



### REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #10
Area	Ohio County, WV	Well	Thelma Hays OHI 10H
Field	Ohio	Wellbore	Thelma Hays OHI 10H AWB
Facility	Thelma Hays OHI Pad		

### REPORT SETUP INFORMATION

Projection System	NAD83 / UTM Zone 17 North, US feet	Software System	WellArchitect® 5.0
North Reference	Grid	User	Thomsuzc
Scale	0.999618	Report Generated	10/31/2017 at 11:52:41 AM
Convergence at slot	0.29° East	Database/Source file	WA_Pennsylvania/Thelma_Hays_OHI_10H_AWP_Proj_15329_.xml

### WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-33.97	-7.97	1764964.43	14582138.46	40°09'04.655"N	80°33'15.419"W
Facility Reference Pt			1764972.40	14582172.42	40°09'04.990"N	80°33'15.314"W
Field Reference Pt			0.00	0.00	0°00'00.000"	85°29'19.478"W

### WELLPATH DATUM

Calculation method	Minimum curvature	SDC46 (KB) to Facility Vertical Datum	1270.10ft
Horizontal Reference Pt	Slot	SDC46 (KB) to Mean Sea Level	1270.10ft
Vertical Reference Pt	SDC46 (KB)	SDC46 (KB) to Ground Level at Slot (Slot #10)	26.00ft
MD Reference Pt	SDC46 (KB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	150.22°

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# Actual Wellpath Report

Thelma Hays OHI 10H AWP Proj: 15329'  
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## REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #10
Area	Ohio County, WV	Well	Thelma Hays OHI 10H
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Facility	Thelma Hays OHI Pad		

## WELLPATH DATA (168 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†	0.000	319.830	0.00	0.00	0.00	0.00	1764964.43	14582138.46	40°09'04.655"N	80°33'15.419"W	0.00	0.000	0.00	0.00	0.00
26.00	0.000	319.830	26.00	0.00	0.00	0.00	1764964.43	14582138.46	40°09'04.655"N	80°33'15.419"W	0.00	0.000	0.00	0.00	0.00
192.00	1.000	319.830	191.99	-1.42	1.11	-0.93	1764963.50	14582139.57	40°09'04.666"N	80°33'15.431"W	1.45	319.830	0.60	0.60	-24.20
284.00	0.800	316.230	283.98	-2.84	2.18	-1.90	1764962.53	14582140.64	40°09'04.676"N	80°33'15.443"W	2.89	319.031	0.23	-0.22	-3.91
376.00	0.400	301.530	375.98	-3.74	2.82	-2.61	1764961.82	14582141.27	40°09'04.683"N	80°33'15.452"W	3.84	317.123	0.46	-0.43	-15.98
469.00	1.000	291.130	468.97	-4.66	3.28	-3.65	1764960.78	14582141.74	40°09'04.687"N	80°33'15.466"W	4.90	311.942	0.66	0.65	-11.18
562.00	0.800	258.730	561.96	-5.49	3.44	-5.04	1764959.39	14582141.90	40°09'04.689"N	80°33'15.484"W	6.11	304.335	0.58	-0.22	-34.84
697.00	0.410	236.440	696.95	-5.76	2.99	-6.37	1764958.06	14582141.45	40°09'04.685"N	80°33'15.501"W	7.04	295.169	0.33	-0.29	-16.51
790.00	1.500	253.030	789.93	-6.01	2.45	-7.81	1764956.62	14582140.91	40°09'04.679"N	80°33'15.519"W	8.19	287.439	1.20	1.17	17.84
