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COMMERCIAL SCALE DEMONSTRATION ENHANCED OIL RECOVERY BY MICELLAR-POLYMER FLOOD

Annual Report, October 1981—September 1982

By
J. C. Howell

June 1983
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Work Performed Under Contract No. AC03-78ET13077

Marathon Oil Co.
Findlay, Ohio

U. S. DEPARTMENT OF ENERGY

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Annual Report, October 1981–September 1982

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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 is now completed. After 10% of a pore volume of micellar slug was injected, injection of 11% pore volume of Dow 700 Pusher™ polymer was conducted at a concentration of 1156 ppm. This was followed by 19% pore volume of 800 ppm polymer. At the end of this reporting period, 411 ppm polymer was being injected into the 2.5-acre pattern and 625 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%. Oil cut has been in excess of 5% since March 7, 1978. The oil cut of the 2.5-acre pattern has decreased from 7.9% in September, 1981, to 6.2% in September, 1982. The 2.5-acre pattern appears to be on a shallow decline.

After 23% of a pore volume injection, the 5.0-acre pattern oil cut gradually increased from 4% to the current peak of 11.3%. The 5.0-acre pattern experienced a sharp increase in oil cut after 34% of a pore volume of total fluid had been injected and now at 44.9% of a pore volume injected appears to have established a plateau. The oil cut of the 5.0-acre pattern has increased from 10.9% in September, 1981, to 11.3% in September, 1982.

As a result of project operations, 848,062 barrels of oil have been recovered from the project area. Oil cuts remain high in both patterns and significant additional recovery is expected in future years.

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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 Fifth Annual Report covers the interim from October 1, 1981, through September 30, 1982. The report is organized under four Work Breakdown Structures (WBS) which are summarized below.

WBS No. 2100 - Fluid Injection

1) Polymer injection has continued in varying concentrations. During the interim of October 1, 1981 and September 30, 1982, the polymer concentrations were reduced from 625 ppm to 411 ppm and 800 ppm to 625 ppm on the 2.5- and 5.0-acre patterns, respectively.

2) A program of stimulating injection wells has continued. During October, 1981, ten injection wells were stimulated using high pressure water jetting and chemical treatments. During August, 1982, one injection well was hydraulically fractured. These and past results show that hydraulically fractured wells give the greatest improvement, but can also, if not carefully designed, cause injector/producer communication.

3) A test comparing the injectivity of Dow 700 and Marathon field-manufactured polymer is reported.

WBS No. 2200 - Production

1) A program of stimulating producing wells has continued. The hydraulic fracture treatment of 25 oil wells in November, 1981 and 17 oil wells in August, 1982 are reported with favorable results.

WBS No. 2300 - Performance Monitoring

1) Subsequent to injection of tritiated water into ten injection wells, produced fluids from all oil wells have been analyzed monthly for the presence of tritiated water. As of August, 1982, 132 wells have shown the presence of tritiated water.

2) Samples of produced water have been collected monthly and analyzed for sulfonate (a micellar slug component) content. In September, 1982, 119 wells indicated sulfonate levels higher than background. Analysis of sulfonate production shows 32% and 17% of the 2.5- and 5.0-acre pattern's wells respectively have fallen off peak sulfonate response.

3) Presently the 2.5- and 5.0-acre patterns are producing at oil cuts of 6.7% and 11.3%, respectively.

4) The analysis of six injection wells' and six production wells' transient tests are reported.

WBS NO. 2400 - Economic Monitoring

1) An analysis and forecast based on historic and future economic parameter estimates is reported. The Windfall Profit Tax (WPT) has significantly affected project economics.

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

FLUID SUMMARY DATA SHEET
September, 1982

	2.5-Acre Spacing	5.0-Acre Spacing	Total Project
Oil Production			
B/D	252	243	495
B/M	7,566	7,289	14,850
Cumulative, Bbls.	595,323	252,739	848,062
% PV	5.6	4.21	5.10
Oil Cut - %			
This Month	6.2	11.3	8.0
Last Month	7.0	11.6	8.5
Cumulative	8.1	6.4	7.5
Total Fluid Production			
B/D	4,078	2,141	6,219
B/M	122,344	64,215	186,559
Cumulative, Bbls.	7,372,814	3,970,095	11,342,909
% PV	69.4	66.2	68.2
Fluid Injection			
B/D	5,151	1,417	6,568
B/M	154,390	42,504	196,894
Cumulative, Bbls.	8,298,289	2,693,337	10,991,626
% PV	78.1	44.9	66.1
Injection/Production Ratio*			
This Month	1.2	0.90	1.10
Last Month	1.17	1.04	1.13
Cumulative	1.06	0.96	1.03

*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

Fluid Summary Data Sheet (Cont'd.)
September, 1982

	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	633	632	--
Polymer Viscosity, cp @ 77° F	10.2	18.7	--
Polymer Screen Factor @ 77° F	13.3	16.6	--
Injection Rate (BPDNF)	1.98	1.90	--
Wells			
Producers	91	41	132
Injectors			
Micellar Fluid	85	29	114
Water	6	6	12
Water Disposal	1	1	2
Abandoned	6	0	6

Fluid Injection Schedule

	Slug	Polymer, ppm 1156	800	625	411
2.5-Acre					
Starting Date	2/10/77	11/21/78	5/20/79	7/28/80	5/26/82
% PV Actual	10.0	11.0	19.0	32.0	6.1
% PV Ultimate	10.0	11.0	19.0	32.0	12.0
Cumulative, Bbls.	1,063,446	1,169,677	2,019,170	3,401,604	644,393
5.0-Acre					
Starting Date	2/10/77	11/21/78	1/14/80	3/5/82	
% PV Actual	10.0	11.0	19.0	4.9	
% PV Ultimate	10.0	11.0	19.0	32.0	
Cumulative, Bbls.	599,679	658,999	1,139,370	295,289	

POLYMER INJECTION

Introduction

Polymer injection was initiated November 21, 1978, and has continued in varying concentrations. A table of polymer concentrations injected to date is included in the Fluid Summary Data Sheet.

Discussion

Polymer concentration was reduced from 625 ppm to 411 ppm on the 2.5-acre pattern. A total of 3,401,604 barrels or 32.0% pore volume of 625 ppm polymer was injected into the pattern.

Presently 411 ppm polymer is being injected into the 2.5-acre pattern at an average injection rate of 5,151 BPD (1.98 barrels per day per net foot (B/D/NF)) and an average plant pressure of 633 psig. The Brookfield viscosity at 6 rpm and 72° F averaged 10.2 cp. The screen factor averaged 13.3 at 77° F. The desired pore volume for 411 ppm polymer injection is 12.0% of a pore volume. As of September, 1982, 6.1% pore volume has been injected. Cumulative injection totals 8,298,289 barrels or 78.1% pore volume.

On March 5, 1982, the 5.0-acre pattern's polymer concentration was reduced from 800 ppm to 625 ppm. A total of 1,139,370 barrels or 19.0% pore volume of 800 ppm polymer was injected.

Presently, 625 ppm polymer is being injected into the 5.0-acre pattern at an average injection rate of 1,417 BPD (1.90 B/D/NF) and an average plant pressure of 632 psig. The Brookfield viscosity at 6 rpm and 72° F averaged 18.7 cp. The screen factor averaged 16.9. The desired pore volume for 625 ppm polymer injection is 32.0% of a pore volume. As of September, 1982, 4.9% pore volume has been injected. Cummulative injection totals 2,693,337 barrels or 44.9% pore volume.

INJECTION WELL STIMULATION

Introduction

In order to maintain adequate injection rates and to assure fluid conformance in each pattern an injection well stimulation program has been continued. A total of 41 injection wells has been stimulated since initiation of slug injection. Various stimulation techniques have been used. It appears that small high-viscosity-gelled-water fracture stimulations are the most successful in improving injectivity.

Discussion

During October, 1981, ten injection wells were stimulated. Two injection wells (C-13, W-3) were jetted with high pressure water (hydrojetting), four wells (C-9, E-9, I-13, G-1) were hydrojetted and treated with a polymer degrading chemical, and four wells (K-9, M-9, OO-15, QQ-15) were treated with

INJECTION WELL STIMULATION - (Continued)

Discussion - (Continued)

a polymer degrading chemical only. The different stimulation procedures were used as experimental alternatives to hydraulic fracturing. Fracturing can cause communication between an injection well and its surrounding producers. The injection rates of the recently stimulated wells increased from an average of 0.83 B/D/NF before stimulation to 1.04 B/D/NF after stimulation. No one technique (hydrojetting, hydrojetting plus chemical or chemical) proved superior over another.

During August, 1982, one injection well (II-13) was hydraulically fractured and propped with sand-laden fluid. The fracture was designed for a 30 foot half-fracture length using high viscosity gelled fluids. Injection was increased from 5 BPD (.21 B/D/NF) to 25 BPD (1.04 B/D/NF) at a wellhead pressure of 650 psig. Results for these stimulations as well as past stimulations are given in Table 1.

Based on recent and past results, hydraulic fracturing is the most effective means of improving the injectivity of a damaged well. The fact that fracturing gives superior results over wellbore treatments (e.g. hydrojetting and chemical soaks) indicates that damage exists deeper in the formation. However, to insure against creating fracture communication between wells the fracture should be designed for small half-fracture lengths and pad volumes should be no larger than necessary to prevent sanding out.

POLYMER COMPARISON TEST

Introduction

A test comparing the injectivity of Dow 700 and Marathon field manufactured polymer, both polyacrylamides, was conducted on a recently stimulated injection well.

Discussion

The test was conducted on the M-1 Project using an injection well on the 5.0-acre pattern (QQ-15). Marathon polymer was injected for seven days at an average concentration of 800 ppm. Its viscosity and screen factor, measured at the injection skid, averaged 95 cp (6 RPM, 72° F.) and 36 (77° F.), respectively. The Marathon polymer was injected at a constant rate of 31 BPD. After seven days the stabilized surface pressure was 580 psig. The injectivity of Marathon polymer was determined to be 0.05 BPD per psig. Subsequent to the Marathon polymer injection, Dow 700 polymer was injected. A solution of 800 ppm Dow 700 polymer was injected for seven days. Its viscosity and screen factor, measured at the injection skid, averaged 35 cp (6 RPM, 72° F.) and 13 (77° F.), respectively. Dow polymer was also injected at a constant rate of 31 BPD. After seven days the stabilized surface

POLYMER COMPARISON TEST - (Continued)

Discussion - (Continued)

pressure was 575 psig. Dow's injectivity was determined to be 0.05 BPD per psig.

Analysis of the injectivity data by the Hall Method[3] is shown in figure 16. This analysis shows no significant injectivity change when the change was made from Marathon polymer to Dow 700. The conclusion can be drawn that Marathon field-manufactured polymer had injectivity characteristics at least as good as Dow 700.

Marathon field-manufactured, partially hydrolyzed polyacrylamide polymer is being successfully produced in the field. For additional information, please refer to SPE Paper Number 11208, "Partially Hydrolyzed Polyacrylamides with Superior Flooding and Injection Properties," presented at the SPE 57th Technical Conference and Exhibition, September 26 - 29, 1982.

[3]Hall, H. N., "How to Analyze Waterflood Injection Well Performance", World Oil (October, 1963), pp. 128-130.

PRODUCTION WELL STIMULATION

Introduction

To insure adequate withdrawal rates and to maintain acceptable fluid conformance in each pattern, a production well stimulation program has been continued. To date, 115 wells have been fracture stimulated. Thirty-seven of these wells have been stimulated more than once.

Discussion

During October and November, 1981, 25 production wells were hydraulically fractured and propped with sand-laden fluid. Fracture procedures were designed for a 30-foot half-fracture length using high viscosity gelled fluids.

Based on well tests fluid production of these 25 stimulated wells increased from a total of 363 BPD before stimulation to 1,591 BPD after stimulation. Oil production was increased from 51 BOPD to 216 BOPD after stimulation. Oil production was increased by 70 BOPD in the production tanks.

During August, 1982, 17 production wells were hydraulically fractured and propped with sand-laden fluid. Fracture procedures were designed for a 30-foot half fracture length using high viscosity gelled fluids.

Based on well tests, the fluid production increased from a total of 653 BPD before stimulation to 2,058 BPD after stimulation; oil production was increased from 72 BOPD to 177 BOPD after stimulation. At present the results of the well tests have not been seen in the production tanks. This historically lags behind due to stock volume and associated treating problems created by produced workover fluids.

Table 2 lists all production well stimulation results since initiation of micellar slug injection. Also included in this table are before- and after-production rates and treatment data. Based on the results of the fracture stimulation program, the following observations have been made.

1. Higher sand concentrations extend the life of the fracture stimulation.

2. Excess pad volumes increase the likelihood of creating communication with offset wells. Pad volumes should not be greater than is necessary to prevent sanding out.

3. A propped fracture at the wellbore is extremely important. Over flushing can wash away the propping agent reducing the effective wellbore prop.

TRITIATED WATER INJECTION PROGRAM

Introduction

In order to analyze the parameters controlling fluid communication, such as directional permeability, fracture orientation, and fluid conformance, a radioactive tracer (tritiated water) was injected into selected injection wells in the M-1 Project prior to slug injection. Produced fluid samples from wells are analyzed monthly to determine the presence of radioactive material.

Discussion

A computer printout listing all wells showing the presence of tritiated water content during the past year is shown on pages 86 to 89. Seventy-seven wells indicated the presence of tritiated water in the produced fluid stream in August, 1981. As of August, 1982, 132 wells have shown the presence of tritiated water. Of these 132 wells, 51 wells have shown a tritiated water content higher than background levels for six or more months. Thirty-five of the 51 wells are adjacent to a well in which tritiated water was injected. No conclusions have been developed as a result of this data.

The locations of the tritiated water injection wells are shown in Figure 17. Additional information can be found in Table 3.

HIGH SULFONATE CONTENT WELLS

Introduction

As part of routine performance analysis, produced water from each oil well is sampled monthly and analyzed for sulfonate at Marathon's Denver Research Center.

Discussion

Beginning in March, 1977, produced water samples from each M-1 Project well 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, 1982, 90 wells in the 2.5-acre pattern showed sulfonate levels higher than the background level (.5). This compares to 87 wells in September, 1981. Every oil well on the 2.5-acre pattern has shown sulfonate levels greater than the background level for at least three months.

Thirty-nine wells in the 5.0-acre pattern showed sulfonate levels higher than background levels during the month of August, 1982. This compares with 38

HIGH SULFONATE CONTENT WELLS - (Continued)

Discussion - (Continued)

wells in September, 1981. Sulfonate data for the 2.5- and 5.0-acre patterns for the past year are shown on pages 78 to 81.

Analysis of sulfonate production shows 32% of the 2.5-acre pattern and 17% of the 5.0-acre patterns' wells have fallen off peak sulfonate response. A typical sulfonate response is shown in Figure 18. Sulfonate production can be divided into five general categories. Individual wells were placed in one of the categories by analyzing the sulfonate production history. The results are listed in Figure 18.

OIL CUT MONITORING

Introduction

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

Discussion

During September, 1982, 63 wells on the 2.5-acre pattern and 32 wells on the 5.0-acre pattern produced at or above a 5% oil cut. This compares to 69 wells and 34 wells, respectively, in September, 1981. Currently, the 2.5- and 5.0-acre patterns are producing oil cuts of 6.2% and 11.3%, respectively. Individual well oil cuts are reported on the five-spot reports, pages 63 to 77.

TRANSIENT TESTING

Introduction

In compliance with contractual requirements, transient testing is conducted on six injection wells and six producing wells.

Discussion

During the third quarter of 1982, six injection wells (C-3, I-7, O-13, S-7, GG-13, and OO-13) were transient tested. The locations of the transient test wells are shown in Figure 19. These tests were conducted as part of the continuing effort to determine the effect of Maraflood fluids on well conditions and reservoir parameters. Amerada pressure gauges were set at an approximate depth of 800 feet below the surface to enable pressure falloff and buildup (injectivity) data to be collected for each injection well. Results were then analyzed using a Miller-Dyes-Hutchinson plot.

TRANSIENT TESTING - (Continued)

Discussion - (Continued)

Tables 4 and 5 summarize the results of this year's injection well testing. Also included in these tables are the results of past transient tests conducted on the injection wells.

The latest series of transient tests were conducted during the injection of 411 ppm and 625 ppm polymer into the 2.5- and 5.0-acre patterns, respectively. Two wells showed a significant increase in fluid mobility (S-7, O-13). These wells were tested during injection of 411 ppm polymer. The remaining four wells showed no significant change from previous years' results. Skin factors calculated from this year's data show a small increase over last year indicating an accumulation of damage. However, the majority of the wells have a negative skin factor which is interpreted as an improved wellbore condition.

Oil well pressure transient tests are based on fluid level measurements obtained by echometer readings. This eliminates the need to pull rods as would be necessary if a pressure bomb were used. These results are also analyzed using a Miller-Dyes-Hutchinson plot.

Table 6 summarizes the results of this year's and previous years' production well transient tests. The latest tests show little change in fluid mobility when compared to previous test results. It is evident from skin factor results that the fracture stimulation of T-8 improved the wellbore conditions. The skin factor was decreased from + 0.7 to - 5.3. Three other wells (P-12, PP-12, HH-12) show an increase in skin factor indicating an accumulation of wellbore damage. Two wells (D-4, H-8) show no apparent change.

The 12 wells tested can be divided into six groups of injector/producer pairs. The injector and producer are located adjacent to one another. Table 7 lists this year's transient test results in this manner. Two well groups (O-13/P-12 and I-7/H-8) gave comparable results within their respective areas. The remaining groups did not compare well. This has been historically true and is possibly an indication of poor communication between the wells.

ECONOMIC ANALYSIS

Introduction

An economic analysis of the M-1 Project has been conducted in compliance with the Department of Energy contractual requirements. The analysis is based on historic costs and crude oil prices through 1981. After 1981, both costs and crude prices are escalated using three escalation rate cases (8, 10 and 12% per year). This method is preferable over a constant dollar analysis which would mix historical costs with unescalated costs.

Discussion

Economic and project physical data are input into an in-house computer program that generates economic calculations. The physical data on the M-1 Project may be found in several previous reports. Economic parameters may be divided into four categories: development, micellar slug, polymer and operating costs.

The development costs include all drilling costs and the costs of injection, production and disposal facilities. Costs of various testing are also included in the development costs. Some detail of these costs are shown on Table 8. Development costs total $8.9 million, most of which was spent prior to 1977. Well costs amount to almost 63% of all development costs. The development costs for the 2.5-acre and 5.0-acre patterns in terms of unit costs ($/10-acre) have also been included in Table 8.

The average micellar slug cost for the M-1 Project was $6.05/barrel. A total of $10,062,540 was spent on micellar slug. This is actual cost and does not reflect current prices. Micellar slug cost is a function of the price of oil.

The total polymer cost to date averaged $1.35/pound. This cost should not be construed as an indication of current polyacrylamide prices, since over 40% of the M-1 Project's polymer requirement was purchased in 1975-77.

Operating costs used in this economic analysis are based on past history of the M-1 Project and on future estimates which consider treating costs (i.e., oil-water separation costs). During 1981 the 2.5-acre and 5.0-acre patterns operated at a cost of $876/injection well/month (this does not include oil treating and injection expense). Treating costs are a function of the relative maturity of the project. During peak oil cut response, treating costs ($/barrel) will be higher, reflecting severe emulsion problems. As the project continued the emulsions lessen and treating costs decrease. The history of the M-1 treating cost is shown in Figure 20.

Three crude oil prices ($33/barrel, $38/barrel, $43/barrel) were selected as the average 1982 oil price and used in the economic analysis. These are then escalated at the same rate as the M-1 Project costs. The effect of Windfall Profit Tax (WPT) has also been considered. These and other important input parameters used in the economic analysis are listed in Table 9.

ECONOMIC ANALYSIS - (Continued)

Discussion - (Continued)

The economic analysis has been restricted to a before-income tax basis. A discounted cash flow rate of return is a common method for evaluating a project's viability and was used for this analysis. Figure 21 shows rate of return as a function of oil recovery at three different 1982 crude prices, each escalated at three different yearly rates over the remaining life of the project. The analysis includes payment of a Windfall Profit Tax (WPT).

The effect of the WPT has been considered in this economic analysis. Effective March 1, 1980, the M-1 Project has been subject to a WPT. Since the M-1 Project began production prior to September 30, 1979, it is classified as Stripper Oil and is subject to a 60% WPT rate instead of the 30% rate for incremental tertiary oil. If the M-1 project had been taxed at a 30% incremental tertiary oil rate the project rate of return would be more than doubled. Figure 22 illustrates the effects of WPT on the M-1 Project's economics. The M-1 Project qualifies for the Net Income Limitation on WPT. Without the Net Income Limitation the rate of return for this project would be zero.

A project's economics are sensitive to the cost of the micellar solution. Experience with economic analysis shows that a $1/barrel change in slug price results in a unit change in the percent rate of return.

The general conclusion that can be drawn from this economic analysis is that project economics are very sensitive to recovery and crude oil price. It can also be concluded that WPT has greatly influenced the project's economics. Obviously, future analyses will become more reliable as assumptions are replaced with facts.

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

DE-AC19-78ET-13077

TABLE 1

Injection Well Stimulation Results

Well No.	Treatment Date	Injection Rate B/D/NF Before	Injection Rate B/D/NF After	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Treatment Size: Gelled Water Body (Gal.)	Treatment Size: Sand Pounds	Treatment Size: Sand Mesh	Sand Removed From Well (Lbs.)
A-11	5/23/77	0.32	1.64	H	1,600	600	2,400	10-20	100
M-1	6/06/77	0.78	2.00	H	1,600	800	3,200	10-20	200
K-11	6/06/77	0.22	2.00	H	1,600	750	3,000	10-20	928
C-7	6/06/77	0.68	2.00	H	1,600	450	1,800	10-20	N/A
I-9	6/10/77	0.45	0.83	H	1,600	800	3,200	10-20	N/A
W-3	6/10/77	0.47	2.11	H	1,600	800	3,200	10-20	2,000
C-5	6/20/77	0.36	2.00	H	1,600	450	1,800	10-20	N/A
J. Wasson									
A-12	7/26/77	SI	9.00	H	1,600	2,400	9,600	10-20	N/A
UU-1	8/08/77	SI	5.00	H	1,600	800	3,200	10-20	N/A
UU-5	8/16/77	SI	5.63	H	1,600	700	2,800	10-20	N/A
Brubaker-Prier Fee									
R-12	8/31/77	2.77	7.05	H	1,600	1,100	4,400	10-20	N/A
C-3	8/31/77	1.00	1.36	H	1,600	350	1,400	10-20	100
G-11	9/07/77	0.61	0.94	H	1,600	500	2,000	10-20	400
G-13	9/08/77	0.67	1.56	H	1,600	375	1,500	10-20	500
Q-5	9/13/77	0.11	1.31	H	1,600	775	1,000	10-20	N/A
W-5	9/13/77	0.05	1.37	H	1,600	875	3,500	10-20	400
E-1	9/19/77	0.72	1.67	H	1,600	475	1,900	10-20	200
C-9	9/23/77	0.58	0.53	H	1,600	575	2,300	10-20	300
QQ-15	12/07/77	0.64	0.89	H	1,600	775	3,100	10-20	100
E-5	12/28/77	0.73	0.37	H	1,600	375	1,500	10-20	200
GG-13	5/10/78	1.52	2.12	H	1,550	1,025	4,100	10-20	N/A
SS-1	5/15/78	1.05	2.72	H	1,600	600	2,400	10-20	N/A
EE-15	5/16/78	1.07	1.33	H	1,600	1,225	4,900	10-20	N/A
EE-11	5/17/78	1.21	2.25	H	1,400	600	1,200	10-20	N/A
KK-13	5/17/78	1.54	4.77	H	1,600	650	2,600	10-20	N/A
OO-13	5/18/78	1.03	2.21	H	1,600	600	400	10-20	N/A
QQ-13	5/19/78	1.19	2.44	H	1,600	1,025	4,100	10-20	N/A

* This well received a decentralized jet stimulation.
H = Fractured with high viscosity fluid.

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TABLE 1

Injection Well Stimulation Results (Continued)

Well No.	Treatment Date	Injection Rate B/D/NF Before	Injection Rate B/D/NF After	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Treatment Size: Gelled Water Body (Gal.)	Treatment Size: Sand Pounds	Treatment Size: Sand Mesh	Treatment Size: Sand Removed From Well (Lbs.)
Q-3	1/09/80	1.21	4.53	H	1,600	700	2,800	10-20	990
MM-15	2/10/80	1.11	2.84	H	1,600	675	2,700	10-20	330
I-7	9/17/80	0.34	1.55		Hydrojet Water Stimulation				
O-3	10/03/80	0.04	4.65	H	1,600	750	3,000	10-20	N/A
SS-11	10/13/80	1.52	9.36	H	1,600	650	2,600	10-20	N/A
Q-5	10/15/80	0.52	4.38	H	1,600	800	3,200	10-20	N/A
SS-3	10/15/80	1.10	6.05	H	1,600	800	3,200	10-20	N/A
C-13	9/18/81	1.49	1.54		Hydrojet Water Stimulation				
C-9	9/20/81	0.26	0.32		Hydrojet & Chemical Stimulation				
E-9	9/23/81	0.33	0.33		Hydrojet & Chemical Stimulation				
I-13	9/28/81	0.67	0.67		Hydrojet & Chemical Stimulation				
G-1	10/01/81	0.40	1.79		Hydrojet & Chemical Stimulation				
W-3	10/07/81	0.67	0.84		Hydrojet Water Stimulation				
K-9	10/09/81	1.14	1.14		Chemical Stimulation				
M-9	10/12/81	1.10	1.15		Chemical Stimulation				
OO-15	10/14/81	1.14	1.14		Chemical Stimulation				
QQ-15	10/16/81	1.14	1.46		Chemical Stimulation				
II-13	8/26/82	0.21	1.04	H	1,000	460	2,300	10-20	

MARATHON OIL COMPANY
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TABLE 2

Oil Well Stimulation Results

Well No.	Treatment Date	Test Data: Test Prior BO/D	Test Prior BW/D	Test Prior BF/D	Test After BO/D	Test After BW/D	Test After BF/D	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Gelled Water Body (Gal.)	Sand Pounds	Sand Mesh	Sand Removed From Well Lbs.	Comments
XA-10	2/10/77	0.0	0.0	0.0	0.4	0.2	0.6	H	1,600	250	1,000	10-20	285	
XA-12	2/10/77	N/A	N/A	4.2	15.5	3.7	19.2	H	1,600	300	1,200	10-20	70	
B-6	2/11/77	0.0	0.0	0.0	0.9	2.4	3.3	H	1,600	250	1,000	10-20	200	
F-0	2/14/77	N/A	N/A	4.2	5.1	14.0	19.1	H	1,600	250	1,000	10-20	350	
J-14	2/14/77	N/A	N/A	12.0	3.2	98.4	101.6	H	1,600	550	1,000	10-20	200	
B-8	2/17/77	6.0	0.0	6.0	8.8	7.2	16.0	L	1,600	250	2,200	10-20	72	
B-10	2/17/77	0.0	0/0	0.0	0.0	0.0	0.0	I	1,600	250	1,000	10-20	500	Sanded Out
F-12	2/17/77	N/A	N/A	6.4	1.7	10.1	11.8	L	1,600	250	1,000	10-20	115	
F-14	2/28/77	N/A	N/A	2.4	2.9	8.2	11.1	L	1,600	250	1,000	10-20	N/A	
H-2	2/28/77	N/A	N/A	11.5	1.9	18.9	20.8	L	1,600	450	1,800	10-20	142	
J-12	3/01/77	N/A	N/A	4.2	4.4	72.3	76.7	H	1,600	350	1,400	10-20	N/A	
B-16	3/04/77	0.4	14.2	14.6	4.4	101.6	106.0	L	1,600	450	1,800	10-20	N/A	
F-4	3/07/77	N/A	N/A	19.2	0.2	19.8	20.0	L	1,600	250	1,000	10-20	100	
F-10	3/08/77	N/A	N/A	13.5	0.4	10.6	11.0	L	1,600	350	1,400	10-20	75	
D-0	3/18/77	0.5	10.8	11.3	0.9	77.4	78.4	L	1,600	250	1,000	10-20	225	
AA-11	3/16/77	N/A	N/A	24.0	0.8	88.8	89.6	H	1,600	500	2,000	10-20	140	
D-4	3/28/77	N/A	N/A	92.6	11.3	63.4	74.7	H	1,600	250	1,000	10-20	N/A	
JJ-12	3/16/77	0.9	27.9	28.8	8.9	73.6	82.5	H	1,600	450	1,900	10-20	200	
JJ-14	3/22/77	0.0	2.4	2.4	0.9	8.1	9.0	H	1,600	325	1,300	10-20	150	
DD-10	3/23/77	2.0	0.0	2.0	0.3	10.1	10.4	H	1,600	250	1,000	10-20	143	
LL-14	3/28/77	0.1	2.3	2.4	0.6	17.8	18.4	H	1,600	325	1,300	10-20	500	
DD-14	3/31/77	4.4	54.6	59.0	8.9	97.3	106.2	H	1,600	775	3,100	10-20	N/A	

H = Fractured with high viscosity fluid.
L = Fractured with low viscosity fluid.

