

Form 3160-3  
(June 2015)

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

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
**APPLICATION FOR PERMIT TO DRILL OR REENTER**

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER 1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other 1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		5. Lease Serial No. NMNM086024Z 6. If Indian, Allottee or Tribe Name  7. If Unit or CA Agreement, Name and No.  8. Lease Name and Well No. BLUE STEEL 21 SB FEE 7H 9. API Well No. 30-015-55448
2. Name of Operator MARATHON OIL PERMIAN LLC		10. Field and Pool, or Exploratory Culebra Bluff, South/BONE SPRING 11. Sec., T. R. M. or Blk. and Survey or Area SEC 28/T23S/R29E/NMP
3a. Address 990 TOWN & COUNTRY BLVD, HOUSTON, TX 77024	3b. Phone No. (include area code) (713) 296-2113	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface NWNW / 470 FNL / 1224 FWL / LAT 32.2819283 / LONG -103.9945177 At proposed prod. zone NENW / 100 FNL / 1980 FWL / LAT 32.3121912 / LONG -103.9918074		12. County or Parish EDDY 13. State NM
14. Distance in miles and direction from nearest town or post office* 6.3 miles		
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 470 feet	16. No of acres in lease 17. Spacing Unit dedicated to this well 320.0	20. BLM/BIA Bond No. in file FED:
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 1125 feet	19. Proposed Depth 8765 feet / 19089 feet	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 2999 feet	22. Approximate date work will start* 06/30/2021	23. Estimated duration 31 days
24. Attachments		

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

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

25. Signature (Electronic Submission) Title REGULATORY COMPLIANCE REPRESENTATIVE	Name (Printed/Typed) MELISSA SZUDERA / Ph: (713) 929-6600	Date 10/16/2020
Approved by (Signature) (Electronic Submission) Title Assistant Field Manager Lands & Minerals	Name (Printed/Typed) CODY LAYTON / Ph: (575) 234-5959 Office Carlsbad Field Office	Date 04/28/2023

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

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



(Continued on page 2)

\*(Instructions on page 2)

## INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM I: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

## NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM connects this information to a new evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

**BURDEN HOURS STATEMENT:** Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Connection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

### Additional Operator Remarks

#### Location of Well

0. SHL: NWNW / 470 FNL / 1224 FWL / TWSP: 23S / RANGE: 29E / SECTION: 28 / LAT: 32.2819283 / LONG: -103.9945177 ( TVD: 0 feet, MD: 0 feet )

PPP: SESW / 100 FSL / 1994 FWL / TWSP: 23S / RANGE: 29E / SECTION: 21 / LAT: 32.2834901 / LONG: -103.9920311 ( TVD: 8425 feet, MD: 8511 feet )

BHL: NENW / 100 FNL / 1980 FWL / TWSP: 23S / RANGE: 29E / SECTION: 16 / LAT: 32.3121912 / LONG: -103.9918074 ( TVD: 8765 feet, MD: 19089 feet )

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**Review and Appeal Rights**

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

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U.S. Department of the Interior  
Bureau of Land Management

## Application for Permit to Drill

### APD Package Report

Date Printed: 09/23/2024 12:07 PM

APD ID: 10400063545

Well Status: AAPD

APD Received Date: 10/16/2020 05:47 AM

Well Name: BLUE STEEL 21 SB FEE

Operator: MARATHON OIL PERMIAN LLC

Well Number: 7H

#### APD Package Report Contents

- Form 3160-3
- Operator Certification Report
- Application Report
- Application Attachments
  - Well Plat: 1 file(s)
- Drilling Plan Report
- Drilling Plan Attachments
  - Blowout Prevention Choke Diagram Attachment: 4 file(s)
  - Blowout Prevention BOP Diagram Attachment: 3 file(s)
  - Casing Design Assumptions and Worksheet(s): 3 file(s)
  - Hydrogen sulfide drilling operations plan: 4 file(s)
  - Proposed horizontal/directional/multi-lateral plan submission: 6 file(s)
  - Other Facets: 1 file(s)
- SUPO Report
- SUPO Attachments
  - Existing Road Map: 4 file(s)
  - Attach Well map: 1 file(s)
  - Production Facilities map: 1 file(s)
  - Water source and transportation map: 1 file(s)
  - Well Site Layout Diagram: 3 file(s)
  - Other SUPO Attachment: 5 file(s)
- PWD Report
- PWD Attachments
  - None
- Bond Report
- Bond Attachments
  - None

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

<sup>1</sup> API Number <b>30-015-55448</b>	<sup>2</sup> Pool Code 96721	<sup>3</sup> Pool Name LAGUNA SALADO (BONE SPRING)
<sup>4</sup> Property Code <b>336282</b>	<sup>5</sup> Property Name BLUE STEEL 21 SB FEE	
<sup>7</sup> OGRID No. 372098	<sup>8</sup> Operator Name MARATHON OIL PERMIAN LLC	
		<sup>6</sup> Well Number 7H
		<sup>9</sup> Elevation 2999'

<sup>10</sup> Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	28	23S	29E		470	NORTH	1224	WEST	EDDY

<sup>11</sup> 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
C	16	23S	29E		100	NORTH	1980	WEST	EDDY

<sup>12</sup> Dedicated Acres 320.0	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> Order No.
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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.

**Defining Well**

**CORNER COORDINATES NAD 83, SPCS NM EAST**  
A - X: 646187.07' / Y: 477573.23'  
B - X: 647506.95' / Y: 477578.03'  
C - X: 647475.03' / Y: 466934.71'  
D - X: 646145.88' / Y: 466933.84'

**CORNER COORDINATES NAD 27, SPCS NM EAST**  
A - X: 605004.08' / Y: 477513.56'  
B - X: 606323.97' / Y: 477518.36'  
C - X: 606291.75' / Y: 466875.28'  
D - X: 604962.60' / Y: 466874.42'

**LAST TAKE POINT/BOTTOM HOLE LOCATION**  
100' FNL 1980' FWL, SECTION 16  
NAD 83, SPCS NM EAST  
X: 646846.44' / Y: 477475.63'  
LAT: 32.31219124N / LON: -103.99180739W  
NAD 27, SPCS NM EAST  
X: 605663.46' / Y: 477415.96'  
LAT: 32.31206937N / LON: -103.99131506W

**FIRST TAKE POINT**  
100' FSL 1994' FWL, SECTION 21  
NAD 83, SPCS NM EAST  
X: 646810.57' / Y: 467034.28'  
LAT: 32.28349010N / LON: -103.99203107W  
NAD 27, SPCS NM EAST  
X: 605627.30' / Y: 466974.85'  
LAT: 32.28336798N / LON: -103.99153984W

**KICK OFF POINT**  
50' FSL 1994' FWL, SECTION 21  
NAD 83, SPCS NM EAST  
X: 646810.51' / Y: 466984.28'  
LAT: 32.28335266N / LON: -103.99203179W  
NAD 27, SPCS NM EAST  
X: 605627.23' / Y: 466924.85'  
LAT: 32.28323054N / LON: -103.99154055W

**SURFACE HOLE LOCATION**  
470' FNL 1224' FWL, SECTION 28  
NAD 83, SPCS NM EAST  
X: 646043.93' / Y: 466463.68'  
LAT: 32.28192831N / LON: -103.99451768W  
NAD 27, SPCS NM EAST  
X: 604860.63' / Y: 466404.27'  
LAT: 32.28180619N / LON: -103.99402644W

**<sup>17</sup> OPERATOR CERTIFICATION**

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

*[Signature]* **04/29/2020**  
Signature Date

**Melissa Szudera**  
Printed Name

**mszudera@marathonoil.com**  
E-mail Address

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**<sup>18</sup> 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 17, 2018  
Date of Survey

*[Signature]*  
Signature and Seal of Professional Surveyor

Certificate Number  
**LLOYD P. SHORT 21653**

**PECOS DISTRICT  
SURFACE USE  
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	Marathon Oil Permian LLC
LEASE NO.:	NMNM086024, NMNM136211, NMNM119272
COUNTY:	Eddy

Well Pad 1 (west pad):

**Blue Steel 21 WD Fee 3H**

Surface Hole Location: 470' FNL & 1194' FWL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 330' FNL & 330' FWL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 SB Fee 4H**

Surface Hole Location: 470' FNL & 1104' FWL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 660' FWL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 WD Fee 5H**

Surface Hole Location: 470' FNL & 1134' FWL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 990' FWL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 SB Fee 7H**

Surface Hole Location: 470' FNL & 1224' FWL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 1980' FWL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 WD Fee 10H**

Surface Hole Location: 470' FNL & 1164' FWL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 1650' FWL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 WD Fee 23H**

Surface Hole Location: 470' FNL & 1254' FWL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 2310' FWL, Section 16, T. 23 S., R. 29 E.

Well Pad 2 (east pad):

**Blue Steel 21 WD Fed Com 11H**

Surface Hole Location: 1420' FNL & 938' FEL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 1650' FEL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 WD Fed Com 16H**

Surface Hole Location: 1420' FNL & 908' FEL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 990' FEL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 WD Fed Com 17H**

Surface Hole Location: 1420' FNL & 878' FEL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 330' FEL, Section 16, T. 23 S., R. 29 E.

**Blue Steel 21 WD Fed Com 24H**

Surface Hole Location: 1419' FNL & 968' FEL, Section 28, T. 23 S., R. 29 E.

Bottom Hole Location: 100' FNL & 2310' FEL, Section 16, T. 23 S., R. 29 E.

### TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- General Provisions**
- Permit Expiration**
- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
  - Cave/Karst
  - Hydrology
  - Potash
- Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- Road Section Diagram**
- Production (Post Drilling)**
  - Well Structures & Facilities
- Interim Reclamation**
- Final Abandonment & Reclamation**

## **I. GENERAL PROVISIONS**

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

## **II. PERMIT EXPIRATION**

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

## **III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES**

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

## **IV. NOXIOUS WEEDS**

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

## V. SPECIAL REQUIREMENT(S)

### Hydrology:

The entire well pad(s) will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

When crossing ephemeral drainages the pipeline(s) will be buried to a minimum depth of 48 inches from the top of pipe to ground level. Erosion control methods such as gabions and/or rock aprons should be placed on both up and downstream sides of the pipeline crossing. In addition, curled (weed free) wood/straw fiber wattles/logs and/or silt fences should be placed on the downstream side for sediment control during construction and maintained until soils and vegetation have stabilized. Water bars should be placed within the ROW to divert and dissipate surface runoff. A pipeline access road is not permitted to cross these ephemeral drainages. Traffic should be diverted to a preexisting route. Additional seeding may be required in floodplains and drainages to restore energy dissipating vegetation.

Prior to pipeline installation/construction a leak detection plan will be developed. The method(s) could incorporate gauges to detect pressure drops, situating valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.

Any water erosion that may occur due to the construction of overhead electric line and during the life of the power line will be quickly corrected and proper measures will be taken to prevent future erosion. A power pole should not be placed in drainages, playas, wetlands, riparian areas, or floodplains and must span across the features at a distance away that would not promote further erosion.

### Cave/Karst Surface Mitigation

#### Construction:

##### **General Construction:**

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during construction, minimize

changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.

- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

#### **Leak Detection System:**

- A method of detecting leaks is required. The method could incorporate gauges to measure loss, situating valves and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present.
- A leak detection plan will be submitted to BLM that incorporates an automatic shut off system (see below) to minimize the effects of an undesirable event that could negatively sensitive cave/karst resources.
- Well heads, pipelines (surface and buried), storage tanks, and all supporting equipment should be monitored regularly after installation to promptly identify and fix leaks.

#### **Automatic Shut-off Systems:**

- Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

#### **Cave/Karst Subsurface Mitigation**

The following stipulations will be applied to protect cave/karst and groundwater concerns:

#### **Closed Loop System:**

- A closed loop system using steel tanks will be utilized during drilling – no pits
- All fluids and cuttings will be hauled off-site and disposed of properly at an authorized site

#### **Rotary Drilling with Fresh Water:**

- Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

#### **Directional Drilling:**

- The kick off point for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

#### **Lost Circulation:**

- ALL lost circulation zones between surface and the base of the cave occurrence zone will be logged and reported in the drilling report.
- If a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, regardless of the type of drilling machinery used, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

#### **Abandonment Cementing:**

- Additional plugging conditions of approval may be required upon well abandonment in high and medium karst potential occurrence zones.
- The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

#### **Pressure Testing:**

- The operator will perform annual pressure monitoring on all casing annuli and reported in a sundry notice.
- If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

**Potash:**

The following stipulations will be applied to protect Potash resources:

Lessees must comply with the 2012 Secretarial Potash Order. The Order is designed to manage the efficient development of oil, gas, and potash resources. Section 6 of the Order provides general provisions which must be followed to minimize conflict between the industries and ensure the safety of operations. To minimize impacts to potash resources, the proposed well is confined within the boundaries of the established Blue Steel Drill Island (See Potash Memo and Map in attached file for Drill Island description, included with original EA document).

## **VI. CONSTRUCTION**

### **A. NOTIFICATION**

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

### **B. TOPSOIL**

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

### **C. CLOSED LOOP SYSTEM**

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

### **D. FEDERAL MINERAL MATERIALS PIT**

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

### **E. WELL PAD SURFACING**

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

### **F. EXCLOSURE FENCING (CELLARS & PITS)**

#### **Exclosure Fencing**

The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

### **G. ON LEASE ACCESS ROADS**

#### **Road Width**

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed thirty (30) feet.

**Surfacing**

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

**Crowning**

Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 24' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

**Ditching**

Ditching shall be required on both sides of the road.

**Turnouts**

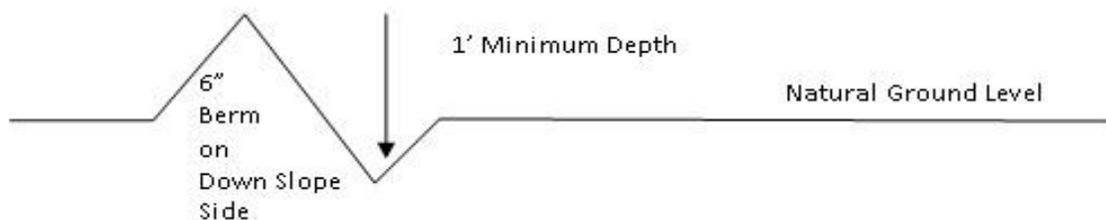
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

**Drainage**

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill out-sloping and in-sloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

**Cross Section of a Typical Lead-off Ditch**



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

### Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$400 \text{ foot road with } 4\% \text{ road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

#### **Cattle guards**

An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

#### **Fence Requirement**

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

#### **Public Access**

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

**Construction Steps**

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

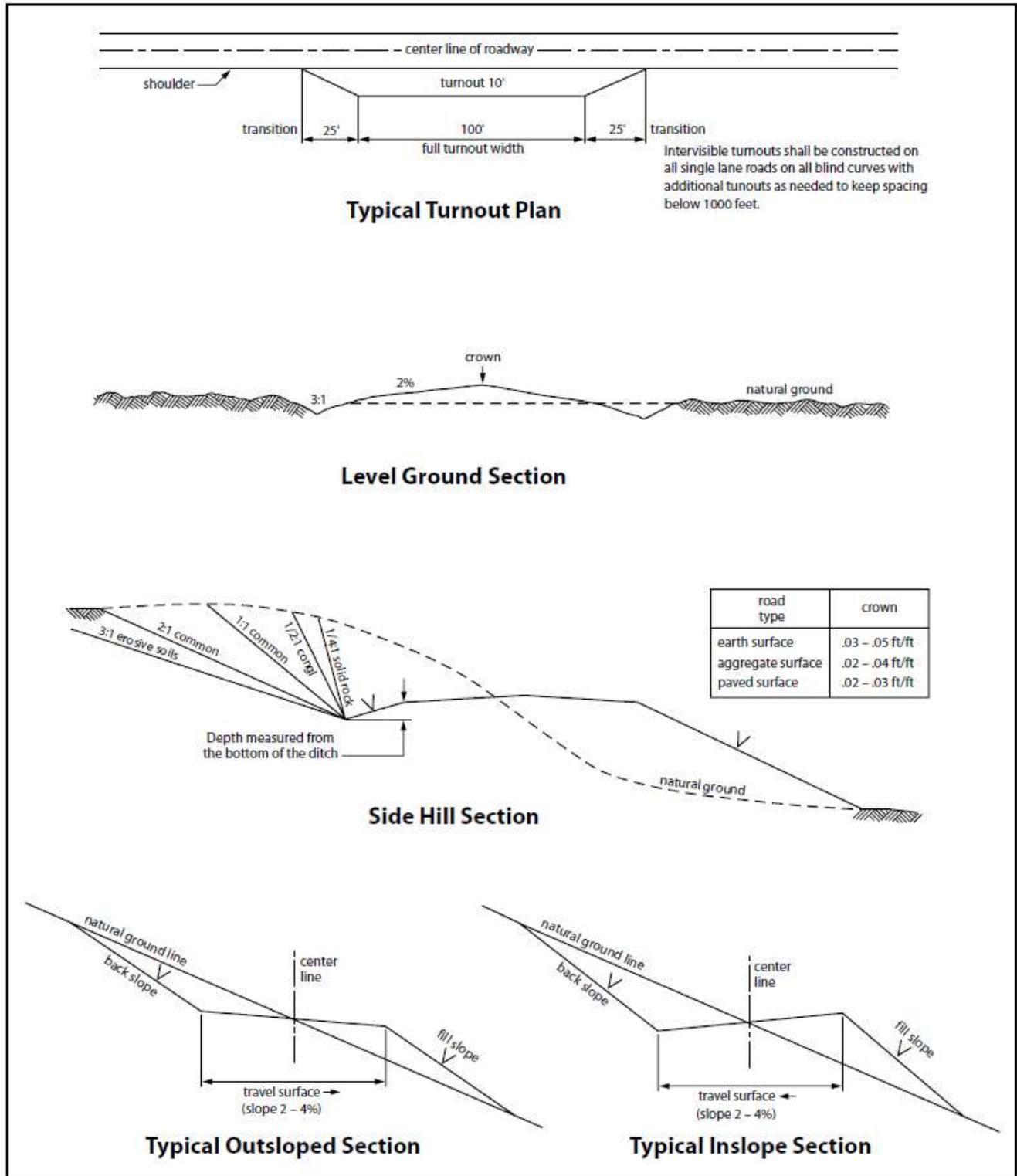


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VII. PRODUCTION (POST DRILLING)

### A. WELL STRUCTURES & FACILITIES

#### Placement of Production Facilities

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

#### Exclosure Netting (Open-top Tanks)

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

#### Chemical and Fuel Secondary Containment and Exclosure Screening

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

#### Open-Vent Exhaust Stack Exclosures

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

#### Containment Structures

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

#### Painting Requirement

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

## VIII. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

#### **IX. FINAL ABANDONMENT & RECLAMATION**

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

**Seed Mixture 2, for Sandy Sites**

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)\* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law (s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed\* per acre:

Species

	<u>lb/acre</u>	
Sand dropseed (Sporobolus cryptandrus)		1.0
Sand love grass (Eragrostis trichodes)	1.0	
Plains bristlegrass (Setaria macrostachya)		2.0

\*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed

## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	<b>Marathon Oil</b>
<b>LEASE NO.:</b>	<b>NMNM086024</b>
<b>LOCATION:</b>	Section 28, T.23 S., R.29 E., NMPPM
<b>COUNTY:</b>	Eddy County, New Mexico

<b>WELL NAME &amp; NO.:</b>	Blue Steel 21 SB Fee 7H
<b>SURFACE HOLE FOOTAGE:</b>	470'/N & 1224'/W
<b>BOTTOM HOLE FOOTAGE:</b>	100'/N & 1980'/W

COA

H2S	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Potash	<input type="radio"/> None	<input checked="" type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input type="radio"/> Low	<input checked="" type="radio"/> Medium	<input type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input type="checkbox"/> COM	<input type="checkbox"/> Unit

### A. HYDROGEN SULFIDE

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

### B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **420** feet (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. Wait on cement (WOC) time for a primary cement job will be a minimum of

**24 hours in the Potash Area** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

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

**Contingency:**

**Operator is approve to use DV Tool. Operator shall contact BLM before conducting DV Tool operation.**

- ❖ In Medium Cave/Karst Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
  - ❖ In Secretary Potash Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
- Cement should tie-back at least **500 feet** into previous casing string. Operator shall provide method of verification.

**C. PRESSURE CONTROL**

1. **Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).**
  2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
    - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
    - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
    - c. Manufacturer representative shall install the test plug for the initial BOP test.

- d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
- e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

## GENERAL REQUIREMENTS

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

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

Eddy County

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

Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)  
689-5981

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
  - a. Operator is approve to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
  - b. Operator is approved to set surface casing with Spudder Rig
    - Notify the BLM when moving in and removing the Spudder Rig.
    - Notify the BLM when moving in the 2<sup>nd</sup> Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
    - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

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

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a

larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

#### B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.
  - d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
  - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been

done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. The results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test

does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

**ZS 042722**



# Operator Certification Data Report

09/23/2024

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

## Operator

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

**NAME:** ADRIAN COVARRUBIAS

**Signed on:** 10/15/2020

**Title:** regulatory Compliance Representative

**Street Address:** 990 TOWN & COUNTRY BLVD

**City:** HOUSTON

**State:** TX

**Zip:** 77024

**Phone:** (713)296-3368

**Email address:** acovarrubias@marathonoil.com

## Field

**Representative Name:**

**Street Address:**

**City:**

**State:**

**Zip:**

**Phone:**

**Email address:**



# Application Data

09/23/2024

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

<b>APD ID:</b> 10400063545	<b>Submission Date:</b> 10/16/2020
<b>Operator Name:</b> MARATHON OIL PERMIAN LLC	
<b>Well Name:</b> BLUE STEEL 21 SB FEE	<b>Well Number:</b> 7H
<b>Well Type:</b> OIL WELL	<b>Well Work Type:</b> Drill

Highlighted data reflects the most recent changes  
[Show Final Text](#)

## Section 1 - General

<b>APD ID:</b> 10400063545	<b>Tie to previous NOS?</b> N	<b>Submission Date:</b> 10/16/2020
<b>BLM Office:</b> Carlsbad	<b>User:</b> ADRIAN COVARRUBIAS	<b>Title:</b> regulatory Compliance Representative
<b>Federal/Indian APD:</b> FED	<b>Is the first lease penetrated for production Federal or Indian?</b> FED	
<b>Lease number:</b> NMNM086024	<b>Lease Acres:</b>	
<b>Surface access agreement in place?</b>	<b>Allotted?</b>	<b>Reservation:</b>
<b>Agreement in place?</b> NO	<b>Federal or Indian agreement:</b>	
<b>Agreement number:</b>		
<b>Agreement name:</b>		
<b>Keep application confidential?</b> Y		
<b>Permitting Agent?</b> NO	<b>APD Operator:</b> MARATHON OIL PERMIAN LLC	
<b>Operator letter of</b>		

## Operator Info

**Operator Organization Name:** MARATHON OIL PERMIAN LLC

**Operator Address:** 990 TOWN & COUNTRY BLVD **Zip:** 77024

**Operator PO Box:**

**Operator City:** HOUSTON **State:** TX

**Operator Phone:** (713)929-6600

**Operator Internet Address:**

## Section 2 - Well Information

<b>Well in Master Development Plan?</b> NO	<b>Master Development Plan name:</b>
<b>Well in Master SUPO?</b> NO	<b>Master SUPO name:</b>
<b>Well in Master Drilling Plan?</b> NO	<b>Master Drilling Plan name:</b>
<b>Well Name:</b> BLUE STEEL 21 SB FEE	<b>Well Number:</b> 7H <b>Well API Number:</b>
<b>Field/Pool or Exploratory?</b> Field and Pool	<b>Field Name:</b> Culebra Bluff, South <b>Pool Name:</b> BONE SPRING

**Operator Name:** MARATHON OIL PERMIAN LLC

**Well Name:** BLUE STEEL 21 SB FEE

**Well Number:** 7H

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

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

**Type of Well Pad:** MULTIPLE WELL

**Multiple Well Pad Name:** Blue Steel 21 Fee    **Number:** 302-1

**Well Class:** HORIZONTAL

**Number of Legs:** 1

**Well Work Type:** Drill

**Well Type:** OIL WELL

**Describe Well Type:**

**Well sub-Type:** INFILL

**Describe sub-type:**

**Distance to town:** 6.3 Miles

**Distance to nearest well:** 1125 FT

**Distance to lease line:** 470 FT

**Reservoir well spacing assigned acres Measurement:** 320 Acres

**Well plat:** APP\_2\_\_BLUE\_STEEL\_21\_SB\_FEE\_7H\_\_Signed\_APD\_C102\_REV0\_CERT\_10.17.2018\_20201015153639.pdf

**Well work start Date:** 06/30/2021

**Duration:** 31 DAYS

**Section 3 - Well Location Table**

**Survey Type:** RECTANGULAR

**Describe Survey Type:**

**Datum:** NAD83

**Vertical Datum:** NAVD88

**Survey number:** 21653

**Reference Datum:** GROUND LEVEL

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this
SHL Leg #1	470	FNL	1224	FWL	23S	29E	28	Aliquot NWN W	32.2819283	-103.9945177	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 086024 Z	2999	0	0	N
KOP Leg #1	50	FSL	1994	FWL	23S	29E	21	Aliquot SESW	32.2833526	-103.9920318	EDD Y	NEW MEXI CO	NEW MEXI CO	F	FEE	-5194	8271	8193	N
PPP Leg #1-1	100	FSL	1994	FWL	23S	29E	21	Aliquot SESW	32.2834901	-103.9920311	EDD Y	NEW MEXI CO	NEW MEXI CO	F	FEE	-5426	8511	8425	Y

**Operator Name:** MARATHON OIL PERMIAN LLC

**Well Name:** BLUE STEEL 21 SB FEE

**Well Number:** 7H

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this
EXIT Leg #1	100	FNL	1980	FWL	23S	29E	16	Aliquot NENW	32.3121912	-103.9918074	EDD Y	NEW MEXICO	NEW MEXICO	S	STATE	-5766	19089	8765	Y
BHL Leg #1	100	FNL	1980	FWL	23S	29E	16	Aliquot NENW	32.3121912	-103.9918074	EDD Y	NEW MEXICO	NEW MEXICO	S	STATE	-5766	19089	8765	Y

CONFIDENTIAL



# Drilling Plan Data Report

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

09/23/2024

APD ID: 10400063545

Submission Date: 10/16/2020

Highlighted data reflects the most recent changes

Operator Name: MARATHON OIL PERMIAN LLC

Well Name: BLUE STEEL 21 SB FEE

Well Number: 7H

Well Type: OIL WELL

Well Work Type: Drill

[Show Final Text](#)

## Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical	Measured Depth	Lithologies	Mineral Resources	Producing Formatio
10319071	RUSTLER	2999	0	0	ANHYDRITE	OTHER : BRINE	N
10319065	SALADO	2643	356	356	ANHYDRITE, SALT	OTHER : BRINE	N
10319066	CASTILE	2013	986	986	ANHYDRITE, SALT	OTHER : BRINE	N
10319073	BASE OF SALT	33	2966	2966	ANHYDRITE, SALT	OTHER : BRINE	N
10319075	LAMAR	33	2966	2966	SANDSTONE, SHALE	NONE	N
10319079	BELL CANYON	-19	3018	3018	SANDSTONE	OIL	N
10319076	CHERRY CANYON	-857	3856	3856	SANDSTONE	OIL	N
10319080	BRUSHY CANYON	-2000	4999	4999	SANDSTONE	OIL	N
10319081	BONE SPRING LIME	-3646	6645	6645	LIMESTONE	NONE	N
10319067	UPPER AVALON SHALE	-3721	6720	6720	SHALE	OIL	N
10319068	BONE SPRING 1ST	-4683	7682	7682	SANDSTONE	OIL	N
10319069	BONE SPRING 2ND	-5462	8461	8461	SANDSTONE	OIL	Y

## Section 2 - Blowout Prevention

Pressure Rating (PSI): 5M

Rating Depth: 20000

**Equipment:** 13 5/8 5M Annular & BOP Stack will be installed and tested for the 12 1/4" and 8 3/4" sections. Min WP is 5000, annular will be tested to 50% of the WP and BOP Stack will be tested 5000. Check and kill valve will meet or exceed minimum BOP requirements.

**Requesting Variance?** YES

**Variance request:** A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.

**Operator Name:** MARATHON OIL PERMIAN LLC

**Well Name:** BLUE STEEL 21 SB FEE

**Well Number:** 7H

**Testing Procedure:** BOP/BOPE will be tested to 250 psi low and the high pressure indicated above by an independent service company per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested. 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 will include a Kelly cock, full opening safety valve / inside BOP and choke lines and choke manifold. See attached schematics. Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i. A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic.

**Choke Diagram Attachment:**

- DRILL\_2\_CHOKE\_\_\_Choke\_Line\_Flex\_III\_Rig\_20201014121812.pdf
- DRILL\_2\_CHOKE\_\_\_Contitech\_Hose\_SN\_663393\_20201014121814.pdf
- DRILL\_2\_CHOKE\_\_\_Choke\_Line\_Test\_Chart\_SN\_63393\_20201014121815.pdf
- DRILL\_2\_CHOKE\_5M\_10M.TWO\_CHOKE\_MANIFOLD.BLM.r1\_20201015084618.pdf

**BOP Diagram Attachment:**

- DRILL\_2\_BOP\_4H7H\_WH\_TH\_Design\_1A\_\_5K\_10K\_5.5in\_\_20201015144547.pdf
- DRILL\_2\_BOP\_\_\_10\_5M\_Flex.BOPE.BLM\_20201014121732.pdf
- DRILL\_2\_BOP\_Well\_Control\_Plan\_\_\_Permian\_20201015085400.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	420	0	420	2999	2579	420	J-55	54.5	ST&C	3.37	1.71	BUOY	2.93	BUOY	2.93
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	3060	0	3041	2901	-42	3060	J-55	36	LT&C	1.26	1.2	BUOY	1.96	BUOY	1.96
3	PRODUCTION	8.75	5.5	NEW	API	N	0	19089	0	8765	2999	-5766	19089	P-110	20	BUTT	1.65	1.29	BUOY	2.08	BUOY	2.08

**Casing Attachments**

**Operator Name:** MARATHON OIL PERMIAN LLC

**Well Name:** BLUE STEEL 21 SB FEE

**Well Number:** 7H

**Casing Attachments**

---

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

DRILL\_3\_4H7H\_Malaga\_BS\_3\_Surface\_20201015151615.pdf

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

DRILL\_3\_4H7H\_Malaga\_BS\_3\_Intermediate\_20201015151715.pdf

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

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

DRILL\_3\_4H7H\_Malaga\_BS\_3\_Production\_20201015151533.pdf

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**Section 4 - Cement**

**Operator Name:** MARATHON OIL PERMIAN LLC

**Well Name:** BLUE STEEL 21 SB FEE

**Well Number:** 7H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	0	0	1.73	13.5	0	100	Class C	LCM
SURFACE	Tail		0	420	428	1.33	14.8	584	100	CLASS C	ACCELERATOR
INTERMEDIATE	Lead		0	2000	634	2.21	12.8	1096	75	CLASS C	EXTENDER, ACCELERATOR.
INTERMEDIATE	Tail		2000	3060	374	1.33	14.8	498	50	CLASS C	RETARDER
PRODUCTION	Lead		2760	8270	876	3.21	11	2366	70	CLASS H	VISCOSIFIER, RETARDER
PRODUCTION	Tail		8270	19089	2912	1.22	14.5	3553	30	CLASS H	EXTENDER, FLUID LOSS, DISPERSANT

### 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:** The necessary mud products for additional weight and fluid loss control will be on location at all times.

**Describe the mud monitoring system utilized:** Losses or gains in the mud system will be monitored visually/manually as well as with an electronic PVT.

### 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	420	WATER-BASED MUD	8.4	8.8							
420	3060	OTHER : Brine	8.8	9.8							
3060	19089	OIL-BASED MUD	8.8	9.8							

**Operator Name:** MARATHON OIL PERMIAN LLC

**Well Name:** BLUE STEEL 21 SB FEE

**Well Number:** 7H

## Section 6 - Test, Logging, Coring

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

GR from TD to surface (horizontal well - vertical portion of hole). GR while drilling from Intermediate casing shoe to TD.

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

GAMMA RAY LOG,

### Coring operation description for the well:

Run gamma-ray (GR) and corrected neutron log (CNL) or analogous to surface for future development of the area, one per shared well pad not to exceed 200 radial distance.

## Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 4466

**Anticipated Surface Pressure:** 2537

**Anticipated Bottom Hole Temperature(F):** 195

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

**Describe:**

**Contingency Plans geohazards description:**

**Contingency Plans geohazards**

**Hydrogen Sulfide drilling operations plan required?** YES

**Hydrogen sulfide drilling operations**

DRILL\_7\_Marathon\_\_Blue\_Steel\_FEE\_3h\_4h\_5h\_7h\_10h\_23h\_Contingency\_Plan\_040820\_20201014125949.pdf  
 DRILL\_7\_\_BLUE\_STEEL\_21\_FEE\_H2S\_Layout\_20201015084707.pdf  
 DRILL\_7\_\_BLUE\_STEEL\_21\_FEE\_Rig\_Layout\_20201015084708.pdf  
 DRILL\_7\_\_GCP\_BLUE\_STEEL\_FEE\_\_4H7H3H5H10H23H\_\_04\_29\_2020\_20201014130025.pdf

## Section 8 - Other Information

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

DRILL\_8PD\_Blue\_Steel\_Fee\_FedCom\_Surface\_Lease\_Map\_20201015123351.pdf  
 DRILL\_8\_\_BLUE\_STEEL\_FEE\_\_FED\_\_S\_ROW\_\_Lease\_Ownership\_Map\_20201015123351.pdf  
 DRILL\_8\_PD\_\_Marathon\_BlueSteel21SB7H\_PrelimA\_ACReport\_20201015155444.pdf  
 DRILL\_8\_PD\_\_Marathon\_BlueSteel21SB7H\_PrelimA\_36x48WM\_20201015155445.PDF  
 DRILL\_8\_PD\_\_Marathon\_BlueSteel21SB7H\_PrelimA\_WPReport\_20201015155449.pdf  
 DRILL\_PLAN\_Blue\_Steel\_21\_SB\_Fee\_4H\_rev\_10.19.21\_20211019092546.pdf

### Other proposed operations facets description:

- Kelly cock will be in the drill string at all times.
- A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor unobstructed and readily accessible at all times.
- Hydrogen Sulfide detection equipment will be in operation after drilling out the surface casing shoe until the production casing is cemented. Breathing equipment will be on location upon

**Operator Name:** MARATHON OIL PERMIAN LLC

**Well Name:** BLUE STEEL 21 SB FEE

**Well Number:** 7H

drilling the surface casing shoe until total depth is reached. If Hydrogen Sulfide is encountered, measured amounts and formations will be reported to the BLM.

