

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. 30-015-53819
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 30-015-53819	² Pool Code 96721	³ Pool Name LAGUNA SALADO (BONE SPRING)
⁴ Property Code 325401	⁵ Property Name BLUE STEEL 21 SB FEE	
⁷ OGRID No. 372098	⁸ Operator Name MARATHON OIL PERMIAN LLC	⁶ Well Number 4H ⁹ Elevation 3000'

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	1104	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
D	16	23S	29E		100	NORTH	660	WEST	EDDY

¹² Dedicated Acres 320.0	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.

Defining Well 	CORNER COORDINATES NAD 83, SPCS NM EAST A - X: 644867.18' / Y: 477568.44' B - X: 646187.07' / Y: 477573.23' C - X: 646145.88' / Y: 466933.84' D - X: 644816.72' / Y: 466932.98'	CORNER COORDINATES NAD 27, SPCS NM EAST A - X: 603684.20' / Y: 477508.77' B - X: 605004.08' / Y: 477513.56' C - X: 604962.60' / Y: 466874.42' D - X: 603633.45' / Y: 466873.55'	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. Date 04/29/2020 Printed Name Melissa Szudera E-mail Address mszudera@marathonoil.com
	LAST TAKE POINT/BOTTOM HOLE LOCATION 100' FNL 660' FWL, SECTION 16 NAD 83, SPCS NM EAST X: 645526.39' / Y: 477470.83' LAT: 32.31218955N / LON: -103.99608031W NAD 27, SPCS NM EAST X: 604343.41' / Y: 477411.17' LAT: 32.31206770N / LON: -103.99558787W		
	FIRST TAKE POINT 100' FSL 665' FWL, SECTION 21 NAD 83, SPCS NM EAST X: 645481.43' / Y: 467033.41' LAT: 32.28349927N / LON: -103.99633202W NAD 27, SPCS NM EAST X: 604298.15' / Y: 466973.98' LAT: 32.28337717N / LON: -103.99584067W		
	KICK OFF POINT 50' FSL 665' FWL, SECTION 21 NAD 83, SPCS NM EAST X: 645481.36' / Y: 466983.41' LAT: 32.28336183N / LON: -103.99633274W NAD 27, SPCS NM EAST X: 604298.09' / Y: 466923.98' LAT: 32.28323973N / LON: -103.99584140W		
	SURFACE HOLE LOCATION 470' FNL 1104' FWL, SECTION 28 NAD 83, SPCS NM EAST X: 645923.91' / Y: 466463.73' LAT: 32.28192949N / LON: -103.99490604W NAD 27, SPCS NM EAST X: 604740.61' / Y: 466404.32' LAT: 32.28180737N / LON: -103.99441480W		

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.

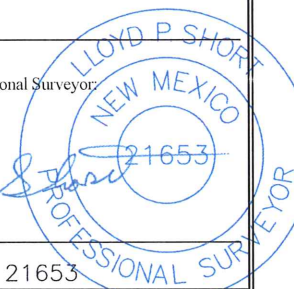
OCTOBER 17, 2018

Date of Survey

Signature and Seal of Professional Surveyor

Certificate Number

LYOYD P. SHORT 21653



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1625 N. French Dr., Hobbs, NM 88240
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District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

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

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

Date: April 29, 2020

☒ Original Operator & OGRID No.: MARATHON OIL PERMIAN, LLC 372098
☐ Amended - Reason for Amendment: _____

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

Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).

Well(s)/Production Facility – Name of facility

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

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Blue Steel 21 WD Fee 23H		D-28-23S-29E	470' FNL 1254' FWL	5200	Flared	
Blue Steel 21 WD Fee 3H		D-28-23S-29E	470' FNL 1194' FWL	5200	Flared	
Blue Steel 21 WD Fee 3H		D-28-23S-29E	470' FNL 1134' FWL	5200	Flared	
Blue Steel 21 WD Fee 10H		D-28-23S-29E	470' FNL 1164' FWL	5200	Flared	
Blue Steel 21 SB Fee 7H		D-28-23S-29E	470' FNL 1224' FWL	5200	Flared	
Blue Steel 21 SB Fee 4H		D-28-23S-29E	470' FNL 1104' FWL	5200	Flared	

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility has a split connection dedicated to Sendero and Lucid and will be connected to Sendero & Lucid's low pressure gathering systems located in Eddy County, New Mexico. It will require about 1 mile of pipeline to connect the facility to low pressure gathering system. Marathon provides (periodically) to Sendero and Lucid a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Marathon, Sendero, and Lucid have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at Sendero's Processing Plant located in Section 31, Township 23S, Range 28E, Eddy County, NM and Lucid's Processing Plant Located in Section 32, Township 23S, Range 28E, Eddy County, NM. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

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

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

Alternatives to Reduce Flaring

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

- Power Generation – On lease
 - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
 - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
 - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines



MARATHON OIL COMPANY

BLUE STEEL 21 FEE

WD Well # 3H

SB Well # 4H

WD Well # 5H

SB Well # 7H

WD Well # 10H

WD Well # 23H

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

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

EDDY County, New Mexico

Rig: PRECISION 582

4/08/2020

**EMERGENCY MEDICAL PROCEDURES
DO NOT PANIC
REMAIN CALM-THINK**

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

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

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

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

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

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

H2S DRILLING OPERATIONS PLAN INDEX

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- V. OPERATING CONDITIONS
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- B. Hydrogen Sulfide Hazards
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INTRODUCTION

H2S DRILLING OPERATIONS PLAN

This Drilling Operations Plan was written specifically for:

MARATHON OIL COMPANY
4111 TIDWELL
CALRSBAD, NM 88220

Action Plan for Accidental Release of H2S

BLUE STEEL 21 FEE

WD Well # 3H

SB Well # 4H

WD Well # 5H

SB Well # 7H

WD Well # 10H

WD Well # 23H

EDDY COUNTY, NM

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

4/08/2020

MARATHON OIL COMPANY
4111 TIDWELL
CARLSBAD, NM 88220

BLUE STEEL 21 FEE
WD Well # 3H
SB Well # 4H
WD Well # 5H
SB Well # 7H
WD Well # 10H
WD Well # 23H

EDDY COUNTY, NM

Directions:

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

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

PURPOSE OF PLAN: The purpose of this plan is to safeguard the lives of the public, contract personnel and company personnel in the event of equipment failure or disasters during drilling or completion operations in formations that may contain Hydrogen Sulfide Gas, H₂S.

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

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

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

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

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

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

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

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

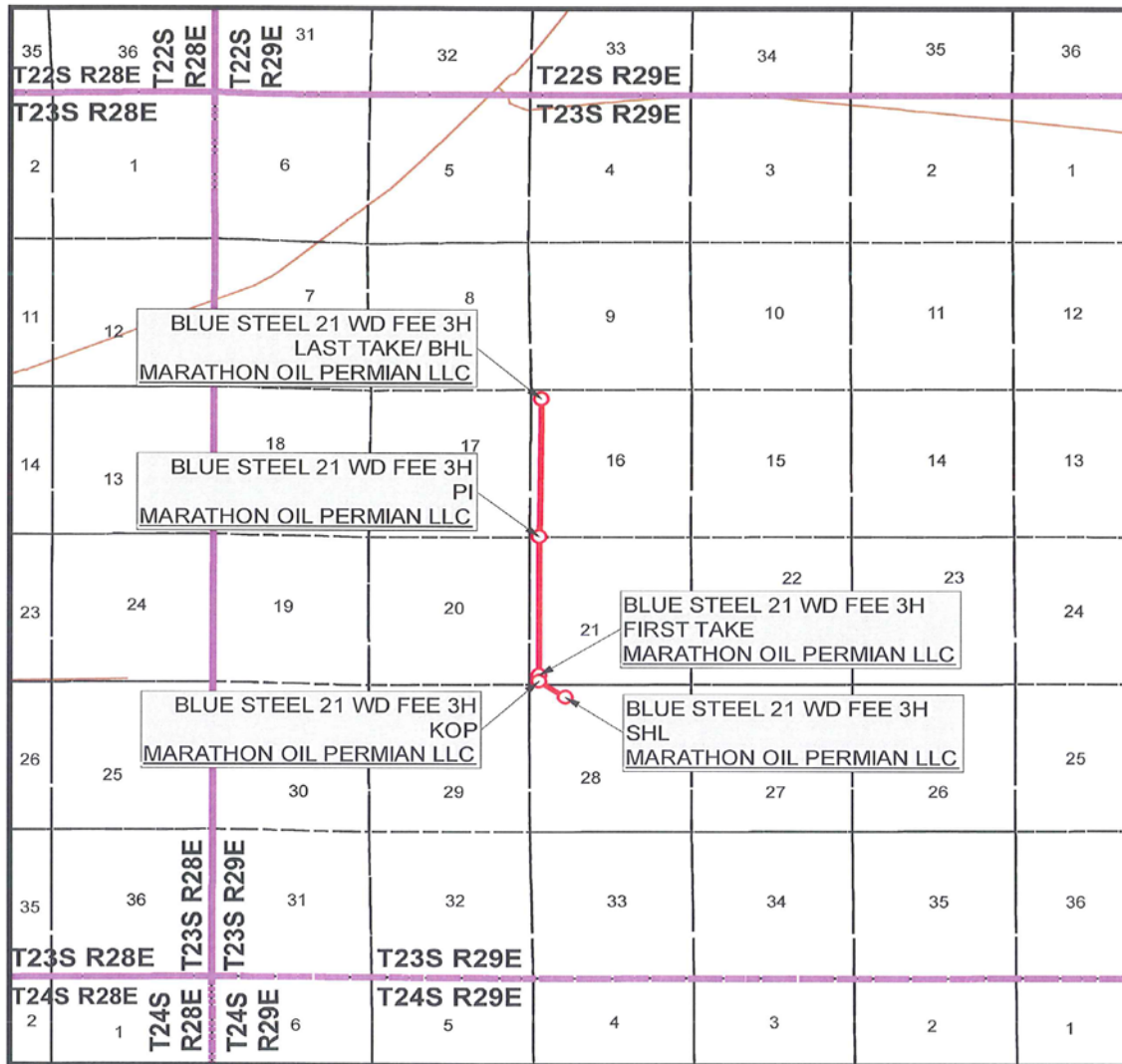
In Scope Personnel – Rig Personnel who will be working or otherwise present in potential H₂S release areas, including the rig floor, cellar, pits, and shaker areas. This would not include 3rd party contractors who do not have a function, besides evacuating the rig, during an emergency condition such as during a well control event or H₂S / LEL alarm. All qualified personnel that have a function to shut a well in during an emergency will be considered In-Scope per this plan

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

H₂S Office – Onsite office trailer space or vehicle that will be designated as the H₂S office

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

VICINITY MAP



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

1" = 1 MILE



SHEET 3 OF 3

PREPARED BY:
 R-SQUARED GLOBAL, LLC
 1309 LOUISVILLE AVENUE, MONROE, LA 71201
 318-323-6900 OFFICE
 JOB No. R3942_002

SAFETY EQUIPMENT

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

SAFETY EQUIPMENT PROVIDED BY TOTAL SAFETY INC.

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

TYPE OF EQUIPMENT AND STORAGE LOCATIONS

1. There will be six 30-minute self-contained breathing apparatus on location. They will be positioned as follows: Two at Briefing Area #1 Two at Briefing Area #2, Two at rig dog house. SCBA Facepieces will be equipped with voice amplifiers for effective means of communication when using protective breathing apparatus.
2. There will be six Escape-type packs on location. One for the Derrickman. One on the Shaker. One at the bottom of rig dog house stairway and spares.
3. A Gastec, pump type, gas detector with low and high range detector tubes for H2S and SO2 will be located in the doghouse
4. Two Briefing Areas will be designated at opposite ends of the location.
5. The Briefing Area most upwind is designated as the Safety Briefing Area #1. In an emergency, personnel must assemble at this upwind area for instructions from their supervisor.
6. The H2S 'Safety' trailer provided by Total Safety, Inc. will contain a cascade system of at least 5 each -300 C.F. air cylinders that will provide a continuous air supply to air lines located on the rig. Note: This trailer will **Only** be provided if H2S conditions require the use of the Air Trailer. (If Required)
7. Two windsocks will be installed so as to be visible from all parts of the location.
8. A well condition warning sign will be displayed at the location entrance to advise of current operating conditions. The condition signs must be at least 200' from the entrance but not more than 500' away.
9. A list of emergency telephone numbers will be kept on rig floor, tool pusher's trailer, the Oil Company's trailer and in the "safety" trailer (if Provided).
10. The primary means of communication will be cell phones.

11. A barricade will be available to block the entrance to location should an emergency occur. In most cases the use of a vehicle is used to block the entrance.
12. A 6-channel H₂S monitor will be located in the doghouse. The 3 sensors will be installed: one on the shale shaker, one at the Cellar, one at the rig floor.
13. An undulating high and low pitch siren and light will be installed on the derrick "A" leg.
14. If H₂S concentration reach 10 ppm an explosion-proof bug blower (fan) will be installed under the rig floor to disperse possible accumulations of H₂S.
15. Any time it is necessary to flare gas containing H₂S, a Sulfur Dioxide monitor or Detector tubes will be used to determine SO₂ concentrations.
16. A flare gun with flares will also be provided in the event it is necessary to ignite the well from a safe distance.

OPERATING PROCEDURES

BLOWOUT PREVENTION MEASURES DURING DRILLING

1. Blowout Prevention Requirements:

All BOP equipment shall meet the American Petroleum Institute specifications as to materials acceptable for H₂S service and tested accordingly (or to BLM specifications).

2. Drilling String Requirements:

All drill string components are to be of material that meets the American Petroleum Institute's specifications for H₂S service. All drill string components should be inspected to IADC critical service specifications prior to running in well.

GAS MONITORING EQUIPMENT

1. A continuous H₂S detection system, consisting of three H₂S detectors and an audible/visual warning system will be in operating during all phases of this H₂S Drilling Operations Plan. The detection system will be adjusted and calibrated such that an H₂S exposure of 10 ppm or higher (at any sensor) will trigger the audible and visual portion (wailing or yelping siren) of the warning system (i.e. H₂S continually present at or above threshold levels) a trained operator or H₂S supervisor will monitor the H₂S detection system.

2. When approaching or completing H₂S formations, crewmembers may attach personnel H₂S monitors to their person.

3. Hand held H₂S sampling gas detectors will be used to check areas not covered by automatic monitoring equipment.

CREW TRAINING AND PROTECTION

1. All personnel working at the well site will be properly trained in accordance with the general training requirements outlined in the API Recommended Practices for Safe Drilling of Wells Containing H₂S. The training will cover, but will not be limited to, the following:

- a. General information of H₂S AND SO₂ GAS
- b. Hazards of these gases
- c. Safety equipment on location
- d. Proper use and care of personal protective equipment
- e. Operational procedures in dealing with H₂S gas
- f. Evacuation procedures
- g. First aid, reviving an H₂S victim, toxicity, etc.
- h. Designated Safe Briefing Areas
- i. Buddy System
- j. Regulations
- k. Review of Drilling Operations Plan

2. Initial training shall be completed when drilling reaches, a depth of 500' above or 3 days prior to penetrating (whichever comes first) the first zone containing or expected to contain H₂S. It must also include a review of the site specific Drilling Operations Plan and, if applicable, the Public Protections Plan.

3. Weekly H₂S and well control drills for all personnel on each working crew shall be conducted.

4. All training sessions and drills shall be recorded on the driller's log or its equivalent.

5. Safety Equipment:

As outlined in the Safety Equipment index, H₂S safety protection equipment will be available to/or assigned each person on location.

6. One person (by job title) shall be designated and identified to all on-site personnel as the person primarily responsible for the overall operation of the on-site safety and training programs. This will be the PIC

METALLURGICAL CONSIDERATIONS

1. Steel drill pipe used in H₂S environments should have yield strength of 95,000psi or less because of potential embrittlement problems. Must conform to the current National Association of Corrosion Engineers (NACE) Standard MR-0175-90, Material Requirement, Sulfide Stress Cracking Resistant Metallica Material for Oil Field Equipment. Drill stem joints near the top of the drill string are normally under the highest stress levels during drilling and do not have the protection of elevated down hole temperatures. These factors should be considered in design of the drill string. Precautions should be taken to minimize drill string stress caused by conditions such as excessive dogleg severity, improper torque, whip, abrasive wear or tool joints and joint imbalance. American Petroleum Institute, Bulletin RR 7G, will be used as a guideline for drill string precautions.
2. Corrosion inhibitors may be applied to the drill pipe or to the mud system as an additional safeguard.
3. Blowout preventors should meet or exceed the recommendations for H₂S service as set forth in the latest edition of API RI 53.

MUD PROGRAM AND TREATING

1. It is of utmost importance that the mud be closely monitored for detection of H₂S and reliability of the H₂S treating chemicals.
2. Identification and analysis of sulfides in the mud and mud filtrates will be carried out per operators prescribed procedures.
3. The mud system will be pre-treated with Zinc Carbonate, Ironite Sponge or similar chemicals of H₂S control prior to drilling into the H₂S bearing formation. Sufficient quantities of corrosion inhibitor should be on location to treat the drill string during Drill Stem Test Operations. Additionally, Aqua Ammonia should be on hand to treat the drill string for crew protection, should H₂S be encountered while tripping string following drill stem testing

WELL CONTROL EQUIPMENT

1. Flare System
 - a. A flare system shall be designed and installed to safely gather and burn H₂S Bearing gas.
 1. Flare lines shall be located as far from the operating site as feasible and in a manner to compensate for wind changes.
 2. The flare line mouth shall be located not less than 150' from wellbore.
 3. Flare lines shall be straight unless targeted with running tees.
 4. Flare Gun & Flares to ignite the well
2. Remote Controlled Choke
 - a. A remote controlled choke shall be installed for all H₂S drilling and where feasible for completion operations. A remote controlled valve may be used in lieu of this requirement for completions operations.
3. Mud-gas separators and rotating heads shall be installed and operable for all exploratory wells.

OPERATING CONDITIONS

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

DEFINITION OF WARNING FLAGS

1. Condition:
GREEN-NORMAL OPERATIONS
Any operation where the possibility of encountering H₂S exists but no H₂S has been detected.
2. Condition:
YELLOW-POTENTIAL DANGER, CAUTION
Any operation where the possibility of encountering H₂S exists and in all situations where concentrations of H₂S are detected in the air below the threshold level (10ppm)
 - a. Cause of condition:
 - *Circulating up drill breaks
 - *Trip gas after trip
 - *Circulating out gas on choke
 - *Poisonous gas present, but below threshold concentrations
 - *Drill stem test
 - b. Safety Action:
 - *Check safety equipment and keep it with you
 - *Be alert for a change in condition
 - *Follow instructions
3. Condition:
RED-EXTREME DANGER
Presence of H₂S at or greater than 10ppm. Breathing apparatus must be worn.
 - a. Safety action:

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

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

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

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

CIRCULATING OUT KICK (WAIT AND WEIGHT METHOD)

If it is suspected that H₂S is present with the gas whenever a kick is taken, the wait and weight method of eliminating gas and raising the mud will be followed.

1. Wait and Weight Method:

a. The wait and Weight Method is:

- *increase density of mud in pits to 'kill' weight mud.
- *open choke and bring pump to initial circulating pressure by holding casing pressure at original valve until pump is up to predetermined speed.
- *when initial circulating pressure is obtained on drill pipe, zero pump stroke counter and record time.
- *reduce drill pipe pressure from initial circulating pressure to final circulating pressure by using pump strokes and/or time according to graph
- *when 'kill' weight mud is at the bit, hold final circulating pressure until kill weight mud is to surface.

b. If a kick has occurred, the standard blowout procedure will be followed and the wait and weight method will be used to kill the well. When the well has been put on the choke and circulation has been established, the following safety procedure must be established.

- *determine when gas is anticipated to reach surface.

- *all non-essential personnel must be moved to safe briefing area
- *all remaining personnel will check out and keep with them their protective breathing apparatus.
- *mud men will see that the proper amount of H₂S scavenging chemical is in the mud and record times checked
- *make sure ignition flare is burning and valves are open to designated flare stacks

CORING OPERATIONS IN H₂S BEARING ZONES

1. Personal protective breathing apparatus will be worn from 10 to 15 stands in advance of retrieving the core barrel. Cores to be transported should be sealed and marked to the presence of H₂S.
 - a. Yellow Caution Flag will be flown at the well condition sign.
 - b. The "NO SMOKING" rule will be enforced

DRILL STEM TESTING OF H₂S ZONES

1. The DST subsurface equipment will be suitable for H₂S service as recommended by the API
2. Drill stem testing of H₂S zone will be conducted in daylight hours
3. All non-essential personnel will be moved to an established safe area or off location
4. The "NO SMOKING" rule will be enforced
5. DST fluids will be circulated through a remote controlled choke and a separator to permit flaring of gas. A continuous pilot light will be used.
6. A yellow or red flag will be flown at entrance to location depending on present gas condition
7. If warranted, the use of Aqua Ammonia for neutralizing the toxicity of H₂S from drill string
 - a. During drill stem tests adequate Filming Amine for H₂S corrosion and Aqua Ammonia for neutralizing H₂S should be on location.
8. On completion of DST, if H₂S contaminated formation fluids or gases are present in drill string, floor workers will be masked up before test valve is removed from drill string and continue "mask

on” conditions until such time that readings in the work area do not exceed 10ppm of H₂S gas.

EMERGENCY PROCEDURES

SOUNDING ALARM

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

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

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

DRILLING CREW ACTIONS

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

RESPONSIBILITIES OF PERSONNEL

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

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

STEPS TO BE TAKEN

In the event of an accidental release of a potentially hazardous volume of H₂S, the following steps will be taken:

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

LEAK IGNITION

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

1. Two men, the operator's on-site representative and the contractor's rig superintendent or TOTAL SAFETY's representative(s), wearing self-contained pressure demand air masks must determine the perimeter of the flammable area. This should be done with one man using an H₂S detector and the other one using a flammable gas detector. The flammable perimeter should be established at 30% to 40% of the lower flammable limits.
2. After the flammable perimeter has been established and all employees and citizens have been removed from the area, the ignition team should move to the up-wind area of the leak perimeter and fire a flare into the area if the leak isn't ignited on the first attempt, move in 20 to 30 feet and fire again. Continue moving in and firing until the leak is ignited or the flammable gas detector indicates the ignition

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

GENERAL EQUIPMENT

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

CRITICAL OPERATIONS

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

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

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

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

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

APPENDICES

EMERGENCY & MEDICAL FACILITIES:

Marathon Oil Corporation Emergency Numbers

Matt Rugaard	Drilling Manager	mprugaard@marathonoil.com	281-513-5163
Mark Bly	Drilling Superintendent	permiansuper@marathonoil.com	281-840-0467
Chris Shields	Drilling Superintendent	permiansuper@marathonoil.com	281-840-0467
Don Eynon	Drilling Engineer	deenyon@marathonoil.com	713-296-3265
Paul Allen	Drilling Engineer	pallen@marathonoil.com	713-296-3262
Chris Montan	Drilling Engineer	cmontan@marathoil.com	713-296-4367
Robert Amaya	Drilling Engineer	RAmaya1@marathonoil.com	713-296-2371
Jeremy Wilson	Lead HES Advisor	permianndches@marathonoil.com	281-659-3734
Scott Doughty	Lead HES Advisor	permianndches@marathonoil.com	281-659-3734
Precision 101	Company Man	Prec101@marathonoil.com	
Precision 582	Company Man	Prec582@marathonoil.com	
Precision 594	Company Man	Prec594@marathonoil.com	
Precision 601	Company Man	Prec601@marathonoil.com	
Precision 101	HES Advisor	Prec101hes@marathonoil.com	
Precision 582	HES Advisor	Prec582hes@marathonoil.com	
Precision 594	HES Advisor	Prec594hes@marathonoil.com	
Precision 601	HES Advisor	Prec601hes@marathonoil.com	

Emergency Services Area Numbers: Or Call 911

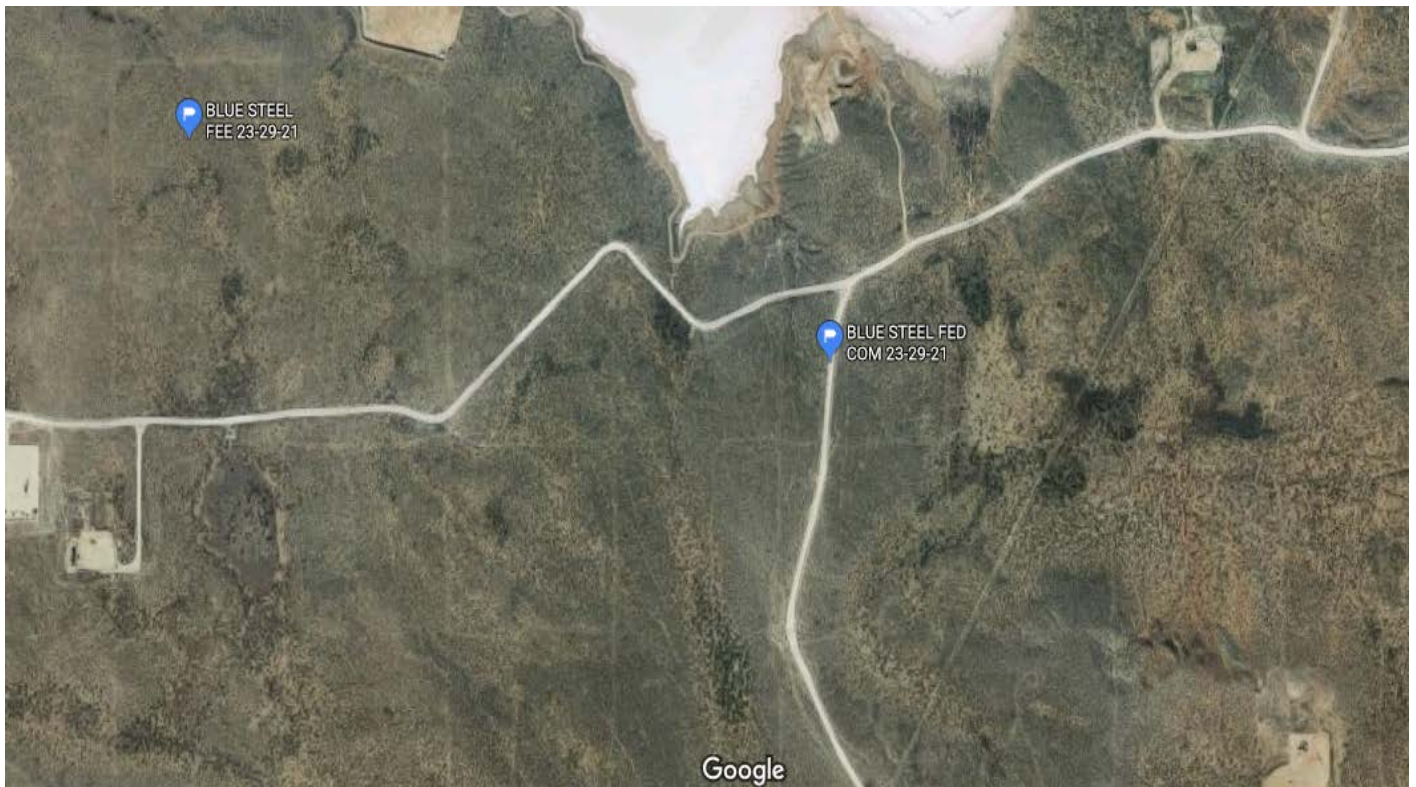
Sheriff (Eddy County, NM)	575-887-7551	New Mexico Poison Control	800-222-1222
Sheriff (Lea County, NM)	575-396-3611	Border Patrol (Las Cruces, NM)	575-528-6600
New Mexico State Police	575-392-5580/5588	Energy Minerals & Natural Resources Dept.	575-748-1283
Carlsbad Medical Center	575-887-4100	Environmental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

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

RESIDENTS AND LANDOWNERS

RESIDENCE

THERE ARE NO RESIDENCE WITHIN ANY RADIUS OF EXPOSURE.



ADDITIONAL INFORMATION

A. HYDROGEN SULFIDE ESSAY

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

B. HYDROGEN SULFIDE HAZARDS

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

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

C. PHYSIOLOGICAL SYSTEMS

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

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

D. TREATMENT

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

E. CHARACTERISTICS OF H₂S

1. Extremely Toxic (refer to chart for toxicity of Hydrogen Sulfide).
2. Heavier than air. Specific gravity= 1.19.
3. Colorless, has odor of rotten eggs.
4. Burns with a blue flame and produces sulfur Dioxide (SO₂) gas, which is very irritating to eyes and lungs. The SO₂ is also toxic and can cause serious injury.
5. H₂S is almost as toxic as hydrogen cyanide.
6. H₂S forms explosive mixture, with air between 4.3% and 46% by volume.
7. Between 5 and 6 times as toxic as carbon monoxide.
8. Produces irritation to eyes, throat, and respiratory tract.
9. Threshold Limit Value (TLV) maximum of eight hours exposure without protective respiratory equipment-10ppm.

