

HG Energy, LLC

Lincoln County, West Virginia

W.S. May #261


W.S. May #261

Wellbore #1

Design: Wellbore #1

QES Survey Report

10 January, 2017

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WV Department of
Environmental Protection

05/26/2017

Survey Report



Company: HG Energy, LLC	Local Co-ordinate Reference: Well W.S. May #261
Project: Lincoln County, West Virginia	TVD Reference: WELL @ 1012.0usft (Decker #9)
Site: W.S. May #261	MD Reference: WELL @ 1012.0usft (Decker #9)
Well: W.S. May #261	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: EDM5002

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	W.S. May #261				
Site Position:		Northing:	13,885,318.88 usft	Latitude:	38° 14' 3.820 N
From:	Lat/Long	Easting:	1,366,057.76 usft	Longitude:	81° 57' 19.850 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.59 °

Well	W.S. May #261					
Well Position	+N/-S	0.0 usft	Northing:	13,885,318.88 usft	Latitude:	38° 14' 3.820 N
	+E/-W	0.0 usft	Easting:	1,366,057.76 usft	Longitude:	81° 57' 19.850 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	1,004.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/29/2016	-7.50	65.93	51,560

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	20.51	

Survey Program	Date	1/10/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
618.0	2,749.0	MWD Surveys (Wellbore #1)	MWD default	MWD - Standard	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
First MWD Survey @ 618' MD / 618' TVD										
618.0	0.56	219.40	618.0	-2.3	-1.9	-2.9	0.09	0.09	0.00	
648.0	0.44	227.66	648.0	-2.5	-2.1	-3.1	0.47	-0.40	27.53	
678.0	0.19	106.55	678.0	-2.6	-2.1	-3.2	1.87	-0.83	-403.70	
708.0	1.48	50.01	708.0	-2.4	-1.8	-2.9	4.61	4.50	188.47	
738.0	2.86	42.07	738.0	-1.6	-1.0	-1.8	4.70	4.60	-26.47	
768.0	4.27	39.87	767.9	-0.2	0.2	-0.1	4.72	4.70	-7.33	
798.0	5.38	33.59	797.8	1.9	1.7	2.3	4.09	4.00	840.93	
828.0	6.66	27.38	827.6	4.6	3.3	5.4	4.78	4.27	-20.70	
858.0	7.81	26.05	857.4	8.0	5.0	9.2	3.87	3.83	-4.43	

