

District I

1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-9720

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

Form C-101
August 1, 2011

Permit 278215

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

1. Operator Name and Address MARATHON OIL PERMIAN LLC 5555 San Felipe St. Houston, TX 77056		2. OGRID Number 372098
		3. API Number 30-015-46730
4. Property Code 327151	5. Property Name WILLOW LAKE 15 WXY FEE	6. Well No. 007H

7. Surface Location

UL - Lot I	Section 15	Township 24S	Range 28E	Lot Idn	Feet From 1342	N/S Line S	Feet From 296	E/W Line E	County Eddy
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8. Proposed Bottom Hole Location

UL - Lot M	Section 15	Township 24S	Range 28E	Lot Idn M	Feet From 330	N/S Line S	Feet From 100	E/W Line W	County Eddy
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9. Pool Information

PURPLE SAGE;WOLFCAMP (GAS)	98220
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Additional Well Information

11. Work Type New Well	12. Well Type GAS	13. Cable/Rotary	14. Lease Type Private	15. Ground Level Elevation 2993
16. Multiple N	17. Proposed Depth 14510	18. Formation Wolfcamp	19. Contractor	20. Spud Date 5/28/2020
Depth to Ground water		Distance from nearest fresh water well		Distance to nearest surface water

☒ We will be using a closed-loop system in lieu of lined pits

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surf	17.5	13.375	54.5	450	470	0
Int1	12.25	9.625	36	2650	878	0
Prod	8.75	5.5	20	14510	1525	0

Casing/Cement Program: Additional Comments

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22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
Annular	2500	5000	
Double Ram	5000	5000	
Pipe	5000	5000	
Blind	5000	5000	

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify I have complied with 19.15.14.9 (A) NMAC ☒ and/or 19.15.14.9 (B) NMAC ☒ if applicable. Signature: Printed Name: Electronically filed by Melissa Szudera Title: Regulatory Compliance Representative Email Address: mszudera@marathonoil.com Date: 2/11/2020	OIL CONSERVATION DIVISION Approved By: Raymond Podany Title: Geologist Approved Date: 2/12/2020 Expiration Date: 2/12/2022 Conditions of Approval Attached
Phone: 713-296-3179	

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GAS CAPTURE PLAN

Date: 2/12/2020

☒ Original

Operator & OGRID No.: [372098] MARATHON OIL PERMIAN LLC

☐ Amended - Reason for
Amendment: _____

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

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

Well(s)/Production Facility – Name of facility

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

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
WILLOW LAKE 15 WXY FEE #007H	30-015-46730	I-15-24S-28E	1342S 0296E	1890	Flared	

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility is dedicated to SENDERO CARLSBAD NGL, LLC and will be connected to SENDERO CARLSBAD NGL, LLC Low Pressure gathering system located in Eddy County, New Mexico. It will require 5280' of pipeline to connect the facility to Low Pressure gathering system. MARATHON OIL PERMIAN LLC provides (periodically) to SENDERO CARLSBAD NGL, LLC a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, MARATHON OIL PERMIAN LLC and SENDERO CARLSBAD NGL, LLC have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at SENDERO CARLSBAD NGL, LLC Processing Plant located in Sec. 31, Twn. 23S, Rng. 28E, Eddy County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

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

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

Alternatives to Reduce Flaring

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

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

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Form APD Comments

Permit 278215

PERMIT COMMENTS

Operator Name and Address: MARATHON OIL PERMIAN LLC [372098] 5555 San Felipe St. Houston, TX 77056		API Number: 30-015-46730
		Well: WILLOW LAKE 15 WXY FEE #007H

Created By	Comment	Comment Date
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Form APD Conditions

Permit 278215

PERMIT CONDITIONS OF APPROVAL

Operator Name and Address: MARATHON OIL PERMIAN LLC [372098] 5555 San Felipe St. Houston, TX 77056		API Number: 30-015-46730
		Well: WILLOW LAKE 15 WXY FEE #007H
OCD Reviewer	Condition	
rpodany	Will require a directional survey with the C-104	
rpodany	Cement is required to circulate on both surface and intermediate1 strings of casing	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

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

Site		Willow Lake 15 (3-5-7)			
Site Position:		Northing:	441,850.05 usft	Latitude:	32° 12' 52.1403960 N
From:	Map	Easting:	582,205.88 usft	Longitude:	104° 4' 3.1020441 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.14 °

Well	WXY #7H					
Well Position	+N/-S	0.00 usft	Northing:	441,790.07 usft	Latitude:	32° 12' 51.5468164 N
	+E/-W	0.00 usft	Easting:	582,205.88 usft	Longitude:	104° 4' 3.1037708 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	2,993.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/31/2020	7.02	59.93	47,821.70

Design	Prelim Plan A				
Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	270.18	

Survey Tool Program	Date	1/31/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	14,510.07	Prelim Plan A (OH)	MWD+IFR1	OWSG MWD + IFR1	

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
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	



