

33.05757

HG Energy, LLC

Harrison County, West Virginia

W.F. Williams #136

W.F. Williams #136

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

11 August, 2014

RECEIVED
Office of Oil and Gas

OCT 07 2014

WV Department of
Environmental Protection



10/31/2014

33.05757

Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.F. Williams #136
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	MD Reference:	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

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.F. Williams #136				
Site Position:		Northing:	14,261,802.90 usft	Latitude:	39° 16' 16.800 N
From:	Lat/Long	Easting:	1,781,715.07 usft	Longitude:	80° 30' 2.600 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.32 °

Well	W.F. Williams #136					
Well Position	+N/-S	0.0 usft	Northing:	14,261,802.90 usft	Latitude:	39° 16' 16.800 N
	+E/-W	0.0 usft	Easting:	1,781,715.07 usft	Longitude:	80° 30' 2.600 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	1,155.0 usft	

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/1/2014	-8.67	66.75	52,237

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	342.00	

Survey Program	Date	8/8/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
650.0	3,047.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	14,261,802.90	1,781,715.07	39° 16' 16.800 N	80° 30' 2.600 W
650.0	0.00	0.00	650.0	0.0	0.0	14,261,802.90	1,781,715.07	39° 16' 16.800 N	80° 30' 2.600 W
Tie-in @ 650' MD / 650' TVD									
682.0	1.50	98.70	682.0	-0.1	0.4	14,261,802.84	1,781,715.49	39° 16' 16.799 N	80° 30' 2.595 W
712.0	1.30	68.40	712.0	0.0	1.1	14,261,802.90	1,781,716.19	39° 16' 16.800 N	80° 30' 2.586 W
742.0	1.80	13.30	742.0	0.6	1.5	14,261,803.49	1,781,716.61	39° 16' 16.806 N	80° 30' 2.580 W
772.0	3.00	352.10	772.0	1.8	1.5	14,261,804.72	1,781,716.62	39° 16' 16.818 N	80° 30' 2.580 W
802.0	4.30	347.00	801.9	3.7	1.2	14,261,806.60	1,781,716.25	39° 16' 16.836 N	80° 30' 2.585 W
832.0	5.80	344.10	831.8	6.2	0.5	14,261,809.15	1,781,715.59	39° 16' 16.862 N	80° 30' 2.593 W
862.0	7.20	341.10	861.6	9.5	-0.5	14,261,812.39	1,781,714.56	39° 16' 16.894 N	80° 30' 2.606 W
892.0	8.60	339.20	891.3	13.4	-1.9	14,261,816.26	1,781,713.16	39° 16' 16.932 N	80° 30' 2.623 W
922.0	9.80	339.10	920.9	17.8	-3.6	14,261,820.75	1,781,711.45	39° 16' 16.977 N	80° 30' 2.645 W

