

US State Plane 1927 (Exact solution)
NAD 1927 (NADCON CONUS)
Clarke 1866
New Mexico East 3001
Mean Sea Level

RKB Elevation: Well @ 3582.50usft (GL: 3536' + KB: 26.5' (H&P480))

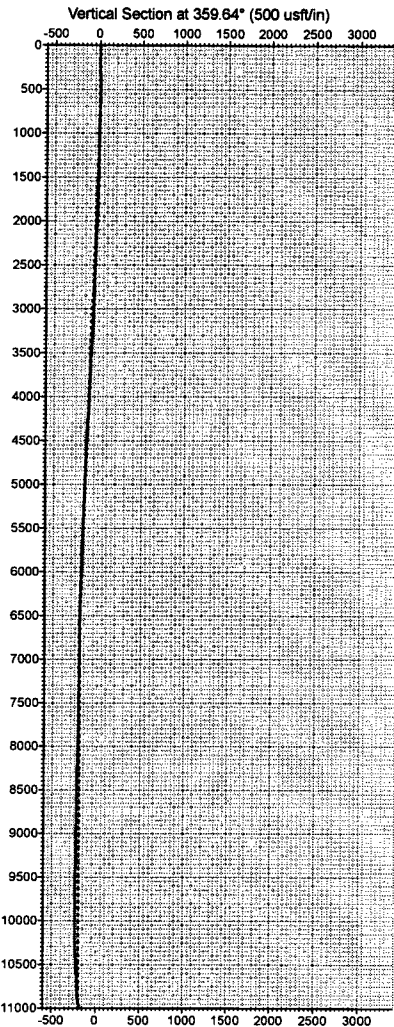
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Spot
0.00	0.00	510091.32	760477.10	32.3995296	-103.4894034	

SECTION DETAILS

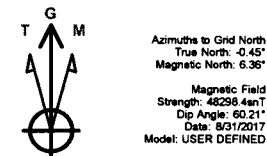
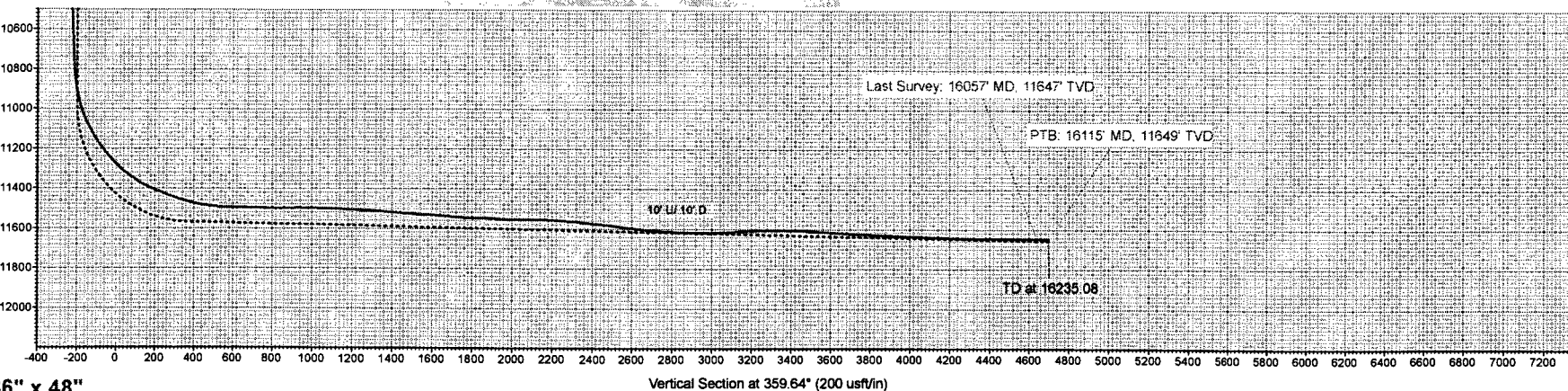
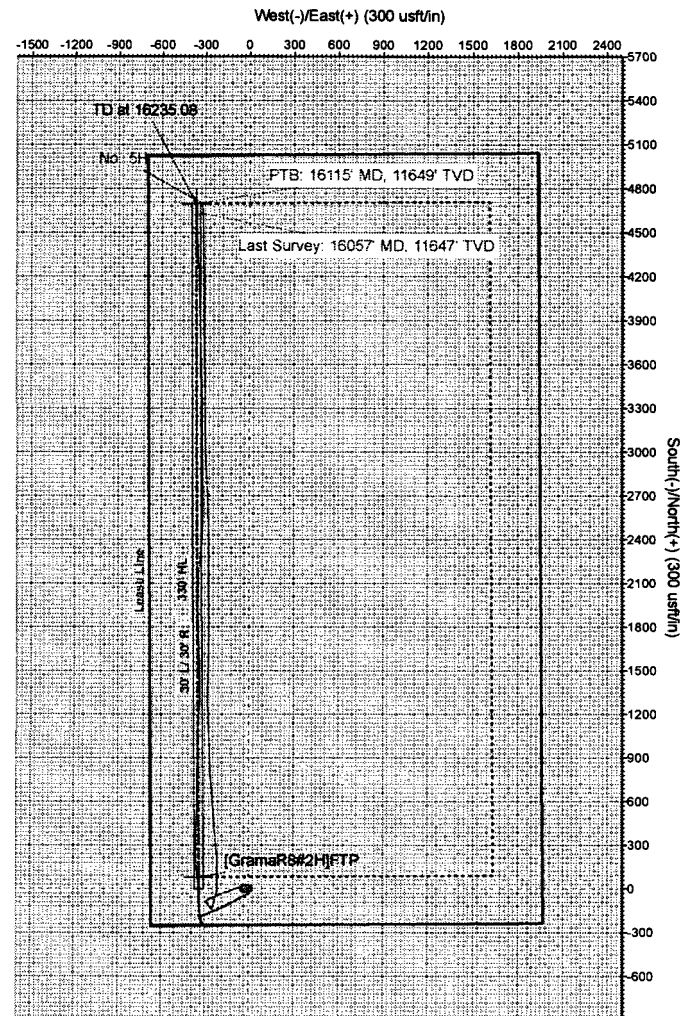
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00
3	1300.00	2.00	180.00	1299.84	-13.96	0.00	0.25	-13.96
4	1825.48	2.00	180.00	1825.00	-32.30	0.00	0.00	-32.30
5	2421.58	4.93	244.98	2420.12	-53.55	-23.24	0.75	-53.41
6	3200.70	4.93	244.98	3185.23	-191.02	-317.76	0.00	-189.02
7	3694.08	0.00	0.00	3678.00	-200.00	-337.00	1.00	-197.88
8	4101.08	0.00	0.00	4095.00	-200.00	-337.00	0.00	-197.88
9	4189.11	88.80	359.84	4156.83	360.98	-340.55	10.00	363.11
10	4623.08	88.80	359.84	4156.41	4695.92	-367.94	0.00	4698.14

