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.

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.

2. Name of Operator

9. API Well No.
30-005-64390

| 3a. Address | 3b. Phone No. *(include area code)* | 10. Field and Pool, or Exploratory |
|---|---|---|
| | | |

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

At surface

At proposed prod. zone

11. Sec., T. R. M. or Blk. and Survey or Area

| 14. Distance in miles and direction from nearest town or post office* | 12. County or Parish | 13. State |
|---|---|---|
| | | |

| 15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) | 16. No of acres in lease | 17. Spacing Unit dedicated to this well |
|---|---|---|
| | | |
| 18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. | 19. Proposed Depth | 20. BLM/BIA Bond No. in file |
| | | |
| 21. Elevations (Show whether DF, KDB, RT, GL, etc.) | 22. Approximate date work will start* | 23. Estimated duration |
| | | |

## 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 |
|---|---|---|
| | | |
| Title | | |
| Approved by *(Signature)* | Name *(Printed/Typed)* | Date |
| | | |
| Title | 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.

APPROVED WITH CONDITIONS

(Continued on page 2)

*(Instructions on page 2)

**Approval Date: 05/17/2024**

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 |
|---|---|---|
| 30-005-64390 | 52770 | Round Tank; San Andres |

| [4] Property Code | [5] Property Name | [6] Well Number |
|---|---|---|
| 320814 | PRINCE GEORGE FEDERAL COM | 3H |

| [7] OGRID No. | [8] Operator Name | [9] Elevation |
|---|---|---|
| 13837 | MACK ENERGY CORPORATION | 3774.8 |

## [10] Surface Location

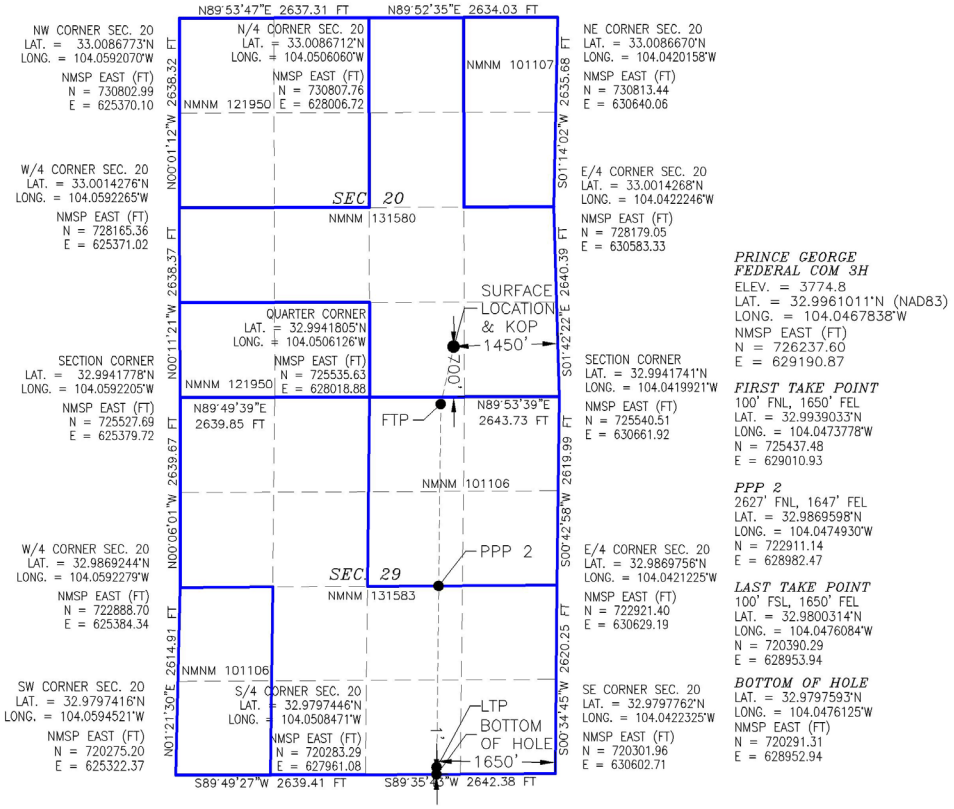
| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| O | 20 | 15 S | 29 E | | 700 | SOUTH | 1450 | EAST | CHAVES |

## [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 |
|---|---|---|---|---|---|---|---|---|---|
| O | 29 | 15 S | 29E | | 1 | SOUTH | 1650 | EAST | CHAVES |

| [12] Dedicated Acres | [13] Joint or Infill | [14] Consolidation Code | [15] Order No. |
|---|---|---|---|
| 160 | | | |

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




## [17] OPERATOR CERTIFICATION

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

Deana Weaver 10/23/2023
Signature Date

Deana Weaver
Printed Name

dweaver@mec.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.*

OCTOBER 6, 2023
Date of Survey

Signature and Seal of Professional Surveyor:

Certificate Number: EDMUND F. JARAMILLO, PLS 12797
SURVEY NO. 9844A

Intent [XX] As Drilled [ ]

| API # |
|---|
| |

| Operator Name: | Property Name: | Well Number |
|---|---|---|
| MACK ENERGY CORPORATION | PRINCE GEORGE FEDERAL COM | 3H |

Kick Off Point (KOP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| O | 20 | 15S | 29E | | 700 | SOUTH | 1450 | EAST | CHAVES |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.9961011 | 104.0474360 | 83 |

First Take Point (FTP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| B | 29 | 15S | 29E | | 100 | NORTH | 1650 | EAST | CHAVES |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.9939033 | 104.0473778 | 83 |

Last Take Point (LTP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| O | 29 | 15S | 29E | | 100 | SOUTH | 1650 | EAST | CHAVES |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.9800314 | 104.0476084 | 83 |

Is this well the defining well for the Horizontal Spacing Unit? [ ]

Is this well an infill well? [ ]

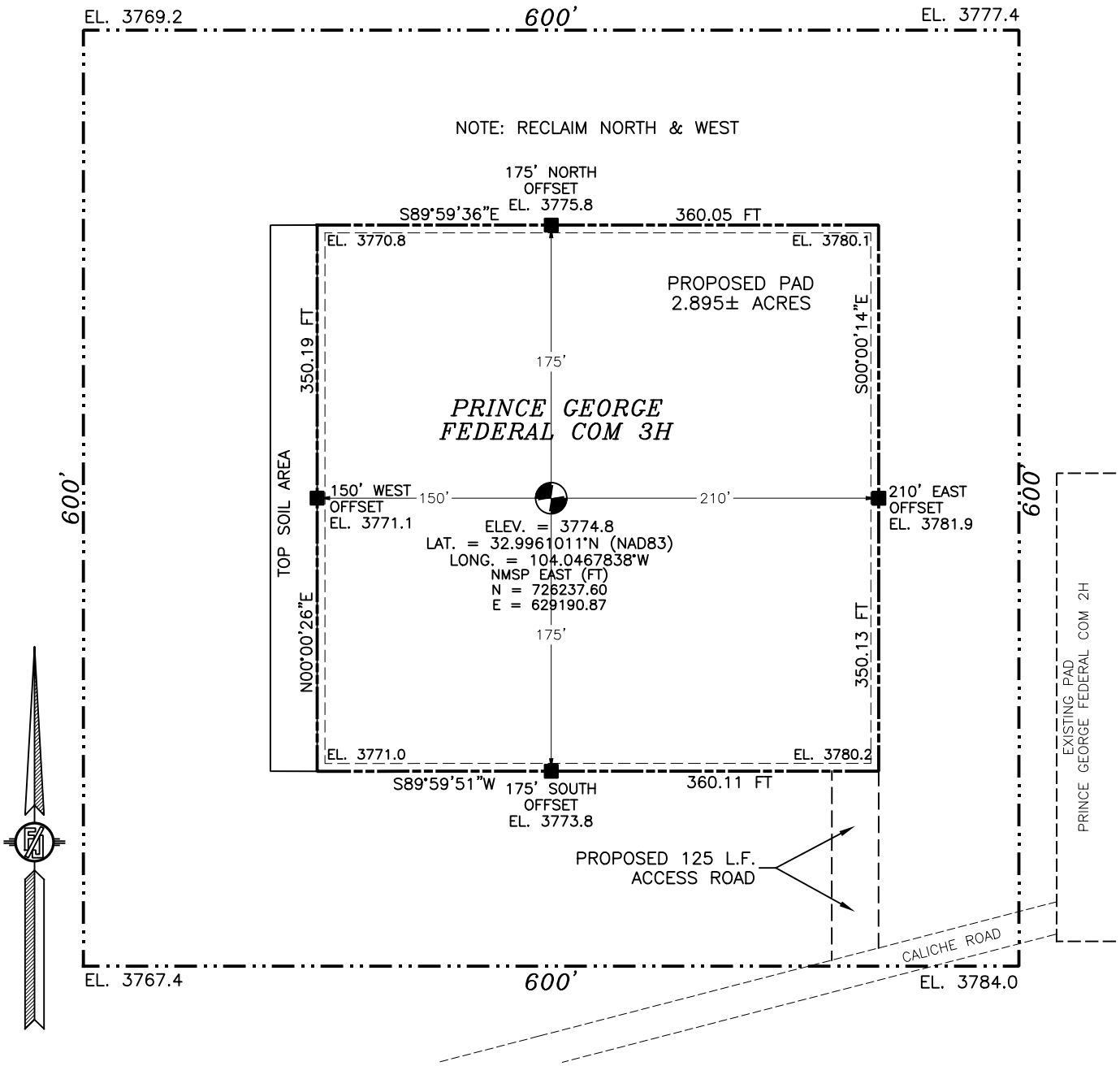
If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

| API # |
|---|
| |

| Operator Name: | Property Name: | Well Number |
|---|---|---|
| | | |

KZ 06/29/2018

# SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
# CHAVES COUNTY, STATE OF NEW MEXICO
# SITE MAP




010 50 100 200
SCALE 1" = 100'

**DIRECTIONS TO LOCATION**
FROM THE INTERSECTION OF ST. HWY. 82 & CO. RD. 217 (HAGERMAN CUT OFF), GO NORTH ON CO. RD. 217 APPROX. 10 MILES, TURN LEFT (NORTHWEST) ON 25' CALICHE LEASE ROAD (CO. LINE ROAD) AND GO APPROX. 3.8 MILES, TURN RIGHT (NORTH) ON 15' CALICHE ROAD AND GO APPROX. 0.6 MILES, TURN RIGHT AND GO EAST APPROX. 0.5 MILES TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH APPROX. 125' TO THE SOUTHEAST PAD CORNER FOR THIS LOCATION.

I, FILIMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND THIS SURVEY WAS MADE TO MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

FILIMON F. JARAMILLO PLS 17078

*MACK ENERGY CORPORATION*
***PRINCE GEORGE FEDERAL COM 3H***
*LOCATED 700 FT. FROM THE SOUTH LINE AND 1450 FT. FROM THE EAST LINE OF SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M. CHAVES COUNTY, STATE OF NEW MEXICO*

*OCTOBER 6, 2023*

*SURVEY NO. 9844A*

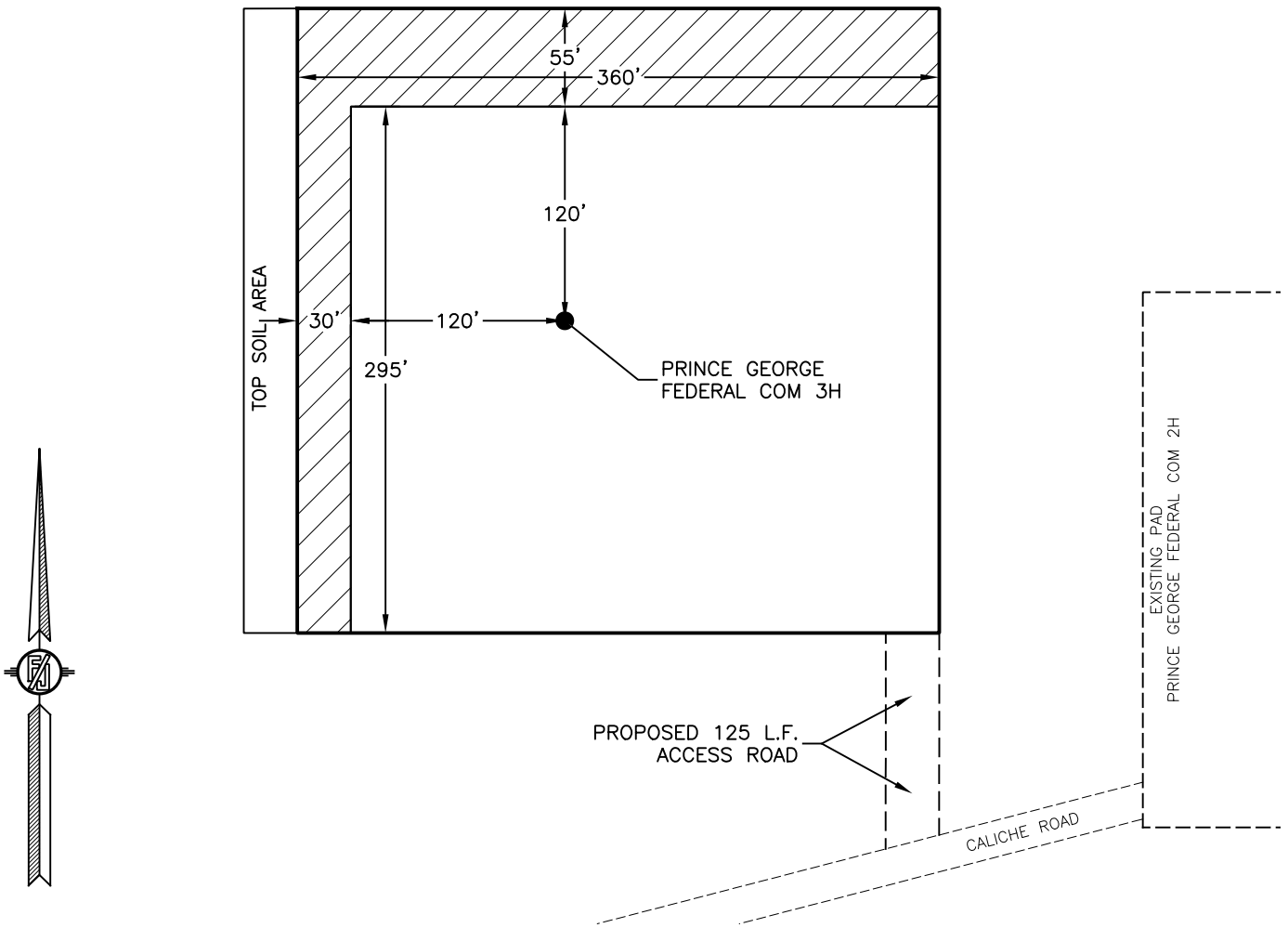
*MADRON SURVEYING, INC.* 301 SOUTH CANAL (575) 234-3327 *CARLSBAD, NEW MEXICO*

# SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
# CHAVES COUNTY, STATE OF NEW MEXICO
# INTERIM SITE RECLAMATION

DENOTES RECLAMATION AREA

0.658± ACRES RECLAMATION AREA

NOTE: RECLAIM NORTH & WEST




MACK ENERGY CORPORATION

**PRINCE GEORGE FEDERAL COM 3H**

LOCATED 700 FT. FROM THE SOUTH LINE AND 1450 FT. FROM THE EAST LINE OF SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M. CHAVES COUNTY, STATE OF NEW MEXICO

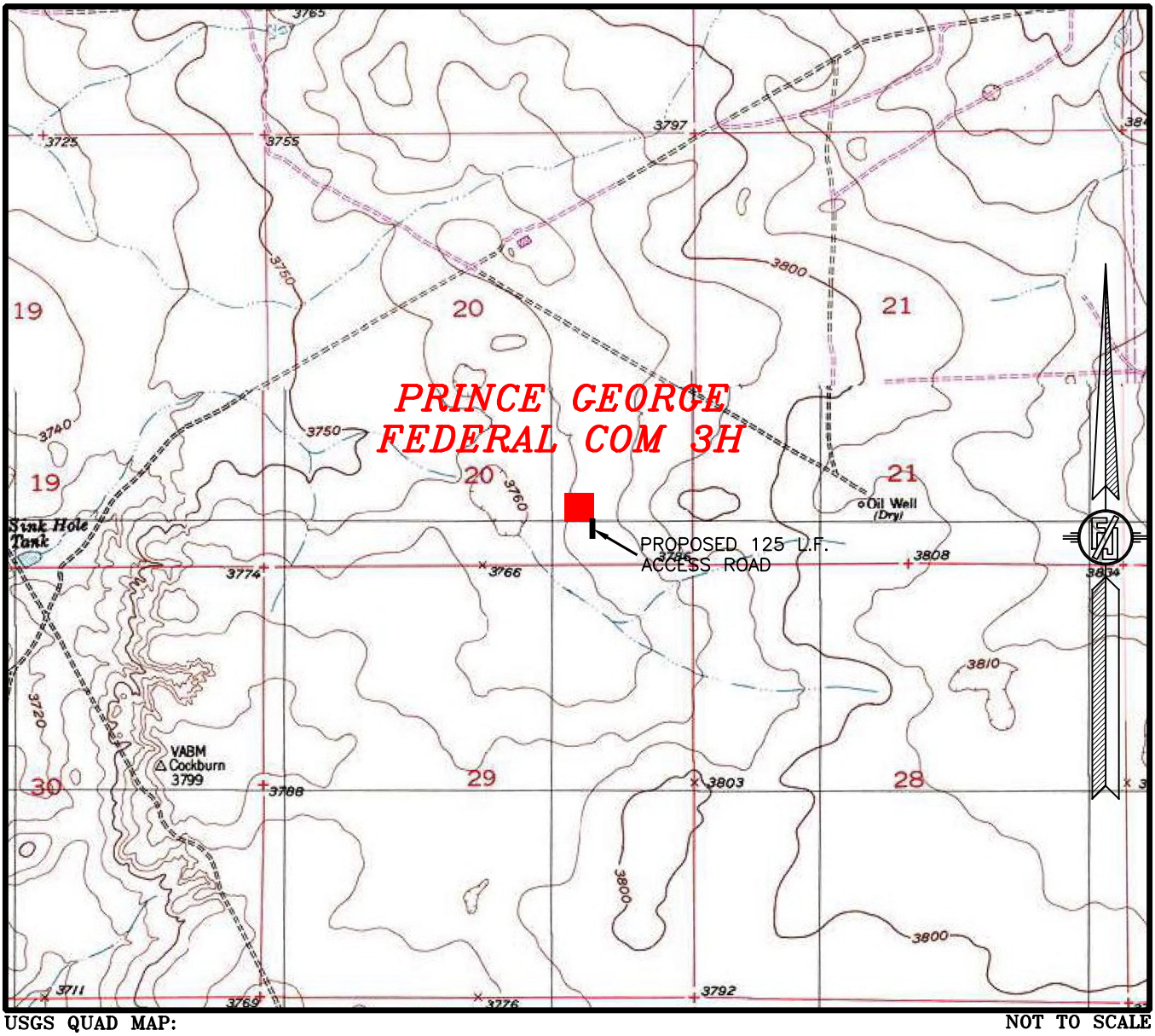
OCTOBER 6, 2023

SURVEY NO. 9844A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3327 CARLSBAD, NEW MEXICO

