



Actual Wellpath Report

Kassay 13H AWP Proj: 17210'

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NORTHEAST NATURAL ENERGY, LLC	Slot	Slot #13
Area	Monongalia County, WV	Well	Kassay 13H
Field	Monongalia	Wellbore	Kassay 13H AWB
Facility	Kassay Pad		

REPORT SETUP INFORMATION			
Projection System	NAD83 / Lambert West Virginia SP, Northern Zone (4701), US feet	Software System	WellArchitect® 5.0
North Reference	Grid	User	Edsaryar
Scale	0.999941	Report Generated	1/17/2017 at 2:14:56 PM
Convergence at slot	0.45° West	Database/Source file	WA_MPL_EASTERNUS_Defn/Kassay_13H_AWP_Proj_17210_.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	141.49	74.30	1773019.97	422808.31	39°39'31.522"N	80°11'39.628"W
Facility Reference Pt			1772945.67	422666.83	39°39'30.118"N	80°11'40.564"W
Field Reference Pt			1777685.71	440640.65	39°42'28.114"N	80°10'41.690"W

WELLPATH DATUM			
Calculation method	Minimum curvature	Nabors X08 (RKB) to Facility Vertical Datum	32.00ft
Horizontal Reference Pt	Slot	Nabors X08 (RKB) to Mean Sea Level	1566.00ft
Vertical Reference Pt	Nabors X08 (RKB)	Nabors X08 (RKB) to Mud Line at Slot (Slot #13)	32.00ft
MD Reference Pt	Nabors X08 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	318.84°

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WELLPATH DATA (182 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	136.990	0.00	0.00	0.00	0.00	1773019.97	422808.31	39°39'31.522"N	80°11'39.628"W	0.00	0.000	0.00	0.00	0.00
32.00	0.000	136.990	32.00	0.00	0.00	0.00	1773019.97	422808.31	39°39'31.522"N	80°11'39.628"W	0.00	0.000	0.00	0.00	0.00
118.00	0.370	136.990	118.00	-0.28	-0.20	0.19	1773020.16	422808.11	39°39'31.520"N	80°11'39.625"W	0.28	136.990	0.43	0.43	159.29
218.00	0.560	75.430	218.00	-0.82	-0.32	0.88	1773020.85	422807.99	39°39'31.519"N	80°11'39.616"W	0.94	109.711	0.50	0.19	-61.56
318.00	0.340	90.610	317.99	-1.24	-0.20	1.65	1773021.62	422808.11	39°39'31.520"N	80°11'39.606"W	1.66	96.780	0.25	-0.22	15.18
418.00	0.370	78.050	417.99	-1.59	-0.13	2.26	1773022.23	422808.18	39°39'31.520"N	80°11'39.599"W	2.27	93.354	0.08	0.03	-12.56
518.00	0.390	88.160	517.99	-1.96	-0.05	2.92	1773022.89	422808.26	39°39'31.521"N	80°11'39.590"W	2.92	91.078	0.07	0.02	10.11
618.00	0.280	91.160	617.99	-2.34	-0.05	3.51	1773023.48	422808.26	39°39'31.521"N	80°11'39.583"W	3.51	90.801	0.11	-0.11	3.00
718.00	0.250	158.750	717.99	-2.71	-0.26	3.83	1773023.80	422808.05	39°39'31.519"N	80°11'39.579"W	3.84	93.844	0.30	-0.03	67.59
818.00	0.570	111.390	817.98	-3.36	-0.64	4.37	1773024.34	422807.67	39°39'31.516"N	80°11'39.572"W	4.42	98.356	0.44	0.32	-47.36