883.00	3.700	253.730	882.83	-6.98	1.26	-11.86	1764952.58	14582139.72	40°09'04.668"N	80°33'15.571"W	11.92	276.054	2.37	2.37	0.75
976.00	5.260	252.180	975.55	-8.56	-0.89	-18.80	1764945.64	14582137.57	40°09'04.647"N	80°33'15.661"W	18.82	267.295	1.68	1.68	-1.67
1069.00	6.590	251.700	1068.05	-10.51	-3.87	-27.92	1764936.52	14582134.59	40°09'04.618"N	80°33'15.779"W	28.19	262.112	1.43	1.43	-0.52
1161.00	7.220	250.360	1159.38	-12.58	-7.47	-38.38	1764926.07	14582130.99	40°09'04.583"N	80°33'15.914"W	39.10	258.987	0.71	0.68	-1.46
1254.00	7.700	249.110	1251.59	-14.57	-11.66	-49.70	1764914.75	14582126.81	40°09'04.542"N	80°33'16.060"W	51.05	256.803	0.54	0.52	-1.34
1347.00	8.480	247.340	1343.67	-16.38	-16.52	-61.85	1764902.60	14582121.95	40°09'04.495"N	80°33'16.216"W	64.02	255.047	0.88	0.84	-1.90
1440.00	7.060	244.140	1435.81	-17.62	-21.65	-73.32	1764891.14	14582116.81	40°09'04.444"N	80°33'16.364"W	76.45	253.547	1.60	-1.53	-3.44
1533.00	5.390	238.480	1528.26	-17.88	-26.43	-82.19	1764882.27	14582112.04	40°09'04.398"N	80°33'16.479"W	86.34	252.174	1.91	-1.80	-6.09
1625.00	5.340	233.830	1619.86	-17.27	-31.22	-89.33	1764875.13	14582107.26	40°09'04.351"N	80°33'16.571"W	94.63	250.738	0.48	-0.05	-5.05
1718.00	5.480	241.860	1712.44	-16.92	-35.86	-96.74	1764867.73	14582102.61	40°09'04.305"N	80°33'16.667"W	103.17	249.659	0.83	0.15	8.63
1799.00	4.510	242.930	1793.14	-17.18	-39.14	-102.99	1764861.48	14582099.34	40°09'04.273"N	80°33'16.748"W	110.17	249.192	1.20	-1.20	1.32
1908.00	3.800	244.070	1901.85	-17.63	-42.67	-110.05	1764854.42	14582095.81	40°09'04.239"N	80°33'16.839"W	118.03	248.808	0.66	-0.65	1.05
2001.00	1.120	232.650	1994.75	-17.71	-44.57	-113.54	1764850.93	14582093.91	40°09'04.220"N	80°33'16.884"W	121.98	248.570	2.92	-2.88	-12.28
2094.00	0.550	237.660	2087.74	-17.57	-45.36	-114.64	1764849.83	14582093.12	40°09'04.212"N	80°33'16.898"W	123.29	248.415	0.62	-0.61	5.39
2186.00	2.080	78.310	2179.73	-17.04	-45.25	-113.38	1764851.09	14582093.22	40°09'04.213"N	80°33'16.882"W	122.08	248.241	2.83	1.66	-173.21
2279.00	4.210	79.010	2272.58	-15.41	-44.26	-108.38	1764856.09	14582094.22	40°09'04.223"N	80°33'16.817"W	117.07	247.785	2.29	2.29	0.75
2372.00	6.930	71.310	2365.14	-13.23	-41.81	-99.71	1764864.76	14582096.66	40°09'04.246"N	80°33'16.706"W	108.12	247.250	3.03	2.92	-8.28
2465.00	8.450	67.990	2457.30	-11.23	-37.45	-88.06	1764876.40	14582101.02	40°09'04.289"N	80°33'16.555"W	95.69	246.959	1.70	1.63	-3.57
2559.00	9.460	67.660	2548.17	-9.34	-32.05	-74.80	1764889.66	14582106.43	40°09'04.342"N	80°33'16.384"W	81.38	246.808	1.10	1.10	-0.36
2658.00	9.610	64.980	2639.89	-7.70	-25.86	-60.70	1764903.76	14582112.61	40°09'04.402"N	80°33'16.202"W	65.97	246.924	0.50	0.16	-2.88
2749.00	10.790	62.720	2731.42	-6.88	-18.59	-45.92	1764918.52	14582119.88	40°09'04.473"N	80°33'16.011"W	49.54	247.967	1.34	1.27	-2.43





