2R - 56

GENERAL CORRESPONDENCE

YEAR(S):

2006

Price, Wayne, EMNRD

From: Price, Wayne, EMNRD
Sent: Tuesday, July 11, 2006 1:04 PM
To: 'Mike Griffin'
Cc: Gum, Tim, EMNRD; chris.biagi@dvn.com; mike.dewitt@dvn.com; joe.johnston@dvn.com; ron.truelove@dvn.com; ldeuel@hughes.net
Subject: RE: Devon Avalon Hills Investigation Protocol, PR-54D

OCD hereby approves of the investigation plan with the following conditions:

1. This E-mail approval will be included in the final report.
2. Notify the district office.
3. All correspondence will include the OCD case # 2R0056

Please be advised that NMOCD approval of this plan does not relieve the owner/operator of responsibility should operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

From: Mike Griffin [mailto:whearth@msn.com]
Sent: Tuesday, July 11, 2006 10:55 AM
To: Price, Wayne, EMNRD
Cc: Gum, Tim, EMNRD; chris.biagi@dvn.com; mike.dewitt@dvn.com; joe.johnston@dvn.com; ron.truelove@dvn.com; ldeuel@hughes.net
Subject: Devon Avalon Hills Investigation Protocol, PR-54D

Good Morning, All:

Attached, please find a copy of the preliminary workplan and investigation protocol for the Devon Avalon Hills 7 Fed. COM # 3 site. Wayne, pending your approval, we've tentatively scheduled Atkins Engineering to start drilling the first monitor well next Monday.

We're not certain as to where the second well will be located as we've got to complete the first before we can really know our gradient. Once determined, we'll get formal permission from the BLM to site a location.

Tim, we plan to be at the location Monday. can this e-mail serve as notice to you that we plan to start taking samples? We will of course encourage and welcome District OCD participation in the activities and very much look forward to working with you guys again.

Mike Griffin

Whole Earth Environmental, Inc.
Phone: 281.394.2050
FAX: 281.394.2051

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Subject: Devon Avalon Hills Investigation Protocol, PR-54D
Attachments: PR-54D Devon Avalon Phase II.doc; Preliminary Workplan - Devon Avalon Hills.doc

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PR-54D

Phase II Investigation Protocol
Devon Energy
Avalon Hills 7 Fed. COM # 3

1.0 Purpose

This protocol is to provide a detailed outline of the steps employed in the delineation of potential environmental impacts resulting from a casing part event associated with the Devon Energy Corporation (Devon) Avalon Hills 7 Fed. COM # 3 site located in Section 7, T21S, R27E of Eddy Co., NM.

2.0 Scope

This protocol is site specific for the Devon Avalon Hills 7 well site.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

3.1.1 Whole Earth shall meet with appropriate Devon personnel to review this protocol and make any requested modifications or alterations prior to submittal to the NMOCD and BLM.

3.1.2 Changes to this protocol will be documented and submitted to Devon for final review prior to submittal to appropriate agencies.

3.2 Regulatory Review

3.2.1 Upon Devon's approval, this protocol will be submitted to the NMOCD offices in Santa Fe and Artesia along with a copy to the Carlsbad BLM for review and comment. Recommended agency changes will be reviewed by the client prior to implementation.

3.2.2 Any recommended change effecting cost will require a revised quotation to be issued to the client for approval prior to the commencement of any on-site activity.

4.0 Safety

4.1 Prior to starting work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Devon personnel, sub-contractors and exchange phone numbers.

4.2 A tailgate safety meeting shall be held and documented each day. All sub-contractors must attend and sign the daily log in sheet.

4.3 Anyone allowed on to location must be wearing appropriate work clothing including steel toed boots and other required personal protective equipment (hardhat, safety glasses and hearing protection). Each vehicle must be equipped with two-way communication capabilities.

4.4 Prior to starting any drilling or excavation activities, the area shall be surveyed with a line finder. If lines are discovered within the area to be drilled or excavated, the line traces shall be marked with pin flags on either side of the line at maximum five-foot intervals.

5.0 Surface Delineation

5.1 A detailed plat map will be prepared showing the overall pad layout, wellhead location, associated drilling and production features, and the location of any surface expressions of impact resulting from the casing part event at the location. The GPS coordinates of the site will be used to correlate NM State Engineer's, NM Tech. and USGS survey data relating to the soil morphology and known depths to groundwater or distance to surface waters.

5.2 Any significant surface stains or areas of interest will be sampled and field tested for the presence and concentrations of TPH and chlorides. Sample collection shall be in accordance with WEQP-96 (Whole Earth Quality Procedure). A minimum of 10% of these samples will be forwarded to Environmental Labs of Texas for confirmation.

5.3 Based on the field and laboratory confirmation sampling results, and if required, a detailed remediation protocol will be prepared and included within the Phase II report.

6.0 Sub-surface Investigation

6.1 A groundwater monitoring well will be constructed at a maximum distance of 50' southeast (anticipated downgradient of groundwater flow) of the Avalon Hills 7 Fed COM #3 wellhead. If possible, the well will be hollow stem auger drilled to a depth sufficient to determine the lower boundary of the aquifer. The well will be cased, developed and sampled in accordance with NMOCD guidelines. The design of the well shall be 2" diameter (nominal) and shall have a minimum of 10' of slotted screen within the water table and 10' of slotted screen extending above it.

6.2 Split spoon samples will be collected at 5' intervals and analyzed in the field for TPH (total petroleum hydrocarbons) and chlorides. Selected soil samples shall be forwarded to Environmental Labs of Texas for the analysis of BTEX (benzene, toluene, ethylbenzene and xylenes), chlorides and TPH. The NMOCD and BLM will be notified at least 48 hours in advance of the subsurface drilling and testing activities.

6.3 Additional soil samples from the boring shall be analyzed to determine soil morphology with the results used in the preparation of a HYDRUS 2D contaminant migration model.

6.4 The monitoring well depth to water information will be used in conjunction with information from other wells within the immediate area to determine the approximate groundwater flow gradient (anticipated as south to southeast based on regional information).

6.5 After monitoring well completion and development, water samples will be collected from the well in accordance with WEQP-77 protocols and analyzed for BTEX, major cations and anions, chlorides, RCRA 8 metals, and bromine.

6.6 The nearest existing water well will be located and with landowner permission, sampled. The water will be tested for all the constituents of concern (C of C) described in section 6.6 of this protocol.

6.7 A second monitor well will be auger drilled and completed in accordance with section 6.1 of this protocol. Soil samples will be collected and analyzed in accordance with section 6.2 of this protocol. Water samples will be collected and analyzed in accordance with section 6.5 of this protocol. The location of the well will be at a location up-gradient of the Avalon Hills 7 well. It is likely that the installation of this monitor well will require an off-site access agreement with

the adjacent landowner. It appears that the BLM is responsible for the surrounding land. A request for access to install this well will be submitted at the same time that this protocol is sent to the BLM for review.

7.0 Documentation & Reporting

At the conclusion of the assessment project, Whole Earth will prepare a Phase II report for submittal to the regulatory agencies. The report will include the following information:

- A plat of the location showing the location of the affected area, the location and description of major structures, test hole locations, geo-coordinates and orientation
- Photographs and schematic diagrams of any surface stains
- Field analytical results to include quality assurance and control information.
- Laboratory analytical results to include chain of custody and quality control / assurance information.
- Boring Logs to include depths, soil morphology and analytical information
- If the data shows any issues, a HYDRUS 2D model to include probable contaminant migration path, depth to groundwater and risk assessment calculations
- Well construction details
- Analytical results of water from the nearest existing water well source
- Groundwater flow gradient map
- Remediation plan (if necessary)

PRELIMINARY WORKPLAN
FOR THE DETERMINATION OF POTENTIAL THREAT TO GROUND WATER QUALITY DUE TO DEVON WELL CONTROL SITUATION

Purpose

On June 19, 2006, a "well control situation" took place at a Devon drilling rig north east of Carlsbad directly east of Lake Avalon and State Highway 206[1]. The "well control situation" involved gas escaping from the well. The purpose of this report is to assess hydrogeological information from libraries and the internet in order to draft a preliminary workplan to delineate the boundaries of any potential problem and to determine what if any contaminants may impair ground water quality at the site.

Site Description

No coordinates are yet available for the site except that the well is located at Avalon Hills 7 com #3 within section 7 of township T21S R27E, Eddy County. The elevation of the site is approximately 3200 feet above sea level. Figure 1 shows the approximate location of the site approximately 4 miles north of Carlsbad, New Mexico, and east of Lake Avalon.

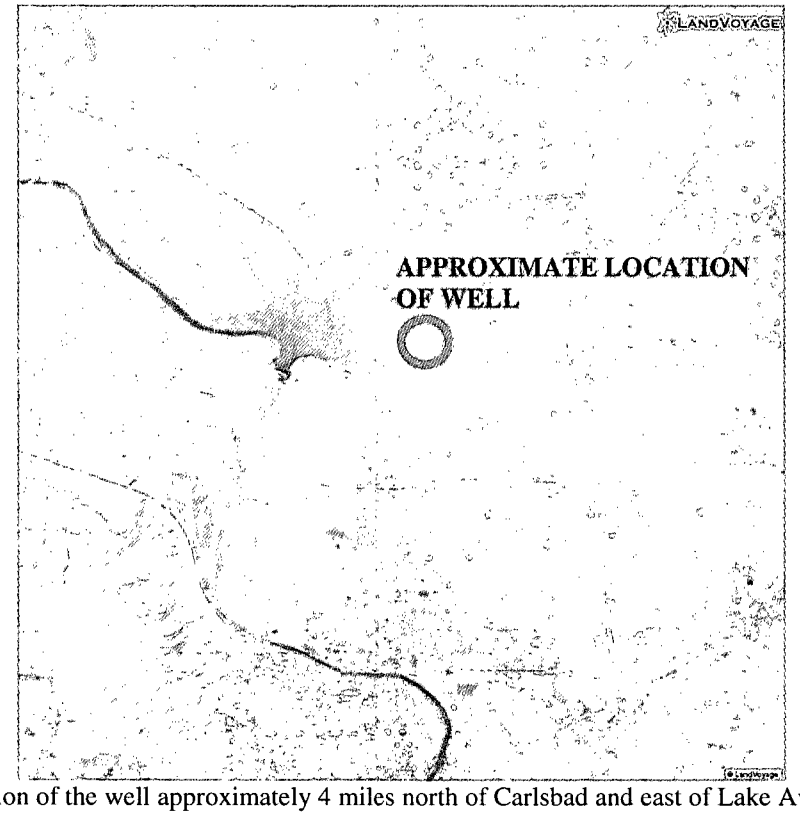

Figure 1. Location of the well approximately 4 miles north of Carlsbad and east of Lake Avalon.

[1] **No injuries from well blowout,** By Kyle Marksteiner, Current-Argus Staff Writer, Jun 21, 2006, 04:22 am

Hydrogeology

The most important aquifer of the area is the Capitan aquifer which provides the water supply for Carlsbad from a well field located west of the Pecos River near the Guadalupe Mountains. The Capitan aquifer is considered a single hydrological unit that consists of the Capitan Reef complex which is composed of the Capitan and Goat Seep Limestones and the Carlsbad facies of the Artesia Group. This Reef complex extends as an arc through southeastern New Mexico and southwestern Texas following the rim of the Delaware Basin. In New Mexico, the arc of the Capitan reef extends from the southwest of Carlsbad to the southeast of Jal (Figure 2). Near Carlsbad the thickness of the aquifer is about 1600 feet and lies below the alluvium in the valley. The main recharge to the aquifer is coming from Guadalupe Mountains and Dark Canyon through fractures and dissolution holes. Secondary recharge also occurs as leakage from Lake Avalon.

The quality of the water in the Capitan aquifer decreases towards the east. Near Carlsbad the chloride content is about 200 mg/l while the well North Cedar Hills about 1 mile NE from the "well control situation" site has a chloride content of 13,800 mg/l (Hiss, 1973). Average hydraulic conductivity in the same area is 2.4 feet/day (Huff, 1997) and aquifer thickness approximately 2,000 feet (Hiss, 1975).

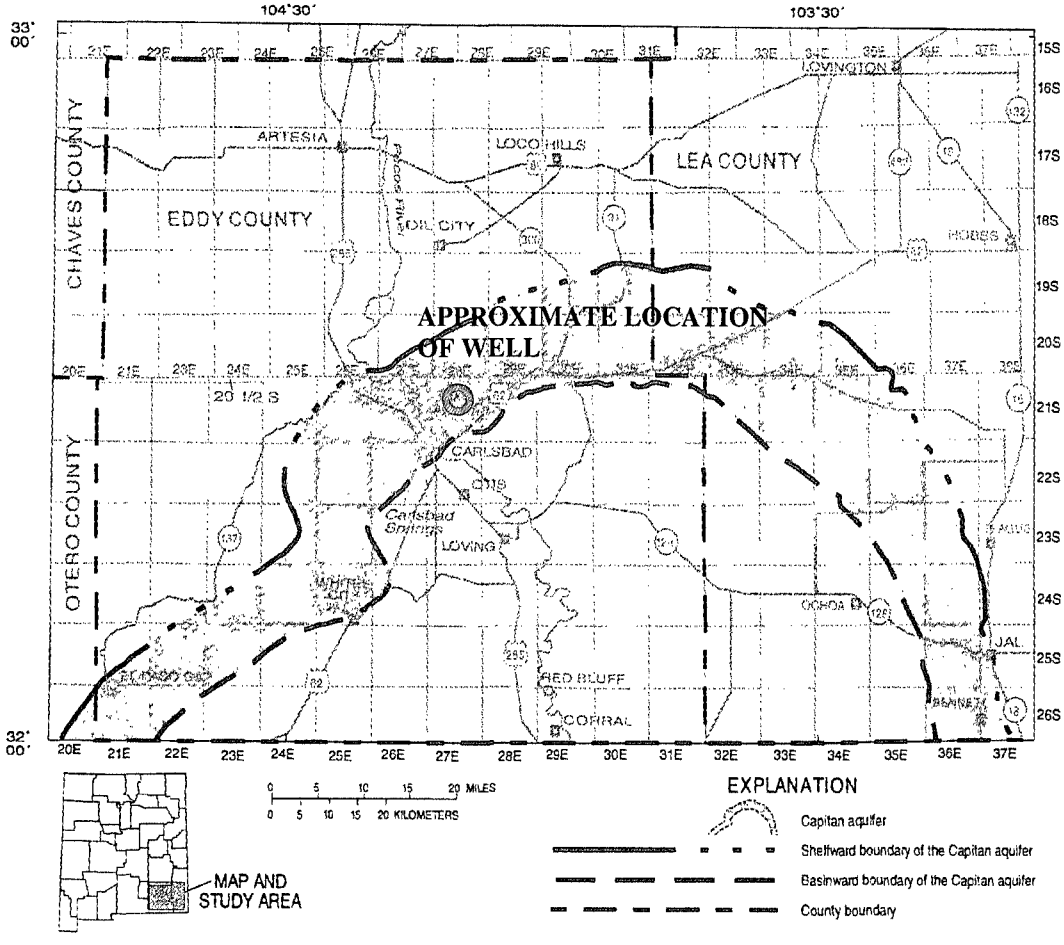

Figure 2. Location of the Capitan Aquifer in southeastern New Mexico (Huff, 1997).

The Capitan aquifer is mostly confined in the area of interest. The depth of its top is approximately 750 feet (Hiss, 1973; Hiss, 1976). Due to its depth and confined nature the Capitan aquifer is at no to little risk for contamination due to the failure of the well casing at depth 80 or 220 feet.

The hydrogeology at shallow depths of the "well control situation" is not well known. A well log obtained approximately one mile northeast of the site indicates that the Capitan Limestone is overlain by the Yates Formation (506-748 feet depth) and the Rustler Formation (0-506 feet depth). The hydrogeology at the site is probably quite similar. The Yates Formation consists of alterating beds of sandstone and dolomite in the carbonate facies and gypsum, red clay and silt, and sandstone in the evaporative facies. North of the site between Lake McMillan and Lake Avalon near the Pecos River this formation yields water to stock wells. The Rustler Formation consists of anhydrite, gypsum, red clay and sand, and two dolimite beds. The lower Culebra Dolomite bed is the principal water-bearing zone but the water is highly mineralized. The principal salt is calcium sulphate while its chloride content is relatively low. In a few cases it has been used for livestock watering (Cox, 1967; United States. National Resources Planning Board, 1942).

Groundwater Flow Direction

The ground water flow direction is critical for the evaluation of the potential threat to ground water quality caused by the "well control situation". The overall flow direction in the Capitan aquifer is towards the east. However, in the Carlsbad area the incision of the Pecos River, the presence of Lake Avalon, and the development of petroleum resources as well as ground water pumping have influenced the ground water flow regime resulting in flow directions from east to southwest (Uliana, 2001).

An analysis of ground water data provided by the USGS (Huff, 1997) (see Table 1 and Figure 3) and the Office of the State Engineer (see Table 2 and Figure 3) was not conclusive but indicated the most likely direction of ground water flow in the Capitan aquifer at the "well control situation" to be between the east and the south.

In the 1940s ground water in the Rustler Formation and alluvium north and northeast of Lake Avalon moved southeastward into playas east of Lake Avalon where it was discharged by evapotranspiration, or it continued underground and was discharged into the Pecos River downstream from Carlsbad Springs (Cox, 1967). Therefore, it is expected that ground water flow in the Rustler Formation at the site is approximately towards the southeast.

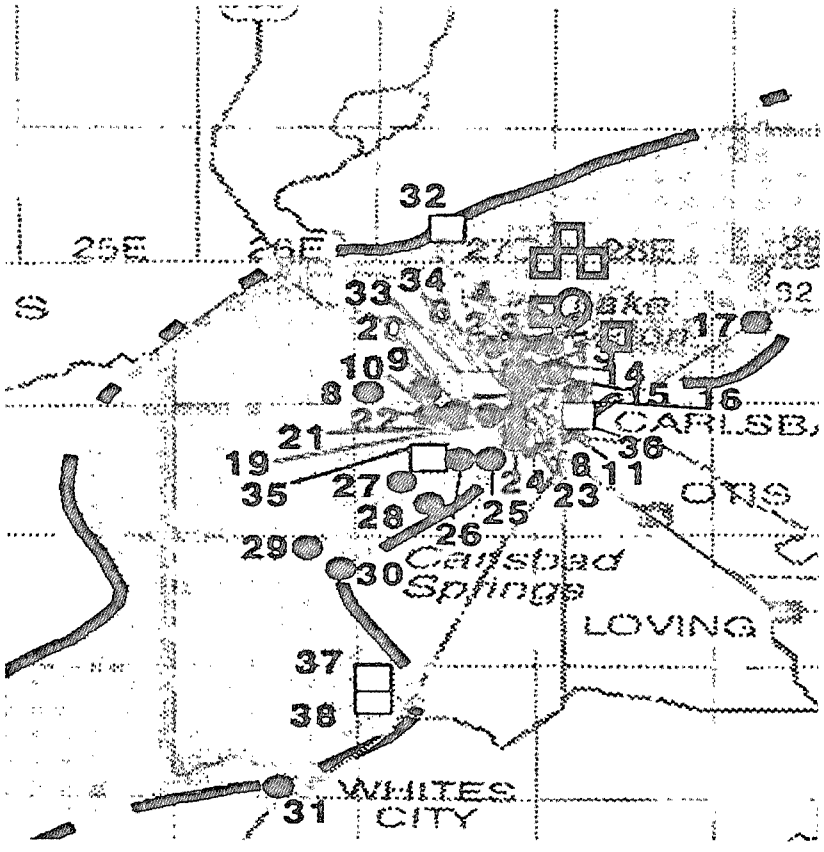

Figure 3. Location of the wells used to determine groundwater flow directions in the area. Black dots are from Ground Water Site Inventory data base (Huff, 1997) with water levels of 1978 and 1993. The green squares are from the website of the Office of the State Engineer (see Table 2); locations are approximate. The red circle is the approximate location of the "well control situation".

Preliminary Immediate Work Plan

1. Use well logs and the piezometer to be drilled to evaluate the hydrogeological situation at the "well control situation". Of special interest are: (1) Is there a shallow aquifer located in the Rustler Formation above the Capitan aquifer?; (2) What is the ground water table depth of this shallow aquifer?; (3) What is the composition of the geological layers at the site?
2. Measure water levels in wells surrounding the "well control situation" to obtain reliable information about local ground water flow direction and ground water gradient in the shallow aquifer.
3. Sample soil and ground water at the site of the "well control situation" to determine extent of possible contamination, specifically concentrations and types of contaminants. It is especially important to analyze for Cl and Br in each sample so that the Cl/Br ratio can be used to trace the origins of the contaminants.
4. Analyze all new information to assess how to proceed.

Table 1. Groundwater depths south of the "well control situation" near Carlsbad used to estimate ground water flow direction and ground water table depth at the site (Huff, 1997).

