

1R - 177

# REPORTS

DATE:

11/4/1998

R.T. HICKS CONSULTANTS, LTD.

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4665 Indian School NE Suite 106 Albuquerque, NM 87110 505.266.5004 Fax: 505.266.7738

November 4, 1998

Mr. Wayne Price  
Environmental Engineer  
New Mexico Oil Conservation Division  
1000 West Broadway  
Hobbs, NM 88240

RE: Mewbourne Oil Company, Conoco Federal #2, Section 30 T20S R39E

Dear Mr. Price:

On behalf of Mewbourne Oil Company (Mewbourne), R.T. Hicks Consultants, Ltd. (Hicks Consultants) conducted an investigation of the water quality in the McCasland water supply well adjacent to the above-mentioned plugged and abandoned oil well. This letter, which completes the work elements identified in our letter of August 17, 1998, presents the results of our investigation and our conclusions.

***Data Review***

Hicks Consultants conducted a literature search to obtain information on the geology and hydrogeology in southern Lea County, near Conoco Federal #2. We also obtained well logs from the office of the State Engineer for water wells within five miles of Conoco Federal #2.

The locations of Conoco Federal #2 and the adjacent McCasland water supply well are presented in Plate 1. Plates 2 and 3 show that the McCasland water supply well is near the edge of the Ogallala Formation, the principal aquifer of the area. Plate 2 also presents depth to water and total depths of nearby wells. As Plate 2 shows, wells within the area mapped as Ogallala suggest a saturated thickness of 10-100 feet. The driller's log of the McCasland water supply well

(Appendix A) identifies the base of the Ogallala at 88 feet, with a depth to water of 58 feet. The saturated thickness of the water-bearing zone at the location is therefore 30 feet.

The log for the McCasland water supply well indicates that anhydrite ( $\text{CaSO}_4$ ) occupies 60% of the saturated thickness. Of nine water wells within a five-mile radius of the site, well logs show that only one other well encountered anhydrite (see Appendix A). This well is located in Section 24, T20S, R38E, approximately two miles northwest of Conoco Federal #2, and is labeled in the log as McCasland Well No. 3. The well log in Appendix A shows anhydrite occupying 30% of the saturated thickness.

We also employed water chemistry data from Nichol森 & Clebsch (1961). We looked specifically at nine oil production wells and four Ogallala water supply wells in the vicinity of Conoco Federal #2 (Table 2).

Hicks Consultants investigated the drilling and abandonment logs from Conoco Federal #2 for any indications of a potential source of impairment to the surrounding aquifer. The drilling log from December 1970 refers to the use of 200 sacks of regular 2% CaCl at a depth of 1,663 feet below grade. The log has no discussion of geology until 2,335 feet below grade, well below the depth of interest for the adjacent McCasland water supply well.

The plugging and abandonment record for Conoco Federal #2 demonstrates that this well was plugged in accordance with the requirements of the New Mexico Oil Conservation Division (NMOCD). Mark Production Company plugged and abandoned the well during the latter half of February 1974. Plugs were set at depths of 6,000 feet, 4,100 feet, 3,000 feet and 1,710 feet below grade and at the surface. There is no evidence from the abandonment record to suggest the well casing may be leaking or otherwise impairing the surrounding aquifer.

### ***Field Investigation***

On September 1, 1998, Melissa Snodgrass of Hicks Consultants examined the subject site with Mr. Jerry Elgin of Mewbourne. During the site visit, Hicks Consultants observed four water wells on the McCasland property (see Plate 4) and collected water samples from three of them.

**FED #2:** The water well adjacent to Conoco Federal #2, labeled Fed #2 on the chain of custody (Appendix B), is located 30 feet from the plugged and abandoned well. During our investigation, the stock tank into which the McCasland water supply well discharges exhibited a thick salt crust along the water surface and feathery yellow algae along the tank surfaces. Hicks Consultants collected a water sample from the standpipe of this windmill.

**MEW #2 & MEW #3:** The water well labeled MEW #2 on the chain of custody form is approximately two miles north of Conoco Federal #2 (see Plate 4). Mr. Elgin stated that this well and a third well 1.5 miles north of Conoco Federal #2 (MEW #3) are used by livestock. Our field investigation showed that stock tanks at both of these wells contained green algae, tadpoles and other aquatic species. The edges of the tanks contained only a thin layer of salt encrustation. Livestock were in the vicinity of both tanks. Because the windmill was not pumping during the site visit, Hicks Consultants collected a sample from the MEW #2 stock tank.

**MEW #4:** The fourth water well (labeled as MEW #4 on the chain of custody) is approximately two miles northwest of Conoco Federal #2. We believe this is the well referred to in the well logs as McCasland No. 3 (see above) — it is within a quarter mile of the location given on the well log, and no other wells are nearby. Our investigation revealed that the stock tank of this well contained some green algae; salt encrustation was considerably less than in the Fed #2 tank, though greater than in MEW #2 and MEW #3. Site evidence suggests that livestock drink from this well. Because the windmill was not pumping during the site visit, Hicks Consultants collected a water sample from the MEW #4 stock tank.

### ***Laboratory Results***

Assagai Laboratories received all water samples on September 2, 1998. The laboratory analyzed each sample for major cations and anions, and calculated the ion balance for all three wells. The results from the analyses are summarized in Table 1.

The McCasland water supply well near Conoco Federal #2 (identified in Table 1 as Fed #2) exhibits a conductivity of 7,800  $\mu\text{mhos/cm}$ , predominately calcium and chloride. The water from MEW #2 shows a conductivity of 1,160

$\mu\text{mhos/cm}$ . Carbonate is the highest anion concentration at 275  $\mu\text{g/l}$  and the cations calcium and sodium are each approximately 100  $\mu\text{g/l}$ . In MEW #4 calcium and sulfate are the dominant cations and anions, respectively. The specific conductance of MEW #4 is 3,700  $\mu\text{mhos/cm}$ .

### ***Discussion***

Hicks Consultants compared the water chemistry of these three wells with produced water from nine oil production wells and water from four Ogallala water supply wells in southern Lea County. The locations and ion concentrations for all these wells are displayed in Table 2. Plate 5 plots all the wells, along with the results from the 1971 sampling of Conoco #1, on a trilinear diagram.

