

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: ☐ DRILL ☐ REENTER 1b. Type of Well: ☐ Oil Well ☐ Gas Well ☐ Other 1c. Type of Completion: ☐ Hydraulic Fracturing ☐ Single Zone ☐ Multiple Zone		5. Lease Serial No. 6. If Indian, Allottee or Tribe Name 7. If Unit or CA Agreement, Name and No. 8. Lease Name and Well No.
2. Name of Operator		9. API Well No. 30-015-53942
3a. Address	3b. Phone No. (include area code)	10. Field and Pool, or Exploratory
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface At proposed prod. zone		11. Sec., T. R. M. or Blk. and Survey or Area
14. Distance in miles and direction from nearest town or post office*		12. County or Parish
13. State		
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
24. Attachments		

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

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

25. Signature	Name (Printed/Typed)	Date
Title		
Approved by (Signature)	Name (Printed/Typed)	Date
Title		
Office		

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

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

(Continued on page 2)

*(Instructions on page 2)



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

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

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

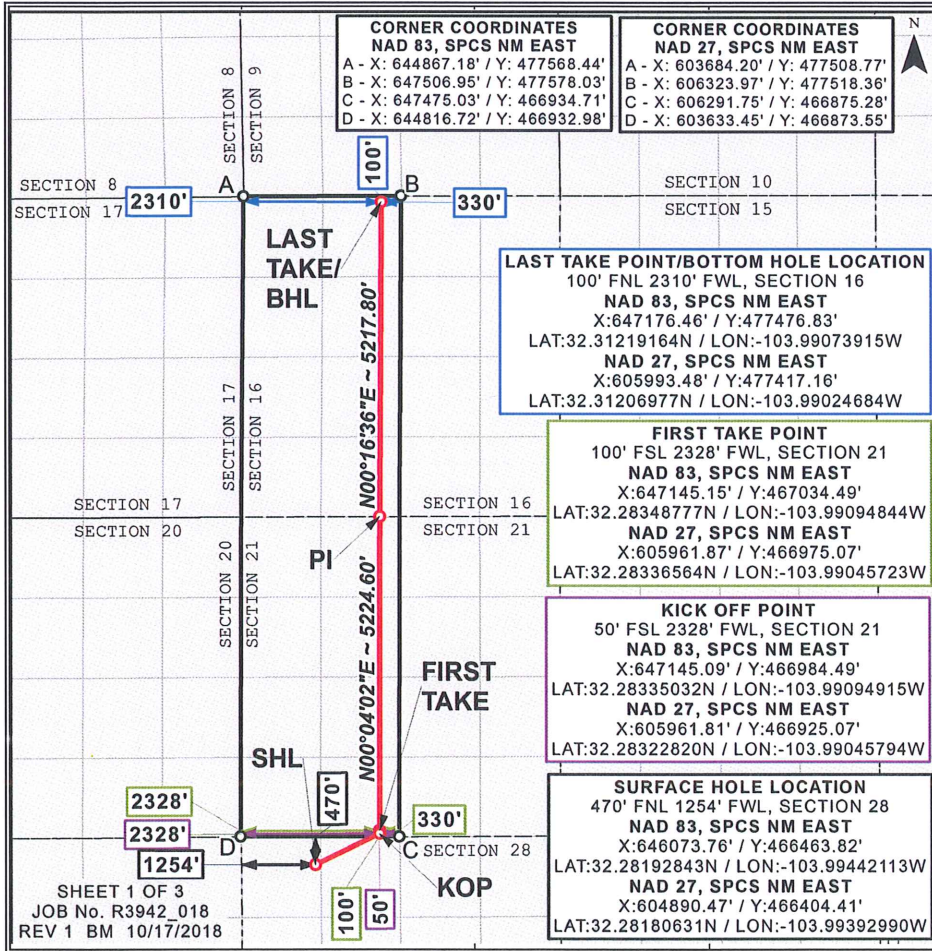
¹ API Number 30-015-53942	² Pool Code 98220	³ Pool Name PURPLE SAGE (WOLFCAMP)
⁴ Property Code 325395	⁵ Property Name BLUE STEEL 21 WD FEE	⁶ Well Number 23H
⁷ OGRID No. 372098	⁸ Operator Name MARATHON OIL PERMIAN LLC	⁹ Elevation 2999'

¹⁰ Surface Location									
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	28	23S	29E		470	NORTH	1254	WEST	EDDY

¹¹ Bottom Hole Location If Different From Surface									
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
C	16	23S	29E		100	NORTH	2310	WEST	EDDY

¹² Dedicated Acres 640.0	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ 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.



17 OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.	
Signature <i>Melissa Szudera</i>	Date 04/29/2020
Printed Name Melissa Szudera	
E-mail Address mszudera@marathonoil.com	
18 SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. OCTOBER 17, 2018	
Date of Survey OCTOBER 17, 2018	
Signature and Seal of Professional Surveyor <i>Lloyd P. Short</i>	
Certificate Number LLOYD P. SHORT 21653	

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:** 372098 **Date:** 06 / 12 / 2023

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

If Other, please describe: _____

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

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Blue Steel 21 WD Fee 10H		D-28-23S-29E	470 FNL 1164 FNL	2700	5200	4900
Blue Steel 21 WD Fee 23H		D-28-23S-29E	470 FNL 1254 FNL	2700	5200	4900

IV. Central Delivery Point Name: Blue Steel WD Fee 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 WD Fee 10H		01/20/2025	02/20/2025	08/20/2025	09/25/2025	09/25/2025
Blue Steel 21 WD Fee 23H		02/20/2025	03/20/2025	09/20/2025	10/25/2025	10/25/2025

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: *Thomas Moore*

Printed Name: Thomas Moore

Title: Regulatory and Land Technician

E-mail Address: tmoore@marathonoil.com

Date: 6/13/2023

Phone:

OIL CONSERVATION DIVISION
(Only applicable when submitted as a standalone form)

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/H₂S 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.



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

Drilling Plan Data Report

05/01/2023

APD ID: 10400063525

Submission Date: 10/16/2020

Highlighted data
reflects the most
recent changes

Operator Name: MARATHON OIL PERMIAN LLC

Well Name: BLUE STEEL 21 WD FEE

Well Number: 23H

Well Type: CONVENTIONAL GAS 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
913498	RUSTLER	2999	0	0	ANHYDRITE	OTHER : BRINE	N
7703563	SALADO	2643	356	356	ANHYDRITE, SALT	OTHER : BRINE	N
7703564	CASTILE	2013	986	986	ANHYDRITE, SALT	OTHER : BRINE	N
913503	LAMAR	33	2966	2966	SANDSTONE, SHALE	NONE	N
913500	BASE OF SALT	33	2966	2966	ANHYDRITE, SALT	OTHER : BRINE	N
913507	BELL CANYON	-19	3018	3018	SANDSTONE, SHALE	OIL	N
913504	CHERRY CANYON	-857	3856	3856	SANDSTONE	OIL	N
913508	BRUSHY CANYON	-2000	4999	4999	SANDSTONE	OIL	N
913509	BONE SPRING LIME	-3646	6645	6645	LIMESTONE	NONE	N
7703671	UPPER AVALON SHALE	-3721	6720	6720	SHALE	OIL	N
7703672	BONE SPRING 1ST	-4683	7682	7682	SANDSTONE	OIL	N
7703673	BONE SPRING 2ND	-5462	8461	8461	SANDSTONE	OIL	N
7703674	BONE SPRING 3RD	-6612	9611	9611	SANDSTONE	OIL	N
913510	WOLFCAMP	-6943	9942	9942	OTHER, SANDSTONE, SHALE : CARBONATES	NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** BLUE STEEL 21 WD FEE**Well Number:** 23H**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", 8 3/4", and 6 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.

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___10_5M_Flex.BOPE.BLM_20201014121732.pdf

DRILL_2_BOP_Well_Control_Plan___Permian_20201015085400.pdf

DRILL_2_BOP3H5H10H23H_WH_TH_4_String_20201015120805.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	5.52	2.5	BUOY	2.5	BUOY	2.5
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	3070	0	3046	2901	-47	3070	J-55	36	LT&C	1.39	1.42	BUOY	1.8	BUOY	1.8
3	INTERMEDIATE	8.75	7.625	NEW	API	N	0	10100	0	9998	3049	-6999	10100	P-110	29.7	OTHER - WEDGE 523	3.12	1.16	BUOY	2.37	BUOY	2.37

Operator Name: MARATHON OIL PERMIAN LLC

Well Name: BLUE STEEL 21 WD FEE

Well Number: 23H

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
4	PRODUCTI ON	6.75	5.5	NEW	API	N	0	21192	0	10845	2999	-7846	21192	P-110	23	OTHER - WEDGE	1.73	1.2	BUOY	2.09	BUOY	2.09

Casing Attachments

Casing ID: 1

String

SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

DRILL_3_3H5H10H23H_Red_Hills_WC_Surface_20201015121131.pdf

Casing ID: 2

String

INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

DRILL_3_3H5H10H23H_Red_Hills_WC_Intermediate_I_20201015121231.pdf

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** BLUE STEEL 21 WD FEE**Well Number:** 23H**Casing Attachments****Casing ID:** 3 **String** INTERMEDIATE**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**

DRILL_3_3H5H10H23H_Red_Hills_WC_Intermediate_II_20201015140609.pdf

Casing ID: 4 **String** PRODUCTION**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**

DRILL_3_3H5H10H23H_Red_Hills_WC_Production_20201015121416.pdf

5.500_20.00_BEN_P110_CY_TLW_SC_5.875_20211019104031.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	220	177	1.73	13.5	306	100	Class C	LCM
SURFACE	Tail		220	420	209	1.33	14.8	278	100	CLASS C	N/A
INTERMEDIATE	Lead		0	2070	513	2.21	12.8	1135	75	CLASS C	EXTENDER, ACCELERATOR.
INTERMEDIATE	Tail		2070	3070	353	1.33	14.8	470	50	CLASS C	RETARDER

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** BLUE STEEL 21 WD FEE**Well Number:** 23H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
INTERMEDIATE	Lead		2770	9100	337	3.21	11	1081	70	Class C	Viscosifier, Retarder.
INTERMEDIATE	Tail		9100	10100	114	1.15	13.8	131	30	CLASS H	Extender, Fluid Loss, Dispersant
PRODUCTION	Lead		8100	10100	68	3.21	11	217	30	CLASS H	EXTENDER, RETARDER, DEFOAMER, VISCOSIFIER, FLUID LOSS
PRODUCTION	Tail		10100	21192	987	1.22	14.5	1204	30	CLASS H	RETARDER, 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
10100	20983	OIL-BASED MUD	13	14							
0	420	WATER-BASED MUD	8.4	8.8							
420	3070	OTHER : Brine	8.8	9.8							

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** BLUE STEEL 21 WD FEE**Well Number:** 23H

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
3070	1010 0	OTHER : BRINE OR OBM	8.8	9.8							

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: 7613

Anticipated Surface Pressure: 5227

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

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** BLUE STEEL 21 WD FEE**Well Number:** 23H

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_BlueSteel21WD23H_PrelimA_ACReport_20201015141820.pdf
DRILL_8_PD__Marathon_BlueSteel21WD23H_PrelimA_WPReport_20201015141820.pdf
DRILL_8_PD__Marathon_BlueSteel21WD23H_PrelimA_36x48WM_20201015141820.PDF
DRILL_PLAN_Blue_Steel_21_WD_Fee_23H_rev_10.19.21_20211019104153.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 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:

MARATHON OIL PERMIAN LLC
DRILLING AND OPERATIONS PLAN

BLUE STEEL 21 WD FEE 23H

SEC. 28, TWP. 23S, RNG. 29E

EDDY COUNTY, NEW MEXICO

1. GEOLOGICAL FORMATIONS

Formation at Surface	Elevation
Permian	2999

Formation	TVD	MD	Elevation	Lithology	Mineral Resources	Producing Formation
Rustler	0	0	2999	Anhydrite	Brine	No
Salado	356	356	2643	Salt/Anhydrite	Brine	No
Castile	986	986	2013	Salt/Anhydrite	Brine	No
Base of Salt (BX)	2966	2966	33	Salt/Anhydrite	Brine	No
Lamar	2966	2966	33	Sandstone/Shale	None	No
Bell Canyon	3018	3018	-19	Sandstone	Oil	No
Cherry Canyon	3856	3856	-857	Sandstone	Oil	No
Brushy Canyon	4999	4999	-2000	Sandstone	Oil	No
Bone Spring Lime	6645	6645	-3646	Limestone	None	No
Upper Avalon Shale	6720	6720	-3721	Shale	Oil	Yes
1st Bone Spring Sand	7682	7682	-4683	Sandstone	Oil	Yes
2nd Bone Spring Carbonate	7963	7963	-4964	Limestone	None	No
2nd Bone Spring Sand	8461	8461	-5462	Sandstone	Oil	Yes
3rd Bone Spring Carbonate	8804	8804	-5805	Limestone	Oil	No
3rd Bone Spring Sand	9611	9611	-6612	Sandstone	Oil	Yes
Wolfcamp	9942	9942	-6943	Sandstone/Shale/Carbonates	Natural Gas/Oil	Yes
Wolfcamp A	10081	10081	-7082	Sandstone/Shale/Carbonates	Natural Gas/Oil	Yes
Wolfcamp B	10321	10321	-7322	Sandstone/Shale/Carbonates	Natural Gas/Oil	No
Wolfcamp C	10670	10670	-7671	Sandstone/Shale/Carbonates	Natural Gas/Oil	No
Wolfcamp D	11040	11040	-8041	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		5000
			Pipe Ram		
			Double Ram		
			Other* BOP Stack	x	
8 3/4	13 5/8	5000	Annular	x	50% of working pressure
			Blind Ram		5000
			Pipe Ram		
			Double Ram		
			Other* BOP Stack	x	
6 3/4	13 5/8	5000	Annular	x	50% of working pressure
			Blind Ram		5000
			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	5.52	2.5	2.5
Intermediate I	12 1/4	9 5/8	0	3070	0	3047	36	J55	LTC	1.39	1.42	1.8
Intermediate II	8 3/4	7 5/8	0	10100	0	9998	29.7	P110	Wedge 523	3.12	1.16	2.37
Production	6 3/4	5 1/2	0	21192	0	10842	23	P110	Wedge	1.73	1.2	2.09

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
	Y or N
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.	
	Y or N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	

	Y or N
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 nd 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?	
	Y or N
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	220	177	1.73	13.5	306	100	Class C	LCM
Surface	Tail	--	220	420	209	1.33	14.8	278	100	Class C	N/A
Intermediate I	Lead	--	0	2070	513	2.21	12.8	1135	75	Class C	Extender, Accelerator
Intermediate I	Tail	--	2070	3070	353	1.33	14.8	470	50	Class C	Retarder
Intermediate II	Lead	--	2770	9100	337	3.21	11	1081	70	Class C	Viscosifier, Retarder
Intermediate II	Tail	--	9100	10100	114	1.15	13.8	131	30	Class H	Extender, Fluid Loss, Dispersant
Production	Lead	--	8100	10100	68	3.21	11	217	30	Class H	Extender, Retarder, Defoamer, Viscosifier, Fluid Loss
Production	Tail	--	10100	21192	987	1.22	14.5	1204	30	Class H	Retarder, 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	3070	Brine	8.8	9.8
3070	10100	Brine or Oil Based Mud	8.8	9.8
10100	20983	Oil Based Mud	13.0	14.0

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: 7613 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

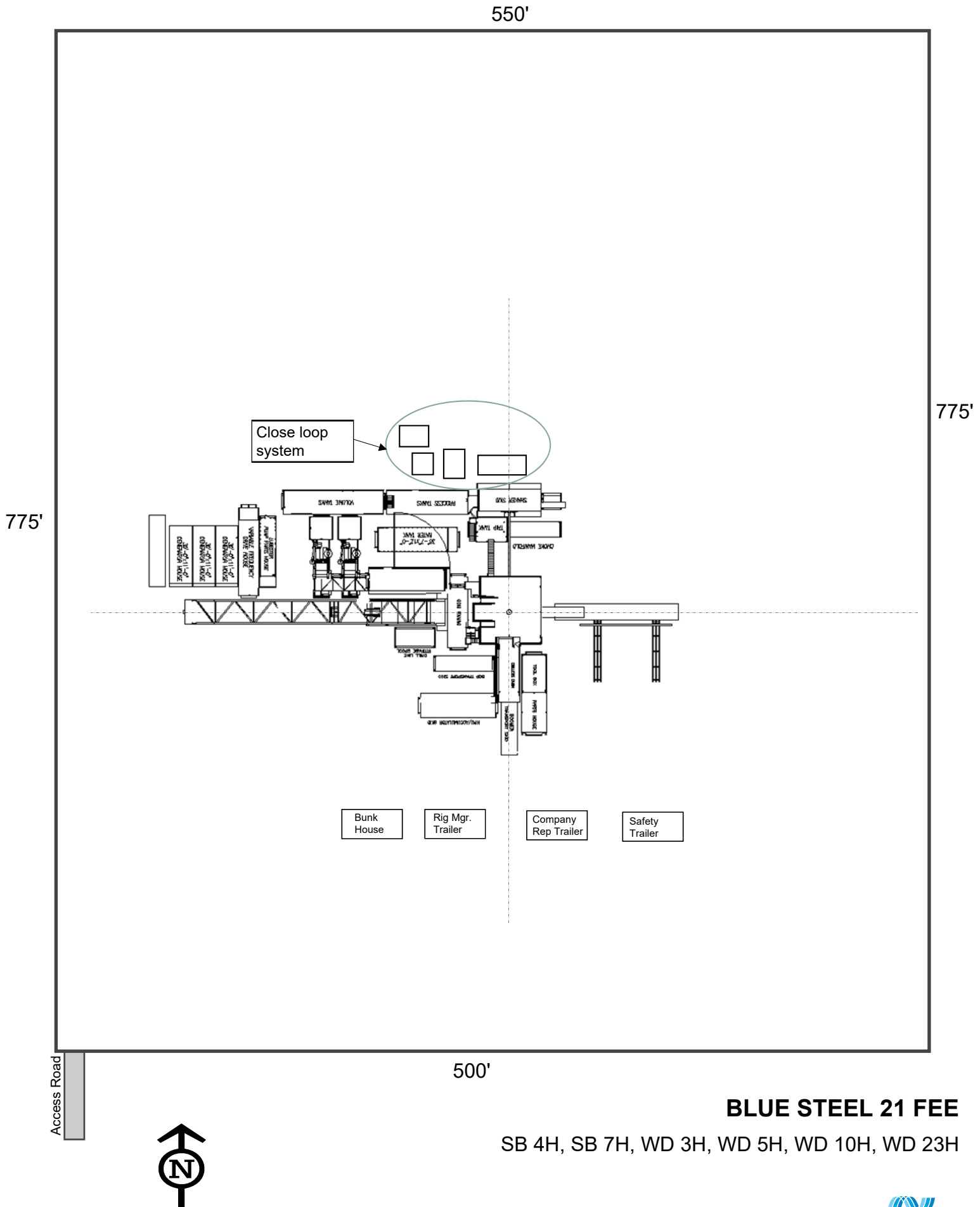
- B.** Anticipated Starting Date and Duration of Operations
 - i.* Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to 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.





Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

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

Survey Tool Program	Date 4/6/2020	
From (usft)	To (usft)	Survey (Wellbore)
0.00	21,192.85	Prelim Plan A (OH)
		Tool Name
		MWD+IFR1
		Description
		OWSG MWD + IFR1

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Blue Steel 21 Fee						
SB #4H - OH - Prelim Plan A	600.00	601.00	149.86	146.01	38.925	CC
SB #4H - OH - Prelim Plan A	700.00	699.15	150.48	145.93	33.104	ES
SB #4H - OH - Prelim Plan A	21,192.85	19,035.79	2,678.59	2,490.76	14.261	SF
SB #7H - OH - Prelim Plan A	1,200.00	1,200.00	29.84	21.69	3.662	CC, ES
SB #7H - OH - Prelim Plan A	6,800.00	6,807.18	164.40	114.42	3.289	SF
WD #10H - OH - Prelim Plan A	607.28	607.28	89.91	86.01	23.062	CC
WD #10H - OH - Prelim Plan A	1,200.00	1,200.33	91.63	83.58	11.390	ES
WD #10H - OH - Prelim Plan A	21,192.85	21,278.20	670.84	447.91	3.009	SF
WD #3H - OH - Prelim Plan A	638.60	638.60	59.96	55.84	14.543	CC
WD #3H - OH - Prelim Plan A	1,100.00	1,100.26	61.53	54.11	8.283	ES
WD #3H - OH - Prelim Plan A	1,300.00	1,299.63	64.71	55.86	7.308	SF
WD #5H - OH - Prelim Plan A	600.00	601.00	119.97	116.12	31.161	CC
WD #5H - OH - Prelim Plan A	800.00	800.15	120.91	115.63	22.904	ES
WD #5H - OH - Prelim Plan A	21,192.85	21,110.61	1,320.40	1,098.35	5.947	SF

Offset Design Blue Steel 21 Fee - SB #4H - OH - Prelim Plan A												
Survey Program: 0-MWD+IFR1												
Reference	Offset	Semi Major Axis			Distance							
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	1.00	0.00	0.00	0.00	-90.03	-0.09	-149.86	149.86			
100.00	100.00	101.00	100.00	0.13	0.13	-90.03	-0.09	-149.86	149.86	149.59	0.27	564.935
200.00	200.00	201.00	200.00	0.49	0.49	-90.03	-0.09	-149.86	149.86	148.88	0.98	152.574
300.00	300.00	301.00	300.00	0.85	0.85	-90.03	-0.09	-149.86	149.86	148.16	1.70	88.197
400.00	400.00	401.00	400.00	1.21	1.21	-90.03	-0.09	-149.86	149.86	147.44	2.42	62.026
500.00	500.00	501.00	500.00	1.56	1.57	-90.03	-0.09	-149.86	149.86	146.73	3.13	47.832
600.00	600.00	601.00	600.00	1.92	1.93	-90.03	-0.09	-149.86	149.86	146.01	3.85	38.925 CC
700.00	700.00	699.15	698.15	2.28	2.26	-90.27	-0.70	-150.47	150.48	145.93	4.55	33.104 ES
800.00	800.00	802.78	796.18	2.64	2.61	-90.94	-2.49	-152.26	152.33	147.08	5.25	29.010
900.00	900.00	902.84	896.06	3.00	2.95	-91.83	-4.96	-154.73	154.86	148.91	5.95	26.026
1,000.00	1,000.00	1,002.90	995.94	3.36	3.30	-92.70	-7.42	-157.19	157.42	150.77	6.65	23.660
1,100.00	1,100.00	1,102.97	1,095.81	3.72	3.65	-93.54	-9.89	-159.66	160.02	152.66	7.36	21.742
1,200.00	1,200.00	1,203.03	1,195.69	4.07	4.00	-94.36	-12.35	-162.12	162.65	154.58	8.07	20.159
1,300.00	1,299.98	1,303.16	1,295.49	4.43	4.35	-159.41	-14.82	-164.59	166.95	158.17	8.77	19.027

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

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
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	1,399.84	1,403.54	1,395.06	4.78	4.71	-160.69	-17.28	-167.05	174.58	165.10	9.48	18.417		
1,500.00	1,499.45	1,504.27	1,494.26	5.13	5.06	-162.18	-19.73	-169.50	185.60	175.41	10.19	18.219		
1,600.00	1,598.70	1,605.49	1,592.99	5.49	5.42	-163.76	-22.16	-171.93	200.06	189.17	10.90	18.358		
1,700.00	1,697.47	1,707.30	1,691.12	5.85	5.78	-165.34	-24.59	-174.36	218.00	206.39	11.61	18.774		
1,800.00	1,795.95	1,790.55	1,788.91	6.21	6.08	-166.86	-27.00	-176.77	237.77	225.51	12.26	19.395		
1,900.00	1,894.43	1,888.40	1,886.69	6.57	6.43	-168.15	-29.42	-179.19	257.67	244.71	12.96	19.885		
2,000.00	1,992.91	1,986.25	1,984.48	6.94	6.78	-169.25	-31.83	-181.60	277.67	264.01	13.66	20.328		
2,100.00	2,091.39	2,082.76	2,080.94	7.31	7.12	-169.96	-33.15	-184.48	297.95	283.59	14.36	20.755		
2,200.00	2,189.87	2,178.95	2,177.02	7.68	7.47	-170.00	-31.57	-188.71	318.76	303.71	15.05	21.183		
2,300.00	2,288.35	2,274.83	2,272.63	8.05	7.80	-169.49	-27.09	-194.28	340.10	324.36	15.74	21.611		
2,400.00	2,386.83	2,370.19	2,367.45	8.42	8.14	-168.53	-19.76	-201.17	362.04	345.62	16.42	22.046		
2,500.00	2,485.31	2,464.83	2,461.19	8.80	8.47	-167.22	-9.65	-209.31	384.71	367.61	17.10	22.497		
2,600.00	2,583.79	2,559.62	2,554.65	9.18	8.80	-165.63	3.10	-218.69	408.25	390.47	17.78	22.960		
2,700.00	2,682.27	2,656.08	2,649.65	9.55	9.13	-164.11	16.67	-228.51	432.23	413.76	18.47	23.396		
2,800.00	2,780.75	2,752.55	2,744.65	9.93	9.47	-162.74	30.24	-238.33	456.48	437.31	19.17	23.810		
2,900.00	2,879.23	2,849.01	2,839.64	10.31	9.81	-161.51	43.81	-248.15	480.95	461.08	19.87	24.203		
3,000.00	2,977.72	2,945.47	2,934.64	10.69	10.16	-160.40	57.38	-257.96	505.61	485.03	20.57	24.576		
3,100.00	3,076.20	3,041.93	3,029.64	11.07	10.50	-159.39	70.95	-267.78	530.43	509.15	21.28	24.929		
3,200.00	3,174.68	3,138.40	3,124.64	11.45	10.85	-158.47	84.52	-277.60	555.39	533.41	21.98	25.264		
3,300.00	3,273.16	3,234.86	3,219.64	11.83	11.20	-157.63	98.09	-287.42	580.48	557.79	22.69	25.581		
3,400.00	3,371.64	3,331.32	3,314.63	12.21	11.55	-156.86	111.66	-297.24	605.68	582.27	23.40	25.881		
3,500.00	3,470.12	3,427.79	3,409.63	12.59	11.91	-156.15	125.22	-307.05	630.97	606.85	24.11	26.166		
3,600.00	3,568.60	3,524.25	3,504.63	12.97	12.26	-155.49	138.79	-316.87	656.34	631.52	24.83	26.437		
3,700.00	3,667.08	3,620.71	3,599.63	13.36	12.62	-154.88	152.36	-326.69	681.79	656.25	25.54	26.694		
3,800.00	3,765.56	3,717.18	3,694.62	13.74	12.97	-154.32	165.93	-336.51	707.31	681.05	26.26	26.938		
3,900.00	3,864.04	3,813.64	3,789.62	14.12	13.33	-153.80	179.50	-346.33	732.89	705.91	26.97	27.170		
4,000.00	3,962.52	3,910.10	3,884.62	14.51	13.69	-153.31	193.07	-356.14	758.52	730.83	27.69	27.392		
4,100.00	4,061.00	4,006.57	3,979.62	14.89	14.05	-152.85	206.64	-365.96	784.20	755.79	28.41	27.603		
4,200.00	4,159.48	4,103.03	4,074.62	15.27	14.41	-152.42	220.21	-375.78	809.92	780.79	29.13	27.804		
4,300.00	4,257.97	4,200.51	4,169.61	15.66	14.77	-152.02	233.78	-385.60	835.68	805.83	29.85	27.992		
4,400.00	4,356.45	4,304.05	4,264.61	16.04	15.16	-151.64	247.35	-395.42	861.48	830.88	30.60	28.151		
4,500.00	4,454.93	4,407.58	4,359.61	16.43	15.54	-151.29	260.92	-405.24	887.31	855.96	31.35	28.303		
4,600.00	4,553.41	4,488.88	4,454.61	16.81	15.85	-150.95	274.49	-415.05	913.17	881.16	32.02	28.522		
4,700.00	4,651.89	4,585.34	4,549.61	17.19	16.21	-150.63	288.06	-424.87	939.06	906.32	32.74	28.683		
4,800.00	4,750.37	4,681.81	4,644.60	17.58	16.57	-150.33	301.63	-434.69	964.98	931.51	33.46	28.837		
4,900.00	4,848.85	4,778.27	4,739.60	17.96	16.93	-150.05	315.20	-444.51	990.91	956.73	34.19	28.984		
5,000.00	4,947.33	4,874.73	4,834.60	18.35	17.30	-149.78	328.77	-454.33	1,016.87	981.96	34.91	29.126		
5,100.00	5,045.81	4,971.20	4,929.60	18.73	17.66	-149.52	342.34	-464.14	1,042.86	1,007.22	35.64	29.262		
5,200.00	5,144.29	5,067.66	5,024.59	19.12	18.03	-149.28	355.91	-473.96	1,068.85	1,032.49	36.36	29.393		
5,300.00	5,242.77	5,164.12	5,119.59	19.50	18.39	-149.04	369.47	-483.78	1,094.87	1,057.78	37.09	29.518		
5,400.00	5,341.25	5,260.59	5,214.59	19.89	18.75	-148.82	383.04	-493.60	1,120.90	1,083.08	37.82	29.639		
5,500.00	5,439.73	5,357.05	5,309.59	20.27	19.12	-148.61	396.61	-503.42	1,146.95	1,108.40	38.55	29.756		
5,600.00	5,538.22	5,453.51	5,404.59	20.66	19.48	-148.41	410.18	-513.23	1,173.01	1,133.74	39.27	29.868		
5,700.00	5,636.70	5,549.97	5,499.58	21.05	19.85	-148.21	423.75	-523.05	1,199.09	1,159.08	40.00	29.976		
5,800.00	5,735.18	5,646.44	5,594.58	21.43	20.21	-148.03	437.32	-532.87	1,225.17	1,184.44	40.73	30.080		
5,900.00	5,833.66	5,742.90	5,689.58	21.82	20.58	-147.85	450.89	-542.69	1,251.27	1,209.81	41.46	30.181		
6,000.00	5,932.14	5,839.36	5,784.58	22.20	20.95	-147.68	464.46	-552.51	1,277.38	1,235.19	42.19	30.278		
6,100.00	6,030.62	5,935.83	5,879.58	22.59	21.31	-147.52	478.03	-562.32	1,303.50	1,260.58	42.92	30.372		
6,200.00	6,129.10	6,055.60	5,997.70	22.97	21.76	-147.35	494.09	-573.95	1,329.17	1,285.36	43.81	30.337		
6,300.00	6,227.58	6,197.35	6,138.35	23.36	22.29	-147.37	508.25	-584.19	1,352.00	1,307.18	44.83	30.160		
6,400.00	6,326.06	6,340.94	6,281.53	23.75	22.80	-147.61	516.82	-590.39	1,371.58	1,325.79	45.80	29.949		
6,500.00	6,424.54	6,485.68	6,426.22	24.13	23.31	-148.06	519.57	-592.38	1,387.89	1,341.17	46.72	29.707		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

