

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION
OF WALLEN PRODUCTION COMPANY FOR
WATERFLOOD PROJECT,
LEA COUNTY, NEW MEXICO

CASE NO. 9736

CERTIFICATE OF MAILING
AND
COMPLIANCE WITH ORDER R-8054

In accordance with Division Rule 1207 (Order R-8054) I hereby certify that on July 26, 1989, I caused to be mailed by certified mail, return-receipt requested, notice of this hearing and a copy of the application for the above referenced case along with the cover letter, at least twenty days prior to the hearing set for August 23, 1989 to the parties shown in the application as evidenced by the attached copy of the return receipt cards.


W. Thomas Kellahin

SUBSCRIBED AND SWORN TO before me this 21st day of August, 1989.


Ronwyn Stoner
Notary Public

My Commission Expires:

March 3, 1993

BEFORE EXAMINER STOGNER	
OIL CONSERVATION DIVISION	
<u>Wallen</u>	EXHIBIT NO. <u>4</u>
CASE NO. <u>9736</u>	

WTK/Wallen/Tonto # /

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
FI-RO Corporation
P.O. Box 8148
Roswell, NM 88201

4. Article Number P 103 899 138

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature - Address X
6. Signature - Agent X
7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

WTK/Wallen/Tonto # 7

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
Oil Conservation Division
State Land Office
Attn: Land Commissioner
P.O. Box 1148
Santa Fe, NM 87501

4. Article Number P 103 899 136

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature - Address X
6. Signature - Agent X
7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

WTK/Wallen/Tonto # /

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1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
Bureau of Land Mgmt
Roswell Dist Office
Attn: Dist Mgr
P.O. Box 1397
Roswell, NM 88201-1397

4. Article Number P 103 899 135

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Addressee's Address (ONLY if requested and fee paid)

6. Signature - Address X
7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

WTK/Wallen/Tonto # 7

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1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
Union Oil Co of Calif.
4000 N. Big Spring
Suite 300
Midland, TX 79702

4. Article Number P 103 899 139

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Addressee's Address (ONLY if requested and fee paid)

6. Signature - Address X
7. Date of Delivery

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- 1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (*Extra charge*)
- 3. Article Addressed to:
- 4. Article Number P 103 899 141

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check boxes for additional service(s) requested.	
1. Show to whom delivered, date, and addressee's address. 2. <input type="checkbox"/> Restricted Delivery (<i>Extra charge</i>)	
3. Article Addressed to:	
Mr. Jerry Sexton Oil Conservation Division Post Office Box 1980 Hobbs, NM 88240	
4. Article Number P 103 899 134	
Type of Service:	
<input type="checkbox"/> Insured <input type="checkbox"/> Registered <input type="checkbox"/> COD <input type="checkbox"/> Certified <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Express Mail	
Always obtain signature of addressee or agent and DATE DELIVERED.	
5. Addressee's Address (ONLY if requested and fee paid)	
Mr. Jerry Sexton	
6. Signature — Address X	
7. Date of Delivery Mar. 1988 J. 2-7-9	
PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT	

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Mr. Jerry Sexton Oil Conservation Division Post Office Box 1980 Hobbs, NM 88240	
4. Article Number P 103 899 134	
Type of Service:	
<input type="checkbox"/> Insured <input type="checkbox"/> Registered <input type="checkbox"/> COD <input type="checkbox"/> Certified <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Express Mail	
Always obtain signature of addressee or agent and DATE DELIVERED.	
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6. Signature — Address X	
7. Date of Delivery Mar. 1988 J. 2-7-9	
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1. Show to whom delivered, date, and addressee's address. 2. <input type="checkbox"/> Restricted Delivery (<i>Extra charge</i>)	
3. Article Addressed to:	
Kaiser-Francis Oil Co. P.O. Box 21468 Tulsa, OK 79121 Attn: Jim Wakefield	
4. Article Number P-103 899 140	
Type of Service:	
<input type="checkbox"/> Insured <input type="checkbox"/> Registered <input type="checkbox"/> COD <input type="checkbox"/> Certified <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Express Mail	
Always obtain signature of addressee or agent and DATE DELIVERED.	
5. Addressee's Address (ONLY if requested and fee paid)	
WINDON SERVICE US POSTAL SERVICE 333 N. 4th 1st FL Tulsa, OK 74103-9612	
6. Signature — Address X	
7. Date of Delivery Mar. 1988 J. 1-10-92	
PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT	

APPLICATION FOR AUTHORIZATION TO INJECT

- I. Purpose: Secondary Recovery Pressure Maintenance Disposal Storage
Application qualifies for administrative approval? Yes No
- II. Operator: Wallen Production Company
Address: P.O. Box 1960 Midland, Texas 79702
- Contact party: Walter W. Krug Phone: 915-683-2600
- III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project? Yes No
If yes, give the Division order number authorizing the project _____.
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- * VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
 2. Whether the system is open or closed;
 3. Proposed average and maximum injection pressure;
 4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
 5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- * VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (any water containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be impacted by the injection interval.
- IX. Describe the proposed stimulation program, if any.
- * X. Attach appropriate logging and test data on the well (if well logs have been filed with the Division they need not be resubmitted.)
- * XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification

I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: W. Thomas Kellam

Title Attorney

Signature: [Signature]

Date: July 24, 1989

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal.

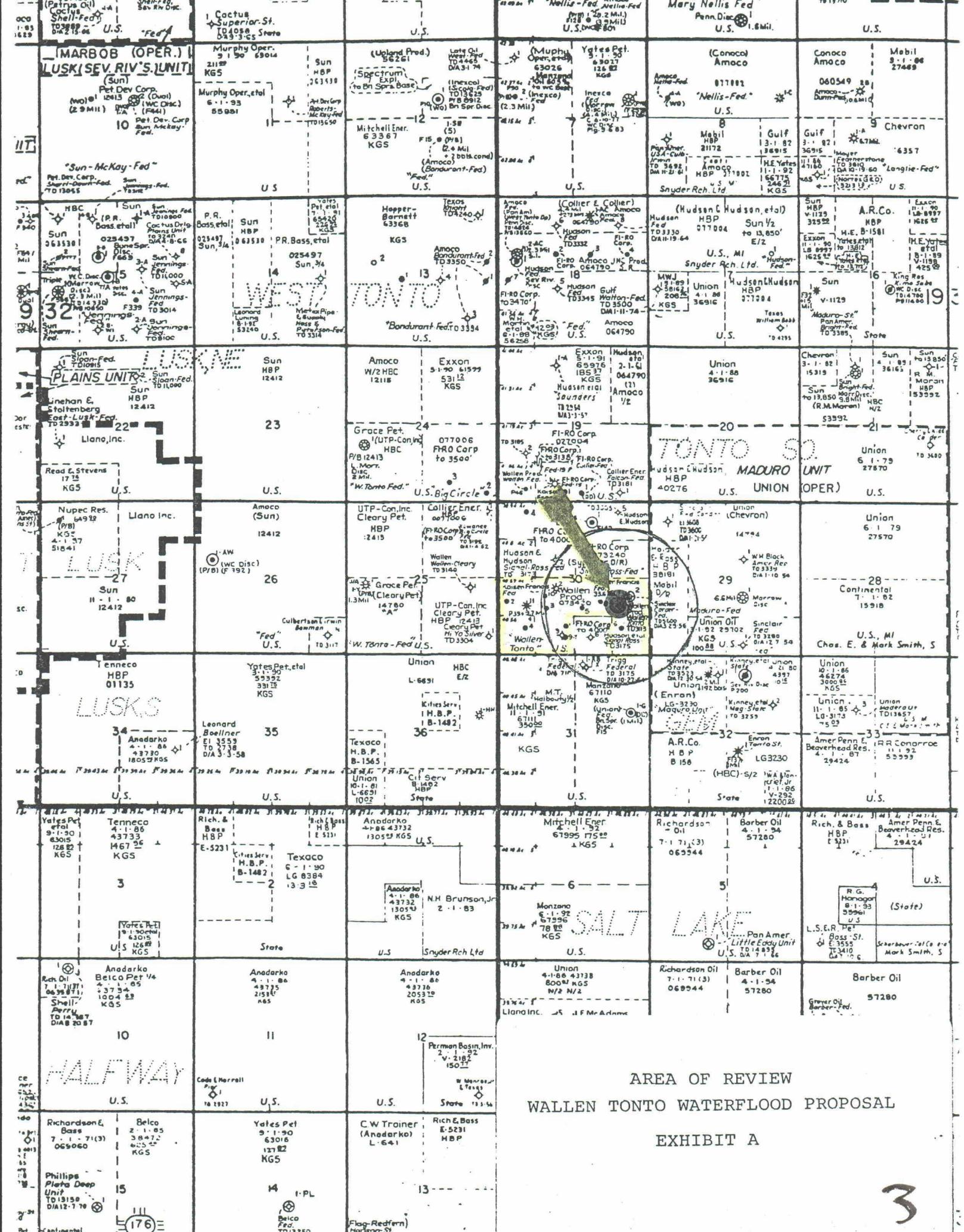
WALLEN PRODUCTION COMPANY

Proposed Wallen Tonto Waterflood

Wallen Tonto #7 WIW
Section 30, T19S, R33E
Lea County, New Mexico

List of Exhibits - Form C-108

Exhibit A	Map required by Paragraph V
Exhibit B	Tabular Summary required by Paragraph VI
Exhibit C	Data Sheet required by Paragraph VII
Exhibit D	Geological Data - Paragraph VIII
Exhibit E	Log of Injection Well
Exhibit F	Data Sheet on Proposed Injection Well
Exhibit G	Schematic of Proposed Injection Well
Exhibit H	Schematic of P&A Wells within Area of Review
Exhibit I	Water Analysis Produced Water to be re-injected
Exhibit J	Statement per Paragraph XII
Exhibit K	Notice Requirements