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

TABLE 2

Oil Well Stimulation Results (Continued)

Well No.	Treatment Date	Test Data: Test Prior BO/D	Test Prior BW/D	Test Prior BF/D	Test After BO/D	Test After BW/D	Test After BF/D	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Gelled Water Body (Gal.)	Sand Pounds	Sand Mesh	Sand Removed From Well Lbs.	Comments
PP-14	4/01/77	0.6	27.2	27.8	0.0	94.3	94.3	H	1,600	775	3,100	10-20	200	
PP-16	4/01/77	0.5	23.5	24.0	3.7	84.8	88.5	H	1,600	625	2,500	10-20	300	
DD-16	4/06/77	0.2	22.8	23.0	8.1	142.0	150.1	H	1,600	475	1,900	10-20	N/A	
RR-14	4/07/77	0.3	1.1	1.4	9.0	9.4	18.4	H	1,600	400	1,600	10-20	75	
TT-4	4/07/77	0.4	4.7	5.1	11.8	54.6	66.4	H	1,600	550	2,200	10-20	30	
TT-6	4/13/77	0.4	15.3	15.7	4.7	90.2	94.9	H	1,600	475	1,900	10-20	100	
FF-18	4/13/77	0.2	16.8	7.0	3.0	94.6	97.6	H	1,600	775	3,100	10-20	240	
FF-20	4/15/77	0.4	0.1	0.5	6.5	5.5	12.0	H	1,600	250	1,000	10-20	N/A	
HH-16	4/15/77	0.0	10.3	10.3	17.5	56.1	73.6	H	1,600	400	1,600	10-20	145	
RR-6	4/18/77	0.8	4.5	5.3	3.5	92.5	96.0	H	1,600	400	1,600	10-20	100	
DD-18	4/18/77	0.0	22.3	22.3	3.7	90.7	94.4	H	1,600	475	1,900	10-20	N/A	
FF-16	4/21/77	1.0	12.8	13.8	6.0	129.7	135.7	H	1,600	550	2,200	10-20	100	
H-14	4/21/77	0.0	13.6	13.6	0.5	39.5	40.0	H	1,600	350	1,400	10-20	N/A	
J-4	4/25/77	1.5	16.0	17.5	0.5	93.9	94.4	H	1,600	450	1,800	10-20	200	
RR-4	4/25/77	0.8	11.2	12.0	3.3	32.7	36.0	H	1,600	700	2,800	10-20	100	
H-10	4/27/77	0.2	12.6	12.8	3.7	96.6	100.3	H	1,600	350	1,400	10-20	50	
B-12	4/28/77	3.0	5.0	8.0	16.2	19.2	35.4	H	1,600	400	1,600	10-20	75	
R-4	4/29/77	N/A	N/A	N/A	N/A	N/A	N/A	H	1,600	300	1,200	10-20	N/A	Sanded Out
J-0	4/29/77	2.0	15.6	17.6	1.6	20.8	22.4	H	1,600	450	1,800	10-20	N/A	Sanded Out
H-12	5/03/77	0.6	12.0	12.6	1.4	81.1	82.5	H	1,600	300	1,200	10-20	N/A	
R-4	5/06/77	0.3	10.1	10.4	6.6	34.7	41.3	H	1,600	300	1,200	10-20	N/A	Re-Fracture
H-4	5/09/77	0.3	21.3	21.6	0.0	70.8	70.8	H	1,600	450	1,800	10-20	N/A	

H = Fractured with high viscosity fluid.
L = Fractured with low viscosity fluid.

MARATHON OIL COMPANY
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TABLE 2

Oil Well Stimulation Results (Continued)

Well No.	Treatment Date	Test Data: Test Prior BO/D	Test Prior BW/D	Test Prior BF/D	Test After BO/D	Test After BW/D	Test After BF/D	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Gelled Water Body (Gal.)	Sand Pounds	Sand Mesh	Sand Removed From Well Lbs.	Comments
L-2	5/09/77	0.2	16.9	17.1	0.5	31.0	31.5	H	1,600	750	3,000	10-20	1,500	
F-6	5/13/77	0.3	12.5	12.8	4.4	125.3	129.7	H	1,600	450	1,800	10-20	300	
N-2	5/16/77	1.0	18.1	19.1	2.2	109.9	112.1	H	1,600	550	2,200	10-20	N/A	
R-12	5/17/77	1.0	24.6	25.6	23.6	82.5	106.1	H	1,600	650	2,600	10-20	N/A	
D-6	5/18/77	2.8	24.4	27.2	3.0	114.9	117.9	H	1,600	450	1,800	10-20	N/A	
N-4	5/20/77	5.8	28.7	34.5	23.6	82.5	106.1	H	1,600	550	2,200	10-20	N/A	
D-2	5/23/77	1.4	8.2	9.6	2.3	21.1	23.4	H	1,600	250	1,000	10-20	100	
R-6	5/24/77	0.1	9.0	9.1	3.7	61.2	64.9	H	1,600	450	1,800	10-20	100	
N-6	5/25/77	2.8	53.8	56.6	4.4	90.0	94.4	H	1,600	1100	4,400	10-20	125	
H-0	5/27/77	10.1	30.3	40.4	23.6	70.8	94.4	H	1,600	450	1,800	10-20	N/A	
R-8	5/31/77	0.0	16.8	16.8	1.5	92.8	94.3	H	1,600	550	2,200	10-20	N/A	
N-8	6/01/77	1.9	221.1	224.0	1.5	128.2	129.7	H	1,600	950	3,800	10-20	200	
HH-12	6/03/77	0.3	7.7	8.0	1.5	81.0	82.5	H	1,600	350	1,400	10-20	N/A	
H-6	6/27/77	0.4	6.3	6.7	0.0	109.5	109.5	H	1,600	500	2,000	10-20	300	
T-6	6/28/77	0.0	5.3	5.3	3.0	44.2	47.2	H	1,600	400	1,600	10-20	N/A	
XA-10	6/09/77	0.0	0.0	0.0	0.0	0.0	0.0	H	1,600	400	1,600	10-20	500	Re-Fracture
B-10	6/27/77	0.0	0.0	0.0	0.0	0.0	0.0	H	1,600	500	2,000	10-20	N/A	Re-Fracture
T-12	7/05/77	0.7	40.9	41.6	0.6	60.7	61.3	H	1,600	600	2,400	10-20	N/A	
H-8	7/06/77	0.0	9.3	9.3	3.0	91.3	94.3	H	1,600	450	1,800	10-20	50	
R-14	7/08/77	1.1	17.3	18.4	10.4	69.6	80.0	H	1,600	900	3,600	10-20	100	
V-6	7/11/77	2.4	3.1	5.5	1.1	11.0	12.1	H	1,600	350	1,400	10-20	N/A	
FF-12	7/12/77	0.0	14.4	14.4	1.5	81.0	82.5	H	1,600	450	1,800	10-20	350	

H = Fractured with high viscosity fluid.
L = Fractured with low viscosity fluid.

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TABLE 2

Oil Well Stimulation Results (Continued)

Well No.	Treatment Date	Test Data: Test Prior BO/D	Test Prior BW/D	Test Prior BF/D	Test After BO/D	Test After BW/D	Test After BF/D	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Gelled Water Body (Gal.)	Sand Pounds	Sand Mesh	Sand Removed From Well Lbs.	Comments
TT-10	7/15/77	1.5	8.5	10.0	8.3	27.7	36.0	H	1,600	550	2,200	10-20	N/A	
TT-8	7/15/77	0.2	3.8	4.0	0.3	26.1	26.4	H	1,600	550	2,200	10-20	100	
L-12	7/18/77	0.5	17.9	18.4	0.5	21.1	21.6	H	1,600	500	2,000	10-20	350	
J-6	7/21/77	0.6	18.0	18.6	0.0	16.0	16.0	H	1,600	500	2,000	10-20	100	
A R Smith														
35	7/25/77	1.4	8.1	9.5	11.8	76.7	88.5	H	1,600	1000	4,000	10-20	350	
J-8	7/28/77	1.5	17.7	19.2	1.5	22.1	23.6	H	1,600	500	2,000	10-20	70	
A R Smith														
36	8/03/77	0.5	54.5	55.0	1.3	102.2	103.5	H	1,600	100	4,000	10-20	N/A	
Brubaker-Prier Fee														
18	8/04/77	0.2	0.1	0.3	0.0	26.8	26.8	H	1,600	1100	4,400	10-20	200	
N-10	8/12/77	0.3	31.7	32.0	0.6	30.9	31.5	H	1,600	1250	1,500	10-20	900	
RR-12	10/28/77	0.0	27.5	27.5	2.0	80.5	82.5	H	1,600	620	2,500	10-20	50	
RR-14	11/03/77	2.3	5.7	8.0	5.0	11.8	16.8	H	1,600	465	1,860	10-20	N/A	
PP-12	11/10/77	0.8	24.5	25.3	3.0	85.5	88.5	H	1,600	625	2,500	10-20	N/A	
TT-2	11/15/77	0.4	4.1	4.5	0.5	4.2	4.7	H	1,600	970	3,880	10-20	200	
NN-12	11/17/77	0.3	27.8	28.1	5.9	79.7	85.6	H	1,600	515	2,100	10-20	100	
DD-10	11/22/77	0.0	7.1	7.1	8.1	48.0	56.1	H	1,600	380	1,520	10-20	100	Re-Fracture
RR-4	11/30/77	6.1	9.2	15.3	8.9	23.6	32.5	H	1,600	700	2,800	10-20	900	Re-Fracture
HH-14	12/15/77	0.0	7.2	7.2	0.7	70.1	70.8	H	1,600	850	3,400	10-20	N/A	
FF-14	5/19/78	0.6	8.9	9.5	0.0	86.4	86.4	H	1,600	900	3,600	10-20	N/A	
HH-18	5/20/78	0.0	9.4	9.4	0.0	82.6	82.6	H	1,300	760	3,000	10-20	N/A	
LL-14	5/22/78	0.0	7.2	7.2	1.5	45.7	42.7	H	1,600	400	1,600	10-20	N/A	Re-Fracture
JJ-14	5/22/78	0.2	11.1	11.3	5.9	48.7	54.6	H	1,600	400	1,600	10-20	N/A	Re-Fracture

H = Fractured with high viscosity fluid.
L = Fractured with low viscosity fluid.

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TABLE 2

Oil Well Stimulation Results (Continued)

Well No.	Treatment Date	Test Data: Test Prior BO/D	Test Prior BW/D	Test Prior BF/D	Test After BO/D	Test After BW/D	Test After BF/D	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Gelled Water Body (Gal.)	Sand Pounds	Sand Mesh	Sand Removed From Well Lbs.	Comments
F-2	12/10/79	2.1	5.9	8.0	16.7	14.7	31.4	H	1,600	300	1,200	10-20	495	
F-8	1/29/80	0.5	15.7	16.2	0.5	16.3	16.8	H	1,600	450	1,800	10-20	N/A	
J-10	1/30/80	1.0	7.6	8.6	6.6	137.7	144.3	H	1,600	500	2,000	10-20	660	
L-6	1/16/80	2.6	19.0	21.6	29.5	82.5	112.0	H	1,600	1175	4,700	10-20	330	
L-10	1/23/80	1.2	30.8	32.0	11.8	92.7	104.5	H	1,600	950	3,800	10-20	330	
P-10	1/23/80	3.7	61.2	64.9	7.4	134.1	141.5	H	1,600	1175	4,700	10-20	660	
R-0	1/17/80	0.7	15.0	15.7	10.3	153.7	164.0	H	1,600	475	1,500	10-20	330	
R-10	1/24/80	1.5	54.5	56.0	11.8	129.7	141.5	H	1,600	1150	4,500	10-20	495	
V-2	1/17/80	1.5	19.5	21.0	17.7	135.6	153.3	H	1,600	400	1,600	10-20	330	
LL-12	1/08/80	0.7	67.2	67.9	1.5	151.8	153.3	H	1,600	826	3,300	10-20	825	
H-2	9/18/80	1.4	5.5	6.9	7.4	28.0	35.4	H	1,600	700	2,800	10-20	N/A	Re-fracture
F-4	9/19/80	0.2	0.8	1.0	1.0	8.6	9.6	H	1,600	325	1,300	10-20	N/A	Re-fracture
J-0	9/25/80	1.2	8.7	9.9	2.8	8.5	11.3	H	1,600	714	2,857	10-20	N/A	Re-fracture
L-4	9/25/80	2.2	22.8	25.0	17.7	128.2	145.9	H	1,600	798	3,192	10-20	N/A	
L-0	9/29/80	0.6	13.3	13.9	5.9	156.2	162.1	H	1,600	750	3,000	10-20	N/A	
R-2	9/30/80	1.0	12.6	13.6	14.8	179.0	193.8	H	1,600	420	1,680	10-20	N/A	
L-8	9/30/80	3.7	19.7	23.4	19.2	79.5	98.7	H	1,600	1320	5,280	10-20	N/A	
D-8	10/03/80	0.9	7.4	8.3	3.3	9.9	13.2	H	1,600	900	3,600	10-20	N/A	
V-8	10/03/80	0.5	6.9	7.4	14.8	86.9	101.7	H	1,600	600	2,400	10-20	N/A	
F-10	10/08/80	0.6	6.1	6.7	1.9	13.5	15.4	H	1,600	550	2,200	10-20	N/A	Re-fracture
T-14	10/08/80	1.5	18.1	19.6	4.4	194.6	199.0	H	1,600	1200	4,800	10-20	N/A	
P-12	10/09/80	1.0	38.2	39.2	7.4	92.8	100.2	H	1,600	1380	5,520	10-20	N/A	
B-14	10/15/80	3.9	29.7	33.6	32.4	143.0	175.4	H	1,600	900	3,600	10-20	N/A	

H = Fractured with high viscosity fluid.
L = Fractured with low viscosity fluid.

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

TABLE 2

Oil Well Stimulation Results (Continued)

Well No.	Treatment Date	Test Data: Test Prior BO/D	Test Prior BW/D	Test Prior BF/D	Test After BO/D	Test After BW/D	Test After BF/D	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Gelled Water Body (Gal.)	Sand Pounds	Sand Mesh	Comments
XA-14	11/30/81	4.6	12.1	16.7	19.2	92.8	112.0	H	1,600	800	4,000	10-20	
B-4	11/11/81	0.1	2.5	2.6	0.5	13.9	14.4	H	1,600	350	1,750	10-20	
B-6	11/16/81	0.6	0.9	1.5	0.2	1.7	1.9	H	1,600	300	1,500	10-20	Re-Fracture
D-0	11/19/81	1.0	5.9	6.9	10.3	57.7	67.8	H	1,600	300	1,500	10-20	Re-Fracture
D-2	11-23-81	2.4	6.9	9.3	3.0	30.9	33.9	H	1,600	300	1,500	10-20	Re-Fracture
D-8	11-30-81	1.8	9.9	11.7	7.4	44.2	51.6	H	1,600	550	2,750	10-20	Re-Fracture
F-8	12/03/81	0.7	24.3	25.0	1.5	29.5	31.0	H	1,600	300	1,500	1,020	Re-Fracture
F-14	11/23/81	0.2	5.9	6.1	3.0	50.1	53.1	H	1,600	300	1,500	10-20	Re-Fracture
H-8	11/17/81	1.8	12.4	14.1	8.8	81.1	89.9	H	1,600	300	1,500	10-20	Re-Fracture
H-10	11/13/81	1.3	15.0	16.3	4.4	42.8	47.2	H	1,600	300	1,500	10-20	Re-Fracture
J-10	11/10/81	2.0	8.7	10.7	7.4	61.9	69.3	H	1,600	700	3,500	10-20	Re-Fracture
P-0	10/29/81	1.6	13.0	14.6	7.4	114.9	122.3	H	1,600	300	1,500	10-20	Re-Fracture, Scale
P-4	10/20/81	2.6	26.4	29.0	20.6	100.3	120.9	H	1,600	800	4,000	10-20	
R-4	10/14/81	1.2	7.9	9.1	3.0	20.6	23.6	H	1,600	300	1,500	10-20	Re-Fracture
R-6	10/15/81	5.9	29.5	35.4	10.3	42.8	53.1	H	1,600	350	1,750	10-20	Re-Fracture
T-2	10/27/81	0.1	0.7	0.8	5.9	45.7	51.6	H	1,600	500	2,500	10-20	Scale
T-4	10/30/81	1.5	9.0	10.5	5.9	50.1	56.0	H	1,600	300	1,500	10-20	
T-8	11/04/81	3.0	24.8	27.8	25.1	141.5	166.6	H	1,600	420	2,100	10-20	
V-4	10/15/81	2.1	10.4	12.5	16.2	64.9	81.1	H	1,600	300	1,500	10-20	
FF-20	11/16/81	0.3	0.0	0.3	2.5	3.8	6.3	H	1,600	300	1,500	10-20	Re-Fracture
HH-16	11/19/81	3.4	18.7	22.1	11.8	36.8	48.6	H	1,600	300	1,500	10-20	Re-Fracture
HH-20	11/09/81	3.0	0.8	3.8	13.3	14.7	28.0	H	1,600	300	1,500	10-20	Re-Fracture
RR-2	10/14/81	2.3	9.6	11.9	13.3	69.2	82.5	H	1,600	400	2,000	10-20	
RR-8	11/09/81	5.9	30.9	36.8	7.4	104.6	112.0	H	1,600	500	2,500	10-20	
RR-10	11/03/81	1.6	26.0	27.6	7.4	59.0	66.4	H	1,600	450	2,250	10-20	

H = Fractured with high viscosity fluid.
L = Fractured with low viscosity fluid.

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
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TABLE 2

Oil Well Stimulation Results (Continued)

Well No.	Treatment Date	Test Data: Test Prior BO/D	Test Prior BW/D	Test Prior BF/D	Test After BO/D	Test After BW/D	Test After BF/D	Fracture Fluid Viscosity	Treatment Size: Gelled Water Pad (Gal.)	Gelled Water Body (Gal.)	Sand Pounds	Sand Mesh	Comments
B-12	08/09/82	1.9	17.1	19.0	10.3	104.7	115.0	H	1,000	500	2,500	10-20	Re-fracture
H-6	08/24/82	1.4	19.0	20.4	4.4	54.6	59.0	H	1,000	485	2,425	10-20	Re-fracture
H-12	08/11/82	0.6	12.0	12.6	7.4	81.0	88.4	H	1,000	470	2,350	10-20	Re-fracture
J-4	08/04/82	3.0	37.8	40.8	8.8	67.8	76.6	H	1,000	500	2,500	10-20	Re-fracture
J-6	08/19/82	2.0	28.2	30.2	7.4	50.1	57.5	H	1,000	480	2,400	10-20	Re-fracture
J-12	08/06/82	0.8	15.0	15.8	4.4	54.6	59.0	H	1,000	485	2,425	10-20	Re-fracture
J-14	08/16/82	4.4	35.4	39.8	10.3	85.5	95.8	H	1,000	570	2,550	10-20	Re-fracture
N-12	08/10/82	8.8	60.5	69.3	13.3	240.2	253.5	H	1,000	840	4,200	10-20	
P-2	09/21/82	2.3	21.7	24.0	20.2	77.1	97.3	H	1,000	860	4,300	10-20	
P-6	08/27/82	4.4	28.0	32.4	3.0	33.8	36.8	H	1,000	835	4,175	10-20	
R-12	08/13/82	7.3	69.3	76.6	14.7	150.4	165.1	H	1,000	520	2,600	10-20	Re-fracture
T-10	08/30/82	8.0	51.0	59.0	10.3	171.0	181.3	H	1,000	840	4,200	10-20	
T-12	08/23/82	3.1	36.7	39.8	11.8	176.8	188.6	H	1,000	485	2,425	10-20	Re-fracture
DD-12	08/16/82	11.8	57.5	69.3	8.8	265.3	274.1	H	1,000	560	2,800	10-20	Re-fracture
FF-16	08/18/82	8.8	42.8	51.6	8.6	75.4	84.0	H	1,000	500	2,500	10-20	
NN-14	08/24/82	2.2	33.2	35.4	13.2	78.8	92.0	H	1,000	500	2,500	10-20	Re-fracture
PP-14	08/20/82	1.3	15.5	16.8	20.3	113.6	133.9	H	1,000	510	2,550	10-20	

H = Fractured with high viscosity fluid.
L = Fractured with low viscosity fluid.

MARATHON OIL COMPANY
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TABLE 3

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
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TABLE 4

Injection Well Transient Tests
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
S-7	S, F[1]	BU[2]	10.4	8.1	4.8	2.4	4.0	2.4	1.6		2.9		4.0
		FO[2]	7.1	5.3	5.4	2.3	4.0	1.8	1.2		1.6		2.9
GG-13	S, F	BU	7.8	1.0	2.5	0.6	1.8	1.1	2.0	2.2		2.5	
		FO	6.2	3.0	3.5	0.5	2.7	1.2	1.4	1.3		2.1	
C-3	S, F	BU	5.0	1.0	2.3	1.4	1.7	3.8	2.7		1.9		1.6
		FO	6.5	2.5	0.7	0.4	0.4	3.2	2.6		1.2		2.4
QQ-13	F, F	BU	2.7	0.6	0.7	0.9	2.5	3.4	7.5	--*		6.8	
		FO	3.8	0.8	0.6	0.6	2.5	2.3	8.1	*		--*	
O-13	S	BU	5.8	3.2	0.9	1.1	4.5	--*	2.3		2.3		3.4
		FO	5.2	2.2	0.8	1.7	2.8	1.9	2.8		1.4		4.9
I-7	S, F, D	BU	4.6	3.4	1.4	1.7	1.8	1.3	0.6			1.0	0.6
		FO	3.9	3.5	3.7	3.3	2.5	1.2	1.0			0.6	0.4

[1]S Shot
F Fracture
D Decentralized Jetting

[2]BU - Buildup
FO - Falloff

*Data uninterpretable.

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TABLE 5

Injection Well Transient Tests
Skin Factor, S

Well No.	Stimulation	Test	Water 12/76	Slug 4/7	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
S-7	S, F[1]	BU[2]	-4.0	-1/2	-2.1	-3.5	0.7	-2.1	-2.3		0.4		-1.2
		FO[2]	-2.5	0.6	-3.0	-3.2	0.6	-3.3	-2.3		-2.6		-3.0
GG-13	S, F	BU	-2.7	-2.6	3.4	-2.4	-2.2	-2.7	-1.8	-3.4			-2.7
		FO	-3.0	1.4	6.9	-2.6	-0.8	-2.9	-3.3	-3.7			-3.6
C-3	S, F	BU	-3.1	-2.5	1.5	1.6	-0.2	-3.6	-2.1		-2.0		-2.7
		FO	-3.2	3.7	-2.7	-3.8	-4.2	-3.8	-2.3		-3.1		-1.5
QQ-13	F, F	BU	-4.9	-5.1	-4.7	-4.4	-4.1	-4.2	-4.1	--*			-5.3
		FO	-4.8	-5.0	-4.6	-4.7	-4.7	-5.3	-4.7	--*			--*
O-13	S	BU	-4.1	0.7	-2.3	-2.4	2.7	--*	1.8		-2.3		-0.8
		FO	-3.5	-2.0	-3.4	-2.7	-1.3	-3.5	-1.6		-3.4		+0.5
I-7	S, F, D	BU	-3.7	-2.6	-3.1	-2.9	-1.6	-2.0	-2.1		-1.1		-0.8
		FO	-4.0	-2.4	1.0	-0.5	-1.1	-2.4	-1.4		-2.8		-2.2

[1]S - Shot
F - Fracture
D - Decentralized Jetting

[2]BU - Buildup
FO - Falloff

*Data uninterpretable.

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
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TABLE 6

Production Well Transient Tests

Well No.	Test Date	Test Type	Mobility k/u (md/cp)	Skin Factor S	Stimulation
D-4	11/76	BU	6.4	2.4	None
	12/77	BU	1.3	-5.2	Frac
	11/78	BU	1.1	-5.6	
	8/79	BU	0.5	-4.8	
	9/80	BU	0.6	-4.4	
	9/81	BU	0.5	-4.6	
	9/82	BU	0.6	-4.7	
H-8	11/76	BU	2.6	0.9	None
	11/77	BU	5.4	-4.9	Frac
	11/78	BU	2.0	-5.7	
	8/79	BU	3.6	-3.8	
	9/80	BU	0.6	-3.7	
	9/81	BU	0.9	-1.8	
	9/82	BU	0.7	-1.7	
P-12	11/76	BU	11.3	-1.3	Shot
	12/77	BU	4.1	-3.6	Shot
	11/78	BU	1.8	-5.3	
	8/79	BU	2.2	-3.3	
	9/80	BU	1.1	-1.0	
	9/81	BU	2.2	-4.3	Frac
	9/82	BU	3.2	-1.8	
PP-12	11/76	BU	1.9	0.8	None
	11/77	BU	5.9	-6.5	Frac
	11/78	BU	6.2	-6.7	
	8/79	BU	2.0	-5.6	
	9/80	BU	4.4	-3.9	
	9/81	BU	2.0	-4.7	
	9/82	BU	2.5	-3.8	
HH-12	11/76	BU	5.5	1.7	None
	11/77	BU	19.8	-6.4	Frac
	11/78	BU	9.4	-6.3	
	8/79	BU	8.8	-4.9	
	9/80	BU	4.7	-4.5	
	9/81	BU	4.1	-2.0	
	9/82	BU	4.9	+2.6	
T-8	11/76	BU	15.0	*	
	11/77	BU	*	*	
	11/78	BU	4.2	-2.7	
	8/79	BU	5.3	-0.5	
	9/80	BU	1.2	-2.8	
	9/81	BU	1.1	0.1	
	9/82	BU	15.0	-5.3	Frac

BU - Buildup
*Data uninterpretable.

MARATHON OIL COMPANY
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TABLE 7

Well Group Results

		Fluid Mobility k/u·(md/cp)			Fluid Mobility k/u·(md/cp)
S-7	FO	2.9	T-8	FO	15.0
	BU	4.0			
GG-13	FO	2.1	HH-12	BU	4.9
	BU	2.5			
C-3	FO	2.4	D-4	BU	0.6
	BU	1.6			
QQ-13	FO	6.8	PP-12	BU	2.5
O-13	FO	4.9	P-12	BU	3.2
	BU	3.4			
I-7	FO	0.4	H-8	BU	0.7
	BU	0.6			

BU Buildup
FO Falloff

MARATHON OIL COMPANY
MARAFLOOD™ PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
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TABLE 8

M-1 Development Costs

Wells	
New Injectors	$2,277,591
New Producers	2,516,947
Conversions and Reconditionings	142,089
Abandonments and Reabandonments	663,570
Sub Total	$5,600,197
Surface Facilities	
Salt Water Disposal System	$ 222,643
Production Facility and Lead Lines	1,204,388
Injection Facility and Lines	890,172
Staging Area (Roads, Electrical, etc.)	465,306
Sub Total	$2,782,509
Miscellaneous	
Sub Total	$ 525,903
Total Costs	$8,908,609

Unit Breakdown

2.5 Acre = $240,755/10 Acres
5.0 Acre = $184,772/10 Acres

MARATHON OIL COMPANY
MARAFLOOD™ PROCESS - M-1 PROJECT
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TABLE 9

Economic Program Input Summary

Parameter	Value	Basis
Development Costs (10 Acre)		
2.5 Acre	240,755	Actual Cost
5.0 Acre	184,772	Actual Cost
Slug Cost, $/Bbl.	6.05	Actual Cost
Polymer Cost, $/Lb.	1.35	Actual Cost
Water Cost, $/Bbl.	0.12	1981
Injection Costs, $/Bbl.		
Slug	0.38	Average Actual Cost
Mobility Buffer	0.16	1981
Salt Water Disposal	0.03	1981
Operating Costs, $/Inj. Well-Mo.	876	1981
Royalty, %	12.5	Actual
Escalation (after 1981)	Variable	
Crude Oil Price	(pre-1982) Actual (1982) Variable	
Windfall Profit Tax	Variable	60% Tax Rate
Completion Date		
2.5 Acre	1987	Predicted Injectivity
5.0 Acre	1996	Predicted Injectivity
Recovery	Variable	

MARATHON OIL COMPANY
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FIGURE 1

