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.: NMNM0039880

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.: GHOST RIDER 22 15 FEDERAL COM [325016] 33H

2. Name of Operator: APACHE CORPORATION [873]

9. API Well No.: 30-025-49337

3a. Address: 2000 POST OAK BLVD SUITE 100, HOUSTON, TX 7705(

3b. Phone No. *(include area code)*: (999) 999-9999

10. Field and Pool, or Exploratory: [96603] WOLFCAMP/TRISTE DRAW BONE SPRI

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

At surface: NWSE / 2357 FSL / 2176 FEL / LAT 32.2168027 / LONG -103.6609976

At proposed prod. zone: SWSE / 50 FSL / 2375 FEL / LAT 32.1959413 / LONG -103.6616554

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 15/T24S/R32E/NMP

14. Distance in miles and direction from nearest town or post office*: 30 miles

12. County or Parish: LEA

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any): 50 feet

16. No of acres in lease: 520

17. Spacing Unit dedicated to this well: 240.0

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

19. Proposed Depth: 9454 feet / 17084 feet

20. BLM/BIA Bond No. in file: FED: NMB000736

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3594 feet

22. Approximate date work will start*: 10/30/2020

23. Estimated duration: 15 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	Name *(Printed/Typed)*	Date
(Electronic Submission)	SORINA FLORES / Ph: (432) 818-1000	01/28/2020

Title: Supv of Drilling Services

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575) 234-5959	09/21/2020

Title	Office
Assistant Field Manager Lands & Minerals	Carlsbad Field Office

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

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

NGMP Rec 08/18/2021

KZ
08/20/2021

SL

APPROVED WITH CONDITIONS

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 09/21/2020

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
30-025-49337	96603	TRISTE DRAW; BONE SPRING

4 Property Code	5 Property Name	6 Well Number
325016	GHOST RIDER 22 15 FEDERAL COM	33H

7 OGRID NO.	8 Operator Name	9 Elevation
873	APACHE CORPORATION	3594'

10 Surface Location

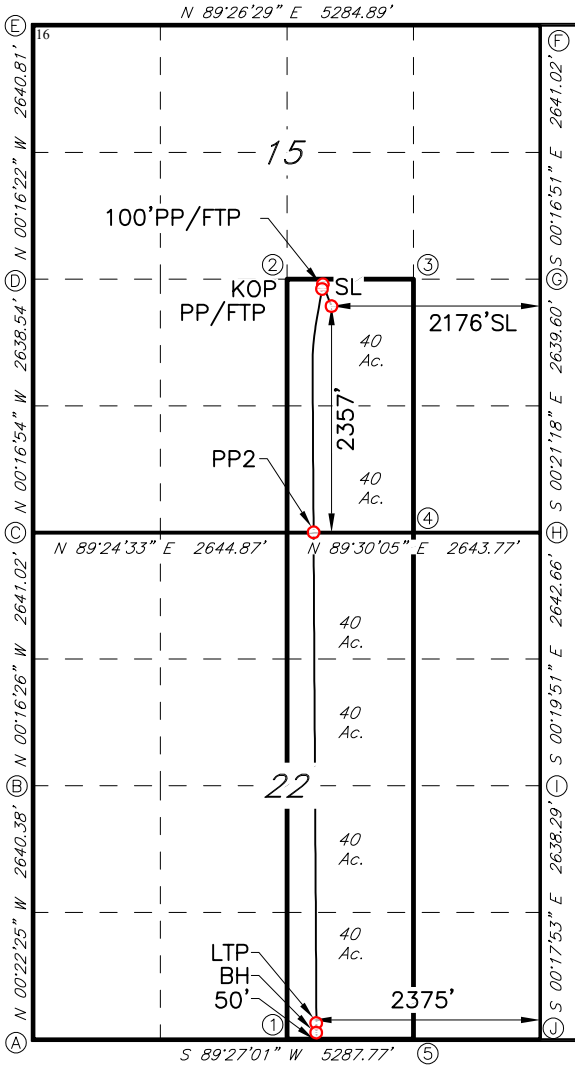
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet From the	East/West line	County
J	15	24S	32E		2357	SOUTH	2176	EAST	LEA

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
0	22	24S	32E		50	SOUTH	2375	EAST	LEA

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

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



GEODETIC DATA
NAD 83 GRID – NM EAST

SURFACE LOCATION (SL)
N 443257.2 – E 749263.7
LAT: 32.2168027° N
LONG: 103.6609976° W

KICK OFF POINT
2586'FSL–2265'FEL (SEC.15)
N: 443485.0 – E: 749173.1
LAT: 32.2174305° N
LONG: 103.6612860° W
MD: 8985.2 – TVD: 8976.9

PENETRATION POINT/
FIRST TAKE POINT (PP/FTP)
2537'FSL–2273'FEL (SEC.15)
N: 443436.2 – E: 749164.8
LAT: 32.2172964° N
LONG: 103.6613137° W
MD: 9203.8 – TVD: 9187.7

PENETRATION POINT 2 (PP2)
0'FSL–2376'FEL (SEC.15)
N 440898.6 – E 749077.2
LAT: 32.2103227° N
LONG: 103.6616484° W
MD:11852.4 – TVD:9454.4

LAST TAKE POINT (LTP)
100'FSL–2375'FEL (SEC.22)
N: 435716.7 – E: 749107.4
LAT: 32.1960785° N
LONG: 103.6616554° W
MD:17034.4 – TVD: 9454.4

BOTTOM HOLE (BH)
N: 435666.7 – E: 749107.7
LAT: 32.1959413° N
LONG: 103.6616554° W
MD:17084.3 – TVD: 9454.4

CORNER DATA
NAD 83 GRID – NM EAST

A: FOUND BRASS CAP "1916"
N 435588.7 – E 746196.0

B: FOUND BRASS CAP "1916"
N 438228.5 – E 746178.8

C: FOUND BRASS CAP "1916"
N: 440869.0 – E: 746166.1

D: FOUND BRASS CAP "1916"
N 443506.9 – E 746153.2

E: FOUND BRASS CAP "1916"
N 446147.2 – E 746140.6

F: CALCULATED CORNER
N: 446198.7 – E: 751424.1

G: FOUND BRASS CAP "1916"
N 443558.2 – E 751437.1

H: FOUND BRASS CAP "1916"
N 440919.2 – E 751453.4

I: FOUND BRASS CAP "1916"
N 438277.2 – E 751468.7

J: FOUND BRASS CAP "1916"
N 435639.5 – E 751482.4

K: FOUND BRASS CAP "1916"
N 440896.2 – E 748810.3

CALCULATED POINTS
1: N 435614.1 – E 748839.2
2: N 443532.6 – E 748796.4
3: N 443545.4 – E 750117.6
4: N 440907.7 – E 750131.9
5: N 435626.8 – E 750160.8

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.

Sorina L Flores 1/28/2020
Signature Date

SORINA L FLORES
Printed Name

sorina.flores@apachecorp.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 and correct to the best of my belief.

03–27–2019
Date of Survey

Signature and Seal of Professional Surveyor

JEFFREY L. FANSLER
NEW MEXICO
10034
PROFESSIONAL SURVEYOR

10034
Certificate Number

ADD P.P.2 – 01.10.20

Job No.: LS19030395DPR

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**APACHE CORPORATION**
LEASE NO.:	**NMNM0039880**
WELL NAME & NO.:	GHOST RIDER 22 15 FEDERAL COM 33H
SURFACE HOLE FOOTAGE:	2357'/S & 2176'/E
BOTTOM HOLE FOOTAGE	50'/S & 2375'/E
LOCATION:	Section 15, T.24 S., R.32 E., NMP
COUNTY:	Lea 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

A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **Delaware Mountain Group**. As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

B. CASING

Casing Design:

1. The **13-3/8** inch surface casing shall be set at approximately **1075** feet (a minimum of **25 feet (Lea 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

Approval Date: 09/21/2020

completing the cement job.

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

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

2. The **9-5/8** inch intermediate casing shall be set at approximately **4800** 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. **Excess cement calculates to 21%, additional cement might be required.**

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.
  Excess cement calculates to 13%, additional cement might be required.

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

Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.
Excess cement calculates to 2%, additional cement might be required.

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Operator has proposed to pump down 5-1/2" X 9-5/8" annulus. Operator must run a CBL / Echo-Meter from TD of the 5-1/2" casing to surface. Submit results to BLM.

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 **2000 (2M)** psi.

b. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **3000 (3M)** 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 **3000 (3M)** 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 Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, 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.

OTA09162020

Approval Date: 09/21/2020

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

Application Data Report
12/08/2020

APD ID: 10400053499
Submission Date: 01/28/2020
Operator Name: APACHE CORPORATION
Well Name: GHOST RIDER 22 15 FEDERAL COM
Well Number: 33H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400053499
Tie to previous NOS? N
Submission Date: 01/28/2020
BLM Office: CARLSBAD
User: Sorina Flores
Title: Supv of Drilling Services
Federal/Indian APD: FED
Is the first lease penetrated for production Federal or Indian? FED
Lease number: NMNM0039880
Lease Acres: 520
Surface access agreement in place?
Allotted?
Reservation:
Agreement in place? NO
Federal or Indian agreement:
Agreement number:
Agreement name:
Keep application confidential? Y
Permitting Agent? NO
APD Operator: APACHE CORPORATION
Operator letter of designation:

Operator Info

Operator Organization Name: APACHE CORPORATION
Operator Address: 303 Veterans Airpark Lane #1000
Zip: 79705
Operator PO Box:
Operator City: Midland
State: TX
Operator Phone: (432)818-1000
Operator Internet Address:

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: GHOST RIDER 22 15 FEDERAL COM
Well Number: 33H
Well API Number:
Field/Pool or Exploratory? Field and Pool
Field Name: WOLFCAMP
Pool Name: TRISTE DRAW BONE SPRING
Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,OIL

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

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

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** Y **New surface disturbance?** N

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** GHOST RIDER 22 15 NORTHWEST **Number:** 2N

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

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: OTHER

Describe sub-type: DEVELOPMENT WELL

Distance to town: 30 Miles **Distance to nearest well:** 30 FT **Distance to lease line:** 50 FT

Reservoir well spacing assigned acres Measurement: 240 Acres

Well plat: GhostRider22_15FedCom33H_PlatSigned_20200128141045.pdf

Well work start Date: 10/30/2020 **Duration:** 15 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: **Reference Datum:** GROUND LEVEL

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	2357	FSL	2176	FEL	24S	32E	15	Aliquot NWSE	32.2168027	-103.6609976	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0039880	3594	0	0	Y
KOP Leg #1	2586	FSL	2265	FEL	24S	32E	15	Aliquot NWSE	32.2174305	-103.661286	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0039880	-5382	8985	8976	Y

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

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 #1-1	2537	FSL	2273	FEL	24S	32E	15	Aliquot SWSE	32.2172964	-103.6613137	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 0039880	-5593	9203	9187	Y
PPP Leg #1-2	0	FSL	2376	FEL	24S	32E	15	Aliquot SWSE	32.2103227	-103.6616484	LEA	NEW MEXICO	NEW MEXICO	F	NMLC0 062269 A	-5860	11852	9454	Y
EXIT Leg #1	50	FSL	2375	FEL	24S	32E	22	Aliquot SWSE	32.1959413	-103.6616554	LEA	NEW MEXICO	NEW MEXICO	F	NMLC0 062269 A	-5860	17084	9454	Y
BHL Leg #1	50	FSL	2375	FEL	24S	32E	22	Aliquot SWSE	32.1959413	-103.6616554	LEA	NEW MEXICO	NEW MEXICO	F	NMLC0 062269 A	-5860	17084	9454	Y

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

Drilling Plan Data Report
12/08/2020

APD ID: 10400053499
Submission Date: 01/28/2020
Operator Name: APACHE CORPORATION
Well Name: GHOST RIDER 22 15 FEDERAL COM
Well Number: 33H
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
639868	QUATERNARY	3593	0	0	ALLUVIUM	USEABLE WATER	N
639869	RUSTLER	2544	1049	1049	ANHYDRITE	POTASH	N
639870	SALADO	2231	1362	1362	ANHYDRITE	POTASH	N
639879	DELAWARE	-1201	4794	4800	LIMESTONE, MUDSTONE, SANDSTONE	NATURAL GAS, OIL	N
639885	BONE SPRING	-5140	8733	8741	LIMESTONE, MUDSTONE, SANDSTONE, SHALE	NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 3M
Rating Depth: 11000

Equipment: Rotating Head, Mud Gas Separator, Blow Down Pit, Flare Line, Ignitor

Requesting Variance? YES

Variance request: Apache request a variance to use a flexible hose between BOP and Choke Manifold. Flex hose may vary pending availability. A quality control inspection and test certificate will be available for review.
Testing Procedure: BOP/BOPE will be tested by independent service company to 250psi low and high pressure indicated above per Onshore Order 2 requirements. System may be upgraded to higher pressure but sill tested to WP listed . If system is upgraded, all components installed will be functional and tested. Pipe rams will be operationally checked each 24 hr period. Blind rams will be operationally checked on each TOOH. These checks will be noted on daily tour sheets. Other accessories to BOP equipment will include Kelly cock and floor safety valve (inside BOP), choke lines and choke manifold. (see attached schematic)
Choke Diagram Attachment:

GhostRider22_15FedCom_12.25_13.625_2M_BOP_Annular_Choke_Manifold_Schem_20200121132940.pdf

BOP Diagram Attachment:

GhostRider22_15FedCom_8.75_13.625_3M_BOP_Choke_Manifold_Schem_20200121132946.pdf

Flexline_20200121132952.pdf

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

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	1075	0	1075	3594	2519	1075	J-55	54.5	BUTT	4.55	1.72	BUOY	4.38	BUOY	4.67
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	4800	0	4794		-1200	4800	J-55	40	LT&C	2.01	2.01	BUOY	2.19	BUOY	1.82
3	PRODUCTION	8.75	5.5	NEW	API	N	0	9735	0	9454		-5860	9735	P-110	17	OTHER - GB-CD	1.67	1.19	BUOY	2.21	BUOY	2.32
4	PRODUCTION	8.5	5.5	NEW	API	N	9735	17084	9454	9454	-5860	-5860	7349	P-110	17	OTHER - GB-CD	1.67	1.19	BUOY	2.21	BUOY	2.32

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

GhostRider22_15FedCom_SurfCsgAssumpt_20200121133107.pdf

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

GhostRider22_15FedCom_IntermCsgAssumpt_20200121133052.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

GhostRider22_15FedCom_ProdCsgAssumpt_20200120122331.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

GhostRider22_15FedCom_ProdCsgAssumpt_20200121133244.pdf

Section 4 - Cement

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	775	405	1.72	13.5	696.6	25	Cl C	4% Bentonite, 1% CaCl2
SURFACE	Tail		775	1075	225	1.33	14.8	299.25	25	Cl C	1% CaCl2
INTERMEDIATE	Lead		0	3840	640	2.32	12.7	1484.8	25	Cl C	10% NaCl, 6% Gel, 1% Premag M, 0.3% defoamer, 0.4% retarder
INTERMEDIATE	Tail		3840	4800	300	1.33	14.8	399	25	Cl C	0.1% retarder
PRODUCTION	Lead		4700	7800	330	2.86	10.5	943.8	20	Nine lite	5% lightweight 3M beads, 0.3% fluid loss, 0.2% dispersant, 0.2% GXT-C, 0.2% suspension aid, 0.15% retarder, 0.15% citric acid
PRODUCTION	Lead		7800	8985	165	2.21	11.5	364.65	20	Nine lite	3% salt, 1% premag M, 0.15% fluid loss, 0.15% GXT-C, 0.45% retarder
PRODUCTION	Tail		8985	17084	1580	1.43	13.2	2259.4	20	Nine lite	1.3% salt, 3% expanding agent, 0.5% fluid loss, 0.1% free water control, 0.65% retarder, 0.2% dispersant, 0.25% defoamer

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

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

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

Describe what will be on location to control well or mitigate other conditions: BOP, Choke Manifold, Gas Buster, Blow Down Pit, Flare Line with Igniter, Pre-Mix Pit, Rotating Head

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

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	1075	SPUD MUD	8.3	9							
1075	4800	SALT SATURATED	9.8	10.5							
4800	17090	OTHER : CUT BRINE	8.6	9.5							

Section 6 - Test, Logging, Coring

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

Will run GR/CNL from TD to surf (horizontal well - vertical portion of hole). Stated logs run will be in the completion report & submitted to BLM.

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

DIRECTIONAL SURVEY,GAMMA RAY LOG,MUD LOG/GEOLOGIC LITHOLOGY LOG,CEMENT BOND LOG,MEASUREMENT WHILE DRILLING,CNL/FDC,MUD LOG/GEOLOGICAL LITHOLOGY LOG,TEMPERATURE LOG,

Coring operation description for the well:

N/A

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4160 **Anticipated Surface Pressure:** 2080

Anticipated Bottom Hole Temperature(F): 155

Anticipated abnormal pressures, temperatures, or potential geologic hazards? YES

Describe:

Loss circ in Brushy Canyon during production cement job.

Contingency Plans geoharzards description:

Intermediate - If lost circ is encountered, Apache may 2-stage Interm csg, DVT may be used in 9-5/8" csg & ECP may be placed below DVT - please see cmt detail attached. The primary production cement job will be pumped as planned. If lift pressures do not indicate tieback, then a contingency bradenhead squeeze will be pumped 4 hours after primary job to achieve cement tieback into intermediate casing. A CBL will be ran afterwards and submitted to the BLM.

