Initial Application Part I

Received: **06/26/2019**

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

RECEIVED:	REVIEWER:	TYPE:	APP NO:
06/26/19	DHR	SWD	pDHR1934755981

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: Bowen #1 SWD **API:**
Pool: Proposed: SWD, Devonian, Fusselman, Montoya **Pool Code:**

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

1) **TYPE OF APPLICATION:** Check those which apply for [A]
A. Location – Spacing Unit – Simultaneous Dedication
☐ NSL ☐ NSP (PROJECT AREA) ☐ NSP (PRORATION UNIT) ☐ SD

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

SWD-2356

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.

June 26, 2019
Date

Randall 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
	BOWEN SWD	#1

[7]OGRID No.	[8]Operator Name	[9]Elevation
328805	AWR DISPOSAL, LLC	3507'

[10]Surface Location

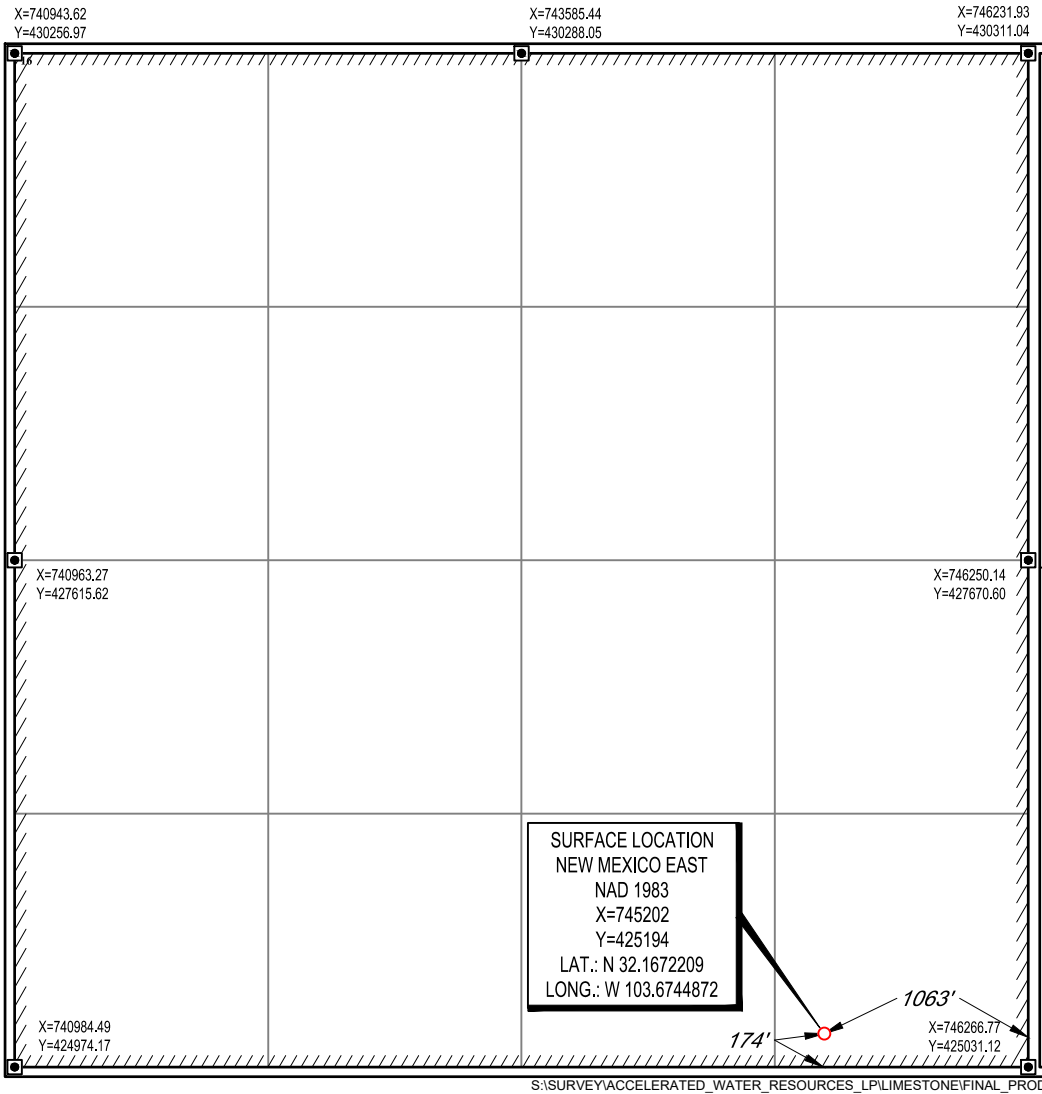
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	33	24-S	32-E	-	174'	SOUTH	1063'	EAST	LEA

[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

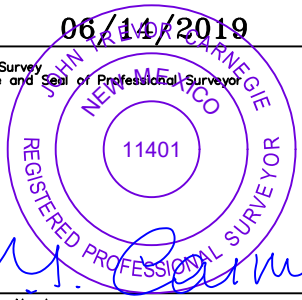
Printed Name

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.

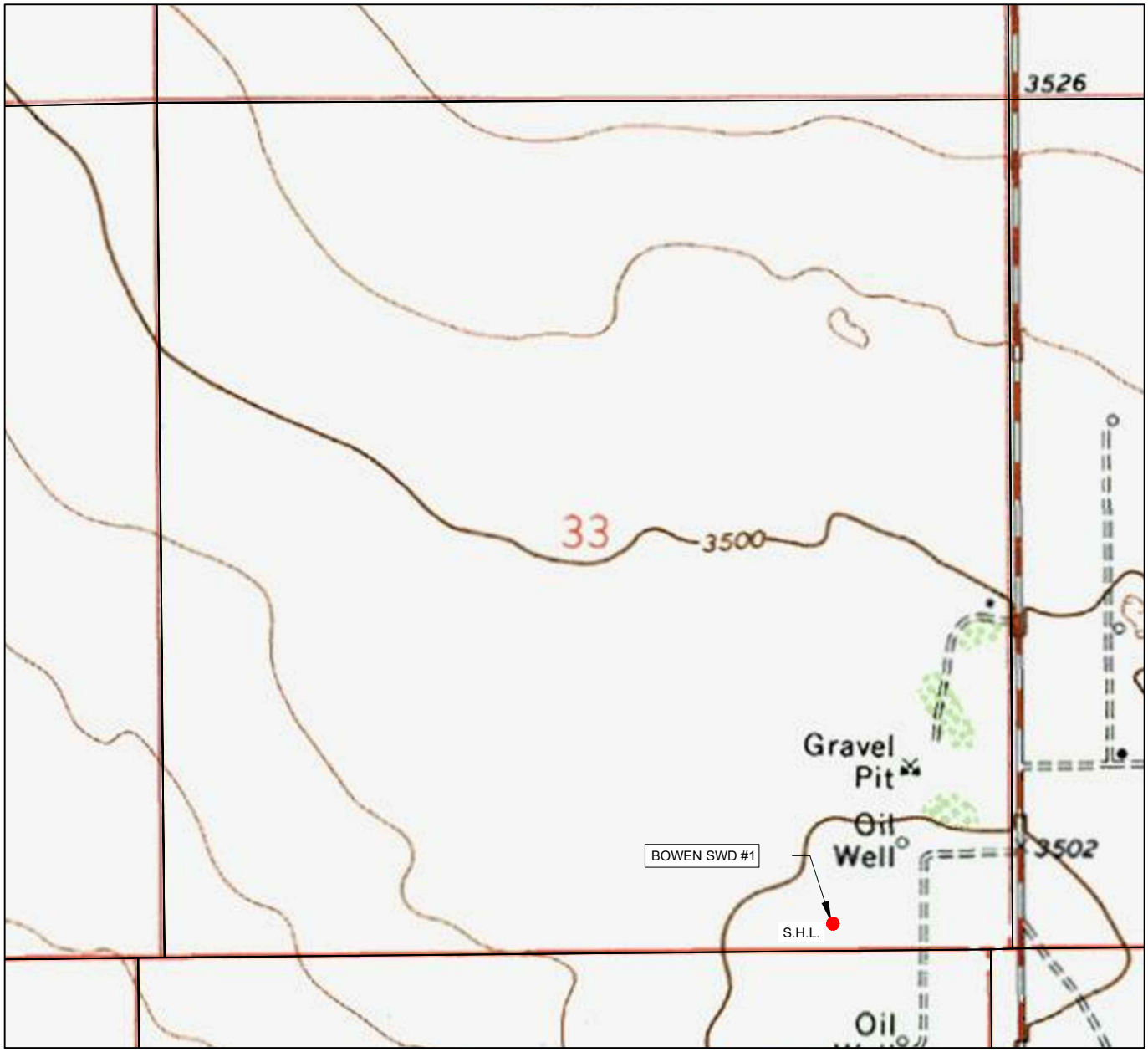
06/14/2019
Date of Survey
Signature and Seal of Professional Surveyor



