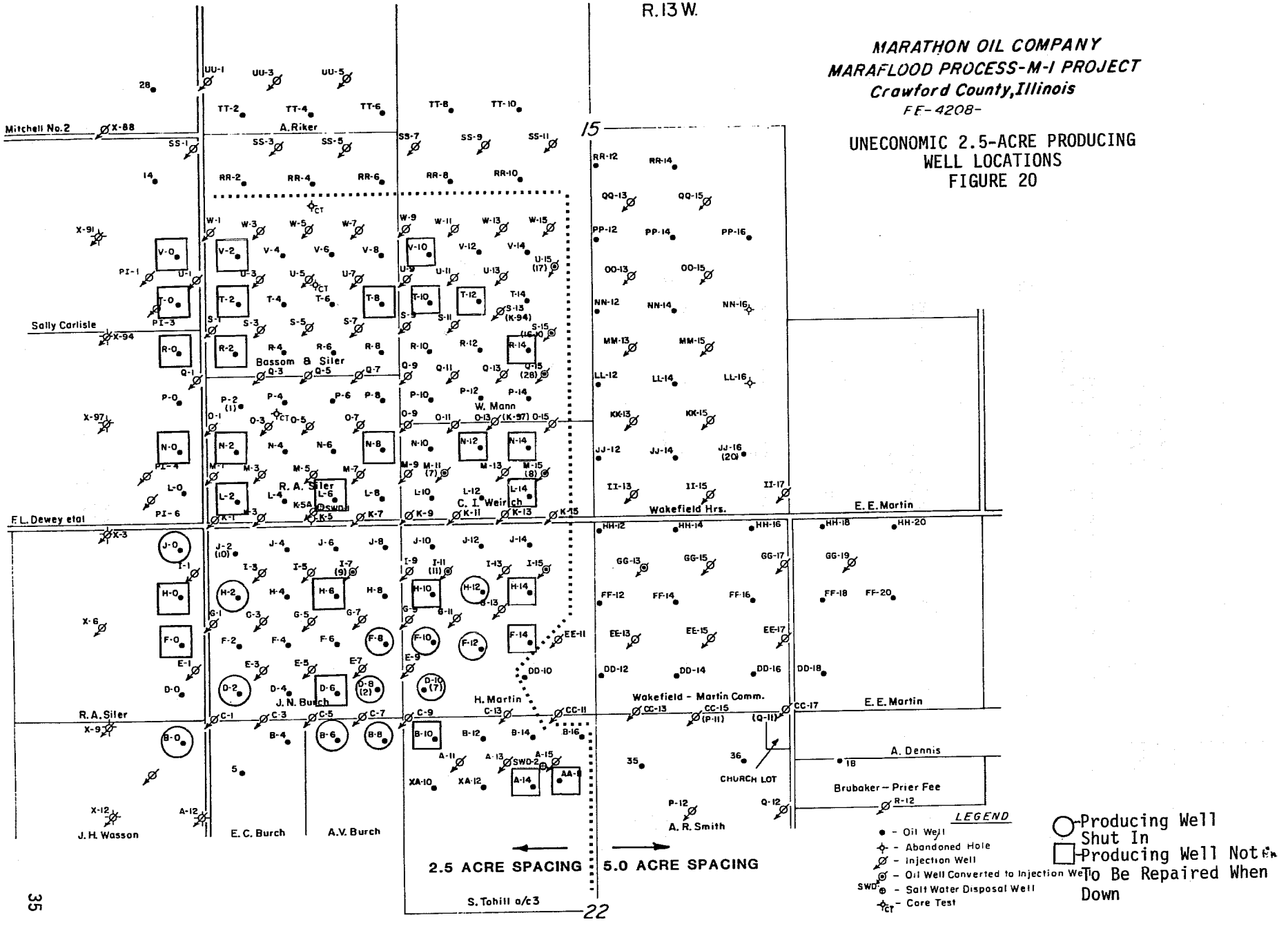
MARATHON OIL COMPANY
MARAFLOOD PROCESS-M-I PROJECT
Crawford County, Illinois
FE-4208-

TRITIATED WATER INJECTION
WELL LOCATIONS
FIGURE 18



MARATHON OIL COMPANY
MARAFLOOD PROCESS-M-I PROJECT
Crawford County, Illinois
FE-4208-

LOCATIONS OF PRODUCING WELLS
ABANDONED DURING 1985
FIGURE 19


R.13W.
MARATHON OIL COMPANY
MARAFLOOD PROCESS-M-I PROJECT
Crawford County, Illinois
FE-4208-
UNECONOMIC 2.5-ACRE PRODUCING
WELL LOCATIONS
FIGURE 20
15
22
Mitchell No.2
A. Riker
Sally Carlisle
Bassom & Siler
W. Mann
R. A. Siler
C. I. Weirich
F.L. Dewey etal
Wakefield Hrs.
E. E. Martin
J. N. Burch
H. Martin
Wakefield - Martin Comm.
CHURCH LOT
A. Dennis
Brubaker - Prier Fee
A. R. Smith
J. H. Wasson
E. C. Burch
A.V. Burch
S. Tohill a/c3
2.5 ACRE SPACING
5.0 ACRE SPACING
LEGEND
- Oil Well
- Abandoned Hole
- Injection Well
- Oil Well Converted to Injection Well
- Salt Water Disposal Well
- Core Test
Producing Well Shut In
Producing Well Not To Be Repaired When Down

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
DATA SUMMARY
2.5-ACRE

MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (MBBLS)	CUM.INJ./ PORE VOL. (%)	WGTD. AVG. BHP.	POLY CUT (%)	SLUG CUT (%)	OIL CUT (%)	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	INJ. FLUID TYPE	VISC. (CP)	SCREEN FACTOR
FEB. 1977	2246	40	0.4	588		.09	4.5	102	0.89	9586	SLUG	36.0	
MAR. 1977	2392	115	1.1	633		.39	3.8	102	0.90	9709	SLUG	30.7	
APR. 1977	2547	191	1.8	665		.07	3.9	103	1.08	9179	SLUG	32.5	
MAY 1977	2642	279	2.6	653		.11	4.7	117	1.08	9282	SLUG	35.5	
JUN. 1977	2488	354	3.3	628		.14	5.8	136	.96	9469	SLUG	34.4	
JUL. 1977	2487	431	4.1	630		.08	4.2	129	.73	8954	SLUG	31.9	
AUG. 1977	2451	507	4.8	633		.12	4.9	150	.77	9185	SLUG	35.3	
SEP. 1977	2372	578	5.4	621		.10	4.8	132	.82	9524	SLUG	32.1	
OCT. 1977	2418	653	6.1	612		.07	4.9	132	.86	9495	SLUG	32.6	
NOV. 1977	2448	726	6.8	525		.13	4.6	122	.85	9773	SLUG	31.0	
DEC. 1977	977	757	7.1	433		.13	4.8	106	.48	9358	SLUG	30.0	
JAN. 1978	928	785	7.4	456		.27	4.7	81	.55	8814	SLUG	28.9	
FEB. 1978	912	811	7.6	440		.17	4.9	80	.54	9550	SLUG	28.0	
MAR. 1978	791	835	7.9	428		.12	5.2	66	.60	9488	SLUG	27.0	
APR. 1978	730	857	8.1	444		.22	5.0	62	.56	10033	SLUG	26.7	
MAY 1978	825	883	8.3	522		.21	5.1	58	.66	9604	SLUG	59.3	
JUN. 1978	994	913	8.6	522		.24	5.3	65	.90	9534	SLUG	69.6	
JUL. 1978	1030	945	8.9	494		.26	5.7	65	.91	9818	SLUG	77.1	
AUG. 1978	1017	976	9.2	512		.29	5.7	67	.88	9764	SLUG	79.4	
SEP. 1978	1084	1009	9.5	516		.31	5.9	67	1.01	10277	SLUG	78.7	
OCT. 1978	1114	1043	9.8	492		.41	6.0	66	.97	10185	SLUG	71.4	
NOV. 1978	3162	1138	10.7	722		.32	7.1	80	2.63	9452	SLUG	54.1	22.9
DEC. 1978	8247	1394	13.1	852		.47	5.6	206	2.08	10191	1156	52.3	28.4
JAN. 1979	7480	1626	15.3	816		.54	5.0	275	1.27	9589	1156	51.1	29.6
FEB. 1979	7436	1812	17.0	791		.49	4.8	271	1.19	9445	1156	52.0	28.7
MAR. 1979	5454	1981	18.6	702		.92	5.5	306	.90	9072	1156	52.5	29.9
APR. 1979	5020	2131	20.1	762		1.10	6.0	287	.97	9275	1156	54.9	28.7
MAY 1979	5018	2286	21.5	774		1.58	6.9	341	.94	9364	1156	36.1	23.3
JUN. 1979	5099	2439	23.0	791		1.97	7.2	352	.97	9426	800	31.4	23.3
JUL. 1979	4977	2594	24.4	858		2.48	8.6	378	1.04	9626	800	31.5	24.8
AUG. 1979	4865	2744	25.8	856		2.91	8.6	400	.96	9220	800	33.2	24.8
SEP. 1979	4820	2889	27.2	863		3.89	8.6	395	.97	9204	800	30.0	23.8
OCT. 1979	4598	3032	28.5	842	3.4	3.86	7.3	310	1.00	8673	800	30.2	25.8
NOV. 1979	4524	3167	29.8	851	2.6	4.60	10.1	483	.89	8652	800	32.0	25.6
DEC. 1979	4168	3297	31.0	833	4.4	4.26	8.8	418	.82	8512	800	30.6	22.5
JAN. 1980	4147	3425	32.2	819	5.3	3.81	8.9	398	.86	8466	800	30.9	21.9
FEB. 1980	4217	3547	33.4	800	2.4	5.06	10.9	404	1.00	8618	800	30.1	24.0
MAR. 1980	4631	3691	34.7	873	6.0	6.16	11.0	425	1.06	8130	800	29.5	20.8
APR. 1980	4571	3828	36.0	861	5.0	7.36	11.3	431	1.08	8103	800	29.3	22.0
MAY 1980	4716	3974	37.4	889	8.9	5.69	12.1	463	1.10	7852	800	30.2	23.2

MARATHON OIL COMPANY
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MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (MBBLS)	CUM.INJ./ PORE VOL. (%)	WGTD. AVG. BHP.	POLY CUT (%)	SLUG CUT (%)	OIL CUT (%)	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	INJ. FLUID TYPE	VISC. (CP)	SCREEN FACTOR
JUN. 1980	4837	4119	38.8	926	11.3	5.61	11.3	437	1.11	7616	800	28.0	21.4
JUL. 1980	4646	4263	40.1	915	12.3	5.49	12.2	484	1.04	7503	800	28.8	21.5
AUG. 1980	4690	4409	41.5	912	11.1	4.67	10.4	408	1.27	7761	625	19.2	18.5
SEP. 1980	5165	4564	42.9	975	17.7	4.99	11.0	452	1.15	7023	625	19.2	19.7
OCT. 1980	5248	4726	44.5	970	16.1	5.08	12.0	577	1.01	7152	625	19.8	19.4
NOV. 1980	5425	4889	46.0	974	19.2	5.26	10.8	529	1.02	6837	625	19.6	19.6
DEC. 1980	5454	5058	47.6	981	17.1	4.89	10.1	481	1.07	7119	625	19.7	19.8
JAN. 1981	6066	5246	49.4	985	19.9	4.81	10.6	528	1.12	6821	625	20.0	20.5
FEB. 1981	6209	5420	51.0	972	19.4	4.94	9.4	447	1.19	6891	625	20.5	20.3
MAR. 1981	5944	5604	52.7	960	26.5	4.76	10.2	473	1.20	6149	625	20.7	19.2
APR. 1981	5056	5756	54.2	925	28.1	5.21	12.1	500	1.13	5858	625	20.9	21.3
MAY 1981	5136	5915	55.7	966	29.1	4.78	11.4	461	1.18	5827	625	20.7	17.6
JUN. 1981	5236	6072	57.1	979	31.2	4.97	10.8	428	1.21	5603	625	20.0	17.1
JUL. 1981	4823	6221	58.5	939	30.7	5.60	10.2	386	1.19	5616	625	21.3	16.7
AUG. 1981	4903	6373	60.0	957	35.4	5.63	9.1	343	1.21	5179	625	19.5	17.5
SEP. 1981	4680	6514	61.3	964	36.4	5.88	7.9	306	1.13	5106	625	19.9	17.9
OCT. 1981	4548	6655	62.6	977	37.4	6.08	7.9	323	1.03	4934	625	19.7	17.8
NOV. 1981	4451	6788	63.9	937	36.1	5.25	8.1	337	0.98	5189	625	20.2	14.6
DEC. 1981	4456	6926	65.2	971	37.0	5.97	7.8	319	1.01	5035	625	20.3	13.7
JAN. 1982	4756	7074	66.6	977	40.8	5.83	7.9	304	1.14	4662	625	20.0	13.6
FEB. 1982	4864	7210	67.8	977	42.1	6.11	8.3	337	1.07	4486	625	20.8	18.0
MAR. 1982	4830	7360	69.3	978	43.4	6.02	8.0	360	1.00	4373	625	19.7	20.8
APR. 1982	5066	7512	70.7	991	44.6	6.18	7.3	334	1.04	4279	625	19.0	20.0
MAY 1982	5292	7676	72.2	999	47.4	4.07	6.9	321	1.07	4226	625	18.0	19.4
JUN. 1982	5207	7832	73.7	996	50.0	4.24	6.9	300	1.14	3948	411	11.4	14.9
JUL. 1982	5014	7987	75.2	986			6.7	285	1.10		411	11.5	13.6
AUG. 1982	5047	8144	76.6	980	51.2	4.27	7.0	284	1.17	3823	411	11.9	13.1
SEP. 1982	5151	8298	78.1	991			6.2	252	1.20		411	10.2	13.3
OCT. 1982	5321	8463	79.6	994	52.3	3.78	7.3	303	1.21	3711	411	11.0	12.7
NOV. 1982	5353	8624	81.1	990			7.0	252	1.42		411	10.1	13.9
DEC. 1982	5335	8788	82.7	984	58.6	2.25	6.0	226	1.35	3315	411	10.6	14.2
JAN. 1983	5385	8955	84.3	999			5.4	228	1.24		200	5.1	14.2
FEB. 1983	5398	9106	85.7	994	60.8	2.15	5.5	255	1.14	3148	200	4.1	10.5
MAR. 1983	5233	9269	87.2	890			5.4	253	1.09		200	4.1	8.8
APR. 1983	5290	9427	88.7	994	62.6	2.11	5.2	237	1.15	2991	200	4.1	8.0
MAY 1983	5681	9603	90.4	1010			4.9	229	1.20		200	3.9	7.5
JUNE 1983	5661	9773	92.0	1012	64.8	1.90	5.1	241	1.18	2803	200	3.9	6.0
JUL. 1983	5721	9950	93.6	1013			5.2	242	1.20		200	4.3	8.6
AUG. 1983	5588	10124	95.3	1014	67.9	1.76	4.4	215	1.13	2564	100	2.9	5.2
SEP. 1983	5583	10291	96.8	1005			3.2	155	1.14		100	2.9	5.4

