

SOUTHWESTERN ENERGY

Project: Ohio County
 Site: Mark Hickman OHI Pad
 Well: 10H
 Wellbore: Wellbore #1
 Design: Plan #3
 Rig: SDC 41
 Job: H18086

FINAL AS DRILLED ANNOTATIONS

MD	Inc	Alt	TYD	+N-S	+E-W	V-Sect	Departure	Annotation
942.0	2.34	123.41	841.9	6.8	-5.3	3.2	13.9	First MWD @ 942' MD 942' TYD
15285.0	88.40	155.15	8786.1	-779.9	6327.9	888.6	8479.9	Last MWD @ 15285' MD 8786' TYD
15227.0	88.40	155.15	8786.5	-779.9	6346.5	893.4	9221.9	PTD @ 15227' MD 8786' TYD



FINAL AS DRILLED TARGET DETAILS

Name	TYD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
PTD Mark Hickman OHI 10H	8786.5	-779.9	6346.5	14533791.23	1771644.32	40° 1' 5.282 N	80° 31' 55.317 W	Point

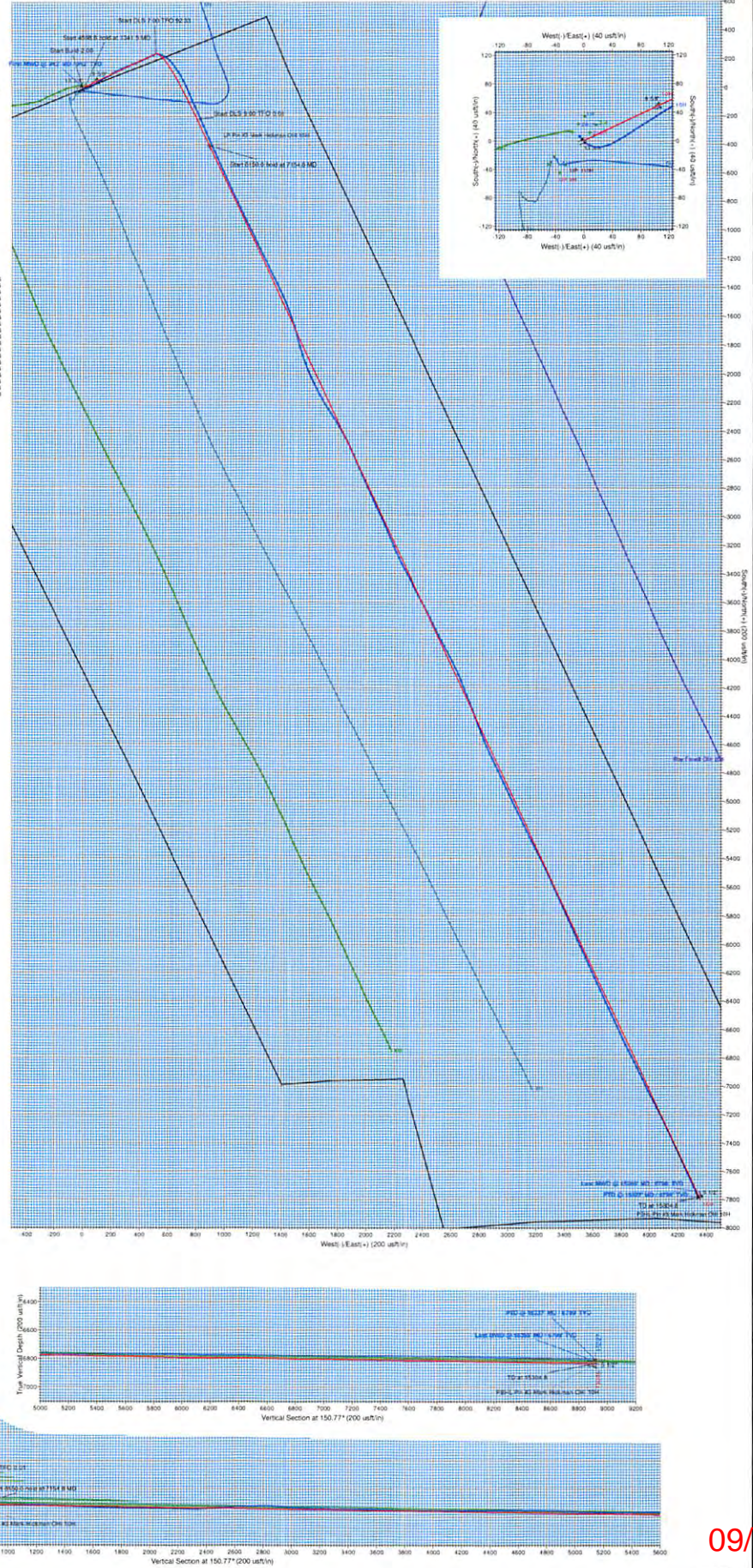
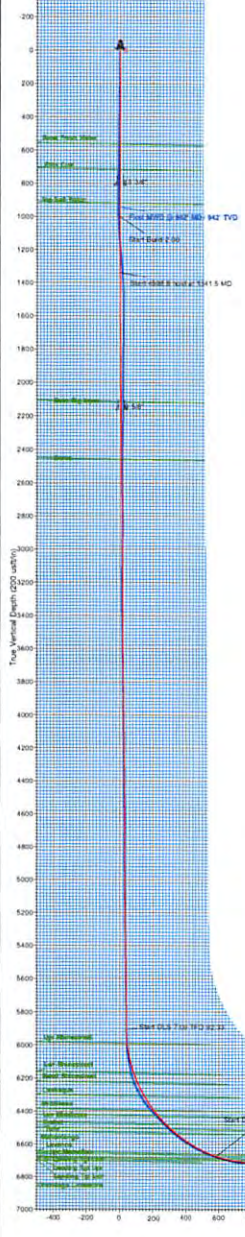


