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

PRODUCTION DEPARTMENT
SOUTHWESTERN DIVISION

December 10, 1987

Downhole Commingling Request
Squaw Federal #3
Sheep Draw Field
Eddy County, New Mexico

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87504-2088

Attention: Mr. David R. Catanach

Exxon respectfully requests an exception to New Mexico Oil Conservation Division Rule 303(a) to permit us to commingle the production from the Morrow and Atoka pools in the subject wellbore. No reservoir damage or waste will result from such downhole commingling, and correlative rights will not be violated.

The Squaw Federal #3 was drilled in late 1985 and completed in the Morrow. The Morrow completion proved to be too poor to pay out and the well was subsequently recompleted to the Atoka using a retrievable plug. This was done with the intention of eventually commingling the Morrow with the Atoka when the Atoka pressure had drawn down to the Morrow pressure. After completion in the Atoka, it was found that the pressure was virtually identical to the pressure found in the Morrow. Therefore, we would like to proceed with commingling at this time.

Attached are exhibits supporting our commingling application. If there are any questions, please contact Bill Duncan at (915) 686-4105.

James D. Howell

JDH/kw
Attachments

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

ATTACHMENT 1

Exxon Squaw Federal #3 - Downhole Commingling Requirements

The Sheep Draw Atoka and Sheep Draw Morrow formations in the above well satisfy the requirements for downhole commingling of two gas zones pursuant to: Rule 303(C)(1)(b)(items 1 through 6):

1. The commingling is necessary to permit a zone or zones to be produced which would not otherwise be economically producible. The Sheep Draw Morrow zone is not economical to produce separately in order to make a commercial well. The expected deliverability is about 150 MCFPD, and rather than totally abandon these Morrow reserves, provision was made on original recompletion to install a retrievable plug for commingling purposes.

2. There will be no crossflow between the zones to be commingled. The bottom hole pressure in the Atoka is 4072 psia, and in the Morrow, 4159 psia. Adjusted to a common datum of 7300' ss, the two pressures are 4102 psia and 4129 psia, respectively. The two pressures are virtually identical and no crossflow should occur.

3. 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. Both the Atoka sands and Morrow sands are very water sensitive. However, neither zone produces any water or condensate (dry gas only).

4. The fluids from each zone are compatible with the fluids from the other(s), and combining the fluids will not result in the formation of precipitates which might damage any of the reservoirs. Neither zone produces any water or condensate (dry gas only).

5. Ownership of the zones to be commingled is common (including working interest, royalty and overriding royalty). All ownership is common on both zones.

6. The bottom hole pressure of the lower pressure zone is not less than 50 percent of the bottom hole pressure of the higher pressure zone adjusted to a common datum. Adjusted to a common datum of 7300' ss, the Atoka pressure is 4102 psia and the Morrow pressure is 4129 psia, which is a difference of only 0.7%.

ATTACHMENT 2

Exxon Squaw Federal #3 - 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):

a. Exxon's name and address:

Exxon Corporation
P. O. Box 1600
Midland, Texas 79702
Attention: New Mexico Operations

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

Squaw Federal No. 3
2479' FSL & 1880' FWL
Section 1, Township 23-S, Range 25-E
Eddy County, New Mexico

Pools to be commingled: Sheep Draw Morrow and Sheep Draw Atoka

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

d. A 24-hour productivity test showing the amount of oil, gas, and water produced from each zone. See attached four point tests and well resume. The well is not yet connected to sales. Sustainable deliverability from the Morrow is estimated at 150 MCFPD, and from the Atoka, 375 MCFPD. There is no condensate or water production.

e. Newly completed well: A complete resume of the well's completion history including description of treating, testing, etc. of each zone, and a prognostication of future production from each zone. See attached resume.

f. A current bottomhole pressure for each zone capable of flowing: Both gas zones are capable of flowing:

Measured BHP - Atoka: 4072 psia (4102 psia @ 7300' ss datum)
Extrapolated BHP - Morrow: (3263 psia S.I.T.P.) 4159 psia (4129 psia @ 7300' ss datum)

BHP Bomb data & Form C-122G are attached.

g. A description of the fluid characteristics of each zone showing that the fluids will not be incompatible in the wellbore. There is no water or condensate production, and therefore, no incompatible fluids. Hydrocarbon analyses of the two gases are attached.

h. A computation showing that the value of the commingled production will not be less than the sum of the values of the individual streams. There is no condensate production to consider. The gas is sold by dollar per MMBTU, and therefore, the gas value is constant whether it is sold separately or commingled. Both zones are sweet with similar levels of nitrogen and CO_2.

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

Gas Allocation

Gas Rate at time of commingling, Morrow:	150 MCFPD
Gas Rate at time of commingling, Atoka:	375 MCFPD
Total, both zones:	525 MCFPD

Sheep Draw Morrow: 150/525 = 0.29 Gas Allocation Factor

Sheep Draw Atoka: 375/525 = 0.71 Gas Allocation Factor

Allocation based upon production rate compares favorably to allocation based upon Exxon's reserve information for each zone.

Condensate Allocation: Neither zone produces any condensate on test. However, some minor amounts of condensate may fall out in the separators during cold weather. It is proposed to use GPM content of the gas to allocate condensate as follows:

GPM content Morrow = 0.953 Gal/MCF
GPM content Atoka = 1.407 Gal/MCF

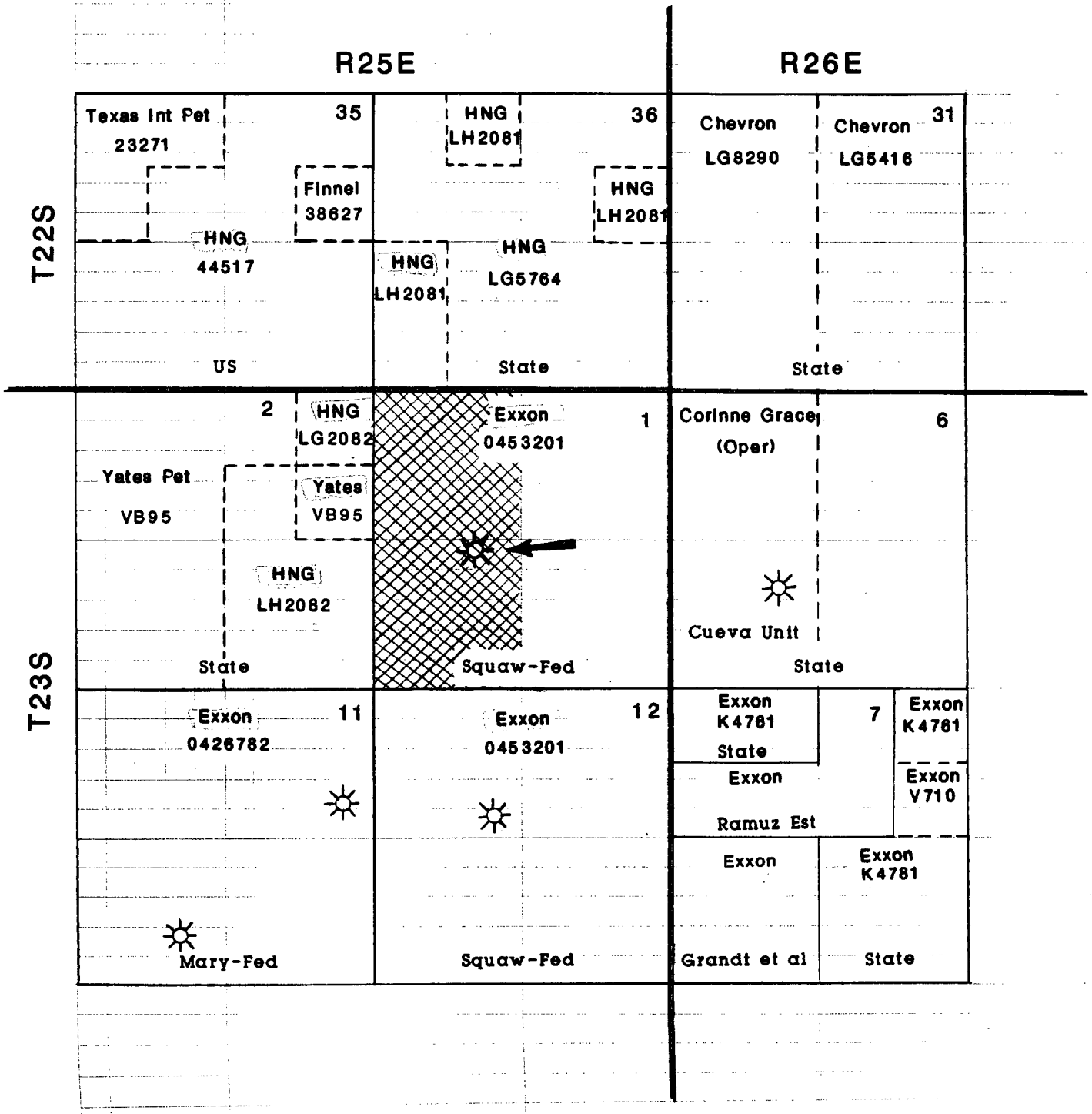
Total gallons, Morrow = 0.953 x 150 = 143 gallons/day
Total gallons, Atoka = 1.407 x 375 = 528 gallons/day
Total gallons, both zones = 671 gallons/day

Sheep Draw Morrow: 143/671 = 0.21 Condensate Allocation Factor

Sheep Draw Atoka: 528/671 = 0.79 Condensate Allocation Factor

j. 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 United States Geological Survey have been notified by copy of this application. A list is attached.

ACREAGE DEDICATED TO SQUAW FEDERAL # 3



Well Resume

Exxon's Squaw Federal #3

Sheep Draw Morrow Operations:

9/14/85	Spud well.
11/01/85	Set 5-1/2" casing @ 11,665'. T.D. @ 11,670'
11/09/85	Clean out well to 11,630'. Pressure tested casing integrity - o.k.
11/12/85	Perforated Morrow at 11,218-233', 11,430-439', and 11,616-621'. Set packer at 11,042'.
11/13/85	Swabbed well for 6 hours, well kicked off flowing 15' flare and kCl water.
11/14/85	13-1/2 hour flow test, flowed at rate of 450 MCFPD, 2900 psig F.T.P., 8/64" choke. No water or condensate.
11/15/85	13 hour flow test, 1060 MCFPD rate, 1120 psig F.T.P., 15/64" choke. No water or condensate.
11/16/85	24 hour flow test, 1060 MCFPD rate, 1120 psig F.T.P., 15/64" choke. No water or condensate.
11/17/85	6 hour flow test, 900 MCFPD rate, 955 psig F.T.P., 15/64" choke. No water or condensate.
11/19/85	70 hour SI well pressure: 2376 psig 70 hour SI bottom hole pressure measurement (BOMB): 3169 psig Ran 4 point test. C.A.O.F. 915 MCFPD, no water or condensate. Shut well in to evaluate and solicit gas contract.
11/21/85	Cost to date: $1,677,000.

Prognosis:

Based upon the 4 point test, the sustainable rate is estimated at 150 MCFPD.

Although this well did test for three days at about 1000 MCFPD, the Morrow had not been sufficiently produced to attain pseudo steady-state rate, which is estimated at around 150 MCFPD, and which would take at least several weeks to attain. The Morrow has very low permeability which is evidenced by the fact that after producing only 2300 MCF, the shut-in bottom hole pressure had declined from an original 4129 psia to 3182 psia. (Even after allowing the S.I. BHP to buildup for 70 hours.) When the BHP was measured on 6/24/87 (19 months later) it was found to be back at original of 4129 psia, based upon extrapolation of shut-in wellhead pressure of 3263 psia (see attached C-122G).

Based upon the well expenditure to date, and faced with an additional expenditure to hook up the well, it would have been more economical to plug the well as a dry hole than the produce the Morrow singly.

Sheep Draw Atoka Operations

10/21/86	Mr. David Catanach (NMOCD - Santa Fe), Mr. Les Clements (NMOCD - Artesia) and Mr. W. T. Duncan (Exxon) verbally discussed strategy of recompleting to the Atoka with the intent of eventual downhole commingling with the Morrow (internal memo attached).

(Continued)

5/27/87 Notice of intent to recomplete and eventually down hole commingle filed with BLM (attached).

6/24/87 19 month S.I. wellhead pressure of 3263 psia recorded for Morrow. Attached C-122-G calculates a static BHP of 4129 psia (back to original). Well was flowed down and killed with KCl brine.

6/25/87 Pulled packer. Ran new packer with wireline retrievable plug. Set new packer at 11,150', between Morrow and Atoka.