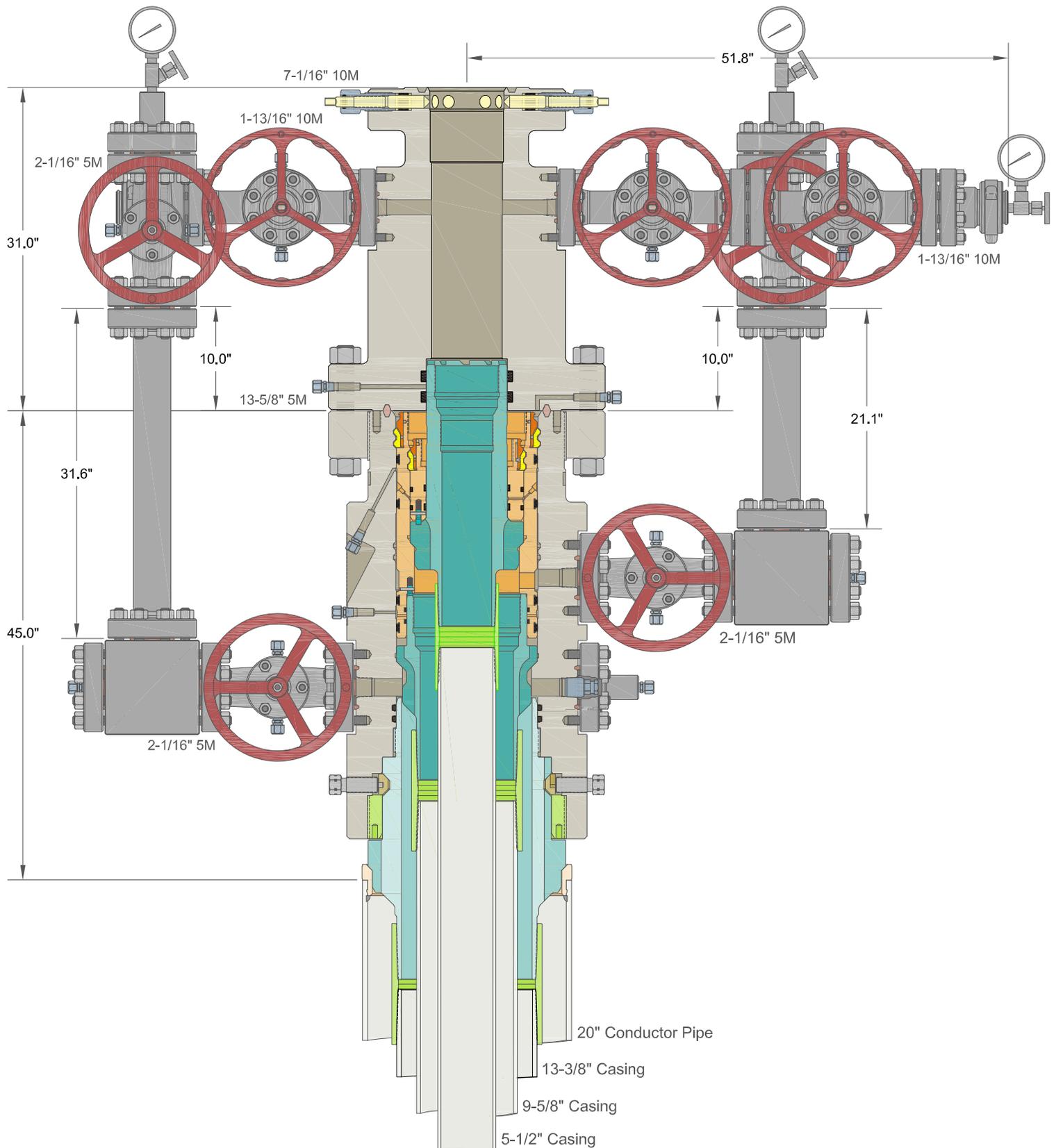
**Potential Hazards:**

- H2S detection equipment will be in operation after drilling out the surface casing shoe until the production casing has been cemented. Breathing equipment will be on location from drilling out the surface shoe until production casing is cemented. If H2S is encountered the operator will comply with Onshore Order #6.
- No abnormal temperatures or pressures are anticipated. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.
- No losses are anticipated at this time.
- All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well.
- Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.

**Other proposed operations facets attachment:**

DRILL\_8\_OF\_Batch\_Drilling\_Plan\_and\_Surface\_Rig\_Request\_20201006091233.pdf

**Other Variance attachment:**



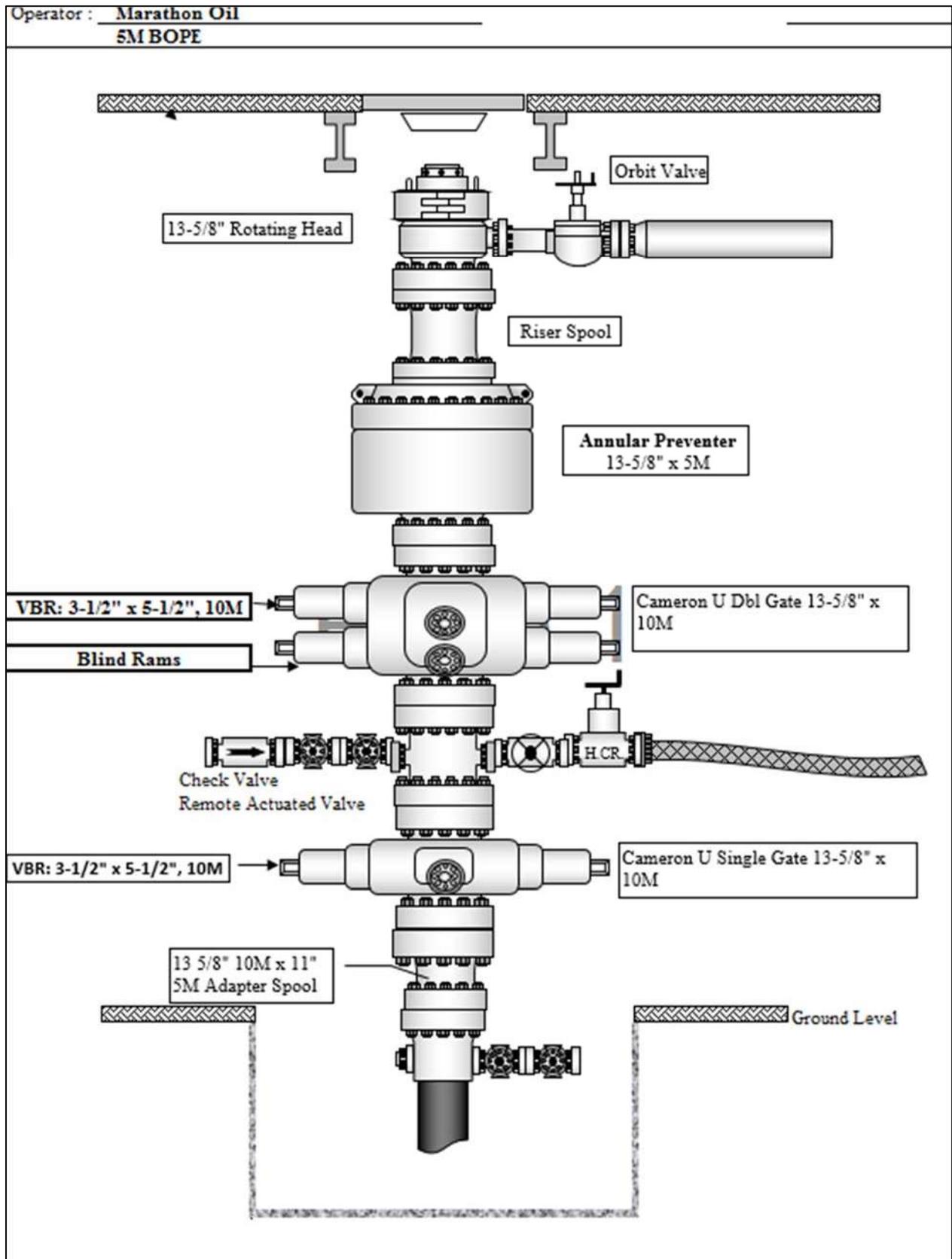
INFORMATION CONTAINED HEREIN IS THE PROPERTY OF CACTUS WELLHEAD, LLC. REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PERMISSIBLE ONLY AS PROVIDED BY CONTRACT OR AS EXPRESSLY AUTHORIZED BY CACTUS WELLHEAD, LLC.

# CACTUS WELLHEAD LLC

MARATHON OIL COMPANY  
CARLSBAD, NM

13-3/8" x 9-5/8" x 5-1/2" 15M MBU-3T-CFL Wellhead Assembly  
With 13-5/8" 5M x 7-1/16" 10M CTH-DBLHPS Tubing Head  
and 9-5/8" & 5-1/2" Pin Down Casing Hangers

DRAWN	DLE	24JUL17
APPRV		
DRAWING NO.	ODE0001625	



## 1. DRILLING WELL CONTROL PLAN

---

### 1.1 WELL CONTROL - CERTIFICATIONS

#### Required IADC/IWCF Well Control Certifications Supervisor Level:

Any personnel who supervises or operates the BOP must possess a valid current IADC training certification and photo identification. This would include the onsite drilling supervisor, tool pusher/rig manager, driller, and any personnel that will be acting in these capacities. Another example of this may be a wireline or snubbing crew rigged up on the rig to assist the rig, the operator of each system must also have a valid control certification for their level of operation.

BLM recognizes IADC training as the industry approved accredited training. Online self-certifications will not be acceptable. Enforcement actions for the lack of a valid Supervisory Level certificate shall be prompt action to correct the deficiency. **Enforcement actions include but are not limited to immediate replacement of personnel lacking certifications, drilling operations being shut down or installment of a 10M annular.**

IADC Driller Level for all Drillers and general knowledge for the Assistant Driller, Derrick Hands, Floor Hands and Motor Hands is recognized by the BLM; however, a Driller Level certification will need to be presented only if acting in a temporary Driller Level certification capacity.

#### **Well Control-Position/Roles**

IADC Well control training and certification is targeted toward each role, e.g., Supervisor Level toward those who direct, Driller Level to those who act, Introductory to those who need to know.

- **Supervisor Level**
  - Specifies and has oversight that the correct actions are carried out
  - Role is to supervise well control equipment, training, testing, and well control events
  - Directs the testing of BOP and other well control equipment
  - Regularly direct well control crew drills
  - Land based rigs – usually runs the choke during a well kill operation
  - Due to role on the rig, training and certification is targeted more toward management of well control and managing an influx out of the well
  
- **Driller Level**
  - Performs an action to prevent or respond to well control accident
  - Role is to monitor the well via electronic devices while drilling and detect unplanned influxes
  - Assist with the testing of BOP and other well control equipment
  - Regularly assist with well control crew drills
  - When influx is detected, responsible to close the BOP
  - Due to role on the rig, training and certification is targeted more toward monitoring and shutting the well in (closing the BOP) when an influx is detected

**(Well Control-Positions/Roles Continued)**

- **Derrick Hand, Assistant Driller Introductory Level**
  - Role is to assist Driller with kick detection by physically monitoring the well at the mixing pits/tanks
  - Regularly record mud weights/viscosity for analysis by the Supervisor level and mud engineer so pre-influx signs can be detected
  - Mix required kill fluids as directed by Supervisor or Driller
  - Due to role on the rig, training and certification is targeted more toward monitoring for influxes, either via mud samples or visual signs on the pits/tanks
  
- **Motorman, Floor Hand Introductory Level**
  - Role is to assist the Supervisor, Driller, or Derrick Hand with detecting influxes
  - Be certain all valves are aligned for proper well control as directed by Supervisor
  - Perform Supervisor or Driller assigned tasks during a well control event
  - Due to role on the rig, training and certification is targeted more toward monitoring for influxes

**1.2 WELL CONTROL-COMPONENT AND PREVENTER COMPATIBILITY CHECKLIST**

The table below, which covers the drilling and casing of the 10M Stack portion of the well, outlines the tubulars and the compatible preventers in use. This table, combined with the mud program, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

- **Example 8-3/4" Production hole section, 10M requirement**

Component	OD	Preventer	RWP
Drill pipe	5"	Fixed lower 5" Upper 4.5-7" VBR	10M
HWDP	5"	Fixed lower 5" Upper 4.5-7" VBR	10M
Drill collars and MWD tools	6.25-6.75"	Upper 4.5-7" VBR	10M
Mud Motor	6.75"	Upper 4.5-7" VBR	10M
Production casing	5.5"	Upper 4.5-7" VBR	10M
ALL	0-13-5/8"	Annular	5M
Open-hole	-	Blind Rams	10M

- VBR = Variable Bore Ram. Compatible range listed in chart.

**1.3 WELL CONTROL-BOP TESTING**

BOP Test will be completed per Onshore Oil and Gas Order #2 Well Control requirements. The 5M Annular Preventer on a required 10M BOP stack will be tested to 70 % of rated working pressure including a 10 minute low pressure test. Pressure shall be maintained at least 10 minutes.

## 1.4 WELL CONTROL - DRILLS

The following drills are conducted and recorded in the Daily Drilling Report and the Contractor's reporting system while engaged in drilling operations:

Type	Frequency	Objective	Comments
Shallow gas kick drill - drilling	Once per well with crew on tour	Response training to a shallow gas influx	To be done prior to drilling surface hole if shallow gas is noted
Kick drill - drilling	Once per week per crew	Response training to an influx while drilling (bit on bottom)	Only one kick drill per week per crew is required, alternating between drilling and tripping.
Kick drill - tripping	Once per week per crew	Response training to an influx while tripping (bit off bottom). Practice stabbing TIW valve	
Choke drill	Once per well with crew on tour	Practice in operating the remotely operated choke with pressure in the well	Before drilling out of the last casing set above a prospective reservoir  Include the scenario of flowing well with gas on drill floor as a table top
H <sub>2</sub> S drill	Prior to drilling into a potential H <sub>2</sub> S zone/reservoir	Practice in use of respiratory equipment	

## 1.5 WELL CONTROL – MONITORING

- Drilling operations which utilize static fluid levels in the wellbore as the active barrier element, a means of accurately monitoring fill-up and displacement volumes during trips are available to the driller and operator. A recirculating trip tank is installed and equipped with a volume indicator easily read from the driller's / operator's position. This data is recorded on a calibrated chart recorder or digitally. The actual volumes are compared to the calculated volumes.
- The On-Site Supervisor ensures hole-filling and pit monitoring procedures are established and documented for every rig operation.
- The well is kept full of fluid with a known density and monitored at all times even when out of the hole.
- Flow checks are a minimum of 15 minutes.
- A flow check is made:
  - In the event of a drilling break.
  - After indications of down hole gains or losses.
  - Prior to all trips out of the hole.
  - After pulling into the casing shoe.
  - Before the BHA enters the BOP stack.
  - If trip displacement is incorrect.

### Well Control-Monitoring (Continued)

- Prior to dropping a survey instrument.
- Prior to dropping a core ball.
- After a well kill operation.
- When the mud density is reduced in the well.
- Flow checks may be made at any time at the sole discretion of the driller or his designate. The Onsite Supervisor ensures that personnel are aware of this authority and the authority to close the well in immediately without further consultation.
- Record slow circulating rates ( SCR ) after each crew change, bit trip, and 500' of new hole drilled and after any variance greater than 0.2 ppg in MW. Slow pump rate recordings should include return flow percent, TVD, MD & pressure. SCR's will be done on all pumps at 30, 40 & 50 SPM. Pressures will be recorded at the choke panel. SCR will be recorded in the IADC daily report and MRO Wellview daily report
- Drilling blind (i.e. without returns) is permissible only in known lithology where the absence of hydrocarbons has been predetermined and written approval of the Drilling Manager.
- All open hole logs to be run with pack-off, lubricator or Drilling Manager approved alternative means.
- The Drilling Contractor has a fully working pit level totalizer / monitoring system with read out for the driller and an audible alarm set to 10 BBL gain / loss volume. Systems are selectable to enable monitoring of all pits in use. Pit volumes are monitored at all times, especially when transferring fluids. Both systems data is recorded on a calibrated chart recorder or electronically.
- The Drilling Contractor has a fully working return mud flow indicator with drillers display and an audible alarm, and is adjustable to record any variance in return volumes.

### 1.6 WELL CONTROL – SHUT IN

- The “hard shut in” method (i.e. against a closed choke using either an annular or ram type preventer) is the Company standard.
- The HCR(s) or failsafe valves are left closed during drilling to prevent any erosion and buildup of solids. The adjustable choke should also be left closed.
- The rig specific shut in procedure, the BOP configuration along with space-out position for the tool joints is posted in the Driller's control cabin or doghouse.
- No well kill operation commences until there is a plan agreed by the Superintendent, On-Site Supervisor and the Drilling Manager.
- During a well kill by circulation, constant bottom hole pressure is maintained throughout.
- Kill sheets are maintained by the Driller and posted in the Driller's control cabin or doghouse. The sheet is updated at a minimum every 500 feet.

## 2. SHUT-IN PROCEDURES:

---

### 2.1 PROCEDURE WHILE DRILLING

- Sound alarm (alert crew)
- Space out drill string – Stop rotating, pick the drill string up off bottom, and space out to ensure no tool joint is located in the BOP element selected for initial closure.
- Shut down pumps (stop pumps and observe well.)
- Shut-in Well - If flow is suspected or confirmed, close uppermost applicable BOP element. (HCR and choke will already be in the closed position.)
  - **Note:** Either the uppermost pipe ram or annular preventer can be used.
- Confirm shut-in
- Notify toolpusher/company representative
- Gather all relevant data required:
  - SIDPP and SICP
  - Hole Depth and Hole TVD
  - Pit gain
  - Time
  - Kick Volume
  - Pipe depth
  - MW in, MW out
  - SPR's (Slow Pump Rate's)
- Regroup and identify forward plan (let well stabilize, update kill sheet, inventory mud additives and mud volumes on location)
- Company Representative, Drilling Superintendent, Drilling Engineer and Drilling Manager will discuss well control kill method to be utilized. A verbal Risk Assessment and preferred kill method will be finalized. Initial Risk Assessment will be finalized within 1 hour of initial shut in.
- No well kill operation commences until there is a plan agreed by the Superintendent, On-Site Supervisor and the Drilling Contractor PIC.
- Recheck all pressures and fluid volume on accumulator unit
- If pressure has built or is anticipated during the kill to reach 2,500 psi or greater, the annular preventer CANNOT be used as per Oil Company Well Control Policy, swap to the upper BOP pipe ram.

### 2.2 PROCEDURE WHILE TRIPPING

- Sound alarm (alert crew)
- Stab full opening safety valve in the drill string and close.
- Space out drill string (ensure no tool joint is located in the BOP element selected for initial closure).
- Shut down pumps (stop pumps and observe well.)
- Shut-in Well - If flow is suspected or confirmed, close uppermost applicable BOP element. (HCR and choke will already be in the closed position.)
  - **Note:** Either the uppermost pipe ram or annular preventer can be used.
- Confirm shut-in
- Notify tool pusher/company representative
- Gather all relevant data required:
  - SIDPP and SICP
  - Hole Depth and Hole TVD
  - Pit gain

## Procedure While Tripping (Continued)

- Time
- Kick Volume
- Pipe depth
- MW in, MW out
- SPR's (Slow Pump Rate's)
- Regroup and identify forward plan (let well stabilize, update kill sheet, inventory mud additives and mud volumes on location)
- Company Representative, Drilling Superintendent, Drilling Engineer and Drilling Manager will discuss well control kill method to be utilized. A verbal Risk Assessment and preferred kill method will be finalized. Initial Risk Assessment will be finalized within 1 hour of initial shut in.
- No well kill operation commences until there is a plan agreed by the Superintendent, On-Site Supervisor and the Drilling Contractor PIC.
- Recheck all pressures and fluid volume on accumulator unit  
If pressure has built or is anticipated during the kill to reach X,XXX psi or greater, the annular preventer CANNOT be used as per Company Well Control Policy, swap to the upper BOP pipe ram.

## 2.3 PROCEDURE WHILE RUNNING CASING

- Sound alarm (alert crew)
- Stab crossover and full opening safety valve and close
- Space out casing (ensure no coupling is located in the BOP element selected for initial closure).
- Shut down pumps (stop pumps and observe well.)
- Shut-in Well - If flow is suspected or confirmed, close uppermost applicable BOP element. (HCR and choke will already be in the closed position.)
  - **Note:** Either the uppermost pipe ram or annular preventer can be used.
- Confirm shut-in
- Notify tool pusher/company representative
- Gather all relevant data required:
  - SIDPP and SICP
  - Hole Depth and Hole TVD
  - Pit gain
  - Time
  - Kick Volume
  - Pipe depth
  - MW in, MW out
  - SPR's (Slow Pump Rate's)
- Regroup and identify forward plan (let well stabilize, update kill sheet, inventory mud additives and mud volumes on location)
- Company Representative, Drilling Superintendent, Drilling Engineer and Drilling Manager will discuss well control kill method to be utilized. A verbal Risk Assessment and preferred kill method will be finalized. Initial Risk Assessment will be finalized within 1 hour of initial shut in.
- No well kill operation commences until there is a plan agreed by the Superintendent, On-Site Supervisor and the Drilling Contractor PIC.
- Recheck all pressures and fluid volume on accumulator unit  
If pressure has built or is anticipated during the kill to reach 2,500 psi or greater, the annular preventer CANNOT be used, swap to the upper BOP pipe ram.

## 2.4 PROCEDURE WITH NO PIPE IN HOLE (OPEN HOLE)

- Sound alarm (alert crew)
- Shut-in with blind rams or BSR. (HCR and choke will already be in the closed position.)
- Confirm shut-in
- Notify toolpusher/company representative
- Gather all relevant data required:
  - Shut-In Pressure
  - Hole Depth and Hole TVD
  - Pit gain
  - Time
  - Kick Volume
  - MW in, MW out
  - SPR's (Slow Pump Rate's)
- Regroup and identify forward plan (let well stabilize, update kill sheet, inventory mud additives and mud volumes on location)
- Company Representative, Drilling Superintendent, Drilling Engineer and Drilling Manager will discuss well control kill method to be utilized. A verbal Risk Assessment and preferred kill method will be finalized. Initial Risk Assessment will be finalized within 1 hour of initial shut in.
- No well kill operation commences until there is a plan agreed by the Superintendent, On-Site Supervisor and the Drilling Contractor PIC.
- Recheck all pressures and fluid volume on accumulator unit.

## 2.5 PROCEDURE WHILE PULLING BHA THRU STACK

- PRIOR to pulling last joint of drill pipe thru the stack.
  - Perform flow check, if flowing.
  - Sound alarm (alert crew).
  - Stab full opening safety valve and close
  - Space out drill string with tool joint just beneath the upper pipe ram.
  - Shut-in using upper pipe ram. (HCR and choke will already be in the closed position).
  - Confirm shut-in.
  - Notify toolpusher/company representative
  - Read and record the following:
    - SIDPP and SICP
    - Pit gain
    - Time
  - Regroup and identify forward plan
- 
- **With BHA in the stack and compatible ram preventer and pipe combo immediately available.**
    - Sound alarm (alert crew)
    - Stab crossover and full opening safety valve and close
    - Space out drill string with upset just beneath the compatible pipe ram.
    - Shut-in using compatible pipe ram. (HCR and choke will already be in the closed position.)
    - Confirm shut-in
    - Notify toolpusher/company representative
    - Read and record the following:
      - SIDPP and SICP
      - Pit gain

### Procedures While Pulling BHA thru Stack (Continued)

- Time
  - Regroup and identify forward plan
  
- **With BHA in the stack and NO compatible ram preventer and pipe combo immediately available.**
  - Sound alarm (alert crew)
  - If possible to pick up high enough, pull string clear of the stack and follow “Open Hole” scenario.
  - If impossible to pick up high enough to pull the string clear of the stack:
  - Stab crossover, make up one joint/stand of drill pipe, and full opening safety valve and close
  - Space out drill string with tool joint just beneath the upper pipe ram.
  - Shut-in using upper pipe ram. (HCR and choke will already be in the closed position.)
  - Confirm shut-in
  - Notify toolpusher/company representative
  - Read and record the following:
    - SIDPP and SICP
    - Pit gain
    - Time



## **MARATHON OIL COMPANY**

### **BLUE STEEL 21 FEE**

**WD Well # 3H**

**SB Well # 4H**

**WD Well # 5H**

**SB Well # 7H**

**WD Well # 10H**

**WD Well # 23H**

**SHL: 470' FNL & 1194' FWL of Unit Letter 'D', Section 28, T-23S, R-29E**

**BHL: 330' FNL & 330' FWL of Unit Letter 'D', Section 16, T-23S, R-29E**

### **EDDY County, New Mexico**

**Rig: PRECISION 582**

**4/08/2020**

# EMERGENCY MEDICAL PROCEDURES DO NOT PANIC REMAIN CALM-THINK

1. HOLD YOUR BREATH. (DO NOT INHALE, STOP BREATHING)
2. PUT ON BREATHING APPARATUS. (NOTE: DO NOT ATTEMPT RESCUE UNTIL YOU HAVE PUT ON BREATHING APPARATUS.)
3. REMOVE VICTIM (S) TO FRESH AIR AS QUICKLY AS POSSIBLE.
4. BE SURE YOU HAVE MOVED VICTIM OUT OF CONTAMINATED AREA BEFORE REMOVING YOUR RESPIRATOR.
5. APPLY MOUTH-TO-MOUTH ARTIFICIAL RESPIRATION, WHICH IS MORE EFFECTIVE, WHILE SOMEONE ELSE GETS THE OXYGEN RESUSCITATOR. RENDER OXYGEN RESUSCITATION ONLY IF PORPERLY TRAINED IN ITS USE.
6. PROVIDE FOR PROMPT TRANSPORTATION TO HOSPITAL AND CONTUNUE GIVING ARTIFICIAL RESPIRATION IF NEEDED.
7. HOSPITAL (S) OR MEDICAL FACILITIES NEED TO BE INFORMED BEFOREHAND, OF THE POSSIBILITY OF H2S GAS POISONING, NO MATTER HOW REMOTE THE POSSIBLITY IS.

Lea Regional Medical Center	(575)492-5000
5419 N Lovington Hwy, Hobbs, NM 88240	
AMBULANCE	911
FIRE DEPARTMENT- HOBBS, NM	(575) 397-9308
POLICE - HOBBS, NM	(575) 397-9265

8. NOTIFY EMERGENCY-ROOM PERSONEL THAT THE VICTIM (S) HAVE POSSIBLY BEEN EXPOSED TO H2S GAS POISONING.

\*\*\*\*\*  
\*\*\*\*\*

**TOTAL SAFETY INC**  
**1420 East Greene St.**  
**Carlsbad, NM 88220**

THIS H2S DRILLING OPERATIONS PLAN WAS  
PREPARED BY: Sean Chamblee  
Strategic Account Manager  
Cell: 713-703-6295

TOTAL SAFETY INC  
1420 East Greene St  
Carlsbad, NM 88220  
Phone: 432-561-5049

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  - A. Oil Company Address and Legal Description of Well Site
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# INTRODUCTION

## H2S DRILLING OPERATIONS PLAN

This Drilling Operations Plan was written specifically for:

MARATHON OIL COMPANY  
4111 TIDWELL  
CALRSBAD, NM 88220

Action Plan for Accidental Release of H2S

## **BLUE STEEL 21 FEE**

**WD Well # 3H**

**SB Well # 4H**

**WD Well # 5H**

**SB Well # 7H**

**WD Well # 10H**

**WD Well # 23H**

EDDY COUNTY, NM

Information, provisions and practices, as set forth in this plan, may be subject to revision and/or updating.

4/08/2020

MARATHON OIL COMPANY  
4111 TIDWELL  
CALRSBAD, NM 88220

**BLUE STEEL 21 FEE**

**WD Well # 3H**

**SB Well # 4H**

**WD Well # 5H**

**SB Well # 7H**

**WD Well # 10H**

**WD Well # 23H**

EDDY COUNTY, NM

**Directions:**

From the Marathon Office at 4111 Tidwell, Carlsbad, NM head south on Tidwell Rd toward US Hwy 285N for 0.2 miles. Turn left onto US Hwy 285S, heading south for 5.1 miles to NM-Hwy 31. Turn left onto NM-Hwy 31, heading east, for 7.7 miles to NM-Hwy 128E. Turn right onto NM-Hwy 128E, heading east, for 4.5 miles to Rawhide Road. Turn right onto Rawhide Road, heading south, for 4.1 miles to a caliche road. Turn right onto caliche road, heading west, for 4.3 miles to a proposed lease road for the Blue Steel Fed 23-29-21WA#2H-FB#21H-SB#1JH-WXY#6H-FB#25H-WA#9H-WXY#8H well location pad.

**GPS Coordinates: 32.28180648, -103.99412390**  
**EDDY COUNTY, NEW MEXICO**

PURPOSE OF PLAN: The purpose of this plan is to safeguard the lives of the public, contract personnel and company personnel in the event of equipment failure or disasters during drilling or completion operations in formations that may contain Hydrogen Sulfide Gas, H<sub>2</sub>S.

As a precautionary measure, this Drilling Plan has been prepared to assure the safety of all concerned, should a disaster occur. However, the Oil Company Representative may have specified materials and practices for the drilling or completion of this well, which supercede the minimum requirements as outlined in this plan.

**Definitions:** For the purpose of this plan the following definitions are to be referred to:

**Controlled Release** – Any release that is planned and occurs during normal operations. A controlled release is managed per the procedures outlined in this section.

**Uncontrolled Release** – Any release that is unplanned and not immediately contained utilizing established shut-in procedures. An uncontrolled release is normally associated with a loss of well control.

**SCBA – (Self Contained Breathing Apparatus)** – A full-face mask respirator with a supplied positive pressure air source.

**Donned SCBA** – When it is required per this plan to “**don**” a SCBA, personnel will be 100% masked up and be on supplied breathing air.

**SCBA On Person** – When it is required per this plan to have SCBA “on person”, personnel will be required to wear the SCBA equipment - but not be masked up.

**“Qualified Buddy”** – Person who has been fit tested and is trained and is familiar with the requirements of donning an SCBA. This person will provide immediate assistance to another person who may be utilizing an SCBA or SkaPack in an IDLH atmosphere in the event of an emergency situation.

**In Scope Personnel** – Rig Personnel who will be working or otherwise present in potential H<sub>2</sub>S release areas, including the rig floor, cellar, pits, and shaker areas. This would not include 3rd party contractors who do not have a function, besides evacuating the rig, during an emergency condition such as during a well control event or H<sub>2</sub>S / LEL alarm. All qualified personnel that have a function to shut a well in during an emergency will be considered In-Scope per this plan

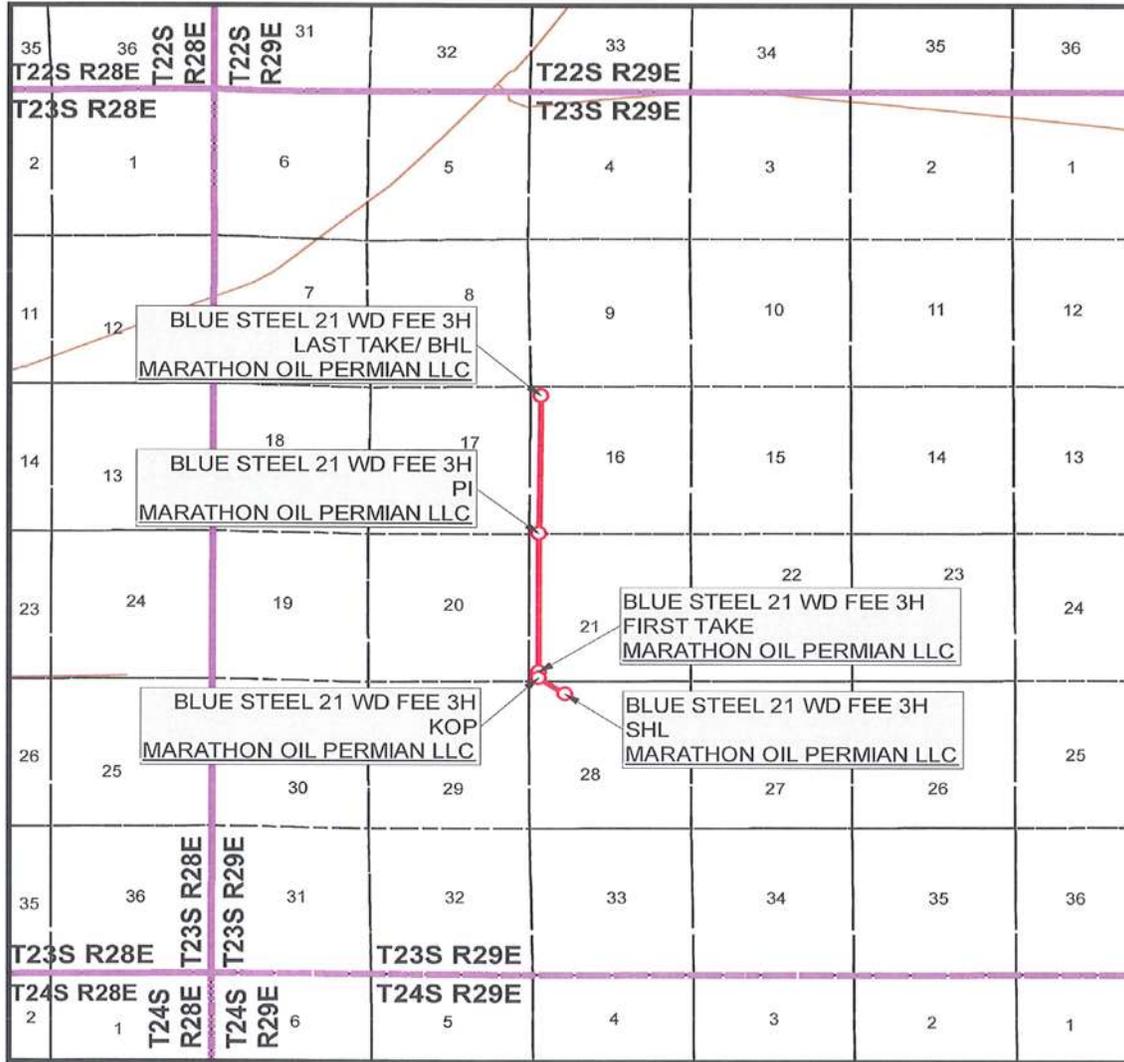
**Out of Scope Personnel** –. All personnel that are not in scope will be Out of Scope per the definition of this plan

**H<sub>2</sub>S Office** – Onsite office trailer space or vehicle that will be designated as the H<sub>2</sub>S office

**Marathon H2S Plan Custodian** – Marathon HES Advisor, Supervisor or Technician that has been specifically assigned per the authorization page of this plan to maintain this document.



### VICINITY MAP



SEC. 28 TWP. 23-S RGE. 29-E  
 SURVEY: N.M.P.M.  
 COUNTY: EDDY  
 OPERATOR: MARATHON OIL PERMIAN LLC  
 DESCRIPTION: 470' FNL & 1194' FWL  
 ELEVATION: 2999'  
 LEASE: BLUE STEEL 21 FEE  
 U.S.G.S. TOPOGRAPHIC MAP: REMUDA BASIN, NM.

1" = 1 MILE



SHEET 3 OF 3

PREPARED BY:  
 R-SQUARED GLOBAL, LLC  
 1309 LOUISVILLE AVENUE, MONROE, LA 71201  
 318-323-6900 OFFICE  
 JOB No. R3942\_002

SAFETY EQUIPMENT

All H2S related Safety Equipment must be installed, tested and Operational at a depth of 500 fee above, or 3 days prior to penetrating the first zone expected to contain H2S.

SAFETY EQUIPMENT PROVIDED BY TOTAL SAFETY INC.