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# Actual Wellpath Report

Thelma Hays OHI 10H AWP Proj: 15329'  
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REFERENCE WELLPATH IDENTIFICATION	
Operator	SOUTHWESTERN ENERGY
Area	Ohio County, WV
Field	Ohio
Facility	Thelma Hays OHI Pad
Slot	Slot #10
Well	Thelma Hays OHI 10H
Wellbore	Thelma Hays OHI 10H AWB

WELLPATH DATA (168 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]
2836.00	12.510	60.650	2822.50	-6.22	-9.66	-29.41	1764935.04	14582128.81	40°09'04.561"N	80°33'15.798"W	30.95	251.819	1.90	1.85	-2.23
2928.00	14.670	63.980	2911.92	-5.38	0.34	-10.25	1764954.18	14582138.80	40°09'04.659"N	80°33'15.551"W	10.26	271.889	2.50	2.35	3.62
3021.00	17.160	69.880	3001.35	-2.31	10.23	13.22	1764977.65	14582148.68	40°09'04.755"N	80°33'15.248"W	16.71	52.279	3.19	2.68	6.34
3114.00	17.390	71.670	3090.16	2.75	19.32	39.30	1765003.71	14582157.77	40°09'04.844"N	80°33'14.912"W	43.79	63.823	0.62	0.25	1.92
3207.00	17.450	76.300	3178.90	9.37	26.99	66.04	1765030.44	14582165.44	40°09'04.918"N	80°33'14.567"W	71.34	67.770	1.49	0.06	4.98
3299.00	17.030	83.190	3266.77	18.45	31.85	92.82	1765057.21	14582170.30	40°09'04.965"N	80°33'14.221"W	98.13	71.058	2.26	-0.46	7.49
3392.00	15.300	85.220	3356.10	28.95	34.49	118.57	1765082.95	14582172.94	40°09'04.990"N	80°33'13.890"W	123.49	73.780	1.96	-1.86	2.18
3485.00	13.640	89.810	3446.15	39.56	35.55	141.77	1765106.14	14582174.00	40°09'04.999"N	80°33'13.591"W	146.16	75.922	2.17	-1.78	4.94
3580.00	13.310	83.110	3538.54	49.34	36.90	163.82	1765128.19	14582175.35	40°09'05.011"N	80°33'13.307"W	167.93	77.307	1.68	-0.35	-7.05
3673.00	13.220	80.640	3629.05	57.21	39.91	184.95	1765149.30	14582178.36	40°09'05.040"N	80°33'13.035"W	189.20	77.822	0.62	-0.10	-2.66
3766.00	12.610	79.810	3719.70	64.33	43.44	205.43	1765169.78	14582181.88	40°09'05.074"N	80°33'12.770"W	209.97	78.080	0.69	-0.66	-0.89
3859.00	13.320	77.860	3810.33	70.98	47.49	225.90	1765190.24	14582185.93	40°09'05.113"N	80°33'12.507"W	230.83	78.128	0.90	0.76	-2.10
3951.00	13.970	69.220	3899.74	75.93	53.66	246.64	1765210.98	14582192.10	40°09'05.173"N	80°33'12.239"W	252.41	77.726	2.32	0.71	-9.39
4044.00	15.000	63.570	3989.79	78.39	63.00	267.92	1765232.24	14582201.43	40°09'05.264"N	80°33'11.965"W	275.22	76.768	1.88	1.11	-6.08
4137.00	14.400	61.620	4079.75	79.37	73.85	288.87	1765253.19	14582212.28	40°09'05.370"N	80°33'11.694"W	298.16	75.659	0.84	-0.65	-2.10
4230.00	15.350	63.650	4169.63	80.39	84.81	310.07	1765274.38	14582223.24	40°09'05.477"N	80°33'11.420"W	321.46	74.702	1.16	1.02	2.18
4323.00	16.830	63.280	4258.98	81.85	96.33	333.13	1765297.43	14582234.75	40°09'05.590"N	80°33'11.123"W	346.78	73.872	1.60	1.59	-0.40
4416.00	17.420	68.330	4347.87	84.53	107.52	358.09	1765322.39	14582245.94	40°09'05.699"N	80°33'10.800"W	373.89	73.287	1.72	0.63	5.43
4509.00	16.680	70.730	4436.78	88.93	117.07	383.63	1765347.91	14582255.48	40°09'05.793"N	80°33'10.471"W	401.10	73.030	1.10	-0.80	2.58
4602.00	16.700	75.480	4525.86	94.88	124.82	409.17	1765373.44	14582263.24	40°09'05.868"N	80°33'10.142"W	427.78	73.035	1.47	0.02	5.11
4695.00	16.480	73.250	4614.99	101.37	131.98	434.73	1765399.00	14582270.39	40°09'05.937"N	80°33'09.812"W	454.32	73.113	0.72	-0.24	-2.40
4788.00	16.840	75.630	4704.09	107.93	139.12	460.41	1765424.67	14582277.53	40°09'06.007"N	80°33'09.481"W	480.97	73.187	0.83	0.39	2.56
4881.00	16.700	80.970	4793.14	116.24	144.56	486.66	1765450.91	14582282.97	40°09'06.059"N	80°33'09.142"W	507.68	73.456	1.66	-0.15	5.74
4973.00	17.300	83.400	4881.12	126.31	148.21	513.31	1765477.54	14582286.61	40°09'06.094"N	80°33'08.799"W	534.27	73.895	1.01	0.65	2.64
5066.00	17.480	86.650	4969.87	137.97	150.61	540.99	1765505.21	14582289.02	40°09'06.116"N	80°33'08.442"W	561.56	74.442	1.06	0.19	3.49
5159.00	15.730	90.680	5058.99	150.58	151.28	567.54	1765531.75	14582289.68	40°09'06.121"N	80°33'08.100"W	587.36	75.074	2.25	-1.88	4.33
5252.00	15.580	90.640	5148.54	163.26	161.03	592.63	1765556.84	14582289.43	40°09'06.118"N	80°33'07.777"W	611.57	75.703	0.17	-0.16	-0.20
5345.00	15.590	88.360	5238.13	175.45	151.28	617.61	1765581.81	14582289.68	40°09'06.119"N	80°33'07.455"W	635.87	76.237	0.62	0.01	-2.29
5438.00	15.510	85.530	5327.72	186.66	152.60	642.50	1765606.69	14582291.00	40°09'06.131"N	80°33'07.135"W	660.38	76.639	0.82	-0.09	-3.04
5531.00	14.960	85.340	5417.45	197.07	154.55	666.86	1765631.04	14582292.95	40°09'06.149"N	80°33'06.821"W	684.54	76.952	0.59	-0.59	-0.20

6/27/2018



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# Actual Wellpath Report

Thelma Hays OHI 10H AWP Proj: 15329'  
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Area	Ohio County, WV	Well	Thelma Hays OHI 10H
Field	Ohio	Wellbore	Thelma Hays OHI 10H AWB
Facility	Thelma Hays OHI Pad		

