



CHESAPEAKE APPALACHIA, LLC

Location: Marshall County, WV
 Field: Marshall
 Facility: Michael Southworth

Slot: Slot 8H
 Well: Michael Southworth 8H
 Wellbore: Michael Southworth 8H (PWB)



Well Profile Data

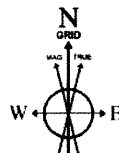
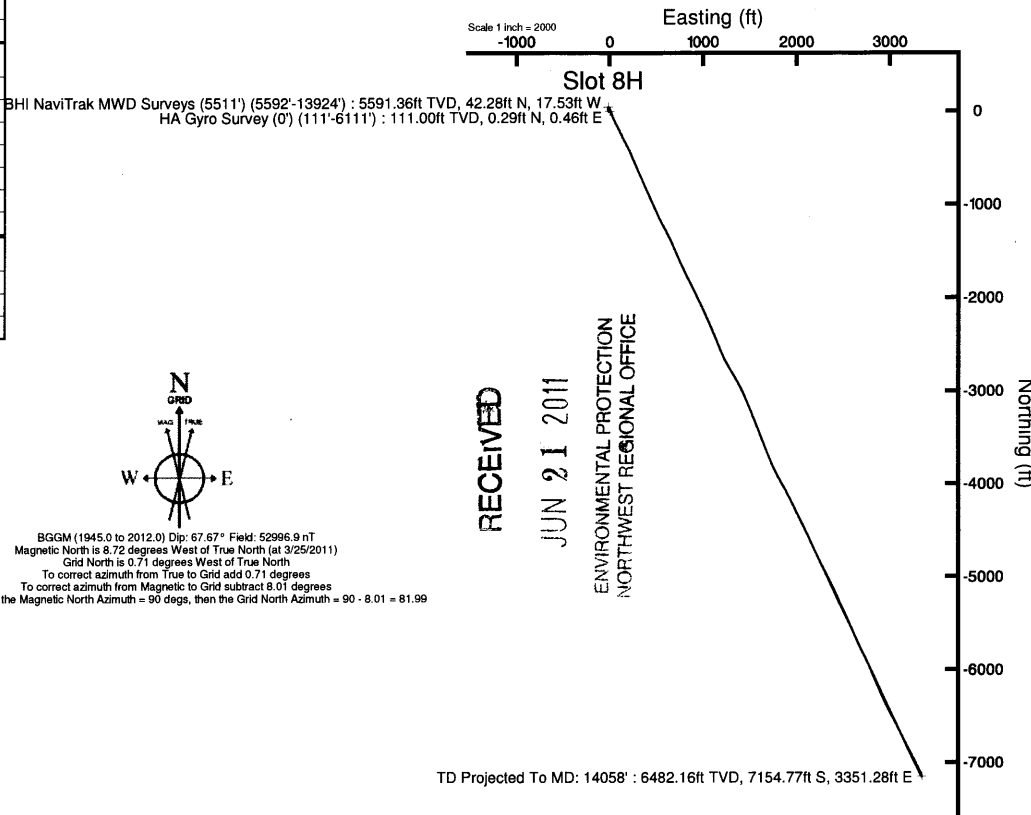
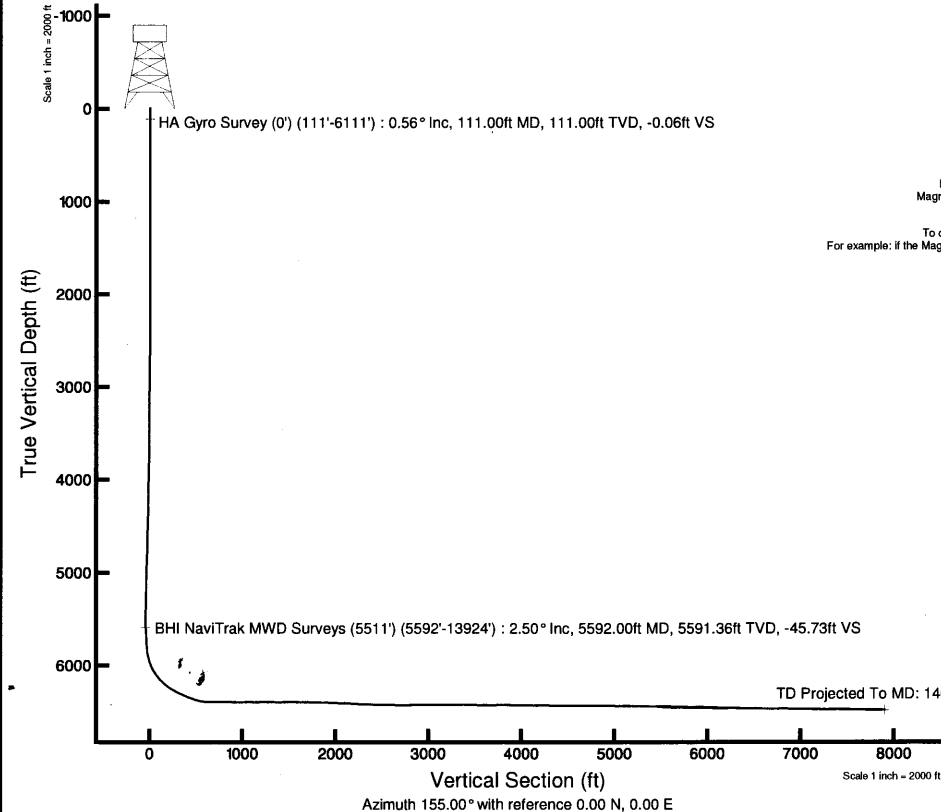
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (%/100ft)	VS (ft)
Tie On	11520.00	89.500	155.000	6445.18	-4862.97	2263.32	0.00	5363.87
End of Drop	11685.00	86.200	155.000	6451.37	-5012.38	2333.00	2.00	5528.73
End of 3D Arc	11840.28	89.301	154.829	6457.46	-5152.89	2398.77	2.00	5683.87
PBHL	14058.14	89.301	154.829	6484.52	-7160.00	3342.00	0.00	7901.55

