

### REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot 8H
Area	Ohio County, WV	Well	Michael Ratcliffe OHI 8H
Field	Ohio	Wellbore	Michael Ratcliffe OHI 8H AWB
Facility	Michael Ratcliffe OHI Pad		

### REPORT SETUP INFORMATION

Projection System	NAD83 / UTM Zone 17 North, US feet	Software System	WellArchitect® 5.1
North Reference	Grid	User	Atenjen
Scale	0.999617	Report Generated	07/Mar/2019 at 09:12
Convergence at slot	0.28° East	Database/Source file	WA_MPL_EASTERNUS_Defn/Michael_Ratcliffe_OHI_8H_AWP_Proj_24451_.xml

### WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	70.37	-104.04	1761415.27	14581101.43	40°08'54.576"N	80°34'01.207"W
Facility Reference Pt			1761519.28	14581031.09	40°08'53.876"N	80°33'59.872"W
Field Reference Pt			0.00	0.00	0°00'00.000"	85°29'19.478"W

### WELLPATH DATUM

Calculation method	Minimum curvature	SDC 41 (RKB) to Facility Vertical Datum	1306.30ft
Horizontal Reference Pt	Slot	SDC 41 (RKB) to Mean Sea Level	1306.30ft
Vertical Reference Pt	SDC 41 (RKB)	SDC 41 (RKB) to Ground Level at Slot (Slot 8H)	26.00ft
MD Reference Pt	SDC 41 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	152.53°

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Area	Wellbore	Michael Ratcliffe OHI 8H AWB
Field		
Facility		

## WELLPATH DATA (279 stations) + = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
0.00	0.00	226.260	0.00	0.00	0.00	0.00	1761415.27	14581101.43	40°08'54.576"N	80°34'01.207"W	0.00	0.000	0.00	0.00	0.00
26.00	0.00	226.260	26.00	0.00	0.00	0.00	1761415.27	14581101.43	40°08'54.576"N	80°34'01.207"W	0.00	0.000	0.00	0.00	0.00
100.00	0.550	226.260	100.00	0.10	-0.25	-0.26	1761415.01	14581101.19	40°08'54.574"N	80°34'01.211"W	0.36	226.280	0.74	0.74	-180.73
200.00	0.160	208.620	200.00	0.31	-0.70	-0.67	1761414.60	14581100.73	40°08'54.570"N	80°34'01.216"W	0.97	223.758	0.40	-0.39	-17.64
300.00	0.270	235.850	300.00	0.42	-0.95	-0.93	1761414.34	14581100.48	40°08'54.567"N	80°34'01.219"W	1.33	224.311	0.15	0.11	27.23
400.00	0.320	235.130	399.99	0.48	-1.25	-1.36	1761413.92	14581100.18	40°08'54.564"N	80°34'01.225"W	1.84	227.409	0.05	0.05	-0.72
500.00	0.160	89.550	499.99	0.58	-1.41	-1.45	1761413.83	14581100.03	40°08'54.563"N	80°34'01.226"W	2.02	225.813	0.46	-0.16	-145.58
600.00	0.100	262.150	599.99	0.61	-1.42	-1.39	1761413.88	14581100.02	40°08'54.562"N	80°34'01.225"W	1.99	224.520	0.26	-0.06	172.60
700.00	0.160	112.890	699.99	0.69	-1.48	-1.35	1761413.92	14581099.95	40°08'54.562"N	80°34'01.225"W	2.01	222.333	0.25	0.06	-149.26
800.00	0.160	212.600	799.99	0.87	-1.65	-1.30	1761413.97	14581099.78	40°08'54.560"N	80°34'01.224"W	2.10	218.097	0.24	0.00	99.71
900.00	0.100	135.980	899.99	1.02	-1.83	-1.31	1761413.96	14581099.60	40°08'54.558"N	80°34'01.224"W	2.26	215.560	0.17	-0.06	-76.62
1000.00	0.240	129.480	999.99	1.30	-2.03	-1.09	1761414.18	14581099.40	40°08'54.556"N	80°34'01.222"W	2.30	208.210	0.14	0.14	-6.50
1100.00	0.480	135.870	1099.99	1.89	-2.46	-0.64	1761414.64	14581098.97	40°08'54.552"N	80°34'01.216"W	2.55	194.469	0.24	0.24	6.39
1200.00	0.630	142.200	1199.99	2.84	-3.20	-0.01	1761415.26	14581098.23	40°08'54.545"N	80°34'01.208"W	3.20	180.131	0.16	0.15	6.33
1300.00	0.470	90.080	1299.98	3.57	-3.63	0.74	1761416.01	14581097.80	40°08'54.540"N	80°34'01.198"W	3.71	168.495	0.50	-0.16	-52.12
1400.00	0.420	82.640	1399.98	3.88	-3.59	1.51	1761416.78	14581097.84	40°08'54.541"N	80°34'01.188"W	3.89	157.130	0.08	-0.05	-7.44
1500.00	0.420	321.320	1499.98	3.65	-3.25	1.65	1761416.92	14581098.18	40°08'54.544"N	80°34'01.186"W	3.65	153.148	0.73	0.00	-121.32
1600.00	0.980	319.540	1599.97	2.46	-2.32	0.86	1761416.13	14581099.11	40°08'54.553"N	80°34'01.196"W	2.47	159.562	0.56	0.56	-1.78
1700.00	0.880	295.150	1699.96	1.01	-1.34	-0.39	1761414.89	14581100.09	40°08'54.563"N	80°34'01.212"W	1.40	196.064	0.40	-0.10	-24.39
1800.00	0.670	288.160	1799.95	-0.02	-0.83	-1.64	1761413.64	14581100.60	40°08'54.568"N	80°34'01.229"W	1.84	243.041	0.23	-0.21	-6.99
1900.00	0.420	264.930	1899.94	-0.57	-0.68	-2.56	1761412.71	14581100.75	40°08'54.570"N	80°34'01.240"W	2.65	255.053	0.33	-0.25	-23.23
1923.00	0.660	268.760	1922.94	-0.66	-0.69	-0.69	1761412.50	14581100.74	40°08'54.570"N	80°34'01.243"W	2.86	255.972	1.05	1.04	16.65
1969.00	0.870	286.530	1968.94	-1.02	-0.60	-3.37	1761411.90	14581100.83	40°08'54.571"N	80°34'01.251"W	3.43	259.925	0.68	0.46	38.63
2016.00	1.050	277.430	2015.93	-1.52	-0.44	-4.14	1761411.13	14581100.99	40°08'54.572"N	80°34'01.261"W	4.17	263.907	0.50	0.38	-19.36
2062.00	0.770	302.890	2061.93	-2.03	-0.22	-4.82	1761410.45	14581101.21	40°08'54.574"N	80°34'01.269"W	4.83	267.388	1.05	-0.61	55.35
2108.00	0.870	332.650	2107.92	-2.65	0.26	-5.24	1761410.03	14581101.69	40°08'54.579"N	80°34'01.275"W	5.25	272.821	0.94	0.22	64.70
2153.00	1.800	334.990	2152.91	-3.69	1.20	-5.70	1761409.58	14581102.63	40°08'54.589"N	80°34'01.281"W	5.82	281.917	2.07	2.07	5.20
2239.00	3.060	5.480	2238.83	-6.97	4.71	-6.05	1761409.23	14581106.14	40°08'54.623"N	80°34'01.285"W	7.67	307.919	2.05	1.47	35.45
2286.00	3.380	13.280	2285.76	-9.07	7.31	-5.61	1761409.66	14581108.74	40°08'54.649"N	80°34'01.279"W	9.21	322.492	1.15	0.68	16.60
2378.00	3.220	47.250	2377.62	-11.81	11.70	-3.09	1761412.18	14581113.13	40°08'54.692"N	80°34'01.246"W	12.10	345.213	2.10	-0.17	36.92