6/29/87 Perforated Atoka, one shot, at 10,469', 10,484', 10,501', 10,552', 10,561', 10,593', 10,795', 10,805', 10,819', 10,843', and 10,857'. (11 shots for limited entry fracture design).

7/03/87 Pumped 105 Bbls of diesel to break down perforations.

7/08/87 Fractured the Atoka with 44,000 gallons diesel and 64,000 lbs. of Bauxite, with maximum surface treating pressure of 12,400 psig. Total load oil: 1210 Bbls to recover.

7/10/87 SI wellhead pressure: 1375 psig. Flow back load, recovered only 219 Bbls diesel.

7/11/87 Well flowing on 20/64" choke, 1700 psig F.T.P., 2665 MCFPD rate. Recovered a total of 320 Bbls of load oil with 890 Bbls. left to recover.

7/13/87 Well flowing on 26/64" choke, 1500 psig F.T.P. 3500 MCFPD rate. Still cleaning up and getting stronger. Shut well in.

7/16/87 S.I.T.P. 2850 psig. Ran coil tubing unit with diesel to clean out fill to 11,080'.

7/17/87 Well flowing on 15/64" choke, 1800 psig F.T.P., 1638 MCFPD rate. Shut in for 72 hour static bottom hole pressure measurement.

7/20/87 Measured BHP to be 4072 psia (and not 6400 psia as originally expected).

Ran 4 point test. C.A.O.F. 4760 MCFPD, no water or condensate. Shut well in waiting on expenditure to hook up well and produce to sales.

Prognosis:

The estimated sustainable rate from the Atoka is 375 MCFPD. Assuming a decline rate of 30% per year applied to the 375 MCFPD rate approximates the future flowstream.

(Continued)

Commingling will recover significant additional reserves from the Morrow. The Morrow reserves will otherwise be left behind when the well is plugged because it will not be economical to recomplete the well deeper solely to produce the Morrow. For this reason the packer with retrievable plug was set between the Atoka and Morrow, until such time as the pressure in the two zones is approximately equal. On recompletion, the pressures were found to be equal.

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: 11/19/85	
Company: Exxon Co. U.S.A.			Connection: None		
Pool: Sheep Draw			Formation: Morrow		Unit
Completion Date: 11/1/85	Total Depth: 11646		Plug Back TD: 11630	Elevation	Farm or Lease Name: Squaw Federal
Csg. Size: 5 / Wt.: 20.8 / d: 4.156 / Set At: 11646			Perforations: From 11218 To 11621		Well No.: 3
Tbg. Size: 2 7/8 / Wt.: 6.5 / d: 2.441 / Set At: 11042			Perforations: From Open To End		Unit: K / Sec.: 1 / Twp.: 23S / Rge.: 25E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single			Packer Set At: 11,042		County: Eddy
Producing Thru: Tbg.	Reservoir Temp. °F: 184 @ 11042	Mean Annual Temp. °F: 60	Baro. Press. – P_a: 13.2		State: New Mexico
L: 11042 / H: 11042 / Gg: .589 / % CO_2: 1.161 / % N_2: .211 / % H_2S: / Prover: / Meter Run: 3.826 / Taps: Flg.					

NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Tubing Press. p.s.i.g.	Tubing Temp. °F	Casing Press. p.s.i.g.	Casing Temp. °F	Duration of Flow
SI							2376				
1.	3.826	X	.750	300	2	67	2220				1 hr.
2.	3.826	X	.750	300	10	88	2155				1 hr.
3.	3.826	X	.750	200	52	88	1730				1 hr.
4.	3.826	X	1.00	300	40	88	1225				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	2.662	25.03	313.2	.9933	1.303	1.024	88
2.	2.662	55.96	313.2	.9741	1.303	1.021	193
3.	2.662	127.62	313.2	.9741	1.303	1.021	440
4.	4.758	111.93	313.2	.9741	1.303	1.021	690
5.							

NO.	P_r	Temp. °R	T_r	Z
1	.46	527	1.51	.954
2.	.46	548	1.57	.960
3.	.46	548	1.57	.960
4.	.46	548	1.57	.960
5.				

Gas Liquid Hydrocarbon Ratio: Dry Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons: Deg.
Specific Gravity Separator Gas: .589 XXXXXXXXX
Specific Gravity Flowing Fluid: XXXXX
Critical Pressure: 676 P.S.I.A. P.S.I.A.
Critical Temperature: 349 R R

P_c 2398.2 P_c^2 5708.3

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1	2233.2	2233.2	4987.3	721.0
2	2168.2	2168.4	4701.9	1006.4
3	1743.2	1774.4	3042.9	2665.4
4	1238.2	1242.5	1543.7	4164.6
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 1.371$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.3252$