CASING DETAILS

MD	TYD	Name	Size
942.0	942.0	13 5/8" 13.5 S	9-5/8
2169.0	2169.0	9 5/8" 9-5/8	9-5/8
15204.8	8833.0	5 1/2" 5-1/2	5-1/2

FORMATION TOP DETAILS

MDPath	TYDPath	Formation	DipAngle
942.0	942.0	Base Fract. Water	0.85 134.85
714.0	714.0	Shin Coal	0.85 134.85
714.0	714.0	Top Silty Shale	0.85 134.85
2126.3	2114.0	Base Silty Shale	0.85 134.85
2465.0	2457.0	Shin	0.85 134.85
6224.3	5996.7	Upr. Riverwood	0.85 134.85
6226.0	6182.7	Upr. Riverwood	0.85 134.85
8271.4	8227.0	Base Riverwood	0.85 134.85
8263.0	8258.0	Coalbank	0.85 134.85
8484.7	8393.0	Middlesex	0.85 134.85
8386.7	8427.0	Upr. Middlesex	0.85 134.85
8571.8	8476.5	Burket	0.85 134.85
8815.9	8555.8	Tully	0.85 134.85
8653.0	8532.0	Murdergo	0.85 134.85
8900.5	8586.0	Upr. Lawrence	0.85 134.85
8710.0	8618.0	Upr. Lawrence	0.85 134.85
8897.5	8688.7	Landing Top Crv	0.85 134.85
8996.0	8689.0	Landing Top Crv	0.85 134.85
7062.8	6798.0	Landing Top Crv	0.85 134.85



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SOUTHWESTERN ENERGY

**Ohio County
Mark Hickman OHI Pad
10H**

Wellbore #1

Design: Wellbore #1

Standard Survey Report

19 April, 2018

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Local Co-ordinate Reference: Well 10H
TVD Reference: 1281.8+26 @ 1307.8usft
MD Reference: 1281.8+26 @ 1307.8usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 14 Multi User

Project	Ohio County		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Mark Hickman OHI Pad		
Site Position:		Northing:	14,541,552.86 usft
From:	Lat/Long	Easting:	1,767,082.84 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	40° 2' 23.327 N
		Longitude:	80° 32' 50.788 W
		Grid Convergence:	0.29 °