Marathon Oil

Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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	2.00	169.03	1,299.98	-1.71	0.33	-0.34	2.00	2.00	0.00
1,400.00	4.00	169.03	1,399.84	-6.85	1.33	-1.35	2.00	2.00	0.00
1,500.00	6.00	169.03	1,499.45	-15.41	2.99	-3.04	2.00	2.00	0.00
1,600.00	8.00	169.03	1,598.70	-27.37	5.31	-5.39	2.00	2.00	0.00
1,700.00	10.00	169.03	1,697.47	-42.73	8.28	-8.42	2.00	2.00	0.00
1,800.00	10.00	169.03	1,795.95	-59.77	11.59	-11.78	0.00	0.00	0.00
1,900.00	10.00	169.03	1,894.43	-76.82	14.89	-15.13	0.00	0.00	0.00
2,000.00	10.00	169.03	1,992.91	-93.87	18.20	-18.49	0.00	0.00	0.00
2,100.00	10.00	169.03	2,091.39	-110.92	21.50	-21.85	0.00	0.00	0.00
2,200.00	10.00	169.03	2,189.87	-127.96	24.81	-25.21	0.00	0.00	0.00
2,300.00	10.00	169.03	2,288.35	-145.01	28.11	-28.57	0.00	0.00	0.00
2,400.00	10.00	169.03	2,386.83	-162.06	31.42	-31.93	0.00	0.00	0.00
2,500.00	10.00	169.03	2,485.31	-179.11	34.72	-35.28	0.00	0.00	0.00
2,600.00	10.00	169.03	2,583.79	-196.15	38.03	-38.64	0.00	0.00	0.00
2,700.00	10.00	169.03	2,682.27	-213.20	41.33	-42.00	0.00	0.00	0.00
2,800.00	10.00	169.03	2,780.75	-230.25	44.64	-45.36	0.00	0.00	0.00
2,900.00	10.00	169.03	2,879.23	-247.30	47.94	-48.72	0.00	0.00	0.00
3,000.00	10.00	169.03	2,977.72	-264.34	51.24	-52.07	0.00	0.00	0.00
3,100.00	10.00	169.03	3,076.20	-281.39	54.55	-55.43	0.00	0.00	0.00
3,200.00	10.00	169.03	3,174.68	-298.44	57.85	-58.79	0.00	0.00	0.00
3,300.00	10.00	169.03	3,273.16	-315.49	61.16	-62.15	0.00	0.00	0.00
3,400.00	10.00	169.03	3,371.64	-332.53	64.46	-65.51	0.00	0.00	0.00
3,500.00	10.00	169.03	3,470.12	-349.58	67.77	-68.87	0.00	0.00	0.00
3,600.00	10.00	169.03	3,568.60	-366.63	71.07	-72.22	0.00	0.00	0.00
3,700.00	10.00	169.03	3,667.08	-383.68	74.38	-75.58	0.00	0.00	0.00
3,800.00	10.00	169.03	3,765.56	-400.72	77.68	-78.94	0.00	0.00	0.00
3,900.00	10.00	169.03	3,864.04	-417.77	80.99	-82.30	0.00	0.00	0.00
4,000.00	10.00	169.03	3,962.52	-434.82	84.29	-85.66	0.00	0.00	0.00
4,100.00	10.00	169.03	4,061.00	-451.87	87.60	-89.02	0.00	0.00	0.00
4,200.00	10.00	169.03	4,159.48	-468.91	90.90	-92.37	0.00	0.00	0.00
4,300.00	10.00	169.03	4,257.97	-485.96	94.21	-95.73	0.00	0.00	0.00
4,400.00	10.00	169.03	4,356.45	-503.01	97.51	-99.09	0.00	0.00	0.00
4,500.00	10.00	169.03	4,454.93	-520.06	100.82	-102.45	0.00	0.00	0.00
4,600.00	10.00	169.03	4,553.41	-537.10	104.12	-105.81	0.00	0.00	0.00
4,700.00	10.00	169.03	4,651.89	-554.15	107.43	-109.17	0.00	0.00	0.00
4,800.00	10.00	169.03	4,750.37	-571.20	110.73	-112.52	0.00	0.00	0.00
4,900.00	10.00	169.03	4,848.85	-588.25	114.03	-115.88	0.00	0.00	0.00
5,000.00	10.00	169.03	4,947.33	-605.29	117.34	-119.24	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,100.00	10.00	169.03	5,045.81	-622.34	120.64	-122.60	0.00	0.00	0.00	
5,200.00	10.00	169.03	5,144.29	-639.39	123.95	-125.96	0.00	0.00	0.00	
5,300.00	10.00	169.03	5,242.77	-656.44	127.25	-129.32	0.00	0.00	0.00	
5,400.00	10.00	169.03	5,341.25	-673.48	130.56	-132.67	0.00	0.00	0.00	
5,500.00	10.00	169.03	5,439.73	-690.53	133.86	-136.03	0.00	0.00	0.00	
5,600.00	10.00	169.03	5,538.22	-707.58	137.17	-139.39	0.00	0.00	0.00	
5,700.00	10.00	169.03	5,636.70	-724.63	140.47	-142.75	0.00	0.00	0.00	
5,800.00	10.00	169.03	5,735.18	-741.67	143.78	-146.11	0.00	0.00	0.00	
5,900.00	10.00	169.03	5,833.66	-758.72	147.08	-149.46	0.00	0.00	0.00	
6,000.00	10.00	169.03	5,932.14	-775.77	150.39	-152.82	0.00	0.00	0.00	
6,100.00	10.00	169.03	6,030.62	-792.82	153.69	-156.18	0.00	0.00	0.00	
6,200.00	10.00	169.03	6,129.10	-809.86	157.00	-159.54	0.00	0.00	0.00	
6,300.00	10.00	169.03	6,227.58	-826.91	160.30	-162.90	0.00	0.00	0.00	
6,400.00	10.00	169.03	6,326.06	-843.96	163.61	-166.26	0.00	0.00	0.00	
6,500.00	10.00	169.03	6,424.54	-861.00	166.91	-169.61	0.00	0.00	0.00	
6,600.00	10.00	169.03	6,523.02	-878.05	170.22	-172.97	0.00	0.00	0.00	
6,700.00	10.00	169.03	6,621.50	-895.10	173.52	-176.33	0.00	0.00	0.00	
6,800.00	10.00	169.03	6,719.99	-912.15	176.82	-179.69	0.00	0.00	0.00	