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Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	MD Reference:	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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
952.0	10.60	339.40	950.4	22.8	-5.5	14,261,825.71	1,781,709.57	39° 16' 17.026 N	80° 30' 2.668 W
982.0	11.60	339.80	979.9	28.2	-7.5	14,261,831.13	1,781,707.55	39° 16' 17.079 N	80° 30' 2.694 W
1,012.0	12.80	338.90	1,009.2	34.2	-9.8	14,261,837.06	1,781,705.32	39° 16' 17.138 N	80° 30' 2.722 W
1,042.0	13.90	338.60	1,038.4	40.6	-12.3	14,261,843.51	1,781,702.81	39° 16' 17.202 N	80° 30' 2.753 W
1,072.0	14.60	339.40	1,067.5	47.5	-14.9	14,261,850.41	1,781,700.16	39° 16' 17.271 N	80° 30' 2.786 W
1,102.0	15.30	340.10	1,096.4	54.8	-17.6	14,261,857.67	1,781,697.48	39° 16' 17.342 N	80° 30' 2.820 W
1,132.0	15.30	339.30	1,125.4	62.2	-20.3	14,261,865.09	1,781,694.74	39° 16' 17.416 N	80° 30' 2.854 W
1,162.0	15.60	339.30	1,154.3	69.7	-23.2	14,261,872.57	1,781,691.91	39° 16' 17.490 N	80° 30' 2.890 W
1,192.0	15.60	337.90	1,183.2	77.2	-26.1	14,261,880.08	1,781,688.97	39° 16' 17.565 N	80° 30' 2.927 W
1,222.0	15.70	338.20	1,212.1	84.7	-29.1	14,261,887.59	1,781,685.94	39° 16' 17.639 N	80° 30' 2.965 W
1,252.0	16.40	339.50	1,240.9	92.4	-32.1	14,261,895.32	1,781,682.95	39° 16' 17.716 N	80° 30' 3.002 W
1,282.0	16.50	341.10	1,269.7	100.4	-35.0	14,261,903.32	1,781,680.09	39° 16' 17.795 N	80° 30' 3.038 W
1,312.0	16.40	343.40	1,298.5	108.5	-37.6	14,261,911.41	1,781,677.50	39° 16' 17.875 N	80° 30' 3.070 W
1,342.0	16.10	344.70	1,327.3	116.6	-39.9	14,261,919.48	1,781,675.19	39° 16' 17.955 N	80° 30' 3.099 W
1,372.0	15.80	344.60	1,356.1	124.5	-42.1	14,261,927.43	1,781,673.01	39° 16' 18.034 N	80° 30' 3.126 W
1,402.0	15.70	343.70	1,385.0	132.4	-44.3	14,261,935.26	1,781,670.79	39° 16' 18.111 N	80° 30' 3.154 W
1,432.0	15.80	342.90	1,413.8	140.2	-46.6	14,261,943.06	1,781,668.45	39° 16' 18.188 N	80° 30' 3.183 W
1,462.0	15.60	341.40	1,442.7	147.9	-49.1	14,261,950.79	1,781,665.96	39° 16' 18.265 N	80° 30' 3.214 W
1,492.0	15.50	341.50	1,471.6	155.5	-51.7	14,261,958.41	1,781,663.40	39° 16' 18.340 N	80° 30' 3.246 W
1,522.0	15.80	342.70	1,500.5	163.2	-54.2	14,261,966.12	1,781,660.91	39° 16' 18.417 N	80° 30' 3.277 W
1,552.0	15.70	343.90	1,529.4	171.0	-56.5	14,261,973.91	1,781,658.57	39° 16' 18.494 N	80° 30' 3.307 W
1,582.0	14.90	341.80	1,558.3	178.6	-58.8	14,261,981.48	1,781,656.24	39° 16' 18.569 N	80° 30' 3.336 W
1,612.0	14.60	340.70	1,587.3	185.8	-61.3	14,261,988.71	1,781,653.79	39° 16' 18.640 N	80° 30' 3.366 W
1,642.0	15.00	341.00	1,616.3	193.0	-63.8	14,261,995.95	1,781,651.27	39° 16' 18.712 N	80° 30' 3.398 W
1,672.0	15.90	343.50	1,645.3	200.7	-66.2	14,262,003.56	1,781,648.84	39° 16' 18.788 N	80° 30' 3.428 W
1,702.0	16.10	344.20	1,674.1	208.6	-68.5	14,262,011.50	1,781,646.54	39° 16' 18.866 N	80° 30' 3.457 W
1,732.0	16.10	342.70	1,702.9	216.6	-70.9	14,262,019.48	1,781,644.17	39° 16' 18.945 N	80° 30' 3.487 W
1,762.0	16.40	342.60	1,731.7	224.6	-73.4	14,262,027.49	1,781,641.67	39° 16' 19.025 N	80° 30' 3.518 W
1,792.0	15.90	342.70	1,760.5	232.6	-75.9	14,262,035.46	1,781,639.18	39° 16' 19.103 N	80° 30' 3.549 W
1,822.0	15.70	343.30	1,789.4	240.4	-78.3	14,262,043.27	1,781,636.79	39° 16' 19.181 N	80° 30' 3.579 W
1,852.0	15.80	343.20	1,818.3	248.2	-80.6	14,262,051.07	1,781,634.45	39° 16' 19.258 N	80° 30' 3.608 W
1,882.0	15.80	342.40	1,847.1	256.0	-83.0	14,262,058.87	1,781,632.03	39° 16' 19.335 N	80° 30' 3.638 W
1,912.0	15.90	342.80	1,876.0	263.8	-85.5	14,262,066.69	1,781,629.58	39° 16' 19.413 N	80° 30' 3.669 W
1,942.0	15.90	341.70	1,904.9	271.6	-88.0	14,262,074.51	1,781,627.08	39° 16' 19.490 N	80° 30' 3.700 W
1,972.0	16.10	341.00	1,933.7	279.4	-90.6	14,262,082.35	1,781,624.43	39° 16' 19.568 N	80° 30' 3.733 W
2,002.0	15.60	339.70	1,962.6	287.2	-93.4	14,262,090.07	1,781,621.68	39° 16' 19.644 N	80° 30' 3.768 W
2,032.0	15.30	339.20	1,991.5	294.6	-96.2	14,262,097.55	1,781,618.87	39° 16' 19.718 N	80° 30' 3.803 W
2,062.0	15.40	339.40	2,020.4	302.1	-99.0	14,262,104.98	1,781,616.07	39° 16' 19.792 N	80° 30' 3.838 W
2,092.0	15.20	339.90	2,049.3	309.5	-101.8	14,262,112.40	1,781,613.31	39° 16' 19.866 N	80° 30' 3.873 W
2,122.0	15.50	340.60	2,078.3	317.0	-104.4	14,262,119.87	1,781,610.63	39° 16' 19.940 N	80° 30' 3.906 W
2,152.0	15.40	340.80	2,107.2	324.5	-107.1	14,262,127.42	1,781,607.99	39° 16' 20.014 N	80° 30' 3.939 W
2,182.0	15.30	341.60	2,136.1	332.0	-109.6	14,262,134.93	1,781,605.43	39° 16' 20.089 N	80° 30' 3.971 W
2,212.0	15.20	341.80	2,165.1	339.5	-112.1	14,262,142.43	1,781,602.95	39° 16' 20.163 N	80° 30' 4.002 W
2,242.0	15.00	341.70	2,194.0	346.9	-114.6	14,262,149.85	1,781,600.50	39° 16' 20.237 N	80° 30' 4.033 W
2,272.0	14.50	342.40	2,223.0	354.2	-116.9	14,262,157.11	1,781,598.15	39° 16' 20.309 N	80° 30' 4.062 W
2,302.0	14.80	343.30	2,252.1	361.5	-119.2	14,262,164.36	1,781,595.91	39° 16' 20.380 N	80° 30' 4.090 W
2,332.0	14.60	343.10	2,281.1	368.8	-121.4	14,262,171.65	1,781,593.71	39° 16' 20.453 N	80° 30' 4.118 W
2,362.0	14.40	341.10	2,310.1	375.9	-123.7	14,262,178.80	1,781,591.40	39° 16' 20.523 N	80° 30' 4.147 W
2,392.0	14.00	339.50	2,339.2	382.8	-126.1	14,262,185.73	1,781,588.92	39° 16' 20.592 N	80° 30' 4.178 W
2,422.0	13.60	338.40	2,368.3	389.5	-128.7	14,262,192.41	1,781,586.36	39° 16' 20.658 N	80° 30' 4.210 W
2,452.0	13.30	338.70	2,397.5	396.0	-131.3	14,262,198.90	1,781,583.80	39° 16' 20.722 N	80° 30' 4.242 W
2,482.0	13.10	339.10	2,426.7	402.4	-133.7	14,262,205.29	1,781,581.34	39° 16' 20.786 N	80° 30' 4.273 W
2,512.0	13.30	340.90	2,455.9	408.8	-136.1	14,262,211.73	1,781,579.00	39° 16' 20.850 N	80° 30' 4.302 W
2,542.0	13.80	342.20	2,485.1	415.5	-138.3	14,262,218.40	1,781,576.77	39° 16' 20.916 N	80° 30' 4.330 W
2,572.0	14.30	343.80	2,514.2	422.5	-140.4	14,262,225.36	1,781,574.64	39° 16' 20.985 N	80° 30' 4.357 W