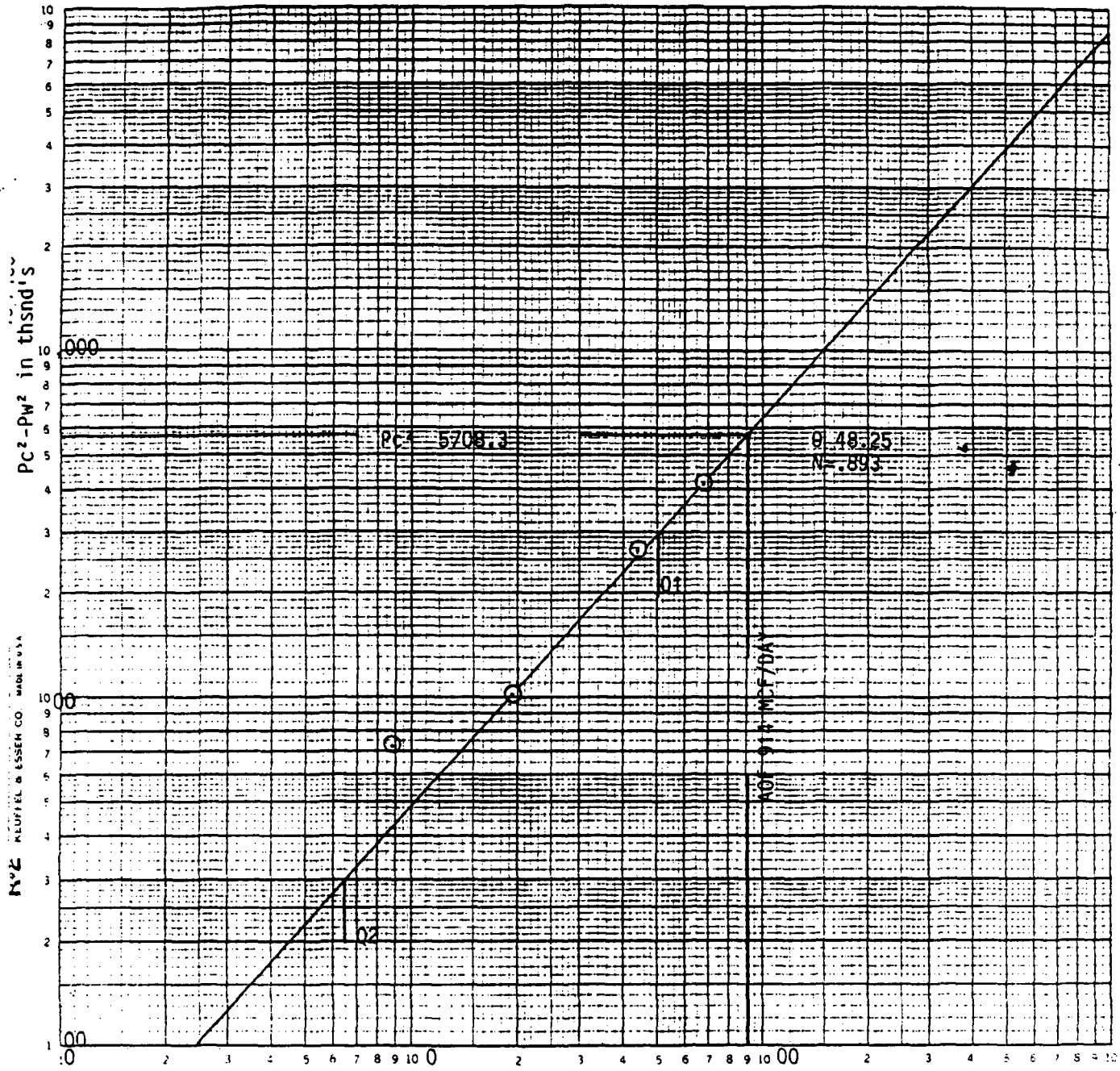
AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = .914$

Absolute Open Flow: 914 Mcfd @ 15.025 | Angle of Slope: 48.25 | Slope, n: .893

Remarks: Equivalent lenght deff and Friction factor were Calculated

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

COMPANY: EXXON CO. U.S.A.
LEASE: SQUAW FEDERAL #3
COUNTY: EDDY
DATE: 11/19/85



Q=MCF/DAY

Q1=508=Log=2.705913

Q2= 65=Log=1.812913

N= .893000

$$CAOF = 690\left(\frac{5708.3}{4164.6}\right)^{.893} = 914 \text{ MCF/DAY}$$

JARREL SERVICES, INC.

