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Directional Survey**

NM OIL CONSERVATION
ARTESIA DISTRICT

MAR 26 2018

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Marathon Oil Permian, LLC

Eddy County, NM (NAD27)

Black River

15-10 State Com X 6H

30-015-44069

OH

Survey: SDI Survey #1

Standard Survey Report

27 December, 2017



www.scientificdrilling.com

Survey Report

Company: Marathon Oil Permian, LLC
Project: Eddy County, NM (NAD27)
Site: Black River
Well: 15-10 State Com X 6H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 15-10 State Com X 6H
TVD Reference: KB = 28' @ 3260.00usft (Patterson 244)
MD Reference: KB = 28' @ 3260.00usft (Patterson 244)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland District

Project	Eddy County, NM (NAD27)		
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		Using geodetic scale factor

Site	Black River		
Site Position:		Northing:	440,342.60 usft
From:	Map	Easting:	549,619.27 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 12' 37.862 N
		Longitude:	104° 10' 22.443 W
		Grid Convergence:	0.09 °

Well	15-10 State Com X 6H		
Well Position	+N/-S	0.00 usft	Northing: 440,342.11 usft
	+E/-W	0.00 usft	Easting: 549,649.27 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32° 12' 37.856 N
		Longitude:	104° 10' 22.094 W
		Ground Level:	3,232.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	HDGM	8/28/2017	7.40
		Dip Angle (°)	59.98
		Field Strength (nT)	48,048

Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.00	0.00	0.00
		Direction (bearing)	0.00

Survey Program	Date 12/27/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
166.00	19,067.00	SDI Survey #1 (OH)	MWD+HDGM
			Description
			OWSG MWD + HDGM

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	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
166.00	1.00	210.70	165.99	-1.25	-0.74	-1.25	0.60	0.60	0.00
226.00	0.97	216.50	225.98	-2.10	-1.31	-2.10	0.17	-0.05	9.67
316.00	1.36	205.15	315.96	-3.68	-2.22	-3.68	0.50	0.43	-12.61
390.00	1.66	213.50	389.94	-5.37	-3.18	-5.37	0.50	0.41	11.28
531.00	1.31	210.12	530.89	-8.47	-5.12	-8.47	0.26	-0.25	-2.40
591.00	1.54	210.19	590.87	-9.76	-5.87	-9.76	0.38	0.38	0.12
682.00	2.00	211.58	681.83	-12.17	-7.31	-12.17	0.51	0.51	1.53
773.00	1.38	221.57	772.79	-14.34	-8.87	-14.34	0.75	-0.68	10.98
864.00	1.40	221.56	863.76	-15.99	-10.34	-15.99	0.02	0.02	-0.01

