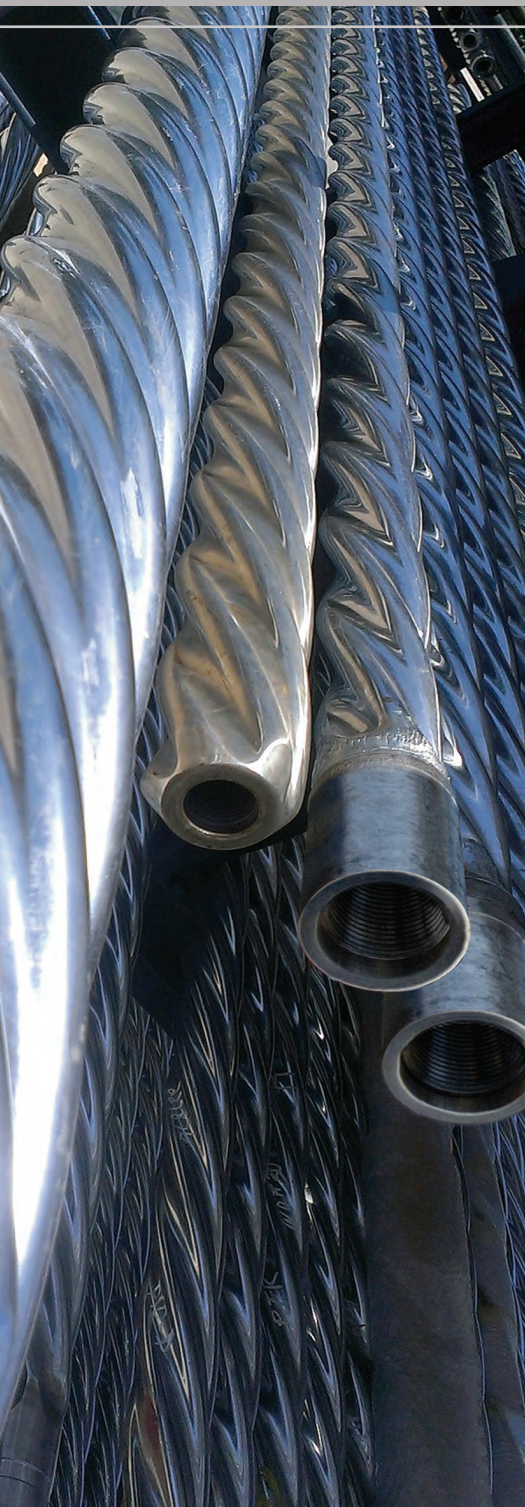




Marathon Oil Corporation

**Madera 19 Fed Com 26-35-19 WB No. 5H
Lea County, NM**

February 15, 2019

**Job No. LNM1413118
API No. 30-025-44901**

Survey Completion Report



Survey Certification Letter

February 15, 2019



Operator Name: Marathon Oil
Well Name: Madera 19 Fed Com 26-35-19 WB No. 5H
County/Parish: Lea County,
State: NM
Rig Name: H&P 480
Job Number: LNM1413118

This is to certify the surveys performed on the referenced well by Professional Directional Ent., Inc. are true and correct MWD Surveys, data provided as follows:

<u>Surveyor</u>	<u>Surveyed Depths</u>	<u>Projection to Bit</u>	<u>Dates Performed</u>	<u>Type of Survey</u>
ProDirectional	178' MD – 20,397' MD	20,450' MD	11/01/18 – 01/17/19	MWD

Sincerely,

Mike Coats
Regulatory Specialist
Professional Directional

850 Conroe Park West Drive | Conroe, TX 77303 | Phone: 936.441.7266
prodirectional.com



Marathon Oil

Lea County, NM

Madera 19 Fed Com 26-35-19 WB

No. 5H

OH

Survey: ProDirectional

Survey Report

15 February, 2019



Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	Database:	WellPlanner1

Project	Lea County, NM(NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Madera 19 Fed Com 26-35-19 WB		
Site Position:		Northing:	373,155.99 usft
From:	Map	Easting:	827,337.05 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.022528
		Longitude:	-103.410511
		Grid Convergence:	0.49 °

Well		No. 5H				
Well Position	+N/-S	0.00 usft	Northing:	373,155.99 usft	Latitude:	32.022529
	+E/-W	0.00 usft	Easting:	827,307.05 usft	Longitude:	-103.410607
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,184.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/15/2018	6.65	59.68	47,710.20

Design		MWD178'-20397', PTB: 20450'			
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	359.45

Survey Program		Date 2/15/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
178.00	20,450.00	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HRGM

