

43-03471

## **HG Energy, LLC**

Lincoln County, West Virginia

JA Fowler #214

JA Fowler 214

Wellbore #1

Design: Wellbore #1

## **Survey Report - Geographic**

12 November, 2014

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01/16/2015

43.03471

Survey Report - Geographic

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WV Department of Environmental Protection

<b>Company:</b>	HG Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well JA Fowler 214
<b>Project:</b>	Lincoln County, West Virginia	<b>TVD Reference:</b>	Well @ 920.0usft (Decker #9)
<b>Site:</b>	JA Fowler #214	<b>MD Reference:</b>	Well @ 920.0usft (Decker #9)
<b>Well:</b>	JA Fowler 214	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM Compass

<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>	JA Fowler #214				
<b>Site Position:</b>		<b>Northing:</b>	13,882,378.33 usft	<b>Latitude:</b>	38° 13' 34.800 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,366,605.80 usft	<b>Longitude:</b>	81° 57' 12.600 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.59 °

<b>Well</b>	JA Fowler 214					
<b>Well Position</b>	+N/-S	0.0 usft	<b>Northing:</b>	13,882,378.33 usft	<b>Latitude:</b>	38° 13' 34.800 N
	+E/-W	0.0 usft	<b>Easting:</b>	1,366,605.80 usft	<b>Longitude:</b>	81° 57' 12.600 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b>	912.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	10/28/2014	-7.44	66.08	51,826

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>		<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Version:</b>	1.0				
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0		139.00

<b>Survey Program</b>	Date 11/10/2014				
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
600.0	2,631.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>	
0.0	0.00	0.00	0.0	0.0	0.0	13,882,378.33	1,366,605.80	38° 13' 34.800 N	81° 57' 12.600 W	
600.0	0.00	0.00	600.0	0.0	0.0	13,882,378.33	1,366,605.80	38° 13' 34.800 N	81° 57' 12.600 W	
<b>FIRST SURVEY @ 600' MD / 600 TVD</b>										
625.0	0.90	139.00	625.0	-0.1	0.1	13,882,378.19	1,366,605.93	38° 13' 34.799 N	81° 57' 12.598 W	
655.0	1.20	138.80	655.0	-0.6	0.5	13,882,377.77	1,366,606.29	38° 13' 34.794 N	81° 57' 12.586 W	
685.0	1.90	132.20	685.0	-1.1	1.1	13,882,377.20	1,366,606.87	38° 13' 34.789 N	81° 57' 12.586 W	
715.0	2.60	147.20	715.0	-2.0	1.8	13,882,376.30	1,366,607.60	38° 13' 34.780 N	81° 57' 12.577 W	
745.0	3.80	141.90	744.9	-3.4	2.8	13,882,374.94	1,366,608.59	38° 13' 34.767 N	81° 57' 12.565 W	
775.0	5.10	144.40	774.8	-5.3	4.2	13,882,373.07	1,366,609.98	38° 13' 34.748 N	81° 57' 12.547 W	
805.0	6.30	138.30	804.7	-7.6	6.0	13,882,370.76	1,366,611.85	38° 13' 34.726 N	81° 57' 12.523 W	
835.0	7.20	138.00	834.5	-10.2	8.4	13,882,368.13	1,366,614.20	38° 13' 34.700 N	81° 57' 12.493 W	
865.0	8.20	136.10	864.2	-13.1	11.1	13,882,365.20	1,366,616.94	38° 13' 34.671 N	81° 57' 12.459 W	



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Well JA Fowler 214 (Deck #9)  
Well @ 920.0usft (Deck #9)  
Well @ 920.0usft (Deck #9)  
Grid  
Minimum Curvature  
EDM Compass

Company: HG Energy, LLC  
Project: Lincoln County, West Virginia  
Site: JA Fowler #214  
Well: JA Fowler 214  
Wellbore: Wellbore #1  
Design: Wellbore #1

Local Co-ordinate Reference:  
TVD Reference:  
MD Reference:  
North Reference:  
Survey Calculation Method:  
Database:

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
895.0	8.80	131.20	893.9	-16.2	14.4	13,882,362.14	1,366,620.15	38° 13' 34.641 N	81° 57' 12.418 W
925.0	9.70	126.80	923.5	-19.2	18.1	13,882,359.12	1,366,623.90	38° 13' 34.612 N	81° 57' 12.371 W
955.0	10.17	127.70	953.0	-22.4	22.2	13,882,355.98	1,366,628.02	38° 13' 34.581 N	81° 57' 12.319 W
985.0	11.40	129.70	982.5	-25.9	26.6	13,882,352.47	1,366,632.40	38° 13' 34.547 N	81° 57' 12.263 W
1,015.0	12.70	131.30	1,011.8	-29.9	31.4	13,882,348.40	1,366,637.16	38° 13' 34.507 N	81° 57' 12.203 W
1,045.0	13.80	130.90	1,041.0	-34.5	36.5	13,882,343.88	1,366,642.34	38° 13' 34.463 N	81° 57' 12.138 W
1,075.0	14.70	136.60	1,070.1	-39.6	41.9	13,882,338.77	1,366,647.66	38° 13' 34.413 N	81° 57' 12.070 W
1,105.0	16.40	140.50	1,099.0	-45.6	47.2	13,882,332.74	1,366,652.97	38° 13' 34.354 N	81° 57' 12.003 W
1,135.0	18.00	144.80	1,127.7	-52.7	52.5	13,882,325.68	1,366,658.33	38° 13' 34.285 N	81° 57' 11.935 W
1,165.0	18.10	143.30	1,156.2	-60.2	58.0	13,882,318.16	1,366,663.79	38° 13' 34.211 N	81° 57' 11.865 W
1,195.0	17.70	143.60	1,184.7	-67.6	63.5	13,882,310.75	1,366,669.28	38° 13' 34.138 N	81° 57' 11.796 W
1,225.0	17.50	143.50	1,213.3	-74.9	68.9	13,882,303.45	1,366,674.67	38° 13' 34.067 N	81° 57' 11.727 W
1,255.0	17.30	142.90	1,242.0	-82.1	74.2	13,882,296.27	1,366,680.05	38° 13' 33.996 N	81° 57' 11.659 W
1,285.0	17.20	142.70	1,270.6	-89.2	79.6	13,882,289.18	1,366,685.42	38° 13' 33.927 N	81° 57' 11.590 W
1,315.0	17.20	142.90	1,299.3	-96.2	85.0	13,882,282.12	1,366,690.79	38° 13' 33.857 N	81° 57' 11.522 W
1,345.0	17.40	143.30	1,327.9	-103.4	90.3	13,882,274.98	1,366,696.14	38° 13' 33.787 N	81° 57' 11.454 W
1,375.0	17.60	142.20	1,356.5	-110.5	95.8	13,882,267.80	1,366,701.61	38° 13' 33.717 N	81° 57' 11.385 W
1,405.0	17.80	142.80	1,385.1	-117.8	101.4	13,882,260.57	1,366,707.16	38° 13' 33.646 N	81° 57' 11.314 W
1,435.0	18.00	142.00	1,413.7	-125.1	107.0	13,882,253.26	1,366,712.78	38° 13' 33.574 N	81° 57' 11.243 W
1,465.0	17.80	142.00	1,442.2	-132.3	112.7	13,882,246.00	1,366,718.46	38° 13' 33.503 N	81° 57' 11.171 W
1,495.0	17.60	142.20	1,470.8	-139.5	118.3	13,882,238.80	1,366,724.06	38° 13' 33.432 N	81° 57' 11.100 W
1,525.0	17.40	141.00	1,499.4	-146.6	123.9	13,882,231.73	1,366,729.67	38° 13' 33.363 N	81° 57' 11.028 W
1,555.0	17.30	142.90	1,528.0	-153.6	129.4	13,882,224.68	1,366,735.18	38° 13' 33.294 N	81° 57' 10.958 W
1,585.0	17.30	142.70	1,556.7	-160.8	134.8	13,882,217.58	1,366,740.57	38° 13' 33.224 N	81° 57' 10.890 W
1,615.0	17.20	141.70	1,585.3	-167.8	140.2	13,882,210.55	1,366,746.03	38° 13' 33.155 N	81° 57' 10.821 W
1,645.0	17.20	141.30	1,614.0	-174.7	145.7	13,882,203.61	1,366,751.55	38° 13' 33.087 N	81° 57' 10.751 W
1,675.0	16.70	137.60	1,642.7	-181.4	151.4	13,882,196.96	1,366,757.23	38° 13' 33.022 N	81° 57' 10.678 W
