

# HG Energy, LLC

Roane County, West Virginia

C. McGraw #114

C. McGraw #114

Wellbore #1

Design: Wellbore #1

## Survey Report - Geographic

11 June, 2015

Received  
Office of Oil & Gas  
JUL 30 2015



08/21/2015

**HP**  
Survey Report - Geographic



<b>Company:</b>	HG Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well C. McGraw #114
<b>Project:</b>	Roane County, West Virginia	<b>TVD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Site:</b>	C. McGraw #114	<b>MD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Well:</b>	C. McGraw #114	<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>	Compass

<b>Project</b>	Roane 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>	C. McGraw #114				
<b>Site Position:</b>		<b>Northing:</b>	14,058,785.70 usft	<b>Latitude:</b>	38° 42' 52.000 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,560,234.86 usft	<b>Longitude:</b>	81° 16' 52.000 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.18 °

<b>Well</b>	C. McGraw #114					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,058,785.70 usft	<b>Latitude:</b>	38° 42' 52.000 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,560,234.86 usft	<b>Longitude:</b>	81° 16' 52.000 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b>	1,111.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	4/21/2015	-7.99	66.37	51,938

<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>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	202.59	

<b>Survey Program</b>	<b>Date</b>	6/11/2015			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
500.0	2,480.0	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	14,058,785.70	1,560,234.86	38° 42' 52.000 N	81° 16' 52.000 W
500.0	0.00	0.00	500.0	0.0	0.0	14,058,785.70	1,560,234.86	38° 42' 52.000 N	81° 16' 52.000 W
<b>Assumed Vertical Tie-In @ 500' MD / 500' TVD</b>									
557.0	0.62	178.19	557.0	-0.3	0.0	14,058,785.39	1,560,234.87	38° 42' 51.994 N	81° 16' 52.000 W
587.0	0.62	182.29	587.0	-0.6	0.0	14,058,785.07	1,560,234.87	38° 42' 51.990 N	81° 16' 52.000 W
617.0	0.88	192.77	617.0	-1.0	0.0	14,058,784.68	1,560,234.81	38° 42' 51.990 N	81° 16' 52.001 W
647.0	1.90	214.37	647.0	-1.7	-0.4	14,058,784.05	1,560,234.48	38° 42' 51.984 N	81° 16' 52.005 W
677.0	3.18	218.77	677.0	-2.7	-1.2	14,058,782.99	1,560,233.68	38° 42' 51.978 N	81° 16' 52.015 W
707.0	4.51	217.50	706.9	-4.3	-2.4	14,058,781.40	1,560,232.44	38° 42' 51.957 N	81° 16' 52.030 W
737.0	5.61	217.19	736.8	-6.4	-4.0	14,058,779.30	1,560,230.84	38° 42' 51.937 N	81° 16' 52.051 W
767.0	6.41	214.59	766.6	-8.9	-5.9	14,058,776.75	1,560,229.00	38° 42' 51.911 N	81° 16' 52.074 W
797.0	7.51	213.00	796.4	-12.0	-7.9	14,058,773.73	1,560,226.98	38° 42' 51.881 N	81° 16' 52.099 W

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<b>Company:</b>	HG Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well C. McGraw #114
<b>Project:</b>	Roane County, West Virginia	<b>TVD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Site:</b>	C. McGraw #114	<b>MD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Well:</b>	C. McGraw #114	<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>	Compass

