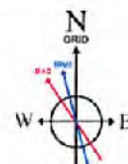
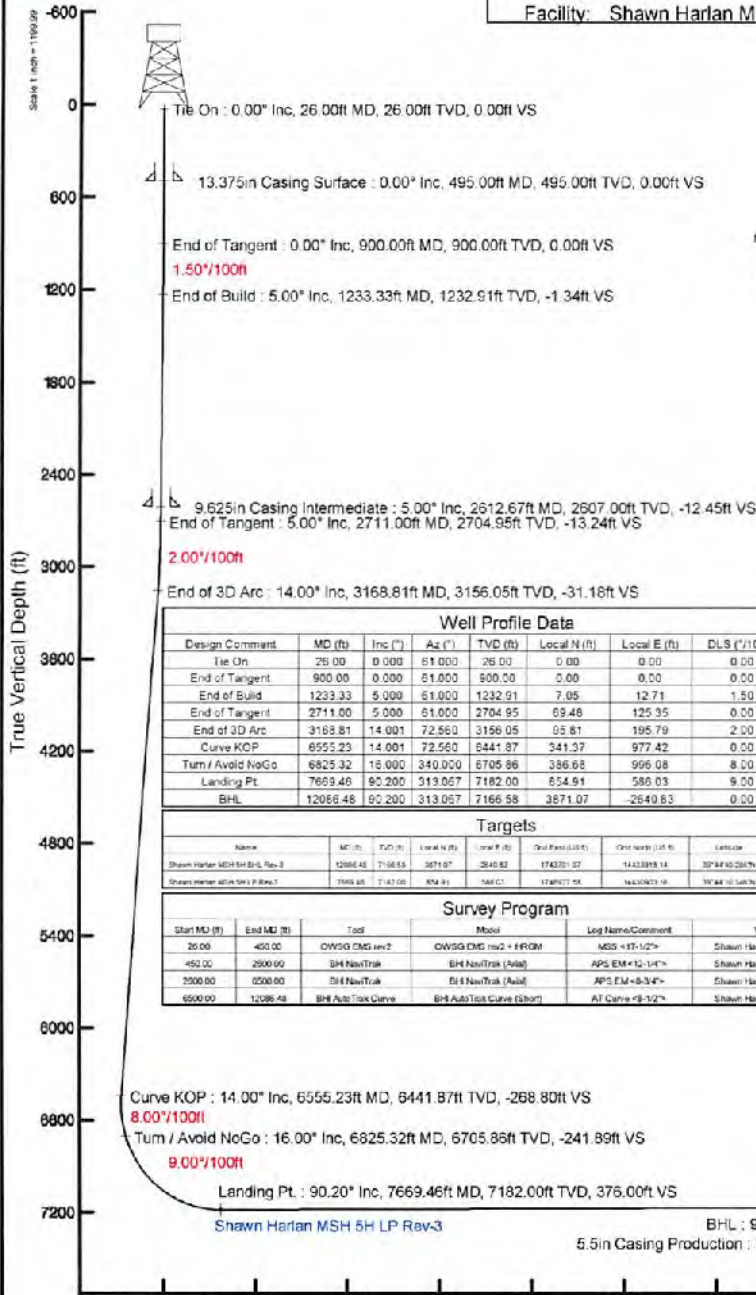


