Form 3160-5
(June 2019)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires: October 31, 2021

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE *- Other instructions on page 2*

5. Lease Serial No. NMNM0540701A

6. If Indian, Allottee or Tribe Name

7. If Unit of CA/Agreement, Name and/or No.

1. Type of Well
☐ Oil Well ☑ Gas Well ☐ Other

8. Well Name and No. CROSSBOW FEDERAL 23 27 8 WX

2. Name of Operator MARATHON OIL PERMIAN LLC

9. API Well No.

3a. Address 990 TOWN & COUNTRY BLVD, HOUSTON, TX

3b. Phone No. *(include area code)* (000) 000-0000

10. Field and Pool or Exploratory Area PURPLE SAGE/WOLFCAMP (GAS)

4. Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)* SEC 8/T23S/R27E/NMP

11. Country or Parish, State EDDY/NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☑ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be perfonned or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has detennined that the site is ready for final inspection.)

Marathon Oil Permian, LLC. Respectfully Requests to make changes to the Approved APD of the above listed well including Depth, FTP, LTP and Drill Plan. See attachment for a detailed summary of the changes being requested, revised C102 well plat, revised directional drill plan, and revised drilling and operations plan.

14. I hereby certify that the foregoing is true and correct. Name *(Printed/Typed)* MELISSA SZUDERA / Ph: (713) 296-3179

Title REGULATORY COMPLIANCE REPRESENTATIVE

Signature

Date 05/23/2022

THE SPACE FOR FEDERAL OR STATE OFICE USE

Approved by ZOTA M STEVENS / Ph: (575) 234-5998 / Approved

Title Petroleum Engineer

Date 12/02/2022

Conditions of approval, if any, are attached. Approval of this notice 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.

Office CARLSBAD

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.

(Instructions on page 2)

Marathon Oil Permian, LLC.

Summary of Changes for NOI Change to AAPD Sundry Submittal

Well Name: **Crossbow 8 WXY Fed Com 8H**
APD ID Num: **10400064838**
API Num:

		Approved APD	Sundry Request
Well Name & Number		Crossbow Federal 23 27 8 WXY 8H	Crossbow 8 WXY Fed Com 8H
Lateral Length		XXL	XXL
Target Formation		WXY	WXY
TVD		8702	8995
MD		18855	19000
Pool Name		Purple Sage; Wolfcamp Gas	Purple Sage; Wolfcamp Gas
Pool Code		98220	98220
Dedicated Acreage		637.68	640
Elevation		3158	3158
SHL	FOOTAGE	1029 FSL 348 FEL	1029 FSL 348 FEL
	UL	P	P
	Q/Q	SESE	SESE
	S-T-R	8-23S-27E	8-23S-27E
FTP	FOOTAGE	2435 FSL 330 FEL	330 FEL 1980 FSL
	UL	I	I
	Q/Q	NESE	NESE
	S-T-R	8-23S-27E	8-23S-27E
LTP	FOOTAGE	2319 FSL 330 FWL	330 FWL 1980 FSL
	UL	L	L
	Q/Q	NWSW	NWSW
	S-T-R	7-23S-27E	7-23S-27E
Casing Stages		3	3
Surf Csg	Top MD	0	0
	Bottom MD	510	510
	Size, Weight, Grade Connection	13.375" 54.5# J55 BTC	13.375" 54.5# J55 BTC
Int 1 Csg	Top MD	0	0
	Bottom MD	8601	8601
	Size, Weight, Grade Connection	9.625" 36# J55 LTC	9.625" 40# P110HC BTC
Prod Csg	Top MD	0	0
	Bottom MD	18855	19000
	Size, Weight, Grade Connection	5.5" 23# P110HC TLW	5.5" 23# P110HC TLW

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

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

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

☑ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	98220	PURPLE SAGE; WOLFCAMP (GAS)

[4] Property Code	[5] Property Name	[6] Well Number
	CROSSBOW 8 WXY FED COM	8H

[7] OGRID No.	[8] Operator Name	[9] Elevation
372098	MARATHON OIL PERMIAN LLC	3158'

[10] Surface Location

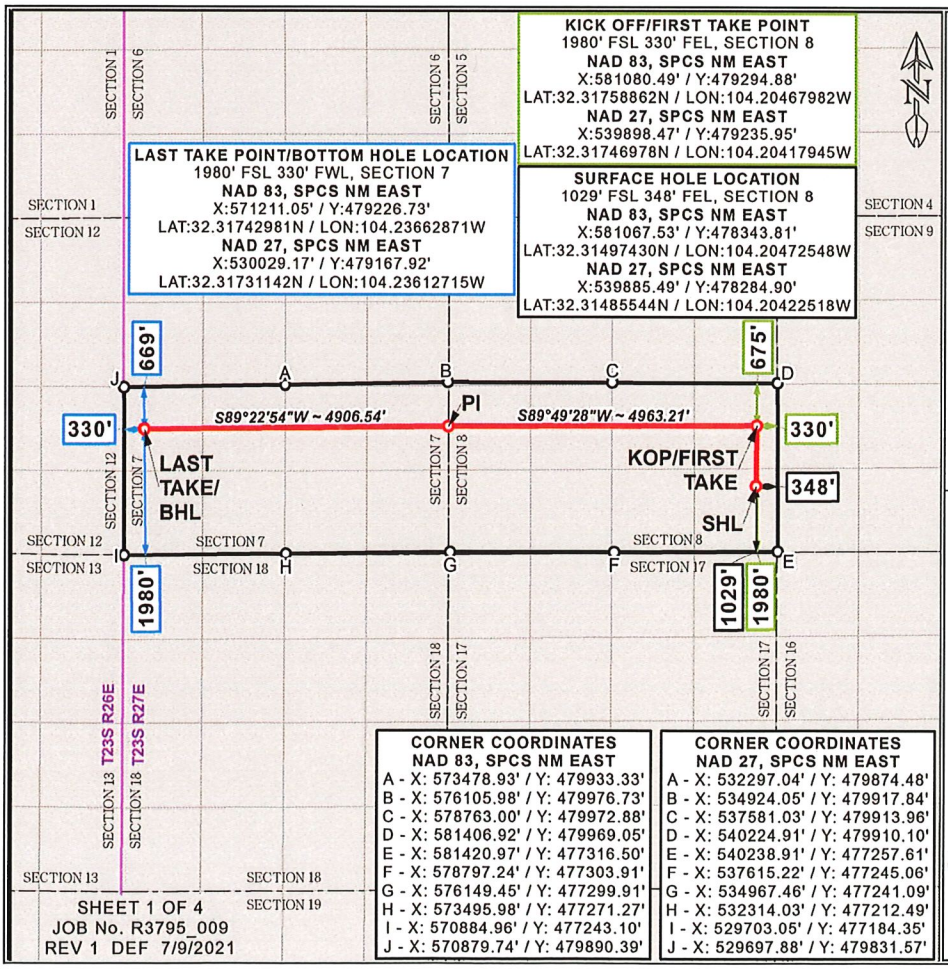
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	8	23S	27E		1029	SOUTH	348	EAST	EDDY

[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
L	7	23S	27E		1980	SOUTH	330	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
637.68			

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.



