DOE/BC/14960--12

4th Quarter, Fiscal Year 1995

POST WATERFLOOD CO2 MISCIBLE FLOOD IN LIGHT OIL FLUVIAL - DOMINATED DELTAIC RESERVOIRS.

DE - FC22 - 93BC14960

TEXACO EXPLORATION AND PRODUCTION INC.

November 10, 1995

RECEIVED
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CONTRACT & ASSISTANCE DIV.

Award Date: June 1, 1993.
Completion Date: December 31, 1997

Government Award for Current Fiscal Year

$ 1,042,421.00

Project Manager (Texaco) Sami Bou-Mikael
COR (DOE) Chandra Nautiyal
Contract Specialist (DOE) John Augustine

Reporting Period : July 1, 1995 through September 30, 1995

U.S./DOE Patent Clearance is not required prior to the publication of this document

MASTER

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POST WATERFLOOD CO_2 MISCIBLE FLOOD IN LIGHT OIL FLUVIAL DOMINATED DELTAIC RESERVOIRS"

"DE-FC22-93BC14960"
TECHNICAL PROGRESS REPORT

4th QUARTER, 1995.

EXECUTIVE SUMMARY.

Production from the Marg Area 1 at Port Neches is averaging 222 BOPD for this quarter. The production drop is due in part to mechanical problems and to poor sweep efficiency caused by water blockage that prevented the CO_2 from contacting new residual oil deeper in the reservoir. Alternating water and gas injection assisted to some extent in maintaining oil production and improved the reservoir yield by reducing the gas production. A workover was performed on well Kuhn #38 to correct failed gravel pack setting. Production from the well was restored to 60 BOPD. Plugging of the injection wells continue to be a problem, reducing the injection rate in critical areas of the reservoir, near well Kuhn #15R.

Texaco drilled the well Polk B #39 to The Marg Area 3 reservoir to gain structural position based on the 3D seismic, and found the sand present as anticipated. However, the sand did not have any hydrocarbon accumulation. For this reason, Texaco will abandon testing the idea of utilizing CO_2 to accelerate the primary production rate and reduce water production and primary production cycle time, in the reservoir.

4th QUARTER (1995) OBJECTIVES.

* Continue monitoring and optimizing reservoir performance.

The reservoir production during this quarter continued to decline due to mechanical problems in the injection and producing wells. The low reservoir sweep efficiency has been impeded by what appear to be water blockage from water injected initially to raise the reservoir pressure to the MMP, prior to CO2 injection. Since the water is an incompressible fluid injected in a closed reservoir, it can not be pushed back into an aquifer and therefore it must be produced before the injected CO_2 can contact the maximum amount of residual oil available in the reservoir. The sweep area will be minimized to a narrow strip between the injection and producing wells where the recovery is high initially until the narrow strip of oil is completely swept.

The producing wells will start to experience premature breakthrough of injection fluids. This was observed in at least 3 of the producing wells: Kuhn #33, Stark #8 and Kuhn #14. The reservoir production for this quarter, shown in Figure 1, averaged 222 BOPD mainly from three wells Kuhn #15R, Stark #8 and Kuhn #38.

During this period, a workover was performed to correct failed gravel pack setting on well Kuhn #38. The workover was completed and we were able to restore production from the well to a rate of 60 BOPD. Another workover was performed on well Kuhn #42 to plug it down to the Marg Area 1 reservoir. The workover will be discussed later in this report.

A second WAG cycle was initiated during this period by converting well Kuhn #17 to water injection and well Stark #7 to CO_2 injection. Recently, we also converted the horizontal Marg Area #1H well to water injection and Kuhn #17 to CO_2 injection after Stark #7 well quit taking any CO_2. A reservoir map is shown in Figure 2.

* Workover well Kuhn #42 to plug it down to the Marg Area 1 to increase the reservoir production.

The workover for well Kuhn #42 was postponed until September 1995 due to well utilization in the C-1 reservoir. The strategy is to plug down the well to the Marg Area 1 to improve the reservoir sweep efficiency and recover additional oil that could not have been recovered otherwise. As a result of the workover the well is currently producing water as indicated by the CHHL (TDT). Later we anticipate to see some hydrocarbon production displaced by the CO_2 injection in the Marg Area 1. After a three months testing period if we did not see any CO_2 in the well, we will evaluate converting it to an injector to displace the stagnant oil from this isolated area toward the center of the reservoir, to be recovered by wells Kuhn #15R and Kuhn #14. Well Kuhn #36 may require a workover to resume CO_2 injection in this section of the reservoir.