OFFICE OF THE STATE GEOLOGIST
 WEST VIRGINIA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
 2014

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Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.F. Williams #136
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	MD Reference:	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,602.0	14.20	344.10	2,543.3	429.6	-142.5	14,262,232.46	1,781,572.60	39° 16' 21.055 N	80° 30' 4.382 W
2,632.0	14.20	344.60	2,572.4	436.6	-144.5	14,262,239.54	1,781,570.62	39° 16' 21.125 N	80° 30' 4.407 W
2,662.0	14.10	345.40	2,601.4	443.7	-146.4	14,262,246.63	1,781,568.72	39° 16' 21.195 N	80° 30' 4.431 W
2,692.0	13.70	343.60	2,630.6	450.7	-148.3	14,262,253.57	1,781,566.80	39° 16' 21.264 N	80° 30' 4.454 W
2,722.0	13.00	343.40	2,659.8	457.3	-150.2	14,262,260.21	1,781,564.83	39° 16' 21.330 N	80° 30' 4.479 W
2,752.0	12.40	342.90	2,689.0	463.6	-152.2	14,262,266.53	1,781,562.92	39° 16' 21.392 N	80° 30' 4.503 W
2,782.0	12.10	339.10	2,718.3	469.6	-154.2	14,262,272.54	1,781,560.85	39° 16' 21.452 N	80° 30' 4.529 W
2,812.0	12.50	337.20	2,747.7	475.6	-156.6	14,262,278.47	1,781,558.47	39° 16' 21.511 N	80° 30' 4.559 W
2,842.0	12.20	335.90	2,777.0	481.5	-159.2	14,262,284.36	1,781,555.92	39° 16' 21.569 N	80° 30' 4.591 W
2,872.0	11.40	334.10	2,806.3	487.0	-161.7	14,262,289.92	1,781,553.33	39° 16' 21.624 N	80° 30' 4.623 W
2,902.0	10.60	335.10	2,835.8	492.2	-164.2	14,262,295.09	1,781,550.87	39° 16' 21.675 N	80° 30' 4.654 W
2,932.0	9.60	333.70	2,865.3	496.9	-166.5	14,262,299.83	1,781,548.60	39° 16' 21.722 N	80° 30' 4.683 W
2,962.0	8.50	333.20	2,894.9	501.2	-168.6	14,262,304.06	1,781,546.49	39° 16' 21.764 N	80° 30' 4.709 W
2,992.0	7.70	333.00	2,924.6	504.9	-170.5	14,262,307.83	1,781,544.58	39° 16' 21.802 N	80° 30' 4.733 W
3,047.0	6.60	333.00	2,979.2	511.0	-173.6	14,262,313.93	1,781,541.47	39° 16' 21.862 N	80° 30' 4.772 W