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
827.0	8.48	212.30	826.1	-15.5	-10.1	14,058,770.22	1,560,224.73	38° 42' 51.847 N	81° 16' 52.127 W	
857.0	9.50	212.08	855.7	-19.5	-12.6	14,058,766.25	1,560,222.23	38° 42' 51.807 N	81° 16' 52.159 W	
887.0	10.38	211.28	885.3	-23.9	-15.3	14,058,761.84	1,560,219.52	38° 42' 51.764 N	81° 16' 52.193 W	
917.0	11.18	210.67	914.7	-28.7	-18.2	14,058,757.03	1,560,216.63	38° 42' 51.716 N	81° 16' 52.229 W	
947.0	12.28	208.77	944.1	-34.0	-21.3	14,058,751.73	1,560,213.61	38° 42' 51.663 N	81° 16' 52.267 W	
977.0	13.21	208.07	973.4	-39.8	-24.4	14,058,745.91	1,560,210.46	38° 42' 51.606 N	81° 16' 52.306 W	
1,007.0	14.32	207.67	1,002.5	-46.1	-27.7	14,058,739.60	1,560,207.13	38° 42' 51.543 N	81° 16' 52.348 W	
1,037.0	15.38	206.79	1,031.5	-52.9	-31.3	14,058,732.76	1,560,203.61	38° 42' 51.476 N	81° 16' 52.392 W	
1,067.0	16.22	205.20	1,060.4	-60.3	-34.8	14,058,725.42	1,560,200.03	38° 42' 51.403 N	81° 16' 52.437 W	
1,097.0	16.88	203.48	1,089.1	-68.1	-38.3	14,058,717.63	1,560,196.51	38° 42' 51.326 N	81° 16' 52.481 W	
1,127.0	17.59	200.49	1,117.8	-76.3	-41.7	14,058,709.39	1,560,193.19	38° 42' 51.244 N	81° 16' 52.523 W	
1,157.0	18.21	198.99	1,146.3	-85.0	-44.8	14,058,700.71	1,560,190.08	38° 42' 51.158 N	81° 16' 52.562 W	
1,187.0	19.09	198.90	1,174.8	-94.1	-47.9	14,058,691.64	1,560,186.96	38° 42' 51.068 N	81° 16' 52.601 W	
1,217.0	19.89	198.77	1,203.0	-103.5	-51.1	14,058,682.17	1,560,183.73	38° 42' 50.975 N	81° 16' 52.641 W	
1,247.0	20.59	198.46	1,231.2	-113.4	-54.4	14,058,672.33	1,560,180.42	38° 42' 50.877 N	81° 16' 52.683 W	
1,277.0	21.08	198.20	1,259.2	-123.5	-57.8	14,058,662.20	1,560,177.07	38° 42' 50.777 N	81° 16' 52.725 W	
1,307.0	21.92	197.09	1,287.1	-134.0	-61.1	14,058,651.72	1,560,173.73	38° 42' 50.673 N	81° 16' 52.766 W	
1,337.0	22.32	196.78	1,314.9	-144.8	-64.4	14,058,640.92	1,560,170.44	38° 42' 50.566 N	81° 16' 52.807 W	
1,367.0	22.80	196.78	1,342.6	-155.8	-67.7	14,058,629.90	1,560,167.12	38° 42' 50.457 N	81° 16' 52.849 W	
1,397.0	23.20	196.87	1,370.3	-167.0	-71.1	14,058,618.68	1,560,163.73	38° 42' 50.346 N	81° 16' 52.891 W	
1,427.0	23.69	196.96	1,397.8	-178.4	-74.6	14,058,607.26	1,560,160.26	38° 42' 50.233 N	81° 16' 52.935 W	
1,457.0	24.30	198.77	1,425.2	-190.1	-78.4	14,058,595.65	1,560,156.51	38° 42' 50.118 N	81° 16' 52.982 W	
1,487.0	24.88	201.19	1,452.5	-201.8	-82.6	14,058,583.92	1,560,152.24	38° 42' 50.002 N	81° 16' 53.035 W	
1,517.0	25.81	202.87	1,479.6	-213.7	-87.4	14,058,572.02	1,560,147.42	38° 42' 49.884 N	81° 16' 53.095 W	
1,547.0	26.51	204.10	1,506.5	-225.8	-92.7	14,058,559.89	1,560,142.15	38° 42' 49.764 N	81° 16' 53.161 W	
1,577.0	27.40	204.50	1,533.2	-238.2	-98.3	14,058,547.49	1,560,136.56	38° 42' 49.642 N	81° 16' 53.232 W	
1,607.0	28.10	205.20	1,559.8	-250.9	-104.2	14,058,534.82	1,560,130.68	38° 42' 49.516 N	81° 16' 53.305 W	