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

# LOCATION VERIFICATION MAP




USGS QUAD MAP:
BASIN WELL
KING CAMP

NOT TO SCALE

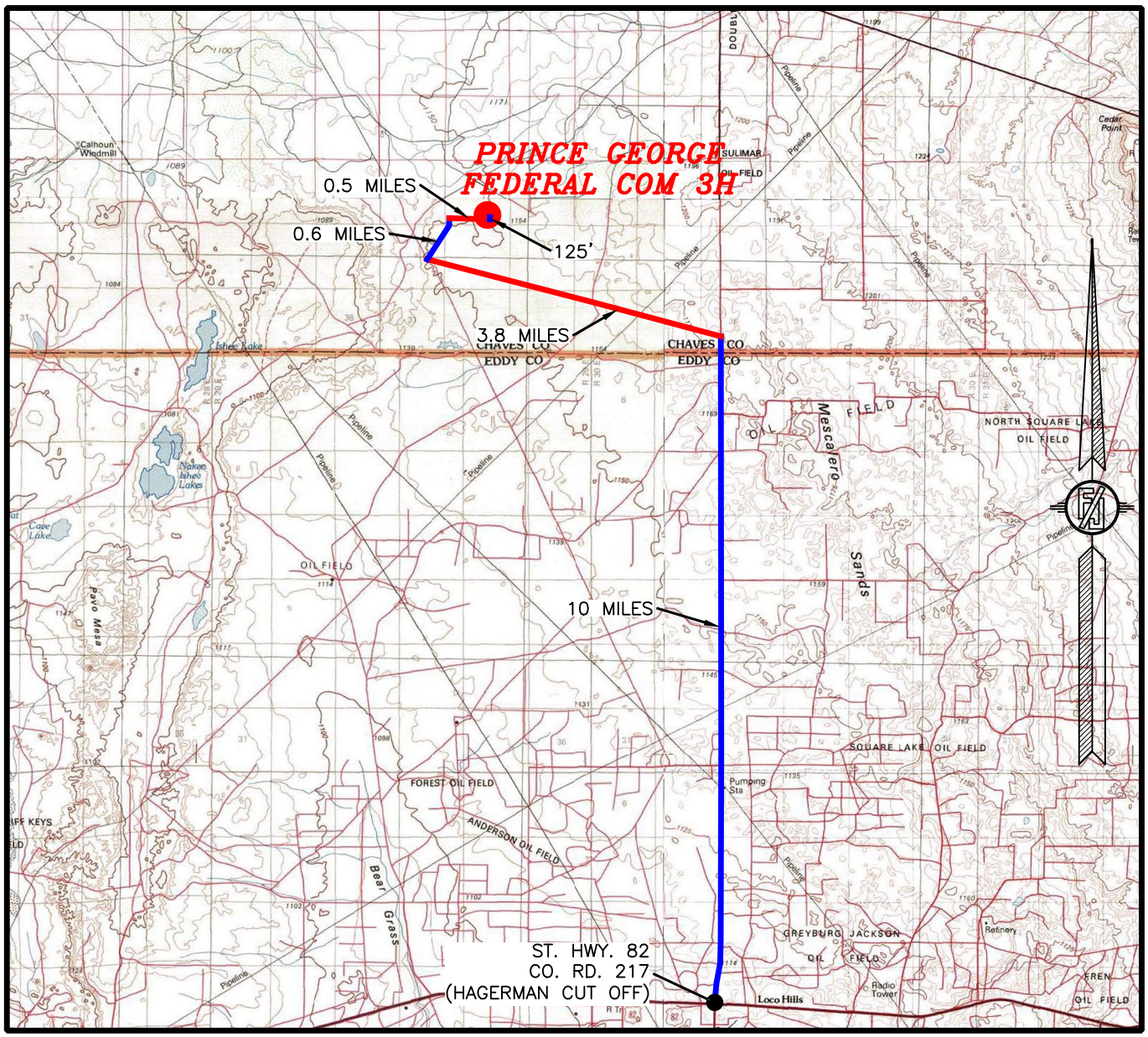
MACK ENERGY CORPORATION
**PRINCE GEORGE FEDERAL COM 3H**
LOCATED 700 FT. FROM THE SOUTH LINE
AND 1450 FT. FROM THE EAST LINE OF
SECTION 20, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

OCTOBER 6, 2023

SURVEY NO. 9844A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3327 CARLSBAD, NEW MEXICO

# SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
# CHAVES COUNTY, STATE OF NEW MEXICO
# VICINITY MAP




*DISTANCES IN MILES* *NOT TO SCALE*

**DIRECTIONS TO LOCATION**
FROM THE INTERSECTION OF ST. HWY. 82 & CO. RD. 217 (HAGERMAN CUT OFF), GO NORTH ON CO. RD. 217 APPROX. 10 MILES, TURN LEFT (NORTHWEST) ON 25' CALICHE LEASE ROAD (CO. LINE ROAD) AND GO APPROX. 3.8 MILES, TURN RIGHT (NORTH) ON 15' CALICHE ROAD AND GO APPROX. 0.6 MILES, TURN RIGHT AND GO EAST APPROX. 0.5 MILES TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH APPROX. 125' TO THE SOUTHEAST PAD CORNER FOR THIS LOCATION.

*MACK ENERGY CORPORATION*
***PRINCE GEORGE FEDERAL COM 3H***
*LOCATED 700 FT. FROM THE SOUTH LINE AND 1450 FT. FROM THE EAST LINE OF SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M. CHAVES COUNTY, STATE OF NEW MEXICO*

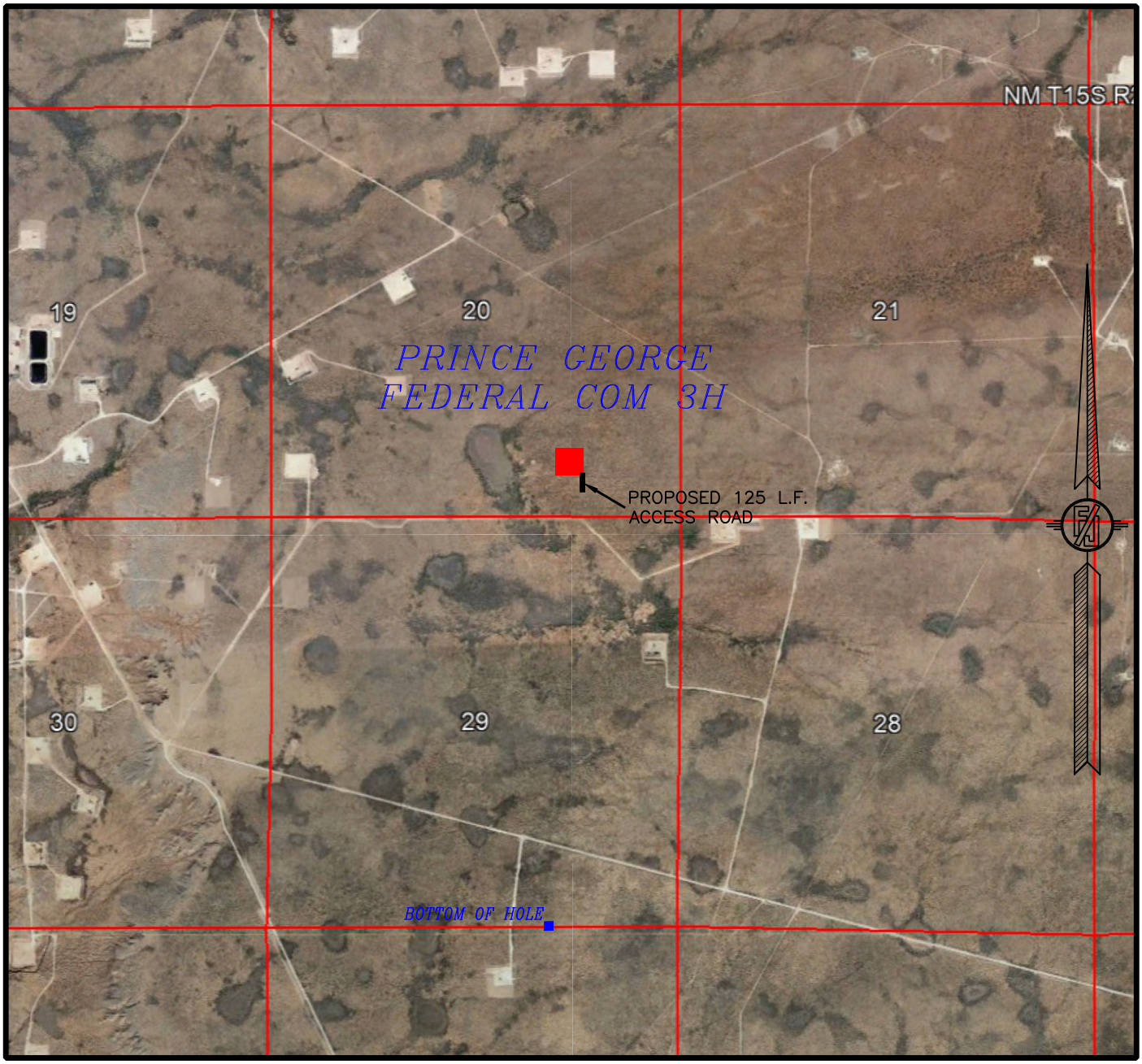
*OCTOBER 6, 2023*

*SURVEY NO. 9844A*

*MADRON SURVEYING, INC.* 301 SOUTH CANAL (575) 234-3327 *CARLSBAD, NEW MEXICO*

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

# AERIAL PHOTO




NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
JUN. 2019

MACK ENERGY CORPORATION
**PRINCE GEORGE FEDERAL COM 3H**
LOCATED 700 FT. FROM THE SOUTH LINE
AND 1450 FT. FROM THE EAST LINE OF
SECTION 20, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

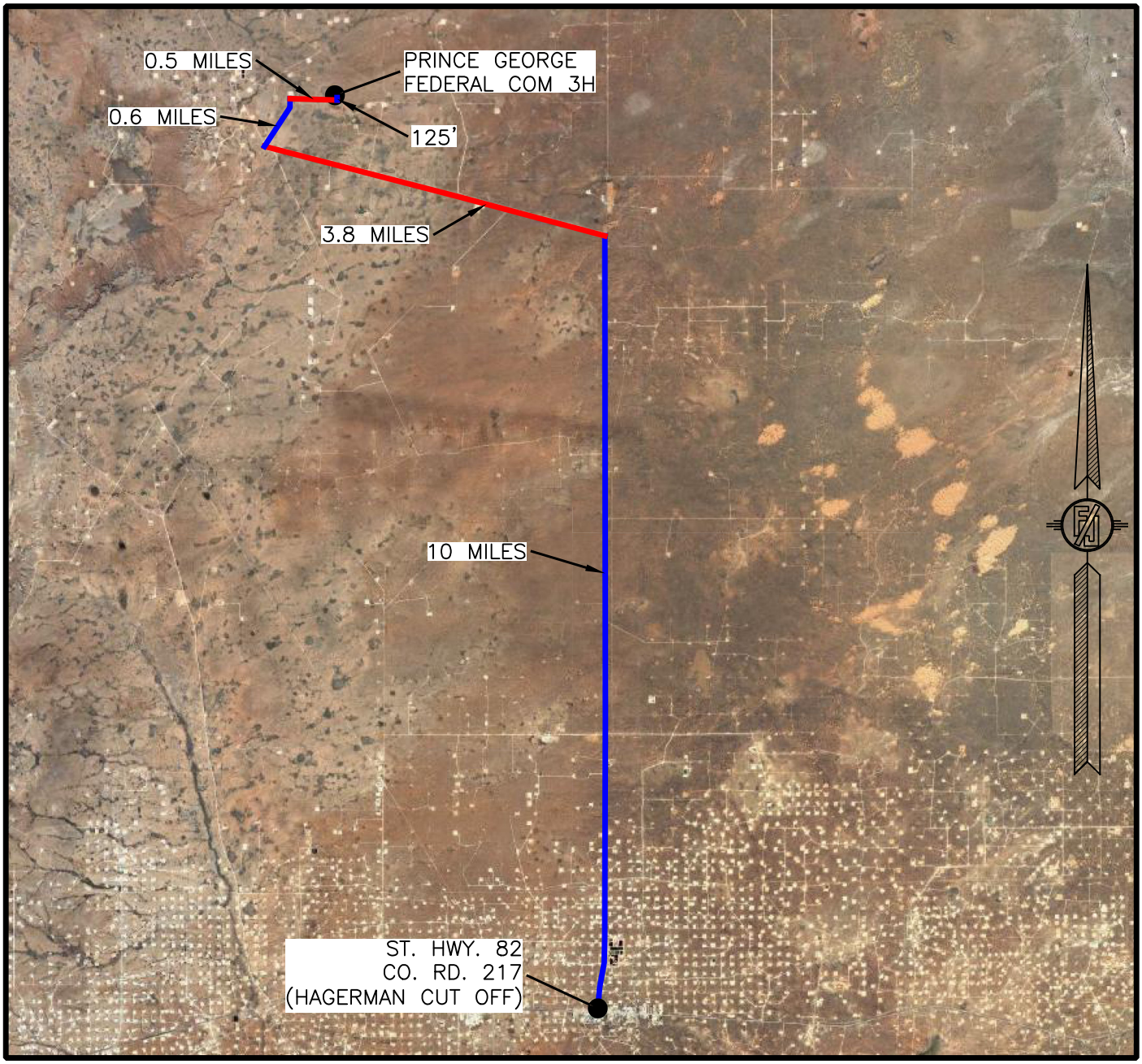
OCTOBER 6, 2023

SURVEY NO. 9844A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3327 CARLSBAD, NEW MEXICO

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

# AERIAL ACCESS ROUTE MAP




NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
JUN. 2019

MACK ENERGY CORPORATION
**PRINCE GEORGE FEDERAL COM 3H**
LOCATED 700 FT. FROM THE SOUTH LINE
AND 1450 FT. FROM THE EAST LINE OF
SECTION 20, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

OCTOBER 6, 2023

SURVEY NO. 9844A

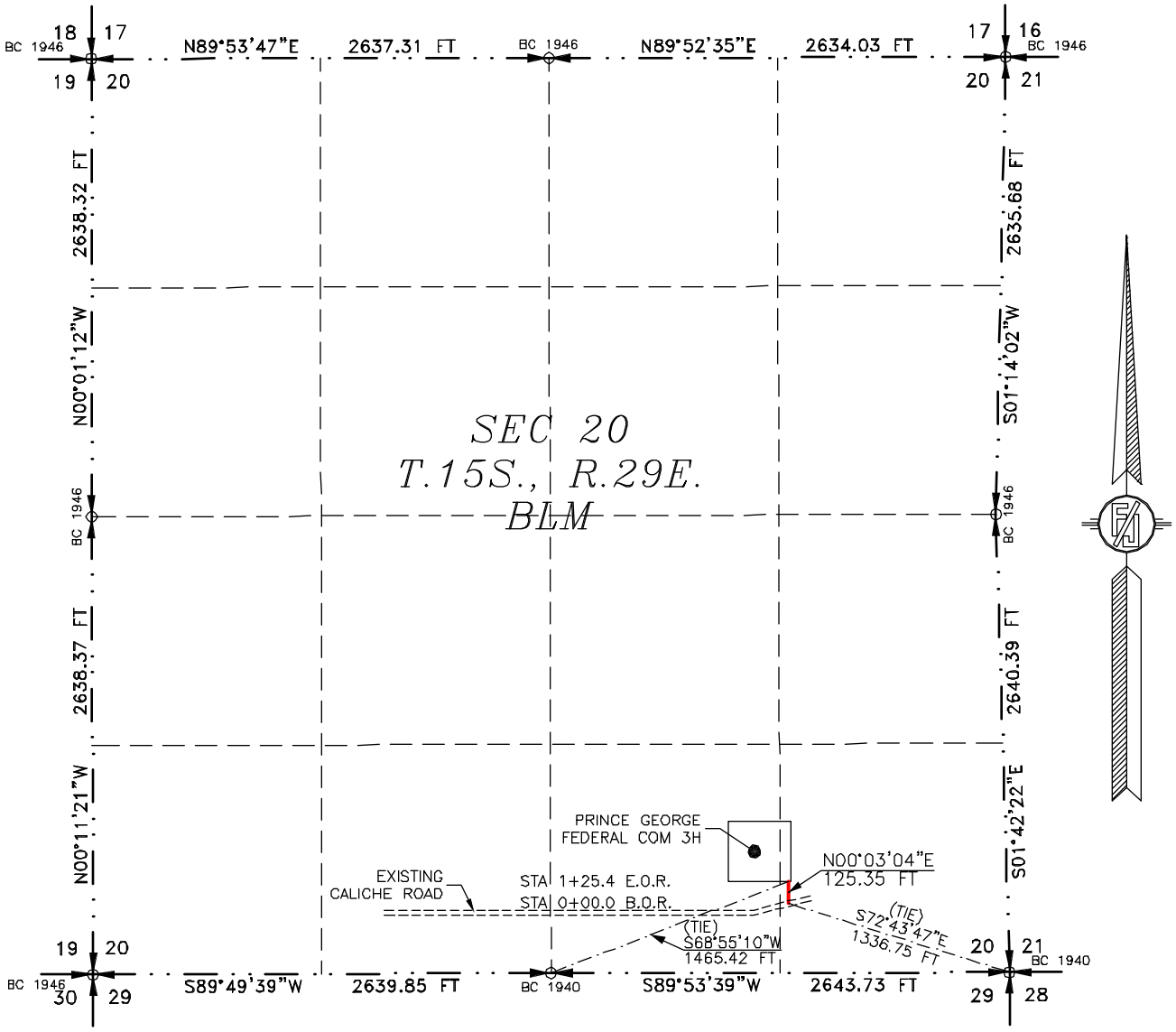
MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3327 CARLSBAD, NEW MEXICO

# ACCESS ROAD PLAT

ACCESS ROAD FOR PRINCE GEORGE FEDERAL COM 3H

## MACK ENERGY CORPORATION

CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO
OCTOBER 6, 2023




SEE NEXT SHEET (2-2) FOR DESCRIPTION

1000 0 1000
Scale: 1" = 1000'

### GENERAL NOTES

1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

### SURVEYOR CERTIFICATE

I, FILIMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 15TH DAY OF OCTOBER 2023.

