

# Lynx Petroleum Consultants, Inc.

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Hobbs, New Mexico 88241

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June 17, 2005

RECEIVED  
JUN 21 2005  
OIL CONSERVATION  
DIVISION

Mr. David Brooks, Mr. David Catanach  
New Mexico Oil Conservation Division  
1220 S. Saint Francis Drive  
Santa Fe, New Mexico 87505

Re: Case 13451 – Additional Documents

Gentlemen:

Attached per your request are copies of the covers of several documents and pertinent data that was referenced in my testimony during the hearing on June 16<sup>th</sup>. The TDS map is from an RE/SPEC report that was submitted to the OCD in its entirety as an Exhibit in Case No. 10693. The Hiss report No. 38 contains data from a test well, the Hackberry Deep Unit No. 1, located in Section 31, T-19S, R-31E, which indicates very high TDS water throughout the reef interval. This well is located to the southwest, approximately 5 miles from our proposed operation. The final map is an Exhibit from a U.S.G.S. water resources report No. 84-4077 showing the reef location and thickness, and the location of the test wells used to develop this data.

Please do not hesitate to call or write if I may be of additional assistance.

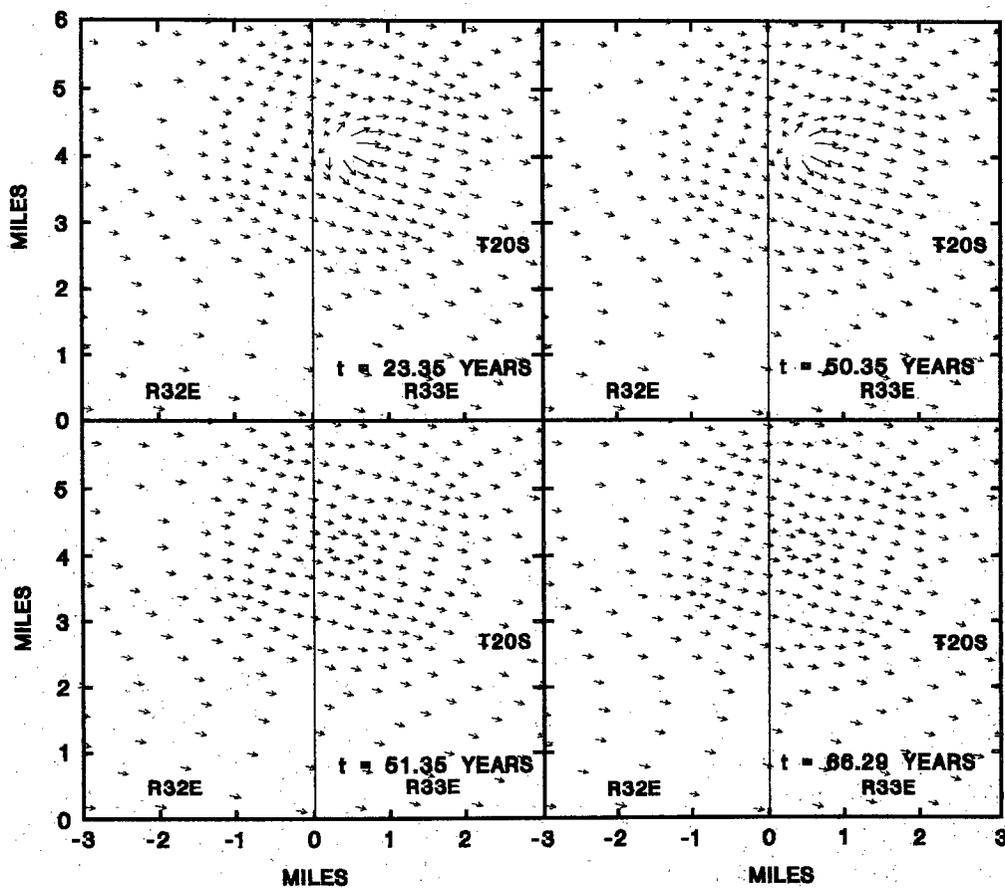
Sincerely,

LYNX PETROLEUM CONSULTANTS, INC.

  
Larry R. Scott

Cc: Pete Domenici, Jr.

