EXXON COMPANY, U.S.A.
POST OFFICE BOX 1600 • MIDLAND, TEXAS 79702-1600

PRODUCTION DEPARTMENT
SOUTHWEST/ROCKY MOUNTAIN DIVISION

Case 8558

February 12, 1986

Downhole Commingling Request
Mary Federal #5
Eddy County, New Mexico

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

ATTENTION: Mr. Michael E. Stogner

Gentlemen:

Exxon respectfully requests NMOCD approval for an exception to Rule 303-A of the Division Rules and Regulations to permit us to commingle the production from the Penn and Strawn pools in the subject wellbore. No reservoir damage or waste will result from such downhole commingling, and correlative rights will not be violated.

The Mary Federal #5 was drilled in late 1985 as a Morrow test, but did not drill through the Morrow due to high gas volumes coming from the Penn zone. A lost circulation zone higher in the wellbore prevented increased mud weight to control this zone. Casing was set at the base of Strawn before open hole logs could be obtained. In November the Strawn formation flowed 913 KCF/D at 2665# and had a calculated absolute open flow (CAOF) of 3.73 MCF after acidizing. Flowing and shut-in temperature logs indicate a channel between the Penn and Strawn formations. Exxon intended to dually complete the Penn and Strawn formations, but the channel will prevent a successful packer leakage test.

We have discussed the situation in the Mary Federal #5 with Messrs. Les Clements and David Catanach of the NMOCD. They later met with Mr. R. L. Stamets in Santa Fe and decided that a hearing would be required for commingling approval because the Strawn and Penn zones do not satisfy all the normal requirements to apply for downhole commingling (see Attachment I item 1). The NMOCD representatives indicated that it would not be difficult to obtain approval if Exxon could show that repair of the channel is uneconomical and will cause waste due to reservoir damage. The attached exhibits support our commingling application.

New Mexico Oil Cons. Division

To coincide with a related Exxon application on the Mary Federal #1, we ask that the captioned request be set for hearing on March 5, 1986. Please contact J. W. Jordan (915) 523-3650 if any further information is required.

James D. Howell

JDH:dag
Attachments

c: Certified Mail - w/Attachments
Mr. Conrad Coffield - Midland
Offset Operators
District II - NMOCD, Artesia, NM
Bureau of Land Management, Carlsbad, NM

FEDERAL EXPRESS (2 copies)

ATTACHMENT 1

Mary Federal #5 - Downhole Commingling
Reuirements for Wells Involving a Gas Zone

1. *That the commingling is necessary to permit a zone or zones to be produced which would otherwise not be economically producible.*

2. *That there will be no crossflow between the zones to be commingled.*

3. *That any zone which is producing from fluid-sensitive sands, which may be subject to damage from water or other produced liquids, is protected from contact from such liquids produced from other zones in the well.*

4. *The fluids from each zone are compatible with the fluids from the other(s), and combining the fluids will not result in formation of precipitates which might damage any of the reservoirs.*

5. *That ownership of the zones to be commingled is common (including working interest, royalty, and overriding royalty).*

6. *The bottom hole pressure of the lower pressure zone is not less than 50% of the bottom hole pressure of the higher pressure zone adjusted to a common datum.*

ATTACHMENT 2

Mary Federal #5 - Downhole Commingling - Data Required

To obtain approval for downhole commingling, we have enclosed the following data pursuant to Rule 303(C)(2)(a through j):

1. *Exxon's name and address:*

   Exxon Corporation
   1700 West Broadway
   Andrews, TX 79714

2. *Lease name, well number, well location, and name of pools to be commingled:*

   Mary Federal #5, 790' FSL & 1829' FWL, Section 11, T-23-S, R-25-E, Eddy County, New Mexico. Pools to be commingled: Penn and Strawn.

3. *A plat of the area showing the acreage dedicated to the well and the ownership of all offsetting leases:*

   Attached.

4. *A 24-hour productivity test on Division Form C-116 showing the amount of oil, gas, and water produced from each zone:*

   Form C-116 for the Strawn zone is attached. Penn has not been perforated.

5. *A production decline curve for both zones showing that for a period of at least one year a steady rate of decline has been established for each zone which will permit a reasonable allocation of the commingled production to each zone for statistical purposes:*

   Incomplete production history in both zones. Well was completed in the Strawn in 11-85 and is currently SI.

6. *A current bottom hole pressure for each zone capable of flowing:*

   The calculated BHP on the Strawn is 4201# at 10,200', based on build-up calculations. It should be noted that an accurate BHP measurement on the Strawn is not likely due to the communication problem. However, build-up analysis indicates no crossflow between the two zones and that there are not any abnormally high pressure stringers present in either zone.

   Build-up data are attached.

7. *A description of the fluid characteristics of each zone showing that the fluids will not be incompatible in the wellbore:*

See attached hydrocarbon analysis from the Strawn zone. Exxon does not anticipate any problem with formation damage from commingling the formation waters. The well did not make any liquids during the 4-point test. The water produced during the test period on the Form C-116 was load water. Currently, the load water has not been completely recovered.

8. *A computation showing that the value of the commingled production will not be less than the sum of the values of the individual streams:*

The gas from both zones remains uncontracted. No NGPA effects are anticipated due to commingling the production. Therefore, the value of the commingled production will not be less than the values of the individual streams.

9. *A formula for the allocation of production to each of the commingled zones and a description of the factors or data used in determining such a formula:*

Exxon is unable to develop a formula for the allocation of production to each of the commingled zones because the Penn has yet to be perforated. Once the Penn is perforated, an allocation formula will be developed from the difference in the calculated absolute open flows. The difference between the current CAOF (attached) and the CAOF taken after the Penn is perforated will be assigned as the fraction allocated to the Penn. The remaining fraction will be assigned to the Strawn.

