

Protested SWD Application

By Apache Corporation
Recieved 01/24/2024



1/24/2024

Energy, Minerals & Natural Resources Department
Oil Conservation Division
Attention: Phillip Goetze, P.G.
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Protest of C108-Application for Authorization to Inject:

Avant Operating, LLC
Alfa Wolf SWD Well #1
1579' FSL & 1578' FWL Section 36, T.18 S., R. 32 E.
Lea County, New Mexico

Engineering Unit,

Apache Corporation hereby gives notice of its intent to protest the referenced SWD application. Should a formal hearing be called, Apache Corporation will appear and present any relevant evidence and testimony in support of our position. By copy of this letter the applicant is being notified of our intent.

Thank you for your assistance, and if you need additional information, please contact me via email at: dean.gaines@apachecorp.com or direct at: (432) 818-1803.

Sincerely,

A handwritten signature in blue ink that reads "Dean Gaines".

Dean Gaines
EH&S Sr. Advisor-Regulatory

cc: brian@permitswest.com



RECEIVED
Apache Corp

JAN 16 2024

Permian-Midland
Regulatory

January 10, 2024

Apache Corporation
303 Veterans Airpark Lane
Suite 1000
Midland TX 79705

Avant Operating, LLC is applying (see attached application) to drill the Alpha Wolf SWD 1 as a saltwater disposal well. As required by NM Oil Conservation Division (NMOCD) rules, I am notifying you of the following proposed saltwater disposal well. This letter is a notice only. No action is needed unless you have questions or objections.

Well Name: Alpha Wolf SWD 1 (NMSLO lease) TD = 15,200'
Proposed Disposal Zones: Silurian (14,566' – 15,200')
Location: 1579' FSL & 1578' FWL Sec. 36, T. 18 S., R. 32 E., Lea County, NM
Approximate Location: 11 air miles SSE of Maljamar, NM
Applicant Name: Avant Operating, LLC (720) 854-9020
Applicant's Address: 1515 Wynkoop St., Suite 700, Denver CO 80202

Submittal Information: Application for a saltwater disposal well will be filed with the NMOCD. If you have an objection, or wish to request a hearing, then it must be filed with the NMOCD within 15 days of receipt of this letter. NMOCD address is 1220 South St. Francis Dr., Santa Fe, NM 87505. Their phone number is (505) 476-3441. Their e-mail address is: ocd.engineer@emnrd.nm.gov.

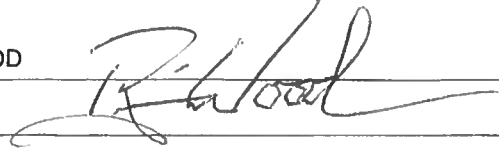
Please call me if you have any questions.

Sincerely,

Brian Wood

1. [REDACTED]
2. [REDACTED]
3. [REDACTED]
4. [REDACTED]
5. [REDACTED]
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95. [REDACTED]
96. [REDACTED]
97. [REDACTED]
98. [REDACTED]
99. [REDACTED]
100. [REDACTED]

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: Secondary Recovery Pressure Maintenance XXX Disposal Storage
Application qualifies for administrative approval? XXX Yes No
- II. OPERATOR: AVANT OPERATING, LLC
ADDRESS: 1515 WYNKOOP ST., SUITE 700, DENVER CO 80202
CONTACT PARTY: BRIAN WOOD (PERMITS WEST, INC.) PHONE: 505 466-8120
- 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 XXX No ALPHA WOLF SWD 1
If yes, give the Division order number authorizing the project: SWD; SILURIAN 98249
- 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: BRIAN WOOD TITLE: CONSULTANT
SIGNATURE:  DATE: 1-9-24
E-MAIL ADDRESS: brian@permitswest.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

Side 2

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

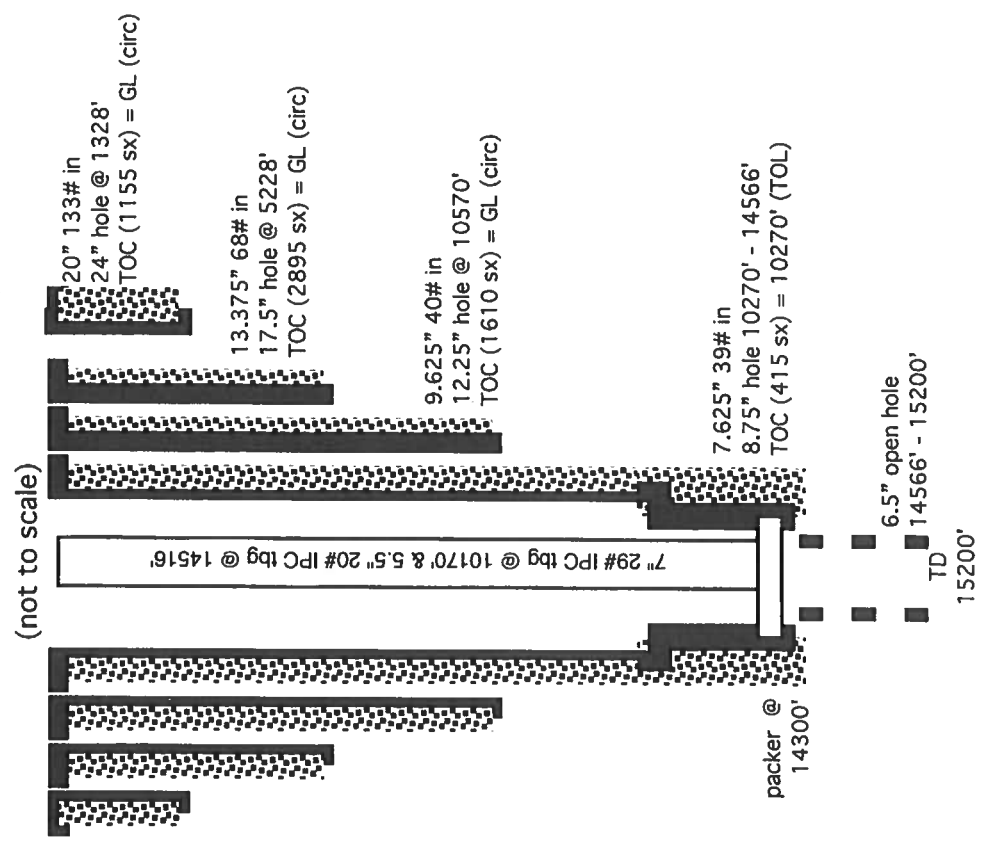
OPERATOR: AVANT OPERATING, LLC

WELL NAME & NUMBER: ALPHA WOLF SWD 1

WELL LOCATION: 1579' FSL & 1578' FWL K 36 18 S 32 E
FOOTAGE LOCATION UNIT LETTER SECTION TOWNSHIP RANGE

WELLS BORE SCHEMATIC

WELL CONSTRUCTION DATA
Surface Casing



Hole Size: 24" Casing Size: 20" ft³

Cemented with: 1155 sx. or Method Determined: CIRC.

Top of Cement: GL Intermediate Casing

Hole Size: 17.5" & 12.25" Casing Size: 13.375" & 9.625" ft³

Cemented with: 2895 & 1610 sx. or Method Determined: CIRC.

Top of Cement: GL Production Casing

Hole Size: 8.75" Casing Size: 7.625" ft³

Cemented with: 415 sx. or Method Determined: TOL

Top of Cement: 10810' Method Determined: TOL

Total Depth: CSG @ 14566' & TD @ 15200'

Injection Interval

6.5" OPEN HOLE 14566 feet to 15200'

(Perforated or Open Hole; indicate which)

INJECTION WELL DATA SHEET

Tubing Size: 7" Lining Material: IPC

Type of Packer: NICKEL PLATED

Packer Setting Depth: 14516'

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

Additional Data

1. Is this a new well drilled for injection? XXX Yes No
If no, for what purpose was the well originally drilled? _____
2. Name of the Injection Formation: SILURIAN
3. Name of Field or Pool (if applicable): SWD; SILURIAN (98249)
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: _____
OVER: YATES (3425'), QUEEN (4115'), BONE SPRING (8549'),
WOLFCAMP (10370'), STRAWN (11998') & MORROW (13275')
UNDER: NONE

AVANT OPERATING, LLC
ALPHA WOLF SWD 1
1579' FSL & 1578' FWL
SEC. 36, T. 18 S., R. 32 E., LEA COUNTY, NM

PAGE 1

I. Goal is to drill a 15,200' deep saltwater disposal well. Proposed disposal interval will be 14,566' – 15,200' in the SWD; Silurian (98249). See Exhibit A for C-102 and map. The well is on NM State Land Office surface and minerals.

II. Operator: Avant Operating, LLC [OGRID 330396]
Operator phone number: (720) 746-5045
Operator address: 1515 Wynkoop St., Suite 700, Denver CO 80202
Contact for Application: Brian Wood (Permits West, Inc.)
Phone: (505) 466-8120

III. A. (1) Lease name: Alpha Wolf (NMSLO VB-0030-0002)
Lease area: S2 Sec. 36, T. 18 S., R. 32 E.
Well name and number: Alpha Wolf SWD 1
Location: 1579' FSL & 1578' FWL Section 36, T. 18 S., R. 32 E.

A. (2) Surface casing (20", 133#, K-55, BTC) will be set at 1,328' in a 24" hole and cemented to GL (>20% excess) with 1,155 sacks.

Intermediate casing 1 (13.375", 68#, HCP-110, LTC) will be set at 5,228' in a 17.5" hole and cemented to GL (>20% excess) with 2,895 sacks.

Intermediate casing 2 (9.625", 40#, HCL-80, BTC) will be set at 10,570' in a 12.25" hole and cemented to GL (>20% excess) with 1,610 sacks.

Liner (7.625", 39#, HCP-110, LTC) will be set from 10,270' to 14,566' in an 8.75" hole and will be cemented to 10,270' (20% excess) with 415 sacks.

A 6.5" open hole will be drilled from 14,566' to 15,200'.

A. (3) IPC 7" 29# HCP-110 Ultra FJ injection string will be run from GL to 10,170'. IPC 5.5" 20# HCP-110 Ultra FJ injection string will be run

AVANT OPERATING, LLC
ALPHA WOLF SWD 1
1579' FSL & 1578' FWL
SEC. 36, T. 18 S., R. 32 E., LEA COUNTY, NM

PAGE 2

from 10,170' to \approx 14,516'. (Disposal interval will be 14,566' to 15,200'.)

- A. (4) A nickel-plated packer will be set at \approx 14,516', or within 100' of the top of the open hole. (Top of the open hole will be 14,566'.)
- B. (1) Disposal zone will be the Silurian (SWD; Silurian (98249) pool). Estimated fracture gradient is \approx 0.92 psi per foot.
- B. (2) Disposal interval will be open hole from 14,566' to 15,200'.
- B. (3) Well will be drilled as a SWD; Silurian well.
- B. (4) No perforated interval is in the well. Well will be completed open hole from 14,566' to 15,200'.
- B. (5) Potentially productive zones in the area of review and above the Silurian (14,541') are the Yates (3,425'), Queen (4,115'), Bone Spring (8,549'), Wolfcamp (10,370'), Strawn (11,998'), and Morrow (13,275'). No oil or gas zone is below the Silurian in the area of review.