Location: Marshall County, WV
Field: Marshall
Facility: Shawn Harlan MSH Pad

Slot: Slot #05
Well: Shawn Harlan MSH 5H
Wellbore: Shawn Harlan MSH 5H PWB

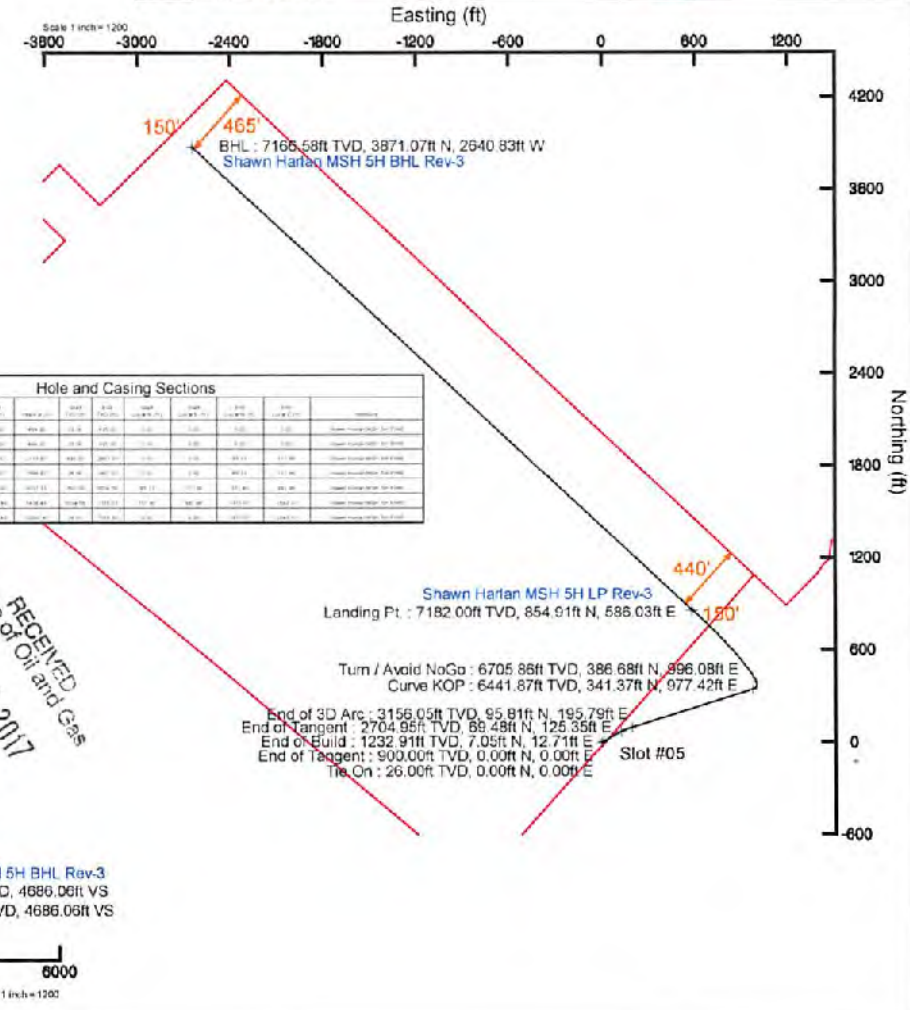


User specified Dip: 67.04° Field: 52587 nT
Magnetic North is 5.27 degrees West of True North (at 12/2/2015)
Grid North is 0.24 degrees East of True North
To correct azimuth from True to Grid subtract 0.24 degrees
To correct azimuth from Magnetic to Grid subtract 6.51 degrees

Plot reference wellpath is Shawn Harlan MSH 5H PWB Ex-02

True vertical depths are referenced to SDC 46 (RKB)	Grid System: NAD83 / UTM Zone 17 North, US feet
Measured depths are referenced to SDC 46 (RKB)	* = Wellpath was transformed from a different geoidic datum
SDC 46 (RKB) to Mean Sea Level: 1416.6 feet	North Reference: Grid north
Mean Sea Level to Mud line (At Slot: Slot #05) : -1390.0 feet	Scale: True distance
Coordinates are in feet referenced to Slot	Depths are in feet
	Created by: edsonvaz on 2016-12-02
	Database: WV_MPL_EASTERNUS_Defn

Location Information					
Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
Shawn Harlan MSH Pad	1746333.890	1443026.540	39°44'01.694"N	80°37'23.709"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Longitude
Slot #05	23.05	7.65	1746341.770	1443026.580	80°37'23.606"W
SDC 46 (RKB) to Mud line (At Slot: Slot #05)			26ft		
Mean Sea Level to Mud line (At Slot: Slot #05)			-1390.0ft		
SDC 46 (RKB) to Mean Sea Level			1416.6ft		



Well Profile Data							
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	VS (ft)
Tie On	26.00	0.000	81.000	26.00	0.00	0.00	0.00
End of Tangent	900.00	0.000	81.000	900.00	0.00	0.00	0.00
End of Build	1233.33	5.000	81.000	1232.91	7.05	12.71	1.50
End of Tangent	2711.00	5.000	81.000	2704.95	69.48	125.35	0.00
End of 3D Arc	3168.81	14.001	72.560	3156.05	95.81	195.79	2.00
Curve KOP	6555.23	14.001	72.560	6441.87	341.37	977.42	0.00
Turn / Avoid NoGo	6825.32	16.000	340.000	6705.96	386.68	996.08	8.00
Landing Pt.	7669.46	90.200	313.067	7182.00	854.91	585.03	9.00
BHL	12086.48	90.200	313.067	7166.58	3871.07	-2640.83	0.00

Hole and Casing Sections											
Start	End	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	VS (ft)	Depth (ft)	Material	Notes
0.00	26.00	26.00	0.00	81.00	26.00	0.00	0.00	0.00	26.00	5.5in Casing	
26.00	900.00	900.00	0.00	81.00	900.00	0.00	0.00	0.00	900.00	5.5in Casing	
900.00	1233.33	1233.33	5.00	81.00	1232.91	7.05	12.71	1.50	1233.33	5.5in Casing	
1233.33	2711.00	2711.00	5.00	81.00	2704.95	69.48	125.35	0.00	2711.00	5.5in Casing	
2711.00	3168.81	3168.81	14.00	72.56	3156.05	95.81	195.79	2.00	3168.81	5.5in Casing	
3168.81	6555.23	6555.23	14.00	72.56	6441.87	341.37	977.42	0.00	6555.23	5.5in Casing	
6555.23	6825.32	6825.32	16.00	340.00	6705.96	386.68	996.08	8.00	6825.32	5.5in Casing	
6825.32	7669.46	7669.46	90.20	313.07	7182.00	854.91	585.03	9.00	7669.46	5.5in Casing	
7669.46	12086.48	12086.48	90.20	313.07	7166.58	3871.07	-2640.83	0.00	12086.48	5.5in Casing	

Targets					
Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	VS (ft)
Shawn Harlan MSH 5H BHL Rev-3	12086.48	7166.58	3871.07	-2640.83	1746333.89
Shawn Harlan MSH 5H LP Rev-3	7669.46	7182.00	854.91	585.03	1746341.77

Survey Program					
Start MD (ft)	End MD (ft)	Tool	Model	Log Name/Comment	Wellbore
20.00	450.00	CHVSS CMS rev2	CHVSS CMS Inc + FROTH	MS -17-12"	Shawn Harlan MSH 5H PWB
450.00	2500.00	BH NavTrak	BH NavTrak (Aid)	APS EM-12-14"	Shawn Harlan MSH 5H PWB
2500.00	6500.00	BH NavTrak	BH NavTrak (Aid)	APS EM-8-34"	Shawn Harlan MSH 5H PWB
6500.00	12086.48	BH AutoTrack Curve	BH AutoTrack Curve (Shot)	AT Curve -8-12"	Shawn Harlan MSH 5H PWB

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Vertical Section (ft)
Azimuth 325.70° with reference 0.00 N, 0.00 E

Scale 1 inch = 1200'



Actual Wellpath Report

Shawn Harlan MSH 5H AWP Proj: 12059'
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REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #05
Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

REPORT SETUP INFORMATION

Projection System	NAD83 / UTM Zone 17 North, US feet	Software System	WellArchitect® 5.0
North Reference	Grid	User	Edsaryar
Scale	0.999613	Report Generated	1/6/2017 at 7:37:40 AM
Convergence at slot	0.25° East	Database/Source file	WA_MPL_EASTERNUS_Defn/Shawn_Harlan_MSH_5H_AWP_Proj_12059_.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	23.05	7.88	1746341.77	14430048.58	39°44'01.921"N	80°37'23.606"W
Facility Reference Pt			1746333.89	14430025.54	39°44'01.694"N	80°37'23.709"W
Field Reference Pt			0.00	0.00	0°00'00.000"	85°29'19.478"W