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
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	6,523.02	6,582.49	6,523.02	24.52	23.64	-148.43	519.57	-592.38	1,402.72	1,355.30	47.42	29.580		
6,700.00	6,621.50	6,680.97	6,621.50	24.91	23.97	-148.80	519.57	-592.38	1,417.61	1,369.48	48.13	29.453		
6,800.00	6,719.99	6,779.45	6,719.99	25.29	24.31	-149.15	519.57	-592.38	1,432.55	1,383.71	48.84	29.331		
6,900.00	6,818.47	6,877.93	6,818.47	25.68	24.65	-149.51	519.57	-592.38	1,447.54	1,397.99	49.55	29.212		
7,000.00	6,916.95	6,976.41	6,916.95	26.06	24.99	-149.85	519.57	-592.38	1,462.59	1,412.33	50.26	29.099		
7,100.00	7,015.43	7,074.89	7,015.43	26.45	25.32	-150.19	519.57	-592.38	1,477.69	1,426.71	50.97	28.989		
7,200.00	7,113.91	7,173.37	7,113.91	26.84	25.66	-150.52	519.57	-592.38	1,492.83	1,441.15	51.69	28.882		
7,300.00	7,212.39	7,271.85	7,212.39	27.22	26.00	-150.84	519.57	-592.38	1,508.03	1,455.63	52.40	28.780		
7,400.00	7,310.87	7,370.33	7,310.87	27.61	26.34	-151.16	519.57	-592.38	1,523.27	1,470.16	53.11	28.680		
7,500.00	7,409.35	7,468.81	7,409.35	28.00	26.68	-151.47	519.57	-592.38	1,538.56	1,484.73	53.83	28.584		
7,600.00	7,507.83	7,567.29	7,507.83	28.38	27.02	-151.77	519.57	-592.38	1,553.89	1,499.35	54.54	28.491		
7,700.00	7,606.31	7,665.78	7,606.31	28.77	27.36	-152.07	519.57	-592.38	1,569.26	1,514.01	55.25	28.401		
7,800.00	7,704.79	7,764.26	7,704.79	29.16	27.70	-152.36	519.57	-592.38	1,584.67	1,528.71	55.97	28.314		
7,900.00	7,803.27	7,862.74	7,803.27	29.54	28.04	-152.65	519.57	-592.38	1,600.13	1,543.45	56.68	28.230		
8,000.00	7,901.75	7,961.22	7,901.75	29.93	28.39	-152.93	519.57	-592.38	1,615.62	1,558.22	57.40	28.148		
8,100.00	8,000.29	8,059.75	8,000.29	30.32	28.73	-153.26	519.57	-592.38	1,630.88	1,572.77	58.11	28.064		
8,200.00	8,099.27	8,158.73	8,099.27	30.69	29.07	-153.60	519.57	-592.38	1,643.61	1,584.79	58.82	27.941		
8,300.00	8,198.68	8,258.30	8,198.68	31.06	29.42	-153.81	520.75	-592.37	1,653.25	1,593.72	59.53	27.770		
8,400.00	8,298.41	8,356.83	8,298.41	31.41	29.77	-153.47	535.49	-592.31	1,659.80	1,599.56	60.24	27.552		
8,500.00	8,398.34	8,448.48	8,398.34	31.76	30.11	-152.57	563.96	-592.19	1,663.63	1,602.72	60.92	27.310		
8,600.00	8,498.33	8,529.25	8,498.33	32.09	30.40	-87.26	600.27	-592.03	1,665.83	1,604.32	61.51	27.080		
8,700.00	8,598.33	8,598.40	8,512.33	32.43	30.64	-85.93	639.15	-591.86	1,669.64	1,607.61	62.02	26.919		
8,800.00	8,698.33	8,656.72	8,556.58	32.76	30.83	-84.63	677.09	-591.70	1,676.38	1,613.96	62.43	26.854		
8,900.00	8,798.33	8,705.61	8,590.55	33.09	31.00	-83.43	712.23	-591.55	1,686.73	1,624.03	62.71	26.899		
9,000.00	8,898.33	8,750.00	8,618.70	33.43	31.14	-82.26	746.54	-591.40	1,701.15	1,638.28	62.88	27.056		
9,100.00	8,998.33	8,781.20	8,636.86	33.76	31.25	-81.41	771.91	-591.29	1,719.92	1,657.06	62.86	27.360		
9,200.00	9,098.33	8,810.53	8,652.64	34.10	31.34	-80.58	796.63	-591.18	1,743.21	1,680.47	62.74	27.783		
9,300.00	9,198.33	8,835.61	8,665.12	34.43	31.42	-79.85	818.39	-591.09	1,771.05	1,708.55	62.50	28.335		
9,400.00	9,298.33	8,850.00	8,671.84	34.77	31.47	-79.42	831.10	-591.03	1,803.43	1,741.34	62.09	29.044		
9,500.00	9,398.33	8,875.98	8,683.17	35.10	31.55	-78.64	854.49	-590.93	1,840.12	1,778.41	61.72	29.816		
9,600.00	9,498.33	8,900.00	8,692.69	35.44	31.63	-77.92	876.53	-590.84	1,881.10	1,819.83	61.27	30.702		
9,700.00	9,598.33	8,900.00	8,692.69	35.78	31.63	-77.92	876.53	-590.84	1,926.05	1,865.49	60.57	31.801		
9,800.00	9,698.33	8,919.66	8,699.78	36.11	31.69	-77.31	894.86	-590.76	1,974.77	1,914.75	60.02	32.904		
9,900.00	9,798.33	8,931.07	8,703.62	36.45	31.73	-76.96	905.62	-590.71	2,027.07	1,967.69	59.38	34.138		
10,000.00	9,898.33	8,950.00	8,709.49	36.79	31.79	-76.37	923.61	-590.63	2,082.75	2,023.95	58.81	35.415		
10,100.00	9,998.33	8,950.00	8,709.49	37.13	31.79	-76.37	923.61	-590.63	2,141.41	2,083.34	58.07	36.874		
10,200.00	10,098.33	8,950.00	8,709.49	37.47	31.79	-76.37	923.61	-590.63	2,203.04	2,145.69	57.36	38.411		
10,300.00	10,198.33	8,950.00	8,709.49	37.81	31.79	-76.37	923.61	-590.63	2,267.42	2,210.75	56.66	40.016		
10,400.00	10,298.32	8,973.56	8,715.97	38.15	31.86	-73.51	946.25	-590.54	2,333.73	2,277.51	56.22	41.513		
10,500.00	10,397.31	9,000.00	8,722.13	38.49	31.94	-64.64	971.97	-590.42	2,399.83	2,344.05	55.78	43.019		
10,600.00	10,492.49	9,000.00	8,722.13	38.83	31.94	-57.67	971.97	-590.42	2,462.09	2,406.98	55.11	44.673		
10,700.00	10,580.97	9,000.00	8,722.13	39.15	31.94	-51.94	971.97	-590.42	2,519.50	2,465.04	54.46	46.266		
10,800.00	10,660.07	9,027.53	8,727.28	39.43	32.02	-47.09	999.01	-590.31	2,570.05	2,516.00	54.05	47.550		
10,900.00	10,727.37	9,050.00	8,730.51	39.67	32.09	-43.52	1,021.24	-590.21	2,612.72	2,559.08	53.64	48.712		
11,000.00	10,780.83	9,050.00	8,730.51	39.86	32.09	-41.10	1,021.24	-590.21	2,646.54	2,593.41	53.13	49.812		
11,100.00	10,818.84	9,100.00	8,734.56	40.01	32.23	-39.30	1,071.06	-590.00	2,670.27	2,617.24	53.03	50.354		
11,200.00	10,840.23	9,100.00	8,734.56	40.16	32.23	-38.45	1,071.06	-590.00	2,683.56	2,630.82	52.74	50.886		
11,300.00	10,844.96	9,156.09	8,734.96	40.31	32.39	-38.24	1,127.14	-589.75	2,686.52	2,633.67	52.85	50.829		
11,400.00	10,844.96	9,256.09	8,734.96	40.50	32.69	-38.24	1,227.14	-589.32	2,686.44	2,633.19	53.25	50.448		
11,500.00	10,844.96	9,356.09	8,734.96	40.72	33.01	-38.24	1,327.14	-588.89	2,686.36	2,632.66	53.70	50.027		
11,600.00	10,844.96	9,456.09	8,734.96	40.96	33.36	-38.24	1,427.14	-588.46	2,686.28	2,632.08	54.20	49.566		
11,700.00	10,844.96	9,556.08	8,734.96	41.23	33.73	-38.23	1,527.14	-588.03	2,686.20	2,631.46	54.74	49.070		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

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
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	10,844.96	9,656.08	8,734.96	41.52	34.12	-38.23	1,627.14	-587.59	2,686.12	2,630.78	55.33	48.543		
11,900.00	10,844.96	9,756.08	8,734.96	41.83	34.54	-38.23	1,727.14	-587.16	2,686.04	2,630.06	55.97	47.988		
12,000.00	10,844.96	9,856.08	8,734.96	42.16	34.98	-38.23	1,827.14	-586.73	2,685.96	2,629.30	56.66	47.408		
12,100.00	10,844.96	9,956.08	8,734.96	42.52	35.44	-38.22	1,927.14	-586.30	2,685.88	2,628.50	57.38	46.808		
12,200.00	10,844.96	10,056.08	8,734.96	42.89	35.91	-38.22	2,027.13	-585.87	2,685.80	2,627.65	58.15	46.189		
12,300.00	10,844.96	10,156.08	8,734.96	43.28	36.41	-38.22	2,127.13	-585.43	2,685.72	2,626.76	58.95	45.557		
12,400.00	10,844.96	10,256.08	8,734.96	43.68	36.93	-38.22	2,227.13	-585.00	2,685.63	2,625.84	59.80	44.913		
12,500.00	10,844.96	10,356.08	8,734.96	44.11	37.46	-38.22	2,327.13	-584.57	2,685.55	2,624.88	60.68	44.261		
12,600.00	10,844.96	10,456.08	8,734.96	44.55	38.02	-38.21	2,427.13	-584.14	2,685.47	2,623.88	61.59	43.602		
12,700.00	10,844.96	10,556.08	8,734.96	45.01	38.58	-38.21	2,527.13	-583.70	2,685.39	2,622.86	62.54	42.940		
12,800.00	10,844.96	10,656.08	8,734.96	45.48	39.17	-38.21	2,627.13	-583.27	2,685.31	2,621.80	63.52	42.277		
12,900.00	10,844.96	10,756.08	8,734.96	45.97	39.77	-38.21	2,727.13	-582.84	2,685.23	2,620.71	64.53	41.614		
13,000.00	10,844.97	10,856.08	8,734.97	46.48	40.38	-38.20	2,827.13	-582.41	2,685.15	2,619.59	65.57	40.954		
13,100.00	10,844.97	10,956.08	8,734.97	47.00	41.00	-38.20	2,927.13	-581.98	2,685.07	2,618.44	66.63	40.297		
13,200.00	10,844.97	11,056.08	8,734.97	47.53	41.64	-38.20	3,027.12	-581.54	2,684.99	2,617.27	67.72	39.646		
13,300.00	10,844.97	11,156.08	8,734.97	48.08	42.30	-38.20	3,127.12	-581.11	2,684.91	2,616.07	68.84	39.001		
13,400.00	10,844.97	11,256.08	8,734.97	48.64	42.96	-38.20	3,227.12	-580.68	2,684.83	2,614.84	69.98	38.363		
13,500.00	10,844.97	11,356.08	8,734.97	49.21	43.63	-38.19	3,327.12	-580.25	2,684.75	2,613.60	71.15	37.734		
13,600.00	10,844.97	11,456.08	8,734.97	49.80	44.32	-38.19	3,427.12	-579.82	2,684.67	2,612.33	72.34	37.114		
13,700.00	10,844.97	11,556.08	8,734.97	50.39	45.02	-38.19	3,527.12	-579.38	2,684.59	2,611.04	73.54	36.503		
13,800.00	10,844.97	11,656.08	8,734.97	51.00	45.72	-38.19	3,627.12	-578.95	2,684.51	2,609.74	74.77	35.903		
13,900.00	10,844.97	11,756.08	8,734.97	51.62	46.44	-38.19	3,727.12	-578.52	2,684.43	2,608.41	76.02	35.314		
14,000.00	10,844.97	11,856.08	8,734.97	52.25	47.16	-38.18	3,827.12	-578.09	2,684.35	2,607.07	77.28	34.735		
14,100.00	10,844.97	11,956.08	8,734.97	52.89	47.89	-38.18	3,927.12	-577.65	2,684.27	2,605.70	78.56	34.168		
14,200.00	10,844.97	12,056.08	8,734.97	53.54	48.63	-38.18	4,027.11	-577.22	2,684.18	2,604.33	79.86	33.612		
14,300.00	10,844.97	12,156.08	8,734.97	54.20	49.38	-38.18	4,127.11	-576.79	2,684.10	2,602.93	81.17	33.067		
14,400.00	10,844.97	12,256.08	8,734.97	54.86	50.14	-38.17	4,227.11	-576.36	2,684.02	2,601.53	82.50	32.534		
14,500.00	10,844.97	12,356.08	8,734.97	55.54	50.90	-38.17	4,327.11	-575.93	2,683.94	2,600.10	83.84	32.013		
14,600.00	10,844.97	12,456.08	8,734.97	56.23	51.67	-38.17	4,427.11	-575.49	2,683.86	2,598.67	85.19	31.503		
14,700.00	10,844.97	12,556.08	8,734.97	56.92	52.45	-38.17	4,527.11	-575.06	2,683.78	2,597.22	86.56	31.004		
14,800.00	10,844.97	12,656.08	8,734.97	57.62	53.23	-38.17	4,627.11	-574.63	2,683.70	2,595.76	87.94	30.517		
14,900.00	10,844.97	12,756.08	8,734.97	58.33	54.02	-38.16	4,727.11	-574.20	2,683.62	2,594.29	89.33	30.041		
15,000.00	10,844.97	12,856.08	8,734.97	59.04	54.82	-38.16	4,827.11	-573.77	2,683.54	2,592.80	90.74	29.575		
15,100.00	10,844.97	12,956.08	8,734.97	59.77	55.62	-38.16	4,927.11	-573.33	2,683.46	2,591.31	92.15	29.121		
15,200.00	10,844.97	13,056.08	8,734.97	60.50	56.42	-38.16	5,027.10	-572.90	2,683.38	2,589.81	93.57	28.677		
15,300.00	10,844.98	13,156.08	8,734.98	61.23	57.23	-38.15	5,127.10	-572.47	2,683.30	2,588.29	95.00	28.244		
15,400.00	10,844.98	13,256.08	8,734.98	61.98	58.05	-38.15	5,227.10	-572.04	2,683.22	2,586.77	96.45	27.821		
15,500.00	10,844.98	13,356.08	8,734.98	62.73	58.87	-38.15	5,327.10	-571.60	2,683.14	2,585.24	97.90	27.408		
15,600.00	10,844.98	13,456.08	8,734.98	63.48	59.69	-38.15	5,427.10	-571.17	2,683.06	2,583.70	99.36	27.004		
15,700.00	10,844.98	13,556.08	8,734.98	64.24	60.52	-38.15	5,527.10	-570.74	2,682.98	2,582.15	100.82	26.611		
15,800.00	10,844.98	13,656.08	8,734.98	65.01	61.35	-38.14	5,627.10	-570.31	2,682.90	2,580.60	102.30	26.226		
15,900.00	10,844.98	13,756.08	8,734.98	65.78	62.19	-38.14	5,727.10	-569.88	2,682.82	2,579.04	103.78	25.851		
16,000.00	10,844.98	13,856.08	8,734.98	66.56	63.03	-38.14	5,827.10	-569.44	2,682.74	2,577.47	105.27	25.484		
16,100.00	10,844.98	13,956.08	8,734.98	67.34	63.87	-38.14	5,927.09	-569.01	2,682.65	2,575.89	106.77	25.126		
16,200.00	10,844.98	14,056.08	8,734.98	68.12	64.72	-38.13	6,027.09	-568.58	2,682.57	2,574.31	108.27	24.777		
16,300.00	10,844.98	14,156.08	8,734.98	68.92	65.57	-38.13	6,127.09	-568.15	2,682.49	2,572.72	109.78	24.436		
16,400.00	10,844.98	14,256.08	8,734.98	69.71	66.42	-38.13	6,227.09	-567.72	2,682.41	2,571.12	111.29	24.102		
16,500.00	10,844.98	14,356.08	8,734.98	70.51	67.28	-38.13	6,327.09	-567.28	2,682.33	2,569.52	112.81	23.777		
16,600.00	10,844.98	14,456.08	8,734.98	71.31	68.14	-38.13	6,427.09	-566.85	2,682.25	2,567.91	114.34	23.459		
16,700.00	10,844.98	14,556.08	8,734.98	72.12	69.00	-38.12	6,527.09	-566.42	2,682.17	2,566.30	115.87	23.148		
16,800.00	10,844.98	14,656.08	8,734.98	72.93	69.87	-38.12	6,627.09	-565.99	2,682.09	2,564.68	117.41	22.844		
16,900.00	10,844.98	14,756.08	8,734.98	73.75	70.74	-38.12	6,727.09	-565.55	2,682.01	2,563.06	118.95	22.547		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