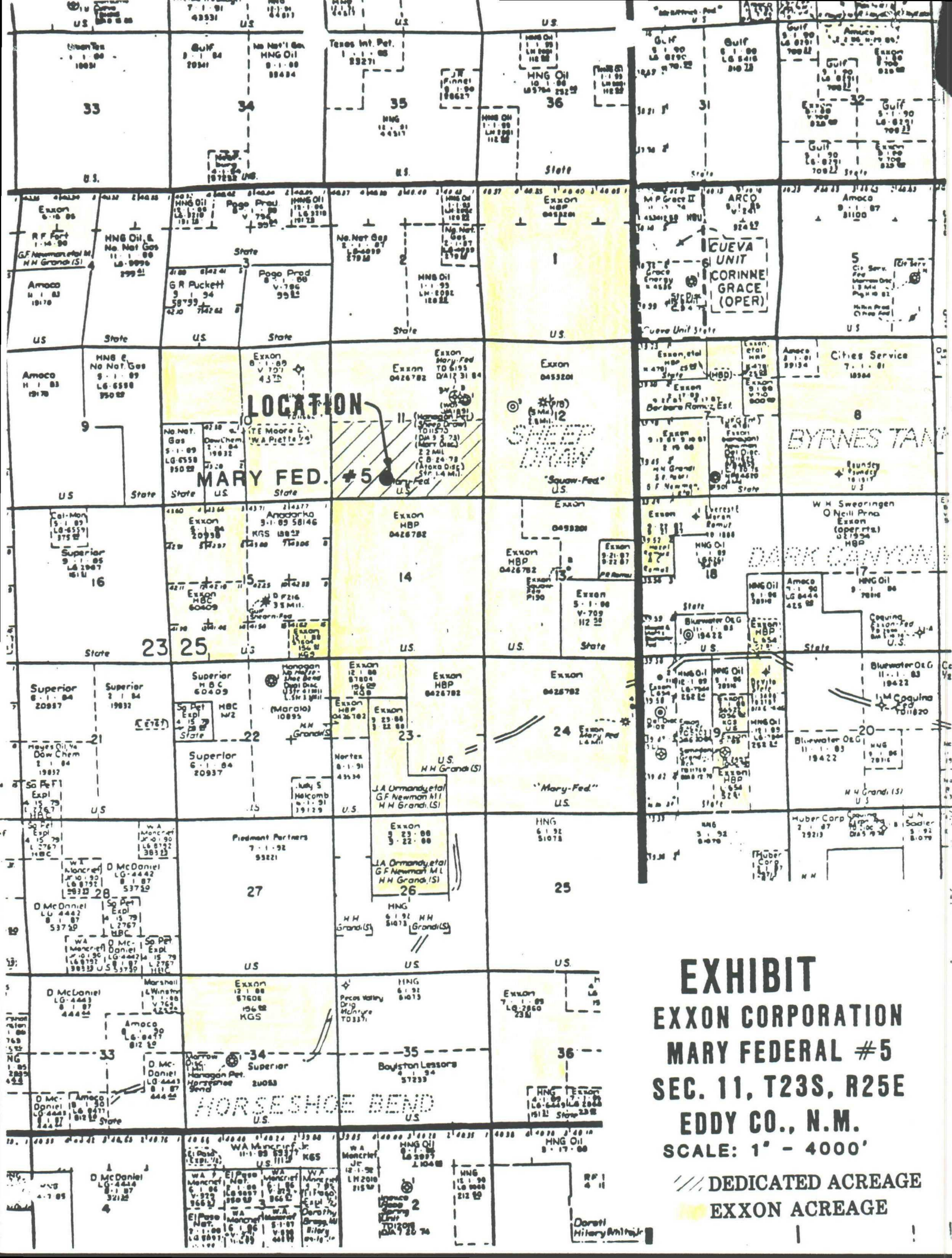
10. *A statement that all offset operators and, in case of a well on Federal land, the United States Geological Survey, has been notified in writing of the proposed commingling:*

All offset operators (list attached) and the BLM in Carlsbad have been notified by copy of this application.

Additionally, we have enclosed:

11. *Copies of Cement Bond Log and Temperature Log indicating a channel between the Strawn and Penn.*

12. *An explanation of Exxon's position that an attempt to repair the channel will be uneconomic and cause waste of hydrocarbons.*


LOCATION
MARY FED. #5
SEP DRAW
DARK CANYON
BYRNES TANK
HORSESHOE BEND
CUEVA UNIT
CORINNE GRACE (OPER)
EXHIBIT
EXXON CORPORATION
MARY FEDERAL #5
SEC. 11, T23S, R25E
EDDY CO., N.M.
SCALE: 1" - 4000'
DEDICATED ACREAGE
EXXON ACREAGE

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-116
Revised 10-1-78

GAS - OIL RATIO TESTS

Operator: Exxon Company U. S. A.
Pool: Strawn
County: Eddy
Address: 1700 W. Broadway, Andrews, Tx. 79714
TYPE OF TEST - (X): Scheduled [ ] Completion [X] Special [ ]

LEASE NAME	WELL NO.	LOCATION U	S	T	R	DATE OF TEST	STATUS	CHOKE SIZE	TBG. PRESS.	DAILY ALLOWABLE	LENGTH OF TEST HOURS	PROD. DURING TEST WATER BBLS.	GRAV. OIL	OIL BBLS.	GAS M.C.F.	GAS - OIL RATIO CU.FT/BBL
Mary Federal	5	N	11	23S	25E	12/15-16/85	F	17/64	746		24	63	-0-	-0-	1,067.5	1,067,500

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Division.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60° F. Specific gravity base will be 0.60.

Report casing pressure in lieu of tubing pressure for any well producing through casing.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Division in accordance with Rule 301 and appropriate pool rules.

I hereby certify that the above informat is true and complete to the best of my kn ledge and belief.

B R Duke
(Signature)

Agent (Duke Services, Inc.)
(Title)

1/24/86

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-122
Revised 10-1-78

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Type Test: [X] Initial [ ] Annual [ ] Special				Test Date: 12/19/85	
Company: Exxon Co. U.S.A.		Connection: None			
Pool:		Formation: Strawn		Unit:	
Completion Date: 11/19/85	Total Depth: 10377	Plug Back TD: 10354	Elevation: 3849	Farm or Lease Name: Mary Federal	
Csg. Size: 7 / Wt.: 26 / d: 6.276 / Set At: 10377		Perforations: From 9916 To 10349		Well No.: 5	
Tbg. Size: 2 7/8 / Wt.: 6.5 / d: 2.441 / Set At: 9870		Perforations: From Open To End		Unit: N / Sec.: 11 / Twp.: 23S / Rge.: 25E	
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single		Packer Set At: 9870		County: Eddy	
Producing Thru: TBG	Reservoir Temp. °F: 173 @ 9870	Mean Annual Temp. °F: 60	Baro. Press. – P_a: 13.2	State: New Mexico	
L: 9870	H: 9870	Gg: .6789	% CO_2: 1.961	% N_2: 1.673	% H_2S:	Prover:	Meter Run: 3.826	Taps: Flg

	FLOW DATA				TUBING DATA		CASING DATA		
NO.	Prover Line Size X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI					2990				
1.	3.826 X 1.00	300	11	86	2930				1 hr.
2.	3.826 X 1.00	300	20	90	2860				1 hr.
3.	3.826 X 1.00	300	40	92	2784				1 hr.
4.	3.826 X 1.00	300	80	92	2665				1 hr.
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	4.758	58.70	313.2	.9759	1.214	1.029	340
2.	4.758	79.14	313.2	.9723	1.214	1.029	457
3.	4.758	111.93	131.2	.9706	1.214	1.029	646
4.	4.758	158.29	313.2	.9706	1.214	1.029	913
5.							

NO.	P_t	Temp. °R	T_r	Z
1	.47	546	1.43	.944
2.	.47	550	1.44	.945
3.	.47	552	1.44	.945
4.	.47	552	1.44	.945
5.				

