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

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

ADMINISTRATIVE ORDER
NFL 72

INFILL DRILLING FINDINGS AND WELL-SPACING WAIVER
MADE PURSUANT TO SECTION 271.305(b) OF THE
FEDERAL ENERGY REGULATORY COMMISSION REGULATIONS,
NATURAL GAS POLICY ACT OF 1978 AND OIL CONSERVATION DIVISION
ORDER NO. R-6013

I.

Operator Arco Oil & Gas Company Well Name and No. Seven Rivers Queen Ut. Well No. 57

Location: Unit I Sec. 34 Twp. 22S Rng. 36E Cty. Lea

II.

THE DIVISION FINDS:

(1) That Section 271.305(b) of the Federal Energy Regulatory Commission Interim Regulations promulgated pursuant to the Natural Gas Policy Act of 1978 provides that, in order for an infill well to qualify as a new onshore production well under Section 103 of said Act, the Division must find, prior to the commencement of drilling, that the well is necessary to effectively and efficiently drain a portion of the reservoir covered by the proration unit which cannot be so drained by any existing well within that unit, and must grant a waiver of existing well-spacing requirements.

(2) That by Order No. R-6013, dated June 7, 1979, the Division established an administrative procedure whereby the Division Director and the Division Examiners are empowered to act for the Division and find that an infill well is necessary.

(3) That the well for which a finding is sought is to be completed in the EuniceSevenRiversQueen South Pool, and the standard spacing unit in said pool is 40 acres.

(4) That a 40 -acre proration unit comprising the NE/4 SE/4 of Sec. 34, Twp. 22S, Rng. 36E, is currently dedicated to the SevenRiversQueen Unit (WIW) No. 31 located in Unit I of said section.

(5) That this proration unit is (x) standard ( ) nonstandard; if nonstandard, said unit was previously approved by Order No. N/A.

(6) That said proration unit is not being effectively and efficiently drained by the existing well(s) on the unit.

(7) That the drilling and completion of the well for which a finding is sought should result in the production of an additional 18,900 MCF of gas from the proration unit which would not otherwise be recovered.

(8) That all the requirements of Order No. R-6013 have been complied with, and that the well for which a finding is sought is necessary to effectively and efficiently drain a portion of the reservoir covered by said proration unit which cannot be so drained by any existing well within the unit.

(9) That in order to permit effective and efficient drainage of said proration unit, the subject application should be approved as an exception to the standard well spacing requirements for the pool.

IT IS THEREFORE ORDERED:

(1) That the applicant is hereby authorized to drill the well described in Section I above as an infill well on the existing proration unit described in Section II(4) above. The authorization for infill drilling granted by this order is an exception to applicable well spacing requirements and is necessary to permit the drainage of a portion of the reservoir covered by said proration unit which cannot be effectively and efficiently drained by any existing well thereon.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on this 22nd day of February, 1983.

DIVISION DIRECTOR ✓ EXAMINER ___

Application Received 6/9/82
Sespence date: Immediately

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

ADMINISTRATIVE ORDER

NFL 72

INFILL DRILLING FINDINGS PURSUANT TO
SECTION 271.305(b) OF THE FEDERAL ENERGY REGULATORY
COMMISSION REGULATIONS, NATURAL GAS POLICY ACT OF 1978
AND OIL CONSERVATION DIVISION ORDER NO. R-6013-A

I.

Operator ARCO Oil and Gas Company Well Name and No. Seven Rivers Queen Unit Well No. 57

Location: Unit I Sec. 34 Twp. 22S Rng. 36E Cty. Lea

II.

THE DIVISION FINDS:

(1) That Section 271.305(b) of the Federal Energy Regulatory Commission Regulations promulgated pursuant to the Natural Gas Policy Act of 1978 provides that, in order for an infill well to qualify as a new onshore production well under Section 103 of said Act, the Division must find that the infill well is necessary to effectively and efficiently drain a portion of the reservoir covered by the proration unit which cannot be so drained by any existing well within that unit.

(2) That by Order No. R-6013-A, dated February 8, 1980, the Division established an administrative procedure whereby the Division Director and the Division Examiners are empowered to act for the Division and find that an infill well is necessary.

(3) That the well for which a finding is sought is completed in the Eunice Seven Rivers Queen South Pool, and the standard spacing unit in said pool is 40 acres.

(4) That a 40 -acre proration unit comprising the NE/4 SE/4 of Sec. 34, Twp. 22S, Rng. 36E, is currently dedicated to the Seven Rivers Queen Unit (WIW) No. 31 located in Unit I of said section.

(5) That this proration unit is (X) standard ( ) nonstandard; if nonstandard, said unit was previously approved by Order No. N/A.

(6) That said proration unit is not being effectively and efficiently drained by the existing well(s) on the unit.

(7) That the drilling and completion of the well for which a finding is sought should result in the production of an additional 18900 MCF of gas from the proration unit which would not otherwise be recovered.

(8) That all the requirements of Order No. R-6013-A have been complied with, and that the well for which a finding is sought is necessary to effectively and efficiently drain a portion of the reservoir covered by said proration unit which cannot be so drained by any existing well within the unit.

(9) That in order to permit effective and efficient drainage of said proration unit, the subject application should be approved.

IT IS THEREFORE ORDERED:

(1) That the applicant is hereby authorized to drill the well described in Section I above as an infill well on the existing proration unit described in Section II(4) above. The authorization for infill drilling granted by this order is necessary to permit the drainage of a portion of the reservoir covered by said proration unit which cannot be effectively and efficiently drained by any existing well thereon.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on this 22nd day of February, 1983.

DIVISION DIRECTOR ___ EXAMINER ___

ARCO Oil and Gas Company
Natural Gas Department
Post Office Box 2819
Dallas, Texas 75221
Telephone 214 651 4675

Paul T. Davis
Manager, Gas Regulations

January 6, 1983

Department of Energy and Minerals
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Michael E. Stogner

RE: Application for NGPA Infill Finding
Seven Rivers Queen Unit No. 57
Lea County, New Mexico
AR #46281, 46449

Dear Mr. Stogner:

Pursuant to Order No. R-6013-A of the Oil Conservation Division, ARCO Oil and Gas Company, a Division of Atlantic Richfield Company (ARCO), submitted an application on June 4, 1982, for administrative finding that subject infill well was necessary. (This is also in regard to the NGPA application submitted on March 29, 1982.) As per your request received November 8, 1982, we are attaching for your consideration a memorandum from Mr. Robert E. Craig of our Midland office dated December 21, 1982, and the documents of support.

Please return the extra copy of this letter with evidence of your receipt thereof in the enclosed self-addressed, stamped envelope.

Yours very truly,

Dottie J. Parks

Dottie J. Parks
Sr. Gas Regulations Administrator
(214) 651-4678

DJP:ke

Enclosures

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

ARCO OIL & GAS COMPANY
P.O. BOX 2819
Dallas, Texas 75221

Attention: Dottie J. Parks, Sr. Gas Regulations Admin.

Re: Application for NGPA Infill Well
Findings Under Provisions of
Order No. R-6013-A Seven Rivers
Queen Unit Well No. 57,
I-34-22S-36E, Lea County

Dear Ms. Parks,

We may not process the subject application for infill findings until the required information, forms, or plats checked on the reverse side of this letter are submitted.

Sincerely,

Michael E. Stogner /DW

Michael E. Stogner,
Petroleum Engineer

MES/dp

- [ ] A copy of Form C-101 must be submitted.
- [ ] A copy of Form C-102 must be submitted.
- [ ] The pool name must be shown.
- [ ] The standard spacing unit size for the pool must be shown.
- [ ] Give the Division Order No. which granted the non-standard proration unit.
- [ ] Please state whether or not the well has been spudded and give the spud date, if any.
- [ ] Information relative to other wells on the proration unit is incomplete.
- [x] The geologic and reservoir data is incomplete or insufficient.

  Please show how 40,000 barrels ultimate oil recovery was cacultated and also show expected gas recovery.
- [ ] Other:

ARCO Oil and Gas Company

Internal Correspondence

Date: December 21, 1982

Subject: Reserve Determination
Seven-Rivers Queen Unit

From/Location: Robert E. Craig - 542 MIO

To/Location: Ms. D. J. Parks - 9104 DST

Attached is a detailed reserve determination for the SRQU No. 57 as requested by the New Mexico Oil Conservation Division. The results of the study show that an infill well at the location of No. 57 could be expected to recover 37.8 MBO new reserves. This differs from the original estimate of 40 MBO by less than 10%. The reason for the difference is that the original value was only an estimate based on data from other patterns in the SRQU. The calculations were made as if No. 57 had not been previously drilled and no completion information was available. However, data from the core analysis of No. 57 was used to provide a more accurate reservoir description. The new reserves for No. 57 were based on increasing the pay continuity and injection efficiency.

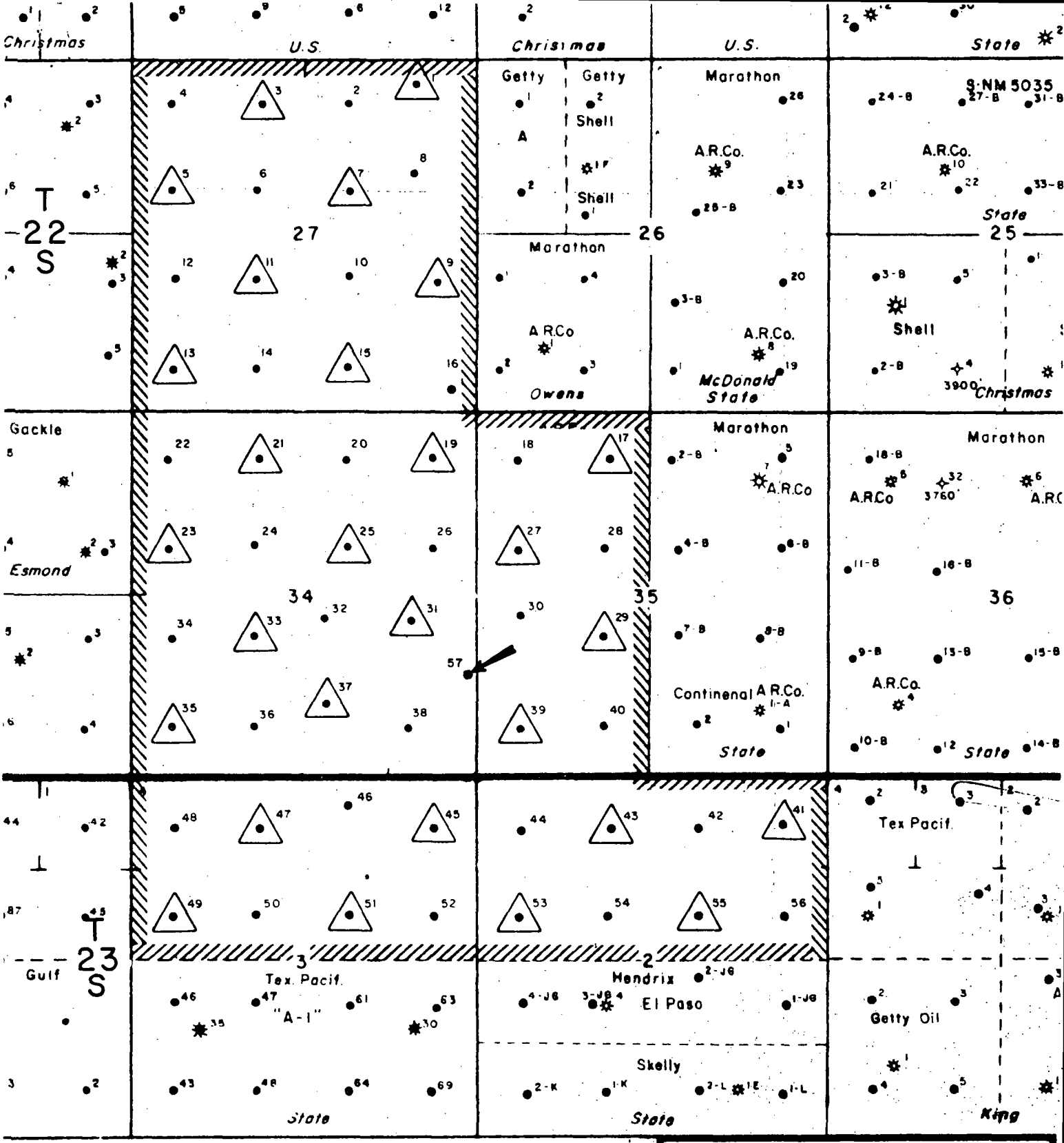
The low initial rate and rapid falloff of No. 57 indicated a lack of injection support and pressure maintenance for the pattern. At this point it was indeed doubtful the well would produce the calculated reserves. However, workovers were planned for the two offset injectors, Nos. 31 and 39, which would improve the productivity of the pattern. After reviewing the profiles of the two wells, it was found that the vertical injection efficiency was less than that calculated for the pattern's total volumetric efficiency. Both wells were worked over in October 1982. A comparison of the before and after treatment profiles for No. 31 showed an increase in vertical injection efficiency from 37% to 85%. Although No. 39 has not been evaluated with an after treatment profile, its workover can be expected to produce similar results to No. 31. Therefore, due to the increase in injection efficiency No. 57 can be expected to recover the reserves of 37.8 MBO as calculated above. Response should occur after a period of 6 months to 1 year. As the pattern is pressured up, the GOR can be expected to fall to a value of 500. ~~This will~~ mean over the life of the well the ultimate gas reserves will be 18.9 MMCF.

If you have any additional questions or require additional information, please contact me.

Robert E. Craig

Engineer

REC:dmm
Atts.



R 36 E

UNIT BOUNDARY

ARCO Oil and Gas Company
Division of AtlanticRichfieldCompany
Permian District Midland, Texas

SEVEN RIVERS-QUEEN UNIT

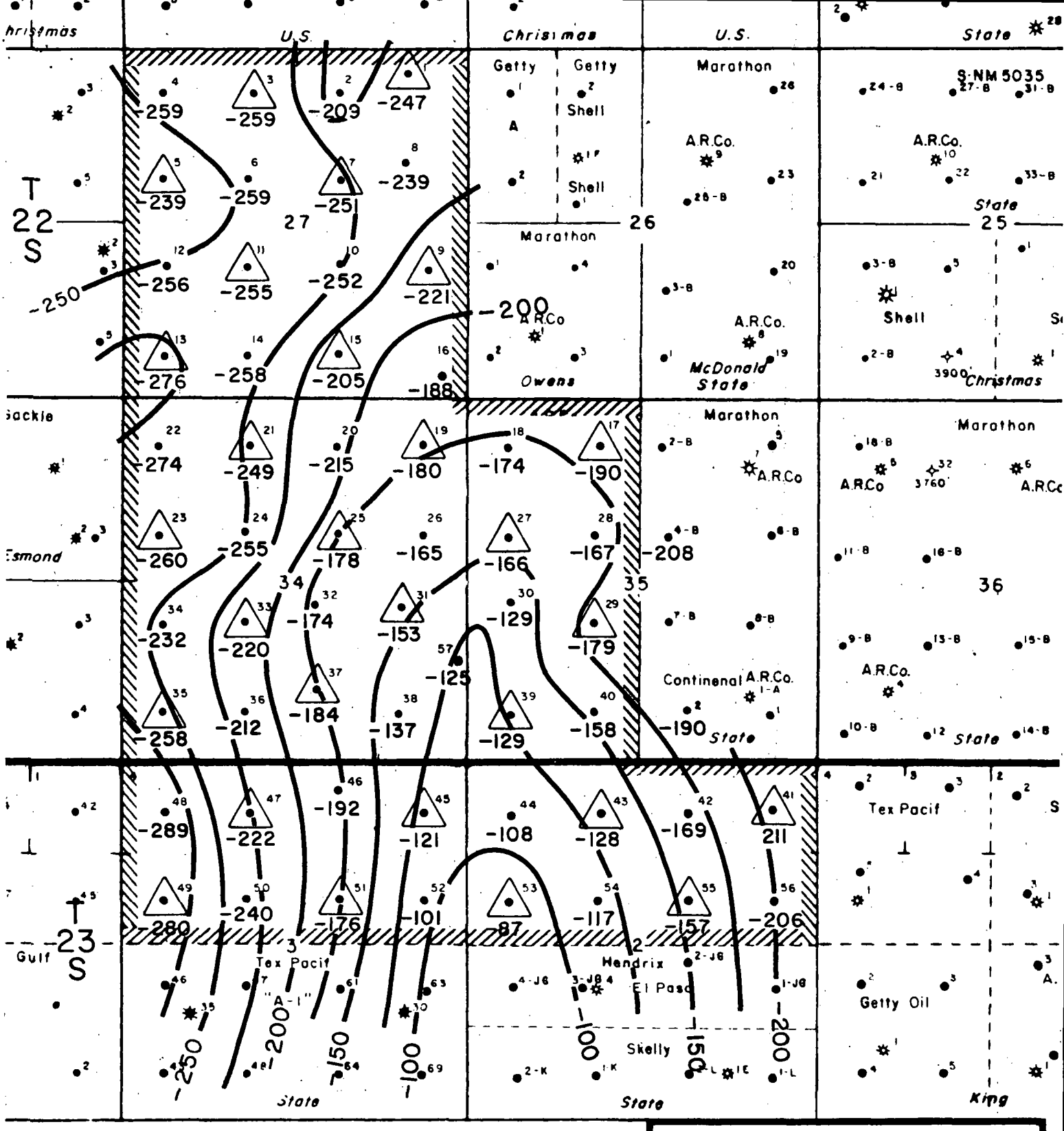
LEA COUNTY, NEW MEXICO

UNIT MAP

Figure 2

SCALE: 1" = 2000'

By: R. CRAIG		Drawn By:	Date: 4-81
Date: 2-82		Revised By:	Date:
Dept.: WEST AREA ENGR.		Dwg No.	



R 36 E

ARCO Oil and Gas Company
Division of AtlanticRichfieldCompany
Permian District Midland, Texas

SEVEN RIVERS-QUEEN UNIT

LEA COUNTY, NEW MEXICO

STRUCTURE MAP
TOP OF QUEEN

C.I. = 25'

Figure 5

SCALE: 1" = 2000'

By: R. CRAIG	Drawn By:	Date: 4 - 81
Date: 6-1-82	Revised By: BS	Date: 6-82
Dept: WEST AREA ENGR.	Dwg No:	

SRQU No. 57
Expected Increased Recovery
Due to Infill Drilling

Average Pay of 4 Surrounding Wells

Well	Net Pay Logged	Estimated Add. Pay	Total Net Pay*
No. 30	35'	--	35'
No. 31	26'+	15'	41'
No. 38	30'+	8'	38'
No. 39	41'	--	41'
Total	132'		155'
Average	33'		38.75'

*Additional pay of deepened wells was estimated by correlating to nearest offsets which were logged through intervals below the logged depth of shallow wells.

From Continuity Curve - South Area
(Wells 41-48)

% Continuous pay - 40 acre spacing (1320')	63%
% Continuous pay - 20 acre spacing (933')	73%

From Relative Permeability Data (Special Core Analysis [No. 57])

$$Soi = 68\% \text{ and } Sor = 32\%$$

$$E_D = \frac{Soi - Sor}{Soi} = \frac{.68 - .32}{.68} = .5294$$

From Core Data on SRQU Wells Nos. 41, 53 and 57

$$\text{Avg. } \phi = 11\%$$

From "Proposed Seven-Rivers Queen Unit Waterflood Study"

$$Boi = 1.21 \text{ RVB/STB} \qquad Box = 1.04 \text{ RVB/STB}$$

$$OOIP_{40 \text{ acres}} = \frac{(7758)(40)(38.75)(.11)(.68)}{1.21}$$

$$= 743.4 \text{ MBO}$$

Primary Recovery From Pattern

Well	Primary Recovery BO	Allocation Factor	Allocated Production BO
No. 30	45,503	.25	11,375
No. 31	20,361	.25	5,090
No. 38	35,347	.25	8,837
No. 39	36,226	.25	9,057
Total	137,437		34,359

From attached Waterflood Pattern Analysis
This pattern currently has a volumetric efficiency of 43.63%. Assuming a 10% increase in efficiency due to infill drilling and an improvement in pay continuity of 10% yields:

$$\Delta E_R = \frac{Boi}{Box} E_D [(Ev_2 - Ev_1)f_1 + (Ev_2 - \bar{A})(f_2 - f_1)]$$

$$= (\frac{1.21}{1.04})(.5294)[(.5363 - .4363).63 + (.5363 - .3406)(.73 - .63)]$$

$$= .0509$$

Therefore ΔE_R due to infill drilling No. 57 is

$$\Delta E_R = (.0509)(743.4)$$

$$= \underline{\underline{37.8 \text{ MBO}}}$$

Where:
- Soi = initial oil saturation
- Sor = residual oil saturation to waterflood
- Sgx = gas saturation at start of flood
- E_D = displacement efficiency
- E_V = volumetric efficiency
- $\bar{A}$ = displaceable pore volume occupied by gas
- f = floodable pay
- 1 = before infill drilling
- 2 = after infill drilling
- ΔE_R = increased recovery

AtlanticRichfieldCompany ◆ **Waterflood Material Balance Analysis**

Field: South Eunice

Reservoir: Seven-Rivers Queen

Element area: 40 Acres

Average thickness: 38.75 Feet

Date start of injection: 3/74

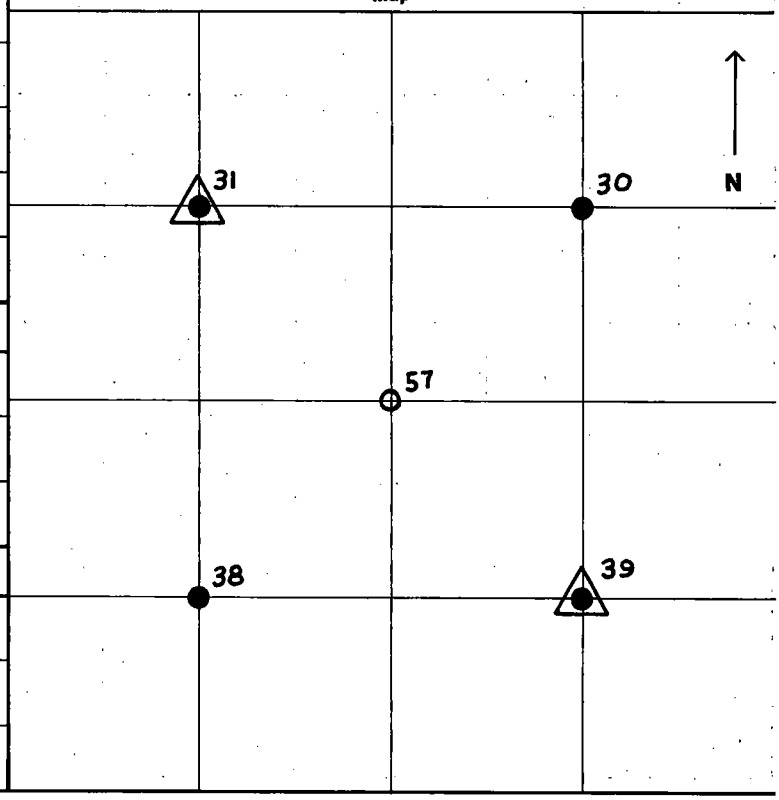
Cumulative production at start of injection

Oil (N_p) =	34.4	MSTB
Gas (G_p) = Avg. GOR 1500	51.5	MMCF
Water (W_p) = Avg. WOR .7	24.08	MBbls

Rock and fluid data

ϕ = .11	S_{cw} = .32
B_{ox} = 1.04	S_{or} = .32
B_{oi} = 1.21	

Map



Pattern volumetric data

V_p = 7758 x Ø x h x Area = 7758 x .11 x 38.75 x 40 = 1,322.7 M RVB

$V_D = V_p \times (1.0 - S_{cw} - S_{or})$ = 1,322.7 M x (1.0 − .32 − .32) = 476 M RVB

$$\text{O.O.I.P.} = \frac{V_p \times (1.0 - S_{cw})}{B_{oi}} = \frac{1{,}322.7\text{ M} \times (1.0 - .32)}{1.21} = 743.4\text{ M STB}$$

$$S_{gx} = S_{oi}\left[1.0 - \frac{B_{ox}}{B_{oi}}(1 - f)\right] = .68\left[1.0 - \frac{1.04}{1.21}(1 - .0463)\right] = .1226$$

$V_{fillup} = V_p \times S_{gx}$ = 1,322.7 M x .1226 = 162.2 M RVB

$$\text{Disp. eff.}\,(E_D) = \frac{S_{oi} - S_{or}}{S_{oi}} = \frac{.68 - .32}{.68} = .5294$$

$$\text{ABAR} = \frac{S_{gx}}{1.0 - S_{cw} - S_{or}} = \frac{.1226}{.36} = .3406$$

Analysis start time is start of injection. Oil production at start of injection, Np = _____ MSTB

Time interval ending	Cumulative Oil production	Total cumulative Recovery	Cumulative water injection	Cumulative water Production	Conformance	Percent fillup	Displaceable Volume Injected	Water bank Radius
	ΔN_p	$\frac{\Delta N_p + N_p}{OOIP}$	W_i	ΔW_p	$\frac{W_i - \Delta W_p}{V_D}$	$\frac{W_i - (\Delta N_p + \Delta W_p)}{V_{Fillup}}$	$\frac{W_i}{V_D}$	r
	MSTB	Fraction	MBbls	MBbls	Fraction	Percent	Fraction	Feet

Pattern 57
Cumulative Production and Injection

Date	SRQU No. 30 MBO/MBW	SRQU No. 38 MBO/MBW	SRQU No. 31 MBW	SRQU No. 39 MBW
1-1-75	1.25/--	1.29/--	50.4	48.5
1-1-76	5.1/4.7	5.2/2.1	167.9	162.5
1-1-77	8.3/10.9	11.1/5.1	269.4	265.4
1-1-78	11.4/22	11.7/5.5	389.3	379.3
1-1-79	13.4/35	12.4/6.3	506.4	485.3
1-1-80	15.9/52	14.4/8.8	658.6	625.7
1-1-81	18.7/75.5	20.5/21.1	816.3	769.3
1-1-82	20.9/94.7	26.9/46.3	932.8	881.4
10-1-82	22.3/108.6	30.7/62.5	1026.2	980.9

REC
12/82

Analysis start time is start of injection.