# CAPITAN GROUNDWATER STUDIES



Prepared for:  
Rhombus Corporation



March 1993

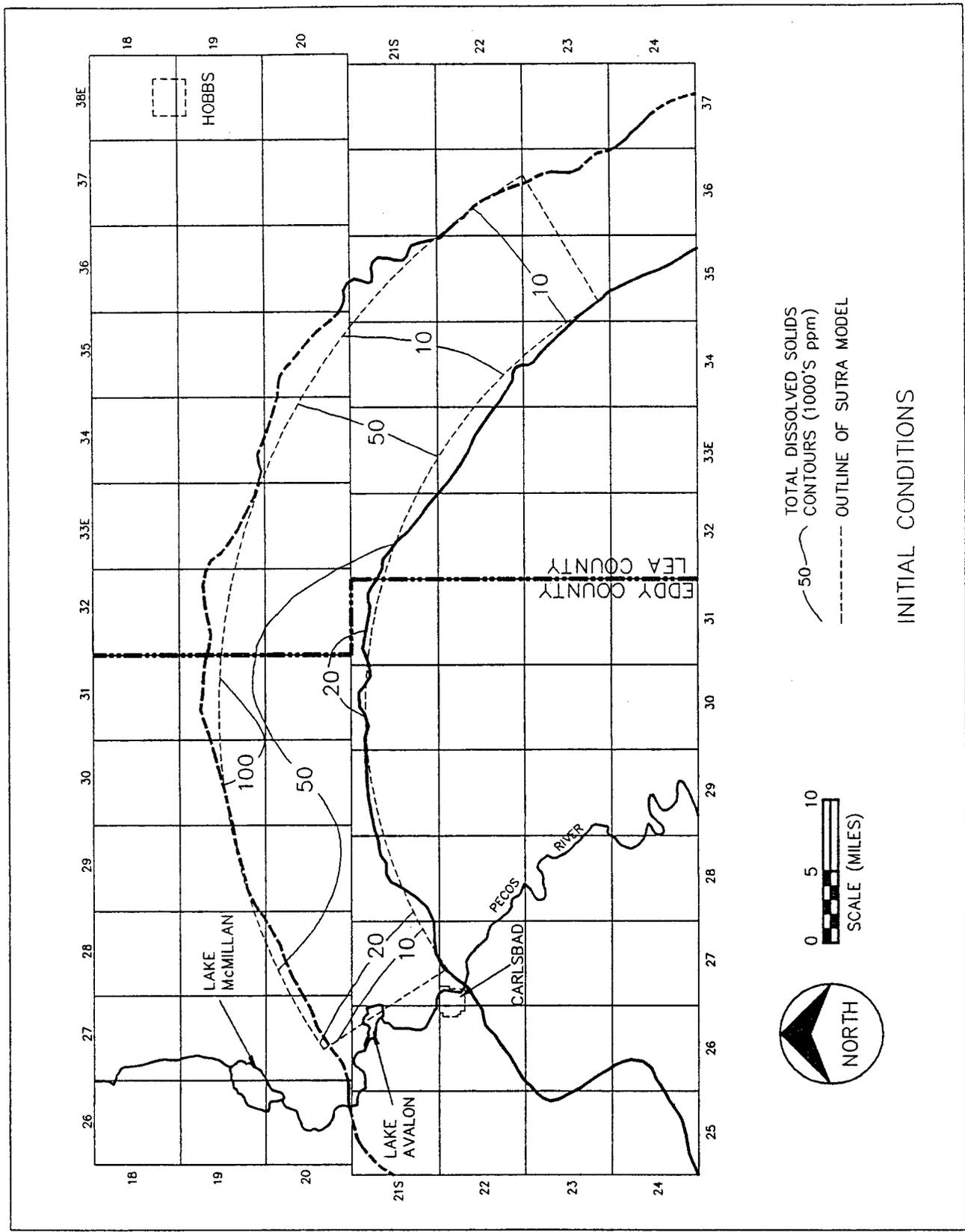
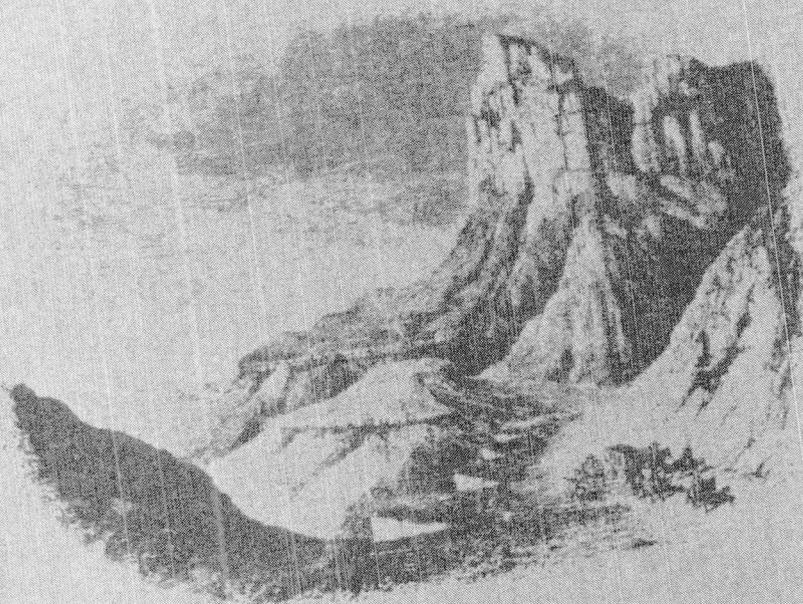


Figure D5. Initial TDS Distribution.