Gas Liquid Hydrocarbon Ratio: DRY Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons: Deg.
Specific Gravity Separator Gas: .679 XXXXXXXXX
Specific Gravity Flowing Fluid: XXXXX
Critical Pressure: 669 P.S.I.A. P.S.I.A.
Critical Temperature: 382 R R

P_c 3003.2 P_c^2 9019.2

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		2943.4	8663.6	355.6
2		2860.1	8180.2	839.0
3		2797.9	7828.2	1191.0
4		2679.7	7180.8	1838.4
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 4.906$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 4.086$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 3.730$

Absolute Open Flow: 3,730 Mcfd @ 15.025 | Angle of Slope θ: 48.5 | Slope, n: .885

Remarks: Well made no fluid during test.

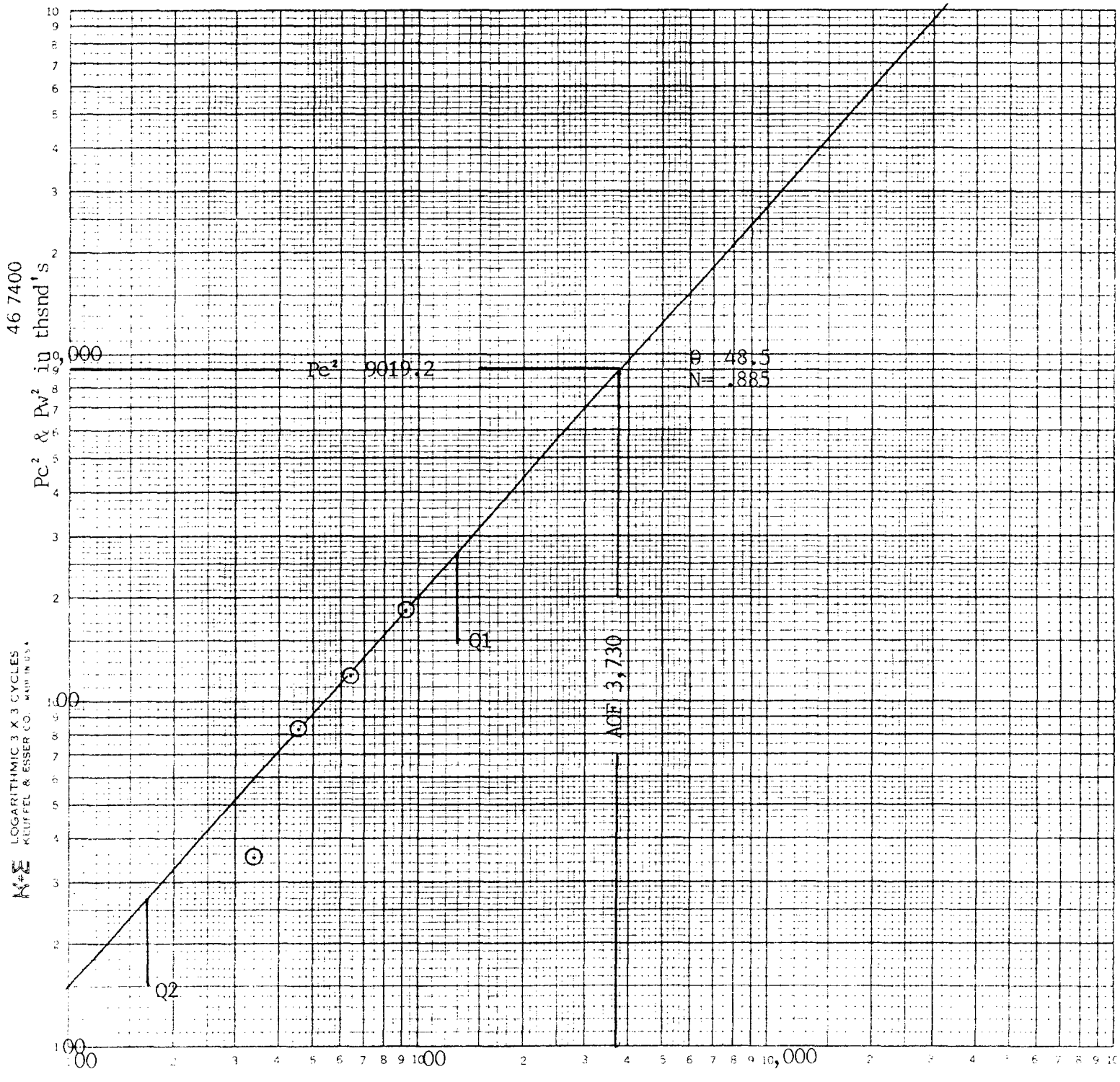
Approved By Division	Conducted By:	Calculated By:	Checked By:
	Duke Services, Inc.	R. Reston	

COMPANY: Exxon Co. U.S.A.

LEASE: Mary Federal # 5

COUNTY: Eddy

DATE: 12/19/85



Q=MCF/DAY

Q1=1300=Log 3.113943

Q2= 169=Log 2.228943

N = .885000

CAOF= $913\left(\frac{9019.2}{1838.4}\right)^{.885}$ =3,730 MCF/DAY

JARREL SERVICES, INC.
PHONE (505) 393-1736
HOBBS, NEW MEXICO, 88240

PRESSURE TRANSIENT TEST DATA

COMPANY: Exxon Company USA
LEASE: Mary Federal
FIELD: Sheep Draw
COUNTY: Eddy
STATUS: 30 minute flow; 48 hour shut-in

CONTACT: Dud Taylor
WELL: #5
ZONE: Strawn
STATE: New Mexico
OPERATOR: Newman

PERFORATIONS FROM: 10,030.0'
DEPTH: 9,850.0'

TO: 10,115.0'
TEMPERATURE: 167.0°F

ELEMENT: 22693
CLOCK: E10195
ELEMENT: 24513
CLOCK: 21499

RANGE: 6500 psig
RANGE: 72 hrs
RANGE: 6250 psig
RANGE: 72 hrs

SURFACE PRESSURE MEASUREMENTS

EVENT	DATE	TIME	DEAD WEIGHT PRESSURE
START CLOCK	12/17/85	11:15:00	866.0 psig
SET ELEMENT	12/17/85	12:00:00	866.0 psig
WELL SHUT IN	12/17/85	12:30:00	866.0 psig
TEST ENDED	12/19/85	12:30:00	2,994.0 psig

