

HG Energy, LLC

Lincoln County, West Virginia

CC Griffith #120

CC Griffith #120

Wellbore #1

Design: Wellbore #1

HG Energy EOW Report

20 October, 2014



HG Energy EOW Report



43-03466

Company: HG Energy, LLC	Local Co-ordinate Reference: Well CC Griffith #120
Project: Lincoln County, West Virginia	TVD Reference: Well @ 934.0usft (Decker #9)
Site: CC Griffith #120	MD Reference: Well @ 934.0usft (Decker #9)
Well: CC Griffith #120	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: EDM Compass

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

Site CC Griffith #120				
Site Position:	Northing: 13,881,467.99 usft	Latitude: 38° 13' 25.700 N		
From: Lat/Long	Easting: 1,365,639.06 usft	Longitude: 81° 57' 24.600 W		
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: -0.59 °		

Well CC Griffith #120				
Well Position +N-S 0.0 usft	Northing: 13,881,467.98 usft	Latitude: 38° 13' 25.700 N		
+E-W 0.0 usft	Easting: 1,365,639.06 usft	Longitude: 81° 57' 24.600 W		
Position Uncertainty 0.0 usft	Wellhead Elevation: 0.0 usft	Ground Level: 926.0 usft		

Wellbore Wellbore #1					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/2/2014	-7.44	66.08	51,833

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	177.00

Survey Program	Date 10/20/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
650.0	2,692.0	MWD (Wellbore #1)	MWD default	MWD - Standard

HG Energy EOW Report



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 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM Compass

43.03466

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	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.00	0.00	
650.0	0.00	0.00	0.00	650.0	0.0	0.0	0.0	0.00	0.0	0.0	0.00	0.00	
FIRST SURVEY @ 650' MD / 650 TVD													
657.0	1.30	111.00	657.0	0.0	0.1	0.0	18.57	0.1	111.00				
687.0	1.60	137.50	687.0	-0.5	0.7	0.5	2.42	0.8	124.24				
717.0	2.00	147.00	717.0	-1.2	1.2	1.3	1.66	1.7	134.16				
747.0	2.60	162.30	747.0	-2.3	1.7	2.4	2.84	2.9	142.90				
777.0	3.60	170.30	776.9	-3.9	2.1	4.0	3.62	4.4	151.52				
807.0	4.50	172.20	806.8	-6.0	2.4	6.1	3.03	6.4	157.93				
837.0	5.30	173.70	836.7	-8.5	2.7	8.6	2.70	8.9	162.21				
867.0	6.00	175.90	866.6	-11.4	3.0	11.6	2.44	11.8	165.34				
897.0	6.40	178.20	896.4	-14.7	3.2	14.8	1.57	15.0	167.86				
927.0	7.10	181.10	926.2	-18.2	3.2	18.4	2.59	18.5	170.11				
957.0	8.30	182.50	955.9	-22.2	3.0	22.4	4.05	22.4	172.20				
987.0	9.40	183.00	985.6	-26.8	2.8	26.9	3.68	27.0	173.99				
1,017.0	10.30	180.00	1,015.1	-32.0	2.7	32.1	3.45	32.1	175.18				
1,047.0	11.50	180.00	1,044.6	-37.6	2.7	37.7	4.00	37.7	175.90				
1,077.0	12.70	179.20	1,073.9	-43.9	2.7	44.0	4.04	44.0	176.43				
1,107.0	13.90	179.70	1,103.1	-50.8	2.8	50.9	4.02	50.9	176.84				
1,137.0	14.80	180.00	1,132.2	-58.3	2.8	58.3	3.01	58.3	177.22				
1,167.0	15.80	177.10	1,161.1	-66.2	3.0	66.2	4.20	66.2	177.38				
1,197.0	16.80	177.10	1,189.9	-74.6	3.5	74.7	3.33	74.7	177.35				
1,227.0	18.00	177.40	1,218.5	-83.5	3.9	83.6	4.01	83.6	177.34				
1,257.0	18.40	177.00	1,247.0	-92.9	4.3	93.0	1.40	93.0	177.32				
1,287.0	19.40	175.50	1,275.4	-102.6	5.0	102.7	3.71	102.7	177.22				
1,317.0	20.60	173.70	1,303.6	-112.8	6.0	113.0	4.50	113.0	176.98				
1,347.0	21.50	174.70	1,331.6	-123.5	7.0	123.7	3.23	123.7	176.74				