Well Number	Location (Section #)	Groundwater depth (feet) 1978	Groundwater depth (feet) 1993
2	21S26E231333	43.35	43.56
3	21S26E244233	56.26	54.53
4	21S26E251142	71.15	
5	21S26E251424		49.9
7	21S26E254343	23.56	
8	21S26E312434		194.37
9	21S26E331122	166.02	
11	21S26E362211	20.18	22.39
12	21S27E193341	35.36	35.02
13	21S27E304243	14.81	
16	21S27E321124	14.33	14.18
17	21S28E173444		47.13
18	22S26E012333	37.09	35.04
19	22S26E022424	60.2	
21	22S26E033444	83.61	82.12
22	22S26E043442	125.8	
23	22S26E121121	38.1	
24	22S26E123414	34.24	33.09
25	22S26E143223	101.44	101.14
26	22S26E154220	155.28	153.69
27	22S26E203141	221.03	221.56
29	23S25E024432	405.5	
30	23S25E123322	403.71	
31	24S25E342211	823.2	

Table 2. Wells within two miles radius around the "well control situation" obtained from the data base on the website of the Office of the State Engineer.

Well Number	Easting	Northing	Elevation (feet)	GW depth (feet)	GW elevation (feet)	Year of Measurement
1	574170	3596843	3333	350	2983	1966
2	572559	3597412	3195	175	3020	2005
3	570964	3596813	3169	89	3080	2000
4	570695	3593499	3270	170	3100	1975
5	575701	3592110	3180	75	3105	1971

References

Cox, E.R. 1967. Geology and hydrology between Lake McMillan and Carlsbad Springs, Eddy County, New Mexico. U.S. Govt Print. Off., Washington.

Hiss, W.L. 1973. Capitan aquifer observation-well network Carlsbad to Jal, New Mexico Technical Report 38. United States Geological Survey.

Hiss, W.L. 1975. Thickness of the Permian Guadalupian Capitan aquifer, southeast New Mexico and west Texas. New Mexico Bureau of Mines & Mineral Resources, New Mexico Institute of Mining and Technology, Socorro.

Hiss, W.L. 1976. Structure of the Permian Guadalupian Capitan aquifer, southeast New Mexico and west Texas. New Mexico Bureau of Mines & Mineral Resources, New Mexico Institute of Mining and Technology, Socorro.

Huff, G.F. 1997. Summary of available hydrogeologic data collected between 1973 and 1995 and information on all permeability data and aquifer tests for the Capitan aquifer, Eddy and Lea counties, New Mexico. U.S Geological Survey. Open File Report 97-370. United States Geological Survey.

Uliana, M.M. 2001. The geology and hydrogeology of the Capitan aquifer: a brief overview, p. 153-166, *In* R. E. Mace, et al., eds. Aquifers of West Texas, Vol. Texas Water Development Board Report 356.

United States. National Resources Planning Board. 1942. The Pecos River joint investigation: reports of the participating agencies. U.S.G.P.O., Washington.

COMPENSATED
COMPENSATED

Densilog Neutron

Essex Atlas

FILE NO.	
COMPANY	MOBIL OIL CORPORATION
WELL	FEDERAL "100" NO. 2
FIELD	BURTON FLAT
COUNTY	EDDY STATE NEW MEXICO
LOCATION:	660' FNL & 1980' FWL
SEC. 18 TWP. 21-S RGE. 27-E	
Other Services	DLL
Permanent Datum	GROUND LEVEL Elev. 3208
Log Measured from	K.B. 14 Ft. Above Permanent Datum
Drilling Measured from	K.B.

Elevations	KB	3222		
	DF			
	GL	3208		
Date	3-9-75			
Run No.	ONE			
Depth—Driller	11500			
Depth—Logger	11505			
Bottom Logged Interval	11503			
Top Logged Interval	SURFACE			
Casing—Driller	8 5/8 @ 2600	@	@	@
Casing—Logger	2592			
Bit Size	7 7/8"			
Type Fluid in Hole	SALT MUD			
Density and Viscosity	10.1 45			
pH and Fluid Loss	9.0 5.6 cc	cc	cc	cc
Source of Sample	CIRCULATED			
Rm @ Meas. Temp.	.048 @ 70 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	.046 @ 70 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	- @ - °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS. MEAS.			
Rm @ BHT	.019 @ 173 °F	@ °F	@ °F	@ °F
Time Since Circ.	16 HOURS			
Max. Rec. Temp. Deg. F	173 °F	°F	°F	°F
Equip. No. and Location	5028 HOBBS			
Recorded By	HOWARD			
Witnessed By	MR. INMAN			

FOLD HERE

GAMMA RAY & CALIPER	DEPTH	COMPENSATED DENSILOG
10 API/CD 0 API API UNITS 100 API		CORRECTION CORRECTION -.1 0 +.1 BULK DENSITY—GRAMS/CC 2.0 3.0
HOLE SIZE - INCHES 6 16	2"=100' LR SURF.	COMPENSATED NEUTRON LIMESTONE POROSITY 30% 20% 10% 0

21433

0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000

SD + RB

LSS + RB

ANHY

LS + ANHY

CAP

CAL

11-1983

Schlumberger BlueView :

21433

21433

0 – 361'	SD + RB
361 – 544'	LST + RD
544 – 830'	ANHY
830 – 1990	LST + ANHY
1990 – 2271	LST

CP @ 857'
DOLOS @ 2550'

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COMPANY MONSANTO COMPANY
WELL AVALON HILLS #2
FIELD ~~BUCKEYE FLATS~~ ~~WILDCAT~~ UNDESIGNATED
COUNTY EDDY STATE NEW MEXICO
LOCATION: 2030' FEL & 1980' FNL
API SERIAL NO. | SEC. 7 | TWP. 21-S | RANGE 27-E

COUNTY EDDY
FIELD UNDESIGNATED
LOCATION
WELL AVALON HILLS #2
COMPANY MONSANTO COMPANY

Other Services: DIL, PML

Elev.: K.B. 3200 D.F. 3199 G.L. 3188

Permanent Datum: G.L. Elev.: 3188
Log Measured From K.B. 12 Ft. Above Perm. Datum
Drilling Measured From K.B.

Date	12-2-74
Run No.	ONE
Depth-Driller	11410
Depth-Logger	11420
Btm. Log Interval	11419
Top Log Interval	0
Casing-Driller	9 5/8 @ 2470
Casing-Logger	2487
Bit Size	8 3/4
Type Fluid in Hole	FRESH MUD
Dens.	9.9
Visc.	38
pH / Fluid Loss	10.5 / 4.2 ml
Source of Sample	PIT
Rm @ Meas. Temp.	1.87 @ 79 °F
Rmf @ Meas. Temp.	1.90 @ 70 °F
Rmc @ Meas. Temp.	1.72 @ 79 °F
Source: Rmf / Rmc	M / LC
Rm @ BHT	.86 @ 168 °F
TIME Circulation Stopped	1800 (12-1-74)
Logger on Bottom	2330 (12-1-74)
Max. Rec. Temp.	168 °F
Equip. / Location	7679 / HOBBS
Recorded By	WALLS, WYANT
Witnessed By	PATTERSON, STOVER

The well name, location and borehole reference data were furnished by the customer.

CALIPER
HOLE DIAM. IN INCHES
6 — 16

DEPTHS

CNL POROSITY - %
45 30 15 0 -15

0 +.25
CORRECTION
GRAMS/CC.

21208

GAMMA RAY
API UNITS
0 — 100
100 — 200

BULK DENSITY
GRAMS/CC.
2.0 2.5 3.0
1.0 1.5 2.0

① 01078

CABLE TOOL TO 631'

0

Sand Caliche

100 — 100
Dolomite

143 — Dol + Gyp
151 — Dol + Anhy

195 — Sd
210 — Sd + Dol.

235 — Dol.

260 — Dol & Sd

340 — Anhy + Sd

390 — Dol + Sd
410 — Dol, Sd, Anhy

460 — Gyp + Anhy

520 — Salt + Anhy

560 — Anhy

590 — Dol + Anhy

631 — LSt

Capitan Reef

21208

Schlumberger BlueView :

EVAP, SST, MST, DOL 0'-2362'
DELAWARE SO 2362'-4772

01078 - ~~ALL~~ LWA

WATER SO
90'-95'
115'-130'
625'-630'

Schlumberger

COMPENSATED NEUTRON/LITHO DENSITY

CSU Field Log

COMPANY: H.L. BROWN, JR.

WELL: STATE COM. "B" #1

FIELD: BURTON FLAT(CHERRY CANYON)
COUNTY: EDDY
STATE : NEW MEXICO
NATION: USA
LOCATION: 1550' FSL & 660' FWL

SEC: 8 TWP: 21-S RGE: 27-E

PERMANENT DATUM: GL
ELEV. OF PERM. DATUM: 3225.4 F
LOG MEASURED FROM: KB
9.0 F ABOVE PERM. DATUM
DRLG. MEASURED FROM: KB

ELEVATIONS-
KB: 3234.4 F
DF: 3233.4 F
GL: 3225.4 F

DATE: 11 FEB 89
RUN NO: 1

DEPTH-DRILLER: 3800.0 F
DEPTH-LOGGER: 3804.0 F
BTM. LOG INTERVAL: 3801.0 F
TOP LOG INTERVAL: 0.0 F

CASING-DRILLER: 2600.0 F
CASING-LOGGER: 2594.0 F
CASING: 8 5/8"
WEIGHT: 24.0000 LB/F
BIT SIZE: 7 7/8"
DEPTH: 3800.0 F

4 RUNS

13

0657'

26056

3234
120
311 MASL

MPHI 30000 -10000
MPHI 70000 30000

11-FEB-1989 07:28
DATA ACQUIRED
11-FEB-1989 03:59

FILE 28

INPUT FILE(S)
12

CP 32.2

GR (GAPI) 200.00
GR (GAPI) 100.00
100.00
0.0

2"/100'
1"

100 200 300 400 500 600 700 800 900 1000 1100 1200

GR

W V N 2 8 W 1/4 A CP 26056

1/4 SECTION OF DEDI

Conf LLB

Schlumberger

COMPENSATED NEUTRON FORMATION DENSITY

COMPANY MONSANTO COMPANY 21073
PI 11168 - 84, 11540 - 54, MORROW GAS, PEC OK

WELL AVALON HILLS #1

FIELD ~~WILDCAT~~ BURTON FLAT MORROW

COUNTY EDDY STATE NEW MEXICO

Location: 660' FSL & 1980' FWL,

Sec. 7 Twp. 21-S Rge. 27-E

Other Services: DIL, PML

COUNTY EDDY
FIELD or LOCATION WILDCAT
WELL AVALON HILLS #1
COMPANY MONSANTO COMPANY

Permanent Datum: G.L. Elev.: 3185
Log Measured From K.B. 15 Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. 3200
D.F. 3199
G.L. 3185

Date	3-16-74					
Run No.	ONE					
Depth—Driller	11420					
Depth—Logger	11420					
Btm. Log Interval	11419					
Top Log Interval	0					
Casing—Driller	9 5/8@ 2714	@		@		@
Casing—Logger	2716					
Bit Size	8 3/4					
Type Fluid in Hole	FRESH MUD					
Fluid Level	FULL					
Dens. / Visc.	10.6 / 42					
pH / Fluid Los	10.8 / 4.5ml		ml		ml	ml
Source of Sample	PIT					
Rmf @ Meas. Temp.	1.9 @ 76 °F	@ °F		@ °F		@ °F
Rmf @ Meas. Temp.	1.36 @ 75 °F	@ °F		@ °F		@ °F
Rmc @ Meas. Temp.	@ °F	@ °F		@ °F		@ °F
Source Rmf / Rmc	M / —	—		—		—
Rm @ BHT	.9 @ 160°F	@ °F		@ °F		@ °F
Time Since Circ.	11 HOURS					
Max. Rec. Temp.	160 °F	°F		°F		°F
Equip. / Location	7679 / HOBBS					
Recorded By	WALLS					
Witnessed By	WEIGEL					

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

CNL POROSITY—%
10 0 10 20 30

CAL CLR

CORRECTION GRAMS/CC.
+.25 0

BULK DENSITY GRAMS/CC.
3.0 2.5 2.0
2.0 1.5 1.0

3250
3235
3145

DEPTHS

0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 100

CALIPER HOLE DIAM. IN INCHES
16 6

GAMMA RAY API UNITS
100 200
0 100

N 2 0 W A (A')

21073

Schlumberger

Harvard Petroleum Corporation

Federal 00 #3
Wildcat
Eddy State New Mexico

PLATFORM EXPRESS
Compensated Neutron
Three Detector LithoDensity

FNL & 2406' FEL	Elev.: K.B. 3238 ft
Section 18-21S-27E	G.L. 3226 ft
	D.F. 3237 ft
Permanent Datum: Ground Level	Elev.: 3226 ft
Log Measured From: Kelly Bushing	12.0 ft above Perm. Datum
Drilling Measured From: Kelly Bushing	

API Serial No.	Section	Township	Range
30-015-34599	18	21S	27E

Logging Date			13-Mar-2006				
Run Number			1				
Depth Driller			5200 ft				
Schlumberger Depth			5200 ft				
Bottom Log Interval			5145 ft				
Top Log Interval			200 ft				
Casing Driller Size @ Depth			8.625 in @ 2267 ft				
Casing Schlumberger			2265 ft				
Bit Size			7.875 in				
Type Fluid In Hole			Brine				
MUD Density	Viscosity		10 lbm/gal	28 s			
Fluid Loss	PH			9.5			
Source Of Sample			Circulation Tank				
RM @ Measured Temperature			0.049 ohm.m @ 68 degF			@	
RMF @ Measured Temperature			0.037 ohm.m @ 68 degF			@	
RMC @ Measured Temperature			0.074 ohm.m @ 68 degF			@	
Source RMF	RMC		Rmf = 0.75 Rm	Rmc = 1.5 Rm			
RM @ MRT	RMF @ MRT		0.034 @ 101	0.025 @ 101		@	@
Maximum Recorded Temperatures			101 degF				
Circulation Stopped	Time		13-Mar-2006	10:00			
Logger On Bottom	Time		13-Mar-2006	17:00			
Unit Number	Location		2224 Midland				
Recorded By			Alison Hall				
Witnessed By			Jeff Harvard				

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Company: Harvard Petroleum Corporation
Well: Federal 00' #3
Field: Wildcat
Location: FNL & 2406' FEL
County: Eddy

Time Mark Every 60 S
Cable Tension (TENS) (LBF) 10000 0
Mud Cake Caliper (HCAL) (IN) 6 16
Bit Size
Gamma Ray (GR) (GAPI) 0 150
Tool/Tot. Drag
HRDD Density Correction (HDRA) (G/C3) -0.05 0.45
Bkgnd Thermal Neutron Poro (N/M) 0.3 0
Bkgnd Rej Formation Density (RHOB) (G/C3)
Formation Logs

200 300 400 500 600 700 800 900 1000 1100 1200

CAS

Schlumberger BlueView

34599

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COMPANY YATES DRILLING COMPANY

WELL AVALON FEDERAL #2

FIELD ~~WILDCAT~~ BURTON FLAT MORROW

COUNTY EDDY STATE NEW MEXICO

LOCATION: 1980' FSL & 1980' FEL

SEC. 18 TWP. 21-S RANGE 27-E

Other Services: DLL

COUNTY EDDY
FIELD WILDCAT
LOCATION
WELL AVALON FEDERAL #2
COMPANY YATES DRILLING CO.

Permanent Datum:	G.L.	Elev.: 3200	
Log Measured From:	K.B.	14 Ft. Above Perm. Datum	Elev.: K.B. 3214
Drilling Measured From:	K.B.		D.F. -
			G.L. 3200

Date	4-26-75		
Run No.	ONE		
Depth—Driller	11700		
Depth—Logger	11700		
Btm. Log Interval	11699		
Top Log Interval	0		
Casing—Driller	9 5/8@ 2708	@	@
Casing—Logger	2699	@	@
Bit Size	7 7/8		
Type Fluid in Hole	BRINE DRISPAC FLOSAL		
Dens. / Visc.	9.9 / 36		
pH / Fluid Loss	11 / 3.0 ml	ml	ml
Source of Sample	CIRC.		
Rm @ Meas. Temp.	.052 @ 75 °F	@ °F	@ °F
Rmf @ Meas. Temp.	.049 @ 76 °F	@ °F	@ °F
Rmc @ Meas. Temp.	- @ - °F	@ °F	@ °F
Source: Rmf / Rmc	M / -	-	-
Rm @ BHT	.024 @ 174F	@ °F	@ °F
Time Circulation Stopped	1330		
Time Logger on Bottom	2130		
Max. Rec. Temp.	174 °F	°F	°F
Equip. Location	7679 HOBBS		
Recorded By	WALLS		
Witnessed By Mr.	BOOK		

CALIPER
HOLE DIAM. IN INCHES
6 — 16

DEPTHS

GAMMA RAY
API UNITS
0 — 100
100 — 200

45 30 15 0 -15
POROSITY CNL
0 — +25
CORRECTION
GRAMS/CC.

BULK DENSITY
GRAMS/CC.
2.0 2.5 3.0
1.0 1.5 2.0

21491

LR

BS

2478

Cen HB

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COMPANY CITIES SERVICE OIL COMPANY

WELL STATE "CS" #1

FIELD NORTH CARLSBAD

COUNTY EDDY STATE NEW MEXICO

LOCATION: 1980' FSL & 660' FWL

Other Services: DLL

API SERIAL NO	SEC	TWP	RANGE
	17	21-S	27-E

Permanent Datum: G.L. Elev.: 3214

Log Measured From: K.B. 20 Ft. Above Perm. Datum

Drilling Measured From: K.B.

Elev.: K.B. 3234 D.F. 3233 G.L. 3214

Date	8-8-75								
Run No.	ONE								
Depth—Driller	11556								
Depth—Logger	11557								
Btm. Log Interval	11556								
Top Log Interval	0								
Casing—Driller	9 5/8 @ 2989	@		@		@			
Casing—Logger	2989								
Bit Size	8 3/4								
Type Fluid in Hole	BRINE POLYMER, DRISPAC								
Dens. / Visc.	10 / 32								
pH / Fluid Loss	11 / 8 ml		ml		ml		ml		
Source of Sample	PIT								
Rm @ Meas. Temp.	.0475@ 66 °F	@	°F	@	°F	@	°F		
Rmf @ Meas. Temp.	.0434@ 76 °F	@	°F	@	°F	@	°F		
Rmc @ Meas. Temp.	- @ - °F	@	°F	@	°F	@	°F		
Source Rmf / Rmc	M / -								
Rm @ BHT	.020@179 °F	@	°F	@	°F	@	°F		
Time Circulation Stopped	8-7 1900								
Time Logger on Bottom	8-8 0200								
Max. Rec. Temp.	179 °F		°F		°F		°F		
Equipment Location	7679 HOBBS								
Recorded By	WALLS								
Witnessed By Mr.	TANNES								

The well name, location and borehole reference data were furnished by the customer.