M-1 Project Wells

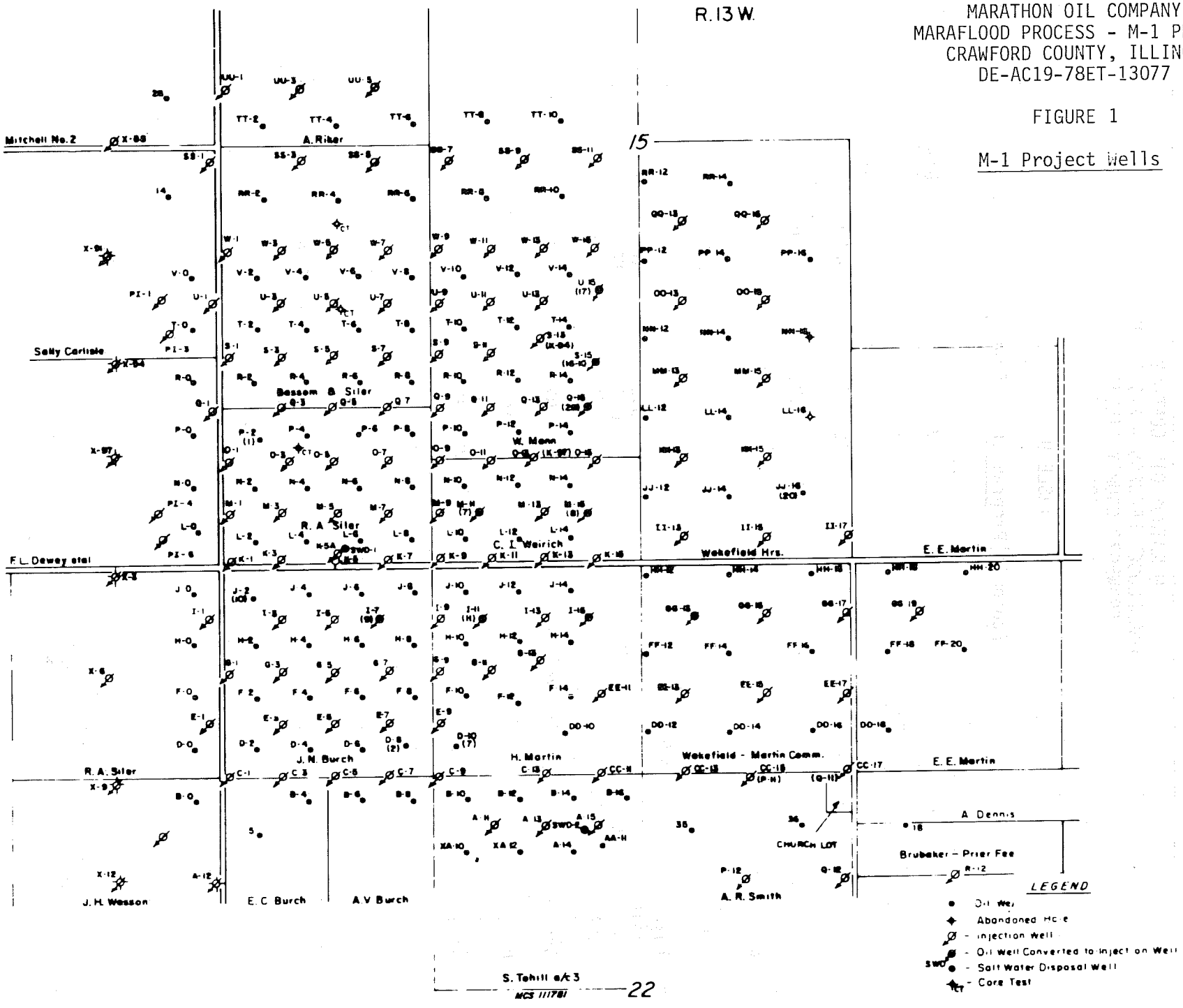

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FIGURE 2

Oil Rate vs. Time

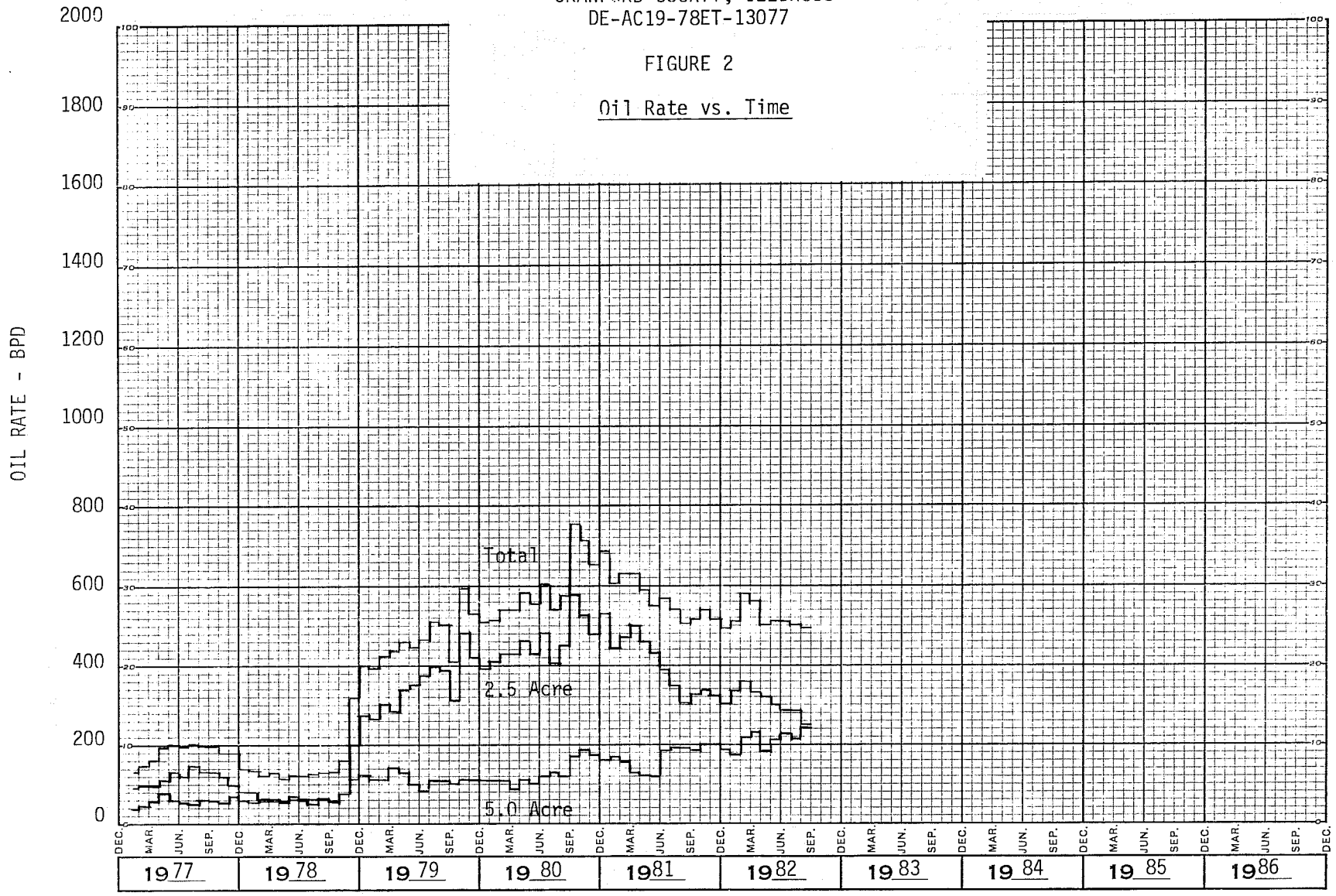

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FIGURE 3

Cumulative Oil vs. Time

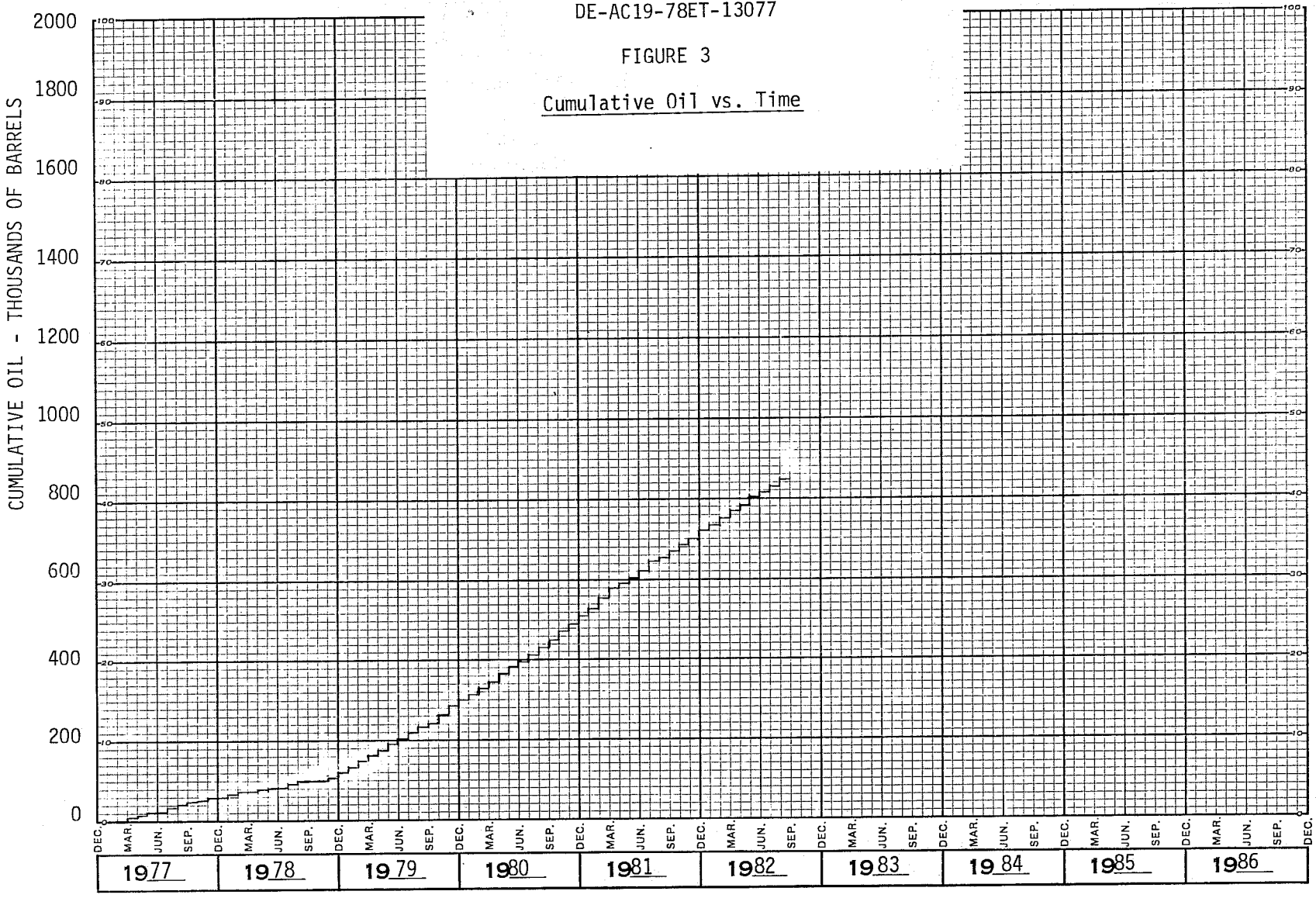

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FIGURE 4

Oil Cut vs. Time

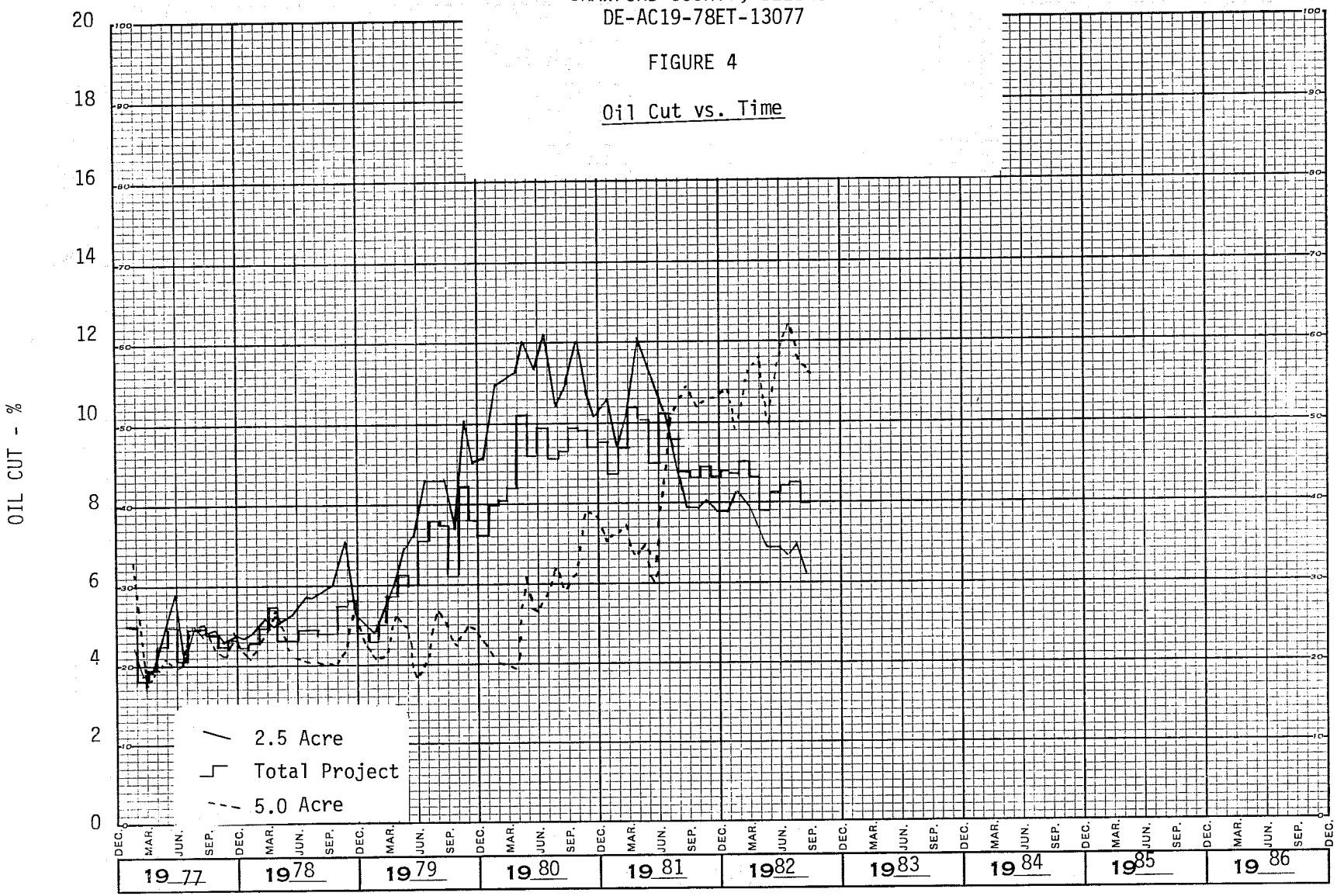

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FIGURE 5
2.5-Acre Spacing

Injection Rate vs. Time
Plant Pressure vs. Time

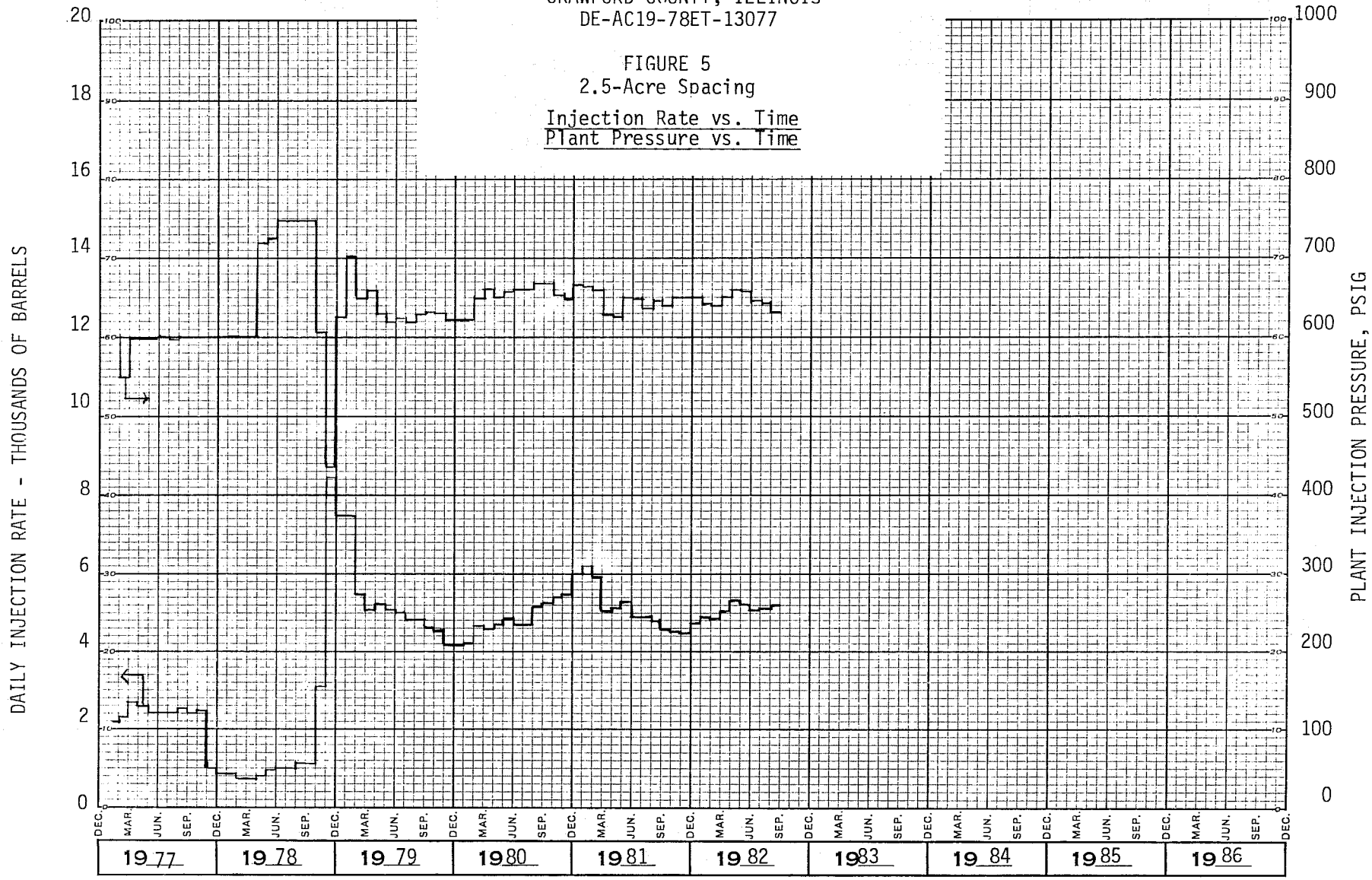

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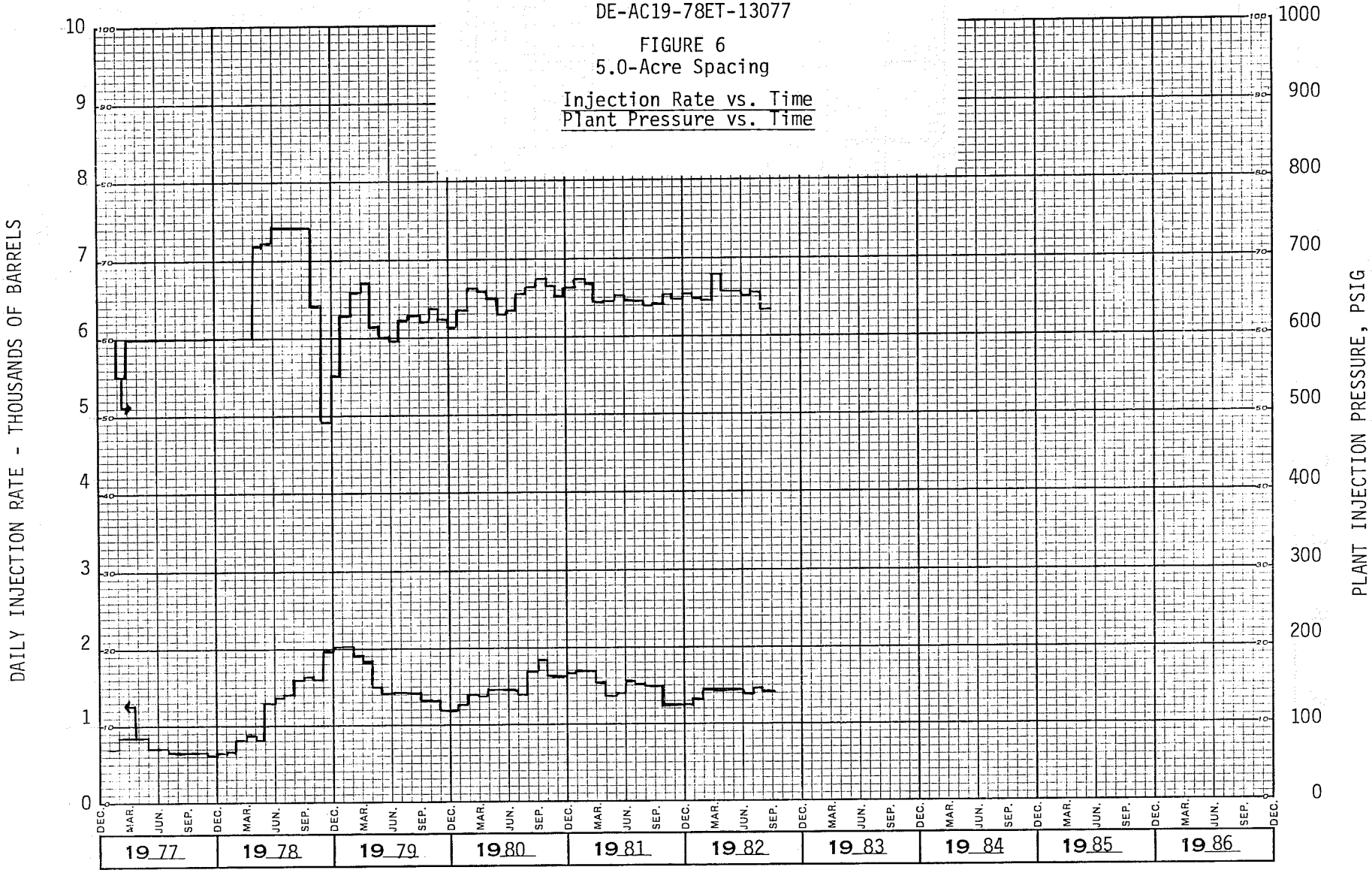
FIGURE 6
5.0-Acre Spacing

Injection Rate vs. Time
Plant Pressure vs. Time

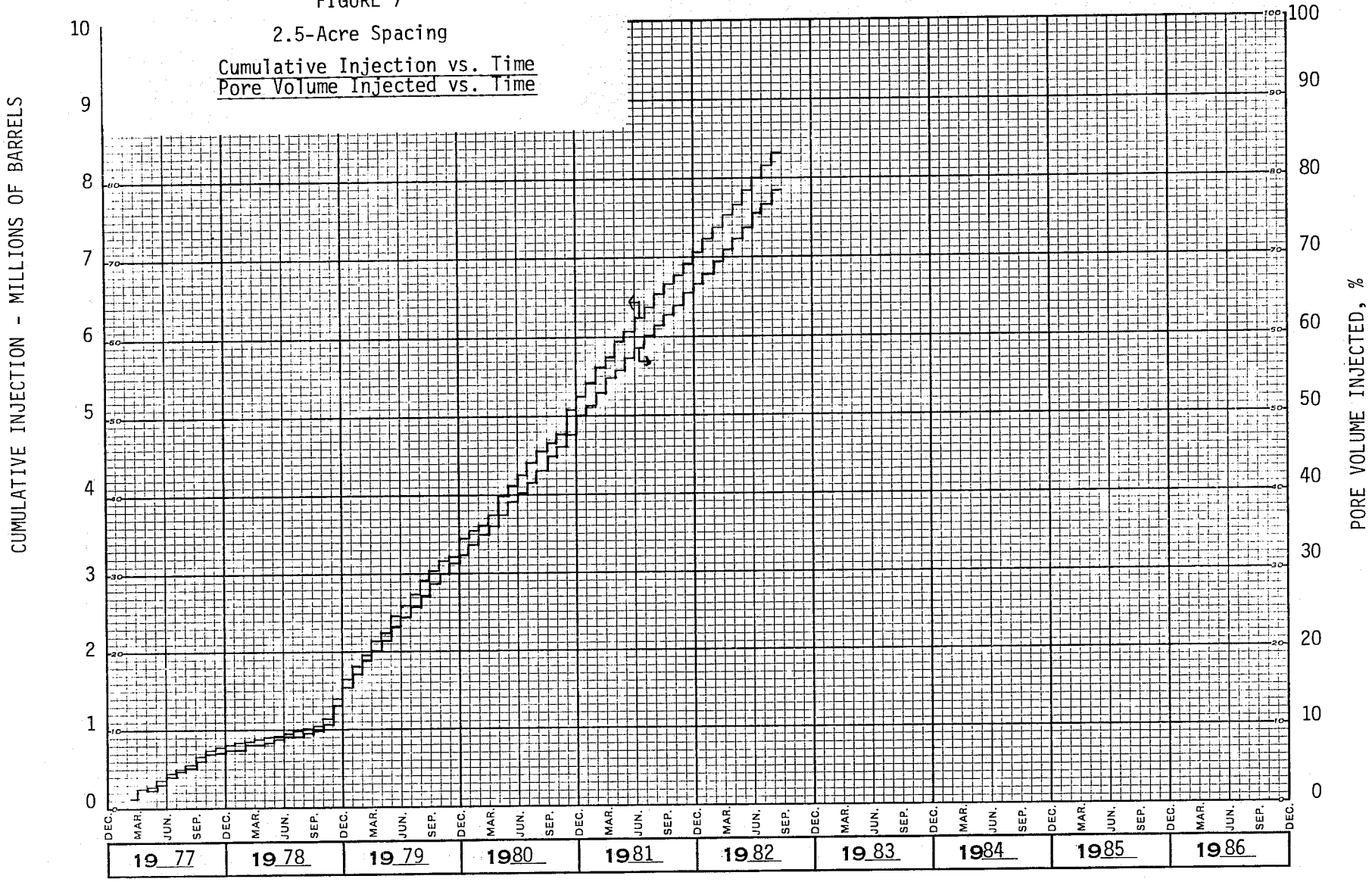


MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 7

2.5-Acre Spacing

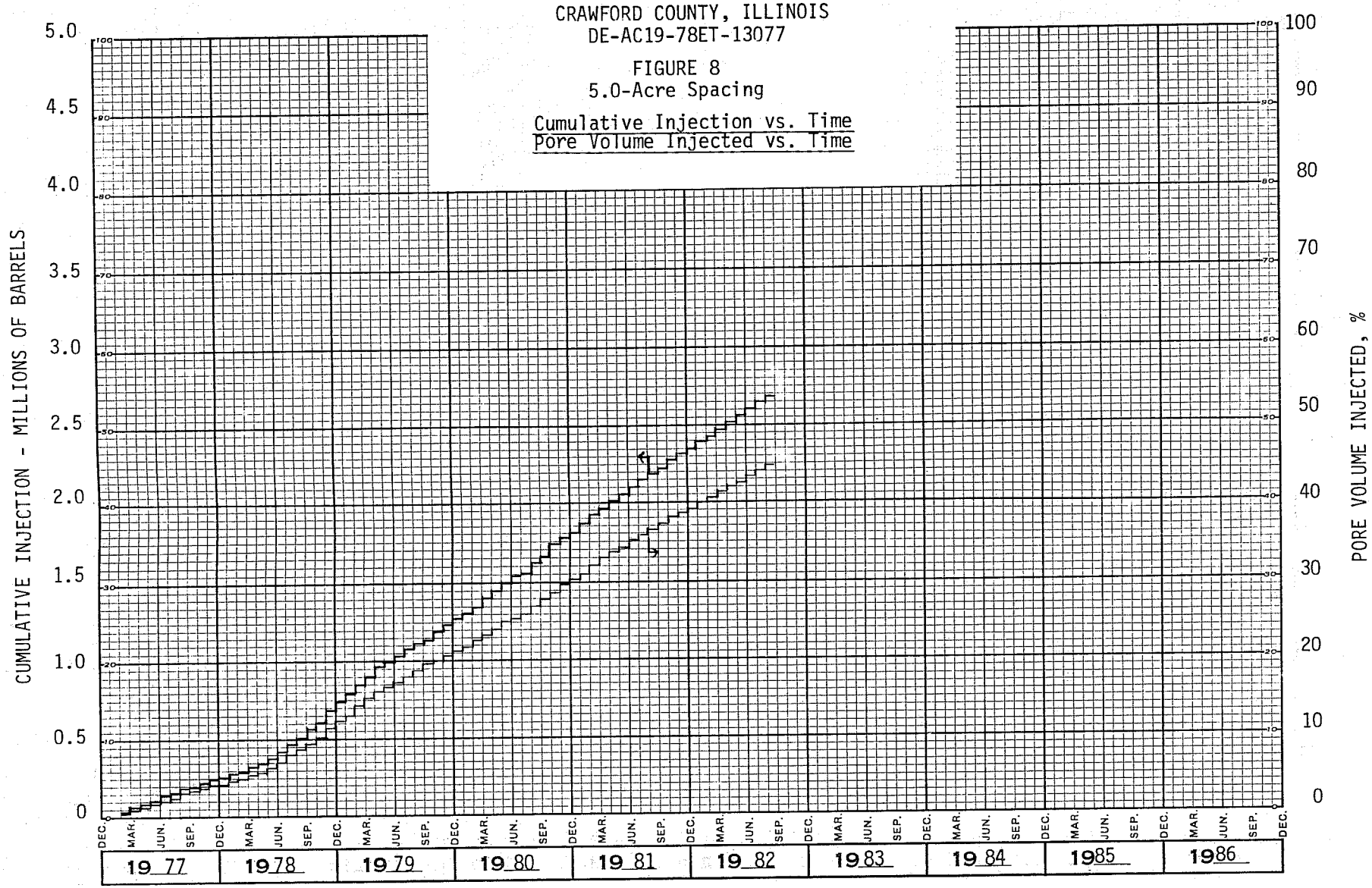
Cumulative Injection vs. Time
Pore Volume Injected vs. Time



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



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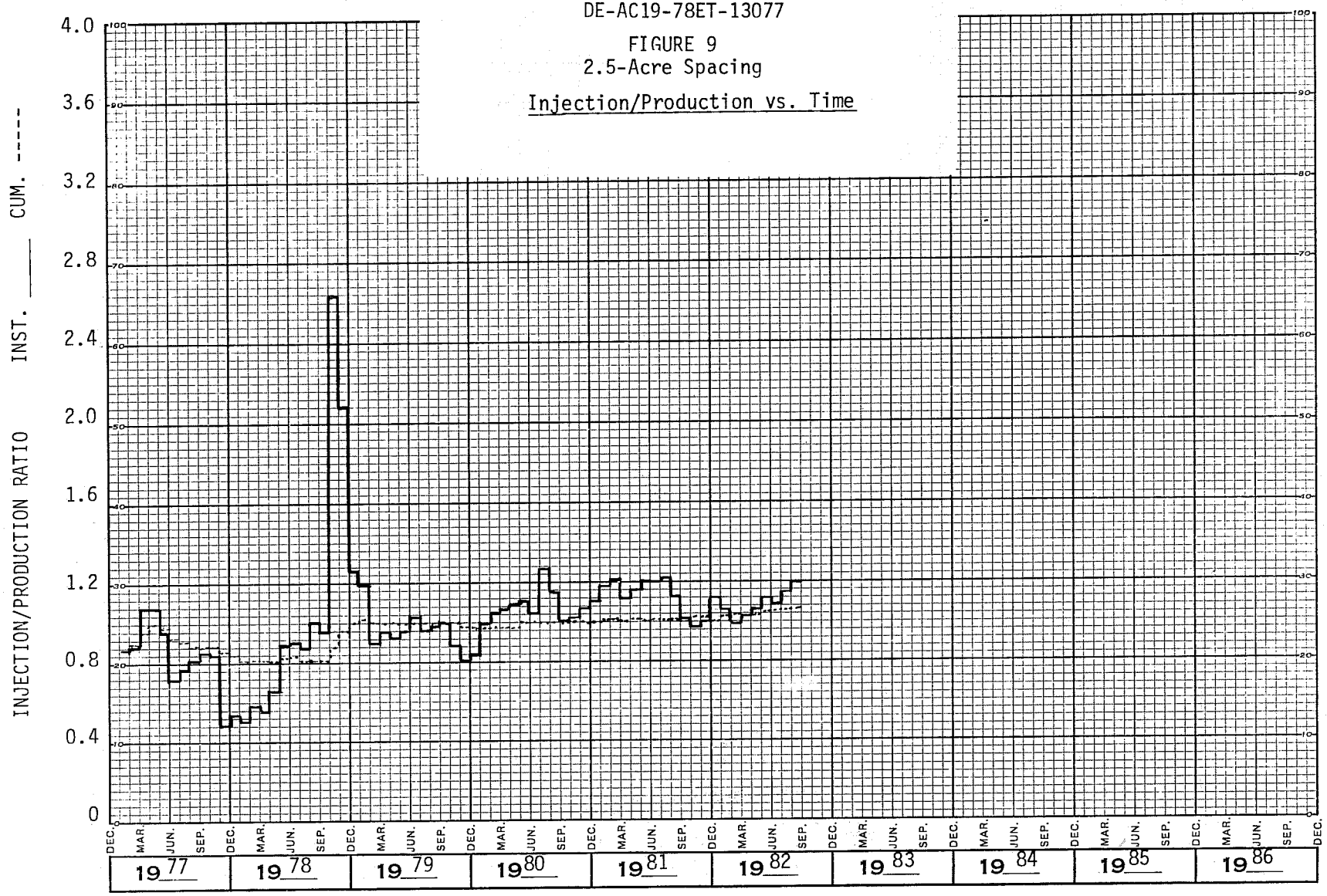
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

