



Marathon Oil

Corporation

Blueberry Hill 19 TB Fee No. 3H
Lea County, NM

October 08, 2019

Job No. LNM1454519
API No. 30-025-44662

Survey Completion Report



PRODIRECTIONAL

Survey Certification Letter

October 08, 2019



Marathon Oil[®]
Corporation

Operator Name: Marathon Oil
Well Name: Blueberry Hill 19 TB Fee No. 3H
County/Parish: Lea County,
State: NM
Rig Name: Precision 101
Job Number: LNM1454519

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	1,167' MD – 19,835' MD	19,924' MD	07/21/19 – 09/11/19	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

Blueberry Hill 19 TB Fee

No. 3H

OH

Survey: ProDirectional

Survey Report

08 October, 2019





ProDirectional Survey Report



Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Blueberry Hill 19 TB Fee
Well: No. 3H
Wellbore: OH
Design: MWD

Local Co-ordinate Reference: Well No. 3H
TVD Reference: Well @ 3364.00usft
MD Reference: Well @ 3364.00usft
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	Blueberry Hill 19 TB Fee		
Site Position:		Northing:	439,067.81 usft
From:	Map	Easting:	829,278.18 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.203647
		Longitude:	-103.402411
		Grid Convergence:	0.50 °

Well	No. 3H, LNM1454519		
Well Position	+N/-S	0.00 usft	Northing: 439,067.81 usft
	+E/-W	0.00 usft	Easting: 829,278.18 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32.203647
		Longitude:	-103.402411
		Ground Level:	3,339.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	HDGM	6/20/2019	6.62
		Dip Angle (°)	59.85
		Field Strength (nT)	47,891.30

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



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Survey Program **Date** 10/8/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
143.00	1,111.00	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HRGM
1,167.00	19,924.00	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)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	439,067.81	829,278.18
143.00	0.60	58.00	143.00	0.39	0.40	0.63	0.75	58.00	439,068.21	829,278.81
202.00	0.80	15.00	201.99	0.95	0.96	1.00	1.39	46.32	439,068.77	829,279.18
287.00	1.10	338.00	286.98	2.28	2.29	0.85	2.44	20.41	439,070.10	829,279.03
378.00	0.60	335.00	377.97	3.53	3.53	0.32	3.54	5.23	439,071.34	829,278.50
472.00	0.70	218.00	471.97	3.53	3.52	-0.24	3.53	356.13	439,071.33	829,277.94
567.00	0.10	204.00	566.97	3.00	2.99	-0.63	3.06	348.11	439,070.80	829,277.55
661.00	0.80	326.00	660.96	3.47	3.46	-1.03	3.61	343.42	439,071.27	829,277.15
756.00	0.60	330.00	755.96	4.45	4.44	-1.65	4.74	339.62	439,072.25	829,276.53
850.00	0.20	330.00	849.95	5.03	5.01	-1.98	5.38	338.45	439,072.82	829,276.20
945.00	0.00	34.00	944.95	5.17	5.15	-2.06	5.55	338.20	439,072.96	829,276.12
1,039.00	0.90	178.00	1,038.95	4.43	4.41	-2.03	4.86	335.25	439,072.22	829,276.15
1,111.00	1.30	229.00	1,110.94	3.34	3.31	-2.63	4.23	321.54	439,071.12	829,275.55
1,167.00	1.00	219.70	1,166.93	2.55	2.52	-3.42	4.25	306.36	439,070.33	829,274.76
Pro MWD First Survey: 1167' MD										
1,188.00	1.20	220.80	1,187.92	2.24	2.21	-3.68	4.30	300.99	439,070.02	829,274.50
1,282.00	4.60	188.20	1,281.79	-2.22	-2.26	-4.86	5.37	245.04	439,065.55	829,273.32
1,376.00	6.90	187.80	1,375.31	-11.54	-11.59	-6.17	13.13	208.02	439,056.22	829,272.01
1,470.00	7.90	189.40	1,468.53	-23.49	-23.56	-7.99	24.88	198.74	439,044.25	829,270.19
1,564.00	7.80	192.30	1,561.65	-36.07	-36.16	-10.40	37.63	196.05	439,031.65	829,267.78
1,653.00	7.80	191.30	1,649.83	-47.87	-47.99	-12.87	49.68	195.02	439,019.82	829,265.31