21546

CNL POROSITY—% 30 20 10 0 10

CORRECTION GRAMS/CC +.25 0

BULK DENSITY GRAMS CC. 2.0 2.5 3.0 1.5 1.0

DEPTHS

CALIPER HOLE DIAM. IN INCHES 6 16

GAMMA RAY API UNITS 0 100 200

8-19-75 10423'

21546

Schlumberger BlueView :

SCHLUMBERGER WELL SURVEYING CORPORATION

HOUSTON, TEXAS

Sonic Log

COMPANY J. GLENN BENNETT

WELL GULF STATE #1

FIELD WILDCAT

LOCATION SEC. 17-21S-27E

COUNTY EDDY

STATE NEW MEXICO

Other Surveys
IES

Location of Well
1980' FNL
660' FWL

Elevation: K.B. ____
D.F. ____
or G.L. 3212

COUNTY EDDY
FIELD or LOCATION WILDCAT
WELL GULF STATE #1
COMPANY J. GLENN BENNETT

Log Depths Measured From K.B. 8 Ft. above GROUND LEVEL

RUN No.			
Date	5-13-50		
First Reading	3294		
Last Reading	1854		
Feet Measured	1440		
Csg. Schlum.	1852		
Csg. Driller	1854		
Depth Reached	3298		
Bottom Driller	3300		
Mud Net.	FRESH WATER		
Dens. Visc.			
Mud Resist.	.57 @ 89 °F	@ °F	@ °F
" Res. BHT	.55 @ 95 °F	@ °F	@ °F
" pH	@ °F	@ °F	@ °F
" Wtr. Loss	CC 30 min	CC 30 min	CC 30 min
" Rmf	.57 @ 89 °F	@ °F	@ °F
Bit Size	6 3/4"		
Spont.	3294 To 1854	To	To
	To	To	To
Opr. Rig Time	3 HOURS		
Truck No.	2022 - ARTESIA		
Recorded By	WILSON		
Witness	BRICE		

SPONTANEOUS-POTENTIAL
millivolts
− 40 +

GAMMA RAY
0 — 7.5
7.5 — 15

DEPTHS

INTERVAL TRANSIT TIME
microseconds per foot
← increases
T 3 ft, ⊥ ft
100 — 70 — 40

0052

0052

Schlumberger BlueView :

COMPANY: Gruy Petroleum Management Company

WELL: Colton 7 Federal Com No. 1

FIELD: Burton Flat: Morrow

COUNTY: Eddy STATE: New Mexico

Schlumberger

Platform Express
Three Detector Litho-Density
Compensated Neutron/HNGS

SHL: 1250' FNL & 2170' FWL
BHL: 1250' FNL & 1650' FWL

Elev.: K.B. 3236 ft
G.L. 3204 ft
D.F. 3235 ft

Permanent Datum: Ground Level Elev.: 3204 ft
Log Measured From: Kelly Bushing 32.0 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

API Serial No.	SECTION	TOWNSHIP	RANGE
30-015-33101	7	21S	27E

Logging Date			24-Aug-2005				
Run Number			One				
Depth Driller			11550 ft				
Schlumberger Depth			11566 ft				
Bottom Log Interval			11563 ft				
Top Log Interval			200 ft				
Casing Driller Size @ Depth			9.625 in @ 2457 ft				
Casing Schlumberger			2459 ft				
Bit Size			8.750 in				
Type Fluid In Hole			Brine / Starch / Salt Gel				
MUD Density	Viscosity		10.1 lbm/gal	37 s			
Fluid Loss	PH		10.6 cm3	10			
Source Of Sample			Circulation Tank				
RM @ Measured Temperature			0.043 ohm.m @ 82 degF			@	
RMF @ Measured Temperature			0.042 ohm.m @ 83 degF			@	
RMC @ Measured Temperature			@			@	
Source RMF	RMC		Measured				
RM @ MRT	RMF @ MRT		0.022 @ 168	0.021 @ 168	@		@
Maximum Recorded Temperatures			164 degF	168			
Circulation Stopped	Time		24-Aug-2005	3:30			
Logger On Bottom	Time		24-Aug-2005	13:20			
Unit Number	Location		3049 Roswell, N.M.				
Recorded By			Brian Bartley				
Witnessed By			Butch Read				

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33101

Integrated Annulus Volume Every 100 Ft3

Time Mark Every 60 S

Cable Tension (TENS) 10000 0 (LBF)

Thermal Neutron Porosity (TNPH) 0.3 -0.1 (V/V)

Bulk Res. Formation Density (RHOZ) 2 0 (G/C3)

Std. Res. Formation Pe (PEFZ) 0 10

NRDD Density Correction (HDRA) -0.05 0.45 (G/C3)

Spectroscopy Gamma Ray (HSGR) 0 100 (GAPI)

HNGS Caliber (HCAL) 6 16 (IN)

Computed Gamma Ray (HCGR) 0 100 (GAPI)

Uranium Indicator 0 100

200 300 400 500 600 700 800 900 1000 1100 1200

33101

Corr LIB

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COMPENSATED NEUTRON
FORMATION DENSITY

COMPANY READ & STEVENS, INCORPORATED
(P. O. BOX - 10524, ATOKA GAS, DES OR
WELL W.R. STATE COM. #1
FIELD ~~BURTON FLAT MORROW~~ ~~A/GRAM HILLS ATOKA~~ G.S.
COUNTY EDDY STATE NEW MEXICO

COUNTY EDDY
FIELD BURTON FLAT MORROW
LOCATION
WELL W.R. STATE COM. #1
COMPANY READ & STEVENS, INC.

LOCATION
660'FSL & 990'FEL
API SERIAL NO. | SEC. 6 | TWP. 21-S | RANGE 27-E

Other Services: DLL/RXO

Elev.: K.B. 3222
D.F.
G.L. 3207

Permanent Datum: G.L. Elev.: 3207
Log Measured From K.B. 15 Ft. Above Perm. Datum
Drilling Measured From K.B.

Date	5-6-77		
Run No.	ONE		
Depth-Driller	11470		
Depth-Logger	11469		
Btm. Log Interval	11467		
Top Log Interval	0		
Casing-Driller	8 5/8@2600	@	@
Casing-Logger	2607	@	@
Bit Size	7 7/8		
Type Fluid in Hole	SALT MUD		
Dens.	11.2		
Visc.	41		
Fluid Loss	10.0	4.2 ml	ml
Source of Sample	MUD PIT		
R@ Meas. Temp.	.049@94 °F	@ °F	@ °F
R@ Meas. Temp.	.041@83 °F	@ °F	@ °F
R@ Meas. Temp.	.074@84 °F	@ °F	@ °F
Rmf / Meas.	C	@	@
°F	°F	°F	°F
Rmc @ Meas. Temp.	.024 @171 °F	@ °F	@ °F
Rm @ Meas. Temp.	.030 5-5	@ °F	@ °F
Source - Rmf - Rmc	1200 5-6	°F	°F
Rm @ BHT	121 °F	°F	°F
Time Since Circ.	7629 HOBBS		
Max. Rec. Temp.	PRICE		
Equip. Location	ANDERSON/REDDY		
Recorded By			
Witnessed By			

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JUN 1 1977
U. S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

FOLD HERE — The well name, location and borehole record data were furnished by the customer.

CALIPER DIAM. IN INCHES
6 — 16

GAMMA RAY API UNITS
0 — 100
100 — 200

CORRECTION GRAMS/CC
Use this scale when correction curve is presented in Track 2
0 — +.25

BULK DENSITY GRAMS/CC
2.0 — 2.5 — 3.0
1.0 — 1.5 — 2.0

CNL POROSITY—%
30 — 20 — 10 — 0 — -10

8900
9000
9100
9200
9300
9400
9500
9600
9700
9800
9900
10000
10100
10200
10300
10400
10500
10600
10700
10800
10900
11000
11100
11200
11300
11400
11500

2288

EST TOPS (PRE-SPUD)

YATES @ 647'
DELAWARE @ 2166'

RED BEDS	0 -	760'	(DEWEY LAKE?)
ANHY	760 -	938	(RUSTLER)
SALT	938 -	2180'	(SALADO)

Dresser Atlas

BHC Acoustilog

20849

FILE NO.	
COMPANY	MOBIL OIL CORPORATION
WELL	FEDERAL "NN" NO. 1
FIELD	UNDESIGNATED Cedar Hills Yates
COUNTY	EDDY STATE NEW MEXICO
LOCATION:	1980'FNL & 660'FEL
	SEC 7 TWP 21-S RGE 27-E
Permanent Datum	GROUND LEVEL Elev. 3206
Log Measured from	G. L. FT. Above Permanent Datum
Drilling Measured from	G. L.

Elevations	
KB	
DF	3206
GL	3206

Other Services

Date	6-18-73			
Run No.	ONE			
Depth—Driller	605			
Depth—Logger	593			
Bottom Logged Interval	590			
Top Logged Interval	SURFACE			
Casing—Driller	8 5/8 @ 350	7" @ 3071	10 400 @	@
Casing—Logger	350	3071	400	
Bit Size	6"			
Type Fluid in Hole	WATER	J.U. 3		
Density and Viscosity	@	@	@	@
pH and Fluid Loss	cc	cc	cc	cc
Source of Sample				
Rm @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc				
Rm @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.				
Max. Rec. Temp. Circ. F.	°F	°F	°F	°F
Equip. No. and Location	6028 HOBBS			
Recorded By	MC ATEE			
Witnessed By	MR. CONVERS			

THIS HEADING AND LOG CONFORMS TO API RECOMMENDED STANDARD PRACTICE RP-33

S.P. or G/R & Caliper	DEPTH	ACOUSTILOG
		T1 3 R1 2 R2 — T2
Millivolts 10 API/CD API UNITS 0 API — 100 API HOLE SIZE - INCHES 7 9 11 13 15	2"=100' LR SURF.	SPECIFIC ACOUSTIC TIME Micro Seconds Per Foot 100 85 70 55 40

100 MS/FT Calibration Signal

40 MS/FT Calibration Signal

0000
0100
0200
0300
0400
0500

SALT

SST

SST

SST

Queen

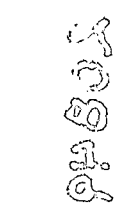
Z 350'-360' Hole Gauge

495 YATES

SHALLOW HOLE ALL OF LOG

Schlumberger BlueView :

20849



Y ATES @ 495'

BEST COPY AVAILABLE

COMPANY H.L. BROWN JR.

WELL FEDERAL 8 NO. 1

FIELD BOSTON FLAT MORROW

COUNTY EDDY STATE N.M.

LOCATION 1980' FNL & 1980' FWL

SEC. 8 TWP. 21S RANGE 27E

Other Services: DLL/MSFL

Permanent Datum: GL Elev.: K.B. 3237.6

Log Measured From: KB 18.4 Ft. Above Perm. Datum

Drilling Measured From: KB D.F. G.L. 3219.2

Date	2-7-88		
Run No.	ONE		
Depth—Driller	11475		
Depth—Logger	11460		
Btm. Log Interval	11459		
Top Log Interval	0		
Casing—Driller	8 5/8@2200	@	
Casing—Logger	2195	@	
Bit Size	7 7/8		
Type Fluid in Hole	DEVCAL STARCH BASE		
Dens.	10.1		
Visc.	43		
pH	10.5		
Fluid Loss	6.4 ml	ml	ml
Source of Sample	CIRC		
Rm @ Meas. Temp.	.61@70°F	@ °F	@ °F
Rmf @ Meas. Temp.	.49@70°F	@ °F	@ °F
Rmc @ Meas. Temp.	.72@70°F	@ °F	@ °F
Source: Rmf / Rmc	CIRC / CIRC		
Rm @ BHT	.61@156°F	@ °F	@ °F
Circulation Stopped	2 0:30		
Logger on Bottom	2 1:30		
Max. Rec. Temp.	156 °F	°F	°F
Equip. Location	ARTESIA		
Recorded By	[illegible]		
Witnessed By	[illegible]		

The well name, location and borehole reference data were furnished by the customer.

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
BD		8.0	BHS		CASE	FPHI		PHIX
DMF		WATE						

230998

GR (GAPI)		DRHO(G/C3)	
100.0	200.0	-0.050	0.4500
GR (GAPI)		NPHI(%)	
0.0	100.0	0.3000	-0.100

100 200 300 400 500 600 700 800 900 CASG. 1000 1100

230998

(~100' EW of ST)

NEVER DRILLED

CST YATES @ 680'

CAP @ 970'

23098

CST SURFACE - RUSTLER

YATES - 580

BLM RPT YATES - 680'

Schlumberger

COMPENSATED NEUTRON
FORMATION DENSITY

COMPANY CITIES SERVICE OIL COMPANY
WELL #1 STATE CQ
FIELD UNDESIGNATED
COUNTY EDDY STATE NEW MEXICO

COMPANY CITIES SERVICE OIL
WELL #1 STATE CQ
FIELD UNDESIGNATED
COUNTY EDDY
STATE NEW MEXICO
LOCATION 1980' FSL & 1980' FEL
Other Services: DLL
SEC 8 TWP 21-S RANGE 27-E
Elev.: K.B. 3271
D.F. 3270
G.L. 3251

Permanent Datum: G.L.
Log Measured From: K.B. 20 Ft. Above Perm. Datum
Drilling Measured From: K.B.

Date	11-28-74		
Run No.	ONE		
Depth—Driller	11675		
Depth—Logger	11689		
Btm. Log Interval	11687		
Top Log Interval	SURFACE		
Casing—Driller	9 5/8@3005	@	
Casing—Logger	3010		
Bit Size	8 3/4		
Type Fluid in Hole	DRLSPMC		
Dens.	10		
Visc.	32		
pH	11		
Fluid Loss	13	ml	ml
Source of Sample	PIT		
Rm @ Meas. Temp.	.055@65	@ °F	@ °F
Rmf @ Meas. Temp.	.045@65	@ °F	@ °F
Rmc @ Meas. Temp.	.08@65	@ °F	@ °F
Source Rmf / Rmc	M / C		
Rm @ BHT	.019@180°	@ °F	@ °F
Time Circulation Stopped	1100 (11-28-74)		
Time Logger on Bottom	1400		
Max. Rec. Temp.	180 °F	°F	°F
Equip. Location	HOBBS		
Recorded By	MARBLE		
Witnessed By	INNES		

Elev.: K.B. 3271
D.F. 3270
G.L. 3251

ARTESIA, OFFICE

FEB 12 1975

O. C. D.

21351

CALIPER HOLE DIAM. IN INCHES	DEPTHS	CORRECTION GRAMS/CC.	BULK DENSITY GRAMS/CC.
6 — 16		0 — +.25	2.0 — 2.5 — 3.0
GAMMA RAY API UNITS			1.0 — 1.5 — 2.0
0 — 100			
100 — 200			

LR

0000
0010
0020
0030
0040
0050
0060
0070
0080
0090
0100

Schlumberger BlueView :

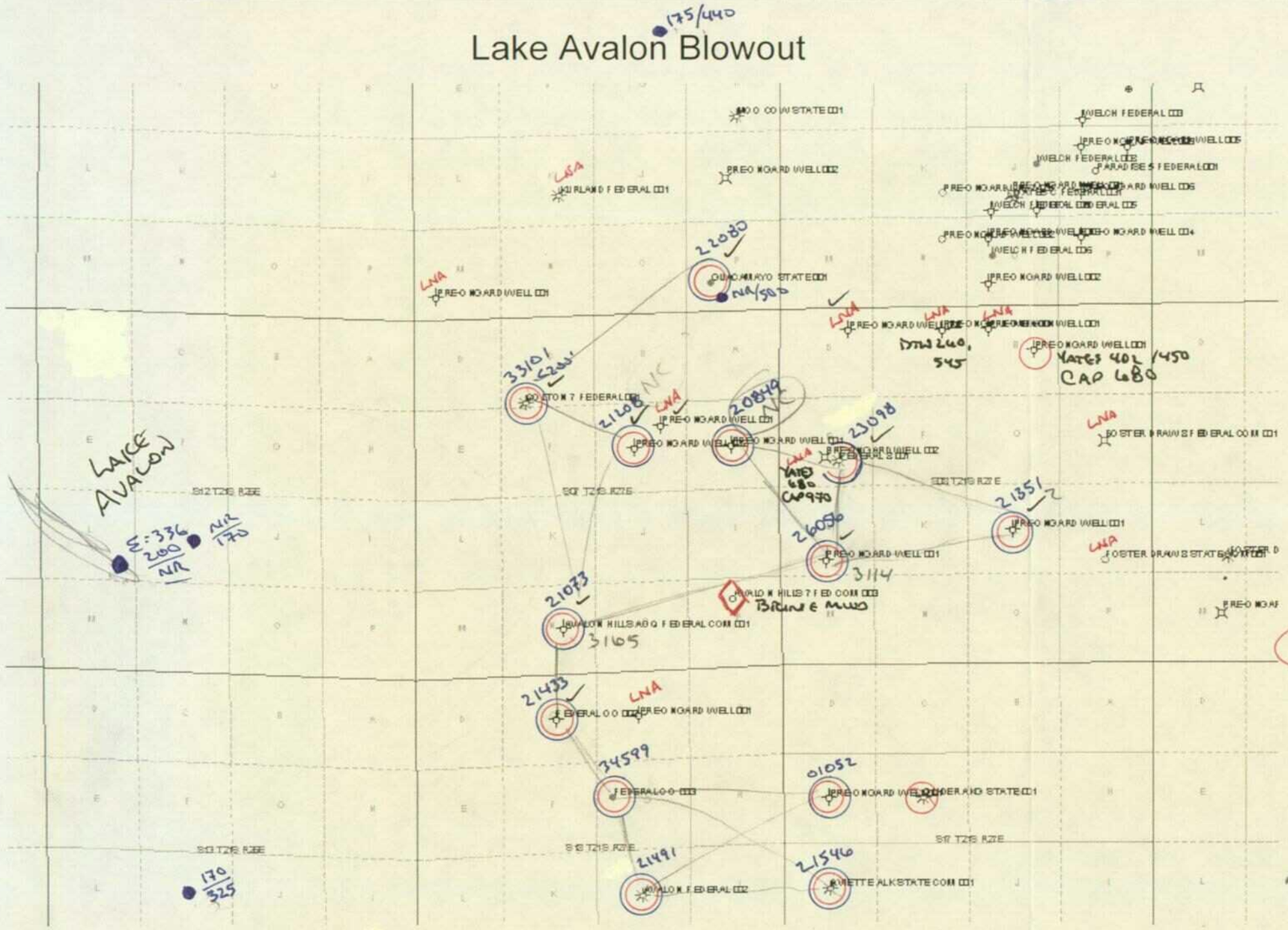
21351

21351

YATES 678
CAP 998

0 – 152'	RB+ANHY
690'	ANHY
915'	SAND, SHALE
2793	ANHY + SD

Lake Avalon Blowout



T21S, R27E

1 NW 3 SW
2 NE 4 SE

WATER WELLS (SEO) 21S, 27E : Σ = 409

POD

§ 7 : NR
§ 6 : 2 213,434
§ 8 : NR
~~§ 13 : NR~~
§ 18 : NR
§ 17 : NR

21S, 26E

~~§ 12 : 4 ; 111~~ ~~NR/400 ; NR/500 ; NR/600~~

§ 12 : 336 ; 314

§ 13 : 2 ; 4-- , 32-

GL ~ 3200' MSL

CAP @ ~~2080' MSL~~ ~2500' MSL (≡ 700' BGS = MD)

DTW ~ 315'

