

HG Energy, LLC

Lincoln County, West Virginia

Austin Griffith #160

Austin Griffith #160

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

02 October, 2015

**Received
Office of Oil & Gas**

NOV 25 2015



02/19/2016

HP
Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well Austin Griffith #160
Project:	Lincoln County, West Virginia	TVD Reference:	WELL @ 696.0usft (Decker #9)
Site:	Austin Griffith #160	MD Reference:	WELL @ 696.0usft (Decker #9)
Well:	Austin Griffith #160	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Project	Lincoln 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	Austin Griffith #160				
Site Position:	Northing:	13,882,002.61 usft	Latitude:	38° 13' 30.700 N	
From:	Lat/Long	Easting:	1,362,852.30 usft	Longitude:	81° 57' 59.600 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.60 °

Well	Austin Griffith #160					
Well Position	+N/-S	0.0 usft	Northing:	13,882,002.61 usft	Latitude:	38° 13' 30.700 N
	+E/-W	0.0 usft	Easting:	1,362,852.30 usft	Longitude:	81° 57' 59.600 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	688.0 usft	

Wellbore	Wellbore #1			
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/2/2015	-7.42	66.03	51,713

Design	Wellbore #1			
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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	113.06

Survey Program	Date	10/2/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
376.0	2,530.0	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	13,882,002.61	1,362,852.30	38° 13' 30.700 N	81° 57' 59.600 W
376.0	0.22	194.07	376.0	-0.7	-0.2	13,882,001.91	1,362,852.13	38° 13' 30.693 N	81° 57' 59.602 W
First MWD Survey @ 376' MD / 376' TVD									
406.0	0.22	182.66	406.0	-0.8	-0.2	13,882,001.79	1,362,852.11	38° 13' 30.692 N	81° 57' 59.602 W
436.0	0.71	138.37	436.0	-1.0	-0.1	13,882,001.60	1,362,852.23	38° 13' 30.690 N	81° 57' 59.601 W
466.0	2.39	117.26	466.0	-1.4	0.6	13,882,001.17	1,362,852.91	38° 13' 30.686 N	81° 57' 59.592 W
496.0	4.11	111.49	495.9	-2.1	2.2	13,882,000.49	1,362,854.47	38° 13' 30.679 N	81° 57' 59.573 W
526.0	5.61	112.46	525.8	-3.1	4.5	13,881,999.54	1,362,856.82	38° 13' 30.670 N	81° 57' 59.543 W
556.0	7.51	114.58	555.6	-4.4	7.7	13,881,998.16	1,362,859.96	38° 13' 30.657 N	81° 57' 59.503 W
586.0	9.50	111.98	585.3	-6.2	11.7	13,881,996.42	1,362,864.04	38° 13' 30.640 N	81° 57' 59.452 W
616.0	11.40	105.45	614.8	-7.9	16.9	13,881,994.70	1,362,869.20	38° 13' 30.624 N	81° 57' 59.387 W
646.0	12.59	104.66	644.1	-9.5	22.9	13,881,993.08	1,362,875.22	38° 13' 30.608 N	81° 57' 59.312 W