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MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (MBBLS)	CUM.INJ./ PORE VOL. (%)	WGTD. AVG. BHP.	POLY CUT (%)	SLUG CUT (%)	OIL CUT (%)	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	INJ. FLUID TYPE	VISC. (CP)	SCREEN FACTOR
OCT. 1983	5547	10463	98.5	1002	68.5	1.93	4.1	191	1.15	2511	100	3.0	5.6
NOV. 1983	5690	10634	100.1	998			3.6	180	1.14		100	2.9	5.6
DEC. 1983	5556	10806	101.7	998	70.6	1.90	3.6	172	1.14	2344	100	3.2	5.8
JAN. 1984	5775	10985	103.4	1002			3.6	179	1.13		100	3.0	5.4
FEB. 1984	5691	11150	104.9	1005	73.1	1.66	3.3	163	1.13	2147	50	2.3	5.2
MAR. 1984	5763	11329	106.6	1003			3.1	152	1.15		50	2.1	4
APR 1984	5650	11498	108.2	993	73.9	1.67	3.4	169	1.09	2067	50	2.3	3.9
MAY 1984	5581	11672	109.8	958			3.3	160	1.10		50	1.4	4.3
JUNE 1984	5396	11833	111.3	955	75.1	1.66	3.2	147	1.14	1964	50	.0	4.3
JULY 1984	5445	12002	112.9	979			2.8	123	1.19		50	2.0	4.0
AUG 1984	5067	12159	114.4	975	76.3	1.53	2.9	125	1.15	1882	50	1.8	3.7
SEP 1984	6010	12340	116.1	974			3.0	135	1.32		WTR	.0	0
OCT 1984	5171	12500	117.6	961	75.4	1.54	2.6	115	1.14	1999	WTR	.0	0
NOV 1984	5214	12656	119.1	972			2.7	124	1.18		WTR	.0	0
DEC 1984	5450	12826	120.7	974	77.0	1.47	2.9	143	1.09	1819	WTR	.0	0
JAN 1985	5209	12987	122.2	973			2.6	124	1.10		WTR	.0	0
FEB 1985	4815	13122	123.5	976	77.7	1.43	2.5	110	1.09	1790	WTR	.0	0
MAR 1985	5280	13285	125.0	980			2.1	100	1.09		WTR	.0	0
APR 1985	5409	13447	126.5	974	74.8	1.33	2.0	97	1.10	2106	WTR	.0	0
MAY 1985	4744	13594	127.9	936			2.4	103	1.12		WTR	.0	0
JUN 1985	5062	13746	129.3	971	80.3	1.23	2.0	104	0.95	1603	WTR	.0	0
JUL 1985	4776	13894	130.7	972			2.0	102	0.96		WTR	.0	0
AUG 1985	5044	14051	132.2	972	80.9	1.25	1.5	80	0.94	1575	WTR	.0	0
SEP 1985	5053	14203	133.6	981			1.5	81	0.93		WTR	.0	0

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MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (MBBLS)	CUM.INJ./ PORE VOL. (%)	WGTD. AVG. BHP.	POLY CUT (%)	SLUG CUT (%)	OIL CUT (%)	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	INJ. FLUID TYPE	VISC. (CP)	SCREEN FACTOR
FEB. 1977	675	12	0.2	585		.15	6.6	44	.90	8319	SLUG	36.0	
MAR. 1977	822	38	0.6	575		.33	3.5	44	.87	9776	SLUG	30.7	
APR. 1977	826	62	1.0	634		.24	3.7	60	.78	9920	SLUG	32.5	
MAY 1977	818	88	1.5	633		.28	4.2	79	.65	9918	SLUG	35.5	
JUN. 1977	738	110	1.8	624		.26	4.0	68	.64	8551	SLUG	34.4	
JUL. 1977	709	132	2.2	648		.20	4.1	65	.67	9221	SLUG	31.9	
AUG. 1977	666	153	2.5	579		.18	5.0	65	.85	9560	SLUG	35.3	
SEP. 1977	652	172	2.9	603		.15	5.1	67	.88	9132	SLUG	32.1	
OCT. 1977	670	193	3.2	589		.12	4.7	64	.89	10556	SLUG	32.6	
NOV. 1977	647	213	3.5	543		.19	4.3	62	.86	8089	SLUG	31.0	
DEC. 1977	622	232	3.9	564		.11	4.9	74	.69	9517	SLUG	30.0	
JAN. 1978	627	251	4.2	564		.21	4.4	62	.79	9362	SLUG	28.9	
FEB. 1978	670	270	4.5	560		.18	4.3	59	.74	9503	SLUG	28.0	
MAR. 1978	810	295	4.9	614		.15	4.8	63	.85	10260	SLUG	27.0	
APR. 1978	862	321	5.4	615		.15	5.5	68	.92	11115	SLUG	26.7	
MAY 1978	823	246	5.8	570		.20	4.4	56	.84	10177	SLUG	59.3	
JUN. 1978	1302	386	6.4	576		.21	4.3	63	1.03	12675	SLUG	69.9	
JUL. 1978	1382	428	7.1	639		.23	4.2	62	1.04	10269	SLUG	77.1	
AUG. 1978	1402	472	7.9	723		.27	4.2	57	1.16	9885	SLUG	79.4	
SEP. 1978	1599	520	8.7	755		.24	4.1	63	1.15	10537	SLUG	78.7	
OCT. 1978	1642	571	9.5	782		.37	4.0	67	1.13	10336	SLUG	71.4	
NOV. 1978	1610	619	10.3	819		.26	4.5	82	1.09	9995	SLUG	49.8	22.9
DEC. 1978	1978	680	11.3	843		.32	5.6	115	1.37	9881	1156	51.7	27.2
JAN. 1979	2007	743	12.4	840		.62	4.7	129	1.04	10111	1156	51.3	28.2
FEB. 1979	2024	793	13.2	851		.64	4.2	119	1.11	10080	1156	51.8	26.7
MAR. 1979	1927	853	14.2	857		.90	4.3	117	.99	9982	1156	52.5	28.8
APR. 1979	1812	907	15.1	845		.86	5.3	144	.92	10289	1156	55.6	27.6
MAY 1979	1486	953	15.9	761		.93	5.0	119	.89	10348	1156	56.0	28.9
JUN. 1979	1425	996	16.6	768		.86	3.7	99	.80	10113	1156	54.1	28.8
JUL. 1979	1406	1040	17.3	792		.88	4.1	87	.95	9996	1156	54.1	29.6
AUG. 1979	1418	1084	18.1	804		.75	5.4	112	.99	9603	1156	54.4	28.7
SEP. 1979	1417	1126	18.8	829		1.13	5.2	111	.95	10451	1156	51.1	27.9
OCT. 1979	1332	1167	19.5	809		.89	4.5	101	.89	9314	1156	52.1	30.5
NOV. 1979	1296	1206	20.1	813		1.45	5.1	115	.83	9993	1156	51.1	29.8
DEC. 1979	1174	1243	20.7	789		1.14	4.9	110	.77	9896	1156	51.7	27.8
JAN. 1980	1182	1279	21.3	787		.92	4.5	110	.72	9993	1156	39.4	23.4
FEB. 1980	1261	1360	21.9	753		.93	4.0	111	.68	9790	800	30.7	21.2
MAR. 1980	1393	1359	22.7	868		1.52	4.0	114	.72	9816	800	29.3	19.7
APR. 1980	1354	1400	23.3	839		2.78	3.9	97	.79	9849	800	30.5	22.2
MAY 1980	1410	1443	24.1	877		1.09	6.3	116	1.06	10239	800	29.9	21.5

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MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (MBBLS)	CUM.INJ./ PORE VOL. (%)	WGTD. AVG. BHP.	POLY CUT (%)	SLUG CUT (%)	OIL CUT (%)	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	INJ. FLUID TYPE	VISC. (CP)	SCREEN FACTOR
JUN. 1980	1408	1486	24.8	893		1.49	5.3	109	0.98	9773	800	29.5	21.3
JUL. 1980	1404	1529	25.5	892		1.35	5.7	121	0.91	10069	800	29.9	21.3
AUG. 1980	1373	1572	26.2	860		1.32	6.5	130	0.98	9637	800	28.3	21.0
SEP. 1980	1648	1621	27.0	924		1.31	5.9	122	1.18	9548	800	27.9	21.5
OCT. 1980	1828	1678	28.0	950		1.46	6.3	170	0.92	9669	800	29.6	21.3
NOV. 1980	1600	1726	28.8	924		1.20	7.8	188	0.94	9876	800	29.4	20.7
DEC. 1980	1608	1776	29.6	953		1.58	7.8	170	1.06	9751	800	29.7	20.8
JAN. 1981	1644	1827	30.5	949		1.49	7.1	160	1.08	9827	800	28.1	21.2
FEB. 1981	1675	1874	31.2	949		1.55	7.3	163	1.10	9696	800	29.3	20.1
MAR. 1981	1664	1925	32.1	949		1.70	7.5	156	1.08	10441	800	31.1	22.1
APR. 1981	1517	1971	32.9	938		2.31	6.7	126	1.10	9227	800	30.0	21.2
MAY 1981	1344	2012	33.6	941	1.4	2.46	7.0	126	1.05	9013	800	31.0	19.6
JUN. 1981	1401	2054	34.3	953	0.7	3.21	6.0	122	0.98	9021	800	29.0	19.1
JUL. 1981	1553	2102	35.1	952	0.2	3.47	10.3	188	1.17	9027	800	30.5	18.6
AUG. 1981	1515	2149	35.8	954	0.0	5.31	10.6	197	1.12	8931	800	29.5	20.1
SEP. 1981	1485	2194	36.6	968	2.5	4.33	10.9	196	1.11	8686	800	29.3	23.8
OCT. 1981	1485	2240	37.4	933	1.9	4.62	10.5	188	1.11	8722	800	31.2	18.7
NOV. 1981	1222	2277	38.0	943	2.5	4.73	10.6	202	0.93	8644	800	30.7	17.3
DEC. 1981	1226	2315	38.6	964	0.1	4.91	10.7	197	0.97	8878	800	29.8	15.5
JAN. 1982	1253	2353	39.2	967	4.2	4.87	10.9	189	1.07	8455	800	29.8	15.2
FEB. 1982	1327	2391	39.9	968	4.5	5.75	9.8	174	1.16	8344	800	29.4	19.7
MAR. 1982	1410	2434	40.6	982	5.7	6.09	11.2	219	1.06	8164	625	21.2	20.7
APR. 1982	1418	2477	41.3	1002	6.9	4.29	11.6	226	1.14	8222	625	18.9	19.8
MAY 1982	1416	2521	42.0	1007	6.4	4.98	10.0	184	1.09	8225	625	19.4	19.0
JUN. 1982	1420	2563	42.7	1018	8.2	5.55	11.5	212	1.10	7950	625	19.7	18.4
JUL. 1982	1394	2607	43.5	1032			12.5	226	1.07		625	19.1	16.1
AUG. 1982	1427	2651	44.2	985	14.9	5.42	11.6	217	1.04	7249	625	19.2	16.5
SEP. 1982	1417	2693	44.9	1032			11.3	243	0.90		625	18.7	16.6
OCT. 1982	1359	2735	45.6	988	10.2	5.89	13.3	263	0.93	7669	625	18.5	16.3
NOV. 1982	1388	2777	46.3	1010			12.0	256	0.89		625	19.7	18.2
DEC. 1982	1436	2822	47.1	1000	17.6	3.71	11.1	234	0.92	7157	625	19.2	17.6
JAN. 1983	1453	2867	47.8	1007			10.6	241	0.83		625	19.6	19.4
FEB. 1983	1456	2907	48.5	1014	18.4	4.22	11.4	212	0.99	7016	625	18.7	18.7
MAR. 1983	1425	2952	49.2	982			11.6	195	1.09		625	19.3	16.6
APR. 1983	1541	2998	50.0	1009	17.7	4.18	11.1	197	1.14	7099	625	19.0	15.0
MAY 1983	1758	3052	50.9	1030			11.1	179	1.35		625	18.8	15.6
JUNE 1983	1771	3106	51.8	1029	22.6	3.99	11.9	215	1.22	6575	625	19.9	14.0
JUL. 1983	1779	3161	52.7	1039			10.8	208	1.16		625	20.6	17.3
AUG. 1983	1746	3215	53.6	1038	28.8	3.87	10.2	197	1.05	5999	625	13.3	11.5
SEP. 1983	1738	3267	54.5	1042			8.7	202	0.91		625	17.7	16.3

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MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (MBBLS)	CUM.INJ./ PORE VOL. (%)	WGTD. AVG. BHP.	POLY CUT (%)	SLUG CUT (%)	OIL CUT (%)	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	INJ. FLUID TYPE	VISC. (CP)	SCREEN FACTOR
OCT. 1983	1721	3321	55.4	1050	24.7	4.88	11.4	224	1.12	6277	625	19.1	15.3
NOV. 1983	1773	3374	56.3	1048			10.1	210	1.04		625	18.6	15.4
DEC. 1983	1715	3427	57.1	1052	27.1	4.76	8.9	198	0.92	6128	625	21.0	16.8
JAN. 1984	1792	3483	58.1	1053			10.0	214	1.04		625	20.3	16.2
FEB. 1984	1794	3535	58.9	1053	29.9	4.42	8.9	196	0.96	5872	625	20.6	17.8
MAR. 1984	1574	3583	59.8	1023			8.4	159	1.09		625	19.8	18.2
APR 1984	1394	3625	60.5	975	30.3	4.20	9.7	165	1.09	5821	625	17.6	14.9
MAY 1984	1328	3666	61.1	902			9.4	150	1.19		625	17.2	17.2
JUNE 1984	1408	3709	61.8	984	30.3	4.01	9.5	170	1.04	5854	625	16.2	18.3
JULY 1984	1341	3750	62.5	989			8.3	148	1.05		625	17.6	15.3
AUG 1984	1261	3789	63.2	1002	32.1	3.80	8.7	149	1.01	5717	625	16.2	15.2
SEP 1984	1331	3829	63.9	988			8.6	149	1.05		625	18.2	15.0
OCT 1984	1475	3875	64.6	988	31.6	3.76	7.8	140	1.07	5814	625	17.5	15.7
NOV 1984	1684	3925	65.5	1009			8.8	171	1.07		625	18.0	16.8
DEC 1984	1555	3974	66.3	1010	32.4	4.00	8.4	152	1.08	5683	625	19.0	17.0
JAN 1985	1446	4018	67.0	1005			7.9	140	0.98		625	20.9	19.0
FEB 1985	1248	4053	67.6	1007	34.6	4.09	7.7	127	0.97	5475	625	20.6	15.5
MAR 1985	1320	4094	68.3	1017			6.5	115	0.99		625	21.9	16.7
APR 1985	1230	4131	68.9	1021	30.6	3.80	6.8	117	1.00	5948	625	19.8	19.3
MAY 1985	1182	4168	69.5	1023			8.7	143	0.95		625	20.7	16.8
JUN 1985	1236	4205	70.1	1027	36.5	3.52	6.7	133	0.84	5390	625	16.4	14.9
JUL 1985	1212	4242	70.7	1029			6.4	130	0.80		625	16.5	14.0
AUG 1985	1225	4280	71.4	1029	38.2	3.54	5.1	107	0.82	5284	625	18.9	15.5
SEP 1985	1328	4320	72.0	1043			5.2	111	0.80		411	19.8*	16.5*

*Viscosity and screen factor are determined by weighted averages. Because the polymer concentration was not reduced until the end of the month, the screen factor and viscosity values may appear somewhat high for 411 ppm polymer

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE INJECTION REPORT
SEPTEMBER 1985 (END OF MONTH REPORT)

