

# HG Energy, LLC

Harrison County, West Virginia

J.M. Fultz #248

J.M. Fultz #248

Wellbore #1

Design: Wellbore #1

## HG Energy EOW Report

17 April, 2014

Environmental Protection  
WV Department of

JUN 13 2014

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DDC  
HG Energy EOW Report



<b>Company:</b> HG Energy, LLC	<b>Local Co-ordinate Reference:</b> Well J.M. Fultz #248
<b>Project:</b> Harrison County, West Virginia	<b>TVD Reference:</b> WELL @ 1289.0usft
<b>Site:</b> J.M. Fultz #248	<b>MD Reference:</b> WELL @ 1289.0usft
<b>Well:</b> J.M. Fultz #248	<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 5000.1 Single User Db

<b>Project</b> Harrison 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> J.M. Fultz #248		
<b>Site Position:</b>	<b>Northing:</b> 14,261,515.99 usft	<b>Latitude:</b> 39° 16' 14.100 N
<b>From:</b> Lat/Long	<b>Easting:</b> 1,779,185.21 usft	<b>Longitude:</b> 80° 30' 34.800 W
<b>Position Uncertainty:</b> 0.0 usft	<b>Slot Radius:</b> 13-3/16 "	<b>Grid Convergence:</b> 0.31 °

<b>Well</b> J.M. Fultz #248		
<b>Well Position</b> +N/S 0.0 usft	<b>Northing:</b> 14,261,515.99 usft	<b>Latitude:</b> 39° 16' 14.100 N
+E/W 0.0 usft	<b>Easting:</b> 1,779,185.21 usft	<b>Longitude:</b> 80° 30' 34.800 W
<b>Position Uncertainty</b> 0.0 usft	<b>Wellhead Elevation:</b> 0.0 usft	<b>Ground Level:</b> 1,281.0 usft

<b>Wellbore</b> Wellbore #1					
<b>Magnetics</b>	<b>Model Name</b> IGRF2010	<b>Sample Date</b> 4/4/2014	<b>Declination (°)</b> -8.65	<b>Dip Angle (°)</b> 66.78	<b>Field Strength (nT)</b> 52,276

<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> 0.0	<b>+N/S (usft)</b> 0.0	<b>+E/W (usft)</b> 0.0	<b>Direction (°)</b> 146.00

<b>Survey Program</b>	<b>Date</b> 4/16/2014			
<b>From (usft)</b> 850.0	<b>To (usft)</b> 3,138.0	<b>Survey (Wellbore)</b> MWD (Wellbore #1)	<b>Tool Name</b> MWD default	<b>Description</b> MWD - Standard

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Local Co-ordinate Reference: Well J.M. Fultz #248  
 TVD Reference: WELL @ 1289.0usft  
 MD Reference: WELL @ 1289.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	EW (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
850.0	0.00	0.00	850.0	0.0	0.0	0.0	0.00	0.0	0.00
<b>FIRST MWD SURVEY @ 850' MD / 850' TVD</b>									
893.0	2.40	159.60	893.0	-0.8	0.3	0.9	5.58	0.9	159.60
923.0	2.40	154.40	923.0	-2.0	0.8	2.1	0.73	2.2	158.09
953.0	3.20	141.10	952.9	-3.2	1.6	3.6	3.42	3.6	153.54
983.0	4.20	133.30	982.9	-4.6	2.9	5.5	3.72	5.5	147.66
1,013.0	5.50	131.70	1,012.8	-6.3	4.8	7.9	4.36	7.9	142.84
1,043.0	6.80	133.70	1,042.6	-8.5	7.2	11.1	4.39	11.1	139.95
1,073.0	7.40	136.40	1,072.4	-11.1	9.8	14.7	2.29	14.8	138.74
1,103.0	7.50	137.30	1,102.1	-14.0	12.4	18.5	0.51	18.7	138.35
1,133.0	6.80	138.50	1,131.9	-16.7	14.9	22.2	2.39	22.4	138.27
1,163.0	6.50	138.60	1,161.7	-19.4	17.2	25.7	1.00	25.9	138.31
1,193.0	5.80	143.40	1,191.5	-21.8	19.3	28.9	2.89	29.1	138.59
1,223.0	5.40	149.30	1,221.3	-24.3	20.9	31.8	2.34	32.0	139.29
1,253.0	5.30	152.00	1,251.2	-26.7	22.3	34.6	0.90	34.8	140.19
1,283.0	5.70	152.50	1,281.1	-29.3	23.6	37.5	1.34	37.6	141.11
1,313.0	6.00	153.60	1,310.9	-32.0	25.0	40.5	1.07	40.6	142.00
1,343.0	6.10	151.80	1,340.8	-34.8	26.4	43.6	0.71	43.7	142.77
1,373.0	6.20	152.60	1,370.6	-37.6	27.9	46.8	0.44	46.9	143.42
1,403.0	6.60	154.10	1,400.4	-40.6	29.4	50.1	1.45	50.2	144.08
1,433.0	6.80	157.70	1,430.2	-43.8	30.9	53.6	1.55	53.6	144.84
1,463.0	6.10	159.90	1,460.0	-47.0	32.1	56.9	2.47	56.9	145.66
1,493.0	5.10	165.30	1,489.9	-49.7	33.0	59.7	3.76	59.7	146.47
1,523.0	3.80	174.60	1,519.8	-52.0	33.4	61.8	4.94	61.8	147.30
1,553.0	3.30	179.30	1,549.7	-53.9	33.5	63.4	1.93	63.4	148.13
1,583.0	3.20	180.90	1,579.7	-55.6	33.5	64.8	0.45	64.9	148.92

