

PRO DIRECTIONAL



Marathon Oil Corporation

Flowmaster 15 FB Fee No. 15H
Lea County, NM

July 22, 2019

Job No. LNM1452519
API No. 30-025-45965

HOBBS OCD
DEC 30 2019
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Survey Completion Report



Marathon Oil

Marathon Oil

Lea County, NM

Flowmaster 15 FB Fee

No. 15H

OH

Survey: ProDirectional

Survey Report

22 July, 2019





ProDirectional Survey Report



Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Flowmaster 15 (2-14-15)
Well: No. 15H
Wellbore: OH
Design: Gyro-MWD-188'-15234', PTB: 15290'

Local Co-ordinate Reference: Well No. 15H
TVD Reference: Well @ 3546.00usft
MD Reference: Well @ 3546.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey Program		Date 7/22/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
188.00	1,089.00	Survey #1 (OH)	GYRO-NS-CT	OWSG XYZ Accel with XY Static and Continuous Gyro	
1,247.00	15,290.00	Survey #2 (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)	Eastings (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	441,922.13	811,324.99
188.00	0.60	128.00	188.00	-0.61	-0.61	0.78	0.98	128.00	441,921.52	811,325.77
300.00	0.40	300.00	299.99	-0.78	-0.77	0.90	1.18	130.63	441,921.36	811,325.89
394.00	0.30	42.00	393.99	-0.43	-0.42	0.78	0.89	118.57	441,921.71	811,325.77
520.00	0.40	272.00	519.99	-0.17	-0.16	0.56	0.58	106.31	441,921.97	811,325.55
615.00	0.70	51.00	614.99	0.21	0.21	0.68	0.71	72.65	441,922.34	811,325.67
710.00	0.80	319.00	709.99	1.07	1.08	0.70	1.28	32.85	441,923.21	811,325.69
804.00	0.60	48.00	803.98	1.90	1.90	0.63	2.01	18.36	441,924.03	811,325.62
900.00	0.50	9.00	899.98	2.64	2.65	1.07	2.86	21.98	441,924.78	811,326.06
1,024.00	0.80	168.00	1,023.97	2.33	2.34	1.34	2.69	29.70	441,924.47	811,326.33
1,059.00	1.00	193.00	1,058.97	1.79	1.80	1.32	2.23	36.14	441,923.93	811,326.31
1,089.00	0.60	117.00	1,088.97	1.47	1.48	1.40	2.03	43.42	441,923.61	811,326.39
1,247.00	0.20	83.20	1,246.96	1.12	1.13	2.41	2.66	64.78	441,923.26	811,327.40
Pro MWD first Survey: 1247' MD										
1,337.00	0.30	106.60	1,336.96	1.06	1.09	2.79	3.00	68.74	441,923.22	811,327.78
1,427.00	0.40	331.20	1,426.96	1.27	1.29	2.87	3.14	65.70	441,923.42	811,327.86
1,516.00	0.80	264.80	1,515.96	1.49	1.51	2.10	2.58	54.25	441,923.64	811,327.09
1,606.00	3.30	255.40	1,605.89	0.81	0.80	-1.04	1.31	307.68	441,922.93	811,323.95
1,695.00	4.60	253.40	1,694.68	-0.81	-0.87	-6.94	6.99	262.89	441,921.26	811,318.05
1,785.00	5.40	252.90	1,784.34	-3.03	-3.14	-14.44	14.78	257.73	441,918.99	811,310.55
1,875.00	7.50	252.80	1,873.76	-5.93	-6.12	-24.10	24.87	255.74	441,916.01	811,300.89



