

HOBBS OCD

NOV 28 2020

Marathon Oil

Cave Lion WXY Federal 6H

This survey is correct to the best of my knowledge and is supported by actual field data.

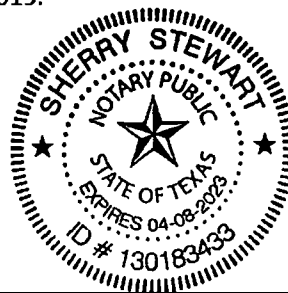
Notarized this date 19th of December, 2019.

Sherry Stewart

Notary Signature

County of Midland

State of Texas



Scientific Drilling

The

In Wellbore Placement

Double
Sided

Marathon Oil Permian, LLC

Lea County, NM (NAD27-NME)

Cave Lion Pad

Cave Lion 5 Federal WXY #6H

ST01

Design: ST01

Standard Survey Report

03 May, 2019



www.scientificdrilling.com

Scientific Drilling, Intl

Survey Report

Company:	Marathon Oil Permian, LLC	Local Co-ordinate Reference:	Well Cave Lion 5 Federal WXY #6H
Project:	Lea County, NM (NAD27-NME)	TVD Reference:	KB=26.5 @ 3289.50usft
Site:	Cave Lion Pad	MD Reference:	KB=26.5 @ 3289.50usft
Well:	Cave Lion 5 Federal WXY #6H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	Midland District

Project	Lea County, NM (NAD27-NME)		
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	Cave Lion Pad				
Site Position:		Northing:	388,917.09 usft	Latitude:	32° 3' 56.703 N
From:	Map	Easting:	791,664.75 usft	Longitude:	103° 23' 30.513 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.50 °

Well	Cave Lion 5 Federal WXY #6H					
Well Position	+N/-S	0.00 usft	Northing:	388,917.09 usft	Latitude:	32° 3' 56.703 N
	+E/-W	0.00 usft	Easting:	791,664.75 usft	Longitude:	103° 23' 30.513 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,263.00 usft

Wellbore	ST01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/27/2019	6.58	59.68	47,717

Design	ST01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	14,781.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (bearing)	
	0.00	0.00	0.00	359.41	

Survey Program	Date 5/3/2019				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
90.00	990.00	Surface Surveys (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,156.00	14,781.00	SDI MWD Surveys (OH)	MWD+HDGM	OWSG MWD + HDGM	
14,844.00	17,503.00	ST1 MWD Surveys (ST01)	MWD+HDGM	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	
90.00	0.40	256.00	90.00	-0.08	-0.30	-0.07	0.44	0.44	0.00	
180.00	0.40	192.00	180.00	-0.46	-0.67	-0.45	0.47	0.00	-71.11	
270.00	0.50	174.00	269.99	-1.16	-0.70	-1.15	0.19	0.11	-20.00	
360.00	0.50	189.00	359.99	-1.94	-0.72	-1.93	0.15	0.00	16.67	
450.00	0.40	191.00	449.99	-2.63	-0.84	-2.62	0.11	-0.11	2.22	
540.00	0.50	190.00	539.99	-3.33	-0.97	-3.32	0.11	0.11	-1.11	
630.00	0.40	181.00	629.98	-4.03	-1.04	-4.02	0.14	-0.11	-10.00	
720.00	0.60	181.00	719.98	-4.81	-1.06	-4.80	0.22	0.22	0.00	