WELLPATH DATUM

Calculation method	Minimum curvature	SDC 46 (RKB) to Facility Vertical Datum	1416.60ft
Horizontal Reference Pt	Slot	SDC 46 (RKB) to Mean Sea Level	1416.60ft
Vertical Reference Pt	SDC 46 (RKB)	SDC 46 (RKB) to Mud Line at Slot (Slot #05)	26.00ft
MD Reference Pt	SDC 46 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	325.70°

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Actual Wellpath Report

Shawn Harlan MSH 5H AWP Proj: 12059'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #05
Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

WELLPATH DATA (144 stations) † = interpolated/extrapolated station																
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]	
0.00†	0.000	174.340	0.00	0.00	0.00	0.00	1746341.77	14430048.58	39°44'01.921"N	80°37'23.606"W	0.00	0.000	0.00	0.00	0.00	
26.00	0.000	174.340	26.00	0.00	0.00	0.00	1746341.77	14430048.58	39°44'01.921"N	80°37'23.606"W	0.00	0.000	0.00	0.00	0.00	
170.00	0.000	34.740	170.00	0.00	0.00	0.00	1746341.77	14430048.58	39°44'01.921"N	80°37'23.606"W	0.00	0.000	0.00	0.00	0.00	
263.00	0.400	174.340	263.00	-0.28	-0.32	0.03	1746341.80	14430048.26	39°44'01.918"N	80°37'23.606"W	0.32	174.340	0.43	0.43	187.46	
356.00	0.500	237.940	356.00	-0.55	-0.86	-0.28	1746341.49	14430047.72	39°44'01.913"N	80°37'23.610"W	0.91	197.997	0.52	0.11	68.39	
448.00	0.200	141.740	448.00	-0.70	-1.20	-0.52	1746341.25	14430047.38	39°44'01.910"N	80°37'23.613"W	1.31	203.443	0.61	-0.33	-104.57	
541.00	0.200	202.140	541.00	-0.95	-1.48	-0.48	1746341.29	14430047.10	39°44'01.907"N	80°37'23.613"W	1.55	198.032	0.22	0.00	64.95	
611.00	0.240	161.490	610.99	-1.16	-1.73	-0.48	1746341.29	14430046.85	39°44'01.904"N	80°37'23.613"W	1.80	195.526	0.22	0.06	-58.07	
750.00	0.090	128.930	749.99	-1.54	-2.08	-0.30	1746341.47	14430046.51	39°44'01.901"N	80°37'23.610"W	2.10	188.319	0.12	-0.11	-23.42	
805.00	0.210	140.130	804.99	-1.69	-2.18	-0.21	1746341.56	14430046.40	39°44'01.900"N	80°37'23.609"W	2.19	185.379	0.22	0.22	20.36	
890.00	0.840	88.190	889.99	-2.17	-2.28	0.52	1746342.29	14430046.30	39°44'01.899"N	80°37'23.600"W	2.34	167.213	0.86	0.74	-61.11	
983.00	2.160	80.330	982.96	-3.27	-1.96	2.93	1746344.70	14430046.62	39°44'01.902"N	80°37'23.589"W	3.52	123.862	1.43	1.42	-8.45	
1076.00	3.680	72.430	1075.83	-4.86	-0.77	7.50	1746349.27	14430047.81	39°44'01.914"N	80°37'23.510"W	7.54	95.849	1.69	1.63	-8.49	
1168.00	5.080	63.200	1167.56	-6.24	1.96	13.95	1746355.72	14430050.54	39°44'01.940"N	80°37'23.428"W	14.09	82.004	1.70	1.52	-10.03	
1261.00	5.930	62.120	1260.13	-7.32	6.06	21.87	1746363.63	14430054.64	39°44'01.980"N	80°37'23.326"W	22.70	74.508	0.92	0.91	-1.16	
1354.00	6.870	61.980	1352.55	-8.46	10.92	31.03	1746372.79	14430059.50	39°44'02.028"N	80°37'23.209"W	32.90	70.608	1.01	1.01	-0.15	
1446.00	7.540	60.390	1443.83	-9.56	16.49	41.13	1746382.89	14430065.06	39°44'02.083"N	80°37'23.079"W	44.32	66.156	0.76	0.73	-1.73	
1539.00	8.120	58.360	1535.96	-10.36	22.95	52.03	1746393.78	14430071.52	39°44'02.146"N	80°37'22.939"W	56.87	66.199	0.69	0.62	-2.18	
1632.00	9.070	57.590	1627.91	-10.91	30.32	63.81	1746405.56	14430078.89	39°44'02.218"N	80°37'22.788"W	70.65	64.582	1.03	1.02	-0.83	
1725.00	9.530	57.110	1719.69	-11.34	38.43	76.47	1746418.21	14430087.00	39°44'02.298"N	80°37'22.626"W	85.58	63.314	0.50	0.49	-0.52	
1817.00	9.690	55.360	1810.40	-11.48	46.97	89.23	1746430.97	14430095.53	39°44'02.382"N	80°37'22.462"W	100.84	62.238	0.36	0.17	-1.90	
1910.00	9.260	55.110	1902.13	-11.36	55.70	101.81	1746443.54	14430104.26	39°44'02.468"N	80°37'22.300"W	116.05	61.317	0.46	-0.46	-0.27	
2002.00	9.250	54.420	1992.93	-11.12	64.24	113.89	1746455.62	14430112.79	39°44'02.552"N	80°37'22.145"W	130.76	60.577	0.12	-0.01	-0.75	
2096.00	9.110	55.070	2085.73	-10.87	72.89	126.14	1746467.86	14430121.44	39°44'02.637"N	80°37'21.988"W	145.68	59.977	0.19	-0.15	0.69	
2189.00	8.510	55.910	2177.63	-10.81	80.96	137.87	1746479.59	14430129.51	39°44'02.716"N	80°37'21.837"W	159.89	59.577	0.66	-0.65	0.90	
2282.00	8.730	54.560	2269.58	-10.69	88.91	149.32	1746491.03	14430137.46	39°44'02.794"N	80°37'21.690"W	173.79	59.228	0.32	0.24	-1.45	
2375.00	9.690	52.620	2361.38	-10.13	97.76	161.29	1746503.00	14430146.30	39°44'02.881"N	80°37'21.537"W	188.60	58.780	1.08	1.03	-2.09	
2467.00	10.570	53.780	2451.95	-9.44	107.44	174.25	1746515.95	14430155.98	39°44'02.976"N	80°37'21.370"W	204.71	58.342	0.98	0.96	1.26	
2560.00	11.080	55.480	2543.29	-9.12	117.55	188.50	1746530.19	14430166.08	39°44'03.075"N	80°37'21.187"W	222.15	58.052	0.65	0.55	1.83	
2700.00	12.520	57.190	2680.33	-9.46	133.40	212.34	1746554.02	14430181.92	39°44'03.231"N	80°37'20.881"W	250.76	57.862	1.06	1.03	1.22	