WELL	DAYS ACTIVE	(FT) NET SAND	PRESS	(BBLS) PORE VOL	****PERCENT INJECTED**** PV SLUG	PV 1156	PV 800	PV 625	PV 411	PV 200	PV 100	PV 50	PV WTR	PV TOTAL	PREV MON. RATE	(B/D) CURRENT RATE	REC RATE (B/D)
A-11	0	25	635	96308	9.5	10.7	21.9	18.0	4.4	3.0	2.7	3.4	8.2	81.6	16	0	57
A-13	30	21	515	126637	9.7	11.5	20.3	50.8	22.8	18.5	15.9	17.1	23.6	190.2	84	7	48
A-15	30	45	300	144717	9.4	12.4	21.4	41.9	16.2	15.7	20.3	21.7	14.8	173.8	56	24	103
C-1	30	37	635	217157	9.7	9.6	17.0	23.8	6.6	5.0	3.5	4.8	12.5	92.5	71	65	85
C-3	30	14	635	65219	8.8	9.0	15.7	24.2	5.9	5.5	3.2	4.1	7.5	83.8	13	13	32
C-5	30	14	635	63152	9.0	8.7	12.5	19.9	9.7	8.7	6.7	8.6	18.0	101.8	44	42	32
C-7	0	13	635	67774	5.8	1.1	2.6	5.3	1.2	1.0	0.8	0.5	0.7	18.9	2	0	29
C-9	30	19	635	78428	9.2	2.5	5.4	5.2	1.3	1.0	0.8	0.6	1.4	27.5	2	1	43
C-13	30	28	635	115337	9.8	13.1	18.2	23.2	8.7	7.3	5.5	7.7	22.1	115.8	85	71	64
E-1	0	18	635	53939	11.5	8.5	14.2	16.5	3.0	1.9	1.0	0.5	1.0	57.9	2	0	41
E-3	30	11	635	40348	14.7	11.0	19.1	38.9	7.6	6.0	11.3	9.5	9.3	127.5	2	1	25
E-5	30	11	635	57323	12.0	12.8	24.8	37.3	14.4	17.4	25.1	20.0	24.8	188.5	7	1	25
E-7	30	31	630	99647	10.6	11.6	20.8	43.2	14.3	12.0	17.5	25.1	39.2	194.2	5	128	71
E-9	30	23	635	90585	10.9	3.2	6.3	4.8	0.9	0.6	0.5	0.3	0.6	28.0	2	1	52
G-1	0	19	635	73828	12.0	6.4	12.9	12.0	5.0	6.3	1.0	0.5	0.7	56.7	2	0	43
G-3	30	26	635	68910	11.6	10.0	16.3	20.6	22.3	12.7	18.3	14.6	10.5	136.7	5	14	59
G-5	0	32	635	99291	10.1	14.1	17.6	41.5	3.2	2.2	1.2	0.9	0.5	91.3	2	0	73
G-7	30	31	635	106308	10.5	9.3	19.4	42.2	17.3	14.5	11.6	12.7	37.9	175.4	129	93	71
G-9	30	20	635	74975	11.5	8.2	13.5	8.3	2.2	1.1	1.4	1.7	2.4	50.3	5	4	46
G-11	30	18	635	74257	10.8	10.2	18.8	16.2	4.4	3.1	2.0	3.2	4.4	73.1	2	7	41
G-13	30	9	635	43871	11.2	8.8	21.8	33.7	7.9	10.6	12.8	13.4	32.9	153.1	39	35	20
I-1	0	20	0	88728	10.2	8.3	17.1	20.9	5.1	4.2	3.3	1.4	2.5	73.1	0	0	46
I-3	30	21	635	75579	11.5	11.6	18.0	42.7	6.6	22.8	13.8	17.0	33.4	177.3	86	71	48
I-5	30	30	635	108764	10.0	13.3	18.1	25.2	6.7	6.4	4.3	6.9	23.1	113.9	80	68	69
I-7	30	29	635	107842	10.0	7.4	14.9	14.2	4.8	4.3	3.3	3.4	4.3	66.7	2	25	66
I-9	30	29	635	96849	9.6	11.7	19.2	38.3	11.7	7.1	6.5	8.0	24.5	136.7	70	52	66
I-11	30	23	635	84025	9.8	14.7	17.1	25.1	7.5	3.2	2.7	4.9	7.6	92.5	13	11	52
I-13	30	17	635	76063	11.2	12.1	16.8	11.5	3.3	3.8	2.6	1.9	5.4	68.5	7	6	39
I-15	30	37	630	241350	9.6	10.6	21.6	24.5	7.0	7.0	5.4	6.5	16.7	108.8	45	90	85
K-1	30	20	635	127844	9.5	12.6	16.7	20.3	7.5	9.8	21.2	7.7	11.5	116.8	53	44	46
K-3	30	40	635	94488	10.0	12.6	18.8	37.5	11.3	11.4	6.3	7.3	31.3	146.6	90	71	92
K-5A	30	35	375	121286	9.7	12.9	18.2	40.2	18.5	17.4	22.2	13.9	21.9	174.8	63	123	80
K-7	30	39	635	136240	10.4	9.7	17.1	18.8	3.1	2.2	3.5	4.2	11.7	80.8	18	8	89
K-9	30	22	635	100351	10.2	11.5	16.4	13.0	2.1	1.0	1.0	0.4	1.6	57.1	3	3	50
K-11	30	24	635	98538	9.8	13.4	15.4	18.4	3.0	3.7	13.8	10.5	12.3	100.2	29	25	55
K-13	30	29	635	121990	9.5	10.6	20.9	44.2	12.4	11.8	10.2	12.5	24.4	156.5	2	163	66
K-15	30	31	635	172949	9.9	11.8	21.1	20.1	3.8	2.4	3.0	3.3	6.5	81.8	29	24	71
M-1	30	32	625	111924	9.9	11.8	19.3	33.6	8.2	5.8	11.0	11.5	31.1	142.2	90	81	73
M-3	30	32	590	114918	10.1	11.4	20.5	42.6	22.9	15.1	13.6	10.6	19.2	166.0	80	50	73
M-5	30	46	300	161274	10.0	9.2	22.9	43.8	16.9	14.2	11.3	13.2	16.2	157.7	25	114	105
M-7	30	49	630	175213	9.9	10.9	23.0	36.8	11.2	8.8	28.2	14.9	23.6	167.2	145	87	112
M-9	30	55	635	192610	9.9	11.7	20.8	20.9	4.1	2.4	2.6	2.0	6.5	80.8	38	33	126
M-11	30	42	635	175452	9.7	10.7	20.5	32.4	9.5	10.5	12.9	10.0	32.7	148.9	163	140	96
M-13	30	56	615	205655	9.4	8.6	25.7	36.6	16.2	16.6	11.0	12.1	21.9	158.2	113	99	128
M-15	30	43	635	156515	9.8	12.8	18.9	37.9	10.2	8.1	11.8	10.0	11.9	131.4	20	20	98
O-1	30	21	560	96744	9.6	12.1	23.7	40.6	24.1	22.2	18.6	19.6	38.0	208.5	59	107	48
O-3	30	23	340	84546	11.3	11.6	3.2	29.5	23.2	23.2	26.0	32.4	59.1	219.7	62	61	52
O-5	30	47	450	153062	9.9	15.1	17.8	44.2	14.5	12.9	10.1	10.9	24.1	159.5	48	85	108
O-7	30	47	610	182713	9.9	13.1	19.2	25.0	7.2	11.1	12.8	16.2	30.0	144.5	64	112	108
O-9	30	48	635	199141	9.8	12.9	19.5	36.6	9.2	6.3	7.1	7.3	17.9	126.5	120	69	110
O-11	30	53	560	213746	9.7	11.8	20.3	38.1	19.7	16.5	12.3	11.7	21.6	161.7	74	129	121
O-13	30	54	625	197371	10.0	12.4	19.4	30.6	10.9	12.5	9.4	9.3	14.8	129.3	116	73	124
O-15	30	46	635	276396	9.8	11.8	19.6	31.4	5.6	4.0	9.6	9.5	15.3	116.5	125	102	105

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE INJECTION REPORT
SEPTEMBER 1985 (END OF MONTH REPORT)

WELL	DAYS ACTIVE	(FT) NET SAND	PRESS	(BBLS) PORE VOL	****PERCENT INJECTED**** PV SLUG	PV 1156	PV 800	PV 625	PV 411	PV 200	PV 100	PV 50	PV WTR	PV TOTAL	PREV MON. RATE	(B/D) CURRENT RATE	REC RATE (B/D)
Q-1	30	22	580	113178	9.7	12.7	20.8	47.0	21.0	18.9	13.3	10.0	26.7	180.0	79	112	50
Q-3	30	19	480	73931	10.6	3.8	26.1	46.7	16.3	12.4	13.6	15.8	39.0	184.3	78	66	43
Q-5	30	29	635	99629	10.0	7.1	12.2	16.0	6.9	3.9	2.6	3.7	11.3	73.6	34	25	66
Q-7	30	48	635	156289	9.8	16.3	15.2	38.2	14.7	12.7	9.4	10.1	26.4	152.8	86	51	110
Q-9	30	48	610	172832	10.3	11.2	19.3	42.5	16.1	21.2	18.8	22.2	26.3	188.0	58	103	110
Q-11	30	45	600	178375	9.9	12.5	21.1	35.3	15.8	9.7	6.9	9.1	21.8	142.2	131	113	103
Q-13	30	37	620	148301	9.9	12.5	19.6	39.6	17.4	15.2	8.6	7.4	26.6	156.9	137	71	85
Q-15	30	52	635	160565	9.6	11.9	20.5	34.2	5.0	2.7	0.7	0.7	2.7	88.1	6	5	119
S-1	30	23	430	105303	10.3	10.9	19.5	37.9	20.9	17.0	13.0	15.0	29.7	174.1	108	192	52
S-3	30	19	635	54587	11.1	11.6	18.0	53.1	18.8	14.6	15.1	15.3	44.2	201.7	92	85	43
S-5	30	16	635	53993	11.4	10.8	22.6	41.1	25.2	30.6	21.1	30.5	64.7	257.9	61	77	36
S-7	30	37	400	119153	9.9	12.6	20.6	35.2	25.0	28.9	17.9	17.0	21.6	188.8	24	100	85
S-9	30	47	300	170003	9.8	13.6	19.6	38.3	18.4	18.2	19.3	15.6	23.4	176.3	119	68	108
S-11	30	45	500	168556	10.1	11.1	21.3	41.7	24.7	20.5	12.9	11.7	19.2	173.2	85	110	103
S-13	30	43	550	150413	10.1	12.6	19.0	12.3	5.7	4.7	4.8	5.4	16.9	91.5	83	113	98
S-15	30	44	615	261128	9.9	11.6	21.2	35.7	11.1	9.7	8.4	9.7	19.4	136.5	83	113	101
U-1	30	21	635	83846	11.9	9.5	19.8	40.7	15.3	12.2	17.5	10.3	14.1	151.3	19	12	48
U-3	30	18	510	57713	10.8	9.0	26.6	49.7	20.8	10.9	13.2	14.0	41.3	196.3	81	71	41
U-5	30	12	530	53089	13.8	9.4	23.0	44.3	20.3	13.7	14.8	15.8	42.1	197.2	78	71	27
U-7	30	19	635	77484	11.3	10.6	21.0	39.6	12.3	23.8	12.6	10.2	21.4	162.7	26	101	43
U-9	30	32	400	123821	10.4	12.3	18.9	34.9	28.8	23.7	11.1	14.5	28.4	183.1	134	106	73
U-11	30	47	410	161693	10.1	12.9	18.1	40.4	15.8	20.5	19.7	12.1	28.3	177.8	96	100	108
U-13	30	43	530	151555	9.3	9.6	22.5	39.2	15.5	21.0	16.5	26.2	18.9	178.5	24	9	98
U-15	30	29	600	172084	9.8	12.5	19.8	36.8	12.9	8.3	8.1	8.9	24.9	141.9	208	140	66
W-1	30	26	635	184594	9.6	5.6	15.1	24.0	9.0	7.5	6.4	6.4	13.4	97.0	107	37	59
W-3	30	19	635	125054	9.8	4.2	0.4	8.6	2.0	1.4	0.4	0.6	1.3	28.8	2	1	43
W-5	30	19	420	65971	10.2	13.4	21.2	41.8	19.8	14.4	14.7	17.4	40.3	193.3	169	99	43
W-7	30	14	440	86599	9.5	11.9	20.9	39.5	18.2	18.5	17.9	21.5	31.3	189.3	76	58	32
W-9	30	17	635	89129	9.7	9.9	22.3	45.6	17.5	16.8	11.8	10.0	13.1	156.8	33	11	39
W-11	30	35	635	177292	9.8	11.5	21.5	27.2	3.7	3.6	2.5	2.3	9.1	91.1	43	39	80
W-13	30	37	635	187643	9.4	8.7	23.1	37.7	18.0	12.3	11.3	14.2	25.6	160.3	174	137	85
W-15	30	31	635	235533	9.9	11.6	22.0	35.5	14.5	9.8	3.7	5.6	2.9	115.4	3	4	71
TOTAL		2598		10627513	10.0	11.0	19.0	32.0	11.9	10.7	10.0	10.0	18.9	133.6	5044	5053	5935

TARGETS (P.V.INJECTED): 10.0 11.0 19.0 32.0 12.0 11.0 10.0 10.0 85.0
BBLS.OF WTR REMAINING TO BE INJECTED: 7052507.0
DAYS REMAINING TO COMPLETE WTR INJECTION: 1282.3

REC RATES BASED ON 2.300 BBLS/DAY/FOOT SAND THICKNESS.

*: PROBLEM WELL, REC RATE= WELLS CURR. RATE + 0 BBLS.
<: CALC REC RATE LESS THAN MINIMUM ALLOWABLE.
>: CALC REC RATE GREATER THAN MAXIMUM ALLOWABLE.
-: REC RATE IS FIXED VALUE.