F. SAFE PRACTICES

If you are faced with an H₂S problem in your operations, the following safe practices are recommended:

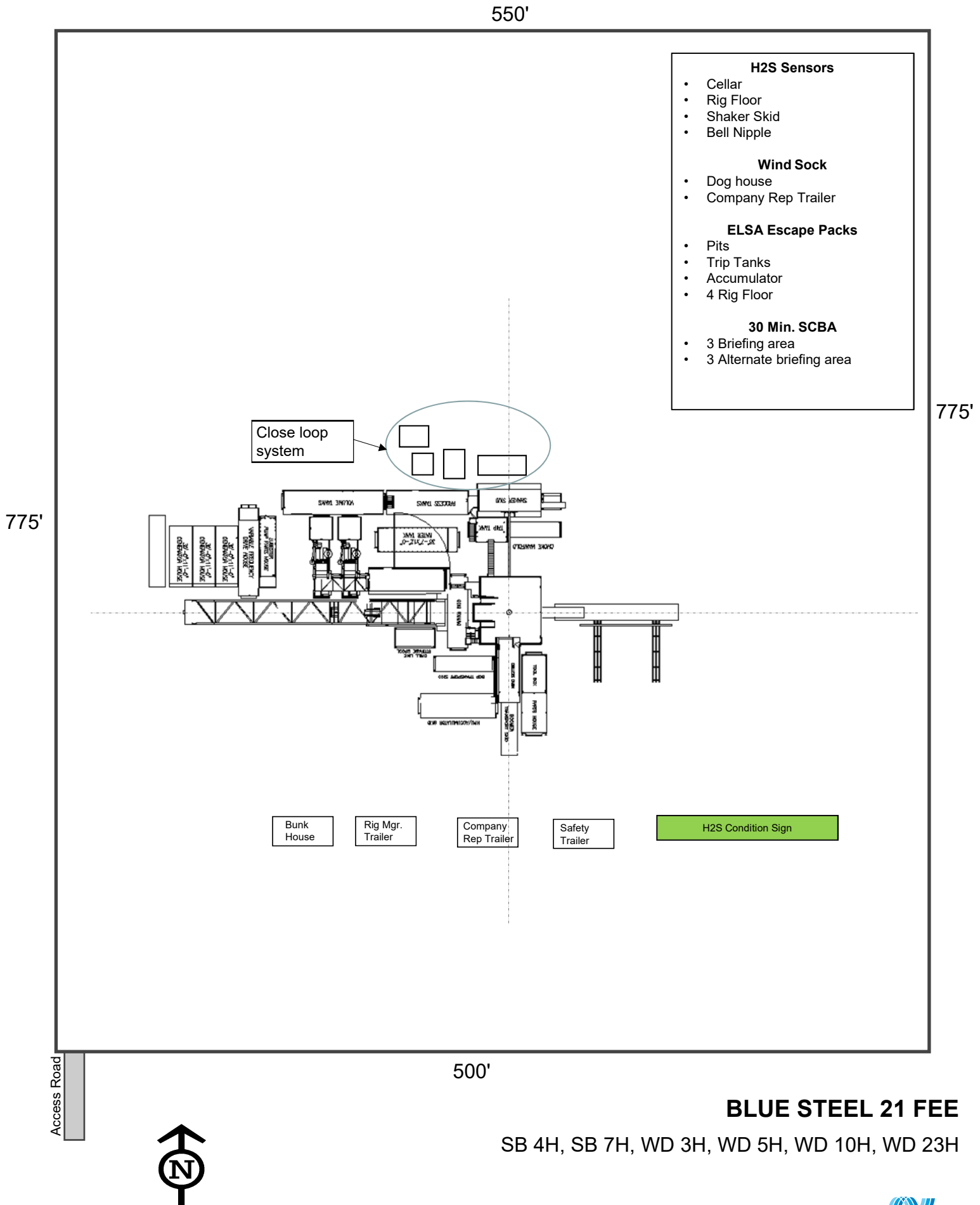
1. Be absolutely sure all concerned are familiar with the hazards concerning H₂S and how to avoid it.
2. All employees should know how to operate and maintain respiration equipment.
3. Be able to give and demonstrate artificial respiration.
4. Post areas where there is poisonous gas with suitable warning signs.
5. Be sure all new employees are thoroughly schooled before they are sent to the field-tomorrow may be too late.
6. Teach men to avoid gas whenever possible-work on the windward side, have fresh air mask available.
7. Never let bad judgment guide you-wear respiratory equipment when gauging tanks, etc. Never try to hold your breath in order to enter a contaminated atmosphere.
8. In areas of high concentration, a two-man operation is preferred.
9. Never enter a tank, cellar or other enclosed place where gas can accumulate without proper respiratory protective equipment and a safety belt secured to a lifeline held by another person outside.
10. Always check out danger areas first with H₂S detectors before allowing anyone to enter. DO NOT TRY TO DETERMINE THE PRESENCE OF GAS BY its ODOR.
11. Wear proper respiratory equipment for the job at hand. Never take a chance with equipment with which you are unfamiliar. If in doubt, consult your supervisor.
12. Carry out practice drills every month with emergency and maintenance breathing air equipment. Telling or showing a group how to operate equipment is not enough-make them show you.
13. Maximum care should be taken to prevent the escape of fumes into the air of working places by leaks, etc.
14. Communication such as radio and telephones should be provided for those people employed where H₂S may be present.

TOXICITY OF HYDROGEN SULFIDE TO MEN

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

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

H2S Preparedness and Contingency Plan Summary



MARATHON OIL PERMIAN LLC
DRILLING AND OPERATIONS PLAN

BLUE STEEL 21 SB FEE 4H

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

EDDY COUNTY, NEW MEXICO

1. GEOLOGICAL FORMATIONS

Formation at Surface	Elevation
Permian	3000

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

2. BLOWOUT PREVENTER TESTING PROCEDURE

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

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

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock, full opening safety valve / inside BOP and choke lines and choke manifold. See attached schematics.

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

3. CASING PROGRAM

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

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

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

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

4. CEMENT PROGRAM

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

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

Pilot Hole Depth: N/A TVD/MD

KOP: N/A TVD/MD

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

Attach plugging procedure for pilot hole: N/A

5. CIRCULATING MEDIUM

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

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

6. TESTING, LOGGING, CORING

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

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

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

GR while drilling from Intermediate casing shoe to TD.

Coring operation description for the well:

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

Mud Logger: None

DST's: None

Open Hole Logs: GR while drilling from Intermediate casing shoe to TD.

7. ANTICIPATED PRESSURE

Anticipated Bottom Hole Pressure: 4451 PSI

Anticipated Bottom Hole Temperature: 195 °F

Anticipate Abnormal Pressure? No

Anticipated Abnormal Temperature? No

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

8. OTHER INFORMATION

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

Batch Drilling Plan

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

Request for Surface Rig

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

1. DRILLING WELL CONTROL PLAN

1.1 WELL CONTROL - CERTIFICATIONS

Required IADC/IWCF Well Control Certifications Supervisor Level:

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

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

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

Well Control-Position/Roles

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

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

(Well Control-Positions/Roles Continued)

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

1.2 WELL CONTROL-COMPONENT AND PREVENTER COMPATIBILITY CHECKLIST

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

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

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

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

1.3 WELL CONTROL-BOP TESTING

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

1.4 WELL CONTROL - DRILLS

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

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

1.5 WELL CONTROL – MONITORING

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

Well Control-Monitoring (Continued)

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

1.6 WELL CONTROL – SHUT IN

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

2. SHUT-IN PROCEDURES:

2.1 PROCEDURE WHILE DRILLING

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

2.2 PROCEDURE WHILE TRIPPING

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

Procedure While Tripping (Continued)

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

2.3 PROCEDURE WHILE RUNNING CASING

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

2.4 PROCEDURE WITH NO PIPE IN HOLE (OPEN HOLE)

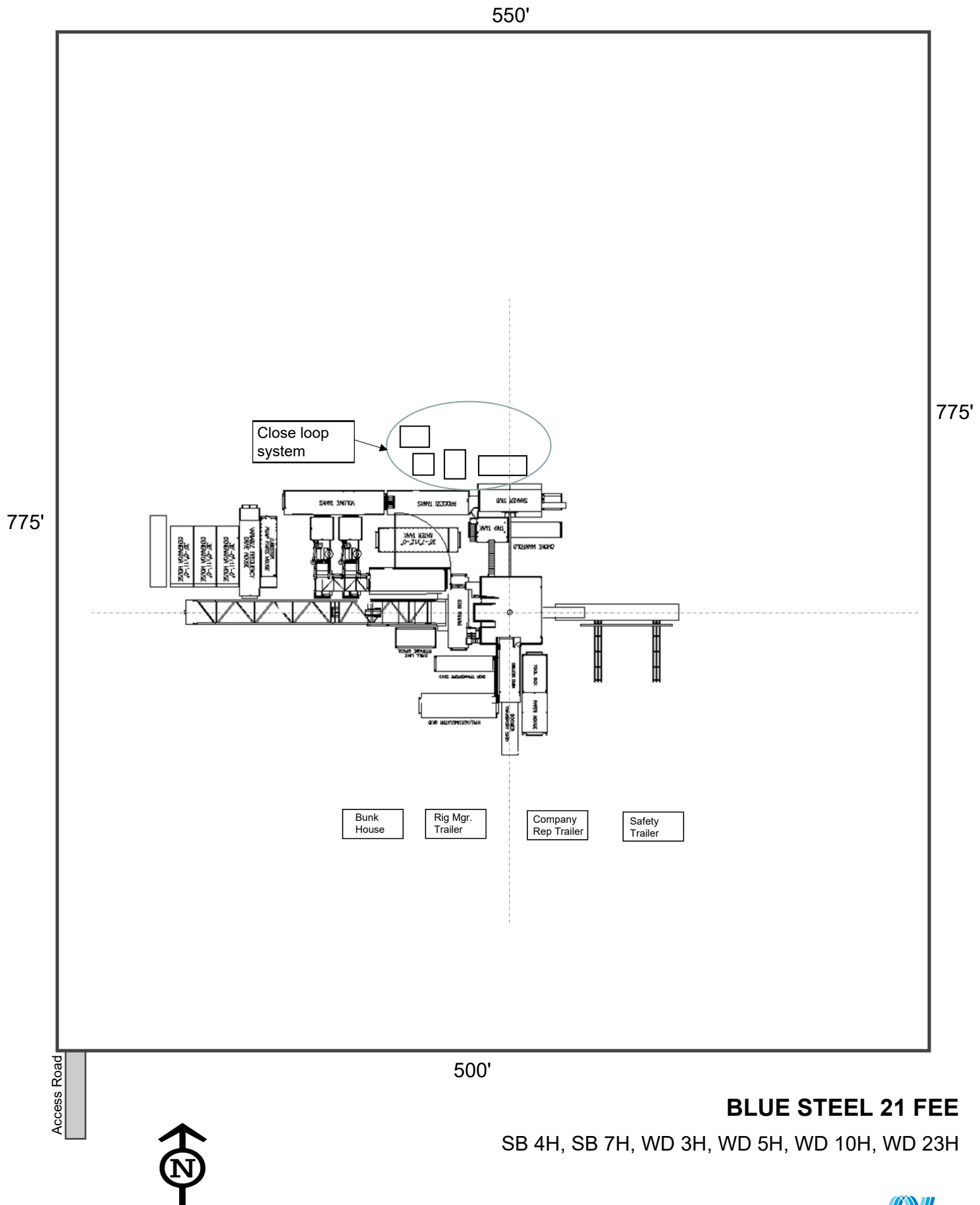
- Sound alarm (alert crew)
- Shut-in with blind rams or BSR. (HCR and choke will already be in the closed position.)
- Confirm shut-in
- Notify toolpusher/company representative
- Gather all relevant data required:
 - Shut-In Pressure
 - Hole Depth and Hole TVD
 - Pit gain
 - Time
 - Kick Volume
 - MW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

2.5 PROCEDURE WHILE PULLING BHA THRU STACK

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

Procedures While Pulling BHA thru Stack (Continued)

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





Pro Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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)	Tool Name	Description
0.00	19,035.79	Prelim Plan A (OH)	MWD+IFR1	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 #7H - OH - Prelim Plan A	600.00	601.00	120.02	116.17	31.174	CC
SB #7H - OH - Prelim Plan A	700.00	701.01	120.64	116.09	26.501	ES
SB #7H - OH - Prelim Plan A	19,035.79	19,080.39	1,320.39	1,102.41	6.057	SF
WD #10H - OH - Prelim Plan A	600.00	599.00	59.95	56.11	15.601	CC
WD #10H - OH - Prelim Plan A	700.00	698.99	60.57	56.04	13.377	ES
WD #10H - OH - Prelim Plan A	2,100.00	2,097.05	97.25	82.92	6.789	SF
WD #23H - OH - Prelim Plan A	600.00	601.00	149.86	146.01	38.925	CC
WD #23H - OH - Prelim Plan A	700.00	701.01	150.48	145.93	33.056	ES
WD #23H - OH - Prelim Plan A	19,035.79	21,181.87	2,678.57	2,490.81	14.265	SF
WD #3H - OH - Prelim Plan A	3,948.61	3,945.50	78.01	50.17	2.802	CC
WD #3H - OH - Prelim Plan A	4,100.00	4,103.45	78.66	49.69	2.716	ES
WD #3H - OH - Prelim Plan A	4,300.00	4,303.89	81.45	51.01	2.676	SF
WD #5H - OH - Prelim Plan A	600.00	600.00	29.89	26.04	7.771	CC
WD #5H - OH - Prelim Plan A	700.00	700.11	30.32	25.77	6.665	ES
WD #5H - OH - Prelim Plan A	8,400.00	8,382.06	335.57	275.93	5.626	SF

Offset Design												
Blue Steel 21 Fee - SB #7H - 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)	Offset Wellbore Centre +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	90.02	-0.05	120.02	120.02			
100.00	100.00	101.00	100.00	0.13	0.13	90.02	-0.05	120.02	120.02	119.75	0.27	452.446
200.00	200.00	201.00	200.00	0.49	0.49	90.02	-0.05	120.02	120.02	119.04	0.98	122.194
300.00	300.00	301.00	300.00	0.85	0.85	90.02	-0.05	120.02	120.02	118.32	1.70	70.635
400.00	400.00	401.00	400.00	1.21	1.21	90.02	-0.05	120.02	120.02	117.60	2.42	49.675
500.00	500.00	501.00	500.00	1.56	1.57	90.02	-0.05	120.02	120.02	116.89	3.13	38.308
600.00	600.00	601.00	600.00	1.92	1.93	90.02	-0.05	120.02	120.02	116.17	3.85	31.174 CC
700.00	699.99	701.01	699.99	2.27	2.29	-135.26	-0.05	120.02	120.64	116.09	4.55	26.501 ES
800.00	799.96	801.04	799.96	2.60	2.64	-136.11	-0.05	120.02	122.51	117.27	5.25	23.353
900.00	899.90	901.10	899.90	2.94	3.00	-137.22	-0.05	120.02	125.05	119.11	5.95	21.033
1,000.00	999.84	1,001.16	999.84	3.29	3.36	-138.29	-0.05	120.02	127.64	120.99	6.65	19.196
1,100.00	1,099.78	1,101.22	1,099.78	3.64	3.72	-139.31	-0.05	120.02	130.26	122.91	7.36	17.710
1,200.00	1,199.72	1,201.28	1,199.72	3.99	4.08	-140.29	-0.05	120.02	132.93	124.86	8.06	16.485

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 SB #4H
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Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
1,300.00	1,299.65	1,301.35	1,299.65	4.34	4.44	-141.23	-0.05	120.02	135.63	126.86	8.77	15.459		
1,400.00	1,399.59	1,401.41	1,399.59	4.69	4.80	-142.13	-0.05	120.02	138.37	128.89	9.49	14.588		
1,500.00	1,499.53	1,498.53	1,499.53	5.05	5.14	-143.00	-0.05	120.02	141.14	130.96	10.19	13.855		
1,600.00	1,599.47	1,594.16	1,595.14	5.40	5.48	-144.07	0.82	121.30	145.41	134.54	10.88	13.371		
1,700.00	1,699.41	1,689.30	1,690.16	5.76	5.82	-145.55	3.46	125.19	152.77	141.22	11.55	13.228		
1,800.00	1,799.35	1,783.80	1,784.34	6.11	6.15	-147.31	7.84	131.64	163.29	151.08	12.21	13.373		
1,900.00	1,899.29	1,877.48	1,877.39	6.47	6.49	-149.20	13.90	140.56	177.01	164.16	12.86	13.769		
2,000.00	1,999.23	1,970.14	1,969.04	6.83	6.82	-151.09	21.57	151.86	193.97	180.49	13.48	14.387		
2,100.00	2,099.17	2,066.09	2,063.55	7.19	7.16	-152.55	30.85	165.52	213.69	199.54	14.15	15.100		
2,200.00	2,199.03	2,163.98	2,159.96	7.54	7.51	-153.23	40.40	179.58	234.06	219.22	14.85	15.766		
2,300.00	2,298.69	2,261.77	2,256.26	7.89	7.87	-156.22	49.94	193.63	254.84	239.30	15.54	16.398		
2,400.00	2,398.02	2,359.34	2,352.34	8.24	8.23	-159.90	59.45	207.65	276.08	259.84	16.24	17.004		
2,500.00	2,496.92	2,456.56	2,448.09	8.59	8.58	-160.14	68.94	221.61	297.93	281.00	16.93	17.594		
2,600.00	2,595.42	2,553.48	2,543.53	8.94	8.94	-161.35	78.39	235.54	320.44	302.81	17.63	18.174		
2,700.00	2,693.90	2,650.37	2,638.95	9.29	9.30	-163.02	87.85	249.45	343.28	324.94	18.33	18.724		
2,800.00	2,792.38	2,747.27	2,734.38	9.64	9.66	-164.49	97.30	263.37	366.35	347.32	19.04	19.243		
2,900.00	2,890.86	2,844.16	2,829.80	9.99	10.02	-165.78	106.75	277.29	389.63	369.89	19.74	19.734		
3,000.00	2,989.34	2,941.06	2,925.22	10.35	10.38	-166.93	116.20	291.21	413.08	392.63	20.45	20.197		
3,100.00	3,087.82	3,037.95	3,020.65	10.71	10.74	-167.96	125.66	305.13	436.67	415.51	21.16	20.633		
3,200.00	3,186.30	3,134.85	3,116.07	11.08	11.11	-168.88	135.11	319.05	460.38	438.50	21.88	21.045		
3,300.00	3,284.78	3,231.74	3,211.49	11.44	11.47	-169.71	144.56	332.97	484.19	461.60	22.59	21.433		
3,400.00	3,383.27	3,328.64	3,306.92	11.81	11.84	-170.46	154.01	346.89	508.09	484.78	23.31	21.801		
3,500.00	3,481.75	3,425.53	3,402.34	12.17	12.20	-171.15	163.47	360.81	532.06	508.04	24.02	22.148		
3,600.00	3,580.23	3,522.43	3,497.76	12.54	12.57	-171.77	172.92	374.73	556.10	531.36	24.74	22.477		
3,700.00	3,678.71	3,619.32	3,593.19	12.91	12.93	-172.35	182.37	388.65	580.20	554.74	25.46	22.788		
3,800.00	3,777.19	3,716.22	3,688.61	13.28	13.30	-172.88	191.82	402.57	604.34	578.16	26.18	23.083		
3,900.00	3,875.67	3,813.11	3,784.03	13.65	13.67	-173.37	201.28	416.49	628.54	601.63	26.90	23.363		
4,000.00	3,974.15	3,910.01	3,879.45	14.02	14.04	-173.82	210.73	430.41	652.77	625.14	27.62	23.630		
4,100.00	4,072.63	4,006.90	3,974.88	14.39	14.40	-174.24	220.18	444.33	677.04	648.69	28.35	23.883		
4,200.00	4,171.11	4,103.80	4,070.30	14.77	14.77	-174.63	229.63	458.25	701.34	672.26	29.07	24.124		
4,300.00	4,269.60	4,200.69	4,165.72	15.14	15.14	-175.00	239.09	472.17	725.66	695.87	29.80	24.354		
4,400.00	4,368.08	4,297.59	4,261.15	15.51	15.51	-175.34	248.54	486.09	750.02	719.50	30.52	24.573		
4,500.00	4,466.56	4,405.52	4,356.57	15.89	15.92	-175.66	257.99	500.01	774.40	743.11	31.29	24.749		
4,600.00	4,565.04	4,508.62	4,451.99	16.26	16.32	-175.96	267.44	513.93	798.80	766.76	32.04	24.931		
4,700.00	4,663.52	4,588.27	4,547.42	16.64	16.62	-176.24	276.90	527.85	823.22	790.51	32.70	25.173		
4,800.00	4,762.00	4,685.17	4,642.84	17.02	16.99	-176.51	286.35	541.77	847.65	814.22	33.43	25.355		
4,900.00	4,860.48	4,782.06	4,738.26	17.39	17.36	-176.76	295.80	555.69	872.11	837.95	34.16	25.531		
5,000.00	4,958.96	4,878.96	4,833.68	17.77	17.73	-176.99	305.25	569.60	896.57	861.69	34.89	25.698		
5,100.00	5,057.44	4,975.85	4,929.11	18.15	18.10	-177.22	314.70	583.52	921.06	885.44	35.62	25.859		
5,200.00	5,155.93	5,072.75	5,024.53	18.52	18.47	-177.43	324.16	597.44	945.55	909.20	36.35	26.014		
5,300.00	5,254.41	5,169.64	5,119.95	18.90	18.84	-177.64	333.61	611.36	970.06	932.98	37.08	26.163		
5,400.00	5,352.89	5,266.54	5,215.38	19.28	19.21	-177.83	343.06	625.28	994.57	956.76	37.81	26.305		
5,500.00	5,451.37	5,363.43	5,310.80	19.66	19.58	-178.01	352.51	639.20	1,019.10	980.56	38.54	26.443		
5,600.00	5,549.85	5,460.33	5,406.22	20.04	19.95	-178.19	361.97	653.12	1,043.64	1,004.36	39.27	26.575		
5,700.00	5,648.33	5,557.22	5,501.65	20.42	20.32	-178.35	371.42	667.04	1,068.18	1,028.18	40.00	26.703		
5,800.00	5,746.81	5,654.12	5,597.07	20.80	20.70	-178.51	380.87	680.96	1,092.73	1,052.00	40.74	26.825		
5,900.00	5,845.29	5,751.01	5,692.49	21.18	21.07	-178.66	390.32	694.88	1,117.29	1,075.83	41.47	26.944		
6,000.00	5,943.79	5,847.92	5,787.93	21.55	21.44	-178.88	399.78	708.80	1,141.82	1,099.62	42.20	27.057		
6,100.00	6,042.65	5,945.21	5,883.74	21.93	21.81	-179.30	409.27	722.78	1,164.91	1,121.98	42.93	27.135		
6,200.00	6,141.98	6,042.97	5,980.01	22.30	22.19	-179.54	418.81	736.82	1,185.85	1,142.19	43.66	27.162		
6,300.00	6,241.66	6,141.09	6,076.64	22.66	22.56	-179.61	428.38	750.92	1,204.61	1,160.23	44.38	27.142		
6,400.00	6,341.55	6,239.44	6,173.49	23.01	22.94	-179.53	437.97	765.05	1,221.22	1,176.12	45.10	27.078		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
6,500.00	6,441.54	6,337.90	6,270.46	23.36	23.32	93.38	447.58	779.19	1,235.73	1,189.92	45.81	26.974		
6,600.00	6,541.54	6,436.38	6,367.45	23.70	23.70	92.89	457.18	793.34	1,249.62	1,203.10	46.52	26.862		
6,700.00	6,641.54	6,534.86	6,464.43	24.04	24.08	92.42	466.79	807.49	1,263.60	1,216.37	47.23	26.754		
6,800.00	6,741.54	6,633.34	6,561.42	24.38	24.45	91.96	476.40	821.63	1,277.65	1,229.71	47.94	26.651		
6,900.00	6,841.54	6,731.82	6,658.40	24.72	24.83	91.51	486.01	835.78	1,291.79	1,243.14	48.65	26.553		
7,000.00	6,941.54	6,830.30	6,755.39	25.07	25.21	91.07	495.61	849.93	1,306.01	1,256.64	49.36	26.458		
7,100.00	7,041.54	6,986.14	6,909.47	25.41	25.80	90.48	508.61	869.06	1,318.26	1,267.80	50.46	26.125		
7,200.00	7,141.54	7,147.01	7,069.62	25.75	26.38	90.11	517.06	881.51	1,325.99	1,274.50	51.49	25.753		
7,300.00	7,241.54	7,309.07	7,231.55	26.10	26.95	89.97	520.46	886.52	1,329.08	1,276.66	52.42	25.356		
7,400.00	7,341.54	7,419.06	7,341.54	26.44	27.32	89.96	520.53	886.62	1,329.14	1,276.01	53.13	25.018		
7,500.00	7,441.54	7,519.06	7,441.54	26.79	27.66	89.96	520.53	886.62	1,329.14	1,275.33	53.81	24.700		
7,600.00	7,541.54	7,619.06	7,541.54	27.13	28.00	89.96	520.53	886.62	1,329.14	1,274.65	54.49	24.390		
7,700.00	7,641.54	7,719.06	7,641.54	27.48	28.33	89.96	520.53	886.62	1,329.14	1,273.96	55.18	24.087		
7,800.00	7,741.54	7,819.06	7,741.54	27.83	28.67	89.96	520.53	886.62	1,329.14	1,273.27	55.87	23.792		
7,900.00	7,841.54	7,919.06	7,841.54	28.17	29.01	89.96	520.53	886.62	1,329.14	1,272.59	56.55	23.503		
8,000.00	7,941.54	8,019.06	7,941.54	28.52	29.35	89.96	520.53	886.62	1,329.14	1,271.90	57.24	23.221		
8,100.00	8,041.54	8,119.06	8,041.54	28.87	29.70	89.96	520.53	886.62	1,329.14	1,271.21	57.93	22.945		
8,200.00	8,141.54	8,219.06	8,141.54	29.22	30.04	89.96	520.53	886.62	1,329.14	1,270.52	58.62	22.675		
8,300.00	8,241.29	8,318.70	8,241.12	29.57	30.38	89.86	522.47	886.63	1,329.13	1,269.81	59.31	22.409		
8,400.00	8,338.66	8,418.68	8,339.54	29.93	30.73	90.10	539.32	886.68	1,329.11	1,269.08	60.03	22.141		
8,500.00	8,430.69	8,519.62	8,434.41	30.29	31.08	90.34	573.41	886.80	1,329.10	1,268.35	60.75	21.877		
8,600.00	8,514.59	8,621.52	8,522.63	30.64	31.42	90.56	624.15	886.98	1,329.10	1,267.62	61.47	21.620		
8,700.00	8,587.81	8,724.36	8,601.14	30.98	31.72	90.77	690.36	887.21	1,329.10	1,266.92	62.18	21.376		
8,800.00	8,648.12	8,828.06	8,667.06	31.31	31.98	90.96	770.22	887.48	1,329.09	1,266.24	62.85	21.146		
8,900.00	8,693.69	8,932.51	8,717.82	31.63	32.22	91.12	861.34	887.80	1,329.08	1,265.58	63.50	20.931		
9,000.00	8,723.13	9,037.57	8,751.37	31.94	32.46	91.24	960.74	888.14	1,329.05	1,264.95	64.10	20.733		
9,100.00	8,735.56	9,143.07	8,766.25	32.23	32.71	91.32	1,065.04	888.50	1,329.01	1,264.34	64.66	20.553		
9,200.00	8,735.96	9,244.60	8,766.96	32.51	32.96	91.34	1,166.56	888.85	1,328.93	1,263.73	65.19	20.385		
9,300.00	8,735.96	9,344.60	8,766.96	32.82	33.24	91.34	1,266.56	889.20	1,328.84	1,263.07	65.77	20.205		
9,400.00	8,735.96	9,444.60	8,766.96	33.16	33.53	91.34	1,366.56	889.54	1,328.75	1,262.35	66.40	20.012		
9,500.00	8,735.96	9,544.60	8,766.96	33.51	33.86	91.34	1,466.56	889.89	1,328.66	1,261.59	67.08	19.809		
9,600.00	8,735.96	9,644.60	8,766.96	33.90	34.21	91.34	1,566.56	890.23	1,328.58	1,260.78	67.80	19.595		
9,700.00	8,735.96	9,744.60	8,766.96	34.30	34.58	91.34	1,666.56	890.58	1,328.49	1,259.92	68.58	19.373		
9,800.00	8,735.96	9,844.60	8,766.96	34.73	34.98	91.34	1,766.56	890.92	1,328.40	1,259.01	69.39	19.143		
9,900.00	8,735.96	9,944.60	8,766.96	35.17	35.39	91.34	1,866.56	891.27	1,328.32	1,258.06	70.26	18.907		
10,000.00	8,735.96	10,044.60	8,766.96	35.64	35.83	91.34	1,966.55	891.61	1,328.23	1,257.07	71.16	18.665		
10,100.00	8,735.96	10,144.60	8,766.96	36.13	36.29	91.34	2,066.55	891.96	1,328.14	1,256.04	72.11	18.419		
10,200.00	8,735.96	10,244.60	8,766.96	36.64	36.77	91.34	2,166.55	892.30	1,328.06	1,254.97	73.09	18.170		
10,300.00	8,735.96	10,344.60	8,766.96	37.16	37.27	91.34	2,266.55	892.65	1,327.97	1,253.86	74.11	17.918		
10,400.00	8,735.96	10,444.60	8,766.96	37.70	37.78	91.34	2,366.55	893.00	1,327.88	1,252.71	75.17	17.665		
10,500.00	8,735.96	10,544.60	8,766.96	38.26	38.32	91.34	2,466.55	893.34	1,327.80	1,251.53	76.26	17.411		
10,600.00	8,735.96	10,644.60	8,766.96	38.84	38.87	91.34	2,566.55	893.69	1,327.71	1,250.32	77.39	17.157		
10,700.00	8,735.96	10,744.60	8,766.96	39.43	39.43	91.34	2,666.55	894.03	1,327.62	1,249.08	78.54	16.903		
10,800.00	8,735.97	10,844.60	8,766.97	40.03	40.01	91.34	2,766.55	894.38	1,327.54	1,247.81	79.73	16.650		
10,900.00	8,735.97	10,944.60	8,766.97	40.65	40.61	91.34	2,866.55	894.72	1,327.45	1,246.50	80.95	16.399		
11,000.00	8,735.97	11,044.60	8,766.97	41.28	41.22	91.34	2,966.55	895.07	1,327.36	1,245.17	82.19	16.150		
11,100.00	8,735.97	11,144.60	8,766.97	41.93	41.84	91.34	3,066.55	895.41	1,327.28	1,243.82	83.46	15.904		
11,200.00	8,735.97	11,244.60	8,766.97	42.58	42.48	91.34	3,166.55	895.76	1,327.19	1,242.44	84.75	15.660		
11,300.00	8,735.97	11,344.60	8,766.97	43.25	43.12	91.34	3,266.55	896.10	1,327.10	1,241.03	86.07	15.419		
11,400.00	8,735.97	11,444.60	8,766.97	43.93	43.78	91.34	3,366.55	896.45	1,327.02	1,239.60	87.41	15.181		
11,500.00	8,735.97	11,544.60	8,766.97	44.62	44.45	91.34	3,466.55	896.79	1,326.93	1,238.15	88.78	14.947		
11,600.00	8,735.97	11,644.60	8,766.97	45.32	45.14	91.34	3,566.54	897.14	1,326.84	1,236.68	90.16	14.717		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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	
11,700.00	8,735.97	11,744.60	8,766.97	46.03	45.83	91.34	3,666.54	897.48	1,326.76	1,235.19	91.56	14.490		
11,800.00	8,735.97	11,844.60	8,766.97	46.75	46.53	91.34	3,766.54	897.83	1,326.67	1,233.68	92.99	14.267		
11,900.00	8,735.97	11,944.60	8,766.97	47.48	47.24	91.34	3,866.54	898.18	1,326.58	1,232.15	94.43	14.049		
12,000.00	8,735.97	12,044.60	8,766.97	48.22	47.96	91.34	3,966.54	898.52	1,326.50	1,230.61	95.89	13.834		
12,100.00	8,735.97	12,144.60	8,766.97	48.96	48.69	91.34	4,066.54	898.87	1,326.41	1,229.05	97.36	13.623		
12,200.00	8,735.97	12,244.60	8,766.97	49.71	49.43	91.34	4,166.54	899.21	1,326.32	1,227.47	98.85	13.417		
12,300.00	8,735.97	12,344.60	8,766.97	50.47	50.17	91.34	4,266.54	899.56	1,326.23	1,225.88	100.36	13.215		
12,400.00	8,735.97	12,444.60	8,766.97	51.24	50.92	91.34	4,366.54	899.90	1,326.15	1,224.27	101.88	13.017		
12,500.00	8,735.97	12,544.60	8,766.97	52.01	51.68	91.34	4,466.54	900.25	1,326.06	1,222.65	103.41	12.823		
12,600.00	8,735.97	12,644.60	8,766.97	52.79	52.45	91.34	4,566.54	900.59	1,325.97	1,221.01	104.96	12.633		
12,700.00	8,735.97	12,744.60	8,766.97	53.58	53.22	91.34	4,666.54	900.94	1,325.89	1,219.36	106.52	12.447		
12,800.00	8,735.97	12,844.60	8,766.97	54.37	54.00	91.34	4,766.54	901.28	1,325.80	1,217.71	108.10	12.265		
12,900.00	8,735.97	12,944.60	8,766.97	55.17	54.78	91.34	4,866.54	901.63	1,325.71	1,216.03	109.68	12.087		
13,000.00	8,735.97	13,044.60	8,766.97	55.97	55.58	91.34	4,966.54	901.97	1,325.63	1,214.35	111.28	11.913		
13,100.00	8,735.97	13,144.60	8,766.97	56.78	56.37	91.34	5,066.54	902.32	1,325.54	1,212.66	112.88	11.743		
13,200.00	8,735.98	13,244.60	8,766.98	57.59	57.17	91.34	5,166.53	902.66	1,325.45	1,210.96	114.50	11.576		
13,300.00	8,735.98	13,344.60	8,766.98	58.41	57.98	91.34	5,266.53	903.01	1,325.37	1,209.24	116.12	11.414		
13,400.00	8,735.98	13,444.60	8,766.98	59.23	58.79	91.34	5,366.53	903.36	1,325.28	1,207.52	117.76	11.254		
13,500.00	8,735.98	13,544.60	8,766.98	60.05	59.61	91.34	5,466.53	903.70	1,325.19	1,205.79	119.40	11.099		
13,600.00	8,735.98	13,644.60	8,766.98	60.88	60.43	91.34	5,566.53	904.05	1,325.11	1,204.05	121.05	10.946		
13,700.00	8,735.98	13,744.60	8,766.98	61.72	61.25	91.34	5,666.53	904.39	1,325.02	1,202.30	122.72	10.798		
13,800.00	8,735.98	13,844.60	8,766.98	62.56	62.08	91.34	5,766.53	904.74	1,324.93	1,200.55	124.38	10.652		
13,900.00	8,735.98	13,944.60	8,766.98	63.40	62.91	91.34	5,866.53	905.08	1,324.85	1,198.79	126.06	10.510		
14,000.00	8,735.98	14,044.60	8,766.98	64.24	63.75	91.34	5,966.53	905.43	1,324.76	1,197.02	127.74	10.370		
14,100.00	8,735.98	14,144.60	8,766.98	65.09	64.59	91.34	6,066.53	905.77	1,324.67	1,195.24	129.43	10.234		
14,200.00	8,735.98	14,244.60	8,766.98	65.94	65.43	91.34	6,166.53	906.12	1,324.59	1,193.45	131.13	10.101		
14,300.00	8,735.98	14,344.60	8,766.98	66.80	66.28	91.34	6,266.53	906.46	1,324.50	1,191.66	132.84	9.971		
14,400.00	8,735.98	14,444.60	8,766.98	67.66	67.13	91.34	6,366.53	906.81	1,324.41	1,189.87	134.55	9.844		
14,500.00	8,735.98	14,544.60	8,766.98	68.52	67.99	91.34	6,466.53	907.15	1,324.33	1,188.06	136.26	9.719		
14,600.00	8,735.98	14,644.60	8,766.98	69.38	68.84	91.34	6,566.53	907.50	1,324.24	1,186.25	137.98	9.597		
14,700.00	8,735.98	14,744.60	8,766.98	70.25	69.70	91.34	6,666.53	907.84	1,324.15	1,184.44	139.71	9.478		
14,800.00	8,735.98	14,844.60	8,766.98	71.12	70.56	91.34	6,766.52	908.19	1,324.07	1,182.62	141.44	9.361		
14,900.00	8,735.98	14,944.60	8,766.98	71.99	71.43	91.34	6,866.52	908.54	1,323.98	1,180.80	143.18	9.247		
15,000.00	8,735.98	15,044.60	8,766.98	72.86	72.30	91.34	6,966.52	908.88	1,323.89	1,178.97	144.93	9.135		
15,100.00	8,735.98	15,144.60	8,766.98	73.74	73.17	91.34	7,066.52	909.23	1,323.81	1,177.13	146.67	9.026		
15,200.00	8,735.98	15,244.60	8,766.98	74.62	74.04	91.34	7,166.52	909.57	1,323.72	1,175.29	148.43	8.918		
15,300.00	8,735.98	15,344.60	8,766.98	75.50	74.91	91.34	7,266.52	909.92	1,323.63	1,173.45	150.18	8.813		
15,400.00	8,735.98	15,444.60	8,766.98	76.38	75.79	91.34	7,366.52	910.26	1,323.54	1,171.60	151.94	8.711		
15,500.00	8,735.99	15,544.60	8,766.99	77.27	76.67	91.34	7,466.52	910.61	1,323.46	1,169.75	153.71	8.610		
15,600.00	8,735.99	15,644.60	8,766.99	78.15	77.55	91.34	7,566.52	910.95	1,323.37	1,167.89	155.48	8.512		
15,700.00	8,735.99	15,744.60	8,766.99	79.04	78.43	91.34	7,666.52	911.30	1,323.28	1,166.03	157.25	8.415		
15,800.00	8,735.99	15,844.60	8,766.99	79.93	79.32	91.34	7,766.52	911.64	1,323.20	1,164.17	159.03	8.320		
15,900.00	8,735.99	15,944.60	8,766.99	80.82	80.21	91.34	7,866.52	911.99	1,323.11	1,162.30	160.81	8.228		
16,000.00	8,735.99	16,044.60	8,766.99	81.72	81.10	91.34	7,966.52	912.33	1,323.02	1,160.43	162.59	8.137		
16,100.00	8,735.99	16,144.60	8,766.99	82.61	81.99	91.34	8,066.52	912.68	1,322.94	1,158.56	164.38	8.048		
16,200.00	8,735.99	16,244.60	8,766.99	83.51	82.88	91.34	8,166.52	913.02	1,322.85	1,156.68	166.17	7.961		
16,300.00	8,735.99	16,344.60	8,766.99	84.41	83.77	91.34	8,266.52	913.37	1,322.76	1,154.80	167.97	7.875		
16,400.00	8,735.99	16,444.60	8,766.99	85.31	84.67	91.34	8,366.51	913.72	1,322.68	1,152.91	169.76	7.791		
16,500.00	8,735.99	16,544.60	8,766.99	86.21	85.57	91.34	8,466.51	914.06	1,322.59	1,151.03	171.56	7.709		
16,600.00	8,735.99	16,644.60	8,766.99	87.11	86.47	91.34	8,566.51	914.41	1,322.50	1,149.14	173.37	7.628		
16,700.00	8,735.99	16,744.60	8,766.99	88.02	87.37	91.34	8,666.51	914.75	1,322.42	1,147.24	175.17	7.549		
16,800.00	8,735.99	16,844.60	8,766.99	88.92	88.27	91.34	8,766.51	915.10	1,322.33	1,145.35	176.98	7.472		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
16,900.00	8,735.99	16,944.60	8,766.99	89.83	89.17	91.34	8,866.51	915.44	1,322.24	1,143.45	178.79	7.395	
17,000.00	8,735.99	17,044.60	8,766.99	90.74	90.08	91.34	8,966.51	915.79	1,322.16	1,141.55	180.61	7.321	
17,100.00	8,735.99	17,144.60	8,766.99	91.65	90.98	91.34	9,066.51	916.13	1,322.07	1,139.65	182.42	7.247	
17,200.00	8,735.99	17,244.60	8,766.99	92.56	91.89	91.34	9,166.51	916.48	1,321.98	1,137.74	184.24	7.175	
17,300.00	8,735.99	17,344.60	8,766.99	93.47	92.80	91.34	9,266.51	916.82	1,321.90	1,135.83	186.06	7.105	
17,400.00	8,735.99	17,444.60	8,766.99	94.38	93.71	91.34	9,366.51	917.17	1,321.81	1,133.92	187.89	7.035	
17,500.00	8,735.99	17,544.60	8,766.99	95.30	94.62	91.34	9,466.51	917.51	1,321.72	1,132.01	189.71	6.967	
17,600.00	8,735.99	17,644.60	8,766.99	96.21	95.53	91.34	9,566.51	917.86	1,321.64	1,130.10	191.54	6.900	
17,700.00	8,735.99	17,744.60	8,766.99	97.13	96.44	91.34	9,666.51	918.20	1,321.55	1,128.18	193.37	6.834	
17,800.00	8,735.99	17,844.60	8,766.99	98.05	97.35	91.34	9,766.51	918.55	1,321.46	1,126.26	195.20	6.770	
17,900.00	8,736.00	17,944.60	8,767.00	98.96	98.27	91.34	9,866.51	918.90	1,321.38	1,124.34	197.03	6.706	
18,000.00	8,736.00	18,044.60	8,767.00	99.88	99.19	91.34	9,966.50	919.24	1,321.29	1,122.42	198.87	6.644	
18,100.00	8,736.00	18,144.60	8,767.00	100.80	100.10	91.34	10,066.50	919.59	1,321.20	1,120.49	200.71	6.583	
18,200.00	8,736.00	18,244.60	8,767.00	101.72	101.02	91.34	10,166.50	919.93	1,321.11	1,118.57	202.55	6.523	
18,300.00	8,736.00	18,344.60	8,767.00	102.64	101.94	91.34	10,266.50	920.28	1,321.03	1,116.64	204.39	6.463	
18,400.00	8,736.00	18,444.60	8,767.00	103.57	102.86	91.34	10,366.50	920.62	1,320.94	1,114.71	206.23	6.405	
18,500.00	8,736.00	18,544.60	8,767.00	104.49	103.78	91.34	10,466.50	920.97	1,320.85	1,112.78	208.07	6.348	
18,600.00	8,736.00	18,644.60	8,767.00	105.41	104.70	91.34	10,566.50	921.31	1,320.77	1,110.85	209.92	6.292	
18,700.00	8,736.00	18,744.60	8,767.00	106.34	105.62	91.35	10,666.50	921.66	1,320.68	1,108.91	211.77	6.236	
18,800.00	8,736.00	18,844.60	8,767.00	107.26	106.55	91.35	10,766.50	922.00	1,320.59	1,106.98	213.62	6.182	
18,900.00	8,736.00	18,944.60	8,767.00	108.19	107.47	91.35	10,866.50	922.35	1,320.51	1,105.04	215.47	6.129	
19,000.00	8,736.00	19,044.60	8,767.00	109.12	108.39	91.35	10,966.50	922.69	1,320.42	1,103.10	217.32	6.076	
19,035.79	8,736.00	19,080.39	8,767.00	109.45	108.72	91.35	11,002.29	922.82	1,320.39	1,102.41	217.98	6.057 SF	



