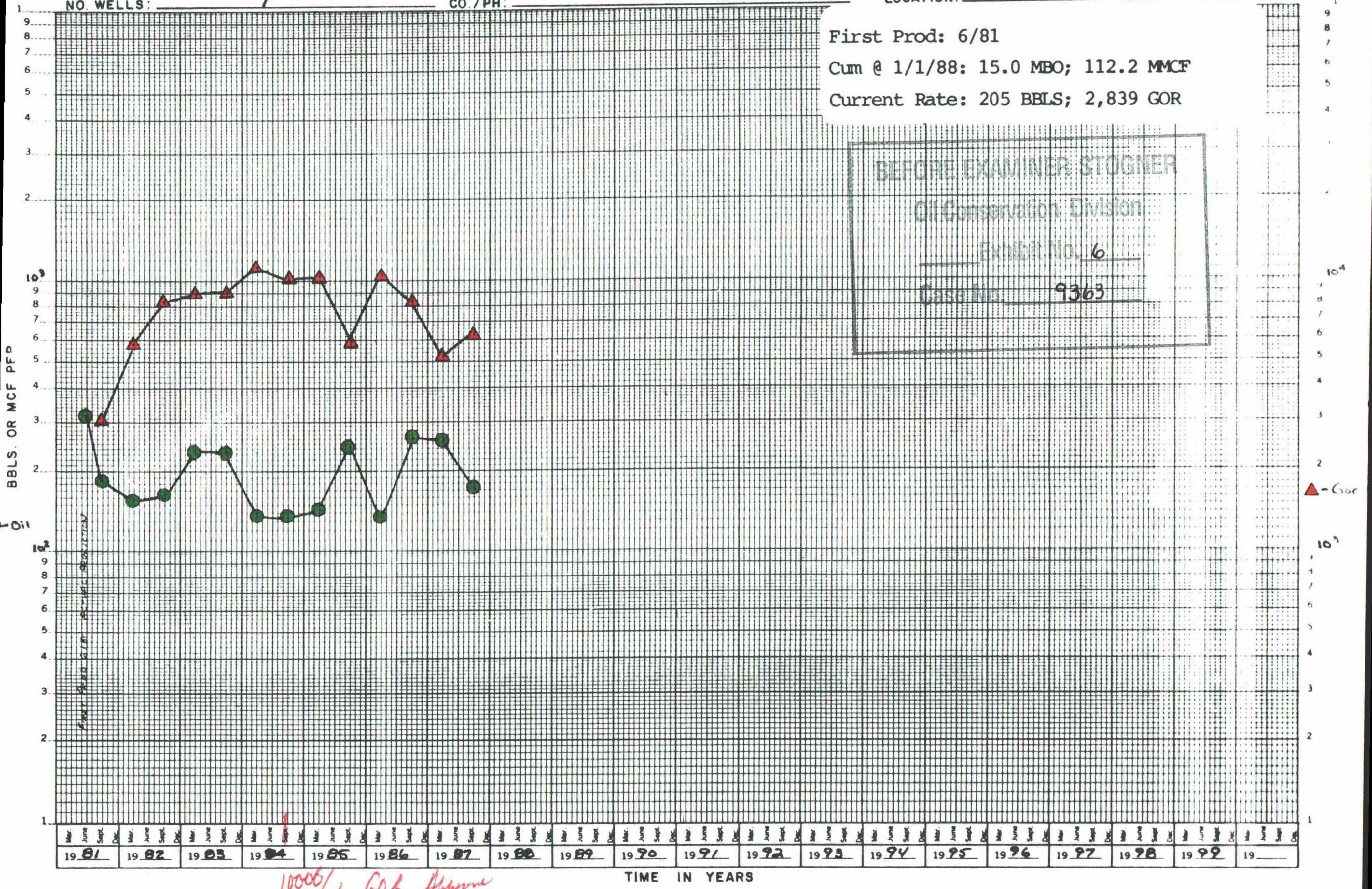
FIELD: Foster
LEASE/UNIT: Foster No. 1
NO. WELLS: 1

RESERVOIR: San Andres
PERFS:
CO./PH:

STATE: New Mexico
OPERATOR: Texas American Oil
LOCATION:

First Prod: 6/81
Cum @ 1/1/88: 15.0 MBO; 112.2 MMCF
Current Rate: 205 BBLS; 2,839 GOR

BEFORE EXAMINER STOGNER
Oil Conservation Division
Exhibit No. 6
Case No. 9363



10,000/1 GOR Allowance

ACCT CODE NO.
LEASE NAME
WELL NO.