Survey Report

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Project:	Eddy County, NM (NAD27)	TVD Reference:	KB = 28' @ 3260.00usft (Patterson 244)
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Well:	15-10 State Com X 6H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
954.00	1.56	206.72	953.73	-17.91	-11.62	-17.91	0.46	0.18	-16.49
1,045.00	1.70	221.54	1,044.70	-20.03	-13.07	-20.03	0.49	0.15	16.29
1,136.00	1.53	225.62	1,135.66	-21.89	-14.83	-21.89	0.23	-0.19	4.48
1,228.00	1.41	237.69	1,227.63	-23.35	-16.67	-23.35	0.36	-0.13	13.12
1,319.00	1.31	215.17	1,318.60	-24.80	-18.21	-24.80	0.59	-0.11	-24.75
1,410.00	1.22	220.29	1,409.58	-26.39	-19.44	-26.39	0.16	-0.10	5.63
1,500.00	1.00	169.84	1,499.57	-27.89	-19.92	-27.89	1.07	-0.24	-56.06
1,595.00	2.06	120.38	1,594.54	-29.57	-18.30	-29.57	1.69	1.12	-52.06
1,689.00	2.46	117.84	1,688.46	-31.37	-15.06	-31.37	0.44	0.43	-2.70
1,784.00	2.40	113.61	1,783.38	-33.12	-11.43	-33.12	0.20	-0.06	-4.45
1,878.00	3.33	112.71	1,877.26	-34.96	-7.11	-34.96	0.99	0.99	-0.96
1,972.00	4.04	108.12	1,971.06	-37.04	-1.44	-37.04	0.82	0.76	-4.88
2,067.00	4.59	111.93	2,065.79	-39.50	5.26	-39.50	0.65	0.58	4.01
2,161.00	4.82	120.87	2,159.48	-42.94	12.14	-42.94	0.82	0.24	9.51
2,255.00	3.45	137.66	2,253.24	-47.05	17.44	-47.05	1.93	-1.46	17.86
2,296.00	3.16	145.95	2,294.17	-48.90	18.90	-48.90	1.36	-0.71	20.22
2,356.00	2.99	149.44	2,354.08	-51.62	20.62	-51.62	0.42	-0.28	5.82
2,451.00	2.79	157.08	2,448.96	-55.88	22.78	-55.88	0.46	-0.21	8.04
2,547.00	2.59	179.34	2,544.86	-60.20	23.72	-60.20	1.10	-0.21	23.19
2,642.00	2.87	180.56	2,639.75	-64.73	23.72	-64.73	0.30	0.29	1.28
2,738.00	2.72	179.36	2,735.64	-69.41	23.72	-69.41	0.17	-0.16	-1.25
2,832.00	3.30	201.70	2,829.51	-74.15	22.74	-74.15	1.38	0.62	23.77
2,926.00	3.64	207.97	2,923.34	-79.30	20.34	-79.30	0.54	0.36	6.67
3,020.00	3.57	208.60	3,017.15	-84.51	17.54	-84.51	0.09	-0.07	0.67
3,114.00	3.07	210.73	3,110.99	-89.24	14.86	-89.24	0.55	-0.53	2.27
3,208.00	2.79	206.58	3,204.87	-93.45	12.55	-93.45	0.37	-0.30	-4.41
3,302.00	2.73	208.92	3,298.76	-97.45	10.44	-97.45	0.14	-0.06	2.49
3,396.00	2.53	205.27	3,392.66	-101.29	8.47	-101.29	0.28	-0.21	-3.88
3,490.00	2.32	211.55	3,486.58	-104.79	6.59	-104.79	0.36	-0.22	6.68
3,584.00	2.22	213.70	3,580.50	-107.92	4.59	-107.92	0.14	-0.11	2.29
3,679.00	2.26	213.55	3,675.43	-111.02	2.53	-111.02	0.04	0.04	-0.16
3,773.00	2.21	222.47	3,769.36	-113.90	0.28	-113.90	0.37	-0.05	9.49
3,867.00	1.47	221.36	3,863.31	-116.14	-1.74	-116.14	0.79	-0.79	-1.18
3,961.00	1.04	229.17	3,957.29	-117.60	-3.18	-117.60	0.49	-0.46	8.31
4,055.00	0.95	236.52	4,051.27	-118.59	-4.48	-118.59	0.17	-0.10	7.82
4,149.00	2.24	188.89	4,145.24	-120.83	-5.41	-120.83	1.86	1.37	-50.67
4,243.00	2.52	189.90	4,239.16	-124.69	-6.05	-124.69	0.30	0.30	1.07
4,338.00	2.45	184.61	4,334.07	-128.77	-6.57	-128.77	0.25	-0.07	-5.57
4,432.00	2.43	182.55	4,427.98	-132.76	-6.82	-132.76	0.10	-0.02	-2.19
4,526.00	2.32	185.78	4,521.90	-136.64	-7.10	-136.64	0.18	-0.12	3.44
4,620.00	1.79	182.15	4,615.84	-140.00	-7.35	-140.00	0.58	-0.56	-3.86
4,715.00	1.67	196.74	4,710.80	-142.81	-7.80	-142.81	0.48	-0.13	15.36
4,810.00	1.51	201.27	4,805.76	-145.30	-8.66	-145.30	0.21	-0.17	4.77
4,904.00	1.79	183.61	4,899.72	-147.92	-9.20	-147.92	0.61	0.30	-18.79