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
[GramaR8#2H]FTP	0.00	77.39	-339.12	510168.71	760137.98
[GramaR8#2H]BHL	11659.41	4695.92	-367.94	514787.24	760109.16



Target Line: 11560' TVD @ 0° VS, 88.8° INC



Azimuth Corrections
Total Magnetic Corr. (M to G): 6.36°
Declination (M to T): 6.81° East



Marathon Oil

Lea County, NM

Grama Ridge 8 State

No. 2H

OH

Design: MWD 195' - 16057' PTB 16115'

Survey Report

14 September, 2017





Professional Directional Survey Report



Company: Marathon Oil
Project: Lea County, NM
Site: Grama Ridge 8 State
Well: No. 2H
Wellbore: OH
Design: MWD 195' - 16057' PTB 16115'

Local Co-ordinate Reference: Well No. 2H
TVD Reference: Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
MD Reference: Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Project Lea County, NM

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

System Datum: Mean Sea Level

Site Grama Ridge 8 State

Site Position:		Northing:	510,091.00 usft	Latitude:	32.3995287
From: Map		Easting:	760,477.00 usft	Longitude:	-103.4894038
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.45 °

Well No. 2H

Well Position	+N-S	0.00 usft	Northing:	510,091.32 usft	Latitude:	32.3995296
	+E-W	0.00 usft	Easting:	760,477.10 usft	Longitude:	-103.4894034
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,536.00 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	8/31/2017	6.81	60.21	48,298.40

Design MWD 195' - 16057' PTB 16115'

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 (°)
	0.00	0.00	0.00	359.64



Professional Directional Survey Report



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Database: WellPlanner1

Survey Program Date 9/14/2017

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
195.00	4,915.00	Survey #1 (OH)	MWD+IFR1	OWSG MWD + IFR1
5,007.00	11,907.00	Survey #2 (OH)	MWD+IFR1	OWSG MWD + IFR1
11,969.00	16,115.00	Survey #3 (OH)	MWD+IFR1	OWSG MWD + IFR1