918.00	0.460	117.140	917.98	-4.17	-1.01	5.19	1773025.16	422807.30	39°39'31.512"N	80°11'39.561"W	5.29	100.973	0.12	-0.11	5.75
1018.00	0.550	115.310	1017.98	-4.99	-1.39	5.98	1773025.95	422806.92	39°39'31.508"N	80°11'39.551"W	6.14	103.124	0.09	0.09	-1.83
1118.00	0.260	105.270	1117.97	-5.62	-1.66	6.64	1773026.60	422806.65	39°39'31.506"N	80°11'39.543"W	6.84	104.044	0.30	-0.29	-10.04
1218.00	0.230	126.000	1217.97	-6.00	-1.84	7.02	1773026.99	422806.47	39°39'31.504"N	80°11'39.538"W	7.25	104.675	0.09	-0.03	20.73
1318.00	0.600	68.740	1317.97	-6.38	-1.77	7.67	1773027.64	422806.54	39°39'31.505"N	80°11'39.529"W	7.87	102.969	0.51	0.37	-57.26
1418.00	1.890	22.970	1417.95	-5.83	-0.06	8.80	1773028.77	422808.25	39°39'31.522"N	80°11'39.515"W	8.80	90.374	1.53	1.29	-45.77
1518.00	4.090	14.760	1517.80	-3.12	4.91	10.35	1773030.32	422813.22	39°39'31.571"N	80°11'39.496"W	11.46	64.622	2.24	2.20	-8.21
1618.00	5.740	12.750	1617.43	1.83	13.24	12.36	1773032.33	422821.55	39°39'31.653"N	80°11'39.471"W	18.11	43.046	1.66	1.65	-2.01
1718.00	5.840	14.200	1716.92	7.67	23.05	14.71	1773034.68	422831.35	39°39'31.750"N	80°11'39.442"W	27.34	32.558	0.18	0.10	1.45
1818.00	5.360	14.190	1816.45	13.21	32.51	17.11	1773037.08	422840.81	39°39'31.844"N	80°11'39.412"W	36.73	27.757	0.48	-0.48	-0.01
1918.00	4.790	12.340	1916.05	18.35	41.11	19.14	1773039.11	422849.42	39°39'31.929"N	80°11'39.387"W	45.35	24.970	0.59	-0.57	-1.85
2018.00	4.840	10.870	2015.70	23.43	49.33	20.83	1773040.80	422857.64	39°39'32.011"N	80°11'39.366"W	53.55	22.893	0.13	0.05	-1.47
2118.00	5.150	8.970	2115.32	28.90	57.91	22.33	1773042.30	422866.22	39°39'32.096"N	80°11'39.348"W	62.07	21.085	0.35	0.31	-1.90
2218.00	5.330	7.990	2214.90	34.82	66.94	23.67	1773043.64	422875.25	39°39'32.185"N	80°11'39.332"W	71.01	19.475	0.20	0.18	-0.98
2318.00	5.280	7.930	2314.47	40.87	76.10	24.95	1773044.92	422884.41	39°39'32.276"N	80°11'39.316"W	80.09	18.155	0.05	-0.05	-0.06
2418.00	5.230	8.870	2414.05	46.81	85.16	26.29	1773046.26	422893.47	39°39'32.365"N	80°11'39.300"W	89.13	17.157	0.10	-0.05	0.94
2518.00	5.250	10.730	2513.64	52.56	94.16	27.85	1773047.81	422902.46	39°39'32.454"N	80°11'39.281"W	98.19	16.475	0.17	0.02	1.86
2618.00	5.300	12.750	2613.21	58.11	103.16	29.72	1773049.69	422911.46	39°39'32.543"N	80°11'39.258"W	107.35	16.070	0.19	0.05	2.02
2718.00	5.010	15.530	2712.81	63.23	111.87	31.91	1773051.87	422920.17	39°39'32.630"N	80°11'39.231"W	116.33	15.918	0.38	-0.29	2.78
2818.00	4.880	16.450	2812.44	67.90	120.16	34.28	1773054.25	422928.46	39°39'32.712"N	80°11'39.201"W	124.95	15.923	0.15	-0.13	0.92