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	373,155.99	827,307.05
178.00	0.49	175.88	178.00	-0.76	-0.76	0.05	0.76	175.88	373,155.23	827,307.10
Pro MWD First Survey: 178' MD										
239.00	0.84	183.65	238.99	-1.47	-1.47	0.04	1.47	178.24	373,154.52	827,307.09
331.00	0.65	185.34	330.99	-2.66	-2.66	-0.05	2.66	181.00	373,153.33	827,307.00
422.00	0.65	170.30	421.98	-3.68	-3.68	-0.01	3.68	180.12	373,152.31	827,307.04
513.00	0.62	169.68	512.97	-4.68	-4.67	0.17	4.68	177.95	373,151.32	827,307.22
605.00	0.62	168.37	604.97	-5.65	-5.65	0.36	5.66	176.38	373,150.34	827,307.41
696.00	0.59	168.59	695.96	-6.60	-6.59	0.55	6.62	175.24	373,149.40	827,307.60
788.00	0.72	170.26	787.96	-7.63	-7.63	0.74	7.66	174.45	373,148.36	827,307.79
879.00	0.63	183.86	878.95	-8.70	-8.69	0.80	8.73	174.72	373,147.30	827,307.85
970.00	0.66	175.03	969.95	-9.72	-9.71	0.82	9.74	175.20	373,146.28	827,307.87
1,061.00	0.64	193.98	1,060.94	-10.73	-10.73	0.74	10.75	176.06	373,145.26	827,307.79
1,127.00	0.68	183.54	1,126.94	-11.48	-11.47	0.62	11.49	176.88	373,144.52	827,307.67
1,244.00	0.63	211.96	1,243.93	-12.72	-12.71	0.24	12.72	178.91	373,143.28	827,307.29
1,336.00	0.65	198.71	1,335.92	-13.63	-13.64	-0.19	13.64	180.81	373,142.35	827,306.86
1,430.00	0.70	206.13	1,429.92	-14.65	-14.66	-0.62	14.67	182.41	373,141.33	827,306.43
1,525.00	0.82	205.90	1,524.91	-15.78	-15.79	-1.17	15.83	184.24	373,140.20	827,305.88
1,620.00	0.84	198.80	1,619.90	-17.04	-17.06	-1.69	17.14	185.66	373,138.93	827,305.36
1,714.00	0.79	187.37	1,713.89	-18.34	-18.36	-2.00	18.46	186.21	373,137.63	827,305.05
1,809.00	0.68	177.57	1,808.88	-19.55	-19.57	-2.06	19.68	186.00	373,136.42	827,304.99
1,903.00	0.40	157.42	1,902.88	-20.41	-20.43	-1.91	20.52	185.33	373,135.56	827,305.14
1,997.00	0.65	145.99	1,996.87	-21.16	-21.17	-1.48	21.23	184.01	373,134.82	827,305.57
2,092.00	0.76	135.13	2,091.87	-22.06	-22.07	-0.74	22.08	181.91	373,133.92	827,306.31
2,187.00	0.79	124.62	2,186.86	-22.89	-22.89	0.25	22.89	179.38	373,133.10	827,307.30
2,281.00	0.89	135.56	2,280.85	-23.79	-23.77	1.29	23.81	176.89	373,132.22	827,308.34
2,375.00	1.51	166.87	2,374.83	-25.52	-25.50	2.08	25.59	175.33	373,130.49	827,309.13

