



Marathon Oil

Marathon Oil

Lea County, NM

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

WA #6H

OH

Design: OH 181'-17185' PTB 17240'

Survey Report

03 January, 2019

HOBBS OCD
APR 23 2019
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Company:	Marathon Oil	Local Co-ordinate Reference:	Well WA #6H
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:	WA #6H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH 181'-17185' PTB 17240'	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	Latitude:	32.223740	
From:	Map	Easting:	768,587.69	usft	Longitude:	-103.464805	
Position Uncertainty:	0.00	usft	Slot Radius:	13-3/16	"	Grid Convergence:	0.46
						°	

Well	WA #6H					
Well Position	+N/-S	0.00 usft	Northing:	446,201.80 usft	Latitude:	32.223741
	+E/-W	0.00 usft	Easting:	768,637.85 usft	Longitude:	-103.464643
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,523.00 usft

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

Design					OH 181'-17185' PTB 17240'						
Audit Notes:											
Version:		1.0		Phase:		ACTUAL		Tie On Depth:		0.00	
Vertical Section:		Depth From (TVD)		+N/-S		+E/-W		Direction			
		(usft)		(usft)		(usft)		(°)			
		0.00		0.00		0.00		179.55			



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well WA #6H
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:	WA #6H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH 181'-17185' PTB 17240'	Database:	WellPlanner1

Survey Program		Date	1/3/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
181.00	1,076.00	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HRGM	
1,218.00	5,247.00	Survey #2 (OH)	MWD+HDGM	OWSG MWD + HRGM	
5,402.00	17,240.00	Survey #3 (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	446,201.80	768,637.85	
181.00	0.40	133.90	181.00	0.44	-0.44	0.46	0.63	133.90	446,201.36	768,638.31	
242.00	0.30	153.10	242.00	0.73	-0.73	0.68	1.00	136.92	446,201.07	768,638.53	
332.00	0.20	241.80	332.00	1.02	-1.01	0.65	1.20	147.34	446,200.79	768,638.50	
423.00	0.10	143.00	423.00	1.16	-1.15	0.56	1.28	154.18	446,200.65	768,638.41	
515.00	0.20	300.00	515.00	1.14	-1.13	0.47	1.23	157.67	446,200.67	768,638.32	
606.00	0.20	199.80	606.00	1.21	-1.20	0.27	1.24	167.15	446,200.60	768,638.12	
697.00	0.40	260.80	696.99	1.40	-1.41	-0.09	1.41	183.77	446,200.39	768,637.76	
789.00	0.30	292.70	788.99	1.36	-1.36	-0.63	1.50	204.86	446,200.44	768,637.22	
880.00	0.20	241.90	879.99	1.34	-1.35	-0.99	1.67	216.37	446,200.45	768,636.86	
971.00	0.50	278.10	970.99	1.35	-1.37	-1.52	2.05	228.16	446,200.43	768,636.33	
1,063.00	0.30	331.60	1,062.99	1.08	-1.10	-2.04	2.31	241.70	446,200.70	768,635.81	
1,076.00	0.40	294.70	1,075.99	1.03	-1.05	-2.09	2.34	243.42	446,200.75	768,635.76	
1,218.00	0.30	349.90	1,217.99	0.45	-0.47	-2.61	2.65	259.69	446,201.33	768,635.24	
1,312.00	0.40	340.40	1,311.98	-0.10	0.08	-2.76	2.76	271.59	446,201.88	768,635.09	
1,407.00	0.60	336.40	1,406.98	-0.87	0.84	-3.07	3.19	285.37	446,202.64	768,634.78	
1,501.00	0.70	332.00	1,500.97	-1.83	1.80	-3.54	3.97	296.99	446,203.60	768,634.31	
1,596.00	0.50	314.30	1,595.97	-2.64	2.60	-4.11	4.87	302.37	446,204.40	768,633.74	
1,690.00	0.50	309.90	1,689.97	-3.19	3.15	-4.72	5.67	303.77	446,204.95	768,633.13	
1,784.00	0.00	266.60	1,783.96	-3.46	3.42	-5.03	6.08	304.18	446,205.22	768,632.82	

Company: Marathon Oil
Project: Lea County, NM
Site: Flowmaster 24-34-15 (3-6-7)
Well: WA #6H
Wellbore: OH
Design: OH 181'-17185' PTB 17240'