Received



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well Austin Griffith #160
Project:	Lincoln County, West Virginia	TVD Reference:	WELL @ 696.0usft (Decker #9)
Site:	Austin Griffith #160	MD Reference:	WELL @ 696.0usft (Decker #9)
Well:	Austin Griffith #160	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
676.0	14.01	103.78	673.3	-11.2	29.6	13,881,991.39	1,362,881.91	38° 13' 30.592 N	81° 57' 59.227 W
706.0	15.60	103.47	702.3	-13.0	37.1	13,881,989.59	1,362,889.36	38° 13' 30.575 N	81° 57' 59.134 W
736.0	17.50	102.06	731.1	-14.9	45.4	13,881,987.70	1,362,897.69	38° 13' 30.557 N	81° 57' 59.029 W
766.0	18.78	102.06	759.6	-16.9	54.5	13,881,985.75	1,362,906.83	38° 13' 30.539 N	81° 57' 58.914 W
796.0	19.62	104.09	787.9	-19.1	64.1	13,881,983.52	1,362,916.43	38° 13' 30.518 N	81° 57' 58.794 W
826.0	20.81	105.76	816.1	-21.8	74.1	13,881,980.84	1,362,926.45	38° 13' 30.492 N	81° 57' 58.668 W
856.0	22.09	108.19	844.0	-25.0	84.6	13,881,977.64	1,362,936.94	38° 13' 30.462 N	81° 57' 58.536 W
886.0	23.20	111.67	871.7	-28.9	95.5	13,881,973.69	1,362,947.79	38° 13' 30.424 N	81° 57' 58.399 W
916.0	24.61	114.88	899.1	-33.7	106.6	13,881,968.88	1,362,958.95	38° 13' 30.378 N	81° 57' 58.259 W
946.0	25.98	117.48	926.3	-39.4	118.1	13,881,963.22	1,362,970.44	38° 13' 30.323 N	81° 57' 58.114 W
976.0	27.40	119.16	953.1	-45.8	130.0	13,881,956.82	1,362,982.30	38° 13' 30.261 N	81° 57' 57.965 W
1,006.0	28.59	121.89	979.5	-52.9	142.1	13,881,949.67	1,362,994.43	38° 13' 30.191 N	81° 57' 57.812 W
1,036.0	29.12	123.26	1,005.8	-60.7	154.3	13,881,941.87	1,363,006.62	38° 13' 30.115 N	81° 57' 57.658 W
1,066.0	29.12	123.17	1,032.0	-68.7	166.5	13,881,933.88	1,363,018.84	38° 13' 30.038 N	81° 57' 57.504 W
1,096.0	28.90	122.86	1,058.3	-76.7	178.7	13,881,925.95	1,363,031.04	38° 13' 29.960 N	81° 57' 57.350 W
1,126.0	28.81	123.08	1,084.5	-84.5	190.9	13,881,918.07	1,363,043.18	38° 13' 29.884 N	81° 57' 57.196 W
1,156.0	29.30	122.77	1,110.8	-92.5	203.1	13,881,910.15	1,363,055.41	38° 13' 29.807 N	81° 57' 57.042 W
1,186.0	29.78	122.38	1,136.9	-100.4	215.6	13,881,902.19	1,363,067.88	38° 13' 29.729 N	81° 57' 56.885 W
1,216.0	29.92	122.29	1,162.9	-108.4	228.2	13,881,894.20	1,363,080.49	38° 13' 29.652 N	81° 57' 56.726 W
1,246.0	29.78	122.07	1,188.9	-116.4	240.8	13,881,886.25	1,363,093.13	38° 13' 29.574 N	81° 57' 56.566 W
1,276.0	29.70	121.76	1,215.0	-124.2	253.5	13,881,878.38	1,363,105.77	38° 13' 29.498 N	81° 57' 56.407 W
1,306.0	30.00	121.76	1,241.0	-132.1	266.2	13,881,870.52	1,363,118.46	38° 13' 29.421 N	81° 57' 56.247 W
1,336.0	30.31	121.58	1,266.9	-140.0	279.0	13,881,862.61	1,363,131.29	38° 13' 29.345 N	81° 57' 56.085 W
1,366.0	30.71	121.36	1,292.8	-147.9	292.0	13,881,854.66	1,363,144.28	38° 13' 29.267 N	81° 57' 55.921 W
1,396.0	30.58	121.27	1,318.6	-155.9	305.0	13,881,846.71	1,363,157.34	38° 13' 29.190 N	81° 57' 55.756 W
1,426.0	28.99	120.97	1,344.6	-163.6	317.8	13,881,839.01	1,363,170.10	38° 13' 29.115 N	81° 57' 55.595 W