SHEET 1 OF 4
JOB No. R3795_009
REV 1 DEF 7/9/2021

CORNER COORDINATES NAD 83, SPCS NM EAST

A - X: 573478.93' / Y: 479933.33'
B - X: 576105.98' / Y: 479976.73'
C - X: 578763.00' / Y: 479972.88'
D - X: 581406.92' / Y: 479969.05'
E - X: 581420.97' / Y: 477316.50'
F - X: 578797.24' / Y: 477303.91'
G - X: 576149.45' / Y: 477299.91'
H - X: 573495.98' / Y: 477271.27'
I - X: 570884.96' / Y: 477243.10'
J - X: 570879.74' / Y: 479890.39'

CORNER COORDINATES NAD 27, SPCS NM EAST

A - X: 532297.04' / Y: 479874.48'
B - X: 534924.05' / Y: 479917.84'
C - X: 537581.03' / Y: 479913.96'
D - X: 540224.91' / Y: 479910.10'
E - X: 540238.91' / Y: 477257.61'
F - X: 537615.22' / Y: 477245.06'
G - X: 534967.46' / Y: 477241.09'
H - X: 532314.03' / Y: 477212.49'
I - X: 529703.05' / Y: 477184.35'
J - X: 529697.88' / Y: 479831.57'

[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: 09/09/2021

Melissa Szudera
Printed Name

mszudera@marathonoil.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

SEPTEMBER 9, 2021
Date of Survey

Signature and Seal of Professional Surveyor:

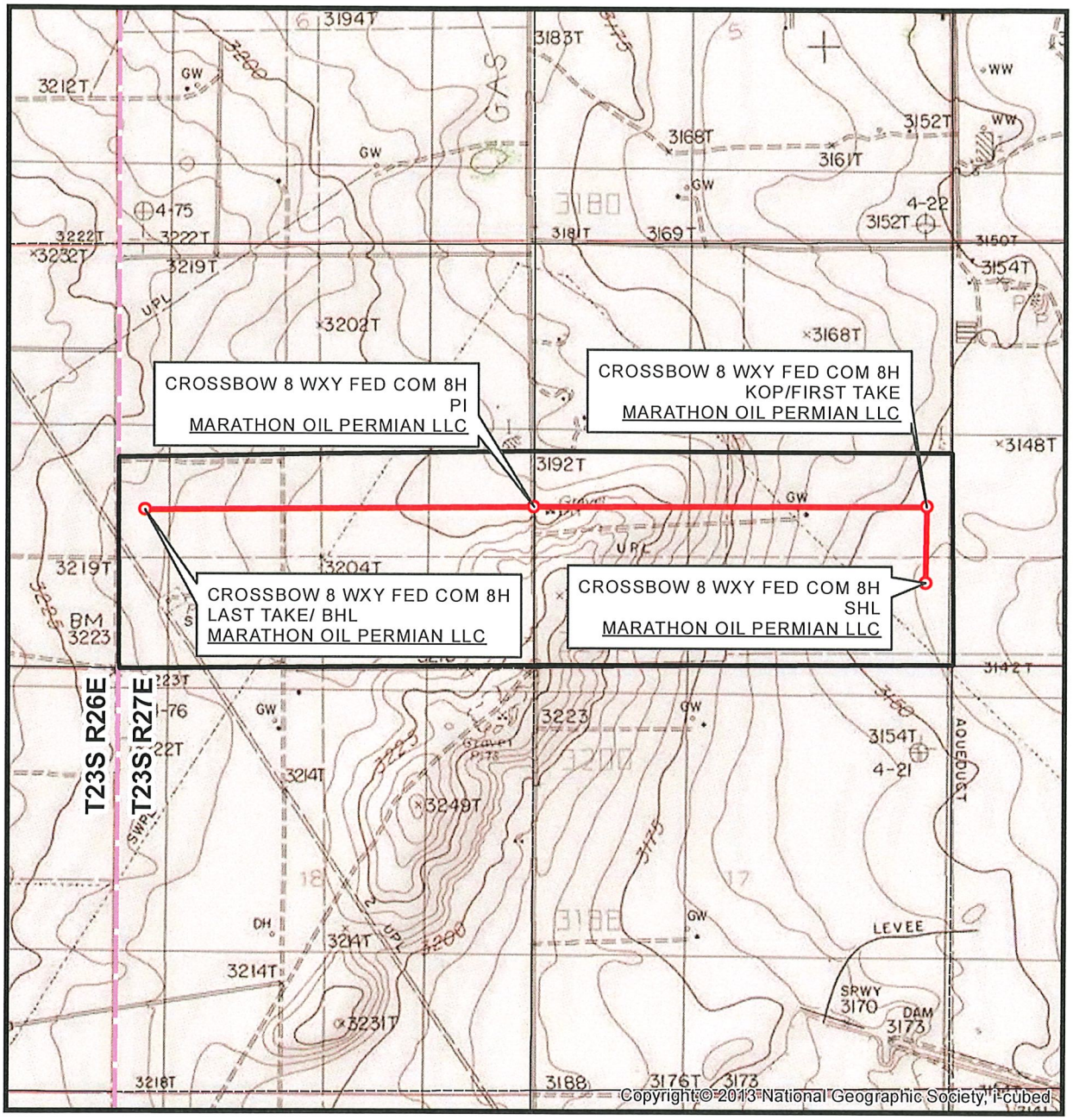
DAVID W. MYERS NEW MEXICO 11403 PROFESSIONAL SURVEYOR

Certificate Number
DAVID W. MYERS 11403

Distances/areas relative to NAD 83 Combined Scale Factor: 0.99976256 Convergence Angle: 00°03'50.20794"

Horizontal Spacing Unit

LOCATION VERIFICATION MAP



SEC. 8 TWP. 23-S RGE. 27-E
SURVEY: N.M.P.M.
COUNTY: EDDY
OPERATOR: MARATHON OIL PERMIAN LLC
DESCRIPTION: 1029' FSL & 348' FEL
ELEVATION: 3158'
LEASE: CROSSBOW 8 FED COM
U.S.G.S. TOPOGRAPHIC MAP: OTIS, NM.

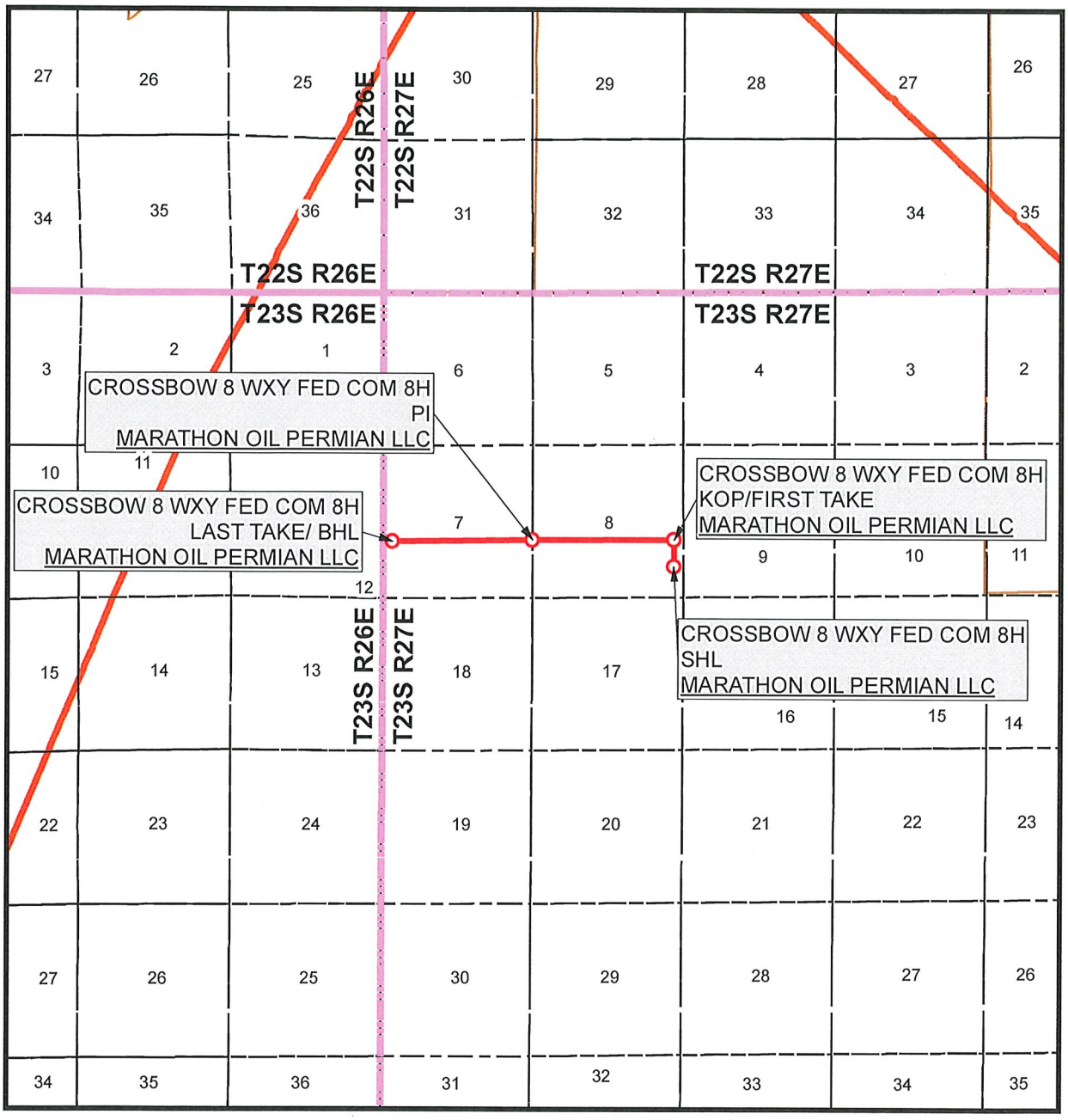
1 " = 2,000 '
CONTOUR INTERVAL = 5'