<u>QTY</u>	<u>EQUIPMENT</u>
6 each	30-minute self-contained breathing apparatus
6 each	ELSA Escape Packs
1 Lot	Sufficient low-pressure airline hose with quick connects
1	6 Channel fixed H2S monitor
4	H2S Sensors (Loc determined at rig up – General: Cellar, Shale Shaker, floor/driller area)
4	Explosion proof Alarm Station (1-Drill Floor, 1- Pits/Shakers, 1- Generators, 1 Quarters area)
10	Personal H2S Monitors
1	Gastec pump type gas detector
Set	Various range of H2s & SO2 detector tubes
2 each	Windsocks w/frames and poles
1 Set	H2S and briefing area signs
1 Set	Well condition signs and flags
1	Flare Gun & Flares

## TYPE OF EQUIPMENT AND STORAGE LOCATIONS

1. There will be six 30-minute self-contained breathing apparatus on location. They will be positioned as follows: Two at Briefing Area #1 Two at Briefing Area #2, Two at rig dog house. SCBA Facepieces will be equipped with voice amplifiers for effective means of communication when using protective breathing apparatus.
2. There will be six Escape-type packs on location. One for the Derrickman. One on the Shaker. One at the bottom of rig dog house stairway and spares.
3. A Gastec, pump type, gas detector with low and high range detector tubes for H<sub>2</sub>S and SO<sub>2</sub> will be located in the doghouse
4. Two Briefing Areas will be designated at opposite ends of the location.
5. The Briefing Area most upwind is designated as the Safety Briefing Area #1. In an emergency, personnel must assemble at this upwind area for instructions from their supervisor.
6. The H<sub>2</sub>S ‘Safety’ trailer provided by Total Safety, Inc. will contain a cascade system of at least 5 each -300 C.F. air cylinders that will provide a continuous air supply to air lines located on the rig. Note: This trailer will **Only** be provided if H<sub>2</sub>S conditions require the use of the Air Trailer. (If Required)
7. Two windsocks will be installed so as to be visible from all parts of the location.
8. A well condition warning sign will be displayed at the location entrance to advise of current operating conditions. The condition signs must be at least 200’ from the entrance but not more than 500’ away.
9. A list of emergency telephone numbers will be kept on rig floor, tool pusher’s trailer, the Oil Company’s trailer and in the “safety” trailer (if Provided).
10. The primary means of communication will be cell phones.

11. A barricade will be available to block the entrance to location should an emergency occur. In most cases the use of a vehicle is used to block the entrance.
12. A 6-channel H<sub>2</sub>S monitor will be located in the doghouse. The 3 sensors will be installed: one on the shale shaker, one at the Cellar, one at the rig floor.
13. An undulating high and low pitch siren and light will be installed on the derrick "A" leg.
14. If H<sub>2</sub>S concentration reach 10 ppm an explosion-proof bug blower (fan) will be installed under the rig floor to disperse possible accumulations of H<sub>2</sub>S.
15. Any time it is necessary to flare gas containing H<sub>2</sub>S, a Sulfur Dioxide monitor or Detector tubes will be used to determine SO<sub>2</sub> concentrations.
16. A flare gun with flares will also be provided in the event it is necessary to ignite the well from a safe distance.

## OPERATING PROCEDURES

### BLOWOUT PREVENTION MEASURES DURING DRILLING

1. Blowout Prevention Requirements:

All BOP equipment shall meet the American Petroleum Institute specifications as to materials acceptable for H<sub>2</sub>S service and tested accordingly (or to BLM specifications).

2. Drilling String Requirements:

All drill string components are to be of material that meets the American Petroleum Institute's specifications for H<sub>2</sub>S service. All drill string components should be inspected to IADC critical service specifications prior to running in well.

### GAS MONITORING EQUIPMENT

1. A continuous H<sub>2</sub>S detection system, consisting of three H<sub>2</sub>S detectors and an audible/visual warning system will be in operating during all phases of this H<sub>2</sub>S Drilling Operations Plan. The detection system will be adjusted and calibrated such that an H<sub>2</sub>S exposure of 10 ppm or higher (at any sensor) will trigger the audible and visual portion (wailing or yelping siren) of the warning system (i.e. H<sub>2</sub>S continually present at or above threshold levels) a trained operator or H<sub>2</sub>S supervisor will monitor the H<sub>2</sub>S detection system.

2. When approaching or completing H<sub>2</sub>S formations, crewmembers may attach personnel H<sub>2</sub>S monitors to their person.

3. Hand held H<sub>2</sub>S sampling gas detectors will be used to check areas not covered by automatic monitoring equipment.

## CREW TRAINING AND PROTECTION

1. All personal working at the well site will be properly trained in accordance with the general training requirements outlined in the API Recommended Practices for Safe Drilling of Wells Containing H<sub>2</sub>S. The training will cover, but will not be limited to, the following:
  - a. General information of H<sub>2</sub>S AND SO<sub>2</sub> GAS
  - b. Hazards of these gases
  - c. Safety equipment on location
  - d. Proper use and care of personal protective equipment
  - e. Operational procedures in dealing with H<sub>2</sub>S gas
  - f. Evacuation procedures
  - g. First aid, reviving an H<sub>2</sub>S victim, toxicity, etc.
  - h. Designated Safe Briefing Areas
  - i. Buddy System
  - j. Regulations
  - k. Review of Drilling Operations Plan
2. Initial training shall be completed when drilling reaches, a depth of 500' above or 3 days prior to penetrating (whichever comes first) the first zone containing or expected to contain H<sub>2</sub>S. It must also include a review of the site specific Drilling Operations Plan and, if applicable, the Public Protections Plan.
3. Weekly H<sub>2</sub>S and well control drills for all personnel on each working crew shall be conducted.
4. All training sessions and drills shall be recorded on the driller's log or its equivalent.
5. Safety Equipment:

As outlined in the Safety Equipment index, H<sub>2</sub>S safety protection equipment will be available to/or assigned each person on location.
6. One person (by job title) shall be designated and identified to all on-site personnel as the person primarily responsible for the overall operation of the on-site safety and training programs. This will be the PIC

## METALLURGICAL CONSIDERATIONS

1. Steel drill pipe used in H<sub>2</sub>S environments should have yield strength of 95,000psi or less because of potential embrittlement problems. Must conform to the current National Association of Corrosion Engineers (NACE) Standard MR-0175-90, Material Requirement, Sulfide Stress Cracking Resistant Metallica Material for Oil Field Equipment. Drill stem joints near the top of the drill string are normally under the highest stress levels during drilling and do not have the protection of elevated down hole temperatures. These factors should be considered in design of the drill string. Precautions should be taken to minimize drill string stress caused by conditions such as excessive dogleg severity, improper torque, whip, abrasive wear or tool joints and joint imbalance. American Petroleum Institute, Bulletin RR 7G, will be used as a guideline for drill string precautions.
2. Corrosion inhibitors may be applied to the drill pipe or to the mud system as an additional safeguard.
3. Blowout preventors should meet or exceed the recommendations for H<sub>2</sub>S service as set forth in the latest edition of API RI 53.

## MUD PROGRAM AND TREATING

1. It is of utmost importance that the mud be closely monitored for detection of H<sub>2</sub>S and reliability of the H<sub>2</sub>S treating chemicals.
2. Identification and analysis of sulfides in the mud and mud filtrates will be carried out per operators prescribed procedures.
3. The mud system will be pre-treated with Zinc Carbonate, Ironite Sponge or similar chemicals of H<sub>2</sub>S control prior to drilling into the H<sub>2</sub>s bearing formation. Sufficient quantities of corrosion inhibitor should be on location to treat the drill string during Drill Stem Test Operations. Additionally, Aqua Ammonia should be on hand to treat the drill string for crew protection, should H<sub>2</sub>S be encountered while tripping string following drill stem testing

## WELL CONTROL EQUIPMENT

1. Flare System
  - a. A flare system shall be designed and installed to safely gather and burn H<sub>2</sub>S Bearing gas.
    1. Flare lines shall be located as far from the operating site as feasible and in a manner to compensate for wind changes.
    2. The flare line mouth shall be located not less than 150' from wellbore.
    3. Flare lines shall be straight unless targeted with running tees.
    4. Flare Gun & Flares to ignite the well
2. Remote Controlled Choke
  - a. A remote controlled choke shall be installed for all H<sub>2</sub>S drilling and where feasible for completion operations. A remote controlled valve may be used in lieu of this requirement for completions operations.
3. Mud-gas separators and rotating heads shall be installed and operable for all exploratory wells.

## OPERATING CONDITIONS

A Well Condition Sign and Flag will be posted on all access roads to the location. The sign shall be legible and large enough to be read by all persons entering the well site and be placed a minimum of 200' but no more than 500' from the well site which allows vehicles to turn around at a safe distance prior to reaching the site.

### DEFINITION OF WARNING FLAGS

1. Condition:  
**GREEN-NORMAL OPERATIONS**  
Any operation where the possibility of encountering H<sub>2</sub>S exists but no H<sub>2</sub>S has been detected.
  
2. Condition:  
**YELLOW-POTENTIAL DANGER, CAUTION**  
Any operation where the possibility of encountering H<sub>2</sub>S exists and in all situations where concentrations of H<sub>2</sub>S are detected in the air below the threshold level (10ppm)
  - a. Cause of condition:
    - \*Circulating up drill breaks
    - \*Trip gas after trip
    - \*Circulating out gas on choke
    - \*Poisonous gas present, but below threshold concentrations
    - \*Drill stem test
  - b. Safety Action:
    - \*Check safety equipment and keep it with you
    - \*Be alert for a change in condition
    - \*Follow instructions
  
3. Condition:  
**RED-EXTREME DANGER**  
Presence of H<sub>2</sub>S at or greater than 10ppm. Breathing apparatus must be worn.
  - a. Safety action:

\*MASK UP. All personnel will have protective breathing equipment with them. All nonessential personnel will move to the Safe Briefing Area and stay there until instructed to do otherwise. All essential Qualified Personnel, using the "Buddy System" (those necessary to maintain control of the well) will don breathing apparatus to perform operations related to well control.

The decision to ignite the well is the responsibility of the operator's on-site representative and should be made only as a last resort, when it is clear that:

- \*human life is endangered
- \*there is no hope of controlling the well under prevailing conditions

Order evacuation of local people within the danger zone. Request help from local authorities, State Police, Sheriff's Dept. and Service Representative.

### CIRCULATING OUT KICK (WAIT AND WEIGHT METHOD)

If it is suspected that H<sub>2</sub>S is present with the gas whenever a kick is taken, the wait and weight method of eliminating gas and raising the mud will be followed.

1. Wait and Weight Method:
  - a. The wait and Weight Method is:
    - \*increase density of mud in pits to 'kill' weight mud.
    - \*open choke and bring pump to initial circulating pressure by holding casing pressure at original valve until pump is up to predetermined speed.
    - \*when initial circulating pressure is obtained on drill pipe, zero pump stroke counter and record time.
    - \*reduce drill pipe pressure from initial circulating pressure to final circulating pressure by using pump strokes and/or time according to graph
    - \*when 'kill' weight mud is at the bit, hold final circulating pressure until kill weight mud is to surface.
  - b. If a kick has occurred, the standard blowout procedure will be followed and the wait and weight method will be used to kill the well. When the well has been put on the choke and circulation has been established, the following safety procedure must be established.
    - \*determine when gas is anticipated to reach surface.

- \*all non-essential personnel must be moved to safe briefing area
- \*all remaining personnel will check out and keep with them their protective breathing apparatus.
- \*mud men will see that the proper amount of H<sub>2</sub>S scavenging chemical is in the mud and record times checked
- \*make sure ignition flare is burning and valves are open to designated flare stacks

### CORING OPERATIONS IN H<sub>2</sub>S BEARING ZONES

1. Personal protective breathing apparatus will be worn from 10 to 15 stands in advance of retrieving the core barrel. Cores to be transported should be sealed and marked to the presence of H<sub>2</sub>S.
  - a. Yellow Caution Flag will be flown at the well condition sign.
  - b. The “NO SMOKING” rule will be enforced

### DRILL STEM TESTING OF H<sub>2</sub>S ZONES

1. The DST subsurface equipment will be suitable for H<sub>2</sub>S service as recommended by the API
2. Drill stem testing of H<sub>2</sub>S zone will be conducted in daylight hours
3. All non-essential personnel will be moved to an established safe area or off location
4. The “NO SMOKING” rule will be enforced
5. DST fluids will be circulated through a remote controlled choke and a separator to permit flaring of gas. A continuous pilot light will be used.
6. A yellow or red flag will be flown at entrance to location depending on present gas condition
7. If warranted, the use of Aqua Ammonia for neutralizing the toxicity of H<sub>2</sub>S from drill string
  - a. During drill stem tests adequate Filming Amine for H<sub>2</sub>S corrosion and Aqua Ammonia for neutralizing H<sub>2</sub>S should be on location.
8. On completion of DST, if H<sub>2</sub>S contaminated formation fluids or gases are present in drill string, floor workers will be masked up before test valve is removed from drill string and continue “mask

on” conditions until such time that readings in the work area do not exceed 10ppm of H<sub>2</sub>S gas.

# EMERGENCY PROCEDURES

## SOUNDING ALARM

In case of an alarm the crews will muster up at the designated area. Total Safety will be dispatched with (2) HES Techs who are to go in under protective breathing air and check the alarm readings and sniff ambient air for the presence of H2S.

By no means are the Co. Rep or HES Advisor to go in under air with the HES Tech. If there is another method in place where the Rig Manager is to go in with the Tech we need to ensure that the rig company has cleared them and that they are properly trained.

1. The fact is to be instilled in the minds of all rig personnel that the sounding alarm means only one thing: H2S IS PRESENT. Everyone is to proceed to his assigned station and the contingency plan is put into effect.

## DRILLING CREW ACTIONS

1. All personnel will don their protective breathing apparatus. The driller will take necessary precautions as indicated in operating procedures.
2. The Buddy system will be implemented. All personnel will act upon directions from the operator's on-site representative.
3. If there are non-essential personnel on location, they will move off location.
4. Entrance to the location will be patrolled, and the proper well condition flag will be displayed at the entrance to the location.

## RESPONSIBILITIES OF PERSONNEL

In order to assure the proper execution of this plan, it is essential that one person be responsible for and in complete charge of implementing these procedures. The responsibility will be as follows:

1. The operator's on-site representative or his assistant
2. Contract Tool Pusher

## STEPS TO BE TAKEN

In the event of an accidental release of a potentially hazardous volume of H<sub>2</sub>S, the following steps will be taken:

1. Contact by the quickest means of communications: the main offices of Oil Company & Contractor as listed on the preceding page.
2. An assigned crewmember will blockade the entrance to the location. No unauthorized personnel will be allowed entry into the location.
3. The operator's on-site representative will remain on location and attempt to regain control of the well.
4. The drilling company's rig superintendent will begin evacuation of those persons in immediate danger. He will begin by telephoning residents in the danger zone. In the event of no contact by telephoning, the tool pusher will proceed at once to each dwelling for a person-to-person contact. In the event the tool pusher cannot leave the location, he will assign a responsible crewmember to proceed in the evacuation of local residents. Upon arrival, the Sheriff's Department and TOTAL SAFETY personnel will aid in further evacuation.

## LEAK IGNITION

Leak Ignition procedure: (used to ignite a leak in the event it becomes necessary to protect the public)

1. Two men, the operator's on-site representative and the contractor's rig superintendent or TOTAL SAFETY's representative(s), wearing self-contained pressure demand air masks must determine the perimeter of the flammable area. This should be done with one man using an H<sub>2</sub>S detector and the other one using a flammable gas detector. The flammable perimeter should be established at 30% to 40% of the lower flammable limits.
2. After the flammable perimeter has been established and all employees and citizens have been removed from the area, the ignition team should move to the up-wind area of the leak perimeter and fire a flare into the area if the leak isn't ignited on the first attempt, move in 20 to 30 feet and fire again. Continue moving in and firing until the leak is ignited or the flammable gas detector indicates the ignition

- team is moving into the hazardous area. If trouble is incurred in igniting the leak by firing toward the leak, try firing 40 degrees to 90 degrees to each side of the area where you have been firing. If still no ignition is accomplished ignite the copper line burner and push it into the leak area. This should accomplish ignition. If ignition is not possible due to the makeup of the gas, the toxic leak perimeter must be established and maintained to insure evacuation is completed and continue until the emergency is secure.
3. The following equipment and man-power will be required to support the ignition team:
    - a. one flare gun with flares
    - b. four pressure demand air packs
    - c. two nylon ropes tied to the ignition team
    - d. two men in a clear area equipped with air packs
    - e. portable propane bottle with copper line
  4. The person with the final authority to ignite the well.

#### GENERAL EQUIPMENT

1. Two areas on the location will be designated as Briefing Areas. The one that is upwind from the well will be designated as the "Safe Briefing Area"
2. In the case of an emergency, personnel will assemble in the upwind area as per prior instructions from the operator's representative.
3. The H2S "Safety" trailer provide by TOTAL SAFETY will contain 10 air cylinders, a resuscitator, one 30-minute air pack and will have a windsock.
4. Two other windsocks will be installed.
5. A condition warning sign will be displayed at the location entrance.
6. A list of emergency telephone numbers will be kept on the rig floor, tool pusher's trailer and the Oil Company's trailer.
7. Two barricades will be available to block the entrance to location.
8. An undulating high and low pitch siren will be installed.
9. A telephone line or mobile phone will be available at the well site for incoming and outgoing communications.

## CRITICAL OPERATIONS

These guidelines will be implemented during H2S alarms on drilling locations with the intent of minimizing catastrophic damage of “**critical tasks**” ONLY and exposure of field personnel (e.g. cement in the stack).

We will wait on Total Safety (or H2S Safety Company) for all other alarm events that aren't defined as “critical”.

- 1.) H2S alarm sounds, crews secure well, and muster based off of wind direction. MOC Operation, MOC Safety, and H2S service company notification will be made and representative from the H2S Service Company is in route to location.
- 2.) Two qualified in scope personnel will don SCBA, utilizing the "buddy system", and respond to area of H2S alarm location to verify the presence of H2S utilizing hand held four gas analyzer or other approved and provided method.
- 3.) If no H2S is found, the “all clear” will be authorized by the Marathon Oil Drilling Superintendent and HES to resume operations. H2S service company will still be required to respond.

**Note:** Personnel will return to muster area awaiting H2S service company and additional equipment if H2S is verified.

**Note:** Personnel will be trained annually on H2S and the elements of this guideline. The MOC HES Advisor and Co Man will receive hands on training from a H2S service company field tech, on how to properly identify the location of the alarming sensor, and the proper method for checking the alarmed area.

# APPENDICES

## EMERGENCY & MEDICAL FACILITIES:

<b>Marathon Oil Corporation Emergency Numbers</b>			
Matt Rugaard	Drilling Manager	mprugaard@marathonoil.com	281-513-5163
Mark Bly	Drilling Superintendent	permiansuper@marathonoil.com	281-840-0467
Chris Shields	Drilling Superintendent	<a href="mailto:permiansuper@marathonoil.com">permiansuper@marathonoil.com</a>	281-840-0467
Don Eynon	Drilling Engineer	deenyon@marathonoil.com	713-296-3265
Paul Allen	Drilling Engineer	<a href="mailto:pallen@marathonoil.com">pallen@marathonoil.com</a>	713-296-3262
Chris Montan	Drilling Engineer	<a href="mailto:cmontan@marathoil.com">cmontan@marathoil.com</a>	713-296-4367
Robert Amaya	Drilling Engineer	<a href="mailto:RAmaya1@marathonoil.com">RAmaya1@marathonoil.com</a>	713-296-2371
Jeremy Wilson	Lead HES Advisor	<a href="mailto:permiandches@marathonoil.com">permiandches@marathonoil.com</a>	281-659-3734
Scott Doughty	Lead HES Advisor	<a href="mailto:permiandches@marathonoil.com">permiandches@marathonoil.com</a>	281-659-3734
Precision 101	Company Man	<a href="mailto:Prec101@marathonoil.com">Prec101@marathonoil.com</a>	
Precision 582	Company Man	<a href="mailto:Prec582@marathonoil.com">Prec582@marathonoil.com</a>	
Precision 594	Company Man	<a href="mailto:Prec594@marathonoil.com">Prec594@marathonoil.com</a>	
Precision 601	Company Man	<a href="mailto:Prec601@marathonoil.com">Prec601@marathonoil.com</a>	
Precision 101	HES Advisor	<a href="mailto:Prec101hes@marathonoil.com">Prec101hes@marathonoil.com</a>	
Precision 582	HES Advisor	<a href="mailto:Prec582hes@marathonoil.com">Prec582hes@marathonoil.com</a>	
Precision 594	HES Advisor	<a href="mailto:Prec5941hes@marathonoil.com">Prec5941hes@marathonoil.com</a>	
Precision 601	HES Advisor	<a href="mailto:Prec601hes@marathonoil.com">Prec601hes@marathonoil.com</a>	

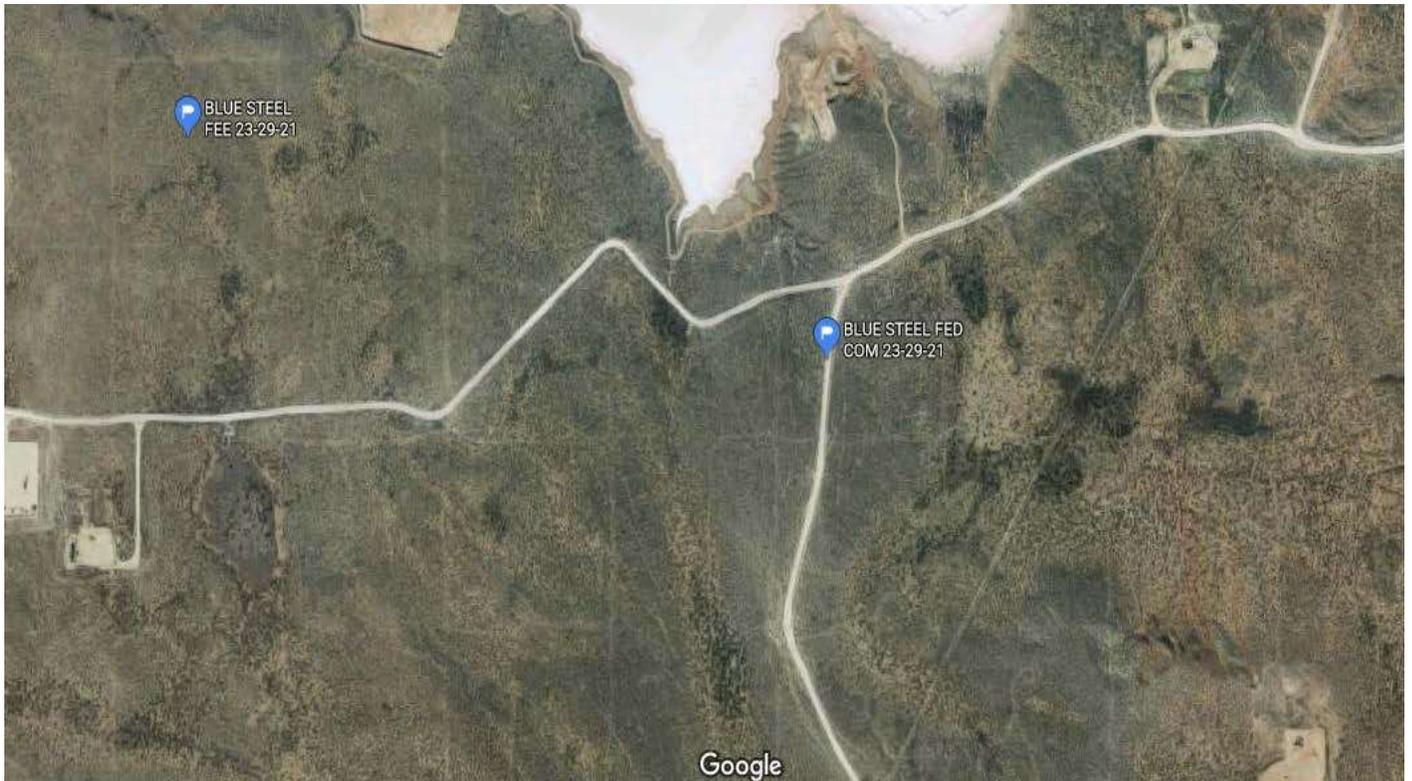
<b>Emergency Services Area Numbers: Or Call 911</b>			
Sheriff (Eddy County, NM)	575-887-7551	New Mexico Poison Control	800-222-1222
Sheriff (Lea County, NM)	575-396-3611	Border Patrol (Las Cruces, NM)	575-528-6600
New Mexico State Police	575-392-5580/5588	Energy Minerals & Natural Resources Dept.	575-748-1283
Carlsbad Medical Center	575-887-4100	Environmental Health Dept.	505-476-8600
Lea Regional Medical Center	575-492-5000	OSHA (Santa Fe, NM)	505-827-2855
Police (Carlsbad, NM)	575-885-2111		
Police (Hobbs, NM)	575-392-9265		
Fire (Carlsbad, NM)	575-885-3124		
Fire (Hobbs, NM)	575-397-9308		
Ambulance Service	911	TOTAL SAFETY H2S – SAFETY SERVICES	432-561-5049

1. For Life Flight, 1<sup>st</sup> dial “911” They will determine nearest helicopter and confirm the need for helicopter.

# RESIDENTS AND LANDOWNERS

## RESIDENCE

THERE ARE NO RESIDENCE WITHIN ANY RADIUS OF EXPOSURE.



# ADDITIONAL INFORMATION

## A. HYDROGEN SULFIDE ESSAY

A deadly enemy of those people employed in the petroleum industry, this gas can paralyze or kill quickly. At least part of the answer lies in education in the hazards, symptoms, characteristics, safe practices, treatment, and the proper use of personal protective equipment.

## B. HYDROGEN SULFIDE HAZARDS

The principal hazard to personnel is asphyxiation or poisoning by inhalation. Hydrogen Sulfide is a colorless, flammable gas having an offensive odor and a sweetish taste. It is highly toxic and doubly hazardous because it is heavier than air (specific gravity = 1.19). Its offensive odor, like that of a rotten egg, has been used as an indicator by many old timers in the oil field, but is not a reliable warning of the presence of gas in a dangerous concentration because people differ greatly in their ability to detect smells. Where high concentrations are encountered, the olfactory nerves are rapidly paralyzed, diluting the sense of smell as a warning indicator. A concentration of a few hundredths of one percent higher than that causing irritation can cause asphyxia and death—in other words there is a very narrow margin between consciousness and unconsciousness, and between unconsciousness and death.

Where high concentrations cause respiratory paralysis, spontaneous breathing does not return unless artificial respiration is applied. Although breathing is paralyzed the heart may continue beating for ten minutes after the attack.

## C. PHYSIOLOGICAL SYSTEMS

ACUTE: results in almost instantaneous asphyxia, with seeming respiratory paralysis acute poisoning, or strangulation, may occur after even a few seconds inhalation of high concentration and results in panting respiration, pallor, cramps, paralysis and almost immediate loss of consciousness with extreme rapidity from respiratory and cardiac paralysis. One breath of a sufficiently high concentration may have this result.

SUBACUTE: RESULTS IN IRRITATION, PRINCIPALLY OF THE EYES, PERSISTENT COUGH, TIGHTENING OR BURNING IN THE CHEST AND SKIN IRRITATION FOLLOVED BY DEPRESSION OF THE CENTRAL NERVOUS SYSTEM. The eye irritation ranges in severity from mild conjunctivitis to swelling and bulging of the conjunctiva photophobia (abnormal intolerance of light) and temporary blindness.

#### D. TREATMENT

1. Victim should be removed to fresh air immediately by rescuers wearing respiratory protective equipment. Protect yourself while rescuing.
2. If the victim is not breathing, begin immediately to apply artificial respiration. (See other chart for the chances for life after breathing has stopped.) If a resuscitator is available let another employee get it and prepare for use.
3. Treat for shock, keep victim warm and comfortable
4. Call a doctor, in all cases, victims of poisoning should be attended by a physician.

#### E. CHARACTERISTICS OF H<sub>2</sub>S

1. Extremely Toxic (refer to chart for toxicity of Hydrogen Sulfide).
2. Heavier than air. Specific gravity= 1.19.
3. Colorless, has odor of rotten eggs.
4. Burns with a blue flame and produces sulfur Dioxide (SO<sub>2</sub>) gas, which is very irritating to eyes and lungs. The SO<sub>2</sub> is also toxic and can cause serious injury.
5. H<sub>2</sub>S is almost as toxic as hydrogen cyanide.
6. H<sub>2</sub>S forms explosive mixture, with air between 4.3% and 46% by volume.
7. Between 5 and 6 times as toxic as carbon monoxide.
8. Produces irritation to eyes, throat, and respiratory tract.
9. Threshold Limit Value (TLV) maximum of eight hours exposure without protective respiratory equipment-10ppm.

## F. SAFE PRACTICES

If you are faced with an H<sub>2</sub>S problem in your operations, the following safe practices are recommended:

1. Be absolutely sure all concerned are familiar with the hazards concerning H<sub>2</sub>S and how to avoid it.
2. All employees should know how to operate and maintain respiration equipment.
3. Be able to give and demonstrate artificial respiration.
4. Post areas where there is poisonous gas with suitable warning signs.
5. Be sure all new employees are thoroughly schooled before they are sent to the field-tomorrow may be too late.
6. Teach men to avoid gas whenever possible-work on the windward side, have fresh air mask available.
7. Never let bad judgment guide you-wear respiratory equipment when gauging tanks, etc. Never try to hold your breath in order to enter a contaminated atmosphere.
8. In areas of high concentration, a two-man operation is preferred.
9. Never enter a tank, cellar or other enclosed place where gas can accumulate without proper respiratory protective equipment and a safety belt secured to a lifeline held by another person outside.
10. Always check out danger areas first with H<sub>2</sub>S detectors before allowing anyone to enter. DO NOT TRY TO DETERMINE THE PRESENCE OF GAS BY its ODOR.
11. Wear proper respiratory equipment for the job at hand. Never take a chance with equipment with which you are unfamiliar. If in doubt, consult your supervisor.
12. Carry out practice drills every month with emergency and maintenance breathing air equipment. Telling or showing a group how to operate equipment is not enough-make them show you.
13. Maximum care should be taken to prevent the escape of fumes into the air of working places by leaks, etc.
14. Communication such as radio and telephones should be provided for those people employed where H<sub>2</sub>S may be present.

TOXICITY OF HYDROGEN SULFIDE TO MEN

H2S Per Cent (PPM)**	0 - 2 Minutes	0 - 15 Minutes	15 - 30 Minutes	30 Minutes to 1 hour	1 - 4 Hours	4 - 8 Hours	4 - 48 Hours
0.005 (50)				Mild Conjunctivities; respiratory tract irritation			
0.010 (100)				Throat			
0.010 (100)		Coughing; irritation of eyes; loss of pain in eyes; sense of smell sleepiness	Disturbed respiration; pain in eyes; sleepiness	Throat & eye irritation	Salivation & mucous discharge; sharp pain in eyes; coughing	Increased symptoms*	Hemorrhage & death*
0.015 (150)		Loss of sense of smell	Throat & eye irritation	Throat & eye irritation	Difficult breathing; blurred vision; effects light & shy	Serious irritating effects	Hemorrhage & death*
0.020 (200)					Hemorrhage & death		
0.025 (250)		Irritation of eyes	Painful secretion of tears; weariness	Light & shy; nasal catarrh; pain in eyes; difficult breathing			
0.035 (350)	Irritation of eyes; loss of sense of smell	Irritation of eyes					
0.035 (350)		Irritation of eyes; loss of sense of smell	Difficult respiration; coughing; irritation of eyes	Increased irritation of eyes and nasal tract; dull pain head; weariness; light shy	Dizziness weakness; increased irritation; death		
0.050 (500)	Coughing collapse & unconsciousness	Respiratory disturbances; irritation of eyes; collapse of heart; few cases of death*	Serious eye irritation; palpitation of heart; few cases of death*	Severe pain in eyes and head dizziness; trembling of extremities; great weakness & death*			
0.060 (600)	Collapse *	Collapse*					
0.070 (700)	unconsciousness; death*	unconsciousness; death*					
0.808 (800)							
0.100 (1000)							
0.150 (1500)							

\*Data secured from experiments of dogs which have susceptibility similar to men. \*\*PPM - parts per million





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:** Marathon Oil Permian LLC **OGRID:** 972098 **Date:** 09 / 23 / 2024

**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
Blue Steel 21 SB Fee 7H		D-28-23S-29E	470 FNL 1224	1000	5200	1500

**IV. Central Delivery Point Name:** Blue Steel CTB [See 19.15.27.9(D)(1) NMAC]

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

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Blue Steel 21 SB Fee 7H		12/1/2024	1/15/2025	6/15/2025	07/1/2025	07/01/2025

**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:	<i>Terri Stathem</i>
Printed Name:	Terri Stathem
Title:	Manager Regulatory Compliance
E-mail Address:	tstathem@marathonoil.com
Date:	09/23/2024
Phone:	713-817-0224
<b>OIL CONSERVATION DIVISION</b> <b>(Only applicable when submitted as a standalone form)</b>	
Approved By:	
Title:	
Approval Date:	
Conditions of Approval:	

**APPENDIX**

## Section 1 - Parts VI, VII, and VIII

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

- Separation equipment is sized to allow for retention time and velocity to adequately separate oil, gas, and water at anticipated peak rates.
- All central tank battery equipment is designed to efficiently capture the remaining gas from the liquid phase.
- Valves and meters are designed to service without flow interruption or venting of gas.

**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.

- ◆ **19.15.27.8 (A) – Venting and Flaring Of Natural Gas**
  - Marathon Oil Permian’s field operations are designed with the goal of minimizing flaring and preventing venting of natural gas. If capturing the gas is not possible then the gas is combusted/flared using properly sized flares or combustors in accordance with state air permit rules.
- ◆ **19.15.27.8 (B) – Venting and Flaring During Drilling Operations**
  - A properly-sized flare stack will be located at a minimum 100’ from the nearest surface hole location on the pad.
  - All natural gas produced during drilling operations will be flared. Venting will only occur if there is an equipment malfunction and/or to avoid risk of an immediate and substantial adverse impact on safety, public health, or the environment.
- ◆ **19.15.27.8 (C) – Venting and Flaring During Completion or Recompletion Operations**
  - During all phases of flowback, wells will flow through a sand separator, or other appropriate flowback separation equipment, and the well stream will be directed to a central tank battery (CTB) through properly sized flowlines.
  - The CTB will have properly sized separation equipment for maximum anticipated flow rates.
  - Multiple stages of separation will be used to separate gas from liquids. All gas will be routed to a sales outlet. Fluids will be routed to tanks equipped with a closed loop system that will recover any residual gas from the tanks and route such gas to a sales outlet.
- ◆ **19.15.27.8 (D) – Venting and Flaring During Production Operations**
  - During production, the well stream will be routed to the CTB where multiple stages of separation will separate gas from liquids. All gas will be routed to a sales outlet. Fluids will be routed to tanks equipped with a closed loop system that will recover any residual gas from the tanks and route such gas to a sales outlet, minimizing tank emissions.
  - Flares are equipped with auto-ignition systems and continuous pilot operations.
  - Automatic gauging equipment is installed on all tanks.
- ◆ **19.15.27.8 (E) – Performance Standards**
  - Production equipment will be designed to handle maximum anticipated rates and pressure.
  - Automatic gauging equipment is installed on all tanks to minimize venting.
  - All flared gas will be combusted in a flare stack that is properly sized and designed to ensure proper combustion.
  - Flares are equipped with continuous pilots and auto-ignitors along with remote monitoring of the pilot status.
  - Weekly AVOs and monthly LDAR inspections will be performed on all wells and facilities that produce more than 60 MCFD.
  - Gas/H<sub>2</sub>S detectors will be installed throughout the facilities and wellheads to detect leaks and enable timely repairs.