2.5-ACRE INJECTION DATA SUMMARY

INJECTION RATE DEVIATION REC RATE BASIS	THIS REPORT	LAST REPORT
NO. WELLS WITHIN 5 % OF REC. RATE:	4	1
NO. WELLS WITHIN 20 % OF REC. RATE:	18	17
NO. WELLS WITHIN 50 % OF REC. RATE:	34	34

FLUID TYPE	PV	PROJECTED INJECTION HISTORY START	FINISH
SLUG	10.0	02/10/77	11/20/78
1156	11.0	11/20/78	05/20/79
800	19.0	05/20/79	07/28/80
625	32.0	07/28/80	05/26/82
411	12.0	05/26/82	01/24/83
200	11.0	01/24/83	08/20/83
100	10.0	08/20/83	02/25/84
50	10.0	02/25/84	08/06/84
WTR	85.0	08/06/84	

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE INJECTION REPORT
SEPTEMBER 1985 (END OF MONTH REPORT-26 DAYS 625 PPM, 4 DAYS 411 PPM)

WELL		DAYS ACTIVE	(FT) NET SAND	PRESS	(BBLS) PORE VOL	****PERCENT INJECTED**** PV SLUG	PV 1156	PV 800	PV 625	PV 411	PV TOTAL	PREV MON. RATE	(B/D) CURRENT RATE	REC RATE (B/D)
CC-11		30	32	620	179070	9.9	11.2	24.1	58.7	0.2	104.1	71	99	65
CC-13	*	30	36	610	330722	10.1	12.0	21.2	43.2	0.1	86.6	97	108	118
CC-15		30	10	620	166984	10.0	11.2	22.5	54.3	0.6	98.5	60	86	58
CC-17	*	30	21	635	232323	9.9	11.9	18.3	33.4	0.1	73.5	49	43	53
EE-11		30	24	635	186979	9.9	12.6	20.6	42.4	0.1	85.6	44	34	70
EE-13		30	45	635	335370	10.0	11.5	19.6	55.4	0.2	96.7	117	122	123
EE-15	*	30	42	635	313883	9.9	11.3	22.1	22.1	0.0	65.4	44	31	41
EE-17		30	22	635	149259	10.1	10.7	25.8	29.5	0.0	76.1	7	19	55
GG-13		30	33	635	290091	10.1	10.8	24.9	42.4	0.1	88.2	49	81	107
GG-15		30	39	625	310349	10.1	11.3	22.4	48.9	0.2	92.9	89	106	111
GG-17		30	25	610	196177	10.2	12.4	22.2	55.5	0.6	100.8	169	167	67
GG-19		30	35	635	271277	10.2	11.8	21.5	31.6	0.0	75.2	17	19	101
II-13	*	30	24	635	208574	10.1	11.6	8.9	11.0	0.0	41.6	7	10	20
II-15	*	30	20	635	203893	9.9	11.9	19.9	9.1	0.0	50.9	10	12	22
II-17	*	30	13	635	130776	10.0	14.8	18.1	27.6	0.0	70.4	2	1	11
KK-13	*	30	13	635	149688	10.2	11.9	16.6	7.8	0.0	46.5	9	8	18
KK-15	*	30	23	635	162784	10.0	10.7	18.2	9.5	0.0	48.4	9	9	19
MM-13	*	30	20	635	175026	10.3	9.4	14.0	8.0	0.0	41.7	11	11	21
MM-15	*	30	19	635	121753	10.1	8.1	26.9	53.5	0.1	98.8	46	42	52
OO-13	*	30	29	635	254995	10.0	11.6	14.8	18.1	0.0	54.5	15	15	25
OO-15	*	30	28	635	185573	10.0	11.5	15.8	25.3	0.1	62.7	58	54	64
QQ-13	*	30	32	635	249117	10.2	11.0	18.4	27.6	0.1	67.2	69	63	73
QQ-15	*	30	28	635	153960	10.2	11.0	16.6	24.3	0.0	62.1	15	17	27
SS-1	*	30	18	635	162464	8.3	5.3	6.8	3.8	0.0	24.3	2	7	17
SS-3	*	30	21	635	170972	9.9	8.3	17.8	20.9	0.0	56.9	4	9	19
SS-5		30	15	635	122640	10.3	10.4	21.3	86.7	0.2	128.9	57	67	44
SS-7		30	15	635	115206	10.0	9.9	28.1	48.1	0.2	96.3	59	51	42
SS-9	*	30	38	635	263508	9.9	9.8	10.2	13.5	0.0	43.4	23	20	30
SS-11	*	30	25	635	203122	10.0	9.4	14.8	14.9	0.0	49.1	16	17	27
TOTAL			745		5996535	10.0	11.0	19.0	32.0	0.1	72.0	1225	1328	1500

TARGETS (P.V.INJECTED): 10.0 11.0 19.0 32.0 12.0
BBLS.OF 411 REMAINING TO BE INJECTED: 713065.2
DAYS REMAINING TO COMPLETE 411 INJECTION: 475.4

NOTE: REC RATE CALCULATIONS INCLUDE THE FOLLOWING FLUID TYPES; FLUID PHASE 5: 411

*: PROBLEM WELL, REC RATE= WELLS CURR. RATE + 0 BBLS.
<: CALC REC RATE LESS THAN MINIMUM ALLOWABLE.
>: CALC REC RATE GREATER THAN MAXIMUM ALLOWABLE.
-: REC RATE IS FIXED VALUE.

5.0-ACRE INJECTION DATA SUMMARY

INJECTION RATE DEVIATION REC RATE BASIS	THIS REPORT	LAST REPORT
NO. WELLS WITHIN 5 % OF REC. RATE:	2	0
NO. WELLS WITHIN 20 % OF REC. RATE:	7	6
NO. WELLS WITHIN 50 % OF REC. RATE:	18	14

FLUID TYPE	PV	PROJECTED INJECTION HISTORY START	FINISH
SLUG	10.0	02/10/77	11/20/78
1156	11.0	11/20/78	01/14/80
800	19.0	01/14/80	03/05/82
625	32.0	03/05/82	09/26/85
411	12.0	09/26/85	

TOTAL POLYMER INJECTED (LBS.) : 939
TOTAL POLYMER CONCENTRATION (PPM):411

AVERAGE VISCOSITY :19.8
AVERAGE SCREEN FACTOR :16.5

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE INJECTION MONITOR REPORT
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WELL	NET SAND	PRESS	DAILY RATE	BPDPNF	TYPE	REGULATION DESCRIPTION	DATE	STIMULATION TYPE	DATE
A-11	25	635	0	.0				FRAC	05 -- 77
A-13	21	515	6	.2	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
A-15	45	300	24	.5	COILS	BYPASSED	08 -- 84	SHOT	01 -- 76
C-1	37	635	65	1.7				FRAC	09 -- 76
C-3	14	635	12	.8				FRAC	08 -- 77
C-5	14	635	41	2.9				FRAC	06 -- 77
C-7	13	635	0	.0				FRAC	06 -- 77
C-9	19	635	1	.0				HJET	09 -- 81
C-13	28	635	71	2.5				HJET	09 -- 81
E-1	18	635	0	.0				HJET	09 -- 81
E-3	11	635	1	.0				FRAC	09 -- 76
E-5	11	635	0	.0				FRAC	12 -- 77
E-7	31	630	127	4.0	COILS	BYPASSED	08 -- 84	SHOT	12 -- 75
E-9	23	635	1	.0				HJET	09 -- 81
G-1	19	635	0	.0				HJET	10 -- 81
G-3	26	635	14	.5				FRAC	09 -- 76
G-5	32	635	0	.0				FRAC	09 -- 76
G-7	31	635	93	3.0				SHOT	12 -- 75
G-9	20	635	4	.2				FRAC	10 -- 76
G-11	18	635	7	.3				FRAC	09 -- 77
G-13	9	635	34	3.7				FRAC	09 -- 77
I-1	20	0	0	.0				FRAC	09 -- 76
I-3	21	635	70	3.3	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
I-5	30	635	68	2.2	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
I-7	29	635	24	.8				FRAC	09 -- 80
I-9	29	635	52	1.7				FRAC	06 -- 77
I-11	23	635	11	.4				FRAC	09 -- 76
I-13	17	635	6	.3				HJET	09 -- 81
I-15	37	630	90	2.4	COILS	BYPASSED	08 -- 84	SHOT	02 -- 76
K-1	20	635	43	2.1	COILS	BYPASSED	08 -- 84	SHOT	07 -- 75
K-3	40	635	70	1.7				FRAC	10 -- 76
K-5A	35	375	123	3.5	COILS	BYPASSED	08 -- 84	FRAC	10 -- 76
K-7	39	635	8	.2				FRAC	08 -- 76
K-9	22	635	3	.1				CHEM	10 -- 81
K-11	24	635	25	1.0				FRAC	06 -- 77
K-13	29	635	163	5.6				SHOT	11 -- 75
K-15	31	635	24	.7				SHOT	10 -- 75
M-1	32	625	80	2.5				FRAC	06 -- 77
M-3	32	590	49	1.5	COILS	BYPASSED	08 -- 84	SHOT	11 -- 75
M-5	46	300	114	2.4	COILS	BYPASSED	08 -- 85	FRAC	09 -- 76
M-7	49	630	87	1.7	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76

MARATHON OIL COMPANY
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WELL	NET SAND	PRESS	DAILY RATE	BPDPNF	TYPE	REGULATION DESCRIPTION	DATE	STIMULATION TYPE	DATE
M-9	55	635	33	.6				CHEM	10 -- 81
M-11	42	635	139	3.3				SHOT	01 -- 76
M-13	56	615	99	1.7	COILS	BYPASSED	08 -- 84	SHOT	11 -- 75
M-15	43	635	20	.4				SHOT	11 -- 75
U-1	21	560	106	5.0	COILS	BYPASSED	08 -- 84	SHOT	12 -- 75
U-3	23	340	61	2.6				FRAC	10 -- 80
U-5	47	450	84	1.7	COILS	BYPASSED	08 -- 84	SHOT	02 -- 76
U-7	47	610	112	2.3				SHOT	11 -- 75
U-9	48	635	68	1.4				SHOT	01 -- 76
U-11	53	560	129	2.4	COILS	BYPASSED	08 -- 84	SHOT	07 -- 75
U-13	54	625	73	1.3	COILS	BYPASSED	08 -- 84	SHOT	10 -- 75
U-15	46	635	102	2.2	COILS	BYPASSED	08 -- 84	SHOT	09 -- 75
W-1	22	580	111	5.0	COILS	BYPASSED	08 -- 84	SHOT	01 -- 76
W-3	19	480	65	3.4	COILS	BYPASSED	08 -- 84	FRAC	01 -- 80
W-5	29	635	24	.8				FRAC	10 -- 80
W-7	48	635	50	1.0				SHOT	01 -- 76
W-9	48	610	103	2.1				SHOT	01 -- 76
W-11	45	600	113	2.5				SHOT	12 -- 75
W-13	37	620	70	1.8	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
W-15	52	635	5	.0				SHOT	11 -- 75
S-1	23	430	192	8.3	COILS	BYPASSED	08 -- 84	SHOT	01 -- 76
S-3	19	635	84	4.4	COILS	BYPASSED	08 -- 84	FRAC	06 -- 77
S-5	16	635	77	4.8	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
S-7	37	400	100	2.7	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
S-9	47	300	68	1.4	COILS	BYPASSED	08 -- 84	SHOT	10 -- 75
S-11	45	500	109	2.4	COILS	BYPASSED	08 -- 84	SHOT	08 -- 75
S-13	43	550	112	2.6	COILS	BYPASSED	08 -- 84	SHOT	09 -- 75
S-15	44	615	113	2.5				SHOT	09 -- 75
U-1	21	635	12	.5				SHOT	01 -- 76
U-3	18	510	71	3.9	COILS	BYPASSED	08 -- 84	SHOT	11 -- 75
U-5	12	530	71	5.9	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
U-7	19	635	101	5.3	COILS	BYPASSED	08 -- 84	FRAC	08 -- 76
U-9	32	400	106	3.3	COILS	BYPASSED	08 -- 84	SHOT	07 -- 75
U-11	47	410	100	2.1	COILS	BYPASSED	08 -- 84	SHOT	12 -- 75
U-13	43	530	8	.1	COILS	BYPASSED	08 -- 84	SHOT	01 -- 76
U-15	29	600	139	4.7				SHOT	10 -- 75
W-1	26	635	37	1.4				SHOT	01 -- 76
W-3	19	635	1	.0				HJET	10 -- 81
W-5	19	420	99	5.2	COILS	BYPASSED	08 -- 84	FRAC	09 -- 77
W-7	14	440	57	4.0	COILS	BYPASSED	08 -- 84	FRAC	09 -- 76
W-9	17	635	11	.6	COILS	BYPASSED	08 -- 84	SHOT	07 -- 75

MARATHON OIL COMPANY
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WELL	NET SAND	PRESS	DAILY RATE	BPDPNF
W-11	35	635	38	1.0
W-13	37	635	137	3.7
W-15	31	635	4	.1

TYPE	REGULATION DESCRIPTION	DATE

TYPE	STIMULATION DATE
SHOT	08 -- 75
SHOT	08 -- 75
SHOT	08 -- 75

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE INJECTION MONITOR REPORT
SEPTEMBER1985

WELL	NET SAND	PRESS	DAILY RATE	BPDPNF	REGULATION TYPE	REGULATION DESCRIPTION	REGULATION DATE	STIMULATION TYPE	STIMULATION DATE
CC-11	32	620	16	.5	COILS	50' COPPER	06 -- 84	PROX	10 22 84
CC-13	36	610	17	.4	COILS	50' COPPER	06 -- 84	PROX	10 23 84
CC-15	10	620	14	1.4	COILS	50' COPPER	06 -- 84	SHOT	02 -- 76
CC-17	21	635	7	.3				SHOT	03 -- 76
EE-11	24	635	5	.2	COILS	50' COPPER	06 -- 84	FRAC	05 -- 78
EE-13	45	635	19	.4	COILS	50' COPPER	06 -- 84	PROX	10 30 84
EE-15	42	635	5	.1				FRAC	05 -- 78
EE-17	22	635	3	.1				SHOT	03 -- 76
GG-13	33	635	13	.3	COILS	50' COPPER	06 -- 84	PROX	10 29 84
GG-15	39	625	17	.4	COILS	50' COPPER	06 -- 84	PROX	10 31 84
GG-17	25	610	27	1.0	COILS	200' COPPER	06 -- 84	PROX	10 19 84
GG-19	35	635	3	.0				FRAC	10 -- 76
II-13	24	635	1	.0				PROX	06 -- 84
II-15	20	635	2	.1				PROX	10 26 84
II-17	13	635	0	.0				FRAC	09 -- 76
KK-13	13	635	1	.0				PROX	06 -- 84
KK-15	23	635	1	.0				PROX	10 25 84
MM-13	20	635	1	.0				PROX	06 -- 84
MM-15	19	635	6	.3				FRAC	02 -- 80
OO-13	29	635	2	.0				FRAC	05 -- 78
OO-15	28	635	5	.2				PROX	10 24 84
QQ-13	32	635	10	.3				FRAC	05 -- 78
QQ-15	28	635	2	.0				CHEM	10 -- 81
SS-1	16	635	1	.0				PROX	10 16 84
SS-3	21	635	1	.0				FRAC	10 -- 80
SS-5	15	635	11	.7				PROX	06 -- 84
SS-7	15	635	8	.5	COILS	150' COPPER	06 -- 84	ACID	10 -- 76
SS-9	38	635	3	.0				PROX	10 17 84
SS-11	25	635	2	.0				PROX	10 18 84

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
PER. WATER INJECTION REPORT
SEPTEMBER 1985 (30 DAY END OF MONTH REPORT)

WELL		DAYS ACTIVE	(FT) NET SAND	PRESS	CUM.# PROJECT INJ.	PREV. RATE (B/D)	CURRENT RATE (B/D)	RECD RATE (B/D)
UU-1		30	11	615	98640	13	58	82
UU-5		0	10	0	62120	1	0	75
X-88		0	19	0	15249	0	0	142
X-91	PA	0	30	0	97	0	0	0
X-94	PA	0	23	0	22805	0	0	0
X-97	PA	0	27	0	17191	0	0	0
X-3	PA	0	29	0	22613	0	0	0
X-6		30	26	615	41514	1	1	195
X-9	PA	0	9	0	34039	0	0	0
X-12	PA	0	32	0	15471	0	0	0
A-12	PA	0	51	0	79763	0	0	0
P-12		30	13	670	97002	5	13	97
Q-12		30	9	670	124471	15	12	67
R-12		30	26	670	137389	10	45	195
PI-1	&	30	17	500	74451	81	20	127
PI-3	&	30	25	610	52635	0	0	187
PI-4	&	30	32	550	97304	90	23	240
PI-6	&	30	26	520	97229	106	72	195
CF-6	*	30	40	340	119103	310	291	300
TOTAL			254		1209086	632	535	1902

"PA": PLUGGED AND ABANDONED.

&: MARAFLOOD PROCESS - M-2 PROJECT - PER. WATER WELL.
*: M-2 UNIT CROSSFLOOD - PER. WATER WELL.

