

Initial Application Part I

Received 1/22/19

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

RECEIVED: <u>V24 2019</u>	REVIEWER:	TYPE: <u>SWD</u>	APP NO: <u>DMAM 19023 55591</u>
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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: Solaris Water Midstream, LLC **OGRID Number:** 371643
Well Name: Lisa Turtle SWD No.1 **API:** 30-015-xxxxx
Pool: Proposed: SWD; Devonian-Silurian **Pool Code:** 97869

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

JAN 22 2019 PM 12:45

SWD-1891

- 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.

Ben Stone
 Print or Type Name

Signature

1/18/2019
 Date

903-488-9850
 Phone Number

ben@sosconsulting.us
 e-mail Address



January 18, 2019

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

Attn: Acting Director

Re: Application of Solaris Water Midstream, LLC to drill and permit for salt water disposal the Lisa Turtle SWD Well No.1, to be located in Section 15, Township 23 South, Range 26 East, NMPM, Eddy County, New Mexico.

Dear Acting Director,

Please find the enclosed form C-108 Application for Authority to Inject, supporting the above-referenced request for salt water disposal. The well will be operated as a commercial endeavor offering operators in the area additional options for produced water disposal.

Solaris Water Midstream is a major provider of salt water disposal services to operators in southeast New Mexico and seeks to optimize efficiency, both economically and operationally, of all its operations. Approval of this application is consistent with that goal as well as the NMOCD's mission of preventing waste and protection of correlative rights.

This application for a proposed Devonian SWD interval includes the currently mandated increased One-Mile Area of Review including pertinent and available seismic information for the area and region. Published legal notice ran today, January 6, 2019 in the Artesia Daily Press and all offset operators and other affected parties have been notified individually. The legal notice affidavit is included with this application. The application also includes a wellbore schematic, area of review maps, affected party plat and other required information for a complete Form C-108. The well is located on private land and minerals. There are state and federal lands & minerals within the one-mile radius notice area; the State Land Office, Bureau of Land Management and offset operators have been notified of this application.

I respectfully request that the approval of this salt water disposal well proceed swiftly and if you or your staff requires additional information or has any questions, please do not hesitate to call or email me.

Best regards,

A handwritten signature in black ink, appearing to read 'Ben Stone', is written over a light blue background.

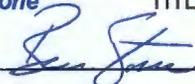
Ben Stone, Partner
SOS Consulting, LLC
Agent for Solaris Water Midstream, LLC

Cc: Application attachment and file

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: ***Salt Water Disposal*** and the application ***QUALIFIES*** for administrative approval.
- II. OPERATOR: ***Solaris Water Midstream, LLC***
ADDRESS: ***701 Tradewinds Blvd., Suite C, Midland, TX 79706***
- CONTACT PARTY: ***Agent: SOS Consulting, LLC – Ben Stone (903) 488-9850***
- III. WELL DATA: ***All well data and applicable wellbore diagrams are ATTACHED.***
- IV. ***This is not an expansion of an existing project.***
- V. ***A map is attached*** 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. A tabulation is attached of data on all wells of public record within the area of review which penetrate the proposed injection zone. ***There are NO (0) Wells in the subject AOR which Penetrate the proposed Devonian interval.*** The data includes a description of each well's type, construction, date drilled, location, depth, and a schematic of any plugged well illustrating all plugging detail. ***NO P&A Wells penetrate.***
- VII. ***The following data is ATTACHED*** 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. ***Appropriate geologic data on the injection zone is ATTACHED*** 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. ***Stimulation program – a conventional acid job may be performed to clean and open the formation.***
- *X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted). ***Well Logs will be filed with OCD.***
- *XI. ***There are several water wells/ PODs within one mile of the proposed salt water disposal well. Analysis will be forwarded.***
- XII. ***An affirmative statement is ATTACHED that available geologic and engineering data has been examined and no evidence was found*** of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.
- XIII. ***"Proof of Notice" section on the next page of this form has been completed and ATTACHED. There are 14 offset lessees and/or operators within 1 mile; state and federal minerals - all have been noticed. Well location is Private.***
- 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: ***Ben Stone*** TITLE: ***SOS Consulting, LLC agent for Solaris Water Midstream, LLC***

SIGNATURE:  DATE: ***1/18/2019***

E-MAIL ADDRESS: ***ben@sosconsulting.us***

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

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

FORM C-108 – APPLICATION FOR AUTHORIZATION TO INJECT (cont.)

III. WELL DATA – *The following information and data is included (See ATTACHED Wellbore Schematic):*

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 *pursuant to the following criteria is ATTACHED.*

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.

C-108 - Items III, IV, V

Item III - Subject Well Data

Wellbore Diagram - PROPOSED

Item IV – Tabulation of AOR Wells

NO wells penetrate the proposed injection interval.

Item V – Area of Review Maps

1. Two Mile AOR Map with One-Mile Fresh Water Well Radius
2. One-Half Mile AOR Map

All Above Exhibits follow this page.



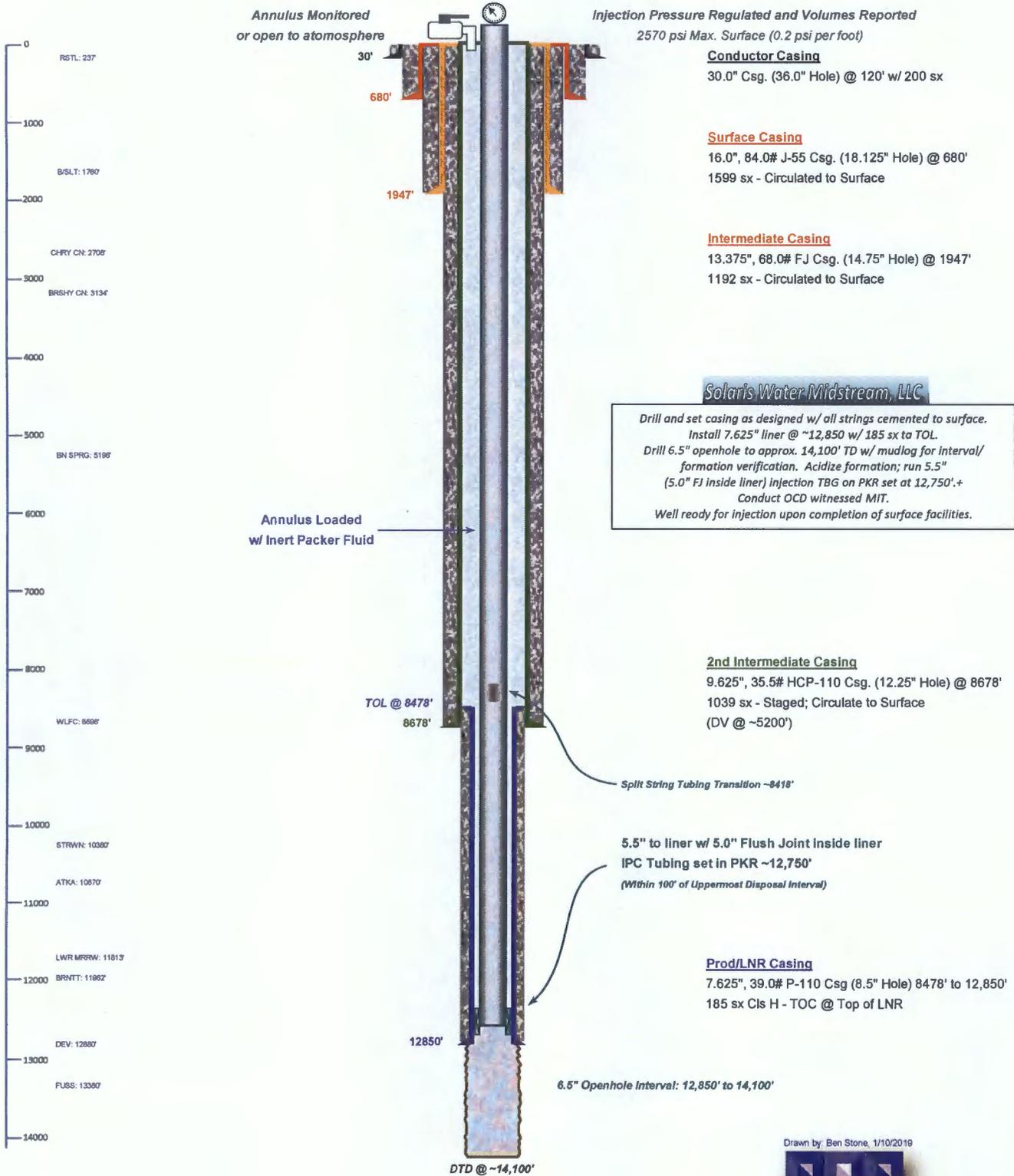
WELL SCHEMATIC - PROPOSED
Lisa Turtle SWD Well No.1

API 30-015-xxxxx

2180' FSL & 2290' FEL, SEC. 15-T23S-R26E
 EDDY COUNTY, NEW MEXICO

SWD; Devonian-Silurian (97869)

Spud Date: 5/01/2019
 SWD Config Dt: 6/01/2019



Injection Pressure Regulated and Volumes Reported
 2570 psi Max. Surface (0.2 psi per foot)

Conductor Casing
 30.0" Csg. (36.0" Hole) @ 120' w/ 200 sx

Surface Casing
 16.0", 84.0# J-55 Csg. (18.125" Hole) @ 680'
 1599 sx - Circulated to Surface

Intermediate Casing
 13.375", 68.0# FJ Csg. (14.75" Hole) @ 1947'
 1192 sx - Circulated to Surface

Solaris Water Midstream, LLC

Drill and set casing as designed w/ all strings cemented to surface.
 Install 7.625" liner @ ~12,850 w/ 185 sx to TOL.
 Drill 6.5" openhole to approx. 14,100' TD w/ mudlog for interval/
 formation verification. Acidize formation; run 5.5"
 (5.0" FJ inside liner) injection TBG on PKR set at 12,750'.+
 Conduct OCD witnessed MIT.
 Well ready for injection upon completion of surface facilities.