## WELLPATH DATA (168 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]
5620.00	15.200	83.220	5503.39	206.51	156.86	689.90	1765654.06	14582295.26	40°09'06.170"N	80°33'06.524"W	707.51	77.191	0.68	0.27	-2.38
5713.00	14.990	80.000	5593.18	215.34	160.39	713.85	1765678.01	14582298.78	40°09'06.204"N	80°33'06.215"W	731.65	77.337	0.93	-0.23	-3.46
5806.00	15.060	77.570	5683.00	223.02	165.07	737.49	1765701.64	14582303.47	40°09'06.249"N	80°33'05.911"W	755.74	77.383	0.68	0.08	-2.61
5854.00	15.130	77.900	5729.35	226.78	167.73	749.71	1765713.85	14582306.13	40°09'06.275"N	80°33'05.753"W	768.24	77.389	0.23	0.15	0.69
5888.00	14.950	77.460	5762.18	229.43	169.61	758.33	1765722.47	14582308.01	40°09'06.293"N	80°33'05.642"W	777.07	77.392	0.63	-0.53	-1.29
5980.00	12.150	86.850	5851.62	237.29	172.72	779.59	1765743.72	14582311.12	40°09'06.323"N	80°33'05.368"W	798.49	77.508	3.86	-3.04	10.21
6073.00	17.430	113.970	5941.62	252.93	167.59	802.13	1765766.25	14582305.99	40°09'06.271"N	80°33'05.078"W	819.45	78.199	9.22	5.68	29.16
6166.00	24.160	121.450	6028.52	280.89	151.98	831.13	1765795.24	14582290.38	40°09'06.115"N	80°33'04.706"W	844.91	79.637	7.77	7.24	8.04
6259.00	32.500	128.030	6110.33	320.78	126.61	867.12	1765831.21	14582265.02	40°09'05.863"N	80°33'04.244"W	876.31	81.693	9.56	8.97	7.08
6351.00	42.280	134.360	6183.37	373.58	89.64	908.83	1765872.91	14582228.07	40°09'05.495"N	80°33'03.709"W	913.24	84.367	11.41	10.63	6.88
6444.00	50.410	139.820	6247.54	439.06	40.29	954.41	1765918.47	14582178.73	40°09'05.005"N	80°33'03.125"W	955.26	87.583	9.71	8.74	5.87
6537.00	59.960	143.310	6300.58	514.46	-19.52	1001.70	1765965.74	14582118.95	40°09'04.412"N	80°33'02.520"W	1001.89	91.116	10.72	10.27	3.75
6629.00	69.540	146.310	6339.79	597.19	-87.48	1049.52	1766013.55	14582051.01	40°09'03.738"N	80°33'01.909"W	1053.16	94.765	10.82	10.41	3.26
6722.00	76.740	149.270	6366.75	686.05	-162.75	1096.88	1766060.89	14581975.77	40°09'02.992"N	80°33'01.304"W	1108.89	98.440	8.32	7.74	3.18
6815.00	79.540	151.620	6385.86	777.05	-241.91	1141.76	1766105.75	14581896.64	40°09'02.207"N	80°33'00.731"W	1167.11	101.963	3.90	3.01	2.53
6907.00	84.210	154.390	6398.87	867.98	-323.04	1183.08	1766147.05	14581815.54	40°09'01.404"N	80°33'00.204"W	1226.39	105.272	5.89	5.08	3.01
7000.00	88.710	159.570	6404.61	960.10	-408.42	1219.34	1766183.30	14581730.19	40°09'00.558"N	80°32'59.743"W	1285.93	108.519	7.37	4.84	5.57
7093.00	88.520	158.730	6406.86	1051.94	-495.31	1252.43	1766216.38	14581643.34	40°08'59.698"N	80°32'59.322"W	1346.82	111.578	0.93	-0.20	-0.90
7186.00	88.770	156.460	6409.06	1144.14	-581.26	1287.87	1766251.80	14581557.43	40°08'58.847"N	80°32'58.872"W	1412.96	114.291	2.45	0.27	-2.44
7278.00	88.280	155.470	6411.43	1235.65	-665.25	1325.33	1766289.25	14581473.46	40°08'58.015"N	80°32'58.395"W	1482.92	116.655	1.20	-0.53	-1.08
7371.00	87.910	153.480	6414.52	1328.34	-749.12	1365.38	1766329.28	14581389.62	40°08'57.184"N	80°32'57.885"W	1557.38	118.752	2.18	-0.40	-2.14
7464.00	88.030	155.040	6417.81	1421.05	-832.84	1405.74	1766369.63	14581305.94	40°08'56.355"N	80°32'57.370"W	1633.93	120.645	1.68	0.13	1.68
7557.00	87.810	156.520	6421.19	1513.54	-917.60	1443.87	1766407.74	14581221.22	40°08'55.515"N	80°32'56.885"W	1710.77	122.437	1.61	-0.24	1.59
7650.00	87.940	158.670	6424.64	1605.71	-1003.51	1479.29	1766443.15	14581135.33	40°08'54.664"N	80°32'56.434"W	1787.55	124.152	2.31	0.14	2.31
7742.00	89.570	161.040	6426.64	1696.38	-1089.86	1510.96	1766474.81	14581049.02	40°08'53.809"N	80°32'56.032"W	1863.00	125.803	3.13	1.77	2.58
7835.00	89.510	162.450	6427.38	1787.50	-1178.17	1540.09	1766503.93	14580960.74	40°08'52.935"N	80°32'55.663"W	1939.06	127.416	1.52	-0.06	1.52
7928.00	90.180	162.470	6427.63	1878.38	-1266.84	1568.12	1766531.94	14580872.10	40°08'52.058"N	80°32'55.308"W	2015.91	128.934	0.72	0.72	0.02
8021.00	91.170	160.020	6426.54	1969.65	-1354.89	1598.01	1766561.83	14580784.09	40°08'51.186"N	80°32'54.928"W	2095.08	130.293	2.84	1.06	-2.63
8114.00	89.970	153.080	6425.61	2062.02	-1440.15	1635.00	1766598.80	14580698.86	40°08'50.342"N	80°32'54.458"W	2178.82	131.375	7.57	-1.29	-7.46
8207.00	89.850	148.630	6425.76	2153.99	-1520.49	1679.79	1766643.58	14580618.56	40°08'49.546"N	80°32'53.886"W	2265.74	132.150	4.84	-0.13	-4.84