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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)
1,743.00	7.80	191.10	1,738.99	-59.83	-59.97	-15.25	61.88	194.26	439,007.84	829,262.93
1,832.00	7.80	193.00	1,827.17	-71.62	-71.78	-17.77	73.95	193.90	438,996.03	829,260.41
1,922.00	7.60	193.20	1,916.36	-83.34	-83.52	-20.50	86.00	193.79	438,984.29	829,257.68
2,011.00	7.50	194.40	2,004.59	-94.67	-94.88	-23.29	97.70	193.79	438,972.93	829,254.89
2,100.00	7.50	204.20	2,092.83	-105.56	-105.80	-27.12	109.22	194.37	438,962.01	829,251.06
2,190.00	7.40	220.70	2,182.08	-115.26	-115.56	-33.30	120.26	196.08	438,952.25	829,244.88
2,280.00	7.00	238.60	2,271.38	-122.44	-122.81	-41.76	129.72	198.78	438,945.00	829,236.42
2,369.00	7.20	258.10	2,359.71	-126.33	-126.79	-51.85	136.98	202.24	438,941.02	829,226.33
2,458.00	7.40	275.00	2,448.00	-126.88	-127.44	-63.02	142.17	206.31	438,940.37	829,215.16
2,548.00	7.50	278.10	2,537.24	-125.45	-126.10	-74.61	146.52	210.61	438,941.71	829,203.57
2,637.00	7.30	279.40	2,625.50	-123.61	-124.36	-85.94	151.17	214.65	438,943.45	829,192.24
2,727.00	6.20	278.40	2,714.87	-121.87	-122.72	-96.39	156.05	218.15	438,945.09	829,181.79
2,816.00	5.80	277.60	2,803.39	-120.49	-121.42	-105.60	160.92	221.01	438,946.39	829,172.58
2,906.00	5.50	280.00	2,892.95	-119.07	-120.07	-114.35	165.81	223.60	438,947.74	829,163.83
2,995.00	5.70	271.50	2,981.53	-118.14	-119.21	-122.97	171.27	225.89	438,948.60	829,155.21
3,085.00	5.80	270.80	3,071.07	-117.88	-119.03	-131.99	177.74	227.95	438,948.78	829,146.19
3,174.00	5.60	274.50	3,159.63	-117.40	-118.63	-140.81	184.12	229.89	438,949.18	829,137.37
3,264.00	5.90	268.40	3,249.18	-117.10	-118.41	-149.82	190.96	231.68	438,949.40	829,128.36
3,354.00	6.10	266.40	3,338.69	-117.45	-118.84	-159.21	198.68	233.26	438,948.97	829,118.97
3,443.00	5.60	269.70	3,427.22	-117.69	-119.16	-168.27	206.19	234.70	438,948.65	829,109.91
3,533.00	6.40	270.10	3,516.73	-117.62	-119.18	-177.68	213.95	236.15	438,948.63	829,100.50
3,623.00	7.60	274.50	3,606.06	-117.05	-118.70	-188.63	222.87	237.82	438,949.11	829,089.55
3,712.00	8.00	275.00	3,694.24	-115.95	-117.70	-200.67	232.64	239.61	438,950.11	829,077.51
3,802.00	8.20	266.20	3,783.34	-115.71	-117.58	-213.31	243.57	241.14	438,950.23	829,064.87
3,892.00	8.70	266.30	3,872.36	-116.46	-118.45	-226.51	255.61	242.39	438,949.36	829,051.67
3,982.00	7.90	265.50	3,961.42	-117.28	-119.37	-239.47	267.57	243.50	438,948.44	829,038.71
4,071.00	8.50	267.40	4,049.51	-117.94	-120.15	-252.14	279.30	244.52	438,947.66	829,026.04



