

Initial Application Part I

Received: 11/07/2019

This application is placed in file for record. It MAY or MAY NOT have been reviewed to be determined Administratively Complete



November 07, 2019

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Subject: Vista Disposal Solutions, LLC – Samford Federal SWD #2
Application for Authorization to Inject

To Whom It May Concern,

On behalf of Vista Disposal Solutions, LLC (Vista), ALL Consulting, LLC (ALL) is submitting the enclosed Application for Authorization to Inject for the Samford Federal SWD #2, a proposed salt water disposal well, in Lea County, NM. Additionally, the public notice for this application will be published on November 8th, 2019, and the affidavit will be delivered once it had been received from Hobbs News-Sun.

Should you have any questions regarding the enclosed application, please contact Dan Arthur at (918) 382-7581 or darthur@all-llc.com.

Sincerely,
ALL Consulting

Dan Arthur
President/Chief Engineer

4CRWF-191107-C-1080

Revised March 23, 2017

RECEIVED: 11/7/19	REVIEWER: BLL	TYPE: SWD	APP NO: pBL1932931649
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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: _____ OGRID Number: _____
 Well Name: _____ API: _____
 Pool: _____ Pool Code: _____

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 **SWD-2317**

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	
<input type="checkbox"/>	Notice Complete
<input type="checkbox"/>	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.

Print or Type Name

Signature



_____ Date

_____ Phone Number

_____ e-mail Address

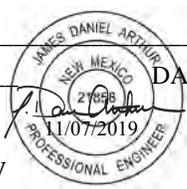
STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: _____ Secondary Recovery _____ Pressure Maintenance X Disposal
_____ Storage Application qualifies for administrative approval? X Yes _____ No
- II. OPERATOR: Vista Disposal Solutions, LLC
ADDRESS: 12444 NM 10th St., Building G, Suite 202-512, Yukon, OK 73099
CONTACT PARTY Nate Alleman PHONE: 918-382-7581
- 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 X 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 geologic data on the injection zone including appropriate lithologic detail, geologic 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 sources 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 sources 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: Dan Arthur, P.E., SPEC TITLE: President/Chief Engineer
SIGNATURE: [Signature] DATE: 11/07/2019
E-MAIL ADDRESS: darthur@all-llc.com
- XV. If the information required under Sections VI, V _____ ve has been previously submitted, it need not be resubmitted.
Please show the date and circumstances of the earlier submittal: _____



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.

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.

Application for Authorization to Inject
Well Name: Samford Federal SWD #2

III – Well Data (The Wellbore Diagram is included as Attachment 1)

A.

(1) General Well Information:

Operator: Vista Disposal Solutions, LLC (OGRID No. 329051)
Lease Name & Well Number: Samford Federal SWD #2
Location Footage Calls: 1,067' FNL & 200' FWL
Legal Location: Unit Letter D, S34 T26S R33E
Ground Elevation: 3,267'
Proposed Injection Interval: 17,710' – 18,910'
County: Lea

(2) Casing Information:

Type	Hole Size	Casing Size	Casing Weight	Setting Depth	Sacks of Cement	Estimated TOC	Method Determined
Surface	24"	20"	133.0 lb/ft	785'	800	Surface	Circulation
Intermediate 1	14-3/4"	13-3/8"	68.0 lb/ft	5,050'	1,130	Surface	Circulation
Intermediate 2	12-1/4"	9-5/8"	53.5 lb/ft	14,365'	4,770	Surface	Circulation
Liner	8-1/2"	7-5/8"	39.0 lb/ft	17,710'	290	14,165'	CBL

Note: A DV Tool will be set at 5,000'

(3) Tubing Information:

4-1/2" (composite weight string) of fiberglass-coated tubing with setting depth of 17,690'

(4) Packer Information: SC-2 or equivalent packer set at 17,690'

B.

(1) Injection Formation Name: Devonian and Silurian formations

Pool Name: SWD; DEVONIAN - SILURIAN

Pool Code: 97869

(2) Injection Interval: Open-hole injection between 17,710' – 18,910'

(3) Drilling Purpose: New Drill for Salt Water Disposal

(4) Other Perforated Intervals: No other perforated intervals exist.

(5) Overlying Oil and Gas Zones: Below are the approximate formation tops for known oil and gas producing zones in the area.

- Permian Delaware Mountain Group (5,050')
- Bone Spring (10,080')
- Wolfcamp (12,155')
- Atoka (14,695')
- Morrow (16,160')

Underlying Oil and Gas Zones: No underlying oil and gas zones exist.

V – Well and Lease Maps

The following maps are included in **Attachment 2**:

- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 2-mile Mineral Ownership Map
- 2-mile Surface Ownership Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- 1-mile Well Detail List
- Potash Lease Map

VI – AOR Well List

There are no wells within the 1-mile AOR that penetrate the proposed injection zone.

A list of the wells within the 1-mile AOR is included in **Attachment 2**.

VII – Proposed Operation

- (1) **Proposed Maximum Injection Rate:** 40,000 bpd
Proposed Average Injection Rate: 20,000 bpd
- (2) A **closed system** will be used.
- (3) **Proposed Surface Maximum Injection Pressure:** 3,542 psi (based on 0.2 psi per foot)
Proposed Average Surface Injection Pressure: approximately 1,500 – 2,000 psi
- (4) **Source Water Analysis:** It is expected that the injectate will consist of produced water from production wells completed in the Wolfcamp and Bone Spring formations. Analysis of water from these formations is included in **Attachment 3**.
- (5) **Injection Formation Water Analysis:** The proposed SWD will be injecting water into the Devonian and Silurian formations which is a non-productive zone in this area known to be compatible with formation water from the Wolfcamp and Bone Spring formations. Water analyses from the Devonian-Silurian formation in the area are included in **Attachment 4**.

VIII – Geologic Description

The proposed injection interval includes the Devonian and Silurian formations from 17,710 – 18,910 feet. These formations consist of carbonate rocks which include light colored dolomite and chert intervals interspersed with some tight limestone intervals. Several thick sections of porous dolomite capable of accepting injected fluids are present within the subject formations in the area.

The base of the deepest Underground Source of Drinking Water (USDW) is at a depth of approximately 760 feet. Surface casing will be set at a depth of 785 feet, which is 25 feet below the top of the Rustler formation, which isolates the USDW. Geophysical log assessment was conducted to accurately determine the top of the Rustler formation, and the top and the base of the Salado formation in this area. Water well depths in the area range from approximately 110 - 250 feet below ground surface.

IX – Proposed Stimulation Program

A small cleanup acid job may be used to remove mud and drill cuttings from the formations. However, no other formation stimulation is currently planned.

X – Logging and Test Data

Geophysical logs will be submitted to the Division upon completion of the well.

XI – Fresh Groundwater Samples

Based on a review of data from the New Mexico Office of the State Engineer, no groundwater wells were located within 1-mile radius of the proposed SWD location; therefore, no groundwater samples were collected in association with this application.

A water well map of the area is included in **Attachment 5**.

XII – No Hydrologic Connection Statement

ALL Consulting has examined available geologic and engineering data and has found no evidence of faulting present in the area that would provide a hydrologic connection between the injection interval and overlying USDWs. Additionally, the casing and cementing program has been designed to further ensure there will be no hydrologic connection between the injection interval and overlying USDWs. A letter from a knowledgeable and qualified expert stating that there is a low risk of seismic activity from the proposed injection activities is included in **Attachment 6**.

XIII – Proof of Notice

A Public Notice was filed with the Hobbs News-Sun newspaper and an affidavit is included in **Attachment 7**.

A copy of the application was mailed to the OCD District Office, landowner, and leasehold operators within 1-mile of the proposed SWD location. A list of the recipients, as well as delivery confirmations, are included in **Attachment 7**.

Attachments

Attachment 1:

- C-102
- Wellbore Diagram

Attachment 2: Area of Review Information:

- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 2-mile Mineral Ownership Map
- 2-mile Surface Ownership Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- 1-mile Well Detail List
- Potash Lease Map