APP DIP ~ 51/3960 = 13/1000 TAN

6	
7	8
18	17

1320/3960

MapNotes

DrawnBy

7/20/2006 9:06:48 AM

Oil Conservation Division

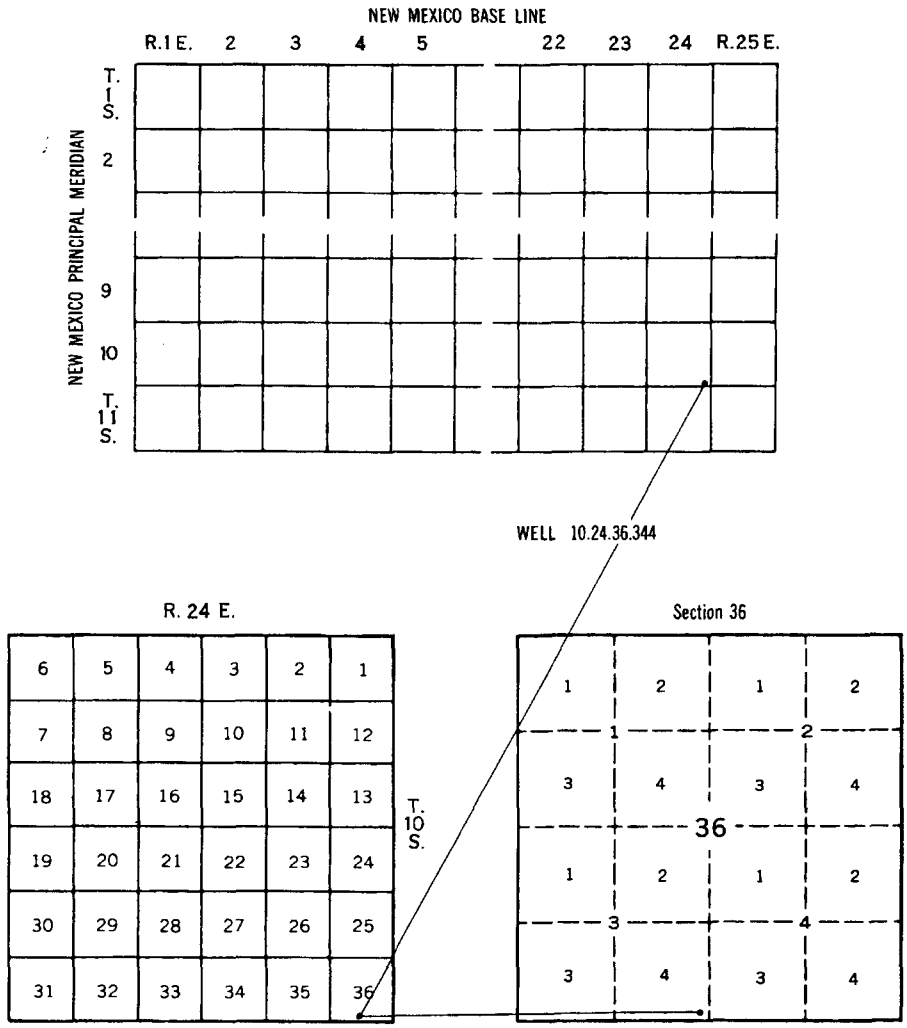
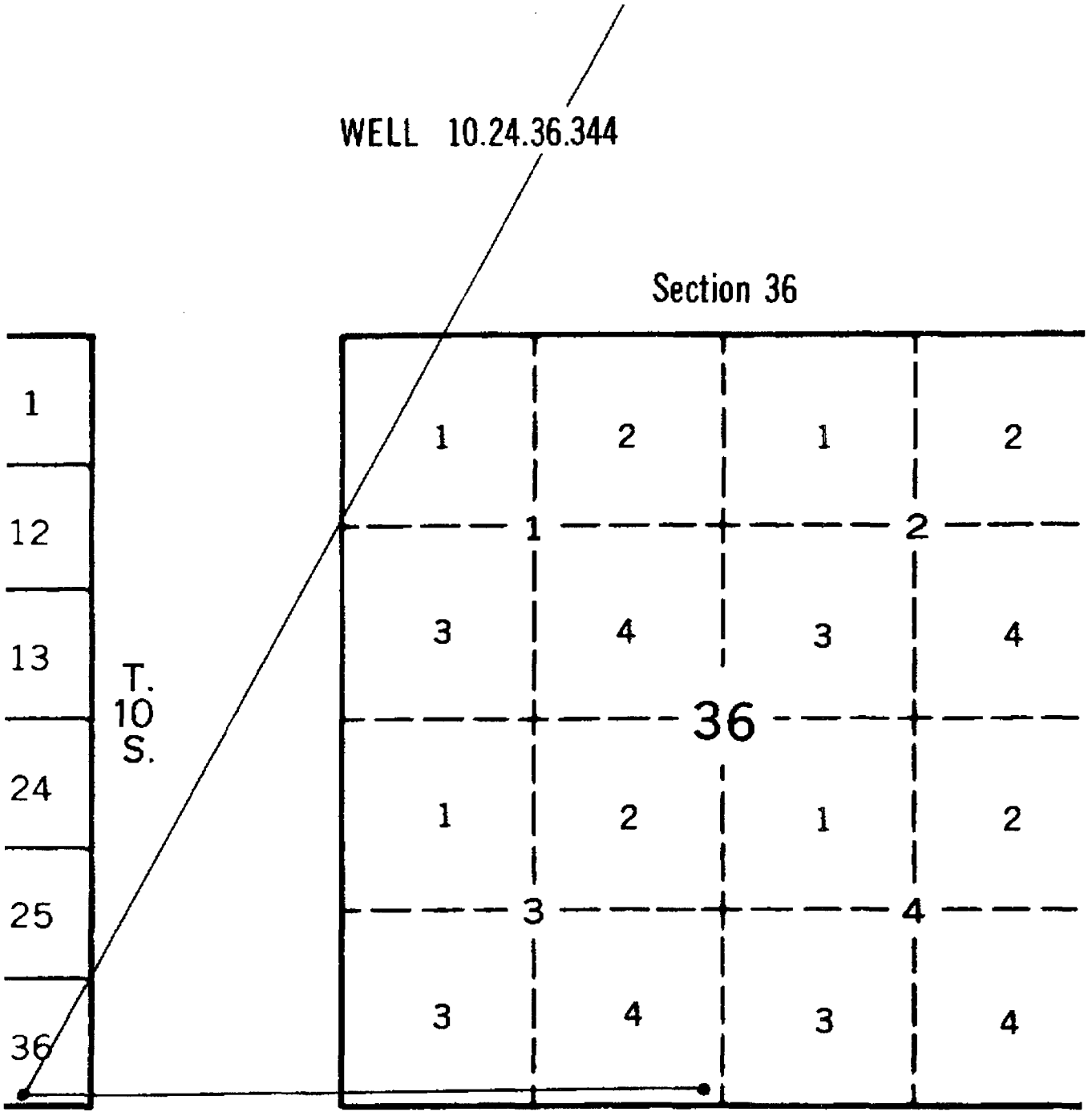


FIGURE 1.—System of numbering wells and locations in New Mexico.

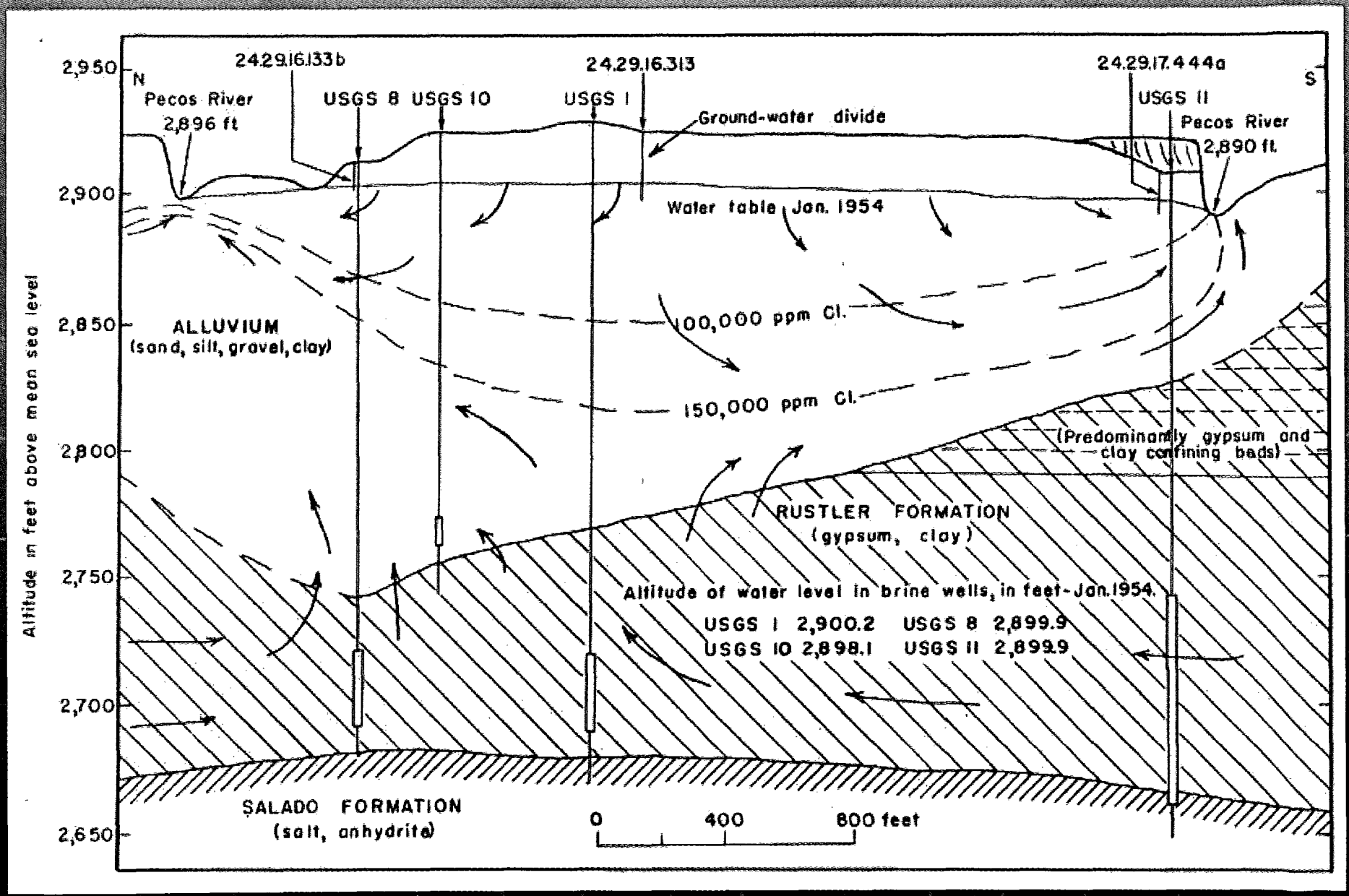
Mexico principal meridian. The third segment denotes the number of the section within the township. The fourth segment denotes the particular 10-acre tract of the section in which the point is located. For this purpose the section is divided into four quarters, numbered 1, 2, 3, and 4, for the northwest, northeast, southwest, and southeast quarters, respectively. The first digit of the fourth segment gives the quarter section, which is a tract of 160 acres. Similarly, the quarter section is divided into four 40-acre tracts numbered in the same manner, and the second digit denotes the 40-acre tract. The 40-acre tract is divided into 10-acre tracts which are numbered in the same manner. Thus a point numbered 10.24.36.344 is located in the SE¼SE¼SW¼ sec. 36, T. 10 S., R. 24 E.



umbering wells and locations in New Mexico.

1. The third segment denotes the numbe
ownship. The fourth segment denotes th
the section in which the point is located

2. Salinity Control at Malaga Bend



Budget Bureau No. 42-R355.2.
Approval expires 12-31-52.

Form 9-330

U. S. LAND OFFICE Santa Fe
SERIAL NUMBER 061451-A
LEASE OR PERMIT TO PROSPECT Federal

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

LOCATE WELL CORRECTLY

LOG OF OIL OR GAS WELL

Company DeKalb Agricultural Assn., Inc. Address 304 Lubbock National Building, Lubbock, Texas
Lessor or Tract Federal Field Cedar Hill (Ext) State New Mexico
Well No. 1-7 Sec. 7 T. 21 R. 31 Meridian N. M. P. M. County Eddy
Location 1650 ft. {N.} of North Line and 1650 ft. {E.} of W. Line of Section 7 Elevation 3201.9 (Derrick floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed Jackie Brown

Date November 1, 1952 Title Superintendent

The summary on this page is for the condition of the well at above date.

Commenced drilling October 6, 1952 Finished drilling October 17, 1952

OIL OR GAS SANDS OR ZONES
(Denote gas by G)

No. 1, from None to ..... No. 4, from ..... to .....
No. 2, from ..... to ..... No. 5, from ..... to .....
No. 3, from ..... to ..... No. 6, from ..... to .....

IMPORTANT WATER SANDS

No. 1, from 90 to 95 No. 3, from 325 to 330
No. 2, from 115 to 130 No. 4, from ..... to .....

CASING RECORD

Size casing	Weight per foot	Threads per inch	Make	Amount	Kind of shoe	Cut and pulled from	Perforated From—	Perforated To—	Purpose
8-5/8	24	8rd.	Natl.	335	Baker	33	OH		Water Shut-off

MUDDING AND CEMENTING RECORD

Size casing	Where set	Number sacks of cement	Method used	Mud gravity	Amount of mud used
8-5/8	333	None	Heavy mud laden fluid behind casing		

PLUGS AND ADAPTERS

Heaving plug—Material ..... Length ..... Depth set .....
Adapters—Material ..... Size .....

SHOOTING RECORD

Size	Shell used	Explosive used	Quantity	Date	Depth shot	Depth cleaned out
		None				

TOOLS USED

Rotary tools were used from ..... feet to 631 feet, and from ..... feet to ..... feet
Cable tools were used from 0 feet to ..... feet, and from ..... feet to ..... feet

DATES

....., 19..... Put to producing Dry, 19.....

The production for the first 24 hours was ..... barrels of fluid of which ..... % was oil; ..... % emulsion; ..... % water; and ..... % sediment. Gravity, °Bé. .....

If gas well, cu. ft. per 24 hours ..... Gallons gasoline per 1,000 cu. ft. of gas .....

Rock pressure, lbs. per sq. in. .....

EMPLOYEES

Al Looney, Driller W. L. Finley, Driller
....., Driller ....., Driller

FORMATION RECORD

FROM—	TO—	TOTAL FEET	FORMATION
0	100	100	Sand & caliche
100	143	43	Dolomite
143	152	9	Dolomite and anhydrite
152	195	43	Dolomite and Anhydrite
195	210	15	Sand
210	235	25	Sand & Dolomite
235	260	25	Dolomite
260	340	80	Dolomite and sand
340	390	50	Anhydrite and sand
390	410	20	Dolomite and sand
410	460	50	Dolomite, sand and Anhydrite
460	520	60	Gypsum and Anhydrite
520	560	40	Salt and Anhydrite
560	590	30	Anhydrite
590	631	41	Dolomite and Anhydrite
631			Total Depth

SD CALICHE
DOL. DOL+CHTS
DOL + ANHY
SD

SALT + ANHY.

U. S. GEOLOGICAL SURVEY
RECEIVED
NOV 20 1952
ARTESIA, NEW MEXICO

(OVER)

16—43044-2

FOLD | MARK

Table 12.--Drillers' logs of selected wells and test holes--Continued

21.27.19.413 J. E. Bennett

Driller: A. H. Moreland

	Thickness (feet)	Depth (feet)
Alluvium		
Sand and red clay	35	35
Sand and gravel (water)	45	80
Rock, red	5	85
Sand and gravel (water)	10	95
Castile formation		
Clay, red, and gypsum	80	175
Clay, blue	169	344
Rock, sandy (water)	31	375

Capitan limestone

21.27.30.144 S. M. Bernard

Driller: H. Hemler

	Thickness (feet)	Depth (feet)
Alluvium		
Topsoil	4	4
Lime and boulders	8	12
Sand and clay	5	17
Conglomerate	16	33
Sand and gravel (water)	6	39
Sand and gravel	1	40
Conglomerate	3	43
Castile formation		
Clay and gypsum	28	71
Shale and gypsum	108	179
Clay, red	7	186
Capitan limestone		
Lime	64	250
Lime, brown	28	278
Lime, white	4	282

Table 12.--Drillers' logs of selected wells and test holes--Continued

21.27.30.330 L. V. Portwood

Driller: J. F. Kimmell

	Thickness (feet)	Depth (feet)
Alluvium		
Caliche	26	26
Clay	5	31
Gravel	24	55
Shale	37	92
Castile formation		
Gypsum	6	98
Silt	34	132
Gypsum	33	165
Capitan limestone		
Lime, gray	55	220
Shale, brown	3	223
Lime, gray	9	232
Lime, white	7	239
Lime	27	266

22.26.1.233e City of Carlsbad

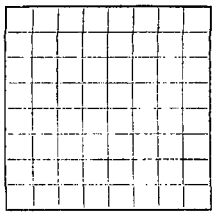
Driller: Martin and Hurley

	Thickness (feet)	Depth (feet)
Alluvium		
Boulders and soft limestone	14	14
Gravel and clay (water at 35 feet)	21	35
Sand and gravel	5	40
Gravel and sand	12	52
Sand and gravel	19	71
Sand and gravel	9	80
Shale, red and gray	30	110
Capitan limestone		
Limestone, gray, sandy	1	111
Lime, brown	1	112
Lime, brown, porous	3	115
Lime, gray, hard	21	136
Limestone (water)	15	151
Limestone, gray	12	163

Form 9-330

Budget Bureau No. 42-R355.5.
Approv. Expires 12-31-52.

U. S. LAND OFFICE LC
SERIAL NUMBER 068440
LEASE OR PERMIT TO PROSPECT



LOCATE WELL CORRECTLY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

LOG OF OIL OR GAS WELL

Company J. M. Hector III Address El Paso, Texas
Lessor or Tract ..... Field Cedar Hills State New Mexico
Well No. 2 Sec. 8 T. 21S R. 27E Meridian N.M.P.M. County Eddy
Location 330 ft. [N.] [S.] of ..... Line and 990 ft. [E.] [W.] of ..... Line of 8 Elevation .....
(Derrick floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed .....

Date July 3, 1953 Title .....

The summary on this page is for the condition of the well at above date.

Commenced drilling ~~April~~ Nov. 12, 1952 Finished drilling December 21, 1952

OIL OR GAS SANDS OR ZONES

(Denote gas by G)

No. 1, from ..... to ..... No. 4, from ..... to .....
No. 2, from ..... to ..... No. 5, from ..... to .....
No. 3, from ..... to ..... No. 6, from ..... to .....

IMPORTANT WATER SANDS

No. 1, from ..... to ..... No. 3, from ..... to .....
No. 2, from ..... to ..... No. 4, from ..... to .....

CASING RECORD

Size casing	Weight per foot	Threads per inch	Make	Amount	Kind of shoe	Cut and pulled from	Perforated From—	Perforated To—	Purpose

MUDDING AND CEMENTING RECORD

Size casing	Where set	Number sacks of cement	Method used	Mud gravity	Amount of mud used

PLUGS AND ADAPTERS

Heaving plug—Material ..... Length ..... Depth set .....
Adapters—Material ..... Size .....

SHOOTING RECORD

Size	Shell used	Explosive used	Quantity	Date	Depth shot	Depth cleaned out

TOOLS USED

Rotary tools were used from ..... feet to ..... feet, and from ..... feet to ..... feet
Cable tools were used from 0 feet to 600 feet, and from ..... feet to ..... feet

DATES

....., 19..... Put to producing ....., 19.....

The production for the first 24 hours was ..... barrels of fluid of which ....% was oil; .....% emulsion; .....% water; and .....% sediment. Gravity, °Bé. .....

If gas well, cu. ft. per 24 hours ..... Gallons gasoline per 1,000 cu. ft. of gas .....

Rock pressure, lbs. per sq. in. .....

EMPLOYEES

....., Driller ....., Driller
....., Driller ....., Driller

FORMATION RECORD

FROM—	TO—	TOTAL FEET	FORMATION
0	20	20	Caliche
20	26	6	Lime
26	49	23	Gravel
49	90	41	Red Bed
90	100	10	Red Bed and Anhy
100	190	90	Red Bed and Gravel
190	225	35	Lime and Gravel
225	240	15	Lime and Anhy
240	270	30	Anhy
270	320	50	Lime
320	332	12	Lime Clay and Shale
332	350	18	Tan Lime and a little shale
350	395	45	Lime Powder - very hard
395	410	15	Lime Shale and Clay
410	415	5	Grey Lime
415	431	6	Lime Shale and Clay
431	441	10	Brown Lime
441	450	9	Sandy Lime
450	475	25	Sand
475	501	26	Lime
501	503	2	Red Bed
503	530	27	Lime
530	540	10	Sandy Lime
540	551	11	Sand
551	600	49	Sand and Lime

FOLD | MARK

[OVER]

16—45364-3

FORMATION RECORD—Continued

FROM—	TO—	TOTAL FEET	FORMATION

HISTORY OF OIL OR GAS WELL

It is of the greatest importance to have a complete history of the well. Please state in detail the dates of redrilling, together with the reasons for the work and its results. If there were any changes made in the casing, state fully, and if any casing was "sidetracked" or left in the well, give its size and location. If the well has been dynamited, give date, size, position, and number of shots. If plugs or bridges were put in to test for water, state kind of material used, position, and results of pumping or bailing.

Budget Bureau 42-R358.2.
Approval expires 12-31-52.

Form 9-331a
(Feb. 1951)

(SUBMIT IN TRIPLICATE)

Land Office [illegible]

Lease No. [illegible]

Unit

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL		SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF REDRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	
NOTICE OF INTENTION TO ABANDON WELL			

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

[illegible], 19[illegible]

Well No. 2 is located [illegible] ft. from {N/S} line and [illegible] ft. from {E/W} line of sec. 3

[illegible] (¼ Sec. and Sec. No.) [illegible] (Twp.) [illegible] (Range) [illegible] (Meridian)

[illegible] (Field) [illegible] (County or Subdivision) [illegible] (State or Territory)

The elevation of the derrick floor above sea level is [illegible] ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

[illegible]

[illegible]

[illegible]

U. S. GEOLOGICAL SURVEY
RECEIVED
NOV 13 1952
ARTESIA

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company [illegible]

Address [illegible]

[illegible]

By [signature]

Title [illegible]

U. S. GOVERNMENT PRINTING OFFICE 16-8437-4

Budget Bureau 42-R358.2.
Approval expires 12-31-52.

Form 9-331a
(Feb. 1951)

(SUBMIT IN TRIPLICATE)

Land Office Las Cruces

Lease No. 068440-A

Unit C

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL	X	SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF REDRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	
NOTICE OF INTENTION TO ABANDON WELL			

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

March 15, 1952

Well No. 1 is located 330 ft. from {N/S} line and 2310 ft. from {E/W} line of sec. 8

NW¼ 8 (¼ Sec. and Sec. No.) T. 21 S. (Twp.) R. 27 E. (Range) NMPM (Meridian)

Cedar Hills (Field) Eddy (County or Subdivision) New Mexico. (State or Territory)

The elevation of the derrick floor above sea level is ..... ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

A Yates Lime test is intended to a depth of about 550 feet.

Proposed Casing Program:

8" @ 375' Set w/ mud
7" @ 530' Set w/ 20 sx. cement.

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company HANSON OIL CO.

Address Box 852

Roswell,

New Mexico.

By Ernest A. Hanson

Title Operator

U. S. GOVERNMENT PRINTING OFFICE 16-8437-4

COPY TO O. C. C.

Form 9-330

Budget Bureau No. 42-R355.2.
Approval expires 12-31-52.