As Plate 5 shows, all oil field produced waters plot very closely, with high levels of sodium and chloride and high total dissolved solids (TDS). The Ogallala water supply wells show larger variation, but are generally in the center of the diagram with balanced concentrations of all ions and a significantly lower TDS concentration. The March 1998 sample from the McCasland water supply well near Conoco Federal #2 plots apart from the oil field produced water and the Ogallala water supply wells due to the dominance of calcium and chloride. The September 1998 sample from this well is very similar to the March result and plots as calcium chloride water. MEW #2 plots very near the Ogallala wells, but has a slightly higher percentage of chloride. MEW #4 also plots as calcium chloride water, but with a higher percentage of sodium than the well near Conoco Federal #2.

According to *Groundwater Hydrology* (D. Todd, Wiley 1980):

Simple mixtures of two source waters can be identified; for example, an analysis of any mixture of two waters will plot on a straight line AB on the diagram, where A and B are the positions of the analyses of the two component waters.

Ogallala groundwater impaired by sodium chloride-rich produced water from a casing leak would plot between these two groupings. As Plate 5 illustrates, the McCasland water supply well does not plot on a line between the brine water and the Ogallala water.

The water from the McCasland water supply well near Conoco Federal #2 is therefore not similar to Ogallala groundwater; nor does it display characteristics we would expect of Ogallala groundwater mixed with oil field brine from a casing leak. Calcium and chloride dominate the water chemistry of this well. The TDS is also much higher than most Ogallala water wells.

### **Conclusions**

1. The McCasland water supply well near Conoco Federal #2 draws water from the Ogallala Formation.
2. The saturated thickness of the water-bearing zone near the McCasland water supply well is less than most Ogallala supply wells.
3. Most Ogallala water supply wells draw water from thick sand and/or gravel lenses within the Formation.
4. The McCasland water supply well near Conoco Federal #2 draws water from an anhydrite ( $\text{CaSO}_4$ ) unit within the lower Ogallala.
5. Anhydrite within the Ogallala indicates an evaporite sequence, such as a buried playa lake.
6. The Conoco Federal #2 oil well was properly plugged and abandoned by Mark Production Company, following applicable NMOCD rules and standard industry practice.
7. The water chemistry of the McCasland water supply well near Conoco Federal #2 is not consistent with a mixture of Ogallala groundwater and oil field produced water.
8. The plugged and abandoned Conoco Federal #2 oil well is not discharging formation brine via a casing leak.
9. Two hypotheses exist to explain why the McCasland water supply well near Conoco Federal #2 does not produce water similar to that produced by most Ogallala water supply wells:
  - Unintentional disposal of waste calcium chloride into a reserve pit, or on-site spills, could be the source of calcium chloride in groundwater. The drilling of Conoco Federal #2 employed calcium chloride, but at a depth considerably below the casing of the adjacent windmill. Invasion of drilling mud into the Ogallala and/or leaching of calcium chloride

from the grout cannot account for the calcium chloride in the McCasland water supply well near Conoco Federal #2.

- The water chemistry in the McCasland water supply well could be a natural phenomenon. The McCasland water supply well is not similar to typical Ogallala water supply wells. This well draws water from anhydrite. Wells that draw water from anhydrite will exhibit water chemistry dominated by calcium and sulfate and show a TDS concentration higher than wells producing from sand and gravel. Elevated chloride concentrations are also associated with wells that draw water from groundwater zones rich in anhydrite and other evaporite minerals.
10. If calcium chloride in the McCasland water supply well near Conoco Federal #2 is due to unintentional disposal or loss of calcium chloride from drilling operations, then the subsurface volume influenced is not large. Natural dilution will eventually restore groundwater to a quality consistent with anhydrite units.
  11. If calcium chloride in the Conoco Federal #2 windmill is a natural phenomenon, then the subsurface volume influenced is as large as the source of calcium and chloride. In this case, the subsurface extent of anhydrite may mirror the extent of calcium chloride groundwater. The zone of naturally occurring poor-quality water may be large.
  12. MEW #4 appears to demonstrate natural degradation due to increased evaporite (anhydrite) within the saturated zone.

### ***Recommendation***

We do not recommend any additional investigation or inquiry at this site. All evidence shows that Mewbourne's operations in relation to its Conoco Federal #2 well were consistent with industry practice and NMOCD rules, and the water chemistry of the adjacent McCasland water supply well is not consistent with a casing leak. The record shows no evidence of calcium chloride disposal on this lease. Evidence does show that the hydrogeology beneath the Conoco Federal #2 lease is not similar to other areas where the Ogallala produces high quality water.

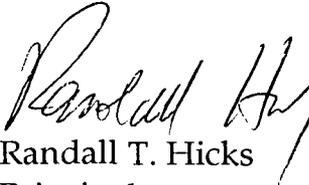
The source of calcium chloride in the McCasland water supply well is either natural evaporites or a small quantity of calcium chloride used at the well site.

Mr. Wayne Price  
11/04/98  
Page 7

The natural degradation in MEW #4 suggests the condition may be natural. If the source is natural, any further investigation should be the responsibility of the appropriate state agency, not Mewbourne. Due to the high solubility of calcium chloride, if the original source was a surface release, all of the calcium chloride is likely dissolved in groundwater. Therefore, surface remedies will not be useful in remediating the water quality. Additionally, any impairment of water quality from an on-site source is restricted to the well site and a small distance down-gradient. Natural dilution is the only logical remedial technique for such an insult. Consequently, even in the unlikely circumstance the Conoco Federal #2 well is the source, we see no benefit of further inquiry.

If you have any questions regarding this submission, please contact Melissa Snodgrass or me at our Albuquerque office.

Sincerely,  
R.T. Hicks Consultants, L.L.C.