Pro Directional Anticollision Report



Marathon Oil

Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
0.00	0.00	1.00	0.00	0.00	0.00	90.11	-0.12	59.95	59.95					
100.00	100.00	101.00	100.00	0.13	0.13	90.11	-0.12	59.95	59.95	59.68	0.27	225.997		
200.00	200.00	201.00	200.00	0.49	0.49	90.11	-0.12	59.95	59.95	58.97	0.98	61.036		
300.00	300.00	301.00	300.00	0.85	0.85	90.11	-0.12	59.95	59.95	58.25	1.70	35.282		
400.00	400.00	401.00	400.00	1.21	1.21	90.11	-0.12	59.95	59.95	57.53	2.42	24.813		
500.00	500.00	501.00	500.00	1.56	1.57	90.11	-0.12	59.95	59.95	56.82	3.13	19.135		
600.00	600.00	599.00	600.00	1.92	1.92	90.11	-0.12	59.95	59.95	56.11	3.84	15.601 CC		
700.00	699.99	698.99	699.99	2.27	2.26	-134.66	-0.98	59.95	60.57	56.04	4.53	13.377 ES		
800.00	799.96	801.04	799.92	2.60	2.60	-133.97	-3.57	59.95	62.43	57.23	5.20	12.004		
900.00	899.90	901.07	899.82	2.94	2.94	-133.10	-7.06	59.95	64.92	59.04	5.88	11.043		
1,000.00	999.84	1,001.11	999.73	3.29	3.28	-132.30	-10.55	59.95	67.43	60.86	6.57	10.269		
1,100.00	1,099.78	1,101.15	1,099.63	3.64	3.63	-131.56	-14.04	59.95	69.95	62.69	7.26	9.634		
1,200.00	1,199.72	1,201.18	1,199.53	3.99	3.97	-130.87	-17.53	59.95	72.48	64.52	7.96	9.106		
1,300.00	1,299.65	1,301.22	1,299.44	4.34	4.32	-130.23	-21.02	59.95	75.01	66.35	8.66	8.661		
1,400.00	1,399.59	1,401.25	1,399.34	4.69	4.68	-129.63	-24.51	59.95	77.56	68.20	9.37	8.280		
1,500.00	1,499.53	1,501.29	1,499.24	5.05	5.03	-129.07	-27.99	59.95	80.12	70.04	10.07	7.953		
1,600.00	1,599.47	1,601.32	1,599.15	5.40	5.38	-128.54	-31.48	59.95	82.68	71.90	10.78	7.667		
1,700.00	1,699.41	1,701.36	1,699.05	5.76	5.74	-128.04	-34.97	59.95	85.25	73.76	11.49	7.417		
1,800.00	1,799.35	1,801.40	1,798.96	6.11	6.10	-127.57	-38.46	59.95	87.83	75.62	12.21	7.195		
1,900.00	1,899.29	1,901.43	1,898.86	6.47	6.45	-127.13	-41.95	59.95	90.41	77.49	12.92	6.998		
2,000.00	1,999.23	1,998.53	1,998.76	6.83	6.80	-126.72	-45.44	59.95	93.00	79.37	13.62	6.826		
2,100.00	2,099.17	2,097.05	2,097.25	7.19	7.15	178.98	-47.54	60.86	97.25	82.92	14.33	6.789 SF		
2,200.00	2,199.03	2,195.27	2,195.42	7.54	7.49	153.48	-46.84	63.65	104.92	89.90	15.01	6.988		
2,300.00	2,298.69	2,293.05	2,293.02	7.89	7.82	143.28	-43.38	68.31	115.97	100.28	15.69	7.391		
2,400.00	2,398.02	2,390.22	2,389.78	8.24	8.16	137.97	-37.21	74.79	130.39	114.03	16.36	7.969		
2,500.00	2,496.92	2,486.64	2,485.44	8.59	8.49	134.64	-28.40	83.02	148.13	131.10	17.03	8.700		
2,600.00	2,595.42	2,582.29	2,579.88	8.94	8.82	133.65	-17.02	92.97	168.63	150.95	17.68	9.536		
2,700.00	2,693.90	2,679.99	2,676.09	9.29	9.16	132.99	-4.12	103.99	189.89	171.52	18.37	10.339		
2,800.00	2,792.38	2,777.68	2,772.30	9.64	9.50	132.46	8.78	115.01	211.17	192.11	19.05	11.082		
2,900.00	2,890.86	2,875.37	2,868.51	9.99	9.85	132.03	21.68	126.03	232.46	212.71	19.75	11.772		
3,000.00	2,989.34	2,973.07	2,964.72	10.35	10.19	131.67	34.58	137.05	253.76	233.32	20.44	12.413		
3,100.00	3,087.82	3,070.76	3,060.93	10.71	10.54	131.37	47.48	148.07	275.07	253.93	21.14	13.011		
3,200.00	3,186.30	3,168.46	3,157.14	11.08	10.89	131.11	60.38	159.09	296.38	274.54	21.84	13.568		
3,300.00	3,284.78	3,266.15	3,253.35	11.44	11.24	130.88	73.28	170.12	317.70	295.15	22.55	14.089		
3,400.00	3,383.27	3,363.84	3,349.55	11.81	11.60	130.69	86.18	181.14	339.03	315.77	23.26	14.577		
3,500.00	3,481.75	3,461.54	3,445.76	12.17	11.95	130.51	99.08	192.16	360.36	336.39	23.97	15.035		
3,600.00	3,580.23	3,559.23	3,541.97	12.54	12.31	130.36	111.98	203.18	381.69	357.01	24.68	15.465		
3,700.00	3,678.71	3,656.92	3,638.18	12.91	12.66	130.22	124.88	214.20	403.02	377.63	25.40	15.870		
3,800.00	3,777.19	3,754.62	3,734.39	13.28	13.02	130.10	137.78	225.22	424.36	398.24	26.11	16.252		
3,900.00	3,875.67	3,852.31	3,830.60	13.65	13.38	129.99	150.68	236.25	445.69	418.86	26.83	16.612		
4,000.00	3,974.15	3,950.00	3,926.81	14.02	13.74	129.89	163.58	247.27	467.03	439.48	27.55	16.953		
4,100.00	4,072.63	4,047.70	4,023.02	14.39	14.10	129.79	176.48	258.29	488.37	460.10	28.27	17.276		
4,200.00	4,171.11	4,145.39	4,119.23	14.77	14.46	129.71	189.38	269.31	509.71	480.72	28.99	17.582		
4,300.00	4,269.60	4,243.09	4,215.44	15.14	14.82	129.63	202.28	280.33	531.05	501.34	29.71	17.872		
4,400.00	4,368.08	4,340.78	4,311.64	15.51	15.19	129.56	215.18	291.35	552.39	521.96	30.44	18.148		
4,500.00	4,466.56	4,438.47	4,407.85	15.89	15.55	129.49	228.08	302.37	573.74	542.57	31.16	18.411		
4,600.00	4,565.04	4,536.17	4,504.06	16.26	15.91	129.43	240.98	313.40	595.08	563.19	31.89	18.661		
4,700.00	4,663.52	4,633.86	4,600.27	16.64	16.28	129.37	253.88	324.42	616.43	583.81	32.62	18.899		
4,800.00	4,762.00	4,731.55	4,696.48	17.02	16.64	129.32	266.78	335.44	637.77	604.43	33.34	19.126		
4,900.00	4,860.48	4,829.25	4,792.69	17.39	17.01	129.27	279.68	346.46	659.12	625.04	34.07	19.344		
5,000.00	4,958.96	4,926.94	4,888.90	17.77	17.37	129.22	292.58	357.48	680.46	645.66	34.80	19.552		
5,100.00	5,057.44	5,024.64	4,985.11	18.15	17.74	129.18	305.48	368.50	701.81	666.28	35.53	19.751		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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	
5,200.00	5,155.93	5,122.33	5,081.32	18.52	18.11	129.13	318.38	379.53	723.16	686.89	36.26	19.941	
5,300.00	5,254.41	5,220.02	5,177.53	18.90	18.47	129.09	331.28	390.55	744.50	707.51	37.00	20.124	
5,400.00	5,352.89	5,317.72	5,273.73	19.28	18.84	129.06	344.18	401.57	765.85	728.12	37.73	20.299	
5,500.00	5,451.37	5,415.41	5,369.94	19.66	19.21	129.02	357.08	412.59	787.20	748.74	38.46	20.467	
5,600.00	5,549.85	5,513.10	5,466.15	20.04	19.58	128.99	369.98	423.61	808.55	769.35	39.19	20.629	
5,700.00	5,648.33	5,610.80	5,562.36	20.42	19.94	128.96	382.88	434.63	829.90	789.97	39.93	20.784	
5,800.00	5,746.81	5,708.49	5,658.57	20.80	20.31	128.93	395.78	445.65	851.24	810.58	40.66	20.934	
5,900.00	5,845.29	5,806.18	5,754.78	21.18	20.68	128.90	408.68	456.68	872.59	831.20	41.40	21.078	
6,000.00	5,943.79	5,903.89	5,851.00	21.55	21.05	128.93	421.58	467.70	893.90	851.77	42.13	21.216	
6,100.00	6,042.65	6,001.86	5,947.48	21.93	21.42	129.10	434.52	478.75	913.76	870.89	42.87	21.317	
6,200.00	6,141.98	6,100.15	6,044.28	22.30	21.79	129.07	447.50	489.84	931.47	887.88	43.59	21.367	
6,300.00	6,241.66	6,198.64	6,141.27	22.66	22.16	128.85	460.50	500.95	947.06	902.74	44.32	21.370	
6,400.00	6,341.55	6,302.80	6,238.33	23.01	22.56	128.45	473.52	512.07	960.56	915.51	45.05	21.320	
6,500.00	6,441.54	6,395.71	6,335.35	23.36	22.91	91.97	486.52	523.18	972.09	926.35	45.74	21.252	
6,600.00	6,541.54	6,520.36	6,458.50	23.70	23.37	91.09	501.11	535.65	981.86	935.22	46.64	21.053	
6,700.00	6,641.54	6,647.91	6,585.26	24.04	23.84	90.46	511.82	544.79	988.95	941.43	47.52	20.812	
6,800.00	6,741.54	6,776.48	6,713.54	24.38	24.30	90.08	518.25	550.29	993.21	944.85	48.36	20.537	
6,900.00	6,841.54	6,905.55	6,842.57	24.72	24.75	89.96	520.31	552.05	994.57	945.40	49.16	20.230	
6,912.64	6,854.18	6,921.88	6,858.90	24.77	24.80	89.97	520.25	552.00	994.53	945.27	49.26	20.188	
7,000.00	6,941.54	7,004.52	6,941.54	25.07	25.08	89.96	520.31	552.05	994.57	944.73	49.84	19.954	
7,100.00	7,041.54	7,104.52	7,041.54	25.41	25.42	89.96	520.31	552.05	994.57	944.04	50.53	19.684	
7,200.00	7,141.54	7,204.52	7,141.54	25.75	25.76	89.96	520.31	552.05	994.57	943.36	51.21	19.421	
7,300.00	7,241.54	7,304.52	7,241.54	26.10	26.11	89.96	520.31	552.05	994.57	942.68	51.90	19.165	
7,400.00	7,341.54	7,404.52	7,341.54	26.44	26.45	89.96	520.31	552.05	994.57	941.99	52.58	18.915	
7,500.00	7,441.54	7,504.52	7,441.54	26.79	26.79	89.96	520.31	552.05	994.57	941.30	53.27	18.671	
7,600.00	7,541.54	7,604.52	7,541.54	27.13	27.13	89.96	520.31	552.05	994.57	940.61	53.96	18.433	
7,700.00	7,641.54	7,704.52	7,641.54	27.48	27.48	89.96	520.31	552.05	994.57	939.93	54.64	18.201	
7,800.00	7,741.54	7,804.52	7,741.54	27.83	27.82	89.96	520.31	552.05	994.57	939.24	55.33	17.974	
7,900.00	7,841.54	7,904.52	7,841.54	28.17	28.17	89.96	520.31	552.05	994.57	938.55	56.02	17.753	
8,000.00	7,941.54	8,004.52	7,941.54	28.52	28.51	89.96	520.31	552.05	994.57	937.86	56.71	17.537	
8,100.00	8,041.54	8,104.52	8,041.54	28.87	28.85	89.96	520.31	552.05	994.57	937.17	57.40	17.326	
8,200.00	8,141.54	8,204.52	8,141.54	29.22	29.20	89.96	520.31	552.05	994.57	936.47	58.10	17.120	
8,285.05	8,226.39	8,289.37	8,226.39	29.52	29.49	90.00	520.31	552.05	994.56	935.87	58.69	16.946	
8,300.00	8,241.29	8,304.27	8,241.29	29.57	29.54	90.02	520.31	552.05	994.56	935.77	58.79	16.916	
8,400.00	8,338.66	8,401.64	8,338.66	29.93	29.88	91.24	520.31	552.05	994.82	935.32	59.50	16.721	
8,500.00	8,430.69	8,506.33	8,430.69	30.29	30.24	93.13	520.31	552.05	996.45	936.22	60.23	16.544	
8,600.00	8,514.59	8,577.57	8,514.59	30.64	30.49	95.24	520.31	552.05	1,001.26	940.41	60.85	16.456	
8,700.00	8,587.81	8,650.79	8,587.81	30.98	30.74	97.06	520.31	552.05	1,011.35	949.90	61.46	16.457	
8,800.00	8,648.12	8,711.10	8,648.12	31.31	30.95	98.01	520.31	552.05	1,028.78	966.79	62.00	16.594	
8,900.00	8,693.69	8,756.67	8,693.69	31.63	31.11	97.60	520.31	552.05	1,055.02	992.57	62.44	16.895	
9,000.00	8,723.13	8,786.11	8,723.13	31.94	31.21	95.41	520.31	552.05	1,090.58	1,027.80	62.78	17.372	
9,100.00	8,735.56	8,801.47	8,735.56	32.23	31.27	91.18	520.31	552.05	1,134.84	1,071.85	62.99	18.016	
9,200.00	8,735.96	8,801.06	8,735.96	32.51	31.27	90.00	520.31	552.05	1,186.24	1,123.15	63.09	18.802	
9,300.00	8,735.96	8,801.06	8,735.96	32.82	31.27	90.00	520.31	552.05	1,243.57	1,180.40	63.18	19.684	
9,400.00	8,735.96	8,801.06	8,735.96	33.16	31.27	90.00	520.31	552.05	1,306.06	1,242.81	63.25	20.650	
9,500.00	8,735.96	8,801.06	8,735.96	33.51	31.27	90.00	520.31	552.05	1,372.99	1,309.68	63.31	21.688	
9,600.00	8,735.96	8,801.06	8,735.96	33.90	31.27	90.00	520.31	552.05	1,443.75	1,380.39	63.36	22.788	
9,700.00	8,735.96	8,801.06	8,735.96	34.30	31.27	90.00	520.31	552.05	1,517.80	1,454.40	63.40	23.941	
9,800.00	8,735.96	8,801.06	8,735.96	34.73	31.27	90.00	520.31	552.05	1,594.69	1,531.25	63.43	25.140	
9,900.00	8,735.96	8,801.06	8,735.96	35.17	31.27	90.00	520.31	552.05	1,674.02	1,610.55	63.46	26.378	
10,000.00	8,735.96	8,801.06	8,735.96	35.64	31.27	90.00	520.31	552.05	1,755.46	1,691.97	63.49	27.650	
10,100.00	8,735.96	8,801.06	8,735.96	36.13	31.27	90.00	520.31	552.05	1,838.74	1,775.22	63.51	28.950	

