Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM137445

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

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

8. Lease Name and Well No.
CHES RIDDLE FED COM
226H

2. Name of Operator
MATADOR PRODUCTION COMPANY

9. API Well No.
30 015 47028

3a. Address
5400 LBJ Freeway, Suite 1500 Dallas TX 75240

3b. Phone No. *(include area code)*
(972)371-5200

10. Field and Pool, or Exploratory
JENNINGS; BONE SPRING, WEST / ANT

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface SENE / 1927 FNL / 504 FEL / LAT 32.2489789 / LONG -104.0511406
At proposed prod. zone SENE / 2336 FNL / 240 FEL / LAT 32.2478987 / LONG -104.0331076

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 2 / T24S / R28E / NMP

14. Distance in miles and direction from nearest town or post office*
2 miles

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)
504 feet

16. No of acres in lease
80

17. Spacing Unit dedicated to this well
320

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.
30 feet

19. Proposed Depth
10403 feet / 15552 feet

20. BLM/BIA Bond No. in file
FED: NMB001079

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
2979 feet

22. Approximate date work will start*
12/31/2018

23. Estimated duration
30 days

24. Attachments

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

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

25. Signature
(Electronic Submission)

Name *(Printed/Typed)*
Lara Thompson / Ph: (505)254-1115

Date
09/24/2018

Title
Assistant Project Manager

Approved by *(Signature)*
(Electronic Submission)

Name *(Printed/Typed)*
Cody Layton / Ph: (575)234-5959

Date
04/08/2020

Title
Assistant Field Manager Lands & Minerals

Office
CARLSBAD

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

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

APPROVED WITH CONDITIONS

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 04/08/2020

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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

FORM C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ **AMENDED REPORT**

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1]API Number	[2]Pool Code	[3]Pool Name
30 015 47028		

[4]Property Code	[5]Property Name	[6]Well Number
328110	CHES RIDDLE FED COM	#226H

[7]OGRID No.	[8]Operator Name	[9]Elevation
228937	MATADOR PRODUCTION COMPANY	2979'

[10]Surface Location

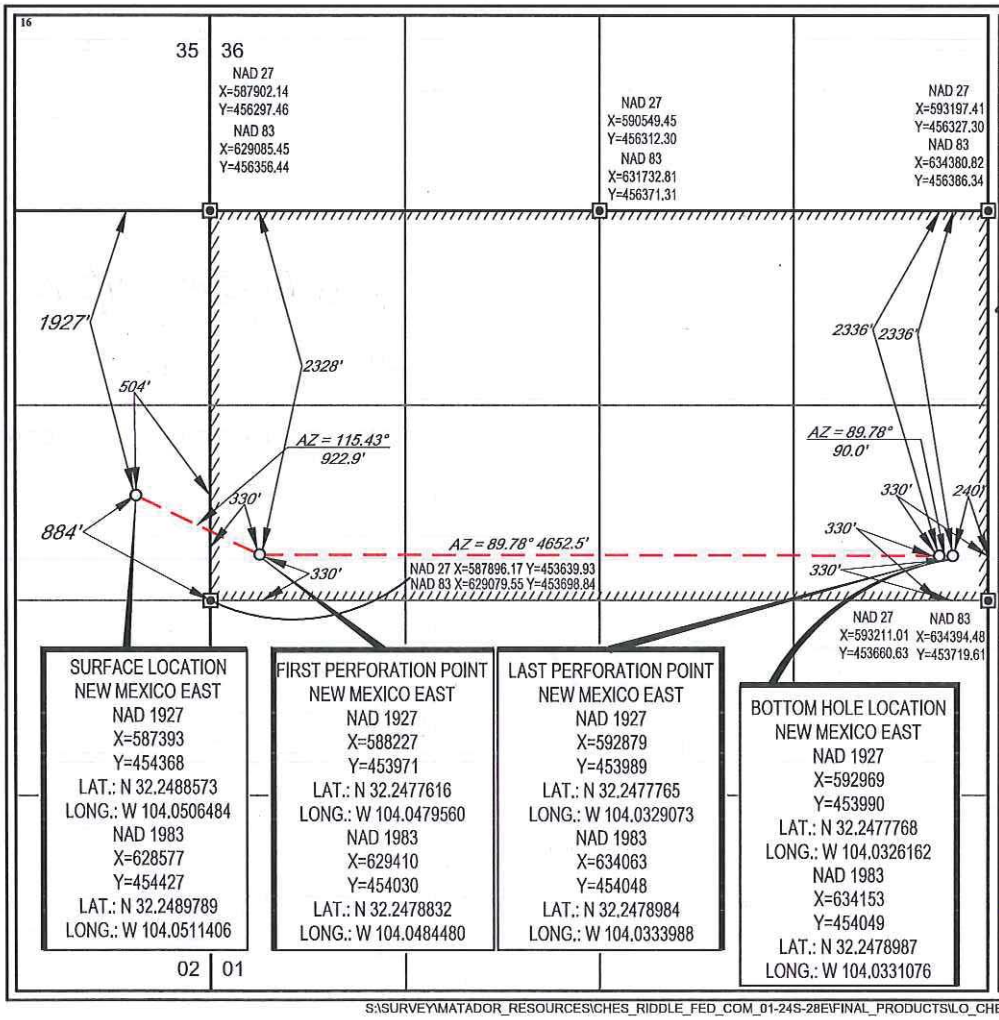
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	02	24-S	28-E	–	1927'	NORTH	504'	EAST	EDDY

[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
H	01	24-S	28-E	–	2336'	NORTH	240'	EAST	EDDY

[12]Dedicated Acres	[13]Joint or Infill	[14]Consolidation Code	[15]Order No.
~~319.36~~	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.



[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.

Lara Thompson 9/6/18
Signature Date

Lara Thompson
Printed Name

lara.thompson@swca.com
E-mail Address

[18]SURVEYOR CERTIFICATION

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

06/18/2018
Date of Survey
Signature and Seal of Professional Surveyor

MICHAEL BROWN
NEW MEXICO
18329
PROFESSIONAL SURVEYOR

Certificate Number

S:\SURVEY\MATADOR_RESOURCES\CHES_RIDDLE_FED_COM_01-24S-28E\FINAL_PRODUCTS\LO_CHES_RIDDLE_FED_COM_226H_REV2.DWG 7/18/2018 2:50:01 PM bgregory

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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
	2220	Antelope Ridge

[4]Property Code	[5]Property Name	[6]Well Number
	CHES RIDDLE FED COM	#226H

[7]OGRID No.	[8]Operator Name	[9]Elevation
	MATADOR PRODUCTION COMPANY	2979'

[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
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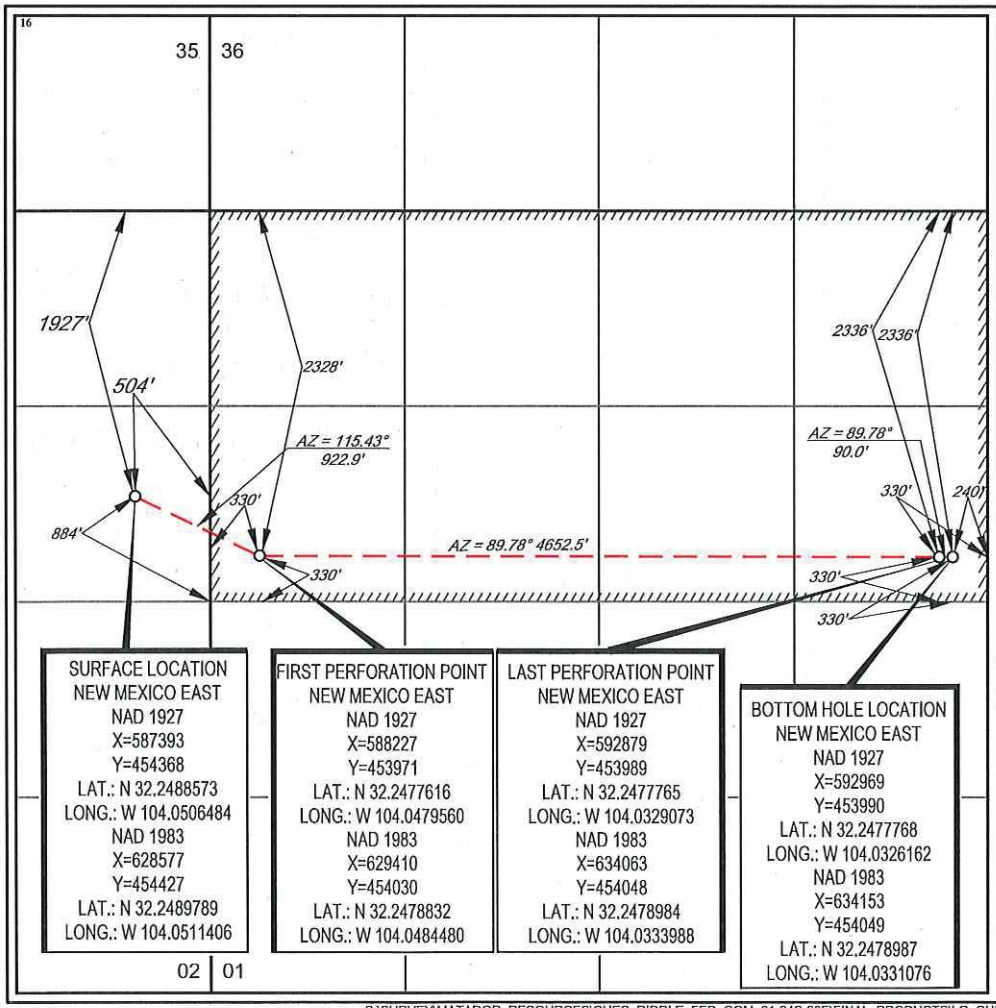
[12]Dedicated Acres	[13]Joint or Infill	[14]Consolidation Code	[15]Order No.
319.36			

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.



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Lara Thompson 9/6/18
Signature Date

Lara Thompson
Printed Name

lara.thompson@swca.com
E-mail Address

[18]SURVEYOR CERTIFICATION

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

06/18/2018
Date of Survey
Signature and Seal of Professional Surveyor

MICHAEL BROWN
NEW MEXICO
18329
PROFESSIONAL SURVEYOR

Certificate Number

S:\SURVEY\MATADOR_RESOURCES\CHES_RIDDLE_FED_COM_01-24S-28E\FINAL_PRODUCTS\LO_CHES_RIDDLE_FED_COM_226H_REV2.DWG 7/18/2018 2:50:00 PM bgregory

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Matador Production Company
WELL NAME & NO.:	Ches Riddle Fed Com 226H
SURFACE HOLE FOOTAGE:	1927'/N & 504'/E
BOTTOM HOLE FOOTAGE	2336'/N & 240'/E
LOCATION:	Section 2, T.24 S., R.28 E., NMPM
COUNTY:	Eddy County, New Mexico

COA

H2S	○ Yes	◉ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	◉ Medium	○ High
Cave/Karst Potential	○ Critical		
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	○ Conventional	○ Multibowl	◉ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☐ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☑ COM	☐ Unit

A. HYDROGEN SULFIDE

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

B. CASING

Casing Design:

1. The **13-3/8** inch surface casing shall be set at approximately **448** feet (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The **13-3/8** inch intermediate casing shall be set at approximately **2739** feet. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

Option 1 (Single Stage):

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

Option 2:

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

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

b. Second stage above DV tool:

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

❖ In **Medium Cave/Karst Areas** if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

3. The minimum required fill of cement behind the **7 5/8 x 7** inch 2nd intermediate casing is:

Option 1 (Single Stage):

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

Option 2:

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

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

b. Second stage above DV tool:

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

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

- Cement should tie-back **200 feet** into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

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

2.

Option 1:

a. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.

b. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **5000 (5M)** psi.

Option 2:

1. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
c. Manufacturer representative shall install the test plug for the initial BOP test.
d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

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

GENERAL REQUIREMENTS

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

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

☒ Eddy County
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, (575) 361-2822

☒ Lea County
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575) 393-3612

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

   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig
      - Notify the BLM when moving in and removing the Spudder Rig.
      - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.

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

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

A. CASING

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

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

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

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

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

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

7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

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

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

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

    a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
    b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
    c. Manufacturer representative shall install the test plug for the initial BOP test.
    d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
    e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

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

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

lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).

c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

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

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

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

h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

NMK04022020

Operator Certification Data Report

04/08/2020

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME: Lara Thompson **Signed on:** 09/10/2018

Title: Assistant Project Manager

Street Address: 5647 Jefferson Street NE

City: Albuquerque **State:** NM **Zip:** 87109

Phone: (505)254-1115

Email address: Lara.Thompson@swca.com

Field Representative

Representative Name:

Street Address:

City: **State:** **Zip:**

Phone:

Email address:

APD ID: 10400033874 **Submission Date:** 09/24/2018

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400033874 **Tie to previous NOS?** N **Submission Date:** 09/24/2018

BLM Office: CARLSBAD **User:** Lara Thompson **Title:** Assistant Project Manager

Federal/Indian APD: FED **Is the first lease penetrated for production Federal or Indian?** FED

Lease number: NMNM137445 **Lease Acres:** 80

Surface access agreement in place? **Allotted?** **Reservation:**

Agreement in place? NO **Federal or Indian agreement:**

Agreement number:

Agreement name:

Keep application confidential? YES

Permitting Agent? YES **APD Operator:** MATADOR PRODUCTION COMPANY

Operator letter of designation:

Operator Info

Operator Organization Name: MATADOR PRODUCTION COMPANY

Operator Address: 5400 LBJ Freeway, Suite 1500 **Zip:** 75240

Operator PO Box:

Operator City: Dallas **State:** TX

Operator Phone: (972)371-5200

Operator Internet Address: amonroe@matadorresources.com

Section 2 - Well Information

Well in Master Development Plan? NO **Master Development Plan name:**

Well in Master SUPO? NO **Master SUPO name:**

Well in Master Drilling Plan? NO **Master Drilling Plan name:**

Well Name: CHES RIDDLE FED COM **Well Number:** 226H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** JENNINGS; BONE SPRING, WEST **Pool Name:** ANTELOPE RIDGE; BS, NORTH

Is the proposed well in an area containing other mineral resources? NATURAL GAS,OIL

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

Is the proposed well in an area containing other mineral resources? NATURAL GAS,OIL

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** NO **New surface disturbance?**

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** SLOT 2 **Number:** 5

Well Class: HORIZONTAL **Number of Legs:** 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: APPRAISAL

Describe sub-type:

Distance to town: 2 Miles **Distance to nearest well:** 30 FT **Distance to lease line:** 504 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: ChesRiddleFedCom_226H_20180924115751.pdf

Well work start Date: 12/31/2018 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: **Reference Datum:**

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
SHL Leg #1	1927	FNL	504	FEL	24S	28E	2	Aliquot SENE	32.2489789	-104.0511406	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	2979	0	0	
KOP Leg #1	1927	FNL	504	FEL	24S	28E	2	Aliquot SENE	32.2489789	-104.0511406	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-6845	9843	9824	
PPP Leg #1-1	2310	FNL	2640	FEL	24S	28E	2	Aliquot SWNE	32.5239	-104.242792	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 081922	-7424	13130	10403	

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
PPP Leg #1-2	2310	FNL	1320	FWL	24S	28E	2	Aliquot SENW	32.5239	-104.242792	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 137445	-7424	11810	10403	
PPP Leg #1-3	2328	FNL	330	FWL	24S	28E	2	Aliquot SWNW	32.2478832	-104.048448	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-7424	10810	10403	
EXIT Leg #1	2336	FNL	330	FEL	24S	28E	2	Aliquot SENE	32.2478984	-104.0333988	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-7424	15462	10403	
BHL Leg #1	2336	FNL	240	FEL	24S	28E	2	Aliquot SENE	32.2478987	-104.0331076	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-7424	15552	10403	

APD ID: 10400033874 **Submission Date:** 09/24/2018

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
298680	TOP SALT	2506	450	450		NONE	N
298681	CASTILE	1499	1007	1007		NONE	N
298682	BASE OF SALT	-141	2647	2647		NONE	N
298683	BELL CANYON	-185	2691	2691		NATURAL GAS, OIL	N
298684	CHERRY CANYON	-1043	3549	3549		NATURAL GAS, OIL	N
298685	BRUSHY CANYON	-2226	4732	4732		NATURAL GAS, OIL	N
298686	BONE SPRING LIME	-3824	6330	6330		NATURAL GAS, OIL	N
298687	BONE SPRING 1ST	-4561	7067	7067		NATURAL GAS, OIL	N
298688	BONE SPRING 2ND	-5030	7536	7536		NATURAL GAS, OIL	N
298689	BONE SPRING 3RD	-5989	8495	8495		NATURAL GAS, OIL	N
298690	WOLFCAMP	-7073	9579	9597		NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 5M **Rating Depth:** 12000

Equipment: A 12,000' 5000-psi BOP stack consisting of 3 rams with 2 pipe rams, 1 blind ram, and one annular preventer will be utilized below surface casing to TD. See attachments for BOP and choke manifold diagrams. An accumulator complying with Onshore Order #2 requirements for the pressure rating of the BOP stack will be present. A rotating head will also be installed as needed.