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 Project: Lincoln County, West Virginia
 Site: CC Griffith #120
 Well: CC Griffith #120
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well CC Griffith #120
 TVD Reference: Well @ 934.0usft (Decker #9)
 MD Reference: Well @ 934.0usft (Decker #9)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM Compass

43-03466

Survey												
MD (usft)	Inc (°)	Azi (azimuth) (°)		TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)		
1,377.0	22.60	174.40	174.40	1,359.4	-134.7	8.1	135.0	3.69	135.0	176.55	176.55	
1,407.0	23.00	174.40	174.40	1,387.1	-146.3	9.2	146.6	1.33	146.6	176.38	176.38	
1,437.0	22.90	174.50	174.50	1,414.7	-158.0	10.4	158.3	0.36	158.3	176.24	176.24	
1,467.0	22.60	174.70	174.70	1,442.4	-169.5	11.5	169.9	1.03	169.9	176.13	176.13	
1,497.0	22.40	172.80	172.80	1,470.1	-180.9	12.7	181.3	2.51	181.4	175.98	175.98	
1,527.0	22.50	174.10	174.10	1,497.8	-192.3	14.0	192.8	1.69	192.8	175.83	175.83	
1,557.0	22.50	176.30	176.30	1,525.5	-203.7	15.0	204.2	2.81	204.3	175.79	175.79	
1,587.0	22.60	177.60	177.60	1,553.2	-215.2	15.6	215.7	1.69	215.8	175.86	175.86	
1,617.0	23.00	176.60	176.60	1,580.9	-226.8	16.2	227.4	1.86	227.4	175.92	175.92	
1,647.0	23.50	178.70	178.70	1,608.4	-238.7	16.7	239.2	3.23	239.2	176.00	176.00	
1,677.0	23.30	177.40	177.40	1,636.0	-250.6	17.1	251.1	1.85	251.2	176.10	176.10	
1,707.0	22.20	179.60	179.60	1,663.6	-262.2	17.4	262.7	4.63	262.7	176.21	176.21	
1,737.0	21.70	179.10	179.10	1,691.5	-273.4	17.5	273.9	1.78	273.9	176.34	176.34	
1,767.0	21.00	178.40	178.40	1,719.4	-284.3	17.7	284.8	2.48	284.9	176.43	176.43	
1,797.0	20.50	178.40	178.40	1,747.5	-294.9	18.0	295.5	1.67	295.5	176.50	176.50	
1,827.0	20.10	178.20	178.20	1,775.6	-305.3	18.4	305.9	1.35	305.9	176.56	176.56	
1,857.0	19.70	179.90	179.90	1,803.8	-315.5	18.5	316.1	2.34	316.1	176.64	176.64	
1,887.0	19.70	176.00	176.00	1,832.0	-325.6	18.9	326.2	4.38	326.2	176.68	176.68	
1,917.0	19.50	177.30	177.30	1,860.3	-335.7	19.5	336.2	1.60	336.2	176.68	176.68	
1,947.0	19.10	175.20	175.20	1,888.6	-345.6	20.1	346.2	2.67	346.2	176.67	176.67	
1,977.0	18.40	175.50	175.50	1,917.0	-355.2	20.9	355.8	2.36	355.8	176.63	176.63	
2,007.0	18.10	178.40	178.40	1,945.5	-364.6	21.4	365.2	3.19	365.2	176.64	176.64	
2,037.0	17.30	178.10	178.10	1,974.1	-373.7	21.7	374.3	2.68	374.3	176.68	176.68	
2,067.0	17.10	180.00	180.00	2,002.8	-382.5	21.8	383.2	1.99	383.2	176.73	176.73	
2,097.0	16.50	180.40	180.40	2,031.5	-391.2	21.8	391.8	2.04	391.8	176.81	176.81	
2,127.0	17.10	180.40	180.40	2,060.2	-399.9	21.7	400.5	2.00	400.5	176.89	176.89	
2,157.0	17.80	180.80	180.80	2,088.8	-408.9	21.6	409.5	2.37	409.5	176.97	176.97	

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 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well CC Griffith #120
 TVD Reference: Well @ 934.0usft (Decker #9)
 MD Reference: Well @ 934.0usft (Decker #9)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM Compass