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,999.00	2.17	175.40	4,994.67	-151.20	-9.15	-151.20	0.50	0.40	-8.64
5,093.00	1.77	182.15	5,088.61	-154.42	-9.06	-154.42	0.49	-0.43	7.18
5,188.00	1.75	184.88	5,183.57	-157.33	-9.24	-157.33	0.09	-0.02	2.87
5,282.00	1.42	188.87	5,277.53	-159.91	-9.54	-159.91	0.37	-0.35	4.24
5,376.00	1.35	193.06	5,371.50	-162.14	-9.97	-162.14	0.13	-0.07	4.46
5,470.00	2.41	181.04	5,465.45	-165.20	-10.26	-165.20	1.20	1.13	-12.79
5,565.00	3.09	170.50	5,560.34	-169.72	-9.87	-169.72	0.89	0.72	-11.09
5,661.00	3.02	168.90	5,656.21	-174.75	-8.95	-174.75	0.11	-0.07	-1.67
5,755.00	3.01	171.94	5,750.08	-179.63	-8.13	-179.63	0.17	-0.01	3.23
5,849.00	2.30	165.65	5,843.97	-183.90	-7.32	-183.90	0.82	-0.76	-6.69
5,942.00	2.13	170.47	5,936.90	-187.41	-6.57	-187.41	0.27	-0.18	5.18
6,037.00	1.93	148.60	6,031.85	-190.52	-5.44	-190.52	0.84	-0.21	-23.02
6,131.00	1.34	130.03	6,125.81	-192.58	-3.78	-192.58	0.84	-0.63	-19.76
6,225.00	1.44	103.60	6,219.78	-193.56	-1.79	-193.56	0.68	0.11	-28.12
6,319.00	0.93	150.64	6,313.76	-194.50	-0.27	-194.50	1.12	-0.54	50.04
6,413.00	0.39	223.59	6,407.76	-195.40	-0.11	-195.40	0.95	-0.57	77.61
6,507.00	0.80	220.99	6,501.75	-196.13	-0.76	-196.13	0.44	0.44	-2.77
6,601.00	0.88	198.74	6,595.74	-197.31	-1.43	-197.31	0.35	0.09	-23.67
6,695.00	0.69	200.04	6,689.73	-198.52	-1.85	-198.52	0.20	-0.20	1.38
6,789.00	0.84	227.08	6,783.73	-199.52	-2.55	-199.52	0.41	0.16	28.77
6,884.00	1.25	204.95	6,878.71	-200.94	-3.50	-200.94	0.60	0.43	-23.29
6,978.00	1.67	210.58	6,972.68	-203.04	-4.63	-203.04	0.47	0.45	5.99
7,073.00	1.70	224.34	7,067.64	-205.24	-6.32	-205.24	0.43	0.03	14.48
7,165.00	1.70	235.88	7,159.60	-206.99	-8.40	-206.99	0.37	0.00	12.54
7,260.00	1.65	260.26	7,254.56	-208.01	-10.91	-208.01	0.75	-0.05	25.66
7,354.00	2.03	212.48	7,348.52	-209.64	-13.14	-209.64	1.63	0.40	-50.83
7,448.00	2.01	209.55	7,442.46	-212.48	-14.85	-212.48	0.11	-0.02	-3.12
7,542.00	1.74	222.17	7,536.41	-214.97	-16.62	-214.97	0.52	-0.29	13.43
7,637.00	1.42	248.42	7,631.37	-216.47	-18.68	-216.47	0.82	-0.34	27.63
7,731.00	1.69	264.05	7,725.34	-217.04	-21.14	-217.04	0.53	0.29	16.63
7,825.00	1.58	229.23	7,819.30	-218.03	-23.51	-218.03	1.05	-0.12	-37.04
7,919.00	1.67	242.59	7,913.26	-219.51	-25.70	-219.51	0.41	0.10	14.21
8,014.00	2.74	200.93	8,008.20	-222.27	-27.74	-222.27	1.96	1.13	-43.85
8,109.00	2.60	226.12	8,103.10	-225.88	-30.11	-225.88	1.23	-0.15	26.52
8,203.00	1.99	237.19	8,197.02	-228.25	-33.02	-228.25	0.80	-0.65	11.78
8,297.00	2.03	236.87	8,290.97	-230.04	-35.78	-230.04	0.04	0.04	-0.34
8,392.00	1.91	267.24	8,385.91	-231.04	-38.77	-231.04	1.09	-0.13	31.97
8,437.00	1.87	355.38	8,430.90	-230.34	-39.58	-230.34	5.84	-0.09	195.87
8,486.00	6.40	11.62	8,479.76	-226.87	-39.09	-226.87	9.46	9.24	33.14
8,531.00	10.88	18.30	8,524.24	-220.37	-37.25	-220.37	10.19	9.96	14.84
8,581.00	15.75	9.28	8,572.88	-209.19	-34.68	-209.19	10.56	9.74	-18.04
8,626.00	20.18	6.47	8,615.68	-195.44	-32.82	-195.44	10.03	9.84	-6.24
8,675.00	24.34	8.96	8,661.02	-177.06	-30.29	-177.06	8.70	8.49	5.08

