

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**

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER 1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other 1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		5. Lease Serial No. NMLC029387C  6. If Indian, Allottee or Tribe Name  7. If Unit or CA Agreement, Name and No.  8. Lease Name and Well No. SILVER 29-28 FED COM  111H 9. API Well No. <span style="color: red;">30-015-55236</span>
2. Name of Operator CENTENNIAL RESOURCE PRODUCTION LLC		10. Field and Pool, or Exploratory SHUGART/BONE SPRING
3a. Address 300 N MARIENFIELD STREET SUITE 1000, MIDLAND, TX	3b. Phone No. (include area code) (432) 695-4222	11. Sec., T. R. M. or Blk. and Survey or Area SEC 29/T18S/R31E/NMP
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface SWNE / 1928 FNL / 2146 FEL / LAT 32.720394 / LONG -103.890039 At proposed prod. zone NENE / 660 FNL / 100 FEL / LAT 32.723913 / LONG -103.866217		12. County or Parish EDDY
14. Distance in miles and direction from nearest town or post office* 2 miles		13. State NM
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 1928 feet	16. No of acres in lease 	17. Spacing Unit dedicated to this well 240.0
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 33 feet	19. Proposed Depth 7895 feet / 15412 feet	20. BLM/BIA Bond No. in file FED:
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3625 feet	22. Approximate date work will start* 05/01/2024	23. Estimated duration 18 days

**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.<br>2. A Drilling Plan.<br>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).<br>5. Operator certification.<br>6. Such other site specific information and/or plans as may be requested by the BLM. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

25. Signature (Electronic Submission)	Name (Printed/Typed) TINLEE VIA / Ph: (432) 695-4222	Date 05/24/2023
Title Drilling Engineer		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) CODY LAYTON / Ph: (575) 234-5959	Date 05/10/2024
Title Assistant Field Manager Lands & Minerals Carlsbad Field 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.



(Continued on page 2)

\*(Instructions on page 2)

## 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 well, 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 directionally 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 well 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 will 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 collects this information to allow 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 Connection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

### Additional Operator Remarks

#### Location of Well

0. SHL: SWNE / 1928 FNL / 2146 FEL / TWSP: 18S / RANGE: 31E / SECTION: 29 / LAT: 32.720394 / LONG: -103.890039 ( TVD: 0 feet, MD: 0 feet )  
PPP: NWNE / 660 FNL / 2540 FEL / TWSP: 18S / RANGE: 31E / SECTION: 29 / LAT: 32.723876 / LONG: -103.890821 ( TVD: 7895 feet, MD: 8253 feet )  
PPP: NENE / 660 FNL / 0 FEL / TWSP: 18S / RANGE: 31E / SECTION: 29 / LAT: 32.723889 / LONG: -103.883068 ( TVD: 7895 feet, MD: 10229 feet )  
PPP: NENW / 660 FNL / 2642 FWL / TWSP: 18S / RANGE: 31E / SECTION: 28 / LAT: 32.723902 / LONG: -103.87448 ( TVD: 7895 feet, MD: 12070 feet )  
PPP: NWNW / 660 FNL / 1321 FWL / TWSP: 18S / RANGE: 31E / SECTION: 28 / LAT: 32.723895 / LONG: -103.878774 ( TVD: 7895 feet, MD: 11550 feet )  
BHL: NENE / 660 FNL / 100 FEL / TWSP: 18S / RANGE: 31E / SECTION: 28 / LAT: 32.723913 / LONG: -103.866217 ( TVD: 7895 feet, MD: 15412 feet )

#### BLM Point of Contact

Name: JANET D ESTES  
Title: ADJUDICATOR  
Phone: (575) 234-6233  
Email: JESTES@BLM.GOV

CONFIDENTIAL

**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.

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Form C-102  
Revised August 1, 2011  
Submit one copy to appropriate  
District Office  
 AMENDED REPORT

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

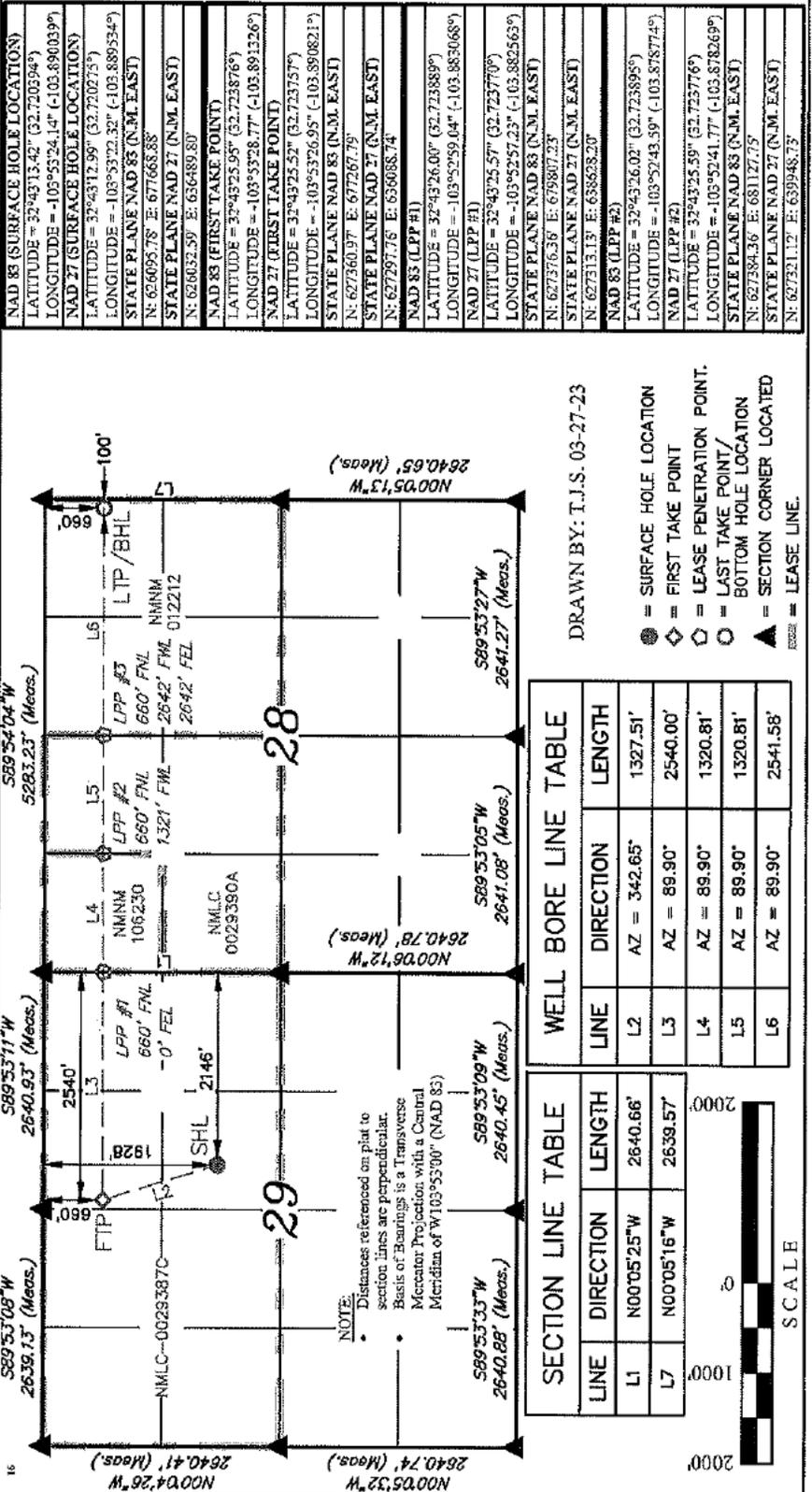
District I  
1625 N. French Dr., Hobbs, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720  
District II  
811 S. First St., Artesia, NM 88210  
Phone: (575) 748-1283 Fax: (575) 748-9720  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170  
District IV  
1230 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

WELL LOCATION AND ACREAGE DEDICATION PLAT

<sup>1</sup> API Number <b>30-015-55236</b>	<sup>2</sup> Pool Code <b>56400</b>	<sup>3</sup> Pool Name <b>Shugart; Bone Spring</b>
<sup>4</sup> Property Code <b>336003</b>	<sup>5</sup> Property Name <b>SILVER 29-28 FED COM</b>	<sup>6</sup> Well Number <b>111H</b>
<sup>7</sup> OGRID No. <b>372165</b>	<sup>8</sup> Operator Name <b>PERMIAN RESOURCES OPERATING, LLC</b>	<sup>9</sup> Elevation <b>3624.7'</b>

<sup>10</sup> Surface Location			<sup>11</sup> Bottom Hole Location if Different From Surface					
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	East/West line	County
G	29	18S	31E	1928	2146	NORTH	EAST	EDDY
A	28	18S	31E	660	100	NORTH	EAST	EDDY
<sup>12</sup> Dedicated Acres <b>240</b>		<sup>13</sup> Joint or Infill		<sup>14</sup> Consolidation Code		<sup>15</sup> Order No.		

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



**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 a 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 entered into and approved by the division.

Signature: *P. J. ...* Date: 5/23/2023  
Printed Name: Tinlee Via  
E-mail Address: tinlee.via@permanres.com

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

March 23, 2023  
Date of Survey  
Signature and Seal of Professional Surveyor:



Certificate Number: **NAD 83 (LPP #3)**

LATITUDE = 32°43'26.05" (32.723902°)
LONGITUDE = -103°52'28.13" (-103.874489°)
<b>NAD 27 (LPP #3)</b>
LATITUDE = 32°43'25.62" (32.723782°)
LONGITUDE = -103°52'26.31" (-103.873975°)
<b>STATE PLANE NAD 83 (N.M. EAST)</b>
N: 627592.36' E: 682448.27'
<b>STATE PLANE NAD 27 (N.M. EAST)</b>
N: 627339.11' E: 641269.26'
<b>NAD 83 (LTP/BHL)</b>
LATITUDE = 32°43'26.09" (32.723919°)
LONGITUDE = -103°51'58.38" (-103.866317°)
<b>NAD 27 (LTP/BHL)</b>
LATITUDE = 32°43'25.66" (32.723794°)
LONGITUDE = -103°51'56.57" (-103.865713°)
<b>STATE PLANE NAD 83 (N.M. EAST)</b>
N: 627407.75' E: 684989.30'
<b>STATE PLANE NAD 27 (N.M. EAST)</b>
N: 627544.48' E: 643810.29'

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:** Permian Resources Operating, LLC **OGRID:** 372165 **Date:** 05/13/2024

**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
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████
██████████	████	██████████	██████████	████	████	████

**IV. Central Delivery Point Name:** Long John Silver CTB [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
Long John 29-30 Fed Com 111H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Long John 29-30 Fed Com 112H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Long John 29-30 Fed Com 121H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Long John 29-30 Fed Com 122H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Long John 29-30 Fed Com 131H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Long John 29-30 Fed Com 132H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Silver 29-28 Fed Com 111H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Silver 29-28 Fed Com 112H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Silver 29-28 Fed Com 121H	TBD		<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>

Silver 29-28 Fed Com 122H		<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	
Silver 29-28 Fed Com 131H		<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	
Silver 29-28 Fed Com 132H		<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	

**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
Long John 29-30 Fed Com 111H	TBD	1180	430,020
Long John 29-30 Fed Com 112H	TBD	1180	430,020
Long John 29-30 Fed Com 121H	TBD	1180	430,020
Long John 29-30 Fed Com 122H	TBD	1180	430,020
Long John 29-30 Fed Com 131H	TBD	1180	430,020
Long John 29-30 Fed Com 132H	TBD	1180	430,020
Silver 29-28 Fed Com 111H	TBD	1180	430,020
Silver 29-28 Fed Com 112H	TBD	1180	430,020
Silver 29-28 Fed Com 121H	TBD	1180	430,020
Silver 29-28 Fed Com 122H	TBD	1180	430,020
Silver 29-28 Fed Com 131H	TBD	1180	430,020
Silver 29-28 Fed Com 132H	TBD	1180	430,020

**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:
Printed Name: Cassie Evans
Title: Regulatory Specialist
E-mail Address: Cassie.Evans@permianres.com
Date: 5/13/24
Phone: 432-313-1732
<b>OIL CONSERVATION DIVISION (Only applicable when submitted as a standalone form)</b>
Approved By:
Title:
Approval Date:
Conditions of Approval:

## NATURAL GAS MANAGEMENT PLAN DESCRIPTIONS

### VI. Separation Equipment:

Permian utilizes a production forecast from our Reservoir Engineering team to appropriately size each permanent, 3-phase separator and heater treater utilized for production operations. Our goal is to maintain 5 minutes of retention time in the test vessel and 20 minutes in the heater treater at peak production rates. The gas produced is routed from the separator to the gas sales line.

### VII. Operational Practices:

#### *Drilling*

During Permian's drilling operations it is uncommon for venting or flaring to occur. If flaring is needed due to safety concerns, gas will be routed to a flare and volumes will be estimated.

#### *Flowback*

During completion/recompletion flowback operations, after separation flowback begins and as soon as it is technically feasible, Permian routes gas through a permanent separator and the controlled facility where the gas is either sold or flared through a high-pressure flare if needed.

#### *Production*

Per 19.15.27.8.D, Permian's facilities are designed to minimize waste. Our produced gas will only be vented or flared in an emergency or malfunction situation, except as allowed for normal operations noted in 19.15.27.8.D(2) & (4). All gas that is flared is metered. All gas that may be vented will be estimated.

#### *Performance Standards*

Permian utilizes a production forecast from our Reservoir Engineering team to appropriately size each permanent, 3-phase separator and heater treater utilized for production operations.

All of Permian's permanent storage tanks associated with production operations which are routed to a flare or control device are equipped with an automatic gauging system.

All of Permian's flare stacks, both currently installed and for future installation, are:

- 1) Appropriately sized and designed to ensure proper combustion efficiency.
- 2) Equipped with an automatic ignitor or continuous pilot.
- 3) Anchored and located at least 100 feet from the well and storage tanks.

Permian's field operations and HSE teams have implemented an AVO inspection schedule that adheres to the requirements of 19.15.27.8.E(5).

All of our operations and facilities are designed to minimize waste. We routinely employ the following methods and practices:

- Closed loop systems
- Enclosed and properly sized tanks.

- Vapor recovery units to maximize recovery of low-pressure gas streams and potential unauthorized emissions.
- Low-emitting or electric engines whenever practical
- Combustors and flare stacks in the event of a malfunction or emergency
- Routine facility inspections to identify leaking components, functioning control devices, such as flares and combustors, and repair / replacement of malfunctioning components where applicable.

#### *Measurement or Estimation*

Permian measures or estimates the volumes of natural gas vented, flared and/or beneficially used for all of our drilling, completing, and producing wells. We utilize accepted industry standards and methodology which can be independently verified. Annual GOR testing is completed on our wells and will be submitted as required by the NMOCD. None of our equipment is designed to allow diversion around metering elements except during inspection, maintenance, and repair operations.

#### **VIII. Best Management Practices:**

Permian utilizes the following BMPs to minimize venting during active and planned maintenance activities:

- Use a closed-loop process wherever possible during planned maintenance activities, such as blowdowns, liquid removal, and work over operations.
- Employ low-emitting or electric engines for equipment, such as compressors.
- Adhere to a strict preventative maintenance program which includes routine facility inspections, identification of component malfunctions, and repairing or replacing components such as hatches, seals, valves, etc. where applicable.
- Utilize vapor recovery units (VRU's) to maximize recovery of volumes of low-pressure gas streams and potential unauthorized emissions.
- Route low pressure gas and emissions streams to a combustion device to prevent venting where necessary.



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

# Drilling Plan Data Report

05/11/2024

APD ID: 10400092425

Submission Date: 05/24/2023

Highlighted data reflects the most recent changes

Operator Name: CENTENNIAL RESOURCE PRODUCTION LLC

Well Name: SILVER 29-28 FED COM

Well Number: 111H

Well Type: OIL WELL

Well Work Type: Drill

[Show Final Text](#)

## Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical	Measured Depth	Lithologies	Mineral Resources	Producing Formatio
13408729	RUSTLER	3654	545	545	SANDSTONE	USEABLE WATER	N
13408730	TOP SALT	2879	775	775	ANHYDRITE, SALT	NONE	N
13408748	TANSILL	1734	1920	1920	ANHYDRITE, SHALE	NATURAL GAS, OIL	N
13408733	YATES	1559	2095	2095	SHALE	NATURAL GAS, OIL	N
13408749	SEVEN RIVERS	1109	2545	2545	LIMESTONE	NATURAL GAS, OIL	N
13408750	QUEEN	399	3255	3255	LIMESTONE	NATURAL GAS, OIL	N
13408751	GRAYBURG	-87	3741	3741	LIMESTONE	NATURAL GAS, OIL	N
13408732	CHERRY CANYON	-691	4345	4345	SANDSTONE	NATURAL GAS, OIL	N
13408752	BRUSHY CANYON	-1031	4685	4685	SANDSTONE	NATURAL GAS, OIL	N
13408739	BONE SPRING LIME	-2401	6055	6055	LIMESTONE	NATURAL GAS, OIL	N
13408743	FIRST BONE SPRING SAND	-4031	7685	7685	SANDSTONE, SHALE	NATURAL GAS, OIL	Y
13408744	BONE SPRING 2ND	-4831	8485	8485	SANDSTONE	NATURAL GAS, OIL	N
13408746	BONE SPRING 3RD	-5614	9268	9268	SANDSTONE	NATURAL GAS, OIL	N

## Section 2 - Blowout Prevention

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC**Well Name:** SILVER 29-28 FED COM**Well Number:** 111H**Pressure Rating (PSI):** 5M**Rating Depth:** 8000

**Equipment:** BOPE with working pressure ratings in excess of anticipated maximum surface pressure will be utilized for well control from drill out of surface casing to TMD. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested. All BOPE connections shall be flanged, welded or clamped. All choke lines shall be straight unless targeted with running tees or tee blocks are used, and choke lines shall be anchored to prevent whip and reduce vibrations. All valves in the choke line & the choke manifold shall be full opening as to not cause restrictions and to allow for straight fluid paths to minimize potential erosion. All gauges utilized in the well control system shall be of a type designed for drilling fluid service. A top drive inside BOP valve will be utilized at all times. Subs equipped with full opening valves sized to fit the drill pipe and collars will be available on the rig floor in the open position. The key to operate said valve equipped subs will be on the rig floor at all times. The accumulator system will have sufficient capacity to open the HCR and close all three sets of rams plus the annular preventer while retaining at least 300 psi above precharge on the closing manifold (accumulator system shall be capable of doing so without using the closing unit pumps). The fluid reservoir capacity will be double the usable fluid volume of the accumulator system capacity, and the fluid level will be maintained at the manufacturer's recommended level. Prior to connecting the closing unit to the BOP stack, an accumulator precharge pressure test shall be performed to ensure the precharge pressure is within 100 psi of the desired precharge pressure (only nitrogen gas will be used to precharge). Two independent power sources will be made available at all times to power the closing unit pumps so that the pumps can automatically start when the closing valve manifold pressure has decreased to the preset level. Closing unit pumps will be sized to allow opening of HCR and closing of annular preventer on 5" drill pipe achieving at least 200 psi above precharge pressure with the accumulator system isolated from service in less than two minutes. A valve shall be installed in the closing line as close to the annular preventer as possible to act as a locking device; the valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative. Remote controls capable of opening and closing all preventers & the HCR shall be readily accessible to the driller; master controls with the same capability will be operable at the accumulator. The wellhead will be a multibowl speed head allowing for hangoff of intermediate casing & isolation of the 133/8 x 95/8 annulus without breaking the connection between the BOP & wellhead to install an additional casing head. A wear bushing will be installed & inspected frequently to guard against internal wear to wellhead. VBRs (variable bore rams) will be run in upper rambody of BOP stack to provide redundancy to annular preventer while RIH w/ production casing;

**Requesting Variance?** YES**Variance request:** Flex hose and offline cement variances, see attachments in section 8.

**Testing Procedure:** The BOP test shall be performed before drilling out of the surface casing shoe and will occur at a minimum: a. when initially installed b. whenever any seal subject to test pressure is broken c. following related repairs d. at 30 day intervals e. checked daily as to mechanical operating conditions. The ram type preventer(s) will be tested using a test plug to 250 psi (low) and 5,000 psi (high) (casinghead WP) with a test plug upon its installation onto the 13 surface casing. If a test plug is not used, the ram type preventer(s) shall be tested to 70% of the minimum internal yield pressure of the casing. The annular type preventer(s) shall be tested to 3500 psi. Pressure will be maintained for at least 10 minutes or until provisions of the test are met, whichever is longer. A Sundry Notice (Form 3160 5), along with a copy of the BOP test report, shall be submitted to the local BLM office within 5 working days following the test. If the bleed line is connected into the buffer tank (header), all BOP equipment including the buffer tank and associated valves will be rated at the required BOP pressure. The BLM office will be provided with a minimum of four (4) hours notice of BOP testing to allow witnessing. The BOP Configuration, choke manifold layout, and accumulator system, will be in compliance with Onshore Order 2 for a 5,000 psi system. A remote accumulator and a multi-bowl system will be used, please see attachment in section 8 for multi-bowl procedure. Pressures, capacities, and specific placement and use of the manual and/or hydraulic controls, accumulator controls, bleed lines, etc., will be identified at the time of the BLM 'witnessed BOP test. Any remote controls will be capable of both opening and closing all preventers and shall be readily accessible.