U. S. LAND OFFICE Las Cruces
SERIAL NUMBER 068410-A
LEASE OR PERMIT TO PROSPECT C

LOCATE WELL CORRECTLY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

30-015-01079

LOG OF OIL OR GAS WELL

Company ...[illegible] OIL COMPANY... Address ...Box 952, Roswell, New Mexico...
Lessor or Tract ...[illegible]... Field ...[illegible]... State ...NEW MEXICO...
Well No. ...1... Sec. ...E... T. ...21S... R. ...27E... Meridian ...N. M.... County ...EDDY...
Location 330 ft. [N.] of ...N... Line and 2310 ft. [E.] of ...W... Line of ...Section 8... Elevation 3286.3
(Derrick floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed ...[signature]...

Date ...June 3, 1952... Title ...Operator...

The summary on this page is for the condition of the well at above date.

Commenced drilling ...April 8... 1952 Finished drilling ...May 23... 1952

OIL OR GAS SANDS OR ZONES

(Denote gas by G)

No. 1, from ...G 439'... to ...-... No. 4, from ...G 546'... to ...549'...
No. 2, from ...G 463'... to ...-... No. 5, from ...G 545'... to ...-...
No. 3, from ...G 542'... to ...-... No. 6, from ...-... to ...-...

IMPORTANT WATER SANDS

No. 1, from ...260'... to ...270'... No. 3, from ...-... to ...-...
No. 2, from ...545'... to ...-... No. 4, from ...-... to ...-...

CASING RECORD

Size casing	Weight per foot	Threads per inch	Make	Amount	Kind of shoe	Cut and pulled from	Perforated From—	Perforated To—	Purpose
8"	24#	8 rd	Kitts	393'					Water S.O.
7"	20#	8 rd	Used	546'					Gas S.O.

MUDDING AND CEMENTING RECORD

Size casing	Where set	Number sacks of cement	Method used	Mud gravity	Amount of mud used
8"	393'			Used	-
7"	546'	20 S.C.			

PLUGS AND ADAPTERS

Heaving plug—Material ... Length ... Depth set ...
Adapters—Material ... Size ...

SHOOTING RECORD

Size	Shell used	Explosive used	Quantity	Date	Depth shot	Depth cleaned out

TOOLS USED

Rotary tools were used from ... feet to ... feet, and from ... feet to ... feet
Cable tools were used from ...0... feet to ...571'... feet, and from ... feet to ... feet

DATES

..., 19... Put to producing ..., 19...

The production for the first 24 hours was ... barrels of fluid of which ... % was oil; ... % emulsion; ... % water; and ... % sediment. Gravity, °Bé. ...

If gas well, cu. ft. per 24 hours ... Gallons gasoline per 1,000 cu. ft. of gas ...

Rock pressure, lbs. per sq. in. ...

EMPLOYEES

...[illegible]... Driller ...[illegible]... Driller
...[illegible]... Driller ... Driller

FORMATION RECORD

FROM—	TO—	TOTAL FEET	FORMATION
0	50	50	Cal.
50	75	25	R. "
75	100	25	"
100	113	13	"
113	127	14	"
127	137	10	"
137	145	8	"
145	160	15	"
160	170	10	"
170	183	13	"
183	194	11	"
194	210	16	Anhy. & Gyp.
210	224	14	" "
224	240	16	" "
240	252	12	" "

FOLD | MARK

FORMATION RECORD—Continued

FROM--	TO--	TOTAL FEET	FORMATION
252	261	9	Lime
261	270	9	"
270	281	11	"
281	293	12	"
293	303	10	"
303	315	12	"
315	325	10	"
325	331	6	"
331	351	20	Lime & Sand
351	356	5	Lime
356	366	10	"
366	371	5	"
371	384	13	"
384	391	7	Lime & Sand
391	396	5	" "
396	408	12	" "
408	415	7	Lime
415	424	9	"
424	439	15	"
439	452	13	Lime & Sand
452	462	10	Sand
462	467	5	Lime
467	473	6	"
473	480	7	"
480	488	8	"
488	506	18	Sand & Lime
506	512	6	Lime
512	525	13	Lime & Shale
525	531	6	Sand & Lime
531	535	4	Sand
535	536	1	Lime & Sand
536	541	5	Lime
541	547	6	Lime & Sand
547	564	17	Lime
564	571	17	Lime & Sand

S.I.W.C. T.D. 501' = 571'

16—63094-1 U. S. GOVERNMENT PRINTING OFFICE

HISTORY OF OIL OR GAS WELL

It is of the greatest importance to have a complete history of the well. Please state in detail the dates of redrilling, together with the reasons for the work and its results. If there were any changes made in the casing, state fully, and if any casing was "sidetracked" or left in the well, give its size and location. If the well has been dynamited, give date, size, position, and number of shots. If plugs or bridges were put in to test for water, state kind of material used, position, and results of pumping or bailing.

County [illegible] Depth 550' Pool Cedar Hills

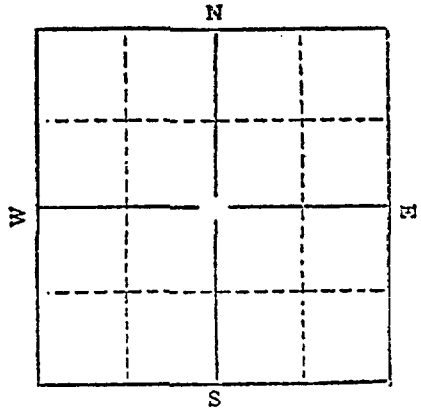
SCOUT REPORT

New Mexico Oil Conservation Commission

Company Hanson Oil Company Well No. 1 Farm Name E. A. Hanson

330 Feet from N Line 2[illegible] Feet from [illegible] Line Sec. 8 Twp. 21S Range 27E

C 101 Approved: Land [illegible] Contractor [illegible]



Elevation Spudded 1-2[illegible] Completed

TA Total Depth P. B.

OX Top Pay District 2

SX I. P. BOPD C

SY Base BO Hrs.

GSR Choke: Inch

GC Tubing: @ Feet

GGD Pressures: Tubing Casing

GSA GOR Gravity

Glo Effective Perfs.

Ute

T. Tan.

Abo

Penn.

T. Miss.

T. Dev.

T. SIL.

T. Mont.

T. Simp.

T. McK.

Ellen.

T. Gr. Wash

Ca

Acid & Shooting Record

	From	To
	From	To
	From	To
	From	To
	From	To

SHOWS

S/ [illegible]

S/ [illegible]

S/ [illegible]

S/ [illegible]

S/ [illegible]

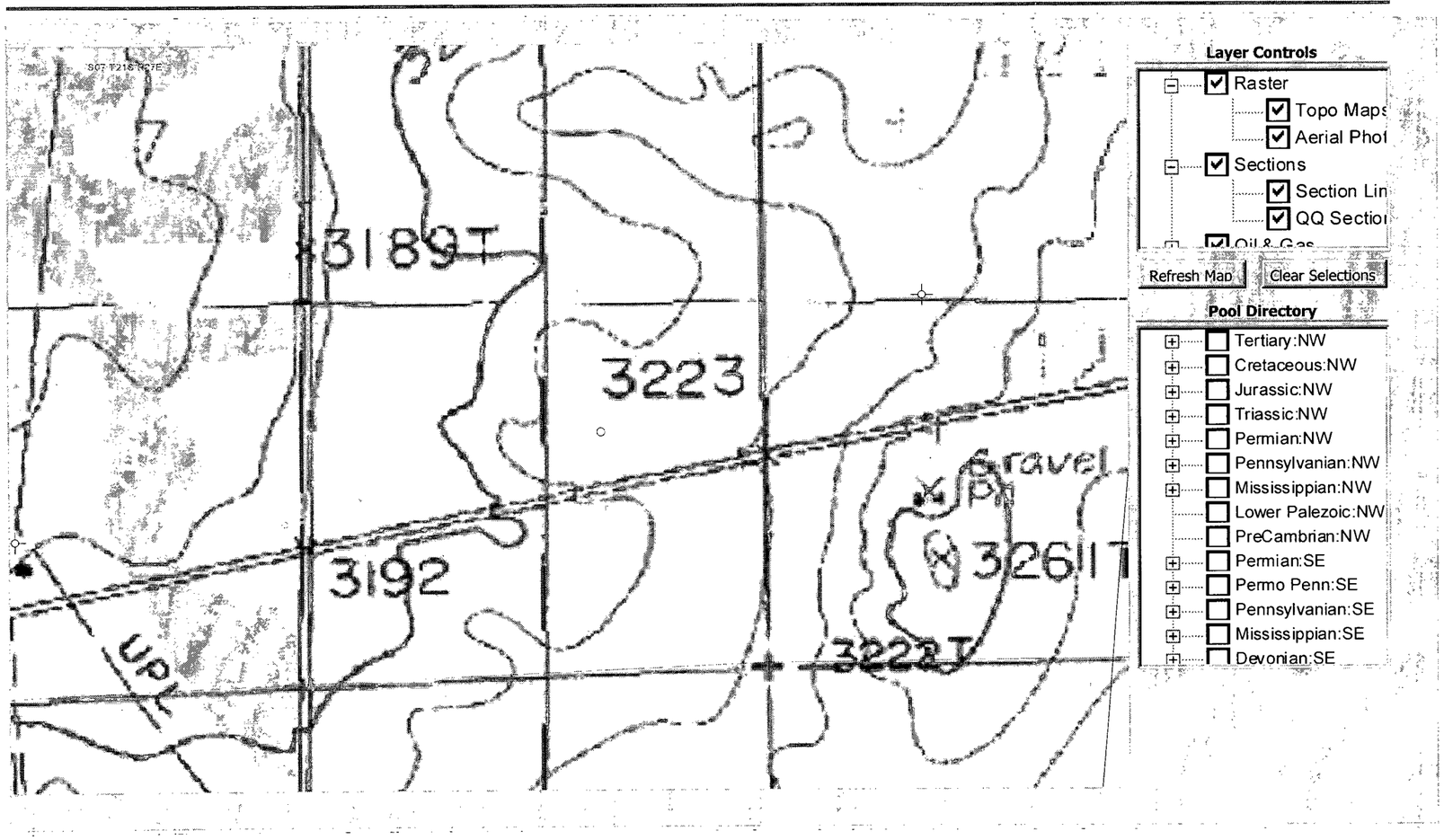
AMOUNT CASING & CEMENTING RECORD

Size	Feet	Sax Cement
8 5/	3[illegible]	[illegible]
7	544	4[illegible]

Mar. 19	Location	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
APR [illegible]	[illegible]	[illegible]	[illegible]
APR [illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
MAY 7	[illegible]	[illegible]	[illegible]

SEP 26 1967

RBDMS GIS/GPS Utility



Layer Controls

- Raster
  - Topo Maps
  - Aerial Phot
- Sections
  - Section Lin
  - QQ Sectio
- Oil & Gas

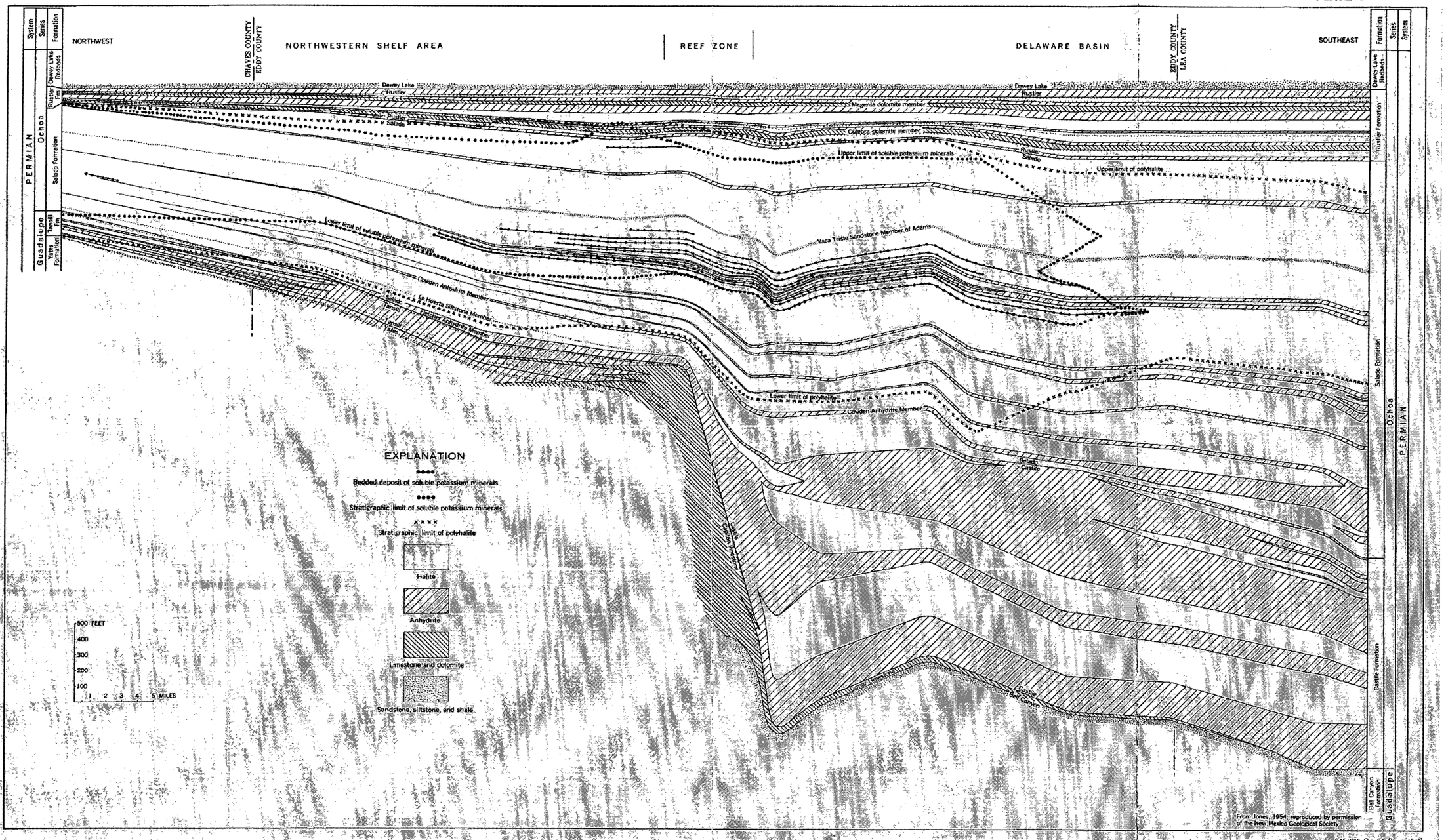
Refresh Map | Clear Selections

Pool Directory

- Tertiary:NW
- Cretaceous:NW
- Jurassic:NW
- Triassic:NW
- Permian:NW
- Pennsylvanian:NW
- Mississippian:NW
- Lower Palezoic:NW
- PreCambrian:NW
- Permian:SE
- Permo Penn:SE
- Pennsylvanian:SE
- Mississippian:SE
- Devonian:SE

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PROFESSIONAL PAPER 440-Y
PLATE 1

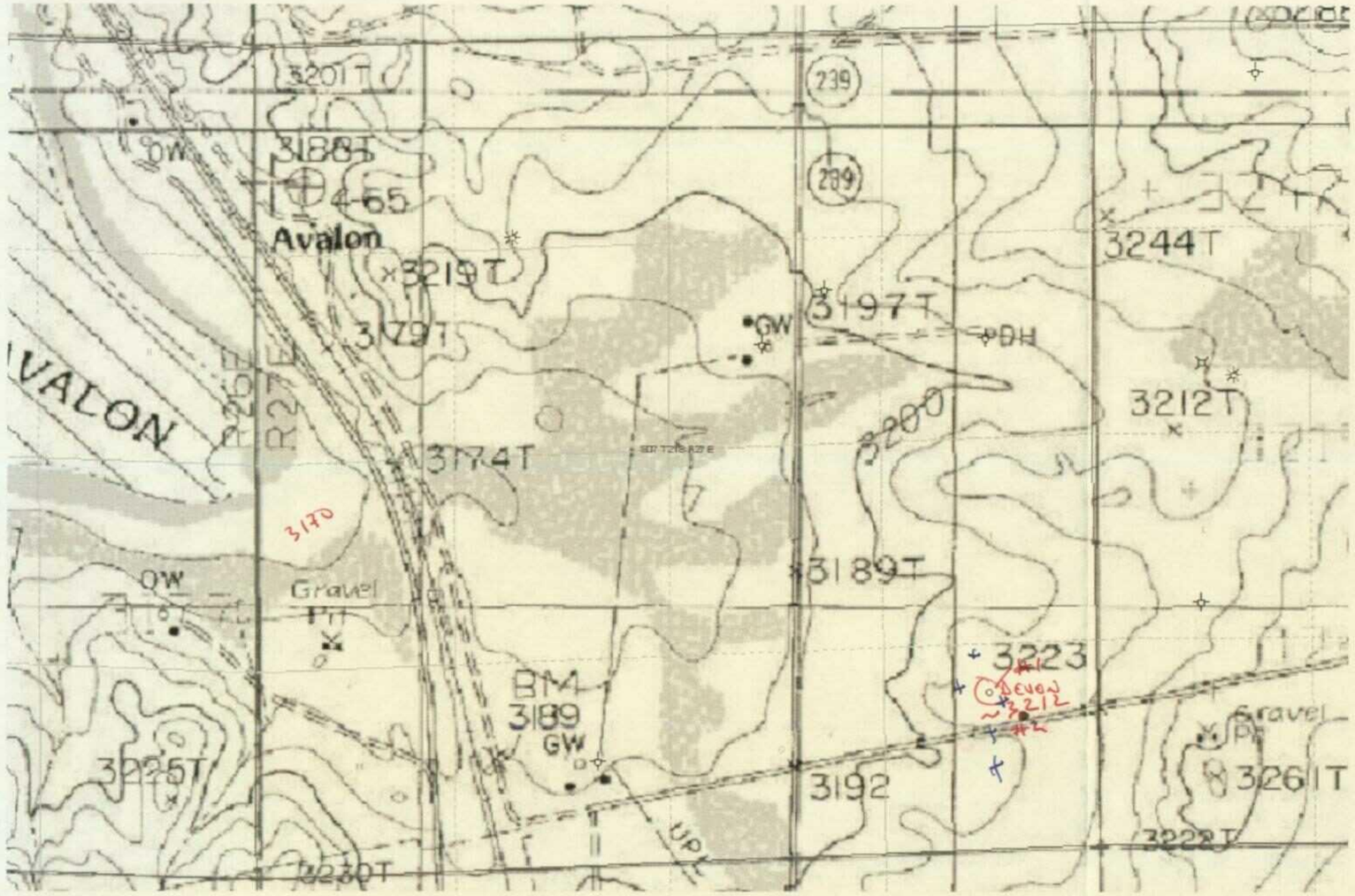


From Jones, 1954; reproduced by permission of the New Mexico Geological Society

145-880 O - 64 (In pocket)