IV. This is not an expansion of an existing injection project. It is disposal only.

V. Exhibit B shows and tabulates the 40 existing, or approved but not yet drilled, wells within a one-mile radius. Twenty-one of the wells are P&A. The remaining 19 wells are oil wells. Deepest of the 40 wells is 13,701' TVD (Barnett). Exhibit C shows all 105 existing wells (52 oil or gas + 48 P&A + 3 WIW + 2 water) within a two-mile radius. The water injectors are Bone Spring.

All leases within a one-mile radius are BLM or NMSLO. Exhibit D shows and tabulates all leases within a one-mile radius. Two-mile radius leases are BLM or NMSLO (Exhibit E).

AVANT OPERATING, LLC
 ALPHA WOLF SWD 1
 1579' FSL & 1578' FWL
 SEC. 36, T. 18 S., R. 32 E., LEA COUNTY, NM

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VI. No Silurian penetrator is within a mile. Deepest (13,701' TVD) well within a mile bottomed in the Barnett, 840' above the Silurian (14,541'). An estimated 30' of Woodford shale is between the bottom of the Mississippian and the top of the Silurian. Closest partially approved (SWD-2473; but APD 30-025-45391 expired) is 2-1/2 miles southeast. Closest fully approved Silurian or Devonian well (SWD-2369; 30-025-51764) is 4 miles southeast.

- VII. 1. Average injection rate will be $\approx 25,000$ bwpd.
 Maximum injection rate will be 30,000 bwpd.
2. System will be open and closed. Water will both be trucked and piped.
3. Average injection pressure will be $\approx 2,500$ psi. Maximum injection pressure will be 2,913 psi ($= 0.2$ psi/ft $\times 14,566'$ (top of open hole)).
4. Disposal water will be produced water, mainly Bone Spring, but also Delaware, Morrow, Strawn, Wolfcamp, Yates, et al. Avant has 9 approved wells in T. 18 S., R. 32 E., 8 of which are Bone Spring. Abstracts from the NM Produced Water Quality Database v.2 for wells in T. 18 S., R. 32 E. are in Exhibit F. A table of TDS ranges from those wells is below. Devonian samples (Exhibit F) from T. 20 S., R. 34 E. found TDS at 33,414 mg/l and 45,778 mg/l.

Formation	TDS range (mg/l)
Artesia	24,662 – 382,423
Bone Spring	121,381 – 187,542
Delaware	25,300
Wolfcamp	187,007

No compatibility problems have been reported from the closest (14 miles southeast) active Devonian-Silurian; SWD well. At least 25,347,005 barrels have been disposed in 30-025-45334 since 2019.

5. No Silurian oil or gas well is within 5 miles.

VIII. The Silurian interval ($\approx 737'$ thick) is composed of limestone and dolomite. Confining strata are the Woodford shale above and Sylvan shale below. Closest

AVANT OPERATING, LLC
 ALPHA WOLF SWD 1
 1579' FSL & 1578' FWL
 SEC. 36, T. 18 S., R. 32 E., LEA COUNTY, NM

PAGE 4

possible underground source of drinking water above the proposed disposal interval are the red beds above the Rustler anhydrite. According to State Engineer records (Exhibit G), closest water well is 1.31 miles southeast, but it could not be found during a July 19, 2023, field inspection. Deepest water well within 2-miles is 700'. A stock tank was found 1.57 miles northeast in NESW Section 30 and sampled. Capitan Reef is 1.7 miles south. Ogallala aquifer is 7 miles northeast. No underground source of drinking water is below the proposed disposal interval.

Estimated formation tops (TVD) are:

Red Beds = 0'
 Rustler = 1,303'
 Salt = 1,600'
 Salt (base) = 2,865'
 Yates = 3,425'
 Queen = 4,115'
 Delaware = 5,328'
 1st Bone Spring = 8,549'
 3rd Bone Spring = 10,092'
 Wolfcamp = 10,370'
 Strawn = 11,198'
 Mississippian Limestone = 13,891'
 Woodford Shale = 14,426'
 Silurian = 14,541'
top disposal interval = 14,566'
bottom disposal interval = 15,200'
 TD = 15,200'
 Fusselman = 15,279'

According to State Engineer records (Exhibit G), the deepest water well within 2-miles is 700'. There will be >13,000' of vertical separation including multiple layers of shale, salt, and anhydrite between the bottom of the only likely underground water source (red beds) and the top of the Silurian.

IX. Well will be stimulated with acid as needed.

AVANT OPERATING, LLC
ALPHA WOLF SWD 1
1579' FSL & 1578' FWL
SEC. 36, T. 18 S., R. 32 E., LEA COUNTY, NM

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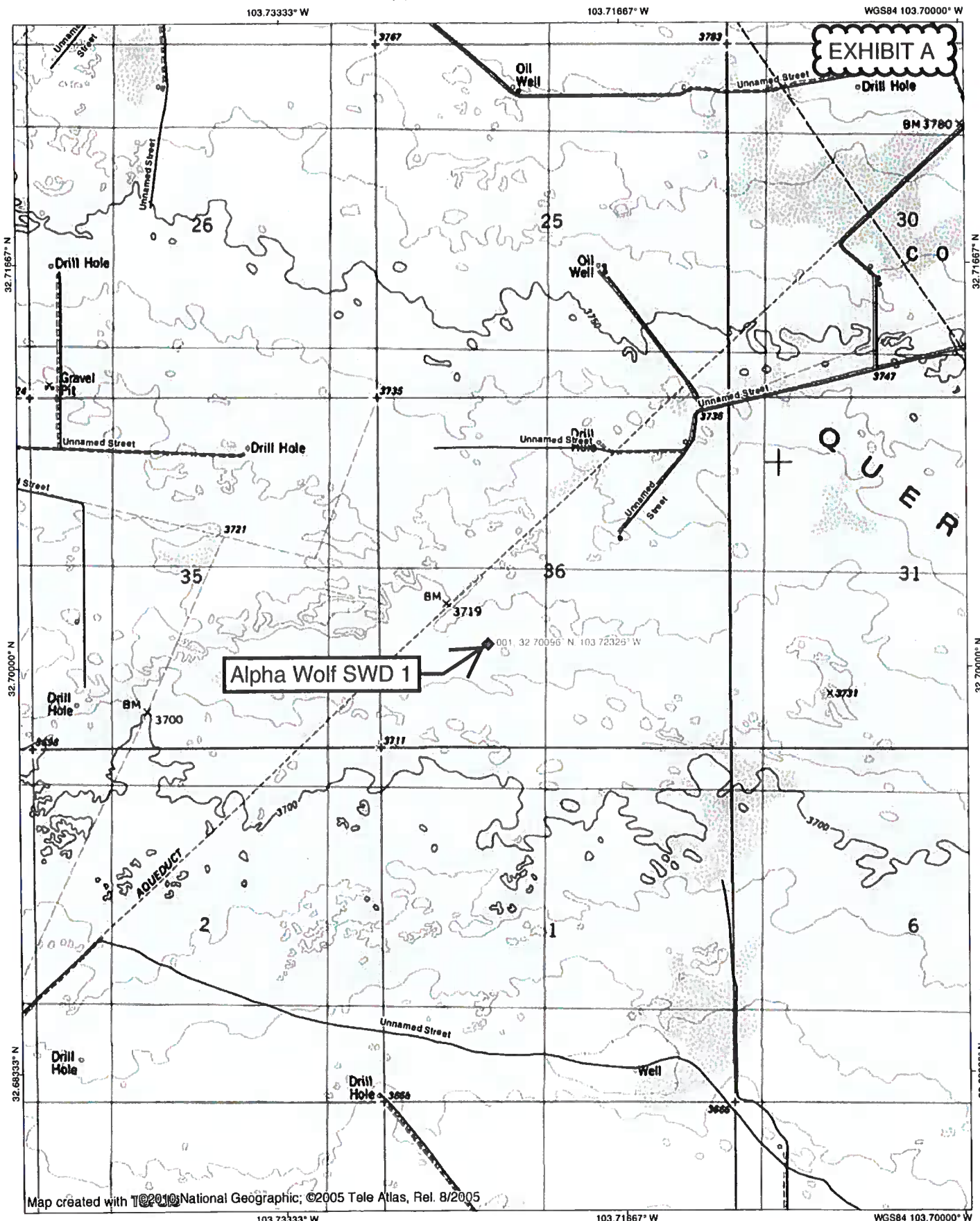
X. GR, bulk density, neutron density, and sonic logs will be run.

XI. According to State Engineer records (Exhibit G), 2 water wells are within a 2-mile radius, closest of which is 1.31 miles southeast. Neither were found during a field inspection. A stock tank (Exhibit H) not in the State records was found 1.57 miles northeast and sampled. Its location and analyses are in Exhibit H.

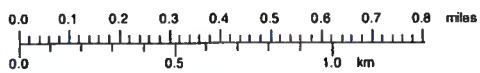
XII. Avant Operating, LLC (Exhibit I) is not aware of any geologic or engineering data that may indicate the Silurian is in hydrologic connection with any underground sources of water. Deepest water well within a 2-mile radius is 700'. There are 26 active Silurian SWD wells in New Mexico.

XIII. A legal ad (Exhibit J) was published on December 19, 2023. Notice (Exhibit K) and this application has been sent to the surface owner (NMSLO), all well operators regardless of depth, government lessors, lessees, and operating right holders within a mile.

