

SOUTHWESTERN ENERGY

Project: Ohio County
 Site: OCC A OHI Pad
 Well: OCC A OHI 5H
 Wellbore: Wellbore #1
 Design: Plan #2
 Rig: SDC 41
 Job: N18181



05/03/2019

SECTION DETAILS

Sec	MD	Inc	Adj	TVD	+N-S	+E-W	Dip	True	V-act	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	450.0	0.00	0.00	450.0	0.0	0.0	0.00	0.00	0.0	
3	900.0	5.00	85.00	896.7	5.5	8.4	0.00	80.00	2.1	
4	1350.0	5.00	80.00	1345.0	5.5	8.0	0.00	80.00	2.0	
5	1800.0	5.00	0.00	1795.0	5.5	8.0	0.00	80.00	2.0	
6	2250.0	5.00	0.00	2245.0	5.5	8.0	0.00	80.00	2.0	
7	2700.0	5.00	0.00	2695.0	5.5	8.0	0.00	80.00	2.0	
8	3150.0	5.00	0.00	3145.0	5.5	8.0	0.00	80.00	2.0	
9	3600.0	5.00	0.00	3595.0	5.5	8.0	0.00	80.00	2.0	
10	4050.0	5.00	0.00	4045.0	5.5	8.0	0.00	80.00	2.0	
11	4500.0	5.00	0.00	4495.0	5.5	8.0	0.00	80.00	2.0	

