

BEFORE THE NEW MEXICO OIL CONSERVATION DIVISION

APPLICATION OF VISTA DISPOSAL SOLUTIONS LLC,
FOR A SALT WATER DISPOSAL WELL,
IN LEA COUNTY, NEW MEXICO.

Case No.

APPLICATION FOR SALT WATER DISPOSAL

Vista Disposal Solutions LLC, by and through its undersigned attorney, applies for an order approving a salt water disposal well, and in support thereof, states:

1. Applicant seeks an order proposing a salt water disposal well its Samford Federal SWD #1, to drilled at a location 261' FSL and 70' FWL, Unit E, Section 34, Township 26 South, Range 33 East, N.M.P.M. Lea County, New Mexico.
2. Applicant proposes to set a packer at 17,680' feet below the surface of the earth and then inject into the Devonian Silurian formation at depths between 17,700' through 18,900' open hole, as stated in the attached C-108.
3. Attached hereto as Exhibit A is the C-108.
4. The granting of this application will prevent waste and protect correlative rights.

WHEREFORE, Applicant requests that, after notice and hearing, the Division enter its order approving this application.

Respectfully submitted,

PADILLA LAW FIRM, P.A.

/s/ ERNEST L. PADILLA

ERNEST L. PADILLA,

Attorney for Vista Disposal Solutions, LLC

PO Box 2523

Santa Fe, New Mexico 87504

505-988-7577

padillalaw@qwestoffice.net

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

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 #1

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 #1
Location Footage Calls: 261' FSL & 70' FWL
Legal Location: Unit Letter F, S34 T26S R33E
Ground Elevation: 3,291'
Proposed Injection Interval: 17,700' – 18,900'
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	805'	820	Surface	Circulation
Intermediate 1	14-3/4"	13-3/8"	68.0 lb/ft	5,200'	1,160	Surface	Circulation
Intermediate 2	12-1/4"	9-5/8"	53.5 lb/ft	14,200'	4,710	Surface	Circulation
Liner	8-1/2"	7-5/8"	39.0 lb/ft	17,700	305	14,000 (TOL)	CBL

(3) Tubing Information:

4-1/2" (composite weight string) of fiberglass-coated tubing with setting depth of 17,680'

(4) Packer Information: Lok-set or equivalent packer set at 17,680'

B.

(1) Injection Formation Name: Devonian and Silurian-Fusselman formations

Pool Name: SWD; DEVONIAN - SILURIAN

Pool Code: 97869

(2) Injection Interval: Open-hole injection between 17,700' – 18,900'

(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.

- Delaware (5,200')
- Bone Springs (9,300')
- Wolfcamp (12,000')
- Atoka (14,600')
- Morrow (15,300')

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
- 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:** 30,000 bpd
Proposed Average Injection Rate: 15,000 bpd
- (2) A closed system will be used.
- (3) **Proposed Maximum Injection Pressure:** 3,540 psi (surface)
Proposed Average Injection Pressure: approximately 1,500 – 2,000 psi (surface)
Source Water Analysis: It is expected that the injectate will consist of produced water from production wells completed in the Wolfcamp and Bone Springs formations. Analysis of water from these formations is included in **Attachment 3**.
- (4) **Injection Formation Water Analysis:** The proposed SWD will be injecting water into the Devonian and Silurian-Fusselman formations which is a non-productive zone known to be compatible with formation water from the Wolfcamp and Bone Springs 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-Fusselman formations from 17,700 – 18,900 feet. These formations consist of carbonates including light colored dolomite and chert intervals interspersed with some tight limestone intervals. Several thick sections of porous dolomite capable of taking water are present within the subject formations in the area.

The freshwater formation is the Rustler at a depth of approximately 780 feet. Water well depths in the area range from approximately 135 - 300 feet below ground surface.

IX – Proposed Stimulation Program

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

X – Logging and Test Data

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 are located within 1-mile 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

No faulting is present in the area that would provide a hydrologic connection between the injection interval and overlying USDWs. Additionally, the casing program has been designed to 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: Wellbore Diagram

Attachment 2: Area of Review Information:

- 2-mile Oil & Gas Well Map
- 2-mile Lease 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

Wellbore Diagram

Ground Level Elevation: 3,291'

32" Borehole to 140'

30" Conductor casing set @ approximately 120'
Cemented to surface.

Cement top verified by circulation to surface.

24" Borehole to 825'

20" 133# J55 BTC surface casing set @ approximately 805'
Cemented to surface with 820 sacks.

Cement top verified by circulation to surface.

14.75" Borehole to 5,220'

13.375" 68# N80 LTC intermediate casing set @ approximately 5,200'
Cemented to surface with 1,160 sacks.

Cement top verified by circulation to surface.

12.25" Borehole to 14,220'

9.625" 23.5# L80 LTC intermediate casing set @ approximately 14,200'
Cemented to surface with 4,710 sacks in two stages.

Cement top verified by circulation to surface.

4.5" (composite weight string) fiberglass-coated tubing

Set on Lokset packer (or equivalent) at approximately 17,730'

8.5" Borehole to 17,770'

7.625" 39# P110 Ultra FJ liner set @ 17,750'
Cemented 200' inside the 9.625" 2nd intermediate casing with 305 sacks of cement.

Estimated top of cement will be at 14,000 feet. Radial cement bond log will confirm top of cement.