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
10,200.00	8,735.96	8,801.06	8,735.96	36.64	31.27	90.00	520.31	552.05	1,923.61	1,860.07	63.54	30.276		
10,300.00	8,735.96	8,801.06	8,735.96	37.16	31.27	90.00	520.31	552.05	2,009.87	1,946.31	63.56	31.623		
10,400.00	8,735.96	8,801.06	8,735.96	37.70	31.27	90.00	520.31	552.05	2,097.35	2,033.77	63.58	32.989		
10,500.00	8,735.96	8,801.06	8,735.96	38.26	31.27	90.00	520.31	552.05	2,185.91	2,122.31	63.60	34.371		
10,600.00	8,735.96	8,801.06	8,735.96	38.84	31.27	90.00	520.31	552.05	2,275.41	2,211.79	63.62	35.768		
10,700.00	8,735.96	8,801.06	8,735.96	39.43	31.27	90.00	520.31	552.05	2,365.76	2,302.12	63.64	37.176		
10,800.00	8,735.97	13,029.99	10,965.97	40.03	46.10	155.98	2,767.26	560.79	2,441.33	2,382.55	58.79	41.528		
10,900.00	8,735.97	13,129.99	10,965.97	40.65	46.63	155.99	2,867.26	561.18	2,441.32	2,381.46	59.86	40.784		
11,000.00	8,735.97	13,229.99	10,965.97	41.28	47.17	155.99	2,967.26	561.56	2,441.30	2,380.34	60.96	40.050		
11,100.00	8,735.97	13,329.99	10,965.97	41.93	47.73	155.99	3,067.26	561.95	2,441.28	2,379.21	62.07	39.328		
11,200.00	8,735.97	13,429.99	10,965.97	42.58	48.29	155.99	3,167.26	562.34	2,441.26	2,378.05	63.22	38.618		
11,300.00	8,735.97	13,529.99	10,965.97	43.25	48.88	155.99	3,267.26	562.73	2,441.25	2,376.87	64.38	37.920		
11,400.00	8,735.97	13,629.99	10,965.97	43.93	49.47	155.99	3,367.26	563.12	2,441.23	2,375.67	65.56	37.236		
11,500.00	8,735.97	13,729.99	10,965.97	44.62	50.07	155.99	3,467.25	563.51	2,441.21	2,374.45	66.76	36.566		
11,600.00	8,735.97	13,829.99	10,965.97	45.32	50.69	155.99	3,567.25	563.90	2,441.19	2,373.21	67.98	35.910		
11,700.00	8,735.97	13,929.99	10,965.97	46.03	51.32	155.99	3,667.25	564.29	2,441.18	2,371.96	69.22	35.268		
11,800.00	8,735.97	14,029.99	10,965.97	46.75	51.96	155.99	3,767.25	564.68	2,441.16	2,370.69	70.47	34.641		
11,900.00	8,735.97	14,129.99	10,965.97	47.48	52.60	155.99	3,867.25	565.06	2,441.14	2,369.40	71.74	34.029		
12,000.00	8,735.97	14,229.99	10,965.97	48.22	53.26	156.00	3,967.25	565.45	2,441.12	2,368.10	73.02	33.432		
12,100.00	8,735.97	14,329.99	10,965.97	48.96	53.93	156.00	4,067.25	565.84	2,441.10	2,366.79	74.31	32.849		
12,200.00	8,735.97	14,429.99	10,965.97	49.71	54.60	156.00	4,167.25	566.23	2,441.09	2,365.46	75.62	32.280		
12,300.00	8,735.97	14,529.99	10,965.97	50.47	55.29	156.00	4,267.25	566.62	2,441.07	2,364.13	76.94	31.726		
12,400.00	8,735.97	14,629.99	10,965.97	51.24	55.98	156.00	4,367.25	567.01	2,441.05	2,362.78	78.28	31.185		
12,500.00	8,735.97	14,729.99	10,965.97	52.01	56.68	156.00	4,467.25	567.40	2,441.03	2,361.42	79.62	30.659		
12,600.00	8,735.97	14,829.99	10,965.97	52.79	57.39	156.00	4,567.25	567.79	2,441.02	2,360.04	80.97	30.146		
12,700.00	8,735.97	14,929.99	10,965.97	53.58	58.10	156.00	4,667.25	568.18	2,441.00	2,358.66	82.34	29.646		
12,800.00	8,735.97	15,029.99	10,965.97	54.37	58.83	156.00	4,767.25	568.56	2,440.98	2,357.27	83.71	29.159		
12,900.00	8,735.97	15,129.99	10,965.97	55.17	59.56	156.00	4,867.24	568.95	2,440.96	2,355.87	85.09	28.685		
13,000.00	8,735.97	15,229.99	10,965.97	55.97	60.29	156.00	4,967.24	569.34	2,440.95	2,354.46	86.49	28.224		
13,100.00	8,735.97	15,329.99	10,965.97	56.78	61.04	156.01	5,067.24	569.73	2,440.93	2,353.04	87.89	27.774		
13,200.00	8,735.98	15,429.99	10,965.98	57.59	61.79	156.01	5,167.24	570.12	2,440.91	2,351.62	89.29	27.336		
13,300.00	8,735.98	15,529.99	10,965.98	58.41	62.54	156.01	5,267.24	570.51	2,440.89	2,350.18	90.71	26.909		
13,400.00	8,735.98	15,629.99	10,965.98	59.23	63.30	156.01	5,367.24	570.90	2,440.88	2,348.74	92.13	26.493		
13,500.00	8,735.98	15,729.99	10,965.98	60.05	64.07	156.01	5,467.24	571.29	2,440.86	2,347.30	93.56	26.088		
13,600.00	8,735.98	15,829.99	10,965.98	60.88	64.84	156.01	5,567.24	571.67	2,440.84	2,345.84	95.00	25.694		
13,700.00	8,735.98	15,929.99	10,965.98	61.72	65.62	156.01	5,667.24	572.06	2,440.82	2,344.38	96.44	25.309		
13,800.00	8,735.98	16,029.99	10,965.98	62.56	66.40	156.01	5,767.24	572.45	2,440.81	2,342.92	97.89	24.935		
13,900.00	8,735.98	16,129.99	10,965.98	63.40	67.19	156.01	5,867.24	572.84	2,440.79	2,341.45	99.34	24.570		
14,000.00	8,735.98	16,229.99	10,965.98	64.24	67.98	156.01	5,967.24	573.23	2,440.77	2,339.97	100.80	24.214		
14,100.00	8,735.98	16,329.99	10,965.98	65.09	68.78	156.02	6,067.24	573.62	2,440.75	2,338.49	102.27	23.867		
14,200.00	8,735.98	16,429.99	10,965.98	65.94	69.58	156.02	6,167.23	574.01	2,440.74	2,337.00	103.74	23.528		
14,300.00	8,735.98	16,529.99	10,965.98	66.80	70.38	156.02	6,267.23	574.40	2,440.72	2,335.51	105.21	23.198		
14,400.00	8,735.98	16,629.99	10,965.98	67.66	71.19	156.02	6,367.23	574.79	2,440.70	2,334.01	106.69	22.877		
14,500.00	8,735.98	16,729.99	10,965.98	68.52	72.00	156.02	6,467.23	575.17	2,440.68	2,332.51	108.17	22.563		
14,600.00	8,735.98	16,829.99	10,965.98	69.38	72.82	156.02	6,567.23	575.56	2,440.66	2,331.00	109.66	22.256		
14,700.00	8,735.98	16,929.99	10,965.98	70.25	73.64	156.02	6,667.23	575.95	2,440.65	2,329.49	111.15	21.957		
14,800.00	8,735.98	17,029.99	10,965.98	71.12	74.46	156.02	6,767.23	576.34	2,440.63	2,327.98	112.65	21.666		
14,900.00	8,735.98	17,129.99	10,965.98	71.99	75.29	156.02	6,867.23	576.73	2,440.61	2,326.46	114.15	21.381		
15,000.00	8,735.98	17,229.99	10,965.98	72.86	76.12	156.02	6,967.23	577.12	2,440.59	2,324.94	115.65	21.103		
15,100.00	8,735.98	17,329.99	10,965.98	73.74	76.95	156.02	7,067.23	577.51	2,440.58	2,323.42	117.16	20.831		
15,200.00	8,735.98	17,429.99	10,965.98	74.62	77.79	156.03	7,167.23	577.90	2,440.56	2,321.89	118.67	20.566		
15,300.00	8,735.98	17,529.99	10,965.98	75.50	78.63	156.03	7,267.23	578.28	2,440.54	2,320.36	120.18	20.307		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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	8,735.98	17,629.99	10,965.98	76.38	79.47	156.03	7,367.23	578.67	2,440.52	2,318.82	121.70	20.054	
15,500.00	8,735.99	17,729.99	10,965.99	77.27	80.32	156.03	7,467.22	579.06	2,440.51	2,317.29	123.22	19.806	
15,600.00	8,735.99	17,829.99	10,965.99	78.15	81.17	156.03	7,567.22	579.45	2,440.49	2,315.75	124.74	19.564	
15,700.00	8,735.99	17,929.99	10,965.99	79.04	82.02	156.03	7,667.22	579.84	2,440.47	2,314.20	126.27	19.328	
15,800.00	8,735.99	18,029.99	10,965.99	79.93	82.87	156.03	7,767.22	580.23	2,440.45	2,312.66	127.79	19.097	
15,900.00	8,735.99	18,129.99	10,965.99	80.82	83.72	156.03	7,867.22	580.62	2,440.44	2,311.11	129.32	18.871	
16,000.00	8,735.99	18,229.99	10,965.99	81.72	84.58	156.03	7,967.22	581.01	2,440.42	2,309.56	130.86	18.649	
16,100.00	8,735.99	18,329.99	10,965.99	82.61	85.44	156.03	8,067.22	581.40	2,440.40	2,308.01	132.39	18.433	
16,200.00	8,735.99	18,429.99	10,965.99	83.51	86.31	156.03	8,167.22	581.78	2,440.38	2,306.45	133.93	18.221	
16,300.00	8,735.99	18,529.99	10,965.99	84.41	87.17	156.04	8,267.22	582.17	2,440.37	2,304.90	135.47	18.014	
16,400.00	8,735.99	18,629.99	10,965.99	85.31	88.04	156.04	8,367.22	582.56	2,440.35	2,303.34	137.01	17.811	
16,500.00	8,735.99	18,729.99	10,965.99	86.21	88.91	156.04	8,467.22	582.95	2,440.33	2,301.77	138.56	17.613	
16,600.00	8,735.99	18,829.99	10,965.99	87.11	89.78	156.04	8,567.22	583.34	2,440.31	2,300.21	140.10	17.418	
16,700.00	8,735.99	18,929.99	10,965.99	88.02	90.65	156.04	8,667.22	583.73	2,440.30	2,298.65	141.65	17.228	
16,800.00	8,735.99	19,029.99	10,965.99	88.92	91.53	156.04	8,767.21	584.12	2,440.28	2,297.08	143.20	17.041	
16,900.00	8,735.99	19,129.99	10,965.99	89.83	92.40	156.04	8,867.21	584.51	2,440.26	2,295.51	144.75	16.858	
17,000.00	8,735.99	19,229.99	10,965.99	90.74	93.28	156.04	8,967.21	584.90	2,440.24	2,293.94	146.31	16.679	
17,100.00	8,735.99	19,329.99	10,965.99	91.65	94.16	156.04	9,067.21	585.28	2,440.22	2,292.36	147.86	16.504	
17,200.00	8,735.99	19,429.99	10,965.99	92.56	95.04	156.04	9,167.21	585.67	2,440.21	2,290.79	149.42	16.331	
17,300.00	8,735.99	19,529.99	10,965.99	93.47	95.93	156.04	9,267.21	586.06	2,440.19	2,289.21	150.98	16.163	
17,400.00	8,735.99	19,629.99	10,965.99	94.38	96.81	156.05	9,367.21	586.45	2,440.17	2,287.64	152.54	15.997	
17,500.00	8,735.99	19,729.99	10,965.99	95.30	97.70	156.05	9,467.21	586.84	2,440.15	2,286.06	154.10	15.835	
17,600.00	8,735.99	19,829.99	10,965.99	96.21	98.59	156.05	9,567.21	587.23	2,440.14	2,284.48	155.66	15.676	
17,700.00	8,735.99	19,929.99	10,965.99	97.13	99.48	156.05	9,667.21	587.62	2,440.12	2,282.89	157.23	15.520	
17,800.00	8,735.99	20,029.99	10,965.99	98.05	100.37	156.05	9,767.21	588.01	2,440.10	2,281.31	158.79	15.367	
17,900.00	8,736.00	20,129.99	10,966.00	98.96	101.26	156.05	9,867.21	588.39	2,440.08	2,279.73	160.36	15.216	
18,000.00	8,736.00	20,229.99	10,966.00	99.88	102.16	156.05	9,967.21	588.78	2,440.07	2,278.14	161.93	15.069	
18,100.00	8,736.00	20,329.99	10,966.00	100.80	103.05	156.05	10,067.20	589.17	2,440.05	2,276.55	163.50	14.924	
18,200.00	8,736.00	20,429.99	10,966.00	101.72	103.95	156.05	10,167.20	589.56	2,440.03	2,274.96	165.07	14.782	
18,300.00	8,736.00	20,529.99	10,966.00	102.64	104.85	156.05	10,267.20	589.95	2,440.01	2,273.37	166.64	14.642	
18,400.00	8,736.00	20,629.99	10,966.00	103.57	105.75	156.06	10,367.20	590.34	2,440.00	2,271.78	168.21	14.505	
18,500.00	8,736.00	20,729.99	10,966.00	104.49	106.65	156.06	10,467.20	590.73	2,439.98	2,270.19	169.79	14.371	
18,600.00	8,736.00	20,829.99	10,966.00	105.41	107.55	156.06	10,567.20	591.12	2,439.96	2,268.60	171.36	14.238	
18,700.00	8,736.00	20,929.99	10,966.00	106.34	108.45	156.06	10,667.20	591.51	2,439.94	2,267.00	172.94	14.109	
18,800.00	8,736.00	21,029.99	10,966.00	107.26	109.35	156.06	10,767.20	591.89	2,439.93	2,265.41	174.52	13.981	
18,900.00	8,736.00	21,129.99	10,966.00	108.19	110.26	156.06	10,867.20	592.28	2,439.91	2,263.81	176.10	13.855	
19,000.00	8,736.00	21,229.99	10,966.00	109.12	111.16	156.06	10,967.20	592.67	2,439.89	2,262.21	177.68	13.732	
19,035.79	8,736.00	21,265.78	10,966.00	109.45	111.49	156.06	11,002.99	592.81	2,439.88	2,261.64	178.24	13.689	