FORMATION TOP DETAILS

MD/Fth	TVDepth	Formation	Dip/Angle
432.0	432.0	STY	-0.00 336.53
506.0	506.0	STY	-0.00 336.53
566.0	566.0	STY	-0.00 336.53
600.0	600.0	STY	-0.00 336.53
634.0	634.0	STY	-0.00 336.53
668.0	668.0	STY	-0.00 336.53
702.0	702.0	STY	-0.00 336.53
736.0	736.0	STY	-0.00 336.53
770.0	770.0	STY	-0.00 336.53
804.0	804.0	STY	-0.00 336.53
838.0	838.0	STY	-0.00 336.53
872.0	872.0	STY	-0.00 336.53
906.0	906.0	STY	-0.00 336.53
940.0	940.0	STY	-0.00 336.53
974.0	974.0	STY	-0.00 336.53
1008.0	1008.0	STY	-0.00 336.53
1042.0	1042.0	STY	-0.00 336.53
1076.0	1076.0	STY	-0.00 336.53
1110.0	1110.0	STY	-0.00 336.53
1144.0	1144.0	STY	-0.00 336.53
1178.0	1178.0	STY	-0.00 336.53
1212.0	1212.0	STY	-0.00 336.53
1246.0	1246.0	STY	-0.00 336.53
1280.0	1280.0	STY	-0.00 336.53
1314.0	1314.0	STY	-0.00 336.53
1348.0	1348.0	STY	-0.00 336.53
1382.0	1382.0	STY	-0.00 336.53
1416.0	1416.0	STY	-0.00 336.53
1450.0	1450.0	STY	-0.00 336.53
1484.0	1484.0	STY	-0.00 336.53
1518.0	1518.0	STY	-0.00 336.53
1552.0	1552.0	STY	-0.00 336.53
1586.0	1586.0	STY	-0.00 336.53
1620.0	1620.0	STY	-0.00 336.53
1654.0	1654.0	STY	-0.00 336.53
1688.0	1688.0	STY	-0.00 336.53
1722.0	1722.0	STY	-0.00 336.53
1756.0	1756.0	STY	-0.00 336.53
1790.0	1790.0	STY	-0.00 336.53
1824.0	1824.0	STY	-0.00 336.53
1858.0	1858.0	STY	-0.00 336.53
1892.0	1892.0	STY	-0.00 336.53
1926.0	1926.0	STY	-0.00 336.53
1960.0	1960.0	STY	-0.00 336.53
1994.0	1994.0	STY	-0.00 336.53
2028.0	2028.0	STY	-0.00 336.53
2062.0	2062.0	STY	-0.00 336.53
2096.0	2096.0	STY	-0.00 336.53
2130.0	2130.0	STY	-0.00 336.53
2164.0	2164.0	STY	-0.00 336.53
2198.0	2198.0	STY	-0.00 336.53
2232.0	2232.0	STY	-0.00 336.53
2266.0	2266.0	STY	-0.00 336.53
2300.0	2300.0	STY	-0.00 336.53
2334.0	2334.0	STY	-0.00 336.53
2368.0	2368.0	STY	-0.00 336.53
2402.0	2402.0	STY	-0.00 336.53
2436.0	2436.0	STY	-0.00 336.53
2470.0	2470.0	STY	-0.00 336.53
2504.0	2504.0	STY	-0.00 336.53
2538.0	2538.0	STY	-0.00 336.53
2572.0	2572.0	STY	-0.00 336.53
2606.0	2606.0	STY	-0.00 336.53
2640.0	2640.0	STY	-0.00 336.53
2674.0	2674.0	STY	-0.00 336.53
2708.0	2708.0	STY	-0.00 336.53
2742.0	2742.0	STY	-0.00 336.53
2776.0	2776.0	STY	-0.00 336.53
2810.0	2810.0	STY	-0.00 336.53
2844.0	2844.0	STY	-0.00 336.53
2878.0	2878.0	STY	-0.00 336.53
2912.0	2912.0	STY	-0.00 336.53
2946.0	2946.0	STY	-0.00 336.53
2980.0	2980.0	STY	-0.00 336.53
3014.0	3014.0	STY	-0.00 336.53
3048.0	3048.0	STY	-0.00 336.53
3082.0	3082.0	STY	-0.00 336.53
3116.0	3116.0	STY	-0.00 336.53
3150.0	3150.0	STY	-0.00 336.53
3184.0	3184.0	STY	-0.00 336.53
3218.0	3218.0	STY	-0.00 336.53
3252.0	3252.0	STY	-0.00 336.53
3286.0	3286.0	STY	-0.00 336.53
3320.0	3320.0	STY	-0.00 336.53
3354.0	3354.0	STY	-0.00 336.53
3388.0	3388.0	STY	-0.00 336.53
3422.0	3422.0	STY	-0.00 336.53
3456.0	3456.0	STY	-0.00 336.53
3490.0	3490.0	STY	-0.00 336.53
3524.0	3524.0	STY	-0.00 336.53
3558.0	3558.0	STY	-0.00 336.53
3592.0	3592.0	STY	-0.00 336.53
3626.0	3626.0	STY	-0.00 336.53
3660.0	3660.0	STY	-0.00 336.53
3694.0	3694.0	STY	-0.00 336.53
3728.0	3728.0	STY	-0.00 336.53
3762.0	3762.0	STY	-0.00 336.53
3796.0	3796.0	STY	-0.00 336.53
3830.0	3830.0	STY	-0.00 336.53
3864.0	3864.0	STY	-0.00 336.53
3898.0	3898.0	STY	-0.00 336.53
3932.0	3932.0	STY	-0.00 336.53
3966.0	3966.0	STY	-0.00 336.53
4000.0	4000.0	STY	-0.00 336.53
4034.0	4034.0	STY	-0.00 336.53
4068.0	4068.0	STY	-0.00 336.53
4102.0	4102.0	STY	-0.00 336.53
4136.0	4136.0	STY	-0.00 336.53
