WFX 2-12-96

680

CALL VERBAL READY

MEWBOURNE OIL COMPANY

P.O. BOX 7698
TYLER, TEXAS 75711
903 - 561-2900
FAX 903 - 561-1870

January 24, 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
NO. Z 079 526 649

State of New Mexico
Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

Attention: Mr. David Catanach

Re: Application for Authority to Inject
Querecho Plains Queen Associated
Sand Unit Well No. 2
Lea County, New Mexico

Mr. Catanach:

Attached is Mewbourne Oil Company's application requesting approval to inject water into the referenced well. Administrative approval is requested in accordance with the Division Order for the referenced Unit. All necessary notices are mailed as of today with a "Service List" attached for your convenience.

If you have any questions regarding this application, please contact me at (903) 561-2900.

Your truly

Kevin Mayes, P.E.
Project Engineer

KM:gt
Attachments

SERVICE LIST

Mr. David Catanach
State of New Mexico
Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

State of New Mexico
Oil Conservation Division
P. O. Box 1980
Hobbs, New Mexico 88240

Bureau of Land Management
Carlsbad Resource Area Headquarters
P. O. Box 1778
Carlsbad, New mexico 88220

Lovington Daily Leader
P. O. Drawer 1717
Lovington, New Mexico 88260

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: [X] Secondary Recovery [ ] Pressure Maintenance [ ] Disposal [ ] Storage
Application qualifies for administrative approval? [X] yes [ ] no

II. Operator: Mewbourne Oil Company

Address: P. O. Box 7698, Tyler, Texas 75711

Contact party: Kevin Mayes Phone: (903) 561-2900

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? [X] yes [ ] no
If yes, give the Division order number authorizing the project R-10151.

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 (aquifers 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 immediately underlying 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: Kevin Mayes Title Project Engineer

Signature: Kevin Mayes Date: January 24, 1996

* 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.

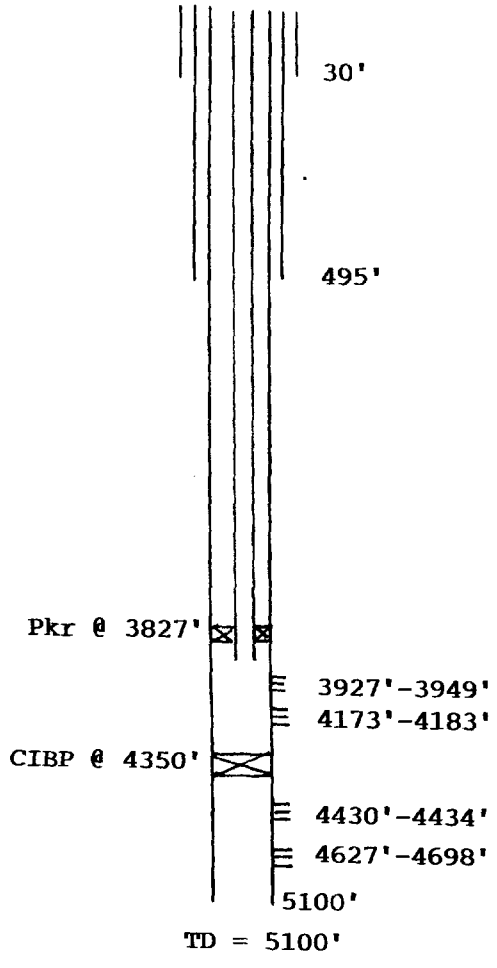
DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division district office.

ITEM III OF NEW MEXICO OCD FORM C-108

INJECTION WELL DATA SHEET

Mewbourne Oil Co.	Querecho Plains Queen Associated Sand Unit			
OPERATOR	LEASE			
2	2300' FNL & 2300' FWL	23	18S	23E
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE

Schematic



Tabular Data

Surface Casing

Size 16 " Cemented with 3 yds xx.

TOC Surface feet determined by Circulated

Hole size NA

Intermediate Casing

Size 8 5/8" " Cemented with 250 sx.

TOC Surface feet determined by Circulated

Hole size 11"

Long string

Size 5 1/2 " Cemented with 375 sx.

TOC 3315 feet determined by Temp. Log.

Hole size 7 7/8"

Total depth 5100'

Injection interval

3927 feet to 4183 feet

(perforated or open-hole, indicate which)