Well	10H		
Well Position	+N/-S	0.0 usft	Northing: 14,541,540.93 usft
	+E/-W	0.0 usft	Easting: 1,767,098.85 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	40° 2' 23.208 N
		Longitude:	80° 32' 50.582 W
		Ground Level:	1,281.8 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	02/19/18	-8.48	67.30	52,752.30000000

Design	Wellbore #1			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	150.77

Survey Program	Date 04/19/18			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	794.0	Survey #1 (Wellbore #1)	GYRO-MWD	OWSG Gyro MWD
879.0	15,327.0	Survey #2 (Wellbore #1)	MWD+HRGM	OWSG MWD + HRGM

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
100.0	0.60	312.72	100.0	0.4	-0.4	-0.5	0.60	0.60	0.00	
200.0	0.90	293.93	200.0	1.0	-1.5	-1.6	0.38	0.30	-18.79	
300.0	0.83	297.18	300.0	1.7	-2.8	-2.9	0.09	-0.07	3.25	
400.0	0.77	328.34	400.0	2.6	-3.8	-4.1	0.43	-0.06	31.16	
500.0	0.52	341.38	500.0	3.6	-4.3	-5.2	0.29	-0.25	13.04	
600.0	0.65	305.91	600.0	4.3	-4.9	-6.2	0.38	0.13	-35.47	
700.0	0.79	319.87	699.9	5.2	-5.9	-7.4	0.22	0.14	13.96	
729.0	0.56	322.16	728.9	5.5	-6.1	-7.7	0.80	-0.79	7.90	
762.0	0.84	329.02	761.9	5.8	-6.3	-8.1	0.88	0.85	20.79	



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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
794.0	0.87	345.46	793.9	6.2	-6.5	-8.6	0.77	0.09	51.38
879.0	0.48	80.33	878.9	6.9	-6.3	-9.1	1.21	-0.46	111.61
942.0	0.54	123.41	941.9	6.8	-5.8	-8.8	0.60	0.10	68.38
First MWD @ 942' MD / 942' TVD									
973.0	0.83	133.25	972.9	6.6	-5.5	-8.4	1.01	0.94	31.74
1,037.0	2.03	145.31	1,036.9	5.3	-4.5	-6.8	1.92	1.88	18.84
1,069.0	2.81	146.59	1,068.9	4.2	-3.8	-5.5	2.44	2.44	4.00
1,101.0	3.51	145.28	1,100.8	2.7	-2.8	-3.7	2.20	2.19	-4.09
1,133.0	4.06	138.66	1,132.8	1.1	-1.5	-1.7	2.19	1.72	-20.69
1,166.0	4.63	134.43	1,165.7	-0.7	0.3	0.8	1.98	1.73	-12.82
1,198.0	5.29	130.63	1,197.5	-2.6	2.3	3.4	2.30	2.06	-11.88
