

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. NMNM06767 6. If Indian, Allottee or Tribe Name  7. If Unit or CA Agreement, Name and No.  8. Lease Name and Well No. MORBUCKS 25-26 FED 133H 9. API Well No. 30-015-56471
2. Name of Operator CENTENNIAL RESOURCE PRODUCTION LLC 3a. Address 300 N MARIENFIELD STREET SUITE 1000, MIDLAND, TX 3b. Phone No. (include area code) (432) 695-4222		10. Field and Pool, or Exploratory Hackberry/Bone Spring, NW 11. Sec., T. R. M. or Blk. and Survey or Area SEC 25/T19S/R30E/NMP
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SWSE / 1197 FSL / 1397 FEL / LAT 32.627356 / LONG -103.9215 At proposed prod. zone NWSW / 1980 FSL / 100 FWL / LAT 32.62953 / LONG -103.950909		12. County or Parish EDDY 13. State NM
14. Distance in miles and direction from nearest town or post office*  15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 1197 feet 16. No of acres in lease  17. Spacing Unit dedicated to this well 280.0		18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 30 feet 19. Proposed Depth 9790 feet / 18665 feet 20. BLM/BIA Bond No. in file FED:
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3430 feet 22. Approximate date work will start* 06/30/2024		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 07/31/2023
Title Drilling Engineer		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) CHRISTOPHER WALLS / Ph: (575) 234-2234	Date 03/26/2025
Title Petroleum Engineer		
Office 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 connects this information to an 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: SWSE / 1197 FSL / 1397 FEL / TWSP: 19S / RANGE: 30E / SECTION: 25 / LAT: 32.627356 / LONG: -103.9215 ( TVD: 0 feet, MD: 0 feet )

PPP: NWSE / 1980 FSL / 1420 FEL / TWSP: 19S / RANGE: 30E / SECTION: 25 / LAT: 32.629509 / LONG: -103.921574 ( TVD: 9790 feet, MD: 10104 feet )

PPP: NWSE / 1984 FSL / 2637 FEL / TWSP: 19S / RANGE: 30E / SECTION: 26 / LAT: 32.629525 / LONG: -103.942671 ( TVD: 9790 feet, MD: 16103 feet )

PPP: NWSW / 1987 FSL / 0 FWL / TWSP: 19S / RANGE: 30E / SECTION: 25 / LAT: 32.629519 / LONG: -103.934103 ( TVD: 9790 feet, MD: 13465 feet )

BHL: NWSW / 1980 FSL / 100 FWL / TWSP: 19S / RANGE: 30E / SECTION: 26 / LAT: 32.62953 / LONG: -103.950909 ( TVD: 9790 feet, MD: 18665 feet )

### BLM Point of Contact

Name: JANET D ESTES

Title: ADJUDICATOR

Phone: (575) 234-6233

Email: JESTES@BLM.GOV

### **Review and Appeal Rights**

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

C-102  Submit Electronically Via OCD Permitting	State of New Mexico Energy, Minerals & Natural Resources Department OIL CONSERVATION DIVISION		Revised July 9, 2024	
			Submittal Type:	<input type="checkbox"/> Initial Submittal
				<input type="checkbox"/> Amended Report
		<input type="checkbox"/> As Drilled		

## WELL LOCATION INFORMATION

API Number 30-015-56471	Pool Code	Pool Name
Property Code 337184	Property Name MORBUCKS 25-26 FED	Well Number 133H
OGRID No. 372165	Operator Name PERMIAN RESOURCES OPERATING, LLC	Ground Level Elevation 3430.2'
Surface Owner: <input type="checkbox"/> State <input type="checkbox"/> Fee <input type="checkbox"/> Tribal <input type="checkbox"/> Federal		Mineral Owner: <input type="checkbox"/> State <input type="checkbox"/> Fee <input type="checkbox"/> Tribal <input type="checkbox"/> Federal

## Surface Location

UL O	Section 25	Township 19S	Range 30E	Lot	Ft. from N/S 1197 SOUTH	Ft. from E/W 1397 EAST	Latitude (NAD 83) 32.627356°	Longitude (NAD 83) -103.921500°	County EDDY
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## Bottom Hole Location

UL L	Section 26	Township 19S	Range 30E	Lot	Ft. from N/S 1980 SOUTH	Ft. from E/W 100 WEST	Latitude (NAD 83) 32.629530°	Longitude (NAD 83) -103.950909°	County EDDY
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Dedicated Acres	Infill or Defining Well	Defining Well API	Overlapping Spacing Unit (Y/N)	Consolidation Code
Order Numbers.		Well setbacks are under Common Ownership: <input type="checkbox"/> Yes <input type="checkbox"/> No		

## Kick Off Point (KOP)

UL O	Section 25	Township 19S	Range 30E	Lot	Ft. from N/S 1197 SOUTH	Ft. from E/W 1397 EAST	Latitude (NAD 83) 32.627356°	Longitude (NAD 83) -103.921500°	County EDDY
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## First Take Point (FTP)

UL J	Section 25	Township 19S	Range 30E	Lot	Ft. from N/S 1980 SOUTH	Ft. from E/W 1420 EAST	Latitude (NAD 83) 32.629509°	Longitude (NAD 83) -103.921574°	County EDDY
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## Last Take Point (LTP)

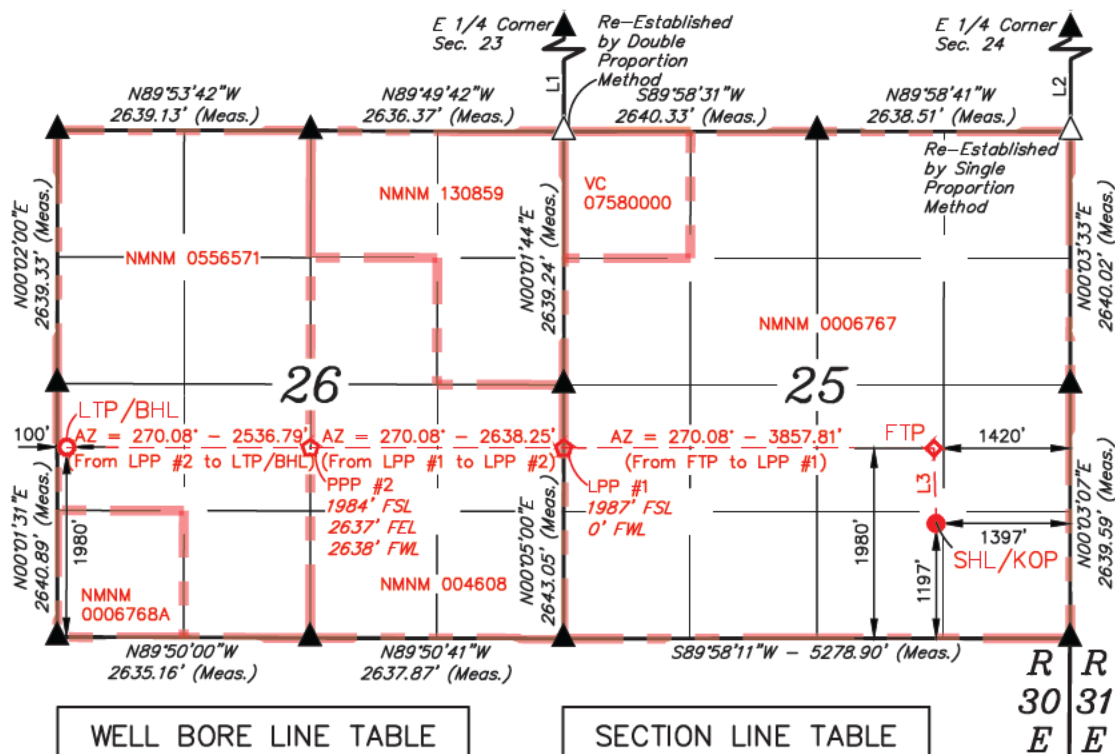
UL L	Section 26	Township 19S	Range 30E	Lot	Ft. from N/S 1980 SOUTH	Ft. from E/W 100 WEST	Latitude (NAD 83) 32.629530°	Longitude (NAD 83) -103.950909°	County EDDY
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Unitized Area or Area of Uniform Interest	Spacing Unit Type <input type="checkbox"/> Horizontal <input type="checkbox"/> Vertical	Ground Floor Elevation:
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<b>OPERATOR CERTIFICATIONS</b>  <i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and, if the well is a vertical or directional well, that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of a working interest or unleased mineral interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</i>  <i>If this well is a horizontal well, I further certify that this organization has received the consent of at least one lessee or owner of a working interest or unleased mineral interest in each tract (in the target pool or formation) in which any part of the well's completed interval will be located or obtained a compulsory pooling order from the division.</i>		<b>SURVEYOR CERTIFICATIONS</b>  <i>I hereby certify that the well location shown on this plat was plotted from the 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.</i>	
Signature <i>Cassie Evans</i>	Date		
Printed Name		Signature and Seal of Professional Surveyor 23782	April 13, 2023
Email Address		Certificate Number	Date of Survey

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

Property Name MORBUCKS 25-26 FED	Well Number 133H	Drawn By N.D.T. 04-18-23	Revised By REV. 1 Z.L. 07-19-24 (FORM UPDATE)
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WELL BORE LINE TABLE		
LINE	DIRECTION	LENGTH
L3	AZ = 358.35°	783.75'

SECTION LINE TABLE		
LINE	DIRECTION	LENGTH
L1	N00°04'03"E	2639.24'
L2	N00°03'33"E	2640.02'

**LEGEND:**

- = SURFACE HOLE/KICK OFF POINT.
- ◆ = FIRST TAKE POINT.
- ◇ = LEASE PENETRATION POINT.
- = LAST TAKE POINT/BOTTOM HOLE LOCATION.
- ▲ = SECTION CORNERS LOCATED.
- △ = SECTION CORNER RE-ESTABLISHED. (Not Set on Ground.)
- = LEASE LINE.

**NOTE:**

- Distances referenced on plat to section lines are perpendicular.
- Basis of Bearings is a Transverse Mercator Projection with a Central Meridian of W103°53'00" (NAD 83)

<b>NAD 83 (LPP #1)</b>
LATITUDE = 32°37'46.27" (32.629519°)
LONGITUDE = -103°56'02.77" (-103.934103°)
<b>NAD 27 (LPP #1)</b>
LATITUDE = 32°37'45.84" (32.629399°)
LONGITUDE = -103°56'00.96" (-103.933600°)
<b>STATE PLANE NAD 83 (N.M. EAST)</b>
N: 592980.66' E: 664241.61'
<b>STATE PLANE NAD 27 (N.M. EAST)</b>
N: 592918.30' E: 623061.67'

<b>NAD 83 (LPP #2)</b>
LATITUDE = 32°37'46.29" (32.629525°)
LONGITUDE = -103°56'33.61" (-103.942671°)
<b>NAD 27 (LPP #2)</b>
LATITUDE = 32°37'45.86" (32.629406°)
LONGITUDE = -103°56'31.80" (-103.942168°)
<b>STATE PLANE NAD 83 (N.M. EAST)</b>
N: 592973.13' E: 661603.91'
<b>STATE PLANE NAD 27 (N.M. EAST)</b>
N: 592910.79' E: 620423.97'

<b>NAD 83 (LTP/BHL)</b>
LATITUDE = 32°37'46.31" (32.629530°)
LONGITUDE = -103°57'03.27" (-103.950909°)
<b>NAD 27 (LTP/BHL)</b>
LATITUDE = 32°37'45.88" (32.629411°)
LONGITUDE = -103°57'01.46" (-103.950406°)
<b>STATE PLANE NAD 83 (N.M. EAST)</b>
N: 592965.89' E: 659067.66'
<b>STATE PLANE NAD 27 (N.M. EAST)</b>
N: 592903.57' E: 617887.71'

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:** 03/25/2025

**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.

[illegible]

**IV. Central Delivery Point Name:** Mojo 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
STINGRAY 24 FED 113H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 114H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 123H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 124H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 133H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 134H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 111H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 111H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 121H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 122H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 131H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
STINGRAY 24 FED 132H	TBD	<u>6/02/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
ACE 25-30 FED 113H	TBD	<u>6/12/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
ACE 25-30 FED 114H	TBD	<u>6/12/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
ACE 25-30 FED 123H	TBD	<u>6/12/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
ACE 25-30 FED 124H	TBD	<u>6/12/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
ACE 25-30 FED 133H	TBD	<u>6/12/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
ACE 25-30 FED 134H	TBD	<u>6/12/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
MORBUCKS 25-26 FED 113H	TBD	<u>5/01/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
MORBUCKS 25-26 FED 114H	TBD	<u>5/01/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
MORBUCKS 25-26 FED 123H	TBD	<u>5/01/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
MORBUCKS 25-26 FED 124H	TBD	<u>5/01/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
MORBUCKS 25-26 FED 133H	TBD	<u>5/01/2025</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>	<u>TBD</u>
MORBUCKS 25-26 FED 134H	TBD	<u>5/01/2025</u>	<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

[illegible]

### **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 Supervisor
E-mail Address: Cassie.Evans@permianres.com
Date: 3/25/25
Phone: 432-313-1732
<b>OIL CONSERVATION DIVISION</b> <b>(Only applicable when submitted as a standalone form)</b>
Approved By:
Title:
Approval Date:
Conditions of Approval:

## Permian Resources Operating, LLC (372165)

**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

## Permian Resources Operating, LLC (372165)

- 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 OCD. 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

03/26/2025

APD ID: 10400093685

Submission Date: 07/31/2023

Highlighted data  
reflects the most  
recent changes

Operator Name: CENTENNIAL RESOURCE PRODUCTION LLC

Well Name: MORBUCKS 25-26 FED

Well Number: 133H

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
15281585	RUSTLER	3430	630	630	SANDSTONE	USEABLE WATER	N
15281586	TOP SALT	2720	710	710	SALT	NONE	N
15281587	TANSILL	1550	1880	1880	ANHYDRITE, SHALE	NONE	N
15281588	YATES	1450	1980	1980	ANHYDRITE, SHALE	NONE	N
15281589	SEVEN RIVERS	1190	2240	2240	LIMESTONE	NONE	N
15281590	CAPITAN REEF	1080	2350	2350	LIMESTONE	NONE	N
15281591	CHERRY CANYON	-630	4060	4060	SANDSTONE	NATURAL GAS, OIL	N
15281596	BRUSHY CANYON	-1455	4885	4885	SANDSTONE	NATURAL GAS, OIL	N
15281592	BONE SPRING LIME	-3180	6610	6610	LIMESTONE, SHALE	NATURAL GAS, OIL	N
15281593	BONE SPRING 1ST	-4480	7910	7910	SANDSTONE	NATURAL GAS, OIL	N
15281594	BONE SPRING 2ND	-4970	8400	8400	SANDSTONE	NATURAL GAS, OIL	N
15281595	BONE SPRING 3RD	-6130	9560	9560	SANDSTONE	NATURAL GAS, OIL	Y

## Section 2 - Blowout Prevention

Pressure Rating (PSI): 5M

Rating Depth: 10000

**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

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC**Well Name:** MORBUCKS 25-26 FED**Well Number:** 133H

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 (variablebore 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:**

Morbucks\_Choke\_20230731093211.pdf

Morbucks\_Flex\_Hose\_Specs\_20230731093211.pdf

**BOP Diagram Attachment:**

Morbucks\_5M\_BOP\_20230731093218.pdf

Morbucks\_2M\_BOP\_20230731093216.pdf

Operator Name: CENTENNIAL RESOURCE PRODUCTION LLC

Well Name: MORBUCKS 25-26 FEDWell Number: 133H

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	26	20.0	NEW	API	N	0	655	0	655	3430	2775	655	J-55	94	ST&C	1.61	1.91	DRY	3.6	DRY	6.67
2	INTERMEDIATE	17.5	13.375	NEW	API	N	0	1905	0	1905	3301	1525	1905	J-55	40	BUTT	4.29	2.95	DRY	4.84	DRY	5.16
3	INTERMEDIATE	12.25	9.625	NEW	API	N	0	4010	0	4010	3431	-580	4010	J-55	40	BUTT	3.13	1.66	DRY	2.74	DRY	2.42
4	PRODUCTION	8.75	5.5	NEW	NON API	N	0	10105	0	9790	3431	-6360	10105	OTHER	17	OTHER - GEOCONN	1.47	1.53	DRY	2.05	DRY	2.05
5	PRODUCTION	7.875	5.5	NEW	NON API	N	10105	18665	9790	9790	-6360	-6360	8560	OTHER	17	OTHER - GEOCONN	1.47	1.53	DRY	2.05	DRY	2.05