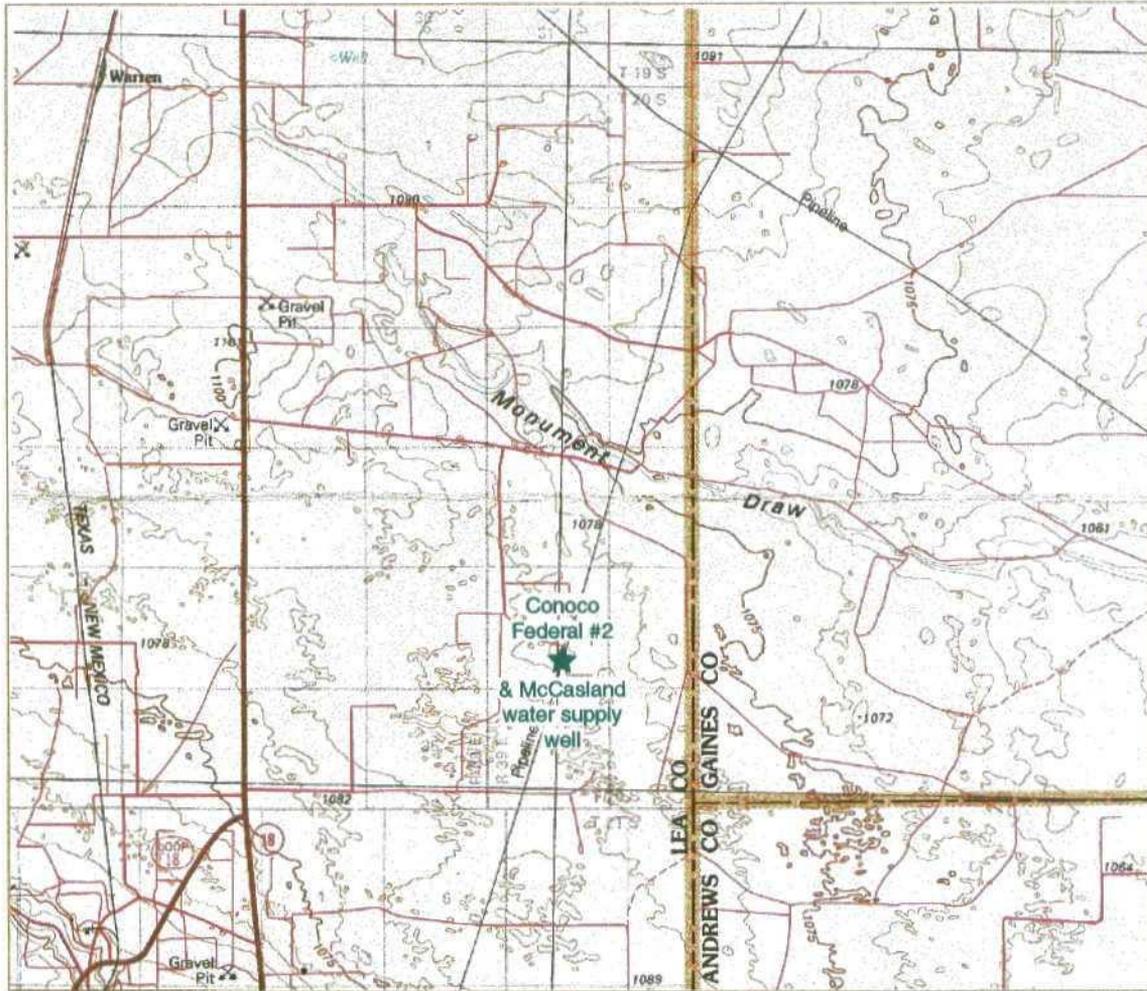
  
Randall T. Hicks  
Principal



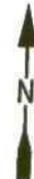
  
Melissa Snodgrass  
Staff Engineer

cc: Gary Larson, Esq.  
Mike Shepard, Mewbourne  
Jerry Elgin, Mewbourne





Map source: USGS Hobbs, New Mexico-Texas Quadrangle map



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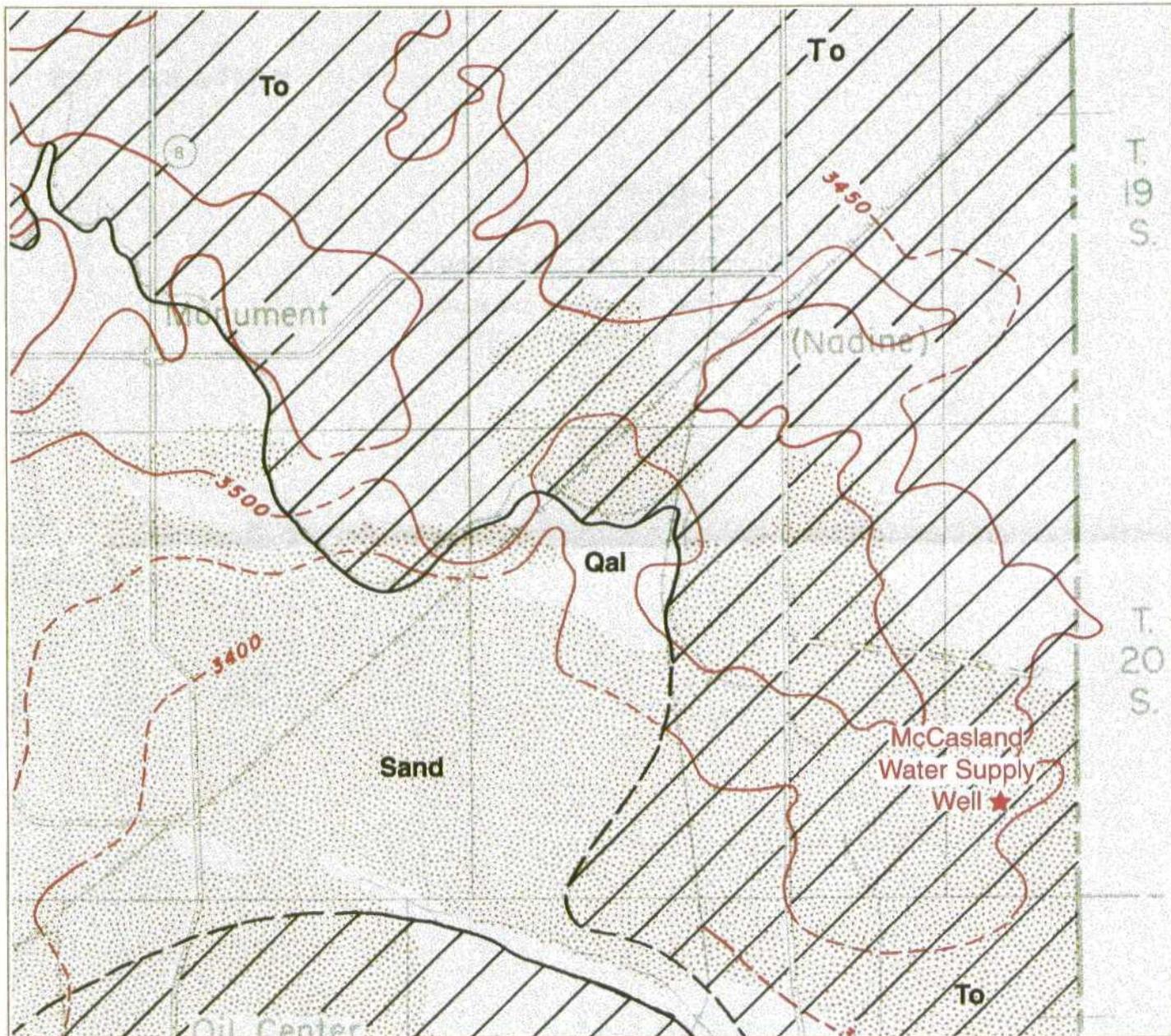
Mewbourne Oil