Certificate Number

S:\SURVEY\ACCELERATED_WATER_RESOURCES_LP\LIMESTONE\FINAL_PRODUCTS\LO_BOWEN_SWD_1_PAD.DWG 11/22/2019 2:01:52 PM kmatheny

LOCATION & ELEVATION VERIFICATION MAP

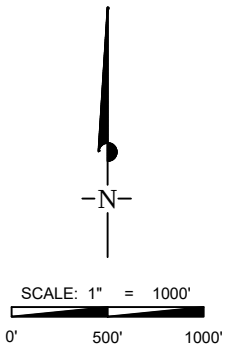


AWR DISPOSAL, LLC

LEASE NAME & WELL NO.: BOWEN SWD #1

SECTION 33 TWP 24-S RGE 32-E SURVEY N.M.P.M.
COUNTY LEA STATE NM ELEVATION 3507'
DESCRIPTION 174' FSL & 1063' FEL

LATITUDE N 32.1672209 LONGITUDE W 103.6744872



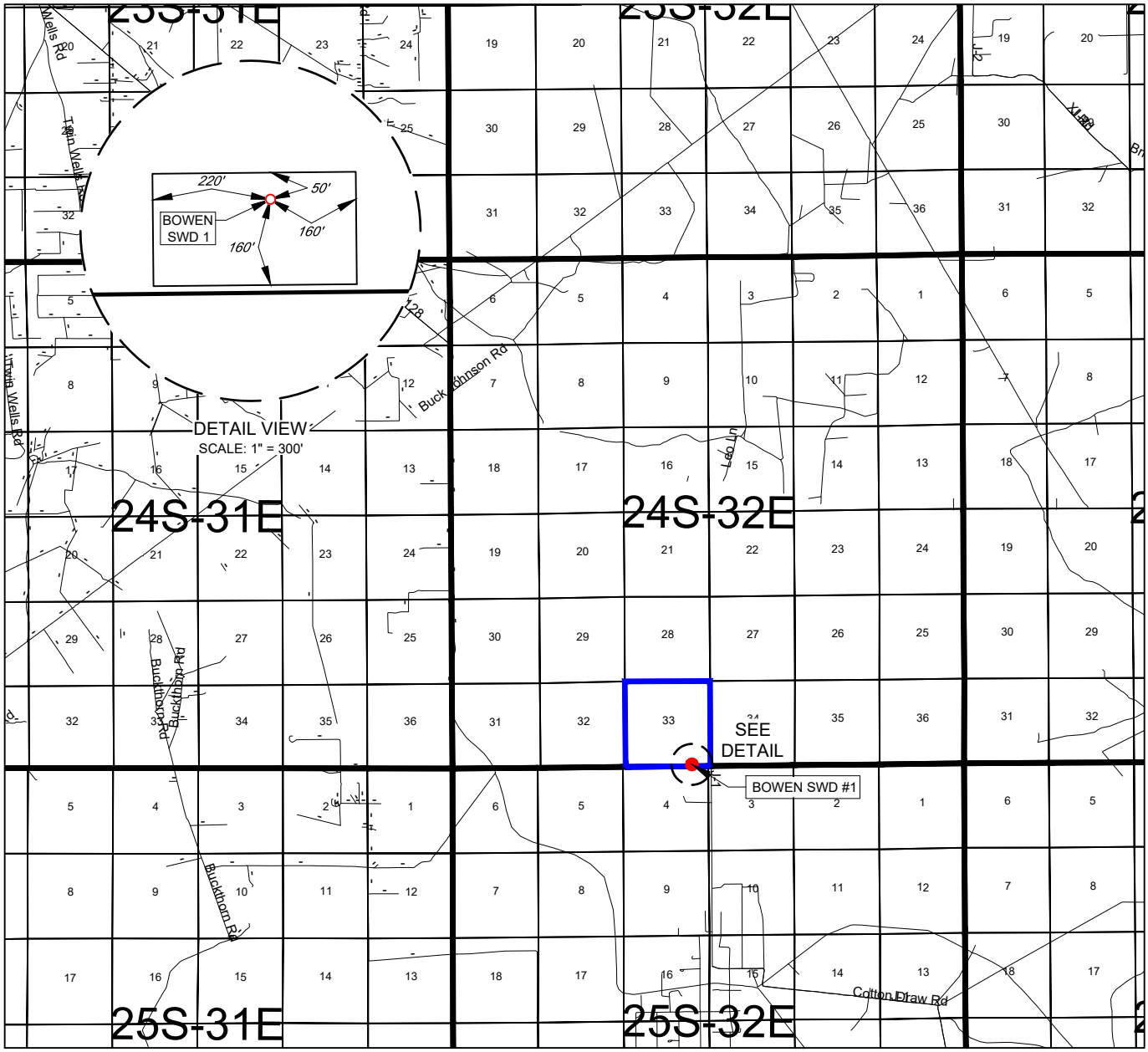
THIS EASEMENT/SERVITUDE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY ACCELERATED WATER RESOURCES, LP. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE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

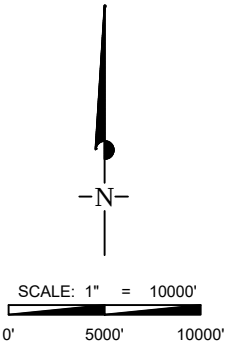


AWR DISPOSAL, LLC

LEASE NAME & WELL NO.: BOWEN SWD #1

SECTION 33 TWP 24-S RGE 32-E SURVEY N.M.P.M.
COUNTY LEA STATE NM
DESCRIPTION 174' FSL & 1063' FEL

DISTANCE & DIRECTION
FROM INT. OF ONSUREZ RD & W. ASH RD., GO EAST ON W. ASH RD. ±1.5 MILES, THENCE NORTH (LEFT) ON HWY 387 ±2.0 MILES, THENCE EAST (RIGHT) ONTO NM-31 ±4.5 MILES, THENCE NORTHEAST (RIGHT) ON NM-128 ±22.8 MILES, THENCE SOUTH (RIGHT) ON J-1 ±3.3 TO A POINT ±1072 FEET SOUTHEAST OF THE LOCATION.



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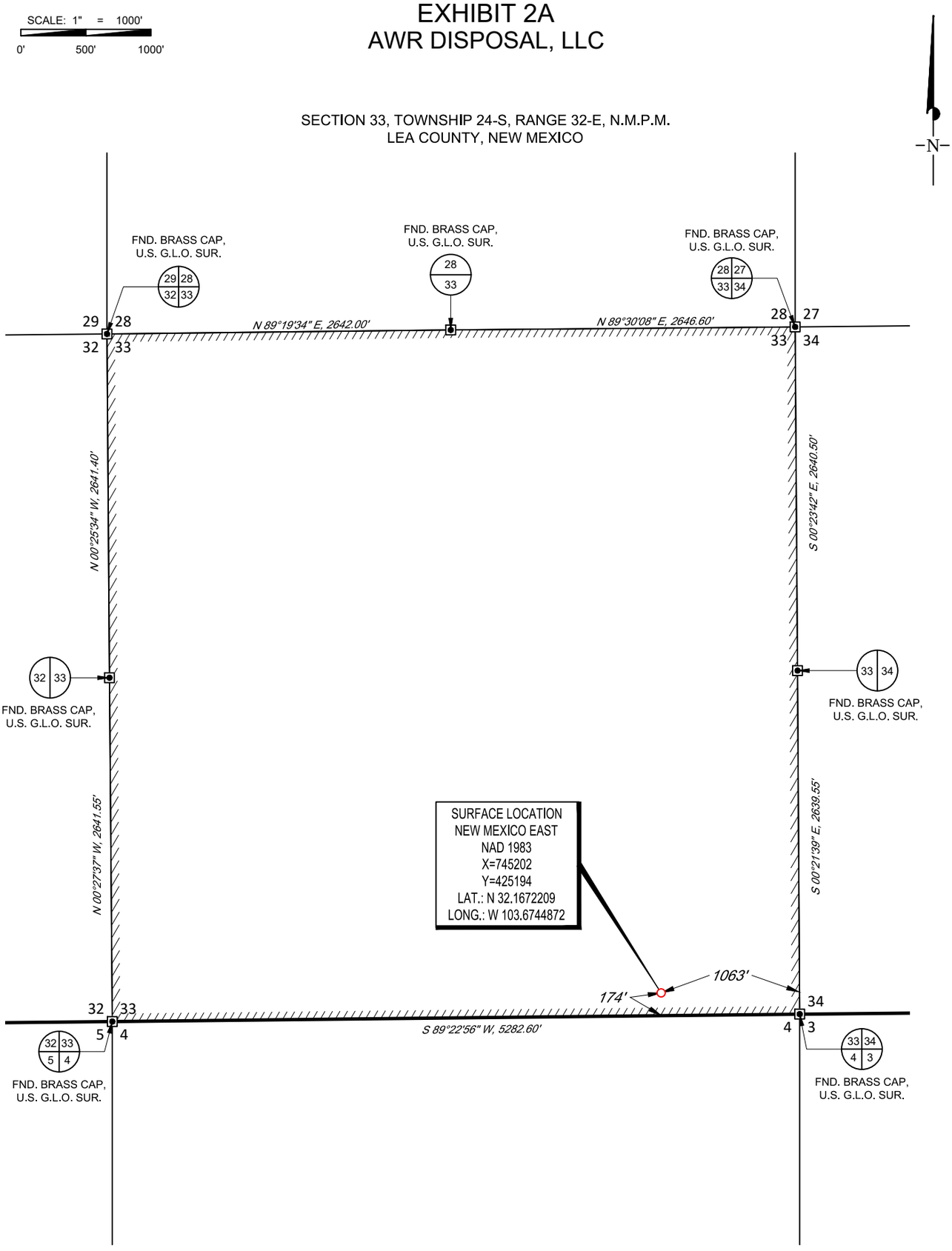
TELEPHONE: (432) 682-1653 OR (800) 767-1653 • FAX (432) 682-1743
WWW.TOPOGRAPHIC.COM

SCALE: 1" = 1000'

0' 500' 1000'

EXHIBIT 2A
AWR DISPOSAL, LLC

SECTION 33, TOWNSHIP 24-S, RANGE 32-E, N.M.P.M.
LEA COUNTY, NEW MEXICO



LEASE NAME & WELL NO.: BOWEN SWD #1

SECTION 33 TWP 24-S RGE 32-E SURVEY N.M.P.M.
COUNTY LEA STATE NM
DESCRIPTION 174' FSL & 1063' FEL

DISTANCE & DIRECTION
FROM INT. OF ONSUREZ RD & W. ASH RD., GO EAST ON W. ASH RD. ±1.5 MILES, THENCE NORTH (LEFT) ON HWY 387 ±2.0 MILES, THENCE EAST (RIGHT) ONTO NM-31 ±4.5 MILES, THENCE NORTHEAST (RIGHT) ON NM-128 ±22.8 MILES, THENCE SOUTH (RIGHT) ON J-1 ±3.3 TO A POINT ±1072 FEET SOUTHEAST 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.

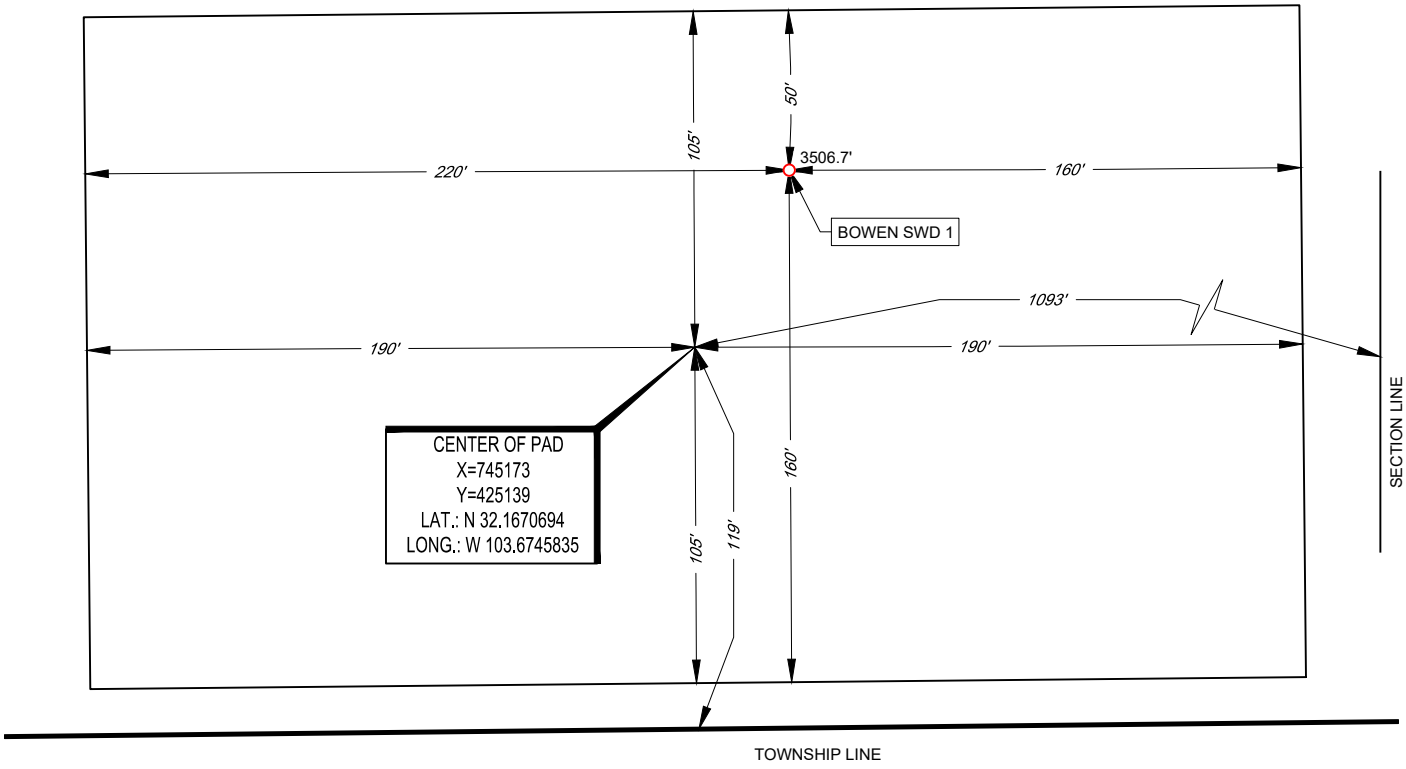
JOHN TREVOR CARNEGIE
NEW MEXICO
11401
REGISTERED PROFESSIONAL SURVEYOR

John Trevor Carnegie, P.S. No. 11401

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

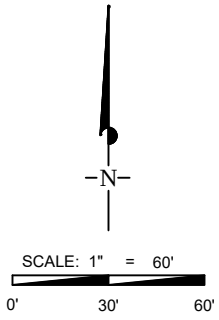
SECTION 33, TOWNSHIP 24-S, RANGE 32-E, N.M.P.M.
LEA COUNTY, NEW MEXICO



LEASE NAME & WELL NO.: BOWEN SWD #1

#1 LATITUDE N 32.1672209 #1 LONGITUDE W 103.6744872

CENTER OF PAD IS 119' FSL & 1093' 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"

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, TX 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).

