

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 48713
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)



Approval Date: 05/27/2021

INSTRUCTIONS

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

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

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

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

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

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

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

NOTICES

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

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

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

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

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

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

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

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

Additional Operator Remarks

Location of Well

0. SHL: NENE / 1267 FNL / 287 FEL / TWSP: 23S / RANGE: 27E / SECTION: 8 / LAT: 32.3232475 / LONG: -104.2046941 (TVD: 0 feet, MD: 0 feet)

PPP: NENW / 995 FNL / 1279 FWL / TWSP: 23S / RANGE: 27E / SECTION: 7 / LAT: 32.3238607 / LONG: -104.2335466 (TVD: 8998 feet, MD: 13858 feet)

PPP: NENE / 940 FNL / 330 FEL / TWSP: 23S / RANGE: 27E / SECTION: 8 / LAT: 32.3241444 / LONG: -104.2048055 (TVD: 8670 feet, MD: 8762 feet)

BHL: LOT 1 / 999 FNL / 330 FWL / TWSP: 23S / RANGE: 27E / SECTION: 7 / LAT: 32.3238303 / LONG: -104.2366195 (TVD: 8903 feet, MD: 18767 feet)

BLM Point of Contact

Name: Deborah Ham

Title: Legal Landlaw Examiner

Phone: (575) 234-5965

Email: dham@blm.gov

CONFIDENTIAL

Review and Appeal Rights

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

CONFIDENTIAL

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

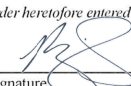
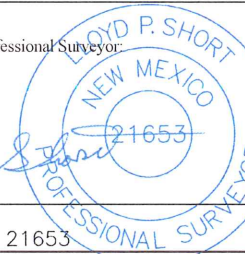
State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number		² Pool Code 98220		³ Pool Name PURPLE SAGE; WOLFCAMP (GAS)					
⁴ Property Code		⁵ Property Name CROSSBOW 8 WA FED COM						⁶ Well Number 16H	
⁷ OGRID No. 372098		⁸ Operator Name MARATHON OIL PERMIAN LLC						⁹ Elevation 3166'	
¹⁰ Surface Location									
UL or lot no. A	Section 8	Township 23S	Range 27E	Lot Idn	Feet from the 1267	North/South line NORTH	Feet from the 287	East/West line EAST	County EDDY
¹¹ Bottom Hole Location If Different From Surface									
UL or lot no. D	Section 7	Township 23S	Range 27E	Lot Idn	Feet from the 999	North/South line NORTH	Feet from the 330	East/West line WEST	County EDDY
¹² Dedicated Acres 638.16		¹³ Joint or Infill		¹⁴ Consolidation Code		¹⁵ Order No.			

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

17 OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. Signature:  Date: 02/17/2020 Printed Name: MELISSA SZUDERA E-mail Address: MSZUDERA@MARATHONOIL.COM						18 SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. SEPTEMBER 4, 2018 Date of Survey Signature and Seal of Professional Surveyor:  Certificate Number: LLOYD P. SHORT 21653					
---	--	--	--	--	--	---	--	--	--	--	--

LAST TAKE POINT/BOTTOM HOLE LOCATION
999' FNL 330' FWL, SECTION 7
NAD 83, SPCS NM EAST
X:571211.78' / Y:481555.16'
LAT:32.32383032N / LON:-104.23661954W
NAD 27, SPCS NM EAST
X:530029.95' / Y:481496.29'
LAT:32.32371196N / LON:-104.23611780W

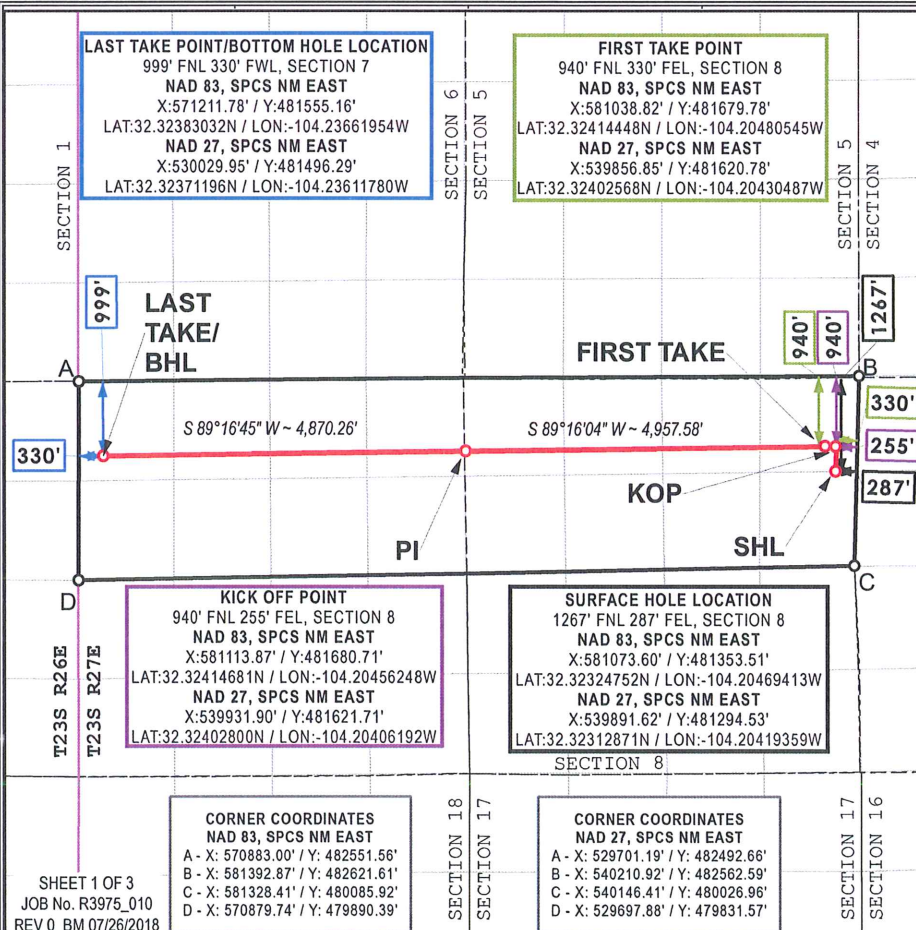
FIRST TAKE POINT
940' FNL 330' FEL, SECTION 8
NAD 83, SPCS NM EAST
X:581038.82' / Y:481679.78'
LAT:32.32414448N / LON:-104.20480545W
NAD 27, SPCS NM EAST
X:539856.85' / Y:481620.78'
LAT:32.32402568N / LON:-104.20430487W

KICK OFF POINT
940' FNL 255' FEL, SECTION 8
NAD 83, SPCS NM EAST
X:581113.87' / Y:481680.71'
LAT:32.32414681N / LON:-104.20456248W
NAD 27, SPCS NM EAST
X:539931.90' / Y:481621.71'
LAT:32.32402800N / LON:-104.20406192W

SURFACE HOLE LOCATION
1267' FNL 287' FEL, SECTION 8
NAD 83, SPCS NM EAST
X:581073.60' / Y:481353.51'
LAT:32.32324752N / LON:-104.20469413W
NAD 27, SPCS NM EAST
X:539891.62' / Y:481294.53'
LAT:32.32312871N / LON:-104.20419359W