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	510,091.32	760,477.10
195.00	0.60	327.40	195.00	0.86	0.86	-0.55	1.02	327.40	510,092.18	760,476.55
287.00	0.70	340.80	286.99	1.80	1.80	-0.99	2.05	331.04	510,093.12	760,476.11
379.00	0.40	327.10	378.99	2.61	2.60	-1.35	2.93	332.47	510,093.92	760,475.75
470.00	0.30	298.60	469.98	2.99	2.98	-1.74	3.45	329.77	510,094.30	760,475.36
562.00	0.60	166.70	561.98	2.64	2.62	-1.84	3.20	325.02	510,093.94	760,475.26
653.00	1.30	175.10	652.97	1.14	1.13	-1.64	1.99	304.65	510,092.45	760,475.46
745.00	1.20	165.50	744.95	-0.83	-0.84	-1.31	1.55	237.28	510,090.48	760,475.79
837.00	1.80	177.70	836.92	-3.21	-3.22	-1.01	3.37	197.41	510,088.10	760,476.09
928.00	1.50	179.70	927.88	-5.83	-5.84	-0.95	5.91	189.20	510,085.48	760,476.15
1,020.00	1.20	184.60	1,019.85	-7.99	-8.00	-1.02	8.06	187.24	510,083.32	760,476.08
1,111.00	0.80	158.10	1,110.84	-9.53	-9.54	-0.86	9.58	185.12	510,081.78	760,476.24
1,202.00	0.60	179.00	1,201.83	-10.60	-10.61	-0.61	10.62	183.29	510,080.71	760,476.49
1,295.00	0.70	150.50	1,294.83	-11.58	-11.59	-0.32	11.59	181.59	510,079.73	760,476.78
1,389.00	0.80	159.10	1,388.82	-12.70	-12.70	0.19	12.70	179.12	510,078.62	760,477.29
1,483.00	1.20	177.20	1,482.80	-14.30	-14.30	0.48	14.30	178.09	510,077.02	760,477.58
1,578.00	1.30	181.30	1,577.78	-16.37	-16.37	0.50	16.37	178.25	510,074.95	760,477.60
1,705.00	1.10	180.20	1,704.75	-19.03	-19.03	0.46	19.03	178.60	510,072.29	760,477.56
1,799.00	1.20	159.40	1,798.74	-20.85	-20.85	0.81	20.87	177.78	510,070.47	760,477.91
1,893.00	1.90	169.20	1,892.70	-23.31	-23.30	1.45	23.35	176.45	510,068.02	760,478.55

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Project: Lea County, NM
Site: Grama Ridge 8 State
Well: No. 2H
Wellbore: OH
Design: MWD 195' - 16057' PTB 16115'

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well No. 2H
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
Grid
Minimum Curvature
WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
1,988.00	2.40	194.10	1,987.64	-26.79	-26.78	1.26	26.81	177.31	510,064.54	760,478.36
2,082.00	2.60	203.20	2,081.55	-30.65	-30.65	-0.06	30.65	180.12	510,060.67	760,477.04
2,177.00	2.70	222.80	2,176.45	-34.25	-34.27	-2.43	34.35	184.06	510,057.05	760,474.67
2,271.00	3.00	223.70	2,270.33	-37.64	-37.67	-5.64	38.09	188.51	510,053.65	760,471.46
2,365.00	2.70	235.00	2,364.21	-40.66	-40.72	-9.15	41.74	192.66	510,050.60	760,467.95
2,460.00	3.00	236.40	2,459.10	-43.30	-43.38	-13.05	45.30	196.75	510,047.94	760,464.05
2,554.00	3.70	241.60	2,552.94	-46.07	-46.18	-17.77	49.48	201.04	510,045.14	760,459.33
2,649.00	4.50	242.60	2,647.69	-49.21	-49.36	-23.77	54.78	205.72	510,041.96	760,453.33
2,743.00	5.40	250.50	2,741.34	-52.33	-52.53	-31.22	61.11	210.72	510,038.79	760,445.88
2,838.00	5.40	252.70	2,835.92	-55.10	-55.35	-39.70	68.12	215.65	510,035.97	760,437.40
2,932.00	4.00	245.80	2,929.60	-57.71	-58.01	-46.91	74.61	218.96	510,033.31	760,430.19
3,027.00	4.00	234.70	3,024.37	-60.95	-61.28	-52.64	80.79	220.66	510,030.04	760,424.46
3,121.00	4.60	237.10	3,118.11	-64.86	-65.23	-58.48	87.60	221.88	510,026.09	760,418.62
3,216.00	4.60	238.30	3,212.80	-68.89	-69.30	-64.92	94.96	223.13	510,022.02	760,412.18
3,310.00	5.10	241.70	3,306.47	-72.81	-73.26	-71.81	102.58	224.43	510,018.06	760,405.29
3,404.00	5.40	238.80	3,400.07	-77.03	-77.53	-79.27	110.88	225.64	510,013.79	760,397.83
3,499.00	5.80	238.30	3,494.62	-81.82	-82.37	-87.18	119.93	226.62	510,008.95	760,389.92
3,593.00	5.30	243.80	3,588.18	-86.18	-86.78	-95.11	128.75	227.62	510,004.54	760,381.99
3,687.00	5.50	240.90	3,681.76	-90.24	-90.89	-102.94	137.32	228.56	510,000.43	760,374.16
3,782.00	5.30	242.00	3,776.34	-94.46	-95.16	-110.80	146.05	229.34	509,996.16	760,366.30
3,876.00	4.90	247.80	3,869.97	-97.97	-98.72	-118.35	154.11	230.17	509,992.60	760,358.75
3,971.00	4.90	243.70	3,964.62	-101.26	-102.05	-125.74	161.94	230.94	509,989.27	760,351.36
4,065.00	6.30	239.80	4,058.17	-105.58	-106.42	-133.80	170.96	231.50	509,984.90	760,343.30
4,159.00	7.10	240.80	4,151.53	-110.95	-111.85	-143.33	181.80	232.03	509,979.47	760,333.77
4,254.00	6.50	239.10	4,245.86	-116.51	-117.48	-153.06	192.95	232.49	509,973.84	760,324.04
4,348.00	6.10	241.00	4,339.29	-121.61	-122.63	-162.00	203.18	232.88	509,968.69	760,315.10
4,443.00	6.00	240.30	4,433.76	-126.46	-127.54	-170.73	213.10	233.24	509,963.78	760,306.37