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)	
2,470.00	2.63	179.02	2,469.76	-28.92	-28.90	2.40	29.00	175.24	373,127.09	827,309.45	
2,564.00	4.17	177.24	2,563.60	-34.49	-34.47	2.61	34.57	175.68	373,121.52	827,309.66	
2,659.00	5.83	175.53	2,658.23	-42.76	-42.73	3.15	42.85	175.79	373,113.26	827,310.20	
2,753.00	7.70	177.89	2,751.57	-53.82	-53.79	3.75	53.92	176.01	373,102.20	827,310.80	
2,847.00	9.63	184.08	2,844.50	-67.95	-67.92	3.43	68.01	177.11	373,088.07	827,310.48	
2,942.00	10.30	188.00	2,938.06	-84.27	-84.26	1.68	84.28	178.86	373,071.73	827,308.73	
3,036.00	10.25	187.15	3,030.56	-100.87	-100.88	-0.53	100.88	180.30	373,055.11	827,306.52	
3,131.00	10.28	186.50	3,124.04	-117.66	-117.69	-2.54	117.72	181.24	373,038.30	827,304.51	
3,225.00	10.77	190.39	3,216.46	-134.61	-134.66	-5.08	134.76	182.16	373,021.33	827,301.97	
3,319.00	10.98	192.63	3,308.77	-151.95	-152.04	-8.62	152.28	183.24	373,003.95	827,298.43	
3,414.00	10.87	190.21	3,402.05	-169.55	-169.68	-12.19	170.12	184.11	372,986.31	827,294.86	
3,508.00	10.67	187.49	3,494.39	-186.88	-187.03	-14.89	187.62	184.55	372,968.96	827,292.16	
3,603.00	10.58	188.48	3,587.76	-204.20	-204.38	-17.32	205.11	184.84	372,951.61	827,289.73	
3,697.00	10.53	188.66	3,680.17	-221.20	-221.40	-19.89	222.29	185.13	372,934.59	827,287.16	
3,792.00	10.62	189.60	3,773.56	-238.39	-238.62	-22.66	239.69	185.42	372,917.37	827,284.39	
3,886.00	9.43	194.11	3,866.12	-254.36	-254.63	-25.98	255.95	185.83	372,901.36	827,281.07	
3,980.00	8.01	200.32	3,959.04	-267.93	-268.24	-30.13	269.92	186.41	372,887.75	827,276.92	
4,075.00	6.14	209.04	4,053.31	-278.54	-278.89	-34.90	281.06	187.13	372,877.10	827,272.15	
4,169.00	4.26	218.05	4,146.92	-285.64	-286.03	-39.49	288.74	187.86	372,869.96	827,267.56	
4,264.00	2.52	242.16	4,241.76	-289.35	-289.79	-43.51	293.03	188.54	372,866.20	827,263.54	
4,358.00	1.81	301.21	4,335.70	-289.52	-289.98	-46.61	293.70	189.13	372,866.01	827,260.44	
4,452.00	1.76	322.32	4,429.65	-287.59	-288.07	-48.76	292.17	189.61	372,867.92	827,258.29	
4,547.00	1.23	329.75	4,524.62	-285.54	-286.03	-50.16	290.40	189.95	372,869.96	827,256.89	
4,641.00	1.48	21.76	4,618.60	-283.54	-284.04	-50.22	288.44	190.03	372,871.95	827,256.83	
4,736.00	1.73	44.36	4,713.56	-281.39	-281.87	-48.77	286.06	189.82	372,874.12	827,258.28	
4,830.00	1.65	60.87	4,807.52	-279.74	-280.20	-46.59	284.04	189.44	372,875.79	827,260.46	
4,925.00	2.23	78.84	4,902.47	-278.74	-279.17	-43.58	282.56	188.87	372,876.82	827,263.47	

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)	
5,019.00	3.09	88.52	4,996.37	-278.36	-278.75	-39.26	281.51	188.02	372,877.24	827,267.79	
5,114.00	2.30	96.35	5,091.26	-278.55	-278.90	-34.80	281.06	187.11	372,877.09	827,272.25	
5,208.00	1.33	97.45	5,185.21	-278.93	-279.25	-31.85	281.06	186.51	372,876.74	827,275.20	
5,302.00	1.41	94.81	5,279.19	-279.19	-279.49	-29.61	281.05	186.05	372,876.50	827,277.44	
5,345.00	1.51	89.01	5,322.17	-279.24	-279.52	-28.52	280.97	185.83	372,876.47	827,278.53	
5,483.00	1.24	93.16	5,460.13	-279.32	-279.57	-25.21	280.71	185.15	372,876.42	827,281.84	
5,578.00	1.66	18.87	5,555.11	-278.09	-278.33	-23.74	279.34	184.87	372,877.66	827,283.31	
5,673.00	2.07	11.06	5,650.06	-275.11	-275.34	-22.96	276.30	184.77	372,880.65	827,284.09	
5,767.00	2.03	16.63	5,744.00	-271.86	-272.08	-22.16	272.98	184.66	372,883.91	827,284.89	
5,862.00	2.00	15.27	5,838.94	-268.65	-268.87	-21.24	269.71	184.52	372,887.12	827,285.81	
5,956.00	1.84	350.08	5,932.89	-265.59	-265.80	-21.07	266.63	184.53	372,890.19	827,285.98	
6,050.00	2.28	320.40	6,026.83	-262.64	-262.87	-22.52	263.84	184.90	372,893.12	827,284.53	
6,145.00	2.35	327.96	6,121.75	-259.52	-259.77	-24.76	260.94	185.44	372,896.22	827,282.29	
6,239.00	2.36	327.55	6,215.67	-256.23	-256.50	-26.82	257.90	185.97	372,899.49	827,280.23	
6,333.00	1.82	326.49	6,309.61	-253.33	-253.62	-28.68	255.24	186.45	372,902.37	827,278.37	
6,428.00	0.96	319.71	6,404.58	-251.46	-251.76	-30.03	253.54	186.80	372,904.23	827,277.02	
6,522.00	0.93	321.84	6,498.57	-250.25	-250.56	-31.01	252.47	187.06	372,905.43	827,276.04	
6,617.00	0.70	305.51	6,593.56	-249.29	-249.61	-31.96	251.65	187.30	372,906.38	827,275.09	
6,711.00	0.71	331.71	6,687.55	-248.44	-248.77	-32.70	250.91	187.49	372,907.22	827,274.35	
6,805.00	0.59	335.61	6,781.55	-247.48	-247.81	-33.18	250.02	187.63	372,908.18	827,273.87	
6,900.00	0.49	341.37	6,876.54	-246.65	-246.98	-33.51	249.25	187.73	372,909.01	827,273.54	
6,994.00	0.46	318.11	6,970.54	-245.98	-246.32	-33.89	248.64	187.83	372,909.67	827,273.16	
7,088.00	0.60	313.11	7,064.54	-245.36	-245.70	-34.50	248.11	187.99	372,910.29	827,272.55	
7,183.00	0.31	330.70	7,159.53	-244.79	-245.14	-34.99	247.62	188.12	372,910.85	827,272.06	
7,277.00	0.49	306.23	7,253.53	-244.33	-244.68	-35.44	247.23	188.24	372,911.31	827,271.61	
7,372.00	0.38	283.28	7,348.53	-244.01	-244.37	-36.08	247.02	188.40	372,911.62	827,270.97	
7,466.00	0.40	297.86	7,442.53	-243.78	-244.14	-36.67	246.88	188.54	372,911.85	827,270.38	