1,456.0	27.22	119.69	1,371.1	-170.7	330.0	13,881,831.87	1,363,182.29	38° 13' 29.046 N	81° 57' 55.441 W
1,486.0	25.32	118.28	1,398.0	-177.2	341.6	13,881,825.43	1,363,193.90	38° 13' 28.983 N	81° 57' 55.295 W
1,516.0	24.22	117.09	1,425.2	-183.0	352.7	13,881,819.59	1,363,205.03	38° 13' 28.927 N	81° 57' 55.155 W
1,546.0	23.11	116.07	1,452.7	-188.4	363.5	13,881,814.20	1,363,215.80	38° 13' 28.875 N	81° 57' 55.019 W
1,576.0	22.89	115.15	1,480.3	-193.5	374.1	13,881,809.13	1,363,226.37	38° 13' 28.826 N	81° 57' 54.886 W
1,606.0	23.20	114.97	1,507.9	-198.4	384.7	13,881,804.16	1,363,237.01	38° 13' 28.777 N	81° 57' 54.752 W
1,636.0	23.42	114.49	1,535.5	-203.4	395.5	13,881,799.19	1,363,247.79	38° 13' 28.729 N	81° 57' 54.616 W
1,666.0	23.51	114.27	1,563.0	-208.3	406.4	13,881,794.26	1,363,258.67	38° 13' 28.682 N	81° 57' 54.479 W
1,696.0	23.60	114.97	1,590.5	-213.3	417.3	13,881,789.27	1,363,269.57	38° 13' 28.634 N	81° 57' 54.342 W
1,726.0	23.51	114.18	1,618.0	-218.3	428.2	13,881,784.28	1,363,280.47	38° 13' 28.585 N	81° 57' 54.205 W
1,756.0	23.51	114.75	1,645.5	-223.3	439.1	13,881,779.32	1,363,291.36	38° 13' 28.537 N	81° 57' 54.067 W
1,786.0	23.29	114.09	1,673.0	-228.2	449.9	13,881,774.40	1,363,302.21	38° 13' 28.490 N	81° 57' 53.931 W
1,816.0	22.01	114.27	1,700.7	-232.9	460.4	13,881,769.67	1,363,312.75	38° 13' 28.444 N	81° 57' 53.798 W
1,846.0	21.52	113.39	1,728.6	-237.4	470.6	13,881,765.17	1,363,322.93	38° 13' 28.401 N	81° 57' 53.670 W
1,876.0	21.30	112.86	1,756.5	-241.7	480.7	13,881,760.87	1,363,333.00	38° 13' 28.359 N	81° 57' 53.543 W
1,906.0	20.90	110.39	1,784.5	-245.7	490.7	13,881,756.89	1,363,343.04	38° 13' 28.321 N	81° 57' 53.417 W
1,936.0	21.21	106.56	1,812.5	-249.1	500.9	13,881,753.48	1,363,353.25	38° 13' 28.288 N	81° 57' 53.288 W
1,966.0	21.52	105.98	1,840.4	-252.2	511.4	13,881,750.42	1,363,363.74	38° 13' 28.259 N	81° 57' 53.156 W
1,996.0	22.40	105.59	1,868.2	-255.2	522.2	13,881,747.36	1,363,374.54	38° 13' 28.230 N	81° 57' 53.021 W
2,026.0	23.11	104.88	1,895.9	-258.3	533.4	13,881,744.32	1,363,385.74	38° 13' 28.201 N	81° 57' 52.880 W
2,056.0	23.11	102.77	1,923.5	-261.1	544.9	13,881,741.50	1,363,397.17	38° 13' 28.174 N	81° 57' 52.736 W
2,086.0	22.80	101.18	1,951.1	-263.5	556.3	13,881,739.08	1,363,408.61	38° 13' 28.152 N	81° 57' 52.592 W
2,116.0	22.80	100.25	1,978.8	-265.7	567.7	13,881,736.91	1,363,420.04	38° 13' 28.131 N	81° 57' 52.449 W
2,146.0	23.29	99.37	2,006.4	-267.7	579.3	13,881,734.91	1,363,431.61	38° 13' 28.113 N	81° 57' 52.304 W
2,176.0	24.22	97.96	2,033.8	-269.5	591.3	13,881,733.10	1,363,443.55	38° 13' 28.096 N	81° 57' 52.154 W
2,206.0	24.70	97.87	2,061.2	-271.2	603.6	13,881,731.39	1,363,455.86	38° 13' 28.080 N	81° 57' 51.999 W
2,236.0	25.10	98.76	2,088.4	-273.0	616.1	13,881,729.56	1,363,468.35	38° 13' 28.064 N	81° 57' 51.842 W
2,266.0	26.20	98.49	2,115.4	-275.0	628.9	13,881,727.61	1,363,481.19	38° 13' 28.046 N	81° 57' 51.681 W
2,326.0	27.31	98.36	2,142.9	-279.0	655.6	13,881,723.65	1,363,507.91	38° 13' 28.009 N	81° 57' 51.346 W

