Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☐ DRILL ☐ REENTER

1b. Type of Well: ☐ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☐ Single Zone ☐ Multiple Zone

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

8. Lease Name and Well No.

[331686]

2. Name of Operator

[372224]

9. API Well No.

30-025-52137

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory **[97088]**

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface

At proposed prod. zone

11. Sec., T. R. M. or Blk. and Survey or Area

14. Distance in miles and direction from nearest town or post office*	12. County or Parish	13. State

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature	Name *(Printed/Typed)*	Date

Title

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
Title	Office	

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

NGMP Rec 10/12/2023

SL

APPROVED WITH CONDITIONS

KZ
10/20/2023

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 10/05/2023

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM I: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the wen, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionany drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service wen or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record win be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:
The BLM conects this information to anow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Conection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

 Approval Date: 10/05/2023

Additional Operator Remarks

Location of Well

0. SHL: SESW / 200 FSL / 1740 FWL / TWSP: 25S / RANGE: 36E / SECTION: 20 / LAT: 32.109156 / LONG: -103.2900624 (TVD: 0 feet, MD: 0 feet)

PPP: SESW / 100 FSL / 1790 FWL / TWSP: 25S / RANGE: 36E / SECTION: 20 / LAT: 32.1088812 / LONG: -103.2899008 (TVD: 11254 feet, MD: 11546 feet)

BHL: NENW / 50 FNL / 1790 FWL / TWSP: 25S / RANGE: 36E / SECTION: 17 / LAT: 32.1375291 / LONG: -103.2899108 (TVD: 11254 feet, MD: 21968 feet)

BLM Point of Contact

Name: MARIAH HUGHES

Title: Land Law Examiner

Phone: (575) 234-5972

Email: mhughes@blm.gov

Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.

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
	97088	WC-025 G-08 S253534O;BONE SPRING

[4]Property Code	[5]Property Name	[6]Well Number
331686	DOGWOOD 25 36 20 FED COM	093H

[7]OGRID No.	[8]Operator Name	[9]Elevation
372224	AMEREDEV OPERATING, LLC.	3059'

[10]Surface Location

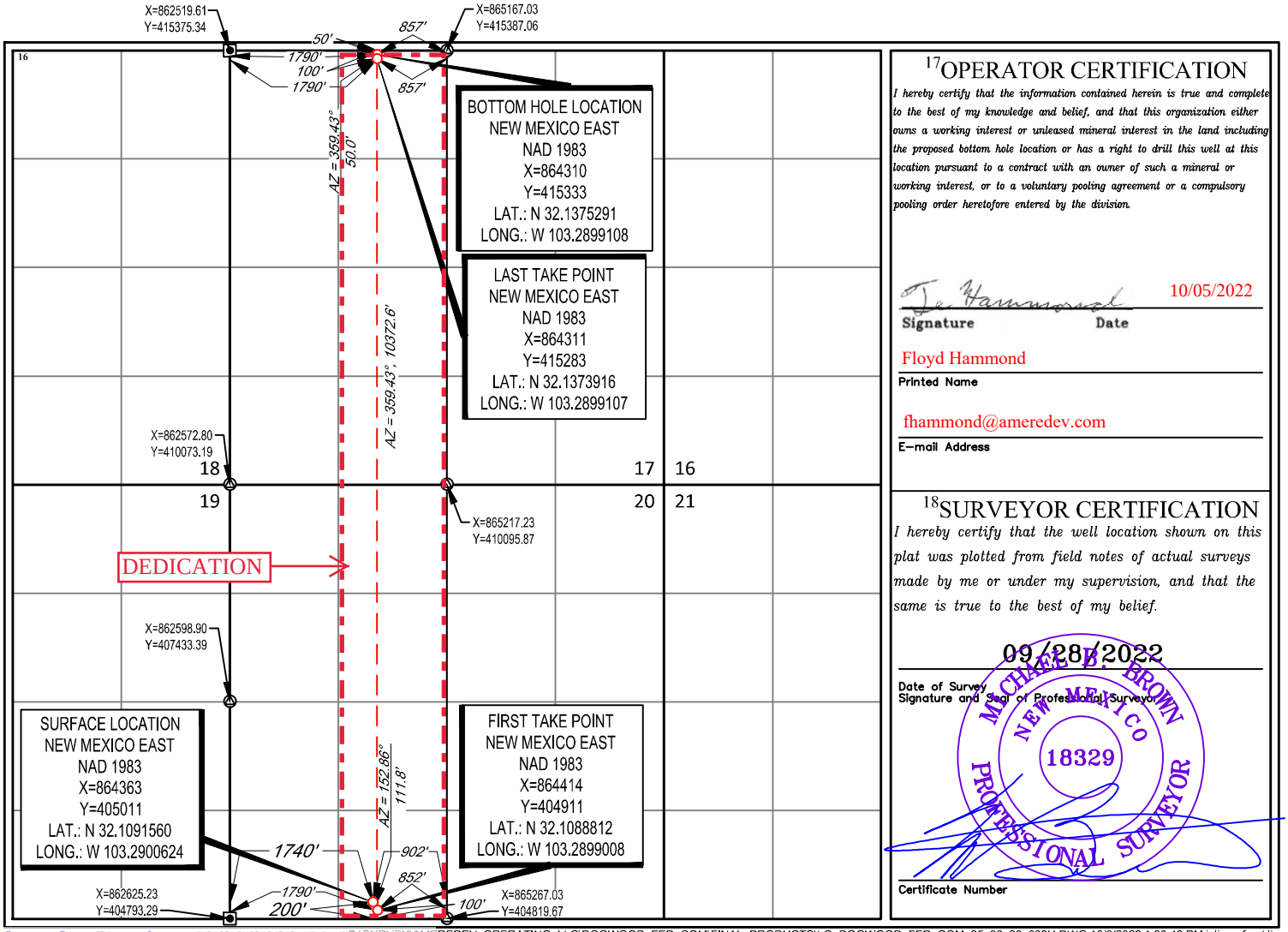
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	20	25-S	36-E	–	200'	SOUTH	1740'	WEST	LEA

[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
C	17	25-S	36-E	–	50'	NORTH	1790'	WEST	LEA

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

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 10/05/2022

Floyd Hammond
Printed Name

fhammond@ameredev.com
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.

09/28/2022
Date of Survey
Signature and Seal of Professional Surveyor

MICHAEL B. BROWN
NEW MEXICO
18329
PROFESSIONAL SURVEYOR

Certificate Number

State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Electronically
Via E-permitting

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

NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

Section 1 – Plan Description
Effective May 25, 2021

I. Operator: Ameredev II, LLC **OGRID:** 372224 **Date:** 09/22/2023

II. Type: ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: _____

III. Well(s): Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Dogwood 25 36 20 Fed Com 091H	30025-		200’ FSL & 380’ FWL	564	1,114	555
Dogwood 25 36 20 Fed Com 093H	30025-		200’ FSL & 1740’ FWL	564	1,114	555
Dogwood 25 36 20 Fed Com 095H	30025-		200’ FSL & 1760’ FEL	564	1,114	555
Dogwood 25 36 20 Fed Com 097H	30025-		200’ FSL & 886’ FEL	564	1,114	555
Dogwood 25 36 20 Fed Com 104H	30025-		200’ FSL & 1780’ FWL	564	1,114	555
Dogwood 25 36 20 Fed Com 106H	30025-		200’ FSL & 1720’ FEL	564	1,114	555

IV. Central Delivery Point Name: _____ [See 19.15.27.9(D)(1) NMAC]

V. Anticipated Schedule: Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Dogwood 25 36 20 Fed Com 091H	30025-	12/01/2023	12/20/2023	01/20/2024	02/10/2024	02/13/2024
Dogwood 25 36 20 Fed Com 093H	30025-	12/01/2023	12/20/2023	01/20/2024	02/10/2024	02/13/2024
Dogwood 25 36 20 Fed Com 095H	30025-	12/01/2023	12/20/2023	01/20/2024	02/10/2024	02/13/2024
Dogwood 25 36 20 Fed Com 097H	30025-	12/01/2023	12/20/2023	01/20/2024	02/10/2024	02/13/2024
Dogwood 25 36 20 Fed Com 104H	30025-	12/01/2023	12/20/2023	01/20/2024	02/10/2024	02/13/2024
Dogwood 25 36 20 Fed Com 106H	30025-	12/01/2023	12/20/2023	01/20/2024	02/10/2024	02/13/2024

VI. Separation Equipment: ☒ Attach a complete description of how Operator will size separation equipment to optimize gas capture.

VII. Operational Practices: ☒ Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

VIII. Best Management Practices: ☒ Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

Section 2 – Enhanced Plan

EFFECTIVE APRIL 1, 2022

Beginning April 1, 2022, an operator that is not in compliance with its statewide natural gas capture requirement for the applicable reporting area must complete this section.

☒ Operator certifies that it is not required to complete this section because Operator is in compliance with its statewide natural gas capture requirement for the applicable reporting area.

IX. Anticipated Natural Gas Production:

Well	API	Anticipated Average Natural Gas Rate MCF/D	Anticipated Volume of Natural Gas for the First Year MCF

X. Natural Gas Gathering System (NGGS):

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Maximum Daily Capacity of System Segment Tie-in

XI. Map. ☐ Attach an accurate and legible map depicting the location of the well(s), the anticipated pipeline route(s) connecting the production operations to the existing or planned interconnect of the natural gas gathering system(s), and the maximum daily capacity of the segment or portion of the natural gas gathering system(s) to which the well(s) will be connected.

XII. Line Capacity. The natural gas gathering system ☐ will ☐ will not have capacity to gather 100% of the anticipated natural gas production volume from the well prior to the date of first production.

XIII. Line Pressure. Operator ☐ does ☐ does not anticipate that its existing well(s) connected to the same segment, or portion, of the natural gas gathering system(s) described above will continue to meet anticipated increases in line pressure caused by the new well(s).

☐ Attach Operator's plan to manage production in response to the increased line pressure.

XIV. Confidentiality: ☐ Operator asserts confidentiality pursuant to Section 71-2-8 NMSA 1978 for the information provided in Section 2 as provided in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and attaches a full description of the specific information for which confidentiality is asserted and the basis for such assertion.

Section 3 - Certifications

Effective May 25, 2021

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

☒ Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system. ***If Operator checks this box, Operator will select one of the following:***

Well Shut-In. ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

Venting and Flaring Plan. ☐ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- **(a)** power generation on lease;
- **(b)** power generation for grid;
- **(c)** compression on lease;
- **(d)** liquids removal on lease;
- **(e)** reinjection for underground storage;
- **(f)** reinjection for temporary storage;
- **(g)** reinjection for enhanced oil recovery;
- **(h)** fuel cell production; and
- **(i)** other alternative beneficial uses approved by the division.

Section 4 - Notices

1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature: Cesca Yu
Printed Name: Cesca Yu
Title: Engineer
E-mail Address: cyu@ameredev.com
Date: 09/22/2023
Phone: 512-775-1417

OIL CONSERVATION DIVISION **(Only applicable when submitted as a standalone form)**
Approved By:
Title:
Approval Date:
Conditions of Approval:

Natural Gas Management Plan

VI. Separation Equipment: Attach a complete description of how Operator will size separation equipment to optimize gas capture.

• Separation equipment is sized to allow for retention time and velocity to adequately separate oil, gas, and water at anticipated peak rates.
• All central tank battery equipment is designed to efficiently capture the remaining gas from the liquid phase.
• Valves and meters are designed to service without flow interruption or venting of gas.

VII. Operational Practices: Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F 19.15.27.8 NMAC.

19.15.27.8 (A)

Ameredev's field operations are designed with the goal of minimizing flaring and preventing venting of natural gas. If capturing the gas is not possible then the gas is combusted/flared using properly sized flares or combustors in accordance with state air permit rules.

19.15.27.8 (B) Venting and Flaring during drilling operations

• A properly-sized flare stack will be located at a minimum 100' from the nearest surface hole location on the pad.
• All natural gas produced during drilling operations will be flared. Venting will only occur if there is an equipment malfunction and/or to avoid risk of an immediate and substantial adverse impact on safety, public health, or the environment.

19.15.27.8 (C) Venting and Flaring during completions or recompletions operations.

• During all phases of flowback, wells will flow through a sand separator, or other appropriate flowback separation equipment, and the well stream will be directed to a central tank battery (CTB) through properly sized flowlines
• The CTB will have properly sized separation equipment for maximum anticipated flowrates
• Multiple stages of separation will be used to separate gas from liquids. All gas will be routed to a sales outlet. Fluids will be routed to tanks equipped with a closed loop system that will recover any residual gas from the tanks and route such gas to a sales outlet.

19.15.27.8 (D) Venting and Flaring during production operations.

• During production, the well stream will be routed to the CTB where multiple stages of separation will separate gas from liquids. All gas will be routed to a sales outlet. Fluids will be routed to tanks with a closed

loop system that will recover any residual gas from the tanks and route such gas to a sales outlet, minimizing tank emissions.
• Flares are equipped with auto-ignition systems and continuous pilot operations.
• Automatic gauging equipment is installed on all tanks.

19.15.27.8 (E) Performance Standards

• Production equipment will be designed to handle maximum anticipated rates and pressure.
• Automatic gauging equipment is installed on all tanks to minimize venting
• All flared gas will be combusted in a flare stack that is properly sized and designed to ensure proper combustion.
•Flares are equipped with continuous pilots and auto-ignitors along with remote monitoring of the pilot status
• Weekly AVOs and monthly LDAR inspections will be performed on all wells and facilities that produce more than 60 Mcfd.
• Gas/H2S detectors will be installed throughout the facilities and wellheads to detect leaks and enable timely repairs.

19.15.27.8 (F) Measurement or estimation of vented and flared natural gas

• All high pressure flared gas is measured by equipment conforming to API 14.10.
• No meter bypasses are installed.
• When metering is not practical due to low pressure/low rate, the vented or flared volume will be estimated through flare flow curves with the assistance of air emissions consultants, as necessary.

VIII. Best Management Practices: Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

• Ameredev will use best management practices to vent as minimally as possible during well intervention operations and downhole well maintenance
• All natural gas is routed into the gas gathering system and directed to one of Ameredev's multiple gas sales outlets.
• All venting events will be recorded and all start-up, shutdown, maintenance logs will be kept for control equipment
• All control equipment will be maintained to provide highest run-time possible
• All procedures are drafted to keep venting and flaring to the absolute minimum

AFMSS
U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Drilling Plan Data Report
10/05/2023

APD ID: 10400088613
Submission Date: 10/12/2022
Operator Name: AMEREDEV OPERATING LLC
Well Name: DOGWOOD 25 36 20 FED COM
Well Number: 093H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical	Measured Depth	Lithologies	Mineral Resources	Producing Formatio
12258138	RUSTLER ANHYDRITE	3059	1124	1124	ANHYDRITE	NONE	N
12258139	SALADO	1363	1696	1696	SALT	NONE	N
12258140	TANSILL	-297	3356	3356	LIMESTONE	NONE	N
12258141	CAPITAN REEF	-823	3882	3882	LIMESTONE	USEABLE WATER	N
12258142	LAMAR	-2070	5129	5129	LIMESTONE	NONE	N
12258143	BELL CANYON	-2178	5237	5237	SANDSTONE	NATURAL GAS, OIL	N
12258144	BRUSHY CANYON	-4061	7120	7120	SANDSTONE	NATURAL GAS, OIL	N
12258145	BONE SPRING LIME	-5033	8092	8092	LIMESTONE	NONE	N
12258146	BONE SPRING 1ST	-6487	9546	9546	SANDSTONE	NATURAL GAS, OIL	N
12258147	BONE SPRING 2ND	-7001	10060	10060	SANDSTONE	NATURAL GAS, OIL	N
12258148	BONE SPRING 3RD	-7540	10599	10599	LIMESTONE	NATURAL GAS, OIL	N
12258149	BONE SPRING 3RD	-8101	11160	11160	SANDSTONE	NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 10M
Rating Depth: 15000

Equipment: 10M BOPE SYSTEM WILL BE USED AFTER THE SURFACE CASING IS SET. A KELLY COCK WILL BE KEPT IN THE DRILL STRING AT ALL TIMES. A FULL OPENING DRILL PIPE STABBING VALVE WITH PROPER DRILL PIPE CONNECTIONS WILL BE ON THE RIG FLOOR AT ALL TIMES.
Requesting Variance? YES

Variance request: Co-Flex Choke Line

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Testing Procedure: See attachment

Choke Diagram Attachment:

10M_Choke_Manifold_REV_20221012094900.pdf

BOP Diagram Attachment:

5M_Annular_Preventer_Variance_and_Well_Control_Plan_20221012094915.pdf

Pressure_Control_Plan_Single_Well_MB4_3String_Big_Hole_BLM_20221012094915.pdf

5M_BOP_System_20221012094915.pdf

3_String_MB_Ameredev_Wellhead_Drawing_7.0625in_Spool_net_20221012094930.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	17.5	13.375	NEW	API	N	0	1249	0	1249	3059	1810	1249	J-55	68	OTHER - BTC	7.35	1	DRY	10.77	DRY	12.59
2	INTERMEDIATE	9.875	7.625	NEW	API	N	0	10724	0	10724	3061	-7665	10724	HCL-80	29.7	OTHER - BTC	1.28	1.29	DRY	2	DRY	2.95
3	PRODUCTION	6.75	5.5	NEW	API	N	0	21968	0	11254	3061	-8195	21968	P-110	23	OTHER - USS Eagle SFH	1.83	1.97	DRY	1.5	DRY	1.67

Casing Attachments

Casing ID: 1 **String** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

13.375_68_J55_SEAH_20221012095127.pdf

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Casing Attachments

Dogwood_25_36_20_Fed_Com_093H_WBS_and_CDA_20221012112016.pdf

Casing ID: 2 **String** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Dogwood_25_36_20_Fed_Com_093H_WBS_and_CDA_20221012112159.pdf

7.625_29.70_L80HC_BORUSAN_20221012112210.pdf

Casing ID: 3 **String** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Dogwood_25_36_20_Fed_Com_093H_WBS_and_CDA_20221012112108.pdf

5.5_23_RYS110_EAGLE_SFH_20221012112232.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	863	833.1	1.76	13.5	1466.3	100	Class C	Bentonite, Accelerator, Kolseal, Defoamer, Celloflake
SURFACE	Tail		863	1249	200	1.34	14.8	268	100	Class C	N/A

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
INTERMEDIATE	Lead	3356	0	2825	644.6	3.5	9	2256.1	50	Class C	Bentonite, Salt, Kolseal, Defoamer, Celloclake
INTERMEDIATE	Tail		2825	3356	200	1.33	14.8	266	25	Class C	N/A
INTERMEDIATE	Lead	3356	3356	9503	936.8	2.47	11.9	2313.9	50	Class H	Bentonite, Retarder, Kolseal, Defoamer, Celloflake, Anti-Settling
INTERMEDIATE	Tail		9503	10724	200	1.31	14.2	262	25	Class H	Salt, Bentonite, Retarder, Dispersant, Fluid Loss
PRODUCTION	Lead		0	21968	1710	1.34	14.2	2292	25	Class H	Salt, Bentonite, Fluid Loss, Dispersant, Retarder, Defoamer

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: All necessary supplies (e.g. bentonite, cedar bark) for fluid control will be on site.

Describe the mud monitoring system utilized: An electronic pit volume totalizer (PVT) will be utilized on the circulating system to monitor pit volume, flow rate, pump pressure, and pump rate.

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	1249	WATER-BASED MUD	8.4	8.6							

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
1249	10724	OTHER : Diesel Brine Emulsion	7.5	9.4							
10724	11254	OIL-BASED MUD	10.5	12.5							

Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

A directional survey, measurement while drilling and a mudlog/geologic lithology log will all be run from surface to TD.

List of open and cased hole logs run in the well:

DIRECTIONAL SURVEY,MEASUREMENT WHILE DRILLING,MUD LOG/GEOLOGICAL LITHOLOGY LOG,

Coring operation description for the well:

No coring will be done on this well.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 6145 **Anticipated Surface Pressure:** 3669

Anticipated Bottom Hole Temperature(F): 165

Anticipated abnormal pressures, temperatures, or potential geologic hazards? NO

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations

H2S_Plan_20221012101152.pdf

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Dogwood_Fed_Com_25_36_20_093H_PWP_20221012112737.pdf

Other proposed operations facets description:

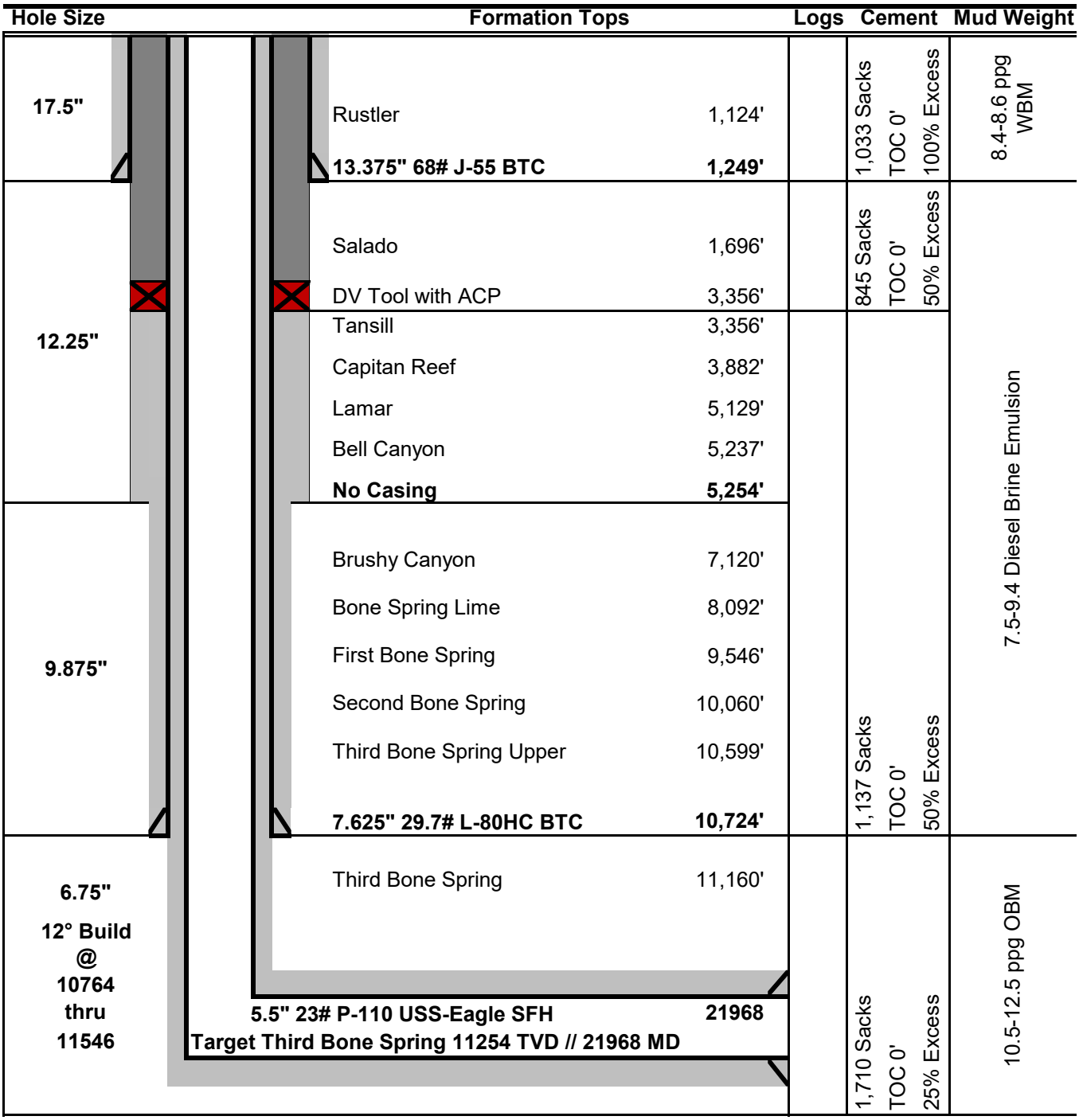
Other proposed operations facets attachment:

Other Variance attachment:

5M_Annular_Preventer_Variance_and_Well_Control_Plan_20221012101237.pdf
Generic_BS_Contingency_REV_20221012101252.pdf
R616___CoC_for_hoses_12_18_17_20221012101226.pdf
Requested_Exceptions___3_String_Revised_01312019_20221012101224.pdf

Wellbore Schematic

Well:	Dogwood 25 36 20 Fed Com 093H	**Co. Well ID:**	xxxxxx
SHL:	SEC. 20, T.-25S, R.-36E, 200' FSL, 1740' FWL	**AFE No.:**	xxxx-xxx
BHL:	SEC. 17, T.-25S, R.-36E, 50' FNL, 1790' FWL	**API No.:**	xxxxxxxxxx
	Lea, NM	**GL:**	3059
Wellhead:	A - 13-5/8" 10M x 13-5/8" SOW	**Field:**	Delaware
	B - 13-5/8" 10M x 13-5/8" 10M	**Objective:**	Third Bone Spring
	C - 13-5/8" 10M x 13-5/8" 10M	**TVD:**	11254
	Tubing Spool - 7-1/16" 15M x 13-3/8" 10M	**MD:**	21968
Xmas Tree:	2-9/16" 10M	**Rig:**	TBD **KB** 27'
Tubing:	2-7/8" L-80 6.5# 8rd EUE	**E-Mail:**	DrillingCR@ameredev.com



Casing Design and Safety Factor Check

Casing Specifications						
Segment	**Hole ID**	**Depth**	**OD**	**Weight**	**Grade**	**Coupling**
Surface	17.5	1,249'	13.375	68	J-55	BTC
Intermediate	9.875	10,724'	7.625	29.7	HCL-80	BTC
Prod Segment A	6.75	10764	5.5	23	P-110	SFH
Prod Segment B	6.75	21968	5.5	23	P-110	SFH

Check Surface Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
14.375	1,069	915	4,100	3,450
Safety Factors				
1.56	12.59	10.77	7.35	0.66
Check Intermediate Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
7.625	940	558	6700	9460
Safety Factors				
1.13	2.95	2.00	1.28	1.29
Check Prod Casing, Segment A				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
0.49	1.67	1.50	1.83	1.97
Check Prod Casing, Segment B				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
0.49	2.83	2.54	0.90	1.97

PERFORMANCE DATA

API BTC **13.375 in** **68.00 lbs/ft** **J-55**
Technical Data Sheet

Tubular Parameters

Size	13.375	in	Minimum Yield	55,000	psi
Nominal Weight	68.00	lbs/ft	Minimum Tensile	75,000	psi
Grade	J-55		Yield Load	1,069,000	lbs
PE Weight	66.10	lbs/ft	Tensile Load	1,458,000	lbs
Wall Thickness	0.480	in	Min. Internal Yield Pressure	3,500	psi
Nominal ID	12.415	in	Collapse Pressure	1,950	psi
Drift Diameter	12.259	in			
Nom. Pipe Body Area	19.445	in²			

Connection Parameters

Connection OD	14.375	in
Coupling Length	10.625	in
Threads Per Inch	5.000	in
Standoff Thread Turns	1.000	
Make-Up Loss	4.513	in
Yield Load In Tension	---	lbs
Min. Internal Yield Pressure	3,500	psi

Printed on: February-13-2015

BORUSAN MANNESMANN

API 5CT Casing Performance Data Sheet

Manufactured to specifications of API 5CT 9th edition and bears the API monogram.
Designed for enhanced performance through increased collapse resistance.

Grade	L80HC

	Pipe Body Mechanical Properties
Minimum Yield Strength	80,000 psi
Maximum Yield Strength	95,000 psi
Minimum Tensile Strength	95,000 psi
Maximum Hardness	23.0 HRC

	Sizes
OD	7 5/8 in
Nominal Wall Thickness	0.375 in
Nominal Weight, T&C	29.70 lb/ft
Nominal Weight, PE	29.06 lb/ft
Nominal ID	6.875 in
Standard Drift	6.750 in
Alternate Drift	N/A

	Minimum Performance
Collapse Pressure	5,780 psi
Internal Pressure Yield	6,880 psi
Pipe body Tension Yield	683,000 lbs
Internal pressure leak resistance STC/LTC connections	6,880 psi
Internal pressure leak resistance BTC connections	6,880 psi

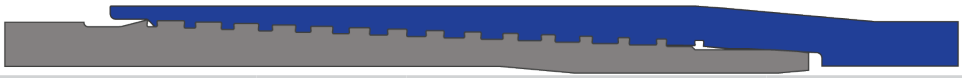
	Inspection and Testing
Visual	OD Longitidunal and independent 3rd party SEA
NDT	Independent 3rd party full body EMI after hydrotest Calibration notch sensitivity: 10% of specified wall thickness

	Color code
Pipe ends	One red, one brown and one blue band
Couplings	Red with one brown band

U. S. Steel Tubular Products

11/14/2018 9:02:57 AM

5.500" 23.00lbs/ft (0.415" Wall) USS RYS110 USS-EAGLE SFH™



MECHANICAL PROPERTIES	Pipe	USS-EAGLE SFH™	
Minimum Yield Strength	110,000	--	psi
Maximum Yield Strength	125,000	--	psi
Minimum Tensile Strength	120,000	--	psi
DIMENSIONS	**Pipe**	**USS-EAGLE SFH™**	
Outside Diameter	5.500	5.830	in.
Wall Thickness	0.415	--	in.
Inside Diameter	4.670	4.585	in.
Standard Drift	4.545	4.545	in.
Alternate Drift	--	4.545	in.
Nominal Linear Weight, T&C	23.00	--	lbs/ft
Plain End Weight	22.56	--	lbs/ft
SECTION AREA	**Pipe**	**USS-EAGLE SFH™**	
Critical Area	6.630	5.507	sq. in.
Joint Efficiency	--	83.1	%
PERFORMANCE	**Pipe**	**USS-EAGLE SFH™**	
Minimum Collapse Pressure	14,540	14,540	psi
External Pressure Leak Resistance	--	10,000	psi
Minimum Internal Yield Pressure	14,520	14,520	psi
Minimum Pipe Body Yield Strength	729,000	--	lbs
Joint Strength	--	606,000	lbs
Compression Rating	--	606,000	lbs
Reference Length	--	17,909	ft
Maximum Uniaxial Bend Rating	--	76.2	deg/100 ft
MAKE-UP DATA	**Pipe**	**USS-EAGLE SFH™**	
Make-Up Loss	--	6.65	in.
Minimum Make-Up Torque	--	16,600	ft-lbs
Maximum Make-Up Torque	--	19,800	ft-lbs
Maximum Operating Torque	--	28,000	ft-lbs

U. S. Steel Tubular Products
460 Wildwood Forest Drive, Suite 300S
Spring, Texas 77380

1-877-893-9461
connections@uss.com
www.usstubular.com

American Resource Development LLC.