TOPOI map printed on 01/01/24 from "Untitled.tpo"



Map created with TIGER National Geographic; ©2005 Tele Atlas, Rel. 8/2005



TN MN
6°
01/01/24

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
611 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-8720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-8170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, N.M. 87506
Phone: (505) 478-3460 Fax: (505) 478-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

EXHIBIT A

Form C-102

August 1, 2011

**Submit one copy to appropriate
District Office**

☐ AMENDED REPORT

OIL CONSERVATION DIVISION

1220 South St. Francis Dr.
Santa Fe, N.M. 87505

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number 30-025-		*Pool Code 98249	*Pool Name SWD; SILURIAN
*Property Code	*Property Name ALPHA WOLF SWD		*Well Number 1
*OGRID No. 330396	*Operator Name AVANT OPERATING, LLC		*Elevation 3711

¹⁰ Surface Location

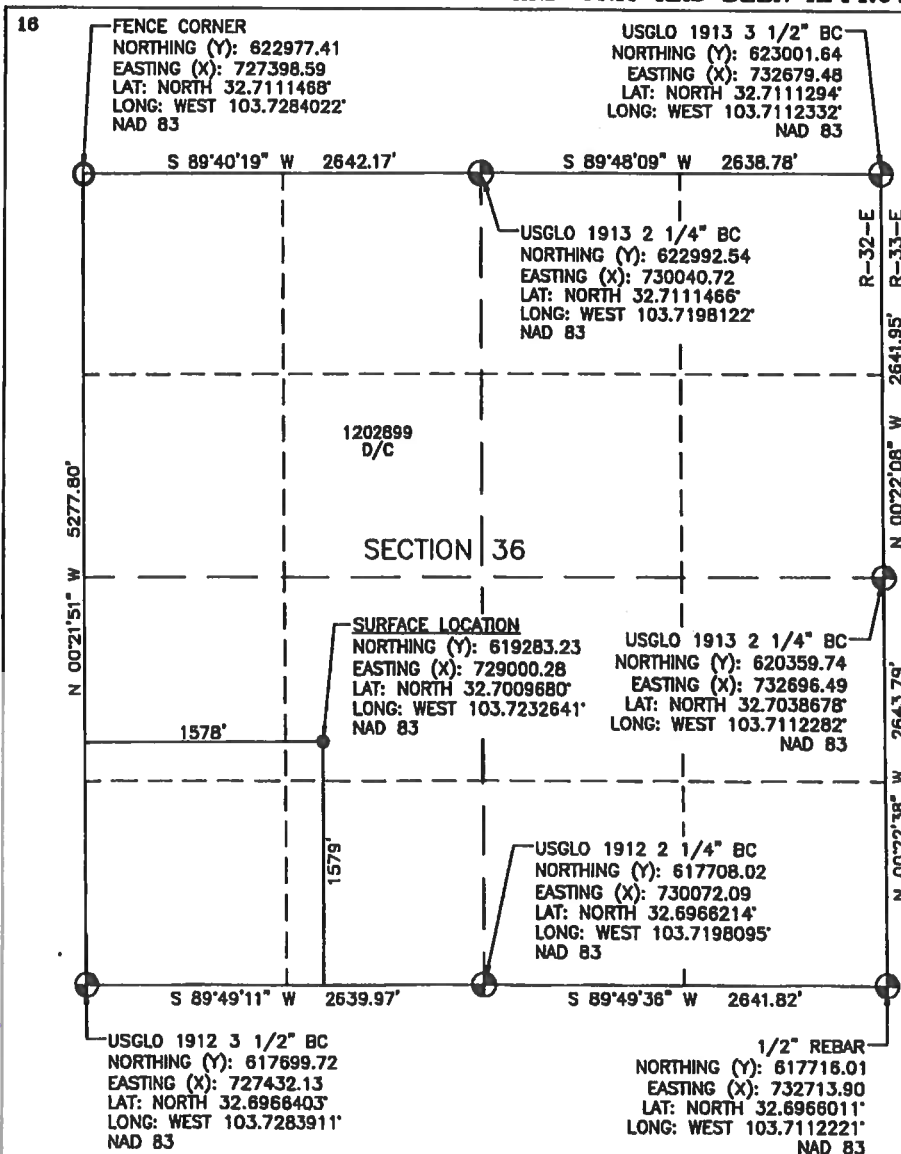
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
K	36	18 S	32 E		1579	SOUTH	1578	WEST	LEA

¹¹Bottom 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
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12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
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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 1-1-24
Date

BRIAN WOOD
Printed Name
brian@permitswest.com
E-mail Address
505 466-8120

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 and correct to the best of my belief.

10/12/23

Date of Survey

Signature and Seal of Professional Surveyor



30

(14831)

PPH (111) DR

100

OFFICE

11/18/12

1. A. X. O. M. A. S. I. H. / 2

(Signature)

Certificate Number 14031

19871

LEGEND:

LEGEND:
● SUBSEA LOCATION (SUN)

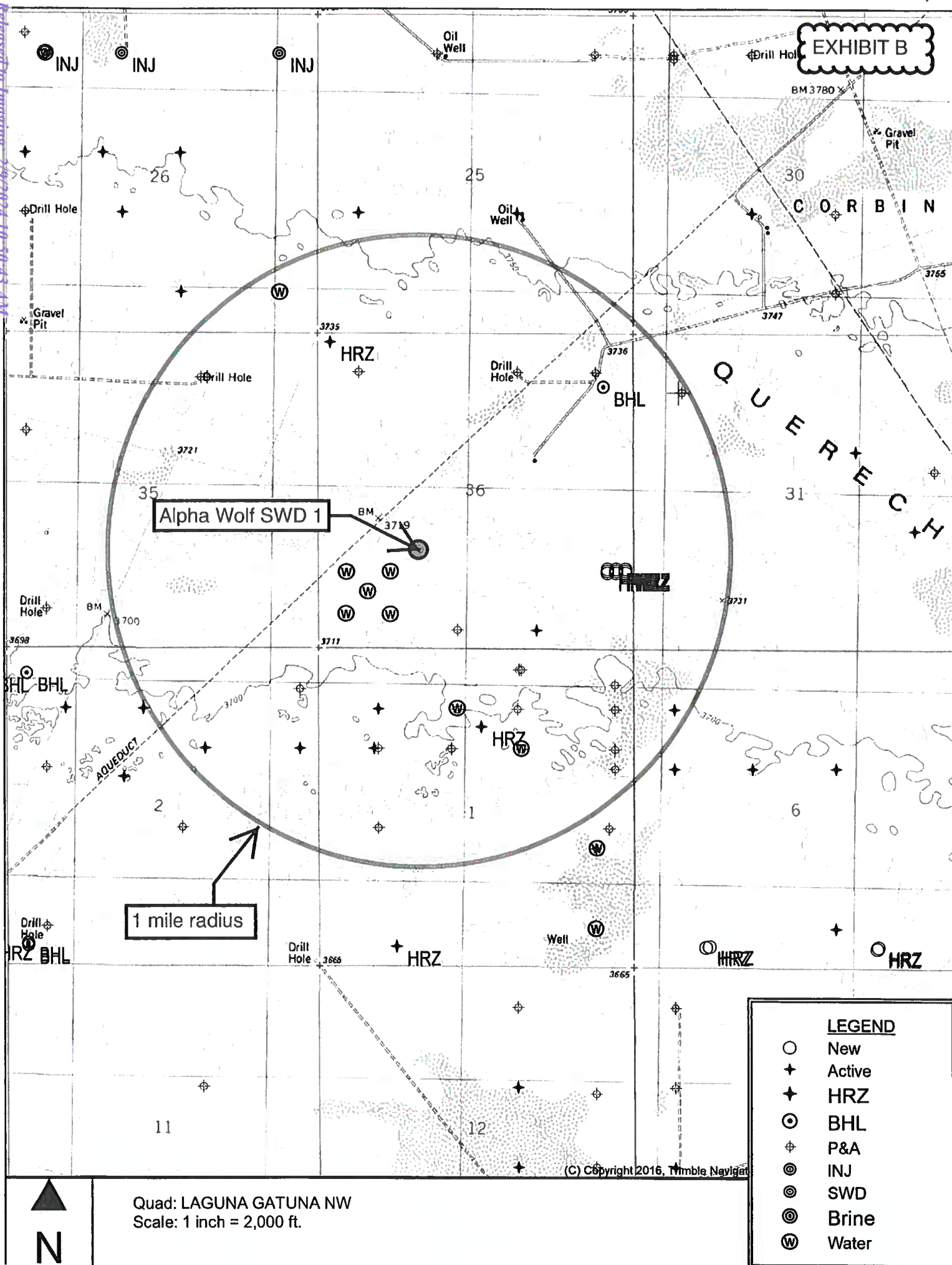
● = SURFACE LOCATION (SHL)

 = FOUND MONUMENT

○ = FENCE CORNER

LEGEND:

- = SURFACE LOCATION (SHL)
- ⊕ = FOUND MONUMENT
- = FENCE CORNER



WELLS WITHIN 1 MILE RADIUS OF ALPHA WOLF SWD 1 - SORTED BY DISTANCE FROM ALPHA WOLF SWD 1

API	OPERATOR	WELL	TYPE	UNIT-SECTION	TVD	ZONE @ TVD	FEET FROM ALPHA WOLF SWD 1
3002531349	Strata	Paloma State 003	P&A	N-36	3654	Yates	1477
3002531153	Avant	Paloma State 001	O	O-36	9075	Bone Spring	2417
3002531325	Cimarex CO	Bondurant Federal 005	P&A	B-1	3800	Seven Rivers	2611
3002540182	Cimarex CO	Bondurant Federal 012H	P&A	B-1	9878	Bone Spring	2634
3002531627	Walsh & Watts	Cochise 1 Federal 003	O	D-1	3700	Seven Rivers	2651
3002531440	Cimarex CO	Bondurant Federal 008	P&A	C-1	3700	Seven Rivers	2699
3002531668	Devon	Cochise 2 State 002	P&A	A-2	3680	Seven Rivers	2948
3002532431	Cimarex CO	Bondurant Federal 010	P&A	B-1	3650	Yates	3115
3002542793	Mewbourne	Crazy Wolf 1-2 B2CD Federal Com 001H	O	B-1	9533	Bone Spring	3116
3002530058	Yates	French 36 State 001	P&A	D-36	10250	Bone Spring	3161
3002551781	Avant	Alpha Wolf 36 Fed Com 301H	O	I-36	8600 plan	Bone Spring	3259
3002551782	Avant	Alpha Wolf 36 Fed Com 302H	O	P-36	8600 plan	Bone Spring	3262
3002551783	Avant	Alpha Wolf 36 Fed Com 303H	O	P-36	8600 plan	Bone Spring	3265
3002531604	Ralph C Bruton	Cochise 1 Federal 001	P&A	E-1	11370	Wolfcamp	3298
3002531626	Walsh & Watts	Cochise 1 Federal 002	O	E-1	3634	Yates	3312
3002531439	Cimarex CO	Bondurant Federal 009	P&A	F-1	3720	Seven Rivers	3316

EXHIBIT B

WELLS WITHIN 1 MILE RADIUS OF ALPHA WOLF SWD 1 - SORTED BY DISTANCE FROM ALPHA WOLF SWD 1

API	OPERATOR	WELL	TYPE	UNIT-SECTION	TVD	ZONE @ TVD	FEET FROM ALPHA WOLF SWD 1
3002551787	Avant	Alpha Wolf 36 Fed Com 601H	O	I-36	10350 plan	Bone Spring	3409
3002551786	Avant	Alpha Wolf 36 Fed Com 602H	O	P-36	10350 plan	Bone Spring	3411
3002551789	Avant	Alpha Wolf 36 Fed Com 603H	O	P-36	10350 plan	Bone Spring	3414
3002524185	French	Nephew 001	P&A	B-36	13600	Strawn	3472
3002551784	Avant	Alpha Wolf 36 Fed Com 501H	O	I-36	9550 plan	Bone Spring	3559
3002551785	Avant	Alpha Wolf 36 Fed Com 502H	O	P-36	9550 plan	Bone Spring	3561
3002551785	Avant	Alpha Wolf 36 Fed Com 503H	O	P-36	9550 plan	Bone Spring	3563
3002542695	Mewbourne	Lone Wolf 36 B2DM State Com 001H	O	D-36	9580	Bone Spring	3662
3002531326	Cimarex CO	Bondurant Federal 007	P&A	G-1	3740	Yates	3722
3002531605	Walsh & Watts	Cochise 2 State 001	O	H-2	3700	Seven Rivers	3759
3002531218	Cimarex CO	Bondurant Federal 003	P&A	A-1	4559	Queen	4028
3002532432	Cimarex CO	Bondurant Federal 011	P&A	A-1	3700	Yates	4265
3002520398	Lovelady	Humble State 001	P&A	A-36	4377	Penrose	4283
3002527470	Hendon	New Mexico 35 Federal 002	P&A	B-35	3406	Queen	4539
3002531628	Devon	Cochise 1 Federal 004	P&A	L-1	3725	Seven Rivers	4604
3002522800	Union	New Mexico 35 Federal 001	P&A	B-35	13701	Barnett	4617
3002530972	Special	Bondurant Federal Com 002	P&A	H-1	9100	Bone Spring	4697
3002531670	Walsh & Watts	Cochise 2 State 004	O	G-2	3685	Seven Rivers	4773