Requesting Variance? YES

Variance request: Matador requests a variance to have the option of running a speed head for setting the Intermediate 1, Intermediate 2, and Production Strings. Matador requests a variance to drill this well using a co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. If the specific hose is not available, then one of equal or higher rating will be used. Matador requests a variance to have the option of batch drilling this well with other wells on the same pad. In the event that this well is batch drilled, the

wellbore will be secured with a blind flange of like pressure. When the rig returns to this well and BOPs are installed, the operator will perform a full BOP test. Matador requests a variance to run 7-5/8" BTC casing inside 9-5/8" BTC casing which will be less than the 0.422" stand off regulation. Matador has met with Christopher Walls and Mustafa Haque as well as other BLM representatives and determined that this would be acceptable as long as the 7-5/8" flush casing was run throughout the entire 300' cement tie back section between 9-5/8" and 7-5/8" casing.

Testing Procedure: BOP will be inspected and operated as required in Onshore Order #2. Kelly cock and sub equipped with a full opening valve sized to fit the drill pipe and collars will be available on the rig floor in the open position. A third party company will test the BOPs. After setting surface casing, a minimum 5M BOPE system will be installed. Test pressures will be 250 psi low and 5000 psi high with the annular being tested to 250 psi low and 2500 psi high before drilling below surface shoe. In the event that the rig drills multiple wells on the pad and any seal subject to test pressures are broken, a full BOP test will be performed when the rig returns and the 5M BOPE system is re-installed.

Choke Diagram Attachment:

BLM_5M_BOP_System_20180907133138.pdf

BOP Diagram Attachment:

BOP_809_001_20180907133157.pdf

809_CoFlex_Certs__20180907133219.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	17.5	13.375	NEW	API	N	0	475	0	475			475	J-55	54.5	BUTT	1.125	1.125	BUOY	1.8	BUOY	1.8
2	INTERMEDIATE	8.75	7.625	NEW	API	Y	0	2441	0	2441			2441	P-110	29.7	BUTT	1.125	1.125	BUOY	1.8	BUOY	1.8
3	INTERMEDIATE	12.25	9.625	NEW	API	N	0	2741	0	2741			2741	J-55	40	BUTT	1.125	1.125	BUOY	1.8	BUOY	1.8
4	PRODUCTION	6.125	5.5	NEW	NON API	Y	0	9643	0	9643			9643	P-110	20	OTHER - DWC/C-IS MS	1.125	1.125	BUOY	1.8	BUOY	1.8
5	INTERMEDIATE	8.75	7.625	NEW	NON API	Y	2441	9743	2441	9743			7302	P-110	29.7	OTHER - VAM HTF-NR	1.125	1.125	BUOY	1.8	BUOY	1.8
6	INTERMEDIATE	8.75	7.0	NEW	API	Y	9743	10643	9743	10388			900	P-110	29	BUTT	1.125	1.125	BUOY	1.8	BUOY	1.8
7	PRODUCTION	6.125	4.5	NEW	NON API	Y	9643	15552	9643	10403			5909	P-110	13.5	OTHER - DWC/C-IS HT	1.125	1.125	BUOY	1.8	BUOY	1.8

Casing Attachments

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

BLM_Casing_Design_Assumptions_4_string_20190709121435.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Tapered_String_Spec_Ches_Riddle_Fed_Com__226H_20180910145106.pdf

Casing Design Assumptions and Worksheet(s):

BLM_Casing_Design_Assumptions_4_string_20190709121458.pdf

Casing ID: 3 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

BLM_Casing_Design_Assumptions_4_string_20190709121447.pdf

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

Casing Attachments

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

Inspection Document:

Spec Document:

5.500in_x_20__VST_P110EC_DWC_C_IS_MS_CDS_20190709122109.PDF

Tapered String Spec:

Tapered_String_Spec_Ches_Riddle_Fed_Com__226H_20180910145208.pdf

Casing Design Assumptions and Worksheet(s):

BLM_Casing_Design_Assumptions_4_string_20190709121514.pdf

Casing ID: 5 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

VRCC_16_1177___CDS___7.625_in_29.70_ppf_P110_EC_VAM_HTF_NR_Rev02_20190709121918.pdf

Tapered String Spec:

Tapered_String_Spec_Ches_Riddle_Fed_Com__226H_20190709121928.pdf

Casing Design Assumptions and Worksheet(s):

BLM_Casing_Design_Assumptions_4_string_20190709122928.pdf

Casing ID: 6 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Tapered_String_Spec_Ches_Riddle_Fed_Com__226H_20190709122029.pdf

Casing Design Assumptions and Worksheet(s):

BLM_Casing_Design_Assumptions_4_string_20190709122902.pdf

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

Casing Attachments

Casing ID: 7 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

4.500in_x_13.50___0.290in__VST_P110EC_DWC_C_HT_IS_Tubing_CDS_20190709122222.PDF

Tapered String Spec:

Tapered_String_Spec_Ches_Riddle_Fed_Com__226H_20190709122230.pdf

Casing Design Assumptions and Worksheet(s):

BLM_Casing_Design_Assumptions_4_string_20190709122848.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	175	200	1.72	12.5	339	100	C	5% NaCl + LCM
SURFACE	Tail		175	475	330	1.38	14.8	452	100	C	5% NaCl + LCM
INTERMEDIATE	Lead		0	2193	500	2.13	12.6	1065	50	C	Bentonite + 1% CaCL2 + 8% NaCl + LCM
INTERMEDIATE	Tail		2193	2741	210	1.38	14.8	292	50	C	5% NaCl + LCM
INTERMEDIATE	Lead		2441	9643	460	2.13	11	977	35	TXI	Fluid Loss + Dispersant + Retarder + LCM
INTERMEDIATE	Tail		9643	10643	170	1.38	14.8	233	35	TXI	Fluid Loss + Dispersant + Retarder + LCM
INTERMEDIATE	Lead		2441	9643	460	2.13	11	977		TXI	Fluid Loss + Dispersant + Retarder + LCM
INTERMEDIATE	Tail		9643	10643	170	1.38	14.8	233		TXI	Fluid Loss + Dispersant + Retarder + LCM
INTERMEDIATE	Lead		2441	9643	460	2.13	11	977		TXI	Fluid Loss + Dispersant + Retarder + LCM
INTERMEDIATE	Tail		9643	10643	170	1.38	14.8	233		TXI	Fluid Loss + Dispersant + Retarder + LCM
PRODUCTION	Lead		10143	15552	490	1.17	15.8	569		TXI	Fluid Loss + Dispersant + Retarder + LCM

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		10143	15552	490	1.17	15.8	569	10	H	Fluid Loss + Dispersant + Retarder + LCM

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

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

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

Describe what will be on location to control well or mitigate other conditions: All necessary mud products (barite, bentonite, LCM) for weight addition and fluid loss control will be on location at all times. Mud program is subject to change due to hole conditions.
Describe the mud monitoring system utilized: An electronic Pason mud monitoring system complying with Onshore Order 2 will be used.

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	475	SPUD MUD	8.4	8.8							
475	2741	SALT SATURATED	9.5	10.2							
2741	10388	OTHER : FW/Cut Brine	8.4	9.4							
10388	10403	OIL-BASED MUD	11.5	12.5							

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: CHES RIDDLE FED COM **Well Number:** 226H

Section 6 - Test, Logging, Coring

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

No core or drill stem test is planned.
A 2-person mud logging program will be used from Intermediate 2 Casing shoe to TD.
No electric logs are planned at this time. GR will be collected through the MWD tools from Intermediatecasing to TD. CBL with CCL will be run as far as gravity will let it fall to top of curve.

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

CBL,GR,MUDLOG

Coring operation description for the well:

NA

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 6762 **Anticipated Surface Pressure:** 4473.34

Anticipated Bottom Hole Temperature(F): 160

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? NO

Hydrogen sulfide drilling operations plan:

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Matador_Ches_Riddle_Fed_Com_226H_Rev_A.0_Wellpath_20180907153525.pdf
Matador_Ches_Riddle_Fed_Com_226H_Rev_A.0_HSE_Risk_Clearance_20180907153903.pdf
Matador_Ches_Riddle_Fed_Com_226H_Rev_A.0_Plot_20180907153906.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Other Variance attachment:

Close_Loop_System_20180907153600.docx
4_String_Wellhead_Diagram_20180907153608.pdf
Drill_Plan_Ches_Riddle_Fed_Com__226H_20180910145902.pdf

H2S_Emergency_Contacts_20190709125820.docx

Matador_Hydrogen_Sulfide_Drilling_Original_20190709125820.docx

MRC_Energy_Co__Drilling_Contingency_plan_20190709125821.doc

Gas_Capture_Plan___Ches_Riddle_Federal_Com__112H__122H__202H__222H__206H..._20190709125839.pdf

Technical Specifications

Connection Type:	Size(O.D.):	Weight (Wall):	Grade:
DWC/C-IS MS Casing	5-1/2 in	20.00 lb/ft (0.361 in)	VST P110 EC
standard			

	Material
VST P110 EC	Grade
125,000	Minimum Yield Strength (psi)
135,000	Minimum Ultimate Strength (psi)
	Pipe Dimensions
5.500	Nominal Pipe Body O.D. (in)
4.778	Nominal Pipe Body I.D.(in)
0.361	Nominal Wall Thickness (in)
20.00	Nominal Weight (lbs/ft)
19.83	Plain End Weight (lbs/ft)
5.828	Nominal Pipe Body Area (sq in)
	Pipe Body Performance Properties
729,000	Minimum Pipe Body Yield Strength (lbs)
12,090	Minimum Collapse Pressure (psi)
14,360	Minimum Internal Yield Pressure (psi)
13,100	Hydrostatic Test Pressure (psi)
	Connection Dimensions
6.115	Connection O.D. (in)
4.778	Connection I.D. (in)
4.653	Connection Drift Diameter (in)
4.13	Make-up Loss (in)
5.828	Critical Area (sq in)
100.0	Joint Efficiency (%)
	Connection Performance Properties
729,000	Joint Strength (lbs)
26,040	Reference String Length (ft) 1.4 Design Factor
728,000	API Joint Strength (lbs)
729,000	Compression Rating (lbs)
12,090	API Collapse Pressure Rating (psi)
14,360	API Internal Pressure Resistance (psi)
104.2	Maximum Uniaxial Bend Rating [degrees/100 ft]
	Appoximated Field End Torque Values
16,100	Minimum Final Torque (ft-lbs)
18,600	Maximum Final Torque (ft-lbs)
21,100	Connection Yield Torque (ft-lbs)

VAM USA
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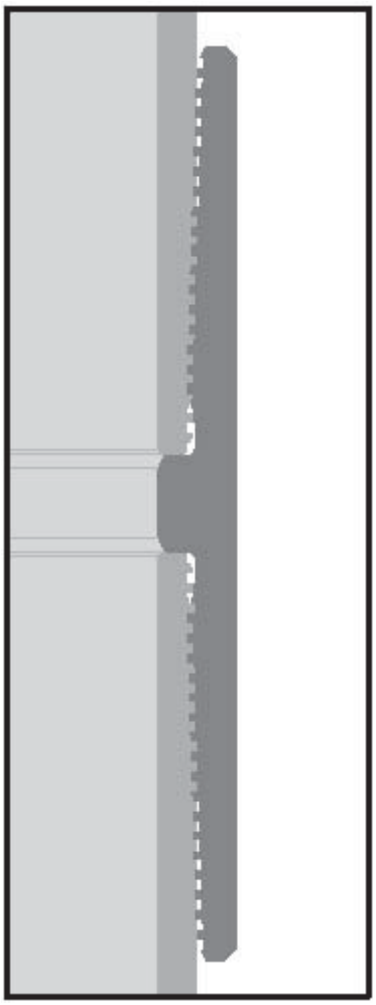
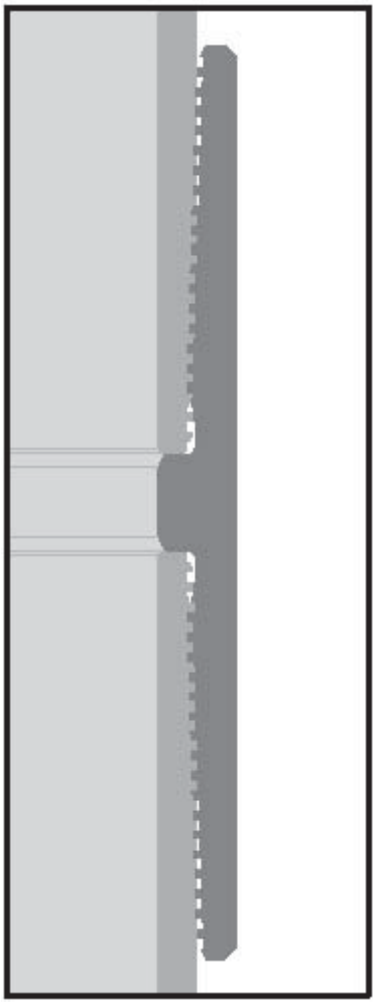


For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).

DWC Connection Data Notes:

1. DWC connections are available with a seal ring (SR) option.
2. All standard DWC/C connections are interchangeable for a give pipe OD. DWC connections are interchangeable with DWC/C-SR connections of the same OD and wall.
3. Connection performance properties are based on nominal pipe body and connection dimensions.
4. DWC connection internal and external pressure resistance is calculated using the API rating for buttress connections. API Internal pressure resistance is calculated from formulas 31, 32, and 35 in the API Bulletin 5C3.
5. DWC joint strength is the minimum pipe body yield strength multiplied by the connection critical area.
6. API joint strength is for reference only. It is calculated from formulas 42 and 43 in the API Bulletin 5C3.
7. Bending efficiency is equal to the compression efficiency.
8. The torque values listed are recommended. The actual torque required may be affected by field conditions such as temperature, thread compound, speed of make-up, weather conditions, etc.
9. Connection yield torque is not to be exceeded.
10. Reference string length is calculated by dividing the joint strength by both the nominal weight in air and a design factor (DF) of 1.4. These values are offered for reference only and do not include load factors such as bending, buoyancy, temperature, load dynamics, etc.
11. DWC connections will accommodate API standard drift diameters.



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Issued on: 12 Janv. 2017 by T. DELBOSCO

VRCC 16-1177 Rev02 for Houston Field Service

DATA ARE INFORMATIVE ONLY.
BASED ON SI_PD-101836 P&B

VAM® HTF-NR™

Connection Data Sheet

OD	Weight	Wall Th.	Grade	API Drift	Connection
7 5/8 in.	29.70 lb/ft	0.375 in.	P110 EC	6.750 in.	VAM® HTF NR

PIPE PROPERTIES		
Nominal OD	7.625	in.
Nominal ID	6.875	in.
Nominal Cross Section Area	8.541	sqin.
Grade Type	Enhanced API	
Min. Yield Strength	125	ksi
Max. Yield Strength	140	ksi
Min. Ultimate Tensile Strength	135	ksi
Tensile Yield Strength	1 068	klb
Internal Yield Pressure	10 760	psi
Collapse pressure	7 360	psi

CONNECTION PROPERTIES	
Connection Type	Premium Integral Flush
Connection OD (nom)	7.701 in.
Connection ID (nom)	6.782 in.
Make-Up Loss	4.657 in.
Critical Cross Section	4.971 sqin.
Tension Efficiency	58 % of pipe
Compression Efficiency	72.7 % of pipe
Compression Efficiency with Sealability	34.8 % of pipe
Internal Pressure Efficiency	100 % of pipe
External Pressure Efficiency	100 % of pipe

CONNECTION PERFORMANCES		
Tensile Yield Strength	619	klb
Compression Resistance	778	klb
Compression with Sealability	372	klb
Internal Yield Pressure	10 760	psi
External Pressure Resistance	7 360	psi
Max. Bending	44	°/100ft
Max. Bending with Sealability	17	°/100ft

TORQUE VALUES	
Min. Make-up torque	9 600 ft.lb
Opti. Make-up torque	11 300 ft.lb
Max. Make-up torque	13 000 ft.lb
Max. Torque with Sealability	58 500 ft.lb
Max. Torsional Value	73 000 ft.lb

VAM® HTF™ (High Torque Flush) is a flush OD integral connection providing maximum clearance along with torque strength for challenging applications such as extended reach and slim hole wells, drilling liner / casing, liner rotation to acheive better cementation in highly deviated and critical High Pressure / High Temperature wells.

Looking ahea on the outcoming testing industry standards, VAM® decided to create an upgraded design and launch on the market the VAM® HTF-NR as the new standard version of VAM® extreme high torque flush connection. The VAM® HTF-NR has extensive tests as per API RP 5C5:2015 CAL II which include the gas sealability having load points with bending, internal pressure and high temperature at 135°C.

