Initial Application Part I

Received: **04/24/2019**

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

APR 24 2019 PM02:49

Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:
4/24/2019		SWD	pMAM1915 40934

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: LilyStream Water Solutions, LLC **OGRID Number:** 373500
Well Name: Lucas SWD #2 **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

FOR OCD ONLY
☐ Notice Complete
☐ Application Content Complete

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

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.

Joel Lowry
Print or Type Name

Joel Lowry
Signature

4/18/2019
Date

432-466-4450
Phone Number

joel@lowryenvironmental.com
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* **XXX** *Disposal* _____ *Storage*
Application qualifies for administrative approval? **XXX** *Yes* _____ *No*

II. *OPERATOR:* **LilyStream Water Solutions, LLC**
ADDRESS: **1308 West Ave. N, Lovington, NM, 88260**
CONTACT PARTY: **Joel Lowry** *PHONE:* **432-466-4450**

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

Applicable Well Data is provided as Attachment #1.

IV. *Is this an expansion of an existing project?* _____ *Yes* **XXX** *No*
If yes, give the Division order number authorizing the project: **N/A**

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.*

A map identifying all wells and leases within a two mile radius is provided as Figure 1 in Attachment #2.
A map identifying all wells and leases within the one-mile expanded Area of Review is provided as Figure 2 in Attachment #2.

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.*

A tabulation of data on all wells of public record within the expanded area of review which penetrate the proposed injection zone is provided as Attachment #3.

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.).*

Proposed operation details are provided as Attachment #4.
Analysis from source zone produced water is provided as Attachment #4a.
Analysis from injection zone produced water is provided as Attachment #4b.

***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.*

Geological data on the proposed injection zone is provided as Attachment #5.

IX. *Describe the proposed stimulation program, if any.*

Acid may be utilized to clean and open the formation in accordance with industry standards, as necessary.

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

As this is a new drill, logging and test data is not available. Well Log and test data will be filed with the NMOCD upon completion of the well. NMOCD District I Office will be notified prior to conducting MIT.

***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.*

A map depicting fresh water wells within a one mile radius and associated chemical analysis, if applicable, is provided as Attachment #6.

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 one and any underground sources of drinking water.*

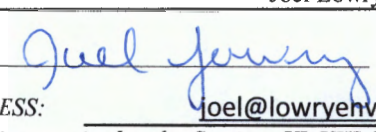
An Affirmative Statement is provided as Attachment #7.

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

"Proof of Notice" documentation is provided as Attachment #8.

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

NAME: Joel Lowry *TITLE:* Agent of Lilystream Water Solutions, LLC

SIGNATURE: 

EMAIL ADDRESS: joel@lowryenvironmental.com

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 submitte

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

ATTACHMENT #1

Well Data

Attachment #1 **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)

General Well Information	
Operator	LilyStream Water Solutions, LLC
Lease Name & Well No.	Lucas SWD #2
Location	1,690' FNL & 250' FEL, UL H, Sec. 14, T25S, R25E

(2)

Casing Information								
String	Size (in.)	Grade	Weight	Setting Depth (ft bgs)	Cement (sx)	Hole Size (in.)	Estimated Top of Cement	Method of Determination
Surface	20	J-55	94.0 lb/ft.	300	825	26	Surface	Circulation
Intermediate 1	13.375	P-110	80.7 lb/ft	2,000	1,140	17.5	Surface	Circulation
Production	9.625	P-110	53.5 lb/ft.	8,885	1,510	12.25	Surface	Circulation
Liner	7.625	P-110	39.0 lb/ft.	8585 to 12112	370	8.5	8585' (TOL)	CBL

(3)

Description of Tubing			
Size	Weight	Lining Material	Setting Depth (ft.)
5.5"	23.0 lb/ft	Internal Plastic Coated	8,525
5"	18.0 lb/ft	Internal Plastic Coated	12,012

(4)

Packer Information	
Type	Setting Depth (ft.)
LOK-SET ™ or Equivalent	12,012

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.

Injection Information		
(1)	Name of Injection Formation:	Devonian-Silurian
(2)	Injection Interval:	12112 to 13112 ft.
	Perforated or Open-Hole:	Open Hole
(3)	Purpose of Well:	New Drill for Salt Water Disposal
(4)	Other Perforated Intervals:	None

(5)

Estimated Depth of Various Formations Including Oil and Gas Zones (ft. bgs)	
B. Salt	1,328
T. Delaware	1,479
T. Bone Spring	5,050
T. Wolfcamp	8,141
T. Cisco	9,798
T. Strawn	9,989
T. Atoka	10,230
T. Morrow	10,782
T. Woodford Shale	11,992
T. Devonian	12,112
T. Montoya	13,112

There are no known oil and gas zones beneath the proposed injection zone.

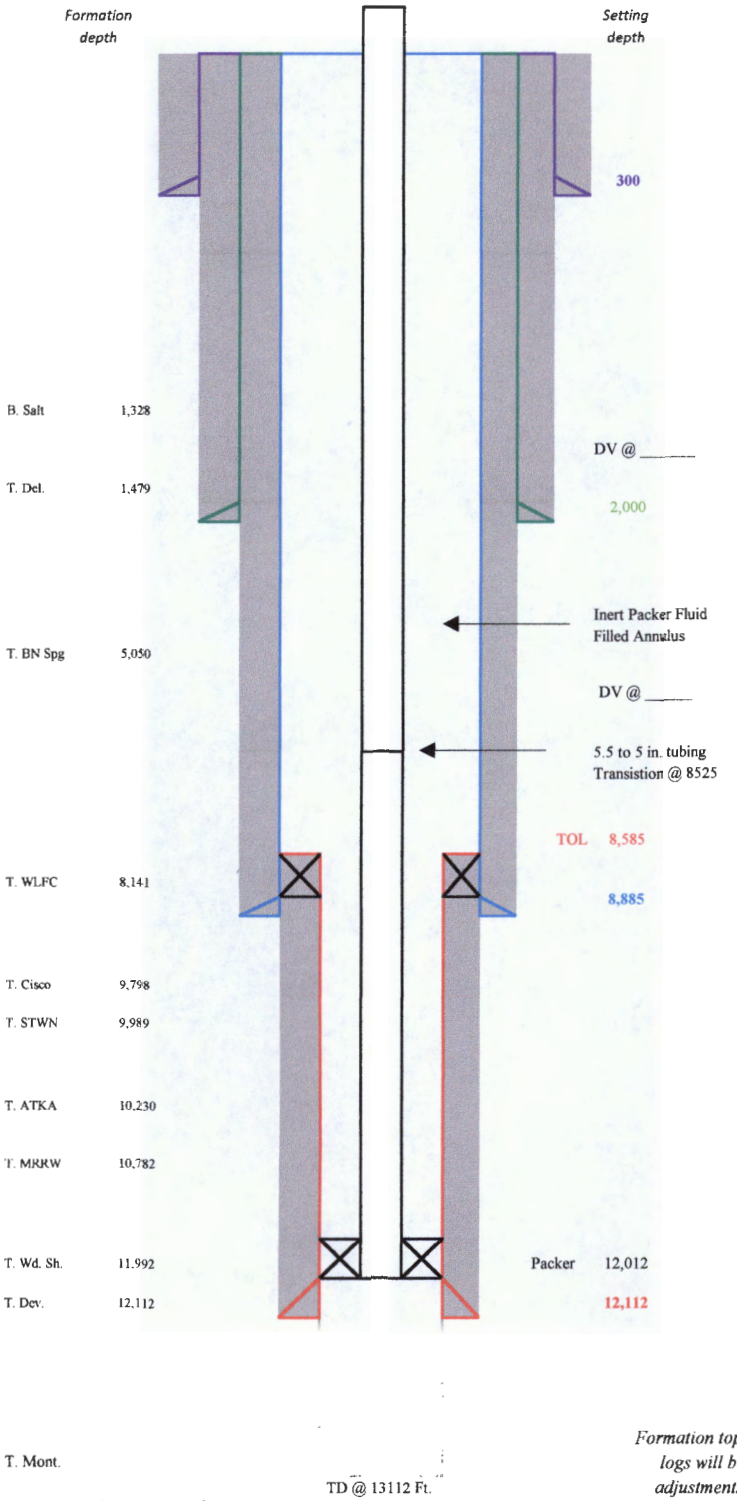
INJECTION WELL DATA SHEET

OPERATOR: **LilyStream Water Solutions, LLC**

WELL NAME & NUMBER: **Lucas SWD #2**

WELL LOCATION					
1,690' FNL & 250' FEL	**H**	**14**	**25S**	**25E**
FOOTAGE LOCATION	UNIT LETTER	SECTION	TOWNSHIP	RANGE

WELLBORE SCHEMATIC



Not to Scale

WELL CONSTRUCTION DATA

Surface Casing

Hole Size **26** in. Casing Size: **20** in.

Setting Depth: **Surface** ft. to **300** ft.

Cemented with: **825** sx. or _____ ft^3

Top of Cement: **Surface** Method Determined **Circulation**

1st Intermediate Casing

Hole Size **17.5** in. Casing Size: **13.375** in.

Setting Depth: **Surface** ft. to **2,000** ft.

Cemented with: **1140** sx. or _____ ft^3

Top of Cement: **Surface** Method Determined **Circulation**

Production Casing

Hole Size **12.25** in. Casing Size: **9.625** in.

Setting Depth: **Surface** ft. to **8,885** ft.

Cemented with: **1510** sx. or _____ ft^3

Top of Cement: **Surface** Method Determined **Circulation**

Liner

Hole Size **8.5** in. Casing Size: **7.625** in.

Setting Depth: **8,585** ft. to **12,112** ft.

Cemented with: **370** sx. or _____ ft^3

Top of Cement: **8585** TOL Method Determined **CBL**

Open Hole Injection Interval

12,112 ft. to **13,112** ft

Formation tops have been extrapulated from control wells in the vicinity. During drilling activites, mud and other logs will be utilized to confirm depths and thicknesses of geologic formations. Should logging data indicate adjustments are required to the casing and cement program, applicable Sundry Notices will be filed with the NMOCD.

INJECTION WELL DATA SHEET

Tubing Size: **5.5" tapered to 5"** Lining Matrial: **Internal Plastic Coated (ICP)**

Type of Packer: **LOK-SET ™ or Equivalent**

Packer Setting Depth: **12,012** Ft.