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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)
4,385.00	9.20	240.40	4,344.33	-177.05	-180.39	-424.84	461.55	246.99	441,741.74	810,900.15
4,475.00	9.00	241.70	4,433.19	-183.84	-187.29	-437.29	475.71	246.82	441,734.84	810,887.70
4,565.00	8.00	241.40	4,522.20	-190.09	-193.62	-448.99	488.96	246.67	441,728.51	810,876.00
4,654.00	7.00	233.50	4,610.44	-196.20	-199.81	-458.78	500.41	246.47	441,722.32	810,866.21
4,744.00	7.90	231.60	4,699.68	-203.23	-206.92	-468.04	511.74	246.15	441,715.21	810,856.95
4,834.00	9.90	242.20	4,788.60	-210.59	-214.37	-479.73	525.45	245.92	441,707.76	810,845.26
4,924.00	11.20	247.00	4,877.08	-217.50	-221.39	-494.62	541.91	245.89	441,700.74	810,830.37
5,013.00	10.50	243.90	4,964.49	-224.32	-228.34	-509.86	558.66	245.88	441,693.79	810,815.13
5,103.00	9.80	240.10	5,053.08	-231.64	-235.76	-523.87	574.47	245.77	441,686.37	810,801.12
5,192.00	9.10	234.70	5,140.87	-239.39	-243.60	-536.18	588.92	245.57	441,678.53	810,788.81
5,282.00	8.30	235.20	5,229.84	-247.12	-251.43	-547.32	602.31	245.33	441,670.70	810,777.67
5,359.00	8.00	240.10	5,306.06	-252.89	-257.27	-556.53	613.12	245.19	441,664.86	810,768.46
5,546.00	6.70	244.40	5,491.52	-263.92	-268.47	-577.65	636.99	245.07	441,653.66	810,747.34
5,636.00	6.90	250.30	5,580.89	-267.94	-272.56	-587.47	647.62	245.11	441,649.57	810,737.52
5,726.00	9.10	257.30	5,670.01	-271.23	-275.95	-599.51	659.97	245.28	441,646.18	810,725.48
5,815.00	10.30	259.70	5,757.74	-274.08	-278.92	-614.20	674.57	245.58	441,643.21	810,710.79
5,905.00	10.50	261.00	5,846.26	-276.68	-281.64	-630.22	690.29	245.92	441,640.49	810,694.77
5,994.00	10.00	261.00	5,933.84	-279.04	-284.12	-645.86	705.59	246.26	441,638.01	810,679.13
6,084.00	9.90	260.10	6,022.48	-281.47	-286.67	-661.20	720.67	246.56	441,635.46	810,663.79
6,174.00	10.10	260.10	6,111.12	-284.03	-289.36	-676.60	735.87	246.85	441,632.77	810,648.39
6,263.00	10.10	260.90	6,198.74	-286.49	-291.93	-691.99	751.05	247.13	441,630.20	810,633.00
6,353.00	9.80	259.90	6,287.38	-288.96	-294.52	-707.32	766.19	247.39	441,627.61	810,617.67
6,442.00	9.40	254.20	6,375.14	-292.15	-297.83	-721.77	780.81	247.58	441,624.30	810,603.22
6,532.00	9.90	247.20	6,463.87	-297.04	-302.83	-735.98	795.85	247.63	441,619.30	810,589.01
6,622.00	9.80	248.90	6,552.54	-302.68	-308.59	-750.26	811.24	247.64	441,613.54	810,574.73
6,711.00	9.20	248.40	6,640.32	-307.92	-313.93	-763.94	825.93	247.66	441,608.20	810,561.05
6,801.00	9.90	250.70	6,729.07	-313.02	-319.14	-777.93	840.85	247.69	441,602.99	810,547.06



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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)
9,309.00	3.30	241.50	9,193.92	-498.64	-507.90	-1,175.91	1,280.90	246.64	441,414.23	810,149.08
9,399.00	3.00	235.50	9,283.79	-501.18	-510.47	-1,180.12	1,285.79	246.61	441,411.66	810,144.87
9,488.00	2.60	248.60	9,372.68	-503.21	-512.52	-1,183.92	1,290.10	246.59	441,409.61	810,141.07
9,578.00	2.40	253.60	9,462.60	-504.45	-513.80	-1,187.63	1,294.01	246.61	441,408.33	810,137.36
9,668.00	2.10	251.80	9,552.53	-505.47	-514.84	-1,191.00	1,297.52	246.62	441,407.29	810,133.99
9,757.00	1.60	251.60	9,641.48	-506.35	-515.75	-1,193.73	1,300.38	246.63	441,406.38	810,131.26
9,802.00	1.20	252.30	9,686.47	-506.69	-516.09	-1,194.78	1,301.48	246.64	441,406.04	810,130.21
9,855.00	0.80	237.00	9,739.46	-507.05	-516.46	-1,195.62	1,302.39	246.64	441,405.67	810,129.37
9,944.00	0.90	273.80	9,828.45	-507.33	-516.75	-1,196.83	1,303.63	246.65	441,405.38	810,128.16
10,033.00	6.90	356.00	9,917.23	-501.94	-511.36	-1,197.91	1,302.49	246.88	441,410.77	810,127.08
10,123.00	20.00	352.60	10,004.57	-481.18	-490.62	-1,200.28	1,296.68	247.77	441,431.51	810,124.71
10,213.00	29.20	353.30	10,086.31	-443.99	-453.47	-1,204.83	1,287.34	249.37	441,468.66	810,120.16
10,303.00	36.10	357.70	10,162.06	-395.61	-405.11	-1,208.46	1,274.55	251.47	441,517.02	810,116.53
10,392.00	44.40	2.00	10,229.94	-338.18	-347.68	-1,208.43	1,257.45	253.95	441,574.45	810,116.56
10,482.00	50.70	358.10	10,290.66	-271.83	-281.33	-1,208.48	1,240.80	256.89	441,640.80	810,116.51
10,571.00	60.60	359.20	10,340.82	-198.46	-207.97	-1,210.17	1,227.91	260.25	441,714.16	810,114.82
10,660.00	70.50	358.60	10,377.61	-117.54	-127.07	-1,211.74	1,218.38	264.01	441,795.06	810,113.25
10,750.00	77.00	358.50	10,402.78	-31.20	-40.74	-1,213.93	1,214.61	268.08	441,881.39	810,111.06
10,840.00	83.30	359.60	10,418.17	57.42	47.88	-1,215.39	1,216.33	272.26	441,970.01	810,109.60
10,894.00	88.60	359.90	10,421.99	111.27	101.73	-1,215.62	1,219.87	274.78	442,023.86	810,109.37
10,930.00	89.60	359.90	10,422.55	147.26	137.72	-1,215.68	1,223.46	276.46	442,059.85	810,109.31
11,019.00	91.00	359.70	10,422.08	236.26	226.72	-1,215.99	1,236.95	280.56	442,148.85	810,109.00
11,109.00	92.10	359.10	10,419.65	326.22	316.68	-1,216.94	1,257.46	284.59	442,238.81	810,108.05
11,198.00	91.60	0.30	10,416.78	415.18	405.63	-1,217.40	1,283.20	288.43	442,327.76	810,107.59
11,288.00	90.60	0.20	10,415.05	505.15	495.61	-1,217.01	1,314.05	292.16	442,417.74	810,107.98
11,377.00	90.90	359.80	10,413.88	594.14	584.60	-1,217.01	1,350.14	295.66	442,506.73	810,107.98
11,467.00	90.70	0.20	10,412.63	684.13	674.59	-1,217.01	1,391.47	299.00	442,596.72	810,107.98