2nd Intermediate Casing
 9.625", 35.5# HCP-110 Csg. (12.25" Hole) @ 8678'
 1039 sx - Staged; Circulate to Surface
 (DV @ ~5200')

Split String Tubing Transition ~8418'

5.5" to liner w/ 5.0" Flush Joint inside liner
 IPC Tubing set in PKR ~12,750'
 (Within 100' of Uppermost Disposal Interval)

Prod/LNR Casing
 7.625", 39.0# P-110 Csg (8.5" Hole) 8478' to 12,850'
 185 sx Cls H - TOC @ Top of LNR

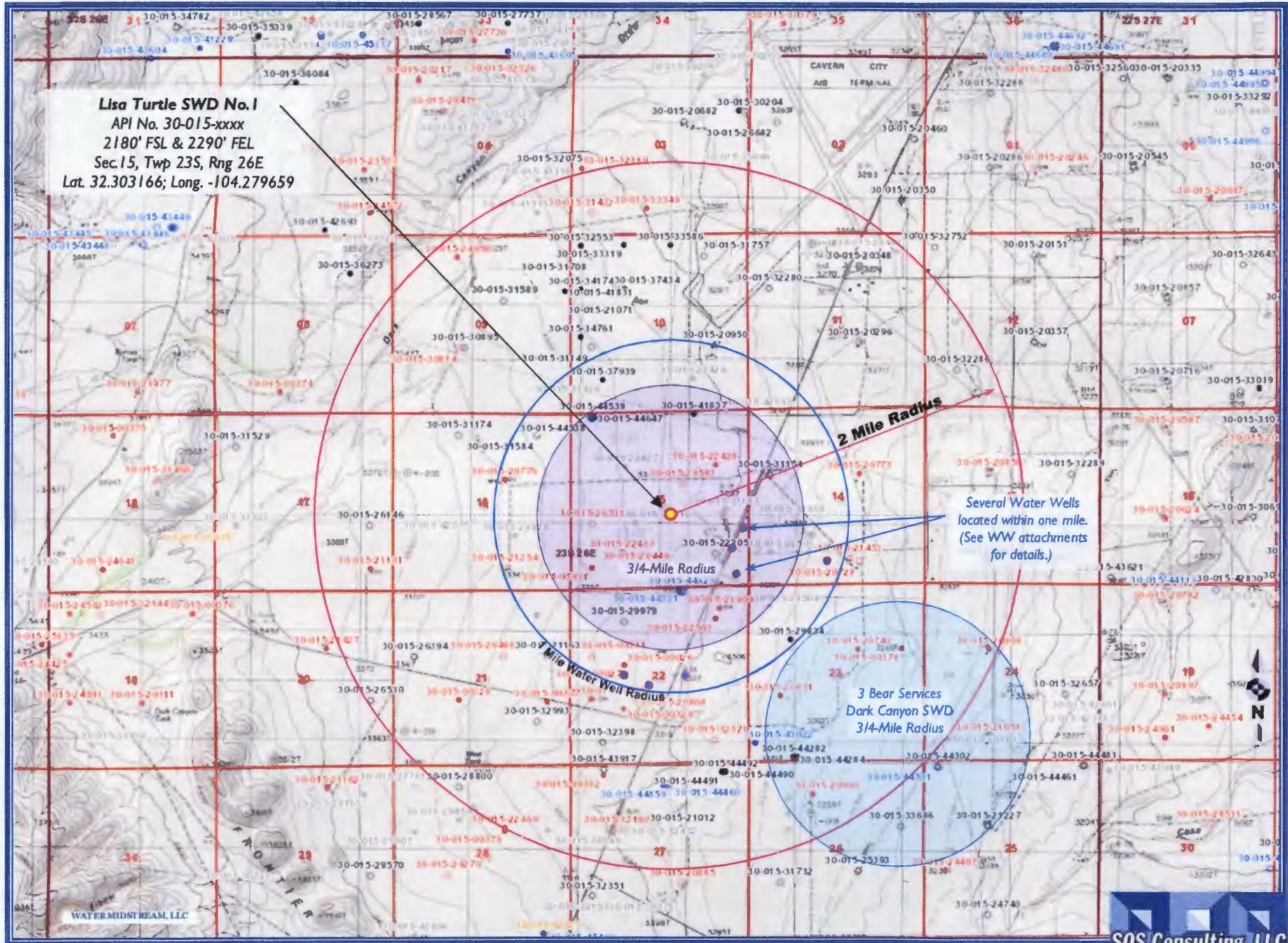
6.5" Openhole Interval: 12,850' to 14,100'

Drawn by: Ben Stone, 1/10/2019



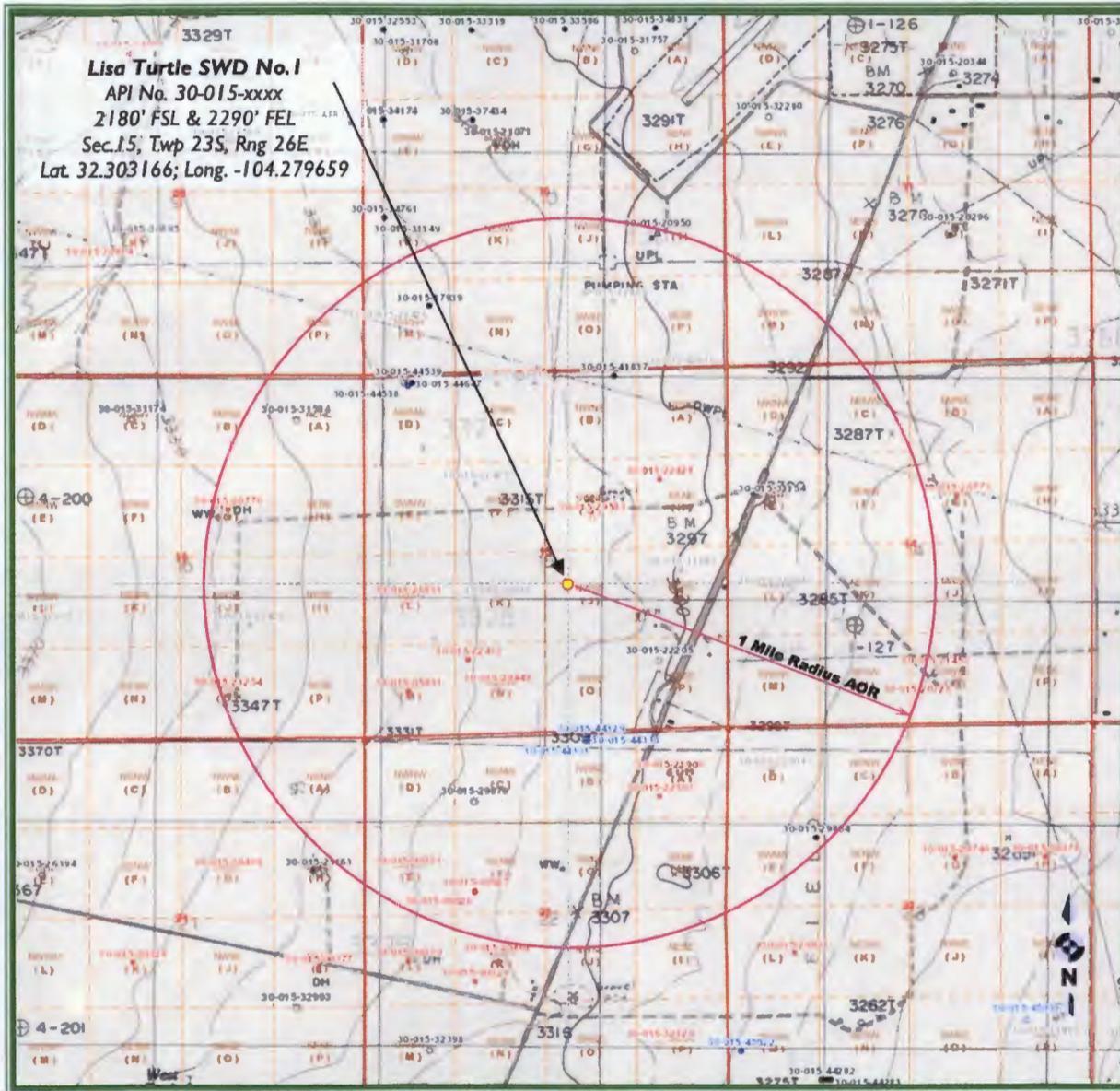
Lisa Turtle SWD No.1 - Area of Review / 2 Miles

(Attachment to NMOCD Form C-108 - Item V)



Lisa Turtle SWD Well No.1 - Area of Review / Overview Map

(Attachment to NMOCD Form C-108, Application for Authority to Inject.)