Survey Report

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8,720.00	22.71	16.54	8,702.29	-159.57	-26.37	-159.57	7.63	-3.62	16.84	
8,771.00	25.70	18.50	8,748.80	-139.64	-20.06	-139.64	6.07	5.86	3.84	
8,866.00	31.97	17.56	8,831.98	-96.08	-5.92	-96.08	6.62	6.60	-0.99	
8,911.00	35.62	16.32	8,869.37	-72.14	1.36	-72.14	8.25	8.11	-2.76	
8,962.00	39.02	15.52	8,909.92	-42.41	9.83	-42.41	6.73	6.67	-1.57	
9,007.00	43.17	14.37	8,943.83	-13.84	17.44	-13.84	9.37	9.22	-2.56	
9,057.00	46.15	11.90	8,979.39	20.38	25.41	20.38	6.90	5.96	-4.94	
9,090.00	49.09	9.40	9,001.63	44.34	29.90	44.34	10.52	8.91	-7.58	
9,121.00	53.84	9.16	9,020.94	68.26	33.81	68.26	15.33	15.32	-0.77	
9,134.38	55.57	9.20	9,028.67	79.04	35.55	79.04	12.91	12.91	0.32	
FTP[15-10X6H]										
9,153.00	57.97	9.26	9,038.87	94.41	38.05	94.41	12.91	12.91	0.31	
9,185.00	63.12	8.65	9,054.60	121.93	42.38	121.93	16.18	16.09	-1.91	
9,217.00	67.26	6.69	9,068.03	150.71	46.25	150.71	14.08	12.94	-6.13	
9,249.00	71.48	5.38	9,079.30	180.48	49.39	180.48	13.73	13.19	-4.09	
9,280.00	76.88	3.89	9,087.75	210.20	51.80	210.20	18.02	17.42	-4.81	
9,312.00	81.47	2.94	9,093.76	241.57	53.67	241.57	14.64	14.34	-2.97	
9,343.00	85.36	0.35	9,097.31	272.34	54.55	272.34	15.04	12.55	-8.35	
9,456.00	91.21	357.23	9,100.70	385.20	52.16	385.20	5.87	5.18	-2.76	
9,551.00	92.25	355.59	9,097.83	479.97	46.21	479.97	2.04	1.09	-1.73	
9,645.00	93.29	355.24	9,093.29	573.56	38.71	573.56	1.17	1.11	-0.37	
9,740.00	93.78	356.17	9,087.43	668.11	31.61	668.11	1.10	0.52	0.98	
9,835.00	93.56	357.23	9,081.35	762.76	26.15	762.76	1.14	-0.23	1.12	
9,930.00	91.98	357.77	9,076.76	857.55	22.01	857.55	1.76	-1.66	0.57	
10,025.00	93.06	358.81	9,072.58	952.41	19.18	952.41	1.58	1.14	1.09	
10,120.00	91.51	359.86	9,068.79	1,047.33	18.08	1,047.33	1.97	-1.63	1.11	
10,214.00	89.50	359.25	9,067.96	1,141.32	17.35	1,141.32	2.23	-2.14	-0.65	
10,309.00	89.53	358.48	9,068.77	1,236.29	15.47	1,236.29	0.81	0.03	-0.81	
10,404.00	90.24	358.02	9,068.96	1,331.25	12.56	1,331.25	0.89	0.75	-0.48	
10,499.00	91.68	356.31	9,067.37	1,426.11	7.87	1,426.11	2.35	1.52	-1.80	
10,594.00	92.45	357.49	9,063.94	1,520.91	2.73	1,520.91	1.48	0.81	1.24	
10,688.00	92.01	358.43	9,060.28	1,614.78	-0.61	1,614.78	1.10	-0.47	1.00	
10,783.00	91.51	0.33	9,057.37	1,709.72	-1.64	1,709.72	2.07	-0.53	2.00	
10,878.00	90.77	1.34	9,055.48	1,804.69	-0.25	1,804.69	1.32	-0.78	1.06	
10,973.00	90.50	1.50	9,054.42	1,899.66	2.10	1,899.66	0.33	-0.28	0.17	
11,068.00	89.29	1.17	9,054.60	1,994.63	4.31	1,994.63	1.32	-1.27	-0.35	
11,163.00	90.67	0.60	9,054.63	2,089.61	5.78	2,089.61	1.57	1.45	-0.60	
11,258.00	92.75	0.13	9,051.80	2,184.56	6.39	2,184.56	2.24	2.19	-0.49	
11,352.00	93.19	0.46	9,046.93	2,278.44	6.87	2,278.44	0.58	0.47	0.35	
11,447.00	91.58	0.33	9,042.97	2,373.35	7.52	2,373.35	1.70	-1.69	-0.14	
11,542.00	89.90	0.27	9,041.75	2,468.34	8.02	2,468.34	1.77	-1.77	-0.06	
11,637.00	88.99	1.34	9,042.67	2,563.32	9.36	2,563.32	1.48	-0.96	1.13	
11,732.00	89.36	359.91	9,044.03	2,658.30	10.39	2,658.30	1.55	0.39	-1.51	
11,826.00	89.80	358.78	9,044.72	2,752.29	9.32	2,752.29	1.29	0.47	-1.20	

