



Actual Wellpath Report
PEN-2E-HS AWP Proj: 15953'
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REFERENCE WELLPATH IDENTIFICATION	
Operator	NOBLE ENERGY
Area	Ritchie County, WV
Field	Ritchie
Facility	PEN-2 Pad
Slot	Slot E
Well	PEN-2E-HS
Wellbore	PEN-2E-HS AWB

REPORT SETUP INFORMATION	
Projection System	NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet
Grid	Goffbral
Scale	0.999953
Convergence at slot	0.96° West
Software System	WellArchitect® 4.0.1
User	Goffbral
Report Generated	9/2/2014 at 10:28:40 AM
Database/Source file	W:\NorthEast\PEN-2E-HS_AWB.xml

WELLPATH LOCATION			
	Local coordinates		Geographic coordinates
	North [ft]	East [ft]	
Slot Location	28.09	74.35	39°20'11.630"N 81°00'45.290"W
Facility Reference Pt	1572187.43	1572113.09	39°20'11.340"N 81°00'46.230"W
Field Reference Pt	0.00	0.00	38°17'12.460"N 86°28'23.077"W

WELLPATH DATUM	
Calculation method	Minimum curvature
Horizontal Reference Pt	Slot
Vertical Reference Pt	Nomac 78 (RT)
MD Reference Pt	Nomac 78 (RT)
Field Vertical Reference	Mean Sea Level
	Nomac 78 (RT) to Facility Vertical Datum
	Nomac 78 (RT) to Mean Sea Level
	Nomac 78 (RT) to Mud Line at Slot (Slot E)
	Section Origin
	Section Azimuth
	1101.07ft
	1101.07ft
	26.00ft
	N 0.00, E 0.00 ft
	140.03°

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REFERENCE WELLPATH IDENTIFICATION		Slot	Slot E
Operator	NOBLE ENERGY	Well	PEN-2E-HS
Area	Ritchie County, WV	Wellbore	PEN-2E-HS AWB
Field	Ritchie		
Facility	PEN-2 Pad		

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 [1/1000]
0.00†	0.000	9.550	0.00	0.00	0.00	0.00	1572187.43	308295.03	39°20'11.630"N	81°00'45.290"W	0.00	0.000	0.00
26.00	0.000	9.550	26.00	0.00	0.00	0.00	1572187.43	308295.03	39°20'11.630"N	81°00'45.290"W	0.00	0.000	0.00
100.00	0.150	9.550	100.00	-0.06	0.10	0.02	1572187.45	308295.13	39°20'11.631"N	81°00'45.290"W	0.10	9.550	0.20
200.00	0.250	99.080	200.00	0.02	0.19	0.25	1572187.69	308295.22	39°20'11.632"N	81°00'45.287"W	0.32	53.092	0.29
300.00	0.510	108.140	300.00	0.56	0.02	0.89	1572188.32	308295.05	39°20'11.630"N	81°00'45.279"W	0.89	88.896	0.27
400.00	0.510	104.530	399.99	1.30	-0.23	1.75	1572189.18	308294.80	39°20'11.628"N	81°00'45.268"W	1.76	97.605	0.03
500.00	0.760	108.310	499.99	2.23	-0.55	2.81	1572190.24	308294.48	39°20'11.625"N	81°00'45.254"W	2.86	101.151	0.25
559.00	1.000	87.620	558.98	2.87	-0.65	3.69	1572191.12	308294.38	39°20'11.624"N	81°00'45.243"W	3.75	100.055	0.67
681.00	0.510	100.010	680.97	3.94	-0.70	5.29	1572192.72	308294.33	39°20'11.624"N	81°00'45.223"W	5.34	97.588	0.42