POST OFFICE BOX 1664 PHONES 505 393-6386 — 393-6276

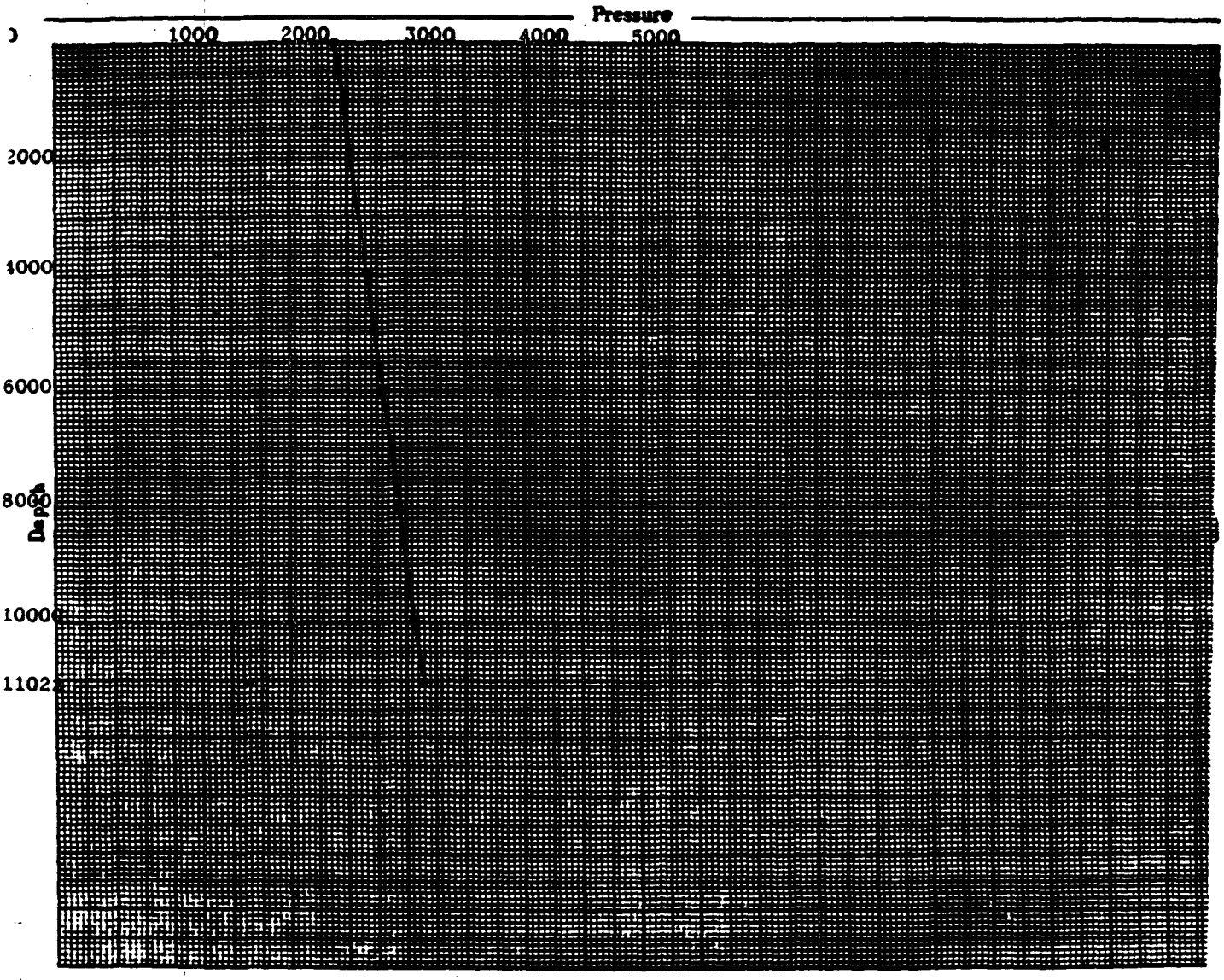
HOBBS, NEW MEXICO 88240

OPERATOR Exxon Company USA
FIELD Sheep Draw
FORMATION Morrow
LEASE Squaw Federal WELL No. 3
COUNTY Eddy STATE New Mexico
DATE 11/19/85 TIME 11:00 AM
Status Shut in
Test Depth 11022'
Time S. I. 70.0 hrs. Last test date -
Tub Pres. 2390 BHP last test -
Cas. Pres. PKR BHP change -
Elev. 3734'KB Fluid top None
Datum (-7686)** Water top None
Temp. @ 181 °F Run by JSI #29
Cal. No. 22693 Chart No. 2

BOTTOM HOLE PRESSURE RECORD

Depth		Pressure	Gradient
0		2390	-
2000		2521	.066
4000		2658	.069
6000		2792	.067
8000		2933	.071
10000		3069	.068
11022		3141	.071
11420	(-7686)	3169 * **	(.071)

* EXTRAPOLATED PRESSURE
** MIDPOINT OF CASING PERFORATIONS



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

→File

ANALYSIS CERTIFICATE

CLIENT: DUKE SERVICES INC.,
ADDRESS: 2400 N GRIMES - SUITE 273
CITY, STATE: HOBBS, NM 88240

ANALYSIS NUMBER: 8335
DATE OF RUN: 11 20 85
DATE SECURED: 11 19 85

SAMPLE IDENT: EXXON CO USA - SQUAW FEDERAL #3
SAMPLING PRESS:300 PSIG
SAMPLING TEMP:88 DEG F

REMARKS: 700 MCFD

MORROW GAS ANALYSIS

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

	MOLE PERCENT	GAL/ MCF
NITROGEN	0.211	
CARBON DIOXIDE	1.161	
METHANE	95.163	
ETHANE	2.791	0.744
PROPANE	0.347	0.095
ISO-BUTANE	0.079	0.026
NORMAL BUTANE	0.100	0.031
ISO-PENTANE	0.052	0.019
NORMAL PENTANE	0.036	0.013
HEXANES	0.060	0.025
TOTAL	100.000	0.953

PROPANE GPM: 0.09 BUTANES GPM: 0.06
ETHANE GPM: 0.74 PENTANES PLUS GPM: 0.06

SPECIFIC GRAV (CALC): 0.5888
MOLE WEIGHT: 17.05

HHV-BTU/CU FT	PRESSURE (PSIA)	WET	DRY
	14.696	1013	1032
	14.650	1010	1028
	14.730	1016	1034
	14.735	1016	1034

DEANE SIMPSON

TO: WELL FILE

990-0072-1C

MEMORANDUM

TO	SUBJECT	
L. J. Sohaney	Squaw Federal No. 3 South Carlsbad Area	
FROM	**DATE**	**FILE NO.**
W. T. Duncan Bill	October 21, 1986	Cons 2.1.6 Fed 1.10.1 ST 6.6

I contacted both David Catanach (NMOCD-Santa Fe) and Les Clements (NMOCD-Artesia) today and described why we would like to set a retrievable plug above the Morrow in the captioned well. Neither party had any objection to the proposal, saying that no formal approval was required until Exxon wanted to obtain a permit to downhole commingle the Morrow and the Atoka. Both agreed that obtaining authority to commingle should be no problem when the pressure in the two zones is more nearly equal.

In addition, I asked Bob Pitschke with the BLM in Carlsbad what the BLM would require. He said they wanted a Sundry Notice before we moved uphole and another before downhole commingling, but that no specific authorization to use a packer and plug above the Morrow is required.

WTD:tt

xc: R. M. Chiquito
J. L. Schaumburg

Form 3160-3
(November 1983)
(formerly 9-331C)

SUBMIT IN T. ICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0136
Expires August 31, 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: NM-0453201

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Squaw Federal

9. WELL NO.: 3

10. FIELD AND POOL, OR WILDCAT: Undes. Sheep Draw-Atoka Gas

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 1, T23S, R25E

12. COUNTY OR PARISH: Eddy

13. STATE: NM

1a. TYPE OF WORK: DRILL ☐ DEEPEN ☐ PLUG BACK ☒

b. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ OTHER — SINGLE ZONE ☐ MULTIPLE ZONE ☐

2. NAME OF OPERATOR: Exxon Corporation Attn: David A. Murray

3. ADDRESS OF OPERATOR: P. O. Box 1600, Midland, TX 79702

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 2479' FSL and 1880' FWL of Sec.
At proposed prod. zone:

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 5 miles SW from Carlsbad

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 1880' FWL

16. NO. OF ACRES IN LEASE: 1440.84

17. NO. OF ACRES ASSIGNED TO THIS WELL: 320

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: None

19. PROPOSED DEPTH: 10,857

20. ROTARY OR CABLE TOOLS: N/A

21. ELEVATIONS (Show whether DF, RT, GR, etc.): FR 3695'

22. APPROX. DATE WORK WILL START*:

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
26	20	94	85	250 sx
17 1/2	13 3/8	54.5	1510	2635 sx
12 1/4	9 5/8	40	2604	775 sx
8 1/2	5	20.8	11665	2800 sx

This well is currently completed in the Sheep Draw Morrow Gas field. Exxon proposes to set a CIBP above the Morrow, then perforate and stimulate the Atoka. The Atoka will be produced until the Morrow and Atoka BHP are more nearly equal. At that time the two zones will be commingled.

BOPs will be Class 1.