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WELLPATH DATA (182 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]
2918.00	3.540	17.570	2912.16	71.78	127.18	36.42	1773056.38	422935.48	39°39'32.781"N	80°11'39.175"W	132.29	15.978	1.34	-1.34	1.12
3018.00	2.570	20.320	3012.02	74.46	132.23	38.13	1773058.09	422940.53	39°39'32.831"N	80°11'39.153"W	137.61	16.084	0.98	-0.97	2.75
3118.00	1.590	22.650	3111.95	76.14	135.61	39.44	1773059.41	422943.91	39°39'32.865"N	80°11'39.137"W	141.23	16.216	0.98	-0.98	2.33
3218.00	1.510	16.670	3211.92	77.45	138.15	40.35	1773060.32	422946.45	39°39'32.890"N	80°11'39.125"W	143.92	16.282	0.18	-0.08	-5.98
3318.00	0.940	31.500	3311.89	78.40	140.11	41.16	1773061.13	422948.41	39°39'32.909"N	80°11'39.115"W	146.03	16.370	0.65	-0.57	14.83
3418.00	0.390	40.330	3411.89	78.69	141.07	41.81	1773061.77	422949.37	39°39'32.919"N	80°11'39.107"W	147.14	16.507	0.56	-0.55	8.83
3518.00	0.370	35.160	3511.89	78.82	141.60	42.21	1773062.18	422949.90	39°39'32.924"N	80°11'39.102"W	147.75	16.601	0.04	-0.02	-5.17
3618.00	0.270	126.750	3611.88	78.67	141.72	42.59	1773062.56	422950.02	39°39'32.925"N	80°11'39.097"W	147.98	16.726	0.46	-0.10	91.59
3718.00	0.450	128.550	3711.88	78.05	141.33	43.08	1773063.05	422949.63	39°39'32.922"N	80°11'39.091"W	147.75	16.953	0.18	0.18	1.80
3818.00	0.440	112.080	3811.88	77.32	140.94	43.75	1773063.71	422949.25	39°39'32.918"N	80°11'39.082"W	147.58	17.243	0.13	-0.01	-16.47
3918.00	0.360	141.290	3911.88	76.66	140.55	44.30	1773064.27	422948.86	39°39'32.914"N	80°11'39.075"W	147.37	17.493	0.22	-0.08	29.21
4018.00	0.410	155.350	4011.87	76.01	139.98	44.64	1773064.61	422948.29	39°39'32.908"N	80°11'39.071"W	146.93	17.689	0.11	0.05	14.06
4118.00	0.130	132.290	4111.87	75.55	139.58	44.88	1773064.84	422947.88	39°39'32.904"N	80°11'39.068"W	146.62	17.823	0.29	-0.28	-23.06
4218.00	0.180	111.960	4211.87	75.30	139.45	45.11	1773065.07	422947.75	39°39'32.903"N	80°11'39.065"W	146.56	17.925	0.07	0.05	-20.33
4318.00	0.300	124.410	4311.87	74.90	139.24	45.47	1773065.44	422947.54	39°39'32.901"N	80°11'39.060"W	146.48	18.084	0.13	0.12	12.45
4418.00	0.190	163.900	4411.87	74.50	138.93	45.73	1773065.70	422947.23	39°39'32.898"N	80°11'39.057"W	146.27	18.219	0.20	-0.11	39.49
4518.00	0.530	168.780	4511.87	73.95	138.32	45.87	1773065.83	422946.62	39°39'32.892"N	80°11'39.055"W	145.73	18.345	0.34	0.34	4.88
4618.00	0.540	157.630	4611.86	73.10	137.43	46.14	1773066.10	422945.73	39°39'32.883"N	80°11'39.051"W	144.97	18.557	0.10	0.01	-11.15
4718.00	0.420	139.000	4711.86	72.29	136.72	46.56	1773066.52	422945.02	39°39'32.876"N	80°11'39.046"W	144.43	18.805	0.20	-0.12	-18.63
4818.00	0.280	185.300	4811.86	71.76	136.20	46.77	1773066.74	422944.50	39°39'32.871"N	80°11'39.043"W	144.01	18.954	0.30	-0.14	46.30
4918.00	0.470	198.190	4911.86	71.38	135.57	46.62	1773066.59	422943.87	39°39'32.865"N	80°11'39.045"W	143.36	18.979	0.21	0.19	12.89
5018.00	0.520	198.170	5011.85	70.94	134.74	46.35	1773066.32	422943.05	39°39'32.857"N	80°11'39.048"W	142.50	18.984	0.05	0.05	-0.02
5118.00	0.560	194.470	5111.85	70.43	133.84	46.09	1773066.06	422942.14	39°39'32.848"N	80°11'39.052"W	141.55	19.002	0.05	0.04	-3.70
5218.00	0.560	201.930	5211.84	69.93	132.91	45.79	1773065.75	422941.22	39°39'32.839"N	80°11'39.055"W	140.58	19.008	0.07	0.00	7.46
5318.00	0.360	214.870	5311.84	69.64	132.20	45.42	1773065.39	422940.50	39°39'32.832"N	80°11'39.060"W	139.79	18.962	0.22	-0.20	12.94
5418.00	0.360	192.430	5411.84	69.37	131.64	45.18	1773065.14	422939.94	39°39'32.826"N	80°11'39.063"W	139.17	18.941	0.14	0.00	-22.44
5518.00	0.420	177.780	5511.84	68.90	130.97	45.12	1773065.09	422939.27	39°39'32.819"N	80°11'39.064"W	138.52	19.011	0.12	0.06	-14.65
5618.00	0.460	172.700	5611.83	68.28	130.20	45.19	1773065.16	422938.50	39°39'32.812"N	80°11'39.063"W	137.82	19.140	0.06	0.04	-5.08
5718.00	0.450	163.660	5711.83	67.59	129.43	45.35	1773065.32	422937.73	39°39'32.804"N	80°11'39.061"W	137.14	19.310	0.07	-0.01	-9.04
5818.00	0.420	174.400	5811.83	66.94	128.68	45.50	1773065.46	422936.99	39°39'32.797"N	80°11'39.059"W	136.49	19.471	0.09	-0.03	10.74