◆ **19.15.27.8 (F) – Measurement or Estimation of Vented and Flared Natural Gas**

- All high pressure flared gas is measured by equipment conforming to API 14.10.
- No meter bypasses are installed.
- When metering is not practical due to low pressure/low rate, the vented or flared volume will be estimated through flare flow curves with the assistance of air emissions consultants, as necessary.

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

- Marathon Oil Permian will use best management practices to vent as minimally as possible during well intervention operations and downhole well maintenance.
- All natural gas is routed into the gas gathering system and directed to one of Marathon Oil Permian’s multiple gas sales outlets.
- All venting events will be recorded and all start-up, shutdown, maintenance logs will be kept for control equipment.
- All control equipment will be maintained to provide highest run-time possible.
- All procedures are drafted to keep venting and flaring to the absolute minimum.



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

<b>Reference</b>	Prelim Plan A		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD Interval 100.00usft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 20,000.00 usft	<b>Error Surface:</b>	Pedal Curve
<b>Warning Levels Evaluated at:</b>	2.00 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	<b>Date</b>	4/6/2020		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	19,089.74	Prelim Plan A (OH)	MWD+IFR1	OWSG MWD + IFR1

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance		Separation Factor	Warning
			Between Centres (usft)	Between Ellipses (usft)		
<b>Offset Well - Wellbore - Design</b>						
Blue Steel 21 Fee						
SB #4H - OH - Prelim Plan A	600.00	601.00	120.02	116.17	31.174	CC
SB #4H - OH - Prelim Plan A	700.00	699.52	120.64	116.09	26.533	ES
SB #4H - OH - Prelim Plan A	19,089.74	19,035.79	1,320.42	1,102.37	6.056	SF
WD #10H - OH - Prelim Plan A	607.97	607.97	60.07	56.17	15.388	CC
WD #10H - OH - Prelim Plan A	1,100.00	1,100.27	61.69	54.35	8.407	ES
WD #10H - OH - Prelim Plan A	8,500.00	8,479.45	337.76	277.35	5.591	SF
WD #23H - OH - Prelim Plan A	1,200.00	1,200.00	29.84	21.69	3.662	CC, ES
WD #23H - OH - Prelim Plan A	6,900.00	6,889.16	166.71	116.05	3.291	SF
WD #3H - OH - Prelim Plan A	602.55	602.55	30.12	26.26	7.794	CC
WD #3H - OH - Prelim Plan A	900.00	900.14	30.92	24.92	5.157	ES
WD #3H - OH - Prelim Plan A	1,300.00	1,299.61	36.69	27.83	4.141	SF
WD #5H - OH - Prelim Plan A	600.00	601.00	90.13	86.28	23.410	CC
WD #5H - OH - Prelim Plan A	700.00	700.58	90.36	85.80	19.795	ES
WD #5H - OH - Prelim Plan A	1,500.00	1,493.42	109.52	99.27	10.686	SF