1,637.0	28.50	204.98	1,586.2	-263.8	-110.2	14,058,521.94	1,560,124.65	38° 42' 49.388 N	81° 16' 53.381 W	
1,667.0	28.99	204.76	1,612.5	-276.9	-116.3	14,058,508.85	1,560,118.59	38° 42' 49.259 N	81° 16' 53.457 W	
1,697.0	29.52	204.89	1,638.7	-290.2	-122.4	14,058,495.54	1,560,112.43	38° 42' 49.127 N	81° 16' 53.534 W	
1,727.0	30.09	205.47	1,664.7	-303.7	-128.8	14,058,482.05	1,560,106.09	38° 42' 48.993 N	81° 16' 53.614 W	
1,757.0	30.58	206.39	1,690.6	-317.3	-135.4	14,058,468.42	1,560,099.46	38° 42' 48.859 N	81° 16' 53.697 W	
1,787.0	31.82	204.67	1,716.3	-331.3	-142.1	14,058,454.40	1,560,092.77	38° 42' 48.720 N	81° 16' 53.781 W	
1,817.0	32.61	205.38	1,741.6	-345.8	-148.9	14,058,439.91	1,560,086.00	38° 42' 48.576 N	81° 16' 53.865 W	
1,847.0	33.19	204.89	1,766.8	-360.5	-155.8	14,058,425.16	1,560,079.08	38° 42' 48.430 N	81° 16' 53.952 W	
1,877.0	33.01	204.67	1,792.0	-375.4	-162.6	14,058,410.28	1,560,072.21	38° 42' 48.283 N	81° 16' 54.038 W	
1,907.0	32.92	204.10	1,817.1	-390.3	-169.4	14,058,395.42	1,560,065.47	38° 42' 48.136 N	81° 16' 54.123 W	
1,937.0	32.79	203.48	1,842.3	-405.2	-176.0	14,058,380.52	1,560,058.91	38° 42' 47.988 N	81° 16' 54.205 W	
1,967.0	32.79	202.87	1,867.6	-420.1	-182.3	14,058,365.59	1,560,052.51	38° 42' 47.840 N	81° 16' 54.285 W	
1,997.0	33.10	202.87	1,892.7	-435.1	-188.7	14,058,350.56	1,560,046.17	38° 42' 47.691 N	81° 16' 54.365 W	
2,027.0	33.80	202.69	1,917.8	-450.4	-195.1	14,058,335.31	1,560,039.77	38° 42' 47.540 N	81° 16' 54.445 W	
2,057.0	34.51	201.76	1,942.6	-466.0	-201.5	14,058,319.72	1,560,033.40	38° 42' 47.386 N	81° 16' 54.525 W	
2,087.0	34.20	201.19	1,967.4	-481.7	-207.7	14,058,303.96	1,560,027.20	38° 42' 47.230 N	81° 16' 54.602 W	
2,117.0	34.29	200.79	1,992.2	-497.5	-213.7	14,058,288.20	1,560,021.16	38° 42' 47.074 N	81° 16' 54.678 W	
2,147.0	33.72	200.18	2,017.0	-513.2	-219.6	14,058,272.49	1,560,015.28	38° 42' 46.918 N	81° 16' 54.751 W	
2,177.0	34.20	199.87	2,041.9	-529.0	-225.3	14,058,256.74	1,560,009.55	38° 42' 46.763 N	81° 16' 54.823 W	
2,207.0	34.60	199.69	2,066.7	-544.9	-231.1	14,058,240.79	1,560,003.81	38° 42' 46.605 N	81° 16' 54.895 W	
2,237.0	34.91	198.99	2,091.3	-561.0	-236.7	14,058,224.65	1,559,998.15	38° 42' 46.445 N	81° 16' 54.966 W	
2,267.0	34.11	198.46	2,116.0	-577.1	-242.2	14,058,208.56	1,559,992.69	38° 42' 46.286 N	81° 16' 55.034 W	
2,297.0	33.58	197.58	2,140.9	-593.0	-247.3	14,058,192.67	1,559,987.52	38° 42' 46.128 N	81° 16' 55.099 W	
2,327.0	32.92	196.87	2,166.0	-608.7	-252.2	14,058,176.96	1,559,982.65	38° 42' 45.973 N	81° 16' 55.160 W	
2,357.0	31.99	195.86	2,191.4	-624.2	-256.8	14,058,161.51	1,559,978.11	38° 42' 45.820 N	81° 16' 55.216 W	
2,387.0	30.89	194.67	2,216.9	-639.3	-260.9	14,058,146.42	1,559,973.99	38° 42' 45.671 N	81° 16' 55.268 W	
2,417.0	29.21	192.77	2,242.9	-653.9	-264.4	14,058,131.83	1,559,970.42	38° 42' 45.526 N	81° 16' 55.312 W	