6,900.00	10.00	169.03	6,818.47	-929.19	180.13	-183.05	0.00	0.00	0.00	
7,000.00	10.00	169.03	6,916.95	-946.24	183.43	-186.41	0.00	0.00	0.00	
7,100.00	10.00	169.03	7,015.43	-963.29	186.74	-189.76	0.00	0.00	0.00	
7,136.56	10.00	169.03	7,051.44	-969.52	187.95	-190.99	0.00	0.00	0.00	
7,200.00	8.73	169.03	7,114.03	-979.66	189.91	-192.99	2.00	-2.00	0.00	
7,300.00	6.73	169.03	7,213.11	-992.86	192.47	-195.59	2.00	-2.00	0.00	
7,400.00	4.73	169.03	7,312.61	-1,002.67	194.37	-197.52	2.00	-2.00	0.00	
7,500.00	2.73	169.03	7,412.39	-1,009.06	195.61	-198.78	2.00	-2.00	0.00	
7,600.00	0.73	169.03	7,512.34	-1,012.02	196.19	-199.36	2.00	-2.00	0.00	
7,636.56	0.00	0.00	7,548.90	-1,012.25	196.23	-199.41	2.00	-2.00	0.00	
7,700.00	0.00	0.00	7,612.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
7,800.00	0.00	0.00	7,712.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
7,900.00	0.00	0.00	7,812.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,000.00	0.00	0.00	7,912.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,100.00	0.00	0.00	8,012.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,200.00	0.00	0.00	8,112.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,300.00	0.00	0.00	8,212.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,400.00	0.00	0.00	8,312.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,500.00	0.00	0.00	8,412.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,600.00	0.00	0.00	8,512.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,700.00	0.00	0.00	8,612.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,800.00	0.00	0.00	8,712.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,900.00	0.00	0.00	8,812.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
9,000.00	0.00	0.00	8,912.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,100.00	0.00	0.00	9,012.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
9,155.16	0.00	0.00	9,067.50	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
[WillLake15#7H]FTP										
9,175.00	2.38	270.18	9,087.33	-1,012.25	195.82	-199.00	12.00	12.00	0.00	
9,200.00	5.38	270.18	9,112.27	-1,012.24	194.13	-197.31	12.00	12.00	0.00	
9,225.00	8.38	270.18	9,137.09	-1,012.23	191.13	-194.31	12.00	12.00	0.00	
9,250.00	11.38	270.18	9,161.71	-1,012.22	186.84	-190.02	12.00	12.00	0.00	
9,275.00	14.38	270.18	9,186.08	-1,012.20	181.27	-184.45	12.00	12.00	0.00	
9,300.00	17.38	270.18	9,210.13	-1,012.18	174.43	-177.61	12.00	12.00	0.00	
9,325.00	20.38	270.18	9,233.78	-1,012.16	166.34	-169.52	12.00	12.00	0.00	
9,350.00	23.38	270.18	9,256.97	-1,012.13	157.03	-160.20	12.00	12.00	0.00	
9,375.00	26.38	270.18	9,279.65	-1,012.10	146.51	-149.69	12.00	12.00	0.00	
9,400.00	29.38	270.18	9,301.75	-1,012.06	134.82	-138.00	12.00	12.00	0.00	
9,425.00	32.38	270.18	9,323.20	-1,012.02	121.99	-125.17	12.00	12.00	0.00	
9,450.00	35.38	270.18	9,343.95	-1,011.98	108.05	-111.23	12.00	12.00	0.00	
9,475.00	38.38	270.18	9,363.95	-1,011.93	93.05	-96.23	12.00	12.00	0.00	
9,500.00	41.38	270.18	9,383.13	-1,011.88	77.03	-80.20	12.00	12.00	0.00	
9,525.00	44.38	270.18	9,401.45	-1,011.83	60.02	-63.19	12.00	12.00	0.00	
9,550.00	47.38	270.18	9,418.85	-1,011.77	42.07	-45.25	12.00	12.00	0.00	
9,575.00	50.38	270.18	9,435.29	-1,011.71	23.24	-26.42	12.00	12.00	0.00	
9,600.00	53.38	270.18	9,450.72	-1,011.65	3.57	-6.75	12.00	12.00	0.00	
9,625.00	56.38	270.18	9,465.10	-1,011.59	-16.87	13.70	12.00	12.00	0.00	
9,650.00	59.38	270.18	9,478.39	-1,011.52	-38.04	34.87	12.00	12.00	0.00	
9,675.00	62.38	270.18	9,490.56	-1,011.45	-59.88	56.70	12.00	12.00	0.00	
9,700.00	65.38	270.18	9,501.56	-1,011.38	-82.33	79.15	12.00	12.00	0.00	
9,725.00	68.38	270.18	9,511.38	-1,011.31	-105.32	102.14	12.00	12.00	0.00	
9,750.00	71.38	270.18	9,519.97	-1,011.24	-128.79	125.61	12.00	12.00	0.00	
9,775.00	74.38	270.18	9,527.33	-1,011.16	-152.68	149.50	12.00	12.00	0.00	
9,800.00	77.38	270.18	9,533.43	-1,011.09	-176.92	173.74	12.00	12.00	0.00	
9,825.00	80.38	270.18	9,538.25	-1,011.01	-201.45	198.27	12.00	12.00	0.00	