Location Information

Facility Name		Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
Michael Southworth		1687674.500	552933.441	40°00'45.979"N	80°36'54.169"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Slot 8H	0.00	0.00	1687674.500	552933.441	40°00'45.979"N	80°36'54.169"W
Nomac 243 (RT) to Mud line (At Slot: Slot 8H)				20ft		
Mean Sea Level to Mud line (At Slot: Slot 8H)				-1180ft		
Nomac 243 (RT) to Mean Sea Level				1200ft		

Targets

Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Michael Southworth 8H PBHL Rev-5	6462.20	-7160.00	3342.00	1691016.37	545773.71	39°59'35.833"N	80°36'10.092"W	
Michael Southworth 8H PBHL Rev-6	14058.14	6484.52	-7160.00	3342.00	1691016.37	39°59'35.833"N	80°36'10.093"W	



BGGM (1945.0 to 2012.0) Dip: 67.67° Field: 52996.9 nT
 Magnetic North is 8.72 degrees West of True North (at 3/25/2011)
 Grid North is 0.71 degrees West of True North
 To correct azimuth from True to Grid add 0.71 degrees
 To correct azimuth from Magnetic to Grid subtract 8.01 degrees
 For example: if the Magnetic North Azimuth = 90 degs, then the Grid North Azimuth = 90 - 8.01 = 81.99

API: 47-051-01430-00
 Rig: Nomac 243
 BHI Job#: 3733511
 Duration: 04/01/2011-04/15/2011



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'
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REFERENCE WELLPATH IDENTIFICATION

Operator	CHESAPEAKE APPALACHIA, LLC	Slot	Slot 8H
Area	Marshall County, WV	Well	Michael Southworth 8H
Field	Marshall	Wellbore	Michael Southworth 8H (AWB)
Facility	Michael Southworth		

REPORT SETUP INFORMATION

Projection System	NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet	Software System	WellArchitect@ 3.0.0
North Reference	Grid	User	Alvayes
Scale	0.999963	Report Generated	6/16/2011 at 6:05:51 PM
Convergence at slot	0.71° West	Database/Source file	WA_EasternUS/Michael_Southworth_8H_AWB_.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	0.00	0.00	1687674.50	552933.44	40°00'45.979"N	80°36'54.169"W
Facility Reference Pt			1687674.50	552933.44	40°00'45.979"N	80°36'54.169"W
Field Reference Pt			0.00	0.00	38°17'12.460"N	86°28'23.077"W

WELLPATH DATUM

Calculation method	Minimum curvature	Nomac 243 (RT) to Facility Vertical Datum	20.00ft
Horizontal Reference Pt	Slot	Nomac 243 (RT) to Mean Sea Level	1200.00ft
Vertical Reference Pt	Nomac 243 (RT)	Nomac 243 (RT) to Mud Line at Slot (Slot 8H)	20.00ft
MD Reference Pt	Nomac 243 (RT)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	155.00°

RECEIVED

JUN 21 2011

ENVIRONMENTAL PROTECTION
NORTHWEST REGIONAL OFFICE



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'
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Area	Marshall County, WV	Well	Michael Southworth 8H
Field	Marshall	Wellbore	Michael Southworth 8H (AWB)
Facility	Michael Southworth		

