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

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 10439
Order No. R-9790

APPLICATION OF ANADARKO PETROLEUM CORPORATION FOR SALT WATER DISPOSAL, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on February 6, 1992, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this _____ day of November, 1992, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

(1) Due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) The applicant, Anadarko Petroleum Corporation, seeks authority to re-enter and deepen the previously plugged and abandoned Hudson & Hudson, Inc. Saunders "A" Well No. 1, located 660 feet from the North line and 1980 feet from the West line (Unit C) of Section 19, Township 19 South, Range 33 East, NMPM, Lea County, New Mexico, to the Capitan Reef and dispose of produced salt water in the open hole interval from approximately 3500 feet to 4300 feet.

(3) The applicant proposes to inject up to 1,000 barrels of water per day into the proposed disposal well. The source of the injected fluid is Delaware formation water produced in conjunction with oil and gas operations.

(4) The Capitan Formation, or Capitan Reef as it is commonly referred to, is an organic carbonate buildup along the margins of the Delaware Basin. This formation in New Mexico outcrops on the

northern side of the Delaware Basin in southern Eddy County and extends into the subsurface to the north and east in an arc shape to the southern portion of Lea County.

(5) The Capitan Reef, in the southern portion of Eddy County, contains fresh water and is a major source of water for the City of Carlsbad.

(6) According to applicant's evidence, it currently operates the Teas Yates Unit Water Supply Well No. 1 located in Section 14, Township 20 South, Range 33 East, NMPM, which is completed in and producing from the Capitan Reef.

(7) An analysis of the water being produced from the Teas Yates Unit Water Supply Well No. 1, submitted as evidence in this case, indicates that the total dissolved solids are approximately 105,000 mg/l.

(8) An analysis of the water being produced from the Delaware formation in this area indicates that the total dissolved solids are approximately 219,000 mg/l.

(9) The applicant contends that the Capitan Reef in the area of the proposed disposal well does not contain fresh water and is suitable for injection purposes.

(10) The applicant further contends that there may exist a subsurface barrier located east of Carlsbad within the Capitan Reef which separates the potable water in the western portion of the reef from the non-potable water in the eastern portion of the reef.

(11) Rule No. 701 (E)(2) of the Division Rules and Regulations states that "Disposal will not be permitted into zones containing waters having total dissolved solids concentrations of 10,000 mg/l or less except after notice and hearing, provided however, that the Division may establish exempted aquifers for such zones wherein such injection may be approved administratively".

(12) In order to supplement the evidence presented in this case, the Division, subsequent to the hearing, consulted with the State Engineer for the State of New Mexico, whose responsibilities include, among other things, the designation of underground sources of drinking water within the state.

(13) Technical literature available to the Division, namely a map of Chloride Ion Concentration in Ground Water in Permian Guadalupian Rocks, Southeast New Mexico, prepared by the USGS and New Mexico State Engineer and published in 1975, indicates that while there are areas of high chloride concentration within the Capitan Reef, there are also numerous areas south and east of the proposed disposal site which contain water with chloride concentrations less than 10,000 mg/l.

(14) Other technical literature indicates that there is a shortage of data regarding the quality of the water in the Capitan Reef in some areas of Eddy and especially Lea County.

(15) The evidence presented by the applicant in this case is insufficient and does not establish:

a) that the Capitan Reef should be subdivided into two distinct areas, one that contains potable water and one that does not contain potable water;

b) the existence of a subsurface barrier within the Capitan Reef which would effectively isolate potable water from non-potable water;

c) that the area of the proposed disposal well is hydrologically disconnected from other areas of the Capitan Reef which may contain fresh water;

d) the overall hydrologic system within the Capitan Reef is such that injection into the proposed well will not cause the degradation of fresh water within those areas of the Capitan Reef which do contain fresh water.

(16) The application of Anardarko Petroleum Corporation should be denied.

IT IS THEREFORE ORDERED THAT:

(1) The application of Anadarko Petroleum Corporation to re-enter and deepen the previously plugged and abandoned Hudson & Hudson, Inc. Saunders "A" Well No. 1, located 660 feet from the North line and 1980 feet from the West line (Unit C) of Section 19, Township 19 South, Range 33 East, NMPM, Lea County, New Mexico, for the purpose of disposal of produced water into the Capitan Reef from approximately 3500 feet to 4300 feet is hereby denied.

(2) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

WILLIAM J. LEMAY
Director

S E A L

ANADARKO PETROLEUM CORPORATION • 1300 INDEPENDENCE PLAZA • P. O. BOX 2497 • MIDLAND, TEXAS 79702 • (915) 682-1666 • FAX (915) 682-9071

Anadarko

October 24, 1991

10439

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

Re: Form C-108
Water Disposal Well
EXXON Federal SWD No. 3
660' FNL & 1980' FWL
C- Sec. 19, T19S, R33E
Lea County, New Mexico

Gentlemen:

Attached is Anadarko Petroleum Corporation's application to re-enter deepen and complete the former D&A'ed Saunders "A" No. 1 as a water disposal well.

Anadarko is requesting this disposal permit to have an economical system in which to dispose of produced waters from Anadarko's EXXON Federal (Delaware) lease. Anadarko recently completed the EXXON Federal No. 1 and is preparing an application to drill the No. 2. The No. 1 is being pumped with a Lufkin 456 unit and is currently making 70-100 BOPD and 300-400 BWPD. Disposal is $2.00 per barrel of water trucked and disposed. These economics are not very encouraging and limit our ability to fully develop what is perceived as an economical project with controlled expenses. An additional eight wells are possible based on acreage currently leased for continued development.

The only other alternative to a disposal well and trucking is the disposal of the produced water into the Laguna Gatuna playa lake. Our current and future concerns of open surface disposal does not permit Anadarko to request this manner of disposal. We therefore respectfully request that our application be administratively approved as quickly as the NMOCD process permits.

Anadarko with the NMOCD permission will rename the disposal well the EXXON Federal SWD No. 3. The currently plugged well would be re-entered to the 8-5/8" casing stub, tied back to surface, cemented to surface, and cleaned out to

the current TD of 2947'. The well would then be drilled through the lost circulation zones in the capitan reef, cased & cemented from 3500' back to surface, equipped with injection tubing & packer and completed with disposal into the open hole portion of the capitan reef below 3500'.

Should you have any questions concerning this application please phone me at 915/682-1666.

Very truly yours,

George R.S. Buehler

George R.S. Buehler
Staff Production Engineer

GRSB:gks

cc: NMOCD Santa Fe, New Mexico

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

FORM C-108
Revised 7-1-81

Case 10439

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: ☐ Secondary Recovery ☐ Pressure Maintenance ☒ Disposal ☐ Storage
Application qualifies for administrative approval? ☒ yes ☐ no

II. Operator: Anadarko Petroleum Corporation

Address: P. O. Drawer 130, Artesia, New Mexico 88210

Contact party: Jerry E. Buckles Phone: 505/748-3368

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? ☐ yes ☒ no
If yes, give the Division order number authorizing the project _____.

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

* VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

* X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

* XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

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

Name: George R.S. Buehler Title Staff Production Engineer

Signature: George R S Buehler Date: October 14, 1991

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

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

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; location by Section, Township, and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) the intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;

(3) the formation name and depth with expected maximum injection rates and pressures; and

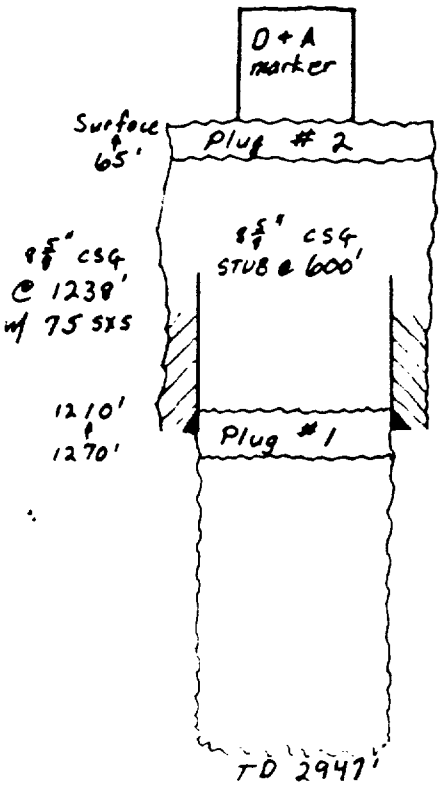
(4) a notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, P. O. Box 2088, Santa Fe, New Mexico 87501 within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

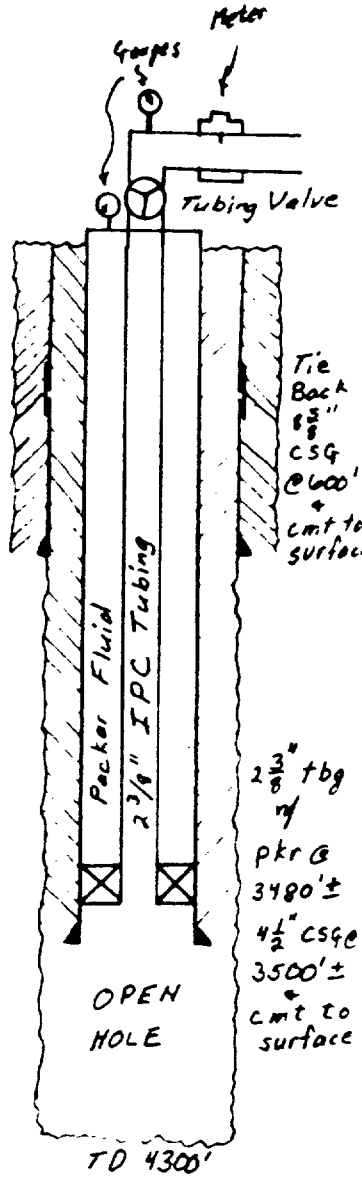
III A

WELL DATA SHEET



Before Re-entry

Date Spudded: February 24, 1957
Plugged: March 2, 1957
8-5/8" casing @ 1238' w/75 sxs
14 jts 28#
26 jts 24#
TD 2947'
Cut and pulled 600' of 8-5/8" casing plugs
#1 1270' to 1210'
#2 65' to surface



After Re-entry

8-5/8" casing 1238' to surface
1) Dress off csg stub & run fluid caliper
2) Bowl over & cement to surface
Drill new 7-7/8" hole 2947' to 4300'
Set 4-1/2 csg @ 3500' & cement to surface
Set 2-3/8" IPC tbg @ 3485'± w/Arrow - Set 1 J-lock Injection Packer
(Injection Into Zone 3500' to 4300')
Estimated Avg. Inj 1000 BWPD
Estimated Avg Inj Pres 200 psi
Estimated Maximum Pres 700 psi

EXXON Federal SWD No. 3
660' FNL & 1980' FWL
Sec. 19, T19S, R33E

III B

1) Disposal Formation: Capitan Reef

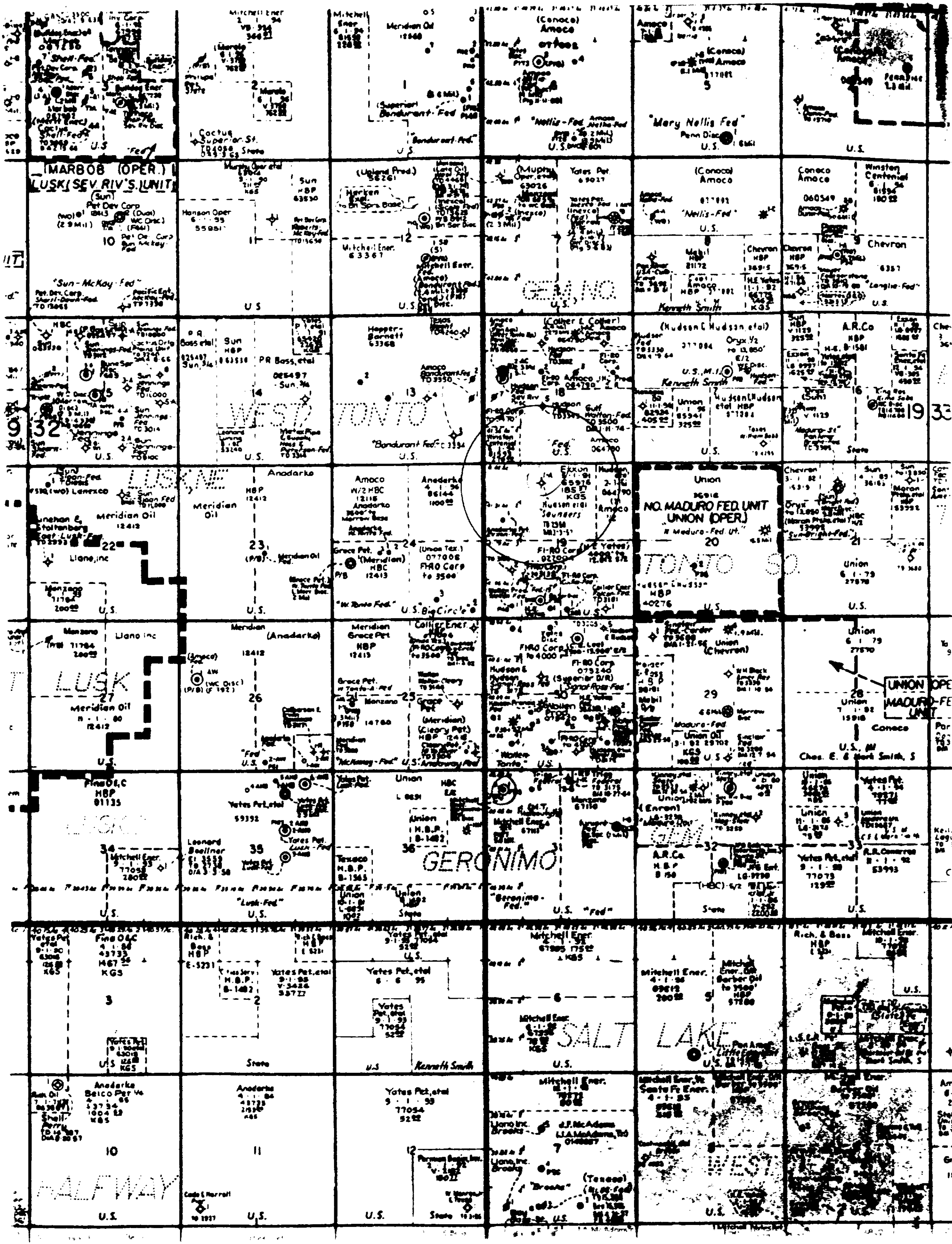
2) Disposal Interval: 3500-4300 (Open Hole)

3) Well was originally drilled to a TD of 2947'
The original operator Hudson & Hudson, Inc. had filed an intent to drill to 3100' with rotary tools and then change to cable tools and drill to 4300', set 5-1/2" casing and complete an oil well with perforations. Hudson & Hudson, Inc. never finished drilling the well but instead plugged the well March 2, 1957.

4) Well was partially drilled and abandoned prior to TD.
Plug #1 1270' to 1210' (amt cmt NR)
8-5/8" csg cut & pulled @ 600'
Plug #2 65' to surface (amt cmt NR)

5) The highest possible oil zone in this area is the Yates @ 2833' to 3255'

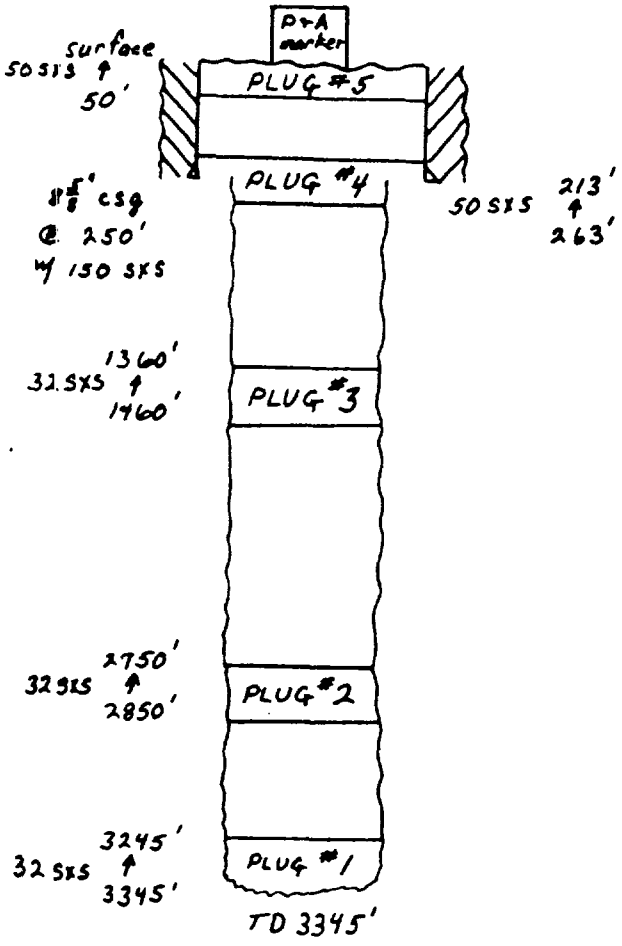
The next lower possible oil zone in this area is the Delaware @ 4977' to 7700'



MARBOB (OPER.)
LUSK (SEV. RIV'S.) UNIT
"Sun-McKay-Fed"
"Mary Nellis Fed"
"Nellis-Fed"
GEM, NO.
WEST
TONTO
"Bondurant Fed"
"Fed"
LUSK, N.
NO. MADURO FED. UNIT
UNION (OPER.)
TONTO SO.
U.S. Big Circle
LUSK
UNION (OPER.)
MADURO-FED. UNIT
GERONIMO
"Geronimo-Fed."
"Lusk-Fed"
SALT LAKE
HALFWAY
Kenneth Smith
Chas. E. & Mark Smith, S

VI

WELL DATA SHEET



Date Spudded: July 4, 1960
Plugged: July 12, 1960
8-5/8" csg @ 250' w/150 sxs
TD 3345
Plug #1 32 sxs 3345'-3245'
Plug #2 32 sxs 2850'-2750'
Plug #3 32 sxs 1460'-1360'
Plug #4 50 sxs 263'-213'
Plug #5 50 sxs 50'-surface

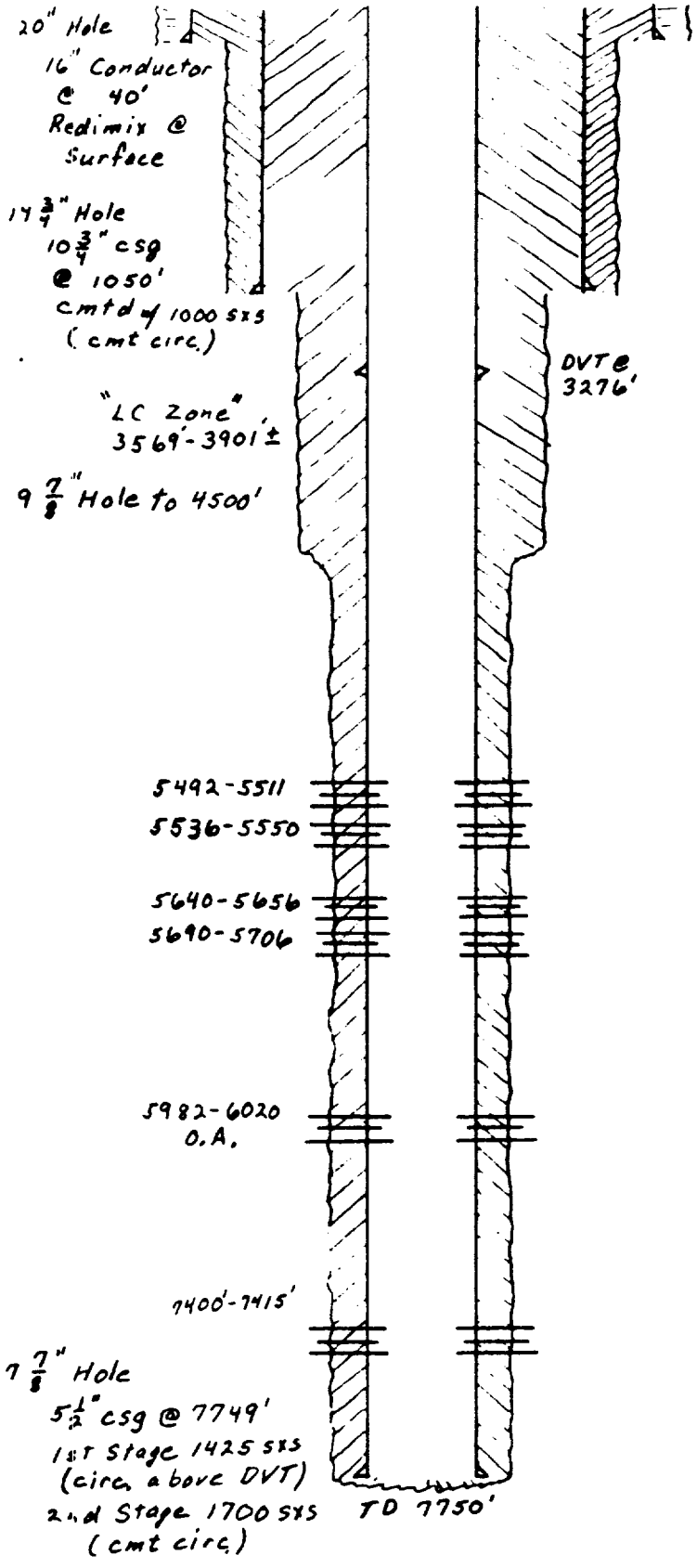
NOTE: This well appears to of penetrated the top of the capitan reef.

