



Marathon Oil

Marathon Oil

Lea County, NM

Flowmaster 24-34-15 (3-6-7)

TB #7H

OH

Design: MWD 181'-16799' PTB 16854'

Survey Report

15 January, 2019





Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well TB #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Site:	Flowmaster 24-34-15 (3-6-7)	MD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Well:	TB #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	Database:	WellPlanner1

Project	Lea 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	Flowmaster 24-34-15 (3-6-7)		
Site Position:		Northing:	446,201.15 usft
From:	Map	Easting:	768,587.69 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.223740
		Longitude:	-103.464805
		Grid Convergence:	0.46 °

Well	TB #7H		
Well Position	+N/-S	0.00 usft	Northing: 446,201.15 usft
	+E/-W	0.00 usft	Easting: 768,587.69 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32.223740
		Longitude:	-103.464805
		Ground Level:	3,523.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	HDGM	10/31/2018	6.70
			Dip Angle (°)
			59.92
			Field Strength (nT)
			47,966.60

Design	MWD 181'-16799' PTB 16854'		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+NAS	+E/W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction (°)
			179.55



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well TB #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Site:	Flowmaster 24-34-15 (3-6-7)	MD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Well:	TB #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	Database:	WellPlanner1

Survey Program		Date	1/15/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
181.00	1,081.00	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HRGM	
1,218.00	5,370.00	Survey #2 (OH)	MWD+HDGM	OWSG MWD + HRGM	
5,465.00	9,718.00	Survey #3 (OH)	MWD+HDGM	OWSG MWD + HRGM	
9,812.00	16,854.00	Survey #4 (OH)	MWD+HDGM	OWSG MWD + HRGM	

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	446,201.15	768,587.69
0.06	0.00	321.00		0.06	0.00	0.00	0.00	0.00	321.00	446,201.15	768,587.69
[Flowmaster#7H]FTP											
181.00	0.50	321.00		181.00	-0.62	0.61	-0.50	0.79	321.00	446,201.76	768,587.19
242.00	1.00	305.90		241.99	-1.14	1.13	-1.10	1.58	315.95	446,202.28	768,586.59
332.00	0.90	310.70		331.98	-2.07	2.05	-2.27	3.06	312.17	446,203.20	768,585.42
423.00	0.60	313.60		422.97	-2.87	2.85	-3.15	4.25	312.08	446,204.00	768,584.54
515.00	0.40	3.50		514.97	-3.53	3.50	-3.48	4.94	315.15	446,204.65	768,584.21
697.00	0.70	339.60		696.96	-5.21	5.18	-3.83	6.44	323.49	446,206.33	768,583.86
789.00	0.60	12.90		788.95	-6.20	6.17	-3.92	7.31	327.58	446,207.32	768,583.77
971.00	0.90	351.80		970.94	-8.55	8.52	-3.91	9.37	335.33	446,209.67	768,583.78
1,063.00	0.70	351.80		1,062.93	-9.82	9.79	-4.10	10.61	337.30	446,210.94	768,583.59
1,081.00	0.70	11.00		1,080.93	-10.04	10.01	-4.09	10.81	337.77	446,211.16	768,583.60
1,218.00	0.40	351.60		1,217.92	-11.33	11.30	-4.00	11.99	340.51	446,212.45	768,583.69
1,312.00	0.30	344.70		1,311.92	-11.89	11.86	-4.11	12.56	340.88	446,213.01	768,583.58
1,501.00	0.80	315.40		1,500.91	-13.32	13.28	-5.17	14.25	338.73	446,214.43	768,582.52
1,596.00	0.50	278.00		1,595.91	-13.86	13.81	-6.05	15.07	336.35	446,214.96	768,581.64
1,690.00	0.50	260.50		1,689.90	-13.85	13.80	-6.86	15.41	333.58	446,214.95	768,580.83
1,785.00	0.70	249.40		1,784.90	-13.59	13.53	-7.81	15.62	330.00	446,214.68	768,579.88
1,879.00	0.50	232.30		1,878.89	-13.14	13.07	-8.67	15.69	326.44	446,214.22	768,579.02



Professional Directional Survey Report



Company: Marathon Oil
Project: Lea County, NM
Site: Flowmaster 24-34-15 (3-6-7)
Well: TB #7H
Wellbore: OH
Design: MWD 181'-16799' PTB 16854'