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Actual Wellpath Report

Shawn Harlan MSH 5H AWP Proj: 12059'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #05
Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

WELLPATH DATA (144 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]
2746.00	12.300	55.470	2725.26	-9.57	138.88	220.56	1746562.25	14430187.40	39°44'03.285"N	80°37'20.776"W	260.64	57.804	0.94	-0.48	-3.74
2839.00	10.120	63.610	2816.48	-10.65	148.12	236.05	1746577.72	14430196.65	39°44'03.375"N	80°37'20.577"W	278.67	57.891	2.89	-2.34	8.75
2935.00	11.340	77.750	2910.82	-15.36	153.88	252.83	1746594.50	14430202.40	39°44'03.432"N	80°37'20.362"W	295.97	58.674	3.01	1.27	14.73
3028.00	12.260	78.690	3001.85	-22.65	157.75	271.45	1746613.11	14430206.27	39°44'03.469"N	80°37'20.123"W	313.96	59.837	1.01	0.99	1.01
3120.00	11.470	76.880	3091.88	-29.77	161.74	289.93	1746631.59	14430210.26	39°44'03.508"N	80°37'19.887"W	332.00	60.844	0.95	-0.86	-1.97
3213.00	11.830	78.080	3182.97	-36.74	165.81	308.27	1746649.92	14430214.33	39°44'03.547"N	80°37'19.652"W	350.03	61.725	0.47	0.39	1.29
3306.00	12.600	78.190	3273.86	-44.25	169.86	327.52	1746669.16	14430218.37	39°44'03.586"N	80°37'19.405"W	368.95	62.588	0.83	0.83	0.12
3399.00	12.580	76.870	3364.63	-51.79	174.23	347.31	1746688.95	14430222.75	39°44'03.629"N	80°37'19.151"W	388.57	63.359	0.31	-0.02	-1.42
3492.00	11.850	75.700	3455.52	-58.71	178.89	366.43	1746708.06	14430227.40	39°44'03.674"N	80°37'18.906"W	407.77	63.978	0.83	-0.78	-1.26
3584.00	10.990	75.530	3545.70	-64.91	183.42	384.07	1746725.70	14430231.93	39°44'03.718"N	80°37'18.680"W	425.62	64.473	0.94	-0.93	-0.18
3677.00	12.830	77.960	3636.69	-71.83	187.79	402.76	1746744.37	14430236.29	39°44'03.761"N	80°37'18.441"W	444.39	65.003	2.05	1.98	2.61
3770.00	13.210	71.720	3727.31	-78.68	193.27	422.95	1746764.55	14430241.78	39°44'03.814"N	80°37'18.182"W	465.02	65.441	1.57	0.41	-6.71
3862.00	12.720	67.250	3816.96	-83.61	200.49	442.27	1746783.87	14430248.99	39°44'03.884"N	80°37'17.935"W	485.59	65.614	1.21	-0.53	-4.86
3955.00	11.720	66.410	3907.86	-87.41	208.23	460.37	1746801.96	14430256.73	39°44'03.960"N	80°37'17.702"W	505.27	65.662	1.09	-1.08	-0.90
4048.00	11.600	72.300	3998.94	-91.84	214.85	477.93	1746819.52	14430263.35	39°44'04.025"N	80°37'17.477"W	524.01	65.794	1.29	-0.13	6.33
4141.00	11.730	78.080	4090.02	-98.11	219.65	496.09	1746837.67	14430268.14	39°44'04.071"N	80°37'17.245"W	542.54	66.118	1.26	0.14	6.22
4233.00	11.280	75.580	4180.17	-104.73	223.82	513.96	1746855.53	14430272.31	39°44'04.112"N	80°37'17.016"W	560.58	66.468	0.73	-0.49	-2.72
4326.00	11.440	73.620	4271.35	-110.66	228.69	531.61	1746873.18	14430277.18	39°44'04.159"N	80°37'16.789"W	578.71	66.724	0.45	0.17	-2.11
4419.00	11.100	75.880	4362.56	-116.59	233.47	549.14	1746890.70	14430281.96	39°44'04.206"N	80°37'16.565"W	596.71	66.967	0.60	-0.37	2.43
4511.00	11.160	81.940	4452.83	-123.58	236.88	566.55	1746908.10	14430285.37	39°44'04.239"N	80°37'16.342"W	614.08	67.310	1.27	0.07	6.59
4604.00	12.370	84.050	4543.88	-132.29	239.17	585.37	1746926.91	14430287.66	39°44'04.261"N	80°37'16.101"W	632.35	67.776	1.38	1.30	2.27
4697.00	13.020	83.000	4634.60	-141.82	241.48	605.67	1746947.21	14430289.97	39°44'04.283"N	80°37'15.841"W	652.04	68.263	0.74	0.70	-1.13
4790.00	13.220	82.410	4725.18	-151.41	244.16	626.61	1746968.14	14430292.65	39°44'04.308"N	80°37'15.573"W	672.50	68.711	0.26	0.22	-0.63
4882.00	13.790	76.840	4814.63	-160.09	248.05	647.72	1746989.24	14430296.53	39°44'04.346"N	80°37'15.302"W	693.59	69.045	1.54	0.62	-6.05
4975.00	13.890	72.720	4904.94	-167.36	253.89	669.17	1747010.88	14430302.37	39°44'04.403"N	80°37'15.027"W	715.72	69.223	1.06	0.11	-4.43
5068.00	13.950	70.180	4995.21	-173.43	261.01	690.38	1747031.88	14430309.49	39°44'04.472"N	80°37'14.756"W	738.07	69.290	0.66	0.06	-2.73
5161.00	13.480	72.190	5085.56	-179.31	268.12	711.24	1747052.74	14430316.60	39°44'04.542"N	80°37'14.488"W	760.10	69.345	0.72	-0.51	2.16
5254.00	12.490	75.610	5176.18	-185.81	273.94	731.30	1747072.79	14430322.41	39°44'04.598"N	80°37'14.231"W	780.93	69.465	1.35	-1.06	3.68
5347.00	12.520	76.270	5266.97	-192.78	278.83	750.84	1747092.32	14430327.30	39°44'04.646"N	80°37'13.981"W	800.94	69.627	0.16	0.03	0.71
5439.00	11.880	69.670	5358.90	-198.57	284.49	769.41	1747110.88	14430332.95	39°44'04.701"N	80°37'13.743"W	820.32	69.708	1.67	-0.70	-7.17