FILIMON F. JARAMILLO PLS 12797

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3327

SHEET: 1-2

SURVEY NO. 9844A

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

# ACCESS ROAD PLAT

ACCESS ROAD FOR PRINCE GEORGE FEDERAL COM 3H

## MACK ENERGY CORPORATION

CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO
OCTOBER 6, 2023

## DESCRIPTION

A STRIP OF LAND 30 FEET WIDE CROSSING BUREAU OF LAND MANAGEMENT LAND IN SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M., CHAVES COUNTY, STATE OF NEW MEXICO AND BEING 15 FEET EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT WITHIN THE SW/4 SE/4 OF SAID SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M., WHENCE THE SOUTHEAST CORNER OF SAID SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS S72°43'47"E, A DISTANCE OF 1336.75 FEET;
THENCE N00°03'04"E A DISTANCE OF 125.35 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE SOUTH QUARTER CORNER OF SAID SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS S68°55'10"W, A DISTANCE OF 1465.42 FEET;

SAID STRIP OF LAND BEING 125.35 FEET OR 7.60 RODS IN LENGTH, CONTAINING 0.086 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

| | | | |
|---|---|---|---|
| SW/4 SE/4 | 125.35 L.F. | 7.60 RODS | 0.086 ACRES |

### GENERAL NOTES

1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

### SURVEYOR CERTIFICATE

I, FILIMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 16 DAY OF OCTOBER 2023.

FILIMON F. JARAMILLO PLS 12797

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3327

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:** Mack Energy Corporation **OGRID:** 013837 **Date:** 9 / 21 / 2023

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

If Other, please describe: _____

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

| Well Name | API | ULSTR | Footages | Anticipated Oil BBL/D | Anticipated Gas MCF/D | Anticipated Produced Water BBL/D |
|---|---|---|---|---|---|---|
| Prince George Federal Com 3H | | O Sec 20 T15S R29E | 700 FSL 1650 FEL | 100 | 100 | 1,000 |
| | | | | | | |

**IV. Central Delivery Point Name:** DCP Midstream Linam Ranch Proscessing Plant / Durango Midstream [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 |
|---|---|---|---|---|---|---|
| Prince George Federal Com 3H | | 2/1/2024 | 2/20/2024 | 7/31/2024 | 7/31/2024 | 7/1/2024 |
| | | | | | | |

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

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

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

# Section 2 – Enhanced Plan

**EFFECTIVE APRIL 1, 2022**

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

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

**IX. Anticipated Natural Gas Production:**

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

**X. Natural Gas Gathering System (NGGS):**

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

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

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

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

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

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

## Section 3 - Certifications

**Effective May 25, 2021**

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

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

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

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

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

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

## Section 4 - Notices

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

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

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

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

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

| | |
|---|---|
| Signature: | Deana Weaver |
| Printed Name: | Deana Weaver |
| Title: | Regulatory Technician II |
| E-mail Address: | dweaver@mec.com |
| Date: | 9/21/2023 |
| Phone: | 575-748-1288 |

**OIL CONSERVATION DIVISION**

**(Only applicable when submitted as a standalone form)**

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

VI. Separation Equipment:

Mack Energy Corporation(MEC) production facilities 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 of our completion project. MEC will utilize flowback separation equipment and production separation equipment designed and built to industry specifications after the completion to optimize gas capture and send gas to sales or flare based on analytical composition. MEC operates facilities that are typically multi-well facilities. Production separation equipment is upgraded prior to new wells being completed, if determined to be undersized or inadequate. This equipment is already on-site and tied into our sales gas lines prior to the new drill operations.

VII. Operational Practices:

1. Subsection (A) Venting and Flaring of Natural Gas. MEC understands the requirements of NMAC 19.15.27.8 which outlines that the venting and flaring of natural gas during drilling, completion or production operations that constitutes waste as defined in 19.15.2 are prohibited.
2. Subsection (B) Venting and Flaring during drilling operations. This gas capture plan isn't for a well being drilled.
3. Subsection (C) Venting and flaring during completion or recompletion. Flowlines will be routed for flowback fluids into a completion or storage tank and if feasible under well conditions, flare rather than vent and commence operation of a separator as soon as it is technically feasible for a separator to function.
    - At any point in the well life (completion, production, inactive) an audio, visual and olfactory inspection be performed at prescribed intervals (weekly or monthly) pursuant to Subsection D of 19.15.27.8 NMAC, to confirm that all production equipment is operating properly and there are no leaks or releases.
4. Subsection (D) Venting and flaring during production operations ○ At any point in the well life (completion, production, inactive) an audio, visual and olfactory inspection be performed at prescribed intervals (weekly or monthly) pursuant to Subsection D of 19.15.27.8 NMAC, to confirm that all production equipment is operating properly and there are no leaks or releases.
    - Monitor manual liquid unloading for wells on-site or in close proximity (<30 minutes' drive time), take reasonable actions to achieve a stabilized rate and pressure at the earliest practical time, and take reasonable actions to minimize venting to the maximum extent practicable.
    - MEC will not vent or flare except during the approved activities listed in NMAC 19.15.27.8 (D) 14.
5. Subsection (E) Performance standards ○ All tanks and separation equipment are designed for maximum throughput and pressure to minimize waste.
    - If a flare is utilized during production operations it will have a continuous pilot and is located more than 100 feet from any known well or storage tanks.
    - At any point in the well life (completion, production, inactive) an audio, visual and olfactory inspection be performed at prescribed intervals (weekly or monthly) pursuant to Subsection D of 19.15.27.8 NMAC, to confirm that all production equipment is operating properly and there are no leaks or releases.

6. Subsection (F) Measurement or estimation of vented and flared natural gas ○ Measurement equipment is installed to measure the volume of natural gas flared from process piping.
    - When measurement isn't practicable, estimation of vented and flared natural gas will be completed as noted in 19.15.27.8 (F) 5-6.

VIII. Best Management Practices:

1. MEC has adequate storage and takeaway capacity for wells it chooses to complete as the flowlines at the sites are already in place and tied into a gathering system.
2. MEC will flare rather than vent vessel blowdown gas when technically feasible during active and/or planned maintenance to equipment on-site.
3. MEC combusts natural gas that would otherwise be vented or flared, when technically feasible.
4. MEC will shut in wells in the event of a takeaway disruption, emergency situation, or other operations where venting or flaring may occur due to equipment failures.
5. MEC has a gas gathering system in place(CTB-887)a with multiple purchaser's to limit venting or flaring, due to purchaser shut downs.

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

# Drilling Plan Data Report
05/17/2024

**APD ID:** 10400094607
**Submission Date:** 10/31/2023
**Operator Name:** MACK ENERGY CORPORATION
**Well Name:** PRINCE GEORGE FEDERAL COM
**Well Number:** 3H
**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 | Measured Depth | Lithologies | Mineral Resources | Producing Formatio |
|---|---|---|---|---|---|---|---|
| 13450146 | QUATERNARY | 3769 | 0 | 0 | ALLUVIUM | NONE | N |
| 13450147 | TOP OF SALT | 3559 | 210 | 210 | SALT | NONE | N |
| 13450148 | BASE OF SALT | 2939 | 830 | 830 | SALT | NONE | N |
| 13450152 | YATES | 2901 | 868 | 868 | ANHYDRITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450145 | SEVEN RIVERS | 2664 | 1105 | 1105 | ANHYDRITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450150 | QUEEN | 2177 | 1592 | 1592 | ANHYDRITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450151 | GRAYBURG | 1782 | 1987 | 1987 | ANHYDRITE, DOLOMITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450149 | SAN ANDRES | 1467 | 2302 | 2302 | ANHYDRITE, DOLOMITE | NATURAL GAS, OIL | Y |

## Section 2 - Blowout Prevention

**Pressure Rating (PSI):** 3M
**Rating Depth:** 8856

**Equipment:** Rotating Head, Mud-Gas Separator

**Requesting Variance?** NO

**Variance request:**

**Testing Procedure:** 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. The estimated Bottom Hole at TD is 120 degrees and estimated maximum bottom hole pressure is 1504 psig (0.052*3154*9.2) less than 2900 bottom hole pressure.

**Choke Diagram Attachment:**

NEW_Choke_Manifold_3M_20230920122618.pdf

**BOP Diagram Attachment:**

NEW_BOP_3M_20230920122628.pdf

**Operator Name:** MACK ENERGY CORPORATION

**Well Name:** PRINCE GEORGE FEDERAL COM **Well Number:** 3H

NEW_Choke_Manifold_3M_20230920122618.pdf

NEW_BOP_3M_20230920122628.pdf

## Section 3 - Casing

| Casing ID | String Type | Hole Size | Csg Size | Condition | Standard | Tapered String | Top Set MD | Bottom Set MD | Top Set TVD | Bottom Set TVD | Top Set MSL | Bottom Set MSL | Calculated casing length MD | Grade | Weight | Joint Type | Collapse SF | Burst SF | Joint SF Type | Joint SF | Body SF Type | Body SF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SURFACE | 17.5 | 13.375 | NEW | API | N | 0 | 200 | 0 | 200 | 3774 | 3574 | 200 | J-55 | 48 | ST&C | 7.412 | 4.701 | BUOY | 52.87 | BUOY | 4.74 |
| 2 | INTERMEDIATE | 12.25 | 9.625 | NEW | API | N | 0 | 1200 | 0 | 1200 | 3769 | 2574 | 1200 | J-55 | 36 | ST&C | 3.237 | 7.04 | BUOY | 10.768 | BUOY | 7.04 |
| 3 | PRODUCTION | 8.75 | 7.0 | NEW | API | N | 0 | 2325 | 0 | 2325 | 3769 | 1449 | 2325 | HCP-110 | 26 | LT&C | 6.02 | 3.357 | BUOY | 6.827 | BUOY | 3.317 |
| 4 | PRODUCTION | 8.75 | 7.0 | NEW | API | N | 2325 | 3375 | 2325 | 3145 | 1444 | 629 | 1050 | HCP-110 | 26 | BUTT | 4.191 | 3.376 | BUOY | 8.433 | BUOY | 3.357 |
| 5 | PRODUCTION | 8.75 | 5.5 | NEW | API | N | 3375 | 8857 | 3145 | 3154 | 624 | 620 | 5482 | HCP-110 | 17 | BUTT | 5.077 | 3.717 | BUOY | 7.234 | BUOY | 3.61 |

**Casing Attachments**

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

Surface_Csg_20231023140546.pdf

**Operator Name:** MACK ENERGY CORPORATION

**Well Name:** PRINCE GEORGE FEDERAL COM **Well Number:** 3H

**Casing Attachments**

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

Inter_csg_20231023140638.pdf

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

Production_Csg_20231023140742.pdf

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

Production_Csg_20231023141336.pdf

**Operator Name:** MACK ENERGY CORPORATION

**Well Name:** PRINCE GEORGE FEDERAL COM **Well Number:** 3H

**Casing Attachments**

**Casing ID:** 5 **String** PRODUCTION

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

Production_Csg_20231023141450.pdf

## Section 4 - Cement

| String Type | Lead/Tail | Stage Tool Depth | Top MD | Bottom MD | Quantity(sx) | Yield | Density | Cu Ft | Excess% | Cement type | Additives |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PRODUCTION | Lead | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |
| PRODUCTION | Lead | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |
| SURFACE | Lead | | 0 | 200 | 100 | 1.61 | 14.4 | 160 | | RFC+12% PF53+2%PF1+5 pps PF42+.125pps PF29 | 20bbls Gelled Water 50sx of 11# Scavenger Cement |
| SURFACE | Tail | | 0 | 200 | 250 | 1.34 | 14.8 | 160 | 100 | Class C+1% PF1 | 20bbls Gelled Water 50sx of 11# Scavenger Cement |
| INTERMEDIATE | Lead | | 0 | 1200 | 220 | 1.72 | 13.5 | 417 | 100 | Class C + 45 PF20+.4pps PF45+.125 PF29 | 20bbls Gelled Water 50sx of 11# Scavenger Cement |
| INTERMEDIATE | Tail | | 0 | 1200 | 200 | 1.34 | 14.8 | 417 | 100 | Class C + 1% PF 1 | 20bbls Gelled Water 50sx of 11# Scavenger Cement |
| PRODUCTION | Lead | | 0 | 8857 | 300 | 2.82 | 13.5 | 2235 | 35 | Class C 4% PF20+4pps PF45+125pps | 20bbls Gelled Water 20bbls Chemical Wash 50sx of 11# |

**Operator Name:** MACK ENERGY CORPORATION

**Well Name:** PRINCE GEORGE FEDERAL COM **Well Number:** 3H

| String Type | Lead/Tail | Stage Tool Depth | Top MD | Bottom MD | Quantity(sx) | Yield | Density | Cu Ft | Excess% | Cement type | Additives |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | PF29 | Scavenger Cement |
| PRODUCTION | Tail | | 0 | 8857 | 1710 | 1.34 | 14.2 | 2235 | 35 | 50/50 Poz C + 5% (BWOW) PF44 +2% PF204+.2% PF606+.1% PF153+.4pps PF44 | 20bbls Gelled Water 20bbls Chemical Wash 50sx of 11# scavenger Cement |

## 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:** BOPE Brine Water

**Describe the mud monitoring system utilized:** Parson PVT with Pit Volume Recorder

## 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 | 200 | SPUD MUD | 9.6 | 10 | 74.8 | | 11 | | 160000 | 10 | |
| 210 | 1200 | LSND/GEL | 9.6 | 10 | 74.8 | | 11 | | 160000 | 10 | |
| 1200 | 8857 | LSND/GEL | 9.6 | 10 | 74.8 | | 11 | | 160000 | 10 | |

**Operator Name:** MACK ENERGY CORPORATION

**Well Name:** PRINCE GEORGE FEDERAL COM **Well Number:** 3H

## Section 6 - Test, Logging, Coring

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

None

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

CALIPER,CNL/FDC,FORMATION DENSITY COMPENSATED LOG,GAMMA RAY LOG,

**Coring operation description for the well:**

Will evaluate after logging to determine if side coring is necessary

## Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 1504 **Anticipated Surface Pressure:** 792

**Anticipated Bottom Hole Temperature(F):** 95

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

**Describe:**

**Contingency Plans geoharzards description:**

**Contingency Plans geohazards**

**Hydrogen Sulfide drilling operations plan required?** NO

**Hydrogen sulfide drilling operations**

## Section 8 - Other Information

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

Escape_Route_20230921102635.pdf
Gas_Management_20230921102945.pdf
H2S_Plan_20230922085554.pdf
Preliminary_Horizontal_Well_Plan__1_20231023142010.pdf
KOP_20231023142042.pdf
Drill_Plan_20231031104007.pdf
H2S_Plan_20231031104118.pdf

**Other proposed operations facets description:**

**Other proposed operations facets attachment:**

**Other Variance attachment:**

Variance_request_20230921102516.pdf
Cactus_Wellhead_installation_Procedure_20230921102537.pdf

**Operator Name:** MACK ENERGY CORPORATION

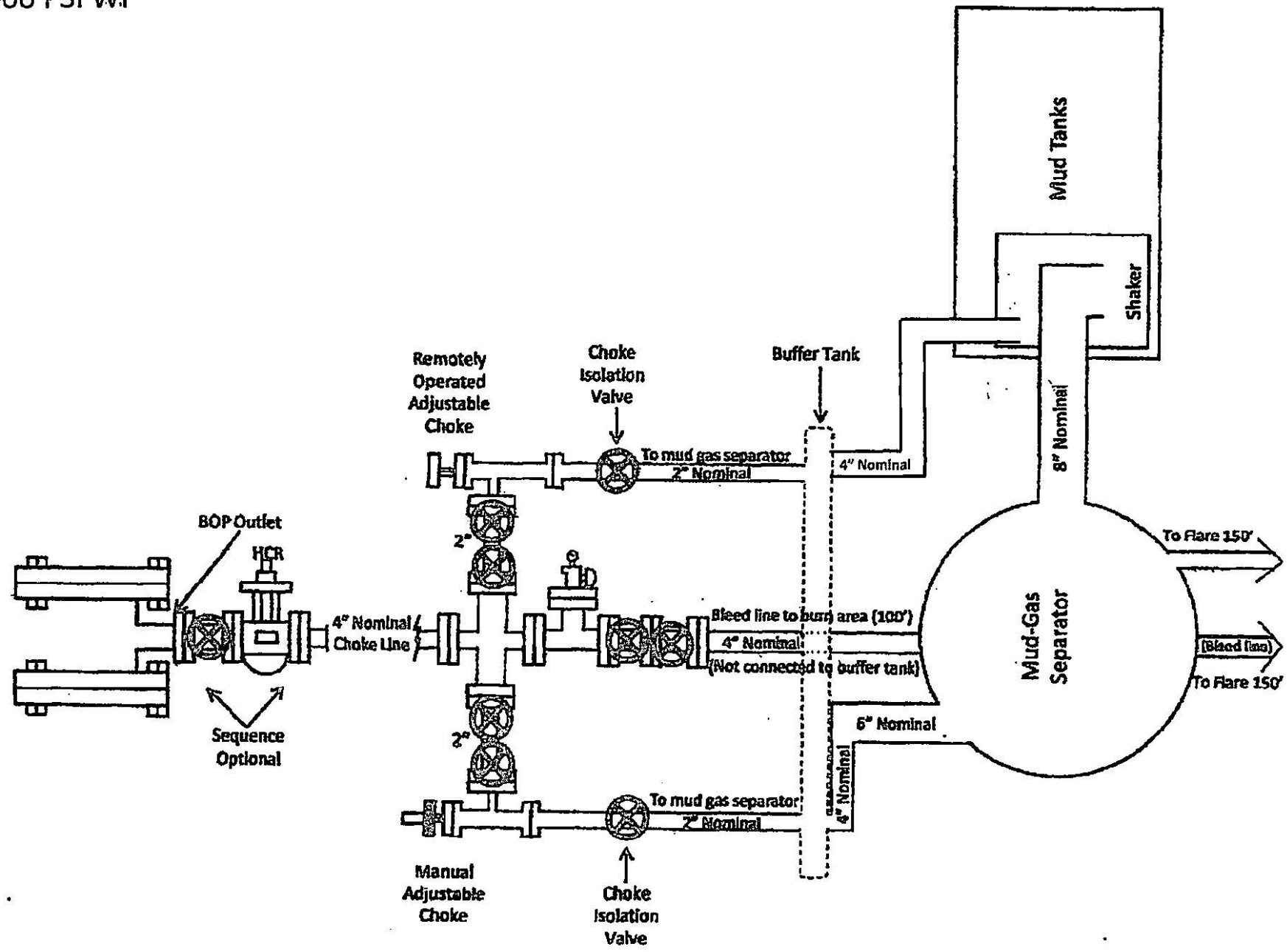
**Well Name:** PRINCE GEORGE FEDERAL COM **Well Number:** 3H