**Choke Diagram Attachment:**

Silver\_29\_Fed\_Com\_5M\_Choke\_Diagram\_20230523132812.pdf

**BOP Diagram Attachment:**Released by Imaging 7/12/2024 9:51:05 AM  
SILVER 29-28 FED COM 5M BOP Diagram 20230523132816.pdf

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC

**Well Name:** SILVER 29-28 FED COM

**Well Number:** 111H

Silver\_29\_Fed\_Com\_5M\_Choke\_Diagram\_20230523132812.pdf

Silver\_29\_Fed\_Com\_5K\_BOP\_Diagram\_20230523132816.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	570	0	570	3625	3055	570	J-55	54.5	BUTT	4.01	1.69	DRY	6.94	DRY	6.51
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	4635	0	4635	3758	-959	4635	J-55	36	BUTT	2.89	1.65	DRY	2.39	DRY	2.11
3	PRODUCTION	8.75	5.5	NEW	API	N	0	8253	0	7895	3238	-4270	8253	OTHER	17	OTHER - GEOCONN	1.82	1.9	DRY	2.33	DRY	2.33
4	PRODUCTION	7.875	5.5	NEW	API	N	8253	15412	7895	7895	-4270	-4270	7159	OTHER	17	OTHER - GEOCONN	1.82	1.9	DRY	2.33	DRY	2.33

**Casing Attachments**

**Casing ID:** 1      **String**      SURFACE

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

**Casing Design Assumptions and Worksheet(s):**

Silver\_29\_Fed\_Com\_Casing\_Design\_Assumptions\_20230523133012.pdf

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC

**Well Name:** SILVER 29-28 FED COM

**Well Number:** 111H

**Casing Attachments**

---

**Casing ID:** 2            **String**    INTERMEDIATE

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

**Casing Design Assumptions and Worksheet(s):**

Silver\_29\_Fed\_Com\_Casing\_Design\_Assumptions\_20230523132957.pdf

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**Casing ID:** 3            **String**    PRODUCTION

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

**Casing Design Assumptions and Worksheet(s):**

Silver\_29\_Fed\_Com\_Casing\_Design\_Assumptions\_20230523133052.pdf

Silver\_29\_Fed\_Com\_Production\_Casing\_Spec\_Sheet\_20230523133134.pdf

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**Casing ID:** 4            **String**    PRODUCTION

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

**Casing Design Assumptions and Worksheet(s):**

Silver\_29\_Fed\_Com\_Production\_Casing\_Spec\_Sheet\_20230523133221.pdf

Silver\_29\_Fed\_Com\_Casing\_Design\_Assumptions\_20230523133221.pdf

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**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC

**Well Name:** SILVER 29-28 FED COM

**Well Number:** 111H

**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	370	280	1.88	12.9	520	100	Class C	EconoCem-HLC + 5% Salt + 5% Kol-Seal
SURFACE	Tail		370	570	450	1.34	14.8	600	50	Class C	Accelerator
INTERMEDIATE	Lead		0	3700	810	2.08	12.7	1680	50	Class C	Salt, Extender & LCM
INTERMEDIATE	Tail		3700	4635	330	1.34	14.8	440	50	Class C	Accelerator
PRODUCTION	Lead		4135	7509	490	2.41	11.5	1160	40	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder
PRODUCTION	Tail		7509	15412	1040	1.73	12.5	1790	25	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder
PRODUCTION	Lead		4135	7509	490	2.41	11.5	1160	40	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder
PRODUCTION	Tail		7509	15412	1040	1.73	12.5	1790	25	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder

**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:** Sufficient quantities of mud materials will be on the well site at all times for the purpose of assuring well control and maintaining wellbore integrity. Surface interval will employ fresh water mud. The intermediate hole will utilize a saturated brine fluid to inhibit salt washout. The production hole will employ brine based and oil base fluid to inhibit formation reactivity and of the appropriate density to maintain well control.

**Describe the mud monitoring system utilized:** Centrifuge separation system. Open tank monitoring with EDR will be used for drilling fluids and return volumes. Open tank monitoring will be used for cement and cuttings return volumes. Mud properties will be monitored at least every 24 hours using industry accepted mud check practices.

**Circulating Medium Table**

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC

**Well Name:** SILVER 29-28 FED COM

**Well Number:** 111H

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	570	WATER-BASED MUD	8.6	9.5							
8253	1541 2	OIL-BASED MUD	9	10							
4635	8253	OTHER : Brine	9	10							
570	4635	SALT SATURATED	10	10							

### Section 6 - Test, Logging, Coring

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

Will utilize MWD/LWD (Gamma Ray logging) from intermediate hole to TD of the well.

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

DIRECTIONAL SURVEY, GAMMA RAY LOG,

**Coring operation description for the well:**

N/A

### Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 4110

**Anticipated Surface Pressure:** 2373

**Anticipated Bottom Hole Temperature(F):** 137

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

**Describe:**

**Contingency Plans geohazards description:**

**Contingency Plans geohazards**

**Hydrogen Sulfide drilling operations plan required?** YES

**Hydrogen sulfide drilling operations**

H2S\_Contingency\_Plan\_Silver\_29\_28\_Fed\_Com\_111H\_\_112H\_\_121H\_\_122H\_\_131H\_\_132H\_20230523133616.pdf

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC

**Well Name:** SILVER 29-28 FED COM

**Well Number:** 111H

## Section 8 - Other Information

### Proposed horizontal/directional/multi-lateral plan submission:

Silver\_29\_28\_Fed\_Com\_111H\_\_PWP0\_20230523133730.pdf

Silver\_29\_28\_Fed\_Com\_111H\_\_PWP0\_AC\_Summary\_20230523133729.pdf

### Other proposed operations facets description:

Please see attached Drilling plan including multi-bowl diagram and procedure, proposed WBD, and casing connection data sheet. We also plan to batch drill this well along with offline cementing, see details under variance request below. Permian Resources Operating, LLC requests to use a flex hose on H&P choke manifold for this well. The Flex Hose specifications are attached below.

### Other proposed operations facets attachment:

Multibowl\_Wellhead\_Diagram\_20230515132758.pdf

Silver\_29\_Fed\_Com\_111H\_Proposed\_WBD\_20230523133843.pdf

Silver\_29\_Fed\_Com\_Production\_Casing\_Spec\_Sheet\_20230523133849.pdf

Silver\_29\_Fed\_Com\_Multiwell\_Batch\_Drilling\_Procedure\_20230523133902.pdf

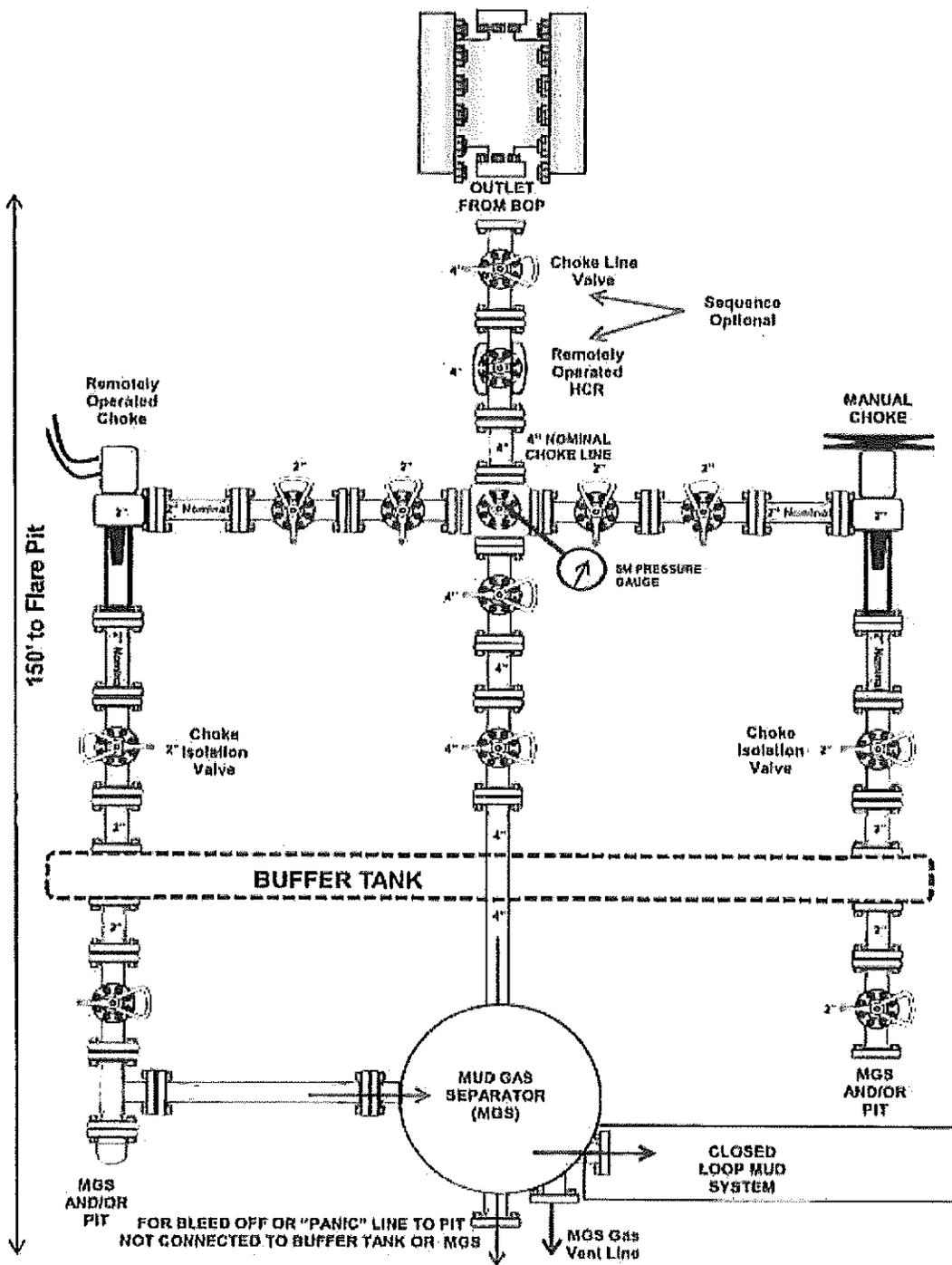
Silver\_29\_28\_Fed\_Com\_111H\_drilling\_packet\_20240221094841.pdf

### Other Variance attachment:

Offline\_Cementing\_Procedure\_20230519095721.pdf

Silver\_29\_Fed\_Com\_5M\_Choke\_Diagram\_20230523133925.pdf

# 5M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)





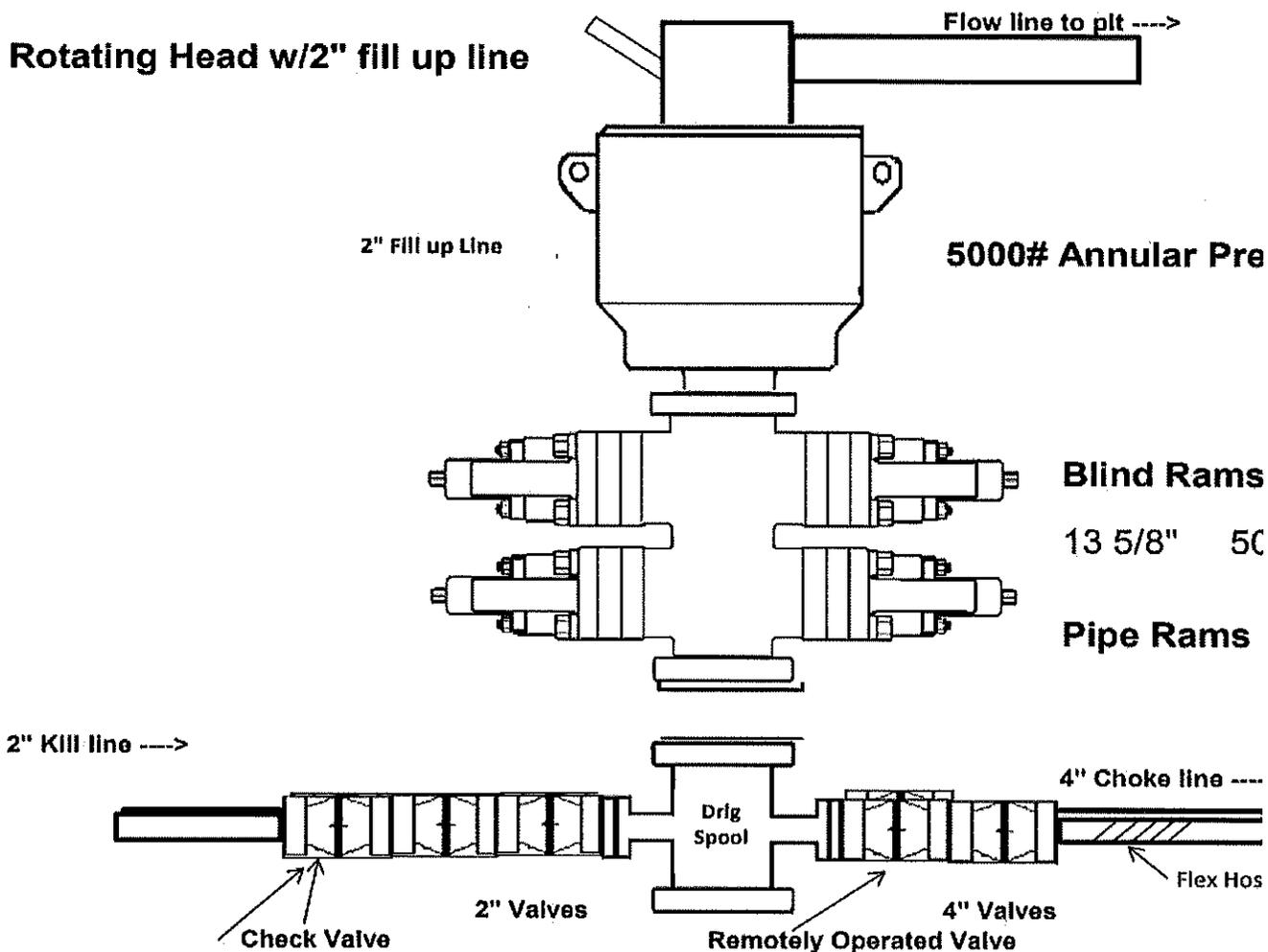
CONTITECH RUBBER Industrial KR.	No:QC-DB-210/2014
	Page: 9/113

QUALITY CONTROL INSPECTION AND TEST CERTIFICATE		CERT. N°	504
PURCHASER: Contitech Oil & Marine Corp.		P.O. N°	4500400650
CONTITECH RUBBER, order N°: 538238	HOSE TYPE: 3" in Choke and KM Hose		
HOSE SERIAL N°: 67255	NOMINAL / ACTUAL LENGTH: 10,87 m / 10,77 m.		
W.P.: 68,9 MPa 10000 psi	T.P.: 103,4 MPa 15000 psi	Duration:	60 min.
Pressure test with water at ambient temperature  See attachment. ( 1 page )  ↑ 10 mm = 10 MPa → 10 mm = 20 MPa			
COUPLINGS Type	Serial N°	Quantity	Heat N°
3" coupling with	9251 - 9254	AISI 4130	A0579N
4 1/16" 10K API b.w. Flange end		AISI 4130	03600
Not Designed For Well Testing		API Spec 16 C Temperature rate: "B"	
All metal parts are forged.			
WE CERTIFY THAT THE ABOVE HOSE HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE TERMS OF THE ORDER INSPECTED AND PRESSURE TESTED AS ABOVE WITH SATISFACTORY RESULT.			
STATEMENT OF CONFORMITY: We hereby certify that the above items/equipment supplied by us are in conformity with the terms, conditions and specifications of the above Purchaser Order and that these items/equipment were fabricated, inspected and tested in accordance with the referenced standards, codes and specifications and meet the relevant acceptance criteria and design requirements.			
COUNTRY OF ORIGIN HUNGARY/EU			
Date:	Inspector:	Quality Control:	
20. March 2014.		CONTITECH RUBBER Industrial KR. Quality Control 	

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# 5,000 psi BOP Schematic



## Permian Resources Casing Design Criteria

A sundry will be requested if any lesser grade or different size casing is substituted. All casing will be centralized as specified in On Shore Order II. Casing will be tested as specified in On Shore Order II.

### Casing Design Assumptions:

#### Surface

- 1) Burst Design Loads
  - a) Displacement to Gas
    - (1) Internal: Assumes a full column of gas in the casing with a gas gradient of 0.7 psi/ft in the absence of better information. It is limited to the controlling pressure based on the maximum expected pore pressure within the next drilling interval.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the TD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

#### Intermediate I

- 1) Burst Design Loads
  - a) Displacement to Gas
    - (1) Internal: Assumes a full column of gas in the casing with a gas gradient of 0.7 psi/ft in the absence of better information. It is limited to the controlling pressure based on the maximum expected pore pressure within the next drilling interval.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.

- (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the TD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    - 1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    - 1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

#### Intermediate or Intermediate II

- 1) Burst Design Loads
  - a) Gas Kick Profile
    - (1) Internal: Load profile based on influx encountered in lateral portion of wellbore with a maximum influx volume of 150 bbl and a kick intensity of 1.5 ppg using maximum anticipated MW of 9.9 ppg.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCD regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the deepest TVD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    - 1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    - 1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

Production

- 1) Burst Design Loads
  - a) Injection Down Casing
    - (1) Internal: Surface pressure plus injection fluid gradient.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test (Drilling)
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCD regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - c) Casing Pressure Test (Production)
    - (1) Internal: The design pressure test should be the greater of the planned test pressure prior to simulation down the casing, the regulatory test pressure, and the expected gas lift system pressure. The design test fluid should be the fluid associated with the pressure test having the greatest pressure.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
  - d) Tubing Leak
    - (1) Internal: SITP plus a packer fluid gradient to the top of packer.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
  - b) Full Evacuation
    - (1) Internal: Full void pipe.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

## Permian Resources Casing Design Criteria

A sundry will be requested if any lesser grade or different size casing is substituted. All casing will be centralized as specified in On Shore Order II. Casing will be tested as specified in On Shore Order II.

### Casing Design Assumptions:

#### Surface

- 1) Burst Design Loads
  - a) Displacement to Gas
    - (1) Internal: Assumes a full column of gas in the casing with a gas gradient of 0.7 psi/ft in the absence of better information. It is limited to the controlling pressure based on the maximum expected pore pressure within the next drilling interval.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the TD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

#### Intermediate I

- 1) Burst Design Loads
  - a) Displacement to Gas
    - (1) Internal: Assumes a full column of gas in the casing with a gas gradient of 0.7 psi/ft in the absence of better information. It is limited to the controlling pressure based on the maximum expected pore pressure within the next drilling interval.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.

- (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the TD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    - 1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    - 1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

#### Intermediate or Intermediate II

- 1) Burst Design Loads
  - a) Gas Kick Profile
    - (1) Internal: Load profile based on influx encountered in lateral portion of wellbore with a maximum influx volume of 150 bbl and a kick intensity of 1.5 ppg using maximum anticipated MW of 9.9 ppg.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the deepest TVD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    - 1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    - 1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

Production

- 1) Burst Design Loads
  - a) Injection Down Casing
    - (1) Internal: Surface pressure plus injection fluid gradient.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test (Drilling)
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCD regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - c) Casing Pressure Test (Production)
    - (1) Internal: The design pressure test should be the greater of the planned test pressure prior to simulation down the casing, the regulatory test pressure, and the expected gas lift system pressure. The design test fluid should be the fluid associated with the pressure test having the greatest pressure.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
  - d) Tubing Leak
    - (1) Internal: SITP plus a packer fluid gradient to the top of packer.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
  - b) Full Evacuation
    - (1) Internal: Full void pipe.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

## Permian Resources Casing Design Criteria

A sundry will be requested if any lesser grade or different size casing is substituted. All casing will be centralized as specified in On Shore Order II. Casing will be tested as specified in On Shore Order II.

### Casing Design Assumptions:

#### Surface

- 1) Burst Design Loads
  - a) Displacement to Gas
    - (1) Internal: Assumes a full column of gas in the casing with a gas gradient of 0.7 psi/ft in the absence of better information. It is limited to the controlling pressure based on the maximum expected pore pressure within the next drilling interval.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the TD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

#### Intermediate I

- 1) Burst Design Loads
  - a) Displacement to Gas
    - (1) Internal: Assumes a full column of gas in the casing with a gas gradient of 0.7 psi/ft in the absence of better information. It is limited to the controlling pressure based on the maximum expected pore pressure within the next drilling interval.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.

- (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the TD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    - 1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    - 1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

#### Intermediate or Intermediate II

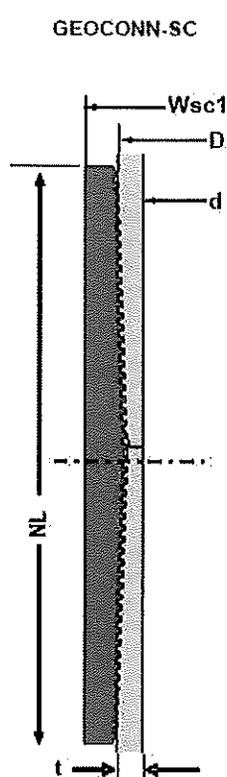
- 1) Burst Design Loads
  - a) Gas Kick Profile
    - (1) Internal: Load profile based on influx encountered in lateral portion of wellbore with a maximum influx volume of 150 bbl and a kick intensity of 1.5 ppg using maximum anticipated MW of 9.9 ppg.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCDC regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight from TOC to surface and cement slurry weight from TOC to shoe.
  - b) Lost Returns with Mud Drop
    - (1) Internal: Lost circulation at the deepest TVD of the next hole section and the fluid level falls to a depth where the hydrostatic pressure of the mud column equals pore pressure at the depth of the lost circulation zone.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    - 1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    - 1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

Production

- 1) Burst Design Loads
  - a) Injection Down Casing
    - (1) Internal: Surface pressure plus injection fluid gradient.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test (Drilling)
    - (1) Internal: Displacement fluid plus surface pressure required to comply with regulatory casing test pressure requirements of Onshore Oil and Gas Order No. 2 and NM NMAC 19.15.16 of NMOCD regulations.
    - (2) External: Mud weight to TOC and cement mix water gradient (8.4 ppg) below TOC.
  - c) Casing Pressure Test (Production)
    - (1) Internal: The design pressure test should be the greater of the planned test pressure prior to simulation down the casing, the regulatory test pressure, and the expected gas lift system pressure. The design test fluid should be the fluid associated with the pressure test having the greatest pressure.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
  - d) Tubing Leak
    - (1) Internal: SITP plus a packer fluid gradient to the top of packer.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
- 2) Collapse Loads
  - a) Cementing
    - (1) Internal: Displacement fluid density.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
  - b) Full Evacuation
    - (1) Internal: Full void pipe.
    - (2) External: Mud weight to TOC and cement slurry(s) density below TOC.
- 3) Tension Loads
  - a) Overpull Force
    1. Axial: Buoyant weight of the string plus planned 100,000 lbs applied in stuck pipe situation.
  - b) Green Cement Casing Test
    1. Axial: Buoyant weight of the string plus cement plug bump pressure load.

Metal One Corp.  <b>Metal One</b>	<b>GEOCONN-SC</b> Pipe: SeAH P110RY 95%PBW (SMYS110ksi) *1 Coupling: P110RY (SMYS110ksi) <b>Connection Data Sheet</b>	Page	MAI GC 5.5 17 SeAH P110RY 95%RBW+SC-Cplg6.050 P110RY
		Date	3-Feb-21
		Rev.	0

Geometry
Imperial
S.I.



Pipe Body				
Grade *1	P110RY	-	P110RY	-
SMYS	110	ksi	110	ksi
Pipe OD ( D )	5.500	in	139.70	mm
Weight	17.00	lb/ft	25.33	kg/m
Wall Thickness ( t )	0.304	in	7.72	mm
Pipe ID ( d )	4.892	in	124.26	mm
Drift Dia.	4.767	in	121.08	mm

Connection				
Coupling SMYS	110	ksi	110	ksi
SC-Coupling OD ( Wsc1 )	6.050	in	153.67	mm
Coupling Length ( NL )	8.350	in	212.09	mm
Make up Loss	4.125	in	104.78	mm
Pipe Critical Area	4.96	in <sup>2</sup>	3,202	mm <sup>2</sup>
Box Critical Area	6.10	in <sup>2</sup>	3,937	mm <sup>2</sup>
Thread Taper	1 / 16 ( 3/4" per ft )			
Number of Threads	5 TPI			

Performance
Imperial
S.I.