Ameredev Operating

Lea County, NM (N83-NME)
Dogwood_AGI
Dogwood Fed Com 25-36-20 093H

OWB

Plan: PRELIM#1

Standard Planning Report - Geographic

10 October, 2022

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

Database:	AUS-COMPASS - EDM_15 - 32bit	**Local Co-ordinate Reference:**	Well Dogwood Fed Com 25-36-20 093H
Company:	Ameredev Operating	**TVD Reference:**	KB=26' @ 3085.0usft
Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Project Lea County, NM (N83-NME)

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site Dogwood_AGI

Site Position:		**Northing:**	405,003.49 usft	**Latitude:**	32.1091554
From:	Map	**Easting:**	863,649.20 usft	**Longitude:**	-103.2923681
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "		

Well Dogwood Fed Com 25-36-20 093H

Well Position	**+N/-S**	0.0 usft	**Northing:**	405,010.64 usft	**Latitude:**	32.1091560
	+E/-W	0.0 usft	**Easting:**	864,363.14 usft	**Longitude:**	-103.2900624
Position Uncertainty		3.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,059.0 usft
Grid Convergence:		0.55 °				

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	10/4/2022	6.25	59.79	47,320.63239380

Design PRELIM#1

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	359.43

Plan Survey Tool Program **Date** 10/10/2022

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	21,968.4	PRELIM#1 (OWB)	MWD OWSG MWD - Standard	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,191.3	3.83	174.74	2,191.1	-6.4	0.6	2.00	2.00	0.00	174.74	
10,764.0	3.83	174.74	10,744.8	-575.9	53.0	0.00	0.00	0.00	0.00	
11,545.8	90.00	359.43	11,254.0	-99.5	51.0	12.00	11.02	-22.43	-175.31	FTP (DW 093H)
21,918.4	90.00	359.43	11,254.0	10,272.6	-52.5	0.00	0.00	0.00	0.00	LTP (DW 093H)
21,968.4	90.00	359.43	11,254.0	10,322.6	-53.0	0.00	0.00	0.00	0.00	BHL (DW 093H)

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

Database:	AUS-COMPASS - EDM_15 - 32bit	**Local Co-ordinate Reference:**	Well Dogwood Fed Com 25-36-20 093H
Company:	Ameredev Operating	**TVD Reference:**	KB=26' @ 3085.0usft
Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
100.0	0.00	0.00	100.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
200.0	0.00	0.00	200.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
300.0	0.00	0.00	300.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
400.0	0.00	0.00	400.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
500.0	0.00	0.00	500.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
600.0	0.00	0.00	600.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
700.0	0.00	0.00	700.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
800.0	0.00	0.00	800.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
900.0	0.00	0.00	900.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,000.0	0.00	0.00	1,000.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,100.0	0.00	0.00	1,100.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,123.0	0.00	0.00	1,123.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
Rustler									
1,200.0	0.00	0.00	1,200.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,300.0	0.00	0.00	1,300.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,400.0	0.00	0.00	1,400.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,500.0	0.00	0.00	1,500.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,600.0	0.00	0.00	1,600.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,695.0	0.00	0.00	1,695.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
Salado									
1,700.0	0.00	0.00	1,700.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,800.0	0.00	0.00	1,800.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
1,900.0	0.00	0.00	1,900.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
2,000.0	0.00	0.00	2,000.0	0.0	0.0	405,010.64	864,363.14	32.1091560	-103.2900624
Start Build 2.00									
2,100.0	2.00	174.74	2,100.0	-1.7	0.2	405,008.90	864,363.30	32.1091512	-103.2900619
2,191.3	3.83	174.74	2,191.1	-6.4	0.6	405,004.28	864,363.72	32.1091385	-103.2900607
Start 8572.8 hold at 2191.3 MD									
2,200.0	3.83	174.74	2,199.8	-6.9	0.6	405,003.70	864,363.78	32.1091369	-103.2900605
2,300.0	3.83	174.74	2,299.6	-13.6	1.2	404,997.06	864,364.39	32.1091187	-103.2900588
2,400.0	3.83	174.74	2,399.4	-20.2	1.9	404,990.42	864,365.00	32.1091004	-103.2900570
2,500.0	3.83	174.74	2,499.2	-26.9	2.5	404,983.77	864,365.61	32.1090821	-103.2900553
2,600.0	3.83	174.74	2,598.9	-33.5	3.1	404,977.13	864,366.22	32.1090638	-103.2900535
2,700.0	3.83	174.74	2,698.7	-40.2	3.7	404,970.48	864,366.83	32.1090456	-103.2900517
2,800.0	3.83	174.74	2,798.5	-46.8	4.3	404,963.84	864,367.44	32.1090273	-103.2900500
2,900.0	3.83	174.74	2,898.3	-53.4	4.9	404,957.20	864,368.05	32.1090090	-103.2900482
3,000.0	3.83	174.74	2,998.1	-60.1	5.5	404,950.55	864,368.66	32.1089907	-103.2900464
3,100.0	3.83	174.74	3,097.8	-66.7	6.1	404,943.91	864,369.28	32.1089725	-103.2900447
3,200.0	3.83	174.74	3,197.6	-73.4	6.7	404,937.27	864,369.89	32.1089542	-103.2900429
3,300.0	3.83	174.74	3,297.4	-80.0	7.4	404,930.62	864,370.50	32.1089359	-103.2900411
3,357.7	3.83	174.74	3,355.0	-83.9	7.7	404,926.79	864,370.85	32.1089254	-103.2900401
Tansill									
3,400.0	3.83	174.74	3,397.2	-86.7	8.0	404,923.98	864,371.11	32.1089176	-103.2900394
3,500.0	3.83	174.74	3,496.9	-93.3	8.6	404,917.34	864,371.72	32.1088994	-103.2900376
3,600.0	3.83	174.74	3,596.7	-99.9	9.2	404,910.69	864,372.33	32.1088811	-103.2900358
3,700.0	3.83	174.74	3,696.5	-106.6	9.8	404,904.05	864,372.94	32.1088628	-103.2900341
3,800.0	3.83	174.74	3,796.3	-113.2	10.4	404,897.40	864,373.55	32.1088445	-103.2900323
3,884.9	3.83	174.74	3,881.0	-118.9	10.9	404,891.76	864,374.07	32.1088290	-103.2900308
Capitan									
3,900.0	3.83	174.74	3,896.1	-119.9	11.0	404,890.76	864,374.17	32.1088262	-103.2900305
4,000.0	3.83	174.74	3,995.8	-126.5	11.6	404,884.12	864,374.78	32.1088080	-103.2900288
4,100.0	3.83	174.74	4,095.6	-133.2	12.3	404,877.47	864,375.39	32.1087897	-103.2900270
4,200.0	3.83	174.74	4,195.4	-139.8	12.9	404,870.83	864,376.00	32.1087714	-103.2900252

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

Database:	AUS-COMPASS - EDM_15 - 32bit	**Local Co-ordinate Reference:**	Well Dogwood Fed Com 25-36-20 093H
Company:	Ameredev Operating	**TVD Reference:**	KB=26' @ 3085.0usft
Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,300.0	3.83	174.74	4,295.2	-146.5	13.5	404,864.19	864,376.61	32.1087531	-103.2900235
4,400.0	3.83	174.74	4,394.9	-153.1	14.1	404,857.54	864,377.22	32.1087349	-103.2900217
4,500.0	3.83	174.74	4,494.7	-159.7	14.7	404,850.90	864,377.83	32.1087166	-103.2900199
4,600.0	3.83	174.74	4,594.5	-166.4	15.3	404,844.26	864,378.44	32.1086983	-103.2900182
4,700.0	3.83	174.74	4,694.3	-173.0	15.9	404,837.61	864,379.06	32.1086800	-103.2900164
4,800.0	3.83	174.74	4,794.0	-179.7	16.5	404,830.97	864,379.67	32.1086618	-103.2900146
4,900.0	3.83	174.74	4,893.8	-186.3	17.1	404,824.32	864,380.28	32.1086435	-103.2900129
5,000.0	3.83	174.74	4,993.6	-193.0	17.8	404,817.68	864,380.89	32.1086252	-103.2900111
5,043.0	3.83	174.74	5,036.5	-195.8	18.0	404,814.82	864,381.15	32.1086174	-103.2900103
NMNM138912 Exit at 5043.0 MD									
5,100.0	3.83	174.74	5,093.4	-199.6	18.4	404,811.04	864,381.50	32.1086069	-103.2900093
5,134.7	3.83	174.74	5,128.0	-201.9	18.6	404,808.73	864,381.71	32.1086006	-103.2900087
Lamar									
5,200.0	3.83	174.74	5,193.2	-206.2	19.0	404,804.39	864,382.11	32.1085887	-103.2900076
5,242.9	3.83	174.74	5,236.0	-209.1	19.2	404,801.54	864,382.37	32.1085808	-103.2900068
Bell Canyon									
5,300.0	3.83	174.74	5,292.9	-212.9	19.6	404,797.75	864,382.72	32.1085704	-103.2900058
5,400.0	3.83	174.74	5,392.7	-219.5	20.2	404,791.11	864,383.33	32.1085521	-103.2900040
5,500.0	3.83	174.74	5,492.5	-226.2	20.8	404,784.46	864,383.94	32.1085338	-103.2900023
5,600.0	3.83	174.74	5,592.3	-232.8	21.4	404,777.82	864,384.56	32.1085155	-103.2900005
5,700.0	3.83	174.74	5,692.0	-239.5	22.0	404,771.18	864,385.17	32.1084973	-103.2899987
5,800.0	3.83	174.74	5,791.8	-246.1	22.6	404,764.53	864,385.78	32.1084790	-103.2899970
5,900.0	3.83	174.74	5,891.6	-252.8	23.3	404,757.89	864,386.39	32.1084607	-103.2899952
6,000.0	3.83	174.74	5,991.4	-259.4	23.9	404,751.24	864,387.00	32.1084424	-103.2899934
6,100.0	3.83	174.74	6,091.1	-266.0	24.5	404,744.60	864,387.61	32.1084242	-103.2899917
6,200.0	3.83	174.74	6,190.9	-272.7	25.1	404,737.96	864,388.22	32.1084059	-103.2899899
6,300.0	3.83	174.74	6,290.7	-279.3	25.7	404,731.31	864,388.83	32.1083876	-103.2899881
6,400.0	3.83	174.74	6,390.5	-286.0	26.3	404,724.67	864,389.45	32.1083693	-103.2899864
6,500.0	3.83	174.74	6,490.3	-292.6	26.9	404,718.03	864,390.06	32.1083511	-103.2899846
6,600.0	3.83	174.74	6,590.0	-299.3	27.5	404,711.38	864,390.67	32.1083328	-103.2899828
6,700.0	3.83	174.74	6,689.8	-305.9	28.1	404,704.74	864,391.28	32.1083145	-103.2899811
6,800.0	3.83	174.74	6,789.6	-312.5	28.8	404,698.10	864,391.89	32.1082962	-103.2899793
6,900.0	3.83	174.74	6,889.4	-319.2	29.4	404,691.45	864,392.50	32.1082780	-103.2899775
7,000.0	3.83	174.74	6,989.1	-325.8	30.0	404,684.81	864,393.11	32.1082597	-103.2899758
7,100.0	3.83	174.74	7,088.9	-332.5	30.6	404,678.16	864,393.72	32.1082414	-103.2899740
7,130.1	3.83	174.74	7,119.0	-334.5	30.8	404,676.16	864,393.91	32.1082359	-103.2899735
Brushy Canyon									
7,200.0	3.83	174.74	7,188.7	-339.1	31.2	404,671.52	864,394.33	32.1082231	-103.2899723
7,300.0	3.83	174.74	7,288.5	-345.8	31.8	404,664.88	864,394.95	32.1082049	-103.2899705
7,400.0	3.83	174.74	7,388.3	-352.4	32.4	404,658.23	864,395.56	32.1081866	-103.2899687
7,500.0	3.83	174.74	7,488.0	-359.0	33.0	404,651.59	864,396.17	32.1081683	-103.2899670
7,600.0	3.83	174.74	7,587.8	-365.7	33.6	404,644.95	864,396.78	32.1081500	-103.2899652
7,700.0	3.83	174.74	7,687.6	-372.3	34.3	404,638.30	864,397.39	32.1081317	-103.2899634
7,800.0	3.83	174.74	7,787.4	-379.0	34.9	404,631.66	864,398.00	32.1081135	-103.2899617
7,900.0	3.83	174.74	7,887.1	-385.6	35.5	404,625.01	864,398.61	32.1080952	-103.2899599
8,000.0	3.83	174.74	7,986.9	-392.3	36.1	404,618.37	864,399.22	32.1080769	-103.2899581
8,100.0	3.83	174.74	8,086.7	-398.9	36.7	404,611.73	864,399.84	32.1080586	-103.2899564
8,104.3	3.83	174.74	8,091.0	-399.2	36.7	404,611.44	864,399.86	32.1080579	-103.2899563
Bone Spring Lime									
8,200.0	3.83	174.74	8,186.5	-405.6	37.3	404,605.08	864,400.45	32.1080404	-103.2899546
8,300.0	3.83	174.74	8,286.2	-412.2	37.9	404,598.44	864,401.06	32.1080221	-103.2899528
8,400.0	3.83	174.74	8,386.0	-418.8	38.5	404,591.80	864,401.67	32.1080038	-103.2899511
8,500.0	3.83	174.74	8,485.8	-425.5	39.1	404,585.15	864,402.28	32.1079855	-103.2899493
8,600.0	3.83	174.74	8,585.6	-432.1	39.8	404,578.51	864,402.89	32.1079673	-103.2899475

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

Database:	AUS-COMPASS - EDM_15 - 32bit	**Local Co-ordinate Reference:**	Well Dogwood Fed Com 25-36-20 093H
Company:	Ameredev Operating	**TVD Reference:**	KB=26' @ 3085.0usft
Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,700.0	3.83	174.74	8,685.4	-438.8	40.4	404,571.87	864,403.50	32.1079490	-103.2899458
8,800.0	3.83	174.74	8,785.1	-445.4	41.0	404,565.22	864,404.11	32.1079307	-103.2899440
8,900.0	3.83	174.74	8,884.9	-452.1	41.6	404,558.58	864,404.72	32.1079124	-103.2899422
9,000.0	3.83	174.74	8,984.7	-458.7	42.2	404,551.93	864,405.34	32.1078942	-103.2899405
9,100.0	3.83	174.74	9,084.5	-465.3	42.8	404,545.29	864,405.95	32.1078759	-103.2899387
9,200.0	3.83	174.74	9,184.2	-472.0	43.4	404,538.65	864,406.56	32.1078576	-103.2899369
9,300.0	3.83	174.74	9,284.0	-478.6	44.0	404,532.00	864,407.17	32.1078393	-103.2899352
9,400.0	3.83	174.74	9,383.8	-485.3	44.6	404,525.36	864,407.78	32.1078210	-103.2899334
9,500.0	3.83	174.74	9,483.6	-491.9	45.3	404,518.72	864,408.39	32.1078028	-103.2899316
9,561.6	3.83	174.74	9,545.0	-496.0	45.6	404,514.63	864,408.77	32.1077915	-103.2899305
First Bone Spring									
9,600.0	3.83	174.74	9,583.4	-498.6	45.9	404,512.07	864,409.00	32.1077845	-103.2899299
9,700.0	3.83	174.74	9,683.1	-505.2	46.5	404,505.43	864,409.61	32.1077662	-103.2899281
9,800.0	3.83	174.74	9,782.9	-511.9	47.1	404,498.79	864,410.23	32.1077479	-103.2899263
9,900.0	3.83	174.74	9,882.7	-518.5	47.7	404,492.14	864,410.84	32.1077297	-103.2899246
10,000.0	3.83	174.74	9,982.5	-525.1	48.3	404,485.50	864,411.45	32.1077114	-103.2899228
10,076.7	3.83	174.74	10,059.0	-530.2	48.8	404,480.40	864,411.92	32.1076974	-103.2899214
Second Bone Spring									
10,100.0	3.83	174.74	10,082.2	-531.8	48.9	404,478.85	864,412.06	32.1076931	-103.2899210
10,200.0	3.83	174.74	10,182.0	-538.4	49.5	404,472.21	864,412.67	32.1076748	-103.2899193
10,300.0	3.83	174.74	10,281.8	-545.1	50.1	404,465.57	864,413.28	32.1076566	-103.2899175
10,400.0	3.83	174.74	10,381.6	-551.7	50.8	404,458.92	864,413.89	32.1076383	-103.2899157
10,500.0	3.83	174.74	10,481.3	-558.4	51.4	404,452.28	864,414.50	32.1076200	-103.2899140
10,600.0	3.83	174.74	10,581.1	-565.0	52.0	404,445.64	864,415.11	32.1076017	-103.2899122
10,616.9	3.83	174.74	10,598.0	-566.1	52.1	404,444.51	864,415.22	32.1075986	-103.2899119
Upper Third Bone Spring									
10,700.0	3.83	174.74	10,680.9	-571.6	52.6	404,438.99	864,415.73	32.1075835	-103.2899104
10,764.0	3.83	174.74	10,744.8	-575.9	53.0	404,434.74	864,416.12	32.1075718	-103.2899093
KOP-Start DLS 12.00 TFO -175.31									
10,775.0	2.52	172.29	10,755.7	-576.5	53.0	404,434.14	864,416.18	32.1075701	-103.2899091
10,800.0	0.59	31.31	10,780.7	-576.9	53.2	404,433.70	864,416.32	32.1075689	-103.2899087
10,825.0	3.52	4.53	10,805.7	-576.1	53.3	404,434.58	864,416.45	32.1075713	-103.2899082
10,850.0	6.51	2.17	10,830.6	-573.9	53.4	404,436.76	864,416.57	32.1075773	-103.2899078
10,875.0	9.51	1.30	10,855.4	-570.4	53.5	404,440.24	864,416.67	32.1075869	-103.2899074
10,900.0	12.51	0.84	10,879.9	-565.6	53.6	404,445.01	864,416.75	32.1076000	-103.2899069
10,925.0	15.51	0.56	10,904.2	-559.6	53.7	404,451.06	864,416.82	32.1076166	-103.2899065
10,950.0	18.51	0.36	10,928.1	-552.3	53.7	404,458.37	864,416.88	32.1076367	-103.2899061
10,975.0	21.51	0.22	10,951.6	-543.7	53.8	404,466.92	864,416.93	32.1076602	-103.2899057
11,000.0	24.50	0.11	10,974.6	-533.9	53.8	404,476.69	864,416.95	32.1076870	-103.2899053
11,025.0	27.50	0.03	10,997.0	-523.0	53.8	404,487.65	864,416.97	32.1077172	-103.2899049
11,050.0	30.50	359.96	11,018.9	-510.9	53.8	404,499.77	864,416.97	32.1077505	-103.2899045
11,075.0	33.50	359.90	11,040.1	-497.6	53.8	404,513.02	864,416.95	32.1077869	-103.2899042
11,100.0	36.50	359.85	11,060.6	-483.3	53.8	404,527.36	864,416.92	32.1078263	-103.2899038
11,125.0	39.50	359.81	11,080.3	-467.9	53.7	404,542.75	864,416.87	32.1078686	-103.2899035
11,150.0	42.50	359.77	11,099.1	-451.5	53.7	404,559.15	864,416.81	32.1079137	-103.2899032
11,175.0	45.50	359.74	11,117.1	-434.1	53.6	404,576.52	864,416.74	32.1079614	-103.2899029
11,200.0	48.50	359.70	11,134.2	-415.8	53.5	404,594.80	864,416.65	32.1080117	-103.2899026
11,225.0	51.50	359.68	11,150.2	-396.7	53.4	404,613.95	864,416.54	32.1080643	-103.2899023
11,239.4	53.23	359.66	11,159.0	-385.3	53.3	404,625.34	864,416.48	32.1080956	-103.2899022
Third Bone Spring									
11,250.0	54.50	359.65	11,165.3	-376.7	53.3	404,633.91	864,416.43	32.1081192	-103.2899021
11,275.0	57.50	359.63	11,179.2	-356.0	53.2	404,654.64	864,416.30	32.1081761	-103.2899019
11,300.0	60.50	359.61	11,192.1	-334.6	53.0	404,676.07	864,416.15	32.1082350	-103.2899017
11,325.0	63.50	359.58	11,203.8	-312.5	52.9	404,698.14	864,416.00	32.1082957	-103.2899015

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

Database:	AUS-COMPASS - EDM_15 - 32bit	**Local Co-ordinate Reference:**	Well Dogwood Fed Com 25-36-20 093H
Company:	Ameredev Operating	**TVD Reference:**	KB=26' @ 3085.0usft
Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,350.0	66.50	359.56	11,214.4	-289.8	52.7	404,720.79	864,415.83	32.1083580	-103.2899013
11,375.0	69.50	359.55	11,223.8	-266.7	52.5	404,743.97	864,415.65	32.1084217	-103.2899012
11,400.0	72.50	359.53	11,231.9	-243.0	52.3	404,767.60	864,415.46	32.1084867	-103.2899010
11,425.0	75.50	359.51	11,238.8	-219.0	52.1	404,791.63	864,415.25	32.1085527	-103.2899009
11,450.0	78.50	359.49	11,244.4	-194.7	51.9	404,815.97	864,415.04	32.1086196	-103.2899009
NMNM138912 Entry at 11450.0 MD									
11,475.0	81.50	359.47	11,248.8	-170.0	51.7	404,840.60	864,414.82	32.1086873	-103.2899008
11,500.0	84.50	359.46	11,251.8	-145.2	51.5	404,865.41	864,414.59	32.1087555	-103.2899008
11,525.0	87.50	359.44	11,253.5	-120.3	51.2	404,890.35	864,414.35	32.1088240	-103.2899008
11,545.8	90.00	359.43	11,254.0	-99.5	51.0	404,911.15	864,414.14	32.1088812	-103.2899008
LP-Start 10372.6 hold at 11545.8 MD - FTP (DW 093H)									
11,600.0	90.00	359.43	11,254.0	-45.3	50.5	404,965.34	864,413.60	32.1090302	-103.2899008
11,700.0	90.00	359.43	11,254.0	54.7	49.5	405,065.33	864,412.60	32.1093050	-103.2899009
11,800.0	90.00	359.43	11,254.0	154.7	48.5	405,165.33	864,411.61	32.1095799	-103.2899010
11,900.0	90.00	359.43	11,254.0	254.7	47.5	405,265.32	864,410.61	32.1098548	-103.2899011
12,000.0	90.00	359.43	11,254.0	354.7	46.5	405,365.32	864,409.61	32.1101296	-103.2899012
12,100.0	90.00	359.43	11,254.0	454.7	45.5	405,465.31	864,408.61	32.1104045	-103.2899013
12,200.0	90.00	359.43	11,254.0	554.7	44.5	405,565.31	864,407.61	32.1106794	-103.2899014
12,300.0	90.00	359.43	11,254.0	654.7	43.5	405,665.30	864,406.62	32.1109542	-103.2899015
12,400.0	90.00	359.43	11,254.0	754.7	42.5	405,765.30	864,405.62	32.1112291	-103.2899016
12,500.0	90.00	359.43	11,254.0	854.7	41.5	405,865.29	864,404.62	32.1115039	-103.2899017
12,600.0	90.00	359.43	11,254.0	954.7	40.5	405,965.29	864,403.62	32.1117788	-103.2899018
12,700.0	90.00	359.43	11,254.0	1,054.6	39.5	406,065.28	864,402.62	32.1120537	-103.2899019
12,800.0	90.00	359.43	11,254.0	1,154.6	38.5	406,165.28	864,401.63	32.1123285	-103.2899020
12,900.0	90.00	359.43	11,254.0	1,254.6	37.5	406,265.27	864,400.63	32.1126034	-103.2899021
13,000.0	90.00	359.43	11,254.0	1,354.6	36.5	406,365.27	864,399.63	32.1128783	-103.2899022
13,100.0	90.00	359.43	11,254.0	1,454.6	35.5	406,465.26	864,398.63	32.1131531	-103.2899023
13,200.0	90.00	359.43	11,254.0	1,554.6	34.5	406,565.26	864,397.64	32.1134280	-103.2899024
13,300.0	90.00	359.43	11,254.0	1,654.6	33.5	406,665.25	864,396.64	32.1137028	-103.2899025
13,400.0	90.00	359.43	11,254.0	1,754.6	32.5	406,765.25	864,395.64	32.1139777	-103.2899026
13,500.0	90.00	359.43	11,254.0	1,854.6	31.5	406,865.24	864,394.64	32.1142526	-103.2899027
13,600.0	90.00	359.43	11,254.0	1,954.6	30.5	406,965.24	864,393.64	32.1145274	-103.2899028
13,700.0	90.00	359.43	11,254.0	2,054.6	29.5	407,065.23	864,392.65	32.1148023	-103.2899029
13,800.0	90.00	359.43	11,254.0	2,154.6	28.5	407,165.23	864,391.65	32.1150772	-103.2899030
13,900.0	90.00	359.43	11,254.0	2,254.6	27.5	407,265.22	864,390.65	32.1153520	-103.2899031
14,000.0	90.00	359.43	11,254.0	2,354.6	26.5	407,365.22	864,389.65	32.1156269	-103.2899032
14,100.0	90.00	359.43	11,254.0	2,454.6	25.5	407,465.21	864,388.65	32.1159017	-103.2899033
14,200.0	90.00	359.43	11,254.0	2,554.6	24.5	407,565.21	864,387.66	32.1161766	-103.2899034
14,300.0	90.00	359.43	11,254.0	2,654.6	23.5	407,665.20	864,386.66	32.1164515	-103.2899034
14,400.0	90.00	359.43	11,254.0	2,754.6	22.5	407,765.20	864,385.66	32.1167263	-103.2899035
14,500.0	90.00	359.43	11,254.0	2,854.6	21.5	407,865.19	864,384.66	32.1170012	-103.2899036
14,600.0	90.00	359.43	11,254.0	2,954.6	20.5	407,965.19	864,383.66	32.1172761	-103.2899037
14,700.0	90.00	359.43	11,254.0	3,054.5	19.5	408,065.18	864,382.67	32.1175509	-103.2899038
14,800.0	90.00	359.43	11,254.0	3,154.5	18.5	408,165.18	864,381.67	32.1178258	-103.2899039
14,900.0	90.00	359.43	11,254.0	3,254.5	17.5	408,265.17	864,380.67	32.1181006	-103.2899040
15,000.0	90.00	359.43	11,254.0	3,354.5	16.5	408,365.17	864,379.67	32.1183755	-103.2899041
15,100.0	90.00	359.43	11,254.0	3,454.5	15.5	408,465.16	864,378.67	32.1186504	-103.2899042
15,200.0	90.00	359.43	11,254.0	3,554.5	14.5	408,565.16	864,377.68	32.1189252	-103.2899043
15,300.0	90.00	359.43	11,254.0	3,654.5	13.5	408,665.15	864,376.68	32.1192001	-103.2899044
15,400.0	90.00	359.43	11,254.0	3,754.5	12.5	408,765.15	864,375.68	32.1194750	-103.2899045
15,500.0	90.00	359.43	11,254.0	3,854.5	11.5	408,865.14	864,374.68	32.1197498	-103.2899046
15,600.0	90.00	359.43	11,254.0	3,954.5	10.5	408,965.14	864,373.68	32.1200247	-103.2899047
15,700.0	90.00	359.43	11,254.0	4,054.5	9.5	409,065.13	864,372.69	32.1202995	-103.2899048
15,800.0	90.00	359.43	11,254.0	4,154.5	8.6	409,165.13	864,371.69	32.1205744	-103.2899049

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

Database:	AUS-COMPASS - EDM_15 - 32bit	**Local Co-ordinate Reference:**	Well Dogwood Fed Com 25-36-20 093H
Company:	Ameredev Operating	**TVD Reference:**	KB=26' @ 3085.0usft
Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,900.0	90.00	359.43	11,254.0	4,254.5	7.6	409,265.12	864,370.69	32.1208493	-103.2899050
16,000.0	90.00	359.43	11,254.0	4,354.5	6.6	409,365.12	864,369.69	32.1211241	-103.2899051
16,100.0	90.00	359.43	11,254.0	4,454.5	5.6	409,465.11	864,368.69	32.1213990	-103.2899052
16,200.0	90.00	359.43	11,254.0	4,554.5	4.6	409,565.11	864,367.70	32.1216739	-103.2899053
16,300.0	90.00	359.43	11,254.0	4,654.5	3.6	409,665.10	864,366.70	32.1219487	-103.2899054
16,400.0	90.00	359.43	11,254.0	4,754.5	2.6	409,765.10	864,365.70	32.1222236	-103.2899055
16,500.0	90.00	359.43	11,254.0	4,854.5	1.6	409,865.10	864,364.70	32.1224984	-103.2899056
16,600.0	90.00	359.43	11,254.0	4,954.5	0.6	409,965.09	864,363.70	32.1227733	-103.2899056
16,700.0	90.00	359.43	11,254.0	5,054.4	-0.4	410,065.09	864,362.71	32.1230482	-103.2899057
16,731.0	90.00	359.43	11,254.0	5,085.4	-0.7	410,096.05	864,362.40	32.1231333	-103.2899058
NMNM138912 Exit at 16731.0 MD									
16,800.0	90.00	359.43	11,254.0	5,154.4	-1.4	410,165.08	864,361.71	32.1233230	-103.2899058
16,900.0	90.00	359.43	11,254.0	5,254.4	-2.4	410,265.08	864,360.71	32.1235979	-103.2899059
17,000.0	90.00	359.43	11,254.0	5,354.4	-3.4	410,365.07	864,359.71	32.1238728	-103.2899060
17,100.0	90.00	359.43	11,254.0	5,454.4	-4.4	410,465.07	864,358.71	32.1241476	-103.2899061
17,200.0	90.00	359.43	11,254.0	5,554.4	-5.4	410,565.06	864,357.72	32.1244225	-103.2899062
17,300.0	90.00	359.43	11,254.0	5,654.4	-6.4	410,665.06	864,356.72	32.1246973	-103.2899063
17,400.0	90.00	359.43	11,254.0	5,754.4	-7.4	410,765.05	864,355.72	32.1249722	-103.2899064
17,500.0	90.00	359.43	11,254.0	5,854.4	-8.4	410,865.05	864,354.72	32.1252471	-103.2899065
17,600.0	90.00	359.43	11,254.0	5,954.4	-9.4	410,965.04	864,353.72	32.1255219	-103.2899066
17,700.0	90.00	359.43	11,254.0	6,054.4	-10.4	411,065.04	864,352.73	32.1257968	-103.2899067
17,800.0	90.00	359.43	11,254.0	6,154.4	-11.4	411,165.03	864,351.73	32.1260716	-103.2899068
17,900.0	90.00	359.43	11,254.0	6,254.4	-12.4	411,265.03	864,350.73	32.1263465	-103.2899069
18,000.0	90.00	359.43	11,254.0	6,354.4	-13.4	411,365.02	864,349.73	32.1266214	-103.2899070
18,100.0	90.00	359.43	11,254.0	6,454.4	-14.4	411,465.02	864,348.73	32.1268962	-103.2899071
18,200.0	90.00	359.43	11,254.0	6,554.4	-15.4	411,565.01	864,347.74	32.1271711	-103.2899072
18,300.0	90.00	359.43	11,254.0	6,654.4	-16.4	411,665.01	864,346.74	32.1274460	-103.2899073
18,400.0	90.00	359.43	11,254.0	6,754.4	-17.4	411,765.00	864,345.74	32.1277208	-103.2899074
18,500.0	90.00	359.43	11,254.0	6,854.4	-18.4	411,865.00	864,344.74	32.1279957	-103.2899075
18,600.0	90.00	359.43	11,254.0	6,954.4	-19.4	411,964.99	864,343.74	32.1282705	-103.2899076
18,700.0	90.00	359.43	11,254.0	7,054.3	-20.4	412,064.99	864,342.75	32.1285454	-103.2899076
18,800.0	90.00	359.43	11,254.0	7,154.3	-21.4	412,164.98	864,341.75	32.1288203	-103.2899077
18,900.0	90.00	359.43	11,254.0	7,254.3	-22.4	412,264.98	864,340.75	32.1290951	-103.2899078
19,000.0	90.00	359.43	11,254.0	7,354.3	-23.4	412,364.97	864,339.75	32.1293700	-103.2899079
19,100.0	90.00	359.43	11,254.0	7,454.3	-24.4	412,464.97	864,338.75	32.1296449	-103.2899080
19,200.0	90.00	359.43	11,254.0	7,554.3	-25.4	412,564.96	864,337.76	32.1299197	-103.2899081
19,300.0	90.00	359.43	11,254.0	7,654.3	-26.4	412,664.96	864,336.76	32.1301946	-103.2899082
19,400.0	90.00	359.43	11,254.0	7,754.3	-27.4	412,764.95	864,335.76	32.1304694	-103.2899083
19,500.0	90.00	359.43	11,254.0	7,854.3	-28.4	412,864.95	864,334.76	32.1307443	-103.2899084
19,600.0	90.00	359.43	11,254.0	7,954.3	-29.4	412,964.94	864,333.76	32.1310192	-103.2899085
19,700.0	90.00	359.43	11,254.0	8,054.3	-30.4	413,064.94	864,332.77	32.1312940	-103.2899086
19,800.0	90.00	359.43	11,254.0	8,154.3	-31.4	413,164.93	864,331.77	32.1315689	-103.2899087
19,900.0	90.00	359.43	11,254.0	8,254.3	-32.4	413,264.93	864,330.77	32.1318437	-103.2899088
20,000.0	90.00	359.43	11,254.0	8,354.3	-33.4	413,364.92	864,329.77	32.1321186	-103.2899089
20,100.0	90.00	359.43	11,254.0	8,454.3	-34.4	413,464.92	864,328.77	32.1323935	-103.2899090
20,200.0	90.00	359.43	11,254.0	8,554.3	-35.4	413,564.91	864,327.78	32.1326683	-103.2899091
20,300.0	90.00	359.43	11,254.0	8,654.3	-36.4	413,664.91	864,326.78	32.1329432	-103.2899092
20,400.0	90.00	359.43	11,254.0	8,754.3	-37.4	413,764.90	864,325.78	32.1332181	-103.2899093
20,500.0	90.00	359.43	11,254.0	8,854.3	-38.4	413,864.90	864,324.78	32.1334929	-103.2899094
20,600.0	90.00	359.43	11,254.0	8,954.3	-39.4	413,964.89	864,323.78	32.1337678	-103.2899094
20,700.0	90.00	359.43	11,254.0	9,054.2	-40.4	414,064.89	864,322.79	32.1340426	-103.2899095
20,800.0	90.00	359.43	11,254.0	9,154.2	-41.3	414,164.88	864,321.79	32.1343175	-103.2899096
20,900.0	90.00	359.43	11,254.0	9,254.2	-42.3	414,264.88	864,320.79	32.1345924	-103.2899097
21,000.0	90.00	359.43	11,254.0	9,354.2	-43.3	414,364.87	864,319.79	32.1348672	-103.2899098