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 Wellbore: Wellbore #1  
 Design: Wellbore #1

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 TVD Reference: WELL @ 1289.0usft  
 MD Reference: WELL @ 1289.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
1,613.0	3.50	173.00	1,609.6	-57.3	33.6	66.3	1.83	66.4	149.62
1,643.0	3.60	170.40	1,639.6	-59.2	33.9	68.0	0.63	68.2	150.21
1,673.0	3.70	174.50	1,669.5	-61.1	34.1	69.7	0.93	69.9	150.80
1,703.0	3.80	169.30	1,699.4	-63.0	34.4	71.5	1.18	71.8	151.37
1,733.0	4.30	160.00	1,729.4	-65.0	35.0	73.5	2.75	73.8	151.73
1,763.0	4.60	153.10	1,759.3	-67.2	35.9	75.7	2.04	76.1	151.88
1,793.0	4.60	147.90	1,789.2	-69.2	37.1	78.1	1.39	78.6	151.84
1,823.0	4.70	140.40	1,819.1	-71.2	38.5	80.6	2.05	81.0	151.60
1,853.0	4.90	136.60	1,849.0	-73.1	40.2	83.1	1.25	83.4	151.21
1,883.0	5.10	132.50	1,878.8	-74.9	42.0	85.6	1.36	85.9	150.71
1,913.0	5.30	128.90	1,908.7	-76.7	44.1	88.2	1.28	88.5	150.11
1,943.0	5.60	127.40	1,938.6	-78.5	46.3	90.9	1.11	91.1	149.44
1,973.0	6.00	126.20	1,968.4	-80.3	48.8	93.8	1.39	93.9	148.73
2,003.0	6.50	127.00	1,998.3	-82.2	51.4	96.9	1.69	97.0	148.00
2,033.0	7.20	128.80	2,028.0	-84.4	54.2	100.3	2.44	100.3	147.30
2,063.0	7.90	135.60	2,057.8	-87.1	57.1	104.1	3.78	104.1	146.74
2,093.0	8.80	142.60	2,087.5	-90.4	59.9	108.4	4.52	108.4	146.44
2,123.0	9.30	146.60	2,117.1	-94.2	62.7	113.2	2.68	113.2	146.37
2,153.0	9.60	147.00	2,146.7	-98.3	65.4	118.1	1.02	118.1	146.39
2,183.0	9.50	147.50	2,176.3	-102.5	68.1	123.1	0.43	123.1	146.42
2,213.0	9.30	147.40	2,205.9	-106.7	70.7	128.0	0.67	128.0	146.46
2,243.0	8.60	151.20	2,235.5	-110.7	73.1	132.6	3.05	132.6	146.56
2,273.0	8.00	152.50	2,265.2	-114.5	75.1	136.9	2.10	136.9	146.72
2,303.0	6.80	154.60	2,294.9	-117.9	76.9	140.7	4.10	140.8	146.91
2,333.0	5.00	157.00	2,324.8	-120.7	78.1	143.8	6.05	143.8	147.09
2,363.0	4.10	156.70	2,354.7	-122.9	79.1	146.1	3.00	146.2	147.25
2,393.0	3.60	141.80	2,384.6	-124.7	80.1	148.1	3.71	148.2	147.29