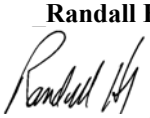
*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

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: __**12/12/2019**_____

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:_**Hard copy delivered on the 06/26/2019**_**and 8/2/2019**_____

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.

Side 1

INJECTION WELL DATA SHEET

OPERATOR: __**AWR Disposal, LLC**_____

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

WELL LOCATION: ____**174' FSL 1063' FEL**_____**P**_____**33**_____**24S**_____**32E**_____

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: __**Proposed: SWD, Devonian, Fusselman, Montoya**_____

3. Name of Field or Pool (if applicable): _____

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
Seismic information

AWR Disposal LLC

Lease Name: Bowen SWD #1

Unit Letter P, Sec. 33, T24S R32E

174 FSL, 1063' FEL

Lea County, NM

Latitude + 32°20'17.34"N, Longitude 103°33'57.57"W

Date Spudded: TBD

20", 133#, J-55 casing @ 1,032'.

Cmt w/ 450 sks, 13.7 lead and 450 sks, 14.8 tail

24" Hole

13-3/8", 68# L-80 EZ-GO FJ3 casing @ 4,552'.
DV Tool w/ 10' pkr at 4,000'

1st Stg Cmt w/ 1000 sks 11.8 ppg lead & 400 sks 13.2 ppg tail.

2nd Stg Cmt w/ 1000 sks 11.8 ppg lead & 380 sks 13.2 ppg tail.

17.5" Hole

9-5/8", 35.5#, HCP-110 BTC casing @ 11,782'.

Upper DV Tool w/ 10' pkr at 7,000'
Lower DV Tool w/ 10' pkr at 9,000'

1st Stg Cmt w/ 600 sks 11.8 ppg lead & 400 sks 13.2 ppg tail.

2nd Stg Cmt w/ 600 sks 11.8 ppg lead & 380 sks 13.2 ppg tail.

3rd Stg Cmt w/ 600 sks 11.8 ppg lead & 380 sks 13.2 ppg tail.

5.5" Tubing

12.25" Hole

5" Tubing

Maximum Proposed Injection Rate: 40,000 BBLS PER DAY

Maximum Proposed Injections Pressure: 3,400 psi

7-5/8" Liner, 39#, P-110 casing @ 17,066'.

Cmt w/ 230 sks 11.9 ppg Class C

8.5" Hole

Halliburton BWS
Packer set @ 16,986'

Injection Interval:

17,066' - 18,400'

6.5" Openhole

TD: 18,400'

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: Bowen SWD #1
Unit Letter P, Section 33, T24S R32E, 174 FSL, 1063 FEL

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 Bowen SWD were established by Geologist Herb Wacker. The tops were picked in part by using the offset open hole logs of the surround wells. The Barnett Formation top and deeper formations were picked using GeoMaps and offset deeper well control in Lea County.

BOWEN, Section 33 OF T24S R32E		
Formation	**GL**	**3507**
Tops	**KB**	**3537**
	SS	**TVD**
Rustler	832	2675
T/Salt	1140	2367
B/Salt	4490	-983
T/Lamar	4707	-1200
Delaware	4760	-1253
Cherry Canyon	5700	-2193
Brushy Canyon	7277	-3770
Bone Spring	8552	-5045
1st BS Sand	9917	-6410
2nd BS Sand	10442	-6935
3rd BS Sand	10917	-7410
Wolfcamp	12057	-8550
Penn	a	
Cisco	b	
Canyon	13517	-10010
Strawn	13897	-10390
Atoka	14112	-10605
Morrow	14679	-11172
Morrow Clastics	15250	-11743
Morrow Lower	15675	-12168
Barnett	15578	-12071
Miss LS	16532	-13025
Woodford	16850	-13343
Devonian	17008	-13501
Fusselman	17662	-14155
T/Montoya	18200	-14693
Simpson	18620	-15113
Ellenburger		
Injection Interval	**17066**	-13559
	18400	-14893
TD	**18400**	**-14893**

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 16,986'

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

A Halliburton BWS Packer will be set at 16,986'.

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 Formations 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 17,066-18,400 (1,334 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.

Tops for the Bowen SWD well were picked in part by using the offset open hole logs on the surrounding wells. The Barnett Formation top and deeper formations were picked using GeoMaps and offset deeper well control in Lea County.

Overlying Oil & Gas Zone (Using GL of 3507'):

Delaware (4760')
1st BS Sand (9917')
2nd BS Sand (10,442')
3rd BS Sand (10,917')
Wolfcamp (12,057')
Strawn (13,897')
Atoka (14,112')
Morrow (14,679')
Barnett (15,578')

Underlying Oil & Gas Zones:

None Exist

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.

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 2a presents the lease numbers for the SLO and BLM oil and gas leases and shows circles with radii of 0.5, 1.0, and 2.0 miles. Also shown are areas unleased at this time, and identifies if oil and gas minerals are owned by BLM.
- 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 Oil and Gas Well Operators shown on Plate 1a within a 1.0-mile radius area of review.
- Table 2 lists all lessees, lessors/mineral interests and surface owners (affected persons) within the 1-mile AOR presented on Plate 2a and 2b.

The Bowen SWD #1 location is on private land owned by Basin Properties Ranches LLC, minerals are owned by BLM (Plate 2b).

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

According to the data presented in Table 1, there are no wells that penetrate the proposed injection zone within the 1-mile AOR

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 and recycled produced water from 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: 3,400 psi
Proposed Average Injection Rate: 2,550 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 Springs Formations are the subjects of the analyses. These formations 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 the Delaware, Avalon, and Bone Springs Formations into the Devonian/Fusselman/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-producing wells. The closest wells represented in Table 4 are more than 30 miles to the east. The value of these data for the purpose of evaluating potential problems relating to the injections of produced water into the proposed injection interval is probably poor. As stated above, we are unaware of any problems associated with disposal of produced water derived from the Delaware, Avalon, and Bone Springs Formations into the Devonian/Fusselman/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 Formations 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 saltwater 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 17,008 and 18,620 respectively. The depth interval of the injection interval is 17,066-18,400 (1,334 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 Bowen SWD, the closest water well (well USGS-14343) is associated with two ranch building complexes, about 0.4 miles to the north of the Bowen SWD site (Plate 3a). In January of 2013, a depth to water of 289.69 feet was reported by the USGS.

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 Eddy County and in the area of the Bowen SWD, the depth interval of this potential source of fresh water is about 700-1000 feet. This data suggests that USGS-14343 accesses water within the Chinle Formation.

The locations of all water supply wells listed in public databases are shown in Plate 3b. As stated above, there are no active water supply wells within 1.5 miles of the proposed location. The location of nearby mapped surface water bodies are shown in Plate 4. No mapped surface water exists within the Area of Review.

In the area of the Bowen SWD, the depth interval of the Rustler is about 700-1000 feet bgs, according to the BLM and OCD and, we agree with this assessment. The bottom of the Rustler Formation is characterized by evaporates (anhydrite) and is not considered an underground source of drinking water. Thus, in this area, surface casing required by OCD to prevent impairment of fresh water runs from ground surface to a depth of 991 feet at the proposed Bowen SWD.

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 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 no such faults are mapped in the area of the proposed Bowen SWD[1]
- The Texas Bureau of Economic Geology has mapped older faults (e.g. basement and Woodford) in New Mexico and the closest mapped fault is more than 11 miles to the east[2]
- 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 15,000 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 through the 2800-foot low-permeability salt zone that underlies the Rustler Formation.

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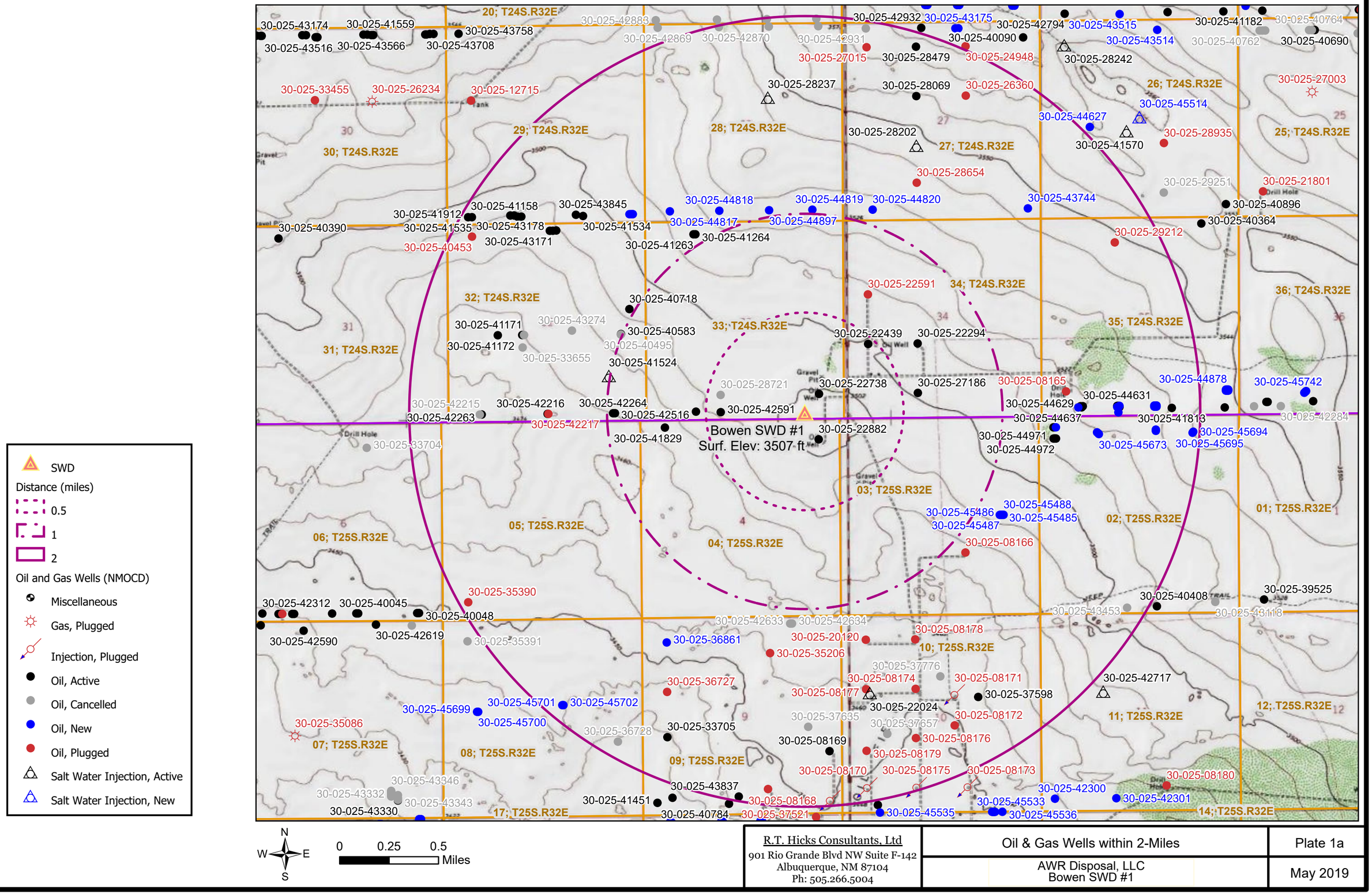
[1] https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf

[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); Woodord Faults (Comer 1991, plate 1). Http://www.beg.utexas.edu/resprog/permianbasin/gis.htm

    - 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

Plates

M:\accelerated Water\SWDs\Bowen\arcGISpro\arcGISpro.aprx



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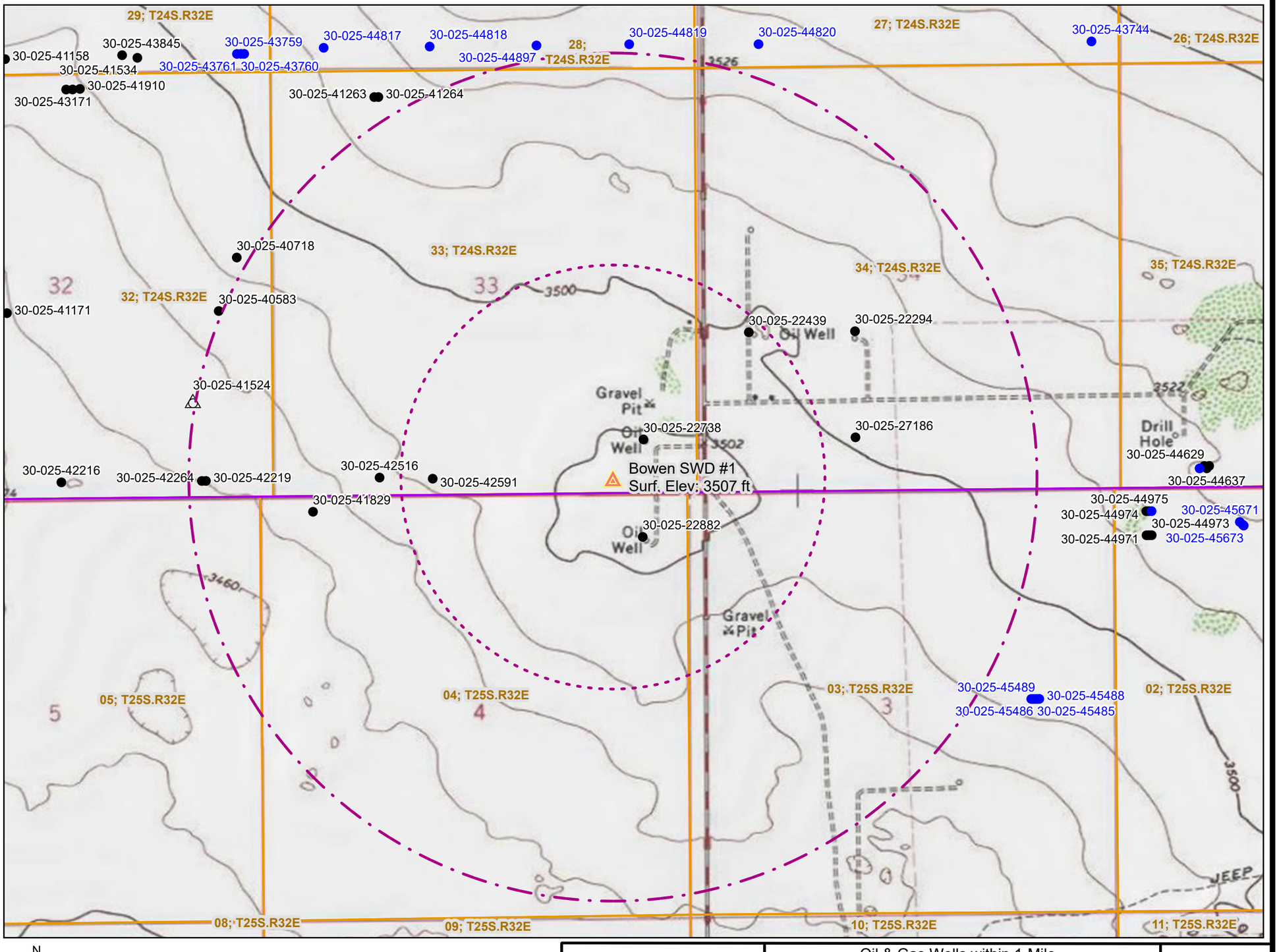
Oil & Gas Wells within 2-Miles

AWR Disposal, LLC
Bowen SWD #1

Plate 1a

May 2019

M:\accelerated Water\SWDs\Bowen\arcGISpro\arcGISpro.aprx



SWD

Distance (miles)

0.5

1

2

Oil and Gas Wells (NMOCD)

Oil, Active

Oil, New

Salt Water Injection, Active

N W E S

0 0.25 0.5 Miles

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Oil & Gas Wells within 1-Mile (Active and New)

AWR Disposal, LLC
Bowen SWD #1

Plate 1b

May 2019

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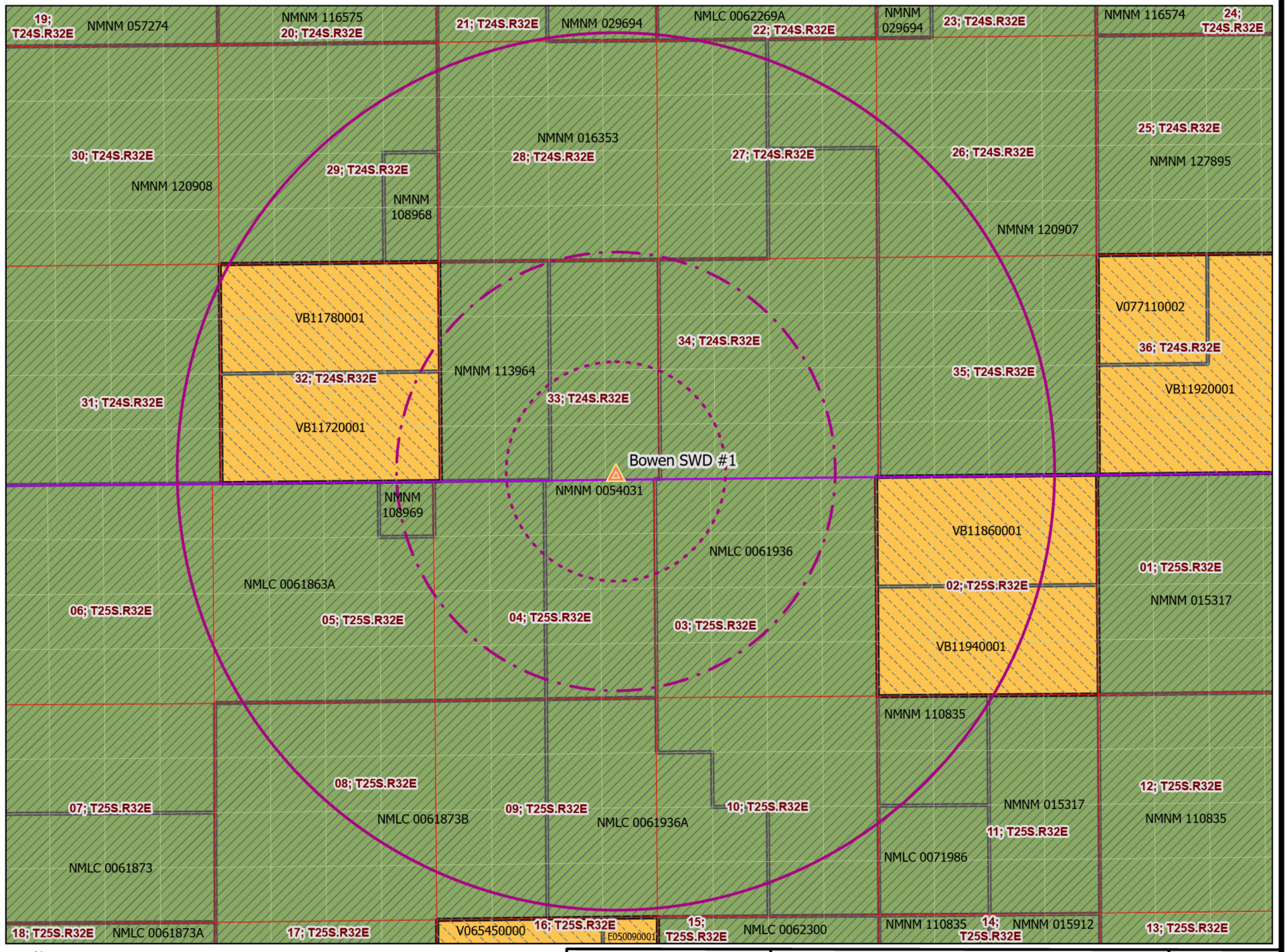

SWD

Distance (miles)

0.5

1

2

Oil and Gas Leases

BLM Leases

SLO Leases

Mineral Ownership (BLM Dataset)

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

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

Township Range Section

Township Range

Section

UL (qq)

N W E S

0 0.25 0.5 Miles

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Oil and Gas Leases with Mineral Ownership Within 2-Miles

