Initial Application Part I

Received: **08/14/2019**

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

Revised March 23, 2017

RECEIVED: 08/14/2019	REVIEWER:	TYPE: SWD	APP NO: pMAM1922740693

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: AWR Disposal LLC **OGRID Number:** 328805
Well Name: Sammies SWD #1 **API:**
Pool: Proposed: SWD, Devonian, Fusselman, Montoya **Pool Code:** 97869

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

SWD-2245

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.

08/14/2019
Date

Randy Hicks (agent)
Print or Type Name

505 238 9515
Phone Number

Signature

r@rthicksconsult.com
e-mail Address

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources
Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

FORM C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ **AMENDED REPORT**

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1]API Number	[2]Pool Code	[3]Pool Name

[4]Property Code	[5]Property Name	[6]Well Number
	SAMMIES SWD	#1

[7]OGRID No.	[8]Operator Name	[9]Elevation
328805	AWR DISPOSAL, LLC	3495'

[10]Surface Location

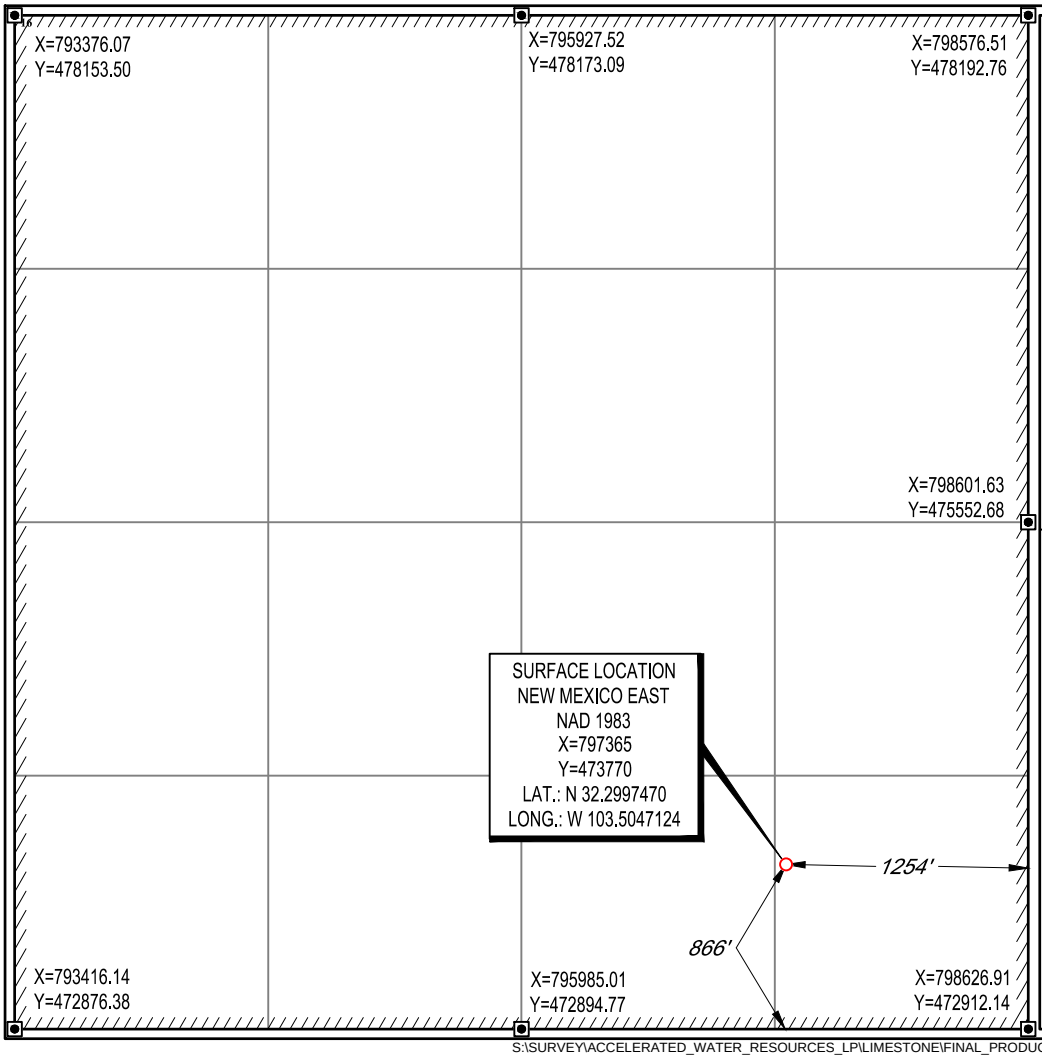
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	18	23-S	34-E	-	866'	SOUTH	1254'	EAST	LEA

[11]Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

[12]Dedicated Acres	[13]Joint or Infill	[14]Consolidation Code	[15]Order No.

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



[17]OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

[18]SURVEYOR CERTIFICATION

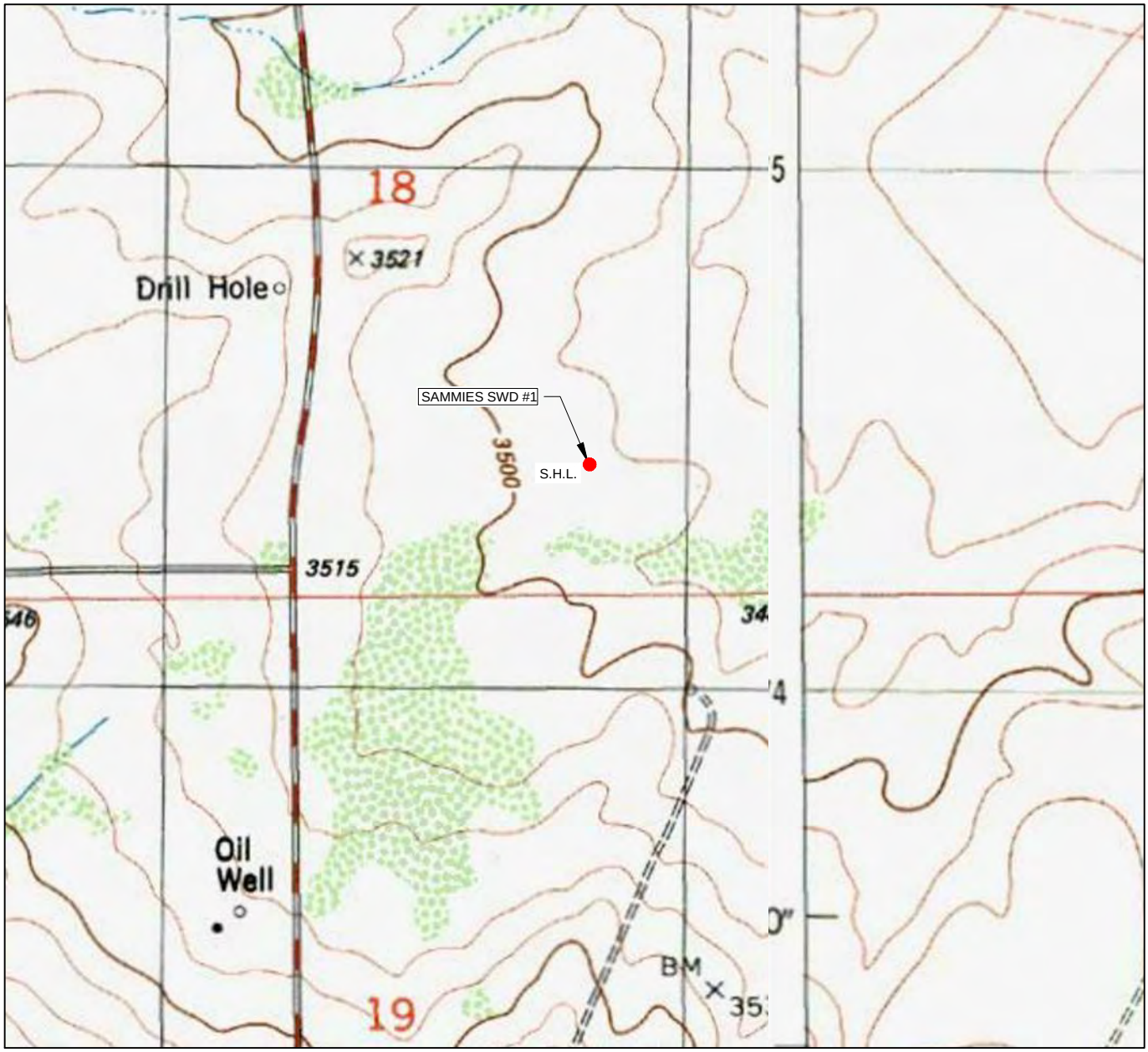
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true to the best of my belief.

07/17/2019
Date of Survey
Signature and Seal of Professional Surveyor

JOHN ARTHUR CARNEGIE
NEW MEXICO
11401
REGISTERED PROFESSIONAL SURVEYOR

Certificate Number

LOCATION & ELEVATION VERIFICATION MAP

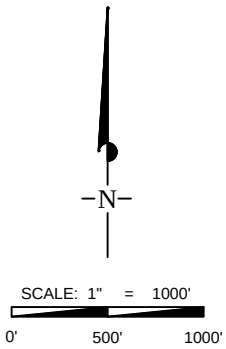


AWR DISPOSAL, LLC

LEASE NAME & WELL NO.: SAMMIES SWD #1

SECTION 18 TWP 23-S RGE 34-E SURVEY N.M.P.M.
COUNTY LEA STATE NM ELEVATION 3495'
DESCRIPTION 866' FSL & 1254' FEL

LATITUDE N 32.2997470 LONGITUDE W 103.5047124



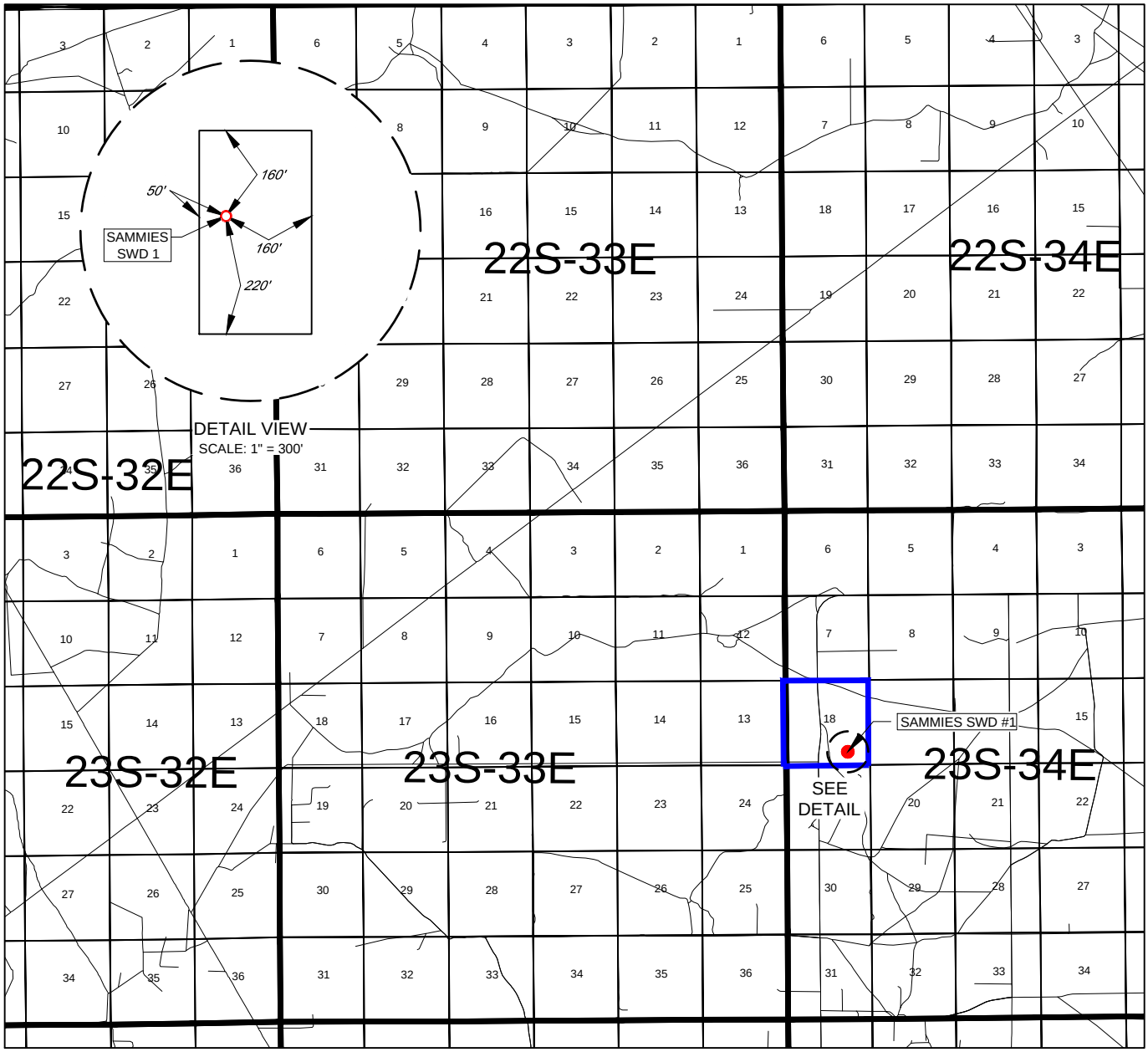
THIS EASEMENT/SERVITUDE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY ACCELERATED WATER RESOURCES, LP. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.

ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREON ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM, EAST ZONE OF THE NORTH AMERICAN DATUM 1983, U.S. SURVEY FEET.

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
1400 EVERMAN PARKWAY, Ste. 146 • FT. WORTH, TEXAS 76140
TELEPHONE: (817) 744-7512 • FAX (817) 744-7554
2903 NORTH BIG SPRING • MIDLAND, TEXAS 79705
TELEPHONE: (432) 682-1653 OR (800) 767-1653 • FAX (432) 682-1743
WWW.TOPOGRAPHIC.COM

EXHIBIT 2

VICINITY MAP



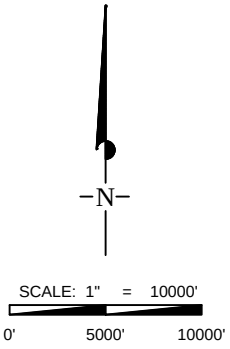
AWR DISPOSAL, LLC

LEASE NAME & WELL NO.: SAMMIES SWD #1

SECTION 18 TWP 23-S RGE 34-E SURVEY N.M.P.M.
COUNTY LEA STATE NM
DESCRIPTION 866' FSL & 1254' FEL

DISTANCE & DIRECTION

FROM INT. OF NM-128 & DELAWARE BASIN RD., GO NORTH ON DELAWARE BASIN RD. ±5.1 MILES, THENCE GO SOUTHEAST (RIGHT) ON A LEASE RD. ±0.47 MILES TO A POINT ±1824.3 FEET SOUTH OF THE LOCATION.