FIGURE 9
2.5-Acre Spacing

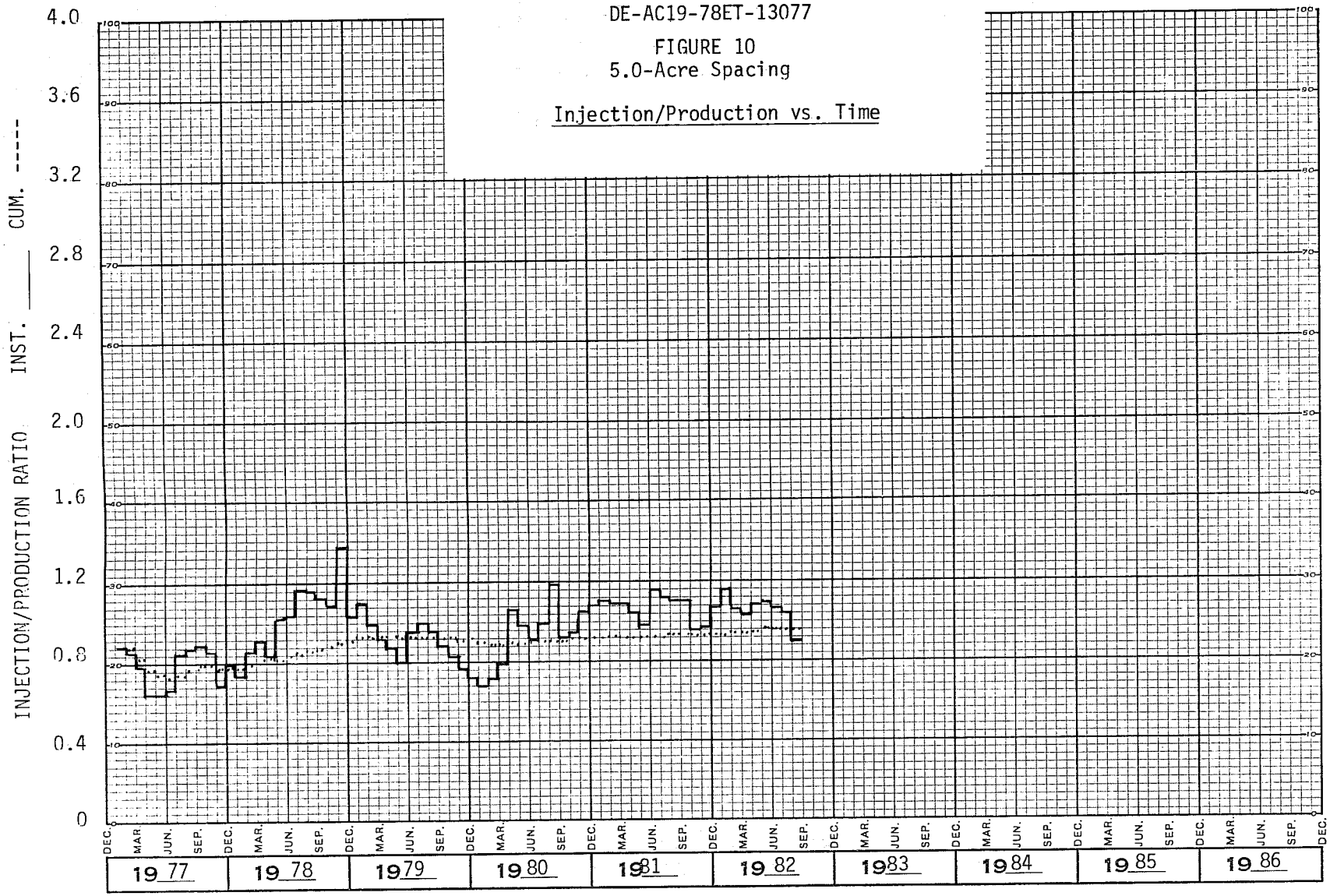
Injection/Production vs. Time

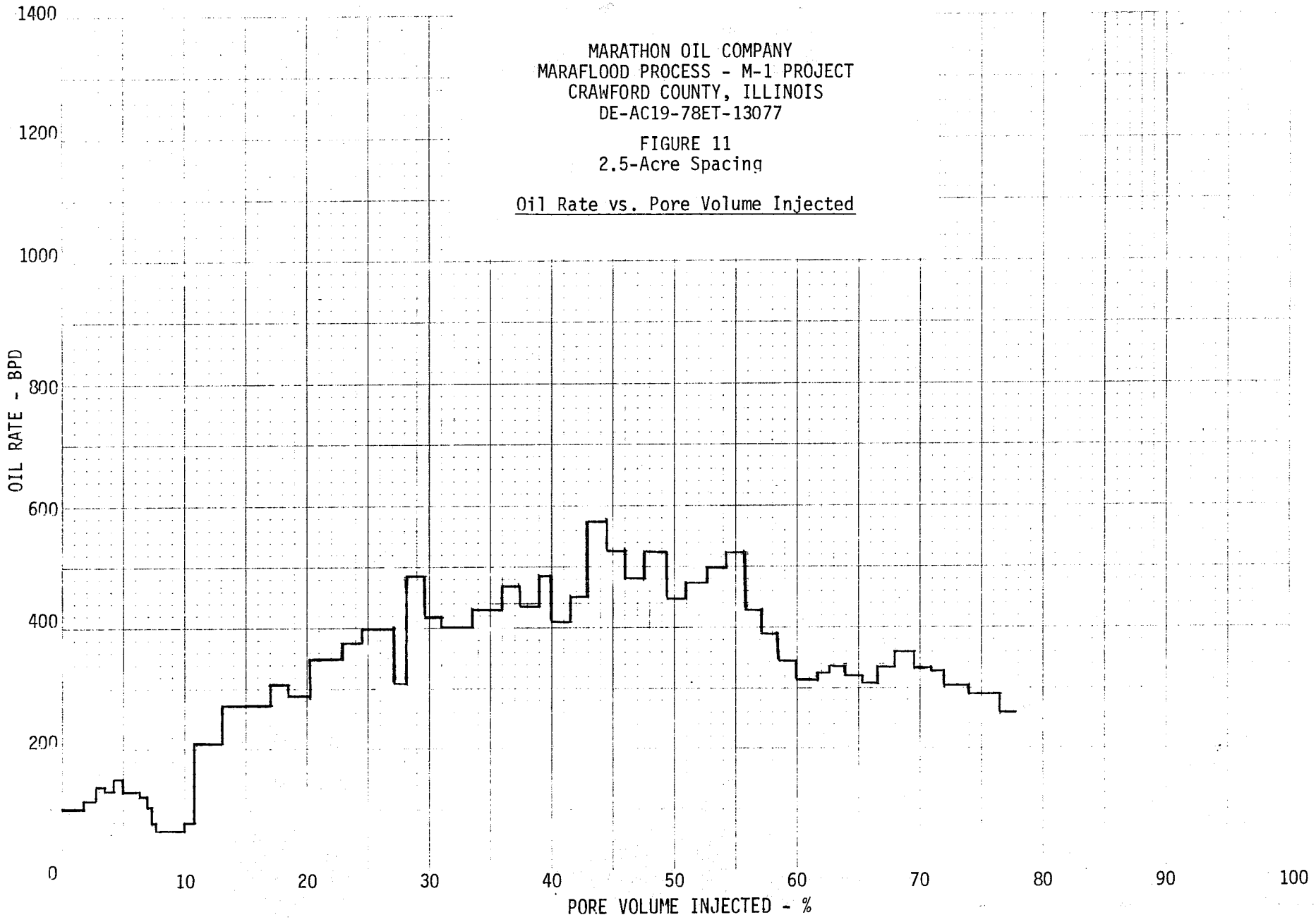


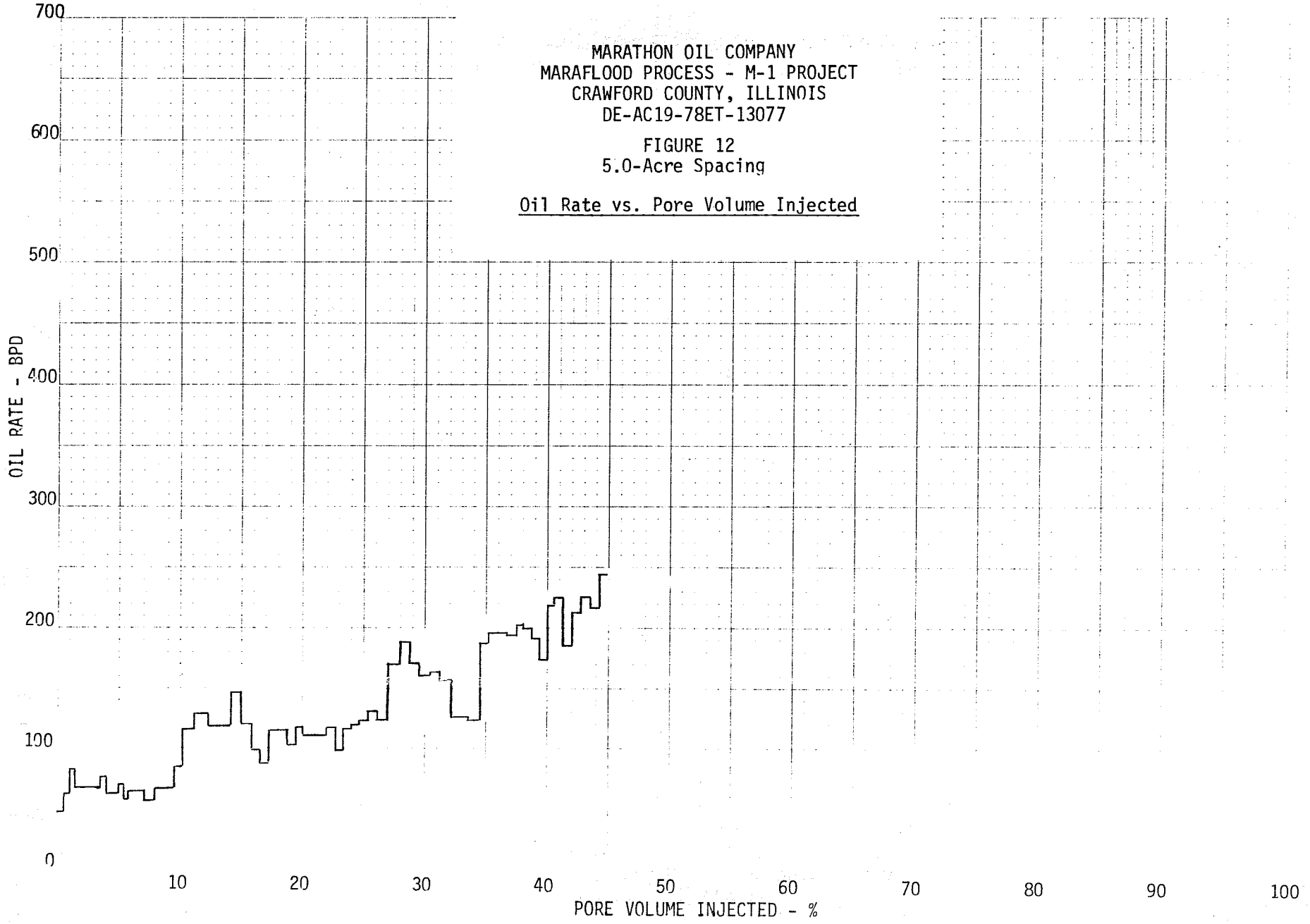
MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077

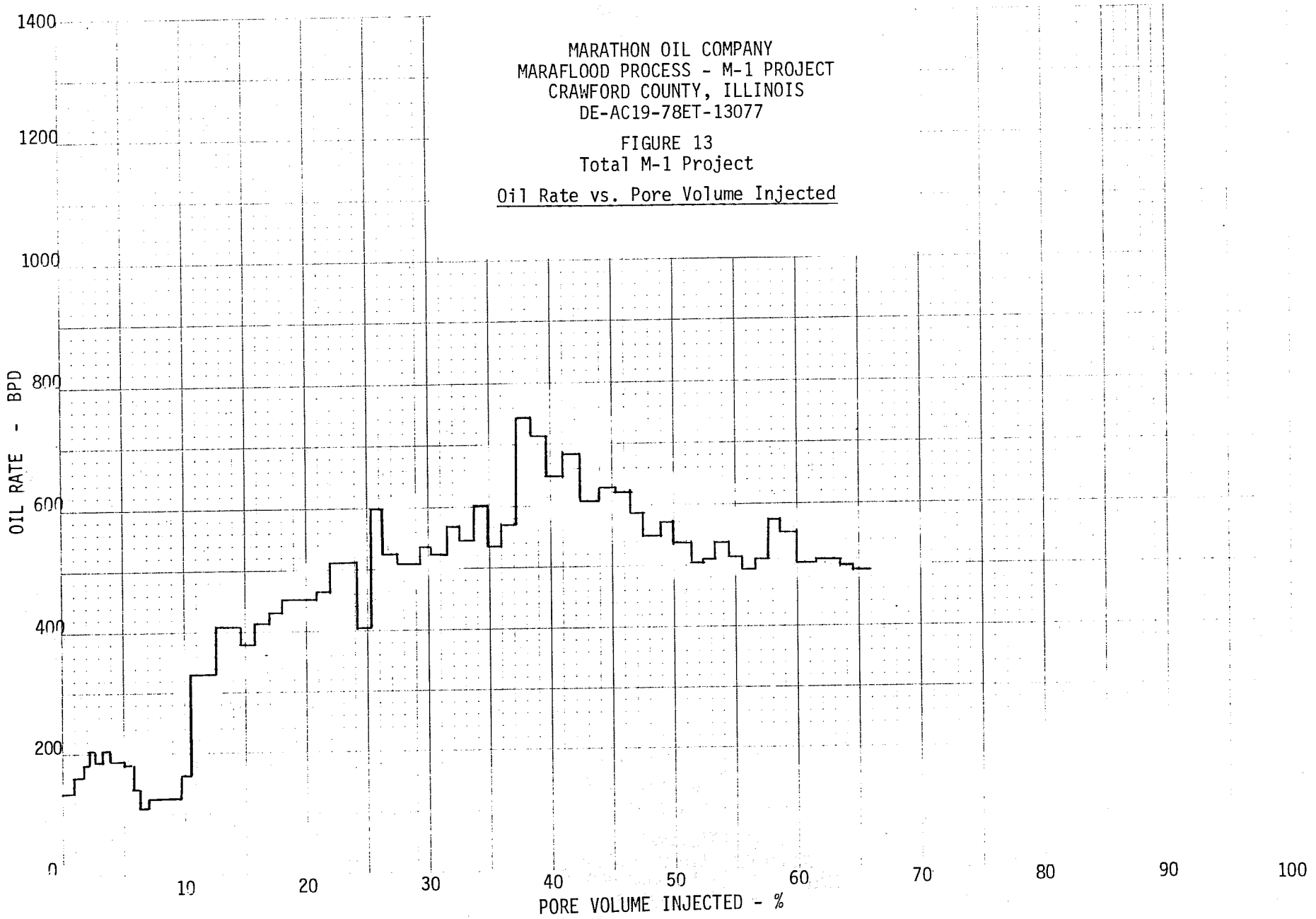
FIGURE 10
5.0-Acre Spacing

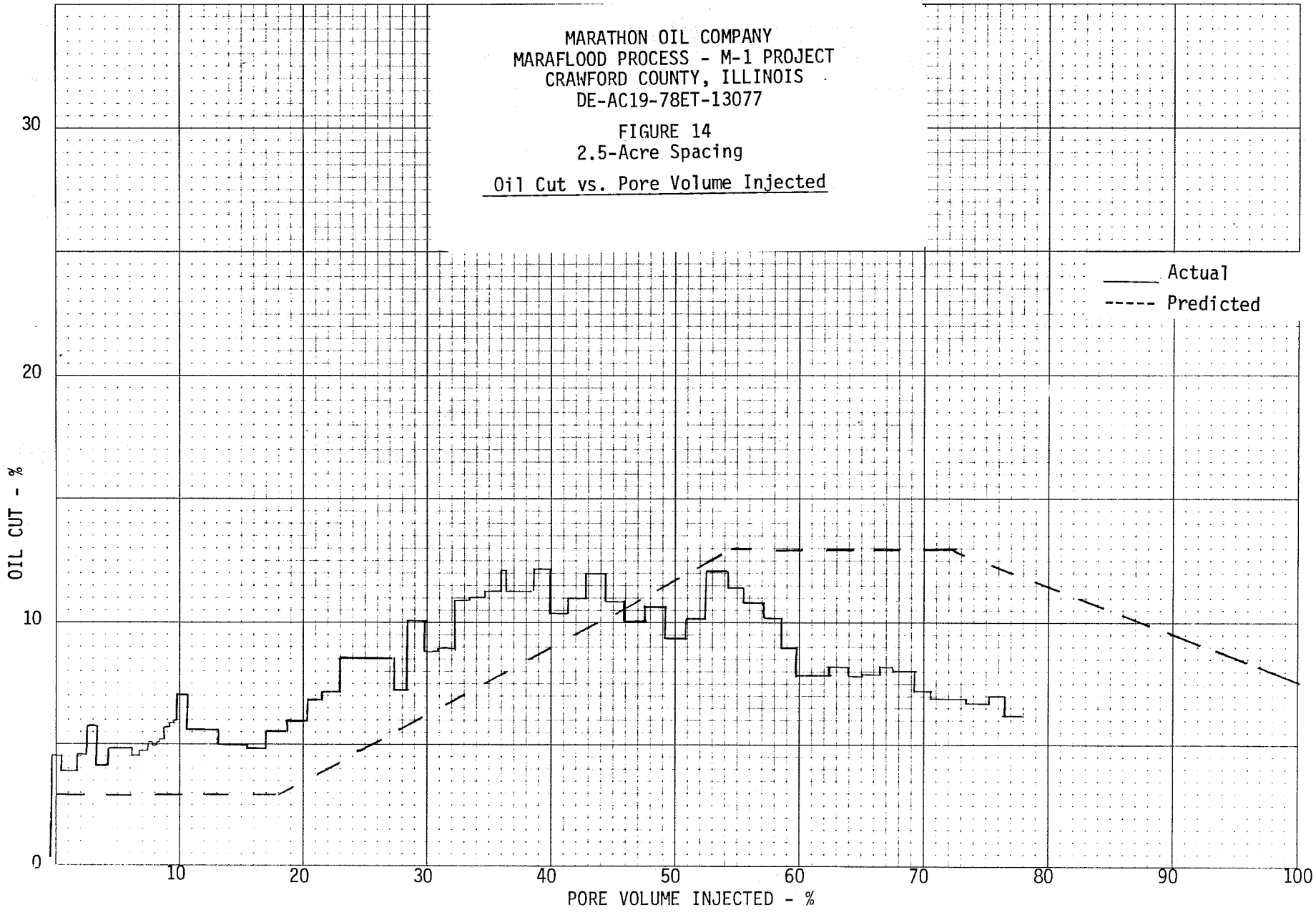
Injection/Production vs. Time




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
OIL RATE - BPD
1400
1200
1000
800
600
400
200
0
10
20
30
40
50
60
70
80
90
100
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
700
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
PORE VOLUME INJECTED - %

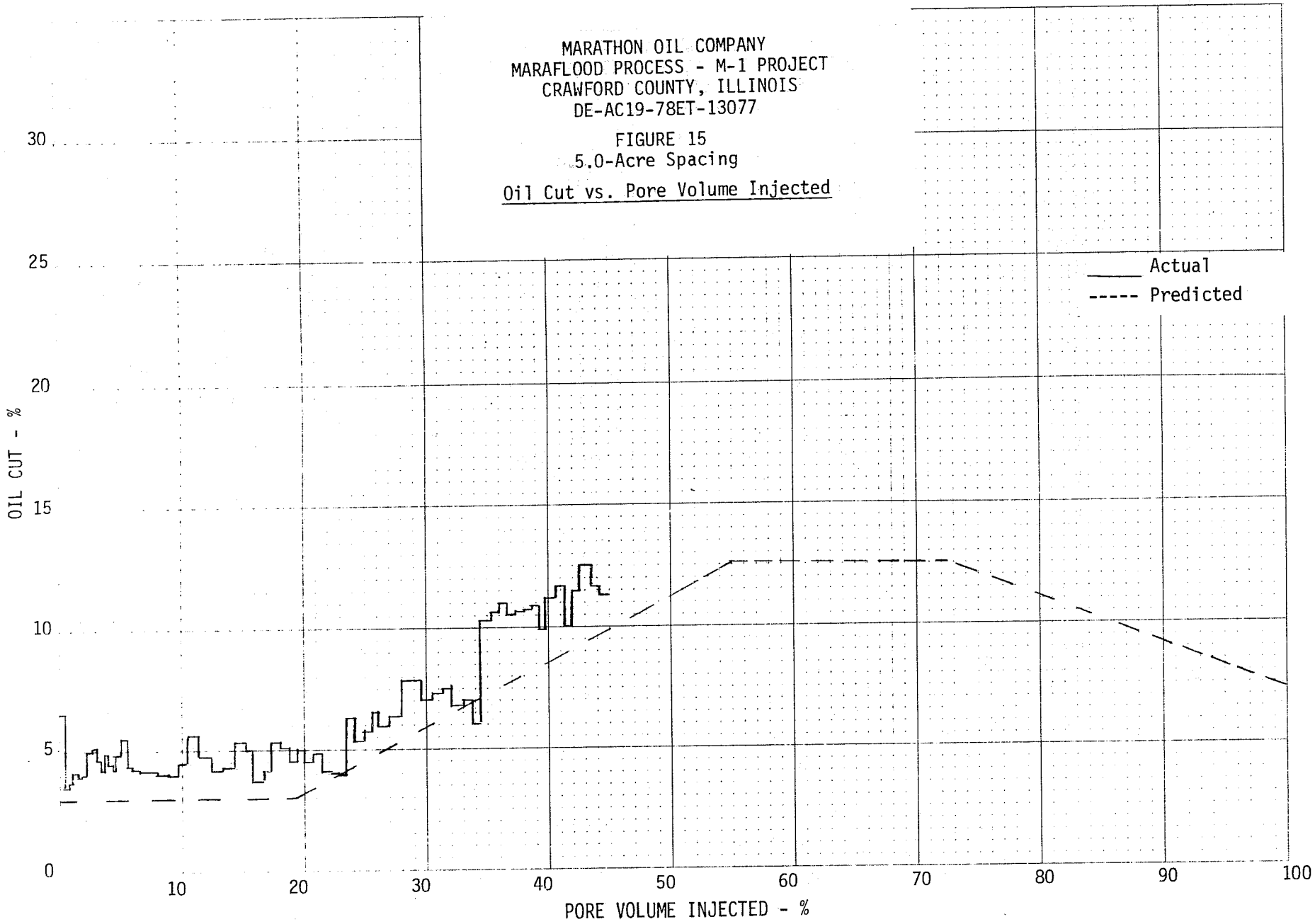

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077
FIGURE 13
Total M-1 Project
Oil Rate vs. Pore Volume Injected
OIL RATE - BPD
1400
1200
1000
800
600
400
200
0
10
20
30
40
50
60
70
80
90
100
PORE VOLUME INJECTED - %

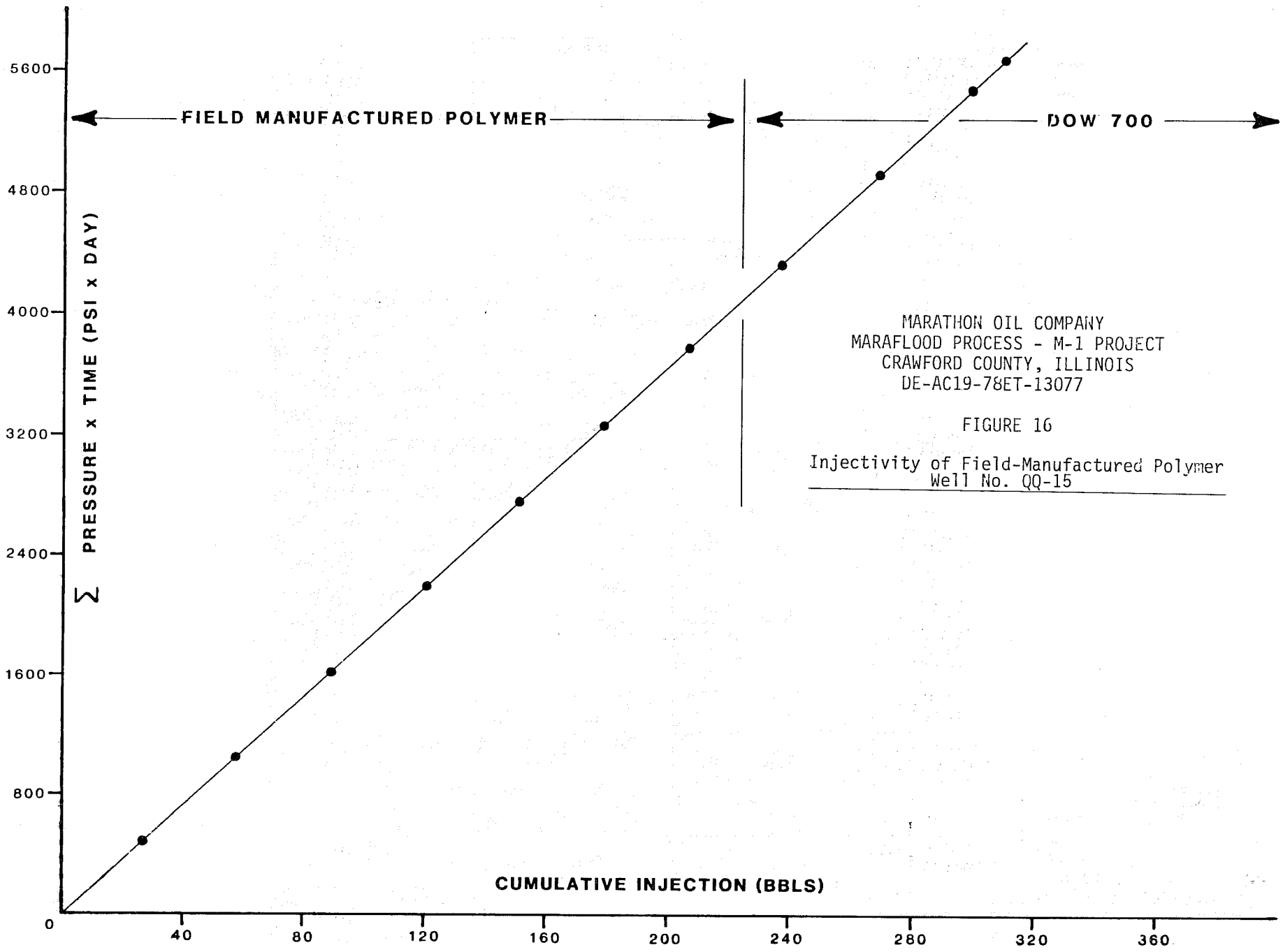

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
CRAWFORD COUNTY, ILLINOIS
DE-AC19-78ET-13077
FIGURE 14
2.5-Acre Spacing
Oil Cut vs. Pore Volume Injected
Actual
Predicted
OIL CUT - %
0
10
20
30
PORE VOLUME INJECTED - %
10
20
30
40
50
60
70
80
90
100

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





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MARAFLOOD PROCESS - M-1 PROJECT
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FIGURE 16