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
XA-10	0	0.0 1629.0 0.0	0.0 137.5 0.0	0.0 1766.5 0.0	0.0 0.076	0.0 20175.3 0.0	23252	0.0	0.070	0.868	0.0 0.09
XA-12	0	0.0 14593.5 0.0	0.0 48070.4 0.0	0.0 62663.9 0.0	0.0 1.087	50.6 80912.5 1.7	57623	0.0	0.253	1.404	0.0 0.77
XA-14	0	0.0 12157.5 0.0	0.0 184433.4 0.0	0.0 196590.9 0.0	0.0 2.737	233.2 124684.2 7.8	71828	0.0	0.169	1.736	0.0 1.58
AA-11	30	24.6 12608.7 0.8	3434.0 114635.9 114.5	3458.6 127244.6 115.3	0.110 4.045	182.6 63767.2 6.1	31456	0.007	0.401	2.027	18.94 2.00
B-0	0	0.0 2686.6 0.0	0.0 105652.9 0.0	0.0 108339.4 0.0	0.0 1.711	3548.5 176523.9 118.3	63309	0.0	0.042	2.788	0.0 0.61
EB-5	0	0.0 2595.1 0.0	0.0 75369.6 0.0	0.0 77964.6 0.0	0.0 0.945	584.0 88698.7 19.5	82486	0.0	0.031	1.075	0.0 0.88
B-4	30	13.7 2192.1 0.5	1034.7 46896.9 34.5	1048.3 49089.0 34.9	0.042 1.949	408.6 30502.4 13.6	25188	0.013	0.087	1.211	2.57 1.61
B-6	0	0.0 824.2 0.0	0.0 3698.3 0.0	0.0 4522.4 0.0	0.0 0.165	314.6 19792.2 10.5	27488	0.0	0.030	0.720	0.0 0.23
B-8	0	0.0 1754.5 0.0	0.0 8072.5 0.0	0.0 9827.0 0.0	0.0 0.319	10.7 9074.5 0.4	30786	0.0	0.057	0.295	0.0 1.08
B-10	0	0.0 1429.8 0.0	0.0 814.7 0.0	0.0 2244.5 0.0	0.0 0.096	10.7 25224.7 0.4	23297	0.0	0.061	1.083	0.0 0.09
B-12	30	49.2 18198.4 1.6	1299.3 83440.9 43.3	1348.5 101639.2 45.0	0.014 1.058	754.2 125075.7 25.1	96079	0.036	0.189	1.302	1.79 0.81
B-14	30	24.6 15741.6 0.8	2877.1 215676.1 95.9	2901.7 231417.7 96.7	0.021 1.673	1681.5 206309.1 56.1	138324	0.008	0.114	1.491	1.73 1.12
B-16	0	0.0 3172.4 0.0	0.0 59715.7 0.0	0.0 62888.1 0.0	0.0 0.442	1737.0 181938.7 57.9	142341	0.0	0.022	1.278	0.0 0.35

MARATHON OIL COMPANY
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SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
D-0	0	0.0 3002.5 0.0	0.0 49212.0 0.0	0.0 52214.5 0.0	0.0 1.035	493.8 86585.3 16.5	50426	0.0	0.060	1.717	0.0 0.60
D-2	0	0.0 3841.2 0.0	0.0 37476.9 0.0	0.0 41318.1 0.0	0.0 0.458	594.6 85734.9 19.8	90143	0.0	0.043	0.951	0.0 0.48
D-4	0	0.0 6680.8 0.0	0.0 51835.5 0.0	0.0 58516.3 0.0	0.0 1.223	425.7 70306.1 14.2	47861	0.0	0.140	1.469	0.0 0.83
D-6	30	24.6 9885.1 0.8	4547.7 177496.8 151.6	4572.3 187381.9 152.4	0.048 1.959	1279.8 95347.5 42.7	95658	0.005	0.103	0.997	3.57 1.97
D-8	0	0.0 2145.4 0.0	0.0 27513.2 0.0	0.0 29658.6 0.0	0.0 0.371	980.0 63922.3 32.7	79988	0.0	0.027	0.799	0.0 0.46
D-10	0	0.0 2780.5 0.0	0.0 30726.7 0.0	0.0 33507.2 0.0	0.0 0.910	21.3 12280.4 0.7	36821	0.0	0.076	0.334	0.0 2.73
F-0	30	16.4 4667.4 0.5	546.5 39567.9 18.2	562.9 44235.3 18.8	0.014 1.117	7.3 32177.9 0.2	39598	0.029	0.118	0.813	77.65 1.37
F-2	0	0.0 7077.6 0.0	0.0 38339.9 0.0	0.0 45417.5 0.0	0.0 0.776	117.2 56539.4 3.9	58501	0.0	0.121	0.966	0.0 0.80
F-4	30	13.7 1533.6 0.5	601.5 44037.8 20.1	615.2 45571.4 20.5	0.014 1.036	123.6 87084.2 4.1	43996	0.022	0.035	1.979	4.98 0.52
F-6	30	24.6 5924.6 0.8	2382.1 157434.8 79.4	2406.7 163359.4 80.2	0.024 1.621	1663.7 145699.9 55.5	100749	0.010	0.059	1.446	1.45 1.12
F-8	0	0.0 1415.7 0.0	0.0 44441.2 0.0	0.0 45856.8 0.0	0.0 0.528	1699.9 112276.6 56.7	86889	0.0	0.016	1.292	0.0 0.41
F-10	0	0.0 1652.6 0.0	0.0 21484.0 0.0	0.0 23136.6 0.0	0.0 0.450	95.9 30115.6 3.2	51403	0.0	0.032	0.586	0.0 0.77
F-12	0	0.0 1091.5 0.0	0.0 15236.2 0.0	0.0 16327.8 0.0	0.0 0.504	314.3 30555.3 10.5	32366	0.0	0.034	0.944	0.0 0.53

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SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
F-14	0	0.0 2499.0 0.0	0.0 36133.9 0.0	0.0 38632.9 0.0	0.0 0.959	670.4 80983.1 22.3	40285	0.0	0.062	2.010	0.0 0.48
H-0	0	0.0 14906.7 0.0	0.0 94865.4 0.0	0.0 109772.0 0.0	0.0 2.858	3.8 36634.2 0.1	38404	0.0	0.388	0.954	0.0 3.00
H-2	0	0.0 3879.0 0.0	0.0 21049.9 0.0	0.0 24928.9 0.0	0.0 0.328	638.0 84589.1 21.3	76083	0.0	0.051	1.112	0.0 0.29
H-4	30	49.2 9094.1 1.6	1732.5 109817.3 57.7	1781.6 118911.4 59.4	0.019 1.265	1151.6 112451.4 38.4	94033	0.028	0.097	1.196	1.55 1.06
H-6	30	24.6 3296.3 0.8	1825.3 107089.5 60.8	1849.9 110385.7 61.7	0.017 1.004	1397.4 119971.6 46.6	109986	0.013	0.030	1.091	1.32 0.92
H-8	30	49.2 6274.1 1.6	1546.8 101556.3 51.6	1596.0 107830.3 53.2	0.017 1.124	1307.2 108671.1 43.6	95901	0.031	0.065	1.133	1.22 0.99
H-10	30	24.6 5579.6 0.8	1392.2 86681.2 46.4	1416.7 92260.8 47.2	0.019 1.205	562.3 76446.7 18.7	76555	0.017	0.073	0.999	2.52 1.21
H-12	0	0.0 4949.3 0.0	0.0 60734.7 0.0	0.0 65683.9 0.0	0.0 1.134	448.2 63249.4 14.9	57907	0.0	0.085	1.092	0.0 1.04
H-14	30	24.6 10349.6 0.8	3000.9 162806.7 100.0	3025.5 173156.3 100.8	0.034 1.924	1232.4 120834.9 41.1	90003	0.008	0.115	1.343	2.45 1.43
J-0	0	0.0 2350.7 0.0	0.0 22056.3 0.0	0.0 24407.0 0.0	0.0 0.587	1515.6 129929.3 50.5	41558	0.0	0.057	3.126	0.0 0.19
J-2	0	0.0 8230.0 0.0	0.0 109915.5 0.0	0.0 118145.5 0.0	0.0 1.453	1389.8 122915.1 46.3	81310	0.0	0.101	1.512	0.0 0.96
J-4	30	73.8 6923.6 2.5	2444.0 140583.1 81.5	2517.8 147506.7 83.9	0.020 1.164	2497.3 154176.0 83.2	126673	0.029	0.055	1.217	1.01 0.96
J-6	30	73.8 14120.2 2.5	1392.2 108261.0 46.4	1465.9 122381.1 48.9	0.012 0.961	1682.7 131249.1 56.1	127371	0.050	0.111	1.030	0.87 0.93

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
J-8	30	98.4 10006.6 3.3	1237.5 107739.7 41.2	1335.9 117746.3 44.5	0.011 0.946	663.5 93979.2 22.1	124459	0.074	0.080	0.755	2.01 1.25
J-10	30	73.8 5692.8 2.5	835.3 58087.9 27.8	909.1 63780.7 30.3	0.009 0.629	692.8 91679.2 23.1	101349	0.081	0.056	0.905	1.31 0.70
J-12	30	98.4 3239.4 3.3	1608.7 75043.9 53.6	1707.1 78283.3 56.9	0.017 0.795	1549.6 105116.2 51.7	98442	0.058	0.033	1.068	1.10 0.74
J-14	30	147.6 8488.3 4.9	1918.1 194372.9 63.9	2065.7 202861.2 68.9	0.015 1.516	2400.9 191090.6 80.0	133805	0.071	0.063	1.428	0.86 1.06
L-0	30	49.2 8201.9 1.6	4207.4 226244.6 140.2	4256.6 234446.5 141.9	0.075 4.111	1473.5 118035.9 49.1	57036	0.012	0.144	2.069	2.89 1.99
L-2	30	24.6 4278.5 0.8	587.8 73980.3 19.6	612.4 78258.7 20.4	0.008 1.015	1836.4 162074.2 61.2	77129	0.040	0.055	2.101	0.33 0.48
L-4	30	24.6 9823.4 0.8	1330.3 120621.7 44.3	1354.9 130445.1 45.2	0.010 0.974	2680.7 201996.4 89.4	133876	0.018	0.073	1.509	0.51 0.65
L-6	30	24.6 11400.6 0.8	3186.5 159216.4 106.2	3211.1 170617.0 107.0	0.023 1.219	2492.7 219684.8 83.1	139935	0.008	0.081	1.570	1.29 0.78
L-8	30	24.6 11385.7 0.8	2196.5 163967.4 73.2	2221.1 175353.1 74.0	0.015 1.222	990.7 156162.0 33.0	143466	0.011	0.079	1.088	2.24 1.12
L-10	30	49.2 9753.5 1.6	990.0 123352.9 33.0	1039.2 133106.4 34.6	0.010 1.268	1514.6 144440.8 50.5	105002	0.047	0.093	1.376	0.69 0.92
L-12	30	24.6 18083.5 0.8	1268.4 131385.1 42.3	1293.0 149468.6 43.1	0.009 1.059	3209.5 221027.9 107.0	141141	0.019	0.128	1.566	0.40 0.68
L-14	30	24.6 7049.0 0.8	1639.6 166728.6 54.7	1664.2 173777.6 55.5	0.013 1.307	2303.6 220291.9 76.8	132995	0.015	0.053	1.656	0.72 0.79
N-0	30	5.5 2486.9 0.2	701.2 58858.1 23.4	706.7 61345.0 23.6	0.009 0.803	1819.5 169089.6 60.6	76442	0.008	0.033	2.212	0.39 0.36

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
N-2	30	24.6 7740.7 0.8	2196.5 187334.4 73.2	2221.1 195075.1 74.0	0.023 1.997	2235.5 187055.1 74.5	97694	0.011	0.079	1.915	0.99 1.04
N-4	30	24.6 35862.2 0.8	6032.7 345370.7 201.1	6057.2 381232.9 201.9	0.044 2.750	2323.8 222310.2 77.5	138627	0.004	0.259	1.604	2.61 1.71
N-6	30	49.2 25276.2 1.6	5506.7 333873.9 183.6	5555.9 359150.1 185.2	0.033 2.113	2988.5 267032.1 99.6	169978	0.009	0.149	1.571	1.86 1.34
N-8	30	24.6 14611.1 0.8	2382.1 209304.1 79.4	2406.7 223915.2 80.2	0.013 1.195	2261.0 243791.4 75.4	187415	0.010	0.078	1.301	1.06 0.92
N-10	30	24.6 15535.3 0.8	1330.3 192125.7 44.3	1354.9 207661.0 45.2	0.008 1.181	2783.8 257488.1 92.8	175851	0.018	0.088	1.464	0.49 0.81
N-12	30	49.2 12036.4 1.6	9714.1 416257.2 323.8	9763.3 428293.6 325.4	0.048 2.092	3314.5 299427.4 110.5	204686	0.005	0.059	1.463	2.95 1.43
N-14	30	73.8 8265.5 2.5	1515.9 205409.8 50.5	1589.7 213675.3 53.0	0.007 0.929	2418.6 311245.0 80.6	229987	0.046	0.036	1.353	0.66 0.69
P-0	30	73.8 10248.1 2.5	6713.3 240370.1 223.8	6787.1 250618.1 226.2	0.147 5.412	1775.9 132942.7 59.2	46305	0.011	0.221	2.871	3.82 1.89
P-2	30	73.8 7221.3 2.5	1268.4 87331.9 42.3	1342.2 94553.2 44.7	0.014 1.017	2590.1 184328.5 86.3	92938	0.055	0.078	1.983	0.52 0.51
P-4	30	24.6 9117.8 0.8	3929.0 161566.1 131.0	3953.6 170683.9 131.8	0.039 1.692	1774.8 161736.2 59.2	100901	0.006	0.090	1.603	2.23 1.06
P-6	30	49.2 7764.2 1.6	3650.5 200700.4 121.7	3699.7 208464.5 123.3	0.022 1.248	2044.6 207320.8 68.2	167022	0.013	0.046	1.241	1.81 1.01
P-8	30	24.6 3310.6 0.8	1268.4 140676.4 42.3	1293.0 143987.0 43.1	0.008 0.867	2509.5 273425.9 83.6	166037	0.019	0.020	1.647	0.52 0.53
P-10	30	24.6 9263.6 0.8	1701.5 160610.2 56.7	1726.1 169873.9 57.5	0.009 0.900	3107.2 299051.9 103.6	188735	0.014	0.049	1.585	0.56 0.57

MARATHON OIL COMPANY
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2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
P-12	30	24.6 8898.5 0.8	2877.1 260495.5 95.9	2901.7 269394.0 96.7	0.018 1.705	2902.5 275092.4 96.7	157985	0.008	0.056	1.741	1.00 0.98
P-14	30	49.2 10554.7 1.6	1856.2 228311.1 61.9	1905.4 238865.7 63.5	0.010 1.193	2025.4 263414.4 67.5	200173	0.026	0.053	1.316	0.94 0.91
R-0	30	16.4 3058.2 0.5	1031.2 95537.5 34.4	1047.6 98595.7 34.9	0.021 1.975	2281.2 124580.4 76.0	49932	0.016	0.061	2.495	0.46 0.79
R-2	30	10.9 4927.3 0.4	4131.8 174478.2 137.7	4142.7 179405.5 138.1	0.044 1.920	3410.0 159932.4 113.7	93453	0.003	0.053	1.711	1.21 1.12
R-4	0	0.0 4757.2 0.0	0.0 29534.3 0.0	0.0 34291.6 0.0	0.0 0.610	1893.5 115718.1 63.1	56261	0.0	0.085	2.057	0.0 0.30
R-6	30	24.6 12041.5 0.8	525.9 93465.9 17.5	550.5 105507.4 18.4	0.006 1.058	1895.0 170609.7 63.2	99678	0.045	0.121	1.712	0.29 0.62
R-8	30	24.6 19159.4 0.8	4238.3 265012.9 141.3	4262.9 284172.2 142.1	0.027 1.801	2416.3 276342.6 80.5	157827	0.006	0.121	1.751	1.76 1.03
R-10	30	24.6 14729.1 0.8	4671.4 256411.9 155.7	4696.0 271140.9 156.5	0.029 1.693	2960.3 297820.2 98.7	160116	0.005	0.092	1.860	1.59 0.91
R-12	30	98.4 15039.8 3.3	1608.7 179617.8 53.6	1707.1 194657.6 56.9	0.011 1.199	3052.4 231764.5 101.7	162359	0.058	0.093	1.427	0.56 0.84
R-14	0	0.0 20706.1 0.0	0.0 173997.6 0.0	0.0 194703.6 0.0	0.0 1.182	2482.8 252056.1 82.8	164729	0.0	0.126	1.530	0.0 0.77
T-0	30	5.5 1784.7 0.2	835.3 41238.1 27.8	840.8 43022.8 28.0	0.021 1.088	1535.1 120562.4 51.2	39555	0.007	0.045	3.048	0.55 0.36
T-2	0	0.0 2894.6 0.0	0.0 100783.1 0.0	0.0 103677.7 0.0	0.0 1.405	2703.9 134806.1 90.1	73817	0.0	0.039	1.826	0.0 0.77
T-4	30	49.2 4947.7 1.6	2041.8 79510.4 68.1	2091.0 84458.1 69.7	0.035 1.416	2284.2 118154.7 76.1	59636	0.024	0.083	1.981	0.92 0.71