AWR Disposal, LLC
Bowen SWD #1

Plate 2a

July 2019

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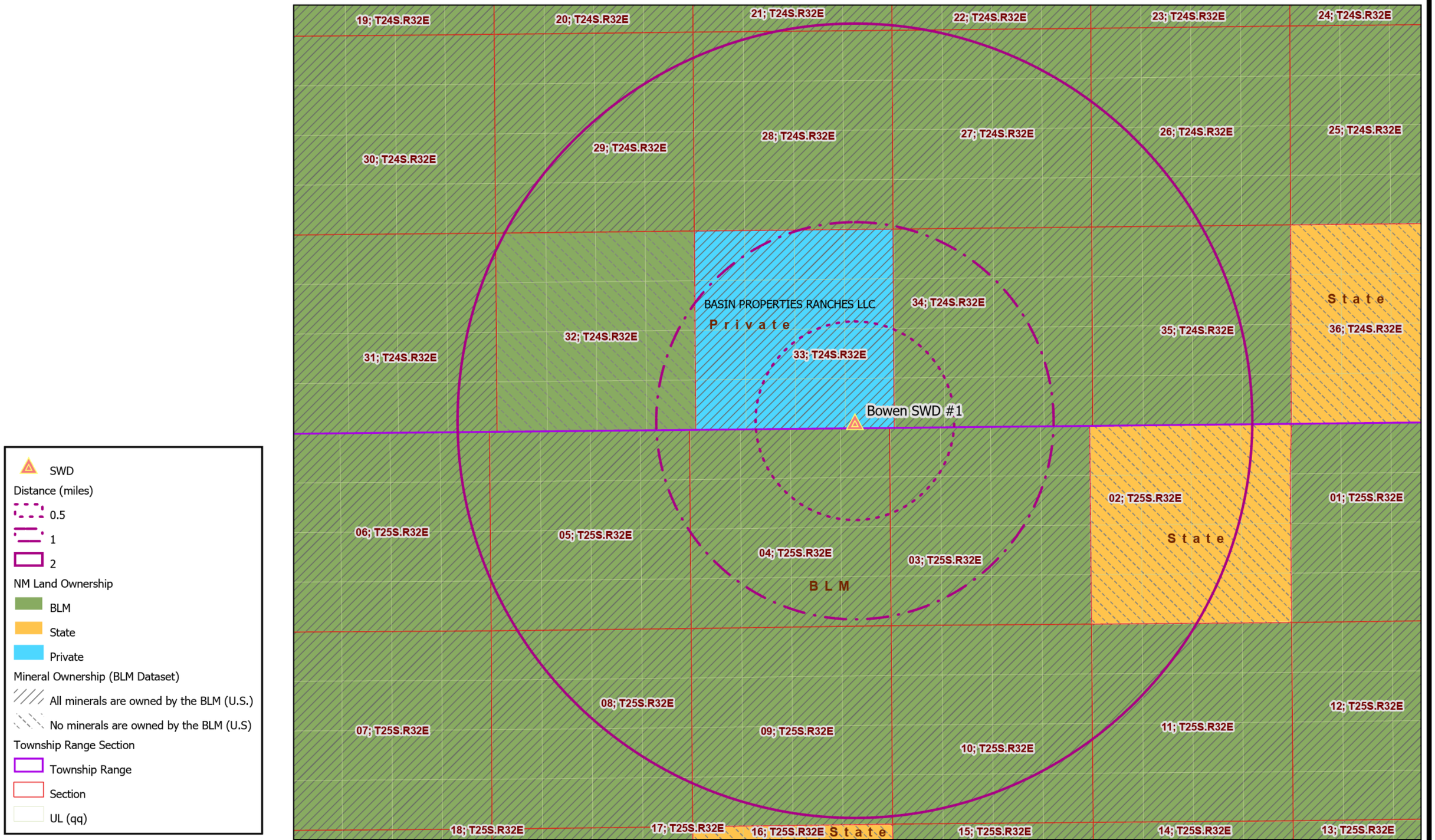

SWD

Distance (miles)

0.5

1

2

NM Land Ownership

BLM

State

Private

Mineral Ownership (BLM Dataset)

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

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

Township Range Section

Township Range

Section

UL (qq)

N W E S

0 0.25 0.5 Miles

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Surface and Mineral Ownership Within 2-Miles

AWR Disposal, LLC
Bowen SWD #1

Plate 2b

July 2019

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SWD

Potentiometric Surface (ft msl)

Isocontour

USGS Gauging Station (DTW, Date)

Aquifer Code, Well Status

Alluvium/Bolsom

Ogallala

Chinle

Santa Rosa, Site had been pumped recently.

Rustler

Azotea Tongue of Seven Rivers Formation

Misc. Water Wells (Well ID, DTW)

Well Depth (ft)

No Data

<= 150

351 - 500

OSE Water Wells (DTW/Date)

Well Depth (ft)

<=150

501-1000

Other

NM Geology

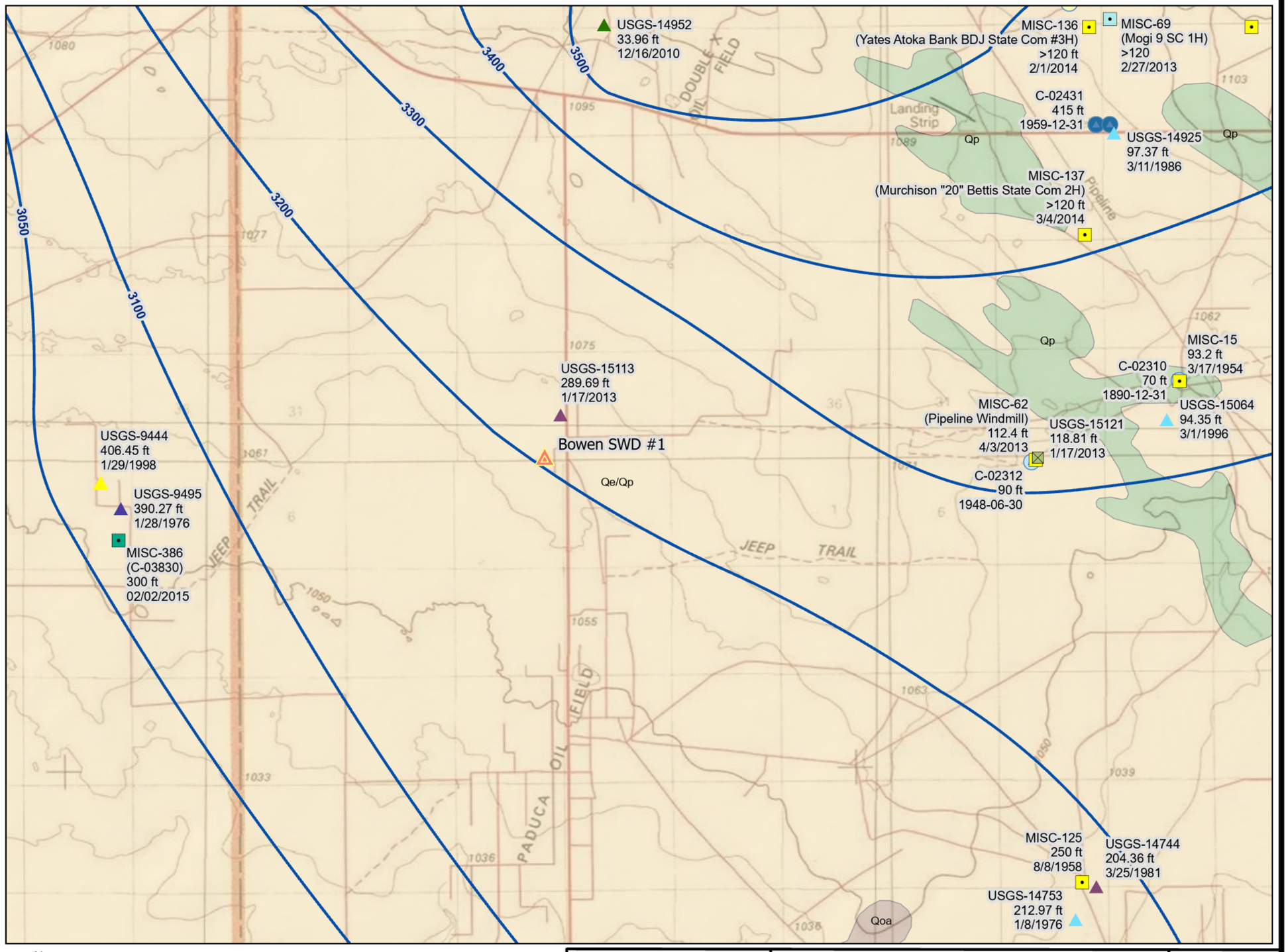
Map Unit,Description

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

Note: Some features not present in map extent.



N W E S

0 0.5 1 Miles

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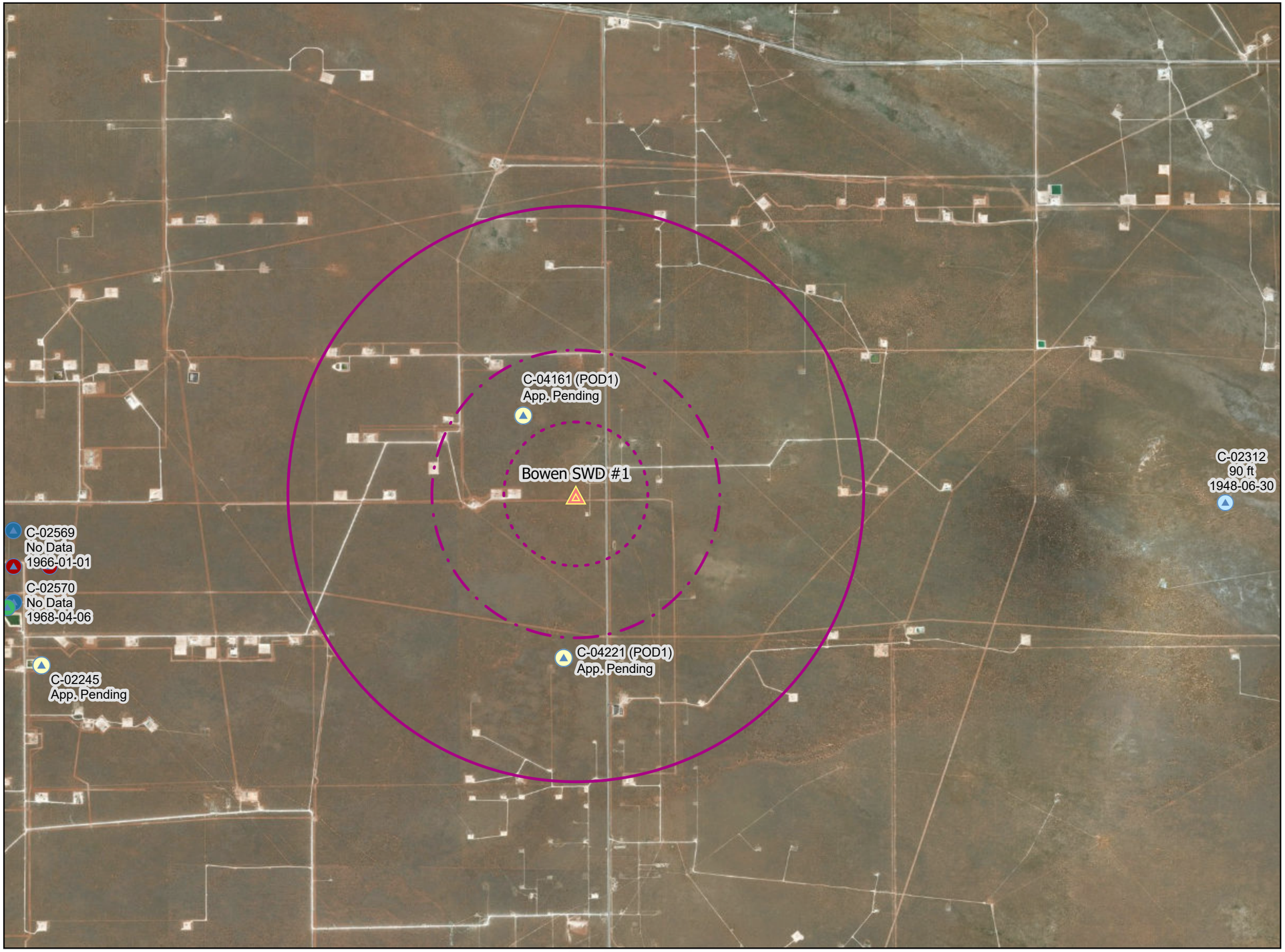
Potentiometric Surface Map with Depth to Water