Attachment 3: Source Water Analyses

Attachment 4: Injection Formation Water Analyses

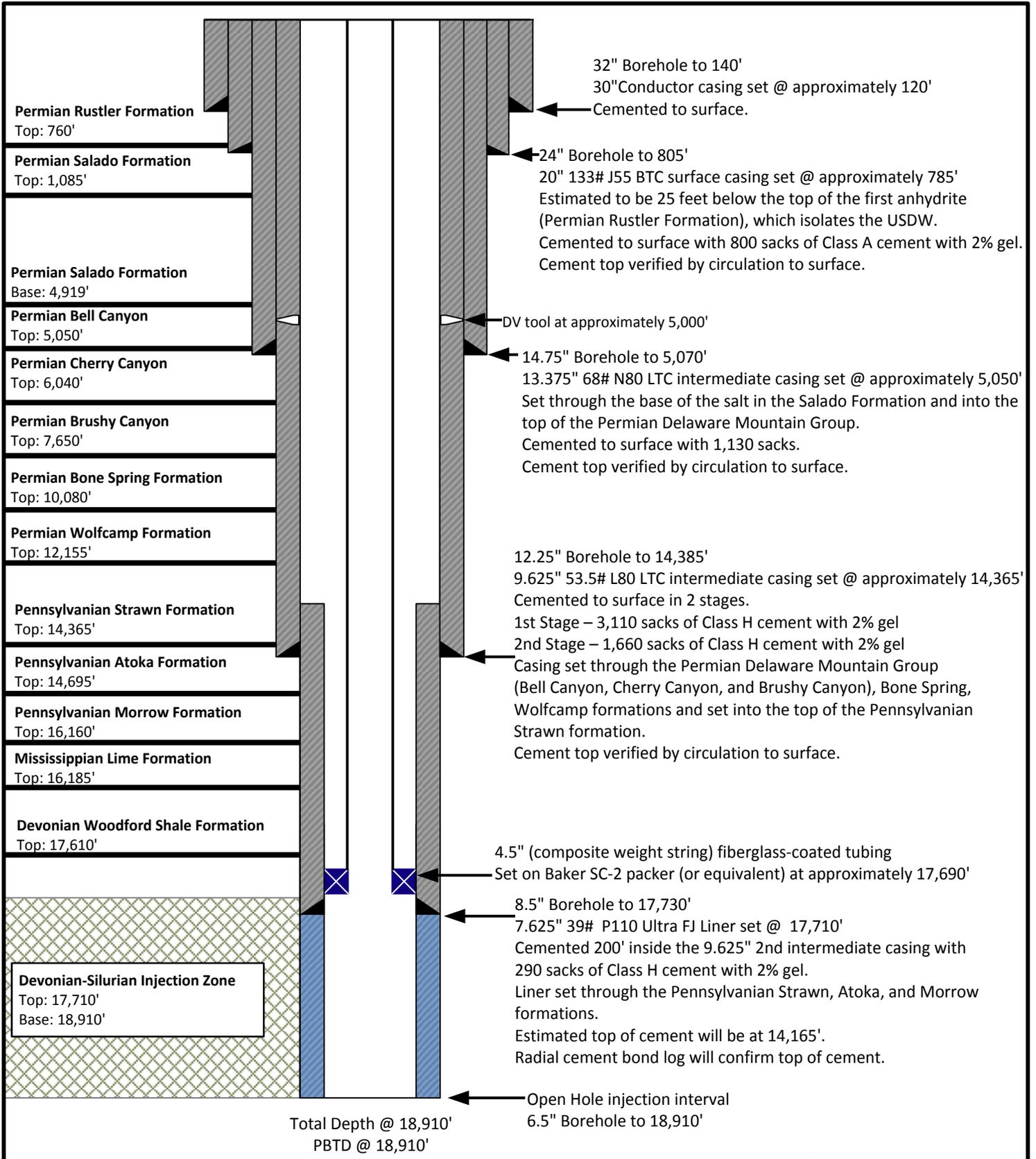
Attachment 5: Water Well Map and Well Data

Attachment 6: Induced Seismicity Assessment Letter

Attachment 7: Public Notice Affidavit and Notice of Application Confirmations

Attachment 1

- C-102
- Wellbore Diagram



Note: Listed depths and cement volumes are approximates based on available information. All cement calculations use yield of 1.18 cubic foot per sack and include 25% excess.

NOT TO SCALE

Prepared by:

 Prepared for:


Drawn by: Joshua Ticknor
 Project Manager:
 Dan Arthur
 Date: 11/07/2019

Vista Disposal Solutions, LLC
Samford Federal SWD #2

SC-2 Packer**1 Introduction**

The SC-2™ packer is Baker Hughes, a GE company (BHGE)' primary packer for cased hole gravel pack and frac pack applications where a high performance retrievable packer is required.

2 Description

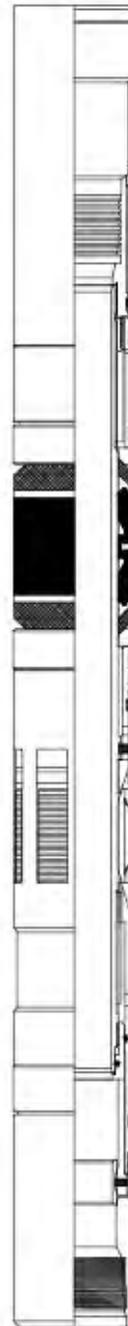
The SC-2 packer is a fully retrievable, high-performance retainer production packer. Although the packer was originally designed for premium gravel pack applications, it may also be used as a standard completion packer in wells where a premium retrievable production packer is required.

The SC-2 packer is fully compatible with standard BHGE sealing accessories, including retrievable and expendable plugs.

Refer to the specifications guide in the Packer Size/Model Availability Guide, Specification Guide, and Packer/Accessory Guide for SC™ and HP™ Packers (Product Family H48861), Unit 5750 under Sand Control Tools for packer/accessory size and packer size/model availability.

3 Application

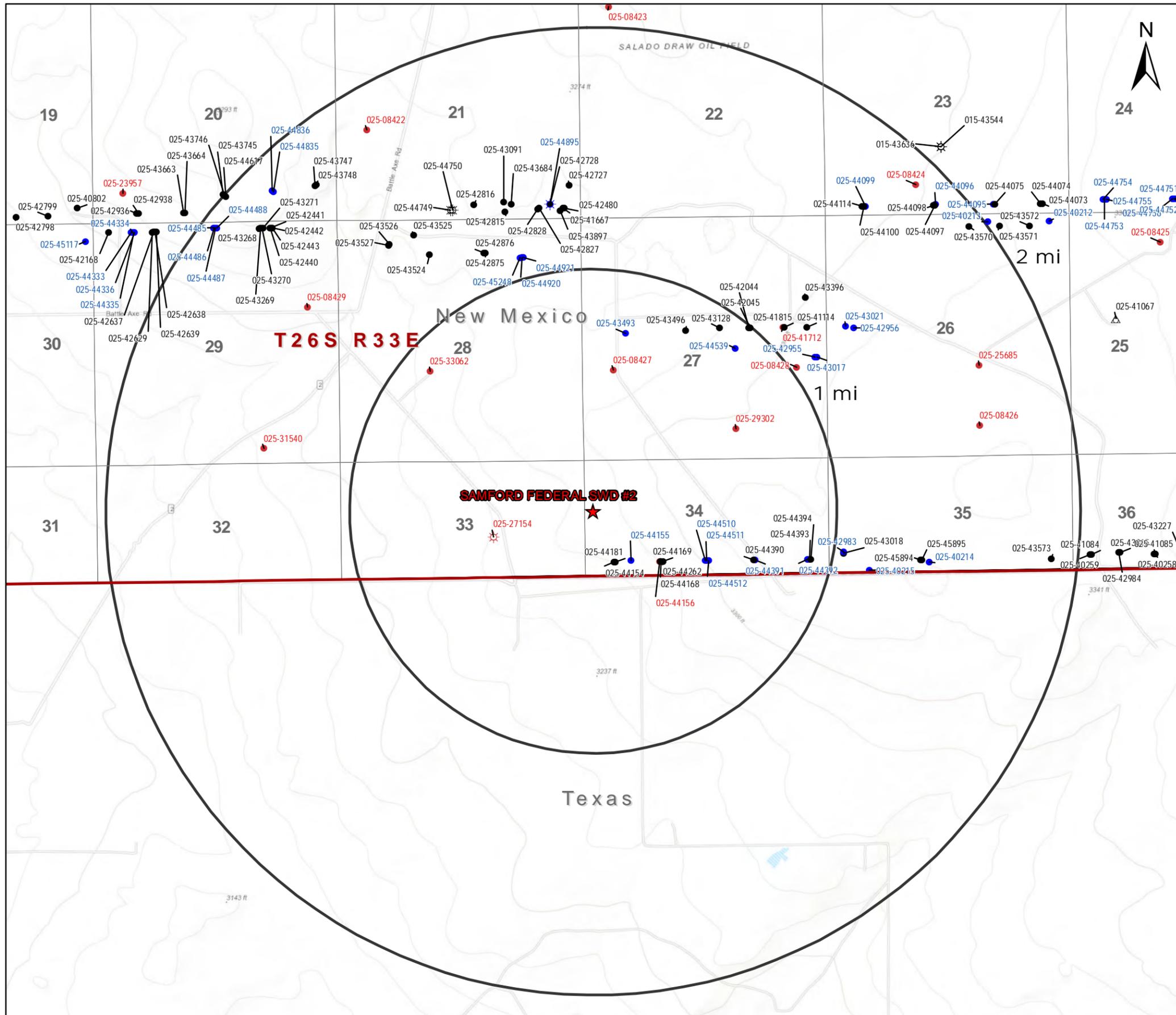
The SC-2 packer is primarily used in gravel pack or frac pack applications where a higher differential pressure production rating, treating pressure rating and temperature are required. The SC-2 may also be used as a production packer.