Other Type of Tubing/Casing Seal (if applicable): **Not Applicable**

Additional Data

1. Is this a new well drilled for injection? **XXX** Yes _____ No

   If no, for what purpose was the well oringally drilled? **N/A**

2. Name of the Injection Formation: **Devonian-Silurian**

3. Name of Field or Pool (if applicable): **SWD; Devonian-Silurian**

4. Has the well ever been perforated in any other zones (s)" List all such perforated intervals and give plugging detail, i.e. sacks of cent or plugs(s) used. **N/A**

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

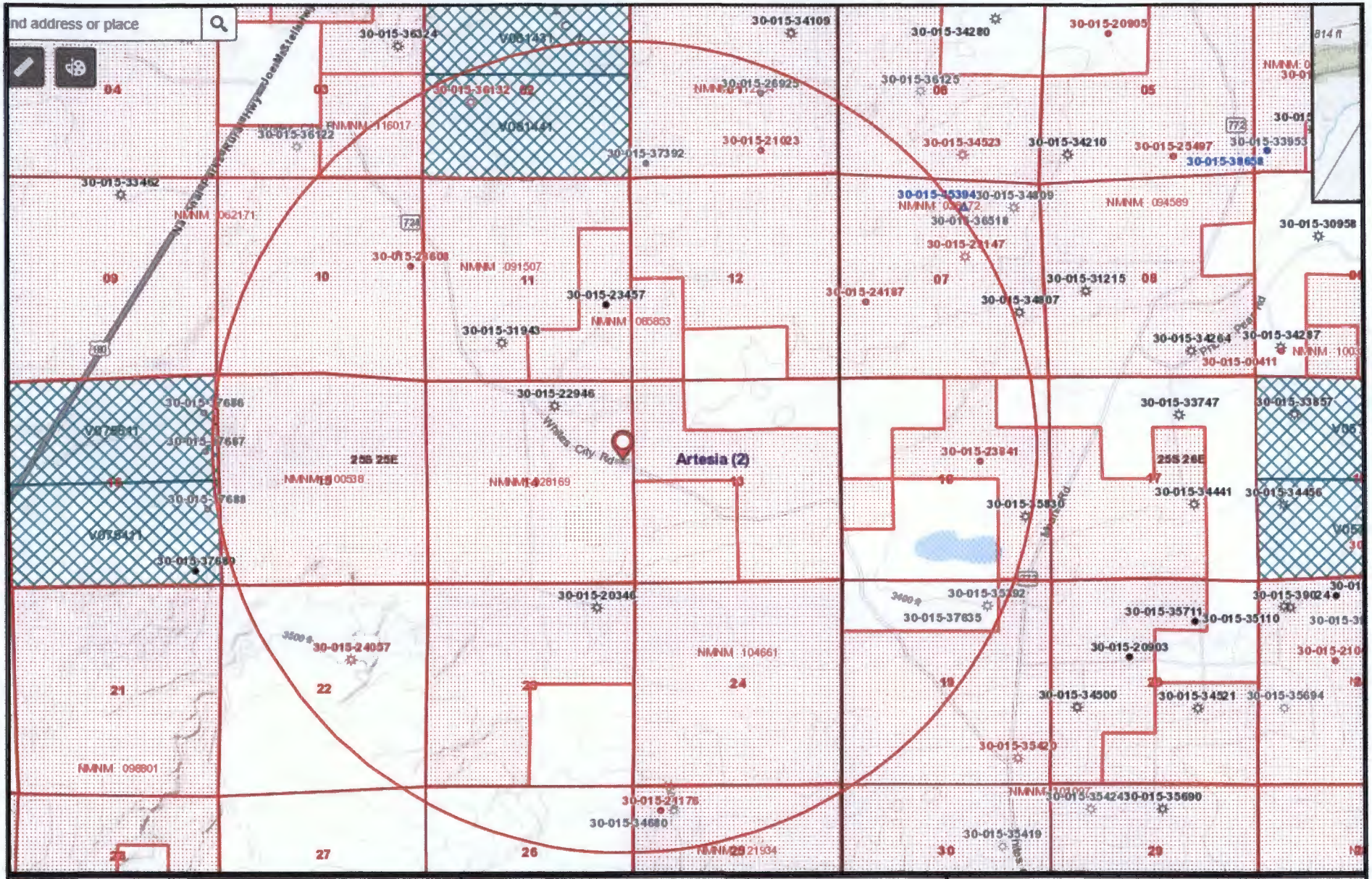
name	*depth*
B. Salt	**1,328**
T. Delaware	**1,479**
T. Bone Spring	**5,050**
T. Wolfcamp	**8,141**
T. Cisco	**9,798**
T. Strawn	**9,989**
T. Atoka	**10,230**
T. Morrow	**10,782**
T. Woodford	**11,992**
T. Devonian	**12,112**
T. Montoya	**13,112**

There are no known oil and gas zones underlying the proposed injection interval

ATTACHMENT #2

Figure 1 - 2-Mile Area of Review Map

Figure 2 - 1-Mile Area of Review Map



LEGEND:

- Proposed SWD Location
- 2-Mile Radius

Figure 1 - 2-Mile Area of Review Map

LilyStream Water Solutions, LLC

Lucas SWD #2

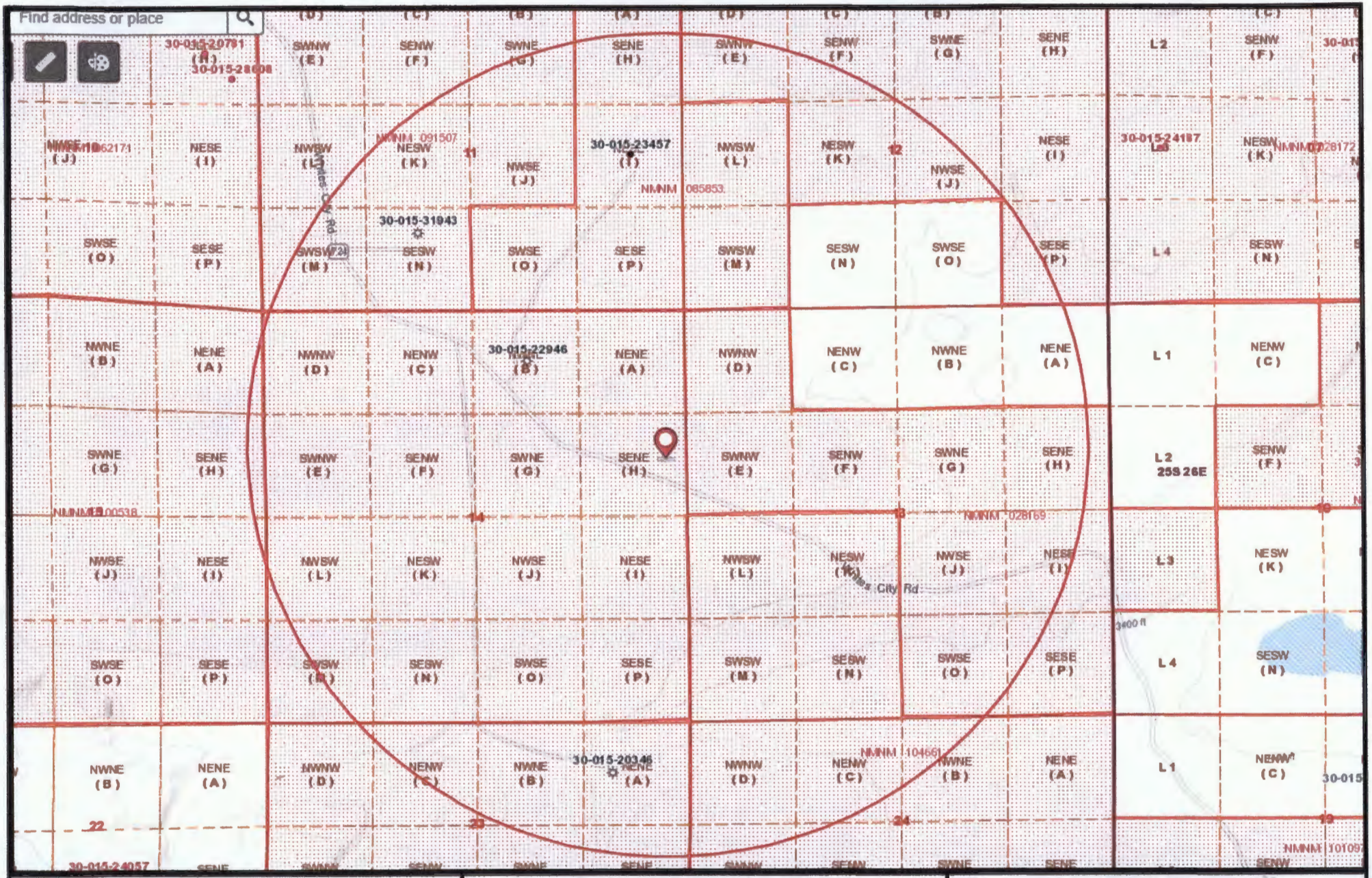
API No. Pending

Legals: UL H, Sec. 14,T25S, R25E

Eddy County, New Mexico

LOWRY environmental

Drafted by: jwl Checked by: client Date: 2/11/2019



LEGEND:

- Proposed SWD Location
- 1-Mile Radius

Figure 2 - 1-Mile Area of Review Map

LilyStream Water Solutions, LLC

Lucas SWD #2

API No. Pending

Legals: UL H, Sec. 14,T25S, R25E

Eddy County, New Mexico

LOWRY environmental

Drafted by: jwl Checked by: client Date: 2/11/2019

ATTACHMENT #3

Tabulation of Data Wells within AOR

TABULATION OF DATA

Summary of Wells within AOR and Surrounding Vicinity

API No.	Well Name	Type	Status	Section	Township	Range	Unit Letter	OCRID Name	Pool ID
30-015-20781	PRE-ONGARD WELL #001	Oil	Plugged (Site Released	10	25S	25E	H	PRE-ONGARD WELL OPERATOR	
30-015-21023	WC FEDERAL #001	Oil	Plugged (Site Released	1	25S	25E	O	SNOW OIL & GAS INC	[96382] WHITE CITY, DELAWARE
30-015-22946	MEANDER FEDERAL #001	Gas	Active	14	25S	25E	B	TAP ROCK OPERATING, LLC	[87285] WHITE CITY, WOLFCAMP (GAS)(ABOLISHED; [98220] PURPLE SAGE, WOLFCAMP (GAS)
30-015-23147	DELTA FEDERAL #001	Gas	Plugged (Site Released	7	25S	26E	G	OXY USA WTP LIMITED PARTNERSHIP	[84407] SAGE DRAW, WOLFCAMP (GAS)(ABOLISH); [96086] WC, WOLFCAMP (GAS)DO NOT USE
30-015-23457	SHEARNWEST FEDERAL #001	Oil	Active	11	25S	25E	I	JKM ENERGY, LLC	[96382] WHITE CITY, DELAWARE
30-015-24187	PRE-ONGARD WELL #002	Oil	Plugged (Site Released	7	25S	26E	L	PRE-ONGARD WELL OPERATOR	
30-015-26925	PRE-ONGARD WELL #001	Oil	Cancelled APD	1	25S	25E	J	PRE-ONGARD WELL OPERATOR	
30-015-28608	BLUESTAR FEDERAL #001	Oil	Plugged (Site Released	10	25S	25E	H	CABAL ENERGY CORPORATION	[96382] WHITE CITY, DELAWARE
30-015-31943	WILD HOG 11 FEDERAL #001	Gas	Active	11	25S	25E	N	JKM ENERGY, LLC	[87285] WHITE CITY, WOLFCAMP (GAS)(ABOLISHED; [98220] PURPLE SAGE, WOLFCAMP (GAS)
30-015-33462	HIGH HOG 9 FEDERAL #001	Gas	Active	9	25S	25E	B	JKM ENERGY, LLC	[96070] WC, MORROW (GAS); [97480] WHITE CITY, MORROW (G)
30-015-34109	VERN 1 FEDERAL #001	Gas	Active	1	25S	25E	H	CIMAREX ENERGY CO. OF COLORADO	[74900] CHOSA DRAW, MORROW (GAS); [96072] WC, UPPER PENN; [97377] COTTONWOOD DRAW, MORROW (G); [97841] WILDCAT G-04 S252501H, BONE SPRING
30-015-34523	BLACK MAGIC 6 COM #002	Gas	Plugged (Site Released	6	25S	26E	O	CIMAREX ENERGY CO. OF COLORADO	[74900] CHOSA DRAW, MORROW (GAS); [96403] WILDCAT, BONE SPRING
30-015-36122	CRACKAJACK FEDERAL COM #001	Gas	Cancelled APD	3	25S	25E	N	COG OPERATING LLC	[74900] CHOSA DRAW, MORROW (GAS)
30-015-36125	ADRIANNE 6 FEDERAL #002C	Gas	Cancelled APD	6	25S	26E	K	CIMAREX ENERGY CO. OF COLORADO	[74900] CHOSA DRAW, MORROW (GAS)
30-015-36132	HOMER STATE COM #002	Gas	Plugged (Site Released	2	25S	25E	L	CIMAREX ENERGY CO. OF COLORADO	[74900] CHOSA DRAW, MORROW (GAS)
30-015-36324	CRACKAJACK FEDERAL COM #002	Gas	Active	3	25S	25E	H	COG OPERATING LLC	[74900] CHOSA DRAW, MORROW (GAS)

No Wells within AOR penetrate the proposed injection zone.

ATTACHMENT #4

Proposed Operations

A. Source Zone Produced Water Analysis

B. Injection Zone Produced Water Analysis

VII. Proposed Operations

Attach data on the proposed operation, including:

	Proposed Operation		
(1)	Average Rate:	20,000 bbls	
	Maximum Rate:	30,000 bbls	
(2)	Open or Closed:	Open	
(3)	Average Injection Pressure:	1,500 - 2,000	psi
	Maximum Injection Pressure:	2,422	psi

(4) ***Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and***

The anticipated sources of produced water proposed to be injected into the Devonian and Silurian formations are from the Delaware, Wolfcamp and Bone Springs Formations, which are known to be compatible with formation water from the Devonian Formation. Laboratory analysis of water samples collected from the respective formations is provided as **Attachment #4a.**

(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***

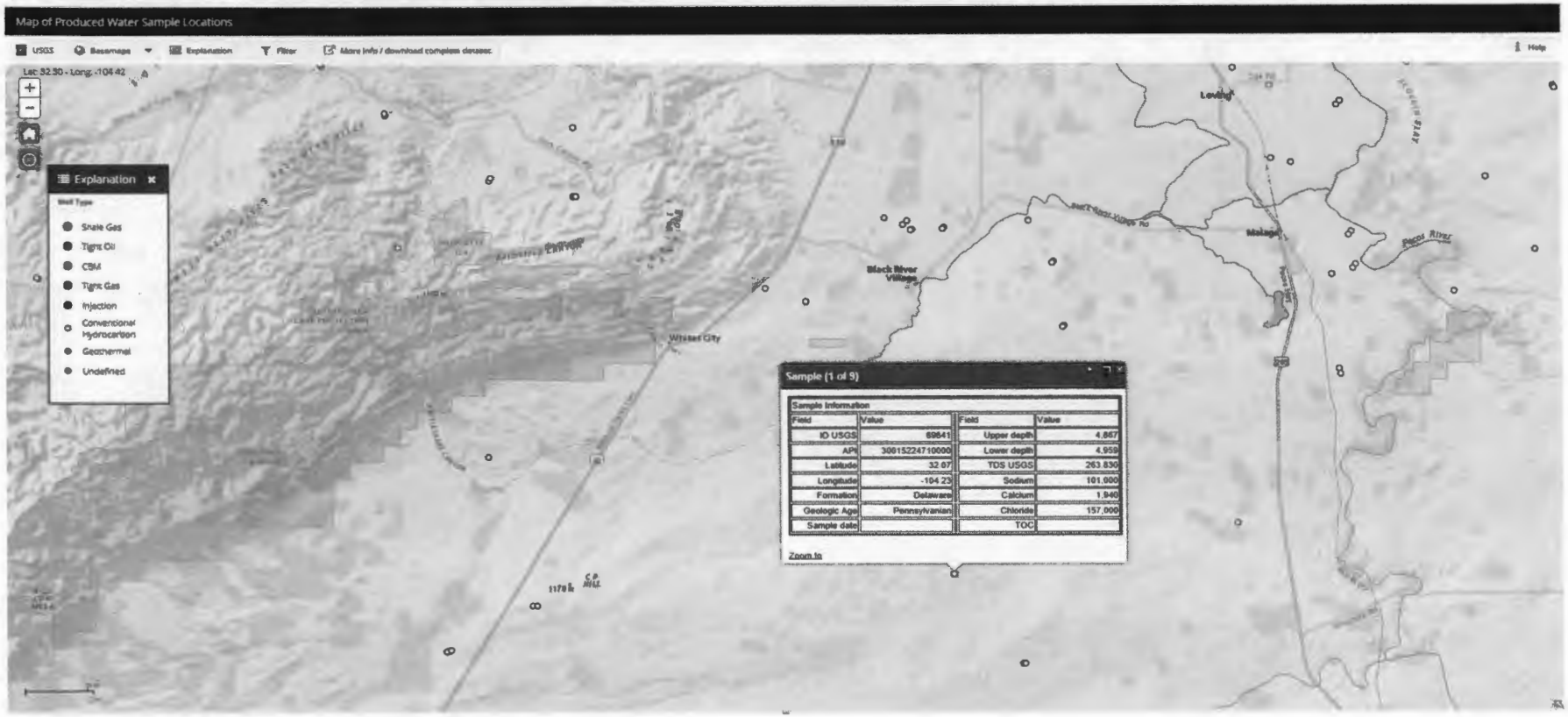
Laboratory analysis of water samples collected from the Devonian and Fusselman Formations are provided as **Attachment #4b.**

Safety, Spill Prevention and Release Response

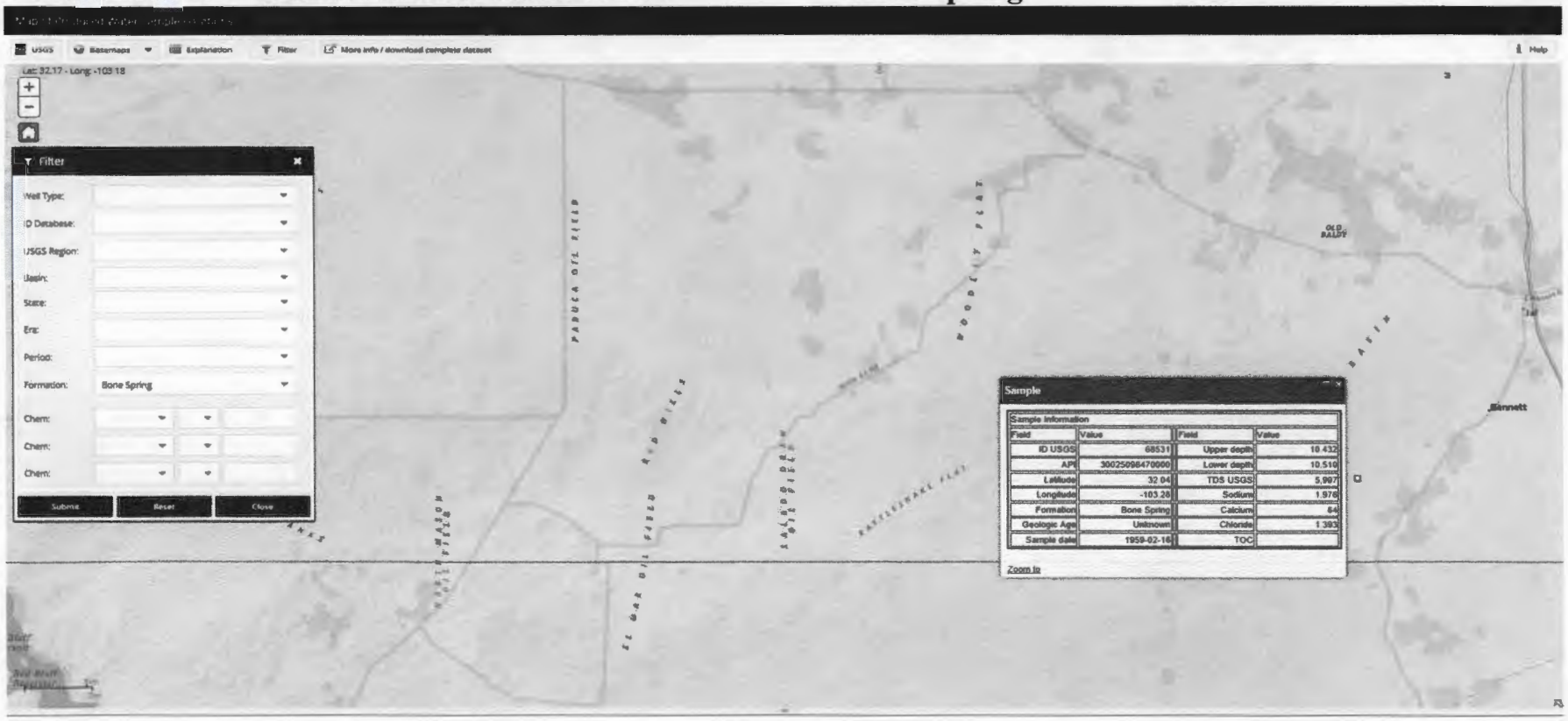
Above-ground storage tanks (ASTs) associated with the SWD operation will be placed into a steel-walled, lined containment system. The well, injection equipment and ASTs will be equipment with metering and pressure sensing devices in an effort to monitor and ensure the integrity of the equipment and prevent accidental releases to the environment.