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Wellbore: OH
Design: MWD 195' - 16057' PTB 16115'

Local Co-ordinate Reference:
TVD Reference:
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North Reference:
Survey Calculation Method:
Database:

Well No. 2H
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
Grid
Minimum Curvature
WellPlanner1

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)	
4,537.00	5.50	240.20	4,527.29	-131.08	-132.21	-178.90	222.45	233.54	509,959.11	760,298.20	
4,632.00	5.30	246.30	4,621.87	-135.06	-136.24	-186.87	231.26	233.91	509,955.08	760,290.23	
4,726.00	5.00	247.60	4,715.49	-138.32	-139.54	-194.63	239.49	234.36	509,951.78	760,282.47	
4,821.00	4.50	248.90	4,810.16	-141.19	-142.46	-201.94	247.13	234.80	509,948.86	760,275.16	
4,915.00	4.30	249.20	4,903.88	-143.73	-145.04	-208.67	254.13	235.20	509,946.28	760,268.43	
5,007.00	3.90	248.00	4,995.65	-146.08	-147.44	-214.80	260.53	235.53	509,943.88	760,262.30	
5,101.00	5.10	247.50	5,089.36	-148.84	-150.23	-221.62	267.74	235.87	509,941.09	760,255.48	
5,196.00	5.90	249.90	5,183.92	-152.08	-153.53	-230.11	276.62	236.29	509,937.79	760,246.99	
5,291.00	6.00	250.30	5,278.41	-155.37	-156.88	-239.37	286.20	236.76	509,934.44	760,237.73	
5,385.00	6.20	249.60	5,371.87	-158.74	-160.30	-248.75	295.93	237.20	509,931.02	760,228.35	
5,480.00	6.30	249.60	5,466.31	-162.28	-163.91	-258.44	306.04	237.62	509,927.41	760,218.66	
5,574.00	6.30	249.50	5,559.74	-165.82	-167.51	-268.11	316.14	238.00	509,923.81	760,208.99	
5,669.00	6.20	250.50	5,654.18	-169.30	-171.05	-277.83	326.26	238.38	509,920.27	760,199.27	
5,763.00	6.10	250.30	5,747.64	-172.62	-174.43	-287.31	336.12	238.74	509,916.89	760,189.79	
5,858.00	6.00	249.10	5,842.11	-176.03	-177.90	-296.71	345.95	239.05	509,913.42	760,180.39	
5,952.00	6.00	249.80	5,935.59	-179.42	-181.35	-305.91	355.62	239.34	509,909.97	760,171.19	
6,047.00	5.20	246.70	6,030.14	-182.79	-184.77	-314.52	364.78	239.57	509,906.55	760,162.58	
6,141.00	4.00	243.90	6,123.83	-185.87	-187.90	-321.38	372.27	239.69	509,903.42	760,155.72	
6,236.00	3.60	239.50	6,218.63	-188.81	-190.87	-326.92	378.56	239.72	509,900.45	760,150.18	
6,330.00	2.80	229.30	6,312.48	-191.78	-193.86	-331.21	383.77	239.66	509,897.46	760,145.89	
6,425.00	2.10	198.90	6,407.40	-194.92	-197.02	-333.53	387.37	239.43	509,894.30	760,143.57	
6,519.00	0.90	169.90	6,501.36	-197.28	-199.38	-333.96	388.95	239.16	509,891.94	760,143.14	
6,613.00	0.50	156.40	6,595.36	-198.38	-200.48	-333.66	389.26	239.00	509,890.84	760,143.44	
6,708.00	0.50	160.80	6,690.35	-199.15	-201.25	-333.36	389.40	238.88	509,890.07	760,143.74	
6,802.00	0.50	183.70	6,784.35	-199.95	-202.05	-333.25	389.72	238.77	509,889.27	760,143.85	
6,897.00	0.50	201.00	6,879.34	-200.75	-202.85	-333.43	390.28	238.68	509,888.47	760,143.67	
6,991.00	0.60	212.20	6,973.34	-201.55	-203.65	-333.84	391.05	238.62	509,887.67	760,143.26	