Scientific Drilling, Intl Survey Report

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Well:	Cave Lion 5 Federal WXY #6H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	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)
810.00	0.70	201.00	809.97	-5.80	-1.26	-5.78	0.27	0.11	22.22
900.00	0.70	216.00	899.97	-6.76	-1.78	-6.74	0.20	0.00	16.67
990.00	0.80	222.00	989.96	-7.67	-2.53	-7.64	0.14	0.11	6.67
1,156.00	1.31	217.91	1,155.93	-10.03	-4.47	-9.98	0.31	0.31	-2.46
1,247.00	2.29	243.77	1,246.89	-11.65	-6.74	-11.58	1.37	1.08	28.42
1,341.00	4.74	247.38	1,340.70	-13.97	-12.01	-13.85	2.62	2.61	3.84
1,436.00	6.46	253.97	1,435.25	-16.96	-20.77	-16.74	1.93	1.81	6.94
1,530.00	8.03	260.42	1,528.49	-19.51	-32.32	-19.18	1.88	1.67	6.86
1,624.00	8.96	263.33	1,621.46	-21.46	-46.07	-20.98	1.09	0.99	3.10
1,719.00	9.54	264.30	1,715.23	-23.10	-61.25	-22.46	0.63	0.61	1.02
1,813.00	9.83	266.22	1,807.89	-24.40	-77.01	-23.61	0.46	0.31	2.04
1,907.00	9.78	265.91	1,900.51	-25.50	-92.98	-24.54	0.08	-0.05	-0.33
2,002.00	10.18	262.27	1,994.08	-27.20	-109.35	-26.08	0.79	0.42	-3.83
2,096.00	10.90	262.01	2,086.49	-29.56	-126.38	-28.25	0.77	0.77	-0.28
2,190.00	10.52	254.86	2,178.86	-33.03	-143.46	-31.55	1.47	-0.40	-7.61
2,285.00	11.14	253.92	2,272.17	-37.84	-160.65	-36.18	0.68	0.65	-0.99
2,379.00	10.69	254.32	2,364.46	-42.71	-177.77	-40.88	0.49	-0.48	0.43
2,474.00	10.70	255.57	2,457.81	-47.29	-194.80	-45.28	0.24	0.01	1.32
2,568.00	10.57	257.21	2,550.20	-51.37	-211.66	-49.19	0.35	-0.14	1.74
2,662.00	9.94	254.49	2,642.70	-55.45	-227.88	-53.10	0.85	-0.67	-2.89
2,756.00	9.87	257.51	2,735.30	-59.36	-243.57	-56.85	0.56	-0.07	3.21
2,851.00	9.37	254.78	2,828.96	-63.15	-258.98	-60.48	0.71	-0.53	-2.87
2,945.00	9.07	256.36	2,921.75	-66.91	-273.56	-64.09	0.42	-0.32	1.88
3,040.00	9.98	258.51	3,015.44	-70.32	-288.91	-67.34	1.03	0.96	2.28
3,134.00	10.23	258.43	3,107.98	-73.61	-305.06	-70.47	0.27	0.27	-0.09
3,228.00	9.88	259.95	3,200.54	-76.69	-321.18	-73.38	0.47	-0.37	1.62
3,323.00	9.49	259.12	3,294.18	-79.59	-336.90	-76.12	0.44	-0.41	-0.87
3,417.00	9.05	260.96	3,386.95	-82.22	-351.81	-78.59	0.56	-0.47	1.96
3,512.00	9.71	258.82	3,480.68	-84.95	-367.05	-81.16	0.79	0.69	-2.25
3,606.00	9.72	260.25	3,573.34	-87.83	-382.65	-83.88	0.26	0.01	1.52
3,701.00	10.07	253.62	3,666.92	-91.53	-398.52	-87.42	1.25	0.37	-6.98
3,795.00	10.26	251.61	3,759.45	-96.49	-414.35	-92.21	0.43	0.20	-2.14
3,890.00	10.10	253.31	3,852.95	-101.55	-430.35	-97.11	0.36	-0.17	1.79
3,984.00	9.90	253.35	3,945.53	-106.23	-445.99	-101.63	0.21	-0.21	0.04
4,079.00	10.08	251.46	4,039.09	-111.21	-461.70	-106.45	0.39	0.19	-1.99
4,173.00	10.07	251.65	4,131.64	-116.42	-477.30	-111.49	0.04	-0.01	0.20
4,267.00	9.84	254.13	4,224.22	-121.20	-492.82	-116.12	0.52	-0.24	2.64
4,362.00	9.77	254.28	4,317.83	-125.60	-508.39	-120.36	0.08	-0.07	0.16
4,456.00	9.53	254.94	4,410.50	-129.79	-523.58	-124.39	0.28	-0.26	0.70
4,550.00	9.64	255.07	4,503.19	-133.84	-538.70	-128.28	0.12	0.12	0.14
4,645.00	8.86	255.45	4,596.96	-137.72	-553.47	-132.02	0.82	-0.82	0.40
4,739.00	9.58	254.23	4,689.74	-141.67	-568.00	-135.81	0.79	0.77	-1.30
4,834.00	9.68	256.80	4,783.40	-145.64	-583.39	-139.62	0.46	0.11	2.71