HP
Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well Austin Griffith #160
Project:	Lincoln County, West Virginia	TVD Reference:	WELL @ 696.0usft (Decker #9)
Site:	Austin Griffith #160	MD Reference:	WELL @ 696.0usft (Decker #9)
Well:	Austin Griffith #160	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,356.0	25.98	97.08	2,195.8	-280.8	668.9	13,881,721.84	1,363,521.24	38° 13' 27.993 N	81° 57' 51.178 W
2,386.0	23.99	94.17	2,223.0	-282.0	681.5	13,881,720.59	1,363,533.85	38° 13' 27.982 N	81° 57' 51.020 W
2,416.0	21.79	93.86	2,250.6	-282.8	693.2	13,881,719.77	1,363,545.49	38° 13' 27.975 N	81° 57' 50.874 W
2,446.0	19.49	92.59	2,278.7	-283.4	703.7	13,881,719.17	1,363,556.04	38° 13' 27.970 N	81° 57' 50.742 W
2,530.0	19.49	92.59	2,357.9	-284.7	731.7	13,881,717.90	1,363,584.04	38° 13' 27.960 N	81° 57' 50.391 W

TD @ 2530' MD / 2358' TVD

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
376.0	376.0	-0.7	-0.2	First MWD Survey @ 376' MD / 376' TVD
2,530.0	2,357.9	-284.7	731.7	TD @ 2530' MD / 2358' TVD

Checked By: _____ Approved By: _____ Date: _____

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NOV 25 2015

HG Energy, LLC

Lincoln County, West Virginia

Austin Griffith #160

Austin Griffith #160

Wellbore #1

Design: Wellbore #1

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Company: HG Energy, LLC	Local Co-ordinate Reference: Well Austin Griffith #160
Project: Lincoln County, West Virginia	TVD Reference: WELL @ 696.0usft (Decker #9)
Site: Austin Griffith #160	MD Reference: WELL @ 696.0usft (Decker #9)
Well: Austin Griffith #160	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: Compass

Project Lincoln 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 Austin Griffith #160		
Site Position:	Northing: 13,882,002.61 usft	Latitude: 38° 13' 30.700 N
From: Lat/Long	Easting: 1,362,852.30 usft	Longitude: 81° 57' 59.600 W
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: -0.60 °

Well Austin Griffith #160		
Well Position +N/-S 0.0 usft	Northing: 13,882,002.61 usft	Latitude: 38° 13' 30.700 N
+E/-W 0.0 usft	Easting: 1,362,852.30 usft	Longitude: 81° 57' 59.600 W
Position Uncertainty 0.0 usft	Wellhead Elevation: 0.0 usft	Ground Level: 688.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/2/2015	-7.42	66.03	51,713

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	113.06

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Survey Program Date 10/2/2015				
From (usft) 376.0	To (usft) 2,530.0	Survey (Wellbore) MWD (Wellbore #1)	Tool Name MWD default	Description MWD - Standard