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MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
2471.00	3.990	58.890	2470.43	-12.70	15.15	1.60	1761416.87	14581116.57	40°08'54.726"N	80°34'01.186"W	15.23	6.027	1.14	0.83	12.52
2564.00	4.930	69.770	2563.15	-12.40	18.20	8.12	1761423.39	14581119.62	40°08'54.756"N	80°34'01.102"W	19.93	24.041	1.36	1.01	11.70
2656.00	6.620	66.070	2654.68	-11.58	21.72	16.68	1761431.94	14581123.14	40°08'54.790"N	80°34'00.991"W	27.38	37.518	1.88	1.84	4.02
2749.00	8.570	64.720	2746.86	-10.98	26.85	27.84	1761443.10	14581128.27	40°08'54.840"N	80°34'00.847"W	38.68	46.037	2.11	2.10	-1.45
2842.00	10.060	64.610	2838.63	-10.42	33.30	41.45	1761456.70	14581134.71	40°08'54.903"N	80°34'00.672"W	53.16	51.225	1.60	1.60	-0.12
2935.00	11.430	69.730	2930.00	-8.97	39.97	57.43	1761472.68	14581141.39	40°08'54.969"N	80°34'00.465"W	69.97	55.163	1.79	1.47	5.51
3027.00	12.750	74.280	3019.96	-5.76	45.88	75.76	1761491.00	14581147.29	40°08'55.026"N	80°34'00.229"W	88.57	58.800	1.77	1.43	4.95
3120.00	14.760	74.710	3110.29	-1.17	51.79	97.06	1761512.30	14581153.20	40°08'55.083"N	80°33'59.954"W	110.01	61.919	2.16	2.16	0.46
3213.00	16.710	70.730	3199.80	3.23	59.32	121.12	1761536.34	14581160.73	40°08'55.157"N	80°33'59.644"W	134.86	63.904	2.40	2.10	-4.28
3306.00	16.560	67.080	3288.91	6.19	68.90	145.94	1761561.16	14581170.30	40°08'55.250"N	80°33'59.324"W	161.39	64.729	1.13	-0.16	-3.92
3398.00	17.050	66.270	3376.98	8.11	79.43	170.37	1761585.57	14581180.83	40°08'55.353"N	80°33'59.009"W	187.97	65.004	0.59	0.53	-0.88
3491.00	17.820	69.140	3465.71	10.64	89.99	196.15	1761611.34	14581191.38	40°08'55.456"N	80°33'58.676"W	215.80	65.356	1.24	0.83	3.09
3584.00	17.790	71.550	3554.26	14.51	99.55	222.92	1761638.11	14581200.94	40°08'55.549"N	80°33'58.330"W	244.14	65.936	0.79	-0.03	2.59
3676.00	17.830	74.130	3641.85	19.54	107.85	249.80	1761664.98	14581209.24	40°08'55.630"N	80°33'57.984"W	272.09	66.649	0.86	0.04	2.80
3769.00	17.270	70.600	3730.52	24.34	116.33	276.52	1761691.68	14581217.71	40°08'55.713"N	80°33'57.639"W	299.99	67.184	1.29	-0.60	-3.80
3862.00	17.540	72.370	3819.27	28.68	125.16	302.90	1761718.05	14581226.54	40°08'55.799"N	80°33'57.299"W	327.74	67.550	0.64	0.29	1.90
3954.00	17.900	71.980	3906.90	33.37	133.73	329.55	1761744.70	14581235.11	40°08'55.882"N	80°33'56.955"W	355.65	67.913	0.41	0.39	-0.42
4047.00	17.220	67.910	3995.57	37.00	143.33	355.90	1761771.04	14581244.70	40°08'55.976"N	80°33'56.615"W	383.68	68.064	1.51	-0.73	-4.38
4140.00	16.940	69.320	4084.47	39.90	153.29	381.33	1761796.46	14581254.66	40°08'56.073"N	80°33'56.287"W	410.99	68.101	0.54	-0.30	1.52
4232.00	17.830	72.530	4172.27	43.93	162.25	407.31	1761822.42	14581263.62	40°08'56.160"N	80°33'55.952"W	438.44	68.280	1.42	0.97	3.49
4325.00	17.250	69.370	4260.95	48.04	171.38	433.80	1761848.90	14581272.75	40°08'56.249"N	80°33'55.610"W	466.42	68.442	1.20	-0.62	-3.40
4417.00	17.660	69.070	4348.71	51.26	181.18	459.60	1761874.69	14581282.54	40°08'56.345"N	80°33'55.278"W	494.02	68.485	0.46	0.45	-0.33
4510.00	17.850	70.300	4437.28	54.79	191.02	486.19	1761901.28	14581292.58	40°08'56.441"N	80°33'54.934"W	522.37	68.551	0.45	0.20	1.32
4603.00	16.770	65.740	4526.07	57.47	201.34	511.84	1761926.92	14581302.69	40°08'56.541"N	80°33'54.603"W	550.02	68.527	1.86	-1.16	-4.90
4696.00	16.460	68.330	4615.19	59.55	211.72	536.32	1761951.39	14581313.07	40°08'56.643"N	80°33'54.288"W	576.60	68.458	0.86	-0.33	2.78
4788.00	17.960	71.760	4703.07	63.14	220.97	561.91	1761976.96	14581322.32	40°08'56.733"N	80°33'53.958"W	603.79	68.533	1.97	1.63	3.73
4881.00	17.410	68.600	4791.75	66.89	230.45	588.26	1762003.31	14581331.79	40°08'56.825"N	80°33'53.618"W	631.79	68.607	1.37	-0.91	-3.40
4974.00	17.070	69.880	4880.64	70.08	240.14	613.82	1762028.85	14581341.47	40°08'56.920"N	80°33'53.288"W	659.12	68.634	0.41	-0.04	1.38
5067.00	18.050	73.330	4969.31	74.53	248.97	640.44	1762055.46	14581350.30	40°08'57.006"N	80°33'52.945"W	687.13	68.757	1.54	1.05	3.71
5159.00	17.450	68.920	5056.93	78.99	257.78	667.06	1762082.07	14581359.11	40°08'57.092"N	80°33'52.601"W	715.14	68.871	1.28	-0.64	-3.65

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5252.00	16.460	66.130	5145.89	81.62	267.89	692.22	1762107.22	14581369.22	40°08'57.190"N	80°33'52.277"W	742.25	68.843	1.61	-1.08	-4.13
5345.00	16.990	68.270	5234.95	83.81	278.26	716.89	1762131.88	14581379.58	40°08'57.291"N	80°33'51.958"W	769.00	68.787	0.87	0.57	2.30
5437.00	17.550	69.680	5322.81	86.88	288.05	742.38	1762157.37	14581389.37	40°08'57.387"N	80°33'51.629"W	796.31	68.793	0.76	0.61	1.53
5530.00	17.240	70.250	5411.55	90.47	297.57	768.50	1762183.48	14581398.89	40°08'57.480"N	80°33'51.292"W	824.10	68.833	0.38	-0.33	0.61
5623.00	18.060	69.630	5500.17	94.11	307.25	794.99	1762209.95	14581408.56	40°08'57.574"N	80°33'50.951"W	852.30	68.869	0.90	0.88	-0.67
5716.00	16.950	66.730	5588.87	96.89	317.62	820.96	1762235.91	14581418.93	40°08'57.675"N	80°33'50.615"W	880.26	68.849	1.51	-1.19	-3.10
5806.00	16.840	68.030	5674.98	99.10	327.68	845.10	1762260.05	14581428.98	40°08'57.774"N	80°33'50.304"W	906.40	68.807	0.43	-0.12	1.42
5866.00	16.430	69.020	5732.47	100.89	333.96	861.09	1762276.03	14581435.27	40°08'57.835"N	80°33'50.098"W	923.58	68.802	0.83	-0.68	1.65
5957.00	16.800	69.890	5819.67	104.03	343.09	885.45	1762300.38	14581444.39	40°08'57.924"N	80°33'49.783"W	949.60	68.820	0.49	0.41	0.96
6004.00	16.190	83.750	5864.76	107.28	346.14	898.35	1762313.27	14581447.44	40°08'57.954"N	80°33'49.617"W	962.73	68.928	8.45	-1.30	29.49
6050.00	16.610	100.590	5908.91	113.65	345.63	911.19	1762326.11	14581446.93	40°08'57.948"N	80°33'49.452"W	974.54	69.227	10.34	0.91	36.61
6096.00	17.900	114.210	5952.86	123.26	341.52	924.11	1762339.02	14581442.82	40°08'57.907"N	80°33'49.286"W	985.20	69.717	9.20	2.80	29.61
6143.00	20.530	118.580	5997.24	135.76	334.62	937.94	1762352.85	14581435.92	40°08'57.838"N	80°33'49.108"W	995.84	70.366	6.37	5.60	9.30
6189.00	24.680	118.810	6039.69	150.45	326.13	953.44	1762368.35	14581427.43	40°08'57.753"N	80°33'48.909"W	1007.68	71.117	9.02	9.02	0.50
6235.00	28.600	120.530	6080.80	167.78	315.90	971.35	1762386.24	14581417.21	40°08'57.651"N	80°33'48.679"W	1021.43	71.984	8.68	8.52	3.74
6282.00	33.800	124.360	6121.00	188.86	302.80	991.85	1762406.73	14581404.11	40°08'57.521"N	80°33'48.416"W	1037.04	73.023	11.84	11.06	8.15
6328.00	39.040	127.690	6158.00	213.31	286.71	1013.89	1762428.77	14581388.03	40°08'57.361"N	80°33'48.133"W	1053.65	74.210	12.17	11.39	7.24
6375.00	44.410	130.930	6193.07	242.05	266.87	1038.05	1762452.92	14581368.20	40°08'57.163"N	80°33'47.823"W	1071.80	75.582	12.31	11.43	6.89
6421.00	48.970	133.240	6224.62	273.41	244.42	1062.86	1762477.72	14581345.76	40°08'56.940"N	80°33'47.505"W	1090.60	77.049	10.56	9.91	5.02
6467.00	53.520	135.200	6253.41	307.45	219.45	1088.59	1762503.44	14581320.79	40°08'56.692"N	80°33'47.175"W	1110.49	78.603	10.33	9.89	3.83
6514.00	58.120	137.510	6279.81	344.76	191.35	1115.45	1762530.29	14581292.71	40°08'56.413"N	80°33'46.831"W	1131.74	80.266	10.74	9.79	5.34
6560.00	63.060	141.010	6302.40	383.75	160.99	1141.57	1762556.40	14581262.36	40°08'56.112"N	80°33'46.497"W	1152.86	81.973	12.62	10.74	7.61
6606.00	66.670	144.800	6321.94	424.79	127.77	1166.66	1762581.48	14581229.15	40°08'55.783"N	80°33'46.176"W	1173.63	83.750	10.83	7.85	8.24
6653.00	70.850	149.980	6338.97	468.40	90.88	1190.23	1762605.04	14581192.28	40°08'55.417"N	80°33'45.875"W	1193.69	85.634	13.58	8.89	11.02
6699.00	74.840	152.880	6352.54	512.33	52.29	1211.23	1762626.03	14581153.70	40°08'55.034"N	80°33'45.607"W	1212.36	87.528	10.56	8.67	6.30
6745.00	79.920	154.060	6362.59	557.20	12.14	1231.27	1762646.06	14581113.56	40°08'54.637"N	80°33'45.351"W	1231.33	89.435	11.32	11.04	2.57
6792.00	83.490	154.710	6369.36	603.67	-29.80	1251.37	1762666.16	14581071.65	40°08'54.221"N	80°33'45.095"W	1251.72	91.364	7.72	7.30	1.38
6838.00	84.230	155.910	6374.28	649.37	-71.20	1270.80	1762685.58	14581030.26	40°08'53.811"N	80°33'44.847"W	1272.79	93.207	1.73	1.61	0.65
6884.00	85.640	154.700	6377.95	695.18	-112.70	1290.28	1762705.06	14580988.77	40°08'53.400"N	80°33'44.599"W	1295.19	94.992	5.28	5.24	-0.67
6977.00	89.420	155.850	6381.14	788.01	-197.12	1329.15	1762743.91	14580904.39	40°08'52.564"N	80°33'44.104"W	1343.69	98.436	3.23	2.99	1.24

