

PRO DIRECTIONAL

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Marathon Oil Corporation

Dogie Draw Fed Com 25-34-14 WA #2H
Lea County, NM

April 24, 2019

Job No. LNM1428519
API No. 30-025-44093

Survey Completion Report



PRODIRECTIONAL

Survey Certification Letter

April 24, 2019



Marathon Oil[®]
Corporation

Operator Name: Marathon Oil
Well Name: Dogie Draw Fed Com 25-34-14 WA No. 2H
County/Parish: Lea County,
State: NM
Rig Name: H&P 498
Job Number: LNM1428519

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	176' MD – 13,016' MD	13,070' MD	01/24/19 – 04/02/19	MWD

Sincerely,

Mike Coats

Mike Coats
Regulatory Specialist
Professional Directional

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

prodirectional.com

The Standard of Excellence in Directional Supervision



Marathon Oil

Marathon Oil

Lea County, NM

Dogie Draw Fed Com 25-34-14 WA

No. 2H

OH

Survey: ProDirectional

Survey Report

24 April, 2019





ProDirectional
Survey Report



Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Dogie Draw Fed Com 25-34-14 WA
Well: No. 2H
Wellbore: OH
Design: MWD-176'-13016', PTB: 13070'

Local Co-ordinate Reference: Well No. 2H
TVD Reference: Well @ 3357.50usft
MD Reference: Well @ 3357.50usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	Dogie Draw Fed Com 25-34-14 WA		
Site Position:		Northing:	412,301.07 usft
From:	Map	Easting:	815,592.32 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.130394
		Longitude:	-103.447366
		Grid Convergence:	0.47 °

Well	No. 2H					
Well Position	+N/-S	0.00 usft	Northing:	412,301.07 usft	Latitude:	32.130394
	+E/-W	0.00 usft	Easting:	815,592.31 usft	Longitude:	-103.447366
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,331.00 usft

Wellbore	OH					
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength	
	HDGM	1/31/2019	(°)	(°)	(nT)	
			6.63	59.77	47,833.20	

Design	MWD-176'-13016', PTB: 13070'				
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	179.52

Survey Program	Date 4/24/2019				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
176.00	13,070.00	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HRGM	



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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	412,301.07	815,592.31
176.00	0.80	117.20	175.99	0.57	-0.56	1.09	1.23	117.20	412,300.51	815,593.40
Pro MWD First Survey: 176' MD										
240.00	1.10	119.90	239.99	1.09	-1.07	2.02	2.29	117.92	412,300.00	815,594.33
330.00	1.00	106.90	329.97	1.76	-1.73	3.52	3.93	116.17	412,299.34	815,595.83
420.00	0.90	94.30	419.96	2.05	-2.01	4.98	5.37	112.01	412,299.06	815,597.29
511.00	0.80	99.80	510.95	2.23	-2.17	6.32	6.68	108.99	412,298.90	815,598.63
603.00	0.40	81.90	602.94	2.30	-2.24	7.27	7.61	107.11	412,298.83	815,599.58
694.00	0.40	276.80	693.94	2.22	-2.16	7.27	7.58	106.52	412,298.91	815,599.58
785.00	0.30	279.00	784.94	2.14	-2.08	6.72	7.03	107.21	412,298.99	815,599.03
876.00	0.50	268.90	875.94	2.10	-2.05	6.08	6.42	108.63	412,299.02	815,598.39
968.00	0.50	268.70	967.93	2.11	-2.07	5.28	5.67	111.38	412,299.00	815,597.59
1,063.00	0.20	266.80	1,062.93	2.13	-2.09	4.70	5.14	113.93	412,298.98	815,597.01
1,158.00	0.10	85.20	1,157.93	2.13	-2.09	4.62	5.07	114.33	412,298.98	815,596.93
1,252.00	0.10	341.70	1,251.93	2.04	-2.00	4.68	5.09	113.20	412,299.07	815,596.99
1,347.00	0.10	305.90	1,346.93	1.92	-1.88	4.58	4.95	112.27	412,299.19	815,596.89
1,441.00	0.20	179.90	1,440.93	2.03	-1.99	4.52	4.94	113.81	412,299.08	815,596.83
1,535.00	0.00	268.30	1,534.93	2.19	-2.16	4.52	5.00	115.53	412,298.91	815,596.83
1,630.00	0.30	326.20	1,629.93	1.99	-1.95	4.38	4.79	114.01	412,299.12	815,596.69
1,725.00	0.30	327.30	1,724.93	1.57	-1.53	4.11	4.38	110.49	412,299.54	815,596.42
1,819.00	0.10	333.20	1,818.93	1.29	-1.25	3.94	4.13	107.68	412,299.82	815,596.25
1,914.00	0.10	21.60	1,913.93	1.14	-1.10	3.93	4.08	105.68	412,299.97	815,596.24
2,008.00	0.00	63.90	2,007.93	1.06	-1.03	3.96	4.09	104.54	412,300.04	815,596.27
2,103.00	0.50	231.90	2,102.93	1.31	-1.28	3.63	3.85	109.45	412,299.79	815,595.94
2,197.00	1.90	242.60	2,196.91	2.27	-2.25	1.93	2.96	139.47	412,298.82	815,594.24
2,292.00	3.10	245.20	2,291.81	4.04	-4.05	-1.80	4.44	203.98	412,297.02	815,590.51
2,386.00	2.70	246.00	2,385.69	5.97	-6.02	-6.13	8.60	225.53	412,295.05	815,586.18

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Survey

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2,481.00	1.80	243.80	2,480.62	7.51	-7.59	-9.52	12.17	231.42	412,293.48	815,582.79
2,575.00	1.50	257.40	2,574.58	8.41	-8.51	-12.04	14.75	234.75	412,292.56	815,580.27
2,669.00	1.80	283.30	2,668.54	8.32	-8.44	-14.68	16.93	240.11	412,292.63	815,577.63
2,764.00	1.50	293.60	2,763.50	7.45	-7.60	-17.27	18.87	246.25	412,293.47	815,575.04
2,858.00	1.30	301.70	2,857.47	6.38	-6.55	-19.31	20.39	251.27	412,294.52	815,573.00
2,952.00	1.10	293.30	2,951.45	5.45	-5.63	-21.04	21.78	255.02	412,295.44	815,571.27
3,046.00	1.40	265.20	3,045.43	5.17	-5.37	-23.01	23.63	256.87	412,295.70	815,569.30
3,141.00	1.70	253.60	3,140.40	5.65	-5.86	-25.52	26.19	257.06	412,295.21	815,566.79
3,236.00	1.10	259.00	3,235.37	6.20	-6.43	-27.77	28.51	256.95	412,294.64	815,564.54
3,330.00	1.30	257.70	3,329.35	6.58	-6.83	-29.70	30.47	257.04	412,294.24	815,562.61
3,424.00	2.90	258.00	3,423.28	7.28	-7.56	-33.07	33.92	257.13	412,293.51	815,559.24
3,519.00	4.00	262.50	3,518.11	8.16	-8.49	-38.70	39.62	257.63	412,292.58	815,553.61
3,614.00	3.40	269.70	3,612.91	8.56	-8.93	-44.80	45.69	258.72	412,292.14	815,547.51
3,708.00	3.30	273.30	3,706.75	8.37	-8.79	-50.29	51.05	260.08	412,292.28	815,542.02
3,802.00	2.80	273.80	3,800.62	8.02	-8.49	-55.28	55.93	261.27	412,292.58	815,537.03
3,896.00	2.20	280.50	3,894.53	7.51	-8.00	-59.35	59.89	262.32	412,293.07	815,532.96
3,991.00	2.20	264.70	3,989.46	7.31	-7.84	-62.96	63.44	262.90	412,293.23	815,529.35
4,086.00	2.50	252.00	4,084.38	8.09	-8.65	-66.74	67.30	262.62	412,292.42	815,525.57
4,180.00	2.40	252.90	4,178.29	9.27	-9.86	-70.57	71.26	262.05	412,291.21	815,521.74
4,275.00	2.10	250.20	4,273.22	10.41	-11.04	-74.11	74.93	261.53	412,290.03	815,518.20
4,369.00	2.20	249.40	4,367.15	11.61	-12.25	-77.42	78.39	261.01	412,288.82	815,514.89
4,464.00	2.50	245.30	4,462.07	13.08	-13.76	-81.01	82.17	260.36	412,287.31	815,511.30
4,558.00	2.20	244.80	4,555.99	14.68	-15.39	-84.51	85.90	259.68	412,285.68	815,507.80
4,652.00	2.10	268.10	4,649.93	15.48	-16.21	-87.86	89.34	259.55	412,284.86	815,504.45
4,746.00	2.00	280.30	4,743.87	15.21	-15.98	-91.20	92.58	260.06	412,285.09	815,501.11
4,841.00	1.50	277.00	4,838.83	14.74	-15.53	-94.06	95.33	260.63	412,285.54	815,498.25
4,935.00	0.50	260.70	4,932.81	14.64	-15.44	-95.69	96.93	260.83	412,285.63	815,496.62



