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Directional Survey**

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DISTRICT II-ARTESIA O.C.D.

Marathon Oil Permian, LLC

Eddy County, NM (NAD27)

Sterling State 23-27-20

WA #6H

30-015-44620

OH

Survey: SDI Survey #1

Standard Survey Report

26 March, 2018



Scientific Drilling

www.scientificdrilling.com

Survey Report

Company:	Marathon Oil Permian, LLC	Local Co-ordinate Reference:	Well WA #6H
Project:	Eddy County, NM (NAD27)	TVD Reference:	KB = 25' @ 3206.00usft (Precision 594)
Site:	Sterling State 23-27-20	MD Reference:	KB = 25' @ 3206.00usft (Precision 594)
Well:	WA #6H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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	Sterling State 23-27-20				
Site Position:		Northing:	467,254.93 usft	Latitude:	32° 17' 4.337 N
From:	Map	Easting:	538,802.63 usft	Longitude:	104° 12' 27.980 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.07 °

Well	WA #6H					
Well Position	+N/-S	0.00 usft	Northing:	467,254.93 usft	Latitude:	32° 17' 4.336 N
	+E/-W	0.00 usft	Easting:	538,852.63 usft	Longitude:	104° 12' 27.397 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,181.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/18/2018	7.38	60.03	48,018

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)	Direction (bearing)	
	0.00	0.00	0.00	359.80	

Survey Program	Date	3/26/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
683.00	9,727.00	SDI Survey #1 (OH)	MWD+HDGM	OWSG MWD + HDGM	

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)
578.10	1.78	249.58	577.89	-4.34	-12.27	-4.30	0.00	0.00	0.00
683.00	1.58	241.86	682.75	-5.59	-15.07	-5.54	0.29	-0.19	-7.36
774.00	1.13	237.98	773.72	-6.66	-16.94	-6.60	0.50	-0.49	-4.26
866.00	0.84	241.28	865.71	-7.46	-18.30	-7.40	0.32	-0.32	3.59
958.00	0.93	237.26	957.69	-8.19	-19.52	-8.12	0.12	0.10	-4.37
1,049.00	1.03	226.98	1,048.68	-9.15	-20.74	-9.08	0.22	0.11	-11.30
1,138.00	0.96	212.52	1,137.67	-10.32	-21.72	-10.25	0.29	-0.08	-16.25
1,228.00	0.60	153.70	1,227.66	-11.38	-21.92	-11.30	0.92	-0.40	-65.36
1,317.00	1.23	94.24	1,316.65	-11.87	-20.76	-11.80	1.19	0.71	-66.81
1,407.00	1.20	94.81	1,406.63	-12.02	-18.86	-11.95	0.04	-0.03	0.63