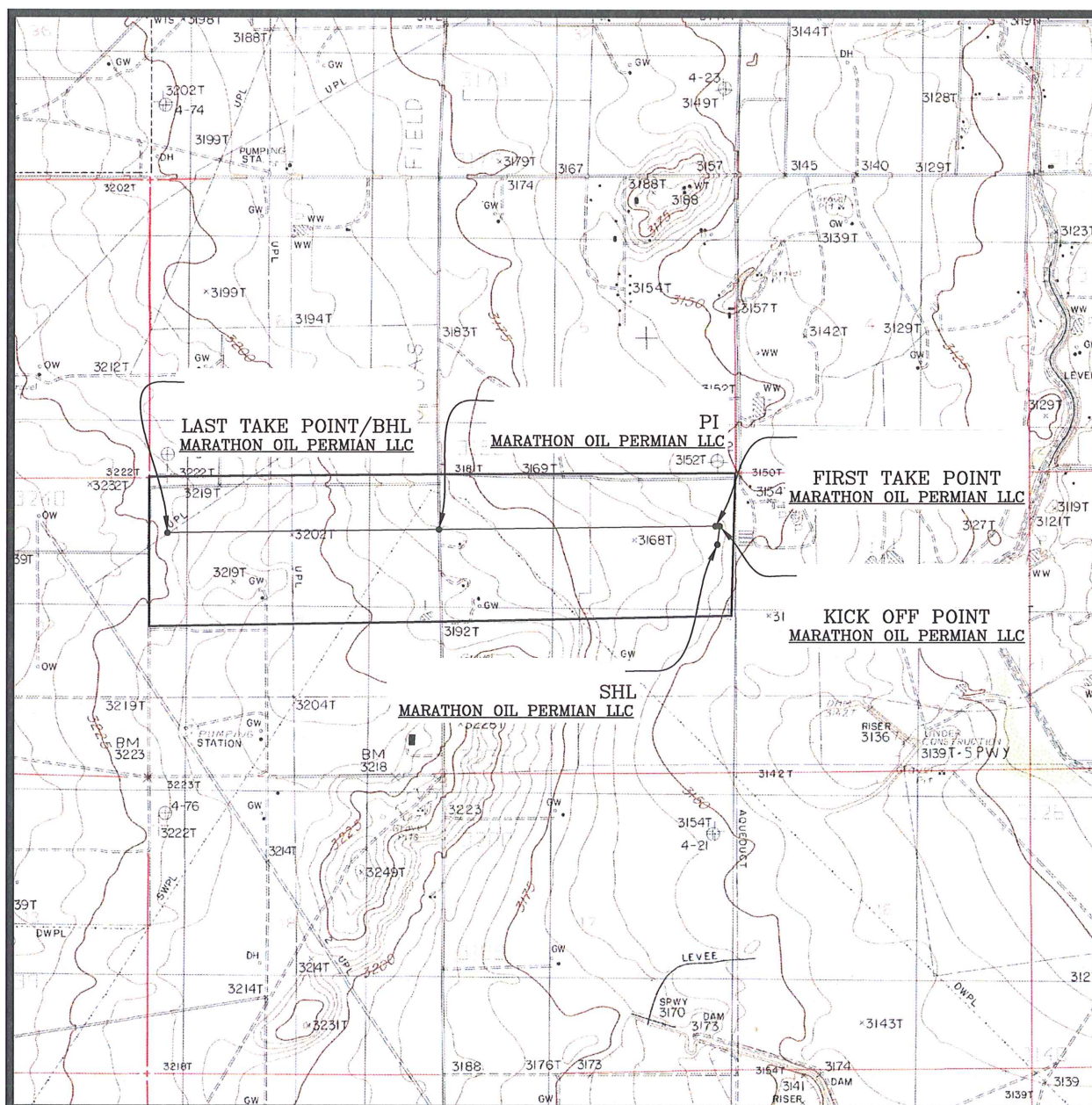
CORNER COORDINATES
NAD 83, SPCS NM EAST
A - X: 570883.00' / Y: 482551.56'
B - X: 581392.87' / Y: 482621.61'
C - X: 581328.41' / Y: 480085.92'
D - X: 570879.74' / Y: 479890.39'

CORNER COORDINATES
NAD 27, SPCS NM EAST
A - X: 529701.19' / Y: 482492.66'
B - X: 540210.92' / Y: 482562.59'
C - X: 540146.41' / Y: 480026.96'
D - X: 529697.88' / Y: 479831.57'



SHEET 1 OF 3
JOB No. R3975_010
REV 0 BM 07/26/2018

LOCATION VERIFICATION MAP



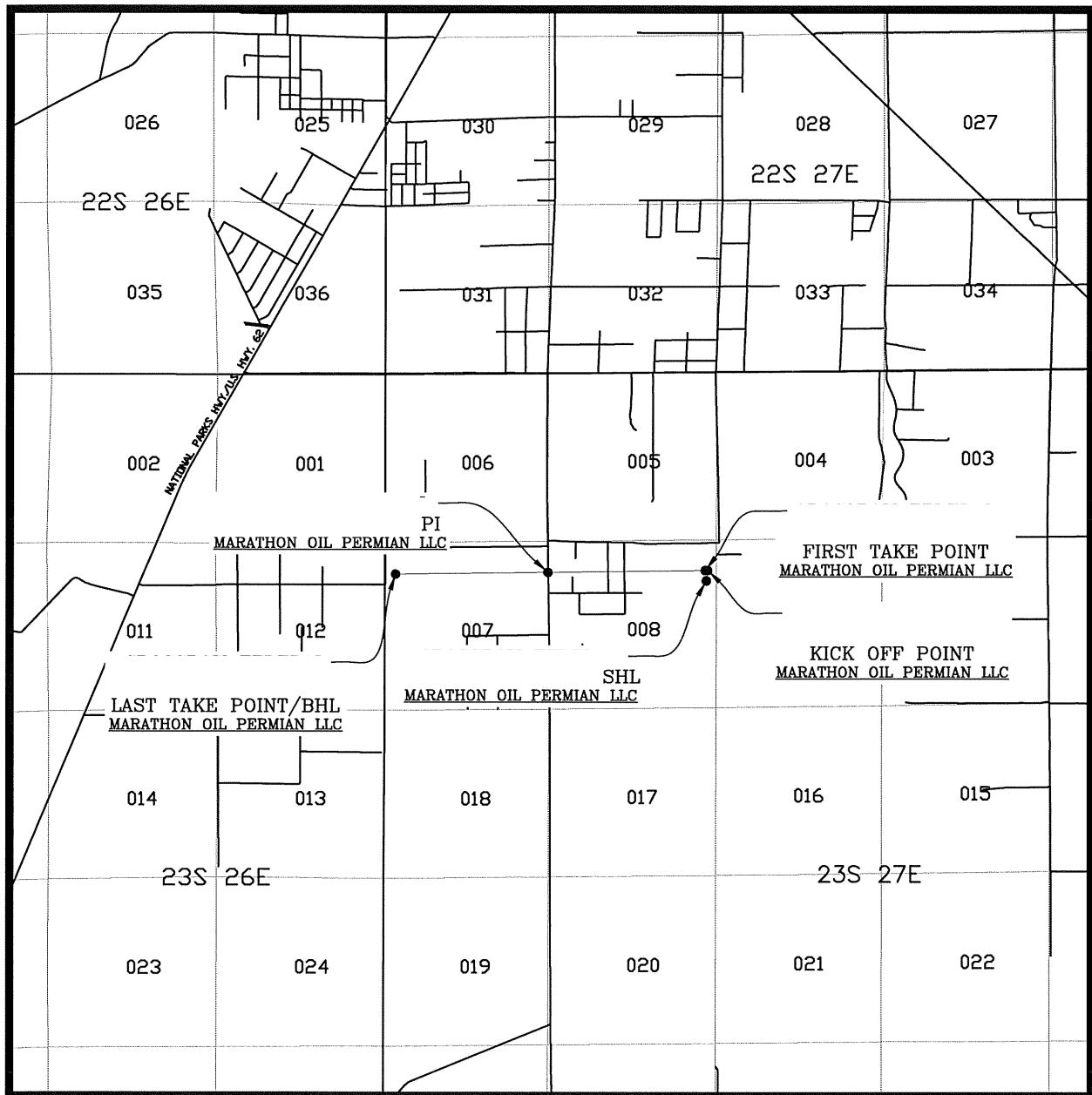
SEC. 8 TWP. 23-S RGE. 27-E
 SURVEY: N.M.P.M.
 COUNTY: EDDY
 DESCRIPTION: 1267' FNL & 287' FEL
 ELEVATION: 3166'
 OPERATOR: MARATHON OIL PERMIAN LLC
 LEASE: CROSSBOW 8 FED COM
 U.S.G.S. TOPOGRAPHIC MAP: OTIS, N.M.
 WELL: CROSSBOW 8 WA FED COM 16H

SCALE: 1" = 3000'
 CONTOUR INTERVAL = 5'

SHEET 2 OF 3

PREPARED BY:
 R-SQUARED GLOBAL, LLC
 1309 LOUISVILLE AVENUE, MONROE, LA 71201
 318-323-6900 OFFICE
 JOB No. R3795_010

VICINITY MAP



SEC. 8 TWP. 23-S RGE. 27-E
SURVEY: N.M.P.M.
COUNTY: EDDY
DESCRIPTION: 1267' FNL & 287' FEL
ELEVATION: 3166'
OPERATOR: MARATHON OIL PERMIAN LLC
LEASE: CROSSBOW 8 FED COM
U.S.G.S. TOPOGRAPHIC MAP: OTIS, N.M.
WELL: CROSSBOW 8 WA FED COM 16H