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

GhostRider22_15FedCom_H2SOpsContgPlan_20190910135208.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

GhostRider22_15FedCom33H_DirPlan_20200121133604.pdf

Other proposed operations facets description:

Apache Corp respectfully request approval to utilize a spudder rig to pre-set surf csg. Please see attachment for procedure. *Plan - To set interm into Lamar limestone and continue with 3-string csg design if no water flows in Delaware or if water flows are small. Apache will utilize standard three string Cameron MNDS multibowl wellhead system - procedure attached.

Other proposed operations facets attachment:

5.5_17lb_P110_GB_CD_Connection_Datasheet_20190910135827.pdf

CameronRunningProcedure003612_Rev_02_20190910135552.pdf

GhostRider22_15FedCom_MultibowlWellheadProcedure_20190911140636.pdf

GhostRider22_15FedCom33H_CmtDetail_20200121133637.pdf

GhostRider22_15FedCom33H_CsgDetail_20200121133637.pdf

GhostRider22_15FedCom33H_SpudderRigProcedure_20200121133648.pdf

Other Variance attachment:

HYDROGEN SULFIDE (H_2S) DRILLING OPERATIONS PLAN

Hydrogen Sulfide Training:

All regularly assigned personnel, contracted or employed by Apache Corporation will receive training from qualified instructor(s) in the following areas prior to commencing drilling possible hydrogen sulfide bearing formations in this well:

- The hazards and characteristics of hydrogen sulfide (H_2S)
- The proper use and maintenance of personal protective equipment and life support systems.
- The proper use of H_2S detectors, alarms, warning systems, briefing area, evacuation procedures & prevailing winds.
- The proper techniques for first aid and rescue procedures.

Supervisory personnel will be trained in the following areas:

- The effects of H_2S on metal components. If high tensile tubulars are to be utilized, personnel will be trained in their special maintenance requirements.
- Corrective action & shut-in procedures when drilling or reworking a well & blowout prevention / well control procedures.
- The contents and requirements of the H_2S Drilling Operations Plan

There will be an initial training session just prior to encountering a known or probable H_2S zone (within 3 days or 500') and weekly H_2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H_2S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received proper training.

H_2S SAFETY EQUIPMENT AND SYSTEMS:

Well Control Equipment that will be available & installed if H_2S is encountered:

- Flare Line with electronic igniter or continuous pilot.
- Choke manifold with a minimum of one remote choke.
- Blind rams & pipe rams to accommodate all pipe sizes with properly sized closing unit.
- Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head & flare gun with flares

Protective Equipment for Essential Personnel:

- Mark II Survive-air 30 minute units located in dog house & at briefing areas, as indicated on wellsite diagram.

H2S Dection and Monitoring Equipment:

- Two portable H_2S monitors positioned on location for best coverage & response. These units have warning lights & audible sirens when H_2S levels of 20 ppm are reached.
- One portable H_2S monitor positioned near flare line.

H2S Visual Warning Systems:

- Wind direction indicators are shown on wellsite diagram.
- Caution / Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used when appropriate.

Mud Program:

- The Mud Program has been designed to minimize the volume of H_2S circulated to the surface. Proper mud weights, safe drilling practices & the use of H_2S scavengers will minimize hazards when penetrating H_2S bearing zones.
- A mud-gas separator and H_2S gas buster will be utilized as needed.

Metallurgy:

- All drill strings, casing, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold & lines, & valves will be suitable for H_2S service.
- All elastomers used for packing & seals shall be H_2S trim.

Communication:

- Cellular telephone and 2-way radio communications in company vehicles, rig floor and mud logging trailer.

HYDROGEN SULFIDE (H_2S) CONTINGENCY PLAN

Assumed 100 ppm ROE = 3000'

100 ppm H_2S concentration shall trigger activation of this plan.

Emergency Procedures

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

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

Ignition of Gas source

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

Characteristics of H_2S and SO_2

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

Contacting Authorities

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

WELL CONTROL EMERGENCY RESPONSE PLAN

I. GENERAL PHILOSOPHY

Our objective is to ensure that during an emergency, a predetermined procedure is followed so that prompt decisions can be made based on accurate information.

The best way to handle and emergency is with an experienced organization set up for the sole purpose of solving the problem. The *Well Control Emergency Response Team* was organized to handle dangerous & expensive well control problems. The *Team* is structured such that each individual can contribute the most from his area of expertise. Key decision-makers are determined prior to an emergency to avoid confusion about who is in charge.

If the well is flowing uncontrolled at the surface or subsurface, *The Emergency Response Team* will be mobilized. The *Team* is customized for the people currently on the Apache staff. Staff changes may require a change in the plan.

II. EMERGENCY PROCEDURE ON DRILLING OR COMPLETION OPERATIONS

A. In the event of an emergency the *Drilling Foreman or Tool-Pusher* will immediately contact only one of the following starting with the first name listed:

Name	Office	Mobile	Home
Danny Laman – Drlg Superintendent	432-818-1022	432-634-0288	
John Vacek – Drilling Engineer	432-818-1882	281-222-1812	
Bobby Smith – Drilling Manager	432-818-1020	432-556-7701	
Bill Jones – EH&S Coordinator		432-967-9576	

***This one phone call will free the Drilling Foreman to devote his full time to securing the safety of personnel & equipment. This call will initiate the process to mobilize the Well Control Emergency Response Team. Apache maintains an Emergency Telephone Conference Room in the Houston office. This room is available for us by the Permian Region. The room has 50 separate telephone lines.*

B. The Apache employee contacted by the Drilling Foreman will begin contacting the rest of the *Team*. If **DANNY LAMAN** is out of contact**, JOHN VACEK** will be notified.

C. If a member of the *Emergency Response Team* is away from the job, he must be available for call back. Telephone numbers should be left with secretaries or a key decision-maker.

D. Apache's reporting procedure for spills or releases of oil or hazardous materials will be implemented when spills or releases have occurred or are probable.

EMERGENCY RESPONSE NUMBERS:

SHERIFF DEPARTMENT	
Eddy County	575-887-7551
Lea County	575-396-3611
FIRE DEPARTMENT	911
Artesia	575-746-5050
Carlsbad	575-885-2111
Eunice	575-394-2111
Hobbs	575-397-9308
Jal	575-395-2221
Lovington	575-396-2359
HOSPITALS	911
Artesia Medical Emergency	575-746-5050
Carlsbad Medical Emergency	575-885-2111
Eunice Medical Emergency	575-394-2112
Hobbs Medical Emergency	575-397-9308
Jal Medical Emergency	575-395-2221
Lovington Medical Emergency	575-396-2359
AGENT NOTIFICATIONS	
Bureau of Land Management	575-393-3612
New Mexico Oil Conservation Division	575-393-6161

PERMIAN

NW DISTRICT - NM EZ NAD 83
GHOST RIDER 22-15 FED COM PAD (N West)
Ghost Rider 22-15 Fed Com 33H

Ghost Rider 22-15 Fed Com 33H

Plan: Design #1

Standard Planning Report

06 September, 2019

Planning Report

Database:	PEDM	**Local Co-ordinate Reference:**	Well Ghost Rider 22-15 Fed Com 33H
Company:	PERMIAN	**TVD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Project:	NW DISTRICT - NM EZ NAD 83	**MD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Site:	GHOST RIDER 22-15 FED COM PAD (N West)	**North Reference:**	Grid
Well:	Ghost Rider 22-15 Fed Com 33H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Ghost Rider 22-15 Fed Com 33H		
Design:	Design #1		

Project NW DISTRICT - NM EZ NAD 83

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

Site GHOST RIDER 22-15 FED COM PAD (N West)

Site Position:		**Northing:**	443,251.80 ft	**Latitude:**	32° 13' 0.462 N
From:	Map	**Easting:**	748,709.90 ft	**Longitude:**	103° 39' 46.056 W
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.36 °

Well Ghost Rider 22-15 Fed Com 33H

Well Position	**+N/-S**	5.4 ft	**Northing:**	443,257.20 ft	**Latitude:**	32° 13' 0.481 N
	+E/-W	553.8 ft	**Easting:**	749,263.70 ft	**Longitude:**	103° 39' 39.609 W
Position Uncertainty		0.0 ft	**Wellhead Elevation:**		**Ground Level:**	3,594.0 ft

Wellbore Ghost Rider 22-15 Fed Com 33H

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM_FILE	7/31/2019	6.68	59.87	47,880.40000000

Design Design #1

Audit Notes:

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

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	181.18

Plan Survey Tool Program **Date** 9/6/2019

	Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	8,987.8	Design #1 (Ghost Rider 22-15 Fe	MWD+HDGM (MWD) OWSG MWD + HDGM	
2	9,000.0	17,084.4	Design #1 (Ghost Rider 22-15 Fe	20180329 MWD+IFR1+SAG+I OWSG MWD + IFR1 + Sag + M	

Planning Report

Database:	PEDM	**Local Co-ordinate Reference:**	Well Ghost Rider 22-15 Fed Com 33H
Company:	PERMIAN	**TVD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Project:	NW DISTRICT - NM EZ NAD 83	**MD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Site:	GHOST RIDER 22-15 FED COM PAD (N West)	**North Reference:**	Grid
Well:	Ghost Rider 22-15 Fed Com 33H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Ghost Rider 22-15 Fed Com 33H		
Design:	Design #1		

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,666.7	4.00	338.31	2,666.5	8.6	-3.4	1.50	1.50	0.00	338.31	
5,914.3	4.00	338.31	5,906.2	219.2	-87.2	0.00	0.00	0.00	0.00	
6,181.0	0.00	0.00	6,172.7	227.8	-90.6	1.50	-1.50	0.00	180.00	
8,985.2	0.00	0.00	8,976.9	227.8	-90.6	0.00	0.00	0.00	0.00	
9,735.2	90.00	189.60	9,454.4	-243.0	-170.2	12.00	12.00	0.00	189.60	
10,066.4	90.00	179.67	9,454.4	-572.6	-196.9	3.00	0.00	-3.00	-90.00	
17,084.4	90.00	179.67	9,454.4	-7,590.5	-156.0	0.00	0.00	0.00	0.00	BHL Ghost Rider 22-1

Planning Report

Database:	PEDM	**Local Co-ordinate Reference:**	Well Ghost Rider 22-15 Fed Com 33H
Company:	PERMIAN	**TVD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Project:	NW DISTRICT - NM EZ NAD 83	**MD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Site:	GHOST RIDER 22-15 FED COM PAD (N West)	**North Reference:**	Grid
Well:	Ghost Rider 22-15 Fed Com 33H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Ghost Rider 22-15 Fed Com 33H		
Design:	Design #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	1.50	338.31	2,500.0	1.2	-0.5	-1.2	1.50	1.50	0.00
2,600.0	3.00	338.31	2,599.9	4.9	-1.9	-4.8	1.50	1.50	0.00
2,666.7	4.00	338.31	2,666.5	8.6	-3.4	-8.6	1.50	1.50	0.00
2,700.0	4.00	338.31	2,699.7	10.8	-4.3	-10.7	0.00	0.00	0.00
2,800.0	4.00	338.31	2,799.5	17.3	-6.9	-17.1	0.00	0.00	0.00
2,900.0	4.00	338.31	2,899.2	23.8	-9.5	-23.6	0.00	0.00	0.00
3,000.0	4.00	338.31	2,999.0	30.3	-12.0	-30.0	0.00	0.00	0.00
3,100.0	4.00	338.31	3,098.7	36.7	-14.6	-36.4	0.00	0.00	0.00
3,200.0	4.00	338.31	3,198.5	43.2	-17.2	-42.9	0.00	0.00	0.00
3,300.0	4.00	338.31	3,298.2	49.7	-19.8	-49.3	0.00	0.00	0.00
3,400.0	4.00	338.31	3,398.0	56.2	-22.3	-55.7	0.00	0.00	0.00
3,500.0	4.00	338.31	3,497.8	62.7	-24.9	-62.1	0.00	0.00	0.00
3,600.0	4.00	338.31	3,597.5	69.1	-27.5	-68.6	0.00	0.00	0.00
3,700.0	4.00	338.31	3,697.3	75.6	-30.1	-75.0	0.00	0.00	0.00
3,800.0	4.00	338.31	3,797.0	82.1	-32.7	-81.4	0.00	0.00	0.00
3,900.0	4.00	338.31	3,896.8	88.6	-35.2	-87.8	0.00	0.00	0.00
4,000.0	4.00	338.31	3,996.5	95.1	-37.8	-94.3	0.00	0.00	0.00
4,100.0	4.00	338.31	4,096.3	101.6	-40.4	-100.7	0.00	0.00	0.00
4,200.0	4.00	338.31	4,196.0	108.0	-43.0	-107.1	0.00	0.00	0.00
4,300.0	4.00	338.31	4,295.8	114.5	-45.5	-113.6	0.00	0.00	0.00
4,400.0	4.00	338.31	4,395.6	121.0	-48.1	-120.0	0.00	0.00	0.00
4,500.0	4.00	338.31	4,495.3	127.5	-50.7	-126.4	0.00	0.00	0.00
4,600.0	4.00	338.31	4,595.1	134.0	-53.3	-132.8	0.00	0.00	0.00
4,700.0	4.00	338.31	4,694.8	140.4	-55.9	-139.3	0.00	0.00	0.00
4,800.0	4.00	338.31	4,794.6	146.9	-58.4	-145.7	0.00	0.00	0.00
4,900.0	4.00	338.31	4,894.3	153.4	-61.0	-152.1	0.00	0.00	0.00
5,000.0	4.00	338.31	4,994.1	159.9	-63.6	-158.5	0.00	0.00	0.00
5,100.0	4.00	338.31	5,093.9	166.4	-66.2	-165.0	0.00	0.00	0.00

Planning Report

Database:	PEDM	**Local Co-ordinate Reference:**	Well Ghost Rider 22-15 Fed Com 33H
Company:	PERMIAN	**TVD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Project:	NW DISTRICT - NM EZ NAD 83	**MD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Site:	GHOST RIDER 22-15 FED COM PAD (N West)	**North Reference:**	Grid
Well:	Ghost Rider 22-15 Fed Com 33H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Ghost Rider 22-15 Fed Com 33H		
Design:	Design #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,200.0	4.00	338.31	5,193.6	172.9	-68.7	-171.4	0.00	0.00	0.00
5,300.0	4.00	338.31	5,293.4	179.3	-71.3	-177.8	0.00	0.00	0.00
5,400.0	4.00	338.31	5,393.1	185.8	-73.9	-184.3	0.00	0.00	0.00
5,500.0	4.00	338.31	5,492.9	192.3	-76.5	-190.7	0.00	0.00	0.00
5,600.0	4.00	338.31	5,592.6	198.8	-79.1	-197.1	0.00	0.00	0.00
5,700.0	4.00	338.31	5,692.4	205.3	-81.6	-203.5	0.00	0.00	0.00
5,800.0	4.00	338.31	5,792.2	211.7	-84.2	-210.0	0.00	0.00	0.00
5,900.0	4.00	338.31	5,891.9	218.2	-86.8	-216.4	0.00	0.00	0.00
5,914.3	4.00	338.31	5,906.2	219.2	-87.2	-217.3	0.00	0.00	0.00
6,000.0	2.72	338.31	5,991.7	223.8	-89.0	-221.9	1.50	-1.50	0.00
6,100.0	1.22	338.31	6,091.7	227.0	-90.3	-225.1	1.50	-1.50	0.00
6,181.0	0.00	0.00	6,172.7	227.8	-90.6	-225.9	1.50	-1.50	0.00
6,200.0	0.00	0.00	6,191.7	227.8	-90.6	-225.9	0.00	0.00	0.00
6,300.0	0.00	0.00	6,291.7	227.8	-90.6	-225.9	0.00	0.00	0.00
6,400.0	0.00	0.00	6,391.7	227.8	-90.6	-225.9	0.00	0.00	0.00
6,500.0	0.00	0.00	6,491.7	227.8	-90.6	-225.9	0.00	0.00	0.00
6,600.0	0.00	0.00	6,591.7	227.8	-90.6	-225.9	0.00	0.00	0.00
6,700.0	0.00	0.00	6,691.7	227.8	-90.6	-225.9	0.00	0.00	0.00
6,800.0	0.00	0.00	6,791.7	227.8	-90.6	-225.9	0.00	0.00	0.00
6,900.0	0.00	0.00	6,891.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,000.0	0.00	0.00	6,991.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,100.0	0.00	0.00	7,091.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,200.0	0.00	0.00	7,191.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,300.0	0.00	0.00	7,291.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,400.0	0.00	0.00	7,391.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,500.0	0.00	0.00	7,491.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,600.0	0.00	0.00	7,591.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,700.0	0.00	0.00	7,691.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,800.0	0.00	0.00	7,791.7	227.8	-90.6	-225.9	0.00	0.00	0.00
7,900.0	0.00	0.00	7,891.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,000.0	0.00	0.00	7,991.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,100.0	0.00	0.00	8,091.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,200.0	0.00	0.00	8,191.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,300.0	0.00	0.00	8,291.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,400.0	0.00	0.00	8,391.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,500.0	0.00	0.00	8,491.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,600.0	0.00	0.00	8,591.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,700.0	0.00	0.00	8,691.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,800.0	0.00	0.00	8,791.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,900.0	0.00	0.00	8,891.7	227.8	-90.6	-225.9	0.00	0.00	0.00
8,985.2	0.00	0.00	8,976.9	227.8	-90.6	-225.9	0.00	0.00	0.00
9,000.0	1.77	189.60	8,991.7	227.6	-90.6	-225.7	12.00	12.00	0.00
9,100.0	13.77	189.60	9,090.6	214.3	-92.9	-212.3	12.00	12.00	0.00
9,200.0	25.77	189.60	9,184.5	181.0	-98.5	-178.9	12.00	12.00	0.00
9,300.0	37.77	189.60	9,269.3	129.2	-107.3	-126.9	12.00	12.00	0.00
9,400.0	49.77	189.60	9,341.4	61.1	-118.8	-58.6	12.00	12.00	0.00
9,500.0	61.77	189.60	9,397.6	-20.3	-132.6	23.0	12.00	12.00	0.00
9,600.0	73.77	189.60	9,435.3	-111.4	-148.0	114.4	12.00	12.00	0.00
9,700.0	85.77	189.60	9,453.1	-208.3	-164.4	211.6	12.00	12.00	0.00
9,735.2	90.00	189.60	9,454.4	-243.0	-170.2	246.4	12.00	12.00	0.00
9,800.0	90.00	187.66	9,454.4	-307.0	-179.9	310.6	3.00	0.00	-3.00
9,900.0	90.00	184.66	9,454.4	-406.4	-190.7	410.2	3.00	0.00	-3.00
10,000.0	90.00	181.66	9,454.4	-506.2	-196.2	510.2	3.00	0.00	-3.00

