District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

Form C-101
August 1, 2011

Permit 366960

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

1. Operator Name and Address	2. OGRID Number
Permian Resources Operating, LLC 300 N. Marienfeld St Ste 1000 Midland, TX 79701	372165
	3. API Number 30-015-55207

4. Property Code	5. Property Name	6. Well No.
335761	WEAVER 27 STATE COM	121H

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
H	27	19S	28E		1362	N	286	E	Eddy

8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
D	28	19S	29E	D	330	N	100	W	Eddy

9. Pool Information

WINCHESTER; BONE SPRING, WEST	97569

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
New Well	OIL		State	3351
16. Multiple	**17. Proposed Depth**	**18. Formation**	**19. Contractor**	**20. Spud Date**
N	17616	2nd Bone Spring Sand		7/1/2024
Depth to Ground water		Distance from nearest fresh water well		Distance to nearest surface water

☒ **We will be using a closed-loop system in lieu of lined pits**

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surf	17.5	13.375	54.5	269	220	0
Int1	12.25	9.625	36	3019	760	0
Prod	7.875	5.5	17	17616	2020	0

Casing/Cement Program: Additional Comments

22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
Double Ram	5000	5000	

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. **I further certify I have complied with 19.15.14.9 (A) NMAC ☒ and/or 19.15.14.9 (B) NMAC ☒, if applicable.** Signature:		**OIL CONSERVATION DIVISION**	
Printed Name:	Electronically filed by Stephanie Rabadue	Approved By:	Ward Rikala
Title:	Regulatory Manager	Title:	
Email Address:	stephanie.rabadue@permianres.com	Approved Date: 6/26/2024	Expiration Date: 6/26/2026
Date: 6/10/2024	Phone: 432-260-4388	Conditions of Approval Attached	

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

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-015-55207	97569	Winchester; Bone Spring, West

[4] Property Code	[5] Property Name	[6] Well Number
3335761	WEAVER 27 ST COM	#121H

[7] OGRID No.	[8] Operator Name	[9] Elevation
372165	PERMIAN RESOURCES OPERATING, LLC	3,351.49'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	27	19 S	28 E		1,362'	NORTH	286'	EAST	EDDY

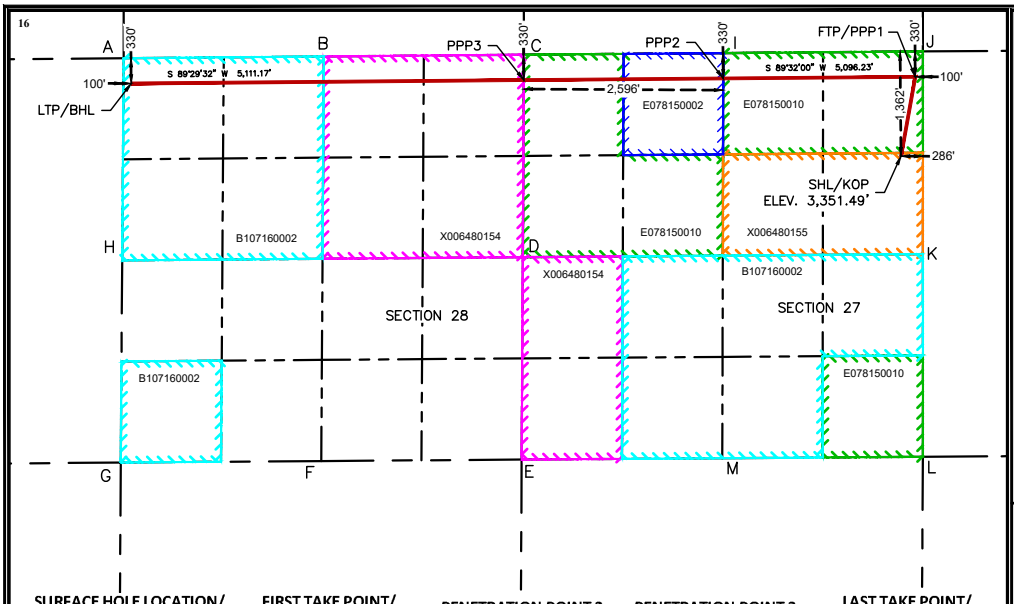
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	28	19 S	28 E		330'	NORTH	100'	WEST	EDDY

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

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

16



SURFACE HOLE LOCATION/ KICK OFF POINT	FIRST TAKE POINT/ PENETRATION POINT 1	PENETRATION POINT 2	PENETRATION POINT 3	LAST TAKE POINT/ BOTTOM HOLE LOCATION
1,362' FNL & 286' FEL	330' FNL & 100' FEL	330' FNL & 2,596' FWL	330' FNL & 0' FEL	330' FNL & 100' FWL
NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83
NORTH:594,894.29'	NORTH:595,927.87'	NORTH:595,907.50'	NORTH:595,886.35'	NORTH:595,841.04'
EAST:595,698.27'	EAST:595,884.27'	EAST:593,384.39'	EAST:590,788.21'	EAST:585,677.24'
LAT:32.63528927	LAT:32.63812944	LAT:32.63808466	LAT:32.63803759	LAT:32.63793320
LONG:-104.15674091	LONG:-104.15613108	LONG:-104.16425236	LONG:-104.17268646	LONG:-104.18929024
NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27
NORTH:594,832.37'	NORTH:595,865.93'	NORTH:595,845.59'	NORTH:595,824.45'	NORTH:595,779.19'
EAST:554,518.37'	EAST:554,704.39'	EAST:552,204.51'	EAST:549,608.33'	EAST:544,497.37'
LAT:32.63517211	LAT:32.63801231	LAT:32.63796761	LAT:32.63792063	LAT:32.63781641
LONG:-104.15623302	LONG:-104.15562313	LONG:-104.16374422	LONG:-104.17217811	LONG:-104.18878150

CORNER COORDINATES NEW MEXICO EAST - NAD 83	
A-FOUND IRON PIPE W/ BRASS CAP N:596,170.19' E:585,579.70'	G-FOUND IRON PIPE W/ BRASS CAP N:590,907.03' E:585,541.35'
B-FOUND IRON PIPE W/ BRASS CAP N:596,193.40' E:588,185.13'	H-FOUND IRON PIPE W/ BRASS CAP N:593,538.25' E:585,560.00'
C-FOUND IRON PIPE W/ BRASS CAP N:596,216.35' E:590,789.98'	I-FOUND IRON PIPE W/ BRASS CAP N:596,236.89' E:593,385.18'
D-FOUND IRON PIPE W/ BRASS CAP N:593,580.23' E:590,775.84'	J-FOUND IRON PIPE W/ BRASS CAP N:596,258.72' E:595,984.31'
E-FOUND IRON PIPE W/ BRASS CAP N:590,945.00' E:590,760.68'	K-FOUND IRON PIPE W/ BRASS CAP N:593,620.12' E:595,984.04'
F-FOUND 5/8" IRON PIPE W/ ALUM. CAP N:590,925.86' E:588,152.01'	L-FOUND IRON PIPE W/ BRASS CAP N:590,981.15' E:595,983.74'
	M-FOUND IRON PIPE W/ BRASS CAP N:590,962.75' E:593,372.54'

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cassie Evans 6/10/24
Signature Date

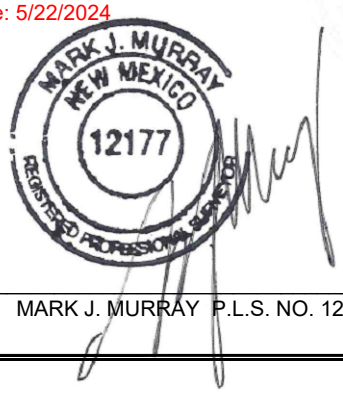
Cassie Evans 6/10/24
Printed Name Date

Cassie.Evans@permianres.com
Email Address Date

[18] SURVEYOR CERTIFICATION

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

Date: 5/22/2024



MARK J. MURRAY P.L.S. NO. 12177

Intent [ ] As Drilled [ ]

API #

Operator Name:	Property Name:	Well Number
PERMIAN RESOURCES OPERATING, LLC	WEAVER 27 ST COM	121H

Kick Off Point (KOP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
H	27	19S	28E		1,362	NORTH	286	EAST	EDDY

Latitude	Longitude	NAD
32.635289	-104.156741	83

First Take Point (FTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
A	27	19S	28E		330	NORTH	100	EAST	EDDY

Latitude	Longitude	NAD
32.638129	-104.156131	83

Last Take Point (LTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
D	28	19S	28E		330	NORTH	100	WEST	EDDY

Latitude	Longitude	NAD
32.637933	-104.189290	83

Is this well the defining well for the Horizontal Spacing Unit? NO

Is this well an infill well? Yes

If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API #
30-015-46769

Operator Name:	Property Name:	Well Number
Permian Resources Operating LLC	Weaver 27 State Com	132H

KZ 06/29/2018

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

Form APD Conditions

Permit 366960

PERMIT CONDITIONS OF APPROVAL

Operator Name and Address:	API Number:
Permian Resources Operating, LLC [372165] 300 N. Marienfeld St Ste 1000 Midland, TX 79701	30-015-55207
	Well: WEAVER 27 STATE COM #121H

OCD Reviewer	Condition
ward.rikala	Notify OCD 24 hours prior to casing & cement
ward.rikala	Will require a File As Drilled C-102 and a Directional Survey with the C-104
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
ward.rikala	Cement is required to circulate on both surface and intermediate1 strings of casing
ward.rikala	If cement does not circulate on any string, a CBL is required for that string of casing
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
ward.rikala	The Operator is to notify NMOCD by sundry (Form C-103) within ten (10) days of the well being spud

State of New Mexico
Energy, Minerals and Natural Resources Department

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:** 9/21/2023

II. Type: ☑ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.
If Other, please describe: _____.

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

Well Name	API	ULSTR	Footages	Anticipated Oil	Anticipated Gas	Anticipated Prod Water
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						

IV. Central Delivery Point Name: Big Burro/Weaver 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 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
Big Burro 27 State Com 123H		3/9/2025	3/19/2025	6/21/2025	7/20/2025	7/20/2025
Big Burro 27 State Com 124H		4/4/2025	4/14/2025	6/21/2025	7/20/2025	7/20/2025
Big Burro 27 State Com 203H		3/19/2025	4/4/2025	6/21/2025	7/20/2025	7/20/2025
Big Burro 27 State Com 204H		2/21/2025	3/9/2025	6/21/2025	7/20/2025	7/20/2025
Weaver 27 State Com 121H		TBD	TBD	TBD	TBD	TBD
Weaver 27 State Com 122H		TBD	TBD	TBD	TBD	TBD
Weaver 27 State Com 201H		TBD	TBD	TBD	TBD	TBD
Weaver 27 State Com 202H		TBD	TBD	TBD	TBD	TBD

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

VII. Operations 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 Name	API	Anticipated Average Natural Gas Rate	Anticipated Volume of Natural Gas for the First Year
[redacted]			

X. Natural Gas Gathering System (NGGS):

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Volume of Natural Gas for the First Year
LM Energy	LM Touchdown Gathering System	H-27-19S-28E	7/20/2025	28 MMCF/D

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 system(s) to which the well(s) will be connected.

XII. Line Capacity. 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 attached 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, not 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 and update for each Natural Gas Management Plan until the Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.
   - **(c)** OCD may deny or conditionally approve and 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, 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:
Title:
E-mail Address:
Date:
Phone:

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

Permian Resources Operating, LLC (372165)

Natural Gas Management Plan Descriptions

VI. Separation Equipment:

Permian Resources Operating, LLC (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 though 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 effciency.

2)Equipped with an automatic ignitor or continuous pilot.

3) Anchored and located at least 100 feet from the well and storage tanks.

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

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

- Closed-loop systems
- Enclosed and properly sized tanks

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

Measurement or estimation

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

VIII. Best Management Practices:

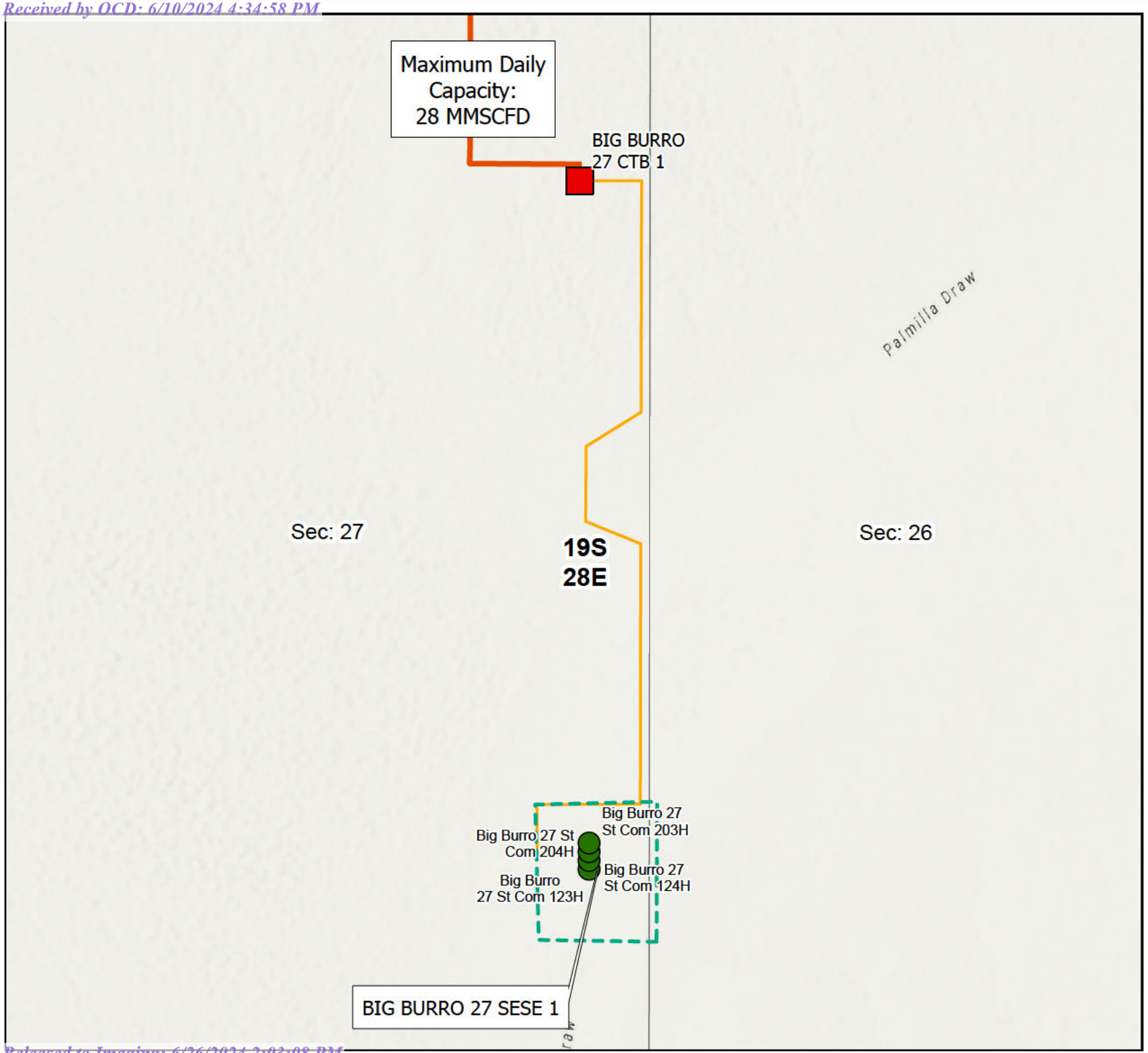
Permian Resources utilizes the following BMPs to minimize venting during active and planned maintenance activities:

- 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

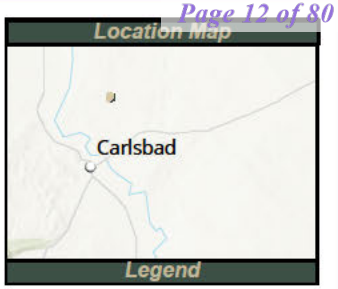
Enhanced Natural Gas Management Plan

Operator's Plan to Manage Production in Response to Increased Line Pressure

Permian Resources Operating, LLC (Permian) anticipates that its existing wells connected to the same portion of the natural gas gathering system will continue to meet anticipated increases in line pressure caused by the new wells. Permian will actively monitor line pressure throughout the field and will make necessary adjustments to existing production separators' pressures to send gas to sales. Permian also plans to implement automated alarms on all flare meters to alert of flaring events as they occur. The alarms will send notifications to field operations and engineering staff via text message and email at every occurrence of flaring. In addition, Permian plans to implement automated alarms on all flare meters to alert of any continuous flaring event that has continued for at least 4 hours. The alarms will send notifications to field operations and engineering management. Permian personnel will promptly respond to these alarms, communicate with midstream partners, and take the appropriate action to reduce flaring caused by high line pressure from new well production.