WELLS WITHIN 1 MILE RADIUS OF ALPHA WOLF SWD 1 - SORTED BY DISTANCE FROM ALPHA WOLF SWD 1

API	OPERATOR	WELL	TYPE	UNIT-SECTION	TVD	ZONE @ TVD	FEET FROM ALPHA WOLF SWD 1
3002531192	Cimarex CO	Bondurant Federal 004	P&A	H-1	3800	Seven Rivers	4932
3002531608	Legacy	Nellis Federal 006	P&A	D-6	3724	Yates	5089
3002531671	Walsh & Watts	Cochise 2 State 005	O	C-2	3680	Seven Rivers	5210
3002532829	Basin	Hudson Federal 31 002	P&A	D-31	13606	Morrow	5241
3002531331	Burlington	Bondurant Federal 006	P&A	I-1	3800	Seven Rivers	5634

EXHIBIT C

Alpha Wolf SWD 1

2 mile radius

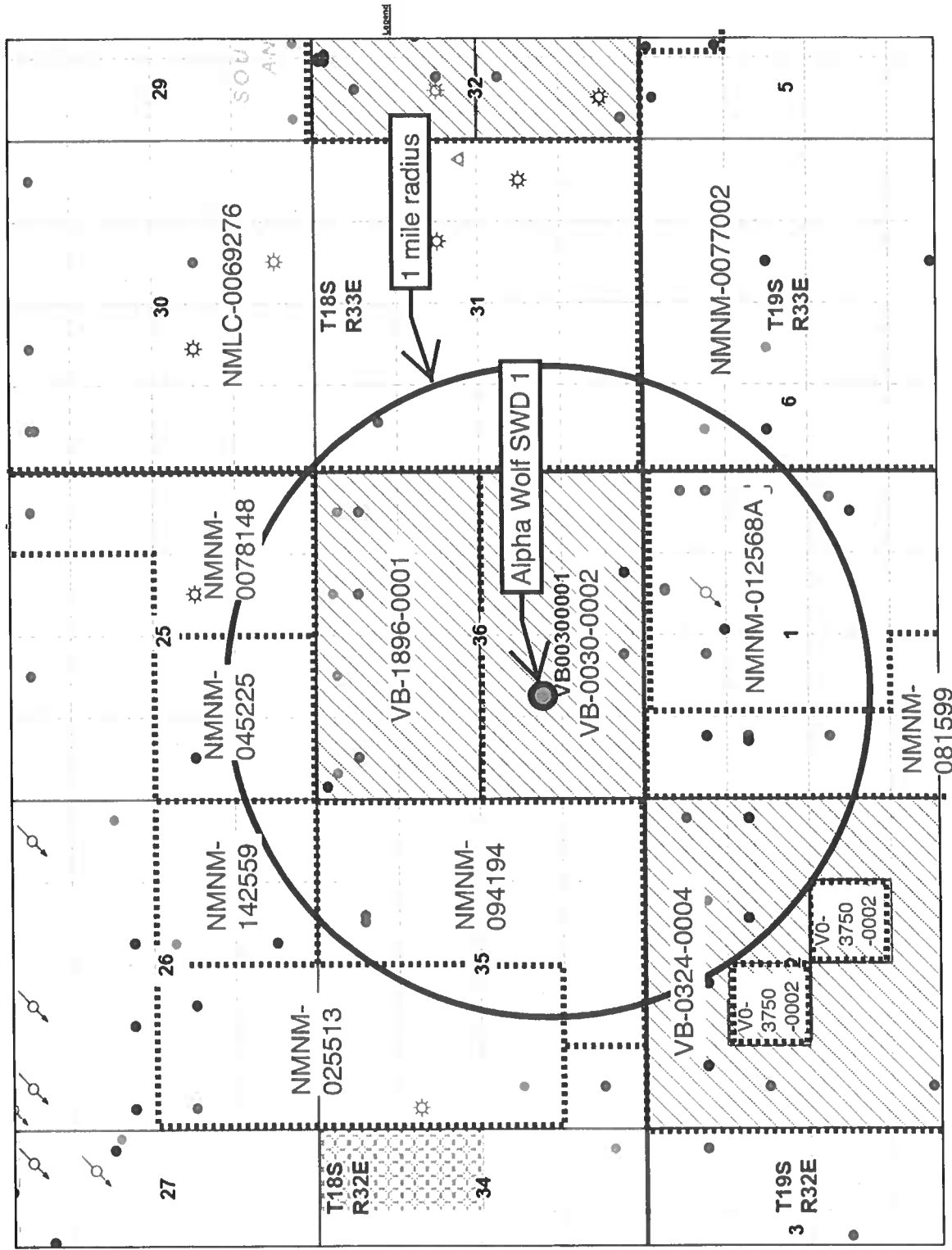
LEGEND

- New
- + Active
- + HRZ
- ⊙ BHL
- ⊕ P&A
- ⊙ INJ
- ⊙ SWD
- ⊙ Brine
- ⊙ Water

Quad: HOBBS
Scale: 1 inch = 3,333 ft.



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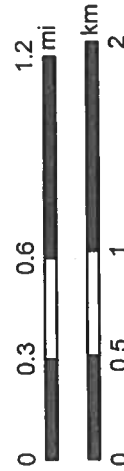
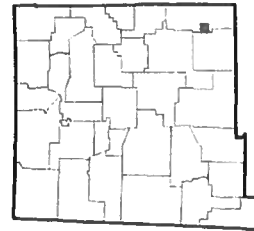


Disclaimer:
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EXHIBIT D



ALPHA WOLF SWD 1 AREA OF REVIEW LEASES

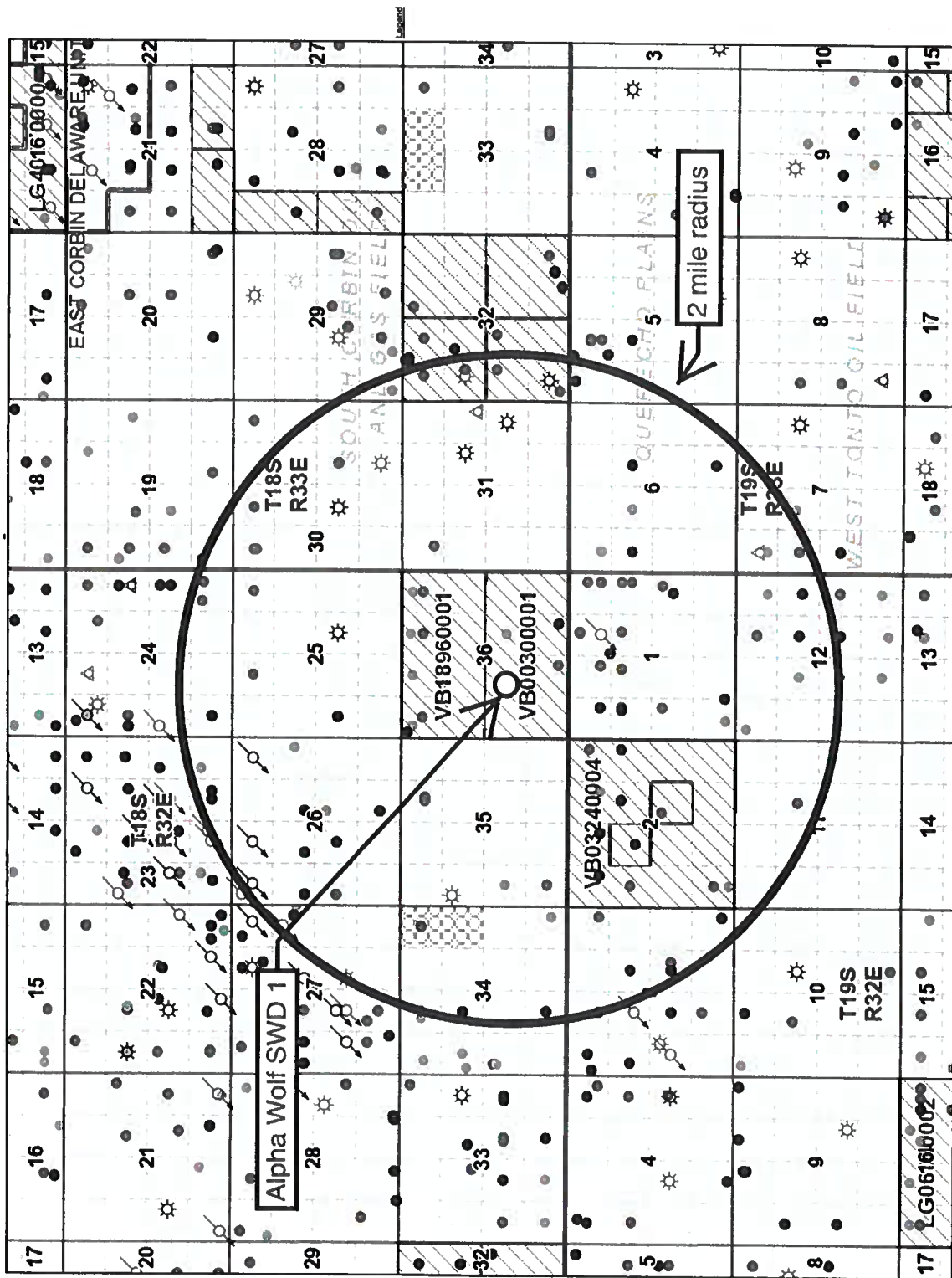
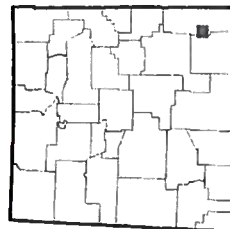
Aliquot Parts in Area of Review	Lessor	Lease	Lessee(s) of Record	Well Operators (all shallower than Silurian)
SW4 25-18S-32E	BLM	NMNM-045225	F Petroleum	V-F
NWSE & S2SE4 25-18S-32E	BLM	NMNM-0078148	BTA Oil, L R French Jr., French Land & Cattle, Viersen Oil & Gas	Burgundy
S2SE4 26-18S-32E	BLM	NMNM-142559	Mewbourne	Mewbourne
E2 & SESW 35-18S-32E	BLM	NMNM-094194	Lewis Burleson, Katherine Crews, Susie Crews, Jack Huff, Courtney Johnson, O H B Inc.	Avant
E2NE4 & NESW 35-18S-32E	BLM	NMNM-025513	Lewis Burleson, Jack Huff, O H B Inc.	Avant
N2 36-18S-32E	NMSLO	VB-1896-0001	Mewbourne	Mewbourne
S2 36-18S-32E	NMSLO	VB-0030-0002	Avant	Avant
SWSW 30-18S-33E	BLM	NMLC-0069276	Hudson Trust 4, Frost Bank Trustee J T Hudson fbo J T Ard, S J Iverson Trust, Javelina Partners, L .D. Hudson, Lindy's Living Trust, M. W. Iverson Trust, Zorro Partners	Special Energy
W2NW4, SENW, & SW4 31-18S-33E	BLM	NMLC-0069276	ditto	Legacy Reserves
NE4, E2NW4, NESW, & N2SE4 1-19S-32E	BLM	NMNM-012568A	XTO	Mewbourne, Permian Resources
W2NW4 & NWSW 1-19S-32E	BLM	NMNM-081599	Mammoth	Permian Resources, Walsh & Watts