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)	
7,561.00	0.46	317.16	7,537.52	-243.34	-243.71	-37.22	246.53	188.68	372,912.28	827,269.83	
7,655.00	0.47	266.44	7,631.52	-243.08	-243.45	-37.86	246.38	188.84	372,912.54	827,269.19	
7,749.00	0.60	267.42	7,725.52	-243.12	-243.50	-38.74	246.56	189.04	372,912.49	827,268.31	
7,844.00	0.84	288.88	7,820.51	-242.90	-243.30	-39.89	246.55	189.31	372,912.69	827,267.16	
7,938.00	0.53	271.70	7,914.50	-242.66	-243.06	-40.98	246.49	189.57	372,912.93	827,266.07	
8,032.00	0.41	263.00	8,008.50	-242.68	-243.09	-41.75	246.65	189.75	372,912.90	827,265.30	
8,127.00	0.94	256.93	8,103.49	-242.89	-243.31	-42.85	247.05	189.99	372,912.68	827,264.20	
8,221.00	0.98	256.35	8,197.48	-243.23	-243.67	-44.38	247.68	190.32	372,912.32	827,262.67	
8,316.00	0.91	247.85	8,292.47	-243.70	-244.15	-45.87	248.42	190.64	372,911.84	827,261.18	
8,410.00	0.89	239.71	8,386.45	-244.33	-244.80	-47.19	249.30	190.91	372,911.19	827,259.86	
8,505.00	1.03	243.41	8,481.44	-245.07	-245.55	-48.59	250.31	191.19	372,910.44	827,258.46	
8,599.00	0.75	229.08	8,575.43	-245.84	-246.33	-49.81	251.32	191.43	372,909.66	827,257.24	
8,693.00	0.75	240.68	8,669.42	-246.54	-247.04	-50.81	252.21	191.62	372,908.95	827,256.24	
8,788.00	0.82	238.88	8,764.41	-247.18	-247.69	-51.93	253.08	191.84	372,908.30	827,255.12	
8,882.00	0.59	227.55	8,858.41	-247.85	-248.37	-52.87	253.93	192.02	372,907.62	827,254.18	
8,977.00	0.59	259.74	8,953.40	-248.26	-248.78	-53.71	254.52	192.18	372,907.21	827,253.34	
9,071.00	0.68	265.68	9,047.39	-248.38	-248.91	-54.74	254.86	192.40	372,907.08	827,252.31	
9,165.00	0.70	249.70	9,141.39	-248.61	-249.15	-55.84	255.33	192.63	372,906.84	827,251.21	
9,260.00	0.44	285.62	9,236.38	-248.70	-249.26	-56.73	255.63	192.82	372,906.73	827,250.32	
9,354.00	1.18	43.23	9,330.38	-247.90	-248.45	-56.42	254.78	192.79	372,907.54	827,250.63	
9,448.00	1.94	23.70	9,424.34	-245.75	-246.29	-55.11	252.38	192.61	372,909.70	827,251.94	
9,543.00	1.91	10.36	9,519.29	-242.73	-243.26	-54.18	249.22	192.56	372,912.73	827,252.87	
9,637.00	1.88	14.49	9,613.24	-239.70	-240.23	-53.52	246.12	192.56	372,915.76	827,253.53	
9,731.00	1.89	315.98	9,707.19	-237.09	-237.62	-54.21	243.73	192.85	372,918.37	827,252.84	
9,826.00	1.89	269.42	9,802.15	-235.95	-236.51	-56.86	243.25	193.52	372,919.48	827,250.19	
9,920.00	2.30	270.70	9,896.09	-235.91	-236.50	-60.30	244.07	194.30	372,919.49	827,246.75	
10,015.00	2.93	272.67	9,990.99	-235.74	-236.37	-64.63	245.04	195.29	372,919.62	827,242.42	