Local Co-ordinate Reference: Well TB #7H
TVD Reference: Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
MD Reference: Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
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)
1,974.00	0.50	228.60	1,973.89	-12.62	12.55	-9.31	15.62	323.42	446,213.70	768,578.38
2,068.00	0.20	215.30	2,067.89	-12.22	12.14	-9.71	15.55	321.34	446,213.29	768,577.98
2,162.00	0.40	235.40	2,161.89	-11.90	11.82	-10.08	15.53	319.55	446,212.97	768,577.61
2,257.00	0.30	295.10	2,256.88	-11.82	11.74	-10.58	15.80	317.98	446,212.89	768,577.11
2,351.00	0.50	292.40	2,350.88	-12.09	12.00	-11.18	16.40	317.03	446,213.15	768,576.51
2,446.00	0.20	329.40	2,445.88	-12.39	12.30	-11.65	16.94	316.56	446,213.45	768,576.04
2,541.00	0.20	327.10	2,540.88	-12.67	12.58	-11.82	17.26	316.79	446,213.73	768,575.87
2,636.00	0.50	329.20	2,635.88	-13.17	13.08	-12.12	17.83	317.17	446,214.23	768,575.57
2,730.00	0.40	347.90	2,729.87	-13.85	13.75	-12.40	18.51	317.95	446,214.90	768,575.29
2,825.00	0.50	339.60	2,824.87	-14.56	14.46	-12.61	19.19	318.90	446,215.61	768,575.08
2,919.00	0.50	351.90	2,918.87	-15.35	15.25	-12.82	19.92	319.96	446,216.40	768,574.87
3,014.00	0.60	358.80	3,013.86	-16.26	16.16	-12.88	20.67	321.43	446,217.31	768,574.81
3,108.00	0.50	1.70	3,107.86	-17.16	17.06	-12.88	21.38	322.95	446,218.21	768,574.81
3,203.00	0.60	347.40	3,202.86	-18.06	17.96	-12.98	22.16	324.15	446,219.11	768,574.71
3,298.00	0.50	342.30	3,297.85	-18.95	18.84	-13.21	23.01	324.96	446,219.99	768,574.48
3,392.00	0.40	296.20	3,391.85	-19.48	19.38	-13.63	23.69	324.87	446,220.53	768,574.06
3,486.00	0.30	8.40	3,485.85	-19.87	19.77	-13.89	24.16	324.90	446,220.92	768,573.80
3,581.00	0.20	91.00	3,580.85	-20.12	20.01	-13.69	24.24	325.62	446,221.16	768,574.00
3,676.00	0.20	17.20	3,675.85	-20.27	20.16	-13.47	24.25	326.25	446,221.31	768,574.22
3,771.00	0.40	74.80	3,770.84	-20.51	20.41	-13.10	24.25	327.30	446,221.56	768,574.59
3,865.00	0.90	111.20	3,864.84	-20.32	20.23	-12.10	23.57	329.11	446,221.38	768,575.59
3,959.00	1.80	116.50	3,958.81	-19.38	19.30	-10.09	21.78	332.40	446,220.45	768,577.60
4,054.00	1.50	101.90	4,053.77	-18.44	18.38	-7.54	19.87	337.70	446,219.53	768,580.15
4,148.00	1.10	110.70	4,147.75	-17.85	17.81	-5.49	18.64	342.87	446,218.96	768,582.20
4,242.00	1.00	115.40	4,241.73	-17.17	17.14	-3.91	17.58	347.16	446,218.29	768,583.78
4,336.00	0.60	87.70	4,335.72	-16.83	16.81	-2.67	17.02	350.96	446,217.96	768,585.02
4,431.00	0.50	63.80	4,430.72	-17.02	17.01	-1.80	17.10	353.95	446,218.16	768,585.89