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# Actual Wellpath Report

Thelma Hays OHI 10H AWP Proj: 15329'  
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## REFERENCE WELLPATH IDENTIFICATION

Operator	Slot	Slot #10
SOUTHWESTERN ENERGY	Well	Thelma Hays OHI 10H
Area	Wellbore	Thelma Hays OHI 10H AWP
Field		
Facility		

## WELLPATH DATA (168 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]
8299.00	89.780	148.350	6426.06	2246.95	-1599.77	1728.40	1766992.16	14580539.30	40°08'48.760"N	80°32'53.265"W	2355.13	132.787	0.31	-0.08	-0.30
8392.00	90.030	148.330	6426.21	2339.90	-1678.93	1777.21	1766740.96	14580460.17	40°08'47.975"N	80°32'52.642"W	2444.85	133.371	0.27	0.27	-0.02
8484.00	89.720	149.460	6426.41	2431.87	-1757.70	1824.74	1766788.47	14580381.43	40°08'47.194"N	80°32'52.035"W	2533.61	133.928	1.27	-0.34	1.23
8577.00	89.970	151.340	6426.66	2524.87	-1838.56	1870.67	1766834.38	14580300.61	40°08'46.393"N	80°32'51.449"W	2622.92	134.504	2.04	0.27	2.02
8670.00	89.320	151.420	6427.24	2617.85	-1920.20	1915.22	1766878.91	14580219.00	40°08'45.584"N	80°32'50.881"W	2712.05	135.074	0.70	-0.70	0.09
8762.00	89.510	153.480	6428.18	2709.77	-2001.76	1957.77	1766921.44	14580137.47	40°08'44.776"N	80°32'50.338"W	2799.98	135.637	2.25	0.21	2.24
8855.00	89.290	158.560	6429.15	2802.26	-2086.70	1995.55	1766959.21	14580052.57	40°08'43.934"N	80°32'49.857"W	2887.30	136.279	5.47	-0.24	5.46
8948.00	89.350	159.410	6430.26	2894.16	-2173.50	2028.90	1766992.55	14579965.79	40°08'43.075"N	80°32'49.433"W	2973.30	136.971	0.92	0.06	0.91
9040.00	89.290	163.420	6431.35	2984.39	-2260.68	2058.21	1767021.85	14579878.65	40°08'42.212"N	80°32'49.062"W	3057.27	137.684	4.36	-0.07	4.36
9133.00	89.420	158.310	6432.40	3075.75	-2348.51	2088.68	1767052.31	14579790.85	40°08'41.343"N	80°32'48.675"W	3142.94	138.351	5.50	0.14	-5.49
9225.00	89.260	155.240	6433.46	3167.13	-2433.04	2124.96	1767088.57	14579706.36	40°08'40.505"N	80°32'48.214"W	3230.34	138.867	3.34	-0.17	-3.34
9318.00	89.200	157.060	6434.71	3259.62	-2518.08	2162.56	1767126.15	14579621.34	40°08'39.663"N	80°32'47.735"W	3319.25	139.344	1.96	-0.06	1.96
9410.00	89.320	158.070	6435.90	3350.86	-2603.11	2197.66	1767161.25	14579536.35	40°08'38.821"N	80°32'47.289"W	3406.75	139.827	1.11	0.13	1.10
9503.00	89.350	160.650	6436.97	3442.66	-2690.13	2230.44	1767194.01	14579449.36	40°08'37.959"N	80°32'46.872"W	3494.52	140.337	2.77	0.03	2.77
9596.00	89.350	161.890	6438.03	3533.93	-2778.20	2260.30	1767223.86	14579361.33	40°08'37.088"N	80°32'46.494"W	3581.53	140.869	1.33	0.00	1.33
9688.00	89.540	159.590	6438.92	3624.37	-2865.04	2290.64	1767254.19	14579274.52	40°08'36.228"N	80°32'46.109"W	3668.17	141.357	2.51	0.21	-2.50
9781.00	89.320	156.530	6439.85	3716.49	-2951.29	2325.39	1767288.92	14579188.31	40°08'35.374"N	80°32'45.667"W	3757.33	141.765	3.30	-0.24	-3.29
9874.00	89.320	157.050	6440.95	3808.87	-3036.76	2362.03	1767325.56	14579102.87	40°08'34.528"N	80°32'45.201"W	3847.22	142.124	0.56	0.00	0.56
9967.00	89.820	156.020	6441.65	3901.30	-3122.06	2399.06	1767362.57	14579017.60	40°08'33.683"N	80°32'44.729"W	3937.36	142.460	1.23	0.54	-1.11
10060.00	89.910	154.460	6441.87	3993.94	-3206.51	2438.01	1767401.51	14578933.18	40°08'32.846"N	80°32'44.233"W	4028.10	142.753	1.68	0.10	-1.68
10153.00	89.850	152.980	6442.06	4086.77	-3289.89	2479.19	1767442.67	14578849.83	40°08'32.020"N	80°32'43.709"W	4119.44	142.999	1.59	-0.06	-1.59
10245.00	89.850	152.790	6442.30	4178.67	-3371.78	2521.12	1767484.58	14578767.97	40°08'31.209"N	80°32'43.174"W	4210.10	143.214	0.21	0.00	-0.21
10338.00	89.850	154.890	6442.55	4271.48	-3455.25	2562.12	1767525.56	14578684.54	40°08'30.382"N	80°32'42.652"W	4301.54	143.443	2.26	0.00	2.26
10431.00	89.970	156.640	6442.69	4364.04	-3540.05	2600.29	1767563.72	14578599.77	40°08'29.542"N	80°32'42.166"W	4392.43	143.701	1.89	0.13	1.88
10524.00	89.880	153.720	6442.81	4456.68	-3624.45	2639.33	1767602.74	14578515.40	40°08'28.706"N	80°32'41.669"W	4483.60	143.938	3.14	-0.10	-3.14
10616.00	89.780	150.870	6443.09	4548.61	-3705.90	2682.09	1767645.49	14578433.99	40°08'27.899"N	80°32'41.123"W	4574.64	144.105	3.10	-0.11	-3.10
10709.00	89.720	153.060	6443.49	4641.56	-3787.98	2725.80	1767689.18	14578351.94	40°08'27.086"N	80°32'40.566"W	4666.77	144.261	2.36	-0.06	2.35
10802.00	89.820	156.240	6443.87	4734.27	-3872.01	2765.61	1767728.98	14578267.94	40°08'26.253"N	80°32'40.059"W	4758.27	144.463	3.42	0.11	3.42
10895.00	89.820	154.070	6444.16	4826.92	-3956.40	2804.69	1767768.04	14578183.58	40°08'25.417"N	80°32'39.562"W	4849.68	144.667	2.33	0.00	-2.33
10988.00	89.720	154.470	6444.53	4919.68	-4040.18	2845.06	1767808.40	14578099.84	40°08'24.587"N	80°32'39.047"W	4941.40	144.847	0.44	-0.11	0.43