Open Hole injection interval

6.5" Borehole to 18,900'

Total Depth @ 18,900'
PBDT @ 18,900'

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:

ALLCONSULTING

Drawn by: Joshua Ticknor

Project Manager:
Dan Arthur

Date: 8/5/2019

Vista Disposal Solutions, LLC
Samford Federal SWD #1
Section 34, Twp 26S, Rng 33E
261' FSL & 70' FWL
Lea County, NM

A-3 and AL-2 LOK-SET Retrievable Casing Packers

Product Family No. H64630 and H64628

APPLICATION

The A-3™ LOK-SET™ packer combines advantages of a retrievable packer with the features of a permanent packer. An ability to lock down tubing forces makes the A-3 suitable for a broad range of applications, including production, injection, zone isolation, and remedial operations. The AL-2™ LOK-SET packer is similar to the A-3, and has a larger bore.

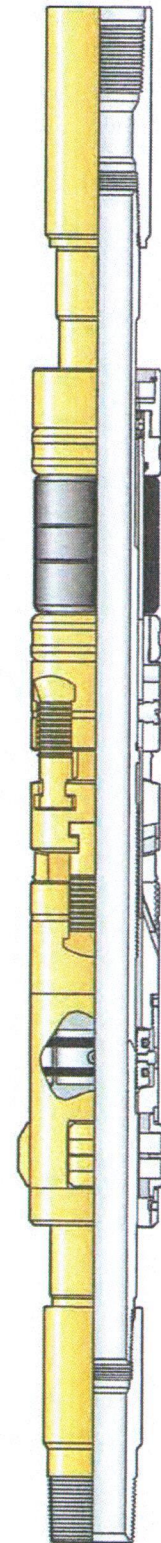
Advantages

- Holds pressure from above and below, without relying on set-down weight, tubing tension, or hydraulic hold down
- Provides tubing anchoring with tension applied, suitable for pumping wells or injection, controlling tubing forces related to change fluid temperatures
- Opposed, non-transferring, dovetail slips prevent packer movement associated with changing differential pressures, while allowing the landing of the tubing in tension, neutral or compression
- Right-hand tubing rotation controls setting and releasing
- Packing element compression locks in by ratcheting action of lock segments, which restricts rotation to one direction

Accessories

To provide a simple and reliable injection system for retrieving an injection string without having to unseat the packer:

L-10 or L-316 on-off sealing connectors, Product Family Nos. H68420 and H68422. Baker Hughes blanking plug can be used in the seating nipple profile of the on-off sealing connector to provide a means of plugging the lower zone while the tubing is being pulled.



A-3 LOK-SET
Retrievable Casing Packer
Product Family No. H64630

SPECIFICATION GUIDES

A-3™ LOK-SET Retrievable Casing Packer, Product Family No. H64630

Casing			Packer				
OD		Weight *	Size	Nom ID		Max Gage Ring OD	
in.	mm	lb/ft		in.	mm	in.	mm
4	101.6	9.5-12.9	41A2	1.500	38.1	3.244	82.4
4-1/2	144.3	21.6-23.6	41A2	1.500	38.1	3.244	82.4
4	101.6	9.5	41A4	1.500	38.1	3.423	112.4
4-1/2	114.3	18.8	41A4	1.500	38.1	3.423	112.4
		13.5-17.7	41B			3.578	90.9
		11.6-13.5	43A2	1.978	50.2	3.786	96.2
		9.5-10.5	43A4			3.786	96.2
5	127.0	15-18	43B	1.978	50.2	4.140	105.2
		11.5-15	43C			4.265	108.3
5-1/2	139.7	26	43C	1.978	50.2	4.265	108.3
		20-23	45A2			4.515	114.7
		15.5-20	45A4			4.656	118.3
		13-15.5	45B			4.796	121.8
6	152.4	26	45B	1.978	50.2	4.796	121.8
		20-23	45C			5.078	129.0
		15-18	45D			5.171	131.3
6-5/8	168.3	34	45E	1.978	50.2	5.421	137.7
		24-32	45F			5.499	139.7
		24	47A2	2.441	62.0	5.671	144.0
		17-24	45G	1.978	50.2	5.796	147.2
7	177.8	17-20	47A4	2.441	62.0	5.827	148.0
		38	47A2	2.441	62.0	5.671	144.0
		32-35	47A4			5.827	148.0
		26-29	47B2			5.983	152.0
		23-26	47B4			6.093	154.8
		17-20	47C2			6.281	159.5
7-5/8	193.7	33.7-39	47C4	2.441	62.0	6.468	164.3
		24-29.7	47D2			6.687	169.9
		20-24	47D4			6.827	173.4
8-5/8	219.1	44-49	49A2	3.500	88.9	7.327	186.1
		32-40	49A4			7.546	191.7
		20-28	49B			7.796	198.0
9-5/8	244.5	47-53.5	51A2	3.500	88.9	8.234	209.1
		40-47	51A4			8.452	214.7
		29.3-36	51B			8.608	218.6

AL-2™ Large Bore LOK-SET Retrievable Casing Packer Product Family No. H64628

Casing			Packer					
OD		Weight *	Size	Nom ID		Max Gage Ring OD		Max Diameter of Compressed Drag Block
in.	mm	lb/ft		in.	mm	in.	mm	in.
5-1/2	139.7	20	45A2 x 2-3/8	2.375	60.3	4.562	115.9	4.592
		15.5-17	45A4 x 2-3/8			4.656	118.3	4.750
		13	45B x 2-3/8			4.796	121.8	4.902
6	152.4	26	45B x 2-3/8	2.375	60.3	4.796	121.8	4.902

- * When selecting a packer for a casing weight common to two weight ranges (same OD), choose the packer size shown for the lighter of the two weight ranges. Example: for 7-in. (177.8 mm) OD 26 lb/ft casing use packer size 47B4. Under certain circumstances the other packer size may be run, such as when running in mixed casing strings.
- Repair kits, including such items as packing elements, seal rings, etc., are available for redressing Baker Retrievable Packers. Contact your Baker Hughes representative. Use only Baker Hughes repair parts.