COMPOSITE CROSS SECTION SHOWING THE SUCCESSION OF EVAPORITES IN UPPER PERMIAN FORMATIONS, SOUTHEASTERN NEW MEXICO

RBDMS Map

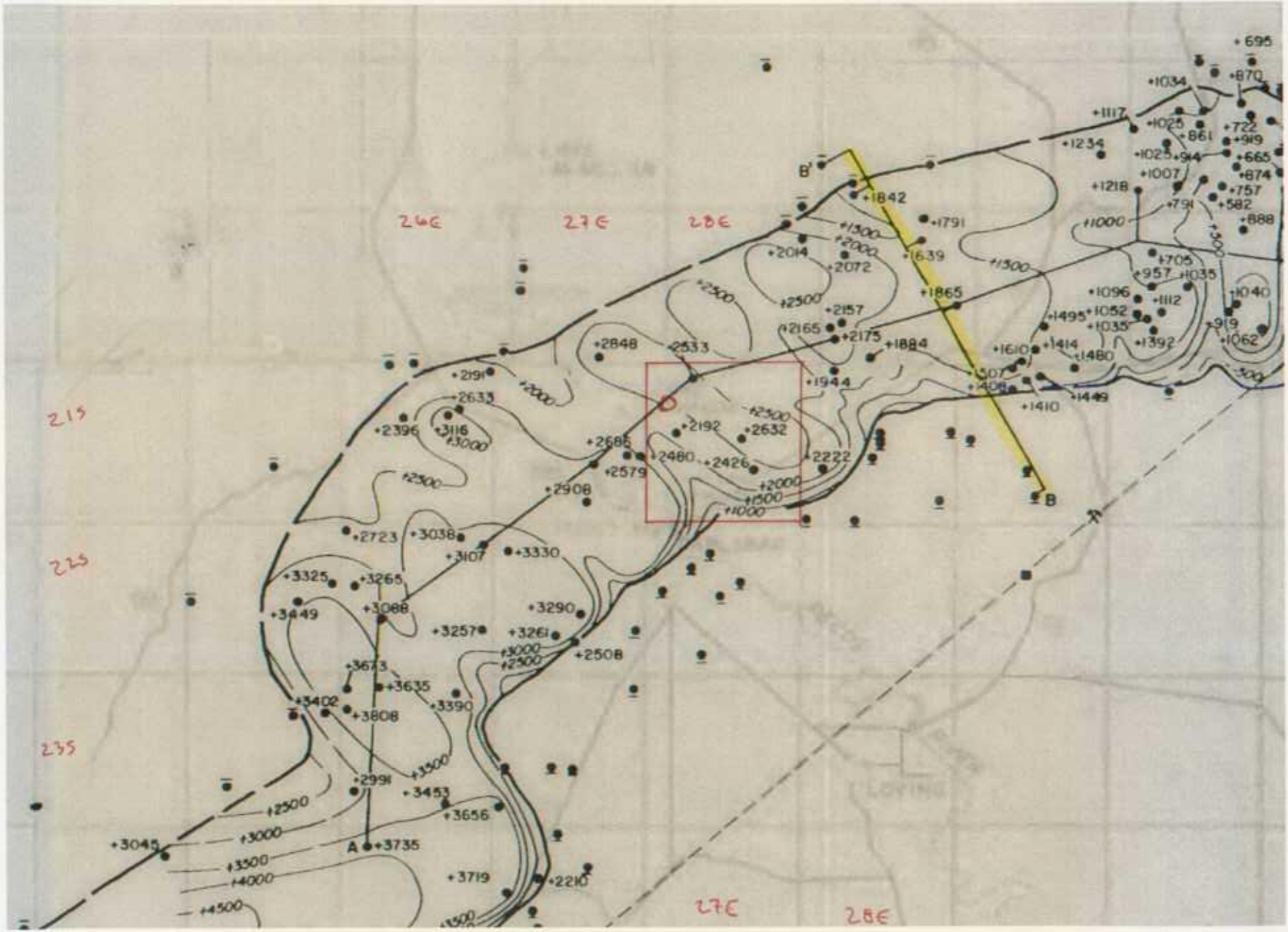


MapNotes

DrawnBy

7/24/2006 2:13:32 PM

Oil Conservation Division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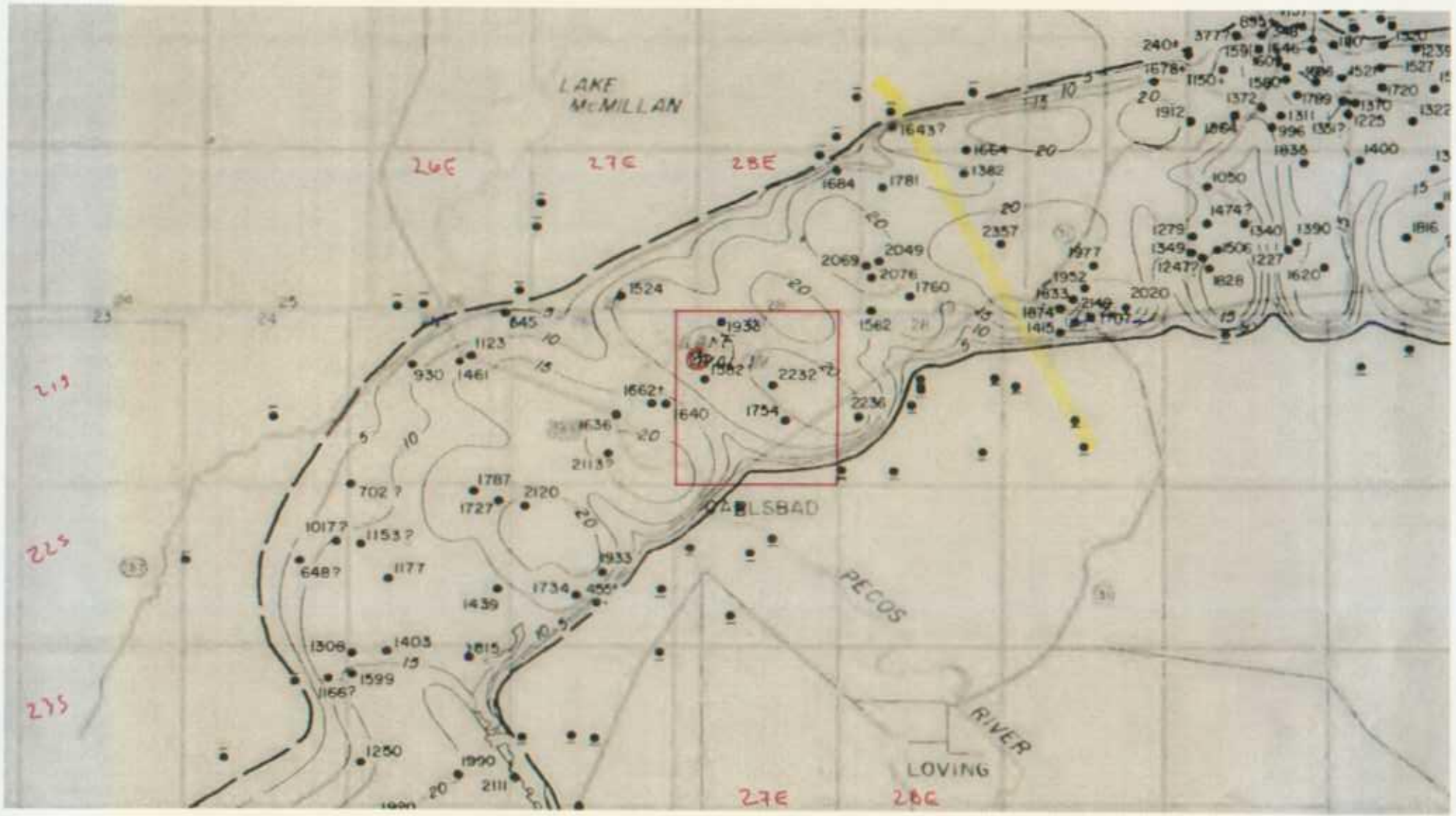
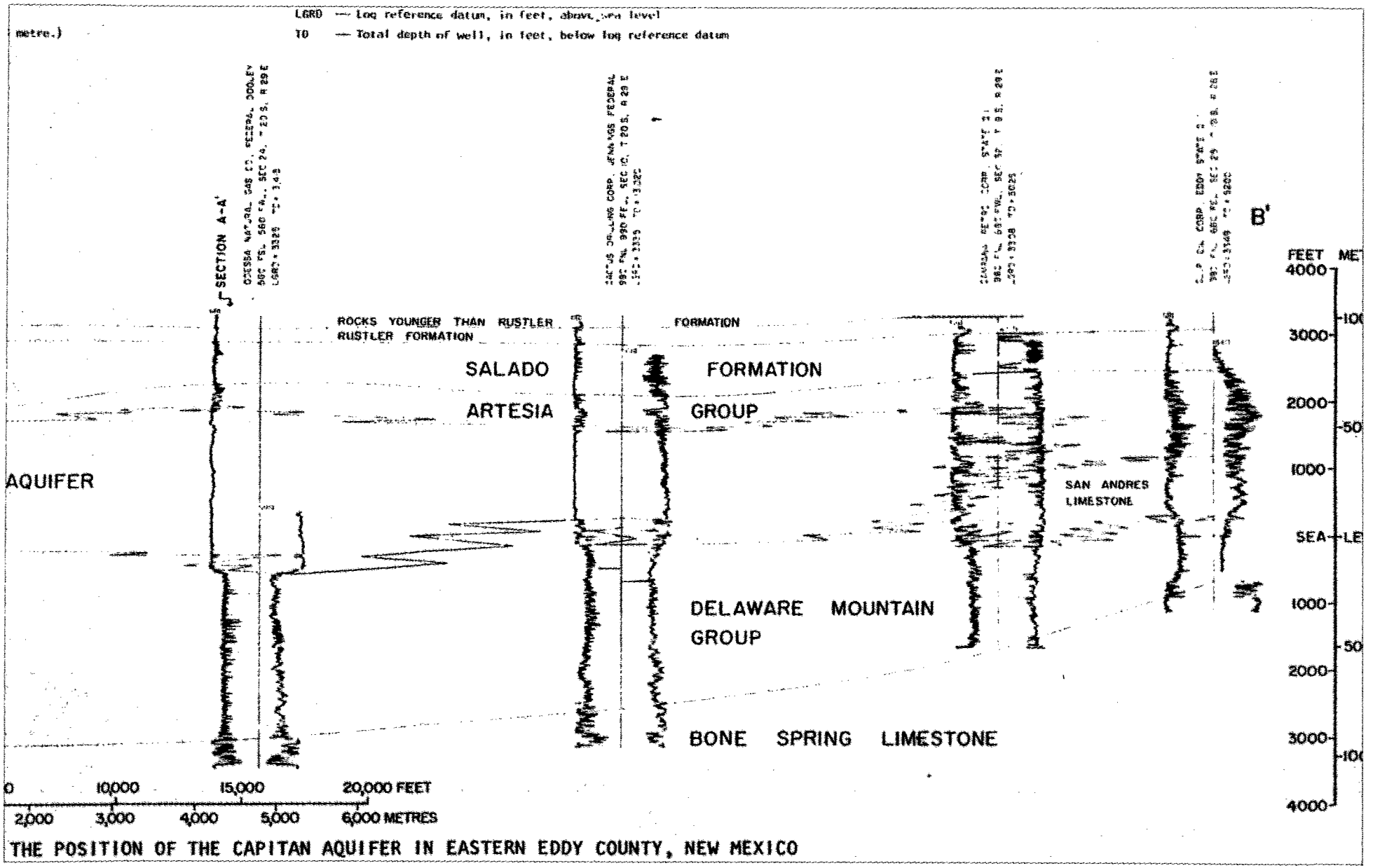
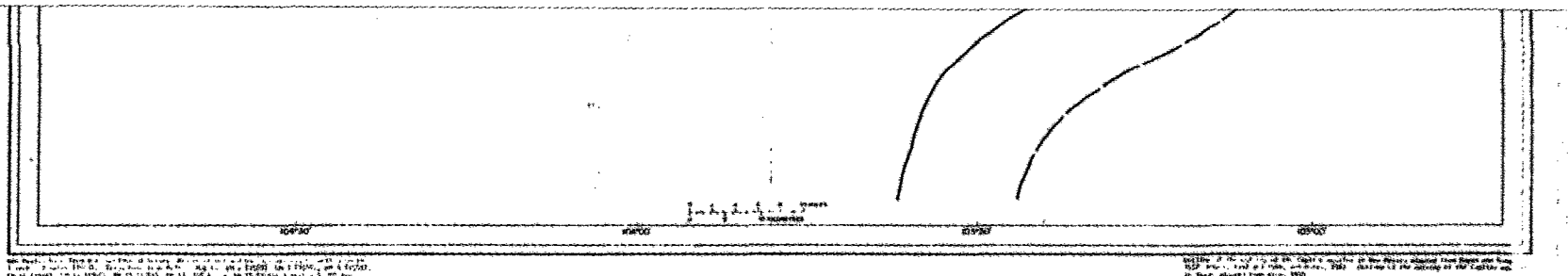
USGS, 1975. CAPITAN THICKNESS (100's FT)
OFR 75-282