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
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		
17,000.00	10,844.98	14,856.08	8,734.98	74.57	71.61	-38.12	6,827.09	-565.12	2,681.93	2,561.44	120.50	22.257		
17,100.00	10,844.98	14,956.08	8,734.98	75.39	72.48	-38.12	6,927.08	-564.69	2,681.85	2,559.80	122.05	21.974		
17,200.00	10,844.98	15,056.08	8,734.98	76.22	73.35	-38.11	7,027.08	-564.26	2,681.77	2,558.17	123.60	21.697		
17,300.00	10,844.98	15,156.08	8,734.98	77.05	74.23	-38.11	7,127.08	-563.83	2,681.69	2,556.53	125.16	21.426		
17,400.00	10,844.98	15,256.08	8,734.98	77.88	75.11	-38.11	7,227.08	-563.39	2,681.61	2,554.89	126.72	21.161		
17,500.00	10,844.98	15,356.08	8,734.98	78.71	75.99	-38.11	7,327.08	-562.96	2,681.53	2,553.24	128.29	20.902		
17,600.00	10,844.98	15,456.08	8,734.98	79.55	76.88	-38.10	7,427.08	-562.53	2,681.45	2,551.59	129.86	20.648		
17,700.00	10,844.99	15,556.08	8,734.99	80.39	77.76	-38.10	7,527.08	-562.10	2,681.37	2,549.93	131.44	20.401		
17,800.00	10,844.99	15,656.08	8,734.99	81.24	78.65	-38.10	7,627.08	-561.67	2,681.29	2,548.27	133.01	20.158		
17,900.00	10,844.99	15,756.08	8,734.99	82.09	79.54	-38.10	7,727.08	-561.23	2,681.21	2,546.61	134.60	19.920		
18,000.00	10,844.99	15,856.08	8,734.99	82.94	80.43	-38.10	7,827.08	-560.80	2,681.13	2,544.95	136.18	19.688		
18,100.00	10,844.99	15,956.08	8,734.99	83.79	81.32	-38.09	7,927.07	-560.37	2,681.05	2,543.28	137.77	19.461		
18,200.00	10,844.99	16,056.08	8,734.99	84.64	82.22	-38.09	8,027.07	-559.94	2,680.97	2,541.61	139.36	19.238		
18,300.00	10,844.99	16,156.08	8,734.99	85.50	83.12	-38.09	8,127.07	-559.50	2,680.89	2,539.93	140.95	19.020		
18,400.00	10,844.99	16,256.08	8,734.99	86.36	84.01	-38.09	8,227.07	-559.07	2,680.81	2,538.26	142.55	18.806		
18,500.00	10,844.99	16,356.08	8,734.99	87.22	84.91	-38.08	8,327.07	-558.64	2,680.72	2,536.58	144.15	18.597		
18,600.00	10,844.99	16,456.08	8,734.99	88.08	85.81	-38.08	8,427.07	-558.21	2,680.64	2,534.90	145.75	18.392		
18,700.00	10,844.99	16,556.08	8,734.99	88.95	86.72	-38.08	8,527.07	-557.78	2,680.56	2,533.21	147.35	18.191		
18,800.00	10,844.99	16,656.08	8,734.99	89.82	87.62	-38.08	8,627.07	-557.34	2,680.48	2,531.52	148.96	17.995		
18,900.00	10,844.99	16,756.08	8,734.99	90.69	88.53	-38.08	8,727.07	-556.91	2,680.40	2,529.84	150.57	17.802		
19,000.00	10,844.99	16,856.08	8,734.99	91.56	89.43	-38.07	8,827.07	-556.48	2,680.32	2,528.14	152.18	17.613		
19,100.00	10,844.99	16,956.08	8,734.99	92.43	90.34	-38.07	8,927.06	-556.05	2,680.24	2,526.45	153.79	17.428		
19,200.00	10,844.99	17,056.08	8,734.99	93.31	91.25	-38.07	9,027.06	-555.62	2,680.16	2,524.75	155.41	17.246		
19,300.00	10,844.99	17,156.08	8,734.99	94.19	92.16	-38.07	9,127.06	-555.18	2,680.08	2,523.06	157.03	17.068		
19,400.00	10,844.99	17,256.08	8,734.99	95.07	93.07	-38.06	9,227.06	-554.75	2,680.00	2,521.36	158.65	16.893		
19,500.00	10,844.99	17,356.08	8,734.99	95.95	93.98	-38.06	9,327.06	-554.32	2,679.92	2,519.65	160.27	16.721		
19,600.00	10,844.99	17,456.08	8,734.99	96.83	94.90	-38.06	9,427.06	-553.89	2,679.84	2,517.95	161.89	16.553		
19,700.00	10,844.99	17,556.08	8,734.99	97.72	95.81	-38.06	9,527.06	-553.45	2,679.76	2,516.24	163.52	16.388		
19,800.00	10,844.99	17,656.08	8,734.99	98.60	96.73	-38.06	9,627.06	-553.02	2,679.68	2,514.54	165.14	16.226		
19,900.00	10,844.99	17,756.08	8,734.99	99.49	97.64	-38.05	9,727.06	-552.59	2,679.60	2,512.83	166.77	16.067		
20,000.00	10,845.00	17,856.08	8,735.00	100.38	98.56	-38.05	9,827.05	-552.16	2,679.52	2,511.12	168.40	15.911		
20,100.00	10,845.00	17,956.08	8,735.00	101.27	99.48	-38.05	9,927.05	-551.73	2,679.44	2,509.40	170.04	15.758		
20,200.00	10,845.00	18,056.08	8,735.00	102.16	100.40	-38.05	10,027.05	-551.29	2,679.36	2,507.69	171.67	15.608		
20,300.00	10,845.00	18,156.08	8,735.00	103.05	101.32	-38.05	10,127.05	-550.86	2,679.28	2,505.97	173.31	15.460		
20,400.00	10,845.00	18,256.08	8,735.00	103.95	102.24	-38.04	10,227.05	-550.43	2,679.20	2,504.26	174.94	15.315		
20,500.00	10,845.00	18,356.08	8,735.00	104.84	103.16	-38.04	10,327.05	-550.00	2,679.12	2,502.54	176.58	15.172		
20,600.00	10,845.00	18,456.08	8,735.00	105.74	104.08	-38.04	10,427.05	-549.57	2,679.04	2,500.82	178.22	15.032		
20,700.00	10,845.00	18,556.08	8,735.00	106.64	105.01	-38.04	10,527.05	-549.13	2,678.96	2,499.10	179.86	14.894		
20,800.00	10,845.00	18,656.08	8,735.00	107.54	105.93	-38.03	10,627.05	-548.70	2,678.88	2,497.37	181.50	14.759		
20,900.00	10,845.00	18,756.08	8,735.00	108.44	106.86	-38.03	10,727.05	-548.27	2,678.80	2,495.65	183.15	14.626		
21,000.00	10,845.00	18,856.08	8,735.00	109.34	107.78	-38.03	10,827.05	-547.84	2,678.72	2,493.92	184.79	14.496		
21,100.00	10,845.00	18,956.08	8,735.00	110.24	108.71	-38.03	10,927.04	-547.40	2,678.64	2,492.20	186.44	14.367		
21,183.30	10,845.00	19,039.37	8,735.00	111.00	109.48	-38.03	11,010.34	-547.04	2,678.57	2,490.76	187.81	14.262		
21,192.85	10,845.00	19,035.79	8,735.00	111.08	109.45	-38.03	11,006.76	-547.06	2,678.59	2,490.76	187.83	14.261 SF		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - SB #7H - OH - Prelim Plan A													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		
0.00	0.00	0.00	0.00	0.00	0.00	-90.27	-0.14	-29.84	29.84					
100.00	100.00	100.00	100.00	0.13	0.13	-90.27	-0.14	-29.84	29.84	29.58	0.26	114.032		
200.00	200.00	200.00	200.00	0.49	0.49	-90.27	-0.14	-29.84	29.84	28.86	0.98	30.492		
300.00	300.00	300.00	300.00	0.85	0.85	-90.27	-0.14	-29.84	29.84	28.14	1.70	17.599		
400.00	400.00	400.00	400.00	1.21	1.21	-90.27	-0.14	-29.84	29.84	27.43	2.41	12.369		
500.00	500.00	500.00	500.00	1.56	1.56	-90.27	-0.14	-29.84	29.84	26.71	3.13	9.535		
600.00	600.00	600.00	600.00	1.92	1.92	-90.27	-0.14	-29.84	29.84	25.99	3.85	7.758		
700.00	700.00	700.00	700.00	2.28	2.28	-90.27	-0.14	-29.84	29.84	25.28	4.56	6.539		
800.00	800.00	800.00	800.00	2.64	2.64	-90.27	-0.14	-29.84	29.84	24.56	5.28	5.651		
900.00	900.00	900.00	900.00	3.00	3.00	-90.27	-0.14	-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	-90.27	-0.14	-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	-90.27	-0.14	-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	-90.27	-0.14	-29.84	29.84	21.69	8.15	3.662 CC, ES		
1,300.00	1,299.98	1,300.02	1,299.98	4.43	4.43	-155.71	-0.14	-29.84	31.42	22.56	8.86	3.547		
1,400.00	1,399.84	1,400.16	1,399.84	4.78	4.79	-159.08	-0.14	-29.84	36.26	26.69	9.57	3.789		
1,500.00	1,499.45	1,499.45	1,499.45	5.13	5.15	-163.04	-0.14	-29.84	44.51	34.23	10.28	4.331		
1,600.00	1,598.70	1,600.50	1,600.48	5.49	5.51	-165.99	0.85	-28.38	54.67	43.69	10.98	4.978		
1,700.00	1,697.47	1,701.92	1,701.75	5.85	5.86	-167.56	3.86	-23.96	65.04	53.36	11.68	5.570		
1,800.00	1,795.95	1,803.85	1,803.28	6.21	6.22	-168.06	8.90	-16.52	73.82	61.45	12.36	5.970		
1,900.00	1,894.43	1,906.27	1,904.91	6.57	6.59	-167.57	16.02	-6.05	79.26	66.21	13.05	6.075		
2,000.00	1,992.91	2,008.92	2,006.25	6.94	6.96	-166.21	25.19	7.46	81.38	67.65	13.72	5.930		
2,100.00	2,091.39	2,108.65	2,104.47	7.31	7.31	-164.56	34.91	21.77	82.19	67.75	14.44	5.690		
2,200.00	2,189.87	2,208.62	2,202.92	7.68	7.68	-162.93	44.66	36.14	83.06	67.89	15.17	5.476		
2,300.00	2,288.35	2,308.59	2,301.37	8.05	8.04	-161.34	54.41	50.50	84.00	68.10	15.89	5.285		
2,400.00	2,386.83	2,408.56	2,399.82	8.42	8.41	-159.79	64.17	64.86	84.99	68.37	16.62	5.113		
2,500.00	2,485.31	2,508.53	2,498.27	8.80	8.77	-158.27	73.92	79.22	86.05	68.70	17.36	4.958		
2,600.00	2,583.79	2,608.50	2,596.72	9.18	9.14	-156.79	83.67	93.58	87.17	69.08	18.09	4.819		
2,700.00	2,682.27	2,708.47	2,695.17	9.55	9.51	-155.35	93.42	107.94	88.34	69.52	18.83	4.692		
2,800.00	2,780.75	2,808.44	2,793.62	9.93	9.89	-153.95	103.18	122.30	89.57	70.01	19.57	4.578		
2,900.00	2,879.23	2,908.40	2,892.07	10.31	10.26	-152.58	112.93	136.66	90.85	70.55	20.31	4.474		
3,000.00	2,977.72	3,008.37	2,990.52	10.69	10.63	-151.26	122.68	151.02	92.19	71.13	21.05	4.379		
3,100.00	3,076.20	3,108.34	3,088.97	11.07	11.01	-149.97	132.43	165.39	93.56	71.77	21.80	4.292		
3,200.00	3,174.68	3,208.31	3,187.42	11.45	11.38	-148.72	142.19	179.75	94.99	72.44	22.54	4.213		
3,300.00	3,273.16	3,308.28	3,285.87	11.83	11.76	-147.51	151.94	194.11	96.46	73.17	23.29	4.141		
3,400.00	3,371.64	3,408.25	3,384.32	12.21	12.14	-146.33	161.69	208.47	97.97	73.93	24.04	4.075		
3,500.00	3,470.12	3,508.22	3,482.77	12.59	12.51	-145.20	171.44	222.83	99.52	74.73	24.79	4.014		
3,600.00	3,568.60	3,608.19	3,581.22	12.97	12.89	-144.09	181.19	237.19	101.11	75.56	25.55	3.958		
3,700.00	3,667.08	3,708.15	3,679.67	13.36	13.27	-143.02	190.95	251.55	102.73	76.43	26.30	3.906		
3,800.00	3,765.56	3,808.12	3,778.12	13.74	13.65	-141.99	200.70	265.91	104.39	77.34	27.05	3.859		
3,900.00	3,864.04	3,908.09	3,876.57	14.12	14.03	-140.99	210.45	280.27	106.09	78.28	27.81	3.815		
4,000.00	3,962.52	4,008.06	3,975.02	14.51	14.41	-140.01	220.20	294.64	107.81	79.24	28.57	3.774		
4,100.00	4,061.00	4,108.03	4,073.47	14.89	14.79	-139.07	229.96	309.00	109.56	80.24	29.32	3.736		
4,200.00	4,159.48	4,208.00	4,171.92	15.27	15.17	-138.16	239.71	323.36	111.35	81.26	30.08	3.701		
4,300.00	4,257.97	4,307.97	4,270.37	15.66	15.55	-137.28	249.46	337.72	113.16	82.31	30.84	3.669		
4,400.00	4,356.45	4,407.94	4,368.82	16.04	15.93	-136.43	259.21	352.08	114.99	83.39	31.60	3.639		
4,500.00	4,454.93	4,507.90	4,467.27	16.43	16.31	-135.60	268.96	366.44	116.85	84.49	32.36	3.611		
4,600.00	4,553.41	4,607.87	4,565.72	16.81	16.69	-134.80	278.72	380.80	118.74	85.61	33.12	3.585		
4,700.00	4,651.89	4,707.84	4,664.17	17.19	17.08	-134.03	288.47	395.16	120.64	86.76	33.89	3.560		
4,800.00	4,750.37	4,807.81	4,762.62	17.58	17.46	-133.28	298.22	409.52	122.57	87.92	34.65	3.538		
4,900.00	4,848.85	4,907.78	4,861.07	17.96	17.84	-132.55	307.97	423.89	124.52	89.11	35.41	3.516		
5,000.00	4,947.33	5,007.75	4,959.52	18.35	18.22	-131.85	317.73	438.25	126.49	90.31	36.18	3.496		
5,100.00	5,045.81	5,107.72	5,057.97	18.73	18.60	-131.16	327.48	452.61	128.47	91.53	36.94	3.478		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - SB #7H - OH - Prelim Plan A													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		
5,200.00	5,144.29	5,207.68	5,156.42	19.12	18.99	-130.50	337.23	466.97	130.48	92.77	37.70	3.461		
5,300.00	5,242.77	5,307.65	5,254.87	19.50	19.37	-129.86	346.98	481.33	132.50	94.03	38.47	3.444		
5,400.00	5,341.25	5,407.62	5,353.32	19.89	19.75	-129.23	356.74	495.69	134.53	95.30	39.23	3.429		
5,500.00	5,439.73	5,507.59	5,451.77	20.27	20.13	-128.63	366.49	510.05	136.59	96.59	40.00	3.415		
5,600.00	5,538.22	5,607.56	5,550.22	20.66	20.52	-128.04	376.24	524.41	138.65	97.89	40.77	3.401		
5,700.00	5,636.70	5,707.53	5,648.67	21.05	20.90	-127.48	385.99	538.77	140.74	99.20	41.53	3.389		
5,800.00	5,735.18	5,807.50	5,747.12	21.43	21.28	-126.92	395.74	553.14	142.83	100.53	42.30	3.377		
5,900.00	5,833.66	5,907.47	5,845.57	21.82	21.67	-126.39	405.50	567.50	144.94	101.87	43.07	3.365		
6,000.00	5,932.14	6,007.43	5,944.02	22.20	22.05	-125.87	415.25	581.86	147.06	103.22	43.83	3.355		
6,100.00	6,030.62	6,107.40	6,042.47	22.59	22.43	-125.36	425.00	596.22	149.19	104.59	44.60	3.345		
6,200.00	6,129.10	6,207.37	6,140.92	22.97	22.82	-124.87	434.75	610.58	151.33	105.96	45.37	3.336		
6,300.00	6,227.58	6,307.34	6,239.37	23.36	23.20	-124.39	444.51	624.94	153.49	107.35	46.14	3.327		
6,400.00	6,326.06	6,407.31	6,337.82	23.75	23.59	-123.92	454.26	639.30	155.65	108.75	46.90	3.318		
6,500.00	6,424.54	6,507.28	6,436.27	24.13	23.97	-123.47	464.01	653.66	157.82	110.15	47.67	3.311		
6,600.00	6,523.02	6,607.25	6,534.72	24.52	24.35	-123.03	473.76	668.02	160.01	111.57	48.44	3.303		
6,700.00	6,621.50	6,707.22	6,633.17	24.91	24.74	-122.61	483.52	682.38	162.20	112.99	49.21	3.296		
6,800.00	6,719.99	6,807.18	6,731.62	25.29	25.12	-122.19	493.27	696.75	164.40	114.42	49.98	3.289 SF		
6,900.00	6,818.47	6,905.50	6,828.58	25.68	25.50	-122.06	502.38	710.16	166.97	116.23	50.74	3.291		
7,000.00	6,916.95	7,003.02	6,925.24	26.06	25.86	-122.92	509.64	720.86	170.88	119.42	51.46	3.321		
7,100.00	7,015.43	7,100.16	7,021.90	26.45	26.22	-124.71	515.03	728.80	176.33	124.18	52.15	3.381		
7,200.00	7,113.91	7,196.71	7,118.24	26.84	26.56	-127.28	518.56	734.00	183.57	130.78	52.79	3.477		
7,300.00	7,212.39	7,292.46	7,213.93	27.22	26.89	-130.45	520.26	736.50	192.95	139.55	53.40	3.614		
7,400.00	7,310.87	7,389.39	7,310.87	27.61	27.22	-133.99	520.44	736.76	204.53	150.53	53.99	3.788		
7,500.00	7,409.35	7,487.88	7,409.35	28.00	27.55	-137.27	520.44	736.76	217.04	162.41	54.63	3.973		
7,600.00	7,507.83	7,586.36	7,507.83	28.38	27.88	-140.19	520.44	736.76	230.18	174.90	55.28	4.164		
7,700.00	7,606.31	7,684.84	7,606.31	28.77	28.22	-142.79	520.44	736.76	243.85	187.91	55.94	4.359		
7,800.00	7,704.79	7,783.32	7,704.79	29.16	28.55	-145.11	520.44	736.76	257.96	201.36	56.60	4.558		
7,900.00	7,803.27	7,881.80	7,803.27	29.54	28.89	-147.19	520.44	736.76	272.46	215.18	57.27	4.757		
8,000.00	7,901.75	7,980.28	7,901.75	29.93	29.22	-149.06	520.44	736.76	287.27	229.31	57.95	4.957		
8,100.00	8,000.29	8,078.81	8,000.29	30.32	29.56	-150.78	520.44	736.76	302.09	243.45	58.64	5.152		
8,200.00	8,099.27	8,177.79	8,099.27	30.69	29.90	-152.15	520.44	736.76	314.60	255.27	59.32	5.303		
8,300.00	8,198.68	8,277.21	8,198.68	31.06	30.23	-153.13	520.44	736.76	324.15	264.14	60.01	5.401		
8,400.00	8,298.41	8,375.68	8,298.41	31.41	30.58	-152.11	529.88	736.79	330.81	270.11	60.70	5.450		
8,500.00	8,398.34	8,469.05	8,398.34	31.76	30.91	-148.28	554.15	736.88	335.83	274.56	61.27	5.481		
8,600.00	8,498.33	8,552.63	8,498.33	32.09	31.19	-78.61	588.03	736.99	342.89	281.41	61.49	5.577		
8,700.00	8,598.33	8,624.95	8,524.43	32.43	31.43	-72.50	626.03	737.12	358.14	297.08	61.06	5.865		
8,800.00	8,698.33	8,686.32	8,572.50	32.76	31.61	-66.76	664.14	737.26	384.75	324.94	59.81	6.432		
8,900.00	8,798.33	8,737.95	8,609.59	33.09	31.75	-61.76	700.03	737.38	423.47	365.62	57.86	7.319		
9,000.00	8,898.33	8,781.32	8,638.14	33.43	31.87	-57.58	732.66	737.49	473.39	417.87	55.52	8.526		
9,100.00	8,998.33	8,817.87	8,660.24	33.76	31.96	-54.15	761.78	737.59	532.76	479.61	53.15	10.024		
9,200.00	9,098.33	8,850.00	8,678.09	34.10	32.03	-51.25	788.48	737.69	599.72	548.71	51.01	11.757		
9,300.00	9,198.33	8,875.32	8,691.08	34.43	32.09	-49.04	810.21	737.76	672.62	623.60	49.02	13.720		
9,400.00	9,298.33	8,900.00	8,702.82	34.77	32.15	-46.98	831.92	737.84	750.17	702.69	47.48	15.801		
9,500.00	9,398.33	8,917.82	8,710.70	35.10	32.19	-45.54	847.90	737.89	831.33	785.29	46.04	18.057		
9,600.00	9,498.33	8,935.05	8,717.85	35.44	32.23	-44.19	863.58	737.94	915.37	870.44	44.93	20.373		
9,700.00	9,598.33	8,950.00	8,723.66	35.78	32.26	-43.06	877.35	737.99	1,001.70	957.67	44.03	22.752		
9,800.00	9,698.33	8,950.00	8,723.66	36.11	32.26	-43.06	877.35	737.99	1,090.10	1,047.21	42.90	25.412		
9,900.00	9,798.33	8,975.54	8,732.76	36.45	32.32	-41.21	901.21	738.07	1,179.54	1,136.80	42.74	27.599		
10,000.00	9,898.33	9,000.00	8,740.47	36.79	32.38	-39.53	924.42	738.16	1,270.70	1,228.05	42.65	29.793		
10,100.00	9,998.33	9,000.00	8,740.47	37.13	32.38	-39.53	924.42	738.16	1,362.44	1,320.39	42.05	32.402		
10,200.00	10,098.33	9,000.00	8,740.47	37.47	32.38	-39.53	924.42	738.16	1,455.27	1,413.68	41.59	34.990		
10,300.00	10,198.33	9,000.00	8,740.47	37.81	32.38	-39.53	924.42	738.16	1,549.00	1,507.74	41.26	37.547		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - SB #7H - OH - Prelim Plan A													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	10,298.32	9,019.79	8,745.98	38.15	32.42	-34.20	943.42	738.22	1,642.85	1,601.46	41.39	39.695		
10,500.00	10,397.31	9,029.54	8,748.46	38.49	32.44	-23.53	952.86	738.25	1,733.41	1,692.22	41.19	42.088		
10,600.00	10,492.49	9,050.00	8,753.12	38.83	32.49	-17.74	972.78	738.32	1,817.38	1,776.37	41.01	44.311		
10,700.00	10,580.97	9,050.00	8,753.12	39.15	32.49	-14.54	972.78	738.32	1,892.87	1,852.47	40.40	46.857		
10,800.00	10,660.07	9,074.88	8,757.83	39.43	32.55	-12.35	997.20	738.41	1,958.41	1,918.32	40.09	48.851		
10,900.00	10,727.37	9,100.00	8,761.50	39.67	32.61	-10.94	1,022.06	738.49	2,013.00	1,973.27	39.73	50.671		
11,000.00	10,780.83	9,100.00	8,761.50	39.86	32.61	-10.08	1,022.06	738.49	2,055.70	2,016.63	39.07	52.614		
11,100.00	10,818.84	9,150.00	8,765.55	40.01	32.73	-9.47	1,071.87	738.66	2,085.60	2,046.63	38.98	53.505		
11,200.00	10,840.23	9,150.00	8,765.55	40.16	32.73	-9.20	1,071.87	738.66	2,102.05	2,063.58	38.48	54.630		
11,300.00	10,844.96	9,200.76	8,765.96	40.31	32.85	-9.14	1,121.11	738.83	2,105.71	2,067.25	38.46	54.751		
11,400.00	10,844.96	9,300.76	8,765.96	40.50	33.11	-9.13	1,221.11	739.18	2,105.70	2,066.86	38.84	54.215		
11,500.00	10,844.96	9,400.76	8,765.96	40.72	33.40	-9.13	1,321.11	739.53	2,105.69	2,066.41	39.28	53.605		
11,600.00	10,844.96	9,500.76	8,765.96	40.96	33.71	-9.13	1,421.11	739.87	2,105.69	2,065.91	39.78	52.931		
11,700.00	10,844.96	9,600.76	8,765.96	41.23	34.05	-9.13	1,521.11	740.22	2,105.68	2,065.34	40.34	52.201		
11,800.00	10,844.96	9,700.76	8,765.96	41.52	34.41	-9.13	1,621.11	740.56	2,105.67	2,064.73	40.95	51.423		
11,900.00	10,844.96	9,800.76	8,765.96	41.83	34.80	-9.13	1,721.11	740.91	2,105.67	2,064.06	41.61	50.604		
12,000.00	10,844.96	9,900.76	8,765.96	42.16	35.21	-9.13	1,821.11	741.25	2,105.66	2,063.34	42.32	49.754		
12,100.00	10,844.96	10,000.76	8,765.96	42.52	35.64	-9.13	1,921.11	741.60	2,105.65	2,062.58	43.08	48.880		
12,200.00	10,844.96	10,100.76	8,765.96	42.89	36.09	-9.12	2,021.11	741.94	2,105.65	2,061.77	43.88	47.988		
12,300.00	10,844.96	10,200.76	8,765.96	43.28	36.56	-9.12	2,121.11	742.29	2,105.64	2,060.92	44.72	47.084		
12,400.00	10,844.96	10,300.76	8,765.96	43.68	37.05	-9.12	2,221.11	742.63	2,105.63	2,060.03	45.60	46.173		
12,500.00	10,844.96	10,400.76	8,765.96	44.11	37.55	-9.12	2,321.10	742.98	2,105.63	2,059.11	46.52	45.262		
12,600.00	10,844.96	10,500.76	8,765.96	44.55	38.08	-9.12	2,421.10	743.32	2,105.62	2,058.15	47.47	44.354		
12,700.00	10,844.96	10,600.76	8,765.96	45.01	38.62	-9.12	2,521.10	743.67	2,105.61	2,057.15	48.46	43.452		
12,800.00	10,844.96	10,700.76	8,765.96	45.48	39.18	-9.12	2,621.10	744.01	2,105.61	2,056.13	49.47	42.560		
12,900.00	10,844.96	10,800.76	8,765.96	45.97	39.75	-9.12	2,721.10	744.36	2,105.60	2,055.08	50.52	41.680		
13,000.00	10,844.97	10,900.76	8,765.97	46.48	40.34	-9.12	2,821.10	744.71	2,105.59	2,054.00	51.59	40.815		
13,100.00	10,844.97	11,000.76	8,765.97	47.00	40.95	-9.11	2,921.10	745.05	2,105.58	2,052.90	52.69	39.965		
13,200.00	10,844.97	11,100.76	8,765.97	47.53	41.56	-9.11	3,021.10	745.40	2,105.58	2,051.77	53.81	39.133		
13,300.00	10,844.97	11,200.76	8,765.97	48.08	42.19	-9.11	3,121.10	745.74	2,105.57	2,050.62	54.95	38.320		
13,400.00	10,844.97	11,300.76	8,765.97	48.64	42.84	-9.11	3,221.10	746.09	2,105.56	2,049.45	56.11	37.525		
13,500.00	10,844.97	11,400.76	8,765.97	49.21	43.49	-9.11	3,321.10	746.43	2,105.56	2,048.26	57.29	36.750		
13,600.00	10,844.97	11,500.76	8,765.97	49.80	44.16	-9.11	3,421.10	746.78	2,105.55	2,047.06	58.49	35.995		
13,700.00	10,844.97	11,600.76	8,765.97	50.39	44.83	-9.11	3,521.10	747.12	2,105.54	2,045.83	59.71	35.261		
13,800.00	10,844.97	11,700.76	8,765.97	51.00	45.52	-9.11	3,621.10	747.47	2,105.54	2,044.59	60.95	34.546		
13,900.00	10,844.97	11,800.76	8,765.97	51.62	46.22	-9.10	3,721.10	747.81	2,105.53	2,043.33	62.20	33.852		
14,000.00	10,844.97	11,900.76	8,765.97	52.25	46.93	-9.10	3,821.10	748.16	2,105.52	2,042.06	63.46	33.177		
14,100.00	10,844.97	12,000.76	8,765.97	52.89	47.64	-9.10	3,921.10	748.50	2,105.52	2,040.77	64.74	32.522		
14,200.00	10,844.97	12,100.76	8,765.97	53.54	48.37	-9.10	4,021.09	748.85	2,105.51	2,039.48	66.03	31.886		
14,300.00	10,844.97	12,200.76	8,765.97	54.20	49.10	-9.10	4,121.09	749.19	2,105.50	2,038.17	67.34	31.269		
14,400.00	10,844.97	12,300.76	8,765.97	54.86	49.84	-9.10	4,221.09	749.54	2,105.49	2,036.84	68.65	30.670		
14,500.00	10,844.97	12,400.76	8,765.97	55.54	50.59	-9.10	4,321.09	749.89	2,105.49	2,035.51	69.98	30.089		
14,600.00	10,844.97	12,500.76	8,765.97	56.23	51.35	-9.10	4,421.09	750.23	2,105.48	2,034.17	71.31	29.525		
14,700.00	10,844.97	12,600.76	8,765.97	56.92	52.11	-9.10	4,521.09	750.58	2,105.47	2,032.82	72.66	28.978		
14,800.00	10,844.97	12,700.76	8,765.97	57.62	52.88	-9.09	4,621.09	750.92	2,105.47	2,031.46	74.01	28.448		
14,900.00	10,844.97	12,800.76	8,765.97	58.33	53.66	-9.09	4,721.09	751.27	2,105.46	2,030.09	75.37	27.933		
15,000.00	10,844.97	12,900.76	8,765.97	59.04	54.44	-9.09	4,821.09	751.61	2,105.45	2,028.71	76.75	27.434		
15,100.00	10,844.97	13,000.76	8,765.97	59.77	55.23	-9.09	4,921.09	751.96	2,105.45	2,027.32	78.12	26.950		
15,200.00	10,844.97	13,100.76	8,765.97	60.50	56.02	-9.09	5,021.09	752.30	2,105.44	2,025.93	79.51	26.480		
15,300.00	10,844.98	13,200.76	8,765.98	61.23	56.82	-9.09	5,121.09	752.65	2,105.43	2,024.53	80.90	26.024		
15,400.00	10,844.98	13,300.76	8,765.98	61.98	57.62	-9.09	5,221.09	752.99	2,105.43	2,023.12	82.30	25.581		
15,500.00	10,844.98	13,400.76	8,765.98	62.73	58.43	-9.09	5,321.09	753.34	2,105.42	2,021.71	83.71	25.151		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - SB #7H - OH - Prelim Plan A													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	10,844.98	13,500.76	8,765.98	63.48	59.25	-9.09	5,421.09	753.68	2,105.41	2,020.29	85.12	24.734		
15,700.00	10,844.98	13,600.76	8,765.98	64.24	60.07	-9.08	5,521.09	754.03	2,105.41	2,018.86	86.54	24.329		
15,800.00	10,844.98	13,699.24	8,765.98	65.01	60.88	-9.08	5,621.08	754.37	2,105.40	2,017.45	87.95	23.938		
15,900.00	10,844.98	13,800.76	8,765.98	65.78	61.72	-9.08	5,721.08	754.72	2,105.39	2,016.00	89.39	23.552		
16,000.00	10,844.98	13,900.76	8,765.98	66.56	62.55	-9.08	5,821.08	755.07	2,105.39	2,014.56	90.83	23.180		
16,100.00	10,844.98	14,000.76	8,765.98	67.34	63.38	-9.08	5,921.08	755.41	2,105.38	2,013.11	92.26	22.819		
16,200.00	10,844.98	14,100.76	8,765.98	68.12	64.22	-9.08	6,021.08	755.76	2,105.37	2,011.66	93.71	22.468		
16,300.00	10,844.98	14,200.76	8,765.98	68.92	65.06	-9.08	6,121.08	756.10	2,105.36	2,010.21	95.15	22.126		
16,400.00	10,844.98	14,300.76	8,765.98	69.71	65.91	-9.08	6,221.08	756.45	2,105.36	2,008.75	96.60	21.793		
16,500.00	10,844.98	14,400.76	8,765.98	70.51	66.76	-9.07	6,321.08	756.79	2,105.35	2,007.29	98.06	21.470		
16,600.00	10,844.98	14,500.76	8,765.98	71.31	67.61	-9.07	6,421.08	757.14	2,105.34	2,005.83	99.52	21.155		
16,700.00	10,844.98	14,600.76	8,765.98	72.12	68.47	-9.07	6,521.08	757.48	2,105.34	2,004.36	100.98	20.849		
16,800.00	10,844.98	14,700.76	8,765.98	72.93	69.32	-9.07	6,621.08	757.83	2,105.33	2,002.88	102.45	20.550		
16,900.00	10,844.98	14,800.76	8,765.98	73.75	70.19	-9.07	6,721.08	758.17	2,105.32	2,001.41	103.92	20.260		
17,000.00	10,844.98	14,900.76	8,765.98	74.57	71.05	-9.07	6,821.08	758.52	2,105.32	1,999.93	105.39	19.977		
17,100.00	10,844.98	15,000.76	8,765.98	75.39	71.92	-9.07	6,921.08	758.86	2,105.31	1,998.45	106.86	19.701		
17,200.00	10,844.98	15,100.76	8,765.98	76.22	72.78	-9.07	7,021.08	759.21	2,105.30	1,996.96	108.34	19.432		
17,300.00	10,844.98	15,200.76	8,765.98	77.05	73.66	-9.07	7,121.08	759.55	2,105.30	1,995.47	109.82	19.170		
17,400.00	10,844.98	15,300.76	8,765.98	77.88	74.53	-9.06	7,221.08	759.90	2,105.29	1,993.98	111.31	18.914		
17,500.00	10,844.98	15,400.76	8,765.98	78.71	75.41	-9.06	7,321.07	760.25	2,105.28	1,992.49	112.79	18.665		
17,600.00	10,844.98	15,500.76	8,765.98	79.55	76.28	-9.06	7,421.07	760.59	2,105.28	1,990.99	114.28	18.422		
17,700.00	10,844.99	15,600.76	8,765.99	80.39	77.16	-9.06	7,521.07	760.94	2,105.27	1,989.50	115.77	18.185		
17,800.00	10,844.99	15,700.76	8,765.99	81.24	78.05	-9.06	7,621.07	761.28	2,105.26	1,988.00	117.27	17.953		
17,900.00	10,844.99	15,800.76	8,765.99	82.09	78.93	-9.06	7,721.07	761.63	2,105.25	1,986.49	118.76	17.727		
18,000.00	10,844.99	15,900.76	8,765.99	82.94	79.82	-9.06	7,821.07	761.97	2,105.25	1,984.99	120.26	17.506		
18,100.00	10,844.99	16,000.76	8,765.99	83.79	80.71	-9.06	7,921.07	762.32	2,105.24	1,983.48	121.76	17.290		
18,200.00	10,844.99	16,100.76	8,765.99	84.64	81.60	-9.05	8,021.07	762.66	2,105.23	1,981.97	123.26	17.080		
18,300.00	10,844.99	16,200.76	8,765.99	85.50	82.49	-9.05	8,121.07	763.01	2,105.23	1,980.46	124.76	16.874		
18,400.00	10,844.99	16,300.76	8,765.99	86.36	83.38	-9.05	8,221.07	763.35	2,105.22	1,978.95	126.27	16.673		
18,500.00	10,844.99	16,400.76	8,765.99	87.22	84.28	-9.05	8,321.07	763.70	2,105.21	1,977.44	127.78	16.476		
18,600.00	10,844.99	16,500.76	8,765.99	88.08	85.17	-9.05	8,421.07	764.04	2,105.21	1,975.92	129.28	16.284		
18,700.00	10,844.99	16,600.76	8,765.99	88.95	86.07	-9.05	8,521.07	764.39	2,105.20	1,974.40	130.80	16.095		
18,800.00	10,844.99	16,700.76	8,765.99	89.82	86.97	-9.05	8,621.07	764.73	2,105.19	1,972.89	132.31	15.911		
18,900.00	10,844.99	16,800.76	8,765.99	90.69	87.87	-9.05	8,721.07	765.08	2,105.19	1,971.37	133.82	15.731		
19,000.00	10,844.99	16,900.76	8,765.99	91.56	88.77	-9.05	8,821.07	765.43	2,105.18	1,969.84	135.34	15.555		
19,100.00	10,844.99	17,000.76	8,765.99	92.43	89.68	-9.04	8,921.06	765.77	2,105.17	1,968.32	136.85	15.383		
19,200.00	10,844.99	17,100.76	8,765.99	93.31	90.58	-9.04	9,021.06	766.12	2,105.17	1,966.80	138.37	15.214		
19,300.00	10,844.99	17,200.76	8,765.99	94.19	91.49	-9.04	9,121.06	766.46	2,105.16	1,965.27	139.89	15.049		
19,400.00	10,844.99	17,300.76	8,765.99	95.07	92.40	-9.04	9,221.06	766.81	2,105.15	1,963.74	141.41	14.887		
19,500.00	10,844.99	17,400.76	8,765.99	95.95	93.31	-9.04	9,321.06	767.15	2,105.15	1,962.21	142.93	14.728		
19,600.00	10,844.99	17,500.76	8,765.99	96.83	94.22	-9.04	9,421.06	767.50	2,105.14	1,960.68	144.46	14.573		
19,700.00	10,844.99	17,600.76	8,765.99	97.72	95.13	-9.04	9,521.06	767.84	2,105.13	1,959.15	145.98	14.421		
19,800.00	10,844.99	17,700.76	8,765.99	98.60	96.04	-9.04	9,621.06	768.19	2,105.12	1,957.62	147.50	14.272		
19,900.00	10,844.99	17,800.76	8,765.99	99.49	96.95	-9.03	9,721.06	768.53	2,105.12	1,956.09	149.03	14.125		
20,000.00	10,845.00	17,900.76	8,766.00	100.38	97.87	-9.03	9,821.06	768.88	2,105.11	1,954.55	150.56	13.982		
20,100.00	10,845.00	18,000.76	8,766.00	101.27	98.78	-9.03	9,921.06	769.22	2,105.10	1,953.02	152.09	13.841		
20,200.00	10,845.00	18,100.76	8,766.00	102.16	99.70	-9.03	10,021.06	769.57	2,105.10	1,951.48	153.62	13.704		
20,300.00	10,845.00	18,200.76	8,766.00	103.05	100.62	-9.03	10,121.06	769.91	2,105.09	1,949.94	155.15	13.568		
20,400.00	10,845.00	18,300.76	8,766.00	103.95	101.54	-9.03	10,221.06	770.26	2,105.08	1,948.40	156.68	13.436		
20,500.00	10,845.00	18,400.76	8,766.00	104.84	102.46	-9.03	10,321.06	770.61	2,105.08	1,946.87	158.21	13.305		
20,600.00	10,845.00	18,500.76	8,766.00	105.74	103.38	-9.03	10,421.06	770.95	2,105.07	1,945.33	159.74	13.178		
20,700.00	10,845.00	18,600.76	8,766.00	106.64	104.30	-9.03	10,521.06	771.30	2,105.06	1,943.78	161.28	13.052		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - SB #7H - OH - Prelim Plan A												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
20,800.00	10,845.00	18,700.76	8,766.00	107.54	105.22	-9.02	10,621.05	771.64	2,105.06	1,942.24	162.81	12.929	
20,900.00	10,845.00	18,800.76	8,766.00	108.44	106.14	-9.02	10,721.05	771.99	2,105.05	1,940.70	164.35	12.808	
21,000.00	10,845.00	18,900.76	8,766.00	109.34	107.06	-9.02	10,821.05	772.33	2,105.04	1,939.16	165.89	12.690	
21,100.00	10,845.00	19,000.76	8,766.00	110.24	107.99	-9.02	10,921.05	772.68	2,105.04	1,937.61	167.42	12.573	
21,192.85	10,845.00	19,092.09	8,766.00	111.08	108.83	-9.02	11,013.90	773.00	2,105.03	1,936.19	168.84	12.468	