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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 #23H - 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	89.97	0.09	149.86	149.86					
100.00	100.00	101.00	100.00	0.13	0.13	89.97	0.09	149.86	149.86	149.59	0.27	564.935		
200.00	200.00	201.00	200.00	0.49	0.49	89.97	0.09	149.86	149.86	148.88	0.98	152.574		
300.00	300.00	301.00	300.00	0.85	0.85	89.97	0.09	149.86	149.86	148.16	1.70	88.197		
400.00	400.00	401.00	400.00	1.21	1.21	89.97	0.09	149.86	149.86	147.44	2.42	62.026		
500.00	500.00	501.00	500.00	1.56	1.57	89.97	0.09	149.86	149.86	146.73	3.13	47.832		
600.00	600.00	601.00	600.00	1.92	1.93	89.97	0.09	149.86	149.86	146.01	3.85	38.925 CC		
700.00	699.99	701.01	699.99	2.27	2.29	-135.26	0.09	149.86	150.48	145.93	4.55	33.056 ES		
800.00	799.96	801.04	799.96	2.60	2.64	-135.94	0.09	149.86	152.35	147.10	5.25	29.041		
900.00	899.90	901.10	899.90	2.94	3.00	-136.84	0.09	149.86	154.88	148.93	5.95	26.049		
1,000.00	999.84	1,001.16	999.84	3.29	3.36	-137.71	0.09	149.86	157.44	150.79	6.65	23.679		
1,100.00	1,099.78	1,101.22	1,099.78	3.64	3.72	-138.55	0.09	149.86	160.04	152.69	7.36	21.759		
1,200.00	1,199.72	1,198.72	1,199.72	3.99	4.07	-139.36	0.09	149.86	162.67	154.62	8.05	20.197		
1,300.00	1,299.65	1,293.57	1,294.55	4.34	4.41	-140.30	0.76	151.23	166.85	158.11	8.74	19.095		
1,400.00	1,399.59	1,387.95	1,388.81	4.69	4.74	-141.53	2.78	155.40	174.17	164.76	9.41	18.511		
1,500.00	1,499.53	1,481.72	1,482.26	5.05	5.07	-142.96	6.14	162.31	184.69	174.62	10.07	18.340		
1,600.00	1,599.47	1,574.68	1,574.61	5.40	5.40	-144.49	10.78	171.87	198.42	187.70	10.72	18.511		
1,700.00	1,699.41	1,666.66	1,665.60	5.76	5.73	-146.01	16.67	183.97	215.38	204.02	11.35	18.968		
1,800.00	1,799.35	1,762.08	1,759.60	6.11	6.07	-147.52	23.83	198.70	234.91	222.89	12.02	19.543		
1,900.00	1,899.29	1,859.93	1,855.97	6.47	6.43	-148.83	31.25	213.98	254.80	242.08	12.72	20.032		
2,000.00	1,999.23	1,957.78	1,952.33	6.83	6.78	-149.96	38.68	229.26	274.79	261.37	13.42	20.477		
2,100.00	2,099.17	2,055.63	2,048.69	7.19	7.14	154.41	46.11	244.55	295.14	281.02	14.12	20.900		
2,200.00	2,199.03	2,153.41	2,144.99	7.54	7.51	128.48	53.53	259.82	316.05	301.23	14.82	21.322		
2,300.00	2,298.69	2,251.01	2,241.10	7.89	7.87	118.61	60.94	275.06	337.51	321.99	15.52	21.744		
2,400.00	2,398.02	2,348.29	2,336.91	8.24	8.23	114.24	68.32	290.26	359.59	343.37	16.22	22.168		
2,500.00	2,496.92	2,445.15	2,432.30	8.59	8.59	112.31	75.67	305.38	382.45	365.53	16.92	22.603		
2,600.00	2,595.42	2,541.64	2,527.32	8.94	8.96	113.32	83.00	320.45	406.07	388.45	17.62	23.046		
2,700.00	2,693.90	2,638.10	2,622.31	9.29	9.32	114.86	90.32	335.52	430.03	411.70	18.32	23.471		
2,800.00	2,792.38	2,734.56	2,717.31	9.64	9.68	116.25	97.64	350.58	454.25	435.22	19.03	23.876		
2,900.00	2,890.86	2,831.03	2,812.31	9.99	10.05	117.49	104.96	365.65	478.70	458.97	19.73	24.260		
3,000.00	2,989.34	2,927.49	2,907.31	10.35	10.41	118.61	112.28	380.72	503.34	482.90	20.44	24.625		
3,100.00	3,087.82	3,023.95	3,002.30	10.71	10.78	119.63	119.60	395.78	528.15	507.00	21.15	24.971		
3,200.00	3,186.30	3,120.41	3,097.30	11.08	11.15	120.55	126.93	410.85	553.10	531.24	21.86	25.299		
3,300.00	3,284.78	3,216.88	3,192.30	11.44	11.51	121.40	134.25	425.91	578.18	555.60	22.58	25.610		
3,400.00	3,383.27	3,313.34	3,287.30	11.81	11.88	122.18	141.57	440.98	603.37	580.08	23.29	25.906		
3,500.00	3,481.75	3,409.80	3,382.29	12.17	12.25	122.89	148.89	456.04	628.65	604.64	24.01	26.186		
3,600.00	3,580.23	3,506.27	3,477.29	12.54	12.62	123.55	156.21	471.11	654.02	629.29	24.72	26.453		
3,700.00	3,678.71	3,602.73	3,572.29	12.91	12.99	124.17	163.54	486.18	679.46	654.02	25.44	26.706		
3,800.00	3,777.19	3,700.81	3,667.29	13.28	13.36	124.73	170.86	501.24	704.97	678.80	26.17	26.941		
3,900.00	3,875.67	3,804.34	3,762.28	13.65	13.76	125.26	178.18	516.31	730.54	703.63	26.91	27.144		
4,000.00	3,974.15	3,907.88	3,857.28	14.02	14.15	125.75	185.50	531.37	756.17	728.51	27.66	27.337		
4,100.00	4,072.63	3,988.58	3,952.28	14.39	14.46	126.21	192.82	546.44	781.84	753.52	28.32	27.604		
4,200.00	4,171.11	4,085.05	4,047.28	14.77	14.83	126.64	200.14	561.50	807.56	778.52	29.05	27.803		
4,300.00	4,269.60	4,181.51	4,142.27	15.14	15.20	127.05	207.47	576.57	833.32	803.55	29.77	27.993		
4,400.00	4,368.08	4,277.97	4,237.27	15.51	15.57	127.43	214.79	591.63	859.12	828.62	30.49	28.174		
4,500.00	4,466.56	4,374.43	4,332.27	15.89	15.94	127.78	222.11	606.70	884.94	853.73	31.22	28.348		
4,600.00	4,565.04	4,470.90	4,427.27	16.26	16.31	128.12	229.43	621.77	910.80	878.86	31.94	28.514		
4,700.00	4,663.52	4,567.36	4,522.26	16.64	16.68	128.44	236.75	636.83	936.69	904.02	32.67	28.674		
4,800.00	4,762.00	4,663.82	4,617.26	17.02	17.05	128.74	244.08	651.90	962.60	929.21	33.39	28.826		
4,900.00	4,860.48	4,760.29	4,712.26	17.39	17.43	129.03	251.40	666.96	988.54	954.42	34.12	28.973		
5,000.00	4,958.96	4,856.75	4,807.26	17.77	17.80	129.30	258.72	682.03	1,014.50	979.65	34.85	29.114		
5,100.00	5,057.44	4,953.21	4,902.25	18.15	18.17	129.56	266.04	697.09	1,040.48	1,004.90	35.57	29.249		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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 #23H - 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	5,155.93	5,049.68	4,997.25	18.52	18.54	129.80	273.36	712.16	1,066.47	1,030.17	36.30	29.379		
5,300.00	5,254.41	5,146.14	5,092.25	18.90	18.91	130.04	280.68	727.23	1,092.49	1,055.46	37.03	29.504		
5,400.00	5,352.89	5,242.60	5,187.25	19.28	19.28	130.26	288.01	742.29	1,118.52	1,080.76	37.76	29.624		
5,500.00	5,451.37	5,339.06	5,282.24	19.66	19.65	130.47	295.33	757.36	1,144.56	1,106.08	38.49	29.740		
5,600.00	5,549.85	5,435.53	5,377.24	20.04	20.03	130.68	302.65	772.42	1,170.62	1,131.41	39.22	29.851		
5,700.00	5,648.33	5,531.99	5,472.24	20.42	20.40	130.87	309.97	787.49	1,196.70	1,156.75	39.94	29.959		
5,800.00	5,746.81	5,628.45	5,567.24	20.80	20.77	131.06	317.29	802.55	1,222.78	1,182.11	40.67	30.063		
5,900.00	5,845.29	5,724.92	5,662.23	21.18	21.14	131.24	324.61	817.62	1,248.88	1,207.48	41.40	30.163		
6,000.00	5,943.79	5,821.39	5,757.25	21.55	21.51	131.48	331.94	832.69	1,274.95	1,232.81	42.13	30.259		
6,100.00	6,042.65	5,918.31	5,852.69	21.93	21.89	131.94	339.29	847.82	1,299.50	1,256.64	42.86	30.318		
6,200.00	6,141.98	6,015.78	5,948.68	22.30	22.26	132.25	346.69	863.05	1,321.79	1,278.21	43.59	30.324		
6,300.00	6,241.66	6,113.70	6,045.11	22.66	22.64	132.40	354.12	878.34	1,341.80	1,297.48	44.31	30.281		
6,400.00	6,341.55	6,211.94	6,141.86	23.01	23.02	132.41	361.58	893.68	1,359.50	1,314.47	45.03	30.191		
6,500.00	6,441.54	6,310.37	6,238.80	23.36	23.40	96.36	369.05	909.06	1,374.97	1,329.23	45.74	30.059		
6,600.00	6,541.54	6,408.85	6,335.78	23.70	23.78	95.98	376.53	924.44	1,389.75	1,343.30	46.45	29.918		
6,700.00	6,641.54	6,507.34	6,432.77	24.04	24.16	95.60	384.00	939.82	1,404.58	1,357.42	47.16	29.782		
6,800.00	6,741.54	6,605.82	6,529.75	24.38	24.54	95.24	391.48	955.20	1,419.47	1,371.60	47.87	29.651		
6,900.00	6,841.54	6,704.30	6,626.74	24.72	24.92	94.88	398.95	970.58	1,434.42	1,385.84	48.58	29.525		
7,000.00	6,941.54	6,802.78	6,723.72	25.07	25.30	94.53	406.43	985.96	1,449.42	1,400.13	49.30	29.403		
7,100.00	7,041.54	6,901.26	6,820.70	25.41	25.68	94.19	413.90	1,001.34	1,464.48	1,414.47	50.01	29.285		
7,200.00	7,141.54	7,000.26	6,917.69	25.75	26.06	93.85	421.38	1,016.72	1,479.58	1,428.86	50.72	29.170		
7,300.00	7,241.54	7,101.78	7,014.67	26.10	26.46	93.52	428.85	1,032.10	1,494.73	1,443.29	51.45	29.054		
7,400.00	7,341.54	7,196.70	7,111.66	26.44	26.82	93.20	436.33	1,047.49	1,509.94	1,457.79	52.15	28.955		
7,500.00	7,441.54	7,304.82	7,208.64	26.79	27.24	92.88	443.80	1,062.87	1,525.18	1,472.28	52.90	28.832		
7,600.00	7,541.54	7,406.34	7,305.63	27.13	27.63	92.57	451.28	1,078.25	1,540.47	1,486.85	53.62	28.727		
7,700.00	7,641.54	7,507.86	7,402.61	27.48	28.03	92.27	458.75	1,093.63	1,555.81	1,501.46	54.35	28.626		
7,800.00	7,741.54	7,609.38	7,499.60	27.83	28.42	91.97	466.23	1,109.01	1,571.19	1,516.11	55.08	28.527		
7,900.00	7,841.54	7,689.10	7,596.58	28.17	28.73	91.68	473.70	1,124.39	1,586.61	1,530.88	55.72	28.474		
8,000.00	7,941.54	7,787.59	7,693.57	28.52	29.11	91.39	481.18	1,139.77	1,602.07	1,545.63	56.44	28.386		
8,100.00	8,041.54	7,886.07	7,790.55	28.87	29.49	91.11	488.65	1,155.15	1,617.56	1,560.41	57.15	28.302		
8,200.00	8,141.54	7,984.55	7,887.54	29.22	29.87	90.84	496.13	1,170.53	1,633.10	1,575.23	57.87	28.220		
8,300.00	8,241.29	8,109.68	8,010.85	29.57	30.35	89.33	505.43	1,189.67	1,648.47	1,589.69	58.77	28.047		
8,400.00	8,338.66	8,311.92	8,211.56	29.93	31.10	89.44	516.12	1,211.67	1,659.24	1,599.16	60.09	27.614		
8,500.00	8,430.69	8,503.04	8,402.38	30.29	31.77	91.32	520.52	1,220.72	1,664.48	1,603.33	61.16	27.216		
8,600.00	8,514.59	8,615.26	8,514.59	30.64	32.14	93.05	520.75	1,221.20	1,667.48	1,605.60	61.89	26.944		
8,700.00	8,587.81	8,688.48	8,587.81	30.98	32.39	94.16	520.75	1,221.20	1,673.43	1,610.93	62.50	26.775		
8,800.00	8,648.12	8,748.79	8,648.12	31.31	32.59	94.75	520.75	1,221.20	1,683.87	1,620.81	63.06	26.704		
8,900.00	8,693.69	8,805.65	8,693.69	31.63	32.78	94.52	520.75	1,221.20	1,699.85	1,636.27	63.58	26.737		
9,000.00	8,723.13	8,823.80	8,723.13	31.94	32.84	93.21	520.75	1,221.20	1,721.96	1,658.02	63.93	26.933		
9,100.00	8,735.56	8,836.22	8,735.56	32.23	32.88	90.70	520.75	1,221.20	1,750.14	1,685.91	64.22	27.251		
9,200.00	8,735.96	8,836.62	8,735.96	32.51	32.88	90.00	520.75	1,221.20	1,783.71	1,719.27	64.44	27.682		
9,300.00	8,735.96	8,836.63	8,735.96	32.82	32.88	90.00	520.75	1,221.20	1,822.16	1,757.51	64.65	28.187		
9,400.00	8,735.96	8,836.63	8,735.96	33.16	32.88	90.00	520.75	1,221.20	1,865.18	1,800.33	64.85	28.762		
9,500.00	8,735.96	8,836.63	8,735.96	33.51	32.88	90.00	520.75	1,221.20	1,912.47	1,847.43	65.05	29.402		
9,600.00	8,735.96	8,836.63	8,735.96	33.90	32.88	90.00	520.75	1,221.20	1,963.72	1,898.49	65.23	30.104		
9,700.00	8,735.96	8,836.63	8,735.96	34.30	32.88	90.00	520.75	1,221.20	2,018.62	1,953.21	65.41	30.862		
9,800.00	8,735.96	8,836.63	8,735.96	34.73	32.88	90.00	520.75	1,221.20	2,076.89	2,011.32	65.58	31.672		
9,900.00	8,735.96	8,836.63	8,735.96	35.17	32.88	90.00	520.75	1,221.20	2,138.25	2,072.52	65.73	32.531		
10,000.00	8,735.96	8,836.63	8,735.96	35.64	32.88	90.00	520.75	1,221.20	2,202.45	2,136.57	65.87	33.434		
10,100.00	8,735.96	8,836.63	8,735.96	36.13	32.88	90.00	520.75	1,221.20	2,269.23	2,203.22	66.01	34.378		
10,200.00	8,735.96	8,836.63	8,735.96	36.64	32.88	90.00	520.75	1,221.20	2,338.39	2,272.25	66.13	35.359		
10,300.00	8,735.96	8,836.63	8,735.96	37.16	32.88	90.00	520.75	1,221.20	2,409.71	2,343.46	66.25	36.373		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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 #23H - 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	8,735.96	8,836.63	8,735.96	37.70	32.88	90.00	520.75	1,221.20	2,483.01	2,416.65	66.36	37.419		
10,500.00	8,735.96	8,836.63	8,735.96	38.26	32.88	90.00	520.75	1,221.20	2,558.12	2,491.66	66.46	38.493		
10,600.00	8,735.96	8,836.63	8,735.96	38.84	32.88	90.00	520.75	1,221.20	2,634.89	2,568.34	66.55	39.593		
10,700.00	8,735.96	12,846.08	10,845.96	39.43	45.71	141.79	2,666.11	1,227.68	2,685.28	2,621.31	63.96	41.983		
10,800.00	8,735.97	12,946.08	10,845.97	40.03	46.21	141.79	2,766.11	1,227.98	2,685.20	2,620.21	64.98	41.320		
10,900.00	8,735.97	13,046.08	10,845.97	40.65	46.72	141.80	2,866.11	1,228.28	2,685.12	2,619.08	66.04	40.661		
11,000.00	8,735.97	13,146.08	10,845.97	41.28	47.24	141.80	2,966.11	1,228.58	2,685.03	2,617.92	67.11	40.007		
11,100.00	8,735.97	13,246.08	10,845.97	41.93	47.78	141.80	3,066.11	1,228.88	2,684.95	2,616.73	68.22	39.358		
11,200.00	8,735.97	13,346.08	10,845.97	42.58	48.34	141.80	3,166.11	1,229.18	2,684.87	2,615.53	69.35	38.716		
11,300.00	8,735.97	13,446.08	10,845.97	43.25	48.90	141.80	3,266.11	1,229.49	2,684.79	2,614.29	70.50	38.082		
11,400.00	8,735.97	13,546.08	10,845.97	43.93	49.48	141.81	3,366.11	1,229.79	2,684.71	2,613.04	71.68	37.457		
11,500.00	8,735.97	13,646.08	10,845.97	44.62	50.07	141.81	3,466.11	1,230.09	2,684.63	2,611.76	72.87	36.841		
11,600.00	8,735.97	13,746.08	10,845.97	45.32	50.67	141.81	3,566.11	1,230.39	2,684.55	2,610.46	74.09	36.235		
11,700.00	8,735.97	13,846.08	10,845.97	46.03	51.29	141.81	3,666.11	1,230.69	2,684.47	2,609.15	75.32	35.639		
11,800.00	8,735.97	13,946.08	10,845.97	46.75	51.91	141.82	3,766.11	1,231.00	2,684.39	2,607.81	76.58	35.055		
11,900.00	8,735.97	14,046.08	10,845.97	47.48	52.54	141.82	3,866.11	1,231.30	2,684.31	2,606.46	77.85	34.481		
12,000.00	8,735.97	14,146.08	10,845.97	48.22	53.19	141.82	3,966.10	1,231.60	2,684.23	2,605.09	79.14	33.919		
12,100.00	8,735.97	14,246.08	10,845.97	48.96	53.84	141.82	4,066.10	1,231.90	2,684.15	2,603.71	80.44	33.368		
12,200.00	8,735.97	14,346.08	10,845.97	49.71	54.50	141.82	4,166.10	1,232.20	2,684.07	2,602.31	81.76	32.828		
12,300.00	8,735.97	14,446.08	10,845.97	50.47	55.18	141.83	4,266.10	1,232.51	2,683.99	2,600.89	83.09	32.300		
12,400.00	8,735.97	14,546.08	10,845.97	51.24	55.86	141.83	4,366.10	1,232.81	2,683.91	2,599.46	84.44	31.784		
12,500.00	8,735.97	14,646.08	10,845.97	52.01	56.54	141.83	4,466.10	1,233.11	2,683.83	2,598.02	85.80	31.279		
12,600.00	8,735.97	14,746.08	10,845.97	52.79	57.24	141.83	4,566.10	1,233.41	2,683.75	2,596.57	87.18	30.785		
12,700.00	8,735.97	14,846.08	10,845.97	53.58	57.95	141.84	4,666.10	1,233.71	2,683.67	2,595.10	88.56	30.303		
12,800.00	8,735.97	14,946.08	10,845.97	54.37	58.66	141.84	4,766.10	1,234.01	2,683.58	2,593.63	89.96	29.832		
12,900.00	8,735.97	15,046.08	10,845.97	55.17	59.38	141.84	4,866.10	1,234.32	2,683.50	2,592.14	91.36	29.371		
13,000.00	8,735.97	15,146.08	10,845.97	55.97	60.10	141.84	4,966.10	1,234.62	2,683.42	2,590.64	92.78	28.922		
13,100.00	8,735.97	15,246.08	10,845.97	56.78	60.84	141.84	5,066.10	1,234.92	2,683.34	2,589.13	94.21	28.483		
13,200.00	8,735.98	15,346.08	10,845.98	57.59	61.58	141.85	5,166.10	1,235.22	2,683.26	2,587.62	95.65	28.054		
13,300.00	8,735.98	15,446.08	10,845.98	58.41	62.32	141.85	5,266.10	1,235.52	2,683.18	2,586.09	97.09	27.635		
13,400.00	8,735.98	15,546.08	10,845.98	59.23	63.07	141.85	5,366.10	1,235.83	2,683.10	2,584.55	98.55	27.227		
13,500.00	8,735.98	15,646.08	10,845.98	60.05	63.83	141.85	5,466.10	1,236.13	2,683.02	2,583.01	100.01	26.828		
13,600.00	8,735.98	15,746.08	10,845.98	60.88	64.60	141.86	5,566.10	1,236.43	2,682.94	2,581.46	101.48	26.438		
13,700.00	8,735.98	15,846.08	10,845.98	61.72	65.36	141.86	5,666.10	1,236.73	2,682.86	2,579.90	102.96	26.057		
13,800.00	8,735.98	15,946.08	10,845.98	62.56	66.14	141.86	5,766.10	1,237.03	2,682.78	2,578.33	104.44	25.686		
13,900.00	8,735.98	16,046.08	10,845.98	63.40	66.92	141.86	5,866.09	1,237.33	2,682.70	2,576.76	105.94	25.323		
14,000.00	8,735.98	16,146.08	10,845.98	64.24	67.70	141.86	5,966.09	1,237.64	2,682.62	2,575.18	107.44	24.969		
14,100.00	8,735.98	16,246.08	10,845.98	65.09	68.49	141.87	6,066.09	1,237.94	2,682.54	2,573.60	108.94	24.623		
14,200.00	8,735.98	16,346.08	10,845.98	65.94	69.28	141.87	6,166.09	1,238.24	2,682.46	2,572.00	110.45	24.286		
14,300.00	8,735.98	16,446.08	10,845.98	66.80	70.08	141.87	6,266.09	1,238.54	2,682.38	2,570.41	111.97	23.956		
14,400.00	8,735.98	16,546.08	10,845.98	67.66	70.88	141.87	6,366.09	1,238.84	2,682.30	2,568.80	113.49	23.634		
14,500.00	8,735.98	16,646.08	10,845.98	68.52	71.69	141.87	6,466.09	1,239.15	2,682.22	2,567.19	115.02	23.319		
14,600.00	8,735.98	16,746.08	10,845.98	69.38	72.50	141.88	6,566.09	1,239.45	2,682.14	2,565.58	116.56	23.011		
14,700.00	8,735.98	16,846.08	10,845.98	70.25	73.31	141.88	6,666.09	1,239.75	2,682.06	2,563.96	118.10	22.711		
14,800.00	8,735.98	16,946.08	10,845.98	71.12	74.13	141.88	6,766.09	1,240.05	2,681.98	2,562.34	119.64	22.417		
14,900.00	8,735.98	17,046.08	10,845.98	71.99	74.95	141.88	6,866.09	1,240.35	2,681.89	2,560.71	121.19	22.130		
15,000.00	8,735.98	17,146.08	10,845.98	72.86	75.77	141.89	6,966.09	1,240.66	2,681.81	2,559.07	122.74	21.849		
15,100.00	8,735.98	17,246.08	10,845.98	73.74	76.60	141.89	7,066.09	1,240.96	2,681.73	2,557.44	124.30	21.575		
15,200.00	8,735.98	17,346.08	10,845.98	74.62	77.43	141.89	7,166.09	1,241.26	2,681.65	2,555.79	125.86	21.307		
15,300.00	8,735.98	17,446.08	10,845.98	75.50	78.26	141.89	7,266.09	1,241.56	2,681.57	2,554.15	127.42	21.045		
15,400.00	8,735.98	17,546.08	10,845.98	76.38	79.10	141.89	7,366.09	1,241.86	2,681.49	2,552.50	128.99	20.788		
15,500.00	8,735.99	17,646.08	10,845.99	77.27	79.94	141.90	7,466.09	1,242.16	2,681.41	2,550.85	130.56	20.537		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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 #23H - 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	8,735.99	17,746.08	10,845.99	78.15	80.78	141.90	7,566.09	1,242.47	2,681.33	2,549.19	132.14	20.291		
15,700.00	8,735.99	17,846.08	10,845.99	79.04	81.63	141.90	7,666.08	1,242.77	2,681.25	2,547.53	133.72	20.051		
15,800.00	8,735.99	17,946.08	10,845.99	79.93	82.48	141.90	7,766.08	1,243.07	2,681.17	2,545.87	135.30	19.816		
15,900.00	8,735.99	18,046.08	10,845.99	80.82	83.33	141.91	7,866.08	1,243.37	2,681.09	2,544.20	136.89	19.586		
16,000.00	8,735.99	18,146.08	10,845.99	81.72	84.18	141.91	7,966.08	1,243.67	2,681.01	2,542.53	138.48	19.361		
16,100.00	8,735.99	18,246.08	10,845.99	82.61	85.04	141.91	8,066.08	1,243.98	2,680.93	2,540.86	140.07	19.140		
16,200.00	8,735.99	18,346.08	10,845.99	83.51	85.90	141.91	8,166.08	1,244.28	2,680.85	2,539.18	141.66	18.924		
16,300.00	8,735.99	18,446.08	10,845.99	84.41	86.76	141.91	8,266.08	1,244.58	2,680.77	2,537.51	143.26	18.712		
16,400.00	8,735.99	18,546.08	10,845.99	85.31	87.62	141.92	8,366.08	1,244.88	2,680.69	2,535.83	144.86	18.505		
16,500.00	8,735.99	18,646.08	10,845.99	86.21	88.48	141.92	8,466.08	1,245.18	2,680.61	2,534.14	146.47	18.302		
16,600.00	8,735.99	18,746.08	10,845.99	87.11	89.35	141.92	8,566.08	1,245.48	2,680.53	2,532.46	148.07	18.103		
16,700.00	8,735.99	18,846.08	10,845.99	88.02	90.22	141.92	8,666.08	1,245.79	2,680.45	2,530.77	149.68	17.908		
16,800.00	8,735.99	18,946.08	10,845.99	88.92	91.09	141.93	8,766.08	1,246.09	2,680.37	2,529.08	151.29	17.717		
16,900.00	8,735.99	19,046.08	10,845.99	89.83	91.96	141.93	8,866.08	1,246.39	2,680.29	2,527.39	152.90	17.530		
17,000.00	8,735.99	19,146.08	10,845.99	90.74	92.84	141.93	8,966.08	1,246.69	2,680.21	2,525.69	154.52	17.346		
17,100.00	8,735.99	19,246.08	10,845.99	91.65	93.72	141.93	9,066.08	1,246.99	2,680.13	2,523.99	156.13	17.166		
17,200.00	8,735.99	19,346.08	10,845.99	92.56	94.59	141.93	9,166.08	1,247.30	2,680.05	2,522.30	157.75	16.989		
17,300.00	8,735.99	19,446.08	10,845.99	93.47	95.47	141.94	9,266.08	1,247.60	2,679.97	2,520.59	159.37	16.816		
17,400.00	8,735.99	19,546.08	10,845.99	94.38	96.36	141.94	9,366.08	1,247.90	2,679.89	2,518.89	160.99	16.646		
17,500.00	8,735.99	19,646.07	10,845.99	95.30	97.24	141.94	9,466.08	1,248.20	2,679.80	2,517.19	162.62	16.479		
17,600.00	8,735.99	19,746.07	10,845.99	96.21	98.12	141.94	9,566.07	1,248.50	2,679.72	2,515.48	164.24	16.315		
17,700.00	8,735.99	19,846.07	10,845.99	97.13	99.01	141.94	9,666.07	1,248.80	2,679.64	2,513.77	165.87	16.155		
17,800.00	8,735.99	19,946.07	10,845.99	98.05	99.90	141.95	9,766.07	1,249.11	2,679.56	2,512.06	167.50	15.997		
17,900.00	8,736.00	20,046.07	10,846.00	98.96	100.79	141.95	9,866.07	1,249.41	2,679.48	2,510.35	169.13	15.842		
18,000.00	8,736.00	20,146.07	10,846.00	99.88	101.68	141.95	9,966.07	1,249.71	2,679.40	2,508.64	170.77	15.690		
18,100.00	8,736.00	20,246.07	10,846.00	100.80	102.57	141.95	10,066.07	1,250.01	2,679.32	2,506.92	172.40	15.541		
18,200.00	8,736.00	20,346.07	10,846.00	101.72	103.47	141.96	10,166.07	1,250.31	2,679.24	2,505.21	174.04	15.395		
18,300.00	8,736.00	20,446.07	10,846.00	102.64	104.36	141.96	10,266.07	1,250.62	2,679.16	2,503.49	175.68	15.251		
18,400.00	8,736.00	20,546.07	10,846.00	103.57	105.26	141.96	10,366.07	1,250.92	2,679.08	2,501.77	177.31	15.109		
18,500.00	8,736.00	20,646.07	10,846.00	104.49	106.15	141.96	10,466.07	1,251.22	2,679.00	2,500.05	178.95	14.970		
18,600.00	8,736.00	20,746.07	10,846.00	105.41	107.05	141.96	10,566.07	1,251.52	2,678.92	2,498.32	180.60	14.834		
18,700.00	8,736.00	20,846.07	10,846.00	106.34	107.95	141.97	10,666.07	1,251.82	2,678.84	2,496.60	182.24	14.700		
18,800.00	8,736.00	20,946.07	10,846.00	107.26	108.85	141.97	10,766.07	1,252.13	2,678.76	2,494.88	183.88	14.568		
18,900.00	8,736.00	21,046.07	10,846.00	108.19	109.76	141.97	10,866.07	1,252.43	2,678.68	2,493.15	185.53	14.438		
19,000.00	8,736.00	21,146.07	10,846.00	109.12	110.66	141.97	10,966.07	1,252.73	2,678.60	2,491.42	187.18	14.311		
19,035.79	8,736.00	21,181.87	10,846.00	109.45	110.98	141.97	11,001.86	1,252.84	2,678.57	2,490.81	187.77	14.265 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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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	1.00	0.00	0.00	0.00	90.03	-0.04	89.90	89.90					
100.00	100.00	101.00	100.00	0.13	0.13	90.03	-0.04	89.90	89.90	89.63	0.27	338.901		
200.00	200.00	201.00	200.00	0.49	0.49	90.03	-0.04	89.90	89.90	88.92	0.98	91.528		
300.00	300.00	301.00	300.00	0.85	0.85	90.03	-0.04	89.90	89.90	88.20	1.70	52.909		
400.00	400.00	401.00	400.00	1.21	1.21	90.03	-0.04	89.90	89.90	87.48	2.42	37.209		
500.00	500.00	501.00	500.00	1.56	1.57	90.03	-0.04	89.90	89.90	86.77	3.13	28.694		
600.00	600.00	599.00	600.00	1.92	1.92	90.03	-0.04	89.90	89.90	86.06	3.84	23.394		
700.00	699.99	698.98	699.97	2.27	2.28	-135.90	0.81	89.90	90.53	85.98	4.54	19.920		
800.00	799.96	801.21	799.75	2.60	2.65	-138.62	3.41	89.90	92.55	87.31	5.25	17.644		
900.00	899.90	901.41	899.49	2.94	3.00	-142.09	6.89	89.90	95.57	89.63	5.95	16.076		
1,000.00	999.84	1,001.62	999.22	3.29	3.36	-145.33	10.37	89.90	98.92	92.27	6.65	14.878		
1,100.00	1,099.78	1,101.83	1,098.95	3.64	3.72	-148.35	13.86	89.90	102.56	95.20	7.35	13.945		
1,200.00	1,199.72	1,202.04	1,198.68	3.99	4.08	-151.16	17.34	89.90	106.46	98.40	8.06	13.204		
1,300.00	1,299.65	1,297.75	1,298.41	4.34	4.43	-153.77	20.82	89.90	110.61	101.85	8.76	12.631		
1,400.00	1,399.59	1,400.47	1,401.02	4.69	4.79	-156.84	25.04	88.27	113.72	104.24	9.48	12.000		
1,500.00	1,499.53	1,503.01	1,503.29	5.05	5.16	-161.06	30.58	83.22	114.67	104.48	10.19	11.252		
1,600.00	1,599.47	1,605.05	1,604.74	5.40	5.52	-166.58	37.40	74.82	114.00	103.10	10.90	10.456		
1,700.00	1,699.41	1,706.33	1,705.02	5.76	5.89	-173.62	45.46	63.14	112.53	100.91	11.62	9.686		
1,795.36	1,794.71	1,801.29	1,798.61	6.10	6.23	178.37	54.04	49.54	111.58	99.27	12.30	9.068		
1,800.00	1,799.35	1,805.87	1,803.11	6.11	6.25	177.97	54.46	48.86	111.58	99.24	12.34	9.044		
1,900.00	1,899.29	1,904.42	1,900.17	6.47	6.60	169.48	63.51	34.34	112.97	99.92	13.06	8.651		
2,000.00	1,999.23	2,002.98	1,997.23	6.83	6.97	161.36	72.57	19.82	116.83	103.05	13.78	8.479		
2,100.00	2,099.17	2,101.79	2,094.54	7.19	7.33	99.76	81.64	5.26	121.68	107.19	14.50	8.394		
2,200.00	2,199.03	2,201.03	2,192.27	7.54	7.70	68.75	90.76	-9.36	125.48	110.27	15.21	8.249		
2,300.00	2,298.69	2,300.58	2,290.31	7.89	8.07	54.45	99.91	-24.03	127.46	111.53	15.93	8.003		
2,400.00	2,398.02	2,400.31	2,388.53	8.24	8.44	46.16	109.07	-38.72	127.11	110.46	16.64	7.637		
2,500.00	2,496.92	2,500.12	2,486.81	8.59	8.82	40.71	118.24	-53.43	124.10	106.74	17.36	7.148		
2,600.00	2,595.42	2,600.10	2,585.08	8.94	9.20	38.10	127.41	-68.13	119.08	101.00	18.08	6.585		
2,700.00	2,693.90	2,700.33	2,683.34	9.29	9.57	35.90	136.57	-82.83	114.13	95.32	18.81	6.068		
2,800.00	2,792.38	2,800.55	2,781.60	9.64	9.95	33.51	145.74	-97.53	109.35	89.82	19.53	5.598		
2,900.00	2,890.86	2,900.77	2,879.86	9.99	10.33	30.91	154.91	-112.23	104.78	84.52	20.26	5.172		
3,000.00	2,989.34	3,000.99	2,978.12	10.35	10.71	28.08	164.08	-126.93	100.45	79.46	20.99	4.786		
3,100.00	3,087.82	3,101.22	3,076.39	10.71	11.10	25.00	173.24	-141.63	96.39	74.67	21.72	4.438		
3,200.00	3,186.30	3,201.44	3,174.65	11.08	11.48	21.66	182.41	-156.33	92.63	70.18	22.44	4.127		
3,300.00	3,284.78	3,298.34	3,272.91	11.44	11.85	18.05	191.58	-171.04	89.21	66.05	23.16	3.852		
3,400.00	3,383.27	3,401.89	3,371.17	11.81	12.24	14.17	200.74	-185.74	86.17	62.27	23.90	3.606		
3,500.00	3,481.75	3,502.11	3,469.43	12.17	12.63	10.04	209.91	-200.44	83.55	58.93	24.62	3.394		
3,600.00	3,580.23	3,602.33	3,567.69	12.54	13.01	5.65	219.08	-215.14	81.40	56.06	25.34	3.212		
3,700.00	3,678.71	3,702.55	3,665.96	12.91	13.39	1.06	228.24	-229.84	79.75	53.69	26.06	3.060		
3,800.00	3,777.19	3,797.22	3,764.22	13.28	13.76	-3.69	237.41	-244.54	78.63	51.87	26.76	2.938		
3,900.00	3,875.67	3,903.00	3,862.48	13.65	14.16	-8.54	246.58	-259.24	78.07	50.56	27.51	2.838		
3,948.61	3,923.54	3,945.50	3,910.24	13.83	14.33	-10.91	251.03	-266.39	78.01	50.17	27.84	2.802 CC		
4,000.00	3,974.15	4,003.22	3,960.74	14.02	14.55	-13.43	255.74	-273.94	78.08	49.85	28.24	2.765		
4,100.00	4,072.63	4,103.45	4,059.00	14.39	14.93	-18.28	264.91	-288.64	78.66	49.69	28.97	2.716 ES		
4,200.00	4,171.11	4,203.67	4,157.26	14.77	15.32	-23.02	274.08	-303.34	79.79	50.09	29.70	2.686		
4,300.00	4,269.60	4,303.89	4,255.53	15.14	15.71	-27.61	283.25	-318.05	81.45	51.01	30.44	2.676 SF		
4,400.00	4,368.08	4,395.89	4,353.79	15.51	16.06	-31.98	292.41	-332.75	83.62	52.46	31.16	2.684		
4,500.00	4,466.56	4,495.66	4,452.05	15.89	16.44	-36.11	301.58	-347.45	86.25	54.34	31.90	2.703		
4,600.00	4,565.04	4,604.56	4,550.31	16.26	16.86	-39.98	310.75	-362.15	89.30	56.60	32.69	2.731		
4,700.00	4,663.52	4,704.78	4,648.57	16.64	17.25	-43.58	319.91	-376.85	92.73	59.28	33.45	2.772		
4,800.00	4,762.00	4,805.01	4,746.83	17.02	17.64	-46.92	329.08	-391.55	96.50	62.29	34.21	2.821		
4,900.00	4,860.48	4,894.77	4,845.09	17.39	17.98	-49.99	338.25	-406.25	100.57	65.63	34.94	2.879		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
5,000.00	4,958.96	4,994.55	4,943.36	17.77	18.37	-52.81	347.41	-420.95	104.91	69.21	35.70	2.938		
5,100.00	5,057.44	5,105.67	5,041.62	18.15	18.80	-55.41	356.58	-435.65	109.48	72.97	36.51	2.999		
5,200.00	5,155.93	5,205.90	5,139.88	18.52	19.18	-57.80	365.75	-450.35	114.26	76.98	37.28	3.065		
5,300.00	5,254.41	5,306.12	5,238.14	18.90	19.57	-59.99	374.92	-465.06	119.23	81.17	38.05	3.133		
5,400.00	5,352.89	5,406.34	5,336.40	19.28	19.96	-62.00	384.08	-479.76	124.35	85.53	38.82	3.203		
5,500.00	5,451.37	5,506.57	5,434.66	19.66	20.35	-63.85	393.25	-494.46	129.61	90.02	39.59	3.274		
5,600.00	5,549.85	5,606.79	5,532.93	20.04	20.73	-65.56	402.42	-509.16	135.00	94.64	40.36	3.345		
5,700.00	5,648.33	5,707.01	5,631.19	20.42	21.12	-67.13	411.58	-523.86	140.50	99.36	41.14	3.416		
5,800.00	5,746.81	5,792.77	5,729.45	20.80	21.45	-68.58	420.75	-538.56	146.09	104.24	41.85	3.491		
5,900.00	5,845.29	5,892.54	5,827.71	21.18	21.84	-69.93	429.92	-553.26	151.78	109.16	42.62	3.561		
6,000.00	5,943.79	6,007.68	5,925.97	21.55	22.28	-71.18	439.08	-567.96	157.56	114.11	43.45	3.626		
6,100.00	6,042.65	6,092.09	6,024.23	21.93	22.61	-71.66	448.25	-582.66	164.14	119.99	44.15	3.718		
6,200.00	6,141.98	6,208.23	6,122.39	22.30	23.06	-71.02	457.41	-597.35	171.83	126.88	44.95	3.823		
6,300.00	6,241.66	6,291.22	6,220.33	22.66	23.38	-69.43	466.54	-612.00	180.75	135.15	45.60	3.964		
6,400.00	6,341.55	6,409.68	6,317.93	23.01	23.84	-67.07	475.65	-626.60	191.17	144.80	46.37	4.122		
6,500.00	6,441.54	6,488.97	6,415.08	23.36	24.15	-99.98	484.71	-641.14	203.40	156.42	46.98	4.329		
6,600.00	6,541.54	6,587.46	6,512.07	23.70	24.53	-96.93	493.76	-655.65	216.71	169.05	47.66	4.547		
6,700.00	6,641.54	6,685.94	6,609.05	24.04	24.91	-94.23	502.81	-670.16	230.56	182.22	48.34	4.769		
6,800.00	6,741.54	6,784.42	6,706.04	24.38	25.29	-91.85	511.86	-684.67	244.86	195.83	49.03	4.994		
6,900.00	6,841.54	6,882.90	6,803.02	24.72	25.67	-89.72	520.90	-699.18	259.54	209.81	49.72	5.220		
7,000.00	6,941.54	6,981.38	6,900.01	25.07	26.05	-87.83	529.95	-713.69	274.52	224.10	50.42	5.445		
7,100.00	7,041.54	7,079.86	6,996.99	25.41	26.44	-86.13	539.00	-728.20	289.78	238.66	51.12	5.669		
7,200.00	7,141.54	7,180.21	7,095.83	25.75	26.82	-84.58	548.19	-742.93	305.20	253.36	51.84	5.888		
7,300.00	7,241.54	7,289.88	7,204.28	26.10	27.24	-83.26	556.77	-756.70	318.55	265.92	52.63	6.053		
7,400.00	7,341.54	7,400.66	7,314.38	26.44	27.65	-82.36	563.21	-767.03	328.54	275.17	53.37	6.156		
7,500.00	7,441.54	7,512.22	7,425.65	26.79	28.05	-81.80	567.42	-773.77	335.05	280.99	54.06	6.198		
7,600.00	7,541.54	7,624.23	7,537.60	27.13	28.43	-81.55	569.33	-776.83	338.01	283.33	54.68	6.182		
7,700.00	7,641.54	7,728.17	7,641.54	27.48	28.78	-81.53	569.45	-777.03	338.20	282.87	55.33	6.113		
7,800.00	7,741.54	7,828.17	7,741.54	27.83	29.11	-81.53	569.45	-777.03	338.20	282.19	56.01	6.038		
7,900.00	7,841.54	7,928.17	7,841.54	28.17	29.45	-81.53	569.45	-777.03	338.20	281.50	56.69	5.965		
8,000.00	7,941.54	8,028.17	7,941.54	28.52	29.78	-81.53	569.45	-777.03	338.20	280.82	57.38	5.894		
8,100.00	8,041.54	8,128.17	8,041.54	28.87	30.12	-81.53	569.45	-777.03	338.20	280.13	58.06	5.825		
8,200.00	8,141.54	8,228.17	8,141.54	29.22	30.46	-81.53	569.45	-777.03	338.20	279.45	58.75	5.757		
8,300.00	8,241.29	8,327.92	8,241.29	29.57	30.79	-82.75	569.45	-777.03	337.47	278.02	59.45	5.677		
8,400.00	8,338.66	8,425.29	8,338.66	29.93	31.12	-86.62	569.45	-777.03	335.36	275.18	60.19	5.572		
8,458.52	8,393.35	8,479.98	8,393.35	30.14	31.31	-90.00	569.45	-777.03	334.72	274.09	60.63	5.520		
8,500.00	8,430.69	8,517.32	8,430.69	30.29	31.43	-92.73	569.45	-777.03	335.21	274.25	60.96	5.499		
8,600.00	8,514.59	8,601.22	8,514.59	30.64	31.72	-99.67	569.45	-777.03	342.42	280.67	61.75	5.545		
8,700.00	8,587.81	8,674.44	8,587.81	30.98	31.96	-105.69	569.45	-777.03	362.88	300.35	62.53	5.803		
8,800.00	8,648.12	8,734.75	8,648.12	31.31	32.17	-109.26	569.45	-777.03	400.41	337.21	63.20	6.335		
8,900.00	8,693.69	8,780.32	8,693.69	31.63	32.32	-109.17	569.45	-777.03	455.29	391.58	63.71	7.146		
9,000.00	8,723.13	8,809.76	8,723.13	31.94	32.42	-104.25	569.45	-777.03	524.69	460.66	64.04	8.194		
9,100.00	8,735.56	8,822.19	8,735.56	32.23	32.47	-93.22	569.45	-777.03	604.32	540.13	64.20	9.414		
9,200.00	8,735.96	8,822.59	8,735.96	32.51	32.47	-90.00	569.45	-777.03	689.80	625.55	64.25	10.736		
9,300.00	8,735.96	8,822.59	8,735.96	32.82	32.47	-90.00	569.45	-777.03	778.75	714.47	64.28	12.115		
9,400.00	8,735.96	8,822.59	8,735.96	33.16	32.47	-90.00	569.45	-777.03	870.11	805.81	64.30	13.532		
9,500.00	8,735.96	8,822.59	8,735.96	33.51	32.47	-90.00	569.45	-777.03	963.18	898.86	64.32	14.976		
9,600.00	8,735.96	8,822.59	8,735.96	33.90	32.47	-90.00	569.45	-777.03	1,057.52	993.19	64.33	16.439		
9,700.00	8,735.96	8,822.59	8,735.96	34.30	32.47	-90.00	569.45	-777.03	1,152.81	1,088.47	64.34	17.917		
9,800.00	8,735.96	8,822.59	8,735.96	34.73	32.47	-90.00	569.45	-777.03	1,248.84	1,184.49	64.35	19.406		