Attachment 2

Area of Review Information:

- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 2-mile Mineral Ownership Map
- 2-mile Surface Ownership Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- 1-mile Well Detail List
- Potash Lease Map



Legend

- ★ Proposed SWD
- NMOCED O&G Wells**
- ☀ Gas, Active (4)
- ☀ Gas, New (1)
- ☀ Gas, Plugged (1)
- Oil, Active (80)
- Oil, New (40)
- Oil, Plugged (15)
- △ Salt Water Injection, Active (1)

O&G Wells Area of Review

SAMFORD FEDERAL SWD #2 Lea County, New Mexico

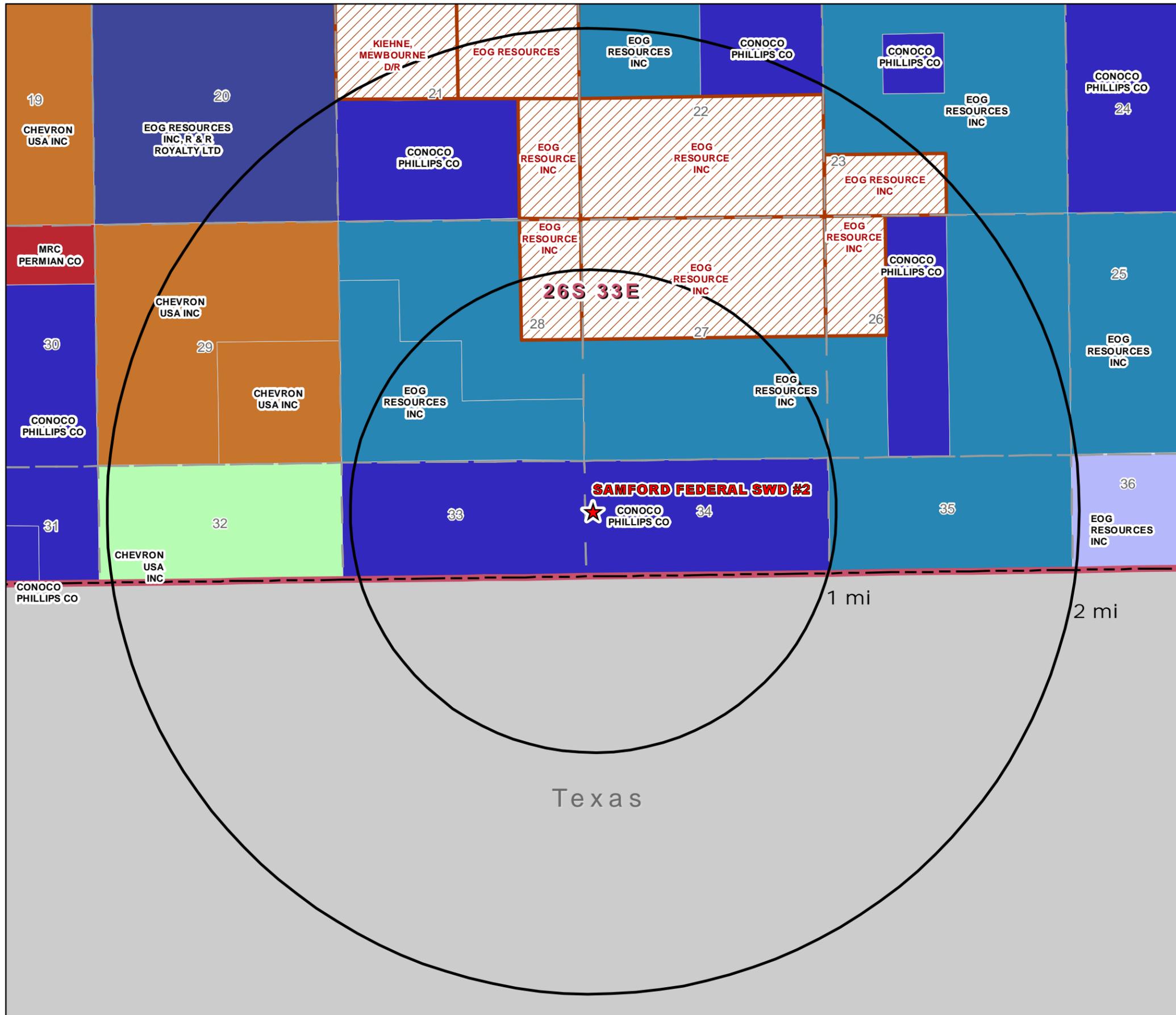
Proj Mgr:
Dan Arthur

October 22, 2019

Mapped by:
Ben Bockelmann



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



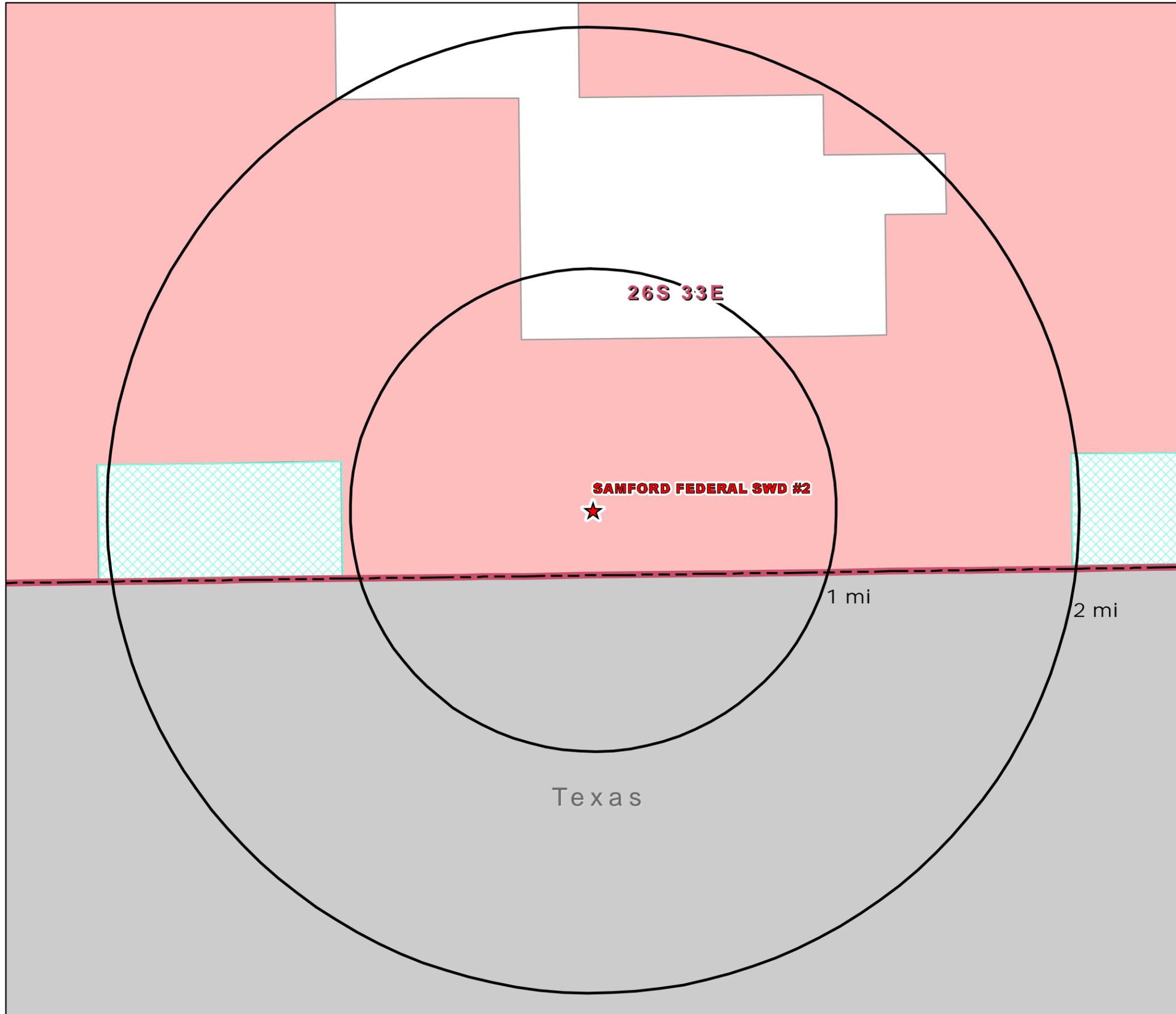
Legend

- ★ Proposed SWD
- ▨ Private Mineral Leases
- BLM Mineral Leases**
 - CHEVRON USA INC
 - CONOCO PHILLIPS CO
 - EOG RESOURCES INC
 - EOG RESOURCES INC, R & R ROYALTY LTD
 - MRC PERMIAN CO
- NMSLO Mineral Leases**
 - CHEVRON USA INC
 - EOG RESOURCES INC



<p>Mineral Lease Area of Review</p>		
<p>SAMFORD FEDERAL SWD #2 Lea County, New Mexico</p>		
<p>Proj Mgr: Dan Arthur</p>	<p>November 06, 2019</p>	<p>Mapped by: Ben Bockelmann</p>
<p>Prepared for:</p>	<p>Prepared by:</p>	





Legend

★ Proposed SWD

Mineral Ownership

■ All minerals are owned by U.S. (BLM)