Location Map



Legend

- SHL
- Well Pad
- CTB Facility
- Gas Takeaway
- Flowlines

N
W E
S

0 100 200 400 Feet

Spatial Reference
Name: GCS North American 1983
GCS: GCS North American 1983
Datum: North American 1983
Map Units: Degree

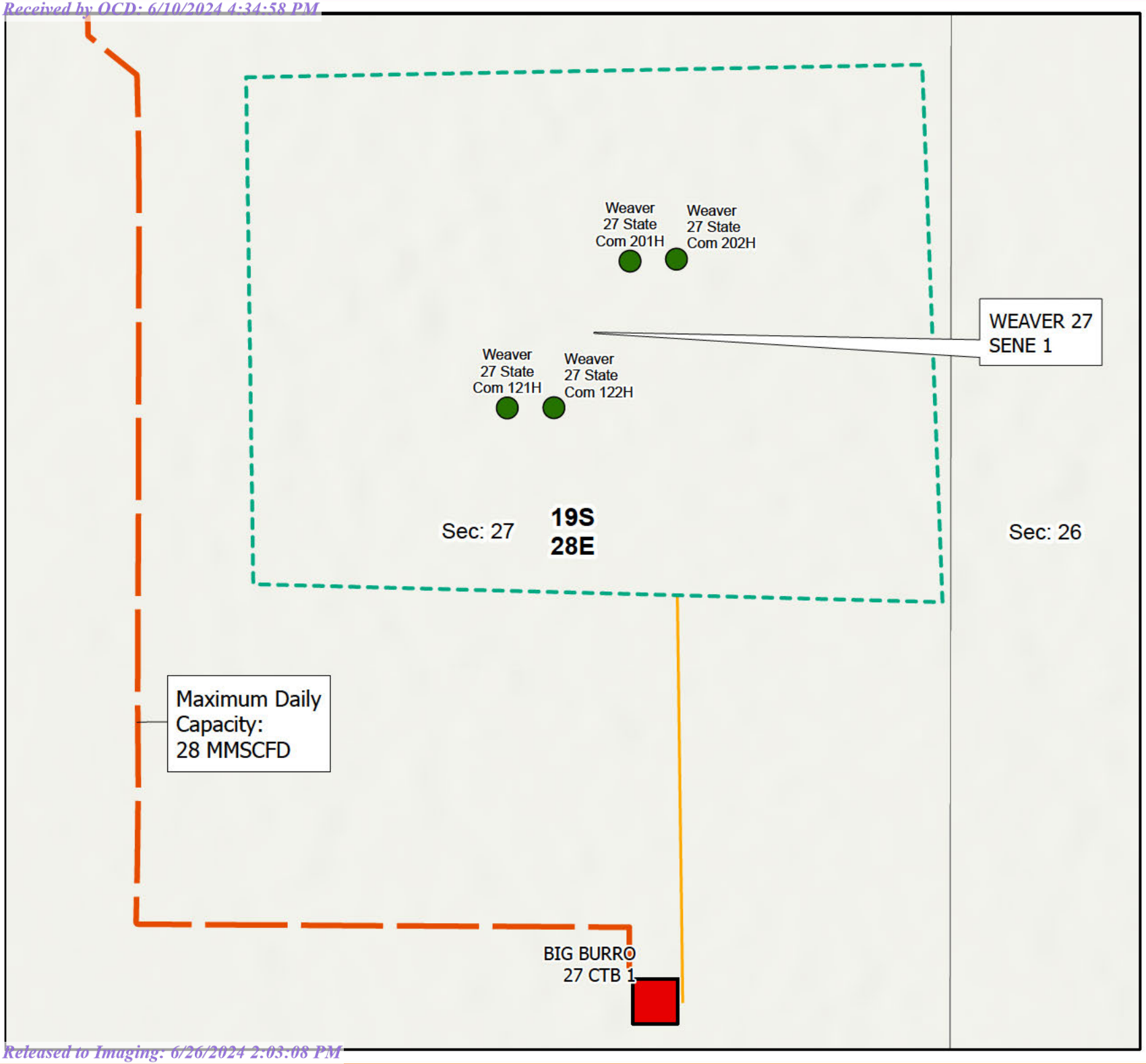
PERMIAN RESOURCES

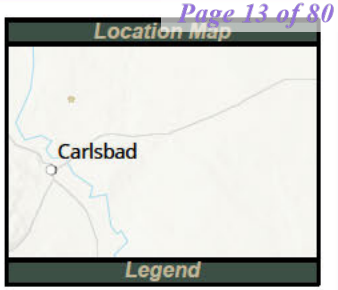
NM APD NGMP Big Burro 27 State Com 123H/124H 203H/204H

Eddy County, New Mexico

Created Date: 08/01/23 Revised Date: 9/27/2023

Author: A. Brown Drafter: T. Douglass





Legend

- SHL
- CTB Facility
- Well Pad
- Flowlines
- Est. Gas Takeaway

N
W E
S

0 20 40 80 Feet

Spatial Reference
Name: GCS North American 1983
GCS: GCS North American 1983
Datum: North American 1983
Map Units: Degree

PERMIAN RESOURCES

NM APD NGMP
Weaver 27 State Com 121H / 122H / 201H / 202H

Eddy County, New Mexico

Created Date: 08/01/23	Revised Date: 10/12/2023
Author: A. Brown	Drafter: T. Douglass

Permian Resources - Weaver 27 State Com 121H

1. Geologic Formations

Formation	Elevation	TVD	Lithology	Target
Rustler	-3137	244	Sandstone	No
Top of Salt	-3057	324	Salt	No
Tansill	-2797	584	Anhydrite/Shale	No
Yates	-2667	714	Anhydrite/Shale	No
Seven Rivers	-2267	1114	Limestone	No
Queen	-1777	1604	Limestone	No
Grayburg	-1317	2064	Limestone	No
San Andres	3	3384	Limestone	No
Cherry Canyon	-312	3069	Sandstone	No
Brushy Canyon	-132	3249	Sandstone	No
Bone Spring Lime	703	4084	Limestone/Shale	No
1st Bone Spring Sand	3073	6454	Sandstone/Limestone/Shale	No
2nd Bone Spring Sand	3833	7214	Sandstone/Limestone/Shale	Yes
3rd Bone Spring Sand	5003	8384	Sandstone/Limestone/Shale	No
Wolfcamp	5463	8844	Shale	No

2. Blowout Prevention

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
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. Pipe rams will be operationally checked each 24-hour period. Blind rams will be operationally checked on each trip out of the hole. These checked will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP), choke lines, and choke manifold. See attached schematics.

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	17.5	13.375	0	269	0	269	269	J55	54.5	BTC	8.50	3.34	Dry	7.93	Dry	7.44
Intermediate	12.25	9.625	0	3019	0	3019	3019	J55	36	BTC	3.05	1.70	Dry	3.06	Dry	2.70
Production	8.75	5.5	0	7886	0	7484	7886	P110RY	17	GeoConn	1.92	2.01	Dry	2.40	Dry	2.40
Production	7.875	5.5	7886	17616	7484	7484	9730	P110RY	17	GeoConn	1.92	2.01	Dry	2.40	Dry	2.40
								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	Quanity (sx)	Yield	Density	Cu Ft	Excess %	Cement Type	Additives
Surface	Tail	0	269	220	1.34	14.8	290	50%	Class C	Accelerator
Intermediate	Lead	0	2410	540	2.08	12.7	1110	50%	Class C	Salt, Extender, and LCM
Intermediate	Tail	2410	3019	220	1.34	14.8	290	50%	Class C	Accelerator
Production	Lead	2519	7136	670	2.41	11.5	1600	40%	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder
Production	Tail	7136	17616	1360	1.73	12.5	2350	25%	Class H	POZ, Extender, Fluid Loss, Dispersant, Retarder

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 oter 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: 8030 Cu Ft

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight	Max Weight
0	269	Spud Mud	8.6	9.5
269	3019	Salt Saturated	10	10
3019	7886	Water Based Mud	9	10
7886	17616	OBM	9	10

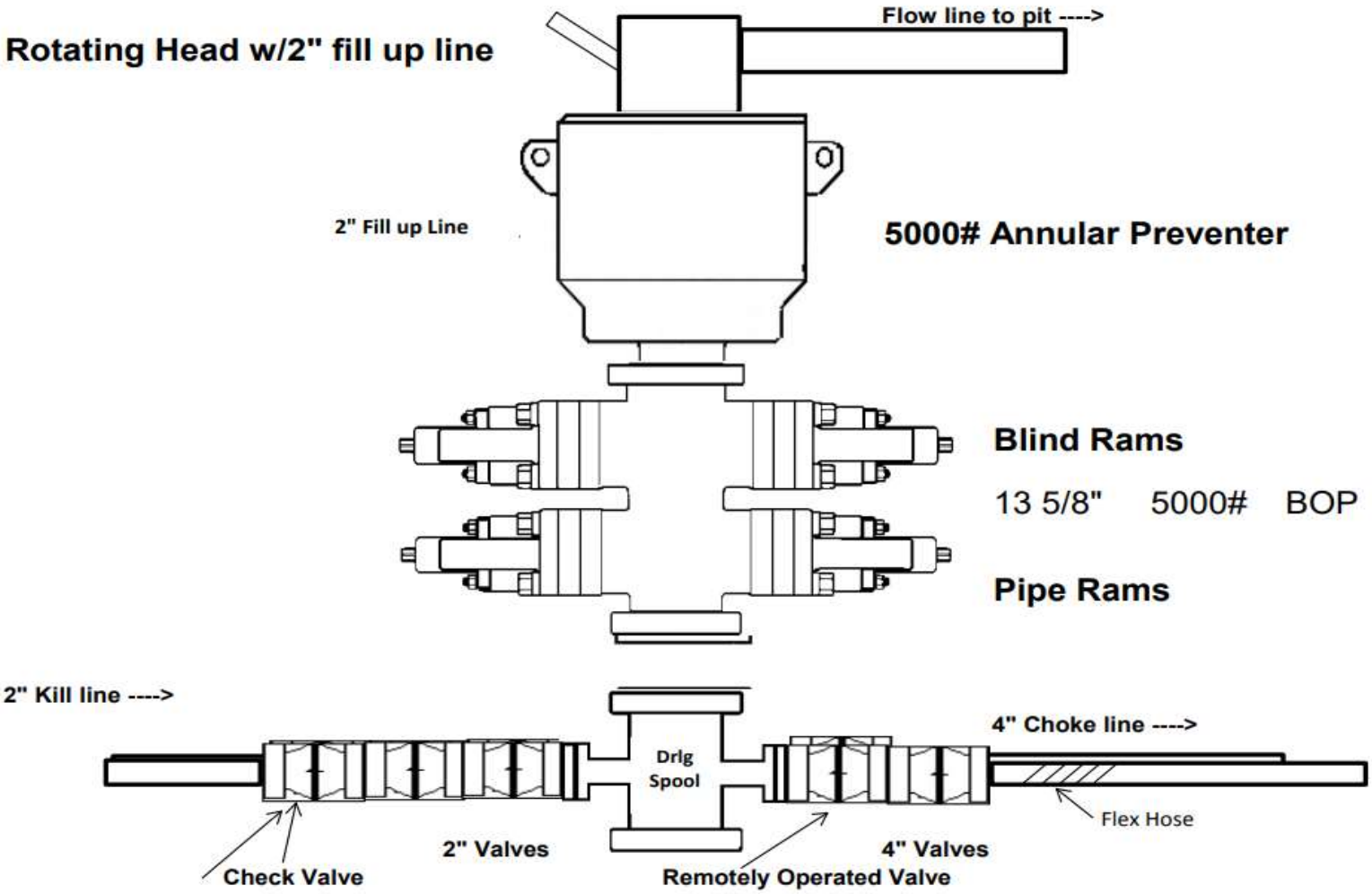
6. Test, Logging, Coring

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:

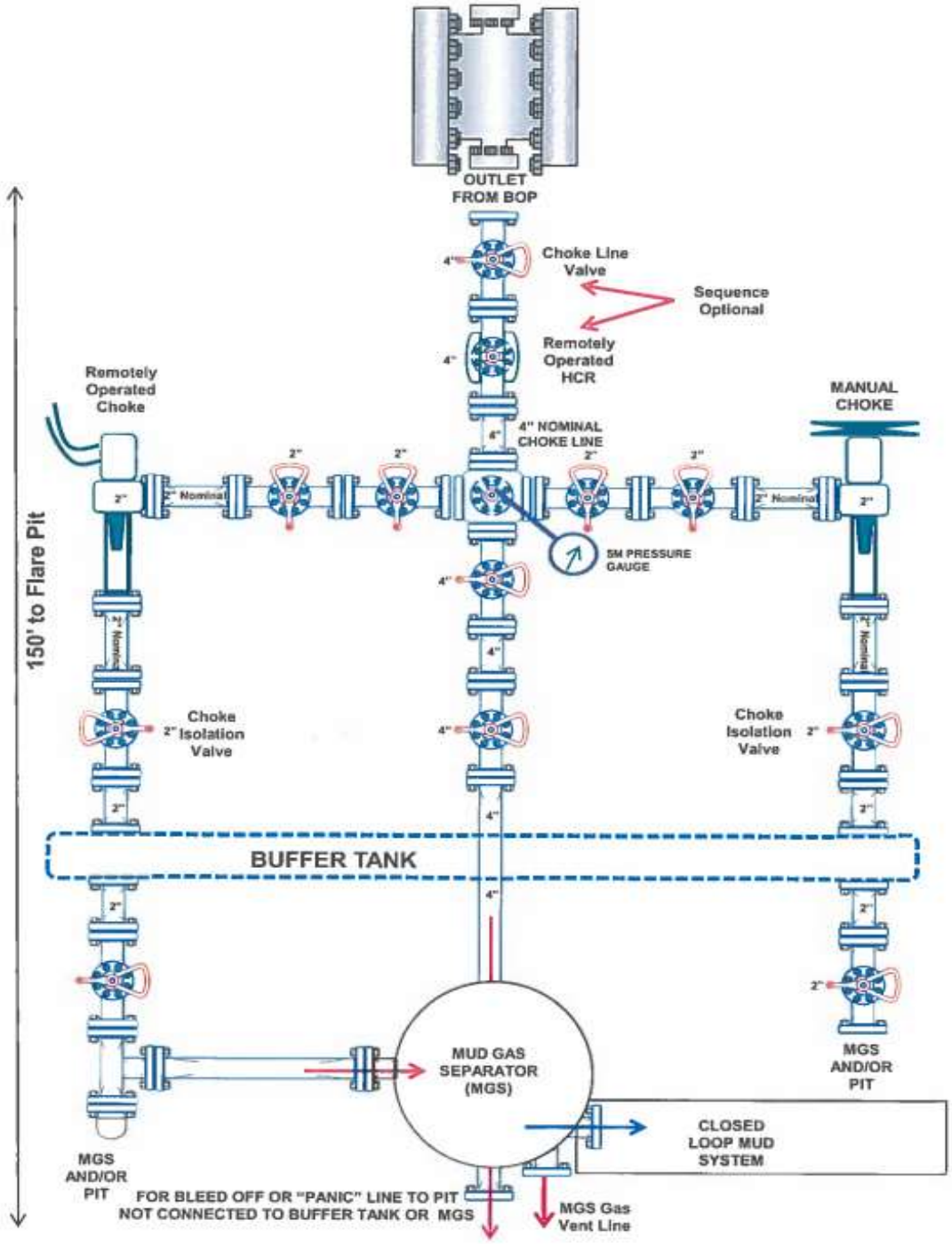
7. Pressure

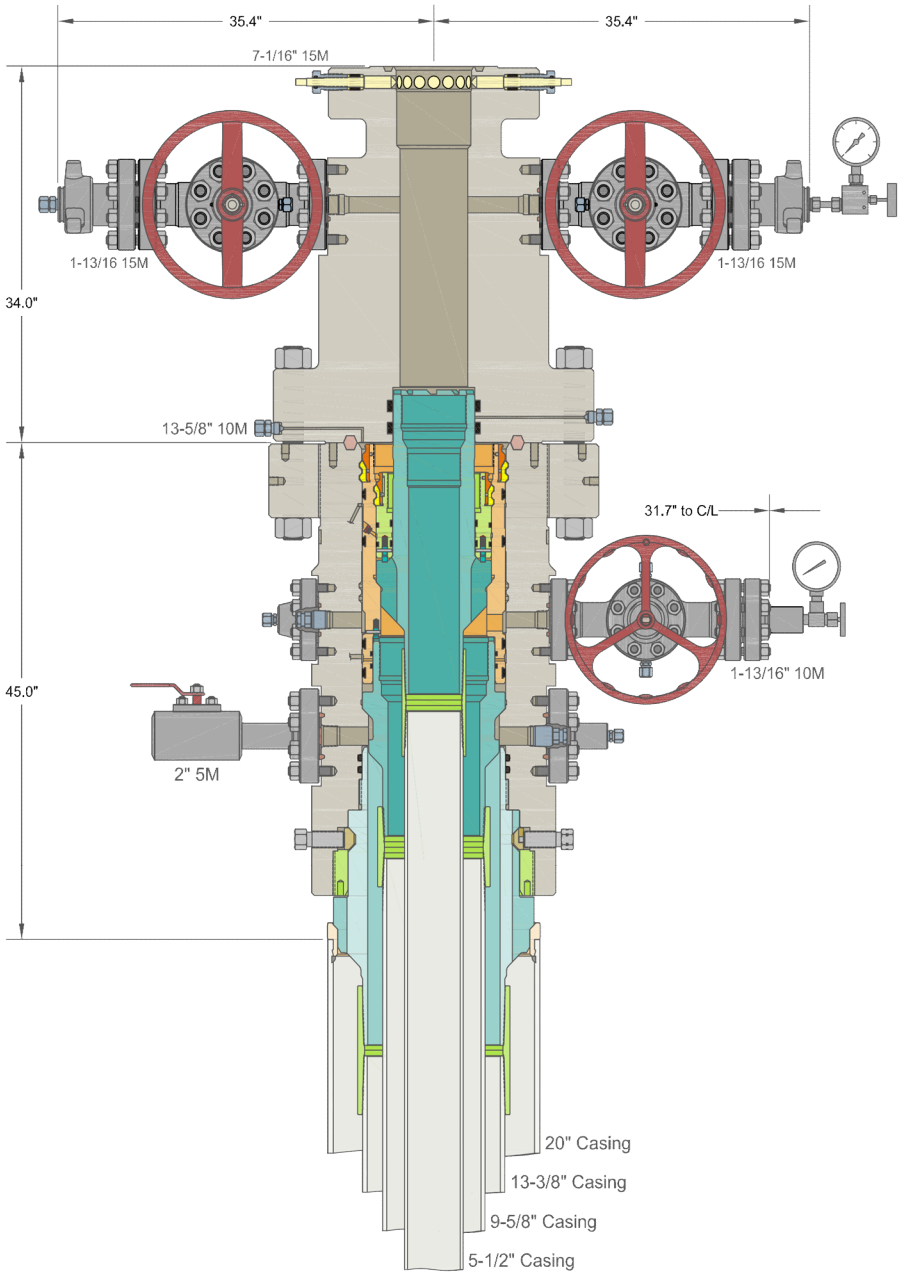
Anticipated Bottom Hole Pressure	3900	psi
Anticipated Surface Pressure	2245.2	psi
Anticipated Bottom Hole Temperature	133	°F
Anticipated Abnormal pressure, temp, or geo hazards	No	

5,000 psi BOP Schematic



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





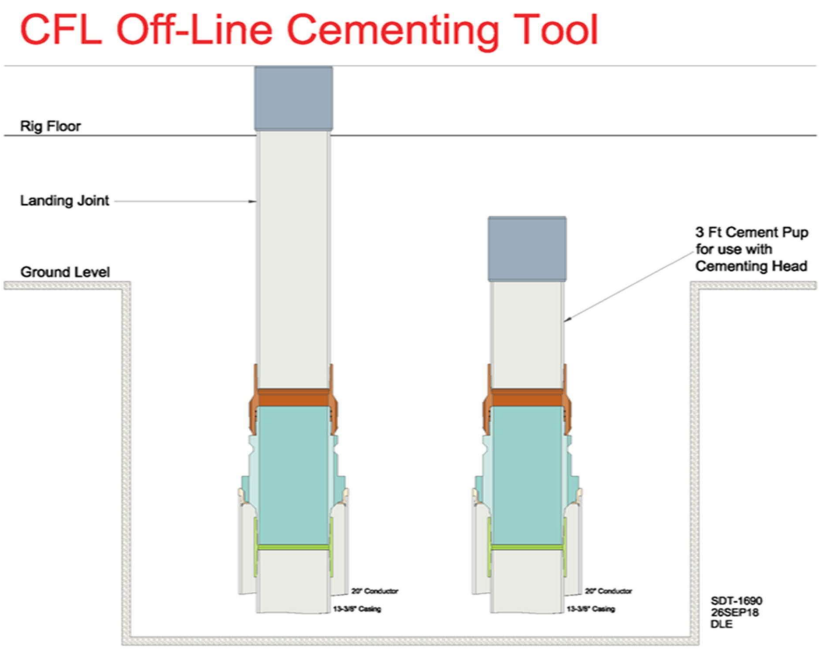
ALL DIMENSIONS APPROXIMATE

CACTUS WELLHEAD LLC	CENTENNIAL RESOURCE DEVELOPMENT LEE CO, NM		
20" x 13-3/8" x 9-5/8" x 5-1/2" 10M MBU-3T-CFL-R-DBLO System With 13-5/8" 10M x 7-1/16" 15M CTH-DBLHPS Tubing Head, 20" Landing Ring & Pin Down Mandrel Casing Hangers	DRAWN	DLE	10JUN20
	APPRV		
	DRAWING NO.	HBE0000338	

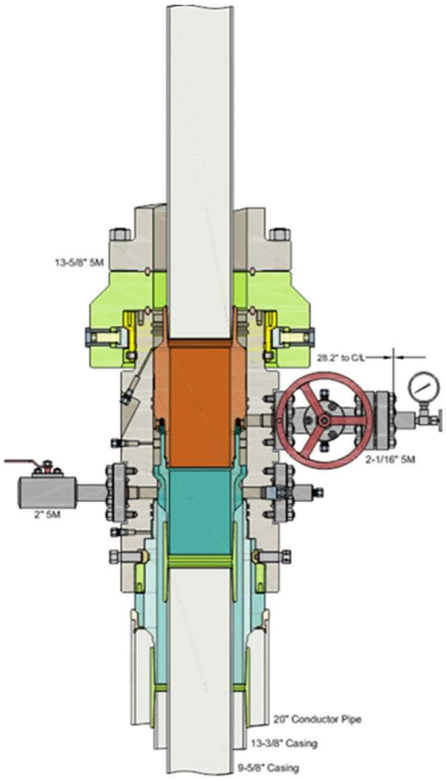
Permian Resources Offline Cementing Procedure
13-3/8" & 9-5/8" Casing

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

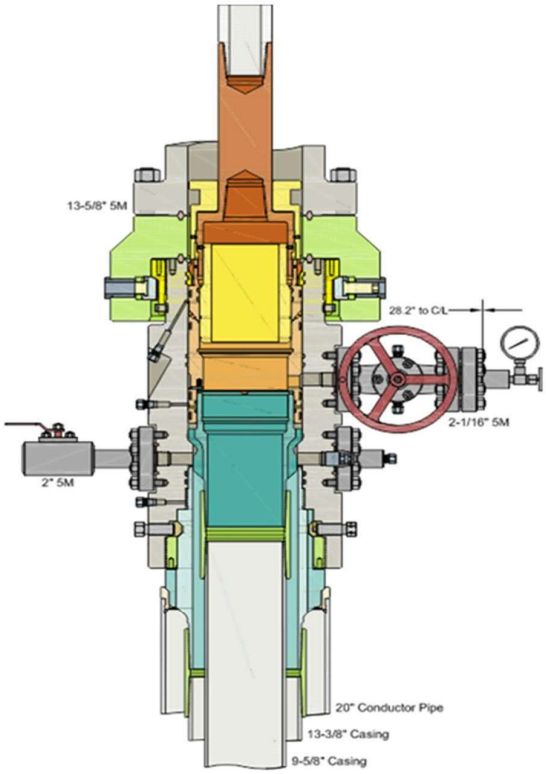
13 3/8" Surface



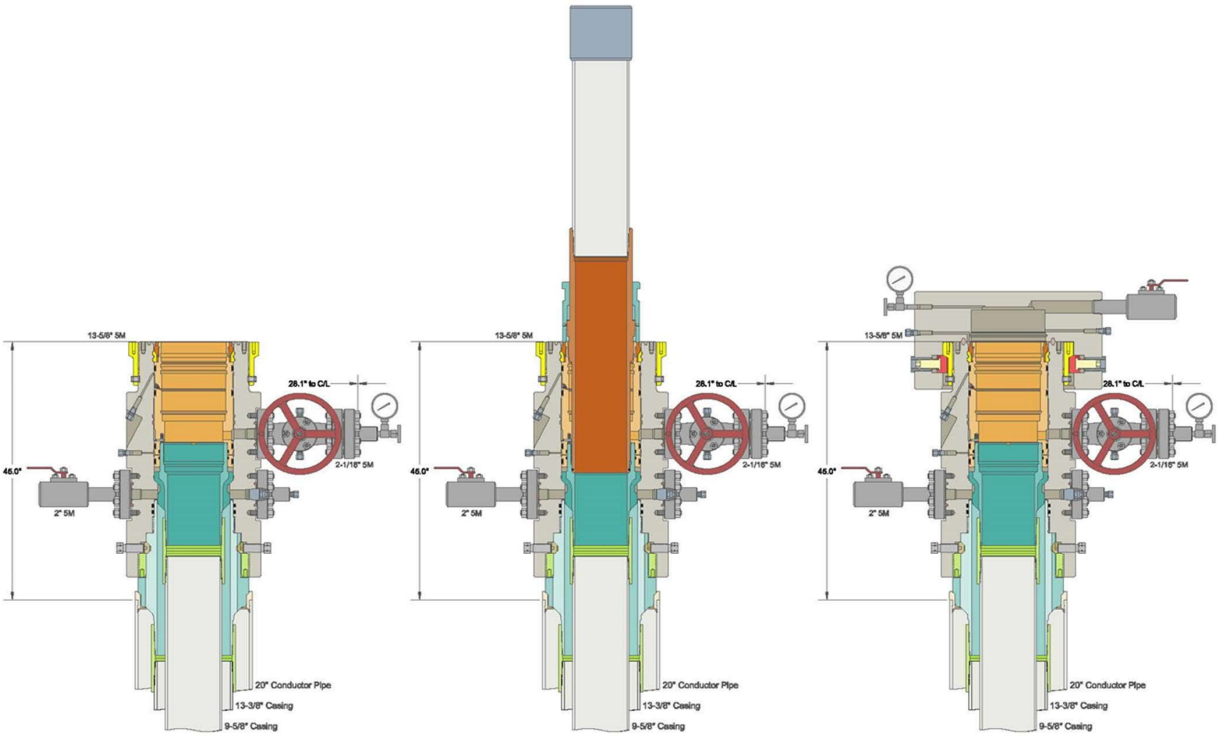
9 5/8" Intermediate



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



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



Permian Resources
Multi-Well Pad Batch Drilling Procedure

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

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

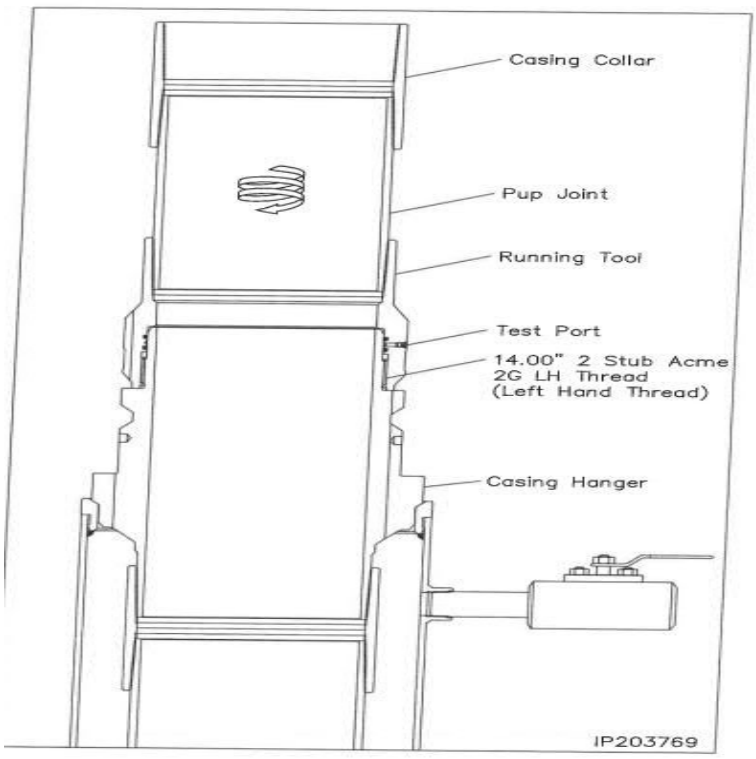


Illustration 1-1

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

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

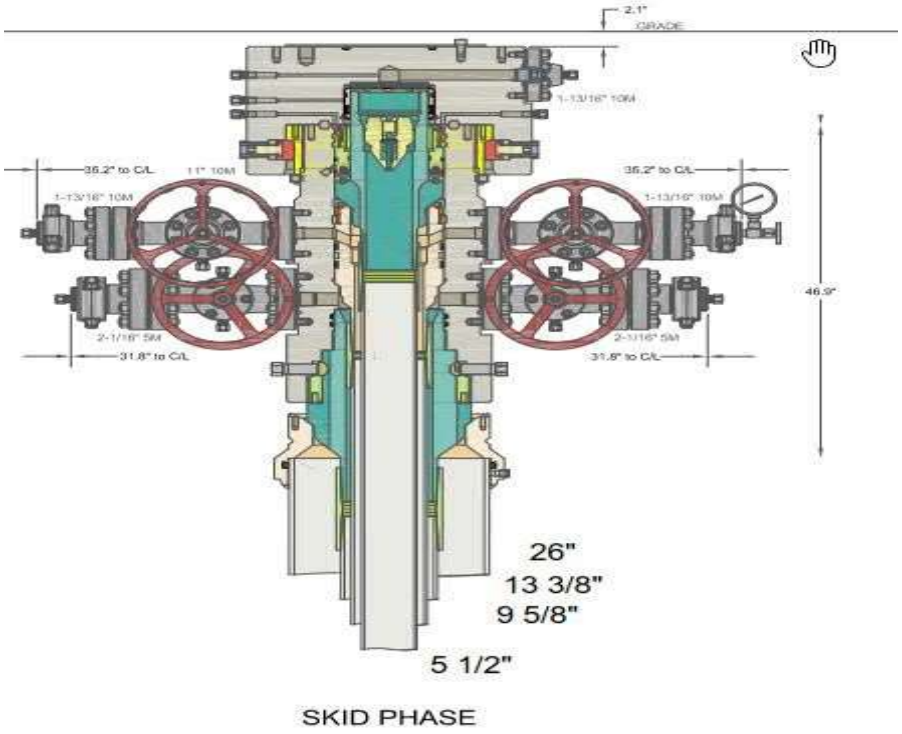


Illustration 2-2

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

1. Big Rig will remove the nightcap and install and test BOPE.
2. Install wear bushing then drill Intermediate shoe-track plus 20' and conduct FIT to minimum MW equivalent to control the formation pressure to TD of well.
3. Drill Vertical hole to KOP – Trip out for Curve BHA.
4. Drill Curve, landing in production interval – Trip for Lateral BHA.
5. Drill Lateral / Production hole to Permitted BHL, perform cleanup cycles and trip out to run 51/2" Production Casing.
6. Remove wear bushing then run 5-1/2" production casing to TD landing casing mandrel in wellhead.
7. Cement 5-1/2" Production string with floats holding.
8. Run in with wash tool and wash wellhead area – install pack-off and test void to 5,000psi for 15 minutes.
9. Install BPV in 5-1/2" mandrel hanger – Nipple down BOPE and install nightcap.
10. Test nightcap void to 5,000psi for 30 minutes per illustration 2-2
11. Skid rig to adjacent well on pad to drill production hole.

Permian Resources 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.

<u>Intermediate or Intermediate II</u>

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.