10.7 miles W/NW of Loving, NM



Eddy County, New Mexico

C-108 ITEM X – LOGS and AVAILABLE TEST DATA

**A Standard Suite of Logs will be run after
drilling the well and submitted to the Division.**

C-108 ITEM VII – PROPOSED OPERATION

Lisa Turtle SWD No.1

Commercial SWD Facility

Upon approval of all permits for SWD, operations would begin within 30 days. Completion of the well operations will take approximately 6-8 weeks. Facility construction including installation of the tank battery, berms, plumbing and other and associated equipment would be occurring during the same interval but at a different location from the well. In any event, it is not expected for the construction phase of the project to last more than 75 days, depending on availability of contractors and equipment.

Configure for Salt Water Disposal

Prior to commencing any work, an NOI sundry(ies) will be submitted to configure the well for SWD and will detail the completion workover including all work otherwise described above, any change to the procedure noted herein and to perform mechanical integrity pressure test per OCD test procedures. (Notify NMOCD 24 hours prior.) The casing/tubing annulus will be monitored for communication with injection fluid or loss of casing integrity.

Operational Summary

The SWD facility will not be fenced so that trucks may access for load disposal 24/7.

The well and injection equipment will be a closed system and equipped with pressure limiting devices and volume meters. The annulus, loaded with an inert, anti-corrosion packer fluid, will be monitored for pressure.

The tanks will be equipped with telemetry devices and visual alarms to alert the operator and customers of full tanks or an overflow situation.

Anticipated daily maximum volume is 40,000 bpd and an average of 25,000 bpd at a maximum surface injection pressure of 2570 psi (.2 psi/ft gradient – maximum pressure will be adjusted if the top of interval is modified after well logs are run).

Potential releases will be contained and cleaned up immediately. The operator shall repair or otherwise correct the situation within 48 hours before resuming operations. OCD will be notified within 24 hours of any release greater than 5 bbls. If required, remediation will start as soon as practicable. Operator shall comply with 19.15.29 NMAC and 19.15.30 NMAC, as necessary and appropriate.

C-108 ITEM VII – PRODUCED WATER ANALYSES

Item VII.4 – Water Analysis of Source Zone Water

Glorieta/ Yeso
Bone Spring
Wolfcamp

Item VII.5 – Water Analysis of Disposal Zone Water

Devonian

Water Analyses follow this page.

C-108 Item VII.5 - Produced Water Data
Solaris Water Midstream, LLC - Lisa Turtle SWD No.1 Prospect

SOURCE ZONE

GLO/YESO

API No	3001524754	Lab ID	
Well Name	PLATT PA 009	Sample ID	1146
		Sample No	
Location	ULSTR 26 18 S 26 E	Lat / Long	32.71216 -104.35742
	330 S 990 W	County	Eddy
Operator (when sampled)	Yates Petroleum Corp.		
	Field ATOKA	Unit	M
Sample Date	8/4/1984	Analysis Date	

	Sample Source Wellhead	Depth (if known)
	Water Typ Produced Water	
ph	7.5	alkalinity_as_caco3_mgL
ph_temp_F		hardness_as_caco3_mgL
specificgravity		hardness_mgL 1800
specificgravity_temp_F		resistivity_ohm_cm
tds_mgL	120382	resistivity_ohm_cm_temp
tds_mgL_180C		conductivity
chloride_mgL	113000	conductivity_temp_F
sodium_mgL	71415	carbonate_mgL 0
calcium_mgL	2560	bicarbonate_mgL 476
iron_mgL	0	sulfate_mgL 2001
barium_mgL		hydroxide_mgL
magnesium_mgL	0	h2s_mgL 0
potassium_mgL		co2_mgL
strontium_mgL		o2_mgL
manganese_mgL		anionremarks

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)



C-108 Item VII.5 - Produced Water Data
Solaris Water Midstream, LLC - Lisa Turtle SWD No.1 Prospect

SOURCE ZONE

GLO/YESO

API No	3001524619	Lab ID	
Well Name	PLATT PA 008	Sample ID	1207
		Sample No	
Location	ULSTR 26 18 S 26 E 430 S 2260 W	Lat / Long	32.71245 -104.35329
		County	Eddy

Operator (when sampled)	Yates Petroleum Corporation	
	Field	ATOKA
	Unit	N
Sample Date	1/19/1985	Analysis Date

	Sample Source well head	Depth (if known)
	Water Typ	Produced Water
ph	6	alkalinity_as_caco3_mgL
ph_temp_F		hardness_as_caco3_mgL
specificgravity		hardness_mgL 11500
specificgravity_temp_F		resistivity_ohm_cm
tds_mgL	136324	resistivity_ohm_cm_temp
tds_mgL_180C		conductivity
chloride_mgL	121000	conductivity_temp_F
sodium_mgL	61571	carbonate_mgL
calcium_mgL	4160	bicarbonate_mgL 104
iron_mgL	0	sulfate_mgL 3720
barium_mgL		hydroxide_mgL
magnesium_mgL	7340	h2s_mgL
potassium_mgL		co2_mgL
strontium_mgL		o2_mgL
manganese_mgL		anionremarks

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)



**C-108 Item VII.5 - Produced Water Data
Solaris Water Midstream, LLC - Lisa Turtle SWD No.1 Prospect**

SOURCE ZONE

BONE SPRING

API No	3001520225	Lab ID	
Well Name	BIG EDDY UNIT 012	Sample ID	5847
		Sample No	
Location	ULSTR 21 20 S 31 E 660 N 660 W	Lat / Long	32,56399 -103,87994
		County	Eddy
Operator (when sampled)	MALLON OIL COMPANY		
	Field BIG EDDY	Unit D	
Sample Date	8/27/1999	Analysis Date	8/31/1999
	Sample Source	Depth (if known)	
	Water Typ		
ph	5.2	alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity	1.125	hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	181697	resistivity_ohm_cm_temp	
tds_mgL_180C		conductivity	
chloride_mgL	123750	conductivity_temp_F	
sodium_mgL	73895.6	carbonate_mgL	
calcium_mgL	5625	bicarbonate_mgL	13,725
iron_mgL	337.5	sulfate_mgL	787,5
barium_mgL		hydroxide_mgL	
magnesium_mgL		h2s_mgL	0
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	
Remarks			

(Produced water data courtesy of NMT Octane NM WAIDS database.)



**C-108 Item VII.5 - Produced Water Data
Solaris Water Midstream, LLC - Lisa Turtle SWD No.1 Prospect**

SOURCE ZONE

WOLFCAMP

API No	3001520138	Lab ID	
Well Name	MAHUN STATE 001	Sample ID	5688
		Sample No	
Location	ULSTR 16 22 S 22 E 1800 N 1980 W	Lat / Long	32.39340 -104.70979
		County	Eddy

Operator (when sampled)

Field	ROCKY ARROYO	Unit	F
Sample Date	5/17/1968	Analysis Date	

	Sample Sourc	DST	Depth (if known)	
	Water Typ			
ph		8.6	alkalinity_as_caco3_mgL	
ph_temp_F			hardness_as_caco3_mgL	
specificgravity			hardness_mgL	
specificgravity_temp_F			resistivity_ohm_cm	
tds_mgL		35495	resistivity_ohm_cm_temp_	
tds_mgL_180C			conductivity	
chloride_mgL		19000	conductivity_temp_F	
sodium_mgL			carbonate_mgL	
calcium_mgL			bicarbonate_mgL	830
iron_mgL			sulfate_mgL	2500
barium_mgL			hydroxide_mgL	
magnesium_mgL			h2s_mgL	
potassium_mgL			co2_mgL	
strontium_mgL			o2_mgL	
manganese_mgL			anionremarks	

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)



C-108 Item VII.5 - Produced Water Data
Solaris Water Midstream, LLC - Lisa Turtle SWD No.1 Prospect

DISPOSAL ZONE

DEVONIAN

API No.	3001510280	Lab ID	
Well Name	JURNEGAN POINT 001	Sample ID	6170
		Sample No	
Location	ULSTR 05 24 S 25 E 660 S 660 W	Lat / Long	32.24037 -104.42375
		County	Eddy

Operator (when sampled)

Field	WLDCAT	Unit	M
Sample Date	12/14/1964	Analysis Date	

Sample Source	DST	Depth (if known)	
Water Type			

ph	7	alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity		hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	229706	resistivity_ohm_cm_temp_	
tds_mgL_180C		conductivity	
chloride_mgL	136964	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL		bicarbonate_mgL	198
iron_mgL		sulfate_mgL	2511
barium_mgL		hydroxide_mgL	
magnesium_mgL		h2s_mgL	
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)



C-108 – Item VIII

Geologic Information

The Devonian and Silurian 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 believed present within the subject formations in the area. Depth control data was inferred from deep wells to the south and east. If the base of Devonian and top of Silurian rocks come in as expected the well will only be drilled deep enough for adequate logging rathole.

At a proposed depth of 14,100' BGL (Below Ground Level) the well will TD approximately 1,250' below the estimated top of the Devonian. Mud logging through the interval will ensure the target interval remains in Devonian and Silurian. Once Devonian is determined, the casing shoe depth will be set at an approximate maximum upper depth of 12,880' BGL. Injection will occur through the resulting openhole interval. Should mud or other logs indicate depth adjustment is required to exploit the desired formation as described; sundries with appropriate data will be filed with the OCD.