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							
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	Warning	
0.00	0.00	0.00	0.00	0.00	0.00	-90.13	-0.21	-89.91	89.91					
100.00	100.00	100.00	100.00	0.13	0.13	-90.13	-0.21	-89.91	89.91	89.65	0.26	343.583		
200.00	200.00	200.00	200.00	0.49	0.49	-90.13	-0.21	-89.91	89.91	88.93	0.98	91.874		
300.00	300.00	300.00	300.00	0.85	0.85	-90.13	-0.21	-89.91	89.91	88.21	1.70	53.027		
400.00	400.00	400.00	400.00	1.21	1.21	-90.13	-0.21	-89.91	89.91	87.50	2.41	37.268		
500.00	500.00	500.00	500.00	1.56	1.56	-90.13	-0.21	-89.91	89.91	86.78	3.13	28.730		
600.00	600.00	600.00	600.00	1.92	1.92	-90.13	-0.21	-89.91	89.91	86.06	3.85	23.375		
607.28	607.28	607.28	607.28	1.95	1.95	-90.13	-0.21	-89.91	89.91	86.01	3.90	23.062 CC		
700.00	700.00	699.99	699.98	2.28	2.26	-90.69	-1.08	-89.91	89.92	85.37	4.55	19.780		
800.00	800.00	800.09	799.87	2.64	2.60	-92.35	-3.70	-89.91	89.99	84.75	5.24	17.188		
900.00	900.00	900.15	899.75	3.00	2.93	-94.57	-7.19	-89.91	90.20	84.27	5.93	15.207		
1,000.00	1,000.00	1,000.21	999.63	3.36	3.28	-96.77	-10.67	-89.91	90.54	83.91	6.63	13.651		
1,100.00	1,100.00	1,100.27	1,099.51	3.72	3.62	-98.95	-14.16	-89.91	91.02	83.68	7.34	12.405		
1,200.00	1,200.00	1,200.33	1,199.38	4.07	3.97	-101.11	-17.65	-89.91	91.63	83.58	8.04	11.390 ES		
1,300.00	1,299.98	1,300.44	1,299.22	4.43	4.32	-167.53	-21.13	-89.91	94.07	85.32	8.75	10.752		
1,400.00	1,399.84	1,400.72	1,398.87	4.78	4.67	-170.10	-24.61	-89.91	100.09	90.64	9.45	10.588		
1,500.00	1,499.45	1,501.30	1,498.23	5.13	5.03	-172.60	-28.08	-89.91	109.74	99.58	10.16	10.801		
1,600.00	1,598.70	1,602.30	1,597.17	5.49	5.39	-174.84	-31.54	-89.91	123.03	112.16	10.87	11.317		
1,700.00	1,697.47	1,703.83	1,695.58	5.85	5.75	-176.73	-34.98	-89.91	139.91	128.32	11.58	12.077		
1,800.00	1,795.95	1,805.68	1,793.68	6.21	6.11	-178.25	-38.40	-89.91	158.63	146.33	12.30	12.897		
1,900.00	1,894.43	1,907.52	1,891.77	6.57	6.47	-179.45	-41.83	-89.91	177.43	164.41	13.01	13.634		
2,000.00	1,992.91	1,990.63	1,989.87	6.94	6.77	179.58	-45.25	-89.91	196.29	182.63	13.66	14.365		
2,100.00	2,091.39	2,094.96	2,094.16	7.31	7.14	178.94	-47.61	-89.04	213.93	199.54	14.40	14.861		
2,200.00	2,189.87	2,201.09	2,200.23	7.68	7.51	178.86	-46.80	-85.98	228.42	213.30	15.12	15.107		
2,300.00	2,288.35	2,308.09	2,307.02	8.05	7.88	179.25	-42.69	-80.67	239.67	223.84	15.83	15.138		
2,400.00	2,386.83	2,415.68	2,414.08	8.42	8.25	-179.94	-35.23	-73.07	247.70	231.16	16.54	14.978		
2,500.00	2,485.31	2,523.56	2,520.95	8.80	8.62	-178.71	-24.41	-63.21	252.55	235.32	17.23	14.655		
2,600.00	2,583.79	2,627.61	2,623.51	9.18	8.98	-177.16	-11.13	-51.78	254.68	236.74	17.94	14.200		
2,700.00	2,682.27	2,727.36	2,721.75	9.55	9.32	-175.63	2.04	-40.53	256.54	237.89	18.65	13.752		
2,800.00	2,780.75	2,827.11	2,819.98	9.93	9.67	-174.12	15.21	-29.27	258.58	239.21	19.38	13.345		
2,900.00	2,879.23	2,926.86	2,918.21	10.31	10.03	-172.64	28.38	-18.02	260.80	240.70	20.10	12.975		
3,000.00	2,977.72	3,026.61	3,016.44	10.69	10.38	-171.18	41.56	-6.77	263.20	242.37	20.83	12.636		
3,100.00	3,076.20	3,126.35	3,114.68	11.07	10.74	-169.75	54.73	4.49	265.76	244.20	21.56	12.327		
3,200.00	3,174.68	3,226.10	3,212.91	11.45	11.10	-168.35	67.90	15.74	268.48	246.19	22.29	12.044		
3,300.00	3,273.16	3,325.85	3,311.14	11.83	11.46	-166.98	81.07	26.99	271.36	248.34	23.03	11.785		
3,400.00	3,371.64	3,425.60	3,409.37	12.21	11.82	-165.63	94.24	38.25	274.40	250.63	23.76	11.547		
3,500.00	3,470.12	3,525.35	3,507.61	12.59	12.18	-164.32	107.41	49.50	277.58	253.08	24.50	11.329		
3,600.00	3,568.60	3,625.10	3,605.84	12.97	12.55	-163.04	120.58	60.75	280.90	255.66	25.24	11.129		
3,700.00	3,667.08	3,724.85	3,704.07	13.36	12.91	-161.79	133.76	72.01	284.37	258.38	25.98	10.945		
3,800.00	3,765.56	3,824.59	3,802.30	13.74	13.28	-160.56	146.93	83.26	287.96	261.24	26.72	10.776		
3,900.00	3,864.04	3,924.34	3,900.54	14.12	13.65	-159.37	160.10	94.51	291.69	264.22	27.47	10.619		
4,000.00	3,962.52	4,024.09	3,998.77	14.51	14.01	-158.21	173.27	105.77	295.53	267.32	28.21	10.475		
4,100.00	4,061.00	4,123.84	4,097.00	14.89	14.38	-157.08	186.44	117.02	299.50	270.54	28.96	10.342		
4,200.00	4,159.48	4,223.59	4,195.23	15.27	14.75	-155.98	199.61	128.27	303.58	273.87	29.71	10.220		
4,300.00	4,257.97	4,323.34	4,293.47	15.66	15.12	-154.91	212.78	139.53	307.77	277.31	30.45	10.106		
4,400.00	4,356.45	4,423.08	4,391.70	16.04	15.49	-153.87	225.96	150.78	312.06	280.86	31.20	10.001		
4,500.00	4,454.93	4,522.83	4,489.93	16.43	15.86	-152.85	239.13	162.03	316.45	284.50	31.95	9.904		
4,600.00	4,553.41	4,622.58	4,588.16	16.81	16.24	-151.87	252.30	173.29	320.94	288.24	32.70	9.814		
4,700.00	4,651.89	4,722.33	4,686.40	17.19	16.61	-150.91	265.47	184.54	325.53	292.07	33.45	9.731		
4,800.00	4,750.37	4,822.08	4,784.63	17.58	16.98	-149.98	278.64	195.79	330.20	295.99	34.21	9.653		
4,900.00	4,848.85	4,921.83	4,882.86	17.96	17.35	-149.07	291.81	207.05	334.95	300.00	34.96	9.581		
5,000.00	4,947.33	5,021.57	4,981.09	18.35	17.73	-148.19	304.98	218.30	339.79	304.08	35.71	9.515		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A													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	
5,100.00	5,045.81	5,121.32	5,079.33	18.73	18.10	-147.34	318.16	229.55	344.71	308.24	36.47	9.453	
5,200.00	5,144.29	5,221.07	5,177.56	19.12	18.48	-146.50	331.33	240.80	349.70	312.48	37.22	9.395	
5,300.00	5,242.77	5,320.82	5,275.79	19.50	18.85	-145.70	344.50	252.06	354.76	316.78	37.98	9.342	
5,400.00	5,341.25	5,420.57	5,374.02	19.89	19.23	-144.91	357.67	263.31	359.89	321.16	38.73	9.292	
5,500.00	5,439.73	5,520.32	5,472.26	20.27	19.60	-144.15	370.84	274.56	365.09	325.60	39.49	9.245	
5,600.00	5,538.22	5,620.06	5,570.49	20.66	19.98	-143.41	384.01	285.82	370.35	330.10	40.24	9.202	
5,700.00	5,636.70	5,719.81	5,668.72	21.05	20.35	-142.69	397.18	297.07	375.66	334.66	41.00	9.162	
5,800.00	5,735.18	5,819.56	5,766.95	21.43	20.73	-141.99	410.36	308.32	381.04	339.28	41.76	9.125	
5,900.00	5,833.66	5,919.31	5,865.18	21.82	21.11	-141.31	423.53	319.58	386.47	343.95	42.52	9.090	
6,000.00	5,932.14	6,019.06	5,963.42	22.20	21.48	-140.65	436.70	330.83	391.96	348.68	43.28	9.057	
6,100.00	6,030.62	6,118.81	6,061.65	22.59	21.86	-140.00	449.87	342.08	397.49	353.46	44.04	9.027	
6,200.00	6,129.10	6,218.55	6,159.88	22.97	22.24	-139.38	463.04	353.34	403.08	358.28	44.79	8.998	
6,300.00	6,227.58	6,318.30	6,258.11	23.36	22.61	-138.77	476.21	364.59	408.71	363.15	45.55	8.972	
6,400.00	6,326.06	6,417.07	6,355.39	23.75	22.99	-138.19	489.22	375.70	414.40	368.10	46.31	8.949	
6,500.00	6,424.54	6,511.09	6,448.31	24.13	23.34	-137.90	500.08	384.98	421.03	374.00	47.03	8.952	
6,600.00	6,523.02	6,604.96	6,541.51	24.52	23.69	-138.00	508.60	392.26	429.03	381.29	47.74	8.987	
6,700.00	6,621.50	6,698.49	6,634.68	24.91	24.02	-138.46	514.78	397.54	438.40	389.98	48.43	9.053	
6,800.00	6,719.99	6,791.47	6,727.52	25.29	24.35	-139.25	518.63	400.83	449.22	400.13	49.09	9.151	
6,900.00	6,818.47	6,883.72	6,819.74	25.68	24.67	-140.33	520.18	402.16	461.58	411.85	49.73	9.282	
7,000.00	6,916.95	6,980.93	6,916.95	26.06	25.00	-141.64	520.22	402.19	475.12	424.72	50.41	9.426	
7,100.00	7,015.43	7,079.41	7,015.43	26.45	25.34	-142.89	520.22	402.19	488.94	437.84	51.10	9.568	
7,200.00	7,113.91	7,177.89	7,113.91	26.84	25.67	-144.08	520.22	402.19	502.97	451.18	51.79	9.711	
7,300.00	7,212.39	7,276.37	7,212.39	27.22	26.01	-145.20	520.22	402.19	517.20	464.72	52.49	9.854	
7,400.00	7,310.87	7,374.85	7,310.87	27.61	26.35	-146.27	520.22	402.19	531.63	478.44	53.18	9.997	
7,500.00	7,409.35	7,473.33	7,409.35	28.00	26.68	-147.28	520.22	402.19	546.22	492.34	53.88	10.138	
7,600.00	7,507.83	7,571.81	7,507.83	28.38	27.02	-148.23	520.22	402.19	560.97	506.39	54.58	10.279	
7,700.00	7,606.31	7,670.29	7,606.31	28.77	27.36	-149.14	520.22	402.19	575.86	520.59	55.28	10.418	
7,800.00	7,704.79	7,768.77	7,704.79	29.16	27.70	-150.00	520.22	402.19	590.89	534.92	55.98	10.556	
7,900.00	7,803.27	7,867.25	7,803.27	29.54	28.04	-150.81	520.22	402.19	606.05	549.37	56.68	10.693	
8,000.00	7,901.75	7,965.73	7,901.75	29.93	28.38	-151.59	520.22	402.19	621.32	563.94	57.38	10.828	
8,100.00	8,000.29	8,064.27	8,000.29	30.32	28.72	-152.38	520.22	402.19	636.43	578.35	58.08	10.957	
8,200.00	8,099.27	8,163.25	8,099.27	30.69	29.06	-153.08	520.22	402.19	649.09	590.30	58.79	11.041	
8,300.00	8,198.68	8,262.66	8,198.68	31.06	29.40	-153.58	520.22	402.19	658.70	599.21	59.49	11.073	
8,400.00	8,298.41	8,362.39	8,298.41	31.41	29.75	-153.92	520.22	402.19	665.22	605.03	60.18	11.053	
8,500.00	8,398.34	8,462.32	8,398.34	31.76	30.09	-154.09	520.22	402.19	668.62	607.74	60.87	10.984	
8,600.00	8,498.33	8,562.31	8,498.33	32.09	30.44	-90.04	520.22	402.19	669.15	607.59	61.56	10.870	
8,700.00	8,598.33	8,662.31	8,598.33	32.43	30.78	-90.04	520.22	402.19	669.15	606.91	62.24	10.752	
8,800.00	8,698.33	8,762.31	8,698.33	32.76	31.13	-90.04	520.22	402.19	669.15	606.23	62.92	10.635	
8,900.00	8,798.33	8,862.31	8,798.33	33.09	31.48	-90.04	520.22	402.19	669.15	605.55	63.60	10.521	
9,000.00	8,898.33	8,962.31	8,898.33	33.43	31.83	-90.04	520.22	402.19	669.15	604.87	64.28	10.410	
9,100.00	8,998.33	9,062.31	8,998.33	33.76	32.17	-90.04	520.22	402.19	669.15	604.19	64.97	10.300	
9,200.00	9,098.33	9,162.31	9,098.33	34.10	32.52	-90.04	520.22	402.19	669.15	603.50	65.65	10.193	
9,300.00	9,198.33	9,262.31	9,198.33	34.43	32.87	-90.04	520.22	402.19	669.15	602.82	66.33	10.088	
9,400.00	9,298.33	9,362.31	9,298.33	34.77	33.22	-90.04	520.22	402.19	669.15	602.13	67.02	9.985	
9,500.00	9,398.33	9,462.31	9,398.33	35.10	33.57	-90.04	520.22	402.19	669.15	601.45	67.70	9.883	
9,600.00	9,498.33	9,562.31	9,498.33	35.44	33.92	-90.04	520.22	402.19	669.15	600.76	68.39	9.784	
9,700.00	9,598.33	9,662.31	9,598.33	35.78	34.27	-90.04	520.22	402.19	669.15	600.07	69.08	9.687	
9,800.00	9,698.33	9,762.31	9,698.33	36.11	34.61	-90.04	520.22	402.19	669.15	599.38	69.77	9.591	
9,900.00	9,798.33	9,862.31	9,798.33	36.45	34.96	-90.04	520.22	402.19	669.15	598.70	70.45	9.498	
10,000.00	9,898.33	9,962.31	9,898.33	36.79	35.31	-90.04	520.22	402.19	669.15	598.01	71.14	9.406	
10,100.00	9,998.33	10,062.31	9,998.33	37.13	35.66	-90.04	520.22	402.19	669.15	597.32	71.83	9.315	
10,200.00	10,098.33	10,162.31	10,098.33	37.47	36.01	-90.04	520.22	402.19	669.15	596.63	72.52	9.227	

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A													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	10,198.33	10,262.31	10,198.33	37.81	36.36	-90.04	520.22	402.19	669.15	595.94	73.21	9.140		
10,300.74	10,199.07	10,263.05	10,199.07	37.81	36.37	-90.21	520.22	402.19	669.15	595.93	73.22	9.139		
10,400.00	10,298.32	10,362.30	10,298.32	38.15	36.71	-90.26	520.22	402.19	669.15	595.25	73.90	9.054		
10,500.00	10,397.31	10,461.45	10,397.47	38.49	37.06	-91.37	520.25	402.19	669.34	594.76	74.59	8.974		
10,600.00	10,492.49	10,564.18	10,499.56	38.83	37.43	-93.11	530.41	402.23	670.16	594.84	75.32	8.897		
10,700.00	10,580.97	10,671.09	10,602.09	39.15	37.81	-94.79	560.13	402.35	671.54	595.43	76.10	8.824		
10,800.00	10,660.07	10,782.40	10,701.05	39.43	38.19	-96.34	610.71	402.54	673.31	596.43	76.88	8.757		
10,900.00	10,727.37	10,898.12	10,791.55	39.67	38.56	-97.72	682.52	402.82	675.25	597.64	77.61	8.701		
11,000.00	10,780.83	11,017.94	10,868.10	39.86	38.91	-98.84	774.41	403.18	677.07	598.82	78.25	8.653		
11,100.00	10,818.84	11,141.16	10,925.16	40.01	39.25	-99.66	883.36	403.60	678.48	599.67	78.81	8.609		
11,200.00	10,840.23	11,266.69	10,958.01	40.16	39.56	-100.10	1,004.25	404.07	679.25	599.92	79.33	8.562		
11,300.00	10,844.96	11,385.35	10,964.96	40.31	39.83	-100.17	1,122.55	404.53	679.30	599.48	79.82	8.510		
11,400.00	10,844.96	11,485.35	10,964.96	40.50	40.06	-100.18	1,222.55	404.92	679.22	598.93	80.29	8.460		
11,500.00	10,844.96	11,585.35	10,964.96	40.72	40.31	-100.18	1,322.55	405.31	679.13	598.33	80.80	8.405		
11,600.00	10,844.96	11,685.35	10,964.96	40.96	40.58	-100.18	1,422.55	405.70	679.05	597.69	81.36	8.347		
11,700.00	10,844.96	11,785.35	10,964.96	41.23	40.88	-100.18	1,522.54	406.09	678.96	597.01	81.95	8.285		
11,800.00	10,844.96	11,885.35	10,964.96	41.52	41.19	-100.18	1,622.54	406.48	678.88	596.29	82.59	8.220		
11,900.00	10,844.96	11,985.35	10,964.96	41.83	41.53	-100.18	1,722.54	406.87	678.79	595.53	83.26	8.152		
12,000.00	10,844.96	12,085.35	10,964.96	42.16	41.88	-100.18	1,822.54	407.25	678.71	594.73	83.98	8.082		
12,100.00	10,844.96	12,185.35	10,964.96	42.52	42.26	-100.19	1,922.54	407.64	678.62	593.89	84.73	8.009		
12,200.00	10,844.96	12,285.35	10,964.96	42.89	42.65	-100.19	2,022.54	408.03	678.53	593.02	85.52	7.934		
12,300.00	10,844.96	12,385.35	10,964.96	43.28	43.06	-100.19	2,122.54	408.42	678.45	592.11	86.34	7.858		
12,400.00	10,844.96	12,485.35	10,964.96	43.68	43.48	-100.19	2,222.54	408.81	678.36	591.16	87.20	7.779		
12,500.00	10,844.96	12,585.35	10,964.96	44.11	43.93	-100.19	2,322.54	409.20	678.28	590.18	88.10	7.699		
12,600.00	10,844.96	12,685.35	10,964.96	44.55	44.39	-100.19	2,422.54	409.59	678.19	589.17	89.02	7.618		
12,700.00	10,844.96	12,785.35	10,964.96	45.01	44.87	-100.19	2,522.54	409.98	678.11	588.13	89.98	7.536		
12,800.00	10,844.96	12,885.35	10,964.96	45.48	45.36	-100.19	2,622.54	410.36	678.02	587.05	90.97	7.453		
12,900.00	10,844.96	12,985.35	10,964.96	45.97	45.87	-100.20	2,722.54	410.75	677.93	585.95	91.98	7.370		
13,000.00	10,844.97	13,085.35	10,964.97	46.48	46.39	-100.20	2,822.53	411.14	677.85	584.82	93.03	7.286		
13,100.00	10,844.97	13,185.35	10,964.97	47.00	46.93	-100.20	2,922.53	411.53	677.76	583.66	94.11	7.202		
13,200.00	10,844.97	13,285.35	10,964.97	47.53	47.48	-100.20	3,022.53	411.92	677.68	582.47	95.21	7.118		
13,300.00	10,844.97	13,385.35	10,964.97	48.08	48.04	-100.20	3,122.53	412.31	677.59	581.26	96.33	7.034		
13,400.00	10,844.97	13,485.35	10,964.97	48.64	48.61	-100.20	3,222.53	412.70	677.51	580.02	97.49	6.950		
13,500.00	10,844.97	13,585.35	10,964.97	49.21	49.20	-100.20	3,322.53	413.09	677.42	578.76	98.66	6.866		
13,600.00	10,844.97	13,685.35	10,964.97	49.80	49.80	-100.20	3,422.53	413.48	677.34	577.47	99.86	6.783		
13,700.00	10,844.97	13,785.35	10,964.97	50.39	50.41	-100.21	3,522.53	413.86	677.25	576.17	101.08	6.700		
13,800.00	10,844.97	13,885.35	10,964.97	51.00	51.04	-100.21	3,622.53	414.25	677.16	574.84	102.33	6.618		
13,900.00	10,844.97	13,985.35	10,964.97	51.62	51.67	-100.21	3,722.53	414.64	677.08	573.49	103.59	6.536		
14,000.00	10,844.97	14,085.35	10,964.97	52.25	52.31	-100.21	3,822.53	415.03	676.99	572.12	104.88	6.455		
14,100.00	10,844.97	14,185.35	10,964.97	52.89	52.97	-100.21	3,922.53	415.42	676.91	570.73	106.18	6.375		
14,200.00	10,844.97	14,285.35	10,964.97	53.54	53.63	-100.21	4,022.52	415.81	676.82	569.32	107.50	6.296		
14,300.00	10,844.97	14,385.35	10,964.97	54.20	54.30	-100.21	4,122.52	416.20	676.74	567.89	108.84	6.218		
14,400.00	10,844.97	14,485.35	10,964.97	54.86	54.98	-100.22	4,222.52	416.59	676.65	566.45	110.20	6.140		
14,500.00	10,844.97	14,585.35	10,964.97	55.54	55.67	-100.22	4,322.52	416.97	676.57	564.99	111.57	6.064		
14,600.00	10,844.97	14,685.35	10,964.97	56.23	56.37	-100.22	4,422.52	417.36	676.48	563.51	112.96	5.988		
14,700.00	10,844.97	14,785.35	10,964.97	56.92	57.07	-100.22	4,522.52	417.75	676.39	562.02	114.37	5.914		
14,800.00	10,844.97	14,885.35	10,964.97	57.62	57.78	-100.22	4,622.52	418.14	676.31	560.52	115.79	5.841		
14,900.00	10,844.97	14,985.35	10,964.97	58.33	58.50	-100.22	4,722.52	418.53	676.22	559.00	117.23	5.768		
15,000.00	10,844.97	15,085.35	10,964.97	59.04	59.23	-100.22	4,822.52	418.92	676.14	557.46	118.68	5.697		
15,100.00	10,844.97	15,185.35	10,964.97	59.77	59.96	-100.22	4,922.52	419.31	676.05	555.91	120.14	5.627		
15,200.00	10,844.97	15,285.35	10,964.97	60.50	60.70	-100.23	5,022.52	419.70	675.97	554.35	121.61	5.558		
15,300.00	10,844.98	15,385.35	10,964.98	61.23	61.45	-100.23	5,122.52	420.09	675.88	552.78	123.10	5.490		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A													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	10,844.98	15,485.35	10,964.98	61.98	62.20	-100.23	5,222.52	420.47	675.79	551.19	124.60	5.424		
15,500.00	10,844.98	15,585.35	10,964.98	62.73	62.96	-100.23	5,322.51	420.86	675.71	549.60	126.11	5.358		
15,600.00	10,844.98	15,685.35	10,964.98	63.48	63.73	-100.23	5,422.51	421.25	675.62	547.99	127.64	5.293		
15,700.00	10,844.98	15,785.35	10,964.98	64.24	64.50	-100.23	5,522.51	421.64	675.54	546.37	129.17	5.230		
15,800.00	10,844.98	15,885.35	10,964.98	65.01	65.27	-100.23	5,622.51	422.03	675.45	544.74	130.71	5.167		
15,900.00	10,844.98	15,985.35	10,964.98	65.78	66.05	-100.23	5,722.51	422.42	675.37	543.10	132.27	5.106		
16,000.00	10,844.98	16,085.35	10,964.98	66.56	66.84	-100.24	5,822.51	422.81	675.28	541.45	133.83	5.046		
16,100.00	10,844.98	16,185.35	10,964.98	67.34	67.63	-100.24	5,922.51	423.20	675.20	539.79	135.40	4.987		
16,200.00	10,844.98	16,285.35	10,964.98	68.12	68.42	-100.24	6,022.51	423.59	675.11	538.13	136.98	4.928		
16,300.00	10,844.98	16,385.35	10,964.98	68.92	69.22	-100.24	6,122.51	423.97	675.02	536.45	138.57	4.871		
16,400.00	10,844.98	16,485.35	10,964.98	69.71	70.02	-100.24	6,222.51	424.36	674.94	534.77	140.17	4.815		
16,500.00	10,844.98	16,585.35	10,964.98	70.51	70.83	-100.24	6,322.51	424.75	674.85	533.07	141.78	4.760		
16,600.00	10,844.98	16,685.35	10,964.98	71.31	71.64	-100.24	6,422.51	425.14	674.77	531.37	143.39	4.706		
16,700.00	10,844.98	16,785.35	10,964.98	72.12	72.45	-100.25	6,522.51	425.53	674.68	529.67	145.02	4.652		
16,800.00	10,844.98	16,885.35	10,964.98	72.93	73.27	-100.25	6,622.50	425.92	674.60	527.95	146.65	4.600		
16,900.00	10,844.98	16,985.35	10,964.98	73.75	74.09	-100.25	6,722.50	426.31	674.51	526.23	148.28	4.549		
17,000.00	10,844.98	17,085.35	10,964.98	74.57	74.92	-100.25	6,822.50	426.70	674.42	524.50	149.93	4.498		
17,100.00	10,844.98	17,185.35	10,964.98	75.39	75.75	-100.25	6,922.50	427.08	674.34	522.76	151.58	4.449		
17,200.00	10,844.98	17,285.35	10,964.98	76.22	76.58	-100.25	7,022.50	427.47	674.25	521.02	153.23	4.400		
17,300.00	10,844.98	17,385.35	10,964.98	77.05	77.42	-100.25	7,122.50	427.86	674.17	519.27	154.90	4.352		
17,400.00	10,844.98	17,485.35	10,964.98	77.88	78.25	-100.25	7,222.50	428.25	674.08	517.52	156.56	4.305		
17,500.00	10,844.98	17,585.35	10,964.98	78.71	79.10	-100.26	7,322.50	428.64	674.00	515.76	158.24	4.259		
17,600.00	10,844.98	17,685.35	10,964.98	79.55	79.94	-100.26	7,422.50	429.03	673.91	513.99	159.92	4.214		
17,700.00	10,844.99	17,785.35	10,964.99	80.39	80.79	-100.26	7,522.50	429.42	673.83	512.22	161.60	4.170		
17,800.00	10,844.99	17,885.35	10,964.99	81.24	81.64	-100.26	7,622.50	429.81	673.74	510.44	163.30	4.126		
17,900.00	10,844.99	17,985.35	10,964.99	82.09	82.49	-100.26	7,722.50	430.20	673.65	508.66	164.99	4.083		
18,000.00	10,844.99	18,085.35	10,964.99	82.94	83.34	-100.26	7,822.49	430.58	673.57	506.88	166.69	4.041		
18,100.00	10,844.99	18,185.35	10,964.99	83.79	84.20	-100.26	7,922.49	430.97	673.48	505.08	168.40	3.999		
18,200.00	10,844.99	18,285.35	10,964.99	84.64	85.06	-100.26	8,022.49	431.36	673.40	503.29	170.11	3.959		
18,300.00	10,844.99	18,385.35	10,964.99	85.50	85.92	-100.27	8,122.49	431.75	673.31	501.49	171.82	3.919		
18,400.00	10,844.99	18,485.35	10,964.99	86.36	86.78	-100.27	8,222.49	432.14	673.23	499.68	173.54	3.879		
18,500.00	10,844.99	18,585.35	10,964.99	87.22	87.65	-100.27	8,322.49	432.53	673.14	497.87	175.27	3.841		
18,600.00	10,844.99	18,685.35	10,964.99	88.08	88.52	-100.27	8,422.49	432.92	673.06	496.06	177.00	3.803		
18,700.00	10,844.99	18,785.35	10,964.99	88.95	89.39	-100.27	8,522.49	433.31	672.97	494.24	178.73	3.765		
18,800.00	10,844.99	18,885.35	10,964.99	89.82	90.26	-100.27	8,622.49	433.70	672.88	492.42	180.46	3.729		
18,900.00	10,844.99	18,985.35	10,964.99	90.69	91.14	-100.27	8,722.49	434.08	672.80	490.60	182.20	3.693		
19,000.00	10,844.99	19,085.35	10,964.99	91.56	92.01	-100.28	8,822.49	434.47	672.71	488.77	183.95	3.657		
19,100.00	10,844.99	19,185.35	10,964.99	92.43	92.89	-100.28	8,922.49	434.86	672.63	486.93	185.69	3.622		
19,200.00	10,844.99	19,285.35	10,964.99	93.31	93.77	-100.28	9,022.49	435.25	672.54	485.10	187.44	3.588		
19,300.00	10,844.99	19,385.35	10,964.99	94.19	94.65	-100.28	9,122.48	435.64	672.46	483.26	189.20	3.554		
19,400.00	10,844.99	19,485.35	10,964.99	95.07	95.53	-100.28	9,222.48	436.03	672.37	481.42	190.95	3.521		
19,500.00	10,844.99	19,585.35	10,964.99	95.95	96.42	-100.28	9,322.48	436.42	672.28	479.57	192.71	3.489		
19,600.00	10,844.99	19,685.35	10,964.99	96.83	97.30	-100.28	9,422.48	436.81	672.20	477.72	194.48	3.456		
19,700.00	10,844.99	19,785.35	10,964.99	97.72	98.19	-100.28	9,522.48	437.19	672.11	475.87	196.24	3.425		
19,800.00	10,844.99	19,885.35	10,964.99	98.60	99.08	-100.29	9,622.48	437.58	672.03	474.01	198.01	3.394		
19,900.00	10,844.99	19,985.35	10,964.99	99.49	99.97	-100.29	9,722.48	437.97	671.94	472.16	199.79	3.363		
20,000.00	10,845.00	20,085.35	10,965.00	100.38	100.86	-100.29	9,822.48	438.36	671.86	470.30	201.56	3.333		
20,100.00	10,845.00	20,185.35	10,965.00	101.27	101.76	-100.29	9,922.48	438.75	671.77	468.43	203.34	3.304		
20,200.00	10,845.00	20,285.35	10,965.00	102.16	102.65	-100.29	10,022.48	439.14	671.69	466.57	205.12	3.275		
20,300.00	10,845.00	20,385.35	10,965.00	103.05	103.55	-100.29	10,122.48	439.53	671.60	464.70	206.90	3.246		
20,400.00	10,845.00	20,485.35	10,965.00	103.95	104.45	-100.29	10,222.48	439.92	671.51	462.83	208.69	3.218		
20,500.00	10,845.00	20,585.35	10,965.00	104.84	105.34	-100.30	10,322.48	440.31	671.43	460.95	210.47	3.190		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #10H - OH - Prelim Plan A												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	
20,600.00	10,845.00	20,685.35	10,965.00	105.74	106.24	-100.30	10,422.47	440.69	671.34	459.08	212.27	3.163	
20,700.00	10,845.00	20,785.35	10,965.00	106.64	107.14	-100.30	10,522.47	441.08	671.26	457.20	214.06	3.136	
20,800.00	10,845.00	20,885.35	10,965.00	107.54	108.05	-100.30	10,622.47	441.47	671.17	455.32	215.85	3.109	
20,900.00	10,845.00	20,985.35	10,965.00	108.44	108.95	-100.30	10,722.47	441.86	671.09	453.44	217.65	3.083	
21,000.00	10,845.00	21,085.35	10,965.00	109.34	109.85	-100.30	10,822.47	442.25	671.00	451.55	219.45	3.058	
21,100.00	10,845.00	21,185.35	10,965.00	110.24	110.76	-100.30	10,922.47	442.64	670.92	449.66	221.25	3.032	
21,192.85	10,845.00	21,278.20	10,965.00	111.08	111.60	-100.30	11,015.32	443.00	670.84	447.91	222.92	3.009 SF	

