

HG Energy, LLC

Harrison County, West Virginia

W.B. Carpenter # 251

W.B. Carpenter #251

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

07 January, 2014

Received

JAN 21 2014

Office of Oil and Gas
WV Dept. of Environmental Protection



02/28/2014

DDC
Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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

Site	W.B. Carpenter # 251				
Site Position:		Northing:	14,263,995.79 usft	Latitude:	39° 16' 38.600 N
From:	Lat/Long	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.31 °

Well	W.B. Carpenter #251					
Well Position	+N/-S	0.0 usft	Northing:	14,263,995.79 usft	Latitude:	39° 16' 38.600 N
	+E/-W	0.0 usft	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,307.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/11/2013	-8.64	66.82	52,317

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	111.63	

Survey Program	Date	12/11/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
805.0	3,204.0	MWD (Wellbore #1)			

Survey	Office of Oil and Gas WV Dept. of Environmental Protection										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude		
805.0	0.00	0.00	805.0	0.0	0.0	14,263,995.79	1,779,525.51	39° 16' 38.600 N	80° 30' 30.300 W		
TIE IN @ 805' MD / 805' TVD											
838.0	1.71	118.92	838.0	-0.2	0.4	14,263,995.56	1,779,525.95	39° 16' 38.598 N	80° 30' 30.295 W		
868.0	2.02	122.92	868.0	-0.7	1.3	14,263,995.05	1,779,526.78	39° 16' 38.593 N	80° 30' 30.284 W		
898.0	2.59	131.80	898.0	-1.5	2.2	14,263,994.31	1,779,527.73	39° 16' 38.585 N	80° 30' 30.272 W		
928.0	3.52	140.02	927.9	-2.6	3.3	14,263,993.16	1,779,528.83	39° 16' 38.574 N	80° 30' 30.258 W		
958.0	4.48	140.59	957.8	-4.2	4.6	14,263,991.55	1,779,530.16	39° 16' 38.558 N	80° 30' 30.241 W		
988.0	4.92	139.80	987.7	-6.1	6.2	14,263,989.66	1,779,531.74	39° 16' 38.539 N	80° 30' 30.221 W		
1,018.0	4.79	141.60	1,017.6	-8.1	7.8	14,263,987.69	1,779,533.35	39° 16' 38.519 N	80° 30' 30.201 W		
1,048.0	5.01	136.72	1,047.5	-10.0	9.5	14,263,985.76	1,779,535.02	39° 16' 38.500 N	80° 30' 30.180 W		
1,078.0	5.49	129.43	1,077.4	-11.9	11.5	14,263,983.89	1,779,537.03	39° 16' 38.482 N	80° 30' 30.154 W		
1,108.0	6.42	119.23	1,107.2	-13.6	14.1	14,263,982.16	1,779,539.60	39° 16' 38.464 N	80° 30' 30.122 W		