9,850.00	83.38	270.18	9,541.78	-1,010.93	-226.19	223.02	12.00	12.00	0.00	
9,875.00	86.38	270.18	9,544.01	-1,010.86	-251.09	247.91	12.00	12.00	0.00	
9,900.00	89.38	270.18	9,544.94	-1,010.78	-276.07	272.89	12.00	12.00	0.00	
9,913.49	91.00	270.18	9,544.89	-1,010.74	-289.55	286.38	12.00	12.00	0.00	
10,000.00	91.00	270.18	9,543.38	-1,010.47	-376.06	372.88	0.00	0.00	0.00	
10,100.00	91.00	270.18	9,541.64	-1,010.15	-476.04	472.86	0.00	0.00	0.00	
10,200.00	91.00	270.18	9,539.90	-1,009.84	-576.02	572.85	0.00	0.00	0.00	
10,300.00	91.00	270.18	9,538.16	-1,009.53	-676.01	672.83	0.00	0.00	0.00	
10,400.00	91.00	270.18	9,536.41	-1,009.22	-775.99	772.82	0.00	0.00	0.00	
10,500.00	91.00	270.18	9,534.67	-1,008.91	-875.98	872.80	0.00	0.00	0.00	
10,600.00	91.00	270.18	9,532.93	-1,008.60	-975.96	972.79	0.00	0.00	0.00	
10,700.00	91.00	270.18	9,531.18	-1,008.28	-1,075.95	1,072.77	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,800.00	91.00	270.18	9,529.44	-1,007.97	-1,175.93	1,172.76	0.00	0.00	0.00	
10,900.00	91.00	270.18	9,527.70	-1,007.66	-1,275.91	1,272.74	0.00	0.00	0.00	
11,000.00	91.00	270.18	9,525.96	-1,007.35	-1,375.90	1,372.73	0.00	0.00	0.00	
11,100.00	91.00	270.18	9,524.21	-1,007.04	-1,475.88	1,472.71	0.00	0.00	0.00	
11,200.00	91.00	270.18	9,522.47	-1,006.73	-1,575.87	1,572.70	0.00	0.00	0.00	
11,300.00	91.00	270.18	9,520.73	-1,006.41	-1,675.85	1,672.68	0.00	0.00	0.00	
11,400.00	91.00	270.18	9,518.98	-1,006.10	-1,775.84	1,772.67	0.00	0.00	0.00	
11,500.00	91.00	270.18	9,517.24	-1,005.79	-1,875.82	1,872.65	0.00	0.00	0.00	
11,600.00	91.00	270.18	9,515.50	-1,005.48	-1,975.80	1,972.64	0.00	0.00	0.00	
11,700.00	91.00	270.18	9,513.76	-1,005.17	-2,075.79	2,072.62	0.00	0.00	0.00	
11,800.00	91.00	270.18	9,512.01	-1,004.86	-2,175.77	2,172.61	0.00	0.00	0.00	
11,900.00	91.00	270.18	9,510.27	-1,004.54	-2,275.76	2,272.59	0.00	0.00	0.00	
12,000.00	91.00	270.18	9,508.53	-1,004.23	-2,375.74	2,372.58	0.00	0.00	0.00	
12,100.00	91.00	270.18	9,506.78	-1,003.92	-2,475.73	2,472.56	0.00	0.00	0.00	
12,200.00	91.00	270.18	9,505.04	-1,003.61	-2,575.71	2,572.55	0.00	0.00	0.00	
12,300.00	91.00	270.18	9,503.30	-1,003.30	-2,675.70	2,672.53	0.00	0.00	0.00	
12,400.00	91.00	270.18	9,501.56	-1,002.99	-2,775.68	2,772.51	0.00	0.00	0.00	
12,500.00	91.00	270.18	9,499.81	-1,002.67	-2,875.66	2,872.50	0.00	0.00	0.00	
12,600.00	91.00	270.18	9,498.07	-1,002.36	-2,975.65	2,972.48	0.00	0.00	0.00	
12,700.00	91.00	270.18	9,496.33	-1,002.05	-3,075.63	3,072.47	0.00	0.00	0.00	
12,800.00	91.00	270.18	9,494.58	-1,001.74	-3,175.62	3,172.45	0.00	0.00	0.00	
12,900.00	91.00	270.18	9,492.84	-1,001.43	-3,275.60	3,272.44	0.00	0.00	0.00	
13,000.00	91.00	270.18	9,491.10	-1,001.12	-3,375.59	3,372.42	0.00	0.00	0.00	
13,100.00	91.00	270.18	9,489.36	-1,000.80	-3,475.57	3,472.41	0.00	0.00	0.00	
13,200.00	91.00	270.18	9,487.61	-1,000.49	-3,575.55	3,572.39	0.00	0.00	0.00	
13,300.00	91.00	270.18	9,485.87	-1,000.18	-3,675.54	3,672.38	0.00	0.00	0.00	
13,400.00	91.00	270.18	9,484.13	-999.87	-3,775.52	3,772.36	0.00	0.00	0.00	
13,500.00	91.00	270.18	9,482.38	-999.56	-3,875.51	3,872.35	0.00	0.00	0.00	
13,600.00	91.00	270.18	9,480.64	-999.25	-3,975.49	3,972.33	0.00	0.00	0.00	
13,700.00	91.00	270.18	9,478.90	-998.93	-4,075.48	4,072.32	0.00	0.00	0.00	
13,800.00	91.00	270.18	9,477.16	-998.62	-4,175.46	4,172.30	0.00	0.00	0.00	
13,900.00	91.00	270.18	9,475.41	-998.31	-4,275.44	4,272.29	0.00	0.00	0.00	
14,000.00	91.00	270.18	9,473.67	-998.00	-4,375.43	4,372.27	0.00	0.00	0.00	
14,100.00	91.00	270.18	9,471.93	-997.69	-4,475.41	4,472.26	0.00	0.00	0.00	
14,200.00	91.00	270.18	9,470.18	-997.38	-4,575.40	4,572.24	0.00	0.00	0.00	
14,300.00	91.00	270.18	9,468.44	-997.06	-4,675.38	4,672.23	0.00	0.00	0.00	
14,400.00	91.00	270.18	9,466.70	-996.75	-4,775.37	4,772.21	0.00	0.00	0.00	
14,500.00	91.00	270.18	9,464.96	-996.44	-4,875.35	4,872.20	0.00	0.00	0.00	
14,510.07	91.00	270.18	9,464.78	-996.41	-4,885.42	4,882.27	0.00	0.00	0.00	
[WillLake15#7H]LTP/BHL										