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A													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		
0.00	0.00	0.00	0.00	0.00	0.00	-90.12	-0.13	-59.96	59.96					
100.00	100.00	100.00	100.00	0.13	0.13	-90.12	-0.13	-59.96	59.96	59.70	0.26	229.131		
200.00	200.00	200.00	200.00	0.49	0.49	-90.12	-0.13	-59.96	59.96	58.98	0.98	61.270		
300.00	300.00	300.00	300.00	0.85	0.85	-90.12	-0.13	-59.96	59.96	58.26	1.70	35.363		
400.00	400.00	400.00	400.00	1.21	1.21	-90.12	-0.13	-59.96	59.96	57.55	2.41	24.854		
500.00	500.00	500.00	500.00	1.56	1.56	-90.12	-0.13	-59.96	59.96	56.83	3.13	19.160		
600.00	600.00	600.00	600.00	1.92	1.92	-90.12	-0.13	-59.96	59.96	56.11	3.85	15.589		
638.60	638.60	638.60	638.60	2.06	2.06	-90.00	0.00	-59.96	59.96	55.84	4.12	14.543 CC		
700.00	700.00	699.99	699.99	2.28	2.28	-89.29	0.74	-59.96	59.96	55.40	4.56	13.141		
800.00	800.00	800.08	799.88	2.64	2.64	-86.79	3.36	-59.96	60.05	54.77	5.28	11.375		
900.00	900.00	900.14	899.76	3.00	3.00	-83.49	6.85	-59.96	60.35	54.35	6.00	10.065		
1,000.00	1,000.00	1,000.20	999.64	3.36	3.36	-80.22	10.33	-59.96	60.84	54.13	6.71	9.065		
1,100.00	1,100.00	1,100.26	1,099.52	3.72	3.72	-77.02	13.82	-59.96	61.53	54.11	7.43	8.283 ES		
1,200.00	1,200.00	1,200.32	1,199.40	4.07	4.08	-73.90	17.31	-59.96	62.41	54.27	8.15	7.662		
1,300.00	1,299.98	1,299.63	1,299.28	4.43	4.43	-136.01	20.80	-59.96	64.71	55.86	8.86	7.308 SF		
1,400.00	1,399.84	1,397.12	1,396.68	4.78	4.78	-136.10	24.79	-61.48	71.23	61.68	9.55	7.460		
1,500.00	1,499.45	1,493.72	1,493.02	5.13	5.13	-137.55	29.93	-66.04	83.66	73.43	10.23	8.179		
1,600.00	1,598.70	1,588.88	1,587.69	5.49	5.47	-139.58	36.15	-73.49	102.03	91.14	10.89	9.367		
1,700.00	1,697.47	1,682.09	1,680.06	5.85	5.80	-141.59	43.33	-83.62	126.35	114.81	11.54	10.949		
1,800.00	1,795.95	1,774.30	1,771.02	6.21	6.13	-143.35	51.47	-96.35	155.15	142.97	12.18	12.739		
1,900.00	1,894.43	1,869.68	1,864.95	6.57	6.48	-144.54	60.23	-110.40	185.01	172.15	12.86	14.385		
2,000.00	1,992.91	1,965.06	1,958.88	6.94	6.83	-145.40	68.99	-124.45	214.91	201.36	13.55	15.861		
2,100.00	2,091.39	2,060.44	2,052.82	7.31	7.18	-146.05	77.76	-138.51	244.85	230.61	14.24	17.194		
2,200.00	2,189.87	2,155.82	2,146.75	7.68	7.53	-146.55	86.52	-152.56	274.81	259.88	14.93	18.401		
2,300.00	2,288.35	2,251.20	2,240.68	8.05	7.89	-146.96	95.28	-166.61	304.79	289.16	15.63	19.498		
2,400.00	2,386.83	2,346.58	2,334.61	8.42	8.24	-147.30	104.04	-180.67	334.78	318.44	16.33	20.500		
2,500.00	2,485.31	2,441.96	2,428.55	8.80	8.60	-147.58	112.81	-194.72	364.77	347.74	17.03	21.417		
2,600.00	2,583.79	2,537.35	2,522.48	9.18	8.96	-147.81	121.57	-208.77	394.78	377.04	17.74	22.259		
2,700.00	2,682.27	2,632.73	2,616.41	9.55	9.32	-148.02	130.33	-222.83	424.78	406.34	18.44	23.035		
2,800.00	2,780.75	2,728.11	2,710.34	9.93	9.68	-148.19	139.10	-236.88	454.80	435.65	19.15	23.753		
2,900.00	2,879.23	2,823.49	2,804.27	10.31	10.04	-148.35	147.86	-250.93	484.81	464.96	19.86	24.418		
3,000.00	2,977.72	2,918.87	2,898.21	10.69	10.40	-148.49	156.62	-264.99	514.83	494.27	20.56	25.035		
3,100.00	3,076.20	3,014.25	2,992.14	11.07	10.76	-148.61	165.39	-279.04	544.86	523.58	21.27	25.610		
3,200.00	3,174.68	3,109.63	3,086.07	11.45	11.13	-148.72	174.15	-293.09	574.88	552.89	21.99	26.147		
3,300.00	3,273.16	3,205.01	3,180.00	11.83	11.49	-148.82	182.91	-307.15	604.90	582.21	22.70	26.650		
3,400.00	3,371.64	3,300.39	3,273.94	12.21	11.86	-148.90	191.68	-321.20	634.93	611.52	23.41	27.120		
3,500.00	3,470.12	3,404.23	3,367.87	12.59	12.25	-148.98	200.44	-335.25	664.96	640.80	24.16	27.526		
3,600.00	3,568.60	3,508.84	3,461.80	12.97	12.65	-149.06	209.20	-349.30	694.99	670.08	24.91	27.904		
3,700.00	3,667.08	3,586.54	3,555.73	13.36	12.95	-149.13	217.96	-363.36	725.02	699.46	25.56	28.370		
3,800.00	3,765.56	3,681.92	3,649.66	13.74	13.32	-149.19	226.73	-377.41	755.05	728.78	26.27	28.740		
3,900.00	3,864.04	3,777.30	3,743.60	14.12	13.68	-149.25	235.49	-391.46	785.08	758.09	26.99	29.089		
4,000.00	3,962.52	3,872.68	3,837.53	14.51	14.05	-149.30	244.25	-405.52	815.11	787.41	27.71	29.420		
4,100.00	4,061.00	3,968.06	3,931.46	14.89	14.41	-149.35	253.02	-419.57	845.15	816.72	28.42	29.734		
4,200.00	4,159.48	4,063.44	4,025.39	15.27	14.78	-149.40	261.78	-433.62	875.18	846.04	29.14	30.032		
4,300.00	4,257.97	4,158.82	4,119.33	15.66	15.15	-149.44	270.54	-447.68	905.22	875.35	29.86	30.315		
4,400.00	4,356.45	4,254.20	4,213.26	16.04	15.51	-149.48	279.31	-461.73	935.25	904.67	30.58	30.584		
4,500.00	4,454.93	4,349.59	4,307.19	16.43	15.88	-149.52	288.07	-475.78	965.28	933.99	31.30	30.841		
4,600.00	4,553.41	4,444.97	4,401.12	16.81	16.25	-149.55	296.83	-489.84	995.32	963.30	32.02	31.085		
4,700.00	4,651.89	4,540.35	4,495.05	17.19	16.62	-149.59	305.59	-503.89	1,025.36	992.62	32.74	31.319		
4,800.00	4,750.37	4,635.73	4,588.99	17.58	16.98	-149.62	314.36	-517.94	1,055.39	1,021.93	33.46	31.542		
4,900.00	4,848.85	4,731.11	4,682.92	17.96	17.35	-149.65	323.12	-532.00	1,085.43	1,051.25	34.18	31.756		
5,000.00	4,947.33	4,826.49	4,776.85	18.35	17.72	-149.68	331.88	-546.05	1,115.46	1,080.56	34.90	31.960		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A													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		
5,100.00	5,045.81	4,921.87	4,870.78	18.73	18.09	-149.70	340.65	-560.10	1,145.50	1,109.88	35.62	32.156		
5,200.00	5,144.29	5,017.25	4,964.72	19.12	18.46	-149.73	349.41	-574.16	1,175.54	1,139.19	36.35	32.344		
5,300.00	5,242.77	5,112.63	5,058.65	19.50	18.82	-149.75	358.17	-588.21	1,205.57	1,168.51	37.07	32.524		
5,400.00	5,341.25	5,208.01	5,152.58	19.89	19.19	-149.78	366.94	-602.26	1,235.61	1,197.82	37.79	32.697		
5,500.00	5,439.73	5,303.40	5,246.51	20.27	19.56	-149.80	375.70	-616.32	1,265.65	1,227.14	38.51	32.863		
5,600.00	5,538.22	5,401.22	5,340.44	20.66	19.94	-149.82	384.46	-630.37	1,295.69	1,256.44	39.24	33.016		
5,700.00	5,636.70	5,505.84	5,434.38	21.05	20.34	-149.84	393.23	-644.42	1,325.72	1,285.72	40.00	33.141		
5,800.00	5,735.18	5,589.54	5,528.31	21.43	20.67	-149.86	401.99	-658.48	1,355.76	1,315.08	40.68	33.326		
5,900.00	5,833.66	5,684.92	5,622.24	21.82	21.03	-149.87	410.75	-672.53	1,385.80	1,344.40	41.41	33.469		
6,000.00	5,932.14	5,780.30	5,716.17	22.20	21.40	-149.89	419.51	-686.58	1,415.84	1,373.71	42.13	33.607		
6,100.00	6,030.62	5,875.68	5,810.10	22.59	21.77	-149.91	428.28	-700.64	1,445.88	1,403.02	42.85	33.740		
6,200.00	6,129.10	5,971.06	5,904.04	22.97	22.14	-149.92	437.04	-714.69	1,475.92	1,432.34	43.58	33.868		
6,300.00	6,227.58	6,066.44	5,997.97	23.36	22.51	-149.94	445.80	-728.74	1,505.95	1,461.65	44.30	33.992		
6,400.00	6,326.06	6,161.83	6,091.90	23.75	22.88	-149.96	454.57	-742.80	1,535.99	1,490.97	45.03	34.112		
6,500.00	6,424.54	6,257.21	6,185.83	24.13	23.25	-149.97	463.33	-756.85	1,566.03	1,520.28	45.75	34.228		
6,600.00	6,523.02	6,352.59	6,279.77	24.52	23.62	-149.98	472.09	-770.90	1,596.07	1,549.59	46.48	34.340		
6,700.00	6,621.50	6,447.97	6,373.70	24.91	23.99	-150.00	480.86	-784.96	1,626.11	1,578.91	47.20	34.449		
6,800.00	6,719.99	6,543.35	6,467.63	25.29	24.36	-150.01	489.62	-799.01	1,656.15	1,608.22	47.93	34.554		
6,900.00	6,818.47	6,638.73	6,561.56	25.68	24.73	-150.02	498.38	-813.06	1,686.19	1,637.53	48.66	34.656		
7,000.00	6,916.95	6,734.11	6,655.49	26.06	25.10	-150.03	507.15	-827.12	1,716.23	1,666.84	49.38	34.755		
7,100.00	7,015.43	6,829.49	6,749.43	26.45	25.47	-150.04	515.91	-841.17	1,746.27	1,696.16	50.11	34.850		
7,200.00	7,113.91	6,924.87	6,843.36	26.84	25.83	-150.06	524.67	-855.22	1,776.30	1,725.47	50.83	34.943		
7,300.00	7,212.39	7,020.25	6,937.29	27.22	26.20	-150.07	533.43	-869.28	1,806.34	1,754.78	51.56	35.034		
7,400.00	7,310.87	7,115.64	7,031.22	27.61	26.57	-150.08	542.20	-883.33	1,836.38	1,784.10	52.29	35.121		
7,500.00	7,409.35	7,278.06	7,191.56	28.00	27.19	-150.13	555.86	-905.25	1,865.52	1,812.04	53.47	34.886		
7,600.00	7,507.83	7,506.35	7,418.79	28.38	28.02	-150.43	567.16	-923.37	1,888.75	1,833.82	54.93	34.387		
7,700.00	7,606.31	7,706.06	7,606.31	28.77	28.70	-150.85	569.36	-926.89	1,905.49	1,849.45	56.04	34.003		
7,800.00	7,704.79	7,807.58	7,704.79	29.16	29.04	-151.11	569.36	-926.89	1,920.73	1,863.97	56.76	33.842		
7,900.00	7,803.27	7,909.10	7,803.27	29.54	29.38	-151.35	569.36	-926.89	1,936.00	1,878.53	57.47	33.685		
8,000.00	7,901.75	7,989.38	7,901.75	29.93	29.65	-151.60	569.36	-926.89	1,951.31	1,893.19	58.12	33.574		
8,100.00	8,000.29	8,087.92	8,000.29	30.32	29.98	-151.89	569.36	-926.89	1,966.39	1,907.56	58.83	33.427		
8,200.00	8,099.27	8,186.90	8,099.27	30.69	30.32	-152.20	569.36	-926.89	1,978.96	1,919.43	59.53	33.243		
8,300.00	8,198.68	8,286.31	8,198.68	31.06	30.65	-152.44	569.36	-926.89	1,988.49	1,928.26	60.23	33.015		
8,400.00	8,298.41	8,386.04	8,298.41	31.41	30.99	-152.59	569.36	-926.89	1,994.94	1,934.01	60.92	32.744		
8,500.00	8,398.34	8,485.97	8,398.34	31.76	31.33	-152.67	569.36	-926.89	1,998.30	1,936.68	61.61	32.434		
8,600.00	8,498.33	8,585.96	8,498.33	32.09	31.66	-88.60	569.36	-926.89	1,998.82	1,936.54	62.29	32.090		
8,700.00	8,598.33	8,685.96	8,598.33	32.43	32.00	-88.60	569.36	-926.89	1,998.82	1,935.86	62.96	31.746		
8,800.00	8,698.33	8,785.96	8,698.33	32.76	32.34	-88.60	569.36	-926.89	1,998.82	1,935.19	63.64	31.409		
8,900.00	8,798.33	8,885.96	8,798.33	33.09	32.68	-88.60	569.36	-926.89	1,998.82	1,934.51	64.31	31.079		
9,000.00	8,898.33	8,985.96	8,898.33	33.43	33.02	-88.60	569.36	-926.89	1,998.82	1,933.83	64.99	30.756		
9,100.00	8,998.33	9,085.96	8,998.33	33.76	33.36	-88.60	569.36	-926.89	1,998.82	1,933.16	65.67	30.438		
9,200.00	9,098.33	9,185.96	9,098.33	34.10	33.70	-88.60	569.36	-926.89	1,998.82	1,932.48	66.35	30.127		
9,300.00	9,198.33	9,285.96	9,198.33	34.43	34.04	-88.60	569.36	-926.89	1,998.82	1,931.80	67.03	29.821		
9,400.00	9,298.33	9,385.96	9,298.33	34.77	34.39	-88.60	569.36	-926.89	1,998.82	1,931.12	67.71	29.522		
9,500.00	9,398.33	9,485.96	9,398.33	35.10	34.73	-88.60	569.36	-926.89	1,998.82	1,930.44	68.39	29.228		
9,600.00	9,498.33	9,585.96	9,498.33	35.44	35.07	-88.60	569.36	-926.89	1,998.82	1,929.75	69.07	28.939		
9,700.00	9,598.33	9,685.96	9,598.33	35.78	35.41	-88.60	569.36	-926.89	1,998.82	1,929.07	69.75	28.656		
9,800.00	9,698.33	9,785.96	9,698.33	36.11	35.76	-88.60	569.36	-926.89	1,998.82	1,928.39	70.43	28.379		
9,900.00	9,798.33	9,885.96	9,798.33	36.45	36.10	-88.60	569.36	-926.89	1,998.82	1,927.71	71.12	28.106		
10,000.00	9,898.33	9,985.96	9,898.33	36.79	36.44	-88.60	569.36	-926.89	1,998.82	1,927.02	71.80	27.838		
10,100.00	9,998.33	10,085.96	9,998.33	37.13	36.79	-88.60	569.36	-926.89	1,998.82	1,926.34	72.49	27.575		
10,200.00	10,098.33	10,185.96	10,098.33	37.47	37.13	-88.60	569.36	-926.89	1,998.82	1,925.65	73.17	27.316		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A													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	10,198.33	10,285.96	10,198.33	37.81	37.47	-88.60	569.36	-926.89	1,998.82	1,924.96	73.86	27.063		
10,400.00	10,298.32	10,385.95	10,298.32	38.15	37.82	-88.80	569.36	-926.89	1,998.81	1,924.26	74.55	26.813		
10,500.00	10,397.31	10,483.40	10,395.75	38.49	38.16	-89.16	570.36	-926.89	1,998.59	1,923.36	75.23	26.566		
10,600.00	10,492.49	10,578.99	10,490.26	38.83	38.49	-89.63	583.90	-926.82	1,998.39	1,922.47	75.91	26.325		
10,700.00	10,580.97	10,677.28	10,583.70	39.15	38.83	-90.12	613.99	-926.68	1,998.30	1,921.70	76.60	26.088		
10,724.51	10,601.32	10,701.81	10,606.12	39.22	38.92	-90.24	623.97	-926.63	1,998.29	1,921.53	76.77	26.031		
10,800.00	10,660.07	10,778.57	10,673.17	39.43	39.17	-90.61	661.22	-926.46	1,998.33	1,921.05	77.28	25.859		
10,900.00	10,727.37	10,883.13	10,755.31	39.67	39.47	-91.09	725.67	-926.16	1,998.47	1,920.54	77.93	25.644		
11,000.00	10,780.83	10,991.07	10,826.38	39.86	39.75	-91.55	806.71	-925.78	1,998.71	1,920.15	78.55	25.444		
11,100.00	10,818.84	11,102.41	10,882.45	40.01	39.99	-91.96	902.70	-925.32	1,998.99	1,919.86	79.13	25.263		
11,200.00	10,840.23	11,216.94	10,919.66	40.16	40.22	-92.31	1,010.80	-924.82	1,999.26	1,919.62	79.65	25.102		
11,300.00	10,844.96	11,334.23	10,934.75	40.31	40.45	-92.57	1,126.92	-924.27	1,999.45	1,919.35	80.10	24.961		
11,400.00	10,844.96	11,436.65	10,934.96	40.50	40.66	-92.58	1,229.33	-923.79	1,999.29	1,918.76	80.53	24.826		
11,500.00	10,844.96	11,536.65	10,934.96	40.72	40.89	-92.58	1,329.33	-923.32	1,999.12	1,918.13	81.00	24.682		
11,600.00	10,844.96	11,636.65	10,934.96	40.96	41.14	-92.58	1,429.33	-922.85	1,998.95	1,917.45	81.51	24.526		
11,700.00	10,844.96	11,736.65	10,934.96	41.23	41.42	-92.58	1,529.33	-922.38	1,998.79	1,916.73	82.06	24.359		
11,800.00	10,844.96	11,836.65	10,934.96	41.52	41.71	-92.58	1,629.32	-921.91	1,998.62	1,915.97	82.65	24.182		
11,900.00	10,844.96	11,936.65	10,934.96	41.83	42.03	-92.58	1,729.32	-921.44	1,998.45	1,915.17	83.28	23.996		
12,000.00	10,844.96	12,036.65	10,934.96	42.16	42.37	-92.58	1,829.32	-920.97	1,998.28	1,914.33	83.96	23.801		
12,100.00	10,844.96	12,136.65	10,934.96	42.52	42.73	-92.58	1,929.32	-920.50	1,998.12	1,913.45	84.67	23.599		
12,200.00	10,844.96	12,236.65	10,934.96	42.89	43.10	-92.58	2,029.32	-920.03	1,997.95	1,912.53	85.42	23.390		
12,300.00	10,844.96	12,336.65	10,934.96	43.28	43.50	-92.58	2,129.32	-919.56	1,997.78	1,911.57	86.21	23.175		
12,400.00	10,844.96	12,436.65	10,934.96	43.68	43.91	-92.58	2,229.32	-919.09	1,997.61	1,910.58	87.03	22.954		
12,500.00	10,844.96	12,536.65	10,934.96	44.11	44.34	-92.58	2,329.32	-918.62	1,997.44	1,909.56	87.89	22.728		
12,600.00	10,844.96	12,636.65	10,934.96	44.55	44.79	-92.58	2,429.31	-918.15	1,997.28	1,908.50	88.78	22.497		
12,700.00	10,844.96	12,736.65	10,934.96	45.01	45.25	-92.58	2,529.31	-917.68	1,997.11	1,907.41	89.70	22.264		
12,800.00	10,844.96	12,836.65	10,934.96	45.48	45.73	-92.58	2,629.31	-917.21	1,996.94	1,906.28	90.66	22.027		
12,900.00	10,844.96	12,936.65	10,934.96	45.97	46.22	-92.58	2,729.31	-916.74	1,996.77	1,905.13	91.65	21.788		
13,000.00	10,844.97	13,036.65	10,934.97	46.48	46.73	-92.58	2,829.31	-916.27	1,996.61	1,903.94	92.66	21.547		
13,100.00	10,844.97	13,136.65	10,934.97	47.00	47.25	-92.58	2,929.31	-915.80	1,996.44	1,902.73	93.71	21.305		
13,200.00	10,844.97	13,236.65	10,934.97	47.53	47.79	-92.58	3,029.31	-915.34	1,996.27	1,901.49	94.78	21.062		
13,300.00	10,844.97	13,336.65	10,934.97	48.08	48.34	-92.58	3,129.31	-914.87	1,996.10	1,900.22	95.88	20.818		
13,400.00	10,844.97	13,436.65	10,934.97	48.64	48.90	-92.58	3,229.30	-914.40	1,995.94	1,898.93	97.01	20.574		
13,500.00	10,844.97	13,536.65	10,934.97	49.21	49.48	-92.58	3,329.30	-913.93	1,995.77	1,897.61	98.16	20.331		
13,600.00	10,844.97	13,636.65	10,934.97	49.80	50.06	-92.58	3,429.30	-913.46	1,995.60	1,896.26	99.34	20.089		
13,700.00	10,844.97	13,736.65	10,934.97	50.39	50.66	-92.59	3,529.30	-912.99	1,995.43	1,894.89	100.54	19.847		
13,800.00	10,844.97	13,836.65	10,934.97	51.00	51.27	-92.59	3,629.30	-912.52	1,995.26	1,893.50	101.76	19.607		
13,900.00	10,844.97	13,936.65	10,934.97	51.62	51.89	-92.59	3,729.30	-912.05	1,995.10	1,892.09	103.01	19.369		
14,000.00	10,844.97	14,036.65	10,934.97	52.25	52.52	-92.59	3,829.30	-911.58	1,994.93	1,890.66	104.27	19.132		
14,100.00	10,844.97	14,136.65	10,934.97	52.89	53.16	-92.59	3,929.30	-911.11	1,994.76	1,889.21	105.56	18.898		
14,200.00	10,844.97	14,236.65	10,934.97	53.54	53.82	-92.59	4,029.29	-910.64	1,994.59	1,887.73	106.86	18.665		
14,300.00	10,844.97	14,336.65	10,934.97	54.20	54.48	-92.59	4,129.29	-910.17	1,994.43	1,886.24	108.19	18.435		
14,400.00	10,844.97	14,436.65	10,934.97	54.86	55.15	-92.59	4,229.29	-909.70	1,994.26	1,884.73	109.53	18.208		
14,500.00	10,844.97	14,536.64	10,934.97	55.54	55.82	-92.59	4,329.29	-909.23	1,994.09	1,883.20	110.89	17.983		
14,600.00	10,844.97	14,636.64	10,934.97	56.23	56.51	-92.59	4,429.29	-908.76	1,993.92	1,881.66	112.26	17.761		
14,700.00	10,844.97	14,736.64	10,934.97	56.92	57.20	-92.59	4,529.29	-908.29	1,993.76	1,880.10	113.66	17.542		
14,800.00	10,844.97	14,836.64	10,934.97	57.62	57.91	-92.59	4,629.29	-907.82	1,993.59	1,878.52	115.07	17.326		
14,900.00	10,844.97	14,936.64	10,934.97	58.33	58.62	-92.59	4,729.29	-907.35	1,993.42	1,876.93	116.49	17.113		
15,000.00	10,844.97	15,036.64	10,934.97	59.04	59.33	-92.59	4,829.28	-906.88	1,993.25	1,875.33	117.93	16.902		
15,100.00	10,844.97	15,136.64	10,934.97	59.77	60.06	-92.59	4,929.28	-906.41	1,993.08	1,873.71	119.38	16.695		
15,200.00	10,844.97	15,236.64	10,934.98	60.50	60.79	-92.59	5,029.28	-905.94	1,992.92	1,872.07	120.84	16.492		
15,300.00	10,844.98	15,336.64	10,934.98	61.23	61.53	-92.59	5,129.28	-905.47	1,992.75	1,870.43	122.32	16.291		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A													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	10,844.98	15,436.64	10,934.98	61.98	62.27	-92.59	5,229.28	-905.00	1,992.58	1,868.77	123.81	16.093		
15,500.00	10,844.98	15,536.64	10,934.98	62.73	63.02	-92.59	5,329.28	-904.53	1,992.41	1,867.10	125.32	15.899		
15,600.00	10,844.98	15,636.64	10,934.98	63.48	63.78	-92.59	5,429.28	-904.06	1,992.25	1,865.41	126.83	15.708		
15,700.00	10,844.98	15,736.64	10,934.98	64.24	64.54	-92.59	5,529.28	-903.59	1,992.08	1,863.72	128.36	15.520		
15,800.00	10,844.98	15,836.64	10,934.98	65.01	65.30	-92.59	5,629.27	-903.12	1,991.91	1,862.02	129.90	15.335		
15,900.00	10,844.98	15,936.64	10,934.98	65.78	66.08	-92.59	5,729.27	-902.65	1,991.74	1,860.30	131.44	15.153		
16,000.00	10,844.98	16,036.64	10,934.98	66.56	66.85	-92.59	5,829.27	-902.18	1,991.58	1,858.57	133.00	14.974		
16,100.00	10,844.98	16,136.64	10,934.98	67.34	67.63	-92.59	5,929.27	-901.71	1,991.41	1,856.84	134.57	14.798		
16,200.00	10,844.98	16,236.64	10,934.98	68.12	68.42	-92.59	6,029.27	-901.24	1,991.24	1,855.09	136.15	14.626		
16,300.00	10,844.98	16,336.64	10,934.98	68.92	69.21	-92.59	6,129.27	-900.77	1,991.07	1,853.34	137.73	14.456		
16,400.00	10,844.98	16,436.64	10,934.98	69.71	70.01	-92.59	6,229.27	-900.30	1,990.90	1,851.58	139.33	14.289		
16,500.00	10,844.98	16,536.64	10,934.98	70.51	70.81	-92.59	6,329.27	-899.83	1,990.74	1,849.81	140.93	14.126		
16,600.00	10,844.98	16,636.64	10,934.98	71.31	71.61	-92.59	6,429.26	-899.37	1,990.57	1,848.03	142.54	13.965		
16,700.00	10,844.98	16,736.64	10,934.98	72.12	72.42	-92.59	6,529.26	-898.90	1,990.40	1,846.24	144.16	13.807		
16,800.00	10,844.98	16,836.64	10,934.98	72.93	73.23	-92.59	6,629.26	-898.43	1,990.23	1,844.45	145.79	13.652		
16,900.00	10,844.98	16,936.64	10,934.98	73.75	74.05	-92.59	6,729.26	-897.96	1,990.07	1,842.64	147.42	13.499		
17,000.00	10,844.98	17,036.64	10,934.98	74.57	74.87	-92.59	6,829.26	-897.49	1,989.90	1,840.83	149.06	13.349		
17,100.00	10,844.98	17,136.64	10,934.98	75.39	75.69	-92.59	6,929.26	-897.02	1,989.73	1,839.02	150.71	13.202		
17,200.00	10,844.98	17,236.64	10,934.98	76.22	76.51	-92.59	7,029.26	-896.55	1,989.56	1,837.20	152.37	13.058		
17,300.00	10,844.98	17,336.64	10,934.98	77.05	77.34	-92.59	7,129.26	-896.08	1,989.40	1,835.37	154.03	12.916		
17,400.00	10,844.98	17,436.64	10,934.98	77.88	78.18	-92.59	7,229.25	-895.61	1,989.23	1,833.53	155.70	12.776		
17,500.00	10,844.98	17,536.64	10,934.99	78.71	79.01	-92.59	7,329.25	-895.14	1,989.06	1,831.69	157.37	12.639		
17,600.00	10,844.98	17,636.64	10,934.99	79.55	79.85	-92.59	7,429.25	-894.67	1,988.89	1,829.84	159.05	12.505		
17,700.00	10,844.99	17,736.64	10,934.99	80.39	80.69	-92.59	7,529.25	-894.20	1,988.72	1,827.99	160.74	12.372		
17,800.00	10,844.99	17,836.64	10,934.99	81.24	81.54	-92.59	7,629.25	-893.73	1,988.56	1,826.13	162.43	12.243		
17,900.00	10,844.99	17,936.64	10,934.99	82.09	82.38	-92.59	7,729.25	-893.26	1,988.39	1,824.26	164.13	12.115		
18,000.00	10,844.99	18,036.64	10,934.99	82.94	83.23	-92.59	7,829.25	-892.79	1,988.22	1,822.39	165.83	11.990		
18,100.00	10,844.99	18,136.64	10,934.99	83.79	84.08	-92.59	7,929.25	-892.32	1,988.05	1,820.52	167.54	11.866		
18,200.00	10,844.99	18,236.64	10,934.99	84.64	84.94	-92.59	8,029.24	-891.85	1,987.89	1,818.64	169.25	11.745		
18,300.00	10,844.99	18,336.64	10,934.99	85.50	85.79	-92.60	8,129.24	-891.38	1,987.72	1,816.75	170.96	11.627		
18,400.00	10,844.99	18,436.64	10,934.99	86.36	86.65	-92.60	8,229.24	-890.91	1,987.55	1,814.87	172.69	11.510		
18,500.00	10,844.99	18,536.64	10,934.99	87.22	87.52	-92.60	8,329.24	-890.44	1,987.38	1,812.97	174.41	11.395		
18,600.00	10,844.99	18,636.64	10,934.99	88.08	88.38	-92.60	8,429.24	-889.97	1,987.22	1,811.07	176.14	11.282		
18,700.00	10,844.99	18,736.64	10,934.99	88.95	89.24	-92.60	8,529.24	-889.50	1,987.05	1,809.17	177.88	11.171		
18,800.00	10,844.99	18,836.64	10,934.99	89.82	90.11	-92.60	8,629.24	-889.03	1,986.88	1,807.27	179.61	11.062		
18,900.00	10,844.99	18,936.64	10,934.99	90.69	90.98	-92.60	8,729.24	-888.56	1,986.71	1,805.36	181.36	10.955		
19,000.00	10,844.99	19,036.64	10,934.99	91.56	91.85	-92.60	8,829.23	-888.09	1,986.54	1,803.44	183.10	10.849		
19,100.00	10,844.99	19,136.64	10,934.99	92.43	92.73	-92.60	8,929.23	-887.62	1,986.38	1,801.52	184.85	10.746		
19,200.00	10,844.99	19,236.64	10,934.99	93.31	93.60	-92.60	9,029.23	-887.15	1,986.21	1,799.60	186.61	10.644		
19,300.00	10,844.99	19,336.64	10,934.99	94.19	94.48	-92.60	9,129.23	-886.68	1,986.04	1,797.68	188.36	10.544		
19,400.00	10,844.99	19,436.64	10,934.99	95.07	95.36	-92.60	9,229.23	-886.21	1,985.87	1,795.75	190.12	10.445		
19,500.00	10,844.99	19,536.64	10,934.99	95.95	96.24	-92.60	9,329.23	-885.74	1,985.71	1,793.82	191.89	10.348		
19,600.00	10,844.99	19,636.64	10,934.99	96.83	97.12	-92.60	9,429.23	-885.27	1,985.54	1,791.88	193.65	10.253		
19,700.00	10,844.99	19,736.64	10,934.99	97.72	98.01	-92.60	9,529.23	-884.80	1,985.37	1,789.95	195.42	10.159		
19,800.00	10,844.99	19,836.64	10,935.00	98.60	98.89	-92.60	9,629.22	-884.33	1,985.20	1,788.01	197.20	10.067		
19,900.00	10,844.99	19,936.64	10,935.00	99.49	99.78	-92.60	9,729.22	-883.86	1,985.04	1,786.06	198.97	9.976		
20,000.00	10,845.00	20,036.64	10,935.00	100.38	100.67	-92.60	9,829.22	-883.40	1,984.87	1,784.11	200.75	9.887		
20,100.00	10,845.00	20,136.64	10,935.00	101.27	101.56	-92.60	9,929.22	-882.93	1,984.70	1,782.16	202.54	9.799		
20,200.00	10,845.00	20,236.64	10,935.00	102.16	102.45	-92.60	10,029.22	-882.46	1,984.53	1,780.21	204.32	9.713		
20,300.00	10,845.00	20,336.64	10,935.00	103.05	103.34	-92.60	10,129.22	-881.99	1,984.36	1,778.26	206.11	9.628		
20,400.00	10,845.00	20,436.64	10,935.00	103.95	104.23	-92.60	10,229.22	-881.52	1,984.20	1,776.30	207.90	9.544		
20,500.00	10,845.00	20,536.64	10,935.00	104.84	105.13	-92.60	10,329.22	-881.05	1,984.03	1,774.34	209.69	9.462		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #3H - OH - Prelim Plan A												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
20,600.00	10,845.00	20,636.64	10,935.00	105.74	106.03	-92.60	10,429.21	-880.58	1,983.86	1,772.38	211.49	9.381	
20,700.00	10,845.00	20,736.64	10,935.00	106.64	106.92	-92.60	10,529.21	-880.11	1,983.69	1,770.41	213.28	9.301	
20,800.00	10,845.00	20,836.64	10,935.00	107.54	107.82	-92.60	10,629.21	-879.64	1,983.53	1,768.44	215.08	9.222	
20,900.00	10,845.00	20,936.64	10,935.00	108.44	108.72	-92.60	10,729.21	-879.17	1,983.36	1,766.47	216.89	9.145	
20,953.44	10,845.00	20,990.07	10,935.00	108.92	109.20	-92.60	10,782.65	-878.92	1,983.27	1,765.42	217.85	9.104	
21,000.00	10,845.00	20,982.98	10,935.00	109.34	109.14	-92.60	10,775.55	-878.95	1,983.92	1,765.77	218.15	9.094	
21,100.00	10,845.00	20,982.98	10,935.00	110.24	109.14	-92.60	10,775.55	-878.95	1,988.97	1,770.37	218.59	9.099	
21,192.85	10,845.00	20,982.98	10,935.00	111.08	109.14	-92.60	10,775.55	-878.95	1,998.13	1,779.53	218.60	9.141	