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,138.0	6.81	113.30	1,137.0	-15.2	17.2	14,263,980.64	1,779,542.70	39° 16' 38.449 N	80° 30' 30.082 W
1,168.0	6.59	107.81	1,166.8	-16.4	20.5	14,263,979.41	1,779,545.97	39° 16' 38.437 N	80° 30' 30.041 W
1,198.0	6.42	105.70	1,196.6	-17.4	23.7	14,263,978.43	1,779,549.22	39° 16' 38.427 N	80° 30' 30.000 W
1,228.0	6.50	114.22	1,226.4	-18.5	26.9	14,263,977.28	1,779,552.39	39° 16' 38.415 N	80° 30' 29.959 W
1,258.0	6.59	123.80	1,256.3	-20.2	29.9	14,263,975.62	1,779,555.37	39° 16' 38.399 N	80° 30' 29.922 W
1,288.0	6.50	123.89	1,286.1	-22.1	32.7	14,263,973.72	1,779,558.21	39° 16' 38.380 N	80° 30' 29.886 W
1,318.0	6.28	122.53	1,315.9	-23.9	35.5	14,263,971.89	1,779,561.00	39° 16' 38.362 N	80° 30' 29.850 W
1,348.0	6.20	116.59	1,345.7	-25.5	38.3	14,263,970.28	1,779,563.83	39° 16' 38.346 N	80° 30' 29.814 W
1,378.0	6.11	115.19	1,375.5	-26.9	41.2	14,263,968.88	1,779,566.72	39° 16' 38.332 N	80° 30' 29.778 W
1,408.0	5.89	116.90	1,405.4	-28.3	44.0	14,263,967.50	1,779,569.54	39° 16' 38.318 N	80° 30' 29.742 W
1,438.0	6.11	118.31	1,435.2	-29.7	46.8	14,263,966.05	1,779,572.32	39° 16' 38.303 N	80° 30' 29.707 W
1,468.0	6.11	119.41	1,465.0	-31.3	49.6	14,263,964.51	1,779,575.12	39° 16' 38.288 N	80° 30' 29.671 W
1,498.0	6.02	119.01	1,494.9	-32.8	52.4	14,263,962.96	1,779,577.88	39° 16' 38.273 N	80° 30' 29.636 W
1,528.0	5.89	116.02	1,524.7	-34.3	55.1	14,263,961.52	1,779,580.64	39° 16' 38.258 N	80° 30' 29.601 W
1,558.0	5.58	115.89	1,554.5	-35.6	57.8	14,263,960.21	1,779,583.34	39° 16' 38.245 N	80° 30' 29.567 W
1,588.0	5.19	111.89	1,584.4	-36.7	60.4	14,263,959.07	1,779,585.91	39° 16' 38.234 N	80° 30' 29.534 W
1,618.0	4.61	110.71	1,614.3	-37.7	62.8	14,263,958.14	1,779,588.30	39° 16' 38.224 N	80° 30' 29.504 W
1,648.0	4.31	108.90	1,644.2	-38.5	65.0	14,263,957.34	1,779,590.49	39° 16' 38.216 N	80° 30' 29.476 W
1,678.0	4.70	106.22	1,674.1	-39.2	67.2	14,263,956.64	1,779,592.74	39° 16' 38.209 N	80° 30' 29.448 W
1,708.0	5.58	106.40	1,704.0	-39.9	69.8	14,263,955.88	1,779,595.32	39° 16' 38.202 N	80° 30' 29.415 W
1,738.0	5.80	107.01	1,733.8	-40.8	72.7	14,263,955.03	1,779,598.17	39° 16' 38.193 N	80° 30' 29.379 W
1,768.0	6.11	111.32	1,763.7	-41.8	75.6	14,263,954.00	1,779,601.10	39° 16' 38.183 N	80° 30' 29.341 W
1,798.0	6.50	112.60	1,793.5	-43.0	78.6	14,263,952.77	1,779,604.16	39° 16' 38.170 N	80° 30' 29.303 W
1,828.0	6.11	108.60	1,823.3	-44.2	81.7	14,263,951.61	1,779,607.24	39° 16' 38.159 N	80° 30' 29.263 W
1,858.0	5.80	103.19	1,853.2	-45.0	84.7	14,263,950.75	1,779,610.23	39° 16' 38.150 N	80° 30' 29.225 W
1,888.0	5.89	105.30	1,883.0	-45.8	87.7	14,263,950.00	1,779,613.19	39° 16' 38.143 N	80° 30' 29.188 W
1,918.0	6.11	114.40	1,912.8	-46.9	90.6	14,263,948.93	1,779,616.13	39° 16' 38.132 N	80° 30' 29.151 W