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

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
[WillLake15#7H]FTP - plan hits target center - Point	0.00	0.00	9,067.50	-1,012.25	196.23	440,777.82	582,402.11	32° 12' 41.5244849 N	104° 4' 0.8488349 W
[WillLake15#7H]LTP/BH - plan hits target center - Point	0.00	0.00	9,464.78	-996.41	-4,885.42	440,793.66	577,320.46	32° 12' 41.8020533 N	104° 4' 59.9977335 W

Checked By: _____ Approved By: _____ Date: _____



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

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

Site		Willow Lake 15 (3-5-7)			
Site Position:		Northing:	441,850.05 usft	Latitude:	32° 12' 52.1403960 N
From:	Map	Easting:	582,205.88 usft	Longitude:	104° 4' 3.1020441 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.14 °

Well	WXY #7H					
Well Position	+N/-S	0.00 usft	Northing:	441,790.07 usft	Latitude:	32° 12' 51.5468164 N
	+E/-W	0.00 usft	Easting:	582,205.88 usft	Longitude:	104° 4' 3.1037708 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	2,993.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/31/2020	7.02	59.93	47,821.70

Design	Prelim Plan A				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	270.18	

Survey Tool Program	Date	1/31/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	14,510.07	Prelim Plan A (OH)	MWD+IFR1	OWSG MWD + IFR1	