1,230.0	5.75	123.55	1,229.4	-4.4	4.8	6.2	2.57	1.44	-22.13
1,262.0	6.07	115.74	1,261.2	-6.1	7.6	9.0	2.70	1.00	-24.41
1,294.0	6.61	108.41	1,293.0	-7.4	10.9	11.8	3.04	1.69	-22.91
1,326.0	6.99	99.79	1,324.8	-8.3	14.6	14.3	3.40	1.19	-26.94
1,358.0	7.41	92.31	1,356.6	-8.7	18.5	16.6	3.21	1.31	-23.38
1,390.0	7.86	86.76	1,388.3	-8.7	22.8	18.7	2.70	1.41	-17.34
1,423.0	8.03	78.76	1,421.0	-8.1	27.3	20.4	3.39	0.52	-24.24
1,454.0	8.27	74.54	1,451.6	-7.1	31.6	21.6	2.08	0.77	-13.61
1,486.0	8.37	68.58	1,483.3	-5.6	36.0	22.4	2.71	0.31	-18.63
1,518.0	8.37	64.16	1,515.0	-3.7	40.2	22.9	2.01	0.00	-13.81
1,550.0	8.30	60.92	1,546.6	-1.6	44.3	23.0	1.48	-0.22	-10.13
1,646.0	8.52	58.50	1,641.6	5.5	56.5	22.8	0.43	0.23	-2.52
1,742.0	8.14	57.85	1,736.6	12.8	68.3	22.2	0.41	-0.40	-0.68
1,838.0	7.75	57.07	1,831.7	20.0	79.5	21.4	0.42	-0.41	-0.81
1,934.0	7.46	59.06	1,926.8	26.7	90.2	20.8	0.41	-0.30	2.07
2,030.0	6.84	57.53	2,022.1	32.9	100.4	20.3	0.68	-0.65	-1.59
2,126.0	6.21	60.12	2,117.5	38.6	109.7	19.9	0.72	-0.66	2.70
2,222.0	5.70	57.41	2,212.9	43.8	118.3	19.6	0.61	-0.53	-2.82
2,266.0	5.56	56.52	2,256.7	46.1	121.9	19.3	0.37	-0.32	-2.02
2,361.0	4.90	48.20	2,351.3	51.4	128.7	18.0	1.06	-0.69	-8.76
2,409.0	4.94	44.57	2,399.2	54.2	131.7	17.0	0.65	0.08	-7.56
2,505.0	6.22	49.03	2,494.7	60.5	138.5	14.8	1.41	1.33	4.65
2,601.0	9.73	63.86	2,589.8	67.5	149.8	14.2	4.21	3.66	15.45
2,697.0	10.71	68.33	2,684.2	74.4	165.3	15.8	1.31	1.02	4.66
2,793.0	9.57	64.06	2,778.7	81.2	180.8	17.4	1.42	-1.19	-4.45
2,889.0	7.37	58.45	2,873.7	87.9	193.2	17.6	2.45	-2.29	-5.84
2,985.0	6.55	54.85	2,969.0	94.3	202.9	16.8	0.97	-0.85	-3.75
3,081.0	6.91	57.36	3,064.3	100.5	212.3	15.9	0.48	0.38	2.61
3,177.0	7.41	57.72	3,159.6	107.0	222.4	15.2	0.52	0.52	0.38
3,273.0	7.31	58.96	3,254.8	113.4	232.8	14.7	0.20	-0.10	1.29
3,369.0	7.65	66.26	3,350.0	119.1	243.9	15.1	1.05	0.35	7.60
3,465.0	8.05	68.38	3,445.1	124.2	256.0	16.6	0.51	0.42	2.21