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Actual Wellpath Report

Shawn Harlan MSH 5H AWP Proj: 12059'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #05
Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

WELLPATH DATA (144 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]	
5532.00	12.320	62.680	5447.84	-202.08	292.37	787.20	1747128.66	14430340.83	39°44'04.778"N	80°37'13.514"W	839.74	69.625	1.64	0.47	-7.52	
5625.00	12.090	61.110	5538.73	-204.21	301.63	804.54	1747146.00	14430350.09	39°44'04.869"N	80°37'13.292"W	859.22	69.449	0.43	-0.25	-1.69	
5717.00	11.640	67.020	5628.77	-206.94	309.90	821.52	1747162.97	14430358.36	39°44'04.950"N	80°37'13.074"W	878.03	69.332	1.41	-0.49	6.42	
5810.00	10.490	78.020	5720.05	-211.99	315.33	838.44	1747179.89	14430363.78	39°44'05.003"N	80°37'12.857"W	895.78	69.389	2.58	-1.24	11.83	
5903.00	10.400	77.750	5811.51	-218.36	318.86	854.93	1747196.36	14430367.32	39°44'05.037"N	80°37'12.648"W	912.46	69.546	0.11	-0.10	-0.29	
5995.00	11.020	75.420	5901.91	-224.45	322.84	871.55	1747212.98	14430371.29	39°44'05.076"N	80°37'12.433"W	929.42	69.674	0.82	0.67	-2.53	
6088.00	10.420	79.160	5993.29	-230.79	326.66	888.41	1747229.84	14430375.11	39°44'05.113"N	80°37'12.217"W	946.57	69.812	0.99	-0.65	4.02	
6181.00	11.790	82.460	6084.54	-238.42	329.49	906.09	1747247.51	14430377.94	39°44'05.140"N	80°37'11.991"W	964.14	70.017	1.62	1.47	3.55	
6274.00	12.940	82.860	6175.38	-247.45	332.03	925.85	1747267.26	14430380.48	39°44'05.164"N	80°37'11.738"W	983.58	70.271	1.24	1.24	0.43	
6366.00	12.570	78.900	6265.12	-256.10	335.24	945.89	1747287.29	14430383.69	39°44'05.195"N	80°37'11.481"W	1003.54	70.485	1.03	-0.40	-4.30	
6427.00	12.620	77.070	6324.65	-261.14	338.00	958.90	1747300.30	14430386.45	39°44'05.222"N	80°37'11.314"W	1016.73	70.583	0.66	0.08	-3.00	
6517.00	12.160	73.540	6412.55	-267.63	342.89	977.57	1747318.96	14430391.34	39°44'05.269"N	80°37'11.075"W	1035.97	70.671	0.98	-0.51	-3.92	
6562.00	10.050	49.200	6456.73	-268.63	346.80	985.10	1747326.48	14430395.25	39°44'05.308"N	80°37'10.978"W	1044.36	70.605	11.31	-4.69	-54.09	
6609.00	10.250	21.240	6503.02	-265.80	353.38	989.72	1747331.10	14430401.83	39°44'05.372"N	80°37'10.919"W	1050.91	70.351	10.39	0.43	-59.49	
6655.00	10.490	3.860	6548.28	-260.19	361.38	991.48	1747332.87	14430409.82	39°44'05.451"N	80°37'10.896"W	1055.29	69.974	8.80	0.52	-37.78	
6702.00	9.900	353.340	6594.55	-253.25	369.66	991.30	1747332.69	14430418.10	39°44'05.533"N	80°37'10.898"W	1057.98	69.549	4.15	-1.26	-22.38	
6748.00	10.420	345.880	6639.83	-245.84	377.62	989.83	1747331.21	14430426.06	39°44'05.612"N	80°37'10.916"W	1059.41	69.118	3.07	1.13	-16.22	
6795.00	13.930	343.880	6685.76	-236.47	387.18	987.22	1747328.61	14430435.61	39°44'05.707"N	80°37'10.949"W	1060.43	68.585	7.52	7.47	-4.26	
6841.00	18.430	340.010	6729.93	-224.18	399.34	983.20	1747324.58	14430447.77	39°44'05.827"N	80°37'11.000"W	1061.20	67.895	10.05	9.78	-8.41	
6887.00	21.320	331.560	6773.19	-208.79	413.53	976.72	1747318.11	14430461.95	39°44'05.967"N	80°37'11.082"W	1060.66	67.053	8.84	6.28	-18.37	
6934.00	24.380	322.290	6816.52	-190.60	428.73	966.72	1747308.11	14430477.14	39°44'06.118"N	80°37'11.209"W	1057.52	66.083	10.03	6.51	-19.72	
6980.00	26.730	317.880	6858.02	-170.87	443.92	953.97	1747295.37	14430492.32	39°44'06.269"N	80°37'11.372"W	1052.20	65.046	6.57	5.11	-9.59	
7027.00	30.240	317.300	6899.32	-148.68	460.46	938.85	1747280.25	14430508.86	39°44'06.433"N	80°37'11.584"W	1045.69	63.874	7.49	7.47	-1.23	
7073.00	35.050	318.140	6938.04	-124.11	478.82	922.17	1747263.58	14430527.22	39°44'06.615"N	80°37'11.777"W	1039.07	62.560	10.50	10.46	1.83	
7119.00	40.520	318.810	6974.38	-96.16	499.92	903.50	1747244.92	14430548.31	39°44'06.824"N	80°37'12.015"W	1032.58	61.044	11.92	11.89	1.46	
7166.00	45.200	318.770	7008.83	-64.43	523.96	882.44	1747223.87	14430572.34	39°44'07.063"N	80°37'12.283"W	1026.28	59.300	9.96	9.96	-0.09	
7212.00	50.100	317.900	7039.80	-30.73	549.35	859.84	1747201.28	14430597.71	39°44'07.315"N	80°37'12.571"W	1020.35	57.426	10.74	10.65	-1.89	
7258.00	54.660	317.140	7067.88	5.32	576.21	835.24	1747176.68	14430624.56	39°44'07.581"N	80°37'12.884"W	1014.71	55.399	10.00	9.91	-1.65	
7305.00	59.800	316.870	7093.31	44.38	605.10	808.29	1747149.75	14430653.44	39°44'07.868"N	80°37'13.227"W	1009.70	53.181	10.95	10.94	-0.57	
7351.00	63.050	316.430	7115.31	84.26	634.47	780.57	1747122.03	14430682.80	39°44'08.159"N	80°37'13.581"W	1005.90	50.895	7.11	7.07	-0.96	