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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
7,085.00	0.70	198.60	7,067.33	-202.50	-204.61	-334.28	391.93	238.53	509,886.71	760,142.82
7,180.00	0.90	195.20	7,162.33	-203.77	-205.88	-334.66	392.92	238.40	509,885.44	760,142.44
7,274.00	0.50	124.80	7,256.32	-204.72	-206.83	-334.52	393.29	238.27	509,884.49	760,142.58
7,369.00	0.70	107.70	7,351.31	-205.14	-207.24	-333.63	392.75	238.15	509,884.08	760,143.47
7,463.00	0.70	125.40	7,445.31	-205.65	-207.75	-332.61	392.16	238.01	509,883.57	760,144.49
7,558.00	0.90	127.60	7,540.30	-206.45	-208.54	-331.55	391.68	237.83	509,882.78	760,145.55
7,653.00	0.80	138.40	7,635.29	-207.41	-209.49	-330.52	391.31	237.63	509,881.83	760,146.58
7,747.00	1.00	141.30	7,729.28	-208.54	-210.62	-329.57	391.12	237.42	509,880.70	760,147.53
7,841.00	1.40	146.90	7,823.26	-210.15	-212.22	-328.43	391.03	237.13	509,879.10	760,148.67
7,936.00	1.30	148.00	7,918.23	-212.05	-214.11	-327.22	391.05	236.80	509,877.21	760,149.88
8,030.00	1.40	155.30	8,012.20	-214.00	-216.06	-326.18	391.24	236.48	509,875.26	760,150.92
8,125.00	1.50	154.90	8,107.17	-216.19	-218.24	-325.17	391.61	236.13	509,873.08	760,151.93
8,219.00	1.60	153.50	8,201.14	-218.48	-220.52	-324.06	391.97	235.76	509,870.80	760,153.04
8,314.00	1.60	153.10	8,296.10	-220.86	-222.89	-322.87	392.33	235.38	509,868.43	760,154.23
8,408.00	1.80	153.90	8,390.06	-223.36	-225.39	-321.62	392.74	234.98	509,865.93	760,155.48
8,503.00	0.30	111.80	8,485.04	-224.80	-226.82	-320.74	392.84	234.73	509,864.50	760,156.36
8,597.00	0.60	73.90	8,579.04	-224.76	-226.78	-320.03	392.24	234.68	509,864.54	760,157.07
8,691.00	0.80	138.90	8,673.03	-225.13	-227.14	-319.13	391.71	234.56	509,864.18	760,157.97
8,786.00	0.40	137.90	8,768.03	-225.88	-227.88	-318.47	391.60	234.41	509,863.44	760,158.63
8,880.00	0.90	133.00	8,862.02	-226.63	-228.63	-317.71	391.42	234.26	509,862.69	760,159.39
8,974.00	0.40	266.50	8,956.02	-227.15	-229.15	-317.50	391.56	234.18	509,862.17	760,159.60
9,069.00	0.40	191.20	9,051.02	-227.49	-229.50	-317.89	392.08	234.17	509,861.82	760,159.21
9,163.00	1.70	155.80	9,145.00	-229.09	-231.09	-317.39	392.60	233.94	509,860.23	760,159.71
9,257.00	0.60	128.40	9,238.98	-230.68	-232.67	-316.43	392.76	233.67	509,858.65	760,160.67
9,352.00	0.10	48.80	9,333.98	-230.93	-232.92	-315.98	392.55	233.60	509,858.40	760,161.12
9,446.00	0.80	149.30	9,427.97	-231.45	-233.43	-315.58	392.53	233.51	509,857.89	760,161.52
9,540.00	1.60	152.50	9,521.95	-233.18	-235.16	-314.64	392.81	233.23	509,856.16	760,162.46