(Applied for disposal zone is 3500'-4300')

Federal "18" No. 5
1980' FSL & 2039' FWL
Sec. 18, T19S, R33E

VI

WELL DATA SHEET



Date Spudded: June 5, 1991
Completed: August 5, 1991
20" Hole
16" csg set @ 40' & redimixed to surface
14-3/4" Hole
10-3/4" csg set @ 1050'
Cmtd w/1000 sxs (cmt circ)
9-7/8" Hole to 4500'
LC @ 3569 to 3901±
Regain circ w/400 sxs cmt
Hole 7-7/8" (reduce bit size @ 4500')
TD 7750'
5-1/2" csg @ 7749
FC @ 7702
DVT @ 3276
1st stage w/1425 sxs (cmt to DVT)
Open DVT & circ out 75 sxs
2nd stage w/1700 sxs
circ out 227 sxs

DELAWARE PERFORATIONS

perfs 7400-15 2 SPF
perfs 5982, 86, 89, 92, 96, 98, 6003, 08, 10
13, 16, 20 2 SPF
perfs 5640-56 & 5690-5706
perfs 5492-5511 & 5536-50 2 SPF

EXXON Federal No. 1
1980' FNL & 560' FWL
Sec. 19, T19S, R33E

VII. 1) Avg inj rate 500 BWPD, Max inj rate 1000 BWPD
2) Type system - Closed system
3) 200 avg inj pres max inj pres 700 psi
4&5) a) Water Analysis of EXXON Federal No. 1 - see attached analysis by Unichem #4a
b) Compatability of two waters - see attached analysis by Unichem #4b
c) Water Analysis of Capitan Reef Water from Anadarko's Teas Yates Unit Water Supply Well No. 1 in Section 14-20S-33E - see attached analysis by Unichem #4c

VIII. a) Lithology - Limestone
b) Geological Name - Capitan Reef
c) Top/Reef-3255''
d) Base/Reef-4977'
e) Drinking Water
1) Name of drinking water zone - Triassic
2) Depth to bottom of drinking water zone - 850 feet
3) Drinking Water under disposal zone - None

IX. Proposed stimulation to disposal zone - 2000 gallons 15% HCl

X. Logs & Tests - None, well was never drilled to TD

XI. 1) Water analysis from drinking water well within 1 mile
a) Location of drinking water well - Sec. 18, T19S, R33E
b) Analysis - see attached sheet from State Engineer's Office
c) Date sample taken - 2-15-83

XII. See Exhibit XII

XIII. The following list includes the names of all parties notified of Anadarko's intention to install and operate a water disposal well (namely the EXXON Federal SWD No. 1). See attached list.

UNICHEM
INTERNATIONAL

Home Office 707 N. Leech, P.O. Box 1499 / Hobbs, NM 88240 / Ph. 505/393-7751, Fax 505/393/6754

October 10, 1991

Jerry Buckles
Anadarko Petroleum Corp.
P. O. Drawer 130
Artesia, NM 88210

Dear Mr. Buckles:

Enclosed please find our water analyses and compatibility reports from the **Teas Yates WSW #1** and **Exxon Federal #1.**

If you have any questions or require further information, please contact us.

Sincerely,

Sharon Wright
Laboratory Technician

SW/sr

cc: Bill Polk
Joe Hay
John Offutt
Charlie Copeland
Jeff White

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: Exxon Federal #1 - Wellhead (on 8/12/91)

	Sample 1
Specific Gravity:	1.157
Total Dissolved Solids:	219389
pH:	6.30
Resistivity:	0.047 ohms @ 76°F
IONIC STRENGTH:	4.952

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	1150	23000
Magnesium	(Mg^{+2})	832	10100
Sodium	(Na^{+1})	1980	45600
Iron (total)	(Fe^{+2})	0.752	21.0
Barium	(Ba^{+2})	0.051	3.50
Manganese	(Mn^{+2})	0.190	5.23
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.20	256
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	9.89	475
Chloride	(Cl^{-1})	3950	140000

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
104°F	40°C	2.5	1.00
122°F	50°C	2.7	1.00
140°F	60°C	3.1	1.00
168°F	76°C	3.6	1.0
176°F	80°C	3.8	1.0

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: TEAS YATES & EXXON FEDERAL - COMPATIBILITY (on 10-10-1991)

	Sample 1
Specific Gravity:	1.149
Total Dissolved Solids:	208003
pH:	6.35
IONIC STRENGTH:	4.649

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	1040	20800
Magnesium	(Mg^{+2})	755	9170
Sodium	(Na^{+1})	1950	44800
Iron (total)	(Fe^{+2})	0.677	18.9
Barium	(Ba^{+2})	0.049	3.36
Manganese	(Mn^{+2})	0.172	4.72
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.54	277
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	18.6	893
Chloride	(Cl^{-1})	3720	132000
DISSOLVED GASES			
Carbon Dioxide	(CO_2)		1.00
Hydrogen Sulfide	(H_2S)		11.9
Oxygen	(O_2)		0

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	1.6	8.6
122°F	50°C	2.5	8.3
140°F	60°C	2.9	8.3
168°F	76°C	3.4	8.0
176°F	80°C	3.6	8.0
200°F	93°C	4.1	8.0

Comments:
COMPATIBILITY = TEAS YATES = 10% & EXXON FEDERAL FEDERAL = 90%

4h

The attached exhibit 4c is capitan reef water, sampled from Anadarko's Teas Yates Unit's Water Supply Well No. 1, located approximately 9 miles southwest of the EXXON Federal SWD No. 3. The WSW No. 1's legal is 1330' FNL & 1330' FWL of Section 14, T20S, R33E, Lea County. The producing capitan reef perforations are:

3660-3663
3674-3681
3696-3700
3708-3711
3724-3727
3746-3749
3758-3762

Anadarko produces approximately 3000 BWPD from the Teas Yates Unit WSW No. 1.

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: TEAS YATES WSW #1 (on 10-10-1991)

	Sample 1
Specific Gravity:	1.075
Total Dissolved Solids:	105532
pH:	6.75
IONIC STRENGTH:	1.919

		me/liter	mg/liter
CATIONS:			
Calcium	(Ca^{+2})	80.0	1600
Magnesium	(Mg^{+2})	60.0	729
Sodium	(Na^{+1})	1660	38100
Iron (total)	(Fe^{+2})	0.002	0.060
Barium	(Ba^{+2})	0.031	2.10
Manganese	(Mn^{+2})	0.003	0.090
ANIONS:			
Bicarbonate	(HCO_3^{-1})	7.60	464
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	96.8	4650
Chloride	(Cl^{-1})	1690	60000
DISSOLVED GASES			
Carbon Dioxide	(CO_2)		10.0
Hydrogen Sulfide	(H_2S)		119

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	-0.06	-17
122°F	50°C	0.87	-17
140°F	60°C	1.2	-17
168°F	76°C	1.8	-12
176°F	80°C	1.9	-12
200°F	93°C	2.4	-12

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

ELUID MARTINEZ
STATE ENGINEER

ROSWELL

DISTRICT II
1900 West Second St.
Roswell, New Mexico 88201
(505) 622-6521

October 2, 1991

George Buehler
Anadarko Petro Corporation
P. O. Box 2497
Midland, Texas 79702

Dear Mr. Buehler:

Please find enclosed the information you requested from our office concerning wells in the area of 19S.32E.

If our office can be of any further assistance to you, please do not hesitate to contact us.

Sincerely,

Kenneth Fresquez
Field Supervisor

KF/lc
enc.

Record #	Basin	File #				Ownership	Depth	Water Bearing Fm.	Date Collected	Collector	Use	Loc.	L.S. Elev.	Pt. of Coll.	Chlorides	Sp. Conductance	Temp.		Land Date		DPN.	
7468	CP						0	PRC	76/11/01	SED	STK	19S.29E.25.44332	3320.00	DP	94	2860	68				15-08004	0
7469	CP						0	PRC	81/10/01	SED	STK	19S.29E.25.44332	3320.00	TANK	100	2871	0		282		15-08004	0
7470	CP						0	PRC	85/03/14	SED	STK	19S.29E.25.44332	3320.00	DP	134	2925	65		0385		15-08004	0
3098						SNYDER RANCH	0	PRC	89/05/09	SED	STK	19S.29E.25.44332	3320.00	DP	166	3020	70		0589		15-08004	0
7471	CP	00379					0	PRC	67/03/27	SED	MOD	19S.30E.10.31312	0.00	DP	124000	194010	0		482			0
7472	CP	00357	X				0	PRC	66/04/00	BLR	SRD	19S.30E.24.134133	0.00	BLR300	23270	57639	0		482			0
7473	CP	00357	X				0	PRC	68/04/00	BLR	SRD	19S.30E.24.134133	0.00	BLR240	23560	58166	0		482			0
7474	CP	00357	X				0	PRC	68/04/00	BLR	SRD	19S.30E.24.134133	0.00	BLR340	24000	59277	0		482			0
7475	CP						0	GAL	85/03/14	SED	STK	19S.30E.25.12133	0.00	TS23	161	875	65		0385			0
3097							148	PRC	89/05/15	SED	STK	19S.30E.28.31333	3276.00	TS146	815	4986	0		0589			0
7476	CP	00642		TH	00003		0	TRS	82/02/10	CEC	EXP	19S.31E.25.222313	0.00	BLR230	34	0	0	X	0186	P		0
7477	CP						210	TRS	85/03/14	SED	DOM	19S.31E.27.214121	3460.00	DP	36	606	65		0385			0
7478	CP						177	TRC	81/10/14	SED	SRD	19S.31E.27.214132	3477.00	DP	26	734	0		0483		15-08035	0
7479	CP						230	TRS	90/05/01	SED	DOM	19S.31E.28.33124	3484.00		55	1190	0	X	0784	U	15-08004	0
7480	CP						250	TRS	87/09/29	SED	STK	19S.31E.28.33433	3445.00	DP	164	3077	67		282			0
7481	CP						190	TRC	27/01/25	USE	DOM	19S.31E.28.334332	3442.00	DP	43	1120	0	X	0585	U	15-10188	0
7482	CP						137	TRS	90/05/01	USE	STK	19S.31E.28.334334	3440.00		66	2530	65	X	0784	U		0
7483	CP						137	TRS	80/07/24	SED	STK	19S.31E.28.334334	3440.00	YT	26	2447	0		0680			0
7484	CP						137	TRS	85/03/14	SED	STK	19S.31E.28.334334	3440.00	TS110	143	3021	65		0485			0
7485	CP						0	PYA	85/07/26	CEC	OIL	19S.31E.32.221411	0.00	OTH	13400	38476	0		0186			0
7486	CP						250	TRS	59/11/25	GNR	PPP	19S.31E.33.142221	3457.00	DP	207	2220	0	X	182	P		0
7487	CP						185	TRS	59/11/18	GNR	PPP	19S.31E.33.142224	3456.00	DP	251	2640	0	X	182	P		0
7488	CP						185	TRS	59/11/20	GNR	PPP	19S.31E.33.142224	3456.00	DP	244	2640	0	X	182	P		0
7489	CP						185	TRS	81/09/29	SED	PPP	19S.31E.33.142224	3456.00	DP	274	2777	70		282			0
7490	CP	00641		TH	00004		0	TRS	82/02/13	CEC	EXP	19S.31E.36.14114	0.00	BLR260	51	0	0	X	0186	P		0
7491	CP						800	TRS	58/12/09		STK	19S.32E.08.22411	3644.00		21	682	0	X			25-10231	0
7492	CP						800	TRS	85/11/18	SED	STK	19S.32E.08.22411	3644.00	DP	25	700	0	+			25-10231	0
7493	CP						800	TRS	81/09/24	SED	STK	19S.32E.08.22411	3644.00	DP	24	700	73		282		25-10231	0
7494	CP						800	TRS	85/03/13	SED	STK	19S.32E.08.22411	3644.00	DP	16	655	62		0385		25-10231	0
7495	CP	00640		TH	00001		0	TRS	82/02/10	CEC	EXP	19S.32E.19.224431	0.00	BLR250	45	0	0	X	0186	P		0
7496	CP	00639		TH	00002		0	TRS	82/02/12	CEC	EXP	19S.32E.20.134423	0.00	BLR350	75	0	0	X	0186	P		0
7497	CP	00071					850	TRS	63/02/15	CEC	DOM	19S.33E.18.133223	3635.00	DP	312	0	0	X	1084	P	25-12232	0
7498	CP						100	GAL	76/08/11	CEC	DOM	19S.33E.26.42221	3606.00	DP	266	0	0	X	0279		25-12194	0
7499	CP						100	GAL	78/01/16	CEC	STK	19S.33E.26.42221	3606.00	DP	326	0	0	X	1084	P	25-12194	0
7500	CP						101	GAL	65/11/17	SED	STK	19S.33E.26.422221	3608.00	YT	298	2560	57	*			25-12195	0
7501	CP						101	GAL	72/09/25	USE	DOM	19S.33E.26.422221	3609.00	DP	280	2490	0	X	0279	U	25-12195	0
7502	CP						101	GAL	76/08/20	SED	STK	19S.33E.26.422221	3608.00	DP	289	2807	66				25-12195	0
7503	CP						101	GAL	76/10/08	SED	STK	19S.33E.26.422221	3608.00	YT	306	2610	66				25-12195	0
7504	L						0	TOG	79/10/23	SED	STK	19S.34E.03.41213	3968.00	DP	20	504	67				25-12201	0
7505	L						0	TOG	84/07/18	SED	STK	19S.34E.03.41213	3968.00	DP	26	499	0		1084		25-12201	0
7506	CP						33	GAL	58/12/09	SED	STK	19S.34E.09.24231	3890.00	DP	560	4660	0	X		U	25-12202	0
7507	CP						33	GAL	79/10/16	SED	STK	19S.34E.09.24231	3980.00	DP	238	2314	65		0683		25-12202	0

I, George R.S. Buehler, affirm Anadarko's geological and engineering departments have reviewed the available geological and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

Affirmed this day October 11, 1991

By George R.S. Buehler
Staff Production Engineer

WELLSITE SURFACE OWNER AND OFFSET OPERATORS TO EXXON FEDERAL SWD NO. 1

Surface Owner

USA
Carlsbad Resource Area
P. O. Box 1778
Carlsbad, New Mexico 88220

Offset Operators

19S-33E

Sec. 18 SW/4 SW/4 (Lot 4)
Centenial
Box 1837
Roswell, New Mexico 88202

Sec. 18 Lot 3, E/2 SW/4, SE/4 and E/2 NE/4 Sec. 19
Francis H. Hudson
616 Texas Street
Fort Worth, Texas 76102

Delmar H. Lewis
616 Texas Street
Fort Worth, Texas 76102

Edward R. Hudson, Jr.
1000 First National Bldg.
Fort Worth, Texas 76102

Sec. 19 Lot 1 & 2 W/2 NE/4 & E/2 NW/4 and SE/4 SE/4 Sec. 13-19S-32E
Exxon Company, USA
P. O. Box 1600
Midland, Texas 7902-1600

Sec. 19 Lots 3 & 4, E/2 SW/4 & SE/4
Firo Corporation
P. O. Box 8148
Roswell, New Mexico 88202

Partco, Inc.
P. O. Drawer R
Artesia, New Mexico 88210

Edward R. Hudson
616 Texas Street
Fort Worth, Texas 76102

William A. Hudson
616 Texas Street
Fort Worth, Texas 76102

XIII
(Continued)

WELLSITE SURFACE OWNER AND OFFSET OPERATORS TO EXXON FEDERAL SWD NO. 1

Harvey E. Yates Co.
P. O. Box 1933
Roswell, New Mexico 88202

19S-32E

Sec. 24 NE/4
Anadarko Petroleum Corporation
P. O. Box 2497
Midland, Texas 79702

AFFIDAVIT OF PUBLICATION

State of New Mexico,
County of Lea.

I, Kathi Bearden

of the Hobbs Daily News-Sun, a daily newspaper published at Hobbs, New Mexico, do solemnly swear that the clipping attached hereto was published once a week in the regular and entire issue of said paper, and not a supplement thereof for a period

of

One weeks.
Beginning with the issue dated

Oct. 1, 1991
and ending with the issue dated

Oct. 1, 1991

Kathi Bearden
General Manager
Sworn and subscribed to before

me this 8 day of

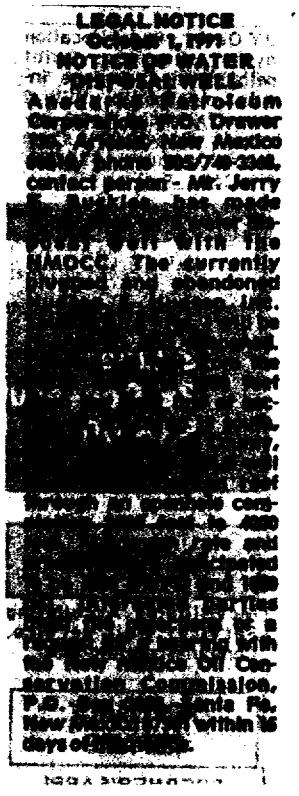
Oct, 1991

Paula Parrish
Notary Public.

My Commission expires

Aug. 5, 1995
(Seal)

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.


LEGAL NOTICE
NOTICE OF WATER

ILLEGIBLE

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

3. Article Addressed to:
USA
Carlsbad Resource Area
P O Box 1778
Carlsbad New Mexico 88220

4. Article Number
P-567 722 899

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X Betty Hill

7. Date of Delivery

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

CARLSBAD NM OCT 15 1991 USPO

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

P-567 722 899
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to	USA Carlsbad Resource Area
Street and No.	P O Box 1778
P.O. State and ZIP Code	Carlsbad New Mexico 88220
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	2.98
Postmark or Date	

U.S.G.P.O. 1985-506
PS Form 3800, June 1985

Fold at line over top of [illegible]

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

3. Article Addressed to:
Centenial
Box 1837
Roswell New Mexico 88202

4. Article Number
P-567 722 900

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

Always obtain signature of addressee and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X [signature]

7. Date of Delivery

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

ROSWELL NM OCT 15 1991 88201

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

P-567 722 900
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to	Centenial
Street and No.	Box 1837
P.O. State and ZIP Code	Roswell New Mexico 88202
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	2.98
Postmark or Date	

PORTLAND OCT 15 1991

U.S.G.P.O. 1985-506
PS Form 3800, June 1985

ILLEGIBLE

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

3. Article Addressed to:
Francis H Hudson
616 Texas Street
Fort Worth Texas 76102

4. Article Number
P-567 722 901

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X

6. Signature — Agent
X Clarke

7. Date of Delivery OCT 17 1981

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

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

P-567 722 901

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to
Francis H Hudson
Street and No.
616 Texas Street
P.O. State and ZIP Code
Fort Worth Texas 76102

Postage	$ .98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom Date and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	

PS Form 3800, June 1985 U.S.G.P.O. 153-506

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

3. Article Addressed to:
Delmar H Lewis
616 Texas Street
Fort Worth Texas 76102

4. Article Number
P-567 722 902

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X

6. Signature — Agent
X

7. Date of Delivery Clarke OCT 17 1981

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

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

P-567 722 902

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to
Delmar H Lewis
Street and No.
616 Texas Street
P.O. State and ZIP Code
Fort Worth Texas 76102

Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom Date and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	

PS Form 3800, June 1985 U.S.G.P.O. 153-506

ILLEGIBLE

Fold at line over top of envelope to the right of the return address

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

3. Article Addressed to:
Edward R. Hudson Jr
616 Texas Street
Fort Worth, Texas 76102

4. Article Number
P 143 463 010

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X [signature]

7. Date of Delivery
OCT 23 1991

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

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

P 143 463 010

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Edward R. Hudson Jr
616 Texas Street
Fort Worth, Texas 76102
.98
1.00
1.00
2.98

DOWNTOWN STA. FT. WORTH, TX OCT 21 1991 USPO

PS Form 3800, June 1985

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

3. Article Addressed to:
Exxon Company USA
P O Box 1600
Midland Texas 79702-1600

4. Article Number
P-567 722 904

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X [signature]

7. Date of Delivery
OCT 14 1991

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

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

ILLEGIBLE

P-567 722 904

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

U.S.G.P.O. 153-506

Sent to Exxon Company USA	
Street and No P O Box 1600	
P.O., State and ZIP Code Midland Texas 79702	
Postage	$ .98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom & Date Delivered	1.00
Return Receipt showing to whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$ 2.98
Postmark or Date	

MIDLAND DOWNTOWN

PS Form 3800, June 1985

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

3. Article Addressed to:
Firo Corporation
P O Box 8148
Roswell New Mexico 88202

4. Article Number
P-567 722 905

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Address
X Juana McDonald

6. Signature – Agent
X Wilma

7. Date of Delivery
10/12

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

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

P-567 722 905
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to	Firo Corporation
Street and No.	P O Box 8148
P.O., State and ZIP Code	Roswell New Mexico 88202
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	MIDLAND, TX DOWNTOWN STA. OCT 1991 USPO

U.S.G.P.O. 153-506
PS Form 3800, June 1985

Fold at line over top of envelope ... of the return ...

The copy of the permit sent to Partco, Inc. was returned by the postal service marked (ATTEMPTED NOT KNOWN). Anadarko attempted to locate Partco, Inc. through both the Artesia City Hall and the Artesia Chamber of Commerce. Anadarko believes Partco, Inc. no longer exists.

P-567 722 906
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to	Partco Inc
Street and No.	P O Drawer R
P.O., State and ZIP Code	Artesia New Mexico 88210
Postage	$ .98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	MIDLAND, TX DOWNTOWN STA. OCT 11 1991 USPO

U.S.G.P.O. 153-506
PS Form 3800, June 1985

ILLEGIBLE

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

3. Article Addressed to:
William A. Hudson
616 Texas Street
Fort Worth, Texas 76102

4. Article Number
P 143 463 011

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery
OCT 23 1991

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

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

P 143 463 011

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

William A. Hudson

616 Texas Street

Fort Worth, Texas 76102

.98
1.00

1.00

PS Form 3800, June 1985

TX DOWNTOWN STA. USPO OCT 22 1991 FT. WORTH, TX

2.98

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

3. Article Addressed to:
Harvey E Yates
P O Box 1933
Roswell New Mexico 88202

4. Article Number
P-576 722 914

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery
10-15-91

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

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

P-567 722 914

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

U.S.G.P.O. 153-506

Sent to: Harvey E Yates	
Street and No. P O Box 1933	
P.O. State and ZIP Code Roswell New Mexico 88202	
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	2.98
Postmark or Date	

PS Form 3800, June 1985

Fold at line over top of envelope to the right of the return address.

ILLEGIBLE

MEMORANDUM

6-4-73

Checked with Don ← AIKEN?
No Problem
Fred

State Engineer Office
Santa Fe, New Mexico

6/1
I so informed
Jim Kapteina
6/6/73

TO Fred

FROM Gene

SUBJECT

I don't see any problem with this applic -
The injection will be to the 8,550 - 8650
depth thru internal plastic tubing, under a ~~Bat~~ Packer -
The inclusion of a pressure gauge should be
added protection ———
If you agree - there is nothing further for
us to do - If you don't agree - let's discuss Tuesday
afternoon +

ILLEGIBLE

Memo

From

A. L. PORTER
Secretary-Director

To Mr. Steve Reynolds

In this application you were informed about, will be added the requirement that a pressure gauge be placed at the surface to measure any change that might take place in the annulus.

We would appreciate receiving any objection to the application within 15 days. Thank you.

Gene — For your handling, coordinate with Fed. Div.