Performance Properties for Pipe Body				
S.M.Y.S. *1	545	klps	2,428	kN
M.I.Y.P. *1	11,550	psi	79.66	MPa
Collapse Strength *1	7,480	psi	51.59	MPa

Note S.M.Y.S. = Specified Minimum YIELD Strength of Pipe body  
 M.I.Y.P. = Minimum Internal Yield Pressure of Pipe body  
 \*1: SeAH P110RY 95%RBW; SMYS110ksi, MIYP11,550psi

Performance Properties for Connection	
Min. Connection Joint Strength	100% of S.M.Y.S.
Min. Compression Yield	100% of S.M.Y.S.
Internal Pressure	100% of M.I.Y.P.
External Pressure	100% of Collapse Strength
Max. DLS ( deg. /100R)	>90

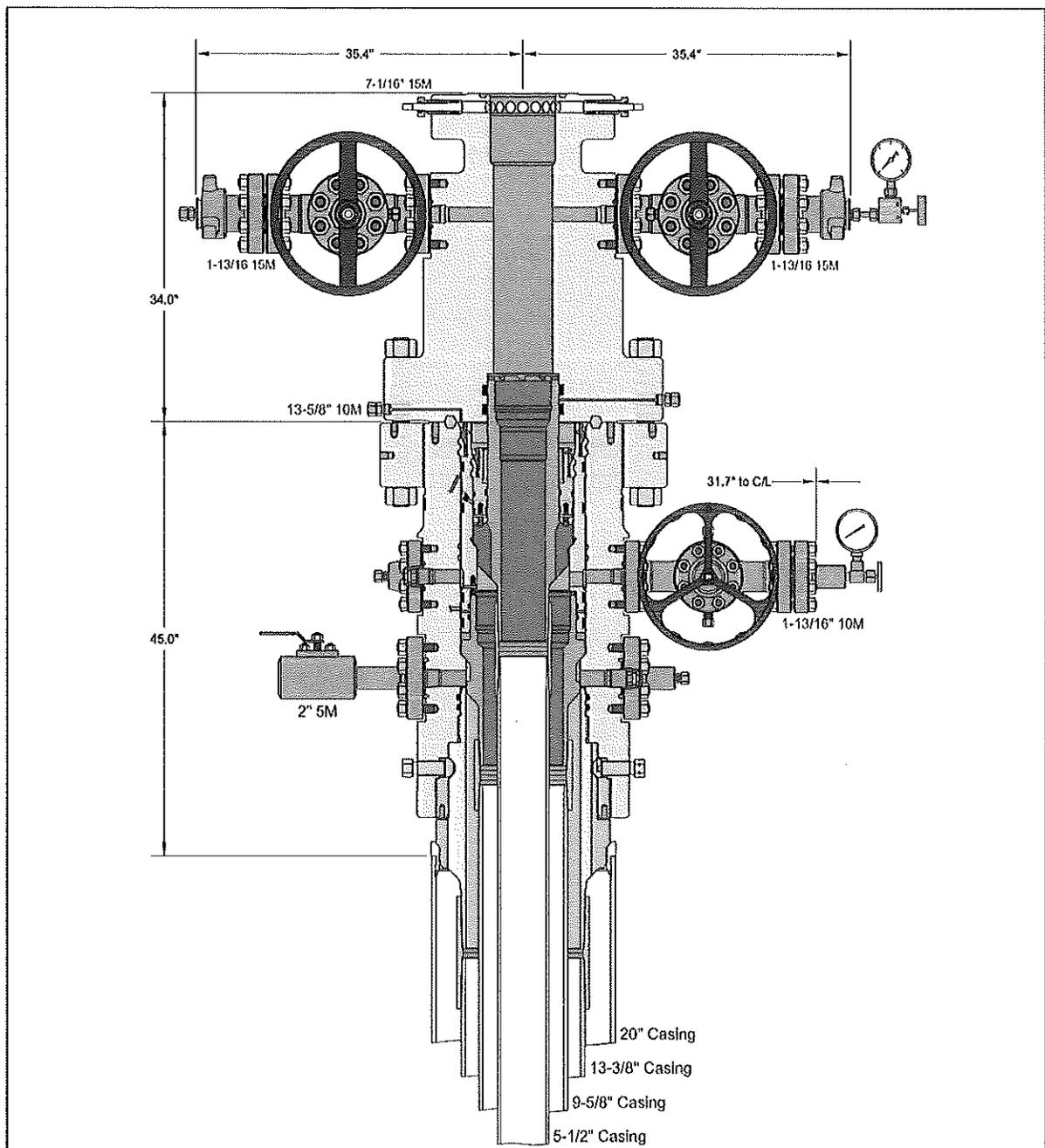
Recommended Torque				
Min.	10,800	ft-lb	14,600	N-m
Opti.	12,000	ft-lb	16,200	N-m
Max.	13,200	ft-lb	17,800	N-m
Operational Max.	15,600	ft-lb	21,100	N-m

Note : Operational Max. torque can be applied for high torque application

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The products described in this Connection Data Sheet are not recommended for use in deep water offshore applications. For more information, please refer to [http://www.mco.co.uk/who-con/\\_images/top/WasteTerms\\_Active\\_20331287\\_7.pdf](http://www.mco.co.uk/who-con/_images/top/WasteTerms_Active_20331287_7.pdf) the contents of which are incorporated by reference into this Connection Data Sheet.



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ALL DIMENSIONS APPROXIMATE

### CACTUS WELLHEAD LLC

CENTENNIAL RESOURCE DEVELOPMENT  
LEE CO, NM

20" x 13-3/8" x 9-5/8" x 5-1/2" 10M MBU-3T-CFL-R-DBLO System  
With 13-5/8" 10M x 7-1/16" 15M CTH-DBLHPS Tubing Head,  
20" Landing Ring & Pin Down Mandrel Casing Hangers

DRAWN	DLE	10JUN20
APPRV		

DRAWING NO.	HBE0000338
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## Permian Resources Multi-Well Pad Batch Drilling Procedure

Surface Casing - PR intends to Batch set all 13-3/8" casing to a depth approved in the APD. 17-1/2" Surface Holes will be batch drilled by a rig. Appropriate notifications will be made prior to spudding the well, running and cementing casing and prior to skidding to the rig to the next well on pad.

1. Drill 17-1/2" Surface hole to Approved Depth with Rig and perform wellbore cleanup cycles. Trip out and rack back drilling BHA.
2. Run and land 13-3/8" 54.5# J55 BTC casing see Illustration 1-1 Below to depth approved in APD.
3. Set packoff and test to 5k psi
4. Offline Cement
5. Install wellhead with pressure gauge and nightcap. Nightcap is shown on final wellhead Stack up Illustration #2-2.
6. Skid Rig to adjacent well to drill Surface hole.
7. Surface casing test will be performed by the rig in order to allow ample time for Cement to develop 500psi compressive strength. Casing test to 0.22 psi/ft or 1500 psi whichever is

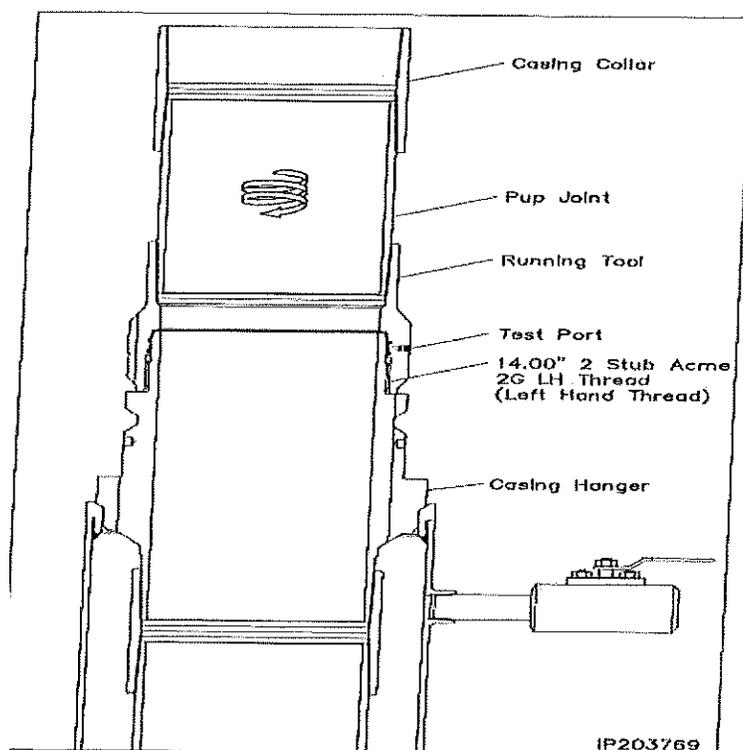


Illustration 1-1

Intermediate Casing – PR intends to Batch set all intermediate casing strings to a depth approved in the APD, typically set into Lamar. 12-1/4" Intermediate Holes will be batch drilled by the rig. Appropriate notifications will be made prior Testing BOPE, and prior to running/cementing all casing strings.

1. Rig will remove the nightcap and install and test BOPE.
2. Test Surface casing per COA WOC timing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst. Cement must have achieved 500psi compressive strength prior to test.
3. Install wear bushing then drill out 13-3/8" shoe-track plus 20' and conduct FIT to minimum of the MW equivalent anticipated to control the formation pressure to the next casing point.
4. Drill Intermediate hole to approved casing point. Trip out of hole with BHA to run Casing.
5. Remove wear bushing then run and land Intermediate Casing with mandrel hanger in wellhead.
6. Cement casing to surface with floats holding.
7. Washout stack then run wash tool in wellhead and wash hanger and pack-off setting area.
8. Install pack-off and test void to 5,000 psi for 15 minutes. Nightcap shown on final wellhead stack up illustration 2-2 on page 3.
9. Test casing per COA WOC timing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst. Cement must have achieved 500psi compressive strength prior to test.
10. Install nightcap – skid rig to adjacent well to drill Intermediate hole.

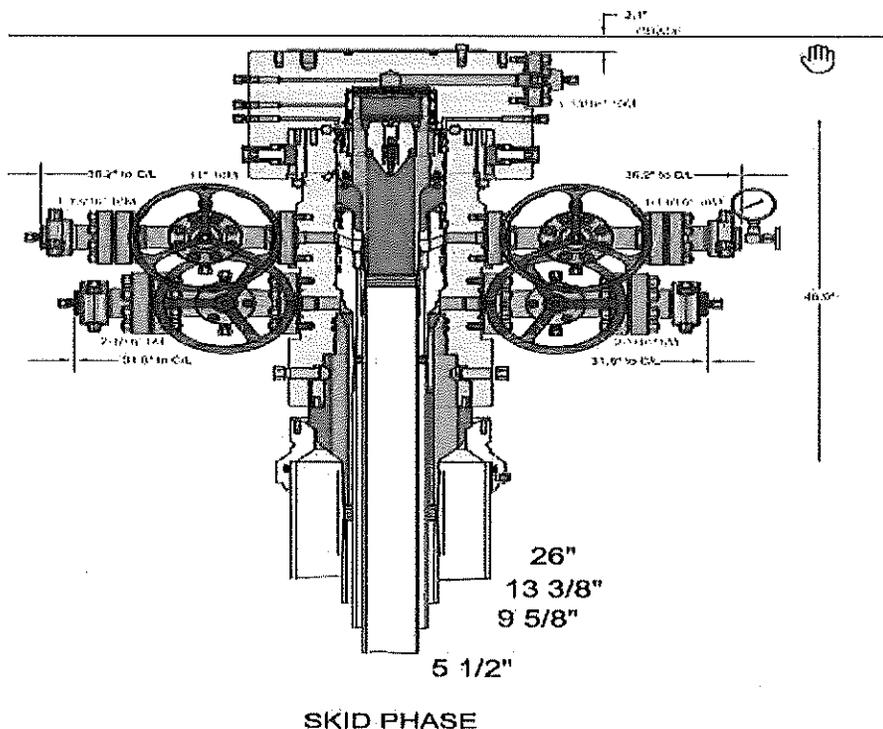


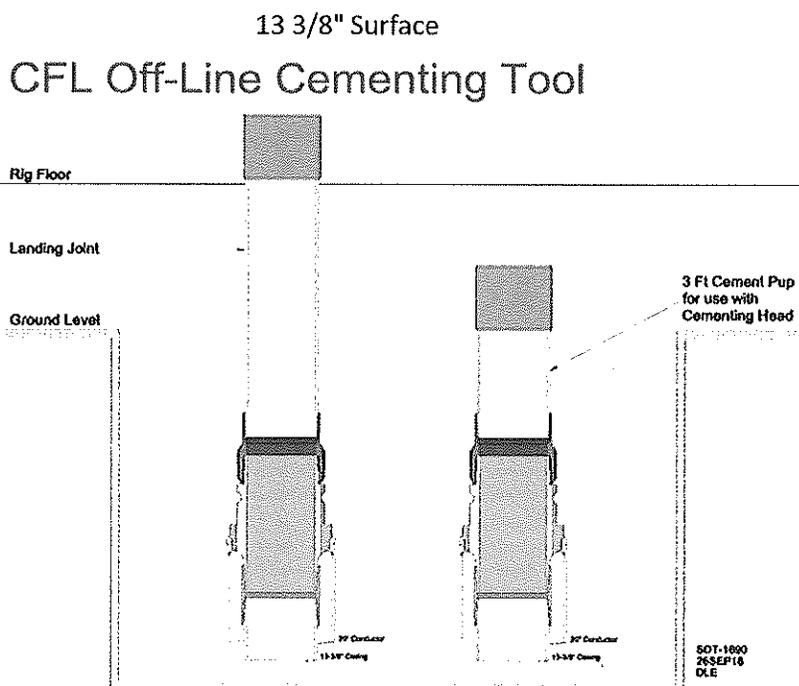
Illustration 2-2

Production Casing – PR intends to Batch set all Production casings with Rig. Appropriate notifications will be made prior Testing BOPE, and prior to running/cementing all casing strings.

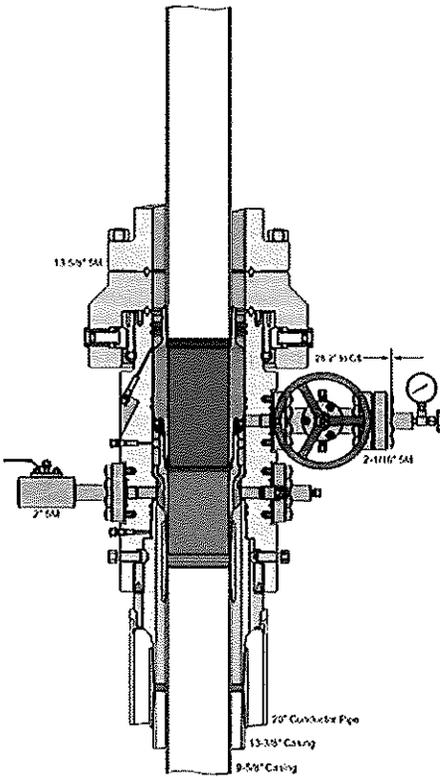
1. Big Rig will remove the nightcap and install and test BOPE.
2. Install wear bushing then drill Intermediate shoe-track plus 20' and conduct FIT to minimum MW equivalent to control the formation pressure to TD of well.
3. Drill Vertical hole to KOP – Trip out for Curve BHA.
4. Drill Curve, landing in production interval – Trip for Lateral BHA.
5. Drill Lateral / Production hole to Permitted BHL, perform cleanup cycles and trip out to run 5 1/2" Production Casing.
6. Remove wear bushing then run 5-1/2" production casing to TD landing casing mandrel in wellhead.
7. Cement 5-1/2" Production string with floats holding.
8. Run in with wash tool and wash wellhead area – install pack-off and test void to 5,000psi for 15 minutes.
9. Install BPV in 5-1/2" mandrel hanger – Nipple down BOPE and install nightcap.
10. Test nightcap void to 5,000psi for 30 minutes per illustration 2-2
11. Skid rig to adjacent well on pad to drill production hole.

**Permian Resources Offline Cementing Procedure  
13-3/8" & 9-5/8" Casing**

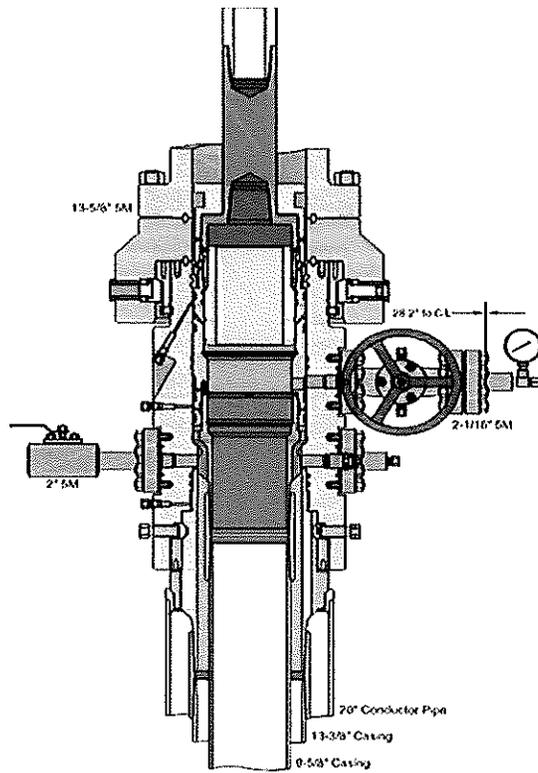
1. Drill hole to Total Depth with Rig and perform wellbore cleanup cycles.
2. Run and casing to Depth.
3. Land casing with mandrel.
4. Circulate 1.5 csg capacity.
5. Flow test – Confirm well is static and floats are holding.
6. Set Annular packoff and pressure test. Test to 5k.
7. Nipple down BOP and install cap flange.
8. Skid rig to next well on pad
9. Remove cap flange (confirm well is static before removal)
  - a) If well is not static use the casing outlet valves to kill well
  - b) Drillers method will be used in well control event
  - c) High pressure return line will be rigged up to lower casing valve and run to choke manifold to control annular pressure
  - d) Kill mud will be circulated once influx is circulated out of hole
  - e) Confirm well is static and remove cap flange to start offline cement operations
10. Install offline cement tool.
11. Rig up cementers.
12. Circulate bottoms up with cement truck
13. Commence planned cement job, take returns through the annulus wellhead valve
14. After plug is bumped confirm floats hold and well is static
15. Rig down cementers and equipment
16. Install night cap with pressure gauge to monitor.



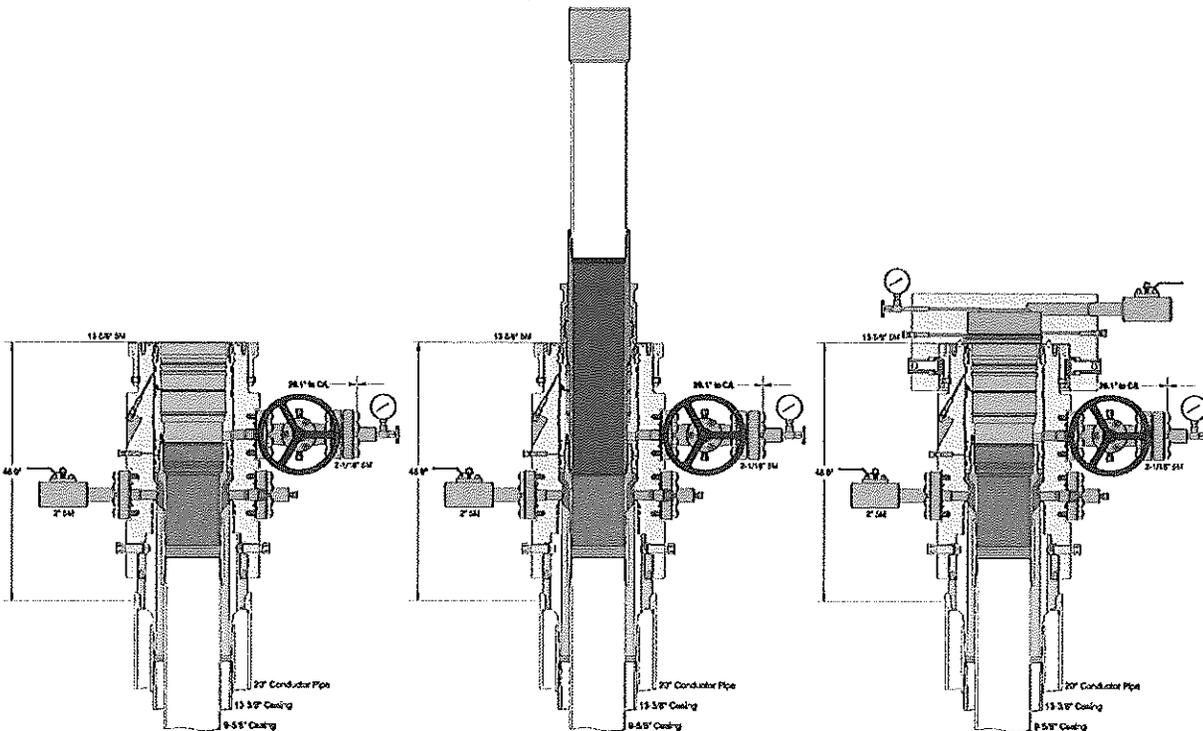
9 5/8" Intermediate



Run 9-5/8" Casing  
Land Casing on 9-5/8" Mandrel Hanger  
Cement 9-5/8" Casing  
Retrieve Running Tool



Run 13-5/8" Packoff  
Test Upper and Lower Seals  
Engage Lockring  
Retrieve Running Tool



# PERMIAN

## RESOURCES

### NEW MEXICO

(SP) EDDY

SILVER 29-28 FED COM

SILVER 29-28 FED COM 111H

OWB

Plan: PWP0

## Standard Planning Report - Geographic

11 May, 2023

# PERMIAN

## Permian Resources Planning Report - Geographic

### RESOURCES

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well SILVER 29-28 FED COM 111H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3624.7usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3624.7usft
<b>Site:</b>	SILVER 29-28 FED COM	<b>North Reference:</b>	Grid
<b>Well:</b>	SILVER 29-28 FED COM 111H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PWP0		

<b>Project</b>	(SP) EDDY		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	New Mexico Eastern Zone		

<b>Site</b>	SILVER 29-28 FED COM				
<b>Site Position:</b>		<b>Northing:</b>	626,091.02 usft	<b>Latitude:</b>	32° 43' 13.377 N
<b>From:</b>	Map	<b>Easting:</b>	677,503.98 usft	<b>Longitude:</b>	103° 53' 26.069 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.24 °

<b>Well</b>	SILVER 29-28 FED COM 111H					
<b>Well Position</b>	+N/-S	0.0 usft	<b>Northing:</b>	626,095.78 usft	<b>Latitude:</b>	32° 43' 13.417 N
	+E/-W	0.0 usft	<b>Easting:</b>	677,668.88 usft	<b>Longitude:</b>	103° 53' 24.139 W
<b>Position Uncertainty</b>	0.0 usft		<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	3,624.7 usft

<b>Wellbore</b>	OWB				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	IGRF200510	12/31/2009	(°)	(°)	(nT)
			7.93	60.65	49,055.11260804

<b>Design</b>	PWP0				
<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.0	
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	79.84	

<b>Plan Survey Tool Program</b>	<b>Date</b>	5/11/2023			
<b>Depth From</b>	<b>Depth To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>	
(usft)	(usft)				
1	0.0	15,411.6 PWP0 (OWB)	MWD+IFR1+MS	OWSG_Rev2_ MWD + IFR1 +	