Local Co-ordinate Reference: Well WA #6H
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)		
1,879.00	0.10	20.30	1,878.96	-3.53	3.50	-5.00	6.10	304.94	446,205.30	768,632.85		
1,973.00	0.90	13.40	1,972.96	-4.33	4.29	-4.80	6.44	311.77	446,206.09	768,633.05		
2,068.00	2.20	11.30	2,067.92	-6.84	6.80	-4.27	8.03	327.87	446,208.60	768,633.58		
2,162.00	3.20	8.40	2,161.82	-11.20	11.17	-3.54	11.72	342.43	446,212.97	768,634.31		
2,257.00	4.40	5.70	2,256.61	-17.44	17.42	-2.79	17.64	350.91	446,219.22	768,635.06		
2,351.00	4.60	3.50	2,350.32	-24.79	24.77	-2.20	24.87	354.93	446,226.57	768,635.65		
2,446.00	4.80	4.90	2,445.00	-32.54	32.53	-1.63	32.57	357.14	446,234.33	768,636.22		
2,541.00	4.90	7.00	2,539.66	-40.52	40.52	-0.79	40.53	358.88	446,242.32	768,637.06		
2,636.00	4.90	4.20	2,634.31	-48.59	48.59	0.00	48.59	360.00	446,250.39	768,637.85		
2,730.00	4.70	6.10	2,727.98	-56.42	56.43	0.70	56.43	0.71	446,258.23	768,638.55		
2,825.00	5.00	4.00	2,822.64	-64.41	64.43	1.40	64.44	1.25	446,266.23	768,639.25		
2,919.00	5.30	5.70	2,916.26	-72.81	72.83	2.12	72.86	1.67	446,274.63	768,639.97		
3,014.00	5.50	7.80	3,010.84	-81.68	81.71	3.17	81.77	2.23	446,283.51	768,641.02		
3,108.00	5.70	10.40	3,104.39	-90.72	90.76	4.63	90.88	2.92	446,292.56	768,642.48		
3,203.00	6.00	9.80	3,198.90	-100.24	100.30	6.33	100.49	3.61	446,302.10	768,644.18		
3,297.00	6.00	12.10	3,292.38	-109.87	109.94	8.19	110.24	4.26	446,311.74	768,646.04		
3,392.00	6.60	12.70	3,386.81	-120.04	120.12	10.43	120.57	4.96	446,321.92	768,648.28		
3,486.00	6.60	13.60	3,480.19	-130.54	130.64	12.89	131.28	5.64	446,332.44	768,650.74		
3,581.00	6.90	16.00	3,574.53	-141.31	141.43	15.75	142.31	6.35	446,343.23	768,653.60		
3,676.00	7.30	17.60	3,668.80	-152.52	152.67	19.15	153.87	7.15	446,354.47	768,657.00		
3,770.00	7.70	18.50	3,761.99	-164.15	164.34	22.95	165.93	7.95	446,366.14	768,660.80		
3,865.00	6.40	22.10	3,856.27	-175.06	175.28	26.96	177.34	8.74	446,377.08	768,664.81		
3,959.00	5.30	12.40	3,949.79	-184.13	184.37	29.86	186.78	9.20	446,386.17	768,667.71		
4,054.00	4.30	19.00	4,044.45	-191.77	192.03	31.97	194.67	9.45	446,393.83	768,669.82		
4,148.00	3.30	36.40	4,138.25	-197.26	197.54	34.72	200.56	9.97	446,399.34	768,672.57		
4,242.00	3.00	30.60	4,232.11	-201.53	201.83	37.58	205.30	10.55	446,403.63	768,675.43		
4,336.00	2.20	19.40	4,326.01	-205.33	205.65	39.43	209.40	10.85	446,407.45	768,677.28		