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REFERENCE WELLPATH IDENTIFICATION			
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Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

WELLPATH DATA (144 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]
7398.00	67.160	316.130	7135.09	126.31	665.27	751.11	1747092.58	14430713.59	39°44'08.465"N	80°37'13.956"W	1003.37	48.468	8.76	8.74	-0.64
7444.00	70.170	316.270	7151.82	168.57	696.20	721.45	1747062.94	14430744.50	39°44'08.772"N	80°37'14.334"W	1002.59	46.021	6.55	6.54	0.30
7491.00	73.660	316.020	7166.41	212.62	728.41	690.50	1747032.00	14430776.70	39°44'09.091"N	80°37'14.729"W	1003.68	43.470	7.44	7.43	-0.53
7537.00	77.460	317.770	7177.88	256.63	760.93	660.07	1747001.59	14430809.21	39°44'09.414"N	80°37'15.116"W	1007.33	40.940	9.04	8.26	3.80
7630.00	88.280	321.190	7189.41	348.22	830.98	600.24	1746941.78	14430879.24	39°44'10.109"N	80°37'15.878"W	1025.10	35.841	12.19	11.63	3.68
7723.00	92.060	320.700	7189.13	440.89	903.19	541.65	1746883.21	14430951.42	39°44'10.825"N	80°37'16.624"W	1053.16	30.952	4.10	4.06	-0.53
7815.00	90.920	319.850	7186.74	532.44	973.92	482.88	1746824.46	14431022.12	39°44'11.526"N	80°37'17.373"W	1087.06	26.373	1.55	-1.24	-0.92
7908.00	91.020	315.530	7185.17	624.50	1042.67	420.30	1746761.91	14431090.84	39°44'12.208"N	80°37'18.170"W	1124.19	21.954	4.65	0.11	-4.65
8001.00	90.890	313.440	7183.61	715.70	1107.82	353.96	1746695.60	14431155.97	39°44'12.855"N	80°37'19.016"W	1163.00	17.719	2.25	-0.14	-2.25
8093.00	90.860	312.180	7182.21	805.37	1170.34	286.48	1746628.14	14431218.46	39°44'13.476"N	80°37'19.876"W	1204.89	13.755	1.37	-0.03	-1.37
8186.00	91.140	308.450	7180.59	895.01	1230.49	215.59	1746557.28	14431278.59	39°44'14.073"N	80°37'20.781"W	1249.23	9.938	4.02	0.30	-4.01
8279.00	91.140	304.160	7178.74	982.70	1285.53	140.68	1746482.39	14431333.61	39°44'14.620"N	80°37'21.737"W	1293.20	6.245	4.61	0.00	-4.61
8372.00	91.020	305.860	7176.98	1069.68	1338.87	64.52	1746406.27	14431386.93	39°44'15.150"N	80°37'22.708"W	1340.43	2.759	1.83	-0.13	1.83
8465.00	90.680	310.130	7175.60	1158.24	1396.10	-8.74	1746333.03	14431444.14	39°44'15.719"N	80°37'23.843"W	1396.13	359.641	4.61	-0.37	4.59
8557.00	90.430	311.420	7174.71	1247.13	1456.18	-78.41	1746263.39	14431504.20	39°44'16.316"N	80°37'24.532"W	1458.29	358.918	1.43	-0.27	1.40
8650.00	90.680	315.210	7173.81	1337.95	1519.97	-146.06	1746195.77	14431567.95	39°44'16.949"N	80°37'25.394"W	1526.97	354.511	4.08	0.27	4.08
8743.00	90.620	318.180	7172.75	1429.79	1587.63	-209.83	1746132.02	14431635.59	39°44'17.620"N	80°37'26.207"W	1601.44	352.471	3.19	-0.06	3.19
8836.00	90.710	316.680	7171.67	1521.81	1656.11	-272.74	1746069.13	14431704.05	39°44'18.300"N	80°37'27.009"W	1678.42	350.648	1.62	0.10	-1.61
8929.00	90.650	316.010	7170.57	1613.57	1723.40	-336.94	1746004.97	14431771.31	39°44'18.967"N	80°37'27.827"W	1756.02	348.938	0.72	-0.06	-0.72
9021.00	90.650	316.110	7169.53	1704.26	1789.64	-400.77	1745941.15	14431837.52	39°44'19.624"N	80°37'28.640"W	1833.96	347.377	0.11	0.00	0.11
9114.00	90.580	314.200	7168.53	1795.68	1855.57	-466.35	1745875.60	14431903.43	39°44'20.279"N	80°37'29.476"W	1913.27	345.892	2.06	-0.08	-2.05
9207.00	90.250	309.900	7167.86	1886.03	1917.84	-535.39	1745806.59	14431965.68	39°44'20.897"N	80°37'30.357"W	1991.17	344.402	4.64	-0.35	-4.62
9300.00	90.180	309.700	7167.51	1975.47	1977.37	-606.84	1745735.17	14432025.18	39°44'21.488"N	80°37'31.268"W	2068.39	342.939	0.23	-0.08	-0.22
9392.00	90.150	311.090	7167.24	2064.21	2036.99	-676.90	1745665.13	14432084.78	39°44'22.080"N	80°37'32.162"W	2146.52	341.618	1.51	-0.03	1.51
9485.00	90.120	314.080	7167.02	2154.77	2099.92	-745.37	1745596.69	14432147.68	39°44'22.705"N	80°37'33.035"W	2228.28	340.458	3.22	-0.03	3.22
9578.00	90.280	315.780	7166.70	2246.13	2165.59	-811.21	1745530.88	14432213.33	39°44'23.357"N	80°37'33.874"W	2312.54	339.465	1.84	0.17	1.83
9671.00	90.180	315.360	7166.32	2337.68	2232.00	-876.31	1745465.80	14432279.72	39°44'24.016"N	80°37'34.704"W	2397.87	338.565	0.46	-0.11	-0.45
9763.00	90.220	312.690	7166.00	2427.77	2295.94	-942.45	1745399.68	14432343.62	39°44'24.650"N	80°37'35.547"W	2481.84	337.682	2.90	0.04	-2.90
9856.00	90.150	312.400	7165.70	2518.33	2358.82	-1010.97	1745331.19	14432406.48	39°44'25.275"N	80°37'36.421"W	2566.34	336.800	0.32	-0.08	-0.31
9949.00	90.250	313.020	7165.38	2608.94	2421.90	-1079.31	1745262.88	14432469.54	39°44'25.901"N	80°37'37.293"W	2651.51	335.980	0.68	0.11	0.67