9,900.00	8,735.96	8,822.59	8,735.96	35.17	32.47	-90.00	569.45	-777.03	1,345.45	1,281.08	64.37	20.903		
10,000.00	8,735.96	8,822.59	8,735.96	35.64	32.47	-90.00	569.45	-777.03	1,442.52	1,378.14	64.38	22.406		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
10,100.00	8,735.96	8,822.59	8,735.96	36.13	32.47	-90.00	569.45	-777.03	1,539.97	1,475.57	64.40	23.914		
10,200.00	8,735.96	8,822.59	8,735.96	36.64	32.47	-90.00	569.45	-777.03	1,637.72	1,573.31	64.41	25.426		
10,300.00	8,735.96	8,822.59	8,735.96	37.16	32.47	-90.00	569.45	-777.03	1,735.73	1,671.30	64.43	26.940		
10,400.00	8,735.96	8,822.59	8,735.96	37.70	32.47	-90.00	569.45	-777.03	1,833.95	1,769.51	64.45	28.457		
10,500.00	8,735.96	8,822.59	8,735.96	38.26	32.47	-90.00	569.45	-777.03	1,932.36	1,867.89	64.47	29.975		
10,600.00	8,735.96	8,822.59	8,735.96	38.84	32.47	-90.00	569.45	-777.03	2,030.92	1,966.44	64.49	31.493		
10,700.00	8,735.96	8,822.60	8,735.96	39.43	32.47	-90.00	569.45	-777.03	2,129.62	2,065.11	64.51	33.013		
10,800.00	8,735.97	12,979.94	10,935.97	40.03	46.44	-171.37	2,772.69	-766.68	2,225.19	2,173.98	51.21	43.451		
10,900.00	8,735.97	13,079.94	10,935.97	40.65	46.95	-171.37	2,872.69	-766.21	2,225.19	2,172.90	52.29	42.556		
11,000.00	8,735.97	13,179.94	10,935.97	41.28	47.48	-171.37	2,972.69	-765.74	2,225.18	2,171.79	53.39	41.677		
11,100.00	8,735.97	13,279.94	10,935.97	41.93	48.02	-171.37	3,072.69	-765.27	2,225.18	2,170.66	54.52	40.818		
11,200.00	8,735.97	13,379.94	10,935.97	42.58	48.58	-171.37	3,172.69	-764.80	2,225.17	2,169.51	55.66	39.977		
11,300.00	8,735.97	13,479.94	10,935.97	43.25	49.15	-171.37	3,272.69	-764.33	2,225.17	2,168.34	56.83	39.156		
11,400.00	8,735.97	13,579.94	10,935.97	43.93	49.73	-171.38	3,372.69	-763.86	2,225.16	2,167.15	58.01	38.355		
11,500.00	8,735.97	13,679.94	10,935.97	44.62	50.32	-171.38	3,472.68	-763.39	2,225.15	2,165.94	59.22	37.576		
11,600.00	8,735.97	13,779.94	10,935.97	45.32	50.92	-171.38	3,572.68	-762.92	2,225.15	2,164.71	60.44	36.816		
11,700.00	8,735.97	13,879.94	10,935.97	46.03	51.54	-171.38	3,672.68	-762.45	2,225.14	2,163.47	61.68	36.078		
11,800.00	8,735.97	13,979.94	10,935.97	46.75	52.16	-171.38	3,772.68	-761.98	2,225.14	2,162.21	62.93	35.360		
11,900.00	8,735.97	14,079.94	10,935.97	47.48	52.80	-171.38	3,872.68	-761.51	2,225.13	2,160.94	64.19	34.662		
12,000.00	8,735.97	14,179.94	10,935.97	48.22	53.45	-171.38	3,972.68	-761.04	2,225.13	2,159.65	65.47	33.985		
12,100.00	8,735.97	14,279.94	10,935.97	48.96	54.10	-171.38	4,072.68	-760.57	2,225.12	2,158.35	66.77	33.327		
12,200.00	8,735.97	14,379.94	10,935.97	49.71	54.76	-171.38	4,172.68	-760.11	2,225.11	2,157.04	68.07	32.689		
12,300.00	8,735.97	14,479.94	10,935.97	50.47	55.44	-171.38	4,272.68	-759.64	2,225.11	2,155.72	69.39	32.069		
12,400.00	8,735.97	14,579.94	10,935.97	51.24	56.12	-171.39	4,372.67	-759.17	2,225.10	2,154.39	70.71	31.467		
12,500.00	8,735.97	14,679.94	10,935.97	52.01	56.81	-171.39	4,472.67	-758.70	2,225.10	2,153.05	72.05	30.884		
12,600.00	8,735.97	14,779.94	10,935.97	52.79	57.51	-171.39	4,572.67	-758.23	2,225.09	2,151.70	73.39	30.318		
12,700.00	8,735.97	14,879.94	10,935.97	53.58	58.21	-171.39	4,672.67	-757.76	2,225.09	2,150.34	74.75	29.768		
12,800.00	8,735.97	14,979.94	10,935.97	54.37	58.93	-171.39	4,772.67	-757.29	2,225.08	2,148.97	76.11	29.235		
12,900.00	8,735.97	15,079.94	10,935.97	55.17	59.65	-171.39	4,872.67	-756.82	2,225.08	2,147.59	77.48	28.718		
13,000.00	8,735.97	15,179.94	10,935.97	55.97	60.37	-171.39	4,972.67	-756.35	2,225.07	2,146.21	78.86	28.215		
13,100.00	8,735.97	15,279.94	10,935.98	56.78	61.11	-171.39	5,072.67	-755.88	2,225.06	2,144.82	80.25	27.728		
13,200.00	8,735.98	15,379.94	10,935.98	57.59	61.85	-171.39	5,172.67	-755.41	2,225.06	2,143.42	81.64	27.255		
13,300.00	8,735.98	15,479.94	10,935.98	58.41	62.59	-171.39	5,272.66	-754.94	2,225.05	2,142.01	83.04	26.795		
13,400.00	8,735.98	15,579.94	10,935.98	59.23	63.35	-171.39	5,372.66	-754.47	2,225.05	2,140.60	84.44	26.349		
13,500.00	8,735.98	15,679.94	10,935.98	60.05	64.10	-171.40	5,472.66	-754.00	2,225.04	2,139.19	85.86	25.916		
13,600.00	8,735.98	15,779.94	10,935.98	60.88	64.87	-171.40	5,572.66	-753.53	2,225.04	2,137.76	87.27	25.495		
13,700.00	8,735.98	15,879.94	10,935.98	61.72	65.64	-171.40	5,672.66	-753.06	2,225.03	2,136.33	88.70	25.086		
13,800.00	8,735.98	15,979.94	10,935.98	62.56	66.41	-171.40	5,772.66	-752.59	2,225.02	2,134.90	90.12	24.688		
13,900.00	8,735.98	16,079.94	10,935.98	63.40	67.19	-171.40	5,872.66	-752.12	2,225.02	2,133.46	91.56	24.302		
14,000.00	8,735.98	16,179.94	10,935.98	64.24	67.97	-171.40	5,972.66	-751.65	2,225.01	2,132.02	92.99	23.926		
14,100.00	8,735.98	16,279.94	10,935.98	65.09	68.76	-171.40	6,072.66	-751.18	2,225.01	2,130.57	94.44	23.561		
14,200.00	8,735.98	16,379.94	10,935.98	65.94	69.56	-171.40	6,172.65	-750.71	2,225.00	2,129.12	95.88	23.205		
14,300.00	8,735.98	16,479.94	10,935.98	66.80	70.35	-171.40	6,272.65	-750.24	2,225.00	2,127.66	97.33	22.859		
14,400.00	8,735.98	16,579.94	10,935.98	67.66	71.15	-171.40	6,372.65	-749.77	2,224.99	2,126.20	98.79	22.523		
14,500.00	8,735.98	16,679.94	10,935.98	68.52	71.96	-171.41	6,472.65	-749.30	2,224.99	2,124.74	100.25	22.195		
14,600.00	8,735.98	16,779.94	10,935.98	69.38	72.77	-171.41	6,572.65	-748.83	2,224.98	2,123.27	101.71	21.876		
14,700.00	8,735.98	16,879.94	10,935.98	70.25	73.58	-171.41	6,672.65	-748.36	2,224.97	2,121.80	103.17	21.566		
14,800.00	8,735.98	16,979.94	10,935.98	71.12	74.40	-171.41	6,772.65	-747.89	2,224.97	2,120.33	104.64	21.263		
14,900.00	8,735.98	17,079.94	10,935.98	71.99	75.22	-171.41	6,872.65	-747.42	2,224.96	2,118.85	106.11	20.968		
15,000.00	8,735.98	17,179.94	10,935.98	72.86	76.05	-171.41	6,972.65	-746.95	2,224.96	2,117.37	107.59	20.681		
15,100.00	8,735.98	17,279.94	10,935.98	73.74	76.87	-171.41	7,072.64	-746.48	2,224.95	2,115.89	109.06	20.400		
15,200.00	8,735.98	17,379.94	10,935.98	74.62	77.70	-171.41	7,172.64	-746.01	2,224.95	2,114.40	110.54	20.127		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
15,300.00	8,735.98	17,479.94	10,935.98	75.50	78.54	-171.41	7,272.64	-745.54	2,224.94	2,112.91	112.03	19.861		
15,400.00	8,735.98	17,579.94	10,935.99	76.38	79.37	-171.41	7,372.64	-745.07	2,224.94	2,111.42	113.51	19.601		
15,500.00	8,735.99	17,679.94	10,935.99	77.27	80.21	-171.42	7,472.64	-744.60	2,224.93	2,109.93	115.00	19.347		
15,600.00	8,735.99	17,779.94	10,935.99	78.15	81.06	-171.42	7,572.64	-744.13	2,224.92	2,108.43	116.49	19.100		
15,700.00	8,735.99	17,879.94	10,935.99	79.04	81.90	-171.42	7,672.64	-743.67	2,224.92	2,106.94	117.98	18.858		
15,800.00	8,735.99	17,979.94	10,935.99	79.93	82.75	-171.42	7,772.64	-743.20	2,224.91	2,105.43	119.48	18.622		
15,900.00	8,735.99	18,079.94	10,935.99	80.82	83.60	-171.42	7,872.64	-742.73	2,224.91	2,103.93	120.98	18.391		
16,000.00	8,735.99	18,179.94	10,935.99	81.72	84.45	-171.42	7,972.63	-742.26	2,224.90	2,102.43	122.47	18.166		
16,100.00	8,735.99	18,279.94	10,935.99	82.61	85.31	-171.42	8,072.63	-741.79	2,224.90	2,100.92	123.97	17.946		
16,200.00	8,735.99	18,379.94	10,935.99	83.51	86.17	-171.42	8,172.63	-741.32	2,224.89	2,099.41	125.48	17.731		
16,300.00	8,735.99	18,479.94	10,935.99	84.41	87.03	-171.42	8,272.63	-740.85	2,224.88	2,097.90	126.98	17.521		
16,400.00	8,735.99	18,579.94	10,935.99	85.31	87.89	-171.42	8,372.63	-740.38	2,224.88	2,096.39	128.49	17.316		
16,500.00	8,735.99	18,679.94	10,935.99	86.21	88.75	-171.42	8,472.63	-739.91	2,224.87	2,094.88	130.00	17.115		
16,600.00	8,735.99	18,779.94	10,935.99	87.11	89.62	-171.43	8,572.63	-739.44	2,224.87	2,093.36	131.51	16.918		
16,700.00	8,735.99	18,879.94	10,935.99	88.02	90.49	-171.43	8,672.63	-738.97	2,224.86	2,091.84	133.02	16.726		
16,800.00	8,735.99	18,979.94	10,935.99	88.92	91.36	-171.43	8,772.63	-738.50	2,224.86	2,090.33	134.53	16.538		
16,900.00	8,735.99	19,079.94	10,935.99	89.83	92.23	-171.43	8,872.62	-738.03	2,224.85	2,088.81	136.05	16.354		
17,000.00	8,735.99	19,179.94	10,935.99	90.74	93.11	-171.43	8,972.62	-737.56	2,224.85	2,087.28	137.56	16.173		
17,100.00	8,735.99	19,279.94	10,935.99	91.65	93.98	-171.43	9,072.62	-737.09	2,224.84	2,085.76	139.08	15.997		
17,200.00	8,735.99	19,379.94	10,935.99	92.56	94.86	-171.43	9,172.62	-736.62	2,224.83	2,084.24	140.60	15.824		
17,300.00	8,735.99	19,479.94	10,935.99	93.47	95.74	-171.43	9,272.62	-736.15	2,224.83	2,082.71	142.12	15.655		
17,400.00	8,735.99	19,579.94	10,935.99	94.38	96.62	-171.43	9,372.62	-735.68	2,224.82	2,081.19	143.64	15.489		
17,500.00	8,735.99	19,679.94	10,935.99	95.30	97.50	-171.43	9,472.62	-735.21	2,224.82	2,079.66	145.16	15.327		
17,600.00	8,735.99	19,779.94	10,935.99	96.21	98.39	-171.44	9,572.62	-734.74	2,224.81	2,078.13	146.68	15.167		
17,700.00	8,735.99	19,879.94	10,936.00	97.13	99.27	-171.44	9,672.62	-734.27	2,224.81	2,076.60	148.21	15.011		
17,800.00	8,735.99	19,979.94	10,936.00	98.05	100.16	-171.44	9,772.61	-733.80	2,224.80	2,075.07	149.73	14.858		
17,900.00	8,736.00	20,079.94	10,936.00	98.96	101.05	-171.44	9,872.61	-733.33	2,224.80	2,073.53	151.26	14.708		
18,000.00	8,736.00	20,179.94	10,936.00	99.88	101.94	-171.44	9,972.61	-732.86	2,224.79	2,072.00	152.79	14.561		
18,100.00	8,736.00	20,279.94	10,936.00	100.80	102.83	-171.44	10,072.61	-732.39	2,224.78	2,070.47	154.32	14.417		
18,200.00	8,736.00	20,379.94	10,936.00	101.72	103.73	-171.44	10,172.61	-731.92	2,224.78	2,068.93	155.85	14.275		
18,300.00	8,736.00	20,479.94	10,936.00	102.64	104.62	-171.44	10,272.61	-731.45	2,224.77	2,067.39	157.38	14.136		
18,400.00	8,736.00	20,579.94	10,936.00	103.57	105.52	-171.44	10,372.61	-730.98	2,224.77	2,065.86	158.91	14.000		
18,500.00	8,736.00	20,679.94	10,936.00	104.49	106.41	-171.44	10,472.61	-730.51	2,224.76	2,064.32	160.44	13.866		
18,600.00	8,736.00	20,779.94	10,936.00	105.41	107.31	-171.44	10,572.61	-730.04	2,224.76	2,062.78	161.98	13.735		
18,700.00	8,736.00	20,879.94	10,936.00	106.34	108.21	-171.45	10,672.60	-729.57	2,224.75	2,061.24	163.51	13.606		
18,800.00	8,736.00	20,979.94	10,936.00	107.26	109.11	-171.45	10,772.60	-729.10	2,224.75	2,059.70	165.05	13.479		
18,811.29	8,736.00	20,991.23	10,936.00	107.37	109.21	-171.45	10,783.89	-729.05	2,224.74	2,059.52	165.22	13.465		
18,900.00	8,736.00	20,982.98	10,936.00	108.19	109.14	-171.45	10,775.64	-729.09	2,226.85	2,060.81	166.04	13.411		
19,000.00	8,736.00	20,982.98	10,936.00	109.12	109.14	-171.45	10,775.64	-729.09	2,233.44	2,066.67	166.76	13.393		
19,035.79	8,736.00	20,982.98	10,936.00	109.45	109.14	-171.45	10,775.64	-729.09	2,236.87	2,069.91	166.96	13.398		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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	0.00	0.00	0.00	0.00	90.10	-0.05	29.89	29.89					
100.00	100.00	100.00	100.00	0.13	0.13	90.10	-0.05	29.89	29.89	29.63	0.26	114.222		
200.00	200.00	200.00	200.00	0.49	0.49	90.10	-0.05	29.89	29.89	28.91	0.98	30.543		
300.00	300.00	300.00	300.00	0.85	0.85	90.10	-0.05	29.89	29.89	28.19	1.70	17.628		
400.00	400.00	400.00	400.00	1.21	1.21	90.10	-0.05	29.89	29.89	27.48	2.41	12.390		
500.00	500.00	500.00	500.00	1.56	1.56	90.10	-0.05	29.89	29.89	26.76	3.13	9.551		
600.00	600.00	600.00	600.00	1.92	1.92	90.10	-0.05	29.89	29.89	26.04	3.85	7.771 CC		
700.00	699.99	700.11	700.11	2.27	2.28	-137.67	0.80	29.67	30.32	25.77	4.55	6.665 ES		
800.00	799.96	800.09	800.05	2.60	2.64	-145.42	3.33	28.99	31.99	26.75	5.24	6.104		
900.00	899.90	900.10	899.80	2.94	3.00	-154.38	6.69	28.10	35.02	29.09	5.94	5.897		
1,000.00	999.84	1,000.28	999.56	3.29	3.36	-161.76	10.06	27.21	38.77	32.13	6.64	5.836		
1,100.00	1,099.78	1,100.46	1,099.31	3.64	3.72	-167.76	13.43	26.32	43.04	35.69	7.35	5.857		
1,200.00	1,199.72	1,199.35	1,199.07	3.99	4.07	-172.64	16.80	25.42	47.70	39.65	8.05	5.923		
1,300.00	1,299.65	1,298.32	1,297.90	4.34	4.43	-178.21	21.75	24.11	53.42	44.67	8.76	6.101		
1,400.00	1,399.59	1,396.69	1,395.90	4.69	4.78	-174.69	29.95	21.94	61.49	52.04	9.45	6.504		
1,500.00	1,499.53	1,494.25	1,492.74	5.05	5.14	-167.32	41.28	18.93	72.57	62.43	10.14	7.156		
1,600.00	1,599.47	1,609.90	1,587.90	5.40	5.56	-160.55	55.58	15.14	87.06	76.18	10.88	8.004		
1,700.00	1,699.41	1,688.67	1,684.53	5.76	5.84	-155.00	72.04	10.78	104.08	92.58	11.51	9.047		
1,800.00	1,799.35	1,786.79	1,781.16	6.11	6.20	-151.02	88.51	6.41	121.79	109.58	12.21	9.976		
1,900.00	1,899.29	1,884.90	1,877.78	6.47	6.56	-148.06	104.98	2.05	139.93	127.01	12.91	10.835		
2,000.00	1,999.23	1,983.02	1,974.41	6.83	6.92	-145.78	121.44	-2.32	158.34	144.72	13.62	11.622		
2,100.00	2,099.17	2,081.43	2,071.33	7.19	7.28	-89.50	137.96	-6.70	175.55	161.21	14.33	12.246		
2,200.00	2,199.03	2,180.36	2,168.75	7.54	7.65	-63.12	154.56	-11.10	189.97	174.92	15.05	12.625		
2,300.00	2,298.69	2,279.69	2,266.57	7.89	8.02	-52.87	171.23	-15.52	201.52	185.75	15.76	12.784		
2,400.00	2,398.02	2,379.29	2,364.66	8.24	8.39	-48.22	187.95	-19.95	210.17	193.69	16.48	12.752		
2,500.00	2,496.92	2,479.05	2,462.90	8.59	8.76	-46.16	204.69	-24.39	215.97	198.77	17.20	12.554		
2,600.00	2,595.42	2,578.85	2,561.18	8.94	9.14	-46.89	221.44	-28.83	219.78	201.85	17.93	12.259		
2,700.00	2,693.90	2,678.64	2,659.47	9.29	9.51	-48.20	238.19	-33.27	223.62	204.96	18.66	11.986		
2,800.00	2,792.38	2,778.44	2,757.75	9.64	9.89	-49.46	254.94	-37.71	227.56	208.17	19.39	11.737		
2,900.00	2,890.86	2,878.24	2,856.03	9.99	10.26	-50.67	271.69	-42.15	231.62	211.49	20.12	11.510		
3,000.00	2,989.34	2,978.04	2,954.32	10.35	10.64	-51.84	288.44	-46.59	235.77	214.91	20.86	11.302		
3,100.00	3,087.82	3,077.84	3,052.60	10.71	11.02	-52.98	305.19	-51.03	240.02	218.42	21.60	11.112		
3,200.00	3,186.30	3,177.64	3,150.88	11.08	11.39	-54.07	321.94	-55.47	244.36	222.02	22.34	10.938		
3,300.00	3,284.78	3,277.44	3,249.17	11.44	11.77	-55.12	338.69	-59.91	248.78	225.70	23.08	10.777		
3,400.00	3,383.27	3,377.24	3,347.45	11.81	12.15	-56.14	355.44	-64.35	253.29	229.46	23.83	10.629		
3,500.00	3,481.75	3,477.04	3,445.73	12.17	12.53	-57.12	372.18	-68.79	257.87	233.30	24.58	10.493		
3,600.00	3,580.23	3,576.84	3,544.02	12.54	12.90	-58.07	388.93	-73.23	262.53	237.20	25.32	10.367		
3,700.00	3,678.71	3,676.63	3,642.30	12.91	13.28	-58.98	405.68	-77.68	267.25	241.18	26.07	10.250		
3,800.00	3,777.19	3,776.43	3,740.58	13.28	13.66	-59.86	422.43	-82.12	272.04	245.22	26.82	10.142		
3,900.00	3,875.67	3,876.23	3,838.87	13.65	14.04	-60.71	439.18	-86.56	276.90	249.32	27.57	10.042		
4,000.00	3,974.15	3,976.03	3,937.15	14.02	14.42	-61.53	455.93	-91.00	281.81	253.48	28.33	9.949		
4,100.00	4,072.63	4,075.83	4,035.43	14.39	14.80	-62.33	472.68	-95.44	286.78	257.70	29.08	9.862		
4,200.00	4,171.11	4,181.24	4,139.40	14.77	15.20	-63.27	489.44	-99.88	291.13	261.25	29.88	9.742		
4,300.00	4,269.60	4,289.00	4,246.25	15.14	15.60	-64.71	502.90	-103.45	292.96	262.28	30.69	9.547		
4,400.00	4,368.08	4,396.34	4,353.13	15.51	15.99	-66.69	512.44	-105.98	292.33	260.87	31.46	9.292		
4,500.00	4,466.56	4,502.96	4,459.58	15.89	16.36	-69.24	518.08	-107.47	289.51	257.30	32.21	8.988		
4,600.00	4,565.04	4,608.57	4,565.17	16.26	16.73	-72.42	519.88	-107.95	284.88	251.94	32.94	8.648		
4,700.00	4,663.52	4,706.92	4,663.52	16.64	17.07	-75.76	519.88	-107.95	280.05	246.38	33.67	8.318		
4,800.00	4,762.00	4,805.40	4,762.00	17.02	17.40	-79.20	519.88	-107.95	276.23	241.84	34.40	8.031		
4,900.00	4,860.48	4,903.88	4,860.48	17.39	17.74	-82.72	519.88	-107.95	273.46	238.34	35.12	7.786		
5,000.00	4,958.96	5,002.36	4,958.96	17.77	18.08	-86.30	519.88	-107.95	271.77	235.93	35.84	7.582		
5,100.00	5,057.44	5,100.84	5,057.44	18.15	18.42	-89.91	519.88	-107.95	271.19	234.62	36.57	7.416		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
5,102.61	5,060.01	5,103.41	5,060.01	18.16	18.43	90.00	519.88	-107.95	271.19	234.60	36.58	7.413		
5,200.00	5,155.93	5,200.68	5,155.93	18.52	18.77	93.51	519.88	-107.95	271.71	234.43	37.29	7.287		
5,300.00	5,254.41	5,302.20	5,254.41	18.90	19.12	97.09	519.88	-107.95	273.35	235.33	38.01	7.191		
5,400.00	5,352.89	5,403.71	5,352.89	19.28	19.47	100.62	519.88	-107.95	276.06	237.32	38.74	7.126		
5,500.00	5,451.37	5,505.23	5,451.37	19.66	19.82	104.07	519.88	-107.95	279.83	240.37	39.46	7.092		
5,600.00	5,549.85	5,606.75	5,549.85	20.04	20.18	107.41	519.88	-107.95	284.61	244.43	40.18	7.084		
5,700.00	5,648.33	5,708.27	5,648.33	20.42	20.53	110.64	519.88	-107.95	290.35	249.46	40.89	7.100		
5,800.00	5,746.81	5,809.79	5,746.81	20.80	20.88	113.74	519.88	-107.95	296.99	255.39	41.61	7.138		
5,900.00	5,845.29	5,888.69	5,845.29	21.18	21.16	116.69	519.88	-107.95	304.49	262.25	42.24	7.209		
6,000.00	5,943.79	5,987.18	5,943.79	21.55	21.50	119.52	519.88	-107.95	312.73	269.79	42.94	7.283		
6,100.00	6,042.65	6,086.05	6,042.65	21.93	21.85	121.96	519.88	-107.95	320.45	276.81	43.64	7.343		
6,200.00	6,141.98	6,185.38	6,141.98	22.30	22.20	123.77	519.88	-107.95	326.73	282.38	44.34	7.368		
6,300.00	6,241.66	6,285.05	6,241.66	22.66	22.54	125.00	519.88	-107.95	331.27	286.23	45.04	7.355		
6,400.00	6,341.55	6,384.95	6,341.55	23.01	22.89	125.68	519.88	-107.95	333.91	288.17	45.74	7.300		
6,500.00	6,441.54	6,484.93	6,441.54	23.36	23.24	89.96	519.88	-107.95	334.57	288.14	46.43	7.206		
6,600.00	6,541.54	6,584.93	6,541.54	23.70	23.59	89.96	519.88	-107.95	334.57	287.45	47.12	7.100		
6,700.00	6,641.54	6,684.93	6,641.54	24.04	23.95	89.96	519.88	-107.95	334.57	286.76	47.81	6.997		
6,800.00	6,741.54	6,784.93	6,741.54	24.38	24.30	89.96	519.88	-107.95	334.57	286.06	48.51	6.898		
6,900.00	6,841.54	6,884.93	6,841.54	24.72	24.65	89.96	519.88	-107.95	334.57	285.37	49.20	6.800		
7,000.00	6,941.54	6,984.93	6,941.54	25.07	25.00	89.96	519.88	-107.95	334.57	284.68	49.89	6.706		
7,100.00	7,041.54	7,084.93	7,041.54	25.41	25.35	89.96	519.88	-107.95	334.57	283.98	50.59	6.614		
7,200.00	7,141.54	7,184.93	7,141.54	25.75	25.70	89.96	519.88	-107.95	334.57	283.29	51.28	6.524		
7,300.00	7,241.54	7,284.93	7,241.54	26.10	26.05	89.96	519.88	-107.95	334.57	282.59	51.98	6.437		
7,400.00	7,341.54	7,384.93	7,341.54	26.44	26.41	89.96	519.88	-107.95	334.57	281.90	52.67	6.352		
7,500.00	7,441.54	7,484.93	7,441.54	26.79	26.76	89.96	519.88	-107.95	334.57	281.20	53.37	6.269		
7,600.00	7,541.54	7,584.93	7,541.54	27.13	27.11	89.96	519.88	-107.95	334.57	280.50	54.07	6.188		
7,700.00	7,641.54	7,684.93	7,641.54	27.48	27.46	89.96	519.88	-107.95	334.57	279.80	54.77	6.109		
7,800.00	7,741.54	7,784.93	7,741.54	27.83	27.82	89.96	519.88	-107.95	334.57	279.11	55.46	6.032		
7,900.00	7,841.54	7,884.93	7,841.54	28.17	28.17	89.96	519.88	-107.95	334.57	278.41	56.16	5.957		
8,000.00	7,941.54	7,984.93	7,941.54	28.52	28.52	89.96	519.88	-107.95	334.57	277.71	56.86	5.884		
8,100.00	8,041.54	8,084.93	8,041.54	28.87	28.88	89.96	519.88	-107.95	334.57	277.01	57.56	5.812		
8,200.00	8,141.54	8,184.93	8,141.54	29.22	29.23	89.96	519.88	-107.95	334.57	276.31	58.26	5.743		
8,249.31	8,190.81	8,234.21	8,190.81	29.39	29.40	90.00	519.88	-107.95	334.57	275.96	58.61	5.709		
8,300.00	8,241.29	8,284.69	8,241.29	29.57	29.58	90.63	519.88	-107.95	334.59	275.63	58.96	5.675		
8,400.00	8,338.66	8,382.06	8,338.66	29.93	29.93	94.22	519.88	-107.95	335.57	275.93	59.64	5.626 SF		
8,500.00	8,430.69	8,474.09	8,430.69	30.29	30.25	99.70	519.88	-107.95	340.77	280.48	60.29	5.652		
8,600.00	8,514.59	8,557.99	8,514.59	30.64	30.55	105.67	519.88	-107.95	355.06	294.17	60.89	5.831		
8,700.00	8,587.81	8,631.21	8,587.81	30.98	30.81	110.54	519.88	-107.95	383.19	321.77	61.43	6.238		
8,800.00	8,648.12	8,708.48	8,648.12	31.31	31.08	112.96	519.88	-107.95	427.69	365.76	61.93	6.906		
8,900.00	8,693.69	8,737.09	8,693.69	31.63	31.18	111.82	519.88	-107.95	488.03	425.83	62.20	7.846		
9,000.00	8,723.13	8,766.53	8,723.13	31.94	31.29	105.83	519.88	-107.95	561.34	498.93	62.41	8.995		
9,100.00	8,735.56	8,778.95	8,735.56	32.23	31.33	93.52	519.88	-107.95	643.62	581.14	62.49	10.300		
9,200.00	8,735.96	8,779.36	8,735.96	32.51	31.33	90.00	519.88	-107.95	730.90	668.41	62.49	11.696		
9,300.00	8,735.96	8,779.36	8,735.96	32.82	31.33	90.00	519.88	-107.95	821.08	758.59	62.49	13.139		
9,400.00	8,735.96	8,779.36	8,735.96	33.16	31.33	90.00	519.88	-107.95	913.31	850.81	62.50	14.613		
9,500.00	8,735.96	8,779.36	8,735.96	33.51	31.33	90.00	519.88	-107.95	1,007.03	944.52	62.51	16.110		
9,600.00	8,735.96	8,779.36	8,735.96	33.90	31.33	90.00	519.88	-107.95	1,101.85	1,039.33	62.52	17.625		
9,700.00	8,735.96	8,779.36	8,735.96	34.30	31.33	90.00	519.88	-107.95	1,197.51	1,134.98	62.53	19.151		
9,800.00	8,735.96	8,779.36	8,735.96	34.73	31.33	90.00	519.88	-107.95	1,293.83	1,231.29	62.54	20.687		
9,900.00	8,735.96	8,779.36	8,735.96	35.17	31.33	90.00	519.88	-107.95	1,390.67	1,328.11	62.56	22.230		
10,000.00	8,735.96	8,779.36	8,735.96	35.64	31.33	90.00	519.88	-107.95	1,487.93	1,425.35	62.58	23.778		
10,100.00	8,735.96	8,779.36	8,735.96	36.13	31.33	90.00	519.88	-107.95	1,585.53	1,522.93	62.59	25.330		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
10,200.00	8,735.96	8,779.36	8,735.96	36.64	31.33	90.00	519.88	-107.95	1,683.41	1,620.80	62.61	26.886		
10,300.00	8,735.96	8,779.36	8,735.96	37.16	31.33	90.00	519.88	-107.95	1,781.53	1,718.89	62.63	28.443		
10,400.00	8,735.96	8,779.36	8,735.96	37.70	31.33	90.00	519.88	-107.95	1,879.84	1,817.18	62.66	30.002		
10,500.00	8,735.96	8,779.36	8,735.96	38.26	31.33	90.00	519.88	-107.95	1,978.32	1,915.64	62.68	31.563		
10,600.00	8,735.96	8,779.36	8,735.96	38.84	31.33	90.00	519.88	-107.95	2,076.95	2,014.25	62.70	33.123		
10,700.00	8,735.96	12,762.41	10,814.96	39.43	45.23	170.88	2,669.83	-99.59	2,105.60	2,053.55	52.05	40.456		
10,800.00	8,735.97	12,862.41	10,814.97	40.03	45.74	170.88	2,769.83	-99.21	2,105.59	2,052.48	53.11	39.642		
10,900.00	8,735.97	12,962.41	10,814.97	40.65	46.27	170.89	2,869.83	-98.82	2,105.59	2,051.38	54.21	38.843		
11,000.00	8,735.97	13,062.41	10,814.97	41.28	46.81	170.89	2,969.83	-98.43	2,105.58	2,050.26	55.32	38.060		
11,100.00	8,735.97	13,162.41	10,814.97	41.93	47.37	170.89	3,069.83	-98.04	2,105.57	2,049.11	56.46	37.293		
11,200.00	8,735.97	13,262.41	10,814.97	42.58	47.93	170.89	3,169.82	-97.65	2,105.57	2,047.95	57.62	36.543		
11,300.00	8,735.97	13,362.41	10,814.97	43.25	48.51	170.89	3,269.82	-97.26	2,105.56	2,046.76	58.80	35.811		
11,400.00	8,735.97	13,462.41	10,814.97	43.93	49.11	170.89	3,369.82	-96.87	2,105.55	2,045.56	59.99	35.097		
11,500.00	8,735.97	13,562.41	10,814.97	44.62	49.71	170.89	3,469.82	-96.49	2,105.54	2,044.34	61.20	34.402		
11,600.00	8,735.97	13,662.41	10,814.97	45.32	50.33	170.89	3,569.82	-96.10	2,105.54	2,043.10	62.43	33.725		
11,700.00	8,735.97	13,762.41	10,814.97	46.03	50.95	170.89	3,669.82	-95.71	2,105.53	2,041.85	63.68	33.066		
11,800.00	8,735.97	13,862.41	10,814.97	46.75	51.59	170.90	3,769.82	-95.32	2,105.52	2,040.59	64.94	32.425		
11,900.00	8,735.97	13,962.41	10,814.97	47.48	52.24	170.90	3,869.82	-94.93	2,105.52	2,039.31	66.21	31.802		
12,000.00	8,735.97	14,062.41	10,814.97	48.22	52.89	170.90	3,969.82	-94.54	2,105.51	2,038.02	67.49	31.196		
12,100.00	8,735.97	14,162.41	10,814.97	48.96	53.56	170.90	4,069.82	-94.15	2,105.50	2,036.71	68.79	30.608		
12,200.00	8,735.97	14,262.41	10,814.97	49.71	54.24	170.90	4,169.82	-93.77	2,105.50	2,035.40	70.10	30.037		
12,300.00	8,735.97	14,362.41	10,814.97	50.47	54.92	170.90	4,269.82	-93.38	2,105.49	2,034.07	71.42	29.482		
12,400.00	8,735.97	14,462.41	10,814.97	51.24	55.61	170.90	4,369.82	-92.99	2,105.48	2,032.74	72.75	28.943		
12,500.00	8,735.97	14,562.41	10,814.97	52.01	56.31	170.90	4,469.82	-92.60	2,105.48	2,031.39	74.08	28.420		
12,600.00	8,735.97	14,662.41	10,814.97	52.79	57.02	170.91	4,569.81	-92.21	2,105.47	2,030.04	75.43	27.912		
12,700.00	8,735.97	14,762.41	10,814.97	53.58	57.74	170.91	4,669.81	-91.82	2,105.46	2,028.67	76.79	27.419		
12,800.00	8,735.97	14,862.41	10,814.97	54.37	58.46	170.91	4,769.81	-91.43	2,105.46	2,027.30	78.15	26.940		
12,900.00	8,735.97	14,962.41	10,814.97	55.17	59.19	170.91	4,869.81	-91.04	2,105.45	2,025.92	79.53	26.474		
13,000.00	8,735.97	15,062.41	10,814.97	55.97	59.93	170.91	4,969.81	-90.66	2,105.44	2,024.53	80.91	26.023		
13,100.00	8,735.97	15,162.41	10,814.97	56.78	60.67	170.91	5,069.81	-90.27	2,105.43	2,023.14	82.30	25.584		
13,200.00	8,735.98	15,262.41	10,814.98	57.59	61.42	170.91	5,169.81	-89.88	2,105.43	2,021.74	83.69	25.158		
13,300.00	8,735.98	15,362.41	10,814.98	58.41	62.18	170.91	5,269.81	-89.49	2,105.42	2,020.33	85.09	24.743		
13,400.00	8,735.98	15,462.41	10,814.98	59.23	62.94	170.91	5,369.81	-89.10	2,105.41	2,018.92	86.50	24.341		
13,500.00	8,735.98	15,562.41	10,814.98	60.05	63.70	170.92	5,469.81	-88.71	2,105.41	2,017.50	87.91	23.950		
13,600.00	8,735.98	15,662.41	10,814.98	60.88	64.48	170.92	5,569.81	-88.32	2,105.40	2,016.07	89.33	23.570		
13,700.00	8,735.98	15,762.41	10,814.98	61.72	65.25	170.92	5,669.81	-87.94	2,105.39	2,014.64	90.75	23.200		
13,800.00	8,735.98	15,862.41	10,814.98	62.56	66.04	170.92	5,769.81	-87.55	2,105.39	2,013.21	92.18	22.840		
13,900.00	8,735.98	15,962.41	10,814.98	63.40	66.82	170.92	5,869.80	-87.16	2,105.38	2,011.77	93.61	22.491		
14,000.00	8,735.98	16,062.41	10,814.98	64.24	67.62	170.92	5,969.80	-86.77	2,105.37	2,010.32	95.05	22.150		
14,100.00	8,735.98	16,162.41	10,814.98	65.09	68.41	170.92	6,069.80	-86.38	2,105.37	2,008.87	96.49	21.819		
14,200.00	8,735.98	16,262.41	10,814.98	65.94	69.21	170.92	6,169.80	-85.99	2,105.36	2,007.42	97.94	21.497		
14,300.00	8,735.98	16,362.41	10,814.98	66.80	70.02	170.93	6,269.80	-85.60	2,105.35	2,005.96	99.39	21.183		
14,400.00	8,735.98	16,462.41	10,814.98	67.66	70.83	170.93	6,369.80	-85.22	2,105.35	2,004.50	100.84	20.878		
14,500.00	8,735.98	16,562.41	10,814.98	68.52	71.64	170.93	6,469.80	-84.83	2,105.34	2,003.04	102.30	20.580		
14,600.00	8,735.98	16,662.41	10,814.98	69.38	72.46	170.93	6,569.80	-84.44	2,105.33	2,001.57	103.76	20.290		
14,700.00	8,735.98	16,762.41	10,814.98	70.25	73.28	170.93	6,669.80	-84.05	2,105.32	2,000.10	105.22	20.008		
14,800.00	8,735.98	16,862.41	10,814.98	71.12	74.10	170.93	6,769.80	-83.66	2,105.32	1,998.63	106.69	19.733		
14,900.00	8,735.98	16,962.41	10,814.98	71.99	74.93	170.93	6,869.80	-83.27	2,105.31	1,997.15	108.16	19.464		
15,000.00	8,735.98	17,062.41	10,814.98	72.86	75.76	170.93	6,969.80	-82.88	2,105.30	1,995.67	109.64	19.202		
15,100.00	8,735.98	17,162.41	10,814.98	73.74	76.60	170.93	7,069.80	-82.50	2,105.30	1,994.18	111.11	18.947		
15,200.00	8,735.98	17,262.41	10,814.98	74.62	77.43	170.94	7,169.79	-82.11	2,105.29	1,992.70	112.59	18.698		
15,300.00	8,735.98	17,362.41	10,814.98	75.50	78.27	170.94	7,269.79	-81.72	2,105.28	1,991.21	114.08	18.455		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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		
15,400.00	8,735.98	17,462.41	10,814.98	76.38	79.12	170.94	7,369.79	-81.33	2,105.28	1,989.72	115.56	18.218		
15,500.00	8,735.99	17,562.41	10,814.99	77.27	79.96	170.94	7,469.79	-80.94	2,105.27	1,988.22	117.05	17.986		
15,600.00	8,735.99	17,662.41	10,814.99	78.15	80.81	170.94	7,569.79	-80.55	2,105.26	1,986.73	118.54	17.760		
15,700.00	8,735.99	17,762.41	10,814.99	79.04	81.66	170.94	7,669.79	-80.16	2,105.26	1,985.23	120.03	17.540		
15,800.00	8,735.99	17,862.41	10,814.99	79.93	82.52	170.94	7,769.79	-79.77	2,105.25	1,983.73	121.52	17.324		
15,900.00	8,735.99	17,962.41	10,814.99	80.82	83.37	170.94	7,869.79	-79.39	2,105.24	1,982.22	123.02	17.113		
16,000.00	8,735.99	18,062.41	10,814.99	81.72	84.23	170.95	7,969.79	-79.00	2,105.24	1,980.72	124.52	16.907		
16,100.00	8,735.99	18,162.41	10,814.99	82.61	85.09	170.95	8,069.79	-78.61	2,105.23	1,979.21	126.02	16.706		
16,200.00	8,735.99	18,262.41	10,814.99	83.51	85.96	170.95	8,169.79	-78.22	2,105.22	1,977.70	127.52	16.509		
16,300.00	8,735.99	18,362.41	10,814.99	84.41	86.82	170.95	8,269.79	-77.83	2,105.22	1,976.19	129.02	16.317		
16,400.00	8,735.99	18,462.41	10,814.99	85.31	87.69	170.95	8,369.79	-77.44	2,105.21	1,974.68	130.53	16.128		
16,500.00	8,735.99	18,562.41	10,814.99	86.21	88.56	170.95	8,469.78	-77.05	2,105.20	1,973.17	132.03	15.944		
16,600.00	8,735.99	18,662.41	10,814.99	87.11	89.43	170.95	8,569.78	-76.67	2,105.19	1,971.65	133.54	15.764		
16,700.00	8,735.99	18,762.41	10,814.99	88.02	90.31	170.95	8,669.78	-76.28	2,105.19	1,970.13	135.05	15.588		
16,800.00	8,735.99	18,862.41	10,814.99	88.92	91.18	170.95	8,769.78	-75.89	2,105.18	1,968.61	136.57	15.415		
16,900.00	8,735.99	18,962.41	10,814.99	89.83	92.06	170.96	8,869.78	-75.50	2,105.17	1,967.09	138.08	15.246		
17,000.00	8,735.99	19,062.41	10,814.99	90.74	92.94	170.96	8,969.78	-75.11	2,105.17	1,965.57	139.59	15.081		
17,100.00	8,735.99	19,162.41	10,814.99	91.65	93.82	170.96	9,069.78	-74.72	2,105.16	1,964.05	141.11	14.919		
17,200.00	8,735.99	19,262.40	10,814.99	92.56	94.70	170.96	9,169.78	-74.33	2,105.15	1,962.53	142.63	14.760		
17,300.00	8,735.99	19,362.40	10,814.99	93.47	95.59	170.96	9,269.78	-73.95	2,105.15	1,961.00	144.15	14.604		
17,400.00	8,735.99	19,462.40	10,814.99	94.38	96.47	170.96	9,369.78	-73.56	2,105.14	1,959.47	145.67	14.452		
17,500.00	8,735.99	19,562.40	10,814.99	95.30	97.36	170.96	9,469.78	-73.17	2,105.13	1,957.94	147.19	14.302		
17,600.00	8,735.99	19,662.40	10,814.99	96.21	98.25	170.96	9,569.78	-72.78	2,105.13	1,956.42	148.71	14.156		
17,700.00	8,735.99	19,762.40	10,814.99	97.13	99.14	170.96	9,669.78	-72.39	2,105.12	1,954.88	150.23	14.012		
17,800.00	8,735.99	19,862.40	10,814.99	98.05	100.03	170.97	9,769.77	-72.00	2,105.11	1,953.35	151.76	13.871		
17,900.00	8,736.00	19,962.40	10,815.00	98.96	100.92	170.97	9,869.77	-71.61	2,105.11	1,951.82	153.29	13.733		
18,000.00	8,736.00	20,062.40	10,815.00	99.88	101.82	170.97	9,969.77	-71.23	2,105.10	1,950.29	154.81	13.598		
18,100.00	8,736.00	20,162.40	10,815.00	100.80	102.71	170.97	10,069.77	-70.84	2,105.09	1,948.75	156.34	13.465		
18,200.00	8,736.00	20,262.40	10,815.00	101.72	103.61	170.97	10,169.77	-70.45	2,105.09	1,947.22	157.87	13.334		
18,300.00	8,736.00	20,362.40	10,815.00	102.64	104.51	170.97	10,269.77	-70.06	2,105.08	1,945.68	159.40	13.206		
18,400.00	8,736.00	20,462.40	10,815.00	103.57	105.41	170.97	10,369.77	-69.67	2,105.07	1,944.14	160.93	13.081		
18,500.00	8,736.00	20,562.40	10,815.00	104.49	106.31	170.97	10,469.77	-69.28	2,105.06	1,942.60	162.46	12.957		
18,600.00	8,736.00	20,662.40	10,815.00	105.41	107.21	170.98	10,569.77	-68.89	2,105.06	1,941.06	163.99	12.836		
18,700.00	8,736.00	20,762.40	10,815.00	106.34	108.11	170.98	10,669.77	-68.50	2,105.05	1,939.52	165.53	12.717		
18,800.00	8,736.00	20,862.40	10,815.00	107.26	109.02	170.98	10,769.77	-68.12	2,105.04	1,937.98	167.06	12.600		
18,900.00	8,736.00	20,962.40	10,815.00	108.19	109.92	170.98	10,869.77	-67.73	2,105.04	1,936.44	168.60	12.486		
19,000.00	8,736.00	21,062.40	10,815.00	109.12	110.83	170.98	10,969.77	-67.34	2,105.03	1,934.90	170.13	12.373		
19,035.79	8,736.00	21,098.20	10,815.00	109.45	111.15	170.98	11,005.56	-67.20	2,105.03	1,934.34	170.68	12.333		