Oil production at start of injection, Np = 34.4 MSTB

Time interval ending	Cumulative Oil production ΔN_p	Total cumulative Recovery $\frac{\Delta N_p + N_p}{OOIP}$	Cumulative water injection W_i	Cumulative water Production ΔW_p	Conformance $\frac{W_i - \Delta W_p}{V_D}$	Percent fillup $\frac{W_i - (\Delta N_p + \Delta W_p)}{V_{Fillup}}$	Displaceable Volume Injected $\frac{W_i}{V_D}$	Water bank Radius r
	MSTB	Fraction	MBbls	MBbls	Fraction	Percent	Fraction	Feet
1-1-75	.64	.0471	24.7	--	.0519			
1-1-76	2.6	.0498	82.6	1.7	.17			
1-1-77	4.9	.0529	133.7	4.0	.2725			
1-1-78	5.8	.0541	192.2	6.9	.3893			
1-1-79	6.5	.055	247.9	10.3	.4992			
1-1-80	7.6	.0565	321.1	15.2	.6426			
1-1-81	9.8	.0595	396.4	24.2	.7819			
1-1-82	12.0	.0624	453.5	35.3	.8786			
10-1-82	13.3	.0642	501.8	42.8	.9643			

REC
12/82

AtlanticRichfieldCompany ◆ **Waterflood Material Balance Analysis**

Field

Reservoir

Element area

Acres

Average thickness

Feet

Date start of injection

Map

Cumulative production at start of injection

Oil (N_p) = MSTB

Gas (G_p) = MMCF

Water (W_p) = MBbls

Rock and fluid data

ϕ = S_{cw} =

B_{ox} = S_{or} =

B_{oi} =

Pattern volumetric data

= 7758 x Ø x h x Area = 7758 x _____ x _____ x _____ = _____ RVB

$V_D = V_p \times (1.0 - S_{cw} - S_{or})$ = _____ x (1.0 – • _____ – • _____) = _____ RVB

$$O.O.I.P. = \frac{V_p \times (1.0 - S_{cw})}{B_{oi}} = \frac{\quad \times (1.0 - \bullet\ \quad)}{\quad} = \quad \text{STB}$$

$$S_{gx} = S_{oi}\left[1.0 - \frac{B_{ox}}{B_{oi}}(1 - f)\right] = \bullet\ \left[1.0 - \frac{\quad}{\quad}(1 - \bullet\ \quad)\right] =$$

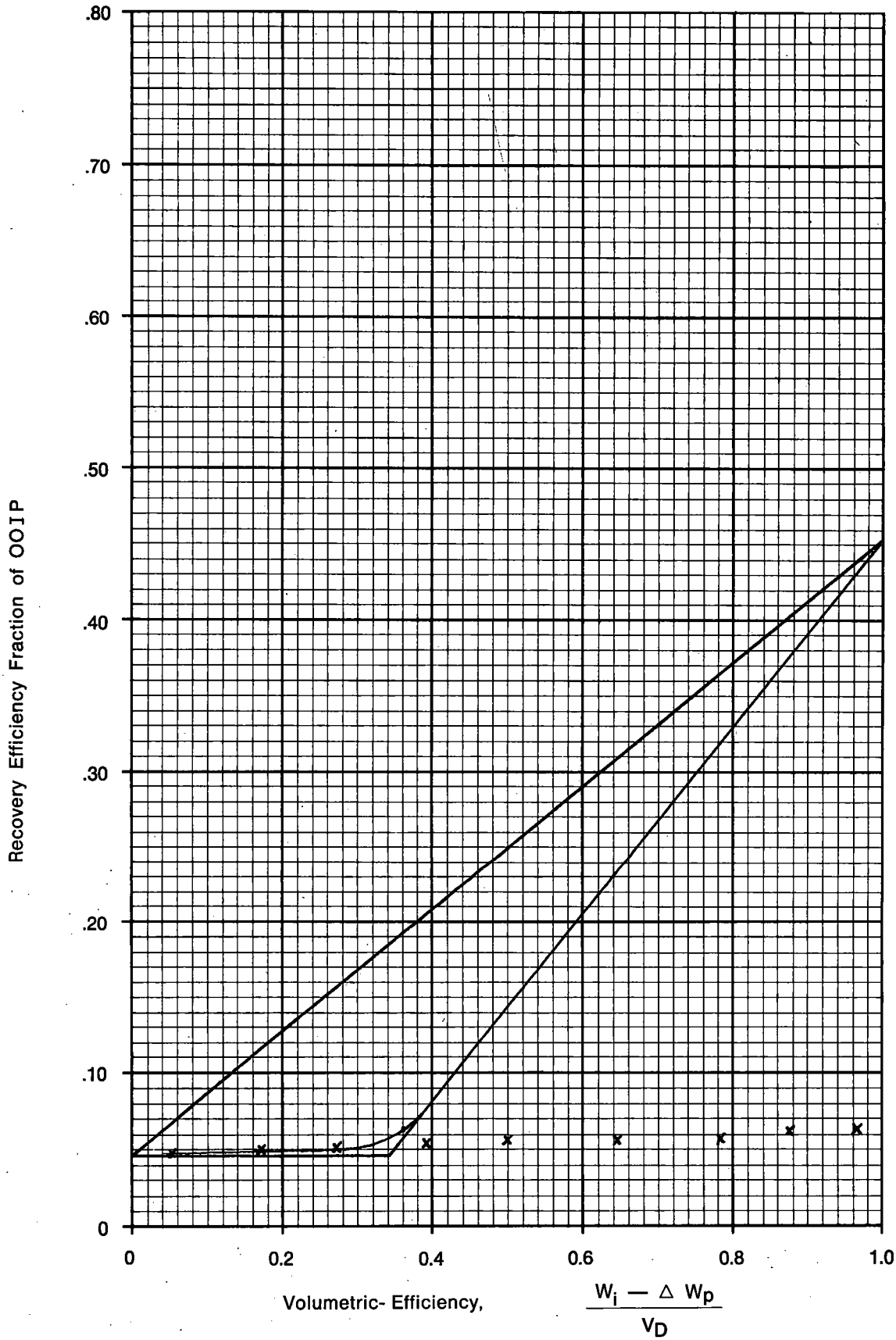
$V_{fillup} = V_p \times S_{gx}$ = _____ x • _____ = _____ RVB

$$\text{Disp. eff.}\,(E_D) = \frac{S_{oi} - S_{or}}{S_{oi}} = \frac{\bullet\ \quad - \bullet\ \quad}{\bullet\ \quad} =$$

$$ABAR = \frac{S_{gx}}{1.0 - S_{cw} - S_{or}} = \frac{\bullet\ \quad}{\bullet\ \quad} =$$

AtlanticRichfieldCompany ◆ **Pattern Performance**

F at start of flood	ABAR	F at $E_v = 1.0$ $F = 1.0 - \frac{B_{oi}}{B_{ox}} (1.0 - E_D) =$	Pattern No.
.0463	.3406	.4525	57



Pattern 57

Injection Efficiency Calculation

Remaining Reserves

Current Rate	No. 30	4 BOPD
	No. 38	12 BOPD
		16 BOPD

Allocated Production 4 BOPD/pattern

$$Npt = \frac{(qi - qt)365}{D} = \frac{(4 - 2.5)365^*}{.1052}$$

$$= 5{,}204 \text{ BO}$$

*Assuming a 10% decline

Ultimate Recovery Under Current Operations

$$U_R = \frac{P + Sec + Sec_{Remaining}}{OOIP}$$

$$= \frac{34.4 + 13.3 + 5.2}{743.4}$$

$$= .0712$$

Therefore .0712 is the recovery where the curve should be assymptotic with the obtuse triangle.

Correcting the Volumetric-Efficiency to where it intersects the curve inside the allowable triangle yields:

$$\frac{Wi - Wp}{V_D} = .37 \quad = \quad Wi = .37\ V_D + Wp$$

$$Wi = (.37)(476) + 42.8$$

$$= 218.9$$

Therefore injection efficiency is:

$$IE = \frac{Wical.}{Wiactual} = \frac{218.9}{501.8}$$

$$= \underline{.4363}$$

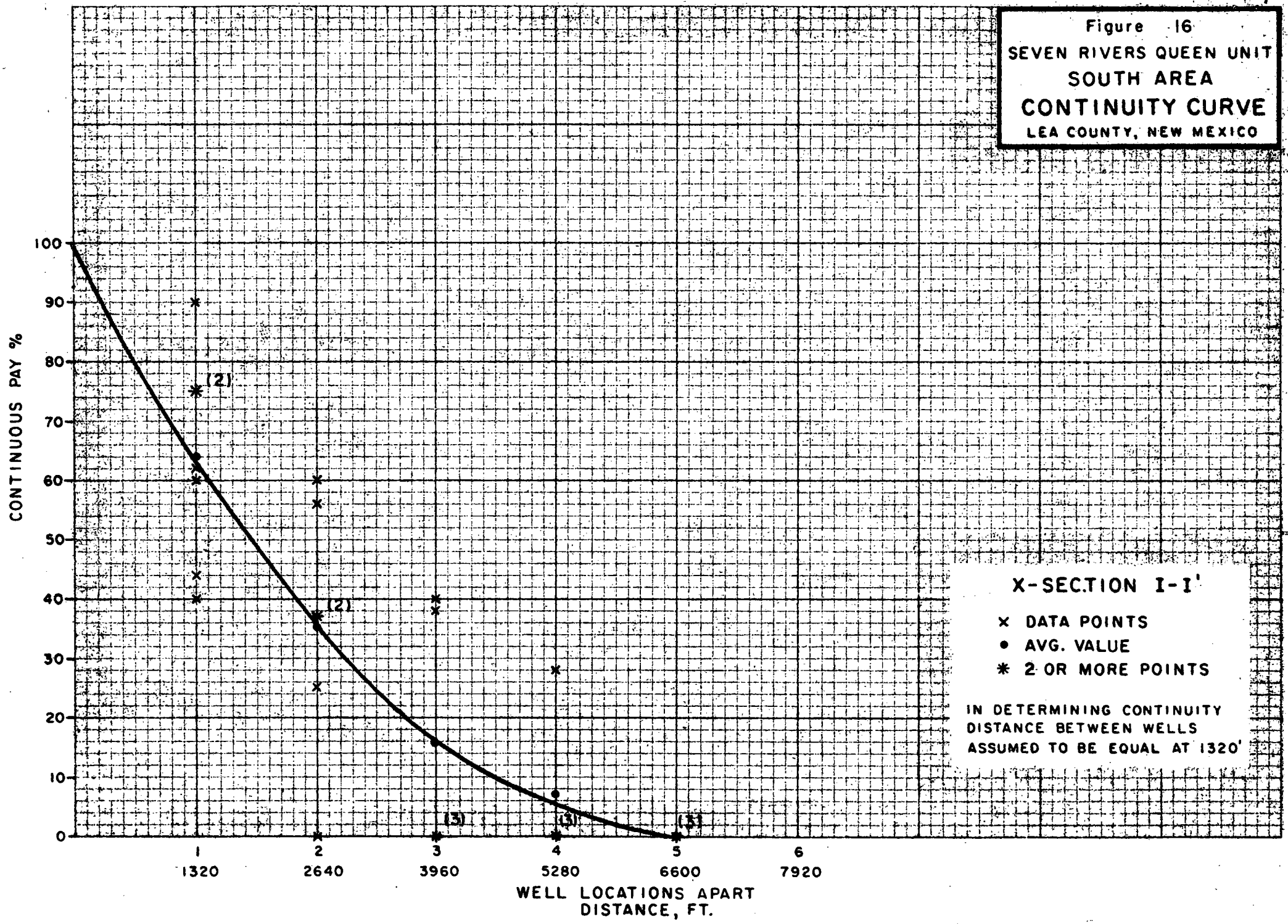
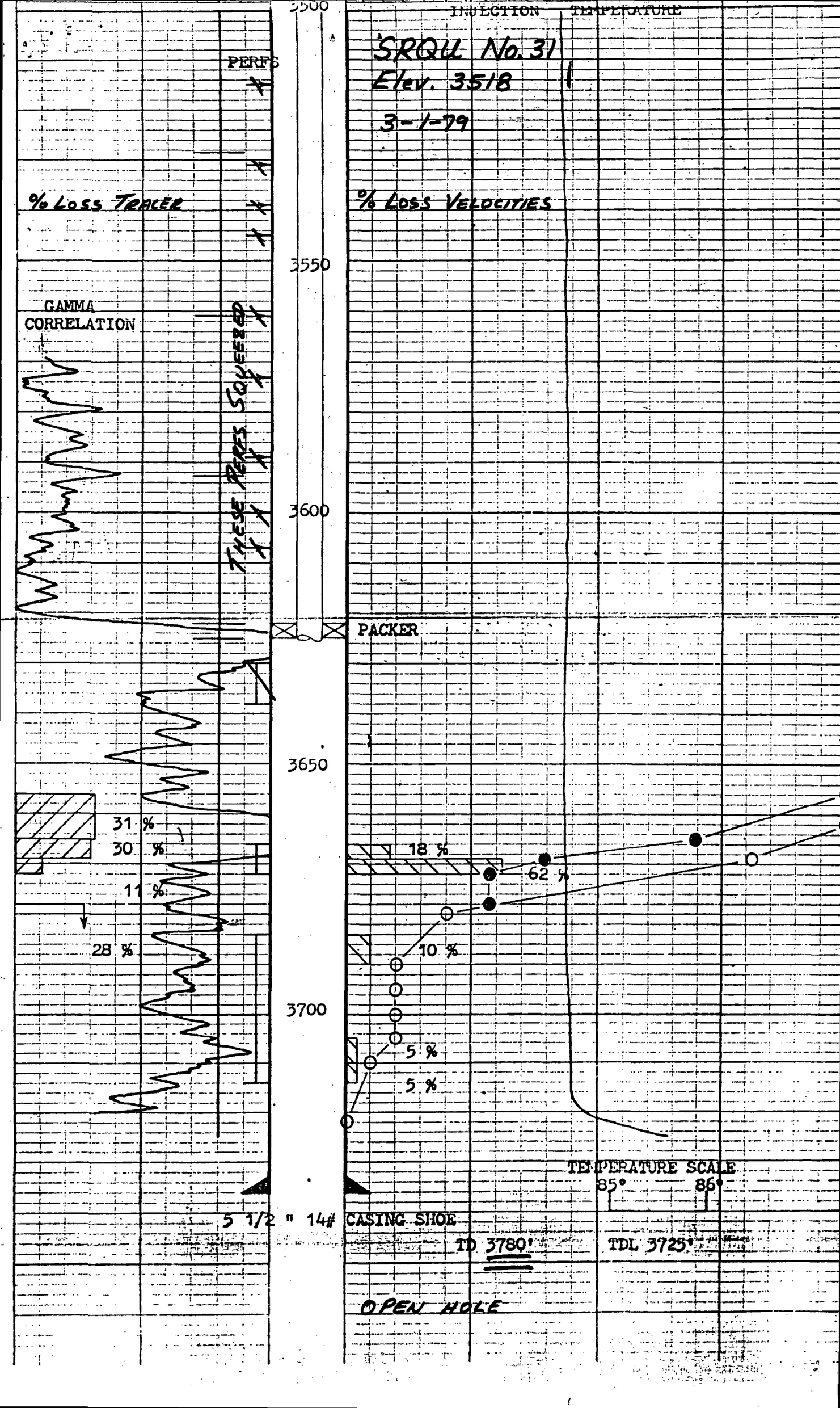
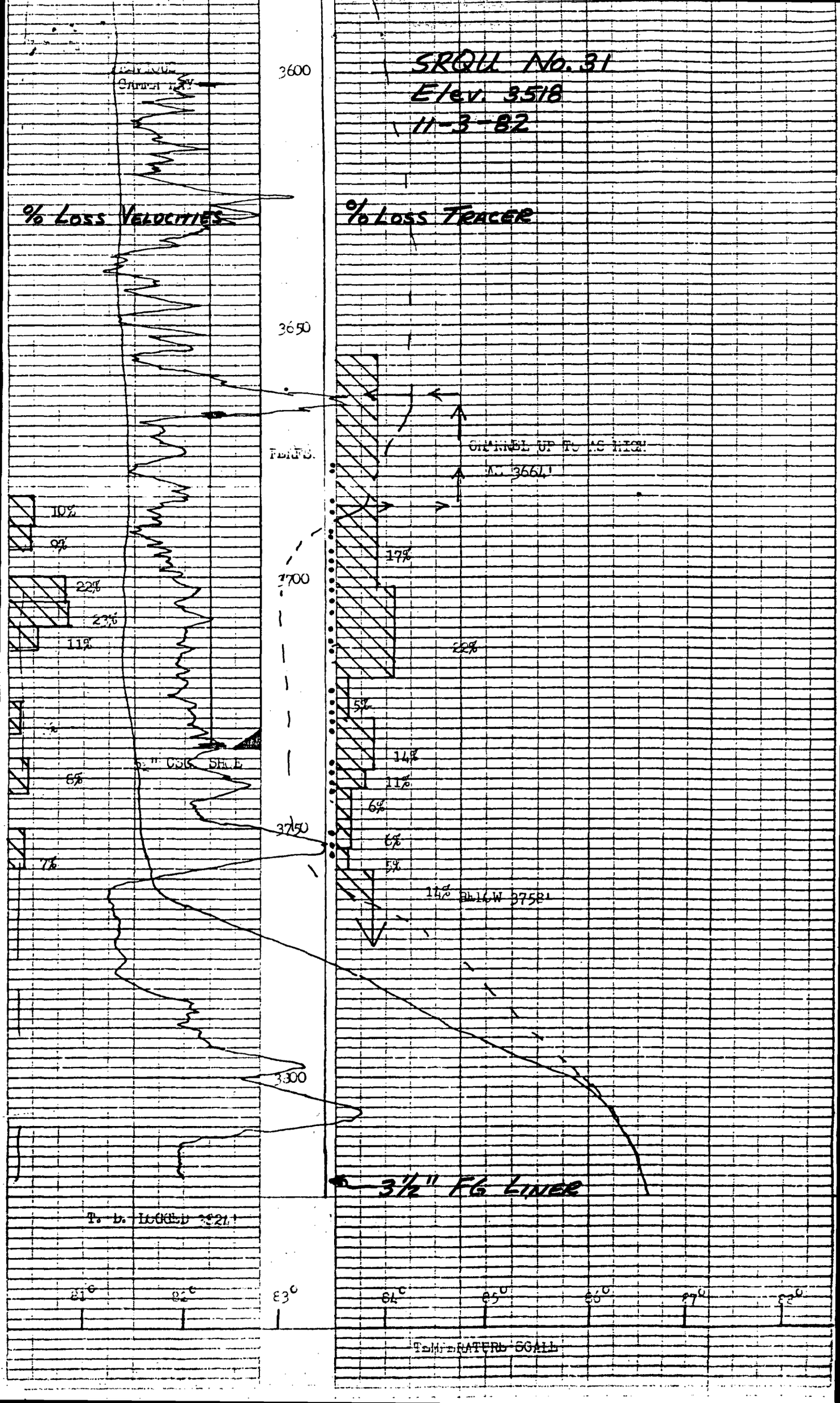


Figure 16
SEVEN RIVERS QUEEN UNIT
SOUTH AREA
CONTINUITY CURVE
LEA COUNTY, NEW MEXICO
CONTINUOUS PAY %
100
90
80
70
60
50
40
30
20
10
0
(2)
(2)
(3)
(3)
(3)
1
1320
2
2640
3
3960
4
5280
5
6600
6
7920
WELL LOCATIONS APART
DISTANCE, FT.
X-SECTION I-I'
× DATA POINTS
• AVG. VALUE
✱ 2 OR MORE POINTS
IN DETERMINING CONTINUITY
DISTANCE BETWEEN WELLS
ASSUMED TO BE EQUAL AT 1320'


INJECTION TEMPERATURE
SROU No. 37
Elev. 3518
3-1-79
PERFS
% Loss Tracer
% Loss Velocities
3550
GAMMA
CORRELATION
THESE PERFS SQUEEZED
3600
PACKER
3650
31 %
30 %
11 %
28 %
18 %
62 %
10 %
3700
5 %
5 %
TEMPERATURE SCALE
85°
86°
5 1/2 " 14# CASING SHOE
TD 3780'
TDL 3725'
OPEN HOLE


SRQU No. 31
Elev. 3518
11-3-82
% Loss Velocities
% Loss Tracer
3600
3650
3700
3750
3300
10%
9%
22%
23%
11%
6%
7%
17%
22%
5%
14%
11%
6%
6%
5%
14% Below 3758'
3½" FG Liner
81°
82°
83°
84°
85°
86°
87°
88°

ARCO Oil and Gas Company
Natural Gas Department
Post Office Box 2819
Dallas, Texas 75221
Telephone 214 651 4675

Paul T. Davis
Manager, Gas Regulations

January 6, 1983

Department of Energy and Minerals
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Michael E. Stogner

RE: Application for NGPA Infill Finding
Seven Rivers Queen Unit No. 57
Lea County, New Mexico
AR #46281, 46449

Dear Mr. Stogner:

Pursuant to Order No. R-6013-A of the Oil Conservation Division, ARCO Oil and Gas Company, a Division of Atlantic Richfield Company (ARCO), submitted an application on June 4, 1982, for administrative finding that subject infill well was necessary. (This is also in regard to the NGPA application submitted on March 29, 1982.) As per your request received November 8, 1982, we are attaching for your consideration a memorandum from Mr. Robert E. Craig of our Midland office dated December 21, 1982, and the documents of support.