1,948.0	6.59	121.82	1,942.7	-48.4	93.5	14,263,947.37	1,779,619.04	39° 16' 38.116 N	80° 30' 29.114 W
1,978.0	6.68	121.30	1,972.5	-50.2	96.5	14,263,945.55	1,779,622.00	39° 16' 38.098 N	80° 30' 29.076 W
2,008.0	6.28	121.30	2,002.3	-52.0	99.4	14,263,943.79	1,779,624.89	39° 16' 38.081 N	80° 30' 29.039 W
2,038.0	6.20	119.10	2,032.1	-53.6	102.2	14,263,942.15	1,779,627.71	39° 16' 38.064 N	80° 30' 29.004 W
2,068.0	6.20	119.72	2,061.9	-55.2	105.0	14,263,940.56	1,779,630.53	39° 16' 38.048 N	80° 30' 28.968 W
2,098.0	6.20	118.40	2,091.7	-56.8	107.8	14,263,938.99	1,779,633.36	39° 16' 38.033 N	80° 30' 28.932 W
2,128.0	6.28	118.79	2,121.6	-58.4	110.7	14,263,937.43	1,779,636.22	39° 16' 38.017 N	80° 30' 28.896 W
2,158.0	6.20	119.80	2,151.4	-60.0	113.6	14,263,935.83	1,779,639.07	39° 16' 38.001 N	80° 30' 28.860 W
2,188.0	6.11	120.51	2,181.2	-61.6	116.3	14,263,934.22	1,779,641.85	39° 16' 37.985 N	80° 30' 28.824 W
2,218.0	5.58	118.09	2,211.1	-63.1	119.0	14,263,932.72	1,779,644.51	39° 16' 37.970 N	80° 30' 28.791 W
2,248.0	5.10	115.50	2,240.9	-64.3	121.5	14,263,931.46	1,779,647.00	39° 16' 37.957 N	80° 30' 28.759 W
2,278.0	5.32	113.12	2,270.8	-65.5	124.0	14,263,930.34	1,779,649.48	39° 16' 37.946 N	80° 30' 28.727 W
2,308.0	5.80	113.43	2,300.7	-66.6	126.6	14,263,929.19	1,779,652.15	39° 16' 37.935 N	80° 30' 28.694 W
2,338.0	5.89	114.71	2,330.5	-67.9	129.4	14,263,927.94	1,779,654.94	39° 16' 37.922 N	80° 30' 28.658 W
2,368.0	5.71	114.62	2,360.3	-69.1	132.2	14,263,926.68	1,779,657.70	39° 16' 37.910 N	80° 30' 28.623 W
2,398.0	5.10	112.60	2,390.2	-70.3	134.8	14,263,925.54	1,779,660.29	39° 16' 37.898 N	80° 30' 28.590 W
2,428.0	4.79	110.09	2,420.1	-71.2	137.2	14,263,924.60	1,779,662.69	39° 16' 37.889 N	80° 30' 28.560 W
2,458.0	5.10	106.53	2,450.0	-72.0	139.6	14,263,923.79	1,779,665.15	39° 16' 37.881 N	80° 30' 28.529 W
2,488.0	6.11	107.81	2,479.8	-72.9	142.4	14,263,922.92	1,779,667.95	39° 16' 37.872 N	80° 30' 28.493 W
2,518.0	7.38	112.20	2,509.6	-74.1	145.7	14,263,921.71	1,779,671.25	39° 16' 37.860 N	80° 30' 28.451 W
2,548.0	7.91	116.33	2,539.4	-75.7	149.4	14,263,920.06	1,779,674.89	39° 16' 37.843 N	80° 30' 28.405 W
2,578.0	7.69	114.93	2,569.1	-77.5	153.0	14,263,918.30	1,779,678.56	39° 16' 37.826 N	80° 30' 28.358 W
2,608.0	7.38	113.43	2,598.8	-79.1	156.6	14,263,916.69	1,779,682.14	39° 16' 37.809 N	80° 30' 28.313 W
2,638.0	7.12	110.53	2,628.6	-80.5	160.1	14,263,915.27	1,779,685.65	39° 16' 37.795 N	80° 30' 28.268 W
2,668.0	6.59	107.81	2,658.4	-81.7	163.5	14,263,914.09	1,779,689.03	39° 16' 37.783 N	80° 30' 28.225 W
2,698.0	6.42	106.53	2,688.2	-82.7	166.8	14,263,913.09	1,779,692.28	39° 16' 37.773 N	80° 30' 28.184 W
2,728.0	6.20	104.82	2,718.0	-83.6	169.9	14,263,912.20	1,779,695.45	39° 16' 37.764 N	80° 30' 28.144 W
2,758.0	6.28	104.20	2,747.8	-84.4	173.1	14,263,911.38	1,779,698.61	39° 16' 37.756 N	80° 30' 28.104 W