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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)
4,161.00	7.20	266.60	4,138.66	-118.47	-120.78	-264.41	290.69	245.45	438,947.03	829,013.77
4,251.00	5.70	258.60	4,228.09	-119.60	-122.00	-274.42	300.32	246.03	438,945.81	829,003.76
4,341.00	5.10	256.20	4,317.69	-121.37	-123.84	-282.69	308.62	246.34	438,943.97	828,995.49
4,430.00	5.30	252.90	4,406.33	-123.45	-125.99	-290.46	316.61	246.55	438,941.82	828,987.72
4,520.00	6.20	246.80	4,495.88	-126.52	-129.13	-298.90	325.60	246.63	438,938.68	828,979.28
4,610.00	8.20	257.20	4,585.17	-129.76	-132.47	-309.63	336.77	246.84	438,935.34	828,968.55
4,699.00	8.90	258.50	4,673.18	-132.42	-135.24	-322.56	349.77	247.25	438,932.57	828,955.62
4,789.00	8.80	261.80	4,762.10	-134.68	-137.61	-336.20	363.27	247.74	438,930.20	828,941.98
4,879.00	9.00	258.40	4,851.02	-136.95	-140.01	-349.91	376.88	248.19	438,927.80	828,928.27
4,969.00	6.80	256.00	4,940.16	-139.55	-142.72	-361.98	389.09	248.48	438,925.09	828,916.20
5,058.00	5.20	261.70	5,028.67	-141.33	-144.57	-371.08	398.25	248.71	438,923.24	828,907.10
5,148.00	4.70	282.30	5,118.34	-141.07	-144.38	-378.72	405.31	249.13	438,923.43	828,899.46
5,238.00	5.10	280.20	5,208.01	-139.51	-142.88	-386.26	411.84	249.70	438,924.93	828,891.92
5,328.00	6.10	276.60	5,297.58	-138.17	-141.63	-394.95	419.57	250.27	438,926.18	828,883.23
5,417.00	5.90	275.80	5,386.10	-137.09	-140.62	-404.19	427.96	250.82	438,927.19	828,873.99
5,507.00	6.60	275.70	5,475.56	-136.02	-139.64	-413.94	436.86	251.36	438,928.17	828,864.24
5,597.00	7.40	274.50	5,564.89	-134.96	-138.67	-424.87	446.93	251.92	438,929.14	828,853.31
5,686.00	7.50	274.20	5,653.14	-133.98	-137.79	-436.37	457.61	252.48	438,930.02	828,841.81
5,776.00	7.50	274.40	5,742.37	-133.00	-136.91	-448.09	468.54	253.01	438,930.90	828,830.09
5,866.00	6.90	273.10	5,831.66	-132.16	-136.17	-459.34	479.10	253.49	438,931.64	828,818.84
5,955.00	5.10	272.00	5,920.17	-131.65	-135.74	-468.64	487.90	253.85	438,932.07	828,809.54
6,045.00	4.40	267.90	6,009.86	-131.57	-135.73	-476.08	495.05	254.09	438,932.08	828,802.10
6,135.00	2.90	268.90	6,099.67	-131.69	-135.90	-481.81	500.61	254.25	438,931.91	828,796.37
6,225.00	0.50	264.30	6,189.63	-131.75	-135.98	-484.48	503.20	254.32	438,931.83	828,793.70
6,314.00	0.90	107.60	6,278.62	-132.00	-136.23	-484.20	503.00	254.29	438,931.58	828,793.98
6,404.00	0.80	112.00	6,368.61	-132.46	-136.68	-482.94	501.91	254.20	438,931.13	828,795.24
6,494.00	0.80	113.10	6,458.61	-132.95	-137.16	-481.78	500.93	254.11	438,930.65	828,796.40