* Drill Polk B#39 as a CO_2 injection well to the Marg Area 3, after a successful completion of the discovery well Polk B#40 as a producer in the same reservoir. Upon well completion commence CO_2 injection by the OWC.

As stated earlier, Texaco drilled the discovery well Polk B#39 and found the sand to be wet. For this reason, Texaco will abandon testing the idea of utilizing CO_2 to accelerate the primary production rate and reduce water production and primary

production cycle time, in the reservoir. We will be evaluating other reservoirs in the Port Neches Field to perform the above test. This test will allow us to measure the economic impact of combining the tertiary and primary production utilizing CO_2.

DISCUSSION OF RESULTS - FIELD OPERATIONS.

Texaco is in the process of completing an update of the reservoir model using the Stratamodel to improve the reservoir description, and tertiary production information. This model update is carried out by Texaco Exploration and Producing Technology Division (EPTD) in Houston. The model should better quantify the tertiary oil recovery volume remaining to be produced from the project and the CO_2 volume required to recover the oil. The separation between the main northern portion and the southern portion of Area 1, confirm the presence of two different drive mechanism in the reservoir which will reduce the total recovery significantly. Based on Texaco's experience in other Gulf Coast reservoirs, Economical CO_2 project should only be conducted in pressure depleted reservoirs, where the oil saturation is at or above the Minimum Displaceable Oil Saturation (> 10% of the S_{or}), and where the gas channels will allow the CO_2 to penetrate deeper to contact the oil and recover it.

Texaco resumed CO_2 purchases from Cardox during the 4th quarter of the 1995 fiscal year. However, in light of the recent decline of oil production from the project, Texaco is evaluating the need for additional CO_2 volume required to recover the remaining tertiary oil. The reservoir model will be utilized to make this decision. The daily CO_2 purchases illustrated in figure 3 averaged 2636 MCFD. The following is a list of the most recent well tests taken during the month of September 1995 for the producing wells:

Kuhn #15R 167 BOPD, 714 BWPD, 1360 MCFD, 22 CHOKE.
Kuhn #38 58 BOPD, 390 BWPD, 1279 MCFD, 20 CHOKE.
Stark #8 16 BOPD, 394 BWPD, 349 MCFD, 28 CHOKE.

The Financial Status Report, Management Summary Report, Milestone Schedule and the Federal transaction report are included in Figure 4 through 9.

DISCUSSION OF RESULTS - TECHNOLOGY TRANSFER.

Texaco will be presenting a paper at the up coming SPE/DOE tenth symposium on IOR to be held in April of 1996. The paper is entitled: "A new analytical method to evaluate, predict and improve CO_2 flood performance in sandstone reservoirs".

1st Quarter (1996) Objectives.

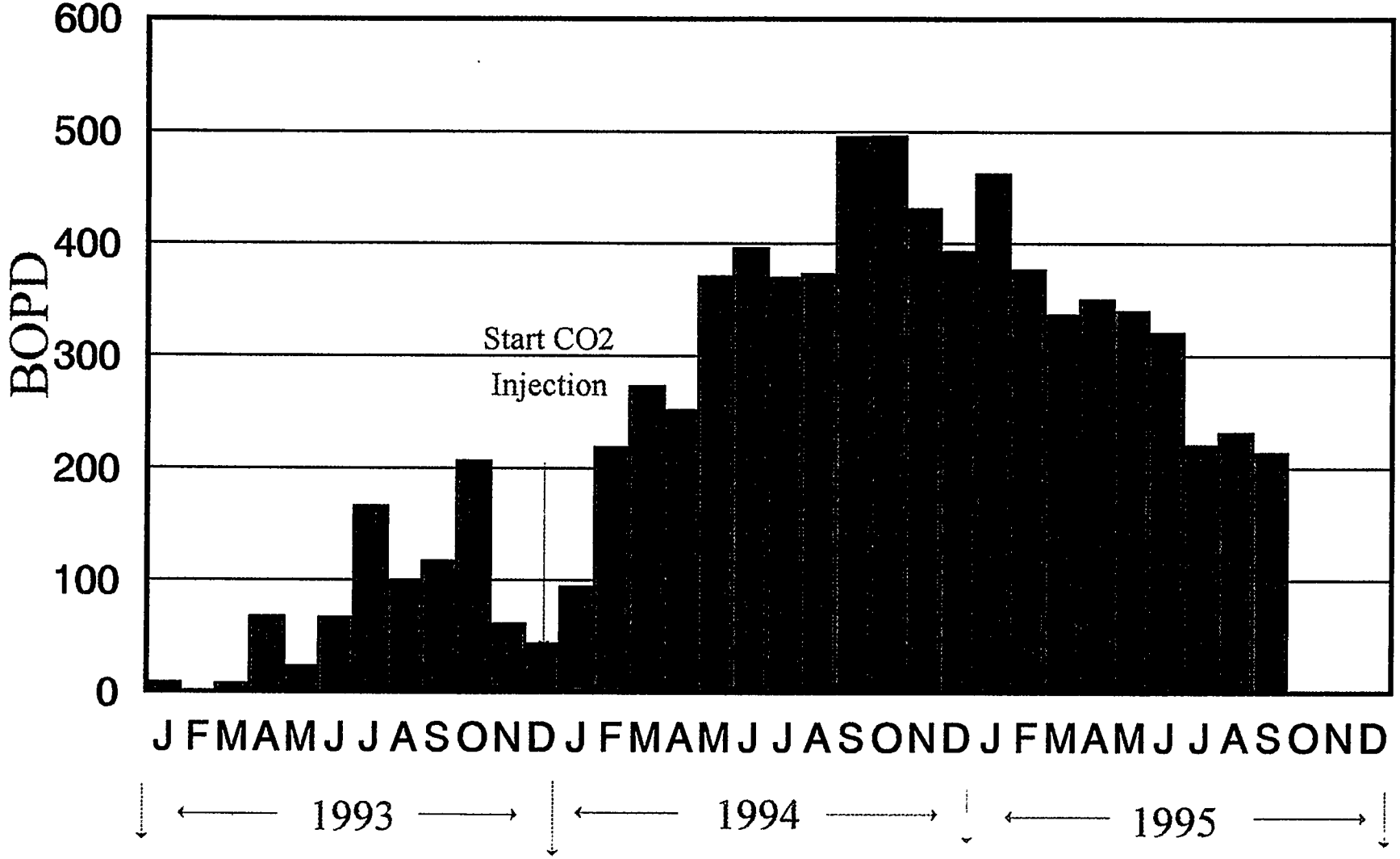
* Continue monitoring and optimizing reservoir performance.