Survey Report

Company: Marathon Oil Permian, LLC
Project: Eddy County, NM (NAD27)
Site: Black River
Well: 15-10 State Com X 6H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 15-10 State Com X 6H
TVD Reference: KB = 28' @ 3260.00usft (Patterson 244)
MD Reference: KB = 28' @ 3260.00usft (Patterson 244)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland District

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,921.00	88.49	359.09	9,046.14	2,847.26	7.55	2,847.26	1.42	-1.38	0.33
12,015.00	89.36	357.64	9,047.90	2,941.20	4.87	2,941.20	1.80	0.93	-1.54
12,110.00	89.40	359.33	9,048.93	3,036.16	2.36	3,036.16	1.78	0.94	1.78
12,208.00	89.25	357.48	9,050.66	3,131.10	-0.30	3,131.10	2.31	-1.21	-1.87
12,300.00	90.44	357.62	9,051.97	3,226.00	-4.38	3,226.00	2.31	2.31	0.17
12,394.00	91.58	359.36	9,050.31	3,319.95	-6.85	3,319.95	2.21	1.21	1.85
12,489.00	92.59	1.04	9,046.85	3,414.88	-6.52	3,414.88	2.06	1.06	1.77
12,583.00	92.55	1.99	9,042.64	3,508.75	-4.04	3,508.75	1.01	-0.04	1.01
12,678.00	90.34	2.21	9,040.24	3,603.65	-0.56	3,603.65	2.34	-2.33	0.23
12,773.00	86.51	2.67	9,042.85	3,698.51	3.48	3,698.51	4.06	-4.03	0.48
12,868.00	87.31	2.01	9,047.97	3,793.29	7.35	3,793.29	1.09	0.84	-0.69
12,962.00	87.68	1.32	9,052.08	3,887.16	10.08	3,887.16	0.83	0.39	-0.73
13,057.00	88.66	0.73	9,055.12	3,982.10	11.78	3,982.10	1.20	1.03	-0.62
13,152.00	90.50	358.95	9,055.81	4,077.09	11.51	4,077.09	2.69	1.94	-1.87
13,247.00	87.88	357.30	9,057.16	4,172.01	8.41	4,172.01	3.26	-2.76	-1.74
13,341.00	91.04	357.23	9,058.04	4,265.89	3.92	4,265.89	3.36	3.36	-0.07
13,436.00	92.42	356.86	9,055.17	4,360.72	-0.97	4,360.72	1.50	1.45	-0.39
13,531.00	92.55	358.42	9,051.05	4,455.55	-4.88	4,455.55	1.65	0.14	1.64
13,626.00	93.60	359.95	9,045.96	4,550.40	-6.23	4,550.40	1.95	1.11	1.61
13,720.00	93.15	0.58	9,040.42	4,644.23	-5.80	4,644.23	0.82	-0.48	0.67
13,815.00	92.42	1.66	9,035.81	4,739.10	-3.94	4,739.10	1.37	-0.77	1.14
13,909.00	89.93	1.74	9,033.88	4,833.03	-1.15	4,833.03	2.65	-2.65	0.09
14,004.00	86.40	0.63	9,036.92	4,927.94	0.81	4,927.94	3.89	-3.72	-1.17
14,099.00	79.21	3.49	9,048.81	5,022.06	4.18	5,022.06	8.14	-7.57	3.01
14,193.00	86.94	4.00	9,060.14	5,115.11	10.27	5,115.11	8.24	8.22	0.54
14,288.00	88.49	5.66	9,063.93	5,209.69	18.26	5,209.69	2.39	1.63	1.75
14,383.00	92.39	5.54	9,063.20	5,304.21	27.53	5,304.21	4.11	4.11	-0.13
14,477.00	93.36	4.67	9,058.48	5,397.72	35.89	5,397.72	1.39	1.03	-0.93
14,572.00	91.88	2.48	9,054.14	5,492.43	41.80	5,492.43	2.78	-1.56	-2.31
14,667.00	94.07	0.59	9,049.21	5,587.26	44.35	5,587.26	3.04	2.31	-1.99
14,761.00	93.49	357.32	9,043.01	5,681.02	42.63	5,681.02	3.53	-0.62	-3.48
14,856.00	90.91	357.59	9,039.36	5,775.85	38.42	5,775.85	2.73	-2.72	0.28
14,951.00	92.72	356.79	9,036.36	5,870.69	33.76	5,870.69	2.08	1.91	-0.84
15,045.00	91.17	358.05	9,033.17	5,964.53	29.54	5,964.53	2.12	-1.65	1.34
15,140.00	91.88	358.75	9,030.64	6,059.46	26.88	6,059.46	1.05	0.75	0.74
15,235.00	93.33	359.18	9,026.32	6,154.34	25.17	6,154.34	1.59	1.53	0.45
15,329.00	92.72	358.58	9,021.36	6,248.19	23.34	6,248.19	0.91	-0.65	-0.64
15,424.00	91.28	358.28	9,018.04	6,343.10	20.73	6,343.10	1.55	-1.52	-0.32
15,519.00	90.13	358.87	9,016.87	6,438.06	18.37	6,438.06	1.36	-1.21	0.62
15,613.00	90.44	0.32	9,016.41	6,532.05	17.71	6,532.05	1.58	0.33	1.54
15,678.00	94.91	3.45	9,013.37	6,596.92	19.84	6,596.92	8.39	6.88	4.82
15,708.00	93.93	3.78	9,011.06	6,626.77	21.73	6,626.77	3.45	-3.27	1.10
15,739.00	92.49	4.95	9,009.33	6,657.63	24.08	6,657.63	5.98	-4.65	3.77