AWR Disposal, LLC
Bowen SWD #1

Plate 3a

August 2019

M:\Accelerated Water\SWDs\BowenSWD\arcGISpro\arcGISpro.aprx



SWD

Distance (miles)

0.5

1

2

OSE Water Wells (DTW/Date)

Well Depth (ft)

<=150

151-350

351-500

501-1000

<1000

Other

N W E S

0 0.5 1 Miles

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Nearby Water Wells (NM OSE)

AWR Disposal, LLC
Bowen SWD #1

Plate 3b

May 2019

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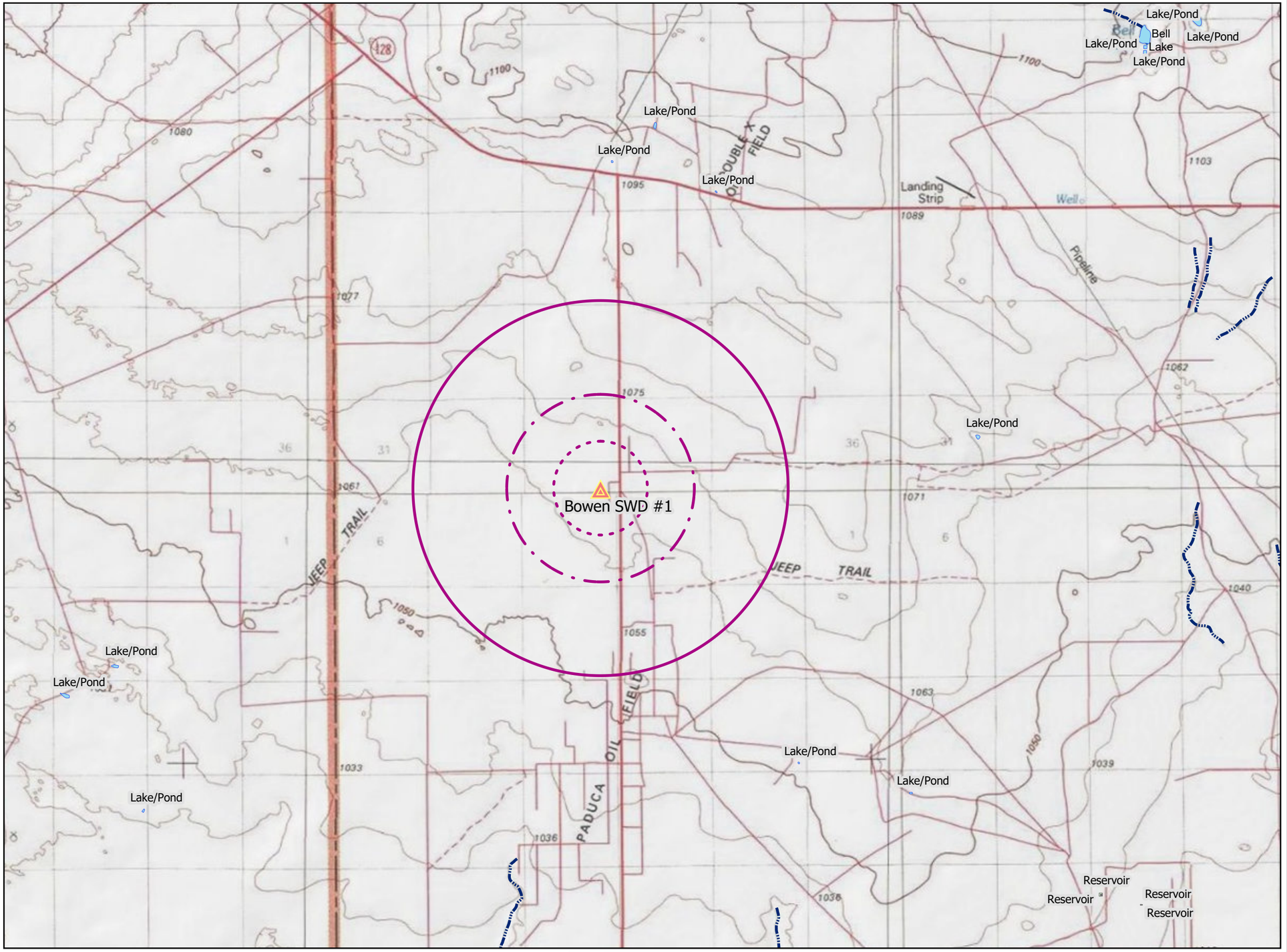

SWD

Distance (miles)

0.5

1

2

Water Bodies (1307)

Lake/Pond

Reservoir

River and Drainages (1307)

Stream/River Artificial Path

Intermittent Stream

Note: Some features not present in map extent.

N W E S

0 0.5 1 Miles

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Surface Water AWR Disposal, LLC Bowen SWD #1	Plate 4 May 2019

Tables

API	Ogrid	Ogrid Name	Well Type	Status	Well Name	ULSTR	Total Depth	Pool ID
30-025-22294	20077	SAHARA OPERATING CO	O	A	COTTON DRAW UNIT #069	K-34-24S-32E	4937	[49490] PADUCA, DELAWARE, NORTH
30-025-22439	20077	SAHARA OPERATING CO	O	A	COTTON DRAW UNIT #070	L-34-24S-32E	4850	[49490] PADUCA, DELAWARE, NORTH
30-025-22591	22351	TEXACO EXPLORATION & PRODUCTION INC	O	P	COTTON DRAW UNIT #071	E-34-24S-32E	4850	
30-025-22738	20077	SAHARA OPERATING CO	O	A	COTTON DRAW UNIT #072	P-33-24S-32E	4850	[49490] PADUCA, DELAWARE, NORTH
30-025-22882	20077	SAHARA OPERATING CO	O	A	COTTON DRAW UNIT #073	1-04-25S-32E	4870	[49490] PADUCA, DELAWARE, NORTH
30-025-27186	20077	SAHARA OPERATING CO	O	A	COTTON DRAW UNIT #074	N-34-24S-32E	4967	[49490] PADUCA, DELAWARE, NORTH
30-025-28721	214263	PRE-ONGARD WELL OPERATOR	O	C	PRE-ONGARD WELL #001	N-33-24S-32E	0	
30-025-41829	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	LIPPIZZAN 4 FEDERAL #001H	4-04-25S-32E	10708	[96715] WC-025 G-06 S253206M, BONE SPRING
30-025-42219	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	CHINCOTEAGUE 32 STATE COM #006H	P-32-24S-32E	10692	[97899] WC-025 G-06 S253206M, BONE SPRING
30-025-42264	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	CHINCOTEAGUE 32 STATE COM #005H	P-32-24S-32E	10692	[97899] WC-025 G-06 S253206M, BONE SPRING
30-025-42516	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	PAINT 33 FEDERAL #001H	M-33-24S-32E	10751	[97899] WC-025 G-06 S253206M, BONE SPRING
30-025-42591	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	A	PAINT 33 FEDERAL #002H	N-33-24S-32E	10772	[97899] WC-025 G-06 S253206M, BONE SPRING

Township	Range	Section	Unit Letter	Lease Number	Lessee (O & G Minerals)	Lessor (O & G Minerals)	Surface Owner	UPC
24S	32E	27	M	NMNM 016353	EXXONMOBIL OIL CORP	BLM (U.S.)	Bureau of Land Management	4189143265266
24S	32E	28	O	NMNM 016353	EXXONMOBIL OIL CORP	BLM (U.S.)	Bureau of Land Management	4188143265266
24S	32E	28	P	NMNM 016353	EXXONMOBIL OIL CORP	BLM (U.S.)	Bureau of Land Management	4188143265266
24S	32E	32	H	VB11780001	EOG Y RESOURCES, INC.	STATE (NM)	Bureau of Land Management	4187144265266
24S	32E	32	I	VB11720001	DEVON ENERGY PRODUCTION COMPANY, LP	STATE (NM)	Bureau of Land Management	4187144265266
24S	32E	32	P	VB11720001	DEVON ENERGY PRODUCTION COMPANY, LP	STATE (NM)	Bureau of Land Management	4187144265266
24S	32E	33	A	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	B	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	C	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	D	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	E	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	F	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	G	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	H	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	I	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	J	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	K	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	L	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	M	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	N	NMNM 113964	DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	O	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	33	P	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	BASIN PROPERTIES RANCHES LLC	4188144265266
24S	32E	34	C	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	D	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	E	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	F	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	G	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	I	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144397397
24S	32E	34	J	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144397397
24S	32E	34	K	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223

Township	Range	Section	Unit Letter	Lease Number	Lessee (O & G Minerals)	Lessor (O & G Minerals)	Surface Owner	UPC
24S	32E	34	L	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	M	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	N	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144221223
24S	32E	34	O	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144397397
24S	32E	34	P	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189144397397
25S	32E	03	A	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145401264
25S	32E	03	B	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145401264
25S	32E	03	C	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267
25S	32E	03	D	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267
25S	32E	03	E	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267
25S	32E	03	F	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267
25S	32E	03	G	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145401264
25S	32E	03	H	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145401264
25S	32E	03	J	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145401264
25S	32E	03	K	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267
25S	32E	03	L	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267
25S	32E	03	M	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267
25S	32E	03	N	NMLC 0061936	CHEVRON USA INC DEVON ENERGY	BLM (U.S.)	Bureau of Land Management	4189145135267

Township	Range	Section	Unit Letter	Lease Number	Lessee (O & G Minerals)	Lessor (O & G Minerals)	Surface Owner	UPC
25S	32E	04	A	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	B	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	C	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	D	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	E	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	F	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	G	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	H	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	I	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	J	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	K	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	L	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	M	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	N	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	O	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	04	P	NMNM 0054031	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4188145267266
25S	32E	05	A	NMNM 108969	EOG Y RESOURCES INC EOG A RESOURCES EOG M RESOURCES INC OXY Y-1 COMPANY	BLM (U.S.)	Bureau of Land Management	4187145268266
25S	32E	05	H	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4187145268266
25S	32E	05	I	NMLC 0061863A	CHEVRON USA INC DEVON ENERGY PROD CO LP	BLM (U.S.)	Bureau of Land Management	4187145268266