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)	
10,109.00	3.40	269.98	10,084.84	-235.57	-236.26	-69.82	246.36	196.46	372,919.73	827,237.23	
10,204.00	3.62	268.40	10,179.66	-235.60	-236.34	-75.63	248.15	197.75	372,919.65	827,231.42	
10,298.00	3.91	271.21	10,273.46	-235.56	-236.36	-81.80	250.11	199.09	372,919.63	827,225.25	
10,393.00	3.99	276.47	10,368.24	-235.06	-235.92	-88.33	251.91	200.53	372,920.07	827,218.72	
10,487.00	4.10	284.42	10,462.00	-233.79	-234.71	-94.83	253.14	202.00	372,921.28	827,212.22	
10,581.00	3.92	288.96	10,555.77	-231.85	-232.83	-101.12	253.84	203.48	372,923.16	827,205.93	
10,676.00	3.61	292.73	10,650.57	-229.58	-230.62	-106.95	254.21	204.88	372,925.37	827,200.10	
10,771.00	2.32	315.94	10,745.44	-227.00	-228.08	-111.05	253.68	205.96	372,927.91	827,196.00	
10,865.00	2.02	352.94	10,839.38	-223.98	-225.07	-112.58	251.65	206.57	372,930.92	827,194.47	
10,959.00	1.69	21.23	10,933.33	-221.04	-222.13	-112.28	248.90	206.81	372,933.86	827,194.77	
11,054.00	1.34	59.48	11,028.30	-219.19	-220.26	-110.81	246.57	206.71	372,935.73	827,196.24	
11,148.00	1.82	76.81	11,122.26	-218.31	-219.36	-108.41	244.69	206.30	372,936.63	827,198.64	
11,243.00	1.79	86.11	11,217.22	-217.90	-218.92	-105.46	243.00	205.72	372,937.07	827,201.59	
11,337.00	1.46	78.05	11,311.18	-217.57	-218.57	-102.83	241.55	205.19	372,937.42	827,204.22	
11,432.00	2.68	121.01	11,406.12	-218.50	-219.47	-99.74	241.07	204.44	372,936.52	827,207.31	
11,526.00	2.89	118.90	11,500.01	-220.81	-221.74	-95.78	241.54	203.36	372,934.25	827,211.27	
11,620.00	2.79	130.54	11,593.90	-223.48	-224.38	-91.97	242.49	202.29	372,931.61	827,215.08	
11,715.00	2.45	140.69	11,688.80	-226.58	-227.45	-88.92	244.21	201.35	372,928.54	827,218.13	
11,809.00	2.28	134.63	11,782.72	-229.48	-230.32	-86.32	245.96	200.55	372,925.67	827,220.73	
11,903.00	2.29	116.91	11,876.64	-231.67	-232.48	-83.32	246.96	199.72	372,923.51	827,223.73	
11,937.00	2.12	114.44	11,910.62	-232.25	-233.05	-82.14	247.10	199.41	372,922.94	827,224.91	
12,044.00	1.93	118.38	12,017.55	-233.96	-234.72	-78.75	247.58	198.55	372,921.27	827,228.30	
12,107.00	1.61	119.29	12,080.52	-234.91	-235.66	-77.05	247.94	198.10	372,920.33	827,230.00	
12,201.00	0.75	109.33	12,174.50	-235.78	-236.51	-75.31	248.21	197.66	372,919.48	827,231.74	
12,295.00	2.23	119.13	12,268.47	-236.89	-237.60	-73.13	248.61	197.11	372,918.39	827,233.92	
12,390.00	2.31	135.50	12,363.39	-239.19	-239.87	-70.18	249.93	196.31	372,916.12	827,236.87	
12,484.00	2.51	144.76	12,457.31	-242.24	-242.90	-67.66	252.15	195.57	372,913.09	827,239.39	