Scientific Drilling, Intl

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Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	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)
4,928.00	9.02	257.13	4,876.15	-149.09	-598.26	-142.92	0.70	-0.70	0.35
5,023.00	9.39	252.72	4,969.93	-153.05	-612.92	-146.73	0.84	0.39	-4.64
5,117.00	9.21	251.34	5,062.69	-157.73	-627.37	-151.26	0.30	-0.19	-1.47
5,212.00	8.92	251.48	5,156.51	-162.50	-641.56	-155.89	0.31	-0.31	0.15
5,306.00	8.28	251.59	5,249.45	-166.96	-654.89	-160.20	0.68	-0.68	0.12
5,364.00	8.01	251.40	5,306.87	-169.58	-662.69	-162.73	0.47	-0.47	-0.33
5,491.00	7.34	249.19	5,432.73	-175.27	-678.66	-168.27	0.58	-0.53	-1.74
5,586.00	7.30	249.54	5,526.95	-179.53	-689.98	-172.42	0.06	-0.04	0.37
5,680.00	7.35	249.26	5,620.19	-183.75	-701.20	-176.52	0.07	0.05	-0.30
5,774.00	7.32	248.14	5,713.42	-188.11	-712.38	-180.76	0.16	-0.03	-1.19
5,869.00	7.30	247.25	5,807.65	-192.70	-723.56	-185.24	0.12	-0.02	-0.94
5,964.00	6.23	257.50	5,901.99	-196.15	-734.16	-188.58	1.69	-1.13	10.79
6,058.00	6.14	259.62	5,995.44	-198.16	-744.09	-190.48	0.26	-0.10	2.26
6,152.00	4.57	256.96	6,089.03	-199.91	-752.68	-192.15	1.69	-1.67	-2.83
6,247.00	2.31	265.43	6,183.85	-200.91	-758.28	-193.10	2.43	-2.38	8.92
6,341.00	1.39	283.20	6,277.80	-200.80	-761.28	-192.95	1.14	-0.98	18.90
6,435.00	1.42	289.08	6,371.77	-200.16	-763.49	-192.29	0.16	0.03	6.26
6,530.00	0.86	281.03	6,466.75	-199.64	-765.30	-191.75	0.61	-0.59	-8.47
6,624.00	0.54	274.10	6,560.75	-199.48	-766.43	-191.57	0.35	-0.34	-7.37
6,719.00	0.61	284.81	6,655.74	-199.31	-767.37	-191.40	0.13	0.07	11.27
6,813.00	0.49	286.72	6,749.74	-199.07	-768.24	-191.15	0.13	-0.13	2.03
6,908.00	0.55	290.07	6,844.73	-198.80	-769.06	-190.87	0.07	0.06	3.53
7,002.00	0.57	279.20	6,938.73	-198.57	-769.94	-190.63	0.11	0.02	-11.56
7,097.00	0.54	285.97	7,033.72	-198.37	-770.84	-190.42	0.08	-0.03	7.13
7,191.00	0.57	293.91	7,127.72	-198.06	-771.69	-190.10	0.09	0.03	8.45
7,285.00	0.58	305.91	7,221.71	-197.59	-772.50	-189.62	0.13	0.01	12.77
7,379.00	0.55	304.80	7,315.71	-197.05	-773.26	-189.08	0.03	-0.03	-1.18
7,474.00	0.53	304.08	7,410.71	-196.55	-774.00	-188.57	0.02	-0.02	-0.76
7,568.00	0.55	287.30	7,504.70	-196.17	-774.79	-188.18	0.17	0.02	-17.85
7,663.00	0.58	286.17	7,599.70	-195.90	-775.69	-187.90	0.03	0.03	-1.19
7,757.00	0.47	276.52	7,693.69	-195.72	-776.53	-187.72	0.15	-0.12	-10.27
7,852.00	0.50	260.87	7,788.69	-195.74	-777.32	-187.73	0.14	0.03	-16.47
7,946.00	0.70	252.98	7,882.68	-195.98	-778.28	-187.95	0.23	0.21	-8.39
8,040.00	0.57	244.33	7,976.68	-196.35	-779.25	-188.31	0.17	-0.14	-9.20
8,135.00	0.50	217.84	8,071.67	-196.88	-779.93	-188.84	0.27	-0.07	-27.88
8,229.00	0.51	233.26	8,165.67	-197.45	-780.51	-189.41	0.14	0.01	16.40
8,324.00	0.73	244.91	8,260.67	-197.96	-781.40	-189.91	0.27	0.23	12.26
8,418.00	0.75	244.51	8,354.66	-198.48	-782.50	-190.41	0.02	0.02	-0.43
8,513.00	0.77	108.43	8,449.65	-198.95	-782.45	-190.88	1.48	0.02	-143.24
8,607.00	1.14	96.99	8,543.64	-199.27	-780.93	-191.21	0.44	0.39	-12.17
8,701.00	1.11	91.51	8,637.62	-199.40	-779.09	-191.37	0.12	-0.03	-5.83
8,796.00	1.01	89.06	8,732.61	-199.41	-777.33	-191.40	0.12	-0.11	-2.58
8,890.00	0.68	27.66	8,826.60	-198.91	-776.24	-190.90	0.97	-0.35	-65.32