Please return the extra copy of this letter with evidence of your receipt thereof in the enclosed self-addressed, stamped envelope.

Yours very truly,

Dottie J. Parks
Sr. Gas Regulations Administrator
(214) 651-4678

DJP:ke

Enclosures

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

ARCO OIL & GAS COMPANY
P.O. BOX 2819
Dallas, Texas 75221

RECEIVED
JAN 10 1983
OIL CONSERVATION DIVISION
SANTA FE

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Attention: Dottie J. Parks, Sr. Gas Regulations Admin.

Re: Application for NGPA Infill Well
Findings Under Provisions of
Order No. R-6013-A Seven Rivers
Queen Unit Well No. 57,
I-34-22S-36E, Lea County

Dear Ms. Parks,

We may not process the subject application for infill findings until the required information, forms, or plats checked on the reverse side of this letter are submitted.

Sincerely,

Michael E Stogner /dw

Michael E. Stogner,
Petroleum Engineer

MES/dp

RECEIVED
NOV 8 1982
GAS REGULATIONS - NGPA

- [ ] A copy of Form C-101 must be submitted.
- [ ] A copy of Form C-102 must be submitted.
- [ ] The pool name must be shown.
- [ ] The standard spacing unit size for the pool must be shown.
- [ ] Give the Division Order No. which granted the non-standard proration unit.
- [ ] Please state whether or not the well has been spudded and give the spud date, if any.
- [ ] Information relative to other wells on the proration unit is incomplete.
- [x] The geologic and reservoir data is incomplete or insufficient.

  Please show how 40,000 barrels ultimate oil recovery was cacultated and also show expected gas recovery.
- [ ] Other:

ARCO Oil and Gas Company | Internal Correspondence

Date: December 21, 1982

Subject: Reserve Determination
Seven-Rivers Queen Unit

From/Location: Robert E. Craig - 542 MIO

To/Location: Ms. D. J. Parks - 9104 DST

Attached is a detailed reserve determination for the SRQU No. 57 as requested by the New Mexico Oil Conservation Division. The results of the study show that an infill well at the location of No. 57 could be expected to recover 37.8 MBO new reserves. This differs from the original estimate of 40 MBO by less than 10%. The reason for the difference is that the original value was only an estimate based on data from other patterns in the SRQU. The calculations were made as if No. 57 had not been previously drilled and no completion information was available. However, data from the core analysis of No. 57 was used to provide a more accurate reservoir description. The new reserves for No. 57 were based on increasing the pay continuity and injection efficiency.

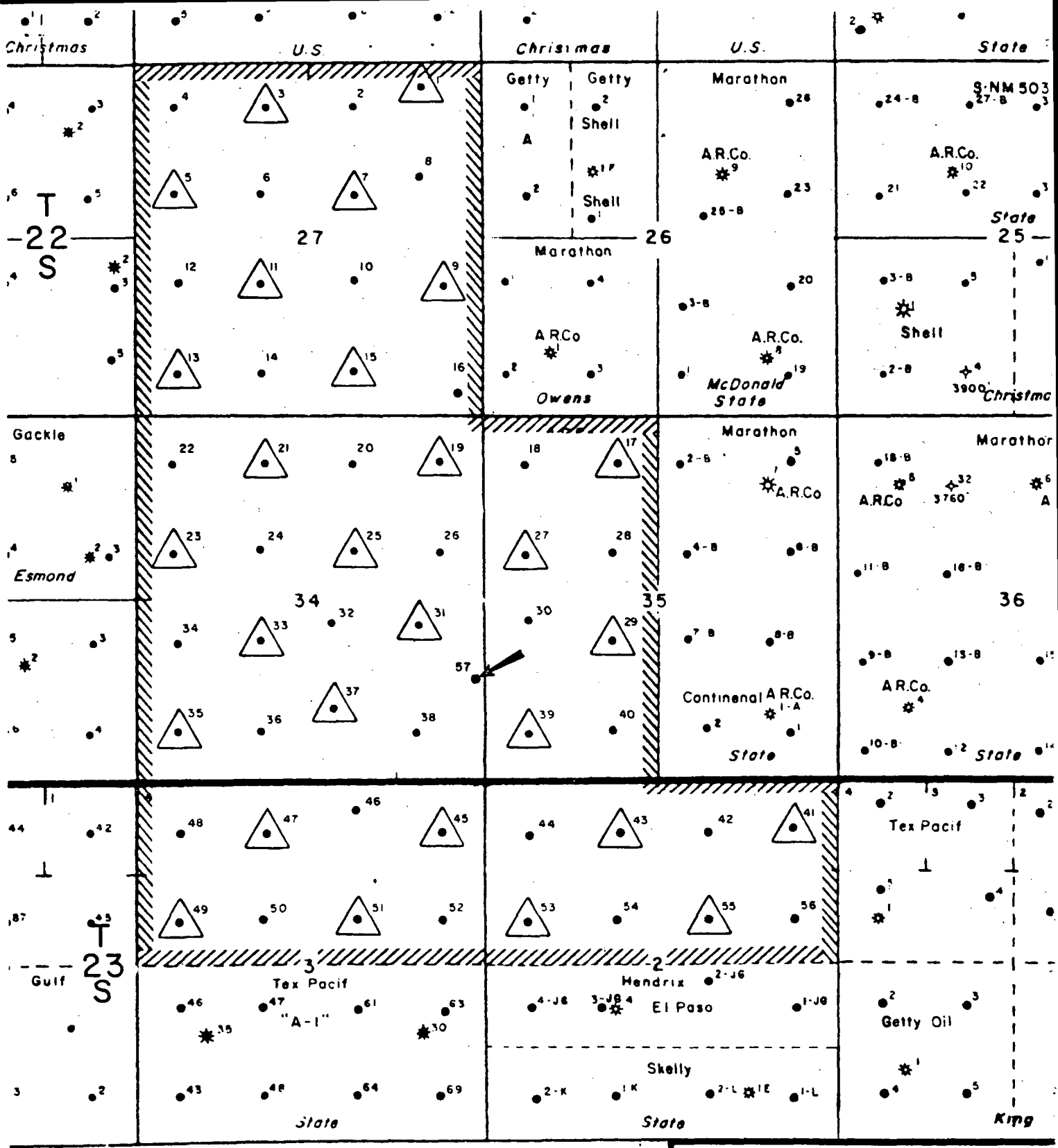
The low initial rate and rapid falloff of No. 57 indicated a lack of injection support and pressure maintenance for the pattern. At this point it was indeed doubtful the well would produce the calculated reserves. However, workovers were planned for the two offset injectors, Nos. 31 and 39, which would improve the productivity of the pattern. After reviewing the profiles of the two wells, it was found that the vertical injection efficiency was less than that calculated for the pattern's total volumetric efficiency. Both wells were worked over in October 1982. A comparison of the before and after treatment profiles for No. 31 showed an increase in vertical injection efficiency from 37% to 85%. Although No. 39 has not been evaluated with an after treatment profile, its workover can be expected to produce similar results to No. 31. Therefore, due to the increase in injection efficiency No. 57 can be expected to recover the reserves of 37.8 MBO as calculated above. Response should occur after a period of 6 months to 1 year. As the pattern is pressured up, the GOR can be expected to fall to a value of 500. This will mean over the life of the well the ultimate gas reserves will be 18.9 MMCF.

If you have any additional questions or require additional information, please contact me.

Robert E. Craig

Engineer

REC:dmm
Atts.



R 36 E

UNIT BOUNDARY

ARCO Oil and Gas Company
Division of AtlanticRichfieldCompany
Permian District Midland, Texas

SEVEN RIVERS-QUEEN UNIT

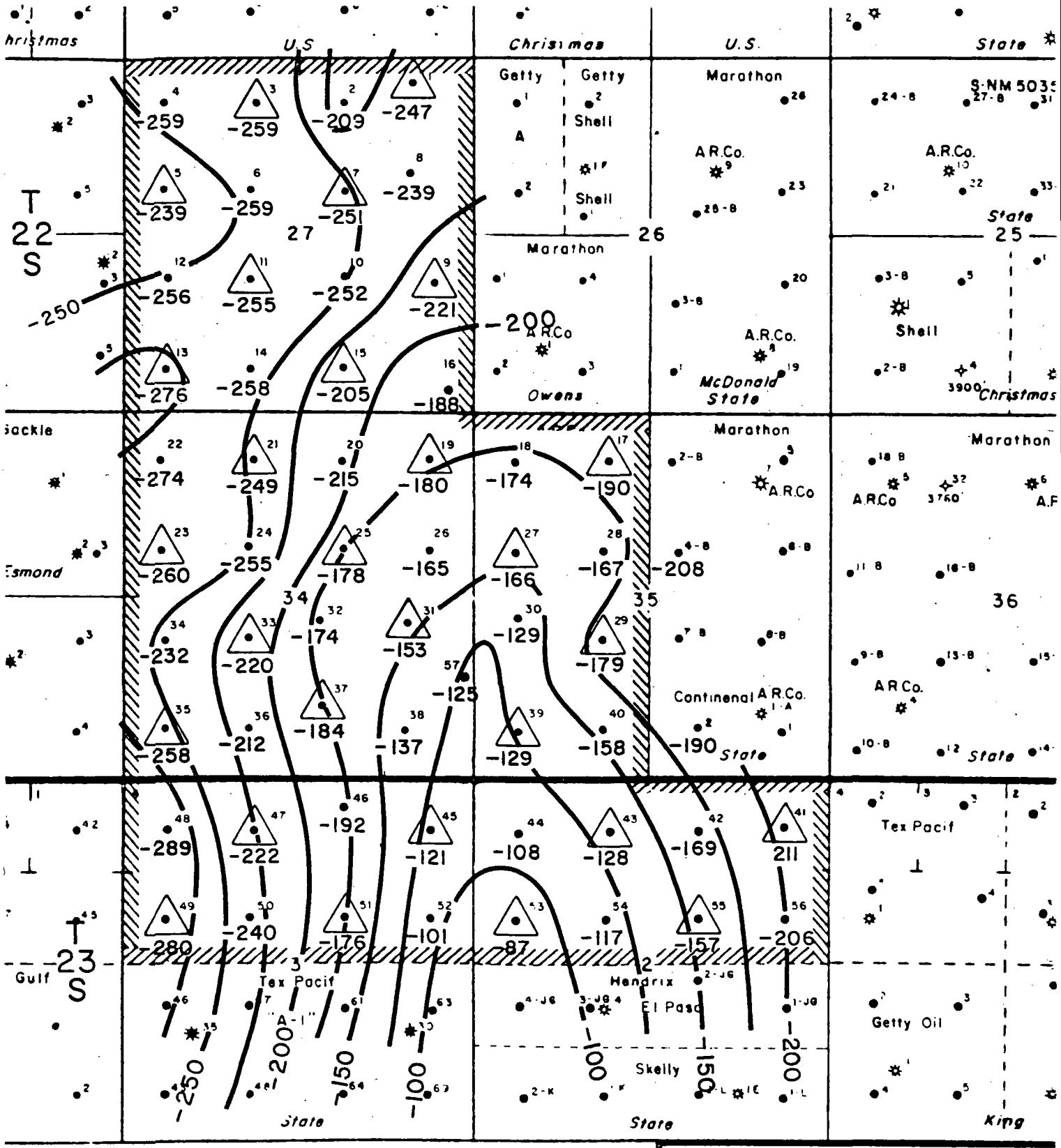
LEA COUNTY, NEW MEXICO

UNIT MAP

Figure 2

SCALE: 1" = 2000'

By: R. CRAIG	Drawn By	Date: 4 - 81
Date 2-82	Revised By	Date
Dept WEST AREA ENGR.	Dwg No	



R 36 E

ARCO Oil and Gas Company
Division of AtlanticRichfieldCompany
Permian District Midland, Texas

SEVEN RIVERS-QUEEN UNIT

LEA COUNTY, NEW MEXICO

STRUCTURE MAP
TOP OF QUEEN

C.I. = 25'

Figure 5

SCALE: 1" = 2000'

By R. CRAIG		Drawn By.	Date 4 - 81
Date 6-1-82		Revised By. BS	Date 6-82
Dept WEST AREA ENGR.		Dwg No.	

SRQU No. 57
Expected Increased Recovery
Due to Infill Drilling

Average Pay of 4 Surrounding Wells

Well	Net Pay Logged	Estimated Add. Pay	Total Net Pay*
No. 30	35'	--	35'
No. 31	26'+	15'	41'
No. 38	30'+	8'	38'
No. 39	41'	--	41'
Total	132'		155'
Average	33'		38.75'

*Additional pay of deepened wells was estimated by correlating to nearest offsets which were logged through intervals below the logged depth of shallow wells.

From Continuity Curve - South Area
(Wells 41-48)

% Continuous pay - 40 acre spacing (1320')	63%
% Continuous pay - 20 acre spacing (933')	73%

From Relative Permeability Data (Special Core Analysis [No. 57])

$$Soi = 68\% \text{ and } Sor = 32\%$$

$$E_D = \frac{Soi - Sor}{Soi} = \frac{.68 - .32}{.68} = .5294$$

From Core Data on SRQU Wells Nos. 41, 53 and 57

$$\text{Avg. } \phi = 11\%$$

From "Proposed Seven-Rivers Queen Unit Waterflood Study"

$$Boi = 1.21 \text{ RVB/STB} \qquad Box = 1.04 \text{ RVB/STB}$$

$$OOIP_{40 \text{ acres}} = \frac{(7758)(40)(38.75)(.11)(.68)}{1.21}$$

$$= 743.4 \text{ MBO}$$

Primary Recovery From Pattern

Well	Primary Recovery BO	Allocation Factor	Allocated Production BO
No. 30	45,503	.25	11,375
No. 31	20,361	.25	5,090
No. 38	35,347	.25	8,837
No. 39	36,226	.25	9,057
Total	137,437		34,359

From attached Waterflood Pattern Analysis
This pattern currently has a volumetric efficiency of 43.63%. Assuming a 10% increase in efficiency due to infill drilling and an improvement in pay continuity of 10% yields:

$$\Delta E_R = \frac{Boi}{Box} E_D [(Ev_2 - Ev_1)f_1 + (Ev_2 - \overline{A})(f_2 - f_1)]$$

$$= (\frac{1.21}{1.04})(.5294)[(.5363 - .4363).63 + (.5363 - .3406)(.73 - .63)]$$

$$= .0509$$

Therefore ΔE_R due to infill drilling No. 57 is

$$\Delta E_R = (.0509)(743.4)$$

$$= \underline{\underline{37.8 \text{ MBO}}}$$

Where:
- Soi = initial oil saturation
- Sor = residual oil saturation to waterflood
- Sgx = gas saturation at start of flood
- E_D = displacement efficiency
- E_V = volumetric efficiency
- $\overline{A}$ = displaceable pore volume occupied by gas
- f = floodable pay
- 1 = before infill drilling
- 2 = after infill drilling
- ΔE_R = increased recovery

AtlanticRichfieldCompany ◆ **Waterflood Material Balance Analysis**

Field: South Eunice

Reservoir: Seven-Rivers Queen

Element area: 40 Acres

Average thickness: 38.75 Feet

Date start of injection: 3/74

Cumulative production at start of injection

Oil (N_p) = 34.4 MSTB

Gas (G_p) = Avg. GOR 1500 51.5 MMCF

Water (W_p) = Avg. WOR .7 24.08 MBbls

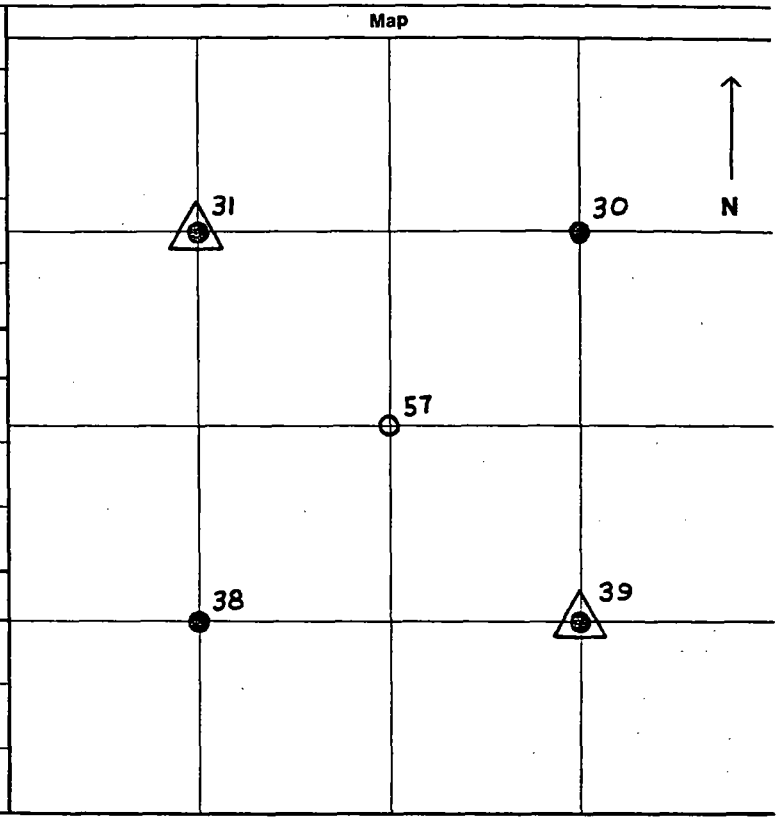
Rock and fluid data

ϕ = .11 S_{cw} = .32

B_{ox} = 1.04 S_{or} = .32

B_{oi} = 1.21

Map



Pattern volumetric data

V_p = 7758 x Ø x h x Area = 7758 x .11 x 38.75 x 40 = 1,322.7 M RVB

$V_D = V_p \times (1.0 - S_{cw} - S_{or})$ = 1,322.7 M x (1.0 − .32 − .32) = 476 M RVB

$$\text{O.O.I.P.} = \frac{V_p \times (1.0 - S_{cw})}{B_{oi}} = \frac{1{,}322.7\ M \times (1.0 - .32)}{1.21} = 743.4\ M \text{ STB}$$

$$S_{gx} = S_{oi}\left[1.0 - \frac{B_{ox}}{B_{oi}}(1 - f)\right] = .68\left[1.0 - \frac{1.04}{1.21}(1 - .0463)\right] = .1226$$

$V_{fillup} = V_p \times S_{gx}$ = 1,322.7 M x .1226 = 162.2 M RVB

$$\text{Disp. eff.}(E_D) = \frac{S_{oi} - S_{or}}{S_{oi}} = \frac{.68 - .32}{.68} = .5294$$

$$\text{ABAR} = \frac{S_{gx}}{1.0 - S_{cw} - S_{or}} = \frac{.1226}{.36} = .3406$$

Pattern 57
Cumulative Production and Injection

Date	SRQU No. 30 MBO/MBW	SRQU No. 38 MBO/MBW	SRQU No. 31 MBW	SRQU No. 39 MBW
1-1-75	1.25/--	1.29/--	50.4	48.5
1-1-76	5.1/4.7	5.2/2.1	167.9	162.5
1-1-77	8.3/10.9	11.1/5.1	269.4	265.4
1-1-78	11.4/22	11.7/5.5	389.3	379.3
1-1-79	13.4/35	12.4/6.3	506.4	485.3
1-1-80	15.9/52	14.4/8.8	658.6	625.7
1-1-81	18.7/75.5	20.5/21.1	816.3	769.3
1-1-82	20.9/94.7	26.9/46.3	932.8	881.4
10-1-82	22.3/108.6	30.7/62.5	1026.2	980.9