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
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	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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	2.00	169.03	1,299.98	-1.71	0.33	-0.34	2.00	2.00	0.00
1,400.00	4.00	169.03	1,399.84	-6.85	1.33	-1.35	2.00	2.00	0.00
1,500.00	6.00	169.03	1,499.45	-15.41	2.99	-3.04	2.00	2.00	0.00
1,600.00	8.00	169.03	1,598.70	-27.37	5.31	-5.39	2.00	2.00	0.00
1,700.00	10.00	169.03	1,697.47	-42.73	8.28	-8.42	2.00	2.00	0.00
1,800.00	10.00	169.03	1,795.95	-59.77	11.59	-11.78	0.00	0.00	0.00
1,900.00	10.00	169.03	1,894.43	-76.82	14.89	-15.13	0.00	0.00	0.00
2,000.00	10.00	169.03	1,992.91	-93.87	18.20	-18.49	0.00	0.00	0.00
2,100.00	10.00	169.03	2,091.39	-110.92	21.50	-21.85	0.00	0.00	0.00
2,200.00	10.00	169.03	2,189.87	-127.96	24.81	-25.21	0.00	0.00	0.00
2,300.00	10.00	169.03	2,288.35	-145.01	28.11	-28.57	0.00	0.00	0.00
2,400.00	10.00	169.03	2,386.83	-162.06	31.42	-31.93	0.00	0.00	0.00
2,500.00	10.00	169.03	2,485.31	-179.11	34.72	-35.28	0.00	0.00	0.00
2,600.00	10.00	169.03	2,583.79	-196.15	38.03	-38.64	0.00	0.00	0.00
2,700.00	10.00	169.03	2,682.27	-213.20	41.33	-42.00	0.00	0.00	0.00
2,800.00	10.00	169.03	2,780.75	-230.25	44.64	-45.36	0.00	0.00	0.00
2,900.00	10.00	169.03	2,879.23	-247.30	47.94	-48.72	0.00	0.00	0.00
3,000.00	10.00	169.03	2,977.72	-264.34	51.24	-52.07	0.00	0.00	0.00
3,100.00	10.00	169.03	3,076.20	-281.39	54.55	-55.43	0.00	0.00	0.00
3,200.00	10.00	169.03	3,174.68	-298.44	57.85	-58.79	0.00	0.00	0.00
3,300.00	10.00	169.03	3,273.16	-315.49	61.16	-62.15	0.00	0.00	0.00
3,400.00	10.00	169.03	3,371.64	-332.53	64.46	-65.51	0.00	0.00	0.00
3,500.00	10.00	169.03	3,470.12	-349.58	67.77	-68.87	0.00	0.00	0.00
3,600.00	10.00	169.03	3,568.60	-366.63	71.07	-72.22	0.00	0.00	0.00
3,700.00	10.00	169.03	3,667.08	-383.68	74.38	-75.58	0.00	0.00	0.00
3,800.00	10.00	169.03	3,765.56	-400.72	77.68	-78.94	0.00	0.00	0.00
3,900.00	10.00	169.03	3,864.04	-417.77	80.99	-82.30	0.00	0.00	0.00
4,000.00	10.00	169.03	3,962.52	-434.82	84.29	-85.66	0.00	0.00	0.00
4,100.00	10.00	169.03	4,061.00	-451.87	87.60	-89.02	0.00	0.00	0.00
4,200.00	10.00	169.03	4,159.48	-468.91	90.90	-92.37	0.00	0.00	0.00
4,300.00	10.00	169.03	4,257.97	-485.96	94.21	-95.73	0.00	0.00	0.00
4,400.00	10.00	169.03	4,356.45	-503.01	97.51	-99.09	0.00	0.00	0.00
4,500.00	10.00	169.03	4,454.93	-520.06	100.82	-102.45	0.00	0.00	0.00
4,600.00	10.00	169.03	4,553.41	-537.10	104.12	-105.81	0.00	0.00	0.00
4,700.00	10.00	169.03	4,651.89	-554.15	107.43	-109.17	0.00	0.00	0.00
4,800.00	10.00	169.03	4,750.37	-571.20	110.73	-112.52	0.00	0.00	0.00
4,900.00	10.00	169.03	4,848.85	-588.25	114.03	-115.88	0.00	0.00	0.00
5,000.00	10.00	169.03	4,947.33	-605.29	117.34	-119.24	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,100.00	10.00	169.03	5,045.81	-622.34	120.64	-122.60	0.00	0.00	0.00	
5,200.00	10.00	169.03	5,144.29	-639.39	123.95	-125.96	0.00	0.00	0.00	
5,300.00	10.00	169.03	5,242.77	-656.44	127.25	-129.32	0.00	0.00	0.00	
5,400.00	10.00	169.03	5,341.25	-673.48	130.56	-132.67	0.00	0.00	0.00	
5,500.00	10.00	169.03	5,439.73	-690.53	133.86	-136.03	0.00	0.00	0.00	
5,600.00	10.00	169.03	5,538.22	-707.58	137.17	-139.39	0.00	0.00	0.00	
5,700.00	10.00	169.03	5,636.70	-724.63	140.47	-142.75	0.00	0.00	0.00	
5,800.00	10.00	169.03	5,735.18	-741.67	143.78	-146.11	0.00	0.00	0.00	
5,900.00	10.00	169.03	5,833.66	-758.72	147.08	-149.46	0.00	0.00	0.00	
6,000.00	10.00	169.03	5,932.14	-775.77	150.39	-152.82	0.00	0.00	0.00	
6,100.00	10.00	169.03	6,030.62	-792.82	153.69	-156.18	0.00	0.00	0.00	
6,200.00	10.00	169.03	6,129.10	-809.86	157.00	-159.54	0.00	0.00	0.00	
6,300.00	10.00	169.03	6,227.58	-826.91	160.30	-162.90	0.00	0.00	0.00	
6,400.00	10.00	169.03	6,326.06	-843.96	163.61	-166.26	0.00	0.00	0.00	
6,500.00	10.00	169.03	6,424.54	-861.00	166.91	-169.61	0.00	0.00	0.00	
6,600.00	10.00	169.03	6,523.02	-878.05	170.22	-172.97	0.00	0.00	0.00	
6,700.00	10.00	169.03	6,621.50	-895.10	173.52	-176.33	0.00	0.00	0.00	
6,800.00	10.00	169.03	6,719.99	-912.15	176.82	-179.69	0.00	0.00	0.00	
6,900.00	10.00	169.03	6,818.47	-929.19	180.13	-183.05	0.00	0.00	0.00	
7,000.00	10.00	169.03	6,916.95	-946.24	183.43	-186.41	0.00	0.00	0.00	
7,100.00	10.00	169.03	7,015.43	-963.29	186.74	-189.76	0.00	0.00	0.00	
7,136.56	10.00	169.03	7,051.44	-969.52	187.95	-190.99	0.00	0.00	0.00	
7,200.00	8.73	169.03	7,114.03	-979.66	189.91	-192.99	2.00	-2.00	0.00	
7,300.00	6.73	169.03	7,213.11	-992.86	192.47	-195.59	2.00	-2.00	0.00	
7,400.00	4.73	169.03	7,312.61	-1,002.67	194.37	-197.52	2.00	-2.00	0.00	
7,500.00	2.73	169.03	7,412.39	-1,009.06	195.61	-198.78	2.00	-2.00	0.00	
7,600.00	0.73	169.03	7,512.34	-1,012.02	196.19	-199.36	2.00	-2.00	0.00	
7,636.56	0.00	0.00	7,548.90	-1,012.25	196.23	-199.41	2.00	-2.00	0.00	
7,700.00	0.00	0.00	7,612.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
7,800.00	0.00	0.00	7,712.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
7,900.00	0.00	0.00	7,812.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,000.00	0.00	0.00	7,912.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,100.00	0.00	0.00	8,012.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,200.00	0.00	0.00	8,112.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,300.00	0.00	0.00	8,212.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,400.00	0.00	0.00	8,312.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,500.00	0.00	0.00	8,412.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,600.00	0.00	0.00	8,512.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,700.00	0.00	0.00	8,612.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,800.00	0.00	0.00	8,712.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
8,900.00	0.00	0.00	8,812.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	
9,000.00	0.00	0.00	8,912.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00	