<b>Plan Sections</b>										
<b>Measured</b>			<b>Vertical</b>			<b>Dogleg</b>	<b>Buld</b>	<b>Turn</b>		
<b>Depth</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Depth</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Rate</b>	<b>Rate</b>	<b>Rate</b>	<b>TFO</b>	<b>Target</b>
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	(°)	
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	
2,500.0	10.00	344.50	2,497.5	41.9	-11.6	2.00	2.00	0.00	344.50	
7,509.0	10.00	344.50	7,430.4	880.1	-244.1	0.00	0.00	0.00	0.00	
8,253.1	90.00	70.80	7,895.0	1,114.2	179.6	12.01	10.75	11.60	86.36	
9,195.4	90.00	89.65	7,895.0	1,273.5	1,104.0	2.00	0.00	2.00	90.00	
15,411.9	90.00	89.65	7,895.0	1,312.0	7,320.4	0.00	0.00	0.00	0.00	SILVER 29-28 FED C

# PERMIAN

## Permian Resources Planning Report - Geographic

### RESOURCES

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well SILVER 29-28 FED COM 111H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3624.7usft
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<b>Well:</b>	SILVER 29-28 FED COM 111H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PWP0		

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	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
100.0	0.00	0.00	100.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
200.0	0.00	0.00	200.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
300.0	0.00	0.00	300.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
400.0	0.00	0.00	400.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
500.0	0.00	0.00	500.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
600.0	0.00	0.00	600.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
700.0	0.00	0.00	700.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
800.0	0.00	0.00	800.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
900.0	0.00	0.00	900.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	626,095.78	677,668.88	32° 43' 13.417 N	103° 53' 24.139 W
2,100.0	2.00	344.50	2,100.0	1.7	-0.5	626,097.47	677,668.41	32° 43' 13.434 N	103° 53' 24.144 W
2,200.0	4.00	344.50	2,199.8	6.7	-1.9	626,102.51	677,667.01	32° 43' 13.484 N	103° 53' 24.161 W
2,300.0	6.00	344.50	2,299.5	15.1	-4.2	626,110.91	677,664.68	32° 43' 13.567 N	103° 53' 24.187 W
2,400.0	8.00	344.50	2,398.7	26.9	-7.5	626,122.65	677,661.42	32° 43' 13.683 N	103° 53' 24.225 W
2,500.0	10.00	344.50	2,497.5	41.9	-11.6	626,137.72	677,657.24	32° 43' 13.833 N	103° 53' 24.273 W
2,600.0	10.00	344.50	2,595.9	58.7	-16.3	626,154.46	677,652.60	32° 43' 13.998 N	103° 53' 24.327 W
2,700.0	10.00	344.50	2,694.4	75.4	-20.9	626,171.19	677,647.96	32° 43' 14.164 N	103° 53' 24.380 W
2,800.0	10.00	344.50	2,792.9	92.1	-25.6	626,187.92	677,643.32	32° 43' 14.330 N	103° 53' 24.434 W
2,900.0	10.00	344.50	2,891.4	108.9	-30.2	626,204.66	677,638.68	32° 43' 14.496 N	103° 53' 24.487 W
3,000.0	10.00	344.50	2,989.9	125.6	-34.8	626,221.39	677,634.04	32° 43' 14.661 N	103° 53' 24.541 W
3,100.0	10.00	344.50	3,088.3	142.3	-39.5	626,238.12	677,629.40	32° 43' 14.827 N	103° 53' 24.594 W
3,200.0	10.00	344.50	3,186.8	159.1	-44.1	626,254.86	677,624.76	32° 43' 14.993 N	103° 53' 24.648 W
3,300.0	10.00	344.50	3,285.3	175.8	-48.8	626,271.59	677,620.12	32° 43' 15.159 N	103° 53' 24.701 W
3,400.0	10.00	344.50	3,383.8	192.5	-53.4	626,288.32	677,615.48	32° 43' 15.325 N	103° 53' 24.755 W
3,500.0	10.00	344.50	3,482.3	209.3	-58.0	626,305.06	677,610.84	32° 43' 15.490 N	103° 53' 24.808 W
3,600.0	10.00	344.50	3,580.8	226.0	-62.7	626,321.79	677,606.20	32° 43' 15.656 N	103° 53' 24.862 W
3,700.0	10.00	344.50	3,679.2	242.7	-67.3	626,338.52	677,601.56	32° 43' 15.822 N	103° 53' 24.915 W
3,800.0	10.00	344.50	3,777.7	259.5	-72.0	626,355.26	677,596.92	32° 43' 15.988 N	103° 53' 24.969 W
3,900.0	10.00	344.50	3,876.2	276.2	-76.6	626,371.99	677,592.28	32° 43' 16.153 N	103° 53' 25.022 W
4,000.0	10.00	344.50	3,974.7	292.9	-81.2	626,388.72	677,587.64	32° 43' 16.319 N	103° 53' 25.076 W
4,100.0	10.00	344.50	4,073.2	309.7	-85.9	626,405.46	677,583.00	32° 43' 16.485 N	103° 53' 25.129 W
4,200.0	10.00	344.50	4,171.6	326.4	-90.5	626,422.19	677,578.35	32° 43' 16.651 N	103° 53' 25.183 W
4,300.0	10.00	344.50	4,270.1	343.1	-95.2	626,438.92	677,573.71	32° 43' 16.816 N	103° 53' 25.236 W
4,400.0	10.00	344.50	4,368.6	359.9	-99.8	626,455.66	677,569.07	32° 43' 16.982 N	103° 53' 25.290 W
4,500.0	10.00	344.50	4,467.1	376.6	-104.4	626,472.39	677,564.43	32° 43' 17.148 N	103° 53' 25.343 W
4,600.0	10.00	344.50	4,565.6	393.3	-109.1	626,489.12	677,559.79	32° 43' 17.314 N	103° 53' 25.397 W
4,700.0	10.00	344.50	4,664.0	410.1	-113.7	626,505.86	677,555.15	32° 43' 17.480 N	103° 53' 25.450 W
4,800.0	10.00	344.50	4,762.5	426.8	-118.4	626,522.59	677,550.51	32° 43' 17.645 N	103° 53' 25.504 W
4,900.0	10.00	344.50	4,861.0	443.5	-123.0	626,539.32	677,545.87	32° 43' 17.811 N	103° 53' 25.557 W
5,000.0	10.00	344.50	4,959.5	460.3	-127.6	626,556.06	677,541.23	32° 43' 17.977 N	103° 53' 25.611 W
5,100.0	10.00	344.50	5,058.0	477.0	-132.3	626,572.79	677,536.59	32° 43' 18.143 N	103° 53' 25.664 W
5,200.0	10.00	344.50	5,156.4	493.7	-136.9	626,589.52	677,531.95	32° 43' 18.308 N	103° 53' 25.718 W
5,300.0	10.00	344.50	5,254.9	510.5	-141.6	626,606.26	677,527.31	32° 43' 18.474 N	103° 53' 25.771 W
5,400.0	10.00	344.50	5,353.4	527.2	-146.2	626,622.99	677,522.67	32° 43' 18.640 N	103° 53' 25.825 W

# PERMIAN

## Permian Resources Planning Report - Geographic

### RESOURCES

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well SILVER 29-28 FED COM 111H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3624.7usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3624.7usft
<b>Site:</b>	SILVER 29-28 FED COM	<b>North Reference:</b>	Grid
<b>Well:</b>	SILVER 29-28 FED COM 111H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Deslgn:</b>	PWP0		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,500.0	10.00	344.50	5,451.9	543.9	-150.8	626,639.72	677,518.03	32° 43' 18.806 N	103° 53' 25.878 W	
5,600.0	10.00	344.50	5,550.4	560.7	-155.5	626,656.45	677,513.39	32° 43' 18.971 N	103° 53' 25.932 W	
5,700.0	10.00	344.50	5,648.9	577.4	-160.1	626,673.19	677,508.75	32° 43' 19.137 N	103° 53' 25.985 W	
5,800.0	10.00	344.50	5,747.3	594.1	-164.8	626,689.92	677,504.11	32° 43' 19.303 N	103° 53' 26.039 W	
5,900.0	10.00	344.50	5,845.8	610.9	-169.4	626,706.65	677,499.47	32° 43' 19.469 N	103° 53' 26.092 W	
6,000.0	10.00	344.50	5,944.3	627.6	-174.1	626,723.39	677,494.83	32° 43' 19.635 N	103° 53' 26.146 W	
6,100.0	10.00	344.50	6,042.8	644.3	-178.7	626,740.12	677,490.18	32° 43' 19.800 N	103° 53' 26.199 W	
6,200.0	10.00	344.50	6,141.3	661.1	-183.3	626,756.85	677,485.54	32° 43' 19.966 N	103° 53' 26.253 W	
6,300.0	10.00	344.50	6,239.7	677.8	-188.0	626,773.59	677,480.90	32° 43' 20.132 N	103° 53' 26.306 W	
6,400.0	10.00	344.50	6,338.2	694.5	-192.6	626,790.32	677,476.26	32° 43' 20.298 N	103° 53' 26.360 W	
6,500.0	10.00	344.50	6,436.7	711.3	-197.3	626,807.05	677,471.62	32° 43' 20.463 N	103° 53' 26.413 W	
6,600.0	10.00	344.50	6,535.2	728.0	-201.9	626,823.79	677,466.98	32° 43' 20.629 N	103° 53' 26.467 W	
6,700.0	10.00	344.50	6,633.7	744.7	-206.5	626,840.52	677,462.34	32° 43' 20.795 N	103° 53' 26.520 W	
6,800.0	10.00	344.50	6,732.1	761.5	-211.2	626,857.25	677,457.70	32° 43' 20.961 N	103° 53' 26.574 W	
6,900.0	10.00	344.50	6,830.6	778.2	-215.8	626,873.99	677,453.06	32° 43' 21.126 N	103° 53' 26.627 W	
7,000.0	10.00	344.50	6,929.1	794.9	-220.5	626,890.72	677,448.42	32° 43' 21.292 N	103° 53' 26.681 W	
7,100.0	10.00	344.50	7,027.6	811.7	-225.1	626,907.45	677,443.78	32° 43' 21.458 N	103° 53' 26.734 W	
7,200.0	10.00	344.50	7,126.1	828.4	-229.7	626,924.19	677,439.14	32° 43' 21.624 N	103° 53' 26.788 W	
7,300.0	10.00	344.50	7,224.5	845.1	-234.4	626,940.92	677,434.50	32° 43' 21.789 N	103° 53' 26.841 W	
7,400.0	10.00	344.50	7,323.0	861.9	-239.0	626,957.65	677,429.86	32° 43' 21.955 N	103° 53' 26.895 W	
7,500.0	10.00	344.50	7,421.5	878.6	-243.7	626,974.39	677,425.22	32° 43' 22.121 N	103° 53' 26.948 W	
7,509.0	10.00	344.50	7,430.4	880.1	-244.1	626,975.89	677,424.80	32° 43' 22.136 N	103° 53' 26.953 W	
7,600.0	15.23	30.55	7,519.3	898.1	-240.1	626,993.86	677,428.78	32° 43' 22.314 N	103° 53' 26.906 W	
7,700.0	25.49	49.14	7,613.1	923.6	-217.1	627,019.34	677,451.82	32° 43' 22.565 N	103° 53' 26.635 W	
7,800.0	36.78	57.19	7,698.6	954.0	-175.5	627,049.75	677,493.41	32° 43' 22.864 N	103° 53' 26.146 W	
7,900.0	48.38	61.81	7,772.1	988.0	-117.1	627,083.76	677,551.73	32° 43' 23.198 N	103° 53' 25.462 W	
<b>SILVER 29-28 FED COM 111H - FTP</b>										
8,000.0	60.11	65.00	7,830.4	1,024.1	-44.6	627,119.88	677,624.23	32° 43' 23.552 N	103° 53' 24.612 W	
8,100.0	71.90	67.50	7,871.0	1,060.7	38.9	627,156.52	677,707.73	32° 43' 23.912 N	103° 53' 23.632 W	
8,200.0	83.72	69.69	7,892.1	1,096.3	129.7	627,192.09	677,798.58	32° 43' 24.260 N	103° 53' 22.567 W	
8,253.0	89.99	70.80	7,895.0	1,114.2	179.5	627,209.96	677,848.36	32° 43' 24.435 N	103° 53' 21.983 W	
<b>EOC/FTP</b>										
8,253.1	90.00	70.80	7,895.0	1,114.2	179.6	627,210.00	677,848.46	32° 43' 24.435 N	103° 53' 21.982 W	
8,300.0	90.00	71.74	7,895.0	1,129.3	224.0	627,225.06	677,892.87	32° 43' 24.582 N	103° 53' 21.462 W	
8,400.0	90.00	73.74	7,895.0	1,158.9	319.5	627,254.73	677,988.36	32° 43' 24.872 N	103° 53' 20.342 W	
8,500.0	90.00	75.74	7,895.0	1,185.3	416.0	627,281.05	678,084.83	32° 43' 25.128 N	103° 53' 19.212 W	
8,600.0	90.00	77.74	7,895.0	1,208.2	513.3	627,303.99	678,182.16	32° 43' 25.351 N	103° 53' 18.071 W	
8,700.0	90.00	79.74	7,895.0	1,227.7	611.4	627,323.52	678,280.23	32° 43' 25.540 N	103° 53' 16.922 W	
8,800.0	90.00	81.74	7,895.0	1,243.8	710.0	627,339.62	678,378.92	32° 43' 25.695 N	103° 53' 15.766 W	
8,900.0	90.00	83.74	7,895.0	1,256.5	809.2	627,352.26	678,478.11	32° 43' 25.816 N	103° 53' 14.605 W	
9,000.0	90.00	85.74	7,895.0	1,265.6	908.8	627,361.43	678,577.69	32° 43' 25.903 N	103° 53' 13.439 W	
9,100.0	90.00	87.74	7,895.0	1,271.3	1,008.6	627,367.12	678,677.52	32° 43' 25.955 N	103° 53' 12.270 W	
9,195.4	90.00	89.65	7,895.0	1,273.5	1,104.0	627,369.30	678,772.87	32° 43' 25.973 N	103° 53' 11.153 W	
9,200.0	90.00	89.65	7,895.0	1,273.5	1,108.6	627,369.32	678,777.49	32° 43' 25.973 N	103° 53' 11.099 W	
9,300.0	90.00	89.65	7,895.0	1,274.2	1,208.6	627,369.94	678,877.49	32° 43' 25.975 N	103° 53' 9.929 W	
9,400.0	90.00	89.65	7,895.0	1,274.8	1,308.6	627,370.56	678,977.48	32° 43' 25.977 N	103° 53' 8.758 W	
9,500.0	90.00	89.65	7,895.0	1,275.4	1,408.6	627,371.18	679,077.48	32° 43' 25.979 N	103° 53' 7.588 W	
9,600.0	90.00	89.65	7,895.0	1,276.0	1,508.6	627,371.80	679,177.48	32° 43' 25.981 N	103° 53' 6.417 W	
9,700.0	90.00	89.65	7,895.0	1,276.6	1,608.6	627,372.42	679,277.48	32° 43' 25.982 N	103° 53' 5.246 W	
9,800.0	90.00	89.65	7,895.0	1,277.3	1,708.6	627,373.04	679,377.48	32° 43' 25.984 N	103° 53' 4.076 W	
9,900.0	90.00	89.65	7,895.0	1,277.9	1,808.6	627,373.65	679,477.48	32° 43' 25.986 N	103° 53' 2.905 W	
10,000.0	90.00	89.65	7,895.0	1,278.5	1,908.6	627,374.27	679,577.47	32° 43' 25.988 N	103° 53' 1.735 W	
10,100.0	90.00	89.65	7,895.0	1,279.1	2,008.6	627,374.89	679,677.47	32° 43' 25.990 N	103° 53' 0.564 W	
10,200.0	90.00	89.65	7,895.0	1,279.7	2,108.6	627,375.51	679,777.47	32° 43' 25.992 N	103° 52' 59.393 W	

# PERMIAN

## Permian Resources Planning Report - Geographic

### RESOURCES

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well SILVER 29-28 FED COM 111H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3624.7usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3624.7usft
<b>Site:</b>	SILVER 29-28 FED COM	<b>North Reference:</b>	Grid
<b>Well:</b>	SILVER 29-28 FED COM 111H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PWP0		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
10,229.0	90.00	89.65	7,895.0	1,279.9	2,137.6	627,375.69	679,806.47	32° 43' 25.993 N	103° 52' 59.054 W	
<b>LPP 1</b>										
10,300.0	90.00	89.65	7,895.0	1,280.3	2,208.6	627,376.13	679,877.47	32° 43' 25.994 N	103° 52' 58.223 W	
10,400.0	90.00	89.65	7,895.0	1,281.0	2,308.6	627,376.75	679,977.47	32° 43' 25.996 N	103° 52' 57.052 W	
10,500.0	90.00	89.65	7,895.0	1,281.6	2,408.6	627,377.37	680,077.46	32° 43' 25.998 N	103° 52' 55.882 W	
10,600.0	90.00	89.65	7,895.0	1,282.2	2,508.6	627,377.98	680,177.46	32° 43' 26.000 N	103° 52' 54.711 W	
10,700.0	90.00	89.65	7,895.0	1,282.8	2,608.6	627,378.60	680,277.46	32° 43' 26.002 N	103° 52' 53.540 W	
10,800.0	90.00	89.65	7,895.0	1,283.4	2,708.6	627,379.22	680,377.46	32° 43' 26.004 N	103° 52' 52.370 W	
10,900.0	90.00	89.65	7,895.0	1,284.1	2,808.6	627,379.84	680,477.46	32° 43' 26.005 N	103° 52' 51.199 W	
11,000.0	90.00	89.65	7,895.0	1,284.7	2,908.6	627,380.46	680,577.45	32° 43' 26.007 N	103° 52' 50.029 W	
11,100.0	90.00	89.65	7,895.0	1,285.3	3,008.6	627,381.08	680,677.45	32° 43' 26.009 N	103° 52' 48.858 W	
11,200.0	90.00	89.65	7,895.0	1,285.9	3,108.6	627,381.70	680,777.45	32° 43' 26.011 N	103° 52' 47.687 W	
11,300.0	90.00	89.65	7,895.0	1,286.5	3,208.6	627,382.32	680,877.45	32° 43' 26.013 N	103° 52' 46.517 W	
11,400.0	90.00	89.65	7,895.0	1,287.2	3,308.6	627,382.93	680,977.45	32° 43' 26.015 N	103° 52' 45.346 W	
11,500.0	90.00	89.65	7,895.0	1,287.8	3,408.6	627,383.55	681,077.44	32° 43' 26.017 N	103° 52' 44.176 W	
11,550.0	90.00	89.65	7,895.0	1,288.1	3,458.6	627,383.86	681,127.44	32° 43' 26.018 N	103° 52' 43.590 W	
<b>LLP 2</b>										
11,600.0	90.00	89.65	7,895.0	1,288.4	3,508.6	627,384.17	681,177.44	32° 43' 26.019 N	103° 52' 43.005 W	
11,700.0	90.00	89.65	7,895.0	1,289.0	3,608.6	627,384.79	681,277.44	32° 43' 26.021 N	103° 52' 41.834 W	
11,800.0	90.00	89.65	7,895.0	1,289.6	3,708.6	627,385.41	681,377.44	32° 43' 26.022 N	103° 52' 40.664 W	
11,900.0	90.00	89.65	7,895.0	1,290.2	3,808.6	627,386.03	681,477.44	32° 43' 26.024 N	103° 52' 39.493 W	
12,000.0	90.00	89.65	7,895.0	1,290.9	3,908.6	627,386.65	681,577.44	32° 43' 26.026 N	103° 52' 38.323 W	
12,070.0	90.00	89.65	7,895.0	1,291.3	3,978.6	627,387.08	681,647.43	32° 43' 26.027 N	103° 52' 37.503 W	
<b>LLP 3</b>										
12,100.0	90.00	89.65	7,895.0	1,291.5	4,008.6	627,387.26	681,677.43	32° 43' 26.028 N	103° 52' 37.152 W	
12,200.0	90.00	89.65	7,895.0	1,292.1	4,108.6	627,387.88	681,777.43	32° 43' 26.030 N	103° 52' 35.981 W	
12,300.0	90.00	89.65	7,895.0	1,292.7	4,208.6	627,388.50	681,877.43	32° 43' 26.032 N	103° 52' 34.811 W	
12,400.0	90.00	89.65	7,895.0	1,293.3	4,308.6	627,389.12	681,977.43	32° 43' 26.034 N	103° 52' 33.640 W	
12,500.0	90.00	89.65	7,895.0	1,294.0	4,408.6	627,389.74	682,077.43	32° 43' 26.035 N	103° 52' 32.470 W	
12,600.0	90.00	89.65	7,895.0	1,294.6	4,508.5	627,390.36	682,177.42	32° 43' 26.037 N	103° 52' 31.299 W	
12,700.0	90.00	89.65	7,895.0	1,295.2	4,608.5	627,390.98	682,277.42	32° 43' 26.039 N	103° 52' 30.128 W	
12,800.0	90.00	89.65	7,895.0	1,295.8	4,708.5	627,391.60	682,377.42	32° 43' 26.041 N	103° 52' 28.958 W	
12,900.0	90.00	89.65	7,895.0	1,296.4	4,808.5	627,392.21	682,477.42	32° 43' 26.043 N	103° 52' 27.787 W	
13,000.0	90.00	89.65	7,895.0	1,297.0	4,908.5	627,392.83	682,577.42	32° 43' 26.045 N	103° 52' 26.617 W	
13,100.0	90.00	89.65	7,895.0	1,297.7	5,008.5	627,393.45	682,677.41	32° 43' 26.046 N	103° 52' 25.446 W	
13,200.0	90.00	89.65	7,895.0	1,298.3	5,108.5	627,394.07	682,777.41	32° 43' 26.048 N	103° 52' 24.275 W	
13,300.0	90.00	89.65	7,895.0	1,298.9	5,208.5	627,394.69	682,877.41	32° 43' 26.050 N	103° 52' 23.105 W	
13,400.0	90.00	89.65	7,895.0	1,299.5	5,308.5	627,395.31	682,977.41	32° 43' 26.052 N	103° 52' 21.934 W	
13,500.0	90.00	89.65	7,895.0	1,300.1	5,408.5	627,395.93	683,077.41	32° 43' 26.054 N	103° 52' 20.764 W	
13,600.0	90.00	89.65	7,895.0	1,300.8	5,508.5	627,396.54	683,177.40	32° 43' 26.056 N	103° 52' 19.593 W	
13,700.0	90.00	89.65	7,895.0	1,301.4	5,608.5	627,397.16	683,277.40	32° 43' 26.057 N	103° 52' 18.422 W	
13,800.0	90.00	89.65	7,895.0	1,302.0	5,708.5	627,397.78	683,377.40	32° 43' 26.059 N	103° 52' 17.252 W	
13,900.0	90.00	89.65	7,895.0	1,302.6	5,808.5	627,398.40	683,477.40	32° 43' 26.061 N	103° 52' 16.081 W	
14,000.0	90.00	89.65	7,895.0	1,303.2	5,908.5	627,399.02	683,577.40	32° 43' 26.063 N	103° 52' 14.911 W	
14,100.0	90.00	89.65	7,895.0	1,303.9	6,008.5	627,399.64	683,677.39	32° 43' 26.065 N	103° 52' 13.740 W	
14,200.0	90.00	89.65	7,895.0	1,304.5	6,108.5	627,400.26	683,777.39	32° 43' 26.066 N	103° 52' 12.569 W	
14,300.0	90.00	89.65	7,895.0	1,305.1	6,208.5	627,400.88	683,877.39	32° 43' 26.068 N	103° 52' 11.399 W	
14,400.0	90.00	89.65	7,895.0	1,305.7	6,308.5	627,401.49	683,977.39	32° 43' 26.070 N	103° 52' 10.228 W	
14,500.0	90.00	89.65	7,895.0	1,306.3	6,408.5	627,402.11	684,077.39	32° 43' 26.072 N	103° 52' 9.058 W	
14,600.0	90.00	89.65	7,895.0	1,306.9	6,508.5	627,402.73	684,177.39	32° 43' 26.074 N	103° 52' 7.887 W	
14,700.0	90.00	89.65	7,895.0	1,307.6	6,608.5	627,403.35	684,277.38	32° 43' 26.075 N	103° 52' 6.716 W	
14,800.0	90.00	89.65	7,895.0	1,308.2	6,708.5	627,403.97	684,377.38	32° 43' 26.077 N	103° 52' 5.546 W	
14,900.0	90.00	89.65	7,895.0	1,308.8	6,808.5	627,404.59	684,477.38	32° 43' 26.079 N	103° 52' 4.375 W	
15,000.0	90.00	89.65	7,895.0	1,309.4	6,908.5	627,405.21	684,577.38	32° 43' 26.081 N	103° 52' 3.205 W	