WELLPATH DATA (172 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]
0.00	0.000	58.190	0.00	0.00	0.00	0.00	1687674.50	552933.44	40°00'45.979"N	80°36'54.169"W	0.00	0.000	0.00
111.00	0.560	58.190	111.00	-0.06	0.29	0.46	1687674.96	552933.73	40°00'45.981"N	80°36'54.163"W	0.54	58.190	0.50
211.00	0.610	52.510	210.99	-0.24	0.87	1.30	1687675.80	552934.31	40°00'45.987"N	80°36'54.153"W	1.56	56.257	0.08
311.00	0.580	46.020	310.99	-0.52	1.54	2.09	1687676.59	552934.98	40°00'45.994"N	80°36'54.143"W	2.59	53.501	0.07
411.00	0.470	30.010	410.98	-0.92	2.25	2.65	1687677.15	552935.69	40°00'46.001"N	80°36'54.135"W	3.48	49.721	0.18
511.00	0.490	64.460	510.98	-1.16	2.79	3.25	1687677.75	552936.23	40°00'46.007"N	80°36'54.128"W	4.28	49.325	0.28
611.00	0.500	81.640	610.98	-1.04	3.04	4.06	1687678.56	552936.48	40°00'46.009"N	80°36'54.117"W	5.07	53.224	0.15
711.00	0.180	105.630	710.97	-0.81	3.06	4.65	1687679.15	552936.50	40°00'46.009"N	80°36'54.110"W	5.56	56.647	0.34
811.00	0.170	39.510	810.97	-0.77	3.13	4.89	1687679.39	552936.57	40°00'46.010"N	80°36'54.107"W	5.81	57.385	0.19
911.00	0.190	26.410	910.97	-0.94	3.39	5.06	1687679.56	552936.83	40°00'46.013"N	80°36'54.105"W	6.09	56.154	0.05
1011.00	0.020	257.510	1010.97	-1.04	3.54	5.12	1687679.62	552936.98	40°00'46.014"N	80°36'54.104"W	6.22	55.338	0.20
1111.00	0.160	125.820	1110.97	-0.93	3.45	5.21	1687679.71	552936.89	40°00'46.013"N	80°36'54.103"W	6.25	56.484	0.17
1211.00	0.160	238.610	1210.97	-0.79	3.30	5.21	1687679.71	552936.74	40°00'46.012"N	80°36'54.103"W	6.16	57.650	0.27
1311.00	0.850	269.790	1310.97	-1.08	3.22	4.35	1687678.85	552936.66	40°00'46.011"N	80°36'54.114"W	5.41	53.442	0.72
1411.00	1.070	236.530	1410.96	-1.26	2.70	2.83	1687677.33	552936.15	40°00'46.006"N	80°36'54.133"W	3.91	46.247	0.59
1511.00	1.030	231.460	1510.94	-0.91	1.63	1.34	1687675.84	552935.07	40°00'45.995"N	80°36'54.152"W	2.11	39.494	0.10
1611.00	1.150	223.320	1610.92	-0.33	0.34	-0.05	1687674.45	552933.78	40°00'45.982"N	80°36'54.170"W	0.34	351.918	0.20
1711.00	1.080	238.380	1710.90	0.15	-0.88	-1.54	1687672.96	552932.56	40°00'45.970"N	80°36'54.189"W	1.78	240.119	0.30
1811.00	0.890	258.980	1810.89	0.07	-1.53	-3.10	1687671.40	552931.91	40°00'45.963"N	80°36'54.209"W	3.46	243.806	0.40
1911.00	0.670	234.430	1910.88	-0.01	-2.02	-4.34	1687670.16	552931.43	40°00'45.958"N	80°36'54.225"W	4.79	245.099	0.40
2011.00	0.530	228.410	2010.87	0.23	-2.66	-5.16	1687669.34	552930.78	40°00'45.952"N	80°36'54.235"W	5.81	242.721	0.15
2111.00	0.530	223.570	2110.87	0.53	-3.30	-5.83	1687668.67	552930.14	40°00'45.945"N	80°36'54.244"W	6.70	240.445	0.04
2211.00	0.400	231.820	2210.87	0.78	-3.86	-6.42	1687668.08	552929.59	40°00'45.940"N	80°36'54.251"W	7.49	239.018	0.15
2311.00	0.480	282.220	2310.86	0.61	-3.98	-7.11	1687667.40	552929.46	40°00'45.938"N	80°36'54.260"W	8.15	240.727	0.38
2411.00	0.300	312.820	2410.86	0.11	-3.72	-7.71	1687666.79	552929.72	40°00'45.941"N	80°36'54.268"W	8.56	244.256	0.27
2511.00	0.250	323.920	2510.86	-0.35	-3.36	-8.03	1687666.47	552930.08	40°00'45.944"N	80°36'54.272"W	8.70	247.275	0.07
2611.00	0.480	330.920	2610.86	-0.98	-2.82	-8.36	1687666.14	552930.62	40°00'45.950"N	80°36'54.276"W	8.82	251.361	0.23
2711.00	0.490	332.700	2710.85	-1.82	-2.07	-8.76	1687665.74	552931.37	40°00'45.957"N	80°36'54.281"W	9.00	256.682	0.02
2811.00	0.500	338.190	2810.85	-2.69	-1.29	-9.12	1687665.38	552932.15	40°00'45.965"N	80°36'54.286"W	9.21	261.957	0.05
2911.00	0.530	325.180	2910.85	-3.58	-0.50	-9.54	1687664.96	552932.94	40°00'45.972"N	80°36'54.292"W	9.56	266.979	0.12



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'
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Area	Marshall County, WV	Well	Michael Southworth 8H
Field	Marshall	Wellbore	Michael Southworth 8H (AWB)
Facility	Michael Southworth		