In the event of an accidental releases to the environment, a Release Notification (NMOCD Form C-141) will be prepared, characterizing the release and proposing remediation activates designed to mitigate environmental impacts, as necessary. In the event of an accidental discharge of greater than 25 bbls, the NMOCD will be notified immediately.

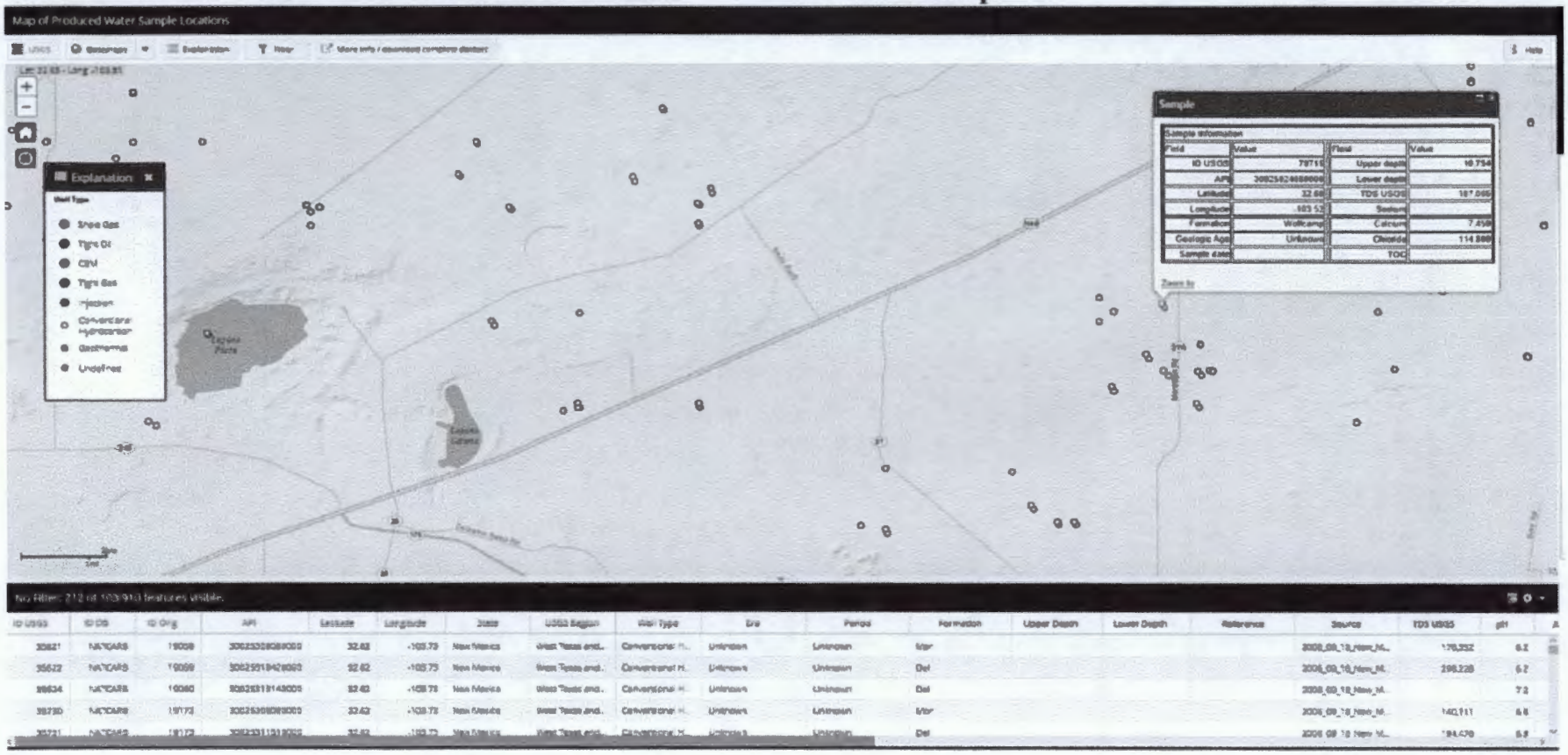
Attachment 4A - Source Zone Produced Water Delaware



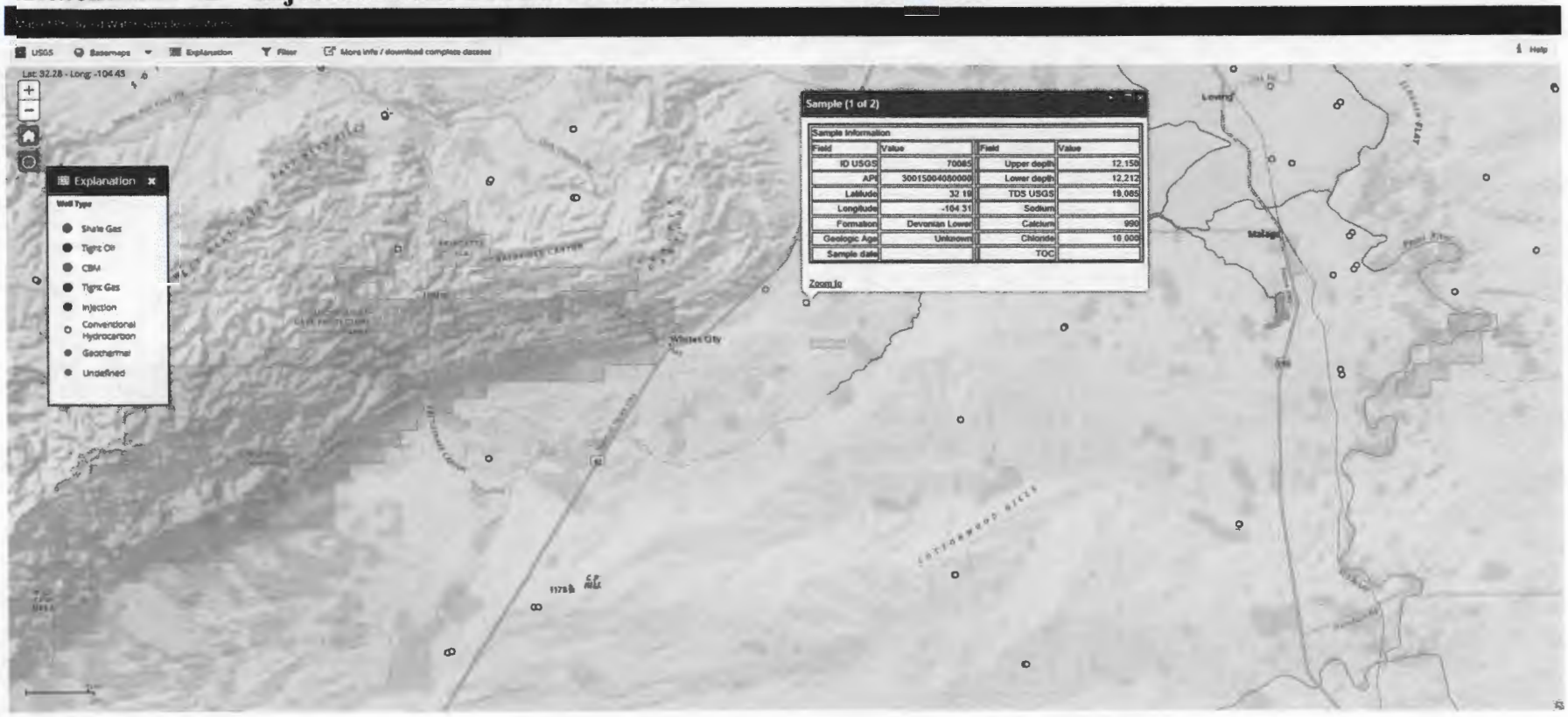
Attachment 4A - Source Zone Produced Water Bone Spring



Attachment 4A - Source Zone Produced Water Wolfcamp

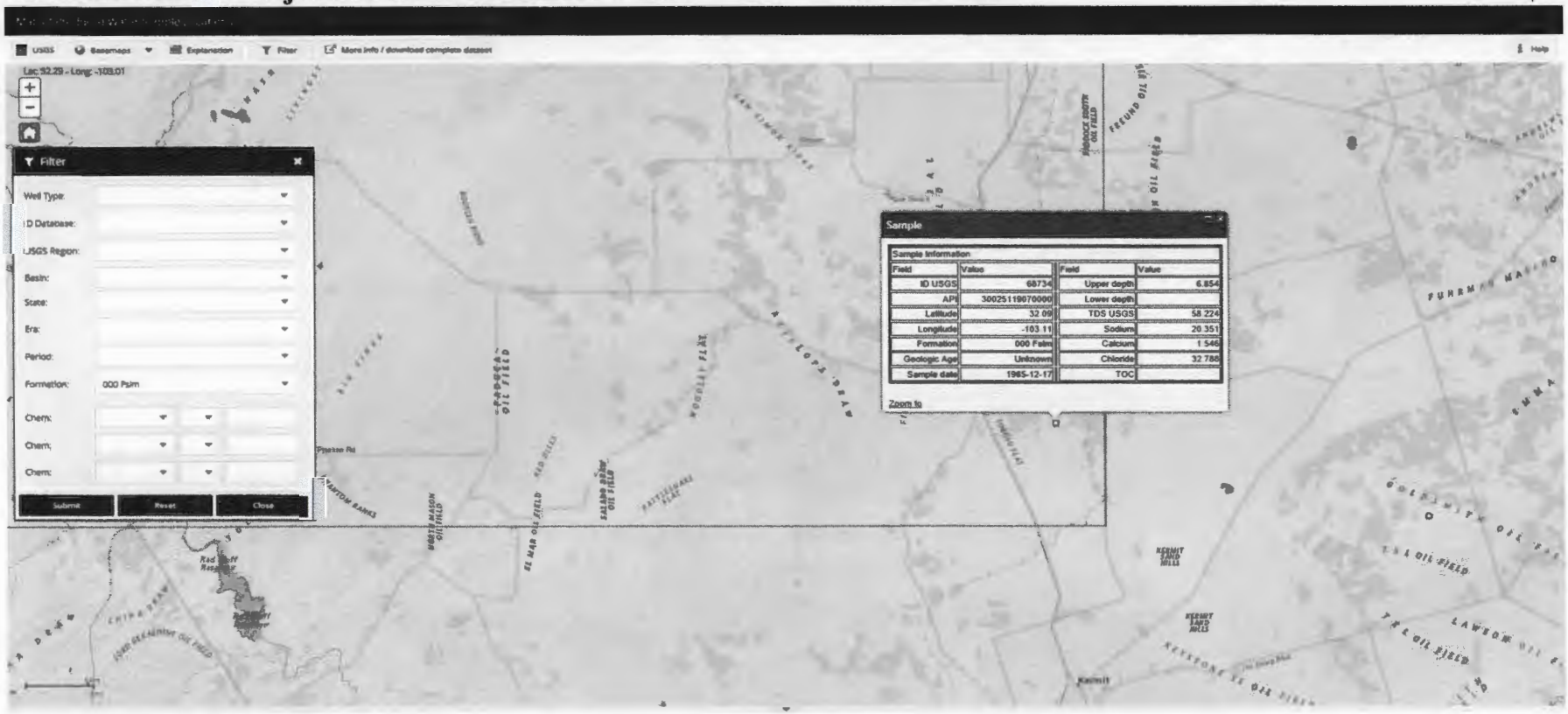


Attachment 4B - Injection Zone Produced Water Devonian



Attachment 4B - Injection Zone Produced Water

Fusselman



ATTACHMENT #5

A. Geological Description

B. Seismic Information

VIIIa Geologic Description

a. Attach appropriate geologic data on the injection zone including appropriate lithological detail, geologic name, thickness, and depth.