SCALE: 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. R3795_010

State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Electronically
Via E-permitting

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

NATURAL GAS MANAGEMENT PLAN

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

Section 1 – Plan Description

Effective May 25, 2021

I. Operator: Marathon Oil Permian, LLC. **OGRID:** 372098 **Date:** 06 / 02 / 2021

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

If Other, please describe: _____

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

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Crossbow 8 WXY Fed Com 15H	30-015-_____	A-8-23S-27E	1266' FNL 377' FEL	1800	4300	7000
Crossbow 8 WA Fed Com 16H	30-015-_____	A-8-23S-27E	1267' FNL 287' FEL	1800	4300	7000
Crossbow 8 WXY Fed Com 9H	30-015-_____	A-8-23S-27E	1267' FNL 317' FEL	1800	4300	7000
Crossbow 8 WXY Fed Com 14H	30-015-_____	A-8-23S-27E	1266' FNL 347' FEL	1800	4300	7000

IV. Central Delivery Point Name: Crossbow North CTB [See 19.15.27.9(D)(1) NMAC]

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

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Crossbow 8 WXY Fed Com 15H	30-015-_____	09/12/2023	10/05/2023	12/17/2023	01/08/2024	01/11/2024
Crossbow 8 WA Fed Com 16H	30-015-_____	10/06/2023	10/25/2023	12/26/2023	01/08/2024	01/11/2024
Crossbow 8 WXY Fed Com 9H	30-015-_____	10/26/2023	11/14/2023	01/01/2024	01/23/2024	01/26/2024
Crossbow 8 WXY Fed Com 14H	30-015-_____	11/15/2023	12/08/2023	01/07/2024	01/23/2024	01/26/2024

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

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

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

Section 2 – Enhanced Plan

EFFECTIVE APRIL 1, 2022

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

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

IX. Anticipated Natural Gas Production:

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

X. Natural Gas Gathering System (NGGS):

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

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

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

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

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

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

Section 3 - Certifications

Effective May 25, 2021

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

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

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

If Operator checks this box, Operator will select one of the following:

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

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

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

Section 4 - Notices

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

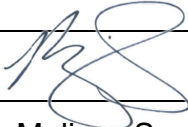
(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit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

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

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

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

Signature:



Printed Name:

Melissa Szudera

Title:

Adv Regulatory Compliance Rep

E-mail Address:

mszudera@marathonoil.com

Date:

06/02/2021

Phone:

713-296-3179

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

Approved By:

Title:

Approval Date:

Conditions of Approval:

APPENDIX

Section 1 - Parts VI, VII, and VIII

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

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

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

◆ **19.15.27.8 (A) – Venting and Flaring Of Natural Gas**

- Marathon Oil Permian's field operations are designed with the goal of minimizing flaring and preventing venting of natural gas. If capturing the gas is not possible then the gas is combusted/flared using properly sized flares or combustors in accordance with state air permit rules.

◆ **19.15.27.8 (B) – Venting and Flaring During Drilling Operations**

- A properly-sized flare stack will be located at a minimum 100' from the nearest surface hole location on the pad.
- All natural gas produced during drilling operations will be flared. Venting will only occur if there is an equipment malfunction and/or to avoid risk of an immediate and substantial adverse impact on safety, public health, or the environment.

◆ **19.15.27.8 (C) – Venting and Flaring During Completion or Recompletion Operations**

- During all phases of flowback, wells will flow through a sand separator, or other appropriate flowback separation equipment, and the well stream will be directed to a central tank battery (CTB) through properly sized flowlines.
- The CTB will have properly sized separation equipment for maximum anticipated flow rates.
- Multiple stages of separation will be used to separate gas from liquids. All gas will be routed to a sales outlet. Fluids will be routed to tanks equipped with a closed loop system that will recover any residual gas from the tanks and route such gas to a sales outlet.

◆ **19.15.27.8 (D) – Venting and Flaring During Production Operations**

- During production, the well stream will be routed to the CTB where multiple stages of separation will separate gas from liquids. All gas will be routed to a sales outlet. Fluids will be routed to tanks equipped with a closed loop system that will recover any residual gas from the tanks and route such gas to a sales outlet, minimizing tank emissions.
- Flares are equipped with auto-ignition systems and continuous pilot operations.
- Automatic gauging equipment is installed on all tanks.

◆ **19.15.27.8 (E) – Performance Standards**

- Production equipment will be designed to handle maximum anticipated rates and pressure.
- Automatic gauging equipment is installed on all tanks to minimize venting.
- All flared gas will be combusted in a flare stack that is properly sized and designed to ensure proper combustion.
- Flares are equipped with continuous pilots and auto-ignitors along with remote monitoring of the pilot status.
- Weekly AVOs and monthly LDAR inspections will be performed on all wells and facilities that produce more than 60 MCFD.
- Gas/H₂S detectors will be installed throughout the facilities and wellheads to detect leaks and enable timely repairs.

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

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

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

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



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

Drilling Plan Data Report

06/01/2021

APD ID: 10400054449

Submission Date: 02/20/2020

Highlighted data
reflects the most
recent changes

Operator Name: MARATHON OIL PERMIAN LLC

Well Name: CROSSBOW 8 WA FED COM

Well Number: 16H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
667993	CASTILE	2672	499	499	ANHYDRITE, SANDSTONE	OTHER : Brine	N
667995	BASE OF SALT	925	1747	1747	LIMESTONE, SANDSTONE	OTHER : BRINE	N
668002	LAMAR	694	1978	1981	SANDSTONE, SHALE	OIL	N
667996	DELAWARE	567	2105	2106	SANDSTONE, SHALE	NONE	N
667998	BONE SPRING	-2726	5398	5424	OTHER, SANDSTONE : CARBONATE	OIL	N
667999	WOLFCAMP	-6223	8895	8959	OTHER, SANDSTONE, SHALE : CARBONATES	NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 5M

Rating Depth: 20000

Equipment: 13 5/8 5M Annular and BOP Stack will be installed and tested before 12 1/4", 8 3/4" and 6 1/8" holes. Annular will be tested to 50% WP, BOP Stack will be tested to 5000. Check and kill valve will meet or exceed minimum BOP requirements.

Requesting Variance? YES

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

Testing Procedure: BOP/BOPE will be tested to 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. Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i. A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic.

Choke Diagram Attachment:

DRILL_2_CHOKE___Choke_Line_Flex_III_Rig_20200219094835.pdf

DRILL_2_CHOKE___Choke_Line_Test_Chart_SN_63393_20200219094846.pdf

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** CROSSBOW 8 WA FED COM**Well Number:** 16H

DRILL_2_CHOKE___Contitech_Hose_SN_663393_20200219094853.pdf

BOP Diagram Attachment:

DRILL_2_BOP___5M_Flex.BOPE_x_5M_ANNULAR.BLM.r1_20200219094903.pdf

DRILL_2_BOP___5M_10M.TWO_CHOKE_MANIFOLD.BLM.r1_20200219094909.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	17.5	13.375	NEW	API	N	0	510	0	510	3166	2656	510	J-55	54.5	ST&C	5.52	2.5	BUOY	2.5	BUOY	2.5
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	1990	0	1982	2901	1184	1990	J-55	36	LT&C	1.74	1.15	BUOY	2.19	BUOY	2.19
3	INTERMEDIATE	8.75	7.0	NEW	API	N	0	9450	0	9080	2998	-5914	9450	P-110	29	BUTT	2.21	1.18	BUOY	1.9	BUOY	1.9
4	PRODUCTION	6.125	4.5	NEW	API	N	9150	18767	8984	8903	-5818	-5737	9617	P-110	13.5	BUTT	1.33	1.56	BUOY	1.88	BUOY	1.88

Casing Attachments**Casing ID:** 1 **String Type:** SURFACE**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**

DRILL_3___Surface_20200219101327.pdf

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** CROSSBOW 8 WA FED COM**Well Number:** 16H**Casing Attachments**

Casing ID: 2 **String Type:** INTERMEDIATE**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**DRILL_3___Intermediate_20200219101513.pdf