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

Database:	AUS-COMPASS - EDM_15 - 32bit	**Local Co-ordinate Reference:**	Well Dogwood Fed Com 25-36-20 093H
Company:	Ameredev Operating	**TVD Reference:**	KB=26' @ 3085.0usft
Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
21,100.0	90.00	359.43	11,254.0	9,454.2	-44.3	414,464.87	864,318.79	32.1351421	-103.2899099
21,200.0	90.00	359.43	11,254.0	9,554.2	-45.3	414,564.86	864,317.80	32.1354170	-103.2899100
21,300.0	90.00	359.43	11,254.0	9,654.2	-46.3	414,664.86	864,316.80	32.1356918	-103.2899101
21,400.0	90.00	359.43	11,254.0	9,754.2	-47.3	414,764.85	864,315.80	32.1359667	-103.2899102
21,500.0	90.00	359.43	11,254.0	9,854.2	-48.3	414,864.85	864,314.80	32.1362415	-103.2899103
21,600.0	90.00	359.43	11,254.0	9,954.2	-49.3	414,964.84	864,313.80	32.1365164	-103.2899104
21,700.0	90.00	359.43	11,254.0	10,054.2	-50.3	415,064.84	864,312.81	32.1367913	-103.2899105
21,800.0	90.00	359.43	11,254.0	10,154.2	-51.3	415,164.83	864,311.81	32.1370661	-103.2899106
21,900.0	90.00	359.43	11,254.0	10,254.2	-52.3	415,264.83	864,310.81	32.1373410	-103.2899107
21,918.4	90.00	359.43	11,254.0	10,272.6	-52.5	415,283.25	864,310.63	32.1373916	-103.2899107
Start 50.0 hold at 21918.4 MD - LTP (DW 093H)									
21,968.4	90.00	359.43	11,254.0	10,322.6	-53.0	415,333.27	864,310.13	32.1375291	-103.2899107
TD at 21968.4 - BHL (DW 093H)									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BHL (DW 093H) - plan hits target center - Point	0.00	0.00	11,254.0	10,322.6	-53.0	415,333.27	864,310.11	32.1375291	-103.2899108
LTP (DW 093H) - plan hits target center - Point	0.00	0.00	11,254.0	10,272.6	-52.5	415,283.25	864,310.63	32.1373916	-103.2899107
FTP (DW 093H) - plan hits target center - Point	0.00	0.00	11,254.0	-99.5	51.0	404,911.15	864,414.14	32.1088812	-103.2899008

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,123.0	1,123.0	Rustler		0.00	
1,695.0	1,695.0	Salado		0.00	
3,357.7	3,355.0	Tansill			
3,884.9	3,881.0	Capitan			
5,134.7	5,128.0	Lamar			
5,242.9	5,236.0	Bell Canyon			
7,130.1	7,119.0	Brushy Canyon			
8,104.3	8,091.0	Bone Spring Lime			
9,561.6	9,545.0	First Bone Spring			
10,076.7	10,059.0	Second Bone Spring			
10,616.9	10,598.0	Upper Third Bone Spring			
11,239.4	11,159.0	Third Bone Spring			

AMEREDEV
American Resource Development LLC.

Planning Report - Geographic

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Project:	Lea County, NM (N83-NME)	**MD Reference:**	KB=26' @ 3085.0usft
Site:	Dogwood_AGI	**North Reference:**	Grid
Well:	Dogwood Fed Com 25-36-20 093H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PRELIM#1		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
2,000.0	2,000.0	0.0	0.0	Start Build 2.00
2,191.3	2,191.1	-6.4	0.6	Start 8572.8 hold at 2191.3 MD
5,043.0	5,036.5	-195.8	18.0	NMNM138912 Exit at 5043.0 MD
10,764.0	10,744.8	-575.9	53.0	KOP-Start DLS 12.00 TFO -175.31
11,450.0	11,244.4	-194.7	51.9	NMNM138912 Entry at 11450.0 MD
11,545.8	11,254.0	-99.5	51.0	LP-Start 10372.6 hold at 11545.8 MD
16,731.0	11,254.0	5,085.4	-0.7	NMNM138912 Exit at 16731.0 MD
21,918.4	11,254.0	10,272.6	-52.5	Start 50.0 hold at 21918.4 MD
21,968.4	11,254.0	10,322.6	-53.0	TD at 21968.4

U.S. Department of the Interior
Bureau of Land Management

2023

Carlsbad Field Office
Environmental Assessment

Environmental Assessment DOI-BLM-NM-P020-2023-0620-EA

Dogwood 25 36 20 Fed Com Multiwell
Lease Number NMNM138912
APD
Ameredev Operating LLC

Department of the Interior
Bureau of Land Management
Pecos District
Carlsbad Field Office
620 E Greene Street
Carlsbad, NM 88220
Phone: (575) 234-5972

Confidentiality Policy
Any comments, including names and street addresses of respondents, you submit may be made available for public review. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

TABLE OF CONTENTS

1. PURPOSE AND NEED FOR ACTION

1.1. Background

Ameredev Operating LLC (Ameredev) has applied for an Application for Permit to Drill on private surface accessing federal minerals approximately 5.7 west of Jal, NM to construct, operate and maintain two well pads and add additional wells to a previously approved pad for the proposed well locations.

Legal Description:

Proposed Well Pad 4N
Dogwood 25 36 20 Fed Com 104H
Surface Hole Location: 200' FSL & 1780' FWL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 2260' FWL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 124H
Surface Hole Location: 200' FSL & 1760' FWL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 2105' FWL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 093H
Surface Hole Location: 200' FSL & 1740' FWL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 1790' FWL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 113H
Surface Hole Location: 200' FSL & 1720' FWL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 1615' FWL, Section 17, T. 25 S, R. 36 E.

Proposed Well Pad 9N
Dogwood 25 36 20 Fed Com 108H
Surface Hole Location: 200' FSL & 846' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 380' FEL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 128H
Surface Hole Location: 200' FSL & 866' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 535' FEL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 097H
Surface Hole Location: 200' FSL & 886' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 850' FEL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 117H
Surface Hole Location: 200' FSL & 906' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 1025' FEL, Section 17, T. 25 S, R. 36 E.

Approved Well Pad 3N
Dogwood 25 36 20 Fed Com 111H
Surface Hole Location: 200' FSL & 360' FWL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 380' FWL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 122H
Surface Hole Location: 200' FSL & 400' FWL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 850' FWL, Section 17, T. 25 S, R. 36 E.

Approved Well Pad 7N
Dogwood 25 36 20 Fed Com 106H

Surface Hole Location: 200' FSL & 1720' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 1672' FEL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 126H
Surface Hole Location: 200' FSL & 1740' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 1790' FEL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 095H
Surface Hole Location: 200' FSL & 1760' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 2105' FEL, Section 17, T. 25 S, R. 36 E.

Dogwood 25 36 20 Fed Com 115H
Surface Hole Location: 200' FSL & 1780' FEL, Section 20, T. 25 S, R. 36 E.
Bottom Hole Location: 50' FNL & 2260' FEL, Section 17, T. 25 S, R. 36 E.

Preparing Office:
Pecos District, Carlsbad Field Office
620 East Greene Street
Carlsbad, NM 88220

1.2. Purpose and Need for Action

The purpose for the action is to provide the applicant with reasonable access to extract fluid minerals from a federal oil and gas lease.

The need for the action is established by BLM's responsibility under the Mineral Leasing Act of 1920 as amended, the Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976, the National Materials and Minerals Policy, Research and Development Act of 1980 and the Federal Onshore Oil and Gas Leasing Reform Act of 1987 to allow reasonable access to develop a federal oil and gas lease.

1.3. Decision to be Made

Based on the information provided in this Environmental Assessment (EA), the BLM Field Manager will decide whether to grant the APD application with appropriate mitigation measures, or whether to reject it.

1.4. Conformance with Applicable Land Use Plan(s)

The Proposed Action is in conformance with the 1988 Carlsbad Resource Management Plan, as amended by the 1997 Carlsbad Approved Resource Management Plan Amendment and the 2008 Special Status Species Approved Resource Management Plan Amendment.

Name of Plan: 1988 Carlsbad Resource Management Plan
Date Approved: September 1988
Decision: [Page 10] "In general, public lands are available for utility and transportation facility development…" [Page 13] "BLM will encourage and facilitate the development by private industry of public land mineral resources so that national and local needs are met, and environmentally sound exploration, extraction, and reclamation practices are used."

Name of Plan: 1997 Carlsbad Approved Resource Management Plan Amendment
Date Approved: October 1997
Decision: [Page 4] "Provide for leasing, exploration and development of oil and gas resources within the Carlsbad Resources Area." The proposed action aids in the development of oil and gas resources and complies with the Surface Use and Occupancy Requirements.

Name of Plan: 2008 Special Status Species Approved Resource Management Plan Amendment

Date Approved: April 2008
Decision: [Page 7-8] The BLM will continue to require oil and gas lessees to conduct operations in a manner that will minimize adverse impacts to resources, land uses, and other users. Leasing with requirements for Plans of Development (PODs) or Conditions of Approval (COAs) to ensure orderly development with a minimum of surface impact in lesser prairie-chicken and sand dune lizard habitats will be considered on a case-by-case basis, providing impacts from exploration and development will not cause unnecessary or undue impact to efforts to restore habitat.

1.5. Relationship to Statutes, Regulations or Other Plans

The following is a non-exclusive list of federal statutes that may apply to a proposed action:

- **Archaeological and Historic Preservation Act of 1974 (16 USC 469)** - Provides for the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of (1) flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alterations of the terrain caused by the construction of a dam by any agency of the United States, or by any private person or corporation holding a license issued by any such agency or (2) any alteration of the terrain caused as a result of any Federal construction project or federally licensed activity or program.
- **Archaeological Resources Protection Act of 1979, as amended (16 USC 470 et seq.)** - Secures, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals.
- **Clean Air Act of 1970, as amended (42 USC 7401 et seq.)** - Defines EPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer.
- **Clean Water Act of 1977, as amended (30 USC 1251)** - Establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
- **Endangered Species Act of 1973 (16 USC 1531 et seq.)** - Protects critically imperiled species from extinction as a consequence of economic growth and development untempered by adequate concern and conservation.
- **Federal Cave Resources Protection Act of 1988 (16 USC 4301 et seq.)** - Protects significant caves on federal lands by identifying their location, regulating their use, requiring permits for removal of their resources, and prohibiting destructive acts.
- **Incidental Take Permit per New Mexico's Endangered Plant Rule.** Prior to development, the applicant must apply for an Incidental Take Permit under NMAC 19.21.2.11 if the development is anticipated to "remove, harm, kill, or destroy" plants on New Mexico's endangered list at NMAC 19.21.2.9.
- **Lechuguilla Cave Protection Act of 1993** - Protects Lechuguilla Cave and other resources and values in and adjacent to Carlsbad Caverns National Park
- **Migratory Bird Treaty Act of 1918 (16 USC 703-712)** - Implements the convention for the protection of migratory birds.
- **Mining and Mineral Policy Act of 1970, as amended (30 USC 21)** - Fosters and encourages private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs.
- **National American Graves Protection and Repatriation Act of 1990 (25 USC 301)** - Provides a process for museums and Federal agencies to return certain Native American cultural items such as human remains, funerary objects, sacred objects, or objects of cultural patrimony to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations and includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on Federal and tribal lands, and penalties for noncompliance and illegal trafficking
- **National Historic Preservation Act of 1966, as amended (16 USC 470)** - Preserves historical and archaeological sites.

- **Wild and Scenic Rivers Act of 1968, as amended (16 USC 1271 et seq.)** - Preserves certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.
- **Wilderness Act of 1964 (16 USC 1131 et seq.)** - Secures for the American people of present and future generations the benefits of an enduring resource of wilderness.

Air quality standards in New Mexico are under the jurisdiction of the New Mexico Environment Department/Air Quality Bureau (NMED/NMAQB). The Environmental Improvement Act, NMSA 1978, and the Air Quality Control Act, NMSA 1978, dictate state air quality standards. Also, 40 CFR § 60 "Standards of Performance for New Stationary Sources" is administered by the NMED/NMAQB.

Additionally, **AMEREDEV** would comply with all applicable federal, state, and local laws and regulations; obtain the necessary permits for drilling, construction, completion, and operation; and certify that Surface Use Agreements have been reached with the private landowners, where required.

1.6. Scoping, Public Involvement, and Issues

The Carlsbad Field Office (CFO) publishes Land Use Planning (LUP) and National Environmental Policy Act (NEPA) documents to the national register known as ePlanning. The register allows you to review and comment online on BLM NEPA and planning projects. A hard copy of this NEPA project has been made available in the Carlsbad Field Office as well as in electronic format on ePlanning at https://eplanning.blm.gov

The draft EA (DOI-BLM-NM-P020-2023-0620-EA) was made available for public comment from August 14, 2023 to September 13, 2023. The BLM received two participation submissions.

Two of the comments expressed personal opinions in favor of or against the proposed action or alternatives without reasoning to meet the criteria for substantive comments pursuant to the BLM NEPA Handbook (H-1790-1) and therefore did not result in any changes to the analysis by the BLM.

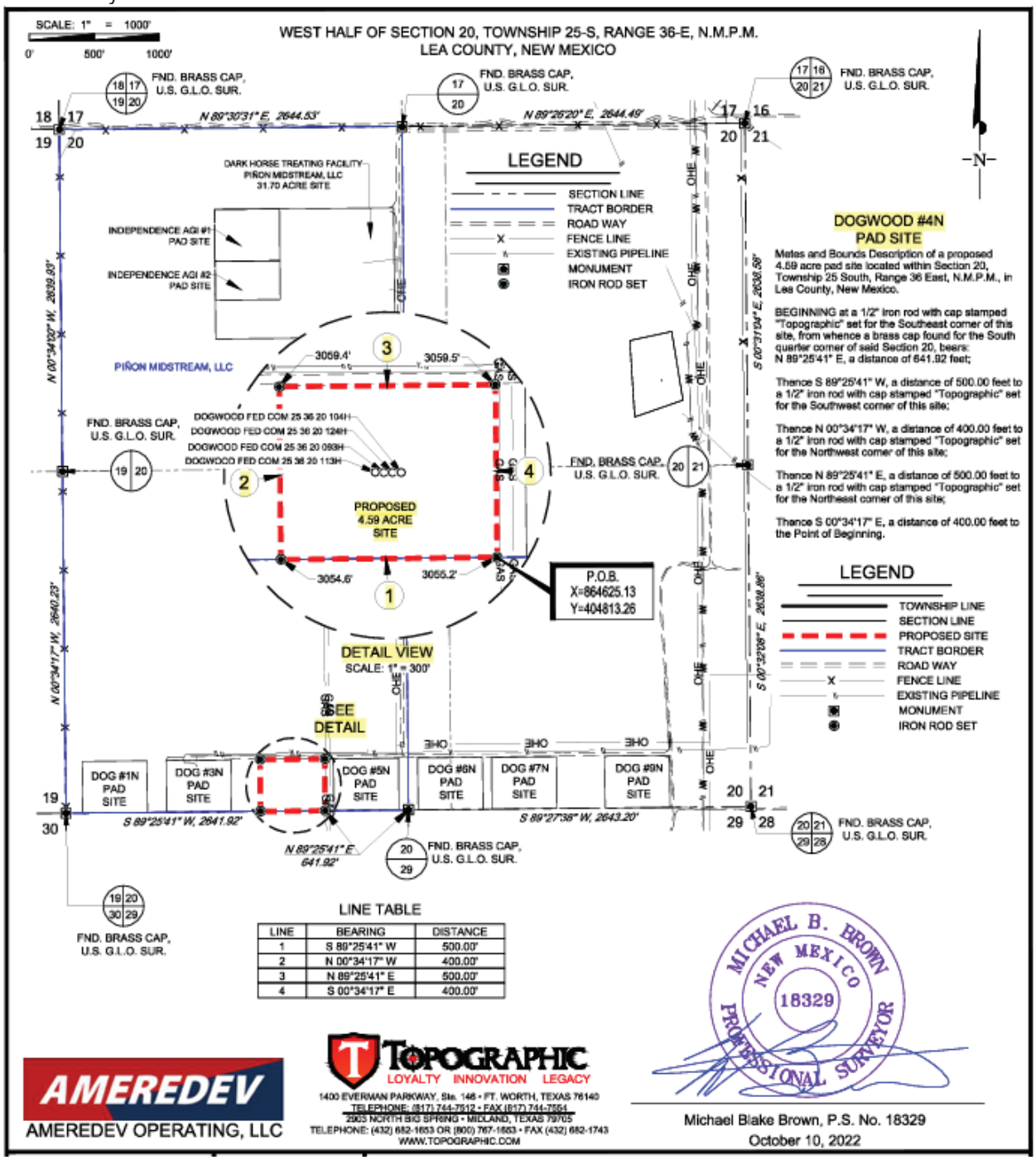
The CFO uses Geographic Information Systems (GIS) in order to identify resources that may be affected by the proposed action. A map of the project area is prepared to display the resources in the area and to identify potential issues. The proposed action was circulated among CFO resource specialists in order to identify any issues associated with the project. The issues that were raised include:

How would environmental justice communities be impacted by the proposed action?
How would air quality, including GHG emissions, be impacted by the proposed action?
How would climate change be impacted by the proposed action?
How would water resources be impacted by the proposed action?
How would watershed resources be impacted by the proposed action?
How would range management be impacted by the proposed action?
How would soils be impacted by the proposed action?
How would vegetation be impacted by the proposed action?
How would wildlife/habitat be impacted by the proposed action?
How would special status species be impacted by the proposed action?
Could noxious weeds be introduced to the project area as a result of the proposed action?
How would visual resources be impacted by the proposed action?
How would cultural resources be impacted by the proposed action?
How would paleontological resources be impacted by the proposed action?

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Proposed Action

The BLM Carlsbad Field Office is proposing to allow Ameredev to construct, operate, and maintain 14 horizontal oil wells on two new 500 x 400 foot surfaced well pads and two existing well pads. All areas not needed for production would be reclaimed by removing the caliche, recontouring the area, spreading the stockpiled topsoil over the area, and seeding the area. It is likely that the proposed well would be drilled within four years.



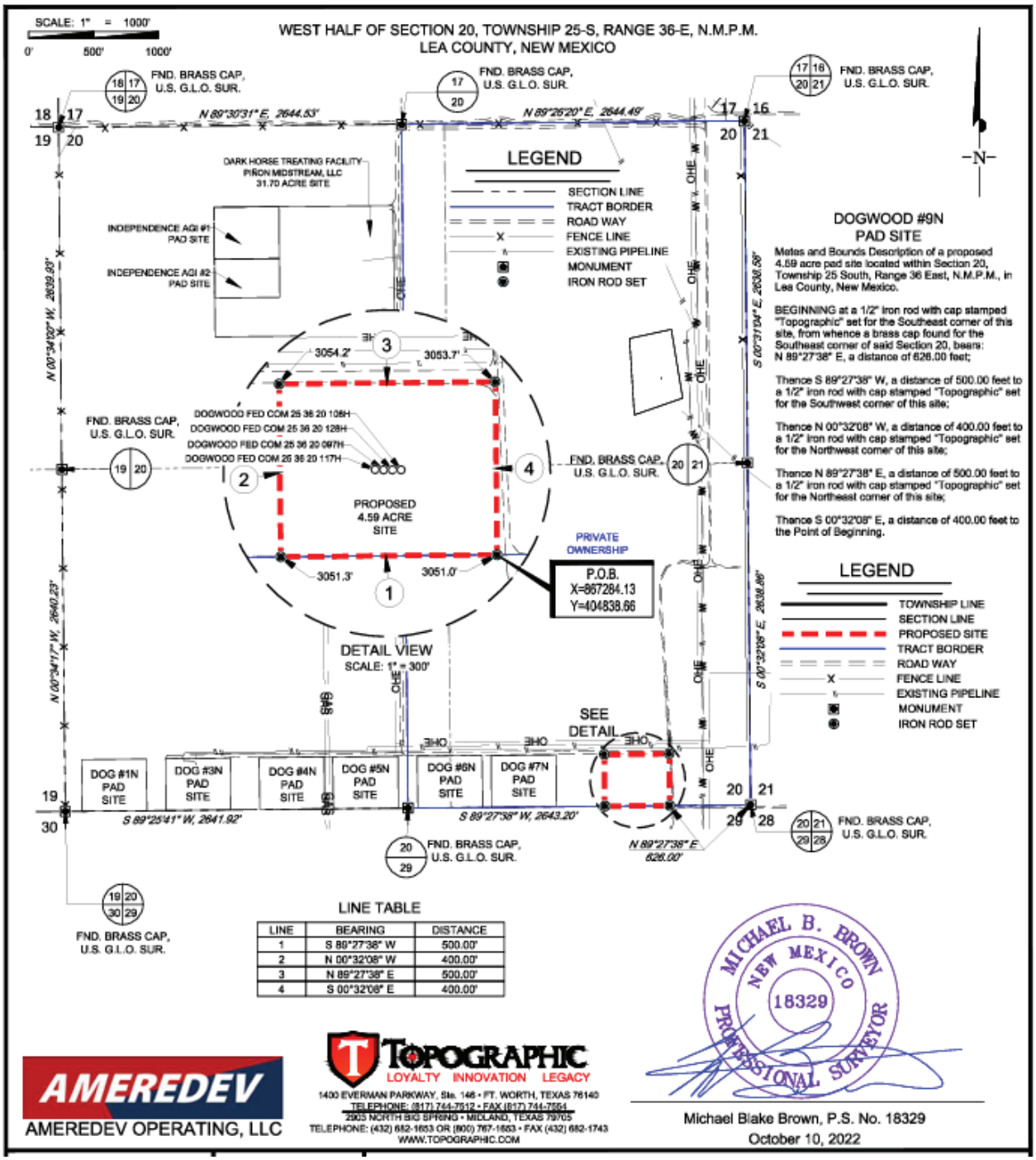


Table 2-1 Proposed Action Total Surface Disturbance:

Action	Length (ft.)	Width (ft.)	Acres
Well Pad 1	500	400	4.59
Well Pad Topsoil Stockpile	400	30	0.27
Well Pad 2	500	400	4.59
Well Pad Topsoil Stockpile	400	30	0.27
Total	-	-	9.73

Mitigation Measures:
Mitigation measures include: BLM Pecos District Conditions of Approval including special requirements for construction in Lesser Prairie-Chicken habitat.

2.2. No Action

The BLM NEPA Handbook (H-1790-1) states that for Environmental Assessments (EAs) on externally initiated proposed actions, the No Action Alternative generally means that the proposed activity will not take place. This option is provided in 43 CFR 3162.3-1 (h) (2). This alternative would deny the approval of the proposed application, and the current land and resource uses would continue to occur in the proposed project area. No mitigation measures would be required.

2.3. Alternatives Considered but Eliminated from Detailed Study

Field investigation of all areas of proposed surface disturbance for the Proposed Action were inspected to ensure that potential impacts to natural and cultural resources would be minimized through the implementation of mitigation measures. These measures are described for all resources potentially impacted in Chapter 3 of this EA. Therefore, no additional alternatives have been considered for this project.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The No Action Alternative reflects the current situation within the project area and will serve as the baseline for comparing the environmental impacts of the analyzed alternatives.

During the analysis process, the interdisciplinary team considered several resources and supplemental authorities. The interdisciplinary team determined that the resources discussed below would be affected by the proposed action.

Projects requiring approval from the BLM such as right of way grants can be denied when the BLM determines that adverse effects to resources (direct or indirect) cannot be mitigated to reach a Finding of No Significant Impact (FONSI). Under the No Action Alternative, the proposed project would not be implemented and there would be no new impacts to natural or cultural resources from the proposed project. The No Action Alternative would result in the continuation of the current land and resource uses in the project area and is used as the baseline for comparison of environmental effects of the analyzed alternatives.

During the analysis process, the interdisciplinary team considered several resources and supplemental authorities. The interdisciplinary team determined that the resources discussed below would be affected by the proposed action.

3.1. Environmental Justice

3.1.1 Affected Environment

The area of analysis for this environmental justice assessment is defined as the BLM Carlsbad Field Office (CFO) jurisdiction, in southeastern New Mexico. The CFO jurisdiction includes a portion of southwestern Chaves County, and Lea and Eddy Counties, New Mexico.

3.1.2 Impacts from the Proposed Action

Executive Order (EO) 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires federal agencies to determine if proposed actions have disproportionate and adverse environmental impacts on minority, low-income, and American Indian

populations of concern. BLM policy, as contained in BLM Land Use Planning Handbook H-1601-1 (BLM 2005), Appendix D, provides direction on how to fulfill agency responsibilities for EO 12898. Environmental justice (EJ) refers to the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, programs, and policies (CEQ 1997).

Following guidance from the Council on Environmental Quality (CEQ) for environmental justice concerns (CEQ 1997), the most recent available demographic data were examined to determine if environmental justice populations of concern are present in the area of analysis.

In 2010, minorities made up 60 percent of the population in the state of New Mexico compared to 36 percent in the United States as a whole. While the population of minorities in Lea and Eddy Counties (57% and 48%, respectively) substantially exceeded the United States average, it was below the state average. Based on the definition of a minority population (minority residents exceed 50% of all residents), Artesia (55%) and Loving (80%) in Eddy County and Hobbs (62%), Lovington (68%), and Jal (50%) in Lea County are all considered “environmental justice populations” for Environmental Justice compliance purposes (Census Bureau 2010). Within the area of analysis, Hispanics make up 49 percent of the total population and about 91 percent of the minority population.

Artesia and Loving are also considered environmental justice populations as determined by low-income status. All identified environmental justice populations should be considered for during implementation to avoid possible disproportionate and adverse impacts. The determination of potential adverse and disproportionate impacts from specific actions is the assessment of the BLM. This assessment should not be assumed to be the position of specific, potentially impacted, EJ populations. The BLM realizes that additional impacts may be identified by local EJ populations as specific development locations and types are proposed. As a result, this discussion assesses only the impacts for the issues identified by the BLM during internal scoping. The BLM would continue to work with affected EJ populations to identify and address additional EJ issues as they arise.

The federal government cannot dictate where oil and gas reserves may occur. Consequently, there may be instances where oil and gas exploration activities disproportionately and adversely impact environmental justice populations, due to proximity, for a limited time. The BLM CFO will utilize stipulations and best management practices (BMPs) to minimize impacts to minority and low-income populations during drilling operations, to the extent practicable.

Mitigation Measures

There are no Environmental Justice mitigation measures for this project, as currently proposed.

3.2. Air Resources

3.1.3 Affected Environment

The analysis area for this issue is the entirety of Lea, Eddy, and Chaves counties. This analysis area was selected because data on air quality emissions are collected at a county level, and the proposed action falls within these three counties. Much of the information in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as AR Technical Report) (BLM 2018).

Methodology and assumptions for calculating air pollutants are described in the AR Technical Report. This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one horizontal gas well. The calculators give an approximation of criteria pollutant, hazardous air pollutants (HAPs), and GHGs emissions to be compared with regional and national emissions levels. Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator (BLM 2018a). One horizontal gas well was chosen to represent the most maximum estimated level of air quality criteria pollutants that would be

emitted by a typical well in the New Mexico Permian Basin. Emissions for an oil well has been included in the Appendix X for comparison, in which emissions would be lower.

3.1.1.1 Air Quality

The U.S. Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants of carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O3), particulate matter equal to or less than 10 microns in diameter (PM_{10}), particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). The EPA has established NAAQS for criteria pollutants that are protective of human health and the environment. The EPA has approved New Mexico's State Implementation Plan and the State enforces State and Federal air quality regulations on all public and private lands.

"Design Values" are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The most recent design values for criteria pollutants within Eddy and Lea Counties are listed below in Table 3-1 (EPA 2018). These counties do not have monitoring data for CO, Pb, and particulate matter concentrations, but because the counties are relatively rural, it is likely that these pollutants are not elevated. Between 2014 and 2017, average estimated concentrations of PM_{10} in Lea County were not listed and it is assumed that monitoring has been discontinued with approval from EPA because the affecting sources have been shut down.