07/2018



## REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #10
Area	Ohio County, WV	Well	Thelma Hays OHI 10H
Field	Ohio	Wellbore	Thelma Hays OHI 10H AWB
Facility	Thelma Hays OHI Pad		

## WELLPATH DATA (168 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]
11081.00	89.660	156.230	6445.04	5012.31	-4124.70	2883.85	1767847.17	14578015.35	40°08'23.750"N	80°32'38.553"W	5032.86	145.040	1.89	-0.06	1.89
11173.00	89.940	160.950	6445.36	5103.30	-4210.32	2917.42	1767880.73	14577929.75	40°08'22.902"N	80°32'38.127"W	5122.32	145.281	5.14	0.30	5.13
11266.00	89.880	166.490	6445.50	5193.70	-4299.56	2943.48	1767906.78	14577840.55	40°08'22.019"N	80°32'37.797"W	5210.59	145.604	5.96	-0.06	5.96
11359.00	89.850	167.860	6445.72	5282.65	-4390.24	2964.12	1767927.42	14577749.91	40°08'21.122"N	80°32'37.537"W	5297.19	145.974	1.47	-0.03	1.47
11452.00	89.820	163.270	6445.99	5372.31	-4480.28	2987.30	1767950.58	14577659.91	40°08'20.231"N	80°32'37.245"W	5384.87	146.306	4.94	-0.03	-4.94
11545.00	89.970	157.470	6446.16	5463.82	-4567.83	3018.53	1767981.80	14577572.38	40°08'19.364"N	80°32'36.849"W	5475.09	146.542	6.24	0.16	-6.24
11638.00	89.940	154.620	6446.23	5556.33	-4652.81	3056.29	1768019.54	14577487.43	40°08'18.523"N	80°32'36.368"W	5566.83	146.700	3.06	-0.03	-3.06
11730.00	90.000	153.880	6446.28	5648.10	-4735.68	3096.26	1768059.50	14577404.60	40°08'17.702"N	80°32'35.859"W	5658.04	146.823	0.81	0.07	-0.80
11823.00	89.910	152.120	6446.35	5740.99	-4818.54	3138.47	1768101.70	14577321.77	40°08'16.881"N	80°32'35.321"W	5750.51	146.922	1.89	-0.10	-1.89
11916.00	89.660	148.390	6446.70	5833.97	-4899.27	3184.61	1768147.81	14577241.07	40°08'16.081"N	80°32'34.732"W	5843.34	146.975	4.02	-0.27	-4.01
12008.00	89.570	150.540	6447.32	5925.95	-4978.50	3231.35	1768194.53	14577161.87	40°08'15.295"N	80°32'34.136"W	5935.24	147.014	2.34	-0.10	2.34
12101.00	89.570	151.580	6448.02	6018.94	-5059.89	3276.35	1768239.52	14577080.52	40°08'14.489"N	80°32'33.562"W	6028.01	147.076	1.12	0.00	1.12
12194.00	89.540	152.950	6448.74	6111.88	-5142.20	3319.62	1768282.78	14576998.24	40°08'13.673"N	80°32'33.010"W	6120.63	147.155	1.47	-0.03	1.47
12287.00	89.450	157.040	6449.56	6204.53	-5226.46	3358.92	1768322.06	14576914.01	40°08'12.838"N	80°32'32.509"W	6212.75	147.272	3.40	-0.10	4.40
12379.00	89.600	160.160	6450.33	6295.53	-5312.10	3392.49	1768355.61	14576828.40	40°08'11.990"N	80°32'32.083"W	6302.97	147.436	3.40	0.16	3.39