Casing Attachments

Casing ID: 1StringSURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Morbucks\_Casing\_Design\_Assumptions\_20230731093523.pdf

Operator Name: CENTENNIAL RESOURCE PRODUCTION LLC

Well Name: MORBUCKS 25-26 FEDWell Number: 133H

Casing Attachments

Casing ID: 2StringINTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Morbucks\_Casing\_Design\_Assumptions\_20230731093541.pdf

Casing ID: 3StringINTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Morbucks\_Casing\_Design\_Assumptions\_20230720093032.pdf

Casing ID: 4StringPRODUCTION

Inspection Document:

Spec Document:

GEOCONN\_Spec\_Sheet\_20230719095646.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Morbucks\_Casing\_Design\_Assumptions\_20230720093001.pdf

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC**Well Name:** MORBUCKS 25-26 FED**Well Number:** 133H**Casing Attachments****Casing ID:** 5      **String**      PRODUCTION**Inspection Document:****Spec Document:**

GEOCONN\_Spec\_Sheet\_20230719095628.pdf

**Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**

Morbucks\_Casing\_Design\_Assumptions\_20230720092929.pdf

**Section 4 - Cement**

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	455	730	1.88	12.9	1370	100	Class C	EconoCem-HLC + 5% Salt + 5% Kol-Seal
SURFACE	Tail		455	655	350	1.34	14.8	460	50	Class C	Accelerator
INTERMEDIATE	Lead		0	1520	840	1.88	12.9	1570	50	Class C	EconoCem-HLC + 5% Salt + 5% Kol-Seal
INTERMEDIATE	Tail		1520	1905	310	1.34	14.8	410	50	Class C	Retarder
INTERMEDIATE	Lead		0	3200	700	1.88	12.9	1300	50	Class C	EconoCem-HLC + 5% Salt + 5% Kol-Seal
INTERMEDIATE	Tail		3200	4010	250	1.33	14.8	320	25	Class C	Salt
PRODUCTION	Lead		3510	9360	850	2.41	11.5	2030	40	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder
PRODUCTION	Tail		9360	18665	1210	1.73	12.5	2090	25	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder
PRODUCTION	Lead		3510	9360	850	2.41	11.5	2030	40	Class H	POZ, Extender, Dispersant, Fluid Loss, Retarder
PRODUCTION	Tail		9360	18665	1210	1.73	12.5	2090	25	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC**Well Name:** MORBUCKS 25-26 FED**Well Number:** 133H

## 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 43 CFR 3172:****Diagram of the equipment for the circulating system in accordance with 43 CFR 3172:**

**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

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	655	SPUD MUD	8.6	9.5							
655	1905	SALT SATURATED	10	10							
1905	10105	WATER-BASED MUD	9	10							
10105	18665	OIL-BASED MUD	9	10							

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC**Well Name:** MORBUCKS 25-26 FED**Well Number:** 133H

## 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:** 5100**Anticipated Surface Pressure:** 2946**Anticipated Bottom Hole Temperature(F):** 154**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\_Morbucks\_25\_26\_Fed\_113H\_\_114H\_\_123H\_\_124H\_\_133H\_\_134H\_20230720094322.pdf

## Section 8 - Other Information

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

Morbucks\_25\_26\_Fed\_133H\_\_PWP0\_AC\_Summary\_20230731094543.pdf

Morbucks\_25\_26\_Fed\_133H\_\_PWP0\_20230731094543.pdf

**Other proposed operations facets description:**

Please see attachment for spec sheets, variance sheet, batch drilling, multibowl.

**Other proposed operations facets attachment:**

Morbucks\_25\_26\_Fed\_133H\_drilling\_packet\_20230731094557.pdf

**Other Variance attachment:**

GEOCONN\_Spec\_Sheet\_20230720094414.pdf

Morbucks\_Batch\_Drilling\_and\_OLC\_Procedure\_20230720094414.pdf

Morbucks\_Choke\_20230720094413.pdf

Morbucks\_Flex\_Hose\_Specs\_20230720094414.pdf

Morubucks\_Multi\_bowl\_Wellhead\_20230720094414.pdf

## Permian Resources - Morbucks 25-26 Fed 133H

## 1. Geologic Formations

Formation	Elevation	TVD	Target
Rustler	2830	630	No
Top of Salt	2750	710	No
Capitan	1110	2350	No
Tansill	1580	1880	No
Yates	1480	1980	No
Seven Rivers	1220	2240	No
Delaware Sands = CYCN	-600	4060	No
BYCN	-1425	4885	No
Bone Spring Lime	-3150	6610	No
1st Bone Spring Sand	-4450	7910	No
2nd Bone Spring Sand	-4940	8400	No
3rd Bone Spring Sand	-6100	9560	Yes
Wolfcamp	-6530	9990	No

## 2. Blowout Prevention

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
17.5	20"	2M	Annular	x	1000 psi
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other*		
12.25	13-5/8"	5M	Annular	x	2500 psi
			Blind Ram	x	5000 psi
			Pipe Ram	x	
			Double Ram		
			Other*		
8.75	13-5/8"	5M	Annular	x	2500 psi
			Blind Ram	x	5000 psi
			Pipe Ram	x	
			Double Ram		
			Other*		

**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 (variablebore 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 Attachemnt: 5 M Choe Manifold

BOP Diagram Attachment: BOP Schematic

**3. Casing**

String	Hole Size	Casing Size	Top	Bottom	Top TVD	Bottom TVD	Length	Grade	Weight	Connection	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
Surface	26	20	0	655	0	655	655	J55	94	STC	1.61	1.91	Dry	3.60	Dry	6.67
Intermediate 1	17.5	13.375	0	1905	0	1905	1905	J55	40	BTC	4.29	2.95	Dry	4.84	Dry	5.16
Intermediate 2	12.25	9.625	0	4010	0	4010	4010	J55	40	BTC	3.13	1.66	Dry	2.74	Dry	2.42
Production	8.75	5.5	0	10105	0	9790	10105	P110RY	17	GeoConn	1.47	1.53	Dry	2.05	Dry	2.05
Production	7.875	5.5	10105	18665	9790	9790	8560	P110RY	17	GeoConn	1.47	1.53	Dry	2.05	Dry	2.05
BLM Min Safety Factor											1.125	1		1.6		1.6

Non API casing spec sheets and casing design assumptions attached.

**4. Cement**

String	Lead/Tail	Top MD	Bottom MD	Quantity (sx)	Yield	Density	Cu Ft	Excess %	Cement Type	Additives
Surface	Lead	0	455	730	1.88	12.9	1370	100%	Class C	EconoCem-HLC + 5% Salt + 5% Kol-Seal
Surface	Tail	455	655	350	1.34	14.8	460	50%	Class C	Accelerator
Intermediate 1	Lead	0	1520	840	1.88	12.9	1570	50%	Class C	EconoCem-HLC + 5% Salt + 5% Kol-Seal
Intermediate 1	Tail	1520	1905	310	1.34	14.8	410	50%	Class C	Retarder
Intermediate 2	Lead	0	3200	700	1.88	12.9	1300	50%	Class C	EconoCem-HLC + 5% Salt + 5% Kol-Seal
Intermediate 2	Tail	3200	4010	250	1.33	14.8	320	25%	Class C	Salt
Production	Lead	3510	9360	850	2.41	11.5	2030	40%	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder
Production	Tail	9360	18665	1210	1.73	12.5	2090	25%	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder

If losses are encountered while drilling intermediate 2 a stage tool will be added and cement will be adjusted accordingly.

**5. Circulating Medium**

**Mud System Type:** Closed

**Will an air or gas system be used:** No

**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.

**Cuttings Volume:** 11670 Cu Ft

**Circulating Medium Table**

Top Depth	Bottom Depth	Mud Type	Min Weight	Max Weight
0	655	Spud Mud	8.6	9.5
655	1905	Salt Saturated	10	10
1905	10105	Water Base Mud	9	10
10105	18665	OBM	9	10

**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

**7. Pressure**

Anticipated Bottom Hole Pressure	5100	psi
Anticipated Surface Pressure	2937	psi
Anticipated Bottom Hole Temperature	154	°F
Anticipated Abnormal pressure, temp, or geo hazards	No	

**8. Waste Management**

<b>Waste Type:</b>	<b>Drilling</b>
Waste content description:	Fresh water based drilling fluid
Amount of waste:	1500 bbls
Waste disposal frequency:	Weekly (after drilling all surfaces)
Safe containment description:	Steel tanks with plastic-lined containment berms
Waste disposal type:	Haul to commercial facility
Disposal location ownership:	Commercial
<b>Waste Type:</b>	<b>Grey Water &amp; Human Waste</b>
Waste content description:	Grey Water/Human Waste
Amount of waste:	5000 gallons
Waste disposal frequency:	Weekly
Safe containment description:	Approved waste storage tanks with containment
Waste disposal type:	Haul to commercial facility
Disposal location ownership:	Commercial
<b>Waste Type:</b>	<b>Garbage</b>
Waste content description:	General trash/garbage
Amount of waste:	5000 lbs
Waste disposal frequency:	Weekly
Safe containment description:	Enclosed trash trailer
Waste disposal type:	Haul to commercial facility
Disposal location ownership:	Commercial
<b>Waste Type:</b>	<b>Drilling</b>
Waste content description:	Drill Cuttings
Amount of waste:	11670 Cu Ft
Waste disposal frequency:	Per well
Safe containment description:	Steel tanks
Waste disposal type:	Haul to commercial facility
Disposal location ownership:	Commercial
<b>Waste Type:</b>	<b>Drilling</b>
Waste content description:	Brine water based drilling fluid
Amount of waste:	1500 bbls
Waste disposal frequency:	Monthly
Safe containment description:	Steel tanks with plastic-lined containment berms
Waste disposal type:	Haul to commercial facility
Disposal location ownership:	Commercial