Survey Report

Company: Marathon Oil Permian, LLC
 Project: Eddy County, NM (NAD27)
 Site: Black River
 Well: 15-10 State Com X 6H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well 15-10 State Com X 6H
 TVD Reference: KB = 28' @ 3260.00usft (Patterson 244)
 MD Reference: KB = 28' @ 3260.00usft (Patterson 244)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: Midland District

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,771.00	91.58	5.77	9,008.19	6,689.47	27.07	6,689.47	3.83	-2.84	2.56
15,802.00	90.87	5.44	9,007.53	6,720.32	30.10	6,720.32	2.53	-2.29	-1.06
15,834.00	89.30	6.15	9,007.48	6,752.15	33.33	6,752.15	5.38	-4.91	2.22
15,897.00	88.26	4.10	9,008.82	6,814.88	38.95	6,814.88	3.65	-1.65	-3.25
15,992.00	92.31	2.57	9,008.35	6,909.70	44.48	6,909.70	4.56	4.26	-1.61
16,023.00	92.35	1.87	9,007.09	6,940.65	45.68	6,940.65	2.26	0.13	-2.26
16,055.00	89.80	2.53	9,006.49	6,972.62	46.91	6,972.62	8.23	-7.97	2.06
16,086.00	90.67	3.72	9,006.36	7,003.57	48.60	7,003.57	4.76	2.81	3.84
16,118.00	91.61	2.96	9,005.72	7,035.51	50.46	7,035.51	3.78	2.94	-2.38
16,150.00	90.07	3.56	9,005.25	7,067.45	52.28	7,067.45	5.16	-4.81	1.88
16,181.00	88.09	3.64	9,005.75	7,098.38	54.23	7,098.38	6.39	-6.39	0.26
16,213.00	86.64	2.79	9,007.22	7,130.30	56.02	7,130.30	5.25	-4.53	-2.66
16,244.00	85.19	1.63	9,009.43	7,161.20	57.21	7,161.20	5.98	-4.68	-3.74
16,276.00	84.45	359.89	9,012.32	7,193.06	57.63	7,193.06	5.89	-2.31	-5.44
16,308.00	84.39	0.00	9,015.43	7,224.91	57.60	7,224.91	0.39	-0.19	0.34
16,339.00	84.82	359.54	9,018.35	7,255.77	57.48	7,255.77	2.03	1.39	-1.48
16,371.00	87.18	358.86	9,020.58	7,287.69	57.03	7,287.69	7.67	7.38	-2.13
16,402.00	87.82	356.91	9,021.93	7,318.64	55.89	7,318.64	6.61	2.06	-6.29
16,434.00	86.82	357.85	9,023.43	7,350.57	54.43	7,350.57	4.29	-3.13	2.94
16,465.00	85.03	358.47	9,025.63	7,381.47	53.44	7,381.47	6.11	-5.77	2.00
16,497.00	85.87	358.34	9,028.17	7,413.36	52.55	7,413.36	2.66	2.63	-0.41
16,528.00	86.71	357.99	9,030.18	7,444.28	51.56	7,444.28	2.93	2.71	-1.13
16,560.00	86.10	357.68	9,032.18	7,476.19	50.35	7,476.19	2.14	-1.91	-0.97
16,592.00	85.29	357.07	9,034.58	7,508.07	48.89	7,508.07	3.17	-2.53	-1.91
16,623.00	85.26	357.31	9,037.14	7,538.92	47.38	7,538.92	0.78	-0.10	0.77
16,655.00	85.80	356.67	9,039.63	7,570.78	45.70	7,570.78	2.61	1.69	-2.00
16,749.00	87.21	354.48	9,045.36	7,664.32	38.46	7,664.32	2.77	1.50	-2.33
16,781.00	87.72	354.52	9,046.78	7,696.14	35.40	7,696.14	1.60	1.59	0.13
16,844.00	88.15	352.91	9,049.05	7,758.72	28.50	7,758.72	2.64	0.68	-2.56
16,876.00	88.45	352.55	9,050.00	7,790.45	24.46	7,790.45	1.46	0.94	-1.13
16,907.00	89.16	353.08	9,050.64	7,821.20	20.58	7,821.20	2.86	2.29	1.71
16,939.00	89.26	354.05	9,051.08	7,852.99	16.99	7,852.99	3.05	0.31	3.03
17,034.00	88.93	357.49	9,052.59	7,947.71	9.99	7,947.71	3.64	-0.35	3.62
17,128.00	89.03	359.01	9,054.26	8,041.65	7.12	8,041.65	1.62	0.11	1.62
17,223.00	89.23	358.39	9,055.70	8,136.61	4.96	8,136.61	0.69	0.21	-0.65
17,318.00	89.23	358.41	9,056.98	8,231.56	2.31	8,231.56	0.02	0.00	0.02
17,412.00	90.67	355.58	9,057.06	8,325.42	-2.62	8,325.42	3.38	1.53	-3.01
17,444.00	90.60	355.43	9,056.71	8,357.32	-5.12	8,357.32	0.52	-0.22	-0.47
17,476.00	89.66	356.07	9,056.63	8,389.23	-7.50	8,389.23	3.55	-2.94	2.00
17,508.00	89.60	356.01	9,056.84	8,421.16	-9.71	8,421.16	0.27	-0.19	-0.19
17,602.00	89.97	357.56	9,057.19	8,515.01	-14.98	8,515.01	1.70	0.39	1.65
17,697.00	87.95	359.45	9,058.92	8,609.95	-17.45	8,609.95	2.91	-2.13	1.99
17,792.00	88.12	1.42	9,062.17	8,704.89	-16.73	8,704.89	2.08	0.18	2.07