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8,985.00	0.87	14.48	8,921.59	-197.71	-775.80	-189.71	0.27	0.20	-13.87
9,079.00	0.84	19.58	9,015.58	-196.37	-775.39	-188.37	0.09	-0.03	5.43
9,174.00	0.70	11.74	9,110.57	-195.14	-775.04	-187.15	0.18	-0.15	-8.25
9,268.00	0.77	13.00	9,204.56	-193.97	-774.78	-185.98	0.08	0.07	1.34
9,362.00	0.69	12.37	9,298.55	-192.80	-774.52	-184.81	0.09	-0.09	-0.67
9,457.00	0.90	23.87	9,393.55	-191.56	-774.09	-183.58	0.28	0.22	12.11
9,551.00	1.01	32.71	9,487.53	-190.18	-773.35	-182.21	0.20	0.12	9.40
9,645.00	1.18	28.11	9,581.52	-188.63	-772.44	-180.67	0.20	0.18	-4.89
9,739.00	1.60	29.46	9,675.49	-186.64	-771.34	-178.68	0.45	0.45	1.44
9,834.00	1.80	35.42	9,770.45	-184.27	-769.83	-176.33	0.28	0.21	6.27
9,928.00	2.01	39.95	9,864.39	-181.80	-767.91	-173.88	0.27	0.22	4.82
10,022.00	2.10	39.74	9,958.33	-179.21	-765.75	-171.32	0.10	0.10	-0.22
10,116.00	1.74	27.06	10,052.28	-176.62	-764.00	-168.74	0.59	-0.38	-13.49
10,211.00	1.79	54.64	10,147.24	-174.47	-762.14	-166.62	0.89	0.05	29.03
10,305.00	2.35	119.93	10,241.19	-174.59	-759.27	-166.76	2.43	0.80	69.46
10,399.00	3.00	143.18	10,335.09	-177.52	-756.12	-169.72	1.33	0.69	24.73
10,494.00	2.39	157.33	10,429.98	-181.33	-753.87	-173.56	0.95	-0.64	14.89
10,588.00	2.00	199.86	10,523.92	-184.69	-753.67	-176.92	1.74	-0.41	45.24
10,683.00	3.17	227.79	10,618.82	-188.01	-756.18	-180.21	1.78	1.23	29.40
10,777.00	3.36	257.68	10,712.68	-190.34	-760.80	-182.50	1.80	0.20	31.80
10,872.00	1.61	271.95	10,807.59	-190.89	-764.85	-183.01	1.94	-1.84	15.02
10,966.00	1.42	263.80	10,901.55	-190.97	-767.33	-183.06	0.31	-0.20	-8.67
11,061.00	1.83	254.74	10,996.52	-191.50	-769.96	-183.56	0.51	0.43	-9.54
11,155.00	2.00	252.62	11,090.46	-192.38	-772.98	-184.42	0.20	0.18	-2.26
11,249.00	2.73	267.14	11,184.38	-192.99	-776.78	-184.98	1.00	0.78	15.45
11,344.00	1.29	260.46	11,279.32	-193.28	-780.09	-185.23	1.53	-1.52	-7.03
11,438.00	0.79	245.59	11,373.31	-193.72	-781.72	-185.66	0.60	-0.53	-15.82
11,532.00	1.38	278.06	11,467.29	-193.83	-783.44	-185.75	0.88	0.63	34.54
11,627.00	1.23	315.00	11,562.27	-192.95	-785.29	-184.85	0.88	-0.16	38.88
11,721.00	1.78	302.30	11,656.23	-191.45	-787.24	-183.34	0.68	0.59	-13.51
11,816.00	0.82	298.09	11,751.21	-190.35	-789.08	-182.21	1.01	-1.01	-4.43
11,855.00	0.41	284.24	11,790.21	-190.18	-789.46	-182.04	1.11	-1.05	-35.51
11,949.00	0.47	314.58	11,884.20	-189.83	-790.07	-181.68	0.25	0.06	32.28
12,044.00	0.20	320.63	11,979.20	-189.42	-790.45	-181.28	0.29	-0.28	6.37
12,138.00	1.45	5.11	12,073.19	-188.11	-790.45	-179.96	1.40	1.33	47.32
12,232.00	12.89	355.33	12,166.30	-176.44	-791.20	-168.28	12.20	12.17	-10.40
12,326.00	21.53	358.23	12,256.01	-148.70	-792.59	-140.53	9.23	9.19	3.09
12,420.00	33.93	356.36	12,339.05	-105.10	-794.79	-96.91	13.22	13.19	-1.99
12,515.00	43.54	347.67	12,413.13	-46.50	-803.49	-38.22	11.60	10.12	-9.15
12,610.00	54.79	352.54	12,475.17	24.20	-815.56	32.60	12.45	11.84	5.13
12,704.00	65.32	358.65	12,522.06	105.26	-821.57	113.71	12.53	11.20	6.50
12,798.00	80.69	1.39	12,549.45	194.87	-821.45	203.32	16.59	16.35	2.91
12,893.00	86.57	2.26	12,559.99	289.20	-818.44	297.61	6.26	6.19	0.92
12,987.00	87.92	1.02	12,584.51	383.05	-815.76	391.43	1.95	1.44	-1.32