TECHNICAL REPORT 38

New Mexico State Engineer  
Santa Fe, New Mexico



# Capitan Aquifer Observation-Well Network Carlsbad to Jalisco New Mexico

by

W. L. HISS

Prepared in cooperation with  
the United States Geological Survey

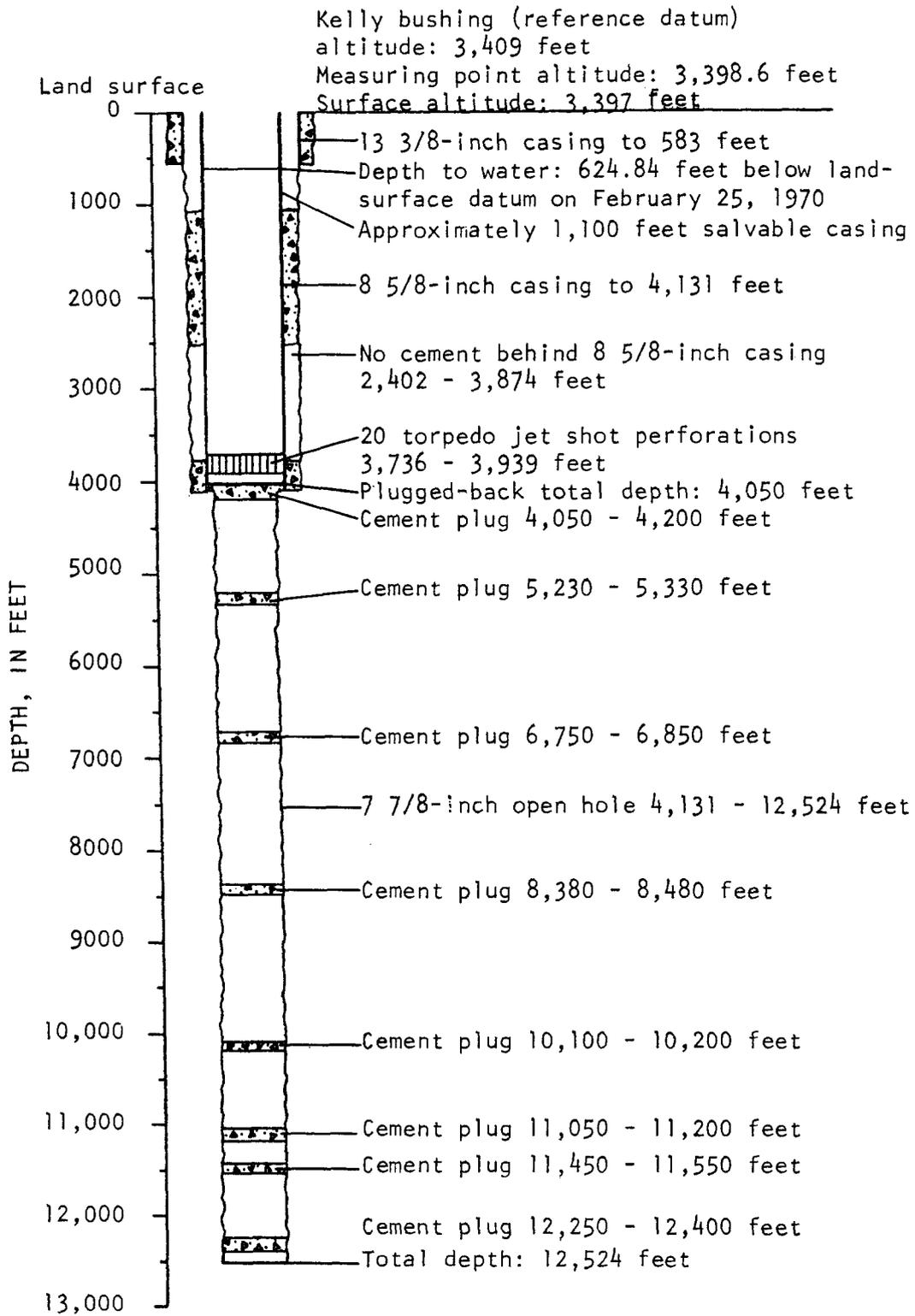
Table 2. --Chemical quality of water in Capitan aquifer observation wells - Concluded

Location number	Well name	Aquifer	Producing interval or sampling depth (feet)	Date	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sodium + Potassium (Na+K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Total dissolved solids	Calcium magnesium-sulfate	Non-carbonate	Specific gravity at 20°C	Hardness as CaCO <sub>3</sub>	Specific conductance (micromhos at 25°C)	pH
20.30.32.341	Yates State 1 - Concluded	Capitan	1,000 <sup>2</sup> / <sub>4610</sub>	12-29-71	---	1,452	600	13,808	595	---	4,410	22,016	---	43,712	6,100	---	1.031	---	50,000	7.1
32.341	do.	do.	1,500 <sup>2</sup> / <sub>4610</sub>	12-29-71	---	1,452	552	14,387	576	---	4,480	22,726	---	43,730	5,900	---	1.031	---	52,083	7.1
32.343	do.	do.	2,000 <sup>2</sup> / <sub>4610</sub>	12-29-71	---	1,452	552	14,385	571	---	4,480	22,726	---	43,858	5,900	---	1.030	---	50,000	7.1
32.341	do.	do.	2,500 <sup>2</sup> / <sub>4610</sub>	12-29-71	---	946	482	10,348	134	---	3,080	16,689	---	32,058	4,350	---	1.022	---	43,680	6.9
19.31.31.132 <sup>1/2</sup>	hackberry Deep Unit 1	do.	2,113 <sup>4627</sup>	12-15-66	---	---	---	---	---	---	---	87,500	---	---	---	---	1.109	---	175,000	---
31.132 <sup>1/2</sup>	do.	do.	3,005 <sup>4627</sup>	12-15-66	---	---	---	---	---	---	---	87,000	---	---	---	---	1.109	---	174,000	---
31.132 <sup>1/2</sup>	do.	do.	3,746 <sup>4627</sup>	12-15-66	---	---	---	---	---	---	---	87,500	---	---	---	---	1.109	---	174,000	---
31.132 <sup>1/2</sup>	do.	do.	3,832 <sup>4627</sup>	12-15-66	---	---	---	---	---	---	---	102,000	---	---	---	---	1.130	---	194,000	---
31.132 <sup>1/2</sup>	do.	do.	3,936 <sup>4627</sup>	12-15-66	---	---	---	---	---	---	---	106,000	---	---	---	---	1.134	---	197,000	---
31.132 <sup>1/2</sup>	do.	do.	750 <sup>2</sup> / <sub>4627</sub>	10-21-71	---	1,892	1,767	69,691	5	---	5,320	112,210	---	191,024	12,000	---	1.115 <sup>1/2</sup>	---	200,000	5.0
31.132 <sup>1/2</sup>	do.	do.	1,520 <sup>2</sup> / <sub>4627</sub>	10-21-71	---	1,848	1,842	68,569	0	---	5,110	110,790	---	188,307	12,200	---	1.114	---	196,078	4.9
31.132 <sup>1/2</sup>	do.	do.	2,020 <sup>2</sup> / <sub>4627</sub>	10-21-71	---	1,804	1,699	69,879	2	---	5,250	112,210	---	190,993	11,500	---	1.115	---	200,000	5.0
31.132 <sup>1/2</sup>	do.	do.	2,770 <sup>2</sup> / <sub>4627</sub>	10-21-71	---	1,716	1,825	69,756	10	---	5,250	112,210	---	190,902	11,800	---	1.115	---	200,000	5.25
31.132 <sup>1/2</sup>	do.	do.	3,270 <sup>2</sup> / <sub>4627</sub>	10-21-71	---	1,760	1,701	69,874	5	---	5,110	112,210	---	190,791	11,400	---	1.116	---	200,000	5.1
31.132 <sup>1/2</sup>	do.	do.	3,770 <sup>2</sup> / <sub>4627</sub>	10-21-71	---	1,980	1,883	66,796	649	---	4,970	107,949	---	184,227	12,700	---	1.112	---	196,078	7.1
19.32.31.110 <sup>2/2</sup>	Middleton Federal B 1	Seven Rivers- Capitan	2,923-2,957	9-26-63	9.2	1,032	537	8,530	357	---	3,430	13,210	---	27,200	4,688	---	1.024	---	---	7.8
31.110	do.	do.	2,923-2,957	10-26-66	---	1,200	446	7,810	460	0	3,650 <sup>9/2</sup>	12,500 <sup>9/2</sup>	---	25,800	4,830	4,450	1.017	48	36,100	6.8
31.110 <sup>2/2</sup>	do.	do.	2,923-2,957	10-26-66	---	1,095	953	7,950	389	---	454 <sup>9/2</sup>	17,900 <sup>9/2</sup>	---	28,740	---	---	1.020	---	---	7.5
21.34.23.310 <sup>2/2</sup>	South Wilson Deep Unit 1	Capitan	4,169-4,187	10-25-66	---	---	---	---	---	---	---	5,920	---	---	---	---	1.012	---	---	---
23.310	do.	do.	4,169-4,187	10-25-66	---	1,040	302	3,190	480	0	2,820	5,250	---	12,800	3,830	3,440	1.008	22.0	18,300	6.7
23.35.26.120 <sup>1/2</sup>	North Custer Mountain Unit 1	do.	4,470-4,507	10-12-66	---	---	---	---	---	---	---	23,200	---	---	---	---	1.029	---	59,300	6.4
28.120 <sup>4627</sup>	do.	do.	4,470-4,507	10-12-66	---	1,500	1,270	11,370	488	---	465	23,900	---	---	---	---	1.034	---	---	---
24.36.20.210 <sup>1/2</sup>	Federal Devision 1	do.	1,073 <sup>4687</sup>	11-4-66	---	---	---	---	---	---	---	157,000	---	---	---	---	1.173	---	215,000	---
30.210 <sup>1/2</sup>	do.	do.	2,134 <sup>4687</sup>	11-4-66	---	---	---	---	---	---	---	160,000	---	---	---	---	1.177	---	219,000	8.0
20.210 <sup>1/2</sup>	do.	do.	4,000 <sup>4687</sup>	11-4-66	---	---	---	---	---	---	---	161,000	---	---	---	---	1.176	---	219,000	8.2
20.210 <sup>1/2</sup>	do.	do.	5,500 <sup>4687</sup>	11-4-66	---	---	---	---	---	---	---	160,000	---	---	---	---	1.179	---	220,000	8.3
20.210 <sup>1/2</sup>	do.	do.	1,500 <sup>4687</sup>	11-15-72	---	820	1,592	66,389	288	14	6,215	103,688	---	173,448	---	---	1.109	---	---	8.7
26.36.4.230 <sup>1/2</sup>	Southeast Jal Unit 1	do.	4,199-4,695	6-14-66	---	---	---	---	---	---	---	82,500	---	---	---	---	1.106	---	168,000	---