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Operator	SOUTHWESTERN ENERGY	Slot	Slot #05
Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

WELLPATH DATA (144 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]
10041.00	90.120	315.160	7165.08	2699.06	2485.91	-1145.38	1745196.84	14432533.52	39°44'26.536"N	80°37'38.135"W	2737.09	335.262	2.33	-0.14	2.33
10134.00	90.090	312.900	7164.91	2790.13	2550.54	-1212.24	1745130.00	14432598.13	39°44'27.178"N	80°37'38.987"W	2823.97	334.579	2.43	-0.03	-2.43
10227.00	89.880	308.080	7164.93	2879.84	2610.91	-1282.95	1745059.32	14432658.47	39°44'27.777"N	80°37'39.889"W	2909.09	333.831	5.19	-0.23	-5.18
10320.00	89.880	308.880	7165.13	2868.67	2668.78	-1355.75	1744986.55	14432716.32	39°44'28.352"N	80°37'40.818"W	2993.40	333.089	0.86	0.00	0.86
10412.00	89.880	311.930	7165.32	3057.40	2728.40	-1425.80	1744916.53	14432775.92	39°44'28.944"N	80°37'41.712"W	3078.49	332.410	3.32	0.00	3.32
10505.00	89.940	314.560	7165.47	3146.21	2792.11	-1493.54	1744648.82	14432839.61	39°44'29.577"N	80°37'42.576"W	3166.47	331.857	2.83	0.06	2.83
10598.00	89.850	315.980	7165.64	3239.67	2858.18	-1558.98	1744783.39	14432905.65	39°44'30.232"N	80°37'43.410"W	3255.71	331.390	1.53	-0.10	1.53
10691.00	89.720	316.410	7165.99	3331.39	2925.30	-1623.36	1744719.04	14432972.74	39°44'30.898"N	80°37'44.230"W	3345.55	330.972	0.48	-0.14	0.46
10783.00	89.780	315.010	7166.39	3421.99	2991.15	-1687.60	1744654.83	14433038.57	39°44'31.552"N	80°37'45.049"W	3434.38	330.568	1.52	0.07	-1.52
10876.00	89.290	313.050	7167.14	3513.06	3055.79	-1754.46	1744587.99	14433103.18	39°44'32.193"N	80°37'45.902"W	3523.63	330.138	2.17	-0.53	-2.11
10969.00	89.350	310.800	7168.25	3603.38	3117.92	-1823.64	1744518.84	14433165.28	39°44'32.810"N	80°37'46.784"W	3612.07	329.677	2.42	0.06	-2.42
11061.00	89.320	310.130	7169.32	3692.14	3177.62	-1893.63	1744448.88	14433224.96	39°44'33.403"N	80°37'47.677"W	3699.07	329.208	0.73	-0.03	-0.73
11154.00	89.600	313.020	7170.19	3782.31	3239.32	-1963.19	1744379.34	14433286.64	39°44'34.015"N	80°37'48.564"W	3787.79	328.782	3.12	0.30	3.11
11247.00	89.660	312.740	7170.79	3872.99	3302.61	-2031.34	1744311.22	14433349.90	39°44'34.644"N	80°37'49.433"W	3877.31	328.405	0.31	0.06	-0.30
11339.00	89.690	312.010	7171.31	3962.51	3364.61	-2099.30	1744243.28	14433411.88	39°44'35.259"N	80°37'50.300"W	3965.81	328.038	0.79	0.03	-0.79
11432.00	89.720	310.140	7171.79	4052.49	3425.71	-2169.41	1744173.21	14433472.96	39°44'35.866"N	80°37'51.194"W	4054.85	327.655	2.01	0.03	-2.01
11525.00	89.720	311.560	7172.25	4142.38	3486.54	-2239.75	1744102.89	14433533.76	39°44'36.470"N	80°37'52.092"W	4143.97	327.283	1.53	0.00	1.53
11617.00	89.750	313.390	7172.67	4231.94	3548.66	-2307.61	1744035.06	14433595.86	39°44'37.087"N	80°37'52.957"W	4232.97	326.965	1.99	0.03	1.99
11710.00	89.680	314.550	7173.15	4322.99	3613.23	-2374.54	1743968.16	14433660.40	39°44'37.727"N	80°37'53.810"W	4323.64	326.688	1.25	-0.10	1.25
11803.00	89.750	314.910	7173.63	4414.29	3678.68	-2440.61	1743902.11	14433725.82	39°44'38.377"N	80°37'54.653"W	4414.66	326.438	0.40	0.10	0.39
11896.00	89.690	312.940	7174.09	4505.33	3743.19	-2507.58	1743835.16	14433790.31	39°44'39.017"N	80°37'55.507"W	4505.49	326.182	2.12	-0.06	-2.12
11988.00	89.750	310.930	7174.54	4594.68	3804.67	-2576.02	1743766.75	14433851.77	39°44'39.627"N	80°37'56.380"W	4594.71	325.899	2.19	0.07	-2.18
12034.00	89.720	310.160	7174.75	4639.08	3834.57	-2610.97	1743731.81	14433881.66	39°44'39.924"N	80°37'56.826"W	4639.08	325.749	1.68	-0.07	-1.67
12059.00	89.720	310.160	7174.87	4663.17	3850.69	-2630.08	1743712.71	14433897.77	39°44'40.085"N	80°37'57.069"W	4663.17	325.666	0.00	0.00	0.00

