

Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:
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ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

**NEW MEXICO OIL CONSERVATION DIVISION**  
 - Geological & Engineering Bureau -  
 1220 South St. Francis Drive, Santa Fe, NM 87505



**ADMINISTRATIVE APPLICATION CHECKLIST**

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

**Applicant:** Apache Corporation **OGRID Number:** 873  
**Well Name:** North Monument G/SA Unit 012 **API:** 30-025-05664  
**Pool:** Eunice - Monument; Grayburg - San Andres **Pool Code:** 23000

**SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED BELOW**

1) **TYPE OF APPLICATION:** Check those which apply for [A]

A. Location - Spacing Unit - Simultaneous Dedication

☐ NSL ☐ NSP (PROJECT AREA) ☐ NSP (PRORATION UNIT) ☐ SD

B. Check one only for [ I ] or [ II ]

[ I ] Commingling - Storage - Measurement

☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[ II ] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery

☒ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

2) **NOTIFICATION REQUIRED TO:** Check those which apply.

- A. ☒ Offset operators or lease holders  
 B. ☒ Royalty, overriding royalty owners, revenue owners  
 C. ☒ Application requires published notice  
 D. ☒ Notification and/or concurrent approval by SLO  
 E. ☐ Notification and/or concurrent approval by BLM  
 F. ☒ Surface owner  
 G. ☒ For all of the above, proof of notification or publication is attached, and/or,  
 H. ☐ No notice required

**FOR OCD ONLY**

☐ Notice Complete  
☐ Application Content Complete

3) **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

**Note: Statement must be completed by an individual with managerial and/or supervisory capacity.**

Brian Wood

12-8-22

Date

Print or Type Name

*Brian Wood*

505 466-8120

Phone Number

brian@permitswest.com

e-mail Address

Signature

FORM C-108  
Revised June 10, 2003



Side 2

## 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 the 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, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

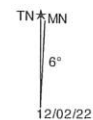
NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

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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.



EXHIBIT A

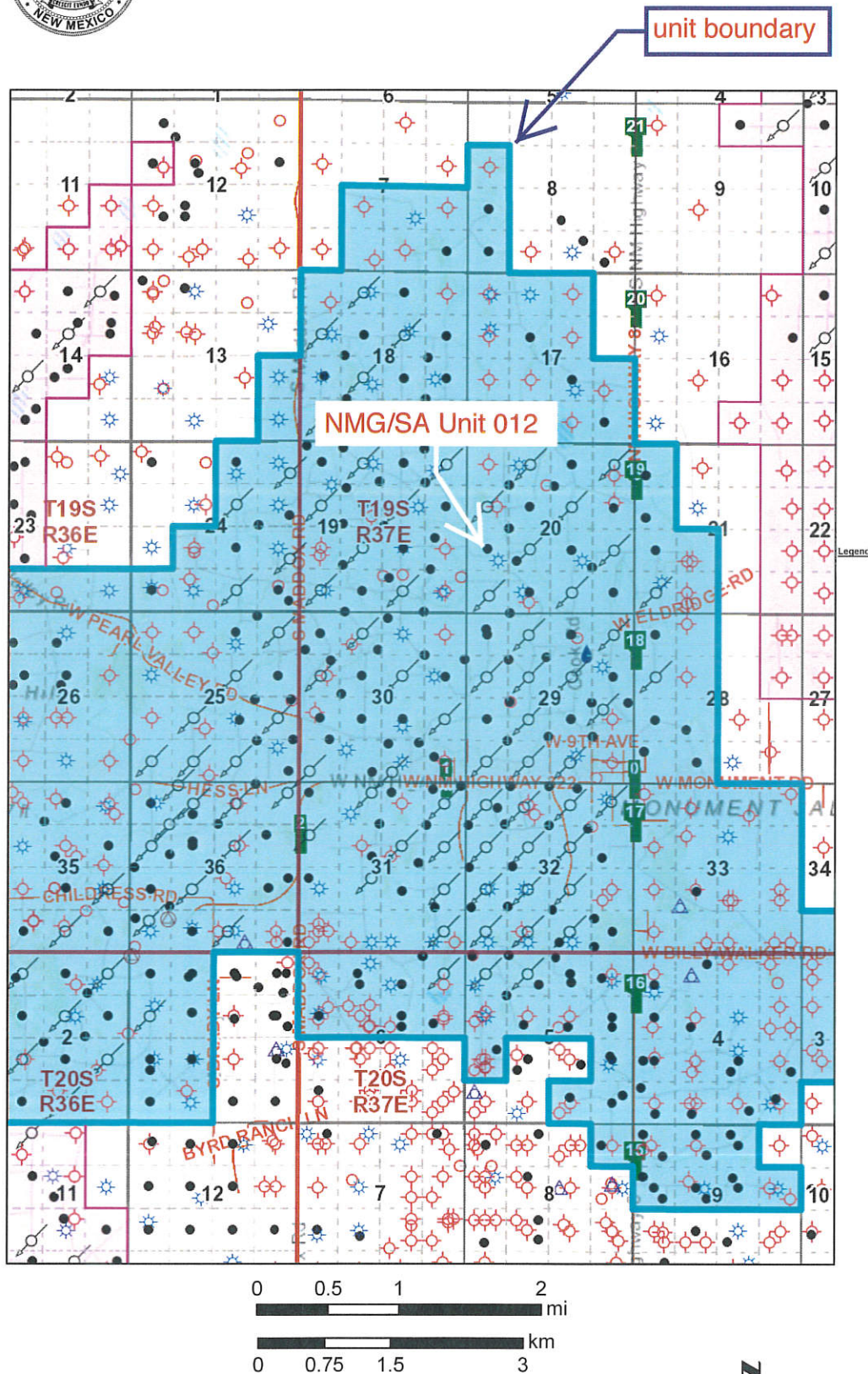






## New Mexico State Land Office

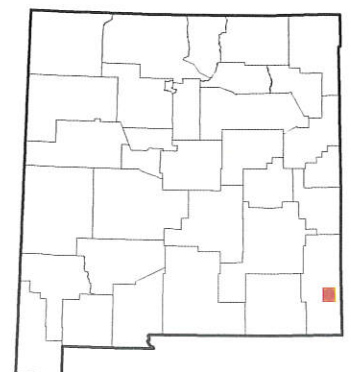
EXHIBIT A



## Disclaimer:

The New Mexico State Land Office assumes no responsibility or liability for, or in connection with the accuracy, reliability or use of the information provided herein with respect to State Land Office data or data from other sources.

Data pertaining to New Mexico State Trust Lands are provisional and subject to revision, and do not constitute an official record of title. Official records may be reviewed at the New Mexico State Land Office in Santa Fe, New Mexico.





# INJECTION WELL DATA SHEET

Side 1

OPERATOR: APACHE CORPORATION

WELL NAME & NUMBER: NORTH MONUMENT G/SA UNIT 012

WELL LOCATION: 1980' FSL & 660' FWL      L      20      19 S      37 E  
 FOOTAGE LOCATION      UNIT LETTER      SECTION      TOWNSHIP      RANGE

## WELLBORE SCHEMATIC

## WELL CONSTRUCTION DATA

### Surface Casing

Hole Size: 17.5"      Casing Size: 12.5"  
 Cemented with: 250 sx.      *or* \_\_\_\_\_ ft<sup>3</sup>  
 Top of Cement: SURFACE      Method Determined: CALC.

### Intermediate Casing

Hole Size: 11.75"      Casing Size: 9.625"  
 Cemented with: 800 sx.      *or* \_\_\_\_\_ ft<sup>3</sup>  
 Top of Cement: SURFACE      Method Determined: CALC.

### Production Casing

Hole Size: 8.75"      Casing Size: 7"  
 Cemented with: 400 sx.      *or* \_\_\_\_\_ ft<sup>3</sup>  
 Top of Cement: 1266'      Method Determined: CALC.  
 Total Depth: 3965'

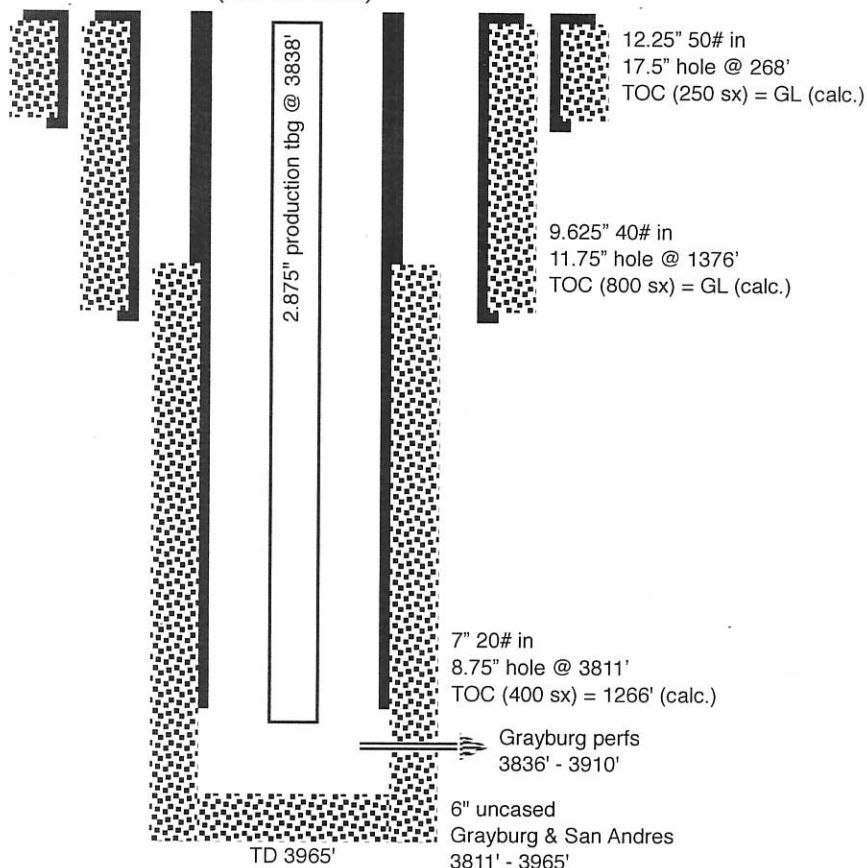
### Injection Interval

3792 feet to 3910'

(Perforated or Open Hole; indicate which)

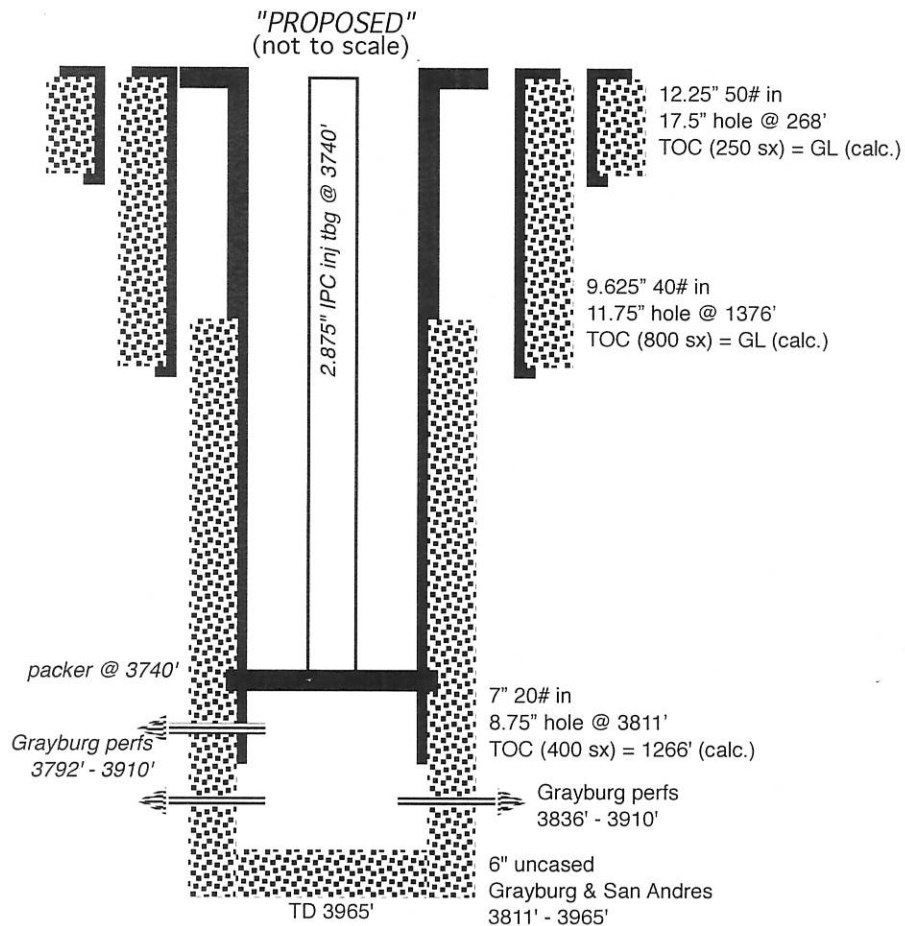
■■■■■■■■■■ ■■■■■■■■■■

"AS IS"  
(not to scale)