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Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:
Well WA #6H
Well @ 3549.50usft (GL: 3523' + KB: 26.5' (H&P498))
Well @ 3549.50usft (GL: 3523' + KB: 26.5' (H&P498))
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)	
4,430.00	1.50	22.40	4,419.96	-208.16	208.49	40.50	212.39	10.99	446,410.29	768,678.35	
4,525.00	1.90	57.00	4,514.92	-210.16	210.50	42.29	214.70	11.36	446,412.30	768,680.14	
4,619.00	2.60	78.00	4,608.85	-211.42	211.79	45.68	216.66	12.17	446,413.59	768,683.53	
4,714.00	2.30	93.10	4,703.76	-211.74	212.13	49.69	217.88	13.18	446,413.93	768,687.54	
4,808.00	0.80	128.30	4,797.73	-211.21	211.62	52.09	217.94	13.83	446,413.42	768,689.94	
4,903.00	1.20	130.40	4,892.71	-210.14	210.57	53.37	217.23	14.22	446,412.37	768,691.22	
4,998.00	1.40	116.20	4,987.69	-208.97	209.41	55.17	216.56	14.76	446,411.21	768,693.02	
5,092.00	0.20	306.60	5,081.68	-208.56	209.00	56.07	216.39	15.02	446,410.80	768,693.92	
5,187.00	0.30	328.50	5,176.68	-208.87	209.31	55.81	216.62	14.93	446,411.11	768,693.66	
5,247.00	0.10	344.50	5,236.68	-209.05	209.50	55.71	216.78	14.89	446,411.30	768,693.56	
5,402.00	0.30	45.70	5,391.68	-209.47	209.91	55.96	217.24	14.93	446,411.71	768,693.81	
5,497.00	0.30	74.50	5,486.68	-209.70	210.15	56.38	217.58	15.02	446,411.95	768,694.23	
5,591.00	1.00	329.90	5,580.67	-210.48	210.93	56.21	218.29	14.92	446,412.73	768,694.06	
5,686.00	1.20	330.40	5,675.65	-212.07	212.51	55.30	219.59	14.59	446,414.31	768,693.15	
5,780.00	1.40	330.50	5,769.63	-213.93	214.36	54.25	221.12	14.20	446,416.16	768,692.10	
5,875.00	1.50	335.90	5,864.60	-216.09	216.51	53.17	222.94	13.80	446,418.31	768,691.02	
5,969.00	1.40	336.50	5,958.57	-218.27	218.69	52.21	224.83	13.43	446,420.49	768,690.06	
6,063.00	0.60	317.00	6,052.55	-219.69	220.10	51.42	226.02	13.15	446,421.90	768,689.27	
6,157.00	0.50	292.90	6,146.55	-220.21	220.62	50.70	226.37	12.94	446,422.42	768,688.55	
6,252.00	0.60	296.40	6,241.54	-220.60	221.00	49.87	226.56	12.72	446,422.80	768,687.72	
6,346.00	0.70	301.40	6,335.54	-221.13	221.52	48.94	226.86	12.46	446,423.32	768,686.79	
6,441.00	0.70	296.70	6,430.53	-221.70	222.08	47.93	227.20	12.18	446,423.88	768,685.78	
6,535.00	0.80	303.20	6,524.52	-222.32	222.70	46.87	227.58	11.88	446,424.50	768,684.72	
6,630.00	0.70	306.70	6,619.52	-223.04	223.41	45.85	228.07	11.60	446,425.21	768,683.70	
6,724.00	0.70	311.80	6,713.51	-223.78	224.14	44.96	228.60	11.34	446,425.94	768,682.81	
6,819.00	0.70	307.90	6,808.50	-224.53	224.88	44.07	229.16	11.09	446,426.68	768,681.92	
6,913.00	0.70	316.40	6,902.49	-225.30	225.65	43.22	229.75	10.84	446,427.45	768,681.07	



Professional Directional Survey Report



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Project: Lea County, NM
Site: Flowmaster 24-34-15 (3-6-7)
Well: WA #6H
Wellbore: OH
Design: OH 181'-17185' PTB 17240'

Local Co-ordinate Reference: Well WA #6H
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)	
7,008.00	0.70	321.70	6,997.49	-226.18	226.52	42.46	230.47	10.62	446,428.32	768,680.31	
7,103.00	0.80	318.40	7,092.48	-227.14	227.47	41.66	231.26	10.38	446,429.27	768,679.51	
7,197.00	0.90	318.70	7,186.47	-228.19	228.52	40.74	232.12	10.11	446,430.32	768,678.59	
7,292.00	0.90	316.80	7,281.46	-229.30	229.62	39.73	233.04	9.82	446,431.42	768,677.58	
7,386.00	1.00	313.60	7,375.44	-230.42	230.73	38.63	233.94	9.51	446,432.53	768,676.48	
7,480.00	1.00	320.60	7,469.43	-231.63	231.93	37.52	234.94	9.19	446,433.73	768,675.37	
7,574.00	1.10	325.50	7,563.41	-233.01	233.30	36.49	236.14	8.89	446,435.10	768,674.34	
7,669.00	1.40	322.30	7,658.39	-234.69	234.97	35.26	237.61	8.53	446,436.77	768,673.11	
7,764.00	1.40	314.60	7,753.36	-236.44	236.71	33.73	239.10	8.11	446,438.51	768,671.58	
7,858.00	1.00	349.00	7,847.34	-238.05	238.32	32.75	240.56	7.83	446,440.12	768,670.60	
7,953.00	1.10	341.70	7,942.33	-239.74	240.00	32.31	242.16	7.67	446,441.80	768,670.16	
8,048.00	1.20	335.10	8,037.31	-241.51	241.77	31.60	243.82	7.45	446,443.57	768,669.45	
8,143.00	1.10	329.90	8,132.29	-243.21	243.46	30.73	245.39	7.19	446,445.26	768,668.58	
8,237.00	0.60	205.40	8,226.28	-243.55	243.79	30.06	245.64	7.03	446,445.59	768,667.91	
8,332.00	0.80	190.70	8,321.28	-242.45	242.69	29.73	244.51	6.98	446,444.49	768,667.58	
8,426.00	0.70	206.10	8,415.27	-241.29	241.53	29.35	243.31	6.93	446,443.33	768,667.20	
8,521.00	0.60	228.30	8,510.26	-240.45	240.68	28.72	242.39	6.81	446,442.48	768,666.57	
8,615.00	0.70	257.00	8,604.26	-240.00	240.22	27.80	241.83	6.60	446,442.02	768,665.65	
8,709.00	0.90	271.50	8,698.25	-239.90	240.11	26.50	241.57	6.30	446,441.91	768,664.35	
8,804.00	1.00	280.40	8,793.23	-240.08	240.28	24.94	241.57	5.93	446,442.08	768,662.79	
8,898.00	1.10	289.10	8,887.22	-240.54	240.73	23.28	241.85	5.52	446,442.53	768,661.13	
8,992.00	1.20	293.30	8,981.20	-241.23	241.41	21.52	242.37	5.09	446,443.21	768,659.37	
9,087.00	1.40	297.00	9,076.18	-242.17	242.33	19.58	243.12	4.62	446,444.13	768,657.43	
9,181.00	1.40	292.60	9,170.15	-243.15	243.29	17.49	243.92	4.11	446,445.09	768,655.34	
9,275.00	1.50	289.80	9,264.12	-244.02	244.15	15.27	244.63	3.58	446,445.95	768,653.12	
9,370.00	1.50	294.60	9,359.09	-244.98	245.09	12.97	245.43	3.03	446,446.89	768,650.82	
9,464.00	1.70	299.60	9,453.05	-246.20	246.29	10.64	246.52	2.47	446,448.09	768,648.49	