Plate 1

Map Showing Five Mile Radius

October 12, 1998





Legend

-  Contours on the red-bed surface
- Sand** Thin cover of drift sand in most places; locally dunes 20-40 feet high
- To** Ogallala formation
- Qal** Alluvium



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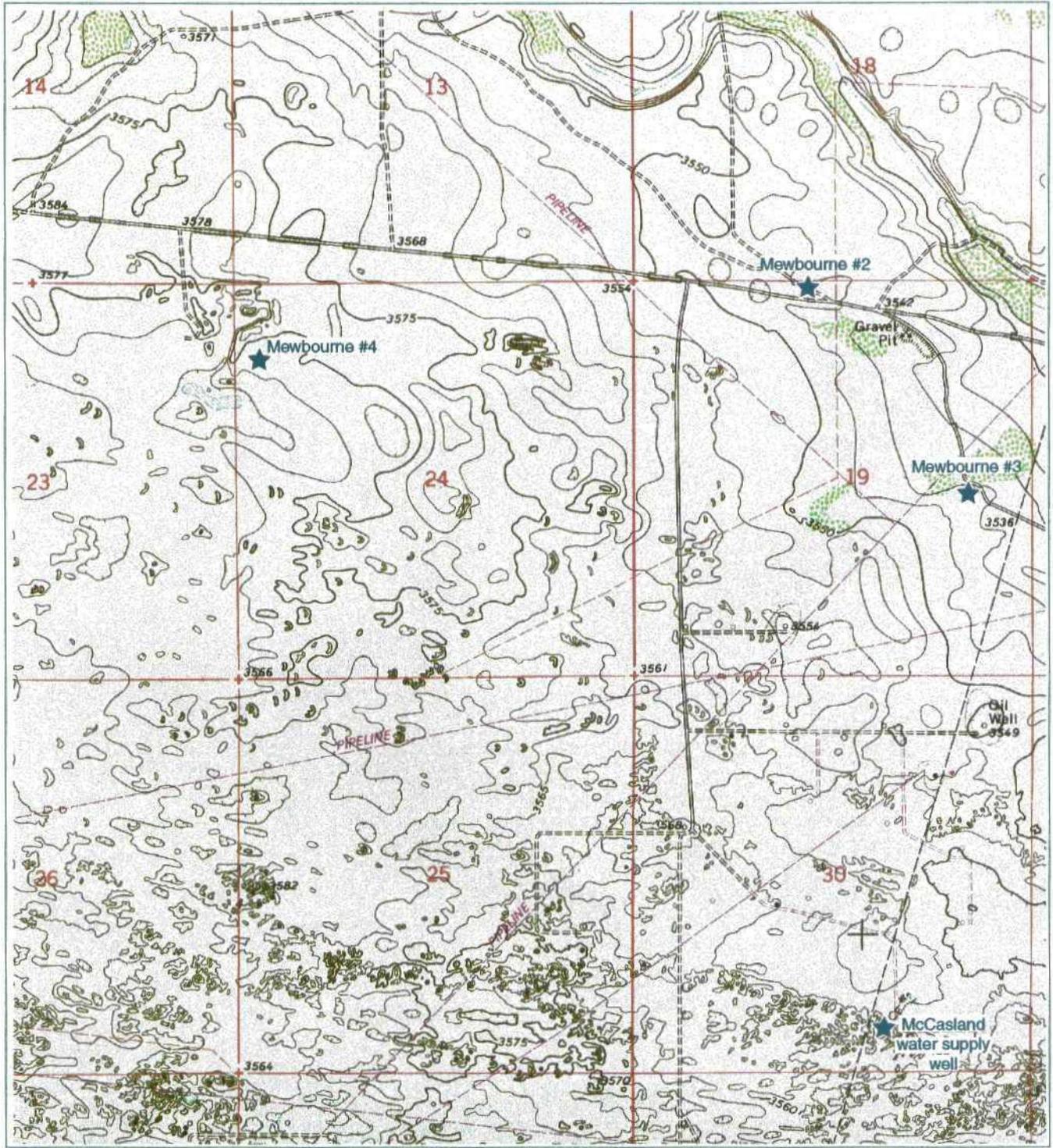
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Mewbourne Oil