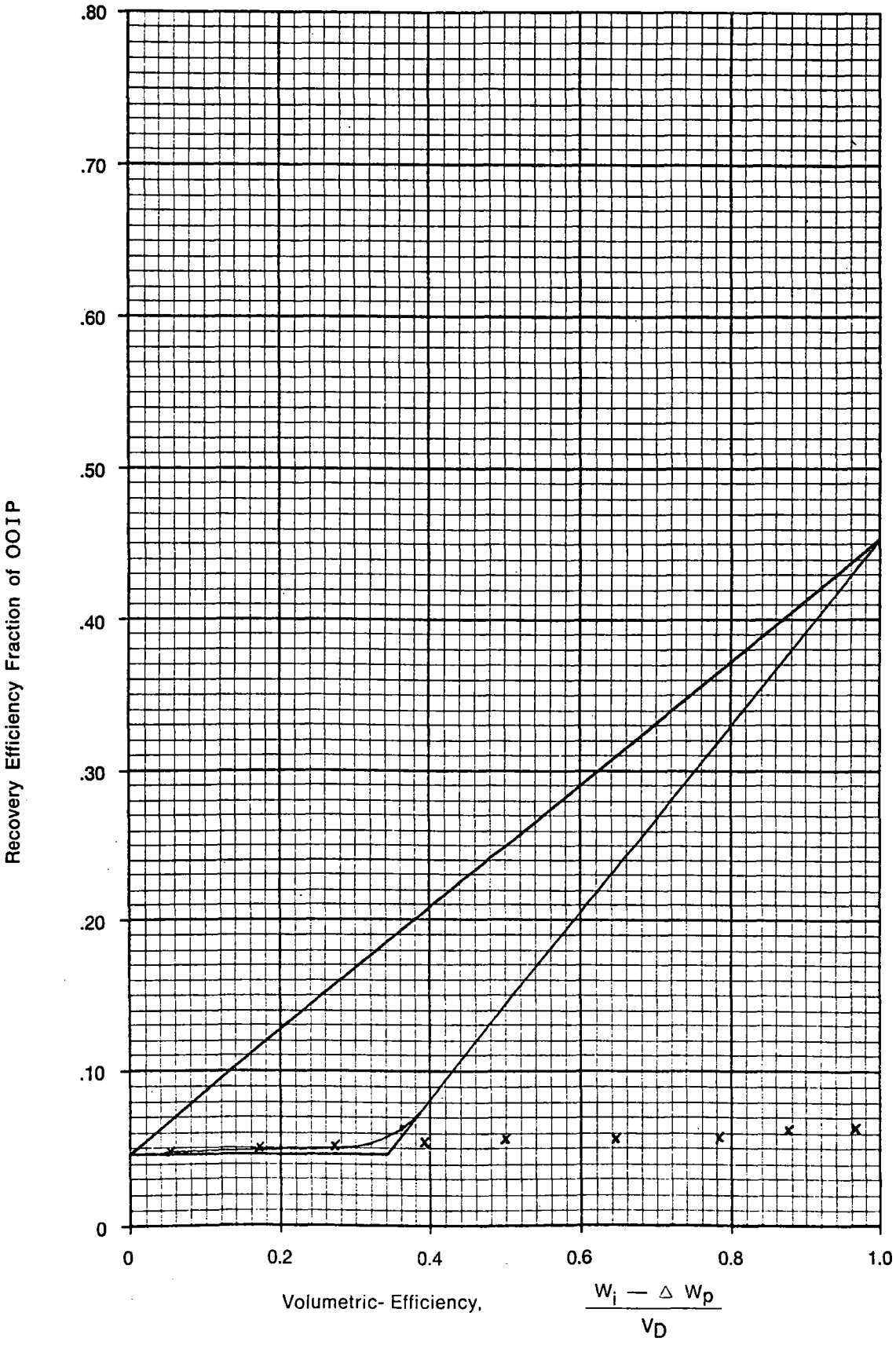
REC
12/82

Analysis start time is start of injection. Oil production at start of injection, Np = 34.4 MSTB

Time interval ending	Cumulative Oil production ΔN_p MSTB	Total cumulative Recovery $\frac{\Delta N_p + N_p}{OOIP}$ Fraction	Cumulative water Injection W_i MBbls	Cumulative water Production ΔW_p MBbls	Conformance $\frac{W_i - \Delta W_p}{V_D}$ Fraction	Percent fillup $\frac{W_i - (\Delta N_p + \Delta W_p)}{V_{Fillup}}$ Percent	Displaceable Volume Injected $\frac{W_i}{V_D}$ Fraction	Water bank Radius r Feet
1-1-75	.64	.0471	24.7	--	.0519			
1-1-76	2.6	.0498	82.6	1.7	.17			
1-1-77	4.9	.0529	133.7	4.0	.2725			
1-1-78	5.8	.0541	192.2	6.9	.3893			
1-1-79	6.5	.055	247.9	10.3	.4992			
1-1-80	7.6	.0565	321.1	15.2	.6426			
1-1-81	9.8	.0595	396.4	24.2	.7819			
1-1-82	12.0	.0624	453.5	35.3	.8786			
10-1-82	13.3	.0642	501.8	42.8	.9643			

AtlanticRichfieldCompany ◆ **Pattern Performance**

F at start of flood	ABAR	F at $E_v = 1.0$	Pattern No.
.0463	.3406	$F = 1.0 - \frac{B_{oi}}{B_{ox}} (1.0 - E_D) =$ .4525	57



Pattern 57

Injection Efficiency Calculation

Remaining Reserves

Current Rate	No. 30	4 BOPD
	No. 38	12 BOPD
		16 BOPD

Allocated Production 4 BOPD/pattern

$$Npt = \frac{(qi - qt)365}{D} = \frac{(4 - 2.5)365*}{.1052}$$

$$= 5{,}204 \text{ BO}$$

*Assuming a 10% decline

Ultimate Recovery Under Current Operations

$$U_R = \frac{P + Sec + Sec_{Remaining}}{OOIP}$$

$$= \frac{34.4 + 13.3 + 5.2}{743.4}$$

$$= .0712$$

Therefore .0712 is the recovery where the curve should be assymptotic with the obtuse triangle.

Correcting the Volumetric-Efficiency to where it intersects the curve inside the allowable triangle yields:

$$\frac{Wi - Wp}{V_D} = .37 \quad = \quad Wi = .37\ V_D + Wp$$

$$Wi = (.37)(476) + 42.8$$

$$= 218.9$$

Therefore injection efficiency is:

$$IE = \frac{Wical.}{Wiactual} = \frac{218.9}{501.8}$$

$$= \underline{.4363}$$

REC
12/82

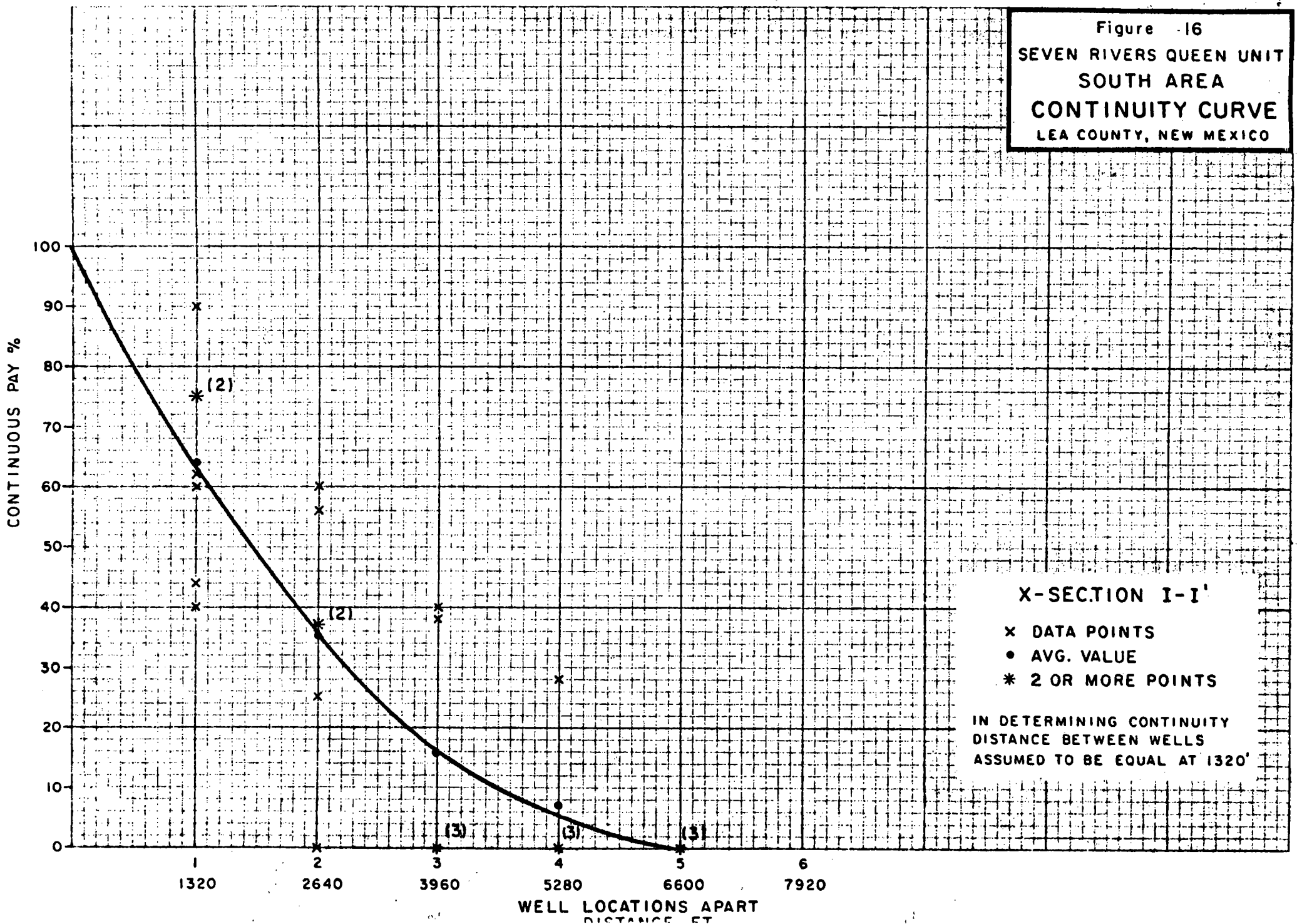
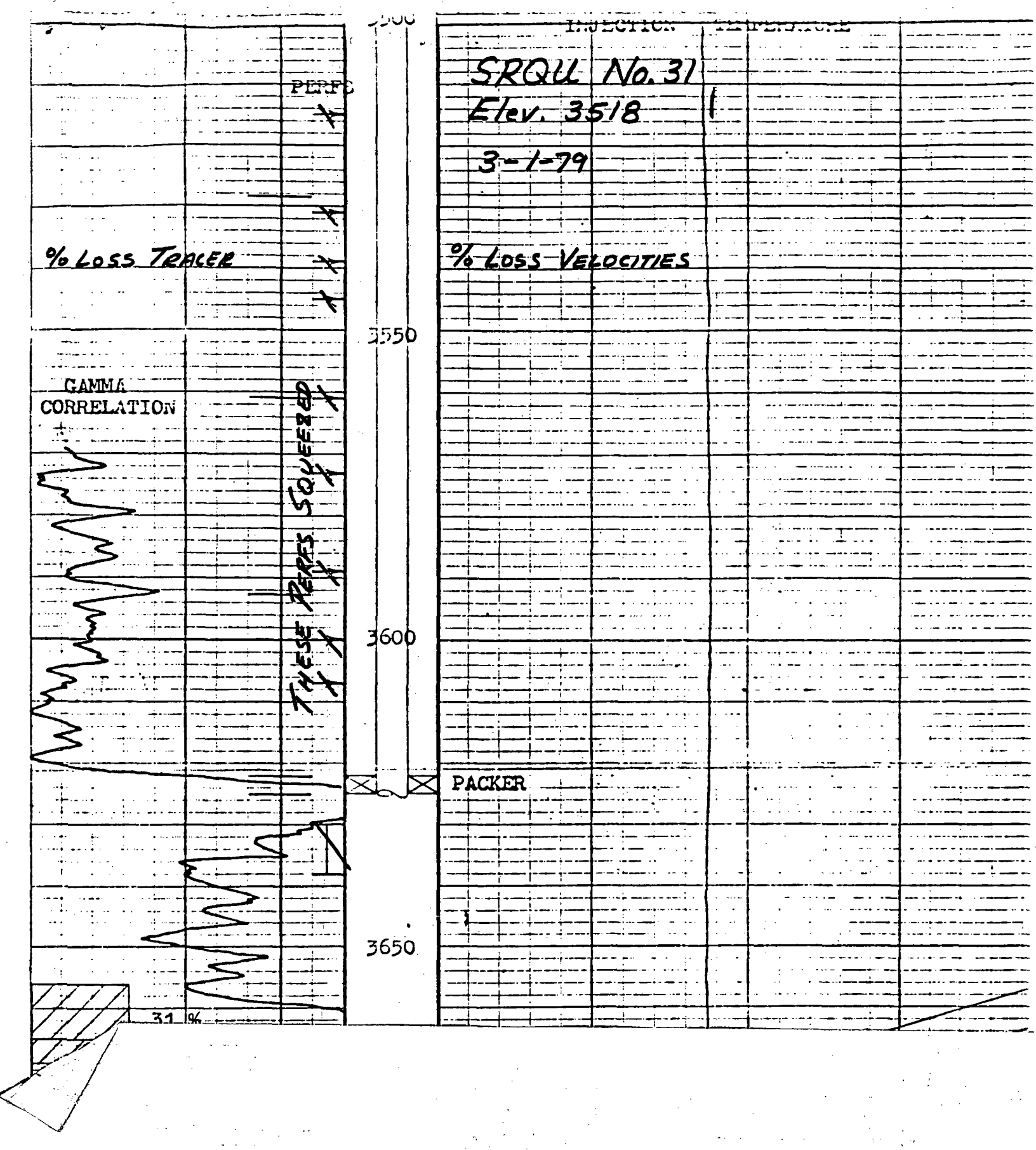
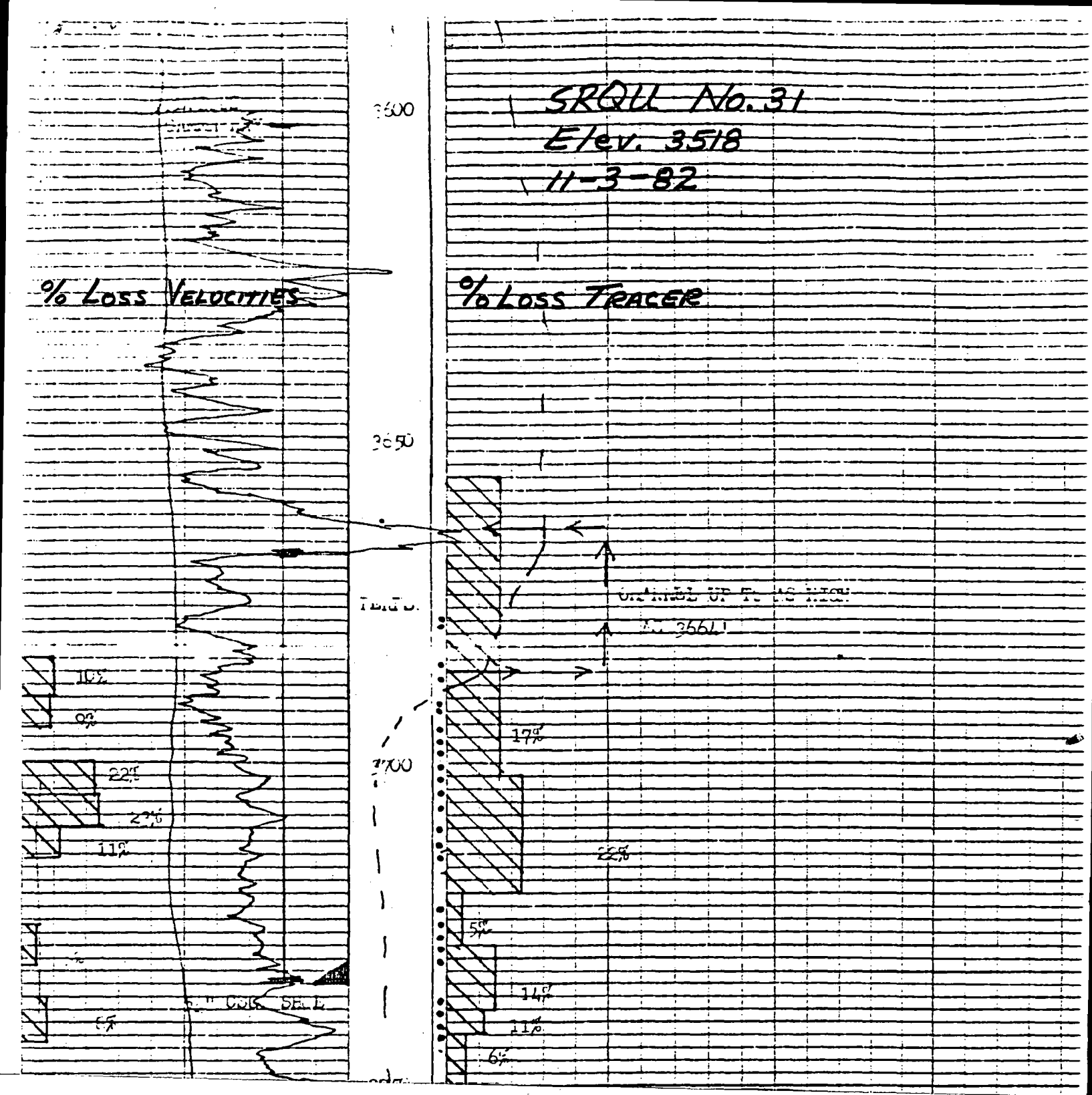


Figure 16
SEVEN RIVERS QUEEN UNIT
SOUTH AREA
CONTINUITY CURVE
LEA COUNTY, NEW MEXICO
CONTINUOUS PAY %
100
90
80
70
60
50
40
30
20
10
0
(2)
(2)
(3)
(3)
(3)
1
1320
2
2640
3
3960
4
5280
5
6600
6
7920
WELL LOCATIONS APART
DISTANCE FT
X-SECTION I-I'
× DATA POINTS
• AVG. VALUE
* 2 OR MORE POINTS
IN DETERMINING CONTINUITY
DISTANCE BETWEEN WELLS
ASSUMED TO BE EQUAL AT 1320'


INJECTION TEMPERATURE
SRQU No. 31
Elev. 3518
3-1-79
PERFS
% LOSS TRACER
% LOSS VELOCITIES
GAMMA CORRELATION
THESE PERFS SQUEEZED
3550
3600
3650
PACKER
31 %


SRQU No. 31
Elev. 3518
11-3-82
% Loss Velocities
% Loss Tracer
3600
3650
3700
10%
9%
22%
2%
11%
6%
17%
28%
5%
14%
11%
6%

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

ARCO OIL & GAS COMPANY
P.O. BOX 2819
Dallas, Texas 75221

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Attention: Dottie J. Parks, Sr. Gas Regulations Admin.

Re: Application for NGPA Infill Well
Findings Under Provisions of
Order No. R-6013-A Seven Rivers
Queen Unit Well No. 57,
I-34-22S-36E, Lea County

Dear Ms. Parks,

We may not process the subject application for infill findings until the required information, forms, or plats checked on the reverse side of this letter are submitted.

Sincerely,

Michael E. Stogner/DV

Michael E. Stogner,
Petroleum Engineer

MES/dp

☐ A copy of Form C-101 must be submitted.

☐ A copy of Form C-102 must be submitted.

☐ The pool name must be shown.

☐ The standard spacing unit size for the pool must be shown.

☐ Give the Division Order No. which granted the non-standard proration unit.

☐ Please state whether or not the well has been spudded and give the spud date, if any.

☐ Information relative to other wells on the proration unit is incomplete.

☒ The geologic and reservoir data is incomplete or insufficient.

Please show how 40,000 barrels ultimate oil recovery was cacultated and also show expected gas recovery.

☐ Other:

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
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STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
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SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

ARCO Oil & Gas Company
P.O. Box 2819
Dallas, Texas 75221

RECEIVED
NOV 01 1982
OIL CONSERVATION DIVISION
SANTA FE

Attention: Dottie J. Parks,
Sr. Gas Regulations Administrator

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Findings Under Provisions of
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J-34-22S-36E, Lea
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Petroleum Engineer

MES/dp

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- ☐ Information relative to other wells on the proration unit is incomplete.
- ☒ The geologic and reservoir data is incomplete or insufficient.

~~Please show how 40,000 barrels ultimate recovery was calculated and show expected gas recovery. (Also any~~

Please show how 40,000 barrels ultimate oil recovery was caculated and also show expected gas recovery.

- ☐ Other:

~~Rule 11 - All operators offsetting operators~~

Please show how 40,000 barrels ultimate recovery was figured and also include ~~the~~ the expected gas recovery. (Rule 11)

ARCO Oil & Gas Company
P.O. Box 2819
Dallas, Texas 75221

Attention: Dottie J. Parks
Sr. Gas Regulations Administrator

Dear Ms. Parks

Seven Rivers Queen Unit Well No 57
NE/4 SE/4 Section 34, Township
22 South, Range 36 East,
NMPM, Lea County

SPECIAL RULES AND REGULATIONS
NATURAL GAS POLICY ACT INFILL FINDINGS
ADMINISTRATIVE PROCEDURE
(Amended February 8, 1980)

A. DEFINITIONS

RULE 1. For purposes of this administrative procedure only, the following definitions are adopted:

a. Infill well: An additional well which has been drilled for production on an established proration unit.

B. APPLICABILITY

RULE 2. These special rules and regulations shall apply to effective and efficient drainage findings for completed infill wells pursuant to Section 271.305 of the final Rules and Regulations of the Federal Energy Regulatory Commission relating to Section 103 of the Natural Gas Policy Act of 1978. (These special rules and regulations do not apply to infill wells drilled in the Blanco Mesaverde or Basin-Dakota Pools. Infill wells in these two pools are covered by Rule 15 B of the "Special Rules for Applications for Wellhead Price Ceiling Category Determinations" promulgated by Division Order No. R-5878 as amended by Order No. R-5878-A.)

C. JUSTIFICATION FOR FINDINGS

RULE 3. The Division Director or a Division Examiner may find that an infill well is necessary:

a. upon a showing by the operator that an additional well is needed to effectively and efficiently drain a portion of the reservoir covered by the proration unit which cannot be so drained by any existing well within that unit, and

b. upon receipt of waivers from all offset operators, or if no offset operator has entered an objection to the infill finding within 20 days after receipt of the application by the Director.

RULE 4. The Director may set any application for hearing at his discretion or at the request of an applicant.

Exhibit A
Order R-6013-A

D. FILING REQUIREMENTS

RULE 5. Each applicant shall submit a copy of the approved Form C-101 for the infill well and Form C-102 showing the proration unit dedicated.

RULE 6. Applicant shall give the name of the pool in which the infill well has been drilled and the standard spacing unit size therefor.

RULE 7. If applicable, the applicant shall give the number of the Division order approving the non-standard proration unit dedicated to the well.

RULE 8. The applicant shall submit a description of all wells drilled on the proration unit (including the completed infill well) which are or have been completed in the same pool or reservoir as the proposed infill well showing:

a. lease name and well location;

b. spud date;

c. completion date;

d. a description of any mechanical problems experienced along with a summary of remedial action(s) taken and the results obtained;

e. the current rate of production; and

f. date of plug and abandonment, if any;

g. a clear and concise statement indicating why the existing well(s) on the proration cannot effectively and efficiently drain the portion of the reservoir covered by the proration unit.

RULE 9. The applicant shall submit geological and engineering information sufficient to support a finding as to the necessity for an infill well including:

a. formation structure map

b. the volume of increased ultimate recovery expected to be obtained and a narrative describing how the increase was determined

c. any other supporting data which the applicant deems to be relevant which may include:

(1) porosity and permeability factors

(2) production/pressure decline curves

(3) effects of secondary recovery or pressure maintenance operations.

RULE 10. Applications for infill findings shall be filed in duplicate with the Santa Fe office of the Division.