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
T-6	0	0.0 9619.1 0.0	0.0 56408.2 0.0	0.0 66027.4 0.0	0.0 0.881	2626.6 150261.5 87.6	74961	0.0	0.128	2.005	0.0 0.44
T-8	0	0.0 12514.4 0.0	0.0 314486.8 0.0	0.0 327001.2 0.0	0.0 2.322	2820.7 221308.8 94.0	140819	0.0	0.089	1.572	0.0 1.48
T-10	30	49.2 18384.3 1.6	8105.4 332948.2 270.2	8154.6 351332.6 271.8	0.051 2.185	2885.7 279611.9 96.2	160801	0.006	0.114	1.739	2.83 1.26
T-12	30	24.6 7739.4 0.8	5413.9 274472.1 180.5	5438.5 282211.4 181.3	0.039 2.033	2488.5 249409.2 83.0	138801	0.005	0.056	1.797	2.19 1.13
T-14	30	49.2 8728.8 1.6	6373.0 280452.2 212.4	6422.2 289181.0 214.1	0.035 1.584	2599.7 242113.2 86.7	182561	0.008	0.048	1.326	2.47 1.19
V-0	30	2.7 858.2 0.1	1175.6 58938.1 39.2	1178.3 59796.3 39.3	0.017 0.872	821.7 133682.7 27.4	68550	0.002	0.013	1.950	1.43 0.45
V-2	0	0.0 7234.6 0.0	0.0 168973.9 0.0	0.0 176208.4 0.0	0.0 1.963	916.1 116237.7 30.5	89783	0.0	0.081	1.295	0.0 1.52
V-4	30	49.2 7931.9 1.6	6125.5 154775.2 204.2	6174.7 162707.1 205.8	0.094 2.483	1824.3 96519.1 60.8	65527	0.008	0.121	1.473	3.38 1.69
V-6	30	24.6 20967.3 0.8	1701.5 141271.9 56.7	1726.1 162239.2 57.5	0.030 2.835	2473.3 131615.5 82.4	57221	0.014	0.366	2.300	0.70 1.23
V-8	30	49.2 4846.0 1.6	1423.1 85717.2 47.4	1472.3 90563.2 49.1	0.018 1.116	2076.1 165265.2 69.2	81115	0.033	0.060	2.037	0.71 0.55
V-10	30	38.3 10767.1 1.3	739.0 114477.2 24.6	777.3 125244.2 25.9	0.006 1.012	1923.2 205601.9 64.1	123793	0.049	0.087	1.661	0.40 0.61
V-12	30	49.2 18841.3 1.6	1361.2 183454.2 45.4	1410.4 202295.5 47.0	0.010 1.391	2136.6 257945.9 71.2	145395	0.035	0.130	1.774	0.66 0.78
V-14	30	49.2 16635.2 1.6	1794.3 185718.6 59.8	1843.5 202353.7 61.5	0.013 1.384	2515.3 298402.1 83.8	146174	0.027	0.114	2.041	0.73 0.68

TOTAL	2435.0	157002.9	159437.7	0.018	147535.6	9066200	0.062	0.086	1.504	1.08
	778443.8	11713987.2	12492429.1	1.378	13634058.7					0.92
	81.2	5233.4	5314.6		4917.9					

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
AS-35	30	43.4 9452.0 1.4	795.7 75932.5 26.5	839.2 85384.4 28.0	0.012 1.171	1549.3 150088.6 51.6	72916	0.052	0.130	2.058	0.54 0.57
AS-36	30	43.4 4490.8 1.4	1968.6 314505.1 65.6	2012.0 318995.9 67.1	0.016 2.584	1151.7 167617.3 38.4	123442	0.022	0.036	1.358	1.75 1.90
DD-10	30	82.0 9107.6 2.7	320.6 63235.4 10.7	402.6 72342.9 13.4	0.005 0.837	1623.1 110690.7 54.1	86394	0.204	0.105	1.281	0.25 0.65
DD-12	30	260.5 22225.4 8.7	7874.5 365813.1 262.5	8135.0 388038.5 271.2	0.024 1.138	2672.6 232458.5 89.1	340851	0.032	0.065	0.682	3.04 1.67
DD-14	30	152.0 26726.6 5.1	2274.1 245865.9 75.8	2426.1 272592.4 80.9	0.008 0.922	2601.0 245082.6 86.7	295683	0.063	0.090	0.829	0.93 1.11
DD-16	30	43.4 9605.4 1.4	1154.0 157695.4 38.5	1197.4 167300.7 39.9	0.005 0.715	1342.7 164234.4 44.8	234062	0.036	0.041	0.702	0.89 1.02
DD-18	30	173.7 9212.2 5.8	678.8 83446.7 22.6	852.5 92658.9 28.4	0.009 0.932	464.9 86798.0 15.5	99411	0.204	0.093	0.873	1.83 1.07
FF-12	30	130.3 11725.5 4.3	1086.1 179132.9 36.2	1216.4 190858.4 40.5	0.004 0.651	2210.2 227297.2 73.7	292955	0.107	0.040	0.776	0.55 0.84
FF-14	30	130.3 18863.4 4.3	3462.1 276770.6 115.4	3592.3 295633.9 119.7	0.010 0.851	2546.1 268378.8 84.9	347235	0.036	0.054	0.773	1.41 1.10
FF-16	30	173.7 17874.5 5.8	1493.4 179685.0 49.8	1667.1 197559.4 55.6	0.007 0.848	2421.0 201411.6 80.7	233092	0.104	0.077	0.864	0.69 0.98
FF-18	30	43.4 18545.8 1.4	1289.8 158618.1 43.0	1333.2 177163.8 44.4	0.008 1.077	1534.5 128959.1 51.2	164544	0.033	0.113	0.784	0.87 1.37
FF-20	30	24.1 3520.8 0.8	7.5 6183.6 0.3	31.7 9704.4 1.1	0.001 0.170	139.8 50949.0 4.7	57048	0.762	0.062	0.893	0.23 0.19
HH-12	30	65.1 8133.1 2.2	780.7 152398.9 26.0	845.8 160532.0 28.2	0.003 0.590	1364.2 176636.6 45.5	272292	0.077	0.030	0.649	0.62 0.91

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
HH-14	30	108.5 16139.4 3.6	2749.3 223096.4 91.6	2857.8 239235.7 95.3	0.010 0.853	1566.4 183523.1 52.2	280397	0.038	0.058	0.655	1.82 1.30
HH-16	30	86.8 17588.7 2.9	984.3 94067.9 32.8	1071.1 111656.6 35.7	0.005 0.501	2146.3 177724.6 71.5	222864	0.081	0.079	0.797	0.50 0.63
HH-18	30	86.8 11656.1 2.9	2308.0 188652.1 76.9	2394.9 200308.2 79.8	0.013 1.094	1401.7 131118.4 46.7	183019	0.036	0.064	0.716	1.71 1.53
HH-20	30	260.5 21466.8 8.7	882.5 25275.6 29.4	1143.0 46742.4 38.1	0.017 0.689	139.8 50949.0 4.7	67865	0.228	0.316	0.751	8.18 0.92
JJ-12	30	43.4 7633.5 1.4	1018.3 173653.9 33.9	1061.7 181287.4 35.4	0.004 0.620	1103.4 207485.4 36.8	292199	0.041	0.026	0.710	0.96 0.87
JJ-14	30	16.9 2894.1 0.6	248.9 48329.8 8.3	265.8 51223.9 8.9	0.002 0.347	313.2 91153.6 10.4	147711	0.064	0.020	0.617	0.85 0.56
JJ-16	30	65.1 16049.7 2.2	814.6 108266.3 27.2	879.7 124316.0 29.3	0.005 0.746	190.8 83555.2 6.4	166634	0.074	0.096	0.501	4.61 1.49
LL-12	30	65.1 7813.2 2.2	916.4 179521.4 30.5	981.6 187334.6 32.7	0.003 0.572	1416.0 212886.3 47.2	327428	0.066	0.024	0.650	0.69 0.88
LL-14	30	43.4 4632.8 1.4	1154.0 66905.7 38.5	1197.4 71538.6 39.9	0.008 0.468	864.6 122643.4 28.8	152809	0.036	0.030	0.803	1.38 0.58
NN-12	30	21.7 10827.2 0.7	2545.6 296663.1 84.9	2567.3 307490.3 85.6	0.011 1.270	1905.1 197009.8 63.5	242122	0.008	0.045	0.814	1.35 1.56
NN-14	30	173.7 12936.6 5.8	1765.0 124641.1 58.8	1938.6 137577.6 64.6	0.007 0.513	1397.1 143974.2 46.6	268441	0.090	0.048	0.536	1.39 0.96
PP-12	30	21.7 14335.4 0.7	3020.8 218682.1 100.7	3042.5 233017.4 101.4	0.014 1.097	1800.7 241480.9 60.0	212400	0.007	0.067	1.137	1.69 0.96
PP-14	30	21.7 8935.9 0.7	848.5 172724.5 28.3	870.3 181660.4 29.0	0.003 0.629	1118.7 129499.4 37.3	288920	0.025	0.031	0.448	0.78 1.40

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
PP-16	30	12.1 3078.3 0.4	761.8 87563.2 25.4	773.9 90641.5 25.8	0.006 0.728	825.1 79064.8 27.5	124520	0.016	0.025	0.635	0.94 1.15
RR-2	30	86.8 11944.0 2.9	1629.2 98799.7 54.3	1716.0 110743.7 57.2	0.008 0.530	455.9 97745.2 15.2	208887	0.051	0.057	0.468	3.76 1.13
RR-4	30	43.4 22844.8 1.4	1425.6 127330.7 47.5	1469.0 150675.5 49.0	0.008 0.825	2502.8 168921.9 83.4	182551	0.030	0.125	0.925	0.59 0.89
RR-6	30	43.4 13899.0 1.4	1968.6 129172.3 65.6	2012.0 143071.2 67.1	0.014 1.008	1558.4 191070.2 51.9	141948	0.022	0.098	1.346	1.29 0.75
RR-8	30	173.7 14044.8 5.8	2443.8 159027.1 81.5	2617.5 173071.9 87.2	0.011 0.750	1619.2 170670.7 54.0	230914	0.066	0.061	0.739	1.62 1.01
RR-10	30	33.8 4772.2 1.1	377.1 107078.9 12.6	410.9 111851.1 13.7	0.002 0.419	1801.0 241126.2 60.0	266817	0.082	0.018	0.904	0.23 0.46
RR-12	30	65.1 10190.4 2.2	1120.1 119615.5 37.3	1185.2 129805.8 39.5	0.005 0.581	692.0 121253.3 23.1	223502	0.055	0.046	0.543	1.71 1.07
RR-14	30	21.7 5485.8 0.7	1044.7 35633.8 34.8	1066.4 41119.6 35.5	0.013 0.511	681.5 80849.9 22.7	80481	0.020	0.068	1.005	1.56 0.51
TT-2	30	43.4 3355.1 1.4	1561.3 98797.7 52.0	1604.7 102152.7 53.5	0.015 0.935	1041.0 90546.4 34.7	109198	0.027	0.031	0.829	1.54 1.13
TT-4	30	86.8 11098.8 2.9	1629.2 125351.2 54.3	1716.0 136450.0 57.2	0.021 1.704	574.2 86180.7 19.1	80067	0.051	0.139	1.076	2.99 1.58
TT-6	30	173.7 5741.9 5.8	1221.9 141299.1 40.7	1395.6 147040.9 46.5	0.026 2.791	883.9 89615.7 29.5	52686	0.124	0.109	1.701	1.58 1.64
TT-8	30	33.8 2030.8 1.1	671.3 56874.6 22.4	705.1 58905.4 23.5	0.006 0.539	532.9 56364.6 17.8	109336	0.048	0.019	0.516	1.32 1.05
TT-10	30	53.1 10685.8 1.8	426.2 55254.4 14.2	479.2 65940.2 16.0	0.003 0.477	345.1 65549.2 11.5	138176	0.111	0.077	0.474	1.39 1.01

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1985 - (30 DAYS)

WELL	DAYS ACTIVE	OIL PROD CUM OIL DAILY AVE	WATER PROD CUM WATER DAILY AVE	FLUID PROD CUM FLUID DAILY AVE	FLD(PV) CUM FLD(PV)	INJECTION CUM INJ DAILY AVE	PORE VOL	OIL CUT	CUM OIL/ PORE VOL	CUM INJ/ PORE VOL	FLD/INJ CUM FLD/ CUM INJ
SC-14	30	65.1 2924.4 2.2	1323.7 64452.0 44.1	1388.9 67376.4 46.3	0.016 0.768	282.8 59866.0 9.4	87710	0.047	0.033	0.683	4.91 1.13
BP-18	30	2.4 531.9 0.1	656.2 24692.2 21.9	658.6 25224.1 22.0	0.008 0.307	749.6 130139.7 25.0	82228	0.004	0.006	1.583	0.88 0.19
TOTAL		3319.0 445020.5 110.6	60702.9 5611205.6 2023.4	64021.9 6056225.1 2134.1	0.008 0.798	51530.3 5912570.4 1717.7	7591755	0.073	0.059	0.779	1.24 1.02