## INJECTION WELL DATA SHEET

OPERATOR: APACHE CORPORATIONWELL NAME & NUMBER: NORTH MONUMENT G/SA UNIT 012WELL LOCATION: 1980' FSL & 660' FWL  
FOOTAGE LOCATIONL  
UNIT LETTER20  
SECTION19 S  
TOWNSHIP37 E  
RANGEWELLBORE SCHEMATICWELL CONSTRUCTION DATASurface CasingHole Size: 17.5" Casing Size: 12.5"Cemented with: 250 sx. *or* \_\_\_\_\_ ft<sup>3</sup>Top of Cement: SURFACE Method Determined: CALC.Intermediate CasingHole Size: 11.75" Casing Size: 9.625"Cemented with: 800 sx. *or* \_\_\_\_\_ ft<sup>3</sup>Top of Cement: SURFACE Method Determined: CALC.Production CasingHole Size: 8.75" Casing Size: 7"Cemented with: 400 sx. *or* \_\_\_\_\_ ft<sup>3</sup>Top of Cement: 1266' Method Determined: CALC.Total Depth: 3965'Injection Interval3792 feet to 3910'

(Perforated or Open Hole; indicate which)



INJECTION WELL DATA SHEETTubing Size: 2.875" J-55 6.4# Lining Material: INTERNAL PLASTIC COATType of Packer: LOCK SET INJECTIONPacker Setting Depth: 3740'

Other Type of Tubing/Casing Seal (if applicable): \_\_\_\_\_

Additional Data

1. Is this a new well drilled for injection? \_\_\_\_\_ Yes XXX No

If no, for what purpose was the well originally drilled? GRAYBURG OIL WELL

2. Name of the Injection Formation: GRAYBURG
3. Name of Field or Pool (if applicable): EUNICE-MONUMENT; GRAYBURG-SAN ANDRES (POOL #23000)

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. \_\_\_\_\_ NO

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: \_\_\_\_\_

OVER: YATES (2605'), SEVEN RIVERS (2855'), & QUEEN (3375')UNDER: SAN ANDRES (3926')




# Affidavit of Publication

EXHIBIT K

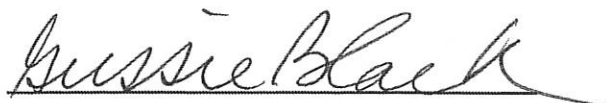
STATE OF NEW MEXICO  
COUNTY OF LEA

I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

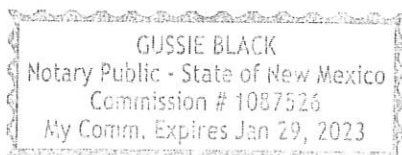
Beginning with the issue dated  
November 17, 2022  
and ending with the issue dated  
November 17, 2022.

  
Publisher

Sworn and subscribed to before me this  
17th day of November 2022.

  
Business Manager

My commission expires  
January 29, 2023  
(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

## LEGAL NOTICE November 17, 2022

Apache Corporation is applying to convert the North Monument G/SA Unit 12 oil well to a water injection well. The well, API 30-025-05664, is at 1980 FSL & 660 FWL, Sec. 20, T. 19 S., R. 37 E., Lea County, NM. This is 1.6 miles NW of the Monument, NM Post Office. Water will be injected at a maximum pressure of 729 psi into the Grayburg formation from 3645' to 3926'. Maximum injection rate will be 700 bwpd. Interested parties must file objections or requests for hearing with the NM Oil Conservation Division, 1220 South Saint Francis Dr., Santa Fe, NM 87505 or ocd.engineer@state.nm.us within 15 days. NMOCD Engineering Bureau phone is 505 476-3441. Additional information can be obtained by contacting: Brian Wood, Permits West, Inc., 37 Verano Loop, Santa Fe, NM 87508. Phone number is (505) 466-8120.  
#00273240

02108485

00273240

BRIAN WOOD  
PERMITS WEST  
37 VERANO LOOP  
SANTA FE, NM 87508





December 5, 2022

Jimmie & Betty Cooper  
P. O. Box 36  
Monument NM 88265

**TYPICAL NOTICE**

Apache Corporation is planning (see attached application) to convert its North Monument G/SA Unit 012 oil well (30-025-05664) to a water injection well. As required by NM Oil Conservation Division (NMOCD) Rules, I am notifying you of the following proposal. This letter is a notice only. No action is needed unless you have questions or objections.

Well Name: North Monument G/SA Unit 012 (fee lease)      ID: 3965'  
Proposed Injection Zone: Grayburg from 3792' to 3910'  
Where: 1980' FSL & 660' FWL Sec. 20, T. 19 S., R. 37 E., Lea County, NM  
Approximate Location: 1.6 miles NW of the Monument, NM Post Office  
Applicant Name: Apache Corporation      (432) 818-1088  
Applicant's Address: 303 Veterans Airpark Lane, #3000, Midland, TX 79705

Submittal Information: Application for a water injection well will be filed with the NMOCD. If you have an objection, or wish to request a hearing, then it must be filed with the NMOCD within 15 days of receipt of this letter. The NMOCD Engineering Bureau address is 1220 South St. Francis Dr. Santa Fe, NM 87505. Phone number is (505) 476-3441. E-mail address is: ocd.engineer@state.nm.us

Please call me if you have any questions.

Sincerely,

Brian Wood



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Sent To David H Arrington Oil & Gas Inc  
500 W Wall St, Suite 300  
Midland TX 79701

Street and Apt. No., or P.O. Box No.

City, State, ZIP+4®



PS Form 3800, April 2015 PSN 7530-02-000-9047

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10103 Gutierrez Rd NE  
Albuquerque TX 87111

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Sent To Jimmi & Betty Cooper  
P.O. Box 36  
Monument NM 88265

Street and Apt. No., or P.O. Box No.

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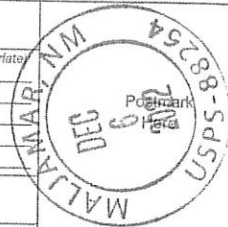
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415 W Wall St, Suite 200  
Midland TX 79701

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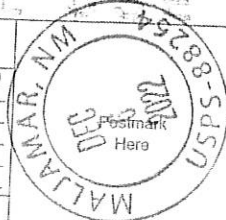
Postage

Total Postage and Fees

Sent To Empire New Mexico LLC  
2200 S Utica Place, Suite 150  
Tulsa OK 74114

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PO Box 1148  
Santa Fe NM 87504

Street and Apt. No., or P.O. Box No.

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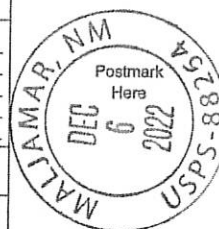
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<input type="checkbox"/> Adult Signature Required*	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$
Total Postage and Fees	\$

Sent To **Mewbourne Oil Co**  
**PO Box 5270**  
**Hobbs NM 88241**  
Street and Apt. No., or P.O. Box No. **Apache NMGSAU-612**  
City, State, ZIP+4®

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EXHIBIT L



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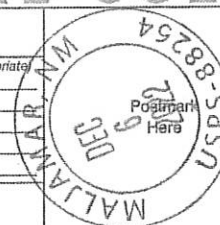
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<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$
Total Postage and Fees	\$

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**PO Box 576**  
**Houston TX 77001**  
Street and Apt. No., or P.O. Box No. **Apache NMGSAU-612**  
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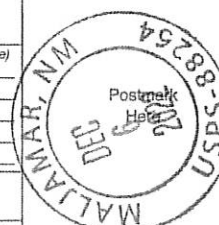
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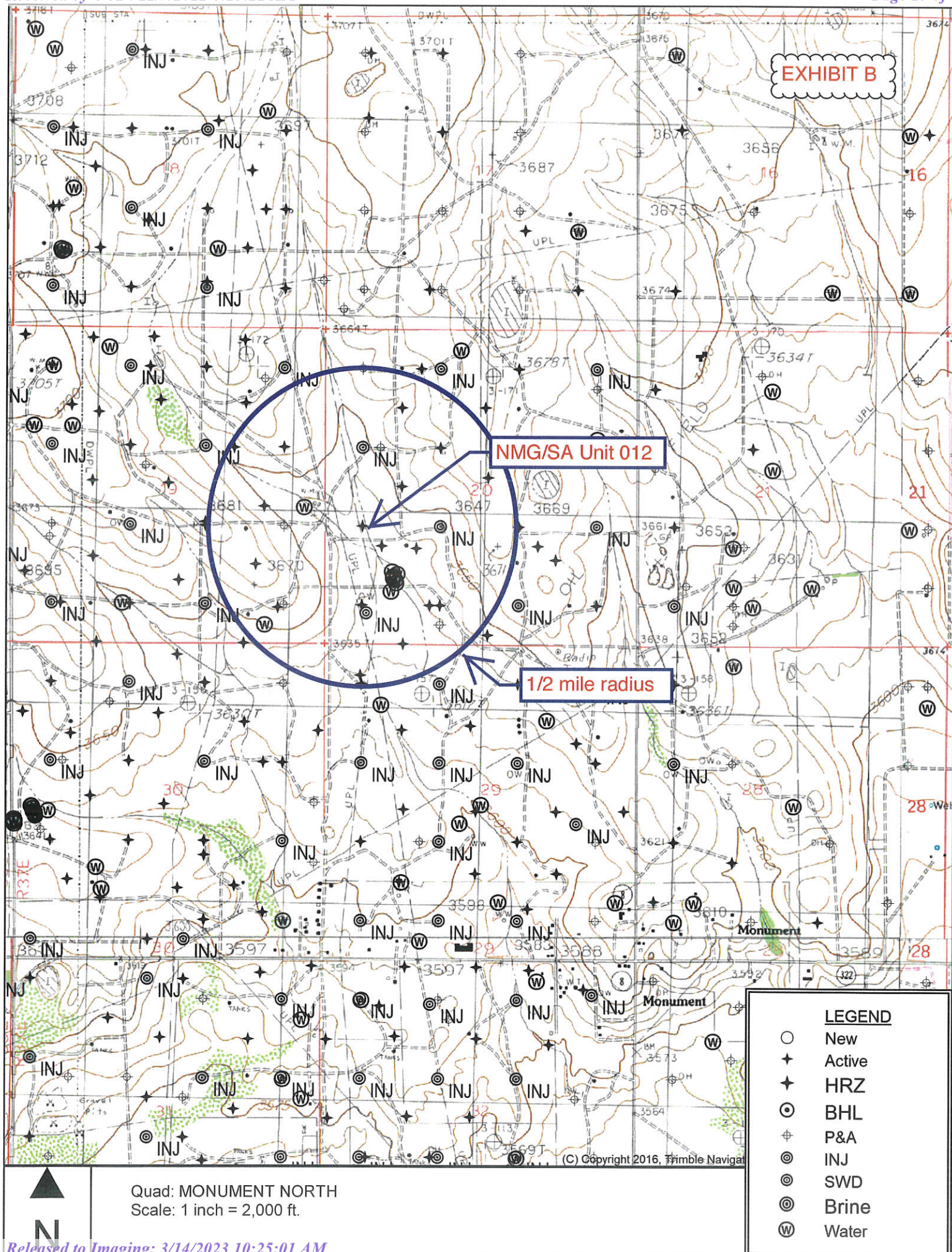
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Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$
Total Postage and Fees	\$

Sent To **Southwest Royalties**  
**PO Box 53570**  
**Midland TX 79710**  
Street and Apt. No., or P.O. Box No. **Apache NMGSAU-612**  
City, State, ZIP+4®

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## SORTED BY DISTANCE FROM NORTH MONUMENT G/SA UNIT 012

API	OPERATOR	WELL	WELL TYPE	UNIT-SECTION-T19S-R37E	TVD	ZONE @ TD	FEET FROM NMGSAU 012
3002509885	Empire New Mexico	H T Mattern 005	G	L-20	3639	Queen	471
3002541036	Apache	N Monument G/SA Unit 384	O	F-20	4100	San Andres	949
3002541038	Apache	N Monument G/SA Unit 386	O	K-20	4048	Grayburg	992
3002505654	Apache	N Monument G/SA Unit 005	I	E-20	3996	Grayburg	1316
3002505665	Apache	N Monument G/SA Unit 013	O	M-20	3942	Grayburg	1320
3002509883	Occidental	State D 002	P&A	I-19	4002	Grayburg	1324
3002505667	Apache	N Monument G/SA Unit 011	I	K-20	3982	Grayburg	1329
3002526535	Apache	State L Gas Com 003	P&A	E-20	3630	Queen	1350
3002533943	Apache	N Monument G/SA Unit 629	I	M-20	3915	Grayburg	1452
3002526214	Apache	N Monument G/SA Unit 009	O	I-19	4010	San Andres	1689
3002530916	Empire New Mexico	H T Mattern 006	G	N-20	3725	Penrose	1751
3002505649	Gulf	Graham State NCT D 002	P&A	P-19	4004	Grayburg	1865
3002505655	Apache	N Monument G/SA Unit 006	O	F-20	3995	Grayburg	1870
3002505645	Apache	N Monument G/SA Unit 008	O	H-19	4000	Grayburg	1872
3002505666	Apache	N Monument G/SA Unit 014	O	N-20	3960	Grayburg	1875
3002541037	Apache	N Monument G/SA Unit 385	O	I-19	4107	San Andres	1907
3002530332	Apache	N Monument G/SA Unit 016	G	P-19	3975	Grayburg	1972
3002541040	Apache	N Monument G/SA Unit 388	O	N-20	4068	San Andres	2094
3002541704	Apache	N Monument G/SA Unit 433	O	C-20	4000	Grayburg	2097