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Survey Report



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Site:	W.S. May #261	MD Reference:	WELL @ 1012.0usft (Decker #9)
Well:	W.S. May #261	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
888.0	8.81	22.62	887.1	11.9	6.8	13.5	3.72	3.33	-11.43
918.0	9.91	22.00	916.7	16.4	8.6	18.4	3.68	3.67	-2.07
948.0	10.67	20.67	946.2	21.4	10.6	23.8	2.65	2.53	-4.43
978.0	11.63	20.94	975.6	26.8	12.6	29.6	3.20	3.20	0.90
1,008.0	12.73	19.27	1,005.0	32.8	14.8	35.9	3.85	3.67	-5.57
1,038.0	13.98	21.01	1,034.1	39.3	17.2	42.8	4.38	4.17	5.80
1,068.0	14.79	19.96	1,063.2	46.3	19.8	50.3	2.84	2.70	-3.50
1,098.0	15.73	18.44	1,092.1	53.7	22.4	58.2	3.41	3.13	-5.07
1,128.0	16.74	16.84	1,120.9	61.7	24.9	66.5	3.68	3.37	-5.33
1,158.0	18.14	18.00	1,149.6	70.3	27.6	75.5	4.81	4.67	3.87
1,188.0	19.28	21.95	1,178.0	79.3	30.9	85.1	5.68	3.80	13.17
1,218.0	20.31	24.56	1,206.2	88.7	34.9	95.3	4.52	3.43	8.70
1,248.0	21.63	27.65	1,234.2	98.3	39.7	106.0	5.74	4.40	10.30
1,278.0	23.01	29.23	1,262.0	108.3	45.1	117.2	5.02	4.60	5.27
1,308.0	24.00	30.08	1,289.5	118.7	51.0	129.1	3.49	3.30	2.83
1,338.0	24.88	30.88	1,316.8	129.4	57.3	141.3	3.13	2.93	2.67
1,368.0	25.69	32.57	1,343.9	140.3	64.1	153.8	3.62	2.70	5.63
1,398.0	25.92	31.20	1,370.9	151.4	71.0	166.7	2.13	0.77	-4.57
1,428.0	26.26	31.27	1,397.9	162.7	77.8	179.6	1.14	1.13	0.23
1,458.0	26.74	31.74	1,424.7	174.1	84.8	192.8	1.75	1.60	1.57
1,488.0	27.43	31.42	1,451.4	185.7	91.9	206.2	2.35	2.30	-1.07
1,518.0	28.07	28.60	1,478.0	197.8	98.9	219.9	4.87	2.13	-9.40
1,548.0	28.61	28.99	1,504.4	210.3	105.8	234.0	1.90	1.80	1.30
1,578.0	28.68	27.62	1,530.7	223.0	112.6	248.3	2.20	0.23	-4.57
1,608.0	27.69	26.26	1,557.2	235.6	119.0	262.4	3.93	-3.30	-4.53
1,638.0	27.07	24.26	1,583.8	248.1	124.9	276.1	3.70	-2.07	-6.67
1,668.0	26.74	22.57	1,610.6	260.5	130.3	289.7	2.78	-1.10	-5.63
1,698.0	26.39	20.78	1,637.4	273.0	135.3	303.1	2.91	-1.17	-5.97
1,728.0	26.44	21.52	1,664.3	285.4	140.1	316.4	1.11	0.17	2.47
1,758.0	26.12	20.94	1,691.2	297.8	144.9	329.7	1.37	-1.07	-1.93
1,788.0	26.47	21.23	1,718.0	310.2	149.7	343.0	1.24	1.17	0.97
1,818.0	26.39	20.15	1,744.9	322.7	154.4	356.3	1.62	-0.27	-3.60
1,848.0	25.97	21.21	1,771.8	335.1	159.1	369.6	2.10	-1.40	3.53
1,878.0	25.22	20.98	1,798.9	347.2	163.7	382.5	2.52	-2.50	-0.77
1,938.0	24.74	18.61	1,853.3	371.0	172.3	407.9	1.85	-0.80	-3.95
1,968.0	24.62	18.62	1,880.5	382.9	176.3	420.4	0.40	0.40	0.03
1,998.0	24.64	19.76	1,907.8	394.7	180.4	432.9	1.59	0.07	3.80
2,028.0	24.54	18.88	1,935.1	406.5	184.5	445.4	1.27	-0.33	-2.93
2,058.0	24.22	18.39	1,962.4	418.2	188.5	457.7	1.26	-1.07	-1.63
2,088.0	22.31	14.91	1,990.0	429.5	191.9	469.6	7.84	6.97	-11.60
2,118.0	21.08	11.00	2,017.8	440.3	194.4	480.5	6.32	-4.10	-13.03
2,148.0	19.82	8.55	2,046.0	450.7	196.2	490.8	5.08	-4.20	-8.17
2,178.0	17.86	6.07	2,074.4	460.3	197.4	500.3	7.06	6.53	-8.27

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West Virginia Department of Environmental Protection

Survey Report



Company: HG Energy, LLC	Local Co-ordinate Reference: Well W.S. May #261
Project: Lincoln County, West Virginia	TVD Reference: WELL @ 1012.0usft (Decker #9)
Site: W.S. May #261	MD Reference: WELL @ 1012.0usft (Decker #9)
Well: W.S. May #261	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: EDM5002