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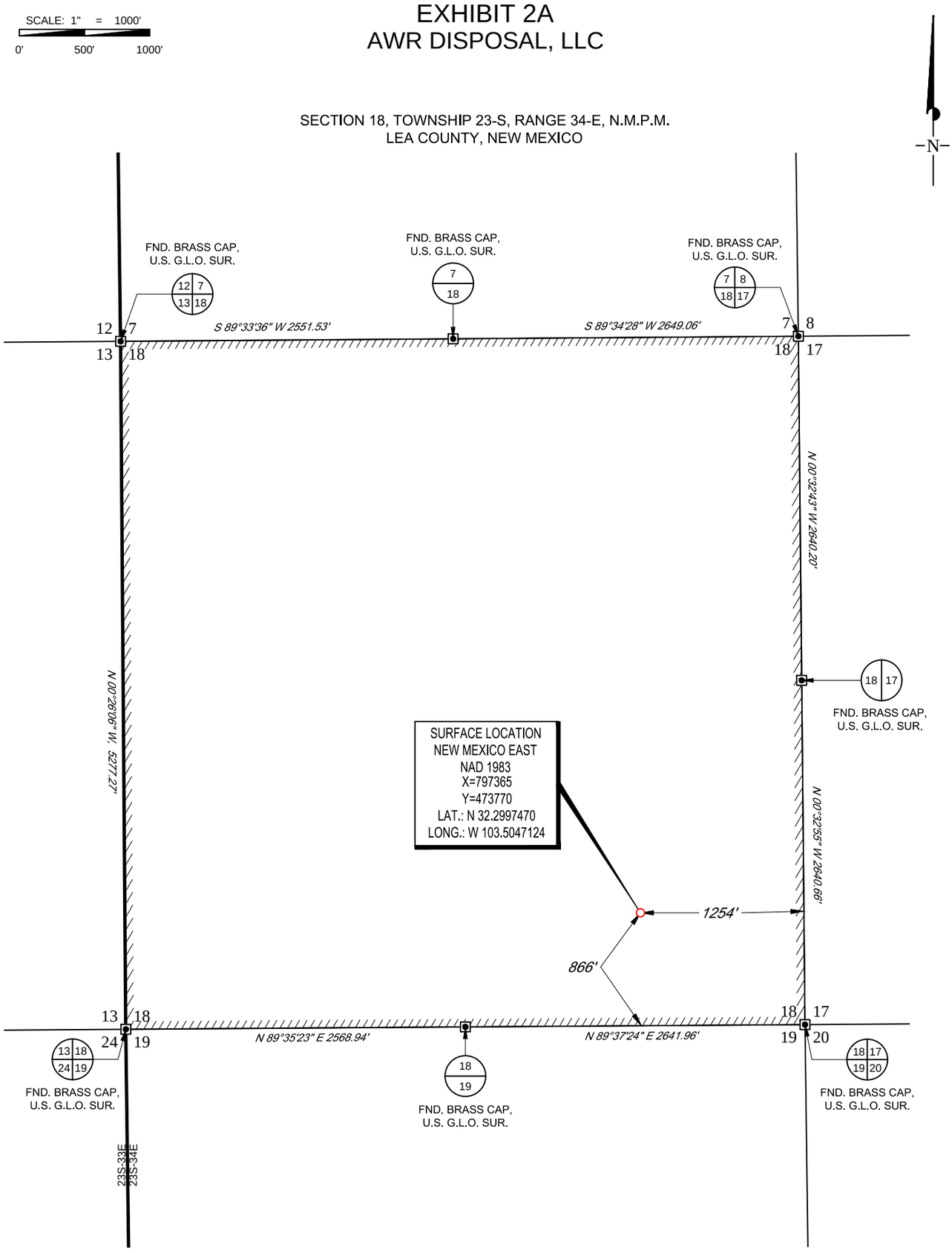
WWW.TOPOGRAPHIC.COM

EXHIBIT 2A
AWR DISPOSAL, LLC

SCALE: 1" = 1000'

0' 500' 1000'

SECTION 18, TOWNSHIP 23-S, RANGE 34-E, N.M.P.M.
LEA COUNTY, NEW MEXICO



LEASE NAME & WELL NO.: SAMMIES SWD #1

SECTION 18 TWP 23-S RGE 34-E SURVEY N.M.P.M.
COUNTY LEA STATE NM
DESCRIPTION 866' FSL & 1254' FEL

DISTANCE & DIRECTION

FROM INT. OF NM-128 & DELAWARE BASIN RD., GO NORTH ON DELAWARE BASIN RD. ±5.1 MILES, THENCE GO SOUTHEAST (RIGHT) ON A LEASE RD. ±0.47 MILES TO A POINT ±1824.3 FEET SOUTH OF THE LOCATION.

ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREON ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM, EAST ZONE OF THE NORTH AMERICAN DATUM 1983, U.S. SURVEY FEET

THIS EASEMENT/SERVITUDE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY AWR DISPOSAL, LLC. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.

JOHN TREVOR CARNEGIE
NEW MEXICO
11401
REGISTERED PROFESSIONAL SURVEYOR

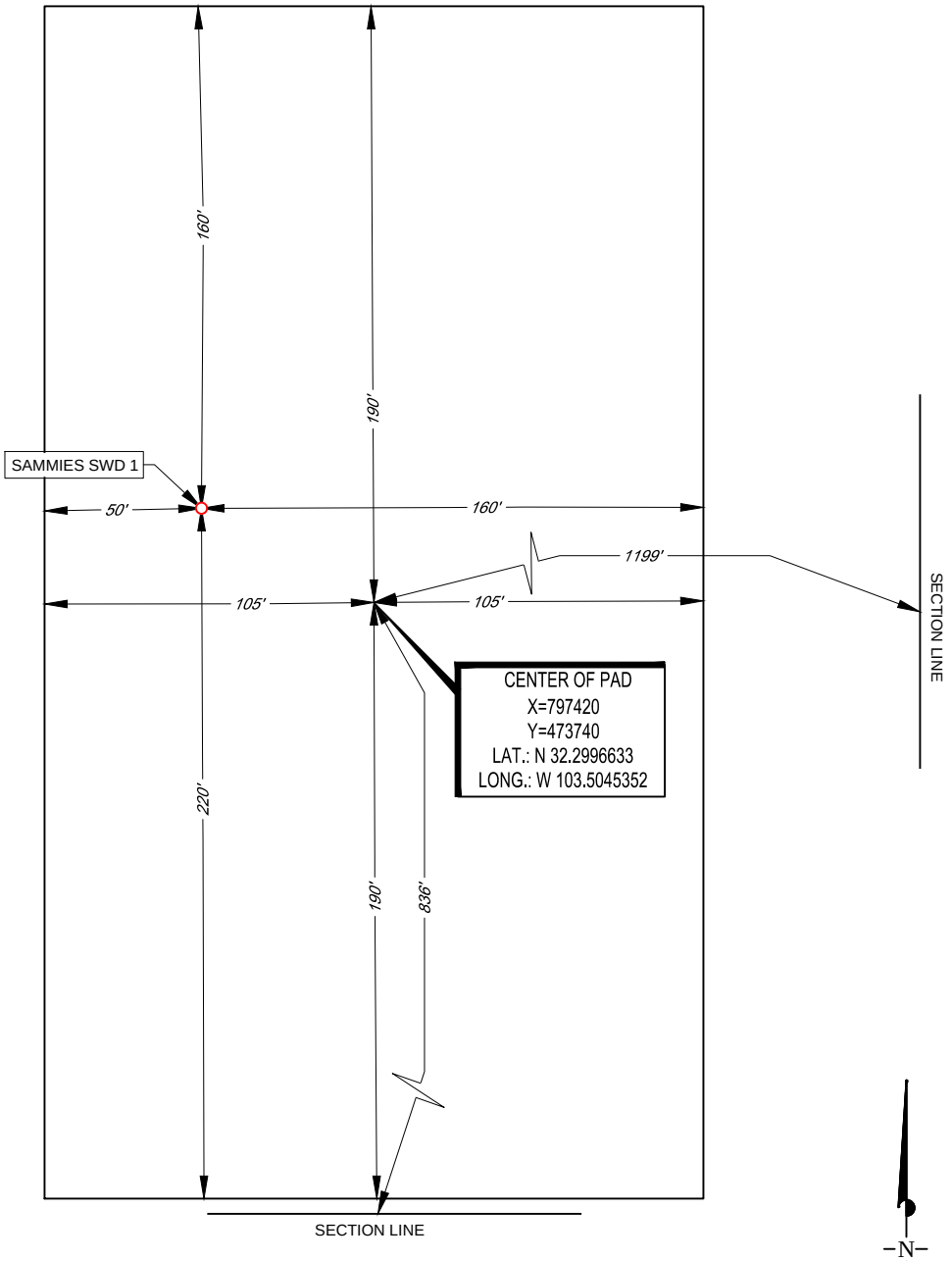
John Trevor Carnegie, P.S. No. 11401
JULY 31, 2019

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
1400 EVERMAN PARKWAY, Ste. 146 • FT. WORTH, TEXAS 76140
TELEPHONE: (817) 744-7512 • FAX (817) 744-7554
2903 NORTH BIG SPRING • MIDLAND, TEXAS 79705
TELEPHONE: (432) 682-1653 OR (800) 767-1653 • FAX (432) 682-1743
WWW.TOPOGRAPHIC.COM

EXHIBIT 2B

AWR DISPOSAL, LLC

SECTION 18, TOWNSHIP 23-S, RANGE 34-E, N.M.P.M.
LEA COUNTY, NEW MEXICO



LEASE NAME & WELL NO.: SAMMIES SWD #1

#1 LATITUDE N 32.2997470 #1 LONGITUDE W 103.5047124

CENTER OF PAD IS 836' FSL & 1199' FEL

ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREON ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM, EAST ZONE OF THE NORTH AMERICAN DATUM 1983, U.S. SURVEY FEET

THIS PROPOSED PAD SITE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY AWR DISPOSAL, LLC. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
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2903 NORTH BIG SPRING • MIDLAND, TEXAS 79705
TELEPHONE: (432) 682-1653 OR (800) 767-1653 • FAX (432) 682-1743
WWW.TOPOGRAPHIC.COM

ORIGINAL DOCUMENT SIZE: 8.5" X 11"

S:\SURVEY\ACCELERATED_WATER_RESOURCES_LP\LIMESTONE\FINAL_PRODUCTS\LO_SAMMIES_SWD_1_PAD.DWG 8/1/2019 3:19:05 PM hperezgomez

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

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

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____Secondary Recovery _____Pressure Maintenance ____**X**____Disposal _____Storage
Application qualifies for administrative approval? __**X**_____Yes _____No

II. OPERATOR: ____AWR Disposal, LLC_____

ADDRESS: ____3300 N. A Street, Ste 220, Midland, Texas 79705_____

CONTACT PARTY: ____Randall Hicks (agent)_____PHONE: __505 238 9515_____

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

IV. Is this an expansion of an existing project? _____Yes ____**X**_____No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

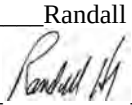
*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

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

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.
NAME: _____Randall Hicks_____TITLE: _____Agent_____

SIGNATURE:  _____ _____DATE: __08/14/2019_____
E-MAIL ADDRESS: _____r@rthicksconsult.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 submittal: _____

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.

INJECTION WELL DATA SHEET

OPERATOR: _____AWR Disposal, LLC._____

WELL NAME & NUMBER: _ SAMMIES **SWD #1**_____

WELL LOCATION: _____**866' FSL & 1254' FEL**_____**P**_____**18**_____**23S**_____**34E**_____
FOOTAGE LOCATION UNIT LETTER SECTION TOWNSHIP RANGE

WELLBORE SCHEMATIC

WELL CONSTRUCTION DATA

Surface Casing

Hole Size: ___See attachments_____ Casing Size:_____

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

Top of Cement: _____ Method Determined: _____

Intermediate Casing

Hole Size: _____ Casing Size:_____

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

Top of Cement: _____ Method Determined: _____

Production Casing

Hole Size: _____ Casing Size:_____

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

Top of Cement: _____ Method Determined: _____

Total Depth: _____

Injection Interval

_____feet to_____

(Perforated or Open Hole; indicate which)

INJECTION WELL DATA SHEET

Tubing Size: _____See attachments_____Lining Material: _____

Type of Packer: _____

Packer Setting Depth: _____

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

Additional Data

1. Is this a new well drilled for injection? __X_____Yes _____No

   If no, for what purpose was the well originally drilled? _____

   _____

2. Name of the Injection Formation: _____

3. Name of Field or Pool (if applicable): _Proposed: SWD, Devonian, Fusselman, Montoya_____

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. ____No_____

   _____

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

   _____

   _____

   _____

Attachments to C-108

Copy of well bore diagram

Section III-XII Written descriptions to supplement C-108

Plates referenced in written descriptions

Tables referenced in written descriptions

OSE well logs referenced in written descriptions

Section XIII Proof of Notice

AWR Disposal LLC

Lease Name: Sammies SWD #1

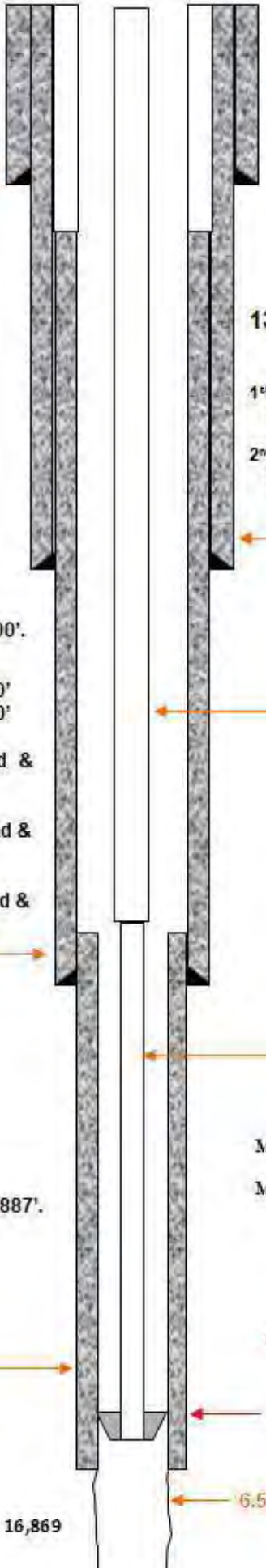
Unit Letter P, Sec. 18, T23S R34E
866' FSL, 1254' FEL
Lea County, NM

Latitude + N 32° 17' 59.09", Longitude W 103° 30' 16.96"

Directions to the Sammies SWD #1

Date Spudded: TBD

From Carlsbad:



Maximum Proposed Injection Rate: 40,000 BBLS PER DAY

Maximum Proposed Injections Pressure: 3,000 psi

Injection Interval:

14,887	-	16,032	DVNN
16,032	-	16,524	FSLM
16,524	-	16,869	MNTY

TD : 16,869

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

Lease Name: Sammies SWD #1
Unit Letter P, Section 18, T23S R34E, 866' FSL, 1,254' FEL

Limestone Basin Property Ranch LLC owns the surface of the proposed SWD location.

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

The attached Wellbore Data Sheet provides all of the design specifics required and a tabulation of these data are shown on the diagram.
The formation tops for the Sammies SWD #1 were established by Geologist Herb Wacker TBPG license #4517.

For the deepest formations, the log from the Amerada Hess Bell Lake North Fed #3 (30-325-33077) was used. It has a total depth of 17,540' in the Ellenburger Formation. The distance from the Sammies SWD #1 location to this well is 2.6 miles to the north.

For picking tops of more shallow formations, the log from the BTA Oil Producers Bell Lake 7909 #1 (30-325-33077) that has a total depth of 14,755' in the Devonian Formation. The distance from the Sammies SWD #1 location is 0.4 mile to the northeast.