712.00	0.620	127.180	711.97	4.21	-0.83	5.56	1572192.99	308294.20	39°20'11.623"N	81°00'45.219"W	5.62	98.492	0.92
745.00	1.060	132.580	744.96	4.68	-1.14	5.93	1572193.36	308293.89	39°20'11.620"N	81°00'45.214"W	6.04	100.930	1.35
809.00	2.750	139.780	808.93	6.81	-2.72	7.35	1572194.79	308292.32	39°20'11.604"N	81°00'45.196"W	7.84	110.281	2.66
903.00	5.930	135.370	902.65	13.90	-7.90	12.22	1572199.65	308287.14	39°20'11.554"N	81°00'45.133"W	14.55	122.864	3.40
998.00	6.540	135.370	997.08	24.19	-15.24	19.47	1572206.90	308279.80	39°20'11.483"N	81°00'45.039"W	24.73	128.048	6.64
1092.00	6.540	134.020	1090.47	34.85	-22.77	27.08	1572214.51	308272.27	39°20'11.410"N	81°00'44.941"W	35.38	130.055	0.16
1188.00	5.000	134.980	1185.98	44.45	-29.53	33.97	1572221.40	308265.51	39°20'11.344"N	81°00'44.851"W	45.01	130.994	1.61
1284.00	3.490	140.270	1281.72	51.54	-34.73	38.80	1572226.23	308260.31	39°20'11.293"N	81°00'44.789"W	52.07	131.832	1.29
1380.00	2.520	155.080	1377.58	56.50	-38.89	41.56	1572228.99	308256.14	39°20'11.253"N	81°00'44.737"W	56.92	133.103	0.85
1475.00	1.890	168.210	1472.51	59.90	-42.32	42.76	1572230.19	308252.72	39°20'11.219"N	81°00'44.734"W	60.16	134.705	0.85
1571.00	0.830	188.190	1568.49	61.76	-44.56	42.98	1572230.41	308250.48	39°20'11.197"N	81°00'44.734"W	61.91	136.031	1.19
1667.00	0.810	200.610	1664.48	62.55	-45.88	42.64	1572230.07	308249.16	39°20'11.184"N	81°00'44.738"W	62.64	137.094	0.19
1762.00	1.200	220.620	1759.46	63.05	-47.26	41.76	1572229.19	308247.77	39°20'11.170"N	81°00'44.748"W	63.07	138.538	0.55
1857.00	0.960	206.800	1854.45	63.52	-48.73	40.75	1572228.18	308246.31	39°20'11.155"N	81°00'44.761"W	63.52	140.094	0.37
1953.00	0.280	73.800	1950.44	63.94	-49.38	40.61	1572228.05	308245.65	39°20'11.149"N	81°00'44.763"W	63.94	140.564	1.22
2048.00	0.920	50.350	2045.44	64.03	-48.83	41.43	1572228.86	308246.21	39°20'11.154"N	81°00'44.752"W	64.03	139.690	0.71
2144.00	0.740	82.270	2141.43	64.37	-48.25	42.63	1572230.06	308246.78	39°20'11.160"N	81°00'44.737"W	64.39	138.540	0.51
2239.00	0.580	224.420	2236.42	64.74	-48.52	42.90	1572230.34	308246.52	39°20'11.158"N	81°00'44.734"W	64.77	138.513	1.32
2334.00	1.140	225.180	2331.41	64.87	-49.53	41.90	1572229.33	308245.51	39°20'11.148"N	81°00'44.746"W	64.87	139.770	0.59
2430.00	1.150	266.670	2427.39	64.38	-50.25	40.26	1572227.69	308244.78	39°20'11.140"N	81°00'44.767"W	64.39	141.302	0.84
2525.00	1.050	325.120	2522.38	62.94	-49.60	38.81	1572226.24	308245.44	39°20'11.146"N	81°00'44.786"W	62.97	141.957	1.13