ALPHA WOLF SWD 1 AREA OF REVIEW LEASES

Aliquot Parts in Area of Review	Lessor	Lease	Lessee(s) of Record	Well Operators (all shallower than Silurian)
NE4, NENW, NESE 2-19S-32E	NMSLO	VB-0324-0004	Walsh & Watts	Mewbourne, Permian Resources, Walsh & Watts
SEnw & NWSE 2-19S-32E	NMSLO	V0-3750-0002	GVC Ventures	GVC, Permian Resources
N2NE4 & SWNW 6-19S-33E	BLM	NMNM-0077002	ConocoPhillips & Occidental Permian	Legacy Reserves



New Mexico State Land Office




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PARAMETERS IN MG/L

API	T. 18 S., R. 32 E., Section	Formation	TDS	Sodium	Calcium	Iron	Magnesium	Chloride	Bicarbonate	Sulfate
3002500835	4	Artesia	382423					232500	396	1205
3002500836	4	Artesia	373378					230100	368	1350
3002500839	4	Artesia	301760					189000	100	500
3002508072	16	Artesia	316512					198400	166	484
3002508074	16	Artesia	300541					189200	189	440
3002508097	20	Artesia	195231							
3002500869	24	Artesia	24662					12520	284	2586
3002500872	27	Artesia	26967					14760	640	1427
3002520489	35	Artesia	210927							
3002528400	3	Bone Spring	149906	55439	5787	81	1360	98373	337	3013
3002532288	3	Bone Spring	121381	44379	4623	36	807	78561	332	1916
3002539365	30	Bone Spring 1st Sand	187542	69124	2305	6	789	114000	502	245
3002539579	30	Bone Spring 1st Sand	168552	71302	2547	9	698	112000	1008	237
3002539365	30	Bone Spring 1st Sand		111804	6030	0	712	189272	305	410
3002539579	30	Bone Spring 1st Sand		116728	6286	2	783	197641	293	440
3002539365	30	Bone Spring 1st Sand	194660	73631	1655	0	425	117773	463	230
3002539579	30	Bone Spring 1st Sand	181992	68165	1918	2	517	110075	463	302
3002529887	19	Delaware	253000	93741	15347	4	2813	181043	242	618
3002508072	16	Queen		98373	7563		11519	198440	166	484
3002508074	16	Queen		91218	7642		11863	189228	189	440
3002531756	17	Wolfcamp	187007	66744	10171	10	2103	127936	175	970

EXHIBIT F



- ~ Home
- ~ Production Data
- ~ Well Data
- ~ Produced Water Data
- ~ NM Pricsheet
- ~ Projects
- ~ Software
- ~ Other Links
- ~ Help

NYMEX LS C
Henry Hub

Updated : 10/12/2023

Slate Land Office Data Access

OCD well/log image files

PRRC NM-TECH NM-BGMR

EXHIBIT F

Home>> Produced Water Data>>Produced Water Quality

- Home
- Production Data
 - Other Searches
 - Older Data
 - Production Summaries
- Well Data
 - Well Activity
 - First Production
- Produced Water Data
 - Produced Water Quality
 - Produced/Injected Water Volume
- NM Pricsheet
- Projects
 - SLO
- Software
 - C-115 Filling
 - Decline Curve Plotting
- Other Links
 - NM O and G Links
 - Other States
- Help
 - Land Unit Description
 - Acknowledgements

PRODUCED WATER QUALITY DATA SEARCH

Data in the New Mexico Produced Water Quality Database v.2 was updated in 2016 for the first time in many years. Data should be used for general informational purposes only. The uncertainties in data collection procedures, analysis quality and specific sample sources make it unsuitable as basis for any significant business or policy decisions. Data was gathered from many sources and about 5400 distinct wells in NM are represented. More data exists for most samples than is provided by the results screen; the downloadable spreadsheet contains more information including field, formation, sample source (where available), and latitude/longitude.

Funding for the database was provided by the U.S. DOE, various New Mexico State agencies, NMT, and WRRRI.

SEARCH PANEL

API NUMBER Example: 3004511439

WELL NAME TOWNSHIP RANGE SECTION

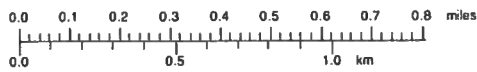
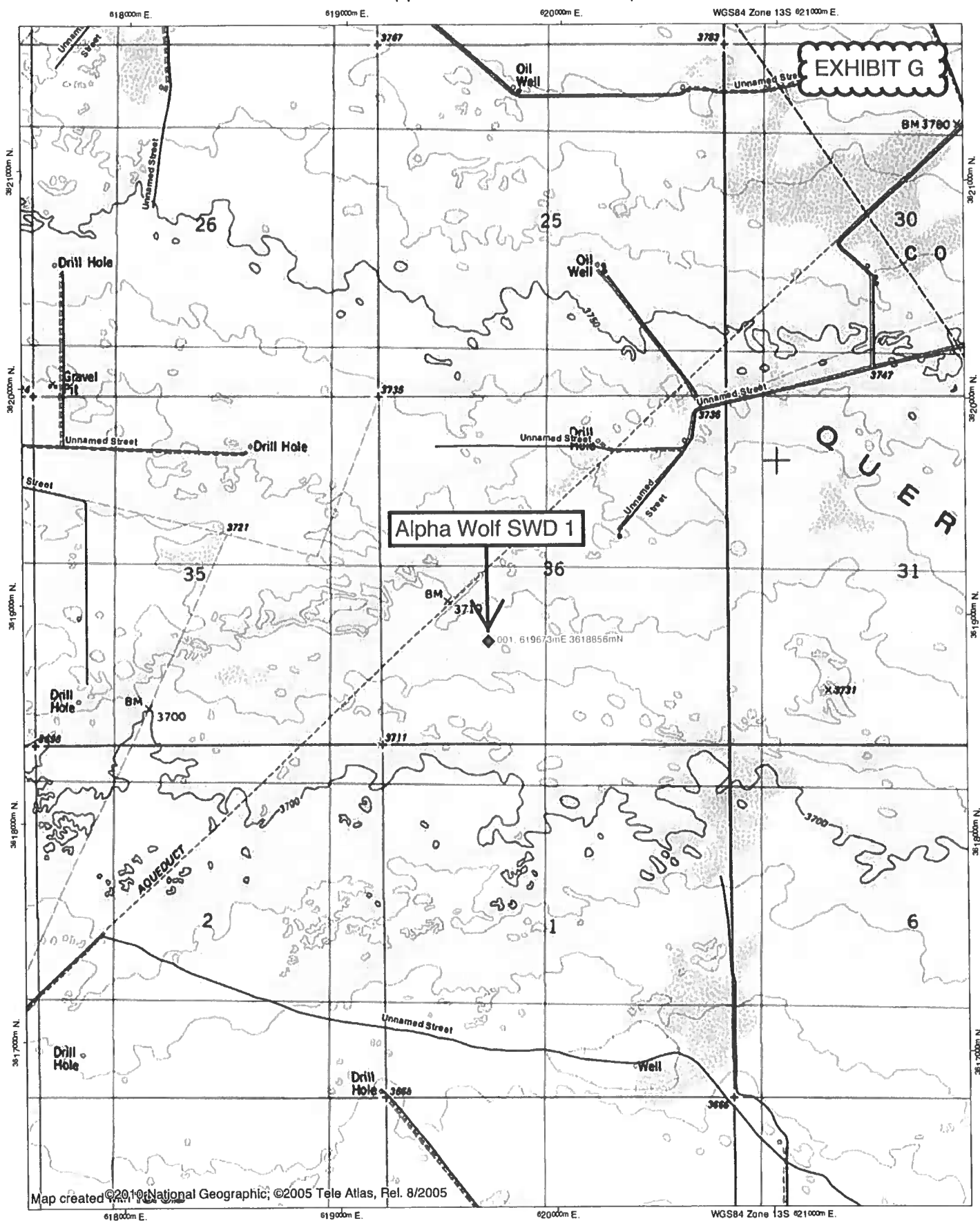
Too many or not enough results? Change your search criteria and press the **Submit** button to improve results. There may be more information for these samples. For all available data including lat/long location, press **EXPORT to EXCEL** to create a downloadable file.

RESULT PANEL

WELLNAME	API	TOWNSHIP	RANGE	SECTION	TDS(mg/L)	Chlorides(mg/L)	Sample Year	Field	Formation
LEA UNIT #008	3002502431	20S	34E	12	44800	25320		LEA	PENNSYLVANIAN
LEA UNIT #008	3002502431	20S	34E	12	35094	19020		LEA	PENNSYLVANIAN
LEA UNIT #008	3002502431	20S	34E	12	33414	18570		LEA	DEVONIAN
LEA UNIT #008	3002502431	20S	34E	12	42216	24000		LEA	PENNSYLVANIAN
LEA UNIT #008	3002502431	20S	34E	12	147229	89640		LEA	BONE SPRING

PETROLEUM RECOVERY RESEARCH CENTER, SORORRO, NM-87801

TOPO! map printed on 01/01/24 from "Untitled.tpo"



TN MN
6°
01/01/24

EXHIBIT G

Alpha Wolf SWD 1

EXHIBIT G



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the
POD suffix indicates the
POD has been replaced
& no longer serves a
water right file.)

