

Survey Report



<b>Company:</b>	HG Energy LLC	<b>Local Co-ordinate Reference:</b>	Well Robert Fowler No. 266
<b>Project:</b>	Lincoln County, West Virginia	<b>TVD Reference:</b>	RKB=882+6 @ 888.00usft (Noah Horn 294)
<b>Site:</b>	Robert Fowler	<b>MD Reference:</b>	RKB=882+6 @ 888.00usft (Noah Horn 294)
<b>Well:</b>	Robert Fowler No. 266	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

<b>Project</b>	Lincoln County, West Virginia		
<b>Map System:</b>	Universal Transverse Mercator	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD83 West Virginia - HARN		
<b>Map Zone:</b>	Zone 17N (84 W to 78 W)		

<b>Site</b>	Robert Fowler				
<b>Site Position:</b>		<b>Northing:</b>	4,231,525.00 m	<b>Latitude:</b>	38° 13' 40.2607 N
<b>From:</b>	Map	<b>Easting:</b>	416,611.00 m	<b>Longitude:</b>	81° 57' 9.8449 W
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.59 °

<b>Well</b>	Robert Fowler No. 266					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	4,231,525.00 m	<b>Latitude:</b>	38° 13' 40.2607 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	416,611.00 m	<b>Longitude:</b>	81° 57' 9.8449 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	882.00 usft

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	8/15/2017	-8.35	65.68	51,577.80000000

<b>Design</b>	Surveys Original Hole				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	108.00	

<b>Survey Program</b>	<b>Date</b>	8/25/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
500.00	2,677.00	MWD (Original Hole)	MWD	OWSG MWD - Standard	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
<b>Assume vertical to 500 MD</b>										
506.00	1.05	148.14	506.00	-0.05	0.03	0.04	17.50	17.50	0.00	
<b>MWD surveys</b>										
536.00	1.57	125.91	535.99	-0.52	0.51	0.64	2.39	1.73	-74.10	
566.00	2.97	115.38	565.97	-1.10	1.54	1.81	4.85	4.67	-35.10	
596.00	4.42	108.30	595.90	-1.79	3.34	3.73	5.06	4.83	-23.60	
626.00	5.46	101.69	625.79	-2.44	5.84	6.31	3.95	3.47	-22.03	
656.00	5.58	98.41	655.65	-2.95	8.68	9.16	1.13	0.40	-10.93	

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<b>Site:</b>	Robert Fowler	<b>MD Reference:</b>	RKB=882+6 @ 888.00usft (Noah Horn 294)
<b>Well:</b>	Robert Fowler No. 266	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
686.00	6.27	98.68	685.49	-3.41	11.74	12.22	2.30	2.30	0.90	
716.00	6.89	101.19	715.30	-4.00	15.12	15.62	2.28	2.07	8.37	
746.00	7.61	102.53	745.06	-4.78	18.83	19.39	2.47	2.40	4.47	
776.00	8.46	102.79	774.76	-5.70	22.92	23.56	2.84	2.83	0.87	
806.00	9.29	101.62	804.40	-6.68	27.44	28.17	2.83	2.77	-3.90	
836.00	9.99	99.79	833.98	-7.61	32.38	33.15	2.55	2.33	-6.10	
866.00	10.83	101.83	863.48	-8.63	37.70	38.52	3.06	2.80	6.80	
896.00	11.74	105.97	892.90	-10.05	43.40	44.38	4.06	3.03	13.80	
926.00	12.26	108.63	922.25	-11.90	49.35	50.61	2.53	1.73	8.87	
956.00	12.31	108.99	951.56	-13.96	55.39	57.00	0.30	0.17	1.20	
986.00	12.98	109.07	980.83	-16.10	61.60	63.56	2.23	2.23	0.27	
1,016.00	13.85	111.80	1,010.02	-18.54	68.12	70.51	3.59	2.90	9.10	
1,046.00	14.81	112.41	1,039.08	-21.33	75.00	77.92	3.24	3.20	2.03	
1,076.00	15.94	111.56	1,068.01	-24.31	82.37	85.65	3.84	3.77	-2.83	
1,106.00	16.89	109.25	1,096.78	-27.26	90.32	94.32	3.84	3.17	-7.70	
1,136.00	17.70	107.19	1,125.43	-30.04	98.79	103.24	3.38	2.70	-6.87	
1,166.00	18.13	105.99	1,153.97	-32.68	107.63	112.46	1.89	1.43	-4.00	
1,196.00	18.93	104.83	1,182.42	-35.21	116.83	121.99	2.94	2.67	-3.87	
1,226.00	19.79	105.13	1,210.72	-37.78	126.43	131.92	2.89	2.87	1.00	
1,256.00	20.86	105.28	1,238.85	-40.51	136.49	142.33	3.57	3.57	0.50	
1,286.00	22.33	106.59	1,266.75	-43.55	147.10	153.36	5.16	4.90	4.37	
1,316.00	23.74	105.88	1,294.35	-46.83	158.37	165.09	4.79	4.70	-2.37	
1,346.00	24.79	107.01	1,321.70	-50.32	170.20	177.42	3.83	3.50	3.77	
1,376.00	25.32	108.55	1,348.88	-54.20	182.29	190.12	2.80	1.77	5.13	
1,406.00	25.78	108.99	1,375.95	-58.37	194.54	203.06	1.66	1.53	1.47	
1,436.00	26.26	109.38	1,402.91	-62.69	206.97	216.22	1.70	1.60	1.30	
1,466.00	26.53	109.44	1,429.78	-67.12	219.55	229.55	0.90	0.90	0.20	
1,496.00	27.46	110.07	1,456.51	-71.73	232.37	243.16	3.24	3.10	2.10	
1,526.00	28.77	110.28	1,482.97	-76.60	245.64	257.29	4.38	4.37	0.70	
1,556.00	29.69	109.72	1,509.15	-81.61	259.40	271.93	3.20	3.07	-1.87	
1,586.00	29.90	108.69	1,535.18	-86.52	273.48	286.83	1.84	0.70	-3.43	
1,616.00	29.63	108.62	1,561.23	-91.28	287.59	301.72	0.91	-0.90	-0.23	
1,646.00	28.01	107.80	1,587.51	-95.80	301.33	316.18	5.56	-5.40	-2.73	
1,676.00	26.50	105.91	1,614.18	-99.79	314.47	329.92	5.80	-5.03	-6.30	
1,706.00	26.37	106.31	1,641.04	-103.50	327.30	343.26	0.73	-0.43	1.33	
1,736.00	27.45	106.77	1,667.79	-107.36	340.32	356.84	3.67	3.60	1.53	
1,766.00	28.42	108.23	1,694.30	-111.59	353.72	370.89	3.96	3.23	4.87	
1,796.00	29.05	108.05	1,720.60	-116.08	367.42	385.31	2.12	2.10	-0.60	
1,826.00	29.07	108.36	1,746.83	-120.63	381.27	399.88	0.51	0.07	1.03	
1,856.00	29.33	107.88	1,773.01	-125.18	395.18	414.52	1.17	0.87	-1.60	
1,886.00	29.51	108.01	1,799.15	-129.72	409.20	429.26	0.64	0.60	0.43	
1,916.00	29.50	108.40	1,825.25	-134.34	423.23	444.03	0.64	-0.03	1.30	
1,946.00	28.26	107.50	1,851.52	-138.81	437.01	458.52	4.38	-4.13	-3.00	