12472.00	89.630	154.810	6450.95	6387.75	-5397.98	3428.09	1768391.20	14576742.55	40°08'11.140"N	80°32'31.630"W	6394.53	147.582	5.75	0.03	-5.75
12565.00	89.660	153.330	6451.53	6480.54	-5481.62	3468.75	1768431.85	14576658.95	40°08'10.311"N	80°32'31.112"W	6486.94	147.674	1.59	0.03	-1.59
12658.00	89.570	150.560	6452.15	6573.48	-5563.68	3512.49	1768475.57	14576576.92	40°08'09.498"N	80°32'30.555"W	6579.67	147.735	2.98	-0.10	-2.98
12751.00	89.540	151.360	6452.87	6666.47	-5644.98	3557.63	1768520.69	14576495.65	40°08'08.692"N	80°32'29.979"W	6672.52	147.780	0.86	-0.03	0.86
12843.00	89.510	155.820	6453.64	6758.29	-5727.36	3598.54	1768561.58	14576413.30	40°08'07.876"N	80°32'29.458"W	6764.03	147.859	4.85	-0.03	4.85
12936.00	89.510	156.400	6454.43	6850.79	-5812.39	3636.20	1768599.23	14576328.31	40°08'07.034"N	80°32'28.978"W	6856.08	147.970	0.62	0.00	0.62
13029.00	89.570	156.390	6455.18	6943.25	-5897.60	3673.44	1768636.46	14576243.12	40°08'06.190"N	80°32'28.505"W	6948.08	148.082	0.07	0.06	-0.01
13122.00	89.570	159.500	6455.88	7035.39	-5983.78	3708.35	1768671.36	14576156.97	40°08'05.337"N	80°32'28.061"W	7039.71	148.212	3.34	0.00	3.34
13215.00	89.600	160.160	6456.55	7127.08	-6071.08	3740.42	1768703.41	14576069.71	40°08'04.473"N	80°32'27.654"W	7130.83	148.363	0.71	0.03	0.71
13308.00	89.850	160.300	6457.00	7218.67	-6158.60	3771.88	1768734.86	14575982.23	40°08'03.606"N	80°32'27.255"W	7221.87	148.514	0.31	0.27	0.15
13400.00	89.940	161.870	6457.17	7309.01	-6245.62	3801.70	1768764.67	14575895.24	40°08'02.745"N	80°32'26.876"W	7311.68	148.671	1.71	0.10	1.71
13493.00	90.060	161.700	6457.17	7400.13	-6333.96	3830.77	1768793.73	14575806.93	40°08'01.870"N	80°32'26.508"W	7402.29	148.835	0.22	0.13	-0.18
13586.00	90.770	160.360	6456.49	7491.47	-6421.91	3861.00	1768823.94	14575719.02	40°08'00.999"N	80°32'26.125"W	7493.21	148.985	1.63	0.76	-1.44
13679.00	91.480	154.260	6454.66	7583.70	-6507.65	3896.85	1768859.78	14575633.31	40°08'00.150"N	80°32'25.669"W	7585.18	149.086	6.60	0.76	-6.56
13772.00	89.780	148.060	6453.64	7676.63	-6589.07	3941.68	1768904.60	14575551.92	40°07'59.343"N	80°32'25.097"W	7678.07	149.111	6.91	-1.83	-6.67



### REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #10
Area	Ohio County, WV	Well	Thelma Hays OHI 10H
Field	Ohio	Wellbore	Thelma Hays OHI 10H AWB
Facility	Thelma Hays OHI Pad		