Casing ID: 3 **String Type:** INTERMEDIATE**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**DRILL_3___Intermediate_II_20200220063155.pdf

Casing ID: 4 **String Type:** PRODUCTION**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**DRILL_3___Liner_20200220063242.pdf

Section 4 - Cement

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** CROSSBOW 8 WA FED COM**Well Number:** 16H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	0	0	1.73	13.5	0	100	Class C	LCM
SURFACE	Tail		0	510	533	1.33	14.8	709	100	CLASS C	N/A
PRODUCTION	Lead		0	0	0	0	0	0	0	N/A, Tail Only	N/A, Tail Only
PRODUCTION	Tail		9150	18767	965	1.22	14.5	1177	30	Class H	Retarder, Extender, Fluid Loss, Dispersant
INTERMEDIATE	Lead		0	900	223	2.21	12.8	493	75	CLASS C	Extender, Accelerator
INTERMEDIATE	Tail		900	1990	385	1.33	14.8	512	50	CLASS C	Retarder
INTERMEDIATE	Lead		1690	8400	534	3.21	11	1715	70	Class C	Viscosifier, Retarder.
INTERMEDIATE	Tail		8400	9450	178	1.15	13.8	205	30	CLASS H	Extender, Fluid Loss, Dispersant.

Section 5 - Circulating Medium

Mud System Type: Closed**Will an air or gas system be Used?** NO**Description of the equipment for the circulating system in accordance with Onshore Order #2:****Diagram of the equipment for the circulating system in accordance with Onshore Order #2:****Describe what will be on location to control well or mitigate other conditions:** The necessary mud products for additional weight and fluid loss control will be on location at all times.**Describe the mud monitoring system utilized:** Losses or gains in the mud system will be monitored visually/manually as well as with an electronic PVT.

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
9450	18767	OIL-BASED MUD	10.5	12.5							

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** CROSSBOW 8 WA FED COM**Well Number:** 16H

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	510	WATER-BASED MUD	8.4	8.8							
510	1990	OTHER : BRINE	9.9	10.2							
1990	9450	OTHER : Cut Brine	8.8	9.8							

Section 6 - Test, Logging, Coring

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

None planned.

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

GAMMA RAY LOG,

Coring operation description for the well:

None Planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 5902

Anticipated Surface Pressure: 3922

Anticipated Bottom Hole Temperature(F): 195

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

Describe:

Contingency Plans geohazards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

DRILL_7___CROSSBOW_8_FED_COM__9_14_15_16___H2S_Layout_20200219102505.pdf

DRILL_7___CROSSBOW_8_FED_COM__9_14_15_16___Rig_Layout_20200219102513.pdf

DRILL_7___GCP___CROSSBOW_8_FED_COM__9_14_15_16___02_17_2020_20200219102522.pdf

DRILL_7___Marathon_Carlsbad_CROSSBOW_8_FED_COM_9H_14H_15H_16H_Contingency_Plan_080119_20200219102533.pdf

Operator Name: MARATHON OIL PERMIAN LLC**Well Name:** CROSSBOW 8 WA FED COM**Well Number:** 16H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

DRILL_8_PD___CROSSBOW_8_FED_COM___N_S___O_G_Lease_Map_20200219102652.pdf
DRILL_8_PD_16___Crossbow_8_WA_Fed_Com_16H_DRILLING_PLAN_20200220063624.pdf
DRILL_8_PD_16___Marathon_CrossbowFedWA_20200220063630
DRILL_8_PD_16___Marathon_CrossbowFedWA_20200220063636

Other proposed operations facets description:

See attached Drill Plan for alternate casing & cement design.

- Kelly cock will be in the drill string at all times.
- A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor unobstructed and readily accessible at all times.
- Hydrogen Sulfide detection equipment will be in operation after drilling out the surface casing shoe until the production casing is cemented. Breathing equipment will be on location upon drilling the surface casing shoe until total depth is reached. If Hydrogen Sulfide is encountered, measured amounts and formations will be reported to the BLM.

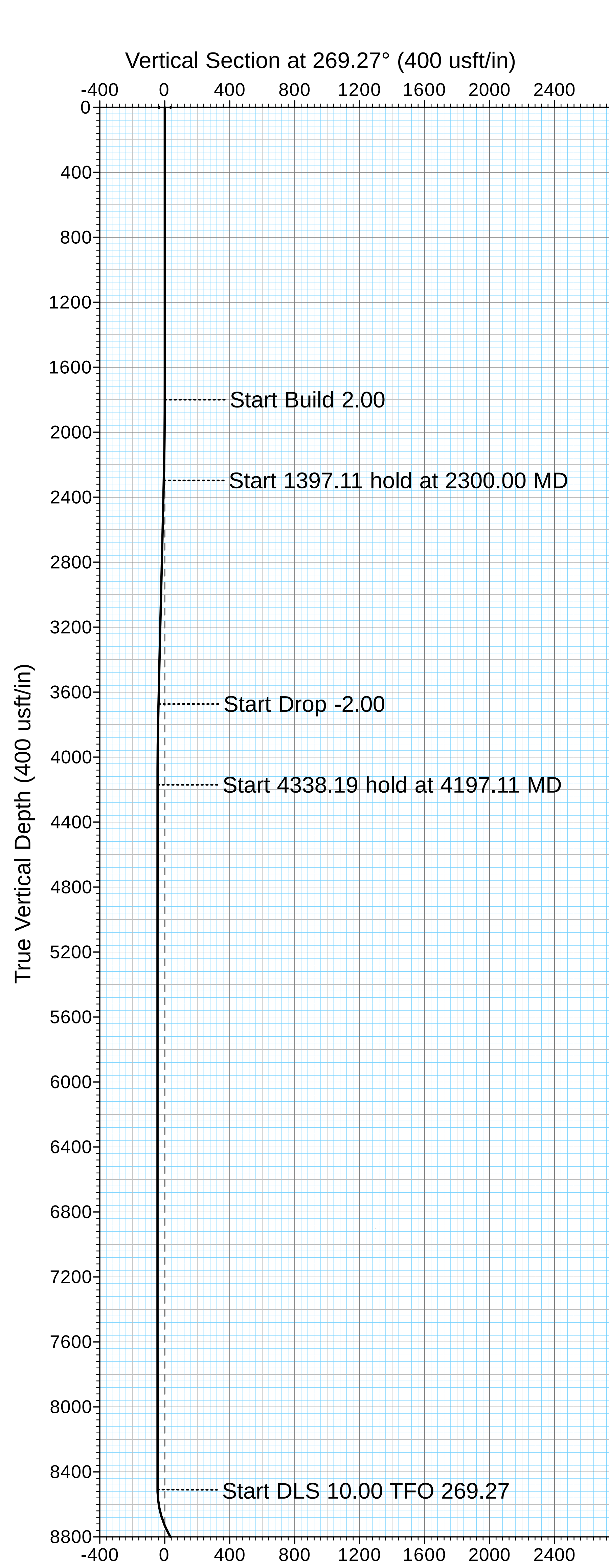
Potential Hazards:

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

Other proposed operations facets attachment:

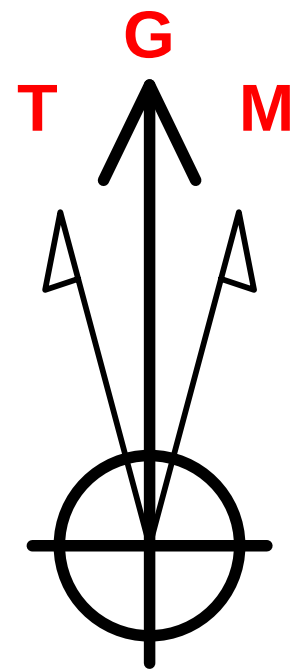
DRILL_8_OF___Batch_Drilling_Plan_and_Surface_Rig_Request_20200219102734.pdf
DRILL_8_OF___Marathon_Permian___Drilling_Well_Control_Plan_06_05_2018_20200219102748.pdf

Other Variance attachment:



Marathon Oil
Eddy County, NM
Crossbow 8 Fed COM (9-14-15-16)
WA #16H
Prelim Plan A
GL: 3166' + KB: 26.5' (H&P480)