**9. Other Information**

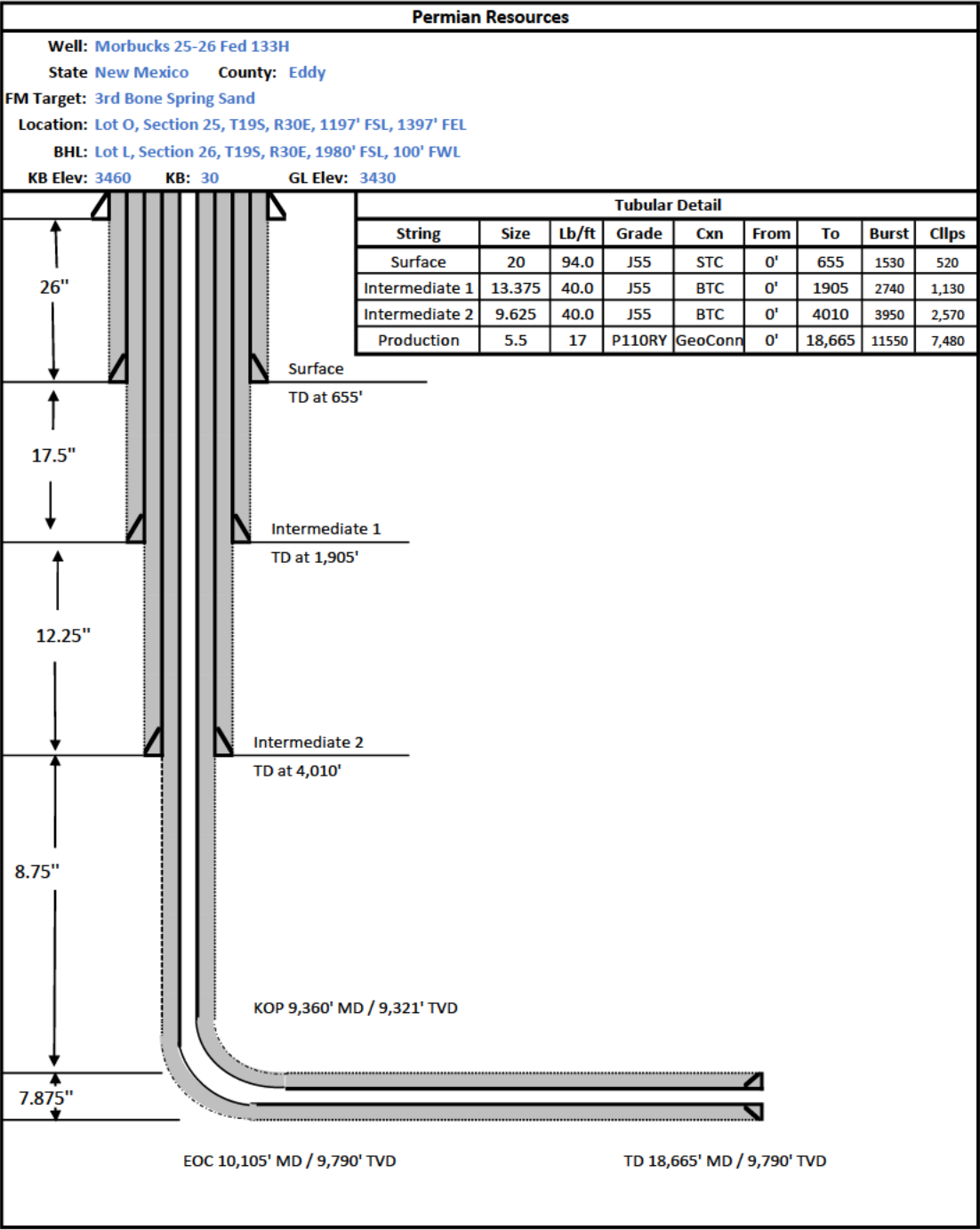
Well Plan and AC Report: attached

Batching Drilling Procedure: attached

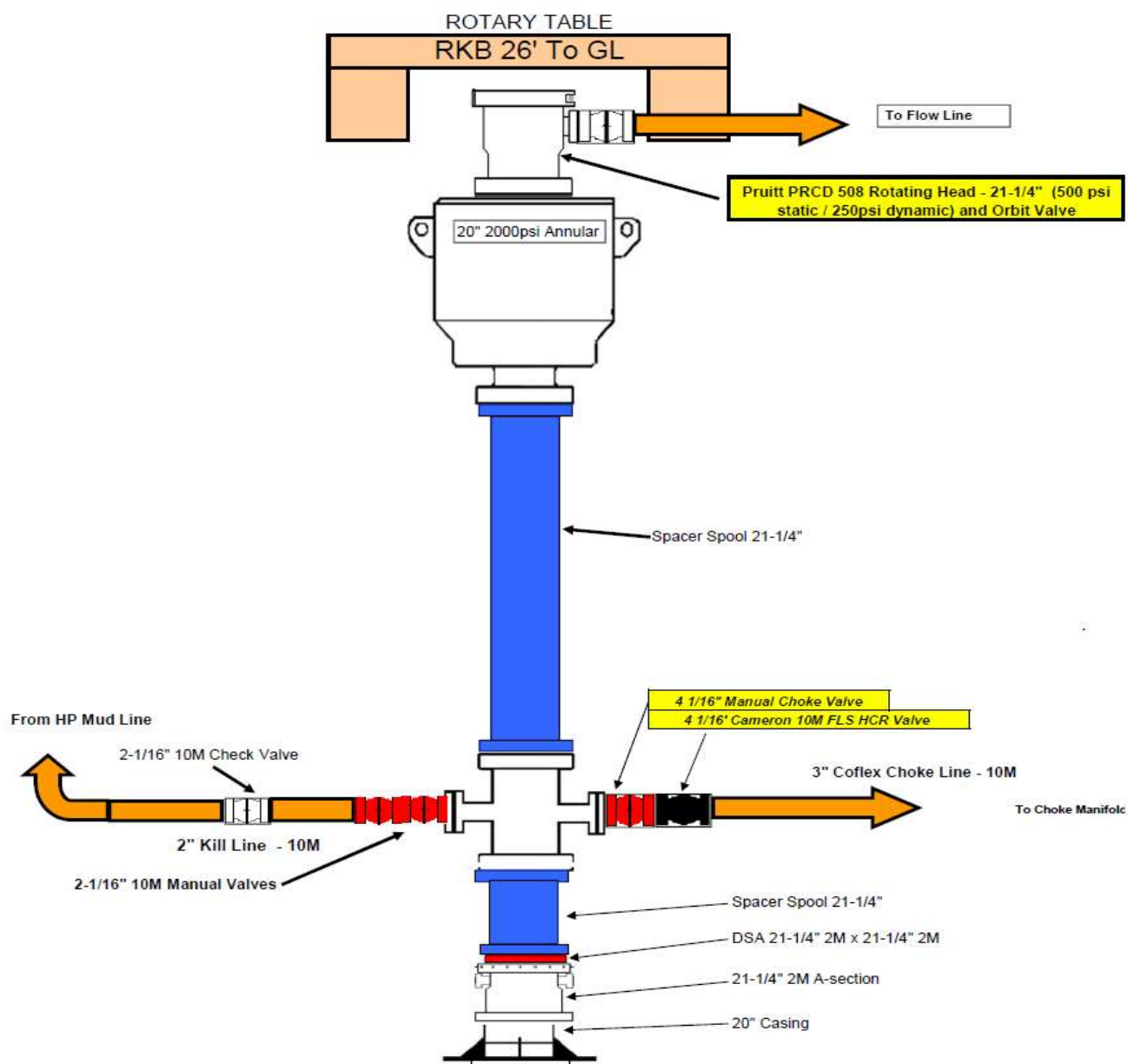
WBD: attached

Flex Hose Specs: attached

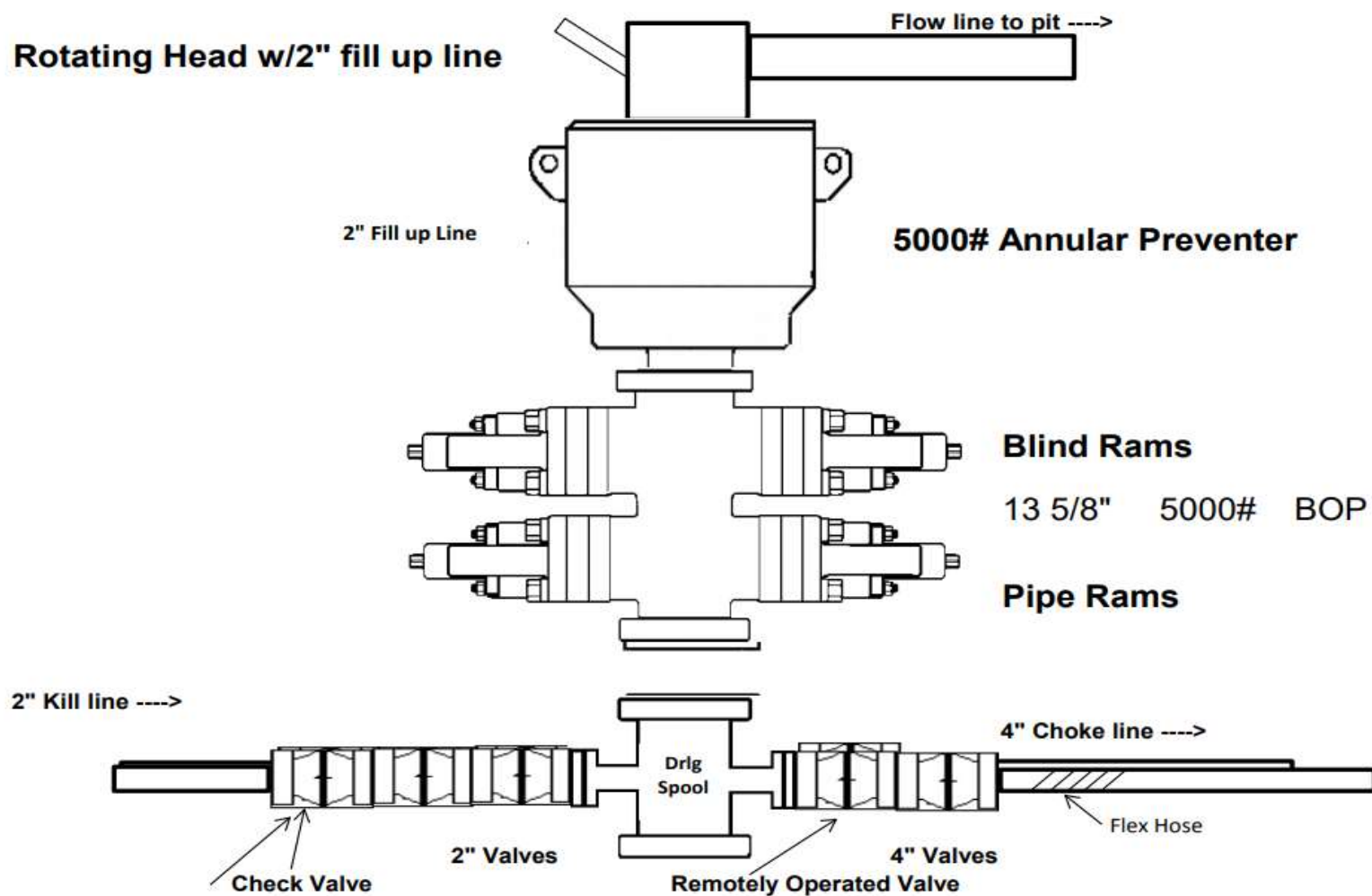
Offline Cementing Procedure Attached:



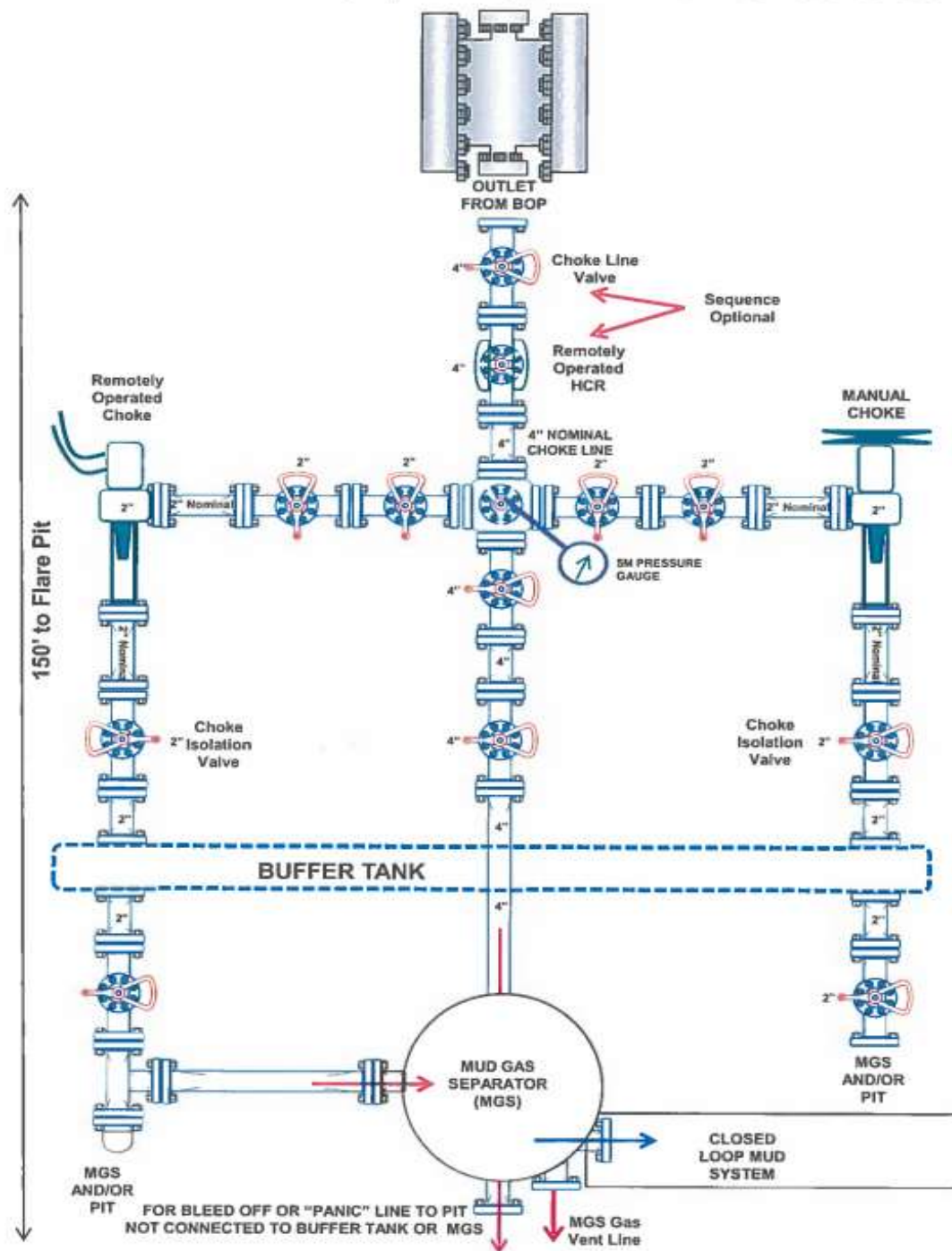
# 2M BOP



## 5,000 psi BOP Schematic



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





ContiTech

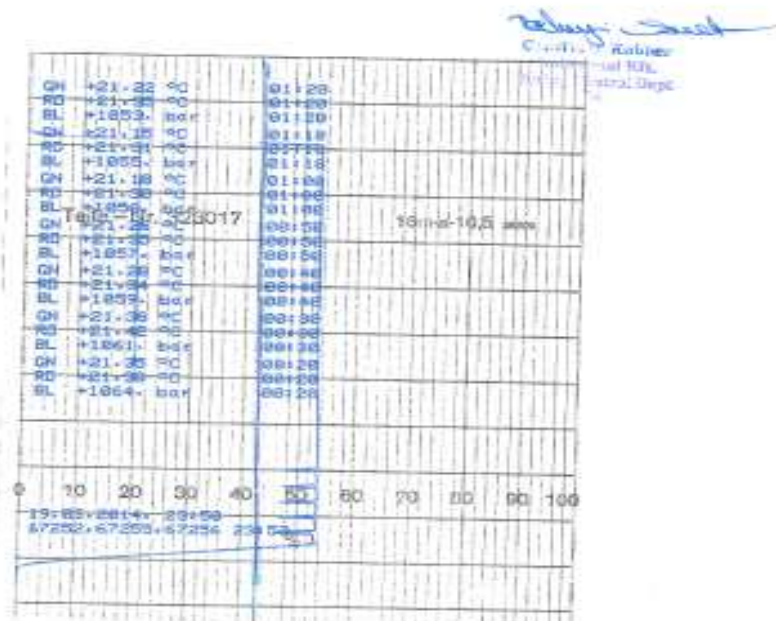
CONTITECH RUBBER Industrial Kft.	No:QC-DB- 210/ 2014 Page: 9 / 113
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<b>QUALITY CONTROL INSPECTION AND TEST CERTIFICATE</b>				CERT. N°: 504	
PURCHASER: ContiTech Oil & Marine Corp.				P.O. N°: 4500409659	
CONTITECH RUBBER order N°: 538236		HOSE TYPE: 3" ID		Choke and Kill Hose	
HOSE SERIAL N°: 67255		NOMINAL / ACTUAL LENGTH:		10,67 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 Min. → 10 mm = 20 MPa					
COUPLINGS Type		Serial N°		Quality	
3" coupling with		9251 9254		AISI 4130	
4 1/16" 10K API b.w. Flange end				AISI 4130	
				A0578N	
				035608	
<b>Not Designed For Well Testing</b>				<b>API Spec 16 C</b>	
				<b>Temperature rate: "B"</b>	
All metal parts are flawless					
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 Oil Quality Control Dept.  	

Centech Rubber Industrial Co., Ltd. (Subsidiary of 10, H-8728 Sangzi) H-6701 P.O. Box 102 Sangzi, Hangzhou  
Phone: +86 571 864 737 / Fax: +86 52 566 728 / e-mail: info@centechrubber.cn / Internet: www.centech-rubber.cn / www.centech.cn  
The Court of Hangzhou County is a Registry Court / Registry Court No: Cg.90-09-000503 / EU 107 No: H11153709  
Data Data Communications Zrt., Budapest: H-10206-26830000

ATTACHMENT OF QUALITY CONTROL INSPECTION AND TEST CERTIFICATE No: 501, 504, 505

Page: 1/1





CONTITECH RUBBER  
Industrial Kft.

No:QC-DB- 210/ 2014

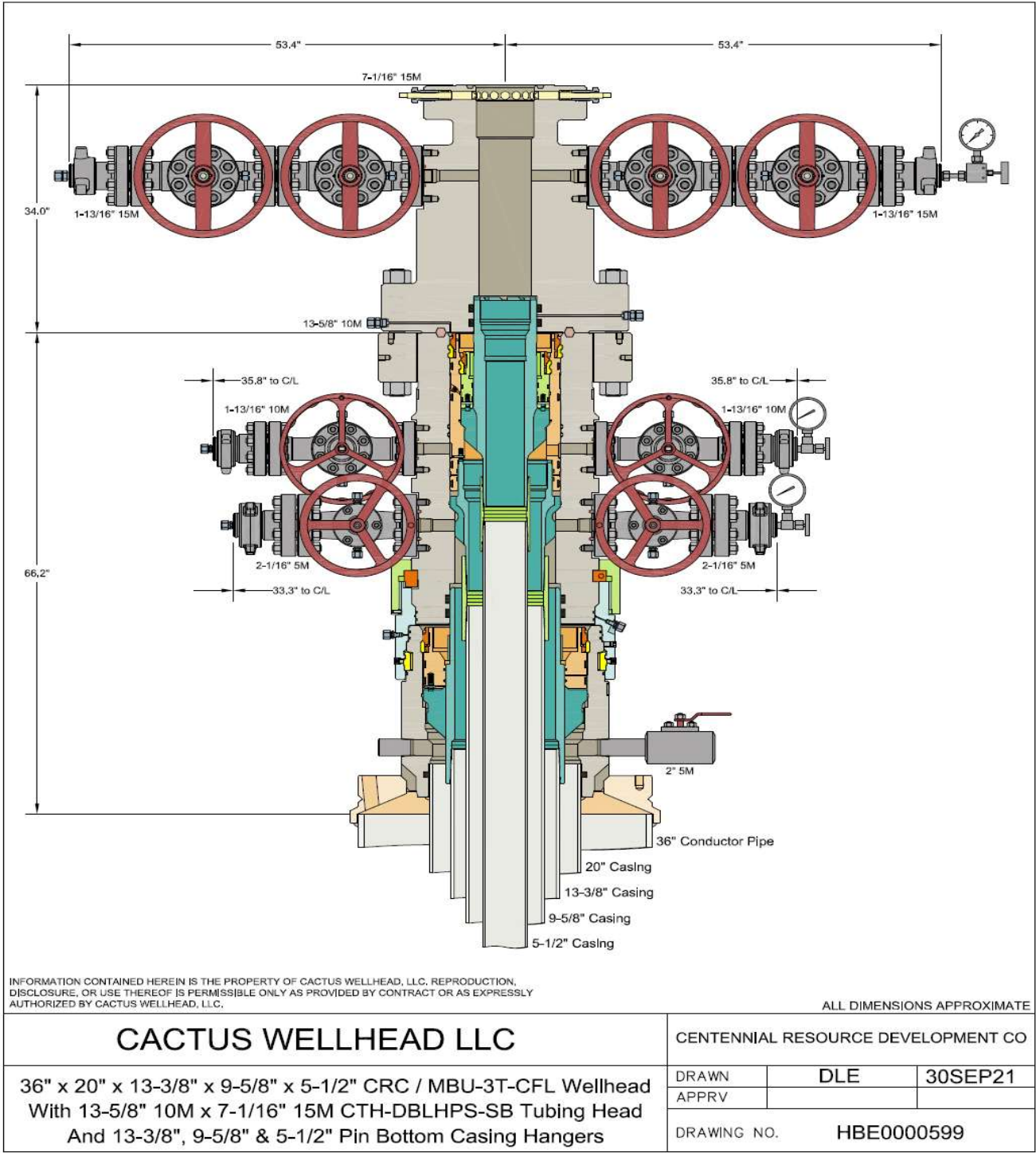
Page: 15 / 113

ContiTech

### Hose Data Sheet

CRI Order No.	538236
Customer	ContiTech Oil & Marine Corp.
Customer Order No.	4500409659
Item No.	1
Hose Type	Flexible Hose
<b>Standard</b>	<b>API SPEC 16 C</b>
Inside dia in inches	3
Length	35 ft
Type of coupling one end	FLANGE 4.1/16" 10K API SPEC 6A TYPE 6BX FLANGE C/W BX155 R.GR.SOUR
Type of coupling other end	FLANGE 4.1/16" 10K API SPEC 6A TYPE 6BX FLANGE C/W BX155 R.GR.SOUR
H2S service NACE MR0175	Yes
Working Pressure	10 000 psi
Design Pressure	10 000 psi
Test Pressure	15 000 psi
Safety Factor	2,25
Marking	USUAL PHOENIX
Cover	NOT FIRE RESISTANT
Outside protection	St. steel outer wrap
Internal stripwound tube	No
Lining	OIL + GAS RESISTANT SOUR
Safety clamp	No
Lifting collar	No
Element C	No
Safety chain	No
Safety wire rope	No
Max. design temperature [°C]	100
Min. design temperature [°C]	-20
Min. Bend Radius operating [m]	0,90
Min. Bend Radius storage [m]	0,90
Electrical continuity	The Hose is electrically continuous
Type of packing	WOODEN CRATE ISPM-15