# PERMIAN

## Permian Resources Planning Report - Geographic

### RESOURCES

Database: Compass  
 Company: NEW MEXICO  
 Project: (SP) EDDY  
 Site: SILVER 29-28 FED COM  
 Well: SILVER 29-28 FED COM 111H  
 Wellbore: OWB  
 Design: PWP0

Local Co-ordinate Reference: Well SILVER 29-28 FED COM 111H  
 TVD Reference: GL @ 3624.7usft  
 MD Reference: GL @ 3624.7usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

#### Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,100.0	90.00	89.65	7,895.0	1,310.0	7,008.5	627,405.82	684,677.38	32° 43' 26.082 N	103° 52' 2.034 W
15,200.0	90.00	89.65	7,895.0	1,310.7	7,108.5	627,406.44	684,777.37	32° 43' 26.084 N	103° 52' 0.864 W
15,300.0	90.00	89.65	7,895.0	1,311.3	7,208.5	627,407.06	684,877.37	32° 43' 26.086 N	103° 51' 59.693 W
15,400.0	90.00	89.65	7,895.0	1,311.9	7,308.5	627,407.68	684,977.37	32° 43' 26.088 N	103° 51' 58.522 W
15,411.9	90.00	89.65	7,895.0	1,312.0	7,320.4	627,407.75	684,989.27	32° 43' 26.088 N	103° 51' 58.383 W

LTP/BHL - SILVER 29-28 FED COM 111H - LTP/BHL

#### Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SILVER 29-28 FED COM - hit/miss target - Shape	0.00	0.00	7,895.0	1,265.2	-401.1	627,360.97	677,267.79	32° 43' 25.953 N	103° 53' 28.772 W
- plan misses target center by 415.4usft at 7900.0usft MD (7772.1 TVD, 988.0 N, -117.1 E)									
- Point									
SILVER 29-28 FED COM - plan hits target center - Point	0.00	0.00	7,895.0	1,312.0	7,320.4	627,407.75	684,989.30	32° 43' 26.088 N	103° 51' 58.383 W

#### Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,253.0	7,895.0	1,114.2	179.5	EOC/FTP
10,229.0	7,895.0	1,279.9	2,137.6	LPP 1
11,550.0	7,895.0	1,288.1	3,456.6	LLP 2
12,070.0	7,895.0	1,291.3	3,978.6	LLP 3
15,411.9	7,895.0	1,312.0	7,320.4	LTP/BHL

# **PERMIAN**

## RESOURCES

### **NEW MEXICO**

**(SP) EDDY**

**SILVER 29-28 FED COM**

**SILVER 29-28 FED COM 111H**

**OWB**

**PWP0**

## **Anticollision Summary Report**

**11 May, 2023**

# PERMIAN

## Permian Resources Anticollision Summary Report

### RESOURCES

<b>Company:</b>	NEW MEXICO	<b>Local Co-ordinate Reference:</b>	Well SILVER 29-28 FED COM 111H
<b>Project:</b>	(SP) EDDY	<b>TVD Reference:</b>	GL @ 3624.7usft
<b>Reference Site:</b>	SILVER 29-28 FED COM	<b>MD Reference:</b>	GL @ 3624.7usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SILVER 29-28 FED COM 111H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	Compass
<b>Reference Design:</b>	PWP0	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	PWP0		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	Stations	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum centre distance of 1,000.0usft	<b>Error Surface:</b>	Pedal Curve
<b>Warning Levels Evaluated at:</b>	2.00 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	Date 5/11/2023		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>
0.0	15,411.6	PWP0 (OWB)	MWD+IFR1+MS
			<b>Description</b>
			OWSG_Rev2_ MWD + IFR1 + Multi-Station Correction

Summary						
Site Name	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (usft)	Measured Depth (usft)	Between Centres (usft)	Between Ellipses (usft)		
SILVER 29-28 FED COM						
SILVER 29-28 FED COM 112H - OWB - PWP0	2,000.0	2,000.0	33.0	18.7	2.301	CC, ES
SILVER 29-28 FED COM 112H - OWB - PWP0	2,100.0	2,098.8	34.3	19.3	2.284	SF
SILVER 29-28 FED COM 121H - OWB - PWP0	2,300.9	2,300.6	64.1	47.6	3.886	CC
SILVER 29-28 FED COM 121H - OWB - PWP0	7,509.9	7,515.2	89.5	34.7	1.633	ES
SILVER 29-28 FED COM 121H - OWB - PWP0	7,525.0	7,530.3	89.6	34.7	1.633	SF
SILVER 29-28 FED COM 122H - OWB - PWP0	2,368.6	2,368.2	96.1	79.1	5.663	CC
SILVER 29-28 FED COM 122H - OWB - PWP0	2,400.0	2,399.3	96.2	79.0	5.595	ES
SILVER 29-28 FED COM 122H - OWB - PWP0	2,500.0	2,498.1	98.1	80.2	5.482	SF
SILVER 29-28 FED COM 131H - OWB - PWP0	2,425.8	2,425.0	128.1	110.8	7.375	CC, ES
SILVER 29-28 FED COM 131H - OWB - PWP0	7,525.0	7,536.0	180.4	125.6	3.293	SF
SILVER 29-28 FED COM 132H - OWB - PWP0	2,476.2	2,475.0	160.2	142.4	9.033	CC
SILVER 29-28 FED COM 132H - OWB - PWP0	2,500.0	2,498.5	160.2	142.3	8.950	ES
SILVER 29-28 FED COM 132H - OWB - PWP0	2,800.0	2,793.9	169.7	149.7	8.473	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# PERMIAN

## Permian Resources Anticollision Summary Report

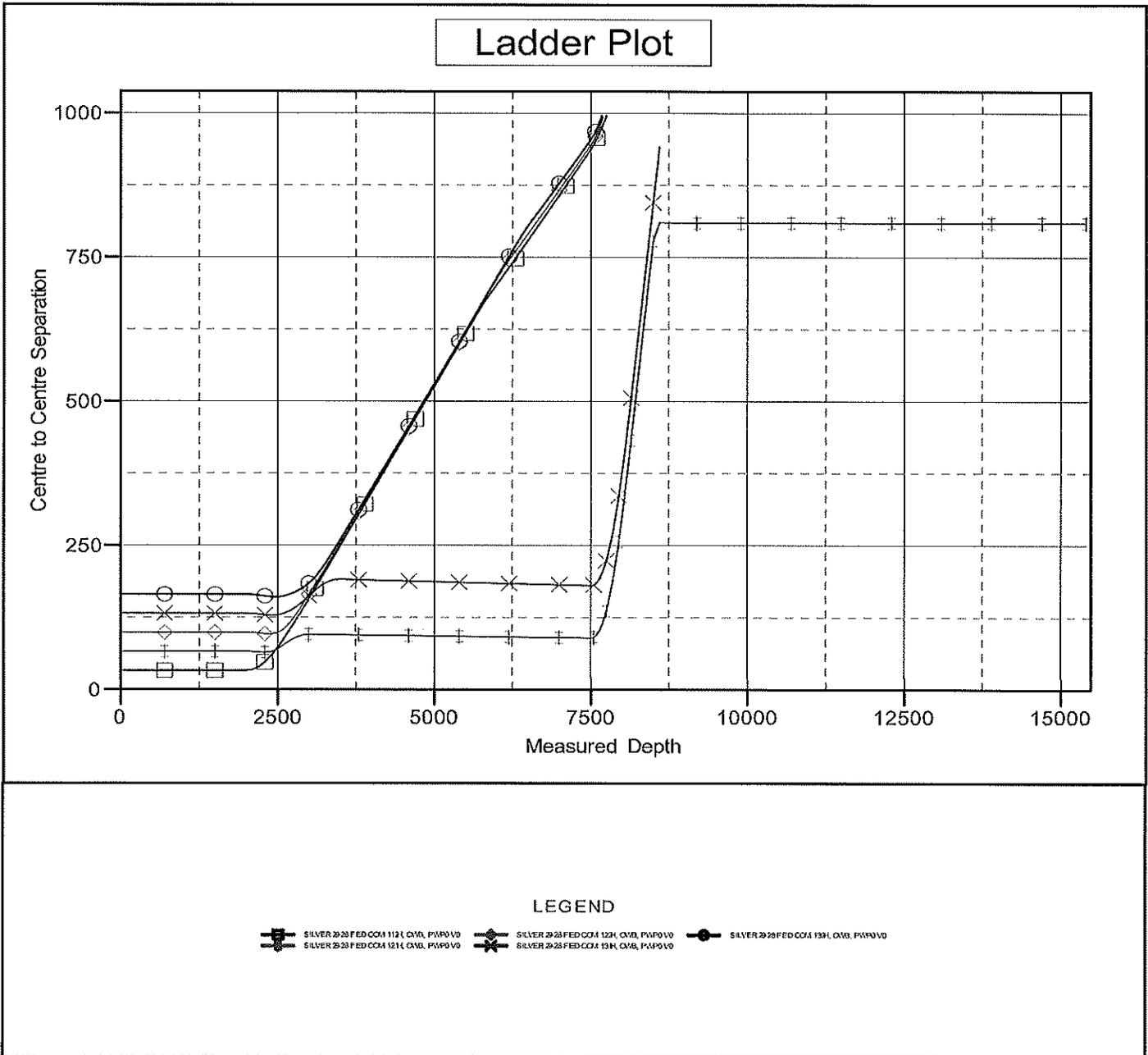
### RESOURCES

Company: NEW MEXICO  
 Project: (SP) EDDY  
 Reference Site: SILVER 29-28 FED COM  
 Site Error: 0.0 usft  
 Reference Well: SILVER 29-28 FED COM 111H  
 Well Error: 0.0 usft  
 Reference Wellbore: OWB  
 Reference Design: PWP0

Local Co-ordinate Reference: Well SILVER 29-28 FED COM 111H  
 TVD Reference: GL @ 3624.7usft  
 MD Reference: GL @ 3624.7usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Output errors are at: 2.00 sigma  
 Database: Compass  
 Offset TVD Reference: Offset Datum

Reference Depths are relative to GL @ 3624.7usft  
 Offset Depths are relative to Offset Datum  
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: SILVER 29-28 FED COM 111H  
 Coordinate System is US State Plane 1983, New Mexico Eastern Zone  
 Grid Convergence at Surface is: 0.24°



CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# PERMIAN

## RESOURCES

### Permian Resources Anticollision Summary Report

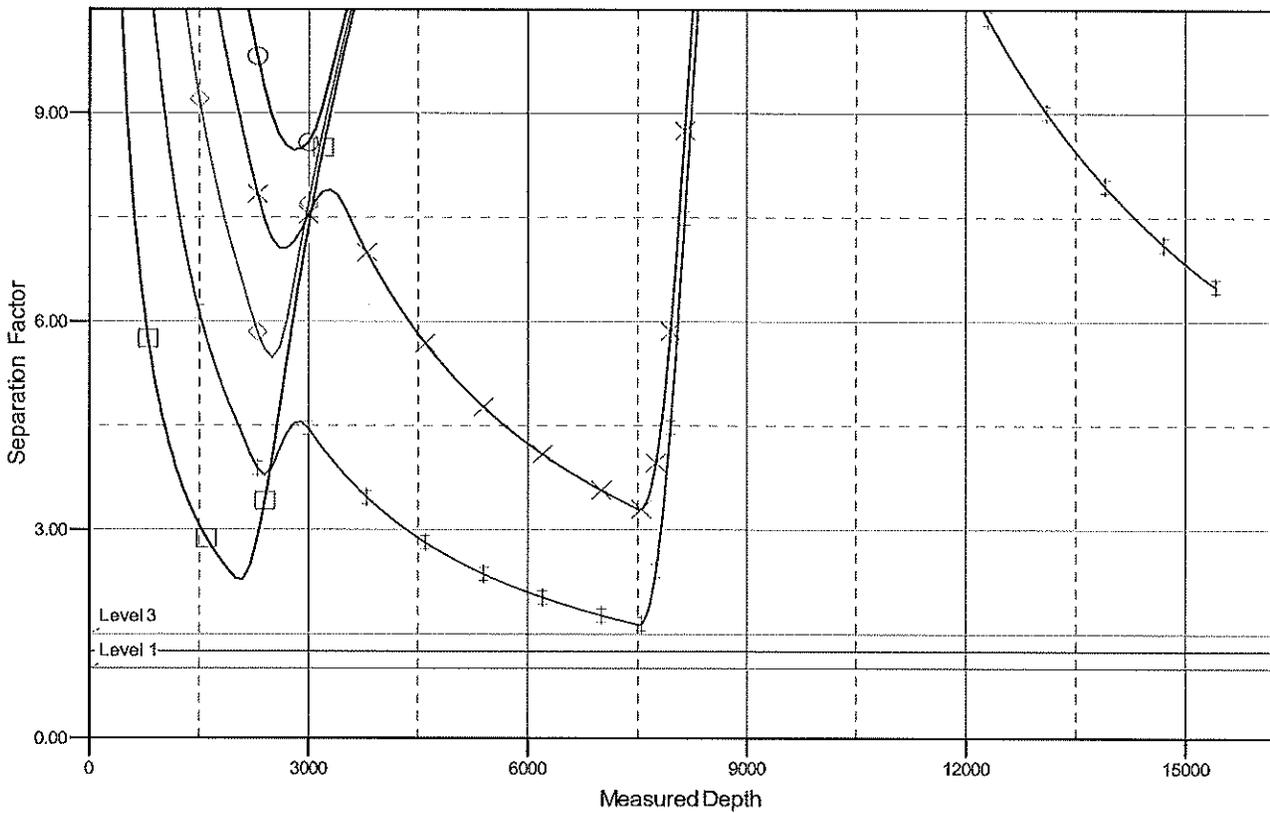
**Company:** NEW MEXICO  
**Project:** (SP) EDDY  
**Reference Site:** SILVER 29-28 FED COM  
**Site Error:** 0.0 usft  
**Reference Well:** SILVER 29-28 FED COM 111H  
**Well Error:** 0.0 usft  
**Reference Wellbore:** OWB  
**Reference Design:** PWP0

**Local Co-ordinate Reference:** Well SILVER 29-28 FED COM 111H  
**TVD Reference:** GL @ 3624.7usft  
**MD Reference:** GL @ 3624.7usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at:** 2.00 sigma  
**Database:** Compass  
**Offset TVD Reference:** Offset Datum

Reference Depths are relative to GL @ 3624.7usft  
 Offset Depths are relative to Offset Datum  
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: SILVER 29-28 FED COM 111H  
 Coordinate System is US State Plane 1983, New Mexico Eastern Zone  
 Grid Convergence at Surface is: 0.24°

### Separation Factor Plot



#### LEGEND

SILVER 29-28 FED COM 111H, OWB, PWP0 V0    
 SILVER 29-28 FED COM 121H, OWB, PWP0 V0    
 SILVER 29-28 FED COM 131H, OWB, PWP0 V0  
 SILVER 29-28 FED COM 121H, OWB, PWP0 V0    
 SILVER 29-28 FED COM 131H, OWB, PWP0 V0

## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	CENTENNIAL RESOURCE PRODUCTION LLC
WELL NAME & NO.:	SILVER 29-28 FED COM 111H
SURFACE HOLE FOOTAGE:	1928'/N & 2146'/E
BOTTOM HOLE FOOTAGE:	660'/N & 100'/E
LOCATION:	Section 29, T.18 S., R.31 E., NMP
COUNTY:	Eddy County, New Mexico

COA

H2S	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input checked="" type="radio"/> Low	<input type="radio"/> Medium	<input type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both
Wellhead Variance	<input type="radio"/> Diverter		
Other	<input type="checkbox"/> 4 String	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input checked="" type="checkbox"/> Fluid Filled	<input type="checkbox"/> Pilot Hole	<input type="checkbox"/> Open Annulus
Cementing	<input type="checkbox"/> Contingency Cement Squeeze	<input type="checkbox"/> EchoMeter	<input type="checkbox"/> Primary Cement Squeeze
Special Requirements	<input type="checkbox"/> Water Disposal	<input checked="" type="checkbox"/> COM	<input type="checkbox"/> Unit
Special Requirements	<input type="checkbox"/> Batch Sundry		
Special Requirements Variance	<input type="checkbox"/> Break Testing	<input checked="" type="checkbox"/> Offline Cementing	<input type="checkbox"/> Casing Clearance

### A. HYDROGEN SULFIDE

A Hydrogen Sulfide (H2S) Drilling Plan shall be activated AT SPUD. As a result, the Hydrogen Sulfide area must meet 43 CFR part 3170 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

### B. CASING

#### Primary Casing Design:

- The 13-3/8 inch surface casing shall be set at approximately **730 feet per BLM Geologist** (a minimum of 70 feet (Eddy County) into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface. The surface hole shall be 17 1/2 inch in diameter.

- 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 **9-5/8** inch intermediate casing shall be set at approximately **4720 feet per BLM Geologist**. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

**Casing test must be conducted in accordance with 43 CFR 3170. Surface pressure applied will vary based on fluid in the casing and burst conditions.**

**Intermediate casing must be kept fluid filled to meet BLM minimum collapse requirement.**

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash. Cement excess is less than 25%, more cement is required if washout occurs. Adjust cement volume and excess based on a fluid caliper or similar method that reflects the as-drilled size of the wellbore.**

### **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. This assembly will only be tested when installed on the **13-3/8** inch surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **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 OOGO2.III.A.2.i 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 Onshore Order 1 and 2.
- 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.

##### **Offline Cementing**

Contact the BLM prior to the commencement of any offline cementing procedure.

## 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 2<sup>nd</sup> 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 integrity 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 OOGO2.III.A.2.i 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.

JS 3/19/2024

# **PERMIAN**

## RESOURCES

### **H<sub>2</sub>S CONTINGENCY PLAN**

FOR

**Permian Resources Corporation**

**Silver 29-28 Fed Com 111H, 112H, 121H, 122H, 131H, 132H**  
**Eddy County, New Mexico**

04-20-2023

This plan is subject to updating

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## ***Section 1.0 – Introduction***

### ***I. Purpose***

The purpose of this contingency plan (Plan) is to provide Permian Resources Corporation. (Permian Resources) with an organized plan of action for alerting and protecting Permian Resources employees, the general public, and any potential first responders prior to any intentional release or immediately following the accidental / unintentional release of a potentially hazardous volume / concentration of Hydrogen Sulfide Gas (H<sub>2</sub>S).

### ***II. Scope & Applicability***

This Plan applies to all planned, unplanned, uncontrolled and/or unauthorized releases of hazardous concentrations of H<sub>2</sub>S or any associated hazardous byproducts of combustion, occurring at any Permian Resources owned or operated facilities including but not limited to: wells, flowlines, pipelines, tank batteries, production facilities, SWD facilities, compressor stations, gas processing plants, drilling / completions / workover operations, and any other applicable company owned property.

## ***Section 2.0 - Plan Implementation***

### ***I. Activation Requirements***

In accordance with the requirements of Bureau of Land Management Onshore Order #6 and NMAC 19.15.11, this Plan shall be activated in advance of any authorized, planned, unplanned, uncontrolled, or unauthorized release of a hazardous volume / concentration of H<sub>2</sub>S gas, or SO<sub>2</sub>, which could potentially adversely impact the workers, general public or the environment.

### ***II. Emergency Evacuation***

In the event of an unplanned, uncontrolled, or unauthorized release of a hazardous volume / concentration of H<sub>2</sub>S gas, the first priority is to ensure the safety of the workers and general public. Upon discovery and subsequent determination of an applicable release, which cannot be quickly mitigated, immediately by using 911, notify local authorities to begin the process of alerting the general public, evacuate any residents within the Radius of Exposure (ROE), and limit any general public or employee access to any areas within the ROE of the affected facility.

### ***III. Emergency Response Activities***

The purpose of emergency response actions is to take steps to quickly mitigate / stop the ongoing release of the hazardous source of H<sub>2</sub>S. Upon discovery of any hazardous release, immediately notify Permian Resources management to activate the Emergency Response Team (ERT). Once Permian Resources supervision arrives and assesses the situation, a work plan identifying the proper procedures shall be developed to stop the release.

## ***Section 3.0 - Potential Hazardous Conditions & Response Actions***

During a planned or unplanned release of H<sub>2</sub>S, there are several hazardous conditions that are presented both to employees, the general public, and emergency responders. These specific hazardous conditions

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are identified in the tables below.

<b>H2S OPERATING CONDITIONS – RESPONSE ACTIONS TO CONSIDER</b>		✓
<b>H<sub>2</sub>S CONDITION 1: POTENTIAL DANGER TO LIFE AND HEALTH → WARNING SIGN GREEN</b>		
H <sub>2</sub> S concentration <10 ppm detected by location monitors		<input type="checkbox"/>
<b>General Actions During Condition 1</b>		<input type="checkbox"/>
Notify Site Supervisor / Permian Resources Person-in-Charge (PIC) of any observed increase in ambient H <sub>2</sub> S concentrations		<input type="checkbox"/>
All personnel check safety equipment is in adequate working order & store in accessible location		<input type="checkbox"/>
Sensitize crews with safety meetings.		<input type="checkbox"/>
Limit visitors and non-essential personnel on location		<input type="checkbox"/>
Continuously monitor H <sub>2</sub> S concentrations and check calibration of sensors		<input type="checkbox"/>
Ensure H <sub>2</sub> S scavenger is on location.		<input type="checkbox"/>
<b>H<sub>2</sub>S CONDITION 2: MODERATE DANGER TO LIFE AND HEALTH → WARNING SIGN YELLOW</b>		
H <sub>2</sub> S concentration >10 ppm and < 30 ppm in atmosphere detected by location monitors:		<input type="checkbox"/>
<b>General Actions During Condition 2</b>		<input type="checkbox"/>
Sound H <sub>2</sub> S alarm and/or display yellow flag.		<input type="checkbox"/>
Account for on-site personnel		<input type="checkbox"/>
Upon sounding of an area or personal H <sub>2</sub> S monitor alarm when 10 ppm is reached, proceed to a safe briefing area upwind of the location immediately (see MA-4, Figure 5-1).		<input type="checkbox"/>
Don proper respiratory protection.		<input type="checkbox"/>
Alert other affected personnel		<input type="checkbox"/>
<b>If trained and safe to do so</b> undertake measures to control source H <sub>2</sub> S discharge and eliminate possible ignition sources. Initiate Emergency Shutdown procedures as deemed necessary to correct or control the specific situation.		<input type="checkbox"/>
Account for on-site personnel at safe briefing area.		<input type="checkbox"/>
Stay in safe briefing area if not working to correct the situation.		<input type="checkbox"/>
Keep Site Supervisor / Permian Resources PIC informed. Notify applicable government agencies ( <b>Appendix A</b> ) If off-site impact; notify any neighbors within Radius of Exposure ( <b>ROE</b> ), <b>Fig 5.11</b>		<input type="checkbox"/>
Continuously monitor H <sub>2</sub> S until readings below 10 ppm.		<input type="checkbox"/>
Evacuated area shall not be re-entered except by trained and authorized personnel utilizing appropriate respiratory protection; or until “all clear” sounded by Permian Resources PIC / Site Supervisor.		