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5918.00	0.500	158.970	5911.82	66.23	127.91	45.69	1773065.66	422936.21	39°39'32.789"N	80°11'39.056"W	135.83	19.656	0.15	0.08	-15.43
6018.00	0.550	154.260	6011.82	65.36	127.07	46.05	1773066.02	422935.37	39°39'32.781"N	80°11'39.051"W	135.16	19.921	0.07	0.05	-4.71
6118.00	0.510	150.670	6111.82	64.46	126.25	46.48	1773066.45	422934.55	39°39'32.773"N	80°11'39.046"W	134.54	20.211	0.05	-0.04	-3.59
6218.00	0.450	155.320	6211.81	63.65	125.51	46.86	1773066.83	422933.81	39°39'32.765"N	80°11'39.041"W	133.97	20.474	0.07	-0.06	4.65
6318.00	0.550	143.060	6311.81	62.79	124.77	47.31	1773067.28	422933.07	39°39'32.758"N	80°11'39.035"W	133.44	20.768	0.15	0.10	-12.26
6392.00	0.530	115.420	6385.81	62.13	124.34	47.84	1773067.80	422932.64	39°39'32.754"N	80°11'39.028"W	133.22	21.043	0.35	-0.03	-37.35
6428.00	0.150	126.980	6421.81	61.93	124.24	48.02	1773067.99	422932.54	39°39'32.753"N	80°11'39.026"W	133.20	21.134	1.07	-1.06	32.11
6523.00	0.090	150.330	6516.80	61.73	124.10	48.16	1773068.13	422932.40	39°39'32.752"N	80°11'39.024"W	133.11	21.211	0.08	-0.06	24.58
6617.00	6.340	73.860	6610.61	59.46	125.48	53.19	1773073.15	422933.78	39°39'32.766"N	80°11'38.960"W	136.28	22.971	6.72	6.65	-81.35
6712.00	14.530	68.950	6703.96	53.14	131.23	69.38	1773089.34	422939.53	39°39'32.824"N	80°11'38.754"W	148.44	27.864	8.66	8.62	-5.17
6807.00	21.860	73.770	6794.16	41.57	140.46	97.52	1773117.48	422948.76	39°39'32.917"N	80°11'38.395"W	171.00	34.771	7.87	7.72	5.07
6901.00	30.030	81.000	6878.63	21.63	149.05	137.63	1773157.59	422957.35	39°39'33.005"N	80°11'37.883"W	202.87	42.719	9.31	8.69	7.69
6996.00	37.120	79.960	6957.73	-5.87	157.78	189.40	1773209.36	422966.08	39°39'33.095"N	80°11'37.221"W	246.51	50.205	7.49	7.46	-1.09
7090.00	45.270	79.330	7028.41	-37.53	168.92	250.25	1773270.20	422977.22	39°39'33.210"N	80°11'36.445"W	301.93	55.980	8.68	8.67	-0.67
7185.00	53.260	79.290	7090.35	-74.00	182.27	320.93	1773340.88	422990.57	39°39'33.347"N	80°11'35.542"W	369.07	60.406	8.41	8.41	-0.04
7280.00	54.790	79.050	7146.15	-112.82	196.71	396.44	1773416.38	423005.01	39°39'33.496"N	80°11'34.578"W	442.56	63.609	1.62	1.61	-0.25
7375.00	54.900	80.500	7200.86	-152.75	210.50	472.87	1773492.81	423018.80	39°39'33.638"N	80°11'33.602"W	517.61	66.004	1.25	0.12	1.53
7469.00	55.230	80.770	7254.68	-193.35	223.04	548.90	1773568.84	423031.34	39°39'33.768"N	80°11'32.631"W	592.49	67.886	0.42	0.35	0.29
7564.00	55.100	79.750	7308.95	-234.00	236.23	625.76	1773645.69	423044.53	39°39'33.904"N	80°11'31.650"W	668.86	69.318	0.89	-0.14	-1.07
7658.00	55.180	78.300	7362.68	-272.78	250.91	701.47	1773721.40	423059.21	39°39'34.055"N	80°11'30.683"W	745.00	70.318	1.27	0.09	-1.54
7753.00	55.270	77.970	7416.86	-310.96	266.96	777.84	1773797.76	423075.25	39°39'34.219"N	80°11'29.709"W	822.37	71.058	0.30	0.09	-0.35
7847.00	55.270	77.410	7470.42	-348.24	283.43	853.32	1773873.23	423091.72	39°39'34.388"N	80°11'28.745"W	899.15	71.626	0.49	0.00	-0.60
7942.00	55.700	76.670	7524.25	-385.22	300.98	929.60	1773949.51	423109.28	39°39'34.567"N	80°11'27.772"W	977.11	72.059	0.79	0.45	-0.78
8037.00	55.810	76.960	7577.71	-422.06	318.90	1006.06	1774025.97	423127.19	39°39'34.750"N	80°11'26.796"W	1055.39	72.413	0.28	0.12	0.31
8132.00	55.960	77.400	7630.99	-459.40	336.35	1082.75	1774102.65	423144.64	39°39'34.928"N	80°11'25.817"W	1133.79	72.743	0.41	0.16	0.46
8226.00	55.940	78.390	7683.62	-497.22	352.68	1158.90	1774178.80	423160.97	39°39'35.095"N	80°11'24.845"W	1211.38	73.074	0.87	-0.02	1.05
8321.00	55.930	79.010	7736.83	-536.40	368.10	1236.07	1774255.97	423176.39	39°39'35.254"N	80°11'23.860"W	1289.72	73.416	0.54	-0.01	0.65
8415.00	56.090	80.970	7789.39	-576.72	381.65	1312.82	1774332.71	423189.93	39°39'35.393"N	80°11'22.880"W	1367.17	73.790	1.74	0.17	2.09
8510.00	53.240	71.910	7844.40	-612.65	399.68	1388.04	1774407.93	423207.96	39°39'35.577"N	80°11'21.920"W	1444.44	73.937	8.33	-3.00	-9.54
8604.00	51.410	59.120	7902.00	-634.02	439.31	1455.55	1774475.43	423238.59	39°39'35.885"N	80°11'21.059"W	1517.82	73.531	10.93	-1.95	-13.61