Company: Marathon Oil
Project: Lea County, NM
Site: Flowmaster 24-34-15 (3-6-7)
Well: WA #6H
Wellbore: OH
Design: OH 181'-17185' PTB 17240'

Local Co-ordinate Reference: Well WA #6H
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)	
9,559.00	1.70	304.50	9,548.01	-247.71	247.79	8.26	247.92	1.91	446,449.59	768,646.11	
9,653.00	0.30	334.90	9,641.99	-248.74	248.80	7.00	248.90	1.61	446,450.60	768,644.85	
9,717.00	0.00	200.70	9,705.99	-248.89	248.95	6.93	249.05	1.59	446,450.75	768,644.78	
9,812.00	0.30	306.60	9,800.99	-249.04	249.10	6.73	249.19	1.55	446,450.90	768,644.58	
9,906.00	0.70	342.20	9,894.99	-249.73	249.79	6.36	249.87	1.46	446,451.59	768,644.21	
10,001.00	1.10	356.00	9,989.97	-251.20	251.25	6.12	251.33	1.39	446,453.05	768,643.97	
10,095.00	1.40	49.10	10,083.95	-252.84	252.91	6.92	253.00	1.57	446,454.71	768,644.77	
10,189.00	1.50	30.90	10,177.93	-254.64	254.71	8.42	254.85	1.89	446,456.51	768,646.27	
10,284.00	1.50	12.60	10,272.89	-256.91	256.99	9.33	257.16	2.08	446,458.79	768,647.18	
10,379.00	1.10	27.10	10,367.87	-258.93	259.02	10.02	259.21	2.22	446,460.82	768,647.87	
10,473.00	1.50	6.00	10,461.84	-260.95	261.05	10.56	261.26	2.32	446,462.85	768,648.41	
10,568.00	1.40	339.70	10,556.82	-263.28	263.37	10.29	263.57	2.24	446,465.17	768,648.14	
10,663.00	1.50	324.50	10,651.79	-265.39	265.47	9.16	265.63	1.98	446,467.27	768,647.01	
10,757.00	2.10	310.90	10,745.74	-267.54	267.60	7.15	267.70	1.53	446,469.40	768,645.00	
10,851.00	2.50	295.80	10,839.66	-269.58	269.62	4.00	269.65	0.85	446,471.42	768,641.85	
10,946.00	0.90	301.00	10,934.62	-270.89	270.91	1.49	270.91	0.32	446,472.71	768,639.34	
11,040.00	0.90	124.00	11,028.62	-270.85	270.87	1.47	270.88	0.31	446,472.67	768,639.32	
11,135.00	0.80	137.40	11,123.60	-269.94	269.97	2.54	269.98	0.54	446,471.77	768,640.39	
11,229.00	0.50	113.60	11,217.60	-269.29	269.32	3.36	269.34	0.71	446,471.12	768,641.21	
11,324.00	0.70	59.80	11,312.59	-269.41	269.45	4.24	269.48	0.90	446,471.25	768,642.09	
11,419.00	1.00	22.80	11,407.58	-270.46	270.50	5.06	270.55	1.07	446,472.30	768,642.91	
11,513.00	0.70	108.90	11,501.58	-271.02	271.07	5.92	271.14	1.25	446,472.87	768,643.77	
11,608.00	0.60	101.90	11,596.57	-270.72	270.78	6.96	270.87	1.47	446,472.58	768,644.81	
11,638.00	0.40	66.40	11,626.57	-270.73	270.79	7.21	270.89	1.53	446,472.59	768,645.06	
11,723.00	0.60	25.50	11,711.57	-271.24	271.31	7.67	271.42	1.62	446,473.11	768,645.52	
11,817.00	0.80	352.90	11,805.56	-272.34	272.41	7.80	272.52	1.64	446,474.21	768,645.65	
11,912.00	1.30	218.10	11,900.55	-272.16	272.22	7.06	272.31	1.49	446,474.02	768,644.91	