The Devonian is overlain by the Barnett Shale and underlain by the Middle and Lower Ordovician; Simpson, McKee and Ellenburger.

Fresh water in the area is generally available from Cenozoic Alluvium and Rustler formations including sand and gravel layers within. State Engineer's records show water wells in the area with a depth to groundwater of 70 to 360 feet with an average depth to groundwater of 219 feet.

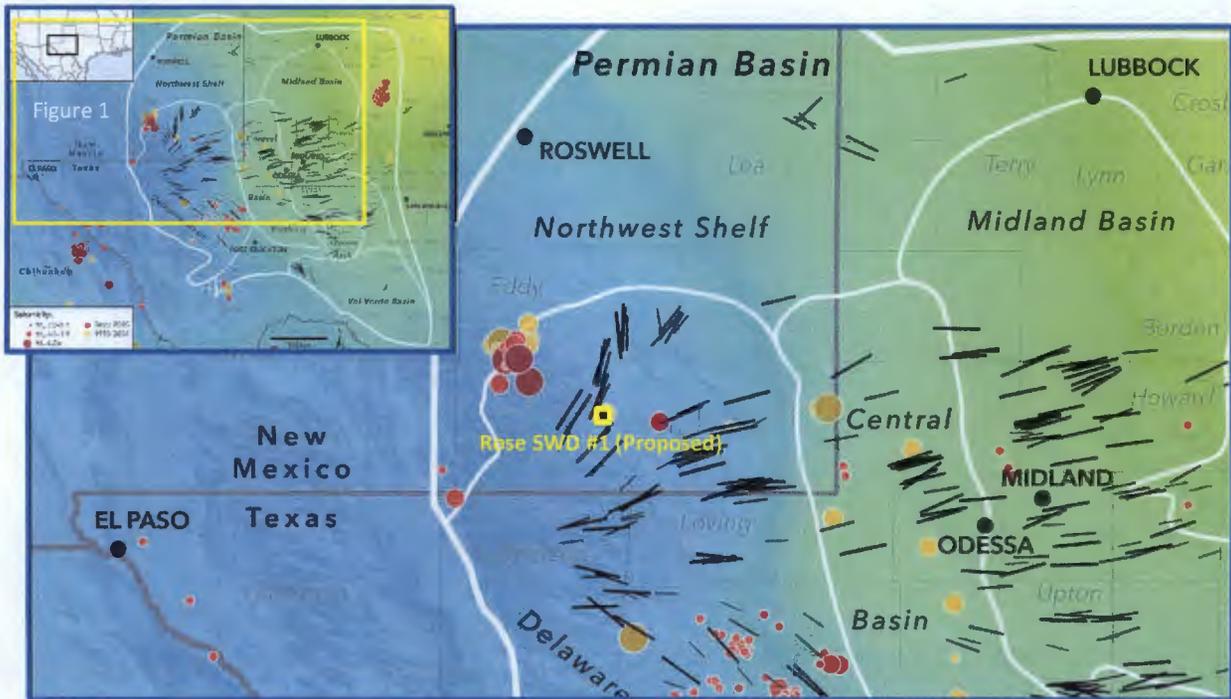
There are several water wells located within one mile of the proposed SWD; 2 have been sampled and analyses will be forwarded upon receipt.

C-108 - Item VIII

Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT

Map Source: State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity (Figure 1); Jens-Erik Lund Sneek/ Mark Zoback, February 2018



PROJECT VICINITY

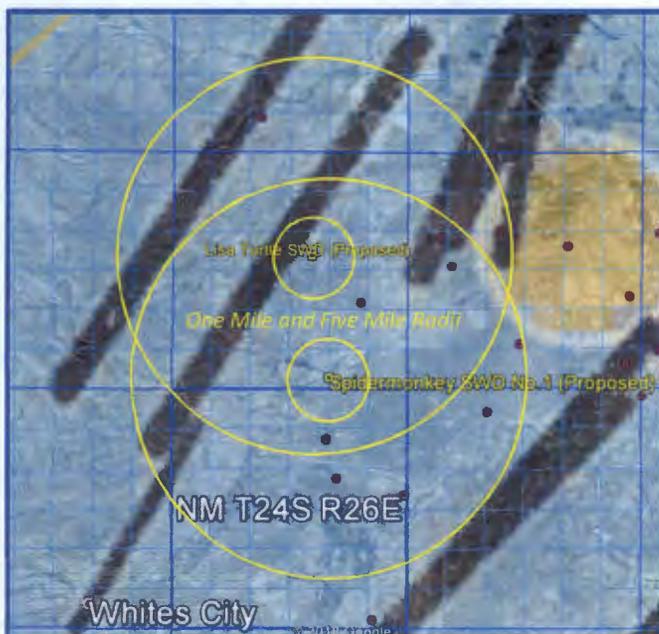


Figure 1. State of stress in the Permian Basin, Texas and New Mexico. Black lines are the measured orientations of the maximum horizontal stress (SHmax), with line length scaled by data quality. The colored background is an interpolation of measured relative principal stress magnitudes (faulting regime) expressed using the $A\sigma$ parameter (see text for details) of Simpson (1997). Blue lines are fault traces known to have experienced normal-sense offset within the past 1.6 Ma, from the USGS Quaternary Faults and Folds Database (Crone and Wheeler, 2000). The boundary between the Shawnee and Mazatzal basement domains is from Lund et al. (2015), and the Precambrian Grenville Front is from Thomas (2006). The Permian Basin boundary is from the U.S. Energy Information Administration, and the subbasin boundaries are from the Texas Bureau of Economic Geology Permian Basin Geological Synthesis Project. Earthquakes are from the USGS National Earthquake Information Center, the TexNet Seismic Monitoring Program, and Gan and Frohlich (2013). Focal mechanisms are from Saint Louis University (Herrmann et al., 2011).

C-108 - Item VIII

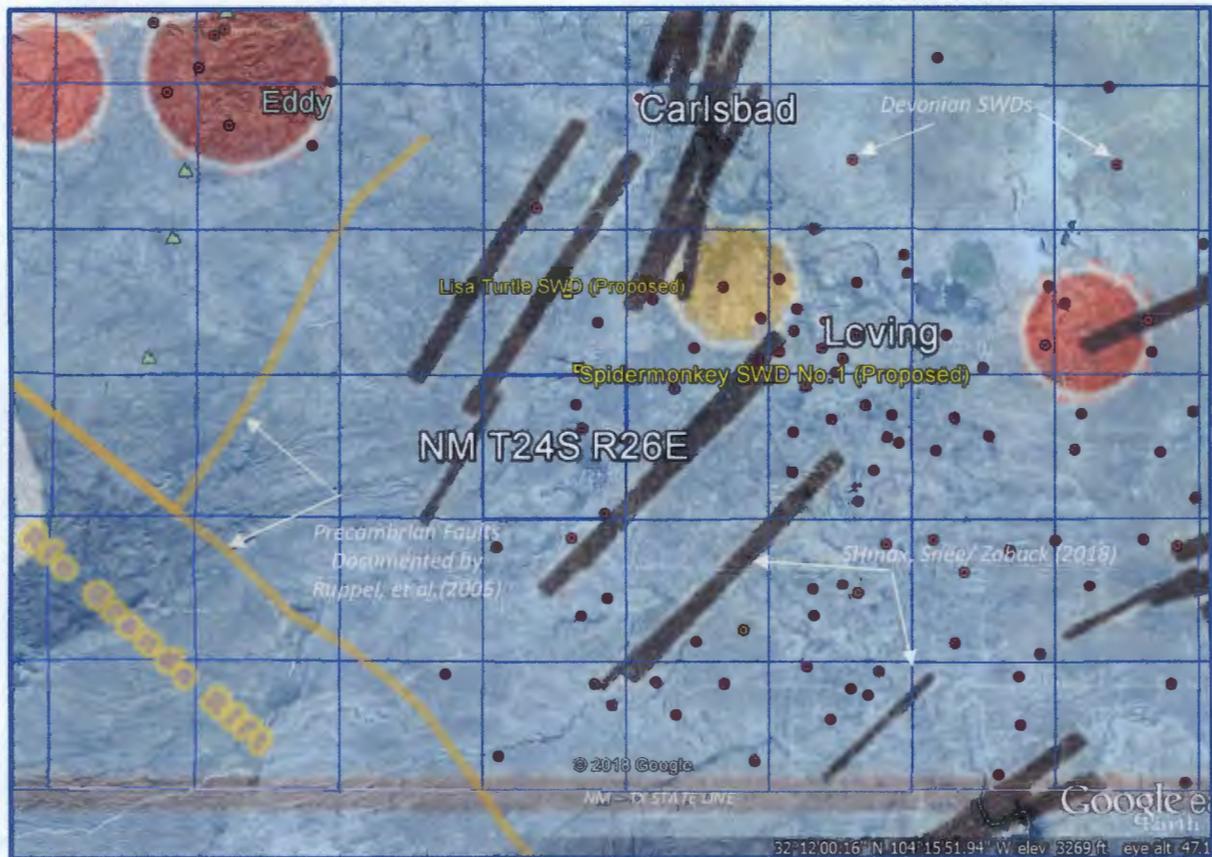
Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

In the following map, a layer with USGS historical earthquake data is overlaid and, a layer showing lines to represent Precambrian faults as documented by Ruppel, et al. (2005). Finally, a layer showing all currently permitted SWDs completed or proposed to be completed in the Devonian (Silurian) formation.