The proposed injection interval consists of sedimentary rock formations deposited during the Devonian and Silurian Periods. The Devonian Formation consists of porous dolomites, chert intervals and limestone (McGlasson, E.H. 1967). The thickness of the Devonian and Silurian Formations is estimated to be approximately 1,000 feet (ft.) locally. Sections of porous dolomite and limestone are believed to be present at the proposed injection site. The proposed injection interval is overlain by the Woodford Shale, which ranges in thickness from 100 to 300 ft. consists of organic-rich dark shales, black cherts, siltstone, sandstone and greenish-colored shales (Broadhead, R.F., 2010). Inferred depths of the proposed injection zone were estimated utilizing completions data from wells within the vicinity.

During the advancement of the proposed well, mud logging data will be utilized to ensure that the thickness of the Devonian and Silurian Formation is adequately defined, allowing for the proper placement of the packer, casing shoe and determination of the open-hole injection interval. Should logging data indicate depth adjustments are required for the casing program, applicable Sundry Notices will be filed with the NMOCD.

b. 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/kg or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.

A search of the USGS database suggests the historic presence of **three (3) wells** within the vicinity of the Site. **Each** of the wells were completed in Alluvium and Bolson Deposits. Data from wells with available information suggested static water levels ranged from **33.14 ft. bgs** as measured in a well approximately **0.9 Northeast** of the Site to **87.9 ft. bgs** as measured in a well approximately **0.8 Mi. Northwest** of the Site.

A search of the NMOSE database suggests the historic presence of **three (3)** wells within a 1-mile radius of the Site. The wells are were drilled to depths ranging from **80 to 115 ft. bgs**. If available and producing, **two (2)** of the identified fresh water wells will be sampled. Analytical results, if applicable, are provided in Attachment #6.

Other known water sources in the area include the Rustler Formation, which outcrops in the area and the underlying Salado and Castile Formations. Groundwater within the Rustler, Salado and Castile is not a a source of drinking water. No usable water is expected to be encountered beyond **300 Ft.** bgs.

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	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Twn	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
C 04019 POD1		CUB	ED	4	4	3	14	25S	25E	559668	3554330	1266	80	35	45
C 02997		C	ED	4	1	1	14	25S	25E	559243	3555500*	1277	100		
C 00834		C	ED		2	3	12	25S	25E	561156	3556423*	1313	115	58	57

Average Depth to Water: **46 feet**

Minimum Depth: **35 feet**

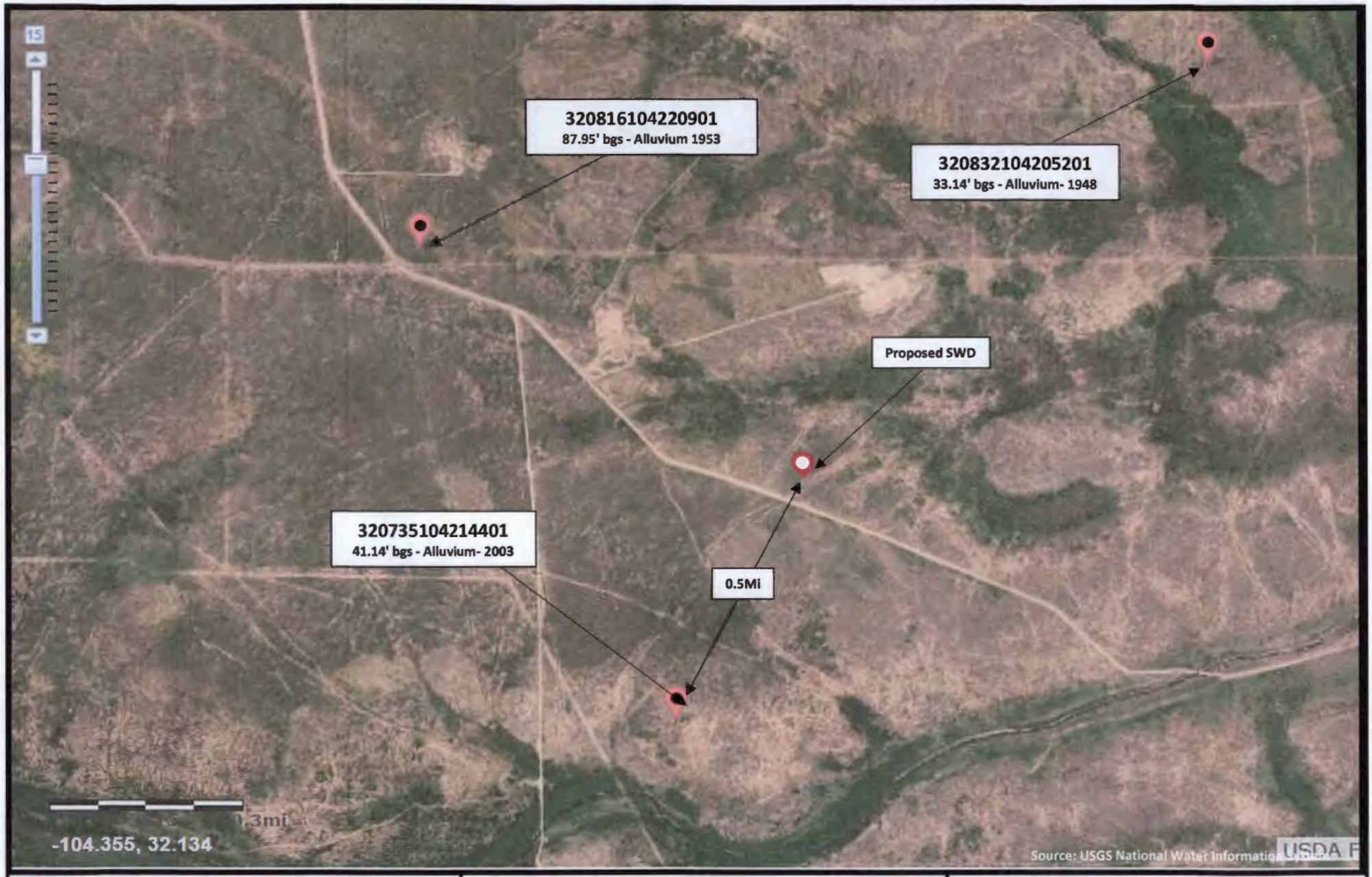
Maximum Depth: **58 feet**

Record Count: 3

UTMNAD83 Radius Search (in meters):

Easting (X): 560502.3 **Northing (Y):** 3555283.6 **Radius:** 1608

***UTM location was derived from PLSS - see Help**



LEGEND:

- Proposed SWD Location
- USGS Water Well (Reported)

Figure 3 - USGS Groundwater Resource Map

LilyStream Water Solutions, LLC

Lucas SWD #2

API No. Pending

Legals: UL H, Sec. 14,T25S, R25E

Eddy County, New Mexico

LOWRY environmental

Drafted by: jwl Checked by: client Date: 2/11/2019

VIIIb Seismic Information

The proposed injection well is located within the western portion of the Delaware Basin in **Unit Letter "H", Section 14, Township 25 South, Range 25 East** in Eddy County, New Mexico. A review of USGS data available on the ComCat Earthquake Catalog indicates the nearest seismic event exceeding a magnitude of 0.1 occurred approximately **17.6 Mi** northeast of Site. The seismic event was reported as a magnitude 3.9 occurring in November of 1974.

The nearest fault trace is approximately **3.4 Mi West** of the proposed injection well. The fault trace is indicative of a normal fault striking Northeast-Southwest.

Data available on the ComCat Earthquake Catalog suggests the recorded seismic events within the region did not occur on the described faults.

Faults traces are depicted as green linear features. Seismic events with available data are depicted as grey dots of which the size is representative of the magnitude. Details regarding the depicted faults are provided on the following page.

Sources:

Bureau of Economic Geology. Accessed February 2019. Permian Basin Geologic Synthesis Project. https://gis.utlands.utsystem.edu/ags/rest/services/GeologicFeatures/MapServer

U.S. Geological Survey (USGS). February 2019. Earthquakes Hazard Program: ComCat Earthquake Catalog. https://earthquake.usgs.gov/learn/kml.php

VIIIb Seismic Information

A recent publication prepared by Snee and Zoback (2018) entitled "State of Stress in the Permian Basin, Texas and New Mexico" discusses the fault slip potential of fault traces complied from Ewing et al. (1990), Green and Jones (1997), Ruppel et al. (2005) as well the USGS Quaternary Faults and Fold Database. A map detailing their findings with the proposed injection well location superimposed is provided below:

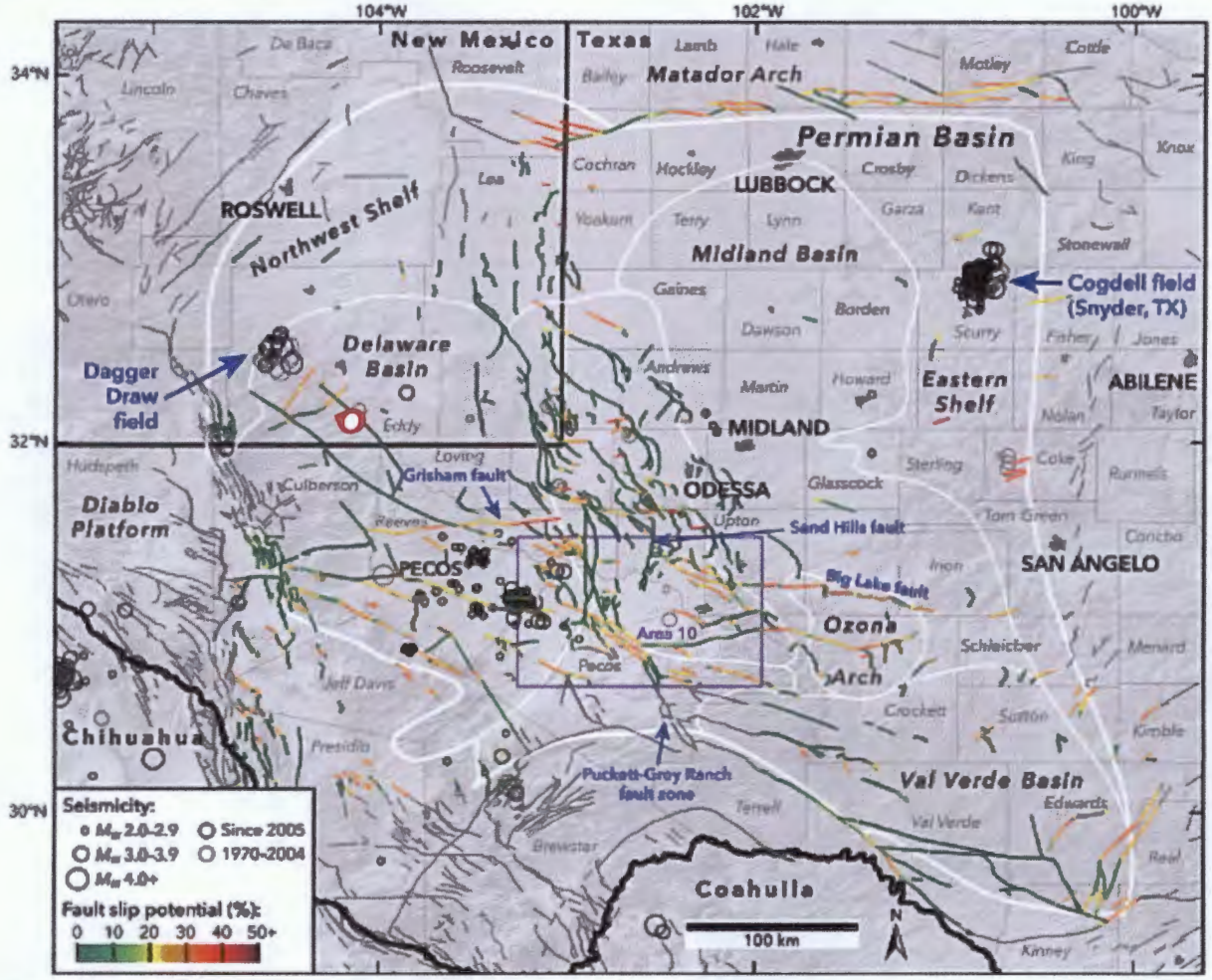


Figure 3. Results of our probabilistic FSP analysis across the Permian Basin. Data sources are as in Figures 1 and 2.

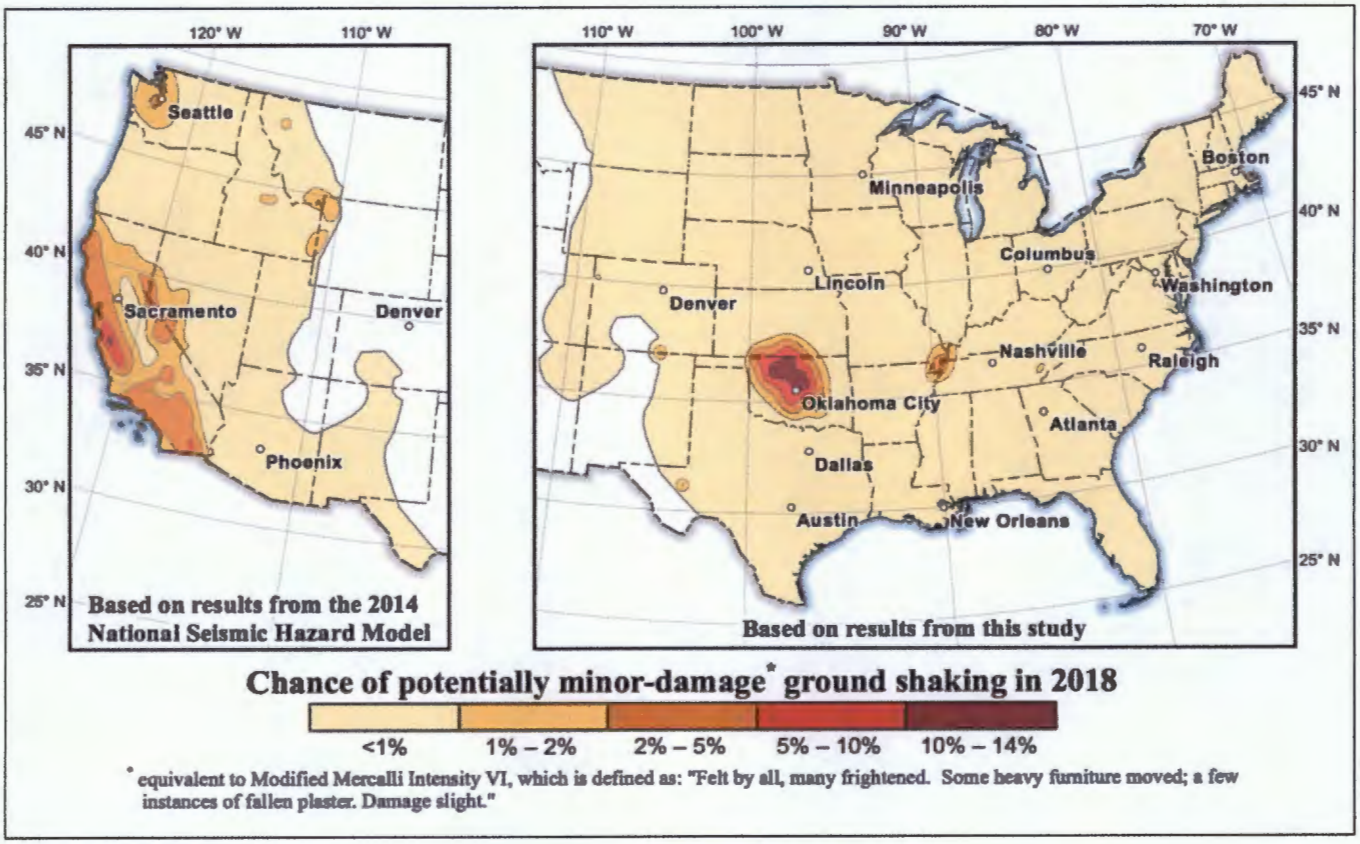
Based on the proposed injection well's distance to known faults, relative low faulting and seismic activity in the area, review of historical earthquake data and the presence of confining layers above and beneath the proposed injection zone, it is unlikely that the proposed injection activities will contribute to a fault-slip event.

Source:

Snee, Jens-Erik Lund, and Mark D. Zoback. 2018 "State of Stress in the Permian Basin, Texas and New Mexico; Implication for Induced Seismicity." The Leading Edge 37 (February 2018).

VIIIb Seismic Information

Data from the 2018 USGS One-Year probabilistic seismic hazard forecast suggests there was a less than 1% chance of potentially minor-damage from induced and natural ground shaking in 2018, as depicted on the map below:



Source:

U.S. Geological Survey (USGS). February 2019. Earthquakes Hazard Program: Short-term Induced Seismicity Models. https://earthquake.usgs.gov/hazards/induced/index.php#2018

ATTACHMENT #6

Fresh Water Laboratory Analysis (*if applicable*)

Fresh Water Sample Location Map (*if applicable*)

LEGEND:

- Sampled Water Well
- *Reported Water Well
- Lucas Ranch

* Not Sampled due to Absence, P&A Status, or Access Issues

Laboratory Analysis not appended to this report will be provided upon receipt under a separate cover

Figure 5 - Water Well Sample Map

LilyStream Water Solutions, LLC

Lucas Ranch

Eddy County, New Mexico

LOWRY environmental

Drafted by: jwl Checked by: client Date: 2/11/2019

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

April 15, 2019

JOEL LOWRY

LOWRY ENVIROMENTAL & ASSOCIATES

PO BOX 296

LOVINGTON, NM 88260

RE: LUCAS SWD

Enclosed are the results of analyses for samples received by the laboratory on 04/08/19 14:20.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

LOWRY ENVIROMENTAL & ASSOCIATES
JOEL LOWRY
PO BOX 296
LOVINGTON NM, 88260
Fax To:

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/15/2019	Sampling Type:	Water
Project Name:	LUCAS SWD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	EDDY CO NM		

Sample ID: 2101 (H901273-01)

Chloride, SM4500Cl-B mg/L **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	**44.0**	4.00	04/11/2019	ND	104	104	100	3.92	

TDS 160.1 mg/L **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	**2010**	5.00	04/15/2019	ND	506	96.0	527	2.08	

Sample ID: 0201 (H901273-02)

Chloride, SM4500Cl-B mg/L **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	**36.0**	4.00	04/11/2019	ND	104	104	100	3.92	

TDS 160.1 mg/L **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	**2360**	5.00	04/15/2019	ND	506	96.0	527	2.08	

Sample ID: 2201 (H901273-03)

Chloride, SM4500Cl-B mg/L **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	**252**	4.00	04/11/2019	ND	104	104	100	3.92	

TDS 160.1 mg/L **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	**4650**	5.00	04/15/2019	ND	506	96.0	527	2.08	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	Lowry Enviro	**BILL TO**	
Project Manager:	Joel Lowry	P.O. #:	Lowry Enviro
Address:	PO Box 846	Company:	
City:	Lovington State: NM Zip: 88260	Attn:	
Phone #:	432-466-4450 Fax #:	Address:	
Project #:	N/A Project Owner:	City:	
Project Name:	Lucas SWD	State: Zip:	
Project Location:	Eddy Co	Phone #:	
Sampler Name:	Joel Lowry	Fax #:	

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	TDS	Chloride
H901273																
1	2101	G	2	X							X		4/18/19	1:25	X	X
2	0201		2											1:30		
3	2201		2											1:00		

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: Joel Lowry	Date: 4-8-19 Time: 14:20	Received By: Tamara Oldaker	
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	0.6° #97	Sample Condition Cool: Yes / No Intact: Yes / No	CHECKED BY: (Initials) TO

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:

ATTACHMENT #7

Affirmative Statement

XII. AFFIRMATIVE STATEMENT

Re: LilyStream Water Solutions, LLC
Lucas SWD #2
Legals: UL H, Sec. 14, T25S, R25E