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



Azimuths to Grid North
True North: -0.07°
Magnetic North: 7.23°

Magnetic Field
Strength: 47948.3snT
Dip Angle: 60.05°
Date: 10/19/2018
Model: HDGM

Azimuth Corrections
Total Magnetic Corr. (M to G): 7.23°
Declination (M to T): 7.30° East

RKB Elevation: Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))

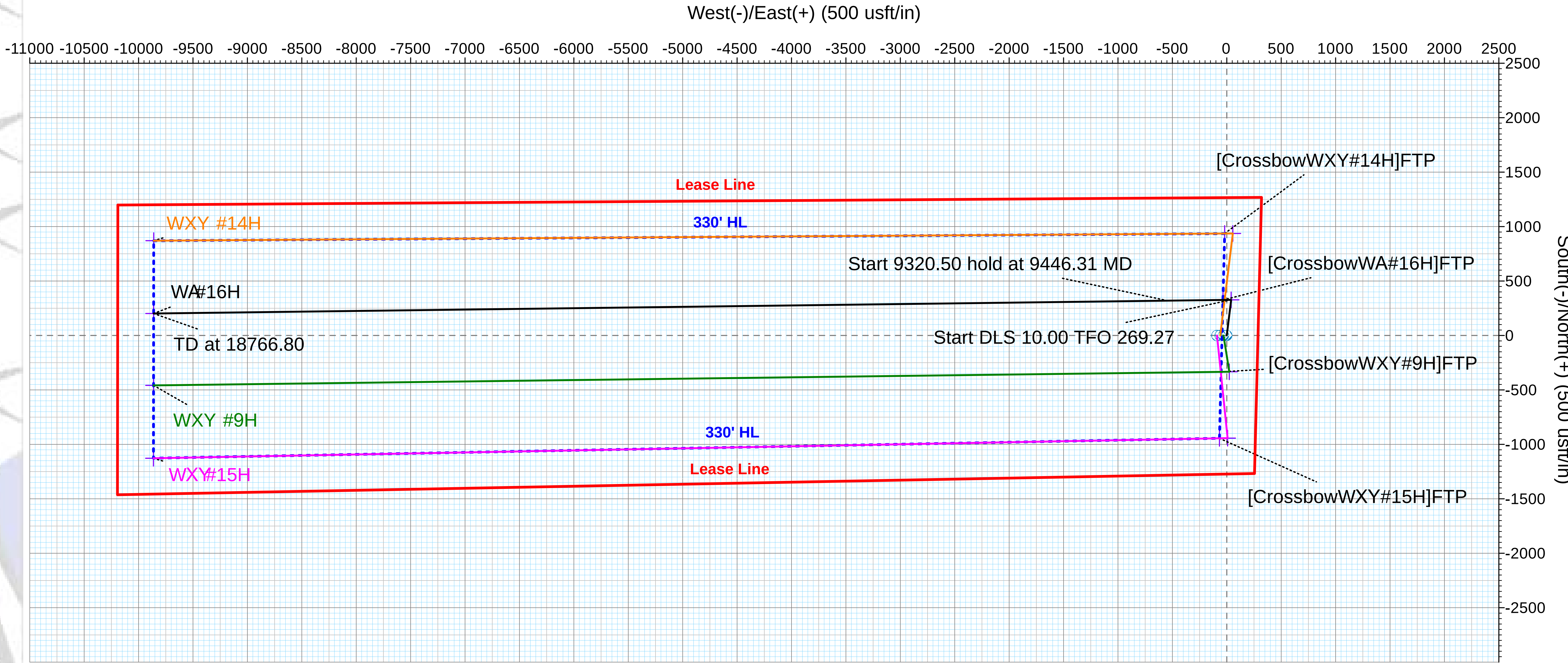
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	481294.53	539891.62	32.323129	-104.204194	

SECTION DETAILS

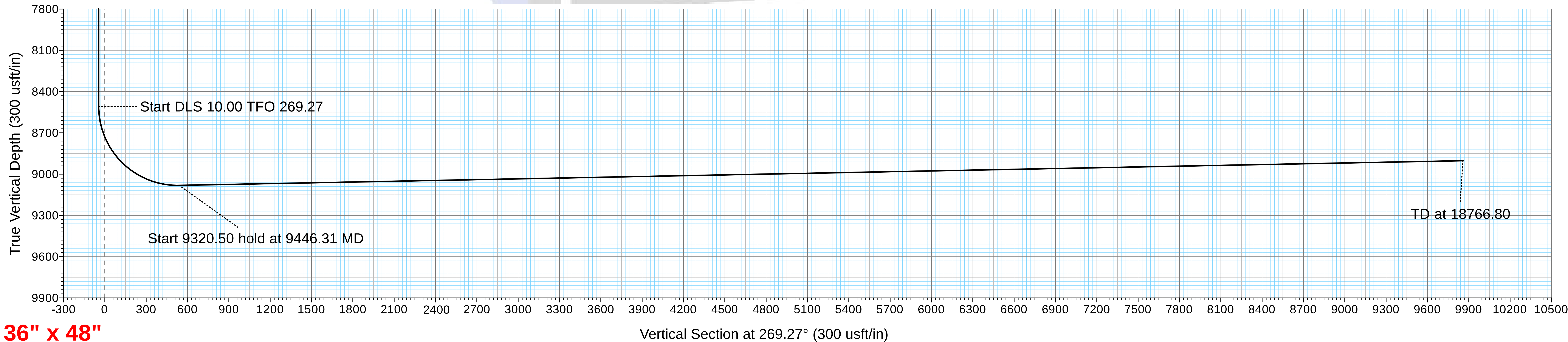
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1800.00	0.00	0.00	1800.00	0.00	0.00	0.00	0.00
3	2300.00	10.00	7.02	2297.47	43.20	5.32	2.00	-5.87
4	3697.11	10.00	7.02	3673.35	283.98	34.96	0.00	-38.58
5	4197.11	0.00	0.00	4170.81	327.18	40.28	2.00	-44.45
6	8535.29	0.00	0.00	8509.00	327.18	40.28	0.00	-44.45
7	9446.31	91.10	269.27	9081.85	319.78	-543.64	10.00	539.52
8	18766.80	91.10	269.27	8902.71	201.76	-9861.67	0.00	9858.30

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
[CrossbowWA#16H]FTP	0.00	326.25	-34.77	481620.78	539856.85
[CrossbowWA#16H]KOP	8509.00	327.18	40.28	481621.71	539931.90
[CrossbowWA#16H]LTP/BHL	8902.71	201.76	-9861.67	481496.29	530029.95



Target Line: 9092' TVD @ 0' VS: 91.1° INC





Professional Directional Planning Report



Marathon Oil

Database:	WellPlanner1	Local Co-ordinate Reference	Well WA #16H
Company:	Marathon Oil	TVD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Project:	Eddy County, NM	MD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Site:	CROSSBOW 8 FED COM	North Reference:	Grid
Well:	WA #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan A		

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		CROSSBOW 8 FED COM			
Site Position:		Northing:	481,294.49 usft	Latitude:	32.323129
From:	Map	Easting:	539,861.62 usft	Longitude:	-104.204291
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.07

Well	WA #16H					
Well Position	+N/-S	0.04 usft	Northing:	481,294.53 usft	Latitude:	32.323129
	+E/-W	30.00 usft	Easting:	539,891.62 usft	Longitude:	-104.204194
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	3,166.00 usft

Wellbore	OH					
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength	
			(°)	(°)	(nT)	
	HDGM	10/19/2018	7.30	60.05	47,948.30	

Design	Prelim Plan A				
Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	269.27	

Plan Survey Tool Program		Date	10/22/2018		
Depth From	Depth To	Survey (Wellbore)	Tool Name	Remarks	
(usft)	(usft)				
1	0.00	1,850.00	Prelim Plan A (OH)	MWD+IFR1	
				OWSG MWD + IFR1	
2	1,850.00	5,400.00	Prelim Plan A (OH)	MWD+IFR1	
				OWSG MWD + IFR1	
3	5,400.00	10,000.00	Prelim Plan A (OH)	MWD+IFR1	
				OWSG MWD + IFR1	
4	10,000.00	18,766.80	Prelim Plan A (OH)	MWD+IFR1	
				OWSG MWD + IFR1	