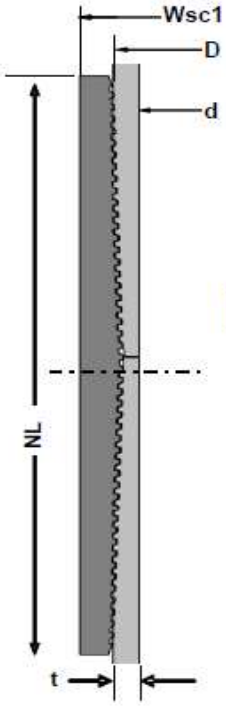
Production

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.

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

Geometry

GEOCONN-SC



Pipe Body

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

Connection

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

Performance

Performance Properties for Pipe Body

	Imperial		S.I.	
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

Performance Properties for Connection

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

Recommended Torque

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

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

Continental
ContiTech

CONTITECH RUBBER Industrial Kft.	No:QC-DB- 210/ 2014
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QUALITY CONTROL INSPECTION AND TEST CERTIFICATE					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	Heat N°
3" coupling with	9251	9254	AISI 4130	A0579N
4 1/16" 10K API b.w. Flange end			AISI 4130	035608

Not Designed For Well Testing **API Spec 16 C**

Temperature rate:"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.		

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

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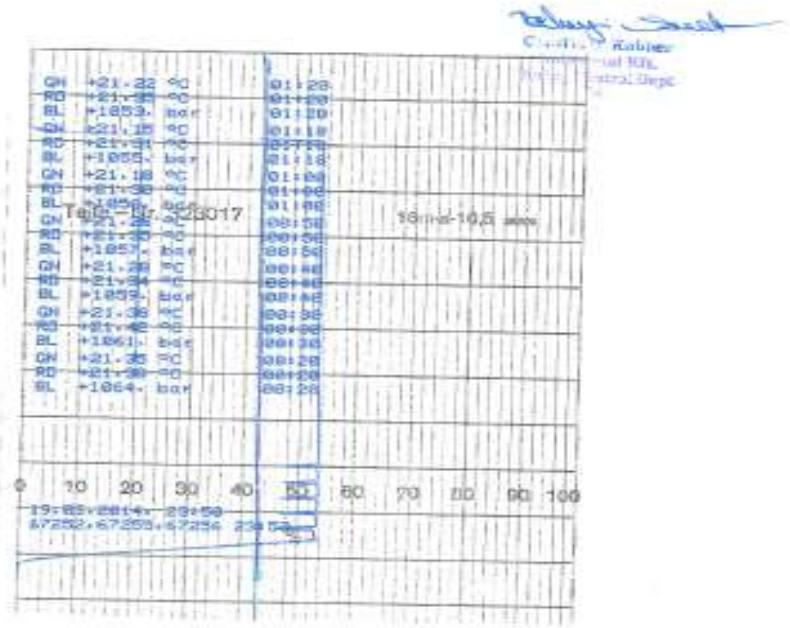

Hose Data Sheet

CRI Order No.	538236
Customer	ContiTech Oil & Marine Corp.
Customer Order No	4500409659
Item No.	1
Hose Type	Flexible Hose
Standard	**API SPEC 16 C**
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
BOP Break Testing Variance Procedure

Subject: Request for a Variance Allowing break Testing of the Blowout Preventer Equipment (BOPE). Permian Resources requests a variance to ONLY test broken pressure seals on the BOPE and function test BOP when skidding a drilling rig between multiple wells on a pad.

Background

Title 43 CFR 3172, Drilling Operations, Sections 6.b.9.iv states that the BOP test must be performed whenever any seal subject to test pressure is broken. The current interpretation of the Bureau of Land Management (BLM) requires a complete BOP test and not just a test of the affected component. 43 CFR 3172.13, Variances from minimum standards states, "An operator may request the authorized officer to approve a variance from any of the minimum standards prescribed in §§ 3172.6 through 3172.12. All such requests shall be submitted in writing to the appropriate authorized officer and provide information as to the circumstances which warrant approval of the variance(s) requested and the proposed alternative methods by which the related minimum standard(s) are to be satisfied. The authorized officer, after considering all relevant factors, if appropriate, may approve the requested variance(s) if it is determined that the proposed alternative(s) meet or exceed the objectives of the applicable minimum standard(s).". Permian Resources feels the break testing the BOPE is such a situation. Therefore, as per 43 CFR 3172.13, Permian Resources submits this request for the variance.

Supporting Documentation

The language used in 43 CFR 3172 became effective on December 19, 1988 and has remained the standard for regulating BLM onshore drilling operations for over 30 years. During this time, there have been significant changes in drilling technology. The BLM continues to use the variance request process to allow for the use of modern technology and acceptable engineering practices that have arisen since 43 CFR 3172 was originally released. The Permian Resources drilling rig fleet has many modern upgrades that allow the intact BOP stack to be moved between well slots on a multi-well pad, as well as, wellhead designs that incorporate quick connects facilitating release of the BOP from the wellhead without breaking any BOP stack components apart. These technologies have been used extensively offshore, and other regulators, API, and many operators around the world have endorsed break testing as safe and reliable.

Figure 1: Winch System attached to BOP Stack

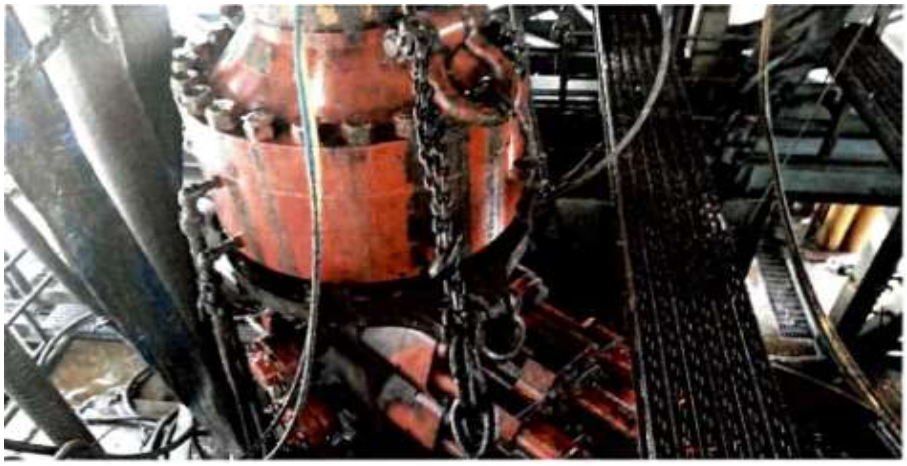


Figure 2: BOP Winch System

American Petroleum Institute (API) standards, specification and recommended practices are considered the industry standard and are consistently utilized and referenced by the industry. 43 CFR 3172 recognizes API recommended Practices (RP) 53 in its original development. API Standard 53, Well Control Equipment Systems for Drilling Wells (Fifth Edition, December 2018, Annex C, Table C.4) recognizes break testing as an acceptable practice. Specifically, API Standard 53, Section 5.3.7.1 states "A pressure test of the pressure containing component shall be performed following the disconnection or repair, limited to the affected component." See Table C.4 below for reference.

Table C.4—Initial Pressure Testing, Surface BOP Stacks

Component to be Pressure Tested	Pressure Test—Low Pressure[a,c] psig (MPa)	Pressure Test—High Pressure[a,c]	
		Change Out of Component, Elastomer, or Ring Gasket	No Change Out of Component, Elastomer, or Ring Gasket
Annular preventer[b]	250 to 350 (1.72 to 2.41)	RWP of annular preventer	MASP or 70% annular RWP, whichever is lower.
Fixed pipe, variable bore, blind, and BSR preventers[a,c]	250 to 350 (1.72 to 2.41)	RWP of ram preventer or wellhead system, whichever is lower	ITP
Choke and kill line and BOP side outlet valves below ram preventers (both sides)	250 to 350 (1.72 to 2.41)	RWP of side outlet valve or wellhead system, whichever is lower	ITP
Choke manifold—upstream of chokes*	250 to 350 (1.72 to 2.41)	RWP of ram preventers or wellhead system, whichever is lower	ITP
Choke manifold—downstream of chokes*	250 to 350 (1.72 to 2.41)	RWP of valve(s), line(s), or MASP for the well program, whichever is lower	
Kelly, kelly valves, drill pipe safety valves, IBOPs	250 to 350 (1.72 to 2.41)	MASP for the well program	

[a] Pressure test evaluation periods shall be a minimum of five minutes.
No visible leaks.
The pressure shall remain stable during the evaluation period. The pressure shall not decrease below the intended test pressure.

[b] Annular(s) and VBR(s) shall be pressure tested on the largest and smallest OD drill pipe to be used in well program.

[c] For pad drilling operations, moving from one wellhead to another within the 21 days, pressure testing is required for pressure-containing and pressure-controlling connections when the integrity of a pressure seal is broken.

[d] For surface offshore operations, the ram BOPs shall be pressure tested with the ram locks engaged and the closing and locking pressure vented during the initial test. For land operations, the ram BOPs shall be pressure tested with the ram locks engaged and the closing and locking pressure vented at commissioning and annually.

* Adjustable chokes are not required to be full sealing devices. Pressure testing against a closed choke is not required.

The Bureau of Safety and Environmental Enforcement (BSEE), Department of Interior, has also utilized the API standards, specification and best practices in the development of its offshore oil and gas regulations and incorporates them by reference within its regulations.

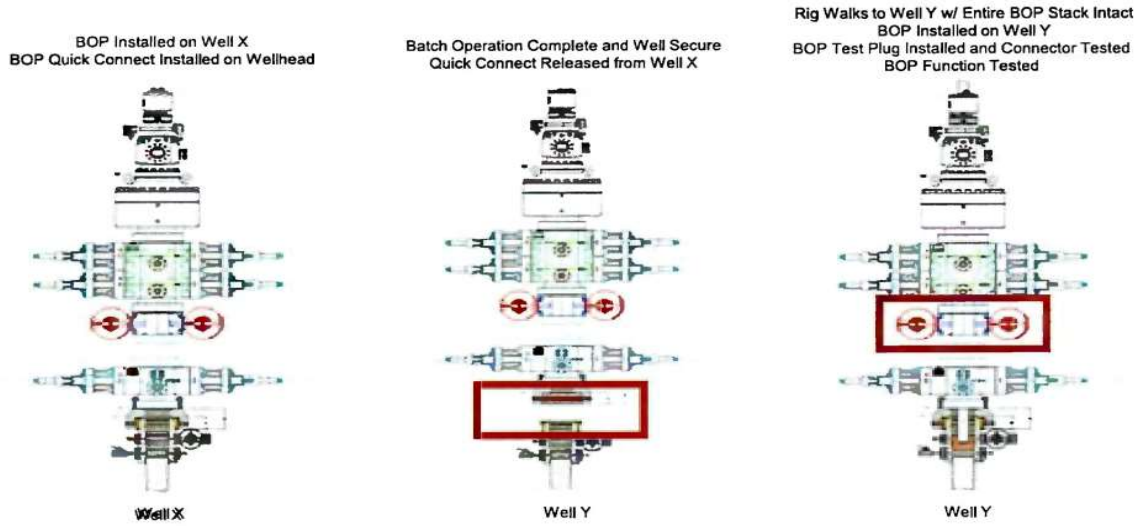
Break testing has been approved by the BLM in the past with other operators based on the detailed information provided in this document.

Permian Resources feels break testing and our current procedures meet the intent of 43 CFR 3172 and often exceed it. There has been no evidence that break testing results in more components failing than seen on full BOP tests. Permian Resources internal standards require complete BOPE tests more often than that of 43 CFR 3172 (every 21 days). In addition to function testing the annular, pipe rams and blind rams after each BOP nipple up, Permian Resources performs a choke drill with the rig crew prior to drilling out every casing shoe. This is additional training for the rig crew that exceeds the requirements of 43 CFR 3172.

Procedures

1) Permian Resources will use this document for our break testing plan for New Mexico Delaware Basin. The summary below will be referenced in the APD or Sundry Notice and receive approval prior to implementing this variance.
2) Permian Resources will perform BOP break testing on multi-wells pads where multiple intermediate sections can be drilled and cased within the 21-day BOP test window.
   a)A full BOP test will be conducted on the first well on the pad.
   b)The first intermediate hole section drilled on the pad will be the deepest. All the remaining hole sections will be the same formation depth or shallower.
   c) A full BOP test will be required if the intermediate hole section being drilled has a MASP over 5M.
   d) A full BOP test will be required prior to drilling any production hole.
3) After performing a complete BOP test on the first well, the intermediate hole section will be drilled and cased, two breaks would be made on the BOP equipment.
   a) Between the HCV valve and choke line connection
   b)Between the BOP quick connect and the wellhead
4) The BOP is then lifted and removed from the wellhead by a hydraulic system.
5) After skidding to the next well, the BOP is moved to the wellhead by the same hydraulic system and installed.
6) The connections mentioned in 3a and 3b will then be reconnected.
7) Install test plug into the wellhead using test joint or drill pipe.
8) A shell test is performed against the upper pipe rams testing the two breaks.
9) The shell test will consist of a 250 psi low test and a high test to the value submitted in the APD or Sundry (e.g. 5,000 psi or 10,000psi).
10) Function tests will be performed on the following components: lower pipe rams, blind rams, and annular.
11) For a multi-well pad the same two breaks on the BOP would be made and on the next wells and steps 4 through 10 would be repeated.
12) A second break test would only be done if the intermediate hole section being drilled could not be completed within the 21 day BOP test window.

Note: Picture below highlights BOP components that will be tested during batch operations



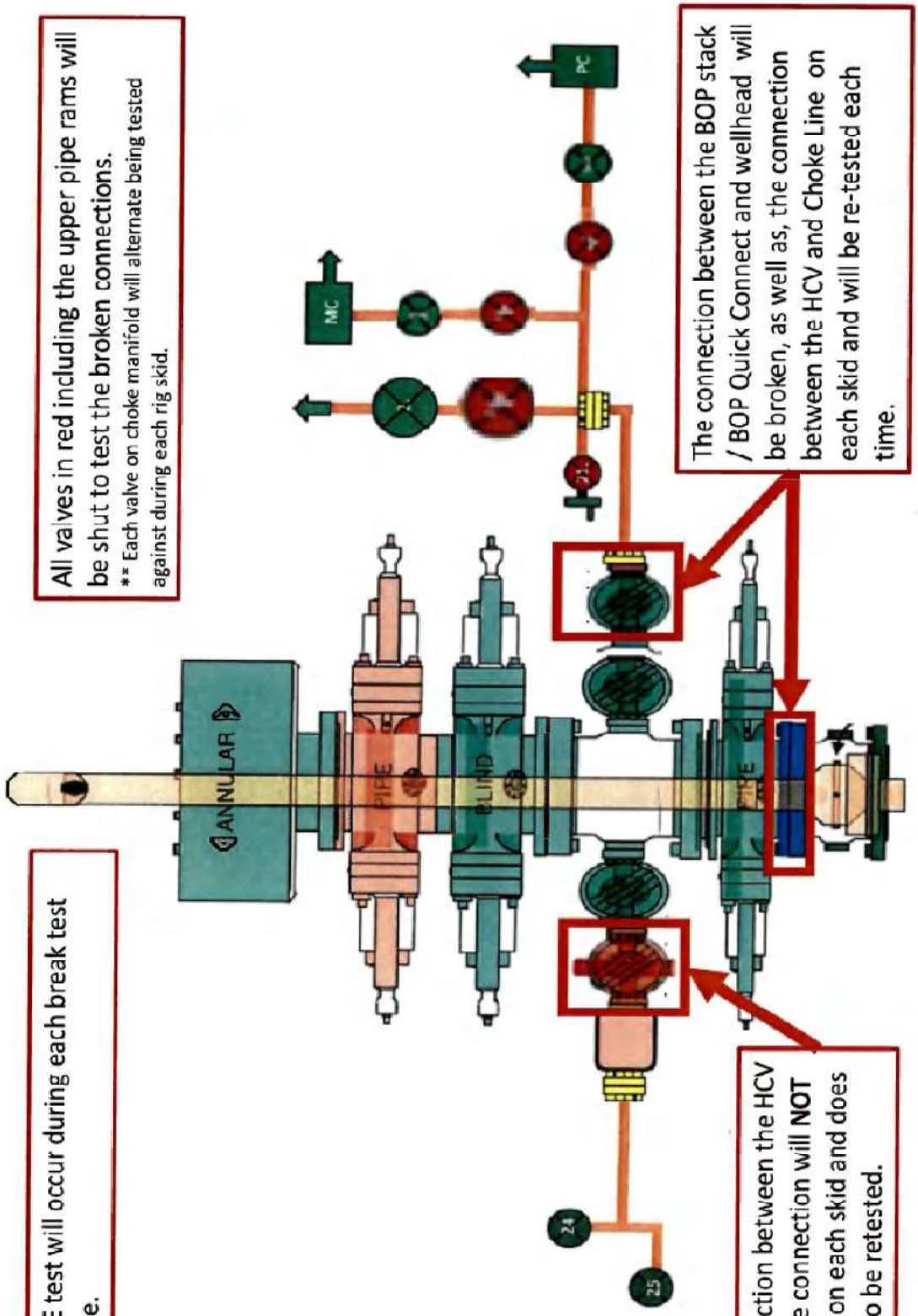
Summary

A variance is requested to ONLY test broken pressure seals on the BOP equipment when moving from wellhead to wellhead which is in compliance with API Standard 53. API Standard 53 states, that for pad drilling operations, moving from one wellhead to another within 21 days, pressure testing is required for pressure-containing and pressure-controlling connections when the integrity of a pressure seal is broken.