Offset Design											Blue Steel 21 Fee - SB #4H - OH - Prelim Plan A		Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Reference		Offset		Semi Major Axis			Distance				Warning	
		Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	1.00	0.00	0.00	0.00	-89.98	0.05	-120.02	120.02					
100.00	100.00	101.00	100.00	0.13	0.13	-89.98	0.05	-120.02	120.02	119.75	0.27	452.446		
200.00	200.00	201.00	200.00	0.49	0.49	-89.98	0.05	-120.02	120.02	119.04	0.98	122.194		
300.00	300.00	301.00	300.00	0.85	0.85	-89.98	0.05	-120.02	120.02	118.32	1.70	70.635		
400.00	400.00	401.00	400.00	1.21	1.21	-89.98	0.05	-120.02	120.02	117.60	2.42	49.675		
500.00	500.00	501.00	500.00	1.56	1.57	-89.98	0.05	-120.02	120.02	116.89	3.13	38.308		
600.00	600.00	601.00	600.00	1.92	1.93	-89.98	0.05	-120.02	120.02	116.17	3.85	31.174	CC	
700.00	700.00	699.52	698.51	2.28	2.27	-90.27	-0.56	-120.63	120.64	116.09	4.55	26.533	ES	
800.00	800.00	802.04	796.92	2.64	2.61	-91.11	-2.37	-122.44	122.50	117.25	5.25	23.341		
900.00	900.00	902.10	896.80	3.00	2.95	-92.22	-4.83	-124.90	125.04	119.09	5.95	21.023		
1,000.00	1,000.00	1,002.16	996.67	3.36	3.30	-93.28	-7.30	-127.37	127.62	120.97	6.65	19.189		
1,100.00	1,100.00	1,102.23	1,096.55	3.72	3.64	-94.30	-9.77	-129.84	130.25	122.89	7.36	17.703		
1,200.00	1,200.00	1,202.29	1,196.43	4.07	4.00	-95.28	-12.23	-132.30	132.91	124.85	8.07	16.479		
1,300.00	1,300.00	1,302.35	1,296.31	4.43	4.35	-96.22	-14.70	-134.77	135.62	126.84	8.78	15.454		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Blue Steel 21 Fee - SB #4H - OH - Prelim Plan A													Offset Well Error:	0.00 usft
Survey Program: 0-MWD+IFR1														
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,400.00	1,400.00	1,402.41	1,396.19	4.79	4.70	-97.13	-17.17	-137.24	138.36	128.87	9.49	14.584		
1,500.00	1,500.00	1,502.47	1,496.07	5.15	5.06	-98.00	-19.63	-139.70	141.13	130.93	10.20	13.837		
1,600.00	1,599.98	1,602.61	1,595.86	5.50	5.41	-154.91	-22.10	-142.17	145.51	134.60	10.91	13.338		
1,700.00	1,699.84	1,702.99	1,695.42	5.86	5.77	-156.44	-24.55	-144.62	153.13	141.52	11.62	13.181		
1,800.00	1,799.45	1,803.74	1,794.62	6.21	6.13	-158.26	-27.00	-147.07	164.09	151.76	12.33	13.311		
1,900.00	1,898.70	1,904.97	1,893.33	6.57	6.49	-160.21	-29.44	-149.51	178.45	165.41	13.04	13.686		
2,000.00	1,997.47	1,993.20	1,991.43	6.92	6.80	-162.15	-31.86	-151.93	196.29	182.58	13.71	14.322		
2,100.00	2,095.95	2,090.22	2,088.39	7.28	7.15	-163.61	-32.99	-154.92	216.14	201.74	14.40	15.011		
2,200.00	2,194.43	2,187.21	2,185.27	7.64	7.49	-164.02	-31.16	-159.30	236.47	221.38	15.09	15.671		
2,300.00	2,292.91	2,284.04	2,281.80	8.01	7.84	-163.62	-26.37	-165.05	257.19	241.41	15.78	16.301		
2,400.00	2,391.39	2,380.48	2,377.67	8.37	8.17	-162.61	-18.65	-172.15	278.36	261.90	16.46	16.908		
2,500.00	2,489.87	2,476.32	2,472.55	8.74	8.51	-161.11	-8.09	-180.55	300.13	282.99	17.15	17.505		
2,600.00	2,588.35	2,572.37	2,567.20	9.11	8.84	-159.31	5.03	-190.15	322.62	304.79	17.83	18.095		
2,700.00	2,686.83	2,669.26	2,662.63	9.48	9.18	-157.66	18.66	-200.01	345.48	326.96	18.52	18.652		
2,800.00	2,785.31	2,766.16	2,758.05	9.85	9.52	-156.21	32.29	-209.87	368.58	349.36	19.22	19.178		
2,900.00	2,883.79	2,863.05	2,853.47	10.23	9.86	-154.93	45.92	-219.74	391.88	371.96	19.92	19.674		
3,000.00	2,982.27	2,959.95	2,948.90	10.60	10.21	-153.80	59.55	-229.60	415.34	394.72	20.62	20.142		
3,100.00	3,080.75	3,056.84	3,044.32	10.98	10.56	-152.78	73.18	-239.46	438.94	417.62	21.33	20.583		
3,200.00	3,179.23	3,153.74	3,139.74	11.35	10.91	-151.87	86.81	-249.32	462.66	440.63	22.03	20.999		
3,300.00	3,277.72	3,250.63	3,235.17	11.73	11.26	-151.05	100.44	-259.18	486.48	463.74	22.74	21.391		
3,400.00	3,376.20	3,347.53	3,330.59	12.11	11.61	-150.30	114.07	-269.05	510.38	486.93	23.45	21.762		
3,500.00	3,474.68	3,444.42	3,426.01	12.48	11.97	-149.62	127.70	-278.91	534.36	510.20	24.17	22.113		
3,600.00	3,573.16	3,541.32	3,521.44	12.86	12.32	-149.00	141.34	-288.77	558.41	533.53	24.88	22.444		
3,700.00	3,671.64	3,638.21	3,616.86	13.24	12.68	-148.43	154.97	-298.63	582.51	556.91	25.60	22.758		
3,800.00	3,770.12	3,735.11	3,712.28	13.62	13.04	-147.90	168.60	-308.49	606.66	580.35	26.31	23.056		
3,900.00	3,868.60	3,832.00	3,807.71	14.00	13.40	-147.42	182.23	-318.36	630.86	603.83	27.03	23.338		
4,000.00	3,967.08	3,928.90	3,903.13	14.38	13.76	-146.97	195.86	-328.22	655.09	627.34	27.75	23.606		
4,100.00	4,065.56	4,025.79	3,998.55	14.76	14.12	-146.55	209.49	-338.08	679.37	650.89	28.47	23.861		
4,200.00	4,164.04	4,122.69	4,093.98	15.14	14.48	-146.16	223.12	-347.94	703.67	674.48	29.19	24.104		
4,300.00	4,262.52	4,219.58	4,189.40	15.52	14.84	-145.80	236.75	-357.80	728.00	698.08	29.92	24.335		
4,400.00	4,361.00	4,316.48	4,284.82	15.90	15.20	-145.46	250.38	-367.67	752.36	721.72	30.64	24.556		
4,500.00	4,459.48	4,413.37	4,380.25	16.28	15.56	-145.15	264.01	-377.53	776.74	745.37	31.36	24.766		
4,600.00	4,557.97	4,510.27	4,475.67	16.66	15.93	-144.85	277.64	-387.39	801.14	769.05	32.09	24.967		
4,700.00	4,656.45	4,607.16	4,571.09	17.05	16.29	-144.57	291.27	-397.25	825.56	792.75	32.81	25.159		
4,800.00	4,754.93	4,704.06	4,666.52	17.43	16.66	-144.30	304.90	-407.11	850.00	816.46	33.54	25.343		
4,900.00	4,853.41	4,800.95	4,761.94	17.81	17.02	-144.05	318.53	-416.98	874.45	840.19	34.27	25.519		
5,000.00	4,951.89	4,902.15	4,857.36	18.19	17.40	-143.81	332.16	-426.84	898.92	863.91	35.01	25.676		
5,100.00	5,050.37	5,005.26	4,952.79	18.57	17.79	-143.59	345.79	-436.70	923.40	887.64	35.76	25.821		
5,200.00	5,148.85	5,108.36	5,048.21	18.96	18.18	-143.38	359.42	-446.56	947.90	911.39	36.51	25.961		
5,300.00	5,247.33	5,188.53	5,143.63	19.34	18.48	-143.18	373.05	-456.42	972.41	935.23	37.18	26.154		
5,400.00	5,345.81	5,285.43	5,239.06	19.72	18.85	-142.99	386.68	-466.29	996.93	959.02	37.91	26.298		
5,500.00	5,444.29	5,382.32	5,334.48	20.11	19.21	-142.80	400.31	-476.15	1,021.45	982.81	38.64	26.436		
5,600.00	5,542.77	5,479.22	5,429.90	20.49	19.58	-142.63	413.94	-486.01	1,045.99	1,006.62	39.37	26.569		
5,700.00	5,641.25	5,576.11	5,525.33	20.87	19.95	-142.46	427.57	-495.87	1,070.54	1,030.44	40.10	26.697		
5,800.00	5,739.73	5,673.01	5,620.75	21.26	20.31	-142.30	441.20	-505.73	1,095.09	1,054.26	40.83	26.820		
5,900.00	5,838.22	5,769.90	5,716.17	21.64	20.68	-142.15	454.83	-515.60	1,119.65	1,078.09	41.56	26.939		
6,000.00	5,936.70	5,866.80	5,811.60	22.02	21.05	-142.01	468.46	-525.46	1,144.22	1,101.93	42.29	27.054		
6,100.00	6,035.18	5,963.69	5,907.02	22.41	21.42	-141.87	482.09	-535.32	1,168.80	1,125.77	43.03	27.164		
6,200.00	6,133.66	6,089.23	6,030.98	22.79	21.89	-141.78	498.10	-546.90	1,192.41	1,148.45	43.96	27.125		
6,300.00	6,232.14	6,222.34	6,163.23	23.17	22.38	-141.90	510.30	-555.73	1,213.23	1,168.32	44.91	27.016		
6,400.00	6,330.62	6,356.65	6,297.22	23.56	22.86	-142.26	517.54	-560.97	1,231.17	1,185.35	45.82	26.870		
6,500.00	6,429.10	6,491.57	6,432.11	23.94	23.33	-142.83	519.69	-562.53	1,246.26	1,199.57	46.69	26.692		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Offset			Semi Major Axis			Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
6,600.00	6,527.58	6,587.04	6,527.58	24.33	23.65	-143.29	519.71	-562.54	1,260.22	1,212.83	47.39	26.594		
6,700.00	6,626.06	6,685.53	6,626.06	24.71	23.99	-143.75	519.71	-562.54	1,274.26	1,226.16	48.10	26.494		
6,800.00	6,724.54	6,784.01	6,724.54	25.09	24.33	-144.20	519.71	-562.54	1,288.38	1,239.57	48.81	26.398		
6,900.00	6,823.15	6,882.61	6,823.15	25.48	24.66	-144.73	519.71	-562.54	1,301.98	1,252.46	49.52	26.294		
7,000.00	6,922.24	6,981.70	6,922.24	25.85	25.00	-145.19	519.71	-562.54	1,312.99	1,262.76	50.22	26.143		
7,100.00	7,021.74	7,081.20	7,021.74	26.22	25.35	-145.53	519.71	-562.54	1,321.17	1,270.25	50.92	25.944		
7,200.00	7,121.53	7,180.99	7,121.53	26.57	25.69	-145.75	519.71	-562.54	1,326.51	1,274.88	51.62	25.696		
7,300.00	7,221.48	7,280.94	7,221.48	26.92	26.03	-145.85	519.71	-562.54	1,328.96	1,276.65	52.31	25.404		
7,400.00	7,321.48	7,380.94	7,321.48	27.25	26.38	-90.04	519.71	-562.54	1,329.14	1,276.14	53.00	25.080		
7,500.00	7,421.48	7,480.94	7,421.48	27.59	26.72	-90.04	519.71	-562.54	1,329.14	1,275.46	53.68	24.760		
7,600.00	7,521.48	7,580.94	7,521.48	27.93	27.07	-90.04	519.71	-562.54	1,329.14	1,274.78	54.36	24.449		
7,700.00	7,621.48	7,680.94	7,621.48	28.27	27.41	-90.04	519.71	-562.54	1,329.14	1,274.09	55.05	24.145		
7,800.00	7,721.48	7,780.94	7,721.48	28.61	27.76	-90.04	519.71	-562.54	1,329.14	1,273.41	55.73	23.848		
7,900.00	7,821.48	7,880.94	7,821.48	28.95	28.11	-90.04	519.71	-562.54	1,329.14	1,272.72	56.42	23.557		
8,000.00	7,921.48	7,980.94	7,921.48	29.29	28.45	-90.04	519.71	-562.54	1,329.14	1,272.03	57.11	23.274		
8,100.00	8,021.48	8,080.94	8,021.48	29.63	28.80	-90.04	519.71	-562.54	1,329.14	1,271.34	57.80	22.997		
8,200.00	8,121.48	8,180.94	8,121.48	29.97	29.15	-90.04	519.71	-562.54	1,329.14	1,270.66	58.48	22.726		
8,300.00	8,221.46	8,281.48	8,221.90	30.31	29.50	-90.13	522.85	-562.53	1,329.13	1,269.95	59.18	22.459		
8,400.00	8,320.40	8,381.58	8,320.04	30.67	29.86	-89.89	541.94	-562.44	1,329.11	1,269.22	59.90	22.191		
8,500.00	8,415.47	8,480.73	8,412.50	31.02	30.22	-89.66	577.37	-562.29	1,329.10	1,268.49	60.61	21.927		
8,600.00	8,503.78	8,578.97	8,496.76	31.35	30.57	-89.44	627.67	-562.07	1,329.10	1,267.77	61.32	21.673		
8,700.00	8,582.64	8,676.40	8,570.61	31.65	30.90	-89.24	691.03	-561.80	1,329.10	1,267.08	62.01	21.432		
8,800.00	8,649.67	8,773.08	8,632.27	31.91	31.22	-89.06	765.36	-561.48	1,329.10	1,266.42	62.67	21.206		
8,900.00	8,702.82	8,869.14	8,680.29	32.15	31.53	-88.90	848.42	-561.12	1,329.09	1,265.78	63.30	20.996		
9,000.00	8,740.47	8,964.68	8,713.64	32.38	31.83	-88.78	937.83	-560.73	1,329.07	1,265.17	63.89	20.801		
9,100.00	8,761.50	9,059.84	8,731.65	32.61	32.12	-88.70	1,031.16	-560.33	1,329.03	1,264.59	64.44	20.624		
9,200.00	8,765.96	9,156.55	8,734.96	32.85	32.39	-88.66	1,127.75	-559.91	1,328.96	1,264.01	64.95	20.460		
9,300.00	8,765.96	9,256.55	8,734.96	33.11	32.69	-88.66	1,227.75	-559.48	1,328.88	1,263.37	65.51	20.285		
9,400.00	8,765.96	9,356.55	8,734.96	33.40	33.01	-88.66	1,327.75	-559.05	1,328.79	1,262.68	66.11	20.098		
9,500.00	8,765.96	9,456.55	8,734.96	33.71	33.36	-88.66	1,427.75	-558.62	1,328.70	1,261.93	66.77	19.899		
9,600.00	8,765.96	9,556.55	8,734.96	34.05	33.73	-88.66	1,527.75	-558.18	1,328.62	1,261.14	67.48	19.690		
9,700.00	8,765.96	9,656.55	8,734.96	34.41	34.12	-88.66	1,627.75	-557.75	1,328.53	1,260.30	68.23	19.471		
9,800.00	8,765.96	9,756.55	8,734.96	34.80	34.54	-88.66	1,727.74	-557.32	1,328.44	1,259.41	69.03	19.245		
9,900.00	8,765.96	9,856.55	8,734.96	35.20	34.98	-88.66	1,827.74	-556.89	1,328.36	1,258.48	69.87	19.011		
10,000.00	8,765.96	9,956.55	8,734.96	35.63	35.44	-88.66	1,927.74	-556.46	1,328.27	1,257.51	70.76	18.772		
10,100.00	8,765.96	10,056.55	8,734.96	36.08	35.92	-88.66	2,027.74	-556.02	1,328.18	1,256.50	71.69	18.528		
10,200.00	8,765.96	10,156.55	8,734.96	36.55	36.42	-88.66	2,127.74	-555.59	1,328.10	1,255.44	72.65	18.280		
10,300.00	8,765.96	10,256.55	8,734.96	37.04	36.93	-88.66	2,227.74	-555.16	1,328.01	1,254.35	73.66	18.029		
10,400.00	8,765.96	10,356.55	8,734.96	37.55	37.47	-88.66	2,327.74	-554.73	1,327.92	1,253.22	74.70	17.777		
10,500.00	8,765.96	10,456.55	8,734.96	38.07	38.02	-88.66	2,427.74	-554.29	1,327.84	1,252.06	75.78	17.523		
10,600.00	8,765.96	10,556.55	8,734.96	38.62	38.59	-88.66	2,527.74	-553.86	1,327.75	1,250.86	76.89	17.268		
10,700.00	8,765.96	10,656.55	8,734.96	39.18	39.17	-88.66	2,627.74	-553.43	1,327.66	1,249.63	78.03	17.014		
10,800.00	8,765.96	10,756.55	8,734.96	39.75	39.77	-88.66	2,727.74	-553.00	1,327.57	1,248.37	79.20	16.761		
10,900.00	8,765.97	10,856.55	8,734.97	40.34	40.38	-88.66	2,827.73	-552.57	1,327.49	1,247.08	80.41	16.509		
11,000.00	8,765.97	10,956.55	8,734.97	40.94	41.01	-88.66	2,927.73	-552.13	1,327.40	1,245.76	81.64	16.259		
11,100.00	8,765.97	11,056.55	8,734.97	41.56	41.65	-88.66	3,027.73	-551.70	1,327.31	1,244.42	82.90	16.012		
11,200.00	8,765.97	11,156.55	8,734.97	42.19	42.30	-88.66	3,127.73	-551.27	1,327.23	1,243.05	84.18	15.767		
11,300.00	8,765.97	11,256.55	8,734.97	42.83	42.96	-88.66	3,227.73	-550.84	1,327.14	1,241.65	85.49	15.524		
11,400.00	8,765.97	11,356.55	8,734.97	43.49	43.64	-88.66	3,327.73	-550.41	1,327.05	1,240.23	86.82	15.285		
11,500.00	8,765.97	11,456.55	8,734.97	44.15	44.32	-88.66	3,427.73	-549.97	1,326.97	1,238.79	88.17	15.050		
11,600.00	8,765.97	11,556.55	8,734.97	44.83	45.02	-88.66	3,527.73	-549.54	1,326.88	1,237.33	89.55	14.817		
11,700.00	8,765.97	11,656.55	8,734.97	45.52	45.72	-88.66	3,627.73	-549.11	1,326.79	1,235.85	90.94	14.589		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Blue Steel 21 Fee - SB #4H - OH - Prelim Plan A													Offset Well Error:	0.00 usft
Survey Program: 0-MWD+IFR1														
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
11,800.00	8,765.97	11,756.55	8,734.97	46.21	46.44	-88.66	3,727.73	-548.68	1,326.71	1,234.35	92.36	14.365		
11,900.00	8,765.97	11,856.55	8,734.97	46.92	47.16	-88.66	3,827.72	-548.24	1,326.62	1,232.83	93.79	14.144		
12,000.00	8,765.97	11,956.55	8,734.97	47.64	47.90	-88.66	3,927.72	-547.81	1,326.53	1,231.29	95.24	13.928		
12,100.00	8,765.97	12,056.55	8,734.97	48.36	48.64	-88.66	4,027.72	-547.38	1,326.45	1,229.74	96.71	13.715		
12,200.00	8,765.97	12,156.55	8,734.97	49.10	49.39	-88.66	4,127.72	-546.95	1,326.36	1,228.16	98.20	13.507		
12,300.00	8,765.97	12,256.55	8,734.97	49.84	50.14	-88.66	4,227.72	-546.52	1,326.27	1,226.58	99.70	13.303		
12,400.00	8,765.97	12,356.55	8,734.97	50.59	50.91	-88.66	4,327.72	-546.08	1,326.19	1,224.98	101.21	13.103		
12,500.00	8,765.97	12,456.55	8,734.97	51.34	51.68	-88.66	4,427.72	-545.65	1,326.10	1,223.36	102.74	12.907		
12,600.00	8,765.97	12,556.55	8,734.97	52.11	52.45	-88.66	4,527.72	-545.22	1,326.01	1,221.73	104.28	12.716		
12,700.00	8,765.97	12,656.55	8,734.97	52.87	53.24	-88.66	4,627.72	-544.79	1,325.93	1,220.09	105.84	12.528		
12,800.00	8,765.97	12,756.55	8,734.97	53.65	54.03	-88.66	4,727.72	-544.36	1,325.84	1,218.44	107.40	12.345		
12,900.00	8,765.97	12,856.55	8,734.97	54.43	54.82	-88.66	4,827.71	-543.92	1,325.75	1,216.77	108.98	12.165		
13,000.00	8,765.97	12,956.55	8,734.97	55.22	55.62	-88.66	4,927.71	-543.49	1,325.67	1,215.09	110.57	11.989		
13,100.00	8,765.97	13,056.55	8,734.97	56.02	56.43	-88.66	5,027.71	-543.06	1,325.58	1,213.41	112.17	11.817		
13,200.00	8,765.98	13,156.55	8,734.98	56.81	57.24	-88.66	5,127.71	-542.63	1,325.49	1,211.71	113.79	11.649		
13,300.00	8,765.98	13,256.55	8,734.98	57.62	58.05	-88.66	5,227.71	-542.19	1,325.41	1,210.00	115.41	11.485		
13,400.00	8,765.98	13,356.55	8,734.98	58.43	58.87	-88.66	5,327.71	-541.76	1,325.32	1,208.28	117.04	11.324		
13,500.00	8,765.98	13,456.55	8,734.98	59.24	59.70	-88.66	5,427.71	-541.33	1,325.23	1,206.55	118.68	11.167		
13,600.00	8,765.98	13,556.55	8,734.98	60.06	60.52	-88.66	5,527.71	-540.90	1,325.15	1,204.82	120.33	11.013		
13,700.00	8,765.98	13,656.55	8,734.98	60.88	61.36	-88.66	5,627.71	-540.47	1,325.06	1,203.07	121.98	10.863		
13,800.00	8,765.98	13,756.55	8,734.98	61.71	62.19	-88.66	5,727.71	-540.03	1,324.97	1,201.32	123.65	10.716		
13,900.00	8,765.98	13,856.55	8,734.98	62.54	63.03	-88.66	5,827.71	-539.60	1,324.88	1,199.56	125.32	10.572		
14,000.00	8,765.98	13,956.55	8,734.98	63.38	63.88	-88.66	5,927.70	-539.17	1,324.80	1,197.79	127.00	10.431		
14,100.00	8,765.98	14,056.55	8,734.98	64.22	64.72	-88.66	6,027.70	-538.74	1,324.71	1,196.02	128.69	10.294		
14,200.00	8,765.98	14,156.55	8,734.98	65.06	65.57	-88.66	6,127.70	-538.31	1,324.62	1,194.24	130.39	10.159		
14,300.00	8,765.98	14,256.55	8,734.98	65.90	66.43	-88.66	6,227.70	-537.87	1,324.54	1,192.45	132.09	10.028		
14,400.00	8,765.98	14,356.55	8,734.98	66.75	67.28	-88.66	6,327.70	-537.44	1,324.45	1,190.66	133.79	9.899		
14,500.00	8,765.98	14,456.55	8,734.98	67.60	68.14	-88.66	6,427.70	-537.01	1,324.36	1,188.86	135.51	9.773		
14,600.00	8,765.98	14,556.55	8,734.98	68.46	69.01	-88.66	6,527.70	-536.58	1,324.28	1,187.05	137.23	9.650		
14,700.00	8,765.98	14,656.55	8,734.98	69.32	69.87	-88.66	6,627.70	-536.14	1,324.19	1,185.24	138.95	9.530		
14,800.00	8,765.98	14,756.55	8,734.98	70.18	70.74	-88.66	6,727.70	-535.71	1,324.10	1,183.42	140.68	9.412		
14,900.00	8,765.98	14,856.55	8,734.98	71.04	71.61	-88.66	6,827.70	-535.28	1,324.02	1,181.60	142.42	9.297		
15,000.00	8,765.98	14,956.55	8,734.98	71.91	72.48	-88.66	6,927.69	-534.85	1,323.93	1,179.77	144.16	9.184		
15,100.00	8,765.98	15,056.55	8,734.98	72.78	73.36	-88.66	7,027.69	-534.42	1,323.84	1,177.94	145.90	9.073		
15,200.00	8,765.98	15,156.55	8,734.98	73.65	74.24	-88.66	7,127.69	-533.98	1,323.76	1,176.10	147.65	8.965		
15,300.00	8,765.98	15,256.55	8,734.98	74.52	75.12	-88.66	7,227.69	-533.55	1,323.67	1,174.26	149.41	8.859		
15,400.00	8,765.98	15,356.55	8,734.98	75.40	76.00	-88.66	7,327.69	-533.12	1,323.58	1,172.41	151.17	8.756		
15,500.00	8,765.98	15,456.55	8,734.98	76.28	76.88	-88.66	7,427.69	-532.69	1,323.50	1,170.56	152.93	8.654		
15,600.00	8,765.99	15,556.55	8,734.99	77.16	77.77	-88.66	7,527.69	-532.26	1,323.41	1,168.71	154.70	8.555		
15,700.00	8,765.99	15,656.55	8,734.99	78.04	78.65	-88.66	7,627.69	-531.82	1,323.32	1,166.85	156.47	8.457		
15,800.00	8,765.99	15,756.55	8,734.99	78.92	79.54	-88.66	7,727.69	-531.39	1,323.24	1,164.99	158.25	8.362		
15,900.00	8,765.99	15,856.55	8,734.99	79.81	80.44	-88.66	7,827.69	-530.96	1,323.15	1,163.12	160.03	8.268		
16,000.00	8,765.99	15,956.55	8,734.99	80.70	81.33	-88.66	7,927.68	-530.53	1,323.06	1,161.25	161.81	8.177		
16,100.00	8,765.99	16,056.55	8,734.99	81.59	82.22	-88.66	8,027.68	-530.09	1,322.98	1,159.38	163.60	8.087		
16,200.00	8,765.99	16,156.55	8,734.99	82.48	83.12	-88.66	8,127.68	-529.66	1,322.89	1,157.50	165.38	7.999		
16,300.00	8,765.99	16,256.55	8,734.99	83.37	84.02	-88.66	8,227.68	-529.23	1,322.80	1,155.62	167.18	7.913		
16,400.00	8,765.99	16,356.55	8,734.99	84.27	84.92	-88.66	8,327.68	-528.80	1,322.72	1,153.74	168.97	7.828		
16,500.00	8,765.99	16,456.55	8,734.99	85.17	85.82	-88.66	8,427.68	-528.37	1,322.63	1,151.86	170.77	7.745		
16,600.00	8,765.99	16,556.55	8,734.99	86.06	86.72	-88.66	8,527.68	-527.93	1,322.54	1,149.97	172.57	7.664		
16,700.00	8,765.99	16,656.55	8,734.99	86.96	87.63	-88.66	8,627.68	-527.50	1,322.45	1,148.08	174.38	7.584		
16,800.00	8,765.99	16,756.55	8,734.99	87.87	88.53	-88.66	8,727.68	-527.07	1,322.37	1,146.18	176.19	7.506		
16,900.00	8,765.99	16,856.55	8,734.99	88.77	89.44	-88.66	8,827.68	-526.64	1,322.28	1,144.28	178.00	7.429		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
17,000.00	8,765.99	16,956.55	8,734.99	89.67	90.34	-88.66	8,927.68	-526.21	1,322.19	1,142.39	179.81	7.353		
17,100.00	8,765.99	17,056.55	8,734.99	90.58	91.25	-88.66	9,027.67	-525.77	1,322.11	1,140.48	181.62	7.279		
17,200.00	8,765.99	17,156.55	8,734.99	91.48	92.16	-88.66	9,127.67	-525.34	1,322.02	1,138.58	183.44	7.207		
17,300.00	8,765.99	17,256.55	8,734.99	92.39	93.07	-88.66	9,227.67	-524.91	1,321.93	1,136.67	185.26	7.135		
17,400.00	8,765.99	17,356.55	8,734.99	93.30	93.99	-88.66	9,327.67	-524.48	1,321.85	1,134.76	187.08	7.066		
17,500.00	8,765.99	17,456.55	8,734.99	94.21	94.90	-88.66	9,427.67	-524.04	1,321.76	1,132.85	188.91	6.997		
17,600.00	8,765.99	17,556.55	8,734.99	95.12	95.82	-88.66	9,527.67	-523.61	1,321.67	1,130.94	190.74	6.929		
17,700.00	8,765.99	17,656.55	8,734.99	96.03	96.73	-88.66	9,627.67	-523.18	1,321.59	1,129.02	192.56	6.863		
17,800.00	8,765.99	17,756.55	8,734.99	96.95	97.65	-88.66	9,727.67	-522.75	1,321.50	1,127.11	194.39	6.798		
17,900.00	8,766.00	17,856.55	8,735.00	97.86	98.56	-88.66	9,827.67	-522.32	1,321.41	1,125.19	196.23	6.734		
18,000.00	8,766.00	17,956.55	8,735.00	98.78	99.48	-88.66	9,927.67	-521.88	1,321.33	1,123.26	198.06	6.671		
18,100.00	8,766.00	18,056.55	8,735.00	99.69	100.40	-88.66	10,027.66	-521.45	1,321.24	1,121.34	199.90	6.610		
18,200.00	8,766.00	18,156.55	8,735.00	100.61	101.32	-88.66	10,127.66	-521.02	1,321.15	1,119.42	201.74	6.549		
18,300.00	8,766.00	18,256.55	8,735.00	101.53	102.24	-88.66	10,227.66	-520.59	1,321.07	1,117.49	203.58	6.489		
18,400.00	8,766.00	18,356.55	8,735.00	102.45	103.17	-88.66	10,327.66	-520.16	1,320.98	1,115.56	205.42	6.431		
18,500.00	8,766.00	18,456.55	8,735.00	103.37	104.09	-88.66	10,427.66	-519.72	1,320.89	1,113.63	207.26	6.373		
18,600.00	8,766.00	18,556.55	8,735.00	104.29	105.01	-88.66	10,527.66	-519.29	1,320.81	1,111.70	209.11	6.316		
18,700.00	8,766.00	18,656.55	8,735.00	105.21	105.94	-88.66	10,627.66	-518.86	1,320.72	1,109.76	210.96	6.261		
18,800.00	8,766.00	18,756.55	8,735.00	106.13	106.86	-88.65	10,727.66	-518.43	1,320.63	1,107.83	212.80	6.206		
18,900.00	8,766.00	18,856.55	8,735.00	107.06	107.79	-88.65	10,827.66	-517.99	1,320.55	1,105.89	214.65	6.152		
19,000.00	8,766.00	18,956.55	8,735.00	107.98	108.71	-88.65	10,927.66	-517.56	1,320.46	1,103.95	216.51	6.099		
19,082.82	8,766.00	19,039.37	8,735.00	108.75	109.48	-88.65	11,010.47	-517.20	1,320.39	1,102.35	218.04	6.056		
19,089.74	8,766.00	19,035.79	8,735.00	108.81	109.45	-88.65	11,006.90	-517.22	1,320.42	1,102.37	218.05	6.056 SF		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A													Offset Well Error:	0.00 usft
Survey Program: 0-MWD+IFR1														
Reference				Offset		Semi Major Axis			Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	-90.07	-0.07	-60.07	60.07					
100.00	100.00	100.00	100.00	0.13	0.13	-90.07	-0.07	-60.07	60.07	59.81	0.26	229.551		
200.00	200.00	200.00	200.00	0.49	0.49	-90.07	-0.07	-60.07	60.07	59.09	0.98	61.382		
300.00	300.00	300.00	300.00	0.85	0.85	-90.07	-0.07	-60.07	60.07	58.37	1.70	35.428		
400.00	400.00	400.00	400.00	1.21	1.21	-90.07	-0.07	-60.07	60.07	57.66	2.41	24.899		
500.00	500.00	500.00	500.00	1.56	1.56	-90.07	-0.07	-60.07	60.07	56.94	3.13	19.195		
600.00	600.00	600.00	600.00	1.92	1.92	-90.07	-0.07	-60.07	60.07	56.22	3.85	15.617		
607.97	607.97	607.97	607.97	1.95	1.95	-90.07	-0.07	-60.07	60.07	56.17	3.90	15.388 CC		
700.00	700.00	699.99	699.98	2.28	2.26	-90.90	-0.94	-60.07	60.08	55.53	4.55	13.216		
800.00	800.00	800.08	799.88	2.64	2.60	-93.39	-3.56	-60.07	60.18	54.94	5.24	11.494		
900.00	900.00	900.14	899.75	3.00	2.93	-96.69	-7.05	-60.07	60.48	54.55	5.93	10.197		
1,000.00	1,000.00	1,000.21	999.63	3.36	3.28	-99.95	-10.53	-60.07	60.99	54.36	6.63	9.195		
1,100.00	1,100.00	1,100.27	1,099.51	3.72	3.62	-103.14	-14.02	-60.07	61.69	54.35	7.34	8.407 ES		
1,200.00	1,200.00	1,200.33	1,199.39	4.07	3.97	-106.25	-17.51	-60.07	62.57	54.53	8.04	7.778		
1,300.00	1,300.00	1,300.39	1,299.27	4.43	4.32	-109.27	-21.00	-60.07	63.64	54.88	8.75	7.270		
1,400.00	1,400.00	1,400.45	1,399.15	4.79	4.67	-112.18	-24.48	-60.07	64.87	55.41	9.46	6.855		
1,500.00	1,500.00	1,500.51	1,499.02	5.15	5.03	-114.97	-27.97	-60.07	66.27	56.09	10.18	6.513		
1,600.00	1,599.98	1,600.63	1,598.85	5.50	5.38	-173.62	-31.46	-60.07	69.55	58.67	10.88	6.390		
1,700.00	1,699.84	1,700.93	1,698.48	5.86	5.74	-176.35	-34.94	-60.07	76.47	64.87	11.59	6.596		
1,800.00	1,799.45	1,801.55	1,797.80	6.21	6.10	-178.69	-38.41	-60.07	87.00	74.70	12.30	7.072		
1,900.00	1,898.70	1,902.60	1,896.69	6.57	6.46	-179.49	-41.86	-60.07	101.11	88.10	13.02	7.769		
2,000.00	1,997.47	1,995.80	1,995.03	6.92	6.79	-178.17	-45.29	-60.07	118.75	105.05	13.70	8.668		
2,100.00	2,095.95	2,098.29	2,097.49	7.28	7.15	-177.42	-47.50	-59.14	136.64	122.22	14.41	9.479		
2,200.00	2,194.43	2,202.16	2,201.31	7.64	7.51	-177.30	-46.64	-56.10	151.18	136.07	15.12	10.000		
2,300.00	2,292.91	2,306.96	2,305.89	8.01	7.87	-177.64	-42.61	-50.89	162.32	146.51	15.81	10.267		
2,400.00	2,391.39	2,412.41	2,410.82	8.37	8.23	-178.37	-35.37	-43.50	170.02	153.53	16.49	10.309		
2,500.00	2,489.87	2,518.22	2,515.67	8.74	8.60	-179.50	-24.88	-33.91	174.30	157.14	17.16	10.156		
2,600.00	2,588.35	2,621.65	2,617.65	9.11	8.96	-179.03	-11.78	-22.61	175.52	157.68	17.84	9.836		
2,700.00	2,686.83	2,721.55	2,716.02	9.48	9.30	-177.55	1.41	-11.34	176.26	157.71	18.56	9.498		
2,800.00	2,785.31	2,821.44	2,814.39	9.85	9.65	-176.07	14.60	-0.07	177.12	157.85	19.28	9.189		
2,900.00	2,883.79	2,921.33	2,912.77	10.23	10.01	-174.62	27.79	11.20	178.10	158.10	20.00	8.907		
3,000.00	2,982.27	3,021.23	3,011.14	10.60	10.36	-173.18	40.99	22.46	179.19	158.47	20.72	8.648		
3,100.00	3,080.75	3,121.12	3,109.52	10.98	10.72	-171.75	54.18	33.73	180.39	158.94	21.45	8.411		
3,200.00	3,179.23	3,221.01	3,207.89	11.35	11.08	-170.35	67.37	45.00	181.70	159.52	22.18	8.194		
3,300.00	3,277.72	3,320.90	3,306.27	11.73	11.44	-168.97	80.56	56.27	183.12	160.21	22.91	7.994		
3,400.00	3,376.20	3,420.80	3,404.64	12.11	11.80	-167.61	93.75	67.54	184.64	161.00	23.64	7.811		
3,500.00	3,474.68	3,520.69	3,503.02	12.48	12.17	-166.27	106.94	78.81	186.27	161.89	24.38	7.642		
3,600.00	3,573.16	3,620.58	3,601.39	12.86	12.53	-164.96	120.13	90.08	188.00	162.88	25.11	7.486		
3,700.00	3,671.64	3,720.48	3,699.77	13.24	12.90	-163.67	133.32	101.35	189.82	163.97	25.85	7.343		
3,800.00	3,770.12	3,820.37	3,798.14	13.62	13.26	-162.41	146.51	112.62	191.74	165.14	26.59	7.211		
3,900.00	3,868.60	3,920.26	3,896.52	14.00	13.63	-161.17	159.70	123.89	193.74	166.41	27.33	7.088		
4,000.00	3,967.08	4,020.16	3,994.89	14.38	14.00	-159.96	172.89	135.16	195.84	167.77	28.08	6.976		
4,100.00	4,065.56	4,120.05	4,093.27	14.76	14.37	-158.77	186.08	146.43	198.03	169.21	28.82	6.871		
4,200.00	4,164.04	4,219.94	4,191.64	15.14	14.74	-157.61	199.27	157.70	200.29	170.73	29.56	6.775		
4,300.00	4,262.52	4,319.83	4,290.02	15.52	15.11	-156.48	212.46	168.97	202.64	172.33	30.31	6.685		
4,400.00	4,361.00	4,419.73	4,388.39	15.90	15.48	-155.37	225.65	180.24	205.06	174.00	31.06	6.602		
4,500.00	4,459.48	4,519.62	4,486.77	16.28	15.85	-154.29	238.84	191.51	207.56	175.75	31.81	6.526		
4,600.00	4,557.97	4,619.51	4,585.14	16.66	16.22	-153.24	252.03	202.78	210.13	177.58	32.56	6.454		
4,700.00	4,656.45	4,719.41	4,683.52	17.05	16.60	-152.21	265.22	214.05	212.77	179.47	33.31	6.388		
4,800.00	4,754.93	4,819.30	4,781.89	17.43	16.97	-151.21	278.41	225.32	215.48	181.42	34.06	6.327		
4,900.00	4,853.41	4,919.19	4,880.27	17.81	17.35	-150.23	291.61	236.59	218.25	183.44	34.81	6.270		
5,000.00	4,951.89	5,019.08	4,978.64	18.19	17.72	-149.28	304.80	247.86	221.09	185.52	35.56	6.217		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A													Offset Well Error:	0.00 usft
Survey Program: 0-MWD+IFR1														
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
							+N/-S (usft)	+E/-W (usft)						
5,100.00	5,050.37	5,118.98	5,077.02	18.57	18.09	-148.35	317.99	259.13	223.98	187.66	36.31	6.168		
5,200.00	5,148.85	5,218.87	5,175.39	18.96	18.47	-147.44	331.18	270.40	226.93	189.86	37.07	6.122		
5,300.00	5,247.33	5,318.76	5,273.77	19.34	18.84	-146.56	344.37	281.67	229.94	192.11	37.82	6.079		
5,400.00	5,345.81	5,418.66	5,372.14	19.72	19.22	-145.70	357.56	292.94	233.00	194.42	38.58	6.040		
5,500.00	5,444.29	5,518.55	5,470.52	20.11	19.60	-144.86	370.75	304.21	236.11	196.77	39.33	6.003		
5,600.00	5,542.77	5,618.44	5,568.89	20.49	19.97	-144.05	383.94	315.48	239.27	199.18	40.09	5.968		
5,700.00	5,641.25	5,718.34	5,667.27	20.87	20.35	-143.26	397.13	326.74	242.47	201.63	40.85	5.936		
5,800.00	5,739.73	5,818.23	5,765.64	21.26	20.73	-142.49	410.32	338.01	245.72	204.12	41.60	5.906		
5,900.00	5,838.22	5,918.12	5,864.02	21.64	21.10	-141.73	423.51	349.28	249.02	206.66	42.36	5.878		
6,000.00	5,936.70	6,018.01	5,962.39	22.02	21.48	-141.00	436.70	360.55	252.36	209.24	43.12	5.853		
6,100.00	6,035.18	6,117.91	6,060.76	22.41	21.86	-140.29	449.89	371.82	255.73	211.86	43.88	5.828		
6,200.00	6,133.66	6,217.80	6,159.14	22.79	22.23	-139.59	463.08	383.09	259.15	214.51	44.64	5.806		
6,300.00	6,232.14	6,317.69	6,257.51	23.17	22.61	-138.92	476.27	394.36	262.60	217.21	45.40	5.785		
6,400.00	6,330.62	6,416.78	6,355.10	23.56	22.99	-138.27	489.32	405.51	266.11	219.96	46.15	5.766		
6,500.00	6,429.10	6,511.81	6,449.03	23.94	23.34	-138.04	500.29	414.89	270.83	223.94	46.89	5.776		
6,600.00	6,527.58	6,606.64	6,543.18	24.33	23.69	-138.36	508.87	422.22	277.35	229.75	47.60	5.827		
6,700.00	6,626.06	6,701.05	6,637.24	24.71	24.03	-139.19	515.06	427.50	285.72	237.44	48.28	5.918		
6,800.00	6,724.54	6,794.86	6,730.90	25.09	24.36	-140.46	518.87	430.75	296.03	247.09	48.94	6.049		
6,900.00	6,823.15	6,887.97	6,823.99	25.48	24.68	-142.11	520.34	432.01	307.85	258.30	49.55	6.213		
7,000.00	6,922.24	6,986.22	6,922.24	25.85	25.02	-143.69	520.36	432.03	318.56	268.33	50.23	6.343		
7,100.00	7,021.74	7,085.72	7,021.74	26.22	25.36	-144.82	520.36	432.03	326.64	275.72	50.91	6.416		
7,200.00	7,121.53	7,185.50	7,121.53	26.57	25.70	-145.52	520.36	432.03	331.94	280.34	51.60	6.433		
7,300.00	7,221.48	7,285.46	7,221.48	26.92	26.04	-145.84	520.36	432.03	334.39	282.11	52.28	6.396		
7,400.00	7,321.48	7,385.45	7,321.48	27.25	26.38	-90.04	520.36	432.03	334.57	281.61	52.96	6.317		
7,500.00	7,421.48	7,485.45	7,421.48	27.59	26.73	-90.04	520.36	432.03	334.57	280.93	53.65	6.237		
7,600.00	7,521.48	7,585.45	7,521.48	27.93	27.07	-90.04	520.36	432.03	334.57	280.24	54.33	6.158		
7,700.00	7,621.48	7,685.45	7,621.48	28.27	27.41	-90.04	520.36	432.03	334.57	279.56	55.01	6.082		
7,800.00	7,721.48	7,785.45	7,721.48	28.61	27.76	-90.04	520.36	432.03	334.57	278.88	55.69	6.007		
7,900.00	7,821.48	7,885.45	7,821.48	28.95	28.10	-90.04	520.36	432.03	334.57	278.19	56.38	5.934		
8,000.00	7,921.48	7,985.45	7,921.48	29.29	28.44	-90.04	520.36	432.03	334.57	277.51	57.06	5.863		
8,100.00	8,021.48	8,085.45	8,021.48	29.63	28.79	-90.04	520.36	432.03	334.57	276.82	57.75	5.794		
8,200.00	8,121.48	8,185.45	8,121.48	29.97	29.13	-90.04	520.36	432.03	334.57	276.13	58.44	5.725		
8,200.79	8,122.26	8,186.24	8,122.26	29.97	29.14	-90.24	520.36	432.03	334.57	276.13	58.44	5.725		
8,300.00	8,221.46	8,285.44	8,221.46	30.31	29.48	-90.36	520.36	432.03	334.57	275.45	59.12	5.659		
8,400.00	8,320.40	8,384.38	8,320.40	30.67	29.82	-92.62	520.36	432.03	334.94	275.15	59.79	5.602		
8,500.00	8,415.47	8,479.45	8,415.47	31.02	30.15	-97.27	520.36	432.03	337.76	277.35	60.41	5.591 SF		
8,600.00	8,503.78	8,567.75	8,503.78	31.35	30.46	-103.14	520.36	432.03	347.25	286.24	61.01	5.692		
8,700.00	8,582.64	8,646.62	8,582.64	31.65	30.73	-108.68	520.36	432.03	368.42	306.85	61.57	5.984		
8,800.00	8,649.67	8,713.64	8,649.67	31.91	30.96	-112.40	520.36	432.03	405.04	342.95	62.09	6.524		
8,900.00	8,702.82	8,766.79	8,702.82	32.15	31.15	-113.11	520.36	432.03	458.06	395.53	62.52	7.326		
9,000.00	8,740.47	8,804.45	8,740.47	32.38	31.28	-109.66	520.36	432.03	525.60	462.75	62.84	8.364		
9,100.00	8,761.50	8,825.48	8,761.50	32.61	31.35	-100.60	520.36	432.03	604.10	541.07	63.03	9.585		
9,200.00	8,765.96	8,829.94	8,765.96	32.85	31.37	-90.00	520.36	432.03	689.43	626.34	63.09	10.928		
9,300.00	8,765.96	8,829.94	8,765.96	33.11	31.37	-90.00	520.36	432.03	778.38	715.27	63.11	12.334		
9,400.00	8,765.96	8,829.94	8,765.96	33.40	31.37	-90.00	520.36	432.03	869.73	806.60	63.13	13.776		
9,500.00	8,765.96	8,829.94	8,765.96	33.71	31.37	-90.00	520.36	432.03	962.81	899.65	63.16	15.245		
9,600.00	8,765.96	8,829.94	8,765.96	34.05	31.37	-90.00	520.36	432.03	1,057.15	993.97	63.18	16.733		
9,700.00	8,765.96	8,829.94	8,765.96	34.41	31.37	-90.00	520.36	432.03	1,152.44	1,089.24	63.20	18.236		
9,800.00	8,765.96	8,829.94	8,765.96	34.80	31.37	-90.00	520.36	432.03	1,248.47	1,185.25	63.22	19.749		
9,900.00	8,765.96	8,829.94	8,765.96	35.20	31.37	-90.00	520.36	432.03	1,345.08	1,281.84	63.24	21.270		
10,000.00	8,765.96	8,829.94	8,765.96	35.63	31.37	-90.00	520.36	432.03	1,442.15	1,378.89	63.26	22.797		
10,100.00	8,765.96	8,829.94	8,765.96	36.08	31.37	-90.00	520.36	432.03	1,539.60	1,476.32	63.28	24.329		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A													Offset Well Error:	0.00 usft
Survey Program: 0-MWD+IFR1														
Reference				Offset			Semi Major Axis			Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,200.00	8,765.96	8,829.94	8,765.96	36.55	31.37	-90.00	520.36	432.03	1,637.35	1,574.05	63.31	25.864		
10,300.00	8,765.96	8,829.94	8,765.96	37.04	31.37	-90.00	520.36	432.03	1,735.36	1,672.03	63.33	27.402		
10,400.00	8,765.96	8,829.94	8,765.96	37.55	31.37	-90.00	520.36	432.03	1,833.59	1,770.24	63.35	28.942		
10,500.00	8,765.96	8,829.94	8,765.96	38.07	31.37	-90.00	520.36	432.03	1,932.00	1,868.62	63.38	30.483		
10,600.00	8,765.96	8,829.94	8,765.96	38.62	31.37	-90.00	520.36	432.03	2,030.56	1,967.16	63.40	32.025		
10,700.00	8,765.96	8,829.94	8,765.96	39.18	31.37	-90.00	520.36	432.03	2,129.26	2,065.83	63.43	33.568		
10,800.00	8,765.96	12,985.97	10,964.96	39.75	45.87	-171.37	2,723.29	440.60	2,224.16	2,169.91	54.25	40.997		
10,900.00	8,765.97	13,085.97	10,964.97	40.34	46.39	-171.37	2,823.29	440.98	2,224.16	2,168.82	55.34	40.192		
11,000.00	8,765.97	13,185.97	10,964.97	40.94	46.93	-171.38	2,923.29	441.37	2,224.15	2,167.70	56.45	39.403		
11,100.00	8,765.97	13,285.97	10,964.97	41.56	47.48	-171.38	3,023.29	441.76	2,224.14	2,166.57	57.58	38.629		
11,200.00	8,765.97	13,385.97	10,964.97	42.19	48.04	-171.38	3,123.28	442.15	2,224.14	2,165.41	58.73	37.872		
11,300.00	8,765.97	13,485.97	10,964.97	42.83	48.62	-171.38	3,223.28	442.54	2,224.13	2,164.23	59.90	37.132		
11,400.00	8,765.97	13,585.97	10,964.97	43.49	49.21	-171.38	3,323.28	442.93	2,224.12	2,163.04	61.09	36.410		
11,500.00	8,765.97	13,685.97	10,964.97	44.15	49.81	-171.38	3,423.28	443.32	2,224.12	2,161.82	62.29	35.705		
11,600.00	8,765.97	13,785.97	10,964.97	44.83	50.42	-171.38	3,523.28	443.71	2,224.11	2,160.60	63.51	35.018		
11,700.00	8,765.97	13,885.97	10,964.97	45.52	51.04	-171.38	3,623.28	444.10	2,224.10	2,159.35	64.75	34.349		
11,800.00	8,765.97	13,985.97	10,964.97	46.21	51.67	-171.38	3,723.28	444.48	2,224.10	2,158.10	66.00	33.698		
11,900.00	8,765.97	14,085.97	10,964.97	46.92	52.32	-171.39	3,823.28	444.87	2,224.09	2,156.83	67.27	33.065		
12,000.00	8,765.97	14,185.97	10,964.97	47.64	52.97	-171.39	3,923.28	445.26	2,224.08	2,155.54	68.54	32.448		
12,100.00	8,765.97	14,285.97	10,964.97	48.36	53.63	-171.39	4,023.28	445.65	2,224.08	2,154.24	69.83	31.849		
12,200.00	8,765.97	14,385.97	10,964.97	49.10	54.30	-171.39	4,123.28	446.04	2,224.07	2,152.94	71.13	31.266		
12,300.00	8,765.97	14,485.97	10,964.97	49.84	54.98	-171.39	4,223.28	446.43	2,224.06	2,151.62	72.45	30.700		
12,400.00	8,765.97	14,585.97	10,964.97	50.59	55.67	-171.39	4,323.28	446.82	2,224.06	2,150.29	73.77	30.149		
12,500.00	8,765.97	14,685.97	10,964.97	51.34	56.37	-171.39	4,423.27	447.21	2,224.05	2,148.95	75.10	29.614		
12,600.00	8,765.97	14,785.97	10,964.97	52.11	57.08	-171.39	4,523.27	447.60	2,224.04	2,147.60	76.44	29.095		
12,700.00	8,765.97	14,885.97	10,964.97	52.87	57.79	-171.39	4,623.27	447.98	2,224.04	2,146.25	77.79	28.590		
12,800.00	8,765.97	14,985.97	10,964.97	53.65	58.51	-171.40	4,723.27	448.37	2,224.03	2,144.88	79.15	28.099		
12,900.00	8,765.97	15,085.97	10,964.97	54.43	59.24	-171.40	4,823.27	448.76	2,224.03	2,143.51	80.52	27.622		
13,000.00	8,765.97	15,185.97	10,964.97	55.22	59.97	-171.40	4,923.27	449.15	2,224.02	2,142.13	81.89	27.158		
13,100.00	8,765.97	15,285.97	10,964.97	56.02	60.71	-171.40	5,023.27	449.54	2,224.01	2,140.74	83.27	26.708		
13,200.00	8,765.98	15,385.97	10,964.98	56.81	61.46	-171.40	5,123.27	449.93	2,224.01	2,139.35	84.66	26.270		
13,300.00	8,765.98	15,485.97	10,964.98	57.62	62.21	-171.40	5,223.27	450.32	2,224.00	2,137.94	86.05	25.844		
13,400.00	8,765.98	15,585.97	10,964.98	58.43	62.97	-171.40	5,323.27	450.71	2,223.99	2,136.54	87.46	25.430		
13,500.00	8,765.98	15,685.97	10,964.98	59.24	63.73	-171.40	5,423.27	451.09	2,223.99	2,135.12	88.86	25.027		
13,600.00	8,765.98	15,785.97	10,964.98	60.06	64.50	-171.40	5,523.27	451.48	2,223.98	2,133.70	90.27	24.636		
13,700.00	8,765.98	15,885.97	10,964.98	60.88	65.28	-171.41	5,623.27	451.87	2,223.97	2,132.28	91.69	24.255		
13,800.00	8,765.98	15,985.97	10,964.98	61.71	66.06	-171.41	5,723.26	452.26	2,223.97	2,130.85	93.12	23.884		
13,900.00	8,765.98	16,085.97	10,964.98	62.54	66.84	-171.41	5,823.26	452.65	2,223.96	2,129.42	94.54	23.523		
14,000.00	8,765.98	16,185.97	10,964.98	63.38	67.63	-171.41	5,923.26	453.04	2,223.95	2,127.98	95.98	23.172		
14,100.00	8,765.98	16,285.97	10,964.98	64.22	68.42	-171.41	6,023.26	453.43	2,223.95	2,126.54	97.41	22.830		
14,200.00	8,765.98	16,385.97	10,964.98	65.06	69.22	-171.41	6,123.26	453.82	2,223.94	2,125.09	98.85	22.497		
14,300.00	8,765.98	16,485.97	10,964.98	65.90	70.03	-171.41	6,223.26	454.21	2,223.93	2,123.64	100.30	22.173		
14,400.00	8,765.98	16,585.97	10,964.98	66.75	70.83	-171.41	6,323.26	454.59	2,223.93	2,122.18	101.75	21.857		
14,500.00	8,765.98	16,685.97	10,964.98	67.60	71.64	-171.41	6,423.26	454.98	2,223.92	2,120.72	103.20	21.549		
14,600.00	8,765.98	16,785.97	10,964.98	68.46	72.46	-171.42	6,523.26	455.37	2,223.91	2,119.26	104.66	21.250		
14,700.00	8,765.98	16,885.97	10,964.98	69.32	73.28	-171.42	6,623.26	455.76	2,223.91	2,117.79	106.12	20.957		
14,800.00	8,765.98	16,985.97	10,964.98	70.18	74.10	-171.42	6,723.26	456.15	2,223.90	2,116.32	107.58	20.672		
14,900.00	8,765.98	17,085.97	10,964.98	71.04	74.92	-171.42	6,823.26	456.54	2,223.90	2,114.85	109.05	20.394		
15,000.00	8,765.98	17,185.97	10,964.98	71.91	75.75	-171.42	6,923.26	456.93	2,223.89	2,113.37	110.52	20.123		
15,100.00	8,765.98	17,285.97	10,964.98	72.78	76.59	-171.42	7,023.25	457.32	2,223.88	2,111.89	111.99	19.858		
15,200.00	8,765.98	17,385.97	10,964.98	73.65	77.42	-171.42	7,123.25	457.70	2,223.88	2,110.41	113.46	19.600		
15,300.00	8,765.98	17,485.97	10,964.98	74.52	78.26	-171.42	7,223.25	458.09	2,223.87	2,108.93	114.94	19.348		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,400.00	8,765.98	17,585.97	10,964.98	75.40	79.10	-171.42	7,323.25	458.48	2,223.86	2,107.44	116.42	19.101		
15,500.00	8,765.98	17,685.97	10,964.98	76.28	79.94	-171.43	7,423.25	458.87	2,223.86	2,105.95	117.91	18.861		
15,600.00	8,765.99	17,785.97	10,964.99	77.16	80.79	-171.43	7,523.25	459.26	2,223.85	2,104.46	119.39	18.626		
15,700.00	8,765.99	17,885.97	10,964.99	78.04	81.64	-171.43	7,623.25	459.65	2,223.84	2,102.96	120.88	18.397		
15,800.00	8,765.99	17,985.97	10,964.99	78.92	82.49	-171.43	7,723.25	460.04	2,223.84	2,101.47	122.37	18.173		
15,900.00	8,765.99	18,085.97	10,964.99	79.81	83.35	-171.43	7,823.25	460.43	2,223.83	2,099.97	123.86	17.954		
16,000.00	8,765.99	18,185.97	10,964.99	80.70	84.20	-171.43	7,923.25	460.82	2,223.82	2,098.47	125.36	17.740		
16,100.00	8,765.99	18,285.97	10,964.99	81.59	85.06	-171.43	8,023.25	461.20	2,223.82	2,096.96	126.85	17.530		
16,200.00	8,765.99	18,385.97	10,964.99	82.48	85.93	-171.43	8,123.25	461.59	2,223.81	2,095.46	128.35	17.326		
16,300.00	8,765.99	18,485.97	10,964.99	83.37	86.79	-171.43	8,223.25	461.98	2,223.80	2,093.95	129.85	17.125		
16,400.00	8,765.99	18,585.97	10,964.99	84.27	87.66	-171.44	8,323.24	462.37	2,223.80	2,092.44	131.36	16.930		
16,500.00	8,765.99	18,685.97	10,964.99	85.17	88.52	-171.44	8,423.24	462.76	2,223.79	2,090.93	132.86	16.738		
16,600.00	8,765.99	18,785.97	10,964.99	86.06	89.39	-171.44	8,523.24	463.15	2,223.78	2,089.42	134.37	16.550		
16,700.00	8,765.99	18,885.97	10,964.99	86.96	90.27	-171.44	8,623.24	463.54	2,223.78	2,087.91	135.87	16.367		
16,800.00	8,765.99	18,985.97	10,964.99	87.87	91.14	-171.44	8,723.24	463.93	2,223.77	2,086.39	137.38	16.187		
16,900.00	8,765.99	19,085.97	10,964.99	88.77	92.02	-171.44	8,823.24	464.32	2,223.77	2,084.87	138.89	16.011		
17,000.00	8,765.99	19,185.97	10,964.99	89.67	92.90	-171.44	8,923.24	464.70	2,223.76	2,083.35	140.40	15.838		
17,100.00	8,765.99	19,285.97	10,964.99	90.58	93.77	-171.44	9,023.24	465.09	2,223.75	2,081.83	141.92	15.669		
17,200.00	8,765.99	19,385.97	10,964.99	91.48	94.66	-171.44	9,123.24	465.48	2,223.75	2,080.31	143.43	15.504		
17,300.00	8,765.99	19,485.97	10,964.99	92.39	95.54	-171.45	9,223.24	465.87	2,223.74	2,078.79	144.95	15.342		
17,400.00	8,765.99	19,585.97	10,964.99	93.30	96.42	-171.45	9,323.24	466.26	2,223.73	2,077.27	146.47	15.183		
17,500.00	8,765.99	19,685.97	10,964.99	94.21	97.31	-171.45	9,423.24	466.65	2,223.73	2,075.74	147.98	15.027		
17,600.00	8,765.99	19,785.97	10,964.99	95.12	98.20	-171.45	9,523.24	467.04	2,223.72	2,074.22	149.50	14.874		
17,700.00	8,765.99	19,885.97	10,964.99	96.03	99.09	-171.45	9,623.23	467.43	2,223.71	2,072.69	151.03	14.724		
17,800.00	8,765.99	19,985.97	10,964.99	96.95	99.98	-171.45	9,723.23	467.81	2,223.71	2,071.16	152.55	14.577		
17,900.00	8,766.00	20,085.97	10,965.00	97.86	100.87	-171.45	9,823.23	468.20	2,223.70	2,069.63	154.07	14.433		
18,000.00	8,766.00	20,185.97	10,965.00	98.78	101.76	-171.45	9,923.23	468.59	2,223.69	2,068.10	155.60	14.291		
18,100.00	8,766.00	20,285.97	10,965.00	99.69	102.66	-171.45	10,023.23	468.98	2,223.69	2,066.57	157.12	14.153		
18,200.00	8,766.00	20,385.97	10,965.00	100.61	103.55	-171.46	10,123.23	469.37	2,223.68	2,065.03	158.65	14.016		
18,300.00	8,766.00	20,485.97	10,965.00	101.53	104.45	-171.46	10,223.23	469.76	2,223.67	2,063.50	160.18	13.883		
18,400.00	8,766.00	20,585.97	10,965.00	102.45	105.35	-171.46	10,323.23	470.15	2,223.67	2,061.96	161.70	13.751		
18,500.00	8,766.00	20,685.97	10,965.00	103.37	106.25	-171.46	10,423.23	470.54	2,223.66	2,060.43	163.23	13.623		
18,600.00	8,766.00	20,785.97	10,965.00	104.29	107.15	-171.46	10,523.23	470.93	2,223.66	2,058.89	164.76	13.496		
18,700.00	8,766.00	20,885.97	10,965.00	105.21	108.05	-171.46	10,623.23	471.31	2,223.65	2,057.35	166.30	13.372		
18,800.00	8,766.00	20,985.97	10,965.00	106.13	108.96	-171.46	10,723.23	471.70	2,223.64	2,055.81	167.83	13.250		
18,900.00	8,766.00	21,085.97	10,965.00	107.06	109.86	-171.46	10,823.23	472.09	2,223.64	2,054.27	169.36	13.130		
19,000.00	8,766.00	21,185.97	10,965.00	107.98	110.77	-171.46	10,923.22	472.48	2,223.63	2,052.73	170.90	13.012		
19,089.74	8,766.00	21,275.71	10,965.00	108.81	111.58	-171.47	11,012.96	472.83	2,223.62	2,051.35	172.27	12.908		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Semi Major Axis				Distance					Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	89.73	0.14	29.84	29.84	29.84	29.58	0.26	114.032	
100.00	100.00	100.00	100.00	0.13	0.13	89.73	0.14	29.84	29.84	29.84	28.86	0.98	30.492	
200.00	200.00	200.00	200.00	0.49	0.49	89.73	0.14	29.84	29.84	29.84	28.86	0.98	30.492	
300.00	300.00	300.00	300.00	0.85	0.85	89.73	0.14	29.84	29.84	29.84	28.14	1.70	17.599	
400.00	400.00	400.00	400.00	1.21	1.21	89.73	0.14	29.84	29.84	29.84	27.43	2.41	12.369	
500.00	500.00	500.00	500.00	1.56	1.56	89.73	0.14	29.84	29.84	29.84	26.71	3.13	9.535	
600.00	600.00	600.00	600.00	1.92	1.92	89.73	0.14	29.84	29.84	29.84	25.99	3.85	7.758	
700.00	700.00	700.00	700.00	2.28	2.28	89.73	0.14	29.84	29.84	29.84	25.28	4.56	6.539	
800.00	800.00	800.00	800.00	2.64	2.64	89.73	0.14	29.84	29.84	29.84	24.56	5.28	5.651	
900.00	900.00	900.00	900.00	3.00	3.00	89.73	0.14	29.84	29.84	29.84	23.84	6.00	4.976	
1,000.00	1,000.00	1,000.00	1,000.00	3.36	3.36	89.73	0.14	29.84	29.84	29.84	23.13	6.71	4.444	
1,100.00	1,100.00	1,100.00	1,100.00	3.72	3.72	89.73	0.14	29.84	29.84	29.84	22.41	7.43	4.016	
1,200.00	1,200.00	1,200.00	1,200.00	4.07	4.07	89.73	0.14	29.84	29.84	29.84	21.69	8.15	3.662	CC, ES
1,300.00	1,300.00	1,299.03	1,299.01	4.43	4.42	88.38	0.89	31.38	31.41	22.55	8.85	8.85	3.548	
1,400.00	1,400.00	1,397.82	1,397.67	4.79	4.77	85.04	3.12	35.98	36.19	26.65	9.55	3.791	3.791	
1,500.00	1,500.00	1,496.15	1,495.62	5.15	5.12	81.10	6.82	43.60	44.34	34.12	10.23	4.336	4.336	
1,600.00	1,599.98	1,593.99	1,592.75	5.50	5.47	22.32	11.96	54.17	54.34	43.45	10.89	4.990	4.990	
1,700.00	1,699.84	1,708.69	1,688.90	5.86	5.88	20.72	18.50	67.63	64.48	52.89	11.59	5.562	5.562	
1,800.00	1,799.45	1,809.09	1,786.99	6.21	6.24	20.12	26.06	83.18	73.35	61.06	12.30	5.966	5.966	
1,900.00	1,898.70	1,909.26	1,885.31	6.57	6.61	20.52	33.64	98.77	78.96	65.96	13.00	6.072	6.072	
2,000.00	1,997.47	2,009.31	1,983.74	6.92	6.97	21.76	41.23	114.39	81.32	67.60	13.72	5.929	5.929	
2,100.00	2,095.95	2,109.34	2,082.19	7.28	7.34	23.43	48.82	130.00	82.12	67.68	14.43	5.689	5.689	
2,200.00	2,194.43	2,190.63	2,180.64	7.64	7.64	25.06	56.40	145.61	82.98	67.89	15.09	5.500	5.500	
2,300.00	2,292.91	2,309.40	2,279.09	8.01	8.09	26.65	63.99	161.23	83.91	68.03	15.88	5.283	5.283	
2,400.00	2,391.39	2,409.43	2,377.54	8.37	8.46	28.21	71.58	176.84	84.90	68.29	16.61	5.111	5.111	
2,500.00	2,489.87	2,490.54	2,475.99	8.74	8.76	29.73	79.17	192.45	85.95	68.68	17.27	4.976	4.976	
2,600.00	2,588.35	2,609.49	2,574.44	9.11	9.21	31.21	86.76	208.06	87.07	68.99	18.08	4.816	4.816	
2,700.00	2,686.83	2,709.53	2,672.89	9.48	9.59	32.66	94.34	223.68	88.24	69.42	18.81	4.690	4.690	
2,800.00	2,785.31	2,809.56	2,771.34	9.85	9.97	34.06	101.93	239.29	89.46	69.91	19.55	4.575	4.575	
2,900.00	2,883.79	2,890.41	2,869.79	10.23	10.27	35.43	109.52	254.90	90.74	70.51	20.22	4.487	4.487	
3,000.00	2,982.27	3,009.62	2,968.24	10.60	10.73	36.76	117.11	270.52	92.06	71.03	21.04	4.376	4.376	
3,100.00	3,080.75	3,109.65	3,066.69	10.98	11.11	38.05	124.69	286.13	93.44	71.66	21.78	4.289	4.289	
3,200.00	3,179.23	3,209.68	3,165.14	11.35	11.49	39.30	132.28	301.74	94.86	72.33	22.53	4.210	4.210	
3,300.00	3,277.72	3,290.29	3,263.59	11.73	11.79	40.52	139.87	317.36	96.32	73.12	23.21	4.151	4.151	
3,400.00	3,376.20	3,409.75	3,362.04	12.11	12.25	41.70	147.46	332.97	97.83	73.80	24.03	4.072	4.072	
3,500.00	3,474.68	3,509.78	3,460.49	12.48	12.63	42.84	155.05	348.58	99.38	74.60	24.78	4.011	4.011	
3,600.00	3,573.16	3,609.81	3,558.94	12.86	13.01	43.95	162.63	364.20	100.96	75.43	25.53	3.954	3.954	
3,700.00	3,671.64	3,690.16	3,657.39	13.24	13.32	45.02	170.22	379.81	102.59	76.37	26.21	3.914	3.914	
3,800.00	3,770.12	3,790.13	3,755.84	13.62	13.70	46.06	177.81	395.42	104.24	77.28	26.97	3.866	3.866	
3,900.00	3,868.60	3,909.90	3,854.29	14.00	14.16	47.06	185.40	411.04	105.93	78.14	27.80	3.811	3.811	
4,000.00	3,967.08	4,009.93	3,952.74	14.38	14.54	48.03	192.99	426.65	107.65	79.10	28.55	3.770	3.770	
4,100.00	4,065.56	4,090.04	4,051.19	14.76	14.85	48.98	200.57	442.26	109.40	80.17	29.24	3.742	3.742	
4,200.00	4,164.04	4,210.00	4,149.84	15.14	15.31	49.89	208.16	457.88	111.19	81.12	30.07	3.698	3.698	
4,300.00	4,262.52	4,289.97	4,248.09	15.52	15.62	50.77	215.75	473.49	112.99	82.24	30.75	3.674	3.674	
4,400.00	4,361.00	4,389.94	4,346.54	15.90	16.00	51.63	223.34	489.10	114.83	83.31	31.51	3.644	3.644	
4,500.00	4,459.48	4,489.91	4,444.99	16.28	16.39	52.46	230.92	504.72	116.68	84.41	32.27	3.615	3.615	
4,600.00	4,557.97	4,589.88	4,543.44	16.66	16.77	53.26	238.51	520.33	118.57	85.53	33.04	3.589	3.589	
4,700.00	4,656.45	4,689.85	4,641.89	17.05	17.15	54.04	246.10	535.94	120.47	86.67	33.80	3.564	3.564	
4,800.00	4,754.93	4,789.82	4,740.34	17.43	17.54	54.79	253.69	551.56	122.40	87.84	34.56	3.542	3.542	
4,900.00	4,853.41	4,889.79	4,838.79	17.81	17.92	55.52	261.28	567.17	124.34	89.02	35.32	3.520	3.520	
5,000.00	4,951.89	4,989.75	4,937.24	18.19	18.31	56.23	268.86	582.78	126.31	90.22	36.09	3.500	3.500	
5,100.00	5,050.37	5,089.72	5,035.69	18.57	18.69	56.91	276.45	598.40	128.29	91.44	36.85	3.481	3.481	

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



Pro Directional Anticollision Report



Company: Marathon Oil, Project: Eddy County, NM, Reference Site: Blue Steel 21 Fee, Site Error: 0.00 usft, Reference Well: SB #7H, Well Error: 0.00 usft, Reference Wellbore: OH, Reference Design: Prelim Plan A, Local Co-ordinate Reference: Well SB #7H, TVD Reference: well @ 3026.00usft, MD Reference: well @ 3026.00usft, North Reference: Grid, Survey Calculation Method: Minimum Curvature, Output errors are at: 2.00 sigma, Database: WellPlanner1, Offset TVD Reference: Reference Datum

Offset Design Blue Steel 21 Fee - WD #23H - OH - Prelim Plan A. Survey Program: 0-MWD+IFR1. Table with columns: Reference, Offset, Semi Major Axis, Distance, Warning. Includes Measured Depth, Vertical Depth, Reference, Offset, Highside Toolface, Offset Wellbore Centre (+N/-S, +E/-W), Between Centres, Between Ellipses, Minimum Separation, Separation Factor.