(R=POD has been
replaced,
O=orphaned,
C=the file is
closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD Number	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	DepthWell	DepthWater	Water Column
CP00812 POD1		CP	LE	4	4	01	19S	32E		620623	3616973*	2109	200		
CP00677		CP	LE	1	1	26	18S	32E		617750	3621373*	3167	700		

Average Depth to Water: --
Minimum Depth: --
Maximum Depth: --

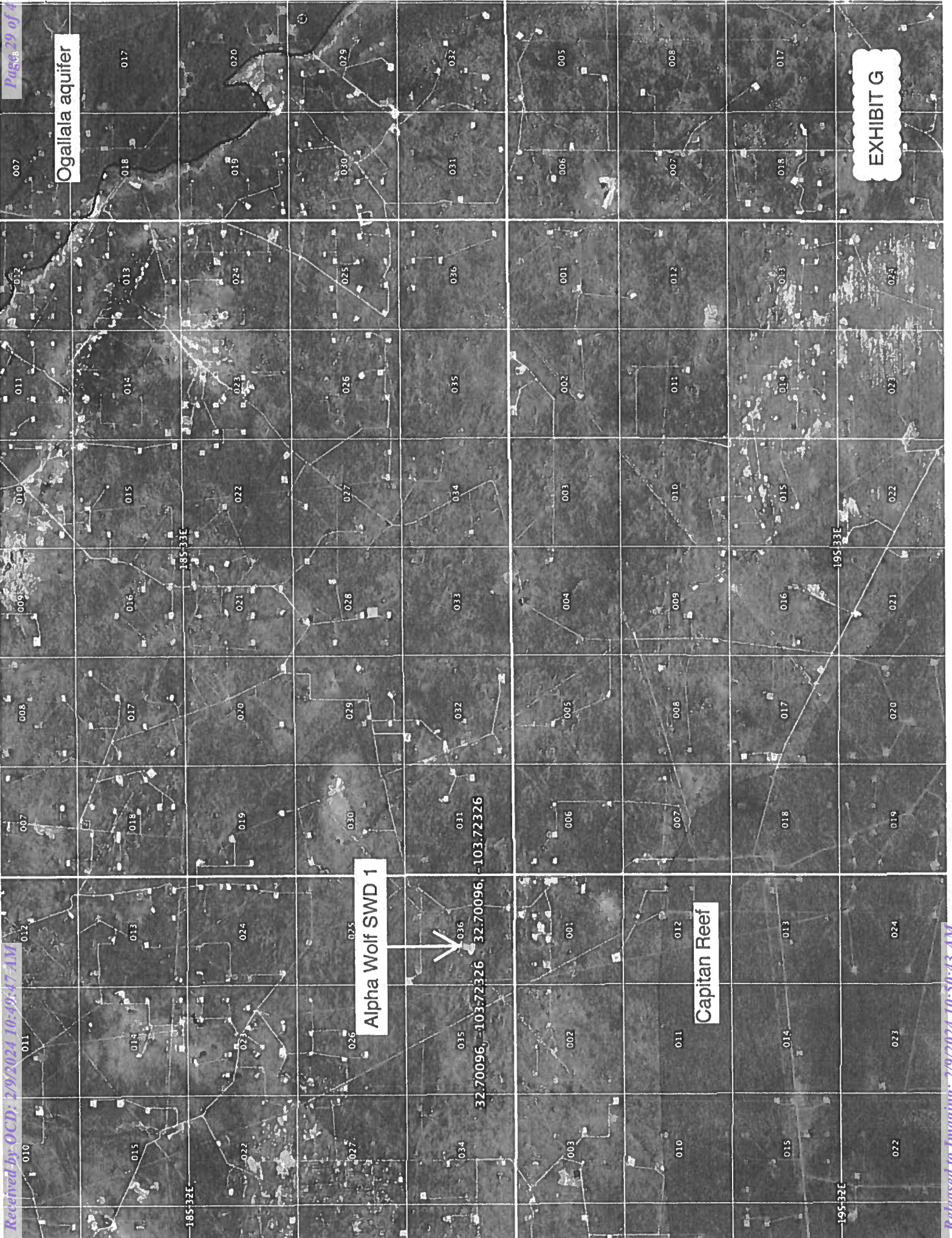
Record Count: 2

UTMNAD83 Radius Search (in meters):

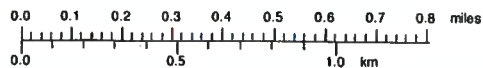
Easting (X): 619673 Northing (Y): 3618856 Radius: 3220

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



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TN★MN
6°
01/01/24

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Permits West

Project: Cut Alpha

Lab ID: 2307931-001

Client Sample ID: Cut

Collection Date: 7/19/2023 11:30:00 AM

Received Date: 7/20/2023 10:10:00 AM

Matrix: AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 1664B							Analyst: ejn
N-Hexane Extractable Material	ND	9.81		mg/L	1	8/7/2023 3:14:00 PM	76694
EPA METHOD 300.0: ANIONS							Analyst: SNS
Chloride	54	10		mg/L	20	7/20/2023 3:56:47 PM	R98395
SM2540C MOD: TOTAL DISSOLVED SOLIDS							Analyst: JAG
Total Dissolved Solids	343	50.0		mg/L	1	7/24/2023 3:35:00 PM	76375

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
	II	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of standard limits. If undiluted results may be estimated.		

EXHIBIT H

Analytical
Lab Order 2307931

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/16/2023

CLIENT: Permits West
Project: Cut Alpha
Lab ID: 2307931-002
Matrix: AQUEOUS
Client Sample ID: Alpha
Collection Date: 7/19/2023 1:05:00 PM
Received Date: 7/20/2023 10:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 1664B						Analyst: ejn	
N-Hexane Extractable Material	ND	9.77		mg/L	1	8/7/2023 3:14:00 PM	76694
EPA METHOD 300.0: ANIONS						Analyst: SNS	
Chloride	50	10		mg/L	20	7/20/2023 4:21:28 PM	R98395
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: JAG	
Total Dissolved Solids	341	50.0		mg/L	1	7/24/2023 3:35:00 PM	76375

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P Sample pH Not In Range
PQL	Practical Quantitative Limit	RI Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.	

Page 33 of 47
Received by OCD: 2/9/2024 10:49:47 AM
Released to Imaging: 2/9/2024 10:50:43 AM

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

EXHIBIT H

WO#: 2307931

16-Aug-23

Client: Permits West
Project: Cut Alpha

Sample ID: MB-76694	SampType: MBLK	TestCode: EPA Method 1664B
Client ID: PBW	Batch ID: 76694	RunNo: 98776
Prep Date: 8/7/2023	Analysis Date: 8/7/2023	SeqNo: 3598139 Units: mg/L
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
N-Hexane Extractable Material	ND	10.0

Sample ID: LCS-76694	SampType: LCS	TestCode: EPA Method 1664B
Client ID: LCSW	Batch ID: 76694	RunNo: 98776
Prep Date: 8/7/2023	Analysis Date: 8/7/2023	SeqNo: 3598140 Units: mg/L
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
N-Hexane Extractable Material	37.2	10.0 40.00 0 93.0 78 114

Sample ID: LCSD-76694	SampType: LCSD	TestCode: EPA Method 1664B
Client ID: LCSS02	Batch ID: 76694	RunNo: 98776
Prep Date: 8/7/2023	Analysis Date: 8/7/2023	SeqNo: 3598141 Units: mg/L
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
N-Hexane Extractable Material	39.0	10.0 40.00 0 97.5 78 114 4.72 20

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of standard limits. If undiluted results may be estimated.

- B Analyte detected in the associated Method Blank
- E Above Quantitation Range/Estimated Value
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit



WO#: 2307931

16-Aug-23

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.**Client:** Permits West**Project:** Cut Alpha

Sample ID: MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions								
Client ID: PBW	Batch ID: R98395	RunNo: 98395								
Prep Date:	Analysis Date: 7/20/2023	SeqNo: 3581614 Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID: LCS	SampType: LCS	TestCode: EPA Method 300.0: Anions								
Client ID: LCSW	Batch ID: R98395	RunNo: 98395								
Prep Date:	Analysis Date: 7/20/2023	SeqNo: 3581615 Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	93.5	90	110			

Sample ID: MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions								
Client ID: PBW	Batch ID: R98395	RunNo: 98395								
Prep Date:	Analysis Date: 7/20/2023	SeqNo: 3581660 Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID: LCS	SampType: LCS	TestCode: EPA Method 300.0: Anions								
Client ID: LCSW	Batch ID: R98395	RunNo: 98395								
Prep Date:	Analysis Date: 7/20/2023	SeqNo: 3581661 Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.5	0.50	5.000	0	90.3	90	110			

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of standard limits. If undiluted results may be estimated

- B Analyte detected in the associated Method Blank
- E Above Quantitation Range/Estimated Value
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit



NM Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

**Re: Geology Statement
Avant Operating, LLC
Alpha Wolf SWD #1
Section 36, T. 18S, R. 32E
Lea County, New Mexico**

To whom it may concern:

Publicly available geologic and engineering data related to the proposed well have been thoroughly reviewed, and no evidence for open faults or any other hydrologic connection between the proposed Silurian injection zone and any underground sources of drinking water has been found. Please see the attached seismic risk assessment for additional information.

Sincerely,

Cory Walk
Geologist



Seismic Risk Assessment
Avant Operating, LLC
Alpha Wolf SWD No. 1
Section 36, Township 18 South, Range 32 East
Lea County, New Mexico

Cory Walk, M.S.

A handwritten signature in black ink that reads "Cory Walk". The signature is written in a cursive style with a large, stylized 'C' and 'W'.

Geologist
Permits West Inc.

December 21, 2023

GENERAL INFORMATION

Alpha Wolf SWD #1 is located in the SW 1/4, section 36, T.18S, R.32E, about 11 miles south of Maljamar, NM in the Permian Basin. Avant Operating, LLC proposes to dispose produced water within the Silurian Formation through an open hole from 14,566'-15,200' below ground surface. This report assesses any potential concerns relating to induced seismicity along deep rooted Precambrian faults or the connection between the injection zone and known underground potable water sources.

SEISMIC RISK ASSESSMENT

Historical Seismicity

Searching the USGS earthquake catalog resulted in no (0) earthquakes above a magnitude 2.5 within 6 miles (9.7 km) of the proposed deep disposal site since 1970 (Fig. 1). The nearest earthquake occurred on June 30, 2020 about 15.5 miles (25.0 km) northeast of the proposed SWD site and had a magnitude of 2.7.

Basement Faults and Subsurface Conditions

A structure contour map (Fig. 1) of the Precambrian basement shows the Alpha Wolf SWD #1 is approximately 10.9 miles (17.5 km) from the nearest basement-rooted fault inferred by Horne et al (2021). **Information about known nearby faults based on GIS data from Horne et al. (2021) is listed in Table 1.**

Snee and Zoback (2018) state, "In the western part of Eddy County, New Mexico, S_{Hmax} is ~north-south (consistent with the state of stress in the Rio Grande Rift; Zoback and Zoback, 1980) but rotates to ~east-northeast-west-southwest in southern Lea County, New Mexico and the northernmost parts of Culberson and Reeves counties, Texas." **Around the Alpha Wolf SWD #1 site, Snee and Zoback indicate a S_{Hmax} direction of N060°E and an A_ϕ of 0.65, indicating an extensional (normal) stress regime.**

Fault Slip Potential (FSP) Modeling

Induced seismicity is a growing concern of deep SWD wells. Software developed by the Stanford Center for Induced and Triggered Seismicity allows for the probabilistic screening of deeply penetrating faults near the proposed injection zone (Walsh et al., 2016; Walsh et al., 2017). This software uses parameters such as stress orientations, fault strike/dip, injection rates, fault friction coefficients, etc. to estimate the potential for fault slip. Using the best available data as input parameters (Table 2) including the subject well injecting at the proposed maximum of 30,000 bbls/day and all other existing SWDs within a 6 mile radius injecting at their individual historical peak annual volume and the proposed SWDs injecting at their proposed maximum rates (3 total SWD wells), the Fault Slip Potential (FSP) models suggest a one (0.01) percent chance of slip on a nearby fault, inferred by Horne et al. (2021), through the year 2044 (Fig. 2; Table 1). **This model also suggests a pore pressure increase of 8.2 psi on the nearest publicly known fault (Fault 54; Fig. 3; Table 1) by the year 2044.** Geomechanical modeling shows that the primary fault of concern (fault 39) would need a pressure increase of 1833 psi to reach a 100% probability of slip on the



fault. A 50% probability requires an increase of 412 psi which is 60x greater than the modeled increase of 6.7 psi (Fig. 3).