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6,583.00	0.60	104.60	6,547.60	-133.33	-137.53	-480.76	500.04	254.04	438,930.28	828,797.42
6,672.00	1.40	130.20	6,636.58	-134.16	-138.34	-479.48	499.04	253.91	438,929.47	828,798.70
6,762.00	1.50	128.00	6,726.56	-135.61	-139.78	-477.71	497.74	253.69	438,928.03	828,800.47
6,852.00	1.30	157.80	6,816.53	-137.29	-141.45	-476.40	496.95	253.46	438,926.36	828,801.78
6,941.00	1.40	178.00	6,905.51	-139.31	-143.47	-475.98	497.13	253.23	438,924.34	828,802.20
7,031.00	1.10	167.90	6,995.48	-141.26	-145.42	-475.76	497.48	253.00	438,922.39	828,802.42
7,121.00	1.10	164.00	7,085.47	-142.94	-147.09	-475.34	497.58	252.81	438,920.72	828,802.84
7,211.00	1.20	158.70	7,175.45	-144.65	-148.80	-474.76	497.53	252.60	438,919.01	828,803.42
7,300.00	1.10	163.50	7,264.43	-146.34	-150.49	-474.18	497.48	252.39	438,917.32	828,804.00
7,390.00	1.10	157.90	7,354.42	-147.98	-152.11	-473.61	497.43	252.19	438,915.70	828,804.57
7,479.00	1.00	152.80	7,443.40	-149.46	-153.60	-472.93	497.25	252.01	438,914.21	828,805.25
7,569.00	0.80	152.40	7,533.39	-150.73	-154.85	-472.28	497.02	251.85	438,912.96	828,805.90
7,658.00	1.00	143.20	7,622.38	-151.90	-156.02	-471.53	496.67	251.69	438,911.79	828,806.65
7,748.00	0.90	157.70	7,712.37	-153.19	-157.31	-470.79	496.37	251.52	438,910.50	828,807.39
7,838.00	1.00	167.20	7,802.35	-154.62	-158.73	-470.34	496.41	251.35	438,909.08	828,807.84
7,928.00	1.10	165.80	7,892.34	-156.22	-160.33	-469.96	496.56	251.16	438,907.48	828,808.22
8,017.00	0.80	153.30	7,981.33	-157.61	-161.71	-469.47	496.54	250.99	438,906.10	828,808.71
8,107.00	0.10	280.70	8,071.32	-158.16	-162.26	-469.27	496.53	250.93	438,905.55	828,808.91
8,197.00	0.20	269.90	8,161.32	-158.14	-162.25	-469.50	496.74	250.94	438,905.56	828,808.68
8,286.00	0.10	133.80	8,250.32	-158.20	-162.30	-469.60	496.85	250.93	438,905.51	828,808.58
8,376.00	0.30	130.30	8,340.32	-158.41	-162.51	-469.36	496.70	250.90	438,905.30	828,808.82
8,465.00	0.30	111.00	8,429.32	-158.64	-162.74	-468.97	496.40	250.86	438,905.07	828,809.21
8,554.00	0.30	92.60	8,518.32	-158.74	-162.84	-468.52	496.01	250.83	438,904.97	828,809.66
8,644.00	0.50	92.40	8,608.32	-158.77	-162.86	-467.89	495.42	250.81	438,904.95	828,810.29
8,733.00	0.50	97.90	8,697.31	-158.85	-162.93	-467.12	494.72	250.77	438,904.88	828,811.06
8,823.00	0.50	78.50	8,787.31	-158.83	-162.91	-466.34	493.98	250.74	438,904.90	828,811.84
8,912.00	0.40	84.70	8,876.31	-158.73	-162.80	-465.65	493.29	250.73	438,905.01	828,812.53