Survey Report

Company: Marathon Oil Permian, LLC
Project: Eddy County, NM (NAD27)
Site: Sterling State 23-27-20
Well: WA #6H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well WA #6H
TVD Reference: KB = 25' @ 3206.00usft (Precision 594)
MD Reference: KB = 25' @ 3206.00usft (Precision 594)
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)
1,496.00	1.49	103.75	1,495.61	-12.37	-16.81	-12.31	0.40	0.33	10.04
1,586.00	2.47	105.40	1,585.55	-13.17	-13.80	-13.12	1.09	1.09	1.83
1,675.00	3.36	97.25	1,674.44	-14.00	-9.36	-13.97	1.10	1.00	-9.16
1,765.00	3.94	87.46	1,764.25	-14.20	-3.66	-14.19	0.94	0.64	-10.88
1,854.00	4.08	84.35	1,853.04	-13.75	2.55	-13.76	0.29	0.16	-3.49
1,943.00	3.81	76.90	1,941.83	-12.77	8.58	-12.80	0.65	-0.30	-8.37
2,032.00	3.65	73.29	2,030.64	-11.29	14.17	-11.34	0.32	-0.18	-4.06
2,059.00	3.45	74.93	2,057.59	-10.83	15.78	-10.88	0.83	-0.74	6.07
2,211.00	3.51	69.30	2,209.31	-7.99	24.55	-8.08	0.23	0.04	-3.70
2,301.00	1.50	30.12	2,299.22	-6.00	27.72	-6.10	2.81	-2.23	-43.53
2,390.00	1.56	29.16	2,388.19	-3.94	28.89	-4.04	0.07	0.07	-1.08
2,479.00	1.47	25.53	2,477.16	-1.85	29.97	-1.95	0.15	-0.10	-4.08
2,568.00	1.38	25.89	2,566.13	0.15	30.93	0.04	0.10	-0.10	0.40
2,658.00	1.47	21.09	2,656.10	2.20	31.82	2.09	0.17	0.10	-5.33
2,747.00	1.24	18.16	2,745.08	4.18	32.53	4.07	0.27	-0.26	-3.29
2,836.00	1.14	17.47	2,834.06	5.94	33.10	5.82	0.11	-0.11	-0.78
2,926.00	1.21	17.14	2,924.04	7.70	33.65	7.58	0.08	0.08	-0.37
3,015.00	1.29	14.49	3,013.02	9.57	34.18	9.45	0.11	0.09	-2.98
3,105.00	1.36	11.36	3,102.99	11.60	34.64	11.48	0.11	0.08	-3.48
3,194.00	1.23	5.07	3,191.97	13.58	34.93	13.46	0.22	-0.15	-7.07
3,284.00	1.07	2.90	3,281.95	15.38	35.06	15.26	0.18	-0.18	-2.41
3,373.00	1.15	357.29	3,370.94	17.11	35.06	16.98	0.15	0.09	-6.30
3,462.00	0.63	247.58	3,459.93	17.81	34.56	17.69	1.67	-0.58	-123.27
3,551.00	3.04	159.68	3,548.89	15.41	34.93	15.29	3.46	2.71	-98.76
3,640.00	3.77	153.85	3,637.73	10.57	37.04	10.44	0.91	0.82	-6.55
3,730.00	5.65	148.61	3,727.42	4.13	40.65	3.99	2.14	2.09	-5.82
3,819.00	6.25	147.64	3,815.94	-3.70	45.53	-3.86	0.68	0.67	-1.09
3,909.00	5.72	148.64	3,905.45	-11.67	50.48	-11.84	0.60	-0.59	1.11
3,998.00	5.20	148.42	3,994.05	-18.89	54.90	-19.08	0.58	-0.58	-0.25
4,087.00	4.64	152.99	4,082.72	-25.53	58.65	-25.74	0.77	-0.63	5.13
4,176.00	4.27	154.65	4,171.45	-31.73	61.71	-31.95	0.44	-0.42	1.87
4,265.00	5.86	137.71	4,260.10	-38.09	66.18	-38.32	2.43	1.79	-19.03
4,355.00	5.52	132.89	4,349.66	-44.44	72.44	-44.69	0.65	-0.38	-5.36
4,445.00	5.24	133.18	4,439.26	-50.19	78.61	-50.47	0.31	-0.31	0.32
4,534.00	6.42	133.49	4,527.80	-56.40	85.19	-56.70	1.33	1.33	0.35
4,623.00	6.74	134.59	4,616.22	-63.49	92.52	-63.81	0.39	0.36	1.24
4,712.00	6.15	134.84	4,704.65	-70.52	99.62	-70.87	0.66	-0.66	0.28
4,802.00	5.94	134.72	4,794.15	-77.19	106.34	-77.57	0.23	-0.23	-0.13
4,891.00	5.73	132.30	4,882.69	-83.42	112.90	-83.82	0.36	-0.24	-2.72
4,981.00	6.30	127.39	4,972.20	-89.45	120.15	-89.87	0.85	0.63	-5.46
5,070.00	5.76	127.86	5,060.70	-95.15	127.55	-95.60	0.61	-0.61	0.53
5,159.00	6.63	129.58	5,149.18	-101.17	135.04	-101.64	1.00	0.98	1.93
5,249.00	7.90	132.68	5,238.46	-108.67	143.59	-109.17	1.48	1.41	3.44
5,338.00	7.57	133.10	5,326.65	-116.82	152.37	-117.35	0.38	-0.37	0.47