EXHIBIT B

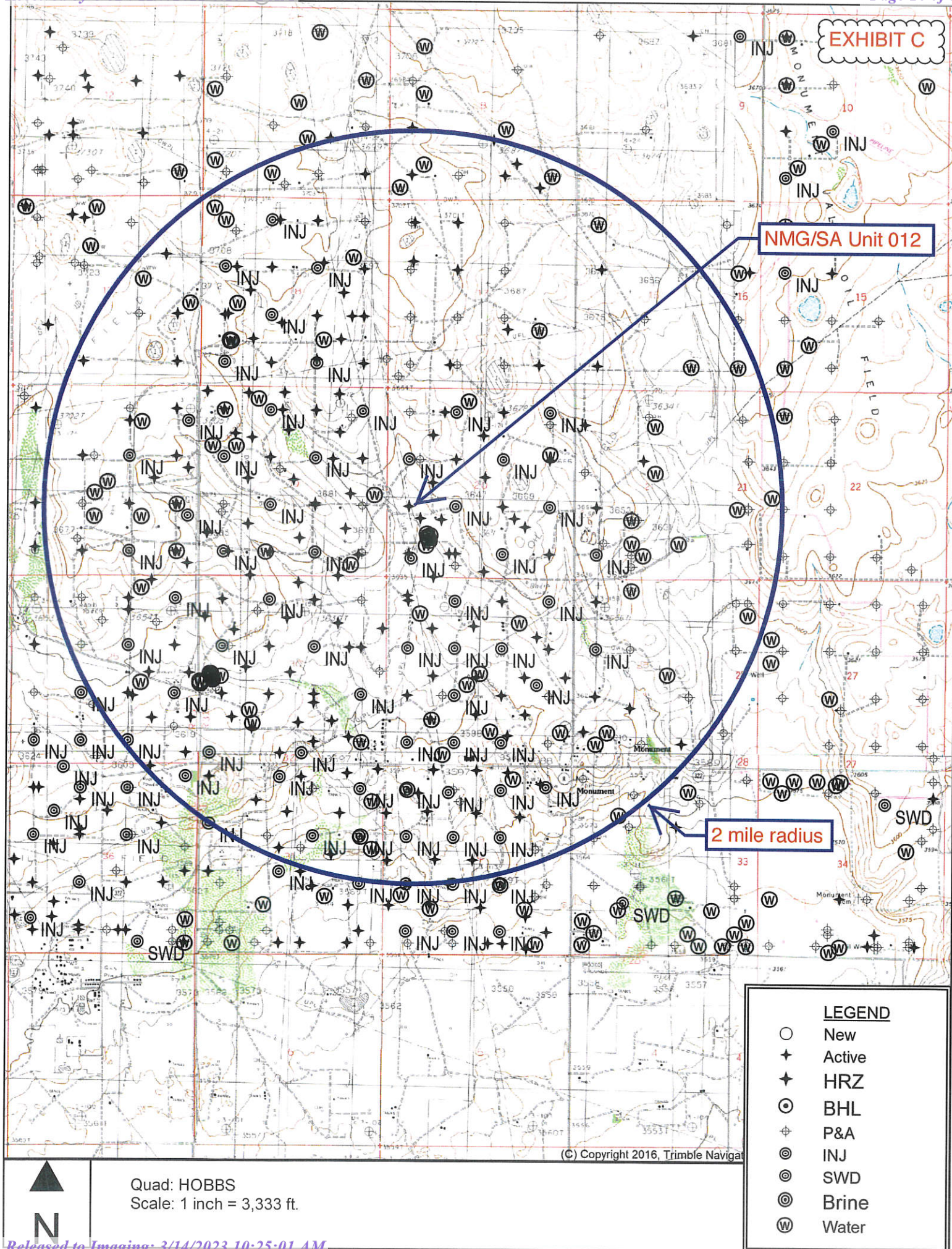


## SORTED BY DISTANCE FROM NORTH MONUMENT G/SA UNIT 012

API	OPERATOR	WELL	WELL TYPE	UNIT-SECTION-T19S-R37E	TVD	ZONE @ TD	FEET FROM NMGSAU 012
3002534770	Me-Tex	Texaco 20 001	P&A	N-20	7550	Abo	2121
3002538146	Apache	N Monument G/SA Unit 344	O	G-20	4125	San Andres	2273
3002533958	Apache	N Monument G/SA Unit 290	O	D-29	4050	Grayburg	2493
3002532961	Mulloy	B V Culp NCTA Com 014	G	G-19	3664	Grayburg	2534
3002505659	Apache	N Monument G/SA Unit 010	O	J-20	4002	Grayburg	2633
3002505668	Apache	N Monument G/SA Unit 004	P&A	D-20	3973	Grayburg	2636
3002505728	Empire New Mexico	Fred Luthy Com 002	O	D-29	3950	Grayburg	2640
3002509882	Apache	N Monument G/SA Unit 010	O	J-19	4033	San Andres	2640
3002526663	Mulloy	B V Culp NCTA Com 009	G	J-19	3800	Grayburg	2651

EXHIBIT B



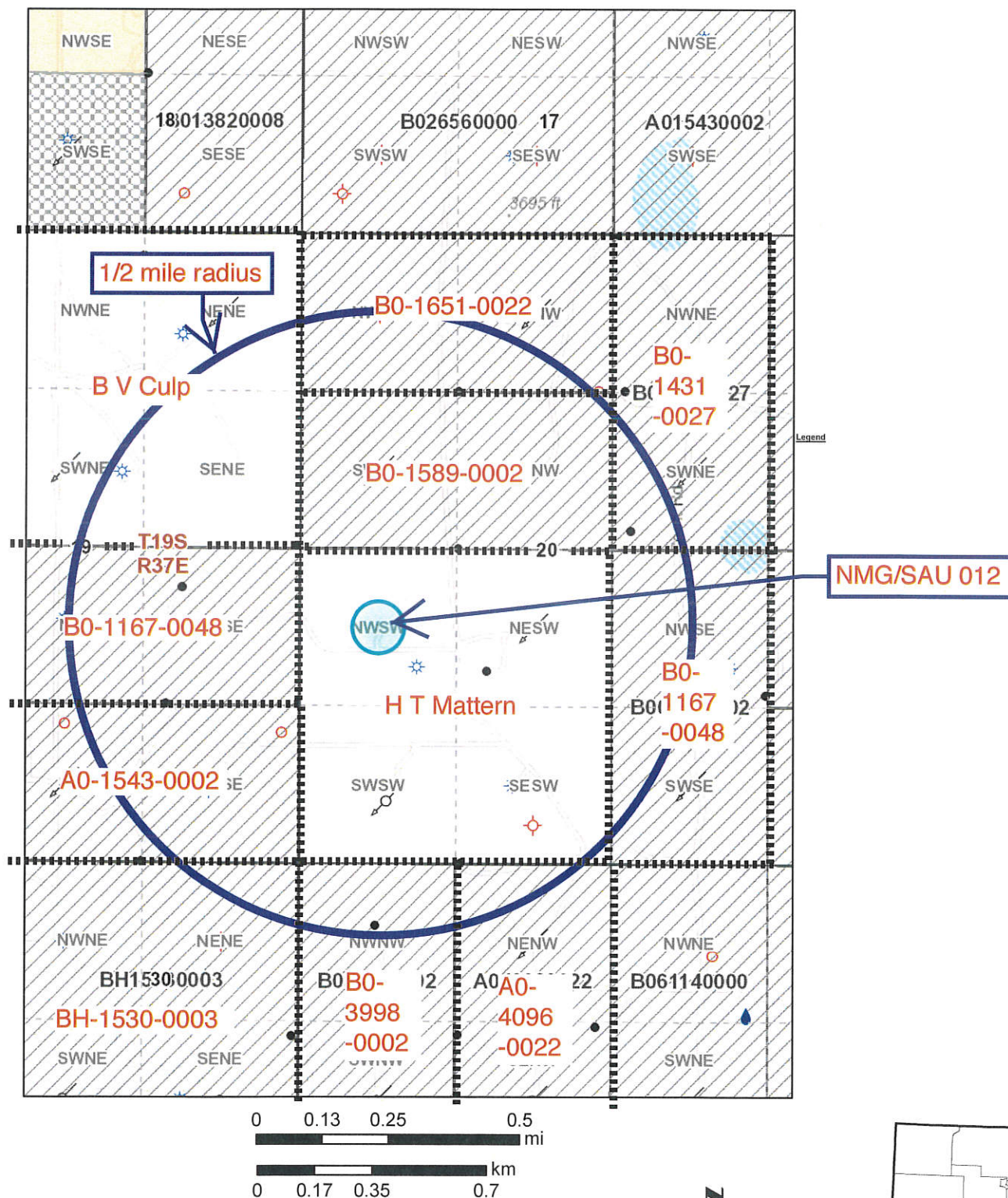






## New Mexico State Land Office

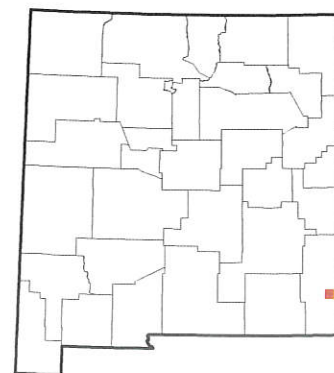
EXHIBIT D



## Disclaimer:

The New Mexico State Land Office assumes no responsibility or liability for, or in connection with the accuracy, reliability or use of the information provided herein with respect to State Land Office data or data from other sources.

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## NORTH MONUMENT G/SA UNIT 012 AREA OF REVIEW LEASES

Aliquot Parts in Area of Review (T. 19 S., R. 37 E.)	Lessor	Lease	Lessee(s) of Record	Well Operators (all zones)
E2NE4 & SWNE Sec. 19	fee	B V Culp	Apache	Apache, Arrington, Mulloy
N2SE4 Sec. 19	NMSLO	B0-1167-0048	Shell Western E&P	Apache, Arrington, Mulloy
S2SE4 Sec. 19	NMSLO	A0-1543-0002	Southwest Royalty	Apache, Arrington, Mulloy
N2NW4 Sec. 20	NMSLO	B0-1651-0022	Mewbourne	Apache, Energy Acumen
S2NW4 Sec. 20	NMSLO	B0-1589-0002	Leaco NM E&P, aka, Apache	Apache
SWNE Sec. 20	NMSLO	B0-1431-0027	Leaco NM E&P, aka, Apache	Apache
W2SE4 Sec. 20	NMSLO	B0-1167-0048	Shell Western E&P	Apache, Empire NM
SW4 Sec. 20	fee	H T Mattern	Apache	Apache, Empire NM
NENW Sec. 29	NMSLO	A0-4096-0022	Leaco NM E&P, aka, Apache	Apache
NWNW Sec. 29	NMSLO	B0-3998-0002	Southwest Royalty	Apache, Empire NM
NENE Sec. 30	NMSLO	BH-1530-0003	Leaco NM E&P, aka, Apache	Apache