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Operator	NOBLE ENERGY	Slot	Slot E
Area	Ritchie County, WV	Well	PEN-2E-HS
Field	Ritchie	Wellbore	PEN-2E-HS AWB
Facility	PEN-2 Pad		

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 [1/100ft]
2621.00	0.550	41.290	2618.37	61.99	-48.53	38.61	1572226.04	308246.51	39°20'11.157"N	81°00'44.788"W	62.01	141.494	1.11
2717.00	0.700	74.260	2714.37	62.16	-48.02	39.48	1572226.91	308247.01	39°20'11.162"N	81°00'44.777"W	62.17	140.577	0.40
2811.00	0.610	104.990	2808.36	62.81	-48.00	40.51	1572227.95	308247.04	39°20'11.162"N	81°00'44.764"W	62.81	139.832	0.38
2906.00	0.420	200.230	2903.36	63.40	-48.45	40.88	1572228.31	308246.58	39°20'11.158"N	81°00'44.759"W	63.40	139.844	0.81
3001.00	0.720	263.510	2998.35	63.24	-48.85	40.17	1572227.60	308246.19	39°20'11.154"N	81°00'44.768"W	63.24	140.569	0.68
3096.00	0.810	261.650	3093.35	62.56	-49.01	38.91	1572226.34	308246.02	39°20'11.152"N	81°00'44.784"W	62.58	141.554	0.10
3192.00	1.360	261.880	3189.33	61.60	-49.27	37.11	1572224.54	308245.76	39°20'11.149"N	81°00'44.807"W	61.69	143.013	0.57
3288.00	0.850	264.100	3285.31	60.60	-49.51	35.28	1572222.71	308245.53	39°20'11.147"N	81°00'44.830"W	60.79	144.528	0.53
3383.00	0.310	306.840	3380.31	59.96	-49.42	34.37	1572221.80	308245.61	39°20'11.147"N	81°00'44.842"W	60.20	145.186	0.69
3479.00	0.280	60.680	3476.30	59.75	-49.15	34.37	1572221.80	308245.88	39°20'11.150"N	81°00'44.842"W	59.98	145.041	0.52
3575.00	0.550	47.930	3572.30	59.77	-48.73	34.91	1572222.34	308246.30	39°20'11.154"N	81°00'44.835"W	59.95	144.381	0.30
3669.00	0.660	85.500	3666.30	60.07	-48.39	35.79	1572223.22	308246.65	39°20'11.158"N	81°00'44.824"W	60.18	143.513	0.43
3764.00	0.980	125.690	3761.29	61.18	-48.82	36.99	1572224.42	308246.22	39°20'11.154"N	81°00'44.809"W	61.25	142.846	0.67
3860.00	0.810	148.190	3857.28	62.64	-49.87	38.02	1572225.45	308245.16	39°20'11.143"N	81°00'44.796"W	62.71	142.682	0.40
3956.00	0.740	165.020	3953.27	63.88	-51.05	38.53	1572225.97	308243.99	39°20'11.132"N	81°00'44.789"W	63.96	142.952	0.25
4051.00	0.970	181.220	4048.26	65.04	-52.44	38.68	1572226.11	308242.59	39°20'11.118"N	81°00'44.787"W	65.16	143.592	0.35
4147.00	0.980	188.240	4144.24	66.20	-54.07	38.54	1572225.97	308240.97	39°20'11.102"N	81°00'44.788"W	66.40	144.518	0.12
4243.00	1.280	178.970	4240.23	67.58	-55.95	38.44	1572225.87	308239.08	39°20'11.083"N	81°00'44.789"W	67.89	145.509	0.36
4334.00	1.460	28.880	4331.22	67.95	-55.96	39.02	1572226.45	308239.08	39°20'11.084"N	81°00'44.781"W	68.22	145.109	2.91
4430.00	4.500	31.710	4427.07	66.32	-51.68	41.59	1572229.02	308243.36	39°20'11.126"N	81°00'44.750"W	66.34	141.173	3.17
4525.00	4.590	30.420	4521.78	63.88	-45.23	45.48	1572232.91	308249.80	39°20'11.191"N	81°00'44.702"W	64.14	134.845	0.14
4621.00	5.310	29.150	4617.42	61.00	-38.04	49.58	1572237.01	308257.00	39°20'11.262"N	81°00'44.651"W	62.49	127.494	0.76
4716.00	7.790	27.820	4711.79	57.00	-28.50	54.73	1572242.16	308266.53	39°20'11.357"N	81°00'44.587"W	61.71	117.511	2.62
4811.00	12.700	31.660	4805.25	51.28	-13.91	63.22	1572250.65	308281.12	39°20'11.503"N	81°00'44.483"W	64.73	102.411	5.22
4907.00	16.290	37.580	4898.18	45.04	5.75	76.98	1572264.41	308300.78	39°20'11.700"N	81°00'44.312"W	77.19	85.730	4.04
5002.00	18.310	36.170	4988.88	38.60	28.36	93.91	1572281.34	308323.39	39°20'11.926"N	81°00'44.101"W	98.10	73.199	2.17
5098.00	20.980	33.030	5079.29	29.96	54.94	112.18	1572299.61	308349.97	39°20'12.192"N	81°00'43.874"W	124.92	63.906	2.99
5193.00	23.780	33.120	5167.12	19.41	85.25	131.92	1572319.35	308380.28	39°20'12.494"N	81°00'43.630"W	157.07	51.129	2.95
5289.00	28.410	31.750	5253.31	6.61	120.90	154.53	1572341.95	308415.93	39°20'12.850"N	81°00'43.349"W	196.20	51.961	4.86
5384.00	33.630	35.520	5334.71	-7.08	161.56	181.73	1572369.15	308456.58	39°20'13.257"N	81°00'43.012"W	243.16	48.362	5.86

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PEN-2E-IIS AWP Proj: 15953'

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot E
Area	Ritchie County, WV	Well	PEN-2E-IIS
Field	Ritchie	Wellbore	PEN-2E-IIS AWB
Facility	PEN-2 Pad		