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## 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 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 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 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 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

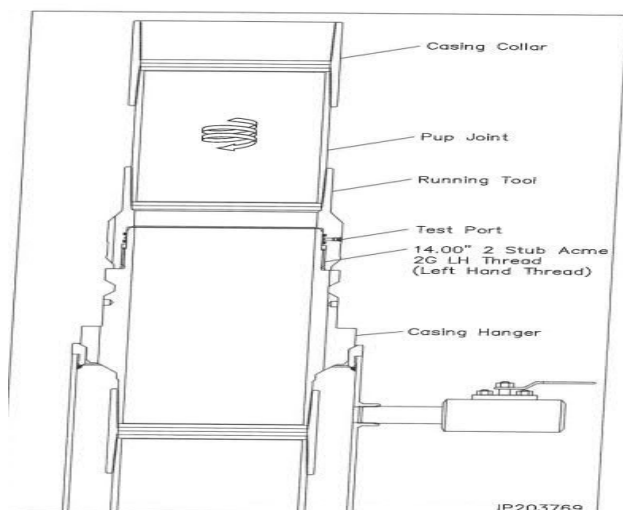
- 1) Burst Design Loads
  - a) Injection Down Casing
    - (1) Internal: Surface pressure plus injection fluid gradient.
    - (2) External: Mud base-fluid density to top of cement and cement mix water gradient (8.4 ppg) below TOC.
  - b) Casing Pressure Test (Drilling)
    - (1) Internal: Displacement 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

### Multi-Well Pad Batch Drilling & Off Line Cement Procedure

20" Surface Casing - PR intends to Batch set and offline cement all 20" casing to a depth approved in the APD. 24" Surface Holes will be batch drilled by a big 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 24" Surface hole to Approved Depth with Surface Preset Rig and perform wellbore cleanup cycles. Trip out and rack back drilling BHA.
2. Run casing with Cactus Multibowl system, with 32" baseplate supported by both 30" Conductor.
3. Circulate 1.5 csg capacity.
4. Flow test – Confirm well is static.
5. Install cap flange.
6. Skid rig to next well on pad
7. 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
8. Install offline cement tool.
9. Rig up cementers.
10. Circulate bottoms up with cement truck
11. Commence planned cement job, take returns through the annulus wellhead valve
12. After plug is bumped confirm floats hold and well is static
13. Perform green cement casing test.
  - a) Test Surface casing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst.
14. Rig down cementers and equipment
15. Install night cap with pressure gauge to monitor.

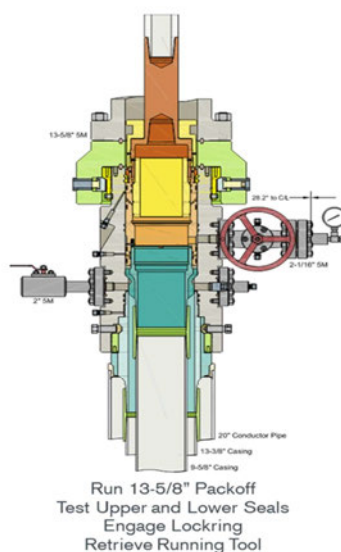
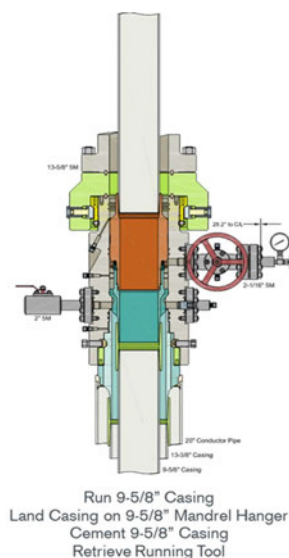


Intermediate 1 Casing – PR intends to Batch set all intermediate 1 casing strings to a depth approved in the APD, typically set into end of salts. Appropriate notifications will be made prior Testing BOPE, and prior to running/cementing all casing strings.

Rig will remove the nightcap and install and test BOPE (testing will be performed on the first intermediate 1 as per requested break testing variance).

Install wear bushing then drill out 20" shoe-track.

1. Drill 17.5" Intermediate 1 hole to approved casing point. Trip out of hole with BHA to run Casing.
2. Remove wear bushing then run and land Intermediate 13 3/8" 54.5# J-55 BTC casing with mandrel hanger in wellhead.
3. Flow test – Confirm well is static.
4. Set Annular packoff and pressure test. Test to 5k.
5. Install BPV, Nipple down BOP and install cap flange.
6. Skid rig to next well on pad
7. 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
8. Install offline cement tool.
9. Rig up cementers.
10. Circulate bottoms up with cement truck
11. Commence planned cement job, take returns through the annulus wellhead valve
12. After plug is bumped confirm floats hold and well is static
13. Perform green cement casing test.
  - a) Test casing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst.
14. Rig down cementers and equipment
15. Install night cap with pressure gauge to monitor.




Intermediate 2 Casing – PR intends to Batch set all intermediate 2 casing strings to a depth approved in the APD, typically set into Captain past losses. Appropriate notifications will be made prior Testing BOPE, and prior to running/cementing all casing strings.

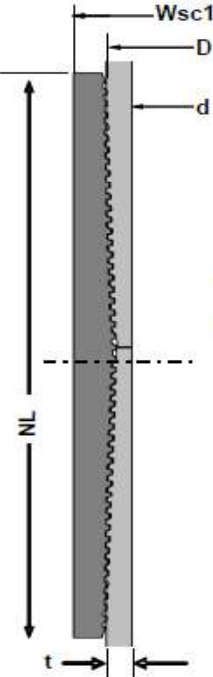
1. Rig will remove the nightcap and install and test BOPE (testing will be performed on the first intermediate 2 as per requested break testing variance).
2. Install wear bushing then drill out 13-3/8" shoe-track.
3. Drill Intermediate 12.25" hole to approved casing point. Trip out of hole with BHA to run Casing.
4. Remove wear bushing then run and land Intermediate 9.625" 40# J-55 BTC casing with mandrel hanger in wellhead.
5. Flow test – Confirm well is static.
6. Set Annular packoff and pressure test. Test to 5k.
7. Install BPV, 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. Perform green cement casing test.
  - a) Test casing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst.
16. Rig down cementers and equipment
17. Install night cap with pressure gauge to monitor.

Production Casing – PR intends to Batch set all Production casings. 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. Install wear bushing then drill Intermediate shoe-track.
3. 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 to surface with floats holding.

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

Geometry	Imperial		S.I.	
<b>Pipe Body</b>				
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
<b>Connection</b>				
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.	
<b>Performance Properties for Pipe Body</b>				
S.M.Y.S. *1	546	kips	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				
<b>Performance Properties for Connection</b>				
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. /100ft)	>90			
<b>Recommended Torque</b>				
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 use of this information is at the reader/user's risk and no warranty is implied or expressed by Metal One Corporation or its parents, subsidiaries or affiliates (herein collectively referred to as "Metal One") with respect to the use of information contained herein. The information provided on this Connection Data Sheet is for informational purposes only, and was prepared by reference to engineering information that is specific to the subject products, without regard to safety-related factors, all of which are the sole responsibility of the operators and users of the subject connectors. Metal One assumes no responsibility for any errors with respect to this information.

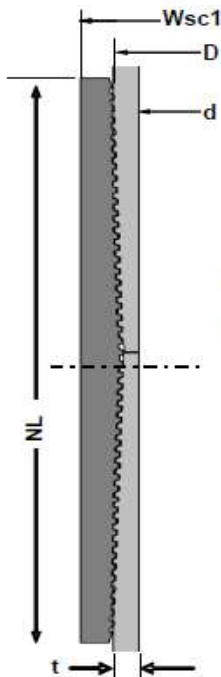
Statements regarding the suitability of products for certain types of applications are based on Metal One's knowledge of typical requirements that are often placed on Metal One products in standard well configurations. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.

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.mto.co.jp/mto-con/images/top/WebsiteTerms\\_Active\\_20233287\\_1.pdf](http://www.mto.co.jp/mto-con/images/top/WebsiteTerms_Active_20233287_1.pdf) the contents of which are incorporated by reference into this Connection Data Sheet.

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



Geometry		Imperial		S.I.	
<b>Pipe Body</b>					
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	
<b>Connection</b>					
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.	
<b>Performance Properties for Pipe Body</b>					
S.M.Y.S. *1	546	kips	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					
<b>Performance Properties for Connection</b>					
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. /100ft)	>90				
<b>Recommended Torque</b>					
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					

#### Legal Notice

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Statements regarding the suitability of products for certain types of applications are based on Metal One's knowledge of typical requirements that are often placed on Metal One products in standard well configurations. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.

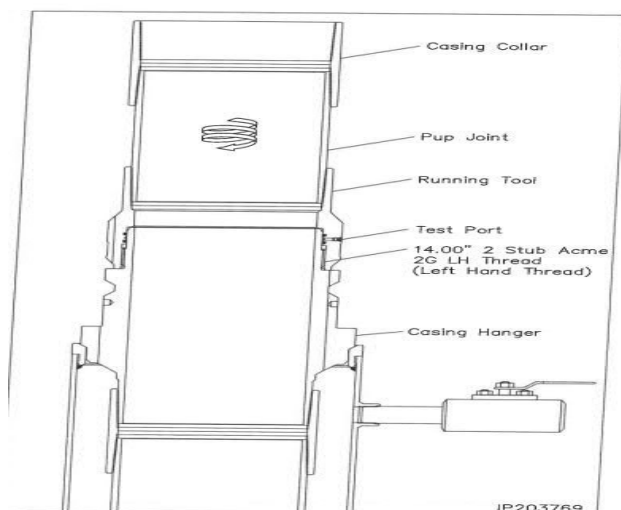
The products described in this Connection Data Sheet are not recommended for use in deep water offshore applications. For more information, please refer to [http://www.mto.co.jp/mto-con/images/top/WebsiteTerms\\_Active\\_202333287\\_1.pdf](http://www.mto.co.jp/mto-con/images/top/WebsiteTerms_Active_202333287_1.pdf) the contents of which are incorporated by reference into this Connection Data Sheet.

## Permian Resources

### Multi-Well Pad Batch Drilling & Off Line Cement Procedure

20" Surface Casing - PR intends to Batch set and offline cement all 20" casing to a depth approved in the APD. 24" Surface Holes will be batch drilled by a big 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 24" Surface hole to Approved Depth with Surface Preset Rig and perform wellbore cleanup cycles. Trip out and rack back drilling BHA.
2. Run casing with Cactus Multibowl system, with 32" baseplate supported by both 30" Conductor.
3. Circulate 1.5 csg capacity.
4. Flow test – Confirm well is static.
5. Install cap flange.
6. Skid rig to next well on pad
7. 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
8. Install offline cement tool.
9. Rig up cementers.
10. Circulate bottoms up with cement truck
11. Commence planned cement job, take returns through the annulus wellhead valve
12. After plug is bumped confirm floats hold and well is static
13. Perform green cement casing test.
  - a) Test Surface casing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst.
14. Rig down cementers and equipment
15. Install night cap with pressure gauge to monitor.

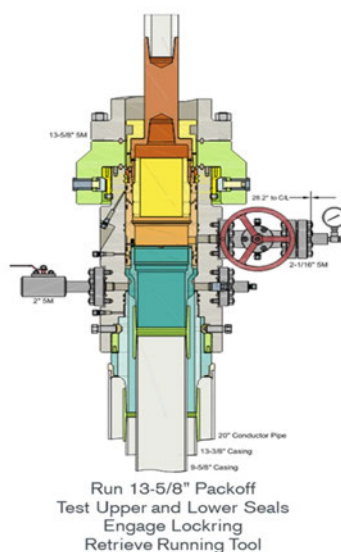
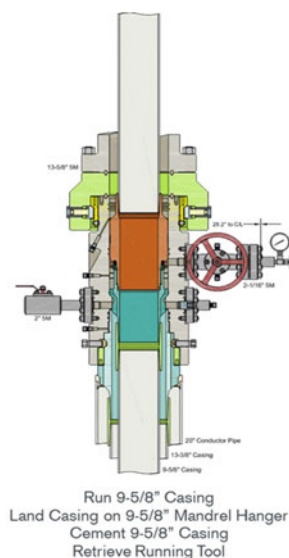


Intermediate 1 Casing – PR intends to Batch set all intermediate 1 casing strings to a depth approved in the APD, typically set into end of salts. Appropriate notifications will be made prior Testing BOPE, and prior to running/cementing all casing strings.

Rig will remove the nightcap and install and test BOPE (testing will be performed on the first intermediate 1 as per requested break testing variance).

Install wear bushing then drill out 20" shoe-track.

1. Drill 17.5" Intermediate 1 hole to approved casing point. Trip out of hole with BHA to run Casing.
2. Remove wear bushing then run and land Intermediate 13 3/8" 54.5# J-55 BTC casing with mandrel hanger in wellhead.
3. Flow test – Confirm well is static.
4. Set Annular packoff and pressure test. Test to 5k.
5. Install BPV, Nipple down BOP and install cap flange.
6. Skid rig to next well on pad
7. 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
8. Install offline cement tool.
9. Rig up cementers.
10. Circulate bottoms up with cement truck
11. Commence planned cement job, take returns through the annulus wellhead valve
12. After plug is bumped confirm floats hold and well is static
13. Perform green cement casing test.
  - a) Test casing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst.
14. Rig down cementers and equipment
15. Install night cap with pressure gauge to monitor.



Intermediate 2 Casing – PR intends to Batch set all intermediate 2 casing strings to a depth approved in the APD, typically set into Captain past losses. 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 (testing will be performed on the first intermediate 2 as per requested break testing variance).
2. Install wear bushing then drill out 13-3/8" shoe-track.
3. Drill Intermediate 12.25" hole to approved casing point. Trip out of hole with BHA to run Casing.
4. Remove wear bushing then run and land Intermediate 9.625" 40# J-55 BTC casing with mandrel hanger in wellhead.
5. Flow test – Confirm well is static.
6. Set Annular packoff and pressure test. Test to 5k.
7. Install BPV, 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. Perform green cement casing test.
  - a) Test casing (.22 psi/ft or 1500 psi whichever is greater) - not to exceed 70% casing burst.
16. Rig down cementers and equipment
17. Install night cap with pressure gauge to monitor.

Production Casing – PR intends to Batch set all Production casings. 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. Install wear bushing then drill Intermediate shoe-track.
3. 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 to surface with floats holding.

## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	Centennial Resource Production LLC
<b>WELL NAME &amp; NO.:</b>	Morbucks 25-26 Fed 133H
<b>LOCATION:</b>	Sec 25-19S-30E-NMP
<b>COUNTY:</b>	Eddy County, New Mexico ▼

COA

<b>H<sub>2</sub>S</b>	<input type="radio"/> No <span style="margin-left: 100px;"><input checked="" type="radio"/> Yes</span>			
<b>Potash / WIPP</b>	<input type="radio"/> None	<input checked="" type="radio"/> Secretary	<input type="radio"/> R-111-Q	<input type="checkbox"/> Open Annulus <input type="checkbox"/> WIPP
<b>Cave / Karst</b>	<input type="radio"/> Low	<input checked="" type="radio"/> Medium	<input type="radio"/> High	<input type="radio"/> Critical
<b>Wellhead</b>	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both	<input type="radio"/> Diverter
<b>Cementing</b>	<input type="checkbox"/> Primary Squeeze	<input type="checkbox"/> Cont. Squeeze	<input type="checkbox"/> EchoMeter	<input type="checkbox"/> DV Tool
<b>Special Req</b>	<input checked="" type="checkbox"/> Capitan Reef	<input type="checkbox"/> Water Disposal	<input type="checkbox"/> COM	<input type="checkbox"/> Unit
<b>Waste Prev.</b>	<input type="radio"/> Self-Certification	<input type="radio"/> Waste Min. Plan	<input checked="" type="radio"/> APD Submitted prior to 06/10/2024	
<b>Additional Language</b>	<input checked="" type="checkbox"/> Flex Hose	<input type="checkbox"/> Casing Clearance	<input type="checkbox"/> Pilot Hole	<input type="checkbox"/> Break Testing
	<input checked="" type="checkbox"/> Four-String	<input checked="" type="checkbox"/> Offline Cementing	<input checked="" type="checkbox"/> Fluid-Filled	

*Break testing is not approved on this well. BOP description and procedure request break testing, but the appropriate documents were not attached. Must sundry if operator wishes break testing to be approved.*

### A. HYDROGEN SULFIDE

A Hydrogen Sulfide (H<sub>2</sub>S) Drilling Plan shall be activated 500 feet prior to drilling into the **North Hackberry and Yates** formations. As a result, the Hydrogen Sulfide area must meet all requirements from 43 CFR 3176, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

### B. CASING

1. The **20** inch surface casing shall be set at approximately **410** feet (a minimum of 70 feet (Eddy County) into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface. *Set depth adjusted per BLM geologist.*
  - 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.

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

2. The minimum required fill of cement behind the **13-3/8** 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, Capitan Reef, or potash.**
  - ❖ In Medium Cave/Karst Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
  - ❖ In Capitan Reef Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
  - ❖ **Special Capitan Reef requirements.** If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:
    - Switch to freshwater mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.
    - Daily drilling reports from the Base of the Salt to the setting of the intermediate casing are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.
3. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:
  - Cement should tie-back at least **50 feet** on top of Capitan Reef top or **200 feet** into the previous casing, whichever is greater. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst, Capitan Reef, or potash.**

4. 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, Capitan Reef, or potash.**

### C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
2. Operator has proposed a multi-bowl wellhead assembly. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.
  - d. If the cement does not circulate and one-inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
  - e. Whenever any seal subject to test pressure is broken, all the tests in 43 CFR 3172 must be followed.

### D. SPECIAL REQUIREMENT(S)

#### 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)

### Contact Eddy County Petroleum Engineering Inspection Staff:

Email or call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220;

**BLM NM CFO DrillingNotifications@BLM.GOV**; (575) 361-2822

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
    - i. Notify the BLM when moving in and removing the Spudder Rig.
    - ii. 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.
    - iii. BOP/BOPE test to be conducted per **43 CFR 3172** as soon as 2<sup>nd</sup> 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. For intervals in which cement to surface is required, cement to surface should be verified with a visual check and density or pH check to differentiate cement from spacer and drilling mud. The results should be documented in the driller's log and daily reports.

### 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 of both lead and tail cement, 2) until cement has been in place at least 8 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-Q 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 3172**.
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:
  - i. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - ii. 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.
  - iii. Manufacturer representative shall install the test plug for the initial BOP test.
  - iv. Whenever any seal subject to test pressure is broken, all the tests in 43 CFR 3172.6(b)(9) must be followed.
  - v. 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.
  - i. 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).
  - ii. 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.)
- iii. 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 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 8 hours or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
  - iv. 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.
  - v. The results of the test shall be reported to the appropriate BLM office.
  - vi. 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.
  - vii. 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.
  - viii. 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 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.

# **PERMIAN**

## **R E S O U R C E S**

### **NEW MEXICO**

**(SP) EDDY**

**MORBUCKS 25-26 FED**

**MORBUCKS 25-26 FED 133H**

**OWB**

**Plan: PWP0**

### **Standard Planning Report - Geographic**

**31 May, 2023**

# PERMIAN

## RESOURCES

### Permian Resources

#### Planning Report - Geographic

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site:</b>	MORBUCKS 25-26 FED	<b>North Reference:</b>	Grid
<b>Well:</b>	MORBUCKS 25-26 FED 133H	<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		

Site		MORBUCKS 25-26 FED			
Site Position:		Northing:	592,330.20 usft	Latitude:	32° 37' 39.686 N
From:	Map	Easting:	668,073.50 usft	Longitude:	103° 55' 17.991 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.22

Well	MORBUCKS 25-26 FED 133H					
Well Position	+N/-S	0.0 usft	Northing:	592,208.50 usft	Latitude:	32° 37' 38.480 N
	+E/-W	0.0 usft	Easting:	668,124.55 usft	Longitude:	103° 55' 17.399 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	3,430.2 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 (nT)</b>
	IGRF200510	12/31/2009	7.94	60.55	48,997.02845702

<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	274.78

<b>Plan Survey Tool Program</b>	<b>Date</b>	5/31/2023		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.0	18,664.5 PWP0 (OWB)	MWD+IFR1+MS	
			OWSG_Rev2_ MWD + IFR1 +	

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	<b>TFO (°)</b>	<b>Target</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,325.0	6.50	358.10	3,324.3	18.4	-0.6	2.00	2.00	0.00	358.10	
9,360.0	6.50	358.10	9,320.5	701.2	-23.3	0.00	0.00	0.00	0.00	
10,104.7	90.00	272.80	9,790.0	777.8	-497.0	12.01	11.21	-11.45	-85.33	
10,252.8	90.00	269.84	9,790.0	781.2	-645.0	2.00	0.00	-2.00	-90.00	
18,664.7	90.00	269.84	9,790.0	757.4	-9,056.9	0.00	0.00	0.00	0.00	MORBUCKS 25-26 FI

# PERMIAN

## RESOURCES

### Permian Resources

#### Planning Report - Geographic

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site:</b>	MORBUCKS 25-26 FED	<b>North Reference:</b>	Grid
<b>Well:</b>	MORBUCKS 25-26 FED 133H	<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	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
100.0	0.00	0.00	100.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
200.0	0.00	0.00	200.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
300.0	0.00	0.00	300.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
400.0	0.00	0.00	400.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
500.0	0.00	0.00	500.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
600.0	0.00	0.00	600.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
700.0	0.00	0.00	700.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
800.0	0.00	0.00	800.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
900.0	0.00	0.00	900.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	592,208.50	668,124.55	32° 37' 38.480 N	103° 55' 17.399 W
3,100.0	2.00	358.10	3,100.0	1.7	-0.1	592,210.25	668,124.50	32° 37' 38.498 N	103° 55' 17.400 W
3,200.0	4.00	358.10	3,199.8	7.0	-0.2	592,215.48	668,124.32	32° 37' 38.549 N	103° 55' 17.402 W
3,300.0	6.00	358.10	3,299.5	15.7	-0.5	592,224.19	668,124.03	32° 37' 38.636 N	103° 55' 17.405 W
3,325.0	6.50	358.10	3,324.3	18.4	-0.6	592,226.91	668,123.94	32° 37' 38.662 N	103° 55' 17.406 W
3,400.0	6.50	358.10	3,398.8	26.9	-0.9	592,235.39	668,123.66	32° 37' 38.746 N	103° 55' 17.408 W
3,500.0	6.50	358.10	3,498.2	38.2	-1.3	592,246.71	668,123.29	32° 37' 38.858 N	103° 55' 17.412 W
3,600.0	6.50	358.10	3,597.5	49.5	-1.6	592,258.02	668,122.91	32° 37' 38.970 N	103° 55' 17.416 W
3,700.0	6.50	358.10	3,696.9	60.8	-2.0	592,269.34	668,122.54	32° 37' 39.082 N	103° 55' 17.420 W
3,800.0	6.50	358.10	3,796.2	72.1	-2.4	592,280.65	668,122.16	32° 37' 39.194 N	103° 55' 17.424 W
3,900.0	6.50	358.10	3,895.6	83.5	-2.8	592,291.96	668,121.79	32° 37' 39.306 N	103° 55' 17.428 W
4,000.0	6.50	358.10	3,995.0	94.8	-3.1	592,303.28	668,121.41	32° 37' 39.418 N	103° 55' 17.432 W
4,100.0	6.50	358.10	4,094.3	106.1	-3.5	592,314.59	668,121.04	32° 37' 39.530 N	103° 55' 17.436 W
4,200.0	6.50	358.10	4,193.7	117.4	-3.9	592,325.91	668,120.66	32° 37' 39.642 N	103° 55' 17.439 W
4,300.0	6.50	358.10	4,293.0	128.7	-4.3	592,337.22	668,120.28	32° 37' 39.754 N	103° 55' 17.443 W
4,400.0	6.50	358.10	4,392.4	140.0	-4.6	592,348.53	668,119.91	32° 37' 39.866 N	103° 55' 17.447 W
4,500.0	6.50	358.10	4,491.8	151.3	-5.0	592,359.85	668,119.53	32° 37' 39.978 N	103° 55' 17.451 W
4,600.0	6.50	358.10	4,591.1	162.7	-5.4	592,371.16	668,119.16	32° 37' 40.090 N	103° 55' 17.455 W
4,700.0	6.50	358.10	4,690.5	174.0	-5.8	592,382.48	668,118.78	32° 37' 40.202 N	103° 55' 17.459 W
4,800.0	6.50	358.10	4,789.8	185.3	-6.1	592,393.79	668,118.41	32° 37' 40.314 N	103° 55' 17.463 W
4,900.0	6.50	358.10	4,889.2	196.6	-6.5	592,405.11	668,118.03	32° 37' 40.426 N	103° 55' 17.467 W
5,000.0	6.50	358.10	4,988.5	207.9	-6.9	592,416.42	668,117.66	32° 37' 40.538 N	103° 55' 17.470 W
5,100.0	6.50	358.10	5,087.9	219.2	-7.3	592,427.73	668,117.28	32° 37' 40.650 N	103° 55' 17.474 W
5,200.0	6.50	358.10	5,187.3	230.5	-7.6	592,439.05	668,116.91	32° 37' 40.762 N	103° 55' 17.478 W
5,300.0	6.50	358.10	5,286.6	241.9	-8.0	592,450.36	668,116.53	32° 37' 40.874 N	103° 55' 17.482 W

# PERMIAN

## RESOURCES

### Permian Resources

#### Planning Report - Geographic

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site:</b>	MORBUCKS 25-26 FED	<b>North Reference:</b>	Grid
<b>Well:</b>	MORBUCKS 25-26 FED 133H	<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	
5,400.0	6.50	358.10	5,386.0	253.2	-8.4	592,461.68	668,116.16	32° 37' 40.986 N	103° 55' 17.486 W	
5,500.0	6.50	358.10	5,485.3	264.5	-8.8	592,472.99	668,115.78	32° 37' 41.098 N	103° 55' 17.490 W	
5,600.0	6.50	358.10	5,584.7	275.8	-9.1	592,484.30	668,115.41	32° 37' 41.210 N	103° 55' 17.494 W	
5,700.0	6.50	358.10	5,684.0	287.1	-9.5	592,495.62	668,115.03	32° 37' 41.322 N	103° 55' 17.498 W	
5,800.0	6.50	358.10	5,783.4	298.4	-9.9	592,506.93	668,114.66	32° 37' 41.434 N	103° 55' 17.501 W	
5,900.0	6.50	358.10	5,882.8	309.7	-10.3	592,518.25	668,114.28	32° 37' 41.546 N	103° 55' 17.505 W	
6,000.0	6.50	358.10	5,982.1	321.1	-10.7	592,529.56	668,113.90	32° 37' 41.658 N	103° 55' 17.509 W	
6,100.0	6.50	358.10	6,081.5	332.4	-11.0	592,540.87	668,113.53	32° 37' 41.770 N	103° 55' 17.513 W	
6,200.0	6.50	358.10	6,180.8	343.7	-11.4	592,552.19	668,113.15	32° 37' 41.882 N	103° 55' 17.517 W	
6,300.0	6.50	358.10	6,280.2	355.0	-11.8	592,563.50	668,112.78	32° 37' 41.994 N	103° 55' 17.521 W	
6,400.0	6.50	358.10	6,379.5	366.3	-12.2	592,574.82	668,112.40	32° 37' 42.105 N	103° 55' 17.525 W	
6,500.0	6.50	358.10	6,478.9	377.6	-12.5	592,586.13	668,112.03	32° 37' 42.217 N	103° 55' 17.529 W	
6,600.0	6.50	358.10	6,578.3	388.9	-12.9	592,597.45	668,111.65	32° 37' 42.329 N	103° 55' 17.532 W	
6,700.0	6.50	358.10	6,677.6	400.3	-13.3	592,608.76	668,111.28	32° 37' 42.441 N	103° 55' 17.536 W	
6,800.0	6.50	358.10	6,777.0	411.6	-13.7	592,620.07	668,110.90	32° 37' 42.553 N	103° 55' 17.540 W	
6,900.0	6.50	358.10	6,876.3	422.9	-14.0	592,631.39	668,110.53	32° 37' 42.665 N	103° 55' 17.544 W	
7,000.0	6.50	358.10	6,975.7	434.2	-14.4	592,642.70	668,110.15	32° 37' 42.777 N	103° 55' 17.548 W	
7,100.0	6.50	358.10	7,075.0	445.5	-14.8	592,654.02	668,109.78	32° 37' 42.889 N	103° 55' 17.552 W	
7,200.0	6.50	358.10	7,174.4	456.8	-15.2	592,665.33	668,109.40	32° 37' 43.001 N	103° 55' 17.556 W	
7,300.0	6.50	358.10	7,273.8	468.1	-15.5	592,676.64	668,109.03	32° 37' 43.113 N	103° 55' 17.560 W	
7,400.0	6.50	358.10	7,373.1	479.5	-15.9	592,687.96	668,108.65	32° 37' 43.225 N	103° 55' 17.563 W	
7,500.0	6.50	358.10	7,472.5	490.8	-16.3	592,699.27	668,108.27	32° 37' 43.337 N	103° 55' 17.567 W	
7,600.0	6.50	358.10	7,571.8	502.1	-16.7	592,710.59	668,107.90	32° 37' 43.449 N	103° 55' 17.571 W	
7,700.0	6.50	358.10	7,671.2	513.4	-17.0	592,721.90	668,107.52	32° 37' 43.561 N	103° 55' 17.575 W	
7,800.0	6.50	358.10	7,770.5	524.7	-17.4	592,733.21	668,107.15	32° 37' 43.673 N	103° 55' 17.579 W	
7,900.0	6.50	358.10	7,869.9	536.0	-17.8	592,744.53	668,106.77	32° 37' 43.785 N	103° 55' 17.583 W	
8,000.0	6.50	358.10	7,969.3	547.3	-18.2	592,755.84	668,106.40	32° 37' 43.897 N	103° 55' 17.587 W	
8,100.0	6.50	358.10	8,068.6	558.7	-18.5	592,767.16	668,106.02	32° 37' 44.009 N	103° 55' 17.591 W	
8,200.0	6.50	358.10	8,168.0	570.0	-18.9	592,778.47	668,105.65	32° 37' 44.121 N	103° 55' 17.594 W	
8,300.0	6.50	358.10	8,267.3	581.3	-19.3	592,789.78	668,105.27	32° 37' 44.233 N	103° 55' 17.598 W	
8,400.0	6.50	358.10	8,366.7	592.6	-19.7	592,801.10	668,104.90	32° 37' 44.345 N	103° 55' 17.602 W	
8,500.0	6.50	358.10	8,466.0	603.9	-20.0	592,812.41	668,104.52	32° 37' 44.457 N	103° 55' 17.606 W	
8,600.0	6.50	358.10	8,565.4	615.2	-20.4	592,823.73	668,104.15	32° 37' 44.569 N	103° 55' 17.610 W	
8,700.0	6.50	358.10	8,664.8	626.5	-20.8	592,835.04	668,103.77	32° 37' 44.681 N	103° 55' 17.614 W	
8,800.0	6.50	358.10	8,764.1	637.9	-21.2	592,846.36	668,103.40	32° 37' 44.793 N	103° 55' 17.618 W	
8,900.0	6.50	358.10	8,863.5	649.2	-21.5	592,857.67	668,103.02	32° 37' 44.905 N	103° 55' 17.622 W	
9,000.0	6.50	358.10	8,962.8	660.5	-21.9	592,868.98	668,102.64	32° 37' 45.017 N	103° 55' 17.625 W	
9,100.0	6.50	358.10	9,062.2	671.8	-22.3	592,880.30	668,102.27	32° 37' 45.129 N	103° 55' 17.629 W	
9,200.0	6.50	358.10	9,161.5	683.1	-22.7	592,891.61	668,101.89	32° 37' 45.241 N	103° 55' 17.633 W	
9,300.0	6.50	358.10	9,260.9	694.4	-23.0	592,902.93	668,101.52	32° 37' 45.353 N	103° 55' 17.637 W	
9,360.0	6.50	358.10	9,320.5	701.2	-23.3	592,909.71	668,101.29	32° 37' 45.420 N	103° 55' 17.639 W	
9,400.0	8.39	323.18	9,360.2	705.8	-25.1	592,914.31	668,099.47	32° 37' 45.465 N	103° 55' 17.661 W	
9,500.0	18.49	292.66	9,457.4	717.8	-44.2	592,926.30	668,080.40	32° 37' 45.585 N	103° 55' 17.883 W	
9,600.0	30.01	284.14	9,548.5	730.1	-83.2	592,938.56	668,041.38	32° 37' 45.708 N	103° 55' 18.339 W	
9,700.0	41.79	280.10	9,629.4	742.1	-140.4	592,950.56	667,984.12	32° 37' 45.828 N	103° 55' 19.008 W	
9,729.0	45.23	279.27	9,650.4	745.4	-160.1	592,953.91	667,964.43	32° 37' 45.862 N	103° 55' 19.238 W	
<b>MORBUCKS 25-26 FED 133H - FTP</b>										
9,800.0	53.66	277.59	9,696.5	753.3	-213.4	592,961.76	667,911.12	32° 37' 45.942 N	103° 55' 19.861 W	
9,900.0	65.57	275.76	9,747.0	763.2	-299.0	592,971.69	667,825.59	32° 37' 46.044 N	103° 55' 20.861 W	
10,000.0	77.50	274.24	9,778.6	771.4	-393.3	592,979.89	667,731.27	32° 37' 46.128 N	103° 55' 21.963 W	
10,100.0	89.43	272.86	9,790.0	777.5	-492.3	592,986.03	667,632.29	32° 37' 46.193 N	103° 55' 23.120 W	
10,104.0	89.91	272.81	9,790.0	777.7	-496.3	592,986.22	667,628.29	32° 37' 46.195 N	103° 55' 23.167 W	
<b>EOC/FTP</b>										
10,104.7	90.00	272.80	9,790.0	777.8	-497.0	592,986.26	667,627.56	32° 37' 46.195 N	103° 55' 23.176 W	