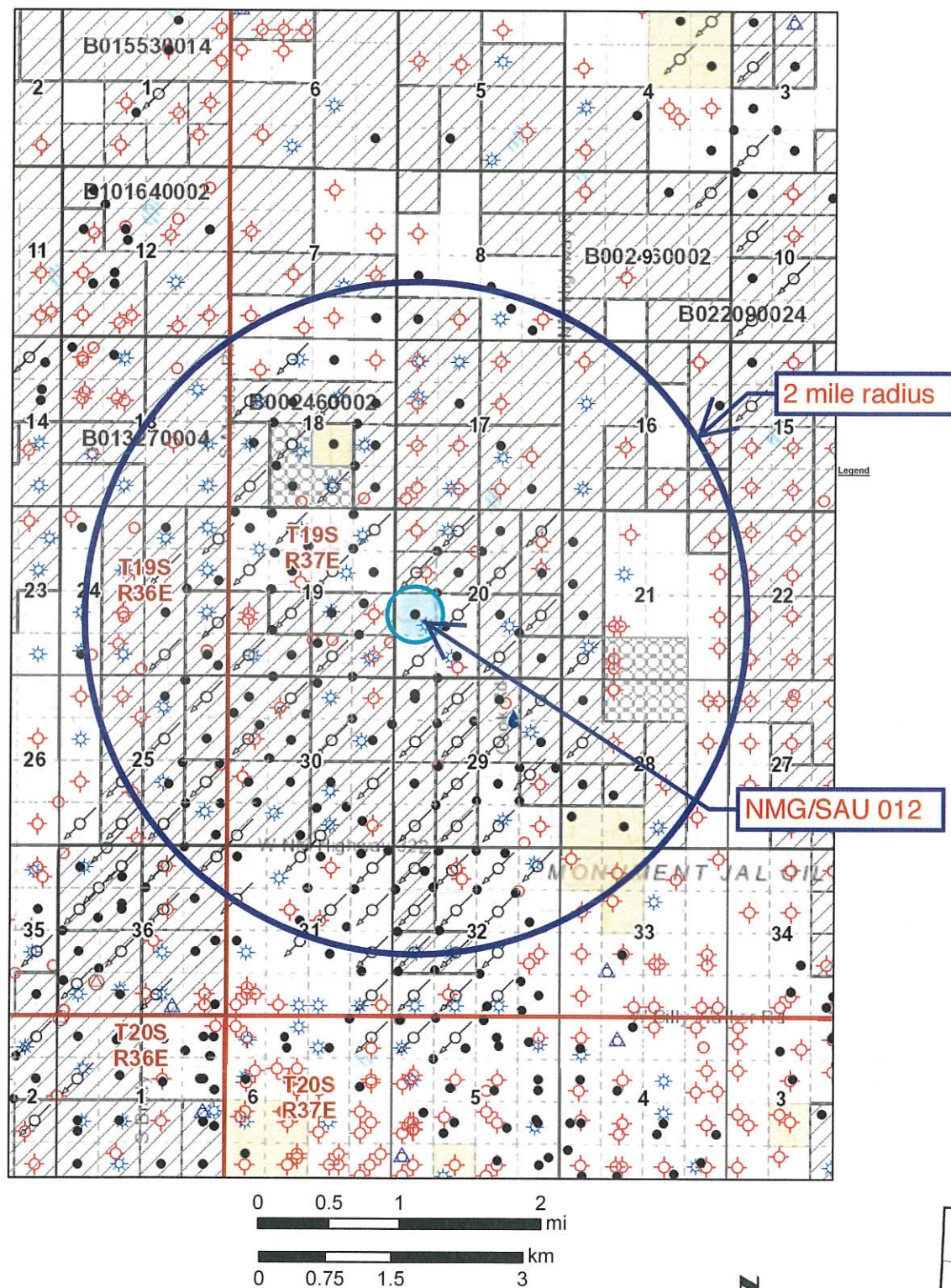
EXHIBIT D





## New Mexico State Land Office

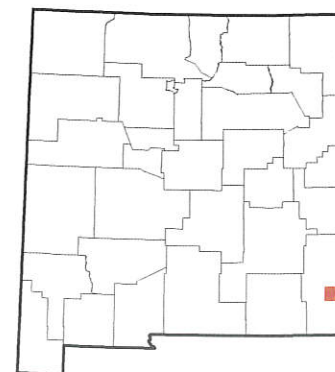
EXHIBIT E



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WELL	SPUD	TVD	POOL	TYPE WELL	HOLE O.D.	CASING O.D.	SET @	CEMENT	TOC	HOW TOC DETERMINED
N Monument G/SA Unit 384	5/24/13	4100	Eunice Monument; Grayburg-SA	O	11	8.625	1348	500 sx	GL	Circ 105 sx
3002541036					7.875	5.5	4100	790 sx	20'	CBL
F-20-19S-37E										
N Monument G/SA Unit 386	6/1/13	4048	Eunice Monument; Grayburg-SA	O	11	8.625	1333	372 sx	GL	Circ 128 sx
3002541038					7.875	5.5	4048	692 sx	40	CBL
K-20-19S-37E										
N Monument G/SA Unit 005	2/3/36	3996	Eunice Monument; Grayburg-SA	I	17.5	12.5	190	150 sx	GL	calc.
3002505654					11	9.625	2476	500 sx	726	calc.
E-20-19S-37E					8.75	7	3851	100 x	3211	calc.
N Monument G/SA Unit 013	4/6/36	3942	Eunice Monument; Grayburg-SA	O	Not reporte	15.5	266	250 sx	no report	no report
3002505665					Not reporte	9.625	1348	800 sx	no report	no report
M-20-19S-37E					Not reporte	7	3800	400 sx	no report	no report



WELL	SPUD	TVD	POOL	TYPE WELL	HOLE O.D.	CASING O.D.	SET @	CEMENT	TOC	HOW TOC DETERMINED
State D 002	3/25/36	4002	Eumont; Yates-7 Rvrs-Queen	P&A	17.5	12.5	145	120 sx	GL	Calc
3002509883					13.75	9.625	1299	350 sx	GL	Calc
I-19-19S-37E					8.75	7	3743	275 sx	1912	Calc
					6.25	5	3662 - 3962	67	3662	Circ.
N Monument G/SA Unit 011	10/27/36	3982	Eunice Monument; Grayburg-SA	I	16	13	125	125 sx	GL	Calc
3002505667					12.25	9.625	1362	600 sx	GL	Calc
K-20-19S-37E					8.625	7	3800	350 sx	1560	Calc
N Monument G/SA Unit 629	9/23/97	3915	Eunice Monument; Grayburg-SA	I	12.25	9.625	480	330 sx	GL	Circ
3002533943					8.75	7	3915	1050 sx	GL	Circ 50 sx
M-20-19S-37E										
N Monument G/SA Unit 009	9/19/79	4010	Eunice Monument; Grayburg-SA	O	12.25	9.625	403	225 sx	GL	Circ 15 bbls
3002526214					8.75	7	4010	300 sx	GL	Circ 219 sx
I-19-19S-37E										

WELL	SPUD	TVD	POOL	TYPE WELL	HOLE O.D.	CASING O.D.	SET @	CEMENT	TOC	HOW TOC DETERMINED
Graham State NCT D 002	3/28/36	4004	Eunice Monument; Grayburg-SA	P&A	13.75	10.75	256	200 sx	no report	no report
3002505649					9.875	7.625	1372	300 sx	no report	no report
P-19-19S-37E					6.75	5.5	3813	400 sx	no report	no report
N Monument G/SA Unit 006	8/26/36	4020	Eunice Monument; Grayburg-SA	O	17.5	12.5	205	200 sx	GL	Calc
3002505655					11	8.625	2545	500 sx	595	Calc
F-20-19S-37E					7.875	6.625	3866	100 sx	2976	Calc
					5.5 - 4.75	open hole	N/A	N/A	N/A	N/A
N Monument G/SA Unit 008	3/1/36	4000	Eunice Monument; Grayburg-SA	O	13.75	10.75	238	250 sx	GL	Circ
3002505645					9.875	7.625	1368	300 sx	no report	no report
H-19-19S-37E					6.75	5.5	3816	300 sx	no report	no report
N Monument G/SA Unit 014	6/23/61	3960	Eunice Monument; Grayburg-SA	O	Not reporte	12.5	247	250 sx	GL	no report
3002505666					Not reporte	9.625	1361	600 sx	GL	no report
N-20-19S-37E					Not reporte	7	3837	400 sx	GL	no report



WELL	SPUD	TVD	POOL	TYPE WELL	HOLE O.D.	CASING O.D.	SET @	CEMENT	TOC	HOW TOC DETERMINED
N Monument G/SA Unit 385	5/6/13	4107	Eunice Monument; Grayburg-SA	O	11	8.625	1310	445 sx	GL	Circ 96 sx
3002541037					7.875	5.5	4107	735 sx	GL	Circ 98 sx
I-19-19S-37E										
N Monument G/SA Unit 016	5/3/88	3975	Eunice Monument; Grayburg-SA	G	12.25	8.625	1330	850 sx	GL	Circ 163 sx
3002530332					7.875	5.5	3975	825 sx	GL	Circ 162 sx
P-19-19S-37E										
N Monument G/SA Unit 388	6/5/13	4068	Eunice Monument; Grayburg-SA	O	11	8.625	1361	520 sx	GL	Circ 141 sx
3002541040					7.875	5.5	4068	820 sx	GL	Circ 110 sx
N-20-19S-37E										
N Monument G/SA Unit 433	7/25/14	4000	Eunice Monument; Grayburg-SA	O	11	8.625	1358	460 sx	GL	Circ 3 sx
3002541704					7.875	5.5	4000	900 sx	GL	CBL
C-20-19S-37E										

WELL	SPUD	TVD	POOL	TYPE WELL	HOLE O.D.	CASING O.D.	SET @	CEMENT	TOC	HOW TOC DETERMINED
Texaco 20 001	12/4/99	7550	Wildcat; Abo	P&A	11	8.625	1349	700 sx	GL	Circ 125 sx
3002534770					7.875	open hole	N/A	N/A	N/A	N/A
N-20-19S-37E										
N Monument G/SA Unit 344	10/23/06	4125	Eunice Monument; Grayburg-SA	O	11	8.625	392	300 sx	GL	Circ
3002538146					7.875	5.5	4125	850 sx	GL	CBL
G-20-19S-37E										
N Monument G/SA Unit 290	5/30/97	4050	Eunice Monument; Grayburg-SA	O	12.25	9.625	1323	575 sx	GL	Circ 125 sx
3002533958					8.75	7	3911	725 sx	GL	Circ 33 sx
D-29-19S-37E					6.25	open hole	N/A	N/A	N/A	N/A
B V Culp NCTA Com 014	5/17/95	3664	Eumont; Yates-7Rvrs- Queen	G	11	8.625	434	250 sx	GL	Circ 17 sx
3002532961					7.875	5.5	3664	775 sx	GL	Circ 97 sx
G-19-19S-37E										



WELL	SPUD	TVD	POOL	TYPE WELL	HOLE O.D.	CASING O.D.	SET @	CEMENT	TOC	HOW TOC DETERMINED
N Monument G/SA Unit 010	12/14/36	4002	Eunice Monument; Grayburg-SA	O	17.25	13	269	275 sx	GL	no report
3002505659					12.25	9.625	1391	275 sx	no report	no report
J-20-19S-37E					8.625	7	3774	260 sx	no report	no report
					6.75	5.5	3759	25 sx	no report	no report
N Monument G/SA Unit 004	4/4/36	3973	Eunice Monument; Grayburg-SA	P&A	18	13	225	209 sx	GL	Circ
3002505668					12.25	9.625	1407	600 sx	GL	no report
D-20-19S-37E					8.75	7	3876	250 sx	2610	CBL
					6.25	open hole	N/A	N/A	N/A	N/A
Fred Luthy Com 002	4/21/36	3950	Eumont; Yates-7Rvrs-Queen	O	14.375	10.75	192	200 sx	GL	Calc
3002505728					9.75	7.625	1351	300 sx	400	Calc
D-29-19S-37E					6.75	5.5	3784	300 sx	2525	Calc

Sorted by distance from NMG/SA Unit 012

WELL	SPUD	TVD	POOL	TYPE WELL	HOLE O.D.	CASING O.D.	SET @	CEMENT	TOC	HOW TOC DETERMINED
N Monument G/SA Unit 010	2/4/36	4033	Eunice Monument; Grayburg-SA	O	17	12.5	273	150 sx	no report	no report
3002509882					12	9.625	1283	400 sx	no report	no report
J-19-19S-37E					9	7	3773	225 sx	no report	no report
B V Culp NCT A Com 009	4/5/80	3800	Eumont; Yates-7Rvrs- Queen	G	12.25	8.625	378	300 sx	GL	Circ
3002526663					7.875	5.5	3800	1050 sx	GL	Circ
J-19-19S-37E										





EXHIBIT F

Well Name: NMGSAU #0516A aka, Graham State NCT D 002

Wellbore API/UWI (10 Digits) 3002505649	Surface Legal Location P-19-19S-37E 660' FSL & 660' FEL	Field Name Monument	State/Province New Mexico
Spud Date 3/25/1936	Original KB Elevation (ft) 3,676.0	Ground Elevation (ft) 3,666.0	KB-Ground Distance (ft) 10.0
PBTD (All) (ftKB)	Total Depth (ftKB) 4,004.0	Apache Working Interest (%) 43.23	

Production, NORTH MONUMENT G/SA UNIT #0516A - Original Hole,  
11/9/2022 4:43:23 PM

## Casing Strings

Run Date	Csg Des	OD (in)	Grade	Wt/Len (lb/ft)	Top Thread	Set Depth (ftKB)
3/25/1936	Surface	10 3/4		32.00		256.00
3/25/1936	Inter 1	7 5/8		26.00		1,372.00
3/25/1936	Prod 1	5 1/2		17.00		3,813.00