AREA OF REVIEW

WALLEN TONTO WATERFLOOD PROPOSAL

EXHIBIT A

3

Code (Morrall)

18-1927

176

WALLEN PRODUCTION COMPANY

Proposed Wallen Tonto Waterflood
Wallen Tonto #7 WIW
Section 30, T19S, R33E
Lea County, New Mexico

Exhibit C

Data on Proposed Operation

1. Proposed average and maximum daily rate and volume of fluids to be injected:

Average daily rate of 200 BWIPD
Maximum daily rate of 400 BWIPD

2. System is closed.

3. Proposed Average Injection Pressure: 600 psig
Proposed Maximum Injection Pressure: 1000 psig

The proposed average and maximum injection pressures are to be determined from step rate tests to be run after the well is re-entered.

4. (A) Source of injection fluid:
Produced water from South Tonto Yates Seven Rivers Pool.
 - (B) Analysis of formation fluid:
Not applicable - re-injected produced water.
5. Zone of disposal is productive of oil and gas within one mile of proposed disposal well.

290^q
580^s
and the
well is
apparatus
mineral
wife

WALLEN PRODUCTION COMPANY

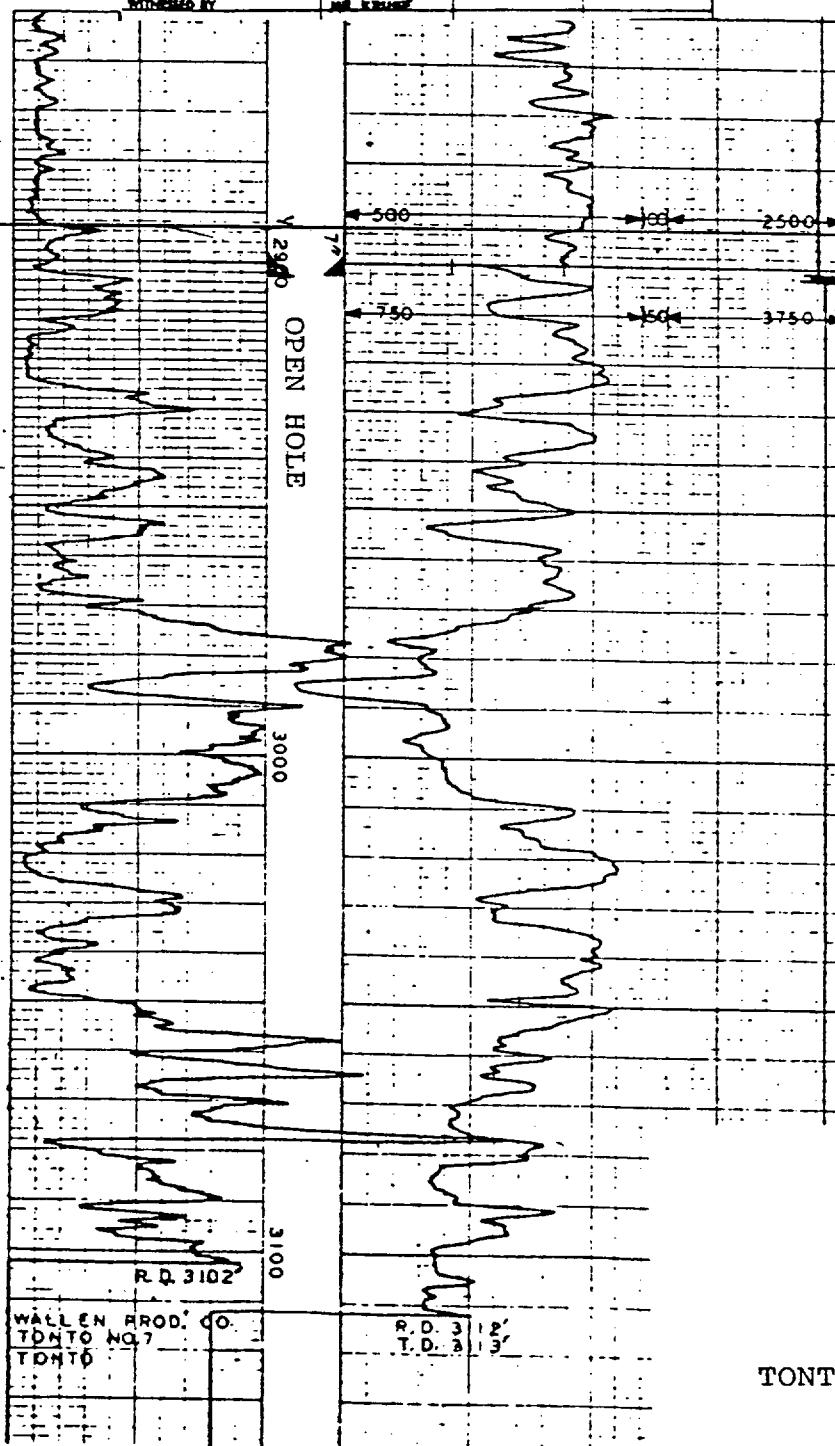
Proposed Wallen Tonto Waterflood
Wallen Tonto #7 WIW
Section 30, T19S, R33E
Lea County, New Mexico

Exhibit D

Geological Data on Injection Zone

Pool: South Tonto Yates Seven Rivers
Formation: Yates Seven Rivers
Geological Name: Yates
Thickness: @200 feet
Depth: @2900 feet
Injection Interval: 2900 to 3113 feet

PLATE NO.	COMPANY <u>WALLEN PRODUCTION COMPANY</u>		
WELL	TONTON NO. 7		
STATE	<u>TEXAS</u>		
COUNTY	<u>TRA</u>	STAN	<u>W. J. WALLEN</u>
LOCATION	<u>SEC 30 TWP 19S R33E</u>		OTHER LOGS
RECEIVER	REC 30	TWP 19S	R33E
LOG NUMBER	REC 30	REC 30	ELEVATIONS
PERMANENT DATUM	ABOVE海平面	FT	2480
LOG MEASURED FROM	2' ABOVE ABOVE海平面	FT	2482
DRILLING MEASURED FROM	2' above	FT	2482
DATE	7-16-78	7-16-78	
RUN NO.	1-8	1-8	
TYPE LOG	GRAMMA DAY	NEUTRON	
DEPTH DRILLED	3128	3128	
DEPTH LOGGED	3118	3118	
BOTTOM LOGGED INTERVAL	3108	3118	
TOP LOGGED INTERVAL	2450	2450	
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL	0		
DENSITY API/GR	1.02		
LEVEL	ABOVE LOG	JUL 27 1978	
MAX REC TEMP DEG F			
OPR REC TIME	1 HR		
RECORDED BY	MURRAY		MURRAY SURVEY
ATTACHED BY	MURRAY		MURRAY



TYPE LOG

WALLEN PRODUCTION

TONTON #7 SEC 30 T19S R33E

EXHIBIT E

6

WALLEN PRODUCTION COMPANY

Proposed Wallen Tonto Waterflood
Wallen Tonto #7 WIW
Section 30, T19S, R33E
Lea County, New Mexico

Exhibit F

Well Data on Injection Well

Stimulation Program: 2000 gallons 15% NE-FE Acid

Location: 1650' FSL & 990' FEL
Section 30, T19S, R33E
Lea County, New Mexico

Casing: 13 3/8" @225' cmtd w/300 sx
7" @2900' cmtd w/200 sx

Tubing: 2 3/8" @2850' - Plastic Coated

Packer: Halliburton R4 Injection Packer

Injection Formation: Yates in the South Tonto Yates-Seven
Rivers Pool.

Injection Interval: 2900' to 3113' Open Hole

Well was originally drilled as oil producer. Currently P&A.