WELLPATH DATA (172 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]
3011.00	0.470	330.460	3010.84	-4.44	0.23	-10.01	1687664.49	552933.67	40°00'45.980"N	80°36'54.298"W	10.01	271.333	0.08
3111.00	0.370	334.150	3110.84	-5.17	0.88	-10.35	1687664.15	552934.32	40°00'45.986"N	80°36'54.302"W	10.39	274.861	0.10
3211.00	0.500	336.570	3210.84	-5.93	1.57	-10.67	1687663.83	552935.01	40°00'45.993"N	80°36'54.307"W	10.78	278.380	0.13
3311.00	0.500	336.450	3310.83	-6.80	2.37	-11.01	1687663.49	552935.81	40°00'46.001"N	80°36'54.311"W	11.27	282.151	0.00
3411.00	0.390	335.030	3410.83	-7.58	3.08	-11.33	1687663.17	552936.52	40°00'46.008"N	80°36'54.315"W	11.74	285.205	0.11
3511.00	0.540	328.050	3510.83	-8.39	3.79	-11.73	1687662.78	552937.23	40°00'46.015"N	80°36'54.320"W	12.32	287.905	0.16
3611.00	0.480	317.030	3610.82	-9.26	4.49	-12.26	1687662.24	552937.94	40°00'46.022"N	80°36'54.327"W	13.06	290.134	0.11
3711.00	0.620	321.850	3710.82	-10.18	5.23	-12.88	1687661.62	552938.67	40°00'46.029"N	80°36'54.336"W	13.90	292.087	0.15
3811.00	0.700	329.250	3810.81	-11.32	6.18	-13.53	1687660.97	552939.62	40°00'46.038"N	80°36'54.344"W	14.87	294.545	0.12
3911.00	0.990	337.830	3910.80	-12.79	7.50	-14.17	1687660.34	552940.94	40°00'46.051"N	80°36'54.352"W	16.03	297.907	0.32
4011.00	1.020	355.030	4010.79	-14.48	9.19	-14.57	1687659.93	552942.63	40°00'46.068"N	80°36'54.358"W	17.22	302.242	0.30
4111.00	0.960	331.560	4110.77	-16.16	10.81	-15.04	1687659.46	552944.25	40°00'46.084"N	80°36'54.364"W	18.53	305.705	0.41
4211.00	1.070	359.040	4210.76	-17.85	12.48	-15.46	1687659.04	552945.92	40°00'46.100"N	80°36'54.370"W	19.87	308.920	0.49
4311.00	1.140	359.700	4310.74	-19.60	14.41	-15.48	1687659.02	552947.85	40°00'46.119"N	80°36'54.370"W	21.15	312.952	0.07
4411.00	1.360	347.040	4410.71	-21.67	16.56	-15.75	1687658.75	552950.00	40°00'46.140"N	80°36'54.374"W	22.86	316.438	0.35
4511.00	1.280	345.010	4510.69	-23.93	18.80	-16.31	1687658.19	552952.24	40°00'46.162"N	80°36'54.382"W	24.88	319.060	0.09
4611.00	1.330	333.330	4610.66	-26.19	20.91	-17.12	1687657.39	552954.35	40°00'46.183"N	80°36'54.392"W	27.02	320.703	0.27
4711.00	1.520	348.000	4710.63	-28.64	23.25	-17.91	1687656.59	552956.69	40°00'46.206"N	80°36'54.403"W	29.35	322.386	0.41
4811.00	1.750	357.150	4810.59	-31.35	26.07	-18.26	1687656.24	552959.51	40°00'46.234"N	80°36'54.408"W	31.83	324.986	0.35
4911.00	1.910	7.070	4910.54	-34.17	29.25	-18.14	1687656.37	552962.69	40°00'46.265"N	80°36'54.407"W	34.42	328.200	0.35
5011.00	1.630	6.000	5010.49	-36.80	32.32	-17.78	1687656.72	552965.76	40°00'46.296"N	80°36'54.403"W	36.89	331.180	0.28
5111.00	1.490	358.460	5110.45	-39.22	35.03	-17.67	1687656.83	552968.47	40°00'46.323"N	80°36'54.402"W	39.23	333.237	0.25
5211.00	1.100	354.940	5210.43	-41.31	37.29	-17.79	1687656.71	552970.73	40°00'46.345"N	80°36'54.404"W	41.31	334.497	0.40
5311.00	1.030	352.990	5310.41	-43.07	39.14	-17.98	1687656.52	552972.57	40°00'46.363"N	80°36'54.407"W	43.07	335.323	0.08
5411.00	1.040	349.230	5410.39	-44.80	40.92	-18.26	1687656.24	552974.36	40°00'46.381"N	80°36'54.410"W	44.81	335.950	0.07
5511.00	1.070	345.240	5510.38	-46.60	42.71	-18.67	1687655.83	552976.15	40°00'46.398"N	80°36'54.416"W	46.61	336.392	0.08
5592.00	2.500	131.100	5591.36	-45.73	42.28	-17.53	1687656.97	552975.72	40°00'46.394"N	80°36'54.401"W	45.77	337.483	4.24
5635.00	1.100	135.800	5634.28	-43.42	40.56	-15.75	1687658.75	552974.00	40°00'46.378"N	80°36'54.378"W	43.52	338.779	3.77
5678.00	3.900	135.400	5677.18	-40.59	38.42	-13.65	1687660.85	552971.86	40°00'46.357"N	80°36'54.351"W	40.78	340.438	0.47
5720.00	3.400	132.400	5719.09	-38.10	36.56	-11.73	1687662.77	552970.00	40°00'46.338"N	80°36'54.326"W	38.40	342.214	1.27