Geologic Map of Southern  
Lea County

Plate 3

October 12, 1998



Map source: USGS Hobbs SE, Tex.-N.Mex. 7.5 minute quadrangle map



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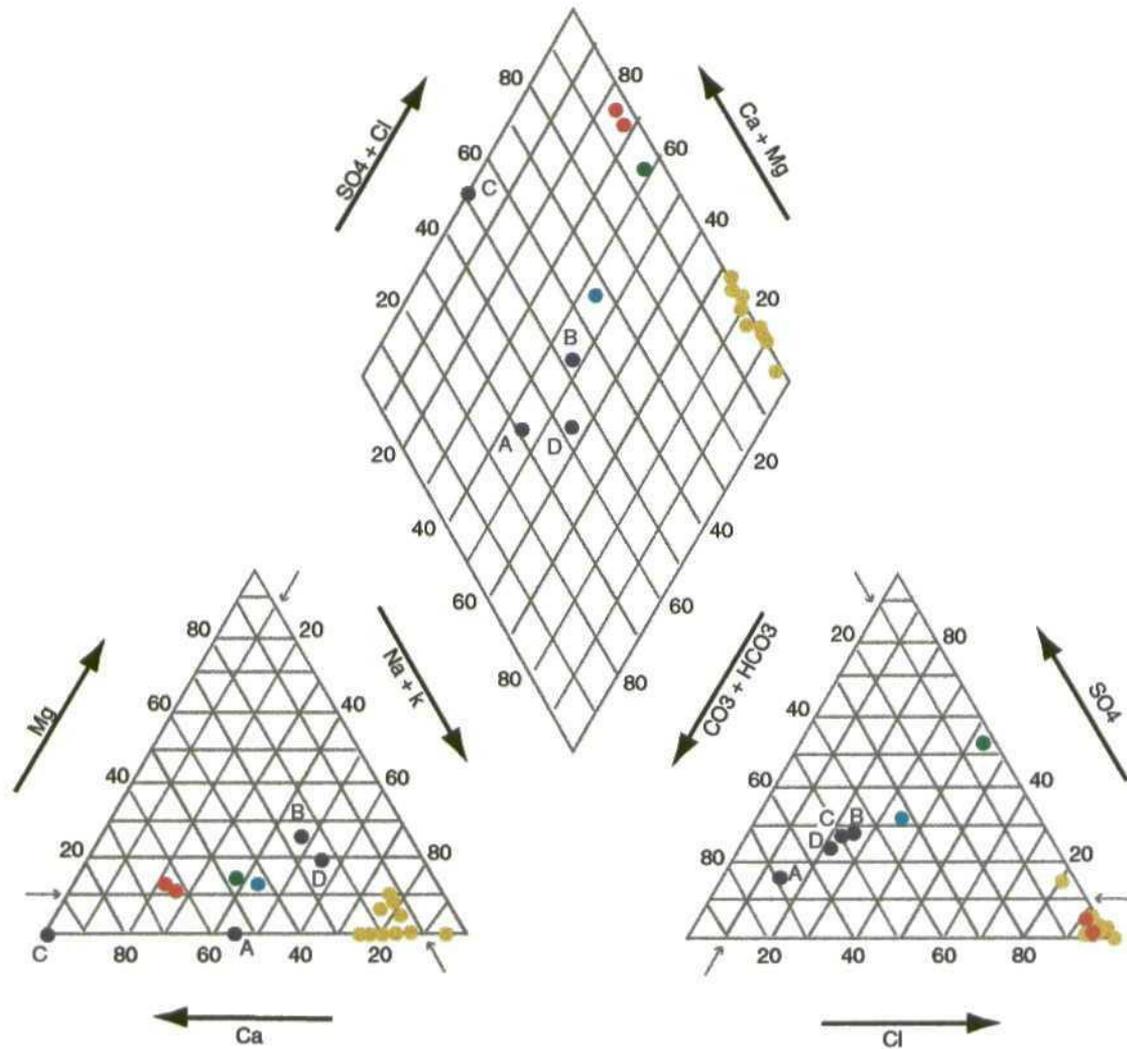
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Topographic Map

Plate 4

October 12, 1998



Legend

- Ogallala Well
- Mew #2
- Mew #4
- McCasland Well near Fed #2
- Oil Production Well

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Mewbourne Oil

Trilinear Diagram

Plate 5

October 12, 1998

**APPENDIX A: Well Logs**

STATE ENGINEER OFFICE  
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Dallas McCasland Owner's Well No. 2  
Street or Post Office Address P.O. Box 206  
City and State Eunice, NM 88231

Well was drilled under Permit No. L-10,044 and is located in the:  
a.  $\frac{1}{4}$  ~~NE~~ <sup>SW</sup>  $\frac{1}{4}$  ~~SE~~  $\frac{1}{4}$  SE  $\frac{1}{4}$  of Section 30 Township 20S Range 39E N.M.P.M.  
b. Tract No. \_\_\_\_\_ of Map No. \_\_\_\_\_ of the \_\_\_\_\_  
c. Lot No. \_\_\_\_\_ of Block No. \_\_\_\_\_ of the \_\_\_\_\_  
Subdivision, recorded in Lea County.  
d. X= \_\_\_\_\_ feet, Y= \_\_\_\_\_ feet, N.M. Coordinate System \_\_\_\_\_ Zone in  
the \_\_\_\_\_ Grant.

(B) Drilling Contractor Dallas McCasland License No. WD 1196  
Address P.O. Box 206, Eunice, NM 88231

Drilling Began 12-16-88 Completed 12-17-88 Type tools rotary Size of hole 7 7/8 in.  
Elevation of land surface or \_\_\_\_\_ at well is \_\_\_\_\_ ft. Total depth of well 90 ft.  
Completed well is  shallow  artesian. Depth to water upon completion of well 40 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			
58	70	12	Gray sand	5

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
5" ID	2.4	PVC	0	90	20	None	50	90

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				
					None

Section 5. PLUGGING RECORD

Plugging Contractor \_\_\_\_\_  
Address \_\_\_\_\_  
Plugging Method \_\_\_\_\_  
Date Well Plugged \_\_\_\_\_  
Plugging approved by: \_\_\_\_\_

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

State Engineer Representative

FOR USE OF STATE ENGINEER ONLY

Date Received January 9, 1989 Quad \_\_\_\_\_ FWL \_\_\_\_\_ FSL \_\_\_\_\_

File No. L-10,044 #2 Use EXP. Location No. 20.39.30.430  
1980' FEL & 660' FSL

(THIS IS NOW STOCK WELL NO. L-10,056)

43233



STATE ENGINEER OFFICE  
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Dallas McCasland Owner's Well No. 3  
 Street or Post Office Address P.O. Box 206  
 City and State Eunice, NM 88231

Well was drilled under Permit No. L-10,044 and is located in the:  
 SW 1/4  
 a. ~~SW~~ 1/4 NW 1/4 of Section 24 Township 20S Range 38E N.M.P.M.  
 b. Tract No. \_\_\_\_\_ of Map No. \_\_\_\_\_ of the \_\_\_\_\_  
 c. Lot No. \_\_\_\_\_ of Block No. \_\_\_\_\_ of the \_\_\_\_\_  
 Subdivision, recorded in \_\_\_\_\_ County.  
 d. X= \_\_\_\_\_ feet, Y= \_\_\_\_\_ feet, N.M. Coordinate System \_\_\_\_\_ Zone in  
 the \_\_\_\_\_ Grant.