### WELLPATH DATA (168 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]
13865.00	89.720	148.260	6454.05	7769.57	-6668.08	3990.74	1768953.64	14575472.95	40°07'58.560"N	80°32'24.471"W	7771.05	149.100	0.22	-0.06	0.22
13957.00	90.030	151.630	6454.25	7861.55	-6747.69	4036.81	1768999.69	14575393.36	40°07'57.771"N	80°32'23.883"W	7863.03	149.110	3.68	0.34	3.66
14050.00	90.000	151.550	6454.22	7954.53	-6829.49	4081.06	1769043.92	14575311.59	40°07'56.961"N	80°32'23.319"W	7955.94	149.139	0.09	-0.03	-0.09
14143.00	89.970	154.280	6454.25	8047.42	-6912.29	4123.40	1769086.25	14575228.83	40°07'56.140"N	80°32'22.779"W	8048.74	149.183	2.94	-0.03	2.94
14235.00	89.970	153.220	6454.30	8139.24	-6994.80	4164.09	1769126.92	14575146.35	40°07'55.323"N	80°32'22.261"W	8140.45	149.234	1.15	0.00	-1.15
14328.00	89.940	155.760	6454.37	8231.97	-7078.72	4204.14	1769166.95	14575062.46	40°07'54.491"N	80°32'21.751"W	8233.05	149.293	2.73	-0.03	2.73
14421.00	89.910	156.410	6454.49	8324.49	-7163.74	4241.84	1769204.64	14574977.47	40°07'53.649"N	80°32'21.274"W	8325.41	149.369	0.70	-0.03	0.70
14514.00	90.090	160.200	6454.49	8416.55	-7250.14	4276.21	1769239.00	14574891.11	40°07'52.794"N	80°32'20.834"W	8417.27	149.467	4.08	0.19	4.08
14607.00	90.000	159.310	6454.42	8508.26	-7337.39	4308.39	1769271.17	14574803.89	40°07'51.930"N	80°32'20.426"W	8508.79	149.579	0.96	-0.10	-0.96
14699.00	89.970	160.570	6454.44	8598.94	-7423.81	4339.95	1769302.71	14574717.51	40°07'51.074"N	80°32'20.025"W	8599.31	149.689	1.37	-0.03	1.37
14792.00	89.880	161.310	6454.56	8690.31	-7511.71	4370.32	1769333.07	14574629.64	40°07'50.204"N	80°32'19.640"W	8690.54	149.809	0.80	-0.10	0.80
14885.00	90.150	160.090	6454.54	8781.76	-7599.48	4401.06	1769363.80	14574541.90	40°07'49.335"N	80°32'19.250"W	8781.88	149.924	1.35	0.29	-1.32
14978.00	88.770	154.210	6455.42	8874.04	-7685.13	4437.17	1769399.89	14574456.28	40°07'48.487"N	80°32'18.791"W	8874.10	149.999	6.48	-1.48	-6.31
15071.00	88.950	157.770	6457.27	8966.53	-7770.05	4474.99	1769437.70	14574371.39	40°07'47.646"N	80°32'18.310"W	8966.57	150.061	3.83	0.19	3.83
15164.00	89.200	155.630	6458.77	9058.92	-7855.45	4511.77	1769474.47	14574286.02	40°07'46.800"N	80°32'17.842"W	9058.93	150.129	2.32	0.27	-2.30
15257.00	88.950	153.260	6460.27	9151.65	-7939.34	4551.88	1769514.56	14574202.17	40°07'45.969"N	80°32'17.331"W	9151.65	150.173	2.56	-0.27	-2.55
15305.00	88.920	153.860	6461.16	9199.56	-7982.31	4573.25	1769535.92	14574159.22	40°07'45.543"N	80°32'17.059"W	9199.56	150.191	1.25	-0.06	1.25
15329.00	88.920	153.860	6461.62	9223.51	-8003.85	4583.82	1769546.49	14574137.68	40°07'45.330"N	80°32'16.924"W	9223.51	150.200	0.00	0.00	0.00

### HOLE & CASING SECTIONS - Ref Wellbore: Thelma Hays OHI 10H AWB Ref Wellpath: Thelma Hays OHI 10H AWP Proj: 15329'

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 EW [ft]
12.25in Open Hole	647.00	1871.00	1224.00	646.95	1864.94	3.18	-41.55	-6.00	-107.78	-107.78
9.625in Casing	26.00	1852.00	1826.00	26.00	1845.98	0.00	-40.95	0.00	-106.56	-106.56
8.75in Open Hole	1871.00	5876.00	4005.00	1864.94	5750.59	-41.55	168.94	-107.78	755.30	755.30
8.5in Open Hole	5876.00	15329.00	9453.00	5750.59	6461.62	168.94	-8003.85	755.30	4583.82	4583.82



### REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #10
Area	Ohio County, WV	Well	Thelma Hays OHI 10H
Field	Ohio	Wellbore	Thelma Hays OHI 10H AWB
Facility	Thelma Hays OHI Pad		

### TARGETS

Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Thelma Hays 10H LP Rev-6	6395.00	-310.96	1164.17	1766128.15	14581827.62	40°09'01.524"N	80°33'00.447"W	point
Thelma Hays 10H BHL Rev-5	6452.00	-8033.92	4597.17	1769559.83	14574107.63	40°07'45.032"N	80°32'16.755"W	point

### WELLPATH COMPOSITION - Ref Wellbore: Thelma Hays OHI 10H AWB Ref Wellpath: Thelma Hays OHI 10H AWP Proj: 15329'

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	562.00	ISCWSA MWD, Rev. 4 (Standard)	01_VES MSS <17-1/2"> (192-562)	Thelma Hays OHI 10H AWB
562.00	1799.00	BHI NaviTrak (Axial)	02_APS EM <12-1/4"> (562)(697'-1799')	Thelma Hays OHI 10H AWB
1799.00	5806.00	BHI NaviTrak (Axial)	03_APS EM <8-3/4"> (1799)(1908'-5806')	Thelma Hays OHI 10H AWB
5806.00	15305.00	BHI AutoTrak Curve (Short)	04_BH AT Curve <8-1/2"> (5806)(5854'-15305')	Thelma Hays OHI 10H AWB
15305.00	15329.00	Blind Drilling (std)	Projection to bit	Thelma Hays OHI 10H AWB



**REFERENCE WELLPATH IDENTIFICATION**

Operator	Slot	Slot #10
SOUTHWESTERN ENERGY	Well	Thelma Hays OHI 10H
Ohio County, WV	Wellbore	Thelma Hays OHI 10H AWB
Ohio		
Thelma Hays OHI Pad		

**COMMENTS**

Wellpath general comments  
API: 47-069-00235-0000  
Job #: 8797755  
Rig: SDC 46  
Duration: 10/22/2017 - 10/30/2017