SUBSURFACE PRESSURE MEASUREMENTS

DATE	TIME	t hrs	GAUGE PRESSURE psig	ABSOLUTE PRESSURE psia	RESERVOIR PRESSURE psia
12/17/85	12:00:00	-.500	1,469.0	1,482.2	1,490.2
12/17/85	12:30:00	0.000	1,469.0	1,482.2	1,490.2
12/17/85	12:35:00	.083	1,509.0	1,522.2	1,530.4
12/17/85	12:40:00	.167	1,543.0	1,556.2	1,564.6
12/17/85	12:45:00	.250	1,568.0	1,581.2	1,589.7
12/17/85	12:50:00	.333	1,593.0	1,606.2	1,614.9
12/17/85	12:55:00	.417	1,622.0	1,635.2	1,644.0
12/17/85	13:00:00	.500	1,647.0	1,660.2	1,669.1
12/17/85	13:05:00	.583	1,672.0	1,685.2	1,694.3
12/17/85	13:10:00	.667	1,700.0	1,713.2	1,722.4
12/17/85	13:15:00	.750	1,718.0	1,731.2	1,740.5
12/17/85	13:20:00	.833	1,740.0	1,753.2	1,762.6
12/17/85	13:25:00	.917	1,765.0	1,778.2	1,787.8
12/17/85	13:30:00	1.000	1,787.0	1,800.2	1,809.9
12/17/85	13:45:00	1.250	1,846.0	1,859.2	1,869.2
12/17/85	14:00:00	1.500	1,912.0	1,925.2	1,935.6
12/17/85	14:15:00	1.750	1,975.0	1,988.2	1,998.9
12/17/85	14:30:00	2.000	2,038.0	2,051.2	2,062.3
12/17/85	14:45:00	2.250	2,101.0	2,114.2	2,125.6
12/17/85	15:00:00	2.500	2,164.0	2,177.2	2,188.9
12/17/85	15:15:00	2.750	2,227.0	2,240.2	2,252.3
12/17/85	15:30:00	3.000	2,286.0	2,299.2	2,311.6

JARREL SERVICES, INC.
PHONE (505) 393-1736
HOBBS, NEW MEXICO, 88240

PRESSURE TRANSIENT TEST DATA

SUBSURFACE PRESSURE MEASUREMENTS

DATE	TIME	t hrs	GAUGE PRESSURE psig	ABSOLUTE PRESSURE psia	RESERVOIR PRESSURE psia
12/17/85	16:00:00	3.500	2,403.0	2,416.2	2,429.2
12/17/85	16:30:00	4.000	2,516.0	2,529.2	2,542.3
12/17/85	17:00:00	4.500	2,632.0	2,645.2	2,659.3
12/17/85	17:30:00	5.000	2,736.0	2,749.2	2,764.0
12/17/85	18:30:00	6.000	2,944.0	2,957.2	2,973.1
12/17/85	19:30:00	7.000	3,120.0	3,133.2	3,150.1
12/17/85	20:30:00	8.000	3,262.0	3,275.2	3,292.9
12/17/85	21:30:00	9.000	3,369.0	3,382.2	3,400.4
12/17/85	22:30:00	10.000	3,461.0	3,474.2	3,492.9
12/17/85	23:30:00	11.000	3,527.0	3,540.2	3,559.3
12/18/85	00:30:00	12.000	3,581.0	3,594.2	3,613.6
12/18/85	01:30:00	13.000	3,616.0	3,629.2	3,648.8
12/18/85	02:30:00	14.000	3,644.0	3,657.2	3,676.9
12/18/85	03:30:00	15.000	3,666.0	3,679.2	3,699.0
12/18/85	04:30:00	16.000	3,682.0	3,695.2	3,715.1
12/18/85	05:30:00	17.000	3,694.0	3,707.2	3,727.2
12/18/85	06:30:00	18.000	3,707.0	3,720.2	3,740.3
12/18/85	07:30:00	19.000	3,716.0	3,729.2	3,749.3
12/18/85	08:30:00	20.000	3,723.0	3,736.2	3,756.3
12/18/85	10:30:00	22.000	3,741.0	3,754.2	3,774.4
12/18/85	12:30:00	24.000	3,757.0	3,770.2	3,790.5
12/18/85	14:30:00	26.000	3,773.0	3,786.2	3,806.6
12/18/85	16:30:00	28.000	3,789.0	3,802.2	3,822.7
12/18/85	18:30:00	30.000	3,805.0	3,818.2	3,838.8
12/18/85	20:30:00	32.000	3,814.0	3,827.2	3,847.3
12/18/85	22:30:00	34.000	3,827.0	3,840.2	3,860.9
12/19/85	00:30:00	36.000	3,836.0	3,849.2	3,869.9
12/19/85	02:30:00	38.000	3,846.0	3,859.2	3,880.0
12/19/85	04:30:00	40.000	3,855.0	3,868.2	3,889.0
12/19/85	06:30:00	42.000	3,867.0	3,880.2	3,901.1
12/19/85	08:30:00	44.000	3,877.0	3,890.2	3,911.2
12/19/85	10:30:00	46.000	3,887.0	3,900.2	3,921.2
12/19/85	12:30:00	48.000	3,896.0	3,909.2	3,930.3

JARREL SERVICES, INC.

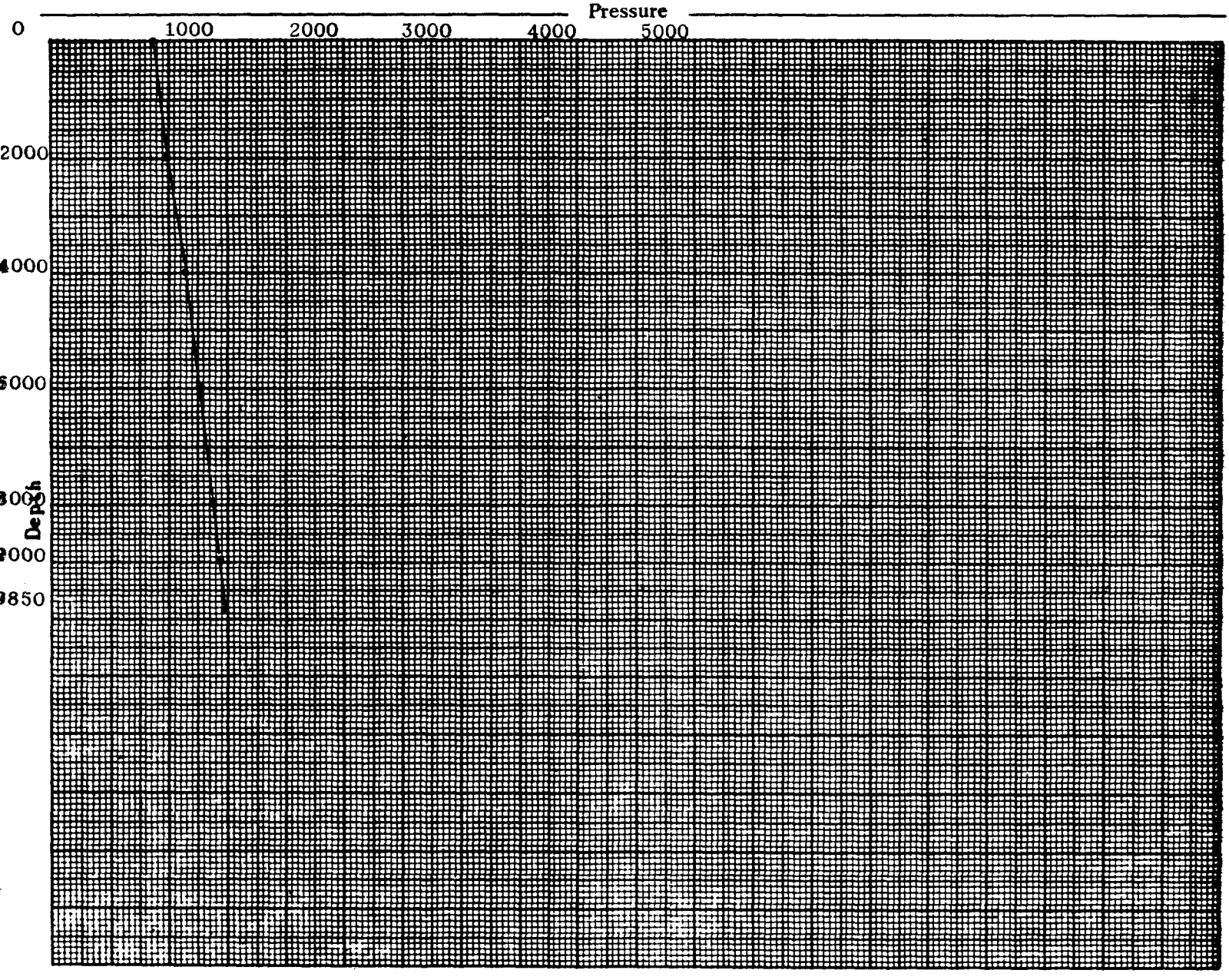
POST OFFICE BOX 1654 PHONES 505 393-5396 — 393-8274