FIELD: Foster RESERVOIR: San Andres STATE: New Mexico

LEASE/UNIT: Harvard No. 1 PERFS: OPERATOR: APC

NO. WELLS: 1 CO./PH: LOCATION:

First Prod: 6/84

Cum @ 1/1/88: 26.0 MBO; 452.1 MMCF

Current Rate: 456 BBLS; 23,826 GOR

BEFORE EXAMINER STOGNER
Oil Conservation Division
Exhibit No. 7
Case No. 9363

BBLS. OR MCF PER MONTH

●- Oil

▲- Gas

Mar. June Sept. Dec.

19 84 19 85 19 86 19 87 19 88 19 89 19 90 19 91 19 92 19 93 19 94 19 95 19 19 19 19 19 19 19 19

TIME IN YEARS

ACCT CODE NO. LEASE NAME WELL NO.

FIELD: FOSTER RESERVOIR: SAN ANDRES STATE: N.M.

LEASE/UNIT: HARVARD No 1 PERFS: OPERATOR: ANADARKO PET. CORP

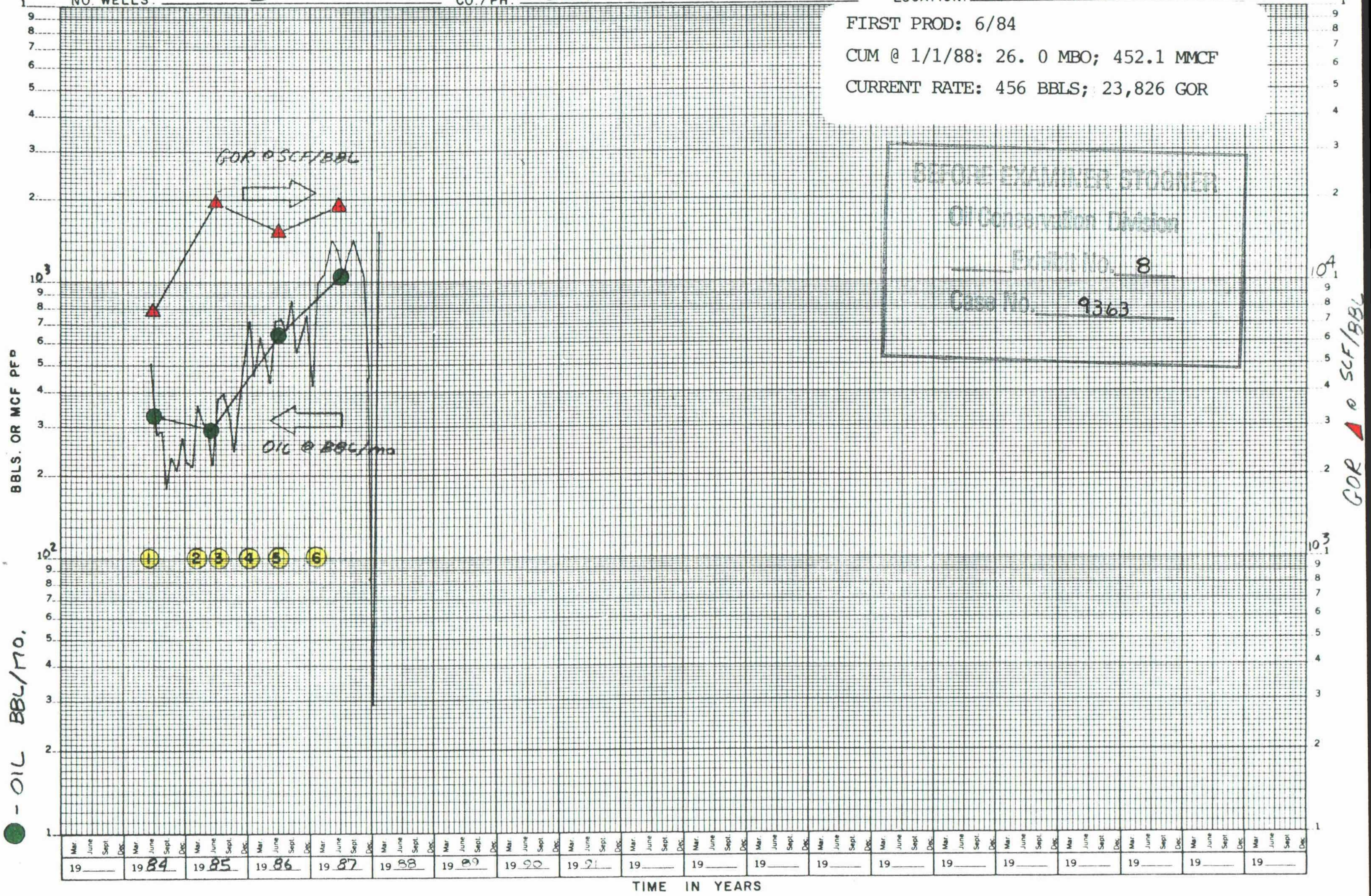
NO. WELLS: 1 CO./PH: LEA LOCATION: 31-18S-39E