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5763.00	3.300	134.600	5762.02	-35.76	34.84	-9.91	1687664.59	552968.28	40°00'46.322"N	80°36'54.302"W	36.22	344.125	0.38
5805.00	2.900	131.100	5803.96	-33.65	33.29	-8.25	1687666.26	552966.73	40°00'46.307"N	80°36'54.280"W	34.29	346.088	1.05
5847.00	5.800	143.300	5845.83	-30.60	30.89	-6.18	1687668.32	552964.33	40°00'46.283"N	80°36'54.253"W	31.50	348.693	7.21
5890.00	10.700	155.400	5888.38	-24.48	25.51	-3.21	1687671.29	552958.95	40°00'46.230"N	80°36'54.215"W	25.71	352.820	12.03
5933.00	15.500	157.300	5930.25	-14.74	16.58	0.67	1687675.17	552950.02	40°00'46.142"N	80°36'54.163"W	16.59	2.305	11.21
5976.00	18.900	161.300	5971.32	-2.08	4.68	5.12	1687679.62	552938.12	40°00'46.025"N	80°36'54.104"W	6.93	47.585	8.37
6018.00	23.000	160.500	6010.54	12.86	-9.51	10.04	1687684.54	552923.93	40°00'45.886"N	80°36'54.039"W	13.83	133.437	9.79
6061.00	27.600	160.300	6049.40	31.15	-26.81	16.21	1687690.71	552906.63	40°00'45.716"N	80°36'53.957"W	31.33	148.851	10.70
6103.00	32.600	160.300	6085.73	52.12	-46.64	23.30	1687697.80	552886.80	40°00'45.521"N	80°36'53.862"W	52.14	153.449	11.90
6146.00	37.900	157.700	6120.83	76.86	-69.78	32.23	1687706.73	552863.66	40°00'45.293"N	80°36'53.744"W	76.86	155.211	12.81
6188.00	41.100	155.700	6153.24	103.56	-94.30	42.81	1687717.31	552839.14	40°00'45.052"N	80°36'53.604"W	103.57	155.586	8.20
6230.00	45.800	152.300	6183.72	132.42	-120.23	55.49	1687729.99	552813.21	40°00'44.797"N	80°36'53.437"W	132.42	155.224	12.50
6273.00	50.100	150.500	6212.52	164.28	-148.25	70.79	1687745.29	552785.19	40°00'44.522"N	80°36'53.236"W	164.29	154.476	10.47
6317.00	55.000	152.200	6239.27	199.13	-178.90	87.52	1687762.01	552754.54	40°00'44.221"N	80°36'53.016"W	199.16	153.933	11.55
6359.00	59.200	154.200	6262.08	234.36	-210.38	103.40	1687777.89	552723.07	40°00'43.912"N	80°36'52.807"W	234.41	153.826	10.77
6401.00	61.200	154.700	6282.95	270.81	-243.26	119.11	1687793.61	552690.19	40°00'43.589"N	80°36'52.600"W	270.85	153.911	4.87
6443.00	64.500	154.800	6302.11	308.17	-277.05	135.05	1687809.55	552656.40	40°00'43.257"N	80°36'52.389"W	308.22	154.012	7.86
6486.00	65.700	153.700	6320.22	347.17	-312.18	152.00	1687826.49	552621.27	40°00'42.912"N	80°36'52.166"W	347.22	154.039	3.63
6530.00	65.700	153.900	6338.32	387.26	-348.16	169.70	1687844.20	552585.29	40°00'42.559"N	80°36'51.933"W	387.32	154.014	0.41
6572.00	69.300	154.100	6354.39	426.05	-383.03	186.71	1687861.20	552550.42	40°00'42.216"N	80°36'51.709"W	426.12	154.013	8.58
6614.00	71.900	154.000	6368.34	465.66	-418.65	204.05	1687878.54	552514.81	40°00'41.867"N	80°36'51.480"W	465.73	154.016	6.19
6657.00	74.600	156.800	6380.74	506.83	-456.09	221.18	1687895.67	552477.37	40°00'41.499"N	80°36'51.254"W	506.88	154.129	8.85
6700.00	79.400	157.000	6390.41	548.69	-494.61	237.61	1687912.10	552438.85	40°00'41.120"N	80°36'51.037"W	548.73	154.341	11.17
6743.00	84.100	156.400	6396.57	591.21	-533.69	254.44	1687928.93	552399.78	40°00'40.736"N	80°36'50.814"W	591.23	154.510	11.02
6785.00	88.700	156.500	6399.21	633.11	-572.10	271.18	1687945.67	552361.36	40°00'40.359"N	80°36'50.593"W	633.12	154.639	10.95
6827.00	90.100	156.600	6399.65	675.09	-610.63	287.89	1687962.38	552322.83	40°00'39.980"N	80°36'50.372"W	675.09	154.758	3.34
6870.00	89.900	155.400	6399.65	718.08	-649.91	305.38	1687979.87	552283.55	40°00'39.594"N	80°36'50.141"W	718.08	154.832	2.83
6916.00	89.900	155.800	6399.73	764.08	-691.80	324.39	1687998.87	552241.67	40°00'39.182"N	80°36'49.890"W	764.08	154.878	0.87
7004.00	89.900	156.100	6399.88	852.06	-772.16	360.25	1688034.73	552161.31	40°00'38.392"N	80°36'49.417"W	852.06	154.989	0.34
7089.00	90.000	155.700	6399.96	937.05	-849.75	394.96	1688069.44	552083.72	40°00'37.630"N	80°36'48.958"W	937.05	155.072	0.49



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'
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REFERENCE WELLPATH IDENTIFICATION

Operator	CHESAPEAKE APPALACHIA, LLC	Slot	Slot 8H
Area	Marshall County, WV	Well	Michael Southworth 8H
Field	Marshall	Wellbore	Michael Southworth 8H (AWB)
Facility	Michael Southworth		