1,705.0	16.20	136.50	1,671.5	-187.6	157.2	13,882,190.74	1,366,763.02	38° 13' 32.961 N	81° 57' 10.605 W
1,735.0	16.10	133.90	1,700.3	-193.5	163.1	13,882,184.82	1,366,768.89	38° 13' 32.903 N	81° 57' 10.531 W
1,765.0	17.10	133.90	1,729.0	-199.5	169.3	13,882,178.88	1,366,775.07	38° 13' 32.845 N	81° 57' 10.453 W
1,795.0	18.00	136.10	1,757.6	-205.9	175.7	13,882,172.48	1,366,781.46	38° 13' 32.782 N	81° 57' 10.372 W
1,825.0	18.50	134.00	1,786.1	-212.5	182.3	13,882,165.84	1,366,788.10	38° 13' 32.717 N	81° 57' 10.288 W
1,855.0	18.80	133.10	1,814.5	-219.1	189.3	13,882,159.23	1,366,795.05	38° 13' 32.653 N	81° 57' 10.200 W
1,885.0	18.90	134.70	1,842.9	-225.8	196.2	13,882,152.51	1,366,802.04	38° 13' 32.587 N	81° 57' 10.111 W
1,915.0	18.80	139.90	1,871.3	-232.9	202.8	13,882,145.39	1,366,808.60	38° 13' 32.517 N	81° 57' 10.028 W
1,945.0	17.90	146.10	1,899.8	-240.5	208.5	13,882,137.86	1,366,814.29	38° 13' 32.443 N	81° 57' 9.956 W
1,975.0	17.60	147.70	1,928.4	-248.1	213.5	13,882,130.20	1,366,819.28	38° 13' 32.368 N	81° 57' 9.892 W
2,005.0	18.00	146.00	1,956.9	-255.8	218.5	13,882,122.53	1,366,824.30	38° 13' 32.293 N	81° 57' 9.828 W
2,035.0	17.40	145.70	1,985.5	-263.4	223.6	13,882,114.98	1,366,829.42	38° 13' 32.219 N	81° 57' 9.763 W
2,065.0	16.70	144.30	2,014.2	-270.6	228.7	13,882,107.77	1,366,834.46	38° 13' 32.148 N	81° 57' 9.699 W
2,095.0	16.00	143.70	2,043.0	-277.4	233.6	13,882,100.94	1,366,839.43	38° 13' 32.081 N	81° 57' 9.636 W
2,125.0	15.20	140.50	2,071.9	-283.8	238.6	13,882,094.57	1,366,844.38	38° 13' 32.018 N	81° 57' 9.573 W
2,155.0	14.50	140.10	2,100.9	-289.7	243.5	13,882,088.66	1,366,849.29	38° 13' 31.960 N	81° 57' 9.511 W
2,185.0	13.80	139.80	2,130.0	-295.3	248.2	13,882,083.04	1,366,854.01	38° 13' 31.905 N	81° 57' 9.451 W
2,215.0	13.10	138.70	2,159.1	-300.6	252.8	13,882,077.76	1,366,858.56	38° 13' 31.854 N	81° 57' 9.393 W
2,245.0	12.50	136.00	2,188.4	-305.5	257.3	13,882,072.87	1,366,863.06	38° 13' 31.806 N	81° 57' 9.336 W
2,275.0	11.90	136.40	2,217.7	-310.0	261.6	13,882,068.29	1,366,867.45	38° 13' 31.761 N	81° 57' 9.280 W
2,305.0	11.00	135.10	2,247.1	-314.3	265.8	13,882,064.02	1,366,871.60	38° 13' 31.719 N	81° 57' 9.228 W
2,335.0	10.40	133.60	2,276.6	-318.2	269.8	13,882,060.13	1,366,875.58	38° 13' 31.681 N	81° 57' 9.177 W
2,365.0	9.50	132.80	2,306.1	-321.8	273.6	13,882,056.58	1,366,879.36	38° 13' 31.646 N	81° 57' 9.130 W
2,395.0	9.30	127.30	2,335.7	-324.9	277.3	13,882,053.43	1,366,883.10	38° 13' 31.616 N	81° 57' 9.082 W
2,425.0	9.80	127.70	2,365.3	-327.9	281.3	13,882,050.40	1,366,887.05	38° 13' 31.586 N	81° 57' 9.032 W
2,455.0	10.00	127.20	2,394.9	-331.1	285.3	13,882,047.26	1,366,891.15	38° 13' 31.555 N	81° 57' 8.981 W
2,485.0	9.50	125.70	2,424.5	-334.1	289.4	13,882,044.24	1,366,895.23	38° 13' 31.526 N	81° 57' 8.929 W
2,515.0	8.70	126.20	2,454.1	-336.9	293.3	13,882,041.46	1,366,899.07	38° 13' 31.499 N	81° 57' 8.880 W