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Survey Report



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5,029.00	0.60	139.90	5,026.81	15.08	-15.89	-95.77	97.08	260.58	412,285.18	815,496.54
5,124.00	1.10	122.40	5,121.80	15.96	-16.76	-94.68	96.16	259.96	412,284.31	815,497.63
5,218.00	0.80	122.20	5,215.78	16.81	-17.59	-93.37	95.01	259.33	412,283.48	815,498.94
5,273.00	0.40	138.20	5,270.78	17.16	-17.94	-92.91	94.63	259.07	412,283.13	815,499.40
5,372.00	0.10	158.60	5,369.78	17.50	-18.27	-92.65	94.44	258.84	412,282.80	815,499.66
5,399.00	0.00	154.30	5,396.78	17.52	-18.30	-92.64	94.43	258.83	412,282.77	815,499.67
5,494.00	0.30	271.30	5,491.78	17.51	-18.29	-92.89	94.68	258.86	412,282.78	815,499.42
5,588.00	1.90	278.30	5,585.76	17.27	-18.06	-94.68	96.39	259.20	412,283.01	815,497.63
5,683.00	3.90	264.60	5,680.83	17.30	-18.14	-99.46	101.10	259.66	412,282.93	815,492.85
5,777.00	4.80	259.30	5,774.36	18.28	-19.17	-106.50	108.21	259.80	412,281.90	815,485.81
5,871.00	5.50	265.30	5,867.98	19.30	-20.27	-114.86	116.63	259.99	412,280.80	815,477.45
5,965.00	5.80	266.90	5,961.53	19.85	-20.89	-124.09	125.84	260.44	412,280.18	815,468.22
6,060.00	5.90	266.00	6,056.03	20.37	-21.49	-133.75	135.47	260.87	412,279.58	815,458.56
6,154.00	5.80	265.40	6,149.54	21.01	-22.21	-143.31	145.02	261.19	412,278.88	815,449.00
6,249.00	5.00	262.70	6,244.12	21.85	-23.12	-152.20	153.95	261.36	412,277.95	815,440.11
6,343.00	4.90	260.20	6,337.77	22.98	-24.33	-160.22	162.05	261.37	412,276.74	815,432.09
6,438.00	4.80	261.50	6,432.43	24.20	-25.60	-168.15	170.09	261.34	412,275.47	815,424.16
6,532.00	4.70	260.10	6,526.11	25.37	-26.85	-175.83	177.87	261.32	412,274.22	815,416.48
6,626.00	4.50	260.10	6,619.80	26.61	-28.14	-183.26	185.41	261.27	412,272.93	815,409.05
6,721.00	4.80	257.40	6,714.49	28.05	-29.65	-190.81	193.10	261.17	412,271.42	815,401.50
6,815.00	5.60	256.60	6,808.10	29.90	-31.57	-199.11	201.59	260.99	412,269.50	815,393.20
6,909.00	5.60	255.60	6,901.65	32.03	-33.78	-208.01	210.74	260.78	412,267.29	815,384.30
7,004.00	5.70	255.50	6,996.19	34.29	-36.11	-217.07	220.05	260.56	412,264.96	815,375.24
7,098.00	5.40	254.70	7,089.75	36.55	-38.45	-225.85	229.10	260.34	412,262.62	815,366.46
7,192.00	5.70	260.50	7,183.31	38.42	-40.38	-234.72	238.17	260.24	412,260.69	815,357.59
7,287.00	5.60	261.90	7,277.85	39.77	-41.82	-243.97	247.52	260.27	412,259.25	815,348.34
7,381.00	5.40	267.80	7,371.42	40.51	-42.63	-252.93	256.49	260.43	412,258.44	815,339.38

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7,476.00	4.70	271.10	7,466.05	40.54	-42.73	-261.28	264.76	260.71	412,258.34	815,331.03
7,570.00	2.60	281.10	7,559.85	40.00	-42.24	-267.23	270.55	261.02	412,258.83	815,325.08
7,665.00	0.80	331.20	7,654.81	38.99	-41.25	-269.66	272.80	261.30	412,259.82	815,322.65
7,759.00	0.80	18.10	7,748.80	37.79	-40.05	-269.77	272.73	261.56	412,261.02	815,322.54
7,854.00	0.60	4.40	7,843.80	36.66	-38.92	-269.53	272.33	261.78	412,262.15	815,322.78
7,948.00	0.30	357.10	7,937.79	35.93	-38.19	-269.51	272.20	261.94	412,262.88	815,322.80
8,043.00	0.30	16.50	8,032.79	35.44	-37.70	-269.45	272.07	262.04	412,263.37	815,322.86
8,137.00	0.30	68.30	8,128.79	35.12	-37.37	-269.15	271.73	262.09	412,263.70	815,323.16
8,231.00	0.20	99.60	8,220.79	35.06	-37.31	-268.76	271.34	262.10	412,263.76	815,323.55
8,328.00	0.40	129.80	8,315.79	35.30	-37.55	-268.34	270.95	262.03	412,263.52	815,323.97
8,421.00	0.60	133.20	8,410.79	35.86	-38.10	-267.72	270.42	261.90	412,262.97	815,324.59
8,515.00	0.70	139.60	8,504.78	36.64	-38.88	-266.99	269.81	261.72	412,262.19	815,325.32
8,610.00	0.50	163.30	8,599.78	37.48	-39.71	-266.50	269.44	261.52	412,261.36	815,325.81
8,704.00	0.50	181.40	8,693.77	38.28	-40.52	-266.39	269.45	261.35	412,260.55	815,325.92
8,799.00	0.40	271.30	8,788.77	38.69	-40.92	-266.73	269.85	261.28	412,260.15	815,325.58
8,893.00	0.80	298.60	8,882.76	38.36	-40.60	-267.63	270.70	261.37	412,260.47	815,324.68
8,988.00	1.00	283.20	8,977.75	37.84	-40.10	-269.02	272.00	261.52	412,260.97	815,323.29
9,082.00	1.30	326.70	9,071.74	36.75	-39.02	-270.41	273.21	261.79	412,262.05	815,321.90
9,176.00	1.80	329.30	9,165.70	34.58	-36.86	-271.75	274.23	262.28	412,264.21	815,320.56
9,271.00	1.70	329.60	9,260.66	32.07	-34.36	-273.22	275.37	262.83	412,266.71	815,319.09
9,365.00	1.50	326.20	9,354.62	29.83	-32.13	-274.61	276.49	263.33	412,268.94	815,317.70
9,460.00	1.50	319.20	9,449.59	27.84	-30.16	-276.12	277.76	263.77	412,270.91	815,316.19
9,554.00	1.80	318.20	9,543.55	25.80	-28.13	-277.90	279.32	264.22	412,272.94	815,314.41
9,648.00	0.30	1.50	9,637.53	24.44	-26.78	-278.88	280.16	264.51	412,274.29	815,313.43
9,743.00	0.30	63.20	9,732.53	24.08	-26.42	-278.65	279.90	264.58	412,274.65	815,313.66
9,837.00	0.30	276.70	9,826.53	23.94	-26.28	-278.68	279.91	264.61	412,274.79	815,313.63
9,932.00	0.90	282.80	9,921.52	23.74	-26.09	-279.65	280.87	264.67	412,274.98	815,312.66