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Offset		Semi Major Axis		Distance				Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		Separation Factor	
10,400.00	8,765.96	8,867.63	8,765.96	37.55	32.98	90.00	520.80	1,101.18	1,830.89	1,764.92	65.97	27.755		
10,500.00	8,765.96	8,867.63	8,765.96	38.07	32.98	90.00	520.80	1,101.18	1,929.29	1,863.30	65.99	29.237		
10,600.00	8,765.96	8,867.63	8,765.96	38.62	32.98	90.00	520.80	1,101.18	2,027.85	1,961.84	66.01	30.719		
10,700.00	8,765.96	12,800.90	10,844.96	39.18	45.49	170.88	2,620.98	1,107.52	2,105.61	2,056.13	49.47	42.561		
10,800.00	8,765.96	12,900.90	10,844.96	39.75	45.98	170.88	2,720.98	1,107.82	2,105.60	2,055.08	50.52	41.681		
10,900.00	8,765.97	13,000.90	10,844.97	40.34	46.48	170.88	2,820.98	1,108.12	2,105.59	2,054.00	51.59	40.815		
11,000.00	8,765.97	13,100.90	10,844.97	40.94	47.00	170.89	2,920.98	1,108.42	2,105.58	2,052.90	52.68	39.966		
11,100.00	8,765.97	13,200.90	10,844.97	41.56	47.54	170.89	3,020.98	1,108.73	2,105.58	2,051.77	53.80	39.134		
11,200.00	8,765.97	13,300.90	10,844.97	42.19	48.08	170.89	3,120.98	1,109.03	2,105.57	2,050.62	54.95	38.320		
11,300.00	8,765.97	13,400.90	10,844.97	42.83	48.64	170.89	3,220.98	1,109.33	2,105.56	2,049.45	56.11	37.525		
11,400.00	8,765.97	13,500.90	10,844.97	43.49	49.22	170.89	3,320.98	1,109.63	2,105.56	2,048.26	57.29	36.751		
11,500.00	8,765.97	13,600.90	10,844.97	44.15	49.80	170.89	3,420.98	1,109.93	2,105.55	2,047.06	58.49	35.996		
11,600.00	8,765.97	13,700.90	10,844.97	44.83	50.40	170.89	3,520.98	1,110.24	2,105.54	2,045.83	59.71	35.261		
11,700.00	8,765.97	13,800.90	10,844.97	45.52	51.01	170.89	3,620.98	1,110.54	2,105.54	2,044.59	60.95	34.546		
11,800.00	8,765.97	13,900.90	10,844.97	46.21	51.62	170.90	3,720.98	1,110.84	2,105.53	2,043.33	62.20	33.852		
11,900.00	8,765.97	14,000.90	10,844.97	46.92	52.25	170.90	3,820.98	1,111.14	2,105.52	2,042.06	63.46	33.177		
12,000.00	8,765.97	14,100.90	10,844.97	47.64	52.89	170.90	3,920.98	1,111.44	2,105.52	2,040.77	64.74	32.522		
12,100.00	8,765.97	14,200.90	10,844.97	48.36	53.54	170.90	4,020.98	1,111.75	2,105.51	2,039.48	66.03	31.886		
12,200.00	8,765.97	14,300.90	10,844.97	49.10	54.20	170.90	4,120.98	1,112.05	2,105.50	2,038.17	67.34	31.269		
12,300.00	8,765.97	14,400.90	10,844.97	49.84	54.87	170.90	4,220.98	1,112.35	2,105.49	2,036.84	68.65	30.670		
12,400.00	8,765.97	14,500.90	10,844.97	50.59	55.55	170.90	4,320.98	1,112.65	2,105.49	2,035.51	69.98	30.089		
12,500.00	8,765.97	14,600.90	10,844.97	51.34	56.23	170.90	4,420.98	1,112.95	2,105.48	2,034.17	71.31	29.525		
12,600.00	8,765.97	14,700.90	10,844.97	52.11	56.93	170.90	4,520.98	1,113.25	2,105.47	2,032.82	72.66	28.978		
12,700.00	8,765.97	14,800.90	10,844.97	52.87	57.63	170.91	4,620.97	1,113.56	2,105.47	2,031.46	74.01	28.448		
12,800.00	8,765.97	14,900.90	10,844.97	53.65	58.34	170.91	4,720.97	1,113.86	2,105.46	2,030.09	75.37	27.933		
12,900.00	8,765.97	15,000.90	10,844.97	54.43	59.05	170.91	4,820.97	1,114.16	2,105.45	2,028.71	76.75	27.434		
13,000.00	8,765.97	15,100.90	10,844.97	55.22	59.77	170.91	4,920.97	1,114.46	2,105.45	2,027.32	78.12	26.950		
13,100.00	8,765.97	15,200.90	10,844.97	56.02	60.50	170.91	5,020.97	1,114.76	2,105.44	2,025.93	79.51	26.480		
13,200.00	8,765.98	15,300.90	10,844.98	56.81	61.24	170.91	5,120.97	1,115.07	2,105.43	2,024.53	80.90	26.024		
13,300.00	8,765.98	15,400.90	10,844.98	57.62	61.98	170.91	5,220.97	1,115.37	2,105.43	2,023.12	82.30	25.581		
13,400.00	8,765.98	15,500.90	10,844.98	58.43	62.73	170.91	5,320.97	1,115.67	2,105.42	2,021.71	83.71	25.151		
13,500.00	8,765.98	15,600.90	10,844.98	59.24	63.49	170.91	5,420.97	1,115.97	2,105.41	2,020.29	85.12	24.734		
13,600.00	8,765.98	15,700.90	10,844.98	60.06	64.25	170.92	5,520.97	1,116.27	2,105.41	2,018.86	86.54	24.328		
13,700.00	8,765.98	15,800.90	10,844.98	60.88	65.02	170.92	5,620.97	1,116.57	2,105.40	2,017.43	87.96	23.935		
13,800.00	8,765.98	15,900.90	10,844.98	61.71	65.79	170.92	5,720.97	1,116.88	2,105.39	2,016.00	89.39	23.552		
13,900.00	8,765.98	16,000.90	10,844.98	62.54	66.56	170.92	5,820.97	1,117.18	2,105.38	2,014.56	90.83	23.180		
14,000.00	8,765.98	16,100.90	10,844.98	63.38	67.35	170.92	5,920.97	1,117.48	2,105.38	2,013.11	92.26	22.819		
14,100.00	8,765.98	16,200.90	10,844.98	64.22	68.13	170.92	6,020.97	1,117.78	2,105.37	2,011.66	93.71	22.468		
14,200.00	8,765.98	16,300.90	10,844.98	65.06	68.92	170.92	6,120.97	1,118.08	2,105.36	2,010.21	95.15	22.126		
14,300.00	8,765.98	16,400.90	10,844.98	65.90	69.72	170.92	6,220.97	1,118.39	2,105.36	2,008.75	96.61	21.793		
14,400.00	8,765.98	16,500.90	10,844.98	66.75	70.52	170.93	6,320.97	1,118.69	2,105.35	2,007.29	98.06	21.470		
14,500.00	8,765.98	16,600.90	10,844.98	67.60	71.32	170.93	6,420.97	1,118.99	2,105.34	2,005.82	99.52	21.155		
14,600.00	8,765.98	16,700.90	10,844.98	68.46	72.13	170.93	6,520.97	1,119.29	2,105.34	2,004.36	100.98	20.849		
14,700.00	8,765.98	16,800.90	10,844.98	69.32	72.94	170.93	6,620.97	1,119.59	2,105.33	2,002.88	102.45	20.550		
14,800.00	8,765.98	16,900.90	10,844.98	70.18	73.76	170.93	6,720.97	1,119.90	2,105.32	2,001.41	103.92	20.260		
14,900.00	8,765.98	17,000.90	10,844.98	71.04	74.58	170.93	6,820.96	1,120.20	2,105.32	1,999.93	105.39	19.977		
15,000.00	8,765.98	17,100.90	10,844.98	71.91	75.40	170.93	6,920.96	1,120.50	2,105.31	1,998.45	106.86	19.701		
15,100.00	8,765.98	17,200.90	10,844.98	72.78	76.22	170.93	7,020.96	1,120.80	2,105.30	1,996.96	108.34	19.432		
15,200.00	8,765.98	17,300.90	10,844.98	73.65	77.05	170.93	7,120.96	1,121.10	2,105.30	1,995.47	109.82	19.170		
15,300.00	8,765.98	17,400.90	10,844.98	74.52	77.89	170.94	7,220.96	1,121.40	2,105.29	1,993.98	111.31	18.914		
15,400.00	8,765.98	17,500.90	10,844.98	75.40	78.72	170.94	7,320.96	1,121.71	2,105.28	1,992.49	112.79	18.665		
15,500.00	8,765.98	17,600.90	10,844.98	76.28	79.56	170.94	7,420.96	1,122.01	2,105.28	1,990.99	114.28	18.422		

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



**Pro Directional**  
Anticollision Report



# Marathon Oil

<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Offset			Semi Major Axis		Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,600.00	8,765.99	17,700.90	10,844.99	77.16	80.40	170.94	7,520.96	1,122.31	2,105.27	1,989.50	115.77	18.185		
15,700.00	8,765.99	17,800.90	10,844.99	78.04	81.25	170.94	7,620.96	1,122.61	2,105.26	1,988.00	117.27	17.953		
15,800.00	8,765.99	17,900.90	10,844.99	78.92	82.09	170.94	7,720.96	1,122.91	2,105.25	1,986.49	118.76	17.727		
15,900.00	8,765.99	18,000.90	10,844.99	79.81	82.94	170.94	7,820.96	1,123.22	2,105.25	1,984.99	120.26	17.506		
16,000.00	8,765.99	18,100.90	10,844.99	80.70	83.80	170.94	7,920.96	1,123.52	2,105.24	1,983.48	121.76	17.290		
16,100.00	8,765.99	18,200.90	10,844.99	81.59	84.65	170.95	8,020.96	1,123.82	2,105.23	1,981.97	123.26	17.080		
16,200.00	8,765.99	18,300.90	10,844.99	82.48	85.51	170.95	8,120.96	1,124.12	2,105.23	1,980.46	124.76	16.874		
16,300.00	8,765.99	18,400.90	10,844.99	83.37	86.37	170.95	8,220.96	1,124.42	2,105.22	1,978.95	126.27	16.673		
16,400.00	8,765.99	18,500.90	10,844.99	84.27	87.23	170.95	8,320.96	1,124.72	2,105.21	1,977.44	127.78	16.476		
16,500.00	8,765.99	18,600.90	10,844.99	85.17	88.09	170.95	8,420.96	1,125.03	2,105.21	1,975.92	129.28	16.283		
16,600.00	8,765.99	18,700.90	10,844.99	86.06	88.96	170.95	8,520.96	1,125.33	2,105.20	1,974.40	130.80	16.095		
16,700.00	8,765.99	18,800.90	10,844.99	86.96	89.83	170.95	8,620.96	1,125.63	2,105.19	1,972.89	132.31	15.911		
16,800.00	8,765.99	18,900.90	10,844.99	87.87	90.70	170.95	8,720.96	1,125.93	2,105.19	1,971.37	133.82	15.731		
16,900.00	8,765.99	19,000.90	10,844.99	88.77	91.57	170.95	8,820.96	1,126.23	2,105.18	1,969.84	135.34	15.555		
17,000.00	8,765.99	19,100.90	10,844.99	89.67	92.44	170.96	8,920.96	1,126.54	2,105.17	1,968.32	136.85	15.383		
17,100.00	8,765.99	19,200.90	10,844.99	90.58	93.32	170.96	9,020.96	1,126.84	2,105.17	1,966.80	138.37	15.214		
17,200.00	8,765.99	19,300.90	10,844.99	91.48	94.20	170.96	9,120.96	1,127.14	2,105.16	1,965.27	139.89	15.049		
17,300.00	8,765.99	19,400.90	10,844.99	92.39	95.08	170.96	9,220.96	1,127.44	2,105.15	1,963.74	141.41	14.887		
17,400.00	8,765.99	19,500.90	10,844.99	93.30	95.96	170.96	9,320.96	1,127.74	2,105.15	1,962.21	142.93	14.728		
17,500.00	8,765.99	19,600.90	10,844.99	94.21	96.84	170.96	9,420.96	1,128.04	2,105.14	1,960.68	144.46	14.573		
17,600.00	8,765.99	19,700.90	10,844.99	95.12	97.72	170.96	9,520.96	1,128.35	2,105.13	1,959.15	145.98	14.421		
17,700.00	8,765.99	19,800.90	10,844.99	96.03	98.61	170.96	9,620.96	1,128.65	2,105.12	1,957.62	147.51	14.272		
17,800.00	8,765.99	19,900.90	10,844.99	96.95	99.50	170.97	9,720.96	1,128.95	2,105.12	1,956.09	149.03	14.125		
17,900.00	8,766.00	20,000.90	10,845.00	97.86	100.39	170.97	9,820.96	1,129.25	2,105.11	1,954.55	150.56	13.982		
18,000.00	8,766.00	20,100.90	10,845.00	98.78	101.28	170.97	9,920.96	1,129.55	2,105.10	1,953.02	152.09	13.841		
18,100.00	8,766.00	20,200.90	10,845.00	99.69	102.17	170.97	10,020.96	1,129.86	2,105.10	1,951.48	153.62	13.704		
18,200.00	8,766.00	20,300.90	10,845.00	100.61	103.06	170.97	10,120.96	1,130.16	2,105.09	1,949.94	155.15	13.568		
18,300.00	8,766.00	20,400.90	10,845.00	101.53	103.96	170.97	10,220.96	1,130.46	2,105.08	1,948.40	156.68	13.436		
18,400.00	8,766.00	20,500.90	10,845.00	102.45	104.85	170.97	10,320.96	1,130.76	2,105.08	1,946.86	158.21	13.305		
18,500.00	8,766.00	20,600.90	10,845.00	103.37	105.75	170.97	10,420.96	1,131.06	2,105.07	1,945.32	159.75	13.178		
18,600.00	8,766.00	20,700.90	10,845.00	104.29	106.65	170.97	10,520.96	1,131.37	2,105.06	1,943.78	161.28	13.052		
18,700.00	8,766.00	20,800.90	10,845.00	105.21	107.55	170.98	10,620.96	1,131.67	2,105.06	1,942.24	162.81	12.929		
18,800.00	8,766.00	20,900.90	10,845.00	106.13	108.45	170.98	10,720.96	1,131.97	2,105.05	1,940.70	164.35	12.808		
18,900.00	8,766.00	21,000.90	10,845.00	107.06	109.35	170.98	10,820.96	1,132.27	2,105.04	1,939.16	165.89	12.690		
19,000.00	8,766.00	21,100.90	10,845.00	107.98	110.25	170.98	10,920.96	1,132.57	2,105.04	1,937.61	167.42	12.573		
19,089.74	8,766.00	21,190.64	10,845.00	108.81	111.06	170.98	11,010.69	1,132.84	2,105.03	1,936.22	168.81	12.470		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A													Offset Well Error:	0.00 usft
Survey Program: 0-MWD+IFR1														
Reference				Offset			Semi Major Axis			Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)    +E/-W (usft)		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	-89.98	0.01	-30.12	30.12					
100.00	100.00	100.00	100.00	0.13	0.13	-89.98	0.01	-30.12	30.12	29.86	0.26	115.100		
200.00	200.00	200.00	200.00	0.49	0.49	-89.98	0.01	-30.12	30.12	29.14	0.98	30.778		
300.00	300.00	300.00	300.00	0.85	0.85	-89.98	0.01	-30.12	30.12	28.42	1.70	17.764		
400.00	400.00	400.00	400.00	1.21	1.21	-89.98	0.01	-30.12	30.12	27.71	2.41	12.485		
500.00	500.00	500.00	500.00	1.56	1.56	-89.98	0.01	-30.12	30.12	26.99	3.13	9.625		
600.00	600.00	600.00	600.00	1.92	1.92	-89.98	0.01	-30.12	30.12	26.27	3.85	7.831		
602.55	602.55	602.55	602.55	1.93	1.93	-89.98	0.01	-30.12	30.12	26.26	3.86	7.794 CC		
700.00	700.00	699.99	699.98	2.28	2.28	-88.32	0.88	-30.12	30.13	25.57	4.56	6.604		
800.00	800.00	800.08	799.88	2.64	2.64	-83.38	3.50	-30.12	30.32	25.04	5.28	5.743		
900.00	900.00	900.14	899.76	3.00	3.00	-76.94	6.99	-30.12	30.92	24.92	6.00	5.157 ES		
1,000.00	1,000.00	1,000.20	999.63	3.36	3.36	-70.83	10.47	-30.12	31.89	25.18	6.71	4.751		
1,100.00	1,100.00	1,100.26	1,099.51	3.72	3.72	-65.13	13.96	-30.12	33.20	25.77	7.43	4.469		
1,200.00	1,200.00	1,200.33	1,199.39	4.07	4.08	-59.92	17.45	-30.12	34.81	26.67	8.15	4.274		
1,300.00	1,300.00	1,299.61	1,299.27	4.43	4.43	-55.20	20.94	-30.12	36.69	27.83	8.86	4.141 SF		
1,400.00	1,400.00	1,398.25	1,397.81	4.79	4.79	-51.74	24.99	-31.68	40.41	30.84	9.56	4.225		
1,500.00	1,500.00	1,496.56	1,495.86	5.15	5.14	-50.26	30.24	-36.38	47.49	37.23	10.26	4.631		
1,600.00	1,599.98	1,594.24	1,593.01	5.50	5.48	-107.53	36.67	-44.15	58.32	47.39	10.93	5.336		
1,700.00	1,699.84	1,690.78	1,688.65	5.86	5.83	-111.61	44.19	-54.87	73.65	62.07	11.58	6.359		
1,800.00	1,799.45	1,786.65	1,783.19	6.21	6.18	-116.37	52.74	-68.33	93.84	81.60	12.24	7.667		
1,900.00	1,898.70	1,883.54	1,878.60	6.57	6.53	-120.85	61.64	-82.60	116.98	104.05	12.93	9.047		
2,000.00	1,997.47	1,979.70	1,973.31	6.92	6.88	-124.87	70.48	-96.77	142.59	128.97	13.62	10.467		
2,100.00	2,095.95	2,075.47	2,067.62	7.28	7.23	-128.45	79.28	-110.88	169.81	155.50	14.31	11.863		
2,200.00	2,194.43	2,171.23	2,161.93	7.64	7.59	-131.03	88.07	-124.99	197.48	182.47	15.01	13.158		
2,300.00	2,292.91	2,267.00	2,256.24	8.01	7.95	-132.99	96.87	-139.10	225.43	209.73	15.70	14.355		
2,400.00	2,391.39	2,362.76	2,350.55	8.37	8.30	-134.51	105.67	-153.21	253.57	237.17	16.40	15.459		
2,500.00	2,489.87	2,458.53	2,444.86	8.74	8.66	-135.73	114.47	-167.32	281.84	264.74	17.10	16.479		
2,600.00	2,588.35	2,554.29	2,539.17	9.11	9.02	-136.72	123.27	-181.43	310.21	292.41	17.81	17.421		
2,700.00	2,686.83	2,650.06	2,633.48	9.48	9.38	-137.55	132.07	-195.54	338.65	320.14	18.51	18.294		
2,800.00	2,785.31	2,745.82	2,727.79	9.85	9.75	-138.25	140.86	-209.65	367.15	347.93	19.22	19.104		
2,900.00	2,883.79	2,841.58	2,822.10	10.23	10.11	-138.85	149.66	-223.76	395.69	375.76	19.93	19.858		
3,000.00	2,982.27	2,937.35	2,916.41	10.60	10.47	-139.37	158.46	-237.87	424.26	403.63	20.64	20.560		
3,100.00	3,080.75	3,033.11	3,010.71	10.98	10.84	-139.83	167.26	-251.98	452.86	431.52	21.35	21.215		
3,200.00	3,179.23	3,128.88	3,105.02	11.35	11.20	-140.23	176.06	-266.09	481.49	459.43	22.06	21.828		
3,300.00	3,277.72	3,224.64	3,199.33	11.73	11.57	-140.58	184.86	-280.20	510.13	487.36	22.77	22.402		
3,400.00	3,376.20	3,320.41	3,293.64	12.11	11.93	-140.90	193.65	-294.31	538.79	515.31	23.49	22.941		
3,500.00	3,474.68	3,416.17	3,387.95	12.48	12.30	-141.19	202.45	-308.42	567.47	543.27	24.20	23.448		
3,600.00	3,573.16	3,511.94	3,482.26	12.86	12.66	-141.44	211.25	-322.53	596.15	571.24	24.92	23.926		
3,700.00	3,671.64	3,607.70	3,576.57	13.24	13.03	-141.68	220.05	-336.64	624.85	599.21	25.63	24.376		
3,800.00	3,770.12	3,703.47	3,670.88	13.62	13.40	-141.89	228.85	-350.75	653.55	627.20	26.35	24.802		
3,900.00	3,868.60	3,799.23	3,765.19	14.00	13.77	-142.09	237.65	-364.86	682.26	655.20	27.07	25.205		
4,000.00	3,967.08	3,905.01	3,859.50	14.38	14.17	-142.27	246.44	-378.97	710.98	683.16	27.83	25.552		
4,100.00	4,065.56	4,009.24	3,953.81	14.76	14.57	-142.43	255.24	-393.08	739.71	711.13	28.58	25.885		
4,200.00	4,164.04	4,086.52	4,048.12	15.14	14.87	-142.59	264.04	-407.19	768.44	739.21	29.23	26.292		
4,300.00	4,262.52	4,182.29	4,142.43	15.52	15.24	-142.73	272.84	-421.30	797.17	767.23	29.95	26.619		
4,400.00	4,361.00	4,278.05	4,236.74	15.90	15.61	-142.86	281.64	-435.40	825.91	795.24	30.67	26.931		
4,500.00	4,459.48	4,373.82	4,331.05	16.28	15.97	-142.99	290.44	-449.51	854.65	823.26	31.39	27.227		
4,600.00	4,557.97	4,469.58	4,425.36	16.66	16.34	-143.10	299.23	-463.62	883.40	851.29	32.11	27.511		
4,700.00	4,656.45	4,565.35	4,519.67	17.05	16.71	-143.21	308.03	-477.73	912.15	879.32	32.83	27.781		
4,800.00	4,754.93	4,661.11	4,613.98	17.43	17.08	-143.31	316.83	-491.84	940.90	907.35	33.56	28.040		
4,900.00	4,853.41	4,756.87	4,708.29	17.81	17.45	-143.41	325.63	-505.95	969.66	935.38	34.28	28.287		
5,000.00	4,951.89	4,852.64	4,802.60	18.19	17.82	-143.50	334.43	-520.06	998.41	963.41	35.00	28.524		

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



Pro Directional Anticollision Report



Company: Marathon Oil
Project: Eddy County, NM
Reference Site: Blue Steel 21 Fee
Site Error: 0.00 usft
Reference Well: SB #7H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Prelim Plan A
Local Co-ordinate Reference: Well SB #7H
TVD Reference: well @ 3026.00usft
MD Reference: well @ 3026.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: WellPlanner1
Offset TVD Reference: Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A
Survey Program: 0-MWD+IFR1
Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft
Table with columns: Measured Depth (usft), Vertical Depth (usft), Reference, Offset, Highside Toolface (degrees), Offset Wellbore Centre (+N/-S, +E/-W), Distance (Between Centres, Between Ellipses, Minimum Separation, Separation Factor), Warning

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



Pro Directional Anticollision Report



Marathon Oil

Company: Marathon Oil, Project: Eddy County, NM, Reference Site: Blue Steel 21 Fee, Site Error: 0.00 usft, Reference Well: SB #7H, Well Error: 0.00 usft, Reference Wellbore: OH, Reference Design: Prelim Plan A, Local Co-ordinate Reference: Well SB #7H, TVD Reference: well @ 3026.00usft, MD Reference: well @ 3026.00usft, North Reference: Grid, Survey Calculation Method: Minimum Curvature, Output errors are at: 2.00 sigma, Database: WellPlanner1, Offset TVD Reference: Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A, Survey Program: 0-MWD+IFR1, Reference, Offset, Semi Major Axis, Distance, Measured Depth, Vertical Depth, Reference, Offset, Highside Toolface, Offset Wellbore Centre, Between Centres, Between Ellipses, Minimum Separation, Separation Factor, Warning

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



Pro Directional Anticollision Report



Company: Marathon Oil; Project: Eddy County, NM; Reference Site: Blue Steel 21 Fee; Site Error: 0.00 usft; Reference Well: SB #7H; Well Error: 0.00 usft; Reference Wellbore: OH; Reference Design: Prelim Plan A; Local Co-ordinate Reference: Well SB #7H; TVD Reference: well @ 3026.00usft; MD Reference: well @ 3026.00usft; North Reference: Grid; Survey Calculation Method: Minimum Curvature; Output errors are at: 2.00 sigma; Database: WellPlanner1; Offset TVD Reference: Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A. Survey Program: 0-MWD+IFR1. Table with columns: Reference, Offset, Semi Major Axis, Distance, Warning. Includes Measured Depth, Vertical Depth, Reference, Offset, Highside Toolface, Offset Wellbore Centre (+N/-S, +E/-W), Between Centres, Between Ellipses, Minimum Separation, Separation Factor.

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Offset			Semi Major Axis			Distance				Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
							+N/-S (usft)	+E/-W (usft)						
0.00	0.00	1.00	0.00	0.00	0.00	-90.00	0.00	-90.13	90.13					
100.00	100.00	101.00	100.00	0.13	0.13	-90.00	0.00	-90.13	90.13	89.86	0.27	339.768		
200.00	200.00	201.00	200.00	0.49	0.49	-90.00	0.00	-90.13	90.13	89.15	0.98	91.762		
300.00	300.00	301.00	300.00	0.85	0.85	-90.00	0.00	-90.13	90.13	88.43	1.70	53.044		
400.00	400.00	401.00	400.00	1.21	1.21	-90.00	0.00	-90.13	90.13	87.71	2.42	37.304		
500.00	500.00	501.00	500.00	1.56	1.57	-90.00	0.00	-90.13	90.13	87.00	3.13	28.768		
600.00	600.00	601.00	600.00	1.92	1.93	-90.00	0.00	-90.13	90.13	86.28	3.85	23.410	CC	
700.00	700.00	700.58	699.58	2.28	2.28	-89.46	0.85	-90.36	90.36	85.80	4.56	19.795	ES	
800.00	800.00	800.11	799.07	2.64	2.64	-87.88	3.38	-91.03	91.09	85.81	5.28	17.256		
900.00	900.00	900.05	898.95	3.00	3.00	-85.80	6.75	-91.92	92.17	86.18	5.99	15.376		
1,000.00	1,000.00	1,000.01	998.83	3.36	3.36	-83.78	10.12	-92.81	93.37	86.66	6.71	13.914		
1,100.00	1,100.00	1,100.07	1,098.71	3.72	3.72	-81.81	13.49	-93.71	94.68	87.26	7.43	12.749		
1,200.00	1,200.00	1,199.87	1,198.58	4.07	4.07	-79.89	16.86	-94.60	96.10	87.96	8.14	11.803		
1,300.00	1,300.00	1,298.26	1,296.84	4.43	4.43	-77.19	21.80	-95.91	98.41	89.56	8.85	11.118		
1,400.00	1,400.00	1,396.18	1,394.39	4.79	4.78	-73.02	29.95	-98.07	102.69	93.14	9.55	10.748		
1,500.00	1,500.00	1,493.42	1,490.92	5.15	5.13	-67.81	41.22	-101.06	109.52	99.27	10.25	10.686	SF	
1,600.00	1,599.98	1,589.82	1,586.18	5.50	5.48	-118.44	55.52	-104.85	120.26	109.34	10.93	11.006		
1,700.00	1,699.84	1,688.17	1,683.04	5.86	5.84	-114.68	72.01	-109.22	134.69	123.07	11.62	11.587		
1,800.00	1,799.45	1,786.77	1,780.14	6.21	6.20	-112.78	88.56	-113.61	150.85	138.52	12.33	12.235		
1,900.00	1,898.70	1,885.22	1,877.09	6.57	6.56	-112.29	105.08	-117.99	168.40	155.36	13.04	12.916		
2,000.00	1,997.47	1,983.38	1,973.76	6.92	6.92	-112.80	121.55	-122.36	187.27	173.52	13.75	13.619		
2,100.00	2,095.95	2,081.36	2,070.26	7.28	7.28	-113.97	138.00	-126.72	206.86	192.40	14.47	14.301		
2,200.00	2,194.43	2,179.35	2,166.75	7.64	7.64	-114.93	154.44	-131.08	226.53	211.35	15.18	14.921		
2,300.00	2,292.91	2,277.33	2,263.25	8.01	8.01	-115.73	170.89	-135.44	246.24	230.34	15.90	15.486		
2,400.00	2,391.39	2,375.31	2,359.74	8.37	8.38	-116.42	187.33	-139.79	266.00	249.37	16.62	16.003		
2,500.00	2,489.87	2,473.30	2,456.24	8.74	8.74	-117.01	203.78	-144.15	285.78	268.44	17.35	16.476		
2,600.00	2,588.35	2,571.28	2,552.73	9.11	9.11	-117.53	220.22	-148.51	305.60	287.52	18.07	16.911		
2,700.00	2,686.83	2,669.26	2,649.23	9.48	9.48	-117.98	236.67	-152.87	325.43	306.63	18.80	17.312		
2,800.00	2,785.31	2,767.24	2,745.72	9.85	9.85	-118.38	253.11	-157.23	345.28	325.75	19.53	17.683		
2,900.00	2,883.79	2,865.23	2,842.22	10.23	10.21	-118.74	269.55	-161.59	365.14	344.89	20.26	18.026		
3,000.00	2,982.27	2,963.21	2,938.71	10.60	10.58	-119.06	286.00	-165.95	385.02	364.03	20.99	18.345		
3,100.00	3,080.75	3,061.19	3,035.21	10.98	10.95	-119.35	302.44	-170.31	404.91	383.19	21.72	18.642		
3,200.00	3,179.23	3,159.18	3,131.70	11.35	11.32	-119.61	318.89	-174.67	424.80	402.35	22.45	18.920		
3,300.00	3,277.72	3,257.16	3,228.19	11.73	11.69	-119.85	335.33	-179.03	444.71	421.52	23.19	19.179		
3,400.00	3,376.20	3,355.14	3,324.69	12.11	12.07	-120.07	351.78	-183.39	464.62	440.70	23.92	19.422		
3,500.00	3,474.68	3,453.13	3,421.18	12.48	12.44	-120.27	368.22	-187.75	484.54	459.88	24.66	19.650		
3,600.00	3,573.16	3,551.11	3,517.68	12.86	12.81	-120.45	384.67	-192.11	504.46	479.06	25.39	19.865		
3,700.00	3,671.64	3,649.09	3,614.17	13.24	13.18	-120.62	401.11	-196.47	524.39	498.25	26.13	20.067		
3,800.00	3,770.12	3,747.07	3,710.67	13.62	13.55	-120.78	417.56	-200.83	544.32	517.45	26.87	20.257		
3,900.00	3,868.60	3,845.06	3,807.16	14.00	13.92	-120.93	434.00	-205.19	564.25	536.64	27.61	20.438		
4,000.00	3,967.08	3,943.04	3,903.66	14.38	14.29	-121.06	450.44	-209.55	584.19	555.84	28.35	20.608		
4,100.00	4,065.56	4,041.02	4,000.15	14.76	14.67	-121.19	466.89	-213.91	604.13	575.04	29.09	20.770		
4,200.00	4,164.04	4,144.11	4,101.71	15.14	15.06	-121.33	483.95	-218.43	623.94	594.08	29.86	20.893		
4,300.00	4,262.52	4,258.01	4,214.47	15.52	15.48	-121.73	499.48	-222.55	641.88	611.18	30.71	20.904		
4,400.00	4,361.00	4,372.48	4,328.35	15.90	15.90	-122.42	510.70	-225.52	657.45	625.92	31.53	20.852		
4,500.00	4,459.48	4,487.18	4,442.81	16.28	16.31	-123.39	517.53	-227.33	670.72	638.39	32.33	20.747		
4,600.00	4,557.97	4,601.71	4,557.32	16.66	16.71	-124.63	519.93	-227.97	681.81	648.71	33.10	20.597		
4,700.00	4,656.45	4,700.84	4,656.45	17.05	17.05	-125.81	519.93	-227.97	691.93	658.11	33.82	20.461		
4,800.00	4,754.93	4,800.67	4,754.93	17.43	17.39	-126.94	519.93	-227.97	702.33	667.80	34.53	20.338		
4,900.00	4,853.41	4,902.19	4,853.41	17.81	17.74	-128.05	519.93	-227.97	713.00	677.75	35.25	20.224		
5,000.00	4,951.89	5,003.71	4,951.89	18.19	18.09	-129.12	519.93	-227.97	723.94	687.96	35.98	20.122		
5,100.00	5,050.37	5,105.23	5,050.37	18.57	18.44	-130.16	519.93	-227.97	735.11	698.41	36.70	20.030		