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9,002.00	0.40	93.80	8,966.31	-158.73	-162.79	-465.03	492.70	250.71	438,905.02	828,813.15
9,091.00	0.50	97.30	9,055.30	-158.81	-162.86	-464.33	492.07	250.67	438,904.95	828,813.85
9,180.00	0.60	79.80	9,144.30	-158.78	-162.83	-463.49	491.26	250.64	438,904.98	828,814.69
9,270.00	0.80	81.30	9,234.29	-158.61	-162.65	-462.40	490.18	250.62	438,905.16	828,815.78
9,359.00	0.70	86.80	9,323.28	-158.50	-162.53	-461.25	489.04	250.59	438,905.28	828,816.93
9,448.00	0.90	88.50	9,412.28	-158.46	-162.48	-460.00	487.86	250.55	438,905.33	828,818.18
9,538.00	1.00	90.90	9,502.26	-158.47	-162.47	-458.51	486.45	250.49	438,905.34	828,819.67
9,624.00	1.20	101.20	9,588.25	-158.67	-162.66	-456.88	484.97	250.40	438,905.15	828,821.30
9,714.00	1.70	123.50	9,678.22	-159.60	-163.58	-454.84	483.36	250.22	438,904.23	828,823.34
9,803.00	1.30	145.90	9,767.19	-161.18	-165.14	-453.17	482.33	249.98	438,902.67	828,825.01
9,893.00	1.50	185.60	9,857.16	-163.20	-167.16	-452.72	482.59	249.73	438,900.65	828,825.46
9,982.00	1.50	180.10	9,946.13	-165.53	-169.49	-452.83	483.51	249.48	438,898.32	828,825.35
10,072.00	1.30	180.80	10,036.11	-167.73	-171.68	-452.85	484.30	249.24	438,896.13	828,825.33
10,161.00	1.20	196.80	10,125.09	-169.63	-173.59	-453.13	485.24	249.04	438,894.22	828,825.05
10,250.00	0.50	200.90	10,214.08	-170.88	-174.84	-453.54	486.07	248.92	438,892.97	828,824.64
10,340.00	0.10	193.30	10,304.07	-171.32	-175.28	-453.70	486.38	248.88	438,892.53	828,824.48
10,429.00	0.10	288.30	10,393.07	-171.37	-175.34	-453.79	486.49	248.87	438,892.47	828,824.39
10,518.00	0.80	162.70	10,482.07	-171.94	-175.90	-453.68	486.59	248.81	438,891.91	828,824.50
10,608.00	0.90	163.50	10,572.06	-173.22	-177.18	-453.29	486.69	248.65	438,890.63	828,824.89
10,697.00	0.80	153.80	10,661.05	-174.45	-178.41	-452.82	486.70	248.50	438,889.40	828,825.36
10,787.00	1.00	142.50	10,751.04	-175.65	-179.60	-452.06	486.43	248.33	438,888.21	828,826.12
10,876.00	1.10	130.10	10,840.03	-176.82	-180.76	-450.94	485.82	248.16	438,887.05	828,827.24
10,966.00	1.10	126.40	10,930.01	-177.90	-181.83	-449.58	484.96	247.98	438,885.98	828,828.60
11,055.00	0.50	106.20	11,019.00	-178.53	-182.45	-448.52	484.21	247.86	438,885.36	828,829.66
11,144.00	0.60	74.60	11,108.00	-178.52	-182.43	-447.70	483.44	247.83	438,885.38	828,830.48
11,234.00	1.00	61.20	11,197.99	-178.02	-181.93	-446.56	482.19	247.83	438,885.88	828,831.62
11,323.00	2.50	49.70	11,286.94	-176.41	-180.30	-444.39	479.58	247.92	438,887.51	828,833.79