43-03466

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (*/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,187.0	18.20	180.80	2,117.4	-418.2	21.5	418.7	1.33	418.7	177.05
2,218.0	17.90	177.70	2,146.8	-427.8	21.6	428.3	3.25	428.3	177.10
2,248.0	18.00	177.70	2,175.4	-437.0	22.0	437.5	0.33	437.5	177.12
2,278.0	17.80	175.20	2,203.9	-446.2	22.6	446.8	2.65	446.8	177.10
2,308.0	17.70	174.60	2,232.5	-455.3	23.4	455.9	0.69	455.9	177.06
2,338.0	17.70	173.40	2,261.1	-464.4	24.3	465.0	1.22	465.0	177.00
2,368.0	17.50	171.90	2,289.7	-473.4	25.5	474.1	1.65	474.1	176.92
2,398.0	17.70	169.50	2,318.3	-482.3	27.0	483.1	2.51	483.1	176.80
2,428.0	17.90	169.20	2,346.8	-491.3	28.7	492.2	0.73	492.2	176.66
2,458.0	17.20	170.60	2,375.4	-500.2	30.3	501.1	2.72	501.2	176.54
2,488.0	16.60	170.80	2,404.1	-508.8	31.7	509.8	2.01	509.8	176.44
2,518.0	15.30	170.40	2,433.0	-517.0	33.0	518.0	4.35	518.0	176.35
2,548.0	13.80	167.40	2,462.0	-524.4	34.5	525.5	5.59	525.5	176.24
2,578.0	12.50	166.10	2,491.2	-531.0	36.0	532.2	4.44	532.2	176.12
2,608.0	11.00	166.10	2,520.6	-536.9	37.5	538.2	5.00	538.3	176.01
2,638.0	9.60	164.70	2,550.1	-542.1	38.8	543.4	4.74	543.5	175.90
2,692.0	9.60	164.70	2,603.4	-550.8	41.2	552.2	0.00	552.4	175.72

TD @ 2692' MD / 2603' TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
650.0	650.0	0.0	0.0	FIRST SURVEY @ 650' MD / 650 TVD
2,692.0	2,603.4	-550.8	41.2	TD @ 2692' MD / 2603' TVD

Checked By: _____ Approved By: _____ Date: _____

43.03466

HG Energy, LLC

Lincoln County, West Virginia

CC Griffith #120

CC Griffith #120

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

20 October, 2014



12/12/2014

43-03466

Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well CC Griffith #120
Project:	Lincoln County, West Virginia	TVD Reference:	Well @ 934.0usft (Decker #9)
Site:	CC Griffith #120	MD Reference:	Well @ 934.0usft (Decker #9)
Well:	CC Griffith #120	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 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	CC Griffith #120				
Site Position:		Northing:	13,881,467.99 usft	Latitude:	38° 13' 25.700 N
From:	Lat/Long	Easting:	1,365,639.06 usft	Longitude:	81° 57' 24.600 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.59 °

Well	CC Griffith #120					
Well Position	+N/-S	0.0 usft	Northing:	13,881,467.98 usft	Latitude:	38° 13' 25.700 N
	+E/-W	0.0 usft	Easting:	1,365,639.06 usft	Longitude:	81° 57' 24.600 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	926.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/2/2014	-7.44	66.08	51,833

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	177.00

Survey Program	Date	10/20/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
650.0	2,692.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

Survey										
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	13,881,467.98	1,365,639.06	38° 13' 25.700 N	81° 57' 24.600 W	
650.0	0.00	0.00	650.0	0.0	0.0	13,881,467.98	1,365,639.06	38° 13' 25.700 N	81° 57' 24.600 W	
FIRST SURVEY @ 650' MD / 650' TVD										
657.0	1.30	111.00	657.0	0.0	0.1	13,881,467.96	1,365,639.13	38° 13' 25.700 N	81° 57' 24.599 W	
687.0	1.60	137.50	687.0	-0.5	0.7	13,881,467.52	1,365,639.73	38° 13' 25.695 N	81° 57' 24.591 W	
717.0	2.00	147.00	717.0	-1.2	1.2	13,881,466.78	1,365,640.30	38° 13' 25.688 N	81° 57' 24.584 W	
747.0	2.60	162.30	747.0	-2.3	1.7	13,881,465.69	1,365,640.79	38° 13' 25.677 N	81° 57' 24.578 W	
777.0	3.60	170.30	776.9	-3.9	2.1	13,881,464.11	1,365,641.16	38° 13' 25.662 N	81° 57' 24.573 W	
807.0	4.50	172.20	806.8	-6.0	2.4	13,881,462.02	1,365,641.48	38° 13' 25.641 N	81° 57' 24.569 W	
837.0	5.30	173.70	836.7	-8.5	2.7	13,881,459.47	1,365,641.79	38° 13' 25.616 N	81° 57' 24.565 W	
867.0	6.00	175.90	866.6	-11.4	3.0	13,881,456.53	1,365,642.05	38° 13' 25.587 N	81° 57' 24.561 W	
897.0	6.40	178.20	896.4	-14.7	3.2	13,881,453.30	1,365,642.22	38° 13' 25.555 N	81° 57' 24.558 W	