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Well:	TB #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	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)
4,525.00	0.70	77.00	4,524.71	-17.33	17.32	-0.88	17.34	357.10	446,218.47	768,586.81
4,620.00	1.30	93.80	4,619.70	-17.37	17.38	0.76	17.39	2.52	446,218.53	768,588.45
4,714.00	2.00	95.90	4,713.66	-17.11	17.14	3.46	17.48	11.41	446,218.29	768,591.15
4,809.00	2.20	94.00	4,808.60	-16.79	16.84	6.93	18.21	22.36	446,217.99	768,594.62
4,903.00	2.50	99.50	4,902.52	-16.29	16.38	10.75	19.59	33.28	446,217.53	768,598.44
4,998.00	3.10	102.10	4,997.40	-15.38	15.50	15.31	21.78	44.64	446,216.65	768,603.00
5,093.00	3.60	104.10	5,092.24	-14.07	14.23	20.71	25.13	55.50	446,215.38	768,608.40
5,187.00	3.30	102.80	5,186.07	-12.71	12.91	26.21	29.22	63.77	446,214.06	768,613.90
5,245.00	2.80	107.90	5,243.99	-11.88	12.11	29.19	31.60	67.47	446,213.26	768,616.88
5,370.00	2.70	108.80	5,368.84	-9.95	10.22	34.88	36.35	73.67	446,211.37	768,622.57
5,465.00	2.50	109.30	5,463.75	-8.51	8.81	38.95	39.94	77.25	446,209.96	768,626.64
5,559.00	1.10	45.20	5,557.70	-8.45	8.77	41.53	42.44	78.07	446,209.92	768,629.22
5,654.00	1.50	9.50	5,652.68	-10.31	10.64	42.38	43.70	75.90	446,211.79	768,630.07
5,748.00	1.80	3.90	5,746.64	-12.99	13.33	42.68	44.72	72.66	446,214.48	768,630.37
5,843.00	1.90	6.90	5,841.59	-16.04	16.38	42.97	45.99	69.14	446,217.53	768,630.66
5,937.00	1.90	7.20	5,935.54	-19.13	19.47	43.36	47.53	65.81	446,220.62	768,631.05
6,031.00	3.80	334.10	6,029.43	-23.49	23.82	42.19	48.45	60.55	446,224.97	768,629.88
6,125.00	4.70	330.80	6,123.17	-29.68	29.99	38.95	49.16	52.41	446,231.14	768,626.64
6,220.00	4.50	328.90	6,217.86	-36.30	36.57	35.13	50.71	43.84	446,237.72	768,622.82
6,314.00	4.40	330.00	6,311.58	-42.61	42.85	31.42	53.14	36.25	446,244.00	768,619.11
6,409.00	4.50	329.50	6,406.29	-49.00	49.22	27.71	56.48	29.38	446,250.37	768,615.40
6,503.00	4.50	328.80	6,500.00	-55.36	55.55	23.92	60.49	23.30	446,256.70	768,611.61
6,598.00	4.40	326.20	6,594.71	-61.61	61.77	19.97	64.92	17.91	446,262.92	768,607.66
6,692.00	4.50	327.00	6,688.43	-67.73	67.86	15.95	69.71	13.23	446,269.01	768,603.64
6,787.00	4.30	324.80	6,783.15	-73.80	73.89	11.87	74.84	9.13	446,275.04	768,599.56
6,881.00	4.30	327.40	6,876.89	-79.68	79.74	7.94	80.14	5.69	446,280.89	768,595.63
6,976.00	5.60	334.70	6,971.53	-86.90	86.93	4.04	87.03	2.66	446,288.08	768,591.73