Professional Directional Survey Report



Company: Marathon Oil
Project: Lea County, NM
Site: Flowmaster 24-34-15 (3-6-7)
Well: WA #6H
Wellbore: OH
Design: OH 181'-17185' PTB 17240'

Local Co-ordinate Reference:
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)	
12,006.00	16.70	178.00	11,993.14	-257.73	257.79	6.87	257.88	1.53	446,459.59	768,644.72	
12,100.00	25.40	179.60	12,080.78	-224.00	224.07	7.48	224.19	1.91	446,425.87	768,645.33	
12,195.00	33.20	181.50	12,163.57	-177.56	177.62	6.94	177.76	2.24	446,379.42	768,644.79	
12,289.00	45.00	185.10	12,236.40	-118.55	118.58	3.30	118.62	1.60	446,320.38	768,641.15	
12,383.00	53.80	183.30	12,297.51	-47.48	47.47	-1.85	47.50	357.77	446,249.27	768,636.00	
12,478.00	65.10	180.40	12,345.73	34.13	-34.16	-4.36	34.44	187.28	446,167.64	768,633.49	
12,572.00	73.70	178.90	12,378.77	122.03	-122.06	-3.79	122.12	181.78	446,079.74	768,634.06	
12,668.00	85.50	182.50	12,396.08	216.25	-216.30	-5.00	216.35	181.32	445,985.50	768,632.85	
12,785.00	91.60	185.20	12,399.04	332.82	-332.93	-12.85	333.18	182.21	445,868.87	768,625.00	
12,879.00	87.70	183.40	12,399.61	426.47	-426.64	-19.90	427.10	182.67	445,775.16	768,617.95	
12,974.00	87.90	183.30	12,403.26	521.19	-521.41	-25.45	522.03	182.79	445,680.39	768,612.40	
13,069.00	88.10	183.30	12,406.57	615.93	-616.19	-30.91	616.97	182.87	445,585.61	768,606.94	
13,163.00	88.50	184.20	12,409.36	709.64	-709.95	-37.06	710.91	182.99	445,491.85	768,600.79	
13,257.00	89.80	181.90	12,410.76	803.44	-803.80	-42.06	804.90	183.00	445,398.00	768,595.79	
13,352.00	90.50	181.80	12,410.51	898.36	-898.75	-45.12	899.88	182.87	445,303.05	768,592.73	
13,445.00	90.20	179.00	12,409.94	991.34	-991.73	-45.77	992.79	182.64	445,210.07	768,592.08	
13,539.00	88.80	178.50	12,410.76	1,085.33	-1,085.70	-43.72	1,086.58	182.31	445,116.10	768,594.13	
13,633.00	89.20	179.60	12,412.40	1,179.31	-1,179.68	-42.16	1,180.43	182.05	445,022.12	768,595.69	
13,729.00	88.20	179.90	12,414.58	1,275.28	-1,275.65	-41.75	1,276.33	181.87	444,926.15	768,596.10	
13,823.00	94.50	180.80	12,412.37	1,369.20	-1,369.57	-42.32	1,370.23	181.77	444,832.23	768,595.53	
13,917.00	92.30	179.50	12,406.79	1,463.02	-1,463.40	-42.56	1,464.02	181.67	444,738.40	768,595.29	
14,011.00	89.70	177.70	12,405.15	1,556.98	-1,557.34	-40.27	1,557.86	181.48	444,644.46	768,597.58	
14,104.00	91.00	176.70	12,404.58	1,649.90	-1,650.23	-35.72	1,650.61	181.24	444,551.57	768,602.13	
14,199.00	89.60	178.60	12,404.08	1,744.84	-1,745.14	-31.83	1,745.43	181.04	444,456.66	768,606.02	
14,293.00	91.20	179.30	12,403.43	1,838.83	-1,839.12	-30.11	1,839.36	180.94	444,362.68	768,607.74	
14,387.00	88.40	179.40	12,403.76	1,932.81	-1,933.10	-29.04	1,933.32	180.86	444,268.70	768,608.81	
14,482.00	89.10	180.70	12,405.83	2,027.79	-2,028.08	-29.12	2,028.29	180.82	444,173.72	768,608.73	