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
SULFONATE REPORT
2.5-ACRE

WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
XA-10	0.79C	0.79C	0.10	0.31	0.31C	0.31C	0.31C	0.31C	0.31C	0.31C	0.31C	0.31C
XA-12	2.54	2.85	2.38	2.32	2.56	2.24	1.97		1.97			
XA-14	0.66	0.68	0.52	0.54	0.64	0.43	0.42	0.37	0.49	0.38	0.38C	0.38C
AA-11	0.45	0.37	0.35	0.36	0.34	0.29	0.25	0.30	0.28	0.32	0.32C	0.40
B-0	0.48	0.70	0.51	0.54	0.60	0.43	0.42	0.37	0.42	0.41	0.41C	0.41C
EB-5	0.94	1.21	0.97	1.14	1.35	1.43	1.82	2.22	2.89	3.22		
B-4	1.75	1.83	1.58	1.50	1.54	1.36	1.40	1.22	1.31	1.07	1.05	1.12
B-6	2.83	2.33	2.80	3.37	3.44	3.30	2.56	3.25	3.72	3.46	3.46C	3.46C
B-8	19.30	19.30C	19.17	15.44	18.90	17.93	19.25	19.41	19.75	19.53	19.53C	19.53C
B-10	0.23C	0.23C	0.12	0.12	0.47	0.10	0.10					
B-12	3.53	3.52	3.17	2.78	2.74	2.50	2.27	2.10	2.19	1.90	1.67	1.65
B-14	1.68	1.47	1.53	1.55	1.44	1.37	1.56	1.67	1.97		1.66	1.72
B-16	3.35	4.12	3.86	3.66	3.59	3.77	3.75	4.59	4.59C			
D-0	6.93	7.51	6.76	7.78	7.35	7.35C	7.35C	7.35C	7.35C	7.35C	7.35C	7.35C
D-2	5.07	6.05	4.98	5.27	5.27	5.33	5.14	6.33	5.96	5.59	5.59C	5.59C
D-4	2.69	3.00	1.78			2.85	2.68	2.36	2.36C			
D-6	1.15	1.11	0.90	1.30	0.95	0.69	0.48	0.57	0.68	0.55	0.49	0.46
D-8	3.97	4.15	3.80	4.14	3.87	3.55	2.86	3.44	3.63	3.37	3.37C	3.37C
D-10	5.42	4.33	6.80	6.07	5.55	6.82	6.12	5.83	6.72	6.28	6.28C	6.28C
F-0	4.58	4.32		4.73	3.77	3.40	3.83	2.49	3.10	2.91	2.69	2.46
F-2	2.59	3.02	3.36		3.59	3.24	3.35	3.45	2.91			
F-4	0.46	0.39	0.33	0.41	0.46	0.35	0.50	0.46	0.66	0.57	0.63	0.60
F-6	2.41	2.35	2.24	2.13	2.23	1.99	1.92	1.77	1.83	1.65	1.53	0.46
F-8	1.84	1.99	1.85	1.99	2.01	1.92	1.61	1.74	2.27			
F-10	2.49	2.69	2.56	2.75	2.61	2.49	2.43	2.46	2.48	2.30	2.30C	2.30C
F-12	6.42	6.93	6.34	6.56	6.59	6.49	6.42	6.32	6.14	5.39	5.39C	5.39C
F-14	2.81	3.13	2.16				2.69	2.66	3.23			
H-0	4.03	4.05	3.88	3.93		3.69	2.87	3.29	3.29C			
H-2	3.21	3.13	3.25	3.05	3.01	2.75	2.66	2.73	2.82	2.95	2.95C	2.95C
H-4	2.99	3.25	2.34	2.25	2.41	2.13	2.09	1.92	2.30	2.03	2.04	2.07
H-6	2.63	2.51	2.24	2.36	2.19	1.98	1.90	1.80	2.09	1.73	1.55	1.52
H-8	3.11	3.22	2.92	3.01	3.06	2.52	2.79	2.65	2.94	2.54	2.46	2.46
H-10	2.17	2.41	2.08	2.30	2.21	2.22	2.24	2.05	2.23	2.03	2.10	2.32
H-12	3.79	4.12	3.65	3.78	3.80	3.33	3.16	3.19	3.16	2.73	2.73C	2.73C
H-14	1.17	1.21	1.12	1.11	1.03	0.89	0.88	0.81	0.69	0.64	0.60	0.61
J-0	2.20	2.90	2.87	3.00	3.25	3.44	3.31	3.53	3.77	3.74	3.74C	3.74C
J-2	1.17	1.53	1.05	1.57	1.74	1.95	1.93	1.69	2.50	2.37		
J-4	3.38	3.39	2.74	2.66	2.94	2.52	2.43	2.30	2.31	2.24	2.14	2.13
J-6	4.75	3.83	2.34	3.36	3.32	3.67	3.57	3.28	3.20	3.11	2.84	2.88
J-8	3.50	2.71	2.69	3.43	3.41	3.17	3.15	3.13	3.08	2.98	2.80	2.96
J-10	1.64	1.04	1.26	1.34	1.54	1.59	1.50	1.62	1.71	1.69	1.69	1.72

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
SULFONATE REPORT
2.5-ACRE

WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
J-12	2.30	2.52	2.18	2.10		2.06	1.80	1.98	2.00	2.11	1.98	2.13
J-14	4.97	5.35	4.94	4.94	4.96	4.75	4.83	4.55	4.48	4.41	4.23	4.17
L-0	0.82	0.87	0.81	0.79	0.85	0.83	0.95	0.96	0.82	0.88	0.80	0.83
L-2	0.30	0.36	0.13	0.36	0.44	1.82	0.51	0.57	0.71	0.89	1.51	1.04
L-4	2.50	2.46	2.13	2.23	2.18	2.05	2.07	1.80	1.86	1.79	1.54	1.70
L-6	0.51	0.57	0.24	0.51	0.60	0.65	0.65	0.78	0.79	0.60	0.42	0.50
L-8	0.99	1.23	1.18	1.42	1.37	1.30	1.40	1.41	1.26	1.23	1.12	1.14
L-10	1.88	2.49	2.83	3.18	3.22	3.02	3.09	3.16	3.16	3.22	3.10	3.33
L-12	4.19	4.31	3.95	3.94	3.64	3.14	3.15	3.05	3.08	2.82	2.82C	2.82C
L-14	2.70	2.19	2.05	2.08	1.96	1.67	1.68	1.59	1.44	1.50	1.40	1.46
N-0	0.43	0.51	0.36	0.37	0.39	0.33	0.27	0.24	0.29	0.21	0.17	0.14
N-2	0.90	0.85	0.21	0.74	0.73	0.70	0.72	0.66	0.63	0.61	0.78	0.65
N-4	1.28	1.30	0.60	1.01	1.00	0.93	0.90	0.81	0.58	0.69	0.67	0.65
N-6	1.30	1.56	1.15	1.45	1.32	1.21	1.24	1.12	0.97	0.98	0.89	0.96
N-8	3.43	3.28	3.14	3.13	3.14	2.79	2.67	2.66	1.97	2.37	2.10	2.07
N-10	3.60	3.80	3.24	3.14	3.05	2.75	2.70	2.50	2.22	2.15	1.97	2.04
N-12	2.07	1.84	1.62	1.23	1.34	1.22	1.19	1.12	1.17	1.06	0.90	0.88
N-14	4.70	4.02	3.70	3.86	3.90	3.58	3.63	3.35	3.23	3.25	3.06	3.27
P-0	0.69	0.72	0.65	0.63	0.68	0.62	0.82	0.61	0.72	0.59	0.62	0.57
P-2	2.19	2.22	1.72	1.61	1.59	2.00	1.40	1.33	1.22	1.31	1.33	1.42
P-4	1.67	1.74	1.08	1.10	1.10	0.49	0.62	1.03	0.78	0.85	0.95	0.94
P-6	3.46	3.11	3.76	2.65	2.64	2.54	2.25	2.12	1.82	1.82	1.76	1.89
P-8	4.47	4.37	1.68	3.77	3.69	3.39	3.30	3.25	3.06	3.01	2.95	3.12
P-10	2.24	2.21	1.43	1.73	1.68	1.59	1.49	1.53	1.42	1.41	1.31	1.30
P-12	1.46	1.56	3.37	1.03	1.26	1.24	1.33	1.30	1.56	1.29	1.31	1.47
P-14	3.90	3.18	3.37	3.48	3.22	2.97	2.73	2.69	2.67	2.34	2.28	2.28
R-0	1.31	1.48	1.27	1.41	1.65	1.70	2.06	2.20	2.25	2.13	1.60	1.46
R-2	0.95	0.95	0.79	0.79	0.77	0.75	0.75	0.72	0.78	0.67	0.69	0.75
R-4	2.68	2.95	2.64	2.82		2.45	2.28					
R-6	3.12	2.99	2.78	2.79	2.86	2.57	2.46	2.24	2.25	2.21	2.08	2.13
R-8	1.60	1.49	1.32	1.26	1.22	1.07	1.10	0.96	0.99	0.82	0.82	0.76
R-10	1.68	1.62	1.30	1.29	1.27	1.16	1.09	1.09	0.84	0.98	0.86	0.86
R-12	1.66	1.70	1.60	1.69	1.62	1.47	1.57	1.45	1.63	1.47	1.47	1.62
R-14	2.04	2.38	2.17	2.29	2.22	1.89	1.74	1.85	1.86	2.03	1.86	1.86C
T-0	0.65	0.67	0.54	0.48	0.62	0.50	0.34	0.32	0.17	0.24	0.20	0.20
T-2	1.50C	1.00	1.70	1.68	1.61	1.08	1.38	1.56	1.58	1.29	1.18	1.18C
T-4	1.85	1.39	1.21	1.25	1.19	1.13	1.13C	1.08	1.00	1.04	0.97	1.05
T-6	2.52	2.65	2.48	2.33	2.23	2.07	2.08	2.05	2.05C			
T-8	0.81	0.75	0.69	0.65	1.19	0.52	0.40	0.42	0.34	0.42	0.42C	0.35
T-10	1.24	1.15	0.94	0.92	0.82	0.78	0.73	0.65	0.35	0.60	0.61	0.68
T-12	2.10	2.02	1.76	1.77	1.67	1.54	1.58	1.53	1.25	1.28	1.28	1.41

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
SULFONATE REPORT
2.5-ACRE

WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
T-14	2.11	2.13	1.81	2.01	1.97	1.78	1.77	1.67	1.54	1.38	1.37	1.39
V-0	1.82	1.62	1.25	1.29	0.84	0.69	0.44	0.16	0.17	0.15	0.10	0.10
V-2	2.34	2.46	2.05	2.34	2.14	1.64	1.95	1.91	2.22	1.98	1.79	1.79C
V-4	1.56	1.56	1.32	1.54	1.37	1.14	1.23	1.20	1.73	0.99	0.91	0.87
V-6	1.78	1.98	1.60	1.77	1.61	1.38	1.46	1.28	1.29	1.50	1.41	1.54
V-8	2.66	2.58	2.08	2.22	2.21	1.91	1.96	1.86	1.81	1.80	1.66	1.78
V-10	2.41	2.18	1.73	1.65	1.49	1.12	1.13	0.94	0.60	0.74	0.66	0.94
V-12	4.20	3.79	3.44		3.48	3.06	3.16	2.91	2.75	2.76	2.47	2.59
V-14	2.14	2.18	1.92	2.07	1.87	1.66	1.69	1.72	1.52	1.48	1.24	1.36

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
SULFONATE REPORT
5.0-ACRE

WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
AS-35	3.02	3.19	1.97	2.54	2.57	2.15	2.26	2.42	2.20	2.23	1.70	1.60
AS-36	1.70	1.73	1.69	1.97	2.02	2.19	1.85	1.67	1.82	1.64	1.48	1.47
DD-10	2.97	3.67	2.44	2.58	2.48	2.03	2.37	2.99	2.95	3.18	2.91	3.39
DD-12	5.59	5.52	4.86	2.36	2.45	2.35	2.59	3.20	3.18	2.85	2.48	2.56
DD-14	7.80	7.87	6.59	7.07	7.33	6.69	6.76	6.68	6.86	6.21	5.75	3.72
DD-16	2.18	2.54	1.95	2.25	2.74	2.33	2.62	2.74	2.90	2.82	2.65	2.80
DD-18	4.89	5.33	5.22	5.83	5.61	5.44	5.13	4.63	4.77	4.50	4.41	5.20
FF-12	5.24	5.13	4.76	4.27	4.07	3.26	3.59	3.99	3.91	3.55	3.29	3.64
FF-14	10.86	9.75	8.97	8.97C	8.94	8.40	8.26	7.97	7.79	6.84	6.74	6.72
FF-16	6.20	6.03	5.53	5.84	5.88	5.80	5.86	5.35	5.69	5.29	4.68	5.29
FF-18	4.45	3.99	3.88	4.46	3.87	3.48	3.82	3.73	3.77	3.48	3.26	3.93
FF-20	0.23	0.36	0.93	0.05		0.10	0.15	3.24	0.16	0.10	0.10	0.10C
HH-12	2.38	2.72	2.46	2.18	2.07	2.18	2.39	2.33	2.52	2.24	2.17	2.43
HH-14	10.32	9.75	8.61	8.04	8.47	8.47	8.41	8.08	8.28	7.06	7.23	7.30
HH-16	8.18	6.52	5.41	6.20	6.59	5.91	5.76	5.75	5.58	4.65	4.30	4.43
HH-18	6.55	6.93	5.68	6.15	5.71	5.34	5.25	5.16	4.86	4.55	4.07	4.17
HH-20	5.86	5.61	4.60	4.73	4.81	3.41	3.42	3.14	2.94	2.71	2.25	2.64
JJ-12	1.07	1.19	1.26	1.34	1.35	1.35	1.44	1.63	2.35	2.38	2.37	2.86
JJ-14	1.67	1.52	1.84	1.68		2.40	2.38	2.41	2.42	2.37	2.26	2.50
JJ-16	1.42	1.36	1.06	1.36		1.19	1.28	1.44	1.48	1.43	1.38	1.27
LL-12	4.51	3.87	4.02	4.52	4.61	4.19	4.47	4.82	5.19	4.92	4.58	5.08
LL-14	0.87	0.99	0.96	1.07	1.11	1.03	1.10	1.03	1.08	0.95	0.95C	2.38
NN-12	1.05	1.06	1.01	0.87	0.93	0.80	0.88	0.81	0.88	0.83	0.78	0.82
NN-14	6.81	6.88	6.84	8.73	7.95	8.79	8.64	9.00	9.53	9.36	9.17	9.87
PP-12	4.01	3.50	3.15	3.14	3.37	2.56	3.05	2.74	2.66	2.36	2.36C	2.37
PP-14	6.76	6.91	6.52	7.27	6.73	6.67	6.86	6.71	6.63	7.09	6.78	6.46
PP-16	1.58	1.53	1.53C				1.91	2.30	2.38	2.26	2.31	2.55
RR-2	4.51	4.54	4.23	4.69	4.40	3.72	3.89	3.88	3.94	3.63	3.49	3.68
RR-4	2.06	2.15	2.11	2.19	2.33	1.86	1.86	1.80		1.70	1.63	1.63
RR-6	3.18	2.84	2.73	2.91	2.80	2.26	2.29	1.58	2.27	2.03	1.94	1.69
RR-8	6.58	6.29	6.28	6.31	6.11	5.98	5.99	5.93	6.54	6.62	5.80	5.82
RR-10	5.53	5.54	5.29			3.20	3.20C	6.17	6.13	5.54	5.54C	5.42
RR-12	7.68	6.91	7.05	7.66	7.70	7.29	7.81	7.78	8.13	7.35	7.56	7.83
RR-14	4.47	4.68	4.65	5.57	5.33	6.14	4.67	5.77	5.32	5.51	4.32	4.56
TT-2	0.98C	1.30	1.25	1.39	1.18	1.08	1.08C	1.07	1.14	0.99	0.91	1.00
TT-4	2.44	2.59	2.37	2.52	1.18	2.29	2.29C	2.46	2.46C	2.46C	2.46C	0.10
TT-6	0.99	1.03	1.06	1.16	2.58	1.05	1.25	1.39	1.62	1.60	1.51	1.57
TT-8	1.28	1.36	1.25	1.23	1.44	1.29	1.56	1.45	1.42	1.40	1.27	1.59
TT-10	7.04	6.81	6.52	7.39	7.23	7.08	7.18	7.04	7.58	7.06	6.58	6.98
SC-14	0.72	0.90	0.80	1.05	1.04	1.10	1.06	1.23	1.18	1.18C	0.98	1.15
BP-18	0.17C	0.11	0.11	0.05	0.10	0.10	0.10	0.12	0.10	0.10	0.10	0.10