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]
5480.00	34.390	36.460	5414.28	-20.10	205.00	213.28	1572400.70	308500.03	39°20'13.691"N	81°00'42.620"W	298.83	46.134	0.96
5555.00	32.730	28.560	5476.81	-32.50	239.86	235.57	1572423.03	308534.89	39°20'14.040"N	81°00'42.344"W	336.20	44.483	6.22
5650.00	36.080	34.070	5555.20	-49.60	285.62	263.54	1572450.96	308580.64	39°20'14.496"N	81°00'41.998"W	388.63	42.698	4.81
5746.00	35.780	35.060	5633.21	-55.42	340.23	302.23	1572489.65	308620.66	39°20'14.898"N	81°00'41.514"W	444.28	42.864	12.18
5841.00	36.020	60.510	5710.19	-48.38	355.71	349.05	1572536.46	308650.72	39°20'15.203"N	81°00'40.924"W	498.36	44.459	3.99
5937.00	35.470	66.640	5788.13	-35.28	380.66	399.20	1572586.62	308675.67	39°20'15.458"N	81°00'40.292"W	551.60	46.363	3.77
6032.00	41.190	80.440	5862.76	-11.51	396.82	455.51	1572642.92	308691.84	39°20'15.627"N	81°00'39.579"W	604.11	48.939	10.81
6127.00	44.930	79.580	5932.16	20.88	408.09	519.37	1572706.78	308703.10	39°20'15.749"N	81°00'38.768"W	660.52	51.842	3.98
6223.00	45.470	82.180	5999.81	55.82	418.88	586.62	1572774.02	308713.89	39°20'15.867"N	81°00'37.915"W	720.82	54.471	2.00
6317.00	45.380	95.110	6065.92	97.42	420.46	653.27	1572840.68	308715.47	39°20'15.894"N	81°00'37.067"W	776.89	57.234	9.79
6416.00	53.120	110.570	6130.72	157.14	403.32	725.80	1572913.20	308698.34	39°20'15.736"N	81°00'36.140"W	830.33	60.939	14.14
6509.00	60.880	121.020	6181.43	228.18	369.20	795.68	1572983.07	308664.22	39°20'15.411"N	81°00'35.244"W	877.16	65.108	12.57
6604.00	65.130	126.180	6224.57	309.34	322.33	866.10	1573053.49	308617.35	39°20'14.959"N	81°00'34.338"W	924.13	69.586	6.59
6700.00	73.120	129.790	6258.76	396.99	267.12	936.67	1573124.06	308562.14	39°20'14.425"N	81°00'33.428"W	974.02	74.083	9.03
6795.00	80.290	132.900	6280.60	488.32	206.07	1006.00	1573193.39	308501.09	39°20'13.834"N	81°00'32.532"W	1026.89	78.424	8.19
6890.00	87.010	136.270	6291.10	582.24	139.83	1073.19	1573260.57	308434.85	39°20'13.190"N	81°00'31.663"W	1082.26	82.577	7.90
6986.00	89.170	138.750	6294.30	678.08	69.08	1137.99	1573325.36	308364.11	39°20'12.502"N	81°00'30.824"W	1140.08	86.536	3.42
7081.00	89.630	137.210	6295.29	773.01	-1.49	1201.57	1573388.95	308293.55	39°20'11.815"N	81°00'29.999"W	1201.57	90.071	1.69
7177.00	89.480	140.420	6296.04	868.98	-73.72	1264.78	1573452.15	308221.31	39°20'11.112"N	81°00'29.180"W	1266.93	93.336	3.35
7272.00	89.420	143.330	6296.95	963.91	-148.44	1323.42	1573510.79	308146.60	39°20'10.383"N	81°00'28.417"W	1331.72	96.400	3.06
7367.00	89.320	144.250	6298.00	1058.70	-225.09	1379.54	1573566.90	308069.95	39°20'09.635"N	81°00'27.687"W	1397.78	99.267	0.97
7463.00	89.510	140.340	6298.98	1154.60	-301.02	1438.24	1573625.60	307994.02	39°20'08.894"N	81°00'26.924"W	1469.40	101.821	4.08
7558.00	89.570	137.920	6299.74	1249.58	-372.85	1500.39	1573687.75	307922.20	39°20'08.195"N	81°00'26.118"W	1546.03	103.956	2.55
7654.00	89.510	136.040	6300.51	1345.44	-443.04	1565.88	1573753.24	307852.02	39°20'07.512"N	81°00'25.269"W	1627.35	105.798	1.96
7749.00	89.540	138.120	6301.30	1440.30	-512.60	1630.57	1573817.92	307782.46	39°20'06.835"N	81°00'24.431"W	1709.25	107.451	2.19
7845.00	89.380	141.320	6302.20	1536.28	-585.82	1692.63	1573879.98	307709.24	39°20'06.122"N	81°00'23.626"W	1791.14	109.091	3.34
7940.00	89.450	145.100	6303.17	1631.12	-661.89	1749.51	1573936.85	307633.18	39°20'05.380"N	81°00'22.886"W	1870.53	110.723	3.98
8036.00	89.570	143.940	6304.00	1726.82	-740.06	1805.22	1573992.57	307555.01	39°20'04.616"N	81°00'22.160"W	1951.03	112.291	1.21
8132.00	89.570	144.530	6304.72	1822.55	-817.95	1861.33	1574048.67	307477.12	39°20'03.856"N	81°00'21.430"W	2033.12	113.723	0.61
8227.00	89.600	142.040	6305.40	1917.39	-894.10	1918.12	1574105.46	307400.98	39°20'03.113"N	81°00'20.691"W	2116.27	114.992	2.62

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Actual Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot E
Area	Ritchie County, WV	Well	PEN-2E-HS
Field	Ritchie	Wellbore	PEN-2E-HS AWB
Facility	PEN-2 Pad		

WELLPATH DATA (172 stations)