The USGS earthquakes shown are well know to the area. The cluster to the NW represents the seismic events in and around the Dagger Draw area (23.3 miles) in 2002. The 2012 quake located approximately 13 miles due east of Loving is also shown (21.7 miles). This was perhaps the most significant of the area in recent years but was determined to not be related to oil and gas activity.

The Precambrian faults and existing Devonian SWDs are discussed in more detail on the next page.



REGIONAL VIEW - DEVONIAN SWD LOCATIONS, PRECAMBRIAN FAULTS, S_{Hmax} , USGS MAGNITUDE

Based on publicly available data for the subject area, it is reasonable to believe the risk of induced seismic activity due to disposal injection into these wells is extremely low.

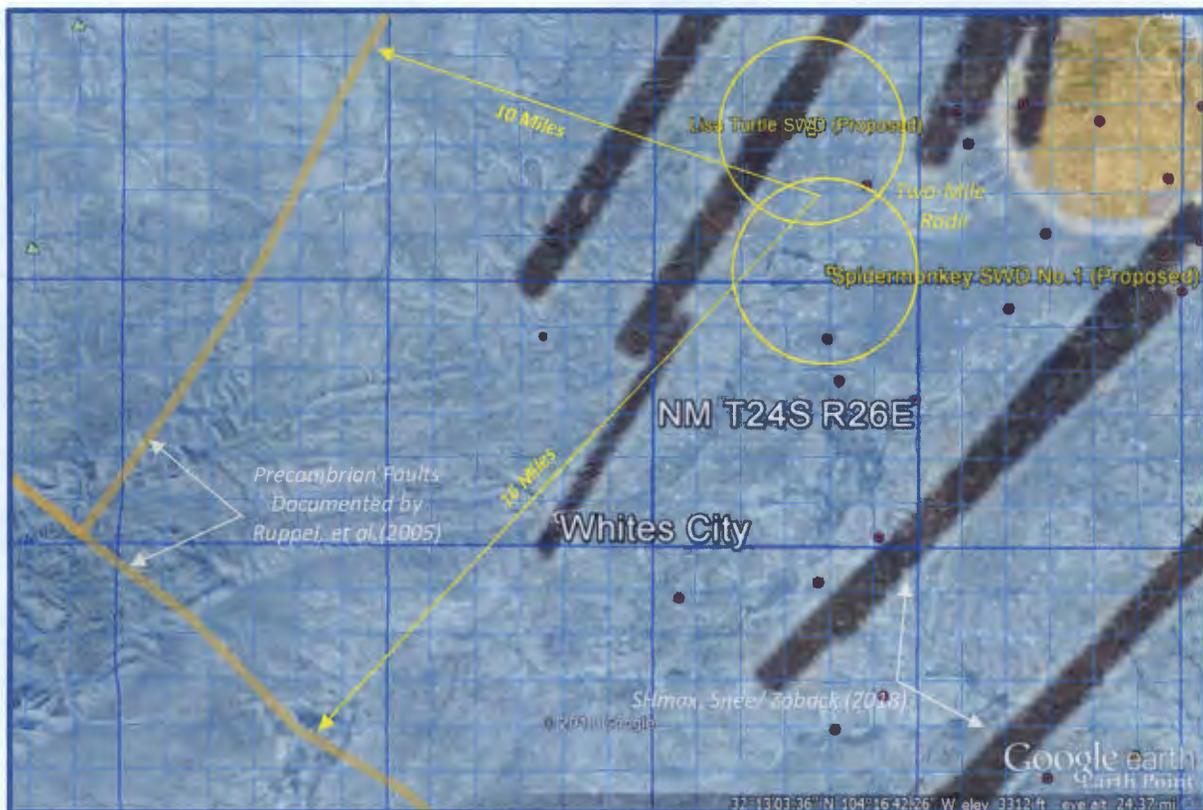
C-108 - Item VIII

Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

The primary Precambrian fault in the area as documented by Ruppel, et al. (2005) is represented on this map by the tan colored line; the fault is running southeast to northwest. The proposed Spidermonkey and Lisa Turtle SWDs [center point] are located approximately 10 miles from the northern fault and 16 from the primary fault. Other Devonian SWDs in the area are also shown by small purple dots completed or proposed to be completed in the Devonian (Silurian) formation.

The previously referenced study by Snee and Zoback evaluated the strike-slip probability using probabilistic FSP (Fault Slip Potential) analysis of known faults in the Permian Basin. The study predicts that the Precambrian fault shown here has less than a 10% probability of being critically stressed to the point of creating an induced seismicity event. The main reason for the low probability is due to the relationship of the strike of the fault to the regional S_{Hmax} orientation in this area.

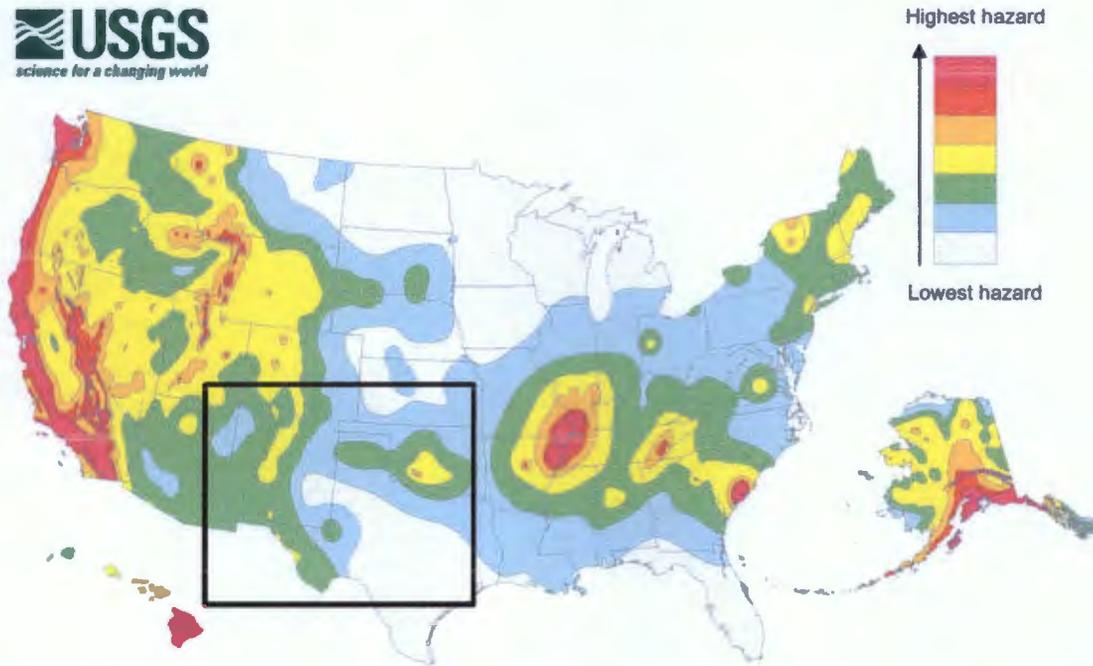


VICINITY - PERMITTED DEVONIAN SWDs, PRECAMBRIAN FAULT, S_{Hmax}

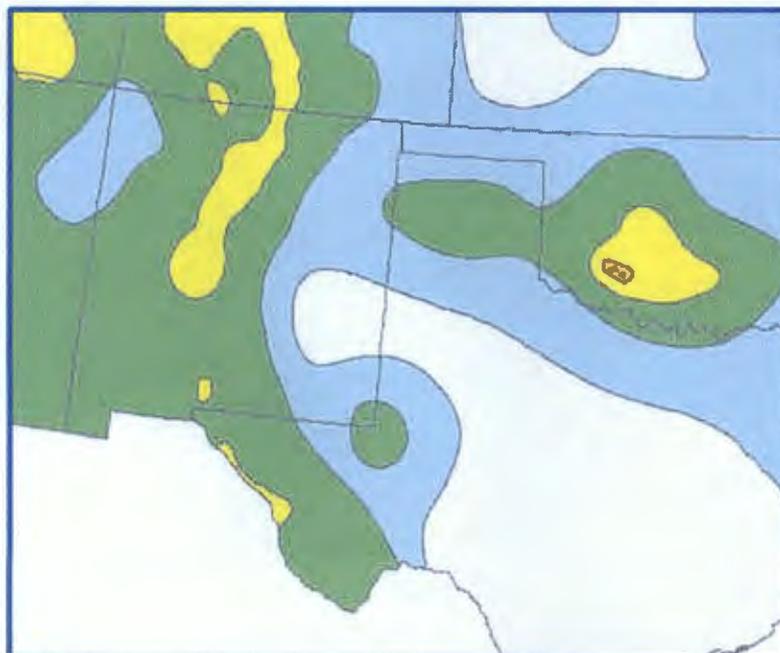
C-108 - Item VIII

Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)



2014 map data: The USGS notes in its report that fracking may be to blame for a sizeable uptick in earthquakes in places like Oklahoma. "Some states have experienced increased seismicity in the past few years that may be associated with human activities such as the disposal of wastewater in deep wells," the report says. USGS hopes to use that data in future maps but it isn't included in this one. "Injection-induced earthquakes are challenging to incorporate into hazard models because they may not behave like natural earthquakes and their rates change based on man-made activities," the report says.