Injectivity of Field-Manufactured Polymer
Well No. QQ-15

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

FIGURE 17

Tritiated Water Injection Wells

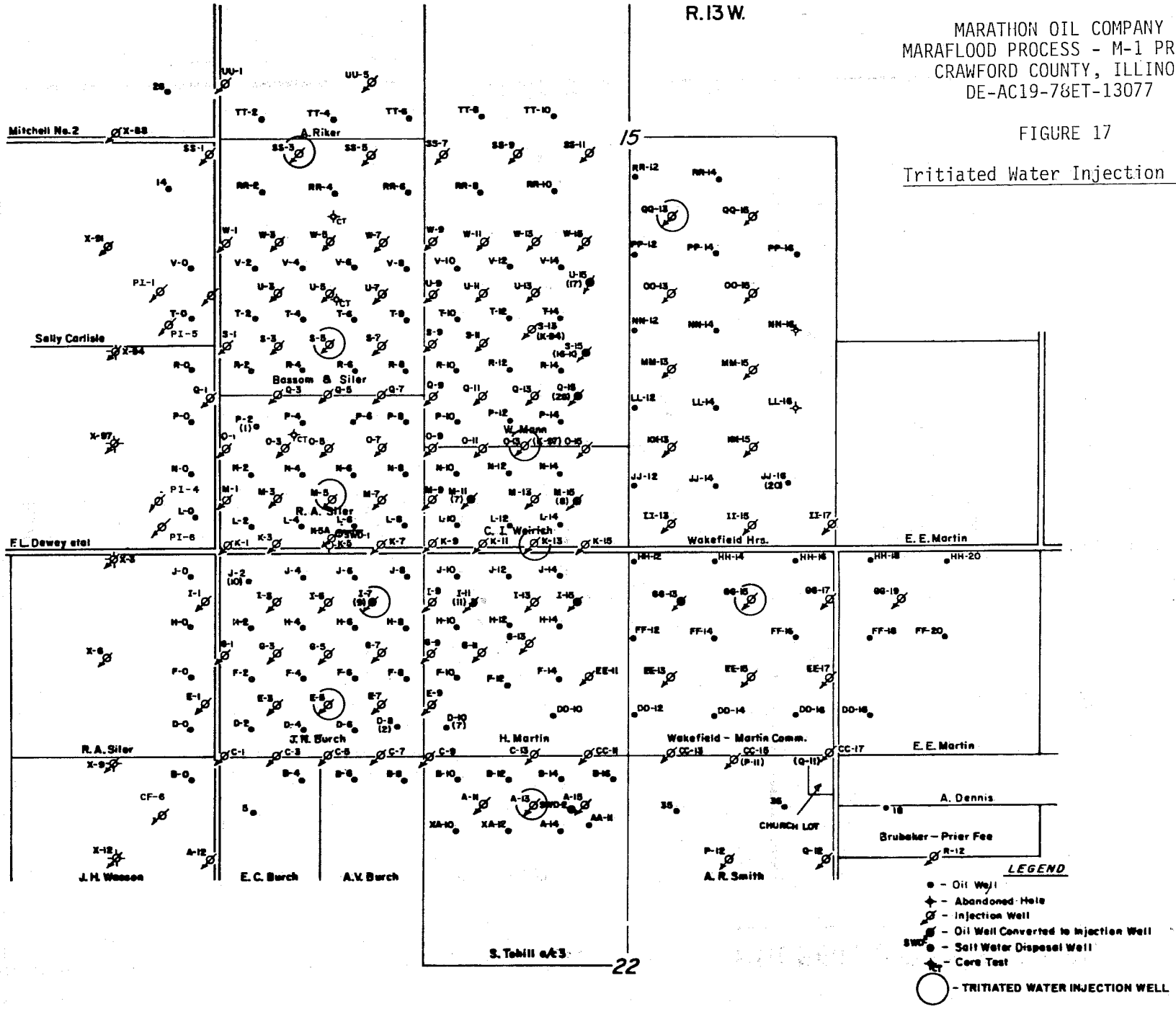
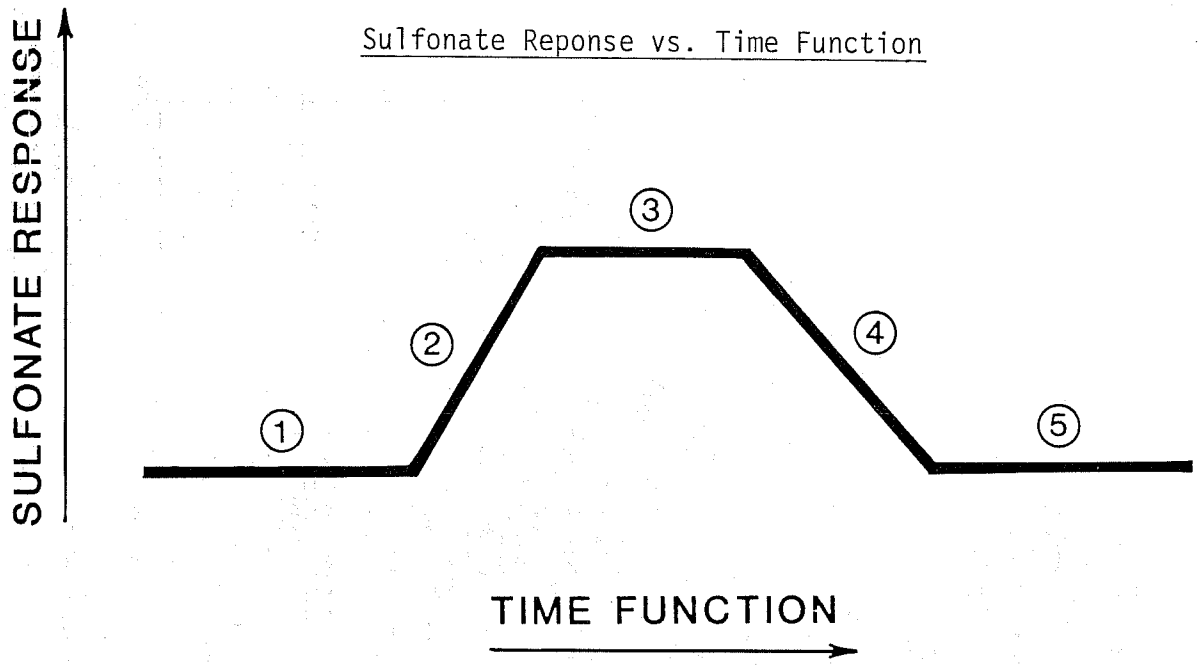


FIGURE 18

Sulfonate Reponse vs. Time Function



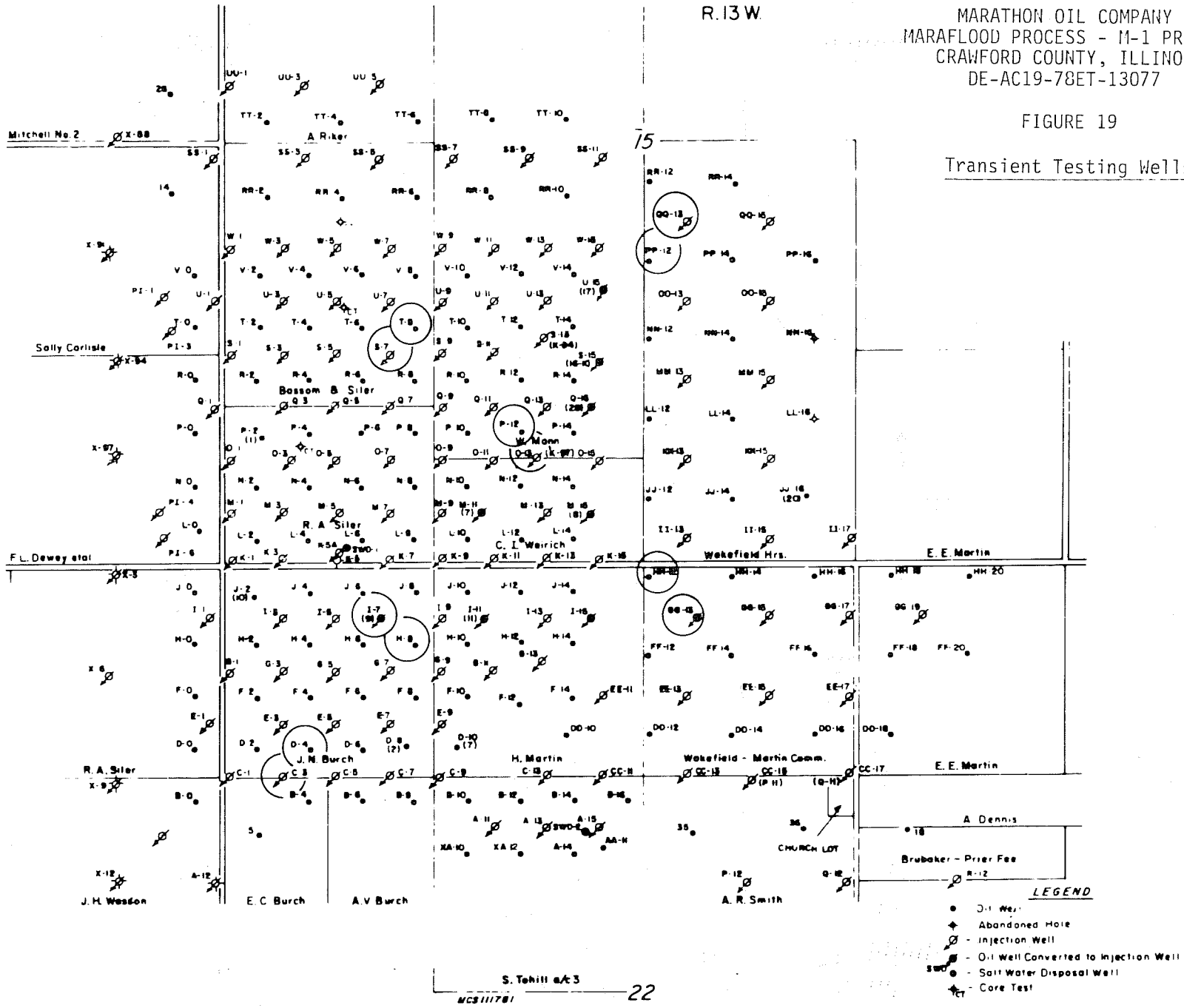
2.5 Acre			5.0 Acre		
Type	Wells	%	Type	Wells	%
1	7	7.7	1	7	17.1
2	36	39.6	2	31	75.6
3	26	28.6	3	3	7.3
4	20	22.0	4	0	0.0
5	2	2.1	5	0	0.0
Total	91	100.0	Total	41	100.0

Analysis is based on monthly sulfonate data through March, 1982.

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

FIGURE 19

Transient Testing Wells



Marathon Oil Company

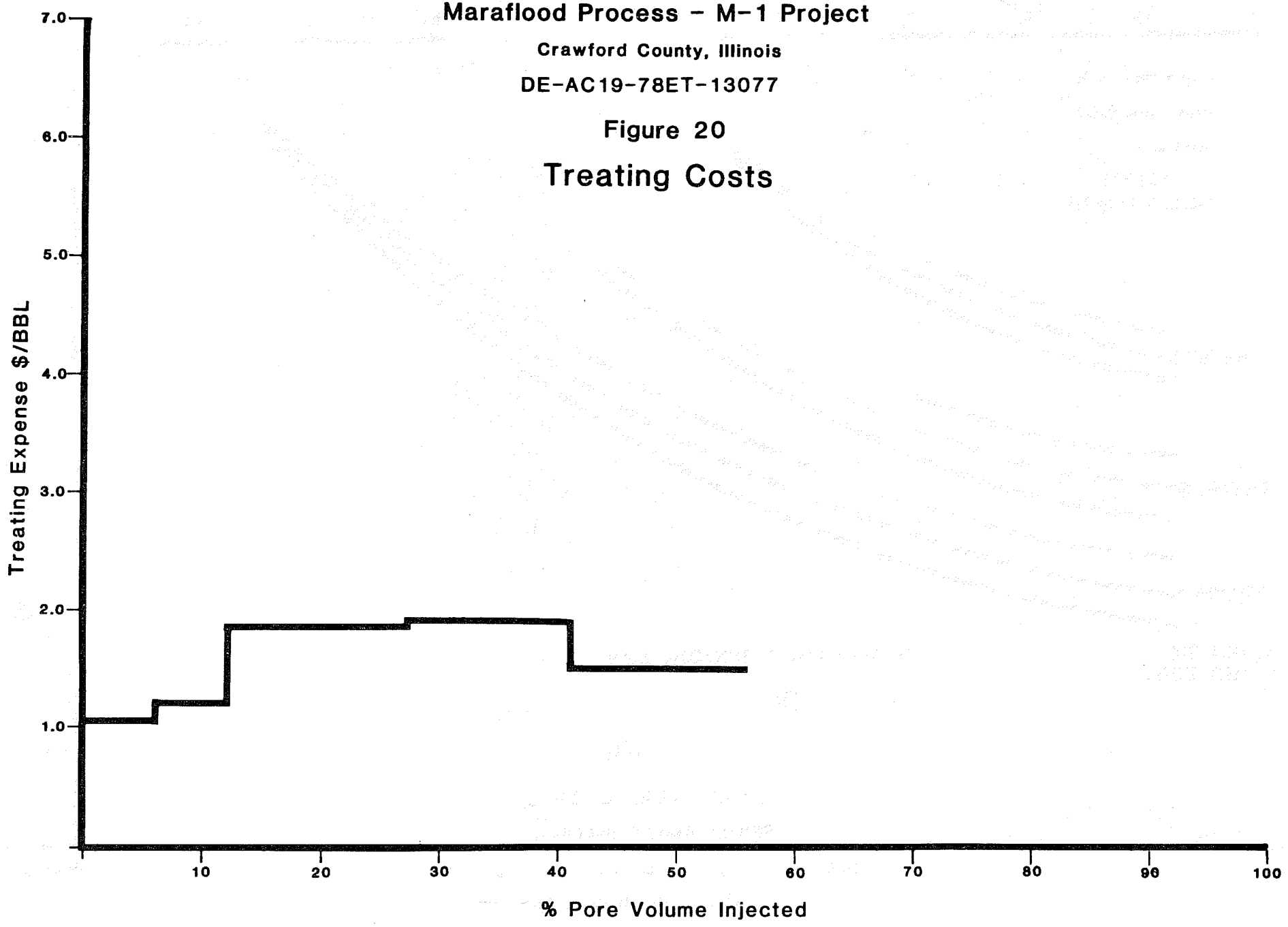
Maraflood Process - M-1 Project

Crawford County, Illinois

DE-AC19-78ET-13077

Figure 20

Treating Costs



Marathon Oil Company

Maraflood Process - M-1 Project

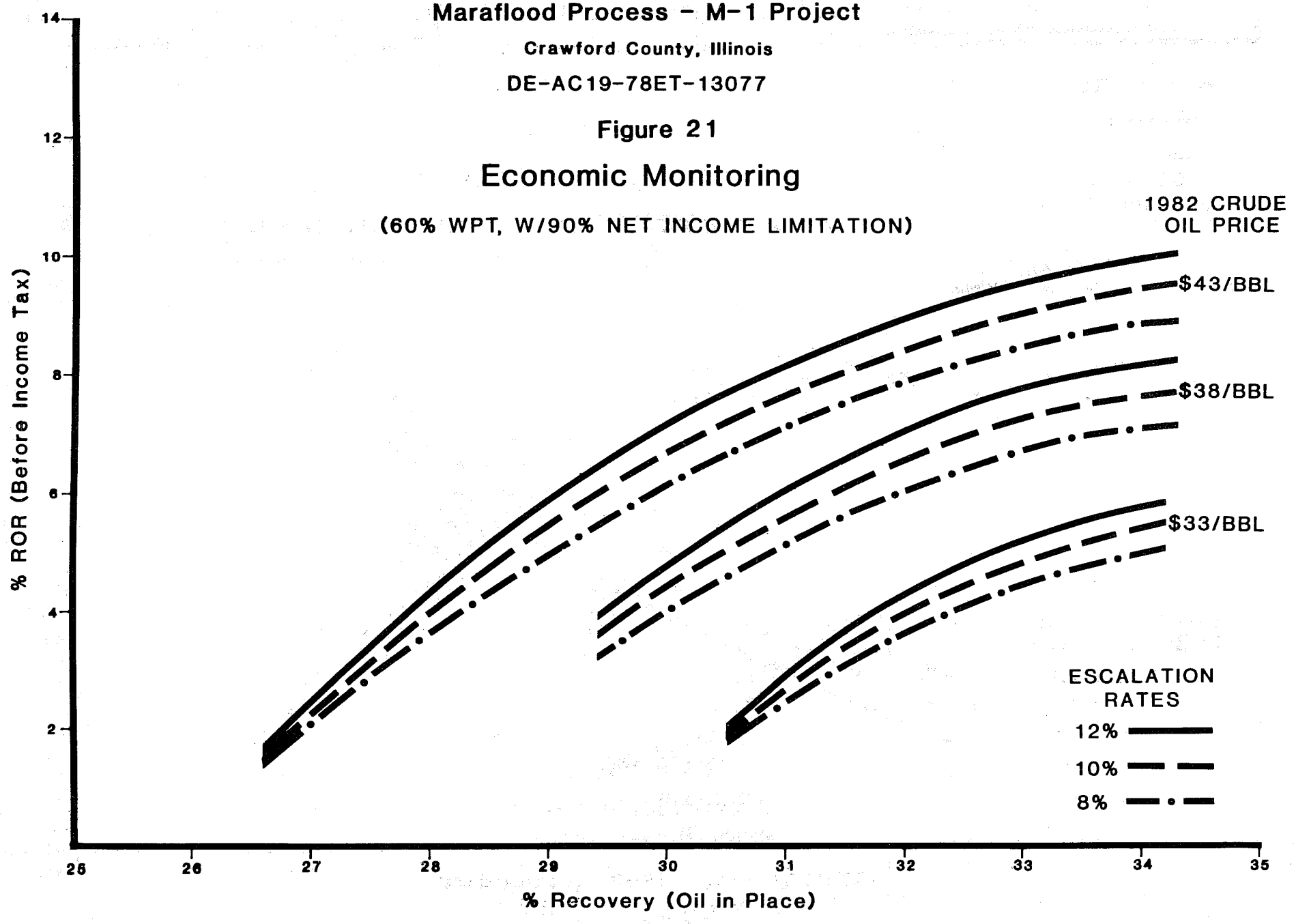
Crawford County, Illinois

DE-AC19-78ET-13077

Figure 21

Economic Monitoring

(60% WPT, W/90% NET INCOME LIMITATION)



Marathon Oil Company

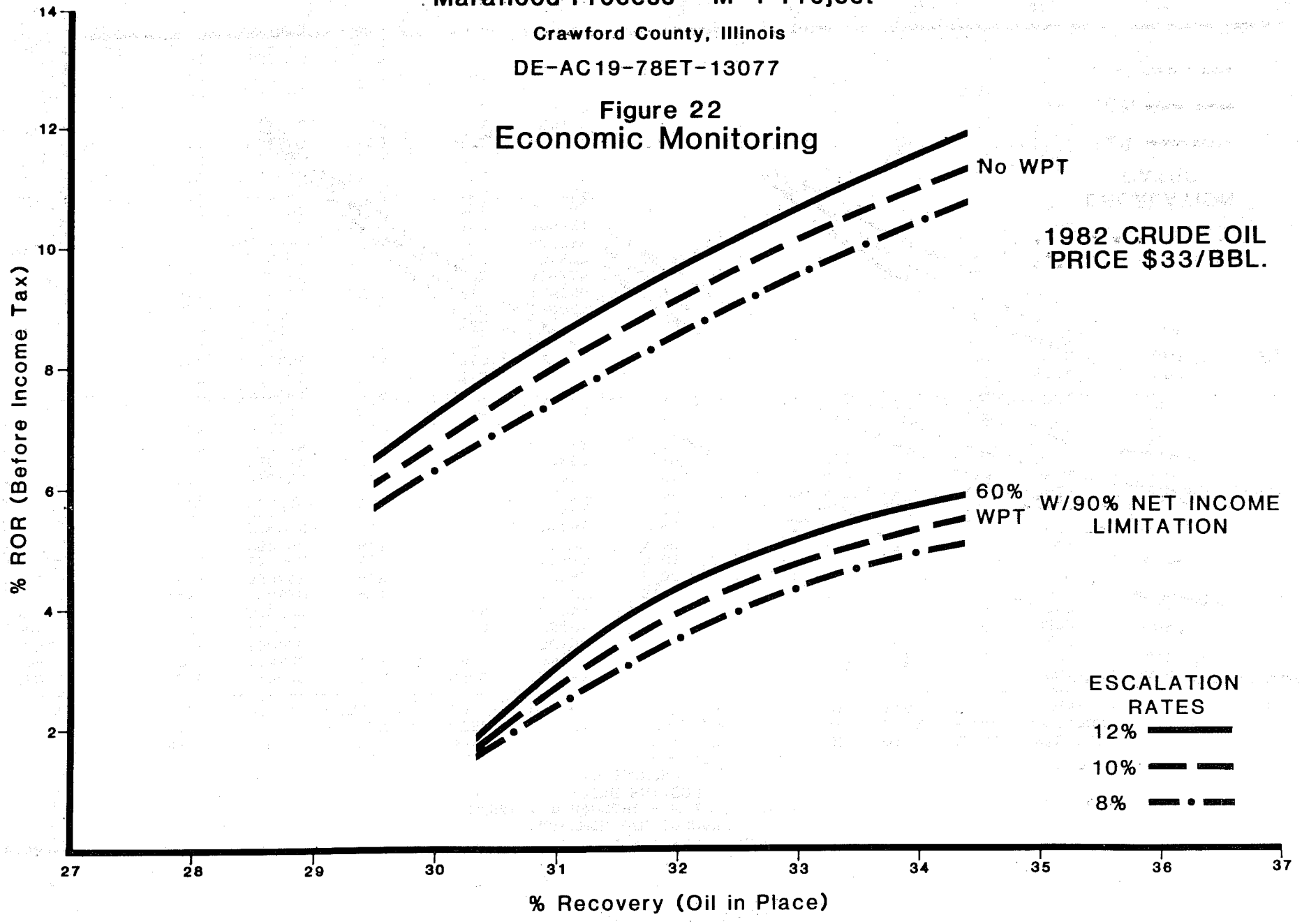
Maraflood Process - M-1 Project

Crawford County, Illinois

DE-AC19-78ET-13077

Figure 22

Economic Monitoring



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

MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (BBLS)	% CUM.INJ./ PORE VOL.	WGTD. AVG. BHP.	CUMULATIVE (BHP*DAYS)	INJ. (B/D) /BHP	% POLY CUT	% SLUG CUT	% OIL CUT	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	VISC. (CP)	SCREEN FACTOR
FEB. 1977	2246	40428	0.4	588	10584	3.82		.09	4.5	102	0.89	9586	36.0	
MAR. 1977	2392	114580	1.1	633	30207	3.78		.39	3.8	102	0.90	9709	30.7	
APR. 1977	2547	190990	1.8	665	50157	3.83		.07	3.9	103	1.08	9179	32.5	
MAY 1977	2642	279108	2.6	653	70400	4.05		.11	4.7	117	1.08	9282	35.5	
JUN. 1977	2488	353736	3.3	628	89240	3.96		.14	5.8	136	0.96	9469	34.4	
JUL. 1977	2487	430820	4.1	630	108770	3.95		.08	4.2	129	0.73	8954	31.9	
AUG. 1977	2451	506787	4.8	633	128393	3.87		.12	4.9	150	0.77	9185	35.3	
SEP. 1977	2372	577961	5.4	621	147023	3.82		.10	4.8	132	0.82	9524	32.1	
OCT. 1977	2418	652907	6.1	612	165995	3.95		.07	4.9	132	0.86	9495	32.6	
NOV. 1977	2448	726345	6.8	525	181745	4.66		.13	4.6	122	0.85	9773	31.0	
DEC. 1977	977	756628	7.1	433	195168	2.26		.13	4.8	106	0.48	9358	30.0	
JAN. 1978	928	785397	7.4	456	209304	2.04		.27	4.7	81	0.55	8814	28.9	
FEB. 1978	912	810925	7.6	440	221624	2.07		.17	4.9	80	0.54	9550	28.0	
MAR. 1978	791	835457	7.9	428	234892	1.85		.12	5.2	66	0.60	9488	27.0	
APR. 1978	730	857365	8.1	444	248212	1.64		.22	5.0	62	0.56	10033	26.7	
MAY 1978	825	882933	8.3	522	264394	1.58		.21	5.1	58	0.66	9604	59.3	
JUN. 1978	994	912743	8.6	522	280054	1.90		.24	5.3	65	0.90	9534	69.6	
JUL. 1978	1030	944661	8.9	494	295368	2.09		.26	5.7	65	0.91	9818	77.1	
AUG. 1978	1017	976185	9.2	512	311240	1.99		.29	5.7	67	0.88	9764	79.4	
SEP. 1978	1084	1008699	9.5	516	326720	2.10		.31	5.9	67	1.01	10277	78.7	
OCT. 1978	1114	1043246	9.8	492	341972	2.26		.41	6.0	66	0.97	10185	71.4	
NOV. 1978	3162	1138100	10.7	722	363632	4.64		.32	7.1	80	2.63	9452	54.1	22.9
DEC. 1978	8247	1393747	13.1	852	390044	9.68		.47	5.6	206	2.08	10191	52.3	28.4
JAN. 1979	7480	1625621	15.3	816	415340	9.17		.54	5.0	275	1.27	9589	51.1	29.6
FEB. 1979	7436	1811525	17.0	791	435115	9.40		.49	4.8	271	1.19	9445	52.0	28.7
MAR. 1979	5454	1980605	18.6	702	456877	7.77		.92	5.5	306	0.90	9072	52.5	29.9
APR. 1979	5020	2131216	20.1	762	479737	6.59		1.10	6.0	287	0.97	9275	54.9	28.7
MAY 1979	5018	2286412	21.5	774	503731	6.48		1.58	6.9	341	0.94	9364	36.1	23.3
JUN. 1979	5099	2439395	23.0	791	527461	6.45		1.97	7.2	352	0.97	9426	31.4	23.3
JUL. 1979	4977	2593670	24.4	858	554059	5.80		2.48	8.6	378	1.04	9626	31.5	24.8
AUG. 1979	4865	2744493	25.8	856	580595	5.68		2.91	8.6	400	0.96	9220	33.2	24.8
SEP. 1979	4820	2889080	27.2	863	606485	5.59		3.89	8.6	395	0.97	9204	30.0	23.8
OCT. 1979	4598	3031613	28.5	842	632587	5.46	2.7	3.86	7.3	310	1.00	8673	30.2	25.8
NOV. 1979	4524	3167322	29.8	851	658117	5.32	2.0	4.60	10.1	483	0.89	8652	32.0	25.6
DEC. 1979	4168	3296543	31.0	833	683940	4.99	3.8	4.26	8.8	418	0.82	8512	30.6	22.5
JAN. 1980	4147	3425101	32.2	819	709329	5.06	4.7	3.81	8.9	398	0.86	8466	30.9	21.9
FEB. 1980	4217	3547393	33.4	800	732529	5.27	1.8	5.06	10.9	404	1.00	8618	30.1	24.0
MAR. 1980	4631	3690934	34.7	873	759592	5.30	5.4	6.16	11.0	425	1.06	8130	29.5	20.8
APR. 1980	4571	3828057	36.0	861	785422	5.31	4.4	7.36	11.3	431	1.08	8103	29.3	22.0
MAY 1980	4716	3974314	37.4	889	812981	5.30	7.4	5.69	12.1	463	1.10	7852	30.2	23.2

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

MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (BBLS)	% CUM.INJ./ PORE VOL.	WGTD. AVG. BHP.	CUMULATIVE (BHP*DAYS)	INJ. (B/D) /BHP	% POLY CUT	% SLUG CUT	% OIL CUT	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	VISC. (CP)	SCREEN FACTOR
JUN. 1980	4837	4119350	38.8	926	840761	5.22	10.8	5.61	11.3	437	1.11	7616	28.0	21.4
JUL. 1980	4646	4263438	40.1	915	869126	5.08	11.8	5.49	12.2	484	1.04	7503	28.8	21.5
AUG. 1980	4690	4408805	41.5	912	897398	5.14	10.5	4.67	10.4	408	1.27	7761	19.2	18.5
SEP. 1980	5165	4563717	42.9	975	926648	5.30	17.2	4.99	11.0	452	1.15	7023	19.2	19.7
OCT. 1980	5248	4726222	44.5	970	956718	5.41	16.6	5.08	12.0	577	1.01	7152	19.8	19.4
NOV. 1980	5425	4889007	46.0	974	985938	5.57	19.6	5.26	10.8	529	1.02	6837	19.6	19.6
DEC. 1980	5454	5058019	47.6	981	1016349	5.56	17.1	4.89	10.1	481	1.07	7119	19.7	19.8
JAN. 1981	6066	5246059	49.4	985	1046884	6.16	20.1	4.81	10.6	528	1.12	6821	20.0	20.5
FEB. 1981	6209	5419879	51.0	972	1074100	6.39	19.3	4.94	9.4	447	1.19	6891	20.5	20.3
MAR. 1981	5944	5604076	52.7	960	1103860	6.19	26.8	4.76	10.2	473	1.20	6149	20.7	19.2
APR. 1981	5056	5755701	54.2	925	1131610	5.47	29.2	5.21	12.1	500	1.13	5858	20.9	21.3
MAY 1981	5136	5914897	55.7	966	1161556	5.32	29.9	4.78	11.4	461	1.18	5827	20.7	17.6
JUN. 1981	5236	6071874	57.1	979	1190926	5.35	31.9	4.97	10.8	428	1.21	5603	20.0	17.1
JUL. 1981	4823	6221446	58.5	939	1220035	5.14	31.1	5.60	10.2	386	1.19	5616	21.3	16.7
AUG. 1981	4903	6373355	60.0	957	1249702	5.12	35.4	5.63	9.1	343	1.21	5179	19.5	17.5
SEP. 1981	4680	6513783	61.3	964	1278622	4.85	35.9	5.88	7.9	306	1.13	5106	19.9	17.9
OCT. 1981	4548	6654792	62.6	977	1308909	4.66	36.9	6.08	7.9	323	1.03	4984	19.7	17.8
NOV. 1981	4451	6788141	63.9	937	1337019	4.75	35.7	5.25	8.1	337	0.98	5189	20.2	14.6
DEC. 1981	4456	6926323	65.2	971	1367120	4.59	36.5	5.97	7.8	319	1.01	5035	20.3	13.7
JAN. 1982	4756	7073685	66.6	977	1397407	4.87	40.3	5.83	7.9	304	1.14	4662	20.0	13.6
FEB. 1982	4864	7209971	67.8	977	1424763	4.98	41.8	6.11	8.3	337	1.07	4486	20.8	18.0
MAR. 1982	4830	7359726	69.3	978	1455081	4.94	43.0	6.02	8.0	360	1.00	4373	19.7	20.8
APR. 1982	5066	7511663	70.7	991	1484811	5.11	43.8	6.18	7.3	334	1.04	4279	19.0	20.0
MAY 1982	5292	7675770	72.2	999	1515780	5.30	46.4	4.07	6.9	321	1.07	4226	18.0	19.4
JUN. 1982	5207	7832057	73.7	996	1545660	5.23	49.0	4.24	6.9	300	1.14	3948	11.4	14.9
JUL. 1982	5014	7987432	75.2	986	1576226	5.09			6.7	285	1.10		11.5	13.6
AUG. 1982	5047	8143899	76.6	980	1606606	5.15	50.2	4.27	7.0	284	1.17	3823	11.9	13.1
SEP. 1982	5151	8298289	78.1	991	1636336	5.20			6.2	252	1.20		10.2	13.3