BUREAU OF LAND MANAGEMENT APPROVED JUN 02 1987 NEW MEXICO

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED David A. Murray (David A. Murray) TITLE Permits Supervisor DATE 5-29-87

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY Raj Giri TITLE AREA MANAGER CARLSBAD RESOURCE AREA DATE 6-16-87

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions On Reverse Side

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Morrow BHP @ 7300' Subsea from Shut-In Wellhead Pressure Measurement

WORKSHEET FOR CALCULATION OF STATIC COLUMN PRESSURE AT GAS LIQUID INTERFACE

(From Wellhead Shut-In Pressure of 3263 PSIA)

Form C-122G
Adopted 9-1-65

COMPANY Exxon Corp. LEASE Squaw Federal WELL NO. 3 DATE June 24, 1987

L 11,034 H 11,034 L/H 1.00 G 0.589 % CO_2 1.16 % N_2 2.1 % H_2S 0

d -- F_r -- GH 6726 P_{cr} 673 (TABLE IX & X) T_{cr} 347 (TABLE IX & X)

Morrow BHP L. Sohaney

LINE											
1	Q_m	zero									
2	T_w (W.H. °R)	546									
3	T_s (BH °R)	632									
4	$T = (\frac{T_w + T_s}{2})$	589									
5	Z (Est.)	0.897									
6	TZ	528.3									
7	GH/TZ	12.73									
8	e^s (Table XIV)	1.601									
9	$1 - e^{-s}$ (Table XIV)	--									
10	P_c	3263									
11	P_c^2	10,647									
12	F_r (Table XV)	--									
13	$F_c = F_r TZ$	--									
14	$F_c Q_m$	--									
15	$L/H (F_c Q_m)^2$	--									
16	$F_w = L/H(F_c Q_m)^2(1-e^{-s})$	--									
17	$P_w^2 = P_t^2 + F_w$	--									
18	$P_f^2 = e^s P_c^2$	17,046									
19	P_f	4129									
20	$P = (\frac{P_c + P_f}{2})$	3696									
21	$P_r = \frac{P}{P_{cr}}$	5.49									
22	$T_r = \frac{T}{T_{cr}}$	1.697									
23	Z (Table XI)	0.897									

One copy to be filed in District Office (Work copy acceptable)

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: 7/20/87	
Company: Exxon Company USA		Connection: None			
Pool: Sheep Draw		Formation: Atoka		Unit	
Completion Date: 6/29/87	Total Depth: 11630'	Plug Back TD: 11150'	Elevation: 3734' KB	Farm or Lease Name: Squaw Federal	
Csg. Size: 5" / Wt.: 20.8# / d: 4.154 / Set At: 11630'	Perforations: From 10469' To 10857'			Well No.: 3	
Tbg. Size: 2 7/8" / Wt.: 6.5# / d: 2.441 / Set At: 10400'	Perforations: From Open To Ended			Unit: K / Sec.: I / Twp.: 23s / Rge.: 25e	
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single		Packer Set At: 10400'		County: Eddy	
Producing Thru: Tbg	Reservoir Temp. °F: 164 @ 10633	Mean Annual Temp. °F: 60°	Baro. Press. – P_a: 13.2	State: New Mexico	

L	H	Cg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
-	-	0.595	0.425	0.483	-	-	4.026	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. DWT	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI						3180	63	PACKER		75.5 hrs
1.	4.026	4/64 1.500	515	3	77	3095	63			1.0 hrs
2.	4.026	7/64 1.500	520	6	77	2985	61			1.0 hrs
3.	4.026	10/64 1.500	525	13	77	2810	61			1.0 hrs
4.	4.026	14/64 1.500	530	18	76	2640	61			1.0 hrs
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	10.84	39.81	528.2	0.9840	1.296	1.039	572
2.	10.84	56.56	533.2	0.9840	1.296	1.039	812
3	10.84	83.65	538.2	0.9840	1.296	1.040	1203
4	10.84	98.88	543.2	0.9850	1.296	1.040	1423
5.							

NO.	P_t	Temp. °R	T_g	Z
1	0.78	537	1.53	0.927
2.	0.79	537	1.53	0.926
3.	0.80	537	1.53	0.925
4	0.80	536	1.53	0.925
5				

Gas Liquid Hydrocarbon Ratio: Dry Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons: - Deg.
Specific Gravity Separator Gas: 0.595 XXXXXXXXXX
Specific Gravity Flowing Fluid: XXXXX
Critical Pressure: 675 P.S.I.A. ____ P.S.I.A.
Critical Temperature: 350 R ____ R

P_c 4072.2* P_c^2 16582.8

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		3950.2	15604.1	978.7
2		3792.2	14380.8	2202.0
3		3628.2	13163.8	3419.0
4		3519.2	12384.8	4198.0
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 3.950$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 3.345$

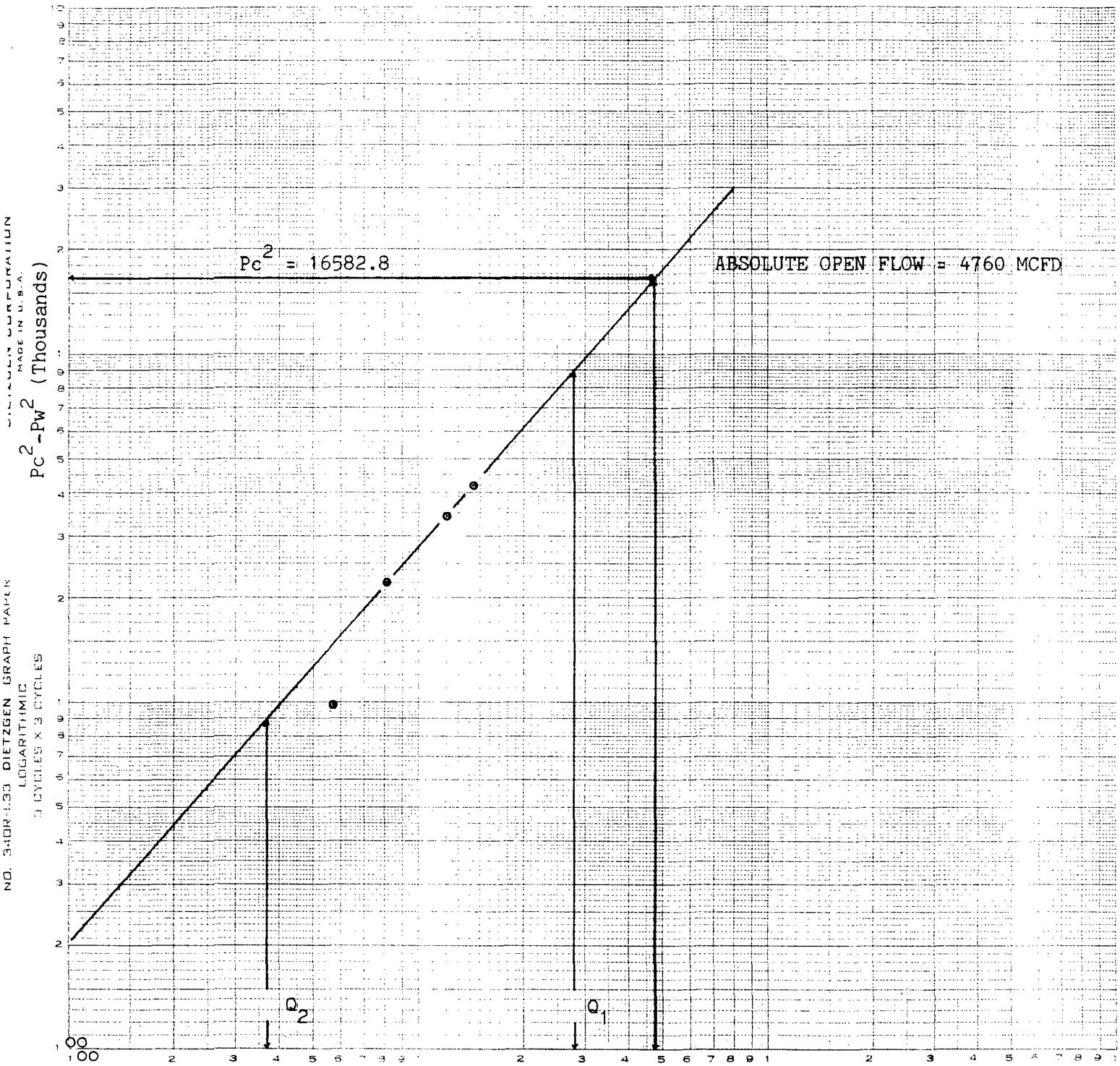
AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 4760$