Company: Marathon Oil
Project: Lea County, NM
Site: Flowmaster 24-34-15 (3-6-7)
Well: WA #6H
Wellbore: OH
Design: OH 181'-17185' PTB 17240'

Local Co-ordinate Reference: Well WA #6H
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)	
14,576.00	91.00	180.00	12,405.75	2,121.77	-2,122.07	-29.70	2,122.28	180.80	444,079.73	768,608.15	
14,671.00	88.10	180.00	12,406.49	2,216.76	-2,217.06	-29.70	2,217.26	180.77	443,984.74	768,608.15	
14,765.00	90.90	180.30	12,407.31	2,310.74	-2,311.04	-29.94	2,311.24	180.74	443,890.76	768,607.91	
14,859.00	88.80	180.30	12,407.56	2,404.72	-2,405.04	-30.44	2,405.23	180.73	443,796.76	768,607.41	
14,953.00	89.10	181.50	12,409.28	2,498.68	-2,499.01	-31.91	2,499.21	180.73	443,702.79	768,605.94	
15,049.00	87.90	181.00	12,411.80	2,594.60	-2,594.95	-34.01	2,595.17	180.75	443,606.85	768,603.84	
15,143.00	90.70	181.60	12,412.94	2,688.54	-2,688.91	-36.14	2,689.15	180.77	443,512.89	768,601.71	
15,237.00	91.30	181.50	12,411.30	2,782.47	-2,782.86	-38.68	2,783.13	180.80	443,418.94	768,599.17	
15,332.00	91.20	180.60	12,409.23	2,877.41	-2,877.82	-40.42	2,878.10	180.80	443,323.98	768,597.43	
15,426.00	89.80	180.60	12,408.41	2,971.39	-2,971.81	-41.40	2,972.10	180.80	443,229.99	768,596.45	
15,520.00	92.70	181.40	12,406.36	3,065.33	-3,065.76	-43.04	3,066.06	180.80	443,136.04	768,594.81	
15,615.00	92.70	179.40	12,401.88	3,160.21	-3,160.65	-43.71	3,160.95	180.79	443,041.15	768,594.14	
15,709.00	87.60	176.00	12,401.64	3,254.11	-3,254.53	-39.94	3,254.77	180.70	442,947.27	768,597.91	
15,756.00	89.00	175.70	12,403.03	3,300.99	-3,301.38	-36.54	3,301.59	180.63	442,900.42	768,601.31	
15,827.00	89.80	175.10	12,403.78	3,371.80	-3,372.15	-30.84	3,372.29	180.52	442,829.65	768,607.01	
15,897.00	92.20	175.90	12,402.55	3,441.61	-3,441.92	-25.35	3,442.01	180.42	442,759.88	768,612.50	
15,944.00	92.30	177.00	12,400.71	3,488.51	-3,488.79	-22.44	3,488.86	180.37	442,713.01	768,615.41	
15,992.00	91.30	176.60	12,399.20	3,536.43	-3,536.69	-19.76	3,536.75	180.32	442,665.11	768,618.09	
16,087.00	94.20	178.90	12,394.64	3,631.25	-3,631.49	-16.04	3,631.53	180.25	442,570.31	768,621.81	
16,150.00	94.80	179.20	12,389.70	3,694.06	-3,694.29	-15.00	3,694.32	180.23	442,507.51	768,622.85	
16,228.00	93.10	179.40	12,384.33	3,771.87	-3,772.10	-14.05	3,772.12	180.21	442,429.70	768,623.80	
16,275.00	93.10	179.50	12,381.79	3,818.80	-3,819.02	-13.60	3,819.05	180.20	442,382.78	768,624.25	
16,369.00	90.10	179.60	12,379.16	3,912.75	-3,912.97	-12.86	3,913.00	180.19	442,288.83	768,624.99	
16,464.00	92.00	182.10	12,377.42	4,007.70	-4,007.94	-14.27	4,007.96	180.20	442,193.86	768,623.58	
16,558.00	90.60	184.60	12,375.29	4,101.46	-4,101.74	-19.76	4,101.79	180.28	442,100.06	768,618.09	
16,638.00	89.70	183.30	12,375.08	4,181.22	-4,181.55	-25.27	4,181.62	180.35	442,020.25	768,612.58	
16,748.00	87.80	180.60	12,377.48	4,291.08	-4,291.44	-29.01	4,291.54	180.39	441,910.36	768,608.84	