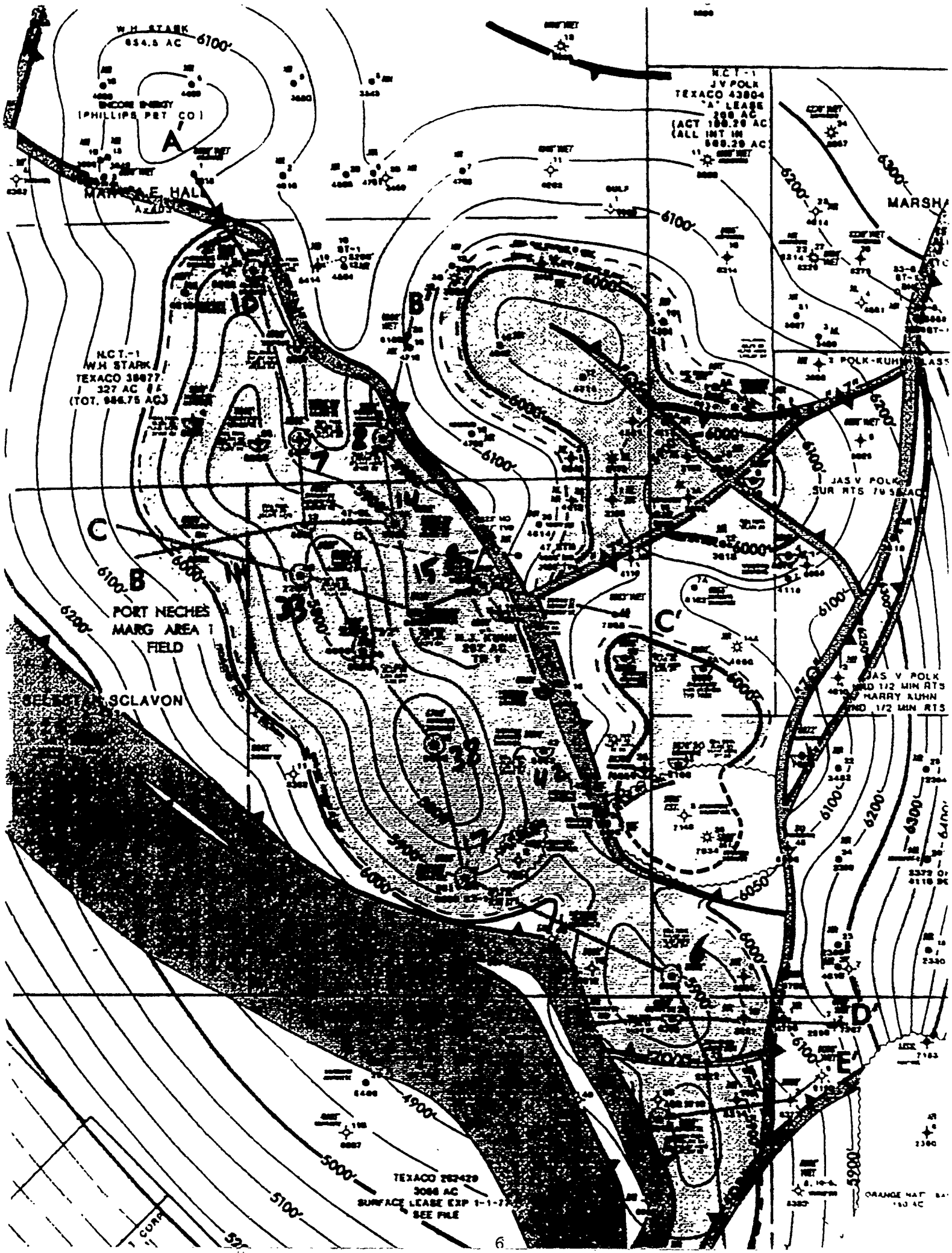
* Evaluate the need for additional CO_2 purchases.