WV Department of Environmental Protection  
 Gas  
 2019

# Actual Wellpath Report

Michael Ratcliffe OHI 8H AWP Proj: 24451'  
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## REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot 8H
Area	Ohio County, WV	Well	Michael Ratcliffe OHI 8H
Field	Ohio	Wellbore	Michael Ratcliffe OHI 8H AWB
Facility	Michael Ratcliffe OHI Pad		

## WELLPATH DATA (279 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS ["/100ft]	Build Rate ["/100ft]	Turn Rate ["/100ft]
7070.00	89.350	156.670	6382.14	880.81	-282.24	1366.59	1762781.34	14580819.30	40°08'51.721"N	80°33'43.627"W	1395.43	101.669	0.88	-0.08	0.88
7162.00	89.420	156.520	6383.13	972.57	-366.67	1403.13	1762817.86	14580734.90	40°08'50.885"N	80°33'43.162"W	1450.25	104.645	0.18	0.08	-0.16
7255.00	89.450	156.640	6384.05	1065.33	-452.00	1440.10	1762854.81	14580649.60	40°08'50.040"N	80°33'42.691"W	1509.37	107.426	0.13	0.03	0.13
7348.00	89.880	156.930	6384.59	1158.08	-537.47	1476.75	1762891.46	14580564.17	40°08'49.194"N	80°33'42.225"W	1571.52	109.999	0.56	0.46	0.31
7440.00	89.850	156.510	6384.81	1249.83	-621.98	1513.11	1762927.80	14580479.69	40°08'48.357"N	80°33'41.762"W	1635.96	112.346	0.46	-0.03	-0.46
7533.00	89.910	155.530	6385.00	1342.66	-706.95	1550.91	1762965.58	14580394.75	40°08'47.515"N	80°33'41.281"W	1704.44	114.505	1.06	0.06	-1.05
7626.00	89.850	155.160	6385.20	1435.54	-791.47	1589.71	1763004.36	14580310.26	40°08'46.678"N	80°33'40.788"W	1775.84	116.468	0.40	-0.06	-0.40
7718.00	89.820	155.820	6385.46	1527.42	-875.18	1627.87	1763042.52	14580226.58	40°08'45.849"N	80°33'40.300"W	1848.22	118.264	0.72	-0.03	0.72
7811.00	89.880	157.080	6385.70	1620.20	-960.44	1665.03	1763079.66	14580141.37	40°08'45.005"N	80°33'39.827"W	1922.18	119.978	1.36	0.06	1.35
7904.00	90.120	157.310	6385.70	1712.89	-1046.17	1701.08	1763115.69	14580055.67	40°08'44.156"N	80°33'39.369"W	1997.03	121.592	0.36	0.26	0.25
7995.00	89.600	155.060	6385.93	1803.70	-1129.41	1737.82	1763152.42	14579972.45	40°08'43.331"N	80°33'38.901"W	2072.58	123.020	2.54	-0.57	-2.47
8088.00	89.320	153.560	6386.80	1896.65	-1213.21	1778.13	1763192.72	14579888.69	40°08'42.501"N	80°33'38.387"W	2152.59	124.306	1.64	-0.30	-1.61
8181.00	89.050	154.010	6388.13	1989.62	-1296.64	1819.21	1763233.78	14579805.29	40°08'41.675"N	80°33'37.863"W	2234.01	125.479	0.56	-0.29	0.48
8274.00	89.350	154.620	6389.42	2082.56	-1380.44	1859.51	1763274.07	14579721.52	40°08'40.845"N	80°33'37.350"W	2315.90	126.589	0.73	0.32	0.66
8367.00	89.320	154.890	6390.50	2175.49	-1464.55	1899.17	1763313.71	14579637.44	40°08'40.012"N	80°33'36.844"W	2398.28	127.638	0.29	-0.03	0.29
8458.00	89.290	155.960	6391.61	2266.36	-1547.30	1937.01	1763351.54	14579554.73	40°08'39.192"N	80°33'36.362"W	2479.15	128.618	1.18	-0.03	1.18
8551.00	89.350	156.920	6392.71	2359.14	-1632.54	1974.18	1763388.70	14579469.52	40°08'38.348"N	80°33'35.889"W	2561.76	129.589	1.03	0.06	1.03
8644.00	89.380	156.070	6393.74	2451.91	-1717.82	2011.27	1763425.77	14579384.27	40°08'37.503"N	80°33'35.417"W	2645.02	130.500	0.91	0.03	-0.91
8736.00	89.570	156.300	6394.58	2543.72	-1801.98	2048.42	1763462.90	14579300.14	40°08'36.670"N	80°33'34.944"W	2728.22	131.338	0.32	0.21	0.25
8829.00	89.320	158.010	6395.49	2636.41	-1887.68	2084.52	1763498.99	14579214.48	40°08'35.921"N	80°33'34.485"W	2812.22	132.163	1.86	-0.27	1.84
8922.00	89.630	159.610	6396.34	2728.84	-1974.39	2118.14	1763532.59	14579127.81	40°08'34.963"N	80°33'34.057"W	2895.63	132.988	1.75	0.33	1.72
9014.00	89.420	159.400	6397.16	2820.16	-2060.56	2150.35	1763564.79	14579041.67	40°08'34.110"N	80°33'33.648"W	2978.24	133.778	0.32	-0.23	-0.23
9106.00	89.690	159.370	6397.81	2911.50	-2146.67	2182.74	1763597.17	14578955.59	40°08'33.257"N	80°33'33.236"W	3061.46	134.523	0.30	0.29	-0.03
9198.00	89.720	158.460	6398.29	3002.92	-2232.50	2215.83	1763630.25	14578869.79	40°08'32.407"N	80°33'32.816"W	3145.47	135.215	0.99	0.03	-0.99
9291.00	89.850	156.060	6398.64	3095.60	-2318.27	2251.78	1763666.18	14578784.06	40°08'31.558"N	80°33'32.358"W	3231.85	135.834	2.58	0.14	-2.58
9384.00	89.140	153.850	6399.46	3188.51	-2402.51	2291.15	1763705.53	14578699.84	40°08'30.724"N	80°33'31.857"W	3319.85	136.359	2.50	-0.76	-2.38
9475.00	89.140	155.900	6400.82	3279.41	-2484.89	2329.78	1763744.15	14578617.50	40°08'29.908"N	80°33'31.365"W	3406.25	136.845	2.25	0.00	2.25
9568.00	89.320	156.940	6402.07	3372.24	-2569.79	2367.72	1763782.08	14578532.63	40°08'29.067"N	80°33'30.882"W	3494.27	137.344	0.20	0.19	0.04
9661.00	89.170	153.940	6403.30	3465.15	-2654.02	2407.11	1763821.45	14578448.43	40°08'28.232"N	80°33'30.380"W	3583.02	137.793	2.16	-0.16	-2.15
9754.00	89.170	151.230	6404.65	3558.13	-2736.56	2449.92	1763864.24	14578365.92	40°08'27.415"N	80°33'29.834"W	3672.99	138.163	2.91	0.00	-2.91