RULE 11. All operators of proration or spacing units offsetting the unit for which an infill finding is sought shall be notified of the application by certified or registered mail, and the application shall state that such notification has been given.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

ARCO OIL & GAS COMPANY
P O BOX 2819
DALLAS TEXAS 75221

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Re: Wellhead price ceiling determination, NGPA of 1978

Gentlemen:

The New Mexico Oil Conservation Division has received your application for a wellhead price ceiling category determination under the section(s) of the Natural Gas Policy Act of 1978 indicated below. If your application is incomplete, forms are attached hereto, indicating the documents and further information which must be filed before your application can be considered. If your application is complete, it will be acted upon administratively unless written objection is received within 15 days of its filing.

WELL NAME AND LOCATION Seven Rivers Queen Unit #57-I 34-22S-36E

SECTION(S) APPLIED FOR 103

DATE APPLICATION RECEIVED March 29, 1982

APPLICATION INCOMPLETE Must file for infill finding (NFL). (Rule 13).

Sincerely,

Michael E. Stogner

DATE: April 13, 1982

NOTE:

THIS FORM LETTER MUST ACCOMPANY TWO COPIES OF THE SUPPLEMENTARY INFORMATION.

ARCO Oil and Gas Company
Natural Gas Department
Post Office Box 2819
Dallas, Texas 75221
Telephone 214 651 4675

Paul T. Davis
Manager, Gas Regulations

Suppl. to O.

June 4, 1982

Department of Energy and Minerals
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501
Attn: Michael E. Stogner

RE: Application for NGPA Infill Finding
Seven Rivers Queen Unit No. 57
Lea County, New Mexico
AR #46281, 46449

Dear Mr. Stogner:

Pursuant to Order No. R-6013-A of the Oil Conservation Division, ARCO Oil and Gas Company, a Division of Atlantic Richfield Company (ARCO), hereby submits an original and one copy of its application for an administrative finding that subject infill well was necessary.

Exhibit I - Approved C-101 for the infill well and form C-102 showing the proration unit dedicated.

Exhibit II - NSL-1422 division order approving the non-standard proration unit dedicated to the well.

Exhibit III - Formation structure map.

Exhibit IV - a description of the well drilled on the proration unit Seven Rivers Queen Unit (WIW) #31.

Exhibit V - Map indicating the line of cross section A-A prime.

Exhibit VI - Subject well is in the Eunice Seven Rivers Queen South pool which has 40 acre spacing for oil wells.

There are no offset operators to subject well and proration unit as they are offset in all directions by the Seven Rivers Queen Unit.

Please return the extra copy of this letter with evidence of your receipt thereof in the enclosed self-addressed envelope.

Yours very truly,

Dottie J. Parks

Dottie J. Parks
Sr. Gas Regulations Administrator
(214) 651-4678

DJP:ke

Enclosures

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

DP

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

ARCO OIL & GAS COMPANY
P O BOX 2819
DALLAS TEXAS 75221

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Re: Wellhead price ceiling determination, NGPA of 1978

Gentlemen:

The New Mexico Oil Conservation Division has received your application for a wellhead price ceiling category determination under the section(s) of the Natural Gas Policy Act of 1978 indicated below. If your application is incomplete, forms are attached hereto, indicating the documents and further information which must be filed before your application can be considered. If your application is complete, it will be acted upon administratively unless written objection is received within 15 days of its filing.

WELL NAME AND LOCATION Seven Rivers Queen Unit #57-I 34-22S-36E

SECTION(S) APPLIED FOR 103

DATE APPLICATION RECEIVED March 29, 1982

APPLICATION INCOMPLETE Must file for infill finding (NFL). (Rule 13).

Sincerely,

Michael E. Stogner

DATE: April 13, 1982

RECEIVED
APR 16 1982
GAS REGULATIONS - NGPA

NOTE:

THIS FORM LETTER MUST ACCOMPANY TWO COPIES OF THE SUPPLEMENTARY INFORMATION

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

September 15, 1981

Mr. Joe D. Ramey
New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

RE: Unorthodox Location
Seven Rivers Queen Unit No. 57
Lea County, New Mexico

ARCO Oil and Gas Company respectfully requests administrative approval to drill its Seven Rivers Queen Unit No. 57, a producing well in an active waterflooding unit, at an unorthodox location of 1500' FSL and 10' FEL Section 34, Township 22 South, Range 36 East, Lea County. The well is to be drilled to a TD of 3900' to test the Seven Rivers Queen formations. In ARCO's opinion completion of the well at the proposed location will provide an efficient production and injection pattern within a secondary recovery project. This well is expected to recover unswept oil left due to premature breakthrough in wells Nos. 30 and 38. The offsetting proration units to the proposed location all fall within the Seven Rivers Queen Unit operated by ARCO and, therefore, no offset operators were notified of the request. Attached for your information is a plat showing the Seven Rivers Queen Unit and the proposed well's location.

Very truly yours,

Robert E. Craig

Robert E. Craig
Engineer

REC:cn

Attachments

cc: NMOCC - Hobbs Office

Exhibit I

30-025-27588

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LAND OFFICE		
OPERATOR		

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-101
Revised 1-1-65

5A. Indicate Type of Lease: STATE [ ] FEE [X]

5. State Oil & Gas Lease No.

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work: DRILL [X] DEEPEN [ ] PLUG BACK [ ]

b. Type of Well: OIL WELL [X] GAS WELL [ ] OTHER SINGLE ZONE [ ] MULTIPLE ZONE [ ]

7. Unit Agreement Name: Seven Rivers Queen Uni

8. Farm or Lease Name: Seven Rivers Queen Uni

2. Name of Operator: ARCO Oil and Gas Company
Division of Atlantic Richfield Co.

9. Well No.: 57

3. Address of Operator: P. O. Box 1710, Hobbs, New Mexico 88241-1710

10. Field and Pool, or Wildcat: Eunice Seven Rivers Queen South

4. Location of Well: UNIT LETTER I LOCATED 1500 FEET FROM THE South LINE
10 FEET FROM THE East LINE OF SEC. 34 TWP. 22S RGE. 36E NMPM

12. County: Lea

19. Proposed Depth	19A. Formation	20. Rotary or C.T.
3900'	7 Rivers Qn	Rotary

21. Elevations (Show whether DF, RT, etc.)	21A. Kind & Status Plug. Bond	21B. Drilling Contractor	22. Approx. Date Work will start
3508' GR	GCA #8	Baber Drlg. Co.	10/06/81

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
17½"	13-3/8" OD	Cond Pipe	30'	2 yds Redi-mix	to surf
12¼"	8-5/8" OD	24# K-55	1400'	675	Circ to surf
7-7/8"	5½" OD	15.5# K-55	3900'	800	Circ to surf

Propose to drill an infill development well and recover remaining primary & secondary reserves.
Administrative Order NSL-1422

Blowout Preventer Program Attached

RECEIVED
NOV 3 1981

CENTRAL FILES

APPROVAL VALID FOR 180 DAYS
PERMIT EXPIRES 4/2/82
UNLESS DRILLING UNDERWAY

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. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Signed Jerry Schmidt Title Dist. Drlg. Supt. Date 9/30/81

(This space for State Use)

APPROVED BY Orig. Signed by Jerry Sexton TITLE Dist 1, Supv. DATE OCT 2 1981

CONDITIONS OF APPROVAL, IF ANY:

NEW MEXICO OIL CONSERVATION COMMISSION

WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section

Operator	Lease	Well No.
Arco Oil & Gas Co. Division of Atlantic Richfield Co.	Seven Rivers Queen Unit	57

Unit Letter	Section	Township	Range	County
I	34	22 South	36 East	Lea

Actual Footage Location of Well:
1500 feet from the South line and 10 feet from the East line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
3508.0'	Seven Rivers Queen So.	Eunice, South	40 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

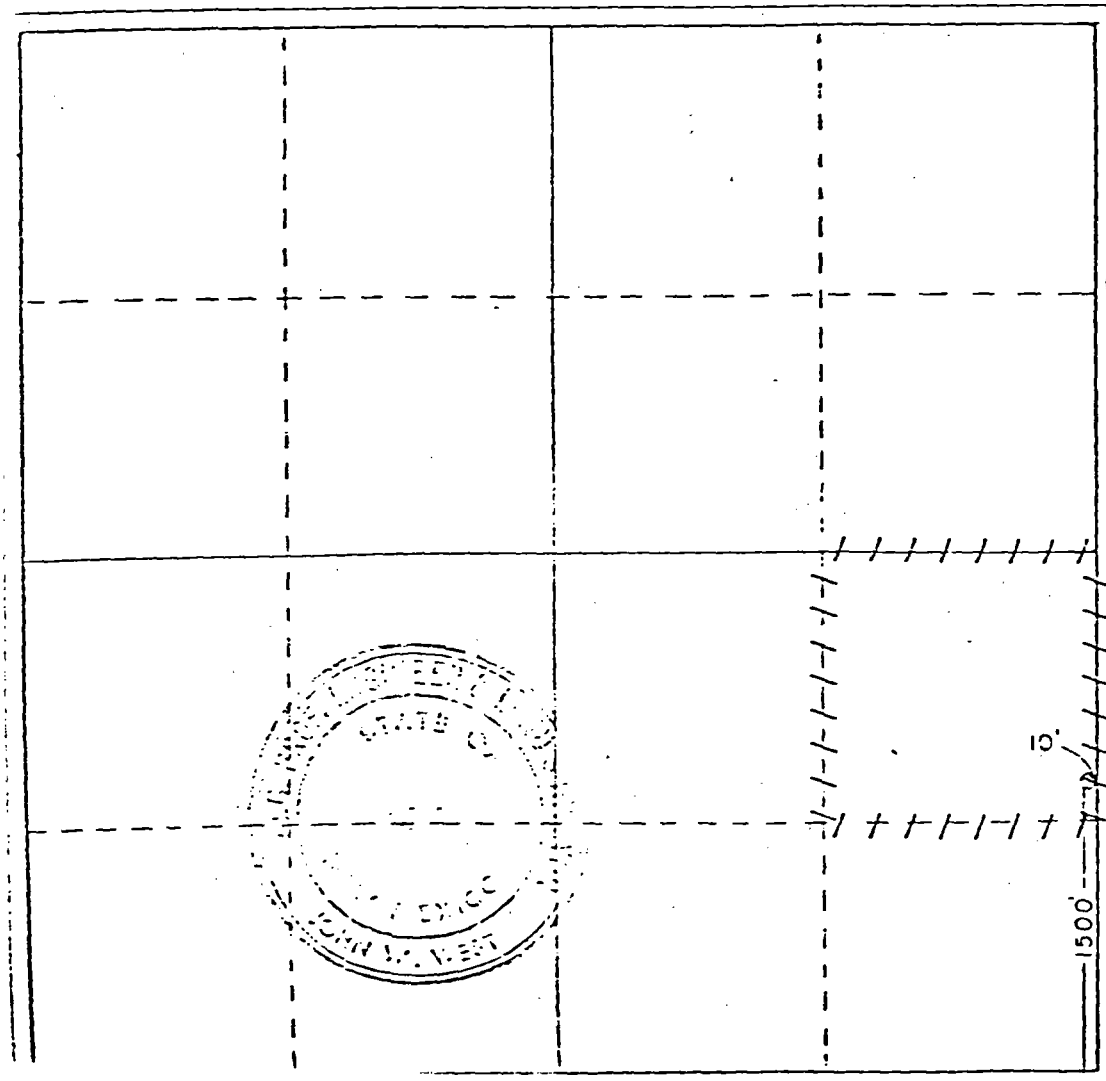
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief

Name: John W. Schmidt

Position: Dist. Drlg. Supt.

Company: ARCO Oil and Gas Co. Div of Atlantic Richfield Co.

Date: 9/30/81

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed: Sept 30, 1931

Registered Professional Engineer and/or Land Surveyor

John W. West

Certificate No. JOHN W. WEST 676

Exhibit II

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

September 18, 1981

ARCO Oil and Gas Company
P. O. Box 1610
Midland, Texas 79702

Attention: Mr. Robert E. Craig

Administrative Order NSL-1422

Gentlemen:

Reference is made to your application for a non-standard location for your Seven Rivers Queen Unit Well No. 57 to be located 1500 feet from the South line and 10 feet from the East line of Section 34, Township 22 South, Range 36 East, NMPM, South Eunice-Seven Rivers Queen Pool, Lea County, New Mexico.

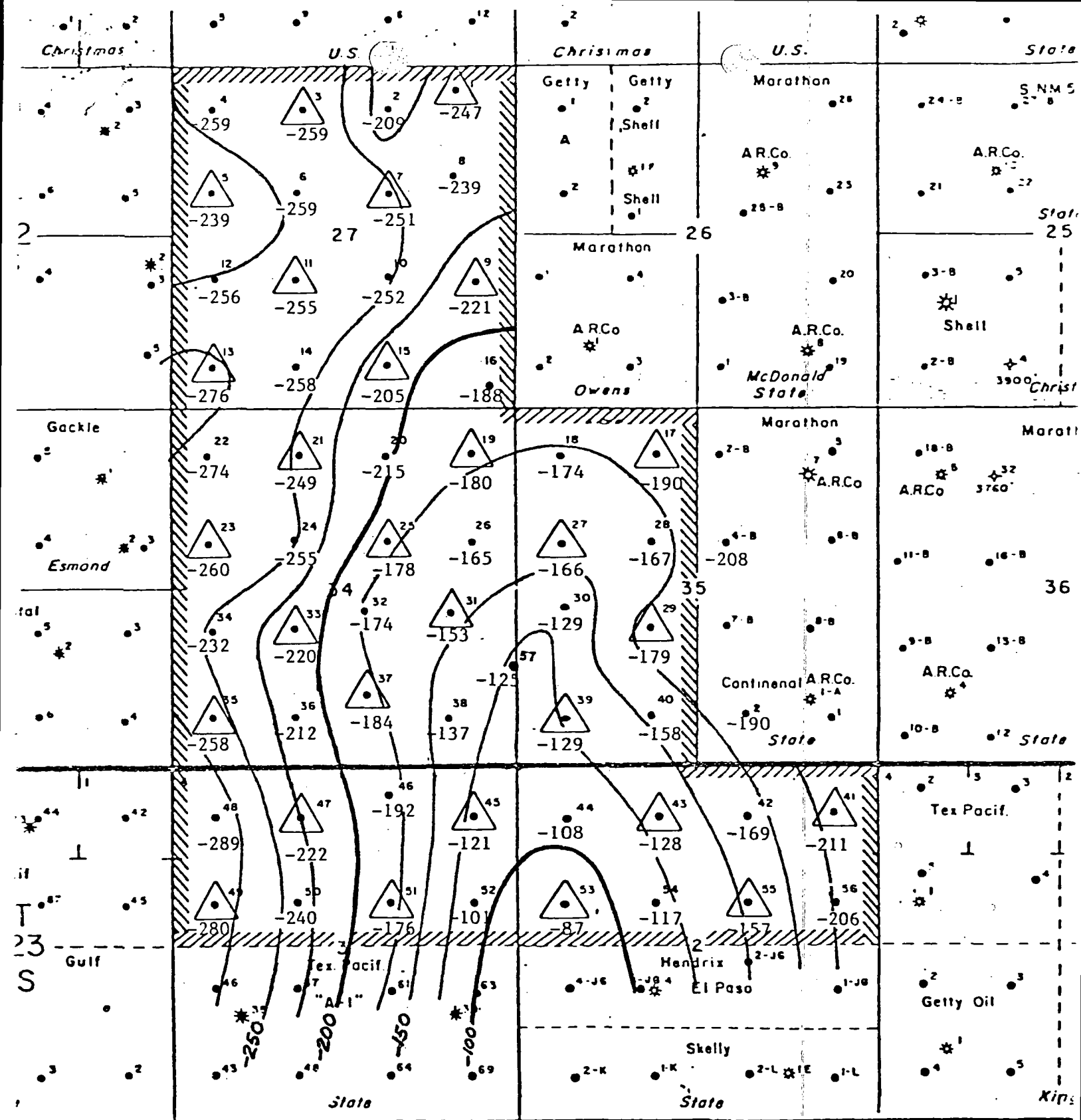
By authority granted me under the provisions of Rule 104 F of the Division Rules and Regulations, the above-described unorthodox location is hereby approved.

Sincerely,

JOE D. RAMEY,
Director

JDR/RLS/dr

cc: Oil Conservation Division - Hobbs
Oil & Gas Engineering Committee - Hobbs



R 36 E

Exhibit III

ARCO Oil and Gas Company ◇

Permian District Midland, Texas

SEVEN RIVERS-QUEEN UN

LEA COUNTY, NEW MEXICO

STRUCTURE MAP

Top of Queen

SCALE 1" = 2000'

R. CRAIG

EXHIBIT IV

SEVEN RIVERS QUEEN UNIT (WIW) #31

Spud Date: July 2, 1957

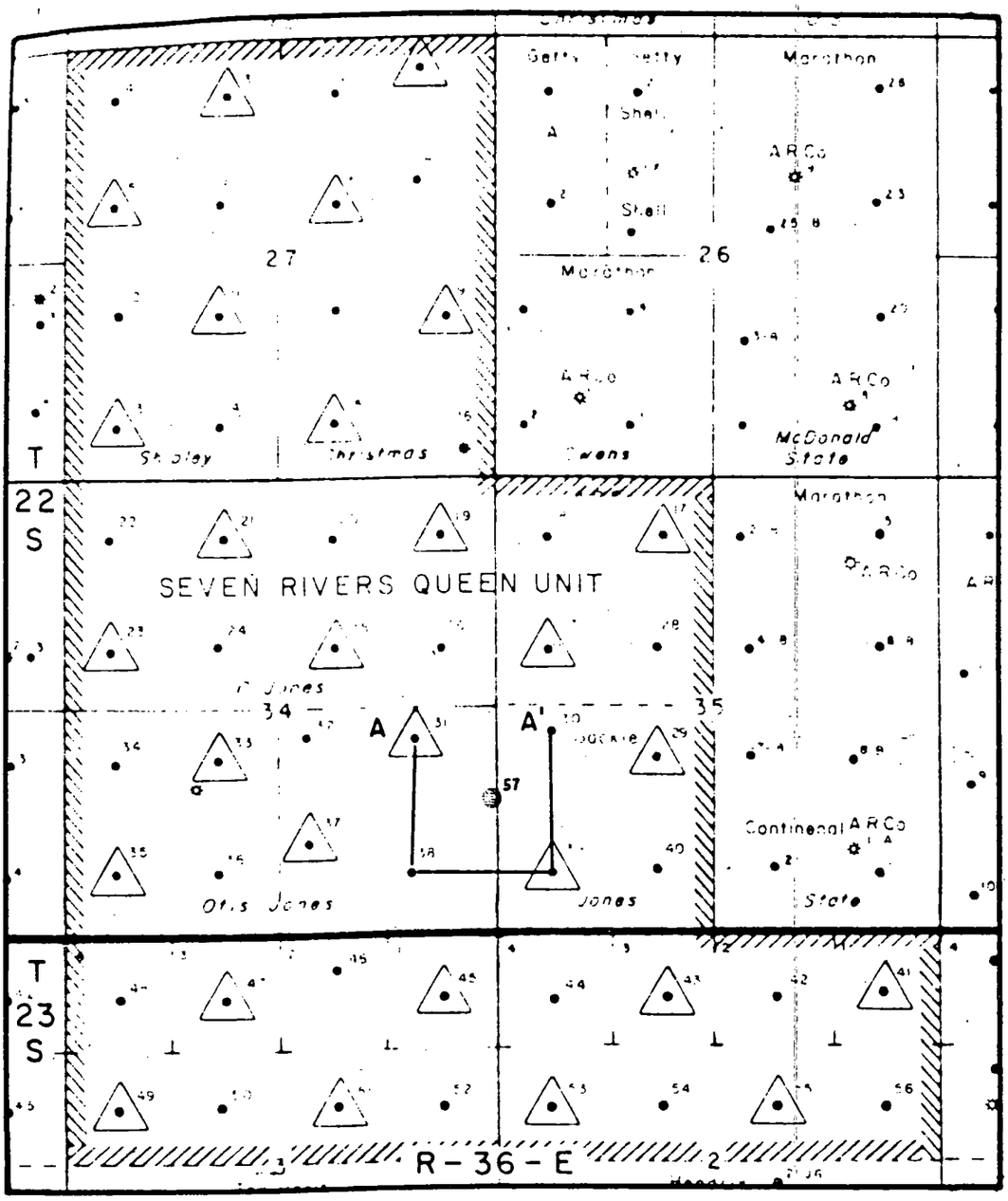
Completion Date: July 19, 1957

Conversion Date: March 5, 1974

The volume of increased ultimate recovery is expected to be approximately 40,000 barrels

Exhibit V

INDEX MAP



Scale: 1" = 2000'

ARCO Oil and Gas Company

Division of Atlantic Richfield Company

Permian District Midland, Texas

SEVEN RIVERS-QUEEN AREA
CROSS SECTION A-A'
Lea County, New Mexico

By KEITH PAIGE	Drawn By R.C.T.	Date 6/5/81
Date 6/5/81	Revised By	Date
Dept WEST ENGR. DEPT.	Dwg No.	

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

Form C-105
Revised 10-1-78

OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

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LAND OFFICE		
OPERATOR		

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State ☐ Fee ☒
5. State Oil & Gas Lease No.:

1a. TYPE OF WELL: OIL WELL ☒ GAS WELL ☐ DRY ☐ OTHER
b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

7. Unit Agreement Name: Seven Rivers Queen Uni
8. Farm or Lease Name: Seven Rivers Queen Uni

2. Name of Operator: ARCO Oil and Gas Company
Div of Atlantic Richfield Co.

9. Well No.: 57

3. Address of Operator: P. O. Box 1710, Hobbs, N M 88241-1710

10. Field and Pool, or Wildcat: Eunice 7-Rivers Queen South

4. Location of Well: UNIT LETTER I LOCATED 1500 FEET FROM THE South LINE AND 10 FEET FROM

East LINE OF SEC. 34 TWP. 22S RGE. 36E NMPM

12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Casinghead
10/13/81	10/27/81	2/14/82	3508' GR	

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
3900'	3856'		→	0-3900'	

24. Producing Interval(s), of this completion — Top, Bottom, Name
3674-3740' Seven Rivers Qn South

25. Was Directional Survey Made: No

26. Type Electric and Other Logs Run
GR-Caliper, CDL/CNL, DLL/MLL, GR-CCL

27. Was Well Cored: Yes

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8" OD	Conductor Pipe	34'	18"	2½ yds Redi-mix	
8-5/8" OD	24# K-55	1392'	12¼"	750 sx	
5½" OD	15.5# K-55	3900'	7-7/8"	1300 sx	

LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2-3/8"OD	3582'	-

31. Perforation Record (Interval, size and number)
3674, 77, 80, 83, 86, 3700, 05, 08, 12, 21, 24, 37, 40'. = 13-.50" holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
3777-3794'	1600 gal 15% NE acid cmt sqz
	200 sx Cl H w/2% CaCl,
3674-3740'	2100 gal 15% NE acid &15,500
	40# cross linked gel & 39,50

PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
1/31/82	Pumping - 2" x 1½" x 16' rod	Prod

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas — Oil Ratio
2/19/82	24			14	98	17	7000:1

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)
-	-		14	98	17	38.4°

33. Disposition of Gas (Sold, used for fuel, vented, etc.)
Sold

Test Witnessed By: Jerry Guy

34. List of Attachments
Logs as listed in item 26 above, core reports, Inclination Report.

35. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED for: J.W. Schmidt TITLE Dist. Drlg. Supt. DATE 2/25/82

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt		T. Strawn		T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt		T. Atoka		T. Pictured Cliffs		T. Penn. "D"	
T. Yates	3130'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers	3344'	T. Devonian		T. Menefee		T. Madison	
T. Queen	3638'	T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg	3826'	T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs		T. Wingate		T.	
T. Wolfcamp		T.		T. Chinle		T.	
T. Penn.		T.		T. Permian		T.	
T Cisco (Bough C)		T.		T. Penn. "A"		T.	