SHEET 2 OF 4

PREPARED BY:
R-SQUARED GLOBAL, LLC
510 TRENTON ST., UNIT B, WEST MONROE, LA 71291
318-323-6900 OFFICE

JOB No. R3795_009

VICINITY MAP



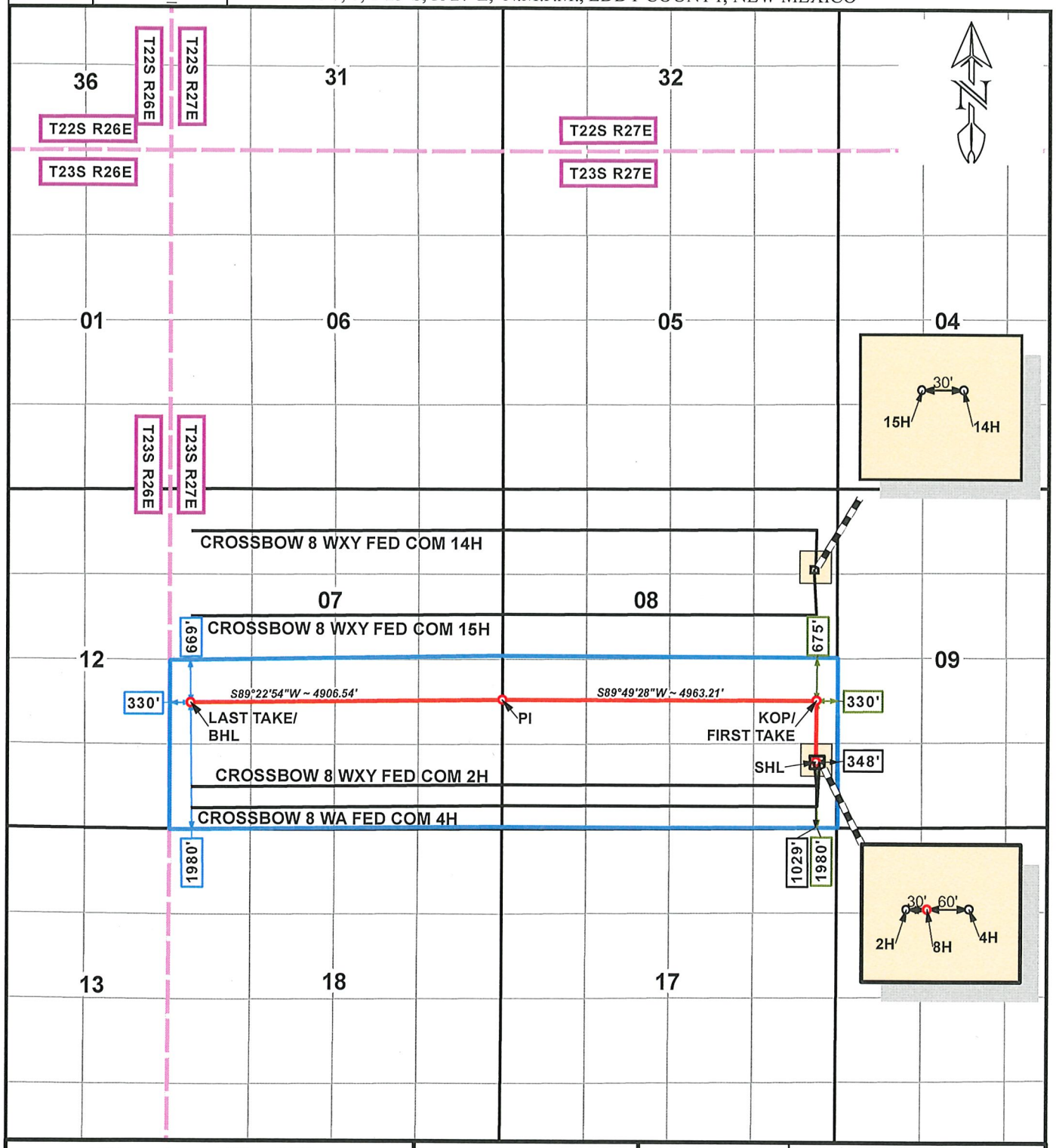
SEC. 8 TWP. 23-S RGE. 27-E
SURVEY: N.M.P.M.
COUNTY: EDDY
OPERATOR: MARATHON OIL PERMIAN LLC
DESCRIPTION: 1029' FSL & 348' FEL
ELEVATION: 3158'
LEASE: CROSSBOW 8 FED COM
U.S.G.S. TOPOGRAPHIC MAP: OTIS, NM.

1 " = 1 MILE

SHEET 3 OF 4

PREPARED BY:
R-SQUARED GLOBAL, LLC
510 TRENTON ST., UNIT B, WEST MONROE, LA 71291
318-323-6900 OFFICE
JOB No. R3795_009

JOB No.	R3795_009	SECTIONS 7, 8, T-23-S, R-27-E, N.M.P.M., EDDY COUNTY, NEW MEXICO



1,000 0 1,000 2,000

1 inch = 2,185 feet

LEGEND

- SUBJECT WELL / DRILL LINE
- SURVEY/SECTION LINE
- LEASE LINE
- OTHER WELLS / DRILL LINES
- TOWNSHIP / RANGE LINE
- DRILL LINE HOLES