(B) Drilling Contractor Dallas McCasland License No. WD 1196  
 Address P.O. Box 206, Eunice, NM 88231  
 Drilling Began 12-28-88 Completed 12-29-88 Type tools rotary Size of hole 6 1/4 in.  
 Elevation of land surface or \_\_\_\_\_ at well is \_\_\_\_\_ ft. Total depth of well 58 ft.  
 Completed well is  shallow  artesian. Depth to water upon completion of well \_\_\_\_\_ ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			
46	54	8	Gray sand	3

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4 1/2" ID	2.0	PVC			20'	none	38	56

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				
					None

Section 5. PLUGGING RECORD

Plugging Contractor \_\_\_\_\_  
 Address \_\_\_\_\_  
 Plugging Method \_\_\_\_\_  
 Date Well Plugged \_\_\_\_\_  
 Plugging approved by: \_\_\_\_\_  
 State Engineer Representative

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received January 9, 1989 Quad \_\_\_\_\_ FWL \_\_\_\_\_ FSL \_\_\_\_\_  
 File No. L-10,044 #3 Use EXP. Location No. 20.38.24.11333

(THIS IS NOW STOCK WELL NO. L-10,057)



WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

	716	FEL	
	1633	FNL	

(A) Owner of well ANNA L. FOSTER  
 Street and Number STAR ST. A  
 City HABBS State IND  
 Well was drilled under Permit No. W-3519 and is located in the  
E 1/2 1/4 NE 1/4 1/4 of Section 31 Twp. 19S Rge. 39E  
 (B) Drilling Contractor M. H. FULFINGTON License No. WD124  
 Street and Number 317 N. FORT P.R.  
 City HABBS State IND  
 Drilling was commenced 3-23 1960  
 Drilling was completed 3-26 1960

(Plat of 640 acres)

Elevation at top of casing in feet above sea level \_\_\_\_\_ Total depth of well 133 ft  
 State whether well is shallow or artesian SHALLOW Depth to water upon completion 60

Section 2

PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation
	From	To		
1	60	80	20	1st water sand
2	100	131	31	2nd water sand
3				
4				
5				

Section 3

RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth		Feet	Type Shoe	Perforations	
			Top	Bottom			From	To
1 1/2		Welded	0	133	133	20 shoe	60	133

Section 4

RECORD OF MUDDING AND CEMENTING

Depth in Feet		Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
From	To				

Section 5

PLUGGING RECORD

Name of Plugging Contractor \_\_\_\_\_ License No. \_\_\_\_\_  
 Street and Number \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_  
 Tons of Clay used \_\_\_\_\_ Tons of Roughage used \_\_\_\_\_ Type of roughage \_\_\_\_\_  
 Plugging method used \_\_\_\_\_ Date Plugged \_\_\_\_\_ 19 \_\_\_\_\_  
 Plugging approved by: \_\_\_\_\_

Cement Plugs were placed as follows:

No.	Depth of Plug		No. of Sacks Used
	From	To	

Basin Supervisor

FOR USE OF STATE ENGINEER ONLY  
 Date Received APR 11 AM 9:05  
 File No. 1-3519 Use Dr Location No. 19 39 31 280

LOG OF WELL

Section 6	Depth in Feet		Thickness In Feet	Color	Type of Material Encountered
	From	To			
	0	8	8		Silt Soil
	8	28	20		Clay
	28	53	25		Sandy Clay
	53	60	7		Hard Rock
	60	80	20		1st water sand
	80	95	15		Sandy Clay
	95	100	5		Hard Rock
	100	131	31		2nd water Red Rock
	131	133	2		

L S Elev 3587'

Depth to K 137'

Elev of K 3452'

Loc. No. 19 39 31 22342

Hydro. Survey  Field Check

SOURCE OF ALTITUDE GIVEN

Interpolated from Topo. Sheet

Determined by Inst. Leveling

Other

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

*M. J. Williams*  
Well Driller

STATE ENGINEER OFFICE  
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Jayson Ussery Owner's Well No. \_\_\_\_\_

Street or Post Office Address E. Nadine Rd.

City and State Hobbs, New Mexico 88240

Well was drilled under Permit No. L-10,557 and is located in the :

a. \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/2 N \_\_\_\_\_ 1/2 \_\_\_\_\_ 1/4 of Section 31 Township 19S  
Range 39E N.M.P.M.

b. Tract No. \_\_\_\_\_ of Map No. \_\_\_\_\_ of the \_\_\_\_\_

c. Lot No. \_\_\_\_\_ of block No. \_\_\_\_\_ of the \_\_\_\_\_

Subdivision, recorded in \_\_\_\_\_ County.

d. X= \_\_\_\_\_ feet, Y= \_\_\_\_\_ feet, N.M. Coordinate System \_\_\_\_\_

Zone in the \_\_\_\_\_ Grant

(B) Drilling Contractor Alan G. Fades License No. WD-1044

Address 1200 E. Bender Blvd. Hobbs, New Mexico 88240

Drilling Began 5-4-96 Completed 5-4-96 Type Tools Rotary Size of hole 7 7/8 in.

Elevation of land surface or \_\_\_\_\_ at well is \_\_\_\_\_ ft. Total depth of well 135 ft.