Absolute Open Flow: 4760 Mcfd @ 15.025 | Angle of Slope θ: 48° 41' | Slope, n: 0.879

Remarks: * BOTTOM HOLE PRESSURES @ 10633' (-6899) USED FOR PRESSURE CALCULATIONS

Approved By Division	Conducted By:	Calculated By:	Checked By:
	Jarrel Services, Inc	D. Dickerson	D. Dickerson

COMPANY: Exxon Company USA
WELL: Squaw Federal, No. 3
LOCATION: K 1 23_s 25_e
COUNTY: Eddy
DATE: July 20, 1987



Q_1 = 2800 MCFD: Log Q_1 = 3.447158

Q_2 = 370 MCFD: Log Q_2 = 2.568202

N = 0.878956 = 0.879

JARREL SERVICES, INC.

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

HOBBS, NEW MEXICO 88240

COMPANY: Exxon Company USA

WELL: Squaw Federal, No. 3 FIELD: Sheep Draw - Atoka

CHRONOLOGICAL PRESSURE DATA

DATE	STATUS OF WELL	TIME	ELASPED TIME HRS.	ELASPED TIME MIN.	SURFACE PRESSURE TBG DWT	SURFACE PRESSURE CSG	BHP @ (-6899) 10350	BHP @ (-6899) 10633 psig
1987								
7/20	Shut in 73.5 hrs. Run Bombs to 10350'	9:30 AM	73	30	3180	PKR	4033	4059
	Started 1st Rate Flowing	11:30	75	30	3180	- MCFD	4033	4059
	Finished 1st Rate & Started 2nd Rate	12:30 PM	1	00	3095	572	3911	3937
	Finished 2nd Rate & Started 3rd Rate	1;30	1	00	2985	812	3753	3779
	Finished 3rd Rate & Started 4th Rate	2:30	1	00	2810	1203	3589	3615
	Finsihed 4th Rate & Pulled Bombs	3:30	1	00	2640	1423	3480	3506

NEW-TEX LAB
P.O. Box 1161
Hobbs, New Mexico 88240

ANALYSIS CERTIFICATE

CLIENT:	BENNETT & CATHEY INC.,	ANALYSIS NUMBER:	1632
ADDRESS:	BOX 787	DATE OF RUN:	07 21 87
CITY, STATE:	ARTESIA, NM 88210	DATE SECURED:	07 21 87

SAMPLE IDENT: EXXON - SQUAW FEDERAL #3
SAMPLING PRESS:150 PSIG SAMPLING TEMP:60 DEG F

Atoka

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

	MOLE PERCENT	GAL/ MCF
NITROGEN	0.483	
CARBON DIOXIDE	0.425	
METHANE	93.981	
ETHANE	3.835	1.023
PROPANE	0.789	0.217
ISO-BUTANE	0.161	0.053
NORMAL BUTANE	0.143	0.045
ISO-PENTANE	0.080	0.029
NORMAL PENTANE	0.055	0.020
HEXANES	0.048	0.020
TOTAL	100.000	1.407

PROPANE GPM:	0.22	BUTANES GPM:	0.10
ETHANE GPM:	1.02	PENTANES PLUS GPM:	0.07

SPECIFIC GRAV (CALC): 0.5945
MOLE WEIGHT: 17.22

HHV-BTU/CU FT PRESSURE (PSIA)	WET	DRY
14.696	1036	1055
14.650	1033	1051
14.730	1038	1057
14.735	1039	1057

ANALYZED BY:
DEANE SIMPSON

APPROVED BY:

JARREL SERVICES, INC.
Box 1230
Hobbs, New Mexico 88240

<<Static Gradient Survey>>

Date: 07/20/87 @ 9:30 am

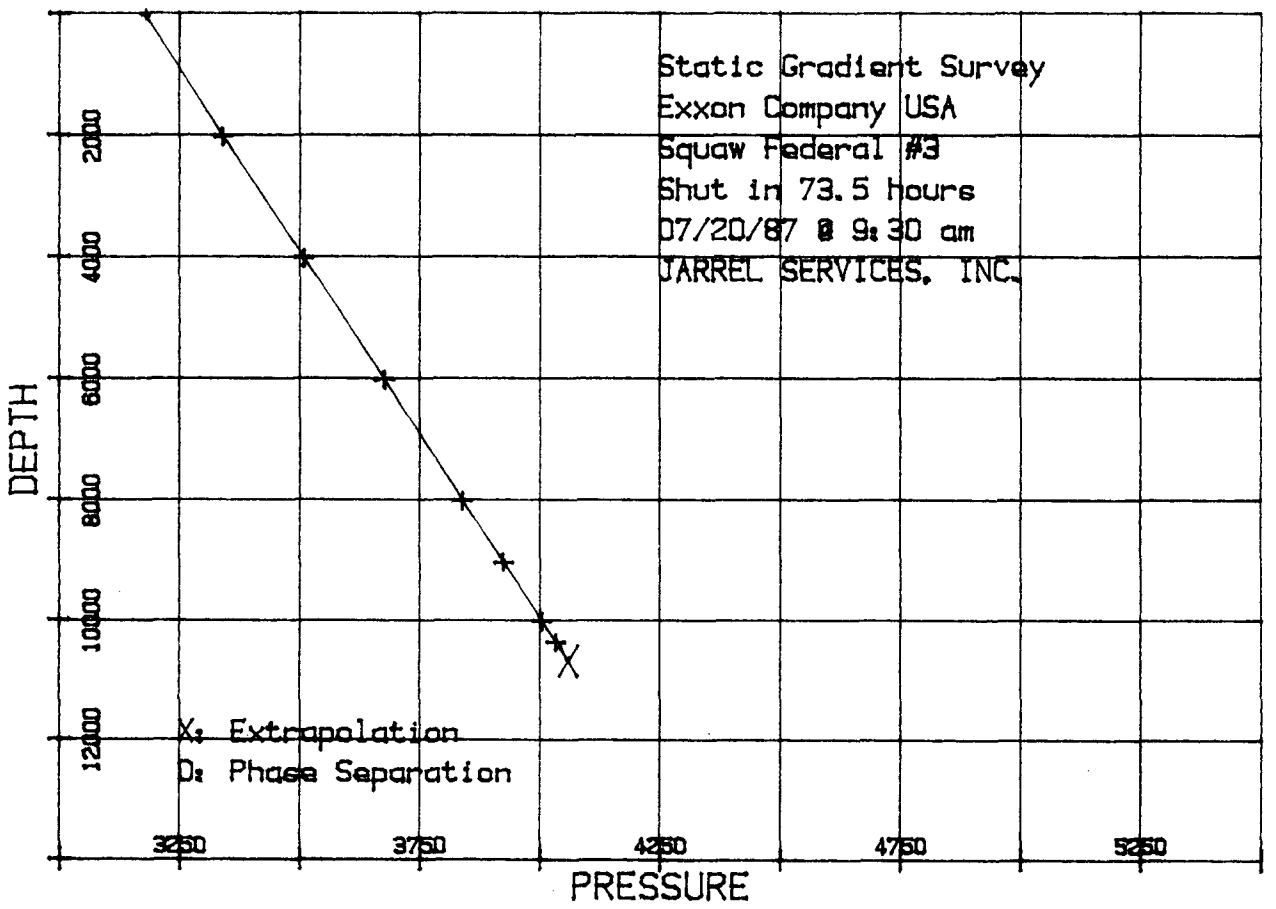
COMPANY: Exxon Company USA
LEASE: Squaw Federal
FIELD: Sheep Draw
COUNTY: Eddy
STATUS: Shut in 73.5 hours
PERFORATIONS FROM: 10469 ft
DEPTH: 10350 ft

CONTACT: James Fort
WELL: #3
ZONE: Atoka
STATE: New Mexico
OPERATOR: Standefer
TD: 10857 ft
TEMPERATURE: 161'F

TABULAR DATA

DEPTH (ft)	PRESSURE (psi)	GRADIENT (psi/ft)	EXPLANATIONS
0	3177		
2000	3339	0.081	
4000	3509	0.085	
6000	3676	0.084	
8000	3839	0.082	
9000	3924	0.085	
10000	4004	0.080	
10350	4033	0.083	
10663	4059	0.083	<=Extrapolated BHP

NOTE: Explanations are included to clarify calculated data points.



Exxon Squaw Federal No. 3
Offset Operators
Eddy County, New Mexico

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

Yates Petroleum
207 S. 4th
Artesia, New Mexico 88210

Bureau of Land Management
P. O. Box 1449
Santa Fe, New Mexico 87504

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

PRODUCTION DEPARTMENT
SOUTHWESTERN DIVISION

December 10, 1987

Downhole Commingling Request
Squaw Federal Well No. 3
Sheep Draw (Morrow) and (Atoka) Pools
Eddy County, New Mexico

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

Exxon has applied to the New Mexico Oil Conservation Division for permission to downhole commingle the Morrow and Atoka production in the captioned wellbore. A copy of that application is attached. If you, as an offset operator or lessor have no objection to the granting of this application, we would appreciate your waiver of objection by executing and returning one copy of this letter to the NMOCD and another copy to Exxon in the attached postage paid envelopes.

Sincerely,

James D. Howell

JDH:def

Attachment

Approved Terry L. Cherryhomes Date December 17, 1987

Company Exxon Oil & Gas

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

PRODUCTION DEPARTMENT
SOUTHWESTERN DIVISION

December 10, 1987

Downhole Commingling Request
Squaw Federal Well No. 3
Sheep Draw (Morrow) and (Atoka) Pools
Eddy County, New Mexico

Yates Petroleum
207 S. 4th
Artesia, New Mexico 88210

Exxon has applied to the New Mexico Oil Conservation Division for permission to downhole commingle the Morrow and Atoka production in the captioned wellbore. A copy of that application is attached. If you, as an offset operator or lessor have no objection to the granting of this application, we would appreciate your waiver of objection by executing and returning one copy of this letter to the NMOCD and another copy to Exxon in the attached postage paid envelopes.

Sincerely,

James D. Howell

JDH:def

Attachment

Approved _____ Date December 30, 1987
Attorney-in-Fact
Company YATES PETROLEUM CORPORATION

YATES PETROLEUM CORPORATION

105 SOUTH FOURTH STREET
ARTESIA, NEW MEXICO 88210
TELEPHONE (505) 748-1471

S. P. YATES
PRESIDENT
JOHN A. YATES
VICE PRESIDENT

December 31, 1987

Exxon Company, U.S.A.
P. O. Box 1600
Midland, Texas 79702-1600

Attention: James D. Howell

Re: Downhole Commingling Request
Squaw Federal Well No. 3
Sheep Draw (Morrow) and (Atoka) Pools
Eddy County, New Mexico

Gentlemen:

As requested in your letter dated December 10, 1987, we are enclosing a copy of your waiver of objection on the captioned, executed by Yates Petroleum Corporation.

Very truly yours,

YATES PETROLEUM CORPORATION

Randy G. Patterson
Land Manager

RGP/bp

Enclosure

cc: NMOCD