Wallen Production Company
Wallen-Tonto Well No. 7
990' FEL & 1650' FSL
Sec. 30, T19S, R33E

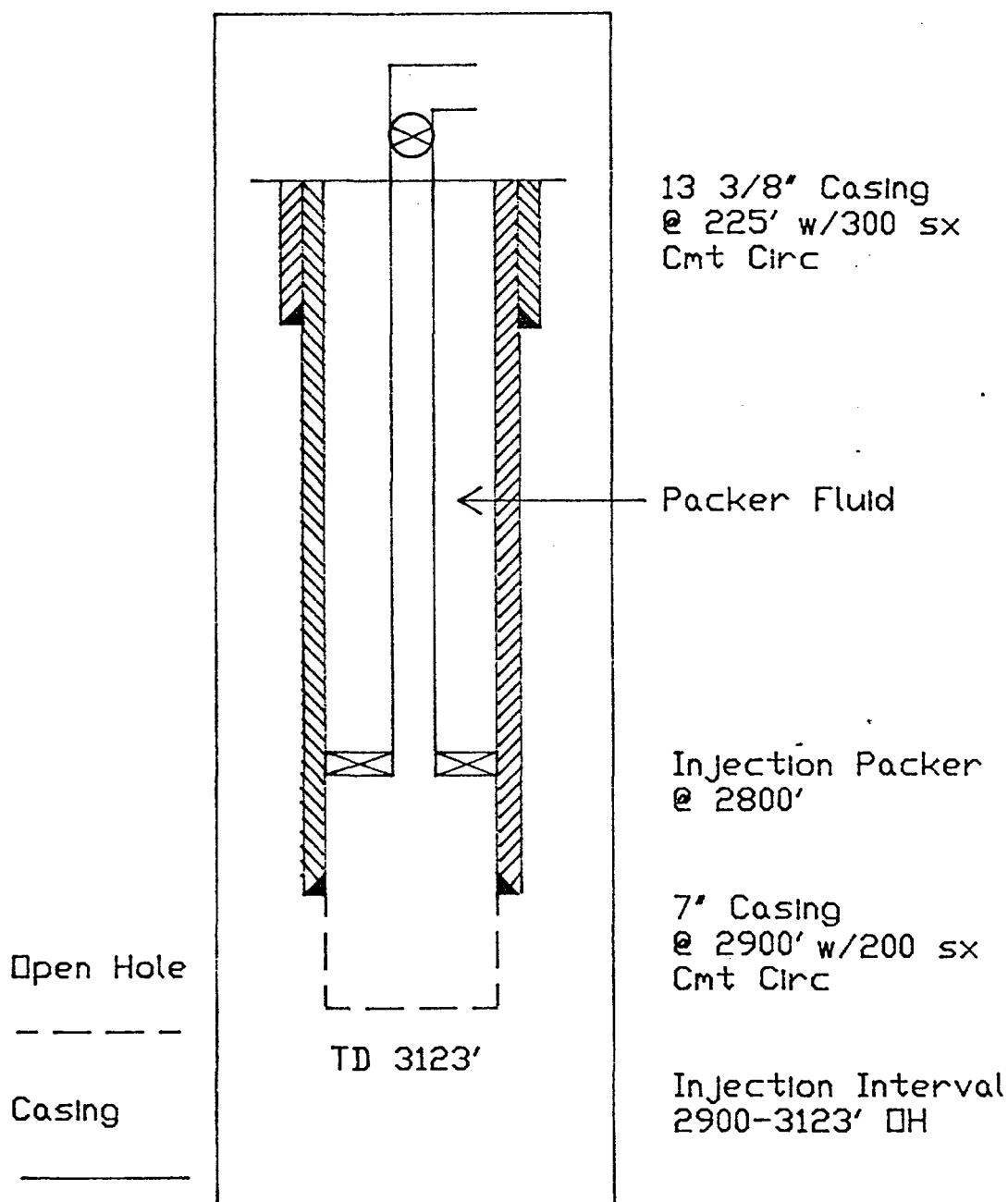


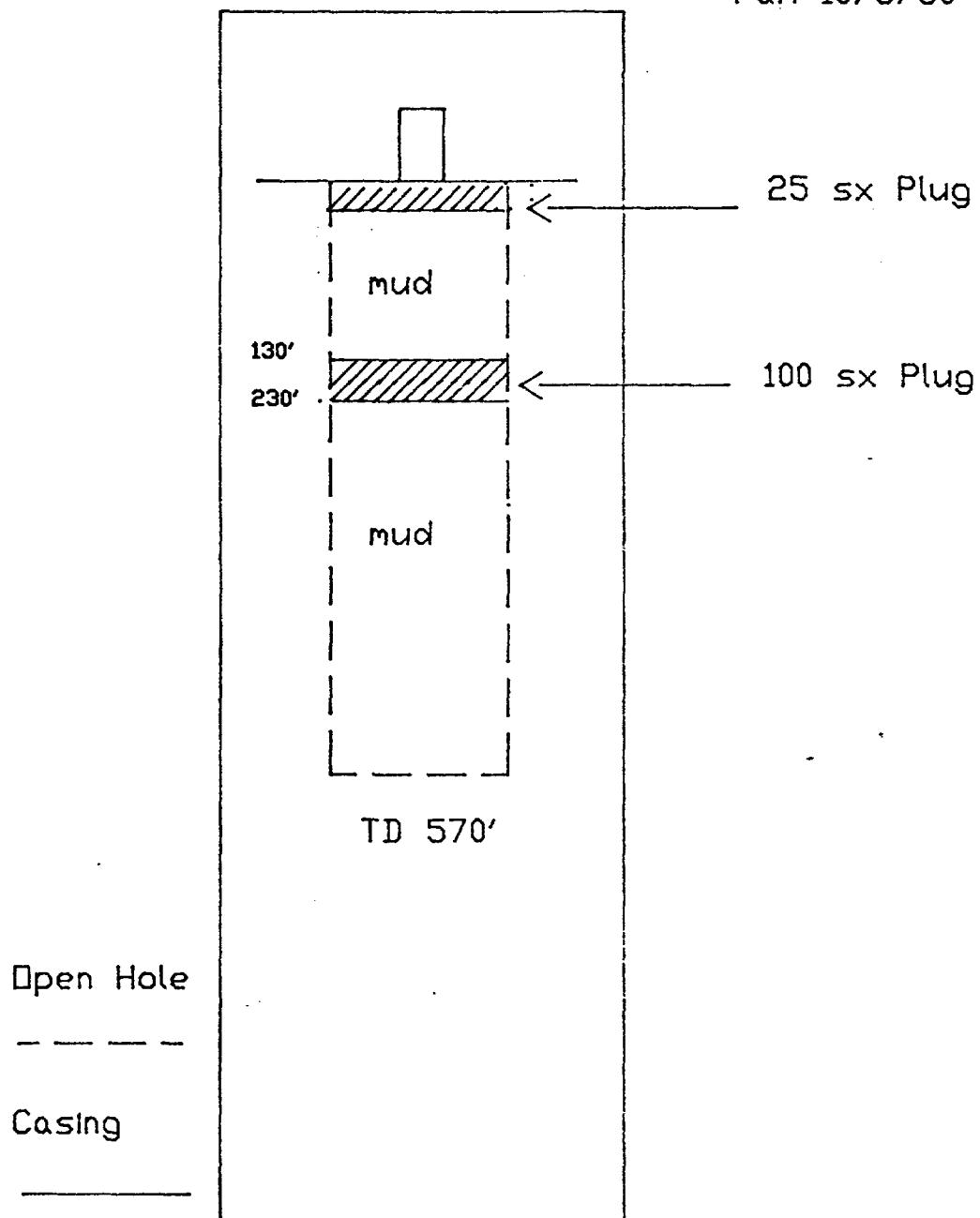
Exhibit B

Operator Well Name, Number	Location: Unit, Sec., Twp., Range	Type	Spudded	Date Completed	ID	Depth P.D.	Zone(s)	Record of Completion		TOC
								Perf's:	Completion Perf's and Casing	
Amoco USA Federal Well No. 1	Sec 30, T19S, R33E 1980 FSL & 760; FEL	Gas	6/19/81	9/21/81	13712	13670	MOTIRON	Perf's: 13244-561 Casing: 13 3/8" e 1276' / 775 SX 9 5/8" e 530' / 340 SX 5 1/2" e 13712 / 2150 SX	Surf-calc Surf-calc Surf-calc	OK
Amoco USA Federal Well No. 2	Sec 30, T19S, R33E 2310 FSL & 1980; FWL	Gas	12/18/81	3/4/83	13800	13753	MOTIRON	Perf's: 13372-440 Casing: 13 3/8" e 1315' / 1050 SX 9 5/8" e 530' / 301 SX 5 1/2" e 13800 / 2160 SX	Surf-calc Surf-calc Surf-calc	OK
Edward Hudson Opal Ross-Fed Well No. 6	Sec 30, T19S, R33E 660; FSL & 1980; FEL	D&A	2/10/64	-	3127	-	Vates Syn Rvrs	Perf's: Not reported Casing: 13 3/8" e 655' / 100 SX 5 1/2" e 3127 / 30 SX	Surf-calc Surf-calc	OK
Sinclair O&G Co. Carder Federal Well No. 2	Sec 30, T19S, R33E 1980; FSL & 660; FEL	P&A	2/14/56	-	5600	-	Delaware	Perf's: Open Hole Casing: 10 3/4" e 305' / 250 SX	Surf-calc	OK
John H. Tripp Federal Well No. 1X	Sec 31, T19S, R33E 330; FNL & 2310; FEL	J&A	9/18/64	-	700	-	Perf's: NA	Casing: 13 3/8" e 85' / 50 SX	Surf-calc	OK
John H. Tripp Federal Well No. 1X	Sec 30, T19S, R33E 1650; FSL & 990; FEL	D&A	10/3/64	-	3175	-	Svn Rvrs	Perf's: NA Casing: 10 3/4" e 497' - pulled	Surf-calc	OK