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Actual Wellpath Report

Kassay 13H AWP Proj: 17210¹
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REFERENCE WELLPATH IDENTIFICATION			
Operator	NORTHEAST NATURAL ENERGY, LLC	Slot	Slot #13
Area	Monongalia County, WV	Well	Kassay 13H
Field	Monongalia	Wellbore	Kassay 13H AWB
Facility	Kassay Pad		

WELLPATH DATA (182 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]
8699.00	51.480	47.720	7961.33	-639.93	474.45	1515.03	1774534.90	423282.74	39°39'36.326"N	80°11'20.303"W	1587.58	72.611	9.38	0.07	-12.00
8794.00	52.720	34.780	8019.84	-630.00	530.65	1564.21	1774584.09	423338.93	39°39'36.885"N	80°11'19.680"W	1651.77	71.261	10.82	1.31	-13.62
8888.00	55.990	24.400	8074.71	-604.74	596.98	1601.72	1774621.59	423405.26	39°39'37.543"N	80°11'19.207"W	1709.35	69.559	9.62	3.48	-11.04
8982.00	59.590	13.200	8124.92	-564.90	672.12	1627.14	1774647.01	423480.39	39°39'38.288"N	80°11'18.889"W	1760.49	67.556	10.78	3.83	-11.91
9077.00	64.220	1.240	8169.78	-509.25	755.05	1637.45	1774657.32	423563.31	39°39'39.108"N	80°11'18.765"W	1803.15	65.245	12.12	4.87	-12.59
9172.00	69.890	349.610	8206.90	-439.08	842.01	1630.31	1774650.18	423650.27	39°39'39.967"N	80°11'18.865"W	1834.90	62.685	12.75	5.97	-12.24
9266.00	74.900	343.150	8235.35	-359.68	928.99	1609.16	1774629.03	423737.24	39°39'40.825"N	80°11'19.144"W	1858.07	60.002	8.44	5.33	-6.87
9361.00	81.660	336.830	8254.66	-273.00	1016.27	1577.31	1774597.18	423824.52	39°39'41.685"N	80°11'19.560"W	1876.35	57.206	9.64	7.12	-6.65
9456.00	86.980	328.820	8264.07	-181.37	1100.25	1534.16	1774554.03	423908.50	39°39'42.512"N	80°11'20.120"W	1887.91	54.353	10.08	5.60	-8.43
9551.00	86.770	323.770	8269.25	-87.35	1179.14	1481.53	1774501.41	423987.38	39°39'43.287"N	80°11'20.801"W	1893.49	51.484	5.31	-0.22	-5.32
9645.00	90.060	324.610	8271.85	6.19	1255.33	1426.56	1774446.45	424063.57	39°39'44.036"N	80°11'21.511"W	1900.25	48.653	3.61	3.50	0.89
9739.00	89.140	321.900	8272.51	99.90	1330.65	1370.34	1774390.22	424138.87	39°39'44.776"N	80°11'22.237"W	1910.09	45.842	3.04	-0.98	-2.88
9834.00	89.110	322.320	8273.96	194.74	1405.61	1312.00	1774331.89	424213.83	39°39'45.513"N	80°11'22.991"W	1922.78	43.027	0.44	-0.03	0.44
9929.00	87.940	322.560	8276.41	289.52	1480.89	1254.11	1774274.00	424289.11	39°39'46.252"N	80°11'23.738"W	1940.57	40.260	1.26	-1.23	0.25
10023.00	89.230	319.730	8278.73	383.40	1554.06	1195.16	1774215.06	424362.28	39°39'46.971"N	80°11'24.499"W	1960.49	37.562	3.31	1.37	-3.01
10118.00	89.200	322.130	8280.03	478.32	1627.80	1135.30	1774155.20	424436.02	39°39'47.695"N	80°11'25.272"W	1984.60	34.893	2.53	-0.03	2.53
10213.00	89.540	322.330	8281.07	573.15	1702.90	1077.11	1774097.02	424511.10	39°39'48.433"N	80°11'26.023"W	2014.95	32.314	0.42	0.36	0.21
10307.00	89.660	322.750	8281.73	666.95	1777.51	1019.94	1774039.85	424585.71	39°39'49.166"N	80°11'26.762"W	2049.35	29.847	0.46	0.13	0.45
10402.00	88.620	322.300	8283.16	761.74	1852.89	962.15	1773982.06	424661.09	39°39'49.906"N	80°11'27.508"W	2087.81	27.441	1.19	-1.09	-0.47
10497.00	88.650	318.930	8285.42	856.66	1926.29	901.90	1773921.81	424734.48	39°39'50.627"N	80°11'28.286"W	2126.97	25.089	3.55	0.03	-3.55
10591.00	88.550	311.600	8287.72	950.38	1993.00	835.80	1773855.72	424801.18	39°39'51.281"N	80°11'29.137"W	2161.16	22.752	7.80	-0.11	-7.80
10685.00	88.580	309.870	8290.07	1043.41	2054.32	764.60	1773784.52	424862.50	39°39'51.882"N	80°11'30.054"W	2191.99	20.415	1.84	0.03	-1.84
10779.00	88.800	313.470	8292.22	1136.64	2116.78	694.41	1773714.34	424924.96	39°39'52.494"N	80°11'30.957"W	2227.77	18.162	3.84	0.23	3.83
10874.00	89.320	318.980	8293.78	1231.49	2185.34	628.72	1773648.66	424993.52	39°39'53.166"N	80°11'31.804"W	2273.99	16.051	5.82	0.55	5.80
10969.00	88.830	322.370	8295.32	1326.41	2258.81	568.54	1773588.47	425066.98	39°39'53.888"N	80°11'32.581"W	2329.26	14.128	3.61	-0.52	3.57
11063.00	88.740	320.590	8297.31	1420.29	2332.34	510.01	1773529.95	425140.50	39°39'54.610"N	80°11'33.337"W	2387.45	12.335	1.90	-0.10	-1.89
11158.00	89.110	321.970	8299.09	1515.18	2406.44	450.60	1773470.54	425214.60	39°39'55.338"N	80°11'34.104"W	2448.27	10.606	1.50	0.39	1.45
11253.00	89.260	326.740	8300.45	1609.70	2483.61	395.26	1773415.20	425291.77	39°39'56.096"N	80°11'34.819"W	2514.87	9.043	5.02	0.16	5.02
11347.00	89.140	330.600	8301.76	1702.30	2563.88	346.39	1773366.34	425372.04	39°39'56.886"N	80°11'35.452"W	2587.18	7.694	4.11	-0.13	4.11
11442.00	89.170	334.070	8303.16	1794.65	2648.00	302.30	1773322.25	425456.15	39°39'57.714"N	80°11'36.024"W	2665.20	6.513	3.65	0.03	3.65

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Operator	NORTHEAST NATURAL ENERGY, LLC	Slot	Slot #13
Area	Monongalia County, WV	Well	Kassay 13H
Field	Monongalia	Wellbore	Kassay 13H AWB
Facility	Kassay Pad		