Company: Marathon Oil
Project: Lea County, NM
Site: Flowmaster 24-34-15 (3-6-7)
Well: WA #6H
Wellbore: OH
Design: OH 181'-17185' PTB 17240'

Local Co-ordinate Reference: Well WA #6H
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)	
16,842.00	89.60	178.80	12,379.61	4,385.05	-4,385.41	-28.52	4,385.50	180.37	441,816.39	768,609.33	
16,936.00	86.90	177.70	12,382.48	4,478.97	-4,479.31	-25.65	4,479.39	180.33	441,722.49	768,612.20	
17,030.00	86.20	176.90	12,388.14	4,572.73	-4,573.04	-21.23	4,573.09	180.27	441,628.76	768,616.62	
17,125.00	87.30	177.00	12,393.52	4,667.48	-4,667.75	-16.18	4,667.78	180.20	441,534.05	768,621.67	
17,185.00	87.10	176.90	12,396.45	4,727.34	-4,727.59	-12.99	4,727.61	180.16	441,474.21	768,624.86	
Last Survey: 17185'MD, 12396'TVD											
17,240.00	87.10	176.90	12,399.24	4,782.21	-4,782.44	-10.02	4,782.45	180.12	441,419.36	768,627.83	
PTB: 17240'MD, 12399'TVD											

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
17,185.00	12,396.45	-4,727.59	-12.99	Last Survey: 17185'MD, 12396'TVD	
17,240.00	12,399.24	-4,782.44	-10.02	PTB: 17240'MD, 12399'TVD	

Checked By: _____ Approved By: _____ Date: _____



Marathon Oil
Lea County, NM
Flowmaster 24-34-15 (3-6-7)
WA #6H
Plan #7
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))

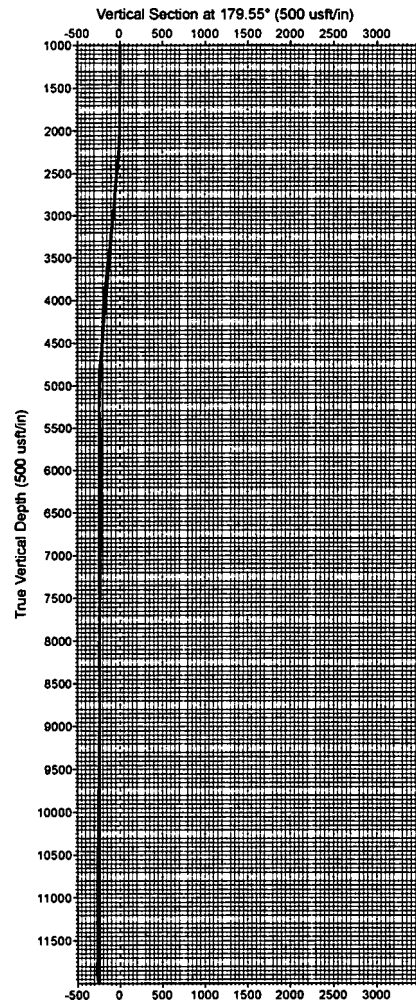
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Spot
0.00	0.00	446201.80	788537.85	32.223741	-103.464643	