Wallen Prod. Co. Wallen-Tonto Well No. 7	Sec 30, T19S, R33E 1650; FSL & 2316; FEL	D&A	5/17/78	-	3123	-	Svn Rvrs	Perf's: NA Casing: 8 5/8" e 940' - pulled	Surf-calc	OK
Wallen Prod. Co. Wallen-Tonto Well No. 8	Sec 30, T19S, R33E 1790; FSL & 1710; FEL	OIL	10/16/81	2/20/82	3120	3115	Svn Rvrs	Perf's: NA Casing: 13 3/8" e 115' / 500 SX 4 1/2" e 2612-3120 / 60 SX	Circ Circ Circ	OK
Wallen Prod. Co. Wallen-Tonto Well No. 5	Sec 30, T19S, R33E 1650; FSL & 2316; FEL	OIL	6/30/77	8/25/77	3094	3094	Svn Rvrs	Perf's: Open Hole Casing: 13 3/8" e 227' / 300 SX 7" e 2804 / 1000 SX	Surf-calc	OK
Wallen Prod. Co. Wallen-Tonto Well No. 3	Sec 30, T19S, R33E 990; FSL & EL	OIL	8/31/77	10/21/77	3073	3073	Svn Rvrs	Perf's: Open Hole Casing: 13 3/8" e 220' / 300 SX 7" e 2810 / 1000 SX	Surf-calc	OK
Wallen Prod. Co. Wallen-Tonto Well No. 6	Sec 30, T19S, R33E 990; FSL & EL	OIL	2/8/78	4/28/78	3096	3085	Svn Rvrs	Perf's: 2986-3880 Casing: 13 3/8" e 210' / 300 SX 4 1/2" e 2901 / 120 SX 4 1/2" e 2600-3096 / 60 SX	Circ Circ Circ	OK
Wallen Prod. Co. Wallen-Tonto Well No. 1	Sec 30, T19S, R33E 600; FSL & 1300; FML	J&A	9/20/80	-	570	-	Svn Rvrs	Perf's: Open Hole Casing: 13 3/8" e 275' / 100 SX 7" e 2806 / 1000 SX	Circ Circ	OK
Wallen Prod. Co. Wallen-Tonto Well No. 9	Sec 30, T19S, R33E 660; FSL & 2300; FWL	OIL	10/17/80	3/18/81	3086	3086	Svn Rvrs	Perf's: 2981-3110 Casing: 10 3/8" e 225' / 450 SX 7" e 2800 / 1000 SX 4 1/2" e 2617-3083 / 60 SX	Circ Circ Circ	OK

OK

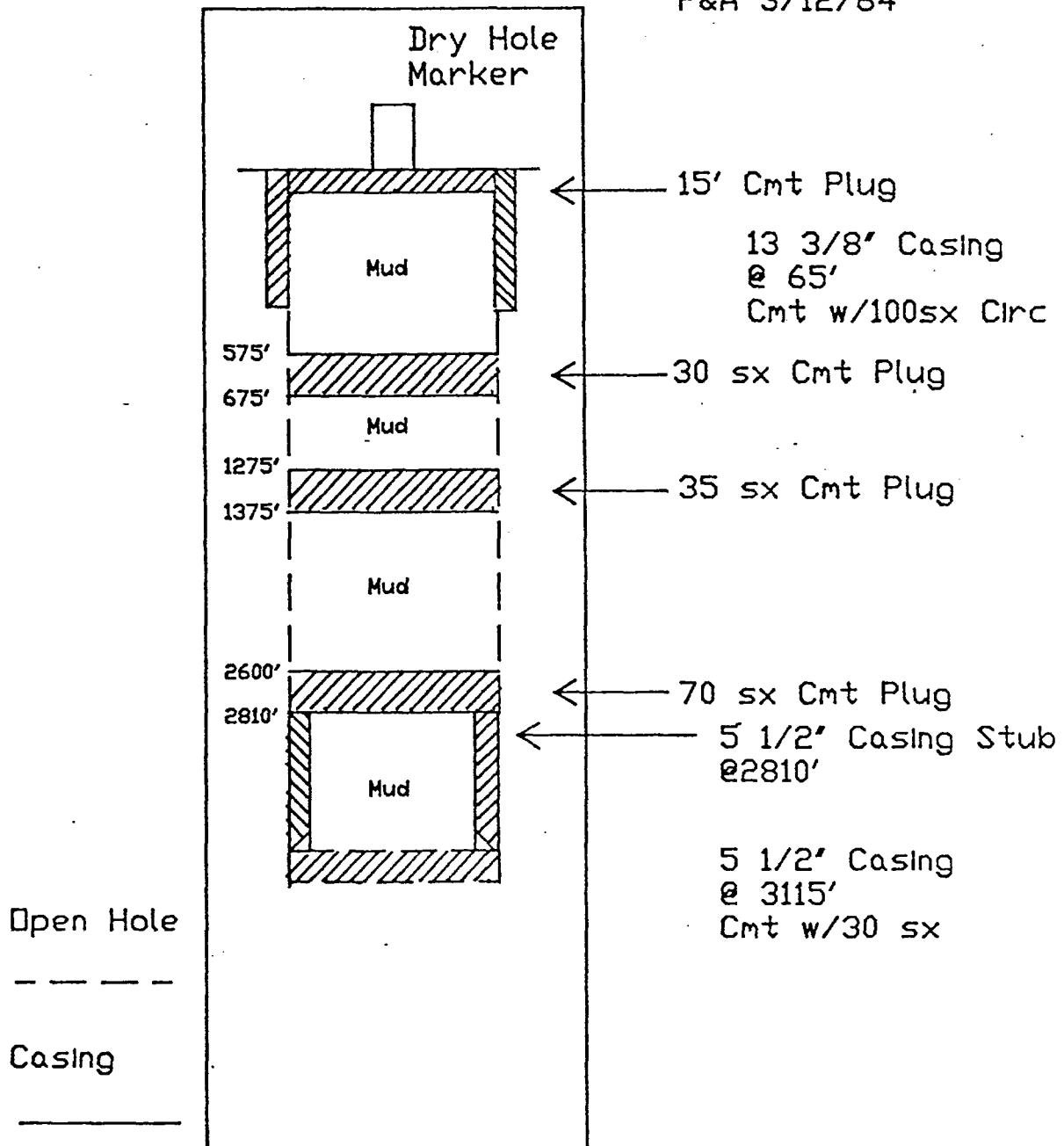
Wallen Production Company
Wallen-Tonto Well No. 9
2300' FWL & 600' FSL
Sec. 30, T19S, R33E

P&A 10/8/80



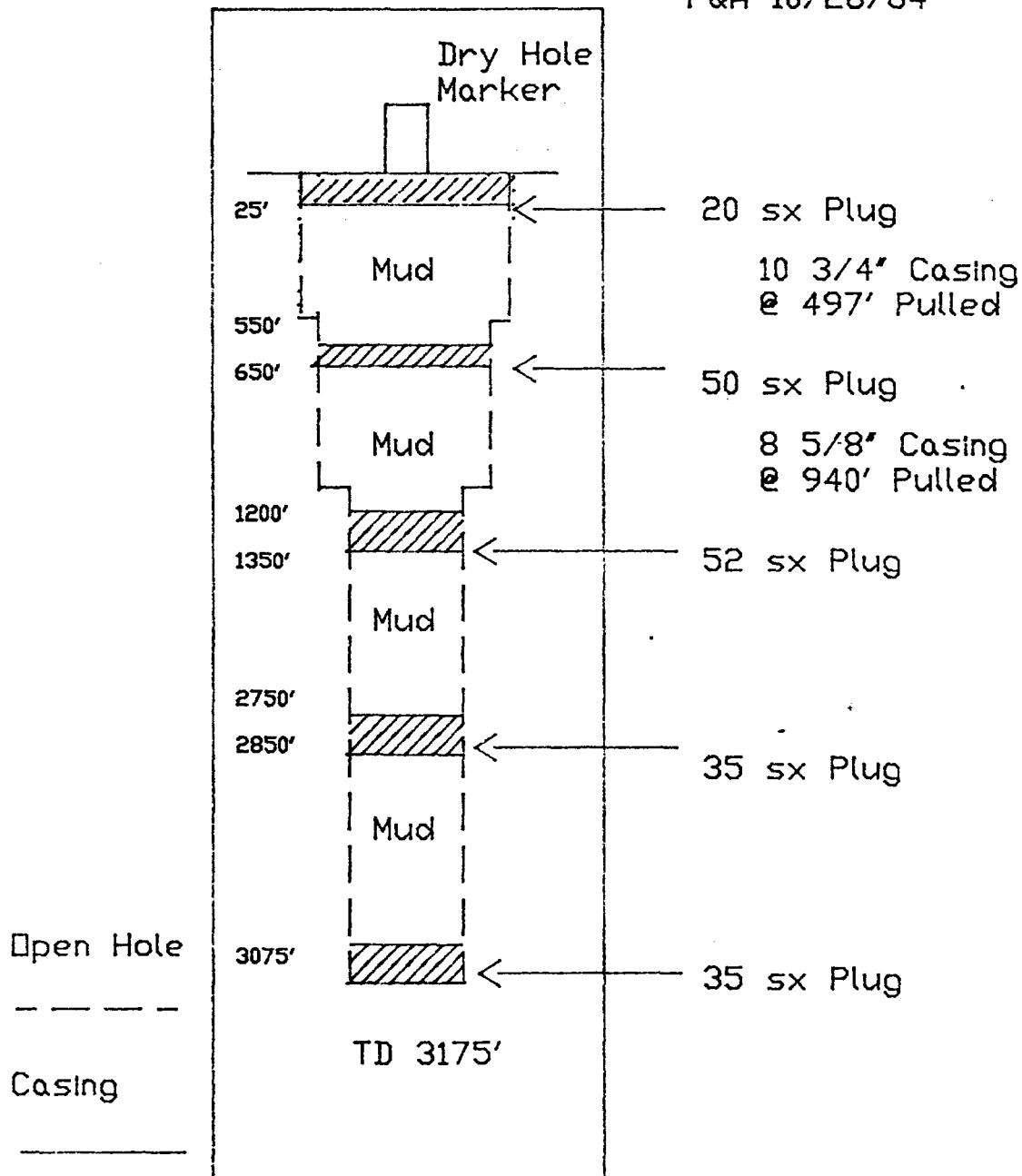
Edward Hudson
Signal Ross_Fed. Well No. 6
660' FSL & 1980' FEL
Sec. 30, T19S, R33E