Company: Marathon Oil
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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)
11,413.00	3.30	46.10	11,376.83	-173.38	-177.23	-441.03	475.31	248.11	438,890.58	828,837.15
11,502.00	2.60	34.50	11,465.71	-169.96	-173.79	-438.04	471.26	248.36	438,894.02	828,840.14
11,552.00	2.30	30.80	11,515.66	-168.18	-172.00	-436.89	469.52	248.51	438,895.81	828,841.29
11,694.00	2.20	27.80	11,657.56	-163.34	-167.14	-434.15	465.22	248.94	438,900.67	828,844.03
11,789.00	1.40	44.80	11,752.51	-160.92	-164.70	-432.49	462.79	249.15	438,903.11	828,845.69
11,883.00	2.50	24.10	11,846.45	-158.25	-162.02	-430.84	460.30	249.39	438,905.79	828,847.34
11,928.00	7.00	8.00	11,891.29	-154.64	-158.40	-430.06	458.30	249.78	438,909.41	828,848.12
11,978.00	13.30	0.90	11,940.48	-145.87	-149.63	-429.54	454.86	250.79	438,918.18	828,848.64
12,072.00	27.80	0.10	12,028.27	-112.97	-116.72	-429.33	444.92	254.79	438,951.09	828,848.85
12,167.00	34.50	356.90	12,109.53	-63.88	-67.64	-430.75	436.03	261.08	439,000.17	828,847.43
12,262.00	53.70	352.70	12,177.45	1.64	-2.18	-437.13	437.14	269.71	439,065.63	828,841.05
12,356.00	59.00	352.50	12,229.52	79.29	75.39	-447.21	453.52	279.57	439,143.20	828,830.97
12,450.00	65.90	352.80	12,272.97	161.99	158.00	-457.86	484.35	289.04	439,225.81	828,820.32
12,544.00	70.00	354.40	12,308.25	248.63	244.56	-467.55	527.65	297.61	439,312.37	828,810.63
12,638.00	80.10	358.00	12,332.48	339.17	335.05	-473.49	580.05	305.28	439,402.86	828,804.69
12,733.00	93.90	357.50	12,337.44	433.76	429.62	-477.21	642.11	312.00	439,497.43	828,800.97
12,827.00	94.10	358.80	12,330.88	527.51	523.34	-480.24	710.29	317.46	439,591.15	828,797.94
12,921.00	90.30	0.30	12,327.27	621.42	617.24	-480.98	782.51	322.07	439,685.05	828,797.20
13,025.00	91.20	359.80	12,325.91	725.40	721.23	-480.88	866.85	326.31	439,789.04	828,797.30
13,119.00	90.80	359.50	12,324.27	819.39	815.22	-481.46	946.77	329.43	439,883.03	828,796.72
13,213.00	89.90	359.70	12,323.69	913.39	909.21	-482.11	1,029.13	332.06	439,977.02	828,796.07
13,308.00	89.80	359.30	12,323.94	1,008.38	1,004.21	-482.94	1,114.30	334.32	440,072.02	828,795.24
13,402.00	90.20	359.40	12,323.94	1,102.38	1,098.20	-484.01	1,200.13	336.22	440,166.01	828,794.17
13,496.00	88.80	359.10	12,324.76	1,196.38	1,192.19	-485.24	1,287.16	337.85	440,260.00	828,792.94
13,592.00	88.70	0.50	12,326.86	1,292.35	1,288.16	-485.58	1,376.64	339.35	440,355.97	828,792.60
13,687.00	89.50	2.90	12,328.35	1,387.26	1,383.10	-482.76	1,464.93	340.76	440,450.91	828,795.42
13,781.00	88.70	2.60	12,329.83	1,481.10	1,476.98	-478.25	1,552.48	342.06	440,544.79	828,799.93