CCC__Rig_6_20230921102546.pdf

Flex_Hose_Cert_20240126114940.pdf

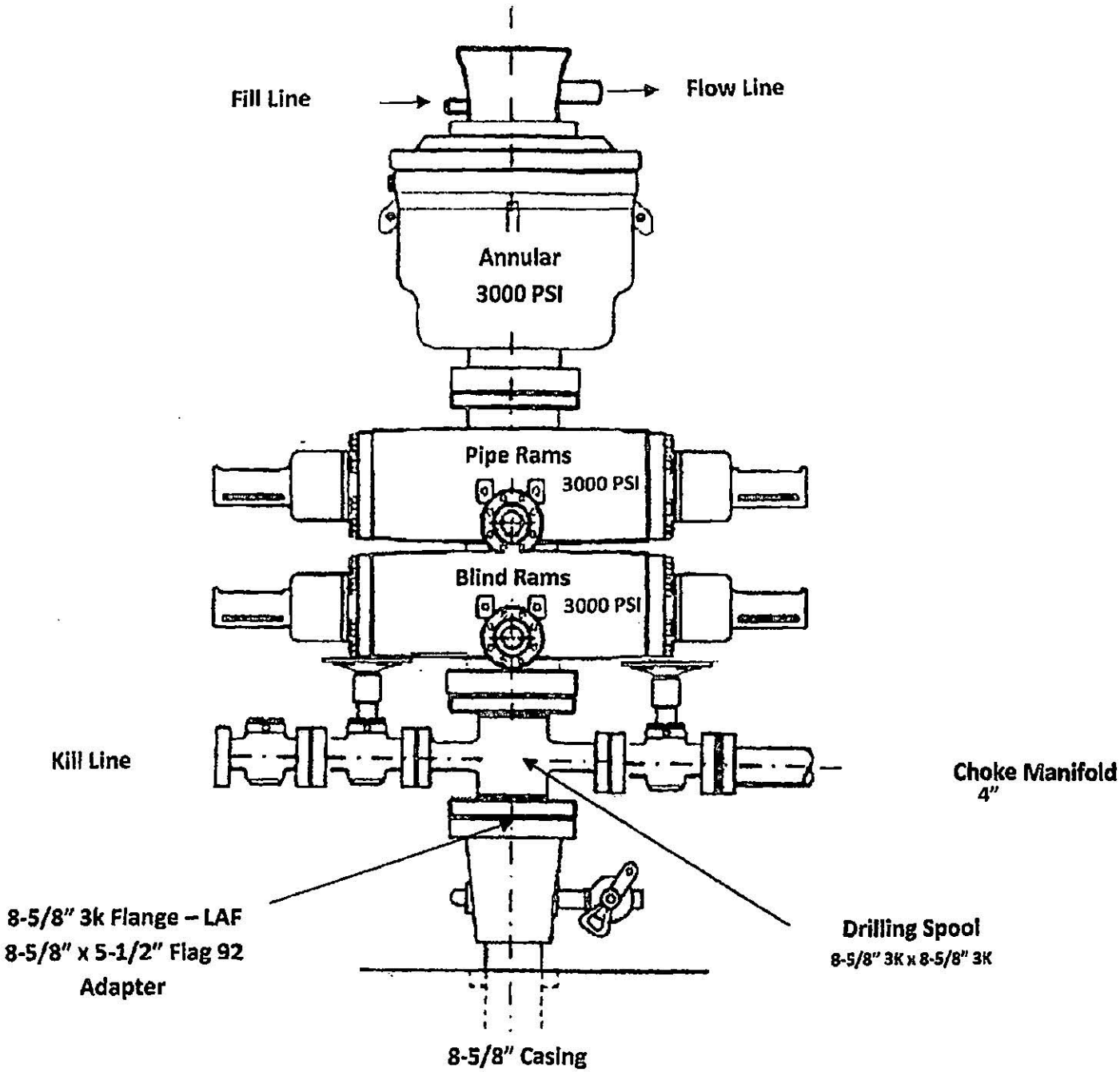
# Choke Manifold

3000 PSI WP



## BOP Diagram

Dual Ram BOP
3000 PSI WP



**Casing Design** **Well:** Prince George Federal Com #3H

**String Size & Function:** 9 5/8 in surface intermediate x

**Total Depth:** 1200 ft **TVD:** 1200 ft

**Pressure Gradient for Calculations** **(While drilling)**

Mud weight, collapse: 10 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 10 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 10 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 624 psi Burst: 624 psi, joint strength: 624 psi

**Partially evacuated hole?** Pressure gradient remaining: 10 #/gal

**Max. Shut in surface pressure:** 500 psi

| **1st segment** | 1200 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 1200 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **9.625** inches | **36** #/ft | **J-55** | **ST&C** | **3,940** | **2,960** | **4,930** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **2,020** psi | **3,520** psi | **394** ,000 # | | **564** ,000 # | | **8.765** | |

| **2nd segment** | ft to ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **3rd segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **4th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **5th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **6th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| Select 1st segment bottom | 1200 | **S.F.** | Actual | | Desire |
|---|---|---|---|---|---|
| | | collapse | 3.237179 | >= | 1.125 |
| 1200 ft to 0 ft | | burst-b | 7.04 | >= | 1.25 |
| 9.625 0 J-55 ST&C | | burst-t | 7.04 | | |
| Top of segment 1 (ft) | 0 | **S.F.** | Actual | | Desire |
| Select 2nd segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | burst-b | 0 | >= | 1.25 |
| 0 ft to 0 ft | | burst-t | 0 | | |
| 0 0 0 0 | | jnt strngth | 10.76785 | >= | 1.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Top of segment 2 (ft) | | S.F. | Actual | | Desire |
| Select | 3rd segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to 0 ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 3 (ft) | | S.F. | Actual | | Desire |
| Select | 4th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to 0 ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 4 (ft) | | S.F. | Actual | | Desire |
| Select | 5th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 5 (ft) | | S.F. | Actual | | Desire |
| Select | 6th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 6 (ft) | | jnt strngth | | >= | 1.8 |

use in colapse calculations across different pressured formations

**Three gradient pressure function**

| | | | | | | |
|---|---|---|---|---|---|---|
| Depth of evaluation: | 1,200 ft | | 516 | psi @ | 1,200 ft | |
| Top of salt: | 2,400 ft | fx #1 | 516 | | | |
| Base of salt: | 3,700 ft | fx #2 | 900 | | | |
| TD of intermediate: | 4,600 ft | fx #3 | 540 | | | |

Pressure gradient to be used above each top to be used as a function of depth. ex. psi/ft

| fx #1 | fx #2 | fx #3 |
|---|---|---|
| 0.43 | 0.75 | 0.45 |

1) Calculate neutral point for buckling with temperature affects computed also
2) Surface burst calculations & kick tolerance in surface pressure for burst
3) Do a comparison test to determine which value is lower joint strength or body yield to use in tensile strength calculations
4) Raise joint strength safety factor up to next level on page #2
5) Sour service what pipe can be used with proper degrading of strength factors and as function of temp

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | #DIV/0! |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 260.582 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 373.016 |
| S.F. Body yield strength top of segment: | 15.4139 |

## Collapse calculations for 1st segment - casing evacuated

| | | | |
|---|---|---|---|
| Buoyancy factor collapse: | 0.847 | | |
| **calculations for bottom of segment @** | 1200 | ft | |
| hydrostatic pressure collapse - backside: | 624 | psi | |
| Axial load @ bottom of section | 0 | lbs | previous segments |
| Axial load factor: | 0 | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | 1 | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | 2020 | psi | |
| Actual safety factor | 3.23718 | | adjusted casing rating / actual pressure |

| | | | |
|---|---|---|---|
| **calculations for top of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ top of section | 36590.4 | lbs | previous segments + (this segment x BF) |
| Axial load factor: | 0.06488 | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | 0.98117 | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | 1981.96 | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |

## Burst calculations for 1st segment - Completion fracture treatment

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 1200 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 3520 | psi | |
| Actual safety factor | 7.04 | | casing rating / differential burst pressure |
| | | | |
| **calculations for top of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 3520 | psi | |
| Actual safety factor | 7.04 | | casing rating / differential burst pressure |

## Joint strength calculations for 1st segment

Buoyancy factor for joint strength calc.: 0.847

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 1200 | ft | |
| Axial load @ bottom of section | 1512 | lbs | weight of previous segments |
| Joint Strength of segment | 394000 | lbs | |
| Body Yield Strength of segment | 564000 | lbs | |
| Actual safety factor joint strength | 260.582 | | csg joint strength / axial load |
| Actual safety factor body yield | 373.016 | | csg body yield strength / axial load |
| | | | |
| **calculations for top of segment @** | 0 | ft | |
| Axial load @ top of section | 36590.4 | lbs | weight of previous segments + (this segment x BF) |
| Joint Strength of segment | 394000 | lbs | |
| Body Yield Strength of segment | 564000 | lbs | |
| Actual safety factor joint strength | 10.7679 | | csg joint strength / axial load |
| Actual safety factor body yield | 15.4139 | | csg body yield strength / axial load |

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | #DIV/0! |
| | |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| | |
| S.F. Joint strength bottom of segment: | 0 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 0 |
| S.F. Body yield strength top of segment: | 0 |

## Collapse calculations for 2nd segment - casing evacuated

Buoyancy factor collapse: 0.847

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |
| | | | |
| **calculations for top of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ top of section | 36590.4 | lbs | previous segments + (this segment x BF) |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |

## Burst calculations for 2nd segment - Completion fracture treatment

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |
| | | | |
| **calculations for top of segment @** | 0 | ft | |

| | | | |
|---|---|---|---|
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |

## Joint strength calculations for 2nd segment

| | | | |
|---|---|---|---|
| Buoyancy factor for joint strength calc.: | 0.847 | | |
| **calculations for bottom of segment @** | 0 | ft | |
| Axial load @ bottom of section | 36590.4 | lbs | weight of previous segments |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |
| **calculations for top of segment @** | 0 | ft | |
| Axial load @ top of section | 36590.4 | lbs | weight of previous segments + (this segment x BF) |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | #DIV/0! |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 0 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 0 |
| S.F. Body yield strength top of segment: | 0 |

## Collapse calculations for 3rd segment - casing evacuated

| | | | |
|---|---|---|---|
| Buoyancy factor collapse: | 0.847 | | |
| **calculations for bottom of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |
| **calculations for top of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ top of section | 36590.4 | lbs | previous segments + (this segment x BF) |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |

## Burst calculations for 3rd segment - Completion fracture treatment

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |
| **calculations for top of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |

## Joint strength calculations for 3rd segment

| | | | |
|---|---|---|---|
| Buoyancy factor for joint strength calc.: | | | |
| **calculations for bottom of segment @** | 0 | ft | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |
| **calculations for top of segment @** | 0 | ft | |
| Axial load @ top of section | 36590.4 | lbs | weight of previous segments + (this segment x BF) |

| | | | |
|---|---|---|---|
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | #DIV/0! |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 0 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 0 |
| S.F. Body yield strength top of segment: | 0 |

## Collapse calculations for 4th segment - casing evacuated

Buoyancy factor collapse: 0.847

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |

| | | | |
|---|---|---|---|
| **calculations for top of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ top of section | 36590.4 | lbs | previous segments + (this segment x BF) |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |

## Burst calculations for 4th segment - Completion fracture treatment

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |

| | | | |
|---|---|---|---|
| **calculations for top of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |

## Joint strength calculations for 4th segment

Buoyancy factor for joint strength calc.: 0.847

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |

| | | | |
|---|---|---|---|
| **calculations for top of segment @** | 0 | ft | |
| Axial load @ top of section | 36590.4 | lbs | weight of previous segments + (this segment x BF) |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | #DIV/0! |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 0 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 0 |
| S.F. Body yield strength top of segment: | 0 |

## Collapse calculations for 5th segment - casing evacuated

| | | | |
|---|---|---|---|
| Buoyancy factor collapse: | 0.847 | | |
| **calculations for bottom of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |
| **calculations for top of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ top of section | 36590.4 | lbs | previous segments + (this segment x BF) |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |

## Burst calculations for 5th segment - Completion fracture treatment

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |
| **calculations for top of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |

## Joint strength calculations for 5th segment

| | | | |
|---|---|---|---|
| Buoyancy factor for joint strength calc.: | 0.847 | | |
| **calculations for bottom of segment @** | 0 | ft | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |
| **calculations for top of segment @** | 0 | ft | |
| Axial load @ top of section | 36590.4 | lbs | weight of previous segments + (this segment x BF) |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | #DIV/0! |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 0 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 0 |
| S.F. Body yield strength top of segment: | 0 |

## Collapse calculations for 6th segment - casing evacuated

| | | | |
|---|---|---|---|
| Buoyancy factor collapse: | 0.847 | | |
| **calculations for bottom of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |
| **calculations for top of segment @** | 0 | ft | |
| hydrostatic pressure collapse - backside: | 0 | psi | |
| Axial load @ top of section | 36590.4 | lbs | previous segments + (this segment x BF) |
| Axial load factor: | #DIV/0! | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | #DIV/0! | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | #DIV/0! | psi | |
| Actual safety factor | #DIV/0! | | adjusted casing rating / actual pressure |

## Burst calculations for 6th segment - Completion fracture treatment

| | | | |
|---|---|---|---|
| **calculations for bottom of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |
| **calculations for top of segment @** | 0 | ft | |
| Differential burst pressure | 500 | psi | (frac. pres.-mud pres.) + max. surf. pres. |
| Burst rating of segment | 0 | psi | |
| Actual safety factor | 0 | | casing rating / differential burst pressure |

## Joint strength calculations for 6th segment

| | | | |
|---|---|---|---|
| Buoyancy factor for joint strength calc.: | 0.847 | | |
| **calculations for bottom of segment @** | 0 | ft | |
| Axial load @ bottom of section | 36590.4 | lbs | load @ top of last segment |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |
| **calculations for top of segment @** | 0 | ft | |
| Axial load @ top of section | 36590.4 | lbs | weight of previous segments + (this segment x BF) |
| Joint Strength of segment | 0 | lbs | |
| Body Yield Strength of segment | 0 | lbs | |
| Actual safety factor joint strength | 0 | | csg joint strength / axial load |
| Actual safety factor body yield | 0 | | csg body yield strength / axial load |

**Casing Design** **Well:** Prince George Federal Com #3H

**String Size & Function:** 5 1/2"x 7" in Production x

**Total Depth:** 8857 ft **TVD:** 3155 ft

**Pressure Gradient for Calculations** **(While drilling)**

Mud weight, collapse: 10.3 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 10.3 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 10.3 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 1689.818 psi Burst: 1689.818 psi, joint strength: 1689.818 psi

**Partially evacuated hole?** Pressure gradient remaining: 10 #/gal

**Max. Shut in surface pressure:** 3000 psi

| **1st segment** | 8857 ft to 3375 ft | | | Make up Torque ft-lbs | | | Total ft = 5482 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **5.5** inches | **17** #/ft | **HCP-110** | **Buttress** | **4,620** | **3,470** | **5,780** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **8,580** psi | **10,640** psi-lrcr | **568** ,000 # | | **546** ,000 # | | **4.767** | |

| **2nd segment** | 3375 ft to 2325 ft | | | Make up Torque ft-lbs | | | Total ft = 1050 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **7** inches | **26** #/ft | **HCP-110** | **Buttress** | **6,930** | **5,200** | **8,660** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **7,800** psi | **9,950** psi-lrcr | **853** ,000 # | | **830** ,000 # | | **6.151** | |

| **3rd segment** | 2325 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 2325 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **7** inches | **26** #/ft | **HCP-110** | **LT&C** | **6930** | **5200** | **8660** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **7,800** psi | **9,950** psi | **693** ,000 # | | **830** ,000 # | | **6.151** | |

| **4th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **5th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **6th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| Select 1st segment bottom | | 8857 | **S.F.** | Actual | | Desire |
|---|---|---|---|---|---|---|
| | | | collapse | 5.07747 | >= | 1.125 |
| 8857 ft to 3375 ft | | | burst-b | 3.7179 | >= | 1.25 |
| 5.5 | 0 HCP-110 Buttress | | burst-t | 3.610023 | | |
| Top of segment 1 (ft) | | 3375 | **S.F.** | Actual | | Desire |
| Select 2nd segment from bottom | | | collapse | 4.190842 | >= | 1.125 |
| | | | burst-b | 3.375914 | >= | 1.25 |
| 3375 ft to 2325 ft | | | burst-t | 3.357256 | | |
| 7 | 26 HCP-110 Buttress | | jnt strngth | 7.234972 | >= | 1.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Top of segment 2 (ft) | 2325 | S.F. | Actual | | Desire |
| Select | 3rd segment from bottom | | collapse | 6.020708 | >= | 1.125 |
| | | | burst-b | 3.357256 | >= | 1.25 |
| 2325 ft | to 0 ft | | burst-t | 3.316667 | | |
| 7 | 26 HCP-110 LT&C | | jnt strngth | 8.403498 | >= | 1.8 |
| | Top of segment 3 (ft) | 0 | S.F. | Actual | | Desire |
| Select | 4th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to 0 ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 6.82723 | >= | 1.8 |
| | Top of segment 4 (ft) | | S.F. | Actual | | Desire |
| Select | 5th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 5 (ft) | | S.F. | Actual | | Desire |
| Select | 6th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 6 (ft) | | jnt strngth | | >= | 1.8 |

use in colapse calculations across different pressured formations

**Three gradient pressure function**

| | | | | | | |
|---|---|---|---|---|---|---|
| Depth of evaluation: | 1,200 ft | | 516 | psi @ | 1,200 ft | |
| Top of salt: | 2,400 ft | fx #1 | 516 | | | |
| Base of salt: | 3,700 ft | fx #2 | 900 | | | |
| TD of intermediate: | 4,600 ft | fx #3 | 540 | | | |

Pressure gradient to be used above each top to be used as a function of depth. ex. psi/ft

| fx #1 | fx #2 | fx #3 |
|---|---|---|
| 0.43 | 0.75 | 0.45 |

1) Calculate neutral point for buckling with temperature affects computed also
2) Surface burst calculations & kick tolerance in surface pressure for burst
3) Do a comparison test to determine which value is lower joint strength or body yield to use in tensile strength calculations
4) Raise joint strength safety factor up to next level on page #2
5) Sour service what pipe can be used with proper degrading of strength factors and as function of temp

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | 4.52308 |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 795.518 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 764.706 |
| S.F. Body yield strength top of segment: | 6.95474 |

## Collapse calculations for 1st segment - casing evacuated

| | | | |
|---|---|---|---|
| Buoyancy factor collapse: | 0.84241 | | |
| **calculations for bottom of segment @** | 3155 | ft | |
| hydrostatic pressure collapse - backside: | 1689.82 | psi | |
| Axial load @ bottom of section | 0 | lbs | previous segments |
| Axial load factor: | 0 | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | 1 | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | 8580 | psi | |
| Actual safety factor | 5.07747 | | adjusted casing rating / actual pressure |