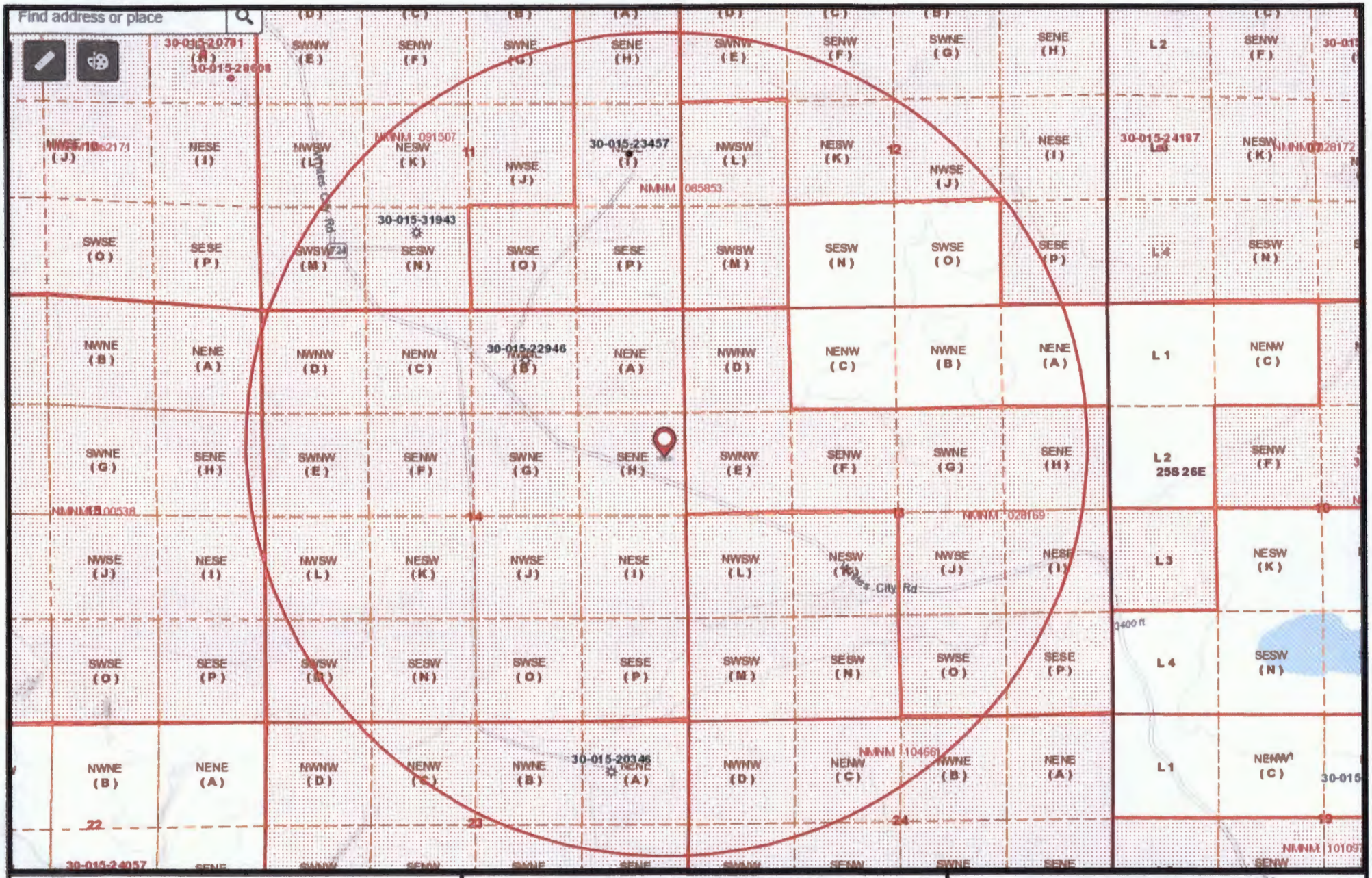
Available geologic and engineering data has been examined and we find no evidence of open faults or any hydrologic connection between the disposal interval and any underground sources of drinking water.

Joel W. Lowry

LOWRY environmental

ATTACHMENT #8

Proof of Notice Documentation



LEGEND:

- Proposed SWD Location
- 1-Mile Radius

Figure 4 - Leasehold Operator Map

LilyStream Water Solutions, LLC

Lucas SWD #2

API No. Pending

Legals: UL H, Sec. 14,T25S, R25E

Eddy County, New Mexico

LOWRY environmental

Drafted by: jwl Checked by: client Date: 2/11/2019

XIV. PROOF OF NOTICE

XIV. PROOF OF NOTICE

Surface Owner:

Berry and Janice Lucas, husband and
P.O. Box 96
White City, NM 88268

Leasehold Operators and/or Unleased Mineral Owners within a One-Mile Radius:

EOG M Resources, Inc.
105 S. 4th St.
Artesia, NM 88210

EOG Y Resources, Inc.
105 S 4th St.
Artesia, NM 88210

EOG A Resources, Inc.
105 S. 4th St.
Artesia, NM 88210

Oxy Y-1 Company
P.O. Box 27570
Houston, TX 77227

MRC Permian Company
5400 LBJ Freeway, Suite 1500
Dallas, TX 75240

JKM Energy, LLC
26 E. Compress Road
Artesia, NM 88210

MRC Permian LKE Company, LLC
5400 LBJ Freeway, Suite 1500
Dallas, TX 75240

EOG Resources Inc.
P.O. Box 2267
Midland, TX 79702

Viola Elaine Barnes, a/k/a Elaine
1004 N. Big Spring, STE 500
Midland, TX 79701

CrownRock Minerals, LP
P.O. Box 51933
Midland, TX 79710

Tap Rock Operating, LLC
602 Park Point Drive Suite 200
Golden, CO 80401

Featherstone Development
P.O. Box 429
Roswell, NM 88202

Hanagan, Robert W
223 West Wall #301
Midland, TX 79702

French L R Jr
P.O. Box 11327
Midland, TX 79701

Cabal Energy Corp
415 W. Wall St STE 1700
Midland, TX 79701

XTO Holdings LLC
810 Houston St
Fort Worth, TX 76102

Christy B. Motycka, a/k/a Christine B.
1004 N. Big Spring, STE 500
Midland, TX 79701

Julie Ellen Barnes
1004 N. Big Springs, STE 500
Midland, TX 79701

XIV. PROOF OF NOTICE

Laurie Barnes Barr
P.O. Box 8098
Asheville, NC 28814

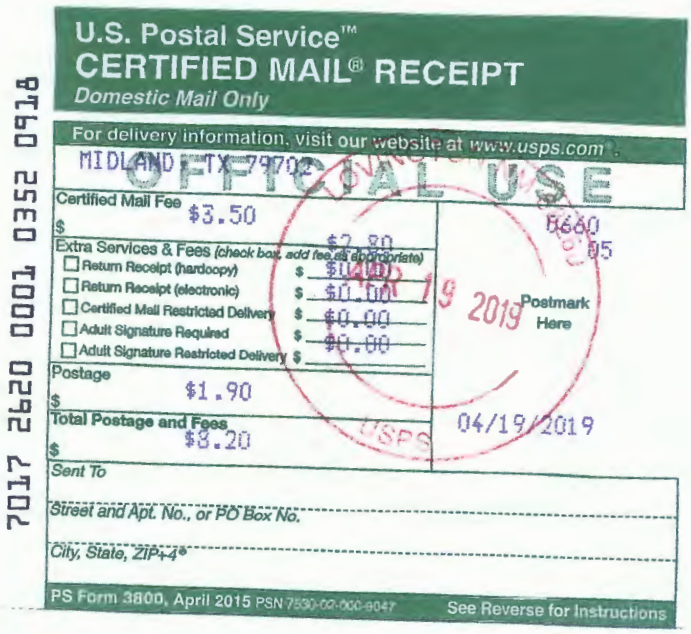
Steven C. Barnes
P.O. Box 505
Midland, TX 79702

Regulatory Agency:

NMOCD - Santa Fe
1220 S. St. Francis Dr.
Santa Fe, NM 87505

NMOCD - District 2
811 S. First
Artesia, NM 88210

XIV. PROOF OF M



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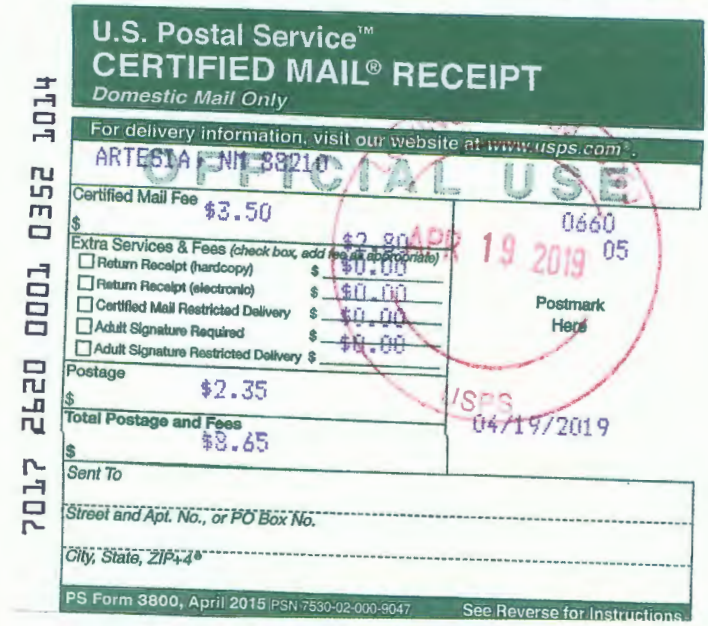

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☐ Adult Signature Restricted Delivery	$
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Total Postage and Fees	$8.20

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☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
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Total Postage and Fees	$8.20

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☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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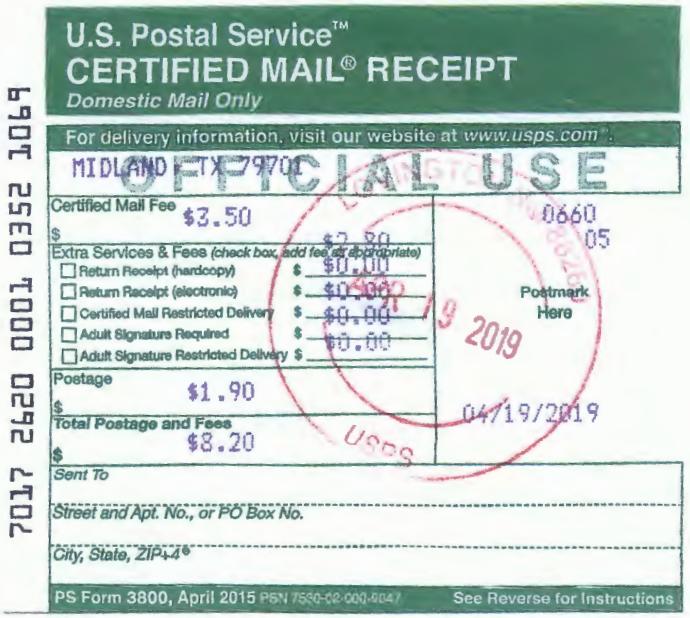