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



# Pro Directional Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Blue Steel 21 Fee - WD #5H - OH - Prelim Plan A													Offset Well Error:	0.00 usft
Survey Program: 0-MWD+IFR1														
Reference				Offset			Semi Major Axis			Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,200.00	5,148.85	5,206.75	5,148.85	18.96	18.79	-131.17	519.93	-227.97	746.53	709.11	37.42	19.948		
5,300.00	5,247.33	5,308.27	5,247.33	19.34	19.14	-132.15	519.93	-227.97	758.17	720.02	38.15	19.875		
5,400.00	5,345.81	5,409.79	5,345.81	19.72	19.49	-133.10	519.93	-227.97	770.03	731.16	38.87	19.810		
5,500.00	5,444.29	5,488.69	5,444.29	20.11	19.77	-134.02	519.93	-227.97	782.09	742.57	39.52	19.791		
5,600.00	5,542.77	5,587.17	5,542.77	20.49	20.11	-134.92	519.93	-227.97	794.35	754.12	40.23	19.745		
5,700.00	5,641.25	5,685.65	5,641.25	20.87	20.45	-135.78	519.93	-227.97	806.80	765.85	40.94	19.705		
5,800.00	5,739.73	5,784.13	5,739.73	21.26	20.79	-136.62	519.93	-227.97	819.42	777.76	41.66	19.670		
5,900.00	5,838.22	5,882.61	5,838.22	21.64	21.14	-137.44	519.93	-227.97	832.22	789.85	42.37	19.640		
6,000.00	5,936.70	5,981.09	5,936.70	22.02	21.48	-138.23	519.93	-227.97	845.18	802.09	43.09	19.615		
6,100.00	6,035.18	6,079.58	6,035.18	22.41	21.83	-139.00	519.93	-227.97	858.30	814.49	43.80	19.594		
6,200.00	6,133.66	6,178.06	6,133.66	22.79	22.17	-139.74	519.93	-227.97	871.56	827.04	44.52	19.577		
6,300.00	6,232.14	6,276.54	6,232.14	23.17	22.51	-140.46	519.93	-227.97	884.97	839.73	45.24	19.563		
6,400.00	6,330.62	6,375.02	6,330.62	23.56	22.86	-141.16	519.93	-227.97	898.51	852.56	45.95	19.553		
6,500.00	6,429.10	6,473.50	6,429.10	23.94	23.20	-141.84	519.93	-227.97	912.18	865.51	46.67	19.546		
6,600.00	6,527.58	6,571.98	6,527.58	24.33	23.55	-142.50	519.93	-227.97	925.97	878.59	47.38	19.542		
6,700.00	6,626.06	6,670.46	6,626.06	24.71	23.89	-143.15	519.93	-227.97	939.89	891.78	48.10	19.540		
6,800.00	6,724.54	6,768.94	6,724.54	25.09	24.24	-143.77	519.93	-227.97	953.91	905.09	48.82	19.540		
6,900.00	6,823.15	6,867.54	6,823.15	25.48	24.59	-144.45	519.93	-227.97	967.45	917.92	49.54	19.530		
7,000.00	6,922.24	6,966.64	6,922.24	25.85	24.93	-145.03	519.93	-227.97	978.43	928.18	50.25	19.472		
7,100.00	7,021.74	7,066.14	7,021.74	26.22	25.28	-145.45	519.93	-227.97	986.61	935.65	50.96	19.461		
7,200.00	7,121.53	7,165.92	7,121.53	26.57	25.64	-145.73	519.93	-227.97	991.94	940.27	51.66	19.320		
7,300.00	7,221.48	7,265.87	7,221.48	26.92	25.99	-145.85	519.93	-227.97	994.39	942.03	52.36	18.990		
7,400.00	7,321.48	7,365.87	7,321.48	27.25	26.34	-90.04	519.93	-227.97	994.57	941.52	53.05	18.746		
7,500.00	7,421.48	7,465.87	7,421.48	27.59	26.69	-90.04	519.93	-227.97	994.57	940.82	53.75	18.505		
7,600.00	7,521.48	7,565.87	7,521.48	27.93	27.04	-90.04	519.93	-227.97	994.57	940.13	54.44	18.270		
7,700.00	7,621.48	7,665.87	7,621.48	28.27	27.40	-90.04	519.93	-227.97	994.57	939.44	55.13	18.041		
7,800.00	7,721.48	7,765.87	7,721.48	28.61	27.75	-90.04	519.93	-227.97	994.57	938.75	55.82	17.817		
7,900.00	7,821.48	7,865.87	7,821.48	28.95	28.10	-90.04	519.93	-227.97	994.57	938.05	56.52	17.598		
8,000.00	7,921.48	7,965.87	7,921.48	29.29	28.46	-90.04	519.93	-227.97	994.57	937.36	57.21	17.385		
8,100.00	8,021.48	8,065.87	8,021.48	29.63	28.81	-90.04	519.93	-227.97	994.57	936.67	57.90	17.176		
8,200.00	8,121.48	8,165.87	8,121.48	29.97	29.16	-90.04	519.93	-227.97	994.57	935.97	58.60	16.972		
8,200.17	8,121.64	8,166.04	8,121.64	29.97	29.16	-90.04	519.93	-227.97	994.57	935.97	58.60	16.972		
8,300.00	8,221.46	8,265.86	8,221.46	30.31	29.52	-90.28	519.93	-227.97	994.57	935.28	59.30	16.773		
8,400.00	8,320.40	8,364.80	8,320.40	30.67	29.87	-91.03	519.93	-227.97	994.73	934.74	59.99	16.581		
8,500.00	8,415.47	8,459.87	8,415.47	31.02	30.20	-92.60	519.93	-227.97	995.77	935.09	60.68	16.411		
8,600.00	8,503.78	8,548.17	8,503.78	31.35	30.52	-94.62	519.93	-227.97	999.15	937.82	61.33	16.291		
8,700.00	8,582.64	8,627.04	8,582.64	31.65	30.79	-96.60	519.93	-227.97	1,006.87	944.93	61.94	16.255		
8,800.00	8,649.67	8,705.94	8,649.67	31.91	31.07	-97.99	519.93	-227.97	1,021.04	958.50	62.53	16.328		
8,900.00	8,702.82	8,747.21	8,702.82	32.15	31.22	-98.24	519.93	-227.97	1,043.43	980.47	62.96	16.573		
9,000.00	8,740.47	8,784.87	8,740.47	32.38	31.35	-96.90	519.93	-227.97	1,075.02	1,011.70	63.33	16.976		
9,100.00	8,761.50	8,805.90	8,761.50	32.61	31.43	-93.62	519.93	-227.97	1,115.75	1,052.18	63.57	17.552		
9,200.00	8,765.96	8,810.36	8,765.96	32.85	31.44	-90.00	519.93	-227.97	1,164.39	1,100.71	63.68	18.284		
9,300.00	8,765.96	8,810.36	8,765.96	33.11	31.44	-90.00	519.93	-227.97	1,219.39	1,155.63	63.76	19.126		
9,400.00	8,765.96	8,810.36	8,765.96	33.40	31.44	-90.00	519.93	-227.97	1,279.85	1,216.03	63.82	20.054		
9,500.00	8,765.96	8,810.36	8,765.96	33.71	31.44	-90.00	519.93	-227.97	1,345.03	1,281.16	63.87	21.058		
9,600.00	8,765.96	8,810.36	8,765.96	34.05	31.44	-90.00	519.93	-227.97	1,414.29	1,350.37	63.92	22.126		
9,700.00	8,765.96	8,810.36	8,765.96	34.41	31.44	-90.00	519.93	-227.97	1,487.05	1,423.09	63.96	23.250		
9,800.00	8,765.96	8,810.36	8,765.96	34.80	31.44	-90.00	519.93	-227.97	1,562.83	1,498.83	64.00	24.421		
9,900.00	8,765.96	8,810.36	8,765.96	35.20	31.44	-90.00	519.93	-227.97	1,641.20	1,577.17	64.03	25.633		
10,000.00	8,765.96	8,810.36	8,765.96	35.63	31.44	-90.00	519.93	-227.97	1,721.81	1,657.76	64.06	26.880		
10,100.00	8,765.96	8,810.36	8,765.96	36.08	31.44	-90.00	519.93	-227.97	1,804.37	1,740.28	64.08	28.157		
10,200.00	8,765.96	8,810.36	8,765.96	36.55	31.44	-90.00	519.93	-227.97	1,888.61	1,824.50	64.11	29.460		

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



**Pro Directional**  
Anticollision Report



# Marathon Oil

<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Offset			Semi Major Axis			Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,300.00	8,765.96	8,810.36	8,765.96	37.04	31.44	-90.00	519.93	-227.97	1,974.32	1,910.19	64.13	30.786		
10,400.00	8,765.96	8,810.36	8,765.96	37.55	31.44	-90.00	519.93	-227.97	2,061.32	1,997.17	64.15	32.130		
10,500.00	8,765.96	8,810.36	8,765.96	38.07	31.44	-90.00	519.93	-227.97	2,149.45	2,085.28	64.18	33.492		
10,600.00	8,765.96	8,810.36	8,765.96	38.62	31.44	-90.00	519.93	-227.97	2,238.58	2,174.38	64.20	34.868		
10,700.00	8,765.96	12,718.38	10,813.96	39.18	45.01	-154.12	2,625.85	-219.79	2,276.32	2,216.41	59.91	37.995		
10,800.00	8,765.96	12,818.38	10,813.96	39.75	45.52	-154.12	2,725.85	-219.40	2,276.30	2,215.34	60.96	37.340		
10,900.00	8,765.97	12,918.38	10,813.97	40.34	46.04	-154.12	2,825.85	-219.01	2,276.28	2,214.25	62.04	36.692		
11,000.00	8,765.97	13,018.38	10,813.97	40.94	46.57	-154.12	2,925.85	-218.62	2,276.27	2,213.13	63.14	36.053		
11,100.00	8,765.97	13,118.38	10,813.97	41.56	47.12	-154.12	3,025.85	-218.23	2,276.25	2,211.99	64.26	35.422		
11,200.00	8,765.97	13,218.38	10,813.97	42.19	47.68	-154.12	3,125.85	-217.84	2,276.23	2,210.82	65.41	34.802		
11,300.00	8,765.97	13,318.38	10,813.97	42.83	48.26	-154.12	3,225.85	-217.45	2,276.21	2,209.64	66.57	34.192		
11,400.00	8,765.97	13,418.38	10,813.97	43.49	48.84	-154.13	3,325.85	-217.07	2,276.19	2,208.43	67.76	33.593		
11,500.00	8,765.97	13,518.38	10,813.97	44.15	49.44	-154.13	3,425.85	-216.68	2,276.17	2,207.21	68.96	33.006		
11,600.00	8,765.97	13,618.38	10,813.97	44.83	50.05	-154.13	3,525.85	-216.29	2,276.15	2,205.97	70.18	32.431		
11,700.00	8,765.97	13,718.38	10,813.97	45.52	50.67	-154.13	3,625.85	-215.90	2,276.13	2,204.71	71.42	31.868		
11,800.00	8,765.97	13,818.38	10,813.97	46.21	51.31	-154.13	3,725.84	-215.51	2,276.11	2,203.44	72.68	31.317		
11,900.00	8,765.97	13,918.38	10,813.97	46.92	51.95	-154.13	3,825.84	-215.12	2,276.10	2,202.15	73.95	30.779		
12,000.00	8,765.97	14,018.38	10,813.97	47.64	52.60	-154.13	3,925.84	-214.73	2,276.08	2,200.84	75.23	30.253		
12,100.00	8,765.97	14,118.38	10,813.97	48.36	53.27	-154.13	4,025.84	-214.35	2,276.06	2,199.53	76.53	29.740		
12,200.00	8,765.97	14,218.38	10,813.97	49.10	53.94	-154.13	4,125.84	-213.96	2,276.04	2,198.19	77.84	29.238		
12,300.00	8,765.97	14,318.38	10,813.97	49.84	54.62	-154.13	4,225.84	-213.57	2,276.02	2,196.85	79.17	28.749		
12,400.00	8,765.97	14,418.38	10,813.97	50.59	55.31	-154.13	4,325.84	-213.18	2,276.00	2,195.50	80.50	28.272		
12,500.00	8,765.97	14,518.38	10,813.97	51.34	56.00	-154.14	4,425.84	-212.79	2,275.98	2,194.13	81.85	27.806		
12,600.00	8,765.97	14,618.38	10,813.97	52.11	56.71	-154.14	4,525.84	-212.40	2,275.96	2,192.75	83.21	27.352		
12,700.00	8,765.97	14,718.38	10,813.97	52.87	57.42	-154.14	4,625.84	-212.01	2,275.94	2,191.37	84.58	26.909		
12,800.00	8,765.97	14,818.38	10,813.97	53.65	58.14	-154.14	4,725.84	-211.62	2,275.93	2,189.97	85.96	26.478		
12,900.00	8,765.97	14,918.38	10,813.97	54.43	58.87	-154.14	4,825.84	-211.24	2,275.91	2,188.56	87.34	26.057		
13,000.00	8,765.97	15,018.38	10,813.97	55.22	59.60	-154.14	4,925.84	-210.85	2,275.89	2,187.15	88.74	25.647		
13,100.00	8,765.97	15,118.38	10,813.97	56.02	60.34	-154.14	5,025.83	-210.46	2,275.87	2,185.73	90.14	25.247		
13,200.00	8,765.98	15,218.38	10,813.98	56.81	61.09	-154.14	5,125.83	-210.07	2,275.85	2,184.30	91.56	24.858		
13,300.00	8,765.98	15,318.38	10,813.98	57.62	61.84	-154.14	5,225.83	-209.68	2,275.83	2,182.86	92.98	24.478		
13,400.00	8,765.98	15,418.38	10,813.98	58.43	62.60	-154.14	5,325.83	-209.29	2,275.81	2,181.41	94.40	24.108		
13,500.00	8,765.98	15,518.38	10,813.98	59.24	63.37	-154.15	5,425.83	-208.90	2,275.79	2,179.96	95.84	23.747		
13,600.00	8,765.98	15,618.38	10,813.98	60.06	64.14	-154.15	5,525.83	-208.52	2,275.78	2,178.50	97.28	23.395		
13,700.00	8,765.98	15,718.38	10,813.98	60.88	64.91	-154.15	5,625.83	-208.13	2,275.76	2,177.03	98.73	23.051		
13,800.00	8,765.98	15,818.38	10,813.98	61.71	65.69	-154.15	5,725.83	-207.74	2,275.74	2,175.56	100.18	22.717		
13,900.00	8,765.98	15,918.38	10,813.98	62.54	66.48	-154.15	5,825.83	-207.35	2,275.72	2,174.08	101.64	22.390		
14,000.00	8,765.98	16,018.38	10,813.98	63.38	67.27	-154.15	5,925.83	-206.96	2,275.70	2,172.60	103.10	22.072		
14,100.00	8,765.98	16,118.38	10,813.98	64.22	68.06	-154.15	6,025.83	-206.57	2,275.68	2,171.11	104.57	21.762		
14,200.00	8,765.98	16,218.38	10,813.98	65.06	68.86	-154.15	6,125.83	-206.18	2,275.66	2,169.61	106.05	21.459		
14,300.00	8,765.98	16,318.38	10,813.98	65.90	69.66	-154.15	6,225.83	-205.80	2,275.64	2,168.11	107.53	21.163		
14,400.00	8,765.98	16,418.38	10,813.98	66.75	70.47	-154.15	6,325.82	-205.41	2,275.62	2,166.61	109.01	20.875		
14,500.00	8,765.98	16,518.38	10,813.98	67.60	71.28	-154.16	6,425.82	-205.02	2,275.61	2,165.10	110.50	20.593		
14,600.00	8,765.98	16,618.38	10,813.98	68.46	72.10	-154.16	6,525.82	-204.63	2,275.59	2,163.59	112.00	20.318		
14,700.00	8,765.98	16,718.38	10,813.98	69.32	72.92	-154.16	6,625.82	-204.24	2,275.57	2,162.07	113.50	20.050		
14,800.00	8,765.98	16,818.38	10,813.98	70.18	73.74	-154.16	6,725.82	-203.85	2,275.55	2,160.55	115.00	19.788		
14,900.00	8,765.98	16,918.38	10,813.98	71.04	74.57	-154.16	6,825.82	-203.46	2,275.53	2,159.03	116.50	19.532		
15,000.00	8,765.98	17,018.38	10,813.98	71.91	75.40	-154.16	6,925.82	-203.07	2,275.51	2,157.50	118.01	19.282		
15,100.00	8,765.98	17,118.38	10,813.98	72.78	76.23	-154.16	7,025.82	-202.69	2,275.49	2,155.96	119.53	19.037		
15,200.00	8,765.98	17,218.38	10,813.98	73.65	77.06	-154.16	7,125.82	-202.30	2,275.47	2,154.43	121.04	18.799		
15,300.00	8,765.98	17,318.38	10,813.98	74.52	77.90	-154.16	7,225.82	-201.91	2,275.45	2,152.89	122.56	18.565		
15,400.00	8,765.98	17,418.38	10,813.98	75.40	78.75	-154.16	7,325.82	-201.52	2,275.44	2,151.35	124.09	18.337		

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



**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference				Offset			Semi Major Axis			Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,500.00	8,765.98	17,518.38	10,813.98	76.28	79.59	-154.17	7,425.82	-201.13	2,275.42	2,149.80	125.61	18,114		
15,600.00	8,765.99	17,618.38	10,813.99	77.16	80.44	-154.17	7,525.82	-200.74	2,275.40	2,148.25	127.14	17,896		
15,700.00	8,765.99	17,718.38	10,813.99	78.04	81.29	-154.17	7,625.81	-200.35	2,275.38	2,146.70	128.68	17,683		
15,800.00	8,765.99	17,818.38	10,813.99	78.92	82.14	-154.17	7,725.81	-199.97	2,275.36	2,145.15	130.21	17,474		
15,900.00	8,765.99	17,918.38	10,813.99	79.81	83.00	-154.17	7,825.81	-199.58	2,275.34	2,143.59	131.75	17,270		
16,000.00	8,765.99	18,018.38	10,813.99	80.70	83.85	-154.17	7,925.81	-199.19	2,275.32	2,142.03	133.29	17,071		
16,100.00	8,765.99	18,118.38	10,813.99	81.59	84.71	-154.17	8,025.81	-198.80	2,275.30	2,140.47	134.83	16,875		
16,200.00	8,765.99	18,218.38	10,813.99	82.48	85.58	-154.17	8,125.81	-198.41	2,275.28	2,138.91	136.38	16,684		
16,300.00	8,765.99	18,318.38	10,813.99	83.37	86.44	-154.17	8,225.81	-198.02	2,275.27	2,137.34	137.92	16,496		
16,400.00	8,765.99	18,418.38	10,813.99	84.27	87.31	-154.17	8,325.81	-197.63	2,275.25	2,135.77	139.47	16,313		
16,500.00	8,765.99	18,518.38	10,813.99	85.17	88.18	-154.18	8,425.81	-197.25	2,275.23	2,134.20	141.03	16,133		
16,600.00	8,765.99	18,618.38	10,813.99	86.06	89.05	-154.18	8,525.81	-196.86	2,275.21	2,132.63	142.58	15,957		
16,700.00	8,765.99	18,718.38	10,813.99	86.96	89.92	-154.18	8,625.81	-196.47	2,275.19	2,131.05	144.14	15,785		
16,800.00	8,765.99	18,818.38	10,813.99	87.87	90.79	-154.18	8,725.81	-196.08	2,275.17	2,129.48	145.69	15,616		
16,900.00	8,765.99	18,918.38	10,813.99	88.77	91.67	-154.18	8,825.81	-195.69	2,275.15	2,127.90	147.25	15,450		
17,000.00	8,765.99	19,018.38	10,813.99	89.67	92.55	-154.18	8,925.81	-195.30	2,275.13	2,126.32	148.82	15,288		
17,100.00	8,765.99	19,118.38	10,813.99	90.58	93.43	-154.18	9,025.80	-194.91	2,275.11	2,124.73	150.38	15,129		
17,200.00	8,765.99	19,218.38	10,813.99	91.48	94.31	-154.18	9,125.80	-194.53	2,275.10	2,123.15	151.95	14,973		
17,300.00	8,765.99	19,318.38	10,813.99	92.39	95.20	-154.18	9,225.80	-194.14	2,275.08	2,121.56	153.51	14,820		
17,400.00	8,765.99	19,418.38	10,813.99	93.30	96.08	-154.18	9,325.80	-193.75	2,275.06	2,119.98	155.08	14,670		
17,500.00	8,765.99	19,518.38	10,813.99	94.21	96.97	-154.18	9,425.80	-193.36	2,275.04	2,118.39	156.65	14,523		
17,600.00	8,765.99	19,618.38	10,813.99	95.12	97.86	-154.19	9,525.80	-192.97	2,275.02	2,116.80	158.22	14,379		
17,700.00	8,765.99	19,718.38	10,813.99	96.03	98.75	-154.19	9,625.80	-192.58	2,275.00	2,115.21	159.80	14,237		
17,800.00	8,765.99	19,818.38	10,813.99	96.95	99.64	-154.19	9,725.80	-192.19	2,274.98	2,113.61	161.37	14,098		
17,900.00	8,766.00	19,918.38	10,814.00	97.86	100.53	-154.19	9,825.80	-191.80	2,274.96	2,112.02	162.95	13,961		
18,000.00	8,766.00	20,018.38	10,814.00	98.78	101.42	-154.19	9,925.80	-191.42	2,274.95	2,110.42	164.52	13,827		
18,100.00	8,766.00	20,118.38	10,814.00	99.69	102.32	-154.19	10,025.80	-191.03	2,274.93	2,108.82	166.10	13,696		
18,200.00	8,766.00	20,218.38	10,814.00	100.61	103.22	-154.19	10,125.80	-190.64	2,274.91	2,107.22	167.68	13,567		
18,300.00	8,766.00	20,318.38	10,814.00	101.53	104.11	-154.19	10,225.80	-190.25	2,274.89	2,105.62	169.26	13,440		
18,400.00	8,766.00	20,418.38	10,814.00	102.45	105.01	-154.19	10,325.79	-189.86	2,274.87	2,104.02	170.85	13,315		
18,500.00	8,766.00	20,518.38	10,814.00	103.37	105.91	-154.19	10,425.79	-189.47	2,274.85	2,102.42	172.43	13,193		
18,600.00	8,766.00	20,618.38	10,814.00	104.29	106.81	-154.20	10,525.79	-189.08	2,274.83	2,100.82	174.01	13,073		
18,700.00	8,766.00	20,718.38	10,814.00	105.21	107.72	-154.20	10,625.79	-188.70	2,274.81	2,099.21	175.60	12,954		
18,800.00	8,766.00	20,818.38	10,814.00	106.13	108.62	-154.20	10,725.79	-188.31	2,274.79	2,097.61	177.19	12,838		
18,900.00	8,766.00	20,918.38	10,814.00	107.06	109.53	-154.20	10,825.79	-187.92	2,274.78	2,096.00	178.78	12,724		
19,000.00	8,766.00	21,018.38	10,814.00	107.98	110.43	-154.20	10,925.79	-187.53	2,274.76	2,094.39	180.36	12,612		
19,089.74	8,766.00	21,108.12	10,814.00	108.81	111.24	-154.20	11,015.53	-187.18	2,274.74	2,092.95	181.79	12,513		

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



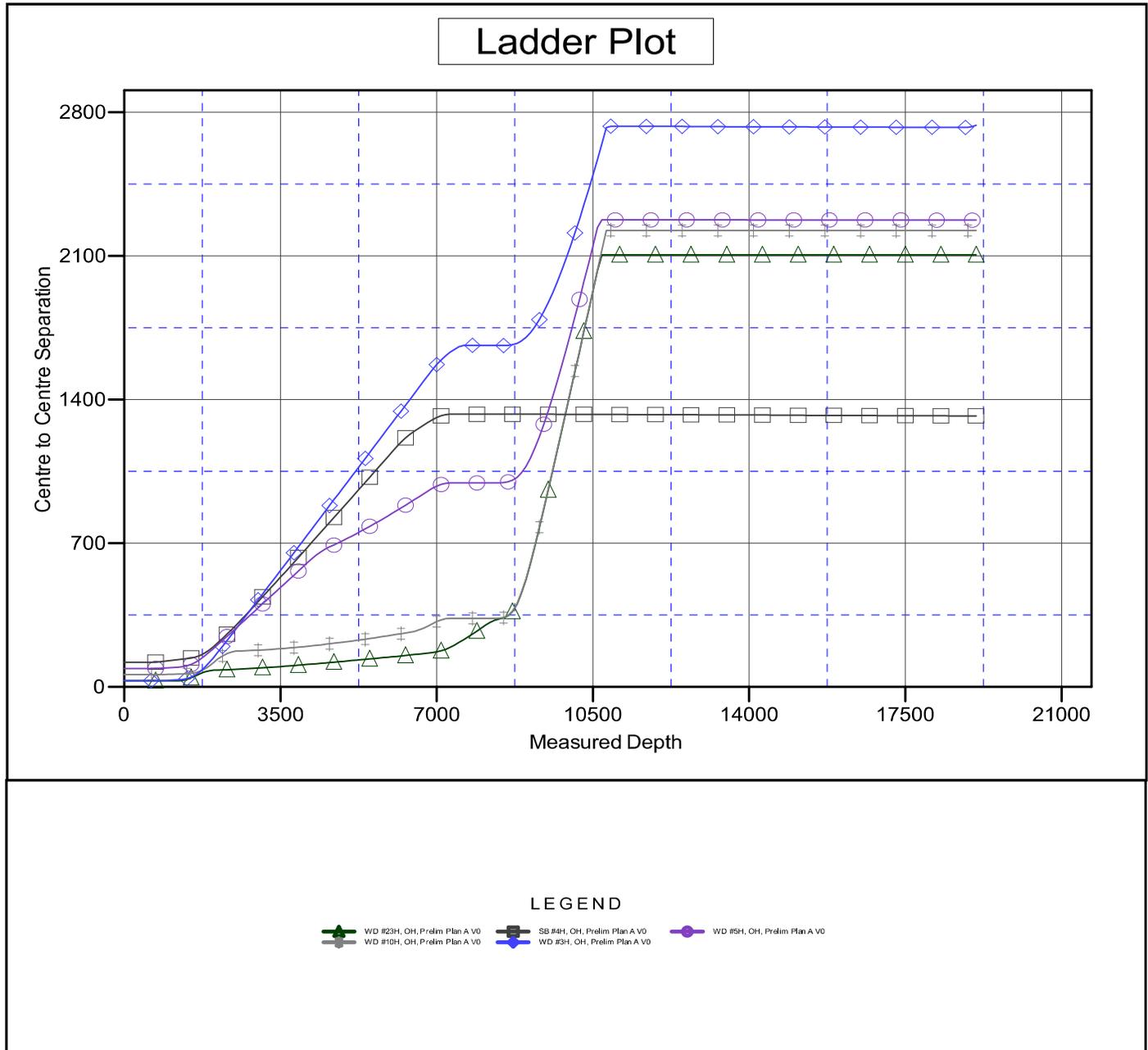
**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Reference Depths are relative to well @ 3026.00usft  
 Offset Depths are relative to Offset Datum  
 Central Meridian is -104.333333

Coordinates are relative to: SB #7H  
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30  
 Grid Convergence at Surface is: 0.18°



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



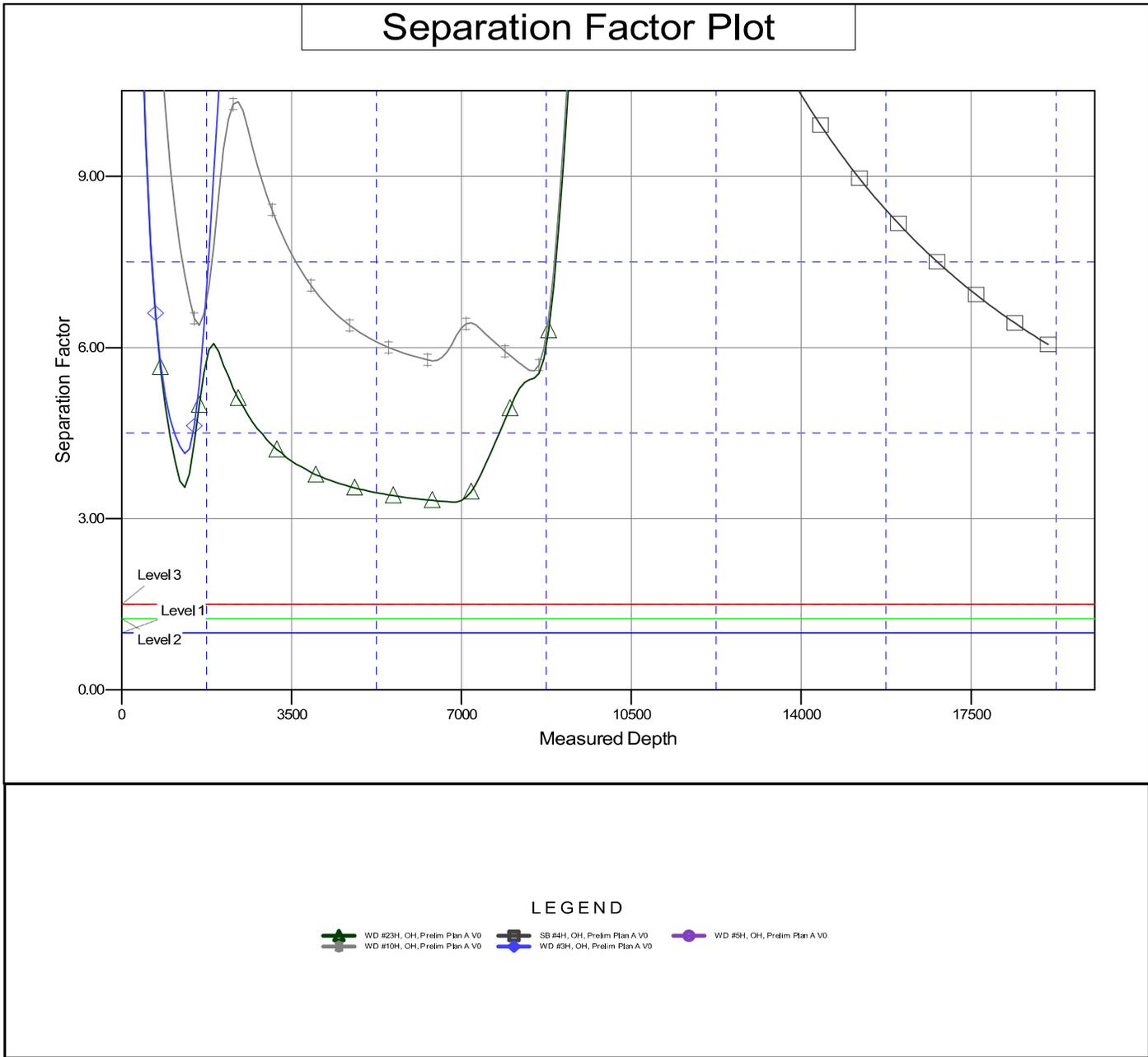
**Pro Directional**  
Anticollision Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Reference Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Site Error:</b>	0.00 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	SB #7H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OH	<b>Database:</b>	WellPlanner1
<b>Reference Design:</b>	Prelim Plan A	<b>Offset TVD Reference:</b>	Reference Datum

Reference Depths are relative to well @ 3026.00usft  
 Offset Depths are relative to Offset Datum  
 Central Meridian is -104.3333333

Coordinates are relative to: SB #7H  
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30  
 Grid Convergence at Surface is: 0.18°



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

**Marathon Oil**  
**Eddy County, NM**  
**Blue Steel 21 Fee**  
**SB #7H**  
**Prelim Plan A**

US State Plane 1927 (Exact solution)  
 NAD 1983 (North CONUS)  
 Clarke 1886  
 New Mexico East 3001  
 Mean Sea Level

RKB Elevation: well @ 3026.00usft

+N-S	+E-W	Northing	Latitude	Longitude	Slot
0.00	0.00	466404.27	32.2818062	-103.9940264	

**SECTION DETAILS**

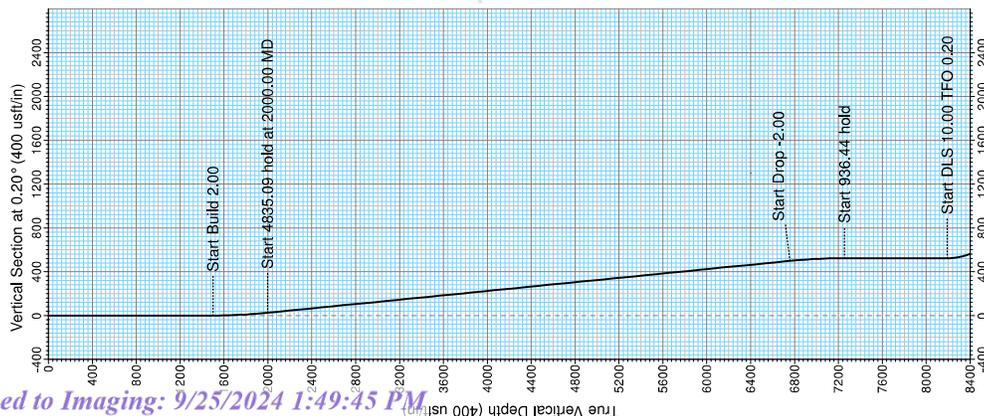
Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	Vsect
1	0.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00
2	1500.00	0.00	0.00	1997.47	0.00	0.00	0.00	0.00
3	2000.00	10.00	55.92	6759.10	24.45	36.01	2.00	24.58
4	6835.09	10.00	55.92	7556.56	496.13	730.59	0.00	498.68
5	7335.09	0.00	0.00	8193.00	520.58	766.60	2.00	523.25
6	8271.53	0.00	0.00	8765.96	1093.53	768.58	10.00	1096.21
7	9171.52	90.00	0.20	8766.00	11011.69	802.83	0.00	11014.43
8	19089.74	90.00	0.20	8766.00	11011.69	802.83	0.00	11014.43

**WELLBORE TARGET DETAILS (MAP CO-ORDINATES)**

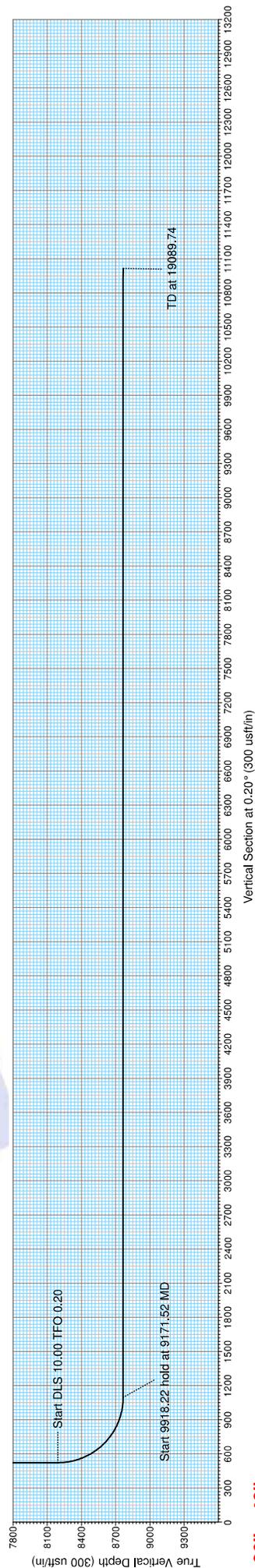
Name	TVD	+N-S	+E-W	Northing	Easting
[BlueSteel21#7H]FTP	0.00	570.58	766.67	466974.85	605627.30
[BlueSteel21#7H]KOP	8193.00	520.58	766.60	466924.85	605627.23
[BlueSteel21#7H]LTP/BHL	8766.00	11011.69	802.83	477415.96	605663.46