Tubing size 2 3/8" lined with Bare Steel (material) set in a

Otis Interlock (brand and model) packer at 3827 feet

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Queen/Penrose

2. Name of Field or Pool (if applicable) Querecho Plains

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? Production

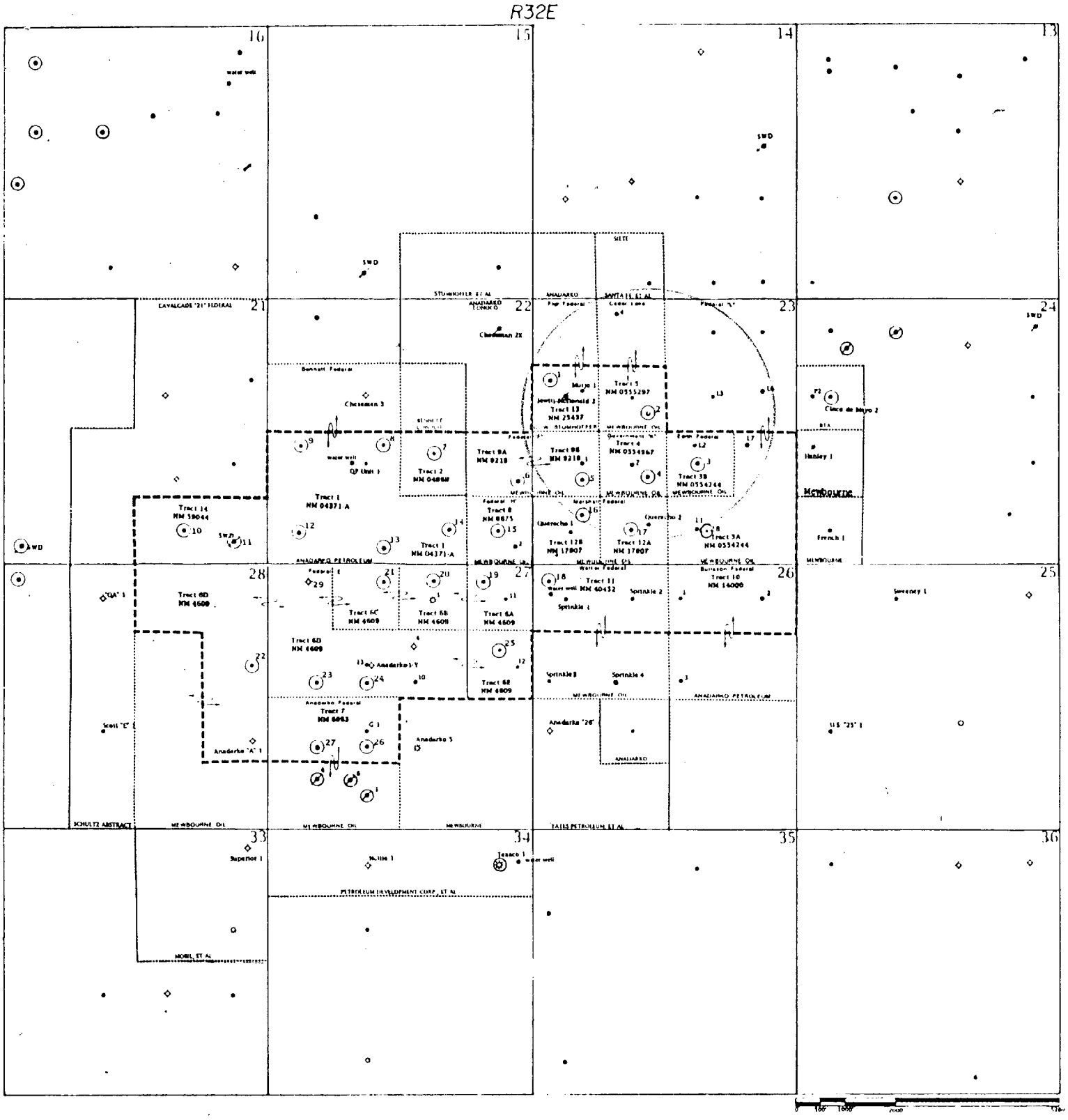
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used)

See Schematic

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area.

Overlying = Seven Rivers

Underlying = Delaware



M O C	Mewbourne Oil Company Tyler, Texas

EXHIBIT "A"

○ Wells With Queen Production

QUERECHO PLAINS QUEEN
ASSOCIATED SAND UNIT
Unit Boundary and Tracts

Revised 11/28/94
Revised 4/21/94
Revised 9/15/93
Revised 7/16/93
Revised 11/15/93

KEVIN MATTS

SH

ITEM VI OF NEW MEXICO OCD FORM C-108
WELLS WITHIN REVIEW AREA WHICH PENETRATE THE QUEEN
QUERECHO PLAINS QUEEN ASSOCIATED SAND UNIT
12-18-95/KMM

OPERATOR	LEASE/WELL	LOCATION	TYPE	CONSTRUCTION	TOP OF CEMENT	DATE DRILLED	TD	COMPLETION & COMMENTS
MEWBOURNE OIL CO.	FED L #4	T18S, R32E, SEC 23 660 FNL, 1650 FEL	WIW	13 3/8 @ 438' CMT W/ 400 SX 8 5/8 @ 4318' CMT W/ 1600 SX 5 1/2 @ 8760' CMT W/ 1325 SX	SURFACE(V) SURFACE(V) 2155'	11/3/87	8760'	OPEN PERFS 8431'-8506' CONVERT TO INJECTION
MEWBOURNE OIL CO.	CEDAR LAKE FED #4	T18S, R32E, SEC 23 330 FNL, 1650 FWL	OIL	8 5/8 @ 450' CMT W/ 300 SX 5 1/2 @ 5003' CMT W/ 1175 SX	SURFACE(V) SURFACE(V)	10/9/91	5003'	OPEN PERFS 4834'-4856'
MEWBOURNE OIL CO.	FLIP FEDERAL #1	T18S, R32E, SEC 23 1650 FNL, 330 FWL	WIW	13 3/8 @ 35' CMT W/ 5 YDS 8 5/8 @ 1190' CMT W/ 500 SX 4 1/2 @ 4750' CMT W/ 550 SX	SURFACE(C) SURFACE(C) 2360'	6/30/80	4750'	PERF & TEST 4648'-4668' PB 4229' OPEN PERFS 4143'-4150' CONVERT TO INJECTION
MALJAMAR OIL & GAS	JEWITT-McDONALD #2	T18S, R32E, SEC 23 1980 FNL, 660 FWL	P & A	8 5/8 @ 1348' CMT W/ 50 7 @ 4616' CMT W/ 150	994' 2800'	2/21/44	4809'	O/H FROM TD TO 7" SHOE P & A
MEWBOURNE OIL CO.	MURJO FED #1	T18S, R32E, SEC 23 1850 FNL, 990 FWL	OIL	13 3/8 @ 350' CMT W/ 350 SX 8 5/8 @ 2777' CMT W/ 1200 SX 5 1/2 @ 10800' CMT W/ 650 SX	SURFACE(V) SURFACE(V) 1300'	6/25/87	11780'	PERF & TEST 10648'-10726 PERF & TEST 10172'-10223' PERF & TEST 9619'-9670' SQZ PERFS 9619'-9670' W/ 1150 PERF & TEST 9726'-9743' PERF & TEST 9192'-9210' CIBP @ 9560' OPEN PERFS 8283'-8426' RET. BP @ 8506' Sqz cmt behind 5 1/2", 1300'-4500'
MEWBOURNE OIL CO.	CEDAR LAKE FED #2	T18S, R32E, SEC 23 1980 FNL, 1980 FWL	OIL	13 3/8 @ 478' CMT W/ 500 SX 8 5/8 @ 4286' CMT W/ 1400 SX 5 1/2 @ 8708' CMT W/ 1075 SX	SURFACE(V) SURFACE(V) 3347'	11/10/86	8700'	OPEN PERFS 8435'-8501'
MEWBOURNE OIL CO.	FED L#3	T18S, R32E, SEC 23 1980 FNL, 1650 FEL	OIL	13 3/8 @ 450' CMT W/ 416 SX 8 5/8 @ 4315' CMT W/ 1700 SX 5 1/2 @ 8698' CMT W/ 1475 SX	SURFACE(V) SURFACE(V) 1342'	6/19/87	8698'	OPEN PERFS 8446'-8526'
MEWBOURNE OIL CO.	FED L#6	T18S, R32E, SEC 23 1880 FNL, 660 FEL	OIL	13 3/8 @ 448' CMT W/ 475 SX 8 5/8 @ 4330' CMT W/ 1575 SX 5 1/2 @ 8650' CMT W/ 1400 SX	SURFACE(V) SURFACE(V) SURFACE(V)	7/24/88	8650'	OPEN PERFS 8436'-8520'
MEWBOURNE OIL CO.	FED L#7	T18S, R32E, SEC 23 2310 FSL, 990 FEL	WIW	8 5/8 @ 356' CMT W/ 250 SX 5 1/2 @ 8670' CMT W/ 4630 SX	SURFACE(V) SURFACE(V)	5/14/88	8670'	DEEPEN FROM OTD @ 4281' (19 OPEN PERFS 8485'-8552' CONVERT TO INJECTION
MEWBOURNE OIL CO.	EDITH FEDERAL #2	T18S, R32E, SEC 23 1980 FSL, 1980 FEL	WIW	8 5/8 @ 380' CMT W/ 250 SX 4 1/2 @ 4270' CMT W/ 300 SX	SURFACE(V) 2966'	2/12/74	4270'	OPEN PERFS 3958'-4224' CONVERT TO INJECTION