Table 3
Produced Water

Well Name	API #	Sect.	Twn.	Ra.	Unit	Cty.	Formation	Sample Date	pH	TDS [mg/L]	Resistivity [ohm-cm]	Sodium [mg/L]	Calcium [mg/L]	Iron [mg/L]	Magn. [mg/L]	Mang. [mg/L]	Chloride [mg/L]	Bicarbonate [mg/L]	Sulfate [mg/L]	CO2 [mg/L]
COTTON DRAW 33 4 FEDERAL COM #001H	3002541263	33	24S	32E	D	Lea	DELAWARE-BRUSHY CANYON	42285	6.6	253483	0.04998	72811.5	15695.3	47.4	2581.4		159430.7		401.8	200
COTTON DRAW 33 4 FEDERAL COM #002H	3002541264	33	24S	32E	C	Lea	DELAWARE-BRUSHY CANYON	42285	6.6	249333	0.05039	71579.8	16716	38.7	2758.3		155226.8		405.7	300
COTTON DRAW 32 STATE FEDERAL COM #001H	3002540583	32	24S	32E	I	Lea	DELAWARE-BRUSHY CANYON	41942	6.2	190416		52851.8	11214.1	41.2	1817.4	2.19	121155.4	1122	0	200
COTTON DRAW 32 STATE FEDERAL COM #003H	3002541171	32	24S	32E	K	Lea	DELAWARE-BRUSHY CANYON	42101	6.5	240651.8	0.04869	72113.4	15674.4	42.1	2636.5	2.4	147407.5	122	0	200
COTTON DRAW 32 STATE FEDERAL COM #001H	3002540583	32	24S	32E	I	Lea	DELAWARE-BRUSHY CANYON	41775	6.1	250315.4		74640.5	18096.3	33.1	3033.1	2.53	151462	122	0	300
COTTON DRAW 32 STATE FEDERAL COM #001H	3002540583	32	24S	32E	I	Lea	DELAWARE-BRUSHY CANYON	41775	6.1	250489		74640.5	18096.3	33.1	3033.1	2.5	151462	122	608	300
COTTON DRAW 32 STATE FEDERAL COM #003H	3002541171	32	24S	32E	K	Lea	DELAWARE-BRUSHY CANYON	42013	6	230307.4		66452.8	15493.6	55.6	2511.9	2.63	143205	122	0	400
COTTON DRAW UNIT #237H	3002541996	10	25S	32E	M	Lea	BONE SPRING 2ND SAND	42101	6.5	207154.8	0.05017	68477	4041.6	41.3	1744.6	1.53	126763.4	122	0	200
COTTON DRAW UNIT #024	3002508176	10	25S	32E	K	LEA	DELAWARE			246555							152600	112	939	
LIPPIZZAN 4 FEDERAL #001H	3002541829	4	25S	32E	D	Lea	BONE SPRING 2ND SAND	42031	6.3	140235.4		42818.4	6441.7	40.5	785.3	0	87998.1	244	0	200
LIPPIZZAN 4 FEDERAL #001H	3002541829	4	25S	32E	D	Lea	BONE SPRING 2ND SAND	41954	6.5	139733.4		42191.3	7002.9	78.4	913.2	1.66	87280.6	244	0	150
LIPPIZZAN 4 FEDERAL #001H	3002541829	4	25S	32E	D	Lea	BONE SPRING 2ND SAND	42101	7.2	141809.9	0.06181	43932.5	6382.4	63.2	789.5	1.2	88463.4	244	0	100
COTTON DRAW UNIT #049	3002508166	3	25S	32E	J	LEA				247372							153000	102	760	
COTTON DRAW UNIT #001	3002508182	15	25S	32E	M	LEA	DELAWARE			308600										
COTTON DRAW UNIT #001	3002508182	15	25S	32E	M	LEA	DELAWARE			309990										
MONSANTO STATE #001	3002508196	16	25S	32E	I	LEA	DELAWARE			224016							138600	139	462	

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 ζ . / 7 !4%2 3500,9 7%,,3

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

June 27, 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 is filing 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 Bowen SWD #1 will be located 174 feet from the South line and 1063 feet from the East line, Section 33, Township 24 South, Range 32 East, Lea County, New Mexico. Produced water and recycled produced water from area production will be commercially disposed into the Devonian, Fusselman, and Montoya Formations at a depth of 17,066 feet to 18,400 feet at a maximum surface pressure of 3,400 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 36.0 miles southwest of Loving, 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
July 26, 2019
and ending with the issue dated
July 26, 2019.

Publisher

Sworn and subscribed to before me this
26th day of July 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
JULY 26, 2019

AWR Disposal LLC, 3300 N. A Street, Ste. 220, Midland, TX 79705 is filing 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 Bowen SWD #1 will be located 174 feet from the South line and 1063 feet from the East line, Section 33, Township 24 South, Range 32 East, Lea County, New Mexico. Produced water and recycled produced water from area production will be commercially disposed into the Devonian, Fusselman, and Montoya Formations at a depth of 17,066 feet to 18,400 feet at a maximum surface pressure of 3,400 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 36.0 miles southwest of Loving, 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
#34505

67115764 00231324

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

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

June 26, 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 Bowen SWD #1. The proposed commercial operation will be for produced water disposal from area operators. As indicated in the notice below, the well is located in Section 33, Township 24 South, Range 32 East in Lea County, New Mexico.

The published notice states that the interval will be from 17,066 feet to 18,400 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 Bowen SWD #1 will be located 174 feet from the South line and 1063 feet from the East line, Section 33, Township 24 South, Range 32 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 17,066 feet to 18,400 feet at a maximum surface pressure of 3,400 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 26.0 miles southwest of Loving, 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.

Thank you for your attention in this matter.

Sincerely,
R.T. Hicks Consultants

Randall Hicks
Principal

OPERATORS, LESSEES, SURFACE AND MINERAL OWNERS WITHIN 1-MILE RADIUS

BASIN PROPERTIES RANCHES LLC
Re: Bowen SWD #1
18 DESTA DRIVE
MIDLAND, TX 79705

Bureau of Land Management
Re: Bowen SWD #1
620 E. Greene Street
Carlsbad, NM 88220-6292

CHEVRON U S A INC
Re: Bowen SWD #1
6301 DEAUVILLE BLVD
MIDLAND, TX 79706

DEVON ENERGY PROD. COMPANY, LP
Re: Bowen SWD #1
333 West Sheridan Ave.
Oklahoma City, OK 73102

EOG A RESOURCES, INC.
Re: Bowen SWD #1
105 S 4th Street
Artesia, NM 88210

EOG M RESOURCES, INC.
Re: Bowen SWD #1
PO BOX 840
ARTESIA, NM 88211

EOG Y RESOURCES, INC.
Re: Bowen SWD #1
104 S 4TH ST
ARTESIA, NM 88210

EXXON MOBIL CORPORATION
Re: Bowen SWD #1
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HOUSTON, TX 77210

New Mexico State Land Office
Re: Bowen SWD #1
310 Old Santa Fe Trail
Santa Fe, NM 87501

OXY Y-1 COMPANY
Re: Bowen SWD #1
PO BOX 27570
HOUSTON, TX 77227

SAHARA OPERATING CO
Re: Bowen SWD #1
P.O. BOX 4130
MIDLAND, TX 79704

TEXACO EXPLORATION & PRODUCTION INC
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Well Plugged
Did not penetrate proposed
Formation-not included as
Affected Person

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City, State, ZI 620 E. Greene Street
Carlsbad, NM 88220-6292

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Oklahoma City, OK 73102

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Santa Fe, NM 87501

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June 27, 2019

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

RE: AWR Disposal LLC Bowen SWD#1
UL P, Section 33 T24S R32E, 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, such as the Dagger Draw area and a magnitude 2.0-2.9 earthquake that occurred between 1970-2004 about 12-miles south of the proposed Bowen SWD #1. A slightly larger magnitude and more recent seismic event is reported about 18 miles west of the Bowen 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 mapped fault that is closest to the Bowen SWD #1 (about 2.6 miles to the east) 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, except for part of southwest-northeast trending fault about 32 miles north-northwest of the Bowen SWD #1 well that has a FSP of about 25 – 33% in the central portion of this fault trace.

Plate 6 reproduces the major elements of Plate 5 in the inset map and also shows that within an 8-mile radius around the proposed Bowen SWD #1, the OCD database shows about 14 active or new Devonian SWDs, which translates into an average density of about one SWD for every 14 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 near the Bowen SWD #1 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 not possess) near the Bowen 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 Bowen 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 Bowen 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 Bowen 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 Ellenburger Formation, which lies beneath the Simpson Group. This downward migration will next enter the permeable units of the Ellenburger and, over time, increase the fluid pressure. After fluid pressure in the Ellenburger 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.

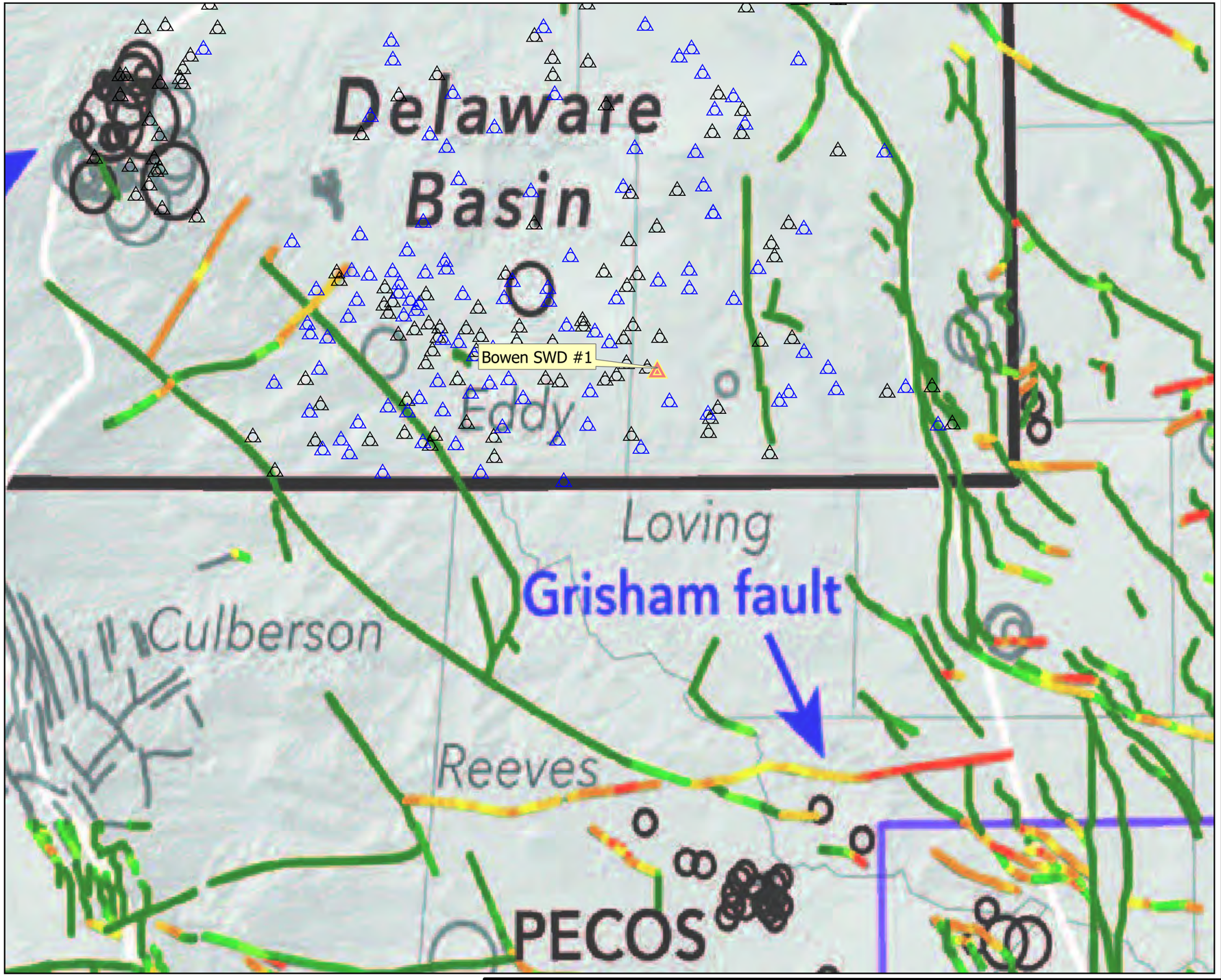
In my opinion, the probability that injection into the Bowen SWD #1 will measurably contribute to the events described above, although the probability of causing a seismic event resulting in damage is so low as to be nil.