Do you need help on this product? - Remember no one knows VAM® like VAM®

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australia@vamfieldservice.com

Over 180 VAM® Specialists available worldwide 24/7 for Rig Site Assistance

Tapered String Specification Sheet

Ches Riddle Fed Com #226H
SHL: 1927' FNL & 504' FEL Section 2
BHL: 2336' FNL & 240' FEL Section 1
Township/Range: 24S 28E
Elevation Above Sea Level: 2,979'

String	Hole Size (in)	Set MD (ft)	Set TVD (ft)	Casing Size (in)	Wt. (lb/ft)	Grade	Joint	Collapse	Burst	Tension
Surface	17.5	0 - 475	0 - 475	13.375	54.5	J-55	BUTT	1.125	1.125	1.8
Intermediate 1	12.25	0 - 2741	0 - 2741	9.625	40	J-55	BUTT	1.125	1.125	1.8
Intermediate 2 Top	8.75	0 - 2441	0 - 2441	7.625	29.7	P-110	BUTT	1.125	1.125	1.8
Intermediate 2 Middle	8.75	2441 - 9743	2441 - 9743	7.625	29.7	P-110	VAM HTF-NR	1.125	1.125	1.8
Intermediate 2 Bottom	8.75	9743 - 10643	9743 - 10388	7	29	P-110	BUTT	1.125	1.125	1.8
Production Top	6.125	0 - 9643	0 - 9643	5.5	20	P-110	DWC/C-IS MS	1.125	1.125	1.8
Production Bottom	6.125	9643 - 15552	9643 - 10403	4.5	13.5	P-110	DWC/C-IS HT	1.125	1.125	1.8

Tapered String Specification Sheet

Ches Riddle Fed Com #226H
SHL: 1927' FNL & 504' FEL Section 2
BHL: 2336' FNL & 240' FEL Section 1
Township/Range: 24S 28E
Elevation Above Sea Level: 2,979'

String	Hole Size (in)	Set MD (ft)	Set TVD (ft)	Casing Size (in)	Wt. (lb/ft)	Grade	Joint	Collapse	Burst	Tension
Surface	17.5	0 - 475	0 - 475	13.375	54.5	J-55	BUTT	1.125	1.125	1.8
Intermediate 1	12.25	0 - 2741	0 - 2741	9.625	40	J-55	BUTT	1.125	1.125	1.8
Intermediate 2 Top	8.75	0 - 2441	0 - 2441	7.625	29.7	P-110	BUTT	1.125	1.125	1.8
Intermediate 2 Middle	8.75	2441 - 9743	2441 - 9743	7.625	29.7	P-110	VAM HTF-NR	1.125	1.125	1.8
Intermediate 2 Bottom	8.75	9743 - 10643	9743 - 10388	7	29	P-110	BUTT	1.125	1.125	1.8
Production Top	6.125	0 - 9643	0 - 9643	5.5	20	P-110	DWC/C-IS MS	1.125	1.125	1.8
Production Bottom	6.125	9643 - 15552	9643 - 10403	4.5	13.5	P-110	DWC/C-IS HT	1.125	1.125	1.8

Tapered String Specification Sheet

Ches Riddle Fed Com #226H
SHL: 1927' FNL & 504' FEL Section 2
BHL: 2336' FNL & 240' FEL Section 1
Township/Range: 24S 28E
Elevation Above Sea Level: 2,979'

String	Hole Size (in)	Set MD (ft)	Set TVD (ft)	Casing Size (in)	Wt. (lb/ft)	Grade	Joint	Collapse	Burst	Tension
Surface	17.5	0 - 475	0 - 475	13.375	54.5	J-55	BUTT	1.125	1.125	1.8
Intermediate 1	12.25	0 - 2741	0 - 2741	9.625	40	J-55	BUTT	1.125	1.125	1.8
Intermediate 2 Top	8.75	0 - 2441	0 - 2441	7.625	29.7	P-110	BUTT	1.125	1.125	1.8
Intermediate 2 Middle	8.75	2441 - 9743	2441 - 9743	7.625	29.7	P-110	VAM HTF-NR	1.125	1.125	1.8
Intermediate 2 Bottom	8.75	9743 - 10643	9743 - 10388	7	29	P-110	BUTT	1.125	1.125	1.8
Production Top	6.125	0 - 9643	0 - 9643	5.5	20	P-110	DWC/C-IS MS	1.125	1.125	1.8
Production Bottom	6.125	9643 - 15552	9643 - 10403	4.5	13.5	P-110	DWC/C-IS HT	1.125	1.125	1.8

Tapered String Specification Sheet

Ches Riddle Fed Com #226H
SHL: 1927' FNL & 504' FEL Section 2
BHL: 2336' FNL & 240' FEL Section 1
Township/Range: 24S 28E
Elevation Above Sea Level: 2,979'

String	Hole Size (in)	Set MD (ft)	Set TVD (ft)	Casing Size (in)	Wt. (lb/ft)	Grade	Joint	Collapse	Burst	Tension
Surface	17.5	0 - 475	0 - 475	13.375	54.5	J-55	BUTT	1.125	1.125	1.8
Intermediate 1	12.25	0 - 2741	0 - 2741	9.625	40	J-55	BUTT	1.125	1.125	1.8
Intermediate 2 Top	8.75	0 - 2441	0 - 2441	7.625	29.7	P-110	BUTT	1.125	1.125	1.8
Intermediate 2 Middle	8.75	2441 - 9743	2441 - 9743	7.625	29.7	P-110	VAM HTF-NR	1.125	1.125	1.8
Intermediate 2 Bottom	8.75	9743 - 10643	9743 - 10388	7	29	P-110	BUTT	1.125	1.125	1.8
Production Top	6.125	0 - 9643	0 - 9643	5.5	20	P-110	DWC/C-IS MS	1.125	1.125	1.8
Production Bottom	6.125	9643 - 15552	9643 - 10403	4.5	13.5	P-110	DWC/C-IS HT	1.125	1.125	1.8

Tapered String Specification Sheet

Ches Riddle Fed Com #226H
SHL: 1927' FNL & 504' FEL Section 2
BHL: 2336' FNL & 240' FEL Section 1
Township/Range: 24S 28E
Elevation Above Sea Level: 2,979'

String	Hole Size (in)	Set MD (ft)	Set TVD (ft)	Casing Size (in)	Wt. (lb/ft)	Grade	Joint	Collapse	Burst	Tension
Surface	17.5	0 - 475	0 - 475	13.375	54.5	J-55	BUTT	1.125	1.125	1.8
Intermediate 1	12.25	0 - 2741	0 - 2741	9.625	40	J-55	BUTT	1.125	1.125	1.8
Intermediate 2 Top	8.75	0 - 2441	0 - 2441	7.625	29.7	P-110	BUTT	1.125	1.125	1.8
Intermediate 2 Middle	8.75	2441 - 9743	2441 - 9743	7.625	29.7	P-110	VAM HTF-NR	1.125	1.125	1.8
Intermediate 2 Bottom	8.75	9743 - 10643	9743 - 10388	7	29	P-110	BUTT	1.125	1.125	1.8
Production Top	6.125	0 - 9643	0 - 9643	5.5	20	P-110	DWC/C-IS MS	1.125	1.125	1.8
Production Bottom	6.125	9643 - 15552	9643 - 10403	4.5	13.5	P-110	DWC/C-IS HT	1.125	1.125	1.8

Casing Design Criteria and Load Case Assumptions

Surface Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

Intermediate #1 Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

Intermediate #2 Casing

Collapse: DF_C=1.125

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

Production Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Casing Design Criteria and Load Case Assumptions

Surface Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

Intermediate #1 Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

Intermediate #2 Casing

Collapse: DF_C=1.125

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

Production Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Casing Design Criteria and Load Case Assumptions

Surface Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

Intermediate #1 Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

Intermediate #2 Casing

Collapse: DF_C=1.125

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

Production Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Casing Design Criteria and Load Case Assumptions

Surface Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

Intermediate #1 Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

Intermediate #2 Casing

Collapse: DF_C=1.125

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

Production Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Casing Design Criteria and Load Case Assumptions

Surface Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

Intermediate #1 Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

Intermediate #2 Casing

Collapse: DF_C=1.125

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

Production Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Casing Design Criteria and Load Case Assumptions

Surface Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

Intermediate #1 Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

Intermediate #2 Casing

Collapse: DF_C=1.125

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

Production Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Casing Design Criteria and Load Case Assumptions

Surface Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

Intermediate #1 Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

Intermediate #2 Casing

Collapse: DF_C=1.125

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

Production Casing

Collapse: DF_C=1.125

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst: DF_b=1.125

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile: DF_t=1.8

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Planned Wellpath Report

Ches Riddle Fed Com No. 226H Rev A.0

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

REPORT SETUP INFORMATION			
Projection System	**NAD27 / TM New Mexico SP, Eastern Zone (3001), US feet**	Software System	**WellArchitect® 5.1**
North Reference	**Grid**	User	**Buiduyh**
Scale	**0.999918**	Report Generated	**07/Aug/2018** at **16:07**
Convergence at slot	**0.15° East**	Database/Source file	**WellArchitectDB/Ches_Riddle_Fed_Com_No._226H_Rev_A.0.xml**

WELLPATH LOCATION	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	**East[ft]**	**Easting[US ft]**	**Northing[US ft]**	**Latitude**	**Longitude**
Slot Location	-21.00	21.00	**587393.00**	**454368.00**	32°14'55.890"N	104°03'02.340"W
Facility Reference Pt			**587372.00**	**454389.00**	32°14'56.099"N	104°03'02.584"W
Field Reference Pt			**152400.30**	**0.00**	30°59'42.846"N	105°26'33.659"W

WELLPATH DATUM			
Calculation method	**Minimum curvature**	Rig on Ches Riddle Fed Com No. 226H (KB) to Facility Vertical Datum	**3008.00ft**
Horizontal Reference Pt	**Slot**	Rig on Ches Riddle Fed Com No. 226H (KB) to Mean Sea Level	**3008.00ft**
Vertical Reference Pt	**Rig on Ches Riddle Fed Com No. 226H (KB)**	Rig on Ches Riddle Fed Com No. 226H (KB) to Ground Level at Slot (Ches Riddle Fed Com No. 226H)	**29.00ft**
MD Reference Pt	**Rig on Ches Riddle Fed Com No. 226H (KB)**	Section Origin	**N 0.00, E 0.00 ft**
Field Vertical Reference	**Mean Sea Level**	Section Azimuth	**89.77°**

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH DATA (190 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
0.00†	0.000	154.015	0.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
29.00	0.000	154.015	29.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	Tie On
129.00†	0.000	154.015	129.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
229.00†	0.000	154.015	229.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
329.00†	0.000	154.015	329.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
429.00†	0.000	154.015	429.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
529.00†	0.000	154.015	529.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
629.00†	0.000	154.015	629.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
729.00†	0.000	154.015	729.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
829.00†	0.000	154.015	829.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
929.00†	0.000	154.015	929.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1007.00†	0.000	154.015	1007.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	Top of Salt Z (Castile)
1029.00†	0.000	154.015	1029.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1129.00†	0.000	154.015	1129.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1229.00†	0.000	154.015	1229.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1329.00†	0.000	154.015	1329.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1429.00†	0.000	154.015	1429.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1529.00†	0.000	154.015	1529.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1629.00†	0.000	154.015	1629.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1729.00†	0.000	154.015	1729.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1829.00†	0.000	154.015	1829.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
1929.00†	0.000	154.015	1929.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
2029.00†	0.000	154.015	2029.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
2129.00†	0.000	154.015	2129.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
2229.00†	0.000	154.015	2229.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
2329.00†	0.000	154.015	2329.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
2429.00†	0.000	154.015	2429.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
2529.00†	0.000	154.015	2529.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	
2600.00	0.000	154.015	2600.00	0.00	0.00	0.00	587393.00	454368.00	32°14'55.890"N	104°03'02.340"W	0.00	End of Tangent
2629.00†	0.290	154.015	2629.00	0.03	-0.07	0.03	587393.03	454367.93	32°14'55.890"N	104°03'02.339"W	1.00	

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH DATA (190 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
2647.00†	0.470	154.015	2647.00	0.08	-0.17	0.08	587393.08	454367.83	32°14'55.888"N	104°03'02.339"W	1.00	Base of Salt Z (G30:CS14-CSB)
2691.00†	0.910	154.015	2691.00	0.31	-0.65	0.32	587393.32	454367.35	32°14'55.884"N	104°03'02.336"W	1.00	Z (G26: Bell Cyn.)
2729.00†	1.290	154.015	2728.99	0.63	-1.31	0.64	587393.64	454366.69	32°14'55.877"N	104°03'02.332"W	1.00	
2829.00†	2.290	154.015	2828.94	1.99	-4.11	2.00	587395.00	454363.89	32°14'55.849"N	104°03'02.317"W	1.00	
2929.00†	3.290	154.015	2928.82	4.10	-8.49	4.14	587397.14	454359.51	32°14'55.806"N	104°03'02.292"W	1.00	
3029.00†	4.290	154.015	3028.60	6.98	-14.43	7.03	587400.03	454353.57	32°14'55.747"N	104°03'02.258"W	1.00	
3100.00	5.000	154.015	3099.37	9.47	-19.60	9.55	587402.55	454348.40	32°14'55.696"N	104°03'02.229"W	1.00	End of Build
3129.00†	5.000	154.015	3128.26	10.57	-21.87	10.66	587403.66	454346.13	32°14'55.674"N	104°03'02.216"W	0.00	
3229.00†	5.000	154.015	3227.87	14.36	-29.71	14.48	587407.48	454338.30	32°14'55.596"N	104°03'02.172"W	0.00	
3329.00†	5.000	154.015	3327.49	18.15	-37.54	18.30	587411.30	454330.46	32°14'55.518"N	104°03'02.128"W	0.00	
3429.00†	5.000	154.015	3427.11	21.93	-45.37	22.12	587415.11	454322.63	32°14'55.441"N	104°03'02.084"W	0.00	
3529.00†	5.000	154.015	3526.73	25.72	-53.21	25.93	587418.93	454314.80	32°14'55.363"N	104°03'02.039"W	0.00	
3551.35†	5.000	154.015	3549.00	26.57	-54.96	26.79	587419.79	454313.04	32°14'55.346"N	104°03'02.030"W	0.00	Z (G13: Cherry Cyn.)
3629.00†	5.000	154.015	3626.35	29.51	-61.04	29.75	587422.75	454306.96	32°14'55.285"N	104°03'01.995"W	0.00	
3729.00†	5.000	154.015	3725.97	33.29	-68.88	33.57	587426.57	454299.13	32°14'55.208"N	104°03'01.951"W	0.00	
3829.00†	5.000	154.015	3825.59	37.08	-76.71	37.39	587430.39	454291.29	32°14'55.130"N	104°03'01.907"W	0.00	
3929.00†	5.000	154.015	3925.21	40.87	-84.55	41.21	587434.21	454283.46	32°14'55.053"N	104°03'01.863"W	0.00	
4029.00†	5.000	154.015	4024.83	44.66	-92.38	45.03	587438.02	454275.63	32°14'54.975"N	104°03'01.818"W	0.00	
4129.00†	5.000	154.015	4124.45	48.44	-100.22	48.85	587441.84	454267.79	32°14'54.897"N	104°03'01.774"W	0.00	
4229.00†	5.000	154.015	4224.07	52.23	-108.05	52.66	587445.66	454259.96	32°14'54.820"N	104°03'01.730"W	0.00	
4329.00†	5.000	154.015	4323.69	56.02	-115.88	56.48	587449.48	454252.13	32°14'54.742"N	104°03'01.686"W	0.00	
4429.00†	5.000	154.015	4423.31	59.80	-123.72	60.30	587453.30	454244.29	32°14'54.664"N	104°03'01.641"W	0.00	
4529.00†	5.000	154.015	4522.93	63.59	-131.55	64.12	587457.12	454236.46	32°14'54.587"N	104°03'01.597"W	0.00	
4629.00†	5.000	154.015	4622.55	67.38	-139.39	67.94	587460.93	454228.62	32°14'54.509"N	104°03'01.553"W	0.00	
4729.00†	5.000	154.015	4722.17	71.17	-147.22	71.76	587464.75	454220.79	32°14'54.432"N	104°03'01.509"W	0.00	
4738.87†	5.000	154.015	4732.00	71.54	-148.00	72.13	587465.13	454220.02	32°14'54.424"N	104°03'01.504"W	0.00	Z (G7: Brushy Cyn.)
4829.00†	5.000	154.015	4821.79	74.95	-155.06	75.58	587468.57	454212.96	32°14'54.354"N	104°03'01.465"W	0.00	
4929.00†	5.000	154.015	4921.41	78.74	-162.89	79.40	587472.39	454205.12	32°14'54.276"N	104°03'01.420"W	0.00	
5029.00†	5.000	154.015	5021.03	82.53	-170.73	83.21	587476.21	454197.29	32°14'54.199"N	104°03'01.376"W	0.00	
5129.00†	5.000	154.015	5120.64	86.31	-178.56	87.03	587480.02	454189.45	32°14'54.121"N	104°03'01.332"W	0.00	