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,100.00	0.00	0.00	9,012.34	-1,012.25	196.23	-199.41	0.00	0.00	0.00
9,155.16	0.00	0.00	9,067.50	-1,012.25	196.23	-199.41	0.00	0.00	0.00
[WillLake15#7H]FTP									
9,175.00	2.38	270.18	9,087.33	-1,012.25	195.82	-199.00	12.00	12.00	0.00
9,200.00	5.38	270.18	9,112.27	-1,012.24	194.13	-197.31	12.00	12.00	0.00
9,225.00	8.38	270.18	9,137.09	-1,012.23	191.13	-194.31	12.00	12.00	0.00
9,250.00	11.38	270.18	9,161.71	-1,012.22	186.84	-190.02	12.00	12.00	0.00
9,275.00	14.38	270.18	9,186.08	-1,012.20	181.27	-184.45	12.00	12.00	0.00
9,300.00	17.38	270.18	9,210.13	-1,012.18	174.43	-177.61	12.00	12.00	0.00
9,325.00	20.38	270.18	9,233.78	-1,012.16	166.34	-169.52	12.00	12.00	0.00
9,350.00	23.38	270.18	9,256.97	-1,012.13	157.03	-160.20	12.00	12.00	0.00
9,375.00	26.38	270.18	9,279.65	-1,012.10	146.51	-149.69	12.00	12.00	0.00
9,400.00	29.38	270.18	9,301.75	-1,012.06	134.82	-138.00	12.00	12.00	0.00
9,425.00	32.38	270.18	9,323.20	-1,012.02	121.99	-125.17	12.00	12.00	0.00
9,450.00	35.38	270.18	9,343.95	-1,011.98	108.05	-111.23	12.00	12.00	0.00
9,475.00	38.38	270.18	9,363.95	-1,011.93	93.05	-96.23	12.00	12.00	0.00
9,500.00	41.38	270.18	9,383.13	-1,011.88	77.03	-80.20	12.00	12.00	0.00
9,525.00	44.38	270.18	9,401.45	-1,011.83	60.02	-63.19	12.00	12.00	0.00
9,550.00	47.38	270.18	9,418.85	-1,011.77	42.07	-45.25	12.00	12.00	0.00
9,575.00	50.38	270.18	9,435.29	-1,011.71	23.24	-26.42	12.00	12.00	0.00
9,600.00	53.38	270.18	9,450.72	-1,011.65	3.57	-6.75	12.00	12.00	0.00
9,625.00	56.38	270.18	9,465.10	-1,011.59	-16.87	13.70	12.00	12.00	0.00
9,650.00	59.38	270.18	9,478.39	-1,011.52	-38.04	34.87	12.00	12.00	0.00
9,675.00	62.38	270.18	9,490.56	-1,011.45	-59.88	56.70	12.00	12.00	0.00
9,700.00	65.38	270.18	9,501.56	-1,011.38	-82.33	79.15	12.00	12.00	0.00
9,725.00	68.38	270.18	9,511.38	-1,011.31	-105.32	102.14	12.00	12.00	0.00
9,750.00	71.38	270.18	9,519.97	-1,011.24	-128.79	125.61	12.00	12.00	0.00
9,775.00	74.38	270.18	9,527.33	-1,011.16	-152.68	149.50	12.00	12.00	0.00
9,800.00	77.38	270.18	9,533.43	-1,011.09	-176.92	173.74	12.00	12.00	0.00
9,825.00	80.38	270.18	9,538.25	-1,011.01	-201.45	198.27	12.00	12.00	0.00
9,850.00	83.38	270.18	9,541.78	-1,010.93	-226.19	223.02	12.00	12.00	0.00
9,875.00	86.38	270.18	9,544.01	-1,010.86	-251.09	247.91	12.00	12.00	0.00
9,900.00	89.38	270.18	9,544.94	-1,010.78	-276.07	272.89	12.00	12.00	0.00
9,913.49	91.00	270.18	9,544.89	-1,010.74	-289.55	286.38	12.00	12.00	0.00
10,000.00	91.00	270.18	9,543.38	-1,010.47	-376.06	372.88	0.00	0.00	0.00
10,100.00	91.00	270.18	9,541.64	-1,010.15	-476.04	472.86	0.00	0.00	0.00
10,200.00	91.00	270.18	9,539.90	-1,009.84	-576.02	572.85	0.00	0.00	0.00
10,300.00	91.00	270.18	9,538.16	-1,009.53	-676.01	672.83	0.00	0.00	0.00
10,400.00	91.00	270.18	9,536.41	-1,009.22	-775.99	772.82	0.00	0.00	0.00
10,500.00	91.00	270.18	9,534.67	-1,008.91	-875.98	872.80	0.00	0.00	0.00
10,600.00	91.00	270.18	9,532.93	-1,008.60	-975.96	972.79	0.00	0.00	0.00
10,700.00	91.00	270.18	9,531.18	-1,008.28	-1,075.95	1,072.77	0.00	0.00	0.00