The BOP will be secured by a hydraulic carrier or cradle. The BLM will be contacted if a Well Control
event occurs prior to the commencement of a BOPE Break Testing operation.

Based on public data and the supporting documentation submitted herein to the BLM, we will request permission to ONLY retest broken pressure seals if the following conditions are met:

1) After a full BOP test is conducted on the first well on the pad.
2) The first intermediate hole section drilled on the pad will be the deepest. All the remaining hole sections will be the same depth or shallower.
3) A full BOP test will be required if the intermediate hole section being drilled has a MASP over 5M.
4) A full BOP test will be required prior to drilling the production hole.


All valves in red including the upper pipe rams will be shut to test the broken connections.
** Each valve on choke manifold will alternate being tested against during each rig skid.
The connection between the BOP stack / BOP Quick Connect and wellhead will be broken, as well as, the connection between the HCV and Choke Line on each skid and will be re-tested each time.
Only ONE test will occur during each break test procedure.
The connection between the HCV and kill line connection will NOT be broken on each skid and does not need to be retested.
ANNULAR
PIPE
BLIND
PIPE
MC
PC
24
25

NEW MEXICO

(SP) EDDY
WEAVER 27 ST COM
WEAVER 27 ST COM 121H

OWB

Plan: PWP0

Standard Planning Report - Geographic

05 June, 2024

Planning Report - Geographic

Database:	Compass_17	**Local Co-ordinate Reference**	Well WEAVER 27 ST COM 121H
Company:	NEW MEXICO	**TVD Reference:**	KB @ 3381.5usft
Project:	(SP) EDDY	**MD Reference:**	KB @ 3381.5usft
Site:	WEAVER 27 ST COM	**North Reference:**	Grid
Well:	WEAVER 27 ST COM 121H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PWP0		

Project (SP) EDDY

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

Site WEAVER 27 ST COM

Site Position:		**Northing:**	594,894.29 usft	**Latitude:**	32° 38' 7.041 N
From:	Map	**Easting:**	595,698.27 usft	**Longitude:**	104° 9' 24.267 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "		

Well WEAVER 27 ST COM 121H

Well Position	**+N/-S**	0.0 usft	**Northing:**	594,894.29 usft	**Latitude:**	32° 38' 7.041 N
	+E/-W	0.0 usft	**Easting:**	595,698.27 usft	**Longitude:**	104° 9' 24.267 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,351.5 usft
Grid Convergence:		0.10 °				

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/2009	8.05	60.52	48,975.78365129

Design PWP0

Audit Notes:

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

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	275.40

Plan Survey Tool Program **Date** 6/5/2024

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	17,616.1	PWP0 (OWB)	MWD OWSG_Rev2_ MWD - Standa	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,750.0	15.00	10.20	2,741.5	96.1	17.3	2.00	2.00	0.00	10.20	
6,053.3	15.00	10.20	5,932.2	937.5	168.7	0.00	0.00	0.00	0.00	
6,803.3	0.00	0.00	6,673.6	1,033.6	186.0	2.00	-2.00	0.00	180.00	
7,136.1	0.00	0.00	7,006.5	1,033.6	186.0	0.00	0.00	0.00	0.00	
7,886.1	90.00	269.51	7,484.0	1,029.5	-291.4	12.00	12.00	-12.07	269.51	
17,616.1	90.00	269.51	7,484.0	946.7	-10,021.0	0.00	0.00	0.00	0.00	BHL W27SC 121H

Planning Report - Geographic

Database:	Compass_17	**Local Co-ordinate Reference**	Well WEAVER 27 ST COM 121H
Company:	NEW MEXICO	**TVD Reference:**	KB @ 3381.5usft
Project:	(SP) EDDY	**MD Reference:**	KB @ 3381.5usft
Site:	WEAVER 27 ST COM	**North Reference:**	Grid
Well:	WEAVER 27 ST COM 121H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	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	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
100.0	0.00	0.00	100.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
200.0	0.00	0.00	200.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
300.0	0.00	0.00	300.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
400.0	0.00	0.00	400.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
500.0	0.00	0.00	500.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
600.0	0.00	0.00	600.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
700.0	0.00	0.00	700.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
800.0	0.00	0.00	800.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
900.0	0.00	0.00	900.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	594,894.29	595,698.27	32° 38' 7.041 N	104° 9' 24.267 W
Start Build 2.00									
2,100.0	2.00	10.20	2,100.0	1.7	0.3	594,896.01	595,698.58	32° 38' 7.058 N	104° 9' 24.264 W
2,200.0	4.00	10.20	2,199.8	6.9	1.2	594,901.16	595,699.51	32° 38' 7.109 N	104° 9' 24.253 W
2,300.0	6.00	10.20	2,299.5	15.4	2.8	594,909.74	595,701.05	32° 38' 7.194 N	104° 9' 24.235 W
2,400.0	8.00	10.20	2,398.7	27.4	4.9	594,921.73	595,703.21	32° 38' 7.313 N	104° 9' 24.209 W
2,500.0	10.00	10.20	2,497.5	42.8	7.7	594,937.13	595,705.98	32° 38' 7.465 N	104° 9' 24.176 W
2,600.0	12.00	10.20	2,595.6	61.6	11.1	594,955.91	595,709.36	32° 38' 7.651 N	104° 9' 24.136 W
2,700.0	14.00	10.20	2,693.1	83.8	15.1	594,978.04	595,713.34	32° 38' 7.870 N	104° 9' 24.089 W
2,750.0	15.00	10.20	2,741.5	96.1	17.3	594,990.37	595,715.56	32° 38' 7.992 N	104° 9' 24.063 W
Start 3303.3 hold at 2750.0 MD									
2,800.0	15.00	10.20	2,789.8	108.8	19.6	595,003.10	595,717.85	32° 38' 8.118 N	104° 9' 24.036 W
2,900.0	15.00	10.20	2,886.4	134.3	24.2	595,028.57	595,722.44	32° 38' 8.370 N	104° 9' 23.982 W
3,000.0	15.00	10.20	2,982.9	159.8	28.7	595,054.05	595,727.02	32° 38' 8.622 N	104° 9' 23.928 W
3,100.0	15.00	10.20	3,079.5	185.2	33.3	595,079.52	595,731.61	32° 38' 8.874 N	104° 9' 23.874 W
3,200.0	15.00	10.20	3,176.1	210.7	37.9	595,104.99	595,736.19	32° 38' 9.126 N	104° 9' 23.820 W
3,300.0	15.00	10.20	3,272.7	236.2	42.5	595,130.47	595,740.77	32° 38' 9.378 N	104° 9' 23.766 W
3,400.0	15.00	10.20	3,369.3	261.6	47.1	595,155.94	595,745.36	32° 38' 9.630 N	104° 9' 23.712 W
3,500.0	15.00	10.20	3,465.9	287.1	51.7	595,181.41	595,749.94	32° 38' 9.882 N	104° 9' 23.657 W
3,600.0	15.00	10.20	3,562.5	312.6	56.3	595,206.88	595,754.53	32° 38' 10.134 N	104° 9' 23.603 W
3,700.0	15.00	10.20	3,659.1	338.1	60.8	595,232.36	595,759.11	32° 38' 10.386 N	104° 9' 23.549 W
3,800.0	15.00	10.20	3,755.7	363.5	65.4	595,257.83	595,763.69	32° 38' 10.638 N	104° 9' 23.495 W
3,900.0	15.00	10.20	3,852.3	389.0	70.0	595,283.30	595,768.28	32° 38' 10.890 N	104° 9' 23.441 W
4,000.0	15.00	10.20	3,948.9	414.5	74.6	595,308.77	595,772.86	32° 38' 11.142 N	104° 9' 23.387 W
4,100.0	15.00	10.20	4,045.5	440.0	79.2	595,334.25	595,777.45	32° 38' 11.394 N	104° 9' 23.333 W
4,200.0	15.00	10.20	4,142.1	465.4	83.8	595,359.72	595,782.03	32° 38' 11.646 N	104° 9' 23.279 W
4,300.0	15.00	10.20	4,238.6	490.9	88.3	595,385.19	595,786.61	32° 38' 11.898 N	104° 9' 23.225 W
4,400.0	15.00	10.20	4,335.2	516.4	92.9	595,410.67	595,791.20	32° 38' 12.150 N	104° 9' 23.171 W
4,500.0	15.00	10.20	4,431.8	541.8	97.5	595,436.14	595,795.78	32° 38' 12.402 N	104° 9' 23.116 W
4,600.0	15.00	10.20	4,528.4	567.3	102.1	595,461.61	595,800.37	32° 38' 12.654 N	104° 9' 23.062 W
4,700.0	15.00	10.20	4,625.0	592.8	106.7	595,487.08	595,804.95	32° 38' 12.906 N	104° 9' 23.008 W
4,800.0	15.00	10.20	4,721.6	618.3	111.3	595,512.56	595,809.53	32° 38' 13.158 N	104° 9' 22.954 W
4,900.0	15.00	10.20	4,818.2	643.7	115.8	595,538.03	595,814.12	32° 38' 13.410 N	104° 9' 22.900 W

Planning Report - Geographic

Database:	Compass_17	**Local Co-ordinate Reference**	Well WEAVER 27 ST COM 121H
Company:	NEW MEXICO	**TVD Reference:**	KB @ 3381.5usft
Project:	(SP) EDDY	**MD Reference:**	KB @ 3381.5usft
Site:	WEAVER 27 ST COM	**North Reference:**	Grid
Well:	WEAVER 27 ST COM 121H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	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
5,000.0	15.00	10.20	4,914.8	669.2	120.4	595,563.50	595,818.70	32° 38' 13.661 N	104° 9' 22.846 W
5,100.0	15.00	10.20	5,011.4	694.7	125.0	595,588.97	595,823.29	32° 38' 13.913 N	104° 9' 22.792 W
5,200.0	15.00	10.20	5,108.0	720.2	129.6	595,614.45	595,827.87	32° 38' 14.165 N	104° 9' 22.738 W
5,300.0	15.00	10.20	5,204.6	745.6	134.2	595,639.92	595,832.45	32° 38' 14.417 N	104° 9' 22.684 W
5,400.0	15.00	10.20	5,301.2	771.1	138.8	595,665.39	595,837.04	32° 38' 14.669 N	104° 9' 22.629 W
5,500.0	15.00	10.20	5,397.8	796.6	143.3	595,690.87	595,841.62	32° 38' 14.921 N	104° 9' 22.575 W
5,600.0	15.00	10.20	5,494.4	822.0	147.9	595,716.34	595,846.21	32° 38' 15.173 N	104° 9' 22.521 W
5,700.0	15.00	10.20	5,590.9	847.5	152.5	595,741.81	595,850.79	32° 38' 15.425 N	104° 9' 22.467 W
5,800.0	15.00	10.20	5,687.5	873.0	157.1	595,767.28	595,855.37	32° 38' 15.677 N	104° 9' 22.413 W
5,900.0	15.00	10.20	5,784.1	898.5	161.7	595,792.76	595,859.96	32° 38' 15.929 N	104° 9' 22.359 W
6,000.0	15.00	10.20	5,880.7	923.9	166.3	595,818.23	595,864.54	32° 38' 16.181 N	104° 9' 22.305 W
6,053.3	15.00	10.20	5,932.2	937.5	168.7	595,831.80	595,866.98	32° 38' 16.316 N	104° 9' 22.276 W
Start Drop -2.00									
6,100.0	14.07	10.20	5,977.4	949.0	170.8	595,843.34	595,869.06	32° 38' 16.430 N	104° 9' 22.252 W
6,200.0	12.07	10.20	6,074.8	971.3	174.8	595,865.59	595,873.06	32° 38' 16.650 N	104° 9' 22.204 W
6,300.0	10.07	10.20	6,173.0	990.2	178.2	595,884.48	595,876.46	32° 38' 16.837 N	104° 9' 22.164 W
6,400.0	8.07	10.20	6,271.7	1,005.7	181.0	595,899.98	595,879.25	32° 38' 16.990 N	104° 9' 22.131 W
6,500.0	6.07	10.20	6,370.9	1,017.8	183.2	595,912.09	595,881.43	32° 38' 17.110 N	104° 9' 22.105 W
6,600.0	4.07	10.20	6,470.5	1,026.5	184.7	595,920.78	595,883.00	32° 38' 17.196 N	104° 9' 22.087 W
6,700.0	2.07	10.20	6,570.4	1,031.7	185.7	595,926.04	595,883.94	32° 38' 17.248 N	104° 9' 22.076 W
6,803.3	0.00	0.00	6,673.6	1,033.6	186.0	595,927.87	595,884.27	32° 38' 17.266 N	104° 9' 22.072 W
Start 332.9 hold at 6803.3 MD									
6,900.0	0.00	0.00	6,770.4	1,033.6	186.0	595,927.87	595,884.27	32° 38' 17.266 N	104° 9' 22.072 W
7,000.0	0.00	0.00	6,870.4	1,033.6	186.0	595,927.87	595,884.27	32° 38' 17.266 N	104° 9' 22.072 W
7,100.0	0.00	0.00	6,970.4	1,033.6	186.0	595,927.87	595,884.27	32° 38' 17.266 N	104° 9' 22.072 W
7,136.1	0.00	0.00	7,006.5	1,033.6	186.0	595,927.87	595,884.27	32° 38' 17.266 N	104° 9' 22.072 W
Start DLS 12.00 TFO 269.51									
7,150.0	1.66	269.51	7,020.4	1,033.6	185.8	595,927.87	595,884.07	32° 38' 17.266 N	104° 9' 22.074 W
7,175.0	4.66	269.51	7,045.3	1,033.6	184.4	595,927.86	595,882.69	32° 38' 17.266 N	104° 9' 22.090 W
7,200.0	7.66	269.51	7,070.2	1,033.5	181.7	595,927.84	595,880.01	32° 38' 17.266 N	104° 9' 22.122 W
7,225.0	10.66	269.51	7,094.9	1,033.5	177.8	595,927.80	595,876.03	32° 38' 17.265 N	104° 9' 22.168 W
7,250.0	13.66	269.51	7,119.3	1,033.5	172.5	595,927.76	595,870.76	32° 38' 17.265 N	104° 9' 22.230 W
7,275.0	16.66	269.51	7,143.4	1,033.4	165.9	595,927.70	595,864.22	32° 38' 17.265 N	104° 9' 22.306 W
7,300.0	19.66	269.51	7,167.2	1,033.3	158.2	595,927.64	595,856.43	32° 38' 17.264 N	104° 9' 22.398 W
7,325.0	22.66	269.51	7,190.5	1,033.3	149.1	595,927.56	595,847.40	32° 38' 17.263 N	104° 9' 22.503 W
7,350.0	25.66	269.51	7,213.3	1,033.2	138.9	595,927.47	595,837.17	32° 38' 17.263 N	104° 9' 22.623 W
7,375.0	28.66	269.51	7,235.5	1,033.1	127.5	595,927.38	595,825.76	32° 38' 17.262 N	104° 9' 22.756 W
7,400.0	31.66	269.51	7,257.1	1,033.0	114.9	595,927.27	595,813.20	32° 38' 17.261 N	104° 9' 22.903 W
7,425.0	34.66	269.51	7,278.1	1,032.9	101.3	595,927.15	595,799.53	32° 38' 17.260 N	104° 9' 23.063 W
7,450.0	37.66	269.51	7,298.2	1,032.7	86.5	595,927.03	595,784.78	32° 38' 17.259 N	104° 9' 23.236 W
7,475.0	40.66	269.51	7,317.6	1,032.6	70.7	595,926.89	595,768.99	32° 38' 17.258 N	104° 9' 23.420 W
7,500.0	43.66	269.51	7,336.2	1,032.5	53.9	595,926.75	595,752.21	32° 38' 17.257 N	104° 9' 23.616 W
7,525.0	46.66	269.51	7,353.8	1,032.3	36.2	595,926.60	595,734.49	32° 38' 17.256 N	104° 9' 23.824 W
7,550.0	49.66	269.51	7,370.5	1,032.1	17.6	595,926.44	595,715.86	32° 38' 17.255 N	104° 9' 24.042 W
7,575.0	52.66	269.51	7,386.1	1,032.0	-1.9	595,926.28	595,696.39	32° 38' 17.253 N	104° 9' 24.269 W
7,600.0	55.66	269.51	7,400.8	1,031.8	-22.1	595,926.10	595,676.13	32° 38' 17.252 N	104° 9' 24.506 W
7,625.0	58.66	269.51	7,414.3	1,031.6	-43.1	595,925.92	595,655.12	32° 38' 17.250 N	104° 9' 24.752 W
7,650.0	61.66	269.51	7,426.8	1,031.4	-64.8	595,925.74	595,633.44	32° 38' 17.249 N	104° 9' 25.005 W
7,675.0	64.66	269.51	7,438.0	1,031.3	-87.1	595,925.55	595,611.14	32° 38' 17.248 N	104° 9' 25.266 W
7,700.0	67.66	269.51	7,448.1	1,031.1	-110.0	595,925.36	595,588.27	32° 38' 17.246 N	104° 9' 25.534 W
7,725.0	70.66	269.51	7,457.0	1,030.9	-133.4	595,925.16	595,564.91	32° 38' 17.244 N	104° 9' 25.807 W
7,750.0	73.66	269.51	7,464.7	1,030.7	-157.2	595,924.95	595,541.12	32° 38' 17.243 N	104° 9' 26.085 W
7,775.0	76.66	269.51	7,471.1	1,030.5	-181.3	595,924.75	595,516.95	32° 38' 17.241 N	104° 9' 26.368 W