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Project: Lincoln County, West Virginia	TVD Reference: WELL @ 696.0usft (Decker #9)
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Well: Austin Griffith #160	North Reference: Grid
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	
376.0	0.22	194.07	376.0	-0.7	-0.2	0.1	0.06	0.7	194.07	
First MWD Survey @ 376' MD / 376' TVD										
406.0	0.22	182.66	406.0	-0.8	-0.2	0.1	0.15	0.8	193.29	
436.0	0.71	138.37	436.0	-1.0	-0.1	0.3	1.91	1.0	184.04	
466.0	2.39	117.26	466.0	-1.4	0.6	1.1	5.82	1.6	157.04	
496.0	4.11	111.49	495.9	-2.1	2.2	2.8	5.83	3.0	134.35	
526.0	5.61	112.46	525.8	-3.1	4.5	5.4	5.01	5.5	124.18	
556.0	7.51	114.58	555.6	-4.4	7.7	8.8	6.38	8.9	120.14	
586.0	9.50	111.98	585.3	-6.2	11.7	13.2	6.75	13.3	117.80	
616.0	11.40	105.45	614.8	-7.9	16.9	18.6	7.45	18.6	115.08	
646.0	12.59	104.66	644.1	-9.5	22.9	24.8	4.00	24.8	112.57	
676.0	14.01	103.78	673.3	-11.2	29.6	31.6	4.78	31.7	110.75	
706.0	15.60	103.47	702.3	-13.0	37.1	39.2	5.31	39.3	109.36	
736.0	17.50	102.06	731.1	-14.9	45.4	47.6	6.47	47.8	108.18	
766.0	18.78	102.06	759.6	-16.9	54.5	56.8	4.27	57.1	107.18	
796.0	19.62	104.09	787.9	-19.1	64.1	66.5	3.58	66.9	106.58	
826.0	20.81	105.76	816.1	-21.8	74.1	76.7	4.41	77.3	106.36	
856.0	22.09	108.19	844.0	-25.0	84.6	87.7	5.19	88.2	106.44	
886.0	23.20	111.67	871.7	-28.9	95.5	99.2	5.80	99.8	106.85	
916.0	24.61	114.88	899.1	-33.7	106.6	111.3	6.39	111.8	107.55	
946.0	25.98	117.48	926.3	-39.4	118.1	124.1	5.88	124.5	108.44	
976.0	27.40	119.16	953.1	-45.8	130.0	137.5	5.36	137.8	109.40	
1,006.0	28.59	121.89	979.5	-52.9	142.1	151.5	5.83	151.7	110.43	
1,036.0	29.12	123.26	1,005.8	-60.7	154.3	165.8	2.82	165.8	111.48	
1,066.0	29.12	123.17	1,032.0	-68.7	166.5	180.1	0.15	180.2	112.43	
1,096.0	28.90	122.86	1,058.3	-76.7	178.7	194.5	0.89	194.5	113.21	