R-SQUARED GLOBAL LLC

Marathon Oil Permian LLC

WELL NAME

CROSSBOW 8 WXY FED COM 8H

DATE SURVEYED: 07/03/2018

REV.	DATE	DESCRIPTION	CHKD
0			

SHEET 4 OF 4

DRAWN BY: DEF

DATE DRAWN: 7/14/2021

CHECKED BY: MWS

510 TRENTON ST., UNIT B,
WEST MONROE, LA 71291
(318) 323-6900

MARATHON OIL PERMIAN LLC
DRILLING AND OPERATIONS PLAN

WELL NAME / NUMBER: CROSSBOW 8 WXY FED COM 8H
STATE: NEW MEXICO
COUNTY: EDDY

1. GEOLOGIC FORMATIONS

Formation at Surface: Rustler
Elevation (feet): 3158

Formation	TVD	MD	Elevation (feet)	Lithology	Mineral Resources	Producing Formation
Rustler	0	0	3158	Anhydrite	Brine	No
Salado	120	120	3038	Salt/Anhydrite	Brine	No
Castile	487	487	2671	Salt/Anhydrite	Brine	No
Base of Salt (BX)	1969	1969	1189	Salt/Anhydrite	Brine	No
Lamar	1969	1969	1189	Sandstone/Shale	None	No
Bell Canyon	2108	2108	1050	Sandstone	Oil	No
Cherry Canyon	2881	2881	277	Sandstone	Oil	No
Brushy Canyon	3910	3910	-752	Sandstone	Oil	No
Bone Spring Lime	5401	5401	-2243	Limestone	None	No
Upper Avalon Shale	5722	5722	-2564	Shale	Oil	No
1st Bone Spring Sand	6453	6453	-3295	Sandstone	Oil	No
2nd Bone Spring Carbonate	6680	6680	-3522	Limestone	None	No
2nd Bone Spring Sand	6930	6930	-3772	Sandstone	Oil	No
3rd Bone Spring Carbonate	7139	7139	-3981	Limestone	Oil	No
3rd Bone Spring Sand	8526	8526	-5368	Sandstone	Oil	No
Wolfcamp	8887	8887	-5729	Sandstone/Shale/Carbonates	Natural Gas / Oil	Yes
Wolfcamp A	9039	9039	-5881	Sandstone/Shale/Carbonates	Natural Gas / Oil	Yes
Wolfcamp B	9204	9204	-6046	Sandstone/Shale/Carbonates	Natural Gas / Oil	No
Wolfcamp C	9500	9500	-6342	Sandstone/Shale/Carbonates	Natural Gas / Oil	No
Wolfcamp D	9752	9752	-6594	Sandstone/Shale/Carbonates	Natural Gas / Oil	No

2. BLOWOUT PREVENTION

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12 ¼"	13 5/8	5000	Annular	x	100% of working pressure
			BOP Stack	x	5000
8 ¾"	13 5/8	10000	Annular	x	50% of working pressure
			BOP Stack	x	10000

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	Top Set MSL	Bottom Set MSL	Weight (lbs/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
Surface	17.5	13.375	0	510	0	510	3158	2648	54.5	J55	BTC	5.22	1.81	4.52
Intermediate I	12.25	9.625	0	8601	0	8436	3158	-5278	40	P110HC	BTC	1.20	1.42	2.44
Intermediate II	8.75	5.5	0	19000	0	8995	3158	-5837	23	P110HC	TLW	2.53	1.26	2.22

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 3rd 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 2nd string set 100' to 600' below the base of salt?	

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

String Type	Lead/Tail	Top MD	Bottom MD	Quantity (sks)	Yield (ft3/sks)	Density (ppg)	Slurry Volume (ft3)	Excess (%)	Cement Type	Additives
Surface	Lead	0	210	109	2.12	12.5	231	25	Class C	Extender,Accelerator, LCM
Surface	Tail	210	510	197	1.32	14.8	260	25	Class C	Accelerator
Intermediate	Lead	0	8101	1469	2.18	12.4	3203	25	Class C	Extender,Accelerator, LCM
Intermediate	Tail	8101	8601	147	1.33	14.8	196	25	Class C	Retarder
Production	Tail	8301	19000	2024	1.68	13	3401	25	Class H	Retarder, Extender, Fluid Loss, Suspension Agent

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	510	Water Based Mud	8.4	8.8
510	8601	Brine/Oil based	9.9	10.2
8601	19000	Oil Based mud	10.5	12.5

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. TEST, LOGGING, CORING

List of production tests including testing procedures, equipment and safety measures:
GR from TD to surface (horizontal well - vertical portion of hole)
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:
No coring is planned at this time.

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

7. PRESSURE

ANTICIPATED BOTTOM HOLE PRESSURE: 5,862 psi

ANTICIPATED BOTTOM HOLE TEMPERATURE: 195°F

ANTICIPATED ABNORMAL PRESSURE: N

ANTICIPATED ABNORMAL TEMPERATURE: N

POTENTIAL HAZARDS:

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

Other Well Information

1. AUXILIARY WELL CONTROL AND MONITORING EQUIPMENT

a. A Kelly cock will be in the drill string at all times.

b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor unobstructed and readily accessible at all times.

c. 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**

2. ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS

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.

Sec 8, T23S, R27E
Crossbow 8 WXY Fed Com #8H
Q220* & WT-220***
Design #1

WELL DETAILS: Crossbow 8 WXY Fed Com #8H

3158.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	478284.90	539885.49	32° 18' 53.480 N	104° 12' 15.211 W

Company Name: Marathon Oil Permian LLC
Crossbow 8 WXY Fed Com #8H
Eddy County, New Mexico (NAD 27)
Rig:
Created by: Michael Hilliard
Date: 21:43, February 24 2022

PROJECT DETAILS: Eddy County, New Mexico (NAD 27)

Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Crossbow 8 WXY Fed Com 8H -VP	8222.0	953.0	293.0	479237.88	540178.46	32° 19' 2.907 N	104° 12' 11.783 W
Crossbow 8 WXY Fed Com 8H -FTP	8995.0	951.0	13.0	479235.95	539898.47	32° 19' 2.891 N	104° 12' 15.046 W
Crossbow 8 WXY Fed Com 8H -LTP	8995.0	883.0	-9856.3	479167.92	530029.17	32° 19' 2.321 N	104° 14' 10.058 W

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
3000.0	0.00	0.00	3000.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
3610.2	12.20	17.09	3605.6	61.9	19.0	2.00	17.09	-19.4	Start 4103.5 hold at 3610.2 MD
7713.7	12.20	17.09	7616.4	891.1	273.9	0.00	0.00	-280.0	Start Drop -2.00
8324.0	0.00	0.00	8222.0	953.0	293.0	2.00	180.00	-299.4	Start 200.0 hold at 8324.0 MD
8524.0	0.00	0.00	8422.0	953.0	293.0	0.00	0.00	-299.4	Start DLS 10.00 TFO 269.61
9424.0	90.00	269.61	8995.0	949.0	-280.0	10.00	269.61	273.5	Start 9576.6 hold at 9424.0 MD
19000.5	90.00	269.61	8995.0	883.0	-9856.3	0.00	0.00	9850.1	TD at 19000.5