Survey Report

Company: Marathon Oil Permian, LLC
Project: Eddy County, NM (NAD27)
Site: Black River
Well: 15-10 State Com X 6H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 15-10 State Com X 6H
TVD Reference: KB = 28' @ 3260.00usft (Patterson 244)
MD Reference: KB = 28' @ 3260.00usft (Patterson 244)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland District

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,887.00	88.12	2.05	9,065.29	8,799.79	-13.86	8,799.79	0.66	0.00	0.66
17,981.00	88.62	2.53	9,067.97	8,893.68	-10.10	8,893.68	0.74	0.53	0.51
18,076.00	89.43	1.97	9,069.58	8,988.59	-6.38	8,988.59	1.04	0.85	-0.59
18,171.00	90.44	2.06	9,069.69	9,083.53	-3.04	9,083.53	1.07	1.06	0.09
18,266.00	91.81	2.48	9,067.82	9,178.43	0.73	9,178.43	1.51	1.44	0.44
18,361.00	92.96	1.91	9,063.87	9,273.28	4.36	9,273.28	1.35	1.21	-0.60
18,457.00	89.90	3.14	9,061.48	9,369.14	8.59	9,369.14	3.44	-3.19	1.28
18,552.00	88.66	359.65	9,062.67	9,464.09	10.90	9,464.09	3.90	-1.31	-3.67
18,647.00	89.26	359.95	9,064.39	9,559.07	10.57	9,559.07	0.71	0.63	0.32
18,742.00	89.63	0.20	9,065.31	9,654.07	10.70	9,654.07	0.47	0.39	0.26
18,837.00	90.37	0.39	9,065.31	9,749.07	11.18	9,749.07	0.80	0.78	0.20
18,932.00	91.04	0.20	9,064.15	9,844.06	11.67	9,844.06	0.73	0.71	-0.20
19,009.00	91.88	0.27	9,062.18	9,921.03	11.99	9,921.03	1.09	1.09	0.09
FINAL MWD Survey (19009.00' MD)									
19,067.00	91.88	0.27	9,060.28	9,979.00	12.26	9,979.00	0.00	0.00	0.00
FINAL Proj. to Bit (19067.00' MD) - BHL[15-10X6H]									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
19,009.00	9,062.18	9,921.03	11.99	FINAL MWD Survey (19009.00' MD)
19,067.00	9,060.28	9,979.00	12.26	FINAL Proj. to Bit (19067.00' MD)