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

MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (BBLS)	% CUM.INJ./ PORE VOL.	WGTD. AVG. BHP.	CUMULATIVE (BHP*DAYS)	INJ. (B/D) /BHP	% POLY CUT	% SLUG CUT	% OIL CUT	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	VISC. (CP)	SCREEN FACTOR
FEB. 1977	675	12150	0.2	585	10530	1.15		.15	6.6	44	0.90	8319	36.0	
MAR. 1977	822	37632	0.6	575	28535	1.43		.33	3.5	44	0.87	9776	30.7	
APR. 1977	826	62412	1.0	634	47375	1.30		.24	3.7	60	0.78	9920	32.5	
MAY 1977	818	88069	1.5	633	66998	1.29		.28	4.2	79	0.65	9918	35.5	
JUN. 1977	738	110196	1.8	624	85718	1.18		.26	4.0	68	0.64	8551	34.4	
JUL. 1977	709	132173	2.2	648	105806	1.09		.20	4.1	65	0.67	9221	31.9	
AUG. 1977	666	152823	2.5	579	123755	1.15		.18	5.0	65	0.85	9560	35.3	
SEP. 1977	652	172381	2.9	603	141845	1.08		.15	5.1	67	0.88	9132	32.1	
OCT. 1977	670	193151	3.2	589	160104	1.14		.12	4.7	64	0.89	10556	32.6	
NOV. 1977	647	212554	3.5	543	176394	1.19		.19	4.3	62	0.86	8089	31.0	
DEC. 1977	622	231830	3.9	564	193878	1.10		.11	4.9	74	0.69	9517	30.0	
JAN. 1978	627	251261	4.2	564	211362	1.11		.21	4.4	62	0.79	9362	28.9	
FEB. 1978	670	270012	4.5	560	227042	1.20		.18	4.3	59	0.74	9503	28.0	
MAR. 1978	810	295132	4.9	614	246076	1.32		.15	4.8	63	0.85	10260	27.0	
APR. 1978	862	320987	5.4	615	264526	1.40		.15	5.5	68	0.92	11115	26.7	
MAY 1978	823	346499	5.8	570	282196	1.44		.20	4.4	56	0.84	10177	59.3	
JUN. 1978	1302	385567	6.4	576	299476	2.26		.21	4.3	63	1.03	12675	69.9	
JUL. 1978	1382	428403	7.1	639	319285	2.16		.23	4.2	62	1.04	10269	77.1	
AUG. 1978	1402	471866	7.9	723	341698	1.94		.27	4.2	57	1.16	9885	79.4	
SEP. 1978	1599	519836	8.7	755	364348	2.12		.24	4.1	63	1.15	10537	78.7	
OCT. 1978	1642	570751	9.5	782	388590	2.10		.37	4.0	67	1.13	10336	71.4	
NOV. 1978	1610	619060	10.3	819	413160	1.97		.26	4.5	82	1.09	9995	49.8	22.9
DEC. 1978	1978	680367	11.3	843	439293	2.35		.32	5.6	115	1.37	9881	51.7	27.2
JAN. 1979	2007	742572	12.4	840	465333	2.39		.62	4.7	129	1.04	10111	51.3	28.2
FEB. 1979	2024	793171	13.2	851	486608	2.38		.64	4.2	119	1.11	10080	51.8	26.7
MAR. 1979	1927	852907	14.2	857	513175	2.25		.90	4.3	117	0.99	9982	52.5	28.8
APR. 1979	1812	907262	15.1	845	538525	2.14		.86	5.3	144	0.92	10289	55.6	27.6
MAY 1979	1486	953342	15.9	761	562116	1.95		.93	5.0	119	0.89	10348	56.0	28.9
JUN. 1979	1425	996090	16.6	768	585156	1.86		.86	3.7	99	0.80	10113	54.1	28.8
JUL. 1979	1406	1039687	17.3	792	609708	1.78		.88	4.1	87	0.95	9996	54.1	29.6
AUG. 1979	1418	1083641	18.1	804	634632	1.76		.75	5.4	112	0.99	9603	54.4	28.7
SEP. 1979	1417	1126151	18.8	829	659502	1.71		1.13	5.2	111	0.95	10451	51.1	27.9
OCT. 1979	1332	1167457	19.5	809	684581	1.65		.89	4.5	101	0.89	9314	52.1	30.5
NOV. 1979	1296	1206352	20.1	813	708971	1.59		1.45	5.1	115	0.83	9993	51.1	29.8
DEC. 1979	1174	1242731	20.7	789	733430	1.49		1.14	4.9	110	0.77	9896	51.7	27.8
JAN. 1980	1182	1279404	21.3	787	757827	1.50		.92	4.5	110	0.72	9993	39.4	23.4
FEB. 1980	1261	1315963	21.9	753	779664	1.67		.93	4.0	111	0.68	9790	30.7	21.2
MAR. 1980	1393	1359156	22.7	868	806572	1.60		1.52	4.0	114	0.72	9816	29.3	19.7
APR. 1980	1354	1399726	23.3	839	831742	1.61		2.78	3.9	97	0.79	9849	30.5	22.2
MAY 1980	1410	1443464	24.1	877	858929	1.61		1.09	6.3	116	1.06	10239	29.9	21.5

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

MONTH AND YEAR	INJ. RATE (B/D)	CUM. INJ. (BBLS)	% CUM.INJ./ PORE VOL.	WGTD. AVG. BHP.	CUMULATIVE (BHP*DAYS)	INJ. (B/D) /BHP	% POLY CUT	% SLUG CUT	% OIL CUT	OIL RATE (B/D)	INJ./ PROD. RATIO	WGTD.AVG. CHLD.CONT. (PPM)	VISC. (CP)	SCREEN FACTOR
JUN. 1980	1408	1485710	24.8	893	885719	1.58		1.49	5.3	109	0.98	9773	29.5	21.3
JUL. 1980	1404	1529241	25.5	892	913371	1.57		1.35	5.7	121	0.91	10069	29.9	21.3
AUG. 1980	1373	1571844	26.2	860	940031	1.60		1.32	6.5	130	0.98	9637	28.3	21.0
SEP. 1980	1648	1621322	27.0	924	967751	1.78		1.31	5.9	122	1.18	9548	27.9	21.5
OCT. 1980	1828	1677919	28.0	950	997201	1.92		1.46	6.3	170	0.92	9669	29.6	21.3
NOV. 1980	1600	1725913	28.8	924	1024921	1.73		1.20	7.8	188	0.94	9876	29.4	20.7
DEC. 1980	1608	1775716	29.6	953	1054464	1.69		1.58	7.8	170	1.06	9751	29.7	20.8
JAN. 1981	1644	1826651	30.5	949	1083883	1.73		1.49	7.1	160	1.08	9827	28.1	21.2
FEB. 1981	1675	1873591	31.2	949	1110455	1.77		1.55	7.3	163	1.10	9696	29.3	20.1
MAR. 1981	1664	1925064	32.1	949	1139874	1.75		1.70	7.5	156	1.08	10441	31.1	22.1
APR. 1981	1517	1970519	32.9	938	1168014	1.62		2.31	6.7	126	1.10	9227	30.0	21.2
MAY 1981	1344	2012203	33.6	941	1197185	1.43	1.5	2.46	7.0	126	1.05	9013	31.0	19.6
JUN. 1981	1401	2054224	34.3	953	1225775	1.47	0.7	3.21	6.0	122	0.98	9021	29.0	19.1
JUL. 1981	1553	2102369	35.1	952	1255287	1.63	0.4	3.47	10.3	188	1.17	9027	30.5	18.6
AUG. 1981	1515	2149355	35.8	954	1284861	1.59	0.0	5.31	10.6	197	1.12	8931	29.5	20.1
SEP. 1981	1485	2193827	36.6	968	1313901	1.53	2.9	4.33	10.9	196	1.11	8686	29.3	23.8
OCT. 1981	1485	2239908	37.4	933	1342824	1.59	2.3	4.62	10.5	188	1.11	8722	31.2	18.7
NOV. 1981	1222	2276608	38.0	943	1371114	1.30	2.9	4.73	10.6	202	0.93	8644	30.7	17.3
DEC. 1981	1226	2314597	38.6	964	1400998	1.27	0.4	4.91	10.7	197	0.97	8878	29.8	15.5
JAN. 1982	1253	2353370	39.2	967	1430975	1.30	4.7	4.87	10.9	189	1.07	8455	29.8	15.2
FEB. 1982	1327	2390552	39.9	968	1458079	1.37	4.9	5.75	9.8	174	1.16	8344	29.4	19.7
MAR. 1982	1410	2434307	40.6	982	1488521	1.44	6.4	6.09	11.2	219	1.06	8164	21.2	20.7
APR. 1982	1418	2476892	41.3	1002	1518581	1.42	7.6	4.29	11.6	226	1.14	8222	18.9	19.8
MAY 1982	1416	2520732	42.0	1007	1549798	1.41	6.9	4.98	10.0	184	1.09	8225	19.4	19.0
JUN. 1982	1420	2563318	42.7	1018	1580338	1.39	9.0	5.55	11.5	212	1.10	7950	19.7	18.4
JUL. 1982	1394	2606563	43.5	1032	1612330	1.35			12.5	226	1.07		19.1	16.1
AUG. 1982	1427	2650833	44.2	985	1642865	1.45	16.2	5.42	11.6	217	1.04	7249	19.2	16.5
SEP. 1982	1417	2693337	44.9	1032	1673825	1.37			11.3	243	0.90		18.7	16.6

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE INJECTION REPORT
SEPTEMBER 1982 (30 DAYS)

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)
A-11	*	30	25	620	96308	9.5	10.7	21.9	18.0	2.4	62.4	18	18	28
A-13		30	21	420	126637	9.7	11.5	20.3	50.8	12.0	104.3	125	118	11
A-15		30	45	340	144717	9.4	12.4	21.4	41.9	8.4	93.5	99	94	97
C-1	*	30	37	640	217157	9.7	9.6	17.0	23.8	3.3	63.4	59	56	66
C-3	*	30	14	640	65219	8.8	9.0	15.7	24.2	3.1	60.7	14	16	26
C-5	*	30	14	640	63152	9.0	8.7	12.5	19.9	5.6	55.6	27	27	37
C-7	*	30	13	640	67774	5.8	1.1	2.6	5.3	0.6	15.5	3	3	13
C-9	*	30	19	640	78428	9.2	2.5	5.4	5.2	0.6	23.1	4	5	15
C-13	*	30	28	620	115337	9.8	13.1	18.2	23.2	4.0	68.3	41	49	59
E-1	*	30	18	640	53939	11.5	8.5	14.2	16.5	1.9	52.5	7	8	18
E-3	*	30	11	640	40348	14.7	11.0	19.1	38.9	4.2	88.0	12	14	24
E-5		30	11	600	57323	12.0	12.8	24.8	37.3	7.7	94.6	35	38	35
E-7		30	31	540	99647	10.6	11.6	20.8	43.2	7.7	93.9	60	60	64
E-9	*	30	23	640	90585	10.9	3.2	6.3	4.8	0.4	25.6	3	3	13
G-1	*	30	19	640	73828	12.0	6.4	12.9	12.0	2.8	46.0	15	15	25
G-3	*	30	26	640	68910	11.6	10.0	16.3	20.6	15.2	73.6	86	80	90
G-5	*	30	32	640	99291	10.1	14.1	17.6	41.5	1.8	85.1	14	16	26
G-7		30	31	600	106308	10.5	9.3	19.4	42.2	9.1	90.5	70	82	89
G-9	*	30	20	640	74975	11.5	8.2	13.5	8.3	1.2	42.6	6	10	20
G-11	*	30	18	640	74257	10.8	10.2	18.8	16.2	2.3	58.3	13	11	21
G-13	*	30	9	640	43871	11.2	8.8	21.8	33.7	4.0	79.4	17	19	29
I-1	*	30	20	640	88728	10.2	8.3	17.1	20.9	3.0	59.5	20	21	31
I-3		30	21	520	75579	11.5	11.6	18.0	42.7	1.8	85.6	9	9	83
I-5	*	30	30	520	108764	10.0	13.3	18.1	25.2	3.2	69.8	24	28	38
I-7	*	30	29	640	107842	10.0	7.4	14.9	14.2	1.7	48.2	13	13	23
I-9	*	30	29	640	96849	9.6	11.7	19.2	38.3	6.3	85.1	44	50	60
I-11	*	30	23	640	84025	9.8	14.7	17.1	25.1	4.0	70.6	24	29	39
I-13	*	30	17	640	76063	11.2	12.1	16.8	11.5	1.2	52.7	6	13	23
I-15	*	30	37	640	241350	9.6	10.6	21.6	24.5	3.3	69.6	63	71	81
K-1	*	30	20	500	127844	9.5	12.6	16.7	20.3	4.3	63.3	43	38	48
K-3		30	40	540	94488	10.0	12.6	18.8	37.5	6.6	85.5	46	40	104
K-5A		30	35	560	121286	9.7	12.9	18.2	40.2	8.5	89.5	110	83	108
K-7	*	30	39	600	136240	10.4	9.7	17.1	18.8	1.7	57.7	14	16	26
K-9	*	30	22	640	100351	10.2	11.5	16.4	13.0	1.1	52.2	10	9	19
K-11	*	30	24	640	98538	9.8	13.4	15.4	18.4	1.8	58.7	12	12	22
K-13		30	29	540	121990	9.5	10.6	20.9	44.2	6.4	91.6	62	62	94
K-15	*	30	31	640	172949	9.9	11.8	21.1	20.1	1.8	64.6	22	33	43
M-1	*	30	32	640	111924	9.9	11.8	19.3	33.6	4.4	79.1	41	38	48
M-3		30	32	600	114918	10.1	11.4	20.5	42.6	14.0	98.6	123	103	45
M-5	*	30	46	420	161274	10.0	9.2	22.9	43.8	8.9	94.8	101	106	116
M-7	*	30	49	640	175213	9.9	10.9	23.0	36.8	6.0	86.6	86	80	90

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE INJECTION REPORT
SEPTEMBER 1982 (30 DAYS)

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)
M-9	*	30	55	640	192610	9.9	11.7	20.8	20.9	2.3	65.5	33	31	41
M-11	*	30	42	640	175452	9.7	10.7	20.5	32.4	4.2	77.4	58	70	80
M-13	*	30	56	640	205655	9.4	8.6	25.7	36.6	7.0	87.3	115	158	168
M-15	*	30	43	640	156515	9.8	12.8	18.9	37.9	5.7	85.1	67	63	73
O-1		30	21	540	96744	9.6	12.1	23.7	40.6	12.8	98.8	101	76	36
O-3	*	30	23	640	84546	11.3	11.6	3.2	29.5	11.6	67.4	76	66	76
O-5		30	47	640	153062	9.9	15.1	17.8	44.2	7.3	94.3	90	89	96
O-7	*	30	47	640	182713	9.9	13.1	19.2	25.0	2.5	69.7	33	41	51
O-9	*	30	48	640	199141	9.8	12.9	19.5	36.6	4.9	83.7	70	79	89
O-11		30	53	620	213746	9.7	11.8	20.3	38.1	9.5	89.4	165	196	192
O-13	*	25	54	600	197371	10.0	12.4	19.4	30.6	4.2	76.5	73	85	95
O-15	*	30	46	640	276396	9.8	11.8	19.6	31.4	2.9	75.5	63	65	75
Q-1		30	22	560	113178	9.7	12.7	20.8	47.0	10.4	100.5	99	79	32
Q-3		30	19	340	73931	10.6	3.8	26.1	46.7	8.4	95.6	54	41	41
Q-5	*	30	29	640	99629	10.0	7.1	12.2	16.0	3.7	49.0	28	28	38
Q-7	*	30	48	640	156289	9.8	16.3	15.2	38.2	6.5	86.0	78	88	98
Q-9		30	48	620	172832	10.3	11.2	19.3	42.5	9.7	93.1	128	97	120
Q-11	*	30	45	640	178375	9.9	12.5	21.1	35.3	8.1	87.0	116	134	144
Q-13		30	37	600	148301	9.9	12.5	19.6	39.6	9.3	91.0	107	114	119
Q-15	*	30	52	640	160565	9.6	11.9	20.5	34.2	2.8	79.1	36	34	44
S-1		30	23	500	105303	10.3	10.9	19.5	37.9	11.2	89.8	95	90	92
S-3		30	19	360	54587	11.1	11.6	18.0	53.1	10.1	103.9	45	46	5
S-5		30	16	640	53993	11.4	10.8	22.6	41.1	12.7	98.5	57	52	21
S-7		30	37	520	119153	9.9	12.6	20.6	35.2	11.8	90.1	102	117	102
S-9		30	47	400	170003	9.8	13.6	19.6	38.3	8.3	89.7	107	123	149
S-11		30	45	580	168556	10.1	11.1	21.3	41.7	11.5	95.7	144	187	92
S-13	*	30	43	340	150413	10.1	12.6	19.0	12.3	3.0	57.0	37	38	48
S-15	*	30	44	640	261128	9.9	11.6	21.2	35.7	5.7	84.0	119	116	126
U-1		30	21	520	53846	11.5	5.5	19.8	40.7	9.4	91.3	69	72	66
U-3		30	18	620	57713	10.8	9.0	26.6	49.7	12.4	108.5	53	50	5
U-5		30	12	380	53089	13.8	9.4	23.0	44.3	11.1	101.6	46	45	12
U-7		30	19	420	77484	11.3	10.6	21.0	39.6	4.7	87.2	33	29	79
U-9		30	32	520	123821	10.4	12.3	18.9	34.9	13.8	90.4	136	138	104
U-11		30	47	540	161693	10.1	12.9	18.1	40.4	6.8	88.4	83	108	154
U-13		30	43	480	151555	9.3	9.6	22.5	39.2	7.1	87.6	91	79	150
U-15	*	30	29	640	172084	9.8	12.5	19.8	36.8	7.3	86.2	100	88	98
W-1	*	30	26	640	184594	9.6	5.6	15.1	24.0	4.8	59.1	75	62	72
W-3	*	30	19	640	125054	9.8	4.2	0.4	8.6	1.1	24.2	10	12	22
W-5		30	19	280	65971	10.2	13.4	21.2	41.8	10.7	97.4	53	55	30
W-7		30	14	440	86599	9.5	11.9	20.9	39.5	8.6	90.4	54	59	72
W-9		30	17	600	89129	9.7	9.9	22.3	45.6	9.9	97.5	64	59	40

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE INJECTION REPORT
SEPTEMBER 1982 (30 DAYS)

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)
W-11	* 30	35	480	177292	9.8	11.5	21.5	27.2	2.2	72.2	29	22	32
W-13	* 30	37	640	187643	9.4	8.7	23.1	37.7	9.6	88.5	142	139	149
W-15	* 30	31	640	235533	9.9	11.6	22.0	35.5	7.6	86.5	112	135	145
TOTAL		2598		10627513	10.0	11.0	19.0	32.0	6.1	78.1	5047	5151	5520

TARGETS (P.V.INJECTED): 10.0 11.0 19.0 32.0 12.0
BBLS.OF 411 PPM POLYMER REMAINING TO BE INJECTED: 629603.0
DAYS REMAINING TO COMPLETE 411 PPM POLYMER INJECTION: 114.1

* DENOTES PROBLEM WELL.

2.5-ACRE INJECTION DATA SUMMARY

FLUID TYPE	PV	PROJECTED INJECTION HISTORY START	FINISH	INJECTION RATE DEVIATION REC RATE BASIS	THIS REPORT	LAST REPORT
SLUG	10	2/10/77	11/20/78	NO. WELLS WITHIN 5 % OF REC. RATE:	5	3
1156	11	11/20/78	5/20/79	NO. WELLS WITHIN 20 % OF REC. RATE:	36	34
800	19	5/20/79	7/28/80	NO. WELLS WITHIN 50 % OF REC. RATE:	67	65
625	32	7/28/80	5/26/82			
411	12	5/26/82	1/13/83			

AVERAGE VISCOSITY : 10.2
AVERAGE SCREEN FACTOR : 13.3
TOTAL POLYMER INJECTED (LBS.) : 22209
TOTAL POLYMER CONCENTRATION (PPM): 411

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE INJECTION REPORT
SEPTEMBER 1982 (30 DAYS)

WELL		DAYS ACTIVE	(FT) NET SAND	PRESS	(BBLS) PORE VOL	****PERCENT INJECTED**** PV SLUG	PV 1156	PV 800	PV 625	PV TOTAL	PREV MON. RATE	(B/D) CURRENT RATE	REC RATE (B/D)
CC-11		30	32	540	179070	9.9	11.2	24.1	4.7	50.0	35	38	93
CC-13	*	30	36	650	330722	10.1	12.0	21.2	6.2	49.5	84	134	144
CC-15		30	10	600	166984	10.0	11.2	22.5	10.4	54.0	73	66	50
CC-17	*	30	21	650	232723	9.9	11.9	18.3	1.8	41.9	17	20	30
EE-11		30	24	620	186979	9.9	12.6	20.6	6.8	49.9	52	51	98
EE-13		30	45	600	335370	10.0	11.5	19.6	10.1	51.2	149	164	152
EE-15	*	30	42	650	313883	9.9	11.3	22.1	5.3	48.7	67	64	74
EE-17		30	22	520	149259	10.1	10.7	25.8	6.8	53.4	68	60	50
GG-13		29	33	620	290091	10.1	10.8	24.9	6.2	51.9	88	65	120
GG-15		30	39	620	310349	10.1	11.3	22.4	8.4	52.2	142	144	124
GG-17		30	25	540	196177	10.2	12.4	22.2	6.1	50.9	54	55	91
GG-19		30	35	540	271277	10.2	11.8	21.5	7.8	51.4	87	88	120
II-13	*	30	24	650	208574	10.1	11.6	8.9	0.8	31.5	4	33	43
II-15	*	30	20	650	203893	9.9	11.9	19.9	2.9	44.6	24	21	31
II-17	*	30	13	650	130776	10.0	14.8	18.1	6.1	49.0	35	26	36
KK-13	*	30	13	650	149688	10.2	11.9	16.6	1.4	40.1	8	8	18
KK-15	*	30	23	650	162784	10.0	10.7	18.2	1.8	40.8	13	10	20
MM-13	*	30	20	650	175026	10.3	9.4	14.0	1.1	34.8	7	9	19
MM-15	*	30	19	650	121753	10.1	8.1	26.9	6.2	51.4	30	38	48
OO-13	*	30	29	650	254995	10.0	11.6	14.8	2.6	38.9	27	47	57
OO-15	*	30	28	650	185573	10.0	11.5	15.8	1.8	39.2	13	17	27
QQ-13	*	23	32	650	249117	10.2	11.0	18.4	1.8	41.4	20	3	13
QQ-15	*	30	28	650	153960	10.2	11.0	16.6	3.9	41.6	23	33	43
SS-1	*	30	18	650	162464	8.3	5.3	6.8	0.9	21.4	6	6	16
SS-3	*	30	21	650	170972	9.9	8.3	17.8	4.0	40.0	40	36	46
SS-5		30	15	650	122640	10.3	10.4	21.3	13.2	55.2	179	108	28
SS-7		30	15	480	115206	10.0	9.9	28.1	5.1	53.2	27	23	39
SS-9	*	30	38	650	263508	9.9	9.8	10.2	2.9	32.8	28	25	35
SS-11	*	30	25	650	203122	10.0	9.4	14.8	2.8	37.0	27	25	35
TOTAL			745		5996535	10.0	11.0	19.0	4.9	44.9	1427	1417	1700

TARGETS (P.V.INJECTED): 10.0 11.0 19.0 32.0
BBLS.OF 625 PPM POLYMER REMAINING TO BE INJECTED: 1624221.0
DAYS REMAINING TO COMPLETE 625 PPM POLYMER INJECTION: 955.4

* DENOTES PROBLEM WELL.

5.0-ACRE INJECTION DATA SUMMARY

FLUID TYPE	PV	PROJECTED INJECTION HISTORY START	FINISH	INJECTION RATE DEVIATION REC RATE BASIS	THIS REPORT	LAST REPORT
SLUG	10	2/10/77	11/20/78	NO. WELLS WITHIN 5 % OF REC. RATE:	0	4
1156	11	11/20/78	1/14/80	NO. WELLS WITHIN 20 % OF REC. RATE:	5	7
800	19	1/15/80	3/ 5/82	NO. WELLS WITHIN 50 % OF REC. RATE:	23	23
625	32	3/ 5/82	12/31/85			

AVERAGE VISCOSITY : 18.7
AVERAGE SCREEN FACTOR : 16.6
TOTAL POLYMER INJECTED (LBS.) : 9297
TOTAL POLYMER CONCENTRATION (PPM): 625

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
PERIPHERAL INJECTION WELL REPORT
SEPTEMBER 1982 (30 DAYS)

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	520	35446	64	58	39
UU-5 *	30	10	520	59545	3	3	76
X-88 *	30	19	640	23402	13	9	8
X-91 **	--	30	--	97	--	--	--
X-94 **	--	23	--	11498	--	--	--
X-97 **	--	27	--	8596	--	--	--
X-3 **	--	29	--	12202	--	--	--
X-6	30	26	460	24267	2	2	43
X-9 **	--	9	--	17020	--	--	--
X-12 **	--	32	--	3868	--	--	--
A-12 **	--	51	--	48185	--	--	--
P-12	30	13	680	88379	30	26	110
Q-12 *	30	9	700	103873	38	35	30
R-12 *	30	26	680	36584	10	13	30
CF-6	30	40	0	134027	165	134	23
PI-1	30	17	380	24608	34	61	18
PI-3	30	25	400	20889	34	48	18
PI-4	30	32	200	26415	45	50	16
PI-6	30	26	200	34444	15	46	16
PERIPHERAL TOTALS		455		713345	453	485	985
5.0-ACRE TOTALS				279738	128	118	183
2.5-ACRE TOTALS				433607	325	367	244

* INDICATES 5.0-ACRE WELLS

** INDICATES WELLS PLUGGED AND ABANDONED

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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	30	22.2 1346.0 0.7	0.0 70.0 0.0	22.2 1416.0 0.7	0.001 0.061	133.1 15544.5 4.4	23252	1.000	0.058	0.669	0.17 0.09
XA-12	30	20.2 14215.4 0.7	256.7 40936.9 8.6	276.9 55152.3 9.2	0.005 0.957	1015.8 49098.0 33.9	57623	0.073	0.247	0.852	0.27 1.12
XA-14	28	194.2 8154.4 6.5	2408.5 53335.5 80.3	2602.7 61489.9 86.8	0.036 0.856	1584.6 68449.5 52.8	71828	0.075	0.114	0.953	1.64 0.90
AA-11	30	10.1 11927.3 0.3	599.6 79110.9 20.0	609.7 91038.2 20.3	0.019 2.894	701.9 34715.7 23.4	31456	0.017	0.379	1.104	0.87 2.62
B-0	30	12.1 2332.5 0.4	270.7 97724.0 9.0	282.8 100056.5 9.4	0.004 1.580	1107.6 97251.5 36.9	63309	0.043	0.037	1.536	0.26 1.03
EB-5	30	[illegible] 0.4	142.3 69105.4 4.7	154.4 71487.1 5.1	0.002 0.867	540.3 69131.2 18.0	82486	0.078	0.029	0.838	0.29 1.03
B-4	30	32.3 1378.1 1.1	616.0 17760.9 20.5	648.3 19139.0 21.6	0.026 0.760	326.1 19432.4 10.9	25188	0.050	0.055	0.771	1.99 0.98
B-6	30	0.0 671.7 0.0	16.3 3098.2 0.5	16.3 3770.0 0.5	0.001 0.137	231.2 11905.8 7.7	27488	0.0	0.024	0.433	0.07 0.32
B-8	30	6.1 1589.8 0.2	74.7 6371.9 2.5	80.7 7961.8 2.7	0.003 0.259	59.7 7616.2 2.0	30786	0.075	0.052	0.247	1.35 1.05
B-10	30	14.1 1036.4 0.5	4.7 623.8 0.2	18.8 1660.1 0.6	0.001 0.071	166.9 19726.9 5.6	23297	0.752	0.044	0.847	0.11 0.08

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
B-12	30	208.1	1238.9	1447.0	0.015	1498.4	96079	0.144	0.161	0.783	0.97
		15442.8	45094.9	60537.7	0.630	75212.6					0.80
		6.9	41.3	48.2		49.9					
B-14	30	208.1	2442.9	2651.0	0.019	2350.2	138324	0.078	0.094	0.779	1.13
		12959.1	121623.9	134582.9	0.973	107787.7					1.25
		6.9	81.4	88.4		78.3					
B-16	30	8.1	270.7	278.7	0.002	1986.9	142341	0.029	0.019	0.688	0.14
		2733.0	54217.7	56950.7	0.400	97992.4					0.58
		0.3	9.0	9.3		66.2					
D-0	30	50.5	345.3	395.8	0.008	812.0	50426	0.128	0.050	1.340	0.49
		2506.2	41742.2	44248.4	0.877	67560.4					0.65
		1.7	11.5	13.2		27.1					
D-2	30	20.2	189.0	209.2	0.002	705.4	90143	0.097	0.036	0.682	0.30
		3287.0	28693.7	31980.7	0.355	61448.4					0.52
		0.7	6.3	7.0		23.5					
D-4	20	10.8	292.4	303.2	0.006	716.6	47861	0.036	0.132	0.873	0.42
		6297.9	39543.9	45841.9	0.958	41793.7					1.10
		0.4	9.7	10.1		23.9					
D-6	30	60.6	1409.3	1469.9	0.015	961.8	95658	0.041	0.080	0.513	1.53
		7653.5	78242.5	85896.0	0.898	49031.1					1.75
		2.0	47.0	49.0		32.1					
D-8	30	10.1	170.3	180.4	0.002	531.7	79988	0.056	0.023	0.462	0.34
		1819.2	20081.1	21900.3	0.274	36937.9					0.59
		0.3	5.7	6.0		17.7					
D-10	30	0.0	200.7	200.7	0.005	59.1	36821	0.0	0.065	0.295	3.39
		2395.0	21029.6	23424.7	0.636	10863.0					2.16
		0.0	6.7	6.7		2.0					
F-0	30	12.1	191.3	203.4	0.005	189.6	39598	0.060	0.109	0.658	1.07
		4304.1	29524.4	33828.5	0.854	26057.5					1.30
		0.4	6.4	6.8		6.3					