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 SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	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 @ 3027.00usft

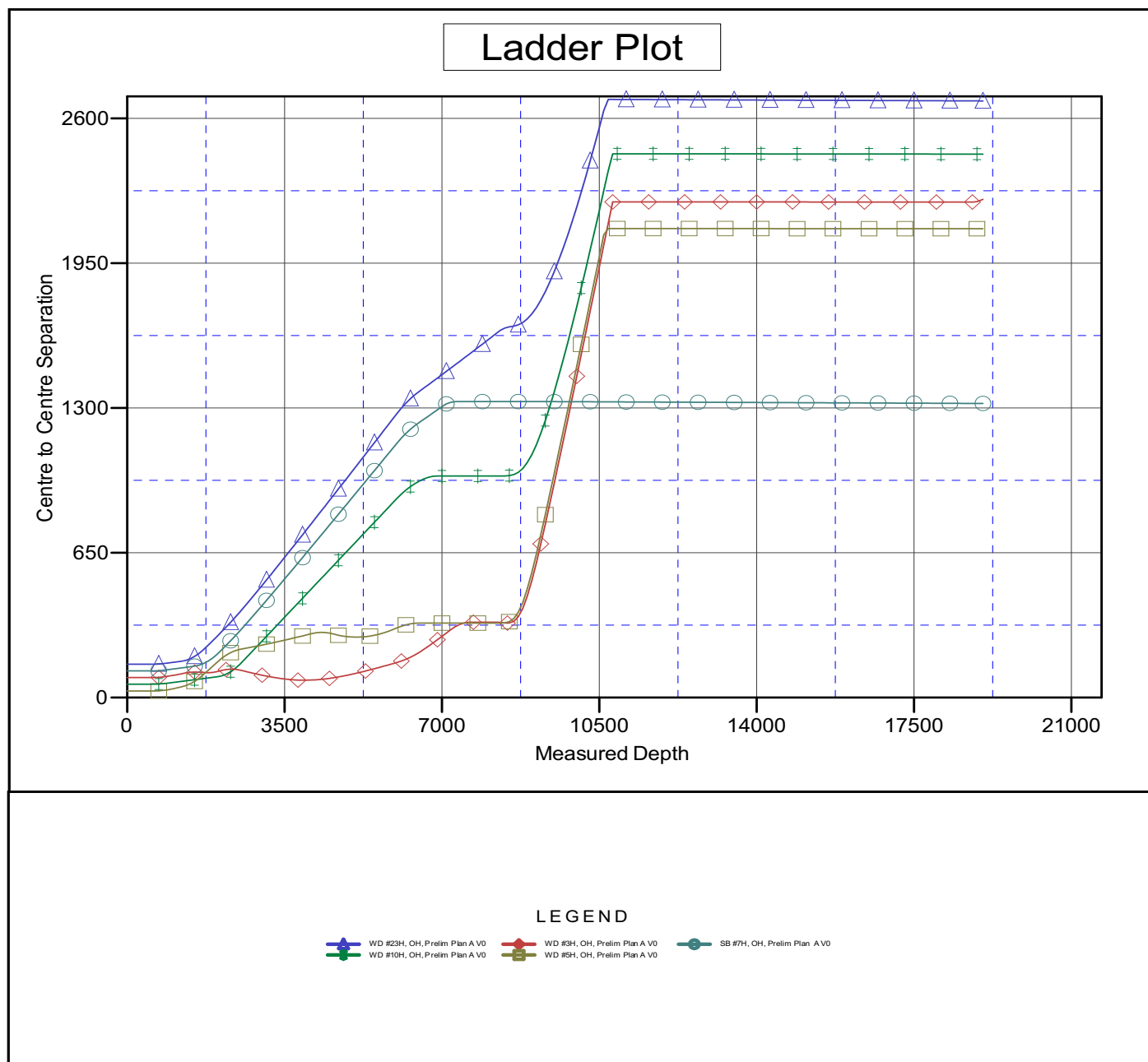
Offset Depths are relative to Offset Datum

Central Meridian is -104.333333

Coordinates are relative to: SB #4H

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

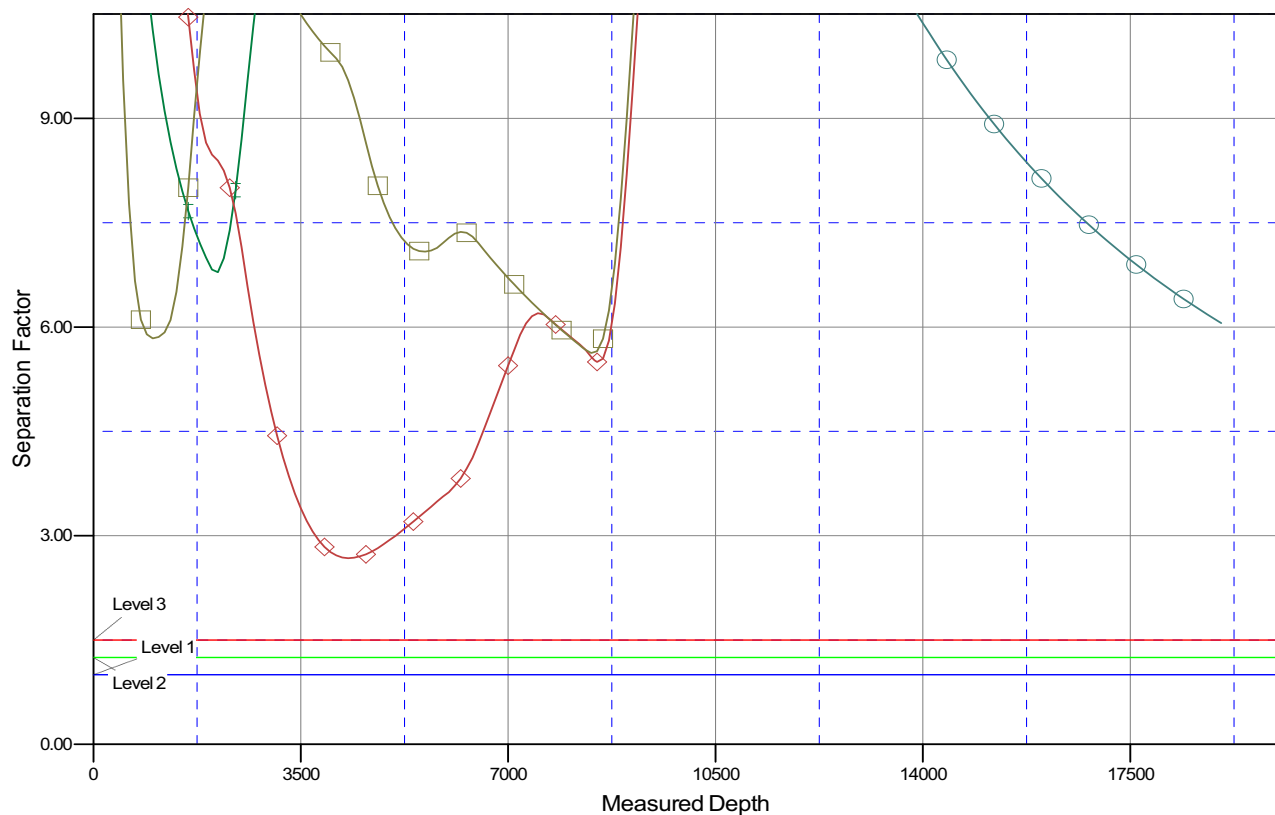


Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Reference Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SB #4H	Survey Calculation Method:	Minimum Curvature
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

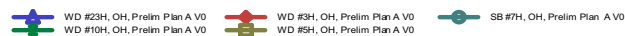
Reference Depths are relative to well @ 3027.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -104.333333

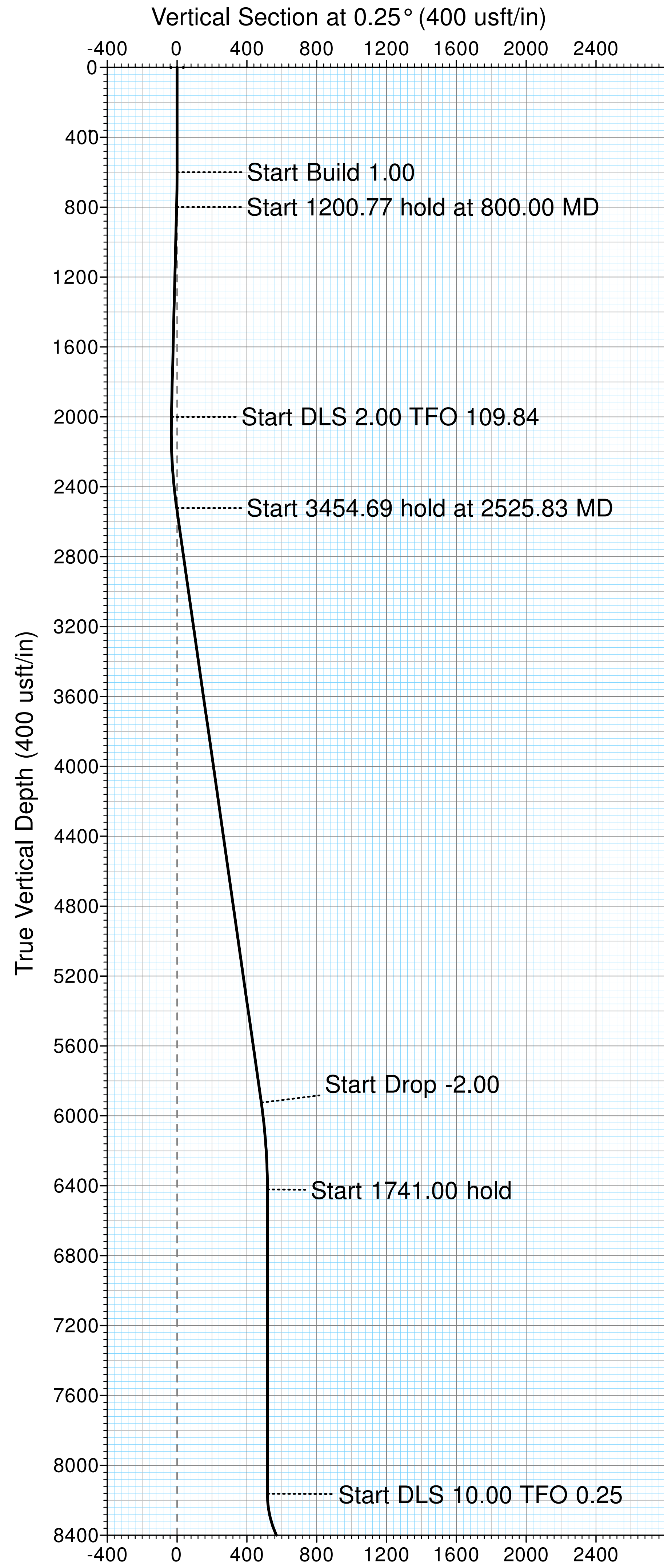
Coordinates are relative to: SB #4H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.18°