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2,423.0	3.20	122.50	2,414.6	-125.8	81.4	149.8	4.02	149.9	147.12
2,453.0	3.80	120.60	2,444.5	-126.8	82.9	151.5	2.04	151.5	146.82
2,483.0	5.00	126.30	2,474.4	-128.1	84.8	153.6	4.25	153.6	146.48
2,513.0	6.20	132.50	2,504.3	-129.9	87.1	156.4	4.47	156.4	146.17
2,543.0	6.90	133.80	2,534.1	-132.3	89.6	159.8	2.38	159.8	145.90
2,573.0	6.70	134.50	2,563.9	-134.8	92.1	163.2	0.72	163.2	145.64
2,603.0	6.00	134.40	2,593.7	-137.1	94.5	166.5	2.33	166.5	145.42
2,633.0	5.00	135.10	2,623.5	-139.1	96.5	169.3	3.34	169.3	145.24
2,663.0	4.70	142.90	2,653.4	-141.0	98.2	171.8	2.41	171.8	145.15
2,693.0	5.30	150.00	2,683.3	-143.2	99.6	174.4	2.87	174.4	145.17
2,723.0	6.00	154.40	2,713.2	-145.8	101.0	177.4	2.74	177.4	145.29
2,753.0	6.50	161.80	2,743.0	-148.8	102.2	180.5	3.16	180.6	145.52
2,783.0	6.00	164.80	2,772.8	-152.0	103.2	183.7	1.99	183.7	145.83
2,813.0	4.80	165.90	2,802.7	-154.7	103.9	186.3	4.01	186.3	146.12
2,843.0	3.30	159.60	2,832.6	-156.7	104.5	188.3	5.21	188.4	146.31
2,873.0	2.40	148.90	2,862.6	-158.1	105.1	189.8	3.47	189.8	146.38
2,903.0	2.10	143.70	2,892.6	-159.0	105.7	191.0	1.21	191.0	146.38
2,933.0	2.10	140.10	2,922.5	-159.9	106.4	192.1	0.44	192.1	146.36
2,963.0	2.70	139.70	2,952.5	-160.9	107.2	193.3	2.00	193.3	146.31
2,993.0	3.50	140.70	2,982.5	-162.1	108.3	195.0	2.67	195.0	146.26
3,023.0	4.40	143.30	3,012.4	-163.8	109.5	197.0	3.06	197.0	146.22
3,053.0	4.90	142.80	3,042.3	-165.7	111.0	199.4	1.67	199.4	146.18
3,083.0	5.10	140.70	3,072.2	-167.7	112.6	202.0	0.90	202.0	146.12
3,138.0	5.10	140.70	3,127.0	-171.5	115.7	206.9	0.00	206.9	146.00

TD @ 3138' MD / 3127' TVD

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<b>Project:</b> Harrison County, West Virginia	<b>TVD Reference:</b> WELL @ 1289.0usft
<b>Site:</b> J.M. Fultz #248	<b>MD Reference:</b> WELL @ 1289.0usft
<b>Well:</b> J.M. Fultz #248	<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 5000.1 Single User Db

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
850.0	850.0	0.0	0.0	FIRST MWD SURVEY @ 850' MD / 850' TVD
3,138.0	3,127.0	-171.5	115.7	TD @ 3138' MD / 3127' TVD

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

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J.M. Fultz #248  
 Harrison County, West Virginia  
 Q140359 & AM-140349  
 Design #1

Company Name: HG Energy, LLC  
 J.M. Fultz #248  
 Harrison County, West Virginia  
 Rig: Decker #6  
 Created By: James Dawson  
 Date: 4/16/2014