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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-2	30	30.3	389.7	420.0	0.007	876.9	58501	0.072	0.106	0.666	0.48
		6175.6	25163.9	31339.5	0.536	38977.0					0.80
		1.0	13.0	14.0		29.2					
F-4	30	6.1	438.6	444.7	0.010	1112.6	43996	0.014	0.014	1.301	0.40
		619.7	16810.1	17429.8	0.396	57234.3					0.30
		0.2	14.6	14.8		37.1					
F-6	30	88.9	1341.6	1430.5	0.014	1464.8	100749	0.062	0.042	0.825	0.98
		4266.0	106564.0	110830.0	1.100	83160.3					1.33
		3.0	44.7	47.7		48.8					
F-8	30	12.1	238.0	250.1	0.003	1156.7	86889	0.048	0.011	0.722	0.22
		928.3	34485.9	35414.2	0.408	62746.2					0.56
		0.4	7.9	8.3		38.6					
F-10	30	14.1	158.7	172.8	0.003	179.0	51403	0.082	0.024	0.494	0.97
		1237.8	16275.2	17513.0	0.341	25381.6					0.69
		0.5	5.3	5.8		6.0					
F-12	30	12.1	105.0	117.1	0.004	221.5	32366	0.103	0.023	0.610	0.53
		728.6	12006.7	12735.3	0.393	19727.5					0.65
		0.4	3.5	3.9		7.4					
F-14	30	86.9	928.6	1017.5	0.025	751.2	40285	0.087	0.048	1.147	1.35
		1929.0	22046.3	23975.3	0.595	46209.0					0.52
		3.0	31.0	33.9		25.0					
H-0	30	34.3	385.0	419.3	0.011	276.1	38404	0.082	0.363	0.778	1.52
		13935.8	80301.0	94236.7	2.454	29864.5					3.16
		1.1	12.8	14.0		9.2					
H-2	30	14.1	184.3	198.5	0.003	933.6	76083	0.071	0.046	0.675	0.21
		3527.0	15445.3	18972.2	0.249	51390.3					0.37
		0.5	6.1	6.6		31.1					
H-4	30	32.3	422.3	454.6	0.005	1001.1	94033	0.071	0.079	0.752	0.45
		7467.8	73046.7	80514.4	0.856	70717.3					1.14
		1.1	14.1	15.2		33.4					

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
H-6	30	88.9	1273.9	1362.8	0.012	1045.7	109986	0.065	0.017	0.717	1.30
		1889.5	59901.6	61791.2	0.562	78885.0					0.78
		3.0	42.5	45.4		34.9					
H-8	22	65.2	958.2	1023.4	0.011	1157.0	95901	0.064	0.038	0.701	0.88
		3653.9	65513.7	69167.6	0.721	67179.4					1.03
		2.2	31.9	34.1		38.6					
H-10	30	30.3	996.3	1026.6	0.013	740.0	76555	0.030	0.044	0.721	1.39
		3406.5	48356.4	51762.9	0.676	55161.2					0.94
		1.0	33.2	34.2		24.7					
H-12	30	149.5	1889.9	2039.4	0.035	532.8	57907	0.073	0.074	0.774	3.83
		4311.3	50422.2	54733.5	0.945	44806.0					1.22
		5.0	63.0	68.0		17.8					
H-14	30	30.3	1066.3	1096.6	0.012	957.6	90003	0.028	0.099	0.862	1.15
		8913.3	90598.9	99512.2	1.106	77563.8					1.28
		1.0	35.5	36.6		31.9					
J-0	30	6.1	114.3	120.4	0.003	1410.3	41558	0.050	0.048	1.513	0.09
		2003.2	18000.0	20003.2	0.481	62889.6					0.32
		0.2	3.8	4.0		47.0					
J-2	30	60.6	858.6	919.2	0.011	806.2	81310	0.066	0.079	0.874	1.14
		6437.8	56368.7	62806.4	0.772	71047.1					0.88
		2.0	28.6	30.6		26.9					
J-4	30	177.8	1581.9	1759.7	0.014	1197.0	126673	0.101	0.036	0.668	1.47
		4523.9	83426.8	87950.7	0.694	84555.1					1.04
		5.9	52.7	58.7		39.9					
J-6	30	149.5	1169.0	1318.4	0.010	1050.2	127371	0.113	0.091	0.632	1.26
		11647.4	65372.9	77020.3	0.605	80546.9					0.96
		5.0	39.0	43.9		35.0					
J-8	30	48.5	569.3	617.8	0.005	658.6	124459	0.078	0.065	0.542	0.94
		8064.6	71732.7	79797.3	0.641	67401.9					1.18
		1.6	19.0	20.6		22.0					

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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-10	30	44.4	312.7	357.1	0.004	745.1	101349	0.124	0.037	0.623	0.48
		3799.2	31243.1	35042.2	0.346	63097.8					0.56
		1.5	10.4	11.9		24.8					
J-12	30	88.9	1273.9	1362.8	0.014	868.0	98442	0.065	0.013	0.685	1.57
		1311.8	44047.1	45358.9	0.461	67455.9					0.67
		3.0	42.5	45.4		28.9					
J-14	30	208.1	1994.9	2203.0	0.016	1559.3	133805	0.094	0.028	0.955	1.41
		3742.1	125214.2	128956.3	0.964	127747.5					1.01
		6.9	66.5	73.4		52.0					
L-0	30	44.4	1117.6	1162.1	0.020	985.0	57036	0.038	0.086	1.087	1.18
		4894.4	110307.1	115201.4	2.020	61993.1					1.86
		1.5	37.3	38.7		32.8					
L-2	30	0.0	359.3	359.3	0.005	1641.6	77129	0.0	0.035	1.213	0.22
		2717.6	37369.2	40086.9	0.520	93555.7					0.43
		0.0	12.0	12.0		54.7					
L-4	30	119.2	1271.6	1390.8	0.010	2484.9	133876	0.086	0.055	0.874	0.56
		7398.8	76171.5	83570.2	0.624	116961.0					0.71
		4.0	42.4	46.4		82.8					
L-6	30	60.6	1031.3	1091.9	0.008	2127.4	139935	0.056	0.069	0.895	0.51
		9698.3	74989.4	84687.6	0.605	125259.4					0.68
		2.0	34.4	36.4		70.9					
L-8	30	88.9	1994.9	2083.8	0.015	1014.8	143466	0.043	0.064	0.728	2.05
		9215.3	93227.3	102442.6	0.714	104424.6					0.98
		3.0	66.5	69.5		33.8					
L-10	30	60.6	961.3	1021.9	0.010	917.7	105002	0.059	0.061	0.898	1.11
		6437.4	83339.7	89777.1	0.855	94265.6					0.95
		2.0	32.0	34.1		30.6					
L-12	30	60.6	893.6	954.2	0.007	2266.6	141141	0.064	0.114	0.873	0.42
		16067.9	100333.7	116401.6	0.825	123163.7					0.95
		2.0	29.8	31.8		75.6					

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
L-14	30	14.1	1392.9	1407.1	0.011	2397.1	132995	0.010	0.043	1.031	0.59
		5672.0	113625.7	119297.7	0.897	137182.3					0.87
		0.5	46.4	46.9		79.9					
N-0	30	16.2	275.3	291.5	0.004	1914.8	76442	0.055	0.026	0.890	0.15
		2018.1	46958.9	48977.0	0.641	68065.2					0.72
		0.5	9.2	9.7		63.8					
N-2	30	14.1	1187.6	1201.8	0.012	2126.0	97694	0.012	0.062	0.935	0.57
		6074.9	120639.7	126714.6	1.297	91309.7					1.39
		0.5	39.6	40.1		70.9					
N-4	30	208.1	3541.9	3749.9	0.027	2729.2	138627	0.055	0.222	0.868	1.37
		30813.1	186653.8	217466.9	1.569	120394.4					1.81
		6.9	118.1	125.0		91.0					
N-6	30	149.5	2750.9	2900.4	0.017	2359.6	169978	0.052	0.121	0.866	1.23
		20595.2	176816.2	197411.3	1.161	147228.4					1.34
		5.0	91.7	96.7		78.7					
N-8	30	119.2	1649.6	1768.8	0.009	1730.6	187415	0.067	0.067	0.777	1.02
		12533.6	143998.0	156531.6	0.835	145663.2					1.07
		4.0	55.0	59.0		57.7					
N-10	30	119.2	1581.9	1701.1	0.010	2827.4	175851	0.070	0.074	0.903	0.60
		12991.7	143817.0	156808.6	0.892	158769.2					0.99
		4.0	52.7	56.7		94.2					
N-12	30	268.7	5604.4	5873.1	0.029	3817.7	204686	0.046	0.026	0.815	1.54
		5339.7	154896.6	160236.2	0.783	166883.6					0.96
		9.0	186.8	195.8		127.3					
N-14	30	60.6	1339.3	1399.9	0.006	3031.1	229987	0.043	0.025	0.830	0.46
		5809.6	158685.6	164495.1	0.715	190826.5					0.86
		2.0	44.6	46.7		101.0					
P-0	30	268.7	3653.8	3922.5	0.085	1617.2	46305	0.068	0.110	1.399	2.43
		5084.1	73459.1	78543.2	1.696	64768.3					1.21
		9.0	121.8	130.8		53.9					

MARATHON OIL COMPANY
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2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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-2	30	0.0 4566.3 0.0	0.0 56608.2 0.0	0.0 61174.5 0.0	0.0 0.658	1965.5 86695.1 65.5	92938	0.0	0.049	0.933	0.0 0.71
P-4	28	165.9 6294.4 5.5	2504.3 59675.4 83.5	2670.3 65969.7 89.0	0.026 0.654	1679.5 82045.5 56.0	100901	0.062	0.062	0.813	1.59 0.80
P-6	30	60.6 2431.2 2.0	788.6 82795.5 26.3	849.2 85226.7 28.3	0.005 0.510	1843.5 116004.9 61.5	167022	0.071	0.015	0.695	0.46 0.73
P-8	30	60.6 1223.4 2.0	1614.6 107280.1 53.8	1675.2 108503.5 55.8	0.010 0.653	2288.7 150868.8 76.3	166037	0.036	0.007	0.909	0.73 0.72
P-10	30	149.5 6095.4 5.0	1684.6 97846.7 56.2	1834.1 103942.1 61.1	0.010 0.551	3801.5 173431.7 126.7	188735	0.082	0.032	0.919	0.48 0.60
P-12	24	119.6 6027.6 4.0	2365.0 148918.6 78.8	2484.6 154946.2 82.8	0.016 0.981	3968.7 161333.2 132.3	157985	0.048	0.038	1.021	0.63 0.96
P-14	30	149.5 7243.2 5.0	1444.3 170697.6 48.1	1593.8 177940.8 53.1	0.008 0.889	2396.5 175293.6 79.9	200173	0.094	0.036	0.876	0.67 1.02
R-0	30	40.4 2138.0 1.3	872.6 73880.3 29.1	913.0 76018.3 30.4	0.018 1.522	1841.4 69434.0 61.4	49932	0.044	0.043	1.391	0.50 1.09
R-2	30	60.6 3643.2 2.0	1924.9 86679.7 64.2	1985.5 90322.8 66.2	0.021 0.967	1911.2 85485.7 63.7	93453	0.031	0.039	0.915	1.04 1.06
R-4	30	46.5 3967.6 1.5	392.0 24169.3 13.1	438.4 28136.9 14.6	0.008 0.500	1248.6 58343.6 41.6	56261	0.106	0.071	1.037	0.35 0.48

MARATHON OIL COMPANY
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2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
R-6	30	149.5 8630.8 5.0	1236.6 63317.7 41.2	1386.1 71948.4 46.2	0.014 0.722	2141.6 87494.6 71.4	99678	0.108	0.087	0.878	0.65 0.82
R-8	30	119.2 16712.7 4.0	2578.2 155389.5 85.9	2697.4 172102.2 89.9	0.017 1.090	3186.5 143083.4 106.2	157827	0.044	0.106	0.907	0.85 1.20
R-10	30	177.8 11557.0 5.9	2958.5 145365.8 98.6	3136.3 156922.7 104.5	0.020 0.980	4056.1 162805.0 135.2	160116	0.057	0.072	1.017	0.77 0.96
R-12	30	297.0 11150.3 9.9	3509.2 111502.8 117.0	3806.1 122653.1 126.9	0.023 0.755	3551.8 137126.7 118.4	162359	0.078	0.069	0.845	1.07 0.89
R-14	30	119.2 18357.8 4.0	1271.6 124388.2 42.4	1390.8 142745.9 46.4	0.008 0.867	2563.1 167341.9 85.4	164729	0.086	0.111	1.016	0.54 0.85
T-0	30	8.1 1144.4 0.3	151.7 29021.5 5.1	159.7 30166.0 5.3	0.004 0.763	2078.9 61881.6 69.3	39555	0.051	0.029	1.564	0.08 0.49
T-2	30	60.6 1692.0 2.0	1236.6 40670.8 41.2	1297.2 42362.8 43.2	0.018 0.574	1930.3 74004.3 64.3	73817	0.047	0.023	1.003	0.67 0.57
T-4	30	119.2 2905.7 4.0	1306.6 36692.6 43.6	1425.8 39598.3 47.5	0.024 0.664	1445.1 57934.0 48.2	59636	0.084	0.049	0.971	0.99 0.68
T-6	30	36.4 6736.9 1.2	511.0 44124.2 17.0	547.3 50861.1 18.2	0.007 0.679	1825.8 72031.1 60.9	74961	0.066	0.090	0.961	0.30 0.71
T-8	25	148.1 9055.1 4.9	5358.7 109623.9 178.6	5506.8 118679.0 183.6	0.039 0.843	3049.9 111805.2 101.7	140819	0.027	0.064	0.794	1.81 1.06

MARATHON OIL COMPANY
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2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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-10	30	208.1 12303.2 6.9	3989.8 118979.2 133.0	4197.9 131282.3 139.9	0.026 0.816	4162.8 145359.2 138.8	160801	0.050	0.077	0.904	1.01 0.90
T-12	30	238.4 3509.0 7.9	4125.2 116182.7 137.5	4363.5 119691.7 145.5	0.031 0.862	3090.5 133203.9 103.0	138801	0.055	0.025	0.960	1.41 0.90
T-14	30	208.1 4638.0 6.9	3404.2 141156.2 113.5	3612.3 145794.2 120.4	0.020 0.799	2281.0 141206.5 76.0	182561	0.058	0.025	0.773	1.58 1.03
V-0	30	8.1 510.8 0.3	252.0 42816.2 8.4	260.1 43326.9 8.7	0.004 0.632	1008.3 49743.6 33.6	68550	0.031	0.007	0.726	0.26 0.87
V-2	30	60.6 5242.3 2.0	1374.3 102480.4 45.8	1434.9 107722.7 47.8	0.016 1.200	1471.2 72075.6 49.0	89783	0.042	0.058	0.803	0.98 1.49
V-4	30	149.5 4847.1 5.0	1822.3 45683.7 60.7	1971.7 50530.9 65.7	0.030 0.771	1214.8 53907.5 40.5	65527	0.076	0.074	0.823	1.62 0.94
V-6	30	149.5 18546.9 5.0	1066.3 92743.6 35.5	1215.8 111290.4 40.5	0.021 1.945	1411.3 67052.1 47.0	57221	0.123	0.324	1.172	0.86 1.66
V-8	30	88.9 2648.4 3.0	963.6 45900.7 32.1	1052.5 48549.1 35.1	0.013 0.599	2129.8 87321.5 71.0	81115	0.084	0.033	1.077	0.49 0.56
V-10	30	62.6 9402.3 2.1	714.0 93492.5 23.8	776.6 102894.7 25.9	0.006 0.831	2446.7 119184.7 81.6	123793	0.081	0.076	0.963	0.32 0.86
V-12	30	119.2 15949.6 4.0	1376.6 128834.9 45.9	1495.8 144784.5 49.9	0.010 0.996	2607.2 145276.8 86.9	145395	0.080	0.110	0.999	0.57 1.00

MARATHON OIL COMPANY
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2.5-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
V-14	30	119.2	1581.9	1701.1	0.012	3555.7	146174	0.070	0.095	1.238	0.48
		13839.5	125010.1	138849.6	0.950	180899.1					0.77
		4.0	52.7	56.7		118.5					
TOTAL		7566.0	114777.6	122343.6	0.013	146521.4	9066200	0.081	0.066	0.865	0.83
		595322.7	6777492.3	7372813.7	0.813	7841690.2					0.94
		252.2	3825.9	4078.1		4884.1					

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5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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	27	175.0 6638.6 5.8	638.9 54323.8 21.3	813.9 60962.4 27.1	0.011 0.836	1694.6 98692.1 56.5	72916	0.215	0.091	1.354	0.48 0.62
AS-36	30	45.6 2447.1 1.5	2149.0 255639.6 71.6	2194.6 258086.6 73.2	0.018 2.091	1106.8 123345.4 36.9	123442	0.021	0.020	0.999	1.98 2.09
DD-10	30	33.4 5936.1 1.1	214.6 44995.1 7.2	248.0 50931.2 8.3	0.003 0.590	1009.4 57847.2 33.6	86394	0.135	0.069	0.670	0.25 0.88
DD-12	30	267.4 5172.4 8.9	7299.9 127344.7 243.3	7567.3 132517.1 252.2	0.022 0.389	2822.7 126088.8 94.1	340851	0.035	0.015	0.370	2.68 1.05
DD-14	30	625.9 16652.8 20.9	2272.8 171321.4 75.8	2898.7 187974.2 96.6	0.010 0.636	3208.5 144550.3 107.0	295683	0.216	0.056	0.489	0.90 1.30
DD-16	30	313.0 5007.6 10.4	1703.2 96708.2 56.8	2016.2 101715.7 67.2	0.009 0.435	1574.2 105627.1 52.5	234062	0.155	0.021	0.451	1.28 0.96
DD-18	30	91.2 3338.9 3.0	1254.7 59144.2 41.8	1345.9 62483.0 44.9	0.014 0.629	599.8 59938.5 20.0	99411	0.068	0.034	0.603	2.24 1.04
FF-12	30	267.4 4668.9 8.9	1177.7 140399.6 39.3	1445.1 145068.4 48.2	0.005 0.495	2441.4 131023.7 81.4	292955	0.185	0.016	0.447	0.59 1.11
FF-14	30	404.1 11322.9 13.5	3120.3 170734.6 104.0	3524.4 182057.4 117.5	0.010 0.524	3277.0 159185.8 109.2	347235	0.115	0.033	0.458	1.08 1.14
FF-16	30	261.3 8339.1 8.7	2074.7 124525.1 69.2	2336.0 132864.1 77.9	0.010 0.570	2422.0 123720.9 80.7	233092	0.112	0.036	0.531	0.96 1.07

MARATHON OIL COMPANY
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5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
FF-18	30	313.0 11800.7 10.4	1540.9 108989.9 51.4	1853.8 120790.5 61.8	0.011 0.734	1529.0 79873.6 51.0	164544	0.169	0.072	0.485	1.21 1.51
FF-20	30	6.1 2802.3 0.2	38.5 5618.5 1.3	44.6 8420.9 1.5	0.001 0.148	663.5 34807.0 22.1	57048	0.136	0.049	0.610	0.07 0.24
HH-12	25	111.4 4790.7 3.7	878.2 122591.9 29.3	989.6 127382.6 33.0	0.004 0.468	1407.0 119734.1 46.9	272292	0.113	0.018	0.440	0.70 1.06
HH-14	30	625.9 8266.2 20.9	1906.8 144970.3 63.6	2532.8 153236.4 84.4	0.009 0.546	1973.6 117116.7 65.8	280397	0.247	0.029	0.418	1.28 1.31
HH-16	30	267.4 10851.8 8.9	853.0 63489.0 28.4	1120.4 74340.7 37.3	0.005 0.334	1908.1 109209.6 63.6	222864	0.239	0.049	0.490	0.59 0.68
HH-18	30	358.5 5859.8 12.0	2027.9 120767.3 67.6	2386.4 126627.1 79.5	0.013 0.692	1332.3 81242.5 44.4	183019	0.150	0.032	0.444	1.79 1.56
HH-20	30	155.0 6408.5 5.2	283.4 8548.5 9.4	438.4 14957.0 14.6	0.006 0.220	663.5 34807.0 22.1	67865	0.353	0.094	0.513	0.66 0.43
JJ-12	30	103.3 5522.0 3.4	1100.6 126839.3 36.7	1203.9 132361.3 40.1	0.004 0.453	1591.0 144098.8 53.0	292199	0.086	0.019	0.493	0.76 0.92
JJ-14	30	51.7 1843.1 1.7	321.9 37707.1 10.7	373.6 39550.1 12.5	0.003 0.268	561.0 76142.1 18.7	147711	0.138	0.012	0.515	0.67 0.52
JJ-16	30	133.7 13156.6 4.5	608.1 85664.4 20.3	741.8 98820.9 24.7	0.004 0.593	521.6 66694.1 17.4	166634	0.180	0.079	0.400	1.42 1.48

MARATHON OIL COMPANY
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5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
LL-12	30	133.7	1216.2	1349.9	0.004	1480.4	327428	0.099	0.012	0.475	0.91
		3882.5	145382.9	149265.4	0.456	155407.4					0.96
		4.5	40.5	45.0		49.3					
LL-14	30	42.5	327.4	370.0	0.002	792.8	152809	0.115	0.011	0.551	0.47
		1639.9	33208.2	34848.1	0.228	84125.2					0.41
		1.4	10.9	12.3		26.4					
NN-12	30	91.2	2149.0	2240.1	0.009	1864.0	242122	0.041	0.032	0.532	1.20
		7757.4	218194.4	225951.7	0.933	128775.0					1.75
		3.0	71.6	74.7		62.1					
NN-14	30	401.1	2168.2	2569.3	0.010	1164.5	268441	0.156	0.010	0.323	2.21
		2789.3	66424.2	69213.5	0.258	86839.7					0.80
		13.4	72.3	85.6		38.8					
PP-12	22	66.8	1634.4	1701.3	0.008	2369.6	212400	0.039	0.058	0.789	0.72
		12256.1	144235.6	156491.7	0.737	167478.6					0.93
		2.2	54.5	56.7		79.0					
PP-14	30	616.8	3125.8	3742.6	0.013	754.5	288920	0.165	0.013	0.293	4.96
		3837.5	109781.0	113618.5	0.393	84642.9					1.34
		20.6	104.2	124.8		25.2					
PP-16	30	21.3	1400.5	1421.8	0.011	546.9	124520	0.015	0.011	0.408	2.60
		1401.4	53229.0	54630.4	0.439	50840.0					1.07
		0.7	46.7	47.4		18.2					
RR-2	30	224.8	1582.2	1807.0	0.009	964.5	208887	0.124	0.032	0.322	1.87
		6688.2	58482.5	65170.7	0.312	67306.1					0.97
		7.5	52.7	60.2		32.2					
RR-4	30	133.7	1623.4	1757.1	0.010	2417.9	182551	0.076	0.100	0.465	0.73
		18245.0	67659.7	85904.6	0.471	84872.1					1.01
		4.5	54.1	58.6		80.6					
RR-6	30	133.7	1136.4	1270.1	0.009	2376.2	141948	0.105	0.071	0.748	0.53
		10047.8	73904.2	83952.0	0.591	106132.9					0.79
		4.5	37.9	42.3		79.2					

MARATHON OIL COMPANY
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5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
RR-8	30	267.4 6413.3 8.9	2435.1 95686.4 81.2	2702.5 102099.7 90.1	0.012 0.442	1238.6 117669.4 41.3	230914	0.099	0.028	0.510	2.18 0.87
RR-10	30	63.8 3611.2 2.1	696.1 93645.6 23.2	760.0 97256.7 25.3	0.003 0.365	3000.6 160406.8 100.0	266817	0.084	0.014	0.601	0.25 0.61
RR-12	30	91.2 6072.0 3.0	1012.6 87163.9 33.8	1103.7 93235.9 36.8	0.005 0.417	913.7 85596.2 30.5	223502	0.083	0.027	0.383	1.21 1.09
RR-14	30	42.5 4233.3 1.4	343.9 19638.7 11.5	386.5 23872.0 12.9	0.005 0.297	436.2 51820.6 14.5	80481	0.110	0.053	0.644	0.89 0.46
TT-2	30	33.4 1582.9 1.1	657.6 61862.2 21.9	691.0 63445.1 23.0	0.006 0.581	1234.3 60939.6 41.1	109198	0.048	0.014	0.558	0.56 1.04
TT-4	30	133.7 9636.0 4.5	1095.1 101019.1 36.5	1228.8 110655.1 41.0	0.015 1.382	1103.7 55686.6 36.8	80067	0.109	0.120	0.696	1.11 1.99
TT-6	30	45.6 1130.5 1.5	1216.2 97265.3 40.5	1261.8 98395.7 42.1	0.024 1.868	1005.8 53962.6 33.5	52686	0.036	0.021	1.024	1.25 1.82
TT-8	30	39.5 1175.2 1.3	676.9 38114.9 22.6	716.4 39290.1 23.9	0.007 0.359	360.8 36967.5 12.0	109336	0.055	0.011	0.338	1.99 1.06
TT-10	30	76.0 8074.7 2.5	500.8 39637.2 16.7	576.7 47712.0 19.2	0.004 0.345	461.1 49475.7 15.4	138176	0.132	0.058	0.358	1.25 0.96
SC-14	30	15.2 1205.0 0.5	434.7 34905.1 14.5	449.9 36110.0 15.0	0.005 0.412	582.1 41142.4 19.4	87710	0.034	0.014	0.469	0.77 0.88

MARATHON OIL COMPANY
MARAFLOOD PROCESS - M-1 PROJECT
5.0-ACRE FIVE SPOT REPORT
SEPTEMBER 1982 (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
BP-18	30	0.0	33.0	33.0	0.000	515.8	82228	0.0	0.003	1.094	0.06
		233.8	7594.3	7828.1	0.095	89921.0					0.09
		0.0	1.1	1.1		17.2					
TOTAL		7284.0	56931.0	64215.0	0.008	57891.1	7591755	0.064	0.033	0.502	1.11
		252739.1	3717356.8	3970095.2	0.523	3813753.8					1.04
		242.8	1897.7	2140.5		1929.7					

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
XA-10	5.03C	5.57	5.57C	6.29	6.29C	6.29C	9.29	5.16	5.16C	5.16C		5.16C
XA-12	5.99	6.38	5.50	6.30	5.72	5.82	5.99	5.75	4.55	3.36		4.21
XA-14	9.32	9.91	8.80	8.30	8.99	6.84	7.19	11.90	4.19	3.82		2.83
AA-11	1.90	1.81	2.02	1.22	2.49	.98	1.10	1.85	.32	.67		1.16
B-0	1.10	1.17	1.29	1.30	1.22	1.13	1.23	.77	.42	.96		1.21
EB-5	1.33	1.45	1.55	1.82	1.54	1.29	1.05	.85	.68	1.17		1.28
B-4	8.05	9.04	5.29	8.63	7.75	7.95	8.15	6.14	6.53	5.98		4.84
B-6	.65	.71	.79	.93	.77	.77C	.66	.29	1.30	1.86		2.22
B-8	14.00	14.00C	14.00C	10.30	11.90	8.98	8.98C	12.20	18.00	19.04		17.30
B-10	3.82C	3.82C	3.82C	3.82C	.25	.25C	.25C	3.85	.10	.10C		.10C
B-12	9.96	10.70	9.65	10.80	10.30	11.50	10.60	10.00	9.28	9.46		9.28
B-14	5.18	5.15	4.62	5.29	5.06	5.09	5.11	5.89	4.02	3.42		3.91
B-16	3.43	3.87	3.80	3.91	3.73	4.37	3.23	3.54	4.01	5.31		4.59
D-0	4.06	4.89	5.02	6.70	4.92	6.70	4.19	3.40	6.98	8.02		7.89
D-2	10.10	10.50	10.50C	3.30	6.18	6.18C	6.18C	8.61	9.15	8.88		7.14
D-4	9.39	9.96	8.06	7.62	8.76	8.29	7.26	8.62	6.33	6.05		5.13
D-6	3.11	3.28	3.01	3.45	3.22	3.22	2.89	3.92	2.11	2.43		2.31
D-8	6.25	6.98	5.90	7.24	6.59	7.99	6.94	4.69	7.13	8.67		10.10
D-10	5.12	5.49	5.24	6.19	5.51	6.56	7.03	3.44	7.32	7.44		7.65
F-0	4.64	5.12	4.67	1.21	1.88	6.35	6.44	4.14	4.64	4.38		4.39
F-2	8.10	9.62	7.61	8.20	8.38	10.50	9.89	6.43	4.68	4.75		5.38
F-4	1.25	1.13	1.23	1.52	1.77	1.21	1.25	1.95	.71	.85		1.21
F-6	5.98	6.91	6.01	7.25	6.54	6.86	5.43	6.61	4.72	5.01		4.32
F-8	3.28	3.59	3.35	3.71	3.48	4.43	4.34	2.78	3.14	3.44		2.98
F-10	2.78	3.11	3.11	3.58	3.15	3.60	3.90	3.40	2.76	3.07		3.13
F-12	3.79	4.59	4.90	5.52	4.70	6.98	7.44	3.35	6.38	6.99		6.91
F-14	5.22	5.65	5.14	4.56	5.15	7.09	6.99	5.99	4.75	5.17		5.03
H-0	6.77	8.28	7.30	8.17	7.63	7.63C	7.63C	6.74	6.81	7.34		6.15
H-2	3.62	4.68	4.13	4.73	4.29	4.63	4.35	3.54	3.22	3.66		3.67
H-4	4.98	5.58	5.34	5.33	5.31	5.74	5.42	4.64	4.64	4.75		4.40
H-6	5.72	5.94	5.48	6.14	5.82	5.37	5.66	5.95	3.98	4.40		3.61
H-8	6.39	6.60	6.40	8.04	6.86	6.86	6.74	6.42	4.95	5.26		4.65
H-10	3.27	3.39	3.35	5.66	3.92	4.69	4.88	4.20	3.58	3.92		2.69
H-12	7.52	8.13	7.49	7.66	7.70	8.29	8.01	8.14	6.69	6.74		6.45
H-14	3.64	3.83	3.23	4.91	3.90	3.34	3.39	4.86	2.19	2.29		2.25
J-0	5.23	6.19	5.36	6.10	5.72	6.88	5.07	4.98	5.19	4.43		4.45
J-2	6.10	6.48	6.03	6.63	6.31	7.67	7.82	5.66	4.59	2.58		3.54
J-4	6.92	7.65	6.76	8.10	7.36	8.47	8.23	7.04	6.41	6.06		6.05
J-6	5.49	6.20	5.74	6.31	5.94	7.87	7.77	5.48	6.24	6.64		5.54
J-8	6.65	7.36	6.86	7.55	7.11	7.79	7.62	6.19	6.35	6.43		5.84
J-10	4.99	5.13	2.67	3.44	4.06	3.62	2.95	5.43	2.81	3.28		3.24