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Survey Report - Geographic



<b>Company:</b>	HG Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well C. McGraw #114
<b>Project:</b>	Roane County, West Virginia	<b>TVD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Site:</b>	C. McGraw #114	<b>MD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Well:</b>	C. McGraw #114	<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>	Compass

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,480.0	29.21	192.77	2,297.9	-683.9	-271.2	14,058,101.84	1,559,963.63	38° 42' 45.230 N	81° 16' 55.397 W
TD @ 2480' MD / 2298' TVD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
500.0	500.0	0.0	0.0	Assumed Vertical Tie-In @ 500' MD / 500' TVD	
2,480.0	2,297.9	-683.9	-271.2	TD @ 2480' MD / 2298' TVD	

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

**HG Energy, LLC**  
Roane County, West Virginia  
C. McGraw #114  
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Wellbore #1

Survey: MWD

**HG Energy EOW Report**

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<b>Company:</b>	HG Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well C. McGraw #114
<b>Project:</b>	Roane County, West Virginia	<b>TVD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Site:</b>	C. McGraw #114	<b>MD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Well:</b>	C. McGraw #114	<b>North Reference:</b>	Grid
<b>Wellbore #1:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Compass

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

<b>Site</b>	C. McGraw #114				
<b>Site Position:</b>		<b>Northing:</b>	14,058,785.70 usft	<b>Latitude:</b>	38° 42' 52.000 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,560,234.86 usft	<b>Longitude:</b>	81° 16' 52.000 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.18 °

<b>Well</b>	C. McGraw #114				
<b>Well Position</b>	+N/-S	<b>Northing:</b>	14,058,785.70 usft	<b>Latitude:</b>	38° 42' 52.000 N
	+E/-W	<b>Easting:</b>	1,560,234.86 usft	<b>Longitude:</b>	81° 16' 52.000 W
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b>	1,111.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	Model Name	Sample Date	Dip Angle (°)	Field Strength (nT)	
	IGRF2015	4/21/2015	-7.99	66.37	51,938

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>		<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Version:</b>	1.00	<b>Depth From (TVD) (usft)</b>	+N/-S (usft)	<b>Direction (°)</b>	
<b>Vertical Section:</b>		0.0	0.0	202.59	

<b>Survey Program</b>	Date	6/11/2015			
<b>From (usft)</b>	To (usft)	Survey (Wellbore)	Tool Name	Description	
500.0	2,480.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

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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	0.00	0.0	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.0	0.00	
<b>Assumed Vertical Tie-In @ 500' MD / 500' TVD</b>										
557.0	0.62	178.19	557.0	-0.3	0.0	0.3	1.09	0.3	178.19	
587.0	0.62	182.29	587.0	-0.6	0.0	0.6	0.15	0.6	179.24	
617.0	0.88	192.77	617.0	-1.0	0.0	1.0	0.98	1.0	182.75	
647.0	1.90	214.37	647.0	-1.7	-0.4	1.7	3.76	1.7	192.96	
677.0	3.18	218.77	677.0	-2.7	-1.2	3.0	4.31	3.0	203.54	
707.0	4.51	217.50	706.9	-4.3	-2.4	4.9	4.44	4.9	209.40	
737.0	5.61	217.19	736.8	-6.4	-4.0	7.5	3.67	7.6	212.16	
767.0	6.41	214.59	766.6	-8.9	-5.9	10.5	2.82	10.7	213.23	
797.0	7.51	213.00	796.4	-12.0	-7.9	14.1	3.72	14.3	213.36	
827.0	8.48	212.30	826.1	-15.5	-10.1	18.2	3.25	18.5	213.19	
857.0	9.50	212.08	855.7	-19.5	-12.6	22.8	3.40	23.2	212.99	
887.0	10.38	211.28	885.3	-23.9	-15.3	27.9	2.97	28.4	212.75	
917.0	11.18	210.67	914.7	-28.7	-18.2	33.5	2.69	34.0	212.45	
947.0	12.28	208.77	944.1	-34.0	-21.3	39.5	3.89	40.1	212.03	
977.0	13.21	208.07	973.4	-39.8	-24.4	46.1	3.14	46.7	211.52	
1,007.0	14.32	207.67	1,002.5	-46.1	-27.7	53.2	3.71	53.8	211.03	
1,037.0	15.38	206.79	1,031.5	-52.9	-31.3	60.9	3.61	61.5	210.56	
1,067.0	16.22	205.20	1,060.4	-60.3	-34.8	69.0	3.15	69.6	210.02	
1,097.0	16.88	203.48	1,089.1	-68.1	-38.3	77.6	2.74	78.1	209.40	
1,127.0	17.59	200.49	1,117.8	-76.3	-41.7	86.5	3.78	86.9	208.64	
1,157.0	18.21	198.99	1,146.3	-85.0	-44.8	95.7	2.58	96.1	207.79	
1,187.0	19.09	198.90	1,174.8	-94.1	-47.9	105.2	2.93	105.6	206.99	
1,217.0	19.89	198.77	1,203.0	-103.5	-51.1	115.2	2.67	115.5	206.28	
1,247.0	20.59	198.46	1,231.2	-113.4	-54.4	125.6	2.36	125.8	205.65	