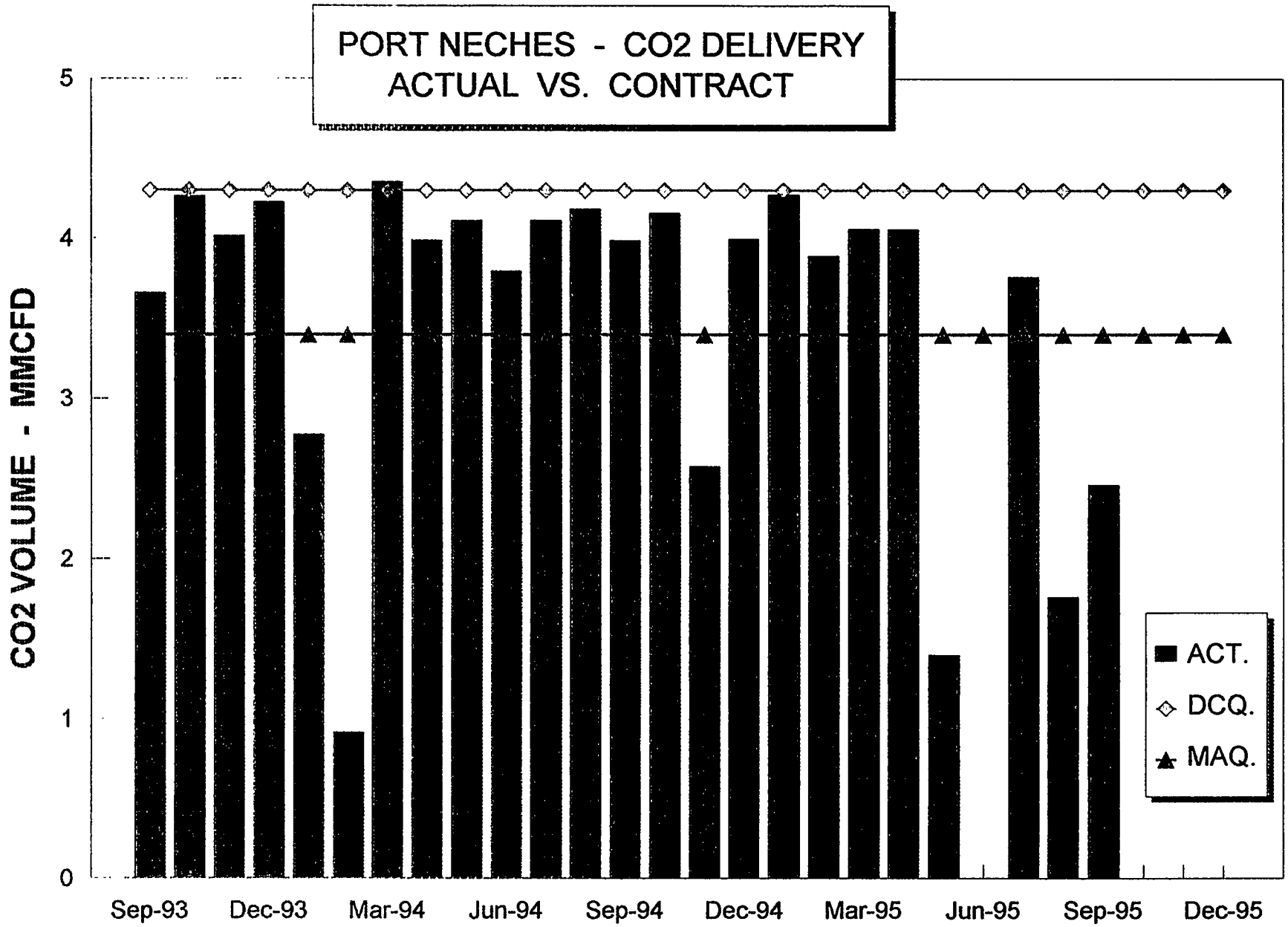
* Update the reservoir model.