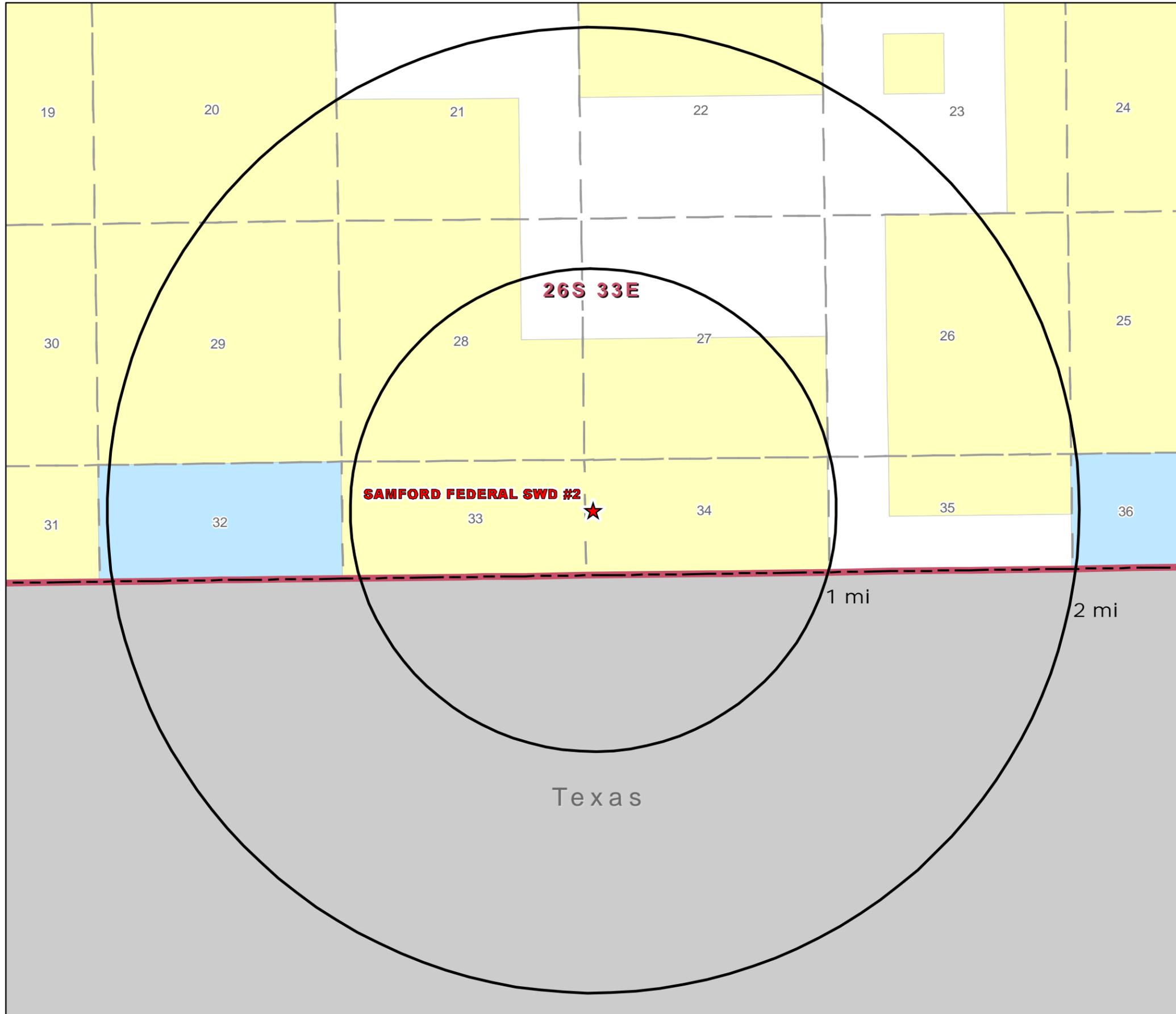
■ Surface and Subsurface minerals (NMSLO)

■ Private minerals



Source Info: BLM Mineral Ownership (<https://catalog.data.gov/dataset/blm-new-mexico-mineral-ownership>) & NMSLO Ownership (<http://www.nmstatelands.org/maps-gis/gis-data-download/>)

Mineral Ownership Area of Review		
SAMFORD FEDERAL SWD #2 Lea County, New Mexico		
Proj Mgr: Dan Arthur	November 06, 2019	Mapped by: Ben Bockelmann
Prepared for: 		Prepared by: 

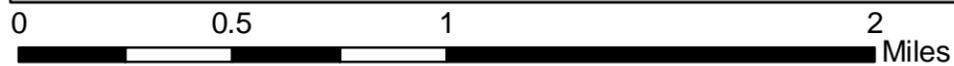


Legend

★ Proposed SWD

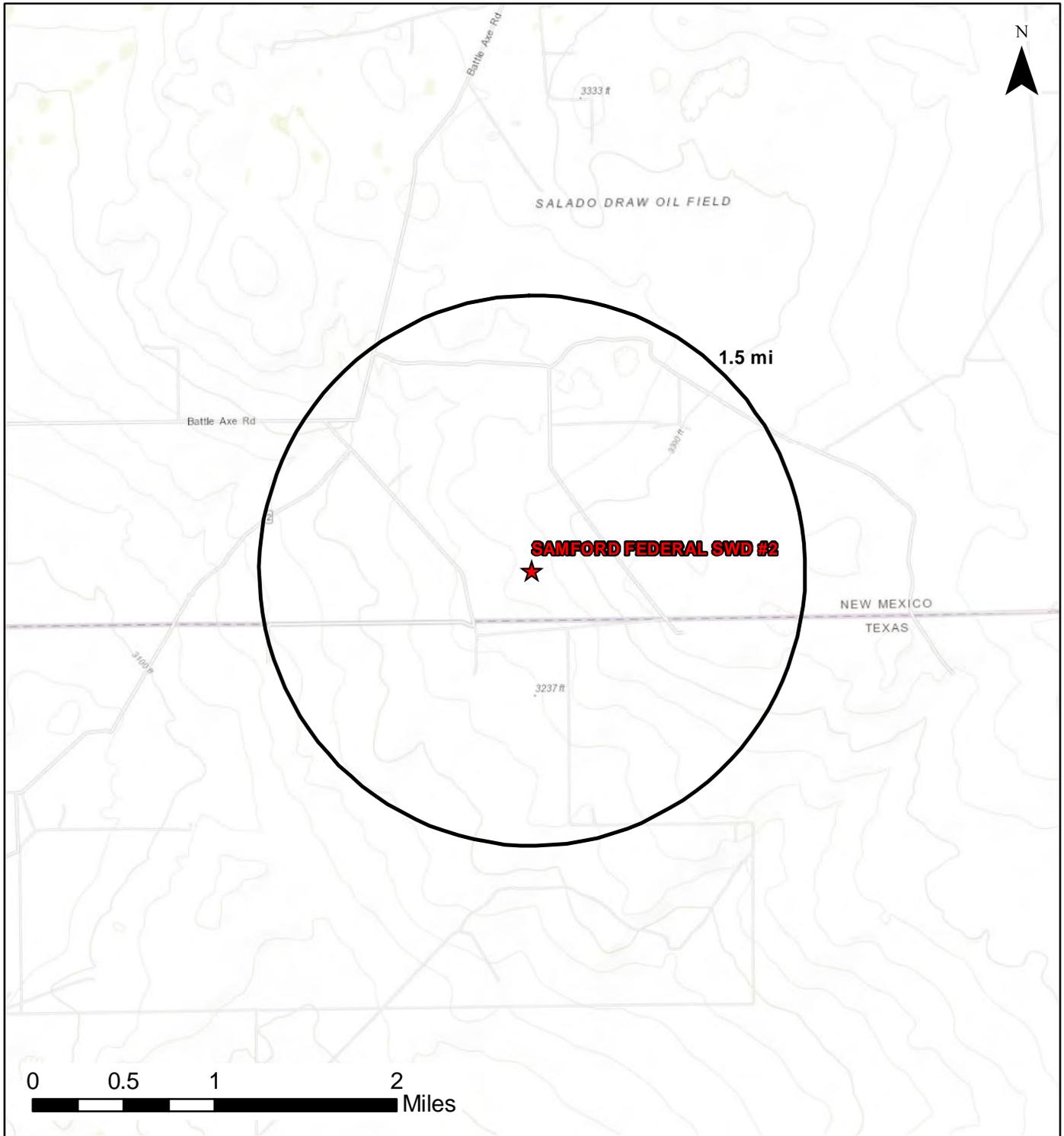
Surface Ownership

- BLM
- Private
- State



Source Info: BLM Surface Ownership (<https://catalog.data.gov/dataset/blm-new-mexico-surface-ownership>)

Surface Ownership Area of Review		
SAMFORD FEDERAL SWD #2 Lea County, New Mexico		
Proj Mgr: Dan Arthur	November 06, 2019	Mapped by: Ben Bockelmann
Prepared for: 	Prepared by: 	



SAMFORD FEDERAL SWD #2
Deep SWDs AOR

Proj Mgr: Dan Arthur	Oct 24, 2019	Mapped by: Ben Bockelmann
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Prepared for: 	Prepared by: 
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Legend