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH DATA (190 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
5229.00†	5.000	154.015	5220.26	90.10	-186.40	90.85	587483.84	454181.62	32°14'54.043"N	104°03'01.288"W	0.00	
5329.00†	5.000	154.015	5319.88	93.89	-194.23	94.67	587487.66	454173.79	32°14'53.966"N	104°03'01.243"W	0.00	
5429.00†	5.000	154.015	5419.50	97.68	-202.06	98.49	587491.48	454165.95	32°14'53.888"N	104°03'01.199"W	0.00	
5529.00†	5.000	154.015	5519.12	101.46	-209.90	102.31	587495.30	454158.12	32°14'53.811"N	104°03'01.155"W	0.00	
5629.00†	5.000	154.015	5618.74	105.25	-217.73	106.13	587499.12	454150.29	32°14'53.733"N	104°03'01.111"W	0.00	
5729.00†	5.000	154.015	5718.36	109.04	-225.57	109.94	587502.93	454142.45	32°14'53.655"N	104°03'01.067"W	0.00	
5829.00†	5.000	154.015	5817.98	112.82	-233.40	113.76	587506.75	454134.62	32°14'53.578"N	104°03'01.022"W	0.00	
5929.00†	5.000	154.015	5917.60	116.61	-241.24	117.58	587510.57	454126.78	32°14'53.500"N	104°03'00.978"W	0.00	
6029.00†	5.000	154.015	6017.22	120.40	-249.07	121.40	587514.39	454118.95	32°14'53.422"N	104°03'00.934"W	0.00	
6129.00†	5.000	154.015	6116.84	124.19	-256.91	125.22	587518.21	454111.12	32°14'53.345"N	104°03'00.890"W	0.00	
6229.00†	5.000	154.015	6216.46	127.97	-264.74	129.04	587522.03	454103.28	32°14'53.267"N	104°03'00.845"W	0.00	
6329.00†	5.000	154.015	6316.08	131.76	-272.57	132.86	587525.84	454095.45	32°14'53.190"N	104°03'00.801"W	0.00	
6342.97†	5.000	154.015	6330.00	132.29	-273.67	133.39	587526.38	454094.35	32°14'53.179"N	104°03'00.795"W	0.00	Z (G4: BSGL (CS9))
6429.00†	5.000	154.015	6415.70	135.55	-280.41	136.67	587529.66	454087.61	32°14'53.112"N	104°03'00.757"W	0.00	
6529.00†	5.000	154.015	6515.32	139.33	-288.24	140.49	587533.48	454079.78	32°14'53.034"N	104°03'00.713"W	0.00	
6629.00†	5.000	154.015	6614.94	143.12	-296.08	144.31	587537.30	454071.95	32°14'52.957"N	104°03'00.669"W	0.00	
6729.00†	5.000	154.015	6714.56	146.91	-303.91	148.13	587541.12	454064.11	32°14'52.879"N	104°03'00.624"W	0.00	
6829.00†	5.000	154.015	6814.18	150.70	-311.75	151.95	587544.94	454056.28	32°14'52.801"N	104°03'00.580"W	0.00	
6929.00†	5.000	154.015	6913.80	154.48	-319.58	155.77	587548.75	454048.45	32°14'52.724"N	104°03'00.536"W	0.00	
7029.00†	5.000	154.015	7013.41	158.27	-327.42	159.59	587552.57	454040.61	32°14'52.646"N	104°03'00.492"W	0.00	
7082.79†	5.000	154.015	7067.00	160.31	-331.63	161.64	587554.63	454036.40	32°14'52.604"N	104°03'00.468"W	0.00	Z (L5.3: FBSC)
7129.00†	5.000	154.015	7113.03	162.06	-335.25	163.40	587556.39	454032.78	32°14'52.569"N	104°03'00.447"W	0.00	
7229.00†	5.000	154.015	7212.65	165.84	-343.09	167.22	587560.21	454024.94	32°14'52.491"N	104°03'00.403"W	0.00	
7295.60†	5.000	154.015	7279.00	168.37	-348.30	169.77	587562.75	454019.73	32°14'52.439"N	104°03'00.374"W	0.00	Z (L5.1: FBSG)
7329.00†	5.000	154.015	7312.27	169.63	-350.92	171.04	587564.03	454017.11	32°14'52.413"N	104°03'00.359"W	0.00	
7429.00†	5.000	154.015	7411.89	173.42	-358.75	174.86	587567.85	454009.28	32°14'52.336"N	104°03'00.315"W	0.00	
7529.00†	5.000	154.015	7511.51	177.21	-366.59	178.68	587571.66	454001.44	32°14'52.258"N	104°03'00.271"W	0.00	
7553.58†	5.000	154.015	7536.00	178.14	-368.51	179.62	587572.60	453999.52	32°14'52.239"N	104°03'00.260"W	0.00	Z (L4.3: SBSC)
7629.00†	5.000	154.015	7611.13	180.99	-374.42	182.50	587575.48	453993.61	32°14'52.180"N	104°03'00.226"W	0.00	
7700.65	5.000	154.015	7682.51	183.71	-380.04	185.23	587578.22	453988.00	32°14'52.125"N	104°03'00.195"W	0.00	End of Tangent

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH DATA (190 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
7729.00†	4.716	154.015	7710.76	184.75	-382.20	186.29	587579.27	453985.84	32°14'52.103"N	104°03'00.183"W	1.00	
7829.00†	3.716	154.015	7810.48	187.94	-388.80	189.51	587582.49	453979.23	32°14'52.038"N	104°03'00.145"W	1.00	
7929.00†	2.716	154.015	7910.33	190.38	-393.85	191.97	587584.95	453974.19	32°14'51.988"N	104°03'00.117"W	1.00	
8029.00†	1.716	154.015	8010.25	192.06	-397.32	193.66	587586.64	453970.71	32°14'51.953"N	104°03'00.097"W	1.00	
8116.77†	0.839	154.015	8098.00	192.91	-399.08	194.52	587587.50	453968.95	32°14'51.936"N	104°03'00.087"W	1.00	Z (L4.1: SBSG)
8129.00†	0.716	154.015	8110.23	192.99	-399.23	194.59	587587.57	453968.80	32°14'51.935"N	104°03'00.086"W	1.00	
8200.65	0.000	89.770	8181.87	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	1.00	End of Drop
8229.00†	0.000	89.770	8210.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
8329.00†	0.000	89.770	8310.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
8429.00†	0.000	89.770	8410.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
8513.78†	0.000	89.770	8495.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (L3.3: TBSC)
8529.00†	0.000	89.770	8510.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
8629.00†	0.000	89.770	8610.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
8725.78†	0.000	89.770	8707.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (L3.3.2: Break Sand (T))
8729.00†	0.000	89.770	8710.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
8829.00†	0.000	89.770	8810.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
8929.00†	0.000	89.770	8910.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9029.00†	0.000	89.770	9010.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9129.00†	0.000	89.770	9110.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9229.00†	0.000	89.770	9210.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9261.78†	0.000	89.770	9243.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (L3.1: TBSG)
9329.00†	0.000	89.770	9310.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9429.00†	0.000	89.770	9410.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9529.00†	0.000	89.770	9510.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9552.78†	0.000	89.770	9534.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (L. TBSG)
9597.78†	0.000	89.770	9579.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (L2: WFMP A)
9629.00†	0.000	89.770	9610.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9632.78†	0.000	89.770	9614.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (X Sand (T))
9669.78†	0.000	89.770	9651.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (X Sand (B))
9700.78†	0.000	89.770	9682.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (Y Sand (T))

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH DATA (190 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
9729.00†	0.000	89.770	9710.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9741.78†	0.000	89.770	9723.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (Y Sand (B))
9751.78†	0.000	89.770	9733.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (Z Sand (T))
9829.00†	0.000	89.770	9810.22	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	
9833.78†	0.000	89.770	9815.00	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	Z (Z Sand (B))
9843.01	0.000	89.770	9824.24	193.18	-399.64	194.79	587587.77	453968.40	32°14'51.931"N	104°03'00.084"W	0.00	End of Tangent
9849.78†	0.676	89.770	9831.00	193.22	-399.64	194.83	587587.81	453968.40	32°14'51.931"N	104°03'00.084"W	10.00	Z (WFMP A Fat)
9922.03†	7.901	89.770	9903.00	198.62	-399.61	200.23	587593.21	453968.42	32°14'51.931"N	104°03'00.021"W	10.00	Z (WFMP Fat Carb 1)
9929.00†	8.599	89.770	9909.90	199.62	-399.61	201.23	587594.21	453968.42	32°14'51.931"N	104°03'00.009"W	10.00	
10021.66†	17.864	89.770	10000.00	220.80	-399.52	222.41	587615.39	453968.51	32°14'51.931"N	104°02'59.762"W	10.00	Z (WFMP B)
10029.00†	18.599	89.770	10006.98	223.10	-399.52	224.71	587617.69	453968.52	32°14'51.931"N	104°02'59.736"W	10.00	
10129.00†	28.599	89.770	10098.50	263.08	-399.35	264.69	587657.67	453968.68	32°14'51.932"N	104°02'59.270"W	10.00	
10229.00†	38.599	89.770	10181.68	318.35	-399.13	319.96	587712.93	453968.90	32°14'51.932"N	104°02'58.627"W	10.00	
10329.00†	48.599	89.770	10254.01	387.22	-398.86	388.83	587781.79	453969.18	32°14'51.933"N	104°02'57.825"W	10.00	
10381.70†	53.869	89.770	10287.00	428.30	-398.69	429.91	587822.87	453969.34	32°14'51.934"N	104°02'57.346"W	10.00	Z (WFMP B.1)
10429.00†	58.599	89.770	10313.28	467.61	-398.53	469.21	587862.17	453969.50	32°14'51.934"N	104°02'56.889"W	10.00	
10529.00†	68.599	89.770	10357.69	557.07	-398.17	558.67	587951.62	453969.86	32°14'51.936"N	104°02'55.847"W	10.00	
10629.00†	78.599	89.770	10385.89	652.87	-397.79	654.48	588047.42	453970.24	32°14'51.937"N	104°02'54.732"W	10.00	
10643.01	80.000	89.770	10388.49	666.65	-397.73	668.25	588061.19	453970.30	32°14'51.937"N	104°02'54.571"W	10.00	End of Build
10729.00†	85.159	89.770	10399.59	751.88	-397.39	753.48	588146.42	453970.64	32°14'51.938"N	104°02'53.579"W	6.00	
10809.68	90.000	89.770	10403.00	832.47	-397.07	834.07	588227.00	453970.96	32°14'51.939"N	104°02'52.641"W	6.00	End of Build
10829.00†	90.000	89.770	10403.00	851.79	-396.99	853.39	588246.31	453971.04	32°14'51.939"N	104°02'52.416"W	0.00	
10929.00†	90.000	89.770	10403.00	951.79	-396.59	953.39	588346.30	453971.44	32°14'51.941"N	104°02'51.251"W	0.00	
11029.00†	90.000	89.770	10403.00	1051.79	-396.19	1053.38	588446.30	453971.84	32°14'51.942"N	104°02'50.087"W	0.00	
11129.00†	90.000	89.770	10403.00	1151.79	-395.79	1153.38	588546.29	453972.25	32°14'51.943"N	104°02'48.923"W	0.00	
11229.00†	90.000	89.770	10403.00	1251.79	-395.39	1253.38	588646.28	453972.65	32°14'51.945"N	104°02'47.758"W	0.00	
11329.00†	90.000	89.770	10403.00	1351.79	-394.98	1353.38	588746.27	453973.05	32°14'51.946"N	104°02'46.594"W	0.00	
11429.00†	90.000	89.770	10403.00	1451.79	-394.58	1453.38	588846.26	453973.45	32°14'51.947"N	104°02'45.430"W	0.00	
11529.00†	90.000	89.770	10403.00	1551.79	-394.18	1553.38	588946.25	453973.85	32°14'51.949"N	104°02'44.265"W	0.00	
11629.00†	90.000	89.770	10403.00	1651.79	-393.78	1653.38	589046.24	453974.25	32°14'51.950"N	104°02'43.101"W	0.00	

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH DATA (190 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
11729.00†	90.000	89.770	10403.00	1751.79	-393.38	1753.38	589146.23	453974.65	32°14'51.951"N	104°02'41.937"W	0.00	
11829.00†	90.000	89.770	10403.00	1851.79	-392.98	1853.38	589246.22	453975.06	32°14'51.953"N	104°02'40.772"W	0.00	
11929.00†	90.000	89.770	10403.00	1951.79	-392.58	1953.38	589346.21	453975.46	32°14'51.954"N	104°02'39.608"W	0.00	
12029.00†	90.000	89.770	10403.00	2051.79	-392.17	2053.38	589446.20	453975.86	32°14'51.955"N	104°02'38.444"W	0.00	
12129.00†	90.000	89.770	10403.00	2151.79	-391.77	2153.38	589546.19	453976.26	32°14'51.957"N	104°02'37.279"W	0.00	
12229.00†	90.000	89.770	10403.00	2251.79	-391.37	2253.37	589646.18	453976.66	32°14'51.958"N	104°02'36.115"W	0.00	
12329.00†	90.000	89.770	10403.00	2351.79	-390.97	2353.37	589746.18	453977.06	32°14'51.959"N	104°02'34.951"W	0.00	
12429.00†	90.000	89.770	10403.00	2451.79	-390.57	2453.37	589846.17	453977.46	32°14'51.961"N	104°02'33.786"W	0.00	
12529.00†	90.000	89.770	10403.00	2551.79	-390.17	2553.37	589946.16	453977.87	32°14'51.962"N	104°02'32.622"W	0.00	
12629.00†	90.000	89.770	10403.00	2651.79	-389.77	2653.37	590046.15	453978.27	32°14'51.963"N	104°02'31.457"W	0.00	
12729.00†	90.000	89.770	10403.00	2751.79	-389.36	2753.37	590146.14	453978.67	32°14'51.964"N	104°02'30.293"W	0.00	
12829.00†	90.000	89.770	10403.00	2851.79	-388.96	2853.37	590246.13	453979.07	32°14'51.966"N	104°02'29.129"W	0.00	
12929.00†	90.000	89.770	10403.00	2951.79	-388.56	2953.37	590346.12	453979.47	32°14'51.967"N	104°02'27.964"W	0.00	
13029.00†	90.000	89.770	10403.00	3051.79	-388.16	3053.37	590446.11	453979.87	32°14'51.968"N	104°02'26.800"W	0.00	
13129.00†	90.000	89.770	10403.00	3151.79	-387.76	3153.37	590546.10	453980.27	32°14'51.970"N	104°02'25.636"W	0.00	
13229.00†	90.000	89.770	10403.00	3251.79	-387.36	3253.37	590646.09	453980.68	32°14'51.971"N	104°02'24.471"W	0.00	
13329.00†	90.000	89.770	10403.00	3351.79	-386.96	3353.37	590746.08	453981.08	32°14'51.972"N	104°02'23.307"W	0.00	
13429.00†	90.000	89.770	10403.00	3451.79	-386.55	3453.36	590846.07	453981.48	32°14'51.973"N	104°02'22.143"W	0.00	
13529.00†	90.000	89.770	10403.00	3551.79	-386.15	3553.36	590946.07	453981.88	32°14'51.975"N	104°02'20.978"W	0.00	
13629.00†	90.000	89.770	10403.00	3651.79	-385.75	3653.36	591046.06	453982.28	32°14'51.976"N	104°02'19.814"W	0.00	
13729.00†	90.000	89.770	10403.00	3751.79	-385.35	3753.36	591146.05	453982.68	32°14'51.977"N	104°02'18.650"W	0.00	
13829.00†	90.000	89.770	10403.00	3851.79	-384.95	3853.36	591246.04	453983.08	32°14'51.978"N	104°02'17.485"W	0.00	
13929.00†	90.000	89.770	10403.00	3951.79	-384.55	3953.36	591346.03	453983.48	32°14'51.980"N	104°02'16.321"W	0.00	
14029.00†	90.000	89.770	10403.00	4051.79	-384.15	4053.36	591446.02	453983.89	32°14'51.981"N	104°02'15.157"W	0.00	
14129.00†	90.000	89.770	10403.00	4151.79	-383.74	4153.36	591546.01	453984.29	32°14'51.982"N	104°02'13.992"W	0.00	
14229.00†	90.000	89.770	10403.00	4251.79	-383.34	4253.36	591646.00	453984.69	32°14'51.983"N	104°02'12.828"W	0.00	
14329.00†	90.000	89.770	10403.00	4351.79	-382.94	4353.36	591745.99	453985.09	32°14'51.985"N	104°02'11.664"W	0.00	
14429.00†	90.000	89.770	10403.00	4451.79	-382.54	4453.36	591845.98	453985.49	32°14'51.986"N	104°02'10.499"W	0.00	
14529.00†	90.000	89.770	10403.00	4551.79	-382.14	4553.36	591945.97	453985.89	32°14'51.987"N	104°02'09.335"W	0.00	
14629.00†	90.000	89.770	10403.00	4651.79	-381.74	4653.36	592045.96	453986.29	32°14'51.988"N	104°02'08.171"W	0.00	