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Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well WA #6H
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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)
5,427.00	6.78	134.53	5,414.95	-124.51	160.39	-125.07	0.91	-0.89	1.61
5,517.00	6.45	134.75	5,504.35	-131.80	167.77	-132.38	0.37	-0.37	0.24
5,606.00	5.83	137.60	5,592.84	-138.66	174.37	-139.26	0.78	-0.70	3.20
5,695.00	5.33	138.31	5,681.42	-145.08	180.17	-145.71	0.57	-0.56	0.80
5,785.00	5.31	139.08	5,771.03	-151.35	185.68	-152.00	0.08	-0.02	0.86
5,874.00	5.74	140.20	5,859.62	-157.88	191.22	-158.55	0.50	0.48	1.26
5,964.00	5.25	142.81	5,949.20	-164.62	196.59	-165.30	0.61	-0.54	2.90
6,053.00	7.33	134.53	6,037.67	-171.84	203.10	-172.55	2.54	2.34	-9.30
6,143.00	6.66	132.55	6,126.99	-179.40	211.04	-180.14	0.79	-0.74	-2.20
6,232.00	6.20	129.85	6,215.43	-185.97	218.53	-186.73	0.62	-0.52	-3.03
6,322.00	5.83	130.54	6,304.94	-192.05	225.74	-192.84	0.42	-0.41	0.77
6,411.00	5.40	133.22	6,393.51	-197.86	232.22	-198.67	0.57	-0.48	3.01
6,500.00	6.22	137.69	6,482.05	-204.29	238.52	-205.13	1.05	0.92	5.02
6,589.00	6.35	138.92	6,570.52	-211.57	245.00	-212.42	0.21	0.15	1.38
6,679.00	5.28	139.60	6,660.06	-218.48	250.95	-219.35	1.19	-1.19	0.76
6,768.00	4.60	131.25	6,748.73	-223.95	256.29	-224.84	1.11	-0.76	-9.38
6,857.00	5.03	122.43	6,837.41	-228.39	262.27	-229.31	0.96	0.48	-9.91
6,947.00	4.40	125.82	6,927.11	-232.53	268.40	-233.46	0.77	-0.70	3.77
7,037.00	5.62	125.35	7,016.76	-237.10	274.79	-238.06	1.36	1.36	-0.52
7,126.00	4.82	128.77	7,105.39	-241.96	281.26	-242.94	0.96	-0.90	3.84
7,215.00	7.01	144.73	7,193.92	-248.74	287.31	-249.74	3.05	2.46	17.93
7,304.00	6.26	147.86	7,282.32	-257.28	293.03	-258.30	0.94	-0.84	3.52
7,393.00	5.07	146.50	7,370.89	-264.67	297.78	-265.71	1.35	-1.34	-1.53
7,483.00	4.57	139.02	7,460.57	-270.69	302.33	-271.75	0.89	-0.56	-8.31
7,572.00	4.71	132.42	7,549.28	-275.83	307.35	-276.91	0.62	0.16	-7.42
7,662.00	4.18	135.23	7,639.01	-280.66	312.39	-281.74	0.64	-0.59	3.12
7,751.00	5.73	135.43	7,727.67	-286.12	317.79	-287.23	1.74	1.74	0.22
7,841.00	4.73	133.99	7,817.30	-291.90	323.62	-293.03	1.12	-1.11	-1.60
7,930.00	4.34	139.23	7,906.02	-297.00	328.45	-298.15	0.64	-0.44	5.89
8,020.00	4.39	129.85	7,995.76	-301.79	333.32	-302.95	0.79	0.06	-10.42
8,109.00	4.22	130.97	8,084.51	-306.12	338.41	-307.30	0.21	-0.19	1.26
8,198.00	4.19	135.21	8,173.27	-310.57	343.17	-311.77	0.35	-0.03	4.76
8,288.00	3.62	137.28	8,263.06	-314.99	347.42	-316.20	0.65	-0.63	2.30
8,377.00	3.30	139.24	8,351.90	-319.00	351.00	-320.22	0.38	-0.36	2.20
8,441.00	3.02	140.56	8,415.80	-321.69	353.27	-322.93	0.45	-0.44	2.06
8,557.00	2.87	136.15	8,531.64	-326.15	357.22	-327.39	0.23	-0.13	-3.80
8,646.00	3.67	15.70	8,620.57	-325.01	359.54	-326.26	6.39	0.90	-135.34
8,690.00	10.88	356.57	8,664.19	-319.50	359.67	-320.76	17.06	16.39	-43.48
8,735.00	17.77	356.86	8,707.77	-308.39	359.04	-309.65	15.31	15.31	0.64
8,780.00	25.44	358.07	8,749.57	-291.85	358.34	-293.10	17.07	17.04	2.69
8,825.00	31.17	359.90	8,789.18	-270.53	357.99	-271.78	12.88	12.73	4.07
8,869.00	37.86	3.44	8,825.42	-245.63	358.78	-246.88	15.87	15.20	8.05
8,914.00	42.91	5.69	8,859.68	-216.59	361.13	-217.84	11.68	11.22	5.00