Company: Marathon Oil
Project: Lea County, NM
Site: Grama Ridge 8 State
Well: No. 2H
Wellbore: OH
Design: MWD 195' - 16057' PTB 16115'

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well No. 2H
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
 Grid
 Minimum Curvature
 WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
9,635.00	1.00	162.60	9,616.93	-235.15	-237.13	-313.78	393.30	232.92	509,854.19	760,163.32
9,729.00	1.00	8.80	9,710.92	-235.13	-237.10	-313.41	392.99	232.89	509,854.22	760,163.69
9,824.00	1.20	18.70	9,805.91	-233.37	-235.34	-312.96	391.57	233.06	509,855.98	760,164.14
9,918.00	1.50	87.50	9,899.88	-232.39	-234.35	-311.42	389.75	233.04	509,856.97	760,165.68
10,013.00	0.40	136.40	9,994.87	-232.59	-234.54	-309.95	388.68	232.88	509,856.78	760,167.15
10,107.00	0.60	119.10	10,088.87	-233.07	-235.02	-309.29	388.45	232.77	509,856.30	760,167.81
10,206.00	0.40	282.90	10,187.87	-233.24	-235.19	-309.17	388.46	232.74	509,856.13	760,167.93
10,300.00	1.60	326.50	10,281.85	-232.07	-234.02	-310.22	388.59	232.97	509,857.30	760,166.88
10,395.00	2.00	333.60	10,376.80	-229.47	-231.43	-311.69	388.21	233.41	509,859.89	760,165.41
10,489.00	3.10	323.10	10,470.71	-225.95	-227.93	-313.94	387.96	234.02	509,863.39	760,163.16
10,584.00	2.70	323.10	10,565.59	-222.09	-224.09	-316.83	388.07	234.73	509,867.23	760,160.27
10,679.00	2.10	331.60	10,660.50	-218.76	-220.77	-319.00	387.94	235.31	509,870.55	760,158.10
10,773.00	3.10	342.60	10,754.41	-214.81	-216.83	-320.58	387.02	235.93	509,874.49	760,156.52
10,867.00	4.70	350.10	10,848.19	-208.58	-210.61	-322.00	384.76	236.81	509,880.71	760,155.10
10,914.00	9.70	348.60	10,894.80	-202.79	-204.82	-323.12	382.57	237.63	509,886.50	760,153.98
10,962.00	13.70	351.20	10,941.79	-193.19	-195.24	-324.79	378.95	238.99	509,896.08	760,152.31
11,009.00	17.80	349.20	10,987.02	-180.62	-182.68	-326.98	374.55	240.81	509,908.64	760,150.12
11,056.00	21.70	348.71	11,031.25	-165.02	-167.09	-330.03	369.92	243.15	509,924.23	760,147.07
11,103.00	25.70	351.51	11,074.28	-146.39	-148.49	-333.24	364.82	245.98	509,942.83	760,143.86
11,151.00	29.80	354.11	11,116.75	-124.20	-126.32	-336.00	358.96	249.40	509,965.00	760,141.10
11,198.00	33.80	356.21	11,156.69	-99.52	-101.64	-338.07	353.02	253.27	509,989.68	760,139.03
11,245.00	37.50	0.01	11,194.88	-72.15	-74.28	-338.93	346.97	257.64	510,017.04	760,138.17
11,292.00	40.20	358.81	11,231.48	-42.67	-44.80	-339.24	342.19	262.48	510,046.52	760,137.86
11,340.00	44.40	356.81	11,266.97	-10.40	-12.54	-340.50	340.73	267.89	510,078.78	760,136.60
11,387.00	48.70	355.30	11,299.29	23.65	21.49	-342.86	343.53	273.59	510,112.81	760,134.24
11,434.00	52.40	354.20	11,329.15	59.80	57.63	-346.19	350.95	279.45	510,148.95	760,130.91
11,482.00	56.70	354.40	11,356.98	98.72	96.53	-350.07	363.13	285.42	510,187.85	760,127.03

Company: Marathon Oil
Project: Lea County, NM
Site: Grama Ridge 8 State
Well: No. 2H
Wellbore: OH
Design: MWD 195' - 16057' PTB 16115'