Professional Directional Survey Report



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Site:	Flowmaster 24-34-15 (3-6-7)	MD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Well:	TB #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	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)
7,071.00	6.00	338.40	7,066.05	-95.74	95.74	0.23	95.74	0.14	446,296.89	768,587.92
7,165.00	6.00	336.90	7,159.53	-104.85	104.83	-3.50	104.89	358.09	446,305.98	768,584.19
7,260.00	5.70	335.50	7,254.04	-113.74	113.69	-7.41	113.93	356.27	446,314.84	768,580.28
7,354.00	5.50	334.70	7,347.59	-122.09	122.01	-11.27	122.53	354.72	446,323.16	768,576.42
7,448.00	5.80	333.30	7,441.13	-130.44	130.32	-15.33	131.22	353.29	446,331.47	768,572.36
7,542.00	6.70	343.60	7,534.57	-139.97	139.83	-19.01	141.11	352.26	446,340.98	768,568.68
7,637.00	6.90	346.00	7,628.91	-150.85	150.68	-21.96	152.27	351.71	446,351.83	768,565.73
7,732.00	6.50	345.10	7,723.26	-161.60	161.41	-24.72	163.30	351.29	446,362.56	768,562.97
7,826.00	6.30	342.70	7,816.67	-171.69	171.48	-27.62	173.69	350.85	446,372.63	768,560.07
7,921.00	6.00	343.40	7,911.12	-181.45	181.22	-30.59	183.78	350.42	446,382.37	768,557.10
8,016.00	5.60	340.90	8,005.64	-190.61	190.35	-33.53	193.28	350.01	446,391.50	768,554.16
8,111.00	5.90	356.30	8,100.17	-199.88	199.61	-35.36	202.71	349.96	446,400.76	768,552.33
8,205.00	5.80	358.60	8,193.68	-209.45	209.18	-35.79	212.22	350.29	446,410.33	768,551.90
8,300.00	3.80	16.00	8,288.34	-217.27	217.00	-35.03	219.81	350.83	446,418.15	768,552.66
8,394.00	3.40	10.60	8,382.16	-222.99	222.74	-33.66	225.27	351.41	446,423.89	768,554.03
8,489.00	3.00	7.20	8,477.01	-228.22	227.97	-32.83	230.32	351.80	446,429.12	768,554.86
8,583.00	2.90	6.30	8,570.88	-233.02	232.78	-32.26	235.00	352.11	446,433.93	768,555.43
8,677.00	1.80	21.40	8,664.80	-236.75	236.51	-31.46	238.60	352.42	446,437.66	768,556.23
8,772.00	1.70	17.50	8,759.76	-239.48	239.25	-30.50	241.18	352.74	446,440.40	768,557.19
8,866.00	1.50	6.80	8,853.72	-242.03	241.80	-29.93	243.64	352.94	446,442.95	768,557.76
8,960.00	1.40	357.00	8,947.69	-244.39	244.17	-29.85	245.98	353.03	446,445.32	768,557.84
9,055.00	1.50	348.40	9,042.66	-246.77	246.54	-30.16	248.38	353.03	446,447.69	768,557.53
9,149.00	1.70	343.00	9,136.63	-249.32	249.08	-30.81	250.98	352.95	446,450.23	768,556.88
9,243.00	1.40	347.60	9,230.59	-251.78	251.54	-31.47	253.50	352.87	446,452.69	768,556.22
9,338.00	1.50	344.50	9,325.56	-254.11	253.87	-32.05	255.88	352.81	446,455.02	768,555.64
9,432.00	1.70	342.40	9,419.53	-256.63	256.38	-32.80	258.47	352.71	446,457.53	768,554.89
9,527.00	1.90	336.80	9,514.48	-259.43	259.17	-33.84	261.37	352.56	446,460.32	768,553.85



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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	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)
9,623.00	2.50	339.30	9,610.41	-262.86	262.60	-35.21	264.95	352.36	446,463.75	768,552.48
9,718.00	2.00	1.90	9,705.34	-266.46	266.19	-35.89	268.60	352.32	446,467.34	768,551.80
9,812.00	2.10	1.00	9,799.28	-269.82	269.55	-35.80	271.92	352.43	446,470.70	768,551.89
9,907.00	2.30	359.80	9,894.21	-273.47	273.20	-35.78	275.53	352.54	446,474.35	768,551.91
10,001.00	2.20	357.60	9,988.13	-277.16	276.89	-35.86	279.20	352.62	446,478.04	768,551.83
10,096.00	2.50	356.30	10,083.05	-281.05	280.78	-36.07	283.08	352.68	446,481.93	768,551.62
10,190.00	2.10	10.70	10,176.98	-284.79	284.51	-35.89	286.77	352.81	446,485.66	768,551.80
10,284.00	1.60	4.70	10,270.93	-287.78	287.52	-35.46	289.69	352.97	446,488.67	768,552.23
10,379.00	1.30	356.00	10,365.90	-290.18	289.91	-35.42	292.07	353.03	446,491.06	768,552.27
10,474.00	1.20	343.60	10,460.88	-292.21	291.94	-35.78	294.13	353.01	446,493.09	768,551.91
10,568.00	1.40	326.90	10,554.85	-294.13	293.85	-36.69	296.13	352.88	446,495.00	768,551.00
10,663.00	1.60	312.40	10,649.82	-296.01	295.71	-38.30	298.18	352.62	446,496.86	768,549.39
10,757.00	1.70	306.60	10,743.78	-297.74	297.43	-40.39	300.16	352.27	446,498.58	768,547.30
10,852.00	2.00	299.80	10,838.73	-299.42	299.09	-42.96	302.16	351.83	446,500.24	768,544.73
10,946.00	1.90	295.80	10,932.68	-300.94	300.59	-45.78	304.05	351.34	446,501.74	768,541.91
11,041.00	1.80	290.80	11,027.63	-302.18	301.80	-48.60	305.69	350.85	446,502.95	768,539.09
11,135.00	2.00	287.10	11,121.58	-303.20	302.81	-51.54	307.16	350.34	446,503.96	768,536.15
11,230.00	2.10	283.20	11,216.52	-304.12	303.69	-54.82	308.60	349.77	446,504.84	768,532.87
11,324.00	2.00	279.10	11,310.45	-304.79	304.35	-58.12	309.85	349.19	446,505.50	768,529.57
11,419.00	2.20	279.80	11,405.39	-305.39	304.92	-61.55	311.07	348.59	446,506.07	768,526.14
11,432.00	2.30	279.30	11,418.38	-305.48	305.00	-62.06	311.25	348.50	446,506.15	768,525.63
11,556.00	2.60	281.30	11,542.27	-306.48	305.96	-67.27	313.27	347.60	446,507.11	768,520.42
11,630.06	7.43	172.20	11,616.12	-302.06	301.53	-68.27	309.16	347.24	446,502.68	768,519.42
[Flowmaster#7H]KOP										
11,651.00	9.80	168.10	11,636.82	-298.97	298.44	-67.72	306.03	347.22	446,499.59	768,519.97
11,745.00	17.90	171.60	11,728.01	-276.78	276.29	-63.95	283.59	346.97	446,477.44	768,523.74
11,840.00	26.80	175.30	11,815.79	-240.89	240.43	-60.06	247.81	345.98	446,441.58	768,527.63