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #5H - OH - Prelim Plan A													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		
0.00	0.00	1.00	0.00	0.00	0.00	-90.07	-0.14	-119.97	119.97					
100.00	100.00	101.00	100.00	0.13	0.13	-90.07	-0.14	-119.97	119.97	119.70	0.27	452.258		
200.00	200.00	201.00	200.00	0.49	0.49	-90.07	-0.14	-119.97	119.97	118.99	0.98	122.143		
300.00	300.00	301.00	300.00	0.85	0.85	-90.07	-0.14	-119.97	119.97	118.27	1.70	70.606		
400.00	400.00	401.00	400.00	1.21	1.21	-90.07	-0.14	-119.97	119.97	117.55	2.42	49.654		
500.00	500.00	501.00	500.00	1.56	1.57	-90.07	-0.14	-119.97	119.97	116.84	3.13	38.292		
600.00	600.00	601.00	600.00	1.92	1.93	-90.07	-0.14	-119.97	119.97	116.12	3.85	31.161 CC		
700.00	700.00	700.45	699.45	2.28	2.28	-89.66	0.71	-120.20	120.20	115.63	4.56	26.334		
800.00	800.00	800.15	798.81	2.64	2.64	-88.47	3.23	-120.86	120.91	115.63	5.28	22.904 ES		
900.00	900.00	900.21	898.69	3.00	3.00	-86.90	6.60	-121.76	121.94	115.95	6.00	20.340		
1,000.00	1,000.00	1,000.27	998.57	3.36	3.36	-85.35	9.97	-122.65	123.06	116.35	6.71	18.337		
1,100.00	1,100.00	1,100.33	1,098.44	3.72	3.72	-83.84	13.34	-123.54	124.27	116.85	7.43	16.731		
1,200.00	1,200.00	1,199.61	1,198.32	4.07	4.07	-82.35	16.71	-124.44	125.57	117.43	8.14	15.423		
1,300.00	1,299.98	1,297.76	1,296.33	4.43	4.43	-144.72	21.63	-125.74	129.06	120.22	8.85	14.591		
1,400.00	1,399.84	1,395.40	1,393.62	4.78	4.78	-142.66	29.73	-127.89	136.93	127.39	9.54	14.351		
1,500.00	1,499.45	1,492.29	1,489.80	5.13	5.13	-140.45	40.93	-130.86	149.24	139.00	10.23	14.583		
1,600.00	1,598.70	1,588.15	1,584.53	5.49	5.48	-138.30	55.11	-134.62	165.97	155.05	10.92	15.200		
1,700.00	1,697.47	1,685.58	1,680.49	5.85	5.83	-136.61	71.43	-138.95	186.42	174.80	11.62	16.045		
1,800.00	1,795.95	1,783.15	1,776.57	6.21	6.18	-135.82	87.81	-143.29	208.19	195.87	12.32	16.895		
1,900.00	1,894.43	1,880.71	1,872.65	6.57	6.54	-135.17	104.18	-147.63	230.00	216.97	13.03	17.652		
2,000.00	1,992.91	1,978.27	1,968.73	6.94	6.90	-134.64	120.56	-151.97	251.83	238.09	13.74	18.328		
2,100.00	2,091.39	2,075.84	2,064.82	7.31	7.26	-134.19	136.93	-156.31	273.67	259.22	14.45	18.934		
2,200.00	2,189.87	2,173.40	2,160.90	7.68	7.62	-133.81	153.31	-160.65	295.53	280.36	15.17	19.480		
2,300.00	2,288.35	2,270.97	2,256.98	8.05	7.99	-133.48	169.68	-164.99	317.40	301.51	15.89	19.975		
2,400.00	2,386.83	2,368.53	2,353.06	8.42	8.35	-133.19	186.05	-169.33	339.28	322.67	16.61	20.424		
2,500.00	2,485.31	2,466.09	2,449.14	8.80	8.72	-132.94	202.43	-173.67	361.17	343.83	17.34	20.834		
2,600.00	2,583.79	2,563.66	2,545.23	9.18	9.08	-132.72	218.80	-178.01	383.06	365.00	18.06	21.209		
2,700.00	2,682.27	2,661.22	2,641.31	9.55	9.45	-132.52	235.18	-182.36	404.96	386.17	18.79	21.554		
2,800.00	2,780.75	2,758.79	2,737.39	9.93	9.81	-132.34	251.55	-186.70	426.86	407.34	19.52	21.872		
2,900.00	2,879.23	2,856.35	2,833.47	10.31	10.18	-132.18	267.92	-191.04	448.77	428.52	20.25	22.166		
3,000.00	2,977.72	2,953.91	2,929.55	10.69	10.55	-132.03	284.30	-195.38	470.67	449.70	20.98	22.438		
3,100.00	3,076.20	3,051.48	3,025.64	11.07	10.92	-131.90	300.67	-199.72	492.58	470.88	21.71	22.692		
3,200.00	3,174.68	3,149.04	3,121.72	11.45	11.29	-131.78	317.05	-204.06	514.50	492.06	22.44	22.927		
3,300.00	3,273.16	3,246.61	3,217.80	11.83	11.65	-131.67	333.42	-208.40	536.41	513.24	23.17	23.148		
3,400.00	3,371.64	3,344.17	3,313.88	12.21	12.02	-131.56	349.80	-212.74	558.33	534.42	23.91	23.354		
3,500.00	3,470.12	3,441.73	3,409.97	12.59	12.39	-131.47	366.17	-217.08	580.25	555.61	24.64	23.547		
3,600.00	3,568.60	3,539.30	3,506.05	12.97	12.76	-131.38	382.54	-221.42	602.17	576.79	25.38	23.729		
3,700.00	3,667.08	3,636.86	3,602.13	13.36	13.13	-131.30	398.92	-225.77	624.09	597.98	26.11	23.900		
3,800.00	3,765.56	3,734.42	3,698.21	13.74	13.50	-131.22	415.29	-230.11	646.01	619.16	26.85	24.061		
3,900.00	3,864.04	3,831.99	3,794.29	14.12	13.87	-131.15	431.67	-234.45	667.93	640.35	27.59	24.213		
4,000.00	3,962.52	3,929.55	3,890.38	14.51	14.24	-131.08	448.04	-238.79	689.86	661.54	28.32	24.357		
4,100.00	4,061.00	4,027.12	3,986.46	14.89	14.61	-131.02	464.41	-243.13	711.78	682.72	29.06	24.493		
4,200.00	4,159.48	4,128.02	4,085.84	15.27	15.00	-130.96	481.27	-247.60	733.67	703.85	29.82	24.601		
4,300.00	4,257.97	4,224.11	4,200.68	15.66	15.43	-131.10	497.68	-251.95	753.96	723.27	30.68	24.573		
4,400.00	4,356.45	4,361.09	4,316.99	16.04	15.86	-131.51	509.64	-255.12	771.86	740.33	31.52	24.485		
4,500.00	4,454.93	4,478.57	4,434.21	16.43	16.28	-132.18	517.03	-257.08	787.40	755.06	32.34	24.345		
4,600.00	4,553.41	4,596.15	4,551.75	16.81	16.69	-133.11	519.77	-257.81	800.67	767.53	33.14	24.162		
4,700.00	4,651.89	4,703.71	4,651.89	17.19	17.06	-134.01	519.79	-257.81	812.74	778.86	33.88	23.989		
4,800.00	4,750.37	4,805.23	4,750.37	17.58	17.40	-134.87	519.79	-257.81	824.99	790.39	34.60	23.842		
4,900.00	4,848.85	4,906.75	4,848.85	17.96	17.75	-135.71	519.79	-257.81	837.43	802.10	35.32	23.707		
5,000.00	4,947.33	5,008.27	4,947.33	18.35	18.10	-136.52	519.79	-257.81	850.04	813.99	36.05	23.581		
5,100.00	5,045.81	5,109.79	5,045.81	18.73	18.45	-137.31	519.79	-257.81	862.81	826.04	36.77	23.465		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #5H - OH - Prelim Plan A													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		
5,200.00	5,144.29	5,188.69	5,144.29	19.12	18.73	-138.07	519.79	-257.81	875.74	838.32	37.42	23.406		
5,300.00	5,242.77	5,287.17	5,242.77	19.50	19.07	-138.82	519.79	-257.81	888.82	850.69	38.13	23.311		
5,400.00	5,341.25	5,385.65	5,341.25	19.89	19.41	-139.54	519.79	-257.81	902.05	863.20	38.84	23.223		
5,500.00	5,439.73	5,484.13	5,439.73	20.27	19.75	-140.24	519.79	-257.81	915.41	875.85	39.56	23.142		
5,600.00	5,538.22	5,582.61	5,538.22	20.66	20.09	-140.92	519.79	-257.81	928.91	888.64	40.27	23.066		
5,700.00	5,636.70	5,681.09	5,636.70	21.05	20.44	-141.58	519.79	-257.81	942.53	901.54	40.99	22.996		
5,800.00	5,735.18	5,779.58	5,735.18	21.43	20.78	-142.22	519.79	-257.81	956.27	914.57	41.70	22.932		
5,900.00	5,833.66	5,878.06	5,833.66	21.82	21.12	-142.85	519.79	-257.81	970.14	927.72	42.42	22.872		
6,000.00	5,932.14	5,976.54	5,932.14	22.20	21.47	-143.46	519.79	-257.81	984.11	940.98	43.13	22.816		
6,100.00	6,030.62	6,075.02	6,030.62	22.59	21.81	-144.05	519.79	-257.81	998.19	954.34	43.85	22.765		
6,200.00	6,129.10	6,173.50	6,129.10	22.97	22.15	-144.62	519.79	-257.81	1,012.37	967.80	44.56	22.717		
6,300.00	6,227.58	6,271.98	6,227.58	23.36	22.50	-145.18	519.79	-257.81	1,026.64	981.36	45.28	22.673		
6,400.00	6,326.06	6,370.46	6,326.06	23.75	22.84	-145.72	519.79	-257.81	1,041.02	995.02	46.00	22.632		
6,500.00	6,424.54	6,468.94	6,424.54	24.13	23.19	-146.25	519.79	-257.81	1,055.48	1,008.76	46.71	22.594		
6,600.00	6,523.02	6,567.42	6,523.02	24.52	23.53	-146.76	519.79	-257.81	1,070.03	1,022.60	47.43	22.559		
6,700.00	6,621.50	6,665.90	6,621.50	24.91	23.88	-147.26	519.79	-257.81	1,084.66	1,036.51	48.15	22.527		
6,800.00	6,719.99	6,764.38	6,719.99	25.29	24.22	-147.75	519.79	-257.81	1,099.37	1,050.50	48.87	22.497		
6,900.00	6,818.47	6,862.86	6,818.47	25.68	24.57	-148.23	519.79	-257.81	1,114.16	1,064.57	49.59	22.469		
7,000.00	6,916.95	6,961.34	6,916.95	26.06	24.92	-148.69	519.79	-257.81	1,129.02	1,078.71	50.30	22.444		
7,100.00	7,015.43	7,059.83	7,015.43	26.45	25.26	-149.14	519.79	-257.81	1,143.95	1,092.93	51.02	22.420		
7,200.00	7,113.91	7,158.31	7,113.91	26.84	25.61	-149.58	519.79	-257.81	1,158.95	1,107.21	51.74	22.399		
7,300.00	7,212.39	7,256.79	7,212.39	27.22	25.96	-150.00	519.79	-257.81	1,174.01	1,121.55	52.46	22.379		
7,400.00	7,310.87	7,355.27	7,310.87	27.61	26.30	-150.42	519.79	-257.81	1,189.14	1,135.96	53.18	22.361		
7,500.00	7,409.35	7,453.75	7,409.35	28.00	26.65	-150.83	519.79	-257.81	1,204.33	1,150.43	53.90	22.344		
7,600.00	7,507.83	7,552.23	7,507.83	28.38	27.00	-151.22	519.79	-257.81	1,219.57	1,164.95	54.62	22.329		
7,700.00	7,606.31	7,650.71	7,606.31	28.77	27.34	-151.61	519.79	-257.81	1,234.87	1,179.53	55.34	22.315		
7,800.00	7,704.79	7,749.19	7,704.79	29.16	27.69	-151.99	519.79	-257.81	1,250.23	1,194.17	56.06	22.302		
7,900.00	7,803.27	7,847.67	7,803.27	29.54	28.04	-152.36	519.79	-257.81	1,265.64	1,208.86	56.78	22.290		
8,000.00	7,901.75	7,946.15	7,901.75	29.93	28.39	-152.71	519.79	-257.81	1,281.09	1,223.59	57.50	22.280		
8,100.00	8,000.29	8,044.68	8,000.29	30.32	28.73	-153.12	519.79	-257.81	1,296.33	1,238.11	58.22	22.266		
8,200.00	8,099.27	8,143.67	8,099.27	30.69	29.08	-153.51	519.79	-257.81	1,309.05	1,250.11	58.94	22.210		
8,300.00	8,198.68	8,243.08	8,198.68	31.06	29.44	-153.81	519.79	-257.81	1,318.69	1,259.04	59.65	22.107		
8,400.00	8,298.41	8,342.81	8,298.41	31.41	29.79	-154.00	519.79	-257.81	1,325.22	1,264.86	60.36	21.956		
8,500.00	8,398.34	8,442.74	8,398.34	31.76	30.14	-154.10	519.79	-257.81	1,328.62	1,267.56	61.06	21.759		
8,600.00	8,498.33	8,542.73	8,498.33	32.09	30.50	-90.04	519.79	-257.81	1,329.15	1,267.40	61.75	21.525		
8,700.00	8,598.33	8,642.73	8,598.33	32.43	30.85	-90.04	519.79	-257.81	1,329.15	1,266.71	62.44	21.288		
8,800.00	8,698.33	8,742.73	8,698.33	32.76	31.20	-90.04	519.79	-257.81	1,329.15	1,266.02	63.13	21.056		
8,900.00	8,798.33	8,842.73	8,798.33	33.09	31.56	-90.04	519.79	-257.81	1,329.15	1,265.34	63.81	20.828		
9,000.00	8,898.33	8,942.73	8,898.33	33.43	31.91	-90.04	519.79	-257.81	1,329.15	1,264.65	64.50	20.606		
9,100.00	8,998.33	9,042.73	8,998.33	33.76	32.27	-90.04	519.79	-257.81	1,329.15	1,263.96	65.19	20.388		
9,200.00	9,098.33	9,142.73	9,098.33	34.10	32.62	-90.04	519.79	-257.81	1,329.15	1,263.27	65.88	20.174		
9,300.00	9,198.33	9,242.73	9,198.33	34.43	32.98	-90.04	519.79	-257.81	1,329.15	1,262.57	66.58	19.964		
9,400.00	9,298.33	9,342.73	9,298.33	34.77	33.33	-90.04	519.79	-257.81	1,329.15	1,261.88	67.27	19.759		
9,500.00	9,398.33	9,442.73	9,398.33	35.10	33.68	-90.04	519.79	-257.81	1,329.15	1,261.19	67.96	19.558		
9,600.00	9,498.33	9,542.73	9,498.33	35.44	34.04	-90.04	519.79	-257.81	1,329.15	1,260.50	68.65	19.361		
9,700.00	9,598.33	9,642.73	9,598.33	35.78	34.39	-90.04	519.79	-257.81	1,329.15	1,259.80	69.35	19.167		
9,800.00	9,698.33	9,742.73	9,698.33	36.11	34.75	-90.04	519.79	-257.81	1,329.15	1,259.11	70.04	18.977		
9,900.00	9,798.33	9,842.73	9,798.33	36.45	35.10	-90.04	519.79	-257.81	1,329.15	1,258.42	70.73	18.791		
10,000.00	9,898.33	9,942.73	9,898.33	36.79	35.46	-90.04	519.79	-257.81	1,329.15	1,257.72	71.43	18.608		
10,100.00	9,998.33	10,042.73	9,998.33	37.13	35.81	-90.04	519.79	-257.81	1,329.15	1,257.03	72.12	18.429		
10,200.00	10,098.33	10,142.73	10,098.33	37.47	36.17	-90.04	519.79	-257.81	1,329.15	1,256.33	72.82	18.253		
10,300.00	10,198.33	10,242.73	10,198.33	37.81	36.53	-90.04	519.79	-257.81	1,329.15	1,255.64	73.51	18.080		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #5H - OH - Prelim Plan A													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	10,298.32	10,343.20	10,298.70	38.15	36.88	-90.11	522.70	-257.80	1,329.14	1,254.93	74.22	17.909		
10,500.00	10,397.31	10,443.22	10,396.83	38.49	37.25	-89.88	541.39	-257.73	1,329.13	1,254.20	74.93	17.739		
10,600.00	10,492.49	10,542.30	10,489.38	38.83	37.61	-89.64	576.42	-257.59	1,329.12	1,253.49	75.63	17.575		
10,700.00	10,580.97	10,640.48	10,573.79	39.15	37.95	-89.43	626.34	-257.40	1,329.12	1,252.81	76.30	17.419		
10,704.30	10,584.59	10,644.69	10,577.20	39.16	37.96	-89.42	628.80	-257.39	1,329.12	1,252.78	76.33	17.412		
10,800.00	10,660.07	10,737.85	10,647.87	39.43	38.27	-89.22	689.34	-257.15	1,329.12	1,252.17	76.95	17.273		
10,900.00	10,727.37	10,834.50	10,709.82	39.67	38.57	-89.05	763.37	-256.86	1,329.11	1,251.57	77.55	17.140		
11,000.00	10,780.83	10,930.52	10,758.20	39.86	38.85	-88.90	846.19	-256.54	1,329.10	1,251.01	78.10	17.019		
11,100.00	10,818.84	11,026.05	10,791.94	40.01	39.11	-88.78	935.44	-256.19	1,329.08	1,250.49	78.60	16.910		
11,200.00	10,840.23	11,121.20	10,810.36	40.16	39.34	-88.70	1,028.68	-255.83	1,329.04	1,250.00	79.04	16.815		
11,300.00	10,844.96	11,217.77	10,813.96	40.31	39.54	-88.66	1,125.11	-255.46	1,328.98	1,249.54	79.44	16.730		
11,400.00	10,844.96	11,317.77	10,813.96	40.50	39.77	-88.66	1,225.11	-255.07	1,328.89	1,249.03	79.86	16.639		
11,500.00	10,844.96	11,417.77	10,813.96	40.72	40.01	-88.66	1,325.11	-254.68	1,328.80	1,248.47	80.34	16.541		
11,600.00	10,844.96	11,517.77	10,813.96	40.96	40.28	-88.66	1,425.11	-254.29	1,328.72	1,247.87	80.85	16.434		
11,700.00	10,844.96	11,617.77	10,813.96	41.23	40.57	-88.66	1,525.11	-253.90	1,328.63	1,247.22	81.41	16.321		
11,800.00	10,844.96	11,717.77	10,813.96	41.52	40.88	-88.66	1,625.11	-253.51	1,328.54	1,246.54	82.01	16.200		
11,900.00	10,844.96	11,817.77	10,813.96	41.83	41.21	-88.66	1,725.11	-253.13	1,328.46	1,245.81	82.65	16.074		
12,000.00	10,844.96	11,917.77	10,813.96	42.16	41.56	-88.66	1,825.11	-252.74	1,328.37	1,245.04	83.33	15.942		
12,100.00	10,844.96	12,017.77	10,813.96	42.52	41.92	-88.66	1,925.11	-252.35	1,328.28	1,244.24	84.05	15.804		
12,200.00	10,844.96	12,117.77	10,813.96	42.89	42.31	-88.66	2,025.10	-251.96	1,328.20	1,243.39	84.80	15.662		
12,300.00	10,844.96	12,217.77	10,813.96	43.28	42.72	-88.66	2,125.10	-251.57	1,328.11	1,242.51	85.60	15.516		
12,400.00	10,844.96	12,317.77	10,813.96	43.68	43.14	-88.66	2,225.10	-251.18	1,328.02	1,241.59	86.43	15.365		
12,500.00	10,844.96	12,417.77	10,813.96	44.11	43.58	-88.66	2,325.10	-250.79	1,327.94	1,240.64	87.29	15.212		
12,600.00	10,844.96	12,517.77	10,813.96	44.55	44.04	-88.66	2,425.10	-250.41	1,327.85	1,239.66	88.19	15.056		
12,700.00	10,844.96	12,617.77	10,813.96	45.01	44.52	-88.66	2,525.10	-250.02	1,327.76	1,238.64	89.13	14.898		
12,800.00	10,844.96	12,717.77	10,813.96	45.48	45.01	-88.66	2,625.10	-249.63	1,327.68	1,237.59	90.09	14.737		
12,900.00	10,844.96	12,817.77	10,813.96	45.97	45.51	-88.66	2,725.10	-249.24	1,327.59	1,236.50	91.09	14.575		
13,000.00	10,844.97	12,917.77	10,813.97	46.48	46.03	-88.66	2,825.10	-248.85	1,327.50	1,235.39	92.11	14.412		
13,100.00	10,844.97	13,017.77	10,813.97	47.00	46.57	-88.66	2,925.10	-248.46	1,327.42	1,234.25	93.16	14.248		
13,200.00	10,844.97	13,117.77	10,813.97	47.53	47.12	-88.66	3,025.10	-248.07	1,327.33	1,233.08	94.25	14.084		
13,300.00	10,844.97	13,217.77	10,813.97	48.08	47.68	-88.66	3,125.10	-247.69	1,327.24	1,231.89	95.36	13.919		
13,400.00	10,844.97	13,317.77	10,813.97	48.64	48.25	-88.66	3,225.10	-247.30	1,327.16	1,230.67	96.49	13.754		
13,500.00	10,844.97	13,417.77	10,813.97	49.21	48.84	-88.66	3,325.09	-246.91	1,327.07	1,229.42	97.65	13.590		
13,600.00	10,844.97	13,517.77	10,813.97	49.80	49.44	-88.66	3,425.09	-246.52	1,326.98	1,228.15	98.83	13.426		
13,700.00	10,844.97	13,617.77	10,813.97	50.39	50.05	-88.66	3,525.09	-246.13	1,326.90	1,226.85	100.04	13.263		
13,800.00	10,844.97	13,717.77	10,813.97	51.00	50.67	-88.66	3,625.09	-245.74	1,326.81	1,225.54	101.27	13.101		
13,900.00	10,844.97	13,817.77	10,813.97	51.62	51.30	-88.66	3,725.09	-245.35	1,326.72	1,224.20	102.52	12.940		
14,000.00	10,844.97	13,917.77	10,813.97	52.25	51.95	-88.66	3,825.09	-244.96	1,326.64	1,222.84	103.80	12.781		
14,100.00	10,844.97	14,017.77	10,813.97	52.89	52.60	-88.66	3,925.09	-244.58	1,326.55	1,221.46	105.09	12.623		
14,200.00	10,844.97	14,117.77	10,813.97	53.54	53.26	-88.66	4,025.09	-244.19	1,326.46	1,220.06	106.40	12.466		
14,300.00	10,844.97	14,217.77	10,813.97	54.20	53.93	-88.66	4,125.09	-243.80	1,326.38	1,218.64	107.74	12.311		
14,400.00	10,844.97	14,317.77	10,813.97	54.86	54.61	-88.66	4,225.09	-243.41	1,326.29	1,217.20	109.08	12.158		
14,500.00	10,844.97	14,417.77	10,813.97	55.54	55.30	-88.66	4,325.09	-243.02	1,326.20	1,215.75	110.45	12.007		
14,600.00	10,844.97	14,517.77	10,813.97	56.23	56.00	-88.66	4,425.09	-242.63	1,326.12	1,214.28	111.84	11.858		
14,700.00	10,844.97	14,617.77	10,813.97	56.92	56.70	-88.66	4,525.09	-242.24	1,326.03	1,212.79	113.24	11.710		
14,800.00	10,844.97	14,717.77	10,813.97	57.62	57.42	-88.66	4,625.08	-241.86	1,325.94	1,211.29	114.65	11.565		
14,900.00	10,844.97	14,817.77	10,813.97	58.33	58.14	-88.66	4,725.08	-241.47	1,325.85	1,209.77	116.08	11.422		
15,000.00	10,844.97	14,917.77	10,813.97	59.04	58.86	-88.66	4,825.08	-241.08	1,325.77	1,208.24	117.53	11.281		
15,100.00	10,844.97	15,017.77	10,813.97	59.77	59.60	-88.66	4,925.08	-240.69	1,325.68	1,206.70	118.98	11.142		
15,200.00	10,844.97	15,117.77	10,813.97	60.50	60.34	-88.66	5,025.08	-240.30	1,325.59	1,205.14	120.46	11.005		
15,300.00	10,844.98	15,217.77	10,813.98	61.23	61.08	-88.66	5,125.08	-239.91	1,325.51	1,203.57	121.94	10.870		
15,400.00	10,844.98	15,317.77	10,813.98	61.98	61.84	-88.66	5,225.08	-239.52	1,325.42	1,201.98	123.44	10.737		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #5H - OH - Prelim Plan A													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	10,844.98	15,417.77	10,813.98	62.73	62.60	-88.66	5,325.08	-239.14	1,325.33	1,200.39	124.95	10.607		
15,600.00	10,844.98	15,517.77	10,813.98	63.48	63.36	-88.66	5,425.08	-238.75	1,325.25	1,198.78	126.47	10.479		
15,700.00	10,844.98	15,617.77	10,813.98	64.24	64.13	-88.66	5,525.08	-238.36	1,325.16	1,197.16	128.00	10.353		
15,800.00	10,844.98	15,717.77	10,813.98	65.01	64.91	-88.66	5,625.08	-237.97	1,325.07	1,195.53	129.55	10.229		
15,900.00	10,844.98	15,817.77	10,813.98	65.78	65.69	-88.66	5,725.08	-237.58	1,324.99	1,193.89	131.10	10.107		
16,000.00	10,844.98	15,917.77	10,813.98	66.56	66.47	-88.66	5,825.07	-237.19	1,324.90	1,192.24	132.66	9.987		
16,100.00	10,844.98	16,017.77	10,813.98	67.34	67.26	-88.66	5,925.07	-236.80	1,324.81	1,190.58	134.24	9.869		
16,200.00	10,844.98	16,117.77	10,813.98	68.12	68.06	-88.66	6,025.07	-236.41	1,324.73	1,188.91	135.82	9.754		
16,300.00	10,844.98	16,217.77	10,813.98	68.92	68.86	-88.66	6,125.07	-236.03	1,324.64	1,187.23	137.41	9.640		
16,400.00	10,844.98	16,317.77	10,813.98	69.71	69.66	-88.66	6,225.07	-235.64	1,324.55	1,185.54	139.01	9.528		
16,500.00	10,844.98	16,417.77	10,813.98	70.51	70.47	-88.66	6,325.07	-235.25	1,324.47	1,183.85	140.62	9.419		
16,600.00	10,844.98	16,517.77	10,813.98	71.31	71.28	-88.66	6,425.07	-234.86	1,324.38	1,182.14	142.24	9.311		
16,700.00	10,844.98	16,617.77	10,813.98	72.12	72.09	-88.66	6,525.07	-234.47	1,324.29	1,180.43	143.86	9.205		
16,800.00	10,844.98	16,717.77	10,813.98	72.93	72.91	-88.66	6,625.07	-234.08	1,324.21	1,178.71	145.49	9.102		
16,900.00	10,844.98	16,817.77	10,813.98	73.75	73.74	-88.66	6,725.07	-233.69	1,324.12	1,176.99	147.13	9.000		
17,000.00	10,844.98	16,917.77	10,813.98	74.57	74.56	-88.66	6,825.07	-233.31	1,324.03	1,175.25	148.78	8.899		
17,100.00	10,844.98	17,017.76	10,813.98	75.39	75.39	-88.66	6,925.07	-232.92	1,323.95	1,173.51	150.43	8.801		
17,200.00	10,844.98	17,117.76	10,813.98	76.22	76.22	-88.66	7,025.07	-232.53	1,323.86	1,171.77	152.09	8.704		
17,300.00	10,844.98	17,217.76	10,813.98	77.05	77.06	-88.66	7,125.06	-232.14	1,323.77	1,170.01	153.76	8.609		
17,400.00	10,844.98	17,317.76	10,813.98	77.88	77.90	-88.66	7,225.06	-231.75	1,323.69	1,168.25	155.43	8.516		
17,500.00	10,844.98	17,417.76	10,813.98	78.71	78.74	-88.66	7,325.06	-231.36	1,323.60	1,166.49	157.11	8.425		
17,600.00	10,844.98	17,517.76	10,813.98	79.55	79.59	-88.66	7,425.06	-230.97	1,323.51	1,164.72	158.80	8.335		
17,700.00	10,844.99	17,617.76	10,813.99	80.39	80.43	-88.66	7,525.06	-230.59	1,323.43	1,162.94	160.49	8.246		
17,800.00	10,844.99	17,717.76	10,813.99	81.24	81.28	-88.66	7,625.06	-230.20	1,323.34	1,161.16	162.18	8.160		
17,900.00	10,844.99	17,817.76	10,813.99	82.09	82.14	-88.66	7,725.06	-229.81	1,323.25	1,159.37	163.88	8.074		
18,000.00	10,844.99	17,917.76	10,813.99	82.94	82.99	-88.66	7,825.06	-229.42	1,323.17	1,157.58	165.59	7.991		
18,100.00	10,844.99	18,017.76	10,813.99	83.79	83.85	-88.66	7,925.06	-229.03	1,323.08	1,155.78	167.30	7.908		
18,200.00	10,844.99	18,117.76	10,813.99	84.64	84.71	-88.66	8,025.06	-228.64	1,322.99	1,153.98	169.02	7.828		
18,300.00	10,844.99	18,217.76	10,813.99	85.50	85.57	-88.66	8,125.06	-228.25	1,322.91	1,152.17	170.74	7.748		
18,400.00	10,844.99	18,317.76	10,813.99	86.36	86.44	-88.66	8,225.06	-227.87	1,322.82	1,150.36	172.46	7.670		
18,500.00	10,844.99	18,417.76	10,813.99	87.22	87.30	-88.66	8,325.06	-227.48	1,322.73	1,148.54	174.19	7.594		
18,600.00	10,844.99	18,517.76	10,813.99	88.08	88.17	-88.66	8,425.05	-227.09	1,322.64	1,146.72	175.93	7.518		
18,700.00	10,844.99	18,617.76	10,813.99	88.95	89.04	-88.66	8,525.05	-226.70	1,322.56	1,144.89	177.66	7.444		
18,800.00	10,844.99	18,717.76	10,813.99	89.82	89.91	-88.66	8,625.05	-226.31	1,322.47	1,143.07	179.41	7.371		
18,900.00	10,844.99	18,817.76	10,813.99	90.69	90.79	-88.66	8,725.05	-225.92	1,322.38	1,141.23	181.15	7.300		
19,000.00	10,844.99	18,917.76	10,813.99	91.56	91.67	-88.66	8,825.05	-225.53	1,322.30	1,139.40	182.90	7.230		
19,100.00	10,844.99	19,017.76	10,813.99	92.43	92.54	-88.66	8,925.05	-225.14	1,322.21	1,137.56	184.66	7.160		
19,200.00	10,844.99	19,117.76	10,813.99	93.31	93.42	-88.66	9,025.05	-224.76	1,322.12	1,135.71	186.41	7.092		
19,300.00	10,844.99	19,217.76	10,813.99	94.19	94.31	-88.66	9,125.05	-224.37	1,322.04	1,133.86	188.17	7.026		
19,400.00	10,844.99	19,317.76	10,813.99	95.07	95.19	-88.66	9,225.05	-223.98	1,321.95	1,132.01	189.94	6.960		
19,500.00	10,844.99	19,417.76	10,813.99	95.95	96.08	-88.66	9,325.05	-223.59	1,321.86	1,130.16	191.70	6.895		
19,600.00	10,844.99	19,517.76	10,813.99	96.83	96.96	-88.66	9,425.05	-223.20	1,321.78	1,128.30	193.47	6.832		
19,700.00	10,844.99	19,617.76	10,813.99	97.72	97.85	-88.66	9,525.05	-222.81	1,321.69	1,126.44	195.25	6.769		
19,800.00	10,844.99	19,717.76	10,813.99	98.60	98.74	-88.66	9,625.04	-222.42	1,321.60	1,124.58	197.03	6.708		
19,900.00	10,844.99	19,817.76	10,813.99	99.49	99.63	-88.66	9,725.04	-222.04	1,321.52	1,122.71	198.80	6.647		
20,000.00	10,845.00	19,917.76	10,814.00	100.38	100.52	-88.66	9,825.04	-221.65	1,321.43	1,120.84	200.59	6.588		
20,100.00	10,845.00	20,017.76	10,814.00	101.27	101.42	-88.66	9,925.04	-221.26	1,321.34	1,118.97	202.37	6.529		
20,200.00	10,845.00	20,117.76	10,814.00	102.16	102.31	-88.66	10,025.04	-220.87	1,321.26	1,117.10	204.16	6.472		
20,300.00	10,845.00	20,217.76	10,814.00	103.05	103.21	-88.66	10,125.04	-220.48	1,321.17	1,115.22	205.95	6.415		
20,400.00	10,845.00	20,317.76	10,814.00	103.95	104.11	-88.66	10,225.04	-220.09	1,321.08	1,113.34	207.74	6.359		
20,500.00	10,845.00	20,417.76	10,814.00	104.84	105.01	-88.66	10,325.04	-219.70	1,321.00	1,111.46	209.54	6.304		
20,600.00	10,845.00	20,517.76	10,814.00	105.74	105.91	-88.66	10,425.04	-219.32	1,320.91	1,109.57	211.34	6.250		