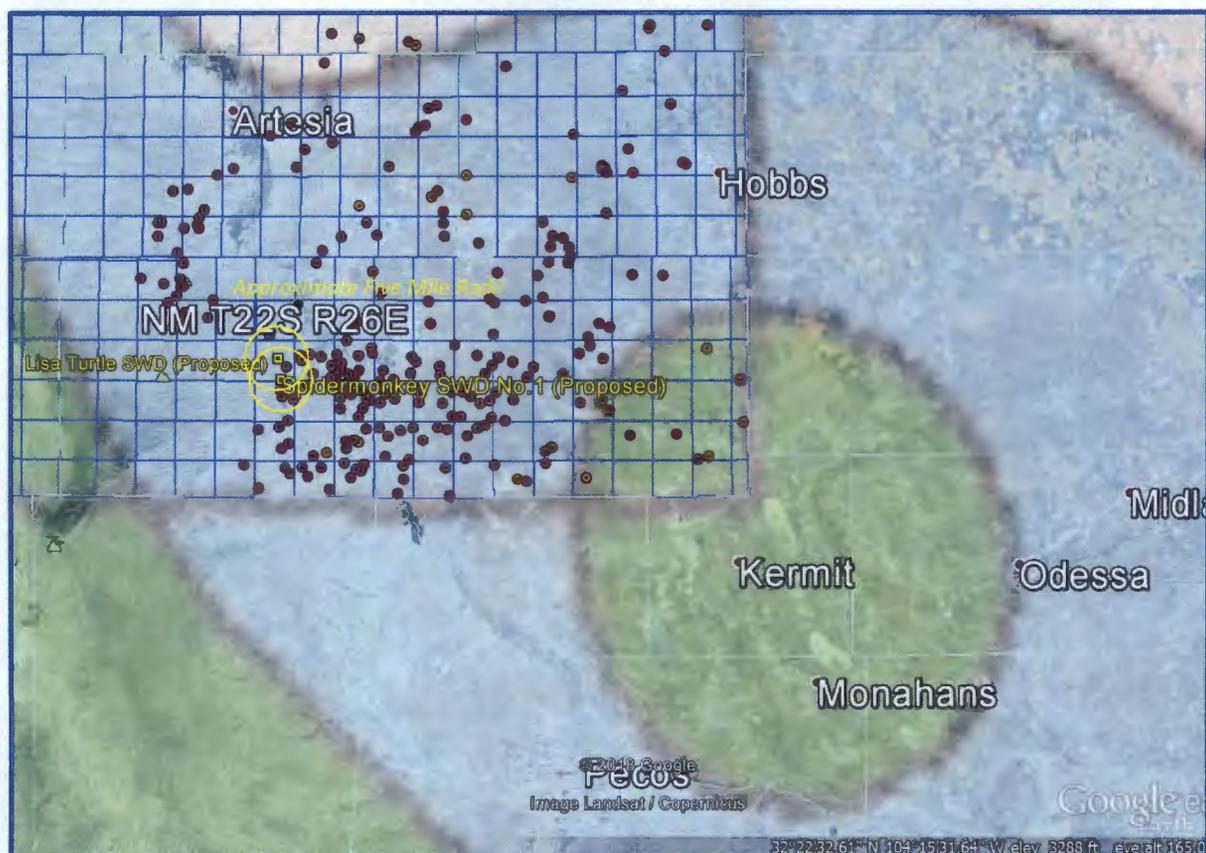


C-108 - Item VIII

Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

USGS 2014 MAP DATA OVERLAY IN GOOGLE EARTH



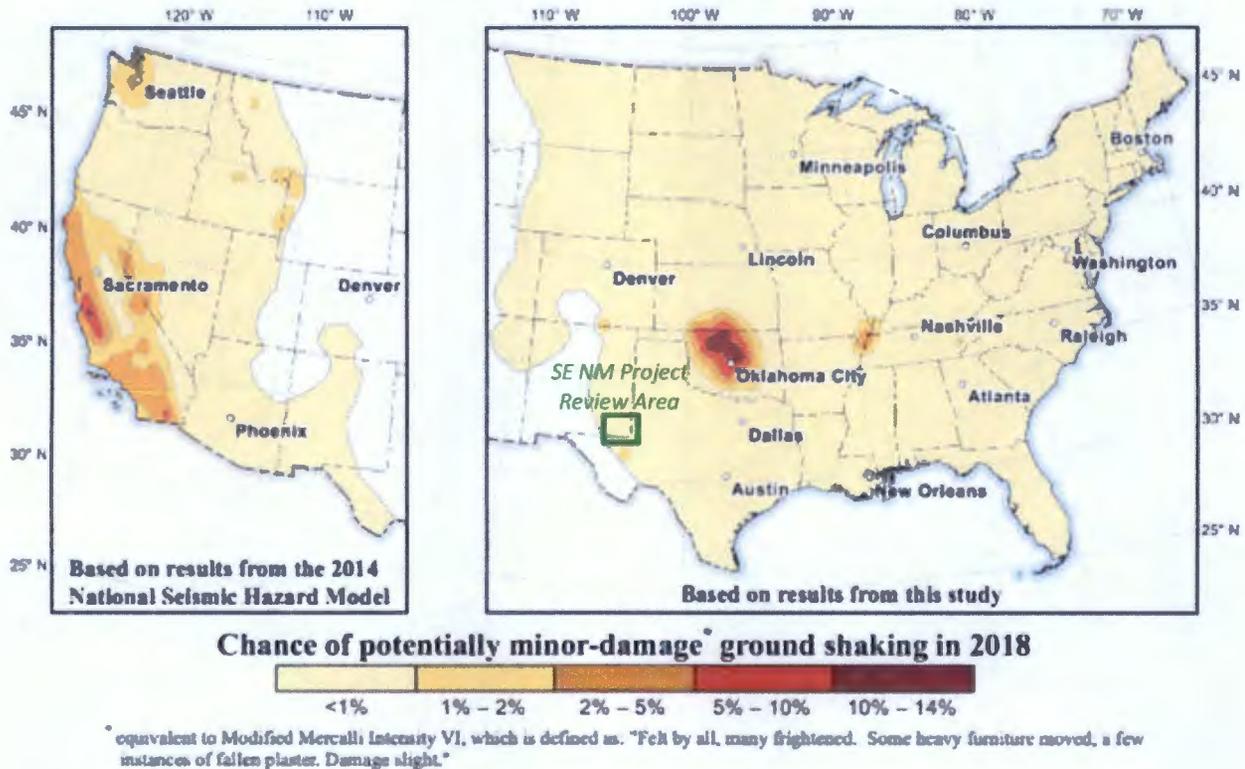
An updated USGS map for 2018 is on the next page. While methodology remained essentially the same according to USGS, the interpreted results and color-coding did have some modification. However, the subject area in southeast New Mexico on both maps remains very low and on the 2018 map, the area is assigned a value of <1% of “potentially minor-damage ground shaking”.

C-108 - Item VIII

Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

USGS 2018 ONE-YEAR MODEL



Map showing chance of damage from an earthquake in the Central and Eastern United States during 2018. Percent chances are represented as follows: pale yellow, less than 1 percent; dark yellow, 1 to 2 percent; orange, 2 to 5 percent; red, 5 to 10 percent; dark red, 10 to 12 percent. See Hazard from the western United States from the [2014 National Seismic Hazard Maps \(Petersen et al., 2014\)](#) for comparison.

The USGS has produced the 2018 one-year probabilistic seismic hazard forecast for the central and eastern United States from induced and natural earthquakes. For consistency, the updated 2018 forecast is developed using the same probabilistic seismicity-based methodology as applied in the two previous forecasts.

Based on publicly available data for the subject area, it is reasonable to believe the risk of induced seismic activity due to disposal injection into these wells is extremely low.

Inset area from previous page...



C-108 ITEM XI – WATER WELLS IN AOR

Depth to Ground Water



New Mexico Office of the State Engineer Water Column/Average Depth to Water

(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 Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 00247	C	ED	4 2 4 15 23S 26E	568406	3574119*	315	230	85						
C 00341	C	CUB	ED 1 3 22 23S 26E	567090	3572566*	1881								
C 00352	C	CUB	ED 1 3 22 23S 26E	567090	3572566*	1867								
C 01015	C	ED	4 4 4 15 23S 26E	568408	3573714*	318	245	73						
C 01022	C	ED	4 3 2 22 23S 26E	568005	3572894*	121	90	31						
C 01140	C	ED	1 3 3 15 23S 26E	566980	3573870*	325								
C 01246 AC-S	CUB	ED	3 1 1 35 23S 26E	568730	3570098	350								
C 01463	C	ED	2 2 3 22 23S 26E	567599	3572678*	295	265	30						
C 01639	C	ED	4 2 4 15 23S 26E	568406	3574119*	300	70	230						
C 03238	C	ED	4 4 4 15 23S 26E	568408	3573714*	323	245	78						
C 04051 POD1	C	ED	1 3 3 35 23S 26E	568653	3569112	360	360	0						
C 04113 POD1	CUB	ED	2 3 1 35 23S 26E	568836	3569881	255	195	60						
C 04113 POD2	CUB	ED	4 3 1 35 23S 26E	568838	3569680	289	278	11						

Average Depth to Water: 219 feet

Minimum Depth: 70 feet

Maximum Depth: 360 feet

Record Count: 13

PLSS Search:

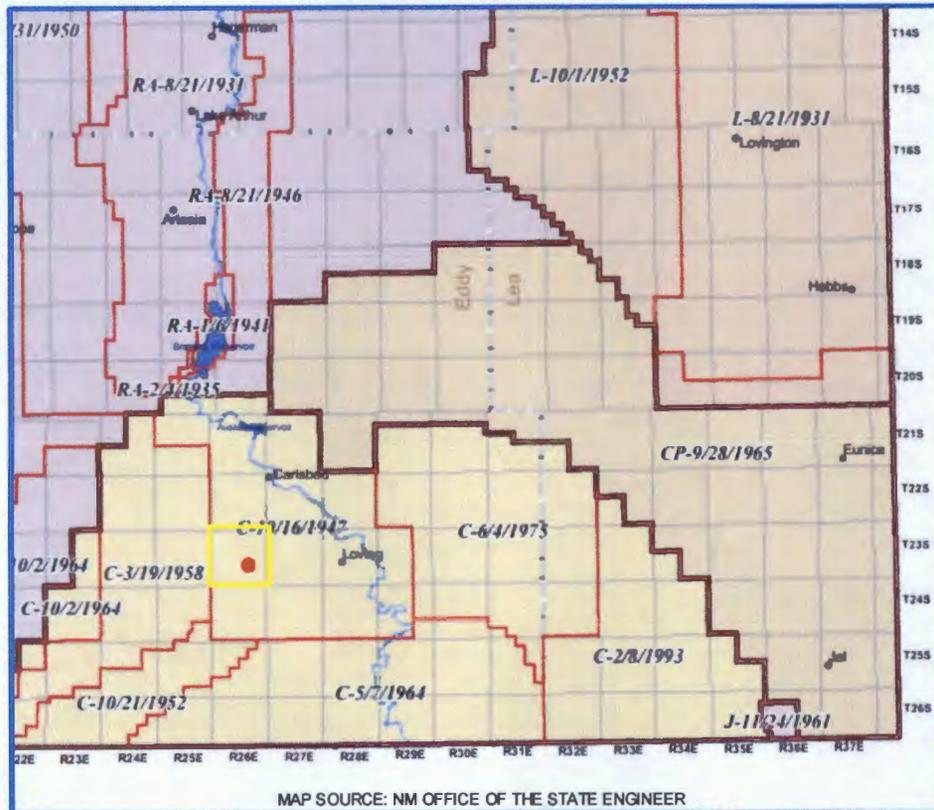
Section(s): 15, 22, 26, 35 Township: 23S Range: 26E

*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.

C-108 - Item XI

Groundwater Basins - Water Column / Depth to Groundwater



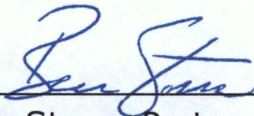
The subject well is located within the Carlsbad Basin.

Fresh water in the area is generally available from Cenozoic Alluvium and Rustler formations including sand and gravel layers within. State Engineer's records show water wells in the area with a depth to groundwater of 70 to 360 feet with an average depth to groundwater of 219 feet.

There are several water wells located within one mile of the proposed SWD; 2 have been sampled and analyses will be forwarded upon receipt.

C-108 ITEM XII – GEOLOGIC AFFIRMATION

We have examined available geologic and engineering data and have found no evidence of open faults or other hydrologic connection between the disposal interval and any underground sources of drinking water.



Ben Stone, Partner
SOS Consulting, LLC

Project: Solaris Water Midstream, LLC
Lisa Turtle SWD No.1
Reviewed 1/17/2019

C-108 ITEM XIII – PROOF OF NOTIFICATION

IDENTIFICATION AND NOTIFICATION OF INTERESTED PARTIES

Exhibits for Section

Affected Parties Map

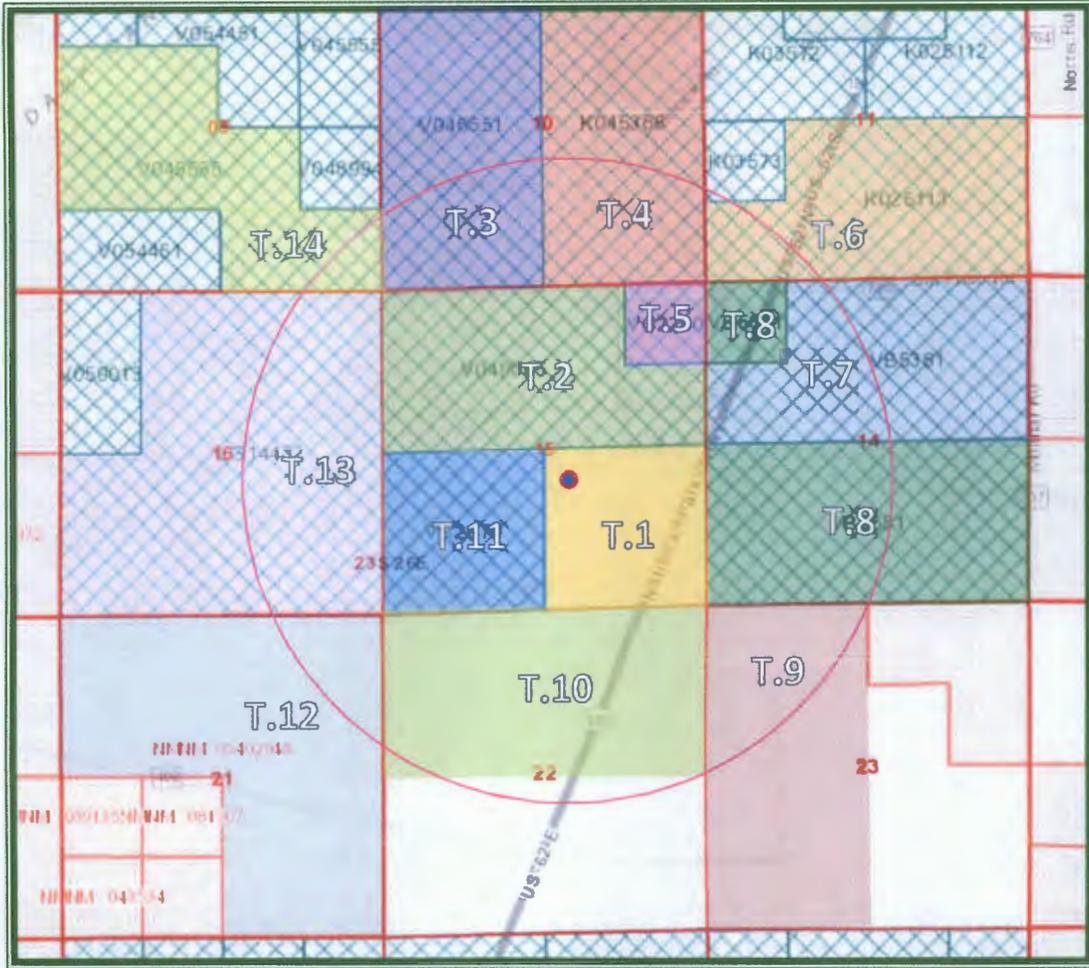
List of Interested Parties

Notification Letter to Interested Parties

Proof of Certified Mailing

Published Legal Notice

Lisa Turtle SWD Well No.1 – Affected Parties Plat
 (Attachment to NMOCD Form C-108, Application for Authority to Inject.)



LEGEND

- | | |
|--------------------------------------|---|
| T.1 – Private; David Maley | T.8 – Echo Production, Inc. |
| T.2 – Chisholm Energy Operating, LLC | T.9 – Private; Chisholm, Mewbourne |
| T.3 – Read & Stevens, Inc. | T.10 – Private; Chevron, Chisholm, Mewbourne |
| T.4 – WPX Energy Permian, LLC | T.11 – Chisholm Energy Operating, LLC |
| T.5 – Chisholm Energy Operating, LLC | T.12 – Blackstone Energy Co./ Axis Energy Corp. |
| T.6 – Occidental Permian, LTD | T.13 – Bettis Brothers, Inc. |
| T.7 – Echo Production, Inc. | T.14 – Chisholm Energy Operating, LLC |

C-108 ITEM XIII – PROOF OF NOTIFICATION AFFECTED PARTIES LIST

SOS Consulting is providing electronic delivery of C-108 applications.
ALL APPLICABLE AFFECTED PARTIES ARE PROVIDED A LINK IN THE NOTICE LETTER
TO A SECURE SOS/ CITRIX SHAREFILE® SITE TO VIEW AND DOWNLOAD
A FULL COPY OF THE SUBJECT C-108 APPLICATION IN PDF FORMAT.