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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)
13,875.00	88.40	2.00	12,332.20	1,574.95	1,570.87	-474.48	1,640.97	343.19	440,638.68	828,803.70
13,969.00	89.10	1.70	12,334.26	1,668.85	1,664.80	-471.44	1,730.27	344.19	440,732.61	828,806.74
14,064.00	88.70	0.50	12,336.08	1,763.80	1,759.77	-469.62	1,821.35	345.06	440,827.58	828,808.56
14,158.00	89.10	358.50	12,337.88	1,857.77	1,853.74	-470.44	1,912.50	345.76	440,921.55	828,807.74
14,253.00	89.00	358.50	12,339.46	1,952.75	1,948.69	-472.93	2,005.26	346.36	441,016.50	828,805.25
14,347.00	87.10	359.00	12,342.66	2,046.68	2,042.61	-474.98	2,097.11	346.91	441,110.42	828,803.20
14,454.00	87.80	0.20	12,347.42	2,153.57	2,149.50	-475.72	2,201.51	347.52	441,217.31	828,802.46
14,548.00	87.60	359.90	12,351.19	2,247.49	2,243.43	-475.64	2,293.29	348.03	441,311.24	828,802.54
14,642.00	89.70	358.70	12,353.41	2,341.46	2,337.39	-476.79	2,385.52	348.47	441,405.20	828,801.39
14,737.00	88.70	355.90	12,354.73	2,436.37	2,432.26	-481.26	2,479.42	348.81	441,500.07	828,796.92
14,801.00	89.80	356.60	12,355.57	2,500.26	2,496.12	-485.45	2,542.88	348.99	441,563.93	828,792.73
14,926.00	88.30	357.50	12,357.64	2,625.12	2,620.93	-491.88	2,666.69	349.37	441,688.74	828,786.30
15,020.00	87.70	358.60	12,360.92	2,719.03	2,714.81	-495.08	2,759.59	349.67	441,782.62	828,783.10
15,114.00	85.40	359.20	12,366.58	2,812.85	2,808.62	-496.88	2,852.23	349.97	441,876.43	828,781.30
15,208.00	85.90	359.80	12,373.71	2,906.58	2,902.35	-497.70	2,944.71	350.27	441,970.16	828,780.48
15,303.00	86.60	0.30	12,379.92	3,001.37	2,997.14	-497.61	3,038.17	350.57	442,064.95	828,780.57
15,397.00	86.90	0.10	12,385.25	3,095.21	3,090.99	-497.29	3,130.74	350.86	442,158.80	828,780.89
15,492.00	87.50	359.40	12,389.89	3,190.10	3,185.87	-497.70	3,224.51	351.12	442,253.68	828,780.48
15,586.00	89.00	0.70	12,392.76	3,284.04	3,279.82	-497.62	3,317.36	351.37	442,347.63	828,780.56
15,681.00	88.40	359.70	12,394.92	3,379.01	3,374.80	-497.29	3,411.24	351.62	442,442.61	828,780.89
15,775.00	88.10	0.60	12,397.79	3,472.96	3,468.75	-497.04	3,504.18	351.85	442,536.56	828,781.14
15,870.00	90.10	0.40	12,399.28	3,567.93	3,563.73	-496.21	3,598.11	352.07	442,631.54	828,781.97
15,964.00	89.10	0.40	12,399.94	3,661.91	3,657.73	-495.55	3,691.14	352.28	442,725.54	828,782.63
16,059.00	88.00	359.90	12,402.34	3,756.87	3,752.69	-495.31	3,785.24	352.48	442,820.50	828,782.87
16,153.00	91.30	358.30	12,402.92	3,850.85	3,846.67	-496.78	3,878.61	352.64	442,914.48	828,781.40
16,247.00	91.70	357.10	12,400.45	3,944.77	3,940.56	-500.55	3,972.22	352.76	443,008.37	828,777.63
16,342.00	87.60	356.50	12,401.03	4,039.65	4,035.38	-505.85	4,066.97	352.85	443,103.19	828,772.33