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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,561.0	6.95	66.24	3,540.2	129.0	267.6	18.1	1.18	-1.15	-2.23
3,657.0	6.19	66.28	3,635.6	133.4	277.6	19.1	0.79	-0.79	0.04
3,753.0	6.03	64.60	3,731.1	137.7	286.9	20.0	0.25	-0.17	-1.75
3,849.0	6.37	67.43	3,826.5	141.9	296.4	20.9	0.48	0.35	2.95
3,946.0	6.67	69.49	3,922.9	145.9	306.7	22.4	0.39	0.31	2.12
4,042.0	6.28	68.28	4,018.3	149.8	316.8	23.9	0.43	-0.41	-1.26
4,138.0	5.90	66.31	4,113.7	153.7	326.2	25.1	0.45	-0.40	-2.05
4,234.0	6.53	65.87	4,209.2	158.0	335.7	26.1	0.66	0.66	-0.46
4,331.0	7.00	63.98	4,305.5	162.8	346.0	26.9	0.54	0.48	-1.95
4,427.0	7.09	64.88	4,400.8	167.9	356.6	27.6	0.15	0.09	0.94
4,523.0	7.46	72.05	4,496.0	172.3	367.9	29.3	1.02	0.39	7.47
4,619.0	7.49	72.62	4,591.2	176.1	379.8	31.8	0.08	0.03	0.59
4,715.0	6.37	55.46	4,686.5	181.0	390.2	32.6	2.44	-1.17	-17.88
4,812.0	5.91	57.75	4,782.9	186.7	398.8	31.8	0.54	-0.47	2.36
4,908.0	6.00	67.08	4,878.4	191.3	407.6	32.1	1.01	0.09	9.72
5,004.0	5.92	68.50	4,973.9	195.1	416.9	33.3	0.17	-0.08	1.48
5,101.0	5.62	65.53	5,070.4	198.9	425.8	34.4	0.44	-0.31	-3.06
5,197.0	5.86	65.55	5,165.9	202.9	434.6	35.2	0.25	0.25	0.02
5,293.0	6.34	66.88	5,261.4	207.0	443.9	36.2	0.52	0.50	1.39
5,389.0	6.67	66.51	5,356.8	211.3	453.9	37.3	0.35	0.34	-0.39
5,486.0	6.44	65.80	5,453.1	215.7	464.0	38.3	0.25	-0.24	-0.73
5,582.0	6.28	62.89	5,548.5	220.3	473.6	39.0	0.37	-0.17	-3.03
5,678.0	6.36	64.46	5,643.9	225.0	483.1	39.5	0.20	0.08	1.64
5,774.0	6.57	66.05	5,739.3	229.5	492.9	40.4	0.29	0.22	1.66
5,871.0	6.59	64.19	5,835.7	234.2	503.0	41.2	0.22	0.02	-1.92
5,919.0	6.32	66.75	5,883.4	236.5	507.9	41.7	0.82	-0.56	5.33
5,966.0	6.81	77.90	5,930.1	238.1	513.0	42.7	2.90	1.04	23.72
6,014.0	7.73	88.66	5,977.7	238.7	519.0	45.1	3.42	1.92	22.42
6,062.0	8.52	98.64	6,025.2	238.3	525.7	48.8	3.36	1.65	20.79
6,096.0	9.57	103.57	6,058.8	237.2	531.0	52.3	3.84	3.09	14.50
6,158.0	11.96	110.33	6,119.7	233.8	542.0	60.6	4.35	3.85	10.90
6,206.0	16.93	113.34	6,166.2	229.3	553.1	70.0	10.47	10.35	6.27
6,254.0	22.97	118.37	6,211.3	222.1	567.8	83.5	13.07	12.58	10.48
6,302.0	27.92	123.36	6,254.6	211.4	585.4	101.4	11.23	10.31	10.40
6,350.0	30.11	129.85	6,296.6	197.5	604.1	122.6	7.98	4.56	13.52
6,398.0	34.34	138.41	6,337.2	179.7	622.3	147.1	12.95	8.81	17.83
6,447.0	39.94	144.98	6,376.3	156.4	640.5	176.3	13.99	11.43	13.41
6,495.0	42.49	146.36	6,412.4	130.3	658.4	207.8	5.64	5.31	2.88
6,543.0	43.83	146.44	6,447.4	103.0	676.5	240.5	2.79	2.79	0.17
6,591.0	45.38	148.43	6,481.6	74.6	694.7	274.1	4.35	3.23	4.15
6,639.0	46.62	152.57	6,514.9	44.5	711.6	308.7	6.72	2.58	8.63
6,687.0	51.22	156.10	6,546.5	11.9	727.3	344.7	11.07	9.58	7.35
6,735.0	55.32	156.73	6,575.2	-23.3	742.6	383.0	8.61	8.54	1.31