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 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)
10,026.00	1.20	284.50	10,015.51	23.32	-25.68	-281.32	282.49	264.79	412,275.39	815,310.99
10,120.00	1.40	278.10	10,109.48	22.89	-25.27	-283.41	284.54	264.91	412,275.80	815,308.90
10,215.00	0.80	215.00	10,204.47	23.26	-25.65	-284.94	286.10	264.86	412,275.42	815,307.37
10,309.00	0.70	154.20	10,298.46	24.31	-26.70	-285.07	286.32	264.65	412,274.37	815,307.24
10,404.00	0.30	77.90	10,393.46	24.79	-27.17	-284.57	285.87	264.55	412,273.90	815,307.74
10,498.00	0.60	95.30	10,487.46	24.79	-27.17	-283.84	285.14	264.53	412,273.90	815,308.47
10,592.00	1.10	165.40	10,581.45	25.71	-28.08	-283.13	284.52	264.34	412,272.99	815,309.18
10,687.00	0.90	176.70	10,676.43	27.34	-29.71	-282.85	284.41	264.00	412,271.36	815,309.46
10,781.00	1.10	196.20	10,770.42	28.94	-31.32	-283.06	284.79	263.69	412,269.75	815,309.25
10,875.00	1.10	185.80	10,864.40	30.70	-33.08	-283.41	285.33	263.34	412,267.99	815,308.90
10,969.00	1.60	197.60	10,958.37	32.85	-35.23	-283.89	286.07	262.93	412,265.84	815,308.42
11,064.00	1.20	185.70	11,053.35	35.10	-37.48	-284.39	286.85	262.49	412,263.59	815,307.92
11,158.00	1.50	185.90	11,147.32	37.30	-39.69	-284.62	287.37	262.06	412,261.38	815,307.69
11,252.00	2.50	187.40	11,241.26	40.55	-42.94	-285.01	288.23	261.43	412,258.13	815,307.30
11,347.00	2.00	182.50	11,336.19	44.26	-46.65	-285.35	289.14	260.71	412,254.42	815,306.96
11,441.00	0.70	195.60	11,430.16	46.45	-48.85	-285.57	289.72	260.29	412,252.22	815,306.74
11,535.00	1.30	190.40	11,524.15	48.05	-50.45	-285.92	290.34	259.99	412,250.62	815,306.39
11,584.00	1.40	201.20	11,573.13	49.15	-51.55	-286.24	290.84	259.79	412,249.52	815,306.07
11,648.00	1.90	206.30	11,637.11	50.83	-53.23	-286.99	291.89	259.49	412,247.84	815,305.32
11,698.00	1.40	210.90	11,687.08	52.09	-54.50	-287.67	292.79	259.27	412,246.57	815,304.64
11,792.00	2.90	128.10	11,781.03	54.55	-56.95	-286.39	292.00	258.75	412,244.12	815,305.92
11,886.00	0.50	135.50	11,874.98	56.33	-58.71	-284.23	290.23	258.33	412,242.36	815,308.08
11,981.00	0.30	162.10	11,969.98	56.86	-59.24	-283.86	289.98	258.21	412,241.83	815,308.45
12,075.00	0.80	163.30	12,063.98	57.73	-60.11	-283.60	289.90	258.03	412,240.96	815,308.71
12,169.00	1.80	150.60	12,157.95	59.65	-62.02	-282.69	289.41	257.63	412,239.05	815,309.62
12,263.00	12.20	183.40	12,251.14	70.89	-73.26	-282.55	291.89	255.47	412,227.81	815,309.76
12,357.00	19.00	175.50	12,341.63	96.09	-98.46	-281.94	298.63	250.75	412,202.61	815,310.37

Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Dogle Draw Fed Com 25-34-14 WA
 Well: No. 2H
 Wellbore: OH
 Design: MWD-176'-13016', PTB: 13070'

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3357.50usft
 MD Reference: Well @ 3357.50usft
 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)
12,451.00	33.50	182.60	12,425.74	137.49	-139.86	-281.91	314.70	243.61	412,161.21	815,310.40
12,546.00	38.30	182.10	12,502.67	193.11	-195.50	-284.18	344.93	235.47	412,105.57	815,308.13
12,640.00	51.90	177.80	12,568.88	259.51	-261.90	-283.83	386.20	227.30	412,039.17	815,308.48
12,734.00	67.80	177.40	12,615.94	340.48	-342.85	-280.41	442.92	219.28	411,958.22	815,311.90
12,829.00	76.40	177.50	12,645.11	430.74	-433.07	-276.40	513.76	212.55	411,868.00	815,315.91
12,923.00	79.00	174.90	12,665.14	522.41	-524.70	-270.30	590.23	207.26	411,776.37	815,322.01
13,016.00	86.90	175.60	12,676.54	614.38	-616.60	-262.67	670.22	203.07	411,684.47	815,329.64
Last Survey: 13016' MD										
13,070.00	89.30	177.00	12,678.33	688.26	-670.46	-259.19	718.81	201.14	411,630.61	815,333.12
PTB: 13070' MD										

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
176.00	175.99	-0.56	1.09	Pro MWD First Survey: 176' MD
13,016.00	12,676.54	-616.60	-262.67	Last Survey: 13016' MD
13,070.00	12,678.33	-670.46	-259.19	PTB: 13070' MD



Marathon Oil Corporation

**Madera 19 WA Fed Com No. 2H(OH)
Lea County, NM**

March 11, 2019

**Job No. LNM1412918
API No. 30-025-44900**

Survey Completion Report



PRODIRECTIONAL

Survey Certification Letter

March 11, 2019



Marathon Oil[®]
Corporation

Operator Name: Marathon Oil
Well Name: Madera 19 WA Fed Com No. 2H(OH)
County/Parish: Lea County,
State: NM
Rig Name: H&P 480
Job Number: LNM1412918

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 – 12,770' MD	12,825' MD	10/28/18 – 02/06/19	MWD

Sincerely,

Mike Coats

Mike Coats
Regulatory Specialist
Professional Directional

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

prodirectional.com

The Standard of Excellence in Directional Supervision



Marathon Oil

Marathon Oil

Lea County, NM

Madera 19 WA Fed Com

No. 2H

OH

Survey: ProDirectional

Survey Report

11 March, 2019





ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 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 WA Fed Com		
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. 2H					
Well Position	+N/-S	0.00 usft	Northing:	373,155.99 usft	Latitude:	32.022530
	+E/-W	0.00 usft	Easting:	827,247.05 usft	Longitude:	-103.410801
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,185.00 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	OH				
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	359.50	

Survey Program	Date	3/11/2019		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
178.00	12,825.00	Survey #1 (OH)	MWD+IFR1	OWSG MWD + IFR1



ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	373,155.99	827,247.05
178.00	0.40	313.50	178.00	0.43	0.43	-0.45	0.62	313.50	373,156.42	827,246.60
Pro MWD First Survey: 178' MD										
239.00	0.50	321.60	239.00	0.79	0.78	-0.77	1.10	315.46	373,156.77	827,246.28
331.00	0.60	329.40	330.99	1.52	1.51	-1.27	1.97	320.08	373,157.50	827,245.78
422.00	0.50	340.90	421.99	2.31	2.30	-1.64	2.82	324.52	373,158.29	827,245.41
513.00	0.40	345.40	512.99	3.00	2.98	-1.85	3.51	328.20	373,158.97	827,245.20
605.00	0.40	345.40	604.98	3.62	3.60	-2.01	4.12	330.84	373,159.59	827,245.04
696.00	0.40	352.50	695.98	4.24	4.22	-2.13	4.73	333.23	373,160.21	827,244.92
788.00	0.40	350.70	787.98	4.88	4.86	-2.22	5.34	335.40	373,160.85	827,244.83
879.00	0.40	349.70	878.98	5.51	5.49	-2.33	5.96	336.96	373,161.48	827,244.72
970.00	0.40	345.10	969.97	6.13	6.10	-2.47	6.59	337.96	373,162.09	827,244.58
1,061.00	0.40	333.00	1,060.97	6.72	6.69	-2.70	7.22	338.06	373,162.68	827,244.35
1,121.00	0.50	337.80	1,120.97	7.15	7.12	-2.89	7.69	337.91	373,163.11	827,244.16
1,244.00	0.40	337.50	1,243.97	8.05	8.02	-3.26	8.65	337.88	373,164.01	827,243.79
1,336.00	0.40	304.90	1,335.96	8.53	8.50	-3.64	9.25	336.79	373,164.49	827,243.41
1,430.00	1.50	245.90	1,429.95	8.23	8.18	-5.04	9.61	328.39	373,164.17	827,242.01
1,525.00	3.90	242.60	1,524.84	6.27	6.19	-9.04	10.96	304.39	373,162.18	827,238.01
1,619.00	5.90	245.10	1,618.49	2.82	2.68	-16.26	16.48	279.37	373,158.67	827,230.79
1,714.00	6.90	248.40	1,712.90	-1.25	-1.47	-26.00	26.04	266.75	373,154.52	827,221.05
1,808.00	6.80	247.90	1,806.23	-5.33	-5.65	-36.40	36.84	261.18	373,150.34	827,210.65
1,903.00	6.80	245.70	1,900.56	-9.67	-10.08	-46.74	47.81	257.83	373,145.91	827,200.31
1,997.00	7.80	247.10	1,993.80	-14.35	-14.85	-57.69	59.57	255.57	373,141.14	827,189.36
2,092.00	9.80	250.90	2,087.67	-19.38	-20.00	-71.27	74.02	254.32	373,135.99	827,175.78
2,186.00	10.70	252.90	2,180.17	-24.43	-25.19	-87.17	90.73	253.88	373,130.80	827,159.88
2,281.00	11.20	254.60	2,273.44	-29.32	-30.23	-104.49	108.78	253.86	373,125.76	827,142.56
2,375.00	11.50	255.80	2,365.60	-33.88	-34.95	-122.38	127.27	254.06	373,121.04	827,124.67



ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
2,470.00	10.60	256.80	2,458.84	-38.05	-39.27	-140.07	145.47	254.34	373,116.72	827,106.98
2,564.00	10.10	257.30	2,551.31	-41.69	-43.06	-156.52	162.34	254.62	373,112.93	827,090.53
2,658.00	10.20	258.00	2,643.84	-45.09	-46.60	-172.70	178.88	254.90	373,109.39	827,074.35
2,753.00	10.10	258.60	2,737.35	-48.34	-50.00	-189.10	195.60	255.19	373,105.99	827,057.95
2,847.00	10.10	259.50	2,829.90	-51.33	-53.13	-205.28	212.05	255.49	373,102.86	827,041.77
2,942.00	9.90	259.90	2,923.45	-54.14	-56.08	-221.51	228.50	255.79	373,099.91	827,025.54
3,036.00	9.60	261.50	3,016.10	-56.58	-58.65	-237.22	244.36	256.11	373,097.34	827,009.83
3,130.00	9.30	263.00	3,108.82	-58.53	-60.74	-252.51	259.71	256.48	373,095.25	826,994.54
3,225.00	8.90	263.90	3,202.63	-60.12	-62.45	-267.44	274.63	256.86	373,093.54	826,979.61
3,319.00	9.30	263.90	3,295.44	-61.57	-64.03	-282.22	289.39	257.22	373,091.96	826,964.83
3,414.00	9.70	262.40	3,389.14	-63.31	-65.91	-297.79	304.99	257.52	373,090.08	826,949.26
3,508.00	8.70	263.80	3,481.93	-64.99	-67.72	-312.70	319.95	257.78	373,088.27	826,934.35
3,603.00	8.80	263.30	3,575.82	-66.49	-69.35	-327.06	334.33	258.03	373,086.64	826,919.99
3,697.00	9.70	256.30	3,668.60	-69.07	-72.06	-341.90	349.41	258.10	373,083.93	826,905.15
3,791.00	10.60	251.80	3,761.13	-73.51	-76.64	-357.81	365.92	257.91	373,079.35	826,889.24
3,886.00	10.90	253.50	3,854.47	-78.64	-81.92	-374.72	383.57	257.67	373,074.07	826,872.33
3,980.00	10.90	254.80	3,946.77	-83.35	-86.77	-391.82	401.31	257.51	373,069.22	826,855.23
4,075.00	10.30	256.50	4,040.15	-87.54	-91.11	-408.74	418.77	257.43	373,064.88	826,838.31
4,169.00	8.80	261.90	4,132.85	-90.38	-94.08	-424.03	434.35	257.49	373,061.91	826,823.02
4,264.00	8.80	259.70	4,226.73	-92.58	-96.41	-438.38	448.85	257.60	373,059.58	826,808.67
4,358.00	9.40	255.80	4,319.54	-95.62	-99.58	-452.90	463.71	257.60	373,056.41	826,794.15
4,452.00	9.10	255.90	4,412.32	-99.19	-103.27	-467.55	478.82	257.54	373,052.72	826,779.50
4,547.00	8.60	255.80	4,506.19	-102.64	-106.84	-481.72	493.43	257.49	373,049.15	826,765.33
4,641.00	8.10	255.50	4,599.19	-105.90	-110.23	-494.94	507.07	257.44	373,045.76	826,752.11
4,736.00	8.20	251.90	4,693.24	-109.57	-114.01	-507.86	520.50	257.35	373,041.98	826,739.19
4,830.00	8.70	248.90	4,786.21	-114.10	-118.65	-520.87	534.21	257.17	373,037.34	826,726.18
4,925.00	8.70	247.20	4,880.12	-119.35	-124.02	-534.19	548.40	256.93	373,031.97	826,712.86



ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
5,019.00	9.50	244.50	4,972.94	-125.33	-130.11	-547.75	562.99	256.64	373,025.88	826,699.30
5,114.00	9.00	242.80	5,066.70	-131.98	-136.89	-561.44	577.88	256.30	373,019.10	826,685.61
5,208.00	9.10	246.80	5,159.53	-138.15	-143.17	-574.81	592.37	256.01	373,012.82	826,672.24
5,302.00	9.80	250.40	5,252.26	-143.64	-148.79	-589.18	607.67	255.83	373,007.20	826,657.87
5,348.00	9.60	252.00	5,297.60	-146.07	-151.28	-596.51	615.40	255.77	373,004.71	826,650.54
5,421.00	8.80	253.80	5,369.66	-149.42	-154.72	-607.66	627.05	255.71	373,001.27	826,639.39
5,484.00	8.70	252.50	5,431.93	-152.11	-157.50	-616.84	636.63	255.68	372,998.49	826,630.21
5,579.00	9.30	255.00	5,525.76	-156.13	-161.65	-631.10	651.48	255.63	372,994.34	826,615.95
5,673.00	10.30	255.20	5,618.39	-160.11	-165.76	-646.56	667.47	255.62	372,990.23	826,600.49
5,768.00	10.20	254.80	5,711.87	-164.34	-170.14	-662.89	684.38	255.61	372,985.85	826,584.16
5,862.00	9.90	254.60	5,804.43	-168.53	-174.46	-678.72	700.78	255.58	372,981.53	826,568.33
5,957.00	9.60	253.20	5,898.05	-172.86	-178.92	-694.17	716.86	255.55	372,977.07	826,552.88
6,051.00	10.40	258.30	5,990.63	-176.71	-182.91	-709.98	733.17	255.55	372,973.08	826,537.07
6,145.00	11.20	259.10	6,082.96	-180.00	-186.36	-727.26	750.75	255.63	372,969.63	826,519.79
6,240.00	10.60	258.00	6,176.25	-183.41	-189.92	-744.86	768.69	255.70	372,966.07	826,502.19
6,334.00	10.20	258.10	6,268.70	-186.78	-193.43	-761.46	785.65	255.75	372,962.56	826,485.59
6,429.00	10.00	257.90	6,362.23	-190.10	-196.89	-777.76	802.30	255.79	372,959.10	826,469.29
6,523.00	9.90	257.60	6,454.82	-193.41	-200.34	-793.63	818.53	255.83	372,955.65	826,453.42
6,617.00	10.10	257.60	6,547.39	-196.77	-203.84	-809.58	834.84	255.87	372,952.15	826,437.47
6,712.00	10.00	257.80	6,640.93	-200.16	-207.38	-825.77	851.41	255.90	372,948.61	826,421.28
6,806.00	9.90	257.80	6,733.52	-203.46	-210.81	-841.65	867.65	255.94	372,945.18	826,405.40
6,901.00	9.90	256.60	6,827.10	-206.94	-214.43	-857.57	883.98	255.96	372,941.56	826,389.48
6,995.00	9.80	256.00	6,919.72	-210.61	-218.24	-873.20	900.06	255.97	372,937.75	826,373.85
7,089.00	9.40	256.20	7,012.40	-214.24	-222.00	-888.41	915.73	255.97	372,933.99	826,358.64
7,184.00	9.10	256.70	7,106.17	-217.69	-225.58	-903.26	931.00	255.98	372,930.41	826,343.79
7,278.00	8.90	256.60	7,199.01	-220.96	-228.98	-917.57	945.71	255.99	372,927.01	826,329.48
7,373.00	8.40	256.40	7,292.93	-224.17	-232.31	-931.46	959.99	256.00	372,923.68	826,315.59



ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
7,467.00	8.20	255.10	7,385.94	-227.40	-235.65	-944.61	973.56	255.99	372,920.34	826,302.44
7,562.00	7.90	254.10	7,480.01	-230.82	-239.18	-957.44	986.86	255.97	372,916.81	826,289.61
7,656.00	6.00	250.50	7,573.31	-234.13	-242.59	-968.28	998.21	255.93	372,913.40	826,278.77
7,750.00	5.70	251.00	7,666.82	-237.21	-245.75	-977.33	1,007.75	255.89	372,910.24	826,269.72
7,845.00	5.70	250.60	7,761.35	-240.24	-248.85	-986.24	1,017.15	255.84	372,907.14	826,260.81
7,939.00	5.40	252.40	7,854.91	-243.05	-251.74	-994.86	1,026.21	255.80	372,904.25	826,252.19
8,033.00	2.50	241.80	7,948.68	-245.30	-254.05	-1,000.88	1,032.62	255.76	372,901.94	826,246.17
8,128.00	0.90	196.20	8,043.64	-246.98	-255.74	-1,002.92	1,035.01	255.69	372,900.25	826,244.13
8,222.00	0.80	182.40	8,137.63	-248.34	-257.11	-1,003.15	1,035.57	255.62	372,898.88	826,243.90
8,316.00	0.80	197.90	8,231.62	-249.62	-258.39	-1,003.38	1,036.11	255.56	372,897.60	826,243.67
8,411.00	0.60	176.40	8,326.61	-250.75	-259.51	-1,003.55	1,036.56	255.50	372,896.48	826,243.50
8,505.00	0.40	167.80	8,420.61	-251.56	-260.33	-1,003.45	1,036.67	255.46	372,895.66	826,243.60
8,600.00	0.60	173.20	8,515.60	-252.38	-261.14	-1,003.32	1,036.75	255.41	372,894.85	826,243.73
8,694.00	0.50	164.60	8,609.60	-253.26	-262.03	-1,003.15	1,036.81	255.36	372,893.96	826,243.90
8,789.00	0.30	126.70	8,704.60	-253.82	-262.58	-1,002.84	1,036.65	255.33	372,893.41	826,244.21
8,883.00	0.30	131.10	8,798.60	-254.13	-262.89	-1,002.46	1,036.36	255.31	372,893.10	826,244.59
8,978.00	0.50	154.90	8,893.59	-254.67	-263.42	-1,002.10	1,036.14	255.27	372,892.57	826,244.95
9,072.00	0.30	180.40	8,987.59	-255.29	-264.04	-1,001.93	1,036.13	255.24	372,891.95	826,245.12
9,166.00	0.10	138.90	9,081.59	-255.60	-264.35	-1,001.87	1,036.16	255.22	372,891.64	826,245.18
9,261.00	0.30	133.60	9,176.59	-255.83	-264.58	-1,001.64	1,036.00	255.20	372,891.41	826,245.41
9,355.00	0.20	102.10	9,270.59	-256.04	-264.79	-1,001.30	1,035.72	255.19	372,891.20	826,245.75
9,449.00	0.30	3.30	9,364.59	-255.83	-264.58	-1,001.13	1,035.50	255.20	372,891.41	826,245.92
9,544.00	0.30	334.60	9,459.59	-255.36	-264.10	-1,001.22	1,035.47	255.22	372,891.89	826,245.83
9,638.00	0.40	109.60	9,553.59	-255.25	-263.99	-1,001.02	1,035.24	255.23	372,892.00	826,246.03
9,732.00	1.20	126.70	9,647.58	-255.95	-264.69	-999.92	1,034.36	255.17	372,891.30	826,247.13
9,826.00	1.50	126.00	9,741.55	-257.28	-266.00	-998.13	1,032.97	255.08	372,889.99	826,248.92
9,920.00	0.50	201.40	9,835.54	-258.39	-267.11	-997.29	1,032.44	255.01	372,888.88	826,249.76



ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
10,015.00	0.90	258.70	9,930.53	-258.92	-267.64	-998.17	1,033.43	254.99	372,888.35	826,248.88
10,109.00	0.90	276.80	10,024.52	-258.96	-267.70	-999.63	1,034.85	255.01	372,888.29	826,247.42
10,204.00	0.90	278.00	10,119.51	-258.76	-267.50	-1,001.11	1,036.23	255.04	372,888.49	826,245.94
10,298.00	1.00	295.60	10,213.50	-258.29	-267.05	-1,002.58	1,037.53	255.08	372,888.94	826,244.47
10,393.00	0.80	270.70	10,308.49	-257.91	-266.68	-1,003.99	1,038.80	255.12	372,889.31	826,243.06
10,487.00	0.70	269.80	10,402.48	-257.89	-266.67	-1,005.22	1,039.99	255.14	372,889.32	826,241.83
10,582.00	1.00	255.30	10,497.47	-258.09	-266.89	-1,006.60	1,041.38	255.15	372,889.10	826,240.45
10,676.00	1.10	270.70	10,591.45	-258.27	-267.08	-1,008.30	1,043.07	255.16	372,888.91	826,238.75
10,771.00	1.70	309.00	10,686.42	-257.36	-266.19	-1,010.30	1,044.78	255.24	372,889.80	826,236.75
10,865.00	1.50	333.70	10,780.39	-255.36	-264.21	-1,011.93	1,045.85	255.37	372,891.78	826,235.12
10,959.00	1.20	328.20	10,874.36	-253.42	-262.27	-1,013.00	1,046.40	255.48	372,893.72	826,234.05
11,054.00	1.00	330.90	10,969.34	-251.84	-260.70	-1,013.92	1,046.90	255.58	372,895.29	826,233.13
11,148.00	1.10	319.00	11,063.33	-250.43	-259.30	-1,014.91	1,047.51	255.67	372,896.69	826,232.14
11,243.00	1.60	299.90	11,158.30	-249.07	-257.95	-1,016.66	1,048.88	255.76	372,898.04	826,230.39
11,337.00	1.00	263.00	11,252.28	-248.50	-257.39	-1,018.61	1,050.63	255.82	372,898.60	826,228.44
11,432.00	0.60	249.50	11,347.27	-248.76	-257.67	-1,019.90	1,051.95	255.82	372,898.32	826,227.15
11,526.00	0.40	331.40	11,441.27	-248.64	-257.55	-1,020.52	1,052.52	255.84	372,898.44	826,226.53
11,620.00	0.70	342.70	11,535.26	-247.80	-256.72	-1,020.85	1,052.63	255.88	372,899.27	826,226.20
11,715.00	0.80	357.30	11,630.26	-246.58	-255.50	-1,021.05	1,052.53	255.95	372,900.49	826,226.00
11,809.00	0.70	338.40	11,724.25	-245.39	-254.31	-1,021.29	1,052.48	256.02	372,901.68	826,225.76
11,904.00	1.00	297.50	11,819.24	-244.46	-253.39	-1,022.24	1,053.18	256.08	372,902.60	826,224.81
11,949.00	1.10	278.50	11,864.23	-244.21	-253.14	-1,023.02	1,053.87	256.10	372,902.85	826,224.03
12,036.00	1.30	252.50	11,951.21	-244.37	-253.32	-1,024.79	1,055.63	256.12	372,902.67	826,222.26
12,130.00	2.10	169.50	12,045.18	-246.37	-255.33	-1,025.49	1,056.80	256.02	372,900.66	826,221.56
12,224.00	2.40	121.30	12,139.12	-249.11	-258.05	-1,023.49	1,055.52	255.85	372,897.94	826,223.56
12,319.00	3.10	128.40	12,234.01	-251.77	-260.68	-1,019.78	1,052.57	255.66	372,895.31	826,227.27
12,413.00	6.60	149.30	12,327.66	-258.04	-266.90	-1,015.03	1,049.53	255.27	372,889.09	826,232.02