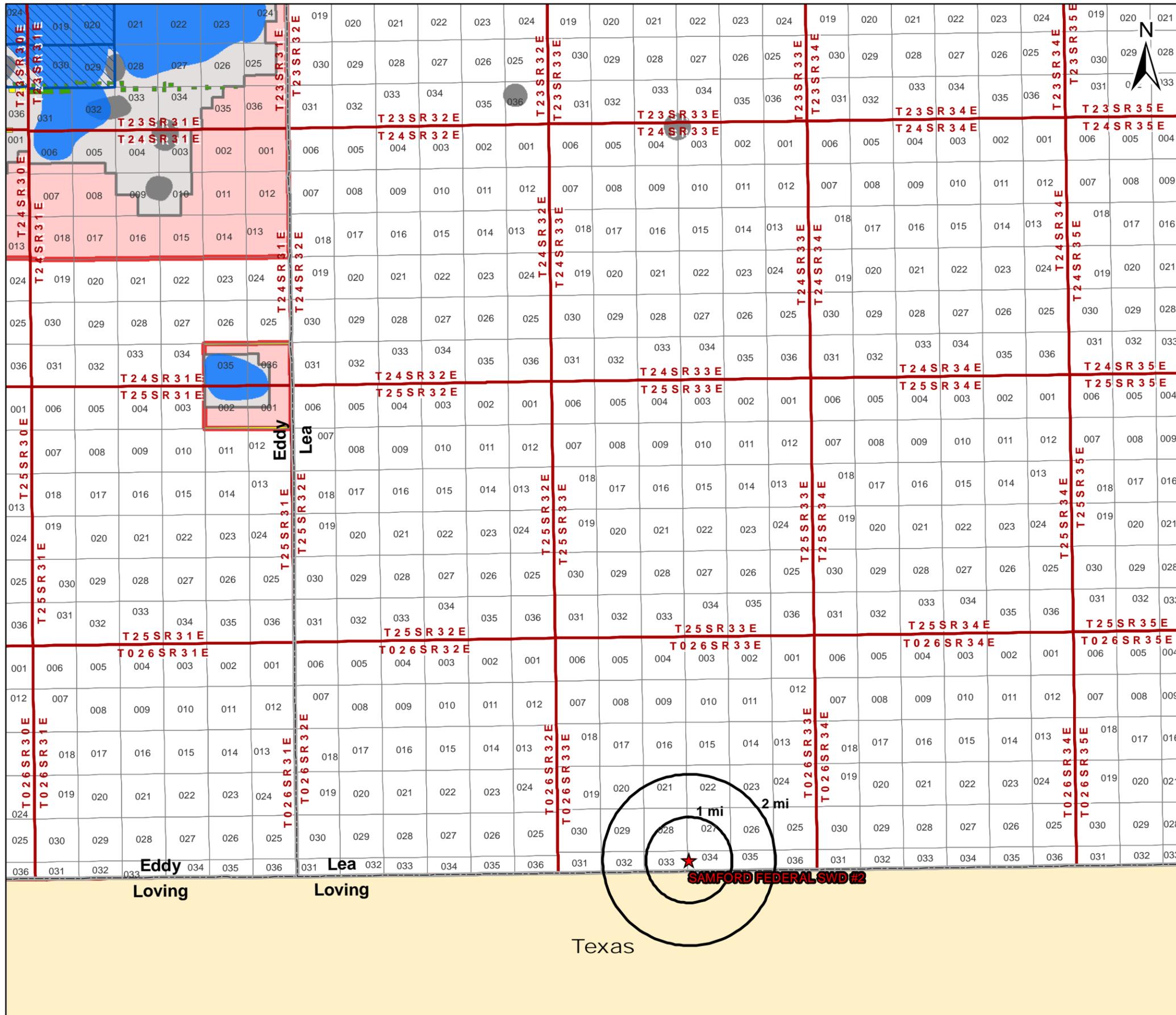
- ★ Proposed SWD

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

AOR Tabulation for Samford Federal SWD #2 (Top of Injection Interval: 17,710')

Well Name	API#	Well Type	Operator	Spud Date	Legal Location (Sec., Tn., Rng.)	Total Vertical Depth	Penetrate Inj. Zone?
BARLOW 34 FEDERAL COM #706H	30-025-44169	O	EOG RESOURCES INC	11/27/2017	3-34-26S-33E	12369	No
BARLOW 34 FEDERAL COM #702H	30-025-44181	O	EOG RESOURCES INC	11/28/2017	4-34-26S-33E	12344	No
BARLOW 34 FEDERAL COM #701H	30-025-44154	O	EOG RESOURCES INC	11/26/2017	4-34-26S-33E	12364	No
BARLOW 34 FEDERAL COM #703H	30-025-44155	O	EOG RESOURCES INC	Not Drilled	4-34-26S-33E	Proposed (12420)	No
BARLOW 34 FEDERAL COM #704H	30-025-44156	Plugged	EOG RESOURCES INC	12/31/9999	3-34-26S-33E	Plugged (195)	No
BARLOW 34 FEDERAL COM #704Y	30-025-44262	O	EOG RESOURCES INC	12/8/2017	3-34-26S-33E	12394	No
BARLOW 34 FEDERAL COM #705H	30-025-44168	O	EOG RESOURCES INC	11/25/2017	3-34-26S-33E	12372	No
PRE-ONGARD WELL #001	30-025-27154	Plugged	PRE-ONGARD WELL OPERATOR (Continental Oil Company)	5/31/1960	2-33-26S-33E	Plugged (16180)	No
BARLOW 34 FEDERAL COM #714H	30-025-44393	O	EOG RESOURCES INC	8/12/2018	1-34-26S-33E	12453	No
BARLOW 34 FEDERAL COM #709H	30-025-44512	O	EOG RESOURCES INC	Not Drilled	2-34-26S-33E	Proposed (12400)	No
BARLOW 34 FEDERAL COM #713H	30-025-44392	O	EOG RESOURCES INC	Not Drilled	1-34-26S-33E	Proposed (12447)	No
BARLOW 34 FEDERAL COM #708H	30-025-44511	O	EOG RESOURCES INC	Not Drilled	3-34-26S-33E	Proposed (12285)	No
BARLOW 34 FEDERAL COM #712H	30-025-44391	O	EOG RESOURCES INC	Not Drilled	2-34-26S-33E	Proposed (12319)	No
BARLOW 34 FEDERAL COM #707H	30-025-44510	O	EOG RESOURCES INC	Not Drilled	3-34-26S-33E	Proposed (12397)	No
BARLOW 34 FEDERAL COM #710H	30-025-44539	O	EOG RESOURCES INC	Not Drilled	2-34-26S-33E	Proposed (12316)	No
BARLOW 34 FEDERAL COM #711H	30-025-44390	O	EOG RESOURCES INC	7/31/2018	2-34-26S-33E	12421	No
BARLOW 34 FEDERAL COM #715H	30-025-44394	O	EOG RESOURCES INC	7/23/2018	1-34-26S-33E	12451	No
EL MAR FEDERAL EAST #001	30-025-29302	Plugged	RALPH E WILLIAMSON	7/12/1985	O-27-26S-33E	Plugged (5250)	No
OPHELIA 27 #708H	30-025-43128	O	EOG RESOURCES INC	5/21/2016	G-27-26S-33E	12370	No
OPHELIA 27 #501H	30-025-42044	O	EOG RESOURCES INC	10/30/2014	G-27-26S-33E	11012	No
RATTLESNAKE 28 FEDERAL #001	30-025-33062	Plugged	EOG RESOURCES INC	8/28/1995	K-28-26S-33E	Plugged (12491)	No
OPHELIA 27 #703H	30-025-42045	O	EOG RESOURCES INC	10/4/2014	G-27-26S-33E	12464	No
PRE-ONGARD WELL #001	30-025-08427	Plugged	PRE-ONGARD WELL OPERATOR (Continental Oil Company)	11/4/1958	L-27-26S-33E	Plugged (5094)	No
OPHELIA 27 #503H	30-025-43496	O	EOG RESOURCES INC	1/25/2017	F-27-26S-33E	10940	No
OPHELIA 27 FEDERAL COM #704H	30-025-43493	O	EOG RESOURCES INC	Not Drilled	E-27-26S-33E	Proposed (12455)	No

Notes: No wells within the 1-mile AOR penetrate the injection interval.



Legend

- ★ Proposed SWD
- Potash Leases
- Ore Type - Measured
- Ore Type - Indicated
- KPLA
- SOPA
- Drill Islands**
- Status**
- Approved
- Nominated

<h2 style="margin: 0;">Potash Leases Area of Review</h2>		
<h3 style="margin: 0;">SAMFORD FEDERAL SWD #2 Lea County, New Mexico</h3>		
Proj Mgr: Dan Arthur	October 22, 2019	Mapped by: Ben Bockelmann
Prepared for: 	Prepared by: 	



Attachment 3

Source Water Analyses

Wolfcamp



Water Analysis

Date: 23-Aug-11

2708 West County Road, Hobbs NM 88240

Phone (575) 392-5556 Fax (575) 392-7307

Analyzed For

Brushy Draw 1#1

Company	Well Name	County	State
	BD	Lea	New Mexico

Eddy *1-265-295*
Sample Source Swab Sample **Sample #** 1

Formation **Depth**

Specific Gravity	1.170	SG @ 60 °F	1.172
pH	6.30	Sulfides	Absent
Temperature (°F)	70	Reducing Agents	

Cations

Sodium (Calc)	in Mg/L	77,962	in PPM	66,520
Calcium	in Mg/L	4,000	in PPM	3,413
Magnesium	in Mg/L	1,200	in PPM	1,024
Soluble Iron (FE2)	in Mg/L	10.0	in PPM	9