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Site:	CC Griffith #120	MD Reference:	Well @ 934.0usft (Decker #9)
Well:	CC Griffith #120	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
927.0	7.10	181.10	926.2	-18.2	3.2	13,881,449.77	1,365,642.23	38° 13' 25.520 N	81° 57' 24.558 W
957.0	8.30	182.50	955.9	-22.2	3.0	13,881,445.76	1,365,642.10	38° 13' 25.480 N	81° 57' 24.559 W
987.0	9.40	183.00	985.6	-26.8	2.8	13,881,441.15	1,365,641.88	38° 13' 25.435 N	81° 57' 24.561 W
1,017.0	10.30	180.00	1,015.1	-32.0	2.7	13,881,436.02	1,365,641.75	38° 13' 25.384 N	81° 57' 24.562 W
1,047.0	11.50	180.00	1,044.6	-37.6	2.7	13,881,430.35	1,365,641.75	38° 13' 25.328 N	81° 57' 24.561 W
1,077.0	12.70	179.20	1,073.9	-43.9	2.7	13,881,424.06	1,365,641.80	38° 13' 25.266 N	81° 57' 24.560 W
1,107.0	13.90	179.70	1,103.1	-50.8	2.8	13,881,417.16	1,365,641.86	38° 13' 25.198 N	81° 57' 24.558 W
1,137.0	14.80	180.00	1,132.2	-58.3	2.8	13,881,409.72	1,365,641.88	38° 13' 25.124 N	81° 57' 24.557 W
1,167.0	15.80	177.10	1,161.1	-66.2	3.0	13,881,401.81	1,365,642.09	38° 13' 25.046 N	81° 57' 24.553 W
1,197.0	16.80	177.10	1,189.9	-74.6	3.5	13,881,393.40	1,365,642.51	38° 13' 24.963 N	81° 57' 24.547 W
1,227.0	18.00	177.40	1,218.5	-83.5	3.9	13,881,384.44	1,365,642.94	38° 13' 24.874 N	81° 57' 24.540 W
1,257.0	18.40	177.00	1,247.0	-92.9	4.3	13,881,375.08	1,365,643.40	38° 13' 24.782 N	81° 57' 24.533 W
1,287.0	19.40	175.50	1,275.4	-102.6	5.0	13,881,365.39	1,365,644.04	38° 13' 24.686 N	81° 57' 24.524 W
1,317.0	20.60	173.70	1,303.6	-112.8	6.0	13,881,355.17	1,365,645.01	38° 13' 24.585 N	81° 57' 24.511 W
1,347.0	21.50	174.70	1,331.6	-123.5	7.0	13,881,344.45	1,365,646.10	38° 13' 24.479 N	81° 57' 24.496 W
1,377.0	22.60	174.40	1,359.4	-134.7	8.1	13,881,333.24	1,365,647.17	38° 13' 24.368 N	81° 57' 24.481 W
1,407.0	23.00	174.40	1,387.1	-146.3	9.2	13,881,321.67	1,365,648.30	38° 13' 24.254 N	81° 57' 24.465 W
1,437.0	22.90	174.50	1,414.7	-158.0	10.4	13,881,310.03	1,365,649.43	38° 13' 24.139 N	81° 57' 24.449 W
1,467.0	22.60	174.70	1,442.4	-169.5	11.5	13,881,298.48	1,365,650.53	38° 13' 24.025 N	81° 57' 24.434 W
1,497.0	22.40	172.80	1,470.1	-180.9	12.7	13,881,287.07	1,365,651.78	38° 13' 23.912 N	81° 57' 24.417 W
1,527.0	22.50	174.10	1,497.8	-192.3	14.0	13,881,275.69	1,365,653.08	38° 13' 23.800 N	81° 57' 24.399 W
1,557.0	22.50	176.30	1,525.5	-203.7	15.0	13,881,264.25	1,365,654.04	38° 13' 23.687 N	81° 57' 24.386 W
1,587.0	22.60	177.60	1,553.2	-215.2	15.6	13,881,252.76	1,365,654.65	38° 13' 23.573 N	81° 57' 24.377 W
1,617.0	23.00	176.60	1,580.9	-226.8	16.2	13,881,241.15	1,365,655.24	38° 13' 23.459 N	81° 57' 24.368 W
1,647.0	23.50	178.70	1,608.4	-238.7	16.7	13,881,229.32	1,365,655.73	38° 13' 23.342 N	81° 57' 24.360 W
1,677.0	23.30	177.40	1,636.0	-250.6	17.1	13,881,217.41	1,365,656.13	38° 13' 23.224 N	81° 57' 24.354 W
1,707.0	22.20	179.60	1,663.6	-262.2	17.4	13,881,205.82	1,365,656.44	38° 13' 23.109 N	81° 57' 24.348 W