MID [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]
8323.00	89.540	138.450	6306.12	2013.37	-967.88	1979.50	1574166.84	307327.20	39°20'02.394"N	81°00'19.894"W	2203.46	116.057	3.74
8419.00	89.540	135.660	6306.90	2109.23	-1038.15	2044.90	1574232.23	307256.94	39°20'01.710"N	81°00'19.047"W	2293.33	116.916	2.91
8514.00	89.420	136.360	6307.76	2203.99	-1106.49	2110.87	1574298.20	307188.59	39°20'01.046"N	81°00'18.193"W	2383.30	117.663	0.75
8705.00	89.540	137.900	6308.63	2299.86	-1176.85	2176.18	1574363.51	307118.24	39°20'00.361"N	81°00'17.347"W	2474.01	118.404	1.61
8801.00	89.600	138.020	6309.91	2490.78	-1319.79	2302.85	1574490.17	306975.30	39°19'58.970"N	81°00'15.705"W	2563.47	119.131	1.11
8899.00	90.090	145.820	6310.13	2588.65	-1396.87	2363.24	1574550.56	306898.23	39°19'58.218"N	81°00'14.920"W	2745.21	120.587	0.97
8993.00	89.750	141.530	6310.26	2682.44	-1472.59	2418.91	1574606.23	306822.52	39°19'57.479"N	81°00'14.195"W	2831.90	121.332	4.58
9088.00	89.750	139.430	6310.67	2777.43	-1545.87	2479.36	1574666.67	306749.24	39°19'56.765"N	81°00'13.410"W	2921.81	121.943	2.21
9184.00	89.630	138.510	6311.19	2873.41	-1618.29	2542.38	1574729.69	306676.83	39°19'56.059"N	81°00'12.593"W	3013.73	122.478	0.97
9280.00	89.690	137.560	6311.76	2969.35	-1689.66	2606.57	1574793.88	306605.45	39°19'55.365"N	81°00'11.761"W	3106.31	122.953	0.99
9375.00	89.970	138.600	6312.04	3064.30	-1760.35	2670.04	1574857.34	306534.77	39°19'54.677"N	81°00'10.938"W	3198.12	123.397	1.13
9470.00	89.780	141.440	6312.25	3159.29	-1833.14	2731.07	1574918.37	306461.98	39°19'53.967"N	81°00'10.146"W	3289.25	123.870	3.00
9566.00	89.660	142.380	6312.72	3255.23	-1908.69	2790.29	1574977.59	306386.43	39°19'53.231"N	81°00'09.377"W	3380.66	124.374	0.99
9661.00	90.000	138.780	6313.00	3350.21	-1982.07	2850.61	1575037.90	306313.06	39°19'52.515"N	81°00'08.594"W	3471.97	124.811	3.81
9756.00	89.600	137.090	6313.33	3445.14	-2052.59	2914.25	1575101.54	306242.54	39°19'51.829"N	81°00'07.769"W	3564.55	125.158	1.83
9851.00	89.720	136.710	6313.90	3540.00	-2121.96	2979.16	1575166.45	306173.18	39°19'51.154"N	81°00'06.928"W	3657.61	125.461	0.42
9947.00	89.720	135.770	6314.37	3635.79	-2191.29	3045.56	1575232.84	306103.85	39°19'50.480"N	81°00'06.068"W	3751.96	125.735	0.98
10041.00	89.630	136.440	6314.90	3729.57	-2259.03	3110.73	1575298.01	306036.12	39°19'49.821"N	81°00'05.225"W	3844.46	125.987	0.72
10137.00	89.540	138.520	6315.59	3825.46	-2329.78	3175.61	1575362.89	305965.37	39°19'49.133"N	81°00'04.384"W	3938.57	126.266	2.17
10231.00	89.660	138.600	6316.25	3919.43	-2400.24	3237.82	1575425.09	305894.91	39°19'48.447"N	81°00'03.578"W	4030.46	126.550	0.15
10326.00	89.820	139.610	6316.68	4014.41	-2472.05	3300.01	1575487.28	305823.10	39°19'47.748"N	81°00'02.771"W	4123.24	126.837	1.08
10422.00	90.090	142.090	6316.76	4110.40	-2546.49	3360.62	1575547.88	305748.66	39°19'47.022"N	81°00'01.984"W	4216.44	127.153	2.60
10517.00	90.310	144.250	6316.43	4205.25	-2622.53	3417.56	1575604.83	305672.63	39°19'46.280"N	81°00'01.243"W	4307.83	127.502	2.29
10612.00	90.090	144.420	6316.09	4299.98	-2699.71	3472.95	1575660.21	305595.46	39°19'45.526"N	81°00'00.522"W	4398.84	127.860	0.29
10706.00	90.400	145.620	6315.69	4393.62	-2776.73	3526.84	1575714.10	305518.44	39°19'44.774"N	80°59'59.820"W	4488.74	128.214	1.32
10801.00	91.230	143.090	6314.34	4488.33	-2853.91	3582.19	1575769.45	305441.26	39°19'44.020"N	80°59'59.100"W	4580.05	128.544	2.80
10897.00	90.460	137.560	6312.92	4584.28	-2927.76	3643.45	1575830.70	305367.41	39°19'43.301"N	80°59'58.304"W	4674.02	128.784	5.82
10990.00	90.250	135.400	6312.35	4677.10	-2995.20	3707.48	1575894.73	305299.98	39°19'42.645"N	80°59'57.475"W	4766.20	128.934	2.33
11085.00	90.090	131.310	6312.07	4771.43	-3060.40	3776.54	1575963.79	305234.78	39°19'42.012"N	80°59'56.583"W	4860.90	129.020	4.31

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Actual Wellpath Report

PEN-2E-HS AWP Proj: 15953'
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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot E
Area	Ritchie County, WV	Well	PEN-2E-HS
Field	Ritchie	Wellbore	PEN-2E-HS AWB
Facility	PEN-2 Pad		