# PERMIAN

## RESOURCES

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#### Planning Report - Geographic

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<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site:</b>	MORBUCKS 25-26 FED	<b>North Reference:</b>	Grid
<b>Well:</b>	MORBUCKS 25-26 FED 133H	<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	
10,200.0	90.00	270.89	9,790.0	780.8	-592.2	592,989.33	667,532.35	32° 37' 46.229 N	103° 55' 24.289 W	
10,252.8	90.00	269.84	9,790.0	781.2	-645.0	592,989.67	667,479.51	32° 37' 46.235 N	103° 55' 24.907 W	
10,300.0	90.00	269.84	9,790.0	781.0	-692.2	592,989.53	667,432.35	32° 37' 46.235 N	103° 55' 25.458 W	
10,400.0	90.00	269.84	9,790.0	780.7	-792.2	592,989.25	667,332.35	32° 37' 46.236 N	103° 55' 26.628 W	
10,500.0	90.00	269.84	9,790.0	780.5	-892.2	592,988.97	667,232.35	32° 37' 46.237 N	103° 55' 27.797 W	
10,600.0	90.00	269.84	9,790.0	780.2	-992.2	592,988.69	667,132.35	32° 37' 46.238 N	103° 55' 28.966 W	
10,700.0	90.00	269.84	9,790.0	779.9	-1,092.2	592,988.40	667,032.35	32° 37' 46.239 N	103° 55' 30.136 W	
10,800.0	90.00	269.84	9,790.0	779.6	-1,192.2	592,988.12	666,932.35	32° 37' 46.240 N	103° 55' 31.305 W	
10,900.0	90.00	269.84	9,790.0	779.3	-1,292.2	592,987.84	666,832.35	32° 37' 46.241 N	103° 55' 32.474 W	
11,000.0	90.00	269.84	9,790.0	779.1	-1,392.2	592,987.56	666,732.35	32° 37' 46.242 N	103° 55' 33.644 W	
11,100.0	90.00	269.84	9,790.0	778.8	-1,492.2	592,987.27	666,632.35	32° 37' 46.243 N	103° 55' 34.813 W	
11,200.0	90.00	269.84	9,790.0	778.5	-1,592.2	592,986.99	666,532.35	32° 37' 46.244 N	103° 55' 35.983 W	
11,300.0	90.00	269.84	9,790.0	778.2	-1,692.2	592,986.71	666,432.35	32° 37' 46.245 N	103° 55' 37.152 W	
11,400.0	90.00	269.84	9,790.0	777.9	-1,792.2	592,986.43	666,332.35	32° 37' 46.246 N	103° 55' 38.321 W	
11,500.0	90.00	269.84	9,790.0	777.6	-1,892.2	592,986.14	666,232.36	32° 37' 46.247 N	103° 55' 39.491 W	
11,600.0	90.00	269.84	9,790.0	777.4	-1,992.2	592,985.86	666,132.36	32° 37' 46.248 N	103° 55' 40.660 W	
11,700.0	90.00	269.84	9,790.0	777.1	-2,092.2	592,985.58	666,032.36	32° 37' 46.249 N	103° 55' 41.829 W	
11,800.0	90.00	269.84	9,790.0	776.8	-2,192.2	592,985.30	665,932.36	32° 37' 46.250 N	103° 55' 42.999 W	
11,900.0	90.00	269.84	9,790.0	776.5	-2,292.2	592,985.01	665,832.36	32° 37' 46.251 N	103° 55' 44.168 W	
12,000.0	90.00	269.84	9,790.0	776.2	-2,392.2	592,984.73	665,732.36	32° 37' 46.252 N	103° 55' 45.338 W	
12,100.0	90.00	269.84	9,790.0	775.9	-2,492.2	592,984.45	665,632.36	32° 37' 46.253 N	103° 55' 46.507 W	
12,200.0	90.00	269.84	9,790.0	775.7	-2,592.2	592,984.16	665,532.36	32° 37' 46.254 N	103° 55' 47.676 W	
12,300.0	90.00	269.84	9,790.0	775.4	-2,692.2	592,983.88	665,432.36	32° 37' 46.255 N	103° 55' 48.846 W	
12,400.0	90.00	269.84	9,790.0	775.1	-2,792.2	592,983.60	665,332.36	32° 37' 46.256 N	103° 55' 50.015 W	
12,500.0	90.00	269.84	9,790.0	774.8	-2,892.2	592,983.32	665,232.36	32° 37' 46.257 N	103° 55' 51.184 W	
12,600.0	90.00	269.84	9,790.0	774.5	-2,992.2	592,983.03	665,132.36	32° 37' 46.258 N	103° 55' 52.354 W	
12,700.0	90.00	269.84	9,790.0	774.2	-3,092.2	592,982.75	665,032.36	32° 37' 46.259 N	103° 55' 53.523 W	
12,800.0	90.00	269.84	9,790.0	774.0	-3,192.2	592,982.47	664,932.36	32° 37' 46.260 N	103° 55' 54.693 W	
12,900.0	90.00	269.84	9,790.0	773.7	-3,292.2	592,982.19	664,832.36	32° 37' 46.261 N	103° 55' 55.862 W	
13,000.0	90.00	269.84	9,790.0	773.4	-3,392.2	592,981.90	664,732.36	32° 37' 46.262 N	103° 55' 57.031 W	
13,100.0	90.00	269.84	9,790.0	773.1	-3,492.2	592,981.62	664,632.36	32° 37' 46.263 N	103° 55' 58.201 W	
13,200.0	90.00	269.84	9,790.0	772.8	-3,592.2	592,981.34	664,532.36	32° 37' 46.263 N	103° 55' 59.370 W	
13,300.0	90.00	269.84	9,790.0	772.6	-3,692.2	592,981.06	664,432.36	32° 37' 46.264 N	103° 56' 0.539 W	
13,400.0	90.00	269.84	9,790.0	772.3	-3,792.2	592,980.77	664,332.36	32° 37' 46.265 N	103° 56' 1.709 W	
13,465.0	90.00	269.84	9,790.0	772.1	-3,857.2	592,980.59	664,267.36	32° 37' 46.266 N	103° 56' 2.469 W	
LPP 1										
13,500.0	90.00	269.84	9,790.0	772.0	-3,892.2	592,980.49	664,232.36	32° 37' 46.266 N	103° 56' 2.878 W	
13,600.0	90.00	269.84	9,790.0	771.7	-3,992.2	592,980.21	664,132.36	32° 37' 46.267 N	103° 56' 4.048 W	
13,700.0	90.00	269.84	9,790.0	771.4	-4,092.2	592,979.93	664,032.36	32° 37' 46.268 N	103° 56' 5.217 W	
13,800.0	90.00	269.84	9,790.0	771.1	-4,192.2	592,979.64	663,932.36	32° 37' 46.269 N	103° 56' 6.386 W	
13,900.0	90.00	269.84	9,790.0	770.9	-4,292.2	592,979.36	663,832.36	32° 37' 46.270 N	103° 56' 7.556 W	
14,000.0	90.00	269.84	9,790.0	770.6	-4,392.2	592,979.08	663,732.36	32° 37' 46.271 N	103° 56' 8.725 W	
14,100.0	90.00	269.84	9,790.0	770.3	-4,492.2	592,978.79	663,632.37	32° 37' 46.272 N	103° 56' 9.894 W	
14,200.0	90.00	269.84	9,790.0	770.0	-4,592.2	592,978.51	663,532.37	32° 37' 46.273 N	103° 56' 11.064 W	
14,300.0	90.00	269.84	9,790.0	769.7	-4,692.2	592,978.23	663,432.37	32° 37' 46.273 N	103° 56' 12.233 W	
14,400.0	90.00	269.84	9,790.0	769.4	-4,792.2	592,977.95	663,332.37	32° 37' 46.274 N	103° 56' 13.403 W	
14,500.0	90.00	269.84	9,790.0	769.2	-4,892.2	592,977.66	663,232.37	32° 37' 46.275 N	103° 56' 14.572 W	
14,600.0	90.00	269.84	9,790.0	768.9	-4,992.2	592,977.38	663,132.37	32° 37' 46.276 N	103° 56' 15.741 W	
14,700.0	90.00	269.84	9,790.0	768.6	-5,092.2	592,977.10	663,032.37	32° 37' 46.277 N	103° 56' 16.911 W	
14,800.0	90.00	269.84	9,790.0	768.3	-5,192.2	592,976.82	662,932.37	32° 37' 46.278 N	103° 56' 18.080 W	
14,900.0	90.00	269.84	9,790.0	768.0	-5,292.2	592,976.53	662,832.37	32° 37' 46.279 N	103° 56' 19.249 W	
15,000.0	90.00	269.84	9,790.0	767.7	-5,392.2	592,976.25	662,732.37	32° 37' 46.280 N	103° 56' 20.419 W	
15,100.0	90.00	269.84	9,790.0	767.5	-5,492.2	592,975.97	662,632.37	32° 37' 46.281 N	103° 56' 21.588 W	
15,200.0	90.00	269.84	9,790.0	767.2	-5,592.2	592,975.69	662,532.37	32° 37' 46.281 N	103° 56' 22.758 W	

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## RESOURCES

### Permian Resources

#### Planning Report - Geographic

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site:</b>	MORBUCKS 25-26 FED	<b>North Reference:</b>	Grid
<b>Well:</b>	MORBUCKS 25-26 FED 133H	<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	
15,300.0	90.00	269.84	9,790.0	766.9	-5,692.2	592,975.40	662,432.37	32° 37' 46.282 N	103° 56' 23.927 W	
15,400.0	90.00	269.84	9,790.0	766.6	-5,792.2	592,975.12	662,332.37	32° 37' 46.283 N	103° 56' 25.096 W	
15,500.0	90.00	269.84	9,790.0	766.3	-5,892.2	592,974.84	662,232.37	32° 37' 46.284 N	103° 56' 26.266 W	
15,600.0	90.00	269.84	9,790.0	766.1	-5,992.2	592,974.56	662,132.37	32° 37' 46.285 N	103° 56' 27.435 W	
15,700.0	90.00	269.84	9,790.0	765.8	-6,092.2	592,974.27	662,032.37	32° 37' 46.286 N	103° 56' 28.604 W	
15,800.0	90.00	269.84	9,790.0	765.5	-6,192.2	592,973.99	661,932.37	32° 37' 46.287 N	103° 56' 29.774 W	
15,900.0	90.00	269.84	9,790.0	765.2	-6,292.2	592,973.71	661,832.37	32° 37' 46.287 N	103° 56' 30.943 W	
16,000.0	90.00	269.84	9,790.0	764.9	-6,392.2	592,973.42	661,732.37	32° 37' 46.288 N	103° 56' 32.113 W	
16,100.0	90.00	269.84	9,790.0	764.6	-6,492.2	592,973.14	661,632.37	32° 37' 46.289 N	103° 56' 33.282 W	
16,103.0	90.00	269.84	9,790.0	764.6	-6,495.2	592,973.13	661,629.37	32° 37' 46.289 N	103° 56' 33.317 W	
LPP 2										
16,200.0	90.00	269.84	9,790.0	764.4	-6,592.2	592,972.86	661,532.37	32° 37' 46.290 N	103° 56' 34.451 W	
16,300.0	90.00	269.84	9,790.0	764.1	-6,692.2	592,972.58	661,432.37	32° 37' 46.291 N	103° 56' 35.621 W	
16,400.0	90.00	269.84	9,790.0	763.8	-6,792.2	592,972.29	661,332.37	32° 37' 46.292 N	103° 56' 36.790 W	
16,500.0	90.00	269.84	9,790.0	763.5	-6,892.2	592,972.01	661,232.37	32° 37' 46.292 N	103° 56' 37.959 W	
16,600.0	90.00	269.84	9,790.0	763.2	-6,992.2	592,971.73	661,132.38	32° 37' 46.293 N	103° 56' 39.129 W	
16,700.0	90.00	269.84	9,790.0	762.9	-7,092.2	592,971.45	661,032.38	32° 37' 46.294 N	103° 56' 40.298 W	
16,800.0	90.00	269.84	9,790.0	762.7	-7,192.2	592,971.16	660,932.38	32° 37' 46.295 N	103° 56' 41.468 W	
16,900.0	90.00	269.84	9,790.0	762.4	-7,292.2	592,970.88	660,832.38	32° 37' 46.296 N	103° 56' 42.637 W	
17,000.0	90.00	269.84	9,790.0	762.1	-7,392.2	592,970.60	660,732.38	32° 37' 46.297 N	103° 56' 43.806 W	
17,100.0	90.00	269.84	9,790.0	761.8	-7,492.2	592,970.32	660,632.38	32° 37' 46.297 N	103° 56' 44.976 W	
17,200.0	90.00	269.84	9,790.0	761.5	-7,592.2	592,970.03	660,532.38	32° 37' 46.298 N	103° 56' 46.145 W	
17,300.0	90.00	269.84	9,790.0	761.2	-7,692.2	592,969.75	660,432.38	32° 37' 46.299 N	103° 56' 47.314 W	
17,400.0	90.00	269.84	9,790.0	761.0	-7,792.2	592,969.47	660,332.38	32° 37' 46.300 N	103° 56' 48.484 W	
17,500.0	90.00	269.84	9,790.0	760.7	-7,892.2	592,969.19	660,232.38	32° 37' 46.301 N	103° 56' 49.653 W	
17,600.0	90.00	269.84	9,790.0	760.4	-7,992.2	592,968.90	660,132.38	32° 37' 46.301 N	103° 56' 50.823 W	
17,700.0	90.00	269.84	9,790.0	760.1	-8,092.2	592,968.62	660,032.38	32° 37' 46.302 N	103° 56' 51.992 W	
17,800.0	90.00	269.84	9,790.0	759.8	-8,192.2	592,968.34	659,932.38	32° 37' 46.303 N	103° 56' 53.161 W	
17,900.0	90.00	269.84	9,790.0	759.6	-8,292.2	592,968.05	659,832.38	32° 37' 46.304 N	103° 56' 54.331 W	
18,000.0	90.00	269.84	9,790.0	759.3	-8,392.2	592,967.77	659,732.38	32° 37' 46.305 N	103° 56' 55.500 W	
18,100.0	90.00	269.84	9,790.0	759.0	-8,492.2	592,967.49	659,632.38	32° 37' 46.305 N	103° 56' 56.669 W	
18,200.0	90.00	269.84	9,790.0	758.7	-8,592.2	592,967.21	659,532.38	32° 37' 46.306 N	103° 56' 57.839 W	
18,300.0	90.00	269.84	9,790.0	758.4	-8,692.2	592,966.92	659,432.38	32° 37' 46.307 N	103° 56' 59.008 W	
18,400.0	90.00	269.84	9,790.0	758.1	-8,792.2	592,966.64	659,332.38	32° 37' 46.308 N	103° 57' 0.178 W	
18,500.0	90.00	269.84	9,790.0	757.9	-8,892.2	592,966.36	659,232.38	32° 37' 46.308 N	103° 57' 1.347 W	
18,600.0	90.00	269.84	9,790.0	757.6	-8,992.2	592,966.08	659,132.38	32° 37' 46.309 N	103° 57' 2.516 W	
18,664.7	90.00	269.84	9,790.0	757.4	-9,056.9	592,965.89	659,067.68	32° 37' 46.310 N	103° 57' 3.273 W	
LTP/BHL - MORBUCKS 25-26 FED 133H - LTP/BHL										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
MORBUCKS 25-26 FED	0.00	0.00	9,790.0	783.2	-25.9	592,991.66	668,098.61	32° 37' 46.231 N	103° 55' 17.667 W	
- plan misses target center by 197.3usft at 9729.0usft MD (9650.4 TVD, 745.4 N, -160.1 E)										
- Point										
MORBUCKS 25-26 FED	0.00	0.00	9,790.0	757.4	-9,056.9	592,965.89	659,067.66	32° 37' 46.310 N	103° 57' 3.273 W	
- plan hits target center										
- Point										