AWR 206 Sammies Sec 18 Twp 23S Rge 34E		
	GL	**3490**
Geologist	**KB**	**3510**
H. Wacker	**MD**	**SS**
Dockum	265	**3245**
Santa Rosa	290	**3220**
Dewey Lake	627	**2883**
Rustler	981	**2529**
Salt	1360	**2150**
Delaware	5069	**-1559**
Bell Canyon	5082	**-1572**
Cherry Canyon	5890	**-2380**
Brushy Canyon	7232	**-3722**
Bone Spring	8536	**-5026**
Avalon	8932	**-5422**
1st Bone Spring	9678	**-6168**
2nd Bone Spring	10211	**-6701**
3rd Bone Spring	11178	**-7668**
Wolfcamp	11494	**-7984**
Strawn	11973	**-8463**
Atoka	12209	**-8699**
Morrow	12978	**-9468**
Barnett	13648	**-10138**
Miss Limestone	14248	**-10738**
Woodford	14632	**-11122**
Devonian	14857	**-11347**
Fusselman	16032	**-12522**
Montoya	16524	**-13014**
Simpson	16899	**-13389**
Top of Interval	14887'	**Devonian +30'**
Bottom of Interval	16869'	**Simpson -30'**
TD	16869'	
Thickness of Injection Interval = 1982'		

3. A description of the tubing to be used including its size, lining material, and setting depth

5-1/2" (20#) internal plastic coated tubing swaged down to 5" (18#) with setting depth of 14,787'.

4. The name, model, and setting depth of the packer used or a description of any other seal system or assembly used

Tryton Tools, 7" Arrow Set 1-X Nickel Plated Injection Packer will be set at 14,787'.

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

The proposed injection intervals include the Devonian, Fusselman and Montoya in an open-hole interval.

(2) The injection interval and whether it is perforated or open-hole.

The depth interval of the open-hole injection interval is 14,887-16,869 (1,982 feet).

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

The well will be drilled for disposal.

(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

There are no perforated intervals, only the open-hole completion described above.

(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.

Overlying Oil & Gas Zone (Using GL of 3490'):

Bone Spring	8536
Avalon	8932
1st Bone Spring	9678
2nd Bone Spring	10211
3rd Bone Spring	11178
Wolfcamp	11494
Strawn	11973
Atoka	12209
Morrow	12978

Underlying Oil & Gas Zones:

Devonian	14857

IV. Is this an expansion of an existing project

No.

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

Plate 1a identifies all OCD listed wells and API numbers and shows circles with radii of 0.5, 1.0, and 2.0 miles. Note that where numerous wells are closely spaced, the API number may not be labeled for clarity. New wells, active wells, plugged wells, and canceled wells have color-coded symbols. Plate 1b shows only new and active wells and circles with radii of 0.5 and 1.0 miles.

Plate 2 identifies the leases within 2-miles of the proposed SWD as well as leases within the 1-mile area of review.

- Plate 2a presents the lease numbers for the SLO and BLM oil and gas leases. Also shown is mineral rights owned by the U.S. that are unleased at this time.
- Plate 2b presents land ownership for the same area and identifies the oil and gas mineral rights ownership.

Table 1 and Table 2 identify all affected persons within the 1-mile area of review

- Table 1 lists all of the Oil and Gas Well Operators shown on Plate 1a within the circle having a 1.0 mile radius.
- Table 2 lists all leasees, leassors/mineral interests and surface owners (affected persons) within the 1-mile AOR presented on Plate 2a.

Note that the northern ½ of Section 18 T23S R34E is shown as unleased oil and gas minerals using the BLM database. The surface of all of Section 18 is owned by Limestone Basin Prop LLC, as is the northern ½ of Sections 13-14 of T23S R33E. The northern ½

of Sections 13-14 are leased for oil and gas production by the State of New Mexico. In the northern ½ of Section 18 (shown as unleased on Plate 2a), four producing wells exist. Obviously, there exists a glitch in the SLO database as the information on one of the wells shows the Lease as LC-065194, which is a State of NM lease number. From these data we conclude that the minerals in the northern ½ of Section 18 belong to the State of NM and are leased by the new operator of these wells, BTA Oil producers. Thus, all affected parties have been notified.

Form 3160-3
(August 2007)

AUG 18 2016

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RECEIVED

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0137
Expires July 31, 2010

5. Lease Serial No.
LC-065194

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

7. If Unit or CA Agreement, Name and No.

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone

8. Lease Name and Well No.
Starcaster 18 Fed Com 1H (317567)

2. Name of Operator Endurance Resources, LLC (270329)

9. API Well No.
30-025-43386

3a. Address 203 West Well Suite 1000
Midland, Tx 79701

3b. Phone No. (include area code)
432-242-4680

10. Field and Pool, or Exploratory
Bell Lake; Bone Springs, North (5150) KB

4. Location of Well (Report location clearly and in accordance with any State requirements.*)
At surface 330' FNL & 1270' FWL
At proposed prod. zone 330' FSL & 660' FWL

HOBBS OCD
AUG 16 2016
RECEIVED

11. Sec., T. R. M. or Blk. and Survey or Area
Sec 18-23s-34e

14. Distance in miles and direction from nearest town or post office*
26 miles Northwest of Jal, New Mexico

12. County or Parish
Lea

13. State
NM

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

API	Ogrid	Ogrid Name	ULSTR	Well Type	Status	Well Name
30-025-26508	3002	BTA OIL PRODUCERS	F-18-23S-34E	G	P	BELL LAKE 7909 JV-P #001

Date Drilled	Plug Date	Total Depth	Pool ID
May, 1980	Oct. 1989	14755	[71880] BELL LAKE, DEVONIAN, MID (GAS)

Table 1 shows that there is one well that penetrated the proposed injection zone. Bell Lake 7909 JV-P #001 (API # 30-025-26508) was completed in the Devonian Formation to a depth of 14,755 feet as a gas well in May, 1980. It was plugged in October of 1989. Reports of these activities are included.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected

Proposed Maximum Injection Rate: 40,000 bbl/day
Proposed Average Injection Rate: 30,000 bbl/day

2. Whether the system is open or closed

This is will be an open system. All AWR Disposal, LLC SWDs may receive produced water from recycling storage facilities, such as in-ground containments or above-ground steel-walled containments, which are registered or permitted under Rule 34.

3. Proposed average and maximum injection pressure

Proposed Maximum Injection Pressure: 3,000 psi
Proposed Average Injection Rate: 2,000 psi

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

The attached Table 3 “Produced Water Chemistry of Nearby Wells” provides the requisite analyses. The Delaware and Bone Spring Formations are the subjects of the analyses. These formations and the Wolfcamp will provide most of the produced water to the proposed SWD. At the time of writing, we are unaware of any problems associated with disposal of produced water derived from any Formations into the Devonian, Fusselman and Montoya injection zone.

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.).

Table 4 presents formational water quality data from the Go-Tech site for Devonian-Fusselman-Montoya producing wells. As stated above, we are unaware of any problems associated with disposal of produced water derived from the Delaware, Avalon, Bone Spring, and Wolfcamp Formations into the Devonian, Fusselman and Montoya injection zone.

*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth.

The proposed injection intervals include the Devonian, Fusselman and Montoya in an open-hole interval. The proposed injection intervals in the Pre-Mississippian Carbonates are well cemented and will provide the necessary open hole integrity while allowing salt water to be injected. Because of the competency of the rock, the open hole section has very little chance of collapsing.

As indicated in Section III.A.2, the approximate depths to the top of the Devonian and the base of the Montoya are 14,857 and 16,899 respectively. The depth interval of the injection interval is 14,887 - 16,869 (1,982 feet), within the Devonian, Fusselman and Montoya Formations.

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.

The Rustler Formation and the Chinle Formation yield water to supply wells in southeastern Eddy County and southwestern Lea County. In the immediate area of the Sammies SWD #1, the closest water well (CP-00566) is associated with a stock tank, about 1.2 miles to the northeast of the Sammies SWD #1 site (Plate 3a). In October of 1974, a depth to water of 255 feet was recorded at this well. The next closest wells for which data is recorded are CP- 07130, about 1.8 miles to the northeast, and C-02282, about 2.2 miles to southwest. Depth to water in these wells is 200-feet (Nov. 2018) and 225-feet (Dec. 1922) respectively.

In this area of Lea County, the Chinle yields water to wells from 100-200 feet below the ground surface (bgs) to a depth of about 600 feet. The upper portion of the Rustler Formation yields fresh water to wells in Lea County and in the area of the Sammies SWD #1, the depth interval of this potential source of fresh water is about 1000 to 1100 feet. The OSE database contains no well information (e.g. driller's logs) for nearby wells. Based upon the data of the surrounding wells, we conclude most water supply wells are completed in the Chinle formation.

The locations of all water supply wells listed in public databases are shown in Plate 3b. The location of nearby mapped surface water bodies are shown in Plate 4. The closest mapped surface water is ephemeral stream beds 0.7 miles to the northwest and about 0.75 miles to the southwest.

IX. Describe the proposed stimulation program, if any

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

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

Logs will be submitted to OCD upon completion of the well.

*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

No active water supply wells with water chemistry data were identified within one mile of the proposed SWD. Data from various sources permit a conclusion that groundwater within the Chinle Formation is potable. In this area, groundwater in the underlying Rustler formation may be relatively brackish.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any

other hydrologic connection between the disposal zone and any underground sources of drinking water

Randall T. Hicks, a Professional Geologist with decades of experience in hydrogeology, affirms, on behalf of AWR Disposal, LLC, that

- The USGS has mapped quaternary faults in New Mexico and the closest fault is at the western edge of the 1-mile area of review for the proposed Sammies SWD #1[1]
- The Texas Bureau of Economic Geology has mapped older faults (e.g. basement and Woodford) in New Mexico and the closest mapped faults are about 1-mile to the west[2] and more than 2-miles to the east.
- With respect to migration of produced water from the injection zone to underground sources of drinking water via faults or other natural conduits, the following conditions were considered
    - The lowest underground source of drinking water is the middle and upper Rustler Formation.
    - More than 9,000 feet of sedimentary rock separates the bottom of the Rustler Formation and the top of the injection zone. Many of the formations that lie between the injection zone and the lowermost aquifer are permeable and contain oil, gas or water at various pressures. Any excursion of injected fluids from the Devonian disposal zone would undoubtedly enter these permeable formations prior to moving into the Rustler Formation.
    - There is no evidence that the pressure regime in the oil and gas reservoirs is sufficient to cause the upward migration of formation water through the bedded salt and into the Rustler or Chinle aquifers.
- There is no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water

[1] https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf

[2] Bureau of Economic Geology (Accessed April 2019). University of Texas at Austin. Basement Faults (Ewing 1990, Tectonic Map of Texas); Precambrian Faults (Frenzel et al. 1988, Figure 6); Woodford Faults (Comer 1991, plate 1). Http://www.beg.utexas.edu/resprog/permianbasin/gis.htm

Data From OCD On Line For All Wells Of Public Record Within The Area Of Review Which Penetrate The Proposed Injection Zone.

API	Ogrid	Ogrid Name	Well Type	Status	Well Name	ULSTR	Total Depth	Pool ID
30-025-26508	3002	BTA OIL PRODUCERS	G	P	BELL LAKE 7909 JV-P #001	F-18-23S-34E	14755	[71880] BELL LAKE, DEVONIAN, MID (GAS)

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OPERATOR		

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-103
Supersedes Old C-102 and C-103
Effective 1-1-65

API 30-025-26508

5a. Indicate Type of Lease: State ☐ Fee ☒

5. State Oil & Gas Lease No.: LC 063387

SUNDRY NOTICES AND REPORTS ON WELLS

(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT —" (FORM C-101) FOR SUCH PROPOSALS.)

1. OIL WELL ☐ GAS WELL ☒ OTHER-

7. Unit Agreement Name:

2. Name of Operator: BTA OIL PRODUCERS

8. Farm or Lease Name: Bell Lake 7909 JV-P

3. Address of Operator: 104 South Pecos Midland, Texas 79701

9. Well No.: 1

4. Location of Well: UNIT LETTER F, 1650 FEET FROM THE North LINE AND 2510 FEET FROM THE West LINE, SECTION 18 TOWNSHIP 23-S RANGE 34-E NMPM.

10. Field and Pool, or Wildcat: Bell Lake Devonian

15. Elevation (*Show whether DF, RT, GR, etc.*): 3,496' GR

12. County: Lea

16. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐		COMMENCE DRILLING OPNS. ☐	PLUG AND ABANDONMENT ☒
PULL OR ALTER CASING ☐	CHANGE PLANS ☐	CASING TEST AND CEMENT JOB ☐	
OTHER ☐		OTHER Re-enter & Re-plug	☒

17. Describe Proposed or Completed Operations (*Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work*) SEE RULE 1103.

Re-enter and Re-plug

7-23-87 Drld surface plug & tagged 2nd plug @ 420'.

7-24-87 Drld Cmt from 420 to 715', Ran bit to 1,025' & Drld cmt stringer to 1,031 (6').

7-25-87 Ran bit to next plug @ 1,165', Drld cmt from 1,165' to 1,387', Ran bit to 4,782', Started Drlg cmt & twisted off.

7-27-87 Fished tbg, DC's & bit.

7-28-87 GIH, started Drlg & twisted off. GIH w/overshot, caught fish. POH & chg tbg string.

7-29-87 Drld cmt to 4,988' - POH.

7-30-87 GIH & tagged cmt plug @ 8,197' - Spotted cmt plugs;

50 sx @ 8,197' - 8,037'
40 sx @ 5,590' - 5,470'
65 sx @ 5,010' - 4,810'

7-31-87 Spotted 65 sx @ 1,410' - 1,210'
65 sx @ 699' - 499'
15 sx @ Surface
P & A 7-31-87

Installed Dry Hole Marker

18. I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNED Dorothy Houghton TITLE Regulatory Supervisor DATE 8/6/87

APPROVED BY R A Sadler TITLE OIL & GAS INSPECTOR DATE OCT 10 1989

CONDITIONS OF APPROVAL, IF ANY:

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OPERATOR		

Form C-105
Revised 11-1-16

NEW MEXICO OIL CONSERVATION COMMISSION
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease: State [ ] Fee [X]

5. State Oil & Gas Lease No.

7. Unit Agreement Name

8. Farm or Lease Name: Bell Lake, 7909 JV-P

9. Well No.: 1

10. Field and Pool, or Wildcat: Undesignated

1a. TYPE OF WELL: OIL WELL [ ] GAS WELL [X] DRY [ ] OTHER

b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

2. Name of Operator: BTA OIL PRODUCERS

3. Address of Operator: 104 South Pecos Midland, Texas 79701

4. Location of Well: UNIT LETTER "C" LOCATED 1650 FEET FROM THE North LINE AND 2510 FEET FROM THE West LINE OF SEC. 18 TWP. 23-S RGE. 34-E NMPM

12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
2/14/80	5/8/80	5/20/80	3497'	3507'

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
14755'	14754'	- -	→	0-14755'	- -

24. Producing Interval(s), of this completion — Top, Bottom, Name: 14660' - 14708' (Devonian)

25. Was Directional Survey Made: No

26. Type Electric and Other Logs Run: Borehole Compensated Sonic Log, Compensated Neutron-Formation Density, Dual Induction, Dual Laterolog.

27. Was Well Cored: No

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
20"	94#	666'	26"	1900 sx + 50 sx top job	- -
13-3/8"	68 & 72#	4945'	17-1/2"	4400 sx	
9-5/8"	47 & 53.5#	11800'	12-1/4"	*	

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
7-5/8"	11,391'	14,020'	370	- -
5"	13,728'	14,755'	220	- -

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2-3/8"&3-1/2"	14,387'	14,300'

31. Perforation Record (Interval, size and number)

14,660' - 14,708' 1" (16 holes)

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
14,660' - 14,708'	1000 Gal. NE 15%

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
5/28/80	Flowing	SI

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas—Oil Ratio
5/28/80	4	14/64"	→	- -	4819	85	

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)
3060	- -	→		4819	85	

34. Disposition of Gas (Sold, used for fuel, vented, etc.): Vented

Test Witnessed By

35. List of Attachments: C-104, Log, Deviation Schedule

36. *I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.*

SIGNED Bob K. Newland BOB K. NEWLAND TITLE Regulatory Supervisor DATE 6/9/80

* DV Tool @5573' 1st Stage w/2200 sx., 2nd stage w/1857 sx.