Planning Report

Database:	PEDM	**Local Co-ordinate Reference:**	Well Ghost Rider 22-15 Fed Com 33H
Company:	PERMIAN	**TVD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Project:	NW DISTRICT - NM EZ NAD 83	**MD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Site:	GHOST RIDER 22-15 FED COM PAD (N West)	**North Reference:**	Grid
Well:	Ghost Rider 22-15 Fed Com 33H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Ghost Rider 22-15 Fed Com 33H		
Design:	Design #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,066.4	90.00	179.67	9,454.4	-572.6	-196.9	576.6	3.00	0.00	-3.00
10,100.0	90.00	179.67	9,454.4	-606.2	-196.7	610.2	0.00	0.00	0.00
10,200.0	90.00	179.67	9,454.4	-706.2	-196.2	710.1	0.00	0.00	0.00
10,300.0	90.00	179.67	9,454.4	-806.2	-195.6	810.1	0.00	0.00	0.00
10,400.0	90.00	179.67	9,454.4	-906.2	-195.0	910.0	0.00	0.00	0.00
10,500.0	90.00	179.67	9,454.4	-1,006.2	-194.4	1,010.0	0.00	0.00	0.00
10,600.0	90.00	179.67	9,454.4	-1,106.2	-193.8	1,110.0	0.00	0.00	0.00
10,700.0	90.00	179.67	9,454.4	-1,206.2	-193.2	1,209.9	0.00	0.00	0.00
10,800.0	90.00	179.67	9,454.4	-1,306.2	-192.7	1,309.9	0.00	0.00	0.00
10,900.0	90.00	179.67	9,454.4	-1,406.2	-192.1	1,409.9	0.00	0.00	0.00
11,000.0	90.00	179.67	9,454.4	-1,506.2	-191.5	1,509.8	0.00	0.00	0.00
11,100.0	90.00	179.67	9,454.4	-1,606.2	-190.9	1,609.8	0.00	0.00	0.00
11,200.0	90.00	179.67	9,454.4	-1,706.2	-190.3	1,709.8	0.00	0.00	0.00
11,300.0	90.00	179.67	9,454.4	-1,806.2	-189.7	1,809.7	0.00	0.00	0.00
11,400.0	90.00	179.67	9,454.4	-1,906.2	-189.2	1,909.7	0.00	0.00	0.00
11,500.0	90.00	179.67	9,454.4	-2,006.2	-188.6	2,009.7	0.00	0.00	0.00
11,600.0	90.00	179.67	9,454.4	-2,106.2	-188.0	2,109.6	0.00	0.00	0.00
11,700.0	90.00	179.67	9,454.4	-2,206.2	-187.4	2,209.6	0.00	0.00	0.00
11,800.0	90.00	179.67	9,454.4	-2,306.2	-186.8	2,309.6	0.00	0.00	0.00
11,900.0	90.00	179.67	9,454.4	-2,406.2	-186.2	2,409.5	0.00	0.00	0.00
12,000.0	90.00	179.67	9,454.4	-2,506.2	-185.7	2,509.5	0.00	0.00	0.00
12,100.0	90.00	179.67	9,454.4	-2,606.2	-185.1	2,609.5	0.00	0.00	0.00
12,200.0	90.00	179.67	9,454.4	-2,706.2	-184.5	2,709.4	0.00	0.00	0.00
12,300.0	90.00	179.67	9,454.4	-2,806.2	-183.9	2,809.4	0.00	0.00	0.00
12,400.0	90.00	179.67	9,454.4	-2,906.2	-183.3	2,909.4	0.00	0.00	0.00
12,500.0	90.00	179.67	9,454.4	-3,006.2	-182.7	3,009.3	0.00	0.00	0.00
12,600.0	90.00	179.67	9,454.4	-3,106.2	-182.2	3,109.3	0.00	0.00	0.00
12,700.0	90.00	179.67	9,454.4	-3,206.2	-181.6	3,209.2	0.00	0.00	0.00
12,800.0	90.00	179.67	9,454.4	-3,306.2	-181.0	3,309.2	0.00	0.00	0.00
12,900.0	90.00	179.67	9,454.4	-3,406.2	-180.4	3,409.2	0.00	0.00	0.00
13,000.0	90.00	179.67	9,454.4	-3,506.2	-179.8	3,509.1	0.00	0.00	0.00
13,100.0	90.00	179.67	9,454.4	-3,606.2	-179.2	3,609.1	0.00	0.00	0.00
13,200.0	90.00	179.67	9,454.4	-3,706.2	-178.7	3,709.1	0.00	0.00	0.00
13,300.0	90.00	179.67	9,454.4	-3,806.2	-178.1	3,809.0	0.00	0.00	0.00
13,400.0	90.00	179.67	9,454.4	-3,906.2	-177.5	3,909.0	0.00	0.00	0.00
13,500.0	90.00	179.67	9,454.4	-4,006.2	-176.9	4,009.0	0.00	0.00	0.00
13,600.0	90.00	179.67	9,454.4	-4,106.2	-176.3	4,108.9	0.00	0.00	0.00
13,700.0	90.00	179.67	9,454.4	-4,206.2	-175.7	4,208.9	0.00	0.00	0.00
13,800.0	90.00	179.67	9,454.4	-4,306.2	-175.2	4,308.9	0.00	0.00	0.00
13,900.0	90.00	179.67	9,454.4	-4,406.2	-174.6	4,408.8	0.00	0.00	0.00
14,000.0	90.00	179.67	9,454.4	-4,506.2	-174.0	4,508.8	0.00	0.00	0.00
14,100.0	90.00	179.67	9,454.4	-4,606.2	-173.4	4,608.8	0.00	0.00	0.00
14,200.0	90.00	179.67	9,454.4	-4,706.2	-172.8	4,708.7	0.00	0.00	0.00
14,300.0	90.00	179.67	9,454.4	-4,806.2	-172.2	4,808.7	0.00	0.00	0.00
14,400.0	90.00	179.67	9,454.4	-4,906.2	-171.7	4,908.7	0.00	0.00	0.00
14,500.0	90.00	179.67	9,454.4	-5,006.2	-171.1	5,008.6	0.00	0.00	0.00
14,600.0	90.00	179.67	9,454.4	-5,106.2	-170.5	5,108.6	0.00	0.00	0.00
14,700.0	90.00	179.67	9,454.4	-5,206.2	-169.9	5,208.6	0.00	0.00	0.00
14,800.0	90.00	179.67	9,454.4	-5,306.2	-169.3	5,308.5	0.00	0.00	0.00
14,900.0	90.00	179.67	9,454.4	-5,406.2	-168.7	5,408.5	0.00	0.00	0.00
15,000.0	90.00	179.67	9,454.4	-5,506.2	-168.2	5,508.4	0.00	0.00	0.00
15,100.0	90.00	179.67	9,454.4	-5,606.2	-167.6	5,608.4	0.00	0.00	0.00
15,200.0	90.00	179.67	9,454.4	-5,706.2	-167.0	5,708.4	0.00	0.00	0.00

Planning Report

Database:	PEDM	**Local Co-ordinate Reference:**	Well Ghost Rider 22-15 Fed Com 33H
Company:	PERMIAN	**TVD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Project:	NW DISTRICT - NM EZ NAD 83	**MD Reference:**	WELL @ 3620.0ft (Original Well Elev)
Site:	GHOST RIDER 22-15 FED COM PAD (N West)	**North Reference:**	Grid
Well:	Ghost Rider 22-15 Fed Com 33H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Ghost Rider 22-15 Fed Com 33H		
Design:	Design #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
15,300.0	90.00	179.67	9,454.4	-5,806.1	-166.4	5,808.3	0.00	0.00	0.00
15,400.0	90.00	179.67	9,454.4	-5,906.1	-165.8	5,908.3	0.00	0.00	0.00
15,500.0	90.00	179.67	9,454.4	-6,006.1	-165.2	6,008.3	0.00	0.00	0.00
15,600.0	90.00	179.67	9,454.4	-6,106.1	-164.7	6,108.2	0.00	0.00	0.00
15,700.0	90.00	179.67	9,454.4	-6,206.1	-164.1	6,208.2	0.00	0.00	0.00
15,800.0	90.00	179.67	9,454.4	-6,306.1	-163.5	6,308.2	0.00	0.00	0.00
15,900.0	90.00	179.67	9,454.4	-6,406.1	-162.9	6,408.1	0.00	0.00	0.00
16,000.0	90.00	179.67	9,454.4	-6,506.1	-162.3	6,508.1	0.00	0.00	0.00
16,100.0	90.00	179.67	9,454.4	-6,606.1	-161.7	6,608.1	0.00	0.00	0.00
16,200.0	90.00	179.67	9,454.4	-6,706.1	-161.2	6,708.0	0.00	0.00	0.00
16,300.0	90.00	179.67	9,454.4	-6,806.1	-160.6	6,808.0	0.00	0.00	0.00
16,400.0	90.00	179.67	9,454.4	-6,906.1	-160.0	6,908.0	0.00	0.00	0.00
16,500.0	90.00	179.67	9,454.4	-7,006.1	-159.4	7,007.9	0.00	0.00	0.00
16,600.0	90.00	179.67	9,454.4	-7,106.1	-158.8	7,107.9	0.00	0.00	0.00
16,700.0	90.00	179.67	9,454.4	-7,206.1	-158.2	7,207.9	0.00	0.00	0.00
16,800.0	90.00	179.67	9,454.4	-7,306.1	-157.7	7,307.8	0.00	0.00	0.00
16,900.0	90.00	179.67	9,454.4	-7,406.1	-157.1	7,407.8	0.00	0.00	0.00
17,000.0	90.00	179.67	9,454.4	-7,506.1	-156.5	7,507.8	0.00	0.00	0.00
17,084.4	90.00	179.67	9,454.4	-7,590.5	-156.0	7,592.1	0.00	0.00	0.00

Design Targets

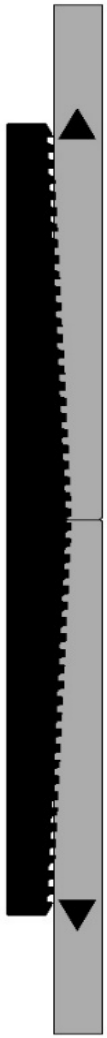
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
BHL Ghost Rider 22-15 I - plan hits target center - Point	0.00	0.00	9,454.4	-7,590.5	-156.0	435,666.70	749,107.70	32° 11' 45.380 N	103° 39' 41.977 W

GB connections
Engineering the Right Connections

GB Connection Performance Properties Sheet

Rev. 1 (08/25/2015)

ENGINEERING THE RIGHT CONNECTIONS™



Casing: 5.5 OD, 17 ppf
Casing Grade: P-110

Connection: GB CD Butt 6.300
Coupling Grade: API P-110

PIPE BODY GEOMETRY					
Nominal OD (in.)	5 1/2	Wall Thickness (in.)	0.304	Drift Diameter (in.)	4.767
Nominal Weight (ppf)	17.00	Nominal ID (in.)	4.892	API Alternate Drift Dia. (in.)	N/A
Plain End Weight (ppf)	16.89	Plain End Area (in.^{2})	4.962		

PIPE BODY PERFORMANCE					
Material Specification	P-110	Min. Yield Str. (psi)	110,000	Min. Ultimate Str. (psi)	125,000
Collapse		**Tension**		**Pressure**	
API (psi)	7,480	Pl. End Yield Str. (kips)	546	Min. Int. Yield Press. (psi)	10,640
High Collapse (psi)	8,580	**Torque**		**Bending**	
		Yield Torque (ft-lbs)	64,680	Build Rate to Yield (°/100 ft)	91.7

GB CD Butt 6.300 COUPLING GEOMETRY			
Coupling OD (in.)	6.300	Makeup Loss (in.)	4.2500
Coupling Length (in.)	8.500	Critical Cross-Sect. (in.^{2})	8.527

GB CD Butt 6.300 CONNECTION PERFORMANCE RATINGS/EFFICIENCIES					
Material Specification	API P-110	Min. Yield Str. (psi)	110,000	Min. Ultimate Str. (psi)	125,000
Tension		**Efficiency**		**Bending**	
Thread Str. (kips)	568	Internal Pressure (%)	100%	Build Rate to Yield (°/100 ft)	80.0
Min. Tension Yield (kips)	891	External Pressure (%)	100%	**Yield Torque**	
Min. Tension Ult. (kips)	1,013	Tension (%)	100%	Yield Torque (ft-lbs)	23,660
Joint Str. (kips)	568	Compression (%)	100%		
		Ratio of Areas (Cplg/Pipe)	1.72		

MAKEUP TORQUE					
Min. MU Tq. (ft-lbs)	8,990	Max. MU Tq. (ft-lbs)	17,980	Running Tq. (ft-lbs)	See GBT RP
				Max. Operating Tq. (ft-lbs)*	22,480

Units: US Customary (lbm, in., °F, lbf)
1 kip = 1,000 lbs
* See Running Procedure for description and limitations.
See attached: Notes for GB Connection Performance Properties.
GBT Running Procedure (GBT RP): www.gbconnections.com/pdf/RP-GB-DWC-Connections.pdf
Blanking Dimensions: www.gbconnections.com/pdf/GB-DWC-Blanking-Dimensions.pdf
Connection yield torque rating based on physical testing or extrapolation therefrom

GB connections
Engineering the Right Connections

Notes for GB Connections Performance Properties

Rev. 1 (May, 2018)

ENGINEERING THE RIGHT CONNECTIONS™

1. All dimensions shown are nominal. Plain end weight is calculated in accordance with API TR 5C3. Performance properties are empirical, based on nominal dimensions, minimum material yield and ultimate strengths, and calculated in general accordance with industry standard formula(s) assuming uniaxial loading. All properties are calculated on the basis of materials at room temperature. NOTE: Material properties change with temperature.
2. Joint strength is the lesser of pipe thread strength and minimum coupling tension as calculated in accordance with API TR 5C3. Tensile efficiency is calculated using coupling strength based on ultimate material strength per API TR 5C3 divided by plain end yield strength of the casing. Minimum Coupling Tension based on material *yield* strength is provided *for information only*. Performance values presented for tension do not account for failure by pull-out (which can occur with heavy wall casing), effects of internal and external pressure, thermally induced axial loads, casing curvature (bending), and/or other static and dynamic loads that may occur singularly or in combination during downhole deployment and with subsequent well operations.
3. Drift diameters are based on Standard and Alternate drift sizes per API 5CT. Drift diameters are not specified for API 5L pipe. Drift diameters shown on GB Connection Performance Property Sheets represent the diameter of the drift mandrel used for end-drifting after coupling buck on. When shown, the alternate drift diameter is used for end drifting. Drift testing is performed in accordance with currently applicable API Specifications.
4. Minimum Internal Yield Pressure Performance values for Casing (API 5CT), Line Pipe (API 5L), and mill casing proprietary grades are based on API TR 5C3 formulas and assume 87.5% minimum wall thicknesses. Minimum Internal Yield Pressure efficiency for GB Connections is the lesser of the Minimum Internal Yield Pressure of the coupling and Leak Resistance divided by pipe body Minimum Internal Yield Pressure (all based on API TR 5C3 formulas). GB Connections typically demonstrate pressure resistance exceeding the mating pipe body unless otherwise noted with a pressure efficiency < 100%. Pressure efficiency can only be achieved when connections are properly assembled in strict accordance with GB Connections' Running Procedures (www.gbconnections.com/pdf/RP-GB-DWC-Connections.pdf.
5. Compression efficiency of the Casing/Connection combinations does not consider the axial load that causes pipe body buckling. The compressive load that causes buckling is usually less than the pipe body compressive yield strength and is dependent on a number of factors including, but not limited to, string length (or slenderness ratio; L/D), thermally induced axial loads, and annular clearance that may (or may not) lend side support to the casing string.
6. Bending values assume a constant radius of curvature where the casing is in uniformly intimate contact with the wall of the wellbore (i.e. when the upset at the coupling OD is small compared with wellbore wall irregularities). When the radius of curvature is not constant due to large wellbore wall irregularities, varying trajectory, micro doglegs, wash-outs, rock ledges, and other downhole conditions, unpredictable excessive bending stresses can occur that may be detrimental to casing and connection performance.
7. Fatigue failures are a function of material properties, stress range, and number of stress reversal cycles. API 5CT, API 5L, and mill proprietary casing/coupling materials have a finite fatigue life. Higher stress ranges yield lower fatigue life. So as a general rule of thumb, casing should never be rotated at higher RPMs than needed for task accomplishment. For the same stress range, casing rotated at 25 RPMs will generally last 4 times longer (more rotating hours) than casing rotated at 100 RPMs. However with fatigue, there are opportunities for unexpected higher stress reversal levels associated with vibration, thermally induced axial loads, and bending (see above) in addition to all other stress reversals imparted during running, rotating, reciprocating, pressure testing, pumping, etc. The extent and quality of the cement job is also a factor. Under aggressive, high-volume, multi-stage hydraulic fracturing operations, the casing string (including the connections) is severely taxed such that local stress range(s) and actual number of applied cycles cannot be precisely determined without full string instrumentation.
8. External pressure efficiency (expressed in percent) is the ratio of the lesser of Minimum Internal Yield Pressure and Leak Resistance for coupling (calculated per API TR 5C3) divided by the API collapse rating of the casing. External pressure efficiency has not been verified by testing and does not consider other applied loads. External pressure efficiency does not account for any high collapse rating that may be shown on GB Connection Performance Property Sheets.
9. Maximum Makeup Torque is provided for guidance only. This value is not the same as the Connection Yield Torque shown. Connection Yield Torque is the lesser of yield torque rating for the critical cross-section of pipe body, connector body, and pin nose and the threadform load flank bearing area. Connection Yield Torque does not consider radial buckling of the pipe or connection due to excessive jaw pressure during torque application. Torque in connections can increase or decrease over that applied at makeup (connection tightening/loosening) with rotating and stimulation operations due to slip-stick, shock loads, bending, tight spots, vibration(s), temperature, and other downhole factors that may occur individually or in combination. Due to circumstances beyond the control of GB Connections, User accepts all risks associated with casing and connection related issues that occur during and after rotating operations.
10. **Every** GB Connection requires the proper amount and distribution of thread compound to all pin and coupling threads and careful field make up in strict accordance with GB Connections' Running Procedures to provide expected levels of performance in service.
11. Reactions among water, drilling muds and other fluids, and chemicals introduced by User with downhole formation fluids may result in an environment detrimental to casing and connection performance. User should carefully consider all aspects of the string design including material compatibility with respect to possible corrosion, sour conditions, and other factors that may result in unexpected casing and/or connection failure at or below published ratings.
12. Performance Properties are subject to change without notice. User is advised to obtain the current GB Connection Performance Property Sheet for each application. Please visit **www.gbconnections.com** to download.