Marathon Oil

Professional Directional Planning Report



Database:	WellPlanner1	Local Co-ordinate Reference	Well WA #16H
Company:	Marathon Oil	TVD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Project:	Eddy County, NM	MD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Site:	CROSSBOW 8 FED COM	North Reference:	Grid
Well:	WA #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan A		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,300.00	10.00	7.02	2,297.47	43.20	5.32	2.00	2.00	0.00	7.02	
3,697.11	10.00	7.02	3,673.35	283.98	34.96	0.00	0.00	0.00	0.00	
4,197.11	0.00	0.00	4,170.81	327.18	40.28	2.00	-2.00	0.00	180.00	
8,535.29	0.00	0.00	8,509.00	327.18	40.28	0.00	0.00	0.00	0.00	[CrossbowWA#16H]K
9,446.31	91.10	269.27	9,081.85	319.78	-543.64	10.00	10.00	-9.96	269.27	
18,766.80	91.10	269.27	8,902.71	201.76	-9,861.67	0.00	0.00	0.00	0.00	[CrossbowWA#16H]L



Professional Directional Planning Report



Marathon Oil

Database:	WellPlanner1	Local Co-ordinate Reference	Well WA #16H
Company:	Marathon Oil	TVD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Project:	Eddy County, NM	MD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Site:	CROSSBOW 8 FED COM	North Reference:	Grid
Well:	WA #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan A		

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
[CrossbowWA#16H]FTP									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	2.00	7.02	1,899.98	1.73	0.21	-0.24	2.00	2.00	0.00
2,000.00	4.00	7.02	1,999.84	6.93	0.85	-0.94	2.00	2.00	0.00
2,100.00	6.00	7.02	2,099.45	15.58	1.92	-2.12	2.00	2.00	0.00
2,200.00	8.00	7.02	2,198.70	27.67	3.41	-3.76	2.00	2.00	0.00
2,300.00	10.00	7.02	2,297.47	43.20	5.32	-5.87	2.00	2.00	0.00
2,400.00	10.00	7.02	2,395.95	60.43	7.44	-8.21	0.00	0.00	0.00
2,500.00	10.00	7.02	2,494.43	77.67	9.56	-10.55	0.00	0.00	0.00
2,600.00	10.00	7.02	2,592.91	94.90	11.68	-12.89	0.00	0.00	0.00
2,700.00	10.00	7.02	2,691.39	112.14	13.81	-15.23	0.00	0.00	0.00
2,800.00	10.00	7.02	2,789.87	129.37	15.93	-17.57	0.00	0.00	0.00
2,900.00	10.00	7.02	2,888.35	146.60	18.05	-19.92	0.00	0.00	0.00
3,000.00	10.00	7.02	2,986.83	163.84	20.17	-22.26	0.00	0.00	0.00
3,100.00	10.00	7.02	3,085.31	181.07	22.29	-24.60	0.00	0.00	0.00
3,200.00	10.00	7.02	3,183.79	198.31	24.41	-26.94	0.00	0.00	0.00
3,300.00	10.00	7.02	3,282.27	215.54	26.54	-29.28	0.00	0.00	0.00
3,400.00	10.00	7.02	3,380.75	232.78	28.66	-31.62	0.00	0.00	0.00
3,500.00	10.00	7.02	3,479.23	250.01	30.78	-33.96	0.00	0.00	0.00
3,600.00	10.00	7.02	3,577.72	267.25	32.90	-36.30	0.00	0.00	0.00
3,697.11	10.00	7.02	3,673.35	283.98	34.96	-38.58	0.00	0.00	0.00
3,700.00	9.94	7.02	3,676.20	284.48	35.02	-38.64	2.00	-2.00	0.00
3,800.00	7.94	7.02	3,774.98	299.91	36.92	-40.74	2.00	-2.00	0.00
3,900.00	5.94	7.02	3,874.24	311.90	38.40	-42.37	2.00	-2.00	0.00
4,000.00	3.94	7.02	3,973.86	320.45	39.45	-43.53	2.00	-2.00	0.00
4,100.00	1.94	7.02	4,073.72	325.55	40.08	-44.22	2.00	-2.00	0.00
4,197.11	0.00	0.00	4,170.81	327.18	40.28	-44.45	2.00	-2.00	0.00
4,200.00	0.00	0.00	4,173.71	327.18	40.28	-44.45	0.00	0.00	0.00
4,300.00	0.00	0.00	4,273.71	327.18	40.28	-44.45	0.00	0.00	0.00
4,400.00	0.00	0.00	4,373.71	327.18	40.28	-44.45	0.00	0.00	0.00
4,500.00	0.00	0.00	4,473.71	327.18	40.28	-44.45	0.00	0.00	0.00
4,600.00	0.00	0.00	4,573.71	327.18	40.28	-44.45	0.00	0.00	0.00
4,700.00	0.00	0.00	4,673.71	327.18	40.28	-44.45	0.00	0.00	0.00



Marathon Oil

Professional Directional

Planning Report



Database:	WellPlanner1	Local Co-ordinate Reference	Well WA #16H
Company:	Marathon Oil	TVD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Project:	Eddy County, NM	MD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Site:	CROSSBOW 8 FED COM	North Reference:	Grid
Well:	WA #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan A		

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)
4,800.00	0.00	0.00	4,773.71	327.18	40.28	-44.45	0.00	0.00	0.00
4,900.00	0.00	0.00	4,873.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,000.00	0.00	0.00	4,973.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,100.00	0.00	0.00	5,073.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,200.00	0.00	0.00	5,173.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,300.00	0.00	0.00	5,273.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,400.00	0.00	0.00	5,373.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,500.00	0.00	0.00	5,473.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,600.00	0.00	0.00	5,573.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,700.00	0.00	0.00	5,673.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,800.00	0.00	0.00	5,773.71	327.18	40.28	-44.45	0.00	0.00	0.00
5,900.00	0.00	0.00	5,873.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,000.00	0.00	0.00	5,973.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,100.00	0.00	0.00	6,073.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,200.00	0.00	0.00	6,173.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,300.00	0.00	0.00	6,273.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,400.00	0.00	0.00	6,373.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,500.00	0.00	0.00	6,473.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,600.00	0.00	0.00	6,573.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,700.00	0.00	0.00	6,673.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,800.00	0.00	0.00	6,773.71	327.18	40.28	-44.45	0.00	0.00	0.00
6,900.00	0.00	0.00	6,873.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,000.00	0.00	0.00	6,973.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,100.00	0.00	0.00	7,073.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,200.00	0.00	0.00	7,173.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,300.00	0.00	0.00	7,273.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,400.00	0.00	0.00	7,373.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,500.00	0.00	0.00	7,473.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,600.00	0.00	0.00	7,573.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,700.00	0.00	0.00	7,673.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,800.00	0.00	0.00	7,773.71	327.18	40.28	-44.45	0.00	0.00	0.00
7,900.00	0.00	0.00	7,873.71	327.18	40.28	-44.45	0.00	0.00	0.00
8,000.00	0.00	0.00	7,973.71	327.18	40.28	-44.45	0.00	0.00	0.00
8,100.00	0.00	0.00	8,073.71	327.18	40.28	-44.45	0.00	0.00	0.00
8,200.00	0.00	0.00	8,173.71	327.18	40.28	-44.45	0.00	0.00	0.00
8,300.00	0.00	0.00	8,273.71	327.18	40.28	-44.45	0.00	0.00	0.00
8,400.00	0.00	0.00	8,373.71	327.18	40.28	-44.45	0.00	0.00	0.00
8,500.00	0.00	0.00	8,473.71	327.18	40.28	-44.45	0.00	0.00	0.00
8,535.29	0.00	0.00	8,509.00	327.18	40.28	-44.45	0.00	0.00	0.00
[CrossbowWA#16H]KOP									
8,550.00	1.47	269.27	8,523.70	327.18	40.09	-44.26	10.00	10.00	0.00
8,600.00	6.47	269.27	8,573.57	327.13	36.63	-40.80	10.00	10.00	0.00
8,650.00	11.47	269.27	8,622.94	327.04	28.84	-33.00	10.00	10.00	0.00
8,700.00	16.47	269.27	8,671.45	326.88	16.77	-20.93	10.00	10.00	0.00
8,750.00	21.47	269.27	8,718.72	326.68	0.52	-4.69	10.00	10.00	0.00
8,800.00	26.47	269.27	8,764.39	326.42	-19.78	15.62	10.00	10.00	0.00
8,850.00	31.47	269.27	8,808.12	326.11	-43.99	39.83	10.00	10.00	0.00
8,900.00	36.47	269.27	8,849.57	325.76	-71.92	67.76	10.00	10.00	0.00
8,950.00	41.47	269.27	8,888.43	325.36	-103.35	99.20	10.00	10.00	0.00
9,000.00	46.47	269.27	8,924.41	324.92	-138.05	133.90	10.00	10.00	0.00
9,050.00	51.47	269.27	8,957.22	324.44	-175.76	171.61	10.00	10.00	0.00