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HG Energy EOW Report

<b>Company:</b>	HG Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well C. McGraw #114
<b>Project:</b>	Roane County, West Virginia	<b>TVD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Site:</b>	C. McGraw #114	<b>MD Reference:</b>	WELL @ 1119.0usft (Decker #9)
<b>Well:</b>	C. McGraw #114	<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>	Compass

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D/Leg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
	1,277.0	21.08	198.20	1,259.2	-123.5	-57.8	136.2	1.66	136.4	205.08
	1,307.0	21.92	197.09	1,287.1	-134.0	-61.1	147.2	3.11	147.3	204.53
	1,337.0	22.32	196.78	1,314.9	-144.8	-64.4	158.4	1.39	158.5	203.99
	1,367.0	22.80	196.78	1,342.6	-155.8	-67.7	169.9	1.60	169.9	203.50
	1,397.0	23.20	196.87	1,370.3	-167.0	-71.1	181.5	1.34	181.5	203.07
	1,427.0	23.69	196.96	1,397.8	-178.4	-74.6	193.4	1.64	193.4	202.69
	1,457.0	24.30	198.77	1,425.2	-190.1	-78.4	205.6	3.19	205.6	202.40
	1,487.0	24.88	201.19	1,452.5	-201.8	-82.6	218.0	3.87	218.0	202.27
	1,517.0	25.81	202.87	1,479.6	-213.7	-87.4	230.9	3.92	230.9	202.25
	1,547.0	26.51	204.10	1,506.5	-225.8	-92.7	244.1	2.95	244.1	202.32
	1,577.0	27.40	204.50	1,533.2	-238.2	-98.3	257.7	3.03	257.7	202.43
	1,607.0	28.10	205.20	1,559.8	-250.9	-104.2	271.7	2.57	271.7	202.55
	1,637.0	28.50	204.98	1,586.2	-263.8	-110.2	285.9	1.38	285.9	202.68
	1,667.0	28.99	204.76	1,612.5	-276.9	-116.3	300.3	1.67	300.3	202.78
	1,697.0	29.52	204.89	1,638.7	-290.2	-122.4	314.9	1.78	314.9	202.88
	1,727.0	30.09	205.47	1,664.7	-303.7	-128.8	329.8	2.13	329.8	202.98
	1,757.0	30.58	206.39	1,690.6	-317.3	-135.4	344.9	2.25	345.0	203.11
	1,787.0	31.82	204.67	1,716.3	-331.3	-142.1	360.5	5.09	360.5	203.21
	1,817.0	32.61	205.38	1,741.6	-345.8	-148.9	376.4	2.92	376.5	203.29
	1,847.0	33.19	204.89	1,766.8	-360.5	-155.8	392.7	2.13	392.8	203.37
	1,877.0	33.01	204.67	1,792.0	-375.4	-162.6	409.1	0.72	409.1	203.42
	1,907.0	32.92	204.10	1,817.1	-390.3	-169.4	425.4	1.08	425.5	203.46
	1,937.0	32.79	203.48	1,842.3	-405.2	-176.0	441.7	1.20	441.7	203.47
	1,967.0	32.79	202.87	1,867.6	-420.1	-182.3	457.9	1.10	458.0	203.46
	1,997.0	33.10	202.87	1,892.7	-435.1	-188.7	474.2	1.03	474.3	203.44
	2,027.0	33.80	202.69	1,917.8	-450.4	-195.1	490.8	2.36	490.8	203.42
	2,057.0	34.51	201.76	1,942.6	-466.0	-201.5	507.6	2.94	507.7	203.38