Anions

Chlorides	in Mg/L	130,000	in PPM	110,922
Sulfates	in Mg/L	250	in PPM	213
Bicarbonates	in Mg/L	127	in PPM	108
Total Hardness (as CaCO3)	in Mg/L	15,000	in PPM	12,799
Total Dissolved Solids (Calc)	in Mg/L	213,549	in PPM	182,209
Equivalent NaCl Concentration	in Mg/L	182,868	in PPM	156,031

Scaling Tendencies

*Calcium Carbonate Index 507,520

Below 500,000 Remote / 500,000 - 1,000,000 Possible / Above 1,000,000 Probable

*Calcium Sulfate (Gyp) Index 1,000,000

Below 500,000 Remote / 500,000 - 10,000,00 Possible / Above 10,000,000 Probable

**This Calculation is only an approximation and is only valid before treatment of a well or several weeks after treatment.*

Remarks RW=.048@70F

Report # 3188

Sec 22, T25S, R28E

Bone Spring

North Permian Basin Region
 P.O. Box 740
 Sundown, TX 79372-0740
 (806) 229-8121
 Lab Team Leader - Sheila Hernandez
 (432) 495-7240

Water Analysis Report by Baker Petrolite

Company:		Sales RDT:	33514.1
Region:	PERMIAN BASIN	Account Manager:	TONY HERNANDEZ (575) 910-7135
Area:	ARTESIA, NM	Sample #:	534665
Lease/Platform:	PINOCHLE 'BPN' STATE COM	Analysis ID #:	106795
Entity (or well #):	2 H	Analysis Cost:	\$90.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 534665 @ 75 F					
		Anions		Cations			
		mg/l	meq/l	mg/l	meq/l		
Sampling Date:	03/10/11	Chloride:	109618.0	3091.92	Sodium:	70275.7	3056.82
Analysis Date:	03/18/11	Bicarbonate:	2135.0	34.99	Magnesium:	195.0	18.04
Analyst:	SANDRA GOMEZ	Carbonate:	0.0	0.	Calcium:	844.0	42.12
TDS (mg/l or g/m3):	184911.1	Sulfate:	747.0	15.55	Strontium:	220.0	5.02
Density (g/cm3, tonne/m3):	1.113	Phosphate:			Barium:	0.8	0.01
Anion/Cation Ratio:	1	Borate:			Iron:	6.5	0.23
Carbon Dioxide:	0.50 PPM	Silicate:			Potassium:	889.0	22.22
Oxygen:		Hydrogen Sulfide:		0 PPM	Aluminum:		
Comments:		pH at time of sampling:		7	Chromium:		
		pH at time of analysis:			Copper:		
		pH used in Calculation:		7	Lead:		
					Manganese:	0.100	0.
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO ₃		Gypsum CaSO ₄ ·2H ₂ O		Anhydrite CaSO ₄		Celestite SrSO ₄		Barite BaSO ₄		CO ₂ Press
		Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	
80	0	1.06	188.52	-1.20	0.00	-1.18	0.00	-0.11	0.00	0.58	0.29	1.72
100	0	1.10	208.05	-1.29	0.00	-1.20	0.00	-0.15	0.00	0.35	0.29	2.35
120	0	1.12	224.17	-1.36	0.00	-1.19	0.00	-0.17	0.00	0.16	0.00	3.17
140	0	1.13	243.17	-1.42	0.00	-1.18	0.00	-0.18	0.00	0.00	0.00	4.21

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.
 Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.
 Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Attachment 4

Injection Formation Water Analyses

Injection Formation Water Analysis																		
Vista Disposal Solutions, LLC - Devonian and Silurian-Fusselman Formations																		
Wellname	API	Latitude	Longitude	Section	Township	Range	Unit	Ftgns	Ftgew	County	State	Company	Field	Formation	Tds_mgL	Chloride_mgL	Bicarbonate_mgL	Sulfate_mgL
STATE B COM #001	3002509716	32.179405	-103.2212524	36	24S	36E	C	600N	1880W	LEA	NM		CUSTER	DEVONIAN	176234	107400	128	1004
FARNSWORTH FEDERAL #006	3002511950	32.077725	-103.162468	4	26S	37E	A	660N	990E	LEA	NM		CROSBY	DEVONIAN	31931	20450	302	591
ARNOTT RAMSAY NCT-B #003	3002511863	32.092228	-103.1784439	32	25S	37E	A	660N	660E	LEA	NM		CROSBY	DEVONIAN		100382	476	
ARNOTT RAMSAY NCT-B #003	3002511863	32.092228	-103.1784439	32	25S	37E	A	660N	660E	LEA	NM		CROSBY	DEVONIAN	158761			
COPPER #001	3002511818	32.099484	-103.1656723	28	25S	37E	J	1980S	1981E	LEA	NM		CROSBY	DEVONIAN	27506	15270	1089	1079
STATE NJ A #001	3002511398	32.164749	-103.1273346	2	25S	37E	A	663N	660E	LEA	NM		JUSTIS NORTH	DEVONIAN	105350	59300	660	4950
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	80880	46200	340	3050
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	84900	48600	840	2650
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	72200	41000	370	2960
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	80900	46200	340	3050
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	77600	44000	550	3240
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	135000	77000	650	5810
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	114000	65000	280	5110
WESTATES FEDERAL #004	3002511389	32.161129	-103.1241226	1	25S	37E	E	1980N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	135000	77000	500	5320
WESTATES FEDERAL #008	3002511393	32.162121	-103.1241226	1	25S	37E	E	1620N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	91058	51020	376	4783
WESTATES FEDERAL #008	3002511393	32.162121	-103.1241226	1	25S	37E	E	1620N	330W	LEA	NM		JUSTIS NORTH	FUSSELMAN	86847	50450	363	2544
STATE Y #009	3002511777	32.10582	-103.1113434	25	25S	37E	A	990N	990E	LEA	NM		JUSTIS	FUSSELMAN	219570	129000	960	4630
STATE Y #009	3002511777	32.10582	-103.1113434	25	25S	37E	A	990N	990E	LEA	NM		JUSTIS	FUSSELMAN	163430	96000	290	3780
SOUTH JUSTIS UNIT #023C	3002511760	32.106728	-103.1184616	25	25S	37E	C	660N	2080W	LEA	NM		JUSTIS	FUSSELMAN	63817	35870	360	3442
CARLSON A #002	3002511764	32.100384	-103.1113434	25	25S	37E	I	2310S	990E	LEA	NM		JUSTIS	FUSSELMAN	208280	124000	510	3400
CARLSON B 25 #004	3002511784	32.096756	-103.1113434	25	25S	37E	P	990S	990E	LEA	NM		JUSTIS	FUSSELMAN	184030	112900	68	1806

Attachment 5

Water Well Map and Well Data



Legend

★ Proposed SWD

NMOSE PODs

Status

- Active (0)
- Pending (0)
- Change Location of Well (0)
- Capped (0)
- Plugged (0)
- Incomplete (0)
- Unknown (0)

Water Wells Area of Review

Samford Federal SWD #2
Lea County, New Mexico

Proj Mgr: Dan Arthur	October 15, 2019	Mapped by: Ben Bockelmann
-------------------------	------------------	------------------------------

Prepared by:




Water Well Sampling Rationale						
Vista Disposal Solutions, LLC - Samford Federal SWD #2						
SWD	Water Wells	Owner	Available Contact Information	Use	Sampling Required	Notes

Note: No water wells are present within 1 mile of the proposed SWD location.

Attachment 6

Induced Seismicity Assessment Letter



November 7, 2019

Mr. Phillip Goetze, P.G.
NM EMNRD – Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Subject: Induced Seismicity Potential Statement for the Samford Federal SWD #2

Dear Mr. Goetze,

This letter provides information regarding the seismic potential associated with injection operations associated with Vista Disposal Solutions, LLC (Vista), proposed Samford Federal SWD #2, hereinafter referred to as the “Subject Well.”

As outlined herein, based on my experience as an expert on the issue of induced seismicity, it is my opinion that the potential for the proposed injection well to cause injection-induced seismicity is expected to be minimal, at best. This conclusion is based on (1) the lack of historic seismic activity and faulting in the area, (2) the low fault slip potential (FSP) of Precambrian faults in the area, (3) the presence of confining layers, and (4) the overall vertical distance between the proposed injection zone and basement rock.

The Subject Well, is located 1,067 FNL & 200’ FWL of Section 34, in T26-S and R33-E of Lea County, New Mexico. Historically, the Eddy and Lea County area has experienced very limited recorded seismic activity (per the U.S. Geological Survey [USGS] earthquake catalog database). There has been one known seismic event located within a 25-mile radius of the proposed Subject Well. The closest recorded seismic event was a M2.9 that occurred on December 4th, 1984 and was located approximately 18.1 miles north of the Subject Well (See Exhibit 1). The closest Class IID well injecting into the same formations (Devonian-Silurian) of the Subject Well is approximately 5.0 miles to the northwest (See Exhibit 1).

Vista does not own either 2D or 3D seismic reflection data in the area of the Subject Well. Fault data from USGS indicates that the closest known fault is approximately 13.7 miles east of the Subject Well (See Exhibit 1).