HOBBS, NEW MEXICO 88240

OPERATOR Exxon Company USA
FIELD Sheep Draw
FORMATION Strawn
LEASE Mary Federal WELL No. 5
COUNTY Eddy STATE New Mexico
DATE 12/17/85 TIME 12:00 N
Status Flowing
Test Depth 9850'
Time S. I. - Last test date -
Tub Pres. 866 BHP last test -
Cas. Pres. PKR BHP change -
Elev. 3860'KB-11' Fluid top Flowing
Datum (-6213)** Water top -
Temp. @ 167°F Run by JSI #13
Cal. No. 24513 Chart No. 1

BOTTOM HOLE PRESSURE RECORD

Depth	Pressure	Gradient
0	866	-
2000	992	.063
4000	1131	.070
6000	1259	.064
8000	1378	.060
9000	1425	.047
9850	1469	.052



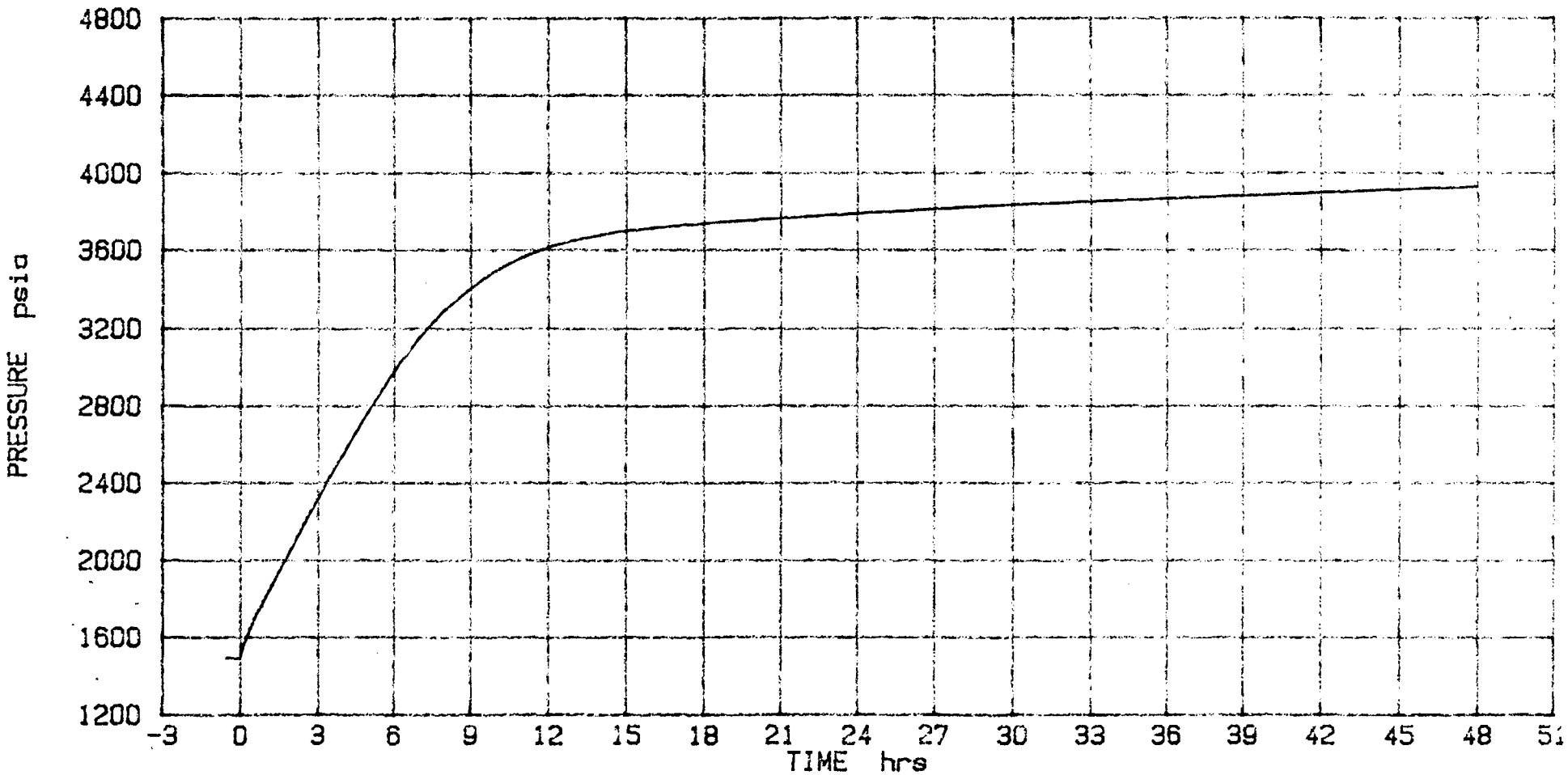
TEST DATE: 12/17/85 TO 12/19/85
TEST DEPTH: 9850 ft
ELEMENT NO: 24513
RANGE: 6250 psig
CLOCK: 21499
RANGE: 72 hrs
OPERATOR: Newman

Exxon Company USA

Mary Federal #5

Sheep Draw - Strawn

JARREL SERVICES, INC.
Box 1654 Hobbs, N. M. 88240 (505) 393-1736



JARREL SERVICES, INC.