Limitations

Data presented in GB Performance Property Sheets and Running Procedures ("GB Information") is provided for informational purposes only and intended to be supplemented by the professional judgment of qualified personnel during design, field handling, deployment, and all subsequent well operations. The use of GB Information is at the User's sole risk.

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GB connections Engineering the Right Connections	**Running Procedure for Casing with GB *Drilling with Casing* Connections**	October 29, 2007
		Rev. 13 (05/16/2018)

OVERVIEW

This field running procedure applies to makeup of **GB *Drilling with Casing*** (GB DwC) Connections which include GB CD, GB CDE, GB RDB, AND GB RDB WS Connections with GB Butt (Buttress), GB 4P, and GB 3P thread forms. All of these connections are suitable for ***Running*** (standard casing applications), ***Rotating*** (to aid string advancement), ***Drilling*** (Drilling with Casing/Drilling with Liners) and ***Driving***. This procedure also applies to the legacy GB Connections known as GB Butt and GB 3P.

Numerous factors impact the makeup torque of Buttress (GB Butt) and Modified Buttress Threads (such as GB 4P and GB 3P). Some of these factors include but are not limited to: allowable threading tolerances, joint characteristics (OD, straightness, hooked ends, and weight), vertical alignment (derrick, top drive, and elevator alignment relative to rotary table), thread compound (amount and distribution), snub line (location and orientation), distance between tongs and backups, temperature/weather, equipment type, efficiencies (electrical, hydraulic and mechanical), grips/dies (type, condition, orientation, location, contact area, and grip distribution), measurement equipment, gauge calibration, personnel, etc. The nature of these types of connections makes it impossible to provide makeup torque values that will yield proper power tight makeup on every rig under all circumstances with the wide variety of existing connection makeup equipment.

This procedure has been designed to determine the ***Running Torque*** required for proper power tight makeup of GB Connections under the circumstances and with the actual equipment, set up conditions, weather, etc. that exist at the time of running. With proper execution of this procedure, GB Connections will be properly and consistently assembled.

LIMITATIONS

This GB Running Procedure provides the basic recommended practices and is intended to be supplemented by the professional judgment of qualified personnel based on observation of actual makeups throughout the casing run. GB DwC Connections require the proper amount and distribution of thread compound to all pin and coupling threads and careful field makeup in strict accordance with GB Connections' Running Procedures to provide expected levels of performance in service.

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DEFINITIONS

1. Minimum Makeup (MU) Torque: Connections must have at least this amount of torque applied.
2. Shoulder Torque: MU torque required to achieve shoulder engagement.
3. Running Torque: Developed at start of casing run per GB Running Procedure and once established, used for the rest of the joints in the string. Using date established with progression of the casing run. The ***Running Torque*** may be adjusted as needed to stay within parameters defined here. The ***Running Torque*** will likely vary with each job due to the factors listed in the Overview section.
4. Delta Torque: Difference between ***Shoulder Torque*** and final makeup torque.
5. Maximum Makeup (MU) Torque: Assembly torque shall not exceed the ***Maximum MU Torque*** shown on size, weight, and grade-specific GB Performance Property Sheets at the beginning of a casing run when

establishing the ***Running Torque***. In the unlikely event that ***Running Torque*** determined by the procedure meets or exceeds the ***Maximum MU Torque***, call GB Connections for assistance.

6. Yield Torque: Torque that causes yielding in the connection (usually yielding of the pin nose). ***Yield Torque*** rating does **NOT** consider the torque that may radially buckle the pipe body at the grip points. ***Yield Torque*** values for the pipe body and connection which are based on nominal dimensions and minimum material yield strength.
7. Maximum Operating Torque: The ***Maximum Operating Torque*** shown on the GB Connections Performance Property Sheets includes a 5% safety factor on ***Yield Torque***. As such, it represents the limiting torque ***spike*** that can be applied to the connection during rotating operations. The ***Maximum Operating Torque*** is **NOT** the ***Maximum MU Torque*** and is **NOT** a sustainable rotating torque. Operating at the ***Maximum Operating Torque*** for any length of time may damage connections due to likely random, unexpected torque spikes that occur during rotating operations. USER should carefully consider this value to determine if a higher Safety Factor on ***Yield Torque*** is more suitable for the project-specific application.

KEY INFORMATION

Thread Compound: Best-O-Life 2000, Best-O-Life 2000 Arctic Grade (AG), API Modified, API Modified Hi-Pressure, or any industry recognized equivalent to these products. Thread compound may also be referred to as “dope”. User should avoid products that include Metal Free (MF) in the product name. Tool joint compounds are expressly forbidden for makeup of GB DwC Connections. Apply thread compound to all pin and box threads as described here is required per this procedure.

Torque Values: ***Minimum and Maximum MU Torque*** values are provided on individual GB Connections Performance Property Sheets available at the following link: http://www.gbconnections.com

Continuous Makeup: Makeup of GB Connections **SHALL START AND CONTINUE WITHOUT STOPPING** until full power tight makeup is achieved.

Makeup Speed: Use of high gear at no more than 20 RPMs is permissible once proper starting thread engagement has occurred. **THE FINAL TWO (2) TURNS, AT A MINIMUM, SHALL BE COMPLETED IN LOW GEAR AT LESS THAN 6 RPMS**.

Pin Nose Engagement: Pin nose engagement is indicated by a spike on an analog torque gauge or a sharp vertical spike on a torque vs. turn plot. As a secondary check, proper power tight makeup is achieved when the coupling covers approximately half of the API Triangle Stamp on the pin. The triangle will be stamped on the pin member as indicated by a white locator stripe.

Acceptance Criteria: All GB Connections must exhibit shoulder engagement (achieve pin-to-pin or pin-to-shoulder engagement) with a: (1) ***Delta Torque*** ranging between 10% and 50% of majority of the ***Shoulder Torque*** and (2) final torque not exceeding the ***Running Torque*** as established in this procedure. Outlier joints that require additional attention would be an exception to ***Maximum MU Torque*** limit as discussed under Comments, Troubleshooting.

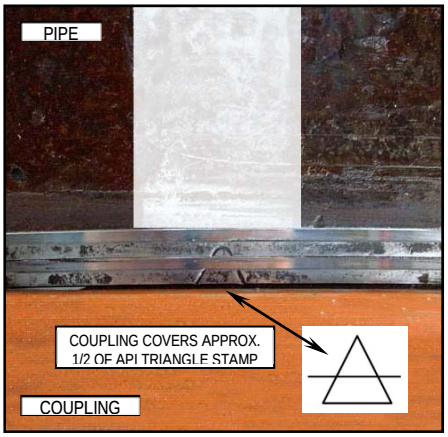
It is imperative that the following procedure be executed carefully at the beginning of every casing run to determine the ***Running Torque*** (torque to be used for the rest of the string). Torque values established on an individual casing run are never transferrable to other runs. The procedure should be fully executed for each and every casing run.

The ***Running Torque*** is determined while running the first 10 joints after joints assembled with threadlocking compounds are made up. Sometimes more than the first 10 joints will be needed to establish the ***Running Torque*** due to erratic results and/or other run-specific conditions. The ***Running Torque*** may have to be re-established or adjusted during the casing run under certain conditions[1] and observations. Use the size-specific GB Connections Performance Property Sheets (http://www.gbconnections.com) for physical properties for the ***Minimum*** and ***Maximum MU Torque*** values.

Connections shall be made up until shoulder engagement with ***Delta Torque*** ≥ 10% of the ***Shoulder Torque*** (not to exceed the ***Maximum MU Torque***, see procedure below) using the ***Running Torque*** value established in this procedure. The ***Maximum MU Torque*** at the beginning of the casing run for establishing the ***Running Torque*** shall be limited to the value shown on the applicable GB Connections Performance Property Sheet. The ***Running Torque*** shall be used thereafter and throughout the run as the limiting makeup torque value. The ***Maximum MU Torque*** on the GBC Performance Property Sheet value is given as a practical limit for avoidance of thread galling, connection damage, and possible tube damage due to excessive jaw pressure that can occur with application of extreme makeup torque. Contact GB Connections if more than the ***Maximum MU Torque*** value is required for shoulder engagement and/or final makeup, or if torque exceeding the ***Maximum Operating Torque*** value is required for the intended service.

PROCEDURE FOR ESTABLISHING ***RUNNING TORQUE***

1. Remove coupling thread protectors only after casing is set in V-Door.
2. ***Always apply fresh thread compound to coupling threads and internal shoulder (where applicable).*** See Comment No. 1 (below) for discussion on proper amount of thread compound.
3. Remove pin thread protectors only after joint is raised in the derrick. Visually inspect pin threads for sufficient thread compound as described in Comment No. 1; ***add fresh compound to pin threads and pin nose***.
4. Fresh thread compound should **NEVER** be added on top of dope contaminated with dust, dirt, and/or debris. Threads observed to have contaminated thread compound shall be thoroughly cleaned and dried before applying fresh thread compound.
5. Stab the pin carefully into the coupling of the joint hanging in the rotary table. A stabbing guide is recommended to protect the pin nose and leading thread from physical damage that may contribute to thread galling. Make up each connection until shoulder engagement plus ***Delta Torque*** between 10% and 50% of the ***Shoulder Torque*** without exceeding the ***Maximum MU Torque*** . Record the ***Shoulder Torque*** observed for the first 10 joints (excluding threadlocked accessory joints). The ***Running Torque*** is (a) the ***Minimum MU Torque*** shown on the GB Connections Performance Property Sheets ***or*** (b) the Maximum ***Shoulder Torque*** recorded from the first 10 makeups + 10%, ***whichever is higher*** (rounded to the next highest 500 ft.-lbs.) When making up the initial joints for establishing the ***Running Torque*** carefully watch the torque gauge for the ***Shoulder Torque*** and try to manually shut down the tongs before reaching ***Maximum MU Torque*** shown on the GB Connections Performance Property Sheets. Alternately, the dump valve should be set to the ***Maximum MU Torque*** during this initial process.
6. After the first 10 makeups (more if necessary due to conditions at the time of the run), use the ***"Running Torque"*** established in Step 5 for the remainder of the string. A dump valve is strongly recommended to stop makeup once the established ***Running Torque*** is achieved.

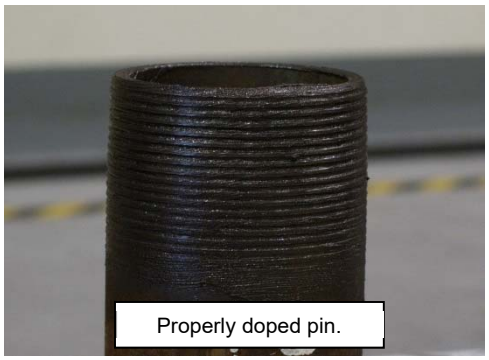


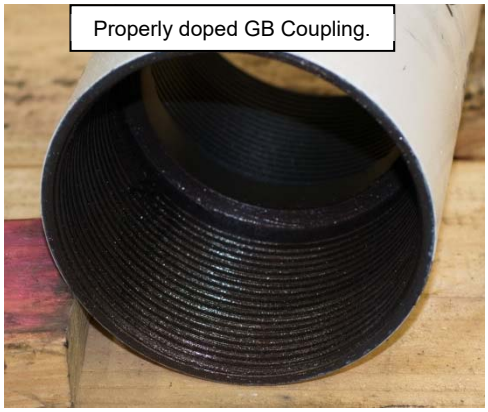
[1] Examples include but are not limited to more than an occasional low or high ***Delta Torque***, string of mixed mills, equipment change, large temperature change, and wobbling or noticeable vibration when joint is turning.

7. All connections made up with the established ***Running Torque*** should achieve shoulder engagement with the minimum amount of ***Delta Torque***. Carefully watch for the spike on the torque gauge during each make up to verify shoulder engagement. As a ***secondary*** verification, randomly check the makeup position relative to the API Triangle Stamp during the run. Proper power tight makeup position is achieved when the coupling covers approximately half of the API Triangle Stamp on the pin (see accompanying photo).
8. All connections should achieve shoulder engagement with at least 10% ***Delta Torque*** before the ***Maximum MU Torque*** is achieved.

COMMENTS, TROUBLESHOOTING

1. GB Connections are thread compound friendly. Thread compounds shall be handled, mixed, and applied in strict accordance with the manufacturer's instructions. **THREAD COMPOUND SHALL BE APPLIED TO BOTH PIN AND COUPLING THREADS AND OPPOSING PIN NOSE OR SHOULDER AREA OF EVERY CONNECTION**. Sufficient thread compound has been applied when all threads (pin and coupling), pin nose, and coupling ID surfaces are completely covered **WITH NO GAPS OR BARE SPOTS**. The thread form should be discernible beneath the compound; i.e. when the thread valleys appear half full. Be generous with the thread compound; but avoid over-doping to the point where ***excessive*** amounts are squeezed out during assembly. Use of a mustache brush is the preferred method for applying and distributing thread compounds to GB Connections.


Properly doped pin.


Properly doped GB Coupling.

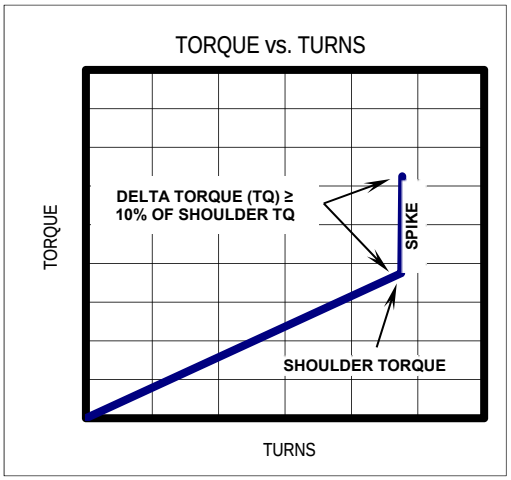
2. If threads are cleaned on racks, new dope shall be applied in a light, even coat to both pin and coupling threads. See Comment No. 1 above for description of sufficient thread compound. Clean thread protectors shall be re-applied to freshly doped pin and coupling threads unless the casing run is imminent (no more than a few hours) to avoid contaminating exposed thread compound.
3. All connections should achieve shoulder engagement before reaching the "***Running Torque***" value determined by this procedure. Any connection that does not achieve shoulder engagement at the established "***Running Torque"*** value shall be visually inspected for position relative to the API Triangle Stamp.
   a) If the coupling is shy of the API Triangle Stamp Base, the connection shall be broken out, cleaned and inspected visually for thread damage, re-doped, and made-up again (or laid down if threads are damaged). Connections that have not achieved shoulder engagement **SHALL NEVER** be backed up a couple of turns and remade. They shall be completely broken out, cleaned and inspected as described above.
   b) If the coupling covers the API Triangle base but does not cover approximately half of the Triangle Stamp, add additional torque to achieve shouldering and finish the makeup. It is common to see high torque (possibly exceeding the ***Maximum MU Torque***) to initiate connection turning. This is acceptable as long as the torque drops off once movement starts and then spikes with shoulder engagement. If acceptable makeup doesn't occur with one additional torque application, the connection shall be broken out (as described in 3a above). With an additional attempt, it is OK for the final torque to exceed the **Running Torque** but it should not exceed the ***Maximum MU Torque*** (except to initiate additional turning).
   c) Any connection not properly assembled (i.e. not meeting the acceptance criteria) in two (2) attempts (provided threads pass a visual inspection each time) is reject and shall be laid down.