1,737.0	21.70	179.10	1,691.5	-273.4	17.5	13,881,194.60	1,365,656.57	38° 13' 22.999 N	81° 57' 24.345 W
1,767.0	21.00	178.40	1,719.4	-284.3	17.7	13,881,183.69	1,365,656.80	38° 13' 22.891 N	81° 57' 24.341 W
1,797.0	20.50	178.40	1,747.5	-294.9	18.0	13,881,173.06	1,365,657.10	38° 13' 22.786 N	81° 57' 24.336 W
1,827.0	20.10	178.20	1,775.6	-305.3	18.4	13,881,162.66	1,365,657.41	38° 13' 22.683 N	81° 57' 24.330 W
1,857.0	19.70	179.90	1,803.8	-315.5	18.5	13,881,152.45	1,365,657.58	38° 13' 22.582 N	81° 57' 24.327 W
1,887.0	19.70	176.00	1,832.0	-325.6	18.9	13,881,142.35	1,365,657.94	38° 13' 22.482 N	81° 57' 24.321 W
1,917.0	19.50	177.30	1,860.3	-335.7	19.5	13,881,132.30	1,365,658.53	38° 13' 22.383 N	81° 57' 24.312 W
1,947.0	19.10	175.20	1,888.6	-345.6	20.1	13,881,122.41	1,365,659.18	38° 13' 22.285 N	81° 57' 24.303 W
1,977.0	18.40	175.50	1,917.0	-355.2	20.9	13,881,112.80	1,365,659.96	38° 13' 22.190 N	81° 57' 24.292 W
2,007.0	18.10	178.40	1,945.5	-364.6	21.4	13,881,103.42	1,365,660.46	38° 13' 22.097 N	81° 57' 24.285 W
2,037.0	17.30	178.10	1,974.1	-373.7	21.7	13,881,094.30	1,365,660.74	38° 13' 22.007 N	81° 57' 24.280 W
2,067.0	17.10	180.00	2,002.8	-382.5	21.8	13,881,085.43	1,365,660.89	38° 13' 21.919 N	81° 57' 24.277 W
2,097.0	16.50	180.40	2,031.5	-391.2	21.8	13,881,076.76	1,365,660.86	38° 13' 21.834 N	81° 57' 24.276 W
2,127.0	17.10	180.40	2,060.2	-399.9	21.7	13,881,068.09	1,365,660.80	38° 13' 21.748 N	81° 57' 24.276 W
2,157.0	17.80	180.80	2,088.8	-408.9	21.6	13,881,059.10	1,365,660.70	38° 13' 21.659 N	81° 57' 24.276 W
2,187.0	18.20	180.80	2,117.4	-418.2	21.5	13,881,049.83	1,365,660.57	38° 13' 21.567 N	81° 57' 24.276 W
2,218.0	17.90	177.70	2,146.8	-427.8	21.6	13,881,040.23	1,365,660.70	38° 13' 21.472 N	81° 57' 24.273 W
2,248.0	18.00	177.70	2,175.4	-437.0	22.0	13,881,030.99	1,365,661.07	38° 13' 21.381 N	81° 57' 24.268 W
2,278.0	17.80	175.20	2,203.9	-446.2	22.6	13,881,021.79	1,365,661.64	38° 13' 21.290 N	81° 57' 24.259 W
2,308.0	17.70	174.60	2,232.5	-455.3	23.4	13,881,012.68	1,365,662.45	38° 13' 21.200 N	81° 57' 24.248 W
2,338.0	17.70	173.40	2,261.1	-464.4	24.3	13,881,003.61	1,365,663.40	38° 13' 21.111 N	81° 57' 24.235 W
2,368.0	17.50	171.90	2,289.7	-473.4	25.5	13,880,994.61	1,365,664.56	38° 13' 21.022 N	81° 57' 24.219 W
2,398.0	17.70	169.50	2,318.3	-482.3	27.0	13,880,985.66	1,365,666.03	38° 13' 20.933 N	81° 57' 24.199 W
2,428.0	17.90	169.20	2,346.8	-491.3	28.7	13,880,976.65	1,365,667.72	38° 13' 20.845 N	81° 57' 24.177 W
2,458.0	17.20	170.60	2,375.4	-500.2	30.3	13,880,967.74	1,365,669.31	38° 13' 20.757 N	81° 57' 24.156 W
2,488.0	16.60	170.80	2,404.1	-508.8	31.7	13,880,959.14	1,365,670.72	38° 13' 20.672 N	81° 57' 24.137 W
2,518.0	15.30	170.40	2,433.0	-517.0	33.0	13,880,951.00	1,365,672.07	38° 13' 20.591 N	81° 57' 24.119 W
2,548.0	13.80	167.40	2,462.0	-524.4	34.5	13,880,943.61	1,365,673.51	38° 13' 20.518 N	81° 57' 24.100 W