## REFERENCE WELLPATH IDENTIFICATION

Operator	Slot	Slot 8H
SOUTHWESTERN ENERGY	Well	Michael Ratcliffe OHI 8H
Ohio County, WV	Wellbore	Michael Ratcliffe OHI 8H AWB
Ohio		
Michael Ratcliffe OHI Pad		

## WELLPATH DATA (279 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
9846.00	89.170	152.870	6405.98	3650.11	-2817.82	2493.03	1763907.34	14578284.70	40°08'26.610"N	80°33'29.284"W	3762.36	138.500	1.78	0.00	1.78
9939.00	89.200	154.110	6407.30	3743.09	-2901.03	2534.54	1763948.83	14578201.52	40°08'25.785"N	80°33'28.755"W	3852.25	138.857	1.33	0.03	1.33
10031.00	89.260	155.230	6408.54	3835.02	-2984.18	2573.89	1763988.17	14578118.40	40°08'24.962"N	80°33'28.254"W	3940.84	139.222	1.22	0.07	1.22
10124.00	89.200	154.580	6409.79	3927.93	-3068.39	2613.33	1764027.60	14578034.22	40°08'24.128"N	80°33'27.751"W	4030.45	139.579	0.70	-0.06	-0.70
10217.00	89.260	153.610	6411.04	4020.88	-3152.04	2653.96	1764068.21	14577950.61	40°08'23.299"N	80°33'27.233"W	4120.54	139.903	1.04	0.06	-1.04
10309.00	88.950	153.170	6412.47	4112.86	-3234.28	2695.16	1764109.40	14577868.39	40°08'22.484"N	80°33'26.708"W	4210.05	140.195	0.58	-0.34	-0.48
10402.00	88.950	153.110	6414.18	4205.84	-3317.24	2737.17	1764151.39	1457785.47	40°08'21.662"N	80°33'26.173"W	4300.72	140.473	0.06	0.00	-0.06
10495.00	88.980	153.730	6415.86	4298.81	-3400.39	2778.78	1764192.98	14577702.35	40°08'20.839"N	80°33'25.642"W	4391.39	140.745	0.67	0.03	0.67
10587.00	88.770	155.230	6417.67	4390.74	-3483.40	2818.41	1764232.59	14577619.37	40°08'20.016"N	80°33'25.137"W	4480.79	141.024	1.65	-0.23	1.63
10680.00	88.650	158.300	6419.76	4483.45	-3568.82	2855.08	1764269.25	14577533.98	40°08'19.170"N	80°33'24.671"W	4570.34	141.340	3.30	-0.13	3.30
10773.00	89.690	160.580	6421.11	4575.76	-3655.88	2887.74	1764301.89	14577446.96	40°08'18.308"N	80°33'24.256"W	4658.81	141.695	2.69	1.12	2.45
10865.00	89.600	158.230	6421.68	4667.09	-3742.00	2920.09	1764334.24	14577360.88	40°08'17.456"N	80°33'23.845"W	4746.52	142.033	2.56	-0.10	-2.55
10958.00	88.920	157.740	6422.88	4759.66	-3828.21	2954.95	1764369.09	14577274.70	40°08'16.602"N	80°33'23.401"W	4836.00	142.336	0.90	-0.73	-0.53
11050.00	89.350	157.420	6424.27	4851.29	-3913.24	2990.04	1764404.16	14577189.70	40°08'15.760"N	80°33'22.955"W	4924.81	142.617	0.58	0.47	-0.35
11142.00	89.720	154.540	6425.01	4943.11	-3997.26	3027.48	1764441.59	14577105.71	40°08'14.928"N	80°33'22.478"W	5014.36	142.860	3.16	0.40	-3.13
11235.00	88.860	152.810	6426.17	5036.08	-4080.61	3068.72	1764482.81	14577022.39	40°08'14.102"N	80°33'21.953"W	5105.72	143.056	2.08	-0.92	-1.86
11327.00	89.020	154.110	6427.87	5128.05	-4162.90	3109.82	1764523.89	14576940.14	40°08'13.287"N	80°33'21.429"W	5196.22	143.239	1.42	0.17	1.41
11420.00	88.920	153.780	6429.54	5221.01	-4246.43	3150.66	1764564.72	14576856.63	40°08'12.460"N	80°33'20.908"W	5287.61	143.426	0.37	-0.11	-0.35
11512.00	89.140	153.930	6431.10	5312.97	-4329.01	3191.19	1764605.23	14576774.09	40°08'11.642"N	80°33'20.392"W	5378.11	143.604	0.29	0.24	0.16
11605.00	89.010	155.450	6432.60	5405.89	-4413.07	3230.94	1764644.97	14576690.06	40°08'10.809"N	80°33'19.885"W	5469.39	143.791	1.64	-0.14	1.63
11698.00	89.290	157.680	6433.98	5498.64	-4498.38	3267.93	1764681.92	14576604.78	40°08'09.964"N	80°33'19.415"W	5560.11	144.003	2.42	0.30	2.40
11791.00	89.080	157.040	6435.30	5591.30	-4584.21	3303.72	1764717.72	14576518.99	40°08'09.114"N	80°33'18.959"W	5650.62	144.221	0.72	-0.23	-0.69
11883.00	88.980	157.680	6436.86	5682.96	-4669.10	3339.13	1764753.12	14576434.13	40°08'08.274"N	80°33'18.509"W	5740.24	144.429	0.70	-0.11	0.70
11976.00	89.820	158.530	6437.83	5775.52	-4755.39	3373.81	1764787.78	14576347.87	40°08'07.419"N	80°33'18.068"W	5830.64	144.645	1.28	0.90	0.91
12069.00	89.350	157.000	6438.51	5868.12	-4841.47	3409.00	1764822.96	14576261.83	40°08'06.567"N	80°33'17.621"W	5921.24	144.850	1.72	-0.51	-1.65
12162.00	89.050	156.710	6439.81	5960.85	-4926.98	3445.55	1764859.49	14576176.35	40°08'05.720"N	80°33'17.156"W	6012.23	145.034	0.45	-0.32	-0.31
12255.00	89.380	158.840	6441.08	6053.44	-5013.05	3480.72	1764894.65	14576090.31	40°08'04.868"N	80°33'16.708"W	6102.96	145.227	2.32	0.35	2.29
12347.00	89.780	158.200	6441.75	6144.94	-5098.66	3514.41	1764928.32	14576004.73	40°08'04.020"N	80°33'16.280"W	6192.53	145.422	0.82	0.43	-0.70
12440.00	89.870	156.950	6441.63	6237.58	-5184.63	3549.88	1764963.79	14575918.80	40°08'03.169"N	80°33'15.829"W	6283.47	145.601	1.49	0.63	-1.34
12533.00	89.680	155.180	6440.78	6330.39	-5269.62	3587.61	1765001.50	14575833.84	40°08'02.327"N	80°33'15.349"W	6374.94	145.753	1.93	0.33	-1.90

## REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot 8H
Area	Ohio County, WV	Well	Michael Ratcliffe OHI 8H
Field	Ohio	Wellbore	Michael Ratcliffe OHI 8H AWB
Facility	Michael Ratcliffe OHI Pad		