4170.0	4170.0	STY	-0.00 336.53
4204.0	4204.0	STY	-0.00 336.53
4238.0	4238.0	STY	-0.00 336.53
4272.0	4272.0	STY	-0.00 336.53
4306.0	4306.0	STY	-0.00 336.53
4340.0	4340.0	STY	-0.00 336.53
4374.0	4374.0	STY	-0.00 336.53
4408.0	4408.0	STY	-0.00 336.53
4442.0	4442.0	STY	-0.00 336.53
4476.0	4476.0	STY	-0.00 336.53
4510.0	4510.0	STY	-0.00 336.53
4544.0	4544.0	STY	-0.00 336.53
4578.0	4578.0	STY	-0.00 336.53
4612.0	4612.0	STY	-0.00 336.53
4646.0	4646.0	STY	-0.00 336.53
4680.0	4680.0	STY	-0.00 336.53
4714.0	4714.0	STY	-0.00 336.53
4748.0	4748.0	STY	-0.00 336.53
4782.0	4782.0	STY	-0.00 336.53
4816.0	4816.0	STY	-0.00 336.53
4850.0	4850.0	STY	-0.00 336.53
4884.0	4884.0	STY	-0.00 336.53
4918.0	4918.0	STY	-0.00 336.53
4952.0	4952.0	STY	-0.00 336.53
4986.0	4986.0	STY	-0.00 336.53
5020.0	5020.0	STY	-0.00 336.53
5054.0	5054.0	STY	-0.00 336.53
5088.0	5088.0	STY	-0.00 336.53
5122.0	5122.0	STY	-0.00 336.53
5156.0	5156.0	STY	-0.00 336.53
5190.0	5190.0	STY	-0.00 336.53
5224.0	5224.0	STY	-0.00 336.53
5258.0	5258.0	STY	-0.00 336.53
5292.0	5292.0	STY	-0.00 336.53
5326.0	5326.0	STY	-0.00 336.53
5360.0	5360.0	STY	-0.00 336.53
5394.0	5394.0	STY	-0.00 336.53
5428.0	5428.0	STY	-0.00 336.53
5462.0	5462.0	STY	-0.00 336.53
5496.0	5496.0	STY	-0.00 336.53
5530.0	5530.0	STY	-0.00 336.53
5564.0	5564.0	STY	-0.00 336.53
5598.0	5598.0	STY	-0.00 336.53
5632.0	5632.0	STY	-0.00 336.53
5666.0	5666.0	STY	-0.00 336.53
5700.0	5700.0	STY	-0.00 336.53
5734.0	5734.0	STY	-0.00 336.53
5768.0	5768.0	STY	-0.00 336.53
5802.0	5802.0	STY	-0.00 336.53
5836.0	5836.0	STY	-0.00 336.53
5870.0	5870.0	STY	-0.00 336.53
5904.0	5904.0	STY	-0.00 336.53
5938.0	5938.0	STY	-0.00 336.53
5972.0	5972.0	STY	-0.00 336.53
6006.0	6006.0	STY	-0.00 336.53
6040.0	6040.0	STY	-0.00 336.53
6074.0	6074.0	STY	-0.00 336.53
6108.0	6108.0	STY	-0.00 336.53
6142.0	6142.0	STY	-0.00 336.53
6176.0	6176.0	STY	-0.00 336.53
6210.0	6210.0	STY	-0.00 336.53
6244.0	6244.0	STY	-0.00 336.53
6278.0	6278.0	STY	-0.00 336.53
6312.0	6312.0	STY	-0.00 336.53
6346.0	6346.0	STY	-0.00 336.53
6380.0	6380.0	STY	-0.00 336.53
6414.0	6414.0	STY	-0.00 336.53
6448.0	6448.0	STY	-0.00 336.53
6482.0	6482.0	STY	-0.00 336.53
6516.0	6516.0	STY	-0.00 336.53
6550.0	6550.0	STY	-0.00 336.53
6584.0	6584.0	STY	-0.00 336.53
6618.0	6618.0	STY	-0.00 336.53
6652.0	6652.0	STY	-0.00 336.53
6686.0	6686.0	STY	-0.00 336.53
6720.0	6720.0	STY	-0.00 336.53
6754.0	6754.0	STY	-0.00 336.53
6788.0	6788.0	STY	-0.00 336.53
6822.0	6822.0	STY	-0.00 336.53
6856.0	6856.0	STY	-0.00 336.53
6890.0	6890.0	STY	-0.00 336.53
6924.0	6924.0	STY	-0.00 336.53
6958.0	6958.0	STY	-0.00 336.53
6992.0	6992.0	STY	-0.00 336.53
7026.0	7026.0	STY	-0.00 336.53
7060.0	7060.0	STY	-0.00 336.53
7094.0	7094.0	STY	-0.00 336.53
7128.0	7128.0	STY	-0.00 336.53
7162.0	7162.0	STY	-0.00 336.53
7196.0	7196.0	STY	-0.00 336.53
7230.0	7230.0	STY	-0.00 336.53
7264.0	7264.0	STY	-0.00 336.53
7298.0	7298.0	STY	-0.00 336.53
7332.0	7332.0	STY	-0.00 336.53
7366.0	7366.0	STY	-0.00 336.53
7400.0	7400.0	STY	-0.00 336.53
7434.0	7434.0	STY	-0.00 336.53
7468.0	7468.0	STY	-0.00 336.53
7502.0	7502.0	STY	-0.00 336.53
7536.0	7536.0	STY	-0.00 336.53
7570.0	7570.0	STY	-0.00 336.53
7604.0	7604.0	STY	-0.00 336.53
7638.0	7638.0	STY	-0.00 336.53
7672.0	7672.0	STY	-0.00 336.53
7706.0	7706.0	STY	-0.00 336.53
7740.0	7740.0	STY	-0.00 336.53
7774.0	7774.0	STY	-0.00 336.53
7808.0	7808.0	STY	-0.00 336.53
7842.0	7842.0	STY	-0.00 336.53
787			