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Local Co-ordinate Reference: Well No. 15H
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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)
13,917.00	88.50	358.60	10,423.36	3,133.38	3,123.93	-1,215.93	3,352.23	338.73	445,046.06	810,109.06
14,006.00	88.90	358.30	10,425.38	3,222.34	3,212.87	-1,218.34	3,436.12	339.23	445,135.00	810,106.65
14,096.00	91.00	357.80	10,425.46	3,312.31	3,302.82	-1,221.40	3,521.42	339.71	445,224.95	810,103.59
14,186.00	90.60	359.50	10,424.20	3,402.28	3,392.78	-1,223.52	3,606.65	340.17	445,314.91	810,101.47
14,275.00	91.20	359.90	10,422.80	3,491.27	3,481.77	-1,223.98	3,690.64	340.63	445,403.90	810,101.01
14,365.00	90.10	0.70	10,421.78	3,581.26	3,571.76	-1,223.51	3,775.50	341.09	445,493.89	810,101.48
14,455.00	89.50	1.60	10,422.10	3,671.22	3,661.74	-1,221.71	3,860.17	341.55	445,583.87	810,103.28
14,544.00	89.40	1.40	10,422.95	3,760.16	3,750.70	-1,219.38	3,943.94	341.99	445,672.83	810,105.61
14,634.00	90.30	1.10	10,423.19	3,850.12	3,840.68	-1,217.41	4,029.01	342.41	445,762.81	810,107.58
14,724.00	89.00	1.30	10,423.74	3,940.08	3,930.66	-1,215.53	4,114.31	342.82	445,852.79	810,109.46
14,813.00	89.90	1.40	10,424.59	4,029.03	4,019.63	-1,213.43	4,198.79	343.20	445,941.76	810,111.56
14,903.00	91.50	1.20	10,423.49	4,118.98	4,109.59	-1,211.39	4,284.42	343.58	446,031.72	810,113.60
14,992.00	89.80	1.00	10,422.48	4,207.94	4,198.57	-1,209.68	4,369.36	343.93	446,120.70	810,115.31
15,082.00	89.90	0.40	10,422.72	4,297.92	4,288.56	-1,208.58	4,455.61	344.26	446,210.69	810,116.41
15,172.00	90.90	359.80	10,422.09	4,387.91	4,378.56	-1,208.42	4,542.25	344.57	446,300.69	810,116.57
15,234.00	92.10	359.80	10,420.46	4,449.89	4,440.53	-1,208.64	4,602.08	344.77	446,362.66	810,116.35
Last Survey: 15234' MD										
15,290.00	92.10	359.80	10,418.41	4,505.85	4,496.50	-1,208.84	4,656.15	344.95	446,418.63	810,116.15
PTB: 15290' MD										

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,247.00	1,246.96	1.13	2.41	Pro MWD first Survey: 1247' MD
15,234.00	10,420.46	4,440.53	-1,208.64	Last Survey: 15234' MD
15,290.00	10,418.41	4,496.50	-1,208.84	PTB: 15290' MD

State/Province NEW MEXICO	Country US	Field Name FIRST BONE	Latitude (°) 32.21178290	Longitude (°) -103.45992100	North/South Distance (ft) 591.0	North/South Reference FSL
API/ IFO UWI 3002545965	KB-Ground Distance (ft) 27.00	KB-Mud Line Distance (ft)	Ground Elevation (ft) 3,519.00	Drilling Rig Spud Date 6/3/2019	Well Original Completion Date 10/30/2019	Well First Production Date 10/31/2019

HORIZONTAL, FLOWMASTER 15 FB FEE 15H, 12/23/2019 1:04:27 PM