FIRST PROD: 6/84

CUM @ 1/1/88: 26. 0 MBO; 452.1 MMCF

CURRENT RATE: 456 BBLS; 23,826 GOR

BEFORE EXAMINER STOGNER
Oil Conservation Division
Exhibit No. 8
Case No. 9363



ACCT CODE NO. ______ LEASE NAME ______ WELL NO. ______

ANADARKO PETROLEUM CORP.
HARVARD NO. 1
FOSTER (SA) FIELD
EQUIPMENT HISTORY

1. Initial completion, install American D-160 w/1-1/2" insert pump. (Pump Capacity: 180 B/D).

2. Well not pumping down, install American D-320 w/1-3/4" insert pump. (Pump Capacity: 200 B/D).

3. Well not pumping down, change pump to 2" insert. (Pump Capacity: 285 B/D).

4. Well beginning to pump down, pump gas locking, add gas anchor, lower pump below perforations, and install casinghead back pressure valve. (Pump Capacity: 345 B/D).

5. Well not pumping down, change pump to 2-1/4" tubing pump. (Pump Capacity: 460 B/D).

6. Install Lufkin Mark II D-456 w/2-1/4" tubing pump. (Pump Capacity: 535 B/D).

ROBERT L. SUMMERS
President
BURTON VETETO
Vice-President
MRS. JO JOHNSON
Secretary-Treasurer

MARTINDALE PETROLEUM CORPORATION

MARK VETETO
Drlg. & Prod. Eng.
MRS. JUDY JOHNSON
Drlg. & Prod. Clerk

P. O. BOX 2403
HOBBS, NEW MEXICO 88241
(505) 397-7750

3/22/88

C-K

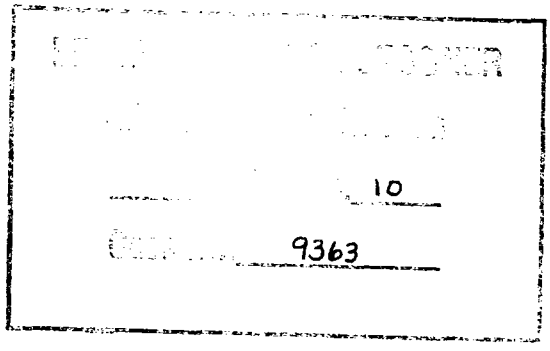
ANADARKO PETROLEUM COMPANY
P.O. BOX 2497
MIDLAND, TEXAS 79702
ATTN: TOMMY THOMPSON

MR. THOMPSON,

IN REGARDS TO OUR TELEPHONE CONVERSATION MARCH 22, I SUPPORT ANADARKO IN THEIR ATTEMPT TO RAISE GOR LIMITS TO 20,000 : 1 OVER THE CURRENT FIELD RULES OF 10,000 : 1 IN THE FOSTER SAN ANDRES EAST POOL. MARTINDALE PETROLEUM CORPORATION CURRENTLY OPERATES THE #1 FOSTER LOCATED IN UNIT D OF SECTION 5, TOWNSHIP 19 SOUTH, RANGE 39 EAST OF LEA COUNTY. THIS WELL IS CURRENTLY PRODUCING FROM THE FOSTER SAN ANDRES AND DUE TO DEPLETION IS EXPERIENCING LARGER GORS THAN THE CURRENT FIELD LIMITS.