ProDirectional
Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 2H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3211.50usft
Site:	Madera 19 WA Fed Com	MD Reference:	Well @ 3211.50usft
Well:	No. 2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	WellPlanner1

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)
12,486.00	10.10	159.10	12,399.88	-267.66	-276.49	-1,010.60	1,047.74	254.70	372,879.50	826,236.45
12,581.00	2.60	68.60	12,494.36	-274.72	-283.51	-1,005.61	1,044.81	254.26	372,872.48	826,241.44
12,675.00	8.20	330.90	12,588.02	-268.06	-276.86	-1,006.89	1,044.26	254.63	372,879.13	826,240.16
12,770.00	17.10	331.40	12,680.62	-249.76	-258.64	-1,016.89	1,049.27	255.73	372,897.35	826,230.16
Last Survey: 12770' MD										
12,825.00	17.10	331.40	12,733.19	-235.49	-244.44	-1,024.63	1,053.38	256.58	372,911.55	826,222.42
PTB: 12825' MD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
178.00	178.00	0.43	-0.45	Pro MWD First Survey: 178' MD	
12,770.00	12,680.62	-258.64	-1,016.89	Last Survey: 12770' MD	
12,825.00	12,733.19	-244.44	-1,024.63	PTB: 12825' MD	



Marathon Oil Corporation

**Madera 19 WA Fed Com No. 2H(ST01)
Lea County, NM**

March 12, 2019

**Job No. LNM1412918B
API No. 30-025-44900**

Survey Completion Report



Survey Certification Letter

March 12, 2019



Marathon Oil
Corporation

Operator Name: Marathon Oil
Well Name: Madera 19 WA Fed Com No. 2H(ST01)
County/Parish: Lea County,
State: NM
Rig Name: H&P 480
Job Number: LNM1412918B

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	12,287' MD – 13,359' MD	13,415 MD	02/09/19 – 02/12/19	MWD

Sincerely,

Mike Coats
Regulatory Specialist
Professional Directional

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

prodirectional.com

The Standard of Excellence in Directional Supervision



Marathon Oil

Marathon Oil

Lea County, NM
Madera 19 WA Fed Com
No. 2H
ST01

Survey: ProDirectional

Survey Report

12 March, 2019





ProDirectional
Survey Report



Company: Marathon Oil	Local Co-ordinate Reference: Well No. 2H
Project: Lea County, NM(NAD 83)	TVD Reference: Well @ 3211.50usft
Site: Madera 19 WA Fed Com	MD Reference: Well @ 3211.50usft
Well: No. 2H	North Reference: Grid
Wellbore: ST01	Survey Calculation Method: Minimum Curvature
Design: MWD	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 WA Fed Com	
Site Position: Northing: 373,155.99 usft	Latitude: 32.022528
From: Map Easting: 827,337.05 usft	Longitude: -103.410511
Position Uncertainty: 0.00 usft	Slot Radius: 13-3/16 °
	Grid Convergence: 0.49 °

Well No. 2H		
Well Position +N/-S 0.00 usft	Northing: 373,155.99 usft	Latitude: 32.022530
+E/-W 0.00 usft	Easting: 827,247.05 usft	Longitude: -103.410801
Position Uncertainty 0.00 usft	Wellhead Elevation: usft	Ground Level: 3,185.00 usft

Wellbore ST01					
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	HDGM	11/15/2018	6.65	59.68	47,710.20

Design MWD				
Audit Notes:				
Version: 1.0	Phase: ACTUAL	Tie On Depth: 12,130.00		
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	359.50



ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: ST01
 Design: MWD

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: WellPlanner1

Survey Program	Date			
	3/12/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
178.00	12,130.00	Survey #1 (OH)	MWD+IFR1	OWSG MWD + IFR1
12,287.00	13,415.00	Survey #1 (ST01)	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	373,155.99	827,247.05
178.00	0.40	313.50	178.00	0.43	0.43	-0.45	0.62	313.50	373,156.42	827,246.60
239.00	0.50	321.60	239.00	0.79	0.78	-0.77	1.10	315.46	373,156.77	827,246.28
331.00	0.60	329.40	330.99	1.52	1.51	-1.27	1.97	320.08	373,157.50	827,245.78
422.00	0.50	340.90	421.99	2.31	2.30	-1.64	2.82	324.52	373,158.29	827,245.41
513.00	0.40	345.40	512.99	3.00	2.98	-1.85	3.51	328.20	373,158.97	827,245.20
605.00	0.40	345.40	604.98	3.62	3.60	-2.01	4.12	330.84	373,159.59	827,245.04
696.00	0.40	352.50	695.98	4.24	4.22	-2.13	4.73	333.23	373,160.21	827,244.92
788.00	0.40	350.70	787.98	4.88	4.86	-2.22	5.34	335.40	373,160.85	827,244.83
879.00	0.40	349.70	878.98	5.51	5.49	-2.33	5.96	336.96	373,161.48	827,244.72
970.00	0.40	345.10	969.97	6.13	6.10	-2.47	6.59	337.96	373,162.09	827,244.58
1,061.00	0.40	333.00	1,060.97	6.72	6.69	-2.70	7.22	338.06	373,162.68	827,244.35
1,121.00	0.50	337.80	1,120.97	7.15	7.12	-2.89	7.69	337.91	373,163.11	827,244.16
1,244.00	0.40	337.50	1,243.97	8.05	8.02	-3.26	8.65	337.88	373,164.01	827,243.79
1,336.00	0.40	304.90	1,335.96	8.53	8.50	-3.64	9.25	336.79	373,164.49	827,243.41
1,430.00	1.50	245.90	1,429.95	8.23	8.18	-5.04	9.61	328.39	373,164.17	827,242.01
1,525.00	3.90	242.60	1,524.84	6.27	6.19	-9.04	10.96	304.39	373,162.18	827,238.01
1,619.00	5.90	245.10	1,618.49	2.82	2.68	-16.26	16.48	279.37	373,158.67	827,230.79
1,714.00	6.90	248.40	1,712.90	-1.25	-1.47	-26.00	26.04	266.75	373,154.52	827,221.05
1,808.00	6.80	247.90	1,806.23	-5.33	-5.65	-36.40	36.84	261.18	373,150.34	827,210.65
1,903.00	6.80	245.70	1,900.56	-9.67	-10.08	-46.74	47.81	257.83	373,145.91	827,200.31

Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: ST01
 Design: MWD

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
1,997.00	7.80	247.10	1,993.80	-14.35	-14.85	-57.69	59.57	255.57	373,141.14	827,189.36
2,092.00	9.80	250.90	2,087.67	-19.38	-20.00	-71.27	74.02	254.32	373,135.99	827,175.78
2,186.00	10.70	252.90	2,180.17	-24.43	-25.19	-87.17	90.73	253.88	373,130.80	827,159.88
2,281.00	11.20	254.60	2,273.44	-29.32	-30.23	-104.49	108.78	253.86	373,125.76	827,142.56
2,375.00	11.50	255.80	2,365.60	-33.88	-34.95	-122.38	127.27	254.06	373,121.04	827,124.67
2,470.00	10.60	256.80	2,458.84	-38.05	-39.27	-140.07	145.47	254.34	373,116.72	827,106.98
2,564.00	10.10	257.30	2,551.31	-41.69	-43.06	-156.52	162.34	254.62	373,112.93	827,090.53
2,658.00	10.20	258.00	2,643.84	-45.09	-46.60	-172.70	178.88	254.90	373,109.39	827,074.35
2,753.00	10.10	258.60	2,737.35	-48.34	-50.00	-189.10	195.60	255.19	373,105.99	827,057.95
2,847.00	10.10	259.50	2,829.90	-51.33	-53.13	-205.28	212.05	255.49	373,102.86	827,041.77
2,942.00	9.90	259.90	2,923.45	-54.14	-56.08	-221.51	228.50	255.79	373,099.91	827,025.54
3,036.00	9.60	261.50	3,016.10	-56.58	-58.65	-237.22	244.36	256.11	373,097.34	827,009.83
3,130.00	9.30	263.00	3,108.82	-58.53	-60.74	-252.51	259.71	256.48	373,095.25	826,994.54
3,225.00	8.90	263.90	3,202.63	-60.12	-62.45	-267.44	274.63	256.86	373,093.54	826,979.61
3,319.00	9.30	263.90	3,295.44	-61.57	-64.03	-282.22	289.39	257.22	373,091.96	826,964.83
3,414.00	9.70	262.40	3,389.14	-63.31	-65.91	-297.79	304.99	257.52	373,090.08	826,949.26
3,508.00	8.70	263.80	3,481.93	-64.99	-67.72	-312.70	319.95	257.78	373,088.27	826,934.35
3,603.00	8.80	263.30	3,575.82	-66.49	-69.35	-327.06	334.33	258.03	373,086.64	826,919.99
3,697.00	9.70	256.30	3,668.60	-69.07	-72.06	-341.90	349.41	258.10	373,083.93	826,905.15
3,791.00	10.60	251.80	3,761.13	-73.51	-76.64	-357.81	365.92	257.91	373,079.35	826,889.24
3,886.00	10.90	253.50	3,854.47	-78.64	-81.92	-374.72	383.57	257.67	373,074.07	826,872.33
3,980.00	10.90	254.80	3,946.77	-83.35	-86.77	-391.82	401.31	257.51	373,069.22	826,855.23
4,075.00	10.30	256.50	4,040.15	-87.54	-91.11	-408.74	418.77	257.43	373,064.88	826,838.31
4,169.00	8.80	261.90	4,132.85	-90.38	-94.08	-424.03	434.35	257.49	373,061.91	826,823.02
4,264.00	8.80	259.70	4,226.73	-92.58	-96.41	-438.38	448.85	257.60	373,059.58	826,808.67
4,358.00	9.40	255.80	4,319.54	-95.62	-99.58	-452.90	463.71	257.60	373,056.41	826,794.15
4,452.00	9.10	255.90	4,412.32	-99.19	-103.27	-467.55	478.82	257.54	373,052.72	826,779.50

Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: ST01
 Design: MWD

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
4,547.00	8.60	255.80	4,506.19	-102.64	-106.84	-481.72	493.43	257.49	373,049.15	826,765.33
4,641.00	8.10	255.50	4,599.19	-105.90	-110.23	-494.94	507.07	257.44	373,045.76	826,752.11
4,736.00	8.20	251.90	4,693.24	-109.57	-114.01	-507.86	520.50	257.35	373,041.98	826,739.19
4,830.00	8.70	248.90	4,786.21	-114.10	-118.65	-520.87	534.21	257.17	373,037.34	826,726.18
4,925.00	8.70	247.20	4,880.12	-119.35	-124.02	-534.19	548.40	256.93	373,031.97	826,712.86
5,019.00	9.50	244.50	4,972.94	-125.33	-130.11	-547.75	562.99	256.64	373,025.88	826,699.30
5,114.00	9.00	242.80	5,066.70	-131.98	-136.89	-561.44	577.88	256.30	373,019.10	826,685.61
5,208.00	9.10	246.80	5,159.53	-138.15	-143.17	-574.81	592.37	256.01	373,012.82	826,672.24
5,302.00	9.80	250.40	5,252.26	-143.64	-148.79	-589.18	607.67	255.83	373,007.20	826,657.87
5,348.00	9.60	252.00	5,297.60	-146.07	-151.28	-596.51	615.40	255.77	373,004.71	826,650.54
5,421.00	8.80	253.80	5,369.66	-149.42	-154.72	-607.66	627.05	255.71	373,001.27	826,639.39
5,484.00	8.70	252.50	5,431.93	-152.11	-157.50	-616.84	636.63	255.68	372,998.49	826,630.21
5,579.00	9.30	255.00	5,525.76	-156.13	-161.65	-631.10	651.48	255.63	372,994.34	826,615.95
5,673.00	10.30	255.20	5,618.39	-160.11	-165.76	-646.56	667.47	255.62	372,990.23	826,600.49
5,768.00	10.20	254.80	5,711.87	-164.34	-170.14	-662.89	684.38	255.61	372,985.85	826,584.16
5,862.00	9.90	254.60	5,804.43	-168.53	-174.46	-678.72	700.78	255.58	372,981.53	826,568.33
5,957.00	9.60	253.20	5,898.05	-172.86	-178.92	-694.17	716.86	255.55	372,977.07	826,552.88
6,051.00	10.40	258.30	5,990.63	-176.71	-182.91	-709.98	733.17	255.55	372,973.08	826,537.07
6,145.00	11.20	259.10	6,082.96	-180.00	-186.36	-727.26	750.75	255.63	372,969.63	826,519.79
6,240.00	10.60	258.00	6,176.25	-183.41	-189.92	-744.86	768.69	255.70	372,966.07	826,502.19
6,334.00	10.20	258.10	6,268.70	-186.78	-193.43	-761.46	785.65	255.75	372,962.56	826,485.59
6,429.00	10.00	257.90	6,362.23	-190.10	-196.89	-777.76	802.30	255.79	372,959.10	826,469.29
6,523.00	9.90	257.60	6,454.82	-193.41	-200.34	-793.63	818.53	255.83	372,955.65	826,453.42
6,617.00	10.10	257.60	6,547.39	-196.77	-203.84	-809.58	834.84	255.87	372,952.15	826,437.47
6,712.00	10.00	257.80	6,640.93	-200.16	-207.38	-825.77	851.41	255.90	372,948.61	826,421.28
6,806.00	9.90	257.80	6,733.52	-203.46	-210.81	-841.65	867.65	255.94	372,945.18	826,405.40
6,901.00	9.90	256.60	6,827.10	-206.94	-214.43	-857.57	883.98	255.96	372,941.56	826,389.48

Company: Marathon Oil
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TVD Reference: Well @ 3211.50usft
MD Reference: Well @ 3211.50usft
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)
6,995.00	9.80	256.00	6,919.72	-210.61	-218.24	-873.20	900.06	255.97	372,937.75	826,373.85
7,089.00	9.40	256.20	7,012.40	-214.24	-222.00	-888.41	915.73	255.97	372,933.99	826,358.64
7,184.00	9.10	256.70	7,106.17	-217.69	-225.58	-903.26	931.00	255.98	372,930.41	826,343.79
7,278.00	8.90	256.60	7,199.01	-220.96	-228.98	-917.57	945.71	255.99	372,927.01	826,329.48
7,373.00	8.40	256.40	7,292.93	-224.17	-232.31	-931.46	959.99	256.00	372,923.68	826,315.59
7,467.00	8.20	255.10	7,385.94	-227.40	-235.65	-944.61	973.56	255.99	372,920.34	826,302.44
7,562.00	7.90	254.10	7,480.01	-230.82	-239.18	-957.44	986.86	255.97	372,916.81	826,289.61
7,656.00	6.00	250.50	7,573.31	-234.13	-242.59	-968.28	998.21	255.93	372,913.40	826,278.77
7,750.00	5.70	251.00	7,666.82	-237.21	-245.75	-977.33	1,007.75	255.89	372,910.24	826,269.72
7,845.00	5.70	250.60	7,761.35	-240.24	-248.85	-986.24	1,017.15	255.84	372,907.14	826,260.81
7,939.00	5.40	252.40	7,854.91	-243.05	-251.74	-994.86	1,026.21	255.80	372,904.25	826,252.19
8,033.00	2.50	241.80	7,948.68	-245.30	-254.05	-1,000.88	1,032.62	255.76	372,901.94	826,246.17
8,128.00	0.90	196.20	8,043.64	-246.98	-255.74	-1,002.92	1,035.01	255.69	372,900.25	826,244.13
8,222.00	0.80	182.40	8,137.63	-248.34	-257.11	-1,003.15	1,035.57	255.62	372,898.88	826,243.90
8,316.00	0.80	197.90	8,231.62	-249.62	-258.39	-1,003.38	1,036.11	255.56	372,897.60	826,243.67
8,411.00	0.60	176.40	8,326.61	-250.75	-259.51	-1,003.55	1,036.56	255.50	372,896.48	826,243.50
8,505.00	0.40	167.80	8,420.61	-251.56	-260.33	-1,003.45	1,036.67	255.46	372,895.66	826,243.60
8,600.00	0.60	173.20	8,515.60	-252.38	-261.14	-1,003.32	1,036.75	255.41	372,894.85	826,243.73
8,694.00	0.50	164.60	8,609.60	-253.26	-262.03	-1,003.15	1,036.81	255.36	372,893.96	826,243.90
8,789.00	0.30	126.70	8,704.60	-253.82	-262.58	-1,002.84	1,036.65	255.33	372,893.41	826,244.21
8,883.00	0.30	131.10	8,798.60	-254.13	-262.89	-1,002.46	1,036.36	255.31	372,893.10	826,244.59
8,978.00	0.50	154.90	8,893.59	-254.67	-263.42	-1,002.10	1,036.14	255.27	372,892.57	826,244.95
9,072.00	0.30	180.40	8,987.59	-255.29	-264.04	-1,001.93	1,036.13	255.24	372,891.95	826,245.12
9,166.00	0.10	138.90	9,081.59	-255.60	-264.35	-1,001.87	1,036.16	255.22	372,891.64	826,245.18
9,261.00	0.30	133.60	9,176.59	-255.83	-264.58	-1,001.64	1,036.00	255.20	372,891.41	826,245.41
9,355.00	0.20	102.10	9,270.59	-256.04	-264.79	-1,001.30	1,035.72	255.19	372,891.20	826,245.75
9,449.00	0.30	3.30	9,364.59	-255.83	-264.58	-1,001.13	1,035.50	255.20	372,891.41	826,245.92