[illegible]

Oil Conservation Commission – Santa Fe, New Mexico

LAW OFFICES
LOSEE & CARSON, P.A.
300 AMERICAN HOME BUILDING
P. O. DRAWER 239
ARTESIA, NEW MEXICO 88210

A. J. LOSEE
JOEL M. CARSON

AREA CODE 505
746-3508

1973 MAY 25 AM 10:37

STATE ENGINEER OFFICE
SANTA FE, N. M.

21 May 1973

RECEIVED
MAY 23 1973
OIL CONSERVATION COMM.
Santa Fe

Mr. A. L. Porter, Jr., Secretary-Director
Oil Conservation Commission of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Porter:

In support of the application of Navajo Refining Company for administrative approval of an exception to the requirements of Rule 701-A of the Oil Conservation Commission of New Mexico, for a salt water disposal well, please find:

1. Commission Form C-108 in triplicate;

2. Plat of area;

3. Electric log;

4. Diagrammatic sketch of proposed injection well.

In addition to the foregoing, you will please consider the letter of Mr. Fred G. Hansen, President of Navajo Refining Company, addressed to you under date of May 9, 1973, setting forth the components of the refinery waste water which is proposed to be disposed of in this well.

In addition you are advised that this well was originally drilled by Charles Loveless to a total depth of 6,871 feet below the surface, where it was plugged and abandoned. Yates Petroleum Corporation, as Operator, proposes to re-enter this well and deepen the same to the Morrow zone of the Pennsylvanian system, where, if it is found non-productive of oil or gas, it will be deepened to the Devonian formation, where, if it is again found non-productive of oil or gas, it is proposed to be completed as a salt water disposal well and turned over to Navajo Refining Company.

The consent of Yates Petroleum Corporation, the operator of all leases within 1/2 mile of the proposed injection well, and Mr. Phillip Hefner, the surface owner, are hereto attached and made a part hereof.

If there is any further information I can furnish you in this matter, please do not hesitate to let me know.

Very truly yours,

LOSEE & CARSON, P.A.

A. J. Losee

AJL:jw
Enclosures

cc w/enclosures: Navajo Refining Company
Yates Petroleum Corporation
Mr. Phillip Hefner

Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR	ADDRESS
Navajo Refining Company	P. O. Drawer 159, Artesia, N.M., 88210

LEASE NAME	WELL NO.	FIELD	COUNTY
State CK	1	Wild Cat	Eddy

LOCATION

OWDD UNIT LETTER C ; WELL IS LOCATED 660 FEET FROM THE North LINE AND 2,180 FEET FROM THE West LINE, SECTION 4 TOWNSHIP 17-S RANGE 26-E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING Yes	8-5/8"	1,228'		Circulated	(Set)
INTERMEDIATE					
LONG STRING Yes	5/2"	8,600'	300	7,000'	Temp. Survey
TUBING Internal Plastic	2-1/2"	8,600'	NAME, MODEL AND DEPTH OF TUBING PACKER Baker model D - 8,600'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Devonian	8,500'	8,600-8,700'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
2-1/2" tubing	Perf	8,550-8,650

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	OWDD oil or gas	No

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
1,000'	None in area	None in area

ANTICIPATED DAILY INJECTION VOLUME (BBLS.) MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSI)
5,000	10,000	Open	Pressure	1,000

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
Unfit	Refinery waste	Salt brine	

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)

State land

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

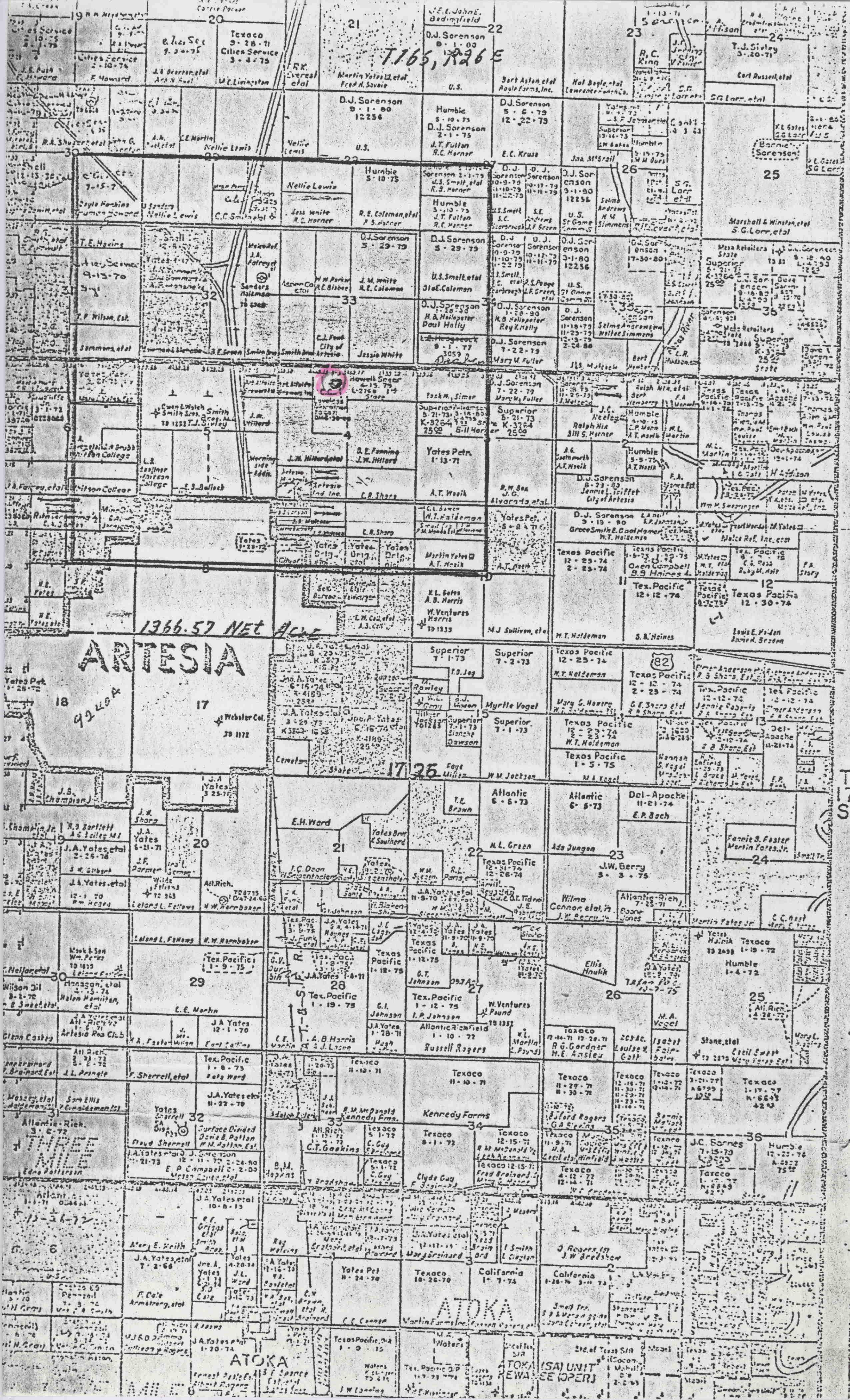
Yates Petroleum Corporation, Artesia, New Mexico

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	THE NEW MEXICO STATE ENGINEER
	Yes	Yes	No
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	Attached	Attached	Attached

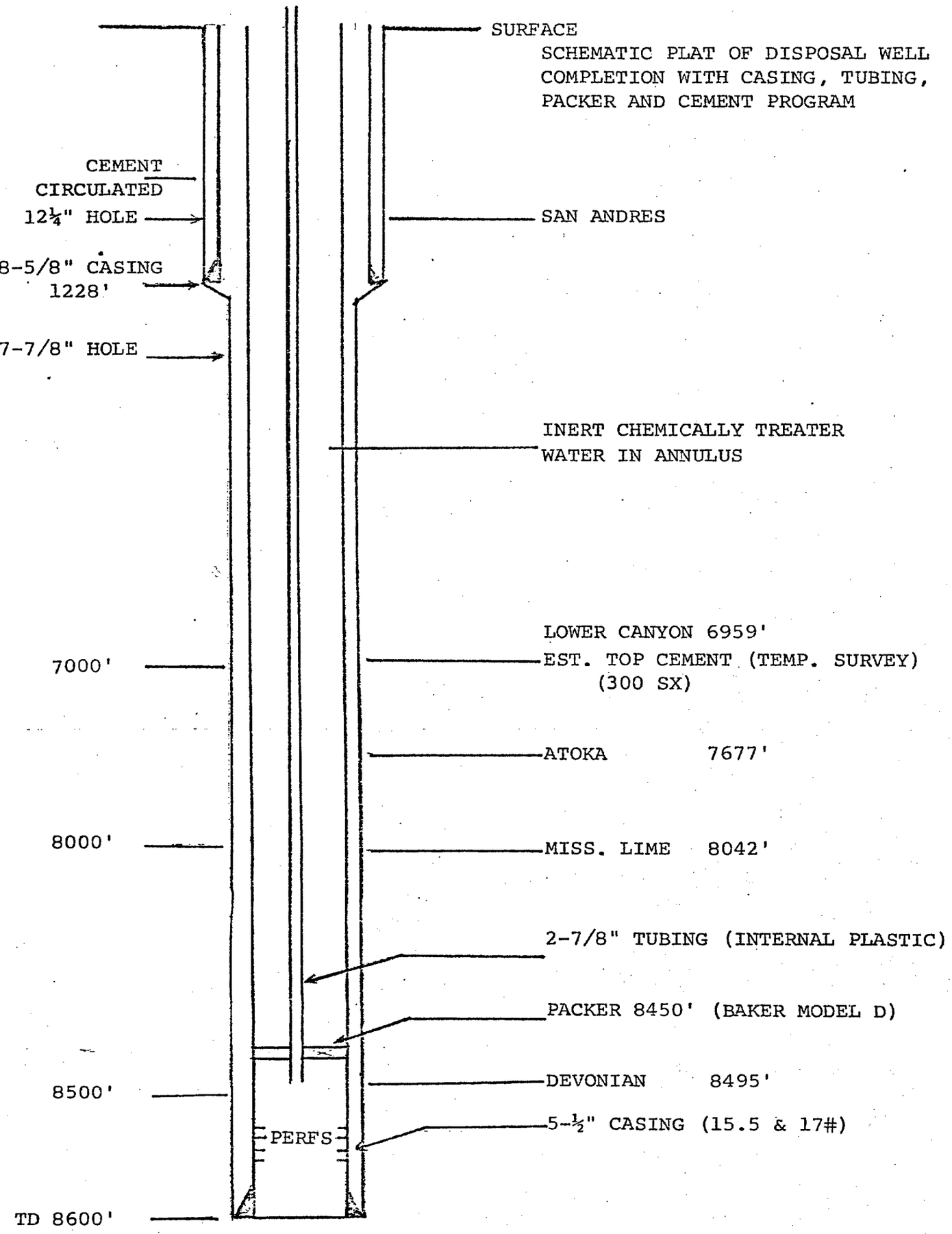
I hereby certify that the information above is true and complete to the best of my knowledge and belief.

(Signature)	(Title)	(Date)
	Attorney	May 21, 1973

NOTE: Should waivers from the State Engineer, the surface owner, and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.


T16S, R26E
ARTESIA
1366.57 Net Acre
ATOKA
D.J. Sorenson
Humble
Superior
Texas Pacific
Yates Petr.
Atlantic
Del-Apache
Texaco
Kennedy Farms
J.A. Yates
Tex. Pacific
Atlantic Richfield
Russell Rogers
J.C. Barnes
E.H. Ward
Myrtle Vogel
Nellie Lewis
Marshall & Winston, etal
S.G. Larr, etal
T.J. Sisley
Webster Col.
82

NAVAJO REFINING COMPANY
STATE CK #1 UNIT C 4-17-26
EDDY COUNTY, NEW MEXICO



N. RAYMOND LAMB MAY 19, 1973

LAW OFFICES
LOSEE & CARSON
A. J. LOSEE
JOEL M. CARSON
300 AMERICAN HOME BUILDING
P. O. DRAWER 239
ARTESIA, NEW MEXICO 88210
, P.A.
AREA CODE 505
746-3508

21 May 1973

Mr. A. L. Porter, Jr., Secretary-Director
Oil Conservation Commission of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Porter:

In support of the application of Navajo Refining Company for administrative approval of an exception to the requirements of Rule 701-A of the Oil Conservation Commission of New Mexico, for a salt water disposal well, please find:

1. Commission Form C-108 in triplicate;

2. Plat of area;

3. Electric log;

4. Diagrammatic sketch of proposed injection well.

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In addition you are advised that this well was originally drilled by Charles Loveless to a total depth of 6,871 feet below the surface, where it was plugged and abandoned. Yates Petroleum Corporation, as Operator, proposes to re-enter this well and deepen the same to the Morrow zone of the Pennsylvanian system, where, if it is found non-productive of oil or gas, it will be deepened to the Devonian formation, where, if it is again found non-productive of oil or gas, it is proposed to be completed as a salt water disposal well and turned over to Navajo Refining Company.

The consent of Yates Petroleum Corporation, the operator of all leases within 1/2 mile of the proposed injection well, and Mr. Phillip Hefner, the surface owner, are hereto attached and made a part hereof.

If there is any further information I can furnish you in this matter, please do not hesitate to let me know.

Very truly yours,

LOSEE & CARSON, P.A.

A. J. Losee

AJL:jw
Enclosures

cc w/enclosures: Navajo Refining Company
Yates Petroleum Corporation
Mr. Phillip Hefner

The undersigned acknowledges receipt of the foregoing letter with all enclosures therein described, and hereby consents to the application of Navajo Refining Company to dispose of salt water by injection through said well into the Devonian formation.

DATED this May 23, 1973.

Phillip Hefner

ILLEGIBLE

LAW OFFICES
LOSEE & CARSON
300 AMERICAN HOME BUILDING, P.A.
P. O. DRAWER 239
ARTESIA, NEW MEXICO 88210

A. J. LOSEE
JOEL M. CARSON

AREA CODE 505
746-3508

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Oil Conservation Commission of New Mexico
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LOSEE & CARSON, P.A.

A. J. Losee

AJL:jw
Enclosures

cc w/enclosures: Navajo Refining Company
Yates Petroleum Corporation
Mr. Phillip Hefner

The undersigned acknowledges receipt of the foregoing letter with all enclosures therein described, and hereby consents to the application of Navajo Refining Company to dispose of salt water by injection through said well into the Devonian formation.

DATED this May 22, 1973.

YATES PETROLEUM CORPORATION

By: B W Harper

To: Paul Sanders '92
Please Handle

K R M
P. O. BOX 1832
HOBBS, NEW MEXICO 88241

February 28, 1992

New Mexico State Engineers Office
P.O. Box 25102
Santa Fe, NM 87504-1712

Dear Sirs:

KRM, INC. is the holder of water rights in the Capitan Basin and we recently found the enclosed application for disposal of produced water from oil operations. We do not believe water should be injected into this reef for many reasons. One is that Malaga and Loving get their water from this reef.

Perhaps you could contact Mr. Mike Williams, the OCD District Supervisor in Artesia for his feelings in this matter.

Thank You,

Donna Setters
Office Manager

Enclosure

cc: New Mexico State Engineers Office
1900 W. Second
Roswell, NM 88201-1712

STATE OF NEW MEXICO
OFFICE OF STATE ENGINEER

Order #63

ORDER

IT IS HEREBY ORDERED that the following specifications shall be followed for the construction of oil, gas, mineral and test wells in artesian basins.

The water protection casing string (also designated as the second or intermediate string) shall be landed into the formation below all known artesian aquifers. Sufficient cement shall be used to obtain circulation to the surface. If surface casing is used, said casing shall not be removed until after cementing of the water protection string has been completed. When circulation to the surface on the water protection string is not obtained, the operator shall run a temperature survey to insure that the cement has circulated to a point well above all artesian aquifer formations. If the temperature survey shows the top of the cement to be in a shallow water zone, the operator, under the direction of a representative of the United States Geological Survey, New Mexico Oil Conservation Commission or the State Engineer, shall place cement to the surface behind the water protection string or circulate cement to the surface on the oil production casing string. Additives of a pozzolanic nature may be used above the casing shoe, but, shall not exceed 50% by volume. The addition of calcium chloride and/or gel may be required, but shall not in any case exceed 2% each by weight. A sufficient amount of cement without additives shall be used to allow neat cement to seal the casing shoe, and rise a minimum of 50 feet above the shoe between the casing and hole. Cement shall be allowed to set a minimum of 48 hours before drilling is resumed. Sealing off of the formations shall be checked by a method approved by the United States Geological Survey, New Mexico Oil Conservation Commission or the State Engineer's Office.

The oil production string or strings shall be landed and cemented as specified by the United States Geological Survey (Oil and Gas Branch) or the New Mexico Oil Conservation Commission.

The preceding casing, cementing and testing program shall be witnessed by an authorized representative of the United States Geological Survey, New Mexico Oil Conservation Commission or the State Engineer's Office.

WITNESS my hand and official seal this 11th day of September, A. D., 1956.

S. E. Reynolds
State Engineer

No. 5-58

NEW MEXICO OIL CONSERVATION COMMISSION

BOX 871

SANTA FE, NEW MEXICO

MEMORANDUM:

TO: All Operators

FROM: A. L. Porter, Jr., Secretary-Director

SUBJECT: Applications for Water Flood Projects.

The Oil Conservation Commission has been advised by the State Engineer that his office will require the following information with regard to all applications to the Commission for permission to institute water flood projects in the State of New Mexico, to-wit:

1. Copy of the Application.
2. Geographical location of water source.
3. Name and depth of formation from which water is to be obtained.
4. Analysis of water as soon as sample is available.

Hereafter, the Commission will not consider an application for permission to institute a water flood project unless there is a statement in the application to the effect that the information outlined above has been submitted to the office of the State Engineer. (The State Engineer's mailing address is P. O. Box 1079, Santa Fe, New Mexico.)

Filed February 7, 1958

1-31-58

ir/

January 17, 1985

M.B. Compton, Chief, Water Rights Division

James I. Wright, Field Engineer

Oral Agreement with the Oil Conservation Division
Regarding Oil Wells

As I recall a new law was passed around the year 1961. Prior to this time we were involved in the supervision of oil well drilling in the artesian water areas and we were attending most of the Oil Conservation Division hearings tomake sure that the fresh water zones were being protected.

I think that in 1962 or 1963, Frank Irby and myself had a meeting with Pete Porter and some of his staff. As a result of this meeting:the Oil Conservation Division would take on all the supervision of oil wells drilled through artesian aquifers and we would designate other areas of fresh water that should be protected and they would be the regulatory agency responsible for enforcement.

We took the position that surface disposal of oil field brines could not continue to be put in unlined surface disposal pits and any water produced as a by product of oil production was their responsibility.

If the dates are important I would suggest that you talk to Steve and Frank and find out what they recall.

As far as I know, it is still Mr. Reynolds' opinion that any well drilled for the production of water still falls under his jurisdiction regardless of the depth of the water bearing formation.

James I. Wright
Field Engineer

JIW/tmg

ILLEGIBLE

C
O
P
Y

January 22, 1958

File: I-Q-13

Mr. A. L. Porter, Jr.
Secretary & Director
New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Porter:

In accordance with our conversation yesterday, this office would like to request that in the future when applications are made for water flood projects in connection with secondary oil recovery, the applicant state the source of his water supply, i. e., the geographical location of the supply by legal subdivision and the name of the formation and the depth from which the water will be produced. We would also like to have the analysis, of the water to be used, submitted with the application if the sample is available at that time and if the sample is not available at that time, we would want the analysis of the water as soon as the well has been drilled.

This office would sincerely appreciate the favorable consideration of this request by your Commission.

Yours truly,

S. E. Reynolds
State Engineer

By:
Frank E. Irby
Chief
Water Rights Division

FEI/ma
cc-F. H. Hennighausen

Blind copies to:
S. E. Reynolds
J. C. Yates thru C. B. Thompson

Filed January 24, 1958
Office Ground Water Supervisor
Roswell, New Mexico

NEW MEXICO
OIL CONSERVATION COMMISSION
P. O. BOX 871
Santa Fe, New Mexico

Memo. No. 32-56

To: All Operators in Chaves and Eddy Counties.

From: A. L. Porter, Jr., Secretary-Director

Subject: Oil Well Drilling in the Roswell-Artesian Basin of Chaves and Eddy Counties.

Effective immediately, Mr. Mose Armstrong, District Supervisor at Artesia of the New Mexico Oil Conservation Commission District, will coordinate all field inspection of oil well drilling operations in the Roswell-Artesian Basin of Chaves and Eddy Counties. The New Mexico Oil Conservation Commission and the New Mexico State Engineer have agreed on this procedure. U. S. Geological Survey personnel at Artesia and Roswell have likewise agreed to join in this coordinated inspection program.

An order from the State Engineer's Office revising the Rules and Regulations for drilling oil wells in the Roswell-Artesian Basin is enclosed for your immediate guidance.

September 13, 1956

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

September 14, 1956

ADDRESS CORRESPONDENCE TO
P. O. BOX 1079
SANTA FE, N. M.

Supreme Court Library
Santa Fe, N. M.

Attn. Mr. Harrison McDonald

Dear Sir:

Enclosed are three signed copies of Order No. 63 for your files. Please sign the enclosed copy of letter and return to this office.

Very truly yours,

S. E. Reynolds
State Engineer

By: Frank E. Irby
Frank E. Irby
Chief
Water Rights Division

ma
encl.

Received 3 copies of Order #63, Specifications for the construction of oil, gas, mineral and test wells in artesian basins.

_____
Librarian

STATE OF NEW MEXICO

STATE ENGINEER OFFICE
SANTA FE

ELUID L. MARTINEZ
State Engineer

BATAAN MEMORIAL BUILDING, ROOM 101
POST OFFICE BOX 25102
SANTA FE, NEW MEXICO 87504-5102

March 5, 1992

Ms. Donna Setters, Office Manager
KRM
P.O. Box 1832
Hobbs, New Mexico 88241

Dear Ms. Setters:

Thank you for your letter of February 28, 1992, with attached copy of Anadarko's application to the Oil Conservation Division for authorization to inject. As this application falls under the purview of the O.C.D., your letter and attachment are being forwarded with a copy of this letter to that agency for consideration.

Please do not hesitate to contact this office again if further discussion would be helpful.

Sincerely,

Eluid L. Martinez
State Engineer

By: Kent W. Breese
Kent W. Breese, Engineer
Water Rights Division

KWB:kb
cc: District II Office
Oil Conservation Division

April 13, 1967

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Porter:

All underground water in the State of New Mexico containing 10,000 parts per million or less of dissolved solids is hereby designated by the State Engineer pursuant to Section 65-3-11.(15) N.M.S.A., 1953 Compilation; except that this designation shall not include any water for which there is no present or reasonably foreseeable beneficial use that would be impaired by contamination. This designation supersedes all previous designations pertaining to underground water.