POST OFFICE BOX 1654 PHONES 505 393-5396 — 393-6274

HOBBS, NEW MEXICO 88240

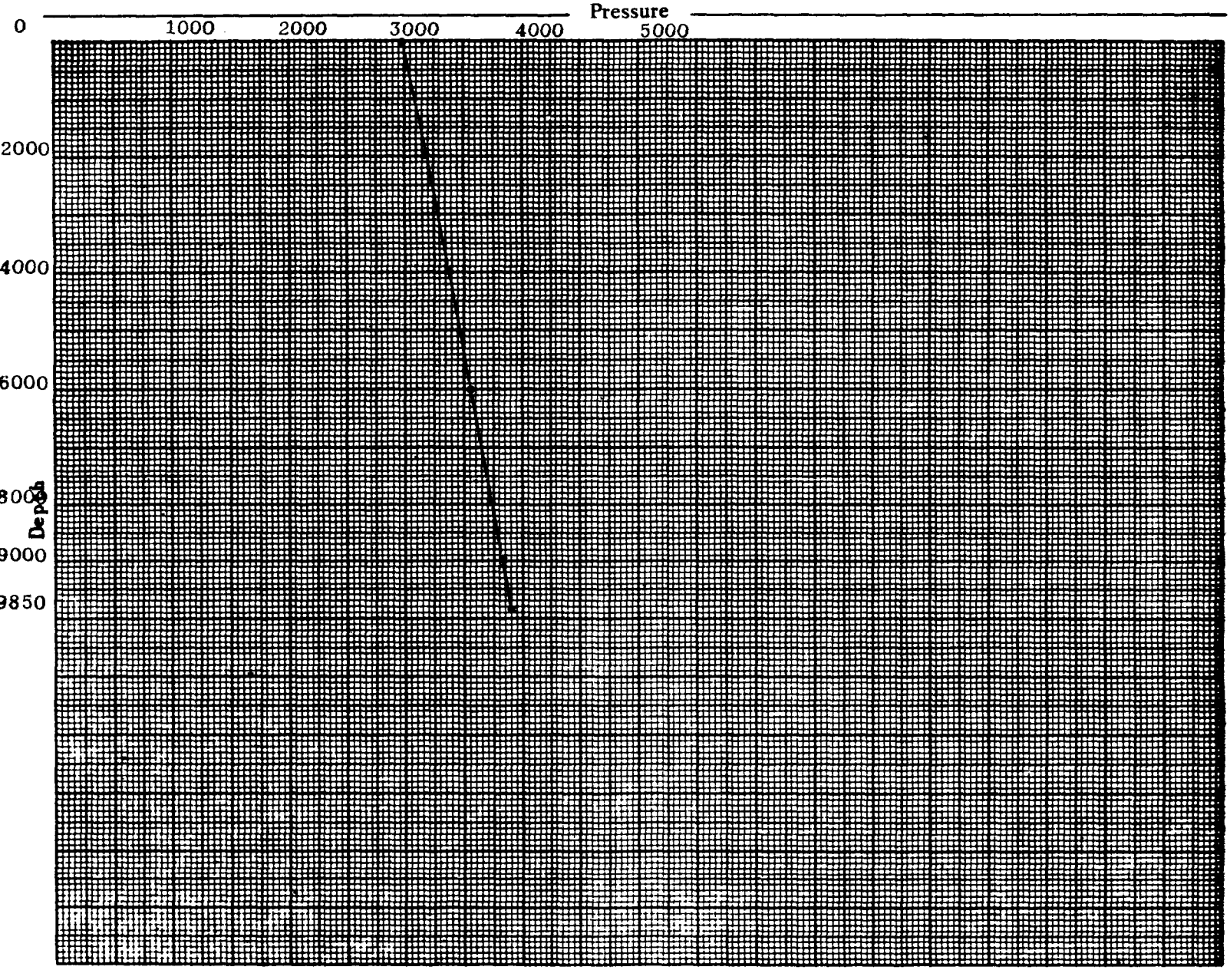
OPERATOR Exxon Company USA
FIELD Sheep Draw
FORMATION Strawn
LEASE Mary Federal WELL No. 5
COUNTY Eddy STATE New Mexico
DATE 12/19/85 TIME 12:30 PM
Status Shut in
Test Depth 9850'
Time S. I. 48.0 hrs. Last test date -
Tub Pres. 2994 BHP last test -
Cas. Pres. PKR BHP change -
Elev. 3860'KB-11' Fluid top None
Datum (-6213)** Water top None
Temp. @ 167° F Run by JSI #14
Cal. No. 24513 Chart No. 2

BOTTOM HOLE PRESSURE RECORD

Depth	Pressure	Gradient
0	2994	-
2000	3184	.095
4000	3370	.093
6000	3553	.092
8000	3727	.087
9000	3817	.090
9850	3896	.093
10073 (-6213)	3917 * **	(.093)

* EXTRAPOLATED PRESSURE

** MIDPOINT OF CASING PERFORATIONS



NEW-TEX LAB

PHONE 505/393-3561 • P. O. BOX 1161 • 611 W. SNYDER • HOBBS, NEW MEXICO 88240

ANALYSIS CERTIFICATE

CLIENT: EXXON CO USA
ADDRESS: 1700 W BROADWAY
CITY, STATE: ANDREWS, TX 79714

ANALYSIS NUMBER: 8551
DATE OF RUN: 12 21 85
DATE SECURED: 12 20 85

SAMPLE IDENT: MARY FEDERAL #5
SAMPLING PRESS: SAMPLING TEMP:

REMARKS: H2S - NONE DETECTED

********** GAS ANALYSIS **********

	MOLE PERCENT	GAL/ MCF
NITROGEN	1.673	
CARBON DIOXIDE	1.961	
METHANE	87.217	
ETHANE	4.575	1.220
PROPANE	1.665	0.457
ISO-BUTANE	0.393	0.128
NORMAL BUTANE	0.551	0.173
ISO-PENTANE	0.246	0.091
NORMAL PENTANE	0.178	0.064
HEXANES	1.541	0.632
TOTAL	100.000	2.765

PROPANE GPM: 0.46 BUTANES GPM: 0.3(
ETHANE GPM: 1.22 PENTANES PLUS GPM: 0.7%

SPECIFIC GRAV (CALC): 0.6789
MOLE WEIGHT: 19.66

HHV-BTU/CU FT PRESSURE (PSIA)	WET	DRY
14.696	1107	1127
14.650	1104	1124
14.730	1110	1130
14.735	1110	1130

DEANE SIMPSON

OFFSET OPERATORS
TO EXXON'S MARY FEDERAL #5
EDDY COUNTY, NEW MEXICO

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

HNG Oil Company
P.O. Box 2267
Midland, Texas 79702

Northern Natural Gas Company
Attn: Bob Walker
One Petroleum Center, Building 6
3300 A Street, Suite 102
Midland, Texas 79705

Pogo Production
P.O. Box 10340
Midland, Texas 79702

Example of Reservoir Damage from Squeeze Operations

The following is an example of Exxon unsuccessfully attempting to restore production from a zone required to be squeezed. This example shows how waste can occur from squeeze operations. These same squeeze operations are required in the Mary Fed. #5 to repair the channel.