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Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well Austin Griffith #160
Project:	Lincoln County, West Virginia	TVD Reference:	WELL @ 696.0usft (Decker #9)
Site:	Austin Griffith #160	MD Reference:	WELL @ 696.0usft (Decker #9)
Well:	Austin Griffith #160	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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 (°)	
1,126.0	28.81	123.08	1,084.5	-84.5	190.9	208.7	0.46	208.8	113.89	
1,156.0	29.30	122.77	1,110.8	-92.5	203.1	223.1	1.71	223.2	114.47	
1,186.0	29.78	122.38	1,136.9	-100.4	215.6	237.7	1.72	237.8	114.98	
1,216.0	29.92	122.29	1,162.9	-108.4	228.2	252.4	0.49	252.6	115.41	
1,246.0	29.78	122.07	1,188.9	-116.4	240.8	267.2	0.59	267.5	115.79	
1,276.0	29.70	121.76	1,215.0	-124.2	253.5	281.9	0.58	282.3	116.11	
1,306.0	30.00	121.76	1,241.0	-132.1	266.2	296.6	1.00	297.1	116.39	
1,336.0	30.31	121.58	1,266.9	-140.0	279.0	311.5	1.08	312.1	116.65	
1,366.0	30.71	121.36	1,292.8	-147.9	292.0	326.6	1.38	327.3	116.87	
1,396.0	30.58	121.27	1,318.6	-155.9	305.0	341.7	0.46	342.6	117.07	
1,426.0	28.99	120.97	1,344.6	-163.6	317.8	356.5	5.32	357.4	117.24	
1,456.0	27.22	119.69	1,371.1	-170.7	330.0	370.5	6.23	371.5	117.36	
1,486.0	25.32	118.28	1,398.0	-177.2	341.6	383.7	6.67	384.8	117.41	
1,516.0	24.22	117.09	1,425.2	-183.0	352.7	396.2	4.03	397.4	117.42	
1,546.0	23.11	116.07	1,452.7	-188.4	363.5	408.2	3.94	409.4	117.40	
1,576.0	22.89	115.15	1,480.3	-193.5	374.1	420.0	1.40	421.1	117.35	
1,606.0	23.20	114.97	1,507.9	-198.4	384.7	431.7	1.06	432.9	117.29	
1,636.0	23.42	114.49	1,535.5	-203.4	395.5	443.6	0.97	444.7	117.22	
1,666.0	23.51	114.27	1,563.0	-208.3	406.4	455.5	0.42	456.7	117.14	
1,696.0	23.60	114.97	1,590.5	-213.3	417.3	467.5	0.98	468.6	117.08	
1,726.0	23.51	114.18	1,618.0	-218.3	428.2	479.5	1.09	480.6	117.02	
1,756.0	23.51	114.75	1,645.5	-223.3	439.1	491.4	0.76	492.6	116.96	
1,786.0	23.29	114.09	1,673.0	-228.2	449.9	503.3	1.14	504.5	116.90	
1,816.0	22.01	114.27	1,700.7	-232.9	460.4	514.9	4.27	516.0	116.83	
1,846.0	21.52	113.39	1,728.6	-237.4	470.6	526.0	1.96	527.1	116.77	
1,876.0	21.30	112.86	1,756.5	-241.7	480.7	537.0	0.98	538.1	116.70	
1,906.0	20.90	110.39	1,784.5	-245.7	490.7	547.8	3.25	548.8	116.60	

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HG Energy EOW Report



Company: HG Energy, LLC
Project: Lincoln County, West Virginia
Site: Austin Griffith #160
Well: Austin Griffith #160
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Austin Griffith #160
TVD Reference: WELL @ 696.0usft (Decker #9)
MD Reference: WELL @ 696.0usft (Decker #9)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: 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 (°)
1,936.0	21.21	106.56	1,812.5	-249.1	500.9	558.5	4.70	559.5	116.44
1,966.0	21.52	105.98	1,840.4	-252.2	511.4	569.4	1.25	570.2	116.25
1,996.0	22.40	105.59	1,868.2	-255.2	522.2	580.5	2.97	581.3	116.05
2,026.0	23.11	104.88	1,895.9	-258.3	533.4	592.0	2.54	592.7	115.84
2,056.0	23.11	102.77	1,923.5	-261.1	544.9	603.6	2.76	604.2	115.60
2,086.0	22.80	101.18	1,951.1	-263.5	556.3	615.1	2.31	615.6	115.35
2,116.0	22.80	100.25	1,978.8	-265.7	567.7	626.4	1.20	626.8	115.08
2,146.0	23.29	99.37	2,006.4	-267.7	579.3	637.9	2.00	638.2	114.80
2,176.0	24.22	97.96	2,033.8	-269.5	591.3	649.6	3.63	649.8	114.50
2,206.0	24.70	97.87	2,061.2	-271.2	603.6	661.6	1.60	661.7	114.20
2,236.0	25.10	98.76	2,088.4	-273.0	616.1	673.8	1.83	673.9	113.90
2,266.0	26.20	98.49	2,115.4	-275.0	628.9	686.4	3.69	686.4	113.62
<u>2,326.0</u>	27.31	98.36	2,169.0	-279.0	655.6	712.5	1.85	<u>712.5</u>	<u>113.05</u>
2,356.0	25.98	97.08	2,195.8	-280.8	668.9	725.5	4.83	725.5	112.77
2,386.0	23.99	94.17	2,223.0	-282.0	681.5	737.5	7.79	737.6	112.48
2,416.0	21.79	93.86	2,250.6	-282.8	693.2	748.6	7.34	748.7	112.20
2,446.0	19.49	92.59	2,278.7	-283.4	703.7	758.5	7.81	758.7	111.94
2,530.0	19.49	92.59	2,357.9	-284.7	731.7	784.8	0.00	785.2	111.26