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well TB #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Site:	Flowmaster 24-34-15 (3-6-7)	MD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Well:	TB #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	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)
11,934.00	40.70	176.60	11,893.76	-188.89	188.46	-56.48	196.74	343.32	446,389.61	768,531.21
12,028.00	49.80	175.60	11,959.87	-122.33	121.93	-51.90	132.52	336.94	446,323.08	768,535.79
12,122.00	57.30	173.90	12,015.68	-47.05	46.70	-44.94	64.81	316.10	446,247.85	768,542.75
12,217.00	61.40	174.20	12,064.10	34.29	-34.57	-36.47	50.25	226.53	446,166.58	768,551.22
12,312.00	67.20	174.40	12,105.28	119.49	-119.72	-27.97	122.94	193.15	446,081.43	768,559.72
12,406.00	80.90	175.20	12,131.05	209.35	-209.51	-19.82	210.45	185.41	445,991.64	768,567.87
12,500.00	87.70	178.00	12,140.38	302.70	-302.82	-14.29	303.16	182.70	445,898.33	768,573.40
12,595.00	86.10	177.60	12,145.52	397.51	-397.61	-10.65	397.75	181.53	445,803.54	768,577.04
12,690.00	85.00	176.60	12,152.89	492.14	-492.20	-5.86	492.23	180.68	445,708.95	768,581.83
12,784.00	87.90	177.50	12,158.71	585.85	-585.88	-1.04	585.88	180.10	445,615.27	768,586.65
12,878.00	88.30	176.50	12,161.83	679.71	-679.70	3.88	679.71	179.67	445,521.45	768,591.57
12,973.00	88.10	179.30	12,164.81	774.61	-774.58	7.36	774.61	179.46	445,426.57	768,595.05
13,068.00	87.70	179.30	12,168.29	869.55	-869.51	8.52	869.55	179.44	445,331.64	768,596.21
13,162.00	89.40	179.30	12,170.67	963.51	-963.47	9.67	963.52	179.43	445,237.68	768,597.36
13,256.00	87.90	178.20	12,172.89	1,057.47	-1,057.41	11.72	1,057.48	179.37	445,143.74	768,599.41
13,351.00	91.20	180.10	12,173.63	1,152.45	-1,152.38	13.13	1,152.46	179.35	445,048.77	768,600.82
13,445.00	92.20	180.20	12,170.84	1,246.40	-1,246.34	12.88	1,246.41	179.41	444,954.81	768,600.57
13,539.00	89.40	180.10	12,169.53	1,340.38	-1,340.32	12.63	1,340.38	179.46	444,860.83	768,600.32
13,633.00	96.20	183.50	12,164.94	1,434.13	-1,434.09	9.70	1,434.13	179.61	444,767.06	768,597.39
13,728.00	96.30	182.50	12,154.60	1,528.39	-1,528.40	4.75	1,528.41	179.82	444,672.75	768,592.44
13,822.00	91.20	182.00	12,148.45	1,622.05	-1,622.09	1.07	1,622.09	179.96	444,579.06	768,588.76
13,916.00	87.40	180.50	12,149.60	1,715.98	-1,716.05	-0.98	1,716.05	180.03	444,485.10	768,586.71
14,010.00	87.50	180.10	12,153.78	1,809.88	-1,809.95	-1.47	1,809.95	180.05	444,391.20	768,586.22
14,104.00	87.10	179.90	12,158.21	1,903.78	-1,903.85	-1.47	1,903.85	180.04	444,297.30	768,586.22
14,198.00	85.40	178.70	12,164.36	1,997.57	-1,997.63	-0.32	1,997.63	180.01	444,203.52	768,587.37
14,292.00	85.20	177.70	12,172.06	2,091.23	-2,091.27	2.62	2,091.27	179.93	444,109.88	768,590.31
14,387.00	86.20	177.90	12,179.18	2,185.91	-2,185.93	6.25	2,185.94	179.84	444,015.22	768,593.94