MEWBOURNE OIL CO.	FED L#2	T18S, R32E, SEC 23 2310 FSL, 2030 FEL	WIW	13 3/8 @ 441' CMT W/ 450 SX 8 5/8 @ 4293' CMT W/ 1800 SX 5 1/2 @ 8750' CMT W/ 925 SX	SURFACE(V) SURFACE(V) 4137'	10/14/86	8750'	OPEN PERFS 8458'-8531' CONVERT TO INJECTION
MEWBOURNE OIL CO.	GOVERNMENT K #1	T18S, R32E, SEC 23 1700 FSL, 2300 FWL	OIL	8 5/8 @ 418' CMT W/ 300 SX 5 1/2 @ 4800' CMT W/ 750 SX	SURFACE 514'	9/29/74	4800'	OPEN PERFS 4178'-4190'
MEWBOURNE OIL CO.	GOVERNMENT K #2	T18S, R32E, SEC 23 1950 FSL, 1980 FWL	WIW	13 3/8 @ 700' CMT W/ 700 SX 8 5/8 @ 4800' CMT W/ 3100 SX 5 1/2 f/ 4408'-8900' CMT W/ 900 S	SURFACE(V) SURFACE(V) 4408'	9/19/86	8900'	OPEN PERFS 8343'-8515' CONVERT TO INJECTION
MEWBOURNE OIL CO.	FED F#1	T18S, R32E, SEC 23 1650 FSL, 990 FWL	OIL	8 5/8 @ 1167' CMT W/ 600 SX 5 1/2 @ 4300' CMT W/ 665 SX	SURFACE(V) 500'	9/29/77	4300'	OPEN PERFS 4132'-4163'
MEWBOURNE OIL CO.	FED F#3	T18S, R32E, SEC 23 1980 FSL, 990 FWL	WIW	13 3/8 @ 480' CMT W/ 275 SX 8 5/8 @ 4285' CMT W/ 1700 SX 5 1/2 @ 8570' CMT W/ 1375 SX	SURFACE(V) SURFACE(V) SURFACE(V)	12/31/86	8570'	OPEN PERFS 8362'-8448' CONVERT TO INJECTION
MEWBOURNE OIL CO.	MARSHALL FED #2	T18S, R32E, SEC 23 990 FSL, 990 FWL	OIL	8 5/8 @ 367' CMT W/ 350 SX 4 1/2 @ 4293' CMT W/ 860 SX	SURFACE(V) SURFACE(V)	12/23/81	4293'	OPEN PERFS 3906'-4160'
MEWBOURNE OIL CO.	QUERECHO FED #2	T18S, R32E, SEC 23 760 FSL, 2310 FWL	OIL	13 3/8 @ 374' CMT W/ 385 SX 8 5/8 @ 3010' CMT W/ 1300 SX 5 1/2 @ 8703' CMT W/ 1100 SX	SURFACE SURFACE 3217'	5/6/86	9100'	OPEN PERFS 8459'-8526'
MEWBOURNE OIL CO.	MARSHALL FED #1	T18S, R32E, SEC 23 660 FSL, 1980 FWL	WIW	8 5/8 @ 514' CMT W/ 59 SX 4 1/2 @ 4250' CMT W/ 300 SX	SURFACE(V) 2934'	6/15/73	4250'	OPEN PERFS 4176'-4190' CONVERT TO INJECTION
MEWBOURNE OIL CO.	FEDERAL L#1	T18S, R32E, SEC 23 660 FSL, 1980 FEL	OIL	13 3/8 @ 459' CMT W/ 400 SX 8 5/8 @ 4345' CMT W/ 1700 SX 5 1/2 @ 9050' CMT W/ 1050 SX	SURFACE(V) SURFACE(V) 3814'	4/22/86	9050'	OPEN PERFS 8474'-8538'