For your information I am attaching a memorandum dated April 10, 1967 and the map mentioned therein which shows the areas and formations in which water of 10,000 parts per million or less commonly occurs.

The surface water designation previously made remains unchanged.

FEI/ma
encl.

Yours truly,

S. E. Reynolds
State Engineer

By:
Frank E. Irby
Chief
Water Rights Div.

March 29, 1985

M.B. Compton, Chief, Water Rights Division

James I. Wright, Field Engineer

Draft of letter to Oil Conservation Division regarding the Protection of Fresh Water.

The statement regarding protection of surface water is my own opinion. I do not know what standard that we gave them originally but Steve probably does. I am not attaching the map or memo referred to in my letter. You can get a copy from Lou. I have reviewed the map and see no reason to revise it. It also might be a good idea to include groundwater discharging into stream systems in the paragraph with water table lakes.

James I. Wright
Field Engineer

JIW/tmg

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

3/16

85 MAR 18 P 3:35

STATE ENGINEER OFFICE
SANTA FE NEW MEXICO

March 15, 1985

Mr. S. E. Reynolds,
State Engineer
101 Bataan Bldg.
Santa Fe, NM 87503

Dear Steve:

I am writing relative to getting an updated determination from you of the definition of "fresh water supplies" under the provisions of Section 70-2-12 B.(15) NMSA, 1978 compilation (copy enclosed).

I have enclosed a copy of the April 13, 1967, letter from you to Pete Porter on this matter. The letter references an earlier determination as to surface waters but that determination is not in evidence. We are thinking of revising some of our general rules to prohibit contamination of "fresh waters", both surface and subsurface, and it could be useful to have a new determination which clearly defines what must be protected.

Sincerely,

R. L. STAMETS
Director

RLS/dp

Encs.

March 21, 1985

Jim Wright:
Brad would like you to
prepare a draft response
to Steve's letter attached

Ed Kogers

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

May 15, 1985

BATAAN MEMORIAL BUILDING
STATE CAPITOL
SANTA FE, NEW MEXICO 87503

Dick Stamets
New Mexico Oil
Conservation Division
Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Stamets:

In response to your letter dated March 15, 1985, this is to advise you that all underground waters in the State of New Mexico containing 10,000 milligrams/liter or less of dissolved solids is hereby designated by the State Engineer pursuant to Section 70-2-12-B. (15) NMSA, 1978. This designation supersedes all previous designations pertaining to underground water.

The water in water table lakes should not be contaminated even though they contain more than 10,000 milligrams/liter of total dissolved solids unless it can be shown that contamination of the lake will not adversely affect the underground water hydrologically connected to the lake.

The surface waters of all streams within the State of New Mexico regardless of the quality of the water within any given reach should be protected.

For your information I am attaching a memorandum dated April 10, 1967, and the map mentioned therein which shows the areas and formations in which water of 10,000 parts per million or less commonly occur. This is the same information which was submitted to your office by Frank Irby on April 13, 1967.

Sincerely,

S. E. Reynolds
State Engineer

By: M. B. Compton
M. B. Compton, Chief
Water Rights Division

MBC:rav

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

BATAAN MEMORIAL BUILDING
STATE CAPITOL
SANTA FE, NEW MEXICO 87503

July 10, 1985

Mr. Dick Stamets
New Mexico Oil Conservation
Division
Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Stamets:

Pursuant to our conversation of July 9, 1985, I am revising my letter of May 15, 1985 to read as follows:

> All underground waters in the State of New Mexico containing 10,000 milligrams/liter or less of dissolved solids are hereby designated by the State Engineer pursuant to Section 70-2-12-B.(15) NMSA, 1978; except that this designation shall not include any water for which there is no present or reasonably foreseeable beneficial use that would be impaired by contamination. This designation supersedes all previous designations pertaining to underground water.
>
> The water in lakes and playas should not be contaminated even though they contain more than 10,000 milligrams/liter of total dissolved solids unless it can be shown that contamination of the lake or playa will not adversely affect ground water hydrologically connected to the lake or playa.
>
> The surface waters of all streams within the State of New Mexico regardless of the quality of the water within any given reach are designated for protection.

The memorandum dated April 10, 1967, and the map mentioned therein which shows the areas and formations in which water of 10,000 parts per million or less commonly occur were furnished you in my May 15, 1985 letter.

Sincerely,

S. E. Reynolds
State Engineer

SER*pat

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

ELUID L. MARTINEZ
State Engineer

BATAAN MEMORIAL BUILDING, ROOM 101
POST OFFICE BOX 25102
SANTA FE, NEW MEXICO 87504-5102

June 24, 1992

Mr. William J. LeMay
Division Director, Oil Conservation Division
Energy, Minerals, and Natural Resources Department
P.O. Box 2088
Santa Fe, New Mexico 87504

RE: Anadarko Petroleum Company
Exxon Federal Well No. 3
Section 19-T19S-R33E, 600' FNL & 1980' FWL
Lea County, New Mexico

Dear Mr. LeMay:

Reference is made to your letter dated April 23, 1992 wherein you state that Anadarko Petroleum Company has proposed the use of an existing oil and gas test well, referred to as the Exxon Federal Well No. 3, within Section 19, Township 19 South, Range 33 East in Lea County, New Mexico as a salt water disposal well. The well would be used to inject water taken from the Delaware Formation at a depth of approximately 5492 to 6020 feet into the Capitan aquifer (often referred to as the Reef) and dispose that water at a depth of approximately 3500 to 4300 feet. You advise that the Oil Conservation Division (OCD) held a hearing on February 6, 1992 during which evidence was received upon which the OCD can approve the proposed injection into the Capitan aquifer.

A finding based on testimony during the above mentioned hearing that one point sample which shows a Total Dissolved Solids content greater than 10,000 parts-per-million (ppm) in the area of the proposed injection well does not negate the fact that the entire Capitan aquifer is in hydraulic connection. Minor areas of saline water are directly connected to major zones of fresh water in Lea and Eddy Counties and to the Pecos River.

I am of the opinion that in recognition of this fact, and with the knowledge that fresh water in that part of the state is limited, that our agencies entered into the, apparently undocumented, agreement that no injection into the Capitan

aquifer should be allowed. This is the same policy which underlies both the Federal Underground Injection Control Program's mandate that a determination be made that such injection not pose a danger of contaminating underground sources of drinking water and our legislature's grant of authority to your agency to regulate produced water in a manner that affords reasonable protection against contamination of fresh water supplies designated by the state engineer. N.M. Stat. Ann §70-2-12(B)(15) (1987 Repl. Pamp.). The Capitan aquifer contains designated fresh water supplies and should be protected from contamination.

I have noted your office's request for a hydrologic determination of the effect that large scale injection of produced salt water might have upon the Capitan Reef. Modeling the Capitan aquifer and its connection to the Pecos River would be a major undertaking and we are reluctant to endorse such a project at this time. A comprehensive solute-transport model of the aquifer might give a more meticulous picture of the flow paths and dispersion rate of saline into fresh water yet will not change the fact that any degradation of any portion of the aquifer could, eventually, degrade the entire aquifer. Please note the attached memorandum from my staff which discusses the hydrogeology of the aquifer and presents the rationale for its protection. I suggest as a practical alternative that, if requested, the State Engineer Office could provide an expert in groundwater hydrology to provide evidence to your hearing officer of the danger posed to fresh water supplies by any injection of salt water into the Capitan aquifer.

Sincerely,

Eluid L. Martinez
State Engineer

Attachment

MEMORANDUM

June 3, 1992

TO: **Eluid Martinez, State Engineer**

THROUGH: **Don Lopez, Chief, Technical Division**

THROUGH: **Tom Morrison, Chief, Hydrology Section**

FROM: **Andy Core, Hydrology Section**

SUBJECT: **Fresh Water in the Capitan aquifer, Eddy and Lea Counties, New Mexico**

Introduction

Two recent inquiries brought to the State Engineer could effect the quality of water within the Capitan aquifer in Eddy and Lea Counties. Both refer to wells located within the Capitan Underground Water Basin. The first inquiry came from George L. Scott, Jr., an independent oil geologist from Roswell, who is requesting that the State Engineer grant an exemption to the SEO policy that the Rustler aquifer contains "fresh" water (i.e. less than 10,000 parts per million (ppm) Total Dissolved Solids (TDS)). His purpose in requesting this exemption is to gain relief from the policy of the Oil Conservation Division of the Department of Energy, Minerals, and Natural Resources (OCD) requiring four strings of casing in producing oil wells in that portion of Eddy County where the Rustler Formation is present within the drilled stratigraphic section. The specific well for which he desires an exemption (Strata #4 Petco State) is located in Section 26, Township 19 South, Range 29 East, NMPM, Eddy County, NM. The second inquiry came in a letter dated 4/23/92

from William J. LeMay, Director, OCD, and concerns the application by Anadarko Petroleum Company to utilize the Exxon Well No. 3 (Section 19, Township 19 South, Range 33 East, NMPM, Lea County, NM) as a salt water disposal well. The source of the saline water is the Delaware Formation at a depth of approximately 5492 to 6020 feet. The injection would be into the Capitan aquifer at a depth of between 3500 and 4300 feet. The OCD has already held a hearing on this application and has found, based on the evidence presented, that the application can be approved. The State Engineer has requested that the Hydrology Section review the inquiries and provide recommendations if any change in SEO policy concerning the Capitan aquifer is deemed appropriate.

Hydrogeology

The Rustler aquifer is within the Permian (Ochoan) Rustler Formation. The formation is made up of interbedded anhydrite and dolomite with minor gypsum, halite and silt layers. North of Carlsbad, the Rustler outcrops roughly parallel to the Pecos River near the line between Ranges 27E and 28E. South of Carlsbad, small outcrops can be found as far west as Range 26E (Bachman, 1984). In general, the Rustler dips gently to the east-southeast. Figure 1a (from Bachman, 1984) shows the relationship between the Ochoan and upper Guadalupian age rocks in the Guadalupe Mountains-Delaware Basin area. The Salado Formation which occurs immediately below the Rustler acts as an effective aquitard because the halite within the unit quickly

plugs primary porosity (Mercer, 1983). The records of the Roswell district office of the SEO indicate that water pumped from the Rustler aquifer is used for domestic and stock purposes and does contain less than 10,000 ppm TDS (Fresquez, 1991).

The Capitan aquifer (often referred to as the reef aquifer) is hosted by the Permian Capitan and Goat Seep Limestones and most of the Carlsbad facies of Meissner (Hiss, 1980). Hiss has divided the Permian facies of Guadalupian age into three aquifer groups (shelf, reef, and basin) as shown in Figure 1b. The point of the three-fold division is to emphasize the very large contrasts in transmissivity (T) and salinity between the groups. East of the Pecos River, the T of the Capitan aquifer is one to two orders of magnitude greater than either the shelf aquifers or the basin aquifers which surround it. In essence, the Capitan may be visualized as a curved tube, similar to a "hula hoop", dipping to the east-northeast, carrying water from the surface in the Guadalupe Mountains of New Mexico and the Glass Mountains of Texas down into the subsurface near Hobbs. Figure 2 shows the gradual change in the flow of water through the Capitan aquifer as the Pecos River came into hydrologic connection with it, and then as the exploitation of water and oil resources impacted it. The salinity of the waters contained in the shelf and basin aquifers are one to two orders of magnitude greater than that within the Capitan aquifer. The reason for this appears to be the higher velocity of movement of fresh water through the Capitan which dilutes the salt content within that aquifer. The

implication of Figure 2 is that the salinity of the central part of the aquifer has risen over time as the volume of fresh water reaching the lower end of the aquifer has diminished.

In detail, the Capitan aquifer was incised by submarine canyons shortly after deposition which were then filled with shelf aquifer materials. The effect of this was to create constrictions where the reef aquifer is thinner than normal and in contact with the lower T, higher salinity, shelf and basin aquifers. The presence of several large submarine canyons between Ranges 26E and 30E apparently retards recharge from the modern Pecos River (Hiss, 1976). This loss of velocity allows waters of higher salinity to pool in the area of Townships 19S and 20S, Ranges 29E and 30E. Much of this portion of the aquifer contains water with TDS of greater than 10,000 ppm (Hood and Kister, 1962, Hiss, 1975, and NMOCD, 2/6/92). However, there is no evidence of any loss of hydraulic connection between the Pecos River and the easternmost portions of the Capitan aquifer.

Consideration of the inquiry of Mr. Scott

Mr. Scott is one of several independent oil company operators who has sought regulatory relief in the past three years since the SEO reiterated to the OCD that "fresh" water, beneficially used in stock and domestic wells, within the Rustler Formation in central Eddy County requires protection during oil and gas exploration and production activities (Mason, 1989). Evidently, for some period prior to that time, no water in the Rustler Formation was considered to fall within the designation

of "fresh" as defined by the State Engineer. It is unclear why that belief was held. The SEO had informed the OCD (then the Oil Conservation Commission) in April, 1967 that the area contained zones of "fresh" water within the Rustler Formation (Irby, 1967). In that same letter the SEO noted "fresh" water occurring in the Capitan aquifer west of the Pecos River but did not specify "fresh" water occurring in the Capitan east of the river.

The effect of the designation of fresh water zones in the Rustler Formation is that OCD now requires four (4) strings of casing to be placed in an oil or gas well producing from the Delaware Mountain Group rather than the three (3) that previously were standard. The resulting cost increase is the incentive for independent oil producers to seek regulatory relief.

Consideration of the inquiry of Mr. LeMay

No documentation has been found to substantiate a rumored "gentlemen's agreement" between Mr. Reynolds (former State Engineer) and Mr. Porter (former OCD director) to consider all of the Capitan aquifer as a "fresh" water source for the purposes of restricting saline discharge. However, such an agreement may well have existed because it has been the policy of the OCD to exclude the use of the Capitan aquifer for saline disposal purposes for many years (David R. Catanach, pers. comm.).

The best reason for such a policy is that the Capitan aquifer does contain "fresh" water in two large areas; 1) immediately east of the Pecos River near Carlsbad and 2) over most of the central portion of Lea County. The introduction of

saline waters into the Capitan by way of disposal injection will cause displacement and deterioration in quality of the "fresh" waters. It is actually conceivable that increased TDS content of the waters in the Capitan could cause changes in the head gradient[1] within the western portion of the aquifer such that poor quality water would flow to the west and affect the quality of the Pecos River at Carlsbad Springs (Hiss, 1973 and 1980).

Conclusions

It appears that there is no justification for a change in the policy of the SEO concerning the existence of "fresh" water in the Rustler aquifer. The casing requirements of the OCD have been reviewed by the District II staff and appear to be acceptable.

Even if zones of high salinity water occur in the central portion of the Capitan aquifer, no complete barrier to hydraulic connection with zones of "fresh" water is known to exist. Therefore, it appears proper for the State Engineer to reassert the longtime policy of protecting the Capitan aquifer from use as a site for salt water disposal.

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[1] Dr. Peggy Barroll and I examined the method of correcting formation water heads to fresh water heads introduced by Hiss (1973) and found it to be acceptable.

References

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Hiss, W.L., 1973, Capitan Aquifer Observation-Well Network Carlsbad to Jal New Mexico, NMSEO, Technical Report 38

_____, 1975, "Chloride-Ion Concentration in Ground Water in Permian Guadalupian Rocks, Southeast New Mexico and West Texas", NMMBR, Resource Map 4

_____, 1976, Stratigraphy and ground-water hydrology of the Capitan aquifer, southeastern New Mexico and west Texas, University of Colorado, Boulder, unpub. PhD dissertation, 396 p.

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Mason, A.B., 6/29/89, "Fresh Water Zones in the areas of 19S.29E, 30E and 20S,29E, 30E, Memorandum to Mike Williams, District Supervisor, OCC, Artesia from SEO, Roswell

Mercer, J.W., 1983, Geohydrology of the Proposed Waste Isolation Pilot Plant Site, Los Medanos Area, Southeastern New Mexico, USGS Water-Resources Investigations Report 83-4016

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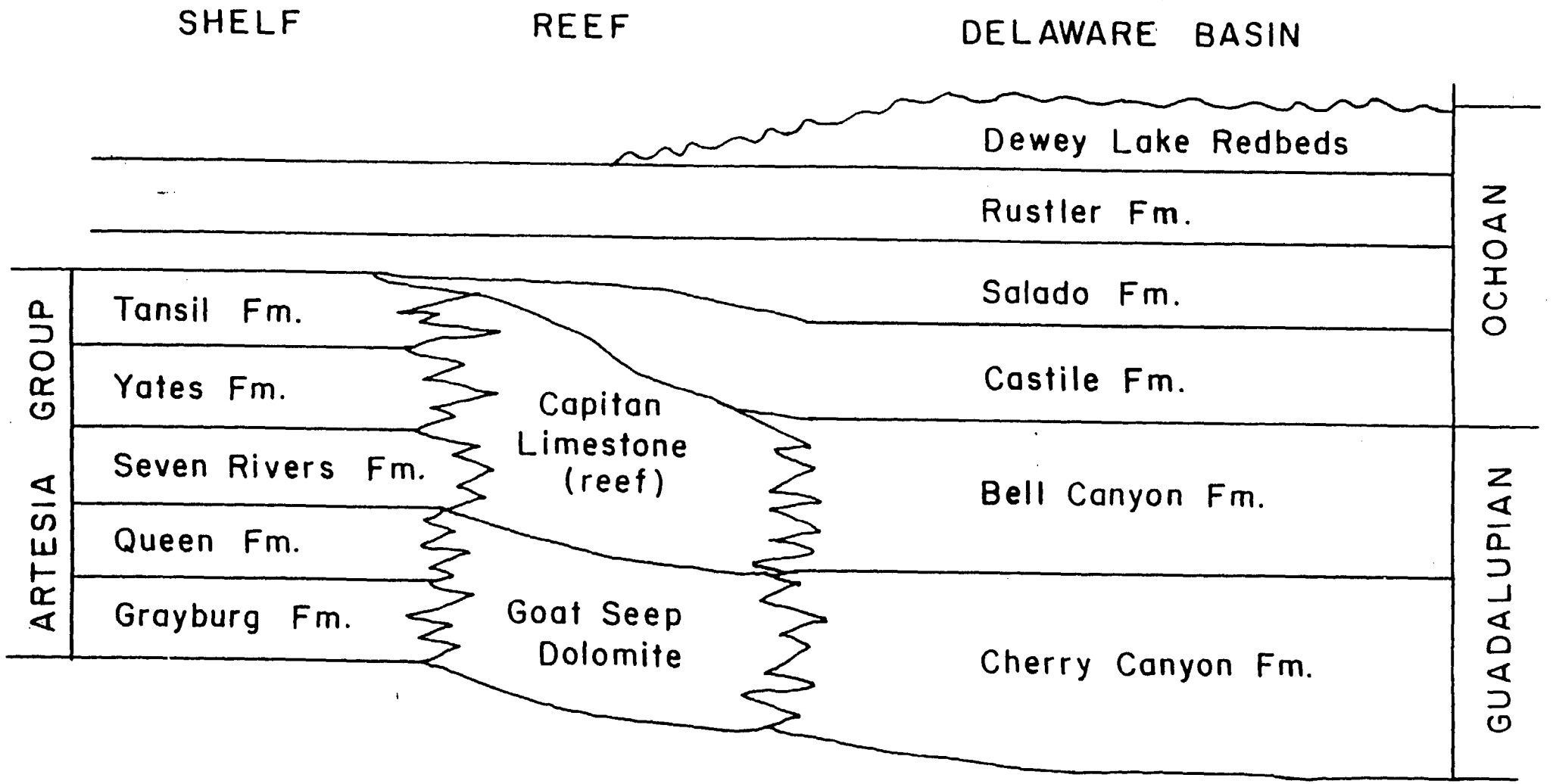


GURE 1a Diagram showing nomenclature and stratigraphic relations of Guadalupian and Ochoan rocks in northwestern part of th laware Basin.