Port Neches CO2 Project

Allocated Production




W.H. STARK
654.5 AC
ENCORE ENERGY
(PHILLIPS PET CO)
A
N.C.T.-1
J.V. POLK
TEXACO 43804
"A" LEASE
N.C.T.-1
W.H. STARK
TEXACO 38877
327 AC
(TOT. 986.75 AC)
B
C
PORT NECHES
MARG AREA 1
FIELD
SCLAVON
C'
D
D'
E
E'
6100'
6200'
6300'
6000'
6050'
5900'
5000'
5100'
4900'
TEXACO 262429
3066 AC
SURFACE LEASE EXP 1-1-77
SEE FILE
JAS V POLK
HARRY KUHN
MARSH


PORT NECHES - CO2 DELIVERY
ACTUAL VS. CONTRACT
CO2 VOLUME - MMCFD
0
1
2
3
4
5
Sep-93
Dec-93
Mar-94
Jun-94
Sep-94
Dec-94
Mar-95
Jun-95
Sep-95
Dec-95
ACT.
DCQ.
MAQ.

DOE F1332.2
(11-84)

U.S. DEPARTMENT OF ENERGY
SUMMARY REPORT

FORM APPROVED
OMB NO. 1901-1400

1. IDENTIFICATION NUMBER	2. PROGRAM/PROJECT TITLE	3. REPORTING PERIOD
DE-FC22-93BC14960	CLASS I	7/1/95 – 9/30/95

4. PARTICIPANT NAME AND ADDRESS
TEXACO Exploration & Production Inc.
400 Poydras St.
New Orleans, LA. 70130

5. START DATE: 6-1-93

6. COMPLETION DATE: 12-31-97

7. FY | 8. MONTHS

9. COST STATUS

a. $ Expressed in: MILLIONS

b. Budget and Reporting No. AC1510100

c. Cost Plan Date 6-23-93

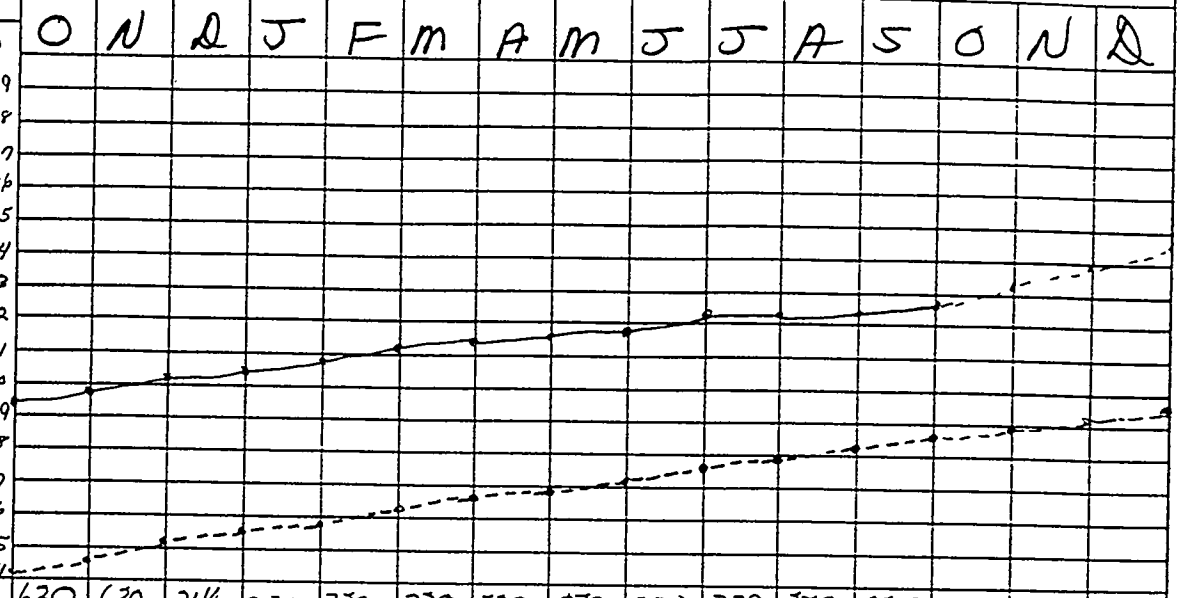
d. Actual Costs Prior Years 19,722

e. Planned Costs Prior Years 14,082

f. Total Estimated Cost for Contract 18,885

g. Total Contract Value 2.985

h. Estimated Subsequent Reporting Period



		O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Accrued Costs	g. Planned	630	630	214	330	330	330	330	330	330	330	330	330			
	h. Actual	214	239	319	490	300	252	91	255	321	135	80	229			
	i. Variance	416	391	<105>	<160>	30	77	<239>	75	09	195	250	101			
	j. Cumulative Variance	<2142>	<1751>	<1856>	<2016>	<1986>	<1909>	<1670>	<1595>	<1586>	<1591>	<1141>	<1040>			

10. LABOR STATUS

a. Labor Expressed in: THOUSANDS

b. Labor Plan Date: N/A Direct Labor

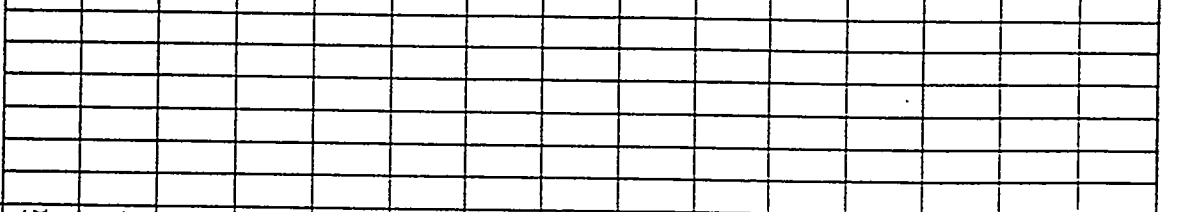
c. Planned Labor Prior Fiscal Years 530

d. Actual Labor Prior Fiscal Years 582

e. Total Estimated Labor for Contract 465