DDC
Survey Report - Geographic



Company: HG Energy, LLC	Local Co-ordinate Reference: Well W.B. Carpenter #251	
Project: Harrison County, West Virginia	TVD Reference: WELL @ 1315.0usft (Decker #6)	
Site: W.B. Carpenter # 251	MD Reference: WELL @ 1315.0usft (Decker #6)	
Well: W.B. Carpenter #251	North Reference: Grid	
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature	
Design: Wellbore #1	Database: EDM 5000.1 Single User Db	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,788.0	6.50	103.81	2,777.6	-85.2	176.3	14,263,910.57	1,779,701.85	39° 16' 37.748 N	80° 30' 28.063 W
2,818.0	6.42	103.02	2,807.5	-86.0	179.6	14,263,909.79	1,779,705.13	39° 16' 37.740 N	80° 30' 28.021 W
2,848.0	6.42	100.60	2,837.3	-86.7	182.9	14,263,909.10	1,779,708.42	39° 16' 37.733 N	80° 30' 27.979 W
2,878.0	6.28	95.72	2,867.1	-87.2	186.2	14,263,908.63	1,779,711.70	39° 16' 37.728 N	80° 30' 27.938 W
2,908.0	6.02	92.43	2,896.9	-87.4	189.4	14,263,908.40	1,779,714.90	39° 16' 37.726 N	80° 30' 27.897 W
2,938.0	5.58	90.10	2,926.8	-87.5	192.4	14,263,908.33	1,779,717.93	39° 16' 37.725 N	80° 30' 27.858 W
2,968.0	5.32	86.01	2,956.6	-87.4	195.3	14,263,908.43	1,779,720.78	39° 16' 37.726 N	80° 30' 27.822 W
2,998.0	4.92	84.21	2,986.5	-87.1	197.9	14,263,908.65	1,779,723.45	39° 16' 37.728 N	80° 30' 27.788 W
3,023.0	4.70	81.31	3,011.4	-86.9	200.0	14,263,908.92	1,779,725.52	39° 16' 37.730 N	80° 30' 27.762 W
3,058.0	4.39	81.22	3,046.3	-86.5	202.8	14,263,909.34	1,779,728.27	39° 16' 37.734 N	80° 30' 27.727 W
3,088.0	4.09	78.63	3,076.2	-86.1	204.9	14,263,909.72	1,779,730.45	39° 16' 37.738 N	80° 30' 27.699 W
3,118.0	3.78	75.81	3,106.1	-85.6	206.9	14,263,910.18	1,779,732.46	39° 16' 37.742 N	80° 30' 27.673 W
3,148.0	3.69	75.02	3,136.1	-85.1	208.8	14,263,910.67	1,779,734.35	39° 16' 37.747 N	80° 30' 27.649 W
3,204.0	3.69	75.02	3,192.0	-84.2	212.3	14,263,911.60	1,779,737.83	39° 16' 37.756 N	80° 30' 27.605 W
TD @ 3204' MD / 3192' TVD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
3,204.0	3,192.0	-84.2	212.3	TD @ 3204' MD / 3192' TVD	

Checked By: _____ Approved By: _____ Date: _____

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JAN 21 2014

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WV Dept. of Environmental Protection

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Harrison County, West Virginia

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I **Larry Wright**, certify that I am employed by **The Appalachian Directional Drilling Company (ADC)**. That I did on the day(s) of **9/17/13** thru **9/18/13** conduct or supervise the taking of a **MWD Survey** from a depth of **805** feet to a depth of **3204** feet, that the data is true, correct, complete and within the limitations of the tool as set forth by **The Appalachian Directional Drilling Company (ADC)**.; that I am authorized and qualified to make this report; that this survey was conducted at the request of **HG Energy, LLC** for the **W.B. Carpenter #251** API No. **47-033-05791** in **Harrison, County WV**; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by **The Appalachian Directional Drilling Company (ADC)**.