P&A 3/12/64



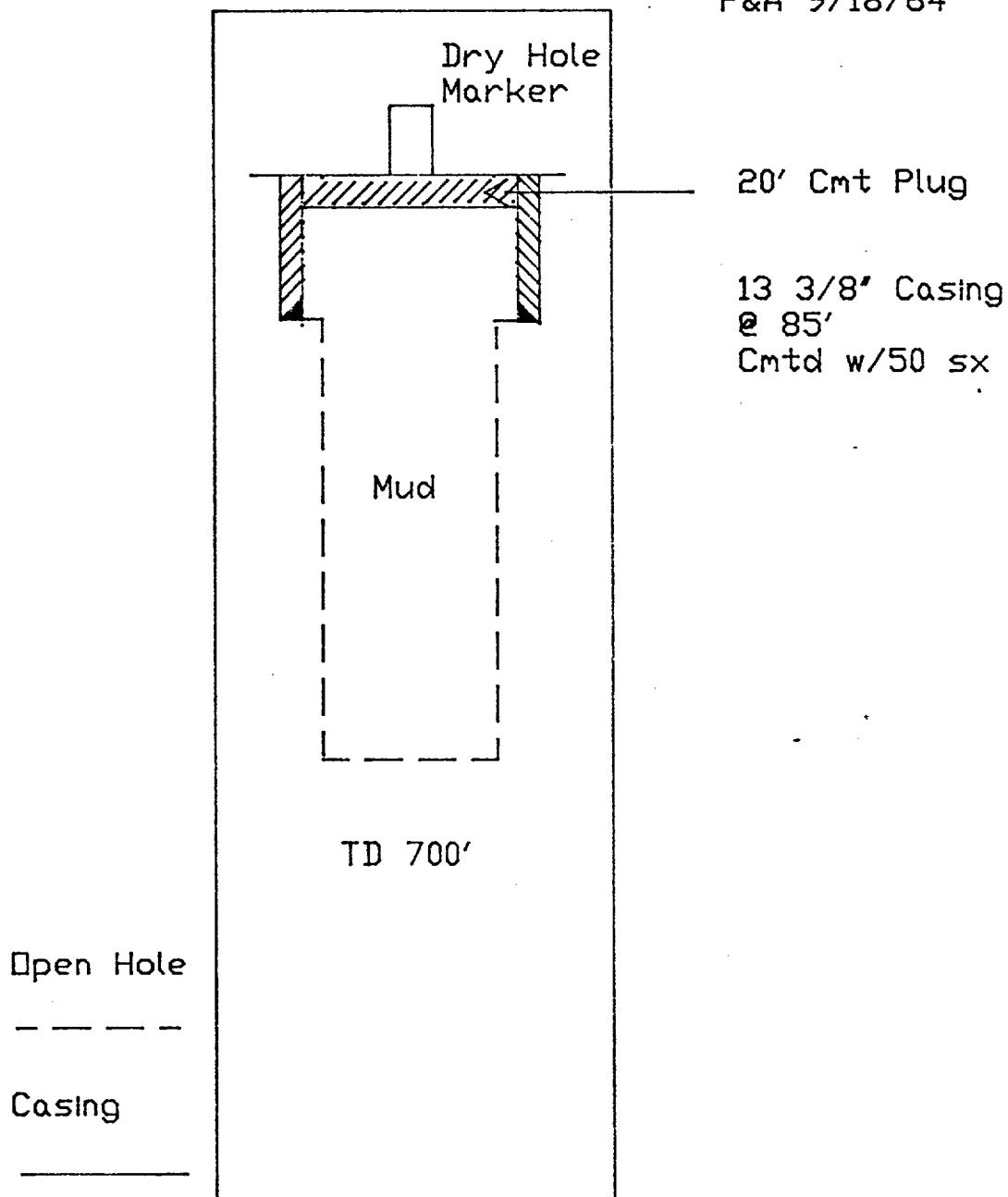
John H. Trigg
Federal "RB" 31 Well No. 1X
335' FNL & 2223' FEL
Sec. 31, T19S, R33E

P&A 10/28/64



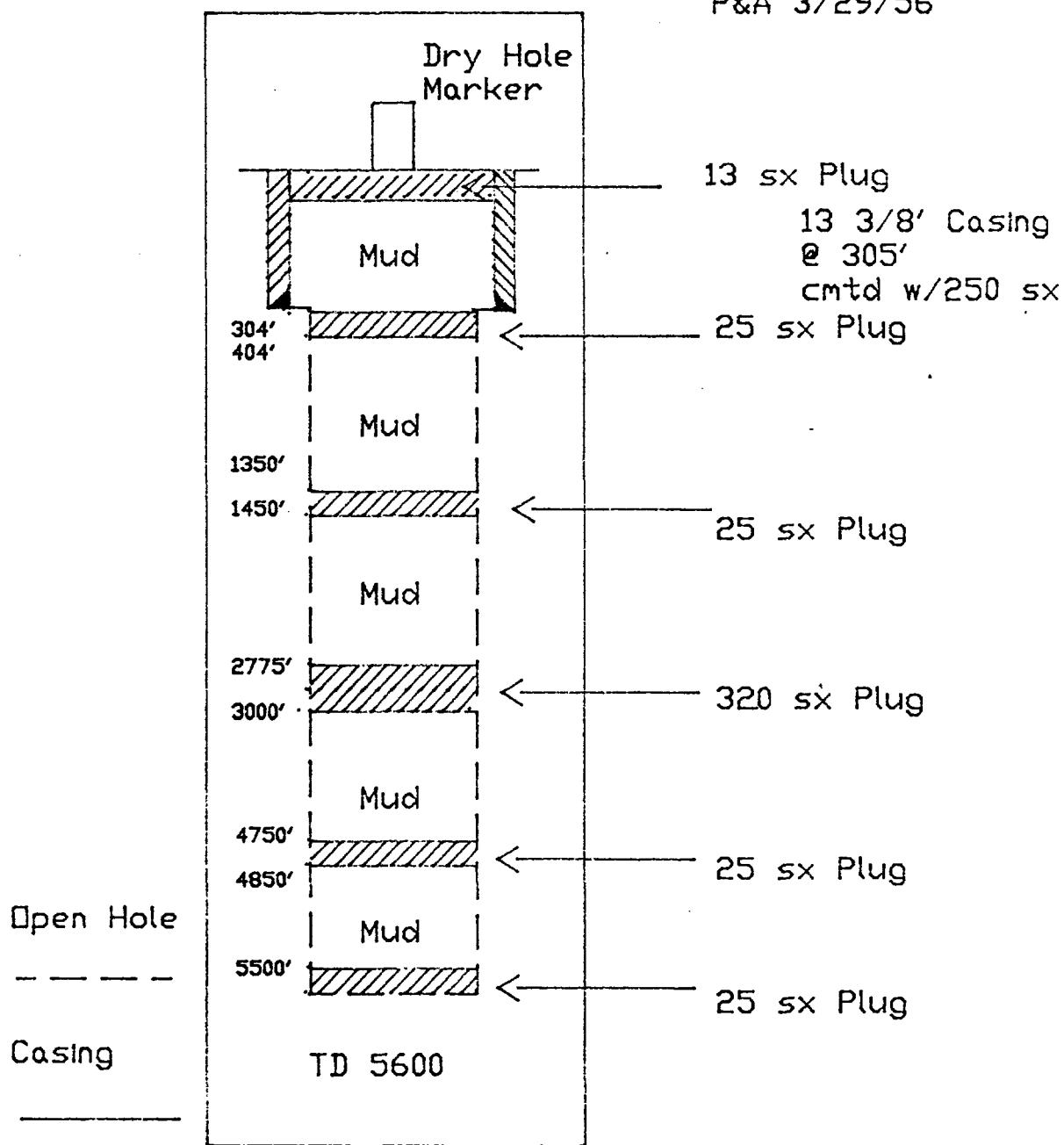
John H. Trigg
Federal 'RB' 31 Well No. 1
330' FNL & 2310' FEL
Sec. 31, T19S, R33E