INSTRUCTIONS

This form is to be filed with the appr to District Office of the Commission not later n 20 days after the completion of any newly-drill- deepened well. It shall be accompanied one copy of all electrical and radio-activity lor n on the well and a summary of all special tests ducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate exce state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy	980	T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt		T. Strawn	11885	T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt	4454	T. Atoka	12337	T. Pictured Cliffs		T. Penn. "D"	
T. Yates		T. Miss	13954	T. Cliff House		T. Leadville	
T. 7 Rivers		T. Devonian	14658	T. Menefee		T. Madison	
T. Queen		T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg		T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs		T. Wingate		T.	
T. Wolfcamp	10603	T.		T. Chinle		T.	
T. Penn.		T.		T. Permian		T.	
T Cisco (Bough C)		T.		T. Penn. "A"		T.	

OIL OR GAS SANDS OR ZONES

No. 1, from 14658 to 14755 No. 4, from ..... to .....

No. 2, from ..... to ..... No. 5, from ..... to .....

No. 3, from ..... to ..... No. 6, from ..... to .....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from none to ..... feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

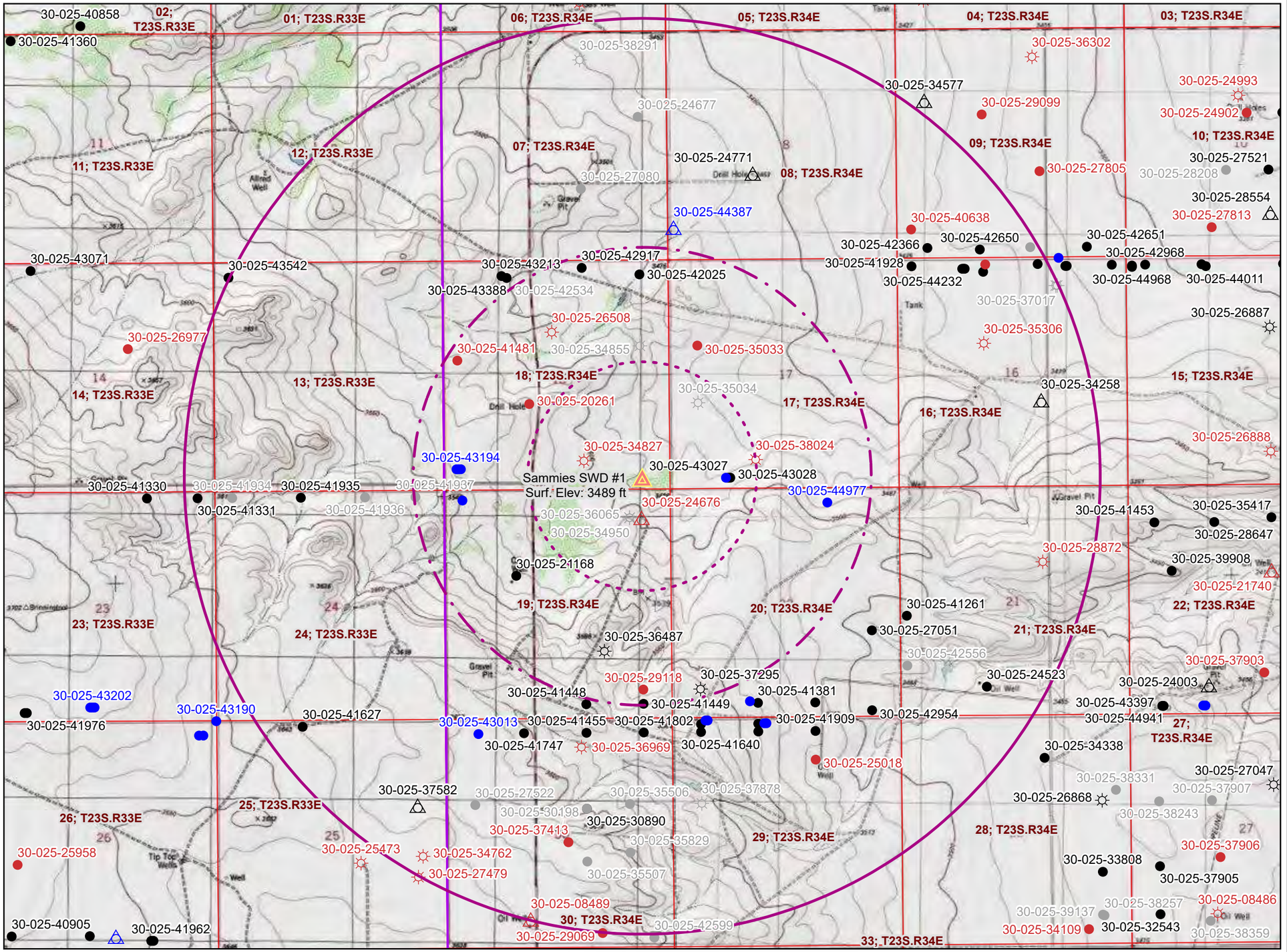
FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
10603	11885	1282'	Wolfcamp				
11885	12186	301'	Strawn				
12337	12520	183'	Atoka				
13954	14478	524'	Miss.				

JUN 1 2 1989

Plates

M:\Accelerated Water\SWDs\Sammies SWD\arcGISproSammies\arcGISproSammies.aprx



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	NM Oil and Gas Wells within 2 Miles AWR Disposal, LLC Sammies SWD #1	Plate 1a August 2019

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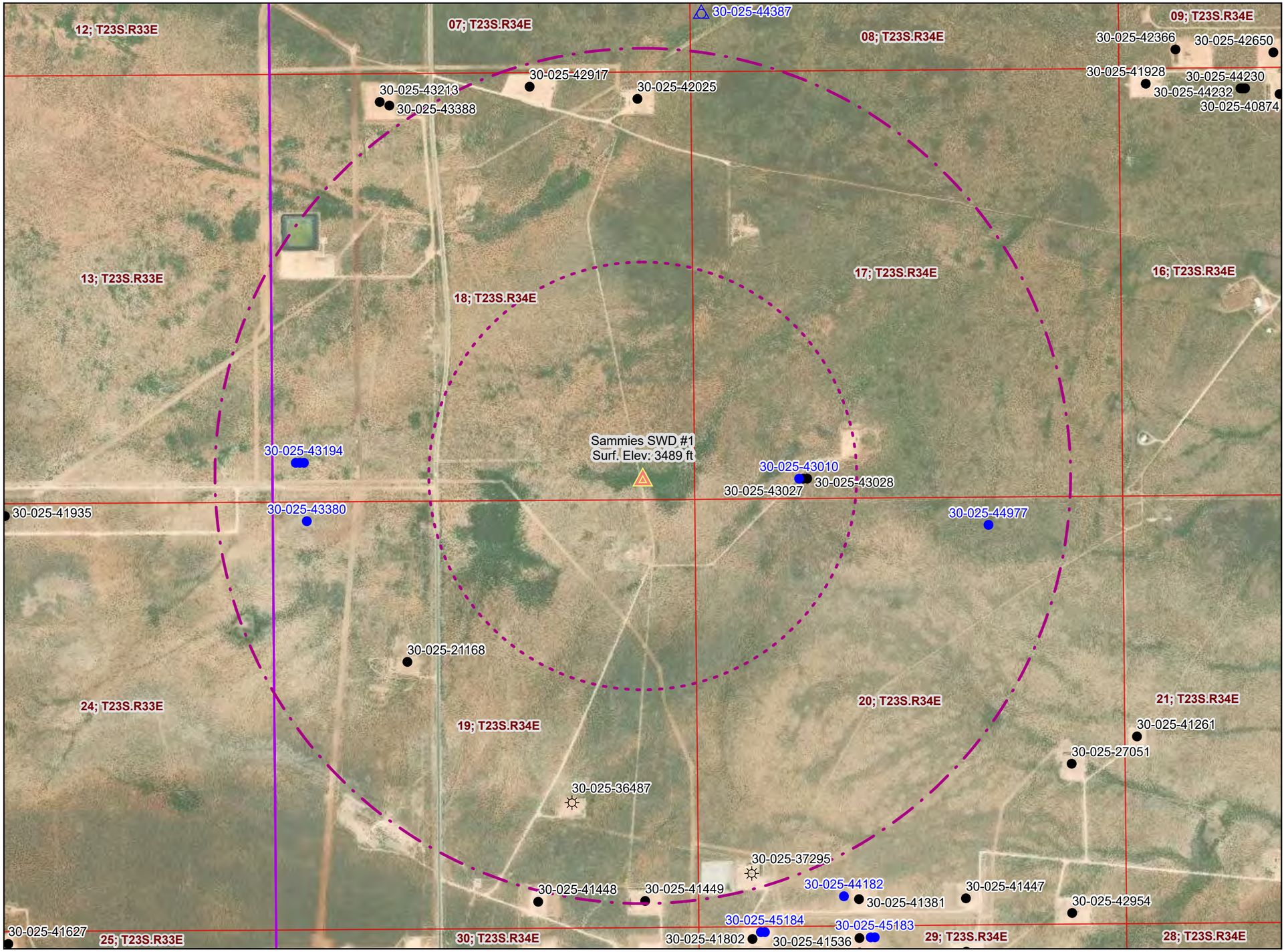

SWD

Distance (miles)

0.5

1

2

Oil and Gas (NMOCD)

Gas, Active

Oil, Active

Oil, New

Salt Water Injection, New

N W E S

0 0.25 0.5 Miles

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

NM Oil and Gas Wells within 1 Miles (Active Only)

AWR Disposal, LLC
Sammies SWD #1

Plate 1b

August 2019

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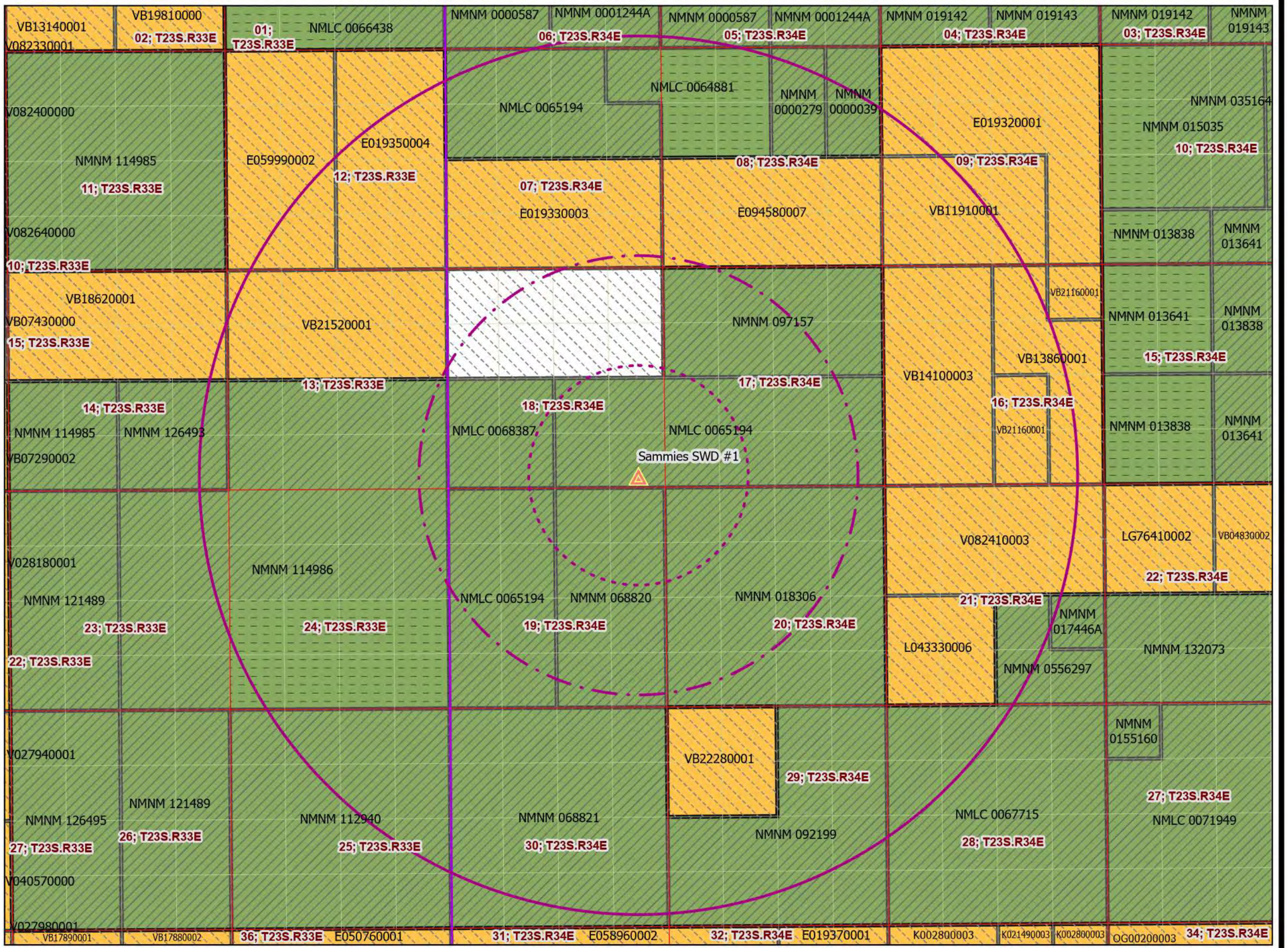

SWD

Distance (miles)

0.5

1

2

Oil and Gas Leases

SLO Leases

BLM Leases

Mineral Ownership (BLM Dataset)

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

No minerals are owned by the U.S. (BLM)

Other minerals are owned by the U.S. (BLM)

Township Range Section

Township Range

Section

UL (qq)

N W E S

0 0.25 0.5 Miles

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Oil and Gas Leases with Mineral Ownership Within 2-Miles