WELLPATH DATA (172 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]
7174.00	89.900	156.100	6400.03	1022.04	-927.34	429.66	1688104.15	552006.13	40°00'36.868"N	80°36'48.500"W	1022.05	155.140	0.49
7259.00	89.900	155.800	6400.18	1107.03	-1004.97	464.30	1688138.79	551928.51	40°00'36.105"N	80°36'48.043"W	1107.04	155.203	0.35
7344.00	89.900	155.400	6400.33	1192.03	-1082.37	499.42	1688173.90	551851.11	40°00'35.344"N	80°36'47.579"W	1192.04	155.231	0.47
7430.00	89.800	153.900	6400.55	1278.02	-1160.09	536.24	1688210.72	551773.40	40°00'34.581"N	80°36'47.093"W	1278.03	155.192	1.75
7515.00	89.800	150.900	6400.85	1362.92	-1235.41	575.61	1688250.09	551698.08	40°00'33.841"N	80°36'46.575"W	1362.92	155.018	3.53
7600.00	90.000	154.200	6401.00	1447.83	-1310.83	614.79	1688289.27	551622.66	40°00'33.101"N	80°36'46.060"W	1447.84	154.873	3.89
7685.00	90.000	155.900	6401.00	1532.83	-1387.89	650.64	1688325.12	551545.60	40°00'32.344"N	80°36'45.587"W	1532.83	154.883	2.00
7770.00	90.000	156.700	6401.00	1617.81	-1465.72	684.81	1688359.28	551467.77	40°00'31.579"N	80°36'45.136"W	1617.81	154.957	0.94
7856.00	89.900	156.000	6401.07	1703.78	-1544.50	719.31	1688393.78	551389.00	40°00'30.804"N	80°36'44.680"W	1703.78	155.028	0.82
7941.00	89.800	154.500	6401.30	1788.78	-1621.69	754.89	1688429.36	551311.81	40°00'30.046"N	80°36'44.210"W	1788.78	155.038	1.77
8027.00	87.700	154.200	6403.17	1874.75	-1699.19	792.11	1688466.58	551234.31	40°00'29.285"N	80°36'43.720"W	1874.75	155.007	2.47
8112.00	87.900	154.800	6406.44	1959.68	-1775.85	828.68	1688503.14	551157.65	40°00'28.532"N	80°36'43.238"W	1959.68	154.985	0.74
8198.00	87.500	154.000	6409.89	2045.61	-1853.35	865.80	1688540.27	551080.16	40°00'27.770"N	80°36'42.748"W	2045.61	154.960	1.04
8283.00	87.500	153.600	6413.59	2130.51	-1929.54	903.30	1688577.76	551003.97	40°00'27.022"N	80°36'42.254"W	2130.51	154.914	0.47
8368.00	87.500	153.900	6417.30	2215.41	-2005.70	940.86	1688615.32	550927.81	40°00'26.274"N	80°36'41.760"W	2215.41	154.869	0.35
8452.00	87.400	154.400	6421.04	2299.32	-2081.22	977.44	1688651.91	550852.30	40°00'25.532"N	80°36'41.277"W	2299.32	154.843	0.61
8537.00	87.600	156.100	6424.75	2384.23	-2158.34	1012.99	1688687.46	550775.18	40°00'24.775"N	80°36'40.808"W	2384.24	154.857	2.01
8622.00	89.400	156.500	6426.97	2469.18	-2236.14	1047.15	1688721.61	550697.39	40°00'24.010"N	80°36'40.357"W	2469.18	154.907	2.17
8707.00	89.500	157.300	6427.79	2554.12	-2314.32	1080.49	1688754.95	550619.21	40°00'23.241"N	80°36'39.916"W	2554.12	154.973	0.95
8792.00	89.400	157.500	6428.60	2639.05	-2392.79	1113.16	1688787.62	550540.74	40°00'22.470"N	80°36'39.484"W	2639.05	155.052	0.26
8878.00	90.100	158.400	6428.98	2724.93	-2472.50	1145.44	1688819.90	550461.04	40°00'21.686"N	80°36'39.057"W	2724.94	155.143	1.33
8963.00	90.600	156.900	6428.46	2809.83	-2551.11	1177.76	1688852.22	550382.43	40°00'20.913"N	80°36'38.629"W	2809.85	155.219	1.86
9049.00	90.500	156.100	6427.63	2895.80	-2629.97	1212.05	1688886.51	550303.57	40°00'20.138"N	80°36'38.176"W	2895.83	155.257	0.94
9134.00	89.300	150.700	6427.78	2980.73	-2705.95	1250.10	1688924.55	550227.60	40°00'19.392"N	80°36'37.675"W	2980.75	155.204	6.51
9219.00	90.500	147.800	6427.93	3065.30	-2778.99	1293.55	1688968.00	550154.56	40°00'18.676"N	80°36'37.105"W	3065.30	155.039	3.69
9305.00	90.500	150.500	6427.18	3150.84	-2852.81	1337.65	1689012.10	550080.74	40°00'17.952"N	80°36'36.526"W	3150.84	154.879	3.14
9390.00	90.200	152.900	6426.66	3235.69	-2927.64	1377.94	1689052.39	550005.91	40°00'17.217"N	80°36'35.997"W	3235.71	154.795	2.85
9475.00	89.600	155.000	6426.81	3320.67	-3004.00	1415.27	1689089.71	549929.55	40°00'16.467"N	80°36'35.505"W	3320.69	154.774	2.57
9560.00	89.500	156.300	6427.48	3405.66	-3081.44	1450.31	1689124.76	549852.12	40°00'15.706"N	80°36'35.042"W	3405.68	154.795	1.53
9645.00	89.500	157.100	6428.22	3490.62	-3159.50	1483.93	1689158.37	549774.06	40°00'14.939"N	80°36'34.598"W	3490.63	154.842	0.94



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'
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REFERENCE WELLPATH IDENTIFICATION

Operator	CHESAPEAKE APPALACHIA, LLC	Slot	Slot 8H
Area	Marshall County, WV	Well	Michael Southworth 8H
Field	Marshall	Wellbore	Michael Southworth 8H (AWB)
Facility	Michael Southworth		