## Cement

Type	Stg #	String	Top (ftKB)	Btm (ftKB)	Top Meas Meth
Casing	1	Surface, 256.00ftKB, 10 3/4	10.00	256.00	
Casing	1	Prod 1, 3,813.00ftKB, 5 1/2	10.00	3,813.00	
Casing	1	Inter 1, 1,372.00ftKB, 7 5/8	10.00	1,372.00	
Plug	1	NORTH MONUMENTG/SAUNIT#0516A-Original Hole	3,813.00	3,919.00	
Plug	1	NORTH MONUMENTG/SAUNIT#0516A-Original Hole	3,608.00	3,813.00	
Plug	1	NORTH MONUMENTG/SAUNIT#0516A-Original Hole	2,478.00	2,578.00	
Plug	1	NORTH MONUMENTG/SAUNIT#0516A-Original Hole	1,500.00	1,600.00	
Plug		NORTH MONUMENTG/SAUNIT#0516A-Original Hole	1,327.00	1,360.00	
Plug		NORTH MONUMENTG/SAUNIT#0516A-Original Hole	10.00	50.00	

## Perforations

Date	Formation	Top (ftKB)	Btm (ftKB)	Shot Dens (shots/ft)	Entered Shot Total	Com
10/1/1954		1,385	1,385			
12/1/1961		1,405	2,106		4	
10/1/1954		3,813	4,004			

## Other In Hole

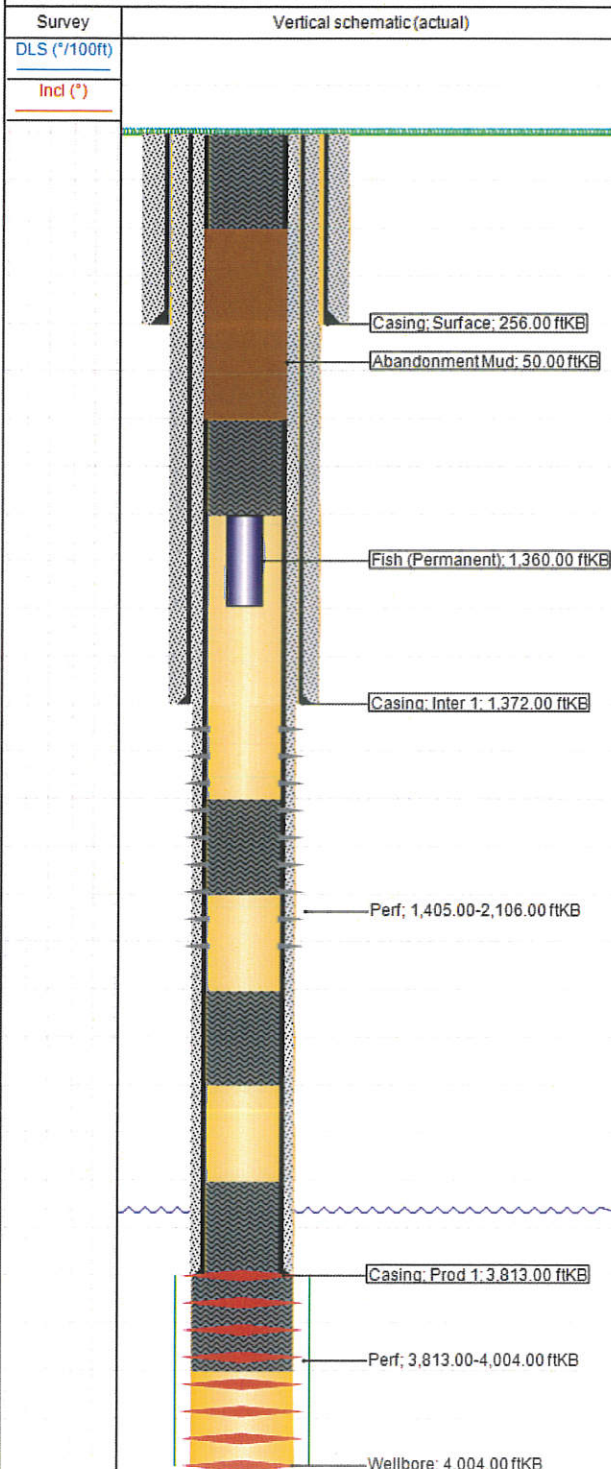
Run Date	Icon	Des	OD (in)	Top (ftKB)
2/27/1979		Abandonment Mud	5 1/2	50
2/27/1979		Fish (Permanent)	2 3/8	1,360

## Stimulation Jobs

Start Date	Com
12/26/1961	Treated OH 3813-4004' w/1000 gals 15% NEA

## Comments

Type	Com
	Well History: 10/1954: Repaired csg lk @ 52'/83' & 1028'/59' through perfs @ 1385' and cmt'd to surf, DO cmt & CO to TD. 12/1961: Repaired csg lk @ 2411, 2355, 1380' through perfs @ 2106 and 1405' (4 holes) 2/1979: P&A'd, csg parted @ 2159'



Spud: 4/4/36

## Apache Corporation – NMGSAU #004

P&amp;A'd 6/15/2010

EXHIBIT F

Date : 11/7/22

API: 30-025-05668

Surface Location

A. Murray



660' FNL & 660' FWL,  
Sec 19, T19S, R37E, Lea County, NM

**Surface Casing**  
13" 40# @ 228' w/ 225 sx to surface

**Intermediate Casing**  
9-5/8" 36# @ 1,407' w/ 600 sx

Perf @ 259'. Sqz 75 sx to surface. 6/15/2010

Spot 50 sx at 1,607'. Tag at 1,340'. 6/14/2010

Perfed casing at 1,925'. Sqz'd w/ 300 sx class c cement to surface.

Perf'd at 2,580' during p&A. Could not get PIR. Spot 30 sx @ 2,636'. Tag @ 2,475'. 6/11/2010

CIBP @ 3,732'. Spot 25 sx of cement. 6/11/2010

Perfs from 3,750'-3,873'.

**Production Casing**  
7" 24# @ 3,876' w/ 250 sxs @ 2,610'

OH from 3,866'-3,973'. Dumped 50 sx cement in OH, and DO to 3,905'. 4/15/2002.

Hole was under reamed to 7-3/4" OH in 6/1988

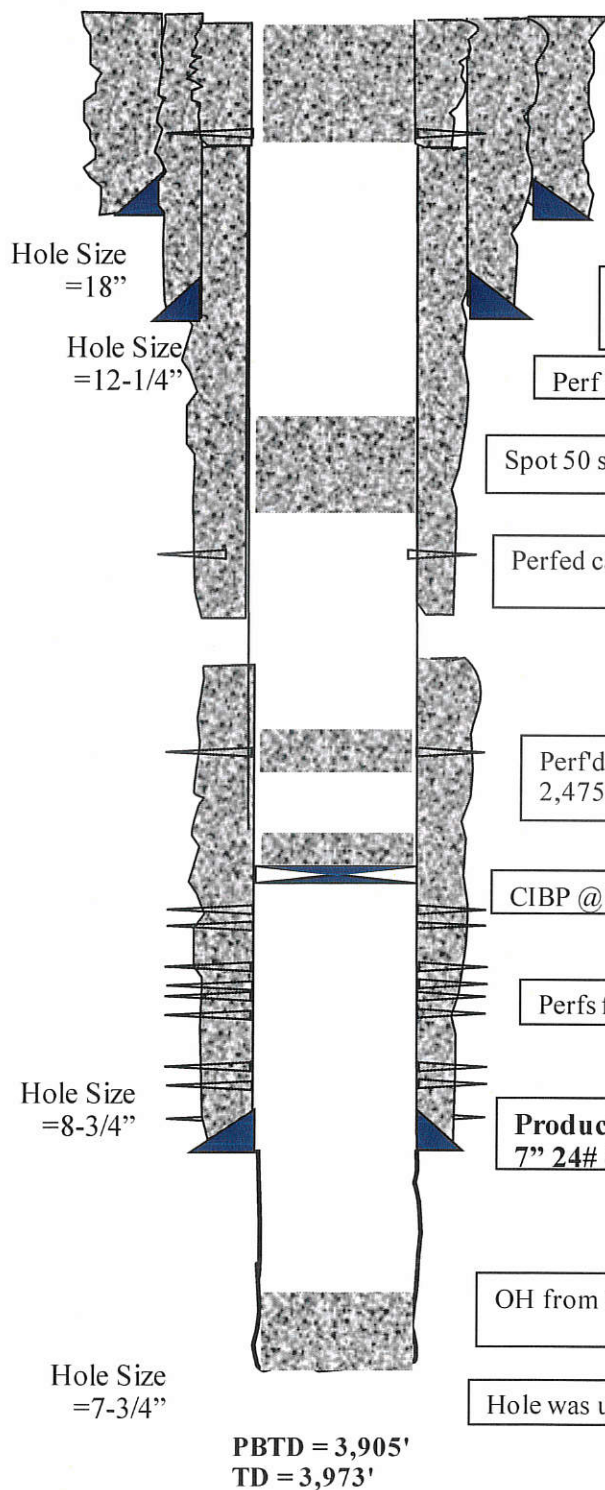




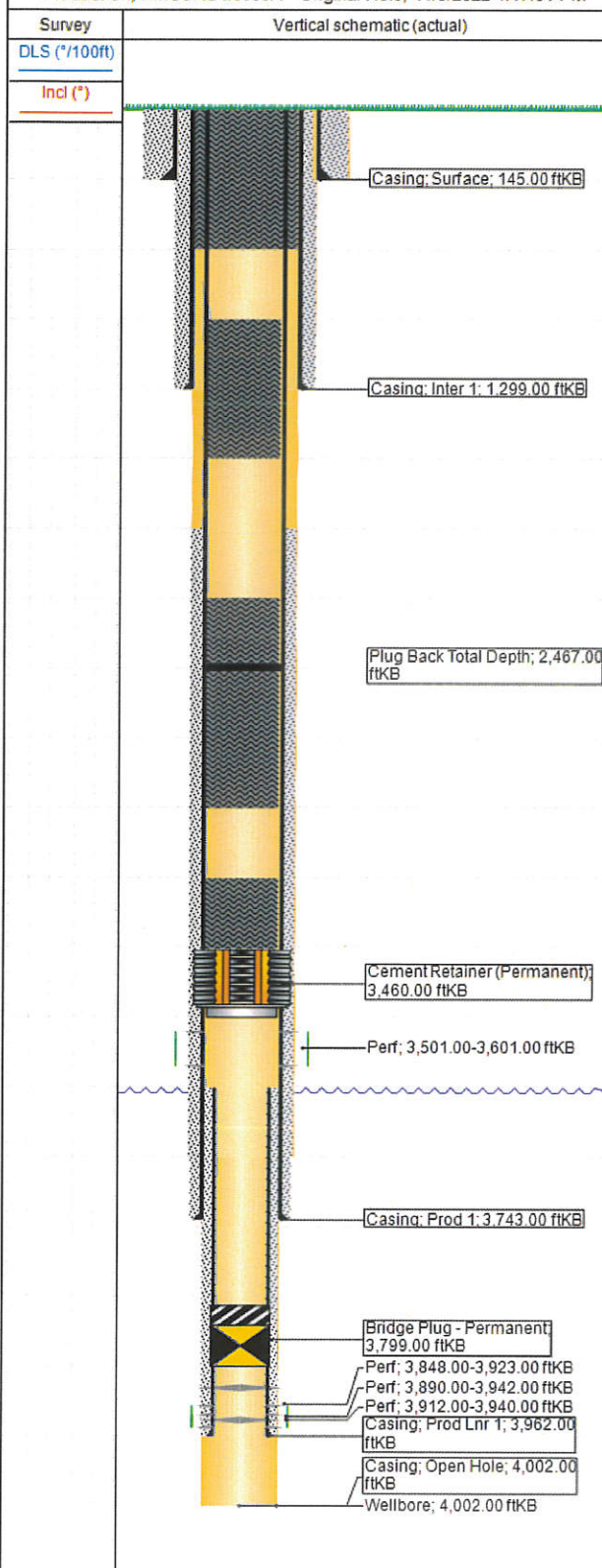


EXHIBIT F

Well Name: NMGSAU #0509A aka, State D 002

Wellbore API/UWI (10 Digits) 3002509883	Surface Legal Location I-19-19S-37E 1980 FSL 660 FEL	Field Name Eunice Monument	State/Province New Mexico
Spud Date 3/25/1936	Original KB Elevation (ft) 3,668.0	Ground Elevation (ft) 3,658.0	KB-Ground Distance (ft) 10.0
PBTD (All) (ftKB) Original Hole - 2,467	Total Depth (ftKB) 4,002.0	Apache Working Interest (%) 43.23	

Production, NMGSAU #0509A - Original Hole, 11/9/2022 4:47:01 PM



## Casing Strings

Run Date	Csg Des	OD (in)	Grade	Wt/Len (lb/ft)	Top Thread	Set Depth (ftKB)
3/25/1936	Surface	12 1/2		50.00		145.00
3/25/1936	Inter 1	9 5/8		36.00		1,299.00
3/25/1936	Prod 1	7		24.00		3,743.00
10/1/1976	Prod Lnr 1	5				3,962.00
3/25/1936	Open Hole					4,002.00