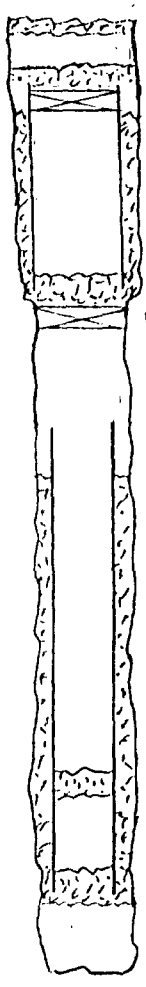
NOTE: TOP OF CEMENT IS CALCULATED WIHTOUT COMPENSATION FOR COLLARS AND USES 75% EXCESS.
CALCULATIONS ASSUME SLURRY YIELDS OF 1.32 CUFT/SX FOR CASING SET SHALLOWER THAN 6000', AND 1.08 CUFT/SX FOR DEEPER CASING.
V= VISUAL
CBL= CEMENT BOND LOG.

ITEM VI OF NEW MEXICO OCD FORM C-108
PLUGGED WELL DETAIL

Maljamar Oil & Gas Jewett-McDonald
OPERATOR LEASE

2	1980' FNL & 660' FWL	23	18S	32E
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE

Schematic



Tabular Data

Surface Casing
Size N/A " Cemented with _____ sx.
TOC _____ feet determined by _____
Hole size _____

Intermediate Casing
Size 8-5/8 " Cemented with 50 sx.
TOC 994 feet determined by calculation
Hole size _____

Long string
Size 7 " Cemented with 150 sx.
TOC 2800 feet determined by calculation
Hole size _____
Total depth 4809'

Injection interval
_____ feet to _____ feet
(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a
_____ (brand and model) packer at _____ feet
(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation _____
2. Name of Field or Pool (if applicable) _____
3. Is this a new well drilled for injection? ☐ Yes ☐ No
   If no, for what purpose was the well originally drilled? _____
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) _____
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. _____

ITEM VII OF NEW MEXICO OCD FORM C-108
DATA ON PROPOSED OPERATIONS
QPQASU NO. 2 (O.H. CEDAR LAKE NO 1)

ITEM VII (1) The maximum injection rate should not exceed 200 bwpd.

ITEM VII (2) The injection system will be operated as a closed system.

ITEM VII (3) Based on the lower of two direct offsetting steprate tests the maximum injection pressure should not exceed 1390 psi.

ITEM VII (4) The source of injection water for the subject well will be the Querecho Plains Bone Spring Sand Unit. The source of water for the Bone Spring Unit is fresh water supplied by the city of Carlsbad, Delaware produced water, Bone Spring produced water and Queen produced water. A copy of these water analyze is attached.

ITEM VII (5) Not applicable.

ITEM VIII OF NEW MEXICO OCD FORM C-108
GEOLOGIC DATA ON THE INJECTION ZONE & UNDERGROUND DRINKING WATER
QPQASU NO. 2 (O.H. CEDAR LAKE NO. 1)

The zone being targeted for water injection is the Queen/Penrose sands at depths from 3927'-4183'. The Queen/Penrose sands are a sequence of well consolidated sandstone, siltstone, and shale strata of Permian Guadalupe age cemented with calcareous material. An eleven percent porosity cut off is use to determine net pay as porosity less than eleven percent is considered impermeable at the existing and proposed reservoir pressure and reservoir fluid regimes. Impermeable shale deposits exist above and below the targeted sands. All injected fluids should remain in the reservoir with the exception of cycling to the surface though wellbores.

Based on communications with the New Mexico State Engineer's Roswell office (Ken Fresquez) and OCD files at Hobbs there appears to be eleven fresh water wells within T18S & R32E. None of these wells are within the area of review. The deepest of these wells has a total depth of 700'. The source strata tapped by this well is the Triassic "Red Beds" and the only other strata Mr. Fresquez referred to as potentially fresh was the Alluvium which is shallower than the "Red Beds". There are no known fresh water strata underlying the Queen/Penrose.

ITEMS IX THROUGH XII
QPQASU NO. 2 (O.H. CEDAR LAKE NO. 1)

ITEM IX. The Queen and Penrose were both acidized and fracture stimulated at the time of completion.

ITEM X. All logging and test data for the existing wellbores already exists on file with the state of New Mexico Oil Conservation Division (OCD) and will not be resubmitted with this application.

ITEM XI. As stated in ITEM VIII, it appears the only strata within one mile of our proposed injector which contains water of possible drinking quality is confined to 700' and shallower. No contamination of this drinking water should occur as all existing wellbores which penetrate the Queen/Penrose in the proposed area are completed or plugged in a manner to prevent communication from our flood to these water strata.

ITEM XII. After reviewing the geology of the Queen/Penrose strata in a one and one-half mile radius around the proposed injector, no evidence appears of fractures or any hydrologic connection between the target sands and any overlying or underlying strata.

CAPROCK LABORATORIES, INC.
3312 BANKHEAD HIGHWAY
MIDLAND, TEXAS 79701
(915) 689 - 7252

May 21, 1992

Mewburne Oil Company
P. O. Box 7698
Tyler, Texas 75711

Attention: Kevin Mays

Subject: Water Compatibility Study

Gentlemen:

Presented in this report are the final results of a water compatibility study performed on 5 samples of produced water provided to this laboratory by Core Laboratory on behalf of Mewburne Oil Company. API Water Analysis was performed on each of the samples to determine their ionic characteristics. Based on these analyses, the scaling tendency with respect to cacium carbonate and calcium sufate were calculated and reported on May 19, 1992 (our Job Number 9205032). The samples were physically mixed to determine if precipitates would form. Turbidity was measured as percent transmittance on each of the combinations at 420 nanometers wavelength on a Milton Roy Model 601 Spectrophotometer.