4. At the established ***Running Torque***, the connections will generally shoulder with ***Delta Torque*** between 10% and 50%. High interference connections will tend to have a higher ***Shoulder Torque*** and less ***Delta Torque*** (at least 10% of the ***Shoulder Torque*** is required). Low interference connections will tend to have lower ***Shoulder Torque*** and more ***Delta Torque*** . In general, the GB Connections makeup consistently but will vary due to any of the factors enumerated in the second paragraph of the Overview section of this procedure. However, wide variability on more than a few joints should be investigated for a root cause and, if necessary, a new ***Running Torque*** should be adjusted as described below.

   If a connection appears to have shouldered but doesn't have at least 10% ***Delta Torque***, the position relative to the API Triangle Stamp should be checked. In just about every instance, the position will have covered the triangle base, so additional torque can be added to complete the makeup as discussed in 3.b) above. Expect an instantaneous spike with showing more than 30% ***Delta Torque*** with application of additional torque. Under this condition, this makeup is acceptable.

   Similarly, random connections here and there with more than 30% ***Delta Torque*** is generally not cause for concern. However, if overshooting the 30% maximum ***Delta Torque*** target occurs frequently, then the established ***Running Torque*** value should be walked down in 500 ft-lbs. to 1,000 ft-lbs. increments until connection makeup routinely falls in line with the stated acceptance criteria.

5. ***Torque vs. Turn monitoring systems are recommended for field makeup of GB Connections.*** While Torque vs. Turn plots provide good information about makeup, they **SHALL NOT BE SUBSTITUTED FOR DIRECT VISUAL OBSERVATION OF THE CONNECTION DURING ASSEMBLY**. There is no second chance to watch field assembly of a connection. Torque vs. Turn plots can always be viewed for verification purposes once a makeup is finished. When available, torque vs. turn plots shall finish with a clearly defined spike as shown in the graphic to the right. The general character of torque vs. turn plots for good makeups will become evident after the first ten (10) makeups (again, more may be necessary due to rig- and/or equipment-specific conditions). Any makeup that results in a plot that is "out-of-character"[2] when compared with the majority of plots from previous good makeups should be checked carefully.



   When using Torque vs. Turn monitoring equipment, GB recommends setting a reference torque value of 500 ft.-lbs. or 10% of the minimum makeup torque (whichever is lower) to normalize the resulting plots. Plot scales should be set so data spans at least 2/3 of the turns scale on each plot (15 turns will usually be sufficient at the start and can be reduced based on data from the first few joints). **UNDER NO CIRCUMSTANCE SHOULD MAKEUP BE STARTED UNTIL THE MONITORING SYSTEM IS READY TO RECORD DATA**.

6. Occasionally the mill side of a GB Connection may turn during field makeup. When observed, the makeup should continue without stopping per this procedure. It may be helpful to scribe a vertical line across the coupling-pipe interface to aid estimation of mill side turning if it is observed with some frequency. The amount of mill side turn should be carefully observed and estimated. If the mill side turns less than ½ turn and all other aspects of the makeup are good, the connection is acceptable. If the mill side turns more than ½ turn trouble- shooting should be initiated paying particular attention to amount and distribution of thread compound, vertical alignment, weight of joint, hooked end on pipe, and other possible factors that may contribute to possible high torque during field makeup. Counting turns can help to estimate if coupling will need to be stopped to avoid over rotation. It should

[2] An "out-of-character" plot may initiate with a high torque, show significantly steeper slope from the start of makeup, wide torque undulations as makeup progresses, no clearly defined spike, insufficient/inconsistent turns, etc.

be noted that mill side turning during field makeup occurs occasionally and should not be concerning. Frequent or persistent mill side turning is a symptom that needs troubleshooting and appropriate corrective action.

7. A double wrap of the pick-up sling should be used when raising casing into the derrick when lifting subs, single joint, side-door, or slip elevators are not being used.
8. Higher torque may be required to achieve shoulder engagement when threadlock compounds are applied. User is advised to carefully follow the manufacturer's instructions with respect to mixing, application, temperature, and time. Torque ranges with threadlock compounds cannot be estimated due to many variables including but not limited to temperature, time, connection tolerances, and surface finish. In these cases, carefully monitor makeup to be sure shouldering occurs. The only exception to the shouldering requirement is with float equipment (float shoe and float collar) that will be assembled with a threadlocking compound. In this case, makeup to a position that covers the base of API Triangle Stamp is considered satisfactory.
9. Manual and automated dump valves can miss the established ***Running Torque*** due to several factors. Slightly overshooting the ***Running Torque*** is not cause for concern as long as the final "dump" torque is not excessive, and the equipment used is generally consistent joint-to-joint. Overshooting the ***Running Torque*** with a final makeup speed greater than 10 RPMs is risky and potentially harmful to the connection as discussed below.
10. Attached is a "Worksheet for determining GB Connections ***Running Torque*** at the beginning of a Casing Run" for use at the start of any casing run using GB Connections. GB recommends that this worksheet be filled out and maintained with the casing run records.

MAKEUP SPEED

To reiterate: Use of high gear at no more than 20 RPMs is permissible once proper starting thread engagement has occurred. **THE FINAL TWO (2) TURNS, AT A MINIMUM, SHALL BE COMPLETED IN LOW GEAR AT LESS THAN 6 RPMS**.

Making up connections at RPM exceeding those listed above may result in unsatisfactory connection performance downhole. Risks associated with excessive makeup RPMs are common for any connection with internal pin nose engagement. High speed makeup can:

1. Impart an unnecessary impulse load at nose contact. Certain materials are more susceptible to cracking under sudden or instantaneously applied loads.
2. Inhibit efficient movement of and trap thread compound under high pressure causing additional and unquantifiable high hoop stresses in the connection.
3. Result in significant overshoot of established dump torque value due to equipment latency between signal and equipment shut down resulting in higher but unknown actual final torque value. Excessive overshoot can result in pin nose yielding.

PROCEDURE SUMMARY

1. Remove coupling protectors after casing is set in V-Door and apply fresh thread compound to coupling threads.
2. Raise joint in derrick, remove pin protectors, and apply fresh thread compound to pin threads and pin nose.
3. Carefully stab pin into coupling and makeup to pin nose engagement. Try to stop makeup without exceeding the ***Maximum MU Torque*** (shown on GB Connections Performance Property Sheets). Carefully watch for and note the ***Shoulder Torque***.
4. Record ***Shoulder Torque*** and Final Torque values, and position relative to API Triangle Stamp for first ten (10) connections, more if necessary due to run/rig-specific conditions.

5. The ***Running Torque*** is (a) the ***Maximum MU Torque*** shown on the GB Connections Performance Property Sheet or (b) the maximum torque required for shoulder engagement + 10% ***Delta Torque*** determined from the first 10 makeups, ***whichever is higher***. Use the attached Worksheet to record this data and determine the ***Running Torque***.
6. Make up the rest of the string at the ***Running Torque*** determined in the previous step verifying each connection has shouldered with between 10% and 30% ***Delta Torque***.

NOTES:

- *This summary is provided for quick reference and is not a substitute for the comprehensive procedure provided above.*
- *Does not apply to threadlock connections.*

DO's and DONT's

1. **DO** check vertical alignment.
2. **DO** apply thread compound to all pin and coupling threads, pin nose and coupling shoulder area.
3. **DO** establish the ***Running Torque*** in accordance with GB Procedures.
4. **DO** make adjustments to ***Running Torque*** if indicated by inconsistent makeups during the casing run.
5. **DO** check every makeup for a clear indication of shouldering with a minimum ***Delta Torque*** ≥ 10% of the ***Shoulder Torque***.
6. **DO** reject any coupling that is not properly made up after two (2) attempts.
7. **DO** carefully stab pins into coupling (use a stabbing guide for casing smaller than 9 5/8" OD).
8. **DO** finish the makeup with at least two (2) full turns in low gear at 6 RPMs or less.
9. **DO** make up every connection continuously to pin nose engagement without stopping.
10. **DO** make note of anything that occurs with any connection makeup such as backup grips slipped, connection inspected and remade, etc.
11. **Do** check out every connection that appears out of character relative to the population. An example would be a connection that is completed in significant fewer turns than most others. Check the triangle stamp and record position and take corrective action if needed.
12. **DO** add torque to any connection that appears to achieve pin nose engagement but not 10% delta torque.
13. **DO** adjust the ***Running Torque*** up or down in increments to achieve consistent ***Delta Torque*** between 10% and 30%.
14. **Do** make note of any anomaly during any connection makeup, such as backups slipped, mill side turned, etc.
15. **DO NOT** over dope.
16. **DO NOT** exceed the ***Maximum MU Torque*** as shown on the GB Connections Performance Property Sheets during assembly.

17. **DO NOT** make up any misaligned connection.
18. **DO NOT** exceed 20 RPMs in high gear and 6 RPMs in low gear for the final two (2) full turns.
19. **DO NOT** remove pin thread protectors until pipe is hanging in the derrick.
20. **DO NOT** ever back a connection up a couple of turns and remake. Any connection requiring this type of attention **SHALL** be broken out completely, cleaned, visually inspected, and if OK, re-doped and remade.
21. **DO NOT** hesitate to contact GB Connections with questions before and during any casing run.

RECOMMENDED EQUIPMENT

- Stabbing Guide
- Mustache Brush
- Torque vs. Turn Monitoring Equipment or Dump Valve

Worksheet for determining GB Connection Running Torque at the beginning of a Casing Run

Ignore joints that are assembled with threadlock compounds. See "Addendum Procedure for GB Connections Assembled with Threadlocking Compounds" available at www.gbconnections.com.

Pertinent Excerpt from GB Running Procedure

5. Stab the pin carefully into the coupling of the joint hanging in the rotary table. A stabbing guide is recommended to protect the pin nose and leading thread from physical damage that may contribute to thread galling. Make up each connection until shoulder engagement plus delta torque ≥ 10% of the shoulder torque without exceeding the Maximum Makeup Torque. Record the shoulder torque observed for the first 10 joints (excluding threadlocked accessory joints). The Running Torque is (a) the Minimum Makeup Torque shown on the GB Connection Performance Property Sheets or (b) the Maximum Shoulder Torque recorded from the first 10 makeups + 10%, whichever is higher (rounded to the next highest 500 ft.-lbs.) When making up the initial joints for establishing the Running Torque carefully watch the torque gauge for the shoulder torque and try to manually shut down the tongs before reaching Maximum Makeup Torque shown on the GB Connection Performance Property Sheets. Alternately, the dump valve should be set to the Maximum Makeup Torque during this initial process.

6. After the first 10 makeups (more if necessary due to conditions at the time of the run), use the "Running Torque" established in Step 5 for the remainder of the string. A dump valve is strongly recommended to stop makeup once the established Running Torque is achieved.

Casing Data		Comment
OD (in)		See GBC Performance Property Sheet
Weight (ppf)		See GBC Performance Property Sheet
Grade		See GBC Performance Property Sheet
Min MU Torque (ft-lbs)		See GBC Performance Property Sheet
Max MU Torque (ft-lbs)		See GBC Performance Property Sheet
Max Operating Torque (ft-lbs)		The Maximum Operating Torque is **NOT** the Maximum Makeup Torque and is **NOT** a sustainable rotating torque. Operating at the Maximum Operating Torque for any length of time will likely damage the connection.

Notes	Joint No.	Shoulder Torque (ft-lbs)	Final Torque (ft-lbs)	Triangle Stamp Position Sketch (△)
Required	1			
Required	2			
Required	3			
Required	4			
Required	5			
Required	6			
Required	7			
Required	8			
Required	9			
Required	10			
Optional	11			
Optional	12			
Optional	13			
Optional	14			
Optional	15			
Max. Shoulder Torque				
A Max. Shoulder Torque + 10%				
B Min. Makeup Torque (from GB Conn. Data Sheet)				
Running Torque (ft-lbs)		-	**A** or **B**, whichever is greater.	

Optional joints should be added if there is wide variability in shoulder torques recorded during the initial 10 joints. Judgement should be used to determine if more than 10 joints are needed for the purpose of establishing the Running Torque and, if so, how many more should be added.

Wide variations in Shoulder Torque during the first ten (10) joints suggest other issues requiring attention such as poor alignment, improper amount and distribution of thread compound, etc. Refer to 2nd paragraph of GB Running Procedure for possible contributing factors to aid troubleshooting.

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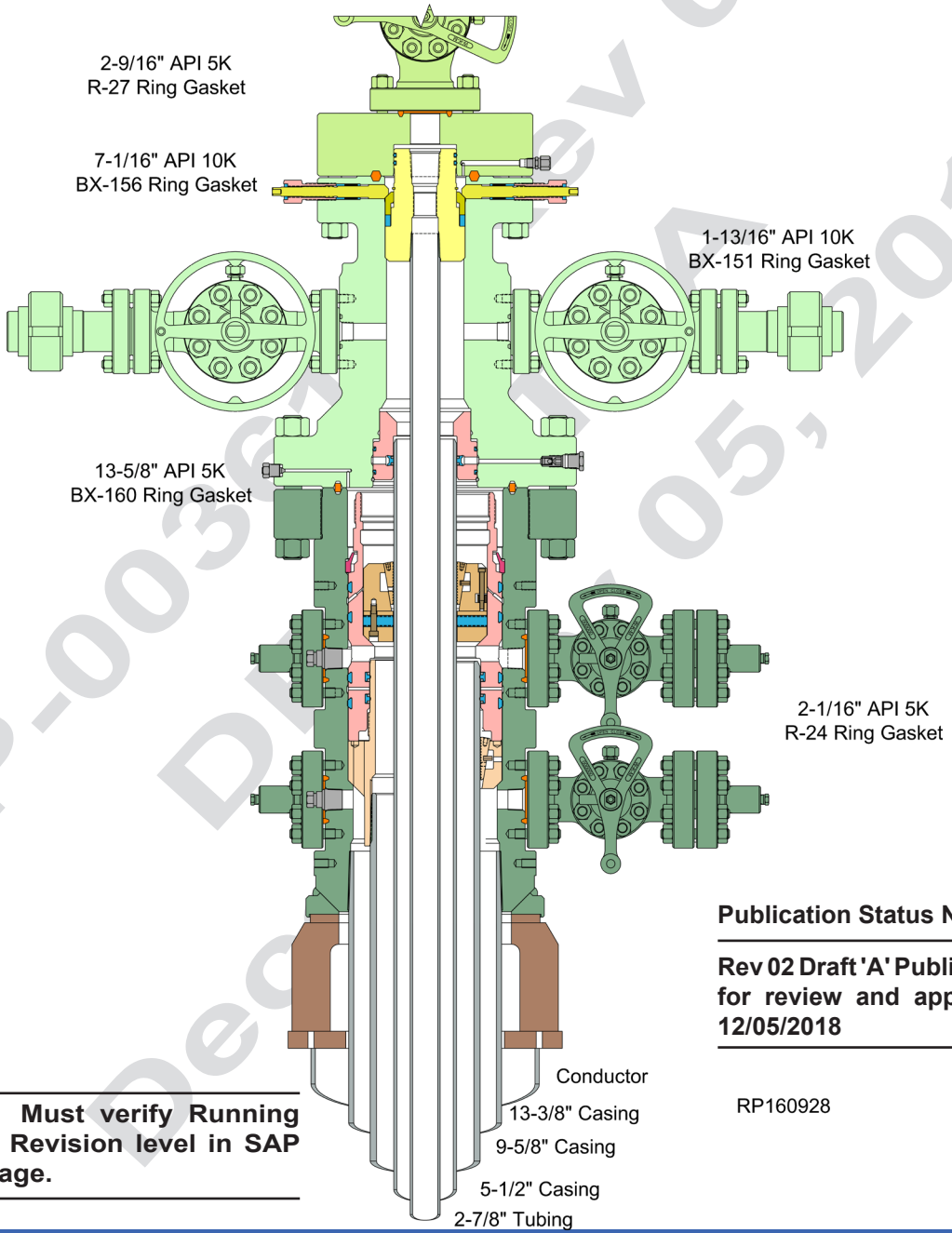
RUNNING PROCEDURE

Apache Corp.
5-1/2" or 7" Producer



Publication Status Note:

Rev 02 Draft 'A' Publication sent for review and approval; EA 12/05/2018

RP160928

⚠ CAUTION Must verify Running Procedure Revision level in SAP prior to usage.