WELLPATH DATA (172 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]
9730.00	89.500	157.900	6428.96	3575.53	-3238.03	1516.46	1689190.90	549695.54	40°00'14.167"N	80°36'34.168"W	3575.54	154.905	0.94
9815.00	89.500	158.300	6429.70	3660.40	-3316.89	1548.16	1689222.60	549616.68	40°00'13.391"N	80°36'33.748"W	3660.40	154.979	0.47
9901.00	89.500	159.600	6430.45	3746.19	-3397.15	1579.05	1689253.49	549536.43	40°00'12.602"N	80°36'33.338"W	3746.20	155.070	1.51
9986.00	89.500	159.700	6431.20	3830.91	-3476.84	1608.61	1689283.04	549456.74	40°00'11.818"N	80°36'32.946"W	3830.93	155.172	0.12
10070.00	89.500	158.800	6431.93	3914.68	-3555.39	1638.37	1689312.80	549378.19	40°00'11.046"N	80°36'32.551"W	3914.72	155.259	1.07
10155.00	89.500	157.400	6432.67	3999.55	-3634.25	1670.07	1689344.50	549299.33	40°00'10.270"N	80°36'32.131"W	3999.61	155.320	1.65
10241.00	89.500	157.100	6433.42	4085.48	-3713.55	1703.32	1689377.76	549220.03	40°00'09.491"N	80°36'31.691"W	4085.56	155.360	0.35
10327.00	89.600	156.100	6434.10	4171.44	-3792.48	1737.48	1689411.91	549141.11	40°00'08.715"N	80°36'31.240"W	4171.53	155.386	1.17
10412.00	89.500	154.100	6434.76	4256.43	-3869.57	1773.26	1689447.69	549064.02	40°00'07.957"N	80°36'30.768"W	4256.53	155.380	2.36
10497.00	89.500	152.200	6435.51	4341.38	-3945.40	1811.65	1689486.08	548988.19	40°00'07.213"N	80°36'30.263"W	4341.46	155.336	2.24
10582.00	89.400	151.600	6436.32	4426.25	-4020.38	1851.68	1689526.11	548913.22	40°00'06.477"N	80°36'29.736"W	4426.30	155.270	0.72
10667.00	89.500	151.700	6437.14	4511.10	-4095.18	1892.04	1689566.47	548838.42	40°00'05.742"N	80°36'29.206"W	4511.13	155.202	0.17
10753.00	89.400	152.300	6437.96	4596.98	-4171.11	1932.42	1689606.84	548762.49	40°00'04.997"N	80°36'28.675"W	4597.00	155.142	0.71
10838.00	89.500	153.600	6438.78	4681.92	-4246.80	1971.07	1689645.49	548686.80	40°00'04.254"N	80°36'28.167"W	4681.93	155.103	1.53
10924.00	89.500	154.700	6439.53	4767.91	-4324.19	2008.56	1689682.99	548609.41	40°00'03.494"N	80°36'27.673"W	4767.91	155.085	1.28
11009.00	89.500	154.500	6440.27	4852.90	-4400.98	2045.02	1689719.44	548532.63	40°00'02.739"N	80°36'27.192"W	4852.91	155.077	0.24
11095.00	89.400	154.500	6441.10	4938.89	-4478.59	2082.04	1689756.47	548455.02	40°00'01.977"N	80°36'26.704"W	4938.90	155.067	0.12
11180.00	89.500	154.500	6441.91	5023.89	-4555.31	2118.64	1689793.06	548378.31	40°00'01.223"N	80°36'26.222"W	5023.89	155.057	0.12
11265.00	89.400	154.900	6442.73	5108.88	-4632.15	2154.96	1689829.38	548301.47	40°00'00.468"N	80°36'25.743"W	5108.88	155.051	0.49
11350.00	89.400	155.300	6443.62	5193.88	-4709.25	2190.75	1689865.16	548224.37	39°59'59.711"N	80°36'25.271"W	5193.88	155.052	0.47
11436.00	89.500	154.300	6444.44	5279.87	-4787.06	2227.36	1689901.78	548146.57	39°59'58.946"N	80°36'24.788"W	5279.87	155.048	1.17
11520.00	89.500	155.000	6445.18	5363.87	-4862.97	2263.32	1689937.74	548070.66	39°59'58.201"N	80°36'24.314"W	5363.87	155.042	0.83
11606.00	89.500	152.800	6445.93	5449.84	-4940.19	2301.15	1689975.57	547993.44	39°59'57.442"N	80°36'23.816"W	5449.84	155.024	2.56
11690.00	88.900	153.200	6447.10	5533.78	-5015.03	2339.29	1690013.70	547918.61	39°59'56.707"N	80°36'23.314"W	5533.78	154.993	0.86
11776.00	88.900	153.900	6448.75	5619.74	-5092.01	2377.58	1690051.99	547841.63	39°59'55.951"N	80°36'22.810"W	5619.74	154.971	0.81
11861.00	88.900	154.900	6450.38	5704.72	-5168.65	2414.30	1690088.71	547764.99	39°59'55.198"N	80°36'22.326"W	5704.72	154.962	1.18
11946.00	89.000	155.900	6451.94	5789.70	-5245.92	2449.68	1690124.09	547687.72	39°59'54.439"N	80°36'21.859"W	5789.70	154.969	1.18
12031.00	89.000	155.600	6453.42	5874.68	-5323.41	2484.59	1690158.99	547610.24	39°59'53.678"N	80°36'21.398"W	5874.68	154.980	0.35
12116.00	88.800	155.800	6455.06	5959.66	-5400.86	2519.56	1690193.96	547532.78	39°59'52.916"N	80°36'20.937"W	5959.66	154.990	0.33
12202.00	88.600	156.000	6457.01	6045.62	-5479.35	2554.67	1690229.07	547454.30	39°59'52.145"N	80°36'20.473"W	6045.62	155.003	0.33



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'
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REFERENCE WELLPATH IDENTIFICATION