The turbidity data are presented in this report and indicated ~~that~~ that the water from the Federal "E" #5 tank battery (Queen Formation) and the water from the Cedardrake Federal #4 well formed precipitates when combined in the ratios tested (very slight decreaces in transmittance were observed). Additional analyses were performed on the waters to determine their barium concentrations and are also presented in this report. Based on calculations from theoretical combinations, all of the waters have a tendency to form both calcium carbonate and calcium sulfate scale on their own and these tendencies do not increase when mixed. The fresh water from Double Eagle and the Delaware produced water from the Cedardrake Federal #4 well both have barium and therefore presents the possibility of barium sulfate scale formation when combined with waters high in sulfate.

In conclusion, based on all of the analyses and physical combinations of these waters, the Delaware produced water from the Jewitt Feed #1 appears to be the most compatible water to the Bone Springs water from the Federal "L" lease.

Respectfully yours,

James L. Pritchard, Lab Manager
Caprock Laboratories, Inc.

CAPROCK LABORATORIES, INC.
3312 BANKHEAD HIGHWAY
MIDLAND, TEXAS 79701
(915) 689 - 7252

COMPANY: MEWBURNE OIL COMPANY JOB NUMBER: 9205032

SAMPLE NUMBER	SAMPLE DESCRIPTION
1	FEDERAL "E" #5 T.B. (QUEEN FORMATION)
2	JEWITT FEED #1 (DELAWARE FORMATION)
3	DOUBLE EAGLE (FRESH WATER)
4	CEDARDRAKE FEDERAL #4 (DELAWARE FORMATION)
5	FEDERAL "L" LEASE (BONE SPRINGS FORMATION)

MIXTURE	TURBITY, % TRANS. @ 420 uM
1-5	96.6
2-5	100.
3-5	100.
4-5	99.5
1-2-5	94.3
1-3-5	95.3
1-4-5	98.8
2-3-5	100.
2-4-5	98.8
3-4-5	99.7
ALL	97.7

CAPROCK LABORATORIES, INC.
3312 Bankhead Hwy.
Midland, Texas 79701
(915) 689-7252
FAX # (915) 689-0130

WATER ANALYSIS REPORT

SAMPLE

Oil Co. :
Lease : DOUBLE EAGLE
Well No.: FRESH WATER
Job No.: 9205032

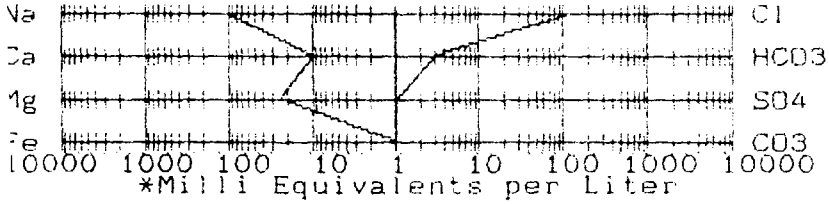
Sample Loc. :
Date Sampled :
Attention :
Analysis No. : 3

ANALYSIS

		MG/L	EQ. WT.	*MEQ/L
1.	pH	9.100		
2.	Specific Gravity 60/60 F.	0.996		
3.	$CaCO_3$ Saturation Index @ 80 F.	+1.548		
	@ 140 F.	+2.388		
	Dissolved Gasses			
4.	Hydrogen Sulfide	0.0		
5.	Carbon Dioxide	Not Determined		
6.	Dissolved Oxygen	Not Determined		
	Cations			
7.	Calcium (Ca^{++})	200	/ 20.1 =	9.95
8.	Magnesium (Mg^{++})	304	/ 12.2 =	24.92
9.	Sodium (Na^{+}) (Calculated)	2,507	/ 23.0 =	109.00
10.	Barium (Ba^{++})	6	/ 68.7 =	0.09
	Anions			
11.	Hydroxyl (OH^{-})	0	/ 17.0 =	0.00
12.	Carbonate ($CO_3^{=}$)	0	/ 30.0 =	0.00
13.	Bicarbonate (HCO_3^{-})	183	/ 61.1 =	3.00
14.	Sulfate ($SO_4^{=}$)	50	/ 48.8 =	1.02
15.	Chloride (Cl^{-})	4,963	/ 35.5 =	139.80
16.	Total Dissolved Solids	8,213		
17.	Total Iron (Fe)	1	/ 18.2 =	0.05
18.	Total Hardness As $CaCO_3$	1,752		
19.	Resistivity @ 75 F. (Calculated)	0.685 /cm.		

LOGARITHMIC WATER PATTERN

*meq/L.



*Milli Equivalents per Liter

Calculated Calcium Sulfate solubility in this brine is 2,814 mg/L. at 90 F.

PROBABLE MINERAL COMPOSITION

COMPOUND	EQ. WT.	X *meq/L =	mg/L.
$Ca(HCO_3)_2$	81.04	3.00	243
$CaSO_4$	68.07	0.94	64
$CaCl_2$	55.50	6.02	334
$Mg(HCO_3)_2$	73.17	0.00	0
$MgSO_4$	60.19	0.00	0
$MgCL_2$	47.62	24.92	1,187
$NaHCO_3$	84.00	0.00	0
$NaSO_4$	71.03	0.00	0
NaCl	58.46	108.87	6,364

Analyst

Remarks and Comments:

LABORATORI S, INC.
3312 Bankhead Hwy.
Midland, Texas 79701
(915) 689-7252
FAX # (915) 689-0130