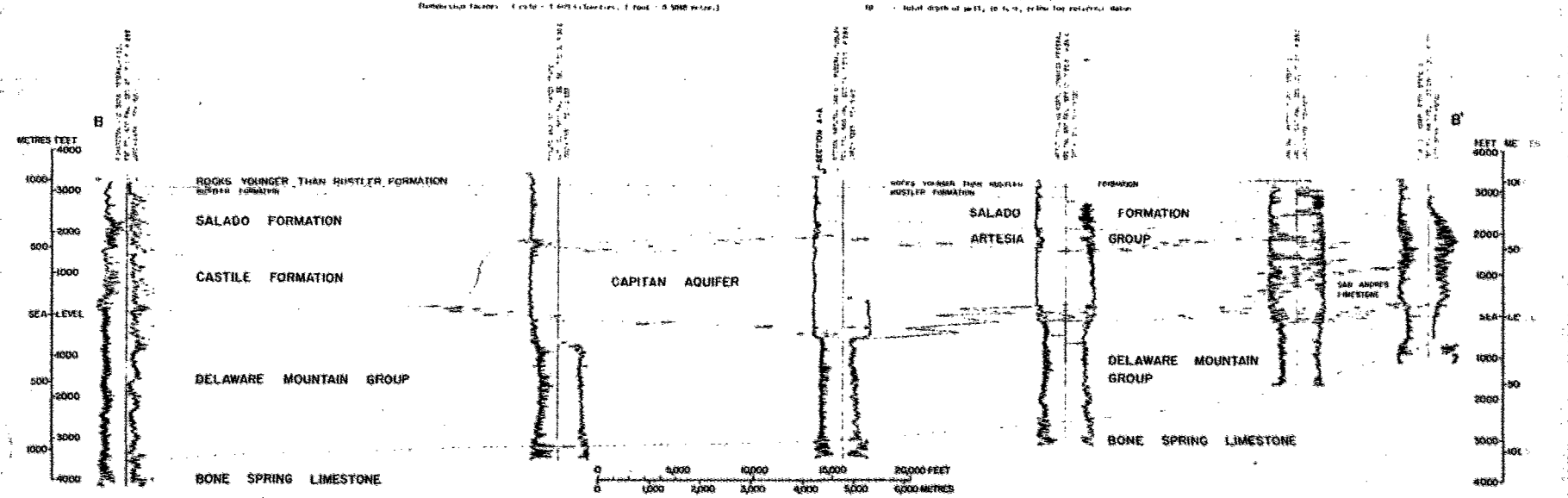




THE POSITION OF THE CAPITAN AQUIFER IN EASTERN EDDY COUNTY, NEW MEXICO



EXPLANATION FOR STRATIGRAPHIC SECTION

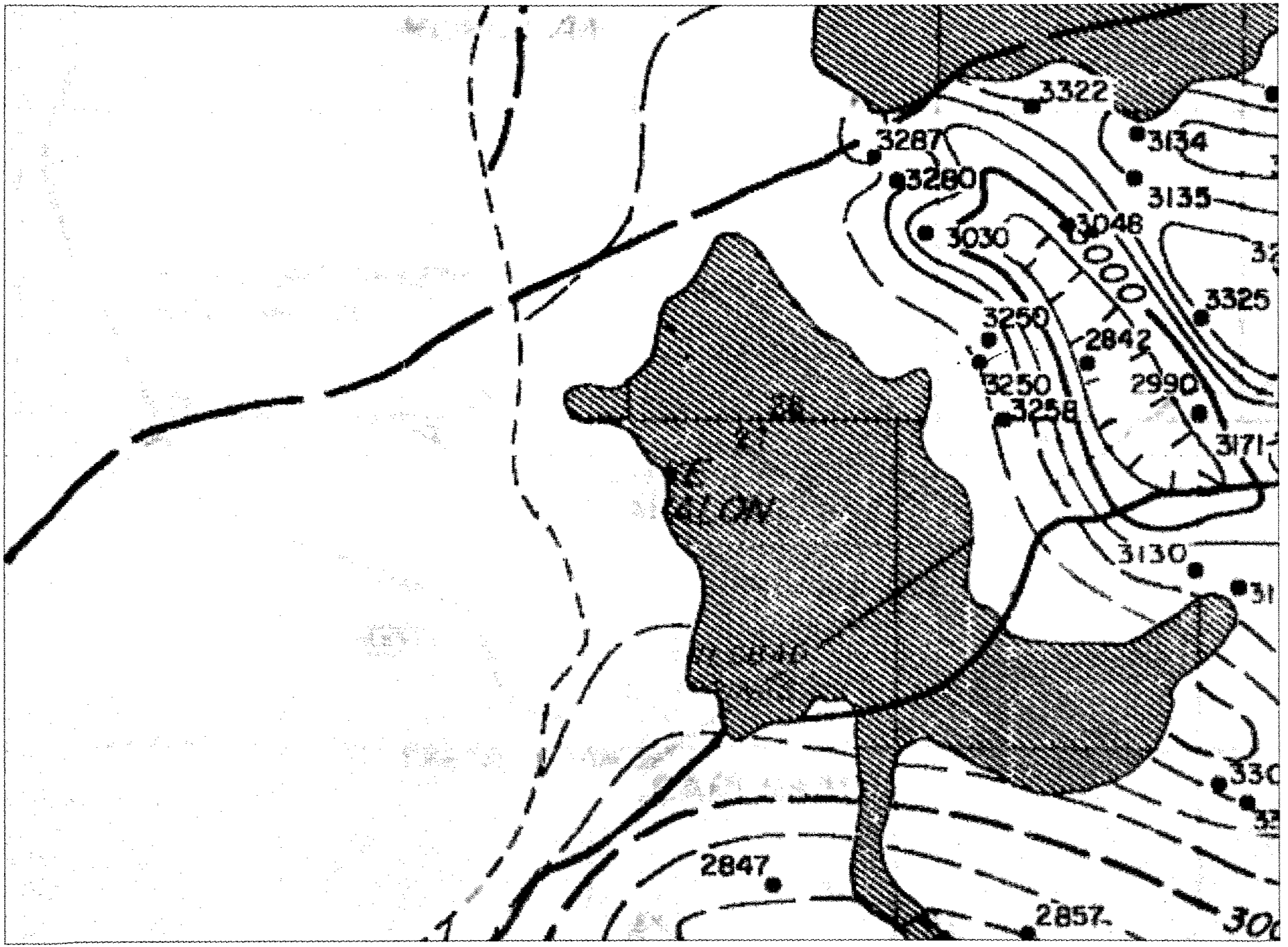


TRANSVERSE STRATIGRAPHIC SECTION B-B' SHOWING THE POSITION OF THE CAPITAN AQUIFER IN EASTERN EDDY COUNTY, NEW MEXICO

STRUCTURE OF THE PERMIAN GUADALUPIAN CAPITAN AQUIFER, SOUTHEAST NEW MEXICO AND WEST TEXAS

by W. L. Hiss

JANUARY 1976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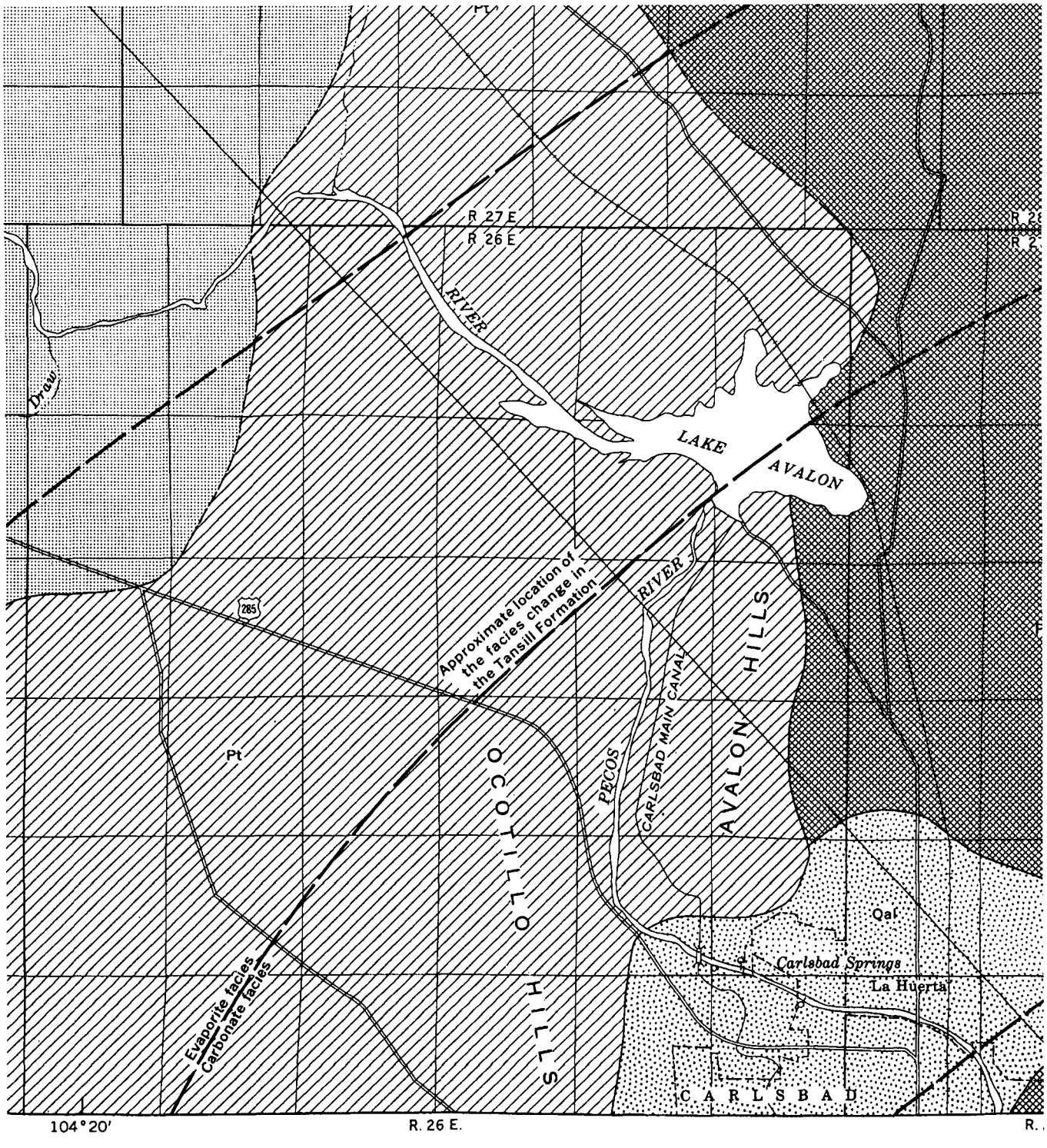
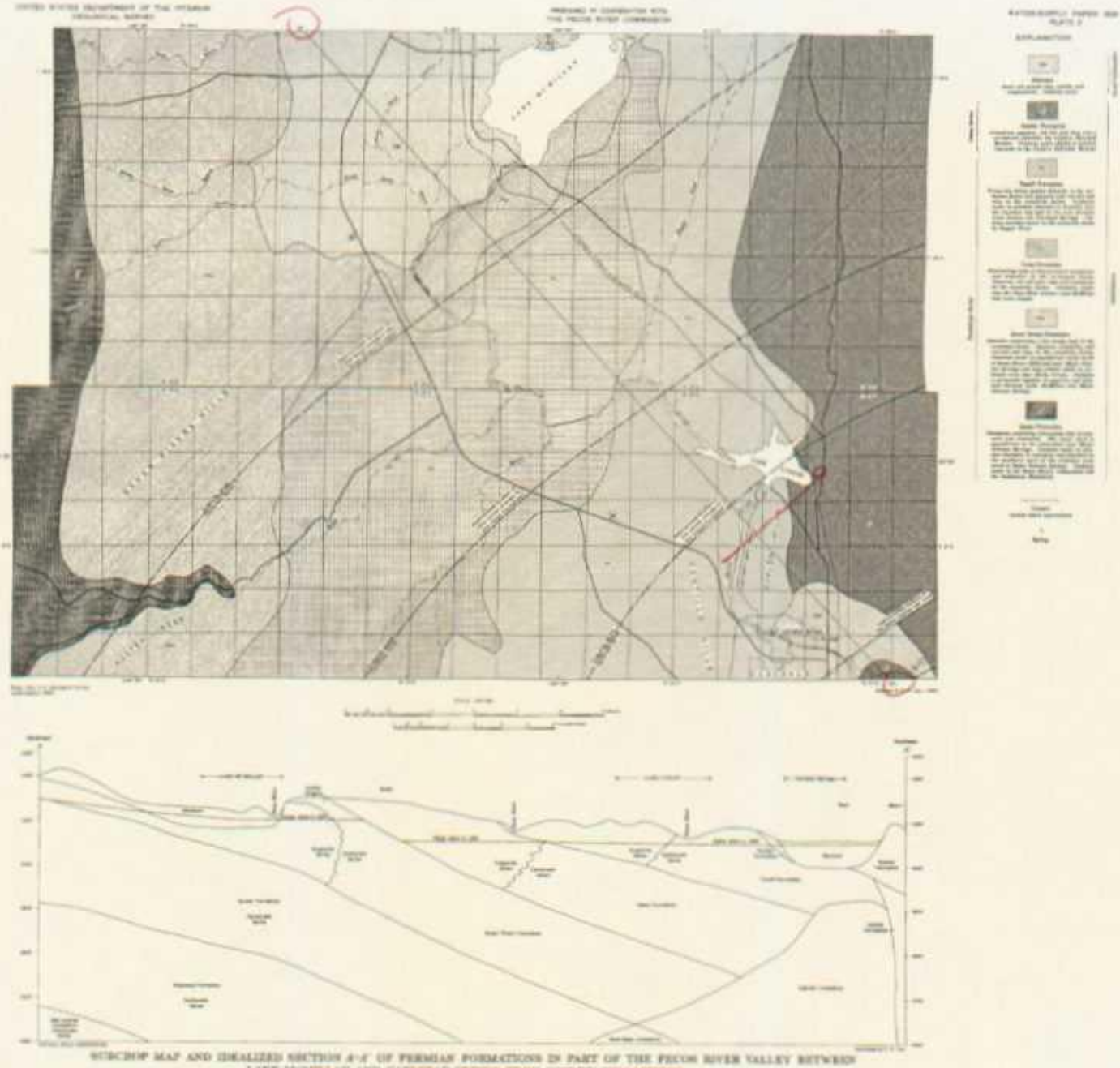


LAKE AVALON

Carlsbad Springs



SUBCROP MAP AND IDEALIZED SECTION A-A' OF PERMIAN FORMATIONS IN PART OF THE PECOS RIVER VALLEY BETWEEN LAKE MCMILLAN AND CARLSBAD SPRINGS, EDDY COUNTY, NEW MEXICO

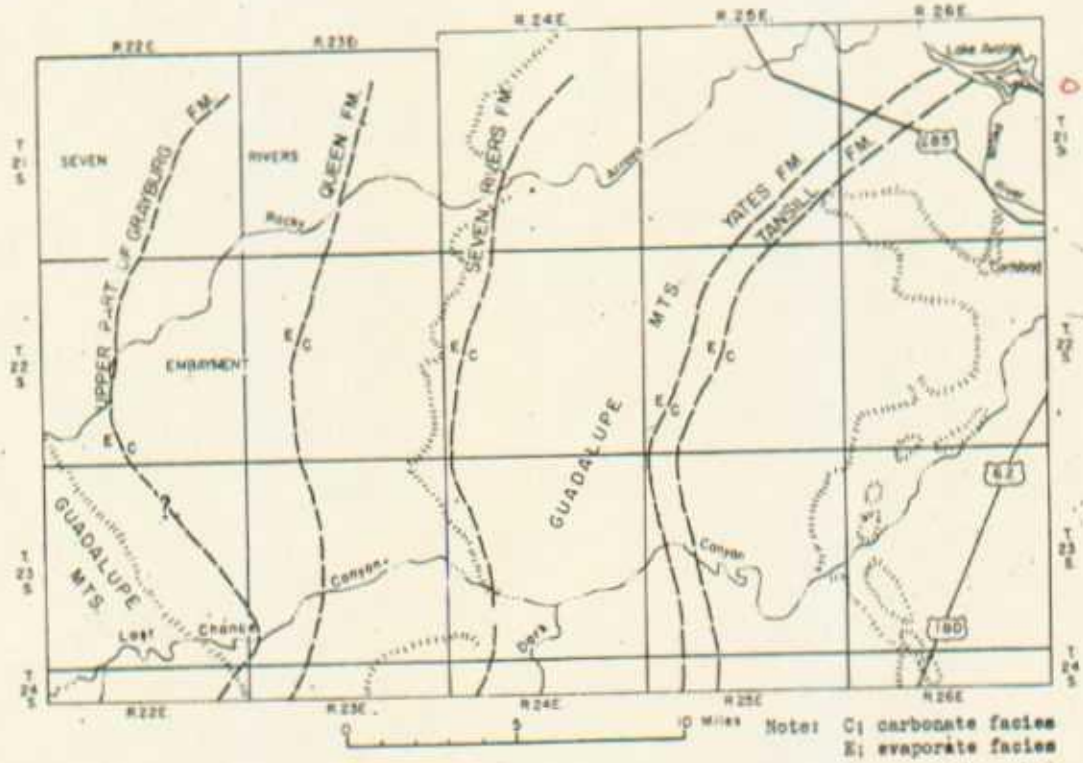
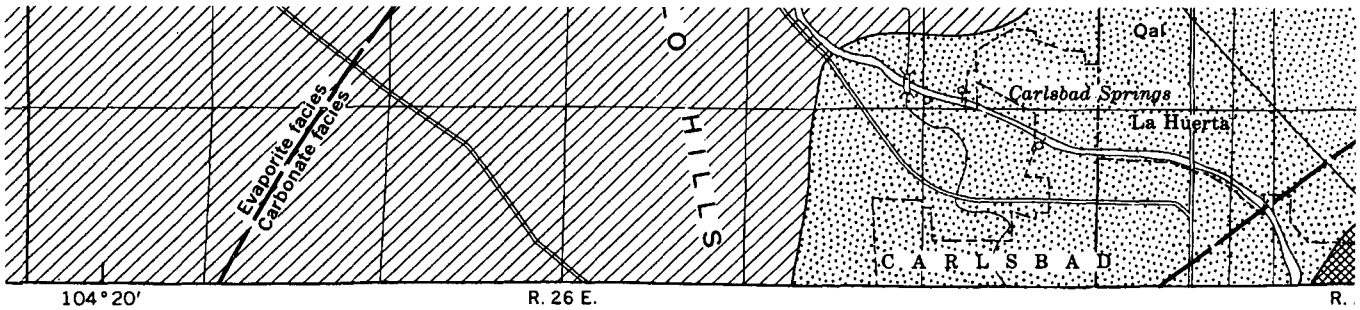
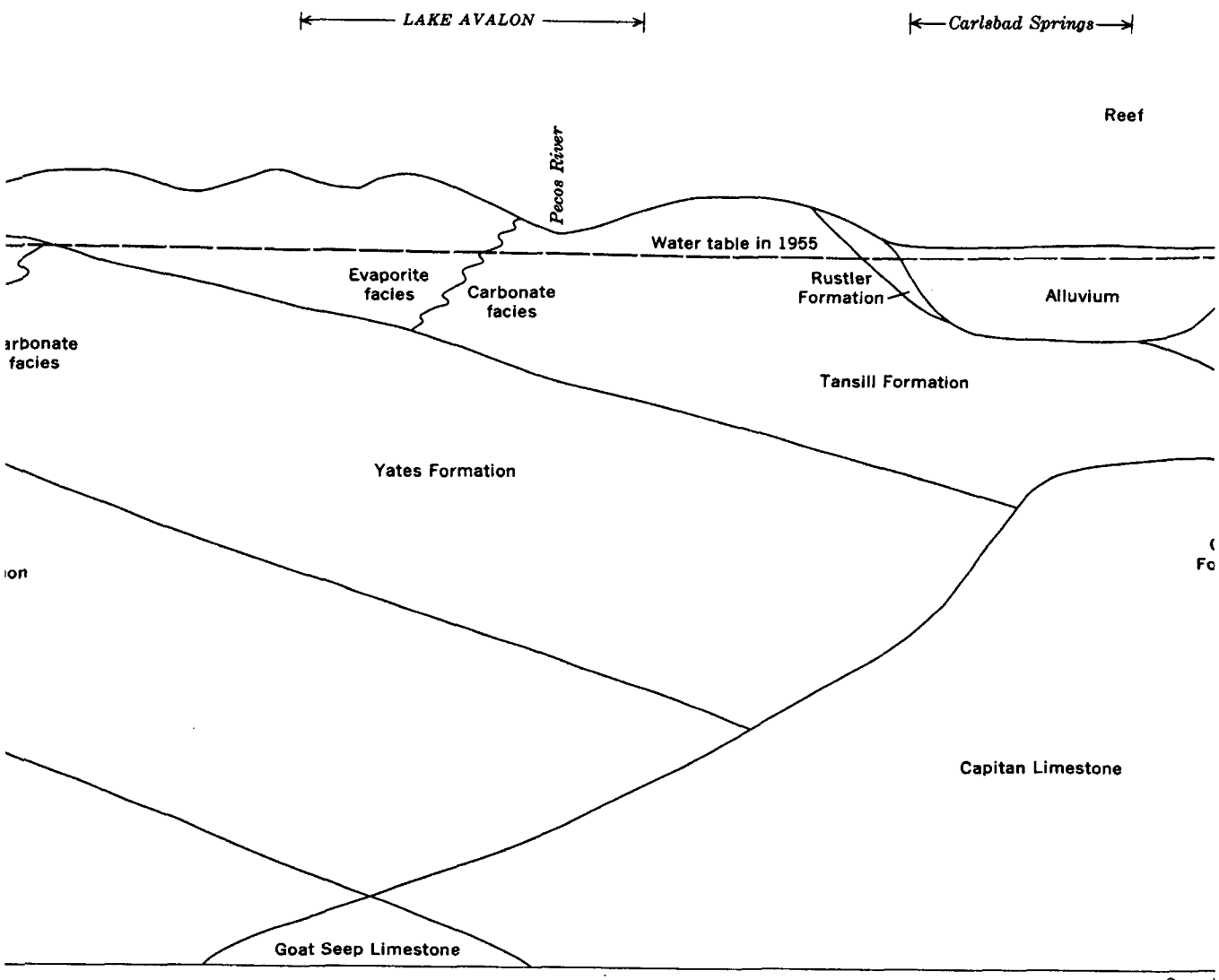


Figure 10.—Map showing approximate boundaries between rocks of carbonate and evaporite facies in various formations of Permian age north and west of Carlsbad, Eddy County, N. Mex.



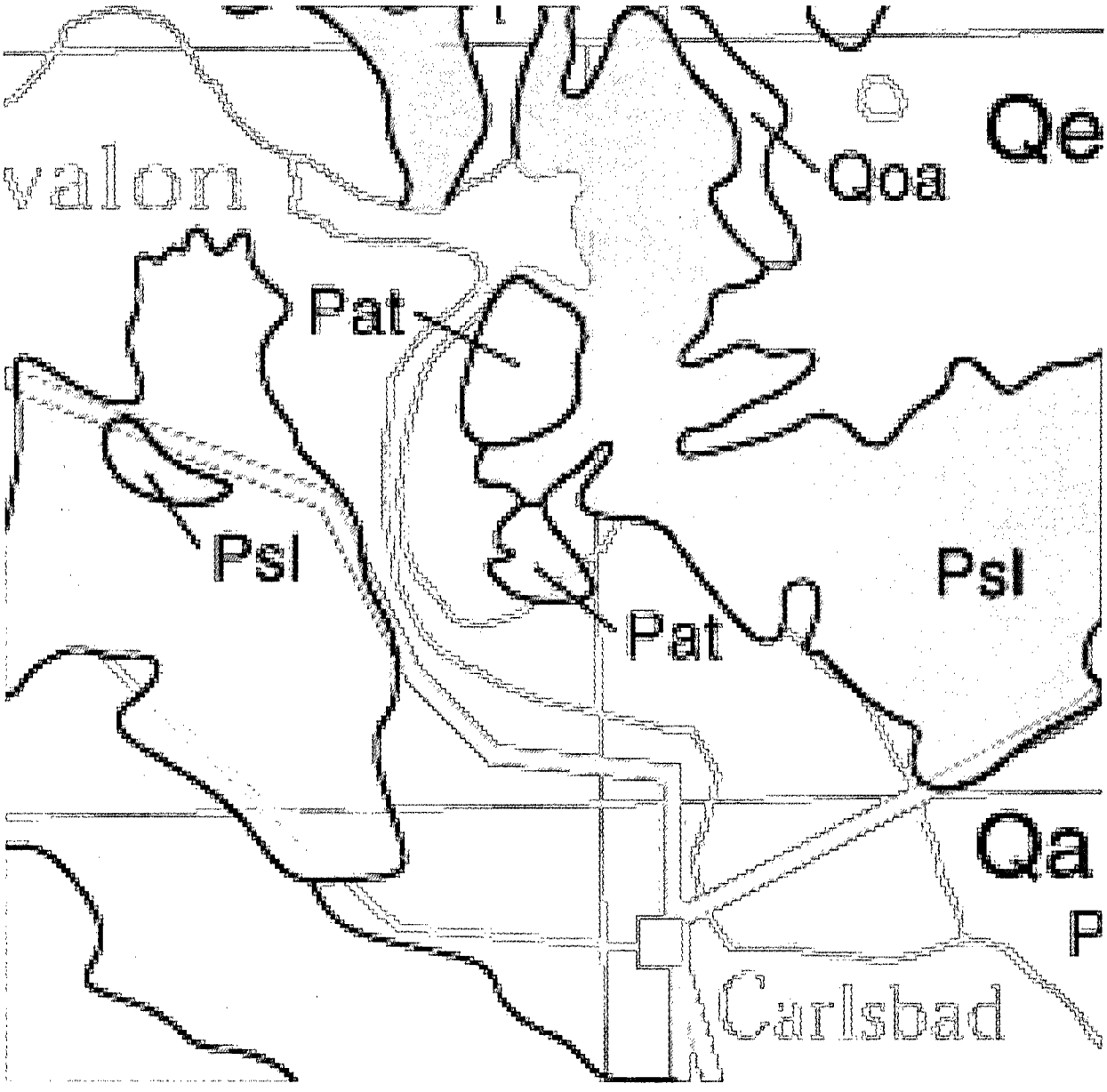
4 5 MILES

5 KILOMETERS



Compi

S IN PART OF THE PECOS RIVER VALLEY BETWEEN
COUNTY NEW MEXICO


Qe
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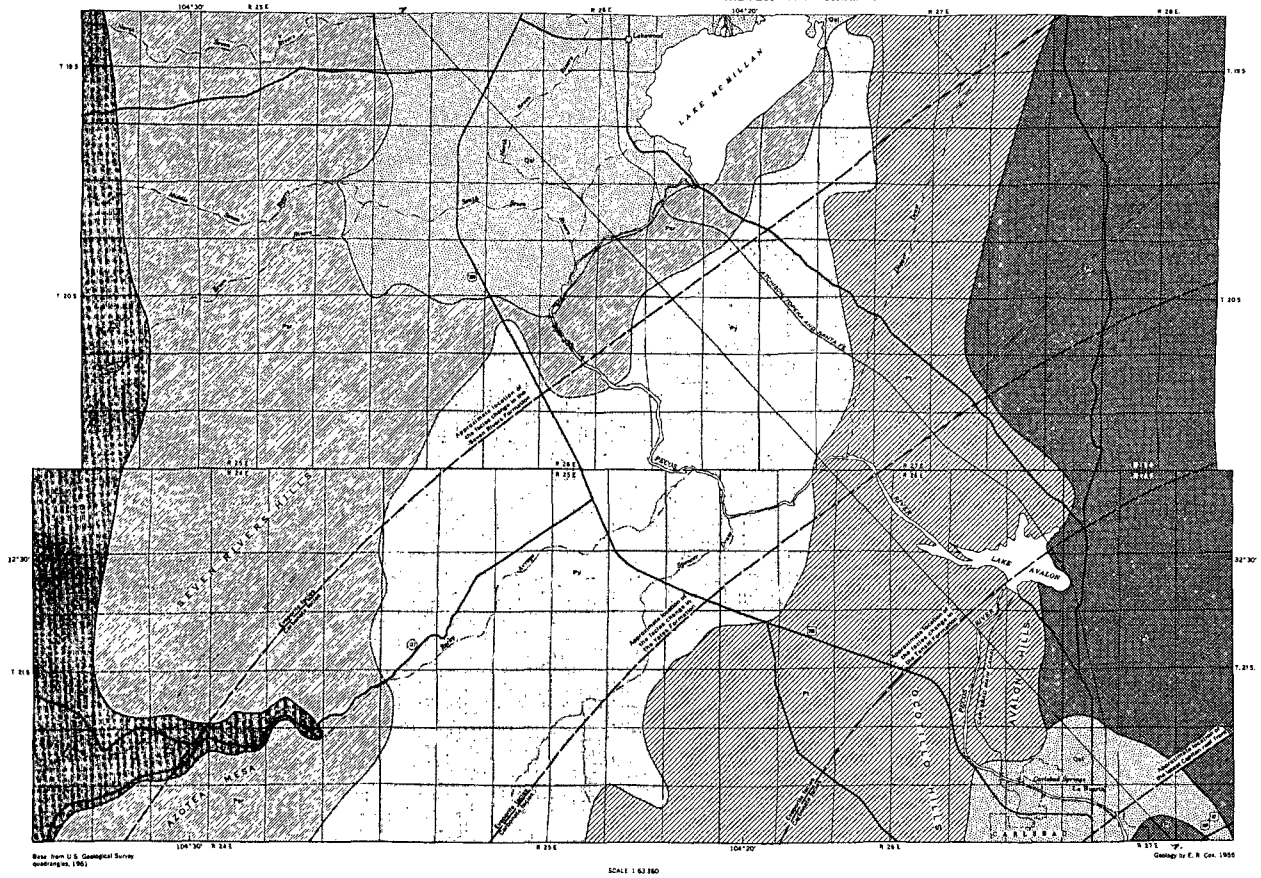
Carlsbad