43-03466

Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well CC Griffith #120
Project:	Lincoln County, West Virginia	TVD Reference:	Well @ 934.0usft (Decker #9)
Site:	CC Griffith #120	MD Reference:	Well @ 934.0usft (Decker #9)
Well:	CC Griffith #120	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	
2,578.0	12.50	166.10	2,491.2	-531.0	36.0	13,880,936.96	1,365,675.07	38° 13' 20.453 N	81° 57' 24.080 W	
2,608.0	11.00	166.10	2,520.6	-536.9	37.5	13,880,931.03	1,365,676.54	38° 13' 20.394 N	81° 57' 24.061 W	
2,638.0	9.60	164.70	2,550.1	-542.1	38.8	13,880,925.84	1,365,677.88	38° 13' 20.343 N	81° 57' 24.043 W	
2,692.0	9.60	164.70	2,603.4	-550.8	41.2	13,880,917.16	1,365,680.26	38° 13' 20.258 N	81° 57' 24.012 W	
TD @ 2692' MD / 2603' TVD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
650.0	650.0	0.0	0.0	FIRST SURVEY @ 650' MD / 650 TVD	
2,692.0	2,603.4	-550.8	41.2	TD @ 2692' MD / 2603' TVD	

Checked By: _____ Approved By: _____ Date: _____

CC Griffith #120
 Lincoln County, West Virginia
 Q141089 & AM-141048
 Design #1

Company Name: HG Energy, LLC
 CC Griffith #120
 Lincoln County, West Virginia
 Created By: Jerry Arsenault
 Date: 10/20/2014

PROJECT DETAILS: Lincoln County, West Virginia
 Geodetic System: Universal Transverse Mercator
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980 (64 W to 78 W)
 Zone: Zone 17N (64 W to 78 W)
 System Datum: Mean Sea Level

DESIGN TRACK DETAILS
 Name: *Plan - CC Griffith #120
 *Plan File Target center
 TWD: 2410.0
 NUC: -74.1
 *Elev: 251.138089350
 135663.14
 Latitude: 38° 13' 25.028 N
 Longitude: 81° 57' 54.149 W

WELL DETAILS: CC Griffith #120

*NLS *Elev	Geodetic Level	UTM	Longitude
0.0	1381947.58	28° 13' 25.000 N	81° 57' 24.600 W
	135623.06		

ANNOTATIONS

TWD	NUC	Asc	Alt	*NLS	*Elev	Vertical	Pressure	Annotation
650.0	650.0	0.0	0.0	0.0	0.0	0.0	0.0	FIRST SURVEY @ 650' MD / 650' TWD
2521.4	2522.0	9.63	194.70	-2523.8	41.2	5512	5512	TW @ 2522' MD / 2522' TWD

HG Energy



43.03466

12/12/2014

M **G** **T**

Azimuths to Grid North
 Correction: -6.85°
 Magnetic Field
 Strength: 51833.5nT
 Dip Angle: 66.08°
 Date: 10/2/2014
 Model: IGRF2010