OIL OR GAS SANDS OR ZONES

No. 1, from 3674' to 3740' No. 4, from ____ to ____

No. 2, from ____ to ____ No. 5, from ____ to ____

No. 3, from ____ to ____ No. 6, from ____ to ____

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from ____ to ____ feet. None Encountered

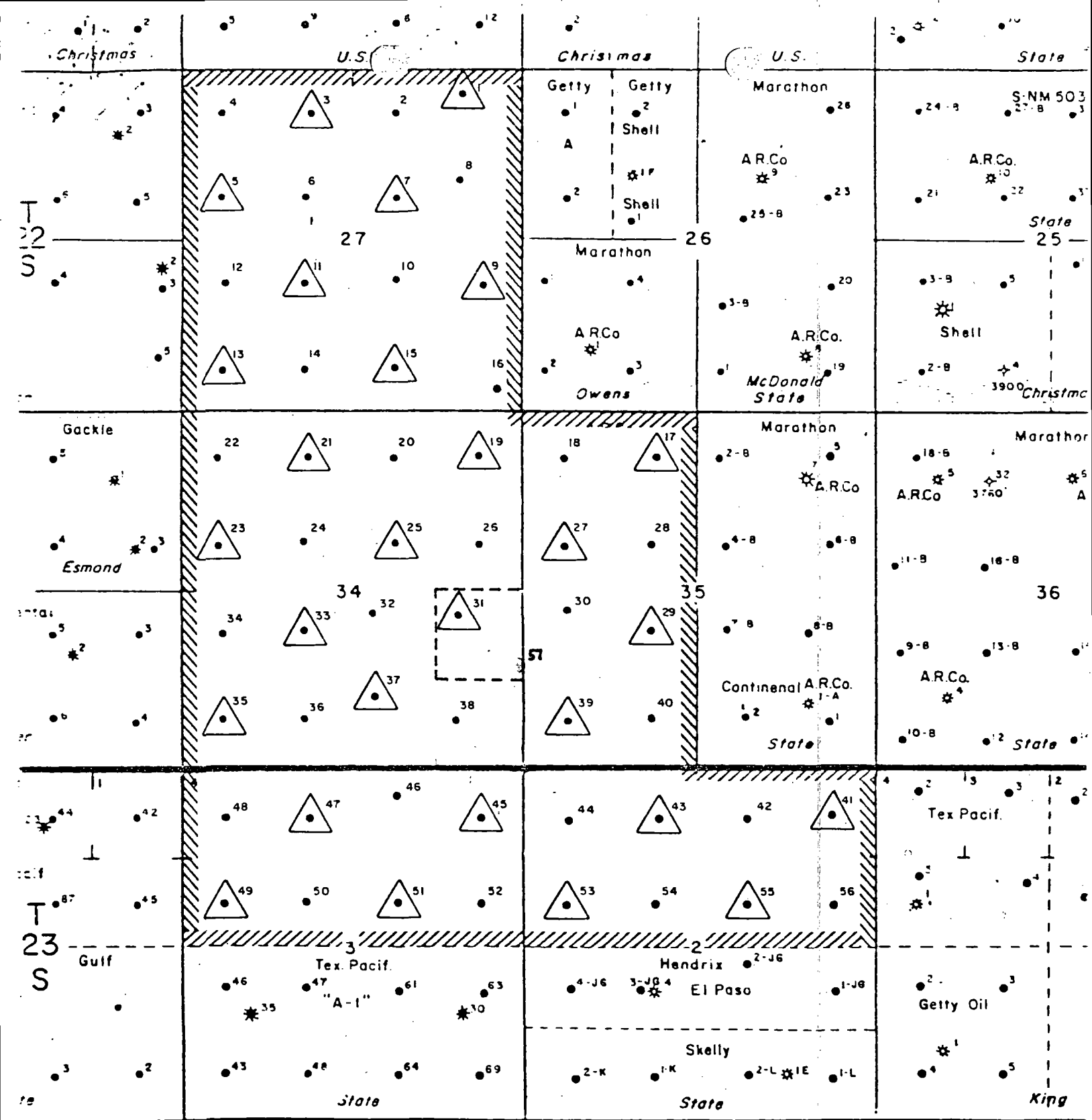
No. 2, from ____ to ____ feet. ____

No. 3, from ____ to ____ feet. ____

No. 4, from ____ to ____ feet. ____

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	710	710	Surface & Red Bed				
710	1392	682	Red Bed & Anhyd				
1392	1425	33	Anhyd				
1425	1890	465	Anhyd & Salt				
1890	2924	1034	Salt & Anhyd				
2924	3272	348	Anhyd & Salt				
3272	3600	328	Anhyd				
3600	3657	57	Anhyd & Lime				
3657	3822	165	Lime				
3822	3900 TD	78	Dolomite				



ARCO Oil and Gas Company
Division of Atlantic Richfield Company
Permian District Midland, Texas

SEVEN RIVERS-QUEEN UNIT

LEA COUNTY, NEW MEXICO

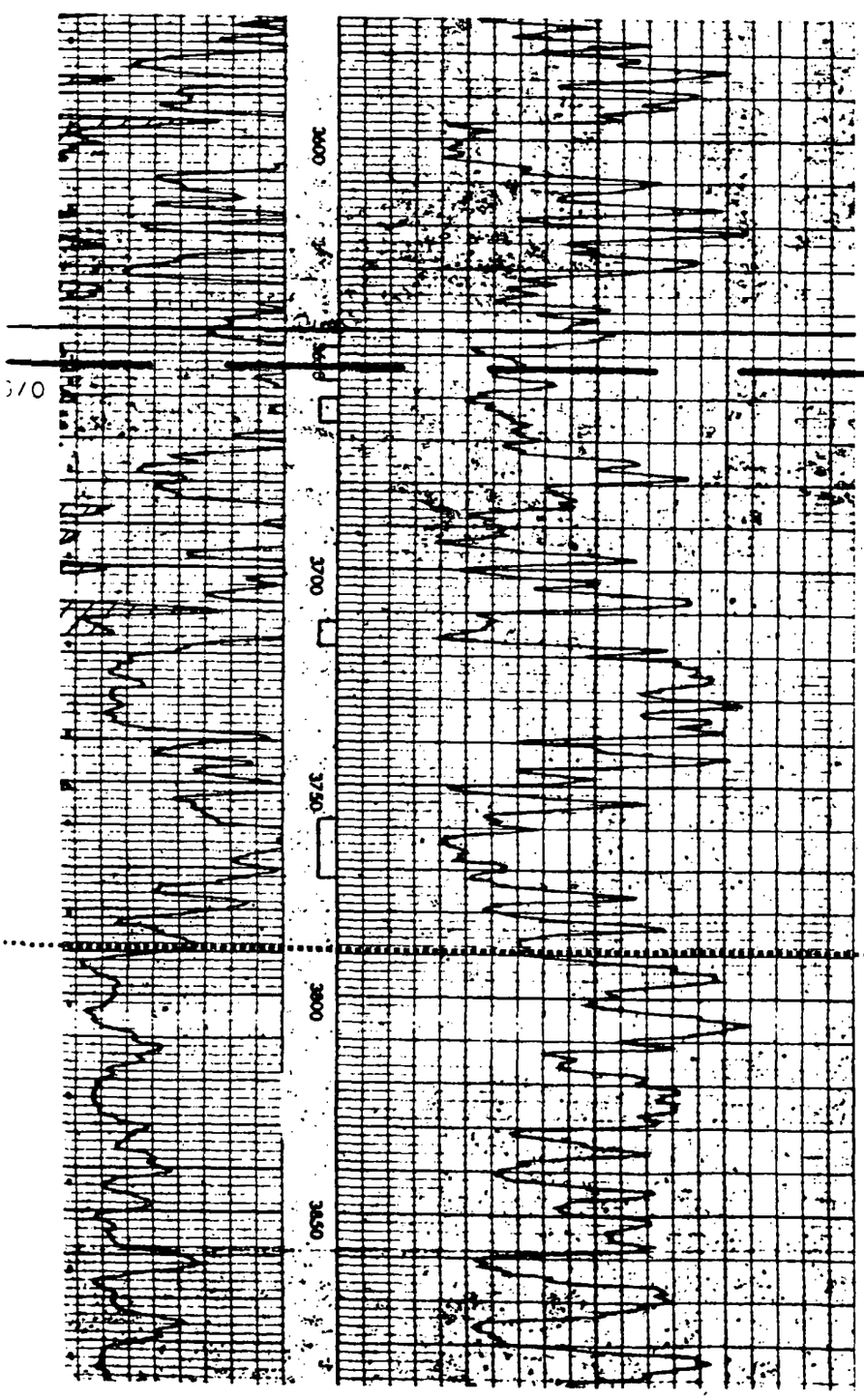
Proration Unit Shared
by Nos. 31 and 57

SCALE 1" = 2000'

By R. CRAIG		Drawn By	Date 4-8
Date 2-82		Revised By	Date
Dept. WEST AREA ENGR			

:CO
'VEN RIVERS QUEEN UNIT NO. 30
. 3503'
). 4010'

A'



DATUM -150'

PERFS.

6/58

3758'-72' 4 JSPF

3712'-18' 4 SPF

1/75

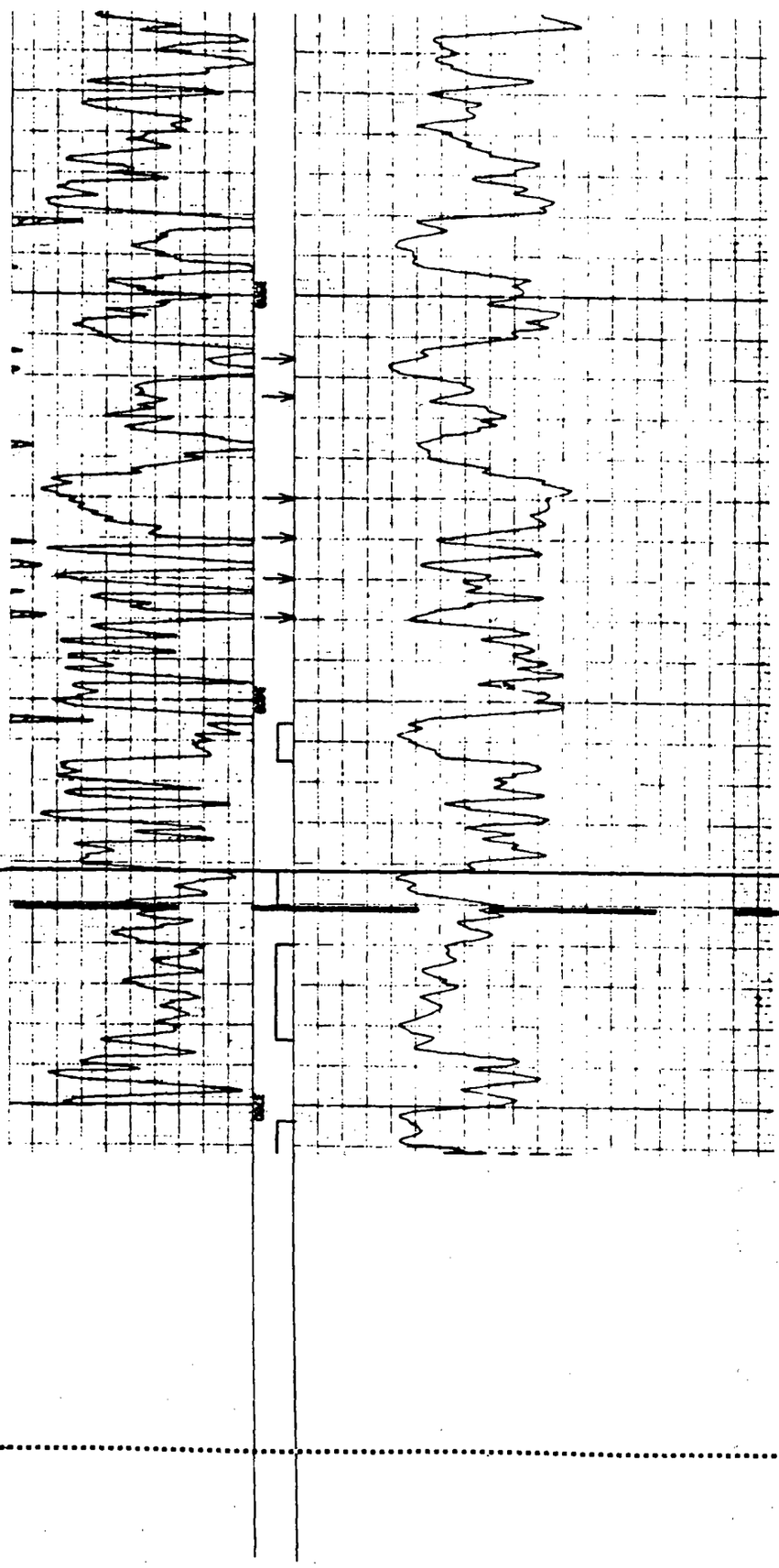
3648'-3656' 1 SPF

3659'-3665' 1 SPF

O/W 3789'

ARCO
SEVEN RIVERS QUEEN UNIT NO. 39
EL. 3505'
T.D. 4010'

ARCO
SEVEN RIVERS QUEEN UNIT NO. 38
EL. 3501'
T.D. 3715'



, SQZD..

ZD.
- 3780'

PERFS:

3517'- 3578' SQZD. 3

3606'- 3712'

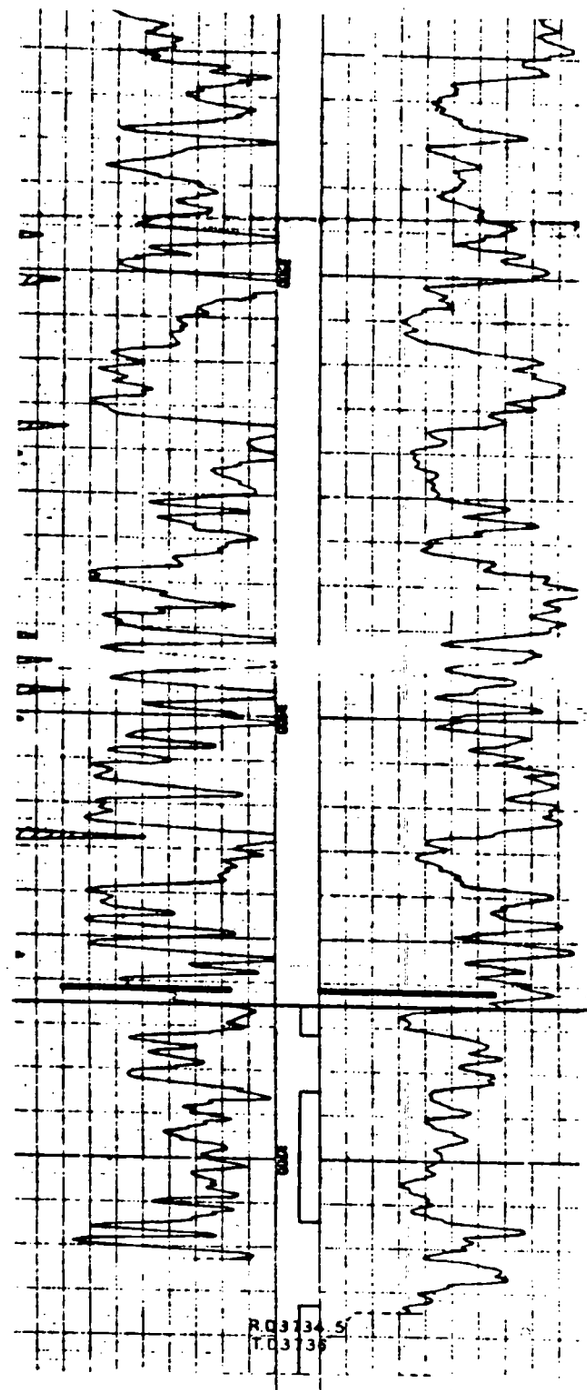
OP OF QUEEN

G/O

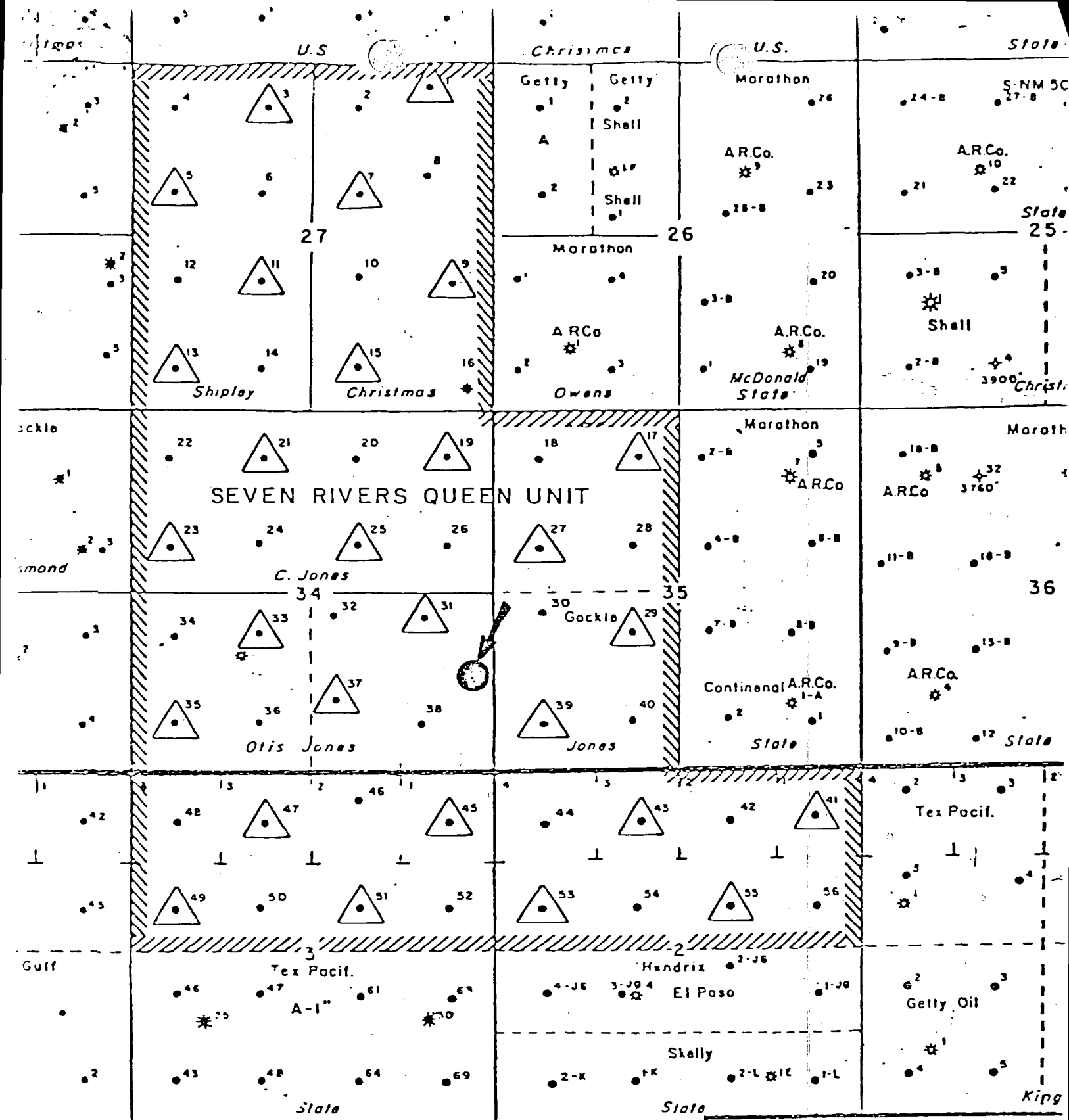
O/W, 3786'

A

ARCO
SEVEN RIVERS QUEEN UNIT NO. 31
EL. 3512'
T.D. 3735'



DATUM -150'



R-36-E

LEGEND

SEVEN RIVERS-QUEEN UNIT
WATER INJECTION WELL

AtlanticRichfieldCompany

SEVEN RIVERS-QUEEN AR

Lea County, New Mexico

SCALE: 1" = 2000'

BOB LEGGOTT

ARCO Oil and Gas Company
Natural Gas Department
Post Office Box 2819
Dallas, Texas 75221
Telephone 214 651 4675

Paul T. Davis
Manager, Gas Regulations

June 4, 1982

Department of Energy and Minerals
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501
Attn: Michael E. Stogner

RE: Application for NGPA Infill Finding
Seven Rivers Queen Unit No. 57
Lea County, New Mexico
AR #46281, 46449

Dear Mr. Stogner:

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Exhibit VI - Subject well is in the Eunice Seven Rivers Queen South pool which has 40 acre spacing for oil wells.

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Please return the extra copy of this letter with evidence of your receipt thereof in the enclosed self-addressed envelope.

Yours very truly,

Dottie J. Parks

Dottie J. Parks
Sr. Gas Regulations Administrator
(214) 651-4678

DJP:ke

Enclosures

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

DP

BRUCE KING
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ARCO OIL & GAS COMPANY
P O BOX 2819
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SANTA FE, NEW MEXICO 87501
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WELL NAME AND LOCATION Seven Rivers Queen Unit #57-I 34-22S-36E

SECTION(S) APPLIED FOR 103

DATE APPLICATION RECEIVED March 29, 1982

APPLICATION INCOMPLETE Must file for infill finding (NFL). (Rule 13).

Sincerely,

Michael E. Stogner

DATE: April 13, 1982

RECEIVED
APR 16 1982
GAS REGULATIONS - NGPA

NOTE:

THIS FORM LETTER MUST ACCOMPANY TWO COPIES OF THE SUPPLEMENTARY INFORMATION.