Larry Wright

Digitally signed by Larry Wright
DN: cn=Larry Wright, o=The
Directional Drilling Company,
ou=GM of Guidance Services,
email=larryw@directionaldrillers.co
m, c=US
Date: 2013.12.12 16:14:08 -06'00'

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JAN 27 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

• 1200 Heavy Haul Road • Morgan Town, WV 26501 •
• PH 304-777-2310 • FAX 304-777-2317 •

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Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

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From:	Lat/Long	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.31 °

Well	W.B. Carpenter #251					
Well Position	+N/-S	0.0 usft	Northing:	14,263,995.79 usft	Latitude:	39° 16' 38.600 N
	+E/-W	0.0 usft	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,307.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/11/2013	-8.64	66.82	52,317

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	111.63	

Survey Program	Date	12/11/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
805.0	3,204.0	MWD (Wellbore #1)			

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)	
TIE IN @ 805' MD / 805' TVD										
805.0	0.00	0.00	805.0	0.0	0.0	0.0	0.00	0.00	0.00	
838.0	1.71	118.92	838.0	-0.2	0.4	0.5	5.18	5.18	0.00	
868.0	2.02	122.92	868.0	-0.7	1.3	1.5	1.12	1.03	13.33	
898.0	2.59	131.80	898.0	-1.5	2.2	2.6	2.24	1.90	29.60	
928.0	3.52	140.02	927.9	-2.6	3.3	4.1	3.42	3.10	27.40	
958.0	4.48	140.59	957.8	-4.2	4.6	5.9	3.20	3.20	1.90	
988.0	4.92	139.80	987.7	-6.1	6.2	8.0	1.48	1.47	-2.63	
1,018.0	4.79	141.60	1,017.6	-8.1	7.8	10.3	0.67	-0.43	6.00	
1,048.0	5.01	136.72	1,047.5	-10.0	9.5	12.5	1.57	0.73	-16.27	