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

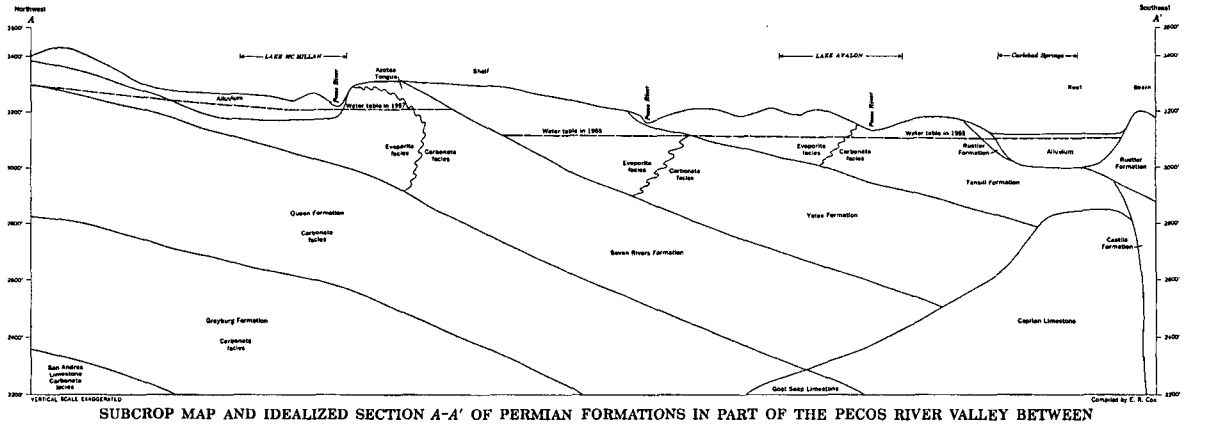
PREPARED IN COOPERATION WITH
THE PECOS RIVER COMMISSION

WATER-SUPPLY PAPER 1828
PLATE 3



EXPLANATION

- Alluvium — Sand, silt, gravel, clay, caliche, and conglomerate. Contains water. (Qal) — QUATERNARY
- Rustler Formation — Anhydrite, gypsum, red silt and clay, and a prominent dolomite, the Culebra Dolomite Member. Contains water chiefly in solution channels in the Culebra Dolomite Member. (Ru) — Ochoa Series
- Tansill Formation — Primarily thinly bedded dolomite in the carbonate facies and gypsum and red silt and clay in the evaporite facies. Contains water in solution channels in dolomite near the Capitan reef and in the area between Lake Avalon and Carlsbad Springs. Contains perched water in the evaporite facies in Dagger Draw. (Pt)
- Yates Formation — Alternating beds of fine-grained sandstone and dolomite in the carbonate facies. Gypsum, red silt and clay and sandstone in the evaporite facies. Contains water near the Pecos River between Lake McMillan and Lake Avalon. (Py)
- Seven Rivers Formation — Dolomite containing a few sandy beds in the carbonate facies. Gypsum, anhydrite, and red silt and clay in the evaporite facies. Contains water in gypsiferous rocks north of Seven Rivers Hills and near Major Johnson Springs and may contain water in carbonate rocks near Rocky Arroyo. Contains a permeable aquifer in gypsum and dolomite between Lake McMillan and Major Johnson Springs. (Psr) — Guadalupe Series
- Queen Formation — Sandstone containing alternating beds of dolomite and limestone. The upper part is gypsiferous in the outcrops near Major Johnson Springs. Contains water in solution channels in limestone and dolomite in the southern part of the artesian area north of Major Johnson Springs. Contains water in the Seven Rivers embayment and the Guadalupe Mountains. (Pq) — PERMIAN
- Contact — Dashed where approximate
- Spring



SUBCROP MAP AND IDEALIZED SECTION *A-A'* OF PERMIAN FORMATIONS IN PART OF THE PECOS RIVER VALLEY BETWEEN LAKE McMILLAN AND CARLSBAD SRINGS, EDDY COUNTY, NEW MEXICO

Fax

To: Tim Gum

Fax: 505-748-9720

Pages: 5, including this cover sheet.

Date: July 20, 20006

Tim:

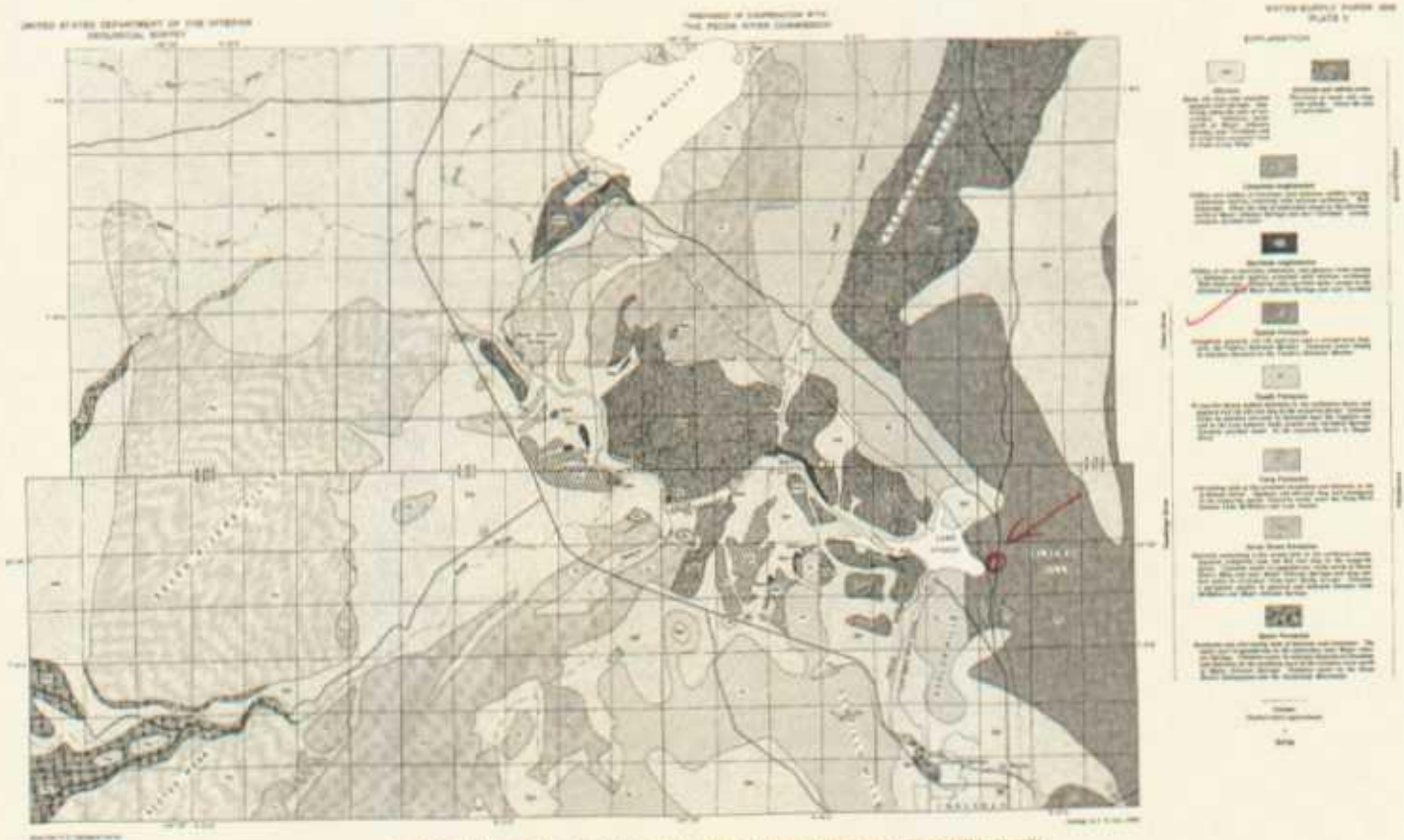
Here are the maps and cross-sections for the Lake Avalon blowout for Wayne.

Glenn

Glenn von Gonten

From the desk of...

Glenn von Gonten
Senior Hydrologist
Energy, Minerals and Natural Resources
Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive South
Santa Fe, NM 87505
505-476-3488
Fax: 505-3462

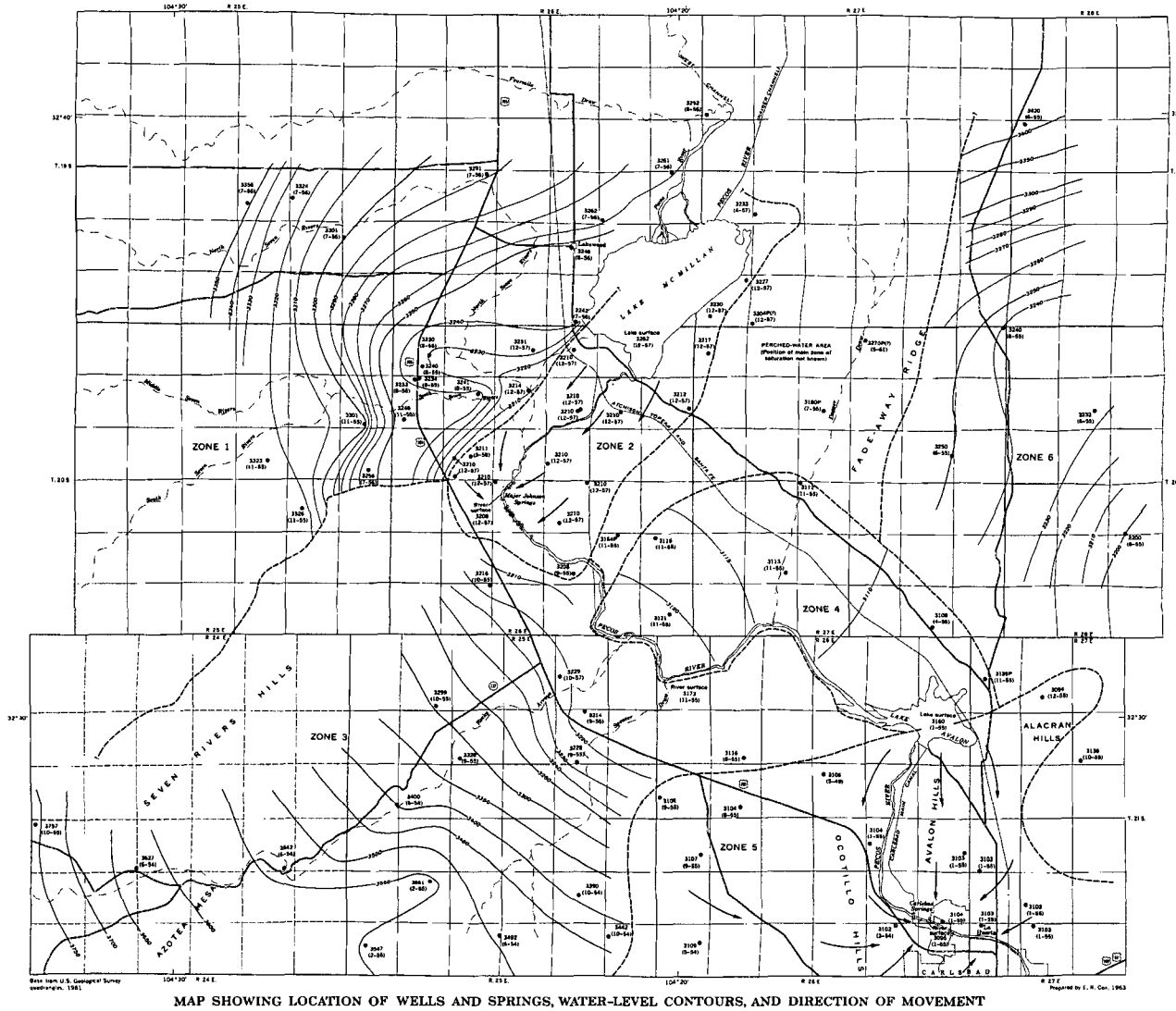


GEOLOGIC MAP OF PART OF THE PECOS RIVER VALLEY BETWEEN LAKE MCMILLAN AND CARLSBAD SPRINGS, EDDY COUNTY, NEW MEXICO

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE PECOS RIVER COMMISSION

WATER-SUPPLY PAPER 1828
PLATE 4



Base from U.S. Geological Survey quadrangles, 1961

Prepared by E. R. Cox, 1963

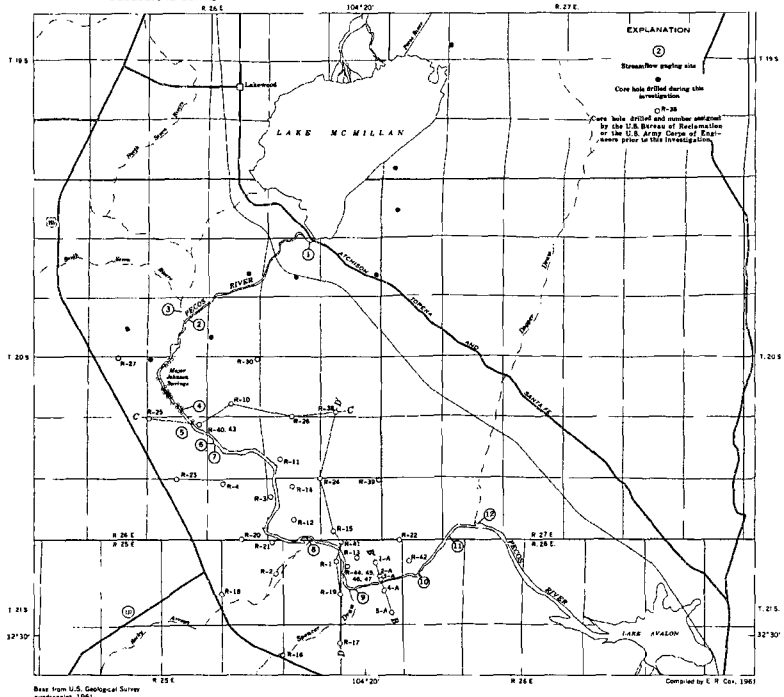
MAP SHOWING LOCATION OF WELLS AND SPRINGS, WATER-LEVEL CONTOURS, AND DIRECTION OF MOVEMENT OF WATER IN CAVERNOUS ROCKS IN THE PECOS RIVER VALLEY BETWEEN LAKE McMILLAN AND CARLSBAD SPRINGS, EDDY COUNTY, NEW MEXICO

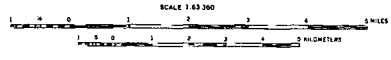
SCALE 1:62 500

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

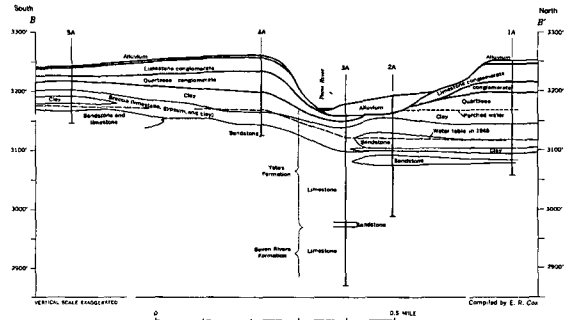
PREPARED IN COOPERATION WITH
THE PECOS RIVER COMMISSION

WATER-SUPPLY PAPER 1828
PLATE 6

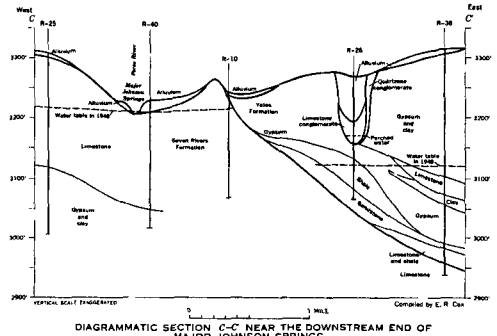




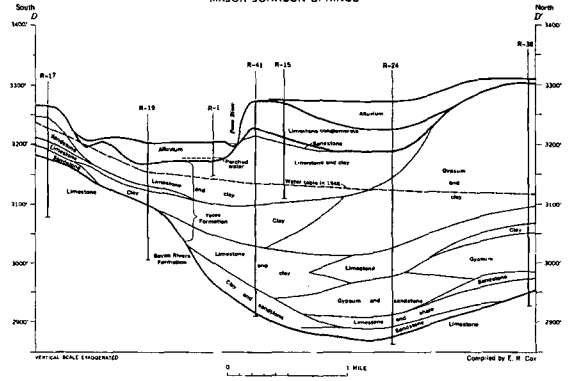
LOCATION MAP



DIAGRAMMATIC SECTION *B–B'* ALONG THE AXIS OF NO. 3 DAMSITE



DIAGRAMMATIC SECTION *C–C'* NEAR THE DOWNSTREAM END OF MAJOR JOHNSON SPRINGS



DIAGRAMMATIC SECTION *D–D'* THREE QUARTERS OF A MILE UPSTREAM FROM THE NO. 3 DAMSITE

DIAGRAMMATIC SECTIONS AND MAP SHOWING LOCATION OF CORE HOLES, SECTIONS, AND STREAMFLOW GAGING SITES BETWEEN LAKE MCMILLAN AND LAKE AVALON, EDDY COUNTY, NEW MEXICO

AVALON HILLS 7
FED COM No. 3

API WELL #	Well Name	Operator Name	Well	Twp	Rng	Sec	UL
30-015-01052-00-00 LTS	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	17	E
30-015-01077-00-00 LNA	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	6	N
30-015-01078-00-00 LNA	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	7	O
30-015-01079-00-00 LNA	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	8	C
30-015-01080-00-00 LNA	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	8	B
30-015-01081-00-00 LNA	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	2	21	27	8	A
30-015-20849-00-00 LTS	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	7	H
30-015-20850-00-00	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	18	B
30-015-20852-00-00	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	18	P
30-015-20877-00-00 Deep	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	8	B
30-015-21073-00-00 LTS	AVALON HILLS AOQ FEDERAL COM	YATES PETROLEUM CORPORATION	1	21	27	7	N
30-015-21118-00-00 LNA	FEDERAL STATE COM	CHESAPEAKE OPERATING, INC.	1	21	27	6	G
30-015-21208-00-00 LTS	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	2	21	27	7	G
30-015-21351-00-00 LTS	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	8	J

30-015-21433-00-00	FEDERAL OO	HARVARD PETROLEUM CORPORATION	2	21	27	18	C
30-015-21491-00-00	AVALON FEDERAL	YATES DRILLING CO	2	21	27	18	J
30-015-21525-00-00	KURLAND FEDERAL	DEVON ENERGY PRODUCTION COMPANY, LP	1	21	27	6	K
30-015-21546-00-00	AVIETTE ALK STATE COM	YATES PETROLEUM CORPORATION	1	21	27	17	L
30-015-22080-00-00	GUACAMAYO STATE	RUSSLYNN PROPERTIES LLC	1	21	27	6	P
30-015-23098-00-00	FEDERAL 8	H L BROWN OPERATING, LLC	1	21	27	8	E
30-015-23427-00-00	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	2	21	27	8	E
30-015-24511-00-00	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	6	I
30-015-24512-00-00	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	2	21	27	6	Q
30-015-24687-00-00	AVALON DELAWARE UNIT	EXXON MOBIL CORPORATION	916	21	27	6	A
30-015-24750-00-00	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	2	21	27	6	H
30-015-24751-00-00	AVALON DELAWARE UNIT	EXXON MOBIL CORPORATION	914	21	27	6	B
30-015-24752-00-00	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	4	21	27	6	G
30-015-24847-00-00	KURLAND A FEDERAL	DEVON ENERGY PRODUCTION COMPANY, LP	1	21	27	6	L

30-015-26056-00-00 LTS	PRE-ONGARD WELL	PRE-ONGARD WELL OPERATOR	1	21	27	8	L
30-015-26906-00-00 D&A	GLIDER AKG STATE	YATES PETROLEUM CORPORATION	1	21	27	17	F
30-015-30178-00-00	MOO COW STATE	RUSSLYNN PROPERTIES LLC	1	21	27	6	16
30-015-31003-00-00	AVIETTE ALK STATE COM	YATES PETROLEUM CORPORATION	2	21	27	17	O
30-015-32904-00-00	FOSTER DRAW 8 STATE COM	MEWBOURNE OIL CO	1	21	27	8	I
30-015-32984-00-00	FOSTER DRAW 8 FEDERAL COM	MEWBOURNE OIL CO	1	21	27	8	H
30-015-33101-00-00 LTS(<200')	COLTON 7 FEDERAL	CIMAREX ENERGY CO OF COLORADO	1	21	27	7	C
30-015-33238-00-00	KURLAND 6 FEDERAL	DEVON ENERGY PRODUCTION	2	21	27	6	12
30-015-33782-00-00	FEDERAL COM	CHI OPERATING INC	2	21	27	6	5
30-015-34468-00-00	AVALON HILLS 7 FED COM	DEVON ENERGY PRODUCTION	3	21	27	7	P
30-015-34599-00-00 LTS(<200')	FEDERAL OO	HARVARD PETROLEUM	3	21	27	18	G