AWR Disposal, LLC
Sammies SWD #1

Plate 2a

August 2019

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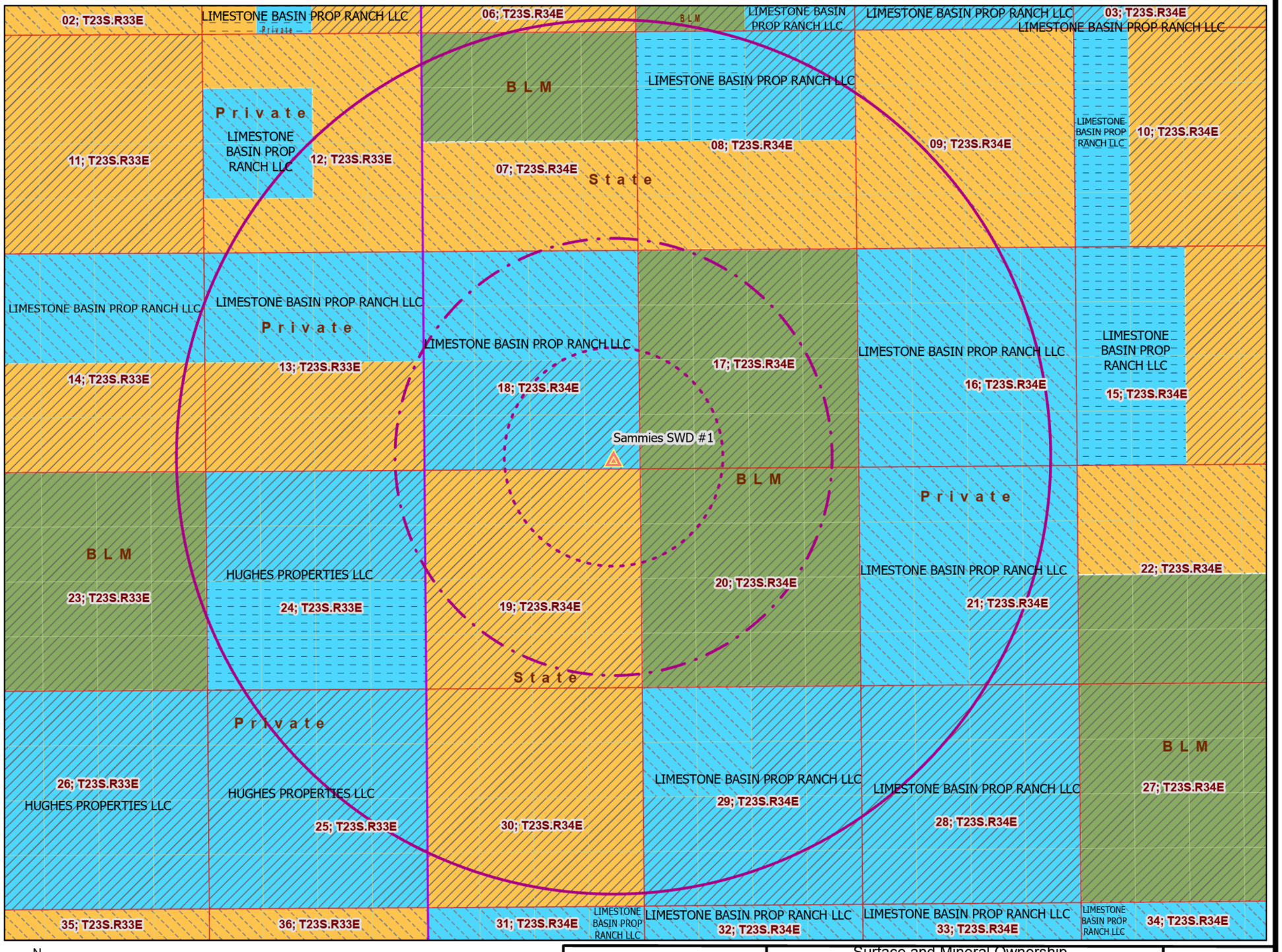

SWD

Distance (miles)

0.5

1

2

NM Land Ownership

BLM

State

Private

Mineral Ownership (BLM Dataset)

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

No minerals are owned by the U.S. (BLM)

Other minerals are owned by the U.S. (BLM)

Township Range Section

Township Range

Section

UL (qq)

N W E S

0 0.25 0.5 Miles

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Surface and Mineral Ownership Within 2-Miles

AWR Disposal, LLC
Sammies SWD #1

Plate 2b

August 2019

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SWD

Potentiometric Surface (ft msl)

Isocontour

USGS Gauging Station (DTW, Date)

Aquifer Code, Well Status

Alluvium/Bolsom

Ogallala

Chinle

Chinle, Site was being pumped.

Santa Rosa

Santa Rosa, Site was being pumped.

Misc. Water Wells (Well ID, DTW)

Well Depth (ft)

No Data

<= 150

> 500

OSE Water Wells (DTW/Date)

Well Depth (ft)

<=150

151-350

351-500

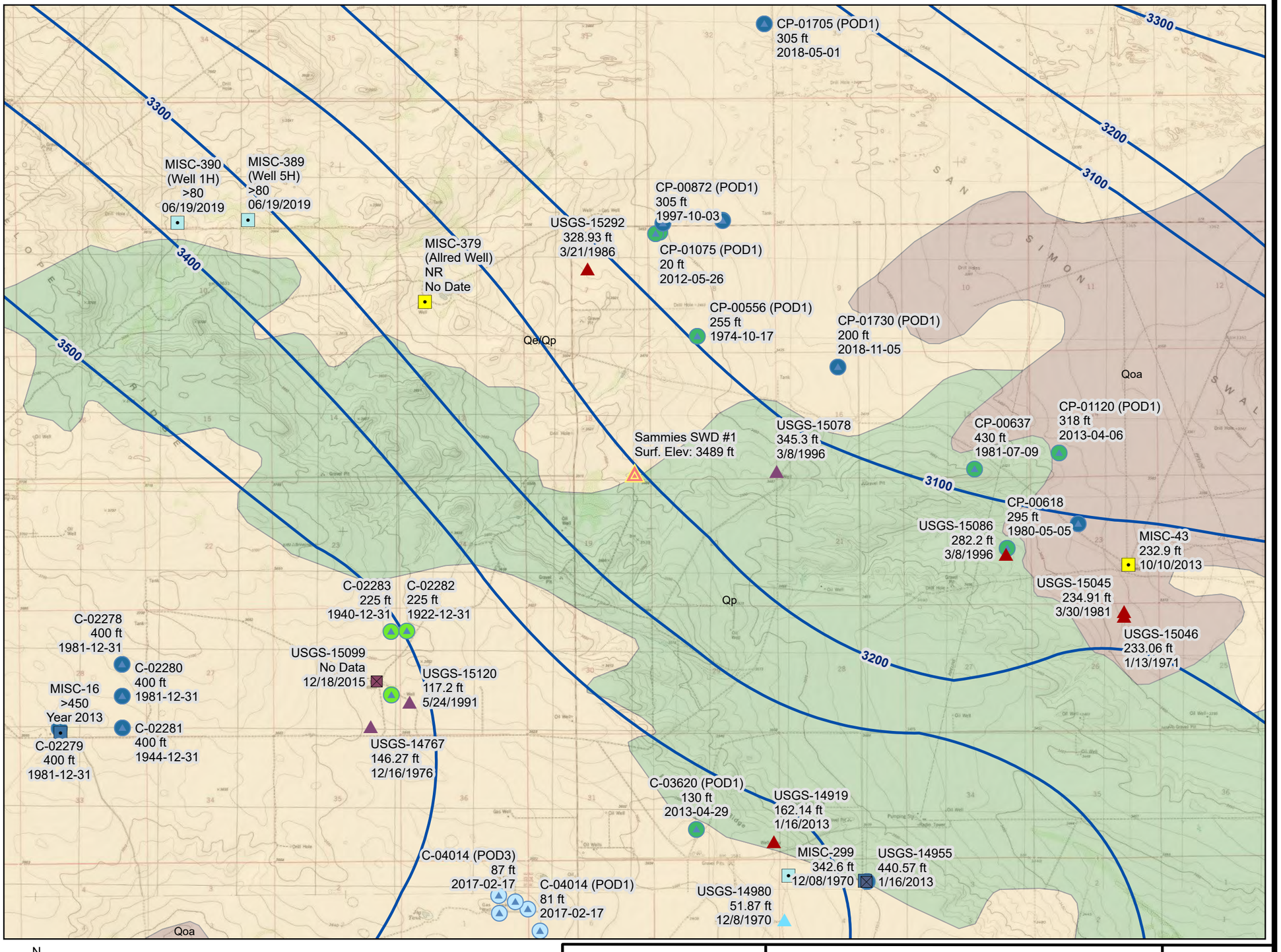
501-1000

NM Geology

Qe/Qp, Quaternary-Eolian Piedmont Deposits

Qoa, Quaternary-Older Alluvial Deposits,Qoa, Quaternary-Older Alluvial Deposits

Qp, Quaternary-Piedmont Alluvial Deposits,Qp, Quaternary-Piedmont Alluvial Deposits



N W E S

0 0.5 1 Miles

R.T. Hicks Consultants, Ltd
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Albuquerque, NM 87104
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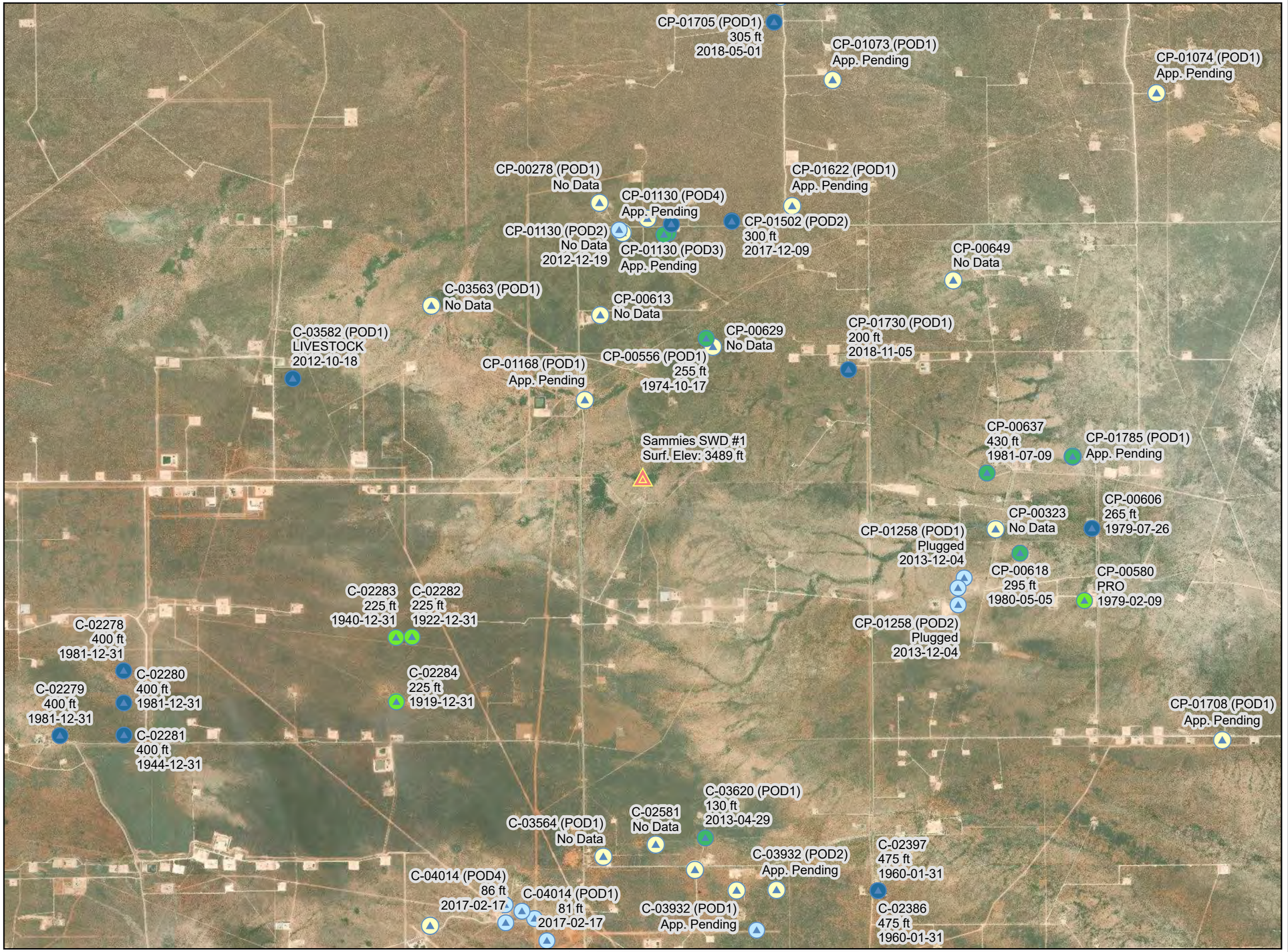
Water Wells with Potentiometric and Geology

AWR Disposal, LLC
Sammies SWD #1

Plate 3a

August 2019

M:\Accelerated Water\SWDs\Sammies SWD\arcGISproSammies\arcGISproSammies.aprx



SWD

OSE Water Wells (DTW/Date)

Well Depth (ft)

- <=150
- 151-350
- 351-500
- 501-1000
- Other

N W E S

0 0.5 1 Miles

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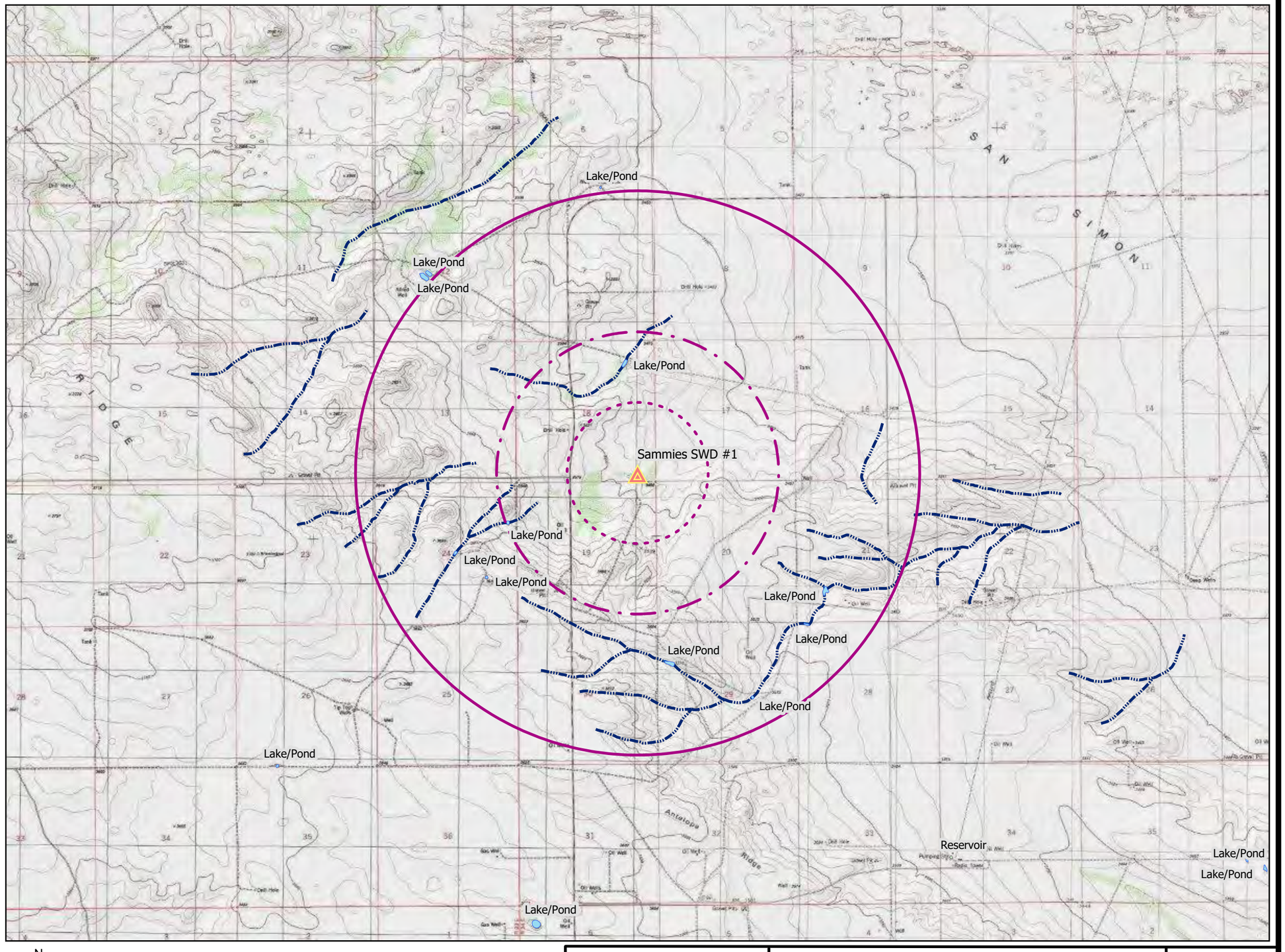
Nearby OSE Water Wells	Plate 3b
AWR Disposal, LLC Sammies SWD #1	August 2019