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well TB #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Site:	Flowmaster 24-34-15 (3-6-7)	MD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Well:	TB #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	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)
14,481.00	88.10	180.40	12,183.86	2,279.78	-2,279.79	7.65	2,279.81	179.81	443,921.36	768,595.34
14,576.00	88.60	179.60	12,186.59	2,374.74	-2,374.75	7.65	2,374.76	179.82	443,826.40	768,595.34
14,670.00	90.60	179.60	12,187.25	2,468.73	-2,468.74	8.30	2,468.76	179.81	443,732.41	768,595.99
14,765.00	91.20	179.50	12,185.76	2,563.72	-2,563.73	9.05	2,563.74	179.80	443,637.42	768,596.74
14,859.00	90.70	179.90	12,184.20	2,657.71	-2,657.71	9.54	2,657.73	179.79	443,543.44	768,597.23
14,953.00	89.40	180.40	12,184.12	2,751.70	-2,751.71	9.29	2,751.73	179.81	443,449.44	768,596.98
15,048.00	87.70	180.90	12,186.52	2,846.65	-2,846.67	8.22	2,846.68	179.83	443,354.48	768,595.91
15,143.00	89.20	178.50	12,189.09	2,941.60	-2,941.62	8.71	2,941.64	179.83	443,259.53	768,596.40
15,236.00	92.50	177.70	12,187.71	3,034.55	-3,034.55	11.80	3,034.57	179.78	443,166.60	768,599.49
15,331.00	90.50	177.10	12,185.22	3,129.44	-3,129.41	16.11	3,129.45	179.71	443,071.74	768,603.80
15,426.00	91.60	178.20	12,183.48	3,224.37	-3,224.31	20.00	3,224.38	179.64	442,976.84	768,607.69
15,520.00	91.70	177.40	12,180.78	3,318.29	-3,318.21	23.61	3,318.29	179.59	442,882.94	768,611.30
15,614.00	91.60	177.50	12,178.07	3,412.19	-3,412.07	27.79	3,412.19	179.53	442,789.08	768,615.48
15,708.00	90.20	177.40	12,176.59	3,506.11	-3,505.97	31.97	3,506.11	179.48	442,695.18	768,619.66
15,803.00	89.70	177.00	12,176.68	3,601.03	-3,600.85	36.61	3,601.04	179.42	442,600.30	768,624.30
15,897.00	89.30	177.20	12,177.50	3,694.94	-3,694.73	41.37	3,694.96	179.36	442,506.42	768,629.06
15,991.00	88.60	179.20	12,179.22	3,788.89	-3,788.66	44.32	3,788.92	179.33	442,412.49	768,632.01
16,086.00	90.10	179.70	12,180.30	3,883.88	-3,883.65	45.23	3,883.91	179.33	442,317.50	768,632.92
16,181.00	90.70	178.80	12,179.63	3,978.88	-3,978.64	46.47	3,978.91	179.33	442,222.51	768,634.16
16,275.00	90.90	178.90	12,178.32	4,072.86	-4,072.61	48.36	4,072.89	179.32	442,128.54	768,636.05
16,369.00	91.30	179.00	12,176.52	4,166.84	-4,166.57	50.08	4,166.88	179.31	442,034.58	768,637.77
16,463.00	90.30	179.60	12,175.20	4,260.83	-4,260.56	51.23	4,260.86	179.31	441,940.59	768,638.92
16,558.00	90.90	179.30	12,174.21	4,355.82	-4,355.55	52.14	4,355.86	179.31	441,845.60	768,639.83
16,652.00	90.30	178.90	12,173.23	4,449.81	-4,449.53	53.62	4,449.85	179.31	441,751.62	768,641.31
16,747.00	89.50	179.00	12,173.39	4,544.81	-4,544.51	55.36	4,544.85	179.30	441,656.64	768,643.05
16,799.00	90.20	179.20	12,173.53	4,596.80	-4,596.51	56.18	4,596.85	179.30	441,604.64	768,643.87