GROUNDWATER SOURCES

Quaternary Alluvium acts as the principal aquifer used for potable ground water near the Alpha Wolf SWD #1 location (Hendrickson and Jones, 1952). Nicholson and Clebsch (1961) state, "Potable ground water is not available below the Permian and Triassic unconformity but, because this boundary is not easily defined, the top of the Rustler anhydrite formation is regarded as the effective lower limit of 'potable' ground water." Around the Alpha Wolf SWD #1, the top of the Rustler Formation lies at an estimated depth of 1,360' bgs.

VERTICAL MIGRATION OF FLUIDS

Permeability barriers exist above (Woodford shale; 110 ft thick) and below (Simpson Group; 325 ft thick) the targeted Silurian injection zone (Plate 2, Comer et al., 1991; Fig. 8, Frenzel et al., 1988). Precambrian structure contours (Ruppel, 2009) show the basement to be at a depth of approximately 16,220' in this area. Therefore, the injection zone lies approximately 1,000' above the Precambrian basement and approximately 13,200' below the previously stated lower limit of potable water at the top of the Rustler formation.

CONCLUDING STATEMENTS

After examination of publicly available geologic and engineering data, there is no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

EXHIBIT I

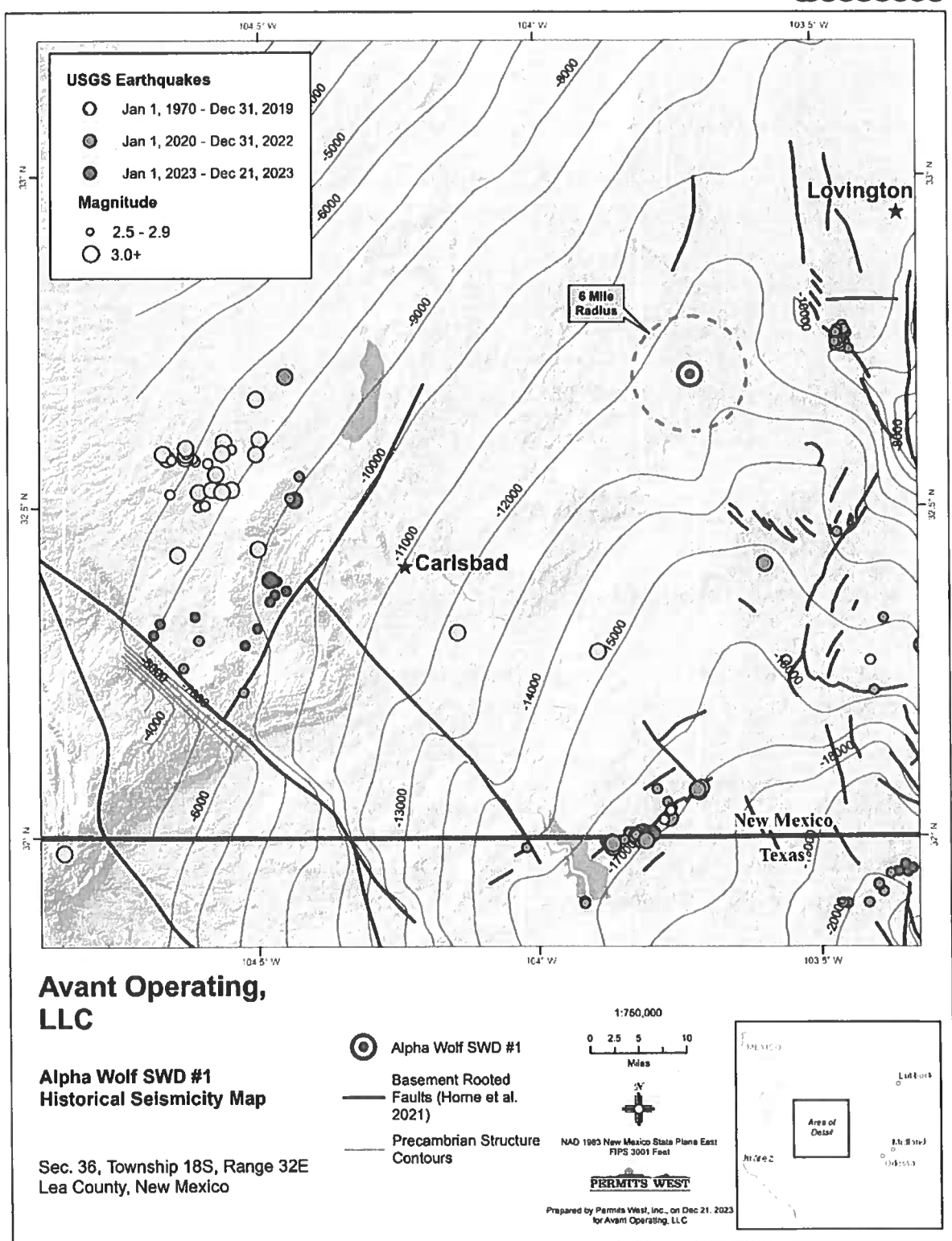


Figure 1. Structural contour map of the Precambrian basement in feet below sea level. Blue lines represent the locations of Precambrian basement-rooted faults (Horne et al., 2021). Alpha Wolf SWD #1 well lies ~10.9 miles south of the closest deeply penetrating fault and 15.5 miles southwest from the closest historic earthquake.

EXHIBIT I

Table 1: Nearby Basement Fault Model Results

Fault Number	Distance to proposed SWD (mi)	Strike (°)	Dip (°)	FSP (2044)	Δ Pore Pressure after 20 years (psi)	Δ Pore Pressure needed for 100% FSP (psi)	Δ Pore Pressure needed for 50% FSP (psi)
Fault 54	10.9	204	60	0.00	8.2	3025	842
Fault 39	14.2	79	67	0.01	6.7	1833	412

Table 2: Fault Slip Potential model input parameters

Faults	Value	Notes
Friction Coefficient	0.58	Ikari et al. (2011)
Dip Angle (deg)	60-75	Horne et al. (2021)
Stress		
Vertical stress gradient (psi/ft)	1.1	Hurd and Zoback (2012)
Max Horizontal Stress Direction (deg)	60	Snee and Zoback (2018)
Depth for calculations (ft)	15200	Proposed injection zone
Initial Reservoir Pressure Gradient (psi/ft)	0.7	calculated from mud wt (ppg) used in drilling at these depths
A Phi Parameter	0.65	Snee and Zoback (2018)
Reference Friction Coefficient	0.58	Ikari et al. (2011)
Hydrology		
Aquifer thickness (ft)	630	Proposed injection zone
Porosity (%)	6	
Permeability (mD)	150	
Injection Rate (bbl/day)	30000	Maximum proposed injection rate

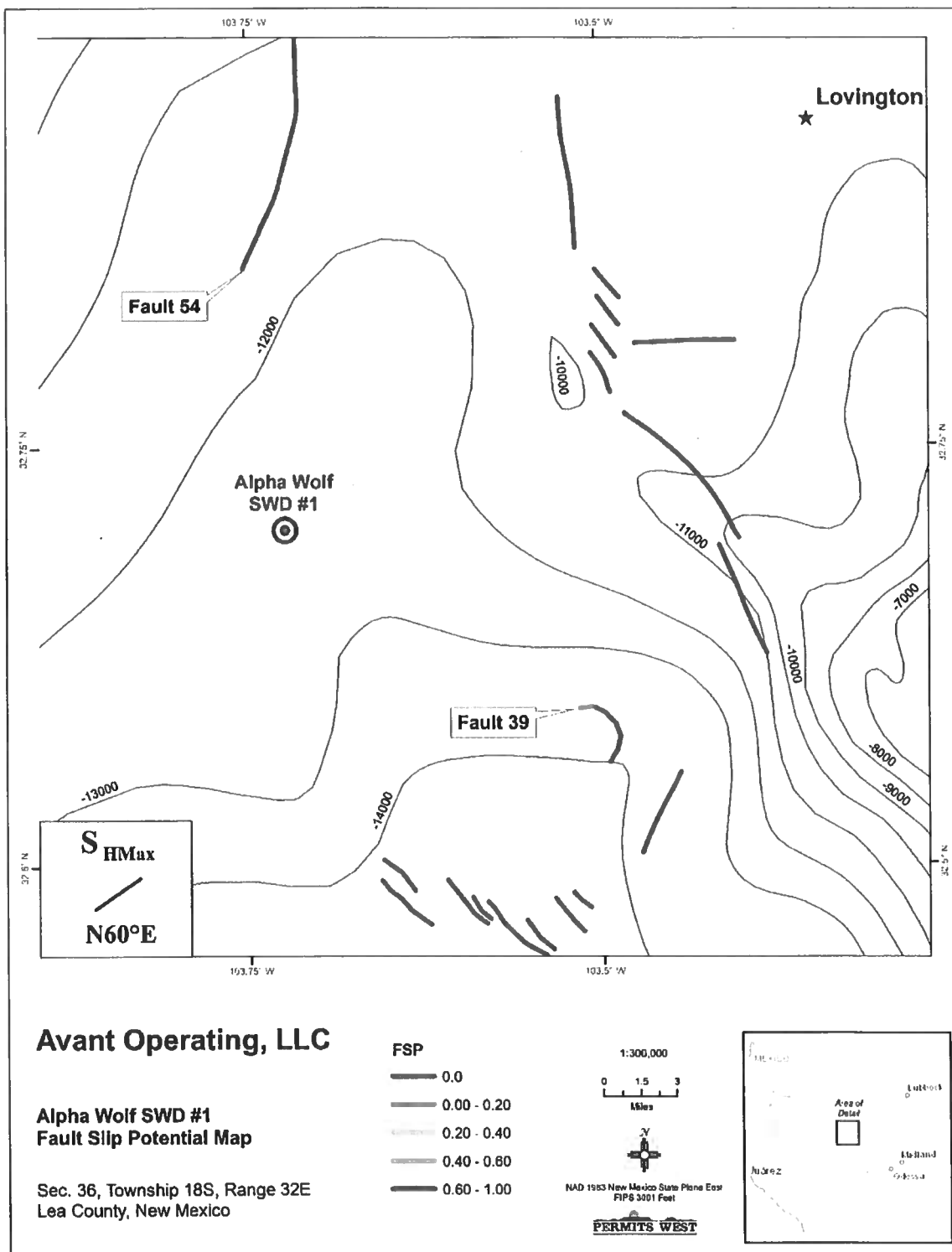


Figure 2. Precambrian fault map of the Alpha Wolf SWD #1 area as mapped by Horne et al. (2021). Faults are colored based on probability of fault slip as modeled using Fault Slip Potential software (Walsh and Zoback, 2016). Labeled values represent the calculated fault slip potential using the parameters indicated in Table 2. Contours show the top of the Precambrian basement in feet below sea level.