Local Co-ordinate Reference: Well No. 2H
TVD Reference: Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
MD Reference: Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
11,529.00	61.80	355.90	11,381.01	138.98	136.76	-353.47	379.00	291.15	510,228.08	760,123.63
11,576.00	68.20	356.00	11,400.86	181.46	179.23	-356.48	398.99	296.69	510,270.55	760,120.62
11,623.00	69.40	357.70	11,417.86	225.23	222.98	-358.88	422.51	301.85	510,314.30	760,118.22
11,670.00	69.90	359.60	11,434.20	269.29	267.03	-359.92	448.16	306.57	510,358.35	760,117.18
11,718.00	70.90	2.10	11,450.30	314.49	312.24	-359.24	475.97	311.00	510,403.56	760,117.86
11,765.00	74.70	2.10	11,464.20	359.34	357.10	-357.60	505.37	314.96	510,448.42	760,119.50
11,812.00	77.30	1.70	11,475.57	404.90	402.67	-356.09	537.53	318.51	510,493.99	760,121.01
11,859.00	80.50	1.31	11,484.62	450.99	448.77	-354.88	572.13	321.66	510,540.09	760,122.22
11,907.00	85.00	1.31	11,490.67	498.58	496.36	-353.79	609.54	324.52	510,587.68	760,123.31
11,969.00	88.40	1.31	11,494.24	560.44	558.23	-352.37	660.15	327.74	510,649.55	760,124.73
12,034.00	88.70	0.10	11,495.89	625.40	623.21	-351.57	715.54	330.57	510,714.53	760,125.53
12,128.00	89.30	359.70	11,497.53	719.39	717.19	-351.74	798.80	333.87	510,808.51	760,125.36
12,223.00	89.80	0.90	11,498.27	814.38	812.19	-351.24	884.88	336.61	510,903.51	760,125.86
12,317.00	90.50	1.70	11,498.03	908.34	906.16	-349.11	971.08	338.93	510,997.48	760,127.99
12,412.00	88.40	359.40	11,498.94	1,003.31	1,001.14	-348.20	1,059.96	340.82	511,092.46	760,128.90
12,506.00	88.00	2.60	11,501.89	1,097.22	1,095.07	-346.56	1,148.60	342.44	511,186.39	760,130.54
12,592.00	86.10	3.10	11,506.32	1,182.97	1,180.84	-342.29	1,229.45	343.83	511,272.16	760,134.81
12,687.00	88.30	2.90	11,510.96	1,277.69	1,275.59	-337.32	1,319.44	345.19	511,366.91	760,139.78
12,781.00	85.00	359.80	11,516.45	1,371.46	1,369.38	-335.11	1,409.79	346.25	511,460.70	760,141.99
12,876.00	85.40	359.50	11,524.40	1,466.13	1,464.05	-335.69	1,502.04	347.09	511,555.37	760,141.41
12,970.00	87.60	358.70	11,530.14	1,559.94	1,557.85	-337.16	1,593.92	347.79	511,649.17	760,139.94
13,067.00	84.40	358.00	11,536.91	1,656.67	1,654.56	-339.94	1,689.13	348.39	511,745.88	760,137.16
13,162.00	86.20	357.70	11,544.69	1,751.30	1,749.17	-343.50	1,782.58	348.89	511,840.49	760,133.60
13,256.00	88.60	357.70	11,548.95	1,845.14	1,842.99	-347.27	1,875.43	349.33	511,934.31	760,129.83
13,351.00	88.00	359.50	11,551.77	1,940.08	1,937.92	-349.59	1,969.20	349.77	512,029.24	760,127.51
13,446.00	90.10	2.10	11,553.35	2,035.03	2,032.88	-348.26	2,062.50	350.28	512,124.20	760,128.84
13,540.00	89.50	2.70	11,553.68	2,128.92	2,126.80	-344.32	2,154.49	350.80	512,218.12	760,132.78

Company: Marathon Oil
Project: Lea County, NM
Site: Grama Ridge 8 State
Well: No. 2H
Wellbore: OH
Design: MWD 195' - 16057' PTB 16115'

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well No. 2H
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
Grid
Minimum Curvature
WellPlanner1