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Offset Design Blue Steel 21 Fee - WD #5H - OH - Prelim Plan A												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
20,700.00	10,845.00	20,617.76	10,814.00	106.64	106.81	-88.66	10,525.04	-218.93	1,320.82	1,107.68	213.14	6.197	
20,800.00	10,845.00	20,717.76	10,814.00	107.54	107.71	-88.66	10,625.04	-218.54	1,320.74	1,105.79	214.94	6.145	
20,900.00	10,845.00	20,817.76	10,814.00	108.44	108.61	-88.65	10,725.04	-218.15	1,320.65	1,103.90	216.75	6.093	
21,000.00	10,845.00	20,917.76	10,814.00	109.34	109.52	-88.65	10,825.04	-217.76	1,320.56	1,102.01	218.55	6.042	
21,100.00	10,845.00	21,017.76	10,814.00	110.24	110.43	-88.65	10,925.03	-217.37	1,320.48	1,100.11	220.36	5.992	
21,192.85	10,845.00	21,110.61	10,814.00	111.08	111.27	-88.65	11,017.88	-217.01	1,320.40	1,098.35	222.05	5.947 SF	

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



Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	Reference Datum

Reference Depths are relative to well @ 3026.00usft

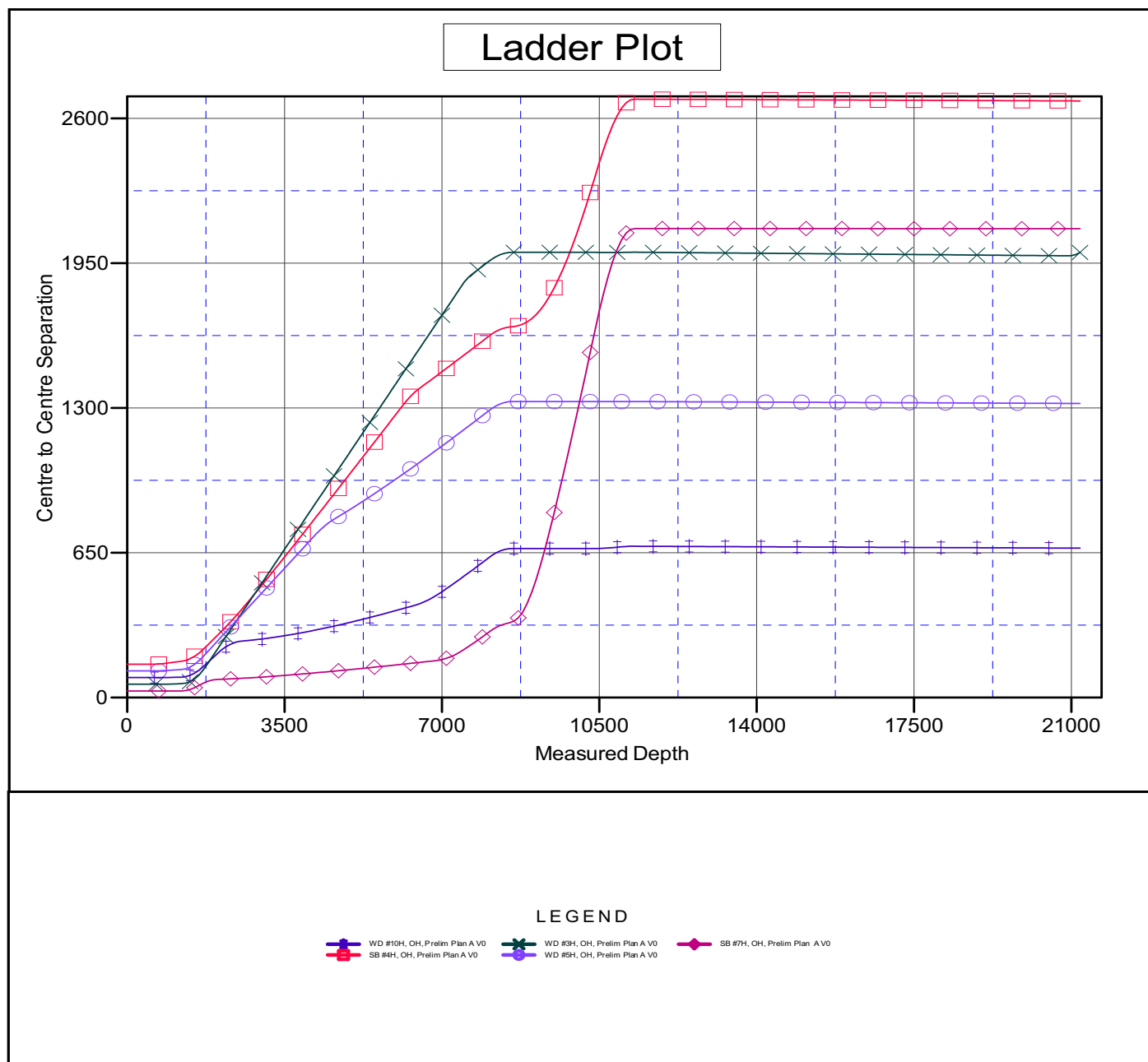
Offset Depths are relative to Offset Datum

Central Meridian is -104.3333333

Coordinates are relative to: WD #23H

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

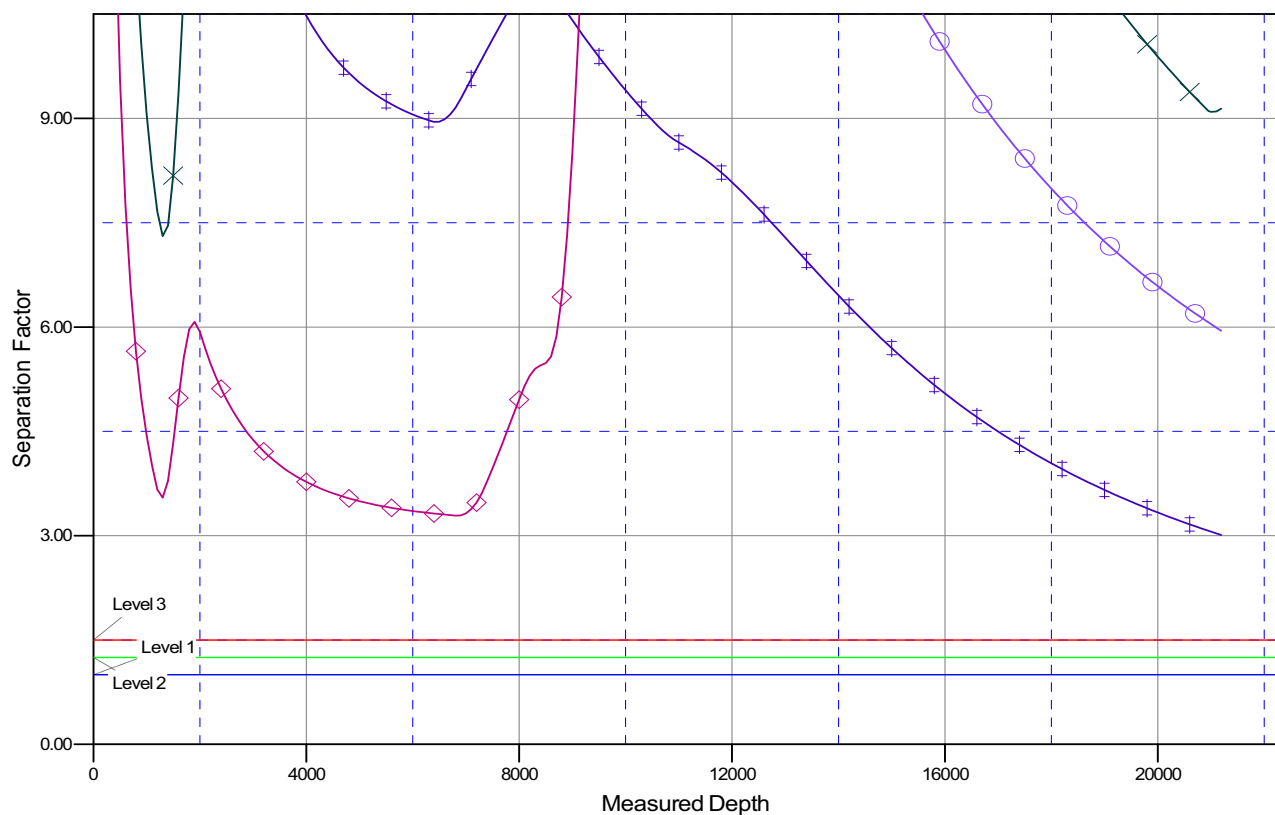


Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	WD #23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	WellPlanner1
Reference Design:	Prelim Plan A	Offset TVD Reference:	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: WD #23H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.18°

Separation Factor Plot



LEGEND

WD #10H, OH, Prelim Plan A V0
SB #4H, OH, Prelim Plan A V0
WD #3H, OH, Prelim Plan A V0
WD #5H, OH, Prelim Plan A V0
SB #7H, OH, Prelim Plan A V0

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



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Well:	WD #23H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

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

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

Well	WD #23H					
Well Position	+N/-S	0.00 usft	Northing:	466,404.41 usft	Latitude:	32.2818063
	+E/-W	0.00 usft	Easting:	604,890.47 usft	Longitude:	-103.9939299
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	2,999.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/3/2020	6.93	60.00	47,832.40

Design	Prelim Plan A				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	0.17	

Survey Tool Program	Date	4/6/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	21,192.85	Prelim Plan A (OH)	MWD+IFR1	OWSG MWD + IFR1	