**Casing Design** **Well:** Prince George Federal Com #3H

**String Size & Function:** 13 3/8 in surface x intermediate

**Total Depth:** 200 ft

**Pressure Gradient for Calculations** **(While drilling)**

Mud weight, collapse: 9.6 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 9.6 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 9.6 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 99.84 psi Burst: 99.84 psi, joint strength: 99.84 psi

**Partially evacuated hole?** Pressure gradient remaining: 10 #/gal

**Max. Shut in surface pressure:** 500 psi

| **1st segment** | 200 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 200 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **13.375** inches | **48** #/ft | **J-55** | **ST&C** | **3,220** | **2,420** | **4,030** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **740** | **2,370** psi | **433** ,000 # | | **744** ,000 # | | **12.559** | |

| **2nd segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **3rd segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **4th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **5th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **6th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

Select 1st segment bottom 200

200 ft to 0 ft
13.375 0 J-55 ST&C

| **S.F.** | Actual | | Desire |
|---|---|---|---|
| collapse | 7.411859 | >= | 1.125 |
| burst-b | 4.700889 | >= | 1.25 |
| burst-t | 4.74 | | |

Top of segment 1 (ft) 0

Select 2nd segment from bottom

0 ft to 0 ft
0 0 0 0

| **S.F.** | Actual | | Desire |
|---|---|---|---|
| collapse | #DIV/0! | >= | 1.125 |
| burst-b | 0 | >= | 1.25 |
| burst-t | 0 | | |
| jnt strngth | 52.86966 | >= | 1.8 |

**Casing Design** **Well:** Prince George Federal Com #3H

**String Size & Function:** 5 1/2"x 7" in Production x

**Total Depth:** 8857 ft **TVD:** 3155 ft

**Pressure Gradient for Calculations** **(While drilling)**

Mud weight, collapse: 10.3 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 10.3 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 10.3 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 1689.818 psi Burst: 1689.818 psi, joint strength: 1689.818 psi

**Partially evacuated hole?** Pressure gradient remaining: 10 #/gal

**Max. Shut in surface pressure:** 3000 psi

| **1st segment** | 8857 ft to 3375 ft | | | Make up Torque ft-lbs | | | Total ft = 5482 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **5.5** inches | **17** #/ft | **HCP-110** | **Buttress** | **4,620** | **3,470** | **5,780** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **8,580** psi | **10,640** psi-lrcr | **568** ,000 # | | **546** ,000 # | | **4.767** | |

| **2nd segment** | 3375 ft to 2325 ft | | | Make up Torque ft-lbs | | | Total ft = 1050 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **7** inches | **26** #/ft | **HCP-110** | **Buttress** | **6,930** | **5,200** | **8,660** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **7,800** psi | **9,950** psi-lrcr | **853** ,000 # | | **830** ,000 # | | **6.151** | |

| **3rd segment** | 2325 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 2325 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| **7** inches | **26** #/ft | **HCP-110** | **LT&C** | **6930** | **5200** | **8660** | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| **7,800** psi | **9,950** psi | **693** ,000 # | | **830** ,000 # | | **6.151** | |

| **4th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **5th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| **6th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | | Total ft = 0 |
|---|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. | |
| inches | #/ft | | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift | |
| psi | psi | ,000 # | | ,000 # | | | |

| Select 1st segment bottom | | 8857 | **S.F.** | Actual | | Desire |
|---|---|---|---|---|---|---|
| | | | collapse | 5.07747 | >= | 1.125 |
| 8857 ft to 3375 ft | | | burst-b | 3.7179 | >= | 1.25 |
| 5.5 | 0 HCP-110 Buttress | | burst-t | 3.610023 | | |
| Top of segment 1 (ft) | | 3375 | **S.F.** | Actual | | Desire |
| Select 2nd segment from bottom | | | collapse | 4.190842 | >= | 1.125 |
| | | | burst-b | 3.375914 | >= | 1.25 |
| 3375 ft to 2325 ft | | | burst-t | 3.357256 | | |
| 7 | 26 HCP-110 Buttress | | jnt strngth | 7.234972 | >= | 1.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Top of segment 2 (ft) | 2325 | S.F. | Actual | | Desire |
| Select | 3rd segment from bottom | | collapse | 6.020708 | >= | 1.125 |
| | | | burst-b | 3.357256 | >= | 1.25 |
| 2325 ft | to 0 ft | | burst-t | 3.316667 | | |
| 7 | 26 HCP-110 LT&C | | jnt strngth | 8.403498 | >= | 1.8 |
| | Top of segment 3 (ft) | 0 | S.F. | Actual | | Desire |
| Select | 4th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to 0 ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 6.82723 | >= | 1.8 |
| | Top of segment 4 (ft) | | S.F. | Actual | | Desire |
| Select | 5th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 5 (ft) | | S.F. | Actual | | Desire |
| Select | 6th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 6 (ft) | | jnt strngth | | >= | 1.8 |

use in colapse calculations across different pressured formations

**Three gradient pressure function**

| | | | | | | |
|---|---|---|---|---|---|---|
| Depth of evaluation: | 1,200 ft | | 516 | psi @ | 1,200 ft | |
| Top of salt: | 2,400 ft | fx #1 | 516 | | | |
| Base of salt: | 3,700 ft | fx #2 | 900 | | | |
| TD of intermediate: | 4,600 ft | fx #3 | 540 | | | |

Pressure gradient to be used above each top to be used as a function of depth. ex. psi/ft

| fx #1 | fx #2 | fx #3 |
|---|---|---|
| 0.43 | 0.75 | 0.45 |

1) Calculate neutral point for buckling with temperature affects computed also
2) Surface burst calculations & kick tolerance in surface pressure for burst
3) Do a comparison test to determine which value is lower joint strength or body yield to use in tensile strength calculations
4) Raise joint strength safety factor up to next level on page #2
5) Sour service what pipe can be used with proper degrading of strength factors and as function of temp

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | 4.52308 |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 795.518 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 764.706 |
| S.F. Body yield strength top of segment: | 6.95474 |

## Collapse calculations for 1st segment - casing evacuated

| | | | |
|---|---|---|---|
| Buoyancy factor collapse: | 0.84241 | | |
| **calculations for bottom of segment @** | 3155 | ft | |
| hydrostatic pressure collapse - backside: | 1689.82 | psi | |
| Axial load @ bottom of section | 0 | lbs | previous segments |
| Axial load factor: | 0 | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | 1 | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | 8580 | psi | |
| Actual safety factor | 5.07747 | | adjusted casing rating / actual pressure |

**Casing Design** **Well:** Prince George Federal Com #3H

**String Size & Function:** 5 1/2"x 7" in Production x

**Total Depth:** 8857 ft **TVD:** 3155 ft

**Pressure Gradient for Calculations** **(While drilling)**

Mud weight, collapse: 10.3 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 10.3 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 10.3 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 1689.818 psi Burst: 1689.818 psi, joint strength: 1689.818 psi

**Partially evacuated hole?** Pressure gradient remaining: 10 #/gal

**Max. Shut in surface pressure:** 3000 psi

| **1st segment** | 8857 ft to 3375 ft | | | Make up Torque ft-lbs | | Total ft = 5482 |
|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. |
| **5.5** inches | **17** #/ft | **HCP-110** | **Buttress** | **4,620** | **3,470** | **5,780** |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift |
| **8,580** psi | **10,640** psi-lrcr | **568** ,000 # | | **546** ,000 # | | **4.767** |

| **2nd segment** | 3375 ft to 2325 ft | | | Make up Torque ft-lbs | | Total ft = 1050 |
|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. |
| **7** inches | **26** #/ft | **HCP-110** | **Buttress** | **6,930** | **5,200** | **8,660** |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift |
| **7,800** psi | **9,950** psi-lrcr | **853** ,000 # | | **830** ,000 # | | **6.151** |

| **3rd segment** | 2325 ft to 0 ft | | | Make up Torque ft-lbs | | Total ft = 2325 |
|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. |
| **7** inches | **26** #/ft | **HCP-110** | **LT&C** | **6930** | **5200** | **8660** |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift |
| **7,800** psi | **9,950** psi | **693** ,000 # | | **830** ,000 # | | **6.151** |

| **4th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | Total ft = 0 |
|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. |
| inches | #/ft | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift |
| psi | psi | ,000 # | | ,000 # | | |

| **5th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | Total ft = 0 |
|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. |
| inches | #/ft | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift |
| psi | psi | ,000 # | | ,000 # | | |

| **6th segment** | 0 ft to 0 ft | | | Make up Torque ft-lbs | | Total ft = 0 |
|---|---|---|---|---|---|---|
| O.D. | Weight | Grade | Threads | opt. | min. | mx. |
| inches | #/ft | | | | | |
| Collapse Resistance | Internal Yield | Joint Strength | | Body Yield | | Drift |
| psi | psi | ,000 # | | ,000 # | | |

| Select 1st segment bottom | | | | 8857 | **S.F.** | Actual | | Desire |
|---|---|---|---|---|---|---|---|---|
| | | | | | collapse | 5.07747 | >= | 1.125 |
| 8857 ft | to | 3375 ft | | | burst-b | 3.7179 | >= | 1.25 |
| 5.5 | 0 | HCP-110 | Buttress | | burst-t | 3.610023 | | |
| Top of segment 1 (ft) | | | | 3375 | **S.F.** | Actual | | Desire |
| Select 2nd segment from bottom | | | | | collapse | 4.190842 | >= | 1.125 |
| | | | | | burst-b | 3.375914 | >= | 1.25 |
| 3375 ft | to | 2325 ft | | | burst-t | 3.357256 | | |
| 7 | 26 | HCP-110 | Buttress | | jnt strngth | 7.234972 | >= | 1.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Top of segment 2 (ft) | 2325 | S.F. | Actual | | Desire |
| Select | 3rd segment from bottom | | collapse | 6.020708 | >= | 1.125 |
| | | | burst-b | 3.357256 | >= | 1.25 |
| 2325 ft | to 0 ft | | burst-t | 3.316667 | | |
| 7 | 26 HCP-110 LT&C | | jnt strngth | 8.403498 | >= | 1.8 |
| | Top of segment 3 (ft) | 0 | S.F. | Actual | | Desire |
| Select | 4th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to 0 ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 6.82723 | >= | 1.8 |
| | Top of segment 4 (ft) | | S.F. | Actual | | Desire |
| Select | 5th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 5 (ft) | | S.F. | Actual | | Desire |
| Select | 6th segment from bottom | | collapse | #DIV/0! | >= | 1.125 |
| | | | burst-b | 0 | >= | 1.25 |
| 0 ft | to ft | | burst-t | 0 | | |
| 0 | 0 0 0 | | jnt strngth | 0 | >= | 1.8 |
| | Top of segment 6 (ft) | | jnt strngth | | >= | 1.8 |

use in colapse calculations across different pressured formations

**Three gradient pressure function**

| | | | | | | |
|---|---|---|---|---|---|---|
| Depth of evaluation: | 1,200 ft | | 516 | psi @ | 1,200 ft | |
| Top of salt: | 2,400 ft | fx #1 | 516 | | | |
| Base of salt: | 3,700 ft | fx #2 | 900 | | | |
| TD of intermediate: | 4,600 ft | fx #3 | 540 | | | |

Pressure gradient to be used above each top to be used as a function of depth. ex. psi/ft

| fx #1 | fx #2 | fx #3 |
|---|---|---|
| 0.43 | 0.75 | 0.45 |

1) Calculate neutral point for buckling with temperature affects computed also
2) Surface burst calculations & kick tolerance in surface pressure for burst
3) Do a comparison test to determine which value is lower joint strength or body yield to use in tensile strength calculations
4) Raise joint strength safety factor up to next level on page #2
5) Sour service what pipe can be used with proper degrading of strength factors and as function of temp

**Adjust for best combination of safety factors**

| | Secondary |
|---|---|
| S.F. Collapse bottom of segment: | |
| S.F. Collapse top of segment: | 4.52308 |
| S.F. Burst bottom of segment: | |
| S.F. Burst top of segment | |
| S.F. Joint strength bottom of segment: | 795.518 |
| S.F. Joint strength top of segment: | |
| S.F. Body yield strength bottom of segment: | 764.706 |
| S.F. Body yield strength top of segment: | 6.95474 |

## Collapse calculations for 1st segment - casing evacuated

| | | | |
|---|---|---|---|
| Buoyancy factor collapse: | 0.84241 | | |
| **calculations for bottom of segment @** | 3155 | ft | |
| hydrostatic pressure collapse - backside: | 1689.82 | psi | |
| Axial load @ bottom of section | 0 | lbs | previous segments |
| Axial load factor: | 0 | | load/(pipe body yield strength) |
| Collapse strength reduction factor: | 1 | | Messrs, Westcott, Dunlop, Kemler,1940 |
| Adjusted collapse rating of segment: | 8580 | psi | |
| Actual safety factor | 5.07747 | | adjusted casing rating / actual pressure |

Attached to Form 3160-3
**Mack Energy Corporation**
**Prince George Federal Com #3H NMNM-101106**
**SHL : 700 FSL & 1450 FEL, SWSE, Sec. 20 T15S R29E**
**BHL : 1 FSL & 1650 FEL, SWSE, Sec. 29 T15S R29E**
**Chaves County, NM**

# DRILLING PROGRAM

## 1. Geologic Name of Surface Formation

Quaternary

## 2. Estimated Tops of Important Geologic Markers:

| | |
|---|---|
| Top of Salt | 210 |
| Base of Salt | 830’ |
| Yates | 868’ |
| Seven Rivers | 1105’ |
| Queen | 1592’ |
| Grayburg | 1987’ |
| San Andres | 2302’ |

## 3. Estimated Depths of Anticipated Fresh Water, Oil and Gas:

| | | |
|---|---|---|
| Water Sand | 150’ | Fresh Water |
| Yates | 868’ | Oil/Gas |
| Seven Rivers | 1105’ | Oil/Gas |
| Queen | 1592’ | Oil/Gas |
| Grayburg | 1987’ | Oil/Gas |
| San Andres | 2302’ | Oil/Gas |

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8” casing to 210’ and circulating cement back to surface will protect the surface fresh water sand. Salt section and shallower zones above TD, which contain commercial quantities of oil and/or gas, will have cement circulated across them by cementing 5 ½” production casing, sufficient cement will be pumped to circulate back to surface.

## 4. Casing Program:

| Hole Size | Interval | OD Casing | Wt, Grade, Jt, cond, collapse/burst/tension |
|---|---|---|---|
| 17 1/2” | 0-200’ | 13 3/8” | 48#, J-55, ST&C, New, 7.411859/4.700889/4.74 |
| 13 3/8” | 0-1200’ | 9 5/8” | 36#, J-55,ST&C,New, 3.237179/7.04/7.04 |
| 8 ¾” | 0-2325’ | 7” | 26#, HCP-110, LT&C,New, 6.020708/3.357256/3.316667 |
| 8 ¾” | 2325’-3375’ | 7” | 26#, HCP-110, Buttress, New, 4.190842/ 3.375914/ 3.357256 |
| 8 ¾” | 3375-8857’ | 5 ½” | 17#, HCP-110, Buttress, New, 5.07747/3.7179/3.610023 |

## 5. Cement Program:

13 3/8” Surface Casing: Lead 100sx, RFC+12%PF53+2%PF1+5ppsPF42+.125ppsPF29, yld 1.61, wt 14.4 ppg, 7.357gals/sx. Tail: 250sx, Class C+1% PF1, yld 1.34, wt 14.8 ppg, 6.323 gals/sx, excess 100%

**Attached to Form 3160-3**
**Mack Energy Corporation**
**Prince George Federal Com #3H NMNM-101106**
**SHL : 700 FSL & 1450 FEL, SWSE, Sec. 20 T15S R29E**
**BHL : 1 FSL & 1650 FEL, SWSE, Sec. 29 T15S R29E**
**Chaves County, NM**

9 5/8" Intermediate Casing: Lead 220sx, Class C+45 P20+.4pps PF45+.125 PF29, yld 1.72, wt 13.5 ppg, 9.102gals/sx, excess 100%, slurry top Surface. Tail 200sx, Class C+1%PF1, yld 1.34, wt 14.8 ppg, 6.323gals/sx, excess 100%, slurry top Surface.

7" & 5 ½" Production Casing: Lead 300sx Class C 4% PF 20+4 pps PF45 +1.25pps PF29, yld 2.82, wt 13.5 ppg, 16.421gals/sx, excess 35%, slurry top Surface,Tail 1710sx, 50/50 Poz C + 5% (BWOW) PF44+2% PF204+.2% PF606+.1% PF153+.4pps PF44 , yield 1.34, wt 14.2, 6.091gals/sx, 35% excess, slurry top 2,200'.

**6. Minimum Specifications for Pressure Control:**

The blowout preventer equipment (BOP) shown in Exhibit #10 will consist of a double ram-type (3000 psi WP) minimum preventer. This unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on top of 4 1/2" drill pipe rams on bottom. The 11" BOP will be nipped up on the 8 5/8" surface casing and tested by a 3rd party to 2000 psi used continuously until TD is reached. All BOP's and accessory equipment will be tested to 2000 psi before drilling out of intermediate casing. Pipe rams will be operationally checked each 24-hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment (Exhibit #10) will include a Kelly cock and floor safety valve and choke lines and choke manifold (Exhibit #11) with a minimum 3000 psi WP rating

**7. Types and Characteristics of the Proposed Mud System:**

The well will be drilled to TD with a combination of fresh and cut brine mud system. The applicable depths and properties of this system are as follows:

| DEPTH | TYPE | WEIGHT | VISCOSITY | WATERLOSS |
|---|---|---|---|---|
| 0-200' | Fresh Water | 8.5 | 28 | N.C. |
| 200'-1,200' | Cut Brine | 9.1 | 29 | N.C. |
| 1,200-8,857' | Cut Brine | 9.1 | 29 | N.C. |

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept at the well site at all times.

**8. Auxiliary Well Control and Monitoring Equipment:**

A. Kelly cock will be kept in the drill string at all times.
B. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

**9. Logging, Testing and Coring Program:**

A. The electric logging program will consist of GR-Dual Laterolog, Spectral Density, Dual Spaced Neutron, CSNG Log from T.D. to 8 5/8 casing shoe.
B. Drill Stem test is not anticipated.

C. No conventional coring is anticipated.
D. Further testing procedures will be determined at TD.

**10. Abnormal Conditions, Pressures, Temperatures and Potential Hazards:**

No abnormal pressures or temperatures are anticipated. The estimated bottom hole at TD is 120 degrees and estimated maximum bottom hole pressure is 1504 psig. Low levels of Hydrogen sulfide have been monitors in producing wells in the area, so H2S may be present while drilling of the well; a plan is attached to the Drilling program. No major loss of circulation zones has been reported in offsetting wells.

**11. Anticipated Starting Date and Duration of Operations:**

Road and location work will not begin until approval has been received from the BLM. The anticipated spud date is February 1, 2024. Once commenced, the drilling operation should be finished in approximately 20 days. If the well is productive, an additional 30 days will be required for completion and testing before a decision is made to install permanent facilities.