Received

JAN 14 2014

Office of Oil and Gas

WV Dept. of Environmental Protection

COMPASS 5000.1 Build 39

DDC
Survey Report



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)
1,078.0	5.49	129.43	1,077.4	-11.9	11.5	15.1	2.74	1.60	-24.30
1,108.0	6.42	119.23	1,107.2	-13.6	14.1	18.1	4.68	3.10	-34.00
1,138.0	6.81	113.30	1,137.0	-15.2	17.2	21.6	2.62	1.30	-19.77
1,168.0	6.59	107.81	1,166.8	-16.4	20.5	25.1	2.26	-0.73	-18.30
1,198.0	6.42	105.70	1,196.6	-17.4	23.7	28.4	0.98	-0.57	-7.03
1,228.0	6.50	114.22	1,226.4	-18.5	26.9	31.8	3.20	0.27	28.40
1,258.0	6.59	123.80	1,256.3	-20.2	29.9	35.2	3.65	0.30	31.93
1,288.0	6.50	123.89	1,286.1	-22.1	32.7	38.5	0.30	-0.30	0.30
1,318.0	6.28	122.53	1,315.9	-23.9	35.5	41.8	0.89	-0.73	-4.53
1,348.0	6.20	116.59	1,345.7	-25.5	38.3	45.0	2.17	-0.27	-19.80
1,378.0	6.11	115.19	1,375.5	-26.9	41.2	48.2	0.58	-0.30	-4.67
1,408.0	5.89	116.90	1,405.4	-28.3	44.0	51.4	0.94	-0.73	5.70
1,438.0	6.11	118.31	1,435.2	-29.7	46.8	54.5	0.88	0.73	4.70
1,468.0	6.11	119.41	1,465.0	-31.3	49.6	57.6	0.39	0.00	3.67
1,498.0	6.02	119.01	1,494.9	-32.8	52.4	60.8	0.33	-0.30	-1.33
1,528.0	5.89	116.02	1,524.7	-34.3	55.1	63.9	1.12	-0.43	-9.97
1,558.0	5.58	115.89	1,554.5	-35.6	57.8	66.9	1.03	-1.03	-0.43
1,588.0	5.19	111.89	1,584.4	-36.7	60.4	69.7	1.80	-1.30	-13.33
1,618.0	4.61	110.71	1,614.3	-37.7	62.8	72.2	1.96	-1.93	-3.93
1,648.0	4.31	108.90	1,644.2	-38.5	65.0	74.6	1.10	-1.00	-6.03
1,678.0	4.70	106.22	1,674.1	-39.2	67.2	76.9	1.48	1.30	-8.93
1,708.0	5.58	106.40	1,704.0	-39.9	69.8	79.6	2.93	2.93	0.60
1,738.0	5.80	107.01	1,733.8	-40.8	72.7	82.6	0.76	0.73	2.03
1,768.0	6.11	111.32	1,763.7	-41.8	75.6	85.7	1.81	1.03	14.37
1,798.0	6.50	112.60	1,793.5	-43.0	78.6	89.0	1.38	1.30	4.27
1,828.0	6.11	108.60	1,823.3	-44.2	81.7	92.3	1.96	-1.30	-13.33
1,858.0	5.80	103.19	1,853.2	-45.0	84.7	95.4	2.14	-1.03	-18.03
1,888.0	5.89	105.30	1,883.0	-45.8	87.7	98.4	0.78	0.30	7.03
1,918.0	6.11	114.40	1,912.8	-46.9	90.6	101.5	3.25	0.73	30.33
1,948.0	6.59	121.82	1,942.7	-48.4	93.5	104.8	3.17	1.60	24.73
1,978.0	6.68	121.30	1,972.5	-50.2	96.5	108.2	0.36	0.30	-1.73
2,008.0	6.28	121.30	2,002.3	-52.0	99.4	111.5	1.33	-1.33	0.00
2,038.0	6.20	119.10	2,032.1	-53.6	102.2	114.8	0.84	-0.27	-7.33
2,068.0	6.20	119.72	2,061.9	-55.2	105.0	118.0	0.22	0.00	2.07
2,098.0	6.20	118.40	2,091.7	-56.8	107.8	121.2	0.48	0.00	-4.40
2,128.0	6.28	118.79	2,121.6	-58.4	110.7	124.4	0.30	0.27	1.30
2,158.0	6.20	119.80	2,151.4	-60.0	113.6	127.7	0.45	-0.27	3.37
2,188.0	6.11	120.51	2,181.2	-61.6	116.3	130.8	0.39	-0.30	2.37
2,218.0	5.58	118.09	2,211.1	-63.1	119.0	133.9	1.95	-1.77	-8.07
2,248.0	5.10	115.50	2,240.9	-64.3	121.5	136.6	1.79	-1.60	-8.63
2,278.0	5.32	113.12	2,270.8	-65.5	124.0	139.4	1.03	0.73	-7.93
2,308.0	5.80	113.43	2,300.7	-66.6	126.6	142.3	1.60	1.60	1.03
2,338.0	5.89	114.71	2,330.5	-67.9	129.4	145.3	0.53	0.30	4.27
2,368.0	5.71	114.62	2,360.3	-69.1	132.2	148.4	0.60	-0.60	-0.30