WATER ANALYSIS REPORT

SAMPLE

il Co. :	MEWBOURNE OIL CO.	Sample Loc. :	QUEEN PENCOSE PROD. WATER
Lease :	FEDERAL E	Date Sampled :	
ell No.:	#5 T.B.	Attention :	
Job No.:	9205032	Analysis No. :	1

ANALYSIS

			MG/L	EQ. WT.	*MEQ/L
1.	pH		6.100		
2.	Specific Gravity 60/60 F.		1.171		
3.	$CaCO_3$ Saturation Index	@ 80 F.	+1.948		
		@ 140 F.	+2.648		

Dissolved Gasses

4.	Hydrogen Sulfide		0.0
5.	Carbon Dioxide		Not Determined
6.	Dissolved Oxygen		Not Determined

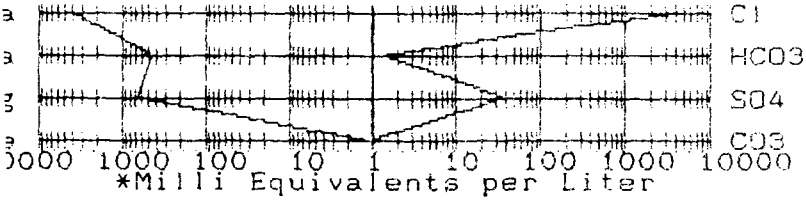
Cations

7.	Calcium	(Ca^{++})		8,978	/ 20.1 =	446.67
8.	Magnesium	(Mg^{++})		8,266	/ 12.2 =	677.54
9.	Sodium	(Na^{+})	(Calculated)	94,120	/ 23.0 =	4,092.17
10.	Barium	(Ba^{++})		0.0		

Anions

11.	Hydroxyl	(OH^{-})	0	/ 17.0 =	0.00
12.	Carbonate	(CO_3^{--})	0	/ 30.0 =	0.00
13.	Bicarbonate	(HCO_3^{-})	85	/ 61.1 =	1.39
14.	Sulfate	(SO_4^{--})	1,950	/ 48.8 =	39.96
15.	Chloride	(Cl^{-})	183,647	/ 35.5 =	5,173.15
16.	Total Dissolved Solids		297,046		
17.	Total Iron (Fe)		22	/ 18.2 =	1.21
18.	Total Hardness As $CaCO_3$		56,450		
19.	Resistivity @ 75 F. (Calculated)		0.001 /cm.	= .1 Ω/m	

LOGARITHMIC WATER PATTERN
*meq/L.



*Milli Equivalents per Liter

Calculated Calcium Sulfate solubility in this brine is 1,232 mg/L. at 90 F.

PROBABLE MINERAL COMPOSITION

COMPOUND	EQ. WT.	X *meq/L =	mg/L.
$Ca(HCO_3)_2$	81.04	1.39	113
$CaSO_4$	68.07	39.96	2,720
$CaCl_2$	55.50	405.32	22,495
$Mg(HCO_3)_2$	73.17	0.00	0
$MgSO_4$	60.19	0.00	0
$MgCL_2$	47.62	677.54	32,265
$NaHCO_3$	84.00	0.00	0
$NaSO_4$	71.03	0.00	0
NaCl	58.46	4,090.30	239,119

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marks and Comments:

CAPROCK LABORATORIES, INC.
3312 Bankhead Hwy.
Midland, Texas 79701
(915) 689-7252
FAX # (915) 689-0130

WATER ANALYSIS REPORT

SAMPLE

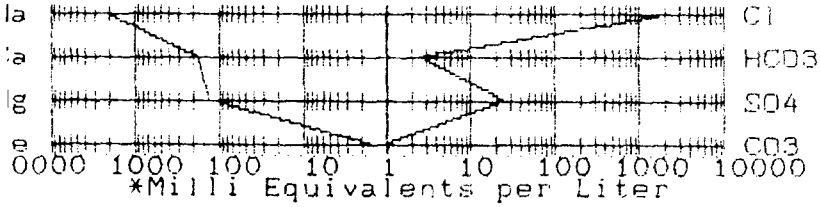
Oil Co. : MEWBOURNE OIL CO.
Lease : FEDERAL L LEASE
Well No.:
Job No.: 9205032

Sample Loc. : BONE SPRINGS PROD. WATER
Date Sampled :
Attention :
Analysis No. : 5

ANALYSIS

		MG/L	EQ. WT.	*MEQ/L
1.	pH	7.550		
2.	Specific Gravity 60/60 F.	1.110		
3.	$CaCO_3$ Saturation Index @ 80 F.	+0.842		
	@ 140 F.	+1.722		
	Dissolved Gasses			
4.	Hydrogen Sulfide	0.0		
5.	Carbon Dioxide	Not Determined		
6.	Dissolved Oxygen	Not Determined		
	Cations			
7.	Calcium (Ca^{++})	3,527	/ 20.1 =	175.47
8.	Magnesium (Mg^{++})	1,556	/ 12.2 =	127.54
9.	Sodium (Na^{+}) (Calculated)	52,547	/ 23.0 =	2,284.65
10.	Barium (Ba^{++})	Not Determined		
	Anions			
11.	Hydroxyl (OH^{-})	0	/ 17.0 =	0.00
12.	Carbonate (CO_3^{--})	0	/ 30.0 =	0.00
13.	Bicarbonate (HCO_3^{-})	159	/ 61.1 =	2.60
14.	Sulfate (SO_4^{--})	1,300	/ 48.8 =	26.64
15.	Chloride (Cl^{-})	90,760	/ 35.5 =	2,556.62
16.	Total Dissolved Solids	149,849		
17.	Total Iron (Fe)	28	/ 18.2 =	1.51
18.	Total Hardness As $CaCO_3$	15,214		
19.	Resistivity @ 75 F. (Calculated)	0.037 /cm.		

LOGARITHMIC WATER PATTERN
*meq/L.



*Milli Equivalents per Liter

Calculated Calcium Sulfate solubility in this brine is 4,032 mg/L. at 90 F.