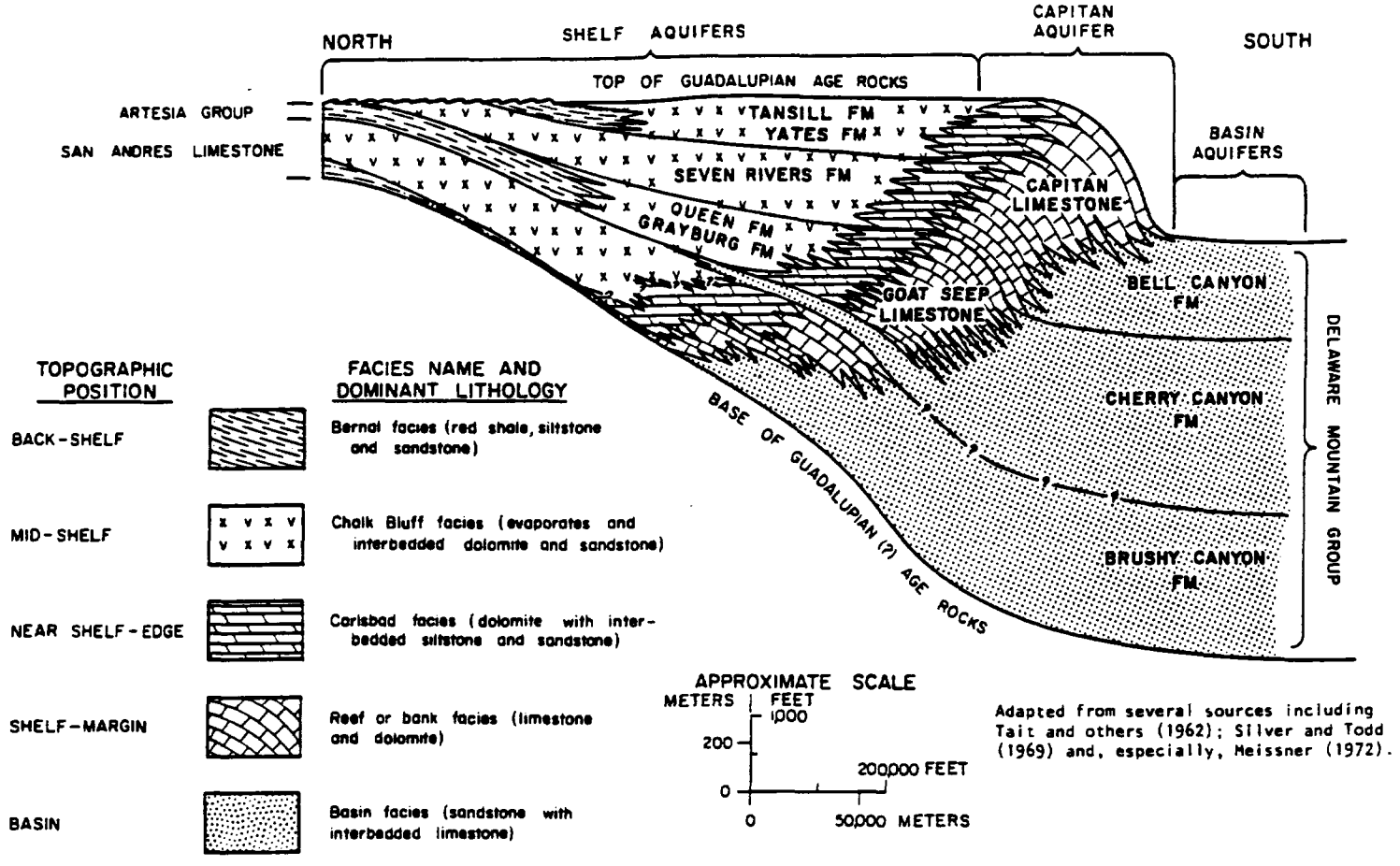
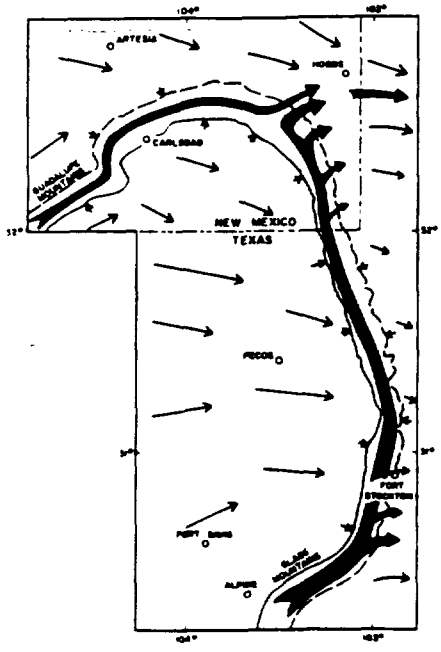
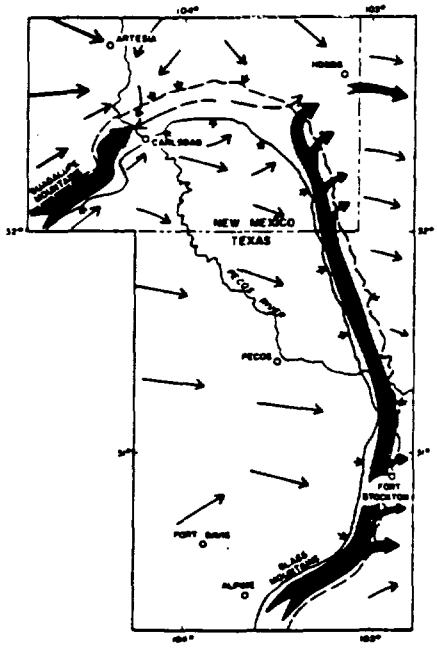


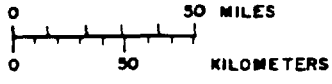
Figure 1b. Highly diagrammatic north-south stratigraphic section showing the positions and relationships of the major lithofacies in the rocks of Guadalupian age, eastern New Mexico.



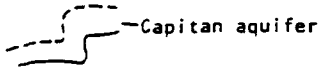
A. Regimen principally controlled by regional tectonics prior to development of the Pecos River.



B. Regimen influenced by erosion of Pecos River at Carlsbad downward into hydraulic communication with the Capitan aquifer.

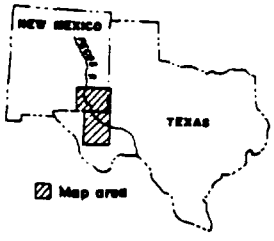


EXPLANATION

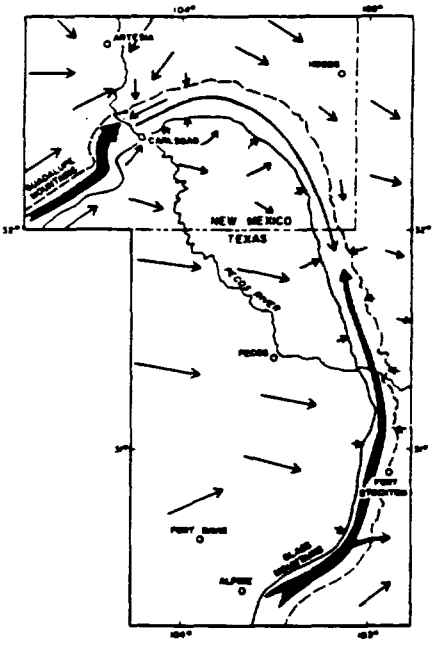


Highly diagrammatic ground-water flow vectors:

1. Vector size indicates relative volume of ground-water flow.
2. Orientation indicates direction of ground-water movement.



INDEX MAP



C. Regimen influenced by both communication with the Pecos River at Carlsbad and the exploitation of ground-water and petroleum resources.

Diagrammatic maps depicting the evolution of ground water regimens in strata of Permian Guadalupian age in southeastern New Mexico and western Texas.

Figure 2

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

April 23, 1992

Mr. Eluid L. Martinez
State Engineer
P.O. Box 25102
Santa Fe, New Mexico 87504-5102

Dear Mr. Martinez:

As you may know, the Oil Conservation Division of the Energy, Minerals and Natural Resources Department, has primacy in administering the Federal Underground Injection Control Program for the State of New Mexico. This program mandates that the Division, in reviewing applications for salt water disposal and secondary recovery injection wells, make a determination that such injection shall not pose a danger of contaminating underground sources of drinking water containing less that 10,000 parts per million total dissolved solids.

Recently, an application was filed by Anadarko Petroleum Company to utilize the Exxon Federal Well No. 3 located 660 feet from the North line and 1980 feet from the West line (Unit C) of Section 19, Township 19 South, Range 33 East, NMPM, Lea County, New Mexico, as a salt water disposal well, injection to occur into the Capitan Reef at a depth of approximately 3500 feet to 4300 feet. The produced water to be injected into this well originates from the Delaware formation at a depth of approximately 5492 feet to 6020 feet, and contains total dissolved solids of approximately 219,389 parts per million. Injection is proposed to average 1000 barrels of water per day.

Anadarko presented geologic and engineering evidence and testimony at a public hearing held in Santa Fe on February 6, 1992, which indicates that in the area of concern, the Capitan Reef contains water with total dissolved solids of 105,532 parts per million, as evidenced by a water analysis from Anadarko's Teas Yates Water Supply Well No. 1 located 1330 feet from the North and West lines (Unit F) of Section 14, Township 20 South, Range 33 East, NMPM, which is currently completed in the Capitan Reef at a depth of approximately 3660 feet to 3762 feet. Based upon the evidence presented, the Division can approve the proposed injection into the Capitan Reef.

The Division's concerns regarding the proposed injection are as follows:

1) The Division has historically not allowed injection into the Capitan Reef as per an agreement supposedly reached between Mr. Pete Porter, previous director of the Division and Mr. Steve Reynolds;

2) Allowing the proposed injection at the present time would set a precedent, and as a result, the Division would expect to see numerous similar applications filed due to the unique ability of the Capitan Reef to easily accept injected fluids;

3) The Division lacks reservoir modeling capability and hydrologic expertise to adequately predict whether or not injection into the Capitan Reef on a large scale will ultimately have a detrimental affect on those portions of the Capitan Reef containing good quality water such as that currently being used by the City of Carlsbad.

Members of my staff have been in preliminary contact with Mr. Paul Saavedra of your office. Thus far, they have been unable to locate any documentation regarding the agreement between Mr. Porter and Mr. Reynolds.

I feel that this is a very important issue because once injection into the Capitan Reef is allowed and the injection occurs, it would be very difficult to perform remediation should contamination occur. We are therefore seeking your assistance in making a hydrologic determination that large scale injection of produced salt water into the Capitan Reef will not have a detrimental affect, at some future time, on those portions of the Reef containing fresh water. A hydrologic study of this nature will provide the Division scientific data and evidence needed to make informed decisions on the effects of salt water injection into the Capitan Reef.

Any assistance you can provide the Division in this matter will be greatly appreciated. If my engineering or geologic staff can be of any assistance, please feel free to request such assistance.

Sincerely,

William J. LeMay

William J. LeMay
Division Director

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

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 10439
Order No. R-9790

APPLICATION OF ANADARKO PETROLEUM CORPORATION FOR SALT WATER DISPOSAL, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on February 6, 1992, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 24th day of November, 1992, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

(1) Due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) The applicant, Anadarko Petroleum Corporation, seeks authority to re-enter and deepen the previously plugged and abandoned Hudson & Hudson, Inc. Saunders "A" Well No. 1, located 660 feet from the North line and 1980 feet from the West line (Unit C) of Section 19, Township 19 South, Range 33 East, NMPM, Lea County, New Mexico, to the Capitan Reef and dispose of produced salt water in the open hole interval from approximately 3500 feet to 4300 feet.

(3) The applicant proposes to inject up to 1,000 barrels of water per day into the proposed disposal well. The source of the injected fluid is Delaware formation water produced in conjunction with oil and gas operations.

(4) The Capitan Formation, or Capitan Reef as it is commonly referred to, is an organic carbonate buildup along the margins of the Delaware Basin. This formation in New Mexico outcrops on the northern side of the Delaware Basin in southern Eddy County and extends into the subsurface to the north and east in an arc shape to the southern portion of Lea County.

(5) The Capitan Reef, in the southern portion of Eddy County, contains fresh water and is a major source of water for the City of Carlsbad.

(6) According to applicant's evidence, it currently operates the Teas Yates Unit Water Supply Well No. 1 located in Section 14, Township 20 South, Range 33 East, NMPM, which is completed in and producing from the Capitan Reef.

(7) An analysis of the water being produced from the Teas Yates Unit Water Supply Well No. 1, submitted as evidence in this case, indicates that the total dissolved solids are approximately 105,000 mg/l.

(8) An analysis of the water being produced from the Delaware formation in this area indicates that the total dissolved solids are approximately 219,000 mg/l.

(9) The applicant contends that the Capitan Reef in the area of the proposed disposal well does not contain fresh water and is suitable for injection purposes.

(10) The applicant further contends that there may exist a subsurface barrier located east of Carlsbad within the Capitan Reef which separates the potable water in the western portion of the reef from the non-potable water in the eastern portion of the reef.

(11) Rule No. 701 (E)(2) of the Division Rules and Regulations states that "Disposal will not be permitted into zones containing waters having total dissolved solids concentrations of 10,000 mg/l or less except after notice and hearing, provided however, that the Division may establish exempted aquifers for such zones wherein such injection may be approved administratively".

(12) In order to supplement the evidence presented in this case, the Division, subsequent to the hearing, consulted with the State Engineer for the State of New Mexico, whose responsibilities include, among other things, the designation of underground sources of drinking water within the state.

(13) Technical literature available to the Division, namely a map of Chloride Ion Concentration in Ground Water in Permian Guadalupian Rocks, Southeast New Mexico, prepared by the USGS and New Mexico State Engineer and published in 1975, indicates that while there are areas of high chloride concentration within the Capitan Reef, there are also numerous areas south and east of the proposed disposal site which contain water with chloride concentrations less than 10,000 mg/l.

(14) Other technical literature indicates that there is a shortage of data regarding the quality of the water in the Capitan Reef in some areas of Eddy and especially Lea County.

(15) The evidence presented by the applicant in this case is insufficient and does not establish:

a) that the Capitan Reef should be subdivided into two distinct areas, one that contains potable water and one that does not contain potable water;

b) the existence of a subsurface barrier within the Capitan Reef which would effectively isolate potable water from non-potable water;

c) that the area of the proposed disposal well is hydrologically disconnected from other areas of the Capitan Reef which may contain fresh water;

d) the overall hydrologic system within the Capitan Reef is such that injection into the proposed well will not cause the degradation of fresh water within those areas of the Capitan Reef which do contain fresh water.

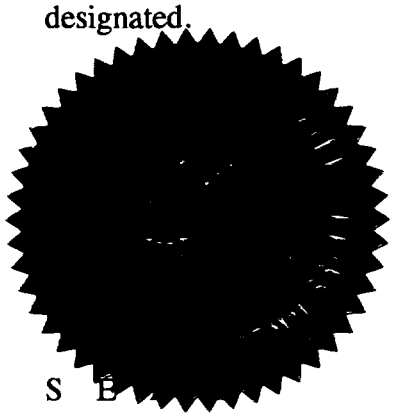
(16) The application of Anadarko Petroleum Corporation should be denied.

IT IS THEREFORE ORDERED THAT:

(1) The application of Anadarko Petroleum Corporation to re-enter and deepen the previously plugged and abandoned Hudson & Hudson, Inc. Saunders "A" Well No. 1, located 660 feet from the North line and 1980 feet from the West line (Unit C) of Section 19, Township 19 South, Range 33 East, NMPM, Lea County, New Mexico, for the purpose of disposal of produced water into the Capitan Reef from approximately 3500 feet to 4300 feet is hereby denied.

(2) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



S E

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

WILLIAM J. LEMAY
Director

ANADARKO PETROLEUM CORPORATION
EXXON SWD NO. 3 HEARING 2/6/92

I. Why we need the disposal well.

A. Water from Exxon No. 1
   1. Options
      a. Trucking
      b. Laguna Gatuna
      c. Disposal well

II. Permits

A. BLM has been approved (OCD has copy)

B. NMOCD Permit
   1. Offset Mineral Owners contacted w/no objections
   2. Surface Owner contacted w/no objections
   3. Application made based on
      a. NMOCD Rule 701-D-1,2,3
      b. Capitan Reefs poor water quality

III. Sources of Information

A. Personal Experience
   1. Severe lost circulation
   2. Water saline & sour (H2S)

B. City of Carlsbad
   1. Max Cordova - Environmental Engineer
   2. Jim Harrison - Water Dept.

C. State Engineers Office Roswell

D. State Engineers - Technical Report #38
   (Capitan Aquifer Observation - Well Network Carlsbad to Jal New Mexico by W. L. Hiss w/cooperation of USGS)

IV. Capitan Reef

A. Put up slide #1
   1. Explain reef building on edge of Delaware Basin
      a. Point out Delaware Basin, Reef, State Lines, City of Carlsbad, Jal, Exxon #3, WSW #1
   2. Reef Today
      a. Outcrops in Mts west of Carlsbad, Pecos River, Dip of Reef east to south
   3. Water west of Pecos fresh w/source greatly dependant on local weather
   4. East of Pecos reef appears to be fractured and the saline Pecos River is source of part of eastern reef water
   5. Current use of water west of Pecos is fresh water for City of Carlsbad. I visited w/both Mr. Cordova & Mr. Harrison - they said as does the Tech Report #38 that the Capitan Reef west of Pecos is not supplied by same source.

6. Water withdraw east of the Pecos is for refining & waterflooding in Eddy, Lea, Winkler & Ward Counties.

B. Put up slide #2
   1. Explain Tech Report #38 & observation wells, point to Exxon #3, WSW #1, Little Eddy Unit I, rest of the 16 wells monitored.

C. Slide #3 Explain
   1. West to East
   2. Increase subsea depth
   3. Flow of ground water in reef east
   4. Decrease in water level of eastern reef
      a. eg FL 6/67 to 3/76 dropped 500' to 600' during study
   5. Compare Water Analysis

I - SECONDARY OR OTHER ENHANCED RECOVERY, PRESSURE MAINTENANCE, SALT WATER DISPOSAL, AND UNDERGROUND STORAGE

Order No. R-6702, effective July 1, 1981, amended, adopted and renumbered Rules 701 through 708.

RULE 701. INJECTION OF FLUIDS INTO RESERVOIRS (As Amended by Order No. R-930, December 28, 1956; Order No. R-1525, November 9, 1959; Order No. R-1644, May 1, 1960; Order No. R-2490, May 28, 1963; Order No. R-2764, September 8, 1964; Order No. R-2761, January 1, 1965; Order No. R-3092, July 18, 1966; Order No. R-3375, March 1, 1968; Order No. R-3933, June 1, 1970; Order No. R-4348, September 1, 1972; Order No. R-4381, September 1, 1972; Order No. R-6702, July 1, 1981; and Order No. R-8390, February 1, 1987.)
(See Section IV, Secondary Recovery, for Complete Order No. R-1525.)

A. PERMIT FOR INJECTION REQUIRED (As Amended by Order No. R-6702, July 1, 1981.)

The injection of gas, liquefied petroleum gas, air, water, or any other medium into any reservoir for the purpose of maintaining reservoir pressure or for the purpose of secondary or other enhanced recovery or for storage or the injection of water into any formation for the purpose of water disposal shall be permitted only by order of the Division after notice and hearing, unless otherwise provided herein.

B. METHOD OF MAKING APPLICATION (As Amended by Order No. R-2490, May 28, 1963; Order No. R-3375, March 1, 1968; and Order No. R-6702, July 1, 1981.)

(1) Application for authority for the injection of gas, liquefied petroleum gas, air, water or any other medium into any formation for any reason, including but not necessarily limited to the establishment of or the expansion of water flood projects, enhanced recovery projects, pressure maintenance projects, and salt water disposal, shall be by submittal of Division Form C-108 complete with all attachments.

(2) The applicant shall furnish, by certified or registered mail, a copy of the application to the owner of the surface of the land on which each injection or disposal well is to be located and to each leasehold operator within one-half mile of the well.

(3) Administrative Approval

If the application is for administrative approval rather than for a hearing, it must also be accompanied by a copy of a legal publication published by the applicant in a newspaper of general circulation in the county in which the proposed injection well is located. (The details required in such legal notice are listed on Side 2 of Form C-108.)

No application for administrative approval may be approved until 15 days following receipt by the Division of Form C-108 complete with all attachments including evidence of mailing as required under paragraph 2 above and proof of publication as required by paragraph 3 above.

If no objection is received within said 15-day period, and a hearing is not otherwise required, the application may be approved administratively.

C. HEARINGS

If a written objection to any application for administrative approval of an injection well is filed within 15 days after receipt of a complete application, or if a hearing is required by these rules or deemed advisable by the Division Director, the application shall be set for hearing and notice thereof given by the Division.

D. SALT WATER DISPOSAL WELLS (As Amended by Order No. R-2490, May 28, 1963; Order No. R-2761, January 1, 1965; Order No. R-3375, March 1, 1968; Order No. R-6702, July 1, 1981; and Order No. R-8390, February 1, 1987.)

1. The Division Director shall have authority to grant an exception to the requirements of Rule 701-A for water disposal wells only, without hearing, when the waters to be disposed of are mineralized to such a degree as to be unfit for domestic, stock, irrigation, or other general use, and when said waters are to be disposed of into a formation older than Triassic (Lea County only) and provided no objections are received pursuant to Rule 701-B 3.

2. Disposal will not be permitted into zones containing waters having total dissolved solids concentrations of 10,000 mg/l or less except after notice and hearing, provided however, that the Division may establish exempted aquifers for such zones wherein such injection may be approved administratively.

3. Notwithstanding the provisions of paragraph 2. above, the Division Director may authorize disposal into such zones if the waters to be disposed of are of higher quality that the native water in the disposal zone.

E. PRESSURE MAINTENANCE PROJECTS

1. Pressure maintenance projects are defined as those projects in which fluids are injected into the producing horizon in an effort to build up and/or maintain the reservoir pressure in an area which has not reached the advanced or "stripper" state of depletion.

2. All applications for establishment of pressure maintenance projects shall be set for hearing.

The project area and the allowable formula for any pressure maintenance project shall be fixed by the Division on an individual basis after notice and hearing.

3. Pressure maintenance projects may be expanded and additional wells placed on injection only upon authority from the Division after notice and hearing or by administrative approval.

The Division Director shall have authority to grant an exception to the hearing requirements of Rule 701-A for the conversion to injection of additional wells within a project area provided that any such well is necessary to develop or maintain efficient pressure maintenance within such project and provided that no objections are received pursuant to Rule 701-B(3).

F. WATER FLOOD PROJECTS (As Amended by Order No. R-2764, September 8, 1964; Order No. R-3092, July 18, 1966; Order No. R-3375, March 1, 1968; Order No. R-3933, June 1, 1970; Order No. R-4348, September 1, 1972; Order No. R-4381, September 1, 1972; and Order No. R-6702, July 1, 1981.)

1. Water flood projects are defined as those projects in which water is injected into a producing horizon in sufficient quantities and under sufficient pressure to stimulate the production of oil from other wells in the area, and shall be limited to those areas in which the wells have reached an advanced state of depletion and are regarded as what is commonly referred to as "stripper" wells.

2. All applications for establishment of water flood projects shall be set for hearing.

The project area of a water flood project shall comprise the proration units owned or operated by a given operator upon which injection wells are located plus all proration units owned or operated by the same operator which directly or diagonally offset the injection tracts and have producing wells completed on them in the same formation; provided however, that additional proration units not directly nor diagonally offsetting an injection tract may be included in the project area if, after notice and hearing, it has been established that such additional units have wells completed thereon which have experienced a substantial response to water injection.

3. The allowable assigned to wells in a water flood project area shall be equal to the ability of the wells to produce and shall not be subject to the depth bracket allowable for the pool nor to the market demand percentage factor.