Planning Report - Geographic

Database:	Compass_17	**Local Co-ordinate Reference**	Well WEAVER 27 ST COM 121H
Company:	NEW MEXICO	**TVD Reference:**	KB @ 3381.5usft
Project:	(SP) EDDY	**MD Reference:**	KB @ 3381.5usft
Site:	WEAVER 27 ST COM	**North Reference:**	Grid
Well:	WEAVER 27 ST COM 121H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	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
7,800.0	79.66	269.51	7,476.2	1,030.2	-205.8	595,924.54	595,492.49	32° 38' 17.239 N	104° 9' 26.654 W
7,825.0	82.66	269.51	7,480.1	1,030.0	-230.5	595,924.33	595,467.79	32° 38' 17.238 N	104° 9' 26.943 W
7,850.0	85.66	269.51	7,482.6	1,029.8	-255.4	595,924.12	595,442.92	32° 38' 17.236 N	104° 9' 27.234 W
7,875.0	88.66	269.51	7,483.8	1,029.6	-280.3	595,923.91	595,417.96	32° 38' 17.234 N	104° 9' 27.526 W
7,886.1	90.00	269.51	7,484.0	1,029.5	-291.4	595,923.81	595,406.83	32° 38' 17.234 N	104° 9' 27.656 W
Start 9729.9 hold at 7886.1 MD									
7,900.0	90.00	269.51	7,484.0	1,029.4	-305.3	595,923.69	595,392.96	32° 38' 17.233 N	104° 9' 27.818 W
8,000.0	90.00	269.51	7,484.0	1,028.5	-405.3	595,922.84	595,292.96	32° 38' 17.226 N	104° 9' 28.987 W
8,100.0	90.00	269.51	7,484.0	1,027.7	-505.3	595,921.99	595,192.97	32° 38' 17.219 N	104° 9' 30.157 W
8,200.0	90.00	269.51	7,484.0	1,026.8	-605.3	595,921.14	595,092.97	32° 38' 17.212 N	104° 9' 31.326 W
8,300.0	90.00	269.51	7,484.0	1,026.0	-705.3	595,920.29	594,992.97	32° 38' 17.206 N	104° 9' 32.496 W
8,400.0	90.00	269.51	7,484.0	1,025.1	-805.3	595,919.44	594,892.98	32° 38' 17.199 N	104° 9' 33.665 W
8,500.0	90.00	269.51	7,484.0	1,024.3	-905.3	595,918.59	594,792.98	32° 38' 17.192 N	104° 9' 34.835 W
8,600.0	90.00	269.51	7,484.0	1,023.4	-1,005.3	595,917.74	594,692.98	32° 38' 17.185 N	104° 9' 36.004 W
8,700.0	90.00	269.51	7,484.0	1,022.6	-1,105.3	595,916.89	594,592.99	32° 38' 17.178 N	104° 9' 37.174 W
8,800.0	90.00	269.51	7,484.0	1,021.7	-1,205.3	595,916.04	594,492.99	32° 38' 17.172 N	104° 9' 38.343 W
8,900.0	90.00	269.51	7,484.0	1,020.9	-1,305.3	595,915.19	594,393.00	32° 38' 17.165 N	104° 9' 39.513 W
9,000.0	90.00	269.51	7,484.0	1,020.0	-1,405.3	595,914.34	594,293.00	32° 38' 17.158 N	104° 9' 40.682 W
9,100.0	90.00	269.51	7,484.0	1,019.2	-1,505.3	595,913.49	594,193.00	32° 38' 17.151 N	104° 9' 41.852 W
9,200.0	90.00	269.51	7,484.0	1,018.3	-1,605.3	595,912.64	594,093.01	32° 38' 17.144 N	104° 9' 43.021 W
9,300.0	90.00	269.51	7,484.0	1,017.5	-1,705.3	595,911.78	593,993.01	32° 38' 17.137 N	104° 9' 44.191 W
9,400.0	90.00	269.51	7,484.0	1,016.6	-1,805.3	595,910.93	593,893.01	32° 38' 17.131 N	104° 9' 45.360 W
9,500.0	90.00	269.51	7,484.0	1,015.8	-1,905.3	595,910.08	593,793.02	32° 38' 17.124 N	104° 9' 46.530 W
9,600.0	90.00	269.51	7,484.0	1,014.9	-2,005.3	595,909.23	593,693.02	32° 38' 17.117 N	104° 9' 47.699 W
9,700.0	90.00	269.51	7,484.0	1,014.1	-2,105.2	595,908.38	593,593.02	32° 38' 17.110 N	104° 9' 48.869 W
9,800.0	90.00	269.51	7,484.0	1,013.2	-2,205.2	595,907.53	593,493.03	32° 38' 17.103 N	104° 9' 50.038 W
9,900.0	90.00	269.51	7,484.0	1,012.4	-2,305.2	595,906.68	593,393.03	32° 38' 17.096 N	104° 9' 51.207 W
9,909.0	90.00	269.51	7,484.0	1,012.3	-2,314.2	595,906.60	593,384.05	32° 38' 17.096 N	104° 9' 51.312 W
E078150002 Entry at 9909.0 MD									
10,000.0	90.00	269.51	7,484.0	1,011.5	-2,405.2	595,905.83	593,293.03	32° 38' 17.090 N	104° 9' 52.377 W
10,100.0	90.00	269.51	7,484.0	1,010.7	-2,505.2	595,904.98	593,193.04	32° 38' 17.083 N	104° 9' 53.546 W
10,200.0	90.00	269.51	7,484.0	1,009.8	-2,605.2	595,904.13	593,093.04	32° 38' 17.076 N	104° 9' 54.716 W
10,300.0	90.00	269.51	7,484.0	1,009.0	-2,705.2	595,903.28	592,993.05	32° 38' 17.069 N	104° 9' 55.885 W
10,400.0	90.00	269.51	7,484.0	1,008.1	-2,805.2	595,902.43	592,893.05	32° 38' 17.062 N	104° 9' 57.055 W
10,500.0	90.00	269.51	7,484.0	1,007.3	-2,905.2	595,901.58	592,793.05	32° 38' 17.055 N	104° 9' 58.224 W
10,600.0	90.00	269.51	7,484.0	1,006.4	-3,005.2	595,900.73	592,693.06	32° 38' 17.048 N	104° 9' 59.394 W
10,700.0	90.00	269.51	7,484.0	1,005.6	-3,105.2	595,899.88	592,593.06	32° 38' 17.042 N	104° 10' 0.563 W
10,800.0	90.00	269.51	7,484.0	1,004.7	-3,205.2	595,899.02	592,493.06	32° 38' 17.035 N	104° 10' 1.733 W
10,900.0	90.00	269.51	7,484.0	1,003.9	-3,305.2	595,898.17	592,393.07	32° 38' 17.028 N	104° 10' 2.902 W
11,000.0	90.00	269.51	7,484.0	1,003.0	-3,405.2	595,897.32	592,293.07	32° 38' 17.021 N	104° 10' 4.072 W
11,100.0	90.00	269.51	7,484.0	1,002.2	-3,505.2	595,896.47	592,193.07	32° 38' 17.014 N	104° 10' 5.241 W
11,200.0	90.00	269.51	7,484.0	1,001.3	-3,605.2	595,895.62	592,093.08	32° 38' 17.007 N	104° 10' 6.411 W
11,207.0	90.00	269.51	7,484.0	1,001.3	-3,612.2	595,895.56	592,086.10	32° 38' 17.007 N	104° 10' 6.492 W
E078150002 Exit at 11207.0 MD									
11,300.0	90.00	269.51	7,484.0	1,000.5	-3,705.2	595,894.77	591,993.08	32° 38' 17.000 N	104° 10' 7.580 W
11,400.0	90.00	269.51	7,484.0	999.6	-3,805.2	595,893.92	591,893.09	32° 38' 16.993 N	104° 10' 8.750 W
11,500.0	90.00	269.51	7,484.0	998.8	-3,905.2	595,893.07	591,793.09	32° 38' 16.987 N	104° 10' 9.919 W
11,600.0	90.00	269.51	7,484.0	997.9	-4,005.2	595,892.22	591,693.09	32° 38' 16.980 N	104° 10' 11.089 W
11,700.0	90.00	269.51	7,484.0	997.1	-4,105.2	595,891.37	591,593.10	32° 38' 16.973 N	104° 10' 12.258 W
11,800.0	90.00	269.51	7,484.0	996.2	-4,205.2	595,890.52	591,493.10	32° 38' 16.966 N	104° 10' 13.427 W
11,900.0	90.00	269.51	7,484.0	995.4	-4,305.2	595,889.67	591,393.10	32° 38' 16.959 N	104° 10' 14.597 W
12,000.0	90.00	269.51	7,484.0	994.5	-4,405.2	595,888.82	591,293.11	32° 38' 16.952 N	104° 10' 15.766 W
12,100.0	90.00	269.51	7,484.0	993.7	-4,505.2	595,887.97	591,193.11	32° 38' 16.945 N	104° 10' 16.936 W

Planning Report - Geographic

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Company:	NEW MEXICO	**TVD Reference:**	KB @ 3381.5usft
Project:	(SP) EDDY	**MD Reference:**	KB @ 3381.5usft
Site:	WEAVER 27 ST COM	**North Reference:**	Grid
Well:	WEAVER 27 ST COM 121H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	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
12,200.0	90.00	269.51	7,484.0	992.8	-4,605.2	595,887.12	591,093.11	32° 38' 16.938 N	104° 10' 18.105 W
12,300.0	90.00	269.51	7,484.0	992.0	-4,705.2	595,886.26	590,993.12	32° 38' 16.931 N	104° 10' 19.275 W
12,400.0	90.00	269.51	7,484.0	991.1	-4,805.2	595,885.41	590,893.12	32° 38' 16.924 N	104° 10' 20.444 W
12,500.0	90.00	269.51	7,484.0	990.3	-4,905.1	595,884.56	590,793.13	32° 38' 16.918 N	104° 10' 21.614 W
12,505.0	90.00	269.51	7,484.0	990.2	-4,910.1	595,884.52	590,788.15	32° 38' 16.917 N	104° 10' 21.672 W
SEC 28 19S 28E Entry at 12505.0 MD									
12,600.0	90.00	269.51	7,484.0	989.4	-5,005.1	595,883.71	590,693.13	32° 38' 16.911 N	104° 10' 22.783 W
12,700.0	90.00	269.51	7,484.0	988.6	-5,105.1	595,882.86	590,593.13	32° 38' 16.904 N	104° 10' 23.953 W
12,800.0	90.00	269.51	7,484.0	987.7	-5,205.1	595,882.01	590,493.14	32° 38' 16.897 N	104° 10' 25.122 W
12,900.0	90.00	269.51	7,484.0	986.9	-5,305.1	595,881.16	590,393.14	32° 38' 16.890 N	104° 10' 26.292 W
13,000.0	90.00	269.51	7,484.0	986.0	-5,405.1	595,880.31	590,293.14	32° 38' 16.883 N	104° 10' 27.461 W
13,100.0	90.00	269.51	7,484.0	985.2	-5,505.1	595,879.46	590,193.15	32° 38' 16.876 N	104° 10' 28.631 W
13,200.0	90.00	269.51	7,484.0	984.3	-5,605.1	595,878.61	590,093.15	32° 38' 16.869 N	104° 10' 29.800 W
13,300.0	90.00	269.51	7,484.0	983.5	-5,705.1	595,877.76	589,993.15	32° 38' 16.862 N	104° 10' 30.970 W
13,400.0	90.00	269.51	7,484.0	982.6	-5,805.1	595,876.91	589,893.16	32° 38' 16.855 N	104° 10' 32.139 W
13,500.0	90.00	269.51	7,484.0	981.8	-5,905.1	595,876.06	589,793.16	32° 38' 16.848 N	104° 10' 33.309 W
13,600.0	90.00	269.51	7,484.0	980.9	-6,005.1	595,875.21	589,693.17	32° 38' 16.841 N	104° 10' 34.478 W
13,700.0	90.00	269.51	7,484.0	980.1	-6,105.1	595,874.36	589,593.17	32° 38' 16.834 N	104° 10' 35.647 W
13,800.0	90.00	269.51	7,484.0	979.2	-6,205.1	595,873.50	589,493.17	32° 38' 16.827 N	104° 10' 36.817 W
13,900.0	90.00	269.51	7,484.0	978.4	-6,305.1	595,872.65	589,393.18	32° 38' 16.820 N	104° 10' 37.986 W
14,000.0	90.00	269.51	7,484.0	977.5	-6,405.1	595,871.80	589,293.18	32° 38' 16.813 N	104° 10' 39.156 W
14,100.0	90.00	269.51	7,484.0	976.7	-6,505.1	595,870.95	589,193.18	32° 38' 16.806 N	104° 10' 40.325 W
14,200.0	90.00	269.51	7,484.0	975.8	-6,605.1	595,870.10	589,093.19	32° 38' 16.799 N	104° 10' 41.495 W
14,300.0	90.00	269.51	7,484.0	975.0	-6,705.1	595,869.25	588,993.19	32° 38' 16.792 N	104° 10' 42.664 W
14,400.0	90.00	269.51	7,484.0	974.1	-6,805.1	595,868.40	588,893.19	32° 38' 16.785 N	104° 10' 43.834 W
14,500.0	90.00	269.51	7,484.0	973.3	-6,905.1	595,867.55	588,793.20	32° 38' 16.779 N	104° 10' 45.003 W
14,600.0	90.00	269.51	7,484.0	972.4	-7,005.1	595,866.70	588,693.20	32° 38' 16.772 N	104° 10' 46.173 W
14,700.0	90.00	269.51	7,484.0	971.6	-7,105.1	595,865.85	588,593.20	32° 38' 16.765 N	104° 10' 47.342 W
14,800.0	90.00	269.51	7,484.0	970.7	-7,205.1	595,865.00	588,493.21	32° 38' 16.758 N	104° 10' 48.512 W
14,900.0	90.00	269.51	7,484.0	969.9	-7,305.1	595,864.15	588,393.21	32° 38' 16.751 N	104° 10' 49.681 W
15,000.0	90.00	269.51	7,484.0	969.0	-7,405.1	595,863.30	588,293.22	32° 38' 16.744 N	104° 10' 50.851 W
15,100.0	90.00	269.51	7,484.0	968.2	-7,505.1	595,862.45	588,193.22	32° 38' 16.737 N	104° 10' 52.020 W
15,111.0	90.00	269.51	7,484.0	968.1	-7,516.0	595,862.35	588,182.25	32° 38' 16.736 N	104° 10' 52.148 W
B107160002 Entry at 15111.0 MD									
15,200.0	90.00	269.51	7,484.0	967.3	-7,605.1	595,861.60	588,093.22	32° 38' 16.730 N	104° 10' 53.190 W
15,300.0	90.00	269.51	7,484.0	966.5	-7,705.0	595,860.75	587,993.23	32° 38' 16.723 N	104° 10' 54.359 W
15,400.0	90.00	269.51	7,484.0	965.6	-7,805.0	595,859.89	587,893.23	32° 38' 16.716 N	104° 10' 55.529 W
15,500.0	90.00	269.51	7,484.0	964.8	-7,905.0	595,859.04	587,793.23	32° 38' 16.709 N	104° 10' 56.698 W
15,600.0	90.00	269.51	7,484.0	963.9	-8,005.0	595,858.19	587,693.24	32° 38' 16.702 N	104° 10' 57.867 W
15,700.0	90.00	269.51	7,484.0	963.0	-8,105.0	595,857.34	587,593.24	32° 38' 16.695 N	104° 10' 59.037 W
15,800.0	90.00	269.51	7,484.0	962.2	-8,205.0	595,856.49	587,493.24	32° 38' 16.687 N	104° 11' 0.206 W
15,900.0	90.00	269.51	7,484.0	961.3	-8,305.0	595,855.64	587,393.25	32° 38' 16.680 N	104° 11' 1.376 W
16,000.0	90.00	269.51	7,484.0	960.5	-8,405.0	595,854.79	587,293.25	32° 38' 16.673 N	104° 11' 2.545 W
16,100.0	90.00	269.51	7,484.0	959.6	-8,505.0	595,853.94	587,193.26	32° 38' 16.666 N	104° 11' 3.715 W
16,200.0	90.00	269.51	7,484.0	958.8	-8,605.0	595,853.09	587,093.26	32° 38' 16.659 N	104° 11' 4.884 W
16,300.0	90.00	269.51	7,484.0	957.9	-8,705.0	595,852.24	586,993.26	32° 38' 16.652 N	104° 11' 6.054 W
16,400.0	90.00	269.51	7,484.0	957.1	-8,805.0	595,851.39	586,893.27	32° 38' 16.645 N	104° 11' 7.223 W
16,500.0	90.00	269.51	7,484.0	956.2	-8,905.0	595,850.54	586,793.27	32° 38' 16.638 N	104° 11' 8.393 W
16,600.0	90.00	269.51	7,484.0	955.4	-9,005.0	595,849.69	586,693.27	32° 38' 16.631 N	104° 11' 9.562 W
16,700.0	90.00	269.51	7,484.0	954.5	-9,105.0	595,848.84	586,593.28	32° 38' 16.624 N	104° 11' 10.732 W
16,800.0	90.00	269.51	7,484.0	953.7	-9,205.0	595,847.99	586,493.28	32° 38' 16.617 N	104° 11' 11.901 W
16,900.0	90.00	269.51	7,484.0	952.8	-9,305.0	595,847.13	586,393.28	32° 38' 16.610 N	104° 11' 13.071 W
17,000.0	90.00	269.51	7,484.0	952.0	-9,405.0	595,846.28	586,293.29	32° 38' 16.603 N	104° 11' 14.240 W