TD @ 3047' MD / 2979' TVD

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
650.0	650.0	0.0	0.0	Tie-in @ 650' MD / 650' TVD
3,047.0	2,979.2	511.0	-173.6	TD @ 3047' MD / 2979' TVD

Checked By: _____ Approved By: _____ Date: _____

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Survey Calculation Method: Minimum Curvature
Database: EDM Compass

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.F. Williams #136		
Site Position:	Northing: 14,261,802.90 usft	Latitude: 39° 16' 16.800 N
From: Lat/Long	Easting: 1,781,715.07 usft	Longitude: 80° 30' 2.600 W
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.32 °

Well W.F. Williams #136		
Well Position +N/-S 0.0 usft	Northing: 14,261,802.90 usft	Latitude: 39° 16' 16.800 N
+E/-W 0.0 usft	Easting: 1,781,715.07 usft	Longitude: 80° 30' 2.600 W
Position Uncertainty 0.0 usft	Wellhead Elevation: 0.0 usft	Ground Level: 1,155.0 usft

Wellbore Wellbore #1					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/1/2014	-8.67	66.75	52,237

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	342.00

Survey Program		Date 8/8/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
650.0	3,047.0	MWD (Wellbore #1)	MWD default	MWD - Standard

HG Energy EOW Report



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Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
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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		
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.00	0.0	0.00		
Tie-in @ 650' MD / 650' TVD											
682.0	1.50	98.70	682.0	-0.1	0.4	-0.2	4.69	0.4	98.70		
712.0	1.30	68.40	712.0	0.0	1.1	-0.3	2.52	1.1	89.87		
742.0	1.80	13.30	742.0	0.6	1.5	0.1	5.00	1.7	69.20		
772.0	3.00	352.10	772.0	1.8	1.5	1.3	4.91	2.4	40.27		
802.0	4.30	347.00	801.9	3.7	1.2	3.1	4.46	3.9	17.75		
832.0	5.80	344.10	831.8	6.2	0.5	5.8	5.07	6.3	4.71		
862.0	7.20	341.10	861.6	9.5	-0.5	9.2	4.80	9.5	356.93		
892.0	8.60	339.20	891.3	13.4	-1.9	13.3	4.75	13.5	351.84		
922.0	9.80	339.10	920.9	17.8	-3.6	18.1	4.00	18.2	348.52		
952.0	10.60	339.40	950.4	22.8	-5.5	23.4	2.67	23.5	346.43		
982.0	11.60	339.80	979.9	28.2	-7.5	29.2	3.34	29.2	345.09		
1,012.0	12.80	338.90	1,009.2	34.2	-9.8	35.5	4.05	35.5	344.06		
1,042.0	13.90	338.60	1,038.4	40.6	-12.3	42.4	3.67	42.4	343.19		
1,072.0	14.60	339.40	1,067.5	47.5	-14.9	49.8	2.42	49.8	342.57		
1,102.0	15.30	340.10	1,096.4	54.8	-17.6	57.5	2.41	57.5	342.20		
1,132.0	15.30	339.30	1,125.4	62.2	-20.3	65.4	0.70	65.4	341.89		
1,162.0	15.60	339.30	1,154.3	69.7	-23.2	73.4	1.00	73.4	341.61		
1,192.0	15.60	337.90	1,183.2	77.2	-26.1	81.5	1.25	81.5	341.31		
1,222.0	15.70	338.20	1,212.1	84.7	-29.1	89.5	0.43	89.6	341.02		
1,252.0	16.40	339.50	1,240.9	92.4	-32.1	97.8	2.62	97.8	340.84		
1,282.0	16.50	341.10	1,269.7	100.4	-35.0	106.3	1.55	106.3	340.79		
1,312.0	16.40	343.40	1,298.5	108.5	-37.6	114.8	2.20	114.8	340.90		
1,342.0	16.10	344.70	1,327.3	116.6	-39.9	123.2	1.57	123.2	341.12		
1,372.0	15.80	344.60	1,356.1	124.5	-42.1	131.4	1.00	131.4	341.34		