Sincerely,
R.T. Hicks Consultants

Randall T. Hicks
Principal

Copy: AWR Disposal LLC

M:\accelerated Water\SWDs\Bowen\arcGISpro\arcGISpro.aprx

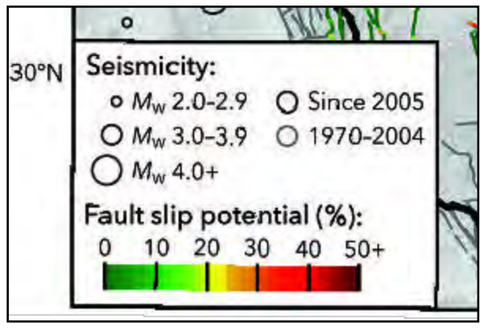


SWD

SWDs (Devonian)

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 4 8 Miles

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

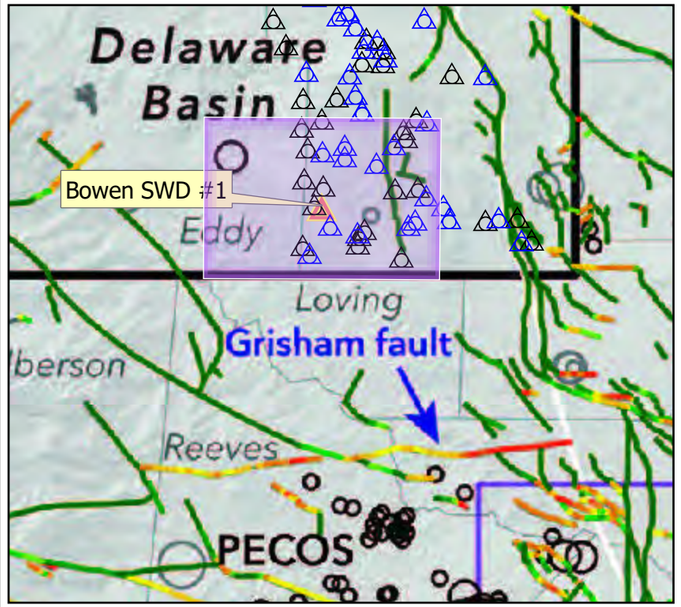
Seismicity with Fault Slip Potential

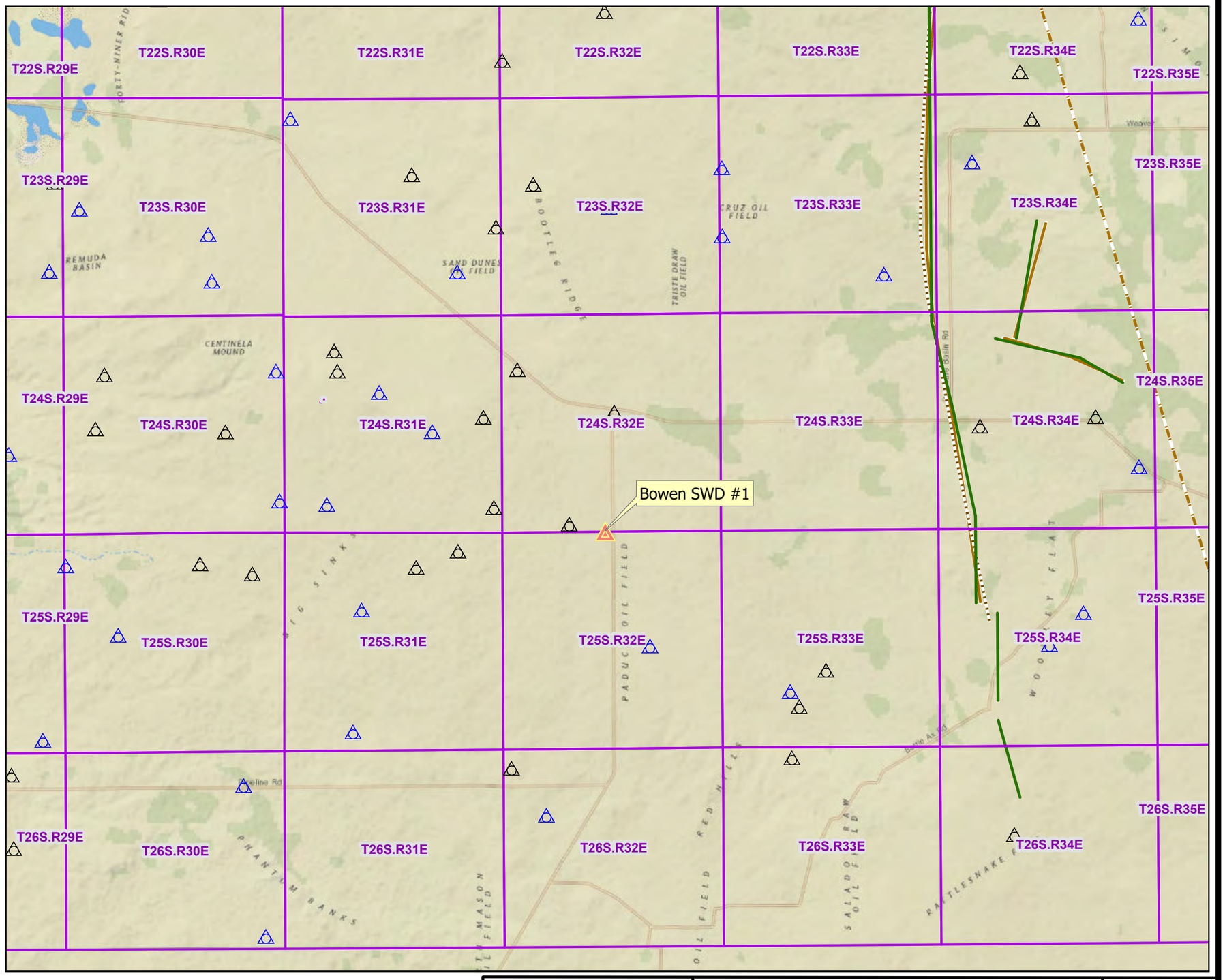
AWR Disposal, LLC
Bowen SWD #1

Plate 5

May 2019

M:\accelerated Water\SWDs\Bowen\arcGISpro\arcGISpro.aprx





SWD

Fault Slip Potential (%)

<5

Faults

Fault - Woodford

Fault - Precambrian

Fault - Basement

SWDs (Devonian)

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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Albuquerque, NM 87104
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Fault Slip Potential Relative to SWDs

AWR Disposal, LLC
Bowen SWD #1

Plate 6

May 2019

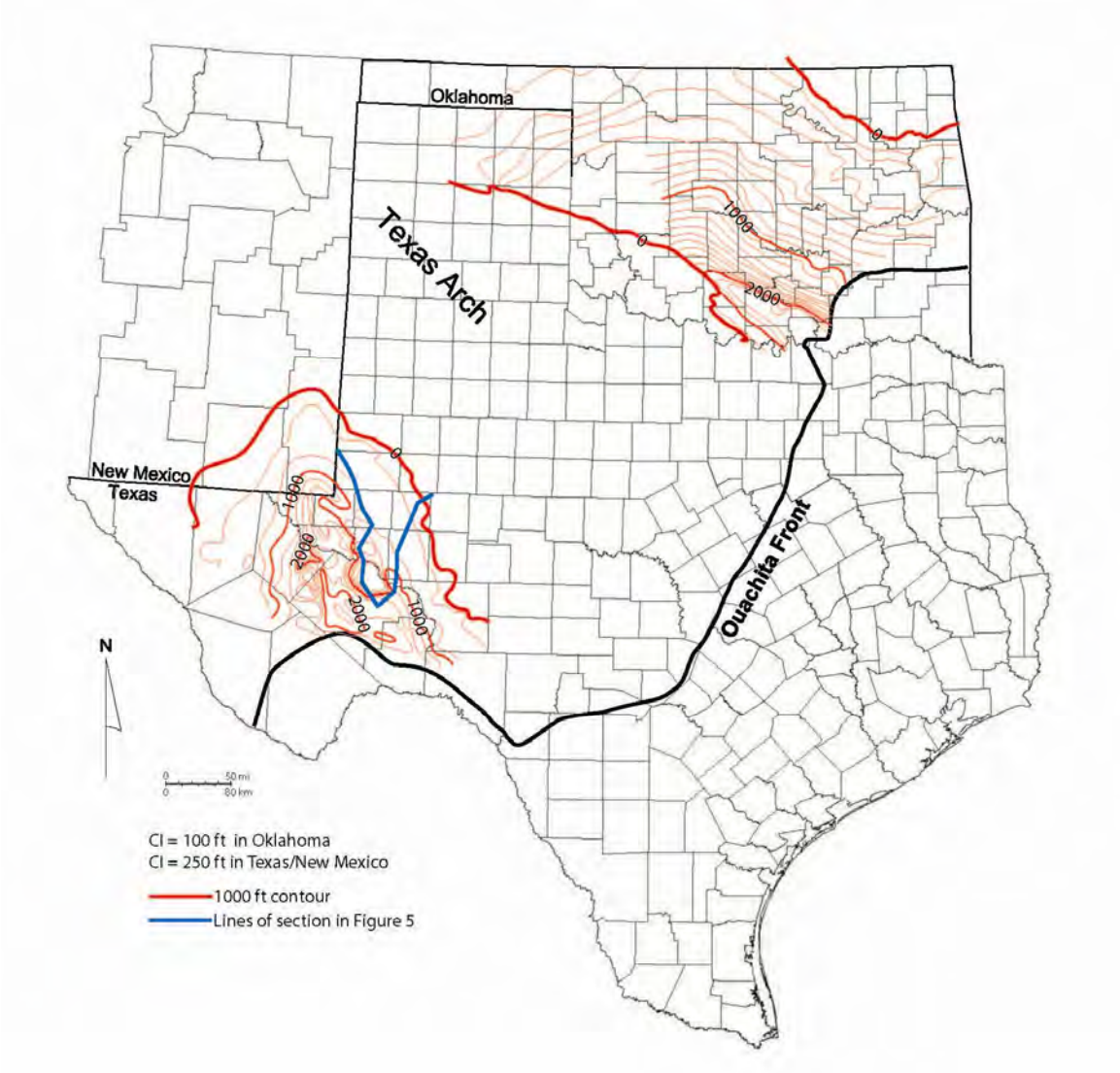

Figure 4. Thickness map of Simpson Group modified from Texas Water Development Board (1972), Frenzel and others (1988), and Northcutt and Johnson (1997). Thousand-foot contour lines and locations of figure 5 cross sections shown in heavy red and blue lines, respectively. Note that contour interval is 100 ft for Oklahoma and 250 ft for Texas and New Mexico.