## Cement

Type	Stg #	String	Top (ftKB)	Btm (ftKB)	Top Meas Meth
Casing	1	Inter 1, 1,299.00ftKB, 9 5/8	10.00	1,299.00	Returns at Surface
Casing	1	Prod 1, 3,743.00ftKB, 7	1,912.00	3,743.00	Calculated
Casing	1	Surface, 145.00ftKB, 12 1/2	10.00	145.00	Returns at Surface
Casing	1	Prod Lnr 1, 3,962.00ftKB, 5	3,662.00	3,962.00	
Plug	1	NMGSAU #0509A - Original Hole	3,234.00	3,460.00	
Plug	1	NMGSAU #0509A - Original Hole	2,448.00	2,589.00	
Plug	1	NMGSAU #0509A - Original Hole	1,245.00	1,349.00	
Plug	1	Inter 1, 1,299.00ftKB, 9 5/8	10.00	195.00	Returns at Surface

## Perforations

Date	Formation	Top (ftKB)	Btm (ftKB)	Shot Dens (shots/ft)	Entered Shot Total	Com
2/20/1986		3,501	3,601	2.0	20	
6/22/1971		3,848	3,923	1.0	11	
2/24/1977		3,890	3,942	1.0	11	
10/5/1976		3,912	3,940	1.0	7	

## Plug Back Total Depths

Date	Type	Com	Depth (ftKB)	Depth (TVD) (ftKB)
2/1/1986	CIBP		2,467	

## Other In Hole

Run Date	Icon	Des	OD (in)	Top (ftKB)
11/6/2006		Cement Retainer (Permanent)	7	3,460
2/1/1986		Bridge Plug - Permanent	5	3,799

## Stimulation Jobs

Start Date	Com
2/20/1986	Spotted 250 gals 15% HCL-NEA
2/24/1977	Acid treated perfs 3890-3942' w/1200 gal 15% NEA
10/5/1976	Acid treated perfs 3912-3940' w/1500 gal 15% NEA
6/22/1971	Acidized w/3000 gal 15% NE acid + 500# Diverter II

## Comments

Type	Com
Well History:	6/1971: Sqz'd OH 3742-4002' w/334 sx Class H. TOC 3526'. DO cmt to 3935'.
	10/1976: CO to TD 4002'. Ran 5" liner @ 3662-3962'
	2/1977: Sqz'd perfs 3912-3940' w/500 sx Class H. DO cmt to 3950'.
	2/1986: Set CIBP @ 3800' w/2 sx cmt on top. Queen perfs swabbed dry, set CIBP @ 2505' w/38' cmt on top. PBTD @ 2467'. TA'd.
	11/2006: P&A'd

GL=3627'  
Spud: 12/4/99

**Me-Tex Oil & Gas, Inc. - Texaco 20 # 1**  
**Wellbore Diagram – P&A (12/22/1999)**

**EXHIBIT F**

Date : 11/3/2022

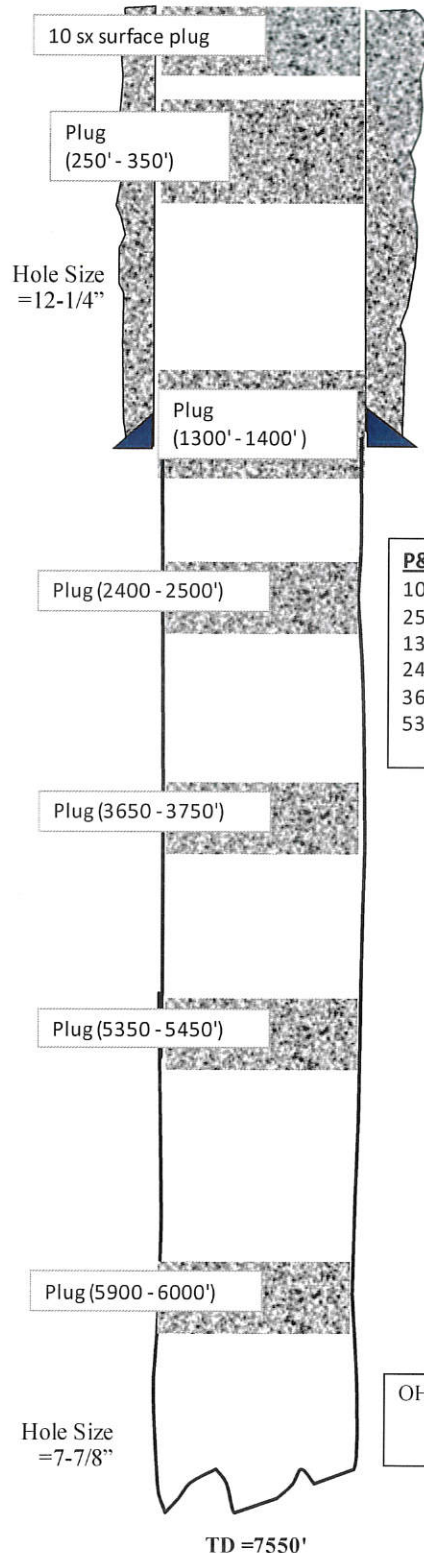
API: 30-025-34770

Surface Location

M. Monzon



330' FSL & 1980' FWL,  
Sec 20, T19S, R37E, Lea County, NM



**Surface Casing**

8-5/8" 24# @ 1349' w/ 500 sx cmt to surface

**P&A Cmt Plugs:**

10 sx surface plug w/ marker  
250' - 350' -> spot 35 sx cmt  
1300' - 1400' -> spot 35 sx cmt  
2400' - 2500' -> spot 35 sx cmt  
3650' - 3750' -> spot 35 sx cmt  
5350' - 5450' -> spot 35 sx cmt

OH from 1349'-7550'- well deemed Dry-Hole and plugged w/ drilling rig

Drawing not to scale



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

Martin Water Laboratories, Inc.  
WATER CONSULTANTS SINCE 1953  
BACTERIAL AND CHEMICAL ANALYSES

**EXHIBIT G**  
709 W. INDIANA  
MIDLAND, TEXAS 79701  
PHONE 683-4521

To: Ms. Denise Wann  
P. O. Drawer "D"  
Monument, NM 88265

Laboratory No. 1290205  
Sample received 12-20-90  
Results reported 1-2-91

Company: Amerada Hess Corporation  
County: Lea, NM  
Field: Eunice Monument  
Lease: As Listed

Subject: To determine the amount of precipitated barium sulfate in submitted mixtures of waters.

<u>Mixture of Waters</u>	<u>Precipitated Barium Sulfate as BaSO<sub>4</sub>, mg/l</u>
1. 90% EMSU water supply well #460 & 10% Larsen #4	0.2
2. 60% EMSU water supply well #460 & 40% Larsen #4	0.2
3. 50% EMSU water supply well #460 & 50% Larsen #4	0.0
4. 40% EMSU water supply well #460 & 60% Larsen #4	0.3
5. 90% EMSU water supply well #460 & 10% State F #3	0.4
6. 60% EMSU water supply well #460 & 40% State F #3	0.0
7. 50% EMSU water supply well #460 & 50% State F #3	0.4
8. 40% EMSU water supply well #460 & 60% State F #3	3.4
9. 90% EMSU water supply well #460 & 10% State F #4	0.0
10. 60% EMSU water supply well #460 & 40% State F #4	0.3
11. 50% EMSU water supply well #460 & 50% State F #4	0.3
12. 40% EMSU water supply well #460 & 60% State F #4	0.5
13. 90% EMSU water supply well #460 & 10% State K #1	0.2
14. 60% EMSU water supply well #460 & 40% State K #1	0.2
15. 50% EMSU water supply well #460 & 50% State K #1	*
16. 40% EMSU water supply well #460 & 60% State K #1	0.0
17. 90% EMSU water supply well #461 & 10% Larsen #4	0.4
18. 60% EMSU water supply well #461 & 40% Larsen #4	0.0
19. 50% EMSU water supply well #461 & 50% Larsen #4	0.2
20. 40% EMSU water supply well #461 & 60% Larsen #4	0.0
21. 90% EMSU water supply well #461 & 10% State F #3	0.0
22. 60% EMSU water supply well #461 & 40% State F #3	0.1
23. 50% EMSU water supply well #461 & 50% State F #3	0.2
24. 40% EMSU water supply well #461 & 60% State F #3	0.2
25. 90% EMSU water supply well #461 & 10% State F #4	0.0
26. 60% EMSU water supply well #461 & 40% State F #4	0.0
27. 50% EMSU water supply well #461 & 50% State F #4	0.0
28. 40% EMSU water supply well #461 & 60% State F #4	0.3

\*No sample submitted at this mixture. We did not consider it necessary to make an extra mixture of these waters because of the absence of any detectable barium sulfate in the other combinations.

EXHIBIT G

Ms. Denise Wann, Amerada Hess Corporation - Laboratory No. 1290205 (Page 2)

<u>Mixture of Waters</u>	<u>Precipitated Barium Sulfate</u>	
	<u>as BaSO<sub>4</sub>, mg/l</u>	
29. 90% EMSU water supply well #461 & 10% State K #1	0.0	
30. 60% EMSU water supply well #461 & 40% State K #1	0.0	
31. 50% EMSU water supply well #461 & 50% State K #1	0.0	
32. 40% EMSU water supply well #461 & 60% State K #1	0.0	

Remarks: The above results clearly need to be qualified. We have reported the results acquired, but our detectable limits are estimated to be approximately 0.5 mg/l; and when we get a reading below that level, we do not consider it conclusive evidence that any barium sulfate is present. Therefore, only a single sample herein showed what we consider to be a reasonable quantity of barium sulfate in the mixed waters. This was 3.4 mg/l that was detected in the combination of 40 percent of well #460 and 60 percent of State "F" #3. It is our carefully considered conclusion that these results do not indicate any significant incompatibility between the waters that were mixed herein. We would only consider it advisable to maintain some observation over conditions in a system handling the mixture of these waters for the possibility of any barium sulfate deposits or precipitates. We do not consider the results to indicate that any of the waters mixed herein are actually sufficiently incompatible to prevent their mixing.

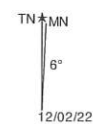


Waylan C. Martin, M.A.

Martin Water Laboratories, Inc.



EXHIBIT H







# New Mexico Office of the State Engineer

## Water Column/Average Depth to Water

EXHIBIT H

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)
























(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD																
Sub-		Q Q Q								Depth Depth Water						
POD Number	Code	basin	County	64	16	4	Sec	Tws	Rng	X	Y	Distance	Well	Water	Column	
<a href="#">L 14366 POD3</a>	L	LE		2	3	3	20	19S	37E	661477	3612899		273	32		
<a href="#">L 13521 POD1</a>	L	LE		4	4	3	20	19S	37E	661504	3612887		298	34	22	12
<a href="#">L 13926 POD1</a>	L	LE		2	3	3	20	19S	37E	661484	3612874		298	32	21	11
<a href="#">L 13926 POD3</a>	L	LE		2	3	3	20	19S	37E	661485	3612865		305	32	21	11
<a href="#">L 10277</a>	L	LE		2	2	4	19	19S	37E	661020	3613219*		316	70	40	30
<a href="#">L 13926 POD2</a>	L	LE		2	3	3	20	19S	37E	661495	3612857		319	32	21	11
<a href="#">L 14366 POD1</a>	L	LE		2	3	3	20	19S	37E	661500	3612840		335	32		
<a href="#">L 14366 POD2</a>	L	LE		2	3	3	20	19S	37E	661473	3612797		361	32		
<a href="#">L 01273</a>	L	LE		3	4	4	19	19S	37E	660827	3612617*		709	62	45	17
<a href="#">L 01251</a>	L	LE		4	1	1	29	19S	37E	661434	3612218*		913	51	38	13
<a href="#">L 05611 POD4</a>	R	L	LE	2	2	1	20	19S	37E	661812	3614032*		1030	105	53	52
<a href="#">L 05433</a>	L	LE		4	1		19	19S	37E	660112	3613518*		1272	5790	1072	4718
<a href="#">L 00062</a>	L	LE		4	4		18	19S	37E	660903	3614327*		1272	93		
<a href="#">L 13525 POD1</a>	L	LE		4	3	4	19	19S	37E	660096	3612717		1291	30	21	9
<a href="#">L 00061</a>	L	LE		3	4		18	19S	37E	660501	3614325*		1453	100		
<a href="#">L 03922</a>	L	LE					29	19S	37E	661958	3611717*		1544	42	22	20
<a href="#">L 03949</a>	L	LE					29	19S	37E	661958	3611717*		1544	36	18	18
<a href="#">L 03956</a>	L	LE					29	19S	37E	661958	3611717*		1544	40	20	20
<a href="#">L 04799</a>	L	LE					29	19S	37E	661958	3611717*		1544	150		
<a href="#">L 10498</a>	L	LE					29	19S	37E	661958	3611717*		1544	60		
<a href="#">L 01259</a>	L	LE		1	2	1	19	19S	37E	660005	3614020*		1592	85	44	41
<a href="#">L 05611 POD3</a>	L	LE		2	2	3	29	19S	37E	661850	3611620*		1594	80	28	52
<a href="#">L 14224 POD2</a>	L	LE		2	3	3	18	19S	37E	660549	3614528		1601	75	59	16