TD @ 2530' MD / 2358' TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
376.0	376.0	-0.7	-0.2	First MWD Survey @ 376' MD / 376' TVD
2,530.0	2,357.9	-284.7	731.7	TD @ 2530' MD / 2358' TVD

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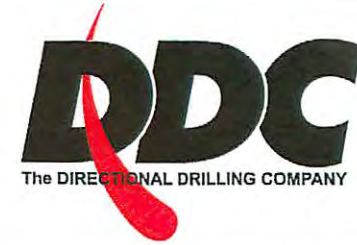
Company: HG Energy, LLC	Local Co-ordinate Reference: Well Austin Griffith #160
Project: Lincoln County, West Virginia	TVD Reference: WELL @ 696.0usft (Decker #9)
Site: Austin Griffith #160	MD Reference: WELL @ 696.0usft (Decker #9)
Well: Austin Griffith #160	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: Compass

Checked By: _____ Approved By: _____ Date: _____

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NOV 25 2015

Company Name: HG Energy, LLC
 Austin Griffith #160
 Lincoln County, West Virginia
 Rig: Decker 9
 Created By: Shane Robbins
 Date: 10/2/2015

Austin Griffith #160
 Lincoln County, West Virginia
 Q150728 & AM-150626
 Design #1



DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
Target Austin Griffith #160 - plan hits target center	2183.0	-311.0	730.712201681.53	1363583.04	38° 13' 27.700 N	81° 57' 59.400 W	

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

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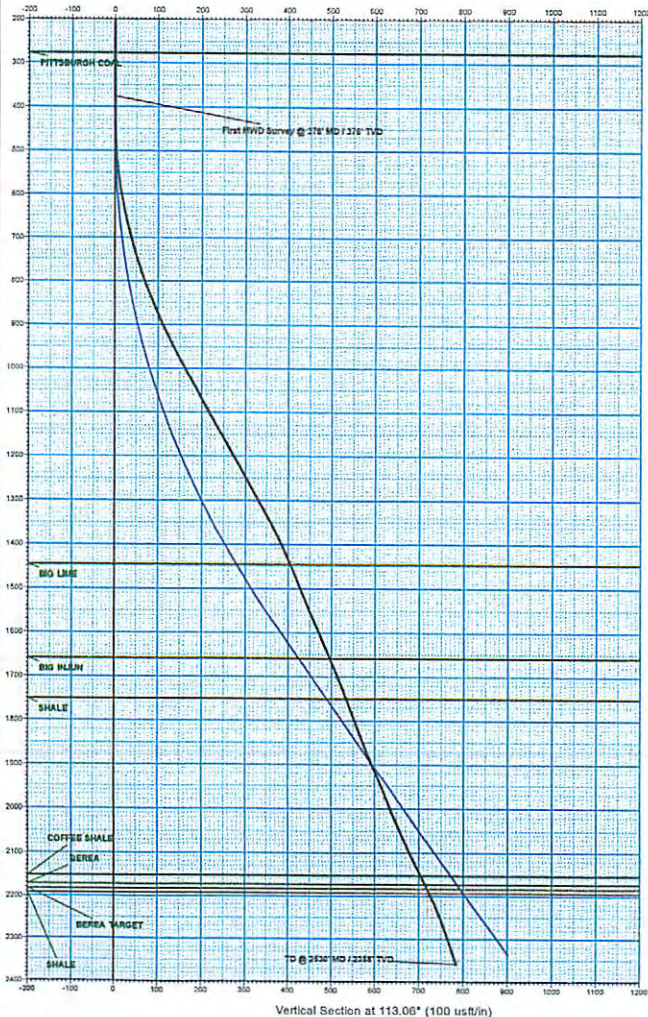
NOV 25 2015