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

September 15, 1981

Mr. Joe D. Ramey
New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

RE: Unorthodox Location
Seven Rivers Queen Unit No. 57
Lea County, New Mexico

ARCO Oil and Gas Company respectfully requests administrative approval to drill its Seven Rivers Queen Unit No. 57, a producing well in an active waterflooding unit, at an unorthodox location of 1500' FSL and 10' FEL Section 34, Township 22 South, Range 36 East, Lea County. The well is to be drilled to a TD of 3900' to test the Seven Rivers Queen formations. In ARCO's opinion completion of the well at the proposed location will provide an efficient production and injection pattern within a secondary recovery project. This well is expected to recover unswept oil left due to premature breakthrough in wells Nos. 30 and 38. The offsetting proration units to the proposed location all fall within the Seven Rivers Queen Unit operated by ARCO and, therefore, no offset operators were notified of the request. Attached for your information is a plat showing the Seven Rivers Queen Unit and the proposed well's location.

Very truly yours,

Robert E. Craig

Robert E. Craig
Engineer

REC:cn

Attachments

cc: NMOCC - Hobbs Office

Exhibit I

30-025-27588

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LAND OFFICE		
OPERATOR		

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-101
Revised 14-65

5A. Indicate Type of Lease: STATE [ ] FEE [X]

5. State Oil & Gas Lease No.

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work: DRILL [X] DEEPEN [ ] PLUG BACK [ ]

1b. Type of Well: OIL WELL [X] GAS WELL [ ] OTHER SINGLE ZONE [ ] MULTIPLE ZONE [ ]

7. Unit Agreement Name: Seven Rivers Queen Un

8. Farm or Lease Name: Seven Rivers Queen Uni

2. Name of Operator: ARCO Oil and Gas Company
Division of Atlantic Richfield Co.

9. Well No.: 57

3. Address of Operator: P. O. Box 1710, Hobbs, New Mexico 88241-1710

10. Field and Pool, or Wildcat: Eunice Seven Rivers Queen South

4. Location of Well: UNIT LETTER I LOCATED 1500 FEET FROM THE South LINE
10 FEET FROM THE East LINE OF SEC. 34 TWP. 22S RGE. 36E NMPM

12. County: Lea

19. Proposed Depth	19A. Formation	20. Rotary or C.T.
3900'	7 Rivers Qn	Rotary

21. Elevations (Show whether DF, RT, etc.)	21A. Kind & Status Plug. Bond	21B. Drilling Contractor	22. Approx. Date Work will start
3508' GR	GCA #8	Baber Drlg. Co.	10/06/81

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
17½"	13-3/8" OD	Cond Pipe	30'	2 yds Redi-mix	to surf
12¼"	8-5/8" OD	24# K-55	1400'	675	Circ to surf
7-7/8"	5½" OD	15.5# K-55	3900'	800	Circ to surf

Propose to drill an infill development well and recover remaining primary & secondary reserves.
Administrative Order NSL-1422

Blowout Preventer Program Attached

RECEIVED
NOV 3 1981

CENTRAL FILES

APPROVAL VALID FOR 180 DAYS
PERMIT EXPIRES 4/2/82
UNLESS DRILLING UNDERWAY

ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Signed Jerry W. Schmidt Title Dist. Drlg. Supt. Date 9/30/81

(This space for State Use)

APPROVED BY Orig. Signed by Jerry Sexton TITLE Dist 1, Supv. DATE OCT 2 1981

CONDITIONS OF APPROVAL, IF ANY: Midland Location

NEW MEXICO OIL CONSERVATION COMMISSION

WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section

Operator	Lease	Well No.
Arco Oil & Gas Co. Division of Atlantic Richfield Co.	Seven Rivers Queen Unit	57

Unit Letter	Section	Township	Range	County
I	34	22 South	36 East	Lea

Actual Footage Location of Well:
1500 feet from the South line and 10 feet from the East line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
3508.0'	Seven Rivers Queen So.	Eunice, South	40 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

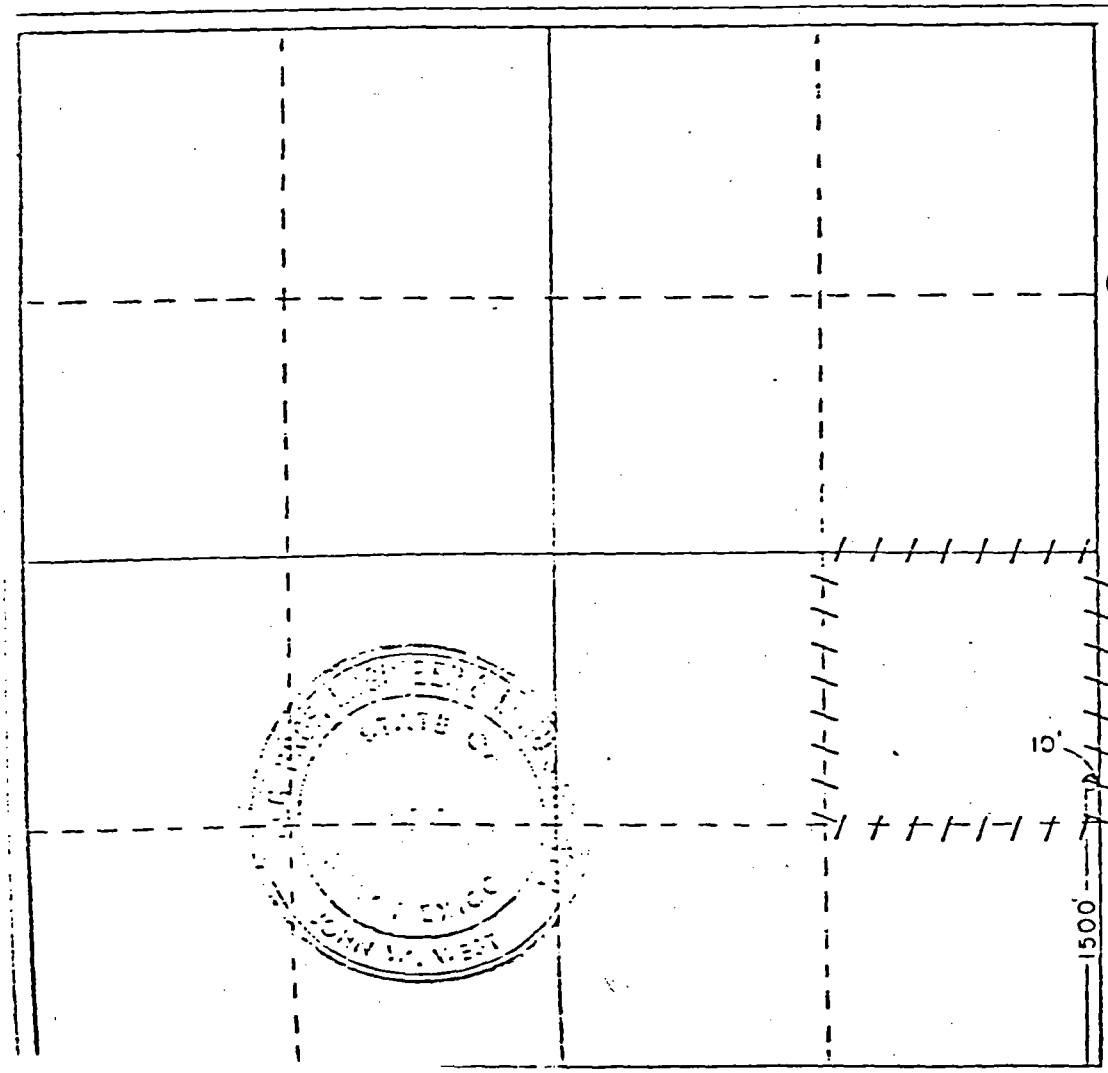
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

Name: Jerry D. Schmidt

Position: Dist. Drlg. Supt.

Company: ARCO Oil and Gas Co. Div of Atlantic Richfield Co

Date: 9/30/81

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed: Sept 30, 1931

Registered Professional Engineer and/or Land Surveyor

Certificate No. JOHN W. WEST 676

Exhibit II

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

September 18, 1981

ARCO Oil and Gas Company
P. O. Box 1610
Midland, Texas 79702

Attention: Mr. Robert E. Craig

Administrative Order NSL-1422

Gentlemen:

Reference is made to your application for a non-standard location for your Seven Rivers Queen Unit Well No. 57 to be located 1500 feet from the South line and 10 feet from the East line of Section 34, Township 22 South, Range 36 East, NMPM, South Eunice-Seven Rivers Queen Pool, Lea County, New Mexico.

By authority granted me under the provisions of Rule 104 F of the Division Rules and Regulations, the above-described unorthodox location is hereby approved.

Sincerely,

JOE D. RAMEY,
Director

JDR/RLS/dr

cc: Oil Conservation Division - Hobbs
Oil & Gas Engineering Committee - Hobbs

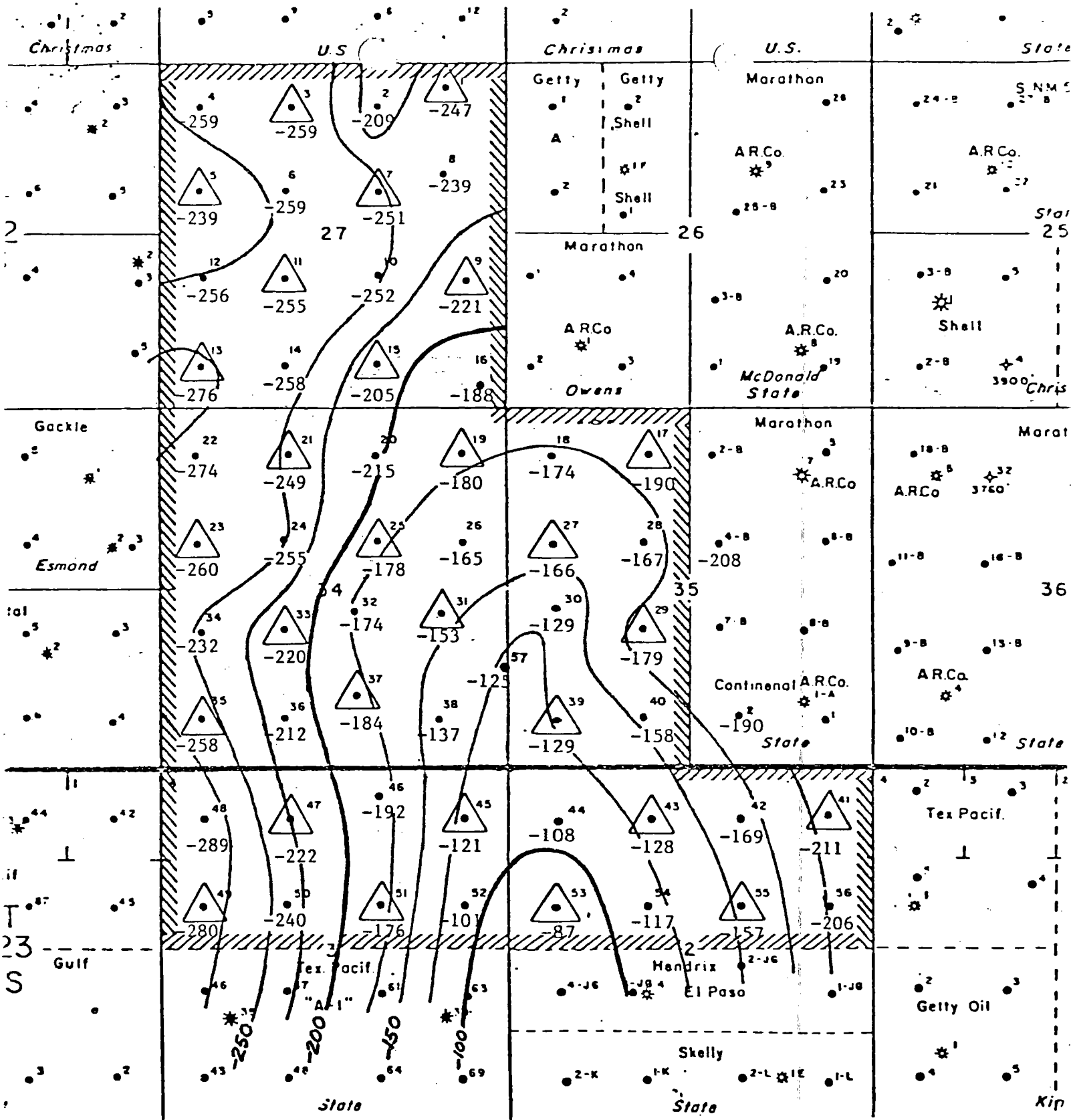

Christmas
U.S
Christmas
U.S.
Getty
Getty
Shell
Shell
Marathon
A.R.Co.
A.R.Co.
Marathon
A.R.Co
A.R.Co.
Owens
McDonald
State
Shell
Gackle
Esmond
Marathon
A.R.Co
A.R.Co
A.R.Co.
Continenal
State
Tex Pacif.
Gulf
Tex. Pacif.
"A-1"
Hendrix
El Paso
Getty Oil
Skelly
State
State
27
26
25
34
35
36
23
-259
-259
-209
-247
-239
-259
-251
-239
-256
-255
-252
-221
-276
-258
-205
-188
-274
-249
-215
-180
-174
-190
-260
-255
-178
-165
-166
-167
-208
-232
-220
-174
-153
-129
-179
-125
-258
-212
-184
-137
-129
-158
-190
-289
-222
-192
-121
-108
-128
-169
-211
-280
-240
-176
-101
-87
-117
-157
-206
-250
-200
-150
-100
R 36 E
ARCO Oil and Gas Company
Permian District Midland, Texas
SEVEN RIVERS-QUEEN UI
LEA COUNTY, NEW MEXICO
STRUCTURE MAP
Top of Queen
SCALE - 1" = 2000'
R. CRAIG

Exhibit III

EXHIBIT IV

SEVEN RIVERS QUEEN UNIT (WIW) #31

Spud Date: July 2, 1957

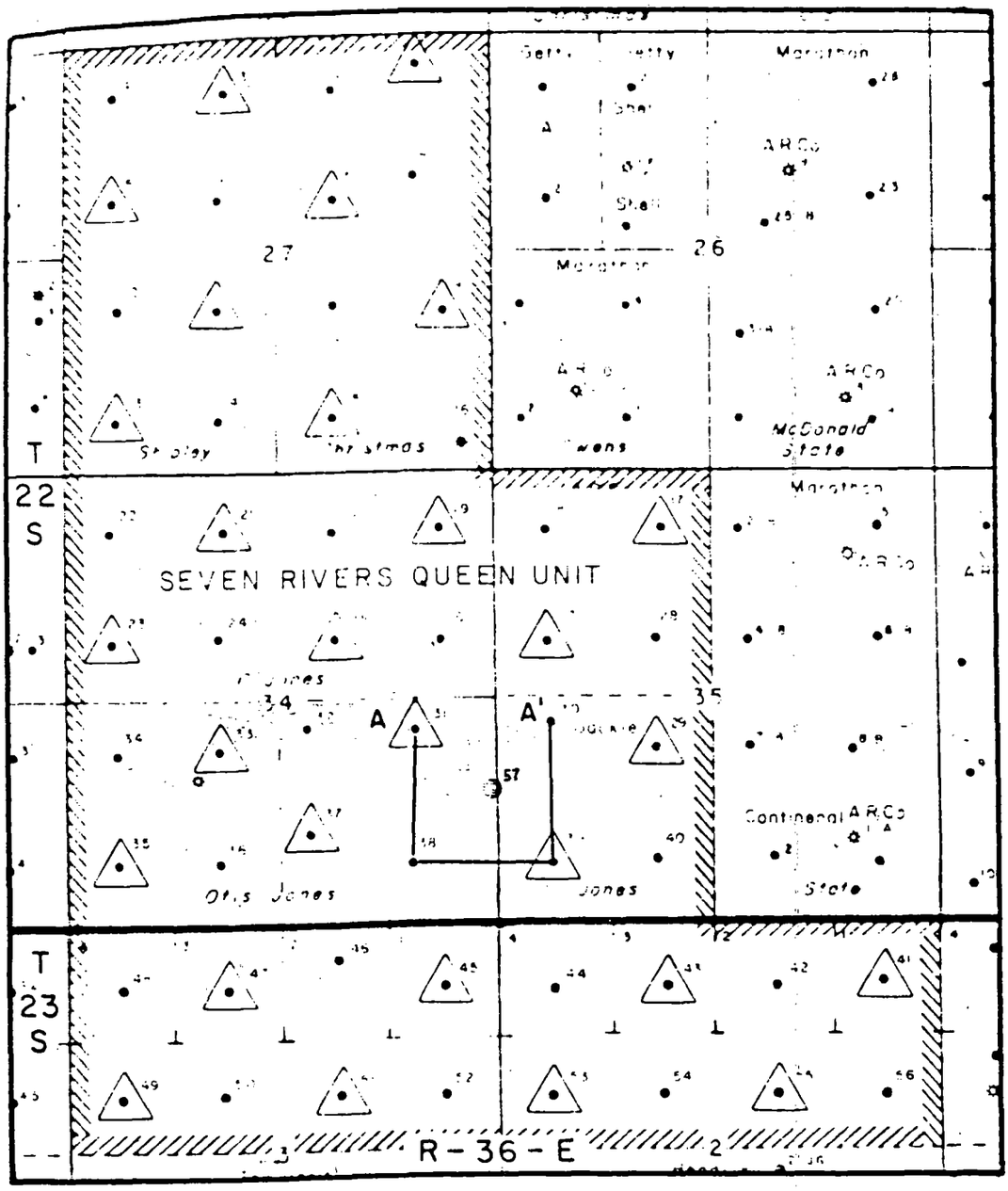
Completion Date: July 19, 1957

Conversion Date: March 5, 1974

The volume of increased ultimate recovery is expected to be approximately 40,000 barrels

Exhibit V

INDEX MAP



Scale: 1" = 2000'

ARCO Oil and Gas Company

Permian District Midland, Texas

SEVEN RIVERS-QUEEN AREA

CROSS SECTION A-A'

Lea County, New Mexico

By KEITH PAIGE	Drawn By R.C.T.	Date 6/5/81
Date 6/5/81	Revised By	Date
Dept WEST ENGR. DEPT.	Dwg No.	

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

Form C-105
Revised 10-1-78

OIL CONSERVATION DIVISION

P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

NO. OF COPIES RECEIVED		
DISTRIBUTION		
SANTA FE		
FILE		
U.S.G.S.		
LAND OFFICE		
OPERATOR		

5a. Indicate Type of Lease: State ☐ Fee ☒

5. State Oil & Gas Lease No.

7. Unit Agreement Name: Seven Rivers Queen Un

1a. TYPE OF WELL: OIL WELL ☒ GAS WELL ☐ DRY ☐ OTHER

b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ OTHER

8. Farm or Lease Name: Seven Rivers Queen Un

2. Name of Operator: ARCO Oil and Gas Company
Div of Atlantic Richfield Co.

9. Well No.: 57

3. Address of Operator: P. O. Box 1710, Hobbs, N M 88241-1710

10. Field and Pool, or Wildcat: Eunice 7-Rivers Queen South

4. Location of Well: UNIT LETTER I LOCATED 1500 FEET FROM THE South LINE AND 10 FEET FROM

East LINE OF SEC. 34 TWP. 22S RGE. 36E NMPM

12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
10/13/81	10/27/81	2/14/82	3508' GR	

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
3900'	3856'		→	0-3900'	

24. Producing Interval(s), of this completion — Top, Bottom, Name: 3674-3740' Seven Rivers Qn South

25. Was Directional Su... Made: No

26. Type Electric and Other Logs Run: GR-Caliper, CDL/CNL, DLL/MLL, GR-CCL

27. Was Well Cored: Yes

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULL...
13-3/8" OD	Conductor Pipe	34'	18"	2½ yds Redi-mix	
8-5/8" OD	24# K-55	1392'	12¼"	750 sx	
5½" OD	15.5# K-55	3900'	7-7/8"	1300 sx	

LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2-3/8"OD	3582'	-

31. Perforation Record (Interval, size and number)

3674, 77, 80, 83, 86, 3700, 05, 08, 12, 21, 24, 37, 40'. = 13-.50" holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
3777-3794'	1600 gal 15% NE acid cmt sqz
	200 sx Cl H w/2% CaCl,
3674-3740'	2100 gal 15% NE acid &15,500
	40# cross linked gel & 39,50

PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
1/31/82	Pumping - 2" x 1½" x 16' rod	Prod

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas — Oil Ratio
2/19/82	24			14	98	17	7000:1

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)
-	-		14	98	17	38.4°

33. Disposition of Gas (Sold, used for fuel, vented, etc.): Sold

Test Witnessed By: Jerry Guy

34. List of Attachments: Logs as listed in item 26 above, core reports, Inclination Report.

35. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED for: J.W. Schmidt TITLE Dist. Drlg. Supt. DATE 2/25/82

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt		T. Strawn		T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt		T. Atoka		T. Pictured Cliffs		T. Penn. "D"	
T. Yates	3130'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers	3344'	T. Devonian		T. Menefee		T. Madison	
T. Queen	3638'	T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg	3826'	T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs		T. Wingate		T.	
T. Wolfcamp		T.		T. Chinle		T.	
T. Penn.		T.		T. Permian		T.	
T Cisco (Bough C)		T.		T. Penn. "A"		T.	