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RESOURCES

**Permian Resources**  
Planning Report - Geographic

<b>Database:</b>	Compass	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Company:</b>	NEW MEXICO	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Project:</b>	(SP) EDDY	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site:</b>	MORBUCKS 25-26 FED	<b>North Reference:</b>	Grid
<b>Well:</b>	MORBUCKS 25-26 FED 133H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PWP0		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
10,104.0	9,790.0	777.7	-496.3	EOC/FTP	
13,465.0	9,790.0	772.1	-3,857.2	LPP 1	
16,103.0	9,790.0	764.6	-6,495.2	LPP 2	
18,664.7	9,790.0	757.4	-9,056.9	LTP/BHL	

# **PERMIAN**

## **R E S O U R C E S**

### **NEW MEXICO**

**(SP) EDDY**

**MORBUCKS 25-26 FED**

**MORBUCKS 25-26 FED 133H**

**OWB**

**PWP0**

## **Anticollision Summary Report**

**31 May, 2023**

# PERMIAN

## RESOURCES

### Permian Resources

#### Anticollision Summary Report

<b>Company:</b>	NEW MEXICO	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Project:</b>	(SP) EDDY	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Reference Site:</b>	MORBUCKS 25-26 FED	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	MORBUCKS 25-26 FED 133H	<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

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

<b>Survey Tool Program</b>	<b>Date</b>	5/31/2023		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	18,664.5	PWP0 (OWB)	MWD+IFR1+MS	OWSG_Rev2_ MWD + IFR1 + Multi-Station Correction

<b>Summary</b>						
<b>Site Name</b>	<b>Reference Measured Depth (usft)</b>	<b>Offset Measured Depth (usft)</b>	<b>Distance Between Centres (usft)</b>	<b>Distance Between Ellipses (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>
<b>Offset Well - Wellbore - Design</b>						
MORBUCKS 25-26 FED						
MORBUCKS 25-26 FED 113H - OWB - PWP0	2,000.0	1,997.7	132.0	117.6	9.209	CC, ES
MORBUCKS 25-26 FED 113H - OWB - PWP0	7,600.0	7,575.0	188.9	134.2	3.453	SF
MORBUCKS 25-26 FED 114H - OWB - PWP0	3,028.6	3,031.3	35.9	14.4	1.670	CC, ES, SF
MORBUCKS 25-26 FED 123H - OWB - PWP0	2,500.0	2,499.2	66.0	48.1	3.682	CC
MORBUCKS 25-26 FED 123H - OWB - PWP0	8,417.5	8,406.7	68.9	8.2	1.134	Level 3, ES, SF
MORBUCKS 25-26 FED 124H - OWB - PWP0	2,970.2	2,971.6	13.2	-7.9	0.626	Level 3, CC, ES, SF
MORBUCKS 25-26 FED 134H - OWB - PWP0	2,902.1	2,932.5	33.0	12.1	1.578	CC
MORBUCKS 25-26 FED 134H - OWB - PWP0	3,000.0	3,030.1	33.1	11.5	1.534	ES, SF

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

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## RESOURCES

### Permian Resources

#### Anticollision Summary Report

<b>Company:</b>	NEW MEXICO	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Project:</b>	(SP) EDDY	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Reference Site:</b>	MORBUCKS 25-26 FED	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	MORBUCKS 25-26 FED 133H	<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

Reference Depths are relative to GL @ 3430.2usft

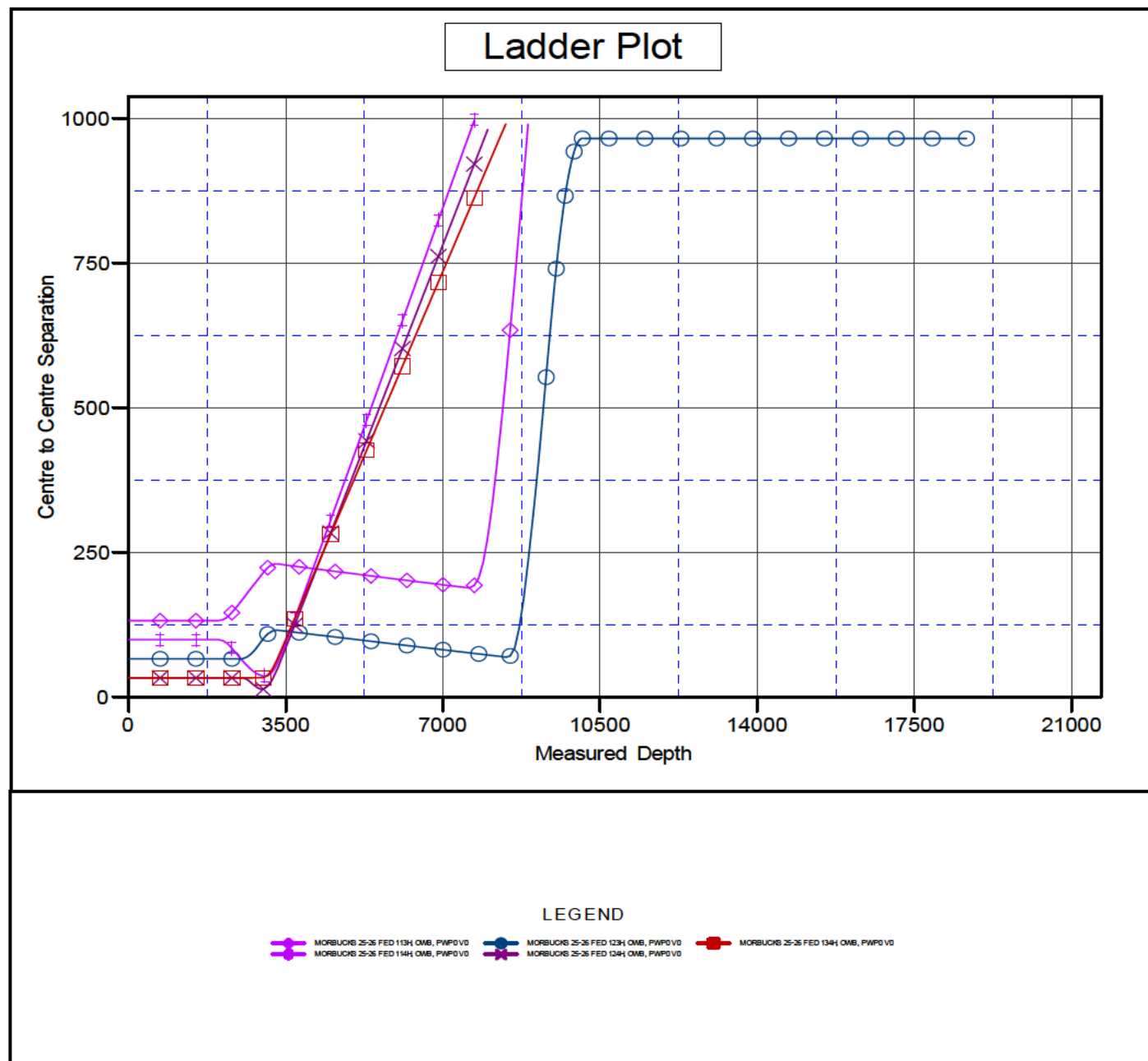
Offset Depths are relative to Offset Datum

Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: MORBUCKS 25-26 FED 133H

Coordinate System is US State Plane 1983, New Mexico Eastern Zone

Grid Convergence at Surface is: 0.22°



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

# PERMIAN

## RESOURCES

### Permian Resources

#### Anticollision Summary Report

<b>Company:</b>	NEW MEXICO	<b>Local Co-ordinate Reference:</b>	Well MORBUCKS 25-26 FED 133H
<b>Project:</b>	(SP) EDDY	<b>TVD Reference:</b>	GL @ 3430.2usft
<b>Reference Site:</b>	MORBUCKS 25-26 FED	<b>MD Reference:</b>	GL @ 3430.2usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	MORBUCKS 25-26 FED 133H	<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

Reference Depths are relative to GL @ 3430.2usft

Offset Depths are relative to Offset Datum

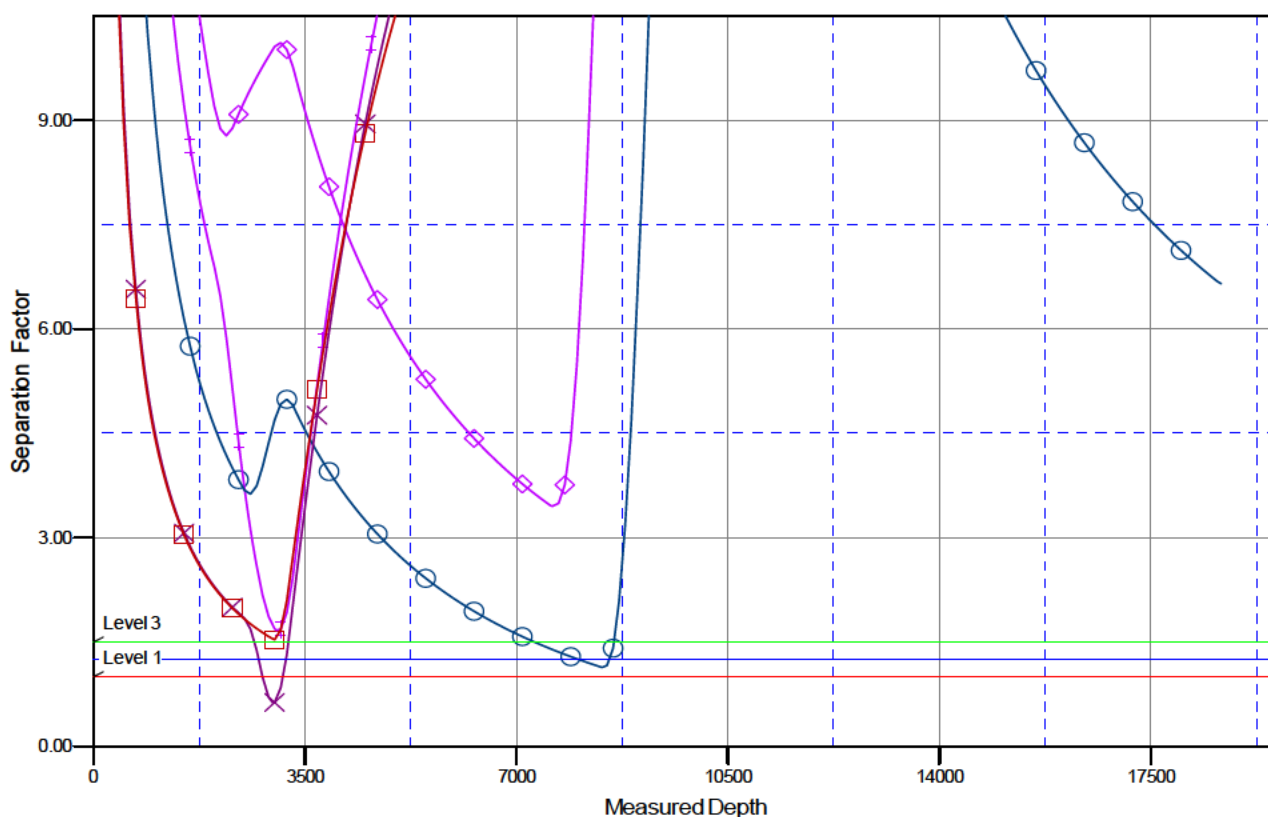
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: MORBUCKS 25-26 FED 133H

Coordinate System is US State Plane 1983, New Mexico Eastern Zone

Grid Convergence at Surface is: 0.22°

## Separation Factor Plot



### LEGEND

MORBUCKS 25-26 FED 113H OMB, PWP0 V0  
 MORBUCKS 25-26 FED 123H OMB, PWP0 V0  
 MORBUCKS 25-26 FED 134H OMB, PWP0 V0

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

# **PERMIAN**

## **R E S O U R C E S**

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

**FOR**

**Permian Resources Corporation**

**Morbucks 25-26 Fed 113H, 114H, 123H, 124H, 133H, 134H**

**Ace 25-30 Fed 113H, 114H, 123H, 124H**

**Eddy County, New Mexico**

**06-06-2023**

**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

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both to employees, the general public, and emergency responders. These specific hazardous conditions are identified in the tables below.

H <sub>2</sub> S OPERATING CONDITIONS – RESPONSE ACTIONS TO CONSIDER		✓
<b>H<sub>2</sub>S CONDITION 1: POTENTIAL DANGER TO LIFE AND HEALTH → WARNING SIGN GREEN</b>		
<b>H<sub>2</sub>S concentration</b> <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>		
<b>H<sub>2</sub>S concentration</b> >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><u>If trained and safe to do so</u></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> )		<input type="checkbox"/>
If off-site impact; notify any neighbors within Radius of Exposure ( <b>ROE</b> ), <b>Fig 5.11</b>		
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"/>

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IF ABOVE ACTIONS CANNOT BE ACCOMPLISHED IN TIME TO PREVENT EXPOSURE TO THE PUBLIC	
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

EMERGENCY CONTACT LIST				
PERMIAN RESOURCES CORPORATION.				
POSITION	NAME	OFFICE	CELL	ALT PHONE
Operations				
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 Hise	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	
HSE & Regulatory				
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	
Local, State, & Federal Agencies				
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.

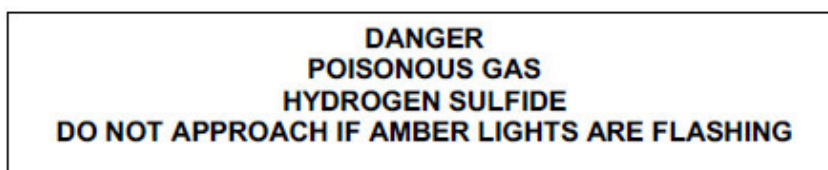
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2. Wind Indicators

- 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.