Completed well is  shallow  artesian Depth to water upon completion of well 75 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			
75	135	60	Water Sand with Sandstone Stringers	35

Section 3. RECORD OF CASING

Diameter (INCHES)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
5 3/4	160psi				135		115	135

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

Section 5. PLUGGING RECORD

Plugging Contractor \_\_\_\_\_  
 Address \_\_\_\_\_  
 Plugging Method \_\_\_\_\_  
 Date Well Plugged \_\_\_\_\_  
 Plugging approved by: \_\_\_\_\_  
 \_\_\_\_\_  
 State Engineer Representative

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

Date Received 06/14/96 **FOR USE OF STATE ENGINEER ONLY**  
 Quad \_\_\_\_\_ FWL \_\_\_\_\_ FSL \_\_\_\_\_  
 File No. L-10,557 Use Domestic Location No. 19-39-31-21121



STATE ENGINEER OFFICE  
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well \_\_\_\_\_ Owner's Well No. \_\_\_\_\_  
Street or Post Office Address \_\_\_\_\_  
City and State \_\_\_\_\_

Well was drilled under Permit No. \_\_\_\_\_ and is located in the:

- a. \_\_\_\_\_ ¼ \_\_\_\_\_ ¼ \_\_\_\_\_ ¼ of Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_ N.M.P.M.
- b. Tract No. \_\_\_\_\_ of Map No. \_\_\_\_\_ of the \_\_\_\_\_
- c. Lot No. \_\_\_\_\_ of Block No. \_\_\_\_\_ of the \_\_\_\_\_  
Subdivision, recorded in \_\_\_\_\_ County.
- d. X= \_\_\_\_\_ feet, Y= \_\_\_\_\_ feet, N.M. Coordinate System \_\_\_\_\_ Zone in  
the \_\_\_\_\_ Grant.

(B) Drilling Contractor \_\_\_\_\_ License No. \_\_\_\_\_  
Address \_\_\_\_\_

Drilling Began \_\_\_\_\_ Completed \_\_\_\_\_ Type tools \_\_\_\_\_ Size of hole \_\_\_\_\_ in.  
Elevation of land surface or \_\_\_\_\_ at well is \_\_\_\_\_ ft. Total depth of well \_\_\_\_\_ ft.  
Completed well is  shallow  artesian. Depth to water upon completion of well \_\_\_\_\_ ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

Section 5. PLUGGING RECORD

Plugging Contractor \_\_\_\_\_  
Address \_\_\_\_\_  
Plugging Method \_\_\_\_\_  
Date Well Plugged \_\_\_\_\_  
Plugging approved by: \_\_\_\_\_

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

State Engineer Representative

FOR USE OF STATE ENGINEER ONLY

Date Received Typed 1/27/78

Quad \_\_\_\_\_ FWL \_\_\_\_\_ FSL \_\_\_\_\_

File No. \_\_\_\_\_ Use 011 Location No. 21.38.8.42400



STATE ENGINEER OFFICE  
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well \_\_\_\_\_ Owner's Well No. \_\_\_\_\_  
Street or Post Office Address \_\_\_\_\_  
City and State \_\_\_\_\_

Well was drilled under Permit No. \_\_\_\_\_ and is located in the:

- a. \_\_\_\_\_ ¼ \_\_\_\_\_ ¼ \_\_\_\_\_ ¼ of Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_ N.M.P.M.
- b. Tract No. \_\_\_\_\_ of Map No. \_\_\_\_\_ of the \_\_\_\_\_
- c. Lot No. \_\_\_\_\_ of Block No. \_\_\_\_\_ of the \_\_\_\_\_  
Subdivision, recorded in \_\_\_\_\_ County.
- d. X= \_\_\_\_\_ feet, Y= \_\_\_\_\_ feet, N.M. Coordinate System \_\_\_\_\_ Zone in  
the \_\_\_\_\_ Grant.

(B) Drilling Contractor \_\_\_\_\_ License No. \_\_\_\_\_

Address \_\_\_\_\_

Drilling Began \_\_\_\_\_ Completed \_\_\_\_\_ Type tools \_\_\_\_\_ Size of hole \_\_\_\_\_ in.

Elevation of land surface or \_\_\_\_\_ at well is \_\_\_\_\_ ft. Total depth of well \_\_\_\_\_ ft.

Completed well is  shallow  artesian. Depth to water upon completion of well \_\_\_\_\_ ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

Section 5. PLUGGING RECORD

Plugging Contractor \_\_\_\_\_

Address \_\_\_\_\_

Plugging Method \_\_\_\_\_

Date Well Plugged \_\_\_\_\_

Plugging approved by: \_\_\_\_\_

State Engineer Representative

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received Typed 1/27/78

Quad \_\_\_\_\_ FWL \_\_\_\_\_ FSL \_\_\_\_\_

File No. \_\_\_\_\_ Use 011 Location No. 21.38.8.44200



STATE ENGINEER OFFICE  
WELL RECORD

FIELD ENGR. LOG

Section 1. GENERAL INFORMATION

(A) Owner of well Millard Deck Owner's Well No. \_\_\_\_\_  
Street or Post Office Address P. O. Box 1047  
City and State Eunice, New Mexico 88231

Well was drilled under Permit No. L-7980 and is located in the:  
a. SE  $\frac{1}{4}$  SW  $\frac{1}{4}$  of Section 26 Township 20-S Range 38-E N.M.P.M.  
b. Tract No. \_\_\_\_\_ of Map No. \_\_\_\_\_ of the \_\_\_\_\_  
c. Lot No. \_\_\_\_\_ of Block No. \_\_\_\_\_ of the \_\_\_\_\_  
Subdivision, recorded in Lea County.  
d. X= \_\_\_\_\_ feet, Y= \_\_\_\_\_ feet, N.M. Coordinate System \_\_\_\_\_ Zone in  
the \_\_\_\_\_ Grant.

(B) Drilling Contractor W. L. Van Noy License No. WD-208  
Address P. O. Box 74 Oil Center, New Mexico, 88266  
Drilling Began ~~INDEX~~ 6-1 Completed June 5, 1978 Drilling tools Spudder Size of hole 10 in.  
Elevation of land surface or \_\_\_\_\_ at well is \_\_\_\_\_ ft. Total depth of well 130 ft.  
Completed well is  shallow  artesian. Depth to water upon completion of well 65 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			
65	130	65	water sand.	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
6 5/8	welded		0	130	130	none	105	125

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

Section 5. PLUGGING RECORD

Plugging Contractor \_\_\_\_\_  
Address \_\_\_\_\_  
Plugging Method \_\_\_\_\_  
Date Well Plugged \_\_\_\_\_  
Plugging approved by: \_\_\_\_\_

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

State Engineer Representative

FOR USE OF STATE ENGINEER ONLY

Date Received September 19, 1978 Quad \_\_\_\_\_ FWL \_\_\_\_\_ FSL \_\_\_\_\_  
File No. L-7980 Use DOM Location No. 20.38.26.34



# WELL RECORD

No. 2

Water Well for  
Oil Well.