Checked By: _____ Approved By: _____ Date: _____

Marathon Oil Corporation

EDDY COUNTY, NM (NAD27)
BLACK RIVER
15-10 STATE COM X 6H
OH
FINAL AS-DRILLED
PATTERSON 244

WELL DETAILS:

Ground Level: 3232.00
+N/-S 0.00 +E/-W 0.00
Northing 440342.11 Easting 549649.27 32° 12' 37.856 N 04° 10' 22.094 W

SECTION DETAILS

SECTION 1: 0.00 TO 10.00
SECTION 2: 10.00 TO 20.00
SECTION 3: 20.00 TO 30.00
SECTION 4: 30.00 TO 40.00
SECTION 5: 40.00 TO 50.00
SECTION 6: 50.00 TO 60.00
SECTION 7: 60.00 TO 70.00
SECTION 8: 70.00 TO 80.00
SECTION 9: 80.00 TO 90.00
SECTION 10: 90.00 TO 100.00

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
BHL(15-10X6H)	9063.00	9979.64	61.27	0.24	450220.67
FTP(15-10X6H)	9063.00	61.27	0.01	440403.37	549655.51

DRILLING TARGET: 9063 TVD @ 0VS // 90.0° INC.

WINDOW: 20 UP // 25 DOWN

SITE DETAILS: BLACK RIVER
SITE CENTRE NORTHING: 440342.00
EASTING: 549649.27

POSITIONAL UNCERTAINTY: 0.00
CONVERGENCE: 0.09
LOCAL NORTH: GRID

PROJECT DETAILS: Eddy County, NM (NAD27)
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

FORMATION TOP DETAILS

NO FORMATION DATA IS AVAILABLE

CALCULATIONS

No existing data is available

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001

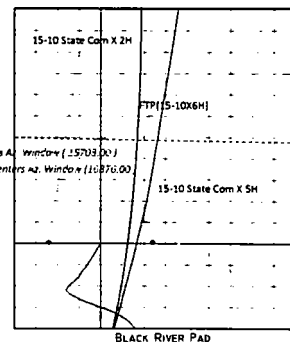
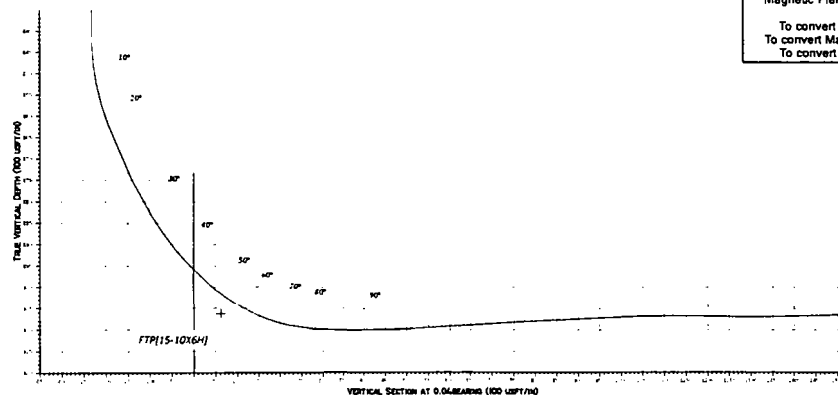
Local Origin: Well 15-10 State Com X 6H, Grid North

Latitude: 32° 12' 37.856 N
Longitude: 104° 10' 22.094 W

Grid East: 549649.27
Grid North: 440342.11
Scale Factor: 1.000

Geomagnetic Model: HDGM
Sample Date: 28-Aug-17
Magnetic Declination: 7.40°
Dip Angle from Horizontal: 59.98°
Magnetic Field Strength: 48048

To convert Magnetic North to Grid, Add 7.31°
To convert Magnetic North to True, Add 7.40° East
To convert True North to Grid, Subtract 0.09°



Azimuths to Grid North
True North: -0.09°
Magnetic North: 7.31°

Magnetic Field
Strength: 48048.2nT
Dip Angle: 59.98°
Date: 8/28/2017
Model: HDGM

To convert Magnetic North to Grid, Add 7.31°
To convert True North to Grid, Subtract 0.09°