Professional Directional Planning Report



Database:	WellPlanner1	Local Co-ordinate Reference	Well WA #16H
Company:	Marathon Oil	TVD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Project:	Eddy County, NM	MD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Site:	CROSSBOW 8 FED COM	North Reference:	Grid
Well:	WA #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan A		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,100.00	56.47	269.27	8,986.62	323.93	-216.18	212.03	10.00	10.00	0.00	
9,150.00	61.47	269.27	9,012.38	323.39	-259.00	254.86	10.00	10.00	0.00	
9,200.00	66.47	269.27	9,034.32	322.82	-303.91	299.78	10.00	10.00	0.00	
9,250.00	71.47	269.27	9,052.26	322.23	-350.57	346.43	10.00	10.00	0.00	
9,300.00	76.47	269.27	9,066.06	321.62	-398.60	394.47	10.00	10.00	0.00	
9,350.00	81.47	269.27	9,075.62	321.00	-447.66	443.53	10.00	10.00	0.00	
9,400.00	86.47	269.27	9,080.87	320.37	-497.36	493.24	10.00	10.00	0.00	
9,446.31	91.10	269.27	9,081.85	319.78	-543.64	539.52	10.00	10.00	0.00	
9,500.00	91.10	269.27	9,080.82	319.10	-597.32	593.21	0.00	0.00	0.00	
9,600.00	91.10	269.27	9,078.90	317.84	-697.30	693.19	0.00	0.00	0.00	
9,700.00	91.10	269.27	9,076.98	316.57	-797.27	793.17	0.00	0.00	0.00	
9,800.00	91.10	269.27	9,075.05	315.31	-897.24	893.15	0.00	0.00	0.00	
9,900.00	91.10	269.27	9,073.13	314.04	-997.22	993.13	0.00	0.00	0.00	
10,000.00	91.10	269.27	9,071.21	312.77	-1,097.19	1,093.12	0.00	0.00	0.00	
10,100.00	91.10	269.27	9,069.29	311.51	-1,197.16	1,193.10	0.00	0.00	0.00	
10,200.00	91.10	269.27	9,067.37	310.24	-1,297.14	1,293.08	0.00	0.00	0.00	
10,300.00	91.10	269.27	9,065.44	308.97	-1,397.11	1,393.06	0.00	0.00	0.00	
10,400.00	91.10	269.27	9,063.52	307.71	-1,497.08	1,493.04	0.00	0.00	0.00	
10,500.00	91.10	269.27	9,061.60	306.44	-1,597.06	1,593.02	0.00	0.00	0.00	
10,600.00	91.10	269.27	9,059.68	305.17	-1,697.03	1,693.00	0.00	0.00	0.00	
10,700.00	91.10	269.27	9,057.76	303.91	-1,797.00	1,792.99	0.00	0.00	0.00	
10,800.00	91.10	269.27	9,055.83	302.64	-1,896.98	1,892.97	0.00	0.00	0.00	
10,900.00	91.10	269.27	9,053.91	301.38	-1,996.95	1,992.95	0.00	0.00	0.00	
11,000.00	91.10	269.27	9,051.99	300.11	-2,096.92	2,092.93	0.00	0.00	0.00	
11,100.00	91.10	269.27	9,050.07	298.84	-2,196.90	2,192.91	0.00	0.00	0.00	
11,200.00	91.10	269.27	9,048.15	297.58	-2,296.87	2,292.89	0.00	0.00	0.00	
11,300.00	91.10	269.27	9,046.22	296.31	-2,396.84	2,392.88	0.00	0.00	0.00	
11,400.00	91.10	269.27	9,044.30	295.04	-2,496.82	2,492.86	0.00	0.00	0.00	
11,500.00	91.10	269.27	9,042.38	293.78	-2,596.79	2,592.84	0.00	0.00	0.00	
11,600.00	91.10	269.27	9,040.46	292.51	-2,696.77	2,692.82	0.00	0.00	0.00	
11,700.00	91.10	269.27	9,038.54	291.25	-2,796.74	2,792.80	0.00	0.00	0.00	
11,800.00	91.10	269.27	9,036.61	289.98	-2,896.71	2,892.78	0.00	0.00	0.00	
11,900.00	91.10	269.27	9,034.69	288.71	-2,996.69	2,992.76	0.00	0.00	0.00	
12,000.00	91.10	269.27	9,032.77	287.45	-3,096.66	3,092.75	0.00	0.00	0.00	
12,100.00	91.10	269.27	9,030.85	286.18	-3,196.63	3,192.73	0.00	0.00	0.00	
12,200.00	91.10	269.27	9,028.93	284.91	-3,296.61	3,292.71	0.00	0.00	0.00	
12,300.00	91.10	269.27	9,027.00	283.65	-3,396.58	3,392.69	0.00	0.00	0.00	
12,400.00	91.10	269.27	9,025.08	282.38	-3,496.55	3,492.67	0.00	0.00	0.00	
12,500.00	91.10	269.27	9,023.16	281.12	-3,596.53	3,592.65	0.00	0.00	0.00	
12,600.00	91.10	269.27	9,021.24	279.85	-3,696.50	3,692.64	0.00	0.00	0.00	
12,700.00	91.10	269.27	9,019.32	278.58	-3,796.47	3,792.62	0.00	0.00	0.00	
12,800.00	91.10	269.27	9,017.39	277.32	-3,896.45	3,892.60	0.00	0.00	0.00	
12,900.00	91.10	269.27	9,015.47	276.05	-3,996.42	3,992.58	0.00	0.00	0.00	
13,000.00	91.10	269.27	9,013.55	274.78	-4,096.39	4,092.56	0.00	0.00	0.00	
13,100.00	91.10	269.27	9,011.63	273.52	-4,196.37	4,192.54	0.00	0.00	0.00	
13,200.00	91.10	269.27	9,009.71	272.25	-4,296.34	4,292.52	0.00	0.00	0.00	
13,300.00	91.10	269.27	9,007.78	270.99	-4,396.32	4,392.51	0.00	0.00	0.00	
13,400.00	91.10	269.27	9,005.86	269.72	-4,496.29	4,492.49	0.00	0.00	0.00	
13,500.00	91.10	269.27	9,003.94	268.45	-4,596.26	4,592.47	0.00	0.00	0.00	
13,600.00	91.10	269.27	9,002.02	267.19	-4,696.24	4,692.45	0.00	0.00	0.00	
13,700.00	91.10	269.27	9,000.10	265.92	-4,796.21	4,792.43	0.00	0.00	0.00	



Professional Directional Planning Report



Database:	WellPlanner1	Local Co-ordinate Reference	Well WA #16H
Company:	Marathon Oil	TVD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Project:	Eddy County, NM	MD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Site:	CROSSBOW 8 FED COM	North Reference:	Grid
Well:	WA #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan A		