**Attachment to Exhibit #10**
**NOTES REGARDING THE BLOWOUT PREVENTERS**
**Prince George Federal Com #3H**
**Chaves County, New Mexico**

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.

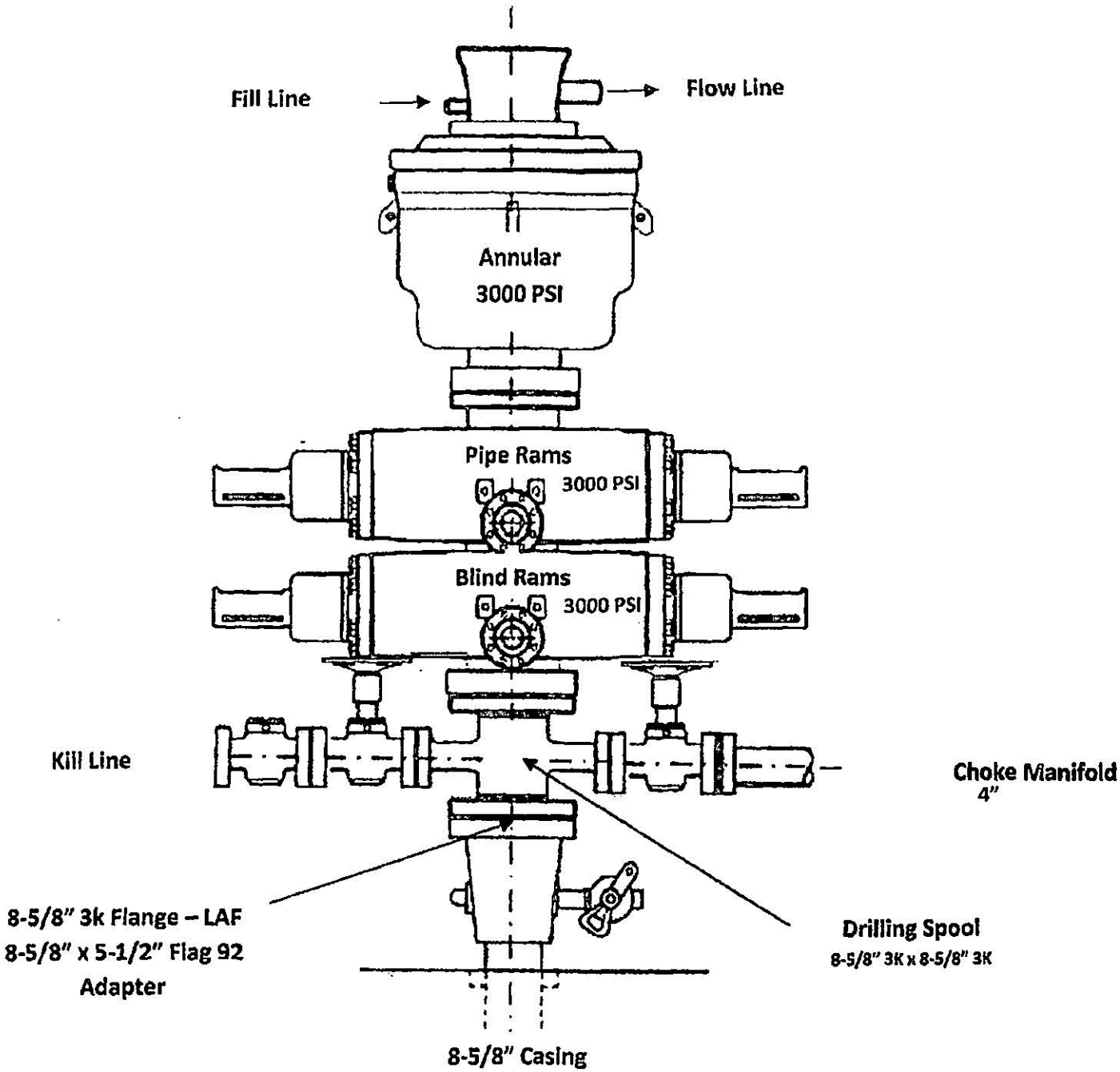
**Attached to Form 3160-3**
**Mack Energy Corporation**
**Prince George Federal Com #3H NMNM-101106**
**SHL : 700 FSL & 1450 FEL, SWSE, Sec. 20 T15S R29E**
**BHL : 1 FSL & 1650 FEL, SWSE, Sec. 29 T15S R29E**
**Chaves County, NM**

10. Blow out preventer control to be located as close to driller's position as feasible.

11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

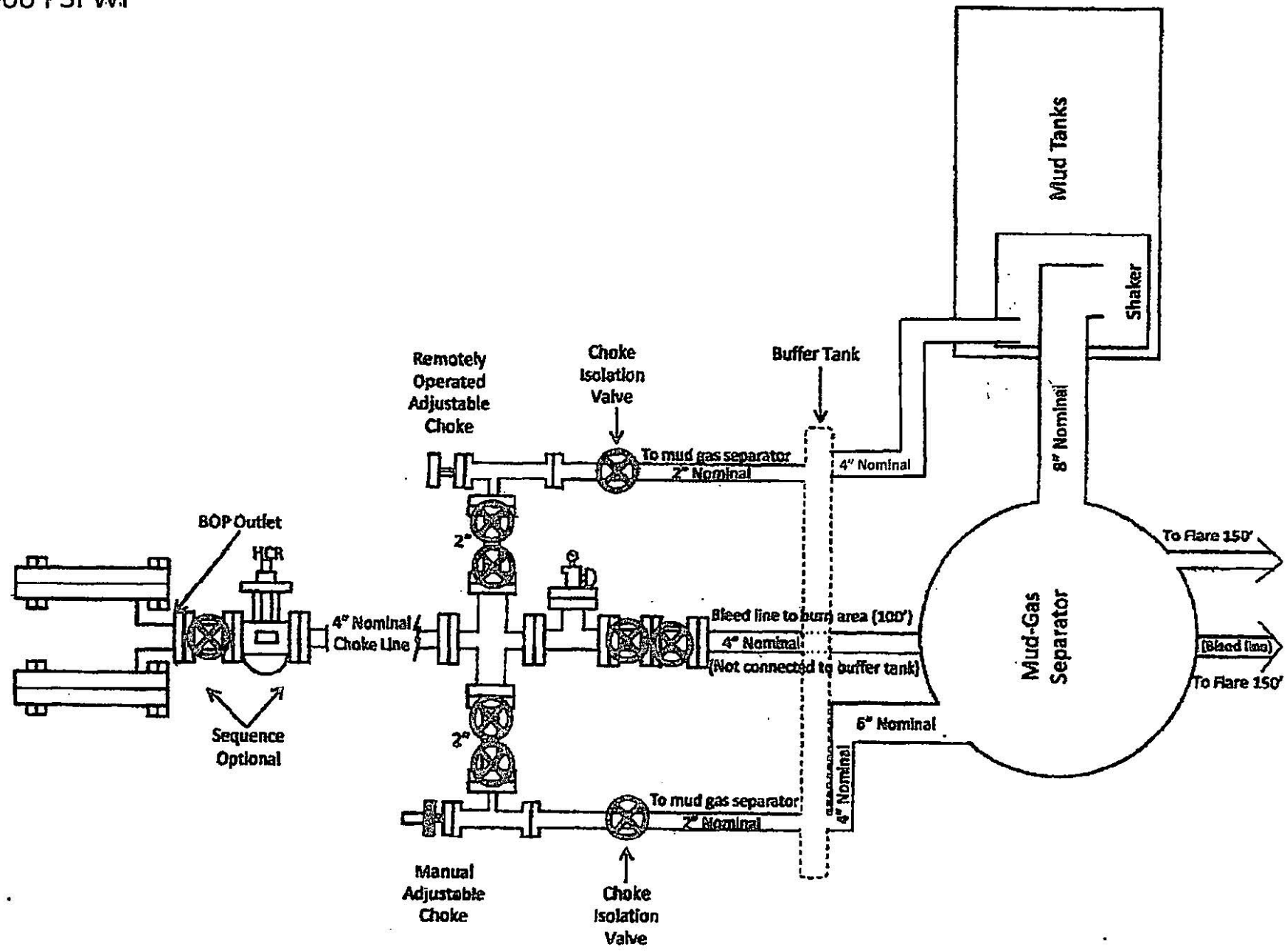
## BOP Diagram

Dual Ram BOP
3000 PSI WP



# Choke Manifold

3000 PSI WP



# Prince George Federal Com #3H, Plan 1 (Plan #1)

| | | | | | |
|---|---|---|---|---|---|
| **Operator** | Mack Energy Corp | **Units** | feet, °/100ft | 08:53 Thursday, October 19, 2023 | Page 1 of 4 |
| **Field** | Round Tank | **County** | Chaves | **Vertical Section Azimuth** | 180.64 |
| **Well Name** | Prince George Federal Com #3H | **State** | New Mexico | **Survey Calculation Method** | Minimum Curvature |
| **Plan** | 1 | **Country** | USA | **Database** | Access |

| | | | | | |
|---|---|---|---|---|---|
| **Location** | SL: 700 FSL & 1450 FEL Section 20-T15S-R29E BHL: 1 FSL & 1650 FEL Section 29-T15S-R29E | **Map Zone** | UTM | **Lat Long Ref** | |
| **Site** | | **Surface X** | 1932693.7 | **Surface Long** | |
| **Slot Name** | **UWI** | **Surface Y** | 11978454.8 | **Surface Lat** | |
| **Well Number** | 3H **API** | **Surface Z** | 3792.3 | **Global Z Ref** | KB |
| **Project** | **MD/TVD Ref** KB | **Ground Level** | 3774.8 | **Local North Ref** | Grid |

**DIRECTIONAL WELL PLAN**

| MD* ft | INC* deg | AZI* deg | TVD* ft | N* ft | E* ft | DLS* °/100ft | V. S.* ft | MapE* ft | MapN* ft | SysTVD* ft |
|---|---|---|---|---|---|---|---|---|---|---|
| *** TIE (at MD = 2320.00) | | | | | | | | | | |
| 2320.00 | 0.00 | 0.0 | 2320.00 | 0.00 | 0.00 | | 0.00 | 1932693.70 | 11978454.80 | 1472.30 |
| 2350.00 | 0.00 | 0.0 | 2350.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1932693.70 | 11978454.80 | 1442.30 |
| 2400.00 | 0.00 | 0.0 | 2400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1932693.70 | 11978454.80 | 1392.30 |
| *** KOP 8 DEGREES (at MD = 2420.00) | | | | | | | | | | |
| 2420.00 | 0.00 | 0.0 | 2420.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1932693.70 | 11978454.80 | 1372.30 |
| 2450.00 | 2.40 | 198.2 | 2449.99 | -0.60 | -0.20 | 8.00 | 0.60 | 1932693.50 | 11978454.20 | 1342.31 |
| 2500.00 | 6.40 | 198.2 | 2499.83 | -4.24 | -1.39 | 8.00 | 4.26 | 1932692.31 | 11978450.56 | 1292.47 |
| 2550.00 | 10.40 | 198.2 | 2549.29 | -11.18 | -3.68 | 8.00 | 11.22 | 1932690.03 | 11978443.62 | 1243.01 |
| 2600.00 | 14.40 | 198.2 | 2598.11 | -21.38 | -7.03 | 8.00 | 21.45 | 1932686.67 | 11978433.43 | 1194.19 |
| 2650.00 | 18.40 | 198.2 | 2646.07 | -34.78 | -11.44 | 8.00 | 34.91 | 1932682.26 | 11978420.02 | 1146.23 |
| 2700.00 | 22.40 | 198.2 | 2692.92 | -51.34 | -16.88 | 8.00 | 51.52 | 1932676.82 | 11978403.46 | 1099.38 |
| 2750.00 | 26.40 | 198.2 | 2738.45 | -70.95 | -23.33 | 8.00 | 71.21 | 1932670.37 | 11978383.85 | 1053.85 |
| 2800.00 | 30.40 | 198.2 | 2782.42 | -93.54 | -30.75 | 8.00 | 93.88 | 1932662.95 | 11978361.26 | 1009.88 |
| 2850.00 | 34.40 | 198.2 | 2824.63 | -118.99 | -39.12 | 8.00 | 119.42 | 1932654.58 | 11978335.81 | 967.67 |
| 2900.00 | 38.40 | 198.2 | 2864.86 | -147.17 | -48.39 | 8.00 | 147.70 | 1932645.31 | 11978307.63 | 927.44 |
| 2950.00 | 42.40 | 198.2 | 2902.93 | -177.95 | -58.51 | 8.00 | 178.59 | 1932635.19 | 11978276.85 | 889.37 |
| 3000.00 | 46.40 | 198.2 | 2938.65 | -211.17 | -69.43 | 8.00 | 211.94 | 1932624.27 | 11978243.63 | 853.65 |
| 3050.00 | 50.40 | 198.2 | 2971.84 | -246.68 | -81.11 | 8.00 | 247.58 | 1932612.59 | 11978208.12 | 820.46 |
| 3100.00 | 54.40 | 198.2 | 3002.34 | -284.31 | -93.48 | 8.00 | 285.34 | 1932600.22 | 11978170.49 | 789.96 |
| *** 55 DEGREE TANGENT (at MD = 3107.50) | | | | | | | | | | |
| 3107.50 | 55.00 | 198.2 | 3006.67 | -290.12 | -95.39 | 8.00 | 291.17 | 1932598.31 | 11978164.68 | 785.63 |
| 3150.00 | 55.00 | 198.2 | 3031.05 | -323.20 | -106.26 | 0.00 | 324.36 | 1932587.44 | 11978131.60 | 761.25 |
| 3200.00 | 55.00 | 198.2 | 3059.73 | -362.11 | -119.05 | 0.00 | 363.41 | 1932574.65 | 11978092.69 | 732.57 |
| 3250.00 | 55.00 | 198.2 | 3088.41 | -401.01 | -131.85 | 0.00 | 402.46 | 1932561.85 | 11978053.79 | 703.89 |
| 3300.00 | 55.00 | 198.2 | 3117.09 | -439.92 | -144.64 | 0.00 | 441.51 | 1932549.06 | 11978014.88 | 675.21 |
| *** 10 DEGREE BUILD (at MD = 3307.50) | | | | | | | | | | |
| 3307.50 | 55.00 | 198.2 | 3121.39 | -445.76 | -146.56 | 0.00 | 447.37 | 1932547.14 | 11978009.04 | 670.91 |
| 3350.00 | 58.75 | 195.8 | 3144.61 | -479.79 | -156.95 | 10.00 | 481.51 | 1932536.75 | 11977975.01 | 647.69 |
| 3400.00 | 63.20 | 193.2 | 3168.87 | -522.11 | -167.87 | 10.00 | 523.95 | 1932525.83 | 11977932.69 | 623.43 |
| 3450.00 | 67.70 | 190.8 | 3189.64 | -566.58 | -177.32 | 10.00 | 568.52 | 1932516.38 | 11977888.22 | 602.66 |
| 3500.00 | 72.24 | 188.6 | 3206.76 | -612.87 | -185.21 | 10.00 | 614.90 | 1932508.49 | 11977841.93 | 585.54 |
| 3550.00 | 76.80 | 186.4 | 3220.11 | -660.63 | -191.50 | 10.00 | 662.73 | 1932502.20 | 11977794.17 | 572.19 |
| 3600.00 | 81.37 | 184.4 | 3229.57 | -709.49 | -196.12 | 10.00 | 711.64 | 1932497.58 | 11977745.31 | 562.73 |
| 3650.00 | 85.96 | 182.4 | 3235.09 | -759.08 | -199.05 | 10.00 | 761.26 | 1932494.65 | 11977695.72 | 557.21 |
| *** LANDING POINT (at MD = 3694.00) | | | | | | | | | | |
| 3694.00 | 90.00 | 180.6 | 3236.64 | -803.03 | -200.21 | 10.00 | 805.21 | 1932493.49 | 11977651.77 | 555.66 |
| 3700.00 | 90.00 | 180.6 | 3236.64 | -809.03 | -200.28 | 0.00 | 811.22 | 1932493.42 | 11977645.77 | 555.66 |
| 3750.00 | 90.00 | 180.6 | 3236.64 | -859.03 | -200.83 | 0.00 | 861.22 | 1932492.87 | 11977595.77 | 555.66 |

# Prince George Federal Com #3H, Plan 1 (Plan #1)

| | | | | | |
|---|---|---|---|---|---|
| **Operator** | Mack Energy Corp | **Units** | feet, °/100ft | 08:53 Thursday, October 19, 2023 | Page 2 of 4 |
| **Field** | Round Tank | **County** | Chaves | **Vertical Section Azimuth** | 180.64 |
| **Well Name** | Prince George Federal Com #3H | **State** | New Mexico | **Survey Calculation Method** | Minimum Curvature |
| **Plan** | 1 | **Country** | USA | **Database** | Access |

| | | | | | |
|---|---|---|---|---|---|
| **Location** | SL: 700 FSL & 1450 FEL Section 20-T15S-R29E BHL: 1 FSL & 1650 FEL Section 29-T15S-R29E | **Map Zone** | UTM | **Lat Long Ref** | |
| **Site** | | **Surface X** | 1932693.7 | **Surface Long** | |
| **Slot Name** | **UWI** | **Surface Y** | 11978454.8 | **Surface Lat** | |
| **Well Number** | 3H **API** | **Surface Z** | 3792.3 | **Global Z Ref** | KB |
| **Project** | **MD/TVD Ref** KB | **Ground Level** | 3774.8 | **Local North Ref** | Grid |