IF I CAN BE OF ANY ASSISTANCE PLEASE CALL ME.

MARK VETETO
MARTINDALE PETROLEUM CORPORATION



OIL AND GAS PRODUCERS

TEXAS AMERICAN OIL CORPORATION

300 WEST WALL, SUITE 400 MIDLAND, TEXAS 79701 915-683-4811

March 24, 1988

State of New Mexico
Department of Energy and Minerals
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 85701

RE: Application for Amendment of the Special Rules
and Regulations of the Foster-San Andres Pool
Lea County, New Mexico

Gentlemen:

Texas American Oil Corporation, an operator in the referenced pool, supports the application submitted by Anadarko Petroleum Corporation to increase the gas-oil ratio limitation to 20,000 cubic feet of gas to one barrel of oil.

The performance of Texas American's Foster Ranch #1 indicates that this is a mature solution gas drive reservoir that requires an increase in the allowable GOR to maintain economic production. Approval of Anadarko's application will benefit all operators in this pool and allow efficient and economic drainage of this reservoir.

We believe that disapproval of this application will result in premature abandonment of this reservoir.

Very truly yours,

David Miller,
Manager of Operations

DM/ks

xc: Anadarko Production Company
P.O. Box 2497
Midland, Texas 79702

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PHILLIPS 66 NATURAL GAS COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA 74004 PHONE: 918 661-6600

March 23, 1988

Additional Gas Purchase
And Marketing, #1 Harvard
SW/4 SE/4, Sec. 31-T18S-R39E
Lea County, NM

Anadarko Petroleum Corporation
400 W. Illinois Street
Independent Plaza Bldg., Suite 1300

Attn: Mr. Tommy Thompson

Dear Mr. Thompson:

In response to your recent inquiry, at this time Phillips 66 Natural Gas Company (P66NGC) does not anticipate any problems in purchasing, processing, and marketing additional gas production from the above captioned lease. It appears, with minor adjustments, our current system can handle the proposed additional volumes of gas production without any significant impact on the operating pressure in this area. Accordingly, we would not anticipate any curtailment in other area production as a result of increased deliveries by Anadarko. Of course, any significant increase in volume could result in increased system pressures that would require line looping or supplemental compression to return the system to normal operating pressures. P66NGC would take such action if economically justified.

Further, in reviewing your inquiry with P66NGC-Sales Division, they do not anticipate any difficulty in marketing additional gas production available at the tailgate of our Eunice processing facility at this time. As you are aware, this processing facility currently handles production from the captioned lease, as well as other gas production from similar leases in Lea County, New Mexico.

If you have any further questions, please do not hesitate to contact me.

Sincerely,

C. L. (Christopher) Wren
Manager, Gas Purchasing
810A Plaza Office Bldg.
(918) 661-9111

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CLW:pkp-004

cc: Mike Fitzgibbons
Augustin Gutierrez

STATE OF NEW MEXICO
DEPARTMENT OF ENERGY AND MINERALS
OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION OF ANADARKO PETROLEUM CORPORATION FOR AMENDMENT OF THE SPECIAL RULES AND REGULATIONS OF THE FOSTER-SAN ANDRES POOL, LEA COUNTY, NEW MEXICO.

CASE: 9363

CERTIFICATE OF MAILING
AND
COMPLIANCE WITH ORDER R-8054

In accordance with Division Rule 1207 (Order R-8054) I hereby certify that on March 31, 1988, notice of the hearing, and a copy of the application for the above referenced case, was mailed at least twenty days prior to hearings originally set for April 27, 1988 to the interested parties listed on Exhibit "A" and "B" attached hereto.

Karen Aubrey
Karen Aubrey

SUBSCRIBED AND SWORN to before me this 26 day of April, 1988.