Note: (Wells are listed in order of increasing distance from Carlsbad, N. Mex. along trace of the Capitan aquifer. Analyses are by U.S. Geological Survey unless otherwise indicated. Chemical constituents are in milligrams per liter.)

1/ Water does not represent formation fluid.  
 2/ Commercial service laboratory analysis.  
 3/ Density of oil at top of fluid column is 0.818 at 17.5°C.  
 4/ Spot sample in fluid column.  
 5/ Plug-back production interval 6400-506.  
 6/ Producing interval 3,236-3,939.  
 7/ Producing interval 4,278-4,285.  
 8/ Difference in chloride and sulfate due to determination by different methods.  
 9/ Producing interval 2,209-2,515.  
 10/ Producing interval 1,538-1,936.  
 11/ Density of oil at top of fluid column is 0.796 at 20°C.  
 12/ Density of oil at top of fluid column is 0.796 at 20°C.

Hackberry Deep Unit 1



Appendix G.--Well-construction details for Hackberry Deep Unit 1,  
1,650 feet from north line and 990 feet from west line  
of sec. 31, T. 19 S., R. 31 E., Eddy County, New Mexico.

Appendix M.--Drilling and completion records of observation  
wells in the Capitan aquifer - Continued

Hackberry Deep Unit 1

Location: 1,650 FNL, 990 FWL, sec. 31, T. 19 S., R. 31 E., Eddy  
County, New Mexico.

Altitude: Kelly bushing 3,414 (Sweeney), 3,409 (Strake - reference  
datum); derrick floor 3,407 (Strake); ground level 3,397;  
casing head flange 3,393; measuring point 3,398.6.

Latitude: 32.61920°N                      Longitude: 103.91330°W

Permian Basin Well Data System No: MH10385

OMNIANA Data File No.: 35015API10385

Original owners: Mr. G. W. Strake. Subsequently assigned to Mr. H. N. Sweeney.

Land owner: U.S. Government. Drilled under Federal Lease No NM-06815A;  
grazing lease held by John Lusk, 304 North Corral, Carlsbad,  
New Mexico 88220.

U.S. Bureau Land Management Use Permit: Assigned Serial No. NM-0559838 and  
noted under 44 L.D. 513.

Water rights: CP-362 assigned on May 9, 1966. Originally assigned CP-363  
in error. Granted on May 9, 1966.

Depth to water from land-surface datum: 610.78 ft on March 2, 1967.

Measuring-point description: Top of 8 5/8-inch casing.