05/03/2019



SOUTHWESTERN ENERGY

**Ohio County
OCC A OHI Pad
OCC A OHI 5H**

Wellbore #1

Design: Wellbore #1

Standard Survey Report

02 May, 2018

RECEIVED
Office of Oil and Gas

JAN 31 2019

WV Department of
Environmental Protection





Company:	SOUTHWESTERN ENERGY	Local Co-ordinate Reference:	Well OCC A OHI 5H
Project:	Ohio County	TVD Reference:	1095.5+26 @ 1121.5usft
Site:	OCC A OHI Pad	MD Reference:	1095.5+26 @ 1121.5usft
Well:	OCC A OHI 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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	OCC A OHI Pad				
Site Position:		Northing:	14,555,923.67 usft	Latitude:	40° 4' 46.070 N
From:	Map	Easting:	1,752,855.85 usft	Longitude:	80° 35' 52.940 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.26 °

Well	OCC A OHI 5H					
Well Position	+N/-S	0.0 usft	Northing:	14,555,923.67 usft	Latitude:	40° 4' 46.070 N
	+E/-W	0.0 usft	Easting:	1,752,855.85 usft	Longitude:	80° 35' 52.940 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	1,095.5 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	04/10/18	-8.27	67.42	52,708.70000000

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	341.30	

Survey Program	Date 05/02/18				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	565.0	Survey #1 (Wellbore #1)	GYRO-MWD	OWSG Gyro MWD	RECEIVED Office of Oil and Gas JAN 31 2019 WV Department of Environmental Protection
591.0	591.0	Survey #2 (Wellbore #1)	MWD+HRGM	OWSG MWD + HRGM	
660.0	660.0	Survey #3 (Wellbore #1)	GYRO-MWD	OWSG Gyro MWD	
685.0	14,585.0	Survey #4 (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	0.59	296.94	100.0	0.2	-0.5	0.4	0.59	0.59	0.00	
200.0	0.43	317.46	200.0	0.7	-1.2	1.1	0.24	-0.16	20.52	
300.0	0.34	354.21	300.0	1.3	-1.5	1.7	0.26	-0.09	36.75	
400.0	0.35	208.28	400.0	1.3	-1.6	1.8	0.66	0.01	-145.93	
474.0	0.31	44.29	474.0	1.3	-1.6	1.7	0.88	-0.05	-221.61	
565.0	0.86	31.91	565.0	2.0	-1.1	2.3	0.62	0.60	-13.60	
591.0	1.22	53.20	591.0	2.4	-0.7	2.5	2.01	1.38	81.88	



Company: SOUTHWESTERN ENERGY
Project: Ohio County
Site: OCC A OHI Pad
Well: OCC A OHI 5H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well OCC A OHI 5H
TVD Reference: 1095.5+26 @ 1121.5usft
MD Reference: 1095.5+26 @ 1121.5usft
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)
660.0	2.73	53.77	659.9	3.8	1.2	3.2	2.19	2.19	0.83
685.0	3.31	61.56	684.9	4.5	2.3	3.5	2.84	2.32	31.16
718.0	3.99	64.79	717.8	5.4	4.2	3.8	2.15	2.06	9.79