In a recent paper written by Snee and Zoback (2018) entitled “State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity,”, the authors found that large groups of mostly north-south striking Precambrian basement faults, predominantly located along the Central Basin Platform, the western Delaware Basin, and large parts of the Northwest Shelf (which includes Eddy and Lea counties, New Mexico) have low FSP at the modeled fluid-pressure

Induced Seismicity Potential Statement for the Samford Federal SWD #2
November 7, 2019

perturbation. The map in Exhibit 2 depicts the low probability risk of FSP for the Delaware Basin and Northwest Shelf areas (Snee and Zoback 2018).

Geologic analysis indicates that the proposed Devonian-Silurian injection zone is overlain by approximately 200 to 400 feet of Woodford Shale, which is the upper confining zone and will serve as a barrier for upward injection fluid migration. Additionally, the Simpson Group that lies directly below the Montoya Formation will act as a lower confining zone to prohibit fluids from migrating downward into the underlying Ellenburger Formation and Precambrian basement rock. See the stratigraphic column for the Delaware Basin included in Exhibit 3.

In the Eddy and Lea Counties area of New Mexico, the Simpson Group is comprised of a series of Middle to Upper Ordovician carbonates, several sandstones, and sandy shales that range from approximately 350 to 650 feet thick (Jones 2008). This group of rocks is capped by the limestones of the Bromide Formation, which is approximately 200 feet thick in this area (Jones 2008). The closest deep well drilled into the Precambrian basement was completed by the Skelly Oil Company in 1975. This well is located in Section 17, Range 36E, Township 25S of Lea County (API No.30-025-25046) and encountered 602 feet of Ellenburger Formation before reaching the top of the Precambrian granite at a depth of 18,920 feet. Based on the estimated thickness of the Simpson Group and Ellenburger Formation in this area, the Precambrian basement should be approximately 1,000 to 1,200 feet below the bottom of the proposed injection zones in the Subject Well.

Conclusion

As an expert on the issue of induced seismicity, it is my opinion that the potential for the proposed injection well to cause injection-induced seismicity is expected to be minimal, at best. This conclusion is based on (1) the lack of historic seismic activity and faulting in the area, (2) the low FSP of Precambrian faults in the area, (3) the presence of confining layers, and (4) the overall vertical distance between the proposed injection zone and basement rock.

Sincerely,
ALL Consulting



J. Daniel Arthur, P.E., SPEC
President and Chief Engineer

Enclosures
References
Exhibits

Induced Seismicity Potential Statement for the Samford Federal SWD #2
November 7, 2019

References

Induced Seismicity Potential Statement for the Samford Federal SWD #2
November 7, 2019

Ball, Mahlon M. 1995. "Permian Basin Province (044)." In *National Assessment of United States Oil and Gas Resources—Results, Methodology, and Supporting Data*. U.S. Geological Survey. <https://certmapper.cr.usgs.gov/data/noga95/prov44/text/prov44.pdf> (accessed June 18, 2018).

Green, G.N., and G.E. Jones. 1997. "The Digital Geologic Map of New Mexico in ARC/INFO Format." U.S. Geological Survey Open-File Report 97-0052. <https://mrdata.usgs.gov/geology/state/state.php?state=NM> (accessed June 14, 2018).

Jones, Rebecca H. 2008. "The Middle-Upper Ordovician Simpson Group of the Permian Basin: Deposition, Diagenesis, and Reservoir Development." http://www.beg.utexas.edu/resprog/permianbasin/PBGSP_members/writ_synth/Simpson.pdf (accessed June 19, 2018).

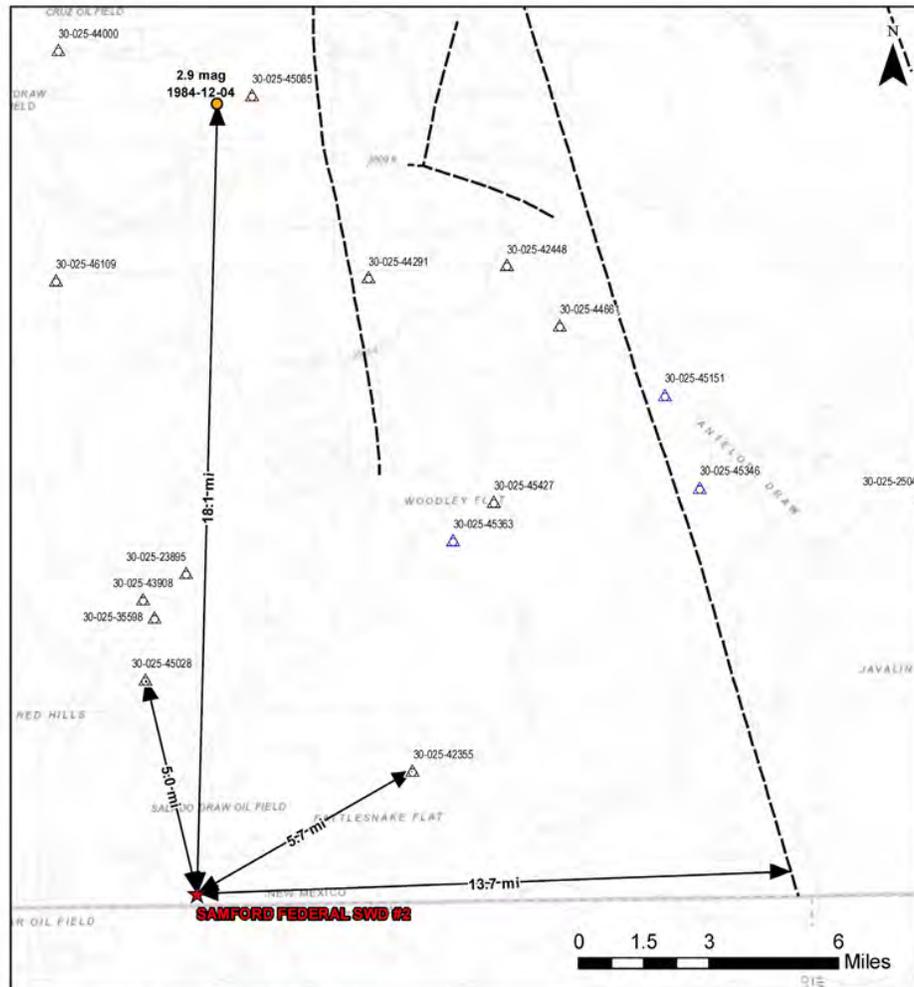
Snee, Jens-Erik Lund, and Mark D. Zoback. 2018. "State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity." *The Leading Edge* 37, no. 2 (February 2018): 127-34.

U.S. Geological Survey (USGS). No date. Earthquakes Hazard Program: Earthquake Catalog. <https://earthquake.usgs.gov/earthquakes/search/> (accessed June 14, 2018).

Induced Seismicity Potential Statement for the Samford Federal SWD #2
November 7, 2019

Exhibits

Induced Seismicity Potential Statement for the Samford Federal SWD #2
 November 7, 2019



SAMFORD FEDERAL SWD #2 Seismic Activity AOR		
Proj Mgr: Dan Arthur	Oct 24, 2019	Mapped by: Ben Bockelmann
Prepared for: VISTA		Prepared by: ALL CONSULTING

- Legend**
- ★ Proposed SWD
 - USGS Seismic Events
 - USGS Faults
 - △ Salt Water Injection, Active (13)
 - ▲ Salt Water Injection, New (3)

Service Layer Credits. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Exhibit 1. Map Showing the Distances from Known and Inferred Faults, Seismic Event, and Closest Deep Injection Well

Induced Seismicity Potential Statement for the Samford Federal SWD #2
November 7, 2019