Scientific Drilling, Intl

Survey Report

Company:	Marathon Oil Permian, LLC	Local Co-ordinate Reference:	Well Cave Lion 5 Federal WXY #8H
Project:	Lea County, NM (NAD27-NME)	TVD Reference:	KB=26.5 @ 3289.50usft
Site:	Cave Lion Pad	MD Reference:	KB=26.5 @ 3289.50usft
Well:	Cave Lion 5 Federal WXY #8H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	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)
13,081.00	88.86	3.43	12,567.15	476.93	-812.11	485.27	2.75	1.00	2.56
13,175.00	89.93	1.66	12,568.14	570.83	-807.93	579.12	2.20	1.14	-1.88
13,269.00	91.91	2.29	12,568.63	664.75	-804.70	673.01	2.21	2.11	0.67
13,364.00	91.21	1.84	12,564.05	759.66	-801.44	767.87	1.01	-0.74	-0.68
13,458.00	92.08	2.60	12,561.35	853.56	-797.96	861.73	1.38	0.93	1.02
13,553.00	89.93	0.77	12,559.68	948.49	-795.17	956.63	2.97	-2.26	-1.93
13,647.00	90.23	0.60	12,559.55	1,042.48	-794.05	1,050.61	0.37	0.32	-0.18
13,742.00	90.20	0.75	12,559.19	1,137.48	-792.93	1,145.58	0.16	-0.03	0.16
13,836.00	90.34	1.37	12,558.75	1,231.46	-791.19	1,239.54	0.68	0.15	0.66
13,931.00	90.23	359.73	12,558.28	1,326.45	-790.28	1,334.52	1.73	-0.12	-1.73
14,025.00	90.91	358.36	12,557.34	1,420.43	-791.84	1,428.51	1.63	0.72	-1.46
14,120.00	91.34	357.78	12,555.48	1,515.36	-795.04	1,523.46	0.76	0.45	-0.61
14,214.00	91.38	358.27	12,553.25	1,609.28	-798.28	1,617.41	0.52	0.04	0.52
14,308.00	89.16	358.38	12,552.80	1,703.23	-801.03	1,711.39	2.36	-2.36	0.12
14,403.00	86.78	356.48	12,556.17	1,798.06	-805.29	1,806.26	3.20	-2.51	-2.00
14,498.00	86.98	357.25	12,561.34	1,892.78	-810.47	1,901.02	0.84	0.21	0.81
14,592.00	95.61	358.22	12,559.22	1,986.59	-814.18	1,994.87	9.24	9.18	1.03
14,686.00	93.79	0.00	12,551.51	2,080.26	-815.64	2,088.54	2.70	-1.94	1.89
14,781.00	87.89	359.39	12,550.12	2,175.20	-816.14	2,183.49	6.24	-6.21	-0.64
14,844.00	86.85	359.85	12,553.01	2,238.13	-816.56	2,246.42	1.80	-1.85	0.73
14,875.00	85.54	2.16	12,555.07	2,269.06	-816.02	2,277.34	8.55	-4.23	7.45
14,920.00	86.74	3.30	12,558.10	2,313.90	-813.88	2,322.16	3.67	2.67	2.53
14,969.00	86.98	3.31	12,560.78	2,362.75	-811.06	2,370.97	0.49	0.49	0.02
15,064.00	87.58	4.47	12,565.29	2,457.42	-804.62	2,465.58	1.37	0.63	1.22
15,158.00	87.11	3.90	12,569.65	2,551.07	-797.77	2,559.15	0.79	-0.50	-0.61
15,253.00	87.05	4.02	12,574.49	2,645.72	-791.22	2,653.73	0.14	-0.06	0.13
15,347.00	86.82	4.10	12,579.51	2,739.35	-784.57	2,747.28	0.26	-0.24	0.09
15,442.00	86.85	2.42	12,584.76	2,834.05	-779.18	2,841.92	1.77	0.03	-1.77
15,537.00	88.59	0.57	12,588.54	2,928.93	-776.70	2,936.77	2.67	1.83	-1.95
15,631.00	88.66	359.17	12,590.79	3,022.90	-776.82	3,030.74	1.49	0.07	-1.49
15,726.00	91.61	1.20	12,590.57	3,117.89	-776.61	3,125.72	3.77	3.11	2.14
15,820.00	91.04	357.38	12,588.39	3,211.83	-777.77	3,219.67	4.11	-0.61	-4.06
15,914.00	92.72	355.34	12,585.31	3,305.59	-783.74	3,313.48	2.81	1.79	-2.17
16,009.00	93.86	354.41	12,579.86	3,400.05	-792.21	3,408.03	1.55	1.20	-0.98
16,102.00	93.86	354.30	12,573.60	3,492.39	-801.34	3,500.45	0.12	0.00	-0.12
16,196.00	95.07	355.68	12,566.28	3,585.74	-809.52	3,593.89	1.95	1.29	1.47
16,290.00	93.43	355.35	12,559.31	3,679.19	-816.85	3,687.41	1.78	-1.74	-0.35
16,385.00	93.43	357.34	12,553.63	3,773.82	-822.90	3,782.10	2.09	0.00	2.09
16,480.00	93.23	358.59	12,548.11	3,868.60	-826.26	3,876.90	1.33	-0.21	1.32
16,574.00	91.95	359.43	12,543.86	3,962.49	-827.89	3,970.80	1.63	-1.36	0.89
16,669.00	88.25	0.26	12,543.70	4,057.47	-828.14	4,065.78	3.99	-3.89	0.87
16,763.00	89.83	359.17	12,545.27	4,151.45	-828.61	4,159.76	2.04	1.68	-1.16
16,857.00	89.97	358.98	12,545.44	4,245.44	-830.13	4,253.76	0.25	0.15	-0.20