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)	
12,579.00	4.61	12.64	12,552.21	-240.23	-240.87	-65.63	249.65	195.24	372,915.12	827,241.42	
12,674.00	4.87	344.84	12,646.90	-232.61	-233.26	-65.84	242.37	195.76	372,922.73	827,241.21	
12,768.00	8.42	11.61	12,740.28	-222.02	-222.66	-65.50	232.09	196.39	372,933.33	827,241.55	
12,863.00	15.26	9.24	12,833.20	-202.88	-203.48	-62.09	212.74	196.97	372,952.51	827,244.96	
12,958.00	26.16	9.63	12,921.93	-169.84	-170.39	-56.56	179.54	198.36	372,985.60	827,250.49	
13,052.00	39.82	2.94	13,000.61	-119.15	-119.65	-51.53	130.27	203.30	373,036.34	827,255.52	
13,146.00	57.95	358.86	13,062.18	-48.67	-49.16	-50.77	70.67	225.92	373,106.83	827,256.28	
13,241.00	76.95	359.29	13,098.44	38.66	38.17	-52.16	64.63	306.19	373,194.16	827,254.89	
13,326.00	89.15	359.73	13,108.71	122.88	122.38	-52.87	133.31	336.63	373,278.37	827,254.18	
13,421.00	89.84	1.45	13,109.55	217.85	217.37	-51.90	223.48	346.57	373,373.36	827,255.15	
13,515.00	90.08	2.51	13,109.61	311.76	311.31	-48.65	315.09	351.12	373,467.30	827,258.40	
13,609.00	89.90	1.32	13,109.63	405.67	405.25	-45.51	407.80	353.59	373,561.24	827,261.54	
13,704.00	91.22	2.19	13,108.70	500.59	500.20	-42.60	502.01	355.13	373,656.19	827,264.45	
13,798.00	92.52	1.92	13,105.63	594.44	594.09	-39.23	595.38	356.22	373,750.08	827,267.82	
13,893.00	92.41	1.50	13,101.55	689.28	688.96	-36.40	689.92	356.98	373,844.95	827,270.65	
13,987.00	91.59	1.02	13,098.27	783.17	782.88	-34.33	783.63	357.49	373,938.87	827,272.72	
14,082.00	93.57	1.94	13,093.99	878.01	877.74	-31.88	878.32	357.92	374,033.73	827,275.17	
14,176.00	92.08	1.26	13,089.36	971.83	971.59	-29.26	972.03	358.28	374,127.58	827,277.79	
14,271.00	90.82	0.71	13,086.95	1,066.76	1,066.54	-27.63	1,066.90	358.52	374,222.53	827,279.42	
14,366.00	89.47	359.27	13,086.71	1,161.75	1,161.54	-27.64	1,161.87	358.64	374,317.53	827,279.41	
14,461.00	93.22	356.98	13,084.48	1,256.68	1,256.44	-30.75	1,256.81	358.60	374,412.43	827,276.30	
14,555.00	90.95	355.91	13,081.06	1,350.48	1,350.19	-36.57	1,350.68	358.45	374,506.18	827,270.48	
14,650.00	90.51	356.42	13,079.85	1,445.31	1,444.97	-42.93	1,445.60	358.30	374,600.96	827,264.12	
14,744.00	91.23	356.98	13,078.43	1,539.19	1,538.80	-48.34	1,539.56	358.20	374,694.79	827,258.71	
14,839.00	92.69	1.46	13,075.18	1,634.11	1,633.71	-49.63	1,634.46	358.26	374,789.70	827,257.42	
14,933.00	91.69	0.71	13,071.58	1,728.00	1,727.62	-47.85	1,728.28	358.41	374,883.61	827,259.20	
15,028.00	88.32	359.07	13,071.58	1,822.98	1,822.60	-48.04	1,823.24	358.49	374,978.59	827,259.01	

Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Madera 19 Fed Com 26-35-19 WB
Well: No. 5H
Wellbore: OH
Design: MWD178'-20397', PTB: 20450'