Surface Systems Publication

CAMERON A Schlumberger Company	**13-5/8" 5K MN-DS System** **13-3/8" x 9-5/8" x 5-1/2"(or 7") x 2-7/8" Casing Program**	**RP-003612** **Rev 02 Draft A**

Torque Chart

Recommended Makeup Torques for Flange Bolting Ft•Lbf Per API 6A: preload = .50Sy				
Bolt Size Nom OD - TPI	B7M, L7M (Sy=80 ksi)		B7, L7, 660 (Sy=105 ksi)	
	cf=0.07	cf=0.13	cf=0.07	cf=0.13
.500-13	27	45	35	59
.625-11	52	88	68	115
.750-10	90	153	118	200
.875-9	143	243	188	319
1.000-8	213	361	279	474
1.125-8	305	523	401	686
1.250-8	421	726	553	953
1.375-8	563	976	739	1280
1.500-8	733	1280	962	1680
1.625-8	934	1640	1230	2150
1.750-8	1170	2050	1530	2700
1.875-8	1440	2540	1890	3330
2.000-8	1750	3090	2300	4060
2.250-8	2500	4440	3280	5820
2.500-8	3430	6120	4500	8030
2.625-8	3970	7100	4720	8430
2.750-8	4570	8180	5420	9700
3.000-8	5930	10700	7050	12700
3.250-8	7550	13600	8970	16100
3.500-8	9430	17000	11200	20200
3.750-8	11600	21000	13800	24900
3.875-8	12800	23200	15200	27500
4.000-8	14100	25500	16700	30300

NOTE

The information in this table is based on API-6A's recommended torque for a given bolt size. The information is presented for the convenience of the user and is based on assumptions of certain coefficients of friction (cf). The coefficients of friction are based on approximations of the friction between the studs and nuts, as well as the nuts and flange face. A coefficient friction of 0.13 assumes the threads and nut bearing surfaces are bare metal and are well lubricated with thread compound. A coefficient of friction of 0.07 assumes the thread and nuts are coated with a fluoropolymer material.

- Lubrication

  It is essential that threads and nut faces be well lubricated with an appropriate grease prior to assembly. Cameron clamps and fast clamps require lubrication on the hub-clamp contact area. Acceptable lubricants include thread joint compounds which meet the formulation, evaluation and testing requirements specified in API Recommended Practice 5A3/ISO13678. (Reference - Jet Lube Grease, 1 lb can PN: 2737980-02).

  Studs and nuts coated with Xylan/PTFE compound in accordance with a Cameron procedure do not require lubrication. However, a light coat of API Recommended Practice 5A3/ISO13678 thread compound is recommended for Xyland-coated bolting as an aid to assembly.

  Material gaskets should be lightly coated with lubricant prior to assembly. Acceptable lubricants include motor oil or Cameron gate valve greases.

IC Test Plug Load Chart

IC Test Plug Maximum Load							
Bowl		Maximum Hanging Load (in 1000s lbs) at Test Pressure					
Size	Pressure	0 psi	2,000 psi	3,000 psi	5,000 psi	10,000 psi	15,000 psi
7-1/16"	2,000 to 5,000 psi	213	135	96	19	N/A	N/A
	10,000 psi	253	175	136	59	0	N/A
	15,000 psi	477	399	360	282	88	0
9"	2,000 to 10,000 psi	600	479	419	299	0	N/A
	15,000 psi	751	630	570	450	149	0
11"	2,000 to 10,000 psi	1277	1091	998	812	348	N/A
	15,000 psi	1596	1410	1317	1131	667	202
13-5/8"	2,000 to 10,000 psi	1713	1426	1283	997	281	N/A
	15,000 psi	2142	1855	1712	1426	710	5
16-3/4"	2,000 to 5,000 psi	3076	2641	2424	1990	N/A	N/A
20"	2,000 to 5,000 psi	2733	2096	1778	1142	N/A	N/A

Minimum Casing Load Chart for IC Type Hangers

Minimum Casing Load for IC-2 & IC-6 Casing Hangers		
Hanger Nom. Size	Casing Size	Load (Pounds)
9"	4-1/2"	46,000
	5-1/2"	42,000
11"	4-1/2"	78,000
	5"	74,000
	5-1/2"	70,000
	6-5/8"	59,000
	7"	55,000
	7-5/8"	48,000
13-5/8"	5-1/2"	120,000
	7"	106,000
	7-5/8"	99,000
	8-5/8"	86,000
	9-5/8"	72,000
	10-3/4"	54,000

Minimum Casing Load for IC-2 & IC-6 Casing Hangers		
Hanger Nom. Size	Casing Size	Load (Pounds)
16-3/4"	9-5/8"	146,000
	10-3/4"	128,000
	11-3/4"	110,000
	11-7/8"	109,000
	13-3/8"	79,000
20-3/4" 21-1/4"	10-3/4"	228,000
	13-3/8"	180,000
	13-5/8"	175,000
	16"	120,000

RP-000573

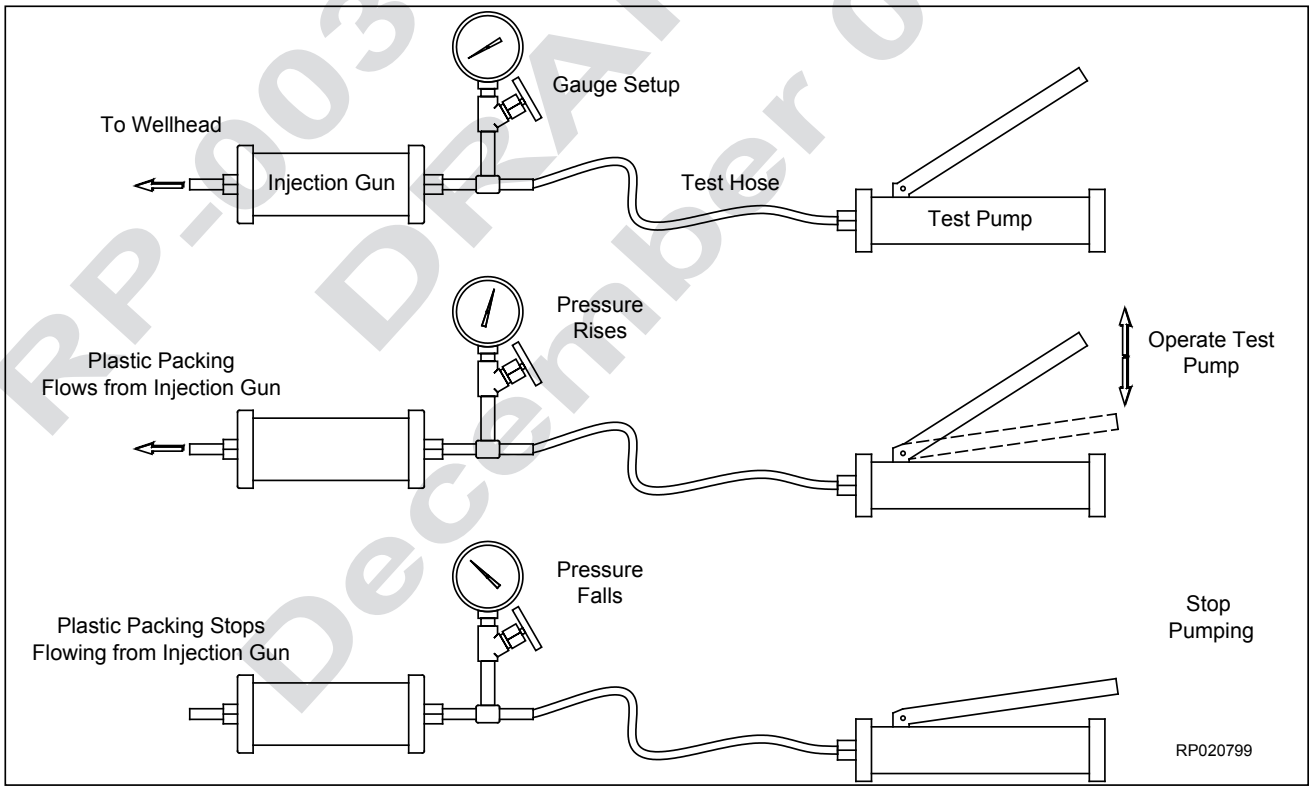
Injection Gun Preparation

1. Maintaining the Injection Gun at ambient temperatures, prepare Test Pump and Injection Gun for injecting P seals.
2. Operate Test Pump to inject fluid into Injection gun.
3. Monitor open end of Injection Gun for signs of plastic packing.
4. After plastic packing begins to flow from open end of Injection Gun continue to inject fluid from Test Pump increasing pressure an additional 200 to 400 psi.
5. Stop pumping Test Pump and monitor plastic packing movement and pressure on the pressure gauge.
6. Once packing has stopped flowing and the pressure gauge has stabilized observe the reading on gauge and record the pressure. **This will be your P1 pressure.**

Screw Type Injection Gun	
Applied Torque (ft-lb)	**Packing Pressure (psi)**
25	1,600
50	5,000
75	7,000
100	8,800
150	14,100
200	17,700
220	20,000

NOTE The pressure recorded will become "0". This is the pressure required to move the plastic packing and is not included in the actual injection pressure.

NOTE The amount of pressure required to force plastic packing to flow from the Injection Gun is dependent on several factors including outside temperature and the plastic injection gun itself. The example given above is for illustration purposes only.



Fraction to Decimal Conversion Chart

FRACTION TO DECIMAL CONVERSION CHART

4THS	8THS	16THS	32NDS	64THS	TO 3 PLACES	TO 2 PLACES	4THS	8THS	16THS	32NDS	64THS	TO 3 PLACES	TO 2 PLACES
				1/64	.016	.02					33/64	.516	.52
			1/32		.031	.03				17/32		.531	.53
				3/64	.047	.05					35/64	.547	.55
		1/16			.062	.06			9/16			.562	.56
				5/64	.078	.08					37/64	.578	.58
			3/32		.094	.09				19/32		.594	.59
				7/64	.109	.11					39/64	.609	.61
	1/8				.125	.12		5/8				.625	.62
				9/64	.141	.14					41/64	.641	.64
			5/32		.156	.16				21/32		.656	.66
				11/64	.172	.17					43/64	.672	.67
		3/16			.188	.19			11/16			.688	.69
				13/64	.203	.20					45/64	.703	.70
			7/32		.219	.22				23/32		.719	.72
				15/64	.234	.23					47/64	.734	.73
1/4					.250	.25	3/4					.750	.75
				17/64	.266	.27					49/64	.766	.77
			9/32		.281	.28				25/32		.781	.78
				19/64	.297	.30					51/64	.797	.80
		5/16			.312	.31			13/16			.812	.81
				21/64	.328	.33					53/64	.828	.83
			11/32		.344	.34				27/32		.844	.84
				23/64	.359	.36					55/64	.859	.86
	3/8				.375	.38		7/8				.875	.88
				25/64	.391	.39					57/64	.891	.89
			13/32		.406	.41				29/32		.906	.91
				27/64	.422	.42					59/64	.922	.92
		7/16			.438	.44			15/16			.938	.94
				29/64	.453	.45					61/64	.953	.95
			15/32		.469	.47				31/32		.969	.97
				31/64	.484	.48					63/64	.984	.98
1/2					.500	.50	1					1.000	1.00

Reference Documents

Refer to Operation and Maintenance Manuals and Standard Running Procedures.

Running Procedure	Description
TC-000148-02	Cameron Type FL & FLS Operation and Maintenance Manual
TC-009084-02	WKM Model M Power R-Seal Operation and Maintenance Manual
RP-002153	Make-up Requirements for API Flange Connections
RP-001558	Valve Removal Plugs
RP-003737	Standard MN-DS Housing with Landing Base Running Procedure
RP-003767	Standard MN-DS Housing through Rotary Table Running Procedure
RP-000654	Standard IC Test Plug Procedure for BOP Test
RP-003740	Standard MN-DS Intermediate Hanger Running Procedure
RP-003734	Standard Wash Tool Procedure
RP-003741	Standard MN-DS Intermediate Packoff Support Bushing Running Procedure
RP-003757	Standard MN-DS Production Packoff Running Procedure
RP-000573	Standard IC-2 Casing Hanger Running Procedure
RP-000592	Standard 'NX' Bushing Running Procedure

Document Control

Revision History

Revision	Date	Description	Prepared by:
01	April 26, 2016	Initial Release per 650205763 Houston Surface Systems Engineering	Maria Contreras
02	Draft A December 05, 2018	Revised Publication per 650356691	Eric Ayres

About this Revision

Owner: **Surface Systems Engineering - Running Procedures Department, Houston, TX**

Author: **Eric Ayres**

Reviewer:

Approver:

Released by: **Maria Contreras, SAP**

Apache Corp respectfully requests approval for the following changes and additions to the drilling plan:

1. Utilize Cameron's MN-DS multibowl wellhead.
2. Description of Operations
    a. Cameron's MN-DS multibowl wellhead will be installed after the surface rig presets surface. A T/A cap will be installed with a 1K pressure gauge to monitor pressures while the rig is not on the well.
2. The rig will N/U BOP and test the BOPE/surface casing to required pressures (Onshore Oil and Gas Order 2).
3. Intermediate will be drilled to casing depth and 9-5/8" intermediate casing will be ran & landed with a mandrel hanger on the MN-DS interior load shoulder.
4. The landing joint will be backed off and the packoff will be installed.
    a. The packoff's upper and lower seals will be tested.
5. Since no BOP seal was broken during this process, Apache respectfully requests to continue operations without performing a BOP test. The initial pressure test should still be valid as long as no seal was broken and <30 days from the initial pressure test.
6. Intermediate casing will be tested to required pressures (Onshore Oil and Gas Order 2).
7. The vertical, curve and lateral will then be drilled according to plan.
8. Production casing will be ran and 5-1/2" slips will be used after the production cement job.
9. Once the rig is removed, Apache Corp will secure the wellhead with a tubing head and cap. The wellhead area will be protected by placing a guard rail around the cellar area.

Please refer to Cameron's MN-DS multibowl wellhead running procedures.

GHOST RIDER 22 15 FEDERAL COM 33H - CMT DETAIL

CEMENT: SURFACE

Stage Tool Depth: N/A

Lead:

Top MD of Segment:	0	Btm MD of Segment:	775
Cmt Type:	C	Cmt Additives:	4% Bentonite + 1% CaCl2
Quantity (sks):	405		
Yield (cu/ft/sk):	1.72	Volume (cu/ft):	696.6
Density (lbs/gal):	13.5	Percent OH Excess:	25%

Tail:

Top MD of Segment:	775	Btm MD of Segment:	1075
Cmt Type:	C	Cmt Additives:	1% CaCl2
Quantity (sks):	225		
Yield (cu/ft/sk):	1.33	Volume (cu/ft):	299.25
Density (lbs/gal):	14.8	Percent OH Excess:	25%

CEMENT: INTERMEDIATE

Single Stage

Lead:

Top MD of Segment:	0	Btm MD of Segment:	3840
Cmt Type:	C	Cmt Additives:	10% NaCl + 6% Bentonite + 1% Premag M + 0.3% Defoamer + 0.4% Retarder
Quantity (sks):	640		
Yield (cu/ft/sk):	2.32	Volume (cu/ft):	1484.8
Density (lbs/gal):	12.7	Percent OH Excess:	25%

Tail:

Top MD of Segment:	3840	Btm MD of Segment:	4800
Cmt Type:	C	Cmt Additives:	0.1% Retarder

Quantity (sks):	300		
Yield (cu/ft/sk):	1.33	Volume (cu/ft):	399
Density (lbs/gal):	14.8	Percent OH Excess:	25%

2 Stage Cement Job

* DV tool depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

*If lost circulation is encountered, Apache may 2-stage Interm csg. A DVT may be used in the 9-5/8" csg & ECP may be placed below DVT.

1st Stage

Lead:

Top MD of Segment:	2280	Btm MD of Segment:	3840
Cmt Type:	C	Cmt Additives:	10% NaCl + 6% Bentonite + 1% Premag M + 0.3% Defoamer + 0.4% Retarder

Quantity (sks):	315		
Yield (cu/ft/sk):	2.32	Volume (cu/ft):	730.8
Density (lbs/gal):	12.7	Percent OH Excess:	25%

Tail:

Top MD of Segment:	3840	Btm MD of Segment:	4800
Cmt Type:	C	Cmt Additives:	0.1% Retarder

Quantity (sks):	300		
Yield (cu/ft/sk):	1.33	Volume (cu/ft):	399
Density (lbs/gal):	14.8	Percent OH Excess:	25%

Stage Tool / ECP Depth: ± 2280'

2nd Stage

Lead:

Top MD of Segment:	0	Btm MD of Segment:	1600

Cmt Type: C

Cmt Additives: 10% NaCl + 6% Bentonite + 1% Premag M + 0.3% Defoamer + 0.4% Retarder

Quantity (sks): 260
Yield (cu/ft/sk): 2.32 Volume (cu/ft): 603.2
Density (lbs/gal): 12.7 Percent OH Excess: 25%

Tail:

Top MD of Segment: 1600

Btm MD of Segment: 2280

Cmt Type: C

Cmt Additives: 0.1% Retarder

Quantity (sks): 200
Yield (cu/ft/sk): 1.33 Volume (cu/ft): 266
Density (lbs/gal): 14.8 Percent OH Excess: 25%

CEMENT: PRODUCTION

Single Stage

Lead 1:

Top MD of Segment: 4700

Btm MD of Segment: 7800

Cmt Type: Nine Lite

Cmt Additives: 5% Lightweight 3M beads + 0.3% Fluid Loss + 0.2% Dispersant + 0.2% GXT-C + 0.2% Suspension Aid + 0.15% Retarder + 0.15% Citric Acid

Quantity (sks): 330
Yield (cu/ft/sk): 2.86 Volume (cu/ft): 943.8
Density (lbs/gal): 10.5 Percent OH Excess: 20%

Lead 2:

Top MD of Segment: 7800

Btm MD of Segment: 8985

Cmt Type: Nine Lite

Cmt Additives: 3% Salt + 1% Premag M + 0.15% Fluid Loss + 0.15% GXT-C + 0.45% Retarder

Quantity (sks): 165
Yield (cu/ft/sk): 2.21 Volume (cu/ft): 364.65

Density (lbs/gal): 11.5 Percent OH Excess: 20%

Tail:

Top MD of Segment: 8985 Btm MD of Segment: 17084

Cmt Type: Nine Lite Cmt Additives: 1.3% Salt + 3% Expanding Agent + 0.5% Fluid Loss + 0.1% Free Water Control + 0.65% Retarder + 0.2% Dispersant + 0.25% Defoamer

Quantity (sks): 1580
Yield (cu/ft/sk): 1.43 Volume (cu/ft): 2259.4
Density (lbs/gal): 13.2 Percent OH Excess: 20%

Production Bradenhead Squeeze Contingency

*Due to the Brushy Canyon being a known zone for lost circulation during the production cement jobs, Apache proposes a contingency bradenhead squeeze 4 hours after bumping the plug on the primary stage if the lift pressure is less than known tieback lift pressures. Slips will be set previous to pumping the Bradenhead squeeze (right after bumping the plug) due to issues with getting slips set after previous Bradenhead squeeze experiences. A CBL will be ran after 7-10 days and will be submitted to the BLM.