WELLPATH DATA (182 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]
11537.00	88.460	333.800	8305.13	1886.35	2733.32	260.57	1773280.52	425541.46	39°39'58.554"N	80°11'36.566"W	2745.71	5.446	0.80	-0.75	-0.28
11631.00	88.490	328.660	8307.63	1978.10	2815.66	215.35	1773235.31	425623.80	39°39'59.364"N	80°11'37.152"W	2823.88	4.374	5.47	0.03	-5.47
11726.00	88.090	324.210	8310.46	2072.20	2894.76	162.87	1773182.83	425702.90	39°40'00.142"N	80°11'37.831"W	2899.34	3.220	4.70	-0.42	-4.68
11820.00	88.430	326.010	8313.32	2165.59	2971.83	109.13	1773129.09	425779.96	39°40'00.899"N	80°11'38.526"W	2973.83	2.103	1.95	0.36	1.91
11915.00	88.340	328.270	8316.00	2259.55	3051.59	57.60	1773077.57	425859.72	39°40'01.684"N	80°11'39.193"W	3052.14	1.081	2.38	-0.09	2.38
12010.00	88.460	328.880	8318.65	2353.15	3132.63	8.09	1773028.06	425940.74	39°40'02.481"N	80°11'39.834"W	3132.64	0.148	0.65	0.13	0.64
12105.00	88.520	325.450	8321.15	2447.10	3212.41	-43.39	1772976.58	426020.52	39°40'03.265"N	80°11'40.500"W	3212.70	359.226	3.61	0.06	-3.61
12199.00	88.490	322.830	8323.61	2540.66	3288.56	-98.43	1772921.54	426096.67	39°40'04.014"N	80°11'41.211"W	3290.03	358.286	2.79	-0.03	-2.79
12293.00	88.400	322.630	8326.16	2634.41	3363.34	-155.34	1772864.64	426171.44	39°40'04.748"N	80°11'41.946"W	3366.92	357.356	0.23	-0.10	-0.21
12387.00	88.370	320.170	8328.81	2728.27	3436.76	-213.95	1772806.03	426244.86	39°40'05.469"N	80°11'42.703"W	3443.42	356.438	2.62	-0.03	-2.62
12482.00	88.220	317.250	8331.63	2823.22	3508.10	-276.61	1772743.38	426316.20	39°40'06.170"N	80°11'43.511"W	3518.99	355.492	3.08	-0.16	-3.07
12576.00	88.370	320.890	8334.43	2917.16	3579.08	-338.15	1772681.84	426387.17	39°40'06.866"N	80°11'44.306"W	3595.02	354.603	3.87	0.16	3.87
12671.00	88.090	319.940	8337.37	3012.08	3652.26	-398.66	1772621.34	426460.35	39°40'07.585"N	80°11'45.086"W	3673.95	353.771	1.04	-0.29	-1.00
12765.00	88.180	320.150	8340.43	3106.00	3724.28	-458.99	1772561.01	426532.36	39°40'08.292"N	80°11'45.865"W	3752.45	352.974	0.24	0.10	0.22
12860.00	88.060	321.220	8343.54	3200.90	3797.73	-519.15	1772500.85	426605.81	39°40'09.013"N	80°11'46.642"W	3833.05	352.216	1.13	-0.13	1.13
12954.00	88.090	326.970	8346.70	3294.42	3873.80	-574.22	1772445.78	426681.87	39°40'09.761"N	80°11'47.353"W	3916.13	351.568	6.11	0.03	6.12
13049.00	88.710	329.540	8349.36	3388.09	3954.55	-624.18	1772395.83	426762.62	39°40'10.555"N	80°11'48.000"W	4003.50	351.031	2.78	0.65	2.71
13144.00	89.850	332.080	8350.55	3481.01	4037.47	-670.50	1772349.51	426845.53	39°40'11.371"N	80°11'48.601"W	4092.77	350.571	2.93	1.20	2.67
13239.00	89.630	326.220	8350.98	3574.43	4118.99	-719.20	1772300.82	426927.05	39°40'12.173"N	80°11'49.232"W	4181.31	350.096	6.17	-0.23	-6.17
13333.00	89.350	323.980	8351.82	3667.86	4196.08	-772.97	1772247.04	427004.13	39°40'12.931"N	80°11'49.927"W	4266.68	349.562	2.40	-0.30	-2.38
13428.00	88.520	320.410	8353.58	3762.67	4271.11	-831.19	1772188.83	427079.16	39°40'13.668"N	80°11'50.679"W	4351.24	348.988	3.86	-0.87	-3.76
13522.00	88.680	318.800	8355.88	3856.63	4342.68	-892.08	1772127.94	427150.72	39°40'14.370"N	80°11'51.465"W	4433.36	348.392	1.72	0.17	-1.71
13617.00	88.580	321.880	8358.15	3951.56	4415.78	-952.69	1772067.34	427223.82	39°40'15.088"N	80°11'52.247"W	4517.38	347.825	3.24	-0.11	3.24
13712.00	88.550	321.970	8360.53	4046.39	4490.54	-1011.26	1772008.77	427298.58	39°40'15.822"N	80°11'53.003"W	4603.00	347.309	0.10	-0.03	0.09
13806.00	88.770	323.410	8362.73	4140.15	4565.29	-1068.22	1771951.82	427373.32	39°40'16.557"N	80°11'53.739"W	4688.60	346.830	1.55	0.23	1.53
13901.00	89.450	327.030	8364.21	4234.53	4643.29	-1122.39	1771897.65	427451.32	39°40'17.323"N	80°11'54.440"W	4777.02	346.411	3.88	0.72	3.81
13996.00	89.480	324.900	8365.09	4328.79	4722.01	-1175.56	1771844.49	427530.03	39°40'18.097"N	80°11'55.128"W	4866.14	346.020	2.24	0.03	-2.24
14091.00	89.570	325.070	8365.88	4423.24	4799.81	-1230.06	1771789.98	427607.83	39°40'18.862"N	80°11'55.832"W	4954.92	345.626	0.20	0.09	0.18
14185.00	89.540	321.230	8366.61	4516.95	4875.02	-1286.43	1771733.62	427683.03	39°40'19.601"N	80°11'56.561"W	5041.89	345.218	4.09	-0.03	-4.09
14280.00	89.630	320.820	8367.30	4611.88	4948.87	-1346.18	1771673.87	427756.88	39°40'20.326"N	80°11'57.332"W	5128.69	344.783	0.44	0.09	-0.43