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]
1180.00	89.880	129.770	6312.09	4865.13	-3122.15	3848.74	1576035.98	305173.04	39°19'41.414"N	80°59'55.651"W	4955.86	129.049	1.64
11276.00	89.540	131.740	6312.58	4959.87	-3184.81	3921.45	1576108.69	305110.37	39°19'40.806"N	80°59'54.713"W	5051.81	129.082	2.08
11371.00	90.340	138.830	6312.68	5054.48	-3252.28	3988.25	1576175.49	305042.91	39°19'40.151"N	80°59'53.848"W	5146.21	129.196	7.51
11467.00	90.460	142.860	6312.01	5150.45	-3326.70	4048.85	1576236.09	304968.49	39°19'39.425"N	80°59'52.361"W	5240.24	129.408	4.20
11562.00	90.310	144.690	6311.37	5245.24	-3403.34	4104.99	1576292.22	304891.86	39°19'38.677"N	80°59'52.331"W	5332.32	129.661	1.93
11658.00	90.430	146.120	6310.75	5340.81	-3482.36	4159.49	1576346.72	304812.84	39°19'37.905"N	80°59'51.621"W	5424.78	129.936	1.49
11753.00	89.660	143.720	6310.67	5435.46	-3560.10	4214.09	1576401.31	304735.11	39°19'37.146"N	80°59'50.910"W	5516.59	130.191	2.65
11848.00	89.630	143.750	6311.26	5530.26	-3636.69	4270.28	1576457.50	304658.52	39°19'36.398"N	80°59'50.178"W	5608.99	130.419	0.04
11943.00	90.090	143.650	6311.49	5625.06	-3713.25	4326.52	1576513.74	304581.96	39°19'35.651"N	80°59'49.447"W	5701.49	130.638	0.50
12039.00	90.310	142.130	6311.16	5720.94	-3789.81	4384.44	1576571.66	304505.41	39°19'34.904"N	80°59'48.693"W	5795.34	130.839	1.60
12134.00	90.180	142.520	6310.75	5815.86	-3865.00	4442.50	1576629.72	304430.22	39°19'34.170"N	80°59'47.939"W	5888.47	131.023	0.43
12229.00	90.090	143.590	6310.53	5910.73	-3940.92	4499.60	1576686.81	304354.30	39°19'33.430"N	80°59'47.196"W	5981.41	131.213	1.13
12322.00	90.280	141.980	6310.23	6003.62	-4014.98	4555.84	1576743.06	304280.24	39°19'32.707"N	80°59'46.465"W	6072.55	131.389	1.74
12418.00	90.680	140.760	6309.42	6099.59	-4089.97	4615.77	1576802.98	304205.26	39°19'31.976"N	80°59'45.686"W	6167.11	131.544	1.34
12512.00	90.120	137.200	6308.77	6193.55	-4160.88	4677.46	1576864.66	304134.35	39°19'31.285"N	80°59'44.887"W	6260.31	131.655	3.83
12607.00	89.940	138.990	6308.72	6288.50	-4231.58	4740.90	1576928.11	304063.66	39°19'30.597"N	80°59'44.064"W	6354.72	131.751	1.89
12702.00	90.000	138.540	6308.77	6383.47	-4303.02	4803.52	1576992.22	303992.22	39°19'29.901"N	80°59'43.253"W	6449.02	131.854	0.48
12797.00	90.430	138.860	6308.41	6478.45	-4374.39	4866.22	1577053.42	303920.85	39°19'29.206"N	80°59'42.440"W	6543.35	131.953	0.56
12893.00	90.340	141.090	6307.76	6574.44	-4447.90	4927.96	1577115.15	303847.35	39°19'28.490"N	80°59'41.639"W	6638.42	132.069	2.32
12989.00	90.280	139.480	6307.25	6670.43	-4521.74	4989.29	1577176.48	303773.51	39°19'27.770"N	80°59'40.843"W	6733.44	132.186	1.68
13084.00	90.000	140.470	6307.01	6765.43	-4594.49	5050.39	1577237.58	303700.77	39°19'27.061"N	80°59'40.050"W	6827.57	132.294	1.08
13179.00	90.370	139.900	6306.71	6860.43	-4667.46	5111.22	1577298.40	303627.80	39°19'26.350"N	80°59'39.261"W	6921.69	132.402	0.72
13275.00	90.090	139.480	6306.32	6956.43	-4740.66	5173.32	1577360.50	303554.60	39°19'25.637"N	80°59'38.455"W	7016.92	132.501	0.53
13370.00	90.180	139.110	6306.10	7051.42	-4812.68	5235.28	1577422.46	303482.59	39°19'24.936"N	80°59'37.651"W	7111.26	132.592	0.40
13466.00	90.090	140.290	6305.87	7147.41	-4885.90	5297.37	1577484.54	303409.37	39°19'24.222"N	80°59'36.846"W	7206.53	132.686	1.23
13562.00	90.030	141.620	6305.77	7243.40	-4960.45	5357.84	1577545.01	303334.82	39°19'23.495"N	80°59'36.061"W	7301.54	132.794	1.39
13657.00	89.940	141.380	6305.80	7338.37	-5034.80	5416.98	1577604.15	303260.48	39°19'22.770"N	80°59'35.293"W	7395.46	132.906	0.27
13752.00	90.060	140.280	6305.80	7433.36	-5108.45	5476.98	1577664.15	303186.83	39°19'22.052"N	80°59'34.514"W	7489.57	133.006	1.16
13848.00	90.060	140.370	6305.70	7529.36	-5182.34	5538.27	1577725.44	303112.95	39°19'21.332"N	80°59'33.718"W	7584.79	133.098	0.09
13943.00	89.690	140.920	6305.90	7624.35	-5255.80	5598.51	1577785.67	303039.49	39°19'20.616"N	80°59'32.936"W	7678.98	133.192	0.70