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Survey Report - Geographic



<b>Company:</b>	HG Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well JA Fowler 214
<b>Project:</b>	Lincoln County, West Virginia	<b>TVD Reference:</b>	Well @ 920.0usft (Decker #9)
<b>Site:</b>	JA Fowler #214	<b>MD Reference:</b>	Well @ 920.0usft (Decker #9)
<b>Well:</b>	JA Fowler 214	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM Compass

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,545.0	7.90	122.50	2,483.8	-339.3	296.8	13,882,039.01	1,366,902.64	38° 13' 31.475 N	81° 57' 8.835 W
2,575.0	7.30	119.30	2,513.5	-341.4	300.2	13,882,036.97	1,366,906.04	38° 13' 31.455 N	81° 57' 8.792 W
2,631.0	7.30	119.30	2,569.0	-344.8	306.4	13,882,033.49	1,366,912.25	38° 13' 31.421 N	81° 57' 8.714 W
TD @ 2631' MD / 2569' TVD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N-S (usft)	+E-W (usft)		
600.0	600.0	0.0	0.0	FIRST SURVEY @ 600' MD / 600 TVD	
2,631.0	2,569.0	-344.8	306.4	TD @ 2631' MD / 2569' TVD	

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

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# HG Energy, LLC

Lincoln County, West Virginia

JA Fowler #214

JA Fowler 214

Wellbore #1

Design: Wellbore #1

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<b>Company:</b> HG Energy, LLC	<b>Local Co-ordinate Reference:</b> Well JA Fowler 214
<b>Project:</b> Lincoln County, West Virginia	<b>TVD Reference:</b> Well @ 920.0usft (Decker #9)
<b>Site:</b> JA Fowler #214	<b>MD Reference:</b> Well @ 920.0usft (Decker #9)
<b>Well:</b> JA Fowler 214	<b>North Reference:</b> Grid
<b>Wellbore:</b> Wellbore #1	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> Wellbore #1	<b>Database:</b> EDM Compass

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

<b>Site</b> JA Fowler #214			
<b>Site Position:</b>	<b>Northing:</b> 13,882,378.33 usft	<b>Latitude:</b> 38° 13' 34.800 N	
<b>From:</b> Lat/Long	<b>Easting:</b> 1,366,605.80 usft	<b>Longitude:</b> 81° 57' 12.600 W	
<b>Position Uncertainty:</b> 0.0 usft	<b>Slot Radius:</b> 13-3/16 "	<b>Grid Convergence:</b> -0.59 °	

<b>Well</b> JA Fowler 214			
<b>Well Position</b> +N/-S 0.0 usft	<b>Northing:</b> 13,882,378.33 usft	<b>Latitude:</b> 38° 13' 34.800 N	
+E/-W 0.0 usft	<b>Easting:</b> 1,366,605.80 usft	<b>Longitude:</b> 81° 57' 12.600 W	
<b>Position Uncertainty</b> 0.0 usft	<b>Wellhead Elevation:</b> 0.0 usft	<b>Ground Level:</b> 912.0 usft	

<b>Wellbore</b> Wellbore #1					
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	10/28/2014	-7.44	66.08	51,826

<b>Design</b> Wellbore #1				
<b>Audit Notes:</b>				
<b>Version:</b> 1.0	<b>Phase:</b> ACTUAL	<b>Tie On Depth:</b> 0.0		
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	139.00

<b>Survey Program</b>	<b>Date</b> 11/10/2014			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
600.0	2,631.0	MWD (Wellbore #1)	MWD default	MWD - Standard

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WV Department of  
Environmental Protection

Company: HG Energy, LLC  
Project: Lincoln County, West Virginia  
Site: JA Fowler #214  
Well: JA Fowler 214  
Wellbore: Wellbore #1  
Design: Wellbore #1