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6,783.0	59.25	156.55	6,601.1	-60.4	758.7	423.2	8.19	8.19	-0.38
6,832.0	62.25	156.49	6,625.0	-99.6	775.7	465.7	6.12	6.12	-0.12
6,880.0	65.17	156.23	6,646.3	-139.0	792.9	508.5	6.10	6.08	-0.54
6,928.0	68.79	154.95	6,665.1	-179.3	811.2	552.6	7.93	7.54	-2.67
6,976.0	72.28	156.26	6,681.1	-220.5	829.9	597.6	7.71	7.27	2.73
7,023.0	75.19	157.14	6,694.2	-261.9	847.7	642.5	6.45	6.19	1.87
7,071.0	77.78	156.83	6,705.4	-304.9	866.0	688.9	5.43	5.40	-0.65
7,119.0	83.19	156.15	6,713.4	-348.2	884.9	736.0	11.36	11.27	-1.42
7,216.0	92.38	155.67	6,717.1	-436.6	924.4	832.4	9.49	9.47	-0.49
7,312.0	90.48	156.19	6,714.7	-524.3	963.5	928.0	2.05	-1.98	0.54
7,380.0	90.54	156.03	6,714.1	-586.4	991.1	995.7	0.25	0.09	-0.24
7,477.0	90.76	155.94	6,713.0	-675.0	1,030.5	1,092.3	0.25	0.23	-0.09
7,573.0	89.66	155.15	6,712.7	-762.4	1,070.3	1,188.0	1.41	-1.15	-0.82
7,669.0	86.67	154.00	6,715.7	-849.1	1,111.5	1,283.7	3.34	-3.11	-1.20
7,766.0	87.92	154.27	6,720.3	-936.2	1,153.7	1,380.4	1.32	1.29	0.28
7,862.0	88.14	154.27	6,723.6	-1,022.7	1,195.4	1,476.2	0.23	0.23	0.00
7,958.0	88.54	154.27	6,726.4	-1,109.1	1,237.0	1,572.0	0.42	0.42	0.00
8,054.0	89.04	153.65	6,728.4	-1,195.4	1,279.2	1,667.8	0.83	0.52	-0.65
8,150.0	89.04	153.21	6,730.0	-1,281.2	1,322.1	1,763.7	0.46	0.00	-0.46
8,246.0	89.11	153.39	6,731.6	-1,367.0	1,365.2	1,859.6	0.20	0.07	0.19
8,342.0	88.52	155.50	6,733.6	-1,453.5	1,406.6	1,955.3	2.28	-0.61	2.20
8,438.0	89.22	159.19	6,735.5	-1,542.1	1,443.6	2,050.7	3.91	0.73	3.84
8,534.0	89.40	161.83	6,736.6	-1,632.6	1,475.6	2,145.3	2.76	0.19	2.75
8,630.0	88.34	162.62	6,738.5	-1,724.0	1,504.9	2,239.3	1.38	-1.10	0.82
8,726.0	91.00	163.58	6,739.1	-1,815.8	1,532.8	2,333.1	2.95	2.77	1.00
8,822.0	91.94	160.60	6,736.6	-1,907.1	1,562.3	2,427.2	3.25	0.98	-3.10
8,917.0	92.82	156.90	6,732.6	-1,995.6	1,596.7	2,521.2	4.00	0.93	-3.89
9,013.0	94.19	152.95	6,726.8	-2,082.4	1,637.3	2,616.7	4.35	1.43	-4.11
9,109.0	92.41	150.49	6,721.2	-2,166.7	1,682.7	2,712.6	3.16	-1.85	-2.56
9,204.0	89.46	147.68	6,719.7	-2,248.2	1,731.5	2,807.5	4.29	-3.11	-2.96
9,301.0	86.19	147.24	6,723.4	-2,329.9	1,783.7	2,904.2	3.40	-3.37	-0.45
9,397.0	85.13	151.19	6,730.6	-2,412.1	1,832.6	2,999.9	4.25	-1.10	4.11
9,493.0	87.22	154.79	6,737.1	-2,497.5	1,876.1	3,095.6	4.33	2.18	3.75
9,589.0	89.42	156.64	6,739.9	-2,584.9	1,915.6	3,191.2	2.99	2.29	1.93
9,686.0	87.02	155.41	6,742.9	-2,673.5	1,955.0	3,287.7	2.78	-2.47	-1.27
9,782.0	90.23	156.55	6,745.2	-2,761.1	1,994.0	3,383.3	3.55	3.34	1.19
9,878.0	89.53	156.38	6,745.4	-2,849.2	2,032.4	3,478.8	0.75	-0.73	-0.18
9,974.0	87.35	155.41	6,748.0	-2,936.8	2,071.6	3,574.4	2.49	-2.27	-1.01
10,069.0	88.03	155.67	6,751.8	-3,023.2	2,110.9	3,669.0	0.77	0.72	0.27
10,166.0	89.33	156.20	6,754.1	-3,111.7	2,150.4	3,765.6	1.45	1.34	0.55
10,261.0	90.38	157.08	6,754.3	-3,198.9	2,188.1	3,860.1	1.44	1.11	0.93
10,359.0	89.84	154.27	6,754.1	-3,288.2	2,228.4	3,957.7	2.92	-0.55	-2.87
10,454.0	89.88	151.72	6,754.3	-3,372.8	2,271.6	4,052.6	2.68	0.04	-2.68
10,551.0	89.99	151.72	6,754.5	-3,458.3	2,317.5	4,149.6	0.11	0.11	0.00