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH DATA (190 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
14729.00†	90.000	89.770	10403.00	4751.79	-381.34	4753.35	592145.95	453986.70	32°14'51.990"N	104°02'07.006"W	0.00	
14829.00†	90.000	89.770	10403.00	4851.79	-380.93	4853.35	592245.95	453987.10	32°14'51.991"N	104°02'05.842"W	0.00	
14929.00†	90.000	89.770	10403.00	4951.79	-380.53	4953.35	592345.94	453987.50	32°14'51.992"N	104°02'04.678"W	0.00	
15029.00†	90.000	89.770	10403.00	5051.79	-380.13	5053.35	592445.93	453987.90	32°14'51.993"N	104°02'03.513"W	0.00	
15129.00†	90.000	89.770	10403.00	5151.79	-379.73	5153.35	592545.92	453988.30	32°14'51.994"N	104°02'02.349"W	0.00	
15229.00†	90.000	89.770	10403.00	5251.79	-379.33	5253.35	592645.91	453988.70	32°14'51.996"N	104°02'01.185"W	0.00	
15329.00†	90.000	89.770	10403.00	5351.79	-378.93	5353.35	592745.90	453989.10	32°14'51.997"N	104°02'00.020"W	0.00	
15429.00†	90.000	89.770	10403.00	5451.79	-378.53	5453.35	592845.89	453989.51	32°14'51.998"N	104°01'58.856"W	0.00	
15529.00†	90.000	89.770	10403.00	5551.79	-378.12	5553.35	592945.88	453989.91	32°14'51.999"N	104°01'57.692"W	0.00	
15552.12	90.000	89.770	10403.00[1]	5574.91	-378.03	5576.47	592969.00	453990.00	32°14'52.000"N	104°01'57.422"W	0.00	End of Tangent

HOLE & CASING SECTIONS - Ref Wellbore: Ches Riddle Fed Com No. 226H Ref Wellpath: Ches Riddle Fed Com No. 226H Rev A.0

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
9.625in Casing	29.00	2677.00	2648.00	29.00	2677.00	0.00	0.00	-0.47	0.23
7in Casing	29.00	10640.22	10611.22	29.00	10388.00	0.00	0.00	-397.75	665.49

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Ches Riddle 226H FTP rev 1		10403.00	-397.03	834.07	**588227.00**	**453971.00**	32°14'51.940"N	104°02'52.641"W	point
Ches Riddle 226H LTP rev 1		10403.00	-379.03	5486.46	**592879.00**	**453989.00**	32°14'51.992"N	104°01'58.470"W	point
1) Ches Riddle 226H PBHL rev 1	15552.12	10403.00	-378.03	5576.47	**592969.00**	**453990.00**	32°14'52.000"N	104°01'57.422"W	point

SURVEY PROGRAM - Ref Wellbore: Ches Riddle Fed Com No. 226H Ref Wellpath: Ches Riddle Fed Com No. 226H Rev A.0

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
29.00	2677.00	BHI NaviTrak (Standard)		Ches Riddle Fed Com No. 226H
2677.00	10644.00	BHI NaviTrak (Standard)		Ches Riddle Fed Com No. 226H
10644.00	15553.86	BHI NaviTrak (Standard)		Ches Riddle Fed Com No. 226H

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

WELLPATH COMMENTS

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
1007.00	0.000	154.015	1007.00	Top of Salt Z (Castile)
2647.00	0.470	154.015	2647.00	Base of Salt Z (G30:CS14-CSB)
2691.00	0.910	154.015	2691.00	Z (G26: Bell Cyn.)
3551.35	5.000	154.015	3549.00	Z (G13: Cherry Cyn.)
4738.87	5.000	154.015	4732.00	Z (G7: Brushy Cyn.)
6342.97	5.000	154.015	6330.00	Z (G4: BSGL (CS9))
7082.79	5.000	154.015	7067.00	Z (L5.3: FBSC)
7295.60	5.000	154.015	7279.00	Z (L5.1: FBSG)
7553.58	5.000	154.015	7536.00	Z (L4.3: SBSC)
8116.77	0.839	154.015	8098.00	Z (L4.1: SBSG)
8513.78	0.000	89.770	8495.00	Z (L3.3: TBSC)
8725.78	0.000	89.770	8707.00	Z (L3.3.2: Break Sand (T))
9261.78	0.000	89.770	9243.00	Z (L3.1: TBSG)
9552.78	0.000	89.770	9534.00	Z (L. TBSG)
9597.78	0.000	89.770	9579.00	Z (L2: WFMP A)
9632.78	0.000	89.770	9614.00	Z (X Sand (T))
9669.78	0.000	89.770	9651.00	Z (X Sand (B))
9700.78	0.000	89.770	9682.00	Z (Y Sand (T))
9741.78	0.000	89.770	9723.00	Z (Y Sand (B))
9751.78	0.000	89.770	9733.00	Z (Z Sand (T))
9833.78	0.000	89.770	9815.00	Z (Z Sand (B))
9849.78	0.676	89.770	9831.00	Z (WFMP A Fat)
9922.03	7.901	89.770	9903.00	Z (WFMP Fat Carb 1)
10021.66	17.864	89.770	10000.00	Z (WFMP B)
10381.70	53.869	89.770	10287.00	Z (WFMP B.1)

Planned Wellpath Report

Ches Riddle Fed Com No. 226H Rev A.0

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Matador Resources**	Slot	**Ches Riddle Fed Com No. 226H**
Area	**Eddy County, NM**	Well	**Ches Riddle Fed Com No. 226H**
Field	**Willow Lake; Bone Spring (Eddy Co., NM)**	Wellbore	**Ches Riddle Fed Com No. 226H**
Facility	**Ches Riddle Fed Com Pad**		

DESIGN COMMENTS

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
29.00	0.000	154.015	29.00	Tie On
2600.00	0.000	154.015	2600.00	End of Tangent
3100.00	5.000	154.015	3099.37	End of Build
7700.65	5.000	154.015	7682.51	End of Tangent
8200.65	0.000	89.770	8181.87	End of Drop
9843.01	0.000	89.770	9824.24	End of Tangent
10643.01	80.000	89.770	10388.49	End of Build
10809.68	90.000	89.770	10403.00	End of Build
15552.12	90.000	89.770	10403.00	End of Tangent

Closed-Loop System

Operating and Maintenance Plan:

During drilling operations, third party service companies will utilize solids control equipment to remove cuttings from the drilling fluids and collect it in haul-off bins. Equipment will be closely monitored at all times while drilling by the derrick man and the service company employees.

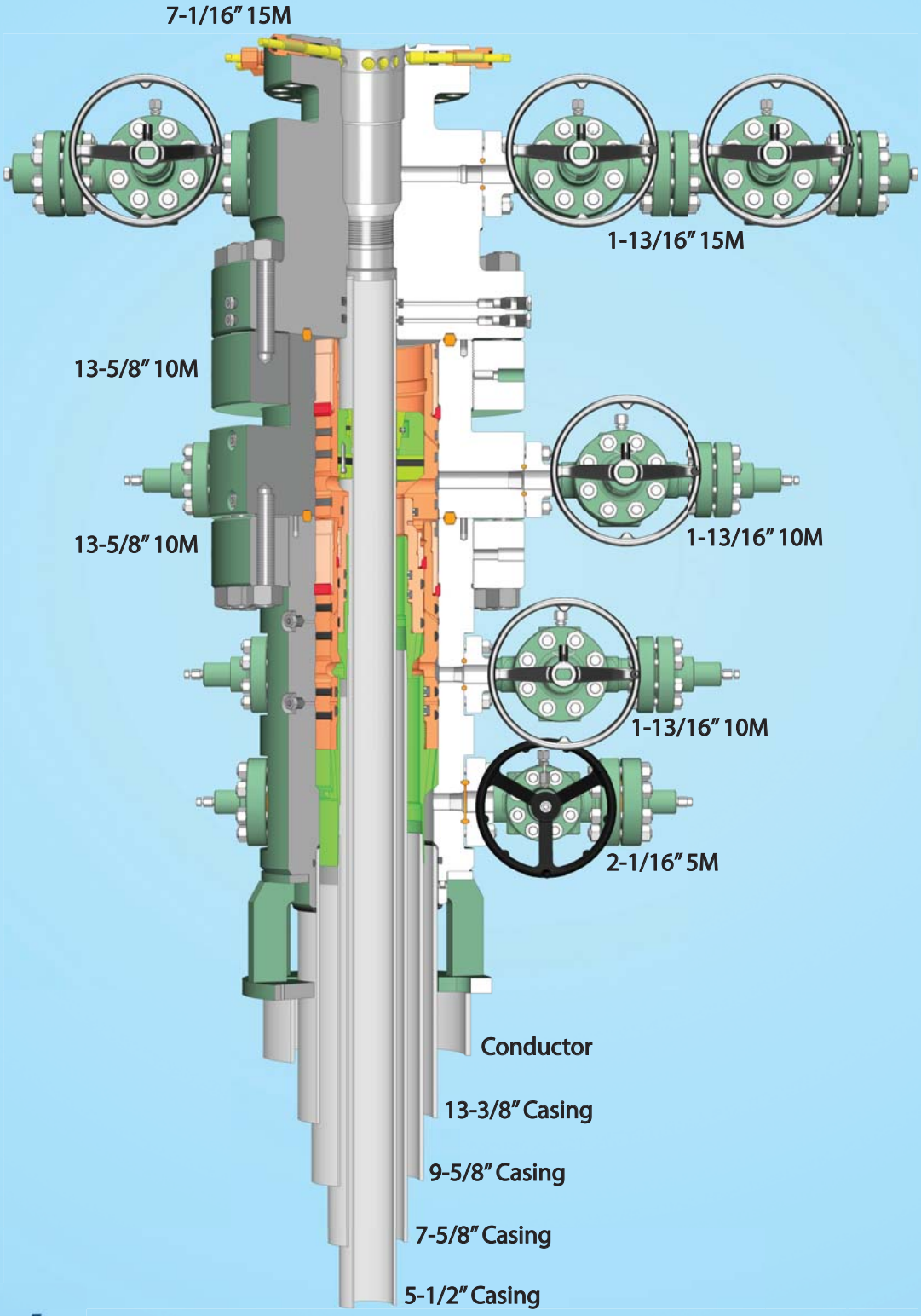
Closure Plan:

During drilling operations, third party service companies will haul off drill solids and fluids to an approved disposal facility. At the end of the well, all closed loop equipment will be removed from the location.

CAMERON
A Schlumberger Company

13-5/8” 10M MN-DS Wellhead

Four Stage MN-DS



Matador
RESOURCES COMPANY

2018-083-03

Ches Riddle Fed Com #226H
SHL: 1927' FNL & 504' FEL Section 2
BHL: 2336' FNL & 240' FEL Section 1
Township/Range: 24S 28E
Elevation Above Sea Level: 2,979'

Drilling Operation Plan

Proposed Drilling Depth: 15552' MD / 10403' TVD

Type of well: Horizontal well, no pilot hole

Permitted Well Type: Gas

Geologic Name of Surface Formation Quaternary Deposits

KOP Lat/Long (NAD27): 32°14'51.931"N / 104°03'00.084"W
TD Lat/Long (NAD27): 32°14'52.000"N / 104°01'57.422"W

1. Estimated Tops

Formation	MD (ft)	TVD (ft)	Thickness (ft)	Lithology	Resource
Top of Salt	450	450	557	Salt	Barren
Castile	1,007	1,007	1,640	Salt	Barren
Base of Salt	2,647	2,647	44	Salt	Barren
Bell Canyon	2,691	2,691	858	Sandstone	Oil/Natural Gas
Cherry Canyon	3,549	3,549	1,183	Sandstone	Oil/Natural Gas
Brushy Canyon	4,732	4,732	1,598	Sandstone	Oil/Natural Gas
Bone Spring Lime	6,330	6,330	737	Limestone	Oil/Natural Gas
1st Bone Spring Carbonate	7,067	7,067	212	Carbonate	Oil/Natural Gas
1st Bone Spring Sand	7,279	7,279	257	Sandstone	Oil/Natural Gas
2nd Bone Spring Carbonate	7,536	7,536	562	Carbonate	Oil/Natural Gas
2nd Bone Spring Sand	8,098	8,098	397	Sandstone	Oil/Natural Gas
3rd Bone Spring Carbonate	8,495	8,495	748	Carbonate	Oil/Natural Gas
3rd Bone Spring Sand	9,261	9,243	336	Sandstone	Oil/Natural Gas
Wolfcamp	9,597	9,579		Shale	Oil/Natural Gas
KOP	**9,843**	**9,824**			**Oil/Natural Gas**
TD	**15,552**	**10,403**			**Oil/Natural Gas**

2. Notable Zones

Wolfcamp is the goal. All perforations will be within the setback requirements as prescribed or permitted by the New Mexico Oil Conservation Division. OSE estimated ground water depth at this location is 140'

3. Pressure Control

Equipment
A 12,000' 5000-psi BOP stack consisting of 3 rams with 2 pipe rams, 1 blind ram, and one annular preventer will be utilized below surface casing to TD. See attachments for BOP and choke manifold diagrams.

An accumulator complying with Onshore Order #2 requirements for the pressure rating of the BOP stack will be present. A rotating head will also be installed as needed.

Testing Procedure

BOP will be inspected and operated as required in Onshore Order #2. Kelly cock and sub equipped with a full opening valve sized to fit the drill pipe and collars will be available on the rig floor in the open position.

A third party company will test the BOPs.

After setting surface casing, a minimum 5M BOPE system will be installed. Test pressures will be 250 psi low and 5000 psi high with the annular being tested to 250 psi low and 2500 psi high before drilling below surface shoe. In the event that the rig drills multiple wells on the pad and any seal subject to test pressures are broken, a full BOP test will be performed when the rig returns and the 5M BOPE system is re-installed.

Variance Request

Matador requests a variance to have the option of running a speed head for setting the Intermediate 1, Intermediate 2, and Production Strings.

Matador requests a variance to drill this well using a co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. If the specific hose is not available, then one of equal or higher rating will be used.

Matador requests a variance to have the option of batch drilling this well with other wells on the same pad. In the event that this well is batch drilled, the wellbore will be secured with a blind flange of like pressure. When the rig returns to this well and BOPs are installed, the operator will perform a full BOP test.

Matador requests a variance to run 7-5/8" BTC casing inside 9-5/8" BTC casing which will be less than the 0.422" stand off regulation. Matador has met with Christopher Walls and Mustafa Haque as well as other BLM representatives and determined that this would be acceptable as long as the 7-5/8" flush casing was run throughout the entire 300' cement tie back section between 9-5/8" and 7-5/8" casing.

4. Casing & Cement

All casing will be API and new. See attached casing assumption worksheet.

String	Hole Size (in)	Set MD (ft)	Set TVD (ft)	Casing Size (in)	Wt. (lb/ft)	Grade	Joint	Collapse	Burst	Tension
Surface	17.5	0 - 475	0 - 475	13.375	54.5	J-55	BUTT	1.125	1.125	1.8
Intermediate 1	12.25	0 - 2741	0 - 2741	9.625	40	J-55	BUTT	1.125	1.125	1.8
Intermediate 2 Top	8.75	0 - 2441	0 - 2441	7.625	29.7	P-110	BUTT	1.125	1.125	1.8
Intermediate 2 Middle	8.75	2441 - 9743	2441 - 9743	7.625	29.7	P-110	VAM HTF-NR	1.125	1.125	1.8
Intermediate 2 Bottom	8.75	9743 - 10643	9743 - 10388	7	29	P-110	BUTT	1.125	1.125	1.8
Production Top	6.125	0 - 9643	0 - 9643	5.5	20	P-110	DWC/C-IS MS	1.125	1.125	1.8
Production Bottom	6.125	9643 - 15552	9643 - 10403	4.5	13.5	P-110	DWC/C-IS HT	1.125	1.125	1.8

- All casing strings will be tested in accordance with Onshore Order #2 - III.B.1.h

String	Type	Sacks	Yield	Cu. Ft.	Weight	Percent Excess	Top of Cement	Blend
Surface	Lead	200	1.72	339	12.5	100%	0	5% NaCl + LCM
	Tail	330	1.38	452	14.8	100%	175	5% NaCl + LCM

Intermediate 1	Lead	500	2.13	1065	12.6	50%	0	Bentonite + 1% CaCL2 + 8% NaCl + LCM
	Tail	210	1.38	292	14.8	50%	2193	5% NaCl + LCM
Intermediate 2	Lead	460	2.13	977	11	35%	2441	Fluid Loss + Dispersant + Retarder + LCM
	Tail	170	1.38	233	14.8	35%	9643	Fluid Loss + Dispersant + Retarder + LCM
Production	Tail	490	1.17	569	15.8	10%	10143	Fluid Loss + Dispersant + Retarder + LCM

5. Mud Program

An electronic Pason mud monitoring system complying with Onshore Order 2 will be used. All necessary mud products (barite, bentonite, LCM) for weight addition and fluid loss control will be on location at all times. Mud program is subject to change due to hole conditions.

Hole Section	Hole Size (in)	Mud Type	Interval MD (ft)	Density (lb/gal)	Viscosity	Fluid Loss
Surface	17.5	Spud Mud	0 - 475	8.4 - 8.8	28-30	NC
Intermediate 1	12.25	Brine Water	475 - 2741	9.5 - 10.2	28-30	NC
Intermediate 2	8.75	FW/Cut Brine	2741 - 10643	8.4 - 9.4	28-30	NC
Production	6.125	OBM	10643 - 15552	11.5 - 12.5	30-35	<20

6. Cores, Test, & Logs

No core or drill stem test is planned.

A 2-person mud logging program will be used from Intermediate 2 Casing shoe to TD.

No electric logs are planned at this time. GR will be collected through the MWD tools from Intermediate casing to TD. CBL with CCL will be run as far as gravity will let it fall to top of curve.

7. Down Hole Conditions

No abnormal pressure or temperature is expected. Maximum anticipated surface pressure is 4473.29 psi. Expected bottom hole temperature is 160 F.