ProDirectional
Survey Report



Company: Marathon Oil
 Project: Lea County, NM(NAD 83)
 Site: Madera 19 WA Fed Com
 Well: No. 2H
 Wellbore: ST01
 Design: MWD

Local Co-ordinate Reference: Well No. 2H
 TVD Reference: Well @ 3211.50usft
 MD Reference: Well @ 3211.50usft
 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)
9,544.00	0.30	334.60	9,459.59	-255.36	-264.10	-1,001.22	1,035.47	255.22	372,891.89	826,245.83
9,638.00	0.40	109.60	9,553.59	-255.25	-263.99	-1,001.02	1,035.24	255.23	372,892.00	826,246.03
9,732.00	1.20	126.70	9,647.58	-255.95	-264.69	-999.92	1,034.36	255.17	372,891.30	826,247.13
9,826.00	1.50	126.00	9,741.55	-257.28	-266.00	-998.13	1,032.97	255.08	372,889.99	826,248.92
9,920.00	0.50	201.40	9,835.54	-258.39	-267.11	-997.29	1,032.44	255.01	372,888.88	826,249.76
10,015.00	0.90	258.70	9,930.53	-258.92	-267.64	-998.17	1,033.43	254.99	372,888.35	826,248.88
10,109.00	0.90	276.80	10,024.52	-258.96	-267.70	-999.63	1,034.85	255.01	372,888.29	826,247.42
10,204.00	0.90	278.00	10,119.51	-258.76	-267.50	-1,001.11	1,036.23	255.04	372,888.49	826,245.94
10,298.00	1.00	295.60	10,213.50	-258.29	-267.05	-1,002.58	1,037.53	255.08	372,888.94	826,244.47
10,393.00	0.80	270.70	10,308.49	-257.91	-266.68	-1,003.99	1,038.80	255.12	372,889.31	826,243.06
10,487.00	0.70	269.80	10,402.48	-257.89	-266.67	-1,005.22	1,039.99	255.14	372,889.32	826,241.83
10,582.00	1.00	255.30	10,497.47	-258.09	-266.89	-1,006.60	1,041.38	255.15	372,889.10	826,240.45
10,676.00	1.10	270.70	10,591.45	-258.27	-267.08	-1,008.30	1,043.07	255.16	372,888.91	826,238.75
10,771.00	1.70	309.00	10,686.42	-257.36	-266.19	-1,010.30	1,044.78	255.24	372,889.80	826,236.75
10,865.00	1.50	333.70	10,780.39	-255.36	-264.21	-1,011.93	1,045.85	255.37	372,891.78	826,235.12
10,959.00	1.20	328.20	10,874.36	-253.42	-262.27	-1,013.00	1,046.40	255.48	372,893.72	826,234.05
11,054.00	1.00	330.90	10,969.34	-251.84	-260.70	-1,013.92	1,046.90	255.58	372,895.29	826,233.13
11,148.00	1.10	319.00	11,063.33	-250.43	-259.30	-1,014.91	1,047.51	255.67	372,896.69	826,232.14
11,243.00	1.60	299.90	11,158.30	-249.07	-257.95	-1,016.66	1,048.88	255.76	372,898.04	826,230.39
11,337.00	1.00	263.00	11,252.28	-248.50	-257.39	-1,018.61	1,050.63	255.82	372,898.60	826,228.44
11,432.00	0.60	249.50	11,347.27	-248.76	-257.67	-1,019.90	1,051.95	255.82	372,898.32	826,227.15
11,526.00	0.40	331.40	11,441.27	-248.64	-257.55	-1,020.52	1,052.52	255.84	372,898.44	826,226.53
11,620.00	0.70	342.70	11,535.26	-247.80	-256.72	-1,020.85	1,052.63	255.88	372,899.27	826,226.20
11,715.00	0.80	357.30	11,630.26	-246.58	-255.50	-1,021.05	1,052.53	255.95	372,900.49	826,226.00
11,809.00	0.70	338.40	11,724.25	-245.39	-254.31	-1,021.29	1,052.48	256.02	372,901.68	826,225.76
11,904.00	1.00	297.50	11,819.24	-244.46	-253.39	-1,022.24	1,053.18	256.08	372,902.60	826,224.81
11,949.00	1.10	278.50	11,864.23	-244.21	-253.14	-1,023.02	1,053.87	256.10	372,902.85	826,224.03

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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)
12,036.00	1.30	252.50	11,951.21	-244.37	-253.32	-1,024.79	1,055.63	256.12	372,902.67	826,222.26
12,130.00	2.10	169.50	12,045.18	-246.37	-255.33	-1,025.49	1,056.80	256.02	372,900.66	826,221.56
12,287.00	6.00	22.60	12,201.94	-241.65	-250.58	-1,021.81	1,052.08	256.22	372,905.41	826,225.24
Pro MWD First ST01 Survey: 12287										
12,319.00	5.50	25.50	12,233.78	-238.73	-247.65	-1,020.50	1,050.12	256.36	372,908.34	826,226.55
12,413.00	4.50	21.90	12,327.42	-231.28	-240.16	-1,017.19	1,045.16	256.72	372,915.83	826,229.86
12,508.00	8.90	17.20	12,421.75	-220.82	-229.68	-1,013.62	1,039.32	257.23	372,926.31	826,233.43
12,603.00	22.70	356.60	12,513.00	-195.38	-204.22	-1,012.53	1,032.92	258.60	372,951.77	826,234.52
12,697.00	33.30	0.10	12,595.89	-151.33	-160.18	-1,013.56	1,026.14	261.02	372,995.81	826,233.49
12,791.00	45.10	1.60	12,668.60	-92.05	-100.89	-1,012.59	1,017.60	264.31	373,055.10	826,234.46
12,887.00	59.60	1.00	12,727.09	-16.28	-25.10	-1,010.91	1,011.22	268.58	373,130.89	826,236.14
12,981.00	69.50	0.10	12,767.43	68.48	59.67	-1,010.12	1,011.88	273.38	373,215.66	826,236.93
13,075.00	75.90	359.70	12,795.37	158.18	149.37	-1,010.28	1,021.26	278.41	373,305.36	826,236.77
13,170.00	80.60	0.40	12,814.71	251.16	242.35	-1,010.20	1,038.86	283.49	373,398.34	826,236.85
13,264.00	85.20	0.40	12,826.33	344.40	335.60	-1,009.54	1,063.86	288.39	373,491.59	826,237.51
13,359.00	90.20	358.80	12,830.14	439.29	430.49	-1,010.21	1,098.11	293.08	373,586.48	826,236.84
Last Survey: 13359' MD										
13,415.00	90.20	358.80	12,829.94	495.28	486.48	-1,011.38	1,122.30	295.69	373,642.47	826,235.67
PTB: 13415' MD										

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
12,287.00	12,201.94	-250.58	-1,021.81	Pro MWD First ST01 Survey: 12287
13,359.00	12,830.14	430.49	-1,010.21	Last Survey: 13359' MD
13,415.00	12,829.94	486.48	-1,011.38	PTB: 13415' MD