WELL DETAILS: Austin Griffith #160

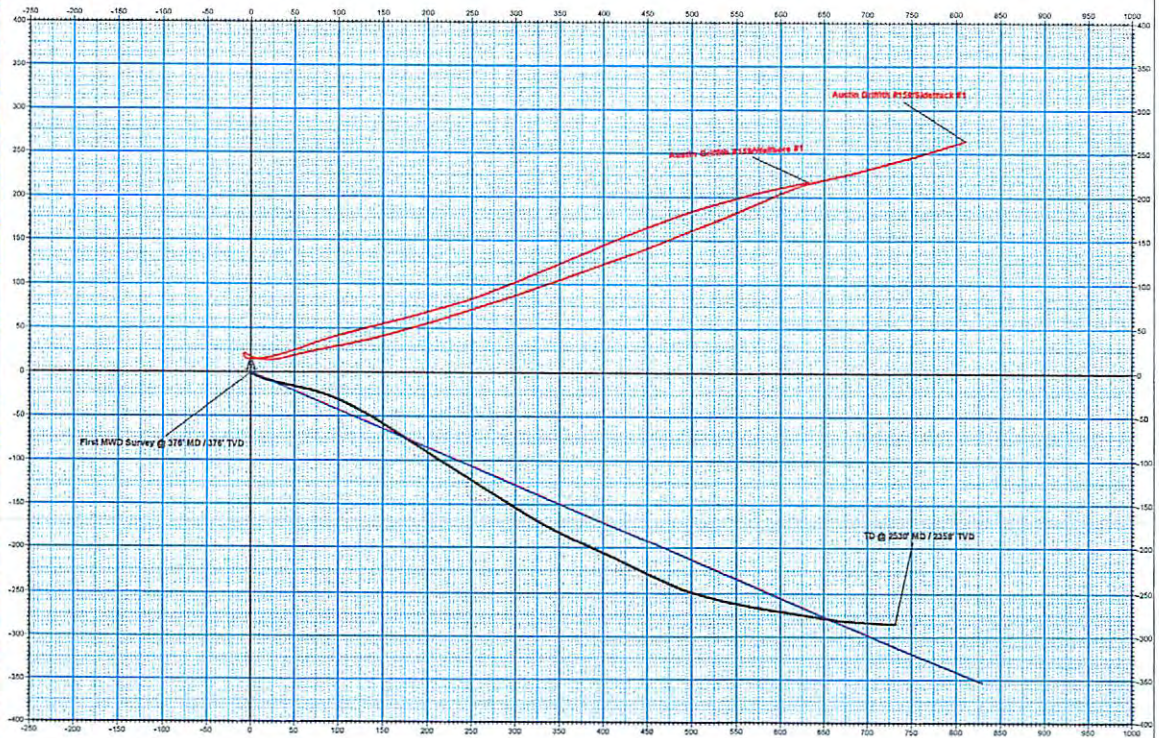
+N-S	+E-W	Northing	Easting	Ground Level	688.0	Latitude	Longitude
0.0	0.0	1363200.61	1362852.30	38° 13' 30.700 N	81° 57' 59.600 W		

ANNOTATIONS

MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Departure	Annotation
376.0	0.22	194.07	376.0	-0.7	-0.2	0.1	0.7	First MWD Survey @ 376' MD / 376' TVD
2520.0	18.45	92.99	2367.9	-284.7	731.7	784.8	797.6	TD @ 2520' MD / 2358' TVD



Vertical Section at 113.06° (100 usft/in)



HG Energy

Azimuths to Grid North
 Correction: -6.83°
 Magnetic Field
 Strength: 51713.4snT
 Dip Angle: 66.03°
 Date: 9/2/2015
 Model: IGRF2015