In accordance with Onshore Order 6, Matador does not anticipate that there will be enough H2S from the surface to the Bone Spring formations to meet the BLM's minimum requirements for the submission of an "H2S Drilling Operation Plan" or "Public Protection Plan" for the drilling and completion of this well. Since we have an H2S safety package on all wells, attached is an "H2S Drilling Operations Plan". Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely. All personnel will be familiar with all aspects of safe operation of equipment being used.

Exhibit E-6: H2S Contingency Plan Emergency Contacts
Ches Riddle Fed Com #226H
Matador Resources Company
UL: H, Sec. 02, 24S, 28E
Eddy Co, NM

Company Office			
Matador Resources Company	(972)-371-5200		
Key Personnel			
Name	**Title**	**Office**	**Mobile**
Billy Goodwin	Vice President Drilling	972-371-5210	817-522-2928
Dee Smith	Drilling Superintendent	972-371-5447	972-822-1010
Toby Solis	Drilling Superintendent		817-372-7817
Patrick Walsh	Drilling Engineer	972-371-5291	626-318-5808
Jimmy Benefield	Construction Superintendent		318-548-6659

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

Other		
Boots & Coots IWC	800-256-9688	or 281-931-8884
Cudd Pressure Control	432-699-0139	or 432-563-3356
Haliburton	575-746-2757	

B.J. Services	575-746-3569

Hydrogen Sulfide Drilling

Operations Plan

Matador Resources

1 H2S safety instructions to the following:

- Characteristics of H2S
- Physical effects and hazards
- Principal and operation of H2S detectors, warning system and briefing areas
- Evacuation procedures, routes and first aid
- Proper use of safety equipment & life support systems
- Essential personnel meeting medical evaluation criteria will receive additional training on the proper use of 30min pressure demand air packs

2 H2S Detection and Alarm Systems:

- H2S sensor/detectors to be located on the drilling rig floor, in the base of the sub structure / cellar area, on the mud pits in the shale shaker area. Additional H2S detectors may be placed as deemed necessary
- An audio alarm system will be installed on the derrick floor and in the doghouse

3 Windsocks and / Wind Streamers:

- Windsocks at mud pit area should be high enough to be visible
- Windsock on the rig floor and / top of doghouse should be high enough to be visible

4 Condition Flags and Signs:

- Warning sign on access road to location
- Flags to be displayed on sign at entrance to location
    - Green Flag – Normal Safe Operation Condition
    - Yellow Flag – Potential Pressure and Danger
    - Red Flag – Danger (H2S present in dangerous concentrations) Only H2S trained personnel admitted on location

5 Well Control Equipment:

- See Exhibit E-1

6 Communication:

- While working under masks chalkboards will be used for communications

- Hand signals will be used where chalk board is inappropriate
- Two way radio will be used to communicate off location in case of emergency help is required. In most cases cellular telephones will be available at most drilling foreman's trailer or living quarters.

7 Drilling Stem Testing:

- No DST cores are planned at this time

8 Drilling contractor supervisor will be required to be familiar with the effects H2S has on tubulars good and other mechanical equipment

9 If H2S is encountered, mud system will be altered if necessary to maintain control of formation. A mud gas separator will be brought into service along with H2S scavengers if necessary

10 H2S Contingency Plan:

- See exhibit (Contingency Plan)

11 Emergency Contacts

- See exhibit (Contingency Plan)

HYDROGEN SULFIDE CONTINGENCY PLAN
Drilling, Testing, & Completion

MRC ENERGY CO.

Ches Riddle Fed Com #226H

Reviewers

---------- Operations Manager
---------- Operations Supt.
---------- Staff RES
---------- Field Supv.
---------- Engineering

Latitude: 32.2489" N
Longitude: 104.0506" W

(Surface Location)

H2S Contingency Plan # 0165 **Revision# 0**

This H2S Contingency Plan is subject to updating

Effective date: July 8, 2015

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INTRODUCTION

The H2S equipment will be rigged up 2 days prior to reaching a potential H2S containing zone. Drilling into any potential H2S zone shall not commence until the on-site MRC Drilling Supervisor has confirmed this plan in place.

The onsite Drilling Foreman will give Total Safety one week (7 days) notice to prepare for rig up of H2S equipment)

To be effective, the plan requires the cooperation and effort of each person participating in the drilling of an H_2S well. Each person must know his/her responsibilities and all emergency and safety procedures. He/she should thoroughly understand and be able to use with accuracy, all safety equipment while performing his/her normal duties, if the circumstance should arise. He/she should therefore familiarize himself/herself with the location of all safety equipment and check to see that it is properly stored, easily accessible at all times, and routinely maintained.

It is the intention of MRC ENERGY CO. and the Drilling Contractor to make every effort to provide adequate safeguards against harm to persons on the rig and in the immediate vicinity from the effects of hydrogen sulfide, which may be released into the atmosphere under emergency conditions. However, the initiative rests with the individual in utilizing the safeguards provided. The ideas and suggestions of the individuals involved in the drilling of this well are highly welcomed and act as a fundamental tool for providing the safest working conditions possible.

The drilling representative is required to enforce these procedures. They are set up for your safety and the safety of all others.

II. PURPOSE

It is MRC Energy Co.'s intent to provide a safe working place, not only for its employees, but also for other contractors who are aiding in the drilling of this well. The safety of the general public is of utmost concern. All precautions will be taken to keep a safe working environment and protect the public.

There is a possibility of encountering toxic hydrogen sulfide gas. Safety procedures must be adhered to in order to protect all personnel connected with the operations as well as people living within the area.

The MRC Energy Co. representative will enforce all aspects of the H2S Contingency Plan. This job will become easier by a careful study of the following pages and training and informing all personnel that will be working on the well, their duties and responsibilities.

A. OPERATING PROCEDURES

DEFINITIONS:

For purpose of this plan, on-site personnel shall be referred to as "In Scope Personnel" or "Out of Scope Personnel", per the following definitions:

In Scope Personnel – Personnel who will be working or otherwise present in potential H2S release areas, including the rig floor, cellar, pits, and shaker areas.

Out of Scope Personnel – Personnel who will not be working or Otherwise present in potential H2S areas. Such personnel include rig Site visitor, delivery and camp services personnel.

GENERAL:

Before this H_2S contingency plan becomes operational, all regularly assigned In Scope Personnel (primarily the MRC, drilling contractor, and certain service personnel,) shall be thoroughly trained in the use of breathing equipment, emergency procedures, and responsibilities. Total Safety Technician or a designee assigned by the MRC Drilling Foreman shall keep a list of all personnel who have been through the on-site H_2S training program at the drill site.

All In Scope Personnel shall be given H2S training and the steps to be taken during H2S conditions under which the well may be drilled. General information will be explained about toxic gases, as well as the physiological effects of H_2S and the various classified operating conditions. In addition, the reader will be informed his/her general responsibility concerning safety equipment and emergency procedures.

The Total Safety H_2S Safety Technician or MRC on-site RSE Technician shall make available the H2S Contingency Plan for all personnel to review.

Without exception, all personnel that arrive on location must proceed directly to and sign-in with the on-site MRC RSE Technician. In Scope Personnel will be required to complete an on-site H2S training and respirator fit testing before starting work, or produce evidence that they have received equivalent training. Out of Scope Personnel will be required to complete a site H2S awareness and general safety briefing. This

briefing will consist of a H2S hazard overview, alarm review and required response to alarms.

B. PROCEDURES TO BE INITIATED PRIOR TO H2S CONTINGENCY PLAN COMPLIANCE:

A list of emergency phone numbers and contacts will be on location and posted at the following locations:

1. MRC ENERGY CO.'S Representative's Office
2. Drilling Contractor's, Toolpusher Office
3. Living Quarters Area

All safety equipment and H_2S related hardware must be set up as required by MRC Energy Co. with regard to location of briefing areas, breathing equipment, etc. All safety equipment must be inspected periodically (at least weekly) with particular attention to resuscitators and breathing equipment.

In Scope Personnel working in the well site area will be assigned breathing apparatus. Operator and drilling contractor personnel required to work in the following areas will be provided with Self Contained Breathing Apparatus:

1. Rig Floor

2. Mud Pits

3. Derrick

4. Shale Shaker

5. Cellar

The Total Safety H_2S Safety Technician will be responsible for rigging up all H_2S continuous monitoring-type detectors. The Total Safety Technician will monitor and bump test the detector units periodically (at least at least once a week to test alarm function during drilling conditions. In the event H_2S is detected, or when drilling in a zone confirmed to contain H_2S, the units shall be bump tested at least once every 24 hours. A bump test/calibration log will be kept on location. All results will be reported to the MRC on-site Drilling Foreman.

All Total Safety H2S equipment will be maintained and inspected by a Total Safety Technician on at least a Weekly basis.

C. DRILLING BELOW CONTINGENCY PLAN DEPTH

H2S response drills will be held at least once per week if possible or as often as necessary to acquaint the crews and service company personnel of their responsibilities and the proper procedures to shut-in a well. Initial drills will be performed until crews demonstrate competency donning and working under mask. After the MRC Energy Co.'s representative is satisfied with initial blowout drill procedures, a drill will be conducted weekly with each crew, as necessary. The H2S Safety Technician or designee will conduct safety talks and maintain the safety equipment, consult and carry out the instructions of the drilling supervisor. All personnel allowed in the well work area during drilling or testing operations will be instructed in the use of breathing equipment until supervisory personnel are satisfied that they are capable of using it.

After familiarization, each person must perform a drill with breathing equipment. The drill should include getting the breathing equipment, donning the breathing apparatus, and performing expected duties for a short period. A record shall be kept of all personnel drilled and the date of the drill. H2S training records will be kept on location for all personnel.

Rig crews and service company personnel shall be made aware of the location of spare air bottles, resuscitation equipment, portable fire extinguishers, H_2S monitors and detectors. Knowledge of the location of the H_2S monitors and detectors are vital in determining as our gas location and the severity of the emergency conditions.

After any device has initially detected H2S, all areas of poor ventilation shall be inspected periodically by means of a portable H_2S detector instrument. The buddy system will be utilized. (When an alarm sounds, personnel will don an SCBA, shut the well in, and proceed to SBA for roll call. The H2S Technician or designee will mask up, with a buddy and will verify source of H2S and report back to the on-site MRC Foreman.)

D. PROCEDURES PROGRAM

1. Drill Site

a. The drilling rig will be located to allow prevailing winds to blow across the reserve pit.

b. A Safe Briefing Area will be provided with a breathing air cascade trailer and or 30-minute SCBA's at the Primary Area. Personnel will assemble at the most up-wind station under alarm conditions, or when so ordered by the MRC Energy Co. representative, the Contractor representative, or the Total Safety H_2S Safety Technician. Windsocks or streamers will be anchored to various strategic places on a pole about 10 feet high, so it is in easy view from the rig floor at all times.

c. Warning signs will be posted on the perimeters. "No Smoking" signs will be posted by MRC Energy Co.as well.

d. One multi-channel automatic H_2S monitor will be provided by Total Safety and the detector heads will be at the shale shaker, bell nipple, mud pits, rig floor, and quarter's area. The monitor will be located inside HSE or Company man trailer. Should the alarm be shut off to silence the sirens, the blinker light must continue to warn of H_2S presence. The Total Safety H2S Safety Technician or designee will continuously monitor the detectors and will reactivate the alarm if H_2S concentrations increase to a dangerous level.

e. A method of escape will be open at all times.

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f. If available, land line telephone service will be provided or cell phones provided. (Primary communications provided)

g. A rig communication system will be provided, as needed.

h. A gas trap, choke manifold, and degasser will be installed.

i. A kill line, securely anchored and of ample strength, will be laid to the well-head from a safe location. This line is to be used only in an emergency.

General

a. The MRC Energy Co. representative and/or the Contractor's Toolpusher will be available at all times. The drilling supervisor, while on duty, will have complete charge of the rig and location operations and will take whatever action is deemed necessary to insure personnel safety, to protect the well, and to prevent damage.

b b. A Mud Engineer will be on location at all times when
c drilling takes place at the depth H_2S may be expected. The mud engineer will be able to verify the presence or absence of H2S.

III. CONDITIONS AND EMERGENCY PROCEDURES

A. DEFINITION OF OPERATIONAL "CONDITIONS"

CONDITION I **"POSSIBLE DANGER"**

Warning Flags — Green

Alarms — No Alarm. Less than 10 ppm

Characterized By: Drilling operations in zones that may contain hydrogen sulfide. This condition remains in effect unless H_2S is detected and it becomes necessary to go to Condition II.

General Action:

a. Be alert for a condition change

b. Check all safety equipment for availability and proper functioning.

c. Perform all drills for familiarization and proficiency.

CONDITION II **"MODERATE DANGER"**

Warning Flags — Yellow

Alarms: Actuates at 10 ppm. Continuous flashing light.

Characterized By: Drilling operations in zones containing hydrogen sulfide. This condition will remain in effect until adding chemicals to the mud system neutralizes the hydrogen sulfide or it becomes necessary to go to Condition III.

General Action:

a. Be alert for a condition change

b. WHEN DRILLING AHEAD - Driller and designated crewmember will don 30 min SCBA, shut-in the well and immediately proceed to the Safe Briefing Area.

WHEN TRIPPING – Driller and two designated crewmembers will don 30 min SCBA, shut in the well and

immediately proceed to the Safe Briefing Area. The Derrickman will don a 5-minute escape pack, descend to the rig floor, don a 30-min SCBA (if necessary) and immediately proceed to the Safe Briefing Area.

c. All In Scope Personnel will proceed directly to the appropriate Safe Briefing Area.

d. Remain in safe briefing area, take roll call and wait for instructions

e. Contact the Total H2S Technician if not on location.

f. Personnel shall ensure that their breathing apparatus is properly fitted and operational before entering an H_2S contaminated area to provide assistance to anyone who may be injured or overcome by toxic gases.

g. All Out of Scope Personnel will report to the appropriate Safe Briefing Area.

CONDITION III "EXTREME DANGER"

Warning Flags	Red
Alarms	Actuate at 15 ppm. Continuous Sirens and Flashing Lights
Characterized by:	Critical well operations which pose an immediate threat of H_2S exposure to on-site personnel and a potential threat to the public.

General Action:

a. WHEN DRILLING AHEAD - Driller and designated crewmember will don 30 min SCBA, shut-in the

well and immediately proceed to the Safe Briefing Area.

WHEN TRIPPING – Driller and two designated crewmembers will don 30 min SCBA, shut in the well and immediately proceed to the Safe Briefing Area. The Derrickman will don a 5-minute escape pack, descend to the rig floor, don a 30-min SCBA (if necessary) and immediately proceed to the Safe Briefing Area.

b. All In Scope Personnel should don SCBA if nearby and immediately proceed to Safe Briefing Area. If SCBA in not nearby at time of alarm, DO NOT GO TOWARDS RIG AREA, but proceed directly to the Safe Briefing Area

c. All out of Scope Personnel shall evacuate the location.

d. Remain in the Safe Briefing Area, take roll call and wait for instructions.

e. Contact the Total H2S Technician if not on location.

f. Personnel shall ensure that their breathing apparatus is properly fitted and operational before entering an H_2S contaminated area to provide assistance to anyone who may be injured or overcome by toxic gases. Use the buddy system.

g. Remain in safe briefing area, take roll call and wait for instructions.

h. A cascade breathing air systems shall be mobilized and utilized to conduct

any additional on rig work required to correct the H2S release condition.

i. If well is ignited do not assume area is safe. SO2 is hazardous and not all H2S will burn.

H_2S EMERGENCY PROCEDURES; IN SCOPE PERSONNEL

A. Day To Day Drilling Operations

1. Upon discovering a release of H_2S gas in the ambient air by warning alarms or in any other way **Do Not Panic**.

2. Hold your breath donning the nearest Self Contained Breathing Apparatus and rapidly move up or across-wind away from the areas where H_2S sensing devices are in place, to the closest available safe briefing area. Continue to use breathing apparatus until it has been determined that the exposure of H_2S gas in the ambient air no longer exists. **Do Not Panic**!

3. Utilize the "Buddy System", i.e.; select and pair up each person participating in the drilling of an H_2S well prior to an emergency situation.

4. Help anyone who is overcome or affected by the H_2S gas by taking him/her up-wind out of the contaminated area. (This should be done utilizing an SCBA and with a buddy.)

5. Take necessary steps to confirm the release of the H_2S gas into the ambient air.

    - When an H2S alarm activates, two designated personnel using the buddy system, while wearing their self contained breathing apparatus, will determine by the read-out on the fixed monitor which sensing device has detected the release of the H_2S gas.

    - They will utilize the hand-held sniffer type device at the particular sensing point disclosed on the fixed monitor to corroborate the fact that H_2S gas has actually been released. This will rule out the possibility of a false alarm. This will be done with a buddy and under mask after reporting to the Safe Briefing Area for roll call and instructions by on-site MRC Foreman.

6. Refer to the Emergency Phone Numbers and call emergency personnel.

7. Take the necessary steps to suppress the release of H_2S gas into the ambient air. Comply with the MRC Energy Co. Representative to physically suppress the release of H_2S gas at the actual release point.