Local Co-ordinate Reference: Well JA Fowler 214  
TVD Reference: Well @ 920.0usft (Decker #9)  
MD Reference: Well @ 920.0usft (Decker #9)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM Compass

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.0	0.00	
<b>FIRST SURVEY @ 600' MD / 600 TVD</b>										
625.0	0.90	139.00	625.0	-0.1	0.1	0.2	3.60	0.2	139.00	
655.0	1.20	138.80	655.0	-0.6	0.5	0.7	1.00	0.7	138.92	
685.0	1.90	132.20	685.0	-1.1	1.1	1.6	2.40	1.6	136.75	
715.0	2.60	147.20	715.0	-2.0	1.8	2.7	3.03	2.7	138.52	
745.0	3.80	141.90	744.9	-3.4	2.8	4.4	4.12	4.4	140.62	
775.0	5.10	144.40	774.8	-5.3	4.2	6.7	4.38	6.7	141.56	
805.0	6.30	138.30	804.7	-7.6	6.0	9.7	4.48	9.7	141.40	
835.0	7.20	138.00	834.5	-10.2	8.4	13.2	3.00	13.2	140.53	
865.0	8.20	136.10	864.2	-13.1	11.1	17.2	3.44	17.2	139.70	
895.0	8.80	131.20	893.9	-16.2	14.4	21.6	3.13	21.6	138.45	
925.0	9.70	126.80	923.5	-19.2	18.1	26.4	3.81	26.4	136.71	
955.0	10.17	127.70	953.0	-22.4	22.2	31.4	1.65	31.5	135.17	
985.0	11.40	129.70	982.5	-25.9	26.6	37.0	4.28	37.1	134.20	
1,015.0	12.70	131.30	1,011.8	-29.9	31.4	43.2	4.47	43.4	133.67	
1,045.0	13.80	130.90	1,041.0	-34.5	36.5	50.0	3.68	50.2	133.32	
1,075.0	14.70	136.60	1,070.1	-39.6	41.9	57.3	5.55	57.6	133.38	
1,105.0	16.40	140.50	1,099.0	-45.6	47.2	65.4	6.65	65.6	134.03	
1,135.0	18.00	144.80	1,127.7	-52.7	52.5	74.2	6.81	74.4	135.06	
1,165.0	18.10	143.30	1,156.2	-60.2	58.0	83.5	1.58	83.6	136.06	
1,195.0	17.70	143.60	1,184.7	-67.6	63.5	92.7	1.37	92.7	136.79	
1,225.0	17.50	143.50	1,213.3	-74.9	68.9	101.7	0.67	101.7	137.39	
1,255.0	17.30	142.90	1,242.0	-82.1	74.2	110.6	0.90	110.7	137.86	
1,285.0	17.20	142.70	1,270.6	-89.2	79.6	119.5	0.39	119.5	138.23	
1,315.0	17.20	142.90	1,299.3	-96.2	85.0	128.4	0.20	128.4	138.55	

43-03471

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HG Energy EOW Report



WV Department of  
Environmental Protection

Company: HG Energy, LLC  
Project: Lincoln County, West Virginia  
Site: JA Fowler #214  
Well: JA Fowler 214  
Wellbore: Wellbore #1  
Design: Wellbore #1

Local Co-ordinate Reference: Well JA Fowler 214  
TVD Reference: Well @ 920.0usft (Decker #9)  
MD Reference: Well @ 920.0usft (Decker #9)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM Compass