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WV Department of
Environmental Protection

Company: SOUTHWESTERN ENERGY
Project: Ohio County
Site: Mark Hickman OHI Pad
Well: 10H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well 10H
TVD Reference: 1281.8+26 @ 1307.8usft
MD Reference: 1281.8+26 @ 1307.8usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 14 Multi User

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,646.0	90.01	152.16	6,754.5	-3,542.1	2,362.2	4,244.6	0.46	0.02	0.46
10,743.0	89.88	152.33	6,754.5	-3,627.9	2,407.4	4,341.5	0.22	-0.13	0.18
10,838.0	90.87	153.56	6,753.9	-3,712.5	2,450.6	4,436.5	1.66	1.04	1.29
10,933.0	90.41	152.60	6,752.9	-3,797.2	2,493.6	4,531.4	1.12	-0.48	-1.01
11,029.0	90.23	152.25	6,752.3	-3,882.3	2,538.0	4,627.3	0.41	-0.19	-0.36
11,125.0	89.20	152.42	6,752.8	-3,967.3	2,582.6	4,723.3	1.09	-1.07	0.18
11,221.0	88.30	154.35	6,754.9	-4,053.1	2,625.6	4,819.2	2.22	-0.94	2.01
11,317.0	87.99	157.43	6,758.0	-4,140.7	2,664.8	4,914.7	3.22	-0.32	3.21
11,414.0	88.10	158.40	6,761.3	-4,230.5	2,701.2	5,010.9	1.01	0.11	1.00
11,510.0	87.95	158.57	6,764.6	-4,319.8	2,736.4	5,106.0	0.24	-0.16	0.18
11,605.0	88.56	159.63	6,767.5	-4,408.5	2,770.3	5,199.9	1.29	0.64	1.12
11,701.0	90.63	159.72	6,768.2	-4,498.5	2,803.7	5,294.8	2.16	2.16	0.09
11,797.0	91.70	158.13	6,766.2	-4,588.1	2,838.2	5,389.8	2.00	1.11	-1.66
11,893.0	90.69	154.35	6,764.2	-4,675.9	2,876.8	5,485.3	4.07	-1.05	-3.94
11,989.0	89.81	154.00	6,763.8	-4,762.3	2,918.6	5,581.1	0.99	-0.92	-0.36
12,086.0	89.81	154.79	6,764.1	-4,849.8	2,960.6	5,677.9	0.81	0.00	0.81
12,182.0	89.42	155.15	6,764.8	-4,936.8	3,001.2	5,773.7	0.55	-0.41	0.38
12,278.0	88.96	154.44	6,766.1	-5,023.6	3,042.1	5,869.4	0.88	-0.48	-0.74
12,374.0	89.31	153.65	6,767.6	-5,109.9	3,084.1	5,965.3	0.90	0.36	-0.82
12,471.0	88.93	153.21	6,769.1	-5,196.7	3,127.5	6,062.2	0.60	-0.39	-0.45
12,567.0	88.93	152.77	6,770.9	-5,282.2	3,171.0	6,158.1	0.46	0.00	-0.46
12,663.0	89.53	153.04	6,772.2	-5,367.6	3,214.8	6,254.0	0.69	0.63	0.28
12,758.0	89.53	154.44	6,772.9	-5,452.8	3,256.8	6,348.9	1.47	0.00	1.47
12,854.0	89.44	154.62	6,773.8	-5,539.5	3,298.1	6,444.6	0.21	-0.09	0.19
12,949.0	89.42	155.41	6,774.8	-5,625.6	3,338.2	6,539.4	0.83	-0.02	0.83
13,045.0	89.51	155.76	6,775.7	-5,713.0	3,377.9	6,635.0	0.38	0.09	0.36
13,141.0	89.51	155.76	6,776.5	-5,800.6	3,417.3	6,730.7	0.00	0.00	0.00
13,237.0	89.51	156.20	6,777.3	-5,888.2	3,456.4	6,826.3	0.46	0.00	0.46
13,332.0	89.46	155.76	6,778.1	-5,975.0	3,495.0	6,920.9	0.47	-0.05	-0.46
13,428.0	89.57	155.85	6,779.0	-6,062.6	3,534.4	7,016.5	0.15	0.11	0.09
13,524.0	89.88	155.76	6,779.4	-6,150.1	3,573.7	7,112.1	0.34	0.32	-0.09
13,620.0	90.08	155.76	6,779.5	-6,237.7	3,613.1	7,207.8	0.21	0.21	0.00
13,715.0	90.05	155.41	6,779.3	-6,324.2	3,652.4	7,302.4	0.37	-0.03	-0.37
13,810.0	90.05	155.15	6,779.3	-6,410.5	3,692.1	7,397.1	0.27	0.00	-0.27
13,907.0	89.90	155.41	6,779.3	-6,498.6	3,732.7	7,493.8	0.31	-0.15	0.27
14,003.0	89.48	155.85	6,779.8	-6,586.0	3,772.3	7,589.5	0.63	-0.44	0.46
14,099.0	89.51	155.15	6,780.7	-6,673.4	3,812.1	7,685.2	0.73	0.03	-0.73
14,195.0	88.85	153.39	6,782.0	-6,759.8	3,853.8	7,781.0	1.96	-0.69	-1.83
14,291.0	89.07	153.56	6,783.8	-6,845.7	3,896.7	7,876.8	0.29	0.23	0.18
14,387.0	89.04	153.39	6,785.4	-6,931.6	3,939.5	7,972.7	0.18	-0.03	-0.18
14,483.0	88.96	152.60	6,787.0	-7,017.1	3,983.1	8,068.6	0.83	-0.08	-0.82
14,579.0	88.89	152.07	6,788.8	-7,102.1	4,027.7	8,164.6	0.56	-0.07	-0.55
14,675.0	88.85	152.51	6,790.7	-7,187.1	4,072.3	8,260.5	0.46	-0.04	0.46