Local Co-ordinate Reference:
TVD Reference: Well No. 5H
MD Reference: Well @ 3210.50usft
North Reference: Well @ 3210.50usft
Survey Calculation Method: Grid
Database: 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)	
15,123.00	87.29	358.73	13,075.21	1,917.91	1,917.51	-49.86	1,918.16	358.51	375,073.50	827,257.19	
15,217.00	89.12	359.62	13,078.16	2,011.85	2,011.45	-51.21	2,012.11	358.54	375,167.44	827,255.84	
15,312.00	91.14	1.44	13,077.94	2,106.83	2,106.44	-50.33	2,107.04	358.63	375,262.43	827,256.72	
15,406.00	91.04	0.43	13,076.15	2,200.78	2,200.41	-48.80	2,200.95	358.73	375,356.40	827,258.25	
15,501.00	86.77	1.13	13,077.97	2,295.71	2,295.36	-47.51	2,295.85	358.81	375,451.35	827,259.54	
15,595.00	87.86	2.71	13,082.37	2,389.52	2,389.20	-44.36	2,389.61	358.94	375,545.19	827,262.69	
15,690.00	87.80	1.08	13,085.97	2,484.36	2,484.08	-41.22	2,484.42	359.05	375,640.07	827,265.83	
15,785.00	90.49	359.40	13,087.39	2,579.33	2,579.05	-40.82	2,579.38	359.09	375,735.04	827,266.23	
15,879.00	90.78	359.49	13,086.35	2,673.32	2,673.04	-41.73	2,673.37	359.11	375,829.03	827,265.32	
15,974.00	90.71	358.91	13,085.11	2,768.31	2,768.03	-43.06	2,768.36	359.11	375,924.02	827,263.99	
16,068.00	94.08	358.08	13,081.18	2,862.20	2,861.90	-45.52	2,862.26	359.09	376,017.89	827,261.53	
16,163.00	95.97	358.81	13,072.86	2,956.82	2,956.49	-48.09	2,956.88	359.07	376,112.48	827,258.96	
16,257.00	90.28	358.43	13,067.74	3,050.63	3,050.29	-50.35	3,050.70	359.05	376,206.28	827,256.70	
16,352.00	92.37	0.56	13,065.54	3,145.59	3,145.25	-51.19	3,145.66	359.07	376,301.24	827,255.86	
16,446.00	91.94	2.92	13,062.01	3,239.45	3,239.13	-48.34	3,239.49	359.15	376,395.12	827,258.71	
16,541.00	86.84	358.70	13,063.02	3,334.36	3,334.06	-47.00	3,334.39	359.19	376,490.05	827,260.05	
16,636.00	85.23	357.35	13,069.59	3,429.10	3,428.77	-50.26	3,429.14	359.16	376,584.76	827,256.79	
16,730.00	89.62	356.63	13,073.81	3,522.89	3,522.53	-55.19	3,522.96	359.10	376,678.52	827,251.86	
16,825.00	91.05	357.07	13,073.26	3,617.79	3,617.38	-60.41	3,617.88	359.04	376,773.37	827,246.64	
16,919.00	91.30	356.54	13,071.33	3,711.67	3,711.21	-65.65	3,711.79	358.99	376,867.20	827,241.40	
17,014.00	92.34	356.53	13,068.31	3,806.50	3,805.99	-71.39	3,806.66	358.93	376,961.98	827,235.66	
17,108.00	91.18	356.02	13,065.42	3,900.31	3,899.74	-77.49	3,900.51	358.86	377,055.73	827,229.56	
17,202.00	92.62	356.47	13,062.31	3,994.11	3,993.49	-83.64	3,994.36	358.80	377,149.48	827,223.41	
17,296.00	93.26	357.73	13,057.49	4,087.90	4,087.24	-88.39	4,088.20	358.76	377,243.23	827,218.66	
17,391.00	92.62	357.13	13,052.61	4,182.72	4,182.02	-92.65	4,183.05	358.73	377,338.01	827,214.40	
17,486.00	91.78	356.75	13,048.97	4,277.55	4,276.81	-97.72	4,277.93	358.69	377,432.80	827,209.33	
17,580.00	90.24	355.99	13,047.31	4,371.40	4,370.61	-103.67	4,371.84	358.64	377,526.60	827,203.38	