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
1,345.0	17.40	143.30	1,327.9	-103.4	90.3	137.3	0.78	137.3	138.84
1,375.0	17.60	142.20	1,356.5	-110.5	95.8	146.3	1.29	146.3	139.08
1,405.0	17.80	142.80	1,385.1	-117.8	101.4	155.4	0.90	155.4	139.28
1,435.0	18.00	142.00	1,413.7	-125.1	107.0	164.6	1.06	164.6	139.46
1,465.0	17.80	142.00	1,442.2	-132.3	112.7	173.8	0.67	173.8	139.59
1,495.0	17.60	142.20	1,470.8	-139.5	118.3	182.9	0.70	182.9	139.72
1,525.0	17.40	141.00	1,499.4	-146.6	123.9	191.9	1.38	191.9	139.81
1,555.0	17.30	142.90	1,528.0	-153.6	129.4	200.8	1.92	200.9	139.90
1,585.0	17.30	142.70	1,556.7	-160.8	134.8	209.7	0.20	209.8	140.02
1,615.0	17.20	141.70	1,585.3	-167.8	140.2	218.6	1.04	218.7	140.11
1,645.0	17.20	141.30	1,614.0	-174.7	145.7	227.5	0.39	227.5	140.17
1,675.0	16.70	137.60	1,642.7	-181.4	151.4	236.2	3.96	236.3	140.14
1,705.0	16.20	136.50	1,671.5	-187.6	157.2	244.7	1.96	244.8	140.03
1,735.0	16.10	133.90	1,700.3	-193.5	163.1	253.0	2.43	253.1	139.88
1,765.0	17.10	133.90	1,729.0	-199.5	169.3	261.6	3.33	261.6	139.68
1,795.0	18.00	136.10	1,757.6	-205.9	175.7	270.6	3.73	270.6	139.52
1,825.0	18.50	134.00	1,786.1	-212.5	182.3	280.0	2.75	280.0	139.37
1,855.0	18.80	133.10	1,814.5	-219.1	189.3	289.5	1.39	289.5	139.18
1,885.0	18.90	134.70	1,842.9	-225.8	196.2	299.2	1.76	299.2	139.01
1,915.0	18.80	139.90	1,871.3	-232.9	202.8	308.9	5.61	308.9	138.96
1,945.0	17.90	146.10	1,899.8	-240.5	208.5	318.3	7.16	318.3	139.07
1,975.0	17.60	147.70	1,928.4	-248.1	213.5	327.3	1.91	327.3	139.29
2,005.0	18.00	146.00	1,956.9	-255.8	218.5	336.4	2.19	336.4	139.50
2,035.0	17.40	145.70	1,985.5	-263.4	223.6	345.5	2.02	345.5	139.66
2,065.0	16.70	144.30	2,014.2	-270.6	228.7	354.2	2.70	354.2	139.80
2,095.0	16.00	143.70	2,043.0	-277.4	233.6	362.6	2.40	362.7	139.90
2,125.0	15.20	140.50	2,071.9	-283.8	238.6	370.7	3.92	370.7	139.94

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WV Department of  
Environmental Protection

Company: HG Energy, LLC  
Project: Lincoln County, West Virginia  
Site: JA Fowler #214  
Well: JA Fowler 214  
Wellbore: Wellbore #1  
Design: Wellbore #1

Local Co-ordinate Reference: Well JA Fowler 214  
TVD Reference: Well @ 920.0usft (Decker #9)  
MD Reference: Well @ 920.0usft (Decker #9)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM Compass

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,155.0	14.50	140.10	2,100.9	-289.7	243.5	378.4	2.36	378.4	139.95
2,185.0	13.80	139.80	2,130.0	-295.3	248.2	385.7	2.35	385.7	139.95
2,215.0	13.10	138.70	2,159.1	-300.6	252.8	392.7	2.48	392.7	139.94
2,245.0	12.50	136.00	2,188.4	-305.5	257.3	399.3	2.82	399.4	139.90
2,275.0	11.90	136.40	2,217.7	-310.0	261.6	405.6	2.02	405.7	139.84
2,305.0	11.00	135.10	2,247.1	-314.3	265.8	411.6	3.12	411.6	139.78
2,335.0	10.40	133.60	2,276.6	-318.2	269.8	417.1	2.20	417.2	139.71
2,365.0	9.50	132.80	2,306.1	-321.8	273.6	422.3	3.04	422.3	139.63
2,395.0	9.30	127.30	2,335.7	-324.9	277.3	427.1	3.07	427.2	139.52
2,425.0	9.80	127.70	2,365.3	-327.9	281.3	432.0	1.68	432.0	139.38
2,455.0	10.00	127.20	2,394.9	-331.1	285.3	437.1	0.73	437.1	139.24
2,485.0	9.50	125.70	2,424.5	-334.1	289.4	442.0	1.87	442.0	139.10
2,515.0	8.70	126.20	2,454.1	-336.9	293.3	446.6	2.68	446.6	138.96
2,545.0	7.90	122.50	2,483.8	-339.3	296.8	450.8	3.21	450.8	138.82
2,575.0	7.30	119.30	2,513.5	-341.4	300.2	454.6	2.45	454.6	138.67
2,631.0	7.30	119.30	2,569.0	-344.8	306.4	461.3	0.00	461.3	138.37