Planning Report - Geographic

Database:	Compass_17	**Local Co-ordinate Reference**	Well WEAVER 27 ST COM 121H
Company:	NEW MEXICO	**TVD Reference:**	KB @ 3381.5usft
Project:	(SP) EDDY	**MD Reference:**	KB @ 3381.5usft
Site:	WEAVER 27 ST COM	**North Reference:**	Grid
Well:	WEAVER 27 ST COM 121H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	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
17,100.0	90.00	269.51	7,484.0	951.1	-9,505.0	595,845.43	586,193.29	32° 38' 16.596 N	104° 11' 15.410 W
17,200.0	90.00	269.51	7,484.0	950.3	-9,605.0	595,844.58	586,093.30	32° 38' 16.589 N	104° 11' 16.579 W
17,300.0	90.00	269.51	7,484.0	949.4	-9,705.0	595,843.73	585,993.30	32° 38' 16.582 N	104° 11' 17.749 W
17,400.0	90.00	269.51	7,484.0	948.6	-9,805.0	595,842.88	585,893.30	32° 38' 16.575 N	104° 11' 18.918 W
17,500.0	90.00	269.51	7,484.0	947.7	-9,905.0	595,842.03	585,793.31	32° 38' 16.568 N	104° 11' 20.087 W
17,600.0	90.00	269.51	7,484.0	946.9	-10,005.0	595,841.18	585,693.31	32° 38' 16.561 N	104° 11' 21.257 W
17,616.1	90.00	269.51	7,484.0	946.7	-10,021.0	595,841.04	585,677.24	32° 38' 16.559 N	104° 11' 21.445 W
TD at 17616.1									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BHL W27SC 121H - plan hits target center - Point	0.00	0.00	7,484.0	946.7	-10,021.0	595,841.04	585,677.24	32° 38' 16.559 N	104° 11' 21.445 W
FTP W27SC 121H - plan misses target center by 197.8usft at 7510.6usft MD (7343.7 TVD, 1032.4 N, 46.5 E) - Point	0.00	0.00	7,484.0	1,033.6	186.0	595,927.87	595,884.27	32° 38' 17.266 N	104° 9' 22.072 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
2,000.0	2,000.0	0.0	0.0	Start Build 2.00
2,750.0	2,741.5	96.1	17.3	Start 3303.3 hold at 2750.0 MD
6,053.3	5,932.2	937.5	168.7	Start Drop -2.00
6,803.3	6,673.6	1,033.6	186.0	Start 332.9 hold at 6803.3 MD
7,136.1	7,006.5	1,033.6	186.0	Start DLS 12.00 TFO 269.51
7,886.1	7,484.0	1,029.5	-291.4	Start 9729.9 hold at 7886.1 MD
9,909.0	7,484.0	1,012.3	-2,314.2	E078150002 Entry at 9909.0 MD
11,207.0	7,484.0	1,001.3	-3,612.2	E078150002 Exit at 11207.0 MD
12,505.0	7,484.0	990.2	-4,910.1	SEC 28 19S 28E Entry at 12505.0 MD
15,111.0	7,484.0	968.1	-7,516.0	B107160002 Entry at 15111.0 MD
17,616.1	7,484.0	946.7	-10,021.0	TD at 17616.1

PERMIAN

RESOURCES

H_2S CONTINGENCY PLAN

FOR

Permian Resources Corporation

Weaver 27 St Com 121H, 122H

Eddy County, New Mexico

12-19-2023
This plan is subject to updating

Table of Contents

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 (H2S).

II. Scope & Applicability

This Plan applies to all planned, unplanned, uncontrolled and/or unauthorized releases of hazardous concentrations of H_2S 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_2S gas, or SO^2, 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_2S 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_2S. 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_2S, there are several hazardous conditions that are presented both to employees, the general public, and emergency responders. These specific hazardous conditions are identified in the tables below.

H2S OPERATING CONDITIONS – RESPONSE ACTIONS TO CONSIDER	✓
H_2S CONDITION 1: POTENTIAL DANGER TO LIFE AND HEALTH –> WARNING SIGN GREEN	
H_2S concentration <10 ppm detected by location monitors	❑
General Actions During Condition 1	❑
Notify Site Supervisor / Permian Resources Person-in-Charge (PIC) of any observed increase in ambient H_2S concentrations	❑
All personnel check safety equipment is in adequate working order & store in accessible location	❑
Sensitize crews with safety meetings.	❑
Limit visitors and non-essential personnel on location	❑
Continuously monitor H_2S concentrations and check calibration of sensors	❑
Ensure H_2S scavenger is on location.	❑
H_2S CONDITION 2: MODERATE DANGER TO LIFE AND HEALTH → WARNING SIGN YELLOW	
H_2S concentration >10 ppm and < 30 ppm in atmosphere detected by location monitors:	❑
General Actions During Condition 2	❑
Sound H_2S alarm and/or display yellow flag.	❑
Account for on-site personnel	❑
Upon sounding of an area or personal H_2S monitor alarm when 10 ppm is reached, proceed to a safe briefing area upwind of the location immediately (see **MA-4**, **Figure 5-1**).	❑
Don proper respiratory protection.	❑
Alert other affected personnel	❑
If trained and safe to do so undertake measures to control source H2S discharge and eliminate possible ignition sources. Initiate Emergency Shutdown procedures as deemed necessary to correct or control the specific situation.	❑
Account for on-site personnel at safe briefing area.	❑
Stay in safe briefing area if not working to correct the situation.	❑
Keep Site Supervisor / Permian Resources PIC informed. Notify applicable government agencies **(Appendix A)** If off-site impact; notify any neighbors within Radius of Exposure **(ROE)**, **Fig 5.11**	❑
Continuously monitor H_2S until readings below 10 ppm.	❑
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.	

H_2S CONDITION 3: EXTREME DANGER TO LIFE AND HEALTH → WARNING SIGN RED	
> **30 ppm H_2S** concentration in air detected by location monitors: Extreme danger to life	❑
General Actions During Condition 3	❑
Sound H_2S alarm and/or display red flag.	❑
Account for on-site personnel	❑
Move away from H_2S source and get out of the affected area.	❑
Proceed to designated safe briefing area; alert other affected personnel.	❑
Account for personnel at safe briefing area.	❑
If trained and safe to do so undertake measures to control source H2S discharge and eliminate possible ignition sources. Initiate Emergency Shutdown procedures as deemed necessary to correct or control the specific situation.	❑
Notify vehicles or situation and divert all traffic away from location.	❑
Permian Resources Peron-in-Charge will make appropriate community notifications.	❑
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 **Condition 1**.	❑
Notify management of the condition and action taken. If H_2S 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_2S Contingency Plan. If well control at the surface is lost, determine if situation warrants igniting the well.	❑
If uncontrolled flow at the surface occurs, the Permian Resources PIC, with approval, if possible, from those coordinating the emergency **(as specified in the site-specific H_2S Contingency Plan)** 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.	❑
If the flow is ignited, burning H_2S will be converted to sulfur dioxide (SO_2), 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_2 will remain in low-lying places under no-wind conditions.	❑
Keep Site Supervisor / Permian Resources PIC informed. Notify applicable government agencies and local law enforcement **(Appendix A)** If off-site impact; notify any neighbors within the Radius of Exposure **(ROE)**, see example in **Figure 5-11.**	❑
Continuously monitor H_2S until readings fall below 10 ppm.	❑
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.	❑
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.	❑
Make recommendations to public officials regarding blocking unauthorized access to the unsafe area and assist as appropriate.	❑

Make recommendations to public officials regarding evacuating the public and assist as appropriate.	❑
Monitor ambient air in the area of exposure (after following abatement measures) to determine when it is safe for re-entry.	❑

Section 4.0 - Notification of H_2S Release Event

I. Local & State Law Enforcement

Prior to the planned / controlled release of a hazardous concentration of H_2S gas or any associated byproducts of the combustion of H_2S 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_2S 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_2S 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_2S 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_2S 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_2S gas or any associated byproducts of combustion.

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	Parker Simmons	432.400.1038	281.536.9813	
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	Stephanie Rabadue		432.260.4388	
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_2S 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.

2. Wind Indicators

a. 4 Windsocks will be installed at strategic points on the facility.

3. Danger Signs
   a. A warning sign indicating the possible well conditions will be displayed at the location entrance.

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

4. H_2S Detectors and Alarms
   a. Continuous monitoring type H_2S detectors, capable of sensing a minimum of 5ppm H_2S in air will be located centrally located at the tanks, heater treater, and combustor. Continuous monitoring type SO_2 detector will also be located at the combustor. The automatic H_2S 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_2S.

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_2S 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.

Permian Resources Corporation	H_2S Contingency Plan Weaver 27 St Com 121H, 122H	Eddy County, New Mexico

II. Directions to Location

FROM THE INTERSECTION OF GEORGE SHOUP RELIEF RTE AND CR-206 IN CARLSBAD, NEW MEXICO 1. GO NORTH ON CR-206 APPROX. 11.99 MILES, 2. TURN RIGHT ONTO LEASE ROAD AND GO SOUTHEAST APPROX. 4.24 MILES, 3. TURN LEFT AND GO NORTH APPROX. 0.71 MILES TO SOUTHEAST PAD CORNER

Permian Resources Corporation	H_2S Contingency Plan Weaver 27 St Com 121H, 122H	Eddy County, New Mexico

Plat of Location

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazon Road, Artec, NM 87410
District IV
1220 S. St Francis Dr., NM 87505
Phone: (505) 476-3460 Fax (505) 476-3462

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

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name

4 Property Code	5 Property Name	6 Well Number
	WEAVER 27 ST COM	#121H
7 OGRID No.	8 Operator Name	9 Elevation
	PERMIAN RESOURCES OPERATING, LLC	3,355'

10 Surface Location

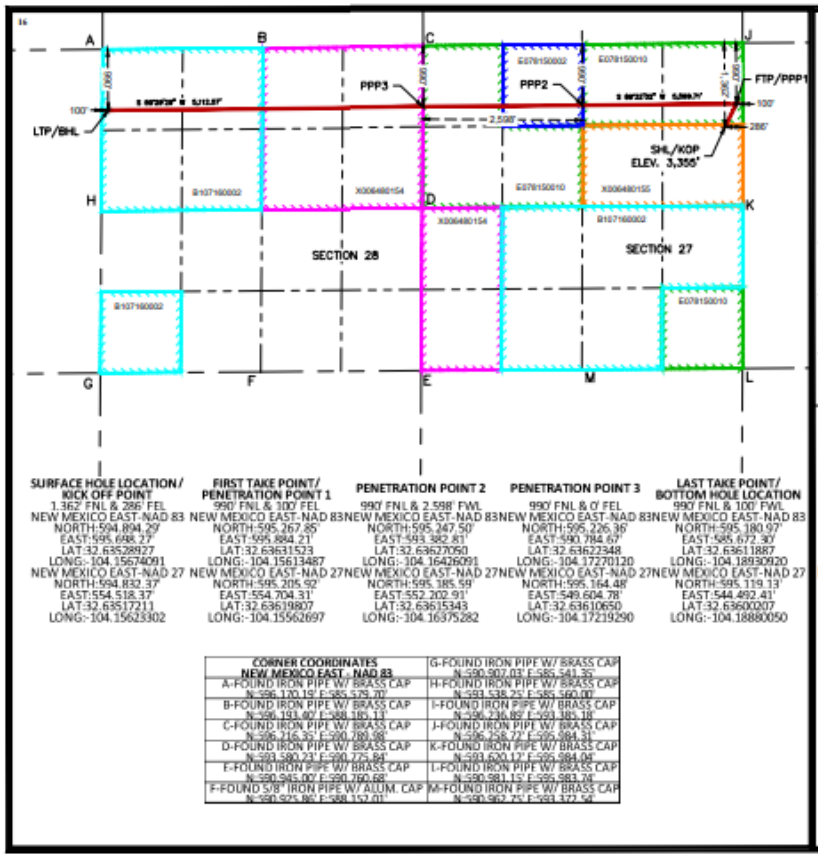
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	27	19 S	28 E		1,362'	NORTH	286'	EAST	EDDY

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	28	19 S	28 E		990'	NORTH	100'	WEST	EDDY

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.