Survey Report

Company:	Marathon Oil Permian, LLC	Local Co-ordinate Reference:	Well WA #6H
Project:	Eddy County, NM (NAD27)	TVD Reference:	KB = 25' @ 3206.00usft (Precision 594)
Site:	Sterling State 23-27-20	MD Reference:	KB = 25' @ 3206.00usft (Precision 594)
Well:	WA #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)
8,958.00	48.44	5.50	8,890.42	-185.27	364.20	-186.54	12.57	12.57	-0.43
9,003.00	53.81	5.40	8,918.65	-150.41	367.52	-151.69	11.93	11.93	-0.22
9,048.00	57.34	4.32	8,944.09	-113.43	370.66	-114.72	8.09	7.84	-2.40
FTP[SS/WA#6H]									
9,093.00	59.53	3.94	8,967.64	-75.19	373.42	-76.49	4.92	4.87	-0.84
9,137.00	59.65	1.18	8,989.92	-37.29	375.11	-38.59	5.42	0.27	-6.27
9,182.00	60.39	358.25	9,012.41	1.69	374.92	0.38	5.87	1.64	-6.51
9,227.00	60.41	357.83	9,034.63	40.79	373.58	39.49	0.81	0.04	-0.93
9,271.00	60.77	357.13	9,056.24	79.08	371.89	77.78	1.61	0.82	-1.59
9,316.00	61.18	357.50	9,078.07	118.39	370.05	117.10	1.16	0.91	0.82
9,361.00	60.95	357.97	9,099.84	157.74	368.49	156.45	1.05	-0.51	1.04
9,406.00	64.15	356.99	9,120.59	197.63	366.73	196.35	7.37	7.11	-2.18
9,450.00	68.35	358.96	9,138.30	237.87	365.32	236.59	10.39	9.55	4.48
9,495.00	71.36	359.51	9,153.80	280.10	364.76	278.83	6.79	6.69	1.22
9,521.68	72.85	0.86	9,162.00	305.49	364.84	304.22	7.38	5.58	5.07
Pen. Top of Target Zone (9521.68)									
9,539.00	73.82	1.73	9,166.97	322.08	365.22	320.80	7.38	5.61	5.00
9,629.00	81.08	4.81	9,186.51	409.71	370.26	408.42	8.73	8.07	3.42
9,669.00	89.29	5.31	9,189.87	449.38	373.77	448.08	20.56	20.53	1.25
OH / FINAL MWD Survey (9669.00' MD)									
9,727.00	89.29	5.31	9,190.59	507.13	379.14	505.80	0.00	0.00	0.00
OH / FINAL Proj. to Bit (9727.00' MD) - BHL[SS/WA#6H] - Targ.Win[SSIWA#6H]									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,521.68	9,162.00	305.49	364.84	Pen. Top of Target Zone (9521.68)
9,669.00	9,189.87	449.38	373.77	OH / FINAL MWD Survey (9669.00' MD)
9,727.00	9,190.59	507.13	379.14	OH / FINAL Proj. to Bit (9727.00' MD)

Checked By: _____ Approved By: _____ Date: _____