8. Check all of MRC Energy Co.'s monitoring devices and increase gas-monitoring activities with the portable hand-operated H_2S and gas detector units.

Do Not Panic!

The MRC Energy Co. representative will assess the situation and with assistance of the Contractor's Representative and Total Safety's H_2S Safety Technician or on site designee, will assign duties to each person to bring the situation under control.

B. RESPONSIBILITIES OF WELL-SITE PERSONNEL

In the event of a release of potentially hazardous amounts of H_2S, all personnel will immediately don their protective breathing apparatus, the well will be shut in and personnel will proceed upwind to the nearest designated safe briefing area for roll call and instructions by MRC Foreman. Consideration will be given to evacuating Out of Scope Personnel, as situation warrants.

1. MRC ENERGY CO.'S Well-site Representatives

a. If MRC Energy Co.'s well-site representative is incapacitated or not on location, this responsibility will fall to the Toolpusher/Driller.

b. Immediately upon assessing the situation, set this plan into Action by initiating the proper procedures to contain the gas and notify the appropriate people and agencies.

c. Ensure that the alarm area indicated by the fixed H_2S Monitor is checked and verified with a portable H_2S detector. (Safety Technician if on location or MRC assigned designee with a buddy utilizing SCBA's)

d. Consult Pusher/driller of remedial actions as needed.

e. Ensure that non-essential personnel proceed to the safe briefing area.

f. Ensure location entrance barricades are positioned. Keep the number of persons on location to a minimum during hazardous operations.

g. Consult each contractor, Service Company and all others allowed to enter the site, that H2S gas may be encountered and the potential hazards that may exist.

h. Authorize the evacuation of local residents if H_2S threatens Their safety.

i. Non essential personnel should be evacuated from location if Situation warrants.

2. Toolpusher

a. Toolpusher/Driller will assume responsibilities of MRC Energy Co.'s well-site representative if that person is incapacitated or not on location.

b. Ensure that the alarm area indicated by the fixed H_2S monitor is checked and verified with a portable H_2S gas detector. (Alarm area indicated by the monitor will be Checked by the H2S Technician and a buddy, under mask.) This will be done after checking in and roll call at the Upwind Safe Briefing Area.

c. Confer with MRC Energy Co.'s well-site representative or superintendent and direct remedial action to suppress the H_2S and control the well.

d. Ensure that personnel at the safe briefing area are instructed on emergency actions required.

e. Ensure that personnel at the drill floor area are instructed on emergency actions required.

f. Ensure that all personnel observe the appropriate safety and emergency procedures.

g. Ensure that all persons are accounted for and provided emergency assistance as necessary.

3. Mud Engineer

a. Run a sulfide check on the flowline mud.

b. Take steps to determine the source of the H_2S and suppress it. Lime and H_2S scavenger shall be added to the mud as necessary.

4. Total H_2S Safety Technician, if on location, or MRC Designee

a. H2S Safety Technician or designee don nearest SCBA and report to Safe Briefing Area for roll call, take a buddy masked up and check monitor and verify with a portable H_2S detector the alarm area indicated by the fixed H_2S monitor. Advise the Toolpusher/Driller and MRC Energy Co.'s well-site representative of findings. Record all findings.

b. If H_2S is flared, check for sulfur dioxide (SO_2) near the flare as necessary. Take hourly readings at different perimeters, log readings and record on location.

c. Ensure that personnel at the safe briefing area are instructed on emergency actions required.

d. Ensure that the appropriate warning flags are displayed.

e. Ensure that all personnel are in S.C.B.A. as necessary.

f. Ensure that all persons are accounted for and provide emergency assistance as necessary.

g. Be prepared to evacuate rig if order is issued.

5. General Personnel & Visitors

a. All In Scope Personnel, if not specifically designated to shut the well in or control the well, shall proceed to the (upwind) safe briefing area. All Out of Scope Personnel shall immediately proceed to the appropriate (upwind) safe briefing area or evacuate the site as conditions warrant.

b. During any emergency, use the "buddy" system to prevent anyone from entering or being left in a gas area alone, even wearing breathing apparatus.

c. Provide assistance to anyone who may be injured or overcome by toxic gases. Personnel shall ensure that their breathing apparatus is properly fitted and operational before entering a potentially H_2S contaminated area.

d. Remain in safe briefing area and wait for instructions.

C. INSTRUCTIONS FOR IGNITING THE WELL

1. The Toolpusher/Driller will confer with MRC Energy Co.'s well-site representative who will secure the approval of the "Texas Wells Delivery Manager, prior to igniting the well, if at all possible.

   The Toolpusher/Driller will be responsible for igniting the well in the event of severe well control problems. This decision should be made only as a last resort in situations where it is clear that:

   a. Human life and property are endangered, or

   b. There is no hope of controlling the well under current conditions.

2. Once the decision has been made, the following procedures should be followed:

a. Two people wearing self-contained breathing apparatus will be needed for the actual lighting of the well. They must first establish the flammable perimeter by using an explosimeter. This should be established at 30% to 40% of the lower flammable limits.

b. After the flammable perimeter has been established and everyone removed from the area, the ignition team should select a site upwind of the well from which to ignite the well. This site should offer the maximum protection and have a clear path for retreat from the area.

c. The ignition team should have safety belts and lifeline attached and manned before attempting ignition. If the leak is not ignited on the first attempt, move in 20 to 30 feet and fire again. Continue to monitor with the explosimeter and NEVER fire from an area with over 75% of the Lower Explosive Limit (LEL). If having trouble igniting the well, try firing 40 degrees to 90 degrees on either side of the well.

d. If ignition is not possible due to the makeup of the gas, the toxic perimeter must be established and evacuation continued until the well is contained.

e. All personnel must act only as directed by the person in charge of the operations.

NOTE: After the well is ignited, burning hydrogen sulfide (H_2S) will convert to sulfur dioxide (SO_2), which is also a highly toxic gas.

DO NOT ASSUME THE AREA IS SAFE AFTER THE WELL IS IGNITED

D. CORING PROCEDURES

Only essential personnel shall be on the rig floor. Ten (10) stands prior to retrieving core barrel; all personnel on drill floor and in derrick shall confirm self-Contained breathing apparatus available and ready for use.

A Total H2S Technician will don a SCBA with a buddy assigned from the rig crew, and continuously monitor for H2S at each connection. Any levels detected will require operations to be shut down and all involved

personnel to don SCBAs. Precautions will remain in place until barrel is laid down.

All involved personnel will don SCBAs when removing the inner barrel from the outer barrel. SCBAs can be removed once the absence of H2S in confirmed by the Total H2S Technician.

Cores will be appropriately marked and sealed for transportation.

Normal Operations

1. Responsibilities of well-site personnel

a. Well-site Representative

1. Notify H_2S Technician of expected date to reach Contingency Plan implementation depth (Two (2) days prior to reaching suspected H_2S bearing zone) or prior to starting well work.

2. Ensure H_2S Safety Technician completes rig-up procedures prior to reaching Contingency Plan effective depth.

3. Restrict the number of personnel at the drilling rig or well site to a minimum while drilling, starting well work, testing or coring.

4. Ensure weekly H_2S drills/training are performed, if possible.

B. Toolpusher

1. Ensure that necessary H_2S safety equipment is provided on the rig, and that it is properly inspected and maintained.

2. Ensure that all personnel that work in the well area, are thoroughly trained in the use of H_2S safety

equipment and periodic drills are held to maintain an adequate level of proficiency.

C. In Scope Personnel

1. Remain clean-shaven. Beards and long sideburns do not allow a proper facepiece seal.

2. Receive H_2S safety training on location, or confirm prior training by certification that is one year within date.

3. Familiarize yourself with the rig's Contingency Plan.

4. Inspect and practice putting on your breathing apparatus.

5. Know the location of the "safe briefing areas".

6. Keep yourself "wind conscious". Be prepared to quickly move upwind and away in the event of any emergency involving release of H_2S.

D. Total Safety H_2S Safety Technician or MRC Designee

1. Conduct training as necessary to ensure all personnel working in well area are familiar with the contingency procedures and the operation of emergency equipment.

2. Check all H_2S safety equipment to ensure that it is ready for emergency use:

   - Check pressure weekly for each shift on breathing apparatus (both 30-minute and hip-packs) to make sure they are charged to full volume.

   - Check pressure on cascade air bottles, if on location, to see that they are capable of recharging breathing apparatus.

- Check oxygen resuscitator, if on location, to ensure that it is charged to full volume.

- Check H_2S detectors weekly for each shift (fixed and portable), and explosimeter, to ensure they are working properly.

3. Provide a weekly report to MRC Energy Co.'s well-site representative documenting:

   - Calibrations performed on H_2S detectors.

   - Proper location and working order of H_2S safety equipment.

   - Attendance of all personnel, trained or retrained, and their company.

   - Weekly drills, if held and a list of personnel participating and summary of actions.

OUT OF SCOPE PERSONNEL

MRC Energy Co. policy will not require Out of Scope Personnel to be clean shaven, have processed medical questionnaires, fit testing, or have certified H2S Training.

SAFETY EQUIPMENT

All respirators will be designed, selected, used and maintained in conformance with ANSI Z88.2, American National Standard for respiratory protection.

Personal protective equipment must be provided and used. Those who are expected to use respiratory equipment in case of an emergency will be carefully instructed in the proper use and told why the equipment is being used. Careful attention will be given to the minute details in order to avoid possible misuse of the equipment during periods of extreme stress.

Self-contained breathing apparatus provides complete respiratory and eye protection in any concentration of toxic gases and under any condition of oxygen deficiency. The wearer is independent of the surrounding atmosphere because he/she is breathing with a system admitting no outside air. It consists of a full face mask, breathing tube, pressure demand regulator, air supply cylinder, and harness. Pure breathing air from the supply cylinder flows to the mask automatically through the pressure demand regulator which reduces the pressure to a breathing level. Upon inhalation, air flows into the mask at a rate precisely regulated to the user's demand. Upon exhalation, the flow to the mask stops and the exhaled breath passes through a valve in the face piece to the surrounding atmosphere. The apparatus includes an alarm & gauge which warns the wearer to leave the contaminated area for a new cylinder of air or cylinder refill.

The derrickman is provided with a full face piece unit attached to a 5– minute escape cylinder. He will also have his own self-contained 30-minute unit breathing apparatus located on the drilling floor. He will use the 5-minute unit to exit the derrick to the floor, donning the 30-minute unit located on the floor, if needed.

All respiratory protective equipment, when not in use, should be stored in a clean, cool, dry place, and out of direct sunlight to retard the deterioration of rubber parts. After each use, the mask assembly will be scrubbed with soap and water, rinsed thoroughly, and dried. Air cylinders can be recharged to a full condition from a cascade system.

Personnel in each crew will be trained in the proper techniques of bottle filling.

The primary piece of equipment to be utilized, should anyone be overcome by hydrogen sulfide, is the oxygen resuscitator, if on location.

When asphyxiation occurs, the victim must be moved to fresh air and immediately given artificial respiration. In order to assure readiness, the bottles of oxygen will be checked at regular intervals and an extra tank kept on hand.

Hand-operated pump-type detectors incorporating detector tubes will give more accurate readings of hydrogen sulfide. The pump-type draws air to be tested through the detector

tube containing lead acetate-silica gel granules. Presence of hydrogen sulfide in the air sample is shown by the development of a dark brown stain on the granules, which is the scale reading of the concentration of hydrogen sulfide. By changing the type of detector tube used, this detector may also be used for sulfur dioxide (SO_2) detection when hydrogen sulfide (H_2S) is being burned in the flare area.

Provisions must be made for the storage of all safety equipment as is evident from the foregoing discussion. All equipment must be stored in an available location so that anyone engaged in normal work situations is no more than "one breath away' from a mask.

V – TOXICITY OF VARIOUS GASES

Common Name	Chemical Formula	Specific Gravity[1]	PEL (OSHA)[2]	STEL[3]	Lethal ppm[4]
Hydrogen Cyanide	HCN	0.94	10	150	300
Hydrogen Sulfide	H_2S	1.18	20	Peak- 50ppm	600
Sulfur Dioxide	SO_2	2.21	2	5 ppm	1000
Chlorine	CL_2	2.45	1		
Carbon Monoxide	CO	0.97	35	200/1 Hour	1000
Carbon Dioxide	CO_2	1.52	5000	5%	10%
Methane	CH_4	0.55	90000		

Note: The ACGIH(7) recommends a TWA(6) value of 10ppm as the TLV(5) for H2S and an STEL of 15ppm.

[1] **Air = 1.0**

[2] **Permissible -** Concentration at which is believed that all workers may repeatedly be exposed, day after day, without adverse effect.

[3] **STEL -** Short Term Exposure Limit. A 15-minute time weighted average.

[4] **Lethal -** Concentration that will cause death with short-term exposure.

TLV – Threshold Limit Value; a concentration recommended by the American Conference of Governmental Industrial Hygienists (ACGIH)

TWA – Time Weighted Average; the average concentration of contaminant one can be exposed to over a given eight-hour period.

ACGIH – (American Conference of Governmental Industrial Hygienists) is an organization comprised of Occupational Health Professionals believed

by many to be the top experts in the field of Industrial Hygiene. They are recognized as an expert rexource by OSHA. The ACGIH releases a bi-annual publication "Threshold Limit Values and Biological Indices" that many safety professionals consider to be the authoritative document on airborne contaminants.
Reference: API RP-49, September 1974 - Reissued August 1978

VI. PROPERTIES OF GASES

A. CARBON DIOXIDE

1. Carbon Dioxide (CO_2) is usually considered inert and is commonly used to extinguish fires. It is 1.52 times heavier than air and will concentrate in low areas of still air. Humans cannot breathe air containing more than 10% CO_2 without losing conscience or becoming disorientation in a few minutes. Continued exposure to CO_2 after being affected will cause convulsions, coma, and respiratory failure.
2. The threshold limit of CO_2 is 5000 ppm. Short-term exposure to 50,000 ppm (5%) is reasonable. This gas is colorless, odorless, and can be tolerated in relatively high concentrations.

B. HYDROGEN SULFIDE

1. Hydrogen Sulfide (H_2S) is a colorless, transparent, flammable gas. It is heavier than air and, hence, may accumulate in low places.
2. Although the slightest presence of H_2S in the air is normally detectable by its characteristic "rotten egg" odor, it is dangerous to rely on the odor as a means of detecting excessive concentrations because the sense of smell is rapidly lost, allowing lethal concentrations to be accumulated without warning. The following table indicates the poisonous nature of H_2S.

CONCENTRATION			EFFECTS
% H_2S	PPM	GR/100 SCF[1]	
0.001	10	.65	Safe for 8 hours without respirator. Obvious and unpleasant odor.
0.0015	15	0.975	Safe for 15 minutes of exposure without respirator.
0.01	100	6.48	Kills smell in 3-15 minutes; may sting eyes and throat.
0.02	200	12.96	Kills smell quickly; stings eyes and throat.
0.05	500	32.96	Dizziness; breathing ceases in a few minutes; need prompt artificial respiration.
0.07	700	45.92	Rapid Unconsciousness; death will result if not rescued promptly.
0.1	1000	64.80	Instant unconsciousness, followed by death within

			minutes.

[1] Grains per 100 Cubic Feet

VII. Treatment Procedures for Hydrogen Sulfide Poisoning

A. Remove the victim to fresh air.

B. If breathing has ceased or is labored, begin resuscitation immediately.
Note: This is the quickest and preferred method of clearing victim's lungs of contaminated air; however, under disaster conditions, it may not be practical to move the victim to fresh air. In such instances, where those rendering first aid must continue to wear masks, a resuscitator should be used.

C. Apply resuscitator to help purge H_2S from the blood stream.

D. Keep the victim at rest and prevent chilling.

E. Get victim under physician's care as soon as possible.

C. SULPHUR DIOXIDE

1. Sulfur Dioxide (SO_2) is a colorless, non-flammable, transparent gas.

2. SO_2 is produced during the burning of H_2S. Although SO_2 is heavier than air, it can be picked up by a breeze and carried downwind at elevated temperatures. Since SO_2 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 SO_2:

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, constriction of the chest, tearing and smarting of eyes.
0.015	150	So irritating that it can only be endured for a few minutes.
.05	500	Causes a sense of suffocation, event with the first

		breath.

VIII. BREATHING AIR EQUIPMENT DRILLS FOR ON & OFF DUTY PERSONNEL

An H_2S Drill and Training Session must be given once a week to ALL on-duty personnel with off duty personnel. On-duty and Off-duty personnel will reverse roles on alternate drills.
An H2S drill and training session must be given once a week to all off-duty personnel in coincidence with on-duty personnel reversing roles on alternate drills.

The purpose of this drill is to instruct the crews in the operation and use of breathing air and H_2S related emergency equipment and to allow the personnel to become acquainted with using the equipment under working conditions. The crews should be trained to put on the breathing air equipment within one minute when required or requested to do so.

The following procedure should be used for weekly drills. The MRC supervisor must be satisfied that the crews are proficient with the equipment.

1. All personnel should be informed that a drill will be held.

2. The Total H2S Safety Technician or a designee assigned by the MRC Drilling Foreman should initiate the drill by signaling as he/she would if H2S was detected.