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)	
17,675.00	91.34	357.34	13,046.00	4,466.28	4,465.43	-109.19	4,466.77	358.60	377,621.42	827,197.86	
17,770.00	90.27	357.82	13,044.67	4,561.21	4,560.34	-113.20	4,561.74	358.58	377,716.33	827,193.85	
17,864.00	91.02	359.66	13,043.61	4,655.20	4,654.30	-115.27	4,655.73	358.58	377,810.29	827,191.78	
17,958.00	90.58	359.55	13,042.29	4,749.19	4,748.29	-115.92	4,749.71	358.60	377,904.28	827,191.13	
18,053.00	89.13	357.92	13,042.54	4,844.17	4,843.26	-118.02	4,844.70	358.60	377,999.25	827,189.03	
18,147.00	90.90	359.79	13,042.51	4,938.16	4,937.24	-119.89	4,938.69	358.61	378,093.23	827,187.16	
18,242.00	94.03	0.55	13,038.42	5,033.05	5,032.14	-119.61	5,033.56	358.64	378,188.13	827,187.44	
18,336.00	93.66	0.76	13,032.12	5,126.82	5,125.92	-118.54	5,127.29	358.68	378,281.91	827,188.51	
18,431.00	91.95	0.73	13,027.47	5,221.68	5,220.79	-117.31	5,222.11	358.71	378,376.78	827,189.74	
18,526.00	91.65	0.28	13,024.49	5,316.61	5,315.74	-116.47	5,317.02	358.74	378,471.73	827,190.58	
18,623.00	90.54	0.25	13,022.64	5,413.59	5,412.72	-116.02	5,413.96	358.77	378,568.71	827,191.03	
18,718.00	90.46	0.64	13,021.81	5,508.57	5,507.71	-115.28	5,508.92	358.80	378,663.70	827,191.77	
18,812.00	88.38	357.85	13,022.76	5,602.55	5,601.69	-116.52	5,602.90	358.81	378,757.68	827,190.53	
18,907.00	89.62	359.61	13,024.42	5,697.52	5,696.64	-118.63	5,697.88	358.81	378,852.63	827,188.42	
19,002.00	89.14	358.46	13,025.44	5,792.51	5,791.62	-120.23	5,792.87	358.81	378,947.61	827,186.82	
19,096.00	90.14	358.94	13,026.03	5,886.50	5,885.60	-122.36	5,886.87	358.81	379,041.59	827,184.69	
19,191.00	91.26	358.59	13,024.87	5,981.48	5,980.56	-124.41	5,981.86	358.81	379,136.55	827,182.64	
19,285.00	89.16	356.82	13,024.53	6,075.43	6,074.48	-128.17	6,075.83	358.79	379,230.47	827,178.88	
19,380.00	87.95	355.89	13,026.92	6,170.26	6,169.25	-134.21	6,170.71	358.75	379,325.24	827,172.84	
19,474.00	92.42	359.47	13,026.62	6,264.17	6,263.14	-138.01	6,264.66	358.74	379,419.13	827,169.04	
19,569.00	93.51	0.17	13,021.71	6,359.04	6,358.01	-138.31	6,359.51	358.75	379,514.00	827,168.74	
19,663.00	91.56	0.09	13,017.55	6,452.94	6,451.91	-138.10	6,453.39	358.77	379,607.90	827,168.95	
19,758.00	90.71	0.93	13,015.67	6,547.90	6,546.89	-137.25	6,548.33	358.80	379,702.88	827,169.80	
19,852.00	88.35	359.18	13,016.44	6,641.88	6,640.87	-137.16	6,642.29	358.82	379,796.86	827,169.89	
19,946.00	88.12	359.21	13,019.33	6,735.84	6,734.82	-138.48	6,736.24	358.82	379,890.81	827,168.57	
20,041.00	87.87	358.48	13,022.66	6,830.77	6,829.74	-140.39	6,831.18	358.82	379,985.73	827,166.66	
20,136.00	87.07	357.37	13,026.85	6,925.65	6,924.58	-143.83	6,926.08	358.81	380,080.57	827,163.22	

Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 5H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3210.50usft
Site:	Madera 19 Fed Com 26-35-19 WB	MD Reference:	Well @ 3210.50usft
Well:	No. 5H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD178'-20397', PTB: 20450'	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)	
20,230.00	88.22	355.31	13,030.71	7,019.42	7,018.31	-149.83	7,019.91	358.78	380,174.30	827,157.22	
20,324.00	88.88	354.98	13,033.09	7,113.13	7,111.94	-157.78	7,113.69	358.73	380,267.93	827,149.27	
20,397.00	88.90	354.49	13,034.51	7,185.87	7,184.62	-164.48	7,186.50	358.69	380,340.61	827,142.57	
Last Survey: 20397' MD											
20,450.00	88.90	354.49	13,035.53	7,238.66	7,237.36	-169.56	7,239.35	358.66	380,393.35	827,137.49	
PTB: 20450' MD											

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
178.00	178.00	-0.76	0.05	Pro MWD First Survey: 178' MD	
20,397.00	13,034.51	7,184.62	-164.48	Last Survey: 20397' MD	
20,450.00	13,035.53	7,237.36	-169.56	PTB: 20450' MD	