## WELLPATH DATA (279 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS ["/100ft]	Build Rate ["/100ft]	Turn Rate ["/100ft]
12624.00	89.600	153.920	6440.56	6421.33	-5351.79	3626.71	1765040.59	14575751.71	40°08'01.513"N	80°33'14.850"W	6464.88	145.876	1.82	-1.19	-1.38
12715.00	89.820	152.830	6441.02	6512.32	-5433.14	3667.49	1765081.35	14575670.39	40°08'00.707"N	80°33'14.331"W	6555.11	145.980	1.22	0.24	-1.20
12807.00	89.140	153.440	6441.85	6604.31	-5515.20	3709.07	1765122.91	14575588.35	40°07'59.894"N	80°33'13.801"W	6646.40	146.079	0.99	-0.74	0.66
12899.00	89.290	156.090	6443.11	6696.22	-5598.41	3748.28	1765162.11	14575505.18	40°07'59.070"N	80°33'13.301"W	6737.34	146.197	2.88	0.16	2.88
12991.00	89.200	155.130	6444.33	6788.08	-5682.19	3786.27	1765200.08	14575421.43	40°07'58.240"N	80°33'12.818"W	6828.11	146.323	1.05	-0.10	-1.04
13083.00	89.230	155.870	6445.59	6879.95	-5765.90	3824.42	1765238.21	14575337.76	40°07'57.411"N	80°33'12.332"W	6918.94	146.444	0.80	0.03	0.80
13176.00	89.200	155.970	6446.86	6972.78	-5850.79	3862.36	1765276.14	14575252.89	40°07'56.570"N	80°33'11.849"W	7010.68	146.570	0.11	-0.03	0.11
13268.00	89.200	155.220	6448.15	7064.64	-5934.57	3900.37	1765314.14	14575169.15	40°07'55.741"N	80°33'11.365"W	7101.54	146.686	0.82	0.00	-0.82
13360.00	89.140	155.340	6449.48	7156.52	-6018.13	3938.84	1765352.59	14575085.62	40°07'54.913"N	80°33'10.875"W	7192.51	146.795	0.15	-0.07	0.13
13451.00	89.320	156.850	6450.70	7247.33	-6101.31	3975.71	1765389.45	14575002.47	40°07'54.089"N	80°33'10.406"W	7282.32	146.911	1.67	0.20	1.66
13543.00	89.200	158.380	6451.89	7338.96	-6186.37	4010.74	1765424.46	14574917.45	40°07'53.247"N	80°33'09.960"W	7372.73	147.044	1.67	-0.13	1.66
13636.00	89.540	160.140	6452.91	7431.31	-6273.33	4043.67	1765457.38	14574830.52	40°07'52.386"N	80°33'09.542"W	7463.64	147.195	1.93	0.37	1.89
13728.00	89.170	158.500	6453.95	7522.66	-6359.40	4076.16	1765489.86	14574744.48	40°07'51.534"N	80°33'09.129"W	7553.61	147.342	1.83	-0.40	-1.78
13819.00	89.660	156.440	6454.88	7613.31	-6443.44	4111.02	1765524.71	14574660.47	40°07'50.701"N	80°33'08.686"W	7643.19	147.461	2.33	0.54	-2.26
13912.00	89.170	155.500	6455.83	7706.13	-6528.38	4148.89	1765562.56	14574575.57	40°07'49.860"N	80°33'08.204"W	7735.18	147.563	1.14	-0.53	-1.01
14005.00	89.200	155.660	6457.15	7798.99	-6613.05	4187.33	1765600.99	14574490.93	40°07'49.022"N	80°33'07.715"W	7827.27	147.658	0.18	0.03	0.17
14097.00	89.230	155.400	6458.41	7890.86	-6696.78	4225.44	1765639.08	14574407.23	40°07'48.192"N	80°33'07.229"W	7918.40	147.749	0.28	0.03	-0.28
14190.00	89.260	154.960	6459.63	7983.75	-6781.18	4264.47	1765678.10	14574322.87	40°07'47.356"N	80°33'06.732"W	8010.62	147.835	0.47	0.03	-0.47
14283.00	89.230	155.490	6460.86	8076.64	-6865.61	4303.44	1765717.05	14574238.46	40°07'46.520"N	80°33'06.236"W	8102.85	147.920	0.57	-0.03	0.57
14376.00	89.200	156.040	6462.13	8169.48	-6950.41	4341.61	1765755.21	14574153.70	40°07'45.680"N	80°33'05.750"W	8194.98	148.009	0.59	-0.03	0.59
14469.00	89.600	155.460	6463.11	8262.33	-7035.19	4379.81	1765793.39	14574068.95	40°07'44.840"N	80°33'05.264"W	8287.14	148.095	0.76	0.43	-0.62
14562.00	89.540	155.090	6463.81	8355.22	-7119.67	4418.70	1765832.27	14573984.51	40°07'44.004"N	80°33'04.769"W	8379.41	148.175	0.40	-0.06	-0.40
14654.00	89.570	154.680	6464.52	8447.14	-7202.97	4457.75	1765871.30	14573901.24	40°07'43.178"N	80°33'04.272"W	8470.79	148.248	0.45	0.03	-0.45
14747.00	89.110	155.230	6465.59	8540.05	-7287.22	4497.12	1765910.66	14573817.02	40°07'42.344"N	80°33'03.770"W	8563.15	148.320	0.77	-0.49	0.59
14840.00	89.480	156.850	6466.74	8632.86	-7372.19	4534.88	1765948.40	14573732.08	40°07'41.502"N	80°33'03.290"W	8655.31	148.403	1.79	0.40	1.74
14931.00	89.060	155.420	6467.15	8723.68	-7455.41	4571.70	1765985.21	14573648.89	40°07'40.678"N	80°33'02.821"W	8745.49	148.483	1.67	0.57	-1.57
15023.00	89.600	154.070	6467.47	8815.61	-7538.61	4610.95	1766024.44	14573565.72	40°07'39.854"N	80°33'02.321"W	8836.94	148.548	1.53	-0.43	-1.47
15114.00	89.510	155.290	6468.18	8906.54	-7620.87	4649.86	1766063.34	14573483.50	40°07'39.039"N	80°33'01.826"W	8927.42	148.611	1.34	-0.10	1.34
15207.00	89.630	156.590	6468.88	8999.37	-7705.82	4687.70	1766101.17	14573398.58	40°07'38.198"N	80°33'01.344"W	9019.65	148.686	1.51	0.13	1.51
15299.00	89.660	157.160	6469.45	9091.09	-7790.46	4723.74	1766137.20	14573313.97	40°07'37.360"N	80°33'00.885"W	9110.71	148.769	0.53	0.03	0.53

### REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY		Slot	Slot 8H
Area	Ohio County, WV		Well	Michael Ratcliffe OHI 8H
Field	Ohio		Wellbore	Michael Ratcliffe OHI 8H AWB
Facility	Michael Ratcliffe OHI Pad			