Scientific Drilling, Intl Survey Report

Company:	Marathon Oil Permian, LLC	Local Co-ordinate Reference:	Well Cave Lion 5 Federal WXY #8H
Project:	Lea County, NM (NAD27-NME)	TVD Reference:	KB=26.5 @ 3289.50usft
Site:	Cave Lion Pad	MD Reference:	KB=26.5 @ 3289.50usft
Well:	Cave Lion 5 Federal WXY #8H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	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)
16,951.00	89.66	356.66	12,545.74	4,339.36	-833.70	4,347.72	2.49	-0.33	-2.47
17,046.00	92.15	355.92	12,544.24	4,434.15	-839.85	4,442.56	2.73	2.62	-0.78
17,140.00	92.65	355.86	12,540.30	4,527.82	-846.58	4,536.30	0.54	0.53	-0.06
17,234.00	92.95	358.76	12,535.71	4,621.59	-850.99	4,630.11	3.10	0.32	3.09
17,328.00	88.12	355.93	12,534.83	4,715.45	-855.34	4,724.01	5.95	-5.14	-3.01
17,422.00	89.36	357.23	12,536.90	4,809.26	-860.94	4,817.87	1.91	1.32	1.38
17,448.00	89.43	356.50	12,537.17	4,835.22	-862.37	4,843.84	2.82	0.27	-2.81
SDI MWD									
17,502.78	89.43	356.50	12,537.72	4,889.90	-865.71	4,898.55	0.00	0.00	0.00
BHL[CL#8H]									
17,503.00	89.43	356.50	12,537.72	4,890.11	-865.72	4,898.77	0.00	0.00	0.00
Bit Projection									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
17,448.00	12,537.17	4,835.22	-862.37	SDI MWD
17,503.00	12,537.72	4,890.11	-865.72	Bit Projection

Checked By: _____	Approved By: _____	Date: _____
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