KLX Directional Drilling

Marathon Oil

Azimuths to Grid North
True North: -0.07°
Magnetic North: 6.86°

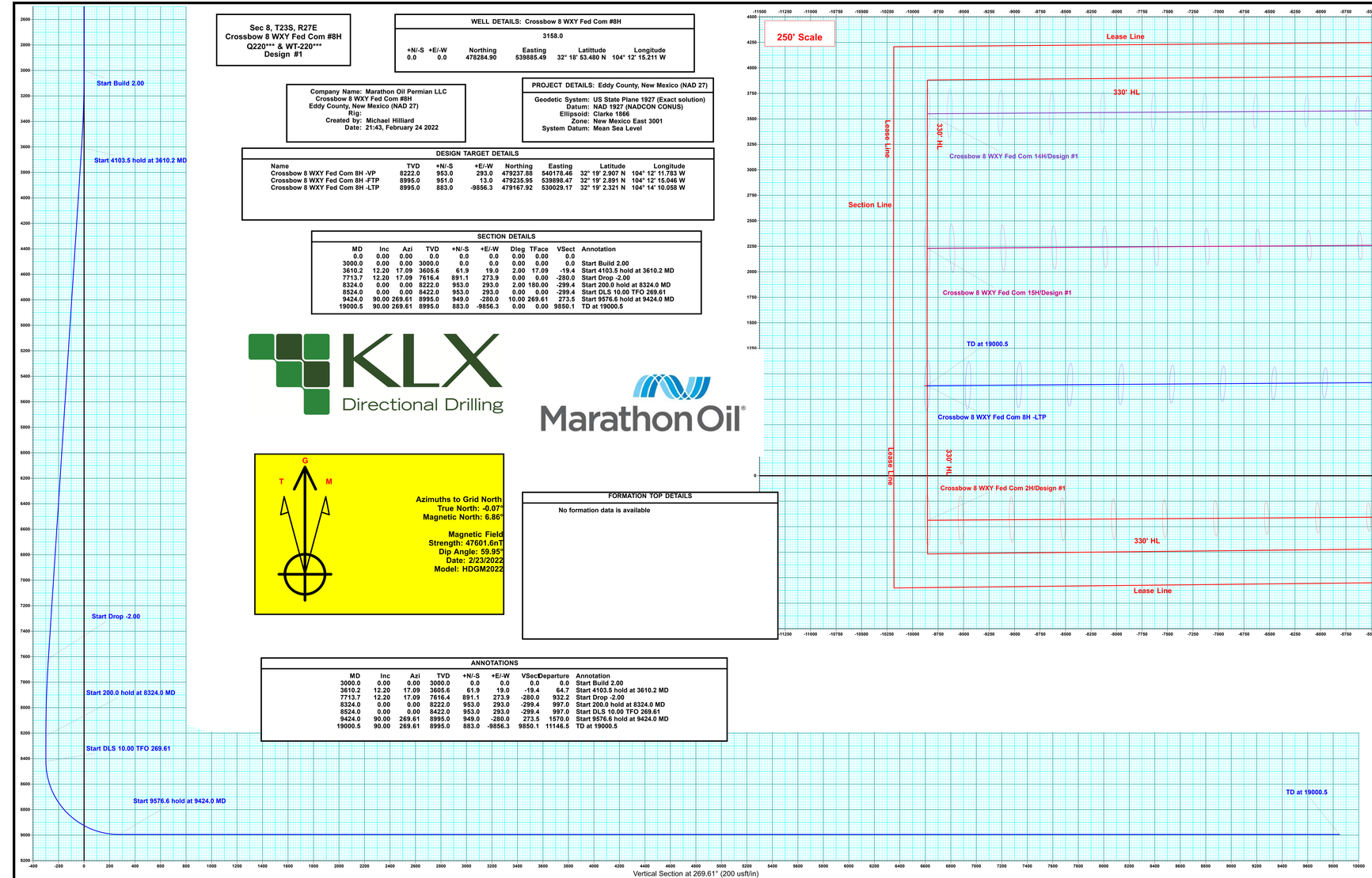
Magnetic Field
Strength: 47601.6nT
Dip Angle: 59.95°
Date: 2/23/2022
Model: HDGM2022

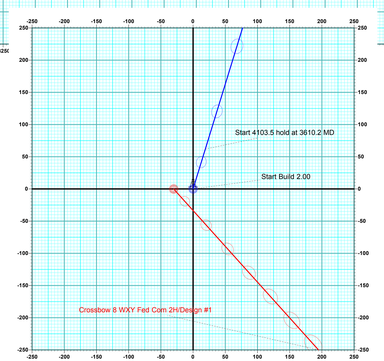
FORMATION TOP DETAILS

No formation data is available

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
3000.0	0.00	0.00	3000.0	0.0	0.0	0.0	0.0	Start Build 2.00
3610.2	12.20	17.09	3605.6	61.9	19.0	-19.4	64.7	Start 4103.5 hold at 3610.2 MD
7713.7	12.20	17.09	7616.4	891.1	273.9	-280.0	932.2	Start Drop -2.00
8324.0	0.00	0.00	8222.0	953.0	293.0	-299.4	997.0	Start 200.0 hold at 8324.0 MD
8524.0	0.00	0.00	8422.0	953.0	293.0	-299.4	997.0	Start DLS 10.00 TFO 269.61
9424.0	90.00	269.61	8995.0	949.0	-280.0	273.5	1570.0	Start 9576.6 hold at 9424.0 MD
19000.5	90.00	269.61	8995.0	883.0	-9856.3	9850.1	11146.5	TD at 19000.5





Marathon Oil Permian LLC

Eddy County, New Mexico (NAD 27)
Sec 8, T23S, R27E
Crossbow 8 WXY Fed Com #8H

Wellbore #1

Plan: Design #1

KLX Well Planning Report

24 February, 2022

Marathon Oil

KLX Directional Drilling

Well Planning Report

KLX Directional Drilling

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Crossbow 8 WXY Fed Com #8H
Company:	Marathon Oil Permian LLC	**TVD Reference:**	RKB @ 3184.5usft
Project:	Eddy County, New Mexico (NAD 27)	**MD Reference:**	RKB @ 3184.5usft
Site:	Sec 8, T23S, R27E	**North Reference:**	Grid
Well:	Crossbow 8 WXY Fed Com #8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project Eddy County, New Mexico (NAD 27)

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 Sec 8, T23S, R27E

Site Position:		**Northing:**	478,284.76 usft	**Latitude:**	32° 18' 53.479 N
From:	Map	**Easting:**	539,855.49 usft	**Longitude:**	104° 12' 15.560 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.07 °

Well Crossbow 8 WXY Fed Com #8H

Well Position	**+N/-S**	0.1 usft	**Northing:**	478,284.90 usft	**Latitude:**	32° 18' 53.480 N
	+E/-W	30.0 usft	**Easting:**	539,885.49 usft	**Longitude:**	104° 12' 15.211 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,158.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2022	2/23/2022	6.93	59.95	47,601.60000000

Design Design #1

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	269.61

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,610.2	12.20	17.09	3,605.6	61.9	19.0	2.00	2.00	0.00	17.09	
7,713.7	12.20	17.09	7,616.4	891.1	273.9	0.00	0.00	0.00	0.00	
8,324.0	0.00	0.01	8,222.0	953.0	293.0	2.00	-2.00	0.00	180.00	Crossbow 8 WXY Fec
8,524.0	0.00	0.01	8,422.0	953.0	293.0	0.00	0.00	0.00	0.01	
9,424.0	90.00	269.61	8,995.0	949.0	-280.0	10.00	10.00	-10.04	269.61	
19,000.5	90.00	269.61	8,995.0	883.0	-9,856.3	0.00	0.00	0.00	0.00	Crossbow 8 WXY Fec

Marathon Oil

KLX Directional Drilling

Well Planning Report

KLX Directional Drilling

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Crossbow 8 WXY Fed Com #8H
Company:	Marathon Oil Permian LLC	**TVD Reference:**	RKB @ 3184.5usft
Project:	Eddy County, New Mexico (NAD 27)	**MD Reference:**	RKB @ 3184.5usft
Site:	Sec 8, T23S, R27E	**North Reference:**	Grid
Well:	Crossbow 8 WXY Fed Com #8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	2.00	17.09	3,100.0	1.7	0.5	-0.5	2.00	2.00	0.00
3,200.0	4.00	17.09	3,199.8	6.7	2.1	-2.1	2.00	2.00	0.00
3,300.0	6.00	17.09	3,299.5	15.0	4.6	-4.7	2.00	2.00	0.00
3,400.0	8.00	17.09	3,398.7	26.6	8.2	-8.4	2.00	2.00	0.00
3,500.0	10.00	17.09	3,497.5	41.6	12.8	-13.1	2.00	2.00	0.00
3,600.0	12.00	17.09	3,595.6	59.8	18.4	-18.8	2.00	2.00	0.00
Start 4103.5 hold at 3610.2 MD									
3,610.2	12.20	17.09	3,605.6	61.9	19.0	-19.4	2.00	2.00	0.00
3,700.0	12.20	17.09	3,693.4	80.0	24.6	-25.1	0.00	0.00	0.00
3,800.0	12.20	17.09	3,791.1	100.2	30.8	-31.5	0.00	0.00	0.00
3,900.0	12.20	17.09	3,888.8	120.4	37.0	-37.8	0.00	0.00	0.00
4,000.0	12.20	17.09	3,986.6	140.7	43.2	-44.2	0.00	0.00	0.00
4,100.0	12.20	17.09	4,084.3	160.9	49.5	-50.5	0.00	0.00	0.00
4,200.0	12.20	17.09	4,182.1	181.1	55.7	-56.9	0.00	0.00	0.00
4,300.0	12.20	17.09	4,279.8	201.3	61.9	-63.2	0.00	0.00	0.00
4,400.0	12.20	17.09	4,377.5	221.5	68.1	-69.6	0.00	0.00	0.00
4,500.0	12.20	17.09	4,475.3	241.7	74.3	-75.9	0.00	0.00	0.00
4,600.0	12.20	17.09	4,573.0	261.9	80.5	-82.3	0.00	0.00	0.00
4,700.0	12.20	17.09	4,670.8	282.1	86.7	-88.6	0.00	0.00	0.00
4,800.0	12.20	17.09	4,768.5	302.3	92.9	-95.0	0.00	0.00	0.00
4,900.0	12.20	17.09	4,866.2	322.5	99.1	-101.3	0.00	0.00	0.00
5,000.0	12.20	17.09	4,964.0	342.7	105.4	-107.7	0.00	0.00	0.00