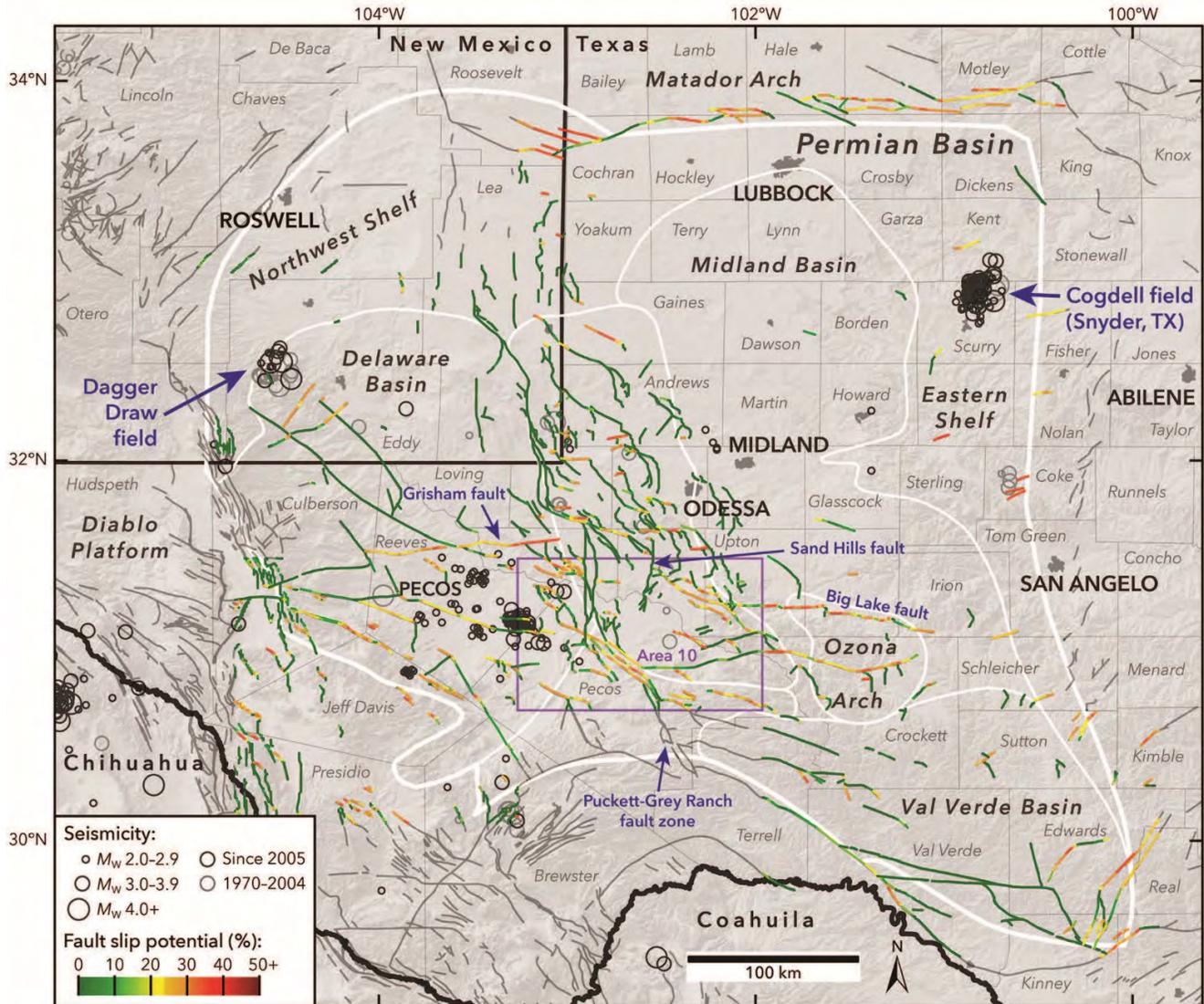


Exhibit 2. Results of the Snee and Zoback (2018) Probabilistic FSP Analysis Across the Permian Basin

Induced Seismicity Potential Statement for the Samford Federal SWD #2
 November 7, 2019

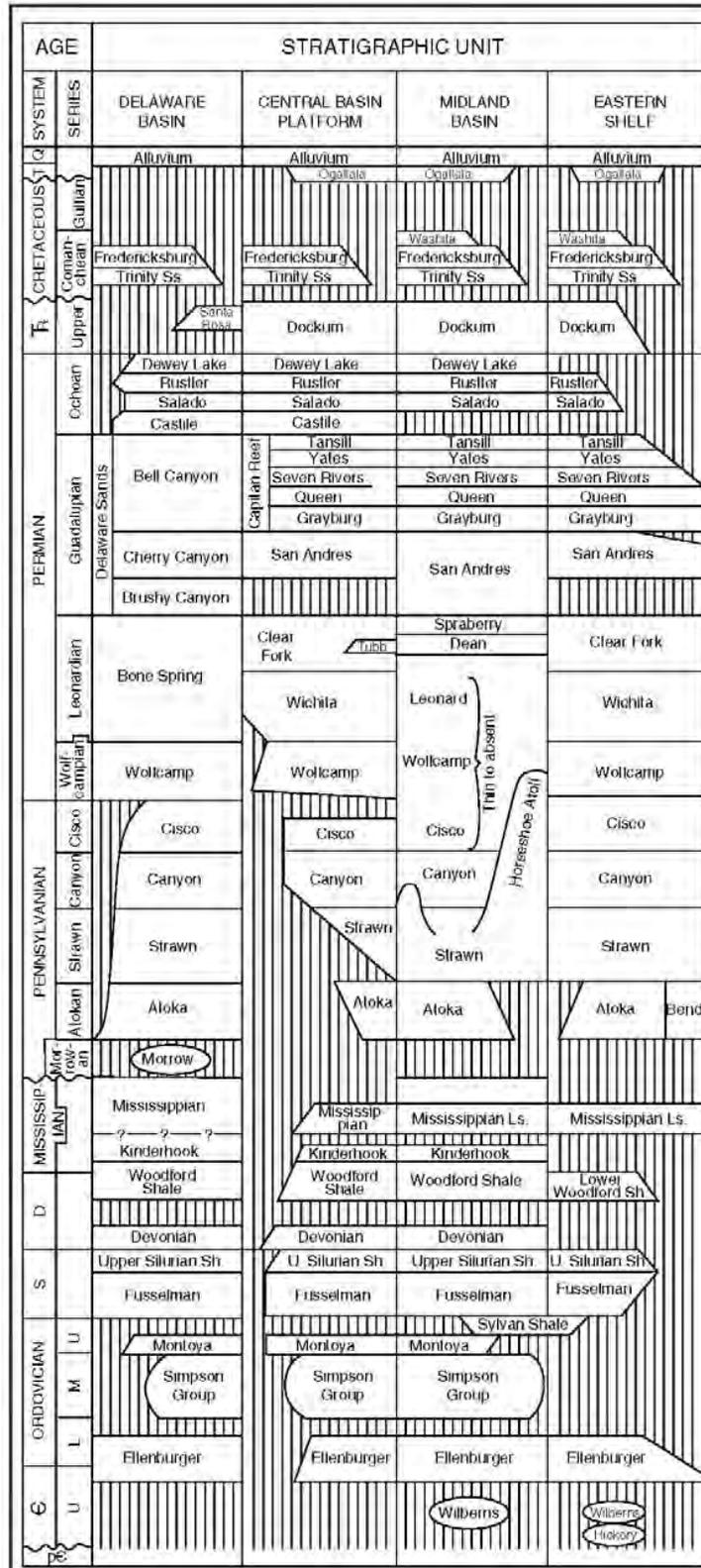


Exhibit 3. Delaware Basin Stratigraphic Chart (Ball 1995)

Attachment 7

Public Notice Affidavit and Notice of Application Confirmations

APPLICATION FOR AUTHORIZATION TO INJECT

NOTICE IS HEREBY GIVEN: That Vista Disposal Solutions, LLC, 12444 NW 10th St., Building G, Suite 202-512, Yukon, OK 73099, is requesting that the New Mexico Oil Conservation Division administratively approve the APPLICATION FOR AUTHORIZATION TO INJECT as follows:

PURPOSE: The intended purpose of the injection well is to dispose of salt water produced from permitted oil and gas wells.

WELL NAME AND LOCATION: Samford Federal SWD #2
Located 23.1 miles southwest of Jal, NM
NW ¼ NW ¼, Section 34, Township 26S, Range 33E
1,067' FNL & 200' FWL
Lea County, NM

NAME AND DEPTH OF DISPOSAL ZONE: Devonian – Silurian (17,710' – 18,910')

EXPECTED MAXIMUM INJECTION RATE: 40,000 Bbls/day

EXPECTED MAXIMUM INJECTION PRESSURE: 3,542 psi (surface)

Objections or requests for hearing must be filed with the New Mexico Oil Conservation Division within fifteen (15) days. Any objection or request for hearing should be mailed to the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505.

Additional information may be obtained by contacting Nate Alleman at 918-382-7581.

Samford Federal SWD #2 - Notice of Application Recipients				
Entity	Address	City	State	Zip Code
Landowner & Mineral Owner				
New Mexico BLM	620 E Greene St.	Carlsbad	NM	88220
OCD District				
NMOCD District 1	1625 N. French Drive	Hobbs	NM	88240
Leasehold Operators				
ConocoPhillips Company (CONOCO PHILLIPS CO)	P.O. Box 7500	Bartlesville	OK	74005
EOG Resources, Inc. (EOG RESOURCES INC)	104 S. 4th Street	Artesia	NM	88210
Railroad Commission of Texas Technical Permitting Section - UIC Program (TEXAS)	P.O. Box 12967	Austin	TX	78711
<p>Notes: The table above shows the Entities who were identified as parties of interest requiring notification on either the 1-mile well detail list (Attachment 2) or on the 2-mile Mineral Lease Map (Attachment 2). The names listed above in parenthesis, are the abbreviated entity names used on either the 1-mile well detail list (Attachment 2) or on the 2-mile Mineral Lease Map (Attachment 2).</p>				

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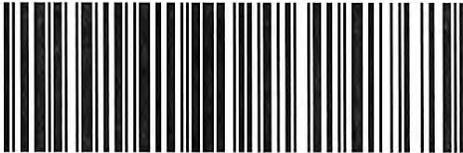


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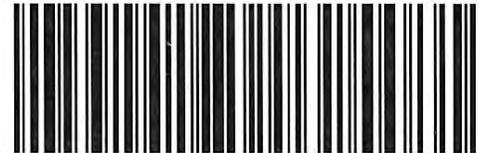


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620 E. Greene St.
Carlsbad NM 88220-6292

NMOCD District 1
1625 N. French Drive
Hobbs NM 88240-9273

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Technical Permitting Section - UIC Program
Railroad Commission of Texas
P.O. Box 12967
Austin TX 78711-2967

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