Date acquired by USGS: March 26, 1966.

Borehole geophysical logs:

Gamma-ray-neutron	1,700-4,024 ft
Acoustic	4,450-11,544 ft
Guard-gamma-ray-forxo-caliper-density	11,500-12,523 ft
Focus-gamma-ray	6,750-11,541 ft
Minifocused-caliper	6,700-11,549 ft
Acoustic-velocity-gamma-ray	11,500-12,518 ft
Gamma-ray	0-11,544 ft

Other logs: Drill cuttings 1,700-4,200 ft; Penetration rate 1,750-4,850 ft.

Casing and cement record:

13 3/8-in, 48-lb/ft casing set to 583 ft with 610 sacks of cement. Top of cement located by temperature survey at 230 ft. Cemented to surface with 100 sacks using line pipe.
8 5/8-in, J-55, 32 and 24-lb/ft casing set to 4,131 ft. Cemented bottom of casing with 200 sacks. Cemented through DV tool set at 2,402 with 1,000 sacks. Temperature survey indicates top of cement at 1,115 ft.

Appendix M. -- Drilling and completion records of observation  
wells in the Capitan aquifer - Continued

Hackberry Deep Unit 1 - Continued

Total depth: 12,524 ft

Plugged-back total depth: 4,050 ft

<u>Formation tops and bases:</u>			
Rustler Fm.	510	(+2,899)	
Yates Fm.	1,955	(+1,454)	
Capitan Limestone	2,193	(+1,216)	
Base of Capitan Limestone	4,103	(-694)	
Delaware Mountain Gp.	4,103	(-694)	
Bone Spring Limestone	6,625	(-3,216)	
Morrow Series	11,558	(-8,149)	
Barnett Shale	12,473	(-9,064)	

Other former owner record:

Spudded January 31, 1965; temporarily abandoned on March 2, 1965. Re-entered hole on August 13, 1965; temporarily abandoned August 24, 1965.

Drill-stem tests in formations of lower Permian and Pennsylvanian age.

Plugging record (Mr. H. N. Sweeney). Eight cement plugs, varying from 35 to 55 sacks of cement, were set at 12,400-12,250, 11,550-11,450, 11,200-11,050, 10,200-10,100, 8,480-8,380, 6,850-6,750, 5,330-5,230, and 4,200-4,050 ft, respectively, to plug open hole. Rotary mud circulated below, between, and above plugs.

<u>Lost circulation:</u>	<u>Depth, feet</u>	<u>Percent lost</u>
	1,893	100
	2,505	40
	2,585	100
	2,800	100
	2,828	40
	3,559-3,987	10-50

USGS work record:

Rigged up work-over rig on March 29, 1966. Bailed rotary mud from casing. Rigged down March 31, 1966. June 6, 1966, ran perforating depth control logs and perforated casing with shaped charges (torpedo jets) designed to cut 1½-in hole in casing and penetrate approximately 23 inches into formation. Perforated the intervals 3,736-3,749 with 8 shots; 3,830-3,833 with 4 shots; and 3,928-3,939 with 8 shots. No indication of fluid entering hole immediately after perforating casing.

Appendix M.--Drilling and completion records of observation

wells in the Capitan aquifer - Continued

Hackberry Deep Unit 1 - Concluded

USGS work record - Concluded

Treated Capitan aquifer with 2,000 gallons of regular 15 percent HCl in June 17, 1966. Acidized through casing.

Swabbed through casing from June 17 to June 20, 1966. Could not lower fluid level below 2,300 ft depth. Swabbed into test tank. Ran aquifer recovery test. Test failed.

Injected 3,000 gal retarded HCl acid in 3 stages through casing in second acid treatment on December 12, 1966. Each stage separated by jelled water and rock salt.

Swabbed through casing from December 12 to December 15, 1966. Sampled fluid in borehole at 3,005, 3,746, 3,832, and 3,936 ft using bailer.

Installed water-level recorder on September 12, 1966. Ran aquifer performance pulse test on September 4, 1969. Test failed.

Bailed approximately 95 feet of oil from borehole on October 21, 1971.

Production rate: 28 to 35 gpm on June 20, 1966, 12 gpm on June 22, 1966, and 43 gpm on December 15, 1966.

Total water produced: Approximately 2,170 bbl produced from June 17 to December 15, 1966.

Special conditions: Approximately 1,100 feet of 8 5/8-in, J-55, 24-lb/ft salvable casing remaining in the hole. Small amount of oil seeping into borehole.

PLATE 2  
DELAWARE BASIN, TEXAS AND NEW MEXICO  
WATER-RESOURCES INVESTIGATIONS REPORT 84-4077

EXPLANATION

----- APPROXIMATE POSITION OF EXTREME SHELFWARD EDGE  
OF CAPITAN REEF COMPLEX.

----- BASINAL EDGE OF CAPITAN REEF COMPLEX--Dashed where  
approximately located.