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,208.0	14.28	2.04	2,103.2	468.5	198.1	508.2	12.49	-11.93	-13.43
2,238.0	11.32	357.06	2,132.4	475.2	198.0	514.5	10.52	-9.87	-16.60
2,268.0	9.31	355.95	2,161.9	480.6	197.7	519.4	6.73	-6.70	-3.70
2,298.0	7.54	355.85	2,191.6	484.9	197.4	523.4	5.90	-5.90	-0.33
2,328.0	5.40	349.15	2,221.4	488.3	197.0	526.4	7.55	-7.13	-22.33
2,358.0	4.00	333.42	2,251.3	490.6	196.3	528.3	6.30	-4.67	-52.43
2,388.0	3.24	308.99	2,281.3	492.1	195.1	529.3	5.67	-2.53	-81.43
2,418.0	2.90	286.24	2,311.2	492.8	193.7	529.5	4.18	-1.13	-75.83
2,448.0	2.80	284.58	2,341.2	493.2	192.3	529.3	0.43	-0.33	-5.53
2,478.0	2.57	284.35	2,371.2	493.6	190.9	529.2	0.77	-0.77	-0.77
2,508.0	2.59	269.09	2,401.1	493.7	189.6	528.9	2.28	0.07	-50.87
2,538.0	2.98	258.02	2,431.1	493.6	188.2	528.2	2.21	1.30	-36.90
2,568.0	2.86	252.32	2,461.0	493.2	186.7	527.3	1.05	-0.40	-19.00
2,585.0	2.67	253.55	2,478.0	492.9	185.9	526.8	1.17	-1.12	7.24
2,598.0	2.53	254.49	2,491.0	492.8	185.3	526.5	1.13	-1.08	7.23
2,628.0	2.21	246.56	2,521.0	492.4	184.2	525.7	1.52	-1.07	-26.43
2,658.0	2.23	239.54	2,551.0	491.8	183.1	524.8	0.91	0.07	-23.40
TD @ 2749' MD / 2642' TVD									
2,749.0	2.23	239.54	2,641.9	490.0	180.1	522.1	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
618.0	618.0	-2.3	-1.9	First MWD Survey @ 618' MD / 618' TVD
2,749.0	2,641.9	490.0	180.1	TD @ 2749' MD / 2642' TVD

Checked By: _____ Approved By: _____ Date: _____

HG Energy, LLC

Lincoln County, West Virginia

W.S. May #261

W.S. May #261

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

10 January, 2017



05/26/2017

Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.S. May #261
Project:	Lincoln County, West Virginia	TVD Reference:	WELL @ 1012.0usft (Decker #9)
Site:	W.S. May #261	MD Reference:	WELL @ 1012.0usft (Decker #9)
Well:	W.S. May #261	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

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	W.S. May #261				
Site Position:		Northing:	13,885,318.88 usft	Latitude:	38° 14' 3.820 N
From:	Lat/Long	Easting:	1,366,057.76 usft	Longitude:	81° 57' 19.850 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.59 °

Well	W.S. May #261					
Well Position	+N/-S	0.0 usft	Northing:	13,885,318.88 usft	Latitude:	38° 14' 3.820 N
	+E/-W	0.0 usft	Easting:	1,366,057.76 usft	Longitude:	81° 57' 19.850 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	0.0 usft	Ground Level:	1,004.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/29/2016	-7.50	65.93	51,560

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	20.51	

Survey Program	Date 1/10/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
618.0	2,749.0	MWD Surveys (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	13,885,318.88	1,366,057.76	38° 14' 3.820 N	81° 57' 19.850 W	
618.0	0.56	219.40	618.0	-2.3	-1.9	13,885,316.54	1,366,055.84	38° 14' 3.797 N	81° 57' 19.874 W	
First MWD Survey @ 618' MD / 618' TVD										
648.0	0.44	227.66	648.0	-2.5	-2.1	13,885,316.35	1,366,055.66	38° 14' 3.795 N	81° 57' 19.876 W	
678.0	0.19	106.55	678.0	-2.6	-2.1	13,885,316.26	1,366,055.63	38° 14' 3.794 N	81° 57' 19.876 W	
708.0	1.48	50.01	708.0	-2.4	-1.8	13,885,316.49	1,366,055.97	38° 14' 3.796 N	81° 57' 19.872 W	
738.0	2.86	42.07	738.0	-1.6	-1.0	13,885,317.30	1,366,056.77	38° 14' 3.804 N	81° 57' 19.862 W	
768.0	4.27	39.87	767.9	-0.2	0.2	13,885,318.71	1,366,057.99	38° 14' 3.818 N	81° 57' 19.847 W	
798.0	5.38	33.59	797.8	1.9	1.7	13,885,320.74	1,366,059.48	38° 14' 3.839 N	81° 57' 19.829 W	
828.0	6.66	27.38	827.6	4.6	3.3	13,885,323.46	1,366,061.06	38° 14' 3.866 N	81° 57' 19.809 W	
858.0	7.81	26.05	857.4	8.0	5.0	13,885,326.83	1,366,062.75	38° 14' 3.899 N	81° 57' 19.788 W	
888.0	8.81	22.62	887.1	11.9	6.8	13,885,330.79	1,366,064.53	38° 14' 3.938 N	81° 57' 19.767 W	