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Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
16,436.00	86.60	357.00	12,405.79	4,133.42	4,129.11	-511.18	4,160.63	352.94	443,196.92	828,767.00
16,531.00	90.10	357.10	12,408.53	4,228.27	4,223.93	-516.06	4,255.34	353.03	443,291.74	828,762.12
16,625.00	90.60	359.60	12,407.95	4,322.25	4,317.88	-518.77	4,348.94	353.15	443,385.69	828,759.41
16,719.00	89.40	359.40	12,407.95	4,416.24	4,411.88	-519.59	4,442.37	353.28	443,479.69	828,758.59
16,814.00	86.80	359.50	12,411.10	4,511.18	4,506.81	-520.50	4,536.77	353.41	443,574.62	828,757.68
16,908.00	92.30	1.10	12,411.84	4,605.13	4,600.77	-520.01	4,630.06	353.55	443,668.58	828,758.17
17,003.00	89.00	359.40	12,410.76	4,700.10	4,695.75	-519.60	4,724.41	353.69	443,763.56	828,758.58
17,098.00	93.00	2.60	12,409.10	4,795.02	4,790.69	-517.94	4,818.60	353.83	443,858.50	828,760.24
17,192.00	92.80	1.90	12,404.35	4,888.79	4,884.49	-514.25	4,911.49	353.99	443,952.30	828,763.93
17,286.00	92.20	0.90	12,400.25	4,982.65	4,978.37	-511.96	5,004.63	354.13	444,046.18	828,766.22
17,381.00	86.60	357.60	12,401.24	5,077.59	5,073.31	-513.20	5,099.20	354.22	444,141.12	828,764.98
17,475.00	88.20	358.60	12,405.51	5,171.47	5,167.16	-516.31	5,192.89	354.29	444,234.97	828,761.87
17,570.00	94.10	358.90	12,403.60	5,266.40	5,262.07	-518.39	5,287.55	354.37	444,329.88	828,759.79
17,664.00	96.00	1.30	12,395.32	5,360.01	5,355.70	-518.22	5,380.71	354.47	444,423.51	828,759.96
17,759.00	96.00	3.40	12,385.39	5,454.37	5,450.09	-514.35	5,474.31	354.61	444,517.90	828,763.83
17,853.00	94.60	2.90	12,376.71	5,547.78	5,543.55	-509.21	5,566.88	354.75	444,611.36	828,768.97
17,948.00	94.40	2.40	12,369.26	5,642.34	5,638.15	-504.83	5,660.71	354.88	444,705.96	828,773.35
18,043.00	99.40	0.90	12,357.85	5,736.55	5,732.39	-502.11	5,754.34	354.99	444,800.20	828,776.07
18,138.00	93.40	359.10	12,347.26	5,830.91	5,826.75	-502.12	5,848.35	355.07	444,894.56	828,776.06
18,232.00	93.60	359.40	12,341.52	5,924.74	5,920.57	-503.35	5,941.93	355.14	444,988.38	828,774.83
18,327.00	92.90	359.40	12,336.14	6,019.58	6,015.41	-504.34	6,036.51	355.21	445,083.22	828,773.84
18,362.00	92.30	359.90	12,334.55	6,054.55	6,050.37	-504.55	6,071.37	355.23	445,118.18	828,773.63
18,457.00	94.10	358.50	12,329.25	6,149.39	6,145.21	-505.88	6,166.00	355.29	445,213.02	828,772.30
18,551.00	95.10	356.50	12,321.71	6,243.02	6,238.81	-509.96	6,259.62	355.33	445,306.62	828,768.22
18,646.00	95.10	355.80	12,313.26	6,337.49	6,333.22	-516.31	6,354.23	355.34	445,401.03	828,761.87
18,740.00	95.30	355.40	12,304.74	6,430.88	6,426.56	-523.50	6,447.84	355.34	445,494.37	828,754.68
18,835.00	96.00	357.00	12,295.39	6,525.26	6,520.88	-529.76	6,542.37	355.36	445,588.69	828,748.42

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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)
18,929.00	97.20	358.20	12,284.58	6,618.58	6,614.18	-533.67	6,635.67	355.39	445,681.99	828,744.51
19,023.00	97.50	357.90	12,272.56	6,711.78	6,707.35	-536.85	6,728.80	355.42	445,775.16	828,741.33
19,117.00	98.60	358.00	12,259.40	6,804.82	6,800.36	-540.18	6,821.78	355.46	445,868.17	828,738.00
19,211.00	99.80	358.40	12,244.37	6,897.58	6,893.11	-543.09	6,914.47	355.50	445,960.92	828,735.09
19,305.00	102.00	358.30	12,226.59	6,989.86	6,985.37	-545.75	7,006.65	355.53	446,053.18	828,732.43
19,400.00	103.60	0.90	12,205.54	7,082.49	7,077.99	-546.40	7,099.05	355.59	446,145.80	828,731.78
19,494.00	104.80	1.20	12,182.49	7,173.58	7,169.10	-544.73	7,189.77	355.65	446,236.91	828,733.45
19,588.00	104.90	0.90	12,158.39	7,264.41	7,259.95	-543.07	7,280.23	355.72	446,327.76	828,735.11
19,683.00	104.10	1.00	12,134.61	7,356.35	7,351.91	-541.54	7,371.83	355.79	446,419.72	828,736.64
19,777.00	104.80	0.80	12,111.15	7,447.35	7,442.92	-540.11	7,462.49	355.85	446,510.73	828,738.07
19,835.00	104.70	0.70	12,096.38	7,503.43	7,499.01	-539.38	7,518.38	355.89	446,566.82	828,738.80
Last Survey: 19835' MD										
19,924.00	104.70	0.70	12,073.80	7,589.49	7,585.09	-538.33	7,604.16	355.94	446,652.90	828,739.85
PTB: 19924' MD										

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,167.00	1,166.93	2.52	-3.42	Pro MWD First Survey: 1167' MD
19,835.00	12,096.38	7,499.01	-539.38	Last Survey: 19835' MD
19,924.00	12,073.80	7,585.09	-538.33	PTB: 19924' MD