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<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,976.00	28.08	107.15	1,877.97	-143.03	450.53	472.68	0.81	-0.60	-1.17
2,006.00	28.26	107.74	1,904.42	-147.27	464.05	486.84	1.11	0.60	1.97
2,036.00	27.27	107.05	1,930.96	-151.45	477.38	500.82	3.47	-3.30	-2.30
2,066.00	27.06	106.16	1,957.65	-155.37	490.51	514.51	1.52	-0.70	-2.97
2,096.00	27.12	106.43	1,984.36	-159.20	503.62	528.16	0.46	0.20	0.90
2,126.00	28.08	107.96	2,010.95	-163.31	516.89	542.06	3.98	3.20	5.10
2,156.00	29.17	109.25	2,037.28	-167.90	530.51	556.43	4.18	3.63	4.30
2,186.00	29.25	109.05	2,063.47	-172.70	544.34	571.07	0.42	0.27	-0.67
2,216.00	29.09	109.03	2,089.66	-177.47	558.17	585.69	0.53	-0.53	-0.07
2,246.00	28.76	107.03	2,115.92	-181.96	571.96	600.20	3.41	-1.10	-6.67
2,276.00	28.49	106.13	2,142.25	-186.06	585.74	614.56	1.70	-0.90	-3.00
2,306.00	28.22	106.36	2,168.65	-190.05	599.41	628.81	0.97	-0.90	0.77
2,336.00	28.11	107.59	2,195.10	-194.18	612.96	642.96	1.97	-0.37	4.10
2,366.00	28.18	108.41	2,221.55	-198.56	626.42	657.11	1.31	0.23	2.73
2,396.00	28.83	108.91	2,247.92	-203.14	639.98	671.43	2.31	2.17	1.67
2,426.00	30.09	107.59	2,274.04	-207.75	653.99	686.18	4.72	4.20	-4.40
2,456.00	28.33	106.34	2,300.22	-212.03	667.99	700.82	6.21	-5.87	-4.17
<del>2,486.00</del>	27.81	106.16	2,326.69	-215.98	681.54	714.93	1.76	-1.73	-0.60
2,507.00	28.16	106.26	2,345.24	-218.73	691.01	724.78	1.68	1.67	0.48
2,516.00	28.31	106.30	2,353.17	-219.92	695.09	729.03	1.68	1.67	0.44
2,546.00	28.25	105.16	2,379.59	-223.78	708.77	743.24	1.81	-0.20	-3.80
2,576.00	28.02	104.71	2,406.04	-227.42	722.44	757.36	1.04	-0.77	-1.50
2,606.00	27.15	104.63	2,432.63	-230.94	735.88	771.23	2.90	-2.90	-0.27
2,636.00	26.61	105.17	2,459.39	-234.43	748.99	784.77	1.98	-1.80	1.80
<b>Survey @ 2636.00 MD 2459.39 TVD</b>									
2,677.00	26.61	105.17	2,496.05	-239.23	766.71	803.12	0.00	0.00	0.00
<b>Survey projected to 2677.00 MD 2496.05 TVD</b>									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.00	500.00	0.00	0.00	Assume vertical to 500 MD
506.00	506.00	-0.05	0.03	MWD surveys
2,636.00	2,459.39	-234.43	748.99	Survey @ 2636.00 MD 2459.39 TVD
2,677.00	2,496.05	-239.23	766.71	Survey projected to 2677.00 MD 2496.05 TVD