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)
13,800.00	91.10	269.27	8,998.17	264.65	-4,896.18	4,892.41	0.00	0.00	0.00
13,900.00	91.10	269.27	8,996.25	263.39	-4,996.16	4,992.39	0.00	0.00	0.00
14,000.00	91.10	269.27	8,994.33	262.12	-5,096.13	5,092.38	0.00	0.00	0.00
14,100.00	91.10	269.27	8,992.41	260.85	-5,196.10	5,192.36	0.00	0.00	0.00
14,200.00	91.10	269.27	8,990.49	259.59	-5,296.08	5,292.34	0.00	0.00	0.00
14,300.00	91.10	269.27	8,988.56	258.32	-5,396.05	5,392.32	0.00	0.00	0.00
14,400.00	91.10	269.27	8,986.64	257.06	-5,496.02	5,492.30	0.00	0.00	0.00
14,500.00	91.10	269.27	8,984.72	255.79	-5,596.00	5,592.28	0.00	0.00	0.00
14,600.00	91.10	269.27	8,982.80	254.52	-5,695.97	5,692.27	0.00	0.00	0.00
14,700.00	91.10	269.27	8,980.88	253.26	-5,795.94	5,792.25	0.00	0.00	0.00
14,800.00	91.10	269.27	8,978.95	251.99	-5,895.92	5,892.23	0.00	0.00	0.00
14,900.00	91.10	269.27	8,977.03	250.72	-5,995.89	5,992.21	0.00	0.00	0.00
15,000.00	91.10	269.27	8,975.11	249.46	-6,095.86	6,092.19	0.00	0.00	0.00
15,100.00	91.10	269.27	8,973.19	248.19	-6,195.84	6,192.17	0.00	0.00	0.00
15,200.00	91.10	269.27	8,971.26	246.93	-6,295.81	6,292.15	0.00	0.00	0.00
15,300.00	91.10	269.27	8,969.34	245.66	-6,395.79	6,392.14	0.00	0.00	0.00
15,400.00	91.10	269.27	8,967.42	244.39	-6,495.76	6,492.12	0.00	0.00	0.00
15,500.00	91.10	269.27	8,965.50	243.13	-6,595.73	6,592.10	0.00	0.00	0.00
15,600.00	91.10	269.27	8,963.58	241.86	-6,695.71	6,692.08	0.00	0.00	0.00
15,700.00	91.10	269.27	8,961.65	240.59	-6,795.68	6,792.06	0.00	0.00	0.00
15,800.00	91.10	269.27	8,959.73	239.33	-6,895.65	6,892.04	0.00	0.00	0.00
15,900.00	91.10	269.27	8,957.81	238.06	-6,995.63	6,992.03	0.00	0.00	0.00
16,000.00	91.10	269.27	8,955.89	236.80	-7,095.60	7,092.01	0.00	0.00	0.00
16,100.00	91.10	269.27	8,953.97	235.53	-7,195.57	7,191.99	0.00	0.00	0.00
16,200.00	91.10	269.27	8,952.04	234.26	-7,295.55	7,291.97	0.00	0.00	0.00
16,300.00	91.10	269.27	8,950.12	233.00	-7,395.52	7,391.95	0.00	0.00	0.00
16,400.00	91.10	269.27	8,948.20	231.73	-7,495.49	7,491.93	0.00	0.00	0.00
16,500.00	91.10	269.27	8,946.28	230.46	-7,595.47	7,591.91	0.00	0.00	0.00
16,600.00	91.10	269.27	8,944.36	229.20	-7,695.44	7,691.90	0.00	0.00	0.00
16,700.00	91.10	269.27	8,942.43	227.93	-7,795.41	7,791.88	0.00	0.00	0.00
16,800.00	91.10	269.27	8,940.51	226.67	-7,895.39	7,891.86	0.00	0.00	0.00
16,900.00	91.10	269.27	8,938.59	225.40	-7,995.36	7,991.84	0.00	0.00	0.00
17,000.00	91.10	269.27	8,936.67	224.13	-8,095.33	8,091.82	0.00	0.00	0.00
17,100.00	91.10	269.27	8,934.75	222.87	-8,195.31	8,191.80	0.00	0.00	0.00
17,200.00	91.10	269.27	8,932.82	221.60	-8,295.28	8,291.79	0.00	0.00	0.00
17,300.00	91.10	269.27	8,930.90	220.33	-8,395.26	8,391.77	0.00	0.00	0.00
17,400.00	91.10	269.27	8,928.98	219.07	-8,495.23	8,491.75	0.00	0.00	0.00
17,500.00	91.10	269.27	8,927.06	217.80	-8,595.20	8,591.73	0.00	0.00	0.00
17,600.00	91.10	269.27	8,925.14	216.54	-8,695.18	8,691.71	0.00	0.00	0.00
17,700.00	91.10	269.27	8,923.21	215.27	-8,795.15	8,791.69	0.00	0.00	0.00
17,800.00	91.10	269.27	8,921.29	214.00	-8,895.12	8,891.67	0.00	0.00	0.00
17,900.00	91.10	269.27	8,919.37	212.74	-8,995.10	8,991.66	0.00	0.00	0.00
18,000.00	91.10	269.27	8,917.45	211.47	-9,095.07	9,091.64	0.00	0.00	0.00
18,100.00	91.10	269.27	8,915.53	210.20	-9,195.04	9,191.62	0.00	0.00	0.00
18,200.00	91.10	269.27	8,913.60	208.94	-9,295.02	9,291.60	0.00	0.00	0.00
18,300.00	91.10	269.27	8,911.68	207.67	-9,394.99	9,391.58	0.00	0.00	0.00
18,400.00	91.10	269.27	8,909.76	206.40	-9,494.96	9,491.56	0.00	0.00	0.00
18,500.00	91.10	269.27	8,907.84	205.14	-9,594.94	9,591.55	0.00	0.00	0.00
18,600.00	91.10	269.27	8,905.92	203.87	-9,694.91	9,691.53	0.00	0.00	0.00
18,700.00	91.10	269.27	8,903.99	202.61	-9,794.88	9,791.51	0.00	0.00	0.00
18,766.80	91.10	269.27	8,902.71	201.76	-9,861.67	9,858.30	0.00	0.00	0.00



Professional Directional Planning Report



Marathon Oil

Database:	WellPlanner1	Local Co-ordinate Reference	Well WA #16H
Company:	Marathon Oil	TVD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Project:	Eddy County, NM	MD Reference:	Well @ 3192.50usft (GL: 3166' + KB: 26.5' (H&P480))
Site:	CROSSBOW 8 FED COM	North Reference:	Grid
Well:	WA #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan A		

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)
[CrossbowWA#16H]LTP/BHL									

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	MARATHON OIL PERMIAN LLC
LEASE NO.:	NMNM091071
WELL NAME & NO.:	CROSSBOW 8 WXY FED COM 16H
SURFACE HOLE FOOTAGE:	1267'/N & 287'/E
BOTTOM HOLE FOOTAGE:	999'/N & 330'/W
LOCATION:	Section 8, T.23 S., R.27 E., NMPM
COUNTY:	Eddy County, New Mexico

COA

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

A. HYDROGEN SULFIDE

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

B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **510 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 **8**

- hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The **9-5/8 inch** Intermediate casing shall be set at **1990 feet**. The minimum required fill of cement behind the **9-5/8 inch** intermediate casing is:

Option 1 (Single Stage):

- Cement to surface. If cement does not circulate see B.1.a, c-d above.
Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.
- ❖ In **Medium Cave/Karst Areas** if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
3. The **7 inch** Second Intermediate casing shall be set at **9450 feet**. The minimum required fill of cement behind the **7 inch** production casing is:

Option 1 (Single Stage):

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.
4. The minimum required fill of cement behind the **4-1/2 inch** production liner is:
- Cement should tie-back **100 feet** into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).'
2. **BOP REQUIREMENTS**

Option 1:

- a. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.
- b. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **5000 (5M)** psi.

Option 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. **The BOP Stack shall be tested to the full working pressure of 5000(5M) psi.**

Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.

- a. 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.
- b. Manufacturer representative shall install the test plug for the initial BOP test.
- c. 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.
- d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

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

- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

GENERAL REQUIREMENTS

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

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

☒ Eddy County

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

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)
393-3612

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

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

A. CASING

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

RI10122020

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

COMMENTS

Action 35472

COMMENTS

Operator: MARATHON OIL PERMIAN LLC 5555 San Felipe St. Houston, TX 77056	OGRID: 372098
	Action Number: 35472
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

COMMENTS

Created By	Comment	Comment Date
kpickford	KP GEO Review 7/8/2021	7/9/2021

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 35472

CONDITIONS

Operator: MARATHON OIL PERMIAN LLC 5555 San Felipe St. Houston, TX 77056	OGRID: 372098
	Action Number: 35472
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

CONDITIONS

Created By	Condition	Condition Date
kpickford	Notify OCD 24 hours prior to casing & cement	7/9/2021
kpickford	Will require a File As Drilled C-102 and a Directional Survey with the C-104	7/9/2021
kpickford	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	7/9/2021
kpickford	Cement is required to circulate on both surface and intermediate1 strings of casing	7/9/2021
kpickford	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	7/9/2021
kpickford	Will require a administrative order for non-standard location prior to placing the well on production	7/9/2021