PROBABLE MINERAL COMPOSITION

COMPOUND	EQ. WT.	X *meq/L =	mg/L.
$Ca(HCO_3)_2$	81.04	2.60	211
$CaSO_4$	68.07	26.64	1,813
$CaCl_2$	55.50	146.23	8,116
$Mg(HCO_3)_2$	73.17	0.00	0
$MgSO_4$	60.19	0.00	0
$MgCL_2$	47.62	127.54	6,074
$NaHCO_3$	84.00	0.00	0
$NaSO_4$	71.03	0.00	0
NaCl	58.46	2,282.85	133,455

K Rea

nalyst

emarks and Comments:

CAPROCK LABORATORIES, INC.
3312 Bankhead Hwy.
Midland, Texas 79701
(915) 689-7252
FAX # (915) 689-0130

WATER ANALYSIS REPORT

SAMPLE

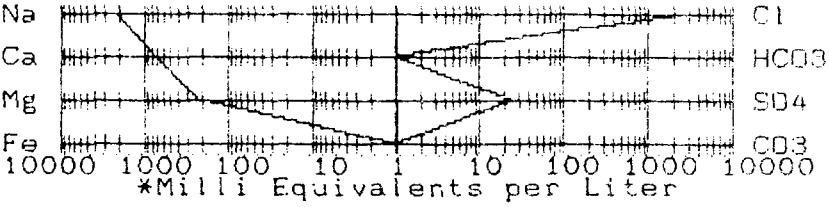
Oil Co. : MEWBOURNE OIL CO.
Lease : CEDARDRAKE FEDERAL
Well No.: #4
Job No.: 9205032

Sample Loc. : DELAWARE PROD. WATER
Date Sampled :
Attention :
Analysis No. : 4

ANALYSIS

		MG/L	EQ. WT.	*MEQ/L
1.	pH	6.900		
2.	Specific Gravity 60/60 F.	1.148		
3.	$CaCO_3$ Saturation Index @ 80 F.	+0.668		
	@ 140 F.	+1.778		
	Dissolved Gasses			
4.	Hydrogen Sulfide	0.0		
5.	Carbon Dioxide	Not Determined		
6.	Dissolved Oxygen	Not Determined		
	Cations			
7.	Calcium (Ca^{++})	14,749	/ 20.1 =	733.78
8.	Magnesium (Mg^{++})	2,674	/ 12.2 =	219.18
9.	Sodium (Na^{+}) (Calculated)	49,932	/ 23.0 =	2,170.96
10.	Barium (Ba^{++})	22	/ 68.7 =	0.32
	Anions			
11.	Hydroxyl (OH^{-})	0	/ 17.0 =	0.00
12.	Carbonate ($CO_3^{=}$)	0	/ 30.0 =	0.00
13.	Bicarbonate (HCO_3^{-})	49	/ 61.1 =	0.80
14.	Sulfate ($SO_4^{=}$)	1,300	/ 48.8 =	26.64
15.	Chloride (Cl^{-})	109,904	/ 35.5 =	3,095.89
16.	Total Dissolved Solids	178,630		
17.	Total Iron (Fe)	18	/ 18.2 =	0.99
18.	Total Hardness As $CaCO_3$	47,843		
19.	Resistivity @ 75 F. (Calculated)	0.014 /cm.		

LOGARITHMIC WATER PATTERN
*meq/L.



*Milli Equivalents per Liter

Calculated Calcium Sulfate solubility in this brine is 1,111 mg/L. at 90 F.

PROBABLE MINERAL COMPOSITION

COMPOUND	EQ. WT.	X *meq/L =	mg/L.
$Ca(HCO_3)_2$	81.04	0.80	65
$CaSO_4$	68.07	26.32	1,792
$CaCl_2$	55.50	706.66	39,220
$Mg(HCO_3)_2$	73.17	0.00	0
$MgSO_4$	60.19	0.00	0
$MgCL_2$	47.62	219.18	10,437
$NaHCO_3$	84.00	0.00	0
$NaSO_4$	71.03	0.00	0
NaCl	58.46	2,170.05	126,861

Analyst

Remarks and Comments:

CAPROCK LABORATORIES, INC.
3312 Bankhead Hwy.
Midland, Texas 79701
(915) 689-7252
FAX # (915) 689-0130

WATER ANALYSIS REPORT

SAMPLE

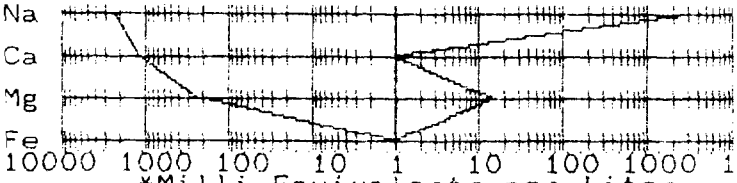
Oil Co. : MANZANO OIL
Lease : JEWITT FEED
Well No.: #1
Job No.: 9205032

Sample Loc. : DELAWARE PROD.
Date Sampled :
Attention :
Analysis No. : 2

ANALYSIS

		MG/L	EQ. WT.	*MEQ/L
1.	pH	6.550		
2.	Specific Gravity 60/60 F.	1.165		
3.	$CaCO_3$ Saturation Index @ 80 F.	+1.052		
	@ 140 F.	+2.812		
	Dissolved Gasses			
4.	Hydrogen Sulfide	0.0		
5.	Carbon Dioxide	Not Determined		
6.	Dissolved Oxygen	Not Determined		
	Cations			
7.	Calcium (Ca^{++})	24,529	/ 20.1 =	1,220.35
8.	Magnesium (Mg^{++})	2,772	/ 12.2 =	227.21
9.	Sodium (Na^{+}) (Calculated)	52,982	/ 23.0 =	2,303.57
10.	Barium (Ba^{++})	0.0		
	Anions			
11.	Hydroxyl (OH^{-})	0	/ 17.0 =	0.00
12.	Carbonate (CO_3^{--})	0	/ 30.0 =	0.00
13.	Bicarbonate (HCO_3^{-})	61	/ 61.1 =	1.00
14.	Sulfate (SO_4^{--})	750	/ 48.8 =	15.37
15.	Chloride (Cl^{-})	132,594	/ 35.5 =	3,735.04
16.	Total Dissolved Solids	213,688		
17.	Total Iron (Fe)	15	/ 18.2 =	0.84
18.	Total Hardness As $CaCO_3$	72,665		
19.	Resistivity @ 75 F. (Calculated)	0.001 /cm.		