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14374.00	89.570	320.180	8367.96	4705.84	5021.40	-1405.97	1771614.09	427829.40	39°40'21.038"N	80°11'58.104"W	5214.52	344.358	0.68	-0.06	-0.68
14469.00	89.750	316.950	8368.52	4800.83	5092.61	-1468.83	1771551.23	427900.61	39°40'21.737"N	80°11'58.915"W	5300.20	343.911	3.41	0.19	-3.40
14564.00	89.850	313.950	8368.85	4895.65	5160.30	-1535.46	1771484.60	427968.30	39°40'22.401"N	80°11'59.774"W	5383.90	343.429	3.16	0.11	-3.16
14658.00	90.280	313.930	8368.74	4989.30	5225.53	-1603.15	1771416.92	428033.52	39°40'23.040"N	80°12'00.646"W	5465.92	342.944	0.46	0.46	-0.02
14753.00	90.090	314.220	8368.44	5083.98	5291.61	-1671.40	1771348.67	428099.60	39°40'23.688"N	80°12'01.525"W	5549.30	342.471	0.36	-0.20	0.31
14848.00	89.480	312.520	8368.79	5178.54	5356.85	-1740.46	1771279.62	428164.83	39°40'24.328"N	80°12'02.415"W	5632.49	342.001	1.90	-0.64	-1.79
14942.00	89.450	314.690	8369.67	5272.14	5421.67	-1808.52	1771211.57	428229.65	39°40'24.963"N	80°12'03.292"W	5715.35	341.553	2.31	-0.03	2.31
15037.00	89.940	317.700	8370.18	5367.02	5490.22	-1874.27	1771145.82	428298.20	39°40'25.635"N	80°12'04.140"W	5801.33	341.151	3.21	0.52	3.17
15131.00	89.970	318.670	8370.25	5461.02	5560.28	-1936.94	1771083.15	428368.25	39°40'26.323"N	80°12'04.948"W	5887.99	340.794	1.03	0.03	1.03
15226.00	89.910	318.900	8370.35	5556.01	5631.74	-1999.53	1771020.56	428439.71	39°40'27.024"N	80°12'05.756"W	5976.17	340.453	0.25	-0.06	0.24
15321.00	89.540	316.350	8370.81	5650.98	5701.92	-2063.55	1770956.54	428509.88	39°40'27.713"N	80°12'06.581"W	6063.84	340.105	2.71	-0.39	-2.68
15416.00	89.660	315.050	8371.47	5745.84	5769.90	-2129.90	1770890.20	428577.86	39°40'28.380"N	80°12'07.437"W	6150.47	339.739	1.37	0.13	-1.37
15510.00	89.690	319.470	8372.00	5839.78	5838.92	-2193.68	1770826.43	428646.88	39°40'29.057"N	80°12'08.259"W	6237.41	339.409	4.70	0.03	4.70
15605.00	89.660	324.420	8372.54	5934.61	5913.70	-2252.22	1770767.89	428721.65	39°40'29.791"N	80°12'09.015"W	6328.06	339.151	5.21	-0.03	5.21
15700.00	89.690	328.170	8373.08	6028.79	5992.72	-2304.93	1770715.18	428800.66	39°40'30.568"N	80°12'09.697"W	6420.70	338.962	3.95	0.03	3.95
15795.00	89.630	324.960	8373.65	6122.91	6071.99	-2357.26	1770662.85	428879.92	39°40'31.347"N	80°12'10.375"W	6513.50	338.783	3.38	-0.06	-3.38
15889.00	89.720	318.220	8374.18	6216.74	6145.60	-2415.63	1770604.49	428953.53	39°40'32.070"N	80°12'11.128"W	6603.31	338.542	7.17	0.10	-7.17
15983.00	89.850	314.920	8374.53	6310.66	6213.85	-2480.24	1770539.88	429021.78	39°40'32.740"N	80°12'11.962"W	6690.56	338.241	3.51	0.14	-3.51
16078.00	89.380	315.960	8375.17	6405.49	6281.54	-2546.90	1770473.23	429089.47	39°40'33.404"N	80°12'12.821"W	6778.23	337.930	1.20	-0.49	1.09
16172.00	89.260	317.040	8376.29	6499.40	6349.72	-2611.60	1770408.53	429157.64	39°40'34.072"N	80°12'13.655"W	6865.81	337.643	1.16	-0.13	1.15
16267.00	89.750	317.600	8377.11	6594.36	6419.56	-2675.99	1770344.14	429227.47	39°40'34.758"N	80°12'14.486"W	6954.97	337.371	0.78	0.52	0.59
16362.00	89.750	316.340	8377.52	6689.31	6489.00	-2740.82	1770279.32	429296.91	39°40'35.439"N	80°12'15.322"W	7044.09	337.102	1.33	0.00	-1.33
16457.00	90.400	316.680	8377.40	6784.23	6557.92	-2806.20	1770213.94	429365.83	39°40'36.115"N	80°12'16.165"W	7133.10	336.833	0.77	0.68	0.36
16551.00	90.280	318.110	8376.84	6878.20	6627.10	-2869.83	1770150.32	429435.01	39°40'36.794"N	80°12'16.985"W	7221.80	336.585	1.53	-0.13	1.52
16646.00	89.850	320.260	8376.73	6973.19	6699.00	-2931.92	1770088.23	429506.90	39°40'37.499"N	80°12'17.787"W	7312.50	336.363	2.31	-0.45	2.26
16740.00	89.410	321.770	8377.34	7067.12	6772.06	-2991.05	1770029.10	429579.96	39°40'38.217"N	80°12'18.550"W	7403.19	336.170	1.67	-0.47	1.61
16835.00	89.480	319.790	8378.26	7162.05	6845.65	-3051.11	1769969.04	429653.54	39°40'38.939"N	80°12'19.326"W	7494.82	335.977	2.09	0.07	-2.08
16930.00	89.940	320.020	8378.74	7257.03	6918.32	-3112.30	1769907.86	429726.21	39°40'39.653"N	80°12'20.116"W	7586.15	335.779	0.54	0.48	0.24
17024.00	90.180	319.960	8378.64	7351.02	6990.32	-3172.73	1769847.43	429798.21	39°40'40.360"N	80°12'20.896"W	7676.64	335.588	0.26	0.26	-0.06
17118.00	90.520	319.400	8378.07	7445.00	7061.99	-3233.56	1769786.61	429869.87	39°40'41.063"N	80°12'21.681"W	7767.08	335.398	0.70	0.36	-0.60