New Mexico "DC" State #1
Sec. 18, T-19-S, R-29-E
Eddy County, New Mexico

The N.M. "DC" State #1 was completed in May, 1982 for 531 BOPD and 65 BWPD from perforations in what Exxon claimed to be the Cisco/Canyon formation. The NMOCD found that the top 11' of the perforations were actually in the Wolfcamp formation and that Exxon was commingling in the wellbore. A production log was run in hope that it would show an insignificant amount of production coming from the perforations in question. Had this been the case, the NMOCD would likely have given administrative approval to commingle in the wellbore. However, the log showed that 8% of the total flowstream was coming from the interval in question. After reviewing the log, the NMOCD chief engineer advised that he could not support administrative approval for downhole commingling. Therefore, an attempt to isolate the Wolfcamp by lowering the packer assembly in the well below the Wolfcamp perfs and temporarily abandon the Wolfcamp zone until the Cisco/Canyon depletes. This attempt failed due to behind pipe communication between the two zones.

An attempt was then made to squeeze the Wolfcamp perforations. During the squeeze operations, the perfs below the bridge plug communicated with the Wolfcamp perfs. After drilling out, the Cisco/Canyon had to be reperforated and acidized. The well produced only 44 BOPD and 54 BWPD after the acid job.

It is unlikely that the majority of the production was coming from the Wolfcamp perfs as a spinner-type production log indicated only about 8% of the total flow coming from the Wolfcamp perfs. Also, the well did not produce any significant volume prior to the squeeze job so it is unlikely that the Cisco/Canyon was depleted. In addition, the better looking porosity zones are in the Cisco/Canyon. It is suspected that the Cisco/Canyon interval was damaged during the squeeze operations and the acid job failed to clean it up.

An acid frac was then attempted to frac thru the formation damage. The well produced 65 BO + 113 BW after the acid frac. The acid frac did improve the productivity, but indicated that there was still substantial reservoir damage based on the production rates.

Production:

After completion - 531 BOPD, 65 BWPD, 1000 KCFPD

After cement squeeze operations - 65 BOPD, 113 BWPD, 218 KCFPD

Costs:

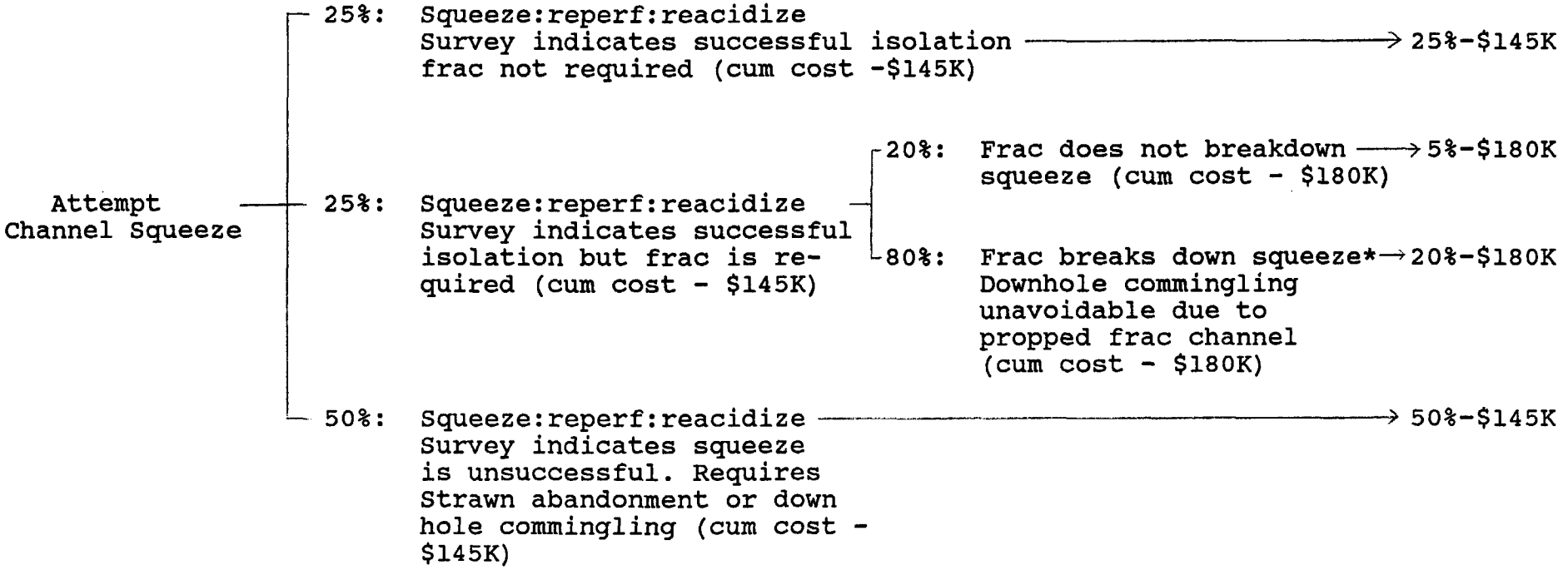
Cement squeezing, reperfing, and acidizing - $70,000

Acid fracing - $62,000

Total - $132,000

Conclusions: Substantial reservoir damage occurred from cement squeezing the Cisco/Canyon. Considerable expense was incurred with several unsuccessful attempts to repair this damage. There were wastes of hydrocarbons due to the cement squeezing operations.

RISKED COST ASSESSMENT
MARY FEDERAL #5
CHANNEL REPAIR



CONSOLIDATED RISK ASSESSMENT

Case	%	Cost K$
Successful isolation of Strawn	30%	$151K
Unsuccessful isolation of Strawn	70%	155K

* Note: There is a 20% chance of a forced downhole commingling situation because of a sand propped channel after frac job.

Economic Discussion:

Based on the above costs, risks and the reserves associated with several similar Strawn completions in the area, Exxon cannot economically justify an attempt to fix the channel and return the Strawn to production. If downhole commingling is not approved, Exxon plans to squeeze the current Strawn perforations and recomplete into the Penn interval. Downhole commingling is being requested to prevent the waste of these Strawn reserves.