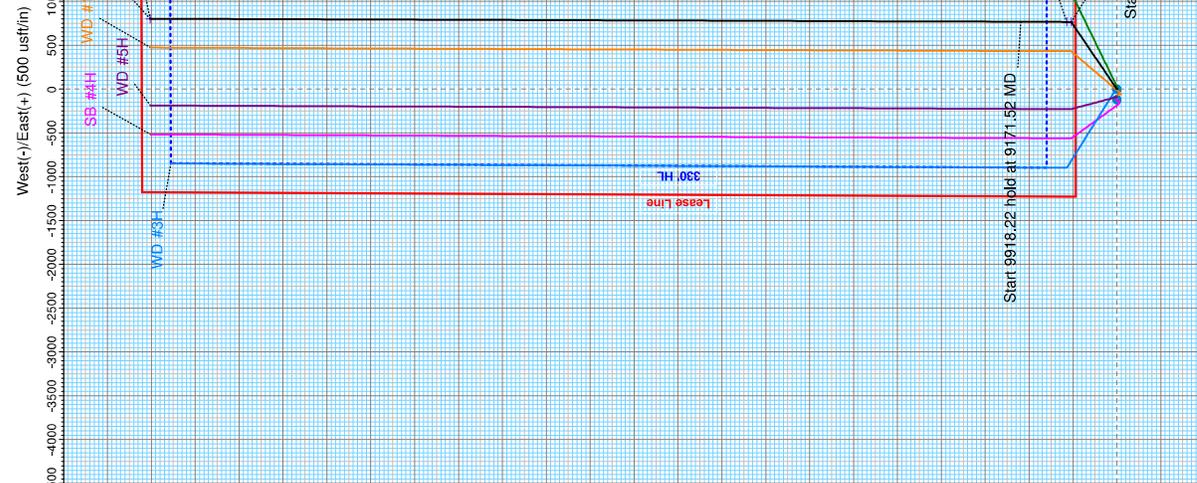
**Azimuth Corrections**  
 Total Magnetic Corr. (M to G): 6.75°  
 Declination (M to T): 6.93° East



**Target Line: 8766' TVD @ 0° VS: 90° INC**



**36" x 48"**





Pro Directional  
Survey Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Well:</b>	SB #7H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Prelim Plan A	<b>Database:</b>	WellPlanner1

<b>Project</b>	Eddy County, NM		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	New Mexico East 3001		

<b>Site</b>	Blue Steel 21 Fee				
<b>Site Position:</b>		<b>Northing:</b>	466,604.25 usft	<b>Latitude:</b>	32.2823559
<b>From:</b>	Map	<b>Easting:</b>	604,860.40 usft	<b>Longitude:</b>	-103.9940251
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.18 °

<b>Well</b>	SB #7H					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	466,404.27 usft	<b>Latitude:</b>	32.2818062
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	604,860.63 usft	<b>Longitude:</b>	-103.9940264
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	2,999.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	4/3/2020	6.93	60.00	47,832.20

<b>Design</b>	Prelim Plan A				
<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00	
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	0.20	

<b>Survey Tool Program</b>	<b>Date</b>	4/6/2020			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
0.00	19,089.74	Prelim Plan A (OH)	MWD+IFR1	OWSG MWD + IFR1	

<b>Planned Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>[BlueSteel21#7H]FTP</b>										
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Pro Directional**  
Survey Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Well:</b>	SB #7H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Prelim Plan A	<b>Database:</b>	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,600.00	2.00	55.82	1,599.98	0.98	1.44	0.99	2.00	2.00	0.00	
1,700.00	4.00	55.82	1,699.84	3.92	5.77	3.94	2.00	2.00	0.00	
1,800.00	6.00	55.82	1,799.45	8.82	12.98	8.86	2.00	2.00	0.00	
1,900.00	8.00	55.82	1,898.70	15.66	23.06	15.74	2.00	2.00	0.00	
2,000.00	10.00	55.82	1,997.47	24.45	36.01	24.58	2.00	2.00	0.00	
2,100.00	10.00	55.82	2,095.95	34.21	50.37	34.38	0.00	0.00	0.00	
2,200.00	10.00	55.82	2,194.43	43.96	64.74	44.19	0.00	0.00	0.00	
2,300.00	10.00	55.82	2,292.91	53.72	79.10	53.99	0.00	0.00	0.00	
2,400.00	10.00	55.82	2,391.39	63.47	93.47	63.80	0.00	0.00	0.00	
2,500.00	10.00	55.82	2,489.87	73.23	107.83	73.60	0.00	0.00	0.00	
2,600.00	10.00	55.82	2,588.35	82.98	122.20	83.41	0.00	0.00	0.00	
2,700.00	10.00	55.82	2,686.83	92.74	136.56	93.21	0.00	0.00	0.00	
2,800.00	10.00	55.82	2,785.31	102.49	150.93	103.02	0.00	0.00	0.00	
2,900.00	10.00	55.82	2,883.79	112.25	165.30	112.82	0.00	0.00	0.00	
3,000.00	10.00	55.82	2,982.27	122.00	179.66	122.63	0.00	0.00	0.00	
3,100.00	10.00	55.82	3,080.75	131.76	194.03	132.44	0.00	0.00	0.00	
3,200.00	10.00	55.82	3,179.23	141.51	208.39	142.24	0.00	0.00	0.00	
3,300.00	10.00	55.82	3,277.72	151.27	222.76	152.05	0.00	0.00	0.00	
3,400.00	10.00	55.82	3,376.20	161.03	237.12	161.85	0.00	0.00	0.00	
3,500.00	10.00	55.82	3,474.68	170.78	251.49	171.66	0.00	0.00	0.00	
3,600.00	10.00	55.82	3,573.16	180.54	265.85	181.46	0.00	0.00	0.00	
3,700.00	10.00	55.82	3,671.64	190.29	280.22	191.27	0.00	0.00	0.00	
3,800.00	10.00	55.82	3,770.12	200.05	294.59	201.07	0.00	0.00	0.00	
3,900.00	10.00	55.82	3,868.60	209.80	308.95	210.88	0.00	0.00	0.00	
4,000.00	10.00	55.82	3,967.08	219.56	323.32	220.68	0.00	0.00	0.00	
4,100.00	10.00	55.82	4,065.56	229.31	337.68	230.49	0.00	0.00	0.00	
4,200.00	10.00	55.82	4,164.04	239.07	352.05	240.30	0.00	0.00	0.00	
4,300.00	10.00	55.82	4,262.52	248.82	366.41	250.10	0.00	0.00	0.00	
4,400.00	10.00	55.82	4,361.00	258.58	380.78	259.91	0.00	0.00	0.00	
4,500.00	10.00	55.82	4,459.48	268.33	395.15	269.71	0.00	0.00	0.00	
4,600.00	10.00	55.82	4,557.97	278.09	409.51	279.52	0.00	0.00	0.00	
4,700.00	10.00	55.82	4,656.45	287.84	423.88	289.32	0.00	0.00	0.00	
4,800.00	10.00	55.82	4,754.93	297.60	438.24	299.13	0.00	0.00	0.00	
4,900.00	10.00	55.82	4,853.41	307.36	452.61	308.93	0.00	0.00	0.00	
5,000.00	10.00	55.82	4,951.89	317.11	466.97	318.74	0.00	0.00	0.00	
5,100.00	10.00	55.82	5,050.37	326.87	481.34	328.54	0.00	0.00	0.00	
5,200.00	10.00	55.82	5,148.85	336.62	495.70	338.35	0.00	0.00	0.00	

**Pro Directional**  
Survey Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Well:</b>	SB #7H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Prelim Plan A	<b>Database:</b>	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,300.00	10.00	55.82	5,247.33	346.38	510.07	348.15	0.00	0.00	0.00	
5,400.00	10.00	55.82	5,345.81	356.13	524.44	357.96	0.00	0.00	0.00	
5,500.00	10.00	55.82	5,444.29	365.89	538.80	367.77	0.00	0.00	0.00	
5,600.00	10.00	55.82	5,542.77	375.64	553.17	377.57	0.00	0.00	0.00	
5,700.00	10.00	55.82	5,641.25	385.40	567.53	387.38	0.00	0.00	0.00	
5,800.00	10.00	55.82	5,739.73	395.15	581.90	397.18	0.00	0.00	0.00	
5,900.00	10.00	55.82	5,838.22	404.91	596.26	406.99	0.00	0.00	0.00	
6,000.00	10.00	55.82	5,936.70	414.66	610.63	416.79	0.00	0.00	0.00	
6,100.00	10.00	55.82	6,035.18	424.42	624.99	426.60	0.00	0.00	0.00	
6,200.00	10.00	55.82	6,133.66	434.17	639.36	436.40	0.00	0.00	0.00	
6,300.00	10.00	55.82	6,232.14	443.93	653.73	446.21	0.00	0.00	0.00	
6,400.00	10.00	55.82	6,330.62	453.69	668.09	456.01	0.00	0.00	0.00	
6,500.00	10.00	55.82	6,429.10	463.44	682.46	465.82	0.00	0.00	0.00	
6,600.00	10.00	55.82	6,527.58	473.20	696.82	475.63	0.00	0.00	0.00	
6,700.00	10.00	55.82	6,626.06	482.95	711.19	485.43	0.00	0.00	0.00	
6,800.00	10.00	55.82	6,724.54	492.71	725.55	495.24	0.00	0.00	0.00	
6,835.09	10.00	55.82	6,759.10	496.13	730.59	498.68	0.00	0.00	0.00	
6,900.00	8.70	55.82	6,823.15	502.05	739.32	504.63	2.00	-2.00	0.00	
7,000.00	6.70	55.82	6,922.24	509.58	750.41	512.20	2.00	-2.00	0.00	
7,100.00	4.70	55.82	7,021.74	515.16	758.62	517.81	2.00	-2.00	0.00	
7,200.00	2.70	55.82	7,121.53	518.79	763.97	521.45	2.00	-2.00	0.00	
7,300.00	0.70	55.82	7,221.48	520.46	766.42	523.13	2.00	-2.00	0.00	
7,335.09	0.00	0.00	7,256.56	520.58	766.60	523.25	2.00	-2.00	0.00	
7,400.00	0.00	0.00	7,321.48	520.58	766.60	523.25	0.00	0.00	0.00	
7,500.00	0.00	0.00	7,421.48	520.58	766.60	523.25	0.00	0.00	0.00	
7,600.00	0.00	0.00	7,521.48	520.58	766.60	523.25	0.00	0.00	0.00	
7,700.00	0.00	0.00	7,621.48	520.58	766.60	523.25	0.00	0.00	0.00	
7,800.00	0.00	0.00	7,721.48	520.58	766.60	523.25	0.00	0.00	0.00	
7,900.00	0.00	0.00	7,821.48	520.58	766.60	523.25	0.00	0.00	0.00	
8,000.00	0.00	0.00	7,921.48	520.58	766.60	523.25	0.00	0.00	0.00	
8,100.00	0.00	0.00	8,021.48	520.58	766.60	523.25	0.00	0.00	0.00	
8,200.00	0.00	0.00	8,121.48	520.58	766.60	523.25	0.00	0.00	0.00	
8,271.53	0.00	0.00	8,193.00	520.58	766.60	523.25	0.00	0.00	0.00	
<b>[BlueSteel21#7H]KOP</b>										
8,300.00	2.85	0.20	8,221.46	521.29	766.60	523.96	10.00	10.00	0.00	
8,350.00	7.85	0.20	8,271.23	525.95	766.62	528.62	10.00	10.00	0.00	
8,400.00	12.85	0.20	8,320.40	534.92	766.65	537.60	10.00	10.00	0.00	
8,450.00	17.85	0.20	8,368.60	548.15	766.70	550.83	10.00	10.00	0.00	
8,500.00	22.85	0.20	8,415.47	565.53	766.76	568.21	10.00	10.00	0.00	
8,550.00	27.85	0.20	8,460.64	586.93	766.83	589.60	10.00	10.00	0.00	
8,600.00	32.85	0.20	8,503.78	612.19	766.92	614.86	10.00	10.00	0.00	
8,650.00	37.85	0.20	8,544.55	641.10	767.02	643.78	10.00	10.00	0.00	
8,700.00	42.85	0.20	8,582.64	673.46	767.13	676.14	10.00	10.00	0.00	



**Pro Directional**  
Survey Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Well:</b>	SB #7H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Prelim Plan A	<b>Database:</b>	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,750.00	47.85	0.20	8,617.77	709.02	767.25	711.69	10.00	10.00	0.00	
8,800.00	52.85	0.20	8,649.67	747.51	767.38	750.18	10.00	10.00	0.00	
8,850.00	57.85	0.20	8,678.09	788.62	767.53	791.30	10.00	10.00	0.00	
8,900.00	62.85	0.20	8,702.82	832.06	767.68	834.74	10.00	10.00	0.00	
8,950.00	67.85	0.20	8,723.66	877.49	767.83	880.16	10.00	10.00	0.00	
9,000.00	72.85	0.20	8,740.47	924.56	768.00	927.24	10.00	10.00	0.00	
9,050.00	77.85	0.20	8,753.12	972.92	768.16	975.59	10.00	10.00	0.00	
9,100.00	82.85	0.20	8,761.50	1,022.20	768.33	1,024.87	10.00	10.00	0.00	
9,150.00	87.85	0.20	8,765.55	1,072.01	768.50	1,074.69	10.00	10.00	0.00	
9,171.52	90.00	0.20	8,765.96	1,093.53	768.58	1,096.21	10.00	10.00	0.00	
9,200.00	90.00	0.20	8,765.96	1,122.01	768.68	1,124.69	0.00	0.00	0.00	
9,300.00	90.00	0.20	8,765.96	1,222.01	769.02	1,224.69	0.00	0.00	0.00	
9,400.00	90.00	0.20	8,765.96	1,322.01	769.37	1,324.69	0.00	0.00	0.00	
9,500.00	90.00	0.20	8,765.96	1,422.01	769.71	1,424.69	0.00	0.00	0.00	
9,600.00	90.00	0.20	8,765.96	1,522.01	770.06	1,524.69	0.00	0.00	0.00	
9,700.00	90.00	0.20	8,765.96	1,622.01	770.40	1,624.69	0.00	0.00	0.00	
9,800.00	90.00	0.20	8,765.96	1,722.01	770.75	1,724.69	0.00	0.00	0.00	
9,900.00	90.00	0.20	8,765.96	1,822.00	771.09	1,824.69	0.00	0.00	0.00	
10,000.00	90.00	0.20	8,765.96	1,922.00	771.44	1,924.69	0.00	0.00	0.00	
10,100.00	90.00	0.20	8,765.96	2,022.00	771.79	2,024.69	0.00	0.00	0.00	
10,200.00	90.00	0.20	8,765.96	2,122.00	772.13	2,124.69	0.00	0.00	0.00	
10,300.00	90.00	0.20	8,765.96	2,222.00	772.48	2,224.69	0.00	0.00	0.00	
10,400.00	90.00	0.20	8,765.96	2,322.00	772.82	2,324.69	0.00	0.00	0.00	
10,500.00	90.00	0.20	8,765.96	2,422.00	773.17	2,424.69	0.00	0.00	0.00	
10,600.00	90.00	0.20	8,765.96	2,522.00	773.51	2,524.69	0.00	0.00	0.00	
10,700.00	90.00	0.20	8,765.96	2,622.00	773.86	2,624.69	0.00	0.00	0.00	
10,800.00	90.00	0.20	8,765.96	2,722.00	774.20	2,724.69	0.00	0.00	0.00	
10,900.00	90.00	0.20	8,765.97	2,822.00	774.55	2,824.69	0.00	0.00	0.00	
11,000.00	90.00	0.20	8,765.97	2,922.00	774.89	2,924.69	0.00	0.00	0.00	
11,100.00	90.00	0.20	8,765.97	3,022.00	775.24	3,024.69	0.00	0.00	0.00	
11,200.00	90.00	0.20	8,765.97	3,122.00	775.58	3,124.69	0.00	0.00	0.00	
11,300.00	90.00	0.20	8,765.97	3,222.00	775.93	3,224.69	0.00	0.00	0.00	
11,400.00	90.00	0.20	8,765.97	3,322.00	776.27	3,324.69	0.00	0.00	0.00	
11,500.00	90.00	0.20	8,765.97	3,422.00	776.62	3,424.69	0.00	0.00	0.00	
11,600.00	90.00	0.20	8,765.97	3,521.99	776.97	3,524.69	0.00	0.00	0.00	
11,700.00	90.00	0.20	8,765.97	3,621.99	777.31	3,624.69	0.00	0.00	0.00	
11,800.00	90.00	0.20	8,765.97	3,721.99	777.66	3,724.69	0.00	0.00	0.00	
11,900.00	90.00	0.20	8,765.97	3,821.99	778.00	3,824.69	0.00	0.00	0.00	
12,000.00	90.00	0.20	8,765.97	3,921.99	778.35	3,924.69	0.00	0.00	0.00	
12,100.00	90.00	0.20	8,765.97	4,021.99	778.69	4,024.69	0.00	0.00	0.00	
12,200.00	90.00	0.20	8,765.97	4,121.99	779.04	4,124.69	0.00	0.00	0.00	
12,300.00	90.00	0.20	8,765.97	4,221.99	779.38	4,224.69	0.00	0.00	0.00	
12,400.00	90.00	0.20	8,765.97	4,321.99	779.73	4,324.69	0.00	0.00	0.00	
12,500.00	90.00	0.20	8,765.97	4,421.99	780.07	4,424.69	0.00	0.00	0.00	



**Pro Directional**  
Survey Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Well:</b>	SB #7H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Prelim Plan A	<b>Database:</b>	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
12,600.00	90.00	0.20	8,765.97	4,521.99	780.42	4,524.69	0.00	0.00	0.00	
12,700.00	90.00	0.20	8,765.97	4,621.99	780.76	4,624.69	0.00	0.00	0.00	
12,800.00	90.00	0.20	8,765.97	4,721.99	781.11	4,724.69	0.00	0.00	0.00	
12,900.00	90.00	0.20	8,765.97	4,821.99	781.45	4,824.69	0.00	0.00	0.00	
13,000.00	90.00	0.20	8,765.97	4,921.99	781.80	4,924.69	0.00	0.00	0.00	
13,100.00	90.00	0.20	8,765.97	5,021.99	782.15	5,024.69	0.00	0.00	0.00	
13,200.00	90.00	0.20	8,765.98	5,121.99	782.49	5,124.69	0.00	0.00	0.00	
13,300.00	90.00	0.20	8,765.98	5,221.98	782.84	5,224.69	0.00	0.00	0.00	
13,400.00	90.00	0.20	8,765.98	5,321.98	783.18	5,324.69	0.00	0.00	0.00	
13,500.00	90.00	0.20	8,765.98	5,421.98	783.53	5,424.69	0.00	0.00	0.00	
13,600.00	90.00	0.20	8,765.98	5,521.98	783.87	5,524.69	0.00	0.00	0.00	
13,700.00	90.00	0.20	8,765.98	5,621.98	784.22	5,624.69	0.00	0.00	0.00	
13,800.00	90.00	0.20	8,765.98	5,721.98	784.56	5,724.69	0.00	0.00	0.00	
13,900.00	90.00	0.20	8,765.98	5,821.98	784.91	5,824.69	0.00	0.00	0.00	
14,000.00	90.00	0.20	8,765.98	5,921.98	785.25	5,924.69	0.00	0.00	0.00	
14,100.00	90.00	0.20	8,765.98	6,021.98	785.60	6,024.69	0.00	0.00	0.00	
14,200.00	90.00	0.20	8,765.98	6,121.98	785.94	6,124.69	0.00	0.00	0.00	
14,300.00	90.00	0.20	8,765.98	6,221.98	786.29	6,224.69	0.00	0.00	0.00	
14,400.00	90.00	0.20	8,765.98	6,321.98	786.63	6,324.69	0.00	0.00	0.00	
14,500.00	90.00	0.20	8,765.98	6,421.98	786.98	6,424.69	0.00	0.00	0.00	
14,600.00	90.00	0.20	8,765.98	6,521.98	787.33	6,524.69	0.00	0.00	0.00	
14,700.00	90.00	0.20	8,765.98	6,621.98	787.67	6,624.69	0.00	0.00	0.00	
14,800.00	90.00	0.20	8,765.98	6,721.98	788.02	6,724.69	0.00	0.00	0.00	
14,900.00	90.00	0.20	8,765.98	6,821.98	788.36	6,824.69	0.00	0.00	0.00	
15,000.00	90.00	0.20	8,765.98	6,921.97	788.71	6,924.69	0.00	0.00	0.00	
15,100.00	90.00	0.20	8,765.98	7,021.97	789.05	7,024.69	0.00	0.00	0.00	
15,200.00	90.00	0.20	8,765.98	7,121.97	789.40	7,124.69	0.00	0.00	0.00	
15,300.00	90.00	0.20	8,765.98	7,221.97	789.74	7,224.69	0.00	0.00	0.00	
15,400.00	90.00	0.20	8,765.98	7,321.97	790.09	7,324.69	0.00	0.00	0.00	
15,500.00	90.00	0.20	8,765.98	7,421.97	790.43	7,424.69	0.00	0.00	0.00	
15,600.00	90.00	0.20	8,765.99	7,521.97	790.78	7,524.69	0.00	0.00	0.00	
15,700.00	90.00	0.20	8,765.99	7,621.97	791.12	7,624.69	0.00	0.00	0.00	
15,800.00	90.00	0.20	8,765.99	7,721.97	791.47	7,724.69	0.00	0.00	0.00	
15,900.00	90.00	0.20	8,765.99	7,821.97	791.81	7,824.69	0.00	0.00	0.00	
16,000.00	90.00	0.20	8,765.99	7,921.97	792.16	7,924.69	0.00	0.00	0.00	
16,100.00	90.00	0.20	8,765.99	8,021.97	792.51	8,024.69	0.00	0.00	0.00	
16,200.00	90.00	0.20	8,765.99	8,121.97	792.85	8,124.69	0.00	0.00	0.00	
16,300.00	90.00	0.20	8,765.99	8,221.97	793.20	8,224.69	0.00	0.00	0.00	
16,400.00	90.00	0.20	8,765.99	8,321.97	793.54	8,324.69	0.00	0.00	0.00	
16,500.00	90.00	0.20	8,765.99	8,421.97	793.89	8,424.69	0.00	0.00	0.00	
16,600.00	90.00	0.20	8,765.99	8,521.97	794.23	8,524.69	0.00	0.00	0.00	
16,700.00	90.00	0.20	8,765.99	8,621.96	794.58	8,624.69	0.00	0.00	0.00	
16,800.00	90.00	0.20	8,765.99	8,721.96	794.92	8,724.69	0.00	0.00	0.00	



**Pro Directional**  
Survey Report



<b>Company:</b>	Marathon Oil	<b>Local Co-ordinate Reference:</b>	Well SB #7H
<b>Project:</b>	Eddy County, NM	<b>TVD Reference:</b>	well @ 3026.00usft
<b>Site:</b>	Blue Steel 21 Fee	<b>MD Reference:</b>	well @ 3026.00usft
<b>Well:</b>	SB #7H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Prelim Plan A	<b>Database:</b>	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
16,900.00	90.00	0.20	8,765.99	8,821.96	795.27	8,824.69	0.00	0.00	0.00	
17,000.00	90.00	0.20	8,765.99	8,921.96	795.61	8,924.69	0.00	0.00	0.00	
17,100.00	90.00	0.20	8,765.99	9,021.96	795.96	9,024.69	0.00	0.00	0.00	
17,200.00	90.00	0.20	8,765.99	9,121.96	796.30	9,124.69	0.00	0.00	0.00	
17,300.00	90.00	0.20	8,765.99	9,221.96	796.65	9,224.69	0.00	0.00	0.00	
17,400.00	90.00	0.20	8,765.99	9,321.96	796.99	9,324.69	0.00	0.00	0.00	
17,500.00	90.00	0.20	8,765.99	9,421.96	797.34	9,424.69	0.00	0.00	0.00	
17,600.00	90.00	0.20	8,765.99	9,521.96	797.69	9,524.69	0.00	0.00	0.00	
17,700.00	90.00	0.20	8,765.99	9,621.96	798.03	9,624.69	0.00	0.00	0.00	
17,800.00	90.00	0.20	8,765.99	9,721.96	798.38	9,724.69	0.00	0.00	0.00	
17,900.00	90.00	0.20	8,766.00	9,821.96	798.72	9,824.69	0.00	0.00	0.00	
18,000.00	90.00	0.20	8,766.00	9,921.96	799.07	9,924.69	0.00	0.00	0.00	
18,100.00	90.00	0.20	8,766.00	10,021.96	799.41	10,024.69	0.00	0.00	0.00	
18,200.00	90.00	0.20	8,766.00	10,121.96	799.76	10,124.69	0.00	0.00	0.00	
18,300.00	90.00	0.20	8,766.00	10,221.96	800.10	10,224.69	0.00	0.00	0.00	
18,400.00	90.00	0.20	8,766.00	10,321.95	800.45	10,324.69	0.00	0.00	0.00	
18,500.00	90.00	0.20	8,766.00	10,421.95	800.79	10,424.69	0.00	0.00	0.00	
18,600.00	90.00	0.20	8,766.00	10,521.95	801.14	10,524.69	0.00	0.00	0.00	
18,700.00	90.00	0.20	8,766.00	10,621.95	801.48	10,624.69	0.00	0.00	0.00	
18,800.00	90.00	0.20	8,766.00	10,721.95	801.83	10,724.69	0.00	0.00	0.00	
18,900.00	90.00	0.20	8,766.00	10,821.95	802.17	10,824.69	0.00	0.00	0.00	
19,000.00	90.00	0.20	8,766.00	10,921.95	802.52	10,924.69	0.00	0.00	0.00	
19,089.74	90.00	0.20	8,766.00	11,011.69	802.83	11,014.43	0.00	0.00	0.00	
[BlueSteel21#7H]LTP/BHL										

Design Targets										
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
[BlueSteel21#7H]FTP - plan misses target center by 955.69usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	570.58	766.67	466,974.85	605,627.30	32.2833680	-103.9915398	
[BlueSteel21#7H]KOP - plan hits target center - Point	0.00	0.00	8,193.00	520.58	766.60	466,924.85	605,627.23	32.2832306	-103.9915405	
[BlueSteel21#7H]LTP/BH - plan hits target center - Point	0.00	0.00	8,766.00	11,011.69	802.83	477,415.96	605,663.46	32.3120694	-103.9913150	

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

MARATHON OIL PERMIAN LLC  
**DRILLING AND OPERATIONS PLAN**

-----  
**BLUE STEEL 21 SB FEE 4H**  
 SEC. 28, TWP. 23S, RNG. 29E  
 EDDY COUNTY, NEW MEXICO

**1. GEOLOGICAL FORMATIONS**

Formation at Surface	Elevation
Permian	3000

Formation	TVD	MD	Elevation	Lithology	Mineral Resources	Producing Formation
Rustler	0	0	3000	Anhydrite	Brine	No
Salado	356	356	2644	Salt/Anhydrite	Brine	No
Castile	986	986	2014	Salt/Anhydrite	Brine	No
Base of Salt (BX)	2966	2966	34	Salt/Anhydrite	Brine	No
Lamar	2966	2966	34	Sandstone/Shale	None	No
Bell Canyon	3018	3018	-18	Sandstone	Oil	No
Cherry Canyon	3856	3856	-856	Sandstone	Oil	No
Brushy Canyon	4999	4999	-1999	Sandstone	Oil	No
Bone Spring Lime	6645	6645	-3645	Limestone	None	No
Upper Avalon Shale	6720	6720	-3720	Shale	Oil	Yes
1st Bone Spring Sand	7682	7682	-4682	Sandstone	Oil	Yes
2nd Bone Spring Carbonate	7963	7963	-4963	Limestone	None	No
2nd Bone Spring Sand	8461	8461	-5461	Sandstone	Oil	Yes
3rd Bone Spring Carbonate	8804	N/A	-5804	Limestone	Oil	No
3rd Bone Spring Sand	9611	N/A	-6611	Sandstone	Oil	Yes
Wolfcamp	9942	N/A	-6942	Sandstone/Shale/Carbonates	Natural Gas/Oil	Yes
Wolfcamp A	10081	N/A	-7081	Sandstone/Shale/Carbonates	Natural Gas/Oil	Yes
Wolfcamp B	10321	N/A	-7321	Sandstone/Shale/Carbonates	Natural Gas/Oil	No
Wolfcamp C	10670	N/A	-7670	Sandstone/Shale/Carbonates	Natural Gas/Oil	No
Wolfcamp D	11040	N/A	-8040	Sandstone/Shale/Carbonates	Natural Gas/Oil	No

**2. BLOWOUT PREVENTER TESTING PROCEDURE**

BOP installed and tested before drilling which hole?	Size	Min. Required WP	Type	✓	Type
12 1/4	13 5/8	5000	Annular	x	50% of working pressure
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other* BOP Stack	x	
8 3/4	13 5/8	5000	Annular	x	50% of working pressure
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other* BOP Stack	x	

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

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 will include a Kelly cock, full opening safety valve / inside BOP and choke lines and choke manifold. See attached schematics.

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?
Y	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic.

**3. CASING PROGRAM**

String Type	Hole Size	Csg Size	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Weight (lbs/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
Surface	17 1/2	13 3/8	0	420	0	420	54.5	J55	STC	3.37	1.71	2.93
Intermediate	12 1/4	9 5/8	0	3060	0	3048	36	J55	LTC	1.26	1.2	1.96
Production	8 3/4	5 1/2	0	19035	0	8736	20	P110	BTC	1.65	1.29	2.08

Minimum safety factors: Burst 1.125 Collapse 1.125 Tension 1.8 Wet/1.6 Dry

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

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 <sup>rd</sup> string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 <sup>nd</sup> string set 100' to 600' below the base of salt?	

	Y or N
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

**4. CEMENT PROGRAM**

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity (sx)	Yield (ft3/sx)	Density (ppg)	Slurry Volume (ft3)	Excess (%)	Cement Type	Additives
Surface	Lead	--	0	0	0	1.73	13.5	0	100	Class C	LCM
Surface	Tail	--	0	420	428	1.33	14.8	584	100	Class C	Accelerator
Intermediate	Lead	--	0	2000	634	2.21	12.8	1096	75	Class C	Extender, Accelerator
Intermediate	Tail	--	2000	3060	374	1.33	14.8	498	50	Class C	Retarder
Production	Lead	--	2760	8220	868	3.21	11	2345	70	Class C	Viscosifier, Retarder
Production	Tail	--	8220	19035	2911	1.22	14.5	3551	30	Class H	Extender, Fluid Loss, Dispersant

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

Pilot Hole Depth: N/A TVD/MD  
 KOP: N/A TVD/MD

Plug Top	Plug Bottom	Excess (%)	Quantity (sx)	Density (ppg)	Yield (ft3/sx)	Water gal/sk	Slurry Description and Cement Type

Attach plugging procedure for pilot hole: N/A

**5. CIRCULATING MEDIUM**

Top Depth	Bottom Depth	Mud Type	Min. Weight (ppg)	Max. Weight (ppg)
0	420	Water Based Mud	8.4	8.8
420	3060	Brine	8.8	9.8
3060	19035	Brine or Oil Based Mud	8.8	9.8

Losses or gains in the mud system will be monitored visually/manually as well as with an electronic PVT. The necessary mud products for additional weight and fluid loss control will be on location at all times.

## 6. TESTING, LOGGING, CORING

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

GR from TD to surface (horizontal well - vertical portion of hole).

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

GR while drilling from Intermediate casing shoe to TD.

### Coring operation description for the well:

Run gamma-ray (GR) and corrected neutron log (CNL) or analogous to surface for future development of the area, one per shared well pad not to exceed 200' radial distance.

Mud Logger:	None
DST's:	None
Open Hole Logs:	GR while drilling from Intermediate casing shoe to TD.

## 7. ANTICIPATED PRESSURE

Anticipated Bottom Hole Pressure:	4451 PSI
Anticipated Bottom Hole Temperature:	195 °F
Anticipate Abnormal Pressure?	No
Anticipated Abnormal Temperature?	No

- A. H2S detection equipment will be in operation after drilling out the surface casing shoe until the production casing has been cemented. Breathing equipment will be on location from drilling out the surface shoe until production casing is cemented. If H2S is encountered the operator will comply with Onshore Order #6.
- B. No abnormal temperatures or pressures are anticipated. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.
- C. No losses are anticipated at this time.
- D. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well.
- E. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.

## 8. OTHER INFORMATION

- A. Auxiliary Well Control and Monitoring Equipment
  - i. A Kelly cock will be in the drill string at all times.
  - ii. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor unobstructed and readily accessible at all times.
  - iii. Hydrogen Sulfide detection equipment will be in operation after drilling out the surface casing shoe until the production casing is cemented. Breathing equipment will be on location upon drilling the surface casing shoe until total depth is reached. If Hydrogen Sulfide is encountered, measured amounts and formations will be reported to the BLM
- B. Anticipated Starting Date and Duration of Operations
  - i. Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.
- C. No abnormal temperatures or pressures are anticipated. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.
- D. No losses are anticipated at this time.
- E. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well.
- F. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.

## Batch Drilling Plan

- Marathon Oil Permian LLC. respectfully requests the option to “batch” drill sections of a well with intentions of returning to the well for later completion.
- When it is determined that the use of a “batch” drilling process to increase overall efficiency and reduce rig time on location, the following steps will be utilized to ensure compliant well control before releasing drilling rig during the batch process.
- Succeeding a successful cement job, fluid levels will be monitored in both the annulus and casing string to be verified static.
- A mandrel hanger packoff will be ran and installed in the multi-bowl wellhead isolating and creating a barrier on the annulus. This packoff will be tested to 5,000 PSI validating the seals.
- At this point the well is secure and the drilling adapter will be removed from the wellhead.
- A 13-5/8” 5M temporary abandonment cap will be installed on the wellhead by stud and nut flange. The seals of the TA cap will then be pressure tested to 5,000 PSI.
- The drilling rig will skid to the next well on the pad to continue the batch drilling process.
- When returning to the well with the TA cap, the TA cap will be removed and the BOP will be nipped up on the wellhead.
- A BOP test will then be conducted according to Onshore Order #2 and drilling operations will resume on the subject well.

## Request for Surface Rig

- Marathon Oil Permian LLC. Requests the option to contract a surface rig to drill, set surface casing and cement on the subject well. If the timing between rigs is such that Marathon Oil Permian LLC. would not be able to preset the surface section, the primary drilling rig will drill the well in its entirety per the APD.

**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 385903

**CONDITIONS**

Operator: MARATHON OIL PERMIAN LLC 990 Town & Country Blvd. Houston, TX 77024	OGRID: 372098
	Action Number: 385903
	Action Type:
	[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	9/25/2024
ward.rikala	Will require a File As Drilled C-102 and a Directional Survey with the C-104	9/25/2024
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	9/25/2024
ward.rikala	Cement is required to circulate on both surface and intermediate1 strings of casing	9/25/2024
ward.rikala	If cement does not circulate on any string, a CBL is required for that string of casing	9/25/2024
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	9/25/2024