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Actual Wellpath Report

Kassay 13H AWP Proj: 17210'

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NORTHEAST NATURAL ENERGY, LLC	Slot	Slot #13
Area	Monongalia County, WV	Well	Kassay 13H
Field	Monongalia	Wellbore	Kassay 13H AWB
Facility	Kassay Pad		

WELLPATH DATA (182 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]
17186.00	90.740	319.190	8377.32	7513.00	7113.54	-3277.90	1769742.27	429921.41	39°40'41.569"N	80°12'22.253"W	7832.43	335.260	0.45	0.32	-0.31
17210.00	90.740	319.190	8377.01	7536.99	7131.70	-3293.58	1769726.59	429939.57	39°40'41.747"N	80°12'22.456"W	7855.50	335.211	0.00	0.00	0.00

HOLE & CASING SECTIONS - Ref Wellbore: Kassay 13H AWB Ref Wellpath: Kassay 13H AWP Proj: 17210'										
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]	
28in Open Hole	32.00	72.00	40.00	32.00	72.00	0.00	0.00	-0.04	0.04	
24in Conductor	32.00	72.00	40.00	32.00	72.00	0.00	0.00	-0.04	0.04	
17.5in Open Hole	72.00	1262.00	1190.00	72.00	1261.97	-0.04	0.04	-1.88	7.22	
13.375in Casing Surface	32.00	1232.00	1200.00	32.00	1231.97	0.00	0.00	-1.86	7.07	
12.25in Open Hole	1262.00	2812.00	1550.00	1261.97	2806.46	-1.88	7.22	119.67	34.13	
9.625in Casing Intermediate	32.00	2782.00	2750.00	32.00	2776.57	0.00	0.00	117.20	33.42	
8.75in Open Hole	2812.00	6407.00	3595.00	2806.46	6400.81	119.67	34.13	124.28	47.94	
8.5in Open Hole	6407.00	17210.00	10803.00	6400.81	8377.01	124.28	47.94	7131.70	-3293.58	
5.5in Casing Production	32.00	17210.00	17178.00	32.00	8377.01	0.00	0.00	7131.70	-3293.58	

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Kassay 13H AWP Proj: 17210'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	NORTHEAST NATURAL ENERGY, LLC	Slot	Slot #13
Area	Monongalia County, WV	Well	Kassay 13H
Field	Monongalia	Wellbore	Kassay 13H AWB
Facility	Kassay Pad		

TARGETS								
Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Kassay 13H BHL Rev-6	8265.00	7127.73	-3298.47	1769721.70	429935.60	39°40'41.708"N	80°12'22.518"W	point
Kassay 13H IP1 Rev-6	8265.00	1824.30	1011.19	1774031.10	424632.50	39°39'49.627"N	80°11'26.878"W	point
Kassay 13H IP2 Rev-6	8265.00	2548.25	325.65	1773345.60	425356.40	39°39'56.730"N	80°11'35.715"W	point
Kassay 13H IP3 Rev-6	8265.00	3246.59	-61.47	1772958.50	426054.70	39°40'03.602"N	80°11'40.735"W	point
Kassay 13H IP4 Rev-6	8265.00	4953.49	-1346.85	1771673.20	427761.50	39°40'20.372"N	80°11'57.341"W	point
Kassay 13H IP5 Rev-6	8265.00	6450.08	-2706.14	1770314.00	429258.00	39°40'35.057"N	80°12'14.874"W	point
Kassay 13H LP Rev-6	8265.00	1173.76	1501.52	1774521.40	423982.00	39°39'43.236"N	80°11'20.544"W	point
Kassay 13H 1-9	8516.00	0.00	0.00	1773019.97	422808.31	39°39'31.522"N	80°11'39.628"W	polygon
Kassay 13H 10-12	8516.00	0.00	0.00	1773019.97	422808.31	39°39'31.522"N	80°11'39.628"W	polygon

WELLPATH COMPOSITION - Ref Wellbore: Kassay 13H AWB				Ref Wellpath: Kassay 13H AWP Proj: 17210'	
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore	
32.00	6392.00	VESI GyroFlex v4	01_VES Gyro <8-3/4"> (100'-6374')	Kassay 13H AWB	
6392.00	17186.00	BHI AutoTrak Curve (Short)	02_BHI AT Curve <8-1/2"> (6392')(6428'-17186')	Kassay 13H AWB	
17186.00	17210.00	Blind Drilling (Std)	Projection to bit	Kassay 13H AWB	

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Kassay 13H AWP Proj: 17210'
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Operator	NORTHEAST NATURAL ENERGY, LLC	Slot	Slot #13
Area	Monongalia County, WV	Well	Kassay 13H
Field	Monongalia	Wellbore	Kassay 13H AWB
Facility	Kassay Pad		

COMMENTS
<p>Wellpath general comments API: 47-061-01689-0000 BHI Job #: 8325067 Rig: Nabors X08 Duration: 1/10/2017-1/15/2017 VES Gyro <8-3/4"> (100'-6374') BHI AT Curve <8-1/2"> (6392')(6428'-17186') Projected MD at TD: 17210'</p>

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