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
[BlueSteel21#23H]FTP										
100.00	0.00	0.00	100.00	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	
300.00	0.00	0.00	300.00	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	
500.00	0.00	0.00	500.00	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	
700.00	0.00	0.00	700.00	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	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Well:	WD #23H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	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	2.00	64.08	1,299.98	0.76	1.57	0.77	2.00	2.00	0.00
1,400.00	4.00	64.08	1,399.84	3.05	6.28	3.07	2.00	2.00	0.00
1,500.00	6.00	64.08	1,499.45	6.86	14.12	6.90	2.00	2.00	0.00
1,600.00	8.00	64.08	1,598.70	12.19	25.08	12.26	2.00	2.00	0.00
1,700.00	10.00	64.08	1,697.47	19.02	39.14	19.14	2.00	2.00	0.00
1,800.00	10.00	64.08	1,795.95	26.61	54.76	26.78	0.00	0.00	0.00
1,900.00	10.00	64.08	1,894.43	34.20	70.38	34.41	0.00	0.00	0.00
2,000.00	10.00	64.08	1,992.91	41.79	86.00	42.05	0.00	0.00	0.00
2,100.00	10.00	64.08	2,091.39	49.38	101.62	49.69	0.00	0.00	0.00
2,200.00	10.00	64.08	2,189.87	56.98	117.24	57.32	0.00	0.00	0.00
2,300.00	10.00	64.08	2,288.35	64.57	132.85	64.96	0.00	0.00	0.00
2,400.00	10.00	64.08	2,386.83	72.16	148.47	72.60	0.00	0.00	0.00
2,500.00	10.00	64.08	2,485.31	79.75	164.09	80.23	0.00	0.00	0.00
2,600.00	10.00	64.08	2,583.79	87.34	179.71	87.87	0.00	0.00	0.00
2,700.00	10.00	64.08	2,682.27	94.93	195.33	95.51	0.00	0.00	0.00
2,800.00	10.00	64.08	2,780.75	102.52	210.94	103.14	0.00	0.00	0.00
2,900.00	10.00	64.08	2,879.23	110.11	226.56	110.78	0.00	0.00	0.00
3,000.00	10.00	64.08	2,977.72	117.70	242.18	118.42	0.00	0.00	0.00
3,100.00	10.00	64.08	3,076.20	125.29	257.80	126.05	0.00	0.00	0.00
3,200.00	10.00	64.08	3,174.68	132.88	273.42	133.69	0.00	0.00	0.00
3,300.00	10.00	64.08	3,273.16	140.47	289.03	141.32	0.00	0.00	0.00
3,400.00	10.00	64.08	3,371.64	148.06	304.65	148.96	0.00	0.00	0.00
3,500.00	10.00	64.08	3,470.12	155.65	320.27	156.60	0.00	0.00	0.00
3,600.00	10.00	64.08	3,568.60	163.24	335.89	164.23	0.00	0.00	0.00
3,700.00	10.00	64.08	3,667.08	170.83	351.51	171.87	0.00	0.00	0.00
3,800.00	10.00	64.08	3,765.56	178.42	367.12	179.51	0.00	0.00	0.00
3,900.00	10.00	64.08	3,864.04	186.01	382.74	187.14	0.00	0.00	0.00
4,000.00	10.00	64.08	3,962.52	193.60	398.36	194.78	0.00	0.00	0.00
4,100.00	10.00	64.08	4,061.00	201.19	413.98	202.42	0.00	0.00	0.00
4,200.00	10.00	64.08	4,159.48	208.78	429.60	210.05	0.00	0.00	0.00
4,300.00	10.00	64.08	4,257.97	216.37	445.22	217.69	0.00	0.00	0.00
4,400.00	10.00	64.08	4,356.45	223.96	460.83	225.33	0.00	0.00	0.00
4,500.00	10.00	64.08	4,454.93	231.55	476.45	232.96	0.00	0.00	0.00
4,600.00	10.00	64.08	4,553.41	239.14	492.07	240.60	0.00	0.00	0.00
4,700.00	10.00	64.08	4,651.89	246.73	507.69	248.24	0.00	0.00	0.00
4,800.00	10.00	64.08	4,750.37	254.32	523.31	255.87	0.00	0.00	0.00
4,900.00	10.00	64.08	4,848.85	261.91	538.92	263.51	0.00	0.00	0.00
5,000.00	10.00	64.08	4,947.33	269.50	554.54	271.15	0.00	0.00	0.00
5,100.00	10.00	64.08	5,045.81	277.09	570.16	278.78	0.00	0.00	0.00
5,200.00	10.00	64.08	5,144.29	284.68	585.78	286.42	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Well:	WD #23H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	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	64.08	5,242.77	292.27	601.40	294.06	0.00	0.00	0.00	
5,400.00	10.00	64.08	5,341.25	299.86	617.01	301.69	0.00	0.00	0.00	
5,500.00	10.00	64.08	5,439.73	307.45	632.63	309.33	0.00	0.00	0.00	
5,600.00	10.00	64.08	5,538.22	315.04	648.25	316.97	0.00	0.00	0.00	
5,700.00	10.00	64.08	5,636.70	322.63	663.87	324.60	0.00	0.00	0.00	
5,800.00	10.00	64.08	5,735.18	330.22	679.49	332.24	0.00	0.00	0.00	
5,900.00	10.00	64.08	5,833.66	337.81	695.11	339.87	0.00	0.00	0.00	
6,000.00	10.00	64.08	5,932.14	345.40	710.72	347.51	0.00	0.00	0.00	
6,100.00	10.00	64.08	6,030.62	352.99	726.34	355.15	0.00	0.00	0.00	
6,200.00	10.00	64.08	6,129.10	360.58	741.96	362.78	0.00	0.00	0.00	
6,300.00	10.00	64.08	6,227.58	368.17	757.58	370.42	0.00	0.00	0.00	
6,400.00	10.00	64.08	6,326.06	375.76	773.20	378.06	0.00	0.00	0.00	
6,500.00	10.00	64.08	6,424.54	383.36	788.81	385.69	0.00	0.00	0.00	
6,600.00	10.00	64.08	6,523.02	390.95	804.43	393.33	0.00	0.00	0.00	
6,700.00	10.00	64.08	6,621.50	398.54	820.05	400.97	0.00	0.00	0.00	
6,800.00	10.00	64.08	6,719.99	406.13	835.67	408.60	0.00	0.00	0.00	
6,900.00	10.00	64.08	6,818.47	413.72	851.29	416.24	0.00	0.00	0.00	
7,000.00	10.00	64.08	6,916.95	421.31	866.90	423.88	0.00	0.00	0.00	
7,100.00	10.00	64.08	7,015.43	428.90	882.52	431.51	0.00	0.00	0.00	
7,200.00	10.00	64.08	7,113.91	436.49	898.14	439.15	0.00	0.00	0.00	
7,300.00	10.00	64.08	7,212.39	444.08	913.76	446.79	0.00	0.00	0.00	
7,400.00	10.00	64.08	7,310.87	451.67	929.38	454.42	0.00	0.00	0.00	
7,500.00	10.00	64.08	7,409.35	459.26	944.99	462.06	0.00	0.00	0.00	
7,600.00	10.00	64.08	7,507.83	466.85	960.61	469.70	0.00	0.00	0.00	
7,700.00	10.00	64.08	7,606.31	474.44	976.23	477.33	0.00	0.00	0.00	
7,800.00	10.00	64.08	7,704.79	482.03	991.85	484.97	0.00	0.00	0.00	
7,900.00	10.00	64.08	7,803.27	489.62	1,007.47	492.61	0.00	0.00	0.00	
8,000.00	10.00	64.08	7,901.75	497.21	1,023.09	500.24	0.00	0.00	0.00	
8,058.33	10.00	64.08	7,959.20	501.64	1,032.20	504.70	0.00	0.00	0.00	
8,100.00	9.17	64.08	8,000.29	504.67	1,038.43	507.75	2.00	-2.00	0.00	
8,200.00	7.17	64.08	8,099.27	510.88	1,051.21	513.99	2.00	-2.00	0.00	
8,300.00	5.17	64.08	8,198.68	515.57	1,060.87	518.72	2.00	-2.00	0.00	
8,400.00	3.17	64.08	8,298.41	518.75	1,067.41	521.91	2.00	-2.00	0.00	
8,500.00	1.17	64.08	8,398.34	520.40	1,070.81	523.58	2.00	-2.00	0.00	
8,558.33	0.00	0.00	8,456.66	520.66	1,071.34	523.84	2.00	-2.00	0.00	
8,600.00	0.00	0.00	8,498.33	520.66	1,071.34	523.84	0.00	0.00	0.00	
8,700.00	0.00	0.00	8,598.33	520.66	1,071.34	523.84	0.00	0.00	0.00	
8,800.00	0.00	0.00	8,698.33	520.66	1,071.34	523.84	0.00	0.00	0.00	
8,900.00	0.00	0.00	8,798.33	520.66	1,071.34	523.84	0.00	0.00	0.00	
9,000.00	0.00	0.00	8,898.33	520.66	1,071.34	523.84	0.00	0.00	0.00	
9,100.00	0.00	0.00	8,998.33	520.66	1,071.34	523.84	0.00	0.00	0.00	
9,200.00	0.00	0.00	9,098.33	520.66	1,071.34	523.84	0.00	0.00	0.00	
9,300.00	0.00	0.00	9,198.33	520.66	1,071.34	523.84	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Well:	WD #23H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	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)
9,400.00	0.00	0.00	9,298.33	520.66	1,071.34	523.84	0.00	0.00	0.00
9,500.00	0.00	0.00	9,398.33	520.66	1,071.34	523.84	0.00	0.00	0.00
9,600.00	0.00	0.00	9,498.33	520.66	1,071.34	523.84	0.00	0.00	0.00
9,700.00	0.00	0.00	9,598.33	520.66	1,071.34	523.84	0.00	0.00	0.00
9,800.00	0.00	0.00	9,698.33	520.66	1,071.34	523.84	0.00	0.00	0.00
9,900.00	0.00	0.00	9,798.33	520.66	1,071.34	523.84	0.00	0.00	0.00
10,000.00	0.00	0.00	9,898.33	520.66	1,071.34	523.84	0.00	0.00	0.00
10,100.00	0.00	0.00	9,998.33	520.66	1,071.34	523.84	0.00	0.00	0.00
10,200.00	0.00	0.00	10,098.33	520.66	1,071.34	523.84	0.00	0.00	0.00
10,300.00	0.00	0.00	10,198.33	520.66	1,071.34	523.84	0.00	0.00	0.00
10,373.67	0.00	0.00	10,272.00	520.66	1,071.34	523.84	0.00	0.00	0.00
[BlueSteel21#23H]KOP									
10,400.00	2.63	0.17	10,298.32	521.27	1,071.34	524.44	10.00	10.00	0.00
10,450.00	7.63	0.17	10,348.11	525.74	1,071.36	528.91	10.00	10.00	0.00
10,500.00	12.63	0.17	10,397.31	534.53	1,071.38	537.71	10.00	10.00	0.00
10,550.00	17.63	0.17	10,445.56	547.58	1,071.42	550.76	10.00	10.00	0.00
10,600.00	22.63	0.17	10,492.49	564.79	1,071.47	567.96	10.00	10.00	0.00
10,650.00	27.63	0.17	10,537.74	586.01	1,071.54	589.19	10.00	10.00	0.00
10,700.00	32.63	0.17	10,580.97	611.11	1,071.61	614.28	10.00	10.00	0.00
10,750.00	37.63	0.17	10,621.85	639.87	1,071.70	643.05	10.00	10.00	0.00
10,800.00	42.63	0.17	10,660.07	672.09	1,071.80	675.27	10.00	10.00	0.00
10,850.00	47.63	0.17	10,695.33	707.52	1,071.90	710.69	10.00	10.00	0.00
10,900.00	52.63	0.17	10,727.37	745.88	1,072.02	749.06	10.00	10.00	0.00
10,950.00	57.63	0.17	10,755.94	786.89	1,072.14	790.07	10.00	10.00	0.00
11,000.00	62.63	0.17	10,780.83	830.24	1,072.27	833.42	10.00	10.00	0.00
11,050.00	67.63	0.17	10,801.85	875.59	1,072.41	878.77	10.00	10.00	0.00
11,100.00	72.63	0.17	10,818.84	922.60	1,072.55	925.77	10.00	10.00	0.00
11,150.00	77.63	0.17	10,831.66	970.91	1,072.70	974.09	10.00	10.00	0.00
11,200.00	82.63	0.17	10,840.23	1,020.15	1,072.85	1,023.33	10.00	10.00	0.00
11,250.00	87.63	0.17	10,844.47	1,069.96	1,073.00	1,073.13	10.00	10.00	0.00
11,273.66	90.00	0.17	10,844.96	1,093.61	1,073.07	1,096.79	10.00	10.00	0.00
11,300.00	90.00	0.17	10,844.96	1,119.95	1,073.15	1,123.13	0.00	0.00	0.00
11,400.00	90.00	0.17	10,844.96	1,219.95	1,073.45	1,223.13	0.00	0.00	0.00
11,500.00	90.00	0.17	10,844.96	1,319.95	1,073.75	1,323.13	0.00	0.00	0.00
11,600.00	90.00	0.17	10,844.96	1,419.95	1,074.05	1,423.13	0.00	0.00	0.00
11,700.00	90.00	0.17	10,844.96	1,519.95	1,074.36	1,523.13	0.00	0.00	0.00
11,800.00	90.00	0.17	10,844.96	1,619.95	1,074.66	1,623.13	0.00	0.00	0.00
11,900.00	90.00	0.17	10,844.96	1,719.95	1,074.96	1,723.13	0.00	0.00	0.00
12,000.00	90.00	0.17	10,844.96	1,819.95	1,075.26	1,823.13	0.00	0.00	0.00
12,100.00	90.00	0.17	10,844.96	1,919.94	1,075.56	1,923.13	0.00	0.00	0.00
12,200.00	90.00	0.17	10,844.96	2,019.94	1,075.87	2,023.13	0.00	0.00	0.00
12,300.00	90.00	0.17	10,844.96	2,119.94	1,076.17	2,123.13	0.00	0.00	0.00
12,400.00	90.00	0.17	10,844.96	2,219.94	1,076.47	2,223.13	0.00	0.00	0.00
12,500.00	90.00	0.17	10,844.96	2,319.94	1,076.77	2,323.13	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Well:	WD #23H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	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	0.17	10,844.96	2,419.94	1,077.07	2,423.13	0.00	0.00	0.00	
12,700.00	90.00	0.17	10,844.96	2,519.94	1,077.37	2,523.13	0.00	0.00	0.00	
12,800.00	90.00	0.17	10,844.96	2,619.94	1,077.68	2,623.13	0.00	0.00	0.00	
12,900.00	90.00	0.17	10,844.96	2,719.94	1,077.98	2,723.13	0.00	0.00	0.00	
13,000.00	90.00	0.17	10,844.97	2,819.94	1,078.28	2,823.13	0.00	0.00	0.00	
13,100.00	90.00	0.17	10,844.97	2,919.94	1,078.58	2,923.13	0.00	0.00	0.00	
13,200.00	90.00	0.17	10,844.97	3,019.94	1,078.88	3,023.13	0.00	0.00	0.00	
13,300.00	90.00	0.17	10,844.97	3,119.94	1,079.19	3,123.13	0.00	0.00	0.00	
13,400.00	90.00	0.17	10,844.97	3,219.94	1,079.49	3,223.13	0.00	0.00	0.00	
13,500.00	90.00	0.17	10,844.97	3,319.94	1,079.79	3,323.13	0.00	0.00	0.00	
13,600.00	90.00	0.17	10,844.97	3,419.94	1,080.09	3,423.13	0.00	0.00	0.00	
13,700.00	90.00	0.17	10,844.97	3,519.94	1,080.39	3,523.13	0.00	0.00	0.00	
13,800.00	90.00	0.17	10,844.97	3,619.94	1,080.70	3,623.13	0.00	0.00	0.00	
13,900.00	90.00	0.17	10,844.97	3,719.94	1,081.00	3,723.13	0.00	0.00	0.00	
14,000.00	90.00	0.17	10,844.97	3,819.94	1,081.30	3,823.13	0.00	0.00	0.00	
14,100.00	90.00	0.17	10,844.97	3,919.94	1,081.60	3,923.13	0.00	0.00	0.00	
14,200.00	90.00	0.17	10,844.97	4,019.94	1,081.90	4,023.13	0.00	0.00	0.00	
14,300.00	90.00	0.17	10,844.97	4,119.93	1,082.20	4,123.13	0.00	0.00	0.00	
14,400.00	90.00	0.17	10,844.97	4,219.93	1,082.51	4,223.13	0.00	0.00	0.00	
14,500.00	90.00	0.17	10,844.97	4,319.93	1,082.81	4,323.13	0.00	0.00	0.00	
14,600.00	90.00	0.17	10,844.97	4,419.93	1,083.11	4,423.13	0.00	0.00	0.00	
14,700.00	90.00	0.17	10,844.97	4,519.93	1,083.41	4,523.13	0.00	0.00	0.00	
14,800.00	90.00	0.17	10,844.97	4,619.93	1,083.71	4,623.13	0.00	0.00	0.00	
14,900.00	90.00	0.17	10,844.97	4,719.93	1,084.02	4,723.13	0.00	0.00	0.00	
15,000.00	90.00	0.17	10,844.97	4,819.93	1,084.32	4,823.13	0.00	0.00	0.00	
15,100.00	90.00	0.17	10,844.97	4,919.93	1,084.62	4,923.13	0.00	0.00	0.00	
15,200.00	90.00	0.17	10,844.97	5,019.93	1,084.92	5,023.13	0.00	0.00	0.00	
15,300.00	90.00	0.17	10,844.98	5,119.93	1,085.22	5,123.13	0.00	0.00	0.00	
15,400.00	90.00	0.17	10,844.98	5,219.93	1,085.52	5,223.13	0.00	0.00	0.00	
15,500.00	90.00	0.17	10,844.98	5,319.93	1,085.83	5,323.13	0.00	0.00	0.00	
15,600.00	90.00	0.17	10,844.98	5,419.93	1,086.13	5,423.13	0.00	0.00	0.00	
15,700.00	90.00	0.17	10,844.98	5,519.93	1,086.43	5,523.13	0.00	0.00	0.00	
15,800.00	90.00	0.17	10,844.98	5,619.93	1,086.73	5,623.13	0.00	0.00	0.00	
15,900.00	90.00	0.17	10,844.98	5,719.93	1,087.03	5,723.13	0.00	0.00	0.00	
16,000.00	90.00	0.17	10,844.98	5,819.93	1,087.34	5,823.13	0.00	0.00	0.00	
16,100.00	90.00	0.17	10,844.98	5,919.93	1,087.64	5,923.13	0.00	0.00	0.00	
16,200.00	90.00	0.17	10,844.98	6,019.93	1,087.94	6,023.13	0.00	0.00	0.00	
16,300.00	90.00	0.17	10,844.98	6,119.93	1,088.24	6,123.13	0.00	0.00	0.00	
16,400.00	90.00	0.17	10,844.98	6,219.93	1,088.54	6,223.13	0.00	0.00	0.00	
16,500.00	90.00	0.17	10,844.98	6,319.92	1,088.84	6,323.13	0.00	0.00	0.00	
16,600.00	90.00	0.17	10,844.98	6,419.92	1,089.15	6,423.13	0.00	0.00	0.00	
16,700.00	90.00	0.17	10,844.98	6,519.92	1,089.45	6,523.13	0.00	0.00	0.00	
16,800.00	90.00	0.17	10,844.98	6,619.92	1,089.75	6,623.13	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Well:	WD #23H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	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	0.17	10,844.98	6,719.92	1,090.05	6,723.13	0.00	0.00	0.00
17,000.00	90.00	0.17	10,844.98	6,819.92	1,090.35	6,823.13	0.00	0.00	0.00
17,100.00	90.00	0.17	10,844.98	6,919.92	1,090.66	6,923.13	0.00	0.00	0.00
17,200.00	90.00	0.17	10,844.98	7,019.92	1,090.96	7,023.13	0.00	0.00	0.00
17,300.00	90.00	0.17	10,844.98	7,119.92	1,091.26	7,123.13	0.00	0.00	0.00
17,400.00	90.00	0.17	10,844.98	7,219.92	1,091.56	7,223.13	0.00	0.00	0.00
17,500.00	90.00	0.17	10,844.98	7,319.92	1,091.86	7,323.13	0.00	0.00	0.00
17,600.00	90.00	0.17	10,844.98	7,419.92	1,092.17	7,423.13	0.00	0.00	0.00
17,700.00	90.00	0.17	10,844.99	7,519.92	1,092.47	7,523.13	0.00	0.00	0.00
17,800.00	90.00	0.17	10,844.99	7,619.92	1,092.77	7,623.13	0.00	0.00	0.00
17,900.00	90.00	0.17	10,844.99	7,719.92	1,093.07	7,723.13	0.00	0.00	0.00
18,000.00	90.00	0.17	10,844.99	7,819.92	1,093.37	7,823.13	0.00	0.00	0.00
18,100.00	90.00	0.17	10,844.99	7,919.92	1,093.67	7,923.13	0.00	0.00	0.00
18,200.00	90.00	0.17	10,844.99	8,019.92	1,093.98	8,023.13	0.00	0.00	0.00
18,300.00	90.00	0.17	10,844.99	8,119.92	1,094.28	8,123.13	0.00	0.00	0.00
18,400.00	90.00	0.17	10,844.99	8,219.92	1,094.58	8,223.13	0.00	0.00	0.00
18,500.00	90.00	0.17	10,844.99	8,319.92	1,094.88	8,323.13	0.00	0.00	0.00
18,600.00	90.00	0.17	10,844.99	8,419.92	1,095.18	8,423.13	0.00	0.00	0.00
18,700.00	90.00	0.17	10,844.99	8,519.91	1,095.49	8,523.13	0.00	0.00	0.00
18,800.00	90.00	0.17	10,844.99	8,619.91	1,095.79	8,623.13	0.00	0.00	0.00
18,900.00	90.00	0.17	10,844.99	8,719.91	1,096.09	8,723.13	0.00	0.00	0.00
19,000.00	90.00	0.17	10,844.99	8,819.91	1,096.39	8,823.13	0.00	0.00	0.00
19,100.00	90.00	0.17	10,844.99	8,919.91	1,096.69	8,923.13	0.00	0.00	0.00
19,200.00	90.00	0.17	10,844.99	9,019.91	1,096.99	9,023.13	0.00	0.00	0.00
19,300.00	90.00	0.17	10,844.99	9,119.91	1,097.30	9,123.13	0.00	0.00	0.00
19,400.00	90.00	0.17	10,844.99	9,219.91	1,097.60	9,223.13	0.00	0.00	0.00
19,500.00	90.00	0.17	10,844.99	9,319.91	1,097.90	9,323.13	0.00	0.00	0.00
19,600.00	90.00	0.17	10,844.99	9,419.91	1,098.20	9,423.13	0.00	0.00	0.00
19,700.00	90.00	0.17	10,844.99	9,519.91	1,098.50	9,523.13	0.00	0.00	0.00
19,800.00	90.00	0.17	10,844.99	9,619.91	1,098.81	9,623.13	0.00	0.00	0.00
19,900.00	90.00	0.17	10,844.99	9,719.91	1,099.11	9,723.13	0.00	0.00	0.00
20,000.00	90.00	0.17	10,845.00	9,819.91	1,099.41	9,823.13	0.00	0.00	0.00
20,100.00	90.00	0.17	10,845.00	9,919.91	1,099.71	9,923.13	0.00	0.00	0.00
20,200.00	90.00	0.17	10,845.00	10,019.91	1,100.01	10,023.13	0.00	0.00	0.00
20,300.00	90.00	0.17	10,845.00	10,119.91	1,100.32	10,123.13	0.00	0.00	0.00
20,400.00	90.00	0.17	10,845.00	10,219.91	1,100.62	10,223.13	0.00	0.00	0.00
20,500.00	90.00	0.17	10,845.00	10,319.91	1,100.92	10,323.13	0.00	0.00	0.00
20,600.00	90.00	0.17	10,845.00	10,419.91	1,101.22	10,423.13	0.00	0.00	0.00
20,700.00	90.00	0.17	10,845.00	10,519.91	1,101.52	10,523.13	0.00	0.00	0.00
20,800.00	90.00	0.17	10,845.00	10,619.91	1,101.82	10,623.13	0.00	0.00	0.00
20,900.00	90.00	0.17	10,845.00	10,719.91	1,102.13	10,723.13	0.00	0.00	0.00
21,000.00	90.00	0.17	10,845.00	10,819.90	1,102.43	10,823.13	0.00	0.00	0.00
21,100.00	90.00	0.17	10,845.00	10,919.90	1,102.73	10,923.13	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WD #23H
Project:	Eddy County, NM	TVD Reference:	well @ 3026.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3026.00usft
Well:	WD #23H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	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)
21,192.85	90.00	0.17	10,845.00	11,012.75	1,103.01	11,015.97	0.00	0.00	0.00
[BlueSteel21#23H]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#23H]FTP - plan misses target center by 1213.90usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	570.66	1,071.40	466,975.07	605,961.87	32.2833657	-103.9904572
[BlueSteel21#23H]KOP - plan hits target center - Point	0.00	0.00	10,272.00	520.66	1,071.34	466,925.07	605,961.81	32.2832282	-103.9904579
[BlueSteel21#23H]LTP/E - plan hits target center - Point	0.00	0.00	10,845.00	11,012.75	1,103.01	477,417.16	605,993.48	32.3120698	-103.9902468

Checked By: _____ Approved By: _____ Date: _____



Marathon Oil
Eddy County, NM
Blue Steel 21 Fee
WD #23H
Prelim Plan A

US State Plane 1927 (Exact solution)
NAD 1927 (NADCON CONUS)
Clarke 1866
New Mexico East 3001
Mean Sea Level

RKB Elevation: well @ 3026.00usft

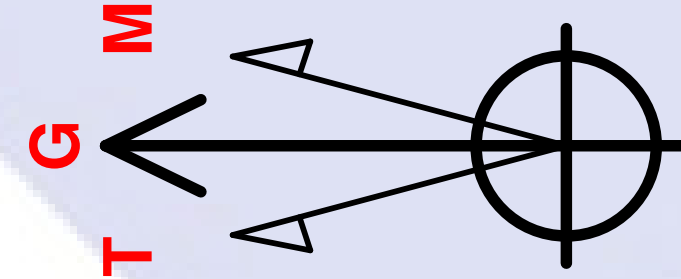
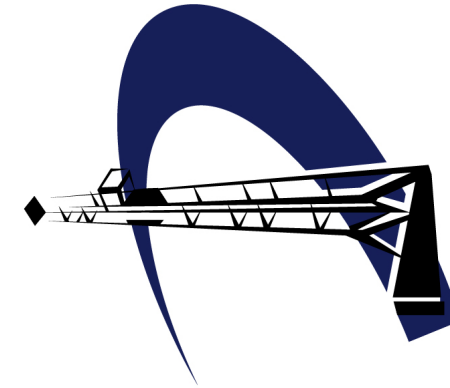
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	466404.41	604890.47	32.2818063	-103.9939299	

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00
3	1700.00	10.00	64.08	1697.47	19.02	39.14	2.00	19.14
4	8058.33	10.00	64.08	7959.20	501.64	1032.20	0.00	504.70
5	8558.33	0.00	0.00	8456.66	520.66	1071.34	2.00	523.84
6	10373.67	0.00	0.00	10272.00	520.66	1071.34	0.00	523.84
7	11273.66	90.00	0.17	10844.96	1093.61	1073.07	10.00	1096.79
8	21192.85	90.00	0.17	10845.00	11012.75	1103.01	0.00	11015.97

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

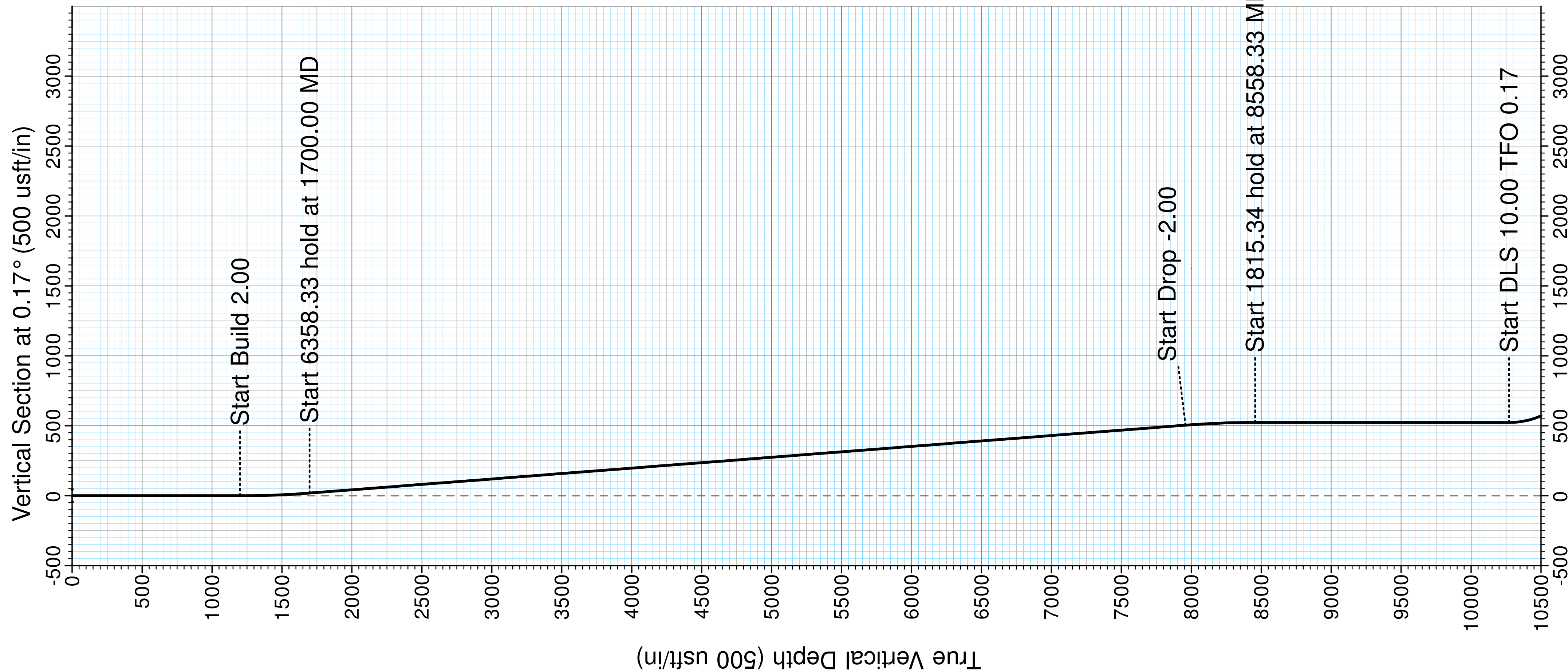
Name	TVD	+N/-S	+E/-W	Northing	Easting
[BlueSteel21 #23H]FTP	0.00	570.66	1071.40	466975.07	605961.87
[BlueSteel21 #23H]KOP	10272.00	520.66	1071.34	466925.07	605961.81
[BlueSteel21 #23H]LTPI/BHL	10845.00	11012.75	1103.01	477417.16	605993.48



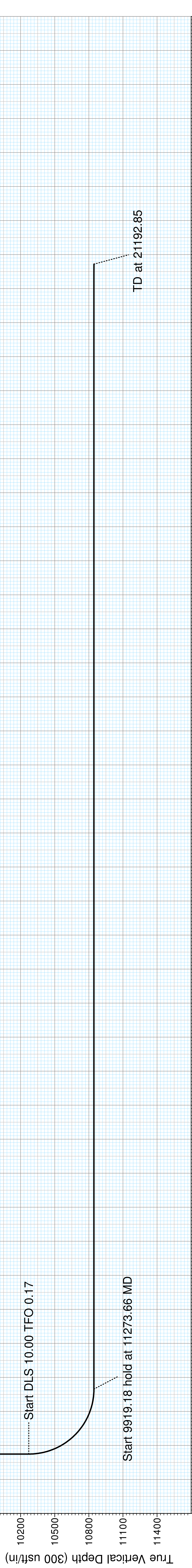
Azimuths to Grid North
True North: -0.18°
Magnetic North: 6.75°
Magnetic Field
Strength: 47832.4usT
Dip Angle: 60.00°
Date: 4/3/2020
Model: HDGM

Azimuth Corrections

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



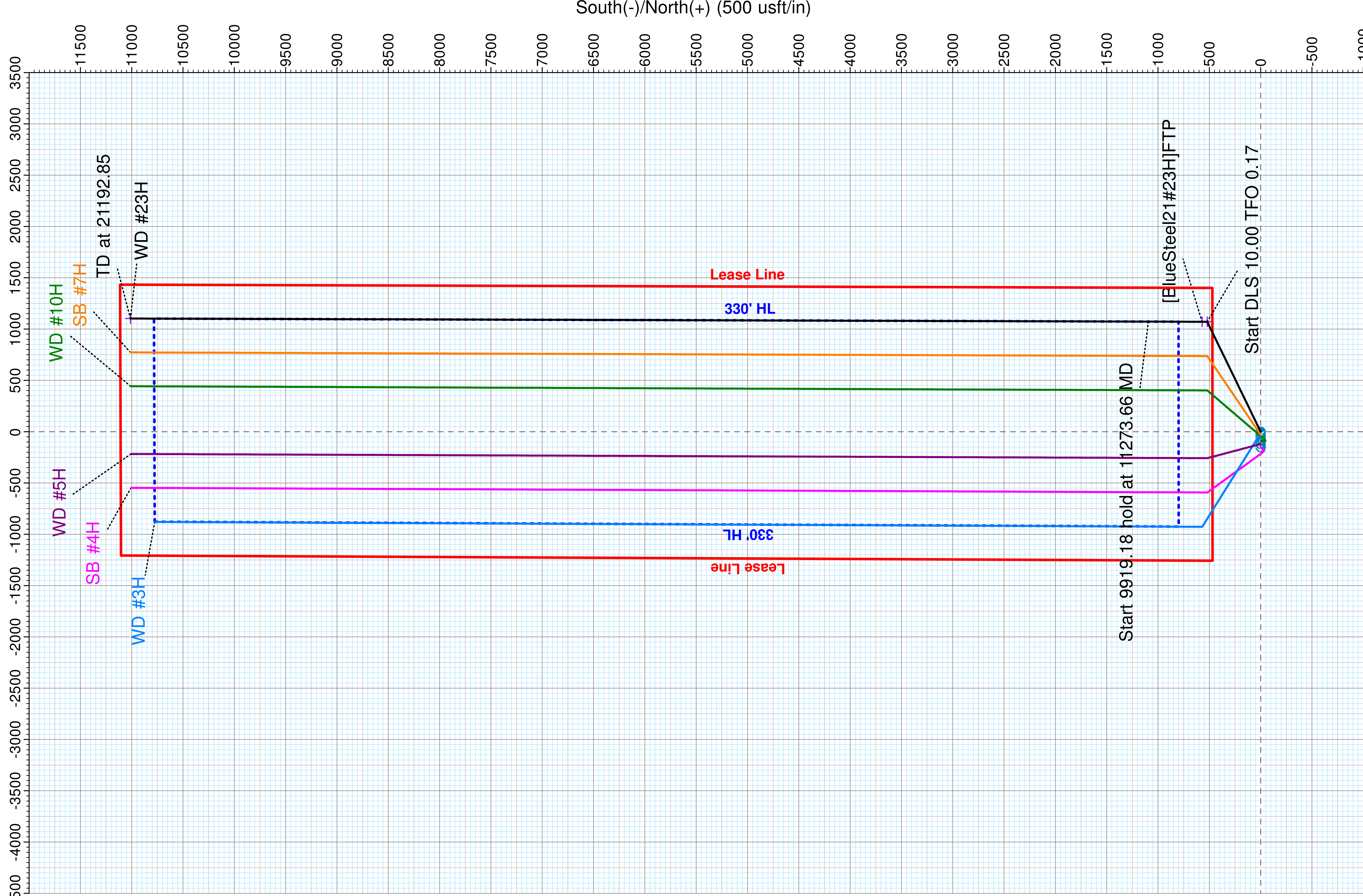
Target Line: 10845' TVD @ 0' VS: 90° INC



36" x 48"

Vertical Section at 0.17° (300 usft/in)

West(-)/East(+) (500 usft/in)



PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Marathon Oil
LEASE NO.:	NMNM119272
LOCATION:	Section 28, T.23 S., R.29 E., NMPM
COUNTY:	Eddy County, New Mexico

WELL NAME & NO.:	Blue Steel 21 WD Fee 23H
SURFACE HOLE FOOTAGE:	470'/N & 1254'/W
BOTTOM HOLE FOOTAGE:	100'/N & 2310'/W

COA

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

A. HYDROGEN SULFIDE

A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **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

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.

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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.

 - ❖ 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 R111 Potash Areas if cement does not circulate to surface on the first two salt protection casing strings, the cement on the 3rd casing string must come to surface.
 3. The minimum required fill of cement behind the **7-5/8** inch production casing is:
 - Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Excess calculate to 14%. Additional cement maybe required.**
 4. The minimum required fill of cement behind the **5-1/2** inch production liner is:
 - Cement should tie-back **100 feet** into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. **Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).**
2. 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 **10,000 (10M) psi. Variance is approved to use a 5000 (5M) Annular which shall be tested to 5000 (5M) psi.**

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

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

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

GENERAL REQUIREMENTS

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

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

☒ Eddy County

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

☒ Lea County

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

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 approved 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 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.**
 - **BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.**
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24

hours. WOC time will be recorded in the driller's log. The casing 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

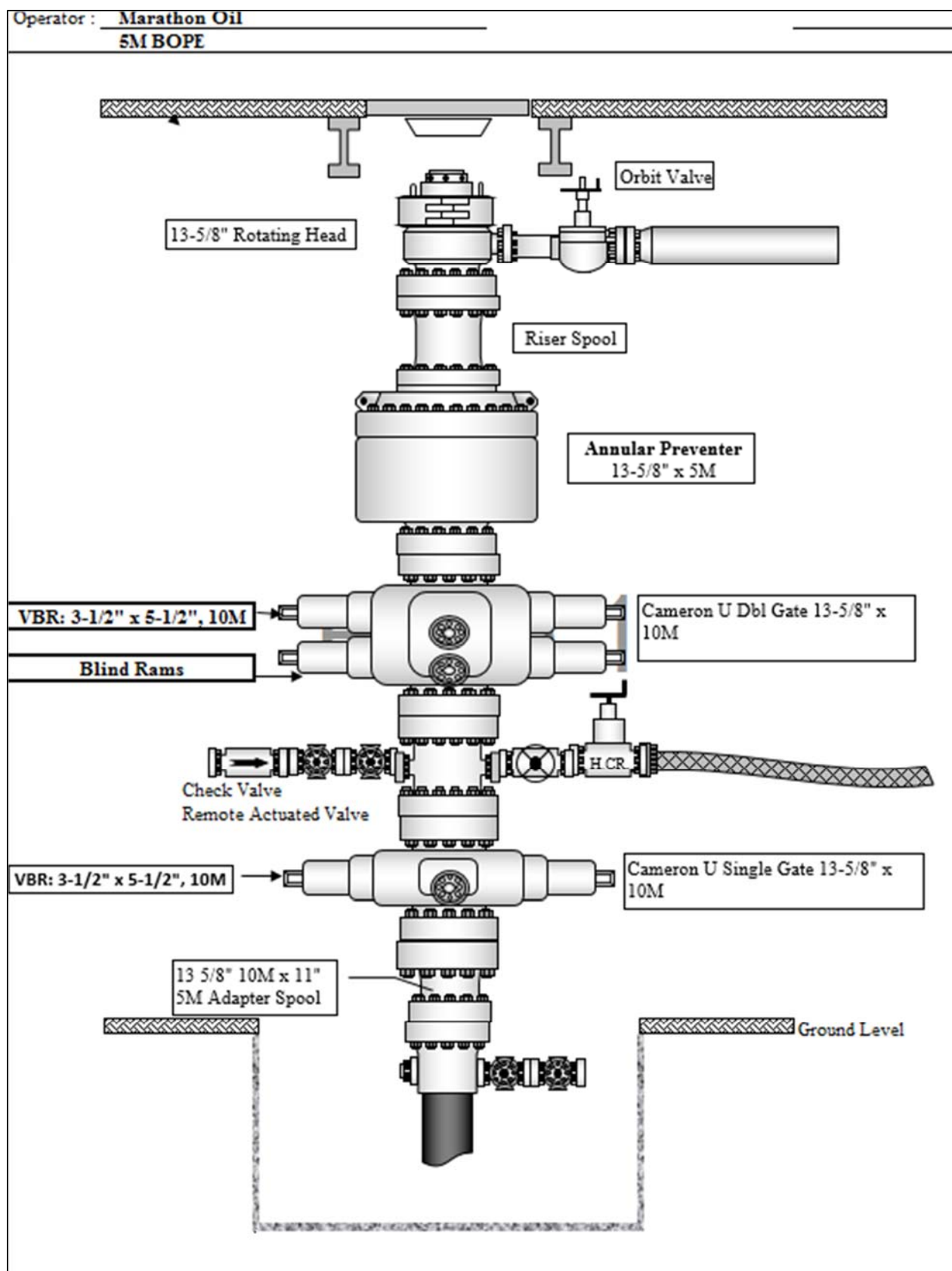
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Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

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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 233154

CONDITIONS

Operator: MARATHON OIL PERMIAN LLC 990 Town & Country Blvd. Houston, TX 77024	OGRID:
	372098
	Action Number: 233154
	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	6/28/2023
ward.rikala	Will require a File As Drilled C-102 and a Directional Survey with the C-104	6/28/2023
ward.rikala	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string	6/28/2023
ward.rikala	Cement is required to circulate on both surface and intermediate1 strings of casing	6/28/2023
ward.rikala	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system	6/28/2023