M:\Accelerated Water\SWDs\Sammies SWD\arcGISproSammies\arcGISproSammies.aprx



SWD

Distance (miles)

0.5

1

2

Water Bodies (1307)

Lake/Pond

Reservoir

River and Drainages (1307)

Stream/River Artificial Path

Intermittent Stream

N W E S

0 0.5 1 Miles

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Surface Water

AWR Disposal, LLC
Sammies SWD #1

Plate 4

August 2019

Tables

Table 1
Oil and Gas Operators (Affected Persons) within 1-Mile AOR

API	Ogrid	Ogrid Name	Well Type	Status	Well Name	District	ULSTR	Total Depth	Pool ID
30-025-20261	214263	PRE-ONGARD WELL OPERATOR	O	P	PRE-ONGARD WELL #009	1	K-18-23S-34E	8697	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-21168	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	BRADLEY A #001	1	F-19-23S-34E	13468	[72000] BELL LAKE, MORROW, MID (GAS)
30-025-24676	229137	COG OPERATING LLC	S	P	FEDERAL 19 #001	1	A-19-23S-34E	8710	[5166] BELL LAKE, DELAWARE, NORTH; [97003] SWD, CHERRY CANYON
30-025-26508	3002	BTA OIL PRODUCERS	G	P	BELL LAKE 7909 JV-P #001	1	F-18-23S-34E	14755	[71880] BELL LAKE, DEVONIAN, MID (GAS)
30-025-29118	214263	PRE-ONGARD WELL OPERATOR	O	P	PRE-ONGARD WELL #001	1	P-19-23S-34E	347	
30-025-34827	260297	BTA OIL PRODUCERS, LLC	G	P	BELL LAKE 7909 JV-P #002	1	O-18-23S-34E	13630	[97363] BELL LAKE, UPPER PENN, NORTH (GAS)
30-025-34855	20305	DEVON SFS OPERATING INC	G	C	PALOMA BLANCO 18 COM #001	1	H-18-23S-34E	0	
30-025-34950	20305	DEVON SFS OPERATING INC	G	C	PALOMA BLANCO 19 FEDERAL #001A	1	A-19-23S-34E	0	
30-025-35033	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	P	PALOMA BLANCO 17 FEDERAL #001	1	E-17-23S-34E	13797	[5150] BELL LAKE, BONE SPRING, NORTH; [5166] BELL LAKE, DELAWARE, NORTH; [71920] BELL LAKE, MORROW, NORTH (GAS)
30-025-35034	20305	DEVON SFS OPERATING INC	G	C	PALOMA BLANCO 17 FEDERAL #002	1	L-17-23S-34E	0	
30-025-36065	6137	DEVON ENERGY PRODUCTION COMPANY, LP	G	C	PALOMA BLANCO 19 FEDERAL COM #001	1	A-19-23S-34E	0	
30-025-36487	6137	DEVON ENERGY PRODUCTION COMPANY, LP	G	A	PALOMA BLANCO 19 FEDERAL COM #002	1	J-19-23S-34E	13704	[72000] BELL LAKE, MORROW, MID (GAS)
30-025-37295	229137	COG OPERATING LLC	G	A	STRATOCASTER 20 FEDERAL #001H	1	M-20-23S-34E	10542	[2209] ANTELOPE RIDGE, BONE SPRING, WEST; [5130] BELL LAKE, BONE SPRING; [70370] ANTELOPE RIDGE, ATOKA, WEST (GAS)
30-025-38024	6137	DEVON ENERGY PRODUCTION COMPANY, LP	G	P	PALOMA BLANCO 17 FEDERAL COM #002	1	N-17-23S-34E	13850	[70450] ANTELOPE RIDGE, STRAWN (GAS)
30-025-41449	229137	COG OPERATING LLC	O	A	NOCASTER 19 FEDERAL #004H	1	P-19-23S-34E	10546	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-41481	4323	CHEVRON U S A INC	O	H	BELL LAKE 18 23 34 #001	1	2-18-23S-34E	5037	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-41937	4323	CHEVRON U S A INC	O	C	BRININSTOOL 24 23 33 USA #004C	1	A-24-23S-33E	0	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-42025	260297	BTA OIL PRODUCERS, LLC	O	A	STARCASTER 18 FEDERAL COM #004H	1	A-18-23S-34E	10394	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-42534	308339	OWL SWD OPERATING, LLC	S	C	LIMESTONE SWD #001C	1	C-18-23S-34E	0	[96101] SWD, DEVONIAN
30-025-42917	260297	BTA OIL PRODUCERS, LLC	O	A	STARCASTER 18 FEDERAL COM #003H	1	B-18-23S-34E	10396	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-43010	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	N	WHITE DOVE 17 FEDERAL COM #001H	1	M-17-23S-34E	0	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-43027	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	WHITE DOVE 17 FEDERAL COM #002H	1	N-17-23S-34E	10434	[2209] ANTELOPE RIDGE, BONE SPRING, WEST; [98133] WC-025 G-05 S233417N, UP BONE SPRING
30-025-43028	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	WHITE DOVE 17 FEDERAL COM #003H	1	N-17-23S-34E	10481	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-43192	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	N	PALOMA BLANCO 19 FEDERAL #001H	1	4-18-23S-34E	0	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-43193	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	N	PALOMA BLANCO 19 FEDERAL #002H	1	4-18-23S-34E	0	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-43194	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	N	PALOMA BLANCO 19 FEDERAL #003H	1	4-18-23S-34E	0	[5150] BELL LAKE, BONE SPRING, NORTH
30-025-43380	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	N	THISTLE UNIT #077H	1	B-21-23S-33E	0	[59900] TRIPLE X, BONE SPRING
30-025-44977	229137	COG OPERATING LLC	O	N	STRATOCASTER 20 FEDERAL #008H	1	B-20-23S-34E	0	[2209] ANTELOPE RIDGE, BONE SPRING, WEST

Township	Range	Section	Unit Letter	Lease Number	Leasee (O & G Minerals)	Leassor (O & G Minerals)	Surface Owner	UPC
23S	33E	13	H	VB21520001	CIMAREX ENERGY CO.	State (NM)	LIMESTONE BASIN PROP RANCH LLC	4197135265133
23S	33E	13	I	NMNM 114986	CHEVRON USA INC	BLM (U.S.)	New Mexico State Land Office	4197135267397
23S	33E	13	P	NMNM 114986	CHEVRON USA INC	BLM (U.S.)	New Mexico State Land Office	4197135267397
23S	33E	24	A	NMNM 114986	CHEVRON USA INC	BLM (U.S.)	HUGHES PROPERTIES LLC	4197136266265
23S	33E	24	H	NMNM 114986	CHEVRON USA INC	BLM (U.S.)	HUGHES PROPERTIES LLC	4197136266265
23S	34E	07	O	E019330003	KAISER-FRANCIS OIL CO	State (NM)	New Mexico State Land Office	4198134262397
23S	34E	07	P	E019330003	KAISER-FRANCIS OIL CO	State (NM)	New Mexico State Land Office	4198134262397
23S	34E	08	M	E094580007	KAISER-FRANCIS OIL CO	State (NM)	New Mexico State Land Office	4199134268397
23S	34E	17	B	NMNM 097157	DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	C	NMNM 097157	DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	D	NMNM 097157	DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	E	NMNM 097157	DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	F	NMNM 097157	DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	G	NMNM 097157	DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	H	NMNM 097157	DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	I	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	J	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	K	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	L	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	M	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	N	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	O	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	17	P	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	Bureau of Land Management	4199135266265
23S	34E	18	A		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	B		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	C		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	D		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	E		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	F		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	G		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	H		Not Leased	Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	I	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	J	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	K	NMLC 0068387	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	L	NMLC 0068387	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	M	NMLC 0068387	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	N	NMLC 0068387	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	O	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265
23S	34E	18	P	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	LIMESTONE BASIN PROP RANCH LLC	4198135262265

Township	Range	Section	Unit Letter	Lease Number	Leasee (O & G Minerals)	Leassor (O & G Minerals)	Surface Owner	UPC
23S	34E	19	A	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	B	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	C	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	D	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	E	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	F	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	G	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	H	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	I	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	J	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	K	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	L	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	N	NMLC 0065194	CONOCOPHILLIPS CO	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	O	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	19	P	NMNM 068820	COG OPERATING LLC	BLM (U.S.)	New Mexico State Land Office	4198136262265
23S	34E	20	A	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	B	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	C	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	D	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	E	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	F	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	G	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	H	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	J	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	K	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	L	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	M	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
23S	34E	20	N	NMNM 018306	WILLIAMSON J C	BLM (U.S.)	Bureau of Land Management	4199136266266
Notes								
(a)	See section V of C 108 for details							

wellname	api	latitude	longitude	section	township	range	unit	ftgns	ftgew	county	state	field	formation	samplesource	sampledate	ph	tds_mgL	resistivity_ohm_cm	sodium_mgL	calcium_mgL	iron_mgL	magnesium_mgL	manganese_mgL	chloride_mgL	bicarbonate_mgL	sulfate_mgL	o2_mgL
RIO BLANCO 4 FEDERAL COM #003	3002536425	32.3309593	-103.4718094	4	23S	34E	J	1650S	1650E	Lea	NM				9/3/2014 0:00	6.1	179000.8		53519.9	12080.6	38.7	1748.7	2.4	109000	122	0	
BELL LAKE UNIT #006	3002508483	32.3282585	-103.507103	6	23S	34E	O	660S	1980E	LEA	NM	BELL LAKE NORTH	DEVONIAN	HEATER TREATER		7	71078							42200	500	1000	
BELL LAKE UNIT #002	3002508489	32.2701836	-103.5112457	30	23S	34E	N	660S	3300E	LEA	NM	SWD	DELAWARE	UNKNOWN			52115							32200	451	529	
RIO BLANCO 4 FEDERAL COM #003	3002536425	32.3309593	-103.4718094	4	23S	34E	J	1650S	1650E	Lea	NM				10/15/2015 0:00	7	254017.1	0.025	62818	24835.8	47	4233.5	5.48	160463.8	244	425	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				10/15/2015 0:00	6.07	185742	0.034	60151.2	9297	80.6	1501	1.68	113474.4	341.6	560	
CABALLO 9 STATE #001	3002534577	32.321888	-103.4814224	9	23S	34E	E	1650N	660W	Lea	NM				9/10/2014 0:00	7.81	71862.4		24399.6	2685.9	462.1	367.8	2.86	42700	576	0	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				9/10/2014 0:00	6.9	71718.6		23830.8	2540	0	346.3	0	42400	610	170	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM				9/8/2004 0:00	6.1	43388.1		13982.1	1697	363	243		25721	207	574	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM				12/16/2004 0:00	6.1	70316.5		25492.9	1361	7	162		41669	228.1	1011	
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM				12/16/2004 0:00	5.6	65810.3		15070.8	6754	28	2137		41261	165.9	277	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				12/16/2004 0:00	6.2	71521.1		25245.7	1754	5	255		42308	207.4	1176	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM				4/26/2005 0:00	5.7	84267.8		28936.1	2670	64	383		50154	153.7	1230	
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM				4/26/2005 0:00	5.9	83217.6		28207.2	2817	1	493		49511	290.4	1188	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				4/26/2005 0:00	5.8	81393.3		27656.1	2657	9.5	497		48230	331.8	1340	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM				5/23/2005 0:00	5.9	76404.4		25237.5	2495	1087	329		45259	290.4	1093	
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM				5/23/2005 0:00	5.9	74771.3		25099.8	2724	5	454		44417	311.1	1123	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				5/23/2005 0:00	5.8	72187.8		24914.3	2151	7.5	345		42673	331.8	1198	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM				6/30/2005 0:00	6.1	74296		25272.2	2538	47	343		44022	456.3	1031	
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM				6/30/2005 0:00	6	74579		25426.9	2472	33	363		44159	414.8	1112	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				6/30/2005 0:00	6.1	73515.4		25199.7	2394	22	320		43444	456.3	1134	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				4/10/2007 0:00	6.6	73741.5		24583.3	2814	5	363	0.2	42853	732	1724	
ANTELOPE RIDGE UNIT #003	3002521082	32.2593155	-103.4610748	34	23S	34E	K	1980S	1650W	LEA	NM	ANTELOPE RIDGE	DEVONIAN	UNKNOWN	11/14/1967 0:00	6.9	80187							47900	476	900	
CABALLO 9 STATE #001	3002534577	32.321888	-103.4814224	9	23S	34E	E	1650N	660W	Lea	NM				5/14/2014 0:00	6.9	70554		22500.6	2476.8	0	337.7	0	42521	732	1299	
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM				5/14/2014 0:00	6.2	192154		54068.3	13499.7	59.3	1983	2.7	119614	122	943	
BELL LAKE UNIT #009	3002520261	32.3028488	-103.5110779	18	23S	34E	K	1980S	1980W	LEA	NM	BELL LAKE NORTH	BONE SPRING	UNKNOWN			204652							130000	512	260	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				3/29/2010 0:00	7	77292.8		25964.7	2876	1	378	0.08	45890	244	1186	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM				8/24/2010 0:00	8.4	69356		24262.3	1833	4.5	298	0.2	40711	366	1404	
CABALLO 9 STATE #001	3002534577	32.321888	-103.4814224	9	23S	34E	E	1650N	660W	Lea	NM				10/14/2010 0:00	7	122402.2		38021	6823	11	1120	1	73600	622.2	1213	
ANTELOPE RIDGE UNIT #002	3002520444	32.2520561	-103.4717407	4	24S	34E	B	660N	1650E	LEA	NM	ANTELOPE RIDGE	ATOKA	HEATER TREATER		6.7	51475							31000	317	340	
FALCON FEDERAL #001	3002532190	32.244812	-103.4173355	1	24S	34E	I	1980S	660E	LEA	NM	Saunders		WELLHEAD	8/2/1983 0:00	7	60992		33879	2560		240		56000	392	1800	2