**DIRECTIONAL WELL PLAN**

| MD* ft | INC* deg | AZI* deg | TVD* ft | N* ft | E* ft | DLS* °/100ft | V. S.* ft | MapE* ft | MapN* ft | SysTVD* ft |
|---|---|---|---|---|---|---|---|---|---|---|
| 3800.00 | 90.00 | 180.6 | 3236.64 | -909.02 | -201.39 | 0.00 | 911.22 | 1932492.31 | 11977545.78 | 555.66 |
| 3850.00 | 90.00 | 180.6 | 3236.64 | -959.02 | -201.95 | 0.00 | 961.22 | 1932491.75 | 11977495.78 | 555.66 |
| 3900.00 | 90.00 | 180.6 | 3236.64 | -1009.02 | -202.51 | 0.00 | 1011.22 | 1932491.19 | 11977445.78 | 555.66 |
| 3950.00 | 90.00 | 180.6 | 3236.64 | -1059.01 | -203.07 | 0.00 | 1061.22 | 1932490.63 | 11977395.79 | 555.66 |
| 4000.00 | 90.00 | 180.6 | 3236.64 | -1109.01 | -203.63 | 0.00 | 1111.22 | 1932490.07 | 11977345.79 | 555.66 |
| 4050.00 | 90.00 | 180.6 | 3236.64 | -1159.01 | -204.19 | 0.00 | 1161.22 | 1932489.51 | 11977295.79 | 555.66 |
| 4100.00 | 90.00 | 180.6 | 3236.64 | -1209.01 | -204.74 | 0.00 | 1211.22 | 1932488.96 | 11977245.80 | 555.66 |
| 4150.00 | 90.00 | 180.6 | 3236.64 | -1259.00 | -205.30 | 0.00 | 1261.22 | 1932488.40 | 11977195.80 | 555.66 |
| 4200.00 | 90.00 | 180.6 | 3236.64 | -1309.00 | -205.86 | 0.00 | 1311.22 | 1932487.84 | 11977145.80 | 555.66 |
| 4250.00 | 90.00 | 180.6 | 3236.64 | -1359.00 | -206.42 | 0.00 | 1361.22 | 1932487.28 | 11977095.80 | 555.66 |
| 4300.00 | 90.00 | 180.6 | 3236.64 | -1408.99 | -206.98 | 0.00 | 1411.22 | 1932486.72 | 11977045.81 | 555.66 |
| 4350.00 | 90.00 | 180.6 | 3236.64 | -1458.99 | -207.54 | 0.00 | 1461.22 | 1932486.16 | 11976995.81 | 555.66 |
| 4400.00 | 90.00 | 180.6 | 3236.64 | -1508.99 | -208.10 | 0.00 | 1511.22 | 1932485.61 | 11976945.81 | 555.66 |
| 4450.00 | 90.00 | 180.6 | 3236.64 | -1558.98 | -208.65 | 0.00 | 1561.22 | 1932485.05 | 11976895.82 | 555.66 |
| 4500.00 | 90.00 | 180.6 | 3236.64 | -1608.98 | -209.21 | 0.00 | 1611.22 | 1932484.49 | 11976845.82 | 555.66 |
| 4550.00 | 90.00 | 180.6 | 3236.64 | -1658.98 | -209.77 | 0.00 | 1661.22 | 1932483.93 | 11976795.82 | 555.66 |
| 4600.00 | 90.00 | 180.6 | 3236.64 | -1708.97 | -210.33 | 0.00 | 1711.22 | 1932483.37 | 11976745.83 | 555.66 |
| 4650.00 | 90.00 | 180.6 | 3236.64 | -1758.97 | -210.89 | 0.00 | 1761.22 | 1932482.81 | 11976695.83 | 555.66 |
| 4700.00 | 90.00 | 180.6 | 3236.64 | -1808.97 | -211.45 | 0.00 | 1811.22 | 1932482.25 | 11976645.83 | 555.66 |
| 4750.00 | 90.00 | 180.6 | 3236.64 | -1858.96 | -212.00 | 0.00 | 1861.22 | 1932481.70 | 11976595.84 | 555.66 |
| 4800.00 | 90.00 | 180.6 | 3236.64 | -1908.96 | -212.56 | 0.00 | 1911.22 | 1932481.14 | 11976545.84 | 555.66 |
| 4850.00 | 90.00 | 180.6 | 3236.64 | -1958.96 | -213.12 | 0.00 | 1961.22 | 1932480.58 | 11976495.84 | 555.66 |
| 4900.00 | 90.00 | 180.6 | 3236.64 | -2008.96 | -213.68 | 0.00 | 2011.22 | 1932480.02 | 11976445.84 | 555.66 |
| 4950.00 | 90.00 | 180.6 | 3236.64 | -2058.95 | -214.24 | 0.00 | 2061.22 | 1932479.46 | 11976395.85 | 555.66 |
| 5000.00 | 90.00 | 180.6 | 3236.64 | -2108.95 | -214.80 | 0.00 | 2111.22 | 1932478.90 | 11976345.85 | 555.66 |
| 5050.00 | 90.00 | 180.6 | 3236.64 | -2158.95 | -215.36 | 0.00 | 2161.22 | 1932478.34 | 11976295.85 | 555.66 |
| 5100.00 | 90.00 | 180.6 | 3236.64 | -2208.94 | -215.91 | 0.00 | 2211.22 | 1932477.79 | 11976245.86 | 555.66 |
| 5150.00 | 90.00 | 180.6 | 3236.64 | -2258.94 | -216.47 | 0.00 | 2261.22 | 1932477.23 | 11976195.86 | 555.66 |
| *** HOLD FLAT (at MD = 5172.00) | | | | | | | | | | |
| 5172.00 | 90.00 | 180.6 | 3236.64 | -2280.93 | -216.72 | 0.00 | 2283.21 | 1932476.98 | 11976173.87 | 555.66 |
| 5200.00 | 90.40 | 180.6 | 3236.54 | -2308.94 | -217.03 | 1.43 | 2311.22 | 1932476.67 | 11976145.86 | 555.76 |
| 5250.00 | 91.12 | 180.6 | 3235.88 | -2358.93 | -217.59 | 1.43 | 2361.21 | 1932476.11 | 11976095.87 | 556.42 |
| *** 1.43 DEGREE BUILD (at MD = 5262.90) | | | | | | | | | | |
| 5262.90 | 91.30 | 180.6 | 3235.60 | -2371.83 | -217.73 | 1.43 | 2374.11 | 1932475.97 | 11976082.97 | 556.70 |
| 5300.00 | 91.30 | 180.6 | 3234.76 | -2408.91 | -218.15 | 0.00 | 2411.20 | 1932475.55 | 11976045.89 | 557.54 |
| 5350.00 | 91.30 | 180.6 | 3233.63 | -2458.90 | -218.71 | 0.00 | 2461.19 | 1932474.99 | 11975995.90 | 558.67 |
| 5400.00 | 91.30 | 180.6 | 3232.49 | -2508.88 | -219.26 | 0.00 | 2511.17 | 1932474.44 | 11975945.92 | 559.81 |

# Prince George Federal Com #3H, Plan 1 (Plan #1)

| | | | | | |
|---|---|---|---|---|---|
| **Operator** | Mack Energy Corp | **Units** | feet, °/100ft | 08:53 Thursday, October 19, 2023 | Page 3 of 4 |
| **Field** | Round Tank | **County** | Chaves | **Vertical Section Azimuth** | 180.64 |
| **Well Name** | Prince George Federal Com #3H | **State** | New Mexico | **Survey Calculation Method** | Minimum Curvature |
| **Plan** | 1 | **Country** | USA | **Database** | Access |

| | | | | | |
|---|---|---|---|---|---|
| **Location** | SL: 700 FSL & 1450 FEL Section 20-T15S-R29E BHL: 1 FSL & 1650 FEL Section 29-T15S-R29E | **Map Zone** | UTM | **Lat Long Ref** | |
| **Site** | | **Surface X** | 1932693.7 | **Surface Long** | |
| **Slot Name** | **UWI** | **Surface Y** | 11978454.8 | **Surface Lat** | |
| **Well Number** | 3H **API** | **Surface Z** | 3792.3 | **Global Z Ref** | KB |
| **Project** | **MD/TVD Ref** KB | **Ground Level** | 3774.8 | **Local North Ref** | Grid |

**DIRECTIONAL WELL PLAN**

| MD* ft | INC* deg | AZI* deg | TVD* ft | N* ft | E* ft | DLS* °/100ft | V. S.* ft | MapE* ft | MapN* ft | SysTVD* ft |
|---|---|---|---|---|---|---|---|---|---|---|
| 5450.00 | 91.30 | 180.6 | 3231.36 | -2558.86 | -219.82 | 0.00 | 2561.16 | 1932473.88 | 11975895.94 | 560.94 |
| 5500.00 | 91.30 | 180.6 | 3230.23 | -2608.85 | -220.38 | 0.00 | 2611.15 | 1932473.32 | 11975845.95 | 562.07 |
| 5550.00 | 91.30 | 180.6 | 3229.09 | -2658.83 | -220.94 | 0.00 | 2661.13 | 1932472.76 | 11975795.97 | 563.21 |
| 5600.00 | 91.30 | 180.6 | 3227.96 | -2708.82 | -221.50 | 0.00 | 2711.12 | 1932472.20 | 11975745.98 | 564.34 |
| 5650.00 | 91.30 | 180.6 | 3226.82 | -2758.80 | -222.06 | 0.00 | 2761.11 | 1932471.64 | 11975696.00 | 565.48 |
| 5700.00 | 91.30 | 180.6 | 3225.69 | -2808.78 | -222.61 | 0.00 | 2811.10 | 1932471.09 | 11975646.02 | 566.61 |
| 5750.00 | 91.30 | 180.6 | 3224.55 | -2858.77 | -223.17 | 0.00 | 2861.08 | 1932470.53 | 11975596.03 | 567.75 |
| 5800.00 | 91.30 | 180.6 | 3223.42 | -2908.75 | -223.73 | 0.00 | 2911.07 | 1932469.97 | 11975546.05 | 568.88 |
| 5850.00 | 91.30 | 180.6 | 3222.28 | -2958.74 | -224.29 | 0.00 | 2961.06 | 1932469.41 | 11975496.06 | 570.02 |
| 5900.00 | 91.30 | 180.6 | 3221.15 | -3008.72 | -224.85 | 0.00 | 3011.04 | 1932468.85 | 11975446.08 | 571.15 |
| 5950.00 | 91.30 | 180.6 | 3220.02 | -3058.70 | -225.41 | 0.00 | 3061.03 | 1932468.29 | 11975396.10 | 572.28 |
| 6000.00 | 91.30 | 180.6 | 3218.88 | -3108.69 | -225.96 | 0.00 | 3111.02 | 1932467.74 | 11975346.11 | 573.42 |
| 6050.00 | 91.30 | 180.6 | 3217.75 | -3158.67 | -226.52 | 0.00 | 3161.01 | 1932467.18 | 11975296.13 | 574.55 |
| 6100.00 | 91.30 | 180.6 | 3216.61 | -3208.66 | -227.08 | 0.00 | 3210.99 | 1932466.62 | 11975246.14 | 575.69 |
| 6150.00 | 91.30 | 180.6 | 3215.48 | -3258.64 | -227.64 | 0.00 | 3260.98 | 1932466.06 | 11975196.16 | 576.82 |
| 6200.00 | 91.30 | 180.6 | 3214.34 | -3308.63 | -228.20 | 0.00 | 3310.97 | 1932465.50 | 11975146.18 | 577.96 |
| 6250.00 | 91.30 | 180.6 | 3213.21 | -3358.61 | -228.76 | 0.00 | 3360.95 | 1932464.94 | 11975096.19 | 579.09 |
| 6300.00 | 91.30 | 180.6 | 3212.08 | -3408.59 | -229.31 | 0.00 | 3410.94 | 1932464.39 | 11975046.21 | 580.22 |
| 6350.00 | 91.30 | 180.6 | 3210.94 | -3458.58 | -229.87 | 0.00 | 3460.93 | 1932463.83 | 11974996.22 | 581.36 |
| 6400.00 | 91.30 | 180.6 | 3209.81 | -3508.56 | -230.43 | 0.00 | 3510.92 | 1932463.27 | 11974946.24 | 582.49 |
| 6450.00 | 91.30 | 180.6 | 3208.67 | -3558.55 | -230.99 | 0.00 | 3560.90 | 1932462.71 | 11974896.25 | 583.63 |
| 6500.00 | 91.30 | 180.6 | 3207.54 | -3608.53 | -231.55 | 0.00 | 3610.89 | 1932462.15 | 11974846.27 | 584.76 |
| 6550.00 | 91.30 | 180.6 | 3206.40 | -3658.51 | -232.11 | 0.00 | 3660.88 | 1932461.59 | 11974796.29 | 585.90 |
| 6600.00 | 91.30 | 180.6 | 3205.27 | -3708.50 | -232.66 | 0.00 | 3710.86 | 1932461.04 | 11974746.30 | 587.03 |
| 6650.00 | 91.30 | 180.6 | 3204.13 | -3758.48 | -233.22 | 0.00 | 3760.85 | 1932460.48 | 11974696.32 | 588.17 |
| 6700.00 | 91.30 | 180.6 | 3203.00 | -3808.47 | -233.78 | 0.00 | 3810.84 | 1932459.92 | 11974646.33 | 589.30 |
| 6750.00 | 91.30 | 180.6 | 3201.87 | -3858.45 | -234.34 | 0.00 | 3860.83 | 1932459.36 | 11974596.35 | 590.43 |
| 6800.00 | 91.30 | 180.6 | 3200.73 | -3908.43 | -234.90 | 0.00 | 3910.81 | 1932458.80 | 11974546.37 | 591.57 |
| 6850.00 | 91.30 | 180.6 | 3199.60 | -3958.42 | -235.46 | 0.00 | 3960.80 | 1932458.24 | 11974496.38 | 592.70 |
| 6900.00 | 91.30 | 180.6 | 3198.46 | -4008.40 | -236.01 | 0.00 | 4010.79 | 1932457.69 | 11974446.40 | 593.84 |
| 6950.00 | 91.30 | 180.6 | 3197.33 | -4058.39 | -236.57 | 0.00 | 4060.77 | 1932457.13 | 11974396.41 | 594.97 |
| 7000.00 | 91.30 | 180.6 | 3196.19 | -4108.37 | -237.13 | 0.00 | 4110.76 | 1932456.57 | 11974346.43 | 596.11 |
| 7050.00 | 91.30 | 180.6 | 3195.06 | -4158.35 | -237.69 | 0.00 | 4160.75 | 1932456.01 | 11974296.45 | 597.24 |
| 7100.00 | 91.30 | 180.6 | 3193.93 | -4208.34 | -238.25 | 0.00 | 4210.74 | 1932455.45 | 11974246.46 | 598.37 |
| 7150.00 | 91.30 | 180.6 | 3192.79 | -4258.32 | -238.81 | 0.00 | 4260.72 | 1932454.89 | 11974196.48 | 599.51 |
| 7200.00 | 91.30 | 180.6 | 3191.66 | -4308.31 | -239.37 | 0.00 | 4310.71 | 1932454.34 | 11974146.49 | 600.64 |
| 7250.00 | 91.30 | 180.6 | 3190.52 | -4358.29 | -239.92 | 0.00 | 4360.70 | 1932453.78 | 11974096.51 | 601.78 |

# Prince George Federal Com #3H, Plan 1 (Plan #1)

| | | | | | |
|---|---|---|---|---|---|
| **Operator** | Mack Energy Corp | **Units** | feet, °/100ft | 08:53 Thursday, October 19, 2023 | Page 4 of 4 |
| **Field** | Round Tank | **County** | Chaves | **Vertical Section Azimuth** | 180.64 |
| **Well Name** | Prince George Federal Com #3H | **State** | New Mexico | **Survey Calculation Method** | Minimum Curvature |
| **Plan** | 1 | **Country** | USA | **Database** | Access |

| | | | | | |
|---|---|---|---|---|---|
| **Location** | SL: 700 FSL & 1450 FEL Section 20-T15S-R29E BHL: 1 FSL & 1650 FEL Section 29-T15S-R29E | | **Map Zone** UTM | **Lat Long Ref** | |
| **Site** | | | **Surface X** 1932693.7 | **Surface Long** | |
| **Slot Name** | | **UWI** | **Surface Y** 11978454.8 | **Surface Lat** | |
| **Well Number** | 3H | **API** | **Surface Z** 3792.3 | **Global Z Ref** | KB |
| **Project** | | **MD/TVD Ref** KB | **Ground Level** 3774.8 | **Local North Ref** | Grid |

**DIRECTIONAL WELL PLAN**

| MD* ft | INC* deg | AZI* deg | TVD* ft | N* ft | E* ft | DLS* °/100ft | V. S.* ft | MapE* ft | MapN* ft | SysTVD* ft |
|---|---|---|---|---|---|---|---|---|---|---|
| 7300.00 | 91.30 | 180.6 | 3189.39 | -4408.27 | -240.48 | 0.00 | 4410.68 | 1932453.22 | 11974046.53 | 602.91 |
| 7350.00 | 91.30 | 180.6 | 3188.25 | -4458.26 | -241.04 | 0.00 | 4460.67 | 1932452.66 | 11973996.54 | 604.05 |
| 7400.00 | 91.30 | 180.6 | 3187.12 | -4508.24 | -241.60 | 0.00 | 4510.66 | 1932452.10 | 11973946.56 | 605.18 |
| 7450.00 | 91.30 | 180.6 | 3185.98 | -4558.23 | -242.16 | 0.00 | 4560.65 | 1932451.54 | 11973896.57 | 606.32 |
| 7500.00 | 91.30 | 180.6 | 3184.85 | -4608.21 | -242.72 | 0.00 | 4610.63 | 1932450.98 | 11973846.59 | 607.45 |
| 7550.00 | 91.30 | 180.6 | 3183.72 | -4658.19 | -243.27 | 0.00 | 4660.62 | 1932450.43 | 11973796.61 | 608.58 |
| 7600.00 | 91.30 | 180.6 | 3182.58 | -4708.18 | -243.83 | 0.00 | 4710.61 | 1932449.87 | 11973746.62 | 609.72 |
| 7650.00 | 91.30 | 180.6 | 3181.45 | -4758.16 | -244.39 | 0.00 | 4760.59 | 1932449.31 | 11973696.64 | 610.85 |
| 7700.00 | 91.30 | 180.6 | 3180.31 | -4808.15 | -244.95 | 0.00 | 4810.58 | 1932448.75 | 11973646.65 | 611.99 |
| 7750.00 | 91.30 | 180.6 | 3179.18 | -4858.13 | -245.51 | 0.00 | 4860.57 | 1932448.19 | 11973596.67 | 613.12 |
| 7800.00 | 91.30 | 180.6 | 3178.04 | -4908.11 | -246.07 | 0.00 | 4910.56 | 1932447.63 | 11973546.69 | 614.26 |
| 7850.00 | 91.30 | 180.6 | 3176.91 | -4958.10 | -246.62 | 0.00 | 4960.54 | 1932447.08 | 11973496.70 | 615.39 |
| 7900.00 | 91.30 | 180.6 | 3175.78 | -5008.08 | -247.18 | 0.00 | 5010.53 | 1932446.52 | 11973446.72 | 616.52 |
| 7950.00 | 91.30 | 180.6 | 3174.64 | -5058.07 | -247.74 | 0.00 | 5060.52 | 1932445.96 | 11973396.73 | 617.66 |
| 8000.00 | 91.30 | 180.6 | 3173.51 | -5108.05 | -248.30 | 0.00 | 5110.50 | 1932445.40 | 11973346.75 | 618.79 |
| 8050.00 | 91.30 | 180.6 | 3172.37 | -5158.03 | -248.86 | 0.00 | 5160.49 | 1932444.84 | 11973296.77 | 619.93 |
| 8100.00 | 91.30 | 180.6 | 3171.24 | -5208.02 | -249.42 | 0.00 | 5210.48 | 1932444.28 | 11973246.78 | 621.06 |
| 8150.00 | 91.30 | 180.6 | 3170.10 | -5258.00 | -249.97 | 0.00 | 5260.47 | 1932443.73 | 11973196.80 | 622.20 |
| 8200.00 | 91.30 | 180.6 | 3168.97 | -5307.99 | -250.53 | 0.00 | 5310.45 | 1932443.17 | 11973146.81 | 623.33 |
| 8250.00 | 91.30 | 180.6 | 3167.84 | -5357.97 | -251.09 | 0.00 | 5360.44 | 1932442.61 | 11973096.83 | 624.46 |
| 8300.00 | 91.30 | 180.6 | 3166.70 | -5407.95 | -251.65 | 0.00 | 5410.43 | 1932442.05 | 11973046.85 | 625.60 |
| 8350.00 | 91.30 | 180.6 | 3165.57 | -5457.94 | -252.21 | 0.00 | 5460.41 | 1932441.49 | 11972996.86 | 626.73 |
| 8400.00 | 91.30 | 180.6 | 3164.43 | -5507.92 | -252.77 | 0.00 | 5510.40 | 1932440.93 | 11972946.88 | 627.87 |
| 8450.00 | 91.30 | 180.6 | 3163.30 | -5557.91 | -253.32 | 0.00 | 5560.39 | 1932440.38 | 11972896.89 | 629.00 |
| 8500.00 | 91.30 | 180.6 | 3162.16 | -5607.89 | -253.88 | 0.00 | 5610.38 | 1932439.82 | 11972846.91 | 630.14 |
| 8550.00 | 91.30 | 180.6 | 3161.03 | -5657.87 | -254.44 | 0.00 | 5660.36 | 1932439.26 | 11972796.93 | 631.27 |
| 8600.00 | 91.30 | 180.6 | 3159.89 | -5707.86 | -255.00 | 0.00 | 5710.35 | 1932438.70 | 11972746.94 | 632.41 |
| 8650.00 | 91.30 | 180.6 | 3158.76 | -5757.84 | -255.56 | 0.00 | 5760.34 | 1932438.14 | 11972696.96 | 633.54 |
| 8700.00 | 91.30 | 180.6 | 3157.63 | -5807.83 | -256.12 | 0.00 | 5810.32 | 1932437.58 | 11972646.97 | 634.67 |
| 8750.00 | 91.30 | 180.6 | 3156.49 | -5857.81 | -256.67 | 0.00 | 5860.31 | 1932437.03 | 11972596.99 | 635.81 |
| 8800.00 | 91.30 | 180.6 | 3155.36 | -5907.79 | -257.23 | 0.00 | 5910.30 | 1932436.47 | 11972547.01 | 636.94 |
| 8850.00 | 91.30 | 180.6 | 3154.22 | -5957.78 | -257.79 | 0.00 | 5960.29 | 1932435.91 | 11972497.02 | 638.08 |
| *** TD (at MD = 8856.90) | | | | | | | | | | |
| 8856.90 | 91.30 | 180.6 | 3154.07 | -5964.68 | -257.87 | 0.00 | 5967.19 | 1932435.83 | 11972490.12 | 638.23 |