814.0	5.88	59.97	813.5	9.3	11.4	5.1	2.01	1.97	-5.02
910.0	6.84	54.63	908.9	15.1	20.4	7.8	1.17	1.00	-5.56
1,006.0	6.95	54.18	1,004.2	21.8	29.7	11.1	0.13	0.11	-0.47
1,103.0	5.63	58.54	1,100.6	27.7	38.6	13.9	1.45	-1.36	4.49
1,198.0	4.46	66.28	1,195.2	31.6	45.9	15.2	1.42	-1.23	8.15
1,295.0	4.30	72.19	1,292.0	34.3	52.8	15.5	0.49	-0.16	6.09
1,391.0	5.40	69.73	1,387.6	36.9	60.5	15.6	1.17	1.15	-2.56
1,486.0	5.53	61.72	1,482.2	40.6	68.7	16.5	0.81	0.14	-8.43
1,583.0	5.99	55.85	1,578.7	45.7	77.0	18.6	0.77	0.47	-6.05
1,679.0	5.95	51.42	1,674.2	51.6	85.1	21.6	0.48	-0.04	-4.61
1,775.0	4.93	49.52	1,769.7	57.4	92.1	24.8	1.08	-1.06	-1.98
1,798.0	4.46	51.61	1,792.7	58.6	93.5	25.5	2.17	-2.04	9.09
1,884.0	4.66	50.64	1,878.4	62.9	98.9	27.9	0.25	0.23	-1.13
1,945.0	4.44	51.70	1,939.2	65.9	102.6	29.5	0.39	-0.36	1.74
2,036.0	1.85	92.49	2,030.1	68.0	106.9	30.2	3.59	-2.85	44.82
2,127.0	0.83	142.06	2,121.0	67.4	108.7	29.0	1.60	-1.12	54.47
2,218.0	0.78	167.30	2,212.0	66.3	109.3	27.8	0.39	-0.05	27.74
2,313.0	0.68	154.08	2,307.0	65.2	109.7	26.6	0.21	-0.11	-13.92
2,409.0	0.56	150.25	2,403.0	64.3	110.1	25.6	0.13	-0.13	-3.99
2,504.0	0.42	131.30	2,498.0	63.6	110.6	24.8	0.22	-0.15	-19.95
2,601.0	0.47	117.53	2,595.0	63.2	111.3	24.2	0.12	0.05	-14.20
2,697.0	0.30	127.81	2,691.0	62.9	111.8	23.7	0.19	-0.18	10.71
2,793.0	0.23	147.38	2,787.0	62.6	112.1	23.3	0.12	-0.07	20.39
2,890.0	0.11	180.01	2,884.0	62.3	112.2	23.0	0.15	-0.12	33.64
2,986.0	0.04	136.33	2,980.0	62.2	112.2	22.9	0.09	-0.07	-45.50
3,082.0	0.09	10.22	3,076.0	62.2	112.3	23.0	0.12	0.05	-131.36
3,178.0	0.27	11.92	3,172.0	62.5	112.3	23.2	0.19	0.19	1.77
3,274.0	0.59	3.42	3,268.0	63.2	112.4	23.9	0.34	0.33	-8.85
3,370.0	2.31	24.66	3,364.0	65.5	113.2	25.7	1.85	1.79	22.13
3,466.0	4.34	22.07	3,459.8	70.6	115.4	29.9	2.12	2.11	-2.70
3,562.0	6.19	16.94	3,555.4	78.9	118.3	36.8	1.99	1.93	-5.34
3,656.0	7.33	13.95	3,648.7	89.6	121.2	46.0	1.27	1.21	-3.18
3,752.0	8.16	17.27	3,743.9	102.1	124.7	56.7	0.98	0.86	3.46
3,848.0	9.56	25.69	3,838.7	115.7	130.2	67.9	1.98	1.46	8.77
3,944.0	11.59	29.12	3,933.1	131.4	138.3	80.1	2.21	2.11	3.57
4,041.0	13.97	26.55	4,027.7	150.3	148.3	94.9	2.52	2.45	-2.65
4,137.0	16.35	22.10	4,120.3	173.2	158.6	113.3	2.76	2.48	-4.64
4,234.0	19.18	21.01	4,212.7	200.8	169.4	135.8	2.94	2.92	-1.12
4,330.0	20.94	26.37	4,302.9	230.9	182.7	160.1	2.65	1.83	5.58
4,425.0	20.36	25.53	4,391.8	261.0	197.4	183.9	2.61	1.83	-0.88