Marathon Oil

KLX Directional Drilling

Well Planning Report

KLX Directional Drilling

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Crossbow 8 WXY Fed Com #8H
Company:	Marathon Oil Permian LLC	**TVD Reference:**	RKB @ 3184.5usft
Project:	Eddy County, New Mexico (NAD 27)	**MD Reference:**	RKB @ 3184.5usft
Site:	Sec 8, T23S, R27E	**North Reference:**	Grid
Well:	Crossbow 8 WXY Fed Com #8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
5,100.0	12.20	17.09	5,061.7	362.9	111.6	-114.0	0.00	0.00	0.00
5,200.0	12.20	17.09	5,159.5	383.1	117.8	-120.4	0.00	0.00	0.00
5,300.0	12.20	17.09	5,257.2	403.3	124.0	-126.7	0.00	0.00	0.00
5,400.0	12.20	17.09	5,354.9	423.6	130.2	-133.1	0.00	0.00	0.00
5,500.0	12.20	17.09	5,452.7	443.8	136.4	-139.4	0.00	0.00	0.00
5,600.0	12.20	17.09	5,550.4	464.0	142.6	-145.8	0.00	0.00	0.00
5,700.0	12.20	17.09	5,648.2	484.2	148.8	-152.1	0.00	0.00	0.00
5,800.0	12.20	17.09	5,745.9	504.4	155.1	-158.5	0.00	0.00	0.00
5,900.0	12.20	17.09	5,843.6	524.6	161.3	-164.8	0.00	0.00	0.00
6,000.0	12.20	17.09	5,941.4	544.8	167.5	-171.2	0.00	0.00	0.00
6,100.0	12.20	17.09	6,039.1	565.0	173.7	-177.5	0.00	0.00	0.00
6,200.0	12.20	17.09	6,136.9	585.2	179.9	-183.9	0.00	0.00	0.00
6,300.0	12.20	17.09	6,234.6	605.4	186.1	-190.2	0.00	0.00	0.00
6,400.0	12.20	17.09	6,332.3	625.6	192.3	-196.6	0.00	0.00	0.00
6,500.0	12.20	17.09	6,430.1	645.8	198.5	-202.9	0.00	0.00	0.00
6,600.0	12.20	17.09	6,527.8	666.0	204.8	-209.3	0.00	0.00	0.00
6,700.0	12.20	17.09	6,625.6	686.2	211.0	-215.6	0.00	0.00	0.00
6,800.0	12.20	17.09	6,723.3	706.5	217.2	-222.0	0.00	0.00	0.00
6,900.0	12.20	17.09	6,821.0	726.7	223.4	-228.3	0.00	0.00	0.00
7,000.0	12.20	17.09	6,918.8	746.9	229.6	-234.7	0.00	0.00	0.00
7,100.0	12.20	17.09	7,016.5	767.1	235.8	-241.0	0.00	0.00	0.00
7,200.0	12.20	17.09	7,114.3	787.3	242.0	-247.4	0.00	0.00	0.00
7,300.0	12.20	17.09	7,212.0	807.5	248.2	-253.7	0.00	0.00	0.00
7,400.0	12.20	17.09	7,309.7	827.7	254.5	-260.1	0.00	0.00	0.00
7,500.0	12.20	17.09	7,407.5	847.9	260.7	-266.4	0.00	0.00	0.00
7,600.0	12.20	17.09	7,505.2	868.1	266.9	-272.8	0.00	0.00	0.00
7,700.0	12.20	17.09	7,603.0	888.3	273.1	-279.1	0.00	0.00	0.00
Start Drop -2.00									
7,713.7	12.20	17.09	7,616.4	891.1	273.9	-280.0	0.00	0.00	0.00
7,800.0	10.48	17.09	7,701.0	907.3	278.9	-285.1	2.00	-2.00	0.00
7,900.0	8.48	17.09	7,799.6	923.0	283.8	-290.0	2.00	-2.00	0.00
8,000.0	6.48	17.09	7,898.7	935.5	287.6	-294.0	2.00	-2.00	0.00
8,100.0	4.48	17.09	7,998.3	944.6	290.4	-296.8	2.00	-2.00	0.00
8,200.0	2.48	17.09	8,098.1	950.4	292.2	-298.6	2.00	-2.00	0.00
8,300.0	0.48	17.09	8,198.0	952.9	292.9	-299.4	2.00	-2.00	0.00
Start 200.0 hold at 8324.0 MD									
8,324.0	0.00	0.01	8,222.0	953.0	293.0	-299.4	2.00	-2.00	0.00
8,400.0	0.00	0.00	8,298.0	953.0	293.0	-299.4	0.00	0.00	0.00
8,500.0	0.00	0.00	8,398.0	953.0	293.0	-299.4	0.00	0.00	0.00
Start DLS 10.00 TFO 269.61									
8,524.0	0.00	0.00	8,422.0	953.0	293.0	-299.4	0.00	0.00	0.00
8,550.0	2.60	269.61	8,448.0	953.0	292.4	-298.9	10.00	10.00	0.00
8,600.0	7.60	269.61	8,497.8	952.9	287.9	-294.4	10.00	10.00	0.00
8,650.0	12.60	269.61	8,547.0	952.9	279.2	-285.6	10.00	10.00	0.00
8,700.0	17.60	269.61	8,595.3	952.8	266.1	-272.6	10.00	10.00	0.00
8,750.0	22.60	269.61	8,642.2	952.7	249.0	-255.4	10.00	10.00	0.00
8,800.0	27.60	269.61	8,687.5	952.5	227.7	-234.2	10.00	10.00	0.00
8,850.0	32.60	269.61	8,730.7	952.4	202.7	-209.2	10.00	10.00	0.00
8,900.0	37.60	269.61	8,771.6	952.2	173.9	-180.4	10.00	10.00	0.00
8,950.0	42.60	269.61	8,809.9	951.9	141.7	-148.2	10.00	10.00	0.00
9,000.0	47.60	269.61	8,845.1	951.7	106.3	-112.8	10.00	10.00	0.00
9,050.0	52.60	269.61	8,877.2	951.4	68.0	-74.5	10.00	10.00	0.00
9,100.0	57.60	269.61	8,905.8	951.1	27.0	-33.5	10.00	10.00	0.00