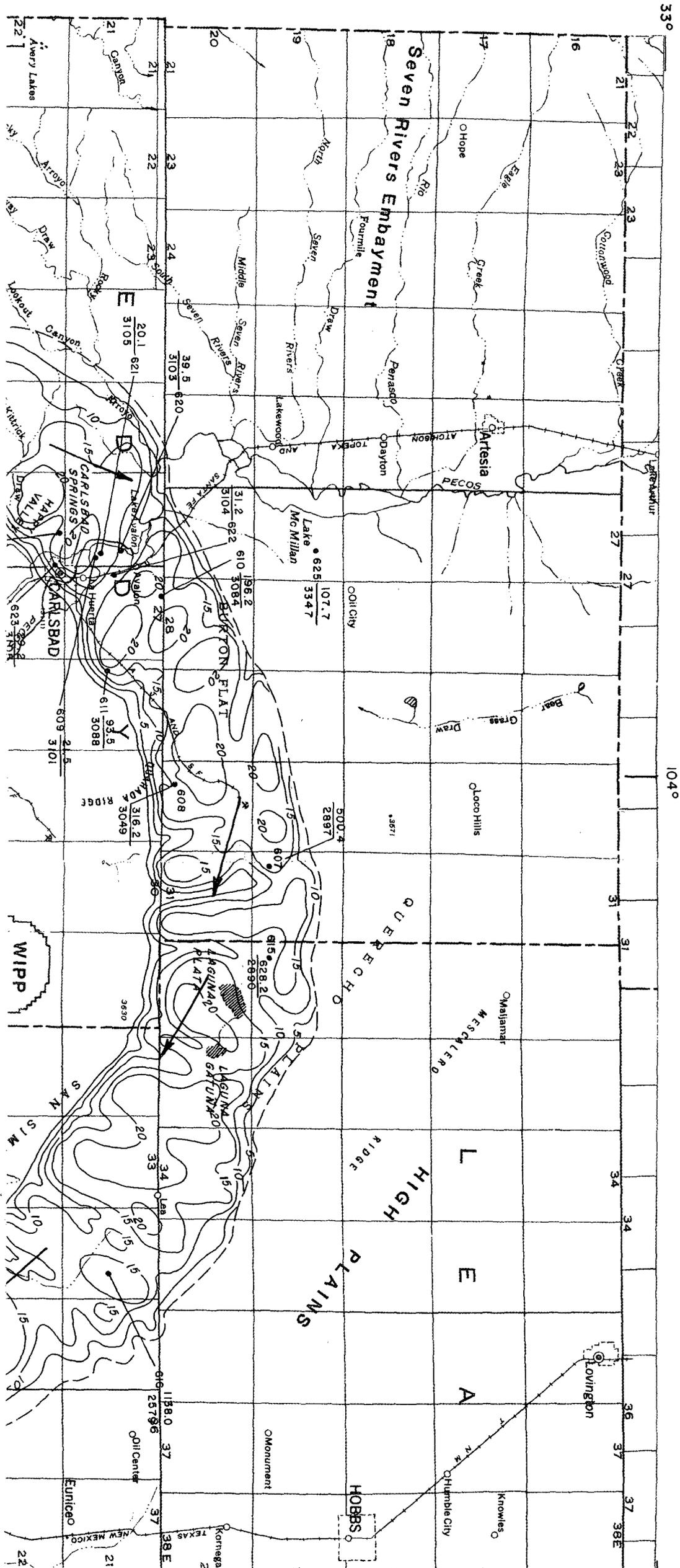
---/5--- LINE OF EQUAL THICKNESS OF THE CAPITAN AQUIFER,  
IN HUNDREDS OF FEET--Dashed where approximately  
located. Interval is 500 feet.  
(From Hiss, 1975).

• 616  $\frac{1138.0}{2579}$  WELL AND IDENTIFICATION NUMBER--  
Upper number is water level below  
or above (+) land surface, in feet.  
Lower number is altitude of water level,  
in feet. R indicates reported measurement.  
Datum is sea level.

→ GENERAL DIRECTION OF GROUND-WATER FLOW IN  
THE CAPITAN REEF--Arrows represent regional  
interpretations and do not necessarily fit  
individual control points.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE  
U.S. ENVIRONMENTAL PROTECTION AGENCY



Elevation: 3546' DF

Cement plug via tubing: Surface-20'

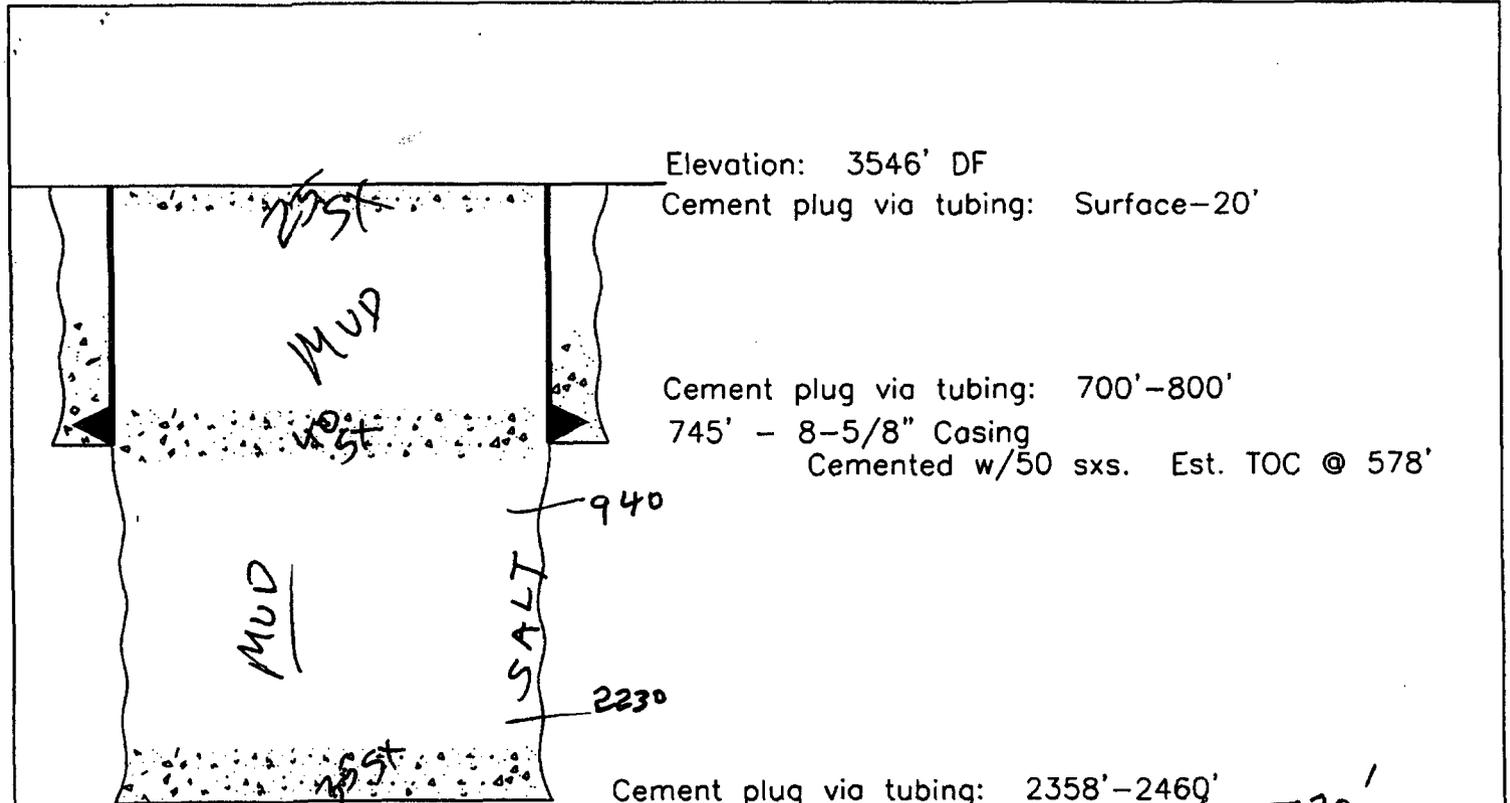
Cement plug via tubing: 700'-800'