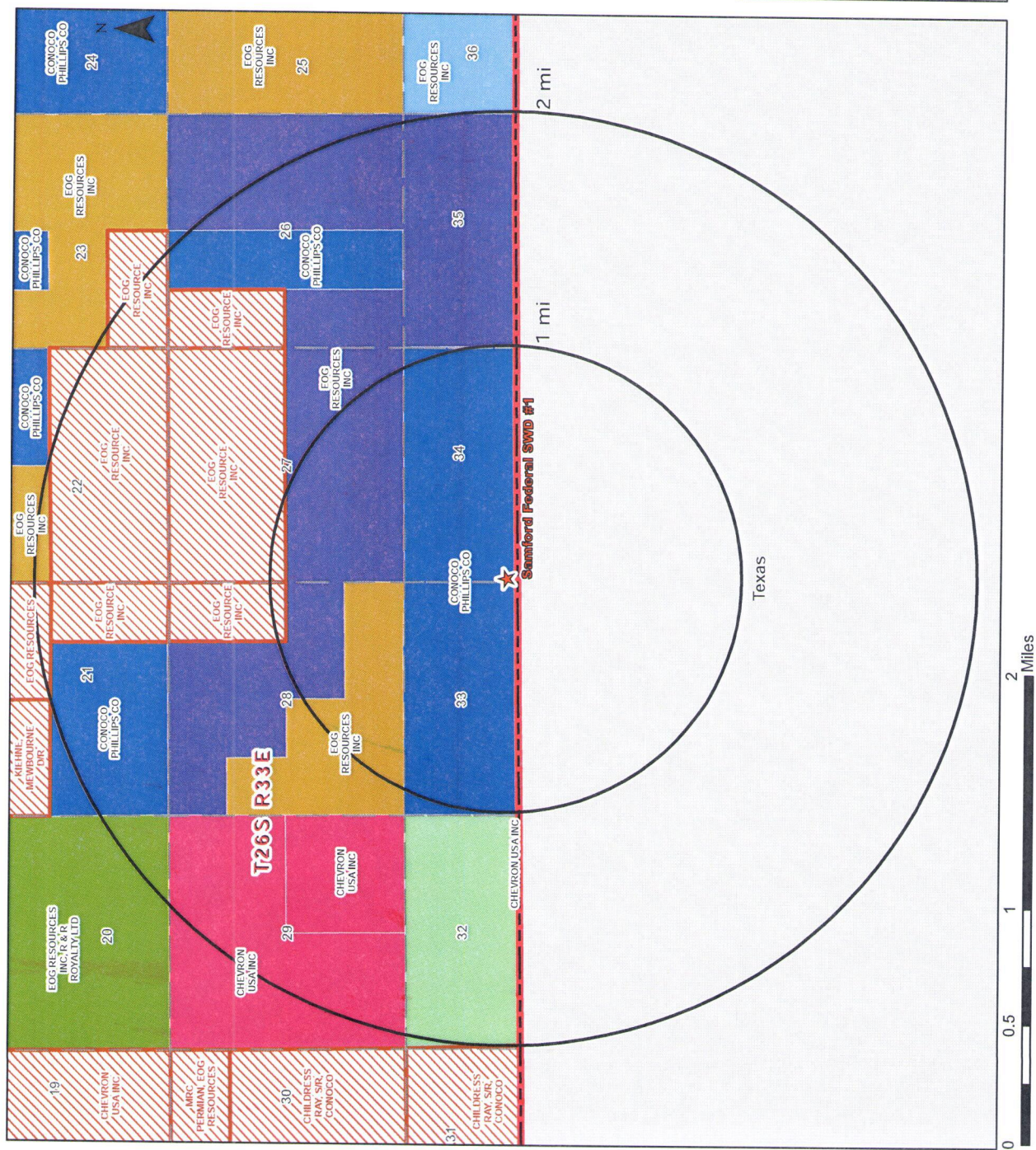
Attachment 2

Area of Review Information:

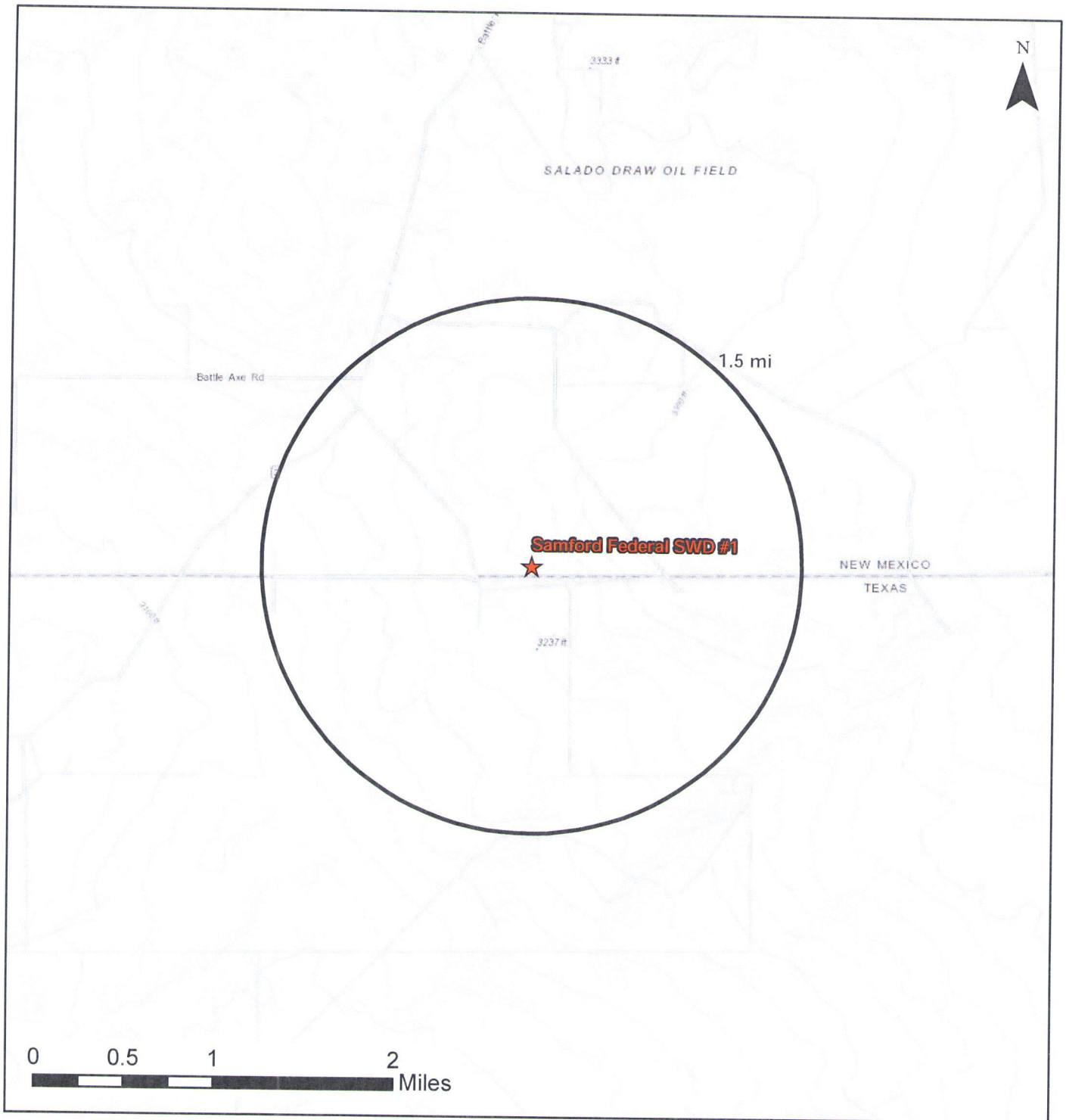
- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- 1-mile Well Detail List
- Potash Lease Map



O&G Wells Area of Review	
Samford Federal SWD #1 Lea County, New Mexico	
Proj Mgr: Dan Arthur	July 11, 2019
Mapped by: Ben Bockelmann	
Prepared for: Vista Disposal Solutions, LLC	
Prepared by: 	



Mineral Lease Area of Review			
Samford Federal SWD #1 Lea County, New Mexico			
Proj Mgr: Dan Arthur	July 15, 2019		Mapped by: Ben Bockelmann



Samford Federal SWD #1 Deep SWDs AOR

Proj Mgr:
Dan Arthur

Jul 9, 2019

Mapped by:
Ben Bockelmann

Prepared for:

Vista Disposal Solutions, LLC

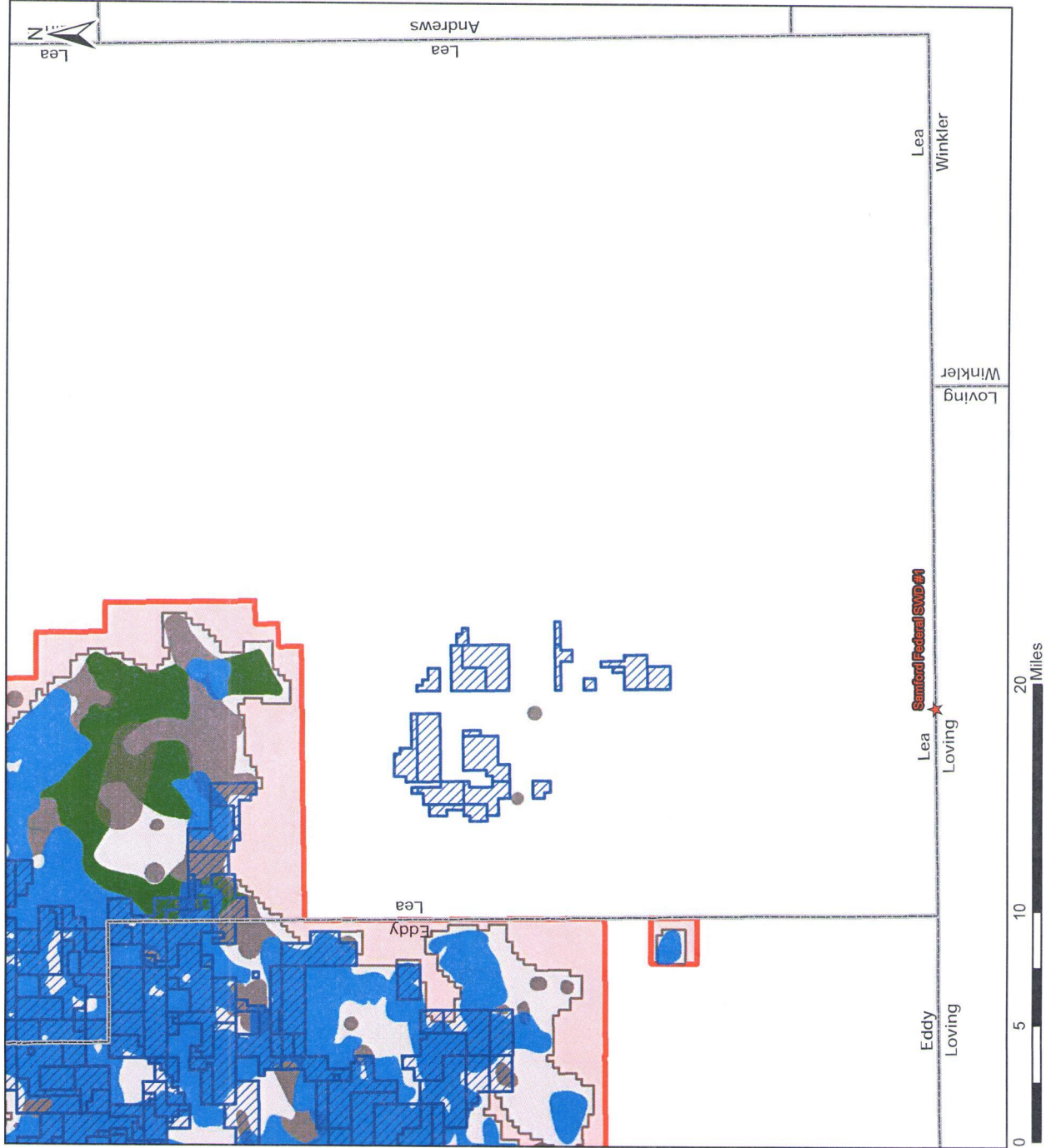
Prepared by:

ALLCONSULTING

Legend

★ Proposed SWD

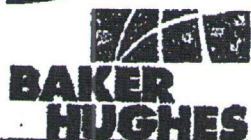
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Potash Leases Area of Review		
Samford Federal SWD #1 Lea County, New Mexico		
Proj Mgr: Dan Arthur	July 06, 2019	Mapped by: Ben Bockelmann
Prepared for: Vista Disposal Solutions, LLC		Prepared by: ALL CONSULTING

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

Sample Source

Swab Sample

Sample #

1

Formation

Depth

Specific Gravity	1.170	SG @ 80 °F	1.172
pH	8.30	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 - 10,000,000 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

North Permian Basin Region

P.O. Box 740

Sundown, TX 79372-0740

(806) 228-8121

Lab Team Leader - Sheila Hernandez

(432) 495-7240

Bone Spring

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							
Sampling Date:	03/10/11	Anions		mg/l	meq/l	Cations		mg/l	meq/l
Analysis Date:	03/18/11	Chloride:	109618.0	3091.92	Sodium:	70275.7	3058.82		
Analyst:	SANDRA GOMEZ	Bicarbonate:	2135.0	34.99	Magnesium:	195.0	18.04		
TDS (mg/l or g/m3):	184911.1	Carbonate:	0.0	0.	Calcium:	844.0	42.12		
Density (g/cm3, tonne/m3):	1.113	Sulfate:	747.0	15.55	Strontium:	220.0	5.02		
Anion/Cation Ratio:	1	Phosphate:			Barium:	0.8	0.01		
		Borate:			Iron:	6.5	0.23		
		Silicate:			Potassium:	889.0	22.22		
Carbon Dioxide:	0.50 PPM	Hydrogen Sulfide:		0 PPM	Aluminum:				
Oxygen:		pH at time of sampling:		7	Chromium:				
Comments:		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	
F	psi											psi
80	0	1.06	188.52	-1.20	0.00	-1.18	0.00	-0.11	0.00	0.66	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.