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JAN 31 2019 COMPASS 5000.14 Build 85

WV Department of Environmental Protection



Company: SOUTHWESTERN ENERGY
Project: Ohio County
Site: OCC A OHI Pad
Well: OCC A OHI 5H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well OCC A OHI 5H
TVD Reference: 1095.5+26 @ 1121.5usft
MD Reference: 1095.5+26 @ 1121.5usft
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)
4,521.0	19.82	27.12	4,481.9	290.5	212.0	207.2	0.80	-0.56	1.66
4,617.0	18.66	27.52	4,572.6	318.6	226.5	229.2	1.22	-1.21	0.42
4,713.0	18.81	27.75	4,663.5	346.0	240.8	250.5	0.17	0.16	0.24
4,810.0	19.91	29.84	4,755.0	374.1	256.3	272.2	1.34	1.13	2.15
4,906.0	19.77	30.49	4,845.3	402.3	272.7	293.6	0.27	-0.15	0.68
5,002.0	20.01	28.86	4,935.6	430.7	288.8	315.3	0.63	0.25	-1.70
5,098.0	20.05	27.25	5,025.8	459.7	304.3	337.9	0.58	0.04	-1.68
5,195.0	20.26	28.64	5,116.8	489.2	320.0	360.8	0.54	0.22	1.43
5,290.0	20.20	27.53	5,206.0	518.2	335.4	383.3	0.41	-0.06	-1.17
5,386.0	19.97	25.66	5,296.1	547.7	350.2	406.5	0.71	-0.24	-1.95
5,483.0	20.03	26.02	5,387.3	577.5	364.7	430.1	0.14	0.06	0.37
5,579.0	20.09	28.25	5,477.5	606.8	379.7	453.1	0.80	0.06	2.32
5,612.0	20.10	29.58	5,508.4	616.8	385.2	460.7	1.39	0.03	4.03
5,676.0	18.79	25.91	5,568.8	635.6	395.1	475.4	2.80	-2.05	-5.73
5,724.0	20.03	16.62	5,614.1	650.4	400.8	487.6	6.92	2.58	-19.35
5,772.0	22.70	10.47	5,658.8	667.4	404.9	502.4	7.25	5.56	-12.81
5,820.0	25.31	5.43	5,702.6	686.7	407.5	519.8	6.91	5.44	-10.50
5,868.0	27.43	1.03	5,745.6	708.0	408.7	539.6	6.00	4.42	-9.17
5,916.0	28.62	355.34	5,788.0	730.5	407.9	561.2	6.09	2.48	-11.85
5,965.0	29.42	351.42	5,830.9	754.1	405.2	584.4	4.21	1.63	-8.00
6,013.0	30.19	346.76	5,872.5	777.5	400.7	608.0	5.08	1.60	-9.71
6,061.0	30.77	340.32	5,913.9	800.9	393.8	632.3	6.91	1.21	-13.42
6,109.0	31.28	335.29	5,955.0	823.7	384.4	657.0	5.50	1.06	-10.48
6,157.0	33.93	337.66	5,995.5	847.5	374.1	682.8	6.13	5.52	4.94
6,205.0	37.98	342.27	6,034.3	873.9	364.5	710.9	10.14	8.44	9.60
6,254.0	42.69	345.79	6,071.7	904.4	355.8	742.6	10.67	9.61	7.18
6,302.0	48.58	347.37	6,105.2	937.8	347.9	776.7	12.49	12.27	3.29
6,350.0	54.57	346.86	6,135.0	974.4	339.5	814.1	12.51	12.48	-1.06
6,398.0	60.76	345.12	6,160.7	1,013.7	329.7	854.5	13.25	12.90	-3.63
6,447.0	68.08	343.04	6,181.8	1,056.2	317.5	898.6	15.42	14.94	-4.24
6,495.0	72.35	345.42	6,198.1	1,099.7	305.3	943.7	10.04	8.90	4.96
6,542.0	74.09	346.37	6,211.7	1,143.3	294.3	988.6	4.18	3.70	2.02
6,590.0	78.70	343.20	6,223.0	1,188.3	282.1	1,035.1	11.55	9.60	-6.60
6,638.0	84.66	342.70	6,229.9	1,233.7	268.2	1,082.6	12.46	12.42	-1.04
6,686.0	91.04	343.08	6,231.7	1,279.5	254.1	1,130.5	13.32	13.29	0.79
6,735.0	90.82	339.91	6,230.9	1,326.0	238.5	1,179.5	6.48	-0.45	-6.47
6,831.0	92.27	338.26	6,228.3	1,415.6	204.2	1,275.4	2.29	1.51	-1.72
6,926.0	93.77	333.37	6,223.3	1,502.1	165.4	1,369.8	5.38	1.58	-5.15
7,021.0	91.62	332.34	6,218.8	1,586.5	122.1	1,463.6	2.51	-2.26	-1.08
7,049.0	91.86	334.51	6,218.0	1,611.6	109.6	1,491.4	7.79	0.86	7.75
7,094.0	91.81	335.18	6,216.5	1,652.3	90.5	1,536.1	1.49	-0.11	1.49
7,190.0	91.53	335.17	6,213.7	1,739.4	50.2	1,631.5	0.29	-0.29	-0.01
7,287.0	91.90	334.95	6,210.8	1,827.3	9.3	1,727.9	0.38	0.38	-0.23
7,383.0	90.76	334.71	6,208.6	1,914.2	-31.5	1,823.2	-1.19	-1.19	-0.25