Company:	SOUTHWESTERN ENERGY	Local Co-ordinate Reference:	Well 10H
Project:	Ohio County	TVD Reference:	1281.8+26 @ 1307.8usft
Site:	Mark Hickman OHI Pad	MD Reference:	1281.8+26 @ 1307.8usft
Well:	10H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 14 Multi User

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
14,772.0	88.98	154.35	6,792.6	-7,273.8	4,115.7	8,357.4	1.90	0.13	1.90	
14,868.0	89.57	155.41	6,793.8	-7,360.8	4,156.4	8,453.1	1.26	0.61	1.10	
14,964.0	89.33	155.85	6,794.7	-7,448.2	4,196.0	8,548.8	0.52	-0.25	0.46	
15,061.0	89.26	156.11	6,795.9	-7,536.8	4,235.5	8,645.4	0.28	-0.07	0.27	
15,152.0	89.55	155.85	6,796.9	-7,619.9	4,272.6	8,736.0	0.43	0.32	-0.29	
15,243.0	89.44	155.23	6,797.7	-7,702.7	4,310.2	8,826.7	0.69	-0.12	-0.68	
15,285.0	89.40	155.15	6,798.1	-7,740.9	4,327.9	8,868.6	0.21	-0.10	-0.19	
Last MWD @ 15285' MD / 6798' TVD										
15,327.0	89.40	155.15	6,798.5	-7,779.0	4,345.5	8,910.4	0.00	0.00	0.00	
PTD @ 15327' MD / 6799' TVD										

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PTD Mark Hickman C	0.00	0.00	6,798.5	-7,779.0	4,345.5	14,533,761.94	1,771,444.35	40° 1' 6.083 N	80° 31' 55.217 W
- hit/miss target									
- Shape									
- actual wellpath hits target center									
- Point									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
942.0	941.9	6.8	-5.8	First MWD @ 942' MD / 942' TVD
15,285.0	6,798.1	-7,740.9	4,327.9	Last MWD @ 15285' MD / 6798' TVD
15,327.0	6,798.5	-7,779.0	4,345.5	PTD @ 15327' MD / 6799' TVD

Checked By: _____ Approved By: _____ Date: _____

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