DDC
Survey Report



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)
2,398.0	5.10	112.60	2,390.2	-70.3	134.8	151.2	2.13	-2.03	-6.73
2,428.0	4.79	110.09	2,420.1	-71.2	137.2	153.8	1.26	-1.03	-8.37
2,458.0	5.10	106.53	2,450.0	-72.0	139.6	156.3	1.45	1.03	-11.87
2,488.0	6.11	107.81	2,479.8	-72.9	142.4	159.3	3.39	3.37	4.27
2,518.0	7.38	112.20	2,509.6	-74.1	145.7	162.8	4.57	4.23	14.63
2,548.0	7.91	116.33	2,539.4	-75.7	149.4	166.8	2.54	1.77	13.77
2,578.0	7.69	114.93	2,569.1	-77.5	153.0	170.8	0.97	-0.73	-4.67
2,608.0	7.38	113.43	2,598.8	-79.1	156.6	174.8	1.22	-1.03	-5.00
2,638.0	7.12	110.53	2,628.6	-80.5	160.1	178.5	1.50	-0.87	-9.67
2,668.0	6.59	107.81	2,658.4	-81.7	163.5	182.1	2.07	-1.77	-9.07
2,698.0	6.42	106.53	2,688.2	-82.7	166.8	185.5	0.74	-0.57	-4.27
2,728.0	6.20	104.82	2,718.0	-83.6	169.9	188.8	0.96	-0.73	-5.70
2,758.0	6.28	104.20	2,747.8	-84.4	173.1	192.0	0.35	0.27	-2.07
2,788.0	6.50	103.81	2,777.6	-85.2	176.3	195.3	0.75	0.73	-1.30
2,818.0	6.42	103.02	2,807.5	-86.0	179.6	198.7	0.40	-0.27	-2.63
2,848.0	6.42	100.60	2,837.3	-86.7	182.9	202.0	0.90	0.00	-8.07
2,878.0	6.28	95.72	2,867.1	-87.2	186.2	205.2	1.86	-0.47	-16.27
2,908.0	6.02	92.43	2,896.9	-87.4	189.4	208.3	1.46	-0.87	-10.97
2,938.0	5.58	90.10	2,926.8	-87.5	192.4	211.1	1.66	-1.47	-7.77
2,968.0	5.32	86.01	2,956.6	-87.4	195.3	213.7	1.56	-0.87	-13.63
2,998.0	4.92	84.21	2,986.5	-87.1	197.9	216.1	1.44	-1.33	-6.00
3,023.0	4.70	81.31	3,011.4	-86.9	200.0	218.0	1.31	-0.88	-11.60
3,058.0	4.39	81.22	3,046.3	-86.5	202.8	220.3	0.89	-0.89	-0.26
3,088.0	4.09	78.63	3,076.2	-86.1	204.9	222.2	1.19	-1.00	-8.63
3,118.0	3.78	75.81	3,106.1	-85.6	206.9	223.9	1.22	-1.03	-9.40
3,148.0	3.69	75.02	3,136.1	-85.1	208.8	225.5	0.35	-0.30	-2.63
TD @ 3204' MD / 3192' TVD									
3,204.0	3.69	75.02	3,192.0	-84.2	212.3	228.4	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
805.0	805.0	0.0	0.0	TIE IN @ 805' MD / 805' TVD
3,204.0	3,192.0	-84.2	212.3	TD @ 3204' MD / 3192' TVD

Checked By: _____ Approved By: _____ Date: _____

Received

JAN 21 2014

02/28/2014

W.B. Carpenter #251
 Harrison County, West Virginia
 Q130777 & AM-13728
 Design #1

Company Name: HG Energy, LLC
 W.B. Carpenter #251
 Harrison County, West Virginia
 Rig: Decker #6
 Created By: TIFFANI MIZELL
 Date: 09/19/2013



HG Energy

WELL DETAILS: W.B. Carpenter #251

Ground Level:	1307.0		
+N/-S	+E/-W	Northing	Easting
0.0	0.0	284742.92	1714533.83
		Latitude	Longitude
		39° 16' 38.600 N	80° 30' 30.300 W

M G T Azimuths to Grid North



Correction: -7.99°

Magnetic Field
 Strength: 52348.2snT
 Dip Angle: 66.84°
 Date: 9/10/2013
 Model: IGRF2010