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**HP**  
HG Energy EOW Report

<b>Company:</b> HG Energy, LLC <b>Project:</b> Roane County, West Virginia <b>Site:</b> C. McGraw #114 <b>Well:</b> C. McGraw #114 <b>Wellbore:</b> Wellbore #1 <b>Design:</b> Wellbore #1	<b>Local Co-ordinate Reference:</b> Well C. McGraw #114 WELL @ 1119.0usft (Decker #9) WELL @ 1119.0usft (Decker #9) <b>TVD Reference:</b> MD Reference: North Reference: Survey Calculation Method: Database: Grid Minimum Curvature Compass
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MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D/Leg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,087.0	34.20	201.19	1,967.4	-481.7	-207.7	524.5	1.49	524.6	203.32
2,117.0	34.29	200.79	1,992.2	-497.5	-213.7	541.4	0.81	541.5	203.25
2,147.0	33.72	200.18	2,017.0	-513.2	-219.6	558.2	2.21	558.2	203.16
2,177.0	34.20	199.87	2,041.9	-529.0	-225.3	574.9	1.70	575.0	203.07
2,207.0	34.60	199.69	2,066.7	-544.9	-231.1	591.9	1.38	591.9	202.98
2,237.0	34.91	198.99	2,091.3	-561.0	-236.7	608.9	1.68	608.9	202.88
2,267.0	34.11	198.46	2,116.0	-577.1	-242.2	625.9	2.85	625.9	202.76
2,297.0	33.58	197.58	2,140.9	-593.0	-247.3	642.5	2.41	642.5	202.64
2,327.0	32.92	196.87	2,166.0	-608.7	-252.2	658.9	2.55	658.9	202.51
2,357.0	31.99	195.86	2,191.4	-624.2	-256.8	674.9	3.59	674.9	202.36
2,387.0	30.89	194.67	2,216.9	-639.3	-260.9	690.4	4.21	690.5	202.20
2,417.0	29.21	192.77	2,242.9	-653.9	-264.4	705.3	6.44	705.3	202.02
2,480.0	29.21	192.77	2,297.9	-683.9	-271.2	735.6	0.00	735.7	201.63

**TD @ 2480' MD / 2298' TVD**

Survey Annotations	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
	500.0	500.0	0.0	0.0	Assumed Vertical Tie-In @ 500' MD / 500' TVD
	2,480.0	2,297.9	-683.9	-271.2	TD @ 2480' MD / 2298' TVD

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

08/21/2015

Company Name: HG Energy, LLC  
 C. McGraw #114  
 Roane County, West Virginia  
 Rig: Decker #9  
 Created By: John Mooney  
 Date: 6/11/2015

C. McGraw #114  
 Roane County, West Virginia  
 Q150461 & AM-150392  
 Design #1

DESIGN TARGET DETAILS

Name	TVD	+NCS	+EAW	Northing	Existing	Latitude	Longitude
Target C. McGraw #114	2152.0	-575.7	-239.5	14552150.00	15059985.39	38° 42' 45.300" N	81° 16' 55.000" W

ANNOTATIONS

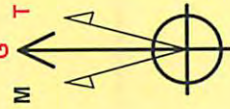
ID	Inc	Adj	TVD	+NCS	+EAW	VSD	Departure	Incidence	Assumed
500.0	0.0	0.0	500.0	0.0	0.0	0.0	0.0	0.0	Assumed Vertical Tie-in @ 500' MD / 500' TVD
2480.0	25.21	192.77	2397.8	-483.9	-271.2	735.6	735.2	TD @ 2480' MD / 2298' TVD	

PROJECT DETAILS:

Roane County, West Virginia  
 Universal Transverse Mercator  
 NAD83 West Virginia - HARN  
 GRS 1980  
 Zone 17W (84 W to 78 W)  
 Mean Sea Level