Tail:

Top MD of Segment: 0 Btm MD of Segment: 7500

Cmt Type: H Cmt Additives: Class H Neat

Quantity (sks): 1885
Yield (cu/ft/sk): 1.18 Volume (cu/ft): 2224.3
Density (lbs/gal): 15.6 Percent OH Excess: 15%

GHOST RIDER 22 15 FEDERAL COM 33H - CSG DETAIL

String: SURFACE

Hole Size:	17.5						
Top Setting Depth (MD):	0	Top Setting Depth (TVD):	0	Btm setting depth (MD):	1075	Btm setting depth (TVD):	1075
Size:	13-3/8"	Grade:	J-55	Weight (lbs/ft):	54.5	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	Buttress

Condition (New/Used): New Standard (API/Non-API): API

Tapered String (Y/N)?: N
If yes, need spec attachment

Safety Factors

Collapse Design Safety Factor: 4.55 Burst Design Safety Factor: 1.72

Body Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Body Tensile Design Safety Factor: 4.38

Joint Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Joint Tensile Design Safety Factor: 4.67

String: INTERMEDIATE

Hole Size:	12.25						
Top Setting Depth (MD):	0	Top Setting Depth (TVD):	0	Btm setting depth (MD):	4800	Btm setting depth (TVD):	4794
Size:	9-5/8"	Grade:	J-55	Weight (lbs/ft):	40	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	LTC

Condition (New/Used):	New	Standard (API/Non-API):	API

Tapered String (Y/N)?: N
If yes, need spec attachment

Safety Factors

Collapse Design Safety Factor:	2.01	Burst Design Safety Factor:	2.01

Body Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Body Tensile Design Safety Factor: 2.19

Joint Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Joint Tensile Design Safety Factor: 1.82

String: **PRODUCTION**

Hole Size: 8.75

Top Setting Depth (MD):	0	Top Setting Depth (TVD):	0	Btm setting depth (MD):	9735	Btm setting depth (TVD):	9454
Size:	5-1/2"	Grade:	P-110	Weight (lbs/ft):	17	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	GB-CD

Hole Size: 8.5

Top Setting Depth (MD):	9735	Top Setting Depth (TVD):	9454	Btm setting depth (MD):	17084	Btm setting depth (TVD):	9454
Size:	5-1/2"	Grade:	P-110	Weight (lbs/ft):	17	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	GB-CD

Condition (New/Used):	New	Standard (API/Non-API):	API

Safety Factors

Collapse Design Safety Factor: 1.67 Burst Design Safety Factor: 1.19

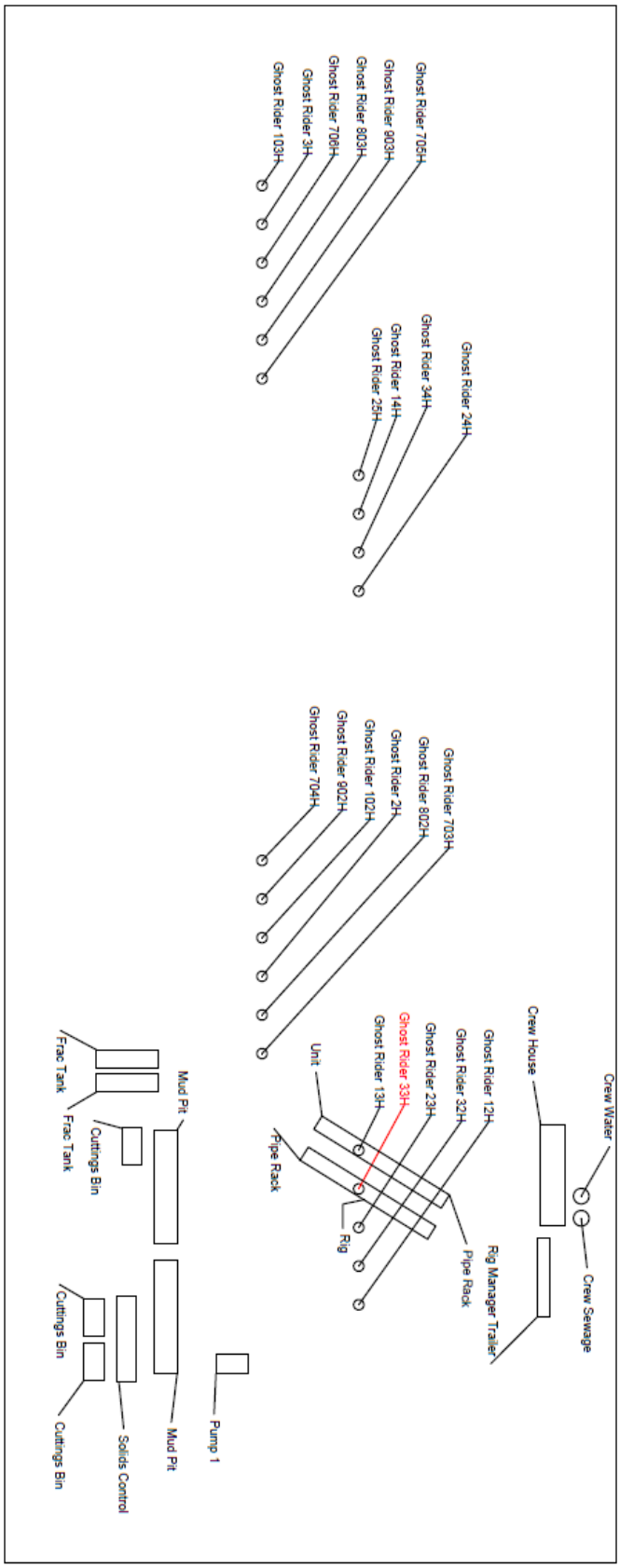
Body Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Body Tensile Design Safety Factor: 2.21

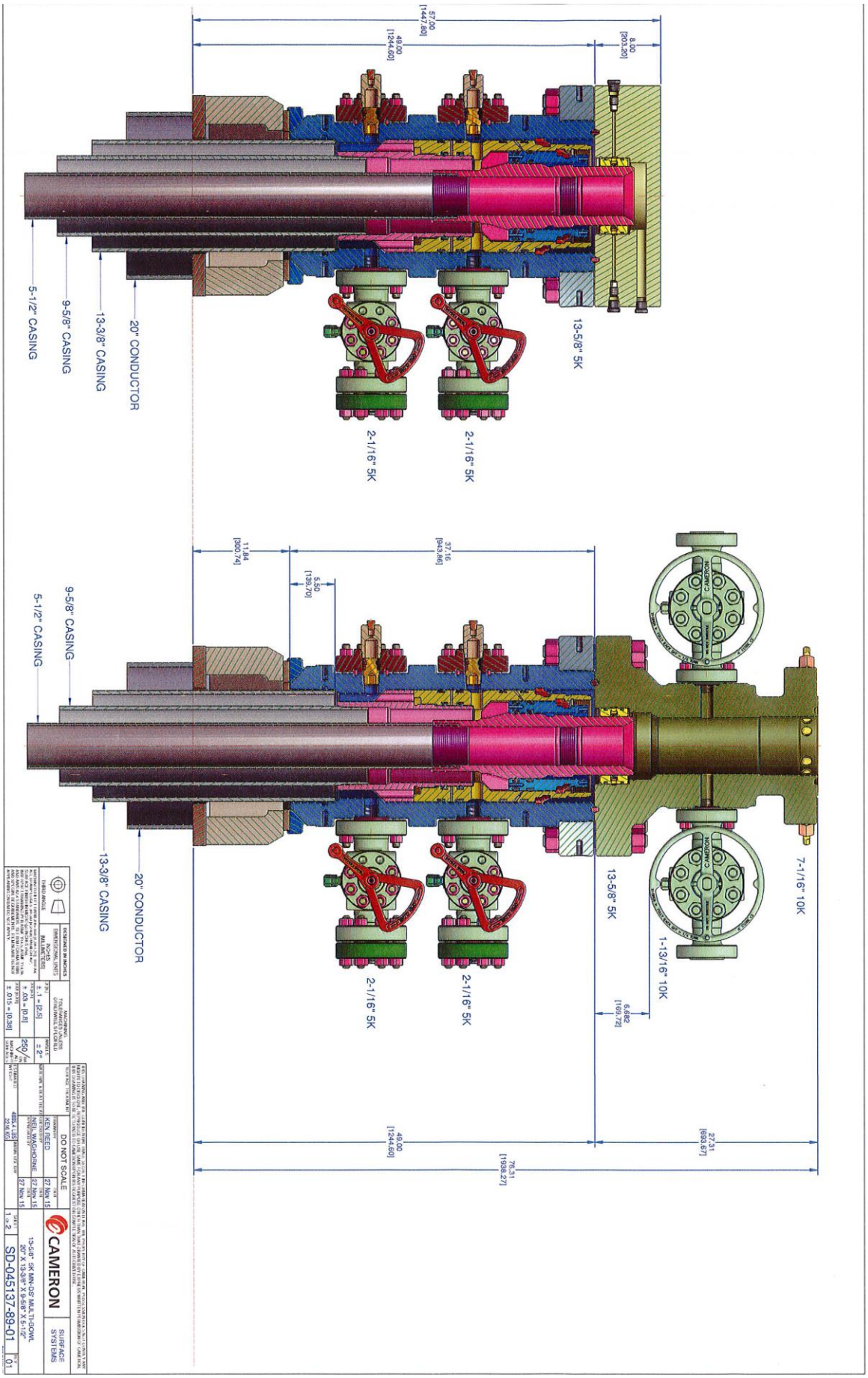
Joint Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Joint Tensile Design Safety Factor: 2.32

Tapered String (Y/N)?: N
If yes, need spec attachment

Apache Corp respectfully requests approval for the following changes and additions to the drilling plan:

1. Utilize a spudder rig to pre-set surface casing.
2. Description of Operations
    1. Spudder rig will move in their rig to drill the surface hole section and pre-set surface casing on the Ghost Rider 22-15 Federal COM 33H.
        a. After drilling the surface hole section, the rig will run casing and cement following all of the applicable rules and regulations (Onshore Oil and Gas Order No. 2).
        b. Rig will utilize fresh water based mud to drill 17-1/2" surface hole to TD. Solids control will be handled entirely on a closed loop basis.
2. The wellhead (page 3) will be installed and tested once the 13-3/8" surface casing is cut off and the WOC time has been reached.
3. A blind flange with the same pressure rating as the wellhead will be installed to seal the wellbore. Pressure will be monitored with a pressure gauge installed on the wellhead.
    a. A means for intervention will be maintained while the drilling rig is not over the well.
4. Spudder rig operations is expected to take 1-2 days on a single well pad.
5. The BLM will be contacted and notified 24 hours prior to commencing spudder rig operations.
6. Drilling operations will be performed with the drilling rig. At that time an approved BOP stack will be nippled up and tested on the wellhead before drilling operations commences on each well.
    a. The BLM will be contacted / notified 24 hours before the drilling rig moves back on to the pad with the pre-set surface casing.
7. Apache Corp will have supervision over the rig to ensure compliance with all BLM regulations and to oversee operations.
8. Once the rig is removed, Apache Corp will secure the wellhead area by placing a guard rail around the cellar area.


Ghost Rider 705H
Ghost Rider 803H
Ghost Rider 708H
Ghost Rider 3H
Ghost Rider 103H
Ghost Rider 24H
Ghost Rider 34H
Ghost Rider 14H
Ghost Rider 25H
Ghost Rider 703H
Ghost Rider 802H
Ghost Rider 2H
Ghost Rider 102H
Ghost Rider 802H
Ghost Rider 704H
Crew Water
Crew House
Crew Sewage
Ghost Rider 12H
Ghost Rider 32H
Ghost Rider 23H
Ghost Rider 33H
Ghost Rider 13H
Unit
Pipe Rack
Rig
Rig Manager Trailer
Pipe Rack
Frac Tank
Frac Tank
Cuttings Bin
Mud Pit
Cuttings Bin
Cuttings Bin
Solids Control
Mud Pit
Pump 1
North


57.00
[1447.80]
49.00
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8.30
[203.20]
13-5/8" 5K
2-1/16" 5K
2-1/16" 5K
5-1/2" CASING
9-5/8" CASING
13-3/8" CASING
20" CONDUCTOR
11.84
[300.74]
37.16
[943.86]
5.50
[139.70]
7-1/16" 10K
13-5/8" 5K
1-13/16" 10K
6.682
[169.72]
2-1/16" 5K
2-1/16" 5K
5-1/2" CASING
9-5/8" CASING
13-3/8" CASING
20" CONDUCTOR
49.00
[1244.60]
27.31
[693.67]
76.31
[1938.27]
DO NOT SCALE
CAMERON
SURFACE SYSTEMS
13-5/8" 5K MN-DS MULTI-BOWL
20" X 13-3/8" X 9-5/8" X 5-1/2"
SD-045137-89-01
01

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

SUPO Data Report
12/08/2020

APD ID: 10400053499
Submission Date: 01/28/2020
Operator Name: APACHE CORPORATION
Well Name: GHOST RIDER 22 15 FEDERAL COM
Well Number: 33H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

GhostRider22_15FedCom33H_ExistingRoads_20200128141330.pdf

Existing Road Purpose: ACCESS,FLUID TRANSPORT

Row(s) Exist? NO

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? NO

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

GhostRider22_15FedCom33H_1MiRadius_20200121133711.pdf

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

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

Submit or defer a Proposed Production Facilities plan? DEFER

Estimated Production Facilities description: Proposed facilities have been submitted with Ghost Rider 22 15 Fed Com 101H.

Section 5 - Location and Types of Water Supply

Water Source Table

Water source type: OTHER

Describe type: BRINE

Water source use type: INTERMEDIATE/PRODUCTION CASING

Source latitude: 32.429596 **Source longitude:** -103.14983

Source datum: NAD83

Water source permit type: PRIVATE CONTRACT

Water source transport method: TRUCKING

Source land ownership: STATE

Source transportation land ownership: STATE

Water source volume (barrels): 2214.2856 **Source volume (acre-feet):** 0.28540614

Source volume (gal): 93000

Water source type: GW WELL

Water source use type: SURFACE CASING

DUST CONTROL

INTERMEDIATE/PRODUCTION CASING

Source latitude: 31.977877 **Source longitude:** -103.73879

Source datum: NAD83

Water source permit type: PRIVATE CONTRACT

Water source transport method:

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

TRUCKING

Source land ownership: PRIVATE

Source transportation land ownership: PRIVATE

Water source volume (barrels): 2214.2856 **Source volume (acre-feet):** 0.28540614

Source volume (gal): 93000

Water source and transportation map:

GhostRider22_15FedCom_BrineWaterSource_20190910142652.pdf
GhostRider22_15FedCom_FW_Source_20190910142652.pdf

Water source comments:

New water well? N

New Water Well Info

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

Well target aquifer:

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

Aquifer comments:

Aquifer documentation:

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

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

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

Drilling method: **Drill material:**

Grout material: **Grout depth:**

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

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Using any construction materials: NO

Construction Materials description:

Construction Materials source location attachment:

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drilling fluid from well, during drilling ops, will be stored safely and recycled to next well. Any excess will be hauled to approved NMOCD disposal facility.
Amount of waste: 2500 barrels

Waste disposal frequency : One Time Only

Safe containment description: Drilling fluids will be stored in sealed frac tanks

Safe containmant attachment:

Waste disposal type: RECYCLE **Disposal location ownership:** OTHER

Disposal type description:

Disposal location description: Operators next well

Waste type: GARBAGE

Waste content description: Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of at a state approved disposal facility. All trash on and around well site will be collected for disposal.
Amount of waste: 1500 pounds

Waste disposal frequency : Weekly

Safe containment description: Garbage will be disposed of in portable trash trailers

Safe containmant attachment:

Waste disposal type: OTHER **Disposal location ownership:** STATE

Disposal type description: Land fill

Disposal location description: Lea County Landfill or Eddy County Landfill

Waste type: SEWAGE

Waste content description: Human waste and grey water will be properly contained and disposed of at a state approved facility.
Amount of waste: 2000 gallons

Waste disposal frequency : Weekly

Safe containment description: Sewage will be stored in steel waste tanks

Safe containmant attachment:

Waste disposal type: OTHER **Disposal location ownership:** STATE

Disposal type description: Municipal waste facility

Disposal location description: Hobbs Municipal Waste Facility

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Waste type: DRILLING

Waste content description: Excess cement returns

Amount of waste: 40 barrels

Waste disposal frequency : Weekly

Safe containment description: Cement returns will be stored in steel roll off bins then transferred to disposal vacuum trucks

Safe containmant attachment:

Waste disposal type: OTHER **Disposal location ownership:** PRIVATE

Disposal type description: Haul to private facility

Disposal location description: R360, 6601 W. Hobbs Hwy, Carlsbad, NM

Waste type: CHEMICALS

Waste content description: After drilling and completions, chemicals, salts, frac sand and other waste material will be removed and disposed of at a state approved disposal facility.