Table 3-1 2017 Design Values in Eddy and Lea Counties (EPA 2018)

Pollutant	2017 Design values	Averaging Time	NAAQS	NMAAQS[e]
O_3	0.068 parts per million (ppm) (Eddy County) 0.067 ppm (Lea County)	8-hour	0.070 ppm[a]	
NO_2	3 parts per billion (ppb) (Eddy County) 4 ppb (Lea County)	Annual	53 ppb[b]	50 ppb
NO_2	24 ppb (Eddy County), 32 ppb (Lea County)	1-hour	100 ppb[c]	
$PM_{2.5}$[d]	9 micrograms per cubic meter (µg/m^3) (Lea County)	Annual	12 µg/m^3[d]	
$PM_{2.5}$[d]	17 µg/m^3 (Lea County)	24-hour	35 µg/m^3[c]	

a Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years

b Not to be exceeded during the year

c 98th percentile, averaged over 3 years

d Annual mean, averaged over 3 years

e The New Mexico Ambient Air Quality Standards (NMAAQS) standard for Total Suspended Particulates (TSP), which was used as a comparison for PM_{10} and $PM_{2.5}$, was repealed as of November 30, 2018.

h While there are no NAAQS for hydrogen sulfide (H_2S), New Mexico has set 1/2-hour standards for H_2S at 0.100 ppm within Pecos-Permian AQ Control Region and 0.030 pp, for municipal boundaries and within five miles of municipalities with populations greater than 20,000 in areas of the state outside of the area within 5 miles of the (BLM 2018).

While all of the analysis area is in attainment of all NAAQs, including ozone, the site at 2811 Holland Street in Eddy County is the most closely watched due to the current design value of 0.068 ppm. The Carlsbad Caverns National Park is listed as having a monitor; however, the design value was not considered valid. While 0.68 is considered below the attainment value of 0.070 ppm, it is the highest design value of the monitoring stations in Eddy and Lea Counties. The potential amounts of ozone precursor emissions of nitrogen oxide(s) (NOx) and VOCs from the proposed action are not expected to impact the current design value for ozone in Chaves, Eddy, and Lea Counties; however, more information at the development stage will provide more information to better estimate air emissions from a specific project.

The Ozone Attainment Initiative is a project authorized by State Statute, 74-2-5.3 New Mexico Statutes Annotated 1978. This statute directs the New Mexico Environment Department to develop plans that may

include regulations more stringent than Federal rules for areas of the state in which ambient monitoring shows ozone levels at or above 95% of the NAAQS. Currently, both Lea and Eddy Counties are within 95% of the 2015 ozone standard of 70 ppb.

Air quality in a given region can also be measured by its Air Quality Index (AQI) value. The AQI is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (AQI <50), moderate (50–100), unhealthy for sensitive groups (100–150), unhealthy (>150), very unhealthy, and hazardous. The AQI is a national index; therefore, the air quality rating and the associated level of health concern is the same throughout the country. The AQI is an important indicator for populations sensitive to air quality changes (EPA 2018b).

AQI values for Chaves County were mainly in the good range (AQI <50) in 2017, with 94% of the days that had an AQI in that range. The median AQI in 2017 was 14, which indicates “good” air quality. The maximum AQI in 2015 was 112, which is “unhealthy for sensitive groups,” and the 90th percentile was 31.5, which is “good” air quality (EPA 2018b).

AQI values for Eddy County were generally in the good range (AQI <50) in 2017, with 67% of the days in that range and 30% of the days in the “moderate” air quality range. The median AQI in 2017 was 45, which indicates “good” air quality. The maximum AQI in 2015 was 140, which is “unhealthy for sensitive groups,” and the 90th percentile was 80, which is “moderate” air quality (EPA 2018b).

AQI values for Lea County were generally in the good range (AQI <50) in 2017, with 67 percent of the days in that range and 32% of the days in the “moderate” air quality range. The median AQI in 2017 was 45, which indicates “good” air quality. The maximum AQI in 2015 was 133, which is “unhealthy for sensitive groups,” and the 90th percentile was 68, which is “moderate” air quality (EPA 2018b). Table 3-2 lists the days where the AQI was “unhealthy for sensitive groups” or worse for the past 10 years. While there are some exceedances, the exceedances do not represent a trend of degrading AQIs.

Table 3-2 Number of Days Classified as “Unhealthy for Sensitive Groups” (AQI 101–150) or Worse (EPA 2018b)

Location	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chaves County	Days	0	0	0	0	0	1	0	0	0	1
Eddy County	Days	9	2	2	7	10	2	4	0	0	10
Lea County	Days	0	3	0	7	1	2	3	1	0	4

The primary sources of air pollution in the PDO are dust from blowing wind on disturbed or exposed soil, exhaust emissions from motorized equipment, oil and gas development, agriculture, and industrial sources. Table 3-5 shows total human-caused emissions for each of the counties in the PDO based on EPA’s 2014 emissions inventory in tons/year (EPA 2014).

The AR Technical Report discusses the relevance of HAPs to oil and gas development and the particular HAPs that are regulated in relation to these activities (BLM 2018a). The EPA conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the United States. The purpose of the NATA is to identify areas where HAP emissions result in high health risks and further emissions reduction strategies are necessary. The EPA has identified 187 toxic air pollutants as HAPs.

The 2005 NATA identifies census tracts with estimated total cancer risk greater than 100 in a million. There are no census tracts in New Mexico with estimated total cancer risk greater than 100 in a million. Southeastern New Mexico has a total respiratory hazard index that is among the lowest in the United States.

3.1.1.2 Climate Change and GHGs

The AR Technical Report summarizes information about greenhouse gas emissions from oil and gas development and their effects on national and global climate conditions. The analysis areas associated with this proposed action are the state of New Mexico, the United States, and the globe. These geographic scales are used in this analysis to provide multiple levels of context associated with GHG emissions as a result of oil and gas development. In addition, the effects of GHG emissions are global in nature.

Climate change is a statistically significant and long-term change in climate patterns. The terms climate change and "global warming," though often used interchangeably, are not the same. Climate change is any deviation from the average climate via warming or cooling and can result from both natural and human (anthropogenic) sources. Natural contributors to climate change include fluctuations in solar radiation, volcanic eruptions, and plate tectonics. Global warming refers to the apparent warming of climate observed since the early twentieth century and is primarily attributed to human activities such as fossil fuel combustion, industrial processes, and land use changes.

The two primary GHGs associated with the oil and gas industry are carbon dioxide (CO_2) and methane (CH_4). CH_4 has a global warming potential that is 21-28 times greater than the warming potential of CO_2. The CO_2 equivalent (CO_{2e}) which takes the difference in warming potential of greenhouse gases into account is reported throughout this document. For purposes of this analysis we also use a 100-year GWP of 25, parallel with the *U.S. EPA Inventory of Greenhouse Gas and Sinks* annual reporting metrics.. More information about the range of GWPs and timeframes are reported in the *AR Technical Report* and the supplemental white paper, *Cumulative BLM New Mexico Greenhouse Gas Emissions* (BLM 2018 & BLM 2019).

The AR Technical Report and the supplemental white paper, *Cumulative BLM New Mexico Greenhouse Gas Emissions* summarizes information about greenhouse gas emissions from past, present and reasonably foreseeable GHG emissions resulting from oil and gas development on BLM lands and their effects on national and global climate conditions (BLM 2018 & BLM 2019).

3.1.4 Impacts from the Proposed Action

Direct and Indirect Impacts *(Impacts, criteria Pollutants and HAPs)*

The AR Technical Report describes the increased criteria pollutant emissions as a result of well development. The most substantial criteria pollutants emitted by oil and gas development and production are VOCs, particulate matter, and NO_2. The number of proposed wells can be found in the proposed action, section 2.1 of this document. Table 3-3 shows estimated emissions and percent increases from existing conditions resulting from reasonably foreseeable well development occurring in 2019 for the Pecos District Office (PDO) planning area. The proposed action falls under the reasonably foreseeable development for the PDO Planning area and we incorporate the data as related to well development to estimate direct impacts from the proposed action (BLM 2019, Engler 2012 & SENM 2014). To facilitate quantification, this analysis assumes that all wells would be developed concurrently and in the same year, though it is more likely that future potential development would not occur in this manner. Emission calculations for construction, operations, maintenance and reclamation are included in Appendix A for a one-well oil and gas scenario.

Construction emissions for both an oil and gas well include well pad construction (fugitive dust), heavy equipment combustive emissions, commuting vehicles and wind erosion. Emissions from operations for an oil well include well workover operations (exhaust and fugitive dust), well site visits for inspection and repair, recompletion traffic, water and oil tank traffic, venting, compression and well pumps, dehydrators and compression station fugitives. Operations emissions for a gas well include well workover operations (exhaust and fugitive dust), wellhead and compressor station fugitives, well site visits for inspection and repair, recompletions, compression, dehydrators, and compression station fugitives. Maintenance emissions for both oil and gas wells are for road travel, and reclamation emission activities are for interim and final activities and include truck traffic, a dozer, blade, and track hoe equipment.

Emissions are anticipated to be at their highest level during the construction and completion phases of implementation (approximately 30 days in duration) because these phases require the highest degree of earth-moving activity, heavy equipment use, and truck traffic, compared with the operations and maintenance phases of implementation. Emissions are anticipated to decline during operations and maintenance as the need for earth-moving and heavy equipment declines.

One of the primary sources of particulate matter (PM10 and PM2.5) emissions is from construction during well development where dust and fine particulates are generated by on-site equipment and activities, as well as off-site vehicles (Araújo et al. 2014; Reid et al. 2010). How PM interacts with the environment is dependent on a variety of factors, with the size and chemical composition of the airborne particles being the most important in terms of dispersion (distance from the source) and deposition from the atmosphere. Impacts of particulate matter emissions would not be confined to the construction site because $PM_{2.5}$ (fine particles) can travel farther in terms of distance than PM_{10} (dust) and other total suspended particulates (particles of sizes up to 50 micrometers) and therefore can impact local residents in the surrounding area (Araújo et al. 2014). VOCs and NO_2 contribute to the formation of O_3, which is the pollutant of most concern in southeastern New Mexico (see Table 3.1) and because O_3 is not a direct emission, emissions of NOx and VOCs are used as a proxy for estimating O_3 levels.

The supplemental white paper *Cumulative BLM New Mexico Greenhouse Gas Emissions* provides information related to the reasonably foreseeable development for the PDO Planning area. Reasonable foreseeable development (2016-2035) shows well development with an average of 320 federal wells per year and 6,400 cumulative federal wells. The number of average wells, 320, is multiplied by the pollutant emission factor from Appendix A for a gas well scenario to calculate reasonably foreseeable emissions related to well development in 2019 (Table 3-3). The BLM understands that the timing of well development varies. Because well development varies (i.e. permit approval, well pad construction, spudding, and completion) the phases of development may not occur in succession but may be spread out in development over time. Historically well completions since 2014 has varied from 584 completed in 2014 to 378 wells completed in 2017 (Table 3-4). Table 3-3 shows the impacts (emissions increase) associated with reasonably foreseeably well development in the PDO for 2019.

Table 3-3 Percent Increase from Reasonable Foreseeable Development (RDF) of Oil and Gas Wells

	Emissions (Tons per Year)					
	PM_{10}	**$PM_{2.5}$**	**NOx**	**SO_2**	**CO**	**VOC**
Human-caused Current Emissions (Chaves, Eddy and Lea counties)	40,085	6,021	29,482	1,886	50,227	115,793
One well emissions[a]	*5.31*	*0.81*	*6.19*	*0.11*	*2.63*	*1.17*[b]
Total Emissions for 2019 Reasonably Foreseeable Well Development (320 wells)	1699.2	259.2	1980.8	35.20	841.6	374.4
Percent Increase	4.23%	4.30%	6.72%	1.87%	1.68%	0.32%

[a] The representative well used to calculate emissions is a horizontal gas well. Emissions for vertical wells were not used from this analysis due to current predominance in horizontal technological drilling methods and because presenting horizontal gas wells emissions estimates represents a more conservative summary of emissions, compared with emissions from a vertical well, with the exception of SO_2, which could be 4 to 5 times greater in a vertical well scenario. However, sulfur dioxide emissions are still estimated to be within the same magnitude and less <1 ton per year of SO_2 emissions per well. See Appendix A for additional discussion of emission factors.
[b] VOC emissions at the operational phase represent a 95% control efficiency and estimates potential emissions representing the contribution for “one oil well” from the emissions at storage tanks, gathering facilities, etc.

While impacts to air quality on a broad-scale in the analysis area show an addition of 6.72% and approximately 4% for NOx and PM respectively, the proposed action would result in even smaller

individualized impacts as development would not occur at the same time and in the same space but over a span of time. Localized and short term impacts to air quality for nearby residences from emissions of particulate matter, NOx, VOCs, and HAPs is expected. Under the Proposed Action, the additional NOx and VOCs emitted from the oil and gas wells are anticipated to be too small in quantity to result in exceedances of O_3 in the analysis area. This incremental addition would not be expected to result in an exceedance of the NAAQS or State air quality standards for any criteria pollutants in the analysis area because the addition of criteria pollutants and VOCs, as shown in Table 3-3 are scaled down to the proposed action level.

Hazardous Air Pollutants (HAPs)

The formulas used for calculating HAPs in the calculators are very imprecise. For many processes it is assumed that emission of HAPs will be equivalent to 10% of VOC emissions. Therefore the HAP emissions reported here should be considered a very gross estimate and likely an overestimate. The calculator estimates that a maximum of 37.44 tons/year of HAPs would be emitted during the construction, and first year of operation during the development of 320 wells using emission factors from a gas well in the Permian Basin. The emissions are a combination of HAP constituents existing in natural gas and released during the completion and operation process. Most gas vented during the completion process is flared, which substantially reduces the quantity of HAPs released.

Impacts Climate Change and GHGs

Climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contributio to global GHGs from a proposed land management action cannot be accurately translated into effects on climate change globally or in the area of any site-specific action. Currently, Global Climate Models are unable to forecast local or regional effects on resources (IPCC 2013). However, there are general projections regarding potential impacts to natural resources and plant and animal species that may be attributed to climate change from GHG emissions over time; however these effects are likely to be varied, including those in the southwestern United States (Karl, 2009).

Climate change projections are based on a hierarchy of climate models that range from simple to complex, coupled with comprehensive Earth System Models. Additional near-term warming is inevitable due to the thermal inertia of the oceans and ongoing GHG emissions. A more detailed discussion of climate change and the relationship of GHGs to climate change as well as the intensity and effects on national and global climate is presented in the AR Technical Report and the supplemental white paper, *Cumulative BLM New Mexico Greenhouse Gas Emissions* (BLM 2018 & BLM 2019).

Analysis of the impacts of the proposed action using GHG emissions as a proxy for impacts are reported below in Table 3-4. Direct impacts of the proposed action are the result of well development activities that includes drill rig operations, workover operations (exhaust), recompletion traffic, venting, compression and well pumps, dehydrators and compression station fugitives as well as other sources that generate carbon dioxide, methane, nitrous oxide.

The *Cumulative BLM New Mexico Greenhouse Gas Emissions* provides information related to the reasonably foreseeable development for the BLM PDO Planning area. Reasonable foreseeable development (2016-2035) shows an average of 320 federal wells per year could be developed and 6,400 cumulative federal wells. Reasonably foreseeable oil and gas production is also provided where total cumulative federal production would result in 1116.73 MMT of CO2e over the life of the RFD (BLM 2019). In 2019, RFD volumes show indirect GHG emissions would be emitted from 79.39 MMbbls of oil and 304,935 MMcf of gas. This proposed action falls under the reasonably foreseeable development and end-use combustion of oil and gas for the PDO area and we incorporate the data as related to well development and production volumes to estimate direct and indirect GHG impacts from the proposed action (Engler 2012 & SENM 2014). The proposed action will yield approximately 795,000 barrels of oil equivalent (BOE) for every horizontal well completed in the Bone Spring Sand and 1,116,000 BOE for per well drilled in the Wolfcamp Shale (Mire and Moomaw 2017). The proposed action would result in end use combustion emissions of 341,850 MT of CO2e per Bone Spring Sand well and 479,880 MT of CO2e for per Wolfcamp Shale Well.

Historically well completions since 2014 has varied from 584 completed in 2014 to 378 wells completed in 2017 (Table 3-4). Table 3-4 also shows the direct GHG emissions associated with reasonably foreseeably well development in the Pecos District Office for 2019. GHG emission calculations for construction, operations, maintenance and reclamation are included in Appendix A for a one-oil and gas well scenario. The AR Technical report provides annual updates to actual well completions in the Pecos District Office in which we then associate the GHG emission factor from Appendix A to the number of well completions per year. Table 3-5 presents indirect end-use GHG emissions for the United States, New Mexico as well as the major BLM federal oil and gas basins associated with the reasonably foreseeable production of oil and gas. A discussion of the methodology and assumptions for this data is contained in the *Cumulative BLM New Mexico Greenhouse Gas Emissions* (BLM 2019). The proposed action falls under the reasonably foreseeable development for the PDO area and we incorporate the data as related to production data to calculate indirect impacts from the proposed action (Engler 2012 & SENM 2014). Historically CO2e emissions from federal oil and gas production for the PDO has varied from 40.10 MMT of CO2e/year in 2014 to 48.85 MMT of CO2e/year in 2017. The reasonably foreseeable indirect GHG emissions resulting from oil and gas well development in 2019 is estimated at 50.82 MMT CO2e/year (Table 3-4).

Table 3-4 Well Completions and estimated GHG emissions based on APD Activity

Pecos District Office	2014	2015	2016	2017	2018	BLM 2019 RFD	BLM RFD (2016-2035)
# of BLM Well Completions*	584	400	389	378	518	320	6,400
Metric Tons of CO2e/year	731,517	501,039	487,260	473,482	648,846	400,831	8,016,624

*Emission factor (metric tons of CO2e per well) is from Tables A 1-2 of Appendix A
# of BLM federal & non-federal wells in PDO RFD (2016-2037) is 16,000.
*PDO BLM wells Includes completions from Carlsbad, Hobbs and Roswell Field Offices
*Wells completed reported from AFMSS 1&2 with run date June 20, 2019.

Table 3-5 Historical oil and gas production and Reasonably Foreseeable Development

Oil and Gas Production	2014	2015	2016	2017	RFD
U.S. Oil Production (Mbbls)[1]	3,196,889	3,442,188	3,232,025	3,413,376	3,639,277
New Mexico Oil Production (Mbbls)	125,021	147,663	146,389	171,440	*
PDO Oil Production (Mbbls)	62,007	73,344	74,810	76,307	79,389
FFO Oil Production (Mbbls)	5,755	8,457	6,889	5,980	5,451
U.S. Gas Production (MMcf)[1]	25,889,605	27,065,460	26,592,115	27,291,222	30,743,208
New Mexico Gas Production (MMcf)	1,140,626	1,151,493	1,139,826	1,196,514	*
PDO Gas Production (MMcf)	245,550	281,713	287,347	293,094	304,935
FFO Gas Production (MMcf)	664,211	642,211	596,747	464,709	196,868
GHG Emissions					
Total U.S. O&G GHG Emissions (MMT) CO2e1	2791.29	2961.11	2844.84	2961.08	3,247
Total New Mexico O&G GHG Emissions (MMT CO2e)	116.17	126.50	125.32	139.19	138.9
Total PDO O&G GHG Emissions (MMT CO2e)	40.10	46.95	47.89	48.85	50.82
Total FFO O&G GHG Emissions (MMT CO2e)	38.82	38.78	35.62	28.00	13.12

1 RFD for the U.S. data projects productions volumes based on year 2020.
*The RFD for New Mexico production is for year 2020. Production volumes to estimate total GHGs use both production and consumption volumes using data from Golder Associates 2017.The methodology can be found in this report.

Cumulative Impacts Criteria Pollutants, HAPs and GHGs

Activities that contribute to levels of air pollutant and GHG emissions in the Permian Basin include fossil fuel industries, vehicle travel, industrial construction, potash mining, and others. A complete inventory of criteria pollutant emissions can be found in a report titled “Southeast New Mexico Inventory of Air Pollutant Emissions and Cumulative Air Impact Analysis 2007” (AES 2011). The AR Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present and reasonably foreseeable impacts to air resources (BLM, 2018). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

The AR Technical Report discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands. However, the small incremental increase in GHGs from this project will not have a measurable impact on climate. Because GHGs affect climate change and climate change is a result various processes occurring in tandem with other global processes, in analyzing direct and indirect impacts we also analyze for cumulative impacts.

The emissions calculator estimated that there could be small direct increases in several criteria pollutants, HAPs, and GHGs as a result of the proposed action. The small increase in emissions that could result from approval of the proposed action would not result in Eddy, Lea, or Chavez County exceeding the NAAQS for any criteria pollutants. The applicable regulatory threshold for HAPs is the oil and gas industry National Emissions Standards for Hazardous Air Pollutants, which are currently under review by the EPA. The emissions from the proposed well are not expected to impact the 8-hour average ozone concentrations, or any other criteria pollutants in the Permian Basin.

Mitigation Measures and Residual Impacts

A discussion on mitigation measures can be found in the section of *Cumulative BLM New Mexico Greenhouse Gas Emissions, A Supplemental White Paper*.

Cumulative Impacts Criteria Pollutants, HAPs and GHGs

Activities that contribute to levels of air pollutant and GHG emissions in the Permian Basin include fossil fuel industries, vehicle travel, industrial construction, potash mining, and others. A complete inventory of criteria pollutant emissions can be found in a report titled “Southeast New Mexico Inventory of Air Pollutant Emissions and Cumulative Air Impact Analysis 2007” (AES 2011). The AR Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present and reasonably foreseeable impacts to air resources (BLM, 2018). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

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Table 3-6 Relative Oil and Gas Combustion Emissions

Emissions Scope	$CO2_e$ (Million Metric Tonnes)
U.S. Total *	3,829.2
New Mexico **	27.7
Life of Project ***	2.74

*Source: Inventory of U.S. Greenhouse Gas emissions and Sinks: 1990-2019, Table 3-5
**https://cnee.colostate.edu/wp-content/uploads/2021/01/New-Mexico-GHG -Inventory-and-Forecast-Report_2020-10-27_final.pdf, Table 2
***BLM Lease Sale Emissions Tool (08/03/2023)

Monetized Impacts from GHGs

The "social cost of carbon", "social cost of nitrous oxide", and "social cost of methane" – together, the "social cost of greenhouse gases" (SC-GHG) are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year.

On January 20, 2021, President Biden issued E.O. 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*.[1] Section 1 of E.O. 13990 establishes an Administration policy to, among other things, listen to the science; improve public health and protect our environment; ensure access to clean air and water; reduce greenhouse gas emissions; and bolster resilience to the impacts of climate change.[2] Section 2 of the E.O. calls for Federal agencies to review existing regulations and policies issued between January 20, 2017, and January 20, 2021, for consistency with the policy articulated in the E.O. and to take appropriate action.

Consistent with E.O. 13990, the Council on Environmental Quality (CEQ) rescinded its 2019 "Draft National Environmental Policy Act Guidance on Considering Greenhouse Gas Emissions" and has begun to review for update its "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews" issued on August 5, 2016 (2016 GHG Guidance).[3] While CEQ works on updated guidance, it has instructed agencies to consider and use all tools and resources available to them in assessing GHG emissions and climate change effects including the 2016 GHG Guidance.[4]

Regarding the use of Social Cost of Carbon or other monetized costs and benefits of GHGs, the 2016 GHG Guidance noted that NEPA does not require monetizing costs and benefits.[5] It also noted that "the weighing of the merits and drawbacks of the various alternatives need not be displayed using a monetary cost-benefit analysis and should not be when there are important qualitative considerations."[6]

Section 5 of E.O. 13990 emphasized how important it is for federal agencies to "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account" and established an Interagency Working Group on the Social Cost of Greenhouse Gases (the "IWG"). [7] ").

[1] 86 FR 7037 (Jan. 25, 2021).
[2] *Id*., sec. 1.
[3] 86 FR 10252 (February 19, 2021).
[4] *Id.*
[5] 2016 GHG Guidance, p. 32, available at: https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf
[6] *Id*.
[7] E.O. 13990, Sec. 5.

In February of 2021, the IWG published *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide: Interim Estimates under Executive Order 13990*(IWG, 2021).[8] This is an interim report that updated previous guidance from 2016.
In accordance with this direction, this subsection provides estimates of the monetary value of changes in GHG emissions that could result from selecting each alternative. Such analysis should not be construed to mean a cost determination is necessary to address potential impacts of GHGs associated with specific alternatives. These numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document. SC-GHG is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decision-making.
For Federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the social cost of carbon dioxide (SC-CO_2), methane (SC-CH_4), and nitrous oxide (SC-N_2O) developed by the Interagency Working Group (IWG) on the SC-GHG. Select estimates are published in the Technical Support Document (IWG 2021)[9] and the complete set of annual estimates are available on the Office of Management and Budget's website[10].

The IWG's SC-GHG estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less significant factor in present-day decisions). The current set of interim estimates of SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG 2021).
As expected with such a complex model, there are multiple sources of uncertainty inherent in the SC-GHG estimates. Some sources of uncertainty relate to physical effects of GHG emissions, human behavior, future population growth and economic changes, and potential adaptation (IWG 2021). To better understand and communicate the quantifiable uncertainty, the IWG method generates several thousand estimates of the social cost for a specific gas, emitted in a specific year, with a specific discount rate. These estimates create a frequency distribution based on different values for key uncertain climate model parameters. The shape and characteristics of that frequency distribution demonstrate the magnitude of uncertainty relative to the average or expected outcome.
To further address uncertainty, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the SC-GHG estimates reflect the average damages from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of damages estimated, applying a 3% annual discount rate for future economic effects. This is a low probability, but high damage scenario, represents an upper bound of damages within the 3% discount rate model. The estimates below follow the IWG recommendations.
The SC-GHGs associated with estimated emissions from the proposed action alternative are analyzed in the first part of this subsection. These estimates represent the present value of future market and nonmarket costs associated with CO_2, CH_4, and N_2O emissions. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM's estimates of emissions in each year. They are rounded to the nearest $1,000.

Table 3-7. SC-GHGs Associated with Future Potential Development

[8] https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf
[9] IWG 2021. *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under Executive Order 13990.* Interagency Working Group on Social Cost of Greenhouse Gasses, February 2021.
[10] https://www.whitehouse.gov/omb/information-regulatory-affairs/regulatory-matters/#scghgs

	Social Cost of GHG (2020$)			
	Average Value, 5% discount rate	**Average Value, 3% discount rate**	**Average Value, 2.5% discount rate**	**95th Percentile Value, 3% discount rate**
Development and Operations	$9,528,000	$30,313,000	$43,996,000	$88,002,000
End-Use	$31,804,000	$110,277,000	$163,928,000	$329,043,000
Total	**$41,332,000**	**$140,590,000**	**$207,924,000**	**$417,045,000**

Source: BLM Lease Sale Emissions Tool and BLM SC-GHG Calculator (08/03/2023).

3.3. Water Resources

The BLM Pecos District Office, which oversees the Carlsbad and Roswell Field Offices and the Hobbs Field Station, encompasses over 3.5 million acres of public lands and over 7 million acres of Federal mineral estate. The Pecos District includes the New Mexico portion of the Permian Basin, a sedimentary depositional basin. The Permian Basin is one of the premier oil and gas producing regions in the United States (U.S.), and prolific producing horizons occur in the New Mexico portion of the basin in Eddy and Lea Counties. The Permian Basin has been a producing oil and natural gas field since the early 1900s. There are approximately 15,660 active Federal wells are within the boundary of the Pecos District.

This section presents information on existing and projected water quantity and water quality data for the Pecos District as summarized from information gathered from the Reasonable Foreseeable Development (RFD) Scenario for the BLM. New Mexico Pecos District (Engler and Cather 2012) and 2014, and data compiled from a 2015 USGS report, Estimate Use of Water in the United States in 2015 (Dieter et. al. 2018), and FracFocus, a national hydraulic fracturing chemical registry managed by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission (FracFocus 2018).

3.3.1. *Affected Environment*

Water Quantity

Existing Surface and Ground Water Use in the Pecos District

The 2015 USGS Report, Estimate Use of Water in the United States in 2015 (Dieter et al. 2018), lists total water withdrawals across eight water use categories: aquaculture, domestic, industrial, irrigation, livestock, mining, public water supply, and thermoelectric power. Tables 3.6 through Table 3.8 list the total 2015 water withdrawals in for the eight water use categories for each of the three counties within the Pecos District (“Pecos District Tri-County Area”). Table 3-9 presents combined water use for the Pecos District Tri-County Area. This area is roughly analogous to the New Mexico portion of the Permian Basin. As shown in the tables, Irrigation is the largest category of water use in all counties, accounting for an average of 75 percent (466,784 acre-feet ([AF]) of the total water withdrawal for the Pecos District Tri-County Area (619,375 AF). Approximately 88 percent (545,154 AF) of the total water use for Pecos District Tri-County Area is from groundwater. Mining (which includes oil and gas development) comprises approximately 15 percent of Pecos District Tri-County Area water withdrawals. All mining-related water use (94,758 AF) is from groundwater. Of that total, 99 percent of withdrawals are from saline sources. Most (87 percent) mining-related water use occurs in Lea County, where mining comprises 31 percent of the total county withdrawals. The relative use of water by industry within the Pecos District Tri-County Area is depicted in Figure 1. The relative use of surface water and fresh/ saline groundwater by industry within the Pecos District Tri-County Area is depicted in Figure 2.

Table 3-6 Lea County 2015 Water Use by Category (af/yr)

Category	Surface Water				Groundwater				Total Withdrawals					
	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	Percent Total Use	AF Saline	Percent Total Use	AF Total	Percent Total Use
Public Water Supply	0	0	0	0%	11,423	0	11,423	100%	11,423	100%	0	0%	11,423	4%
Industrial	0	0	0	0%	78	0	78	100%	78	100%	0	0%	78	0%
Irrigation	0	0	0	0%	166,099	0	166,099	100%	166,099	100%	0	0%	166,099	62%
Livestock	56	0	56	2%	2,870	0	2,870	98%	2,926	100%	0	0%	2,926	1%
Aquaculture	0	0	0	0%	0	0	0	0%	0	0%	0	0%	0	0%
Mining	0	0	0	0%	325	81,642	81,968	100%	325	0.4%	81,642	99.6%	81,968	31%
Thermoelectric power	0	0	0	0%	1,827	0	1,827	100%	1,827	100%	0	0%	1,827	1%
Domestic	0	0	0	0%	1,513	0	1,513	100%	1,513	100%	0	0%	1,513	1%
County Totals	**56**	**0**	**56**	**0%**	**184,136**	**81,642**	**265,778**	**100%**	**184,192**	**69%**	**81,642**	**31%**	**265,834**	**100%**

Source: Dieter et al. 2017.