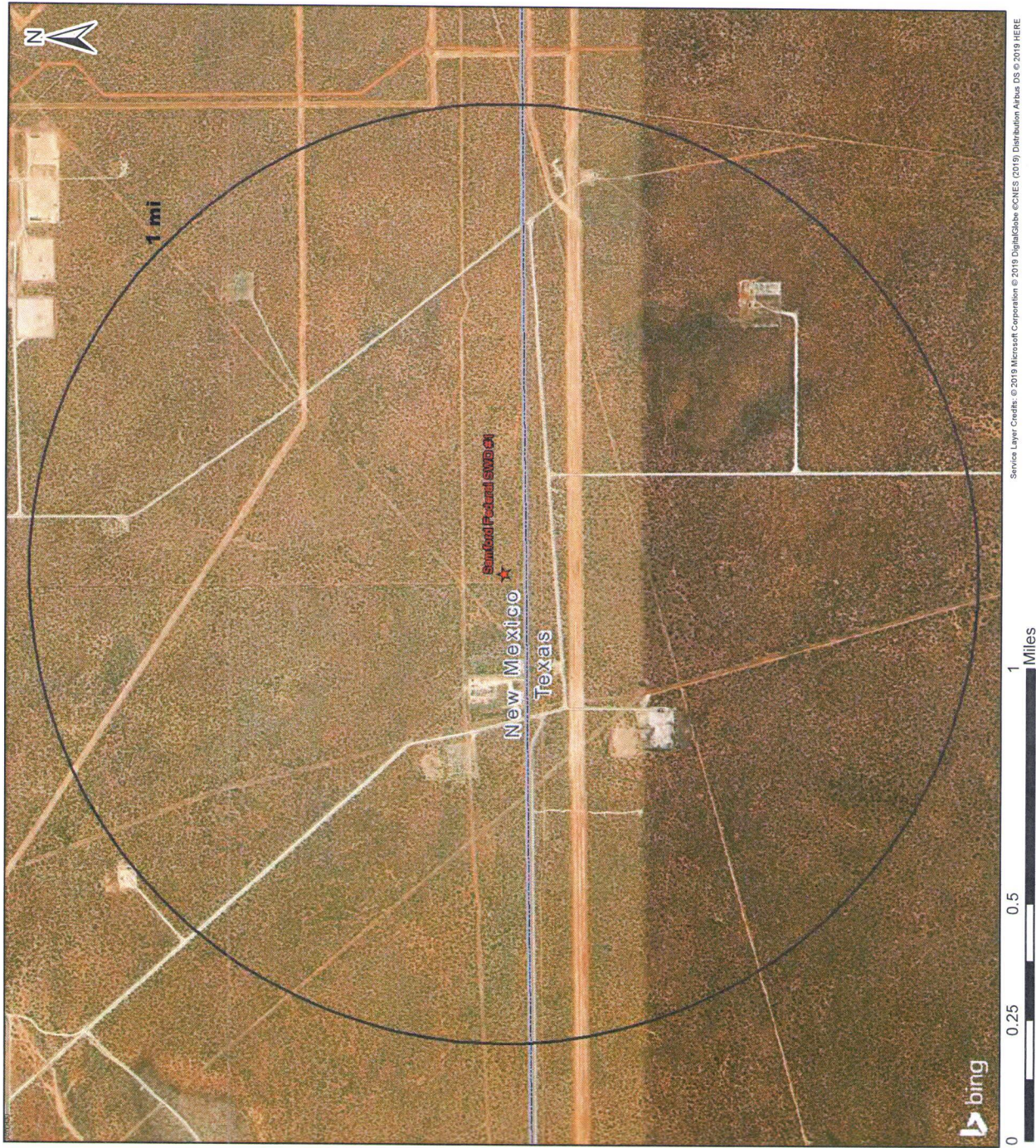
Note 3: The reported CO₂ pressure is actually the calculated CO₂ fugacity. It is usually nearly the same as the CO₂ partial pressure.

Attachment 4

Injection Formation Water Analyses

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 #1 Lea County, New Mexico

Proj Mgr:
Dan Arthur

August 05, 2019

Mapped by:
Ben Bockelmann

Prepared by:

ALLCONSULTING

Water Well Sampling Rationale						
Vista Disposal Solutions, LLC - Samford Federal SWD #1						
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

July 16, 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 #1

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 #1, 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 261 FSL & 70 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 18.3 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 5.3 miles to the north (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 10.7 miles northeast 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

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

References

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).