\*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

12/3/22 2:03 PM

Page 1 of 2

WATER COLUMN/ AVERAGE  
DEPTH TO WATER



Average Depth to Water: 96 feet

Minimum Depth: 18 feet

Maximum Depth: 1072 feet

Record Count: 23

EXHIBIT H

UTMNAD83 Radius Search (in meters):

Easting (X): 661322

Northing (Y): 3613125

Radius: 1610

## Analytical Report

Lab Order 2211086

Date Reported: 11/14/2022

## Hall Environmental Analysis Laboratory, Inc.

EXHIBIT I

CLIENT: Permits West

Client Sample ID: Sec 19

Project: NMGSAU

Collection Date: 11/1/2022 10:20:00 AM

Lab ID: 2211086-003

Matrix: AQUEOUS

Received Date: 11/2/2022 11:33:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 1664B</b>							Analyst: dms
N-Hexane Extractable Material	ND	9.44		mg/L	1	11/9/2022 4:42:00 PM	71367
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: JTT
Chloride	110	5.0		mg/L	10	11/3/2022 9:16:05 AM	R92333
<b>SM2540C MOD: TOTAL DISSOLVED SOLIDS</b>							Analyst: SNS
Total Dissolved Solids	515	20.0	*	mg/L	1	11/8/2022 10:21:00 AM	71300

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Page 4 of 8



## Analytical Report

Lab Order 2211086

Date Reported: 11/14/2022

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Permits West

Client Sample ID: Sec 29

Project: NMGSAU

Collection Date: 11/1/2022 12:50:00 PM

Lab ID: 2211086-001

Matrix: AQUEOUS

Received Date: 11/2/2022 11:33:00 AM

EXHIBIT I

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 1664B</b>							Analyst: dms
N-Hexane Extractable Material	ND	9.46		mg/L	1	11/9/2022 4:42:00 PM	71367
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: JTT
Chloride	210	50		mg/L	100	11/3/2022 8:38:51 AM	R92333
<b>SM2540C MOD: TOTAL DISSOLVED SOLIDS</b>							Analyst: SNS
Total Dissolved Solids	720	40.0	*D	mg/L	1	11/8/2022 10:21:00 AM	71300

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Page 2 of 8



NM Oil Conservation Division  
1220 S. St. Francis Dr.  
Santa Fe, NM 87505

**Re: Geology Statement**  
**Apache Corporation**  
**North Monument G/SA Unit #12**  
**Section 20, T. 19S, R. 37E**  
**Lea County, New Mexico**

To whom it may concern:

Publicly available geologic and engineering data related to the proposed well have been thoroughly reviewed, and no evidence for open faults or any other hydrologic connection between the proposed Grayburg injection zone and any underground sources of drinking water has been found. Please see the attached seismic risk assessment for additional information.

Sincerely,

Cory Walk  
Geologist





**Seismic Risk Assessment**  
**Apache Corporation**  
**North Monument G/SA Unit #12**  
**Section 20, Township 19 South, Range 37 East**  
**Lea County, New Mexico**

**Cory Walk, M.S.**

A handwritten signature in black ink that reads "Cory Walk". The signature is written in a cursive, flowing style.

**Geologist**

**Permits West Inc.**

**November 17, 2022**

**Apache Corporation  
North Monument G/SA Unit #12****SEISMIC RISK ASSESSMENT PAGE 1****EXHIBIT J****GENERAL INFORMATION**

North Monument G/SA Unit #12 is located in the SW ¼, section 20, T19S, R37E, about 1.6 miles northwest of Monument, NM in the Central Basin Platform of the greater Permian Basin. Apache Corporation proposes to convert this existing oil well to a water injection well. The proposed injection zone is within the Grayburg Formation through a cased hole from 3,645'-3,926' below ground surface. The Grayburg is primarily a carbonate reservoir with some sandstones present. This report assesses any potential concerns relating to induced seismicity along deep penetrating Precambrian faults or the connection between the injection zone and known underground potable water sources.

**SEISMIC RISK ASSESSMENT*****Historical Seismicity***

Searching the USGS earthquake catalog resulted in **no (0) earthquakes above a magnitude 2.5 within 6 miles (9.7 km) of the proposed injection site since 1970 (Fig 1).** According to this dataset, the nearest historical earthquake occurred June 28, 2020 about 11.2 miles (~18.0 km) northwest and had a magnitude of 2.7.

***Basement Faults and Subsurface Conditions***

A structure contour map (Fig. 1) of the Precambrian basement shows the North Monument G/SA Unit #12 is approximately 5.0 miles from the nearest basement-penetrating fault inferred by Ewing et al (1990) and about 59 miles from the nearest surface fault.

Snee and Zoback (2018) state, "In the western part of Eddy County, New Mexico,  $S_{Hmax}$  is ~north-south (consistent with the state of stress in the Rio Grande Rift; Zoback and Zoback, 1980) but rotates to ~east-northeast-west-southwest in southern Lea County, New Mexico, and the northernmost parts of Culberson and Reeves counties, Texas." Around the North Monument G/SA Unit #12 site, Snee and Zoback indicate a  $S_{Hmax}$  **direction of N105°E and an  $A_p$  of 0.85, indicating a normal/strike-slip faulting stress regime.**

Induced seismicity is a growing concern of deep injection wells. Snee and Zoback (2018) show that due to its orientation, the nearest Precambrian fault has a low probability of slipping (Fig. 2). Also, the proposed injection zone is much shallower in the Grayburg Formation and therefore would not affect the deep Precambrian faults. In addition to the existing fault orientation, the vertical (approx. 7000') and horizontal (5.0 miles) separation between the proposed water injection zone and any deep Precambrian faults is large enough to infer that there is no immediate concern or potential of induced seismicity as a result from this injection well.

**GROUNDWATER SOURCES**

Three principal aquifers are used for potable groundwater in southern Lea County; these geologic units include the Triassic Santa Rosa formation, Tertiary Ogallala formation, and Quaternary alluvium. Nicholson and Clebsch (1961) state, "Potable ground water is not available below the Permian and Triassic unconformity but, because this boundary is not easily defined, the top of the Rustler anhydrite formation is regarded as the effective lower limit of 'potable' ground water." Around the North Monument G/SA Unit



**Apache Corporation  
North Monument G/SA Unit #12**

**SEISMIC RISK ASSESSMENT PAGE 2**

**EXHIBIT J**

#12 well, the top of a thick anhydrite unit interpreted to represent the Rustler Formation lies at a depth of ~1288 feet bgs.

**STRATIGRAPHY**

A thick permeability barrier (Rustler Anhydrite and Salado Fm; 1280+ ft thick) exists above the targeted Grayburg injection zone. Well data indicates ~2,350 ft of rock separating the top of the injection zone from the previously stated lower limit of potable water at the top of the Rustler anhydrite formation.

**CONCLUDING STATEMENT**

All available geologic and engineering data evaluated around the North Monument G/SA Unit #12 well show no potential structural or stratigraphic connection between the Grayburg injection zone and any subsurface potable water sources. The shallow injection zone, spatial location and orientation of nearby faults also removes any major concern of inducing seismic activity.

Apache Corporation  
North Monument G/SA Unit #12

## SEISMIC RISK ASSESSMENT PAGE 3

EXHIBIT J

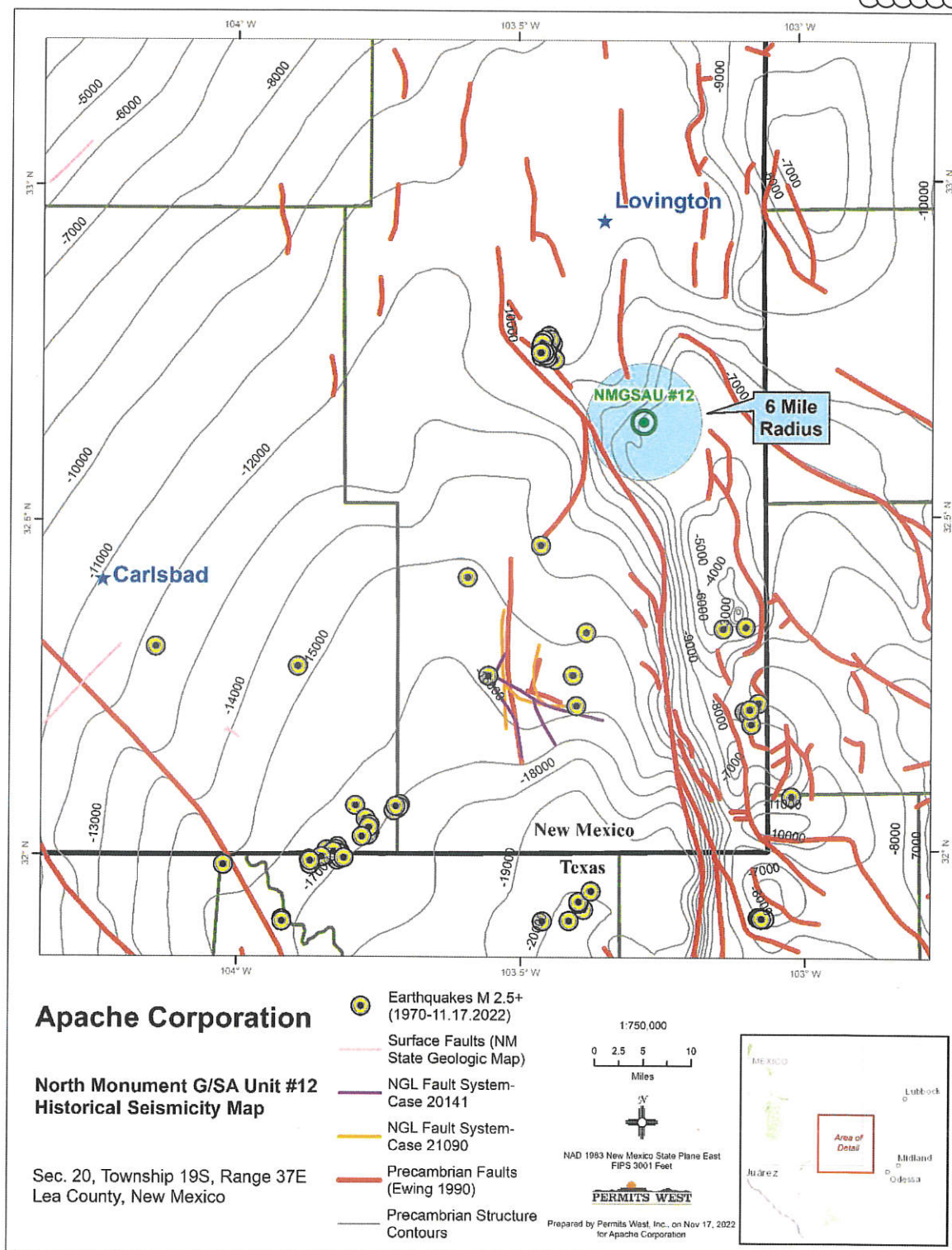


Figure 1. Structural contour map of the Precambrian basement in feet below sea level. Red lines represent the locations of Precambrian basement-penetrating faults (Ewing et al., 1990). The North Monument G/SA Unit #12 well lies ~5.0 miles south of the closest deeply penetrating fault, ~59 miles from the nearest surface fault and ~11.2 miles from the closest historic earthquake.