Survey Report - Geographic



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Site:	W.S. May #261	MD Reference:	WELL @ 1012.0usft (Decker #9)
Well:	W.S. May #261	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
918.0	9.91	22.00	916.7	16.4	8.6	13,885,335.30	1,366,066.38	38° 14' 3.983 N	81° 57' 19.744 W
948.0	10.67	20.67	946.2	21.4	10.6	13,885,340.29	1,366,068.33	38° 14' 4.033 N	81° 57' 19.720 W
978.0	11.63	20.94	975.6	26.8	12.6	13,885,345.71	1,366,070.39	38° 14' 4.087 N	81° 57' 19.695 W
1,008.0	12.73	19.27	1,005.0	32.8	14.8	13,885,351.66	1,366,072.56	38° 14' 4.146 N	81° 57' 19.669 W
1,038.0	13.98	21.01	1,034.1	39.3	17.2	13,885,358.16	1,366,074.95	38° 14' 4.210 N	81° 57' 19.640 W
1,068.0	14.79	19.96	1,063.2	46.3	19.8	13,885,365.14	1,366,077.56	38° 14' 4.280 N	81° 57' 19.608 W
1,098.0	15.73	18.44	1,092.1	53.7	22.4	13,885,372.60	1,366,080.15	38° 14' 4.354 N	81° 57' 19.576 W
1,128.0	16.74	16.84	1,120.9	61.7	24.9	13,885,380.59	1,366,082.69	38° 14' 4.433 N	81° 57' 19.545 W
1,158.0	18.14	18.00	1,149.6	70.3	27.6	13,885,389.17	1,366,085.39	38° 14' 4.518 N	81° 57' 19.513 W
1,188.0	19.28	21.95	1,178.0	79.3	30.9	13,885,398.21	1,366,088.68	38° 14' 4.608 N	81° 57' 19.473 W
1,218.0	20.31	24.56	1,206.2	88.7	34.9	13,885,407.54	1,366,092.70	38° 14' 4.700 N	81° 57' 19.423 W
1,248.0	21.63	27.65	1,234.2	98.3	39.7	13,885,417.17	1,366,097.43	38° 14' 4.796 N	81° 57' 19.365 W
1,278.0	23.01	29.23	1,262.0	108.3	45.1	13,885,427.19	1,366,102.86	38° 14' 4.896 N	81° 57' 19.299 W
1,308.0	24.00	30.08	1,289.5	118.7	51.0	13,885,437.58	1,366,108.78	38° 14' 4.999 N	81° 57' 19.226 W
1,338.0	24.88	30.88	1,316.8	129.4	57.3	13,885,448.28	1,366,115.08	38° 14' 5.105 N	81° 57' 19.148 W
1,368.0	25.69	32.57	1,343.9	140.3	64.1	13,885,459.17	1,366,121.82	38° 14' 5.214 N	81° 57' 19.065 W
1,398.0	25.92	31.20	1,370.9	151.4	71.0	13,885,470.26	1,366,128.71	38° 14' 5.324 N	81° 57' 18.980 W
1,428.0	26.26	31.27	1,397.9	162.7	77.8	13,885,481.54	1,366,135.55	38° 14' 5.436 N	81° 57' 18.896 W
1,458.0	26.74	31.74	1,424.7	174.1	84.8	13,885,492.96	1,366,142.55	38° 14' 5.550 N	81° 57' 18.810 W
1,488.0	27.43	31.42	1,451.4	185.7	91.9	13,885,504.59	1,366,149.70	38° 14' 5.666 N	81° 57' 18.721 W
1,518.0	28.07	28.60	1,478.0	197.8	98.9	13,885,516.69	1,366,156.68	38° 14' 5.786 N	81° 57' 18.635 W
1,548.0	28.61	28.99	1,504.4	210.3	105.8	13,885,529.17	1,366,163.54	38° 14' 5.910 N	81° 57' 18.551 W
1,578.0	28.68	27.62	1,530.7	223.0	112.6	13,885,541.83	1,366,170.36	38° 14' 6.036 N	81° 57' 18.467 W
1,608.0	27.69	26.26	1,557.2	235.6	119.0	13,885,554.46	1,366,176.78	38° 14' 6.162 N	81° 57' 18.388 W
1,638.0	27.07	24.26	1,583.8	248.1	124.9	13,885,566.93	1,366,182.67	38° 14' 6.286 N	81° 57' 18.316 W
1,668.0	26.74	22.57	1,610.6	260.5	130.3	13,885,579.39	1,366,188.07	38° 14' 6.409 N	81° 57' 18.250 W
1,698.0	26.39	20.78	1,637.4	273.0	135.3	13,885,591.86	1,366,193.02	38° 14' 6.533 N	81° 57' 18.190 W