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)	
13,634.00	85.30	5.50	11,557.94	2,222.51	2,220.43	-337.61	2,245.95	351.35	512,311.75	760,139.49	
13,729.00	84.40	6.10	11,566.47	2,316.58	2,314.56	-328.05	2,337.70	351.93	512,405.88	760,149.05	
13,823.00	84.60	4.80	11,575.48	2,409.66	2,407.71	-319.17	2,428.77	352.45	512,499.03	760,157.93	
13,918.00	82.90	1.90	11,585.82	2,503.89	2,501.97	-313.65	2,521.55	352.85	512,593.29	760,163.45	
14,012.00	82.60	0.60	11,597.68	2,597.10	2,595.19	-311.61	2,613.83	353.15	512,686.51	760,165.49	
14,107.00	85.40	358.90	11,607.61	2,691.56	2,689.66	-312.03	2,707.69	353.38	512,780.98	760,165.07	
14,201.00	86.60	358.90	11,614.17	2,785.32	2,783.41	-313.83	2,801.04	353.57	512,874.73	760,163.27	
14,295.00	87.90	358.90	11,618.68	2,879.21	2,877.28	-315.63	2,894.54	353.74	512,968.60	760,161.47	
14,390.00	91.10	358.90	11,619.51	2,974.18	2,972.25	-317.45	2,989.15	353.90	513,063.57	760,159.65	
14,484.00	93.20	359.80	11,615.98	3,068.11	3,066.17	-318.52	3,082.67	354.07	513,157.49	760,158.58	
14,579.00	93.10	359.70	11,610.76	3,162.97	3,161.02	-318.93	3,177.07	354.24	513,252.34	760,158.17	
14,673.00	91.60	359.80	11,606.91	3,256.88	3,254.94	-319.34	3,270.57	354.40	513,346.26	760,157.76	
14,785.00	89.50	358.50	11,605.83	3,368.87	3,366.92	-321.00	3,382.18	354.55	513,458.24	760,156.10	
14,879.00	87.50	358.10	11,608.29	3,462.80	3,460.84	-323.79	3,475.95	354.66	513,552.16	760,153.31	
14,974.00	86.30	358.20	11,613.43	3,557.63	3,555.65	-326.85	3,570.64	354.75	513,646.97	760,150.25	
15,069.00	86.40	358.20	11,619.48	3,652.41	3,650.41	-329.83	3,665.28	354.84	513,741.73	760,147.27	
15,163.00	87.10	358.40	11,624.81	3,746.23	3,744.21	-332.62	3,758.96	354.92	513,835.53	760,144.48	
15,258.00	87.50	358.50	11,629.28	3,841.10	3,839.07	-335.18	3,853.68	355.01	513,930.39	760,141.92	
15,353.00	87.70	358.50	11,633.26	3,936.00	3,933.96	-337.67	3,948.42	355.09	514,025.28	760,139.43	
15,447.00	88.00	358.40	11,636.79	4,029.91	4,027.86	-340.21	4,042.20	355.17	514,119.18	760,136.89	
15,542.00	88.50	358.60	11,639.69	4,124.85	4,122.78	-342.69	4,137.00	355.25	514,214.10	760,134.41	
15,636.00	88.00	357.40	11,642.56	4,218.77	4,216.68	-345.97	4,230.85	355.31	514,308.00	760,131.13	
15,731.00	89.00	357.30	11,645.05	4,313.66	4,311.54	-350.36	4,325.75	355.35	514,402.86	760,126.74	
15,825.00	89.90	356.60	11,645.95	4,407.55	4,405.40	-355.36	4,419.71	355.39	514,496.72	760,121.74	
15,920.00	90.90	358.20	11,645.29	4,502.47	4,500.30	-359.67	4,514.65	355.43	514,591.62	760,117.43	
16,015.00	88.40	359.80	11,645.87	4,597.45	4,595.27	-361.33	4,609.45	355.50	514,686.59	760,115.77	

Company: Marathon Oil
Project: Lea County, NM
Site: Grama Ridge 8 State
Well: No. 2H
Wellbore: OH
Design: MWD 195' - 16057' PTB 16115'

Local Co-ordinate Reference: Well No. 2H
TVD Reference: Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
MD Reference: Well @ 3562.50usft (GL: 3536' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)	
16,057.00	88.40	359.80	11,647.04	4,639.43	4,637.25	-361.48	4,651.32	355.54	514,728.57	760,115.62	
Last Survey: 16057' MD, 11647' TVD											
16,115.00	88.40	359.80	11,648.66	4,697.41	4,695.23	-361.68	4,709.14	355.60	514,786.55	760,115.42	
PTB: 16115' MD, 11649' TVD											

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N-S (usft)	+E-W (usft)	
16,057.00	11,647.04	4,637.25	-361.48	Last Survey: 16057' MD, 11647' TVD
16,115.00	11,648.66	4,695.23	-361.68	PTB: 16115' MD, 11649' TVD