Apache Corporation  
North Monument G/SA Unit #12

## SEISMIC RISK ASSESSMENT PAGE 4

EXHIBIT J

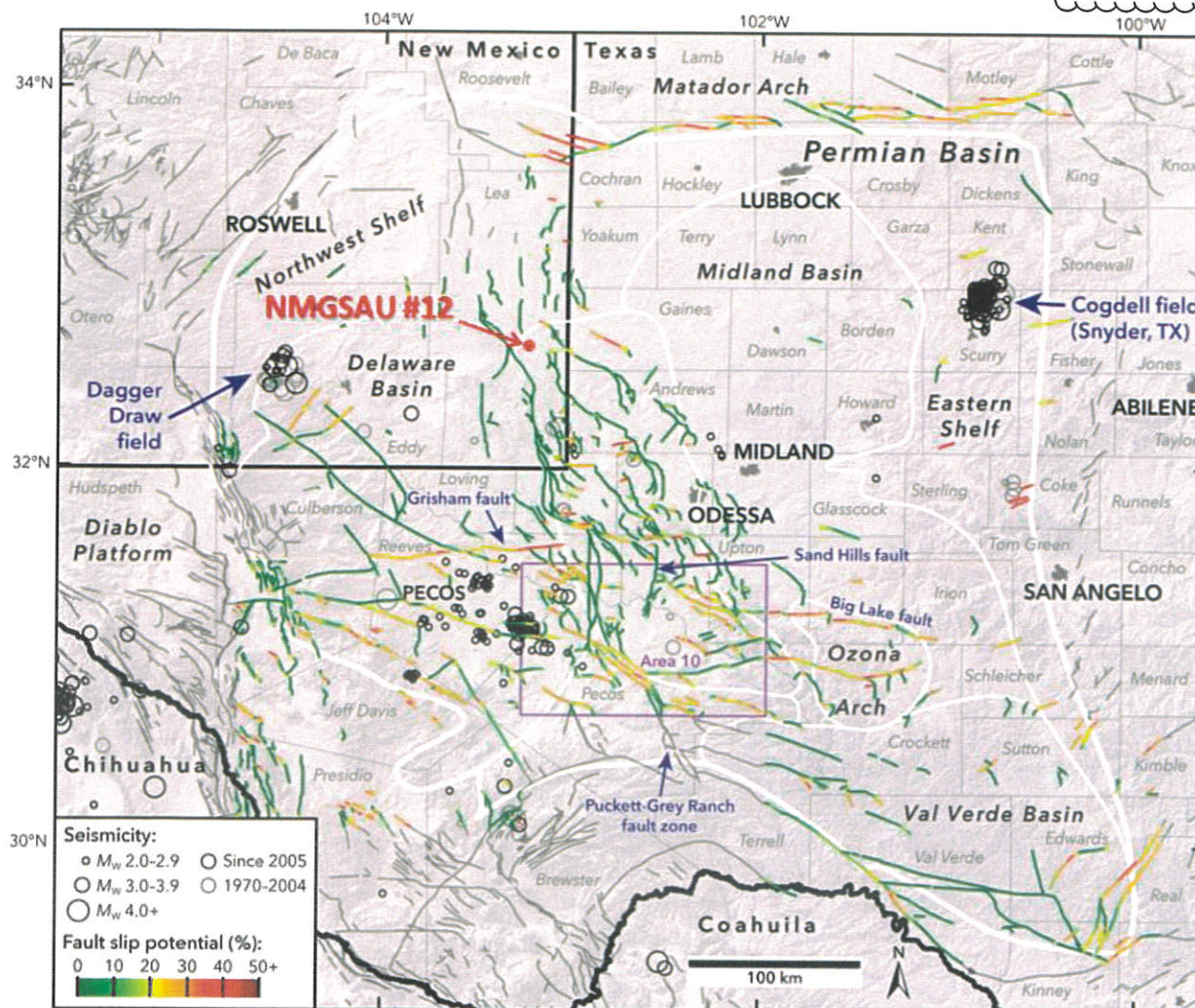


Figure 2. Modified from Snee and Zoback (2018). The nearest deep Precambrian fault lies ~5.0 miles north of the proposed injection well and has a low probability (0%) of slip. Also, the proposed injection zone is much shallower in the Grayburg and therefore removes any major concern of inducing seismicity on any known fault.

**Apache Corporation  
North Monument G/SA Unit #12**

**SEISMIC RISK ASSESSMENT PAGE 5**

**EXHIBIT J**

**References Cited**

Ewing, T. E., 1990, The tectonic map of Texas: Austin, Bureau of Economic Geology, The University of Texas at Austin.

Geologic Map of New Mexico, New Mexico Bureau of Geology and Mineral Resources, 2003, Scale 1:500,000.

Nicholson, A., Jr., and Clebsch, A., Jr., 1961, Geology and ground-water conditions in southern Lea County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Ground-Water Report 6, 123 pp., 2 plates.

Snee, J.-E.L., Zoback, M.D., 2018, State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity: Leading Edge, v. 37, p. 127–134.



APACHE CORPORATION  
NORTH MONUMENT G/SA UNIT 012  
1980' FSL & 660' FWL  
SEC. 20, T. 19 S., R. 37 E., LEA COUNTY, NM

PAGE 1

30-025-05664

I. Goal is to convert an oil well to a water injection well. The well is 3965' deep and is producing from the Grayburg. Current perforations are 3836' - 3910'. After conversion, well will inject into the Grayburg from 3792' to 3910'. The Grayburg is part of the Eunice - Monument; Grayburg - San Andres Pool (code = 23000).

The well and zone are part of the North Monument G/SA Unit (Unit #300156, Case 10253, Order R-9494) that was established in 1991 by Amerada Hess Corp. The waterflood was approved in Case 10252, Order R-9596, also in 1991. Apache became Unit operator in 2006.

The well has had multiple names and numbers (e. g., H T Mattern 1, North Monument G/SA Unit Block 6 Well 12, NMGSAU 612). In addition, NMOCD records show 14 Apache wells with the nomenclature of North Monument G/SA Unit 012.

II. Operator: Apache Corporation (OGRID #873)  
Operator phone number: (432) 818-1088  
Operator address: 303 Veterans Airpark Lane, Suite 3000  
Midland, TX 79705  
Contact for Application: Brian Wood (Permits West, Inc.)  
Phone: (505) 466-8120

III. A. (1) Lease: fee (H T Mattern)  
Lease Size: 160 acres (see Exhibit A for maps)  
Closest Lease Line: 660'  
Lease Area: SW4 Section 20, T. 19 S., R. 37 E.  
Unit Size: 13,385 acres  
Closest Unit Line: 5976'

A. (2) Surface casing (12.25", 50#) was set in 1935 at 268' in a 17.5" hole and cemented with 250 sacks to GL (calc.).

Intermediate casing (9.625", 40#) was set at 1376' in an 11.75" hole and cemented with 800 sacks to GL (calc.).

APACHE CORPORATION  
NORTH MONUMENT G/SA UNIT 012  
1980' FSL & 660' FWL  
SEC. 20, T. 19 S., R. 37 E., LEA COUNTY, NM

PAGE 2

30-025-05664

Production casing (7", 24#) was set at 3811' in an 8.75" hole and cemented with 400 sacks to 1266' (calc.).

The well is completed open hole (6") in the Grayburg from 3811' to 3965'.

Mechanical integrity of the casing will be assured by hydraulically pressure testing to 500 psi for 30 minutes.

- A. (3) Tubing will be IPC, 2.875", J-55, 6.4#. Setting depth will be 3740'. (Top perforation will be 3792'.)
- A. (4) A lock set injection packer will be set at 3740' (52' above the highest perforation of 3792').
- B. (1) Injection zone will be the Grayburg in the Eunice - Monument; Grayburg - San Andres Pool (pool code = 23000).
- B. (2) Injection interval will be 3792' - 3910'. The well is cased to 3811'.
- B. (3) Well was originally drilled as a Grayburg oil well.
- B. (4) The well is uncased from 3811' to 3965' and will remain so in that interval. Will perforate from 3792' to 3811'. Total disposal interval will be 3792' to 3965'.
- B. (5) Next higher oil or gas zone within the area of review is the Queen at 3418' - 3459'. Injection interval will be 3799' - 3943'. Next lower oil or gas zone within the area of review is the San Andres. Its top is at 3926' and it is unitized with the Grayburg.

IV. This is not a horizontal or vertical expansion of an existing injection project. Records for the unit approval (R-9494, Case 10253) include a discussion of the Grayburg water flood. The water flood (R-9596, Case 10252) was approved at the



APACHE CORPORATION  
NORTH MONUMENT G/SA UNIT 012  
1980' FSL & 660' FWL  
SEC. 20, T. 19 S., R. 37 E., LEA COUNTY, NM

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same time in 1991. At least two water flood expansions (WFX-739 and -942) have been approved since then. Closest unit boundary is 5976'. Four injection wells are within a half-mile radius (see Exhibit B).

V. Exhibit B shows and tabulates all 27 existing wells (19 producers + 3 injectors + 5 P&A) within a half-mile (2640') radius, regardless of depth. Exhibit C shows all 419 existing wells (181 oil or gas producing wells + 63 injection or disposal wells + 83 P & A wells + 2 waterflood supply wells + 90 freshwater wells) within a two-mile radius.

Exhibit D shows and tabulates all leases (fee and NMSLO) within a half-mile radius. Exhibit E shows all lessors (BLM, fee, and NMSLO) within a two-mile radius.

VI. Twenty-seven wells are within a half-mile. Twenty-four of the 27 wells penetrated the Grayburg. The 24 penetrators include 17 oil or gas wells, 3 water injectors, and 4 P&A wells. Exhibit F tabulates the penetrators and diagrams the P&A wells.

- VII. 1. Average injection rate will be  $\approx 600$  bwpd. Maximum will be 700 bwpd.
2. System will be closed. The well will tie into the existing Unit pipeline system.
3. Average injection pressure will be  $\approx 350$  psi. Maximum injection pressure would be 758 psi ( $= 0.2$  psi/foot  $\times 3792'$  (top perforation)).
4. Water source will be two existing  $\approx 5125'$  deep lower San Andres water supply wells (#018 and #624) plus produced water from the Grayburg and San Andres. Both water streams (source and produced) are commingled before being piped to injection wells. An analysis (Exhibit G) from the hearing concluded the waters are compatible.
5. Grayburg is productive within one mile of the well.

APACHE CORPORATION  
NORTH MONUMENT G/SA UNIT 012  
1980' FSL & 660' FWL  
SEC. 20, T. 19 S., R. 37 E., LEA COUNTY, NM

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VIII. The Grayburg Formation is interbedded mudstone, wackestone, packstone, grainstone, and dolomite. The porous dolomite is the productive part of the formation. Notable depths are:

Quaternary = 0'  
Ogallala = 80'  
Rustler = 1288'  
Top Salt = 1400'  
Base Salt = 2570'  
Yates = 2605'  
Seven Rivers = 2855'  
Queen = 3375'  
Penrose = 3460'  
Grayburg = 3642'  
injection interval = 3792' – 3910'  
San Andres = 3926'  
TD = 3965'

State Engineer records (Exhibit H) show 19 water wells are within a 1-mile radius. Deepest of the 19 was 5790'. It is a P&A San Andres water supply well (30-025-05640). The remaining 18 wells are 105' or less in depth.

NMG/SA Unit 012 penetrates the Ogallala aquifer and is 10 miles northeast of the Capitan Reef. No existing underground drinking water source is below the Grayburg within a mile radius. Produced water has been injected into 3 zones (Yates, Seven Rivers, Queen) above the Grayburg within T. 19 S., R. 37 E. via ten wells. Produced water has been disposed into 3 zones (San Andres, Delaware, Bone Spring) below the Grayburg within T. 19 S., R. 37 E. via five SWD wells. Over 393,816,692 barrels of water have been injected in the NMG/SA Unit to date.

IX. The well will be stimulated with acid to clean out scale or fill.

X. No log is on file with NMOCD.



APACHE CORPORATION  
NORTH MONUMENT G/SA UNIT 012  
1980' FSL & 660' FWL  
SEC. 20, T. 19 S., R. 37 E., LEA COUNTY, NM

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XI. Two windmills within a mile radius were sampled during a November 1, 2022, field inspection. Analyses from both windmills are in Exhibit I. (Floyd Cody, Manager of the Monument Municipal Domestic Water Consumers Association says most well owners abandoned their wells when the utility came on line.)

XII. Apache (Exhibit J) is not aware of any geologic or engineering data that may indicate the Grayburg is in hydrologic connection with any underground source of water. There are 1,622 Grayburg injectors in New Mexico. Previously approved Unit water flood expansions include WFX-739 and -942.

XIII. A legal ad (see Exhibit K) was published on November 17, 2022. Notice (this application) has been sent (Exhibit L) to the surface owner (Jimmie & Betty Cooper), lessees of record (Mewbourne, Shell Western, and Southwest Royalties), government lessors (NMSLO), and all other well operators (Arrington, Empire, Energy Acumen, and Mulloy) within the ½ mile area of review.

**District I**  
1625 N. French Dr., Hobbs, NM 88240  
Phone:(575) 393-6161 Fax:(575) 393-0720

**District II**  
811 S. First St., Artesia, NM 88210  
Phone:(575) 748-1283 Fax:(575) 748-9720

**District III**  
1000 Rio Brazos Rd., Aztec, NM 87410  
Phone:(505) 334-6178 Fax:(505) 334-6170

**District IV**  
1220 S. St Francis Dr., Santa Fe, NM 87505  
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico  
Energy, Minerals and Natural Resources  
Oil Conservation Division  
1220 S. St Francis Dr.  
Santa Fe, NM 87505

CONDITIONS

Action 165662

CONDITIONS

Operator: APACHE CORPORATION 303 Veterans Airpark Ln Midland, TX 79705	OGRID: 873
	Action Number: 165662
	Action Type: [C-108] Fluid Injection Well (C-108)

CONDITIONS

Created By	Condition	Condition Date
mgebremichael	None	3/14/2023