Date of Receipt .....

Permit No. ....

Name of permittee, Lowe Drilling Company

Street or P. O. Midland Tower Box 832, City and State Midland, Texas

1. Well location and description: The shallow well is located in NW  $\frac{1}{4}$ , SW  $\frac{1}{4}$ .  
(shallow or artesian)

NW  $\frac{1}{4}$  of Section 7, Township 20S, Range 39E; Elevation of top of

casing above sea level, ..... feet; diameter of hole, 7 inches; total depth, 97 feet;

depth to water upon completion, 60 feet; drilling was commenced Dec. 28, 19 54,

and completed Dec. 29, 19 54; name of drilling contractor O. R. Musslewhite

Box 56; Address, Hobbs, New Mexico; Driller's License No. WD 99

### 2. Principal Water-bearing Strata:

	Depth in Feet		Thickness	Description of Water-bearing Formation
	From	To		
No. 1	<u>60</u>	<u>95</u>	<u>35</u>	<u>Sand and sand rock, broken</u>
No. 2				
No. 3				
No. 4				
No. 5				

### 3. Casing Record:

Diameter in inches	Pounds per ft.	Threads per inch	Depth of Casing or Liner		Feet of Casing	Type of Shoe	Perforation	
			Top	Bottom			From	To
<u>7</u>	<u>24</u>	<u>8</u>	<u>0</u>	<u>97</u>	<u>97</u>	<u>None</u>	<u>67</u>	<u>97</u>

4. If above construction replaces old well to be abandoned, give location:  $\frac{1}{4}$ ,  $\frac{1}{4}$ ,  $\frac{1}{4}$

of Section ....., Township ....., Range ....., name and address of plugging contractor.

date of plugging ....., 19.....; describe how well was plugged:

**FILED**  
**MAR 30 1955**  
 OFFICE  
 GROUND WATER SUPERVISOR  
 MIDLAND, TEXAS

L-2898

G.W.D.

~~20397~~ 131

20,397 2112

8. Log of Well:

Description of Formation	Depth in Feet		Thickness in Feet
	From	To	
Soil	0	2	2
Caliche & Rock	2	18	16
Sandy Shale	18	40	22
Quartzite	40	45	5
Sand rock, hard	45	60	15
Sand & sand rock, broken	60	95	35
Red Bed	95	97	2
L S Elev	3563		
Depth to K	95		
Elev of K	3468		
Loc. No.	20.39.7.3113		
Hydro. Survey	Field Check X		
SOURCE OF ALTITUDE GIVEN			
Interpolated from Topo. Sheet	X		
Determined by Inst. Leveling			
Other			
Note: There is a possibility that log is not for well found. <i>gfw</i>			

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

*O. R. [Signature]*  
 Licensed Well Driller

Instructions

This form shall be executed, preferably typewritten, in triplicate and filed with the State Engineer's Office at Roswell, New Mexico, within 10 days after drilling has been completed. Data on water-bearing strata and on all formations encountered should be as complete and accurate as possible.

STATE ENGINEER OFFICE  
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well \_\_\_\_\_ Owner's Well No. \_\_\_\_\_  
Street or Post Office Address \_\_\_\_\_  
City and State \_\_\_\_\_

Well was drilled under Permit No. \_\_\_\_\_ and is located in the:

- a. \_\_\_\_\_ ¼ \_\_\_\_\_ ¼ \_\_\_\_\_ ¼ \_\_\_\_\_ ¼ of Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_ N.M.P.M.
- b. Tract No. \_\_\_\_\_ of Map No. \_\_\_\_\_ of the \_\_\_\_\_
- c. Lot No. \_\_\_\_\_ of Block No. \_\_\_\_\_ of the \_\_\_\_\_  
Subdivision, recorded in \_\_\_\_\_ County.
- d. X= \_\_\_\_\_ feet, Y= \_\_\_\_\_ feet, N.M. Coordinate System \_\_\_\_\_ Zone in  
the \_\_\_\_\_ Grant.

(B) Drilling Contractor \_\_\_\_\_ License No. \_\_\_\_\_

Address \_\_\_\_\_

Drilling Began \_\_\_\_\_ Completed \_\_\_\_\_ Type tools \_\_\_\_\_ Size of hole \_\_\_\_\_ in.

Elevation of land surface or \_\_\_\_\_ at well is \_\_\_\_\_ ft. Total depth of well \_\_\_\_\_ ft.

Completed well is  shallow  artesian. Depth to water upon completion of well \_\_\_\_\_ ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

Section 5. PLUGGING RECORD

Plugging Contractor \_\_\_\_\_

Address \_\_\_\_\_

Plugging Method \_\_\_\_\_

Date Well Plugged \_\_\_\_\_

Plugging approved by: \_\_\_\_\_

State Engineer Representative

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received Typed 1/27/78

Quad \_\_\_\_\_ FWL \_\_\_\_\_ FSL \_\_\_\_\_

File No. \_\_\_\_\_ Use 011 Location No. 21.38.9 44200

Section 6. LOG OF HOLE

Color and Type of Material Encountered	Depth in Feet		Thickness in Feet
	From	To	
Sand	0	40	
Hard sand	40	70	
Red bed	70	820	
Sand	820	860	
Red bed	860	1140	
Sand	1140	1370	
Sand	1370	1609	
Anhydrite	1609	1705	
L S Elev	3575		
Depth to K	70		
Elev of K	3505		

Section 7. REMARKS AND ADDITIONAL INFORMATION

This well record is an excerpt from Oil Conservation Commission files at Hobbs, N.M.

Elevation: 3565' OK

Location: 21.38.9.4200 - 34 2243

Owner/ Elliot Oil Co.

Wyle #1

Record of Casing: 8 5/8"

- 1613'

7" 4318'

Rotary 0-1616'

Cable 1616'-4360'

990' FSL - 330' FBL

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All answers, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or reopened. When this form is used as a plugging record, only Section 1(a) and Section 5 need be completed.

**APPENDIX B: Chain of Custody Form**