Table 3-7 Eddy County 2015 Water Use by Category (af/yr)

Category	Surface Water				Groundwater				Total Withdrawals					
	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	Percent Total Use	AF Saline	Percent Total Use	AF Total	Percent Total Use
Public Water Supply	0	0	0	0%	15,077	0	15,077	100%	15,077	100%	0	0	15,077	8%
Industrial	0	0	0	0%	1,043	0	1,043	100%	1,043	100%	0	0%	1,043	1%
Irrigation	64,054	0	64,054	42%	89,994	0	89,994	58%	154,048	100%	0	0%	154,048	84%
Livestock	34	0	34	3%	1,289	0	1,289	97%	1,323	100%	0	0%	1,323	1%
Aquaculture	0	0	0	0%	0	0	0	0%	0	0%	0	0%	0	0%
Mining	0	0	0	0%	1,169	10,993	12,162	100%	1,169	10%	10,993	90%	12,162	6%
Thermoelectric power	0	0	0	0%	0	0	0	0%	0	0%	0	0%	0	0%
Domestic	0	0	0	0%	258	0	258	100%	258	100%	0	0%	258	0%
County Totals	**64,088**	**0**	**64,088**	**35%**	**108, 830**	**10,993**	**119,823**	**65%**	**172,918**	**94%**	**10,993**	**6%**	**183,910**	**100%**

Source: Dieter et al. 2017.

Table 3-8 Chavez County 2015 Water Use by Category (af/yr)

Category	Surface Water				Groundwater				Total Withdrawals					
	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	Percent Total Use	AF Saline	Percent Total Use	AF Total	Percent Total Use
Public Water Supply	0	0	0	0%	12970	0	12,970	100%	12,970	100%	0	0	12,970	8%
Industrial	0	0	0	0%	0	0	0	0%	0	0%	0	0%	0	0%
Irrigation	9,854	0	9,854	7%	136,784	0	136,784	93%	146,638	100%	0	0%	146,638	86%
Livestock	224	0	224	3%	6,378	0	6,378	97%	6,603	100%	0	0%	6,603	4%
Aquaculture	0	0	0	0%	1,782	0	1,782	100%	1,782	100%	0	0%	1,782	1%
Mining	0	0	0	0%	78	1,592	1,670	100%	78	5%	1,592	95%	1,670	1%
Thermoelectric power	0	0	0	0%	0	0	0	0%	0	0%	0	0%	0	0%
Domestic	0	0	0	0%	1,009	0	1,009	100%	1,009	100%	0	0%	1,009	1%
County Totals	**10,078**	**0**	**10,078**	**6%**	**159,003**	**1,592**	**160,594**	**94%**	**169,080**	**99%**	**1,592**	**1%**	**170,672**	**100%**

Source: Dieter et al. 2017.

Table 3-9 Pecos District Tri-County Area 2015 Water Use by Category (af/yr)

Category	Surface Water				Groundwater				Total Withdrawals					
	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	Percent Total Use	AF Saline	Percent Total Use	AF Total	Percent Total Use
Public Water Supply	-	-	-	0%	39,470	-	39,470	100%	39,470	100%	0	0	39,470	6%
Industrial	-	-	-	0%	1,121	-	1,121	100%	1,121	100%	0	0%	1,121	0%
Irrigation	73,908	-	73,908	16%	392,877	-	392,877	84%	466,784	100%	0	0%	466,784	75%
Livestock	314	-	314	3%	10,537	-	10,537	97%	10,851	100%	0	0%	10,851	2%
Aquaculture	-	-	-	0%	1,782	-	1,782	100%	1,782	100%	0	0%	1,782	0%
Mining	-	-	-	0%	1,573	94,227	95,800	100%	1,573	1%	24,227	99%	95,800	15%
Thermoelectric power	-	-	-	0%	1,827	-	1,827	100%	1,827	100%	0	0%	1,827	0%
Domestic	-	-	-	0%	2,780	-	2,780	100%	2,780	100%	0	0%	2,780	0%
District Totals	**74,221**	**-**	**74,221**	**12%**	**451,968**	**24,227**	**546,195**	**88%**	**526,195**	**85%**	**24,227**	**15%**	**620,416**	**100%**

Source: Dieter et al. 2017.

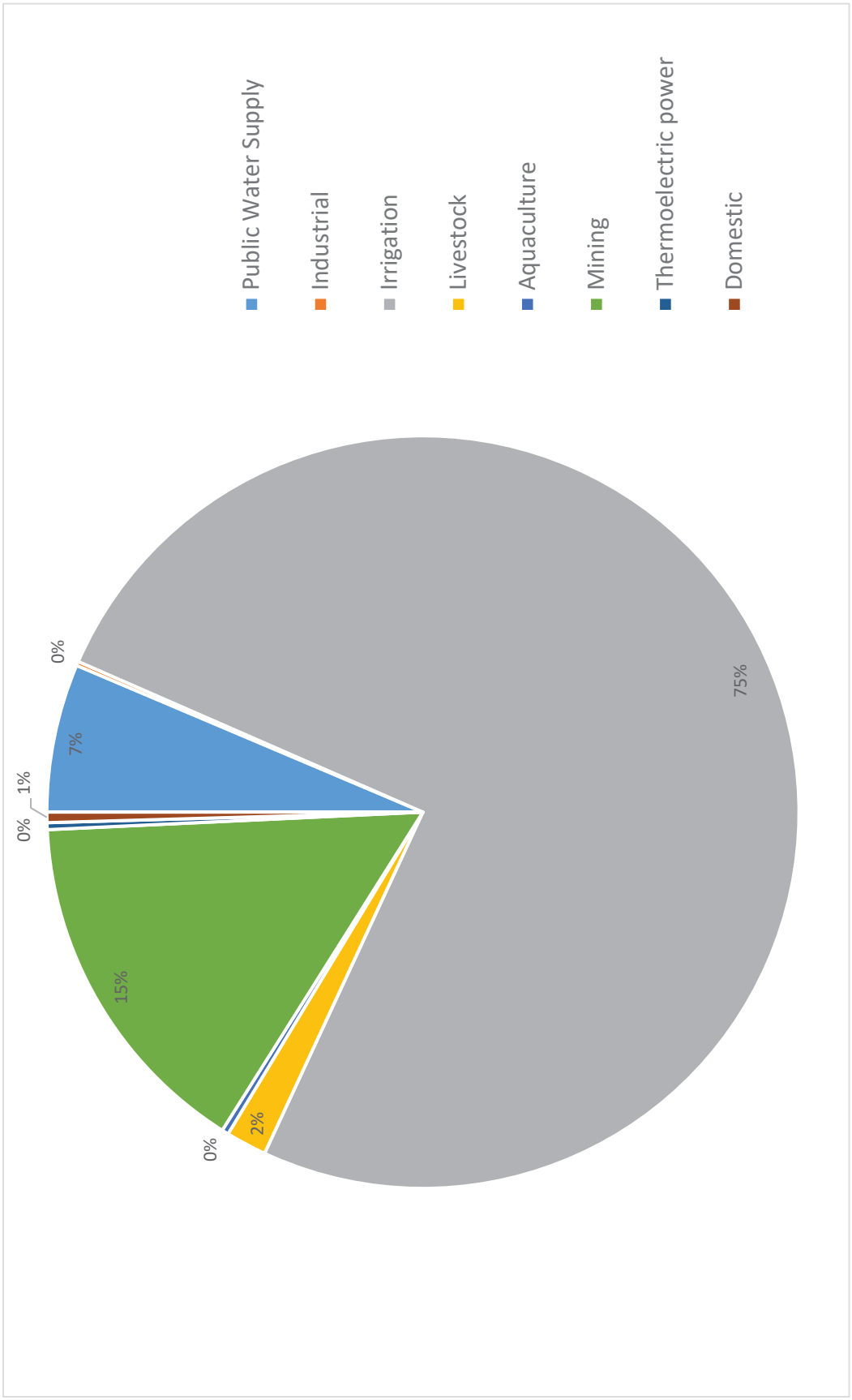
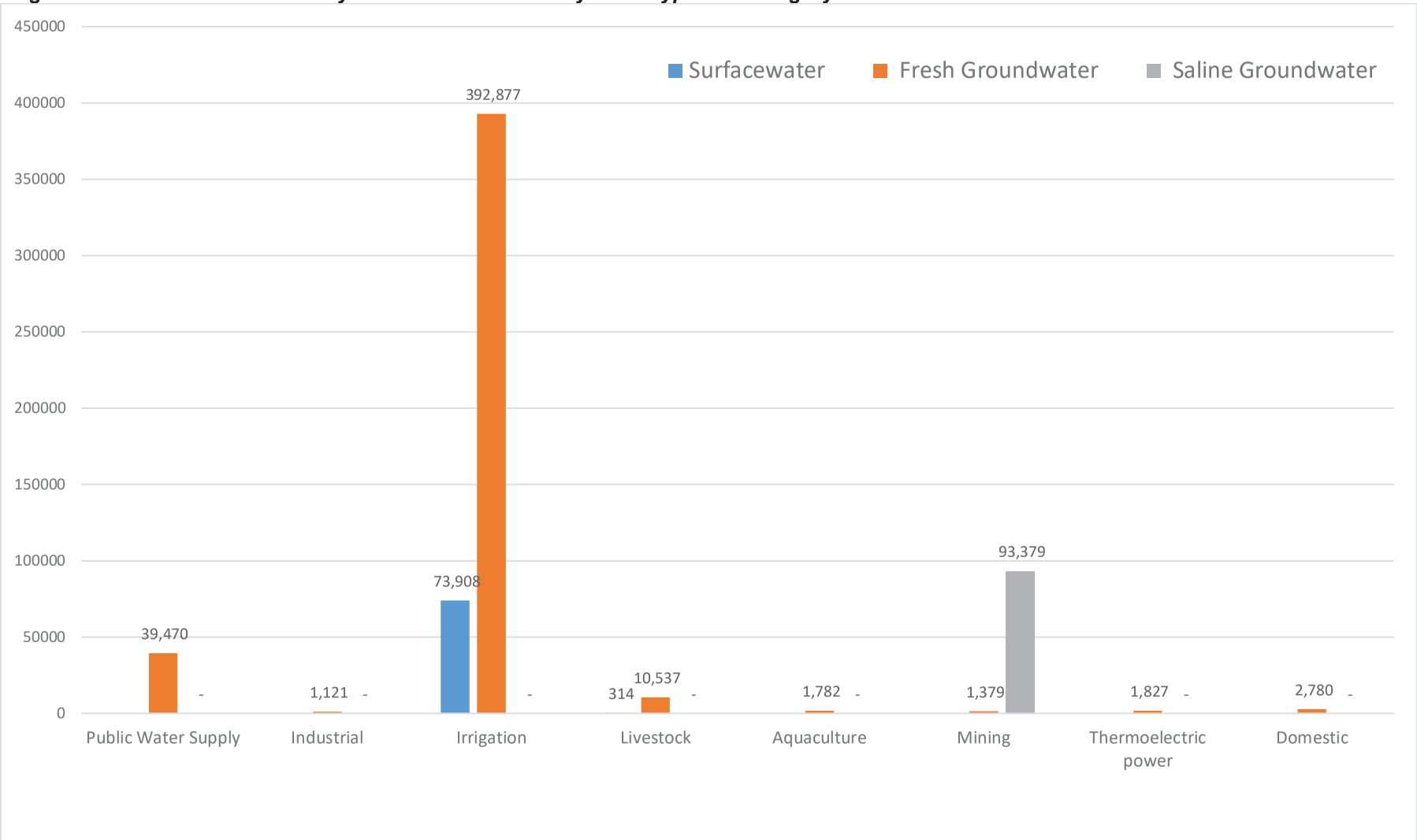


Figure 1 Pecos District Tri-County Area 2015 water use by category

Source: Dieter et al. 2017.

Figure 2 Pecos District Tri-County Area 2015 water use by water type and category



Source: Dieter et al. 2017.

State of New Mexico Water Use

In 2015, withdrawals for all water use categories across the State of New Mexico totaled 3,249,667 AF (USGS 2015). Pecos District Tri-County Area total water usage (619,375 AF) accounted for about 19 percent of the total state withdrawals. Table 3-10 lists the water for the major categories in New Mexico. As shown in the table, Mining water withdrawals totaled 163,901 AF, or about 5 percent of the total water withdrawals for the State of New Mexico. While the data presented in this table are for the state as a whole; most water use in this category is from the Permian Basin with some water use from the San Juan Basin. Table 3-11 presents water use associated with oil and gas development in New Mexico, by county. As shown in the table, over 99 percent of the water use associated with oil and gas development occurs in the Pecos District Tri-County Area (3,994 AF). Water use associated with oil and gas development comprises approximately 2.5 percent of the statewide Mining water use (163,901 AF, see Table 3-10) and 4.2% of the Pecos District Tri-County Area Mining water use (94,758 AF, see Table 3-9).

Table 3-10 State of New Mexico Use by Category (AF/yr)

Category	Surface Water				Groundwater				Total Withdrawals					
	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	AF Saline	AF Total	Percent Total Use	AF Fresh	Percent Total Use	AF Saline	Percent Total Use	AF Total	Percent Total Use
Public Water Supply	87,752	-	87,752	30%	205,715	-	205,715	70%	293,467	100%	-	-	293,467	9%
Industrial	-	-	-	0%	3,811	-	3,811	100%	3,811	100%	-	-	3,811	0%
Irrigation	1,485,112	-	1,485,112	56%	1,175,312	-	1,175,312	44%	2,660,424	100%	-	-	2,660,424	82%
Livestock	2,522	-	2,522	7%	33,372	-	33,372	93%	35,894	100%	-	-	35,894	1%
Aquaculture	6,109	-	6,109	23%	20,929	-	20,929	77%	27,039	100%	-	-	27,039	1%
Mining†	19,550	-	19,550	12%	44,111	100,240	144,351	88%	63,662	39%	100,240	61%	163,901	5%
Thermoelectric power	30,637	-	30,637	82%	6,872	-	6,872	18%	37,509	100%	-	-	37,509	1%
Domestic	-	-	-	0%	27,621	-	27,621	100%	27,621	100%	-	-	27,621	1%
Totals	1,631,683	-	1,631,683	50%	1,517,744	100,240	1,617,984	50%	3,149,427	97%	100,240	3%	3,249,667	100%

Source: Source: Dieter et al. 2017; updated with additional information provided to the BLM from the NMOSE regarding water use of the Navajo Power Plant (BLM 2019).

† Approximately 19,550 AF of the freshwater use within the Mining industry is from surface water; the remainder of all other water use is from groundwater. The Mining category includes the following self-supplied enterprises that extract minerals occurring naturally in the earth's crust: solids, such as potash, coal, and smelting ores; liquids, such as crude petroleum; and gases, such as natural gas. This category includes water used for oil and gas production (well drilling and secondary recovery of oil), quarrying, milling (crushing, screening, washing, flotation, etc.), and other processing done at the mine site or as part of a mining activity, as well as water removed from underground excavations (mine dewatering) and stored in—and evaporated from—tailings ponds. The Mining category also includes water used to irrigate new vegetative covers at former mine sites that have been reclaimed. It does not include the processing of raw materials, such as smelting ores, unless this activity occurs as an integral part of a mining operation and is included in an NMOSE permit.

Table 3-11 2015 State of New Mexico Water Use Associated with Oil and Gas Development (AF/yr)

County	Surface Water	Groundwater	Total	Percent of Total
Bernalillo	0	7	7	0%
Chaves	0	84	84	2%
Eddy	0	2,635	2,635	65%
Lea	0	1,275	1,275	32%
San Juan	30	0	30	1%
Sierra	0	1	1	0%
State Total	**30**	**4,002**	**4,032**	**100%**

NMOSE 2019.

Water Use Associated with Reasonably Foreseeable Oil and Gas Development

The reasonable foreseeable development (RFD) scenario for the BLM New Mexico Pecos District (Engler and Cather 2012, 2013, 2014) was developed as a reasonable estimate of development associated with hydrocarbon production in southeast New Mexico for the next 20 years in the New Mexico portion of the Permian Basin. The RFD is a comprehensive study of all existing plays and an analysis of recent activity, historical production, emerging plays for future potential, and completion trends. Table 3-12 presents planning factors from the RFD.

Table 3-12 RFD Planning Factors

Factor	RFD
Time Frame	2015–2035
Number of wells	16,000 (approximately 800 per year, federal and non-federal)
Average Water Use, Horizontal Well	7.3 AF (2.4 million gallons)
Average Water Use, Vertical Well	1.53 AF (500,000 gal)
Number of Wells Needed for Reservoir Development (play)	4 wells per section per play (horizontal wells)
Percentage of horizontal wells in Bone Spring Formation	84% horizontal
Percentage of horizontal wells in Leonard Formation	14% horizontal

As shown in the table above, the RFD concluded that the average water use for a single horizontal well was 7.3 AF. This figure was based on a study of the Bone Springs formation using data from 2013. Since that time, an estimate of 34.4 AF/horizontal well for the Permian Basin in 2016 was provided by Kondash et. al. (2018). The report concluded that "…the Permian Basin (Texas and New Mexico) had the largest increase in water use (770 percent), from 4900 m^3 per well (3.97 AF) in 2011 to 42500 m^3 per well (34.4 AF) in 2016" (Kondash et al. 2018). Because of this new information, BLM conducted studies using calendar year 2017 and 2018 data from FracFocus, a national hydraulic fracturing chemical registry managed by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission, to provide objective information on hydraulic fracturing. Operators are required by the State of New Mexico to disclose chemistry and water use information on FracFocus.

Reported water use in 2017 was 13,962 AF of which 21 percent (2,959 AF was associated with federal wells (FracFocus 2017). Reported water use in 2018 was 21,742 AF of which 32 percent (6,936 AF was

associated with federal wells (FracFocus 2018). These figures are higher than 2015 reported oil and gas water use (see Table 3-11) and corroborates that water use associated with hydraulic fracturing in the Permian Basin has been increasing in recent years. Analysis of the 2017 data set, consisting of 522 records, resulted an expected value of 26.9 AF, standard deviation of 17.47 AF, and a median of 24.78 AF. Analysis of the 2018 data set, consisting of 696 records, resulted in a mean of 31.2, standard deviation of 18.8 AF, and a median of 27.98 AF. As a result of these studies, the BLM considers the estimate of 31.2 AF as the best current estimate of water use per horizontal well in the Pecos District.

Note that if more water-intensive stimulation methods (e.g., slickwater fracturing) are implemented or if laterals become longer, water use could increase from this estimate). Alternatively, water use estimates could be lower if produced water is reused or recycled for use in hydraulic fracturing. Public concern about water use from hydraulic fracturing is especially high in semiarid regions, where water withdrawals for hydraulic fracturing can account for a significant portion of consumptive water use within a given region. The BLM will continue to evaluate reported water use in FracFocus and other data and will revise water use estimates to be used in NEPA evaluations accordingly.

3.3.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Water use per horizontal well is estimated to be 31.2 AF/horizontal well for the Permian Basin. Vertical well water use is estimated to be 1.53 AF per well. See Table 3-12 for additional water use assumptions. The total water use for this action can be found by multiplying the number of wells in the proposed action by 31.2 AF for horizontal well or 1.53 AF for vertical well.

Drilling and completion of 14 horizontal wells is estimated to use approximately 436.8 acre-feet (AF) of groundwater. Water use associated with the drilling and completion is expected to occur within a 30- to 60-day period for each well. The drilling and completion of the proposed wells would likely be spread out over several years. Compared to 2015 FracFocus water usage in the tri-county analysis area, groundwater use associated with the proposed development, if all wells are drilled within the same year, would represent 0.07% of the total water use category (620,416 AF), 0.08% of the total groundwater use category (546,195 AF), and 0.46% of the water use in the mining category (95,800 AF), which encompasses oil and gas development.

The total estimated water use for drilling and completion of the 14 horizontal wells in the proposed action represents approximately 1.06% of the 2019 oil and gas water use reported to FracFocus (41,350 AF) (BLM 2021a).

Cumulative Water Use Estimates

Past and Present Actions

Pecos District total water usage (620,416 AF) accounted for about 19 percent of the total state withdrawals. Mining (which includes oil and gas development) comprises approximately 15 percent of Pecos District water withdrawals. Water use associated with oil and gas development (4,032 AF) comprises approximately 2.5 percent of the statewide Mining water use (163,901 AF), 4.3 percent of the Pecos District Tri-County Area Mining water use (94,758 AF), and 0.7 percent of Pecos District total water usage. The largest water use of water within the county and the state is agricultural, comprising 75% of all water use within the Pecos District and 82% percent of all water use within the state. This trend is expected to continue.

The BLM examined FracFocus to ascertain water use, cumulative water use, and water use trends in the New Mexico portion of the Permian Basin that is for Chaves, Eddy, and Lea counties-Table 3-13.

Table 3-13 Actual Water Use in the NM portion of the Permian basin for Calendar Years 2014-2018

Year	Federal Water Use	Non-Federal Water Use	Total WU	%FedWU	FedCUMWU	TotCUMWU	Average WU/Well	Total # of Wells Reported to Frac Focus
2014	1307	2509	3816	34.25	1307	3816	6.82	559
2015	4033	4336	8369	48.19	5340	12185	15.82	529
2016	710	6091	6801	10.44	6050	18986	21.66	314
2017	2964	11418	1482	20.61	9014	33368	26.44	544
2018	8411	19681	28092	29.94	17425	61460	31.04	905
	17425	44035	61460					2851

Figure 3 shows the total actual water use per year in the basin, it has increased from 6801 AF in 2016 to 28092 AF in 2018, with a corresponding basin-wide average water use per well increase from 22 AF/well to 31 AF/well (FracFocus, 2019). The Figure 5 shows the cumulative water use per year in the basin. A cumulative total of 61460 AF was used for oil and gas in HF for the years 2014-2018. Total federal cumulative water use in the basin, for the same time period was 17425 AF (Figure 4), a percentage of 28% of the total water use. The total number of wells that were reported to FracFocus, for 2016 to 2018, also increased from 314 to 905 wells.

Figure 3 Permian Basin Total Cumulative Actual Water Use

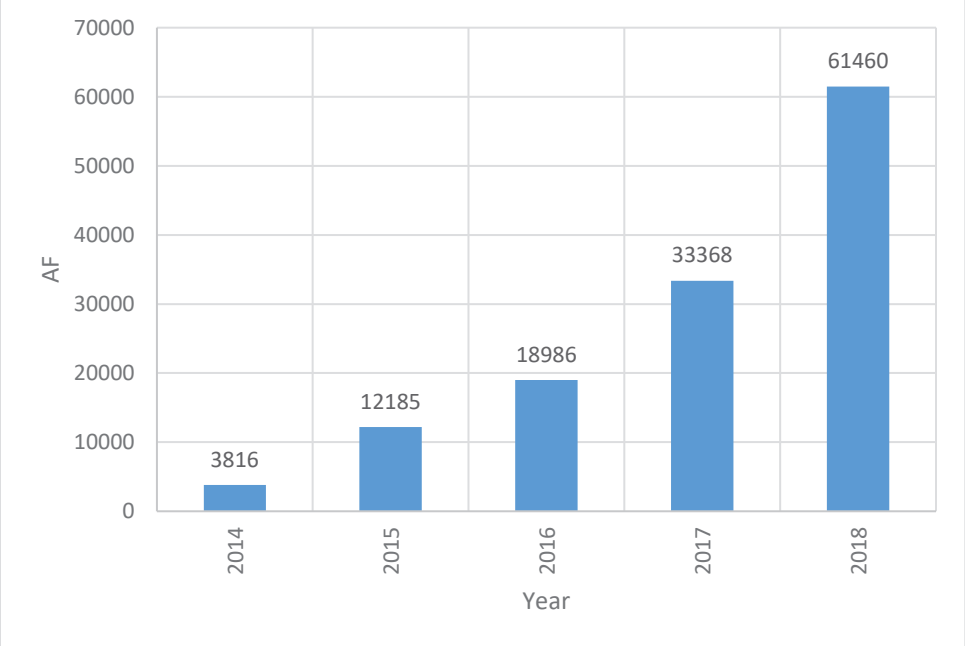


Figure 4 Permian Basin Federal Cumulative Actual Water Use compared to the RFD Scenario

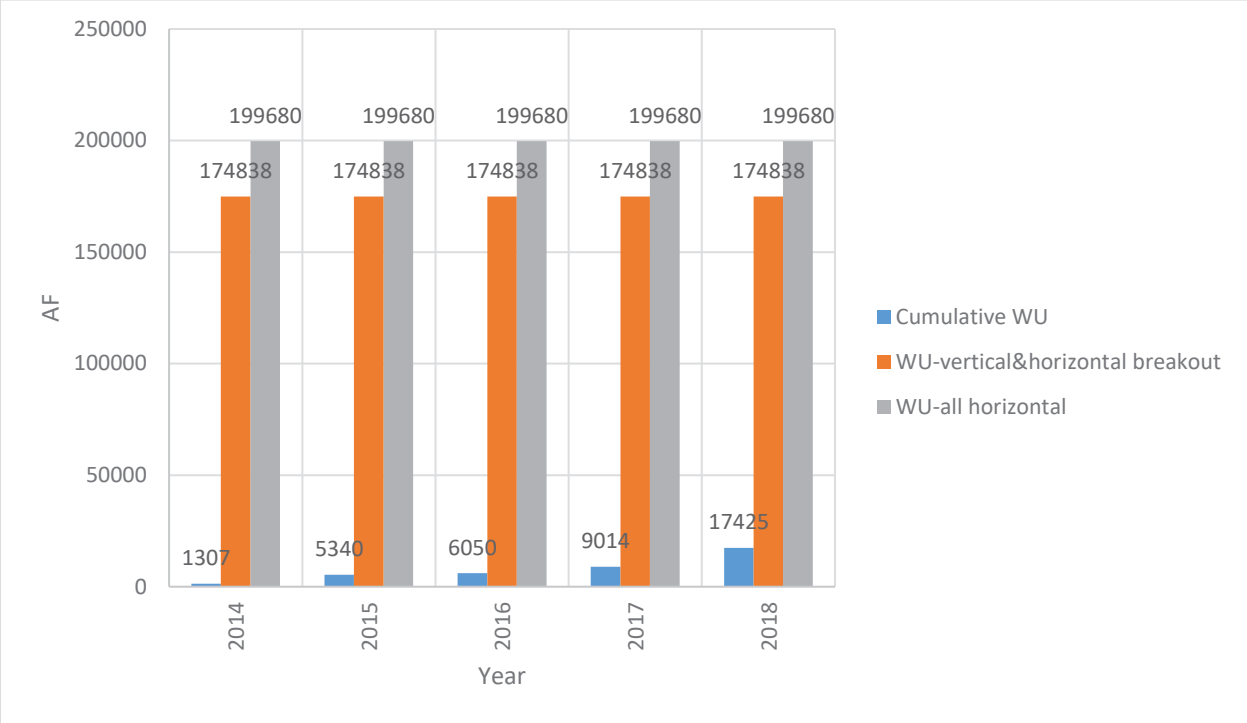
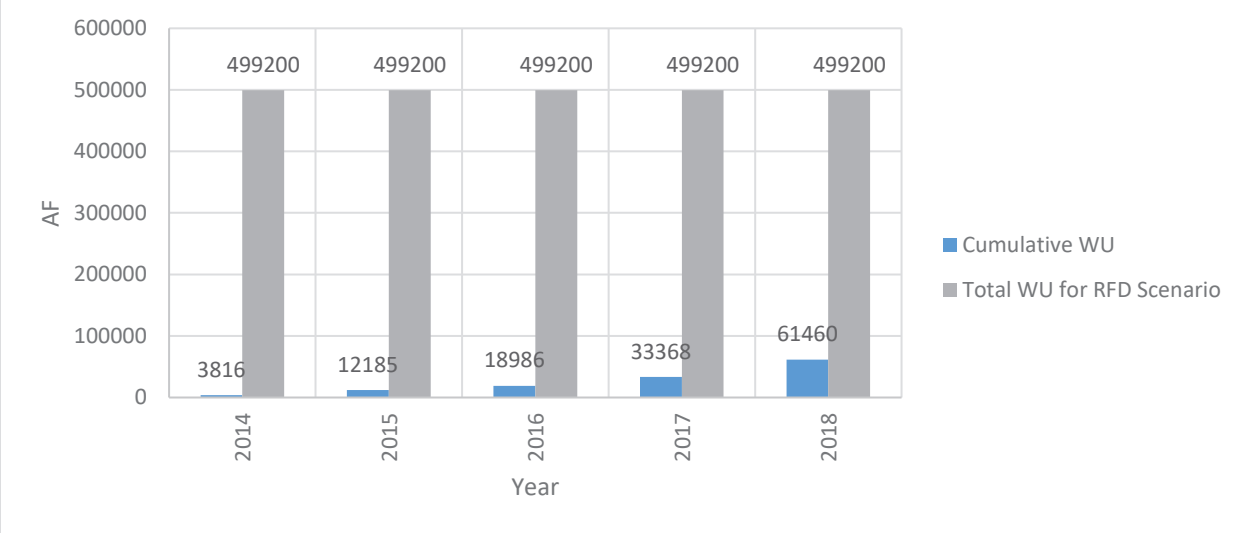


Figure 5 Permian Basin Total Cumulative Actual Water Use compared to the RFD Scenario



Reasonably Foreseeable Future Actions (RFFAs)

Oil and Gas Development

Between 2012 and 2014, the BLM prepared an RFD scenario for the Pecos District that projected approximately 800 new wells per year, for a total of 16,000 wells over a 20-year period. With consideration of the revised water use estimates presented above (31.2 AF per well), development of the 16,000 wells projected in the RFD would require 499,200 AF water, or 24,960 AF of water in any given year. Well development associated with recent or reasonably foreseeable APDs or master development plans are included in the RFD.

Other Development

There are no mining RFFAs that would contribute to cumulative water withdrawals within the Pecos District (BLM 2019b). Some water use would be required during construction and operation of reasonably foreseeable transmission lines and pipelines, these uses are minimal and are not quantified in this analysis. Future water use for the other reported water use categories in the Pecos District is assumed to continue at current levels.

Cumulative Impacts

Development of all RFFAs would require 24,960 AF of water in any given year. This is about 4 percent of Pecos County 2015 total water withdrawals (620,416 AF, which already includes past and present actions). Agriculture would remain by far the largest water use within the county (currently 75% of all water use within the Pecos District and 82% percent of all water use within the state).

Potential Sources of Water for Project Development

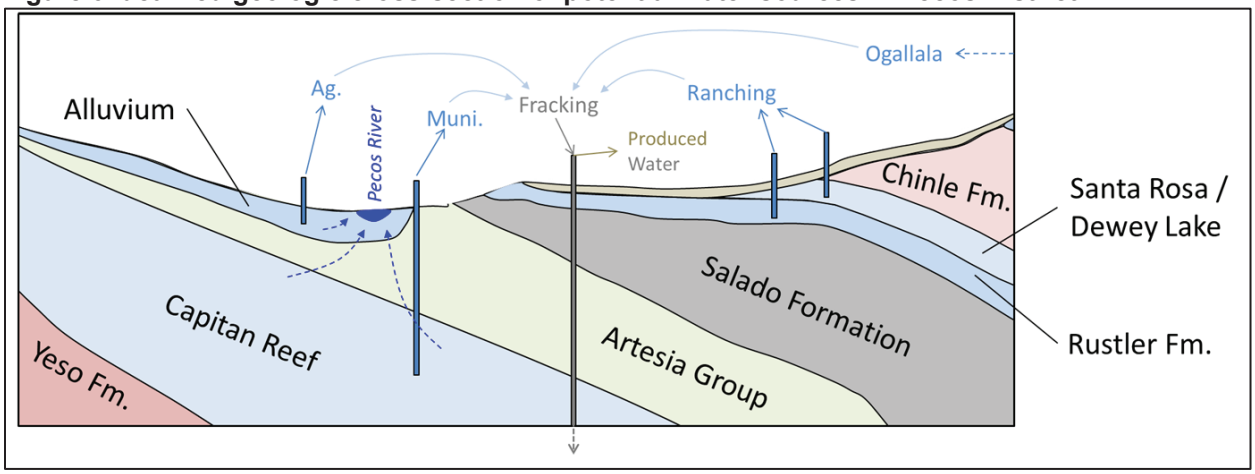
The Pecos District contains a variety of surface waters, from springs and seeps to lakes, playas, rivers, and ephemeral drainages and draws. Waters from spring developments, reservoirs or streams, and stream diversions within the planning area are used primarily for irrigation, livestock, and wildlife. No surface waters used for domestic purposes originate on BLM-managed land. Diversions on BLM-managed lands support private land crop irrigation and stock water needs. Water use associated with oil and gas drilling is primarily from groundwater. Table 3-14 shows the potential sources of groundwater in Pecos District. Figure 6 is an idealized cross section of these aquifers. It is speculative to predict the actual source of water that would be used for development of the RFD (or the development of any specific lease sales). However, because approximately 88 percent of all water use and 100 percent of all mineral use in the Pecos District is currently from groundwater, it is reasonable to assume that water used for development of the RFD would likely be groundwater. Water used for oil and gas drilling and completion would be purchased legally from those who hold water rights in or around the Permian Basin. The transaction would be handled by the New Mexico Oil Conservation Division, as well as the New Mexico Office of the State Engineer.