f. Total Contract Labor N/A

LEGEND
Planned: - - - - - -
Actual: _____
Projected: . . . . . .



		O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Labor	g. Planned	15	15	15	13	13	13	13	13	13	13	13	13			
	h. Actual	15	11	9	5	15	18	19	8	17	3	4	5			
	i. Variance	2	4	6	8	<2>	<5>	<6>	5	<4>	10	9	8			
	j. Cumulative Variance	<43>	<39>	<33>	<25>	<27>	<32>	<38>	<33>	<37>	<27>	<18>	<10>			

11. MILESTONES	STATUS	COMMENTS
a.		
b.		
c.		
d.		
e.		
f.		
g.		

12. SIGNATURE OF PARTICIPANT'S PROJECT MANAGER AND DATE

U.S. DEPARTMENT OF ENERGY
MILESTONE SCHEDULE [ ] PLAN [X] STATUS REPORT

DOE F1332.3
(11-84)

FORM APPROVED
OMB NO. 1901-1400

1. TITLE	2. REPORTING PERIOD	3. IDENTIFICATION NUMBER
Post Waterflood CO2 Miscible Flood in a Light Oil Fluvial Dominated Deltaic Reservoir	**Jul. 1, 1995 - Sept. 30, 1995**	**DE-FC22-93BC14960**
4. PARTICIPANT NAME AND ADDRESS **Texaco Exploration and Production Inc.** **400 Poydras St.** **New Orleans, LA 70130**		5. START DATE **June 1, 1993** 6. COMPLETION DATE **December 31, 1997**

7. ELEMENT CODE	8. REPORTIN ELEMENT	9. DURATION CURRENT FISCAL YEAR 1993												FY 1994				FY 1995				FY 1996	FY 1997	10. PERCENT COMPLETE	
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			a. Plan	b. Actual
1.1	Geologic & Engineering	1																						100%	100%
1.2	Extraction Technology	2																						100%	100%
2.1	Recording Daily Production										3												A	50%	50%
2.2	Reservoir Charac-terization										4			B				C						100%	100%
2.3	Site Operation & Field Work							D				5	E				F							100%	100%
2.4	CO2											6												50%	50%
2.5	EH&S Monitoring & Compliance								G	H		7											I	50%	50%
3.1	CO2 Screening Model														J	8								100%	100%
3.2	Environmental Analysis																	9						100%	100%
3.3	FDD Database & Model																	K				10		80%	80%
3.4	Technical Publications																L						11	50%	50%