745' - 8-5/8" Casing

Cemented w/50 sxs. Est. TOC @ 578'

Cement plug via tubing: 2358'-2460'

*inj zone in offset well 2370-2720'*



T.D. @ 2460'

30-015-10238

ATTACHMENT VI.2

Delhi-Taylor Oil Corp.
Jones Federal 3-23
1980' FSL & 660' FEL
Sec. 23, T-19S, R-31E
Eddy County, N.M.

**LYNX PETROLEUM CONSULTANTS, INC.**  
**APPLICATION FOR AUTHORIZATION TO INJECT**  
**Jones Federal 'B' No. 3**  
**Supporting Documentation**

**III. Well Data: Schematic Attached**

**VI. Wells in Area of Review**

1. Well Name: Jones Federal 'E' No. 1  
Type: Oil (Plugged and Abandoned)  
Casing & Cement: 13-3/8" @ 653' cemented w/650 sxs. Circulated  
8-5/8" @ 3925' cemented w/400 sxs. TOC @ 2160' by  
Temp Svy.  
4-1/2" @ 11,600' cemented w/380 sxs. Estimated TOC @ 9400' ✓  
Date Drilled: November 14, 1964  
Location: 1980' FNL & 660' FEL Section 23, T-19S, R-31E, Eddy Cty, NM  
Total Depth: 11,600'  
Perforations: 11,530-540'  
Schematic: Attached
2. Well Name: Jones Federal 3-23  
Type: Dry hole (Plugged and Abandoned)  
Casing & Cement: 8-5/8" @ 745' cemented w/50 sxs. Estimated TOC @ 578'  
Date Drilled: July 30, 1963  
Location: 1980' FSL & 660' FEL Section 23, T-19S, R-31E, Eddy Cty, NM  
Perforations: None  
Schematic: Attached
3. Well Name: Jones Federal No. 3  
Type: Oil (Plugged and Abandoned)  
Casing & Cement: 13-3/8" @ 701' cemented w/650 sxs. Circulated  
8-5/8" @ 3991' cemented w/500 sxs. TOC @ 2145' by  
Temp Svy.  
4-1/2" @ 11,570' cemented w/550 sxs. TOC @ 9320' by  
Temp Svy.  
Date Drilled: June 18, 1965  
Location: 660' FNL & 660' FEL Section 26, T-19S, R-31E, Eddy Cty, NM  
Perforations: 11,440-450'  
Schematic: Attached

**VII. Proposed Operation**

1. Average Daily Rate: 500 Barrels  
Maximum Daily Rate: 1000 Barrels  
Average Daily Volume: 500 Barrels  
Maximum Daily Volume: 1000 Barrels
2. System will be closed

30-015-10394-00-00

JONES B FEDERAL No. 003

Company Name: DOWDCO INC

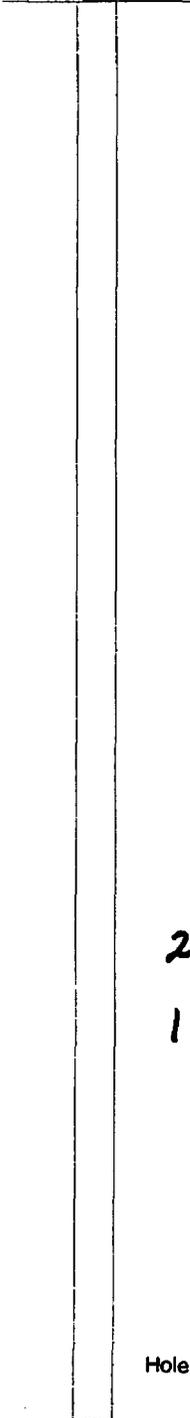
Location: Sec: 23 T: 19S R: 31E Spot:

Lat: 32.6405483962839 Long: -103.83349827919

String Information

Property Name: JONES B FEDERAL

County Name: Eddy



2 370 - 2412

1x 105 BUPO

Cement Information

Perforation Information

Top (ft sub)	Bottom (ft sub)	Shts/Ft	No Shts	Dt Sqz
99999	99999			

Formation Information

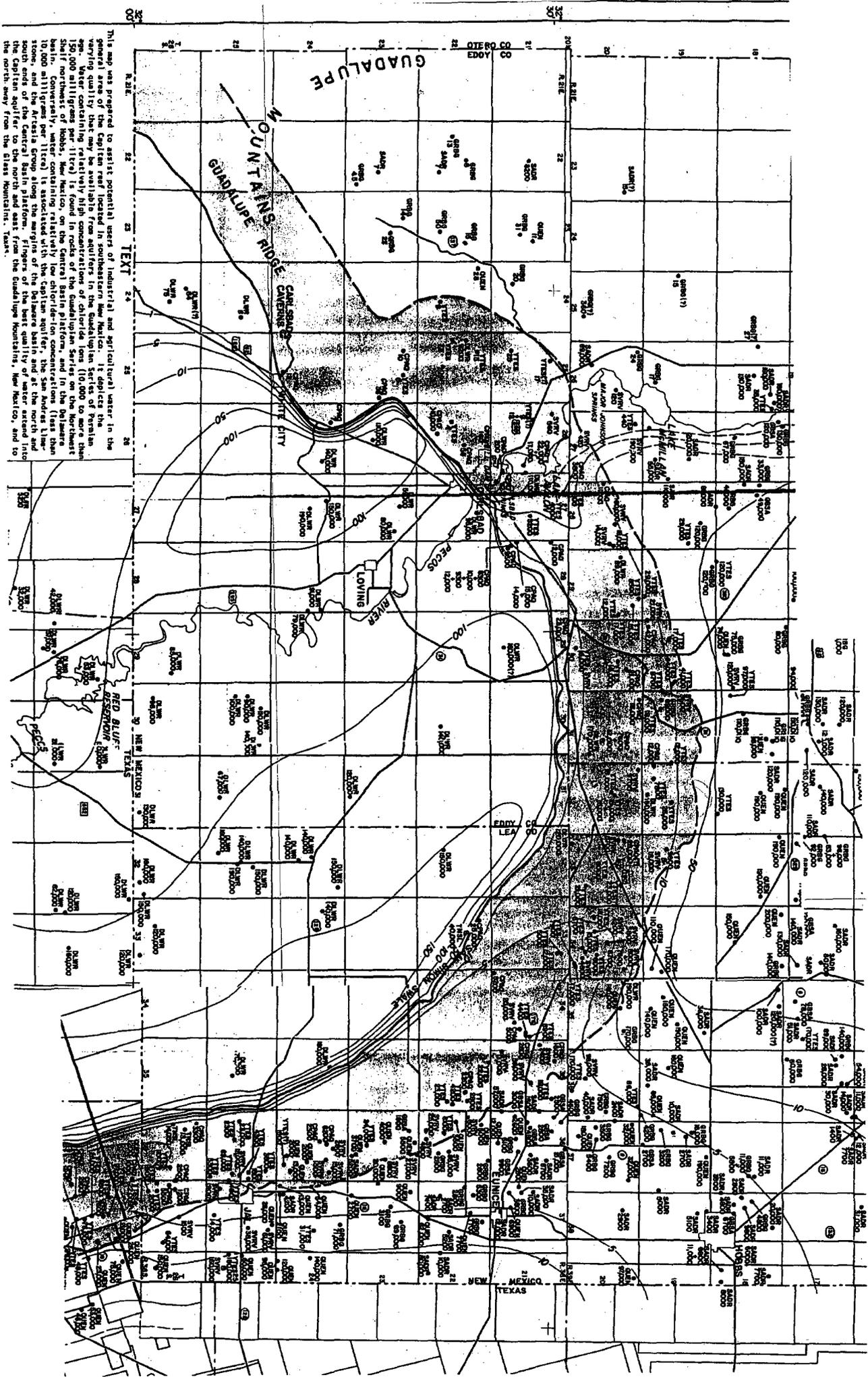
St Code	Formation	Depth
Prust	Rustler	688
Psat	Salado	930
Pbslt	Base of Salt	2220
Pyts	Yates	2375
Psr	Seven Rivers	2570
Preef	Capitan Reef	2705
Pdel	Delaware	4685
Pbs	Bone Spring	7090
Pbs1sd	1st Bone Spring Sand	8362
Pbs2sd	2nd Bone Spring Sand	9100
Pbs3sd	3rd Bone Spring Sand	9890
Pwc	Wolfcamp	11340

Hole: Unknown

TD:

TVD: 99999

PBTD:



This map was prepared to assist potential users of industrial and agricultural water in the general area of the Captain Reef located in southeastern New Mexico. It depicts the varying quality that may be available from aquifers in the Guadalupe Series of Permian age. Water containing relatively high concentrations of chlorides (10,000 to more than 50,000 milligrams per liter) is found in rocks of the Guadalupe Series on the northeast flank of the Guadalupe Mountains. The rocks of the Guadalupe Series are composed of limestone, dolomite, and shale, and contain relatively high concentrations of chlorides. The map shows the distribution of perchlorate in the aquifers of the Guadalupe Series. The map also shows the location of the Captain Reef and the Arceles Group. The map is titled 'GUADALUPE MOUNTAINS RIDGE' and 'CARL SPADE CAVERNS'.

GENERAL INFORMATION  
 This map was prepared to assist potential users of industrial and agricultural water in the general area of the Captain Reef located in southeastern New Mexico. It depicts the varying quality that may be available from aquifers in the Guadalupe Series of Permian age. Water containing relatively high concentrations of chlorides (10,000 to more than 50,000 milligrams per liter) is found in rocks of the Guadalupe Series on the northeast flank of the Guadalupe Mountains. The rocks of the Guadalupe Series are composed of limestone, dolomite, and shale, and contain relatively high concentrations of chlorides. The map shows the distribution of perchlorate in the aquifers of the Guadalupe Series. The map also shows the location of the Captain Reef and the Arceles Group. The map is titled 'GUADALUPE MOUNTAINS RIDGE' and 'CARL SPADE CAVERNS'.