# PECOS DISTRICT
# DRILLING OPERATIONS
# CONDITIONS OF APPROVAL

| | |
|---|---|
| **OPERATOR'S NAME:** | **Mack Energy Corporation** |
| **LEASE NO.:** | **NMNM-101106** |
| **WELL NAME & NO.:** | **Prince George Federal Com 3H** |
| **SURFACE HOLE FOOTAGE:** | **0700' FSL & 1450' FEL** |
| **BOTTOM HOLE FOOTAGE** | **0001' FSL & 1650' FEWL Sec. 29, T. 15 S., R 29 E.** |
| **LOCATION:** | **Section 20, T. 15 S., R 29 E., NMPM** |
| **COUNTY:** | **Chaves County, New Mexico** |

**Communitization Agreement**

· The operator will submit a Communitization Agreement to the Roswell Field Office, 2909 West 2nd Street Roswell, 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.

**The Gamma Ray and Neutron well logs must be run from total depth to surface and e-mailed to Aleksandr Knapowski at cknapowski@blm.gov or hard copy mailed to 2909 West Second Street Roswell, NM 88201 to his attention.**

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)

☒ **Chaves and Roosevelt Counties**
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After hours cll (575) 627-0205.





**Approval Date: 05/17/2024**

**A. Hydrogen Sulfide**

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

2. 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. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

3. 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 is located, this does not include the dog house or stairway area.

4. **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.**

**B. CASING**

**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.**

**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.**

**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.**

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

**High Cave/Karst**
**Possibility of water flows in the Rustler, Queen, Salado, and Artesia Group.**
**Possibility of lost circulation in the Rustler, Artesia Group, and San Andres.**

1. The **13-3/8** inch surface casing shall be set at approximately **220** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**

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

    **b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.**

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

    ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

**Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.**

3. The minimum required fill of cement behind the **7 X 5-1/2** inch production casing is:

    ☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office.

4. 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.

## C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. 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.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).

2. **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 (testing to 2,000 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. **Operator shall perform the intermediate casing integrity test to 70% of the casing burst. This will test the multi-bowl seals.**
    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.**

3. 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. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.

    c. 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.

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

    e. 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.**

    f. 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.

**D. DRILL STEM TEST**

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

**E. 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.

**JAM 03072024**





**Approval Date: 05/17/2024**

Attached to Form 3160-3
Mack Energy Corporation
Prince George Federal Com #3H NMNM-101106
SHL : 700 FSL & 1650 FEL, SWSE, Sec. 20 T15S R29E
BHL : 1 FSL & 1650 FEL, SWSE, Sec. 29 T15S R29E
Chaves County, NM

# Mack Energy Corporation
# Onshore Order #6
# Hydrogen Sulfide Drilling Operation Plan

## I. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

1. The hazards an characteristics of hydrogen sulfide (H2S)
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H2S detectors alarms warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

1. The effects of H2S on metal components. If high tensile tubular are to be used, personnel well be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H2S Drilling Operations Plan and Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H2S zone (within 3 days or 500 feet) and weekly H2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H2S Drilling Operations Plan and the Public Protection Plan. **The concentrations of H2S of wells in this area from surface to TD are low enough that a contingency plan is not required.**

## II. H2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonable expected to contain H2S.

**1. Well Control Equipment:**

A. Flare line.
B. Choke manifold.
C. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
D. Auxiliary equipment may include if applicable: annular preventer & rotating head.

**Attached to Form 3160-3**
**Mack Energy Corporation**
**Prince George Federal Com #3H NMNM-101106**
**SHL : 700 FSL & 1650 FEL, SWSE, Sec. 20 T15S R29E**
**BHL : 1 FSL & 1650 FEL, SWSE, Sec. 29 T15S R29E**
**Chaves County, NM**

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**2. Protective equipment for essential personnel:**

A. Mark II Survive air 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

**3. H2S detection and monitoring equipment:**

A. 1 portable H2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 PPM are reached.

**4. Visual warning systems:**

A. Wind direction indicators as shown on well site diagram (Exhibit #8).
B. Caution/Danger signs (Exhibit #7) 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. See example attached.

**5. Mud program:**

A. The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weight, safe drilling practices and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.

**6. Metallurgy:**

A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
B. All elastomers used for packing and seals shall be H2S trim.

**7. Communication:**

A. Radio communications in company vehicles including cellular telephone and 2-way radio.
B. Land line (telephone) communication at Office.

**8. Well testing:**

A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H2S environment will use the closed chamber method of testing.

Attached to Form 3160-3
Mack Energy Corporation
Prince George Federal Com #3H NMNM-101106
SHL : 700 FSL & 1650 FEL, SWSE, Sec. 20 T15S R29E
BHL : 1 FSL & 1650 FEL, SWSE, Sec. 29 T15S R29E
Chaves County, NM

**EXHIBIT #7**

**WARNING**

**YOU ARE ENTERING AN H2S**

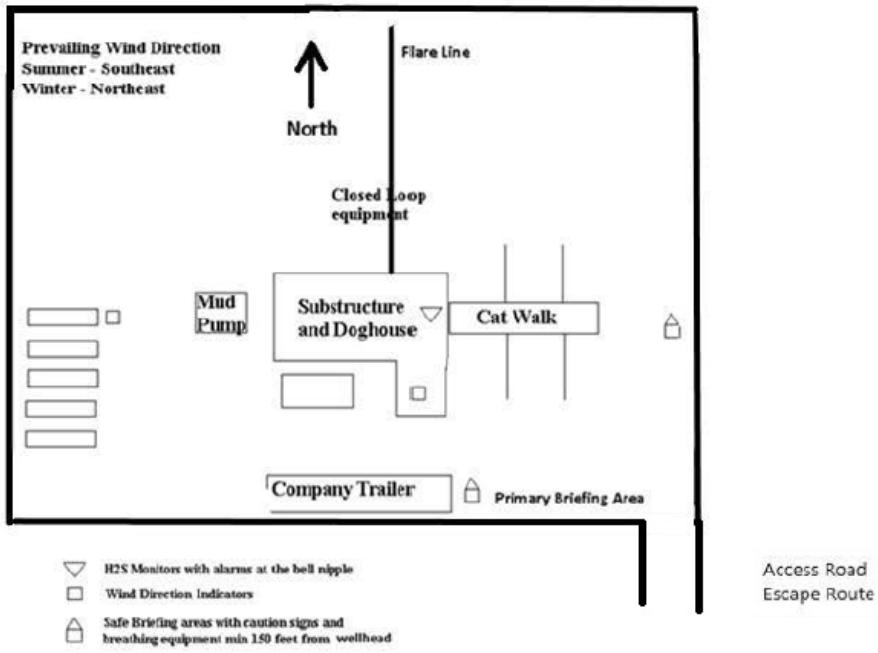
**AUTHORIZED PERSONNEL ONLY**

1. BEARDS OR CONTACT LENSES NOT ALLOWED
2. HARD HATS REQUIRED
3. SMOKING IN DESIGNATED AREAS ONLY
4. BE WIND CONSCIOUS AT ALL TIMES
5. CHECK WITH MACK ENERGY FOREMAN AT OFFICE

**MACK ENERGY CORPORATION**

**1-575-748-1288**

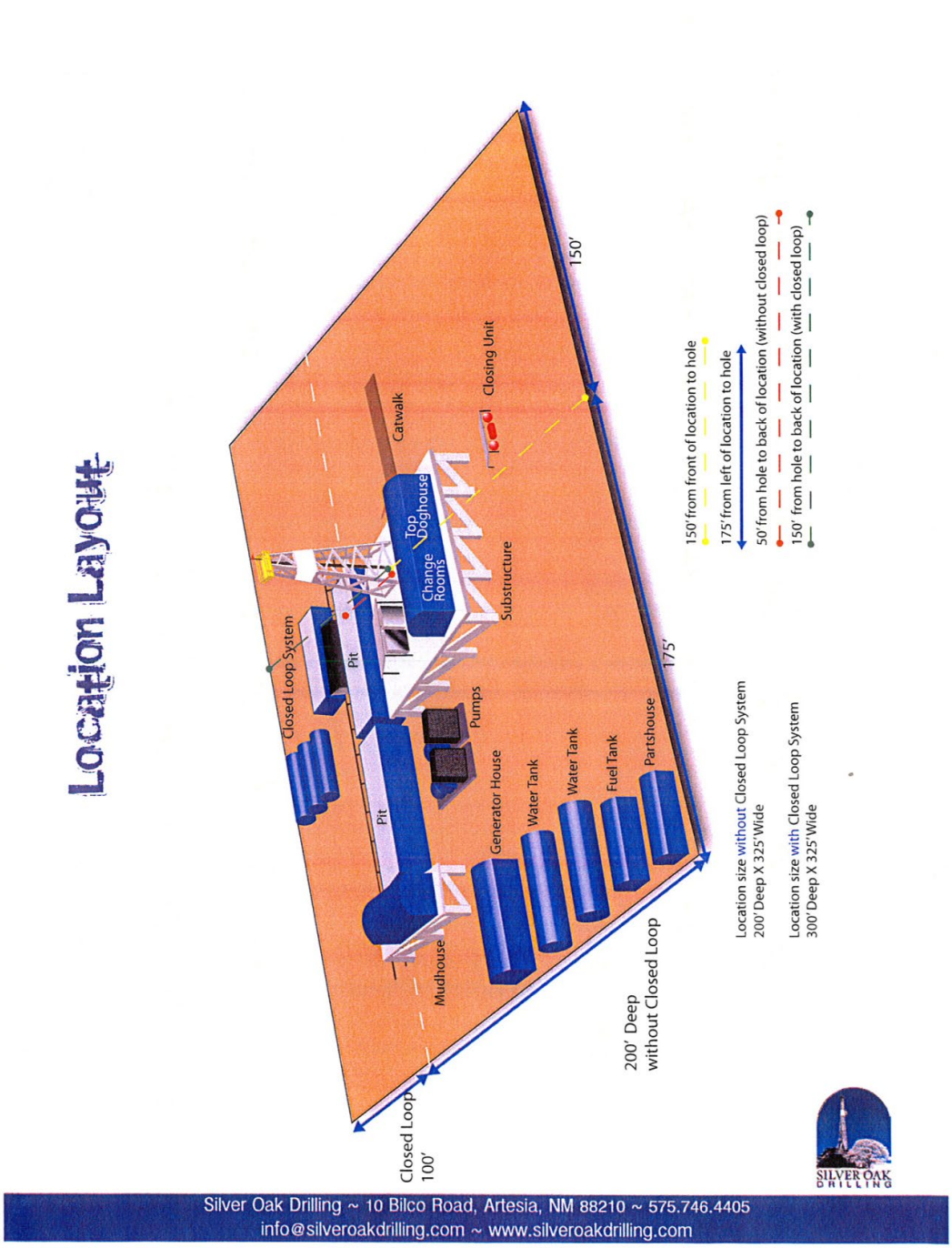
Warning sign @ access road entrance




B.

There will be no drill stem testing.

**DRILLING LOCATION H2S SAFTY EQUIPMENT**
**Exhibit # 8**



**Mack Energy Corporation Call List, Chaves County**

| Artesia (575) | Cellular | Office |
|---|---|---|
| Jim Krogman | 432-934-1596 | 748-1288 |
| Emilio Martinez | 432-934-7586 | 748-1288 |

**Agency Call List (575)**

**Roswell**

State Police……..622-7200
City Police……...624-6770
Sheriff's Office……624-7590
Ambulance……...624-7590
Fire Department……...624-7590
LEPC (Local Emergency Planning Committee……...624-6770
NMOCD……...748-1283
Bureau of Land Management……...627-0272

**Emergency Services**

Boots & Coots IWC……..…1-800-256-9688 or (281)931-8884
Cudd pressure Control…….(915)699-0139 or (915)563-3356
Halliburton……..746-2757
Par Five……..748-9539

Flight For Life-Lubbock, TX……..……(806)743-9911
Aerocare-Lubbock, TX……...(806)747-8923
Med Flight Air Amb-Albuquerque, NM…….(505)842-4433
Lifeguard Air Med Svc. Albuquerque, NM……(505)272-3115

Intent [XX] As Drilled [ ]

| API # |
|---|
| |

| Operator Name: | Property Name: | Well Number |
|---|---|---|
| MACK ENERGY CORPORATION | PRINCE GEORGE FEDERAL COM | 3H |

Kick Off Point (KOP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| O | 20 | 15S | 29E | | 700 | SOUTH | 1450 | EAST | CHAVES |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.9961011 | 104.0474360 | 83 |

First Take Point (FTP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| B | 29 | 15S | 29E | | 100 | NORTH | 1650 | EAST | CHAVES |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.9939033 | 104.0473778 | 83 |

Last Take Point (LTP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| O | 29 | 15S | 29E | | 100 | SOUTH | 1650 | EAST | CHAVES |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.9800314 | 104.0476084 | 83 |

Is this well the defining well for the Horizontal Spacing Unit? [ ]

Is this well an infill well? [ ]

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

| API # |
|---|
| |

| Operator Name: | Property Name: | Well Number |
|---|---|---|
| | | |

KZ 06/29/2018

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

# Drilling Plan Data Report
05/17/2024

**APD ID:** 10400094607
**Submission Date:** 10/31/2023
**Operator Name:** MACK ENERGY CORPORATION
**Well Name:** PRINCE GEORGE FEDERAL COM
**Well Number:** 3H
**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 | Measured Depth | Lithologies | Mineral Resources | Producing Formatio |
|---|---|---|---|---|---|---|---|
| 13450146 | QUATERNARY | 3769 | 0 | 0 | ALLUVIUM | NONE | N |
| 13450147 | TOP OF SALT | 3559 | 210 | 210 | SALT | NONE | N |
| 13450148 | BASE OF SALT | 2939 | 830 | 830 | SALT | NONE | N |
| 13450152 | YATES | 2901 | 868 | 868 | ANHYDRITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450145 | SEVEN RIVERS | 2664 | 1105 | 1105 | ANHYDRITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450150 | QUEEN | 2177 | 1592 | 1592 | ANHYDRITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450151 | GRAYBURG | 1782 | 1987 | 1987 | ANHYDRITE, DOLOMITE, SILTSTONE | NATURAL GAS, OIL | N |
| 13450149 | SAN ANDRES | 1467 | 2302 | 2302 | ANHYDRITE, DOLOMITE | NATURAL GAS, OIL | Y |

## Section 2 - Blowout Prevention

**Pressure Rating (PSI):** 3M
**Rating Depth:** 8856

**Equipment:** Rotating Head, Mud-Gas Separator

**Requesting Variance?** NO

**Variance request:**

**Testing Procedure:** 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. The estimated Bottom Hole at TD is 120 degrees and estimated maximum bottom hole pressure is 1504 psig (0.052*3154*9.2) less than 2900 bottom hole pressure.

**Choke Diagram Attachment:**

NEW_Choke_Manifold_3M_20230920122618.pdf

**BOP Diagram Attachment:**

NEW_BOP_3M_20230920122628.pdf

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

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

CONDITIONS

Action 345612

## CONDITIONS

| | |
|---|---|
| Operator:<br>MACK ENERGY CORP<br>P.O. Box 960<br>Artesia, NM 882110960 | OGRID:<br>13837 |
| | Action Number:<br>345612 |
| | Action Type:<br>[C-101] BLM - Federal/Indian Land Lease (Form 3160-3) |

**CONDITIONS**

| Created By | Condition | Condition Date |
|---|---|---|
| ward.rikala | Notify OCD 24 hours prior to casing & cement | 6/12/2024 |
| ward.rikala | Will require a File As Drilled C-102 and a Directional Survey with the C-104 | 6/12/2024 |
| ward.rikala | Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string | 6/12/2024 |
| ward.rikala | Cement is required to circulate on both surface and intermediate1 strings of casing | 6/12/2024 |
| ward.rikala | If cement does not circulate on any string, a CBL is required for that string of casing | 6/12/2024 |
| ward.rikala | Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system | 6/12/2024 |