P&A 9/18/64



Sinclair Oil & Gas Company
Carder-Federal Well No. 2
330' FNL & 2310' FEL
Sec. 31, T19S, R33E

P&A 3/29/56



WATER ANALYSIS REPORT
furnished by TRETOLITE CHEMICALS

COMPANY: WALLEN PRODUCTION
 LEASE: TONTO
 SAMPLE POINT: HEATER TREATER
 SAMPLE DATE: 5-27-87
 SAMPLE TEMP.:
 pH: 6.5
 H₂S: 500
 SPECIFIC GRAVITY: 1.025

TITRATED AND CALCULATED IONS

	MILLIGRAMS PER LITER	MILLIEQUIVALENTS PER LITER
HCO ₃	915.00	15.00
Cl	11210.00	315.77
SO ₄	1250.00	26.04
Ca	2800.00	140.00
Mg	0.00	0.00
Na	4986.78	216.82

IONIC STRENGTH = 0.44
 TOTAL HARDNESS = 6000.0 mg/ltr.
 TOTAL DISSOLVED SOLIDS = 21155.5 mg/ltr.
 TOTAL IRON (Fe) = 3.0 ppm

PROBABLE MINERAL COMPOSITION AND ION PAIRING

	MILLIEQUIVALENTS PER LITER	MILLIGRAMS PER LITER
Ca(HCO ₃) ₂	15.00	1215.60
CaSO ₄	26.04	1772.66
CaCl ₂	98.96	5492.19
Mg(HCO ₃) ₂	0.00	0.00
MgSO ₄	0.00	0.00
MgCl ₂	0.00	0.00
NaHCO ₃	0.00	0.00
Na ₂ SO ₄	0.00	0.00
NaCl	216.82	12675.08

CALCULATED SCALING TENDENCIES

SCALING INDEX
 CaCO₃ @ 80 DEG F. = 0.5
 CaCO₃ @ 120 DEG F. = 1.0

SATURATION POINT
 CaSO₄ @ 70 DEG F. = 1996.5 MG/LTR.
 CaSO₄ @ 110 DEG F. = 2020.2 MG/LTR.

(THIS SAMPLE CONTAINED 1772.7 MG/LTR. CaSO₄)

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WALLEN PRODUCTION COMPANY

Proposed Wallen Tonto Waterflood
Wallen Tonto #7 WIW
Section 30, T19S, R33E
Lea County, New Mexico

Exhibit J

Affirmative Statement

Wallen Production Company has examined available geologic and engineering data and finds no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

WALLEN PRODUCTION COMPANY

Proposed Wallen Tonto Waterflood
Wallen Tonto #7 WIW
Section 30, T19S, R33E
Lea County, New Mexico

Exhibit K

Notice

Pursuant to Section XIV of Form C-108,

Applicant has mailed copies of the application to the following:

Surface Owners: Bureau of Land Management
Roswell District Office
P.O. Box 1397
Roswell, New Mexico 88201-1397

Attention: District Manager

Oil Conservation Division
State Land Office
P.O. Box 1148
Santa Fe, New Mexico 87501

Attention: Land Commissioner

Leasehold Operators within one-half mile:

Kaiser-Francis
Rt. Box 208
Odessa, Texas 78765

FI-RO Corporation
P.O. Box 8148
Roswell, New Mexico 88201

Union Oil Company of California
4000 N. Big Spring
Suite 300
Midland, Texas 79702

Wallen Production Company
Wallen Tonto Waterflood
Lea County, New Mexico

DATA SHEET

Reserves

Cumulative Production @ 7/1/89	204100 BO
Projected Cumulative Production @ 1/1/90	209900 BO
Remaining Primary Reserves @ 1/1/90	21300 BO
Estimated Primary Recovery	231200 BO
Projected Secondary Reserves @ 1/1/90	63700 BO
Estimated Ultimate Recovery	294900 BO

Economics

Case 1 Primary Production
Case 2 Primary Production w/ Secondary Response
Case 3 Incremental Secondary Production

	Case 1	Case 2	Case 3
Oil Price, \$/BO	16	16	16
Economic Limit, BOPD	24	26	---
Capital Investment	0	60000	60000
Cumulative Net Cash Flow	20900	139800	118900
Net Income/Investment	---	---	3
Payout, Yrs	---	---	2.25

(8)

Wallen Production Company
 Wallen Tonto Waterflood
 Lea County, New Mexico

PRIMARY PRODUCTION

Evaluated Interest

W.I.	100.00%	Operating Expense \$/mo	7500
N.R.I.	69.00%		

Year	Gross Production	Net Production	Oil \$/BO	Net Revenue	Sev&Adv Taxes	Net Expenses	Oper Cost	Capital	Cash Flow	Cum Cash Flow
1990	10275	7090	16	113440	8307	90000	0	0	15133	15133
1991	9351	6452	16	103230	7559	90000	0	0	5671	20804
1992	1474	1017	16	16278	1192	15000	0	0	86	20891

Wallen Production Company
 Wallen Tonto Waterflood
 Lea County, New Mexico

PRIMARY PRODUCTION
 W/PROJECTED WATERFLOOD RESPONSE

Evaluated Interest

W.I.	100.00%	Operating Expense \$/mo	8100
N.R.I.	69.00%		

Year	Gross Production	Net Production	Oil \$/BO	Net Revenue	Sev&Adv Taxes	Net Expenses	Oper Cost	Capital	Cash Flow	Cum Cash Flow
1990	11021	7604	16	121669	8909	100800	60000	-48040	-48040	
1991	15092	10414	16	166619	12201	99000	0	55418	7378	
1992	14610	10081	16	161291	11811	97200	0	52280	59659	
1993	13222	9123	16	145968	10689	97200	0	38080	97738	
1994	11966	8256	16	132101	9673	97200	0	25228	122967	
1995	10829	7472	16	119552	8754	97200	0	13597	136564	
1996	8234	5681	16	90903	6656	81000	0	3247	139811	

Wallen Production Company
 Wallen Tonto Waterflood
 Lea County, New Mexico

INCREMENTAL SECONDARY PRODUCTION

Evaluated Interest

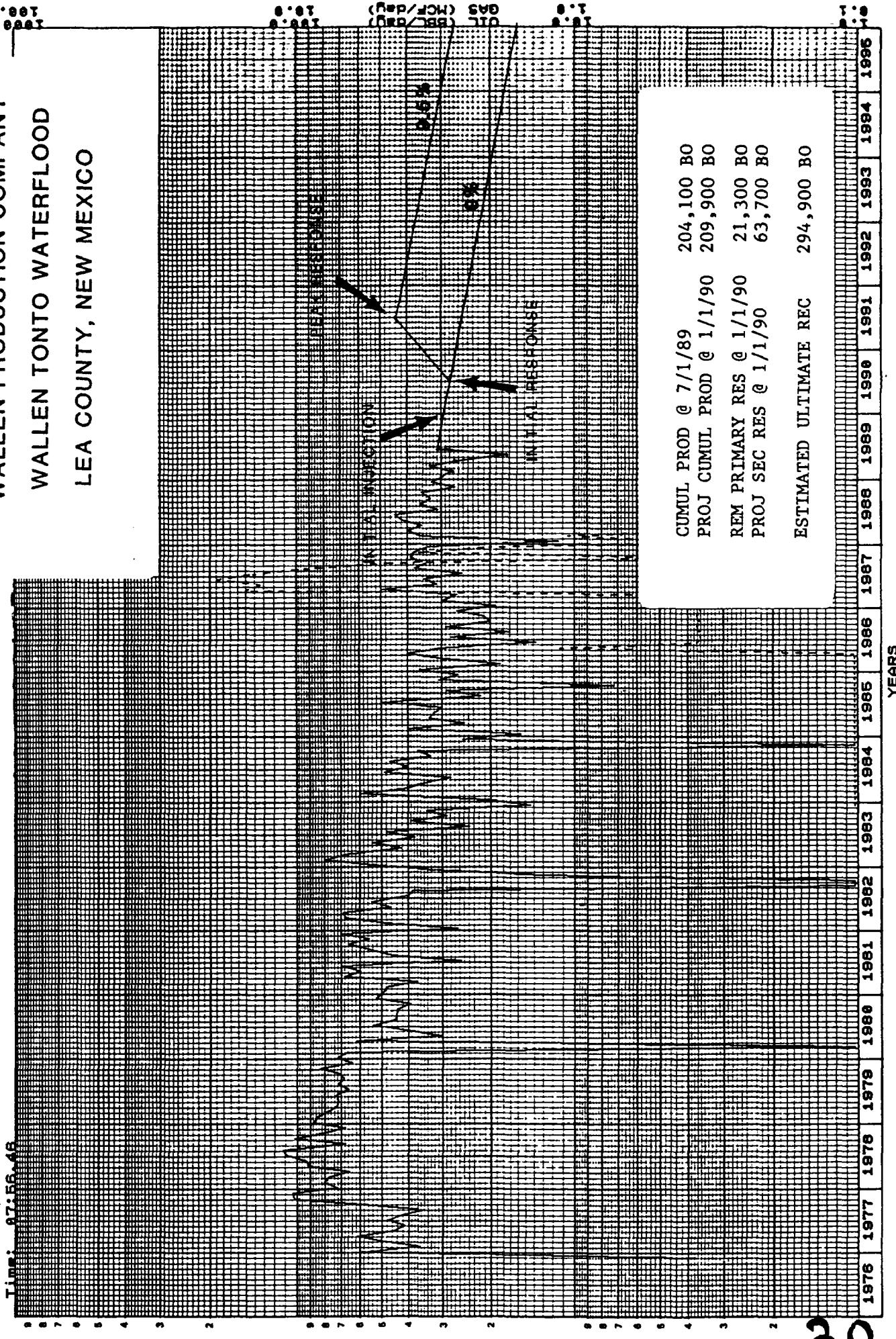
W.I.	100.00%	
N.R.I.	69.00%	

Year	Gross Production	Net Production	Oil \$/BO	Net Revenue	Sev&Adv Taxes	Net Expenses	Oper Cost	Capital	Cash Flow	Cum Cash Flow
1990	745	514	16	8229	603	10800	60000	-63173	-63173	
1991	5742	3962	16	63389	4642	9000	0	49747	-13426	
1992	13135	9063	16	145013	10619	82200	0	52194	38768	
1993	13222	9123	16	145968	10689	97200	0	38080	76848	
1994	11966	8256	16	132101	9673	97200	0	25228	102076	
1995	10829	7472	16	119552	8754	97200	0	13597	115673	
1996	8234	5681	16	90903	6656	81000	0	3247	118920	