Last Survey: 16799'MD, 12174'TVD - [Flowmaster#7H]LTP/BHL



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well TB #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Site:	Flowmaster 24-34-15 (3-6-7)	MD Reference:	Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))
Well:	TB #7H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD 181'-16799' PTB 16854'	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)
16,854.00	90.20	179.20	12,173.34	4,651.80	-4,651.50	56.94	4,651.85	179.30	441,549.65	768,644.63
PTB: 16854'MD, 12173'TVD										

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
16,799.00	12,173.53	-4,596.51	56.18	Last Survey: 16799'MD, 12174'TVD
16,854.00	12,173.34	-4,651.50	56.94	PTB: 16854'MD, 12173'TVD



Marathon Oil
Lea County, NM
Flowmaster 24-34-15 (3-6-7)
TB #7H
Plan #3
GL: 3523' + KB; 26.5' (H&P498)

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

RKB Elevation: Well @ 3549.50usft (GL: 3523' + KB; 26.5' (H&P498))

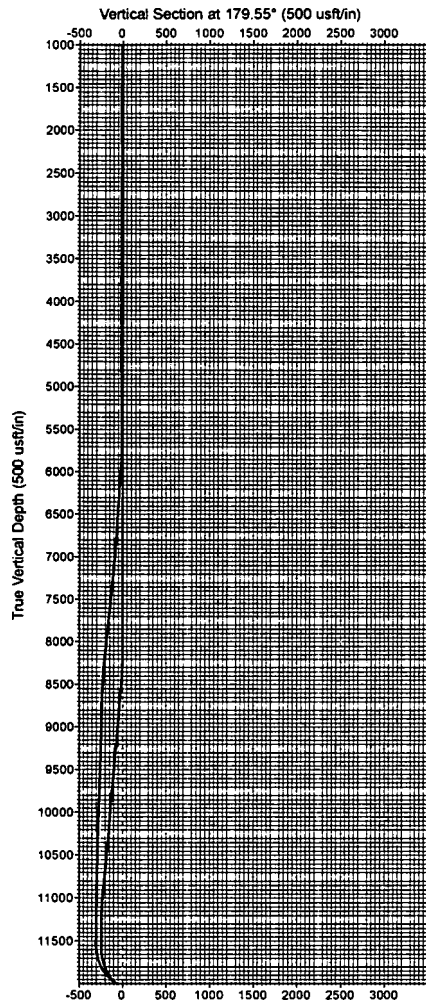
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	446201.15	768587.69	32.223740	-103.464805	

SECTION DETAILS

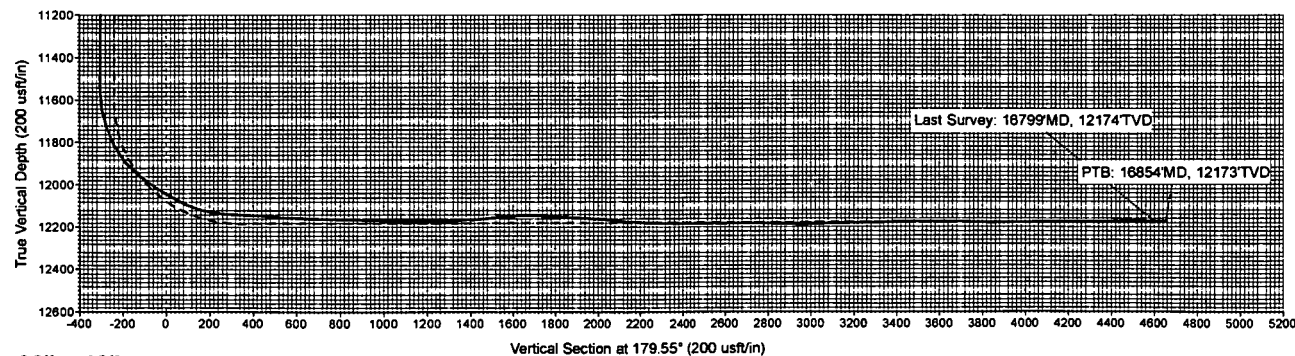
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	8100.00	0.00	0.00	8100.00	0.00	0.00	0.00	0.00
3	8600.00	5.00	357.28	8599.37	21.78	-1.03	1.00	-21.79
4	10860.95	5.00	357.28	10851.72	218.61	-10.38	0.00	-218.69
5	11360.95	0.00	0.00	11351.08	240.39	-11.41	1.00	-240.47
6	11621.37	0.00	0.00	11611.50	240.39	-11.41	0.00	-240.47
7	12522.36	90.10	179.55	12184.46	-333.55	-6.88	10.00	333.49
8	16796.17	90.10	179.55	12176.96	-4607.21	27.03	0.00	4607.28
9	16841.17	90.10	179.55	12176.88	-4652.21	27.39	0.00	4652.28