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<b>H<sub>2</sub>S CONDITION 3: EXTREME DANGER TO LIFE AND HEALTH → WARNING SIGN RED</b>	
> 30 ppm H <sub>2</sub> S concentration in air detected by location monitors: Extreme danger to life	<input type="checkbox"/>
<b>General Actions During Condition 3</b>	<input type="checkbox"/>
Sound H <sub>2</sub> S alarm and/or display red flag.	<input type="checkbox"/>
Account for on-site personnel	<input type="checkbox"/>
Move away from H <sub>2</sub> S source and get out of the affected area.	<input type="checkbox"/>
Proceed to designated safe briefing area; alert other affected personnel.	<input type="checkbox"/>
Account for personnel at safe briefing area.	<input type="checkbox"/>
If trained and safe to do so undertake measures to control source H <sub>2</sub> S discharge and eliminate possible ignition sources. Initiate Emergency Shutdown procedures as deemed necessary to correct or control the specific situation.	<input type="checkbox"/>
Notify vehicles or situation and divert all traffic away from location.	<input type="checkbox"/>
Permian Resources Person-in-Charge will make appropriate community notifications.	<input type="checkbox"/>
Red warning flag must be on display until the situation has been corrected and the Permian Resources Person-in-Charge determines it is safe to resume operations under <b>Condition 1</b> .	<input type="checkbox"/>
Notify management of the condition and action taken. If H <sub>2</sub> S concentration is increasing and steps to correct the situation are not successful – or at any time if well control is questionable – alert all responsible parties for possible activation of the H <sub>2</sub> S Contingency Plan. If well control at the surface is lost, determine if situation warrants igniting the well.	<input type="checkbox"/>
If uncontrolled flow at the surface occurs, the Permian Resources PIC, with approval, if possible, from those coordinating the emergency ( <b>as specified in the site-specific H<sub>2</sub>S Contingency Plan</b> ) are responsible for determining if the situation warrants igniting the flow of the uncontrolled well. This decision should be made only as a last resort and in a situation where it is obvious that human life is in danger and there is no hope of controlling the flow under prevailing conditions.	<input type="checkbox"/>
If the flow is ignited, burning H <sub>2</sub> S will be converted to sulfur dioxide (SO <sub>2</sub> ), which is also highly toxic. Do not assume that area is safe after the flow is ignited. If the well is ignited, evacuation of the area is mandatory, because SO <sub>2</sub> will remain in low-lying places under no-wind conditions.	<input type="checkbox"/>
Keep Site Supervisor / Permian Resources PIC informed. Notify applicable government agencies and local law enforcement ( <b>Appendix A</b> ) If off-site impact; notify any neighbors within the Radius of Exposure ( <b>ROE</b> ), see example in <b>Figure 5-11</b> .	<input type="checkbox"/>
Continuously monitor H <sub>2</sub> S until readings fall below 10 ppm.	<input type="checkbox"/>
Evacuated area shall not be re-entered except by trained and authorized personnel utilizing appropriate respiratory protection; or until “all clear” sounded by Permian Resources PIC / Site Supervisor.	<input type="checkbox"/>
<b>IF ABOVE ACTIONS CANNOT BE ACCOMPLISHED IN TIME TO PREVENT EXPOSURE TO THE PUBLIC</b>	

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Alert public (directly or through appropriate government agencies) who may be subject to potentially harmful exposure levels.	<input type="checkbox"/>
Make recommendations to public officials regarding blocking unauthorized access to the unsafe area and assist as appropriate.	<input type="checkbox"/>
Make recommendations to public officials regarding evacuating the public and assist as appropriate.	<input type="checkbox"/>
Monitor ambient air in the area of exposure (after following abatement measures) to determine when it is safe for re-entry.	<input type="checkbox"/>

**Section 4.0 - Notification of H<sub>2</sub>S Release Event**

**I. Local & State Law Enforcement**

Prior to the planned / controlled release of a hazardous concentration of H<sub>2</sub>S gas or any associated byproducts of the combustion of H<sub>2</sub>S gas, notify local law enforcement agencies regarding the contents of this plan.

In the event of the discovery of an unplanned/uncontrolled release of a hazardous concentration of H<sub>2</sub>S gas or any associated byproducts of combustion, immediately notify local and/or state law enforcement agencies of the situation and ask for their assistance.

**II. General Public**

In the event of a planned or unplanned release of a hazardous concentration of H<sub>2</sub>S gas or any associated byproducts of combustion, notify local law enforcement agencies and ask for their assistance in alerting the general public and limiting access to any public roads that may be impacted by such a release.

**III. New Mexico Oil Conservation Division**

The Permian Resources HSE Department will make any applicable notification to the New Mexico OCD regarding any release of a hazardous concentration of H<sub>2</sub>S Gas or any associated byproducts of combustion.

**IV. New Mexico Environment Department**

The Permian Resources HSE Department will make any applicable notifications to the NMED regarding any release of a hazardous concentration of H<sub>2</sub>S gas or any associated byproducts of combustion.

**V. Bureau of Land Management**

The Permian Resources Regulatory Department will make any applicable notifications to the BLM regarding any release of a hazardous concentration of H<sub>2</sub>S gas or any associated byproducts of combustion.

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**Section 5.0 - Emergency Contact List**

<b>EMERGENCY CONTACT LIST</b>				
<b>PERMIAN RESOURCES CORPORATION.</b>				
<b>POSITION</b>	<b>NAME</b>	<b>OFFICE</b>	<b>CELL</b>	<b>ALT PHONE</b>
<b>Operations</b>				
Operations SuperIntendent	Rick Lawson		432.530.3188	
TX Operations SuperIntendent	Josh Graham	432.940.3191	432.940.3191	
NM Operations SuperIntendent	Manual Mata	432.664.0278	575.408.0216	
Drilling Manager	Jason Fitzgerald	432.315.0146	318.347.3916	
Drilling Engineer	Ronny Hlse	432.315.0144	432.770.4786	
Production Manager	Levi Harris	432.219.8568	720.261.4633	
SVP Development Ops	Clayton Smith	720.499.1416	361.215.2494	
SVP Production Ops	Casey McCain	432.695.4239	432.664.6140	
<b>HSE &amp; Regulatory</b>				
H&S Manager	Adam Hicks	720.499.2377	903.426.4556	
Regulatory Manager	Sarah Ferreyros	720.499.1454	720.854.9020	
Environmental Manager	Montgomery Floyd	432-315-0123	432-425-8321	
HSE Consultant	Blake Wisdom		918-323-2343	
<b>Local, State, &amp; Federal Agencies</b>				
Eddy County Sheriff		575-887-7551		911
New Mexico State Highway Patrol		505-757-2297		911
Carlsbad Fire / EMS		575-885-3125		911
Carlsbad Memorial Hospital		575-887-4100		
Secorp – Safety Contractor	Ricky Stephens		(325)-262-0707	
New Mexico Oil Conservation Division – District 1 Office – Hobbs, NM.		575-393-6161		
New Mexico Environment Department – District III Office – Hobbs, NM		575-397-6910		
New Mexico Oil Conservation Division – Hobbs, NM	24 Hour Emergency	575-393-6161		
Bureau of Land Management – Carlsbad, NM		575-234-5972		
U.S. Fish & Wildlife		502-248-6911		

**Section 6.0 – Drilling Location Information**

**I. Site Safety Information**

**1. Safe Briefing Area**

- a. There shall be two areas that will be designated as "SAFE BRIEFING AREAS". If H<sub>2</sub>S is detected in concentrations equal to or in excess of 10 ppm all personnel not assigned emergency duties are to assemble in the designated Safe Briefing area for instructions. These two areas shall be positioned in accessible locations to facilitate the availability of self-contained breathing air devices. The briefing areas shall be positioned no less than 250' from the wellhead and in such locations that at least one briefing area will be up-wind from the well at all times.

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2. Wind Indicators
  - a. 4 Windsocks will be installed at strategic points on the facility.
3. Danger Signs
  - a. A warning sign indicating the possible well conditions will be displayed at the location entrance.

**DANGER  
POISONOUS GAS  
HYDROGEN SULFIDE  
DO NOT APPROACH IF AMBER LIGHTS ARE FLASHING**

4. H<sub>2</sub>S Detectors and Alarms
  - a. Continuous monitoring type H<sub>2</sub>S detectors, capable of sensing a minimum of 5ppm H<sub>2</sub>S in air will be located centrally located at the tanks, heater treater, and combustor. Continuous monitoring type SO<sub>2</sub> detector will also be located at the combustor. The automatic H<sub>2</sub>S alarm/flashing light will be located at the site entrance and in front of tank battery.
5. Safety Trailer
  - a. A safety trailer equipped with an emergency cascade breathing air system with 2 ea. Work/escape packs, a stretcher, 2 OSHA approved full body harnesses, and a 20# Class ABC fire extinguisher shall be available at the site in close proximity to the safe briefing area. The cascade system shall be able to be deployed to the drill floor when needed to provide safe breathing air to the workers as needed.
6. Well Control Equipment
  - a. The location shall have a flare line to a remote automatic ignitor and back up flare gun, placed 150' from the wellhead.
  - b. The location shall be equipped with a remotely operated choke system and a mud gas separator.
7. Mud Program
  - a. Company shall have a mud program that contains sufficient weight and additives to control H<sub>2</sub>S.
8. Metallurgy
  - a. All drill strings, casing, tubing, wellhead, BOP, spools, kill lines, choke manifold and lines, and valves shall be suitable for anticipated H<sub>2</sub>S volume and pressure.
9. Communication
  - a. The location shall be equipped with a means of effective communication such as a cell phones, intercoms, satellite phones or landlines.

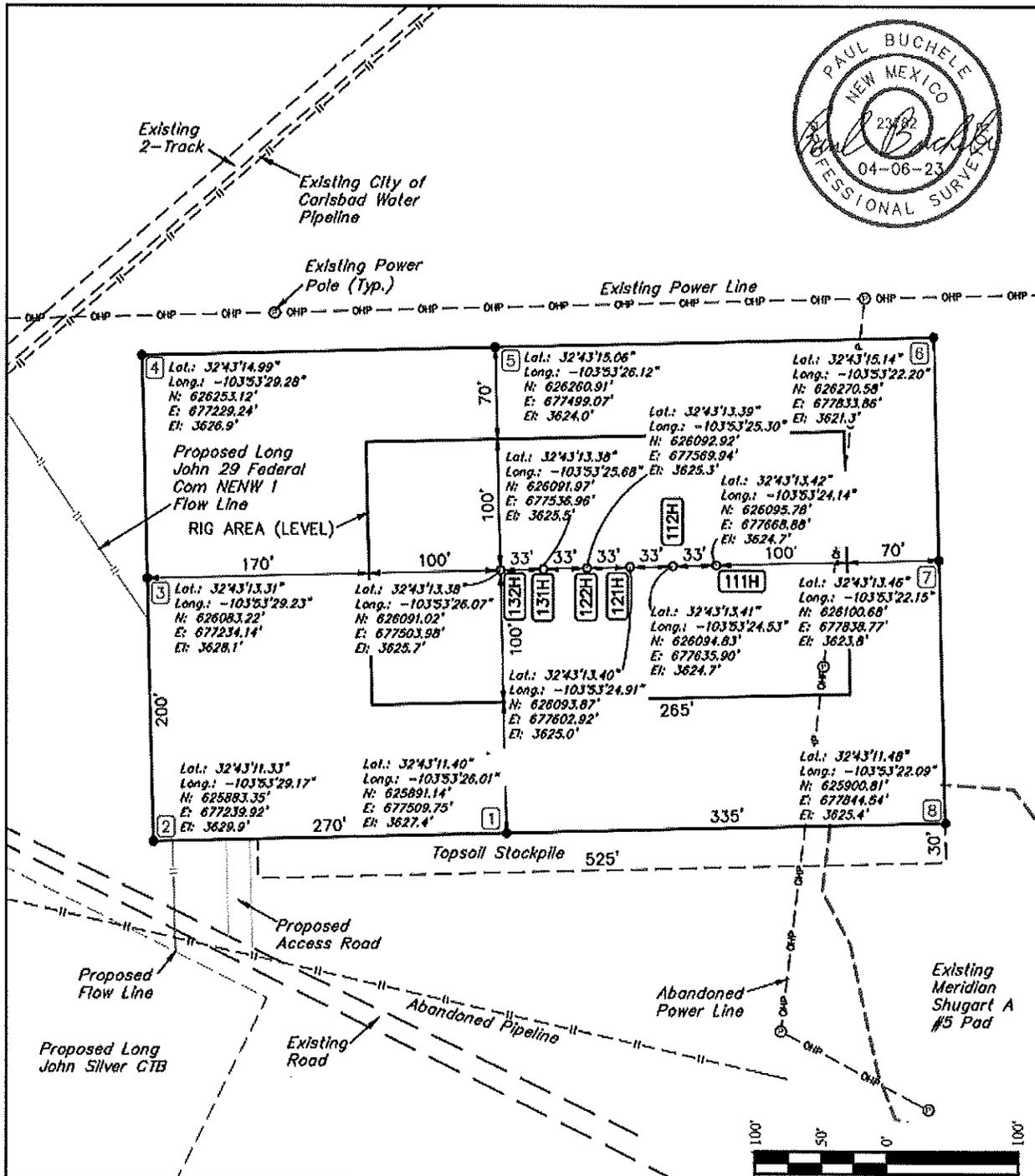
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**II. Directions to Location**

BEGINNING AT THE INTERSECTION OF MALJAMAR ROAD AND US HIGHWAY 82 IN MALJAMAR, NEW MEXICO, PROCEED IN A WESTERLY DIRECTION ALONG US HIGHWAY 82 APPROXIMATELY 8.0 MILES TO THE JUNCTION OF THIS ROAD AND SHUGART ROAD TO THE SOUTH; TURN LEFT AND PROCEED IN A SOUTHERLY DIRECTION APPROXIMATELY 6.6 MILES TO THE JUNCTION OF THIS ROAD AND AN EXISTING ROAD TO THE WEST; TURN RIGHT AND PROCEED IN AN WESTERLY DIRECTION APPROXIMATELY 0.3 MILES TO THE JUNCTION OF THIS ROAD AND AN EXISTING ROAD TO THE NORTH; TURN RIGHT AND PROCEED IN A NORTHERLY DIRECTION APPROXIMATELY 0.1 MILES TO THE BEGINNING OF THE PROPOSED ACCESS ROAD TO THE NORTH; FOLLOW ROAD FLAGS IN A NORTHERLY DIRECTION APPROXIMATELY 78' TO THE PROPOSED LOCATION. TOTAL DISTANCE FROM MALJAMAR, NEW MEXICO TO THE PROPOSED WELL LOCATION IS APPROXIMATELY 15.0 MILES.

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Plat of Location



**NOTES:**  
 \* Banks of Bearings is a Transverse Mercator Projection with a Central Meridian of 103°53'00" (NAD 83)



**UELS, LLC**  
 Regional Office \* 111 NE 3rd Street  
 Seminole, TX 79360 \* (432) 955-6100  
 Corporate Office \* 85 South 200 East  
 Vernal, UT 84078 \* (435) 789-1017

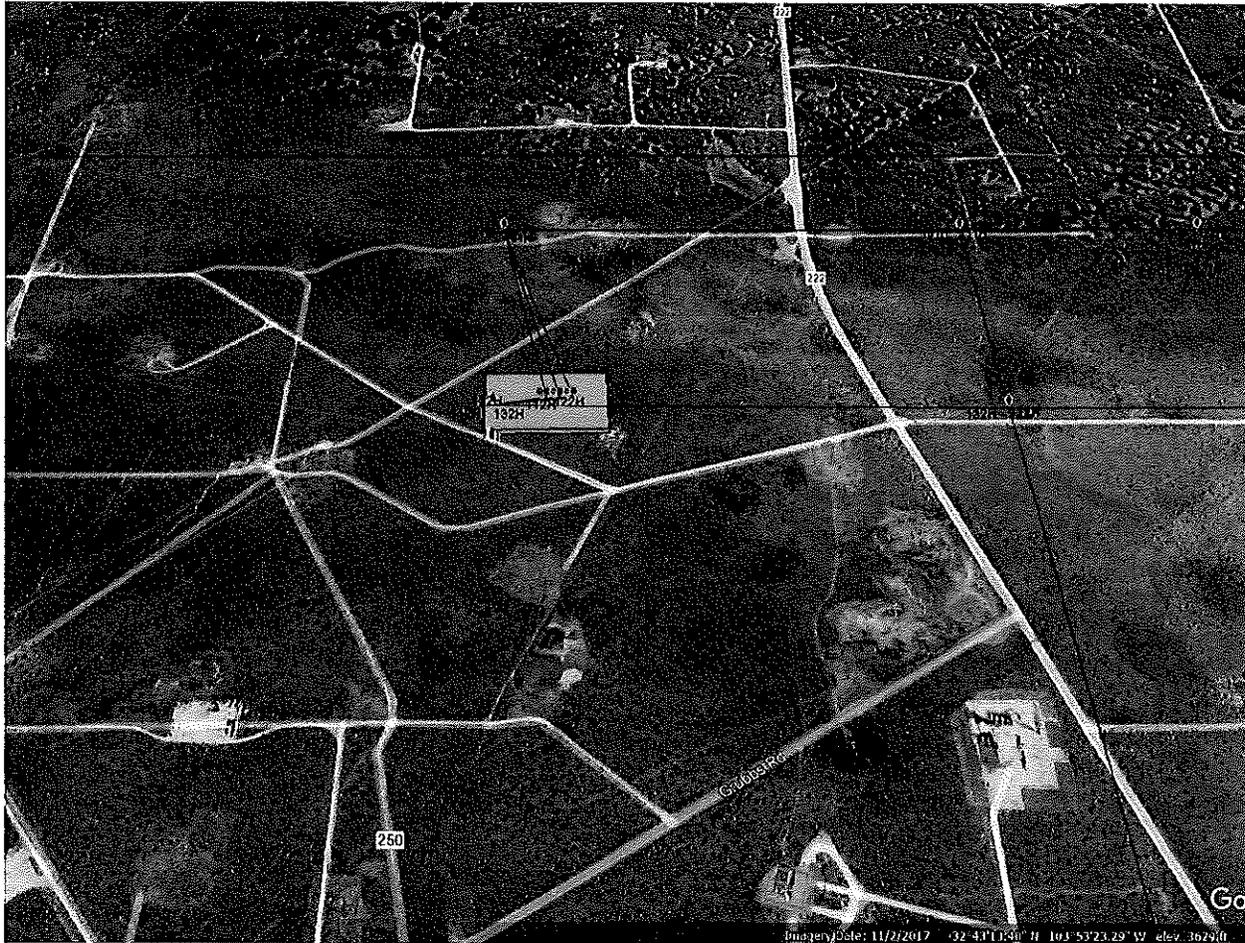
**PERMIAN RESOURCES OPERATING, LLC**

SILVER 29 FEDERAL COM SWNE 1  
 SW 1/4 NE 1/4, SECTION 29, T18S, R31E, N.M.P.M.  
 EDDY COUNTY, NEW MEXICO

SURVEYED BY	A.V., T.V.	03-23-23	SCALE
DRAWN BY	T.J.S.	03-27-23	1" = 100'
<b>SITE PLAN</b>			

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1. Routes of Ingress & Egress (MAP)

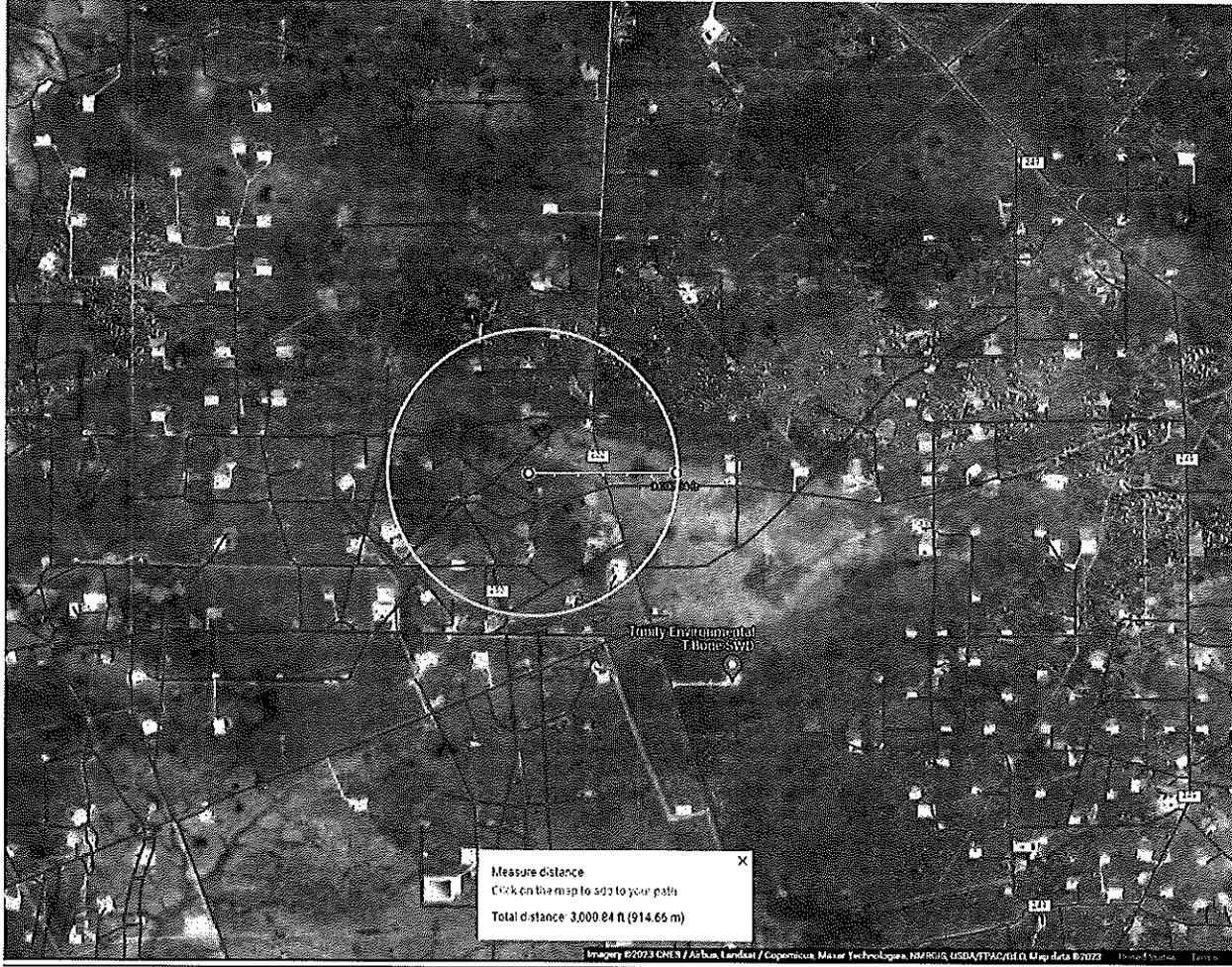


2. Residences in proximity to the 3000' Radius of Exposure (ROE) (MAP)

There are no residences or public gathering places with the 3000' ROE, 100 PPM, 300 PPM, or 500 PPM ROE.