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,800.00	91.00	270.18	9,529.44	-1,007.97	-1,175.93	1,172.76	0.00	0.00	0.00	
10,900.00	91.00	270.18	9,527.70	-1,007.66	-1,275.91	1,272.74	0.00	0.00	0.00	
11,000.00	91.00	270.18	9,525.96	-1,007.35	-1,375.90	1,372.73	0.00	0.00	0.00	
11,100.00	91.00	270.18	9,524.21	-1,007.04	-1,475.88	1,472.71	0.00	0.00	0.00	
11,200.00	91.00	270.18	9,522.47	-1,006.73	-1,575.87	1,572.70	0.00	0.00	0.00	
11,300.00	91.00	270.18	9,520.73	-1,006.41	-1,675.85	1,672.68	0.00	0.00	0.00	
11,400.00	91.00	270.18	9,518.98	-1,006.10	-1,775.84	1,772.67	0.00	0.00	0.00	
11,500.00	91.00	270.18	9,517.24	-1,005.79	-1,875.82	1,872.65	0.00	0.00	0.00	
11,600.00	91.00	270.18	9,515.50	-1,005.48	-1,975.80	1,972.64	0.00	0.00	0.00	
11,700.00	91.00	270.18	9,513.76	-1,005.17	-2,075.79	2,072.62	0.00	0.00	0.00	
11,800.00	91.00	270.18	9,512.01	-1,004.86	-2,175.77	2,172.61	0.00	0.00	0.00	
11,900.00	91.00	270.18	9,510.27	-1,004.54	-2,275.76	2,272.59	0.00	0.00	0.00	
12,000.00	91.00	270.18	9,508.53	-1,004.23	-2,375.74	2,372.58	0.00	0.00	0.00	
12,100.00	91.00	270.18	9,506.78	-1,003.92	-2,475.73	2,472.56	0.00	0.00	0.00	
12,200.00	91.00	270.18	9,505.04	-1,003.61	-2,575.71	2,572.55	0.00	0.00	0.00	
12,300.00	91.00	270.18	9,503.30	-1,003.30	-2,675.70	2,672.53	0.00	0.00	0.00	
12,400.00	91.00	270.18	9,501.56	-1,002.99	-2,775.68	2,772.51	0.00	0.00	0.00	
12,500.00	91.00	270.18	9,499.81	-1,002.67	-2,875.66	2,872.50	0.00	0.00	0.00	
12,600.00	91.00	270.18	9,498.07	-1,002.36	-2,975.65	2,972.48	0.00	0.00	0.00	
12,700.00	91.00	270.18	9,496.33	-1,002.05	-3,075.63	3,072.47	0.00	0.00	0.00	
12,800.00	91.00	270.18	9,494.58	-1,001.74	-3,175.62	3,172.45	0.00	0.00	0.00	
12,900.00	91.00	270.18	9,492.84	-1,001.43	-3,275.60	3,272.44	0.00	0.00	0.00	
13,000.00	91.00	270.18	9,491.10	-1,001.12	-3,375.59	3,372.42	0.00	0.00	0.00	
13,100.00	91.00	270.18	9,489.36	-1,000.80	-3,475.57	3,472.41	0.00	0.00	0.00	
13,200.00	91.00	270.18	9,487.61	-1,000.49	-3,575.55	3,572.39	0.00	0.00	0.00	
13,300.00	91.00	270.18	9,485.87	-1,000.18	-3,675.54	3,672.38	0.00	0.00	0.00	
13,400.00	91.00	270.18	9,484.13	-999.87	-3,775.52	3,772.36	0.00	0.00	0.00	
13,500.00	91.00	270.18	9,482.38	-999.56	-3,875.51	3,872.35	0.00	0.00	0.00	
13,600.00	91.00	270.18	9,480.64	-999.25	-3,975.49	3,972.33	0.00	0.00	0.00	
13,700.00	91.00	270.18	9,478.90	-998.93	-4,075.48	4,072.32	0.00	0.00	0.00	
13,800.00	91.00	270.18	9,477.16	-998.62	-4,175.46	4,172.30	0.00	0.00	0.00	
13,900.00	91.00	270.18	9,475.41	-998.31	-4,275.44	4,272.29	0.00	0.00	0.00	
14,000.00	91.00	270.18	9,473.67	-998.00	-4,375.43	4,372.27	0.00	0.00	0.00	
14,100.00	91.00	270.18	9,471.93	-997.69	-4,475.41	4,472.26	0.00	0.00	0.00	
14,200.00	91.00	270.18	9,470.18	-997.38	-4,575.40	4,572.24	0.00	0.00	0.00	
14,300.00	91.00	270.18	9,468.44	-997.06	-4,675.38	4,672.23	0.00	0.00	0.00	
14,400.00	91.00	270.18	9,466.70	-996.75	-4,775.37	4,772.21	0.00	0.00	0.00	
14,500.00	91.00	270.18	9,464.96	-996.44	-4,875.35	4,872.20	0.00	0.00	0.00	
14,510.07	91.00	270.18	9,464.78	-996.41	-4,885.42	4,882.27	0.00	0.00	0.00	
[WillLake15#7H]LTP/BHL										



Pro Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WXY #7H
Project:	Eddy County, NM	TVD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Site:	Willow Lake 15 (3-5-7)	MD Reference:	Well @ 3020.00usft (GL: 2993' + KB: 27' (PD582))
Well:	WXY #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

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
[WillLake15#7H]FTP - plan hits target center - Point	0.00	0.00	9,067.50	-1,012.25	196.23	440,777.82	582,402.11	32° 12' 41.5244849 N	104° 4' 0.8488349 W
[WillLake15#7H]LTP/BH - plan hits target center - Point	0.00	0.00	9,464.78	-996.41	-4,885.42	440,793.66	577,320.46	32° 12' 41.8020533 N	104° 4' 59.9977335 W

Checked By: _____ Approved By: _____ Date: _____