SURFACE & MINERAL OWNER

- 1 DAVID & EVA MALEY
P.O. Box 519
Carlsbad, NM 88221-0519
Certified: 7018 0360 0001 8569 6330

OFFSET MINERALS LESSEES and OPERATORS (All Notified via USPS Certified Mail)

Private Lease - Maley (T.1 on Affected Parties Map)

Operators

MEWBOURNE OIL COMPANY
Attn: Tim Harrington
P.O. Box 7698
Tyler, TX 75711
Certified: 7018 0360 0001 8569 6347

CHISHOLM ENERGY OPERATING, LLC
801 Cherry Street, Suite 1200, Unit 20
Fort Worth, TX 76102
Certified: 7018 0360 0001 8569 6354

- 4 3BEAR FIELD SERVICES, LLC
500 Don Gaspar Avenue
Santa Fe, NM 87505
Certified: 7018 0360 0001 8569 6378

State Leases V0-49000005, VC-02280000, VC-02070000, V0-45550005 (T.2, T.5, T.11 and T.14 on Affected Parties Map)

Lessee & Operator

CHISHOLM ENERGY OPERATING, LLC
801 Cherry Street, Suite 1200, Unit 20
Fort Worth, TX 76102

Operator

OXY USA WTP, LTD
6001 Deauville Blvd.
Midland, TX 79706
Certified: 7018 0360 0001 8569 6361

State Leases V0-46550001 (T.3 on Affected Parties Map)

Lessee & Operator

READ & STEVENS, INC.
P.O. Box 1518
Roswell, NM 88202
Certified: 7018 0360 0001 8569 6385

**C-108 ITEM XIII – PROOF OF NOTIFICATION
AFFECTED PARTIES LIST (cont.)**

State Leases VB-05160003 (T.4 on Affected Parties Map)

Lessee

WPX ENERGY PERMIAN, LLC
5315 Buena Vista Drive
Carlsbad, NM 88220-9489
Certified: 7018 0360 0001 8569 6392

Operator (T.12)

READ & STEVENS, INC.
P.O. Box 1518
Roswell, NM 88202

State Leases K0-25110003 (T.6 on Affected Parties Map)

Lessee

8 OCCIDENTAL PERMIAN, LTD
6001 Deauville Blvd.
Midland, TX 79706
Certified: 7018 0360 0001 8569 6408

Operator

CHISHOLM ENERGY OPERATING, LLC
801 Cherry Street, Suite 1200, Unit 20
Fort Worth, TX 76102

State Leases VB-05380001, VB-05650001 (T.7 and T.8 on Affected Parties Map)

Lessee

ECHO PRODUCTION, INC.
NM Leases and Operations
122 West John Carpenter Frwy, Suite 300
Irving, TX 75039
Certified: 7018 0360 0001 8569 6415

Operator

OXY USA, INC.
6001 Deauville Blvd.
Midland, TX 79706
Certified: 7018 0360 0001 8569 6422

Private Lease (T.9 on Affected Parties Map)

Lessees and Operators

CHISHOLM ENERGY OPERATING, LLC
801 Cherry Street, Suite 1200, Unit 20
Fort Worth, TX 76102

MEWBOURNE OIL COMPANY
Attn: Tim Harrington
P.O. Box 7698
Tyler, TX 75711

**C-108 ITEM XIII – PROOF OF NOTIFICATION
AFFECTED PARTIES LIST (cont.)**

Private Lease (T.10 on Affected Parties Map)

Lessees and Operators

11 CHEVRON USA, INC.
Attn: Linda McMurray, Permitting Team
6301 Deauville Blvd.
Midland, TX 79706
Certified: 7018 0360 0001 8569 6439

CHISHOLM ENERGY OPERATING, LLC
801 Cherry Street, Suite 1200, Unit 20
Fort Worth, TX 76102

MEWBOURNE OIL COMPANY
Attn: Tim Harrington
P.O. Box 7698
Tyler, TX 75711

BLM Lease NMNM-054029A (T.12 on Affected Parties Map)

Lessee

1 BLACKSTONE ENERGY CO.
1001 Fannin, Ste. 2020
Houston, Texas 77002
Certified: 7018 0360 0001 8569 6446

Operator

CHISHOLM ENERGY OPERATING, LLC
801 Cherry Street, Suite 1200, Unit 20
Fort Worth, TX 76102

State Leases LG-14430002 (T.13 on Affected Parties Map)

Lessee

12 BETTIS BROTHERS, INC.
5315 Buena Vista Drive
Carlsbad, NM 88220-9489
Certified: 7018 0360 0001 8569 6453

Operator

11 RKI EXPLORATION & PROD, INC.
3500 One Williams Center, Ste.4400
Tulsa, OK 74172-0135
Certified: 7018 0360 0001 8569 6460

OFFSET MINERALS OWNERS (Notified via USPS Certified Mail)

11 U.S. DEPARTMENT OF INTERIOR
Bureau of Land Management
Oil & Gas Division
620 E. Greene St.
Carlsbad, NM 88220
Certified: 7018 0360 0001 8569 6477

**C-108 ITEM XIII – PROOF OF NOTIFICATION
AFFECTED PARTIES LIST (cont.)**

OFFSET MINERALS OWNERS (cont.) (Notified via USPS Certified Mail)

16 STATE OF NEW MEXICO
Oil, Gas and Minerals Division
310 Old Santa Fe Trail
Santa Fe, NM 87504
Certified: 7018 0360 0001 8569 6484

REGULATORY

NEW MEXICO OIL CONSERVATION DIVISION (FedEx'ed original and copy)
1220 S. St. Francis Dr.
Santa Fe, NM 87505

NEW MEXICO OIL CONSERVATION DIVISION (FedEx'ed copy)
811 S. First St.
Artesia, NM 88210

January 17, 2019

NOTIFICATION TO INTERESTED PARTIES
via U.S. Certified Mail – Return Receipt Requested

To Whom It May Concern:

Solaris Water Midstream, LLC, Midland, Texas, has made application to the New Mexico Oil Conservation Division to drill and complete for salt water disposal the Spidermonkey SWD Well No.1. The proposed commercial operation will be for produced water disposal from area operators. As indicated in the notice below, the well is located in Section 15, Township 23 South, Range 26 East in Eddy County, New Mexico.

The published notice states that the interval will be from 12,850 feet to 14,100 feet into the Devonian, Silurian and Fusselman formations.

Following is the notice published in the Artesia Daily Press, Artesia, New Mexico on or about January 6, 2019.

LEGAL NOTICE

Solaris Water Midstream, LLC, 701 Tradewinds Blvd., Suite C, Midland, TX 79706, is filing Form C-108 (Application for Authority to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Lisa Turtle SWD No.1, will be located 2180' FSL and 2290' FEL, Section 15, Township 23 South, Range 26 East, Eddy County, New Mexico. Produced water from area production will be commercially disposed into the Devonian (Silurian) and Fusselman formations at a depth of 12,850' to 14,100' at a maximum surface pressure of 2570 psi and a rate limited only by such pressure. (Final completion depths may be adjusted per mudlogging and reported to the NMOCD on form C-105; pressure will remain at the standard gradient of 0.2 psi/ ft of the uppermost injection interval depth.) The proposed SWD well is located approximately 10.7 miles west/ northwest of Loving, NM.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 St. Francis Dr., Santa Fe, NM 87505, (505)476-3460 within 15 days of the date of this notice. Additional information may be obtained from the applicant's agent, SOS Consulting, LLC, (903)488-9850 or, email info@sosconsulting.us.

You have been identified as a party who may be interested as an offset lessee or operator.

You are entitled to a full copy of the application. A full copy in PDF format is posted on the SOS Consulting **ShareFile** site and is available for immediate download.

Use the URL link: <https://sosconsulting.sharefile.com/d-s7605d06386347b18>
(Please Note: The ShareFile service is powered by Citrix Systems and is completely secure.)*

The link to this file will be active for 30 days from the date of this letter. Your company can access and download the file a maximum of five (5) times. (One copy may be downloaded and shared as needed among your company.)

If preferred, you may call SOS Consulting, LLC at 903-488-9850, or email info@sosconsulting.us, and the same PDF file copy will be expedited to you via email.

Please use a subject like "**Lisa Turtle SWD Jan 2019 PDF Copy Request**".

Thank you for your attention in this matter.

Best regards,



Ben Stone, SOS Consulting, LLC
Agent for Solaris Water Midstream, LLC

Cc: Application File

SOS Consulting is committed to providing superior quality work using technology to assist clients and affected parties in obtaining the documentation required. SOS will continue to utilize methods which are less energy and resource intensive including, the reduction of paper copies.

We hope you'll partner with us and appreciate these efforts.

* You will be asked for your email, name and company.
This will not be used by anyone except keeping track of the file downloads.
You will not be solicited by SOS or anyone else. Data is stored on Citrix Systems servers only.

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C-108 - Item XIV

Proof of Notice (Certified Mail Receipts)

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801 Cherry Street, Suite 1200, Unit 20
City, State, Z **Fort Worth, TX 76102**

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Attn: Tim Harrington
City, State, Z **P.O. Box 7698
Tyler, TX 75711**

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500 Don Gaspar Avenue
City, State, Z **Santa Fe, NM 87505**

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City, State, Z **Roswell, NM 88202**

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C-108 - Item XIV

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 City, State, ZIP 5315 Buena Vista Drive
 Carlsbad, NM 88220-9489

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 Street and Apt. ECHO PRODUCTION, INC.
 City, State, ZIP NM Leases and Operations
 122 West John Carpenter Frwy, Suite 30
 Irving, TX 75039

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 Street and Apt. CHEVRON USA, INC.
 City, State, ZIP Attn: Linda McMurray, Permitting Team
 6301 Deauville Blvd.
 Midland, TX 79706

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 City, State, ZIP 6001 Deauville Blvd.
 Midland, TX 79706

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 Adult Signature Restricted Delivery \$

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 Street and Apt. OXY USA, INC.
 City, State, ZIP 6001 Deauville Blvd.
 Midland, TX 79706

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 Return Receipt (electronic) \$
 Certified Mail Restricted Delivery \$
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 Adult Signature Restricted Delivery \$

Postage \$
 Total Postage and Fees \$

Sent To
 Street and Apt. BLACKSTONE ENERGY CO.
 City, State, ZIP 1001 Fannin, Ste. 2020
 Houston Texas 77002

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C-108 - Item XIV

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