Exhibits

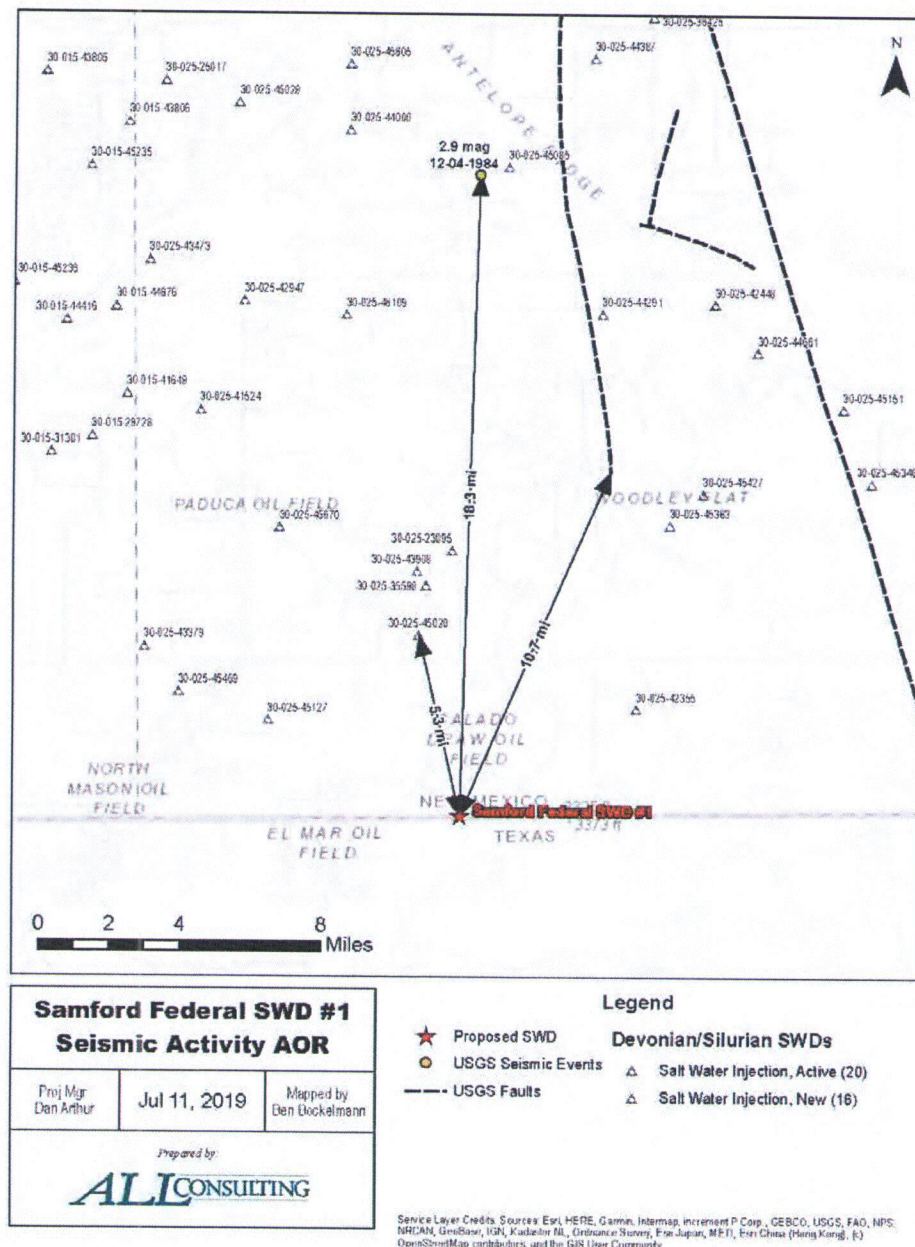


Exhibit 1. Map Showing the Distances from Known and Inferred Faults, Seismic Event, and Closest Deep Injection Well

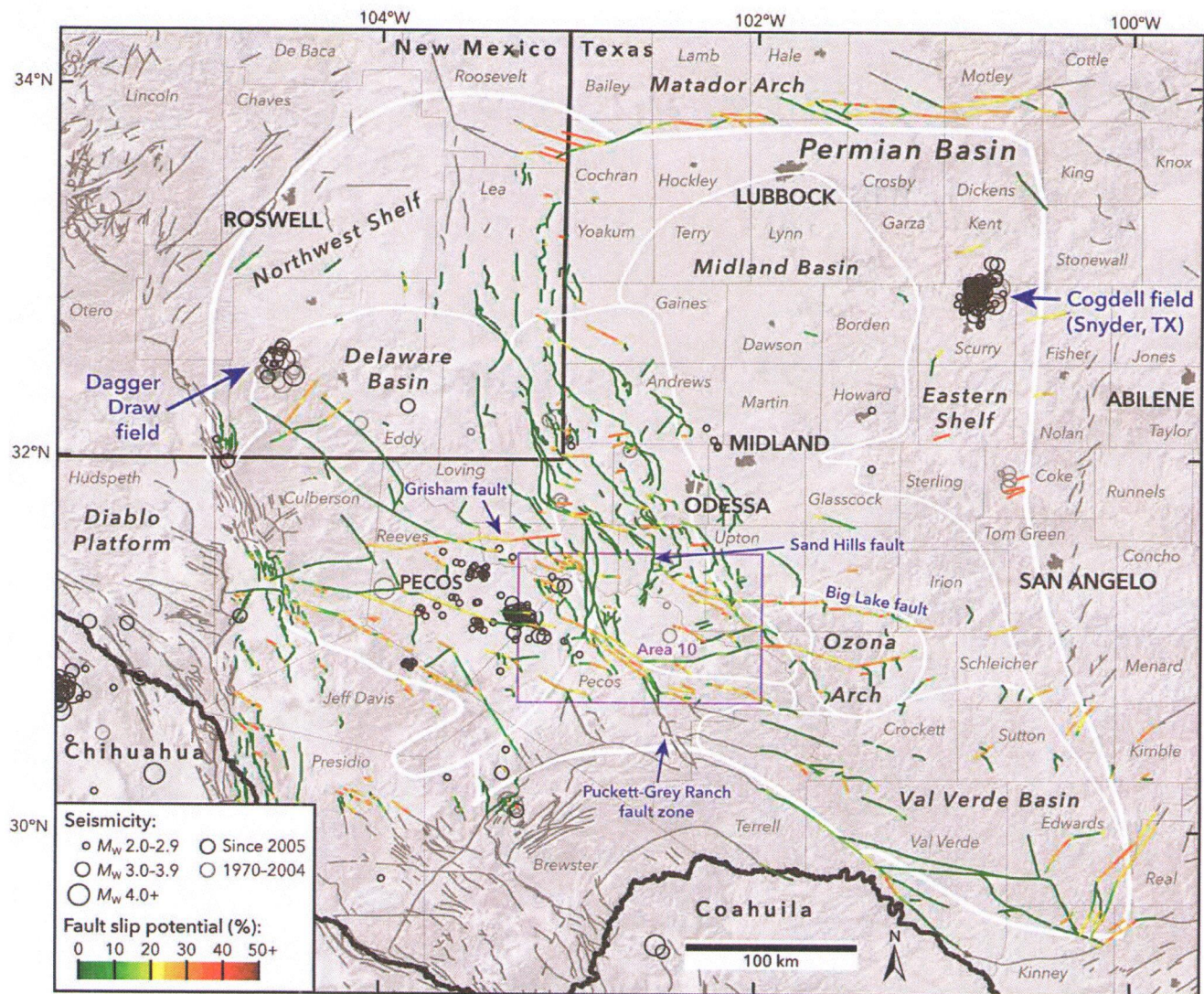


Exhibit 2. Results of the Snee and Zoback (2018) Probabilistic FSP Analysis Across the Permian Basin