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HG Energy EOW Report



Company: HG Energy, LLC	Local Co-ordinate Reference: Well W.F. Williams #136
Project: Harrison County, West Virginia	TVD Reference: WELL @ 1163.0usft (Decker #9)
Site: W.F. Williams #136	MD Reference: WELL @ 1163.0usft (Decker #9)
Well: W.F. Williams #136	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: EDM Compass

3305757

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)		
1,402.0	15.70	343.70	1,385.0	132.4	-44.3	139.6	0.88	139.6	341.50		
1,432.0	15.80	342.90	1,413.8	140.2	-46.6	147.7	0.80	147.7	341.60		
1,462.0	15.60	341.40	1,442.7	147.9	-49.1	155.8	1.51	155.8	341.63		
1,492.0	15.50	341.50	1,471.6	155.5	-51.7	163.9	0.35	163.9	341.62		
1,522.0	15.80	342.70	1,500.5	163.2	-54.2	172.0	1.47	172.0	341.64		
1,552.0	15.70	343.90	1,529.4	171.0	-56.5	180.1	1.14	180.1	341.72		
1,582.0	14.90	341.80	1,558.3	178.6	-58.8	188.0	3.24	188.0	341.77		
1,612.0	14.60	340.70	1,587.3	185.8	-61.3	195.7	1.37	195.7	341.75		
1,642.0	15.00	341.00	1,616.3	193.0	-63.8	203.3	1.36	203.3	341.71		
1,672.0	15.90	343.50	1,645.3	200.7	-66.2	211.3	3.73	211.3	341.73		
1,702.0	16.10	344.20	1,674.1	208.6	-68.5	219.6	0.93	219.6	341.81		
1,732.0	16.10	342.70	1,702.9	216.6	-70.9	227.9	1.39	227.9	341.87		
1,762.0	16.40	342.60	1,731.7	224.6	-73.4	236.3	1.00	236.3	341.90		
1,792.0	15.90	342.70	1,760.5	232.6	-75.9	244.6	1.67	244.6	341.93		
1,822.0	15.70	343.30	1,789.4	240.4	-78.3	252.8	0.86	252.8	341.96		
1,852.0	15.80	343.20	1,818.3	248.2	-80.6	260.9	0.35	260.9	342.00		
1,882.0	15.80	342.40	1,847.1	256.0	-83.0	269.1	0.73	269.1	342.03		
1,912.0	15.90	342.80	1,876.0	263.8	-85.5	277.3	0.49	277.3	342.04		
1,942.0	15.90	341.70	1,904.9	271.6	-88.0	285.5	1.00	285.5	342.05		
1,972.0	16.10	341.00	1,933.7	279.4	-90.6	293.8	0.93	293.8	342.03		
2,002.0	15.60	339.70	1,962.6	287.2	-93.4	302.0	2.04	302.0	341.98		
2,032.0	15.30	339.20	1,991.5	294.6	-96.2	310.0	1.09	310.0	341.92		
2,062.0	15.40	339.40	2,020.4	302.1	-99.0	317.9	0.38	317.9	341.85		
2,092.0	15.20	339.90	2,049.3	309.5	-101.8	325.8	0.80	325.8	341.80		
2,122.0	15.50	340.60	2,078.3	317.0	-104.4	333.7	1.18	333.7	341.76		
2,152.0	15.40	340.80	2,107.2	324.5	-107.1	341.7	0.38	341.7	341.74		
2,182.0	15.30	341.60	2,136.1	332.0	-109.6	349.7	0.78	349.7	341.73		

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HG Energy EOW Report



Company: HG Energy, LLC
 Project: Harrison County, West Virginia
 Site: W.F. Williams #136
 Well: W.F. Williams #136
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well W.F. Williams #136
 TVD Reference: WELL @ 1163.0usft (Decker #9)
 MD Reference: WELL @ 1163.0usft (Decker #9)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM Compass