Table 4 - Chemistry of Produced Water from Formations

wellname	api	section	township	range	unit	county	state	field	formation	depth	samplesource	sampledate	ph	specificgravity	specificgravity_temp_F	tds_mgL	resistivity_ohm_cm	resistivity_ohm_cm_temp_F	conductivity	conductivity_temp_F	sodium_mgL	calcium_mgL	magnesium_mgL	chloride_mgL	bicarbonate_mgL	sulfate_mgL
MCKITTRICK FED #1	3001500135	25	22S	25E	G	EDDY	NM		DEVONIAN		DST					16200								8762	290	1175
MCKITTRICK FED #1	3001500135	25	22S	25E	G	EDDY	NM		DEVONIAN		DST					17510								9389	664	982
CARNERO PEAK UT #001	3001510053	31	22S	25E	A	EDDY	NM		DEVONIAN		DST					14601								7236	515	1487
CARNERO PEAK UT #001	3001510053	31	22S	25E	A	EDDY	NM		DEVONIAN		DST					15780								8126	336	1467
CARNERO PEAK UT #001	3001510053	31	22S	25E	A	EDDY	NM		DEVONIAN		DST					15580								7853	487	1488
BANDANA POINT UT #001	3001500044	13	23S	23E	O	EDDY	NM	BANDANA POINT	DEVONIAN		DST					15500								8020	500	1190
TORTOISE ASB COM #001	3001510490	29	23S	24E	G	EDDY	NM		DEVONIAN		DST					17861								7760	490	3100
TORTOISE ASB COM #001	3001510490	29	23S	24E	G	EDDY	NM		DEVONIAN		DST					15601								7780	476	1600
REMUDA BASIN UNIT #001	3001503691	24	23S	29E	J	EDDY	NM	REMUDA	DEVONIAN		SWAB					64582								37500	610	1700
REMUDA BASIN UNIT #001	3001503691	24	23S	29E	J	EDDY	NM	REMUDA	DEVONIAN		SWAB					56922								29000	1740	4980
BELL LAKE UNIT #006	3002508483	6	23S	34E	O	LEA	NM	BELL LAKE NORTH	DEVONIAN		HEATER TREATER		7			71078								42200	500	1000
ANTELOPE RIDGE UNIT #003	3002521082	34	23S	34E	K	LEA	NM	ANTELOPE RIDGE	DEVONIAN		UNKNOWN	14/11/1967 0:00	6,9			80187								47900	476	900
ANTELOPE RIDGE UNIT #003	3002521082	34	23S	34E	K	LEA	NM	ANTELOPE RIDGE	DEVONIAN		UNKNOWN	14/11/1967 0:00	6,9			80187								47900	476	900
CLINE FEDERAL #001	3002510717	14	23S	37E	K	LEA	NM	CLINE	DEVONIAN		PRODUCTION TEST					118979								71280	462	2593
E C HILL B FEDERAL #001	3002510945	34	23S	37E	A	LEA	NM	TEAGUE	DEVONIAN		UNKNOWN					112959								67390	288	2765
E C HILL D FEDERAL #001	3002510947	34	23S	37E	H	LEA	NM	TEAGUE	DEVONIAN		UNKNOWN					35639										
E C HILL D FEDERAL #004	3002510950	34	23S	37E	A	LEA	NM	TEAGUE	DEVONIAN		UNKNOWN					236252								147000	129	781
HUAPACHE #003	3001500020	22	24S	22E	F	EDDY	NM		DEVONIAN		DST					3110								48	246	2020
JURNEGAN POINT #001	3001510280	5	24S	25E	M	EDDY	NM	WILDCAT	DEVONIAN		DST	14/12/1964 0:00	7			229706								136964	198	2511
JURNEGAN POINT #001	3001510280	5	24S	25E	M	EDDY	NM	WILDCAT	DEVONIAN		DST	14/12/1964 0:00	7			203100								121100	175	2220
WHITE CITY PENN GAS COM UNIT 1 #001	3001500408	29	24S	26E	A	EDDY	NM		DEVONIAN		DST	01/03/1960 0:00	7	1,012	60		0,36	75	25596	64	6072	1002	132	10120	653	1336
STATE B COM #001	3002509716	36	24S	36E	C	LEA	NM	CUSTER	DEVONIAN		UNKNOWN					176234								107400	128	1004
ELLIOTT H FEDERAL #001	3002512272	31	24S	38E	H	LEA	NM	DOLLARHIDE	DEVONIAN		WELLHEAD					58687										
ELLIOTT H FEDERAL #001	3002512272	31	24S	38E	H	LEA	NM	DOLLARHIDE	DEVONIAN		WELLHEAD					57018										
WEST DOLLARHIDE DEVONIAN UNIT #104	3002512297	32	24S	38E	I	LEA	NM	DOLLARHIDE	DEVONIAN		WELLHEAD					50858								30200	183	980
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST	17/06/1961 0:00	6			80880								46200	340	3050
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					84900								48600	840	2650
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					72200								41000	370	2960
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					80900								46200	340	3050
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					77600								44000	550	3240
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					135000								77000	650	5810
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					114000								65000	280	5110
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					135000								77000	500	5320
WESTATES FEDERAL #008	3002511393	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		UNKNOWN					91058								51020	376	4783
WESTATES FEDERAL #008	3002511393	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		UNKNOWN					86847								50450	363	2544
STATE NJ A #001	3002511398	2	25S	37E	A	LEA	NM	JUSTIS NORTH	DEVONIAN		DST					105350								59300	660	4950
NEW MEXICO BM STATE #002	3002511407	2	25S	37E	I	LEA	NM	JUSTIS NORTH	MONTOYA		UNKNOWN					77770								45500	1800	2400
HALE STATE #003	3002512581	2	25S	37E	H	LEA	NM	JUSTIS NORTH	MONTOYA		WELLHEAD					64916								37000	813	2500
SOUTH JUSTIS UNIT #016F	3002511556	13	25S	37E	F	LEA	NM	JUSTIS	FUSSELMAN		UNKNOWN					57675								34030	595	1211
LEARCY MCBUFFINGTON #008	3002511569	13	25S	37E	N	LEA	NM	203MNTY, 259FSLM	FUSSELMAN	7052		02/01/1900 0:00	7,6	1,037	78	67909			81429	67		2603	684	38887	742	2489
LEARCY MCBUFFINGTON #008	3002511569	13	25S	37E	N	LEA	NM	JUSTIS	MONTOYA		UNKNOWN					67898								38880	742	2489
A B COATES C FEDERAL #014	3002511736	24	25S	37E	G	LEA	NM	JUSTIS	MONTOYA		UNKNOWN					39261								22840	871	1030
SOUTH JUSTIS UNIT #023C	3002511760	25	25S	37E	C	LEA	NM	JUSTIS	FUSSELMAN		SEPARATOR					63817								35870	360	3442
CARLSON A #002	3002511764	25	25S	37E	I	LEA	NM	JUSTIS	FUSSELMAN		DST					208280								124000	510	3400
STATE Y #009	3002511777	25	25S	37E	A	LEA	NM	JUSTIS	FUSSELMAN		DST	17/03/1961 0:00	7,3			219570								129000	960	4630
STATE Y #009	3002511777	25	25S	37E	A	LEA	NM	JUSTIS	FUSSELMAN		DST	18/03/1961 0:00	6,8			163430								96000	290	3780
CARLSON B 25 #004	3002511784	25	25S	37E	P	LEA	NM	JUSTIS	FUSSELMAN		SEPARATOR					184030								112900	68	1806
COPPER #001	3002511818	28	25S	37E	J	LEA	NM	CROSBY	DEVONIAN		UNKNOWN					27506								15270	1089	1079
ARNOTT RAMSAY NCT-B #003	3002511863	32	25S	37E	A	LEA	NM	CROSBY	DEVONIAN	8797		02/01/1900 0:00		1,142	70							17244	5345	100382	476	
ARNOTT RAMSAY NCT-B #003	3002511863	32	25S	37E	A	LEA	NM	CROSBY	DEVONIAN		UNKNOWN					158761										
WEST DOLLARHIDE DEVONIAN UNIT #110	3002512386	5	25S	38E	B	LEA	NM	DOLLARHIDE	DEVONIAN		UNKNOWN					56776										
FARNSWORTH FEDERAL #006	3002511950	4	26S	37E	A	LEA	NM	CROSBY	DEVONIAN		UNKNOWN					31931								20450	302	591

OSE Well Logs – NO WATER SUPPLY WELLS

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

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996
Artesia ▲ Carlsbad ▲ Durango ▲ Midland

August 6, 2019

Hobbs News Sun
201 N. Thorp
P.O. Box 850
Hobbs, N.M. 88240

LEGAL NOTICE

AWR Disposal LLC, 3300 N. A Street, Ste. 220, Midland, TX 79705 filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Sammies SWD #1 will be located 866 feet from the South line and 1,254 feet from the East line, Section 18, Township 23 South, Range 34 East, Lea County, New Mexico. Produced water from area production will be commercially disposed into the Devonian, Fusselman and Montoya Formations at a depth of 14,887 feet to 16,869 feet at a maximum surface pressure of 3,000 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 31.2 miles southwest of Eunice, New Mexico.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 S. St. Francis Dr., Santa Fe, NM 87505 (505) 476-3460 within 15 days of the date of this notice.

Additional information can be obtained by contacting Mr. Randall Hicks, agent for Accelerated Water Resources, LP, at 505-238-9515.

Sincerely,
R.T. Hicks Consultants

Randall Hicks
Principal

Affidavit of Publication

STATE OF NEW MEXICO
COUNTY OF LEA

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

Beginning with the issue dated
August 07, 2019
and ending with the issue dated
August 07, 2019.

Publisher

Sworn and subscribed to before me this
7th day of August 2019.

Business Manager

My commission expires
January 29, 2023
(Seal)

OFFICIAL SEAL
GUSSIE BLACK
Notary Public
State of New Mexico
My Commission Expires 1-29-23

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said

LEGALS

LEGAL NOTICE
AUGUST 7, 2019

AWR Disposal LLC, 3300 N. A Street, Ste. 220, Midland, TX 79705 filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Sammies SWD #1 will be located 866 feet from the South line and 1,254 feet from the East line, Section 18, Township 23 South, Range 34 East, Lea County, New Mexico. Produced water from area production will be commercially disposed into the Devonian, Fusselman and Montoya Formations at a depth of 14,887 feet to 16,869 feet at a maximum surface pressure of 3,000 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 31.2 miles southwest of Eunice, New Mexico.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 S. St. Francis Dr., Santa Fe, NM 87505 (505) 476-3460 within 15 days of the date of this notice.

Additional information can be obtained by contacting Mr. Randall Hicks, agent for Accelerated Water Resources, LP, at 505-238-9515.

Sincerely,
R.T. Hicks Consultants
Randall Hicks
Principal
#34535

67115764 00231783

RANDALL HICKS
R.T. HICKS CONSULTANTS, LTD
901 RIO GRANDE BLVD NM
SUITE F-142
ALBUQUERQUE, NM 87104

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August 09, 2019

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

To Whom It May Concern:

AWR Disposal, LLC, Midland, Texas, has made application to the New Mexico Oil Conservation Division to drill and complete, for salt water disposal, the Sammies SWD #1. The proposed commercial operation will be for produced water disposal from area operators. As indicated in the notice below, the well is in Section 18, Township 23 South, Range 34 East in Lea County, New Mexico.

The published notice states that the interval will be from 14,887 feet to 16,869 feet into the Devonian, Fusselman and Montoya Formations.

LEGAL NOTICE

AWR Disposal LLC, 3300 N. A Street, Ste. 220, Midland, TX 79705 filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Sammies SWD #1 will be located 866 feet from the South line and 1,254 feet from the East line, Section 18, Township 23 South, Range 34 East, Lea County, New Mexico. Produced water from area production will be commercially disposed into the Devonian, Fusselman and Montoya Formations at a depth of 14,887 feet to 16,869 feet at a maximum surface pressure of 3,000 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 31.2 miles southwest of Eunice, New Mexico.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 S. St. Francis Dr., Santa Fe, NM 87505 (505) 476-3460 within 15 days of the date of this notice.

You have been identified as a party who may be interested as an offset lessee or operator. **IF YOU WOULD LIKE AN ELECTRONIC COPY OF THE ENTIRE PERMIT PACKAGE, PLEASE SEND YOUR REQUEST TO** david@rthicksconsult.com (request a read receipt to avoid your email becoming stuck in spam).

Thank you for your attention in this matter.

Sincerely,
R.T. Hicks Consultants

Randall Hicks
Principal

OPERATORS, LEASEHOLDERS AND SURFACE OWNERS WITHIN 1 MILE -RADIUS

BTA OIL PRODUCERS, LLC Sammies SWD #1 104 S Pecos Midland, TX 79701		Bureau of Land Management Sammies SWD #1 620 E. Greene Street Carlsbad, NM 88220-6292		CHEVRON USA INC Sammies SWD #1 6301 DEAUVILLE BLVD MIDLAND, TX 79706
CIMAREX ENERGY CO. Sammies SWD #1 600 N. Marienfeld Street Suite 600 Midland, TX 79701		COG OPERATING LLC Sammies SWD #1 600 W Illinois Ave Midland, TX 79701		CONOCOPHILLIPS COMPANY Sammies SWD #1 Attn: Lakeiva Noel PO Box 2197 Houston, TX 77252
DEVON ENERGY PRODUCTION CO. Sammies SWD #1 333 West Sheridan Ave. Oklahoma City, OK 73102		DEVON SFS OPERATING INC Sammies SWD #1 20 N. BROADWAY STE 1500 OKLAHOMA CITY, OK 73102		HUGHES PROPERTIES LLC Sammies SWD #1 PO BOX 5097 CARLSBAD, NM 88221
J C WILLIAMSON Sammies SWD #1 PO BOX 16 MIDLAND, TX 79702		KAISER-FRANCIS OIL CO Sammies SWD #1 6733 S YALE AVE TULSA, OK, OK 74136		LIMESTONE BASIN PROP RANCH LLC Sammies SWD #1 18 DESTA DRIVE MIDLAND, TX 79705
New Mexico State Land Office Sammies SWD #1 310 Old Santa Fe Trail Santa Fe, NM 87501		OWL SWD OPERATING, LLC Sammies SWD #1 8214 WESTCHESTER DR STE 850 DALLAS, TX 75225		

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Sent To: DEVON SFS OPERATING INC
Sammies SWD #1
Street and Apt. No., or PO Box No.: 20 N. BROADWAY STE 1500
City, State, ZIP+4®: OKLAHOMA CITY, OK 73102

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

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Sent To: KAISER-FRANCIS OIL CO
Sammies SWD #1
Street and Apt. No., or PO Box No.: 6733 S YALE AVE
City, State, ZIP+4®: TULSA, OK, OK 74136

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

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☐ Adult Signature Restricted Delivery	$
Postage	$0.55
Total Postage and Fees	$6.85

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Sent To: OWL SWD OPERATING, LLC
Sammies SWD #1
Street and Apt. No., or PO Box No.: 8214 WESTCHESTER DR STE 850
City, State, ZIP+4®: DALLAS, TX 75225

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☐ Adult Signature Required	$
☐ Adult Signature Restricted Delivery	$
Postage	$0.55
Total Postage and Fees	$6.85

DURANGO, CO 81301 AUG 2019 Postmark Here USPS

Sent To: CHEVRON USA INC
Sammies SWD #1
Street and Apt. No., or PO Box No.: 6301 DEAUVILLE BLVD
City, State, ZIP+4®: MIDLAND, TX 79706

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☐ Adult Signature Restricted Delivery	$
Postage	$0.55
Total Postage and Fees	$6.85

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Sent To: CONOCOPHILLIPS COMPANY
Sammies SWD #1
Attn: Lakeiva Noel
Street and Apt. No., or PO Box No.: PO Box 2197
City, State, ZIP+4®: Houston, TX 77252

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

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CARLSBAD, NM 88220

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☐ Adult Signature Required	$
☐ Adult Signature Restricted Delivery	$
Postage	$0.55
Total Postage and Fees	$6.85

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Sent To: HUGHES PROPERTIES LLC
Sammies SWD #1
Street and Apt. No., or PO Box No.: PO BOX 5097
City, State, ZIP+4®: CARLSBAD, NM 88221

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Sammies SWD #1
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Postage	$0.55
$	
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City, State, ZIP+4®	Midland, TX 79701

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August 13, 2019

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

RE: AWR Disposal LLC Sammies SWD #1
UL P, Section 18 T23S R34E, Lea County

Dear Mr. Goetze:

On behalf of AWR Disposal LLC, R.T. Hicks Consultants is providing data and an opinion regarding the probability that injection of wastewater in the above referenced well at the proposed rates will cause seismic events of sufficient magnitude to create damage. It is our understanding that OCD is interested in such an opinion as part of the SWD approval process. We elected to provide this opinion as a separate submission as the C-108 does not specifically require such an opinion.