Operator	CHESAPEAKE APPALACHIA, LLC	Slot	Slot 8H
Area	Marshall County, WV	Well	Michael Southworth 8H
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WELLPATH DATA (172 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]
12287.00	88.400	155.700	6459.23	6130.59	-5556.88	2589.43	1690263.83	547376.77	39°59'51.383"N	80°36'20.014"W	6130.59	155.015	0.42
12373.00	88.400	155.900	6461.63	6216.54	-5635.29	2624.67	1690299.07	547298.36	39°59'50.613"N	80°36'19.549"W	6216.54	155.026	0.23
12460.00	88.400	155.300	6464.06	6303.50	-5714.49	2660.60	1690334.99	547219.17	39°59'49.834"N	80°36'19.075"W	6303.51	155.034	0.69
12544.00	88.900	153.800	6466.04	6387.48	-5790.32	2696.68	1690371.08	547143.35	39°59'49.089"N	80°36'18.599"W	6387.48	155.028	1.88
12631.00	88.900	153.600	6467.71	6474.44	-5868.30	2735.22	1690409.62	547065.37	39°59'48.324"N	80°36'18.092"W	6474.44	155.010	0.23
12716.00	89.400	156.800	6468.97	6559.42	-5945.44	2770.87	1690445.26	546988.23	39°59'47.566"N	80°36'17.622"W	6559.42	155.012	3.81
12801.00	89.500	157.900	6469.79	6644.34	-6023.88	2803.60	1690477.99	546909.79	39°59'46.794"N	80°36'17.189"W	6644.34	155.042	1.30
12886.00	89.500	157.500	6470.53	6729.24	-6102.52	2835.85	1690510.24	546831.16	39°59'46.021"N	80°36'16.762"W	6729.25	155.076	0.47
12972.00	89.400	156.300	6471.36	6815.19	-6181.62	2869.59	1690543.98	546752.06	39°59'45.244"N	80°36'16.316"W	6815.20	155.099	1.40
13057.00	89.400	154.800	6472.25	6900.18	-6258.99	2904.77	1690579.16	546674.69	39°59'44.483"N	80°36'15.852"W	6900.19	155.104	1.76
13142.00	89.400	153.900	6473.14	6985.17	-6335.61	2941.56	1690615.95	546598.08	39°59'43.731"N	80°36'15.367"W	6985.18	155.095	1.06
13227.00	89.400	153.500	6474.03	7070.14	-6411.80	2979.22	1690653.60	546521.88	39°59'42.982"N	80°36'14.871"W	7070.15	155.078	0.47
13313.00	89.500	153.000	6474.85	7156.10	-6488.60	3017.93	1690692.31	546445.09	39°59'42.228"N	80°36'14.362"W	7156.10	155.056	0.59
13398.00	89.600	152.800	6475.52	7241.04	-6564.26	3056.65	1690731.03	546369.43	39°59'41.485"N	80°36'13.853"W	7241.04	155.031	0.26
13460.00	89.400	153.200	6476.06	7303.00	-6619.50	3084.79	1690759.17	546314.19	39°59'40.943"N	80°36'13.482"W	7303.00	155.014	0.72
13554.00	89.400	153.200	6477.05	7396.94	-6703.40	3127.17	1690801.55	546230.30	39°59'40.119"N	80°36'12.925"W	7396.94	154.991	0.00
13646.00	89.400	152.700	6478.01	7488.88	-6785.33	3169.01	1690843.39	546148.37	39°59'39.314"N	80°36'12.374"W	7488.88	154.966	0.54
13738.00	89.400	153.100	6478.97	7580.81	-6867.23	3210.92	1690885.29	546066.48	39°59'38.510"N	80°36'11.823"W	7580.82	154.941	0.43
13831.00	89.400	153.900	6479.95	7673.78	-6950.45	3252.41	1690926.79	545983.26	39°59'37.693"N	80°36'11.277"W	7673.78	154.923	0.86
13924.00	89.400	154.400	6480.92	7766.76	-7034.14	3292.96	1690967.33	545899.57	39°59'36.871"N	80°36'10.742"W	7766.77	154.914	0.54
14010.00	89.500	154.100	6481.75	7852.75	-7111.60	3330.32	1691004.69	545822.12	39°59'36.110"N	80°36'10.250"W	7852.76	154.907	0.37
14058.00	89.500	154.100	6482.16	7900.74	-7154.77	3351.28	1691025.65	545778.94	39°59'35.686"N	80°36'09.974"W	7900.75	154.902	0.00



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'
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REFERENCE WELLPATH IDENTIFICATION

Operator	CHESAPEAKE APPALACHIA, LLC	Slot	Slot 8H
Area	Marshall County, WV	Well	Michael Southworth 8H
Field	Marshall	Wellbore	Michael Southworth 8H (AWB)
Facility	Michael Southworth		

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Michael Southworth 8H PBHL: Rev-5		6462.20	-7160.00	3342.00	1691016.37	545773.71	39°59'35.633"N	80°36'10.092"W	point
Michael Southworth 8H PBHL: Rev-6		6484.52	-7160.00	3342.00	1691016.37	545773.72	39°59'35.633"N	80°36'10.093"W	point

WELLPATH COMPOSITION - Ref Wellbore: Michael Southworth 8H (AWB) Ref Wellpath: BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	5511.00	Generic gyro - northseeking (Standard)	HA Gyro Survey (0') (111'-6111')	Michael Southworth 8H (AWB)
5511.00	14010.00	NaviTrak (MagCorr)	BHI NaviTrak MWD Surveys (5592'-14010')	Michael Southworth 8H (AWB)
14010.00	14058.00	Blind Drilling (std)	Projection to bit	Michael Southworth 8H (AWB)



Actual Wellpath Report

BHI NaviTrak MWD Surveys (5511') (5592'-14010') Proj:14058'

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REFERENCE WELLPATH IDENTIFICATION

Operator	CHESAPEAKE APPALACHIA, LLC	Slot	Slot 8H
Area	Marshall County, WV	Well	Michael Southworth 8H
Field	Marshall	Wellbore	Michael Southworth 8H (AWB)
Facility	Michael Southworth		

COMMENTS

Wellpath general comments

API: 47-051-01430-00

Rig: Nomac 243

BHI Job#: 3733511

Duration: 04/01/2011-04/15/2011

HA Gyro Survey (0') (111'-6111')

BHI NaviTrak MWD Surveys (5511') (5592'-14010')

TD Projected To MD: 14058'