33.05757

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,212.0	15.20	341.80	2,165.1	339.5	-112.1	357.6	0.38	357.6	341.73
2,242.0	15.00	341.70	2,194.0	346.9	-114.6	365.4	0.67	365.4	341.73
2,272.0	14.50	342.40	2,223.0	354.2	-116.9	373.0	1.77	373.0	341.73
2,302.0	14.80	343.30	2,252.1	361.5	-119.2	380.6	1.26	380.6	341.75
2,332.0	14.60	343.10	2,281.1	368.8	-121.4	388.2	0.69	388.2	341.78
2,362.0	14.40	341.10	2,310.1	375.9	-123.7	395.7	1.80	395.7	341.79
2,392.0	14.00	339.50	2,339.2	382.8	-126.1	403.1	1.87	403.1	341.76
2,422.0	13.60	338.40	2,368.3	389.5	-128.7	410.2	1.59	410.2	341.71
2,452.0	13.30	338.70	2,397.5	396.0	-131.3	417.2	1.03	417.2	341.66
2,482.0	13.10	339.10	2,426.7	402.4	-133.7	424.0	0.73	424.0	341.62
2,512.0	13.30	340.90	2,455.9	408.8	-136.1	430.9	1.52	430.9	341.59
2,542.0	13.80	342.20	2,485.1	415.5	-138.3	437.9	1.95	437.9	341.59
2,572.0	14.30	343.80	2,514.2	422.5	-140.4	445.2	2.11	445.2	341.61
2,602.0	14.20	344.10	2,543.3	429.6	-142.5	452.6	0.41	452.6	341.65
2,632.0	14.20	344.60	2,572.4	436.6	-144.5	459.9	0.41	459.9	341.69
2,662.0	14.10	345.40	2,601.4	443.7	-146.4	467.2	0.73	467.2	341.75
2,692.0	13.70	343.60	2,630.6	450.7	-148.3	474.4	1.96	474.4	341.79
2,722.0	13.00	343.40	2,659.8	457.3	-150.2	481.4	2.34	481.4	341.81
2,752.0	12.40	342.90	2,689.0	463.6	-152.2	488.0	2.03	488.0	341.83
2,782.0	12.10	339.10	2,718.3	469.6	-154.2	494.3	2.87	494.3	341.82
2,812.0	12.50	337.20	2,747.7	475.6	-156.6	500.7	1.90	500.7	341.77
2,842.0	12.20	335.90	2,777.0	481.5	-159.2	507.1	1.36	507.1	341.71
2,872.0	11.40	334.10	2,806.3	487.0	-161.7	513.2	2.94	513.2	341.63
2,902.0	10.60	335.10	2,835.8	492.2	-164.2	518.8	2.74	518.9	341.55
2,932.0	9.60	333.70	2,865.3	496.9	-166.5	524.1	3.43	524.1	341.48
2,962.0	8.50	333.20	2,894.9	501.2	-168.6	528.7	3.66	528.7	341.41
2,992.0	7.70	333.00	2,924.6	504.9	-170.5	532.9	2.67	532.9	341.34

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HG Energy EOW Report



33.05757

Company: HG Energy, LLC	Local Co-ordinate Reference: Well W.F. Williams #136
Project: Harrison County, West Virginia	TVD Reference: WELL @ 1163.0usft (Decker #9)
Site: W.F. Williams #136	MD Reference: WELL @ 1163.0usft (Decker #9)
Well: W.F. Williams #136	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	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 (")
3,047.0	6.60	333.00	2,979.2	511.0	-173.6	539.7	2.00	539.7	341.24
TD @ 3047' MD / 2979' TVD									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
650.0	650.0	0.0	0.0	Tie-in @ 650' MD / 650' TVD
3,047.0	2,979.2	511.0	-173.6	TD @ 3047' MD / 2979' TVD

Checked By: _____ Approved By: _____ Date: _____

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 WV Department of
 Environmental Protection

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W.F. Williams #136
 Harrison County, West Virginia
 Q140815 & AM-140764
 Design #1