SECTION DETAILS

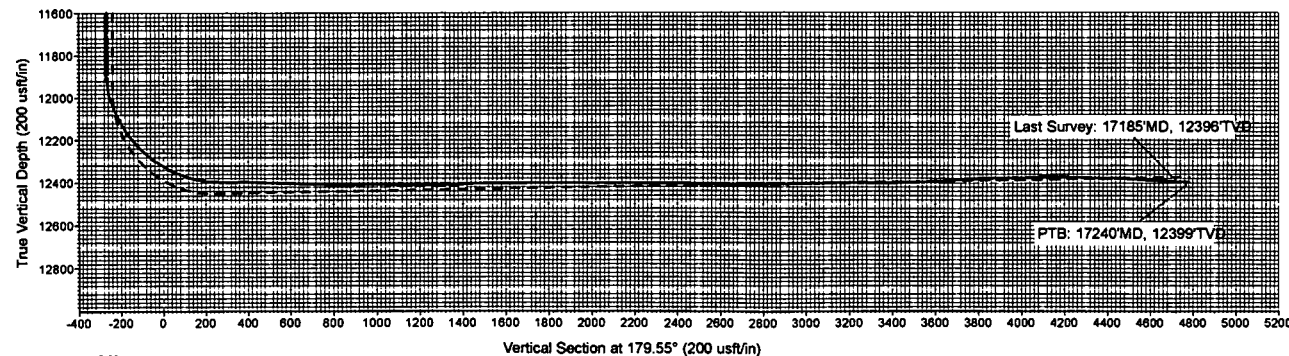
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSecd
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00
3	2250.00	5.00	6.74	2249.68	10.83	1.28	2.00	-10.82
4	4779.28	5.00	6.74	4769.34	229.74	27.15	0.00	-229.52
5	5029.28	0.00	0.00	5019.02	240.57	28.43	2.00	-240.34
6	11983.76	0.00	0.00	11973.50	240.57	28.43	0.00	-240.34
7	12742.09	91.00	187.15	12450.89	-241.45	-32.04	12.00	241.19
8	13121.87	91.00	179.55	12444.25	-620.24	-54.22	2.00	619.79
9	17240.20	91.00	179.55	12372.31	-4737.82	-22.12	0.00	4737.50
10	17285.20	91.00	179.55	12371.52	-4782.81	-21.77	0.00	4782.49

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

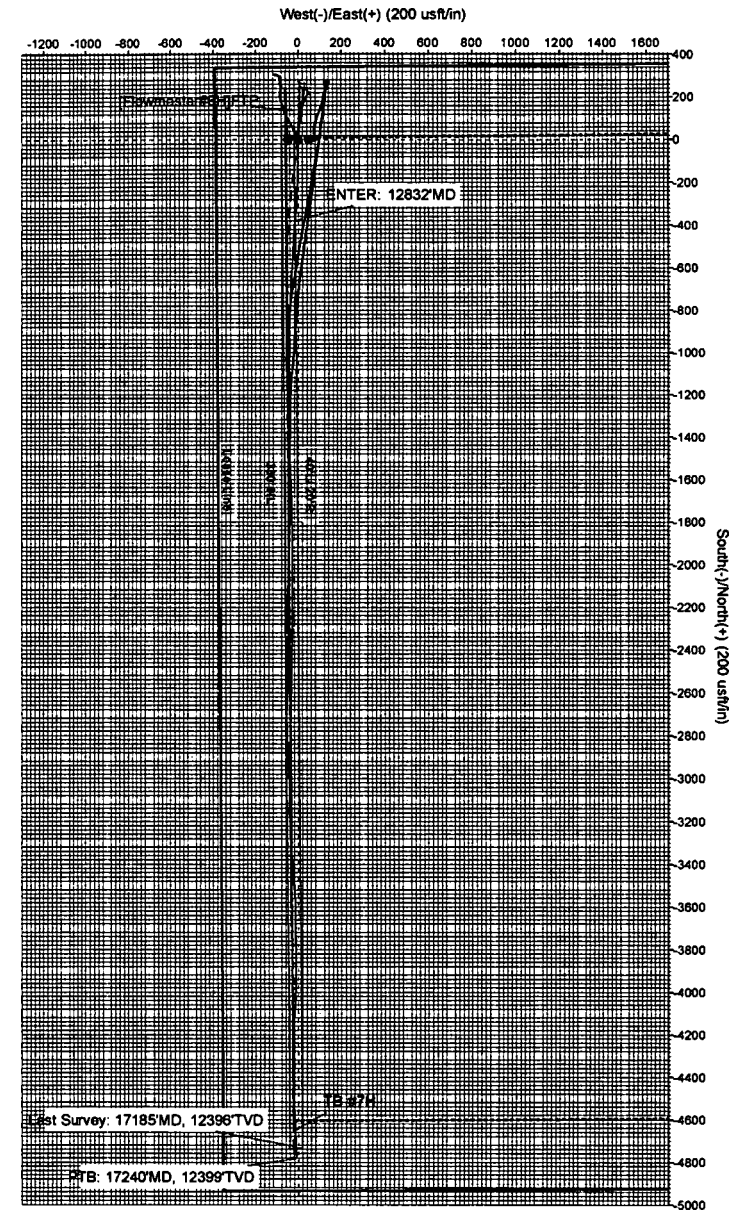
Name	TVD	+N/-S	+E/-W	Northing	Easting
[Flowmaster#6H]FTP	0.00	139.78	-60.80	446341.58	788577.05
[Flowmaster#6H]KOP	11973.50	240.57	28.43	446442.37	788666.28
[Flowmaster#6H]LTP/BHL	12372.31	-4737.82	-22.12	441463.98	768615.73



Target Line: 12455' TVD @ 0' VS: 91° INC



36" x 48"



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

Magnetic Field
Strength: 47966.6nT
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