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
J-12	2.69	3.04	2.90	3.89	3.13	4.37	2.69	3.01	2.97	3.52		4.36
J-14	6.09	6.76	6.62	8.45	6.98	7.26	5.47	5.87	5.76	6.54		9.11
L-0	1.50	1.51	1.54	1.64	1.68	1.19	1.02	2.08	.51	.93		1.20
L-2	5.43	5.74	4.62	5.29	5.55	3.00	2.66	6.30	.65	1.20		1.56
L-4	7.17	7.64	7.20	7.96	8.00	7.09	6.42	6.80	5.59	5.74		4.68
L-6	3.04	3.36	3.18	2.29	2.01	2.82	2.50	3.41	1.63	1.98		1.87
L-8	5.15	5.16	4.54	5.71	5.14	4.13	4.41	5.79	2.62	2.80		2.65
L-10	6.61	7.37	5.94	7.05	6.74	7.19	7.00	6.82	5.86	6.02		5.36
L-12	10.60	10.10	7.97	9.47	9.54	10.00	9.33	9.37	8.12	7.20		6.59
L-14	5.97	6.14	5.24	5.21	5.01	5.48	5.84	6.12	3.73	3.81		3.72
N-0	.79	.91	.82	1.04	1.16	1.15	.97	1.01	.36	.74		1.06
N-2	3.74	3.89	3.24	3.63	3.63	3.22	3.04	3.95	1.90	2.02		2.04
N-4	6.08	5.97	4.71	4.87	5.41	4.89	4.92	6.93	2.56	2.48		2.34
N-6	7.34	7.48	6.20	7.02	7.01	5.84	5.44	8.28	3.87	3.50		3.32
N-8	8.96	9.41	8.04	10.30	9.18	9.14	9.68	9.35	6.44	6.35		6.10
N-10	10.30	10.60	9.16	9.82	9.97	11.10	11.40	9.42	7.83	8.37		7.57
N-12	8.00	9.21	7.70	8.71	8.41	9.20	9.66	8.47	7.13	7.68		8.05
N-14	6.40	6.82	6.01	6.98	6.55	7.15	7.52	6.74	5.62	6.02		5.39
P-0	6.17	7.25	3.91	3.73	4.00	2.96	2.64	6.80	1.08	1.44		1.49
P-2	4.53	4.47	3.96	5.22	4.55	4.43	4.39	4.55	2.87	3.30		3.34
P-4	5.89	6.67	7.10	7.76	6.86	8.17	8.91	5.98	4.98	5.12		4.45
P-6	4.92	5.43	4.53	5.34	5.06	5.96	5.61	4.56	3.91	4.45		4.43
P-8	5.02	5.19	4.69	5.57	5.12	6.82	7.04	4.93	5.07	5.74		5.60
P-10	5.70	5.94	5.07	5.66	5.59	5.98	6.38	6.31	3.54	3.97		3.80
P-12	4.68	4.85	4.26	4.27	4.52	4.97	5.16	5.29	2.96	3.30		3.32
P-14	9.28	9.02	7.47	8.97	6.67	8.55	9.00	9.35	5.96	6.51		5.92
R-0	2.01	2.33	2.20	2.68	2.75	3.26	2.49	2.36	.86	1.39		1.59
R-2	3.62	3.92	2.98	2.67	3.30	3.32	3.16	4.00	1.70	2.02		2.03
R-4	2.78	3.12	5.23	5.14	4.07	6.54	6.45	2.57	3.85	4.11		3.64
R-6	5.88	6.17	6.03	5.06	5.79	7.25	5.77	5.79	4.90	5.42		4.84
R-8	7.09	6.88	5.71	4.81	6.12	6.20	5.95	7.99	3.71	3.97		3.54
R-10	5.09	5.78	4.22	4.12	4.02	4.37	4.84	5.93	3.22	3.38		3.21
R-12	3.91	3.80	3.10	3.32	3.53	3.88	3.39	4.13	2.28	2.80		3.45
R-14	7.23	7.00	5.89	4.74	4.59	6.80	6.64	7.31	4.13	4.54		4.29
T-0	9.87	9.12	7.72	4.97	4.34	5.25	5.83	9.21	2.96	3.12		2.15
T-2	7.93	8.77	10.50	10.20	9.84	8.53	8.04	6.38	4.53	4.99		4.43
T-4	3.07	3.23	2.95	6.01	3.98	4.71	5.01	4.58	2.73	3.12		2.92
T-6	7.06	7.02	5.82	6.32	6.56	6.90	6.17	7.13	4.75	4.91		4.51
T-8	6.76	7.04	6.62	8.94	7.34	8.64	7.79	6.10	4.64	4.48		3.41
T-10	10.10	10.70	8.25	9.30	9.59	9.58	10.20	10.00	6.47	6.70		6.24
T-12	13.10	10.20	9.22	10.40	10.70	12.60	11.90	11.55	8.94	8.48		7.40

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
T-14	5.29	5.45	4.38	4.87	5.00	6.20	6.75	5.51	3.73	4.08		3.91
V-0	5.55	5.98	5.61	6.84	5.75	5.76	6.42	5.27	3.74	4.06		3.91
V-2	6.66	6.58	5.51	7.62	6.94	6.52	6.58	6.62	4.38	4.61		4.41
V-4	3.82	3.82	3.51	4.76	4.19	6.18	6.33	4.47	4.36	4.61		4.44
V-6	5.37	5.39	4.30	4.73	4.95	6.06	5.82	5.50	3.76	3.92		3.87
V-8	6.11	5.86	5.10	5.78	5.71	7.00	7.45	6.09	4.53	4.72		4.59
V-10	5.97	5.97	4.70	5.09	5.43	6.18	6.58	5.40	3.42	3.90		3.75
V-12	12.10	11.20	8.91	11.60	11.00	12.80	12.70	10.79	8.24	8.03		7.39
V-14	5.27	5.59	4.88	6.23	6.44	6.42	5.87	5.31	4.10	4.22		3.93

* CONCENTRATION IN WATER DIVIDED BY CONCENTRATION OF STANDARD 1 % SOLUTION OF M-1 SLUG.
C DATA CARRIED OVER FROM LAST MONTH.
\# ANALYSIS INDICATES LEVEL DUE TO OTHER THAN CRUDE OIL SULFONATE.

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
AS-35	2.57	2.72	2.62	2.77	2.64	4.77	5.44	1.86	3.10	3.62		3.82
AS-36	.83	.87	.93	1.27	.45	.97	1.05	.97	.29	.80		1.16
DD-10	3.59	3.98	3.59	4.16	4.06	5.88	6.19	3.00	3.82	4.10		4.26
DD-12	4.35	4.87	5.94	5.91	6.16	10.70	10.90	3.43	8.12	7.97		7.19
DD-14	7.68	8.29	8.26	7.84	5.93	8.25	8.59	6.17	8.77	10.27		9.50
DD-16	4.63	5.24	5.98	5.75	5.48	6.50	6.50	3.79	4.38	5.06		4.98
DD-18	4.45	4.92	5.25	4.92	5.12	4.25	4.45	5.82	4.11	4.05		4.13
FF-12	2.40	2.80	3.27	3.10	3.67	4.53	4.80	2.10	3.48	4.10		4.77
FF-14	7.72	8.83	8.92	8.65	8.39	10.70	10.20	6.56	11.20	11.49		10.90
FF-16	6.25	5.80	8.20	6.99	6.81	9.16	8.67	5.98	6.49	6.93		8.05
FF-18	6.34	5.47	7.43	6.89	6.75	6.46	6.04	5.77	6.13	6.58		6.12
FF-20	.20C	.20C	.20C	1.52	.69	.69C	.69C	.05	.10	.40		.41
HH-12	2.27	2.46	3.22	3.71	4.24	3.44	3.96	3.01	2.27	2.64		2.84
HH-14	7.84	8.74	2.85	3.23	4.32	10.40	10.40	8.72	12.10	12.11		11.60
HH-16	4.29	4.98	5.74	6.85	6.99	9.58	10.30	4.45	8.37	7.66		7.60
HH-18	5.66	6.20	6.84	2.73	5.01	11.50	11.80	5.18	8.23	8.59		7.57
HH-20	.46	.52	2.15	5.39	4.28	8.98	9.43	5.17	8.27	8.69		7.33
JJ-12	1.21	1.25	1.43	2.05	2.17	2.07	1.98	1.23	.93	1.34		1.96
JJ-14	1.38	1.34	1.60	2.19	2.73	1.89	1.76	1.47	.79	1.46		1.69
JJ-16	2.92	2.89	3.28	4.63	3.60	4.49	4.92	2.02	2.27	2.93		2.48
LL-12	2.78	2.92	3.09	5.58	3.78	5.76	6.03	7.20	3.61	4.62		4.26
LL-14	2.48	2.57	2.79	3.90	4.16	4.33	4.49	2.36	2.84	3.09		3.13
NN-12	1.14	1.25	1.53	2.64	3.50	1.89	1.98	1.54	.59	1.20		1.28
NN-14	2.90	3.14	3.60	4.31	4.87	4.85	4.47	2.84	3.19	4.02		3.55
PP-12	8.98	8.63	10.20	8.57	9.09	7.65	7.69	8.66	6.52	7.33		5.73
PP-14	6.42	6.54	7.78	7.67	7.47	9.64	10.00	6.31	6.40	7.22		6.95
PP-16	1.14	1.20	1.33	1.88	2.00	1.47	1.04	1.49	.46	1.01		1.34
RR-2	3.91	4.01	4.28	5.08	5.15	5.66	6.39	3.87	3.87	4.56		4.51
RR-4	4.82	5.31	5.40	6.38	6.62	5.29	5.42	5.33	4.18	5.15		3.03
RR-6	3.09	3.51	3.84	4.42	4.51	3.93	4.38	3.31	3.36	3.74		3.64
RR-8	3.75	3.88	2.71	4.71	4.73	4.27	4.78	3.95	4.05	4.06		5.24
RR-10	4.16	4.59	5.44	6.92	5.88	6.68	7.04	4.23	5.15	6.54		5.38
RR-12	5.59	5.50	5.77	6.35	6.72	5.98	6.38	5.37	5.67	6.14		5.49
RR-14	5.28	5.66	6.03	6.14	6.02	6.42	6.50	4.56	4.67	5.68		4.67
TT-2	1.70	2.22	2.47	2.61	2.77	1.25	1.25	1.92	.68	.99		1.12
TT-4	3.05	3.44	3.68	4.06	3.96	3.30	3.67	2.48	3.13	2.93		1.99
TT-6	1.86	1.88	2.29	3.52	3.55	2.15	2.54	2.05	1.62	2.14		2.13
TT-8	1.01	1.03	1.24	1.25	1.44	1.09	1.19	1.00	.46	.96		1.46
TT-10	3.91	4.45	4.81	5.92	5.32	6.00	6.58	3.72	5.84	5.63		5.45
SC-14	3.58C	3.58C	3.58C	1.55	.46	.40	.56	1.43	.10	.16		.53
BP-18	.35	.28	.44	.44	.37	.12	.05	.05	.10	.05		.36

* CONCENTRATION IN WATER DIVIDED BY CONCENTRATION OF STANDARD 1 % SOLUTION OF M-1 SLUG.
C DATA CARRIED OVER FROM LAST MONTH.

ANALYSIS INDICATES LEVEL DUE TO OTHER THAN CRUDE OIL SULFONATE.

MARATHON OIL COMPANY

MARAFLOOD PROCESS - M-1 PROJECT

2.5-ACRE CHLORIDE REPORT

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
XA-10	13042C	13080	13080C	9210	9210C	9210C	16030	10940	10940C	10940C		10940C
XA-12	10080	10580	10070	8220	7390	6920	6680	7540	7410	2640		5300
XA-14	4350	4220	4080	3970	3130	3480	2440	3240	3120	2870		3160
AA-11	4400	4320	4540	3540	2740	2450	2410	2150	1920	1880		1900
B-0	7820	7840	7340	7520	7120	7030	6890	7250	7230	6770		6690
EB-5	8200	8080	8000	7840	7640	7710	7700	7770	7950	7830		7530
B-4	2020	2130	2950	2250	1820	1980	1900	1880	1950	1720		1670
B-6	21300	21250	20980	20520	20030	20030C	19640	22060	20830	19990		20570
B-8	11000	11000C	11000C	12810	10760	7470	9880	9760	5460	9940		10790
B-10	9880C	9880C	9880C	9880C	24390	24390C	7370	24360	24620	24620C		24620C
B-12	8210	8040	7750	8100	7380	6960	7440	7290	7650	7210		6810
B-14	4200	3780	3670	3850	3480	3290	3240	3080	3130	3590		2850
B-16	8400	8480	8380	8530	8760	8280	8230	8200	8620	7670		7980
D-0	7590	7320	7300	6770	6620	6520	6480	6470	6270	5940		5780
D-2	6230	6510	6510C	6410	5670	5670C	5080	5040	5150	6210		5240
D-4	4200	4370	4360	4880	4040	4130	4340	4200	4220	4030		4290
D-6	4250	4030	4280	4230	3940	3730	3550	3460	3640	3440		3190
D-8	8240	8120	8500	8010	7160	7340	7140	6900	7820	6600		6910
D-10	9450	8360	8310	8090	10010	7620	7540	7890	8280	7780		7200
F-0	10670	10320	10100	9730	9710	9460	9440	9420	9640	9330		9120
F-2	9120	9960	9460	9320	9150	9540	9330	9590	6970	6320		7170
F-4	1830	1580	1830	2120	1760	2100	2100	2300	2570	1910		1920
F-6	3500	3220	3210	3100	3110	2970	3090	2970	3020	2940		2930
F-8	6150	6140	6070	6600	6190	6040	6080	6210	6090	5910		6050
F-10	8140	8000	8010	8560	7890	7860	7530	7950	8250	7750		7800
F-12	11760	11780	11380	11040	10580	10610	10190	10310	10630	9670		9520
F-14	7790	8590	8240	2730	2640	3220	2860	2920	3410	3460		4280
H-0	9550	9390	9400	9800	9060	9060C	7990	8390	7800	8030		7820
H-2	9160	9280	9360	9370	8880	9250	9180	9470	8110	7750		7890
H-4	4690	4590	4500	4680	4100	4130	4220	4850	4160	4100		4070
H-6	3240	3260	3330	3950	3540	3450	3320	3130	3260	3140		3160
H-8	6390	6360	6320	4330	4330	4360	4300	4750	4450	4180		3990
H-10	5980	5940	6070	4680	4430	4600	4370	4400	4650	4200		5320
H-12	4270	4250	4500	4660	4860	4640	4390	4670	4730	4370		3110
H-14	1570	1650	1600	1730	1540	1400	1390	1440	1170	1200		1150
J-0	9380	9100	9650	9150	8750	8800	8830	9800	9450	7460		7330
J-2	4330	4260	4340	4460	4190	4350	4300	4520	4180	2420		3390
J-4	5310	5060	5170	5430	4750	4760	4900	4970	5140	4120		5150
J-6	6150	5870	5820	5840	5670	5700	5470	6140	5810	5260		6100
J-8	5620	5510	5280	5790	5080	5050	4870	4730	5060	4530		4370
J-10	7940	7570	10560	9860	9040	9010	9010C	9160	8250	7360		6990

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
J-12	9390	8990	9320	8370	8290	8220	8220C	9290	8410	8000		7700
J-14	6150	5820	5700	6100	5380	5170	5240	5210	5480	5060		2910
L-0	6400	5550	5580	5790	5310	5200	4790	5150	4610	4290		4140
L-2	4200	4060	3550	3840	1800	2110	3030	1860	1090	1510		1730
L-4	4560	4290	4320	4660	3840	3670	3320	3370	3550	3300		3210
L-6	3200	2990	3130	1690	2920	2590	2450	2570	1990	2050		1770
L-8	3270	2970	2970	3260	2910	2330	2430	2680	2470	2090		2030
L-10	4770	4750	4640	4740	4410	4500	4480	4570	4580	4290		4130
L-12	6170	6430	6410	5990	4990	6120	6210	5910	6290	6190		5600
L-14	2380	2160	2140	2070	2080	1940	1810	1860	1880	1780		1780
N-0	9180	8770	8750	8900	8830	8600	7660	8130	7940	7600		7550
N-2	2340	2300	2470	2620	2390	2140	2280	2130	2160	2060		1880
N-4	4670	4320	4220	4070	3080	3520	3390	3040	2720	2410		2230
N-6	4110	4070	3870	4130	3610	3380	3420	2570	3290	3100		3050
N-8	3970	3910	3690	3930	3360	3230	3070	2840	2960	2930		2900
N-10	540	5300	5470	5260	4910	4730	4700	4410	4580	4200		4240
N-12	4980	5050	5120	5070	4760	4440	4260	4060	3900	3950		1970
N-14	5770	5650	5530	5280	5120	5030	5120	4800	4750	5080		4990
P-0	6250	5670	5620	5930	6030	5970	6010	6240	6100	5660		5180
P-2	6630	6640	6280	6920	6250	6180	6090	6090	5830	5630		6000
P-4	9260	8710	6320	4860	4080	4040	3850	3670	3640	3480		3670
P-6	6710	6520	6520	6690	6630	6510	6460	6360	6520	6350		6930
P-8	6400	6400	5930	6660	5520	5270	5160	4870	5380	4570		4670
P-10	6610	6260	5950	5460	5190	5030	4970	4950	5080	4970		5030
P-12	3150	3090	3020	3000	2840	2690	2530	2430	2620	2450		2590
P-14	4160	4100	3980	3970	3810	3550	3470	3350	3650	3290		3320
R-0	5280	5060	5460	5810	5890	5930	4380	2260	4870	4450		4600
R-2	2530	2310	2340	2080	2380	2300	1890	1860	1790	1600		1720
R-4	13870	13510	8910	9260	9790	9570	9700	9190	10170	10030		11030
R-6	9270	8860	7610	7060	6540	6400	6420	6260	6220	6030		6150
R-8	3760	3510	3510	3410	2950	2830	2580	2560	2620	2320		2190
R-10	5910	5710	5840	4750	4640	5320	4820	4280	4710	4280		4360
R-12	6530	6380	6530	6360	6340	6310	6210	6170	6220	6320		4650
R-14	5960	5820	5950	5060	5050	5090	4180	4630	4600	4240		4360
T-0	4930	4960	4560	4320	4520	4700	4580	4600	5130	4910		7670
T-2	7550	7450	2400	2760	2360	2850	2920	2510	2490	2520		2620
T-4	8820	8770	7860	8510	7310	6680	6490	6130	6300	5580		6030
T-6	8900	8520	8520	8520	7600	7720	3500	7310	7500	7110		7660
T-8	5000	4900	5320	4660	3810	3480	3290	2860	2760	2390		2090
T-10	4840	4750	5110	5660	5090	5140	5000	5100	5590	5160		5540
T-12	3590	4660	3980	3720	3370	3100	3080	2770	2750	2630		2700

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
T-14	4490	4060	4300	4320	3830	3790	3680	3410	3370	3220		3440
V-0	6000	5970	5540	6370	5700	5480	5620	5560	5630	5250		5430
V-2	5860	5520	5640	6100	5230	5290	5070	5050	5130	5030		4970
V-4	11840	12190	10310	10440	9320	8820	8050	8270	7520	6820		6600
V-6	8350	7810	7880	7710	7510	7240	7200	7110	6690	6530		6410
V-8	6040	6060	5520	5010	5060	5090	4650	4880	5230	5010		5090
V-10	6020	6050	5720	4980	4580	4190	4410	4140	4070	4200		4190
V-12	4160	4200	3880	3740	3550	3470	3950	3060	3140	2860		3090
V-14	4240	4190	4020	4200	4120	3680	3540	3520	3280	3060		2910

C DATA CARRIED OVER FROM LAST MONTH.

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
AS-35	12000	11750	11700	11380	11550	11490	11260	11490	11610	11320		11460
AS-36	9380	9870	9400	10160	9140	9140	9420	9290	9090	9000		9160
DD-10	9830	10040	9790	9390	9510	9550	9440	9780	9670	9500		9950
DD-12	8760	8930	8740	8620	8000	7940	8060	7620	7890	7480		7650
DD-14	8800	8640	8630	8860	8140	7630	7110	7270	6720	6870		6580
DD-16	9290	9440	9150	9310	8600	6720	6440	6790	6760	7000		6810
DD-18	12860	12570	12590	12640	12320	12510	12890	12750	12810	12650		12450
FF-12	8710	8550	8430	8380	8150	8130	7750	7800	7500	7410		7360
FF-14	8540	6590	6310	6140	6590	5740	5610	5260	5150	4960		4950
FF-16	8500	10600	10460	10280	9950	9740	10330	9560	9600	8860		7040
FF-18	9630	9250	9130	9460	8940	8450	8450C	8260	8510	8170		7890
FF-20	27430C	27430C	27430C	27180	27810	27810C	27810C	28900	29100	28600		28130
HH-12	9740	8990	9020	9190	8830	8930	8790	9030	8880	8740		8710
HH-14	6540	6330	6060	6440	5960	5570	5200	5690	5510	5170		4900
HH-16	11480	11990	11720	11430	10160	10350	8340	10200	9890	7470		7570
HH-18	7230	6850	6900	7150	6430	6430	6070	6200	6100	5730		5540
HH-20	27700	28010	15850	18990	17240	17580	16110	16090	16790	15200		14790
JJ-12	4120	4100	3750	4260	3690	4000	3910	3700	3690	3360		3650
JJ-14	9710	9510	9750	10750	9390	9710	9690	9840	9900	9580		9510
JJ-16	9740	9660	13590	9290	6420	9160	9620	8670	9150	8580		8250
LL-12	7230	6970	7000	7520	6570	6540	6570	6730	6360	6190		6010
LL-14	11220	11140	10990	11810	10950	10780	11010	10660	10760	11070		10720
NN-12	5380	5170	5050	5210	4820	4890	4730	4710	4610	4340		4130
NN-14	10370	13720	9450	13700	13440	13350	13560	13000	13340	13140		12830
PP-12	4210	4140	3630	4280	3850	3910	3600	3970	3790	3580		3350
PP-14	8500	8380	8280	8680	7990	8270	8090	7880	8390	8170		5960
PP-16	11180	11280	10800	12610	11130	11180	11100	11120	11030	10760		10710
RR-2	11000	11010	10570	10360	11980	9920	9860	9940	9840	9440		9190
RR-4	12550	12470	12090	12330	12120	11540	11420	11260	11630	11920		9010
RR-6	10570	10250	10100	10160	10050	10240	9550	9670	9810	9910		9400
RR-8	7510	7360	8340	7500	7550	7670	7480	7260	7870	7620		6470
RR-10	7210	7120	7340	6870	6690	6920	5880	6760	6850	6710		6860
RR-12	7800	7970	7900	8110	8040	8300	7740	7400	7480	7720		7600
RR-14	16530	16430	16140	16130	15650	16560	15750	15540	16130	16060		15370
TT-2	9500	9200	8960	9140	9380	9850	9410	9680	9610	10340		9040
TT-4	10510	10090	10990	11210	10580	10710	12040	10950	11150	11180		6420
TT-6	10020	9590	9360	10070	9450	9330	9300	9320	9720	10290		8780
TT-8	9930	9680	9940	9990	9970	9940	9600	9680	9980	10820		9620
TT-10	11950	11060	11060	10700	10790	11320	10590	10370	10540	10720		10260
SC-14	11486C	11486C	11486C	11370	10650	10710	10530	10810	10480	10560		10560
BP-18	13890	13980	13690	15160	13530	13650	14320	13120	13270	13580		14210

C-DATA CARRIED OVER FROM LAST MONTH.

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
XA-10				530								
XA-12	3124	1612	605	317	734	807	888		346	394		52
XA-14	10029	2692	2350	7844	5790	6311	3005		566	501		460
AA-11	38		181	256	198	214	240					3
B-0												
EB-5												
B-4	3554	3000	2100	2300	2843	3042	3437			439		125
B-6							8226					
B-8				6413	7635	8093						
B-10												
B-12	2257	384		40	93	98	113		442	1126		311
B-14	276	102		15	17	18	21		48	198		37
B-16						42	49					
D-0	34			40	41	1396	1647			60		54
D-2		5		1210	1368					1269		261
D-4	1677	776	140	320	387	437	620		327	376		238
D-6	218	166	212	407	437				181	222		170
D-8	85								140	922		2662
D-10	5					6	12		78	24		25
F-0	3			6	6	25	28					12
F-2	85	85		9	25					3		109
F-4						22	25		3	9		6
F-6	59	76	33	23	23					89		69
F-8										17		
F-10	2											
F-12	8									62		24
F-14	19	19								16		
H-0	161	81							199	145		10
H-2												4
H-4				22	30	29	34					
H-6	7	3							12	25		16
H-8	28	11							23	40		23
H-10										3		
H-12	26	26							29	23		35
H-14	3	14		69	122	116	132		54	3		3
J-0	11									10		
J-2	11									29		
J-4	3	3								533		
J-6	610	610	710	713	734	690	794		591	405		581
J-8	381	357	206	408	465	432	501		359			351
J-10	3											

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
J-12	78	68					30		126	115		179
J-14	34	32		31	35		38		44	39		69
L-0												
L-2				90	42	38	45					
L-4	70			20	17	18	18		57	44		
L-6	190	220		84	145	146	175		117	126		100
L-8	32	32										
L-10	47	3							32	33		
L-12	710	711	782	612	510	382	572		694	472		307
L-14	63	70	85	75	79	81	90			80		54
N-0												
N-2				20	18	19	21					
N-4	106	30	38	61	46	48	54		14	27		8
N-6	328	325	450	428		396	458		135	136		109
N-8	82	29							92	92		61
N-10	81	90							179	334		91
N-12	497	42	365	317	298	319	367		443	489		683
N-14	209	224	310	279	271	293	340		206	293		202
P-0	11											3
P-2												
P-4	74	63							203	947		201
P-6												
P-8						8	17					
P-10	13									6		
P-12	193	214	770	990	937	1021	1174		105	99		95
P-14	92	103	60	85	82	90	104		38	386		77
R-0										5		
R-2												
R-4										103		25
R-6	49	51							11	113		27
R-8	41	41							7	182		
R-10	7									76		
R-12									10	20		
R-14	112	110								208		4
T-0	410	391	100	5	22	24	30			56		
T-2										48		
T-4									62	43		
T-6	259	182		143	128	138	161		7	251		
T-8	43	105	201	226	185	198	234			243		35
T-10	173	190	166	74	67	71	84		61	142		19
T-12	110	115	90	105	96	101	121			673		23

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
T-14										19		
V-0										21		
V-2	79	3								144		58
V-4						61	67			258		119
V-6	15									88		22
V-8										113		57
V-10												9
V-12	94	7								318		21
V-14										95		17

(DATA REPORTED AS DPM/ML--DISINTEGRATIONS PER MINUTE/MILLIMETER OF TEST FLUID)
** BELOW BACKGROUND LEVEL

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

WELL ID	9-81	10-81	11-81	12-81	1-82	2-82	3-82	4-82	5-82	6-82	7-82	8-82
AS-35										3		
AS-36												3
DD-10												
DD-12										365		33
DD-14	20									651		51
DD-16	5											6
DD-18												
FF-12										12		45
FF-14	236	149	136	152	163	170	189		426	1162		659
FF-16	340	325	276	185	179	184	206		324	424		208
FF-18										63		12
FF-20												
HH-12												
HH-14	1792	1792	160	291	269	274	310		7458	2359		1319
HH-16	168	148		28	47	48	55		3805	677		578
HH-18	21								375	191		19
HH-20									262	383		102
JJ-12									3			
JJ-14												
JJ-16												
LL-12												
LL-14												
NN-12												
NN-14												
PP-12	1223	1296	440	660	594	594	689		282	519		319
PP-14	65	65	60	39	40	40	47		101	130		116
PP-16												
RR-2	397	404	255	214	247	242	586		217	252		297
RR-4	316	301							23	42		66
RR-6												29
RR-8												
RR-10												11
RR-12	722	664	600	523	518	502	697		840	914		959
RR-14	192	149	210	260	252	242	290		197	181		200
TT-2	102	153	63	97	145	138	152		74	60		69
TT-4	453	486	294	313	296	277	307		525	412		290
TT-6			13	9	31	84	40			5		8
TT-8				86	91		95					6
TT-10												
SC-14												
BP-18												

(DATA REPORTED AS DPM/ML--DISINTEGRATIONS PER MINUTE/MILLIMETER OF TEST FLUID)
** BELOW BACKGROUND LEVEL

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