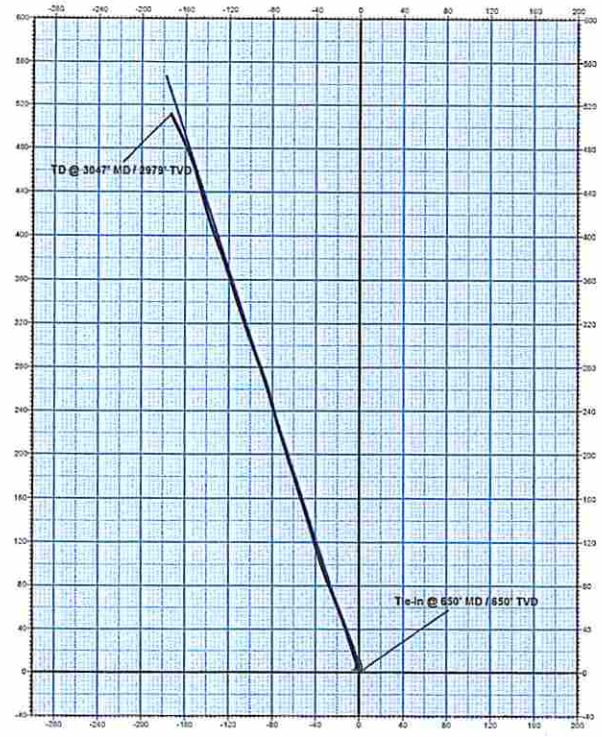
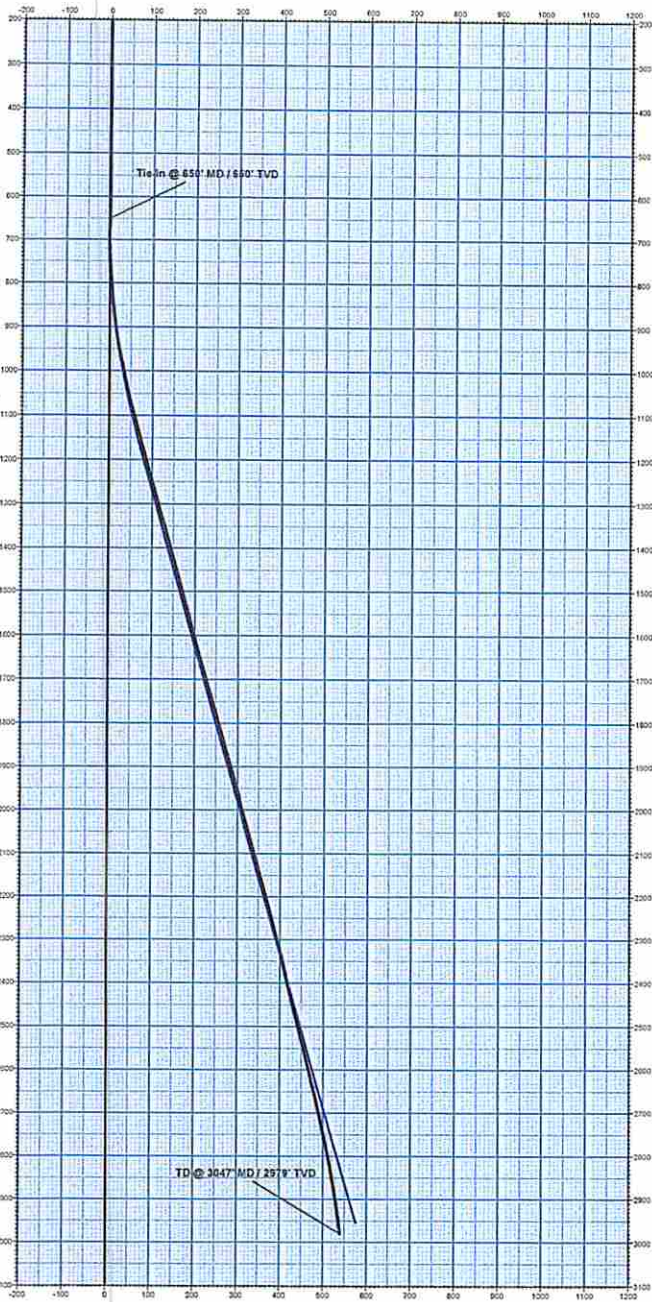
Company Name: HG Energy, LLC
 W.F. Williams #136
 Harrison County, West Virginia
 Rig: Decker #9
 Created By: Will Jircik
 Date: 08/08/2014

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: -8.99°
 Magnetic Field Strength: 52236.6snT
 Dip Angle: 66.75°
 Date: 8/1/2014
 Model: IGRF2010



WELL DETAILS:		W.F. Williams #136			
Ground Level:		1155.0			
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14261002.50	1701715.07	39° 16' 16.800 N	80° 30' 2.600 W

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DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
Target W.F. Williams #136	2768.0	494.5	-160.7	14262297.45	1701554.38	39° 15' 21.698 N	80° 30' 4.609 W
- plan hits target center							

WV Department of Environment

ANNOTATIONS								
MD	Inc.	Azi	TVD	+N-S	+E-W	Vsect	Departure	Annotation
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.0	Tie-in @ 650' MD / 650' TVD
3047.0	6.60	333.00	2979.2	511.0	-173.6	519.7	642.3	TD @ 3047' MD / 2978' TVD

Vertical Section at 342.00° (100 usf/in)

10/31/2014

33-05757

W.F. Williams #136
 Harrison County, West Virginia
 Q140815 & AM-140764
 Design #1