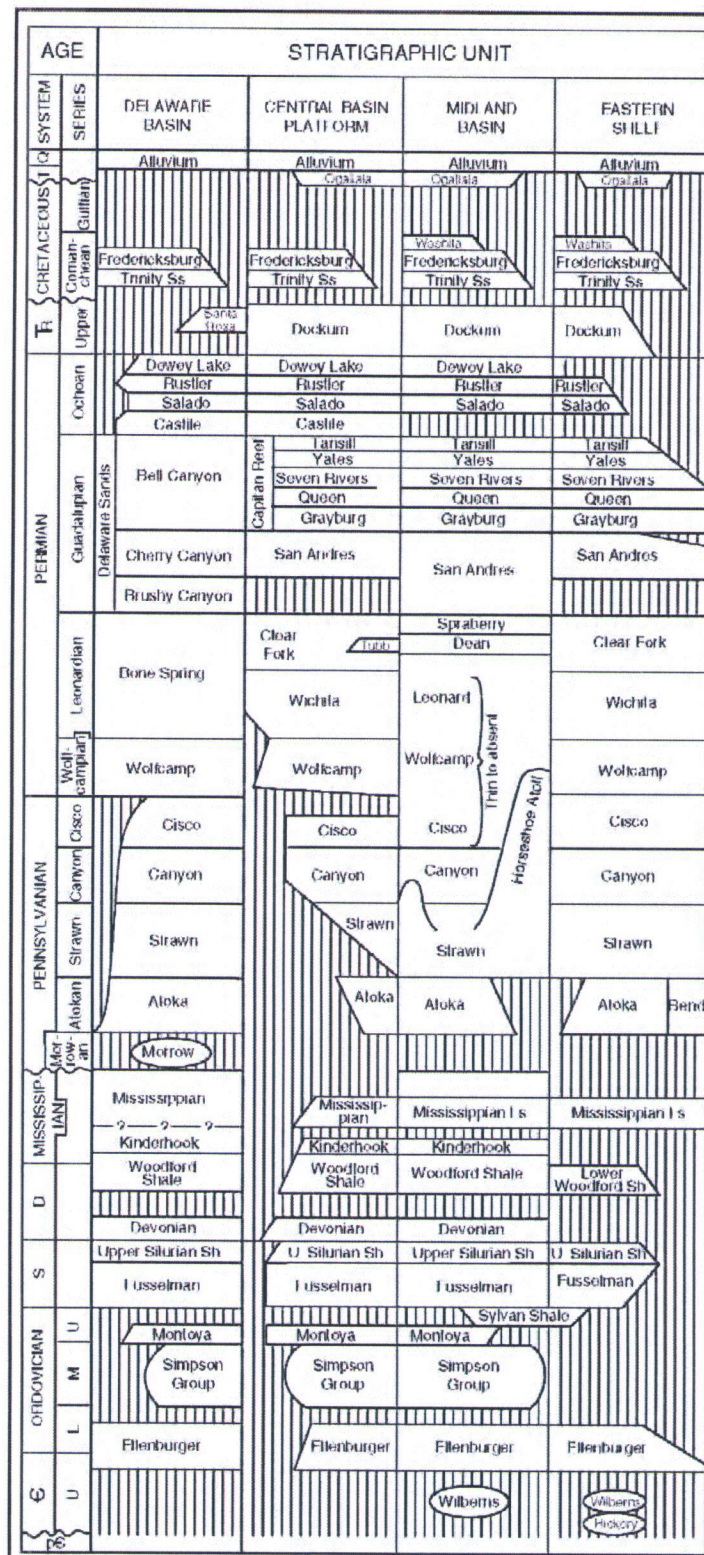


Exhibit 3. Delaware Basin Stratigraphic Chart (Ball 1995)

Attachment 7


Public Notice Affidavit and Notice of Application Confirmations

Affidavit of Publication

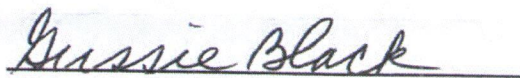
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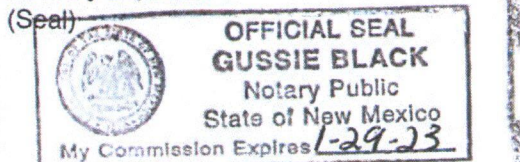
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LEGAL NOTICE
JULY 7, 2019

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 #1
SW 1/4 NW 1/4, Section 34, Township 26S, Range 33E
261' FSL & 70' FWL
Lea County, NM

NAME AND DEPTH OF DISPOSAL ZONE: Devonian - Silurian (17-700' - 18,900')

EXPECTED MAXIMUM INJECTION RATE: 30,000 Bbls/day

EXPECTED MAXIMUM INJECTION PRESSURE: 3,540 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.
#34408

67115320

00230521

DANIEL ARTHUR
ALL CONSULTING
1718 S. CHEYENNE AVE.
TULSA, OK 74119

Samford Federal SWD #1 - 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
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).				

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