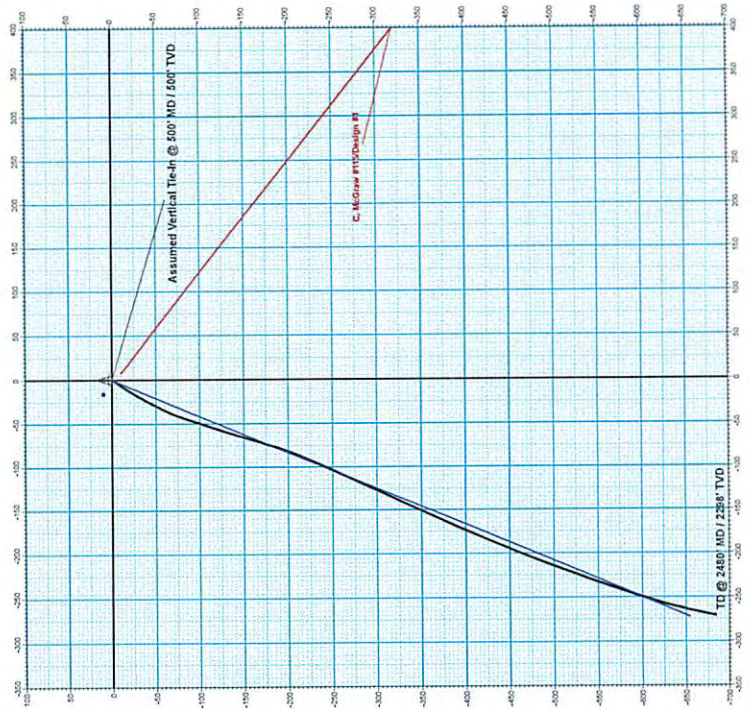
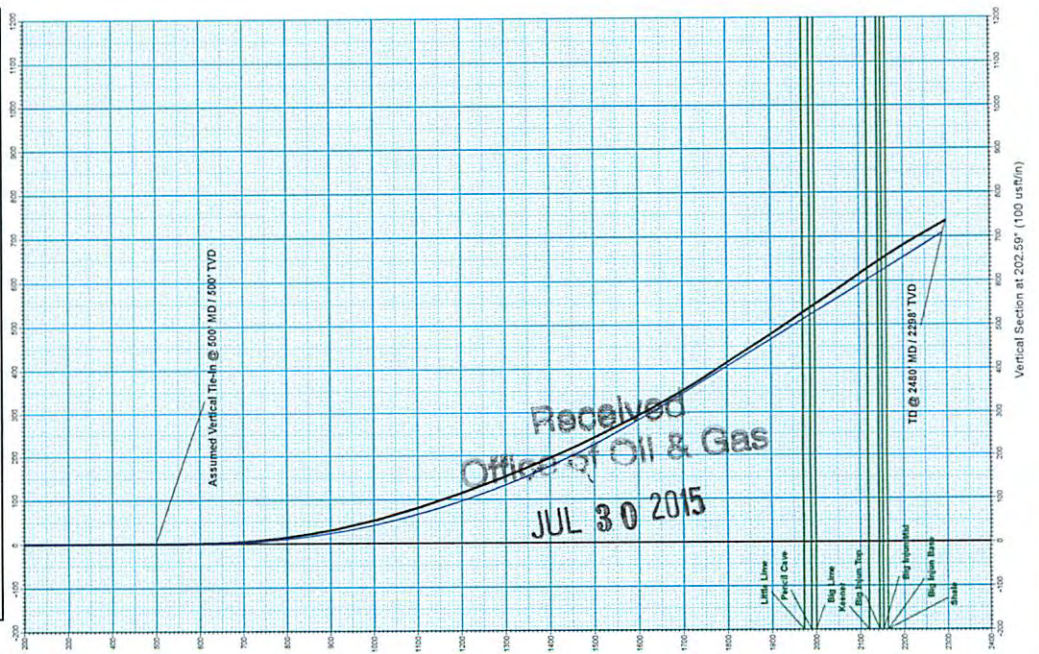
WELL DETAILS:

C. McGraw #114  
 1111.0  
 Ground Level  
 Northing  
 Existing  
 14558785.70  
 1502234.88  
 38° 42' 52.000" N  
 81° 16' 52.000" W



Azimuths to Grid North  
 Correction: -7.81°  
 Magnetic Field  
 Strength: 51937.6snT  
 Dip Angle: 66.37°  
 Date: 4/21/2015  
 Model: IGRF2015

# HG Energy



08/21/2015