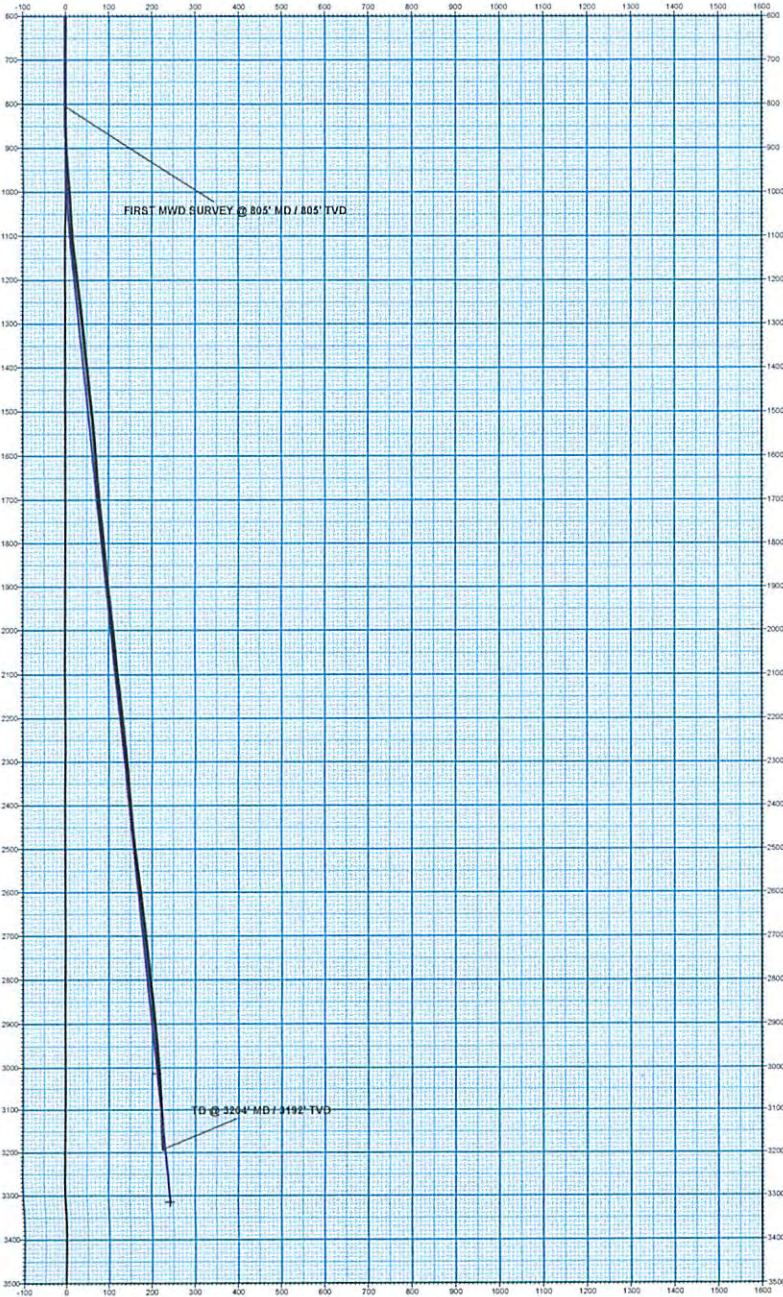
PROJECT DETAILS: Harrison County, West Virginia

Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: West Virginia North 4701
 System Datum: Mean Sea Level

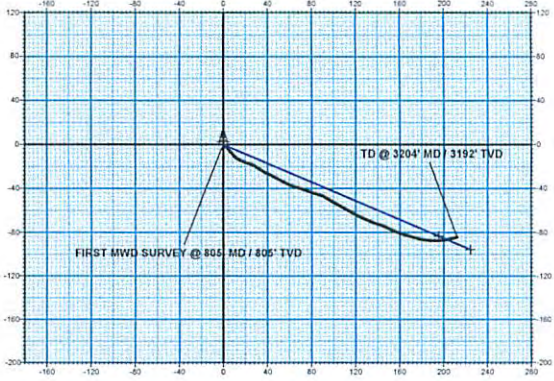
DESIGN TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude
Target 1 - W.B. Carpenter #2513014.6	-83.1	195.7	284659.76	1714729.50	39° 16' 37.800 N	80° 30' 27.800 W
- plan hits target center						

ANNOTATIONS							
MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure
805.0	0.00	0.00	805.0	0.0	0.0	0.0	0.0
3204.0	3.69	75.02	3192.0	-84.2	212.3	228.4	234.5

Annotation: FIRST MWD SURVEY @ 805' MD / 805' TVD
 TD @ 3204' MD / 3192' TVD



Vertical Section at 113.02° (100 usft/in)



Received

JAN 21 2014

Office of Oil and Gas
 WV Dept. of Environmental Protection

02/28/2014