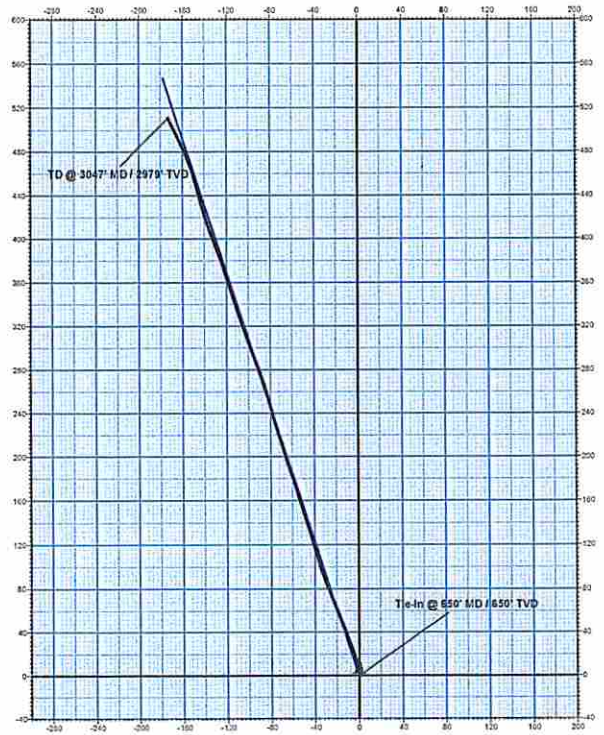
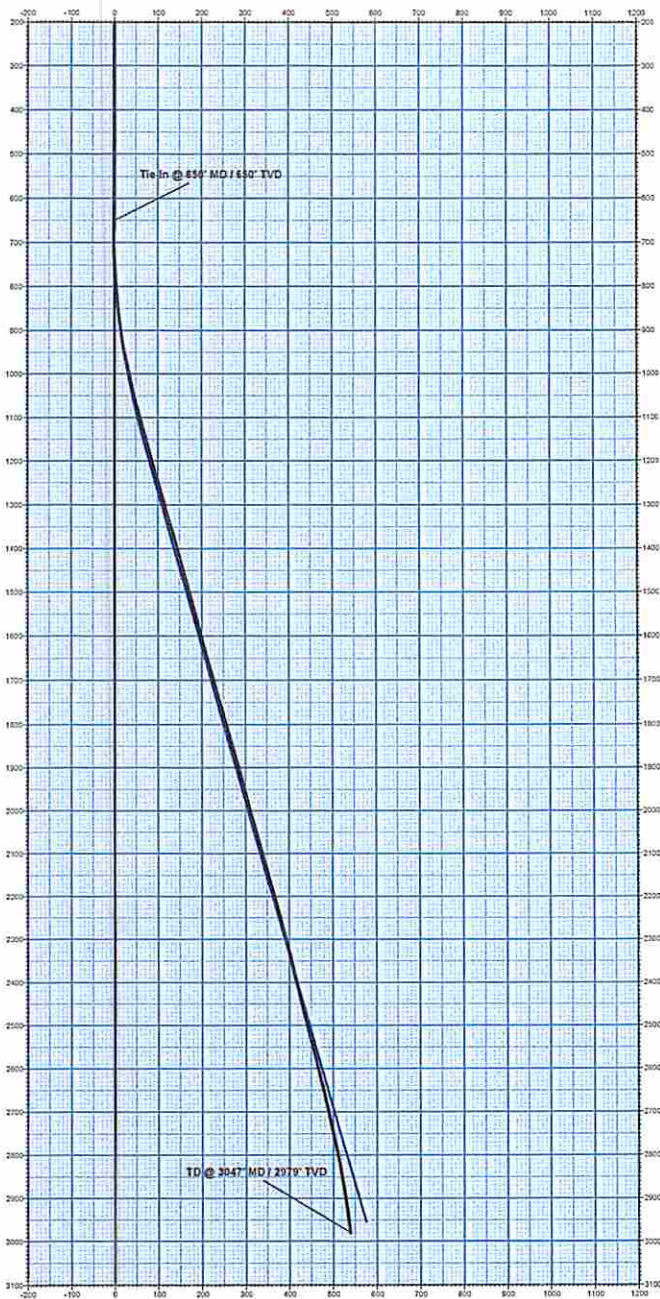
Company Name: HG Energy, LLC
 W.F. Williams #136
 Harrison County, West Virginia
 Rig: Decker #9
 Created By: Will Jircik
 Date: 08/08/2014

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: -8.99°
 Magnetic Field
 Strength: 52236.6snT
 Dip Angle: 66.75°
 Date: 8/1/2014
 Model: IGRF2010



WELL DETAILS: W.F. Williams #136

Ground Level:	1155.0
*N/S	*E/W
0.0	0.0
Northing	Easting
14261802.59	1781715.07
Latitude	Longitude
33° 15' 16.900 N	80° 30' 2.600 W

DESIGN TARGET DETAILS

Name	TVD	*N/S	*E/W	Northing	Easting	Latitude	Longitude
Target W.F. Williams #136	2783.0	404.5	-160.7	14262297.45	1781554.39	33° 15' 21.698 N	80° 30' 4.609 W
- plan hits target center							

ANNOTATIONS

MD	Inc	Adj	TVD	*N/S	*E/W	Vsect	Departure	Annotation
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.0	Tie-in @ 650' MD / 650' TVD
3047.0	6.60	332.00	2979.2	511.0	-173.6	539.7	542.3	TD @ 3047' MD / 2979' TVD

Vertical Section at 342.00' (100 usf/in)

10/31/2014