Separation Factor Plot

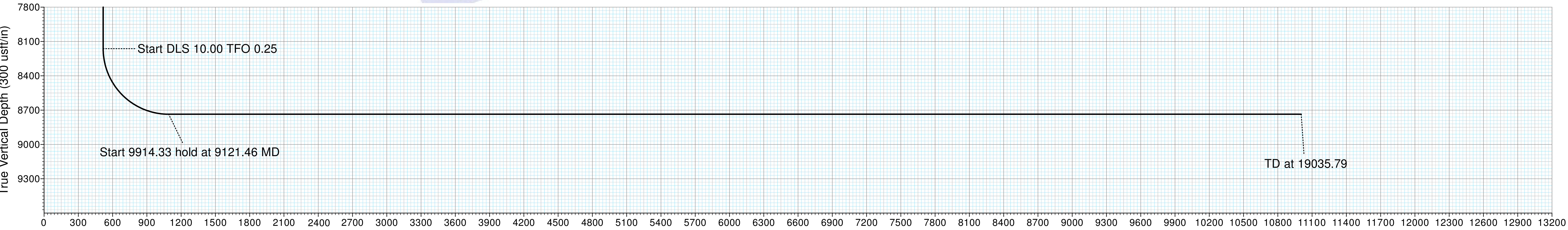


LEGEND

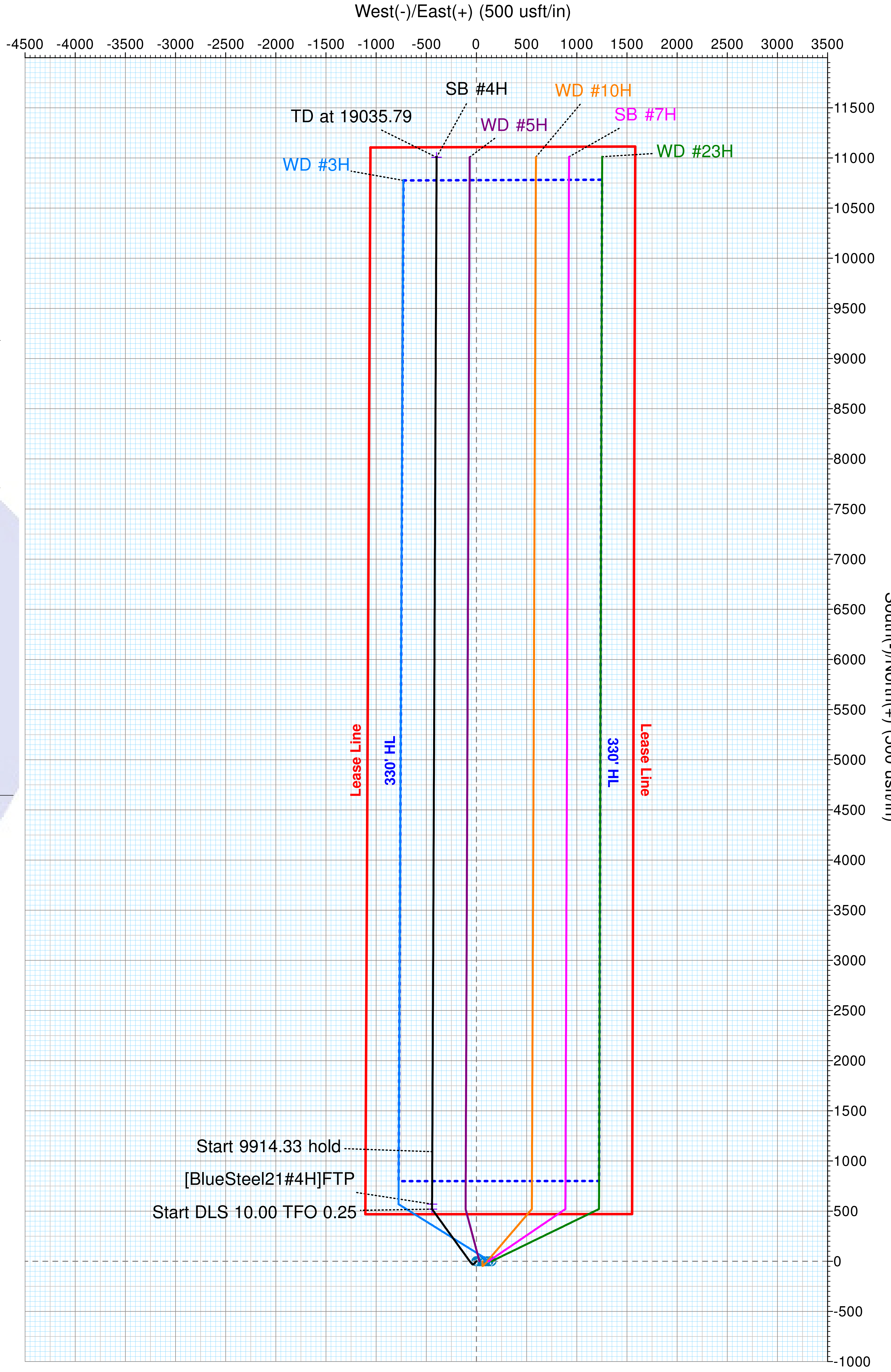
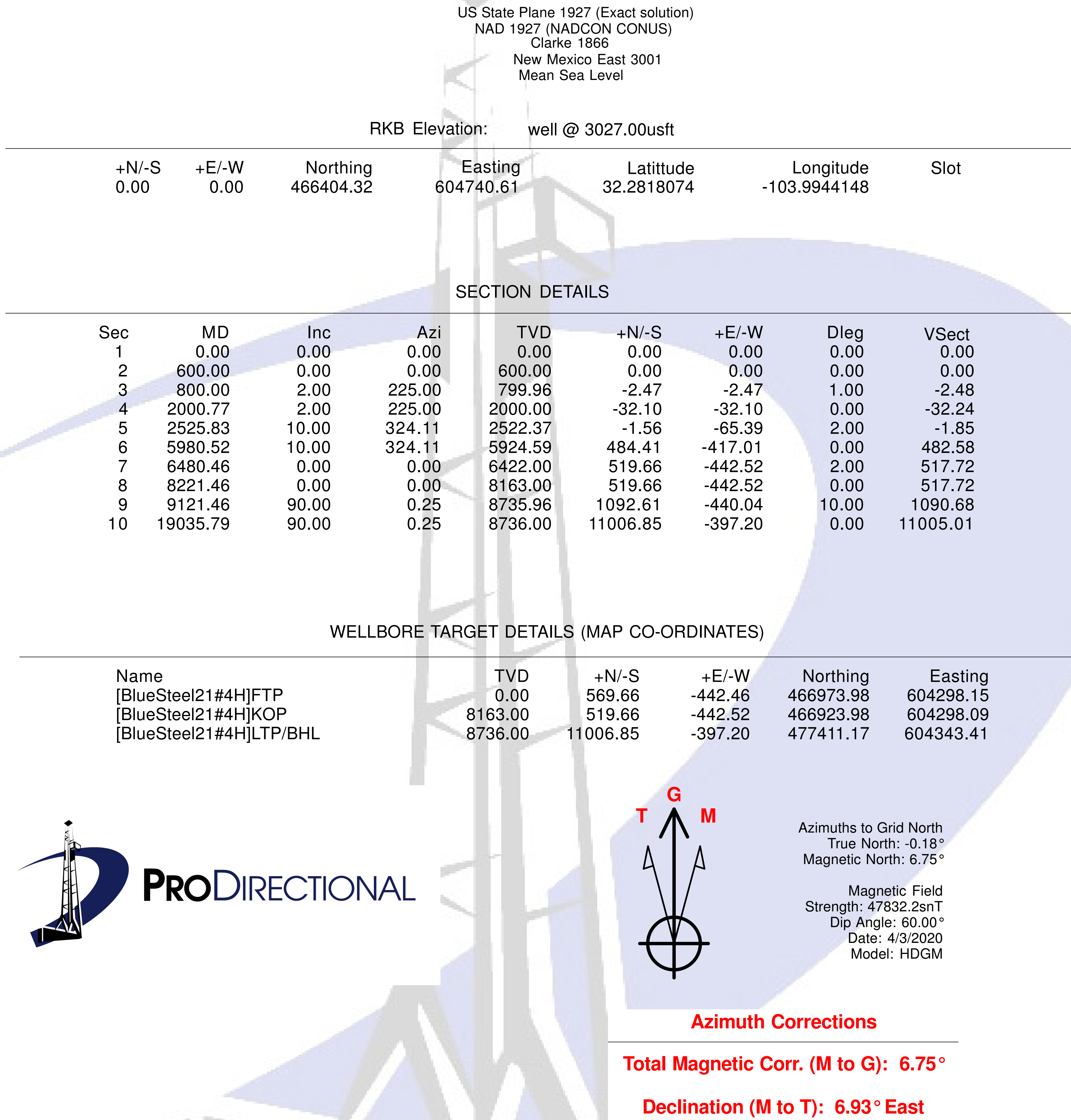




Target Line: 8736' TVD @ 0' VS: 90° INC



36" x 48"





Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Well:	SB #4H	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	SB #4H					
Well Position	+N/-S	0.00 usft	Northing:	466,404.32 usft	Latitude:	32.2818074
	+E/-W	0.00 usft	Easting:	604,740.61 usft	Longitude:	-103.9944148
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,000.00 usft

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

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	0.25	

Survey Tool Program	Date	4/6/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	19,035.79	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#4H]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	1.00	225.00	699.99	-0.62	-0.62	-0.62	1.00	1.00	0.00
800.00	2.00	225.00	799.96	-2.47	-2.47	-2.48	1.00	1.00	0.00
900.00	2.00	225.00	899.90	-4.94	-4.94	-4.96	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Well:	SB #4H	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	2.00	225.00	999.84	-7.40	-7.40	-7.44	0.00	0.00	0.00
1,100.00	2.00	225.00	1,099.78	-9.87	-9.87	-9.91	0.00	0.00	0.00
1,200.00	2.00	225.00	1,199.72	-12.34	-12.34	-12.39	0.00	0.00	0.00
1,300.00	2.00	225.00	1,299.65	-14.81	-14.81	-14.87	0.00	0.00	0.00
1,400.00	2.00	225.00	1,399.59	-17.27	-17.27	-17.35	0.00	0.00	0.00
1,500.00	2.00	225.00	1,499.53	-19.74	-19.74	-19.83	0.00	0.00	0.00
1,600.00	2.00	225.00	1,599.47	-22.21	-22.21	-22.31	0.00	0.00	0.00
1,700.00	2.00	225.00	1,699.41	-24.68	-24.68	-24.79	0.00	0.00	0.00
1,800.00	2.00	225.00	1,799.35	-27.15	-27.15	-27.26	0.00	0.00	0.00
1,900.00	2.00	225.00	1,899.29	-29.61	-29.61	-29.74	0.00	0.00	0.00
2,000.77	2.00	225.00	2,000.00	-32.10	-32.10	-32.24	0.00	0.00	0.00
2,100.00	2.29	279.62	2,099.17	-32.99	-35.28	-33.15	2.00	0.29	55.04
2,200.00	3.80	305.24	2,199.03	-30.75	-39.96	-30.92	2.00	1.51	25.62
2,300.00	5.63	315.38	2,298.69	-25.34	-46.11	-25.54	2.00	1.83	10.14
2,400.00	7.54	320.49	2,398.02	-16.79	-53.73	-17.02	2.00	1.91	5.11
2,500.00	9.49	323.52	2,496.92	-5.09	-62.81	-5.37	2.00	1.95	3.03
2,525.83	10.00	324.11	2,522.37	-1.56	-65.39	-1.85	2.00	1.96	2.29
2,600.00	10.00	324.11	2,595.42	8.87	-72.94	8.55	0.00	0.00	0.00
2,700.00	10.00	324.11	2,693.90	22.94	-83.12	22.57	0.00	0.00	0.00
2,800.00	10.00	324.11	2,792.38	37.00	-93.30	36.60	0.00	0.00	0.00
2,900.00	10.00	324.11	2,890.86	51.07	-103.48	50.62	0.00	0.00	0.00
3,000.00	10.00	324.11	2,989.34	65.14	-113.65	64.64	0.00	0.00	0.00
3,100.00	10.00	324.11	3,087.82	79.21	-123.83	78.66	0.00	0.00	0.00
3,200.00	10.00	324.11	3,186.30	93.27	-134.01	92.69	0.00	0.00	0.00
3,300.00	10.00	324.11	3,284.78	107.34	-144.19	106.71	0.00	0.00	0.00
3,400.00	10.00	324.11	3,383.27	121.41	-154.37	120.73	0.00	0.00	0.00
3,500.00	10.00	324.11	3,481.75	135.47	-164.54	134.75	0.00	0.00	0.00
3,600.00	10.00	324.11	3,580.23	149.54	-174.72	148.78	0.00	0.00	0.00
3,700.00	10.00	324.11	3,678.71	163.61	-184.90	162.80	0.00	0.00	0.00
3,800.00	10.00	324.11	3,777.19	177.67	-195.08	176.82	0.00	0.00	0.00
3,900.00	10.00	324.11	3,875.67	191.74	-205.26	190.84	0.00	0.00	0.00
4,000.00	10.00	324.11	3,974.15	205.81	-215.43	204.87	0.00	0.00	0.00
4,100.00	10.00	324.11	4,072.63	219.87	-225.61	218.89	0.00	0.00	0.00
4,200.00	10.00	324.11	4,171.11	233.94	-235.79	232.91	0.00	0.00	0.00
4,300.00	10.00	324.11	4,269.60	248.01	-245.97	246.93	0.00	0.00	0.00
4,400.00	10.00	324.11	4,368.08	262.08	-256.15	260.96	0.00	0.00	0.00
4,500.00	10.00	324.11	4,466.56	276.14	-266.32	274.98	0.00	0.00	0.00
4,600.00	10.00	324.11	4,565.04	290.21	-276.50	289.00	0.00	0.00	0.00
4,700.00	10.00	324.11	4,663.52	304.28	-286.68	303.02	0.00	0.00	0.00
4,800.00	10.00	324.11	4,762.00	318.34	-296.86	317.05	0.00	0.00	0.00
4,900.00	10.00	324.11	4,860.48	332.41	-307.04	331.07	0.00	0.00	0.00
5,000.00	10.00	324.11	4,958.96	346.48	-317.22	345.09	0.00	0.00	0.00
5,100.00	10.00	324.11	5,057.44	360.54	-327.39	359.11	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Well:	SB #4H	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)
5,200.00	10.00	324.11	5,155.93	374.61	-337.57	373.14	0.00	0.00	0.00
5,300.00	10.00	324.11	5,254.41	388.68	-347.75	387.16	0.00	0.00	0.00
5,400.00	10.00	324.11	5,352.89	402.75	-357.93	401.18	0.00	0.00	0.00
5,500.00	10.00	324.11	5,451.37	416.81	-368.11	415.20	0.00	0.00	0.00
5,600.00	10.00	324.11	5,549.85	430.88	-378.28	429.22	0.00	0.00	0.00
5,700.00	10.00	324.11	5,648.33	444.95	-388.46	443.25	0.00	0.00	0.00
5,800.00	10.00	324.11	5,746.81	459.01	-398.64	457.27	0.00	0.00	0.00
5,900.00	10.00	324.11	5,845.29	473.08	-408.82	471.29	0.00	0.00	0.00
5,980.52	10.00	324.11	5,924.59	484.41	-417.01	482.58	0.00	0.00	0.00
6,000.00	9.61	324.11	5,943.79	487.09	-418.96	485.26	2.00	-2.00	0.00
6,100.00	7.61	324.11	6,042.65	499.22	-427.73	497.35	2.00	-2.00	0.00
6,200.00	5.61	324.11	6,141.98	508.55	-434.48	506.65	2.00	-2.00	0.00
6,300.00	3.61	324.11	6,241.66	515.06	-439.19	513.14	2.00	-2.00	0.00
6,400.00	1.61	324.11	6,341.55	518.74	-441.86	516.81	2.00	-2.00	0.00
6,480.46	0.00	0.00	6,422.00	519.66	-442.52	517.72	2.00	-2.00	0.00
6,500.00	0.00	0.00	6,441.54	519.66	-442.52	517.72	0.00	0.00	0.00
6,600.00	0.00	0.00	6,541.54	519.66	-442.52	517.72	0.00	0.00	0.00
6,700.00	0.00	0.00	6,641.54	519.66	-442.52	517.72	0.00	0.00	0.00
6,800.00	0.00	0.00	6,741.54	519.66	-442.52	517.72	0.00	0.00	0.00
6,900.00	0.00	0.00	6,841.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,000.00	0.00	0.00	6,941.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,100.00	0.00	0.00	7,041.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,200.00	0.00	0.00	7,141.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,300.00	0.00	0.00	7,241.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,400.00	0.00	0.00	7,341.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,500.00	0.00	0.00	7,441.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,600.00	0.00	0.00	7,541.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,700.00	0.00	0.00	7,641.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,800.00	0.00	0.00	7,741.54	519.66	-442.52	517.72	0.00	0.00	0.00
7,900.00	0.00	0.00	7,841.54	519.66	-442.52	517.72	0.00	0.00	0.00
8,000.00	0.00	0.00	7,941.54	519.66	-442.52	517.72	0.00	0.00	0.00
8,100.00	0.00	0.00	8,041.54	519.66	-442.52	517.72	0.00	0.00	0.00
8,200.00	0.00	0.00	8,141.54	519.66	-442.52	517.72	0.00	0.00	0.00
8,221.46	0.00	0.00	8,163.00	519.66	-442.52	517.72	0.00	0.00	0.00
[BlueSteel21#4H]KOP									
8,250.00	2.85	0.25	8,191.52	520.37	-442.52	518.43	10.00	10.00	0.00
8,300.00	7.85	0.25	8,241.29	525.03	-442.50	523.10	10.00	10.00	0.00
8,350.00	12.85	0.25	8,290.46	534.02	-442.46	532.08	10.00	10.00	0.00
8,400.00	17.85	0.25	8,338.66	547.25	-442.40	545.32	10.00	10.00	0.00
8,450.00	22.85	0.25	8,385.52	564.64	-442.33	562.70	10.00	10.00	0.00
8,500.00	27.85	0.25	8,430.69	586.04	-442.23	584.10	10.00	10.00	0.00
8,550.00	32.85	0.25	8,473.83	611.30	-442.12	609.36	10.00	10.00	0.00
8,600.00	37.85	0.25	8,514.59	640.22	-442.00	638.29	10.00	10.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Well:	SB #4H	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)	
8,650.00	42.85	0.25	8,552.68	672.58	-441.86	670.65	10.00	10.00	0.00	
8,700.00	47.85	0.25	8,587.81	708.15	-441.71	706.21	10.00	10.00	0.00	
8,750.00	52.85	0.25	8,619.70	746.63	-441.54	744.70	10.00	10.00	0.00	
8,800.00	57.85	0.25	8,648.12	787.75	-441.36	785.82	10.00	10.00	0.00	
8,850.00	62.85	0.25	8,672.84	831.19	-441.17	829.26	10.00	10.00	0.00	
8,900.00	67.85	0.25	8,693.69	876.62	-440.98	874.69	10.00	10.00	0.00	
8,950.00	72.85	0.25	8,710.49	923.70	-440.77	921.77	10.00	10.00	0.00	
9,000.00	77.85	0.25	8,723.13	972.06	-440.56	970.13	10.00	10.00	0.00	
9,050.00	82.85	0.25	8,731.51	1,021.33	-440.35	1,019.40	10.00	10.00	0.00	
9,100.00	87.85	0.25	8,735.56	1,071.15	-440.14	1,069.22	10.00	10.00	0.00	
9,121.46	90.00	0.25	8,735.96	1,092.61	-440.04	1,090.68	10.00	10.00	0.00	
9,200.00	90.00	0.25	8,735.96	1,171.15	-439.70	1,169.22	0.00	0.00	0.00	
9,300.00	90.00	0.25	8,735.96	1,271.15	-439.27	1,269.22	0.00	0.00	0.00	
9,400.00	90.00	0.25	8,735.96	1,371.15	-438.84	1,369.22	0.00	0.00	0.00	
9,500.00	90.00	0.25	8,735.96	1,471.15	-438.41	1,469.22	0.00	0.00	0.00	
9,600.00	90.00	0.25	8,735.96	1,571.14	-437.98	1,569.22	0.00	0.00	0.00	
9,700.00	90.00	0.25	8,735.96	1,671.14	-437.54	1,669.22	0.00	0.00	0.00	
9,800.00	90.00	0.25	8,735.96	1,771.14	-437.11	1,769.22	0.00	0.00	0.00	
9,900.00	90.00	0.25	8,735.96	1,871.14	-436.68	1,869.22	0.00	0.00	0.00	
10,000.00	90.00	0.25	8,735.96	1,971.14	-436.25	1,969.22	0.00	0.00	0.00	
10,100.00	90.00	0.25	8,735.96	2,071.14	-435.82	2,069.22	0.00	0.00	0.00	
10,200.00	90.00	0.25	8,735.96	2,171.14	-435.38	2,169.22	0.00	0.00	0.00	
10,300.00	90.00	0.25	8,735.96	2,271.14	-434.95	2,269.22	0.00	0.00	0.00	
10,400.00	90.00	0.25	8,735.96	2,371.14	-434.52	2,369.22	0.00	0.00	0.00	
10,500.00	90.00	0.25	8,735.96	2,471.14	-434.09	2,469.22	0.00	0.00	0.00	
10,600.00	90.00	0.25	8,735.96	2,571.14	-433.65	2,569.22	0.00	0.00	0.00	
10,700.00	90.00	0.25	8,735.96	2,671.13	-433.22	2,669.22	0.00	0.00	0.00	
10,800.00	90.00	0.25	8,735.97	2,771.13	-432.79	2,769.22	0.00	0.00	0.00	
10,900.00	90.00	0.25	8,735.97	2,871.13	-432.36	2,869.22	0.00	0.00	0.00	
11,000.00	90.00	0.25	8,735.97	2,971.13	-431.93	2,969.22	0.00	0.00	0.00	
11,100.00	90.00	0.25	8,735.97	3,071.13	-431.49	3,069.22	0.00	0.00	0.00	
11,200.00	90.00	0.25	8,735.97	3,171.13	-431.06	3,169.22	0.00	0.00	0.00	
11,300.00	90.00	0.25	8,735.97	3,271.13	-430.63	3,269.22	0.00	0.00	0.00	
11,400.00	90.00	0.25	8,735.97	3,371.13	-430.20	3,369.22	0.00	0.00	0.00	
11,500.00	90.00	0.25	8,735.97	3,471.13	-429.77	3,469.22	0.00	0.00	0.00	
11,600.00	90.00	0.25	8,735.97	3,571.13	-429.33	3,569.22	0.00	0.00	0.00	
11,700.00	90.00	0.25	8,735.97	3,671.12	-428.90	3,669.22	0.00	0.00	0.00	
11,800.00	90.00	0.25	8,735.97	3,771.12	-428.47	3,769.22	0.00	0.00	0.00	
11,900.00	90.00	0.25	8,735.97	3,871.12	-428.04	3,869.22	0.00	0.00	0.00	
12,000.00	90.00	0.25	8,735.97	3,971.12	-427.60	3,969.22	0.00	0.00	0.00	
12,100.00	90.00	0.25	8,735.97	4,071.12	-427.17	4,069.22	0.00	0.00	0.00	
12,200.00	90.00	0.25	8,735.97	4,171.12	-426.74	4,169.22	0.00	0.00	0.00	
12,300.00	90.00	0.25	8,735.97	4,271.12	-426.31	4,269.22	0.00	0.00	0.00	
12,400.00	90.00	0.25	8,735.97	4,371.12	-425.88	4,369.22	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Well:	SB #4H	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)	
12,500.00	90.00	0.25	8,735.97	4,471.12	-425.44	4,469.22	0.00	0.00	0.00	
12,600.00	90.00	0.25	8,735.97	4,571.12	-425.01	4,569.22	0.00	0.00	0.00	
12,700.00	90.00	0.25	8,735.97	4,671.12	-424.58	4,669.22	0.00	0.00	0.00	
12,800.00	90.00	0.25	8,735.97	4,771.11	-424.15	4,769.22	0.00	0.00	0.00	
12,900.00	90.00	0.25	8,735.97	4,871.11	-423.72	4,869.22	0.00	0.00	0.00	
13,000.00	90.00	0.25	8,735.97	4,971.11	-423.28	4,969.22	0.00	0.00	0.00	
13,100.00	90.00	0.25	8,735.97	5,071.11	-422.85	5,069.22	0.00	0.00	0.00	
13,200.00	90.00	0.25	8,735.98	5,171.11	-422.42	5,169.22	0.00	0.00	0.00	
13,300.00	90.00	0.25	8,735.98	5,271.11	-421.99	5,269.22	0.00	0.00	0.00	
13,400.00	90.00	0.25	8,735.98	5,371.11	-421.55	5,369.22	0.00	0.00	0.00	
13,500.00	90.00	0.25	8,735.98	5,471.11	-421.12	5,469.22	0.00	0.00	0.00	
13,600.00	90.00	0.25	8,735.98	5,571.11	-420.69	5,569.22	0.00	0.00	0.00	
13,700.00	90.00	0.25	8,735.98	5,671.11	-420.26	5,669.22	0.00	0.00	0.00	
13,800.00	90.00	0.25	8,735.98	5,771.11	-419.83	5,769.22	0.00	0.00	0.00	
13,900.00	90.00	0.25	8,735.98	5,871.10	-419.39	5,869.22	0.00	0.00	0.00	
14,000.00	90.00	0.25	8,735.98	5,971.10	-418.96	5,969.22	0.00	0.00	0.00	
14,100.00	90.00	0.25	8,735.98	6,071.10	-418.53	6,069.22	0.00	0.00	0.00	
14,200.00	90.00	0.25	8,735.98	6,171.10	-418.10	6,169.22	0.00	0.00	0.00	
14,300.00	90.00	0.25	8,735.98	6,271.10	-417.67	6,269.22	0.00	0.00	0.00	
14,400.00	90.00	0.25	8,735.98	6,371.10	-417.23	6,369.22	0.00	0.00	0.00	
14,500.00	90.00	0.25	8,735.98	6,471.10	-416.80	6,469.22	0.00	0.00	0.00	
14,600.00	90.00	0.25	8,735.98	6,571.10	-416.37	6,569.22	0.00	0.00	0.00	
14,700.00	90.00	0.25	8,735.98	6,671.10	-415.94	6,669.22	0.00	0.00	0.00	
14,800.00	90.00	0.25	8,735.98	6,771.10	-415.50	6,769.22	0.00	0.00	0.00	
14,900.00	90.00	0.25	8,735.98	6,871.10	-415.07	6,869.22	0.00	0.00	0.00	
15,000.00	90.00	0.25	8,735.98	6,971.09	-414.64	6,969.22	0.00	0.00	0.00	
15,100.00	90.00	0.25	8,735.98	7,071.09	-414.21	7,069.22	0.00	0.00	0.00	
15,200.00	90.00	0.25	8,735.98	7,171.09	-413.78	7,169.22	0.00	0.00	0.00	
15,300.00	90.00	0.25	8,735.98	7,271.09	-413.34	7,269.22	0.00	0.00	0.00	
15,400.00	90.00	0.25	8,735.98	7,371.09	-412.91	7,369.22	0.00	0.00	0.00	
15,500.00	90.00	0.25	8,735.99	7,471.09	-412.48	7,469.22	0.00	0.00	0.00	
15,600.00	90.00	0.25	8,735.99	7,571.09	-412.05	7,569.22	0.00	0.00	0.00	
15,700.00	90.00	0.25	8,735.99	7,671.09	-411.62	7,669.22	0.00	0.00	0.00	
15,800.00	90.00	0.25	8,735.99	7,771.09	-411.18	7,769.22	0.00	0.00	0.00	
15,900.00	90.00	0.25	8,735.99	7,871.09	-410.75	7,869.22	0.00	0.00	0.00	
16,000.00	90.00	0.25	8,735.99	7,971.08	-410.32	7,969.22	0.00	0.00	0.00	
16,100.00	90.00	0.25	8,735.99	8,071.08	-409.89	8,069.22	0.00	0.00	0.00	
16,200.00	90.00	0.25	8,735.99	8,171.08	-409.45	8,169.22	0.00	0.00	0.00	
16,300.00	90.00	0.25	8,735.99	8,271.08	-409.02	8,269.22	0.00	0.00	0.00	
16,400.00	90.00	0.25	8,735.99	8,371.08	-408.59	8,369.22	0.00	0.00	0.00	
16,500.00	90.00	0.25	8,735.99	8,471.08	-408.16	8,469.22	0.00	0.00	0.00	
16,600.00	90.00	0.25	8,735.99	8,571.08	-407.73	8,569.22	0.00	0.00	0.00	
16,700.00	90.00	0.25	8,735.99	8,671.08	-407.29	8,669.22	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well SB #4H
Project:	Eddy County, NM	TVD Reference:	well @ 3027.00usft
Site:	Blue Steel 21 Fee	MD Reference:	well @ 3027.00usft
Well:	SB #4H	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)
16,800.00	90.00	0.25	8,735.99	8,771.08	-406.86	8,769.22	0.00	0.00	0.00
16,900.00	90.00	0.25	8,735.99	8,871.08	-406.43	8,869.22	0.00	0.00	0.00
17,000.00	90.00	0.25	8,735.99	8,971.08	-406.00	8,969.22	0.00	0.00	0.00
17,100.00	90.00	0.25	8,735.99	9,071.07	-405.57	9,069.22	0.00	0.00	0.00
17,200.00	90.00	0.25	8,735.99	9,171.07	-405.13	9,169.22	0.00	0.00	0.00
17,300.00	90.00	0.25	8,735.99	9,271.07	-404.70	9,269.22	0.00	0.00	0.00
17,400.00	90.00	0.25	8,735.99	9,371.07	-404.27	9,369.22	0.00	0.00	0.00
17,500.00	90.00	0.25	8,735.99	9,471.07	-403.84	9,469.22	0.00	0.00	0.00
17,600.00	90.00	0.25	8,735.99	9,571.07	-403.40	9,569.22	0.00	0.00	0.00
17,700.00	90.00	0.25	8,735.99	9,671.07	-402.97	9,669.22	0.00	0.00	0.00
17,800.00	90.00	0.25	8,735.99	9,771.07	-402.54	9,769.22	0.00	0.00	0.00
17,900.00	90.00	0.25	8,736.00	9,871.07	-402.11	9,869.22	0.00	0.00	0.00
18,000.00	90.00	0.25	8,736.00	9,971.07	-401.68	9,969.22	0.00	0.00	0.00
18,100.00	90.00	0.25	8,736.00	10,071.07	-401.24	10,069.22	0.00	0.00	0.00
18,200.00	90.00	0.25	8,736.00	10,171.06	-400.81	10,169.22	0.00	0.00	0.00
18,300.00	90.00	0.25	8,736.00	10,271.06	-400.38	10,269.22	0.00	0.00	0.00
18,400.00	90.00	0.25	8,736.00	10,371.06	-399.95	10,369.22	0.00	0.00	0.00
18,500.00	90.00	0.25	8,736.00	10,471.06	-399.52	10,469.22	0.00	0.00	0.00
18,600.00	90.00	0.25	8,736.00	10,571.06	-399.08	10,569.22	0.00	0.00	0.00
18,700.00	90.00	0.25	8,736.00	10,671.06	-398.65	10,669.22	0.00	0.00	0.00
18,800.00	90.00	0.25	8,736.00	10,771.06	-398.22	10,769.22	0.00	0.00	0.00
18,900.00	90.00	0.25	8,736.00	10,871.06	-397.79	10,869.22	0.00	0.00	0.00
19,000.00	90.00	0.25	8,736.00	10,971.06	-397.35	10,969.22	0.00	0.00	0.00
19,035.79	90.00	0.25	8,736.00	11,006.85	-397.20	11,005.01	0.00	0.00	0.00
[BlueSteel21#4H]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#4H]FTP - plan misses target center by 721.31usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	569.66	-442.46	466,973.98	604,298.15	32.2833772	-103.9958407
[BlueSteel21#4H]KOP - plan hits target center - Point	0.00	0.00	8,163.00	519.66	-442.52	466,923.98	604,298.09	32.2832397	-103.9958414
[BlueSteel21#4H]LTP/BH - plan hits target center - Point	0.00	0.00	8,736.00	11,006.85	-397.20	477,411.17	604,343.41	32.3120677	-103.9955878

Checked By: _____	Approved By: _____	Date: _____
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PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

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

WELL NAME & NO.:	Blue Steel 21 SB Fee 4H
SURFACE HOLE FOOTAGE:	470'/N & 1104'/W
BOTTOM HOLE FOOTAGE:	100'/N & 660'/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

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

- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above.
- Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

Contingency:

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

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

C. PRESSURE CONTROL

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

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

GENERAL REQUIREMENTS

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

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

☒ Eddy County

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

☒ Lea County

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

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. Operator is approve to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. Operator is approved to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 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

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

D. WASTE MATERIAL AND FLUIDS

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

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

ZS 042722

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 220059

CONDITIONS

Operator: MARATHON OIL PERMIAN LLC 990 Town & Country Blvd. Houston, TX 77024	OGRID: 372098
	Action Number: 220059
	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	5/31/2023
ward.rikala	Will require a File As Drilled C-102 and a Directional Survey with the C-104	5/31/2023
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	5/31/2023
ward.rikala	Cement is required to circulate on both surface and intermediate1 strings of casing	5/31/2023
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	5/31/2023