OIL OR GAS SANDS OR ZONES

No. 1, from 3674' to 3740' No. 4, from ____ to ____

No. 2, from ____ to ____ No. 5, from ____ to ____

No. 3, from ____ to ____ No. 6, from ____ to ____

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from ____ to ____ feet None Encountered

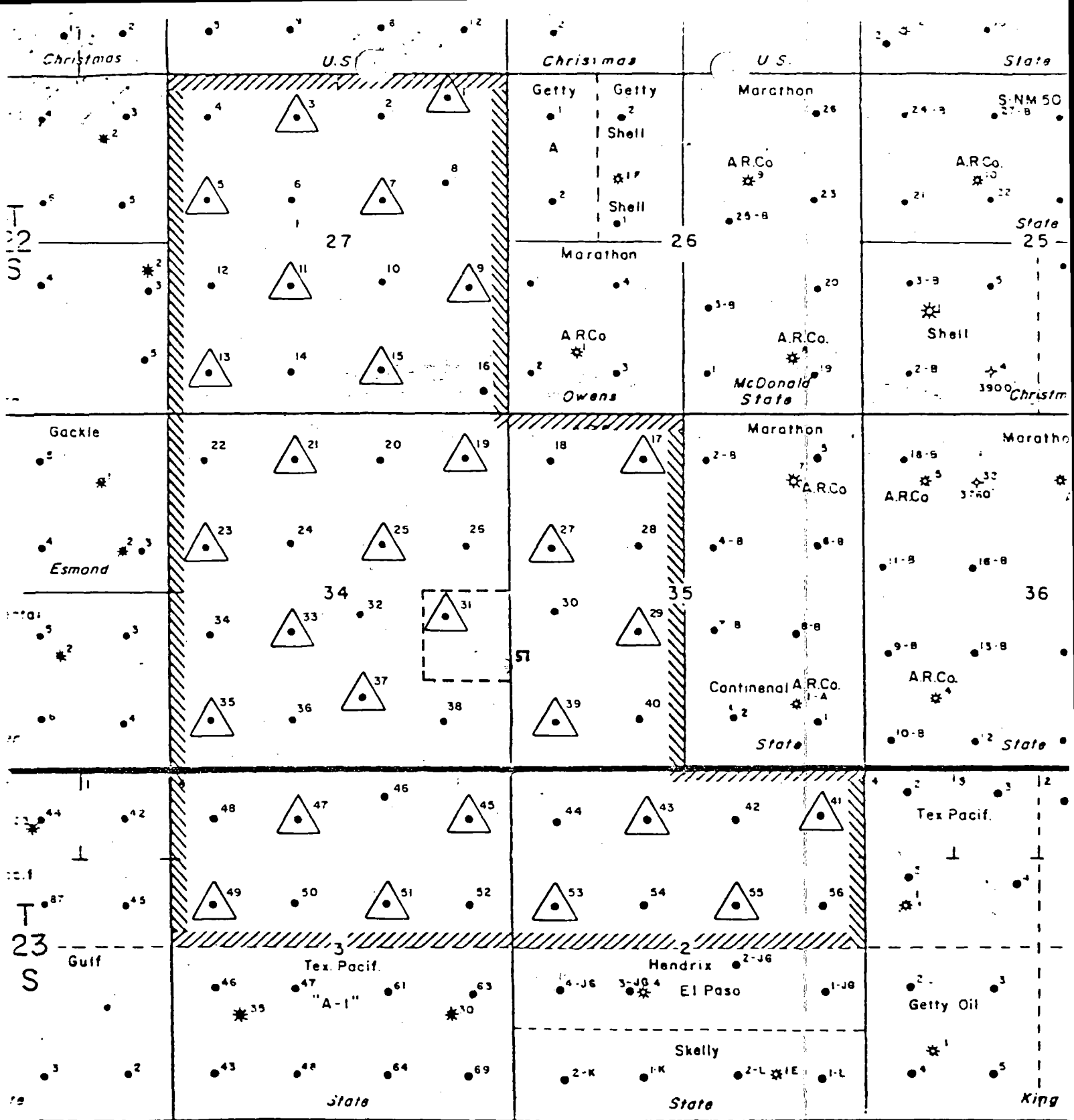
No. 2, from ____ to ____ feet ____

No. 3, from ____ to ____ feet ____

No. 4, from ____ to ____ feet ____

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	710	710	Surface & Red Bed				
710	1392	682	Red Bed & Anhyd				
1392	1425	33	Anhyd				
1425	1890	465	Anhyd & Salt				
1890	2924	1034	Salt & Anhyd				
2924	3272	348	Anhyd & Salt				
3272	3600	328	Anhyd				
3600	3657	57	Anhyd & Lime				
3657	3822	165	Lime				
3822	3900	78	Dolomite				
	TD						



ARCO Oil and Gas Company
Division of Atlantic Richfield Company
Permian District Midland, Texas

SEVEN RIVERS-QUEEN UNI

LEA COUNTY, NEW MEXICO

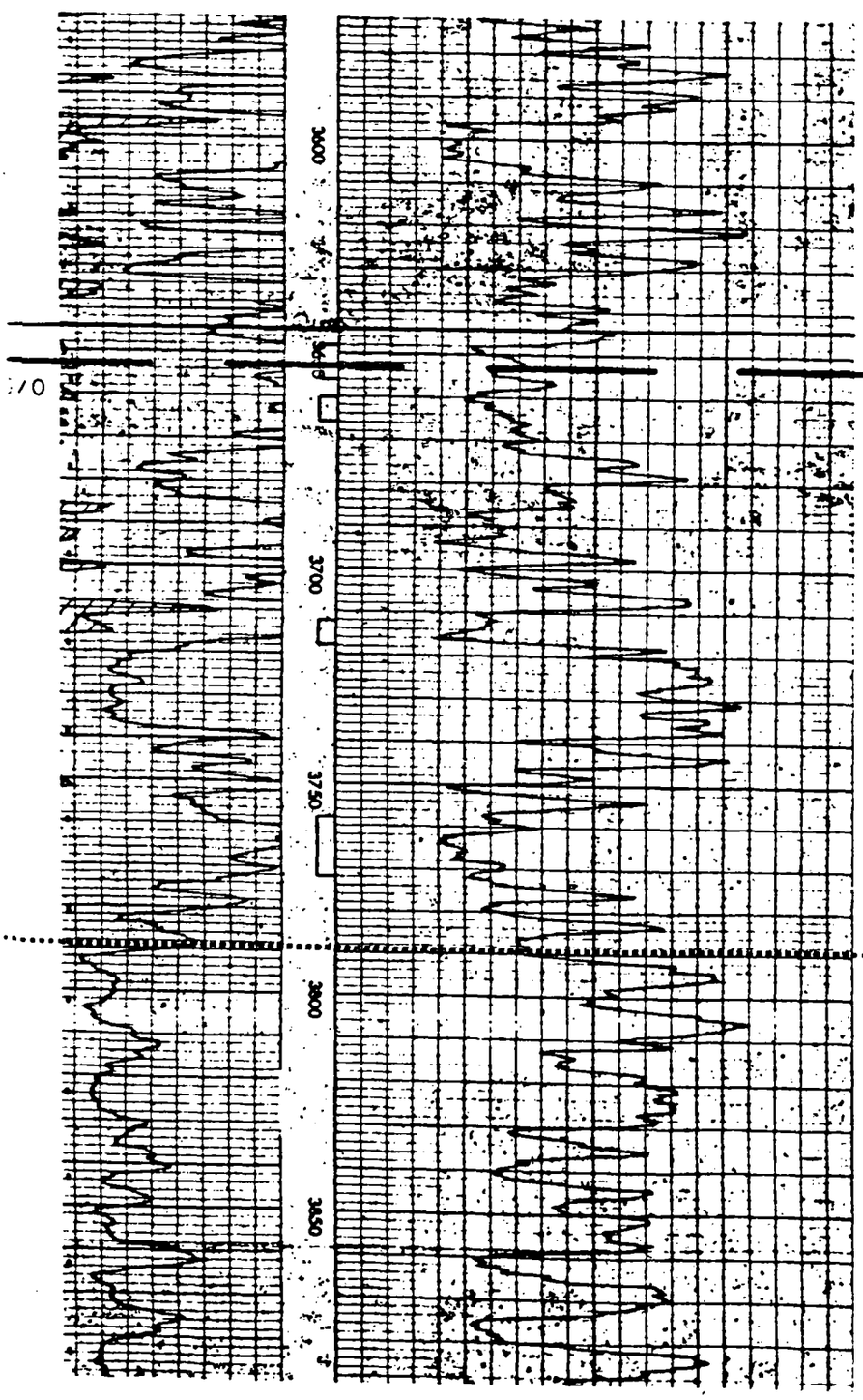
Proration Unit Shared
by Nos. 31 and 57

SCALE - 1" = 2000'

By R. CRAIG		Drawn By	Date 4 -
Date 2-82		Revised By	Date

CO
VEN RIVERS QUEEN UNIT NO. 30
3503'
). 4010'

A'



DATUM -150'

PERFS.

6/58

3758'-72' 4 JSPF

3712'-18' 4 SPF

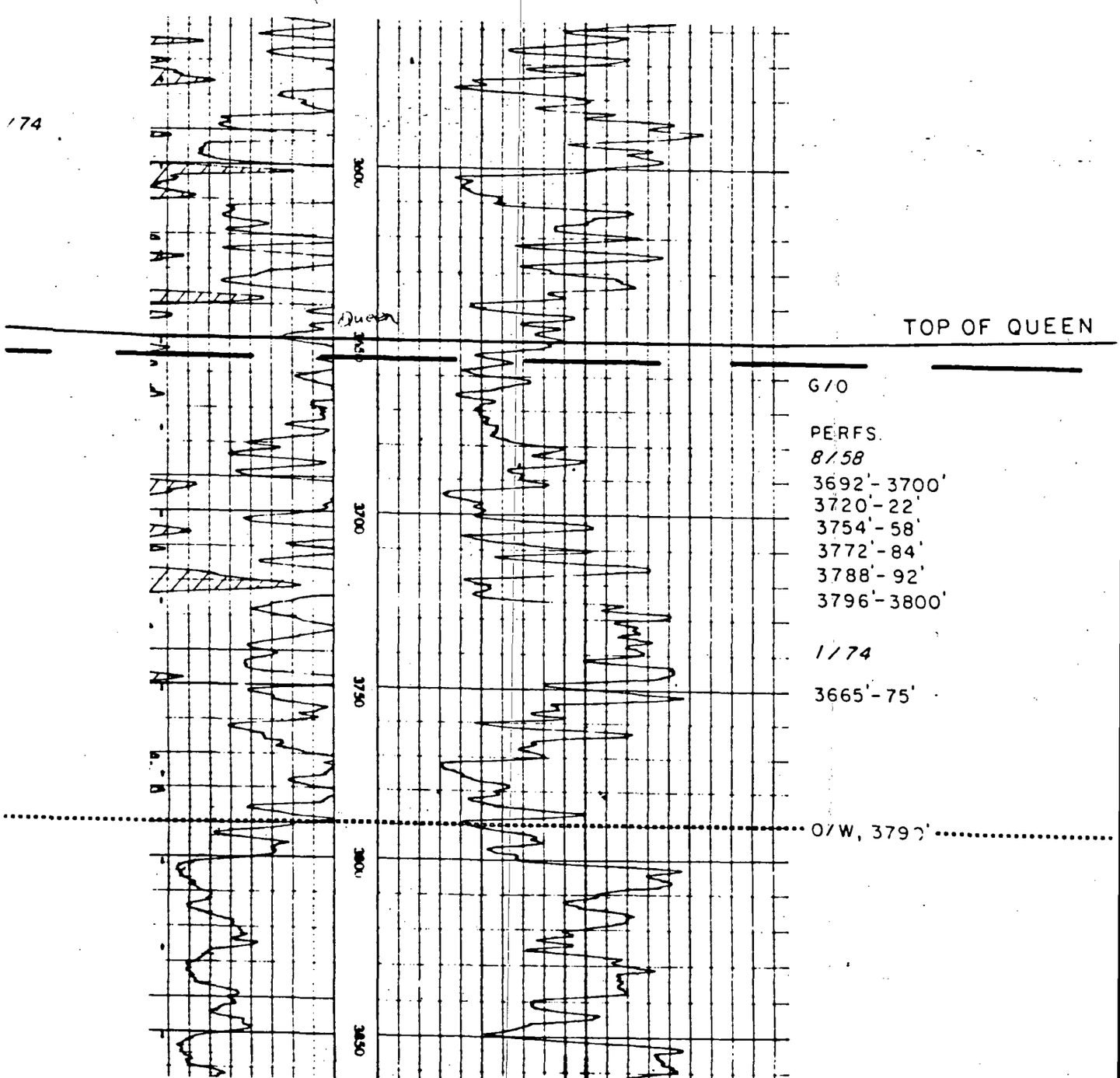
1/75

3648'-3656' 1 SPF

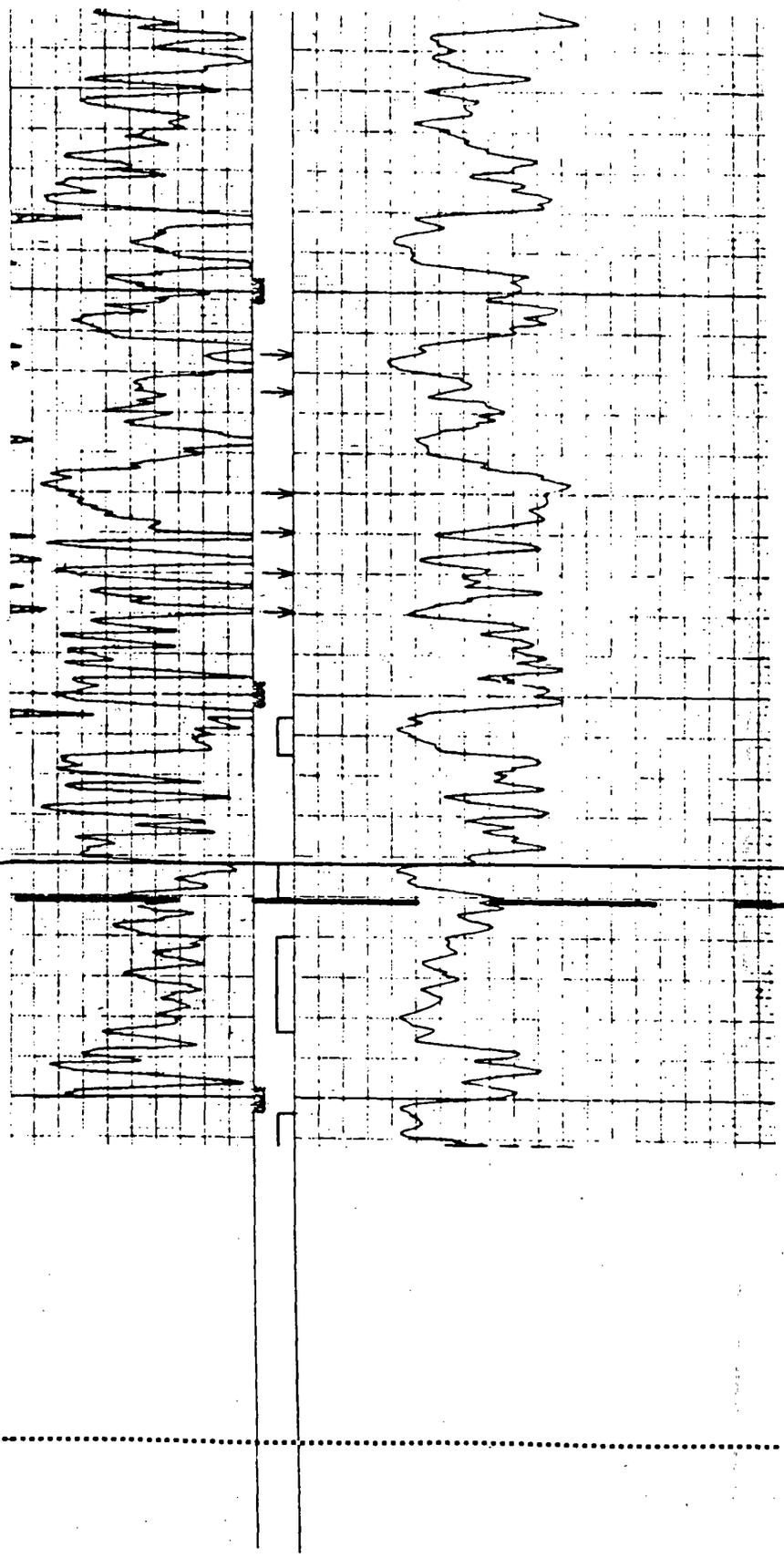
3659'-3665' 1 SPF

O/W 3789'

ARCO
SEVEN RIVERS QUEEN UNIT NO. 39
EL. 3505'
T.D. 4010'



ARCO
SEVEN RIVERS QUEEN UNIT NO. 38
EL. 3501'
T.D. 3715'



, SQZD..

ED.
- 3780'

PERFS:

3517'- 3578' SQZD.

3606'- 3712'

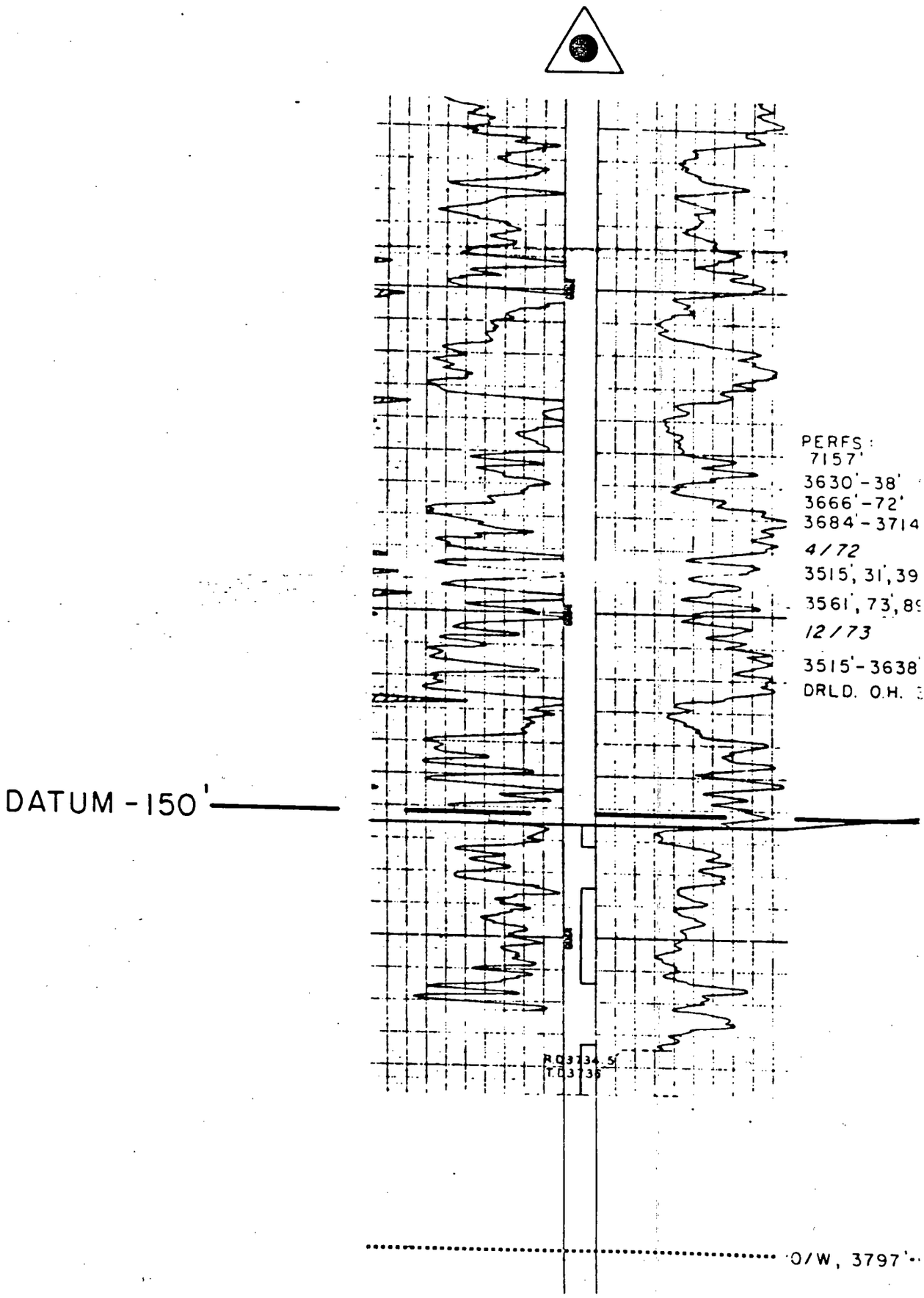
OP OF QUEEN

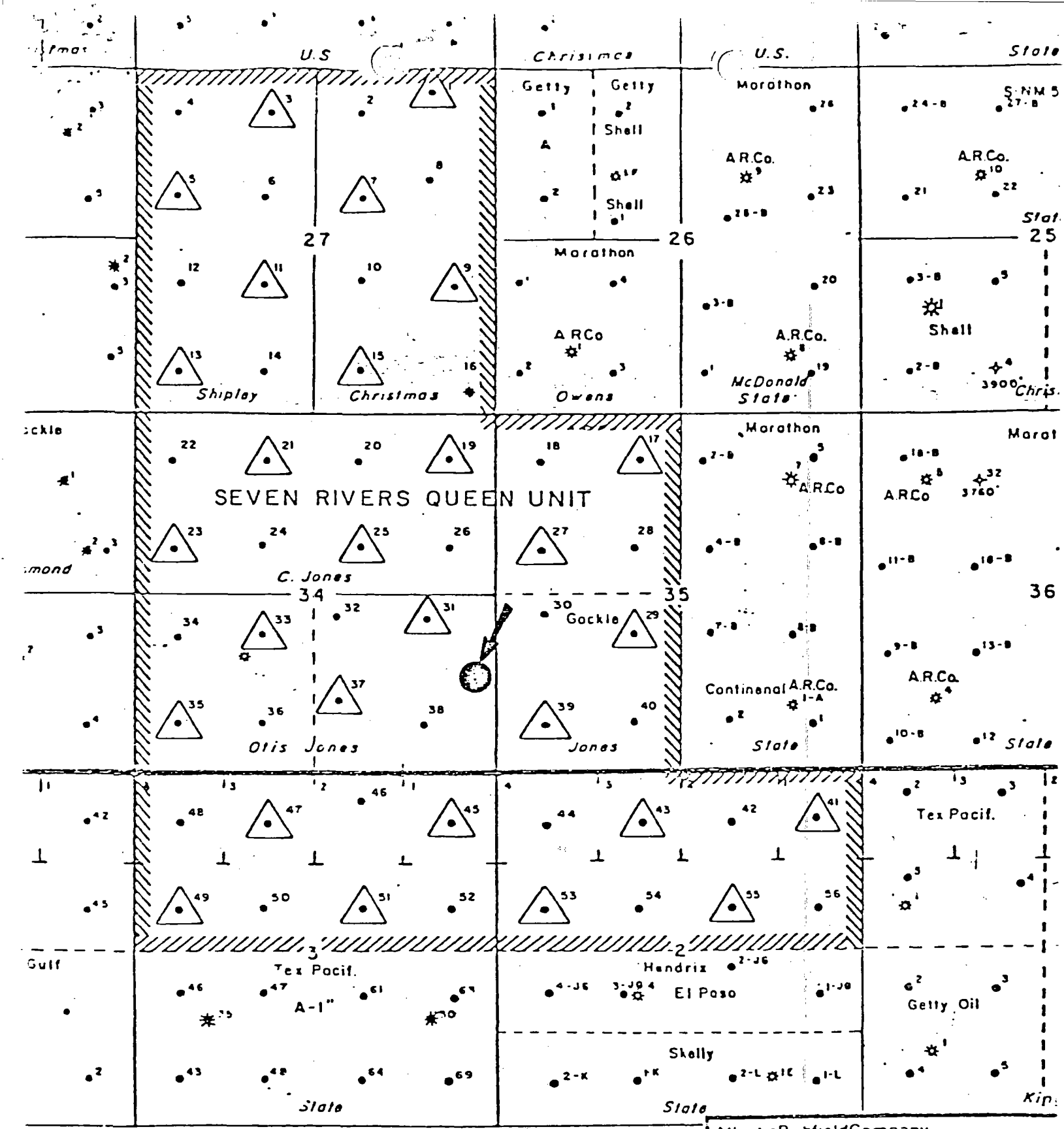
G/O

O/W, 3786'

A

ARCO
SEVEN RIVERS QUEEN UNIT NO. 31
EL. 3512'
T.D. 3735'





R-36-E

LEGEND

SEVEN RIVERS-QUEEN UNIT WATER INJECTION WELL

Atlantic Richfield Company

SEVEN RIVERS-QUEEN AR

Lea County, New Mexico

SCALE: 1" = 2000'