63873 44072 705155 51635 474600 60000

(9)

WALLEN PRODUCTION COMPANY
 WALLEN TONTO WATERFLOOD
 LEA COUNTY, NEW MEXICO



PROPOSAL FOR
SURFACE SALT WATER DISPOSAL

Prepared For
WALLEN PRODUCTION COMPANY
Lea County, New Mexico

3/83

PROPOSAL FOR
SURFACE SALT WATER DISPOSAL
LEA COUNTY, NEW MEXICO

INTRODUCTION

This firm has conducted a geohydrologic investigation for Wallen Production Company near its production in the south half of Section 30, T. 19 S., R. 33 E., in west-central Lea County, New Mexico (Figure 1). Wallen Petroleum proposes to operate a surface salt water disposal system for its leases in Section 30.

This investigation shows that no shallow fresh water is present in the area of the proposed surface salt water disposal site. The deeper Santa Rosa aquifer is isolated from the surface by over 500 feet of impervious red clays. In our opinion, fresh ground water will not be endangered by this disposal operation.

Data presented in this report are from the New Mexico State Engineer's Office, from previous studies by Ed L. Reed & Associates, Inc. and recent field work for the current investigation.

GENERAL GEOLOGY

The area of interest lies in the southern portion of the Querecho Plains, a topographic province in west-central Lea County, New Mexico (Figure 2).

We focused this investigation on geologic formations younger than the Permian because they are the only potential sources of potable ground water in this region. The Permian strata which are comprised largely of anhydrite and salt do not contain fresh water.

The Triassic Dockum Group which lies on undifferentiated Permian and Triassic strata is divided into the Santa Rosa Sandstone and the Chinle Formation. The Santa Rosa Sandstone consists of red to gray, fine to coarse-grained sand which is about 250 feet thick. The Chinle Formation which conformably overlies the Santa Rosa is composed of approximately 500 feet of red to gray shales. The top of the Chinle is marked by an erosional surface.

Quaternary alluvium comprises the surface cover in the Querecho Plains (figure 3). The alluvium ranges in thickness from a few feet to approximately 100 feet. The alluvium consists of dune sand, loosely cemented fine gravel and caliche composed of sand in a calcareous matrix.

LOCAL GEOLOGY

The area covered by this study encompasses most of Townships T. 19 S., R. 32 E.; T. 19 S., R. 33 E.; T. 20 S., R. 32 E.; and T. 20 S., R. 33 E. (Figure 4). The Quaternary alluvium in the study area varies in thickness from 0 to 100 feet. The underlying Chinle Formation is approximately 500 feet thick, and consists of red and gray shales.

The top of the Chinle is an erosional surface which also reflects deeper

structural movement and solution slumping. The Santa Rosa is about 250 feet thick and consists of fine to coarse sands.

The Triassic Chinle outcrops along the north side of Laguna Plata and in the Laguna Gatuna area. The Triassic south of the playa lakes gradually rises southward and southeastward. The Santa Rosa outcrops in the southern part of Section 30 and Section 32 of T. 20 S., R. 32 E. The Triassic also outcrops in several Townships in western Lea County and along the eastern side of Eddy County.

Along the north portion of the study area the Triassic strikes east-west and the dip is southward at a rate of approximately 50 feet per mile (figure 4). In the area of the saline playa lakes (Lagunas Plata, Tonto, Gatuna and Toston), the contours show closures from 25 to 50 feet. These closures suggest that the lakes are caused by salt dissolutioning in the Permian with subsequent slumping reflected in the overlying Triassic. San Simon Swale, approximately 15 miles southeast of the playa lakes is also a closed depression caused by the removal of salt by solution in the Permian-Salado strata.

HYDROLOGY

Potable ground water in the four township area is derived solely from the Quaternary alluvium and Triassic Santa Rosa Formation. Water wells in the vicinity of the Wallen Production Company operation are listed on Table 1 and shown on Figure 4. The Quaternary alluvium which is up to 100 feet thick contains water that is normally potable

except in the vicinity of the playa lakes (Tables 1 and 2). The saturated thickness varies from 0 to 30 feet. The alluvial water where potable is used for stock and domestic purposes. Recharge to this aquifer is derived principally from rainfall which averages 9 inches per year. The ground water movement in the alluvium is toward the playa lakes. Ground water within and near the playas is highly saline (Figure 5). We found no evidence of producible alluvial ground water (fresh or saline) in the area of the Wallen Production Company's oil operation in the south half of Section 30, T. 19 S., R. 33 E. Logs of nine cable tool holes on Sections 19 and 30 were checked for alluvial ground water and none indicated saturation above the Triassic.

The Triassic Chinle Formation generally is not a source of ground water because it consists predominantly of clays. The principal aquifer in the Triassic is the Santa Rosa Sandstone. The water quality in this aquifer is poor, usually having a high concentration of sulfates. The Santa Rosa water is used for industrial purposes such as drilling and gasoline plants and is used on a limited basis for stock.

The Santa Rosa aquifer lies at a depth of 300 to 600 feet and is over 200 feet thick. Porosity development in the sandstone is highly variable which results in a net productive sand thickness ranging from 30 to 100 feet. Reported yields from the Santa Rosa range up to 100 gallons per minute. This aquifer is under artesian pressure with a head of approximately 200 feet. Recharge to the Santa Rosa is from

drainage from the Ogallala aquifer to the north and from infiltration from the surface through sand dunes in eastern Eddy County. Ground water movement is toward the southeast along the structural dip.

Because of the poor quality local ground water, ranchers have access to fresh water transmission pipelines which deliver Ogallala water from the east to the potash mines.

One Santa Rosa sandstone well and one Santa Rosa-Chinle well are completed in the SW/4, NW/4 of Section 18, T. 19 S., R. 33 E. These wells, which have water levels 260 feet and 347 feet from the surface, are currently used for drilling rig supply. A sample from the northernmost of the two wells contains 312 milligrams per liter (mg/l) chlorides, 844 mg/l sulfates and total dissolved solids of 2,070 mg/l. An abandoned Santa Rosa well in the SE/4, SW/4 of Section 5, T. 20 S., R. 33 E. has a static water level of 281 feet from the surface. A water sample from this well contained 1,723 mg/l chlorides, 1,094 mg/l sulfates, and total dissolved solids of 4,744 mg/l. An old Santa Rosa well located in the NE/4, NW/4 of Section 18, on the northwest edge of the Laguna Gatuna Lake was examined in 1972. The static water level was 252 feet from the surface. A 1968 chemical analysis of water from this well shows 21,013 ppm chlorides and 3,895 ppm sulfates.

The water level data show that the Santa Rosa ground water movement is toward the southeast. In the vicinity of the saline playas, the Santa Rosa discharges into the Rustler through the collapse structures beneath the playas.

The ground water movement in the alluvium is toward the playas. The alluvial water discharges into the playas as seeps and springs on the playa shores.

CORE BORING

One core boring was completed during this study in the south-central part of the Wallen lease approximately 200 feet south of the current brine pit. This core boring was drilled to examine the alluvial saturation and the physical characteristics of the upper Triassic. A review of seismic test hole and cable tool data shows that the alluvium in this area is less than 50 feet thick. This conclusion is confirmed by the core boring. The boring was jetted after completion to test for the presence of ground water and no evidence of ground water was detected. Several days after completion, water had seeped into the boring. A sample of this water had 6,666 mg/l chlorides, which by calculation would indicate total dissolved solids over 10,000 mg/l.

Cores taken from the upper Chinle were analyzed for permeability and Atterburg Limits (Table 3). These tests show that the upper Chinle is very fine grained (over 70 percent finer than a 200 mesh sieve). The clays are virtually impervious to fluid migration. The permeability of the upper Chinle averages 9.7×10^{-9} cm/sec.