Actual Wellpath Report

PEN-2E-IIS AWP Proj: 15953'

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot E
Area	Ritchie County, WV	Well	PEN-2E-HS
Field	Ritchie	Wellbore	PEN-2E-HS AWB
Facility	PEN-2 Pad		

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]
14038.00	90.060	138.220	6306.11	7719.34	-5328.10	5660.12	1577847.27	302967.19	39°19'19.912"N	80°59'32.137"W	7773.39	133.269	2.87
14133.00	89.630	135.420	6306.37	7814.18	-5397.37	5725.12	1577912.27	302897.93	39°19'19.238"N	80°59'31.296"W	7868.70	133.312	2.98
14228.00	89.630	137.290	6306.98	7908.98	-5466.11	5790.68	1577977.83	302829.19	39°19'18.569"N	80°59'30.447"W	7963.06	133.348	1.97
14324.00	89.660	138.700	6307.58	8004.91	-5537.44	5854.92	1578042.07	302757.86	39°19'17.875"N	80°59'29.615"W	8058.75	133.404	1.47
14419.00	89.540	143.080	6308.24	8099.88	-5611.14	5914.83	1578101.98	302684.17	39°19'17.157"N	80°59'28.837"W	8152.92	133.491	4.61
14514.00	89.420	145.540	6309.10	8194.60	-5688.29	5970.25	1578157.39	302607.02	39°19'16.403"N	80°59'28.116"W	8246.24	133.615	2.59
14610.00	89.510	147.650	6310.00	8289.96	-5768.42	6023.10	1578210.24	302526.89	39°19'15.620"N	80°59'27.426"W	8339.80	133.763	2.20
14704.00	89.850	146.530	6310.52	8383.25	-5847.33	6074.17	1578261.30	302447.99	39°19'14.849"N	80°59'26.760"W	8431.30	133.910	1.25
14800.00	89.480	142.190	6311.08	8478.95	-5925.33	6130.09	1578317.23	302369.99	39°19'14.087"N	80°59'26.032"W	8525.70	134.027	4.54
14895.00	89.380	142.930	6312.03	8573.85	-6000.76	6187.84	1578374.97	302294.57	39°19'13.351"N	80°59'25.281"W	8619.65	134.121	0.79
14989.00	89.170	141.090	6313.22	8667.78	-6074.83	6245.69	1578432.82	302220.50	39°19'12.628"N	80°59'24.530"W	8712.76	134.205	1.97
15083.00	90.310	140.340	6313.65	8761.77	-6147.58	6305.21	1578492.34	302147.75	39°19'11.919"N	80°59'23.757"W	8806.16	134.275	1.45
15178.00	90.150	136.030	6313.26	8856.70	-6218.37	6368.53	1578555.66	302076.97	39°19'11.230"N	80°59'22.937"W	8900.92	134.316	4.54
15273.00	90.150	137.050	6313.01	8951.52	-6287.32	6433.88	1578621.00	302008.01	39°19'10.559"N	80°59'22.091"W	8995.84	134.340	1.07
15369.00	90.090	137.020	6312.81	9047.39	-6357.57	6499.31	1578686.42	301937.77	39°19'09.876"N	80°59'21.243"W	9091.74	134.368	0.07
15464.00	90.150	137.820	6312.61	9142.29	-6427.53	6563.58	1578750.70	301867.82	39°19'09.195"N	80°59'20.411"W	9186.61	134.400	0.84
15560.00	89.940	138.020	6312.54	9238.22	-6498.78	6627.92	1578815.03	301796.57	39°19'08.502"N	80°59'19.577"W	9282.43	134.436	0.30
15656.00	89.850	136.980	6312.72	9334.13	-6569.55	6692.78	1578879.88	301725.80	39°19'07.813"N	80°59'18.737"W	9378.29	134.468	1.09
15752.00	89.910	137.260	6312.92	9430.01	-6639.90	6758.10	1578945.20	301655.45	39°19'07.128"N	80°59'17.892"W	9474.19	134.495	0.30
15848.00	90.000	139.750	6312.99	9525.96	-6711.80	6821.70	1579008.80	301583.56	39°19'06.428"N	80°59'17.067"W	9569.95	134.535	2.60
15927.00	89.780	140.390	6313.14	9604.96	-6772.38	6872.41	1579059.51	301522.98	39°19'05.838"N	80°59'16.409"W	9648.58	134.580	0.86
15953.00	89.780	140.390	6313.24	9630.96	-6792.41	6888.98	1579076.08	301502.95	39°19'05.643"N	80°59'16.194"W	9674.45	134.596	0.00