Nothing herein contained shall be construed as prohibiting the assignment of special allowables to wells in buffer zones after notice and hearing. Special allowables may also be assigned in

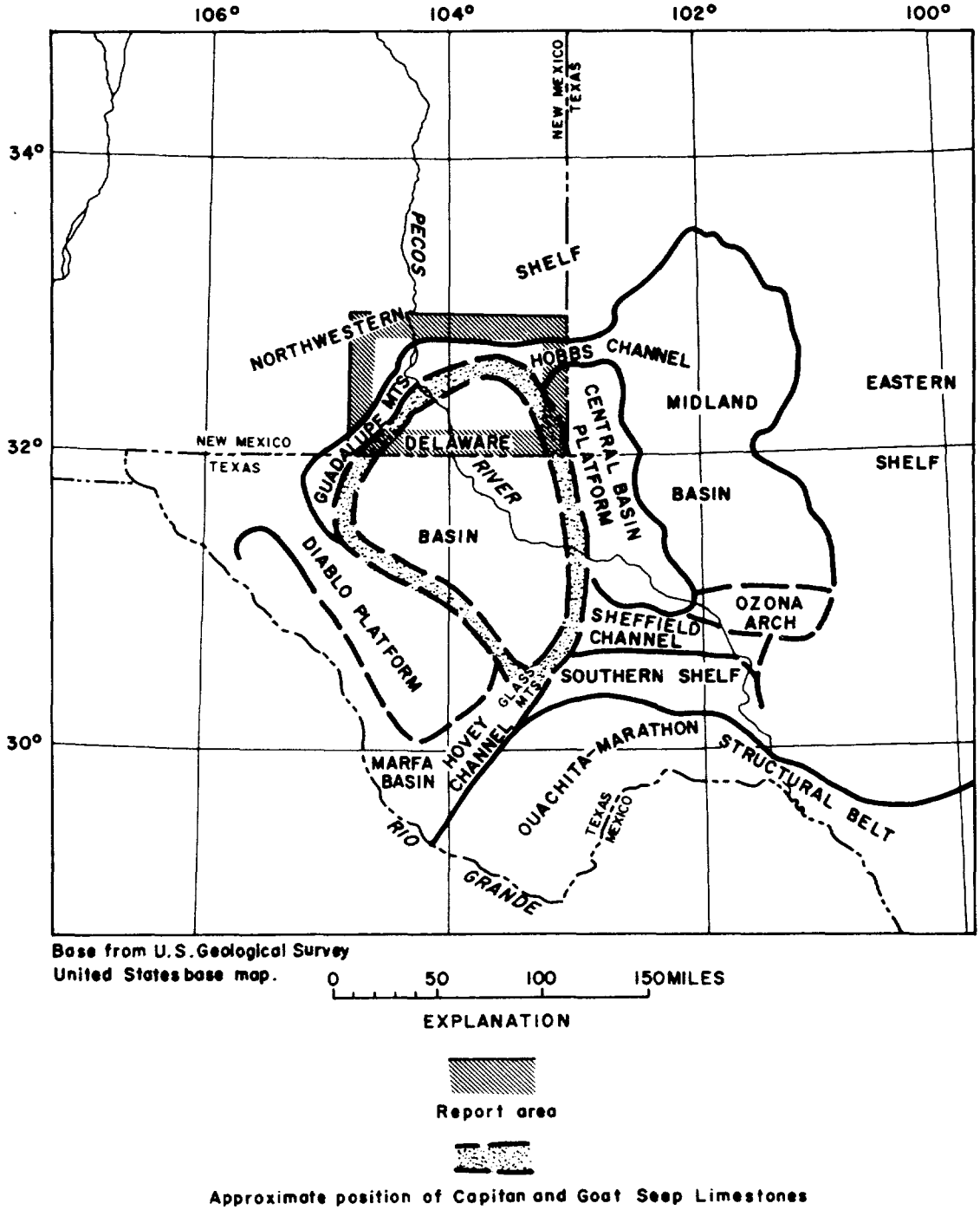
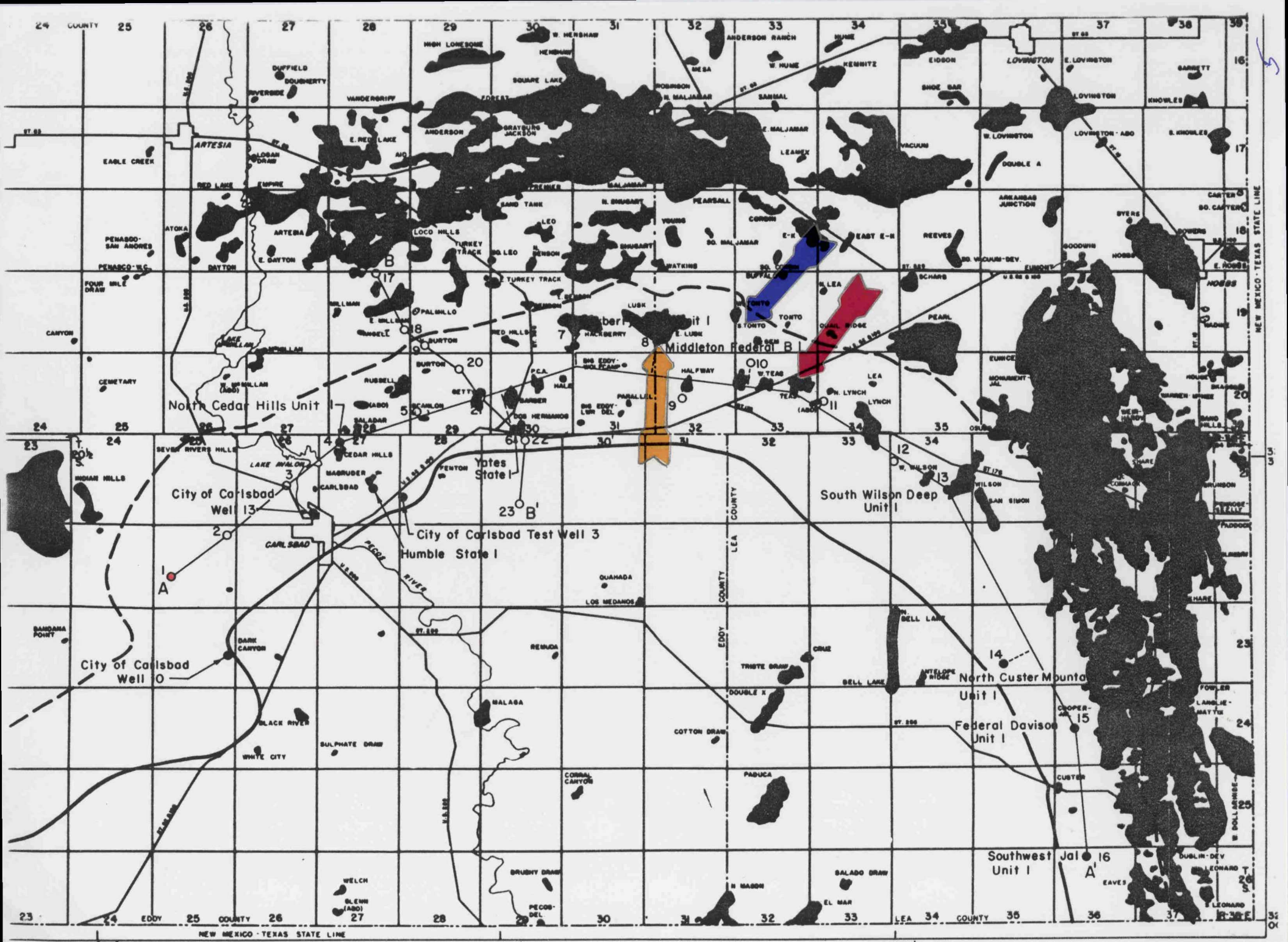


Figure 1.--Tectonic elements in the Permian basin of west Texas and southeastern New Mexico (modified after Oriel, Meyers, and Crosby, 1967).



ological Survey,
swell 38,

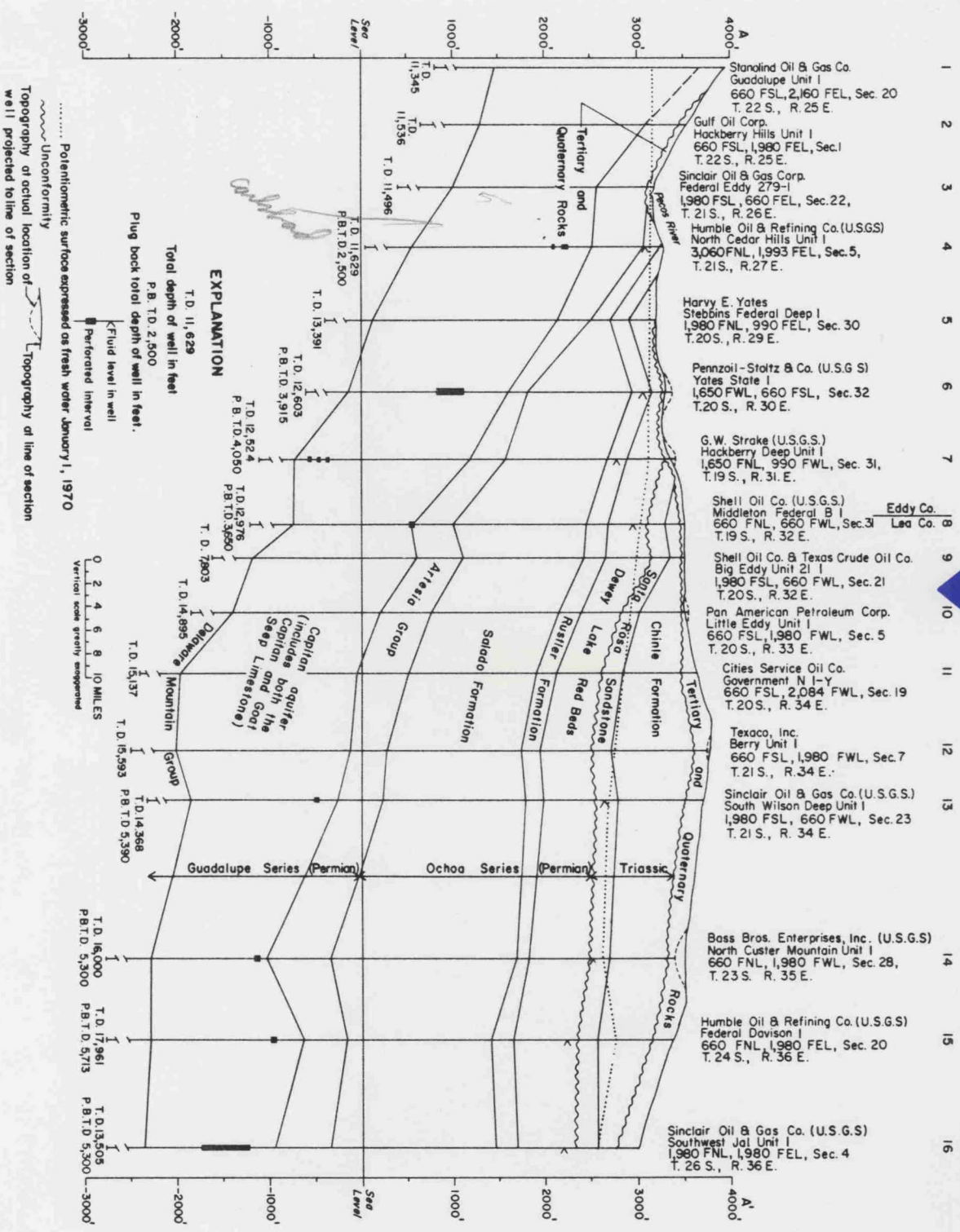


Figure 3.--Longitudinal stratigraphic section A-A' showing the position of the Capitan aquifer, Eddy and Lea Counties, New Mexico.

6

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_2)	Calcium (Ca)	Magnesium (Mg)	Sodium + Potassium (Na+K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Total dissolved solids	Hardness as $CaCO_3$: Calcium magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific gravity 20°C	SAR	Specific conductance (micromhos at 25°C)	pH
20.30.32.341	Yates State 1 - Concluded	Capitan	1,000[2,4610/]	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[2,4610/]	12-29-71	---	1,452	552	14,387	576	---	4,480	22,726	---	43,730	5,900	---	1.031	---	52,083	7.1
32.341	do.	do.	2,000[2,4610/]	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[2,4610/]	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[1/]	Hackberry Deep Unit 1	do.	2,113[467/]	12-15-66	---	---	---	---	---	---	---	87,500	---	---	---	---	1.109	---	175,000	---
31.132[1/]	do.	do.	3,005[467/]	12-15-66	---	---	---	---	---	---	---	87,000	---	---	---	---	1.109	---	174,000	---
31.132[1/]	do.	do.	3,746[467/]	12-15-66	---	---	---	---	---	---	---	87,500	---	---	---	---	1.109	---	174,000	---
31.132[1/]	do.	do.	3,832[467/]	12-15-66	---	---	---	---	---	---	---	102,000	---	---	---	---	1.130	---	194,000	---
31.132[1/]	do.	do.	3,936[467/]	12-15-66	---	---	---	---	---	---	---	106,000	---	---	---	---	1.134	---	197,000	---
31.132[1/]	do.	do.	750[2,467/]	10-21-71	---	1,892	1,767	69,691	5	---	5,320	112,210	---	191,024	12,000	---	1.115[12/]	---	200,000	5.0
31.132[1/]	do.	do.	1,520[2,467/]	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[1/]	do.	do.	2,020[2,467/]	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[1/]	do.	do.	2,770[2,467/]	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[1/]	do.	do.	3,270[2,467/]	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[1/]	do.	do.	3,770[2,467/]	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[2/]	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[9/]	12,500[9/]	---	25,800	4,830	4,450	1.017	48	36,100	6.8
31.110[2/]	do.	do.	2,923-2,957	10-26-66	---	1,095	953	7,950	389	---	454[9/]	17,900[9/]	---	28,740	---	---	1.020	---	---	7.5
21.34.23.310[2/]	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
23.35.28.120[1/]	North Custer Mountain Unit 1	do.	4,470-4,507	10-12-66	---	---	---	---	---	---	---	23,200	---	---	---	---	1.029	---	59,500	6.4
28.120[1&2/]	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[1/]	Federal Davison 1	do.	1,073[468/]	11- 4-66	---	---	---	---	---	---	---	157,000	---	---	---	---	1.173	---	215,000	---
20.210[1/]	do.	do.	2,134[468/]	11- 4-66	---	---	---	---	---	---	---	160,000	---	---	---	---	1.177	---	219,000	8.0
20.210[1/]	do.	do.	4,000[468/]	11- 4-66	---	---	---	---	---	---	---	161,000	---	---	---	---	1.176	---	219,000	8.2
20.210[1/]	do.	do.	5,500[468/]	11- 4-66	---	---	---	---	---	---	---	160,000	---	---	---	---	1.179	---	220,000	8.3
20.210[1/]	do.	do.	1,500[468/]	11-15-72	---	820	1,592	66,389	288	14	6,215	103,688	---	173,448	---	---	1.109	---	---	8.7
26.36. 4.230[1/]	Southwest Jal Unit 1	do.	4,199-4,695	6-14-66	---	---	---	---	---	---	---	82,500	---	---	---	---	1.106	---	168,000	---

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 samples in fluid column.
5/ Plugged-back production interval 640-906.
6/ Producing interval 290-319.
7/ Producing interval 3,736-3,939.
8/ Producing interval 4,278-4,285.
9/ Difference in chloride and sulfate due to determination by different methods.
10/ Producing interval 2,209-2,515.
11/ Producing interval 1,538-1,936.
12/ Density of oil at top of fluid column is 0.796 at 20°C.

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.)

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: TEAS YATES WSW #1 (on 10-10-1991)

	Sample 1
Specific Gravity:	1.075
Total Dissolved Solids:	105532
pH:	6.75
IONIC STRENGTH:	1.919

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	80.0	1600
Magnesium	(Mg^{+2})	60.0	729
Sodium	(Na^{+1})	1660	38100
Iron (total)	(Fe^{+2})	0.002	0.060
Barium	(Ba^{+2})	0.031	2.10
Manganese	(Mn^{+2})	0.003	0.090
ANIONS:			
Bicarbonate	(HCO_3^{-1})	7.60	464
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	96.8	4650
Chloride	(Cl^{-1})	1690	60000
DISSOLVED GASES			
Carbon Dioxide	(CO_2)		10.0
Hydrogen Sulfide	(H_2S)		119

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	-0.06	-17
122°F	50°C	0.87	-17
140°F	60°C	1.2	-17
168°F	76°C	1.8	-12
176°F	80°C	1.9	-12
200°F	93°C	2.4	-12

GRS B
Well File

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Anadarko Petroleum Corp.
P.O. Drawer 130
Artesia , NM 88210

Report Date: October 21, 1991
Lab In Date: October 21, 1991
Sample Date: October 18, 1991

Dear Jerry Buckles

Listed below please find our water analysis report from Teas Yates , Source Well : Teas Yates WSW #1

Specific Gravity:		1.080
Total Dissolved Solids:		111993
PH:		6.50
Ionic Strength:		2.050

CATIONS:		mg/liter
Calcium:	(Ca++)	1400
Magnesium:	(Mg++)	1336
Sodium:	(Na+)	40062
Iron (Total)	(Fe++)	1.20
Barium	(Ba++)	0.00
Manganese:	(Mn++)	.48
Resistivity:		

ANIONS:		
Bicarbonate:	(HCO3-)	415
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	3280
Chloride:	(Cl-)	65500

GASES:		
Carbon Dioxide:	(CO2)	10.0
Oxygen:	(O2)	******
Hydrogen Sulfide:	(H2S)	136.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature		CaCO3 SI	CaSO4 SI
86F	30.0C	-.37	-37.04
104F	40.0C	-.16	-36.66
122F	50.0C	.10	-35.52
140F	60.0C	.43	-34.66
158F	70.0C	.76	-34.08
176F	80.0C	1.15	-33.79

If you have any questions or require further information, please contact us.

Sincerely,

Sharon Wright

Sharon Wright
Laboratory Technician

cc: Charlie Copeland
Jeff White - Midland

bc: Joe Hay
John Offutt

P O BOX 1468
MONAHANS, TEXAS 79756
PH 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 1091211

TO: Mr. George Ruehler
P. O. Box 2497, Midland, TX 79702

SAMPLE RECEIVED 10-23-91
RESULTS REPORTED 10-28-91

COMPANY Anadarko Petroleum Corporation LEASE Texas Yates Water Supply Well

FIELD OR POOL

SECTION ___ BLOCK ___ SURVEY ___ COUNTY Lea STATE NM

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Raw water - taken from Capitan Reef water supply well (3,700'). 10-22-91

NO. 2 from well to 376 C.P.

NO. 3

NO. 4

REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0857			
pH When Sampled				
pH When Received	7.12			
Bicarbonate as HCO_3	519			
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	6,600			
Calcium as Ca	1,540			
Magnesium as Mg	668			
Sodium and/or Potassium	46,157			
Sulfate as SO_4	4,208			
Chloride as Cl	72,439			
Iron as Fe	0.88			
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	125,531			
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	95.0			
Resistivity, ohms/m at 77° F.	0.080			
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks ~~Please contact us if we can be of any assistance in interpretation of the above results.~~

Form No. 3

By

Waylan C. Martin, M.A.

cc: Mr. Dan Kernagan, Midland

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: Exxon Federal #1 - Wellhead (on 8/12/91)

	Sample 1
Specific Gravity:	1.157
Total Dissolved Solids:	219389
pH:	6.30
Resistivity:	0.047 ohms @ 76°F
IONIC STRENGTH:	4.952

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	1150	23000
Magnesium	(Mg^{+2})	832	10100
Sodium	(Na^{+1})	1980	45600
Iron (total)	(Fe^{+2})	0.752	21.0
Barium	(Ba^{+2})	0.051	3.50
Manganese	(Mn^{+2})	0.190	5.23
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.20	256
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	9.89	475
Chloride	(Cl^{-1})	3950	140000

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
104°F	40°C	2.5	1.00
122°F	50°C	2.7	1.00
140°F	60°C	3.1	1.00
168°F	76°C	3.6	1.0
176°F	80°C	3.8	1.0

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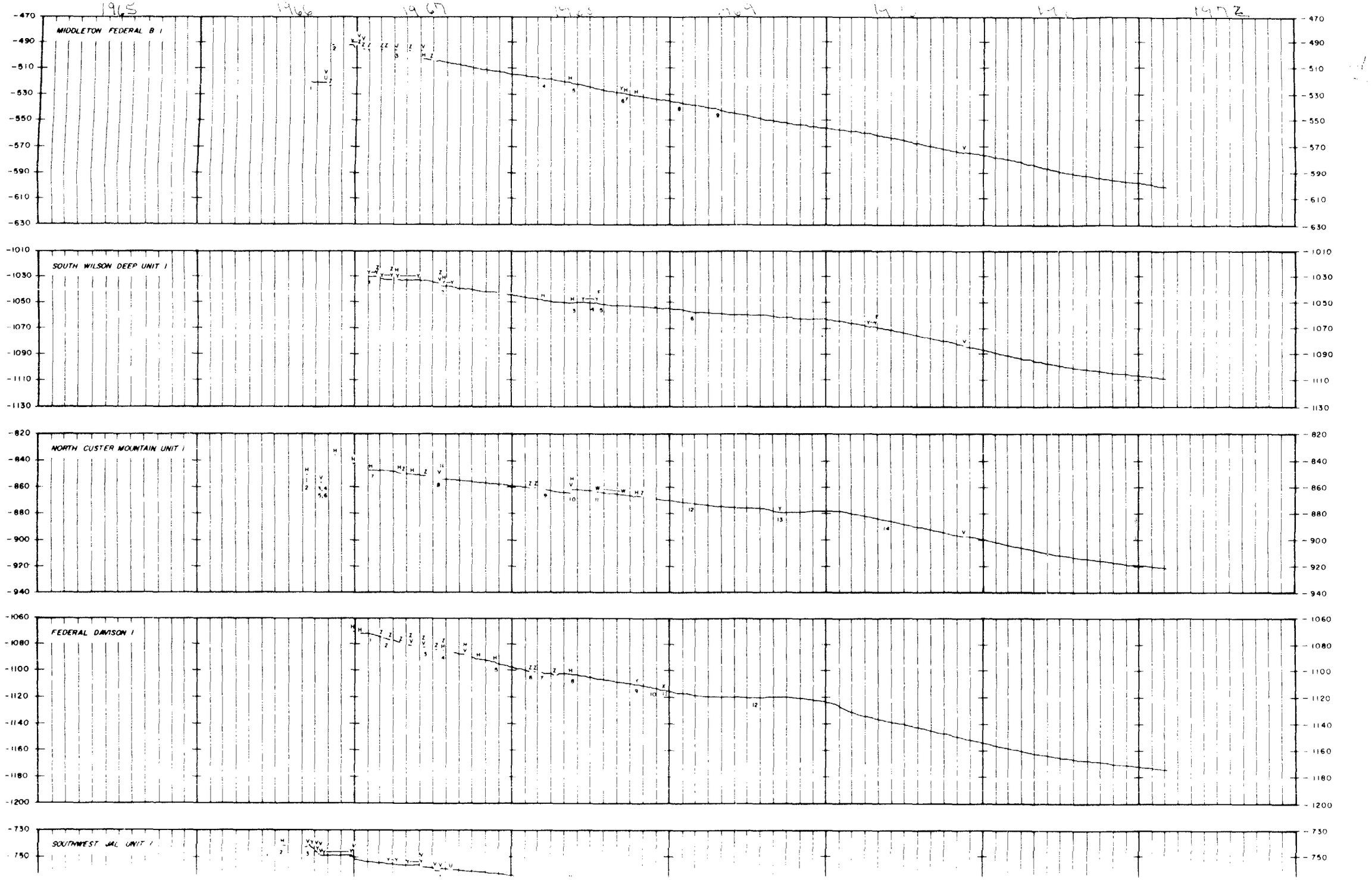

WATER LEVEL IN FEET, BELOW LAND SURFACE DATUM
1965
1966
1967
1968
1969
1970
1971
1972
MIDDLETON FEDERAL B 1
SOUTH WILSON DEEP UNIT 1
NORTH CUSTER MOUNTAIN UNIT 1
FEDERAL DAVISON 1
SOUTHWEST JAL UNIT 1

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: ☐ Secondary Recovery ☐ Pressure Maintenance ☒ Disposal ☐ Storage
Application qualifies for administrative approval? ☒ yes ☐ no

II. Operator: Anadarko Petroleum Corporation

Address: P. O. Drawer 130, Artesia, New Mexico 88210

Contact party: Jerry E. Buckles Phone: 505/748-3368

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? ☐ yes ☒ no
If yes, give the Division order number authorizing the project _____.