We relied upon the following data to develop our opinion

- State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity, Jens-Erik Lund Snee and Mark D. Zoback, The Leading Edge, February 2018[1]
- Plate 5, which is reproduced from the Snee and Zoback publication, which uses the following references
    - Crone, A. J., and R. L. Wheeler, 2000, Data for Quaternary faults, liquefaction features, and possible tectonic features in the Central and Eastern United States, east of the Rocky Mountain front; U.S. Geological Survey Open-File Report.
    - Ewing, T. E., R. T. Budnik, J. T. Ames, and D. M. Ridner, 1990, Tectonic map of Texas: Bureau of Economic Geology, University of Texas at Austin.
    - Green, G. N., and G. E. Jones, 1997, e digital geologic map of New Mexico in ARC/INFO format: U.S. Geological Survey Open-File Report.
    - Ruppel, S. C., R. H. Jones, C. L. Breton, and J. A. Kane, 2005, Preparation of maps depicting geothermal gradient and Precambrian structure in the Permian Basin: USGS Order no. 04CRSA0834 and Requisition no. 04CRPR01474.
    - NMOCD database of oil and gas wells
- Plate 5, which shows the distribution of active and new SWD wells in the area of the proposed AWR Disposal SWD well
- Stratigraphic and lithologic information from two deep wells in the Delaware Basin
- Data on the thickness and lithology of the Simpson Group from the Texas Bureau of Economic Geology[2]

[1] https://scits.stanford.edu/sites/default/files/3702_tss_lundsnee_v2.pdf
[2] http://www.beg.utexas.edu/resprog/permianbasin/PBGSP_members/writ_synth/Simpson.pdf

Plate 5 reproduces Figure 3 of the 2018 publication of Snee and Zoback and shows

1. Fault traces based upon the references provided above for which Dr. Snee and Dr. Zoback provide a value of the fault slip potential (FSP)
2. Areas of documented seismic activity, and a magnitude 2.0-2.9 earthquake that occurred between 1970-2004 about 10 miles south of the proposed Sammies SWD #1. A slightly larger magnitude and more recent seismic event is reported about 21 miles west of the Sammies SWD #1 well location.
3. Although Plate 5 does not show faults that may be identified in confidential seismic data owned by oil and gas operators, the closest mapped basement fault that was re-activated during Woodford time is about 1 mile to the west, exhibits a low FSP (less than 5%) based upon the modeling and analysis of Snee and Zoback referenced above
4. Other mapped faults in southern Lea County shown on Plate 5 also show a low FSP.

Plate 6 reproduces the major elements of Plate 5 in the inset map and also shows that within an 6-mile radius around the proposed Sammies SWD #1, the OCD database shows about 2 active and 2 new Devonian SWDs, which translates into an average density of about one SWD for every 28 square miles.

Figure 4 from the referenced Bureau of Economic Geology (The Middle-Upper Ordovician Simpson Group of the Permian Basin: Deposition, Diagenesis, And Reservoir Development) is attached to this letter and the portion of that figure for the Delaware Basin is shown to the right. In southern Lea County the mapped thickness appears to be 500-1500 feet thick (note one contour line appears to be missing on the map). This unit, which is clay-rich carbonate interbedded with shale and sandstone, provides an excellent permeability/pressure barrier between the injection zone and the basement faults that were re-activated during Woodford time.

Data from the Amoco Federal CW Com 1 (3002528119) show that the thickness of the Simpson in the Antelope Ridge area of Lea County (Section 3 24S 34E) is about 450 feet thick with. This is consistent with Figure 4 of the BEG paper (probably because this well was used to produce the isopach map).

We contend that the data permit conclusion that unmapped faults (which may be located by confidential seismic data that AWR Disposal does not possess) near the Sammies SWD #1 would be dominantly north-south normal faults, as is common in Lea County. The data on Plate 6 permit a conclusion that faults near the Sammies SWD #1 are also most likely to exhibit a low FSP, like the mapped faults shown on Plate 5.

Given the density of Devonian SWDs (planned/new and active) near the proposed Sammies SWD #1 well and the high likelihood that any unmapped faults in the area would exhibit a low FSP, the probability that injection into the Sammies SWD #1 would cause an increase in pore pressure to trigger a seismic event of sufficient magnitude to cause damage is very low.

The users of this letter should recognize the uncertainties of using seismic maps of the Permian Basin to determine probability that injection of wastewater into a single SWD well could cause seismic events of sufficient magnitude to cause damage. However, on a regional basis injection by numerous wells into the Devonian/Fusselman/Montoya interval will raise the hydrostatic pressure. If pressure increases sufficiently, fluid could migrate from the injection zone along fault planes, up and down. Downward fluid migration will be intercepted first by the sandstone units of the Simpson Group. After fluid pressure increases in these sandstones, fluid would migrate downward into the Ellenberger Formation, which lies beneath the Simpson Group. This downward migration will next enter the permeable units of the Ellenberger and, over time, increase the fluid pressure. After fluid pressure in the Ellenberger is sufficiently large to cause downward migration along fault planes or other conduits, the migrating fluid will, in some areas, enter a thinner horizon of granite wash. Downward migrating fluids from the injection zone could then enter basement fault planes if the pressure in the granite wash horizon is sufficient, and reduce the frictional resistance (lubricate the faults). Reduction in the frictional force in faults due to fluid invasion can and has caused seismic events. In my opinion, the probability that injection into the Sammies SWD will measurably contribute to the events described above and will cause a seismic event resulting in damage is so low as to be nil.

Sincerely,
R.T. Hicks Consultants

Randall T. Hicks
Principal

Copy: AWR Disposal LLC

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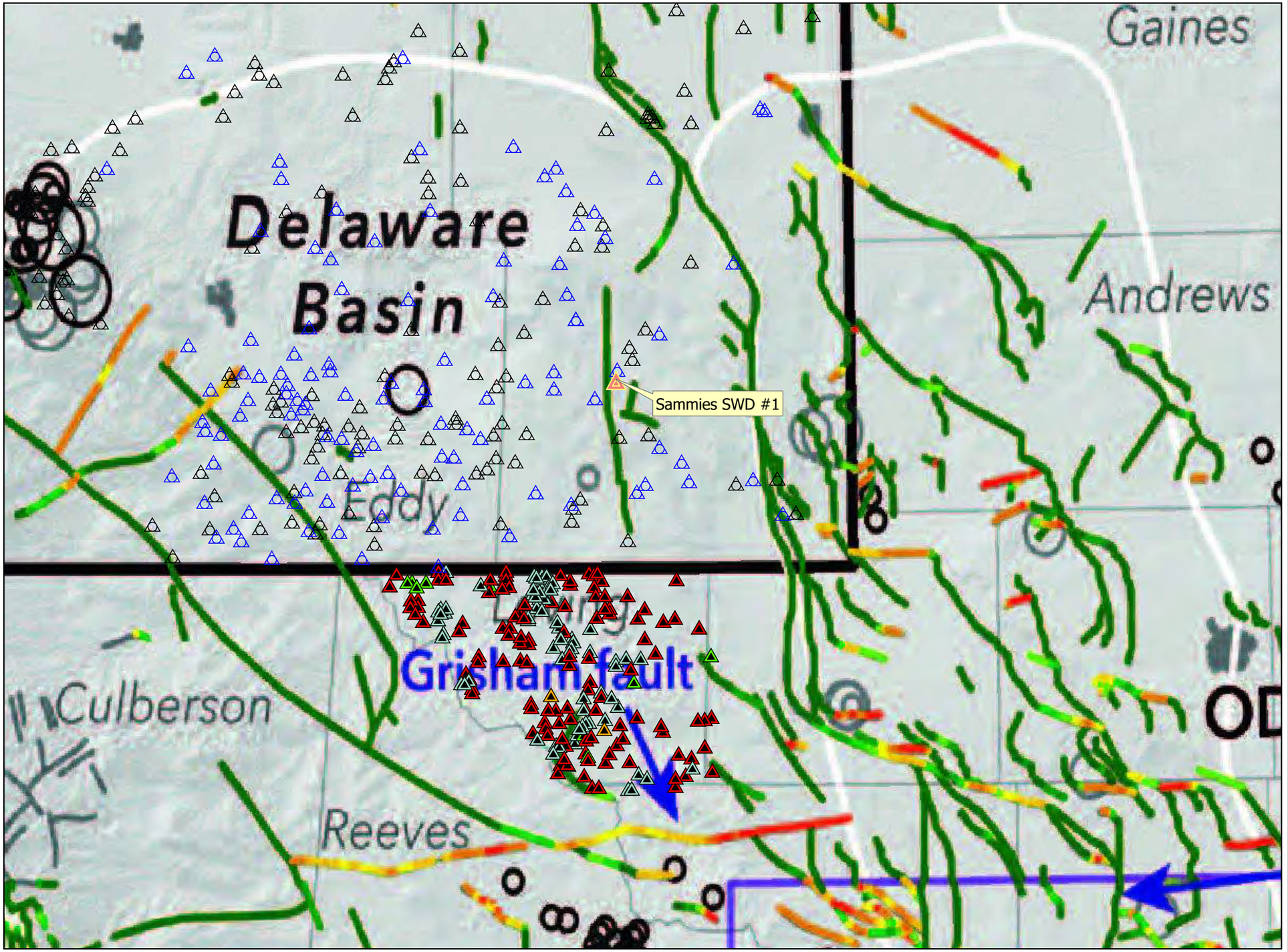

SWD

Oil and Gas (NMOCD)

Salt Water Injection, Active

Salt Water Injection, New

Loving, Tx Oil and Gas Wells

Injection/Disposal From Gas

Injection/Disposal From Oil

Injection/Disposal From Oil/Gas

Injection/Disposal Well

Seismicity:

M_W 2.0-2.9 — Since 2005

M_W 3.0-3.9 — 1970-2004

M_W 4.0+

Fault slip potential (%):

0 10 20 30 40 50+

Seismic and Fault Slip Potential-
Ewing et al. (1990), Green and Jones (1997), Ruppel et al. (2005), and the USGS Quaternary Faults and Folds Database (Crone and Wheeler, 2000).

N W E S

0 5 10 Miles

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Seismicity and Fault Slip Potential	Plate 5
AWR Disposal, LLC Sammies SWD #1	August 2019

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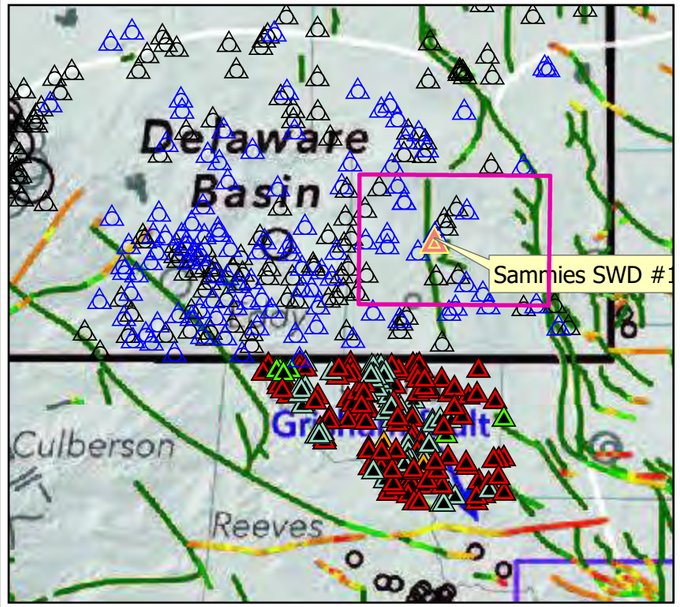

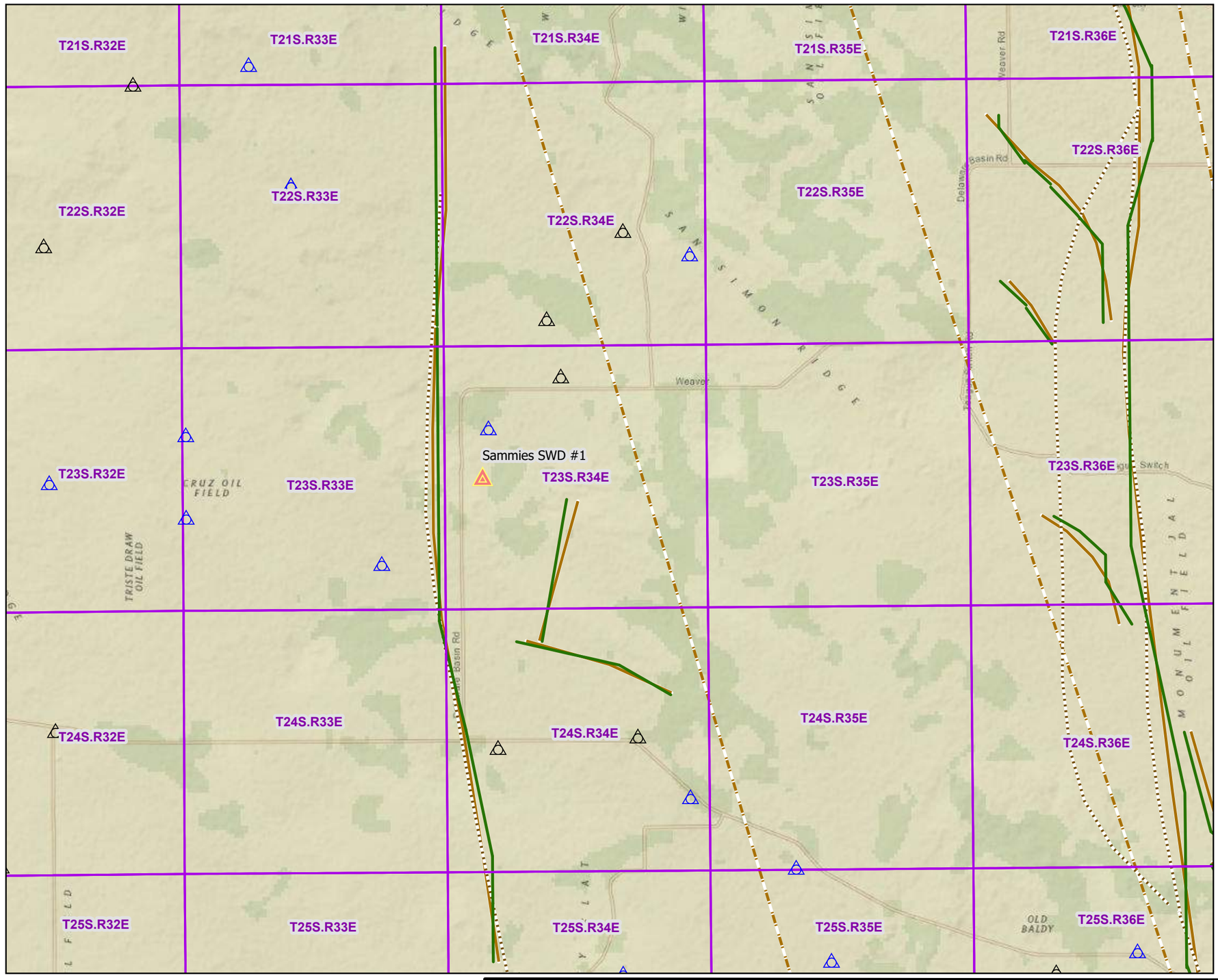

SWD

Faults

Fault - Woodford

Fault - Precambrian

Fault - Basement

Fault Slip Potential (%)

<5

Oil and Gas (NMOCD)

Salt Water Injection, Active

Salt Water Injection, New

Seismic and Fault Slip Potential-
Ewing et al. (1990), Green and Jones (1997), Ruppel et al. (2005), and the USGS Quaternary Faults and Folds Database (Crone and Wheeler, 2000).

N W E S

0 2 4 Miles

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Fault Slip Potential	Plate 6
AWR Disposal, LLC Sammies SWD #1	August 2019