### WELLPATH DATA (279 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
15392.00	89.750	157.150	6469.92	9183.79	-7876.17	4759.83	1766173.27	14573228.30	40°07'36.511"N	80°33'00.426"W	9202.72	148.854	0.10	0.10	-0.03
15484.00	89.600	157.920	6470.45	9275.43	-7961.19	4794.99	1766208.41	14573143.31	40°07'35.669"N	80°32'59.979"W	9293.67	148.940	0.85	-0.16	0.84
15577.00	89.570	158.150	6471.12	9368.00	-8047.43	4829.77	1766243.18	14573057.10	40°07'34.815"N	80°32'59.537"W	9385.51	149.029	0.25	-0.03	0.25
15670.00	89.540	157.070	6471.84	9460.63	-8133.42	4865.20	1766278.59	14572971.15	40°07'33.963"N	80°32'59.087"W	9477.48	149.113	1.16	-0.03	-1.16
15761.00	89.820	155.910	6472.35	9551.41	-8216.86	4901.50	1766314.88	14572887.74	40°07'33.137"N	80°32'58.625"W	9567.73	149.183	1.31	0.31	-1.27
15853.00	90.180	153.800	6472.35	9643.33	-8300.14	4940.59	1766353.95	14572804.49	40°07'32.312"N	80°32'58.127"W	9659.28	149.237	2.33	0.39	-2.29
15946.00	89.660	153.410	6472.48	9736.31	-8383.44	4981.93	1766395.28	14572721.22	40°07'31.487"N	80°32'57.600"W	9752.01	149.279	0.70	-0.56	-0.42
16039.00	89.630	155.290	6473.06	9829.26	-8467.27	5022.18	1766435.52	14572637.42	40°07'30.656"N	80°32'57.088"W	9844.64	149.327	2.02	-0.03	2.02
16131.00	89.630	155.800	6473.65	9921.13	-8551.02	5060.27	1766473.59	14572553.71	40°07'29.827"N	80°32'56.603"W	9936.11	149.384	0.55	0.00	0.55
16224.00	89.750	156.110	6474.15	10013.96	-8635.94	5098.16	1766511.47	14572468.81	40°07'28.986"N	80°32'56.121"W	10028.50	149.445	0.36	0.13	0.33
16316.00	89.570	155.370	6474.70	10105.82	-8719.82	5135.96	1766549.25	14572384.97	40°07'28.155"N	80°32'55.640"W	10119.95	149.502	0.83	-0.20	-0.80
16409.00	89.540	156.300	6475.42	10198.66	-8804.67	5174.03	1766587.31	14572300.16	40°07'27.315"N	80°32'55.155"W	10212.38	149.560	1.00	-0.03	1.00
16501.00	89.260	156.610	6476.39	10290.44	-8889.00	5210.78	1766624.04	14572215.85	40°07'26.479"N	80°32'54.688"W	10303.72	149.621	0.45	-0.30	0.34
16594.00	89.170	155.850	6477.66	10383.24	-8974.10	5248.26	1766661.51	14572130.78	40°07'25.637"N	80°32'54.211"W	10396.09	149.680	0.82	-0.10	-0.82
16686.00	89.230	155.300	6478.94	10475.10	-9057.86	5286.30	1766699.53	14572047.06	40°07'24.807"N	80°32'53.726"W	10487.60	149.732	0.60	0.07	-0.60
16779.00	89.420	156.670	6480.04	10567.92	-9142.80	5324.14	1766737.37	14571962.15	40°07'23.966"N	80°32'53.245"W	10580.05	149.786	1.49	0.20	1.47
16872.00	90.370	157.350	6480.21	10660.63	-9228.41	5360.47	1766773.67	14571876.57	40°07'23.118"N	80°32'52.783"W	10672.31	149.849	1.26	1.02	0.73
16964.00	89.970	157.600	6479.94	10752.29	-9313.40	5395.71	1766808.90	14571791.62	40°07'22.276"N	80°32'52.335"W	10763.50	149.914	0.51	-0.43	0.27
17057.00	90.030	157.560	6479.94	10844.93	-9399.37	5431.18	1766844.36	14571705.69	40°07'21.425"N	80°32'51.884"W	10855.68	149.980	0.08	0.06	-0.04
17150.00	89.750	159.810	6480.12	10937.39	-9486.00	5464.98	1766878.15	14571619.09	40°07'20.567"N	80°32'51.454"W	10947.61	150.053	2.44	-0.30	2.42
17243.00	90.000	158.450	6480.32	11029.77	-9572.89	5498.11	1766911.27	14571532.22	40°07'19.707"N	80°32'51.034"W	11039.45	150.129	1.49	0.27	-1.46
17335.00	90.030	156.830	6480.29	11121.40	-9657.97	5533.11	1766946.25	14571447.18	40°07'18.864"N	80°32'50.589"W	11130.67	150.191	1.76	0.03	-1.76
17428.00	89.820	154.890	6480.42	11214.24	-9742.84	5571.14	1766984.27	14571362.35	40°07'18.024"N	80°32'50.105"W	11223.21	150.238	2.10	-0.23	-2.09
17519.00	89.970	154.570	6480.58	11305.17	-9825.13	5609.99	1767023.10	14571280.09	40°07'17.209"N	80°32'49.610"W	11313.94	150.274	0.39	0.16	-0.35
17612.00	89.750	153.340	6480.81	11398.14	-9908.68	5650.82	1767063.92	14571196.57	40°07'16.381"N	80°32'49.090"W	11406.74	150.304	1.34	-0.24	-1.32
17705.00	90.340	151.990	6480.74	11491.14	-9991.30	5693.53	1767106.60	14571113.98	40°07'15.562"N	80°32'48.546"W	11499.66	150.323	1.58	0.63	-1.45
17797.00	90.310	156.060	6480.22	11583.08	-10073.98	5733.81	1767146.87	14571031.33	40°07'14.743"N	80°32'48.032"W	11591.45	150.353	4.27	-0.03	4.42
17890.00	90.340	158.170	6479.69	11675.78	-10159.66	5769.98	1767183.02	14570945.69	40°07'13.895"N	80°32'47.573"W	11683.80	150.406	2.27	0.03	2.27
17983.00	89.690	157.890	6479.66	11768.35	-10245.90	5804.77	1767217.80	14570859.47	40°07'13.041"N	80°32'47.130"W	11775.99	150.466	0.76	-0.70	-0.30
18076.00	89.750	159.040	6480.12	11860.85	-10332.40	5838.93	1767251.95	14570773.01	40°07'12.184"N	80°32'46.696"W	11868.09	150.529	1.21	0.06	1.20



## REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot 8H
Area	Ohio County, WV	Well	Michael Ratcliffe OHI 8H
Field	Ohio	Wellbore	Michael Ratcliffe OHI 8H AWB
Facility	Michael Ratcliffe OHI Pad		

## WELLPATH DATA (279 stations)

MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS	Build Rate	Turn Rate
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]	[°]	[°]	[ft]	[°]	[°/100ft]	[°/100ft]	[°/100ft]
18168.00	89.940	159.550	6480.37	11952.21	-10418.45	5871.48	1767284.49	14570687.00	40°07'11.332"N	80°32'46.283"W	11959.03	150.596	0.62	0.21	0.59
18261.00	89.750	160.340	6480.62	12044.43	-10505.81	5903.37	1767316.37	14570599.67	40°07'10.467"N	80°32'45.878"W	12050.80	150.668	0.87	-0.20	0.85
18354.00	89.690	163.780	6481.07	12136.14	-10594.27	5932.01	1767345.00	14570511.24	40°07'09.592"N	80°32'45.515"W	12141.97	150.754	3.70	-0.06	3.70
18447.00	89.780	160.390	6481.50	12227.83	-10682.75	5960.61	1767373.59	14570422.80	40°07'08.716"N	80°32'45.153"W	12233.15	150.840	3.65	0.10	-3.65
18540.00	89.940	158.760	6481.73	12320.13	-10769.90	5993.07	1767406.03	14570335.68	40°07'07.853"N	80°32'44.741"W	12325.08	150.906	1.76	0.17	-1.75
18632.00	90.150	156.490	6481.66	12411.76	-10854.97	6028.09	1767441.03	14570250.65	40°07'07.011"N	80°32'44.296"W	12416.45	150.955	2.48	0.23	-2.47
18732.00	90.340	156.690	6481.23	12511.50	-10946.73	6067.82	1767480.75	14570158.91	40°07'06.102"N	80°32'43.791"W	12515.97	151.000	0.28	0.19	0.20
18827.00	90.400	156.270	6480.62	12606.28	-11033.84	6105.73	1767518.65	14570071.84	40°07'05.239"N	80°32'43.308"W	12610.53	151.041	0.45	0.06	-0.44
18921.00	90.340	154.970	6480.01	12700.14	-11119.45	6144.53	1767557.43	14569986.26	40°07'04.391"N	80°32'42.814"W	12704.23	151.075	1.38	-0.06	-1.38
19016.00	90.250	154.070	6479.52	12795.08	-11205.21	6185.39	1767598.28	14569900.54	40°07'03.542"N	80°32'42.294"W	12799.06	151.101	0.95	-0.09	-0.95
19111.00	90.310	152.930	6479.06	12890.06	-11290.23	6227.78	1767640.65	14569815.55	40°07'02.699"N	80°32'41.754"W	12893.97	151.119	1.20	0.06	-1.20
19205.00	90.370	154.600	6478.50	12984.03	-11374.54	6269.33	1767682.19	14569731.27	40°07'01.864"N	80°32'41.225"W	12987.87	151.138	1.78	0.06	1.78
19300.00	90.400	155.460	6477.86	13078.94	-11460.66	6309.44	1767722.28	14569645.19	40°07'01.011"N	80°32'40.714"W	13082.65	151.166	0.91	0.03	0.91
19395.00	89.660	153.810	6477.81	13173.87	-11546.50	6350.13	1767762.95	14569559.38	40°07'00.161"N	80°32'40.196"W	13177.47	151.191	1.90	-0.78	-1.74
19490.00	89.720	154.000	6478.32	13268.84	-11631.81	6391.92	1767804.73	14569474.10	40°06'59.316"N	80°32'39.664"W	13272.36	151.210	0.21	0.06	0.20
19583.00	89.720	153.640	6478.78	13361.82	-11715.27	6432.95	1767845.74	14569390.67	40°06'58.489"N	80°32'39.141"W	13365.27	151.228	0.39	0.00	-0.39
19676.00	89.260	151.040	6479.61	13454.81	-11797.63	6476.11	1767888.89	14569308.34	40°06'57.673"N	80°32'38.591"W	13458.24	151.236	2.84	-0.49	-2.80
19770.00	89.110	152.500	6480.94	13548.79	-11880.44	6520.57	1767933.33	14569225.57	40°06'56.852"N	80°32'38.024"W	13552.22	151.240	1.56	-0.16	1.55
19864.00	89.260	153.850	6482.28	13642.77	-11964.31	6562.98	1767975.73	14569141.73	40°06'56.021"N	80°32'37.484"W	13646.16	151.253	1.44	0.16	1.44
19960.00	89.260	155.070	6483.52	13738.70	-12050.92	6604.37	1768017.10	14569055.15	40°06'55.163"N	80°32'36.957"W	13742.00	151.276	1.27	0.00	1.27
20054.00	89.230	154.640	6484.76	13832.62	-12136.01	6644.31	1768057.02	14568970.10	40°06'54.320"N	80°32'36.449"W	13835.81	151.300	0.46	-0.03	-0.46
20149.00	89.170	153.700	6486.09	13927.57	-12221.51	6685.70	1768098.39	14568884.63	40°06'53.473"N	80°32'35.922"W	13930.68	151.319	0.99	-0.06	-0.99
20243.00	89.170	153.700	6487.45	14021.54	-12305.77	6727.34	1768140.02	14568800.40	40°06'52.638"N	80°32'35.391"W	14024.59	151.335	0.00	0.00	0.00
20337.00	89.170	154.920	6488.81	14115.48	-12390.47	6768.08	1768180.75	14568715.74	40°06'51.799"N	80°32'34.872"W	14118.45	151.355	1.30	0.00	1.30
20431.00	89.230	154.980	6490.12	14209.39	-12475.62	6807.88	1768220.53	14568630.62	40°06'50.956"N	80°32'34.366"W	14212.26	151.379	0.09	0.06	0.06
20526.00	89.200	156.070	6491.42	14304.25	-12562.07	6847.23	1768259.87	14568544.20	40°06'50.100"N	80°32'33.865"W	14307.00	151.406	1.15	-0.03	1.15
20675.00	89.140	156.270	6493.58	14452.93	-12698.35	6907.43	1768320.14	14568407.97	40°06'48.750"N	80°32'33.099"W	14455.47	151.455	0.24	-0.04	0.13
20715.00	89.050	156.360	6494.21	14492.84	-12734.97	6923.51	1768336.02	14568371.37	40°06'48.387"N	80°32'32.895"W	14495.33	151.489	0.24	-0.22	0.07
20810.00	88.860	158.150	6495.95	14587.50	-12822.54	6960.30	1768372.89	14568283.83	40°06'47.520"N	80°32'32.427"W	14589.83	151.506	1.94	-0.20	1.93
20904.00	89.080	160.180	6497.64	14680.86	-12910.35	6993.80	1768406.38	14568196.06	40°06'46.651"N	80°32'32.002"W	14682.99	151.555	2.11	0.23	2.10