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

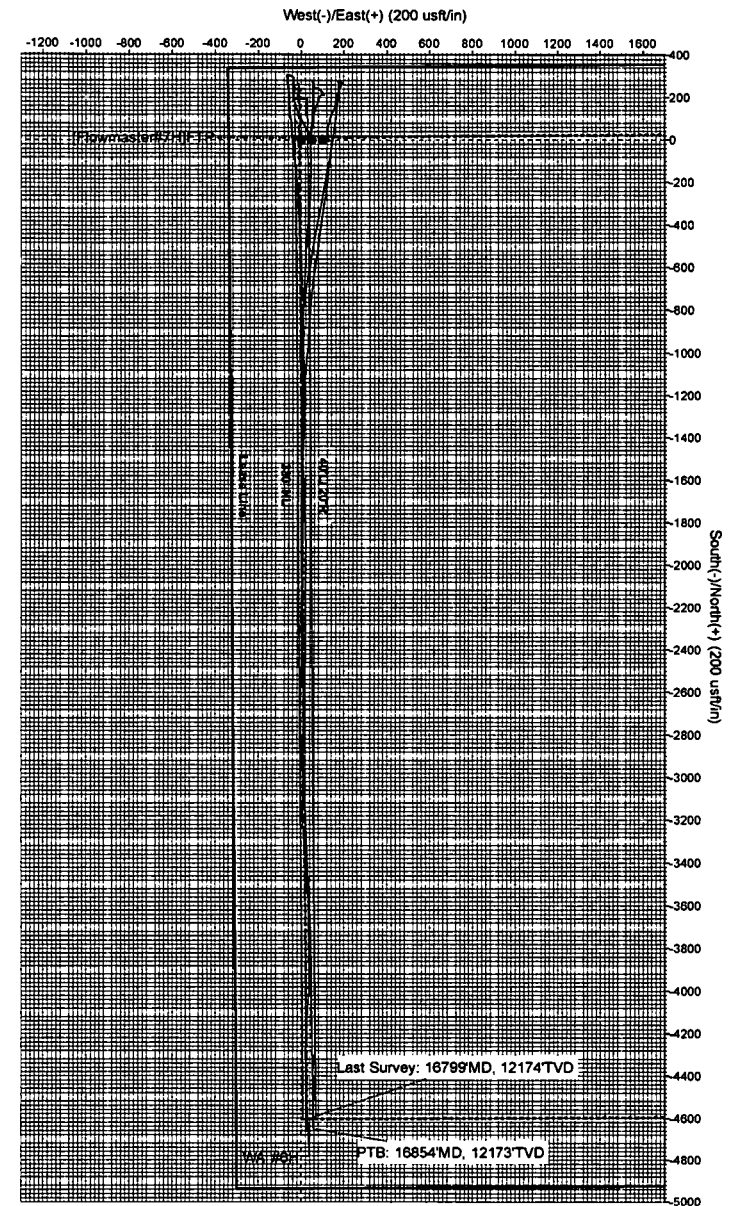
Name	TVD	+N/-S	+E/-W	Northing	Easting
[Flowmaster#7H]FTP	0.00	10.41	-9.60	446211.56	768578.09
[Flowmaster#7H]KOP	11611.50	240.39	-11.41	446441.54	768576.28
[Flowmaster#7H]LTP/BHL	12176.96	-4607.21	27.03	441593.94	768614.72



Target Line: 12185' TVD @ 0° VS: 90.1° INC



36" x 48"



Azimuths to Grid North
True North: 0.46°
Magnetic North: 6.24°

Magnetic Field
Strength: 47966.6uT
Dip Angle: 59.92°
Date: 10/31/2016
Model: HDGM

Azimuth Corrections

Total Magnetic Corr. (M to G): 6.24°

Declination (M to T): 6.70° East