LOGARITHMIC WATER PATTERN
*meq/L.



*Milli Equivalents per Liter

Calculated Calcium Sulfate solubility in this brine is 590 mg/L. at 90 F.

PROBABLE MINERAL COMPOSITION

COMPOUND	EQ. WT.	X *meq/L =	mg/L.
$Ca(HCO_3)_2$	81.04	1.00	81
$CaSO_4$	68.07	15.37	1,046
$CaCl_2$	55.50	1,203.98	66,821
$Mg(HCO_3)_2$	73.17	0.00	0
$MgSO_4$	60.19	0.00	0
$MgCl_2$	47.62	227.21	10,820
$NaHCO_3$	84.00	0.00	0
$NaSO_4$	71.03	0.00	0
NaCl	58.46	2,303.85	134,683

Analyst

Remarks and Comments:

MEWBOURNE OIL COMPANY

P.O. BOX 7698
TYLER, TEXAS 75711
903 - 561-2900
FAX 903 - 561-1870

February 7, 1996

New Mexico Oil Conservation Commission
2040 S. Pacheco
Santa Fe, New Mexico 87505

Attn: Mr. Ben Stone

Re: Application to Inject in Well QPQASU No. 2
Querecho Plains Queen Associated Waterflood Project
Lea County, New Mexico

Dear Mr. Stone:

Enclosed as required for administrative approval of the referenced are copies of the return receipts of notification. I hope this assists you in processing the referenced application.

Should you have any questions or comments please call me or Ken Calvert at (903) 561-2900.

Sincerely,

Kevin Mayes

Kevin Mayes, P.E.
Project Engineer

Affidavit of Publication

STATE OF NEW MEXICO)
) ss.
COUNTY OF LEA)

Joyce Clemens being first duly sworn on oath deposes and says that he is Adv. Director of THE LOVINGTON DAILY LEADER, a daily newspaper of general paid circulation published in the English language at Lovington, Lea County, New Mexico; that said newspaper has been so published in such county continuously and uninterruptedly for a period in excess of Twenty-six (26) consecutive weeks next prior to the first publication of the notice hereto attached as hereinafter shown; and that said newspaper is in all things duly qualified to publish legal notices within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico.

That the notice which is hereto attached, entitled

Legal Notice

~~and numbered~~ ..... ~~in the~~ ..... ~~Court of Lea County, New Mexico,~~ was published in a regular and entire issue of THE LOVINGTON DAILY LEADER and not in any supplement thereof, ~~once each week on the same day of the week~~, for one (1) day ~~consecutive weeks~~, beginning with the issue of January 26, 19 96 and ending with the issue of January 26, 19 96

And that the cost of publishing said notice is the sum of $ 16.56 which sum has been (Paid) (~~Assessed~~) as Court Costs

Joyce Clemens

Subscribed and sworn to before me this 29th day of January, 19 96

Jean Henry
Notary Public, Lea County, New Mexico

My Commission Expires Sept. 28, 19 98

LEGAL NOTICE
NOTICE

SUBJECT: Application for Authority to Inject into the Querecho Plains Queen Associated Sand Unit, Lea County, New Mexico.

Mewbourne Oil Company, P.O. Box 7698, Tyler, Texas 75711, Attention: Kevin Mayes, Project Engineer, is filing this 24th day of January 1996 with the State of New Mexico Oil Conservation Division for authority to inject water into the Querecho Plains QA Sand Unit No. 2, located 2300' FNL & 2300' FWL of Section 23, T18S-R32E, Lea County, New Mexico. This well is currently producing from the Queen Formation (Perfs 3927'-4183'). This application seeks permission to inject into the Queen Formation (Same Perfs 3927' - 4183').

All interested parties must file objection with the Oil Conservation Division, 2040 S. Pacheco, Santa Fe, New Mexico 87505 within 15 days of this notice.

Published in the Lovington Daily Leader January 26, 1996.

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
MR. DAVID CATANACH
STATE OF NEW MEXICO
OIL CONSERVATION COMM.
2040 S. PACHECO
SANTA FE, NM 87505

4a. Article Number
Z 079 526 649

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☒ Return Receipt for Merchandise

7. Date of Delivery
1-29

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

PS Form 3811, December 1991 ☆U.S. GPO: 1993—352-714 **DOMESTIC RETURN RECEIPT**

Is your RETURN ADDRESS completed on the reverse side?

Thank you for using Return Receipt Service.

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
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I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
STATE OF NEW MEXICO
OIL CONSERVATION DIV.
P.O. BOX 1980
HOBBS, NEW MEX 88240

4a. Article Number
Z 079 526 648

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☒ Return Receipt for Merchandise

7. Date of Delivery

5. Signature (Addressee)
1-29

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)
Harry W. Wilcox

PS Form 3811, December 1991 ☆U.S. GPO: 1993—352-714 **DOMESTIC RETURN RECEIPT**

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I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
BUREAU OF LAND MANAGEMENT
CARLSBAD RESOURCE AREA
P.O. BOX 1778
CARLSBAD, NEW MEX 88220

4a. Article Number
Z 079 526 647

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☒ Return Receipt for Merchandise

7. Date of Delivery
1-29

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

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