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***Map of 3000' ROE Perimeter***



***100 PPM, 300 PPM, & 500 PPM Max ROE under worst case scenario***

Enter H <sub>2</sub> S in PPM	<input type="text" value="1500"/>
Enter Gas flow in mcf/day (maximum worst case conditions)	<input type="text" value="2500"/>
500 ppm radius of exposure (public road)	<b><u>105</u></b> feet
300 ppm radius of exposure	<b><u>146</u></b> feet
100 ppm radius of exposure (public area)	<b><u>230</u></b> feet

- Location NAD 83 GPS Coordinates **Lat: 32.720394, Long: 103.890039**

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**3. Public Roads in proximity of the Radius of Exposure (ROE)**

There are no public roads that would be within the 500 PPM ROE. The closest public road is New Mexico Highway 222, which is 1450' from the location.

**Section 7.0 – Hazard Communication**

**I. Physical Characteristics of Hydrogen Sulfide Gas**

Hydrogen sulfide (H<sub>2</sub>S) is a colorless, poisonous gas that is soluble in water. It can be present in crude oils, condensates, natural gas and wastewater streams.

H<sub>2</sub>S is heavier than air with a vapor density of 1.189 (air = 1.0); however, H<sub>2</sub>S is most often mixed with other gases. These mixtures of H<sub>2</sub>S and other gases can be heavier or lighter than air. If the H<sub>2</sub>S-containing mixture is heavier, it can collect in low areas such as ditches, ravines, firewalls, and pits; in storage tanks; and in areas of poor ventilation. Please see physical properties in **Table 7.0**.

With H<sub>2</sub>S the sense of smell is rapidly lost allowing lethal concentrations to be accumulated without warning. The toxicity of hydrogen sulfide at varying concentrations is indicated in the **Table 7.1**.

**Warning:** Do not use the mouth-to-mouth method if a victim ingested or inhaled hydrogen sulfide. Give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

**Table 7.0. Physical Properties of H<sub>2</sub>S**

Properties of H <sub>2</sub> S	Description
Vapor Density > 1 = 1.189 Air = 1	<ul style="list-style-type: none"> <li>▪ H<sub>2</sub>S gas is slightly heavier than air, which can cause it to settle in low places and build in concentration.</li> <li>▪ Produced as a mixture with other gases associated with oil and gas production.</li> </ul>
Flammable Range 4.3%-46% 43000 ppm – 460000 ppm	<ul style="list-style-type: none"> <li>▪ H<sub>2</sub>S can be extremely flammable / explosive when these concentrations are reached by volume in air.</li> </ul>

Although H<sub>2</sub>S is primarily a respiratory hazard, it is also flammable and forms an explosive mixture at concentrations of 4.3%–46.0% (40,000ppm – 460,000 ppm) by volume in air.

**H<sub>2</sub>S can be encountered when:**

- Venting and draining equipment.
- Opening equipment (separators, pumps, and tanks).
- Opening piping connections (“line breaking”).
- Gauging and sampling storage tanks.
- Entering confined spaces.
- Working around wastewater pits, skimmers, and treatment facilities.

**II. Human Health Hazards - Toxicological Information**

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Table 7.1. Hazards &amp; Toxicity

Concentration (ppm)	Symptoms/Effects
0.00011-0.00033 ppm	Typical background concentrations
0.01-1.5 ppm	Odor threshold (when rotten egg smell is first noticeable to some). Odor becomes more offensive at 3-5 ppm. Above 30 ppm, odor described as sweet or sickeningly sweet.
2-5 ppm	Prolonged exposure may cause nausea, tearing of the eyes, headaches or loss of sleep. Airway problems (bronchial constriction) in some asthma patients.
20 ppm	Possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness.
50-100 ppm	Slight conjunctivitis ("gas eye") and respiratory tract irritation after 1 hour. May cause digestive upset and loss of appetite.
100 ppm	Coughing, eye irritation, loss of smell after 2-15 minutes (olfactory fatigue). Altered breathing, drowsiness after 15-30 minutes. Throat irritation after 1 hour. Gradual increase in severity of symptoms over several hours. Death may occur after 48 hours.
100-150 ppm	Loss of smell (olfactory fatigue or paralysis).
200-300 ppm	Marked conjunctivitis and respiratory tract irritation after 1 hour. Pulmonary edema may occur from prolonged exposure.
500-700 ppm	Staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes. Death after 30-60 minutes.
700-1000 ppm	Rapid unconsciousness, "knockdown" or immediate collapse within 1 to 2 breaths, breathing stops, death within minutes.
1000-2000 ppm	Nearly instant death

### III. Environmental Hazards

H<sub>2</sub>S and its associated byproducts from combustion presents a serious environmental hazard. Sulphur Dioxide SO<sub>2</sub> is produced as a constituent of flaring H<sub>2</sub>S Gas and can present hazards associated, which are

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similar to H<sub>2</sub>S. Although SO<sub>2</sub> is heavier than air, it will be picked up by a breeze and carried downwind at elevated temperatures. Since Sulfur Dioxide is extremely irritating to the eyes and mucous membranes of the upper respiratory tract, it has exceptionally good warning powers in this respect. The following table indicates the toxic nature of the gas. Please see the attached SDS in Appendix B for reference.

SULFUR DIOXIDE TOXICITY		
Concentration		Effects
%SO <sub>2</sub>	PPM	
0.0005	3 to 5	Pungent odor-normally a person can detect SO <sub>2</sub> in this range.
0.0012	12	Throat irritation, coughing, and constriction of the chest tearing and smarting of eyes.
0.15	150	So irritating that it can only be endured for a few minutes.
0.05	500	Causes a sense of suffocation, even with first breath.

**Section 8.0 - Regulatory Information**

I. OSHA & NIOSH Information

II. Table 8.0. OSHA & NIOSH H<sub>2</sub>S Information

PEL, IDLH, TLV	Description
NIOSH PEL 10 PPM	<ul style="list-style-type: none"> <li>PEL is the Permissible Exposure Limit that an employee may be exposed up to 8 hr / day.</li> </ul>
OSHA General Industry Ceiling PEL – 20 PPM	<ul style="list-style-type: none"> <li>The maximum exposure limit, which cannot be exceeded for any length of time.</li> </ul>
IDLH 100 PPM	<ul style="list-style-type: none"> <li>Immediately Dangerous to Life and Health</li> </ul>
Permian Resources PEL 10 PPM	<ul style="list-style-type: none"> <li>Permian Resources Policy Regarding H<sub>2</sub>S for employee safety</li> </ul>

III. New Mexico OCD & BLM – H<sub>2</sub>S Concentration Threshold Requirements

New Mexico NMAC 19.15.11 and Onshore Order #6 identify two Radii of Exposure (ROE) that identify potential danger to the public and require additional compliance measures. Permian Resources is required to install safety devices, establish safety procedures and develop a written H<sub>2</sub>S contingency plan for sites where the H<sub>2</sub>S concentrations are as follows.

**Table 8.1. Calculating H<sub>2</sub>S Radius of Exposure**

H <sub>2</sub> S Radius of Exposure	Description	Control and Equipment Requirements
100 ppm	Distance from a release to where the H <sub>2</sub> S concentration in the air will dilute below 100ppm	ROE > 50-ft and includes any part of a "public area" (residence, school, business, etc., or any area that can be expected to be populated).

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		ROE > 3,000-ft
500 ppm	Distance from a release to where the H <sub>2</sub> S concentration in the air will dilute below 500ppm	ROE > 50-ft and includes any part of a public road (public roads are tax supported roads or any road used for public access or use)

**Calculating H<sub>2</sub>S Radius of Exposure**

The ROE of an H<sub>2</sub>S release is calculated to determine if a potentially hazardous volume of H<sub>2</sub>S gas at 100 or 500 parts per million (ppm) is within a regulated distance requiring further action. If information about the concentration of H<sub>2</sub>S and the potential gas release volume is known, the location of the Muster Areas will be set, and safety measures will be implemented based on the calculated radius of exposure (ROE). NMAC 19.15.11 – Hydrogen Sulfide Safety defines the ROE as the radius constructed with the gas’s point of escape as its center and its length calculated by the following Pasquill-Gifford equations:

To determine the extent of the **100 ppm ROE**:

$$x = [(1.589) (\text{mole fraction H}_2\text{S})(Q)]^{(0.6258)}$$

To determine the extent of the **500 ppm ROE**:

$$x = [(0.4546) (\text{mole fraction H}_2\text{S})(Q)]^{(0.6258)}$$

**Table 8.2. Calculating H<sub>2</sub>S Radius of Exposure**

ROE Variable	Description
X =	ROE in feet
Q =	Max volume of gas released determined to be released in cubic feet per day (ft <sup>3</sup> /d) normalized to standard temperature and pressure, 60°F and 14.65 psia
Mole fraction H <sub>2</sub> S =	Mole fraction of H <sub>2</sub> S in the gaseous mixture released.

The volume used as the escape rate in determining the ROE is specified in the rule as follows:

- The maximum daily volume rate of gas containing H<sub>2</sub>S handled by that system element for which the ROE is calculated.
- For existing gas wells, the current adjusted open-flow rate, or the operator's estimate of the well's capacity to flow against zero back-pressure at the wellhead.

**New Mexico Oil Conservation Division & BLM Site Requirements under NMAC 19.15.11 & Onshore Order #6**

- Two cleared areas will be designated as Safe Briefing Areas. During an emergency, personnel will assemble in one of these areas for instructions from the Permian Resources Person-in-Charge. Prevailing wind direction should be considered in locating the briefing areas 200’ or more on either side of the well head. One area should offset the other at an angle of 45° to 90° with respect to prevailing wind direction to allow for wind shifts during the work period.

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- In the event of either an intentional or accidental releases of hydrogen sulfide, safeguards to protect the general public from the harmful effects of hydrogen sulfide must be in place for operations. A summary of the provisions in each of three H<sub>2</sub>S ROE cases is included in **Table 8.3**.
  - **CASE 1** -100 ppm ROE < 50'
  - **CASE 2** - 100 ppm ROE is 50' or greater, but < 3000' and does not penetrate public area.
  - **CASE 3** -100 ppm ROE is 50' or greater and penetrates a public area or 500 ppm ROE includes a public road. Also if 100 ppm ROE > 3000' regardless of public area.

**Table 8.3. NMAC 19.15.11 Compliance Requirements Drilling & Production**

NMAC 19.15.11 & BLM COMPLIANCE REQUIREMENTS – DRILLING & PRODUCTION			
PROVISION	CASE 1	CASE 2	CASE 3
H <sub>2</sub> S Concentration Test	X	X	X
H-9	X	X	X
Training	X	X	X
District Office Notification	X	X	X
Drill Stem Tests Restricted	X*	X*	X
BOP Test	X*	X*	X
Materials		X	X
Warning and Marker		X	X
Security		X	X
Contingency Plan			X
Control and Equipment Safety			X
Monitors		X**	X**
Mud (ph Control or Scavenger)			X*
Wind Indicators		X**	X
Protective Breathing Equipment		X**	X
Choke Manifold, Secondary Remote Control, and Mud-Gas Separator			X
Flare Stacks			X*

**Section 9.0 - Training Requirements**

**Training**

The following elements are considered a minimum level of training for personnel assigned to operations who may encounter H<sub>2</sub>S as part of routine or maintenance work.

- The hazards, characteristics, and properties of hydrogen sulfide (H<sub>2</sub>S) and (SO<sub>2</sub>).
- Sources of H<sub>2</sub>S and SO<sub>2</sub>.
- Proper use of H<sub>2</sub>S and SO<sub>2</sub> detection methods used at the workplace.
- Recognition of, and proper response to, the warning signals initiated by H<sub>2</sub>S and SO<sub>2</sub> detection systems in use at the workplace.
- Symptoms of H<sub>2</sub>S exposure; symptoms of SO<sub>2</sub> exposure
- Rescue techniques and first aid to victims of H<sub>2</sub>S and SO<sub>2</sub> exposure.
- Proper use and maintenance of breathing equipment for working in H<sub>2</sub>S and SO<sub>2</sub> atmospheres, as appropriate theory and hands-on practice, with demonstrated proficiency (29 CFR Part 1910.134).

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- Workplace practices and relevant maintenance procedures that have been established to protect personnel from the hazards of H<sub>2</sub>S and SO<sub>2</sub>.
- Wind direction awareness and routes of egress.
- Confined space and enclosed facility entry procedures (if applicable).
- Emergency response procedures that have been developed for the facility or operations.
- Locations and use of safety equipment.
- Locations of safe briefing areas.

***Refresher training will be conducted annually.***

### ***Section 10.0 - Personal Protective Equipment***

#### **I. Personal H<sub>2</sub>S Monitors**

All personnel engaged in planned or unplanned work activity to mitigate the release of a hazardous concentration of H<sub>2</sub>S shall have on their person a personal H<sub>2</sub>S monitor.

#### **II. Fixed H<sub>2</sub>S Detection and Alarms**

- 4 channel H<sub>2</sub>S monitor
- 4 wireless H<sub>2</sub>S monitors
- H<sub>2</sub>S alarm system (Audible/Red strobe)
- Personal gas monitor for each person on location
- Gas sample tubes

#### **III. Flame Resistant Clothing**

All personnel engaged in planned or unplanned work activity associated with this Plan shall have on the appropriate level of FRC clothing.

#### **IV. Respiratory Protection**

The following respiratory protection equipment shall be available at each drilling location.

- Working cascade system available on rig floor and pit system & 750' of air line hose
- Four (4) breathing air manifolds
- Four (4) 30-minute rescue packs
- Five (5) work/Escape units
- Five (5) escape units
- One (1) filler hose for the work/escape/rescue units

Supplied air (airline or SCBA) respiratory protection against hydrogen sulfide exposure is required in the following situations:

- When routine or maintenance work tasks involve exposure to H<sub>2</sub>S concentrations of 10 ppm or greater.
- When a fixed location area monitor alarms, and re-entry to the work area is required to complete a job.
- When confined spaces are to be entered without knowledge of H<sub>2</sub>S levels present, or if initial measurements are to be taken of H<sub>2</sub>S levels.
- During rescue of employees suspected of H<sub>2</sub>S overexposure.
- For specific tasks identified with significant exposure potential and outlined in local program guidelines.

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- All respiratory equipment for hydrogen sulfide must be of the supplied-air type, equipped with pressure-demand regulators and operated in the pressure-demand mode only. This is the only type of respiratory protection recommended for hydrogen sulfide application. Equipment should be approved by NIOSH/MSHA or other recognized national authority as required. If airline units are used, a five-minute egress bottle should also be carried.
- Gas masks or other air-purifying respirators **MUST NEVER BE USED FOR HYDROGEN SULFIDE** due to the poor warning properties of the gas.
- Use of respiratory protection should be accompanied by a written respiratory protection program.

Appendix A  
H<sub>2</sub>S SDS

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#### SECTION 1: Identification

##### 1.1. Product Identifier

Product form : Substance  
 Name : Hydrogen sulfide  
 CAS No : 7783-06-4  
 Formula : H<sub>2</sub>S  
 Other means of identification : Hydrogen sulfide  
 Product group : Core Products

##### 1.2. Recommended use and restrictions on use

Recommended uses and restrictions : Industrial use  
 Use as directed

##### 1.3. Supplier

Praxair Canada Inc.  
 1200 - 1 City Centre Drive  
 Mississauga - Canada L6B 1M2  
 T 1-905-803-1600 - F 1-905-803-1682  
[www.praxair.ca](http://www.praxair.ca)

##### 1.4. Emergency telephone number

Emergency number : 1-800-363-0042  
 Call emergency number 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product.  
 For routine information, contact your supplier or Praxair sales representative.

#### SECTION 2: Hazard identification

##### 2.1. Classification of the substance or mixture

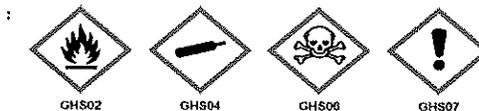
###### GHS/CA classification

Flam. Gas 1 H220  
 Liquefied gas H280  
 Acute Tox. 2 (Inhalation: gas) H330  
 STOT SE 3 H335

##### 2.2. GHS Label elements, including precautionary statements

###### GHS/CA labelling

###### Hazard pictograms



###### Signal word

: DANGER

###### Hazard statements

: **EXTREMELY FLAMMABLE GAS**  
 CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED  
 FATAL IF INHALED  
 MAY CAUSE RESPIRATORY IRRITATION  
 MAY FORM EXPLOSIVE MIXTURES WITH AIR  
 SYMPTOMS MAY BE DELAYED  
 EXTENDED EXPOSURE TO GAS REDUCES THE ABILITY TO SMELL SULFIDES

###### Precautionary statements

: Do not handle until all safety precautions have been read and understood  
 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

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Do not breathe gas  
Use and store only outdoors or in a well-ventilated area  
Avoid release to the environment  
Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection  
Leaking gas fire: Do not extinguish, unless leak can be stopped safely  
In case of leakage, eliminate all ignition sources  
Store locked up  
Dispose of contents/container in accordance with container Supplier/owner instructions  
Protect from sunlight when ambient temperature exceeds 52°C (125°F)  
Close valve after each use and when empty  
Do not open valve until connected to equipment prepared for use  
When returning cylinder, install leak tight valve outlet cap or plug  
Do not depend on odour to detect the presence of gas

2.3. Other hazards

Other hazards not contributing to the classification : Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS-CA)

No data available

### SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Hydrogen sulfide (Main constituent)	(CAS No) 7783-06-4	100	Hydrogen sulfide (H <sub>2</sub> S) / Hydrogen sulphide / Sulfur hydride / Sulfurated hydrogen / Dihydrogen sulphide / Hydrogensulfide

3.2. Mixtures

Not applicable

### SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : Obtain medical assistance. Treat with corticosteroid spray as soon as possible after inhalation.

### SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog. Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

No additional information available

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<b>5.3. Specific hazards arising from the hazardous product</b>	
Fire hazard	: <b>EXTREMELY FLAMMABLE GAS.</b> If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.
Explosion hazard	: <b>EXTREMELY FLAMMABLE GAS.</b> Forms explosive mixtures with air and oxidizing agents.
Reactivity	: No reactivity hazard other than the effects described in sub-sections below.
Reactivity in case of fire	: No reactivity hazard other than the effects described in sub-sections below.
<b>5.4. Special protective equipment and precautions for fire-fighters</b>	
Firefighting Instructions	: <b>DANGER! Toxic, flammable liquefied gas</b>  Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.
Special protective equipment for fire fighters	: Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Other Information	: Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by TC.)

#### SECTION 6: Accidental release measures

<b>6.1. Personal precautions, protective equipment and emergency procedures</b>	
General measures	: <b>DANGER! Toxic, flammable liquefied gas .</b> Forms explosive mixtures with air and oxidizing agents. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.
<b>6.2. Methods and materials for containment and cleaning up</b>	
Methods for cleaning up	: Try to stop release. Reduce vapour with fog or fine water spray. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.
<b>6.3. Reference to other sections</b>	
For further information refer to section 8: Exposure controls/personal protection	

#### SECTION 7: Handling and storage

<b>7.1. Precautions for safe handling</b>	
Precautions for safe handling	: Leak-check system with soapy water; never use a flame  All piped systems and associated equipment must be grounded  Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment  Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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**7.2. Conditions for safe storage, including any incompatibilities**

**Storage conditions**

: Store only where temperature will not exceed 125°F (52°C). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g. NFPA 30, NFPA 65, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

**OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE:** When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all International, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

Hydrogen sulfide (7783-06-4)		
USA - ACGIH	ACGIH TLV-TWA (ppm)	1 ppm
USA - ACGIH	ACGIH TLV-STEL (ppm)	5 ppm
USA - OSHA	OSHA PEL (Ceiling) (ppm)	20 ppm
Canada (Quebec)	VECD (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Canada (Quebec)	VECD (ppm)	15 ppm
Canada (Quebec)	VEMP (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Canada (Quebec)	VEMP (ppm)	10 ppm
Alberta	OEL Ceiling (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Alberta	OEL Ceiling (ppm)	15 ppm
Alberta	OEL TWA (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Alberta	OEL TWA (ppm)	10 ppm
British Columbia	OEL Ceiling (ppm)	10 ppm
Manitoba	OEL STEL (ppm)	5 ppm
Manitoba	OEL TWA (ppm)	1 ppm
New Brunswick	OEL STEL (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
New Brunswick	OEL STEL (ppm)	15 ppm
New Brunswick	OEL TWA (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
New Brunswick	OEL TWA (ppm)	10 ppm
Newfoundland & Labrador	OEL STEL (ppm)	5 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1 ppm
Nova Scotia	OEL STEL (ppm)	5 ppm
Nova Scotia	OEL TWA (ppm)	1 ppm
Nunavut	OEL Ceiling (mg/m <sup>3</sup> )	28 mg/m <sup>3</sup>
Nunavut	OEL Ceiling (ppm)	20 ppm
Nunavut	OEL STEL (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Nunavut	OEL STEL (ppm)	15 ppm
Nunavut	OEL TWA (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Nunavut	OEL TWA (ppm)	10 ppm
Northwest Territories	OEL STEL (ppm)	15 ppm

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## Hydrogen sulfide

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Hydrogen sulfide (7783-06-4)		
Northwest Territories	OEL TWA (ppm)	10 ppm
Ontario	OEL STEL (ppm)	15 ppm
Ontario	OEL TWA (ppm)	10 ppm
Prince Edward Island	OEL STEL (ppm)	5 ppm
Prince Edward Island	OEL TWA (ppm)	1 ppm
Québec	VECD (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Québec	VECD (ppm)	15 ppm
Québec	VEMP (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Québec	VEMP (ppm)	10 ppm
Saskatchewan	OEL STEL (ppm)	15 ppm
Saskatchewan	OEL TWA (ppm)	10 ppm
Yukon	OEL STEL (mg/m <sup>3</sup> )	27 mg/m <sup>3</sup>
Yukon	OEL STEL (ppm)	15 ppm
Yukon	OEL TWA (mg/m <sup>3</sup> )	16 mg/m <sup>3</sup>
Yukon	OEL TWA (ppm)	10 ppm

#### 8.2. Appropriate engineering controls

Appropriate engineering controls : Use corrosion-resistant equipment. Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): Inadequate - Use only in a closed system. Use explosion proof equipment and lighting.