Table 3-14 Potential Sources of Groundwater in Pecos District

Aquifer Name	Description
Pecos Valley Alluvium	Surficial deposits along the Pecos River. No known recharge areas.
Dewey Lake and Santa Rosa	Redbed sandstones. Inconsistent water source. Recharge occurs closer to the surface, as a result of weather events.
Rustler Formation (Culebra and Magenta)	Dolomite, fractured and dissolution zones. Local recharge occurs, largely as a result of weather events.
Capitan Reef	Limestone, Karstic formation. Good quality west of the Pecos, low quality towards the east. Recharge in the west occurs mainly in the vicinity of the Guadalupe Mountains. Recharge in the east occurs in the vicinity of the Glass Mountains (in Texas). The New Mexico portion of the eastern part of the Capitan Reef is recharging at a high rate
Ogallala	Sand and gravel. Offsite aquifer where water imported to area.

Source: Lowry et al 2018.

Figure 6 Idealized geologic cross-section of potential water sources in Pecos District



Source: Summers 1972.

A recent study conducted by Sandia National Laboratory (Lowry et al. 2018) was completed in portions of Eddy and Lea counties that were identified as having of high potential for oil and gas development in the RFD. The study was undertaken to establish a water-level and chemistry baseline and develop a modeling tool to aid the BLM in understanding the regional water supply dynamics under different management, policy, and growth scenarios and to pre-emptively identify risks to water sustainability. The following section summarizes key information in that report related to groundwater sources.

Four high potential areas (HPAs) were studied. The HPAs were associated with the Alto Platform, Bone Spring, and Delaware Mountain Group plays, and were limited the extent of each to development on federal lands managed by the BLM.

Most of the wells that were sampled in each HPA appeared to have a mix of source waters and establishing definitive signatures for each aquifer was not possible. However, evidence shows that the main water source for wells in the North HPA (which included Loco Hills and areas along the Pecos River) are from the Dewey Lake and Santa Rosa aquifer or another perched source in the host Dockum Formation. For the Center North HPA (which encompasses a region known as Burton Flats), the main sources are from the Dewey Lake and Santa Rosa aquifer and the Rustler Formation. For the South HPA (located near Malaga and Loving), the main water sources are the Dewey Lake and Santa Rosa aquifer. The east HPA, which primarily represents the Ogallala aquifer, was excluded from the study because only a small percentage of the land is managed by the BLM and because the aquifer is heavily pumped for agricultural purposes throughout several states, which would require a broader study of the overall aquifer (Lowry et al. 2018). The study also sampled wells that access water from the Capitan Reef, located near the community of Carlsbad.

Select wells were also monitored using both continuous and manual water level measurements throughout the study:

- Water levels in the two sampling water wells located in the North HPA fluctuated only slightly (>1 pounds per square inch [psi]) and carried no obvious trend, indicating a high likelihood that the water level variations are naturally occurring through seasonal and barometric pressure fluctuations.
- Of the two monitoring wells located in the Center North HPA, one showed only show water level changes suggestive of barometric effects and seasonal change; the other well displayed a sharp water level increase. The cause of this change is conjectured to be from active drilling, pumping, or injecting near the well.
- Of the 16 wells monitoring the South HPA:

- 2 wells showed minimal water level change with a slight increasing trend over time, indicating that the aquifer is not being locally impacted by pumping or aquifer development.
- 2 wells showed pressure variations that are typical to nearby pumping. One well was located near a known oil supply well which is the likely driver to the drawdown and recovery response; the other was located near a municipal water supply well and its erratic response is indicative of pumping cycles associated with a small community water supply.
- 5 wells displayed water level changes that are typical for aquifers affected by seasonal variations in pressure and barometric effects.
- 3 wells showed minor water level changes likely due to activity in adjacent wells. The origin of the aquifer activity affecting each well are unknown, but likely due to oilfield drilling activities.
- 1 well had drastic changes in water level as a result of nearby pumping tests conducted as part of monitoring of the Waste Isolation Pilot Plant.
- 3 wells displayed water level changes due to high production pumping by a local ranch.

- Of the five wells monitoring the Capitan Reef, two wells recorded pressure decreases. The source of the pressure change is undetermined, however it is likely these wells are influenced by precipitation given their shallow depth and the karstic nature of the formation, as well as from localized municipal pumping by the City of Carlsbad. The remaining 3 wells recorded water levels increasing at a relatively constant rate. This suggests that the aquifer in the eastern part of the Capitan is experiencing recharge

A model is being developed as part of the Sandia Report to simulates water availability over a range of different future scenarios, including drilling activity and water demand relative to identify areas that are most vulnerable and to estimate the risk to water sustainability. The model is still under development, but when completed, it will allow BLM to look at the balances between water demand and water availability to predict and track both risks to each aquifer as well as calculate well drawdown. The intent is to screen future water extraction that may be unsustainable. The Carlsbad FO will have the capacity to apply this model during future NEPA actions.

Water Use Mitigation Measures

Overall, there have been calls to increase the use of alternative water sources such as brackish water or recycling produced water, minimizing the strain on local freshwater resources (Kondash et al. 2018). The BLM encourages the use of recycled water in hydraulic fracturing techniques but does not have the ability to require this as mitigation.

Moreover, recent studies indicate that the water used for hydraulic fracturing may be retained within the shale formation, with only a small fraction of the fresh water injected into the ground returns as flowback water; water returning to the surface is highly saline, is difficult to treat, and is often disposed through deep-injection wells (Kondash et al. 2018). Thus, the ability to recycle water may be more limited than previously reported. Note that water use calculations above do not assume the use of recycled water.

3.2.2 Affected Environment

Water Quality

Groundwater

As noted in Section 3.2.3, the BLM contracted with Sandia National Laboratory to prepare a report (Lowry et al. 2018) on water sustainability in Pecos District related to oil and gas development. The following section summarizes key information in the report related to groundwater quality.

Groundwater quality in Eddy and Lea Counties and in the Lower Pecos Valley varies considerably depending on the aquifer and location. In general, groundwater on the west side of the Pecos River is

fresher than east of the Pecos River. East of the Pecos River, salinity is higher and can reach concentrations of 35,000 milligrams per Liter (mg/L). Shallow groundwater quality can be very good in the alluvial aquifers, but of poor quality in deeper geologic formations due to the presence of salt, gypsum, and other evaporite deposits. Groundwater tends to be mineralized or 'hard' west of the Ogallala aquifer (Lowry et al. 2018). Typical ranges of total dissolved solids (TDS) along with the general aquifer materials are shown in Table 3-15.

Table 3-15 Typical TDS Ranges Found in the Main Aquifers of the Pecos District

Aquifers	Aquifer Material	Typical TDS Range (mg/L)
Pecos	Alluvium	<200 to 10,000
Rustler (includes Culebra and Magenta)	Carbonates and Evaporites	<1,000 to 4,600
Dockum (includes Dewey Lake and Santa Rosa)	Sandstone and Conglomerates	<5,000 to >10,000
Capitan Reef	Dolomite and Limestone	300 to >5,000

Source: Lowry et al. 2018.

Overall 30 wells in the South HPA, 11 wells in the Center North HPA, and 19 wells in the North HPA were selected for water quality analysis. The predominant water types for each of the HPAs and the Capitan Reef are listed below

1. North – calcium and magnesium dominant
2. Center-North – sodium and calcium dominant
3. South – sodium and calcium dominant
4. Waste Isolation Pilot Plant (WIPP) – sodium and chloride dominant
5. Capitan Reef – sodium dominant

The samples were also compared to the New Mexico Water Quality Control Commission (NMWQCC) human health, domestic water supply, and irrigation use standards for groundwater with a TDS concentration of 10,000 mg/L or less (20.6.2.3103 NMAC). Table 3.16 presents a listing of the sampled water quality parameters by HPA against the NMWQCC standards for drinking water.

Table 3-16 Sampled Water Quality Parameters Against NMWQCC Drinking Water Standards

Parameter	NMWQCC Standard	North HPA	Central North HPA	South HPA and WIPP	Capitan Reef
pH (pH units)	6 to 9	7.07 - 7.97	7.53 - 7.97	6.18 - 8.59	8.08 - 8.86
Specific Conductance (µmhos/cm)	--	1000 - 3905	1300 - 83000	600 - 270000	2770 - 174500
Total Dissolved Solids (TDS)	1000	331 - 3550	869 - 43000	322 - 330000	1951 - 141875
Calcium (Ca2+)	--	0.73 - 590	2.6 - 920	0.7 - 1900	1.4 - 5902
Magnesium (Mg2+)	--	23 - 200	44 - 1492	2.10 - 10000	82.26 - 1420
Sodium (Na+)	--	18 - 262	92.58 - 12000	26 - 95000	225 - 46700
Potassium (K+)	--	0 - 30	4 - 1136	0 - 21000	6.58 - 3352
Chloride (Cl-)	250	16 - 1000	97 - 21000	11 - 190000	388.80 - 82602.1
Alkalinity (CaCO3)	--	139 - 312	19.9 - 181.2	23 - 297.10	18.53 - 250.10
Bicarbonate (HCO3-)	--	139 - 312	19.8 - 181.2	39.72 - 297.10	18.74 - 249.27
Carbonate (CO3-)	--	0 - <2	0 - <2	0 - 16.08	0 - 0.83
Sulfate (SO42-)	600	0 - 1900	306.71 - 6400	0 - 15000	0 - 1975.67
Fluoride (F-)	1.6	0 - 1.3	0.82 - 2.60	0.00 - 3.63	0.09 - 0.52

Nitrite (NO2)	10	0 - 6.27	0 - 8.8	0.00 - 20.08	0.05 - 7.60
Nitrate (NO3)	10	0 - 10	2.6 - 8.8	0 - 19	0.04 - 7.60
Silver (Ag)	0.05	--	--	--	0
Aluminum (Al)	5	--	0.18	0 – 4.06	--
Arsenic (As)	0.1	0.02 – 0.06	0.03 - 0.32	0 – 0.29	0.10
Barium (Ba)	1	0.01 – 0.13	0.01 - 0.03	0- 0.1	0.02 - 0.25
Bromide (Br)	--	0 - 7.8	0.28 - 12.00	0 - 1400	0.3 - 12.73
Cadmium (Cd)	0.01	--	--	--	--
Copper (Cu)	1	0.02	0.03	0.06 - 0.37	--
Iron (Fe)	1	3.34	0.04	0.01 - 1.62	3.41
Lithium (Li)	--	0.14 - 1.70	0.140 - 1.695	0.05 - 0.85	0.04 - 4.49
Manganese (Mn)	0.2	0 - 0.06	0 - 0.20	0 - 0.06	0 - 7.61
Nickel (Ni)	0.2	--	0 - 0.02	0 - 0.01	0.01
Lead (Pb)	0.05	0.04	--	0.02 - 0.06	--
Silicon (Si)	--	2.67 - 18.38	1.9 - 23.4	4.91 - 47.0	0 - 7.10
Strontium (Sr2+)	--	0.63 - 8.47	2.73 - 13.75	0.05 - 32.0	2.52 - 104.8
Vanadium (V)	--	--	0.01 - 0.03	0 - 0.1	--

Source Lowry et al. 2018. Units are milligrams per liter (mg/L) unless otherwise noted. "—" = not applicable or not detected. Values rounded to two decimal places.

Key observations related to the comparison of results to the standards:

- Seventeen of the water quality parameters analyzed have applicable NMWQCC standards, including pH, TDS, Cl-, SO42-, F-, NO3-+ NO2-, Ag, Al, As, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Pb

No exceedances were observed for eight of the parameters with NMWQCC standards, including pH, Ag, Al, Ba, Cd, Cr, Cu, and Ni.

Surface Water

Stream and river conditions vary widely, from completely undisturbed river and vegetative communities in the mountainous highlands, to deep, erodible soil banks at lower elevations where livestock, recreationists, and other public users have access to stream and riverbanks.

Water quality in streams flowing on BLM-managed land is influenced by both natural water quality with regard to salinity content and the intensity of human and industrial activity in the watershed. For example, water quality may be vastly different in a remote mountain spring creek than in waters with natural brine discharge, or where there are human impacts due to urban, farming, ranching, or industrial activity. Chemistry samples of surface water in the planning region are needed in order to establish a baseline chemistry data for the waters. Variances in baseline chemistry can indicate water quality changes attributable to land use development. The most common pollutants for waters in the planning area are sediment and mercury. Beneficial uses listed for these waters are industrial water supply, irrigation storage, livestock watering, recreation, warm water fishery, and wildlife habitat. The dominant legislation affecting national water quality and BLM compliance with New Mexico water quality requirements is the Clean Water Act (CWA) or Federal Water Pollution Control Act. Within the planning area, total maximum daily loads (TMDLs) determinations are not in place for any of the watersheds with 303(d)-listed streams. Thus, an assessment of their condition via this metric is not possible at the time.

3.3.3. *Impacts from the Proposed Action*

Potential Water Sources of Surface Water or Groundwater Contamination

Spills

Spills associated with oil and gas development may reach surface water directly during the spill event. Spills may also reach surface waters indirectly, when the spill has occurred, and a rain event moves contaminants into nearby surface water bodies through surface water flow or even subsurface groundwater flow into springs that discharge into a surface water body.

There are approximately 15,660 federal wells within the New Mexico portion of the Permian Basin. planning area (BLM 2019). As shown in Table 3-17, there were a total of 1,261 spills in the Permian Basin in 2018. The rate of recovery varies by spill type but in generally, most spills are not recovered. No spills occurring in the Pecos District were reported as having affected surface or groundwater.

The BLM works with the NMOCD to remediates spills on public BLM lands. Per NMAC 19.15.29.11, the responsible person shall complete division-approved corrective action for releases that endanger public health or the environment in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC. The remaining contaminates from unrecovered spills are remediated in accordance with federal and state standards. Some remediation consists of removing contaminated soil and replacement with uncontaminated soil and corresponding chemical testing.

Drilling and Completion Activities

The BLM and State of New Mexico Oil Conservation Division (NMOCD) has casing, cementing, and inspection requirements in place to limit the potential for groundwater reservoirs and shallow aquifers to be impacted by fracking or the migration of hydrocarbons on the nominated lease parcels. Prior to approving an APD, a BLM geologist would identify all potential subsurface formations that would be penetrated by the wellbore including groundwater aquifers and any zones that would present potential safety or health risks that would need special protection measures during drilling, or that could require specific protective well construction measures. Casing programs and cement specifications would be submitted to the BLM and NMOCD for approval to ensure that well construction design would be adequate to protect the subsurface environment, including known or anticipated zones with potential risks or zones identified by the geologist. Surface casing would be set to an approved depth, and the well casing and cementing would stabilize the wellbore and provide protection to any overlying freshwater aquifers by isolating hydrocarbon zones from overlying freshwater aquifers. Before hydraulic fracturing takes place, all surface casings and intermediate zones would be required to be cemented from the bottom of the cased hole to the surface. The cemented well would be pressure tested to ensure there are no leaks, and a cement bond log would be run to confirm that the cement has bonded to the steel casing strings and to the surrounding formations.

Water Quality Mitigation Measures

Spills
Secondary containment of production facilities as required on the Conditions of Approval. Best Management Practices for leak detection systems and berming to prevent spills from leaving the pad.

Table 3-17 Summary of 2018 Spills in the New Mexico Portion of the Permian Basin

Material Type	Count of Spills	Volume Spilled	Volume Lost	Units	% Lost
Acid	1	20	1	Barrels	5%
Basic sediment and water (BS&W)	5	19	9	Barrels	47%
Brine Water	3	1,570	1,531	Barrels	98%

Chemical	9	1,342	1,165	Barrels	87%
Condensate	13	405	258	Barrels	64%
Crude Oil	435	15,388	6,595	Barrels	43%
Diesel	3	24	16	Barrels	67%
Drilling Mud/Fluid	6	615	353	Barrels	57%
Other	26	15,049	14,060	Barrels	93%
Produced Water	606	90,931	44,775	Barrels	49%
Sulphuric Acid	1	20	15	Barrels	75%
Total	**1,108**	**125,383**	**68,778**	**Barrels**	**55%**
Natural Gas (Methane) and Natural Gas Liquids	153	144,813	144,813	MCF	100%
Total Number of Spills	**1,261**				

NMOCD 2019.

Drilling and Completion Activities

The BLM requires operators to comply with the regulations at 43 Code of Federal Regulations (CFR) 3160. These regulations require oil and gas development to comply with directives in the Onshore Orders and the orders of the Authorized Officer. Onshore Order No. 2 and the regulations at 43 CFR 3162.3-3 provide regulatory requirements for hydraulic fracturing, including casing specifications, monitoring and recording, and management of recovered fluids. The State of New Mexico also has regulations for drilling, casing and cementing, completion, and plugging to protect freshwater zones (19.15.16 New Mexico Administrative Code). Complying with the aforementioned regulations require producers and regulators to verify the integrity of casing and cement jobs. Casing specifications are designed and submitted to the BLM together with an APD. The BLM petroleum engineer independently reviews the drilling plan, and based on site-specific geologic and hydrologic information, ensures that proper drilling, casing and cementing procedures are incorporated in the plan in order to protect usable groundwater. This isolates usable water zones from drilling, completion/hydraulic fracturing fluids, and fluids from other mineral bearing zones, including hydrocarbon bearing zones. Conditions of Approval (COAs) may be attached to the APD if necessary to ensure groundwater protection. Installation of the casing and cementing operations are witnessed by certified BLM Petroleum Engineering Technicians. At the end of the well's economic life, the operator must submit a plugging plan, which undergoes review by the BLM petroleum engineer prior to well plugging, which ensures permanent isolation of usable groundwater from hydrocarbon bearing zones. BLM inspectors ensure planned procedures are properly followed in the field.

Surface casing and cement would be extended beyond usable water zones. Production casing will be extended and adequately cemented within the surface casing to protect other mineral formations, in addition to usable water bearing zones. These requirements ensure that drilling fluids, hydraulic fracturing fluids, and produced water and hydrocarbons remain within the well bore and do not enter groundwater or any other formations. Since the advent of hydraulic fracturing, more than 1 million hydraulic fracturing treatments have been conducted, with perhaps only one documented case of direct groundwater pollution resulting from injection of hydraulic fracturing chemicals used for shale gas extraction (Gallegos and Varela 2015). Requirements of Onshore Order #2 (along with adherence to state regulations) make contamination of groundwater resources highly unlikely and there have not been any documented past instances of groundwater contamination attributed to well drilling. This is an indication of how effective the use of casing and cement is at preventing leaks and contamination.

3.4. Watershed

3.4.1. *Affected Environment*

The area of the proposed action occurs within the Antelope Draw (HUC10 1307000705), and drains in a southeast direction into Flight in the Hollow Draw, about 1.3 miles away. Stream flow occurs in this Flight in the Hollow Draw during times of heavy rain, and it is likely a source of groundwater recharge. The ground water recharge is from local precipitation entering through playas, sinkholes and swallets. Water quality and quantity is influenced by physical, chemical, and biological reactions that occur as water moves over and through the land surface toward streams and into aquifers. The rate at which water moves through the watershed strongly affects these reactions.

3.4.2. *Impacts from the Proposed Action*

Ephemeral surface water from local rain events will wash down-slope through the area of the proposed action. Localized decreases in vegetative surface cover combined with the caliche covering the pad and road could result in decreased infiltration rates and increased runoff volume and velocity. This causes increased erosion, top soil loss, and sedimentation.

Water quality can be adversely affected following the occurrence of an undesirable event such as a leak or spill. Standard practices or design features of the proposed project that minimize impacts to the watershed and water quality include: utilizing a closed loop system with no reserve pits, berming of the production facilities, utilizing existing surface disturbance, minimizing the well pads total surface disturbance, minimizing vehicular use, surfacing parking and staging areas with caliche and reclaiming the areas not necessary for production and quickly reestablishing vegetation on the reclaimed areas.

Mitigation Measures and Residual Impacts

Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control.

Residual Impacts

During construction and the life of the project, sedimentation still may occur due to improper placement and maintenance of erosion control structures. Erosion may also occur after seeding before vegetation has started to grow back, causing sedimentation in nearby drainages and streams.

3.5. Range

3.5.1. *Affected Environment*

The proposed action is not within an allotment. An allotment fence exists near the west side of the project. In general, an average rating of the range land within this area is 6 acres per Animal Unit Month (AUM). In order to support one cow, for one year, about 72 acres are needed. This equals about nine cows per section.

3.5.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

The loss of 9.73 acres of vegetation would not affect the AUMs authorized for livestock use in this area. There are occasional livestock injuries or deaths due to accidents such as collisions with vehicles, falling into excavations, and ingesting plastic or other materials present at the work site. If the fence is damaged or a gate left open during construction of the proposed action, cattle may cross from one pasture or allotment to another. This will disrupt any grazing plan in place and could cause a loss in time and money

to gather, sort, and return cattle to the correct pasture. If further development occurs, the resulting loss of vegetation could reduce the AUMs authorized for livestock use in this area.

Impacts to the ranching operation are reduced by standard practices such as utilizing existing surface disturbance, minimizing the well pads total surface disturbance, utilizing steel tanks instead of reserve pits, minimizing vehicular use, placing parking and staging areas on caliche surfaced areas, reclaiming the areas not necessary for production, and quickly establishing vegetation on the reclaimed areas.

Mitigation Measures

None.

3.6. Soils

3.6.1. *Affected Environment*

The area of the proposed action is mapped as SR-Simona-Upton association. These are sandy soils and are described below:

Sandy
Typically, these soils are deep, well-drained to excessively drained, non-calcareous to weakly calcareous sands. They are found on undulating plains and low hills in the “sand country” east of the Pecos River. Permeability is moderate to very rapid, water-holding capacity is low to moderate, and little runoff occurs. These soils are susceptible to wind erosion and careful management is needed to maintain a cover of desirable forage plants and to control erosion. Reestablishing native plant cover could take 3-5 years due to unpredictable rainfall and high temperatures.

Low stability soils, such as the sandy and deep sands found on this area, typically contain only large filamentous cyanobacteria. Cyanobacteria, while present in some locations, are not significant. While they occur in the top 4 mm of the soil, this type of soil crust is important in binding loose soil particles together to stabilize the soil surface and reduce erosion. The cyanobacteria also function in the nutrient cycle by fixing atmospheric nitrogen, contributing to soil organic matter, and maintaining soil moisture. Cyanobacteria are mobile and can often move up through disturbed sediments to reach light levels necessary for photosynthesis. Horizontally, they occur in nutrient-poor areas between plant clumps. Because they lack a waxy epidermis, they tend to leak nutrients into the surrounding soil. Vascular plants such as grasses and forbs can then utilize these nutrients.

3.6.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

There is a potential for wind and water erosion due to the erosive nature of these soils once the cover is lost. There is always the potential for soil contamination due to spills or leaks. The biological soil crusts are susceptible to compressional damage, which is due to vehicle traffic. Disruption of the crust can result in decreased soil organism diversity, soil nutrient levels, soil stability, and organic matter. These impacts are expected to be limited to new well pads. Soil contamination from spills or leaks can result in decreased soil fertility, less vegetative cover, and increased soil erosion.

Impacts to soil resources are reduced by standard practices such as utilizing existing surface disturbance, minimizing the well pads total surface disturbance, utilizing steel tanks instead of reserve pits, minimizing vehicular use, placing parking and staging areas on caliche surfaced areas, reclaiming the areas not necessary for production and quickly establishing vegetation on the reclaimed areas.

Mitigation Measures and Residual Impacts

Interim reclamation will be conducted on all disturbed areas not needed for active support of production operations, and if caliche is used as a surfacing material it will be removed at time of reclamation to mitigate impacts to soil resources. Topsoil will be stockpiled to enhance reclamation.

3.7. Visual Resource Management

3.7.1. *Affected Environment*

The Visual Resource Management (VRM) program identifies visual values, establishes objectives in the RMP for managing those values, and provides a means to evaluate proposed projects to ensure that visual management objectives are met.

This proposed project occurs within a Visual Resource Management Class IV zone. The objective of VRM Class IV is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements of color, form, line and texture.

3.7.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

This project will cause some short term and long-term visual impacts to the natural landscape. Short term impacts occur during construction operations and prior to interim reclamation. These include the presence of construction equipment vehicle traffic. However, interim reclamation, conducted within 6 months after construction will reduce this area by recontouring and revegetating.

Long term impacts are visible to the casual observer through the life of the well. These include the visual evidence of storage tanks, piping, pump jacks, pads and roads which cause visible contrast to form, line, color, and texture. Removal of vegetation due to construction exposes bare soil lighter in color and smoother in texture than the surrounding vegetation. The surfacing of these areas with caliche materials causes further contrasts. Those contrasts will be visible to visitors in the area.

After final abandonment and reclamation, the pads will be removed, reclaimed, recontoured and revegetated, thereby eliminating visual impacts.

Short and long term impacts are minimized by best management practices such as color selection, reducing cut and fill, screening facilities with natural features and vegetation, interim reclamation and contouring roads along natural changes in elevation.

Mitigation Measures

Above-ground structures including meter housing that are not subject to safety requirements are painted a flat non-reflective paint color, Shale Green from the BLM Standard Environmental Color Chart (CC-001: June 2008).

3.8. Wildlife

3.8.1. *Affected Environment*

This project occurs in the sand shinnery habitat type. Sand shinnery communities extend across the southern Great Plains occupying sandy soils in portions of north and west Texas, west Oklahoma, and southeast New Mexico. Portions of Eddy, Lea and Chaves counties consist largely of sand shinnery habitat and are intermixed with areas of mesquite to a lesser degree. The characteristic feature of these communities is co-dominance by shinnery oak and various species of grasses. In New Mexico Shinnery oak occurs in sandy soil areas, often including sand dunes.

Various bird, mammal, reptile and invertebrate species inhabit the sand shinnery ecosystem in New Mexico. Herbivorous mammals include mule deer, pronghorn, and numerous rodent species. Carnivores include coyote, bobcat, badger, striped skunk, and swift fox. Two upland game bird species, scaled quail and mourning dove, are prevalent throughout the sand shinnery in New Mexico. Many species of

songbirds nest commonly, with a much larger number that use the habitat during migration or for non-nesting activities. Common avian predators include northern harrier, Swainson's hawk, red-tailed hawk, kestrel, burrowing owl, and Chihuahuan raven. Numerous snake and lizard species have been recorded, including the sand dune lizard, the only vertebrate species restricted entirely to sand shinnery habitat.

Lesser Prairie-Chicken (Tympanuchus pallidicinctus)

In New Mexico, the lesser prairie-chicken (LPC) formerly occupied a range that encompassed the easternmost one-third of the state, extending to the Pecos River, and 48 km west of the Pecos near Fort Sumner. This covered about 38,000 km². By the beginning of the 20th Century, populations still existed in nine eastern counties (Union, Harding, Chaves, De Baca, Quay, Curry, Roosevelt, Lea, and Eddy). The last reliable records from Union County are from 1993. Currently, populations exist only in parts of Lea, Eddy, Curry, Chaves, and Roosevelt counties, comprising about 23% of the historical range.

LPC are found throughout dry grasslands that contained shinnery oak or sand sage. Currently, they most commonly are found in sandy-soiled, mixed-grass vegetation, sometimes with short-grass habitats with clayey or loamy soils interspersed. They occasionally are found in farmland and smaller fields, especially in winter. Shinnery oak shoots are used as cover and produce acorns, which are important food for LPC and many other species of birds, such as the scaled quail, northern bobwhite, and mourning dove. Current geographic range of shinnery oak is nearly congruent with that of the lesser prairie-chicken, and these species sometimes are considered ecological partners. Population densities of LPC are greater in shinnery oak habitat than in sand sage habitat.

LPC use a breeding system in which males form display groups. These groups perform mating displays on arenas called leks. During mating displays male vocalizations called booming, attract females to the lek. Leks are often on knolls, ridges, or other raised areas, but in New Mexico leks are just as likely to be on flat areas such as roads, abandoned oil drill pads, dry playa lakes or at the center of wide, shallow depressions. Leks may be completely bare, covered with short grass, or have scattered clumps of grass or short tufts of plants. An important physical requirement for location of leks is visibility of surroundings, but the most important consideration is proximity of suitable nesting habitat, breeding females and the ability to hear male vocalizations.

In the late 1980s, there were 35 documented active booming grounds known to exist within the CFO. Due to population decreases and unpredictable weather cycles the LPC is currently proposed for federal listing, and potentially may become extirpated from Eddy and southern Lea counties. The last documented sighting within the Carlsbad field office boundaries was on March 15th, 2011.

In June 1998, the US Fish and Wildlife Service (USFWS) issued a statement regarding their status review of the lesser prairie-chicken. It stated, "Protection of the lesser prairie-chicken under the Federal Endangered Species Act (ESA) is warranted but precluded which means that other species in greater need of protection must take priority in the listing process." Given the current Federal Candidate status of this species, the Bureau of Land Management is mandated to carry out management consistent with the principles of multiple use, for the conservation of candidate species and their habitats, and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as Threatened or Endangered (Bureau Manual 6840.06). On December 11, 2012, the USFWS proposed to list the lesser prairie-chicken as a threatened species under the ESA of 1973, as amended. On March 27, 2014, the USFWS in response to the rapid and severe decline of the lesser prairie-chicken announced the final listing of the species as threatened under the ESA, as well as a final special rule under section 4(d) of the ESA that will limit regulatory impacts on landowners and business from the listing. Currently, the USFWS has not determined or designated critical habitat regarding the lesser prairie-chicken. The final rule to list the lesser prairie-chicken as threatened was published in the *Federal Register* on April 10, 2014, and will be effective on May 12, 2014. On July 20, 2016, the U.S. Fish and Wildlife Service formally removed the lesser prairie chicken from protection under the Endangered Species Act. Prescribed management for the species still follows BLM Resource Management Plan guidelines. On June 1, 2021, the USFWS published a proposed rule to list two distinct population segments (DPS) of the lesser prairie-

chicken under the ESA. The endangered species status of the lesser prairie-chicken went into effect March 27, 2023

3.8.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Impacts of the proposed action to wildlife in the localized area may include but are not limited to: possible mortality, habitat degradation and fragmentation, avoidance of habitat during construction and drilling activities and the potential loss of burrows and nests.