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
XA-10	28370C	28370C	29420	28000	28000C	28000C	28000C	28000C	28000C	28000C	28000C	28000C
XA-12	6690	5820	5510	5130	4690	4740	4320		4320			
XA-14	1920	2020	530	1750	1800	1570	1790	1850	1980	1410	1410C	1410C
AA-11	440	410	1020	880	750	700	680	780	910	670	670C	1205
B-0	5400	6110	5640	5580	5760	5590	5170	4730	4190	4040	4040C	4040C
EB-5	7470	7460	7160	7070	7340	7080	6890	6960	6490	6510		
B-4	1060	1130	1070	1160	1130	1050	1090	1100	1000	820	1010	1095
B-6	19190	18020	17850	17310	17330	17120	17420	16610	16290	16860	16860C	16860C
B-8	8730	8730C	8690	8330	8500	7730	7550	7820	7110	7260	7260C	7260C
B-10	24140C	24140C	24430	23810	17790	24250	23650					
B-12	6080	5770	5110	4670	4150	4070	3810	3570	3230	3220	3250	3052
B-14	1860	1730	1690	1480	1510	1500	1590	1640	1690		1640	1567
B-16	6600	6600	6190	7130	7350	6540	6670	6610	6610C			
D-0	4840	4670	4530	4450	4510	4510C	4510C	4510C	4510C	4510C	4510C	4510C
D-2	4850	4790	4550	4360	4250	4500	4530	4590	4460	4420	4420C	4420C
D-4	4260	4160	5200			4450	4130	3900	3900C			
D-6	2360	2170	1850	1790	1620	1300	1310	1200	920	1010	920	1457
D-8	7010	7130	7480	6830	6530	6780	6830	6840	6730	6830	6830C	6830C
D-10	5690	5120	6240	5270	5600	5780	5460	5140	5330	5560	5560C	5560C
F-0	8700	8640		8820	5620	8680	8840	8420	8540	8470	8180	8512
F-2	5460	5910	6280		6270	6200	6150	6120	5540			
F-4	900	1070	1120	1050	1050	1110	1110	1180	1350	1680	1760	1542
F-6	2270	2390	2160	2240	2030	1910	1790	1640	1580	1560	1450	681
F-8	5430	5370	5310	4940	4910	4680	4510	4210	3880			
F-10	7600	7440	7380	7420	7440	7350	7270	7220	7100	7110	7110C	7110C
F-12	8320	8330	7900	8240	8250	8000	7880	7910	8130	7970	7970C	7970C
F-14	4890	5060	4120				5790	5360	5410			
H-0	5910	5920	5660	5510		9090	5310	4540	4540C			
H-2	6490	6720	6650	6610	6650	6590	6400	6370	7180	7150	7150C	7150C
H-4	3620	3590	2900	2630	2850	2630	2580	2410	2460	2450	2460	2464
H-6	2430	1980	1750	1530	1570	1410	1290	1110	1210	1060	910	851
H-8	3610	3460	3500	1530	3250	2870	3130	2990	2950	2860	2790	2606
H-10	3630	3730	3610	3380	3320	3280	3350	3020	3060	2910	2770	2726
H-12	4060	3550	3310	3280	3670	3100	3170	2980	2780	2690	2690C	2690C
H-14	660	750	710	760	750	630	630	520	5380	340	2780	833
J-0	4090	5180	4920	5110	5560	5570	5450	5630	5840	6180	6180C	6180C
J-2	1210	1370	1060	1670	1930	2070	2130	1920	2360	2380		
J-4	3500	2790	2770	2420	2390	2350	2250	2170	1980	1990	2340	1850
J-6	4340	3430	2600	3310	2860	3420	3260	3180	2950	3000	2730	2666
J-8	3580	2790	3510	3410	3330	3190	3020	2940	2780	2810	2700	2542
J-10	6110	4280	5150	4910	5130	5000	4950	5030	4940	4970	4780	4686

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
J-12	5850	5950	6140	5820		6090	5450	5940	6020	6500	6490	6317
J-14	3640	3500	3330	3370	3200	3080	3060	2970	2810	29210	2780	2655
L-0	2700	2590	2550	2450	2520	2530	2610	2450	2240	2270	2160	2024
L-2	600	630	319	690	880	1450	1070	1120	1270	1330	2400	1507
L-4	2010	1850	1740	1670	1620	1630	1560	1550	1380	1360	1140	1166
L-6	830	740	390	570	610	760	720	780	760	690	230	854
L-8	980	1550	1530	1600	1600	1510	1500	1440	1340	1390	1660	1067
L-10	2750	2810	3720	3560	3520	3380	3290	3220	3140	3140	3180	3297
L-12	4010	3710	3510	3080	2800	2340	2440	2250	2100	2010	2010C	2010C
L-14	2000	1440	1120	1400	1240	1110	1130	1110	990	970	960	840
N-0	7300	5050	4610	5040	5770	4140	4840	4630	4560	3550	3830	3471
N-2	1300	1070	910	870	810	810	770	890	730	930	650	1141
N-4	1630	1610	1430	1380	1340	1190	1050	960	880	890	770	599
N-6	2340	2050	1950	1680	1550	1400	1370	1240	1080	1150	990	1046
N-8	1970	1010	2100	1810	1690	1640	1490	1430	1220	1430	1120	1071
N-10	3300	2960	3050	2880	2730	2330	2300	2290	2070	2030	1910	1957
N-12	1660	1450	1330	1130	1190	1080	940	870	800	740	570	1188
N-14	4400	4300	4130	4150	4190	4180	4130	3860	3710	3850	3870	3938
P-0	2770	2660	2790	2740	2740	2730	5480	2650	2300	2190	2080	1971
P-2	4560	4670	4000	3840	3650	2700	3890	3560	3230	3200	3170	3208
P-4	1800	1740	1250	1240	1230	400	520	930	790	870	700	744
P-6	3400	3080	2840	2910	2700	2400	2240	2030	1800	1800	1730	1712
P-8	3200	3030	2510	2560	2450	2310	2200	2080	1880	1880	1750	1680
P-10	3560	3070	1840	2360	2350	2170	2090	1950	1780	1780	1680	1659
P-12	2590	1970	2110	1350	1560	1330	1320	1430	1430	1390	1280	1248
P-14	2140	2020	2200	1970	1970	1830	1780	1640	1600	1560	1500	1468
R-0	3190	3230	3250	3700	3460	3370	3750	3990	4460	4510	4700	3910
R-2	1100	920	780	810	740	730	710	670	680	820	730	635
R-4	10820	9900	9790	9830		9640	9630					
R-6	4430	4320	4580	4180	4230	4150	3960	3680	3650	3700	3410	3602
R-8	1260	1180	1040	980	890	810	770	730	630	820	930	574
R-10	2660	2570	2260	2080	1890	1700	1530	1400	1180	1400	1190	819
R-12	4350	4020	4150	4140	4040	4030	4110	3940	3930	3510	3850	3857
R-14	2440	2410	2610	2360	2200	1930	1730	1690	1710	1710	1640	1640C
T-0	4220	4060	3620	3420	3200	2270	1890	1580	1430	1440	1400	1326
T-2	1780C	1890	1740	1670	1530	500	1470	1500	1440	1430	1240	1240C
T-4	4120	4040	3860	3700	3690	3590	3590C	3410	3530	3470	3730	3456
T-6	6570	6150	6360	6170	6080	6030	5610	5340	5340C			
T-8	740	610	520	480	400	360	300	330	580	580	580C	1078
T-10	1380	1070	1030	820	850	720	670	650	560	500	890	968
T-12	1530	1450	1160	1030	990	870	850	870	830	800	740	695

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
T-14	2640	2580	2420	2340	2290	2030	2030	2030	1820	1580	1710	1737
V-0	3850	2980	2330	1790	1060	750	400	180	70	188	170	179
V-2	4300	4250	4110	4110	4260	1850	4040	3750	3620	3840	3180	3180C
V-4	3200	2730	2390	2070	1970	1720	1680	1660	1570	1420	1380	1868
V-6	3740	3680	3360	3280	3090	2870	2910	2570	2500	2900	2770	2687
V-8	3070	2920	2750	2600	2500	2360	2550	2170	2060	2070	2020	1946
V-10	3230	3050	2570	2380	2170	1810	1530	1280	940	980	850	943
V-12	1830	1730	1640		1530	1410	1360	1270	1230	1250	1200	1138
V-14	1520	1480	1530	1330	1290	1230	1220	1120	930	840	740	716

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
AS-35	11280	11210	7960	10060	9970	10160	10300	10680	10530	10870	9490	8242
AS-36	8730	8850	8980	9000	8770	10160	8960	8800	8870	8740	8670	8983
DD-10	8770	9950	8270	9040	9980	8390	12230	9830	10070	10460	9850	9465
DD-12	5070	4780	4580	4810	4440	3940	4130	4220	3780	3830	3520	3407
DD-14	5640	5620	5300	5460	5480	5410	5560	5370	4930	5040	4830	4871
DD-16	3270	3640	3740	3450	3640	3570	3830	3940	3850	4060	3910	3637
DD-18	10390	9830	9350	9170	9350	8810	9010	9390	8830	9330	8340	8182
FF-12	6270	6270	6160	4860	5380	5620	6530	6030	5660	5750	5560	5434
FF-14	3520	3510	3480	3740	3460	3340	3320	3120	2960	3080	2860	2840
FF-16	7990	7830	7950	8160	8200	7830	7320	7850	7560	7570	7630	7668
FF-18	6460	5990	6120	5940	6200	5910	5890	5830	6030	5960	5710	5715
FF-20	29140	27280	18770	18180	20150	23200	21500	14800	25590	27900	26300	26300C
HH-12	8980	8600	8730	8690	9250	9380	8830	8840	8940	8980	9020	9497
HH-14	3550	3680	3740	3960	3810	3660	3450	3340	3210	3150	3230	3205
HH-16	6230	7700	6410	6580	7380	7420	7070	6440	6640	6990	6850	6395
HH-18	4860	4520	4310	4200	4060	3920	3810	3760	3750	3530	3560	3368
HH-20	16030	14530	14970	15080	15700	15080	14700	14590	15060	14870	14900	14573
JJ-12	1550	1710	1650	1520	1500	1500	1350	1570	2010	2000	2120	2368
JJ-14	9150	7940	8050	6900		8930	8880	8470	9150	9250	9330	9299
JJ-16	5810	6020	4860	4900		4710	4620	4690	4950	4900	4600	3758
LL-12	5940	5530	5380	5370	5460	5170	4980	4990	4920	5690	4920	4945
LL-14	4540	4700	4690	4660	5130	5170	5010	5140	5110	5230	5230C	6133
NN-12	2840	2560	2420	1910	1940	1830	1710	1630	1410	1460	1410	1308
NN-14	9880	9420	9070	8860	8700	8370	7980	7610	7570	7630	7240	7260
PP-12	2500	2390	2280	2100	2030	1930	2210	1910	1680	1800	1800C	1936
PP-14	5920	5850	5880	5750	5840	5750	5570	5580	5780	5510	5490	5388
PP-16	9250	8550					7330	10410	10580	10650	10540	9596
RR-2	7710	7660	7460	7210	7250	6950	7050	6700	6460	6370	6140	6058
RR-4	7830	8140	7720	7420	7110	7930	7610	7270		7160	6910	6307
RR-6	8190	7740	7060	7010	7070	6370	6410	4430	5030	5010	5150	3896
RR-8	4530	4600	4540	4370	4270	4270	4280	4110	3920	3800	3680	3527
RR-10	6530	6580	6460			7380	7380C	6140	6090	6110	6110C	5910
RR-12	6340	6120	6470	6320	6210	5740	5830	6030	5660	5680	5570	5605
RR-14	14780	14670	14450	14230	14120	13970	13340	13110	13160	13500	13730	13623
TT-2	7070C	6790	6660	6750	6420	6170	6170C	5740	5730	5730	5590	5594
TT-4	9630	9610	10120	10150	8010	10480	10480C	10040	10040C	10040C	10040C	202
TT-6	7890	7630	7780	7720	10230	7560	7320	7160	7060	7100	6990	7430
TT-8	9420	9340	9410	9530	9760	9250	8350	9520	9290	9770	6650	9940
TT-10	9200	8760	8540	8660	8640	8170	8110	7750	7660	7610	7250	7349
SC-14	10070	9940	9840	9650	9770	9690	9380	9080	9070	9070C	9830	9408
BP-18	14545	14210	14545	12120	9100	5420	5580	6090	7560	6900	8500	9295

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
XA-10											70C	70C
XA-12		110	81	90	98	74	62	70				
XA-14	63	116	93									
AA-11												
B-0												
EB-5												
B-4												
B-6			56									
B-8												
B-10												
B-12												
B-14												
B-16												
D-0												
D-2		112						74	74C		74C	74C
D-4	74	87	103	83			130	122	51		122C	122C
D-6	104		52	66								
D-8												
D-10												
F-0												
F-2												
F-4				54								
F-6			63		52							
F-8												
F-10												
F-12			74									
F-14												
H-0												
H-2												
H-4												
H-6												
H-8												
H-10												
H-12												
H-14												
J-0												
J-2												
J-4												
J-6	412	477	203	176	248	204	175	313	273	98	229	188
J-8	188	145	145C	122	132	97	114	109	95	59	89	99
J-10			66									

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
J-12	84	75	75	64				52	52C		52C	
J-14				86	69	78						
L-0	112											
L-2	60											
L-4					83							
L-6	61											
L-8												
L-10				73	51							
L-12	133	118	109	124	140	148	113	136	89		136C	136C
L-14	57	64	57		52		64					
N-0												
N-2												
N-4												
N-6	68											
N-8				57								
N-10				64								
N-12	89	106	102	93	80	58	65	61	61C	51	61C	
N-14		68	52		66	82						
P-0												
P-2												
P-4												
P-6												
P-8												
P-10												
P-12												
P-14												
R-0												
R-2												
R-4												
R-6					145							
R-8												
R-10												
R-12												
R-14												
T-0												
T-2												
T-4												
T-6												
T-8												
T-10												
T-12												

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
T-14												
V-0												
V-2												
V-4												
V-6												
V-8												
V-10												
V-12												
V-14												

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WELLID	10-83	12-83	2-84	4-84	6-84	8-84	10-84	12-84	2-85	4-85	6-85	8-85
AS-35												
AS-36												
DD-10												
DD-12					107							
DD-14				51								
DD-16					126							
DD-18					73							
FF-12												
FF-14	230	254	265	201	173	208	204	244	135	107	167	138
FF-16	175	123	154	173	135	149	115	98	130	113	91	85
FF-18												
FF-20												
HH-12												
HH-14	595	561	457	282	355	312	399	328	204	174	249	185
HH-16	323	233	109	265	278	215	105	165	281	272	255	214
HH-18												
HH-20												
JJ-12												
JJ-14	70	54										
JJ-16	73											
LL-12												
LL-14												
NN-12												
NN-14							56					
PP-12	112	173	72	160	166	166	155	149	113	96	149C	92
PP-14	68	86	68	92	55	85	143	102	54	91	85	93
PP-16												
RR-2	153	181	170	127	177	177	153	150	107	63	86	70
RR-4	70	67							56			
RR-6												
RR-8					52		57					
RR-10												
RR-12	552	581	521	377	402	463	292	460	283	423	476	434
RR-14	217	215	110	178	267	244	239	203	245	249	236	211
TT-2	71	283	71	68	72	60	66			58	54	
TT-4	181		261	243	239		230		156			
TT-6		77				158		73	73C		73C	
TT-8	108				52	61						76
TT-10	51	55			57			50	50C		50C	
SC-14												
BP-18												

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