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☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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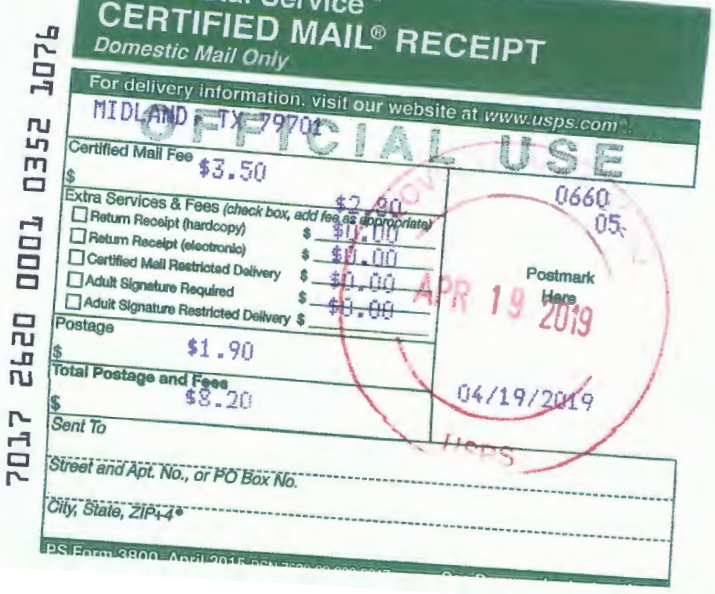
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions



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MIDLAND, TX 79701

OFFICIAL USE

7017 2620 0001 0352 1076

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	
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☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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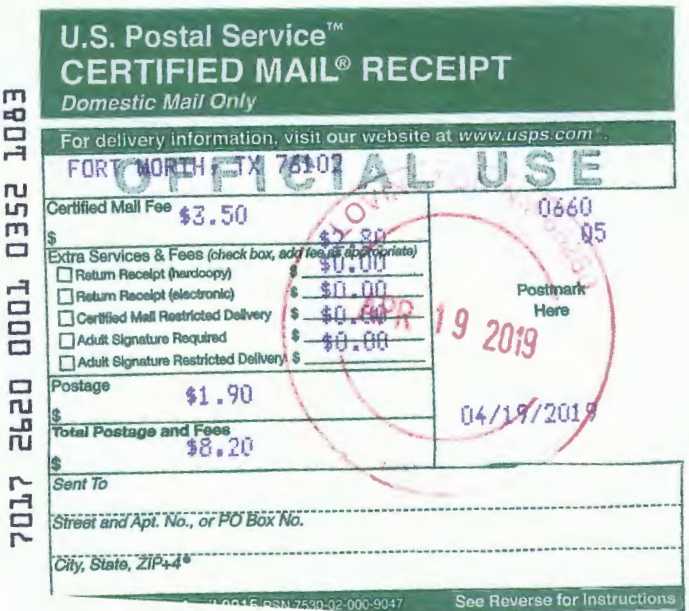
City, State, ZIP+4®

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions



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FORT WORTH, TX 76102

OFFICIAL USE

7017 2620 0001 0352 1083

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	
☐ Return Receipt (hardcopy)	$2.80 $0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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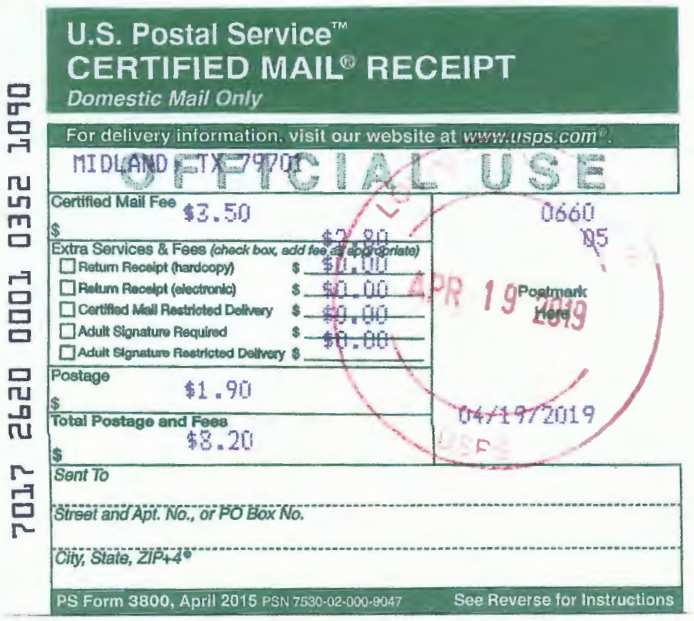
XIV. PROOF OF NOTICE



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MIDLAND, TX 79701

OFFICIAL USE

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Extra Services & Fees (check box, add fee as appropriate)	
☐ Return Receipt (hardcopy)	$2.80 $0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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MIDLAND, TX 79701

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Extra Services & Fees (check box, add fee as appropriate)	
☐ Return Receipt (hardcopy)	$2.80 $0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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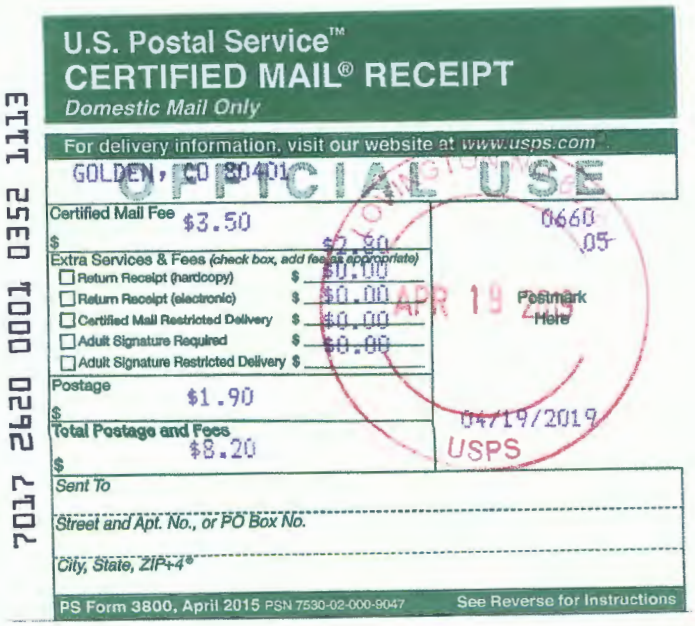
7017 2620 0001 0352 1106



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GOLDEN, CO 80401

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Extra Services & Fees (check box, add fee as appropriate)	
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☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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ROSWELL, NM 88201

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☐ Return Receipt (electronic)	$0.00
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☐ Adult Signature Restricted Delivery	$
Postage	$1.90
Total Postage and Fees	$8.20

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April 12, 2019

NOTIFICATION TO INTERESTED PARTIES

Via U.S. Certified Mail - Return Receipt Requested

RE: Application for Authroization to Inject
Lucas SWD #2
Township 25S, Range 25E, N.M.P.M
Section 14, 1,690' FNL & 250' FEL
Eddy County, New Mexico

To Whom It May Concern:

Enclosed for your review is a copy of a C-108 Application submitted by LilyStream Water Solutions, LLC, Lovington, New Mexico, to the New Mexico Oil Conservation Division to drill and complete for produced water disposal the Lucas SWD #2.

The well is located in Section 14, Township 25S, Range 25E, 1,690' FNL and 250' FEL, Eddy County, New Mexico.

As required by NMOCD, we are notifying you because you have been indentified as an operator or surface owner and therefor an affected party by this action. Any objections must be submitted in writing to NMOCD, 1220 S. St. Francis Drive, Santa Fe, New Mexico 87505. Objections must be received within fifteen (15) days of receipt of this letter.

The well will be a commercial SWD well taking produced water from oil and gas operations in the surrounding area. Please contact Joel Lowry with Lowry Environmental and Associates, LLC, at 432.466.4450 , with any questions or concerns regarding this well or application.

Respectfully,

Joel W. Lowry
LOWRY
environmental

XIV. PROOF OF NOTICE

Affidavit of Publication

Copy of Publication

Affidavit of Publication

No. 25082

State of New Mexico

County of Eddy:

Danny Scott

being duly sworn sayes that he is the **Publisher**

of the Artesia Daily Press, a daily newspaper of General circulation, published in English at Artesia, said county and state, and that the hereto attached

Legal Ad

was published in a regular and entire issue of the said Artesia Daily Press, a daily newspaper duly qualified for that purpose within the meaning of Chapter 167 of the 1937 Session Laws of the state of New Mexico for

1 Consecutive weeks day on the same day as follows:

First Publication	April 21, 2019
Second Publication	
Third Publication	
Fourth Publication	
Fifth Publication	
Sixth Publication	
Seventh Publication	

Subscribed and sworn before me this

22nd day of April 2019

OFFICIAL SEAL
Latisha Romine
NOTARY PUBLIC-STATE OF NEW MEXICO
My commission expires: 5/1/2019

Latisha Romine

Latisha Romine

Notary Public, Eddy County, New Mexico

Legal Notice

LilyStream Water Solutions, LLC, 1308 W. Ave D, Lovington, NM 88260, is filing Form C-108 for an application for Authority to Inject with the New Mexico Oil and Conservation Division requesting administrative approval for a salt water disposal well. The proposed newly drilled well, the Lucas SWD No. 2 is located at 1,690' FNL & 250' FEL, Section 14, Township 25S Range 25E, N.M.P.M., Eddy County, New Mexico: approximately 19.5 miles Southwest of Carlsbad down National Parks Hwy, NM down and 3 Miles Southeast on White City Road . (API # to be assigned). Produced water from area oil and gas producing wells will be commercially disposed into the Devonian and Silurian formations from 12,112' to 13,112' below surface. Expected maximum injection rate is 30,000 bpd, and the expected maximum injection pressure is 2,422 psi. Questions concerning the application can be directed to the applicant's agent Lowry Environmental, LLC, PO Box 948, Lovington, NM 88260, by phone (432) 466-4450 or email joel@lowryenvironmental.com. Objections or request for hearing must be directed to the Oil Conservation Division, (505) 476-3440, 1220 South Saint Francis Drive, Santa Fe, NM 87504, within 15 days.

Published in the Artesia Daily Press, Artesia, N.M., April 21, 2019 Legal No. 25082.