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Actual Wellpath Report

Shawn Harlan MSH 5H AWP Proj: 12059'
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REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #05
Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

HOLE & CASING SECTIONS - Ref Wellbore: Shawn Harlan MSH 5H AWB Ref Wellpath: Shawn Harlan MSH 5H AWP Proj: 12059'

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
17.5in Open Hole	26.00	614.00	588.00	26.00	613.99	0.00	0.00	-1.74	-0.48
13.375in Casing Surface	26.00	614.00	588.00	26.00	613.99	0.00	0.00	-1.74	-0.48
12.25in Open Hole	614.00	2688.00	2074.00	613.99	2668.61	-1.74	-0.48	131.99	210.16
9.625in Casing Intermediate	26.00	2650.00	2624.00	26.00	2631.47	0.00	0.00	127.60	203.44
8.75in Open Hole	2688.00	6504.00	3816.00	2668.61	6399.85	131.99	210.16	342.12	974.94
8.5in Open Hole	6504.00	12059.00	5555.00	6399.85	7174.87	342.12	974.94	3850.69	-2630.08
5.5in Casing Production	26.00	12059.00	12033.00	26.00	7174.87	0.00	0.00	3850.69	-2630.08

TARGETS

Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Shawn Harlan MSH 5H BHL Rev-4	7174.58	3871.07	-2640.83	1743701.97	14433918.14	39°44'40.286"N	80°37'57.206"W	point
Shawn Harlan MSH 5H LP Rev-4	7190.00	854.91	586.03	1746927.58	14430903.16	39°44'10.346"N	80°37'16.059"W	point

WELLPATH COMPOSITION - Ref Wellbore: Shawn Harlan MSH 5H AWB Ref Wellpath: Shawn Harlan MSH 5H AWP Proj: 12059'

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	541.00	OWSG EMS rev2 + HRGM	01_MSS <17-1/2"> (170'-541')	Shawn Harlan MSH 5H AWB
541.00	2560.00	BHI NaviTrak (Axial)	02_APS EM <12-1/4"> (541')(611'-2560')	Shawn Harlan MSH 5H AWB
2560.00	6427.00	BHI NaviTrak (Axial)	03_APS EM <8-3/4"> (2560')(2700'-6427')	Shawn Harlan MSH 5H AWB
6427.00	12034.00	BHI AutoTrak Curve (Short)	04_BHI AT Curve <8-1/2"> (6427')(6517'-12034')	Shawn Harlan MSH 5H AWB
12034.00	12059.00	Blind Drilling (std)	Projection to bit	Shawn Harlan MSH 5H AWB

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Shawn Harlan MSH 5H AWP Proj: 12059'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #05
Area	Marshall County, WV	Well	Shawn Harlan MSH 5H
Field	Marshall	Wellbore	Shawn Harlan MSH 5H AWB
Facility	Shawn Harlan MSH Pad		

COMMENTS

Wellpath general comments

API: 47-051-01882-0000
 BHI Job #: 8319247
 Rig: SDC 46
 Duration: 12/23/2016-1/1/2017
 MSS <17-1/2"> (170'-541')
 APS EM <12-1/4"> (541')(611'-2560')
 APS EM <8-3/4" > (2560')(2700'-6427')
 BHI AT Curve <8-1/2"> (6427')(6517'-12034')
 Projected MD at TD: 12059'

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