11. SIGNATURE OF PARTICIPANT'S PROJECT MANAGER AND DATE

U.S. DEPARTMENT OF ENERGY
MILESTONE SCHEDULE [ ] PLAN [X] SCHEDULE
(ATTACHMENT)

DOE F1332.3 ATTACHMENT
(11-84)

1. TITLE	2. REPORTING PERIOD	3. IDENTIFICATION NUMBER
Post Waterflood CO2 Miscible Flood in a Light Oil Fluvial Dominated Deltaic Reservoir	**Jul. 1, 1995 - Sept.. 30, 1995**	**DE-FC22-93BC14960**
4. PARTICIPANT NAME AND ADDRESS **Texaco Exploration and Production Inc.** **400 Poydras St.** **New Orleans, LA 70130**		5. START DATE **June 1, 1993** 6. COMPLETION DATE **December 31, 1997**

MAJOR EVENTS	DATE	DESCRIPTION	STATUS
1	10/15/92	TASK 1.1 - GEOLOGICAL RESERVOIR DESCRIPTION AND LAB TESTS	COMPLETED
2	10/15/92	TASK 1.2 - PHASE 1 RESERVOIR SIMULATION	COMPLETED
3	08/01/93	TASK 2.1 - RECEIVE DOE APPROVAL TO INJECT CO2	COMPLETED
4	08/01/93	TASK 2.2 - RESERVOIR PRESSURE IS RAISED TO 2700 PSI BY WATER INJECTION	COMPLETED
5	08/15/93	TASK 2.3 - CO2 INJECTION AND PRODUCTION FACILITY IS COMPLETED	COMPLETED
6	08/15/93	TASK 2.4 - CO2 PIPELINE IS INSTALLED	COMPLETED
7	08/15/93	TASK 2.5 - NEPA CATEGORICAL EXCLUSION IS RECEIVED	COMPLETED
8	12/31/95	TASK 3.1 - SPE PAPER AND RELEASE OF CO2 SCREENING MODEL	COMPLETED
9	12/31/94	TASK 3.2 - TOPICAL REPORT ON ENVIRONMENTAL CONSTRAINTS	COMPLETED
10	12/31/95	TASK 3.3 - TOPICAL REPORT ON FDD DATABASE	PROJECT 80% COMPLETE
11	12/31/97	TASK 3.4 - SPE PAPER ON RESERVOIR CHARACTERIZATION	TO BE PRESENTED 1997

INTERMEDIATE EVENTS	DATE	DESCRIPTION	STATUS
A	12/31/97	TASK 2.1 - FINAL PROJECT REPORT	TO BE COMPLETED DURING 1997
B	12/31/93	TASK 2.2 - UPDATED RESERVOIR MODEL COMPLETED	COMPLETED
C	12/01/94	TASK 2.2 - CONVENTIONAL CORE ANALYZED IN POLK "B" #39 WELL	DEFERRED
D	04/30/93	TASK 2.3 - 10 WELL WORKOVER PROGRAM COMPLETED	COMPLETED
E	10/01/93	TASK 2.3 - HORIZONTAL CO2 INJECTION WELL DRILLED, POLK "B" #2 W/O PERFORMED	HORIZ. WELL COMPLETE, POLK "B" W/O CANCELLED
F	12/01/94	TASK 2.3 - VERTICAL CO2 INJECTION WELL DRILLED (POLK "B" #39)	CANCELLED
G	06/10/93	TASK 2.5 - PERMIT FOR CO2 PIPELINE RECEIVED FROM ARMY CORPS OF ENGINEERS	COMPLETED
H	06/30/93	TASK 2.5 - HAZARDOUS SUBSTANCE PLAN SUBMITTED TO DOE	COMPLETED
I	12/31/97	TASK 2.5 - FINAL HAZARDOUS SUBSTANCE PLAN SUBMITTED TO DOE	TO BE COMPLETED DURING 1997
J	12/31/94	TASK 3.1 - CO2 SCREENING MODEL FINAL REPORT SUBMITTED TO DOE	COMPLETED
K	12/31/94	TASK 3.3 - FDD DATABASE STUDY IS COMPLETED BY LSU	LSU WORK WILL BE COMPLETED IN SPRING, 1996
L	04/18/94	TASK 3.5-1ST SPE PAPER PRESENTED-PROJECT IMPLEMENTATION	COMPLETED

11. SIGNATURE OF PARTICIPANT'S PROJECT MANAGER AND DATE

FINANCIAL STATUS REPORT
(Short Form)

1. Federal Agency and Organizational Element to Which Report is submitted	2. Federal Grant or Other Identifying Number Assigned By Federal Agency	OMB Approval No. 0348-0039	Page	of
U. S. Department of Energy	DE-FC22-93BC14960		1	1 pages