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JAN 31 2019



Company: SOUTHWESTERN ENERGY
Project: Ohio County
Site: OCC A OHI Pad
Well: OCC A OHI 5H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well OCC A OHI 5H
TVD Reference: 1095.5+26 @ 1121.5usft
MD Reference: 1095.5+26 @ 1121.5usft
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)
7,479.0	90.10	333.92	6,207.9	2,000.7	-73.1	1,918.5	1.07	-0.69	-0.82
7,575.0	90.47	335.01	6,207.4	2,087.3	-114.5	2,013.8	1.20	0.39	1.14
7,672.0	90.74	335.18	6,206.4	2,175.3	-155.4	2,110.2	0.33	0.28	0.18
7,768.0	90.74	335.18	6,205.2	2,262.4	-195.7	2,205.7	0.00	0.00	0.00
7,863.0	90.21	335.38	6,204.4	2,348.7	-235.4	2,300.2	0.60	-0.56	0.21
7,958.0	89.35	337.03	6,204.7	2,435.6	-273.7	2,394.8	1.96	-0.91	1.74
8,054.0	89.73	336.82	6,205.5	2,523.9	-311.3	2,490.5	0.45	0.40	-0.22
8,151.0	89.35	337.22	6,206.3	2,613.2	-349.2	2,587.2	0.57	-0.39	0.41
8,247.0	89.99	336.76	6,206.8	2,701.6	-386.7	2,682.9	0.82	0.67	-0.48
8,343.0	90.10	336.75	6,206.8	2,789.8	-424.6	2,778.6	0.12	0.11	-0.01
8,439.0	90.05	336.96	6,206.6	2,878.1	-462.3	2,874.4	0.22	-0.05	0.22
8,535.0	90.58	336.50	6,206.1	2,966.2	-500.3	2,970.0	0.73	0.55	-0.48
8,631.0	90.05	336.85	6,205.6	3,054.4	-538.3	3,065.7	0.66	-0.55	0.36
8,726.0	90.58	337.23	6,205.1	3,141.9	-575.3	3,160.5	0.69	0.56	0.40
8,823.0	90.32	336.77	6,204.3	3,231.2	-613.2	3,257.2	0.54	-0.27	-0.47
8,919.0	90.34	336.70	6,203.7	3,319.3	-651.2	3,352.9	0.08	0.02	-0.07
9,015.0	91.33	336.29	6,202.3	3,407.4	-689.4	3,448.5	1.12	1.03	-0.43
9,111.0	91.31	336.49	6,200.1	3,495.3	-727.9	3,544.2	0.21	-0.02	0.21
9,207.0	91.40	336.96	6,197.9	3,583.5	-765.8	3,639.8	0.50	0.09	0.49
9,303.0	91.70	338.11	6,195.3	3,672.2	-802.5	3,735.6	1.24	0.31	1.20
9,399.0	91.59	338.05	6,192.5	3,761.2	-838.3	3,831.4	0.13	-0.11	-0.06
9,495.0	91.77	338.13	6,189.7	3,850.2	-874.1	3,927.2	0.21	0.19	0.08
9,591.0	91.73	338.19	6,186.8	3,939.3	-909.8	4,023.0	0.08	-0.04	0.06
9,687.0	90.36	338.40	6,185.0	4,028.4	-945.3	4,118.9	1.44	-1.43	0.22
9,783.0	89.75	338.58	6,184.9	4,117.8	-980.5	4,214.7	0.66	-0.64	0.19
9,878.0	90.34	338.34	6,184.8	4,206.1	-1,015.4	4,309.6	0.67	0.62	-0.25
9,974.0	90.65	339.02	6,184.0	4,295.6	-1,050.3	4,405.5	0.78	0.32	0.71
10,071.0	89.48	338.87	6,183.9	4,386.1	-1,085.1	4,502.4	1.22	-1.21	-0.15
10,167.0	89.13	338.89	6,185.1	4,475.6	-1,119.7	4,598.3	0.37	-0.36	0.02
10,264.0	89.20	338.53	6,186.5	4,566.0	-1,154.9	4,695.2	0.38	0.07	-0.37
10,360.0	88.91	338.30	6,188.1	4,655.2	-1,190.2	4,791.1	0.39	-0.30	-0.24
10,456.0	89.15	338.16	6,189.7	4,744.4	-1,225.8	4,886.9	0.29	0.25	-0.15
10,552.0	92.03	338.05	6,188.7	4,833.4	-1,261.6	4,982.8	3.00	3.00	-0.11
10,648.0	91.00	336.33	6,186.2	4,921.9	-1,298.8	5,078.5	2.09	-1.07	-1.79
10,744.0	90.12	335.15	6,185.2	5,009.4	-1,338.3	5,174.0	1.53	-0.92	-1.23
10,841.0	91.18	335.13	6,184.1	5,097.4	-1,379.0	5,270.5	1.09	1.09	-0.02
10,937.0	91.15	334.92	6,182.2	5,184.4	-1,419.6	5,365.9	0.22	-0.03	-0.22
11,033.0	91.18	334.00	6,180.2	5,271.0	-1,461.0	5,461.2	0.96	0.03	-0.96
11,129.0	91.20	333.92	6,178.2	5,357.3	-1,503.1	5,556.4	0.09	0.02	-0.08
11,225.0	90.38	333.64	6,176.9	5,443.4	-1,545.5	5,651.5	0.90	-0.85	-0.29
11,321.0	90.96	334.39	6,175.8	5,529.7	-1,587.6	5,746.7	0.99	0.60	0.78
11,417.0	91.11	334.41	6,174.0	5,616.2	-1,629.0	5,842.0	0.16	0.16	0.02
11,513.0	90.69	334.48	6,172.5	5,702.8	-1,670.4	5,937.3	0.44	-0.44	0.07