3. Personnel should don their breathing apparatus.

4. Once the breathing air equipment is on, the H2S Technician should check all personnel to insure proper operation.

A training and information session will be conducted after each drill to answer any H_2S related questions and to cover any gaps identified from one of the following topics:

- Condition II, and III alerts and steps to be taken by all personnel.
- The importance of wind direction when dealing with H_2S.
- Proper use and storage of all types of breathing equipment.
- Proper use and storage of oxygen resuscitators.
- Proper use and storage of H_2S detectors (Mini Checks or equivalent).
- The "buddy system" and the procedure for rescuing a person overcome by H_2S.
- Responsibilities and duties.
- Location of H_2S safety equipment.
- Other parts of the "H_2S Contingency Plan" that should be reviewed.

NOTE: A record of attendance must be kept for weekly drills and training sessions.

IX. HYDROGEN SULFIDE TRAINING CURRICULUM

(FOR EMPLOYERS, VISITORS, AND CONTRACTORS)

EACH PERSON WILL BE INFORMED ON THE RESTRICTIONS OF HAVING BEARDS AND CONTACT LENS. THEY WILL ALSO BE INFORMED OF THE AVAILABILITY OF SPECTACLE KITS.

AFTER THE H2S EQUIPMENT IS RIGGED UP, ALL IN SCOPE PERSONNEL WILL BE H2S TRAINED AND PUT THROUGH A DRILL. ANY DEFICIENCIES WILL BE CORRECTED.

Training Completion cards are good for one year and will indicate date of completion or expiration. Personnel previously trained on another facility and visiting, must attend a "supplemental briefing" on H2S equipment and procedures before beginning duty. Visitors who remain on the location more than 24 hours must receive full H2S training given all crew members. A "supplemental briefing" will include but not be limited to: Location of respirators, familiarization with safe briefing areas, alarms with instruction on responsibilities in the event of a release and hazards of H2S and (SO2, if applicable). A training and drill log will be kept.

Topics for full H2S training shall include the following equipment if on location, but not be limited to the following:

1. **Brief Introduction on H2S**
   - A. Slide or Computer presentation (If Available)
   - B. H2S material will be distributed
   - C. Re-emphasize the properties, toxicity, and hazards of H2S
   - D. Source of SO2 (if applicable)

2. **H2S Detection**
   - A. Description of H2S sensors
   - B. Description of warning system (how it works & it's location)
   - C. Actual location of H2S sensors
   - D. Instruction on use of pump type detector (Gastec)
   - E. Use of card detectors, ampoules, or dosimeters
   - F. Use of combustible gas detector
   - G. Other personnel detectors used
   - H. Alarm conditions I & II,
   - I. SO2 alarms (if applicable)

3. **H2S Protection**
   - A. Types of breathing apparatus provided (30-minute SCBA & 5-minute SCBA (with voice diaphragms for communication if supplied)
   - B. Principle of how breathing apparatus works
   - C. Demonstration on how to use breathing apparatus
   - D. Location of breathing apparatus

4. **Cascade System**
   - A. Description of cascade system
   - B. How system works
   - C. Cascade location of rig with reference to briefing areas
   - D. How to use cascade system (with 5-minute hose work line units & refill, if supplied)
   - E. Importance of wind direction and actual location of Windsocks
   - F. Purpose of compressor/function (if one is on site)

5. **H2S Rescue and First Aid**
   - A. Importance of wind direction
   - B. Safe briefing area
   - C. Buddy system
   - D. H2S symptoms
   - E. Methods of rescue

6. **Hands on Training**
   - A. Donning/familiarization of SCBA 30-minue unit
   - B. Donning/familiarization of SKADA 5- MIN. Packs
   - C. Familiarization of cascades
   - D. Use of O2 resuscitator
   - E. Alarm conditions - upwind briefing areas, etc...
   - F. Duties and responsibilities of all personnel
   - G. Procedures for evacuation
   - H. Search and Rescue teams

7. **Certification**
   - A. Testing on material covered

TOTAL SAFETY US INC., FIT TEST

X. EMPLOYEE INFORMATION

Employee Name: _____ Date: _____

Date of Employee Medical Evaluation: _____

Medical Status (circle): Unrestricted Limitations on Use Use Not Authorized

RESPIRATOR INFORMATIOIN

Respirator Type (Dustmask, SCBA, etc):_____

Brand:_____

Size: (circle): XS S M L XL

FIT TEST INFORMATION

Type of Fit Test Performed:

Quantitative

Porta Count Fit Factor:_____
Fittester 3000 Fit Factor:_____

Qualitative

Irritant Smoke Passed / Failed
Isoamyl Acetate (Banana Oil) Passed / Failed
Saccharin Passed / Failed
Bitrex Passed / Failed

I hereby certify that this fittest was conducted in accordance with the OSHA Fit Testing Protocols found in Appendix A of 1910.134.

Fit Tester Name (Print):_____

Signature:_____ Date:_____

XI. H_2S SAFETY SERVICES

HYDROGEN SULFIDE SAFETY PACKAGE – Contained on location in Total Safety H2S Equipment Trailer, unless otherwise noted:

RESPIRATORY SAFETY SYSTEMS

QTY	DESCRIPTION
12	30-Minute Pressure Demand SCBA (4-Primary Safe Briefing Area, 4-Secondary Safe Briefing Area, 4-floor with one of these for derrick man)
9	Hose Line 5-minute Work Unit w/Escape Cylinder (1 in derrick, 6 on drill floor, 1 in mud pit wt area, 1 in shaker area)

The following shall be part of the package if requested by the MRC Foremen (at least one trailer with cascade system is required to be located in the MRC Magnolia asset for use as needed)

1	Breathing air cascade of 10 bottles w/regulator
2	Refill lines to refill 30-minute units on location
1	6-Man manifold that can be rigged up to work area on floor, if needed
6	25 foot hose lines
2	50 foot hose lines
100	Feet of hose line to rig cascade up to 12 man manifold on floor
12	30-minute Self Contained Breathing apparatus

DETECTION AND ALARM SAFETY SYSTEM

1	H2S Fixed Monitor w/8Channels (Loc determined at rig up) suggested. (Mud pit area, shaker area, bell nipple area, floor/driller area, & outside quarters)
5	H2S Sensors
3	Explosion Proof Alarms (Light and Siren) (1 on floor, 1 in work area, 1 in trailer area where quarters are located)
2	Personal H2S monitors
1	Portable Tri-Gas Hand Held Meter (O2, LEL, H2S)
1	Sensidyne/Gastech Manual Pump Type Detector
8	Boxes H2S Tubes Various Ranges
2	Boxes SO2 Tubes Various Ranges
1	Calibration Gas
1	Set Paper Work for Records: Training, Cal, Inspection, other

ADDITIONAL SAFETY RELATED EQUIPMENT

QTY	DESCRIPTION
2	Windsocks with Pole and Bracket
1	Set Well Condition Sign w/Green, Yellow, Red Flags
1	Primary Safe Briefing Area Sign
1	Secondary Safe Briefing Area Sign
6	Operating Condition Signs for Work Areas & Living Quarters

TRAILER WITH BREATHING AIR CASCADE WILL ALSO INCLUDE THE FOLLOWING:

This equipment will be part of the H2S equipment stored in the trailer, when on location

1	First aid kit
1	Fire Blanket
1	Eye wash station
2	Safety Harness w/150' safety line

XII. EMERGENCY PHONE NUMBERS (Updated March 18, 2009)

EMERGENCY PHONE NUMBERS

MRC Energy Co. Emergency Phone #
MRC Energy Co. Permian Operations Phone----------
MRC Energy Co. Production
113 Daw Rd
Mansfield LA 71052

Title	Names	Phone	Cell
Operations Manager			
Operation Supt.			
Operations Supervisor			
Operations Supervisor			
Office Supervisor			
HSE			
Scheduler Planner			

Hydrogen Sulfide Safety Consultants

Total Safety W. Bender Blvd. Hobbs, NM	575-392-2973	After Hours 24 Hour Call Center Through Office Number
Tommy Throckmorton Operations Manager	575-392-2973	940-268-9614
Rodney Jourdan Sales Contact	575-392-2973	432-349-3928

MRC Energy Co. MEDICAL RESPONSE PLAN AND IT'S MEDICAL PROTOCOLS WILL BE FOLLOWED

MEDICAL COORDINATOR # ----------

Emergency Numbers & Directions

Hospitals (911)

Artesia General Hospital **702 N. 13th St.** **Artesia, NM 88210**	**Main Phone Number**	**575-748-3333**
Nor-Lea General Hospital **1600 N. Main Ave.** **Lovington, NM 88260**	**Main Phone Number**	**575-396-6611**
Lea Regional Medical Center **5419 N. Lovington Hwy** **Hobbs, NM 88240**	**Main Phone Number**	**575-492-5260**
Carlsbad General Hospital **2430 W. Pierce St.** **Carlsbad, NM**	**Main Phone Number**	**575-887-4100**
Lovelace Regional Hospital **117 E. 19th St** **Roswell, NM 88201**	**Main Phone Number**	**575-627-7000**
Winkler Co. Memorial Hospital **821 Jeffee Dr.** **Kermit, Texas 79745**	**Main Phone Number**	**432-586-8299**
Reeves County Hospital **2323 Texas St.** **Pecos, Texas 79772**	**Main Phone Number**	**432-447-3551**

State Police (911)

Texas DPS Loving co. 225 N.Pecos Mentone, Texas 79754	**Office Number**	**432-377-2411**
Texas DPS Winkler Co. 100 E Winkler Kermit, Texas 79745	**Office Number**	**432-586-3465**
Texas DPS Pecos Co. 148 N I-20 Frontage RD Pecos, Texas 79772	**Office Number**	**432-447-3532**
New Mexico State Police 3300 W. Main St Artesia, NM	**Office Number**	**575-748-9718**
New Mexico State Police 304 N. Canyon St Carlsbad, NM 88220	**Office Number**	**575-885-3137**
New Mexico State Police 5100 Jack Gomez Blvd. Hobbs, NM 88240	**Office Number**	**575-392-5588**

Local Law Enforcement (911) (Sheriff)

Reeves Co. Sheriff 500 N. Oak ST Pecos, Texas 79722	**Office Number**	**432-445-4901**
Winkler Co. Sheriff 1300 Bellaire St. Kermit, Texas 79745	**Office Number**	**432-586-3461**
Loving Co. Sheriff Courthouse Mentone, Texas	**Office Number**	**432-377-2411**

Lea Co. Sheriff 1417 S. Commercial St. Lovington, NM 88260	**Office Number**	
Eddy Co. Sheriff 305 N 7th St. Artesia, NM 88210	**Office Number**	**575-766-9888**
Eddy Co. Sheriff 305 N 7th St. Carlsbad, NM 88220	**Office Number**	**575-746-9888**

Federal & State Agencies

OSHA Lubbock Area Office 1205 Texas Av. Room 806 Lubbock, Texas 79401	**Main Number**	**806-472-7681 EXT 7685**
New Mexico Environment Department 400 N Pennsylvania Roswell, NM 88201	**Joe Fresquez**	**575-623-3935**
Texas Railroad Commission Midland, Texas	**Main Number**	**844-773-0305**
BLM Carlsbad, NM Field Office 620 E. Green ST Carlsbad, NM 88220	**Main Number**	**575-234-5972**
BLM Hobbs Field Station 414 W. Taylor Rd. Hobbs, NM 88240	**Main Number**	**575-393-3612**
BLM Roswell District Office 2909 W. Second St. Roswell, NM 88201	**Main Number**	**575-627-0272**

TECQ Texas Commission on Environmental Quality	**Main Number**	**800-832-8224**
New Mexico OCD		
U.S. Environmental Protection Agency Region 6 Texas/New Mexico	**Main Number**	**214-655-2222**
National Response Center Toxic Chemicals & Oil Spills	**Main Number**	**800-424-8802**

Rig Company

XIII. EVACUATION OF THE GENERAL PUBLIC

The procedure to be used in alerting nearby persons in the event of any occurrence that could pose a threat to life or property will be arranged and completed with public officials in detail, prior to drilling into the hydrogen sulfide formations.

In the event of an actual emergency, the following steps will be immediately taken:

1. The MRC Energy Co.'s representative will dispatch sufficient personnel to immediately warn each resident and transients down-wind within radius of exposure from the well site. Then warn all residence in the radius of exposure. Additional evacuation zones may be necessary as the situation warrants.

2. The MRC Energy Co.'s representative will immediately notify proper authorities, including the Sheriff's Office, Highway Patrol, and any other public officials as described above and will enlist their assistance in warning residents and transients in the calculated radius of exposure.

3. The MRC Energy Co.'s representative will dispatch sufficient personnel to divert traffic in the vicinity away from the potentially dangerous area. A

guard to the entrance of the well site will be posted to monitor essential and non essential traffic.

4. General:

A. The area included within the radius of exposure is considered to be the zone of maximum potential hazard from a hydrogen sulfide gas escape. Immediate evacuation of public areas, in accordance with the provisions of this contingency plan, is imperative. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated in accordance with the contingency plan.

B. In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public, including all public areas. MRC Energy Co. will cooperate with these authorities to the fullest extent and will exert every effort by careful advice to such authorities to prevent panic or rumors.

C. MRC Energy Co. will dispatch appropriate management personnel at the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as they might require.

D. One of the products of the combustion of hydrogen sulfide is sulfur dioxide (SO_2). Under certain conditions this gas may be equally as dangerous as H_2S. A pump type detector device, which determines the percent of SO_2 in air through concentrations in ppm, will be available. Although normal air movement is sufficient to dissipate this material to safe levels, the SO_2 detector should be utilized to check concentrations in the proximity of the well once every hour, or as necessary and the situation warrants. Also, if any low areas are suspected of having high concentrations, personnel should be made aware of these areas, and steps should be taken to determine whether or not these low areas are hazardous.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

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

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

X Original
☐ Amended

Operator & OGRID No.: Matador Production Company (228937)
Date: 6/28/2018

Reason for Amendment:_____

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomplete to new zone, re-frac) activity.

Note: A C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule 19.15.18.12.A

Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Ches Riddle Fed Com #112H	N/A	UL-E Sec 01 T24S R28E	###FNL ###FWL	~1000	~21 days	Flare ~21 days on flowback before turn into TB. Time est. depends on sales connect and well cleanup.
Ches Riddle Fed Com #122H	N/A	UL-E Sec 01 T24S R28E	###FNL ###FWL	~1,200	~21 days	Flare ~21 days on flowback before turn into TB. Time est. depends on sales connect and well cleanup.
Ches Riddle Fed Com #202H	N/A	UL-E Sec 01 T24S R28E	###FNL ###FWL	~2,500	~21 days	Flare ~21 days on flowback before turn into TB. Time est. depends on sales connect and well cleanup.
Ches Riddle Fed Com #206H	N/A	UL-E Sec 01 T24S R28E	###FNL ###FWL	~2,500	~21 days	Flare ~21 days on flowback before turn into TB. Time est. depends on sales connect and well cleanup.
Ches Riddle Fed Com #222H	N/A	UL-E Sec 01 T24S R28E	###FNL ###FWL	~9,000	~21 days	Flare ~21 days on flowback before turn into TB. Time est. depends on sales connect and well cleanup.

Ches Riddle Fed Com #226H	N/A	UL-E Sec 01 T24S R28E	###FNL ###FWL	~9,000	~21 days	Flare ~21 days on flowback before turn into TB. Time est. depends on sales connect and well cleanup.

Gathering System and Pipeline Notification

The well will be connected to a production facility after flowback operations are complete so long as the gas transporter system is in place. The gas produced from the production facility should be connected to Longwood RB Pipeline, LLC gathering system. It will require ~4,500' of pipeline to connect the facility to a low/high pressure gathering system. Matador Production Company periodically provides a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future to Longwood RB Pipeline, LLC. If changes occur that will affect the drilling and completion schedule, Matador Production Company will notify Longwood RB Pipeline, LLC. Additionally, the gas produced from the well will be processed at a processing plant further downstream and, although unanticipated, any issues with downstream facilities could cause flaring at the wellhead. The actual flow of the gas will be based on compression operating parameters and gathering system pressures measured when the well starts producing.

Flowback Strategy

After the fracture treatment/completion operations (flowback), the well will be produced to temporary production tanks and the gas will be flared or vented. During flowback, the fluids and sand content will be monitored. If the produced fluids contain minimal sand, then the well will be turned to production facilities. The gas sales should start as soon as the well starts flowing through the production facilities, unless there are operational issues on the midstream system at that time. Based on current information, it is Matador's belief the system will be able to take the gas upon completion of the well.

Safety requirements during cleanout operations may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease
  - Operating a generator will only utilize a portion of the produced gas and the remainder of gas would still need to be flared.
  - Power Company has to be willing to purchase gas back and if they are willing they require a 5 year commitment to supply the agreed upon amount of power back to them. With gas decline rates and unpredictability of markets it is impossible to agree to such long term demands. If the demands are not met then operator is burdened with penalty for not delivering.
- Compressed Natural Gas – On lease
  - Compressed Natural Gas is likely to be uneconomic to operate when the gas volume declines.
- NGL Removal – On lease
  - NGL Removal requires a plant and is expensive on such a small scale rendering it uneconomic and still requires residue gas to be flared.