Notary Public

My Commission Expires:
April 17, 1992

BEFORE EXAMINER STOGNER
Oil Conservation Division
Anadarko Exhibit No. 13
Case No. 9363

EXHIBIT "A"

Texas American Oil Corp.
300 Wall Street, Suite 400
Midland, Texas 79701

P. & J. Investors
P. O. Box 5531
Hobbs, New Mexico 88241

Vlema Wise Estate
Attn: Ms. Jo Johnson
419 West Cain
Hobbs, New Mexico 88240

Mrs. Fern Cone
3309 43rd Street
Lubbock, Texas 79413

Clifford Cone
Box 6010
Lubbock, Texas 79413

Continental EMSCO Corp.
1810 Commerce Street
Dallas, Texas 75221

Stallworth Oil & Gas Inc.
Box 479
1900 Hartford
Dallas, Texas 75221

Zachary Oil Operating Corp.
1212 Commerce Building
Fort Worth, Texas 76102

Martindale Petroleum Corp.
P. O. Box 2403
Hobbs, New Mexico 88240

C. Melvin Neal Estate
P. O. Box 278
Hobbs, New Mexico 88240

Robert L. Summers
Box 776
Hobbs, New Mexico 88240

Douglas L. Cone
P. O. Box 13621
Albuquerque, NM 87192

Kenneth Cone
Box 11310
Midland, Texas 79703

Exxon, USA
Box 1600
Midland, Texas 79702-1600

Sam K. Viersen
Box 280
Okmulgee, Oklahoma 74447

Regency Petroleum Co. of NM
300 East Carpenter Freeway
Suite 1445
Irving, Texas 75062

EXHIBIT B

ADDITIONAL PARTIES ENTITLED TO NOTICE

Primary Fuels, Inc.
319 West Texas, Suite 201
Midland, Texas 79701
Attn: Kenneth H. Gray

TEXAS AMERICAN OIL CORPORATION

300 WEST WALL, SUITE 400 MIDLAND, TEXAS 79701 915-683-4811

APR - 1 1988

March 24, 1988

State of New Mexico
Department of Energy and Minerals
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 85701

Case 9363
M.S.

RE: Application for Amendment of the Special Rules and Regulations of the Foster-San Andres Pool Lea County, New Mexico

Gentlemen:

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We believe that disapproval of this application will result in premature abandonment of this reservoir.

Very truly yours,

David Miller

David Miller,
Manager of Operations

DM/ks

xc: Anadarko Production Company
P.O. Box 2497
Midland, Texas 79702

Developments in Petroleum Science, 8

fundamentals of reservoir engineering

L.P. DAKE

Senior Lecturer in Reservoir Engineering,
Shell Internationale Petroleum Maatschappij B.V.,
The Hague, The Netherlands

ELSEVIER SCIENTIFIC PUBLISHING COMPANY
Amsterdam — Oxford — New York 1978

EXERCISE 3.2 SOLUTION

1) For a solution gas drive reservoir, below the bubble point, the following are assumed

   - m = 0; no initial gascap
   - negligible water influx
   - the term $NB_{oi}\left(\frac{c_w S_{wc} + c_f}{1 - S_{wc}}\right)\Delta p$ is negligible once a significant free gas saturation develops in the reservoir.

Under these conditions the material balance equation can be simplified as

$$N_p\left(B_o + (R_p - R_s)B_g\right) = N\left((B_o - B_{oi}) + (R_{si} - R_s)B_g\right) \qquad (3.20)$$

underground withdrawal = expansion of the oil plus originally dissolved gas

and the recovery factor at abandonment pressure of 900 psia is

$$(RF)_{900} = \left.\frac{N_p}{N}\right|_{900\ psi} = \left.\frac{(B_o - B_{oi}) + (R_{si} - R_s)\,B_g}{B_o + (R_p - R_s)\,B_g}\right|_{900\ psi}$$

in which all the PVT parameters B_o, R_s and B_g are evaluated at the abandonment pressure. Using the data in table 2.4, the recovery factor can be expressed as

$$\left.\frac{N_p}{N}\right|_{900} = \frac{(1.0940 - 1.2417) \div (510 - 122)\ .00339}{1.0940 + (R_p - 122)\ .00339}$$

which can further be reduced to

$$\left.\frac{N_p}{N}\right|_{900} = \frac{344}{R_p + 201}$$

This clearly demonstrates that there is an inverse relationship between the oil recovery and the cumulative gas oil ratio R_p, as illustrated in fig. 3.3.

The conclusion to be drawn from the relationship is that, to obtain a high primary recovery, as much gas as possible should be kept in the reservoir, which requires that the cumulative gas oil ratio should be maintained as low as possible. By keeping the gas in the reservoir the total reservoir system compressibility in the simple material balance

$$dV = cV\,\Delta p$$

will be greatly increased by the presence of the gas and the dV, which is the production, will be large for a given pressure drop.