93585

Schlumberger

CEMENT BOND LOG
VARIABLE DENSITY

COUNTY EDDY N.M.
Field or LOCATION SHEEP DRAW
WELL EXXON MARY FEDERAL NO. 5
COMPANY EXXON CO. U.S.A.

COMPANY EXXON COMPANY U.S.A.

API NO. 30-015-25378

WELL EXXON MARY FEDERAL NO. 5

FIELD SHEEP DRAW

COUNTY EDDY STATE NEW MEXICO

LOCATION
709' FSL & 1829' FWL
Sec. 11 Twp. 23-S Rge. 25-E

Other Services:
CNL
BHC

Permanent Datum: G.L., Elev. 3849
Log Measured From K.B., 11 Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. 3860
D.F. 3859
G.L. 3849

Date	11-14-85	Casing Fluid	10# BRINE
Run No.	ONE	Fluid Level	
Depth — Driller	10371	Max. Rec. Temp.	°F
Depth — Logger	10364	Est. Cement Top	
Btm. Log Interval	10351	Unit / District	5883 / HOBBS
Top Log Interval	9600	Recorded By	O'SULLIVAN
Open Hole Size	8 3/4	Witnessed By	REID

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String						
Prot. String						
Prod. String	7				SURF	TD
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement				
Type of cement				
Additive				
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

Bell PETROLEUM SURVEYS

H-922

TEMPERATURE LOG

COMPANY EXXON COMPANY, U.S.A.

WELL MARY FEDERAL #5

FIELD SHEEP DRAW

COUNTY EDDY STATE NEW MEXICO

LOCATION: 709' FSL & 1829' FWL

OTHER SERVICES:

SEC. 11 TWP. 23-S RGE 25-E

Permanent Datum GROUND LEVEL Elev. 3849'
Log Measured From KELLY BUSHING 11 Ft. Above Perm Datum
Drilling Measured From KELLY BUSHING

ELEVATIONS:
KB. 3860'
DF. 3859'
GL. 3849'

Date	2-6-86		
Run No.	SEE BELOW		
Type Log	PRODUCTION EVALUATION		
Depth—Driller	10,371'		
Depth—Logger	10,359'		
Bottom logged interval	10,359'		
Top logged interval	9,700'		
Type fluid in hole	WATER		
Salinity, PPM Cl.			
Density			
Level	o		
Max. rec. temp., Deg. F.	170		
Operating rig time			
Recorded by	J. BRYAN		
Witnessed by			

RUN No	BORE-HOLE RECORD Bit	From	To	CASING RECORD Size	Wgt.	From	To
				7"		0	T.D.

GEOLOGICAL SUMMARY

MARY FEDERAL NO. 5

The attached cross section and index map show two wells. The Exxon #1 Mary Federal, to the far left, was formerly the Hanagan #1 Sheep Draw and is on the NMOCC Pennsylvanian cross section B - B′ as well number 18. Three formation tops were taken from the NMOCC cross section: Penn., Strawn, and Atoka. The next well is the subject well, the Exxon #5 Mary Federal. The three formation tops are correlated from the #1 Mary Fed. to the #5 Mary Fed. Current perforations are indicated on the #5 Mary Fed. all of which are within the Strawn Formation. The proposed additional perforations are also indicated, located stratigraphically within the "Penn." interval.

Deposits of the Strawn interval are composed of interbedded limestones, shales, and sandstones. Most of the gas production that has been established has been from the limestones which were deposited as carbonate shelf sediments. The "Penn" sediments reflect a continuation of Strawn carbonate deposition. In the #5 Mary Fed. limestones of the "Penn" interval locally thicken and are possibly gas productive.

Also, the index map shows the location of both wells on the cross section plus a third well, the discovery well for the White City (Pennsylvanian) Pool. This pool was formed by Case No. 2157 Order No. R-1857 and "classified as a gas pool for Pennsylvanian production". The discovery well completed only in the "Penn.", however, subsequent wells have completed in the Morrow, Atoka, or Strawn formations. In some cases, two or more formations are completed together. An example is the Gulf Oil Corp. No. 1 White City Penn Gas Com "2" located in Sec. 20, T-24-S, R-26-E, Eddy County, New Mexico.

JBR

COUNTY EDDY, N.M. FIELD WHITE CITY (PENN)

OPR GULF OIL CORP

LSE WHITE CITY PENN GAS COM "2" WELL NO. 1

LOC Sec 20, T-24-S, R-26-E (K)
1830 FSL & 1650 FWL of Sc.

API NO. 30-015-24024

F.R. 12-23-81 OBJ 11,900'RT CO-ORD

CTR Sharp SPUD 2-26-82 ELEV KB

TD 11,500 PBD 11,424 P & A DF 3389'op GL

PAY ZONE	PROD INTERVAL	IP	BO	W	HRS	CHK	TEST BASIS
	10,366-11,376	CAOF 1,573,000			CFGPD		

GOR	GTY	CP	TP	BHP	POT DATE	TREATMENT
dry	.584		1464		7-15-82	A/21,700

CSG 10 3/4-1812-1600 5"-8327-11,500-415
7 5-8-8684-1500

MIDLAND OIL SCOUTS ASSOCIATION WELL RECORD

COUNTY EDDY, N.M. FIELD WHITE CITY (PENN)

WELL: GULF OIL CORP #1 WHITE CITY PENN GAS COM "2" (LOG) MARKERS

DATE

TD 11,500' ; PB 11,424';
DST 9157-9257, op 65", R/210' GCDF,
est 380 MCF, SCR/125 cfg, 1.05cc Oil
60"/5282, FP 284-221, 60"/5235,
HP 5677-5630
Drlg Brk 9877-9921, 9956-9978
DST 9956-78, op 95", R/280' DF, no SCR
60"/5116, FP 934-957, 180"/5204,
HP 6182-6182
Drlg Brk 11,100-105, 11,115-122, 11,175-183
DST 11,100-266', 2200'WB, op 90", R/WB, 186' DF, SC R/4.88
cfg, 950 cc M, 60"/3421, FP 115-1183, 180"/3421,
HP 7002-7002
Pf/5/10,922-24, 5/11,010-012, 5/11,060-062, 5/11,080-082,
5/11,170-172, 5/11,194-196, 7/11,372-376, A/10,500
S/24 BW/2', S/Dry, gd show gas
Pf/10/10,366-370, 5/10,386-388, 5/10,423-425, 5/10,503-505,
5/10,521-523, 10/10,596-600, S/NS, A/200, F/1127 MCF,
4', 20/64"ck, FTP 500, A/10,000 (10,366-600), R/60 BW
F/mist wtr w/gd sho gas/10', 2"ck, FTP 200-400 (10,366-600)

(LOG) MARKERS	
Dela	(1495)
BS	(5100)
WLfc	(8240)
Penn	(9590)
Str	(9784)
Atoka	(10,072)
Morr Li	(10,677)
Morr Cl	(10,910)
Barn	(11,418)