3. Reciepient Organization (Name and complete address, including ZIP code)

Texaco Exploration and Production Inc. 400 Poydras St. New Orleans, LA 70130

4. Employer Identification Number	5. Recipient Account Number or Identifying Number	6. Final Report	7. Basis
51-0265713	323037151	[ ] Yes [X] No	[X] Cash [X] Accrual

8. Funding/Grant Period (See Instuctions) From: (Month, Day, Year)	To: (Month, Day, Year)	9. Period Covered by this Report From: (Month, Day, Year)	To: (Month, Day, Year)
January 1, 1995	December 31, 1997	07-01-95	09-30-95

10 Transactions	I Previously Reported	II This Period	III Cumulative
a. Total outlays	$1,677,079.16	$477,722.06	$2,154,801.22
b. Recipient share of outlays (64.39%)	$1,079,871.27	$307,605.23	$1,387,476.51
c. Federal share of outlays (35.61%)	$597,207.89	$170,116.83	$767,324.71
d. Total unliquidated obligations	0.00	0.00	0.00
e. Recipient share of unliquidated obligations	0.00	0.00	0.00
f. Federal share of unliquidated obligations	0.00	0.00	0.00
g. Total Federal share (Sum of lines c and f)	$597,207.89	$170,116.83	$767,324.71
h. Total Federal funds authorized for this funding period	$2,984,599.00	$0.00	$2,984,599.00
i. Unobligated balance of Federal funds (Line h minus line g)	$2,387,391.11	($170,116.83)	$2,217,274.29

11. Indirect Expense	a. Type of Rate (Place "X" in appropriate box)			
	[X] Provisional	[ ] Predetermined	[ ] Final	[ ] Fixed
(Labor)	b. Rate	c. Base	d. Total Amount	e. Federal Share
	89.34%	$11,823.26	$10,562.90	$3,761.45

12. Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation

13. Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents.

Typed or Printed Name and Title	Telephone (Area code, number and extension)
Sami Bou-Mikael - Project Manager	(504) 593-4565
Signature of Authorized Certifying Official	**Date Report Submitted**
	August 17, 1995

Standard Form 269A (REV 4-88)

Previous Editions not Usable

Prescribed by OMB Circulars A-102 and A-110

Approved by Office of Management and Budget No 80-80182

FEDERAL CASH TRANSACTIONS REPORT

(See instructions on the back. If report is for more than one grant or assistance agreement, attach completed Standard Form 272-A.)

1. Federal sponsoring agency and organizational element to which this report is submitted **U. S. Department of Energy**

2. RECIPIENT ORGANIZATION

Name **Texaco Exploration and Production Inc.**

Number and Street **400 Poydras St.**

New Orleans, Louisiana 70130

City, State and Zip Code:

4. Federal grant or other identification number **DE-FC22-93BC14960**

5. Recipient's account number or identifying number **323037151**

6. Letter of credit number **NA**

7. Last payment voucher number **-**

Give total number for this period

8. Payment Vouchers credited to your account **-**

9. Treasury checks received (whether or not deposited) **0**

10. PERIOD COVERED BY THIS REPORT

FROM (month,day,year) **07/01/95**

TO (month,day,year) **09/30/95**

3. FEDERAL EMPLOYER IDENTIFICATION NO> 51-0265713

11.STATUS OF FEDERAL CASH	a. Cash on hand beginning of reporting period	$0.00
	b. Letter of credit withdrawals	$0.00
	c. Treasury check payments	$0.00
	d. Total receipts (Sum of lines b and c)	$0.00
	e. Total cash available (Sum of lines a and d)	$0.00
	f. Gross disbursements	$0.00
	g. Federal share of program income	$0.00
	h. Net disbursements (Line f minus line g)	$0.00
	i. Adjustments of prior periods	$0.00
	j. Cash on hand end of period	$0.00
12. THE AMOUNT ON LINE j. REPRESENTING	13. OTHER INFORMATION	
	k. Interest income	$0.00
	l. Advances to subgrantees or subcontractors	$0.00

14. REMARKS

15. CERTIFICATION

AUTHORIZED CERTIFYING OFFICIAL	SIGNATURE	DATE REPORT SUBMITTED **11/15/95**
	TYPED OR PRINTED NAME AND TITLE **Sami Bou-Mikael - Project Manager**	TELEPHONE (Area Code, Number, Extension) **(504) 593-4565**

THIS SPACE FOR PRIVATE USE

272-102

STANDARD FORM 272 (7-76)

Prescribed by Office of Management and Budget

Cir. No. A-110