Company: SOUTHWESTERN ENERGY
Project: Ohio County
Site: OCC A OHI Pad
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Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well OCC A OHI 5H
TVD Reference: 1095.5+26 @ 1121.5usft
MD Reference: 1095.5+26 @ 1121.5usft
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)
11,610.0	90.47	334.35	6,171.6	5,790.3	-1,712.3	6,033.6	0.26	-0.23	-0.13
11,706.0	90.56	334.69	6,170.7	5,877.0	-1,753.6	6,129.0	0.37	0.09	0.35
11,803.0	91.07	335.08	6,169.3	5,964.8	-1,794.8	6,225.3	0.66	0.53	0.40
11,899.0	91.79	335.53	6,166.9	6,052.0	-1,834.9	6,320.8	0.88	0.75	0.47
11,999.0	90.03	335.07	6,165.3	6,142.8	-1,876.7	6,420.2	1.82	-1.76	-0.46
12,091.0	89.70	335.60	6,165.5	6,226.4	-1,915.1	6,511.7	0.68	-0.36	0.58
12,187.0	90.19	336.63	6,165.6	6,314.2	-1,953.9	6,607.3	1.19	0.51	1.07
12,283.0	90.54	337.14	6,165.0	6,402.5	-1,991.6	6,703.0	0.64	0.36	0.53
12,380.0	90.54	336.85	6,164.1	6,491.8	-2,029.5	6,799.8	0.30	0.00	-0.30
12,476.0	90.89	336.45	6,162.9	6,579.9	-2,067.6	6,895.4	0.55	0.36	-0.42
12,572.0	90.63	337.10	6,161.6	6,668.1	-2,105.4	6,991.1	0.73	-0.27	0.68
12,668.0	91.18	336.86	6,160.1	6,756.5	-2,143.0	7,086.8	0.63	0.57	-0.25
12,764.0	91.53	336.95	6,157.9	6,844.7	-2,180.6	7,182.5	0.38	0.36	0.09
12,860.0	90.34	336.92	6,156.3	6,933.1	-2,218.2	7,278.2	1.24	-1.24	-0.03
12,957.0	90.74	337.36	6,155.4	7,022.4	-2,255.9	7,375.0	0.61	0.41	0.45
13,053.0	90.67	337.20	6,154.2	7,111.0	-2,293.0	7,470.7	0.18	-0.07	-0.17
13,149.0	90.34	337.17	6,153.4	7,199.5	-2,330.2	7,566.5	0.35	-0.34	-0.03
13,245.0	90.52	337.02	6,152.6	7,287.9	-2,367.5	7,662.2	0.24	0.19	-0.16
13,342.0	91.07	337.34	6,151.3	7,377.3	-2,405.2	7,759.0	0.66	0.57	0.33
13,438.0	91.83	337.36	6,148.9	7,465.9	-2,442.1	7,854.7	0.79	0.79	0.02
13,534.0	90.93	337.04	6,146.5	7,554.3	-2,479.3	7,950.4	0.99	-0.94	-0.33
13,631.0	91.51	337.02	6,144.5	7,643.6	-2,517.2	8,047.1	0.60	0.60	-0.02
13,727.0	91.15	336.96	6,142.2	7,732.0	-2,554.7	8,142.8	0.38	-0.38	-0.06
13,822.0	91.26	336.89	6,140.3	7,819.3	-2,591.9	8,237.5	0.14	0.12	-0.07
13,919.0	91.53	336.75	6,137.9	7,908.5	-2,630.1	8,334.2	0.31	0.28	-0.14
14,015.0	91.66	337.21	6,135.2	7,996.8	-2,667.6	8,429.9	0.50	0.14	0.48
14,111.0	92.27	337.35	6,131.9	8,085.3	-2,704.6	8,525.6	0.65	0.64	0.15
14,208.0	92.58	337.07	6,127.8	8,174.6	-2,742.2	8,622.3	0.43	0.32	-0.29
14,304.0	91.59	337.19	6,124.3	8,263.0	-2,779.5	8,718.0	1.04	-1.03	0.13
14,400.0	92.25	337.40	6,121.1	8,351.5	-2,816.5	8,813.7	0.72	0.69	0.22
14,496.0	91.70	337.40	6,117.8	8,440.1	-2,853.4	8,909.4	0.57	-0.57	0.00
14,551.0	91.53	337.58	6,116.3	8,490.9	-2,874.4	8,964.3	0.45	-0.31	0.33
14,585.0	91.53	337.58	6,115.3	8,522.3	-2,887.4	8,998.2	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PTD OCC A OHI 5H - hit/miss target - Shape - Point	0.00	0.00	6,115.3	8,522.3	-2,887.4	14,564,445.99	1,749,968.46	40° 6' 10.449"N	80° 36' 29.616"W

JAN 31 2019

WV Department



Company:	SOUTHWESTERN ENERGY	Local Co-ordinate Reference:	Well OCC A OHI 5H
Project:	Ohio County	TVD Reference:	1095.5+26 @ 1121.5usft
Site:	OCC A OHI Pad	MD Reference:	1095.5+26 @ 1121.5usft
Well:	OCC A OHI 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 14 Multi User

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
591.0	591.0	2.4	-0.7	First MWD @ 591' MD / 591' TVD
4,629.5	4,584.4	322.2	228.4	Cross Unit Line @ 4630' MD / 4584' TVD
14,551.0	6,116.3	8,490.9	-2,874.4	Last MWD @ 14551' MD / 6116' TVD
14,585.0	6,115.3	8,522.3	-2,887.4	PTD @ 14585' MD / 6115' TVD

Checked By: _____ Approved By: _____ Date: _____

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