PROJECT DETAILS: Harrison 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

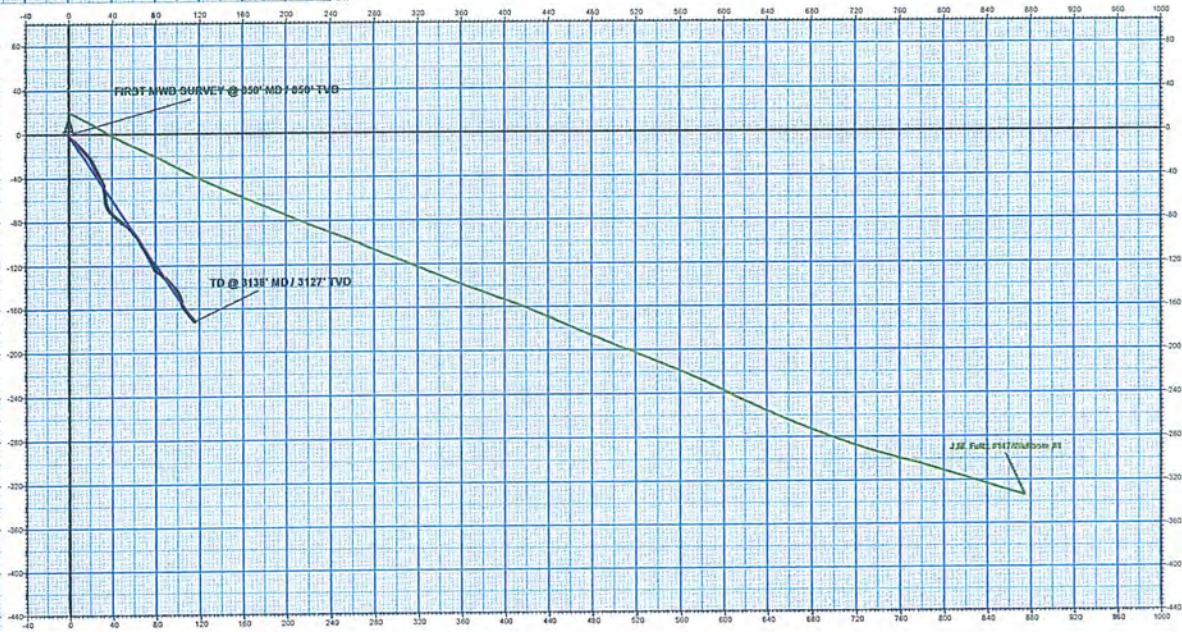
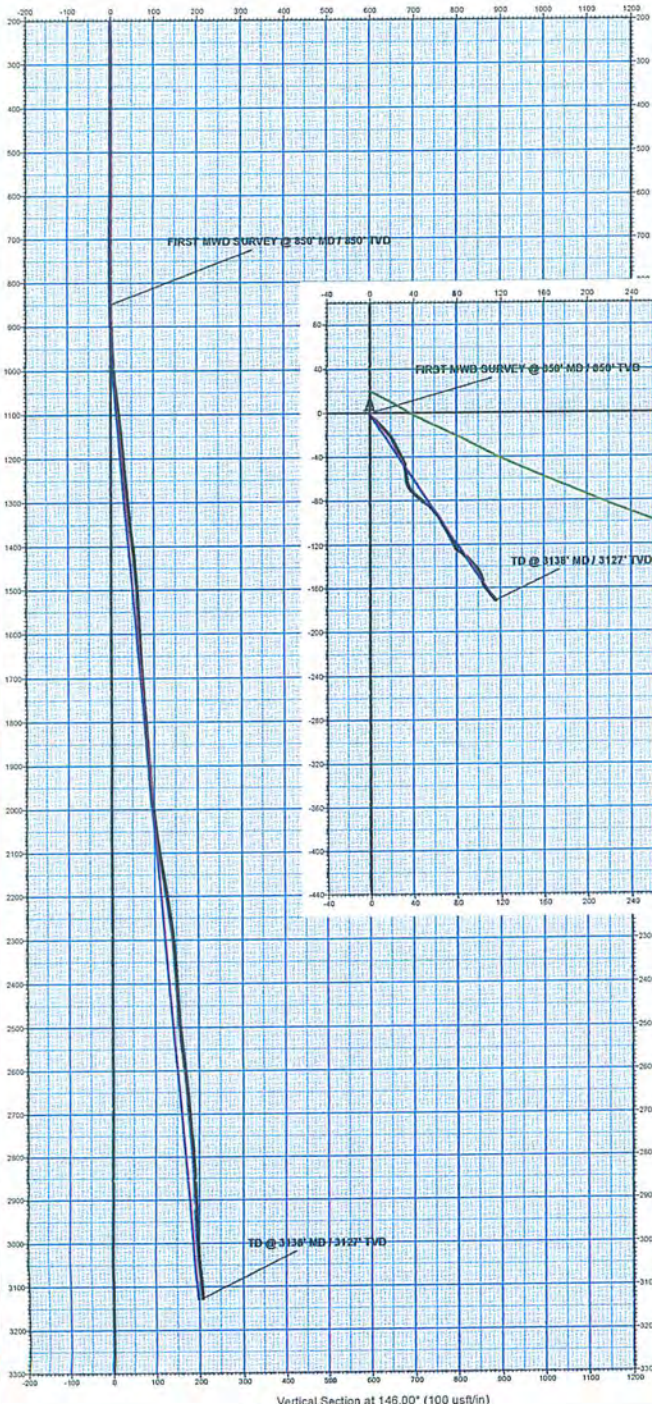


# HG Energy

**Azimuths to Grid North**

Correction: -8.96°

Magnetic Field  
 Strength: 52276.0snT  
 Dip Angle: 66.78°  
 Date: 4/4/2014  
 Model: IGRF2010



WELL DETAILS: J.M. Fultz #248

Ground Level:	1291.0		
+N/-S	+E/-W	Northing	Eastings
0.0	0.0	14261515.99	1779185.21
			39° 16' 14.100 N
			80° 30' 33.530 W

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Eastings	Latitude	Longitude
Target J.M. Fultz #248	2925.0	-149.2	100.7	14261366.76	1779295.97	39° 16' 12.819 N	80° 30' 33.530 W
- plan hits target center							

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
850.0	0.00	0.00	850.0	0.0	0.0	0.0	0.0	FIRST MWD SURVEY @ 850' MD / 850' TVD
3138.0	5.10	140.70	3127.0	-171.5	115.7	206.9	212.1	TD @ 3138' MD / 3127' TVD

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