TD @ 2631' MD / 2569' TVD

43.03471

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
600.0	600.0	0.0	0.0	FIRST SURVEY @ 600' MD / 600 TVD
2,631.0	2,569.0	-344.8	306.4	TD @ 2631' MD / 2569' TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



JA Fowler 214  
Lincoln County, West Virginia  
Q141156 & AM-141140  
Design #1

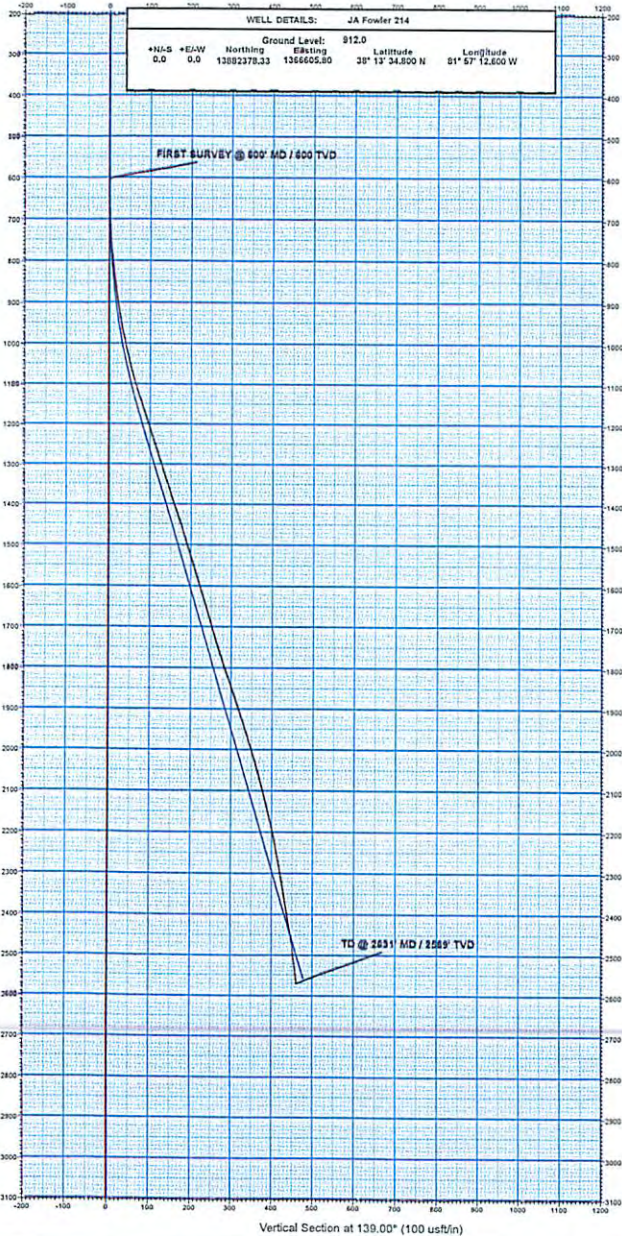
Company Name: HG Energy, LLC  
JA Fowler 214  
Lincoln County, West Virginia  
Rig: Decker #9  
Created By: Jerry Arsenault  
Date: 11/10/2014

PROJECT DETAILS: Lincoln County, West Virginia

Geodetic System: Universal Transverse Mercator  
Datum: NAD83 West Virginia - HARN  
Ellipsoid: GRS 1980  
Zone: Zone 17N (84 W to 78 W)  
System Datum: Mean Sea Level

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - JA Fowler #214 - plan hits target center	2404.0	-326.5	283.8	13882378.33	1366605.80	38° 13' 34.800 N	81° 57' 12.600 W



# HG Energy



43-03471

ANNOTATIONS

MD	Inc	Azi	TVD	+N-S	+E-W	VSec	Departure	Annotation
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.0	Build 3° / 100'
1193.0	16.29	139.00	1185.7	-57.9	50.3	76.7	76.7	COB @ 16.29° Inc / 139° Azm
2462.2	16.29	139.00	2404.0	-326.5	283.8	432.7	432.7	Hold @ 16.29° Inc / 139° Azm
2622.2	16.29	139.00	2557.6	-360.4	313.3	477.5	477.5	TD @ 2622' MD / 2569' TVD