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PEN-2E-HS AWP Proj: 15953'
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REFERENCE WELLPATH IDENTIFICATION

Operator	Area	Field	Facility	Slot	Slot E
NOBLE ENERGY	Ritchie County, WV	Ritchie	PEN-2 Pad	Well	PEN-2E-HS
				Wellbore	PEN-2E-HS AWB

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
PEN-2E-HS BHL Rev-2		6292.00	-6778.50	6877.51	1579064.61	301516.86	39°19'05.778"N	80°59'16.343"W	point
PEN-2E-HS BHL SLB		6292.00	-7436.05	7428.68	1579615.75	300859.34	39°18'59.370"N	80°59'09.193"W	point
PEN-2E-HS LP Rev-2		6292.00	118.93	1096.03	1573283.41	308413.96	39°20'12.987"N	81°00'31.368"W	point
PEN-2 Pad LL		6998.61	-28.09	-74.35	1572113.09	308266.94	39°20'11.340"N	81°00'46.230"W	polygon
PEN2 LL 1		7007.07	-27.78	-74.67	1572112.77	308267.25	39°20'11.343"N	81°00'46.234"W	polygon
PEN2 LL 2		7007.07	-27.78	-74.67	1572112.77	308267.25	39°20'11.343"N	81°00'46.234"W	polygon
PEN2 LL 3		7007.07	-27.78	-74.67	1572112.77	308267.25	39°20'11.343"N	81°00'46.234"W	polygon
PEN2 LL 4		7007.07	-27.78	-74.67	1572112.77	308267.25	39°20'11.343"N	81°00'46.234"W	polygon
PEN2 LL 5		7007.07	-27.78	-74.67	1572112.77	308267.25	39°20'11.343"N	81°00'46.234"W	polygon

WELLPATH COMPOSITION - Ref Wellbore: PEN-2E-HS AWB Ref Wellpath: PEN-2E-HS AWP Proj: 15953'

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	500.00	Generic gyro - northseeking (Standard)	01 Gyro <17-1/2"> (100'-500')	PEN-2E-HS AWB
500.00	5480.00	Navitrak (Mag/Corr)	02 BHI MWD <12-1/4"> (500'-(559'-5480')	PEN-2E-HS AWB
5480.00	15927.00	Navitrak (AT Curve Short Spaced)	03 BHI AT Curve <8-3/4"> (5480'-(5555'-15927')	PEN-2E-HS AWB
15927.00	15953.00	Blind Drilling (std)	Projection to bit	PEN-2E-HS AWB



Actual Wellpath Report
 PEN-2E-HS AWP Proj: 15953'
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REFERENCE WELLPATH IDENTIFICATION

Operator	Area	Field	Facility	Slot	Well	Wellbore	Slot E
NOBLE ENERGY	Ritchie County, WV	Ritchie	PEN-2 Pad				
							PEN-2E-HS
							PEN-2E-HS AWB

COMMENTS

Wellpath general comments
 API: 47-085-10070-0000
 BHH Job #: 6599787
 Rig: Nomac 78
 Duration: 08/14/2014 - 08/29/2014
 Gyro <17-1/2"> (100'-500')
 BHH MWD <12-1/4"> (500')(559'-5480')
 BHH AT Curve <8-3/4"> (5480')(5555'-15927')
 Projected MD at TD: 15953'

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Location: Ritchie County, WV
 Field: Ritchie
 Facility: PEN-2 Pad

Slot: Slot E
 Well: PEN-2E-HS
 Wellbore: PEN-2E-HS PWB

Plot reference wellpath is PEN-2E-HS PWP Rev-A-0

True vertical depths are referenced to Normac 78 (RT)
 Measured depths are referenced to Normac 78 (RT)
 Normac 78 (RT) to Mean Sea Level: 1101.07 feet
 Mean Sea Level to Mud line (At Slot Slot E): -1075.07 feet
 Coordinates are in feet referenced to Slot
 Grid System: NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet
 North Reference: Grid north
 Scale: True distance
 Depths are in feet
 Created by: gaffar on 02/20/14

Location Information			
Facility Name	Grid East (US ft)	Grid North (US ft)	Longitude
PEN-2 Pad	1572113.090	308295.840	81°00'45.230"W
Slot	Local N (ft)	Grid North (US ft)	Longitude
Slot E	28.09	1572187.433	81°00'45.290"W
Slot E	74.35	308295.033	268°
Normac 78 (RT) to Mean Sea Level (At Slot Slot E)	268°		
Mean Sea Level to Mud line (At Slot Slot E)	-1075.07ft		
Normac 78 (RT) to Mean Sea Level	1101.07ft		

BHI AT Curve <8-3/4"> (5480)(5555-15927) : 5476.81ft TVD, 239.88ft N, 235.57ft E
 BHI MWD <12-1/4"> (600)(559-5480) : 558.98ft TVD, 0.65ft S, 3.69ft E-H
 Gyro <17-1/2"> (100-500) : 100.00ft TVD, 0.10ft N, 0.02ft E