Marathon Oil

KLX Directional Drilling

Well Planning Report

KLX Directional Drilling

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Crossbow 8 WXY Fed Com #8H
Company:	Marathon Oil Permian LLC	**TVD Reference:**	RKB @ 3184.5usft
Project:	Eddy County, New Mexico (NAD 27)	**MD Reference:**	RKB @ 3184.5usft
Site:	Sec 8, T23S, R27E	**North Reference:**	Grid
Well:	Crossbow 8 WXY Fed Com #8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
9,150.0	62.60	269.61	8,930.7	950.8	-16.3	9.9	10.00	10.00	0.00
9,200.0	67.60	269.61	8,951.7	950.5	-61.7	55.2	10.00	10.00	0.00
9,250.0	72.60	269.61	8,968.8	950.2	-108.7	102.2	10.00	10.00	0.00
9,300.0	77.60	269.61	8,981.6	949.9	-157.0	150.5	10.00	10.00	0.00
9,350.0	82.60	269.61	8,990.2	949.5	-206.2	199.8	10.00	10.00	0.00
9,400.0	87.60	269.61	8,994.5	949.2	-256.0	249.6	10.00	10.00	0.00
Start 9576.6 hold at 9424.0 MD									
9,424.0	90.00	269.61	8,995.0	949.0	-280.0	273.5	10.00	10.00	0.00
9,500.0	90.00	269.61	8,995.0	948.5	-356.0	349.6	0.00	0.00	0.00
9,600.0	90.00	269.61	8,995.0	947.8	-456.0	449.6	0.00	0.00	0.00
9,700.0	90.00	269.61	8,995.0	947.1	-556.0	549.6	0.00	0.00	0.00
9,800.0	90.00	269.61	8,995.0	946.4	-656.0	649.6	0.00	0.00	0.00
9,900.0	90.00	269.61	8,995.0	945.7	-756.0	749.6	0.00	0.00	0.00
10,000.0	90.00	269.61	8,995.0	945.1	-856.0	849.6	0.00	0.00	0.00
10,100.0	90.00	269.61	8,995.0	944.4	-956.0	949.6	0.00	0.00	0.00
10,200.0	90.00	269.61	8,995.0	943.7	-1,056.0	1,049.6	0.00	0.00	0.00
10,300.0	90.00	269.61	8,995.0	943.0	-1,156.0	1,149.6	0.00	0.00	0.00
10,400.0	90.00	269.61	8,995.0	942.3	-1,256.0	1,249.6	0.00	0.00	0.00
10,500.0	90.00	269.61	8,995.0	941.6	-1,356.0	1,349.6	0.00	0.00	0.00
10,600.0	90.00	269.61	8,995.0	940.9	-1,456.0	1,449.6	0.00	0.00	0.00
10,700.0	90.00	269.61	8,995.0	940.2	-1,556.0	1,549.6	0.00	0.00	0.00
10,800.0	90.00	269.61	8,995.0	939.5	-1,656.0	1,649.6	0.00	0.00	0.00
10,900.0	90.00	269.61	8,995.0	938.9	-1,756.0	1,749.6	0.00	0.00	0.00
11,000.0	90.00	269.61	8,995.0	938.2	-1,856.0	1,849.6	0.00	0.00	0.00
11,100.0	90.00	269.61	8,995.0	937.5	-1,956.0	1,949.6	0.00	0.00	0.00
11,200.0	90.00	269.61	8,995.0	936.8	-2,056.0	2,049.6	0.00	0.00	0.00
11,300.0	90.00	269.61	8,995.0	936.1	-2,156.0	2,149.6	0.00	0.00	0.00
11,400.0	90.00	269.61	8,995.0	935.4	-2,256.0	2,249.6	0.00	0.00	0.00
11,500.0	90.00	269.61	8,995.0	934.7	-2,356.0	2,349.6	0.00	0.00	0.00
11,600.0	90.00	269.61	8,995.0	934.0	-2,456.0	2,449.6	0.00	0.00	0.00
11,700.0	90.00	269.61	8,995.0	933.3	-2,556.0	2,549.6	0.00	0.00	0.00
11,800.0	90.00	269.61	8,995.0	932.7	-2,656.0	2,649.6	0.00	0.00	0.00
11,900.0	90.00	269.61	8,995.0	932.0	-2,756.0	2,749.6	0.00	0.00	0.00
12,000.0	90.00	269.61	8,995.0	931.3	-2,856.0	2,849.6	0.00	0.00	0.00
12,100.0	90.00	269.61	8,995.0	930.6	-2,956.0	2,949.6	0.00	0.00	0.00
12,200.0	90.00	269.61	8,995.0	929.9	-3,056.0	3,049.6	0.00	0.00	0.00
12,300.0	90.00	269.61	8,995.0	929.2	-3,156.0	3,149.6	0.00	0.00	0.00
12,400.0	90.00	269.61	8,995.0	928.5	-3,256.0	3,249.6	0.00	0.00	0.00
12,500.0	90.00	269.61	8,995.0	927.8	-3,355.9	3,349.6	0.00	0.00	0.00
12,600.0	90.00	269.61	8,995.0	927.1	-3,455.9	3,449.6	0.00	0.00	0.00
12,700.0	90.00	269.61	8,995.0	926.4	-3,555.9	3,549.6	0.00	0.00	0.00
12,800.0	90.00	269.61	8,995.0	925.8	-3,655.9	3,649.6	0.00	0.00	0.00
12,900.0	90.00	269.61	8,995.0	925.1	-3,755.9	3,749.6	0.00	0.00	0.00
13,000.0	90.00	269.61	8,995.0	924.4	-3,855.9	3,849.6	0.00	0.00	0.00
13,100.0	90.00	269.61	8,995.0	923.7	-3,955.9	3,949.6	0.00	0.00	0.00
13,200.0	90.00	269.61	8,995.0	923.0	-4,055.9	4,049.6	0.00	0.00	0.00
13,300.0	90.00	269.61	8,995.0	922.3	-4,155.9	4,149.6	0.00	0.00	0.00
13,400.0	90.00	269.61	8,995.0	921.6	-4,255.9	4,249.6	0.00	0.00	0.00
13,500.0	90.00	269.61	8,995.0	920.9	-4,355.9	4,349.6	0.00	0.00	0.00
13,600.0	90.00	269.61	8,995.0	920.2	-4,455.9	4,449.6	0.00	0.00	0.00
13,700.0	90.00	269.61	8,995.0	919.6	-4,555.9	4,549.6	0.00	0.00	0.00
13,800.0	90.00	269.61	8,995.0	918.9	-4,655.9	4,649.6	0.00	0.00	0.00
13,900.0	90.00	269.61	8,995.0	918.2	-4,755.9	4,749.6	0.00	0.00	0.00
14,000.0	90.00	269.61	8,995.0	917.5	-4,855.9	4,849.6	0.00	0.00	0.00