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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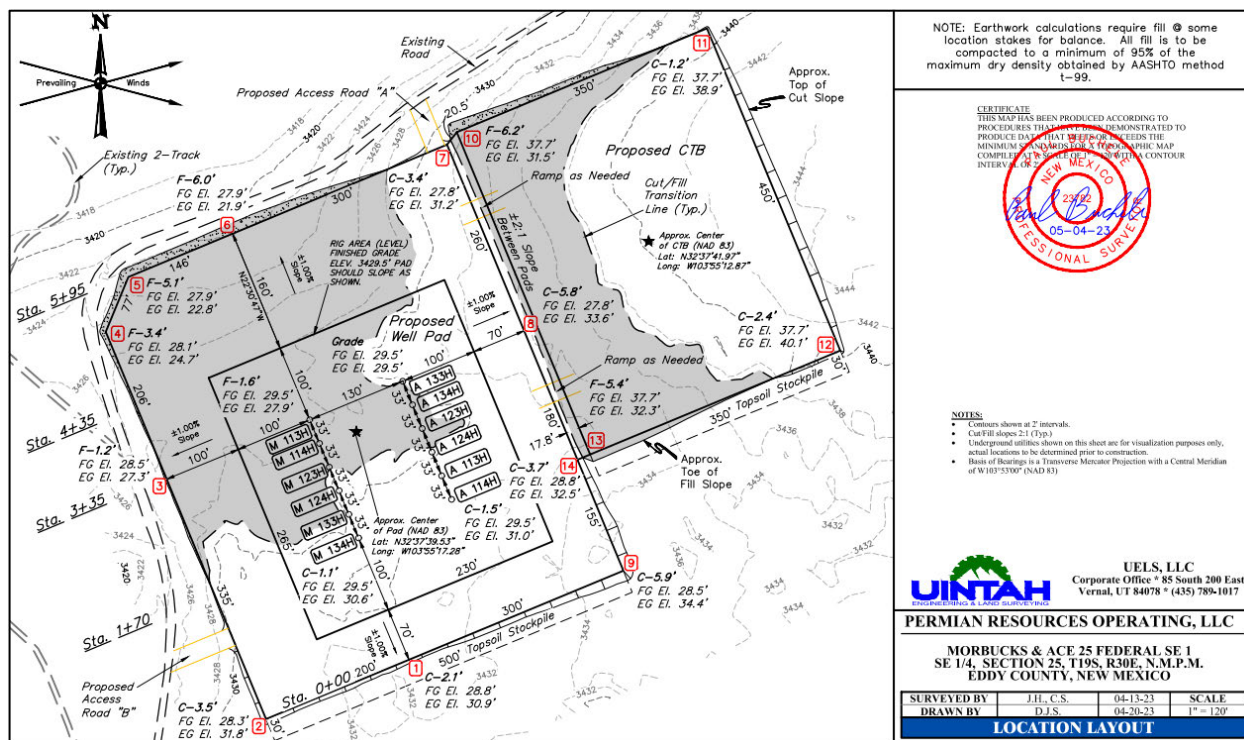
**II. Directions to Location**

BEGINNING AT THE INTERSECTION OF U.S. HIGHWAY 82 AND MALJAMAR ROAD IN MALJAMAR, NEW MEXICO PROCEED IN A WESTERLY DIRECTION ALONG U.S. 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, THEN WESTERLY DIRECTION APPROXIMATELY 16.7 MILES TO THE JUNCTION OF THIS ROAD AND AN EXISTING ROAD TO THE NORTH; TURN RIGHT AND PROCEED IN A NORTHERLY DIRECTION APPROXIMATELY 1.1 MILES TO THE BEGINNING OF THE PROPOSED ACCESS ROAD "A" TO THE EAST; FOLLOW ROAD FLAGS IN AN EASTERLY DIRECTION APPROXIMATELY 83' TO THE PROPOSED LOCATION.

TOTAL DISTANCE FROM THE INTERSECTION OF U.S. HIGHWAY 82 AND MALJAMAR ROAD IN MALJAMAR, NEW MEXICO TO THE PROPOSED WELL LOCATION IS APPROXIMATELY 25.8 MILES.

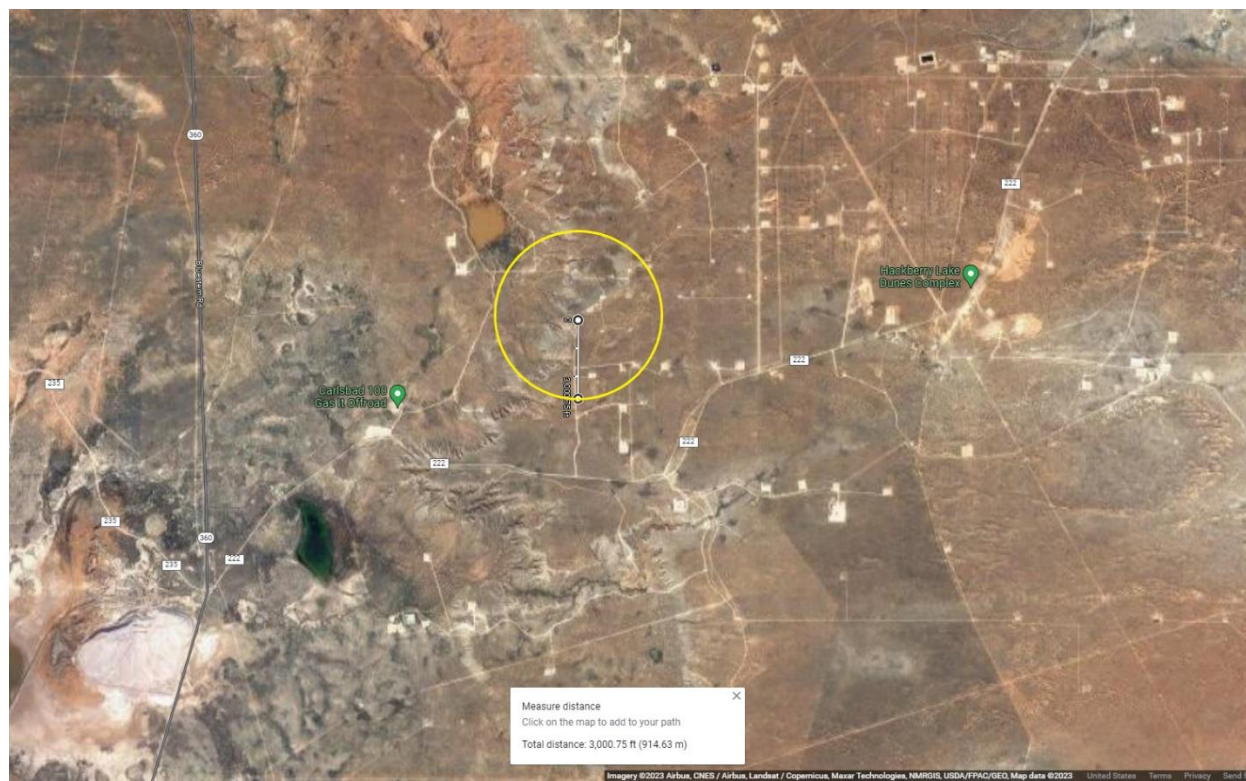
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Plat of Location





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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

1500

Enter Gas flow in mcf/day (maximum worst case conditions)

2500

500 ppm radius of exposure (public road)

**105** feet

300 ppm radius of exposure

**146** feet

100 ppm radius of exposure (public area)

**230** feet

- Location NAD 83 GPS Coordinates **Lat: 32.627691, Long: -103.921664**

**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 1.2 miles from the location.

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## 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

**Table 7.1. Hazards & Toxicity**

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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
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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). 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**:

$$x = [(1.589) (\text{mole fraction H}_2\text{S})(Q)]^{(.6258)}$$

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

$$x = [(0.4546) (\text{mole fraction H}_2\text{S})(Q)]^{(.6258)}$$

**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

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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.

- 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.

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- 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).
- 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.

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- 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.
- 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.

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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 L5B 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 / Sulfureted 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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#### 5.3. Specific hazards arising from the hazardous product

- Fire hazard : **EXTREMELY FLAMMABLE GAS.** 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 : **EXTREMELY FLAMMABLE GAS.** 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.

#### 5.4. Special protective equipment and precautions for fire-fighters

- Firefighting instructions : **DANGER! Toxic, flammable liquefied gas**
- 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

#### 6.1. Personal precautions, protective equipment and emergency procedures

- General measures : **DANGER! Toxic, flammable liquefied gas .** 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.

#### 6.2. Methods and materials for containment and cleaning up

- 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.

#### 6.3. Reference to other sections

For further information refer to section 8: Exposure controls/personal protection

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

- 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 55, 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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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> )	15 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 transfilling 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 transfilling 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	: 1880 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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## Hydrogen sulfide

### Safety Data Sheet E-4611

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979

Revision date: 08-10-2016

Supersedes: 10-15-2013

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

Hydrogen sulfide ( f )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 ppmv/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: Pimephales 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 : Forbidden  
 Carrying Railway Vehicle Index

##### 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 (Australian Inventory of Chemical Substances)  
 Listed on IECSC (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  
 Supersedes : 15/10/2013

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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## Hydrogen sulfide

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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

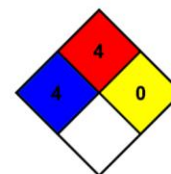
: 4 - Very short exposure could cause death or serious residual injury even though prompt medical attention was given.

#### 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.



#### HMIS 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 IA)

##### 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



## 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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## 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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## Safety Data Sheet

Material Name: SULFUR DIOXIDE

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### 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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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

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**Safety Data Sheet****Material Name: SULFUR DIOXIDE****SDS ID: MAT22290**

<b>Water Solubility</b>	22.8 % (@ 0 °C )	<b>Partition coefficient: n-octanol/water</b>	Not available
<b>Viscosity</b>	Not available	<b>Kinematic viscosity</b>	Not available
<b>Solubility (Other)</b>	Not available	<b>Density</b>	Not available
<b>Physical Form</b>	liquified gas	<b>Molecular Formula</b>	S-O <sub>2</sub>
<b>Molecular Weight</b>	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 LOLI 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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**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.

<b>Sulfur dioxide</b>	<b>7446-09-5</b>
<b>SARA 302:</b>	500 lb TPQ
<b>OSHA (safety):</b>	1000 lb TQ (Liquid )
<b>SARA 304:</b>	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
<b>Sulfur dioxide</b>	<b>7446-09-5</b>	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).

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**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 KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	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 KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI 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;

Permian Resources Corporation	H <sub>2</sub> S Contingency Plan Morbucks 25-26 Fed 113H, 114H, 123H, 124H, 133H, 134H Ace 25-30 Fed 113H, 114H, 123H, 124H	Eddy County, New Mexico
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**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC**Well Name:** MORBUCKS 25-26 FED**Well Number:** 133H

or contaminant that is listed as hazardous under the CERCLA of 1980, as amended, 42 U.S.C 9601 et seq., and its regulation. The definition of hazardous substances under CERCLA includes any hazardous waste as defined in the RCRA of 1976, as amended, 42 U.S.C. 6901 et seq., and its regulations. The term hazardous material also includes any nuclear or nuclear by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.C.S. 2011 et seq. The term does not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a hazardous substance under CERCLA Section 101 (14) U.S.C. 9601 (14) nor does the term include natural gas. iii. No hazardous substances or wastes will be stored on the location after completion of the well. iv. Chemicals brought to location will be on the Toxic Substance Control Act (TSCA) approved inventory list. v. All undesirable events (fires, accidents, blowouts, spills, discharges) as specified in Notice to Lessees (NTL) 3A will be reported to the BLM Carlsbad Field Office. Major events will be reported verbally within 24 hours, followed by a written report within 15 days. Other than Major Events will be reported in writing within 15 days.

**Safe containmant attachment:****Waste disposal type:** HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL**Disposal type description:**

**Disposal location description:** Hazardous Materials. i. All drilling wastes identified as hazardous substances by the Comprehensive Environmental Response Compensation Liability Act (CERCLA) removed from the location, and not reused at another drilling location, will be disposed of at a hazardous waste facility approved by the U.S. Environmental Protection Agency (EPA). ii. Permian Resources, LLC and its contractors will comply with all applicable Federal, State and local laws and regulations, existing or hereafter enacted/promulgated, with regard to any hazardous material, as defined in this paragraph, that will be used, produced, transported or stored on the oil and gas lease. Hazardous material means any substance, pollutant or contaminant that is listed as hazardous under the CERCLA of 1980, as amended, 42 U.S.C 9601 et seq., and its regulation. The definition of hazardous substances under CERCLA includes any hazardous waste as defined in the RCRA of 1976, as amended, 42 U.S.C. 6901 et seq., and its regulations. The term hazardous material also includes any nuclear or nuclear by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.C.S. 2011 et seq. The term does not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a hazardous substance under CERCLA Section 101 (14) U.S.C. 9601 (14) nor does the term include natural gas. iii. No hazardous substances or wastes will be stored on the location after completion of the well. iv. Chemicals brought to location will be on the Toxic Substance Control Act (TSCA) approved inventory list. v. All undesirable events (fires, accidents, blowouts, spills, discharges) as specified in Notice to Lessees (NTL) 3A will be reported to the BLM Carlsbad Field Office. Major events will be reported verbally within 24 hours, followed by a written report within 15 days. Other than Major Events will be reported in writing within 15 days.

**Reserve Pit****Reserve Pit being used?** NO**Temporary disposal of produced water into reserve pit?** NO**Reserve pit length (ft.)****Reserve pit width (ft.)****Reserve pit depth (ft.)****Reserve pit volume (cu. yd.)****Is at least 50% of the reserve pit in cut?****Reserve pit liner****Reserve pit liner specifications and installation description****Cuttings Area****Cuttings Area being used?** NO

**Operator Name:** CENTENNIAL RESOURCE PRODUCTION LLC**Well Name:** MORBUCKS 25-26 FED**Well Number:** 133H**Are you storing cuttings on location?** Y

**Description of cuttings location** The well will be drilled utilizing a closed-loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to a New Mexico Oil Conservation Division (NMOCD) approved disposal site.

**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\_MA\_Well\_Site\_Layout\_20230718100427.pdf

**Comments:** A. Rig Plat Diagrams: There is one (1) multi-well pad requested for the Ace-Morbucks anticipated project. This will allow enough space for cuts and fills, topsoil storage, and storm water control. Interim reclamation of these pads is anticipated after the drilling and completion of all wells on the pad. The well site layout for all pads is attached.: 1. Pad 1: 500ft x625ft (7.17Acres). This total includes topsoil storage, as depicted on the plat. B. Closed-Loop System: There will be no reserve pit as each well will be drilled utilizing a closed loop mud system. The closed loop system will meet the NMOCD requirements 19.15.17. C. V-Door Orientation: The pad was staked with a Northwest v-door orientation in accordance to the staked section and as agreed upon with Keely wetland, BLM Natural Resource Specialist, present at on-site inspection. D. All equipment and vehicles will be confined to the approved disturbed areas of this APD (i.e., access road, well pad and topsoil storage areas).

## Section 10 - Plans for Surface Reclamation

**Type of disturbance:** New Surface Disturbance**Multiple Well Pad Name:** MORBUCKS & ACE 25 SESE**Multiple Well Pad Number:** 1**Recontouring**

10a\_MA\_Interim\_Reclamation\_20230718100444.pdf

10b\_MA\_Recontour\_Plats\_20230718100444.pdf

**Drainage/Erosion control construction:** Erosion features are equal to or less than surrounding area and erosion control is sufficient so that water naturally infiltrates into the soil and gulying, headcutting, slumping, and deep or excessive rills (greater than 3 inches) are not observed.

**Drainage/Erosion control reclamation:** A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community will be established on the site with a density sufficient to control erosion and invasion by non-native plants and to re-establish wildlife habitat or forage production. At a minimum, the

Sante Fe Main Office  
Phone: (505) 476-3441

General Information  
Phone: (505) 629-6116

Online Phone Directory  
<https://www.emnrd.nm.gov/oed/contact-us>

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

CONDITIONS

Action 446539

**CONDITIONS**

Operator: Permian Resources Operating, LLC 300 N. Marienfeld St Ste 1000 Midland, TX 79701	OGRID: 372165
	Action Number: 446539
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

**CONDITIONS**

Created By	Condition	Condition Date
clevans	Cement is required to circulate on both surface and intermediate1 strings of casing.	3/28/2025
clevans	If cement does not circulate on any string, a Cement Bond Log (CBL) is required for that string of casing.	3/28/2025
ward.rikala	Notify the OCD 24 hours prior to casing & cement.	4/15/2025
ward.rikala	File As Drilled C-102 and a directional Survey with C-104 completion packet.	4/15/2025
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.	4/15/2025
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.	4/15/2025
ward.rikala	This well is within the Capitan Reef. The first intermediate casing string shall be set and cemented back to surface immediately above the Capitan Reef. The second intermediate string shall be set and cemented back to surface immediately below the base of the Capitan Reef.	4/15/2025