# Actual Wellpath Report

Michael Ratcliffe OHI 8H AWP Proj: 24451'

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## REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot 8H
Area	Ohio County, WV	Well	Michael Ratcliffe OHI 8H
Field	Ohio	Wellbore	Michael Ratcliffe OHI 8H AWB
Facility	Michael Ratcliffe OHI Pad		

## WELLPATH DATA (279 stations)

MD (ft)	Inclination [°]	Azimuth [°]	TVD (ft)	Vert Sect (ft)	North (ft)	East (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	Closure Dist (ft)	Closure Dir [°]	DLS ["/100ft]	Build Rate ["/100ft]	Turn Rate ["/100ft]
20999.00	89.230	158.260	6499.04	14775.21	-12999.13	7027.56	1768440.12	14568107.31	40°06'45.771"N	80°32'31.573"W	14777.14	151.604	1.94	0.16	-1.94
21093.00	89.260	156.230	6500.28	14868.88	-13085.80	7063.91	1768476.46	14568020.67	40°06'44.913"N	80°32'31.111"W	14870.68	151.639	2.16	0.03	-2.16
21188.00	89.320	153.630	6501.45	14963.78	-13171.84	7104.16	1768516.70	14567934.67	40°06'44.061"N	80°32'30.599"W	14965.51	151.660	2.74	0.06	-2.74
21283.00	89.320	153.630	6502.58	15058.76	-13256.94	7146.35	1768558.87	14567849.59	40°06'43.218"N	80°32'30.061"W	15060.44	151.672	0.00	0.00	0.00
21377.00	89.230	152.410	6503.77	15152.74	-13340.71	7189.00	1768601.50	14567665.86	40°06'42.388"N	80°32'29.518"W	15154.41	151.681	1.30	-0.10	-1.30
21472.00	89.630	153.430	6504.72	15247.74	-13425.29	7232.24	1768644.73	14567481.32	40°06'41.550"N	80°32'28.967"W	15249.38	151.689	1.15	0.42	1.07
21567.00	89.630	153.750	6505.33	15342.72	-13510.37	7274.49	1768686.96	14567296.27	40°06'40.707"N	80°32'28.429"W	15344.33	151.700	0.34	0.00	0.34
21661.00	89.690	157.310	6505.89	15436.57	-13595.91	7313.42	1768725.88	14567110.76	40°06'39.860"N	80°32'27.933"W	15438.10	151.724	3.79	0.06	3.79
21755.00	89.600	157.600	6506.47	15530.22	-13682.73	7349.46	1768761.90	14567423.98	40°06'39.000"N	80°32'27.475"W	15531.63	151.758	0.32	-0.10	0.31
21850.00	89.600	157.600	6507.13	15624.85	-13770.56	7385.66	1768798.09	14567336.18	40°06'38.130"N	80°32'27.015"W	15626.14	151.794	0.00	0.00	0.00
21943.00	89.750	157.140	6507.66	15717.52	-13856.39	7421.45	1768833.86	14567250.38	40°06'37.280"N	80°32'26.560"W	15718.70	151.827	0.52	0.16	-0.49
22037.00	89.320	158.850	6508.42	15811.08	-13943.54	7456.67	1768869.07	14567163.26	40°06'36.417"N	80°32'26.113"W	15812.15	151.863	1.88	-0.46	1.82
22132.00	89.080	160.020	6509.75	15905.38	-14032.48	7490.03	1768902.42	14567074.36	40°06'35.536"N	80°32'25.689"W	15906.32	151.908	1.26	-0.25	1.23
22227.00	89.200	160.340	6511.18	15999.53	-14121.84	7522.24	1768934.61	14566985.03	40°06'34.652"N	80°32'25.281"W	16000.32	151.957	0.36	0.13	0.34
22321.00	89.170	159.510	6512.51	16092.73	-14210.12	7554.50	1768966.86	14566896.79	40°06'33.778"N	80°32'24.872"W	16093.41	152.004	0.88	-0.03	-0.88
22415.00	89.140	157.730	6513.90	16186.19	-14297.63	7588.77	1769001.11	14566809.30	40°06'32.911"N	80°32'24.436"W	16186.78	152.042	1.89	-0.03	-1.89
22510.00	89.290	156.370	6515.20	16280.88	-14385.10	7625.80	1769038.14	14566721.87	40°06'32.045"N	80°32'23.966"W	16281.40	152.071	1.44	0.16	-1.43
22604.00	89.290	155.710	6516.37	16374.70	-14471.00	7663.97	1769076.29	14566636.01	40°06'31.194"N	80°32'23.480"W	16375.17	152.094	0.70	0.00	-0.70
22699.00	89.200	154.940	6517.62	16469.58	-14557.32	7703.63	1769115.93	14566549.72	40°06'30.339"N	80°32'22.975"W	16470.01	152.113	0.82	-0.09	-0.81
22794.00	89.230	155.580	6518.92	16564.46	-14643.59	7743.38	1769155.67	14566463.49	40°06'29.484"N	80°32'22.470"W	16564.86	152.131	0.67	0.03	0.67
22889.00	89.200	156.000	6520.22	16659.30	-14730.22	7782.34	1769194.61	14566376.88	40°06'28.626"N	80°32'21.974"W	16659.66	152.151	0.44	-0.03	0.44
22984.00	89.200	155.630	6521.55	16754.13	-14816.88	7821.25	1769233.51	14566290.26	40°06'27.768"N	80°32'21.479"W	16754.46	152.172	0.39	0.00	-0.39
23079.00	89.230	155.710	6522.85	16848.98	-14903.43	7860.39	1769272.63	14566203.74	40°06'26.911"N	80°32'20.981"W	16849.27	152.192	0.09	0.03	0.08
23174.00	89.110	155.100	6524.22	16943.85	-14989.80	7899.92	1769312.15	14566117.40	40°06'26.055"N	80°32'20.478"W	16944.11	152.210	0.65	-0.13	-0.64
23268.00	89.020	154.960	6525.76	17037.75	-15075.00	7939.60	1769351.81	14566032.23	40°06'25.211"N	80°32'19.973"W	17037.99	152.225	0.18	-0.10	-0.15
23363.00	89.080	155.350	6527.33	17132.63	-15162.47	7979.51	1769391.71	14565946.07	40°06'24.357"N	80°32'19.465"W	17132.85	152.242	0.42	0.06	0.41
23458.00	89.110	155.010	6528.83	17227.52	-15247.41	8019.38	1769431.57	14565859.89	40°06'23.503"N	80°32'18.958"W	17227.72	152.258	0.36	0.03	-0.36
23553.00	89.110	155.250	6530.31	17322.41	-15333.59	8059.33	1769471.50	14565773.74	40°06'22.650"N	80°32'18.449"W	17322.58	152.274	0.25	0.00	0.25
23648.00	89.110	156.630	6531.79	17417.23	-15420.33	8098.06	1769510.21	14565687.04	40°06'21.791"N	80°32'17.957"W	17417.38	152.294	1.45	0.00	1.45
23742.00	89.986	156.960	6533.27	17510.96	-15506.71	8135.09	1769547.23	14565600.69	40°06'20.935"N	80°32'17.486"W	17511.08	152.318	0.35	-0.03	0.35