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

* VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

* X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

* XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

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

Name: George R.S. Buehler Title Staff Production Engineer

Signature: George R S Buehler Date: October 11, 1991

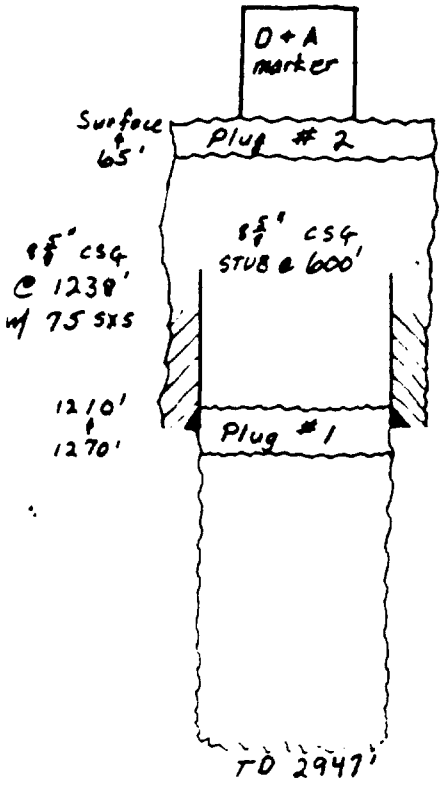
* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal. _____

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

EXAMINER CATANACH
OIL CONSERVATION DIVISION
EXHIBIT NO. 2
CASE NO. 10439

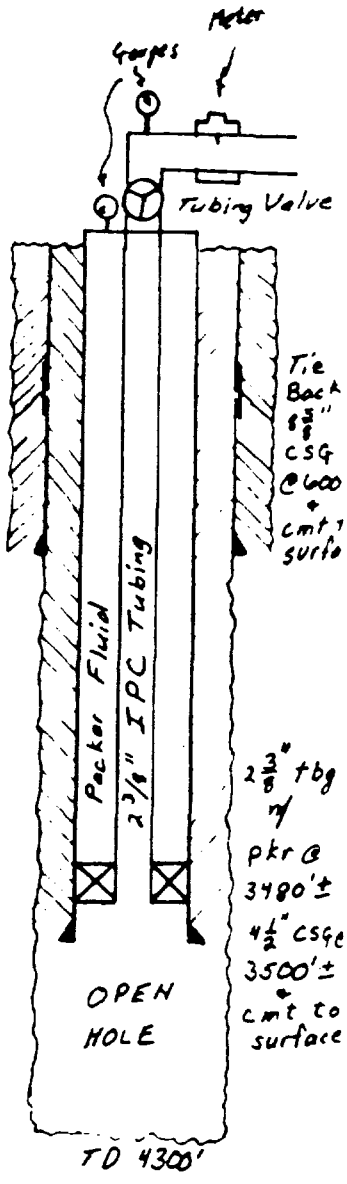
III A

WELL DATA SHEET



Before Re-entry

Date Spudded: February 24, 1957
Plugged: March 2, 1957
8-5/8" casing @ 1238' w/75 sxs
14 jts 28#
26 jts 24#
TD 2947'
Cut and pulled 600' of 8-5/8" casing plugs
#1 1270' to 1210'
#2 65' to surface



After Re-entry

8-5/8" casing 1238' to surface
1) Dress off csg stub & run fluid caliper
2) Bowl over & cement to surface
Drill new 7-7/8" hole 2947' to 4300'
Set 4-1/2 csg @ 3500' & cement to surface
Set 2-3/8" IPC tbg @ 3485'± w/Arrow - Set 1 J-lock Injection Packer
(Injection Into Zone 3500' to 4300')
Estimated Avg. Inj 1000 BWPD
Estimated Avg Inj Pres 200 psi
Estimated Maximum Pres 700 psi

EXXON Federal SWD No. 3
660' FNL & 1980' FWL
Sec. 19, T19S, R33E

III B

1) Disposal Formation: Capitan Reef

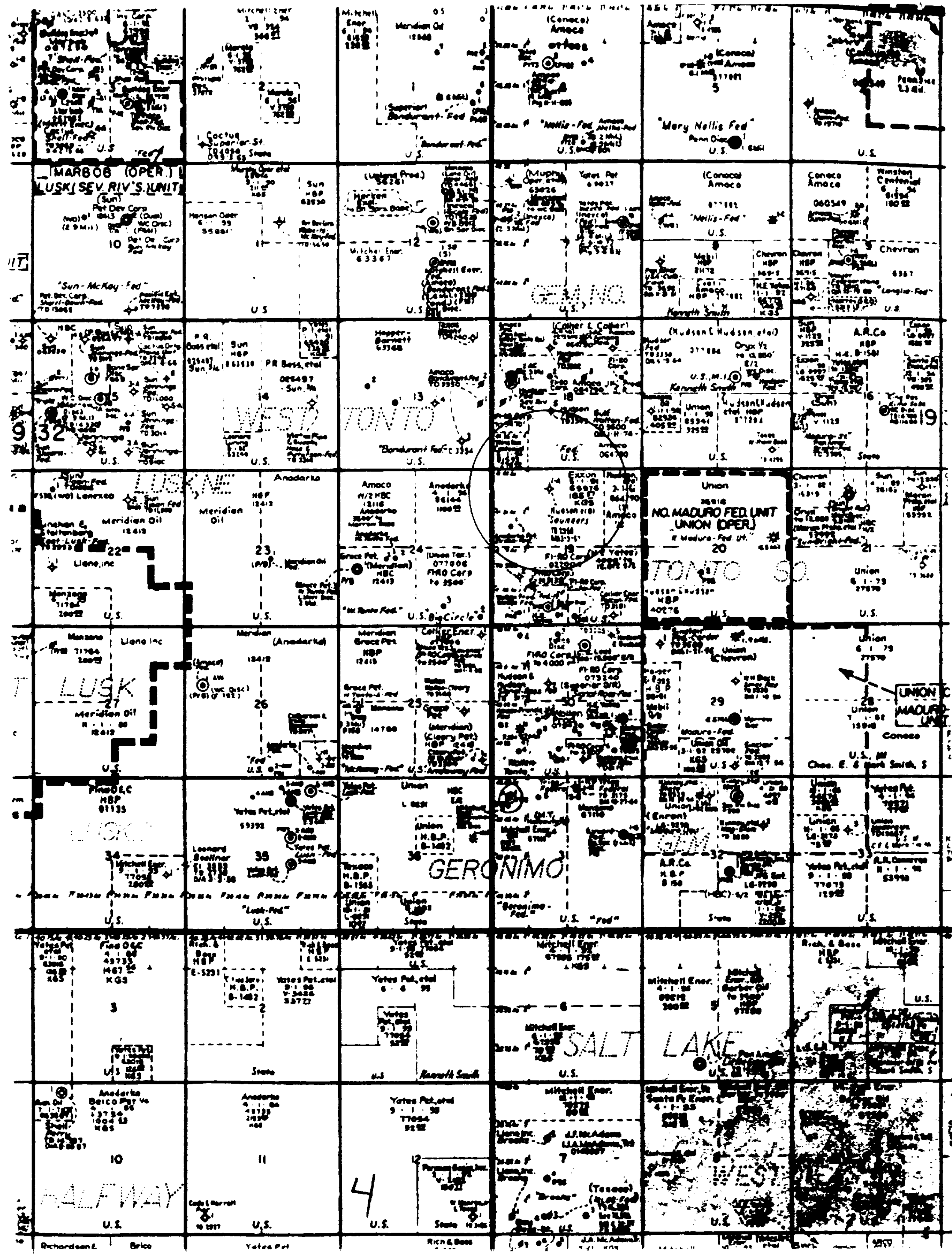
2) Disposal Interval: 3500-4300 (Open Hole)

3) Well was originally drilled to a TD of 2947'
The original operator Hudson & Hudson, Inc. had filed an intent to drill to 3100' with rotary tools and then change to cable tools and drill to 4300', set 5-1/2" casing and complete an oil well with perforations. Hudson & Hudson, Inc. never finished drilling the well but instead plugged the well March 2, 1957.

4) Well was partially drilled and abandoned prior to TD.
Plug #1 1270' to 1210' (amt cmt NR)
8-5/8" csg cut & pulled @ 600'
Plug #2 65' to surface (amt cmt NR)

5) The highest possible oil zone in this area is the Yates @ 2833' to 3255'

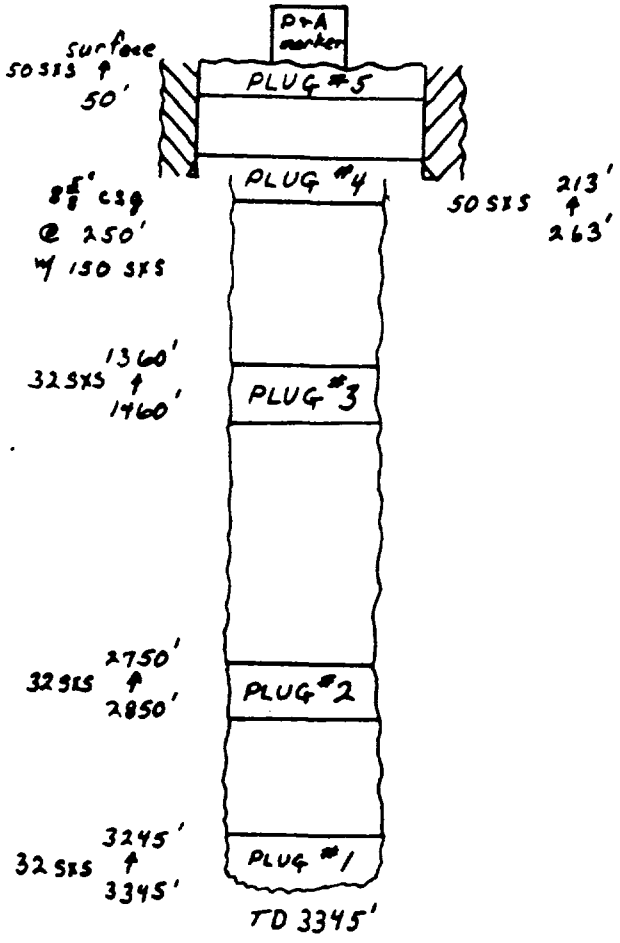
The next lower possible oil zone in this area is the Delaware @ 4977' to 7700'



MARBOB (OPER.)
LUSK (SEV. RIV'S.) UNIT
"Sun - McKay - Fed"
"Mary Nellis Fed"
WEST TONTO
"Bondurant Fed"
NO. MADURO FED. UNIT
UNION (OPER.)
TONTO SO.
LUSK
GERONIMO
"Lusk-Fed"
"Geronimo-Fed."
SALT LAKE
HALFWAY
Amoco
Union
Meridian Oil
Mitchell Ener.
Yates Pet., etal
Anadarko
Chevron
Conoco
Kenneth Smith
U.S.

VI

WELL DATA SHEET



Date Spudded: July 4, 1960
Plugged: July 12, 1960
8-5/8" csg @ 250' w/150 sxs
TD 3345
Plug #1 32 sxs 3345'-3245'
Plug #2 32 sxs 2850'-2750'
Plug #3 32 sxs 1460'-1360'
Plug #4 50 sxs 263'-213'
Plug #5 50 sxs 50'-surface

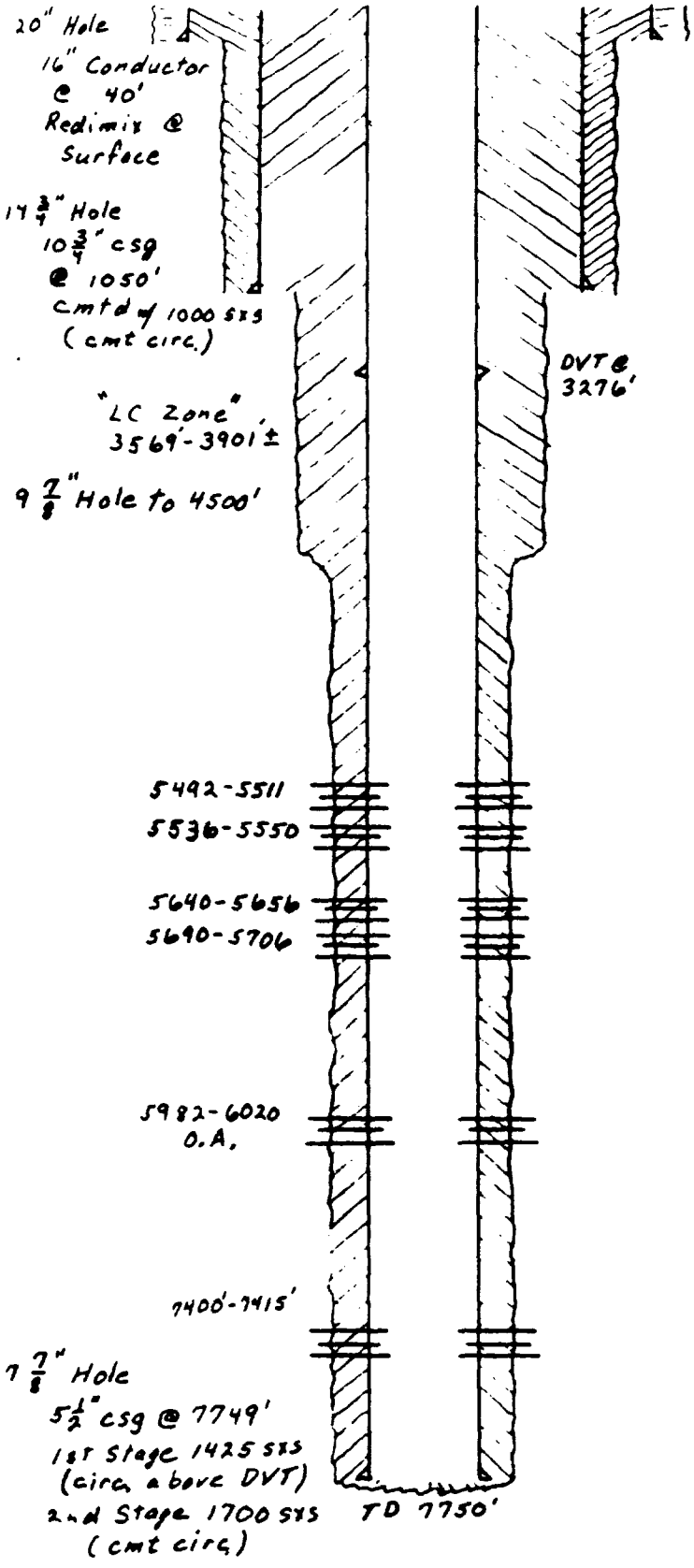
NOTE: This well appears to of penetrated the top of the capitan reef.

(Applied for disposal zone is 3500'-4300')

Federal "18" No. 5
1980' FSL & 2039' FWL
Sec. 18, T19S, R33E

VI

WELL DATA SHEET



Date Spudded: June 5, 1991
Completed: August 5, 1991
20" Hole
16" csg set @ 40' & redimixed to surface
14-3/4" Hole
10-3/4" csg set @ 1050'
Cmtd w/1000 sxs (cmt circ)
9-7/8" Hole to 4500'
LC @ 3569 to 3901±
Regain circ w/400 sxs cmt
Hole 7-7/8" (reduce bit size @ 4500')
TD 7750'
5-1/2" csg @ 7749
FC @ 7702
DVT @ 3276
1st stage w/1425 sxs (cmt to DVT)
Open DVT & circ out 75 sxs
2nd stage w/1700 sxs
circ out 227 sxs

DELAWARE PERFORATIONS

perfs 7400-15 2 SPF
perfs 5982, 86, 89, 92, 96, 98, 6003, 08, 10
13, 16, 20 2 SPF
perfs 5640-56 & 5690-5706
perfs 5492-5511 & 5536-50 2 SPF

EXXON Federal No. 1
1980' FNL & 560' FWL
Sec. 19, T19S, R33E

VII. 1) Avg inj rate 500 BWPD, Max inj rate 1000 BWPD
2) Type system - Closed system
3) 200 avg inj pres max inj pres 700 psi
4&5) a) Water Analysis of EXXON Federal No. 1 - see attached analysis by Unichem #4a
b) Compatability of two waters - see attached analysis by Unichem #4b
c) Water Analysis of Capitan Reef Water from Anadarko's Teas Yates Unit Water Supply Well No. 1 in Section 14-20S-33E - see attached analysis by Unichem #4c

VIII. a) Lithology - Limestone
b) Geological Name - Capitan Reef
c) Top/Reef-3255''
d) Base/Reef-4977'
e) Drinking Water
1) Name of drinking water zone - Triassic
2) Depth to bottom of drinking water zone - 850 feet
3) Drinking Water under disposal zone - None

IX. Proposed stimulation to disposal zone - 2000 gallons 15% HCl

X. Logs & Tests - None, well was never drilled to TD

XI. 1) Water analysis from drinking water well within 1 mile
a) Location of drinking water well - Sec. 18, T19S, R33E
b) Analysis - see attached sheet from State Engineer's Office
c) Date sample taken - 2-15-83

XII. See Exhibit XII

XIII. The following list includes the names of all parties notified of Anadarko's intention to install and operate a water disposal well (namely the EXXON Federal SWD No. 1). See attached list.

UNICHEM
INTERNATIONAL

Home Office 707 N. Leech, P.O. Box 1499 / Hobbs, NM 88240 / Ph. 505/393-7751, Fax 505/393/6754

October 10, 1991

Jerry Buckles
Anadarko Petroleum Corp.
P. O. Drawer 130
Artesia, NM 88210

Dear Mr. Buckles:

Enclosed please find our water analyses and compatibility reports from the **Teas Yates WSW #1** and **Exxon Federal #1.**

If you have any questions or require further information, please contact us.

Sincerely,

Sharon Wright
Laboratory Technician

SW/sr

cc: Bill Polk
Joe Hay
John Offutt
Charlie Copeland
Jeff White

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: Exxon Federal #1 - Wellhead (on 8/12/91)

	Sample 1
Specific Gravity:	1.157
Total Dissolved Solids:	219389
pH:	6.30
Resistivity:	0.047 ohms @ 76°F
IONIC STRENGTH:	4.952

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	1150	23000
Magnesium	(Mg^{+2})	832	10100
Sodium	(Na^{+1})	1980	45600
Iron (total)	(Fe^{+2})	0.752	21.0
Barium	(Ba^{+2})	0.051	3.50
Manganese	(Mn^{+2})	0.190	5.23
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.20	256
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	9.89	475
Chloride	(Cl^{-1})	3950	140000

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
104°F	40°C	2.5	1.00
122°F	50°C	2.7	1.00
140°F	60°C	3.1	1.00
168°F	76°C	3.6	1.0
176°F	80°C	3.8	1.0

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: TEAS YATES & EXXON FEDERAL - COMPATIBILITY (on 10-10-1991)

	Sample 1
Specific Gravity:	1.149
Total Dissolved Solids:	208003
pH:	6.35
IONIC STRENGTH:	4.649

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	1040	20800
Magnesium	(Mg^{+2})	755	9170
Sodium	(Na^{+1})	1950	44800
Iron (total)	(Fe^{+2})	0.677	18.9
Barium	(Ba^{+2})	0.049	3.36
Manganese	(Mn^{+2})	0.172	4.72
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.54	277
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	18.6	893
Chloride	(Cl^{-1})	3720	132000
DISSOLVED GASES			
Carbon Dioxide	(CO_2)		1.00
Hydrogen Sulfide	(H_2S)		11.9
Oxygen	(O_2)		0

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	1.6	8.6
122°F	50°C	2.5	8.3
140°F	60°C	2.9	8.3
168°F	76°C	3.4	8.0
176°F	80°C	3.6	8.0
200°F	93°C	4.1	8.0

Comments:
COMPATIBILITY = TEAS YATES = 10% & EXXON FEDERAL FEDERAL = 90%

10

The attached exhibit 4c is capitan reef water, sampled from Anadarko's Teas Yates Unit's Water Supply Well No. 1, located approximately 9 miles southwest of the EXXON Federal SWD No. 3. The WSW No. 1's legal is 1330' FNL & 1330' FWL of Section 14, T20S, R33E, Lea County. The producing capitan reef perforations are:

3660-3663
3674-3681
3696-3700
3708-3711
3724-3727
3746-3749
3758-3762

Anadarko produces approximately 3000 BWPD from the Teas Yates Unit WSW No. 1.

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : ANADARKO
Date : 10-10-1991
Location: TEAS YATES WSW #1 (on 10-10-1991)

	Sample 1
Specific Gravity:	1.075
Total Dissolved Solids:	105532
pH:	6.75
IONIC STRENGTH:	1.919

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	80.0	1600
Magnesium	(Mg^{+2})	60.0	729
Sodium	(Na^{+1})	1660	38100
Iron (total)	(Fe^{+2})	0.002	0.060
Barium	(Ba^{+2})	0.031	2.10
Manganese	(Mn^{+2})	0.003	0.090
ANIONS:			
Bicarbonate	(HCO_3^{-1})	7.60	464
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	96.8	4650
Chloride	(Cl^{-1})	1690	60000
DISSOLVED GASES			
Carbon Dioxide	(CO_2)		10.0
Hydrogen Sulfide	(H_2S)		119

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	-0.06	-17
122°F	50°C	0.87	-17
140°F	60°C	1.2	-17
168°F	76°C	1.8	-12
176°F	80°C	1.9	-12
200°F	93°C	2.4	-12

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

ELUID MARTINEZ
STATE ENGINEER

ROSWELL

DISTRICT II
1900 West Second St.
Roswell, New Mexico 88201
(505) 622-6521

October 2, 1991

George Buehler
Amadarko Petro Corporation
P. O. Box 2497
Midland, Texas 79702

Dear Mr. Buehler:

Please find enclosed the information you requested from our office concerning wells in the area of 19S.32E.