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



SURFACE HOLE LOCATION / KICK OFF POINT	FIRST TAKE POINT / PENETRATION POINT 1	PENETRATION POINT 2	PENETRATION POINT 3	LAST TAKE POINT / BOTTOM HOLE LOCATION
1,362' FNL & 286' FEL	990' FNL & 100' FEL	990' FNL & 2,598' FWL	990' FNL & 0' FEL	990' FNL & 100' FWL
NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83	NEW MEXICO EAST-NAD 83
NORTH: 594,894.29'	NORTH: 595,267.85'	NORTH: 595,247.50'	NORTH: 595,226.36'	NORTH: 595,180.97'
EAST: 695,688.27'	EAST: 695,884.21'	EAST: 693,382.81'	EAST: 690,784.63'	EAST: 685,672.30'
LAT: 32.63528927	LAT: 32.63631523	LAT: 32.63627050	LAT: 32.63622348	LAT: 32.63611887
LONG: -104.15674091	LONG: -104.15613487	LONG: -104.16426091	LONG: -104.17270120	LONG: -104.18930920
NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27	NEW MEXICO EAST-NAD 27
NORTH: 594,832.37'	NORTH: 595,205.92'	NORTH: 595,185.59'	NORTH: 595,164.48'	NORTH: 595,119.13'
EAST: 654,518.37'	EAST: 654,704.31'	EAST: 652,202.91'	EAST: 649,604.78'	EAST: 644,492.41'
LAT: 32.63517211	LAT: 32.63619807	LAT: 32.63615343	LAT: 32.63610650	LAT: 32.63600207
LONG: -104.15623302	LONG: -104.15562697	LONG: -104.16375282	LONG: -104.17219290	LONG: -104.18880050

CORNER COORDINATES NEW MEXICO EAST - NAD 83	
A-FOUND IRON PIPE W/ BRASS CAP N: 596,120.18' E: 695,579.70'	G-FOUND IRON PIPE W/ BRASS CAP N: 590,907.03' E: 695,541.35'
B-FOUND IRON PIPE W/ BRASS CAP N: 596,193.40' E: 688,185.13'	H-FOUND IRON PIPE W/ BRASS CAP N: 593,538.25' E: 695,560.08'
C-FOUND IRON PIPE W/ BRASS CAP N: 596,216.25' E: 690,780.68'	I-FOUND IRON PIPE W/ BRASS CAP N: 596,236.89' E: 693,385.18'
D-FOUND IRON PIPE W/ BRASS CAP N: 593,580.23' E: 690,775.84'	J-FOUND IRON PIPE W/ BRASS CAP N: 596,258.72' E: 695,584.31'
E-FOUND IRON PIPE W/ BRASS CAP N: 590,945.00' E: 690,769.68'	K-FOUND IRON PIPE W/ BRASS CAP N: 593,600.12' E: 695,584.04'
F-FOUND 5/8" IRON PIPE W/ ALUM. CAP N: 590,925.86' E: 688,157.01'	L-FOUND IRON PIPE W/ BRASS CAP N: 590,981.15' E: 695,583.74'
	M-FOUND IRON PIPE W/ BRASS CAP N: 590,962.75' E: 693,372.54'

17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

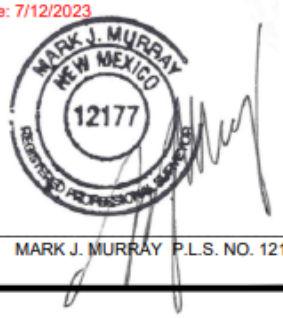
Printed Name Date

Email Address Date

18 SURVEYOR CERTIFICATION

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

Date: 7/12/2023



MARK J. MURRAY P.L.S. NO. 12177

Permian Resources Corporation	H_2S Contingency Plan Weaver 27 St Com 121H, 122H	Eddy County, New Mexico

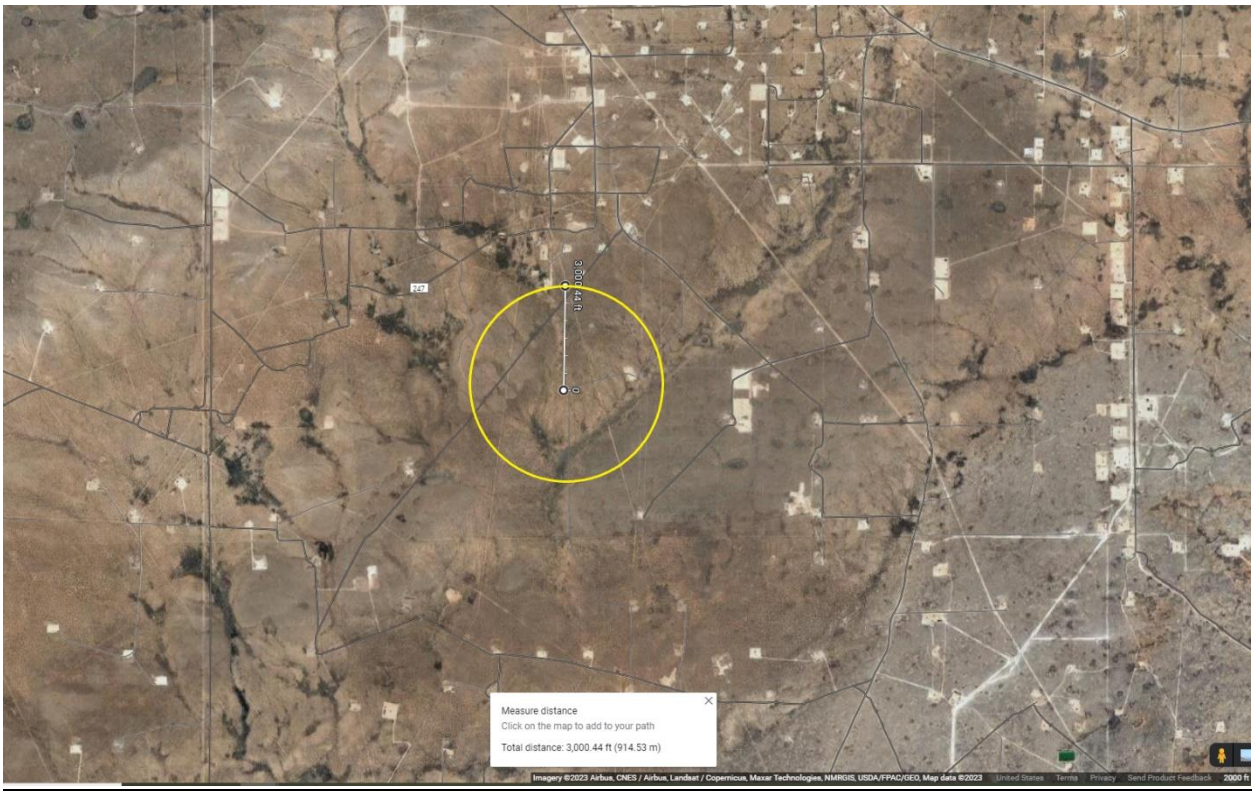
1. Routes of Ingress & Egress (MAP)

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

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

Permian Resources Corporation	H_2S Contingency Plan Weaver 27 St Com 121H, 122H	Eddy County, New Mexico

Map of 3000' ROE Perimeter



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

Enter H_2S 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: 32.63528927, Long: -104.15674091***

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 247, which is 4700' from the location.

Section 7.0 – Hazard Communication

I. Physical Characteristics of Hydrogen Sulfide Gas

Hydrogen sulfide (H_2S) is a colorless, poisonous gas that is soluble in water. It can be present in crude oils, condensates, natural gas and wastewater streams.

H_2S is heavier than air with a vapor density of 1.189 (air = 1.0); however, H_2S is most often mixed with other gases. These mixtures of H_2S and other gases can be heavier or lighter than air. If the H_2S-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_2S 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_2S

Properties of H2S	Description
Vapor Density > 1 = 1.189 Air = 1	▪ H2S gas is slightly heavier than air, which can cause it to settle in low places and build in concentration. ▪ Produced as a mixture with other gases associated with oil and gas production.
Flammable Range 4.3%-46% 43000 ppm – 460000 ppm	▪ H2S can be extremely flammable / explosive when these concentrations are reached by volume in air.

Although H_2S 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_2S 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

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_2S and its associated byproducts from combustion presents a serious environmental hazard. Sulphur Dioxide SO_2 is produced as a constituent of flaring H_2S Gas and can present hazards associated, which are similar to H_2S. Although SO_2 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
$\%SO_2$	PPM	
0.0005	3 to 5	Pungent odor-normally a person can detect SO_2 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_2S Information

PEL, IDLH, TLV	Description
NIOSH PEL 10 PPM	▪ PEL is the Permissible Exposure Limit that an employee may be exposed up to 8 hr / day.
OSHA General Industry Ceiling PEL – 20 PPM	▪ The maximum exposure limit, which cannot be exceeded for any length of time.
IDLH 100 PPM	▪ Immediately Dangerous to Life and Health
Permian Resources PEL 10 PPM	▪ Permian Resources Policy Regarding H2S for employee safety

III. New Mexico OCD & BLM – H_2S 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_2S contingency plan for sites where the H_2S concentrations are as follows.

Table 8.1. Calculating H_2S Radius of Exposure

H_2S Radius of Exposure	Description	Control and Equipment Requirements
100 ppm	Distance from a release to where the H_2S 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_2S 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_2S Radius of Exposure

The ROE of an H_2S release is calculated to determine if a potentially hazardous volume of H_2S gas at 100 or 500 parts per million (ppm) is within a regulated distance requiring further action. If information about the concentration of H_2S 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**:

$x = [(1.589)\ (\text{mole fraction } H_2S)(Q)]^{(.6258)}$.

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

$x = [(0.4546)\ (\text{mole fraction } H_2S)(Q)]^{(.6258)}$.

Table 8.2. Calculating H2S 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^3/d)** normalized to standard temperature and pressure, 60°F and 14.65 psia
Mole fraction H_2S =	Mole fraction of H_2S 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_2S handled by that system element for which the ROE is calculated.
- For existing gas wells, the current adjusted open-flow rate, or the operator's estimate of the well's capacity to flow against zero back-pressure at the wellhead.

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

- Two cleared areas will be designated as Safe Briefing Areas. During an emergency, personnel will assemble in one of these areas for instructions from the Permian Resources Person-in-Charge. Prevailing wind direction should be considered in locating the briefing areas 200' or more on either side of the well head. One area should offset the other at an angle of 45° to 90° with respect to prevailing wind direction to allow for wind shifts during the work period.
- 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_2S 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_2S 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_2S as part of routine or maintenance work.

- The hazards, characteristics, and properties of hydrogen sulfide (H_2S) and (SO_2).
- Sources of H_2S and SO_2.
- Proper use of H_2S and SO_2 detection methods used at the workplace.
- Recognition of, and proper response to, the warning signals initiated by H_2S and SO_2 detection systems in use at the workplace.
- Symptoms of H_2S exposure; symptoms of SO_2 exposure
- Rescue techniques and first aid to victims of H_2S and SO_2 exposure.
- Proper use and maintenance of breathing equipment for working in H_2S and SO_2 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_2S and SO_2.
- 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_2S Monitors

All personnel engaged in planned or unplanned work activity to mitigate the release of a hazardous concentration of H_2S shall have on their person a personal H2S monitor.

II. Fixed H_2S Detection and Alarms

- 4 channel H_2S monitor
- 4 wireless H_2S monitors
- H_2S 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_2S 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_2S levels present, or if initial measurements are to be taken of H_2S levels.
- During rescue of employees suspected of H_2S 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.

Appendix A
H_2S SDS

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

SECTION 1: Identification

1.1. Product identifier

Product form	:	Substance
Name	:	Hydrogen sulfide
CAS No	:	7783-06-4
Formula	:	H2S
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

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 :

GHS02 GHS04 GHS06 GHS07

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

PRAXAIR

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

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 (H2S) / 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

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.

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/m³)	21 mg/m³
Canada (Quebec)	VECD (ppm)	15 ppm
Canada (Quebec)	VEMP (mg/m³)	14 mg/m³
Canada (Quebec)	VEMP (ppm)	10 ppm
Alberta	OEL Ceiling (mg/m³)	21 mg/m³
Alberta	OEL Ceiling (ppm)	15 ppm
Alberta	OEL TWA (mg/m³)	14 mg/m³
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/m³)	21 mg/m³
New Brunswick	OEL STEL (ppm)	15 ppm
New Brunswick	OEL TWA (mg/m³)	14 mg/m³
New Brunswick	OEL TWA (ppm)	10 ppm
New Foundland & Labrador	OEL STEL (ppm)	5 ppm
New Foundland & Labrador	OEL TWA (ppm)	1 ppm
Nova Scotia	OEL STEL (ppm)	5 ppm
Nova Scotia	OEL TWA (ppm)	1 ppm
Nunavut	OEL Ceiling (mg/m³)	28 mg/m³
Nunavut	OEL Ceiling (ppm)	20 ppm
Nunavut	OEL STEL (mg/m³)	21 mg/m³
Nunavut	OEL STEL (ppm)	15 ppm
Nunavut	OEL TWA (mg/m³)	14 mg/m³
Nunavut	OEL TWA (ppm)	10 ppm
Northwest Territories	OEL STEL (ppm)	15 ppm

Hydrogen sulfide (7783-06-4)		
Northwest Territories	OEL TWA (ppm)	10 ppm
Ontario	OEL STEL (ppm)	15 ppm
Ontario	OEL TWA (ppm)	10 ppm
Prince Edward Island	OEL STEL (ppm)	5 ppm
Prince Edward Island	OEL TWA (ppm)	1 ppm
Québec	VECD (mg/m³)	21 mg/m³
Québec	VECD (ppm)	15 ppm
Québec	VEMP (mg/m³)	14 mg/m³
Québec	VEMP (ppm)	10 ppm
Saskatchewan	OEL STEL (ppm)	15 ppm
Saskatchewan	OEL TWA (ppm)	10 ppm
Yukon	OEL STEL (mg/m³)	27 mg/m³
Yukon	OEL STEL (ppm)	15 ppm
Yukon	OEL TWA (mg/m³)	15 mg/m³
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.

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

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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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

SECTION 13: Disposal considerations

13.1. Disposal methods

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

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG)	: UN1053
TDG Primary Hazard Classes	: 2.3 - Class 2.3 - Toxic Gas.
TDG Subsidiary Classes	: 2.1
Proper shipping name	: HYDROGEN SULPHIDE
ERAP Index	: 500
Explosive Limit and Limited Quantity Index	: 0
Passenger Carrying Ship Index	: Forbidden
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	: Forbidden

14.3. Air and sea transport

IMDG

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

IATA

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

SECTION 15: Regulatory information

15.1. National regulations

Hydrogen sulfide (7783-06-4)

Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Hydrogen sulfide (7783-06-4)

Listed on the AICS (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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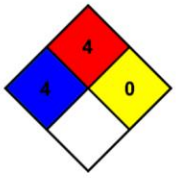
Hydrogen sulfide

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

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. 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). PRAXAIR and the Flowing Airstream design are trademarks or registered trademarks of Praxair Technology, Inc. in the United States and/or other countries.
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.

Appendix B

Permian Resources Corporation	H_2S Contingency Plan Weaver 27 St Com 121H, 122H	Eddy County, New Mexico

SO_2 SDS

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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(SO2); SULFUR OXIDE; SULFUR OXIDE(SO2)
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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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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Material Name: SULFUR DIOXIDE **SDS ID: MAT22290**

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

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

Unsuitable Extinguishing Media

None known.

Special Hazards Arising from the Chemical

Negligible fire hazard.

Hazardous Combustion Products

sulfur oxides

Fire Fighting Measures

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

Special Protective Equipment and Precautions for Firefighters

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

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up

Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Ventilate closed spaces before entering. Evacuation radius: 150 feet. Stop leak if possible without personal risk. Reduce vapors with water spray. Do not get water directly on material.

Environmental Precautions

Avoid release to the environment.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

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

Conditions for Safe Storage, Including any Incompatibilities

Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Protect from sunlight.
Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Keep separated from incompatible substances.

Incompatible Materials

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

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

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

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Material Name: SULFUR DIOXIDE **SDS ID: MAT22290**

NIOSH:	2 ppm TWA ; 5 mg/m3 TWA
	5 ppm STEL ; 13 mg/m3 STEL
	100 ppm IDLH
OSHA (US):	5 ppm TWA ; 13 mg/m3 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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Material Name: SULFUR DIOXIDE **SDS ID: MAT22290**

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

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

Section 10 - STABILITY AND REACTIVITY

Reactivity
No reactivity hazard is expected.
Chemical Stability
Stable at normal temperatures and pressure.
Possibility of Hazardous Reactions
Will not polymerize.
Conditions to Avoid
Minimize contact with material. Containers may rupture or explode if exposed to heat.
Incompatible Materials
bases, combustible materials, halogens, metal carbide, metal oxides, metals, oxidizing materials, peroxides, reducing agents
Hazardous decomposition products
oxides of sulfur

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure
Inhalation
Toxic if inhaled. Causes damage to respiratory system, burns, difficulty breathing
Skin Contact
skin burns
Eye Contact
eye burns
Ingestion
burns, nausea, vomiting, diarrhea, stomach pain
Acute and Chronic Toxicity
Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and the following selected endpoints are published:
Sulfur dioxide (7446-09-5)
Inhalation LC50 Rat 965 - 1168 ppm 4 h
Product Toxicity Data
Acute Toxicity Estimate
No data available.
Immediate Effects

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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.

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

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

U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

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

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

WARNING

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

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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; Sc - Semi-quantitative; STEL - Short-term Exposure Limit;