SUMMARY AND CONCLUSIONS

Two formations supply water to wells in the region; shallow

alluvium and the Triassic Santa Rosa. The alluvium in the vicinity of the Wallen lease is thin and contains no potable ground water. Ground water movement in the alluvium is toward the saline playas to the south where it discharges as seeps and springs in the playa margins. The Santa Rosa contains water which is slightly to moderately saline. The Santa Rosa is protected from vertical infiltration by a thick section of impervious Chinle clays.

Disposal of salt water at the surface will, in our opinion, not endanger fresh ground water supplies. The disposed salt water will enter the alluvium and migrate to the top of the Chinle and then southward along the top of the Chinle, to discharge into the saline playa lakes. The Chinle clays will prohibit migration of the brine into the underlying Santa Rosa aquifer.

Respectfully submitted,

ED L. REED & ASSOCIATES, INC.

Chester F. Skrabacz

Chester F. Skrabacz

V. Steve Reed et al.

V. Steve Reed

TABLE 2

QUATERNARY WELLS WITH NON POTABLE WATER

LOCATION	OWNER	ELEV.	CHEMICAL ANALYSES (In Milligrams/Liter or Parts/Million)			USE	TOTAL WATER LEVEL	WATER DEPTH	TOTAL OF WELL	DISSOLVED CHLORIDES	CONDUCTI- VITY	DATE OF SAMPLED SOLIDS	ANALYSIS BY
			SULFATES	SOLID	ANALYSIS								
NW NW Sec 4 T20S R33E	SE/4 Scarbauer Cattle Co.	3556'	33' <u>1968</u>	58'	Abd. Stock	2,382 12,978	- -	-	10,175 -	11/17/65 10/24/68	United Chem.	State	State
NW NW Sec 21 T20S R33E	-	3536'	35' <u>1981</u>	52'	Abd. Stock	3,518	905	-	-	10/24/68	United Chem.	State	State
SE NW/4 Sec 12 T20S R32E	-	3540'	-	130'	Abd. Stock	9,744	1,878	-	1968	United Chem.	State	State	State
NE SW/4 Sec 1 T20S R32E	Salt Lake Rch.	21.7 30' <u>1954</u>	Abd. Stock	Reported Salty - 1954 and Dry in 1972									

TABLE I
QUATERNARY WELLS WITH POTABLE WATER

LOCATION	OWNER	ELEV.	LEVEL	WATER DEPTH	TOTAL WELL	USE OF WELL	CHEMICAL ANALYSIS (In Milligrams/Liter or Parts/Million)			SAMPLED BY
							TOTAL CHLORIDES	TOTAL SULFATES	DISSOLVED SOLIDS	ELECTRICAL CONDUCTIVITY
NW/NW Sec. 17 T19S R33E	Snyder Ranch	116' 3650'	Abd. Stock	116' 131'	In 1969 (reported good quality water)					
SE NE/4 Sec. 26 T19S R33E	Smith	90.9 <u>1/78</u>	Active Domestic Stock	100' 326	298 996	2134	2560	11/17/65 1/16/78	State Reed	
SE SE/4 Sec. 23 T20S R32E	Old Halfway Bar	36.7' <u>1981</u>	Abd. Dom. Stock	78' 3551'	362	309	1861	1969	Reed	
NW NW Sec. 25 T20S R32E	Smith?	39 <u>1982</u>	85 42	65' Stock	82	--	837 750	1969 9/72	Reed State	
NE/4 Sec. 36 T20S R32E	Bingham Ranch	44' 50'	Domestic	290' 1972	290	--	--	1930	No Data	
SW/4, Sec. 23 T20S R32E		39.8 <u>1981</u>	Stock	No Data						
SE NW/4 Sec. 27 T20S R32E		23.9 <u>1972</u>	Industrial	No Data (Field check - Fresh water)						
SE NW/4 Sec. 30 T20S R32E		9.94 <u>1981</u>	Stock	No Data						

30

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION
OF WALLEN PRODUCTION COMPANY FOR
WATERFLOOD PROJECT,
LEA COUNTY, NEW MEXICO

CASE NO. 9736

CERTIFICATE OF MAILING

AND

COMPLIANCE WITH ORDER R-8054

In accordance with Division Rule 1207 (Order R-8054) I hereby certify that on July 26, 1989, I caused to be mailed by certified mail, return-receipt requested, notice of this hearing and a copy of the application for the above referenced case along with the cover letter, at least twenty days prior to the hearing set for August 23, 1989 to the parties shown in the application as evidenced by the attached copy of the return receipt cards.

Original signed by
W. THOMAS KELLAHIN

W. Thomas Kellahin

SUBSCRIBED AND SWORN TO before me this 21st day of August, 1989.

Ronwyn Stoner
Notary Public

My Commission Expires:

March 3, 1993

BEFORE EXAMINER STOGNER

Oil Conservation Division

Wallen Exhibit No. 4

Case No. 9736

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check boxes for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
FI-RO Corporation
P.O. Box 8148
Roswell, NM 88201

4. Article Number
P 103 899 138

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X 

6. Signature — Agent
X

7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT



SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check boxes for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
Bureau of Land Mgmt
Roswell Dist Office
Attn: Dist Mgr
P.O. Box 1397
Roswell, NM 88201-1397

4. Article Number
P 103 899 135

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Addressee's Address (ONLY if requested and fee paid)
X

6. Addressee's Address (ONLY if requested and fee paid)
X

7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-866 DOMESTIC RETURN RECEIPT

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check boxes for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
Union Oil Co of Calif.
4000 N. Big Spring
Suite 300
Midland, TX 79702

4. Article Number
P 103 899 139

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Addressee's Address (ONLY if requested and fee paid)
X

6. Addressee's Address (ONLY if requested and fee paid)
X

7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-866 DOMESTIC RETURN RECEIPT

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check boxes for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
Oil Conservation Division
State Land Office
Attn: Land Commissioner
P.O. Box 1148
Santa Fe, NM 87501

4. Article Number
P 103 899 136

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Addressee's Address (ONLY if requested and fee paid)
X

6. Addressee's Address (ONLY if requested and fee paid)
X

7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check boxes for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery (Extra charge)

3. Article Addressed to:
WTK/Wallen/Tonto # 7

4. Article Number
P 103 899 139

Type of Service:
 Registered Insured
 Certified COD
 Express Mail Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Addressee's Address (ONLY if requested and fee paid)
X

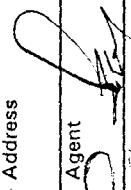
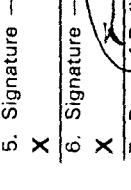
6. Addressee's Address (ONLY if requested and fee paid)
X

7. Date of Delivery

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

W.I.N./W.C.L.E.U./L.O.U.U. SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for rates and check box(es) for additional service(s) requested.	
1. Show to whom delivered, date, and addressee's address. 2. <input type="checkbox"/> Restricted Delivery (Extra charge) 3. Article Addressed to: Mr. Jerry Sexton Oil Conservation Division Post Office Box 1980 Hobbs, NM 88240	
4. Article Number P 103 899 134	
5. Signature — Address  X	
6. Signature — Agent  X	
7. Date of Delivery MAR 29 1988	
DOMESTIC RETURN RECEIPT PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865	
8. Addressee's Address (ONLY if requested and fee paid) WINDOW SERVICE US POSTAL SERVICE 333 W. 4th 1st FL Tulsa, OK 74103-3612	
DOMESTIC RETURN RECEIPT P 103 899 141	
4. Article Number P 103 899 141	
5. Signature — Address  X	
6. Signature — Agent  X	
7. Date of Delivery MAR 29 1988	
DOMESTIC RETURN RECEIPT PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865	
8. Addressee's Address (ONLY if requested and fee paid) WINDOW SERVICE US POSTAL SERVICE 333 W. 4th 1st FL Tulsa, OK 74103-3612	

W.I.N./W.C.L.E.U./L.O.U.U. SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for rates and check box(es) for additional service(s) requested.	
1. Show to whom delivered, date, and addressee's address. 2. <input type="checkbox"/> Restricted Delivery (Extra charge) 3. Article Addressed to: Mr. Jerry Sexton OCD P.O. BOX 1980 Hobbs, NM 88240	
4. Article Number P 103 899 134	
5. Signature — Address  X	
6. Signature — Agent  X	
7. Date of Delivery MAR 29 1988	
DOMESTIC RETURN RECEIPT PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865	
8. Addressee's Address (ONLY if requested and fee paid) WINDOW SERVICE US POSTAL SERVICE 333 W. 4th 1st FL Tulsa, OK 74103-3612	

W.I.N./W.C.L.E.U./L.O.U.U. SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for rates and check box(es) for additional service(s) requested.	
1. Show to whom delivered, date, and addressee's address. 2. <input type="checkbox"/> Restricted Delivery (Extra charge) 3. Article Addressed to: Kaiser-Francis Oil Co. P.O. Box 21468 Tulsa, OK 79121 Attn: Jim Wakefield	
4. Article Number P-103 899 140	
5. Signature — Address  X	
6. Signature — Agent  X	
7. Date of Delivery MAR 29 1988	
DOMESTIC RETURN RECEIPT PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865	
8. Addressee's Address (ONLY if requested and fee paid) WINDOW SERVICE US POSTAL SERVICE 333 W. 4th 1st FL Tulsa, OK 74103-3612	