EXHIBIT I

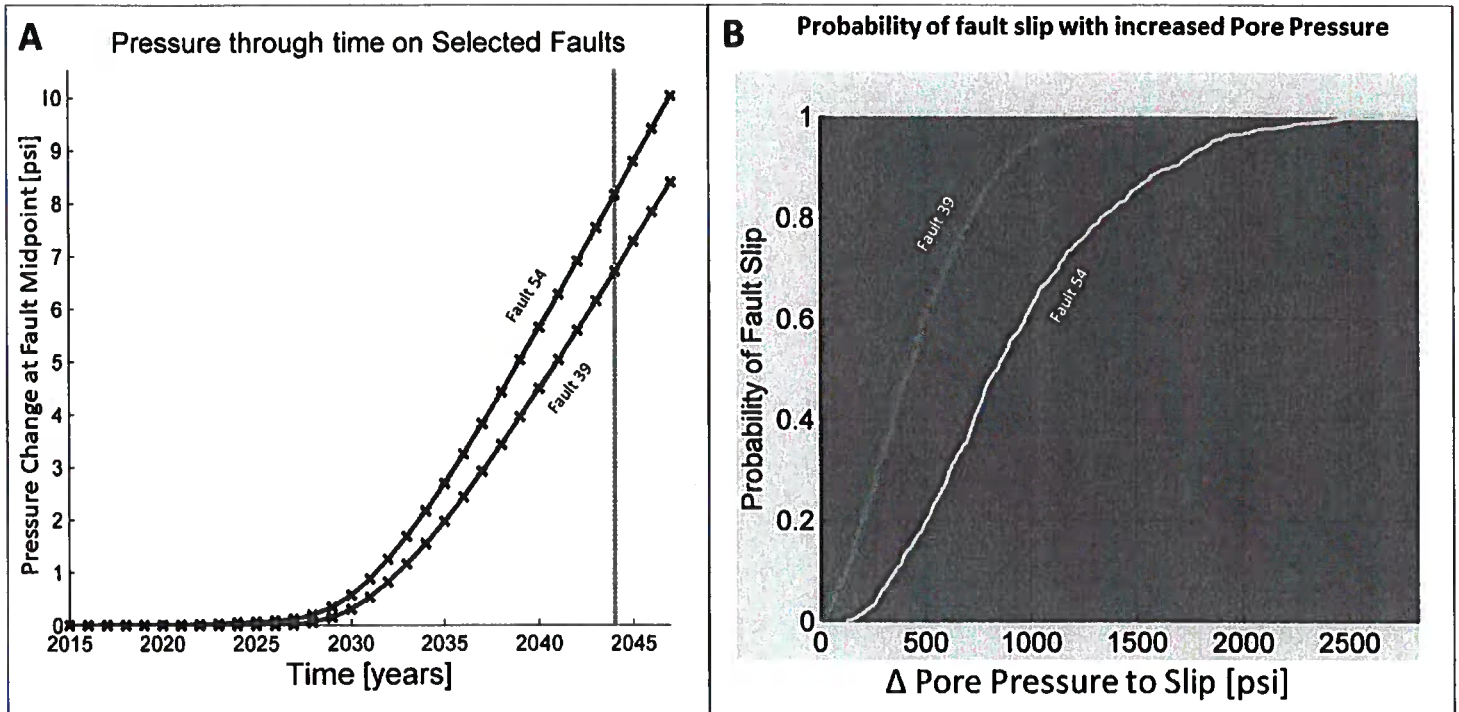


Figure 3. A) Plot showing the modeled change of pore pressure on nearby faults through time as a response to the proposed SWD well. B) Plot showing the required pore pressure increase needed to produce specific probabilities of fault slip on nearby faults.

References Cited

- Comer, J. B., 1991, Stratigraphic Analysis of the Upper Devonian Woodford Formation, Permian Basin, West Texas and Southeastern New Mexico: The University of Texas at Austin, Bureau of Economic Geology, Report of Investigations No. 201, 63 p.
- Frenzel, H. N., Bloomer, R. R., Cline, R. B., Cys, J. M., Galley, J. E., Gibson, W. R., Hills, J. M., King, W. E., Seager, W. R., Kottowski, F. E., Thompson, S., III, Luff, G. C., Pearson, B. T., and Van Sicken, D. C., 1988, The Permian Basin region, in Sloss, L. L., ed., Sedimentary cover—North American Craton, U.S.: Boulder, Colorado, Geological Society of America, The Geology of North America, v. D-2, p. 261–306.
- Hendrickson, G. E., and Jones, R. S., 1952, Geology and Ground-Water Resources of Eddy County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Ground-Water Report 3, 179 pp., 6 plates.
- Horne, E. A., Hennings, P. H., and Zahm, C. K., 2021, Basement-rooted faults of the Delaware Basin and Central Basin Platform, Permian Basin, West Texas and southeastern New Mexico, in Callahan, O. A., and Eichhubl, P., eds., The geologic basement of Texas: a volume in honor of Peter T. Flawn: The University of Texas, Bureau of Economic Geology Report of Investigations No. 286, doi:10.23867/RI0286C6.
- Hurd, O.; Zoback, MD, 2012, Intraplate earthquakes, regional stress and fault mechanics in the Central and Eastern U.S. and Southeastern Canada. *Tectonophysics*, 581:182-92.
- Ikari, M. J.; C. Marone, and D. M. Saffer, 2011, On the relation between fault strength and frictional stability, *Geology*, 39, 83–86.
- Nicholson, A., Jr., and Clebsch, A., Jr., 1961, Geology and ground-water conditions in southern Lea County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Ground-Water Report 6, 123 pp., 2 plates.
- Ruppel, S.C., 2009, Integrated synthesis of the Permian basin: data and models for recovering existing and undiscovered oil resources from the largest oil-bearing basin: U.S. Oil & Natural Gas Technology, Bureau Economic Geology, The University of Texas at Austin, p. 1-959.
- Snee, J.-E.L., Zoback, M.D., 2018, State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity: *Leading Edge*, v. 37, p. 127–134.
- Walsh, F. R., and Zoback, M. D., (2016) Probabilistic assessment of potential fault slip related to injection induced earthquakes: Application to north central Oklahoma, USA, *Geology*, Data Repository item 2016334, doi:10.1130/G38275.1
- Walsh, F. R., Zoback, M. D., Pais, D., Weingarten, M., and Tyrrell, T. (2017) FSP 1.0: A Program for Probabilistic Estimation of Fault Slip Potential Resulting From Fluid Injection, User Guide from the Stanford Center for Induced and Triggered Seismicity, available at SCITS.Stanford.edu/software
- Zoback, M. L., and M. D. Zoback, 1980, State of stress in the conterminous United States: *Journal of Geophysical Research*, 85, no. B11, 6113–6156, <https://doi.org/10.1029/JB085iB11p06113>.

Affidavit of Publication

EXHIBIT J

STATE OF NEW MEXICO
COUNTY OF LEA

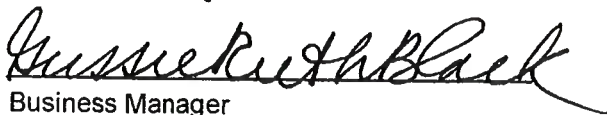
I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated
December 19, 2023
and ending with the issue dated
December 19, 2023.



Publisher

Sworn and subscribed to before me this
19th day of December 2023.



Business Manager

My commission expires

January 29, 2027

(Seal)

STATE OF NEW MEXICO
NOTARY PUBLIC
GUSSIE RUTH BLACK
COMMISSION # 1087526
COMMISSION EXPIRES 01/29/2027

LEGAL NOTICE December 19, 2023

Avant Operating, LLC is applying to drill the Alpha Wolf SWD 1 as a saltwater disposal well. The well is staked at 1579' FSL & 1578' FWL, Sec. 36, T. 18 S., R. 32 E., Lea County, NM. This is 11 miles south-southeast of Maljamar, NM. Water will be injected at a maximum pressure of 2913 psi into the Silurian formation from 14566' to 15200'. Maximum disposal rate will be 30,000 bwpd. Interested parties must file objections, protests, or requests for hearing with the NM Oil Conservation Division, 1220 South Saint Francis Dr., Santa Fe, NM 87505 or OCD.Engineer@emnrd.nm.gov within 15 days. NMOCD Engineering Bureau phone is 505 476-3441. Additional information can be obtained by contacting: Brian Wood, Permits West, Inc., 37 Verano Loop, Santa Fe, NM 87508. Phone number is (505) 466-8120.
#00285873

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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 publication has been made.

BRIAN WOOD
PERMITS WEST
37 VERANO LOOP
SANTA FE, NM 87508



January 9, 2024

NMSLO
P. O. Box 1148
Santa Fe NM 87504

TYPICAL NOTICE

Avant Operating, LLC is applying (see attached application) to drill the Alpha Wolf SWD 1 as a saltwater disposal well. As required by NM Oil Conservation Division (NMOCD) rules, I am notifying you of the following proposed saltwater disposal well. This letter is a notice only. No action is needed unless you have questions or objections.

Well Name: Alpha Wolf SWD 1 (NMSLO lease) ID = 15,200'
Proposed Disposal Zones: Silurian (14,566' - 15,200')
Location: 1579' FSL & 1578' FWL Sec. 36, T. 18 S., R. 32 E., Lea County, NM
Approximate Location: 11 air miles SSE of Maljamar, NM
Applicant Name: Avant Operating, LLC (720) 854-9020
Applicant's Address: 1515 Wynkoop St., Suite 700, Denver CO 80202

Submittal Information: Application for a saltwater disposal well will be filed with the NMOCD. If you have an objection, or wish to request a hearing, then it must be filed with the NMOCD within 15 days of receipt of this letter. NMOCD address is 1220 South St. Francis Dr., Santa Fe, NM 87505. Their phone number is (505) 476-3441. Their e-mail address is: ocd.engineer@emnrd.nm.gov.

Please call me if you have any questions.

Sincerely,

Brian Wood

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 Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 313070

CONDITIONS

Operator: Avant Operating, LLC 1515 Wynkoop Street Denver, CO 80202	OGRID: 330396
	Action Number: 313070
	Action Type: [IM-SD] Admin Order Support Doc (ENG) (IM-AAO)

CONDITIONS

Created By	Condition	Condition Date
mgebremichael	None	2/9/2024