#### 8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Safety glasses. Face shield. Gloves.



- Hand protection : Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.
- Eye protection : Wear goggles and a face shield when transferring or breaking transfer connections. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.
- Respiratory protection : **Respiratory protection:** Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with provincial regulations, local bylaws or guidelines. Selection should be based on the current CSA standard Z94.4, "Selection, Care, and Use of Respirators." Respirators should also be approved by NIOSH and MSHA. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
- Thermal hazard protection : Wear cold insulating gloves when transferring or breaking transfer connections. Standard EN 511 - Cold insulating gloves.
- Other Information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

- Physical state : Gas
- Appearance : Colorless gas. Colorless liquid at low temperature or under high pressure.
- Molecular mass : 34 g/mol
- Colour : Colourless.
- Odour : Odour can persist. Poor warning properties at low concentrations. Rotten eggs.
- Odour threshold : Odour threshold is subjective and inadequate to warn of overexposure.

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pH	: Not applicable.
pH solution	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -86 °C
Freezing point	: -82.9 °C
Boiling point	: -60.3 °C
Flash point	: Not applicable.
Critical temperature	: 100.4 °C
Auto-ignition temperature	: 260 °C
Decomposition temperature	: No data available
Vapour pressure	: 1680 kPa
Vapour pressure at 50 °C	: No data available
Critical pressure	: 8940 kPa
Relative vapour density at 20 °C	: >=
Relative density	: No data available
Relative density of saturated gas/air mixture	: No data available
Density	: No data available
Relative gas density	: 1.2
Solubility	: Water: 3980 mg/l
Log Pow	: Not applicable.
Log Kow	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Viscosity, kinematic (calculated value) (40 °C)	: No data available
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Flammability (solid, gas)	: 4.3 - 46 vol %

#### 9.2. Other information

Gas group	: Liquefied gas
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Reactivity	: No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: May react violently with oxidants. Can form explosive mixture with air.
Conditions to avoid	: Avoid moisture in installation systems. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Incompatible materials	: Ammonia, Bases, Bromine pentafluoride, Chlorine trifluoride, chromium trioxide, (and heat), Copper, (powdered), Fluorine, Lead, Lead oxide, Mercury, Nitric acid, Nitrogen trifluoride, nitrogen sulfide, Organic compounds, Oxidizing agents, Oxygen difluoride, Rubber, Sodium, (and moisture), Water.
Hazardous decomposition products	: Thermal decomposition may produce : Sulfur, Hydrogen.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified

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Acute toxicity (Inhalation) : Inhalation:gas: FATAL IF INHALED.

Hydrogen sulfide (1f)7783-06-4	
LC50 Inhalation rat (mg/l)	0.99 mg/l (Exposure time: 1 h)
LC50 Inhalation rat (ppm)	356 ppm/4h
ATE CA (gases)	356.00000000 ppmw/4h
ATE CA (vapours)	0.99000000 mg/l/4h
ATE CA (dust,mist)	0.99000000 mg/l/4h

Skin corrosion/irritation : Not classified  
pH: Not applicable.

Serious eye damage/irritation : Not classified  
pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : MAY CAUSE RESPIRATORY IRRITATION.

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

#### SECTION 12: Ecological information

##### 12.1. Toxicity

Ecology - general : VERY TOXIC TO AQUATIC LIFE.

Hydrogen sulfide (7783-06-4)	
LC50 fish 1	0,0448 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus (flow-through))
LC50 fish 2	0,016 mg/l (Exposure time: 96 h - Species: Plmephaies promelas (flow-through))

##### 12.2. Persistence and degradability

Hydrogen sulfide (7783-06-4)	
Persistence and degradability	Not applicable for inorganic gases.

##### 12.3. Bioaccumulative potential

Hydrogen sulfide (7783-06-4)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

##### 12.4. Mobility in soil

Hydrogen sulfide (7783-06-4)	
Mobility in soil	No data available.
Log Pow	Not applicable.
Log Kow	Not applicable.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

##### 12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on the ozone layer : None

Effect on global warming : No known effects from this product

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#### SECTION 13: Disposal considerations

##### 13.1. Disposal methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

#### SECTION 14: Transport information

##### 14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN1053  
 TDG Primary Hazard Classes : 2.3 - Class 2.3 - Toxic Gas.  
 TDG Subsidiary Classes : 2.1  
 Proper shipping name : HYDROGEN SULPHIDE

ERAP Index : 500  
 Explosive Limit and Limited Quantity Index : 0  
 Passenger Carrying Ship Index : Forbidden  
 Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : Forbidden

##### 14.3. Air and sea transport

IMDG

UN-No. (IMDG) : 1053  
 Proper Shipping Name (IMDG) : HYDROGEN SULPHIDE  
 Class (IMDG) : 2 - Gases  
 MFAG-No : 117

IATA

UN-No. (IATA) : 1053  
 Proper Shipping Name (IATA) : Hydrogen sulphide  
 Class (IATA) : 2

#### SECTION 15: Regulatory information

##### 15.1. National regulations

###### Hydrogen sulfide (7783-06-4)

Listed on the Canadian DSL (Domestic Substances List)

##### 15.2. International regulations

###### Hydrogen sulfide (7783-06-4)

Listed on the AICS (Austrian Inventory of Chemical Substances)  
 Listed on the ICSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
 Listed on the EEC Inventory EINECS (European Inventory of Existing Commercial Chemical Substances)  
 Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
 Listed on the Korean ECL (Existing Chemicals List)  
 Listed on NZIoC (New Zealand Inventory of Chemicals)  
 Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
 Listed on the United States TSCA (Toxic Substances Control Act) inventory  
 Listed on INSQ (Mexican national Inventory of Chemical Substances)

#### SECTION 16: Other information

Date of issue : 15/10/1979  
 Revision date : 10/08/2016  
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Indication of changes:

Training advice : Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard. Ensure operators understand the flammability hazard.

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**Other Information**

: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair Canada Inc, it is the user's obligation to determine the conditions of safe use of the product. Praxair Canada Inc, SDSs are furnished on sale or delivery by Praxair Canada Inc, or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from [www.praxair.ca](http://www.praxair.ca). If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write Praxair Canada Inc, (Phone: 1-888-257-5149; Address: Praxair Canada Inc, 1 City Centre Drive, Suite 1200, Mississauga, Ontario, L5B 1M2).

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**NFPA health hazard**

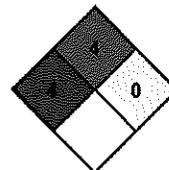
: 4 - Very short exposure could cause death or serious residual injury even though prompt medical attention was given.

**NFPA fire hazard**

: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

**NFPA reactivity**

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



**HMS III Rating**

**Health**

: 2 Moderate Hazard - Temporary or minor injury may occur

**Flammability**

: 4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class 1A)

**Physical**

: 2 Moderate Hazard - Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air.

**SDS Canada (GHS) - Praxair**

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*

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Appendix B  
SO<sub>2</sub> SDS



**MATHESON**

ask...The Gas Professionals™

Safety Data Sheet

Material Name: **SULFUR DIOXIDE**

SDS ID: **MAT22290**

**Section 1 - PRODUCT AND COMPANY IDENTIFICATION**

**Material Name**

SULFUR DIOXIDE

**Synonyms**

MTG MSDS 80; SULFUROUS ACID ANHYDRIDE; SULFUROUS OXIDE; SULPHUR DIOXIDE;  
SULFUROUS ANHYDRIDE; FERMENTICIDE LIQUID; SULFUR DIOXIDE(SO<sub>2</sub>); SULFUR OXIDE;  
SULFUR OXIDE(SO<sub>2</sub>)

**Chemical Family**

inorganic, gas

**Product Description**

Classification determined in accordance with Compressed Gas Association standards.

**Product Use**

Industrial and Specialty Gas Applications.

**Restrictions on Use**

None known.

**Details of the supplier of the safety data sheet**

MATHESON TRI-GAS, INC.

3 Mountainview Road

Warren, NJ 07059

General Information: 1-800-416-2505

Emergency #: 1-800-424-9300 (CHEMTREC)

Outside the US: 703-527-3887 (Call collect)

**Section 2 - HAZARDS IDENTIFICATION**

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

Gases Under Pressure - Liquefied gas

Acute Toxicity - Inhalation - Gas - Category 3

Skin Corrosion/Irritation - Category 1B

Serious Eye Damage/Eye Irritation - Category 1

Simple Asphyxiant

**GHS Label Elements**

**Symbol(s)**



**Signal Word**

Danger

**Hazard Statement(s)**

Contains gas under pressure; may explode if heated.

Toxic if inhaled.

Causes severe skin burns and eye damage.

May displace oxygen and cause rapid suffocation.

**Precautionary Statement(s)**

**Prevention**

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

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**MATHESON**

ask... The Gas Professionals™

### Safety Data Sheet

**Material Name: SULFUR DIOXIDE**

**SDS ID: MAT22290**

Wash thoroughly after handling.

Do not breathe dusts or mists.

**Response**

**IF INHALED:** Remove person to fresh air and keep comfortable for breathing.

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**IF ON SKIN (or hair):** Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

Wash contaminated clothing before reuse.

**IF SWALLOWED:** Rinse mouth. Do NOT induce vomiting.

Immediately call a POISON CENTER or doctor.

Specific treatment (see label).

**Storage**

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Protect from sunlight.

**Disposal**

Dispose of contents/container in accordance with local/regional/national/international regulations.

**Other Hazards**

Contact with liquified gas may cause frostbite.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS		
CAS	Component Name	Percent
7446-09-5	Sulfur dioxide	100.0

**Section 4 - FIRST AID MEASURES**

**Inhalation**

**IF INHALED:** Remove person to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical attention.

**Skin**

**IF ON SKIN (or hair):** Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115°F; 41-46°C). If warm water is not available, gently wrap affected parts in blankets. DO NOT induce vomiting. Get immediate medical attention.

**Eyes**

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing. Get immediate medical attention.

**Ingestion**

**IF SWALLOWED:** Rinse mouth. Do NOT induce vomiting. Get immediate medical attention.

**Most Important Symptoms/Effects**

**Acute**

Toxic if inhaled, frostbite, suffocation, respiratory tract burns, skin burns, eye burns

**Delayed**

No information on significant adverse effects.

**Indication of any immediate medical attention and special treatment needed**

Treat symptomatically and supportively.

**Note to Physicians**

For inhalation, consider oxygen.

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**MATHESON**

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### Safety Data Sheet

Material Name: SULFUR DIOXIDE

SDS ID: MAT22290

#### Section 5 - FIRE FIGHTING MEASURES

**Extinguishing Media**

**Suitable Extinguishing Media**

carbon dioxide, regular dry chemical, Large fires: Use regular foam or flood with fine water spray.

**Unsuitable Extinguishing Media**

None known.

**Special Hazards Arising from the Chemical**

Negligible fire hazard.

**Hazardous Combustion Products**

sulfur oxides

**Fire Fighting Measures**

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. Keep unnecessary people away, isolate hazard area and deny entry.

**Special Protective Equipment and Precautions for Firefighters**

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

#### Section 6 - ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment and Emergency Procedures**

Wear personal protective clothing and equipment, see Section 8.

**Methods and Materials for Containment and Cleaning Up**

Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.

Ventilate closed spaces before entering. Evacuation radius: 150 feet. Stop leak if possible without personal risk.

Reduce vapors with water spray. Do not get water directly on material.

**Environmental Precautions**

Avoid release to the environment.

#### Section 7 - HANDLING AND STORAGE

**Precautions for Safe Handling**

Do not get in eyes, on skin, or on clothing. Do not breathe gas, fumes, vapor, or spray. Wash hands thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink or smoke when using this product. Keep only in original container. Avoid release to the environment.

**Conditions for Safe Storage, Including any Incompatibilities**

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Protect from sunlight.

Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Keep separated from incompatible substances.

**Incompatible Materials**

bases, combustible materials, halogens, metal carbide, metal oxides, metals, oxidizing materials, peroxides, reducing agents

#### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

**Component Exposure Limits**

Sulfur dioxide	7446-09-5
ACGIH:	0.25 ppm STEL

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**MATHESON**

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**Safety Data Sheet**

**Material Name: SULFUR DIOXIDE**

**SDS ID: MAT22290**

NIOSH:	2 ppm TWA ; 5 mg/m <sup>3</sup> TWA
	5 ppm STEL ; 13 mg/m <sup>3</sup> STEL
	100 ppm IDLH
OSHA (US):	5 ppm TWA ; 13 mg/m <sup>3</sup> TWA
Mexico:	0.25 ppm STEL [PPT-CT ]

**ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)**

There are no biological limit values for any of this product's components.

**Engineering Controls**

Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**Individual Protection Measures, such as Personal Protective Equipment**

**Eye/face protection**

Wear splash resistant safety goggles with a faceshield. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin Protection**

Wear appropriate chemical resistant clothing. Wear chemical resistant clothing to prevent skin contact.

**Respiratory Protection**

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

**Glove Recommendations**

Wear appropriate chemical resistant gloves.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES			
Appearance	colorless gas	Physical State	gas
Odor	irritating odor	Color	colorless
Odor Threshold	3 - 5 ppm	pH	(Acidic in solution )
Melting Point	-73 °C (-99 °F )	Boiling Point	-10 °C (14 °F )
Boiling Point Range	Not available	Freezing point	Not available
Evaporation Rate	>1 (Butyl acetate = 1 )	Flammability (solid, gas)	Not available
Autoignition Temperature	Not available	Flash Point	(Not flammable )
Lower Explosive Limit	Not available	Decomposition temperature	Not available
Upper Explosive Limit	Not available	Vapor Pressure	2432 mmHg @ 20 °C
Vapor Density (air=1)	2.26	Specific Gravity (water=1)	1.462 at -10 °C

Permian Resources Corporation	H <sub>2</sub> S Contingency Plan Silver 29-28 Fed Com 111H, 112H, 121H, 122H, 131H, 132H	Eddy County, New Mexico
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### Safety Data Sheet

Material Name: SULFUR DIOXIDE

SDS ID: MAT22290

Water Solubility	22.8 % (@ 0 °C )	Partition coefficient: n-octanol/water	Not available
Viscosity	Not available	Kinematic viscosity	Not available
Solubility (Other)	Not available	Density	Not available
Physical Form	liquified gas	Molecular Formula	S-O2
Molecular Weight	64.06		

**Solvent Solubility**

**Soluble**

alcohol, acetic acid, sulfuric acid, ether, chloroform, Benzene, sulfuryl chloride, nitrobenzenes, Toluene, acetone

**Section 10 - STABILITY AND REACTIVITY**

**Reactivity**

No reactivity hazard is expected.

**Chemical Stability**

Stable at normal temperatures and pressure.

**Possibility of Hazardous Reactions**

Will not polymerize.

**Conditions to Avoid**

Minimize contact with material. Containers may rupture or explode if exposed to heat.

**Incompatible Materials**

bases, combustible materials, halogens, metal carbide, metal oxides, metals, oxidizing materials, peroxides, reducing agents

**Hazardous decomposition products**

oxides of sulfur

**Section 11 - TOXICOLOGICAL INFORMATION**

**Information on Likely Routes of Exposure**

**Inhalation**

Toxic if inhaled. Causes damage to respiratory system, burns, difficulty breathing

**Skin Contact**

skin burns

**Eye Contact**

eye burns

**Ingestion**

burns, nausea, vomiting, diarrhea, stomach pain

**Acute and Chronic Toxicity**

**Component Analysis - LD50/LC50**

The components of this material have been reviewed in various sources and the following selected endpoints are published:

**Sulfur dioxide (7446-09-5)**

Inhalation LC50 Rat 965 - 1168 ppm 4 h

**Product Toxicity Data**

**Acute Toxicity Estimate**

No data available.

**Immediate Effects**

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### Safety Data Sheet

**Material Name: SULFUR DIOXIDE**

**SDS ID: MAT22290**

Toxic if inhaled, frostbite, suffocation, respiratory tract burns, skin burns, eye burns

**Delayed Effects**

No information on significant adverse effects.

**Irritation/Corrosivity Data**

respiratory tract burns, skin burns, eye burns

**Respiratory Sensitization**

No data available.

**Dermal Sensitization**

No data available.

**Component Carcinogenicity**

Sulfur dioxide	7446-09-5
ACGIH:	A4 - Not Classifiable as a Human Carcinogen
IARC:	Monograph 54 [1992] (Group 3 (not classifiable))

**Germ Cell Mutagenicity**

No data available.

**Tumorigenic Data**

No data available

**Reproductive Toxicity**

No data available.

**Specific Target Organ Toxicity - Single Exposure**

No target organs identified.

**Specific Target Organ Toxicity - Repeated Exposure**

No target organs identified.

**Aspiration hazard**

Not applicable.

**Medical Conditions Aggravated by Exposure**

respiratory disorders

**Section 12 - ECOLOGICAL INFORMATION**

**Component Analysis - Aquatic Toxicity**

No LOEL ecotoxicity data are available for this product's components.

**Persistence and Degradability**

No data available.

**Bioaccumulative Potential**

No data available.

**Mobility**

No data available.

**Section 13 - DISPOSAL CONSIDERATIONS**

**Disposal Methods**

Dispose of contents/container in accordance with local/regional/national/international regulations.

**Component Waste Numbers**

The U.S. EPA has not published waste numbers for this product's components.

**Section 14 - TRANSPORT INFORMATION**

**US DOT Information:**

Shipping Name: SULFUR DIOXIDE

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**MATHESON**

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**Safety Data Sheet**

**Material Name: SULFUR DIOXIDE**

**SDS ID: MAT22290**

**Hazard Class:** 2.3  
**UN/NA #:** UN1079  
**Required Label(s):** 2.3

**IMDG Information:**  
**Shipping Name:** SULPHUR DIOXIDE  
**Hazard Class:** 2.3  
**UN#:** UN1079  
**Required Label(s):** 2.3

**TDG Information:**  
**Shipping Name:** SULFUR DIOXIDE  
**Hazard Class:** 2.3  
**UN#:** UN1079  
**Required Label(s):** 2.3

**International Bulk Chemical Code**  
This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

**Section 15 - REGULATORY INFORMATION**

**U.S. Federal Regulations**

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

Sulfur dioxide	7446-09-5
SARA 302:	500 lb TPQ
OSHA (safety):	1000 lb TQ (Liquid)
SARA 304:	500 lb EPCRA RQ

**SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories**  
Gas Under Pressure; Acute toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Simple Asphyxiant

**U.S. State Regulations**

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
Sulfur dioxide	7446-09-5	Yes	Yes	Yes	Yes	Yes

**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**



**WARNING:**

This product can expose you to chemicals including Sulfur dioxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

Permian Resources Corporation	H <sub>2</sub> S Contingency Plan Silver 29-28 Fed Com 111H, 112H, 121H, 122H, 131H, 132H	Eddy County, New Mexico
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**MATHESON**

ask... The Gas Professionals™

### Safety Data Sheet

Material Name: **SULFUR DIOXIDE**

SDS ID: **MAT22290**

Sulfur dioxide	7446-09-5
Repro/Dev. Tox	developmental toxicity, 7/29/2011

**Component Analysis - Inventory**  
**Sulfur dioxide (7446-09-5)**

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECL - Annex 1	KR KECL - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECL	TW, CN	VN (Draft)
No	Yes	Yes	Yes	Yes	Yes	Yes

**Section 16 - OTHER INFORMATION**

**NFPA Ratings**

Health: 3 Fire: 0 Instability: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

**Summary of Changes**

SDS update: 02/10/2016

**Key / Legend**

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania\*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECL Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECL Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; KR REACH CCA - Korea Registration and Evaluation of Chemical Substances Chemical Control Act; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; Ne - Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL - Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL - Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH - Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Se - Semi-quantitative; STEL - Short-term Exposure Limit;

<b>Operator Name:</b> CENTENNIAL RESOURCE PRODUCTION LLC	
<b>Well Name:</b> SILVER 29-28 FED COM	<b>Well Number:</b> 111H

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

**Disposal type description:**

**Disposal location description:** Contents (drill cuttings, mud, salts, and other chemicals) of the mud tanks will be hauled to R360s state approved (NM-01-0006) disposal site at Halfway

**Waste type:** SEWAGE

**Waste content description:** Grey water/ Human waste

**Amount of waste:** 5000 gallons

**Waste disposal frequency :** Weekly

**Safe containment description:** Human waste will be disposed of in chemical toilets and hauled to the Carlsbad wastewater treatment plant.

**Safe containmant attachment:**

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

**Disposal type description:**

**Disposal location description:** Human waste will be disposed of in chemical toilets and hauled to the Carlsbad wastewater treatment plant.

**Waste type:** GARBAGE

**Waste content description:** General trash/ garbage.

**Amount of waste:** 5000 pounds

**Waste disposal frequency :** Weekly

**Safe containment description:** Enclosed trash trailer.

**Safe containmant attachment:**

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

**Disposal type description:**

**Disposal location description:** All trash will be placed in a portable trash cage. It will be hauled to the Eddy County landfill. There will be no trash burning.

**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**

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC

**Well Name:** SILVER 29-28 FED COM

**Well Number:** 111H

### Cuttings Area

**Cuttings Area being used?** NO

**Are you storing cuttings on location?** Y

**Description of cuttings location** 8220 cubic ft of waste, stored in steel tanks. Hauled off to a commercial state approved facility.

**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:**

9\_LJS\_Silver\_SWNE\_Well\_Site\_Layout\_20230524093809.pdf

**Comments:** See rig layout diagram for depictions of the well pad, trash cage, access onto the location, parking, living facilities, and rig orientation.

### Section 10 - Plans for Surface Reclamation

**Type of disturbance:** New Surface Disturbance

**Multiple Well Pad Name:** SILVER 29-28 FED COM SWNE

**Multiple Well Pad Number:** 1

**Recontouring**

10b\_LJS\_Silver\_SWNE\_Recontour\_Plats\_20230524093826.pdf

10a\_LJS\_Silver\_SWNE\_Interim\_Reclamation\_20230524093826.pdf

**Drainage/Erosion control construction:** Drainage and erosion will be monitored to prevent compromising the well site integrity, and to protect the surrounding native topography.

**Drainage/Erosion control reclamation:** Drainage and erosion will be monitored to prevent compromising the well site integrity, and to protect the surrounding native topography.

**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 164432

**CONDITIONS**

Operator: Permian Resources Operating, LLC 300 N. Marienfeld St Ste 1000 Midland, TX 79701	OGRID: 372165
	Action Number: 164432
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

**CONDITIONS**

Created By	Condition	Condition Date
ward.rikala	Notify OCD 24 hours prior to casing & cement	7/12/2024
ward.rikala	Will require a File As Drilled C-102 and a Directional Survey with the C-104	7/12/2024
ward.rikala	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	7/12/2024
ward.rikala	Cement is required to circulate on both surface and intermediate1 strings of casing	7/12/2024
ward.rikala	If cement does not circulate on any string, a CBL is required for that string of casing	7/12/2024
ward.rikala	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	7/12/2024