Standard practices and elements of the proposed action minimize these impacts to wildlife. These include: the NTL-RDO 93-1(modification of open-vent exhaust stacks to prevent perching and entry from birds and bats), nets on open top production tanks, interim reclamation, closed loop systems, exhaust mufflers, berming collection facilities, minimizing cut and fill, road placement, and avoidance of wildlife waters, stick nests, drainages, playas and dunal features. These practices reduce mortality to wildlife and allow habitat to be available in the immediate surrounding area thus reducing stressors on wildlife populations at a localized level. Impacts to local wildlife populations are therefore expected to be minimal.

Climate Change and ESA Consultation
The BLM continues to review the available climate science in connection with its statutory responsibilities, including under NEPA, and has found that despite advances in climate science, “global climate models are unable to forecast local or regional effects on resources as a result of specific emissions.” Any contribution to global climate processes from the approval of an individual APD is simply too remote, speculative, and undetectable to trigger ESA Section 7 consultation, given accumulated and persisting greenhouse gases (“GHG”) already in the atmosphere, the annual volume of GHG emissions that will occur globally regardless of whether a particular APD is approved, and projected continued climate change. See, e.g., BLM 2021 Specialist Report on Report on Annual Greenhouse Gas Emissions and Climate Trends (finding that, “[u]nlike other common air pollutants, the ecological impacts that are attributable to the GHGs are not the result of localized or even regional emissions but are entirely dependent on the collective behavior and emissions of the world’s societies”; and noting “the lack of climate analysis tools and techniques that lend themselves to describing the physical climate or earth system responses, such as changes to sea level, average surface temperatures, or regional precipitation rates, that could be attributable to emissions associated with any single [land management] action or decision.”); see also FWS, Threatened Species Status for Emperor Penguin With Section 4(d) Rule, 87 Fed. Reg. 64,700, 64,704 (Oct. 26, 2022), “based on the best scientific data available we are unable to draw a causal link between the effects of specific GHG emissions and take of the emperor penguin in order to promulgate more specific regulations under [ESA Section] 4(d).”

Special Status Species
Lesser Prairie-Chicken (Tympanuchus pallidicinctus)

Impacts of the proposed action to LPC in the localized area may include but are not limited to: disruptions in breeding cycles, habitat degradation and fragmentation, avoidance of habitat during construction and drilling activities and potential loss of nests. Noise and human activity generated from construction activity could impact the LPC by reducing the establishment of seasonal "booming grounds" or leks, thus possibly reducing reproductive success in the species. It is believed that the noise generated by construction activity and human presence could mask or disrupt the booming of the male prairie-chicken and thus inhibiting the females from hearing the booming. In turn, female LPC would not arrive at the booming ground, and subsequently, there would be decreased courtship interaction and possibly decreased reproduction. Decreased reproduction and the loss of recruitment into the local population would result in an absence of younger male LPC to replace mature male LPC once they expire, eventually causing the lek to disband and become inactive. Additionally, habitat fragmentation caused by development could possibly decrease the habitat available for nesting, brooding and feeding activities.

The CFO takes every precaution to ensure that active booming grounds and nesting habitats are protected by applying a timing and noise condition of approval within portions of suitable and occupied habitat for the LPC. It is not known at this time whether active booming grounds or nest locations are associated with this specific location. Only after survey efforts during the booming season are conducted, will it be known whether an active lek is in close proximity (within 1.5 miles) of the proposed location or not.

Exceptions to timing and noise requirements will be considered in emergency situations such as mechanical failures, however, these exceptions will not be granted if BLM determines, on the basis of biological data or other relevant facts or circumstances, that the grant of an exception would disrupt LPC booming activity during the breeding season. Requests for exceptions on a non-emergency basis may also be considered, but these exceptions will not be granted if BLM determines that there are prairie-chicken sightings, historic leks and or active leks within 1.5 miles of the proposed location, or any combination of the above-mentioned criteria combined with suitable habitat.

In light of the circumstances under which exceptions may be granted, minimal impacts to the LPC are anticipated as a result of the grant of exceptions to the timing limitation for LPC Condition of Approval. On account of these requirements and mitigation measures as below, minimal impacts to the LPC are anticipated as a result of oil and gas activity. This project may affect but is not likely to adversely affect the LPC.

Raptors

Raptors have been observed using plugged and abandoned well markers as perches. Artificial perches may increase raptor presences in a given area. Furthermore, artificial perches may provide strategically located vantage points and may improve the hunting efficiency of raptors. In order to improve the probability of maintaining a stable lesser prairie-chicken population, low profile plugged and abandoned well markers will be installed. The well marker will be approximately two (2) inches above ground level and contain the following information: operator name, lease name, and well number and location, including unit letter, section, township, and range. The previous listed information will be welded, stamped, or otherwise permanently engraved into the metal of the marker.

Candidate Conservation Agreement

The proponent of the proposed action is a Participating Cooperator in the Candidate Conservation Agreement (CCA) for the lesser prairie-chicken (*Tympanuchus pallidicinctus*) and dunes sagebrush lizard (*Sceloporus arenicolus*).

The goal of the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), Center of Excellence for Hazardous Materials Management (CEHMM) and the Participating Cooperator is to reduce and/or eliminate threats to the LPC and/ or SDL. By agreeing to conduct the conservation measures described by the CCA, the Participating Cooperator contributes funding or provides in-kind services for conservation.

The Certificate of Participation (CP) associate with the CCA is voluntary between CEHMM, BLM, USFWS and the Participating Cooperator. Through the CP, the Participating Cooperator voluntarily commits to implement or fund specific conservation actions that will reduce and/or eliminate threats to the SDL and /or the LPC. Funds contributed as part of the CP will be used to implement conservation measures and associated activities. The funds will be directed to the highest priority projects to restore or reclaim habitat at the sole discretion of BLM and USFWS.

The following Conservation Measures are to be accomplished in addition to those described in the CCA and Pecos District Special Status Species Resource Management Plan Amendment (RMPA):

1. To the extent determined by the BLM representative at the Plan of Development stage, all infrastructures supporting the development of a well (including roads, power lines, and pipelines) will be constructed within the same corridor.

2. On enrolled parcels that contain inactive wells, roads and/or facilities that are not reclaimed to current standards, the Participating Cooperator shall remediate and reclaim their facilities within three years of executing this CP, unless the Cooperator can demonstrate they will put the facilities back to beneficial use for the enrolled parcel(s). If an extension is requested by the Cooperator, they shall submit a detailed plan (including dates) and receive BLM approval prior to the three year deadline. All remediation and reclamation shall be performed in accordance with BLM requirements and be approved in advance by the Authorized Officer.

3. Utilize alternative techniques to minimize new surface disturbance when required and as determined by the BLM representative at the Plan of Development stage.

4. Install fence markings along fences owned, controlled, or constructed by the Participating Cooperator that cross through occupied habitat within two miles of an active LPC lek.

5. Bury new powerlines that are within two (2) miles of LPC lek sites active at least once within the past five years (measured from the lek). The avoidance distance is subject to change based on new information received from peer reviewed science.

6. Bury new powerlines that are within one (1) mile of historic LPC lek sites where at least one LPC has been observed within the past three years (measured from the historic lek). The avoidance distance is subject to change based on new information received from peer reviewed science.

7. Management recommendations may be developed based on new information received from peer reviewed science to mitigate impacts from H2S and/or the accumulation of sulfates in the soil related to production of gas containing H2S on the LPC. Such management recommendations will be applied by the Participating Cooperator as Conservation Measures under this CI/CP in suitable and occupied SDL/LPC habitat where peer-reviewed science has shown that H2S levels threaten the LPC.

Mitigation Measures

In May 2008, the Pecos District Special Status Species Resource Management Plan Amendment (RMPA) was approved and is being implemented. In addition to the standard practices that minimize impacts, as listed above, the following COA will apply:

- Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken, to minimize noise associated impacts which could disrupt breeding and nesting activities.
- Upon abandonment, a low profile abandoned well marker will be installed to prevent raptor perching.

3.9. Special Status Plant Species (SSPS)

3.9.1. *Affected Environment*

BLM Reference Manual 6840 – Special Status Species Management (2008) directs BLM to conserve “BLM special status species and the ecosystems upon which they depend on BLM-administered lands”. This directive gives the BLM special authority to designate certain species as BLM special status species. These species are carefully selected and highlighted so that the BLM may be proactive in conserving them to reduce their need for future ESA listing. Unsurveyed potential habitats for SSPS were identified within and/or adjacent to the project area for the Proposed Action. Surveys completed before construction enhance understanding of SSPS habitat suitability, knowledge of SSPS occurrences and inform conservation actions. The following special status plant species may be affected by the Proposed Action.

Scheer’s Beehive Cactus (*Coryphantha robustispina* ssp. *scheeri*)

As of December 2022, there are approximately 907 documented Scheer's beehive cactus individuals, within the CFO boundary. Scheer’s beehive cactus is found in small numbers from Texas to Arizona. In

New Mexico, Scheer's beehive cactus is found in Eddy, Chaves, and Lea counties (New Mexico Rare Plant Technical Council 1999). This species can be found on calcareous gravelly to loamy soils in desert grassland and Chihuahuan desert scrub, usually in slightly-sloping to nearly level areas between 3,000-3,600 feet in elevation, on or surrounding limestone or gypsum benches, hills and bajadas. (2020-0671-EA). Scheer's beehive cactus populations are comprised of few long-lived individuals sensitive to impacts. (New Mexico Rare Plant Technical Council 1999) Therefore, impacts from livestock and development may be detrimental to the health status of the populations. Scheer's beehive cactus is federally not considered, a BLM Sensitive Species, state Endangered, globally Apparently Secure (species) and Vulnerable (subspecies) and has a New Mexico Rare Plant Scorecard rating of Weakly Conserved. This project is within potential habitat for this species. The nearest known occurrence is 22 miles (35704 meters) from proposed project features.

SSPS Survey

No Surveys were done on private sections of the land within modeled potential habitat for Scheer's beehive cactus. Due to the proximity of the nearest known occurrence and low suitable habitat, we will not assume displacement of the species.

3.9.2. *Impacts from the Proposed Action*

Direct and Indirect Effects

The Proposed Action is all surface within the CFO boundary. Direct impacts could result from construction, operation, and/or maintenance related activities within and adjacent to proposed project features. These activities could acutely stress SSPS individuals, reduce or degrade available habitat for SSPS and/or remove individuals from the landscape. Vegetation treatments, such as mowing and/or herbicide application to maintain openness within and around project feature bounds, could also affect SSPS individuals and/or their habitats. Potential indirect impacts to SSPS and the ecological processes that sustain them include, but are not limited to, changes in the following habitat conditions: ground cover, soil nutrient flows and processes, hydrological flows and processes, solar exposure, thermal cover, fugitive dust loads, non-native species dispersal, habitat connectivity and/or fragmentation, and pollinator and dispersal agents' visitation behaviors. Preconstruction clearance surveys inventory SSPS within and adjacent to proposed actions, enabling site-specific conservation actions.

BLM special status plant surveys would be required for any further actions added to the originally Proposed Action. The surveys would only be required if the additional actions intersect SSPS potential habitat that has not been surveyed or was surveyed within three years from the originally Proposed Action.

If an SSPS is observed during a survey, the action would avoid the SSPS, and the Authorized Officer in coordination with a BLM biologist would anticipate impacts and implement mitigation measures if deemed appropriate for the conservation of the species.

Since Scheer's beehive cactus is a small, cryptic species, undetected individuals could be present in and surrounding the project area. To minimize effects on undetected individuals, vehicles and equipment would travel and park only on existing developed surfaces (e.g., pads and roads) and approved work areas.

At least 9.39 acres of Scheer's beehive cactus habitat will be directly impacted as a result of the Proposed Action. While the proposed project may contribute to declines in species abundance, habitat quality, and species occurrence connectivity, the Proposed Action is not expected to cause significant impacts to special status plant species, pollinators, or ecosystem integrity on BLM land by virtue of best practices, standard stipulations and conditions of approval that reduce impacts and reclaim disturbed areas. A decision to authorize the Proposed Action would not contribute to a need to list sensitive plant species under the ESA.

Mitigation Measures and Residual Impacts

3.9.3. *Mitigation Measures*

No special mitigation measures are required.

3.10. Vegetation

3.10.1. *Affected Environment*

Sandy Soil Type Plant Communities

Vegetation within this project area is dominated by warm season, short and midgrasses such as black grama, bush muhly, various dropseeds, and three-awns. Bluestems, bristlegrass, lovegrasses, and hooded windmill grass make up some of the less common grasses. Shrubs include mesquite, shinnery oak, sand sagebrush, broom snakeweed, and yucca. A large variety of forbs occur, and production fluctuates greatly from year to year, and season to season. Common forbs include bladderpod, dove weed, globemallow, annual buckwheat, and sunflower.

3.10.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Construction of the well pads would remove about 9.73 acres of vegetation. This impact would last as long as the well is productive. However, interim reclamation, conducted within 6 months of the well being completed would reduce this area. When the well is plugged and abandoned, the rest of the pad would be reclaimed and potentially re-vegetate in 3-5 years, depending on timely rainfall. By using the proper seed mix (Seed Mix 2/LPC), good seed bed preparation, and proper seeding techniques, this impact would be short term (two or three growing seasons).

Impacts to vegetation are reduced by standard practices such as utilizing existing surface disturbance, minimizing the well pad total surface disturbance, utilizing steel tanks instead of reserve pits, minimizing vehicular use, placing parking and staging areas on caliche surfaced areas, reclaiming the areas not necessary for production and quickly establishing vegetation on the reclaimed areas.

Mitigation Measures

Interim reclamation will be conducted on all disturbed areas not needed for active support of production operations, and if caliche is used as a surfacing material it will be removed at time of reclamation to enhance re-establishment of vegetation.

3.11. Noxious Weeds and Invasive Plants

3.11.1. *Affected Environment*

There are four plant species within the CFO that are identified in the New Mexico Noxious Weed List Noxious Weed Management Act of 1998. These species are African rue, Malta starthistle, Russian olive, and salt cedar. African rue and Malta starthistle populations have been identified throughout the Carlsbad Field Office and mainly occur along the shoulders of highway, state and county roads, lease roads and well pads (especially abandoned well pads). The CFO has an active noxious weed monitoring and treatment program, and partners with county, state and federal agencies and industry to treat infested areas with chemical and monitor the counties for new infestations.

Currently there are no known populations of invasive, non-native species within the project vicinity.

3.11.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Any surface disturbance can increase the possibility of establishment of new populations of invasive, non-native species. The construction of the proposed action may contribute to the establishment and spread of African rue and Malta starthistle. The main mechanism for seed dispersion would be by equipment and vehicles that were previously used and/or driven across noxious weed infested areas. Noxious weed seed could be carried to and from the project area by construction equipment and transport vehicles.

Mitigation Measures

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the pads, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

3.12. Cultural and Historical Resources

3.12.1. *Affected Environment*

The project falls within the Southeastern New Mexico Archaeological Region. This region contains the following cultural/temporal periods: Paleoindian (ca. 11,500 – 7,000 B.C.), Archaic (ca. 6,000 B.C. – A.D. 500), Ceramic (ca. A.D. 500 – 1400), Post Formative Native American (ca. A.D. 1400 – present), and Historic Euro-American (ca. A.D. 1865 to present). Sites representing any or all of these periods are known to occur within the region. A more complete discussion can be found in *Permian Basin Research Design 2016-2026 Volume I: Archaeology and Native American Cultural Resource published in 2016 by* SWCA Environmental Consultants, Albuquerque, New Mexico.

3.12.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

The project falls within the area of the Permian Basin Programmatic Agreement (PBPA). The proposed projects surface disturbing activities would not impact known historic properties that could have contributed to the understanding of the historic and prehistoric pathways of past peoples within the CFO. The PBPA is an optional method of compliance with Section 106 of the National Historic Preservation Act for energy related projects in a 39-quadrangle area of the Carlsbad Field Office. Avoiding known historic properties is a requirement to participate in the PBPA. If any human skeletal remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered at any time during construction, all construction activities shall halt, and the BLM will be notified as soon as possible within 24 hours. Work shall not resume until a Notice to Proceed is issued by the BLM. Please see the BLM 2016 Permian Basin Programmatic Agreement document for more information (U.S. Bureau of Land Management 2016a).

The proponent chose to participate in the Permian Basin PA (23-5408) by planning to avoid all known NRHP eligible and potentially eligible cultural resources. The proponent has contributed funds commensurate to the undertaking into an account for offsite mitigation. Participation in the PA serves as mitigation for the effects of this project on cultural resources.

Mitigation Measures

While the proposed project creates the potential to disturb buried unknown historic properties, the Permian Basin Programmatic Agreement area has high percentages of Class III inventory, which has identified likely almost all the significant cultural resources within those areas, making the chance of impacting a significant cultural resource low. Also, by choosing to participate with the PBPA, the proponent has contributed funds commensurate to the undertaking into an account for offsite mitigation. If any human skeletal remains, funerary objects, sacred objects, or objects of cultural patrimony are

discovered at any time during construction, all construction activities shall halt, and the BLM will be notified as soon as possible within 24 hours.

3.13. Paleontology

3.13.1. *Affected Environment*

Paleontological resources include not only the actual fossils but also the geological deposits that contain them and are recognized as nonrenewable scientific resources protected by federal statutes and policies. For more information on paleontological classifications, see Permanent Instruction Memorandum No. 2022-009: Implementing the Paleontological Resource Preservation Act of 2009 (PRPA) (U.S. Bureau of Land Management 2022 and BLM Fact Sheet-Proposed rule at 43 CFR § 49: Paleontological Resources Preservation (U.S. Bureau of Land Management 2016b).

The Potential Fossil Yield Classification (PFYC) is a tool that allows the BLM to predict the likelihood of a geologic unit to contain paleontological resources. The PFYC is based on a numeric system of 1-5, with PFYC 1 having little likelihood of containing paleontological resources, whereas a PFYC 5 value is a geologic unit that is known to contain abundant scientifically significant paleontological resources. There are no known PFYC 5 values found within the CFO.

3.13.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Direct impacts would result in the immediate physical loss of scientifically significant fossils and their contextual data. The location of the proposed project is within a PFYC 2, where management concern is negligible. A pedestrian survey for paleontological resources was not necessary and there should be no impacts to paleontological resources.

Mitigation Measures

There are no mitigation measures for this project, as currently proposed.

3.14. Impacts from the No Action Alternative

The No Action Alternative is used as the baseline for comparison of environmental effects of the analyzed alternatives. Under the No Action Alternative, the proposed project would not be drilled, built or constructed and there would be no new direct or indirect impacts to natural or cultural resources from oil and gas production. The natural and cultural resources in the project area would continue to be managed under the current land and resource uses.

3.15. Cumulative Impacts

Cumulative impacts are the combined effect of past projects, specific planned projects, and other reasonably foreseeable future actions within the project study area to which oil and gas exploration and development may add incremental impacts. This includes all actions, not just oil and gas actions that may occur in the area including foreseeable non-federal actions.

The combination of all land use practices across a landscape has the potential to change the visual character, disrupt natural water flow and infiltration, disturb cultural sites, cause increases in greenhouse gas emissions, fragment wildlife habitat and contaminate groundwater. Cumulative impacts analysis to air quality, GHG emissions, water use, and quality is included in Chapter 3, under sections 3.1 and 3.2. The likelihood of these impacts occurring is minimized through standard mitigation measures, special Conditions of Approval and ongoing monitoring studies.

All resources are expected to sustain some level of cumulative impacts over time; however, these impacts fluctuate with the gradual abandonment and reclamation of wells. As new wells are being drilled, there are others being abandoned and reclaimed. As the oil field plays out, the cumulative impacts will lessen as more areas are reclaimed and less are developed.

4. SUPPORTING INFORMATION

4.1. List of Preparers

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Date: 5/15/2023

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4.2. References

Applied Enviro Solutions (AES). 2011. Southeast New Mexico Inventory of Air Pollutant Emissions and Cumulative Air Impact Analysis 2007. BLM. Carlsbad Field Office.

Bohannon, Paul 2009. The RCRA Exploration & Production Exemption. http://bohannonlegal.com/pauls-oil-gas-manual-the-rcra-ep-exemption/

Bureau of Land Management (BLM). (2018). Air Resources Technical Report for Oil and Gas Development, New Mexico, Oklahoma, Texas and Kansas.

Bureau of Land Management (BLM). (2019).*Cumulative BLM New Mexico Greenhouse Gas Emissions, A Supplemental White Paper*.

Bureau of Land Management (BLM). (2019). Personal communication between David Herrell, BLM and Julie Valdez, NMOSE regarding water use associated with the Navajo Power Plant.

Dieter, C.A., Maupin, M.A., Caldwell, R.R., Harris, M.A., Ivahnenko, T.I., Lovelace, J.K., Barber, N.L., and Linsey, K.S., 2018, Estimated use of water in the United States in 2015: U.S. Geological Survey Circular 1441, 65 p. Report and dataset available at. https://pubs.er.usgs.gov/publication/cir1441. Downloaded April 1. 2019.

Engler, T. 2013. Response to comments on the DEIS for the Ocho Mine Project. Socorro, NM, USA. November 16.

Engler, T.W., and M. Cather. 2012. Reasonable Foreseeable Development (RFD) Scenario for the BLM. New Mexico Pecos District. Final Report. New Mexico Institute of Mining and Technology. Available at: https://eplanning.blm.gov/epl-front-office/projects/lup/64444/77502/86228/Final_Report-BLM-NMT-RFD.pdf. January 2019.

Environmental Protection Agency. 2013. The Green Book Non Attainment Areas for Criteria Pollutants. http://www.epa.gov/airquality/greenbk/ (Accessed 3/15/2013).

Environmental Protection Agency. 2013. 2005 National-Scale Air Toxics Assessment. Summary of Results. http://www.epa.gov/ttn/atw/nata2005.

Environmental Protection Agency. 2013. Air Trends: Design Values. http://www.epa.gov/airtrends/values.html.

Environmental Protection Agency. 2018. *National Ambient Air Quality Standards (NAAQS)*. Retrieved from U.S. Environmental Protection Agency: https://www.epa.gov/criteria-air-pollutants/naaqs-table

Fletcher, S. M. 2012. Risk Assessment of Groundwater Contamination from Hydraulic Fracturing Fluid Spills in Pennsylvania. Thesis (S.M. in Technology and Policy)--Massachusetts Institute of Technology, Engineering Systems Division, Technology and Policy Program. http://hdl.handle.net/1721.1/72885.

Fitzgerald LA, Painter CW, Sias DS, Snell HL (1997) The range, distribution, and habitat of Sceloporus arenicolus in New Mexico: final report submitted to the New Mexico Department of Game and Fish (Contract #80-516.6-01).

FracFocus. 2017.. Retrieved from FracFocus Data Download. Dataset available for download at the following: http://fracfocus.org/data-download. Downloaded December 13, 2018.

FracFocus. 2018.. Retrieved from FracFocus Data Download. Dataset available for download at the following: http://fracfocus.org/data-download. Downloaded January 28, 2019.

Gallegos, T.J., and Varela, B.A. 2015. Trends in hydraulic fracturing distributions and treatment fluids, additives, proppants, and water volumes applied to wells drilled in the United States from 1947 through 2010—Data analysis and comparison to the literature: U.S. Geological Survey Scientific Investigations Report 2014–5131, 15 p., http://dx.doi.org/10.3133/sir20145131. Accessed February 2019.

Groundwater Protection Council (GWPC). 2009. Modern Shale Gas Development in the United States: A Primer. Prepared for the U.S. Department of Energy, Office of Fossil Energy, and National Energy Technology Laboratory (NETL). DE-FG26-04NT15455. Oklahoma City, OK. http://www.netl.doe.gov/technologies/oilgas/publications/epreports/shale_gas_primer_2009.pdf.

Mire, K., and Moomaw, J. (2017) Delaware Basin: Seven Year Review of Activity and Performance. Unconventional Resources Technology Conference, Austin, Texas, pp 24-26. Available at: https://library.seg.org/doi/abs/10.15530/urtec-2017-2697549#.XRYtE_cvHC0.email

NOAA. 2011. NOAA's 1981-2010 Climate Normals. National Climatic Center. http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html. (Accessed July 1, 2011).

Railey, J. A. 2016
Permian Basin Research Design 2016-2026 Volume I: Archaeology and Native American Cultural Resources. SWCA Environmental Consultants, Albuquerque, New Mexico.

SENM. 2014. Update to the Reasonable Foreseeable Development (RFD) for the BLM Pecos District, SENM. Final Report. New Mexico Institute of Mining and Technology. Available at: https://eplanning.blm.gov/epl-front-office/projects/lup/64444/80056/93025/Final_Report-SENM-DEC2014_updated_RFD.pdf

USDI. BLM. 2013. Air Resources Technical Report for Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas. New Mexico State Office.

Wenzel, C. 2012. A Case Study—Hydraulic Fracturing Geography: The Case of the Eagle Ford Shale, TX, USA. Thesis (M.S.)--Texas State University-San Marcos, Department of Geography. https://digital.library.txstate.edu/handle/10877/4247.

Appendices

Appendix A. Emissions Estimates for Oil and Gas Wells

Emissions for a one-well horizontal and oil gas well on federal lands are included in Tables 4-1 and 4-2. Emissions for vertical wells were omitted from this analysis due to current predominant technological drilling methods being horizontal. Additionally, presenting horizontal oil and gas wells emissions estimates represent a more conservative summary of emissions when compared to emissions from a vertical well with the exception SO_2 which could be 4-5x greater in a vertical well scenario however sulfur dioxide emissions are still estimated to be within the same magnitude and less <1 ton per year of SO_2 emissions per well.

Table A-1 Emission Estimates for One Horizontal Oil Well

Activity/ Phase	Annual Emissions (Tons)*							
	PM_{10}†	$PM_{2.5}$	NO_x	SO_2	CO	VOC**	HAPs	CO_2e
Construction	2.41	0.49	5.21	0.11	1.44	0.42	0.42	578.89
Operations	2.90	0.33	0.80	0.00	1.11	0.75	0.75	126.81
Maintenance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.089
Reclamation**	0.00	0.00	0.18	0.00	0.08	0.00	0.00	0.00
Total	**5.31**	**0.81**	**6.19**	**0.11**	**2.63**	**1.17**	**1.17**	**705.79**

* Values where a “0.00” appear may be too small and not appear due to rounding.

† Reclamation PM_{10} emissions were estimated to be twice the value of Maintenance PM_{10} values.

**VOC emissions at the operational phase represent a 95% control efficiency and estimates potential emissions representing the contribution for “one oil well” from the emissions at storage tanks, gathering facilities, etc.

Table A-2 Emission Estimates for One Horizontal Gas Well

Activity/Phase	Annual Emissions (Tons)*							
	PM_{10}†	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs	CO_2e
Construction	0.64	0.31	5.18	0.11	1.41	0.61	0.41	1125.79
Operations	0.28	0.18	0.34	0.00	0.46	0.16	0.18	126.81
Maintenance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.089
Reclamation†	0.00	0.00	0.18	0.00	0.08	0.00	0.00	0.00
Total	**0.92**	**0.49**	**5.71**	**0.11**	**1.95**	**0.77**	**0.59**	**1252.69**

* Values where a “0.00” appear may be too small and not appear due to rounding.

† Reclamation PM_{10} emissions were estimated to be twice the value of Maintenance PM_{10} values.

Emission estimates for a construction, operations, maintenance and reclamation are included. Construction emissions for both an oil and gas well include well pad construction (fugitive dust), heavy equipment combustive emissions, commuting vehicles and wind erosion. Operations emissions for an oil well include well workover operations (exhaust and fugitive dust), well site visits for inspection and repair, recompletion traffic, water and oil tank traffic, venting, compression and well pumps, dehydrators and compression station fugitives. Operations emissions for a gas well include well workover operations (exhaust and fugitive dust), wellhead and compressor station fugitives, well site visits for inspection and repair, recompletions, compression, dehydrators and compression station fugitives. Maintenance emissions for both oil and gas wells are for road travel and reclamation emission activities are for interim and final activities and include truck traffic, a dozer, blade and track hoe equipment.

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Ameredev Operating LLC
WELL NAME & NO.:	Dogwood 25 36 20 Fed Com 093H
LOCATION:	Sec 20-25S-36E-NMP
COUNTY:	Lea County, New Mexico

COA

H_2S	◉ No	○ Yes		
Potash / WIPP	◉ None	○ Secretary	○ R-111-P	☐ WIPP
Cave / Karst	◉ Low	○ Medium	○ High	○ Critical
Wellhead	○ Conventional	◉ Multibowl	○ Both	○ Diverter
Cementing	☐ Primary Squeeze	☐ Cont. Squeeze	☐ EchoMeter	☑ DV Tool
Special Req	☐ Break Testing	☐ Water Disposal	☑ COM	☐ Unit
Variance	☑ Flex Hose	☐ Casing Clearance	☐ Pilot Hole	☑ Capitan Reef
Variance	☐ Four-String	☐ Offline Cementing	☐ Fluid-Filled	☐ Open Annulus
☐ **Batch APD / Sundry**				

A. HYDROGEN SULFIDE

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately 1249 feet (a minimum of 25 feet (Lea County) into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
    b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours

after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the ***alternate*** **10-3/4** inch intermediate casing is:

- Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst, Capitan Reef, or potash.**

❖ In Capitan Reef Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

❖ **Special Capitan Reef Requirement:** Ensure FW based mud used across the Capitan interval.

3. The minimum required fill of cement behind the **7-5/8** inch intermediate casing is:

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

b. Second stage above DV tool:

- **FOR PRIMARY THREE-STRING DESIGN:** Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst, Capitan Reef, or potash.**
- **FOR ALTERNATE FOUR-STRING DESIGN:** Cement should tie-back at least **50 feet** on top of Capitan Reef top or **200 feet** into the previous casing, whichever is greater. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst, Capitan Reef, or potash.**

❖ In Capitan Reef Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

❖ **Special Capitan Reef requirements.** If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:

(Use this for 3 string wells in the Capitan Reef, if 4 string well ensure FW based mud used across the capitan interval)

- Switch to freshwater mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.

- Daily drilling reports from the Base of the Salt to the setting of the intermediate casing are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.

4. The minimum required fill of cement behind the **5-1/2** inch production casing is:

    - Cement should tie-back at least **50 feet** on top of Capitan Reef top or **200 feet** into the previous casing, whichever is greater. If cement does not circulate see B.1.a, c-d above.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).'

2. Operator has proposed a multi-bowl wellhead assembly. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **10,000 (10M)** psi. **Variance is approved to use a 5000 (5M) Annular which shall be tested to 5000 (5M) psi.**

    a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
    b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
    c. Manufacturer representative shall install the test plug for the initial BOP test.
    d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
    e. Whenever any seal subject to test pressure is broken, all the tests in 43 CFR 3172 must be followed.