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### REFERENCE WELLPATH IDENTIFICATION

Operator	Slot	Slot 8H
SOUTHWESTERN ENERGY	Well	Michael Ratcliffe OHI 8H
Ohio County, WV	Wellbore	Michael Ratcliffe OHI 8H AWB
Ohio		
Facility		

### WELLPATH DATA (279 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
23836.00	89.050	156.340	6534.80	17604.70	-15593.00	8172.34	1769584.47	14565514.44	40°06'20.080"N	80°32'17.012"W	17604.80	152.341	0.66	-0.03	-0.66
23931.00	89.020	156.230	6536.40	17699.48	-15679.97	8210.54	1769622.65	14565427.50	40°06'19.219"N	80°32'16.527"W	17699.56	152.362	0.12	-0.03	-0.12
24026.00	89.080	156.440	6537.98	17794.26	-15766.97	8248.67	1769660.77	14565340.54	40°06'18.357"N	80°32'16.042"W	17794.32	152.383	0.23	0.06	0.22
24120.00	89.140	155.390	6539.44	17888.08	-15852.77	8287.03	1769699.11	14565254.77	40°06'17.507"N	80°32'15.554"W	17888.13	152.402	1.12	0.06	-1.12
24215.00	89.050	155.320	6540.94	17982.96	-15939.11	8326.64	1769738.70	14565168.46	40°06'16.652"N	80°32'15.050"W	17982.99	152.417	0.12	-0.09	-0.07
24310.00	89.050	154.320	6542.51	18077.87	-16025.07	8367.05	1769779.10	14565082.54	40°06'15.801"N	80°32'14.536"W	18077.90	152.430	1.05	0.00	-1.05
24405.00	89.110	154.180	6544.04	18172.81	-16110.62	8408.32	1769820.35	14564997.02	40°06'14.953"N	80°32'14.010"W	18172.84	152.439	0.16	0.06	-0.15
24426.00	89.170	154.420	6544.36	18193.80	-16129.54	8417.42	1769829.45	14564978.10	40°06'14.766"N	80°32'13.894"W	18193.82	152.442	1.18	0.29	1.14
24451.00	89.170	154.420	6544.72	18218.78	-16152.09	8428.22	1769840.24	14564955.56	40°06'14.542"N	80°32'13.757"W	18218.80	152.444	0.00	0.00	0.00

### HOLE & CASING SECTIONS - Ref Wellbore: Michael Ratcliffe OHI 8H AWB Ref Wellpath: Michael Ratcliffe OHI 8H AWP Proj: 24451'

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	End N/S [ft]	Start E/W [ft]	End E/W [ft]	End E/W [ft]
17.5in Open Hole	26.00	678.00	652.00	26.00	677.99	0.00	0.00	0.00	0.00	-1.46
13.375in Casing Surface	26.00	678.00	652.00	26.00	677.99	0.00	0.00	0.00	0.00	-1.46
12.25in Open Hole	678.00	2067.00	1389.00	677.99	2066.93	-1.46	-1.40	-1.40	-1.40	-4.88
9.625in Casing Intermediate	26.00	2067.00	2041.00	26.00	2066.93	0.00	0.00	0.00	0.00	-0.18
8.75in Open Hole	2067.00	5878.00	3811.00	2066.93	5743.98	-0.18	-0.18	-4.88	-4.88	864.26
8.5in Open Hole	5878.00	24451.00	18573.00	5743.98	6544.72	335.18	335.18	864.26	-16152.09	8428.22
5.5in Casing Production	26.00	24451.00	24425.00	26.00	6544.72	0.00	0.00	0.00	0.00	-16152.09

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### REFERENCE WELLPATH IDENTIFICATION

Operator	Slot	Slot 8H
SOUTHWESTERN ENERGY	Well	Michael Ratcliffe OHI 8H
Ohio County, WV	Wellbore	Michael Ratcliffe OHI 8H AWB
Ohio		
Facility		

### TARGETS

Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Michael Ratcliffe OHI 8H LP Rev-6	6380.00	-99.85	1270.00	1762684.78	14581001.62	40°08'53.528"N	80°33'44.859"W	point
Michael Ratcliffe OHI 8H BHL Rev-6	6563.00	-16165.08	8406.00	1769818.04	14564942.57	40°06'14.415"N	80°32'14.044"W	point

### WELLPATH COMPOSITION - Ref Wellbore: Michael Ratcliffe OHI 8H AWB Ref Wellpath: Michael Ratcliffe OHI 8H AWP Proj: 24451'

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	600.00	BHI Generic gyro - northseeking (Standard)	01_Gyro <17 1/2"> (100'-600')	Michael Ratcliffe OHI 8H AWB
600.00	1923.00	BHI Generic gyro - northseeking (Standard)	02_Gyro <12 1/4"> (700'-1923')	Michael Ratcliffe OHI 8H AWB
1923.00	5806.00	OWSG MWD rev2 + HRGM	03_Premier MWD <8 3/4"> (1969'-5806')	Michael Ratcliffe OHI 8H AWB
5806.00	24426.00	BHI AutoTrak Curve (Short)	04_BH AT Curve <8 1/2"> (5866'-24426')	Michael Ratcliffe OHI 8H AWB
24426.00	24451.00	Blind Drilling (std)	Projection to bit	Michael Ratcliffe OHI 8H AWB

**REFERENCE WELLPATH IDENTIFICATION**

Operator	Slot	Slot 8H
SOUTHWESTERN ENERGY	Well	Michael Ratcliffe OHI 8H
Ohio County, WV	Wellbore	Michael Ratcliffe OHI 8H AWB
Ohio		
Michael Ratcliffe OHI Pad		

**COMMENTS**

Wellpath general comments  
API: 47-069-00275-0000  
BH Job #: 109644964  
Rig: SDC 41  
Duration: 02/22/2019 - 03/03/2019

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Well Name: Michael Ratcliffe OHI 8H 47069002750000

LITHOLOGY/FORMATION	TOP DEPTH, MD (FT)	TOP DEPTH, TVD (FT)	BOTTOM DEPTH, MD (FT)	BOTTOM DEPTH, TVD (FT)	QUANTITY AND TYPE OF FLUID
Base of Fresh Water	0.00	0.00	402.00	402.00	
Top of Salt Water	755.00	755.00	NA	NA	
Pittsburgh Coal	611.00	611.00	616.00	616.00	
Pottsville (ss)	749.00	749.00	831.00	831.00	
Raven Cliff (ss)	1360.00	1360.00	1792.00	1792.00	
Big Injun (ss)	1792.00	1792.00	1935.00	1935.00	
Rhinestreet (shale)	5882.00	5748.00	6161.00	6014.00	
Cashaqua (shale)	6161.00	6014.00	6230.00	6077.00	
Middlesex (shale)	6230.00	6077.00	6317.00	6149.00	
Burket (shale)	6317.00	6149.00	6347.00	6172.00	
Tully (ls)	6347.00	6172.00	6407.00	6215.00	
Mahantango (shale)	6407.00	6215.00	6679.00	6347.00	
Marcellus (shale)	6679.00	6347.00	NA	NA	GAS

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