1,728.0	26.44	21.52	1,664.3	285.4	140.1	13,885,604.30	1,366,197.84	38° 14' 6.657 N	81° 57' 18.131 W
1,758.0	26.12	20.94	1,691.2	297.8	144.9	13,885,616.68	1,366,202.65	38° 14' 6.779 N	81° 57' 18.072 W
1,788.0	26.47	21.23	1,718.0	310.2	149.7	13,885,629.08	1,366,207.43	38° 14' 6.903 N	81° 57' 18.014 W
1,818.0	26.39	20.15	1,744.9	322.7	154.4	13,885,641.57	1,366,212.15	38° 14' 7.027 N	81° 57' 17.956 W
1,848.0	25.97	21.21	1,771.8	335.1	159.1	13,885,653.96	1,366,216.82	38° 14' 7.149 N	81° 57' 17.899 W
1,878.0	25.22	20.98	1,798.9	347.2	163.7	13,885,666.05	1,366,221.49	38° 14' 7.270 N	81° 57' 17.842 W
1,938.0	24.74	18.61	1,853.3	371.0	172.3	13,885,689.88	1,366,230.07	38° 14' 7.506 N	81° 57' 17.738 W
1,968.0	24.62	18.62	1,880.5	382.9	176.3	13,885,701.75	1,366,234.07	38° 14' 7.624 N	81° 57' 17.689 W
1,998.0	24.64	19.76	1,907.8	394.7	180.4	13,885,713.56	1,366,238.18	38° 14' 7.741 N	81° 57' 17.639 W
2,028.0	24.54	18.88	1,935.1	406.5	184.5	13,885,725.34	1,366,242.31	38° 14' 7.858 N	81° 57' 17.589 W
2,058.0	24.22	18.39	1,962.4	418.2	188.5	13,885,737.08	1,366,246.27	38° 14' 7.974 N	81° 57' 17.541 W
2,088.0	22.31	14.91	1,990.0	429.5	191.9	13,885,748.42	1,366,249.67	38° 14' 8.087 N	81° 57' 17.500 W
2,118.0	21.08	11.00	2,017.8	440.3	194.4	13,885,759.22	1,366,252.17	38° 14' 8.194 N	81° 57' 17.470 W
2,148.0	19.82	8.55	2,046.0	450.7	196.2	13,885,769.55	1,366,253.95	38° 14' 8.296 N	81° 57' 17.449 W
2,178.0	17.86	6.07	2,074.4	460.3	197.4	13,885,779.15	1,366,255.20	38° 14' 8.391 N	81° 57' 17.434 W
2,208.0	14.28	2.04	2,103.2	468.5	198.1	13,885,787.43	1,366,255.81	38° 14' 8.473 N	81° 57' 17.428 W
2,238.0	11.32	357.06	2,132.4	475.2	198.0	13,885,794.07	1,366,255.79	38° 14' 8.539 N	81° 57' 17.429 W
2,268.0	9.31	355.95	2,161.9	480.6	197.7	13,885,799.43	1,366,255.47	38° 14' 8.592 N	81° 57' 17.434 W
2,298.0	7.54	355.85	2,191.6	484.9	197.4	13,885,803.81	1,366,255.16	38° 14' 8.635 N	81° 57' 17.438 W
2,328.0	5.40	349.15	2,221.4	488.3	197.0	13,885,807.16	1,366,254.75	38° 14' 8.668 N	81° 57' 17.444 W
2,358.0	4.00	333.42	2,251.3	490.6	196.3	13,885,809.48	1,366,254.02	38° 14' 8.691 N	81° 57' 17.453 W
2,388.0	3.24	308.99	2,281.3	492.1	195.1	13,885,810.95	1,366,252.89	38° 14' 8.706 N	81° 57' 17.467 W
2,418.0	2.90	286.24	2,311.2	492.8	193.7	13,885,811.70	1,366,251.50	38° 14' 8.713 N	81° 57' 17.485 W
2,448.0	2.80	284.58	2,341.2	493.2	192.3	13,885,812.09	1,366,250.06	38° 14' 8.717 N	81° 57' 17.503 W
2,478.0	2.57	284.35	2,371.2	493.6	190.9	13,885,812.45	1,366,248.70	38° 14' 8.720 N	81° 57' 17.520 W
2,508.0	2.59	269.09	2,401.1	493.7	189.6	13,885,812.60	1,366,247.37	38° 14' 8.721 N	81° 57' 17.537 W
2,538.0	2.98	258.02	2,431.1	493.6	188.2	13,885,812.43	1,366,245.93	38° 14' 8.719 N	81° 57' 17.555 W
2,568.0	2.86	252.32	2,461.0	493.2	186.7	13,885,812.04	1,366,244.46	38° 14' 8.715 N	81° 57' 17.573 W

Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.S. May #261
Project:	Lincoln County, West Virginia	TVD Reference:	WELL @ 1012.0usft (Decker #9)
Site:	W.S. May #261	MD Reference:	WELL @ 1012.0usft (Decker #9)
Well:	W.S. May #261	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
2,585.0	2.67	253.55	2,478.0	492.9	185.9	13,885,811.80	1,366,243.67	38° 14' 8.713 N	81° 57' 17.583 W	
2,598.0	2.53	254.49	2,491.0	492.8	185.3	13,885,811.64	1,366,243.11	38° 14' 8.711 N	81° 57' 17.590 W	
2,628.0	2.21	246.56	2,521.0	492.4	184.2	13,885,811.23	1,366,241.94	38° 14' 8.707 N	81° 57' 17.605 W	
2,658.0	2.23	239.54	2,551.0	491.8	183.1	13,885,810.70	1,366,240.90	38° 14' 8.702 N	81° 57' 17.618 W	
2,749.0	2.23	239.54	2,641.9	490.0	180.1	13,885,808.91	1,366,237.85	38° 14' 8.684 N	81° 57' 17.656 W	
TD @ 2749' MD / 2642' TVD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
618.0	618.0	-2.3	-1.9	First MWD Survey @ 618' MD / 618' TVD	
2,749.0	2,641.9	490.0	180.1	TD @ 2749' MD / 2642' TVD	

Checked By: _____ Approved By: _____ Date: _____

Company Name: HG Energy, LLC
 W.S. May #261
 Lincoln County, West Virginia
 Rig: Decker #9
 Created By: Shane Robbins
 Date: 1/10/2017

W.S. May #261
 Lincoln County, West Virginia
 Q170004 & AM-170005
 Design #1



PROJECT DETAILS: Lincoln County, West Virginia

Geodetic System: Universal Transverse Mercator
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GR8 1980
 System Datum: Zone 17N (84 W to 78 W)
 Mean Sea Level

DESIGN TARGET DETAILS							
Name	TYD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
Target W.S. May #261	2437.0	471.3	178.4	13122796.38	1362234.13	38° 14' 8.500 N	81° 57' 17.700 W
- please refer target center							

WELL DETAILS: W.S. May #261							
+N-S	+E-W	Northing	Easting	Latitude	Longitude	Ground Level	1984.0
0.0	0.0	13122810.0	1362237.78	38° 14' 2.820 N	81° 57' 19.550 W		

ANNOTATIONS									
ID	Tag	Act	TYD	+N-S	+E-W	Vsect	Departure	Annotation	
112.0	0.00	213.00	613.0	-2.3	-1.0	-2.3	3.0	First BMD Survey @ 613' MD / 613' TYD	
2749.0	2.23	233.84	2641.0	490.0	100.1	522.1	669.1	TD @ 2749' MD / 2641' TYD	

HG Energy

Azimuths to Grid North
 Magnetic North: -6.91°
 Magnetic Field
 Strength: 51559.6snT
 Dip Angle: 65.93°
 Date: 12/29/2016
 Model: IGRF2015