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- The operator will submit an as-drilled survey well plat of the well completion, but are not limited to, those specified in 43 CFR 3171 and 3172.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

GENERAL REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

a. Spudding well (minimum of 24 hours)
b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
c. BOPE tests (minimum of 4 hours)

☒ Eddy County
Email **or** call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, **BLM_NM_CFO_DrillingNotifications@BLM.GOV**
(575) 361-2822

☒ Lea County
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240,
(575) 689-5981

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure

rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).

b. When the operator proposes to set surface casing with Spudder Rig
   - Notify the BLM when moving in and removing the Spudder Rig.
   - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
   - BOP/BOPE test to be conducted per **43 CFR part 3170 Subpart 3172** as soon as 2nd Rig is rigged up on well.

2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.

4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.

7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in **43 CFR part 3170 Subpart 3172** and **API STD 53 Sec. 5.3**.

2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.

4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
c. Manufacturer representative shall install the test plug for the initial BOP test.
d. Whenever any seal subject to test pressure is broken, all the tests in **43 CFR part 3170 Subpart 3172** must be followed.
e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead cement), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the cement plug. The BOPE test can be initiated after bumping the cement plug with the casing valve open. (only applies to single stage cement jobs, prior to the cement setting up.)

c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer and can be initiated immediately with the casing valve open. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to **43 CFR part 3170 Subpart 3172** with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE.

If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

e. The results of the test shall be reported to the appropriate BLM office.

f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.

g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per **43 CFR part 3170 Subpart 3172**.

C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

H_2S Drilling Operation Plan

1. **All Company and Contract personnel admitted on location must be trained by a qualified H_2S safety instructor to the following:**
    a. Characteristics of H_2S
    b. Physical effects and hazards
    c. Principal and operation of H_2s detectors, warning system and briefing areas
    d. Evacuation procedure, routes and first aid
    e. Proper use of safety equipment and life support systems
    f. Essential personnel meeting Medical Evaluation criteria will receive additional training on the proper use of 30 minute pressure demand air packs.

2. **Briefing Area:**
    a. Two perpendicular areas will be designated by signs and readily accessible.
    b. Upon location entry there will be a designated area to establish all safety compliance criteria (1.) has been met.

3. **H_2S Detection and Alarm Systems:**
    a. H_2S sensors/detectors shall be located on the drilling rig floor, in the base of the sub structure/cellar area, and on the mud pits in the shale shaker area. Additional H_2S detectors may be placed as deemed necessary. All detectors will be set to initiate visual alarm at 10 ppm and visual with audible at 14 ppm and all equipment will be calibrated every 30 days or as needed.
    b. An audio alarm will be installed on the derrick floor and in the top doghouse.

4. **Protective Equipment for Essential Personnel:**
    a. **Breathing Apparatus:**
        i. Rescue Packs (SCBA) - 1 Unit shall be placed at each briefing area.
        ii. Two (SCBA) Units will be stored in safety trailer on location.
        iii. Work/Escape packs - 1 Unit will be available on rig floor in doghouse for emergency evacuation for driller.
    b. **Auxiliary Rescue Equipment:**
        i. Stretcher
        ii. 2 - OSHA full body harnesses
        iii. 100 ft. 5/8” OSHA approved rope
        iv. 1 - 20# class ABC fire extinguisher

5. **Windsock and/or Wind Streamers:**
    a. Windsock at mud pit area should be high enough to be visible.
    b. Windsock on the rig floor should be high enough to be visible.

6. **Communication:**
    a. While working under mask scripting boards will be used for communication where applicable.
    b. Hand signals will be used when script boards are not applicable.

c. Two way radios will be used to communicate off location in case of emergency help is required. In most cases cellular telephones will be available at Drilling Foreman's Office.

7. **Drill Stem Testing:** - No Planned DST at this time.

8. **Mud program:**
   a. If H2S is encountered, mud system will be altered if necessary to maintain control of formation. A mud gas separator will be brought into service along with H2S scavengers if necessary.

9. **Metallurgy:**

   a. All drill strings, casing, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H_2S service.
   b. Drilling Contractor supervisor will be required to be familiar with the effect H_2S has on tubular goods and other mechanical equipment provided through contractor.

H_2S Contingency Plan

Emergency Procedures

In the event of a release of H_2S, the first responder(s) must:

- Isolate the area and prevent entry by other persons into the 100 ppm ROE.
- Evacuate any public places encompassed by the 100 ppm ROE.
- Be equipped with H_2S monitors and air packs in order to control the release.
- Use the "buddy system" to ensure no injuries occur during the response.
- Take precautions to avoid personal injury during this operation.
- Contact Operator and/or local officials the aid in operation. See list of phone numbers attached.
- Have received training in the:
  - Detection of H_2S and
  - Measures for protection against the gas,
  - Equipment used for protection and emergency response.

Ignition of Gas Source

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO_2). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally, the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever there is an ignition of the gas.

Characteristics of H_2S and SO_2

Common Name	Chemical Formula	Specific Gravity	Threshold Limit	Hazardous Limit	Lethal Concentration
Hydrogen Sulfide	H_2S	1.189 Air=1	10 ppm	100 ppm/hr	600 ppm
Sulfur Dioxide	SO_2	2.21 Air=1	2 ppm	N/A	1000 ppm

Contacting Authorities

Ameredev Operating LLC personnel must liaise with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available including direction to site. The following call list of essential and potential responders has been prepared for use during a release. Ameredev Operating LLC's response must be in coordination with the State of New Mexico's "Hazardous Materials Emergency Response Plan" (HMER)

H_2S Contingency Plan

Ameredev Operating LLC – Emergency Phone 737-300-4799			
Key Personnel:			
Name	Title	Office	Mobile
Floyd Hammond	Chief Operating officer	737-300-4724	512-783-6810
Shane McNeely	Operations Engineer	737-300-4729	432-413-8593
Joe Bob Jones	Construction Foreman		432-260-9261

Artesia	
Ambulance	911
State Police	575-746-2703
City Police	575-746-2703
Sheriff's Office	575-746-9888
Fire Department	575-746-2701
Local Emergency Planning Committee	575-746-2122
New Mexico Oil Conservation Division	575-748-1283
Carlsbad	
Ambulance	911
State Police	575-885-3137
City Police	575-885-2111
Sheriff's Office	575-887-7551
Fire Department	575-887-3798
Local Emergency Planning Committee	575-887-6544
US Bureau of Land Management	575-887-6544
Santa Fe	
New Mexico Emergency Response Commission (Santa Fe)	505-476-9600
New Mexico Emergency Response Commission (Santa Fe) 24 Hrs	505-827-9126
New Mexico State Emergency Operations Center	505-476-9635
National	
National Emergency Response Center (Washington, D.C.)	800-424-8802
Medical	
Flight for Life - 4000 24th St.; Lubbock, TX	806-743-9911
Aerocare - R3, Box 49F; Lubbock, TX	806-747-8923
Med Flight Air Amb - 2301 Yale Blvd S.E., #D3; Albuquerque, NM	505-842-4433
.'SB Air Med Service - 2505 Clark Carr Loop S.E.; Albuquerque, NM	505-842-4949

AFMSS
U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

SUPO Data Report
10/05/2023

APD ID: 10400088613
Submission Date: 10/12/2022
Operator Name: AMEREDEV OPERATING LLC
Well Name: DOGWOOD 25 36 20 FED COM
Well Number: 093H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes
Show Final Text

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

DOGWOOD_25_36_20_FED_COM_093H___ACCESS_MAP_20221012112808.pdf

Existing Road Purpose: ACCESS
Row(s) Exist? YES

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

DOGWOOD_25_36_20_FED_COM_093H___ACCESS_MAP_20221012112827.pdf
EP_PEACH_BATTERY_ROAD_SEC_21_S_20221012112837.pdf
Dogwood_Road_20221012112837.pdf

New road type: RESOURCE

Length: 4447 Feet
Width (ft.): 30

Max slope (%): 2
Max grade (%): 2

Army Corp of Engineers (ACOE) permit required? N

ACOE Permit Number(s):

New road travel width: 20

New road access erosion control: Crowned and Ditched

New road access plan or profile prepared? N

New road access plan

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Access road engineering design? N

Access road engineering design

Turnout? N

Access surfacing type: OTHER

Access topsoil source: ONSITE

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Grader

Access other construction information: NM One Call (811) will be notified before construction start.

Access miscellaneous information:

Number of access turnouts: **Access turnout map:**

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: Crowned and Ditched

Road Drainage Control Structures (DCS) description: None

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

DOGWOOD_25_36_20_FED_COM_093H___ONE_MILE_RADIUS_20221012113100.pdf

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: A 4 Poly Flowline will be buried and run approximately 3,946 from the Dogwood Fed Com 25 36 20 093H to the Peach CTB northeast of the well pad. A 30' pipeline ROW containing three 12 poly water lines will be run 964' from the Peach CTB to existing water lines. A power line will be run parallel to the pipeline corridor and connect to an existing power line. The power line will be approximately 14,673'. The Peach CTB will be 500x525 and will include a separator, Heat Exchanger, VRU, VRT, meter run and a tank battery. The new production facility will have a secondary containment structure that is constructed to hold the capacity of 1-1/2 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Production Facilities map:

Dogwood_Road_20221012113132.pdf
EP_PEACH_BATTERY_ELECTRIC_SEC_21_S_20221012113132.pdf
BO_PEACH_BATTERY_SITE_S_20221012113132.pdf
EP_PEACH_BATTERY_ROAD_SEC_21_S_20221012113132.pdf
EP_DOGWOOD_FLOWLINE_SEC_20_S_20221012113132.pdf
EP_DOGWOOD_FLOWLINE_SEC_21_S_20221012113132.pdf
Peach_Singh_Water_Line_20221012113132.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source type: GW WELL

Water source use type: DUST CONTROL
SURFACE CASING
INTERMEDIATE/PRODUCTION CASING
STIMULATION

Source latitude: **Source longitude:**

Source datum:

Water source permit type: PRIVATE CONTRACT

Water source transport method: TRUCKING
PIPELINE

Source land ownership: PRIVATE

Source transportation land ownership: FEDERAL

Water source volume (barrels): 20000 **Source volume (acre-feet):** 2.57786193

Source volume (gal): 840000

Water source and transportation

DOGWOOD_25_36_20_FED_COM_093H___WATER_WELLS_LIST_20221012113202.pdf
DOGWOOD_25_36_20_FED_COM_093H___WATER_MAP_20221012113202.pdf

Water source comments: Water will be trucked or surface piped from existing water wells on private land. See attached list of available wells.
New water well? N

New Water Well Info

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Est. depth to top of aquifer(ft): **Est thickness of aquifer:**

Aquifer comments:

Aquifer documentation:

Well depth (ft): **Well casing type:**

Well casing outside diameter (in.): **Well casing inside diameter (in.):**

New water well casing? **Used casing source:**

Drilling method: **Drill material:**

Grout material: **Grout depth:**

Casing length (ft.): **Casing top depth (ft.):**

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Using any construction materials: YES

Construction Materials description: NM One Call (811) will be notified before construction start. Top 6" of soil and brush will be stockpiled west of the pad. Closed loop drilling system will be used. Caliche will be hauled from an existing caliche pit on private (Dinwiddie Cattle Company) land in W2 08-25S-36E or an existing caliche pit on private (Dinwiddie Cattle Company) land in E2 17-25S-36E.

Construction Materials source location

DOGWOOD_25_36_20_FED_COM_093H___WELLSITE_20221012120653.pdf

DOGWOOD_25_36_20_FED_COM_093H___CALICHE_MAP_20221012113217.pdf

Section 7 - Methods for Handling

Waste type: DRILLING

Waste content description: Drill cuttings, mud, salts, and other chemicals

Amount of waste: 2000 barrels

Waste disposal frequency : Daily

Safe containment description: Steel tanks on pad

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL

Disposal type description:

Disposal location description: R360's State approved (NM-01-0006) disposal site at Halfway, NM

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit? NO

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? Y

Description of cuttings location Steel tanks on pad

Cuttings area length (ft.) **Cuttings area width (ft.)**

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary

Are you requesting any Ancillary Facilities?: N

Ancillary Facilities

Comments:

Section 9 - Well Site

Well Site Layout Diagram:

DOGWOOD_25_36_20_FED_COM_093H___WELLSITE_20221012120758.pdf
BO_DOGWOOD_4N_PAD_SITE_S_20221012113341.pdf

Comments:

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Section 10 - Plans for Surface

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: DW

Multiple Well Pad Number: #4N

Recontouring

DOGWOOD_25_36_20_FED_COM_093H___WELLSITE_20221012120816.pdf

Drainage/Erosion control construction: Crowned and ditched

Drainage/Erosion control reclamation: Harrowed on the contour

Well pad proposed disturbance (acres): 4.59	**Well pad interim reclamation (acres):** 0.37	**Well pad long term disturbance (acres):** 4.22
Road proposed disturbance (acres): 3.06	**Road interim reclamation (acres):** 0	**Road long term disturbance (acres):** 3.06
Powerline proposed disturbance (acres): 10.11	**Powerline interim reclamation (acres):** 0	**Powerline long term disturbance (acres):** 10.11
Pipeline proposed disturbance (acres): 2.72	**Pipeline interim reclamation (acres):** 0	**Pipeline long term disturbance (acres):** 2.72
Other proposed disturbance (acres): 0	**Other interim reclamation (acres):** 0	**Other long term disturbance (acres):** 0
Total proposed disturbance: 20.479999999999997	**Total interim reclamation:** 0.37	**Total long term disturbance:** 20.11

Disturbance Comments:

Reconstruction method: If circumstances allow, interim reclamation and/or final reclamation actions will be completed no later than 6 months from when the final well on location has been completed or plugged. Ameredev will gain written permission from the BLM if more time is needed. Interim reclamation will consist of shrinking the pad 8% (.37 acre) by removing caliche and reclaiming a 40' wide swath on the west side of the pad. This will leave 4.22 acres for producing four wells, with tractor-trailer turn around. Disturbed areas will be contoured to match pre-construction grades. Soil and brush will be evenly spread over disturbed areas and harrowed on the contour. Disturbed areas will be seeded in accordance with the surface owner's requirements. All topsoil for the battery will be reseeded in place for the life of the battery.

Topsoil redistribution: Enough stockpiled topsoil will be retained to cover the remainder of the pad when the well is plugged. New road will be similarly reclaimed within 6 months of plugging. Noxious weeds will be controlled.

Soil treatment: None.

Existing Vegetation at the well pad: Sparse low brush and intermittent grasses

Existing Vegetation at the well pad

Existing Vegetation Community at the road: Sparse low brush and intermittent grasses

Existing Vegetation Community at the road

Existing Vegetation Community at the pipeline: Sparse low brush and intermittent grasses

Existing Vegetation Community at the pipeline

Existing Vegetation Community at other disturbances: Sparse low brush and intermittent grasses

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Existing Vegetation Community at other disturbances

Non native seed used? N

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? N

Seedling transplant description

Will seed be harvested for use in site reclamation? N

Seed harvest description:

Seed harvest description attachment:

Seed

Seed Table

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation

Operator Contact/Responsible Official

First Name: Patrick **Last Name:** Kelley

Phone: (404)402-9980 **Email:** pkelley@ameredev.com

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? N

Existing invasive species treatment description:

Existing invasive species treatment

Weed treatment plan description: To BLM standards

Weed treatment plan

Monitoring plan description: To BLM standards

Monitoring plan

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Success standards: To BLM satisfaction

Pit closure description: No Pit

Pit closure attachment:

Section 11 - Surface

Disturbance type: WELL PAD

Describe:

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: AGREEMENT

Surface Access Agreement Need description: Ameredev and the private surface owner have a surface use agreement in place.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Disturbance type: PIPELINE

Describe:

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: AGREEMENT

Surface Access Agreement Need description: Ameredev and the private surface owner have a surface use agreement in place.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Disturbance type: NEW ACCESS ROAD

Describe:

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: AGREEMENT

Surface Access Agreement Need description: Ameredev and the private surface owner have a surface use agreement in place.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Disturbance type: OTHER

Describe: POWERLINE

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: AGREEMENT

Surface Access Agreement Need description: Ameredev and the private surface owner have a surface use agreement in place.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Disturbance type: OTHER

Describe: WATER LINE

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: AGREEMENT

Surface Access Agreement Need description: Ameredev and the private surface owner have a surface use agreement in place.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Section 12 - Other

Right of Way needed? N **Use APD as ROW?**

ROW Type(s):

ROW

SUPO Additional Information:

Use a previously conducted onsite? N

Previous Onsite information:

Other SUPO

Dogwood_25_36_20_Fed_Com_093H_SUPO_20221012121100.pdf

AFMSS

U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

PWD Data Report

10/05/2023

APD ID: 10400088613 **Submission Date:** 10/12/2022

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Well Type: OIL WELL **Well Work Type:** Drill

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined

Would you like to utilize Lined Pit PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit

Pit liner description:

Pit liner manufacturers

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule

Lined pit reclamation description:

Lined pit reclamation

Leak detection system description:

Leak detection system

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Lined pit Monitor description:

Lined pit Monitor

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information

Section 3 - Unlined

Would you like to utilize Unlined Pit PWD options? N

Produced Water Disposal (PWD) Location:

PWD disturbance (acres): **PWD surface owner:**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule

Unlined pit reclamation description:

Unlined pit reclamation

Unlined pit Monitor description:

Unlined pit Monitor

Do you propose to put the produced water to beneficial use?

Beneficial use user

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic

State

Unlined Produced Water Pit Estimated

Unlined pit: do you have a reclamation bond for the pit?

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information

Section 4 -

Would you like to utilize Injection PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: **Injection well name:**

Assigned injection well API number? **Injection well API number:**

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection

Underground Injection Control (UIC) Permit?

UIC Permit

Section 5 - Surface

Would you like to utilize Surface Discharge PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 -

Would you like to utilize Other PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Other PWD discharge volume (bbl/day):

Operator Name: AMEREDEV OPERATING LLC

Well Name: DOGWOOD 25 36 20 FED COM **Well Number:** 093H

Other PWD type description:

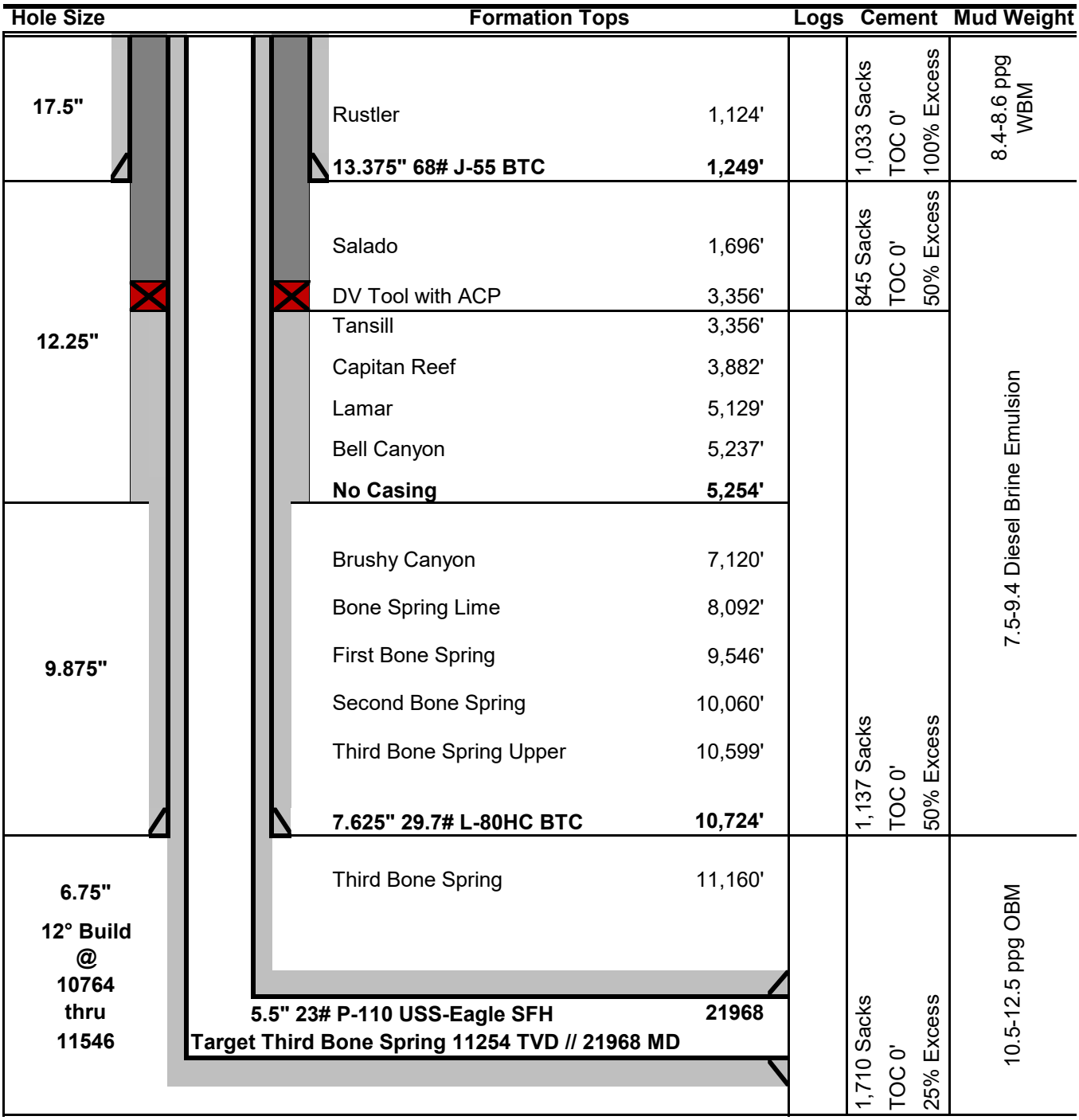
Other PWD type

Have other regulatory requirements been met?

Other regulatory requirements

Wellbore Schematic

Well:	Dogwood 25 36 20 Fed Com 093H	**Co. Well ID:**	xxxxxx
SHL:	SEC. 20, T.-25S, R.-36E, 200' FSL, 1740' FWL	**AFE No.:**	xxxx-xxx
BHL:	SEC. 17, T.-25S, R.-36E, 50' FNL, 1790' FWL	**API No.:**	xxxxxxxxxx
	Lea, NM	**GL:**	3059
Wellhead:	A - 13-5/8" 10M x 13-5/8" SOW	**Field:**	Delaware
	B - 13-5/8" 10M x 13-5/8" 10M	**Objective:**	Third Bone Spring
	C - 13-5/8" 10M x 13-5/8" 10M	**TVD:**	11254
	Tubing Spool - 7-1/16" 15M x 13-3/8" 10M	**MD:**	21968
Xmas Tree:	2-9/16" 10M	**Rig:**	TBD **KB** 27'
Tubing:	2-7/8" L-80 6.5# 8rd EUE	**E-Mail:**	DrillingCR@ameredev.com



5M Annular Preventer Variance Request and Well Control Procedures

Note: A copy of the Well Control Plan must be available at multiple locations on the rig for review by rig personnel, as well as review by the BLM PET/PE, and a copy must be maintained on the rig floor.

Dual Isolation Design for 5M Annular Exception

Ameredev will utilize 13-5/8" 10M (5M Annular) BOPE System consisting of:

- 13-5/8" 5M Annular
- 13-5/8" 10M Upper Pipe Rams
  - 3-1/2" – 5-1/2" Variable Bore Ram
- 13-5/8" 10M Blind Rams
- 13-5/8" 10M Drilling Spool /w 2 - 4" 10M Outlets Double 10M Isolation Valves
- 13-5/8" 10M Lower Blind Rams
  - 3-1/2" – 5-1/2" Variable Bore Ram

All drilling components and casing associated to exposure > 5000 psi BHP requiring a 10M system will have a double isolation (secondary barrier) below the 5M Annular that would provide a barrier to flow. The mud system will always be primary barrier, it will be maintained by adjusting values based on tourly mud tests and monitoring a PVT System to maintain static wellbore conditions, displacement procedures will be followed and recorded on daily drilling reports during tripping operations. Surge and swab pressure values will be calculated and maintained and static flow check will be monitored at previous casing shoe and verified static well conditions prior to tripping out of hole and again prior to pulling last joint of drill pipe through BOPE. The below table, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

Drill Components	Size	Primary Barrier	Secondary Barrier	Third Barrier
Drillpipe	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
HWDP Drillpipe	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Drill Collars	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Production Casing	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
0pen Hole	13-5/8	Drilling Fluid	Blind Rams	
All Drilling Components in 10M Environment will have OD that will allow full Operational RATED WORKING PRESSURE for system design. Kill line with minimum 2" ID will be available outside substructure with 10M Check Valve for OOH Kill Operations				

Well Control Procedures

Proper well control procedures are dependent to differentiating well conditions, to cover the basic well control operations there are will be standard drilling ahead, tripping pipe, tripping BHA, running casing, and pipe out of the hole/open hole scenarios that will be defined by procedures below. Initial Shut In Pressure can be taken against the Uppermost BOPE component the 5M Annular, pressure control can be transferred from the lesser 5M Annular to the 10M Upper Pipe Rams if needed. Shut In Pressures may be equal to or less than the Rated Working Pressure but at no time will the pressure on the annular preventer exceed the Rated Working Pressure of the annular. The annular will be tested to 5,000 psi. This will be the Rated Working Pressure of the annular preventer. All scenarios will be written such as shut in will be performed by closing the 10,000 psi Upper Pipe Rams for faster Accumulator pressure recovery to allow safer reaction to controlling wellbore pressure.

Shutting In While Drilling

1. Sound alarm signaling well control event to Rig Crew
2. Space out drill string to allow FOSV installation
3. Shut down pumps
4. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
5. Install open, full open safety valve and close valve, Close Chokes
6. Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

Shutting In While Tripping

1. Sound alarm signaling well control event to Rig Crew
2. Space out drill string to allow FOSV installation
3. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install open, full open safety valve and close valve, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

Shutting In While Running Casing

1. Sound alarm signaling well control event to Rig Crew
2. Space out casing to allow circulating swedge installation
3. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install circulating swedge, Close high pressure, low torque valves, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold Pre-job safety meeting and discuss kill procedure

Shutting in while out of hole

1. Sound alarm signaling well control event to Rig Crew
2. Shut-in well: close blind rams and open HCR against Open Chokes and Valves Open to working pressure gauge
3. Close Chokes, Verify well is shut-in and monitor pressures
4. Notify supervisory personnel
5. Record data (SIDP, SICP, Pit Gain, and Time)
6. Hold Pre-job safety meeting and discuss kill procedure

Shutting in prior to pulling BHA through stack

Prior to pulling last joint of drill pipe thru the stack space out and check flow
If flowing see steps below.

1. Sound alarm signaling well control event to Rig Crew
2. Shut in upper pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
3. Install open, full open safety valve and close valve, Close Chokes
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold pre-job safety meeting and discuss kill procedure

Shutting in while BHA is in the stack and ram preventer and combo immediately available

1. Sound alarm signaling well control event to Rig Crew
2. Space out BHA with upset just beneath the compatible pipe ram
3. Shut in upper compatible pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install open, full open safety valve and close valve, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

*FOSV will be on rig floor in open position with operating handle for each type of connection utilized and tested to 10,000 psi

Shutting in while BHA is in the stack and no ram preventer or combo immediately available

1. Sound alarm signaling well control event to Rig Crew
2. If possible pick up high enough, to pull string clear and follow “Open Hole” scenario

If not possible to pick up high enough:

3. Stab Crossover, make up one joint/stand of drill pipe, and install open, full open safety valve (Leave Open)
4. Space out drill string with upset just beneath the compatible pipe ram.
5. Shut in upper compatible pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
6. Close FOSV, Close Chokes, Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

Pressure Control Plan

Pressure Control Equipment

- Following setting of 13-3/8” Surface Casing Ameredev will install 13-5/8 MB4 Multi Bowl Casing Head by welding on a 13-5/8 SOW x 13-5/8” 5M in combination with 13-5/8 5M x 13-5/8 10M B-Sec to Land Intm #1 and a 13-5/8 10M x 13-5/8 10M shouldered to land C-Sec to Land Intm #2 (Installation procedure witnessed and verified by a manufacturer’s representative).

- Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Ameredev will install a 5M System Blowout Preventer (BOPE) with a 5M Annular Preventer and related equipment (BOPE). Full testing will be performed utilizing a full isolation test plug and limited to 5,000 psi MOP of MB4 Multi Bowl Casing Head. Pressure will be held for 10 min or until provisions of test are met on all valves and rams. The 5M Annular Preventer will be tested to 50% of approved working pressure (2,500 psi). Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Setting of 9-5/8” (7-5/8" as applicable) Intermediate will be done by landing a wellhead hanger in the 13-5/8” 5M Bowl, Cementing and setting Well Head Packing seals and testing same. (Installation procedure witnessed and verified by a manufacturer’s representative) Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Full testing will be performed utilizing a full isolation test plug to 10,000 psi MOP of MB4 Multi Bowl B-Section. Pressure will be held for 10 min or until provisions of test are met on all valves and rams. The 5M Annular Preventer will be tested to 100% of approved working pressure (5,000 psi).

- Before drilling >20ft of new formation under the 9-5/8” (7-5/8" as applicable) Casing Shoe a pressure integrity test of the Casing Shoe will be performed to minimum of the MWE anticipated to control formation pressure to the next casing depth.

- Following setting of 5-1/2” Production Casing and adequate WOC time Ameredev will break 10M System Blowout Preventer (BOP) from 10M DOL-2 Casing Head, install annulus casing slips and test same (Installation procedure witnessed and verified by a manufacturer’s representative) and install 11” 10M x 5-1/8” 15M Tubing Head (Installation procedure witnessed and verified by a manufacturer’s representative). Ameredev will test head to 70% casing design and install Dry Hole cap with needle valve and pressure gauge to monitor well awaiting completion.

Pressure Control Plan

- Slow pump speeds will be taken daily by each crew and recorded on Daily Drilling Report after mudding up.
- A choke manifold and accumulator with floor and remote operating stations will be functional and in place after installation of BOPE, as well as full functioning mud gas separator.
- Weekly BOPE pit level drills will be conducted by each crew and recorded on Daily Drilling Report.
- BOP will be fully operated when out of hole and will be documented on the daily drilling log.
- All B.O.P.s and associated equipment will be tested in accordance with Onshore Order #2
- All B.O.P. testing will be done by an independent service company.
- The B.O.P. will be tested within 21 days of the original test if drilling takes more time than planned.
- Ameredev requests a variance to connect the B.O.P. choke outlet to the choke manifold using a co-flex hose with a 10,000 psi working pressure that has been tested to 15,000psi and is built to API Spec 16C. Once the flex line is installed it will be tied down with safety clamps. (certifications will be sent to Carlsbad BLM Office prior to install)
- Ameredev requests a variance to install a 5M Annular Preventer on the 10M System to drill the Production Hole below the 9-5/8” (7-5/8" as applicable) Intermediate Section. 5M Annular will be tested to 100% working pressure (5,000 psi). A full well control procedure will be included to isolate well bore.

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 275047

CONDITIONS

Operator:	OGRID:
AMEREDEV OPERATING, LLC 2901 Via Fortuna Austin, TX 78746	372224
	Action Number: 275047
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

CONDITIONS

Created By	Condition	Condition Date
pkautz	Will require a File As Drilled C-102 and a Directional Survey with the C-104	10/20/2023
pkautz	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string	10/20/2023
pkautz	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system	10/20/2023
pkautz	Cement is required to circulate on both surface and intermediate1 strings of casing	10/20/2023
pkautz	If cement does not circulate on any string, a CBL is required for that string of casing	10/20/2023