Amount of waste: 2000 pounds

Waste disposal frequency : Weekly

Safe containment description: Chemicals will be stored in frac tanks

Safe containmant attachment:

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

Disposal type description:

Disposal location description: R360, 6601 W Hobbs Hwy, Carlsbad, NM 88220

Waste type: PRODUCED WATER

Waste content description: Produced water will be hauled to private SWD

Amount of waste: 1500 barrels

Waste disposal frequency : Daily

Safe containment description: Produced water will be transported via pipeline to battery and from battery to SWD

Safe containmant attachment:

Waste disposal type: OTHER **Disposal location ownership:** PRIVATE

Disposal type description: Private SWD

Disposal location description: OWL/Mesquite

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit? NO

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

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

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

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

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? Y

Description of cuttings location Cuttings will be stored in steel haul off bins and taken to an NMOCD approved disposal facility.

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

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

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

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: Y

Ancillary Facilities attachment:

GhostRider22_15FedCom_102H_13H_33H_23H_32H_12H_GasCapturePlan_20200120124758.pdf

Comments: Gas capture plan

Section 9 - Well Site Layout

Well Site Layout Diagram:

GhostRider22_15FedCom33H_WellsiteLayout_20200121133744.pdf
GhostRider22_15FedCom33H_Topsoil_20200128141406.pdf

Comments:

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Section 10 - Plans for Surface Reclamation

Type of disturbance: No New Surface Disturbance **Multiple Well Pad Name:** GHOST RIDER 22 15 NORTHWEST

Multiple Well Pad Number: 2N

Recontouring attachment:

GhostRider22_15FedCom33H_Reclamation_20200128141417.pdf

Drainage/Erosion control construction: During construction proper erosion control methods will be used to control erosion, runoff and siltation of surrounding area

Drainage/Erosion control reclamation: Reclamation is going to follow natural terrain to control erosion, runoff and siltation of surrounding area.

Well pad proposed disturbance (acres):

Road proposed disturbance (acres):

Powerline proposed disturbance (acres):

Pipeline proposed disturbance (acres):

Other proposed disturbance (acres):

Total proposed disturbance: 0

Well pad interim reclamation (acres): 0

Road interim reclamation (acres): 0

Powerline interim reclamation (acres): 0

Pipeline interim reclamation (acres): 0

Other interim reclamation (acres): 0

Total interim reclamation: 0

Well pad long term disturbance (acres): 0

Road long term disturbance (acres): 0

Powerline long term disturbance (acres): 0

Pipeline long term disturbance (acres): 0

Other long term disturbance (acres): 0

Total long term disturbance: 0

Disturbance Comments:

Reconstruction method: Areas planned for interim reclamation will be contoured to original contour if feasible, or if not feasible, to an interim contour that blends with surrounding topography as much as possible. Where applicable, fill material of well pad will be back filled into the cut to bring area back to original contour.

Topsoil redistribution: Topsoil that was spread over interim reclamation areas will be stockpiled prior to recontouring. Topsoil will be redistributed evenly over entire disturbed site to ensure successful revegetation.

Soil treatment: No soil treatment expected.

Existing Vegetation at the well pad: Plants are sparse but include grasses, some mesquite and shinnery oak.

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: Plants are sparse but include grasses, some mesquite and shinnery oak

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Plants are sparse but include grasses, some mesquite and shinnery oak

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: Plants are sparse but include grasses, some mesquite and shinnery oak

Existing Vegetation Community at other disturbances attachment:

Non native seed used?

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project?

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation?

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: **Last Name:**

Phone: **Email:**

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? N

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: Operator will consult with authorized officer for acceptable weed control methods,which include following EPA and BLM requirements and policies.
Weed treatment plan attachment:

Monitoring plan description: Reclaimed areas will be monitored periodically to ensure vegetation has re-established, that area is not re-disturbed, and erosion is controlled.
Monitoring plan attachment:

Success standards: Maintain all disturbed areas as per Gold Book Standards.

Pit closure description: Not applicable

Pit closure attachment:

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

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

Section 12 - Other Information

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

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? Y

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Previous Onsite information: Onsite for the Ghost Rider 22 15 Federal Com Northeast and Northwest pad conducted on March 26, 2019 with BLM Rep: Aaron Chastain.

Other SUPO Attachment

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

PWD Data Report
12/08/2020

APD ID: 10400053499 **Submission Date:** 01/28/2020

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

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

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? N

Produced Water Disposal (PWD) Location:

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

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? N

Produced Water Disposal (PWD) Location:

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

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? N

Produced Water Disposal (PWD) Location:

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

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

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

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

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? N

Produced Water Disposal (PWD) Location:

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

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? N

Produced Water Disposal (PWD) Location:

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

Other PWD discharge volume (bbl/day):

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM **Well Number:** 33H

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

AFMSS

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

Bond Info Data Report

12/08/2020

APD ID: 10400053499

Submission Date: 01/28/2020

Operator Name: APACHE CORPORATION

Well Name: GHOST RIDER 22 15 FEDERAL COM

Well Number: 33H

Well Type: OIL WELL

Well Work Type: Drill

Highlighted data reflects the most recent changes

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Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000736

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Electronically
Via E-permitting

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

NATURAL GAS MANAGEMENT PLAN

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

Section 1 – Plan Description
Effective May 25, 2021

I. Operator: APACHE CORPORATION **OGRID:** 873 **Date:** 08 / 18 / 2021

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

If Other, please describe: _____

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

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Ghost Rider 22 15 Fed Com 42H		Sec 15 T24S R32E	2282' FSL 2370' FEL	1380	2400	3100
Ghost Rider 22 15 Fed Com 13H		Sec 15 T24S R32E	2357' FSL 2206' FEL	775	2600	1800
Ghost Rider 22 15 Fed Com 33H	30-025-49337	Sec 15 T24S R32E	2357' FSL 2176' FEL	775	2600	1800
Ghost Rider 22 15 Fed Com 23H		Sec 15 T24S R32E	2357' FSL 2146' FEL	775	2600	1800
Ghost Rider 22 15 Fed Com 32H		Sec 15 T24S R32E	2272' FSL 480' FEL	775	2600	1800
Ghost Rider 22 15 Fed Com 12H		Sec 15 T24S R32E	2357' FSL 2086' FEL	775	2600	1800

IV. Central Delivery Point Name: GHOST RIDER 22 15 FED CTB [See 19.15.27.9(D)(1) NMAC]

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

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Ghost Rider 22 15 Fed Com 102H		5/18/22	6/24/22	Not yet scheduled	Not yet scheduled	Not yet scheduled
Ghost Rider 22 15 Fed Com 13H		5/26/22	7/2/22	Not yet scheduled	Not yet scheduled	Not yet scheduled
Ghost Rider 22 15 Fed Com 33H	30-025-49337	6/3/22	7/10/22	Not yet scheduled	Not yet scheduled	Not yet scheduled
Ghost Rider 22 15 Fed Com 23H		6/11/22	7/18/22	Not yet scheduled	Not yet scheduled	Not yet scheduled
Ghost Rider 22 15 Fed Com 32H		6/19/22	7/26/22	Not yet scheduled	Not yet scheduled	Not yet scheduled
Ghost Rider 22 15 Fed Com 12H		6/27/22	8/3/22	Not yet scheduled	Not yet scheduled	Not yet scheduled

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

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

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

Section 2 – Enhanced Plan

EFFECTIVE APRIL 1, 2022

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

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

IX. Anticipated Natural Gas Production:

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

X. Natural Gas Gathering System (NGGS):

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

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

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

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

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

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

Section 3 - Certifications

Effective May 25, 2021

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

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

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

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

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

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

Section 4 - Notices

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

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

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

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

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

Signature:	Sorina L Flores
Printed Name:	Sorina L Flores
Title:	Sr Regulatory Analyst
E-mail Address:	sorina.flores@apachecorp.com
Date:	7/18/2021
Phone:	432-818-1167

OIL CONSERVATION DIVISION

(Only applicable when submitted as a standalone form)

Approved By:	
Title:	
Approval Date:	
Conditions of Approval:	

VI. SEPARATION EQUIPMENT

(Complete description of how Apache will size separation equipment to optimize gas capture)

Apache Corporation production tank batteries will include separation equipment designed to efficiently separate gas from liquid phases to optimize gas capture based on projected and estimated volumes from the targeted pool in conjunction with the total number of wells planned to/or existing within the facility. If determined to be undersized or needed, separation equipment will be upgraded prior to well(s) being drilled or completed. The separation equipment will be designed and built according to relevant industry specifications, ie API specifications 12J and ASME Sec VIII Div 1. Other recognized industry publications such as Gas Processors Suppliers Association will be referenced when designing separation equipment to optimize gas capture.

VII. OPERATIONAL PRACTICES

(Complete description of actions Apache will take to comply with the requirements of Subsection A-F of 19.15.27.8 NMAC)

(A) Venting & flaring of natural gas

- Apache acknowledges venting or flaring of natural gas during drilling, completion, or production operations constitutes was as defined in 19.15.2 NMAC is prohibited. Apache will maximize recovery of natural gas by minimizing waste of natural gas through venting and flaring. During drilling, completion and production operations, Apache will vent, or flare natural gas only as authorized in subsections B, C and D of 19.15.27.8 NMAC. Apache shall flare rather than vent natural gas except when flaring technically infeasible or would pose a risk to safe operations or personnel safety, and venting is a safer alternative than flaring.

(B) Venting & flaring during drilling operations

- Apache shall capture or combust natural gas, if technically feasible, using best industry practices and control technologies
- A properly sized flare stack will be located at a minimum of 100 feet from the nearest surface hole location unless otherwise approved by the division.
- In the event of an emergency or malfunction, Apache may vent natural gas to avoid risk of an immediate and substantial adverse impact on safety, public health, or the environment. Apache shall report natural gas vented or flared during an emergency or malfunction to the NMOCD division pursuant Paragraph (1) of Subsection G of 19.15.27.8 NMAC.

(C) Venting & flaring during completions and recompletion

- During initial flowback, Apache shall route flowback fluids into a completion or storage tank and, if technically feasible under the applicable well conditions, flare rather than vent and commence operations of a separator as soon as it is technically feasible for a separator to function.
- During separation flowback, Apache shall capture and route natural gas from separation equipment:
  - To a gas flowline or collection system, reinject into the well, or use on-site as a fuel source or other purpose that a purchased fuel or raw material would serve; or
  - To flare if routing natural gas to a gas flowline or collecting system, reinjecting it into the well, or using it on-site as fuel source or other purpose that a purchased fuel or raw material would serve would pose a risk to safe operation or personnel safety.
- If natural gas does not meet gathering pipeline quality specifications, Apache may flare natural gas for 60 days or until the natural gas meets pipeline quality specifications, whichever is sooner, provided:
  - A properly sized flare stack is equipped with an automatic igniter or continuous pilot
  - Apache analyzes natural gas samples twice per week
  - Apache routs natural gas into a gathering pipeline as soon as pipeline specifications are met
  - Apache provides pipeline specifications and natural gas analyses to NMOCD division upon request

(D) Venting & flaring during production operations

- Apache shall not vent or flare natural gas except:
  - During an emergency or malfunction
  - To unload or clean up liquid holdup in a well to atmospheric pressure, provided:
    - Apache does not vent after well achieves stabilized rate and pressure
    - For liquids unloading by manual purging, Apache remains present on-site until the end of unloading or posts at the well site, contact information of personnel conducting liquids unloading operations in close proximity (<30 minutes' drive time) of well being unloaded until end of unloading, takes all

reasonable actions to achieve stabilized rate and pressure at earliest practical time and takes reasonable actions to minimize venting to maximum extent practicable
- Apache will optimize system to minimize venting of natural gas for any well equipped with a plunger lift system or automated control system
- During downhole maintenance, best management practices will be used to the extent that it does not pose a risk to safe operations and personnel safety.

♦ During first 12 months of production from an exploratory well, or as extended by the division for good cause shown, provided:
- Apache proposes and the division approves well as exploratory
- Apache is in compliance with its' statewide gas capture requirements
- Apache submits an updated C-129 form to the division, including a NGMP and timeline for connecting well to a natural gas gathering system or otherwise approved by the division

♦ During the following activities unless prohibited
- Gauging or sampling a storage tank or other low pressure production vessel
- Loading out liquids from a storage tank or other low pressure production vessel to a transport vehicle
- Repair and maintenance, including blowing down and depressurizing production equipment to perform repair and maintenance
- Normal operation of gas activated pneumatic controller or pump
- Normal operation of storage tank or other low pressure production vessel, but not including venting from a thief hatch that is not properly closed or maintained on an established schedule
- Normal operations of dehydration units and amine treatment units
- Normal operations of compressors, compressor engines, and turbines
- Normal operations of valves, flanges and connectors that is not the result of inadequate equipment design or maintenance
- Bradenhead, packer leakage test or production test lasting less than 24 hours unless the division requires or approves a longer test period
- When natural gas does not meet gathering pipeline specifications
- Commissioning of pipelines, equipment, or facilities only for as long as necessary to purge introduced impurities from pipeline or equipment

(E) Performance standards

➢ All tanks and separation equipment are designed for maximum thoughput and pressure to minimize waste
➢ Permanent storage tanks associated with production operations that is routed to a flare or control device installed after May 25, 2021, shall equip storage tank with an automatic gauging system that reduces venting of natural gas
➢ Apache will install a flare properly sized and designed to ensure proper combustion efficiency
  ♦ Flare stack installed or replaced after May 25, 2021, shall be equipped with an automatic ignitor or continuous pilot
  ♦ Flare stack installed before May 25, 2021, shall be retrofitted with an automatic ignitor, continuous pilot or technology that alerts operator that flare may have malfunctioned no later than 18 months after May 25, 2021
  ♦ Flare stack located at well or facility, with an average daily production of equal to or less than 60 mcf of natural gas shall be equipped with an automatic ignitor or continuous pilot if flare stack is replaced after May 25, 2021
➢ Flare stack constructed after May 25, 2021, shall be securely anchored, and located at least 100 feet from well and storage tanks unless otherwise approved by the division
➢ At any point in the life of the well (drilling, completion, production, inactive) an audio, visual and olfactory (AVO) inspection will be performed weekly, during first year of production and on well or facility with average daily production greater than 60,000 cubic feet of natural gas, to confirm all production components are operating properly and there are no leaks or releases except as allowed in Subsection D of 19.15.27.8 NMAC.
➢ Apache will make and keep records of AVO inspections available to NMOCD for at least 5 years
➢ Apache may use a remote or automated monitoring technology to detect leaks and release in lieu of AVO inspections with prior NMOCD approval
➢ Facilities will be designed to minimize waste
➢ Apache will minimize waste and shall resolve emergencies as quickly and safely as feasible

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

- Apache shall measure or estimate volume of natural gas it vents, flares, or beneficially uses during drilling, completion, and production operations regardless of the reason or authorization for such venting or flaring
- Measurement equipment will be installed to measure volume of natural gas flared from existing process piping or flowline piped from equipment associated with a well or facility associated with approved application for permit to drill that has an average daily production greater than 60 mcf of natural gas
- Measuring equipment shall conform to an industry standard
- Measuring equipment shall not be designed or equipped with a manifold that allows diversion of natural gas around the metering element except for the sole purpose of inspecting and servicing the measurement equipment
- Apache may estimate volume of vented or flared natural gas using methodology that can be independently verified if metering is not practicable due to low flow rate or pressure
- Apache will estimate volume of vented and flared natural gas based on result of an annual GOR test for that well reported on form C-116 to allow division to independently verify volume and rate of flared natural gas for a well that does not require measuring equipment
- Apache shall install measuring equipment whenever the division determines metering is practicable or the existing measuring equipment or GOR test is not sufficient to measure volume of vented and flared natural gas

VIII. BEST MANAGEMENT PRACTICES

(Complete description of Apache's best management practices to minimize venting during active and planned maintenance)

- Apache has a flare stack designed to handle sufficient volume to ensure proper combustion efficiency. Flare stacks are securely anchored at lease 100 feed from wells and storage tanks and are equipped with continuous pilots.
- Apache will not produce oil or gas but will maintain adequate well control through completion operations
- Apache will not flow well during initial production until all flowlines, tank batteries, and oil/gas takeaway are installed, tested, and determined operational
- Apache will equip storage tanks with automatic gauging system to reduce venting of natural gas
- When feasible, Apache will combust natural gas that would otherwise be vented or flared
- When feasible, Apache will minimize venting through pump downs of vessels and reducing time required to purge equipment before returning to service
- When feasible, Apache will shut in wells in the event of a takeaway disruption, emergency situations, or other operations where venting or flaring may occur due to equipment failures
- Reduce number of blowdowns by looking for opportunities to coordinate repair and maintenance activities

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Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 39393

CONDITIONS

Operator: APACHE CORPORATION 303 Veterans Airpark Ln Midland, TX 79705	OGRID: 873
	Action Number: 39393
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

CONDITIONS

Created By	Condition	Condition Date
pkautz	Will require a File As Drilled C-102 and a Directional Survey with the C-104	8/20/2021
pkautz	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string	8/20/2021
pkautz	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system	8/20/2021
pkautz	Cement is required to circulate on both surface and intermediate1 strings of casing	8/20/2021