If our office can be of any further assistance to you, please do not hesitate to contact us.

Sincerely,

Kenneth Fresquez
Field Supervisor

KF/lc
enc.

13

Record #	Basin	File #		Ownership		Depth	Water Bearing Fm.	Date Collected	Collected By	Use	Loc.	U.S. Elev.	Plot Coll.	Chlorides	Sp. Conduct.	Temp		Carb Date		DPR	
7468	CP					0	PRC	76/11/01	SED	STK	19S.29E.25.44332	3320.00	DP	94	2560	68				15-08004	0
7469	CP					0	PRC	81/10/01	SED	STK	19S.29E.25.44332	3320.00	TANK	100	2571	0		282		15-03004	0
7470	CP					0	PRC	85/03/14	SED	STK	19S.29E.25.44332	3320.00	DP	134	2925	65		0385		15-08004	0
3099					SNYDER RANCH	0	PRC	89/05/09	SED	STK	19S.29E.25.44332	3320.00	DP	166	3020	70		0589		15-08004	0
7471	CP	00379				0	PRC	67/03/27	SED	MDD	19S.30E.10.31312	0.00	DP	134000	134010	0		482			0
7472	CP	00357	X			0	PRC	66/04/00	BLR	SRD	19S.30E.24.134133	0.00	BLR360	23270	57839	0		482			0
7473	CP	00357	X			0	PRC	68/04/00	BLR	SRD	19S.30E.24.134133	0.00	BLR240	22560	58166	0		482			0
7474	CP	00357	X			0	PRC	62/04/00	BLR	SRD	19S.30E.24.134133	0.00	BLR340	24000	59277	0		482			0
7475	CP					0	GAL	85/03/14	SED	STK	19S.30E.25.12133	0.00	TE25	161	875	65		0385			0
3097						148	PRC	89/05/15	SED	STK	19S.30E.28.31333	3278.00	TE146	615	4986	0		0589			0
7476	CP	00642		TH	00002	0	TRS	82/02/10	CEC	EXP	19S.31E.25.222213	0.00	BLR230	34	0	0	X	0185	P		0
7477	CP					210	TRS	85/03/14	SED	DOM	19S.31E.27.214121	3460.00	DP	36	638	65		0385			0
7478	CP					177	TRC	81/10/14	SED	SRD	19S.31E.27.214122	3477.00	DP	28	734	0		0681		15-08018	0
7479	CP					230	TRS	56/05/01	SED	DOM	19S.31E.28.33124	3484.00		55	1190	0	X	0784	U	15-09008	0
7480	CP					250	TRS	87/09/24	SED	STK	19S.31E.28.33433	3445.00	DP	109	3077	67		282			0
7481	CP					190	TRC	27/01/25	USE	DOM	19S.31E.28.334332	3442.00	DP	43	1120	0	X	0585	U	15-10188	0
7482	CP					137	TRS	56/05/01	USE	STK	19S.31E.28.334334	3442.00		60	2530	65	X	0784	U		0
7483	CP					137	TRS	60/07/24	SED	STK	19S.31E.28.334334	3443.00	YT	26	2447	0		0685			0
7484	CP					137	TRS	85/03/14	SED	STK	19S.31E.28.334334	3443.00	TE110	143	3021	65		0485			0
7485	CP					0	PYA	85/07/26	CEC	OIL	19S.31E.32.221411	0.00	GTH	13400	38476	0		0186			0
7486	CP					250	TRS	59/11/20	DNR	PPP	19S.31E.33.142224	3458.00	DP	209	2640	0	X	182	P		0
7487	CP					185	TRS	59/11/18	DNR	PPP	19S.31E.33.142224	3458.00	DP	251	2640	0	X	182	P		0
7488	CP					185	TRS	59/11/20	DNR	PPP	19S.31E.33.142224	3458.00	DP	244	2640	0	X	182	P		0
7489	CP					185	TRS	87/09/24	SED	PPP	19S.31E.33.142224	3458.00	DP	274	2777	70		282			0
7490	CP	00641		TH	00004	0	TRS	82/02/13	CEC	EXP	19S.31E.36.14114	0.00	BLR260	51	0	0	X	0186	P		0
7491	CP					800	TRS	58/12/09		STK	19S.32E.08.22411	3644.00		21	682	0	X			25-12201	0
7492	CP					800	TRS	85/11/18	SED	STK	19S.32E.08.22411	3644.00	DP	23	700	0	X			25-12201	0
7493	CP					800	TRS	81/09/24	SED	STK	19S.32E.08.22411	3644.00	DP	24	700	73		282		25-12201	0
7494	CP					800	TRS	85/03/13	SED	STK	19S.32E.08.22411	3644.00	DP	16	655	62		0385		25-12201	0
7495	CP	00640		TH	00001	0	TRS	82/02/10	CEC	EXP	19S.32E.19.224431	0.00	BLR250	45	0	0	X	0186	P		0
7496	CP	00639		TH	00002	0	TRS	82/02/12	CEC	EXP	19S.32E.20.134423	0.00	BLR350	75	0	0	X	0186	P		0
7497	CP	00071				850	TRS	63/02/15	CEC	DND	19S.33E.18.133223	3635.00	DP	312	0	0	X	1084	P	25-12202	0
7498	CP					100	GAL	76/08/11	CEC	DOM	19S.33E.26.42221	3608.00	DP	266	0	0	X	0279		25-12194	0
7499	CP					100	GAL	78/01/16	CEC	STK	19S.33E.26.42221	3608.00	DP	326	0	0	X	1084	P	25-12194	0
7500	CP					101	GAL	65/11/17	SED	STK	19S.33E.26.422221	3608.00	YT	298	2560	57				25-12195	0
7501	CP					101	GAL	72/09/25	USE	DOM	19S.33E.26.422221	3609.00	DP	280	2490	0	X	0279	U	25-12195	0
7502	CP					101	GAL	76/08/20	SED	STK	19S.33E.26.422221	3608.00	DP	289	2807	66				25-12195	0
7503	CP					101	GAL	76/10/08	SED	STK	19S.33E.26.422221	3608.00	YT	306	2610	66				25-12195	0
7504	L					0	TOG	79/10/23	SED	STK	19S.34E.03.41213	3968.00	DP	20	504	67				25-12201	0
7505	L					0	TOG	84/07/16	SED	STK	19S.34E.03.41213	3968.00	DP	26	499	0		1084		25-12201	0
7506	CP					33	GAL	58/12/09	SED	STK	19S.34E.09.24231	3890.00	DP	560	4660	0	X		U	25-12202	0
7507	CP					33	GAL	79/10/16	SED	STK	19S.34E.09.24231	3980.00	DP	238	2514	65		0683		25-12202	0

XII

I, George R.S. Buehler, affirm Anadarko's geological and engineering departments have reviewed the available geological and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

Affirmed this day October 14, 1991

By George R.S. Buehler
Staff Production Engineer

WELLSITE SURFACE OWNER AND OFFSET OPERATORS TO EXXON FEDERAL SWD NO. 1

Surface Owner

USA
Carlsbad Resource Area
P. O. Box 1778
Carlsbad, New Mexico 88220

Offset Operators

19S-33E

Sec. 18 SW/4 SW/4 (Lot 4)
Centenial
Box 1837
Roswell, New Mexico 88202

Sec. 18 Lot 3, E/2 SW/4, SE/4 and E/2 NE/4 Sec. 19
Francis H. Hudson
616 Texas Street
Fort Worth, Texas 76102

Delmar H. Lewis
616 Texas Street
Fort Worth, Texas 76102

Edward R. Hudson, Jr.
1000 First National Bldg.
Fort Worth, Texas 76102

Sec. 19 Lot 1 & 2 W/2 NE/4 & E/2 NW/4 and SE/4 SE/4 Sec. 13-19S-32E
Exxon Company, USA
P. O. Box 1600
Midland, Texas 7902-1600

Sec. 19 Lots 3 & 4, E/2 SW/4 & SE/4
Firo Corporation
P. O. Box 8148
Roswell, New Mexico 88202

Partco, Inc.
P. O. Drawer R
Artesia, New Mexico 88210

Edward R. Hudson
616 Texas Street
Fort Worth, Texas 76102

William A. Hudson
616 Texas Street
Fort Worth, Texas 76102

XIII
(Continued)

WELLSITE SURFACE OWNER AND OFFSET OPERATORS TO EXXON FEDERAL SWD NO. 1

Harvey E. Yates Co.
P. O. Box 1933
Roswell, New Mexico 88202

19S-32E

Sec. 24 NE/4
Anadarko Petroleum Corporation
P. O. Box 2497
Midland, Texas 79702

AFFIDAVIT OF PUBLICATION

State of New Mexico,
County of Lea.

I, Kathi Bearden

of the Hobbs Daily News-Sun, a daily newspaper published at Hobbs, New Mexico, do solemnly swear that the clipping attached hereto was published once a week in the regular and entire issue of said paper, and not a supplement thereof for a period

of

One weeks.
Beginning with the issue dated

Oct. 1, 1991
and ending with the issue dated

Oct. 1, 1991

Kathi Bearden
General Manager
Sworn and subscribed to before

me this 8 day of

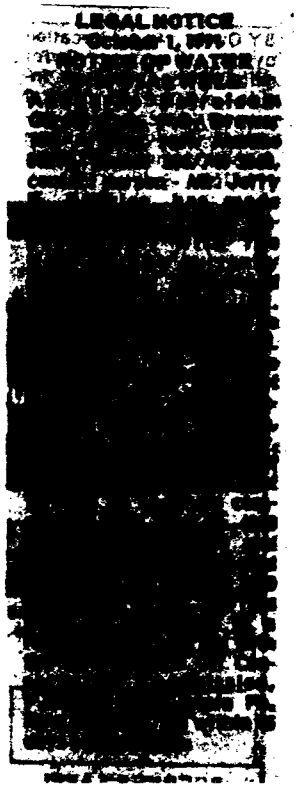
Oct, 1991

Paula Parrish
Notary Public.

My Commission expires

Aug. 5, 1995
(Seal)

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.



ILLEGIBLE

18

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Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and addressee's address. 2. ☐ Restricted Delivery (Extra charge)

3. Article Addressed to:
USA
Carlsbad Resource Area
P O Box 1778
Carlsbad New Mexico 88220

4. Article Number
P-567 722 899

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Address
X

6. Signature – Agent
X Betty Hill

7. Date of Delivery
OCT 15 1991

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

CARLSBAD NM USPO

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

P-567 722 899
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to USA
Carlsbad Resource Area
Street and No.
P O Box 1778
P.O. State and ZIP Code
Carlsbad New Mexico 88220

Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	2.98
Postmark or Date	

PS Form 3800, June 1985 U.S.G.P.O. 1985-506

Fold at line over top of envelope to the right

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

3. Article Addressed to:
Centenial
Box 1837
Roswell New Mexico 88202

4. Article Number
P-567 722 900

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

Always obtain signature of addressee and DATE DELIVERED.

5. Signature – Address
X

6. Signature – Agent
X

7. Date of Delivery

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

ROSWELL NM 88201

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

P-567 722 900
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to Centenial
Street and No. Box 1837
P.O. State and ZIP Code Roswell New Mexico 88202

Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	2.98
Postmark or Date	

ROSWELL NM

PS Form 3800, June 1985 U.S.G.P.O. 1985-506

ILLEGIBLE

19

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

3. Article Addressed to:
Francis H Hudson
616 Texas Street
Fort Worth Texas 76102

4. Article Number
P-567 722 901

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X Clarke

7. Date of Delivery OCT 17 1981

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

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

P-567 722 901

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to	Francis H Hudson
Street and No	616 Texas Street
P.O. State and ZIP Code	Fort Worth Texas 76102
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	

PS Form 3800, June 1985 U.S.G.P.O. 153-606

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

3. Article Addressed to:
Delmar H Lewis
616 Texas Street
Fort Worth Texas 76102

4. Article Number
P-567 722 902

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery OCT 17 1981

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

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

P-567 722 902

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to	Delmar H Lewis
Street and No	616 Texas Street
P.O. State and ZIP Code	Fort Worth Texas 76102
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	

PS Form 3800, June 1985 U.S.G.P.O. 153-606

Fold at line over top of envelope to the right of the return address

ILLEGIBLE

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

3. Article Addressed to:

Edward R. Hudson Jr
616 Texas Street
Fort Worth, Texas 76102

4. Article Number
P 143 463 010

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery
OCT 23 1991

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

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

P 143 463 010

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Edward R. Hudson Jr
616 Texas Street
Fort Worth, Texas 7610

	.98
	1.00
	1.00
Postmark	2.98

PS Form 3800, June 1988

DOWNTOWN STA. FT. WORTH, TX OCT 23 1991 USPS

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

3. Article Addressed to:

Exxon Company USA
P O Box 1600
Midland Texas 79702-1600

4. Article Number
P-567 722 904

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery
OCT 14 1991

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

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

ILLEGIBLE

P-567 722 904

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

Sent to Exxon Company USA	
Street and No. P O Box 1600	
P.O. State and ZIP Code Midland Texas 79702	
Postage	$ .98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, & Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark	

PS Form 3800, June 1985

MIDLAND TX OCT 14 1991 USPS

U.S.G.P.O. 153-606

21

Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and addressee's address. (Extra charge)
2. ☐ Restricted Delivery (Extra charge)

3. Article Addressed to:
Firo Corporation
P O Box 8148
Roswell New Mexico 88202

4. Article Number
P-567 722 905

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Address
X Teresa McDonald

6. Signature – Agent
X Wilma

7. Date of Delivery
10/1?

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

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

P-567 722 905
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Firo Corporation	
Street and No. P O Box 8148	
P.O., State and ZIP Code Roswell New Mexico 88202	
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	

MIDLAND, TX DOWNTOWN USPO OCT 1 1991

PS Form 3800, June 1985 U.S.G.P.O. 153-506

Fold at line over top of envelope ... of the return ad...

P-567 722 906
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Partco Inc	
Street and No. P O Drawer R	
P.O., State and ZIP Code Artesia New Mexico 88210	
Postage	$ .98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$ 2.98
Postmark or Date	22

MIDLAND, TX DOWNTOWN USPO OCT 1 1991

PS Form 3800, June 1985 U.S.G.P.O. 153-506

The copy of the permit sent to Partco, Inc. was returned by the postal service marked (ATTEMPTED NOT KNOWN). Anadarko attempted to locate Partco, Inc. through both the Artesia City Hall and the Artesia Chamber of Commerce. Anadarko believes Partco, Inc. no longer exists.

ILLEGIBLE

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

3. Article Addressed to:
William A. Hudson
616 Texas Street
Fort Worth, Texas 76102

4. Article Number
P 143 463 011

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Address
X

6. Signature – Agent
X

7. Date of Delivery
OCT 23 1991

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

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

P 143 463 011

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

William A. Hudson

616 Texas Street

Fort Worth, Texas 7610

	.98
	1.00
	1.00
	2.98

PS Form 3800, June 1985

DOWNTOWN STA. TX OCT 23 1991 USPO

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

3. Article Addressed to:
Harvey E Yates
P O Box 1933
Roswell New Mexico 88202

4. Article Number
P-576 722 914

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Address
X

6. Signature – Agent
X

7. Date of Delivery
10-15-91

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

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

P-567 722 914

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
See Reverse

U.S.G.P.O. 153-606

Sent to: Harvey E Yates	
Street and No. P O Box 1933	
P.O. State and ZIP Code: Roswell New Mexico 88202	
Postage	.98
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	2.98
Postmark or Date	23

PS Form 3800, June 1985

Fold at line over top of envelope to the right of the return address.

ILLEGIBLE

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

10-29-91

BRUCE KING
GOVERNOR

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88241-1980
(505) 393-6161

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

RE: Proposed:
MC_____
DHC_____
NSL_____
NSP_____
SWD X
WFX_____
PMX_____

Gentlemen:

I have examined the application for the:

Anadarko Pet Corp. (Hudson & Hudson) Saunders A #1-C 19-19-33
Operator Lease & Well No. Unit S-T-R

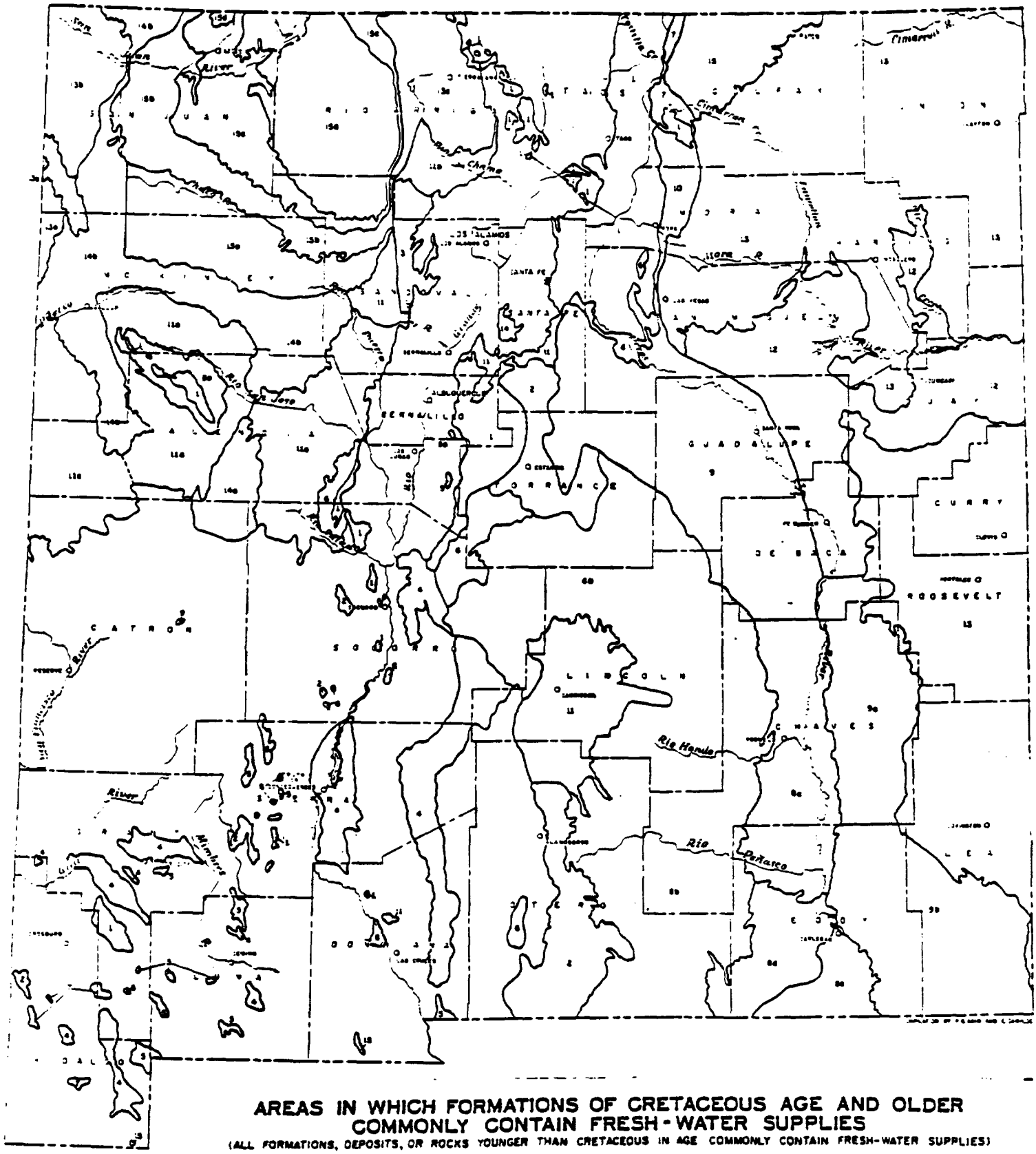
and my recommendations are as follows:

NORMALLY OUTSIDE WATER IS NOT DISPOSED OF INTO CAPITAN REEF, BUT IN THIS AREA THE REEF WATER MAYBE BAD.

Yours very truly,

Jerry Sexton
Supervisor, District 1

/ed



AREAS IN WHICH FORMATIONS OF CRETACEOUS AGE AND OLDER COMMONLY CONTAIN FRESH-WATER SUPPLIES

(ALL FORMATIONS, DEPOSITS, OR ROCKS YOUNGER THAN CRETACEOUS IN AGE COMMONLY CONTAIN FRESH-WATER SUPPLIES)

EXPLANATION

1. Precambrian through Pennsylvanian
2. Precambrian through Permian
3. Precambrian through Triassic
4. Precambrian through Cretaceous
5. Cambrian through Cretaceous
6. Pennsylvanian through Permian
7. Pennsylvanian through Cretaceous
8. Permian
   - 8a — 400 ft. ± San Andres ls.
   - 8b — 1000 ft. ± San Andres ls.
   - 8c — 500 San Andres ls. ± upper fm.
   - 8d — San Andres ls. & Artesia fm. ± Guadalupe Series
   - 8e — Capitan ls. & Bernal fm. ± Rustler fm.
9. Permian through Triassic
   - 9a — Seven River fm. ± Triassic
   - 9b — Rustler fm. ± Triassic
10. Permian through Jurassic
11. Permian through Cretaceous
    - 11a — Todilto fm. ± Morrison fm.
    - 11b — Cutler fm. ± Morrison fm.
    - 11c — Glorieta ss. ± Morrison fm.
12. Triassic through Jurassic
13. Triassic through Cretaceous
    - 13a — Triassic ± Morrison fm.
    - 13b — Triassic ± Point Lookout ss.
    - 13c — Triassic ± Lewis sh.
14. Jurassic through Cretaceous
    - 14a — Morrison fm. ± Point Lookout ss.
    - 14b — Morrison fm. ± Mesaverde gp.
15. Cretaceous
    - 15a — Point Lookout ss. ± Cliff House ss.
    - 15b — Cliff House ss. ± McDermott fm.
    - 15c — Lewis sh. ± Ojo Alamo ss.
    - 15d — San Jose fm.

NOTE: THIS MAP IS AN INTEGRAL PART OF A STATE ENGINEER OFFICE MEMORANDUM DATED APRIL 10, 1957 FROM CHIEF, HYDROLOGY SECTION, U.S.G.S. (RIO) TO CHIEF, WATER RIGHTS DIVISION, (F.E. PREV) REGARDING DESIGNATION OF FRESH-WATER SUPPLIES TO BE PROTECTED.