Marathon Oil

KLX Directional Drilling

Well Planning Report

KLX Directional Drilling

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Crossbow 8 WXY Fed Com #8H
Company:	Marathon Oil Permian LLC	**TVD Reference:**	RKB @ 3184.5usft
Project:	Eddy County, New Mexico (NAD 27)	**MD Reference:**	RKB @ 3184.5usft
Site:	Sec 8, T23S, R27E	**North Reference:**	Grid
Well:	Crossbow 8 WXY Fed Com #8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
14,100.0	90.00	269.61	8,995.0	916.8	-4,955.9	4,949.6	0.00	0.00	0.00
14,200.0	90.00	269.61	8,995.0	916.1	-5,055.9	5,049.6	0.00	0.00	0.00
14,300.0	90.00	269.61	8,995.0	915.4	-5,155.9	5,149.6	0.00	0.00	0.00
14,400.0	90.00	269.61	8,995.0	914.7	-5,255.9	5,249.6	0.00	0.00	0.00
14,500.0	90.00	269.61	8,995.0	914.0	-5,355.9	5,349.6	0.00	0.00	0.00
14,600.0	90.00	269.61	8,995.0	913.4	-5,455.9	5,449.6	0.00	0.00	0.00
14,700.0	90.00	269.61	8,995.0	912.7	-5,555.9	5,549.6	0.00	0.00	0.00
14,800.0	90.00	269.61	8,995.0	912.0	-5,655.9	5,649.6	0.00	0.00	0.00
14,900.0	90.00	269.61	8,995.0	911.3	-5,755.9	5,749.6	0.00	0.00	0.00
15,000.0	90.00	269.61	8,995.0	910.6	-5,855.9	5,849.6	0.00	0.00	0.00
15,100.0	90.00	269.61	8,995.0	909.9	-5,955.9	5,949.6	0.00	0.00	0.00
15,200.0	90.00	269.61	8,995.0	909.2	-6,055.9	6,049.6	0.00	0.00	0.00
15,300.0	90.00	269.61	8,995.0	908.5	-6,155.9	6,149.6	0.00	0.00	0.00
15,400.0	90.00	269.61	8,995.0	907.8	-6,255.9	6,249.6	0.00	0.00	0.00
15,500.0	90.00	269.61	8,995.0	907.1	-6,355.9	6,349.6	0.00	0.00	0.00
15,600.0	90.00	269.61	8,995.0	906.5	-6,455.9	6,449.6	0.00	0.00	0.00
15,700.0	90.00	269.61	8,995.0	905.8	-6,555.9	6,549.6	0.00	0.00	0.00
15,800.0	90.00	269.61	8,995.0	905.1	-6,655.9	6,649.6	0.00	0.00	0.00
15,900.0	90.00	269.61	8,995.0	904.4	-6,755.9	6,749.6	0.00	0.00	0.00
16,000.0	90.00	269.61	8,995.0	903.7	-6,855.9	6,849.6	0.00	0.00	0.00
16,100.0	90.00	269.61	8,995.0	903.0	-6,955.9	6,949.6	0.00	0.00	0.00
16,200.0	90.00	269.61	8,995.0	902.3	-7,055.9	7,049.6	0.00	0.00	0.00
16,300.0	90.00	269.61	8,995.0	901.6	-7,155.9	7,149.6	0.00	0.00	0.00
16,400.0	90.00	269.61	8,995.0	900.9	-7,255.9	7,249.6	0.00	0.00	0.00
16,500.0	90.00	269.61	8,995.0	900.3	-7,355.9	7,349.6	0.00	0.00	0.00
16,600.0	90.00	269.61	8,995.0	899.6	-7,455.9	7,449.6	0.00	0.00	0.00
16,700.0	90.00	269.61	8,995.0	898.9	-7,555.9	7,549.6	0.00	0.00	0.00
16,800.0	90.00	269.61	8,995.0	898.2	-7,655.8	7,649.6	0.00	0.00	0.00
16,900.0	90.00	269.61	8,995.0	897.5	-7,755.8	7,749.6	0.00	0.00	0.00
17,000.0	90.00	269.61	8,995.0	896.8	-7,855.8	7,849.6	0.00	0.00	0.00
17,100.0	90.00	269.61	8,995.0	896.1	-7,955.8	7,949.6	0.00	0.00	0.00
17,200.0	90.00	269.61	8,995.0	895.4	-8,055.8	8,049.6	0.00	0.00	0.00
17,300.0	90.00	269.61	8,995.0	894.7	-8,155.8	8,149.6	0.00	0.00	0.00
17,400.0	90.00	269.61	8,995.0	894.1	-8,255.8	8,249.6	0.00	0.00	0.00
17,500.0	90.00	269.61	8,995.0	893.4	-8,355.8	8,349.6	0.00	0.00	0.00
17,600.0	90.00	269.61	8,995.0	892.7	-8,455.8	8,449.6	0.00	0.00	0.00
17,700.0	90.00	269.61	8,995.0	892.0	-8,555.8	8,549.6	0.00	0.00	0.00
17,800.0	90.00	269.61	8,995.0	891.3	-8,655.8	8,649.6	0.00	0.00	0.00
17,900.0	90.00	269.61	8,995.0	890.6	-8,755.8	8,749.6	0.00	0.00	0.00
18,000.0	90.00	269.61	8,995.0	889.9	-8,855.8	8,849.6	0.00	0.00	0.00
18,100.0	90.00	269.61	8,995.0	889.2	-8,955.8	8,949.6	0.00	0.00	0.00
18,200.0	90.00	269.61	8,995.0	888.5	-9,055.8	9,049.6	0.00	0.00	0.00
18,300.0	90.00	269.61	8,995.0	887.8	-9,155.8	9,149.6	0.00	0.00	0.00
18,400.0	90.00	269.61	8,995.0	887.2	-9,255.8	9,249.6	0.00	0.00	0.00
18,500.0	90.00	269.61	8,995.0	886.5	-9,355.8	9,349.6	0.00	0.00	0.00
18,600.0	90.00	269.61	8,995.0	885.8	-9,455.8	9,449.6	0.00	0.00	0.00
18,700.0	90.00	269.61	8,995.0	885.1	-9,555.8	9,549.6	0.00	0.00	0.00
18,800.0	90.00	269.61	8,995.0	884.4	-9,655.8	9,649.6	0.00	0.00	0.00
18,900.0	90.00	269.61	8,995.0	883.7	-9,755.8	9,749.6	0.00	0.00	0.00
TD at 19000.5									
19,000.5	90.00	269.61	8,995.0	883.0	-9,856.3	9,850.1	0.00	0.00	0.00

Marathon Oil

KLX Directional Drilling
Well Planning Report

KLX Directional Drilling

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Crossbow 8 WXY Fed Com #8H
Company:	Marathon Oil Permian LLC	**TVD Reference:**	RKB @ 3184.5usft
Project:	Eddy County, New Mexico (NAD 27)	**MD Reference:**	RKB @ 3184.5usft
Site:	Sec 8, T23S, R27E	**North Reference:**	Grid
Well:	Crossbow 8 WXY Fed Com #8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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
Crossbow 8 WXY Fed C - plan hits target center - Point	0.00	0.00	8,222.0	953.0	293.0	479,237.88	540,178.46	32° 19' 2.907 N	104° 12' 11.783 W
Crossbow 8 WXY Fed C - plan hits target center - Point	0.00	0.00	8,995.0	883.0	-9,856.3	479,167.92	530,029.17	32° 19' 2.321 N	104° 14' 10.058 W
Crossbow 8 WXY Fed C - plan misses target center by 70.7usft at 9150.5usft MD (8930.9 TVD, 950.8 N, -16.8 E) - Point	0.00	0.00	8,995.0	951.0	13.0	479,235.95	539,898.47	32° 19' 2.891 N	104° 12' 15.046 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
3,000.0	3,000.0	0.0	0.0	Start Build 2.00
3,610.2	3,605.6	61.9	19.0	Start 4103.5 hold at 3610.2 MD
7,713.7	7,616.4	891.1	273.9	Start Drop -2.00
8,324.0	8,222.0	953.0	293.0	Start 200.0 hold at 8324.0 MD
8,524.0	8,422.0	953.0	293.0	Start DLS 10.00 TFO 269.61
9,424.0	8,995.0	949.0	-280.0	Start 9576.6 hold at 9424.0 MD
19,000.5	8,995.0	883.0	-9,856.3	TD at 19000.5

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Marathon Oil**
LEASE NO.:	**NMNM0540701A**
LOCATION:	Section 8, T.23 S., R.27 E., NMPM
COUNTY:	Eddy County, New Mexico

WELL NAME & NO.:	**Crossbow 8 WXY Fed Com 8H**
SURFACE HOLE FOOTAGE:	1029'/S & 348'/E
BOTTOM HOLE FOOTAGE	1980'/S & 330'/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

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 **400** 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.

Intermediate casing must be kept 1/3rd fluid filled to meet BLM minimum collapse requirement.

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.

Contingency:

Operator is approved to used a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The Operator shall contact BLM within 4 hrs before running the 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.

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
   - Cement should tie-back at least **200 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 approved to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
b. Operator is approved to set surface casing with Spudder Rig
- **Notify the BLM when moving in and removing the Spudder Rig.**
- **Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.**
- **BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.**

2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

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

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing intergrity 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 intergrity 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.
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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 166363

CONDITIONS

Operator: MARATHON OIL PERMIAN LLC 990 Town & Country Blvd. Houston, TX 77024	OGRID: 372098
	Action Number: 166363
	Action Type: [C-103] NOI Change of Plans (C-103A)

CONDITIONS

Created By	Condition	Condition Date
kpickford	Adhere to previous NMOCD Conditions of Approval	12/16/2022