



**EP Bell 508  
Lincoln County, WV  
Noah Horn 294 Rig**

**July 31, 2019**

RECEIVED  
Office of Oil and Gas

**AUG 16 2019**

WV Department of  
Environmental Protection

## **Survey Certification Report**



# Survey Certification Letter

July 31, 2019

## HG Energy

Operator Name: HG Energy  
Well Name: EP Bell 508  
County/Parish: Lincoln County  
State: WV  
Rig Name: Noah Horn 294  
Job Number: LWV3507719

This is to certify the surveys performed on the referenced well by Professional Directional Ent., Inc. are true and correct MWD Surveys, data provided as follows:

<u>Surveyor</u>	<u>Surveyed Depths</u>	<u>Projection to Bit</u>	<u>Dates Performed</u>	<u>Type of Survey</u>
ProDirectional	560'MD – 2,570'MD	2,638'MD	06/24/19 – 06/26/19	MWD-OWSG

Sincerely,

John Jordan  
Well Planning Analyst  
Professional Directional

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WV Department of Environmental Protection

850 Conroe Park West Drive | Conroe, TX 77303 | Phone: 936.441.7266

[prodirectional.com](http://prodirectional.com)

*The Standard of Excellence in Directional Supervision*

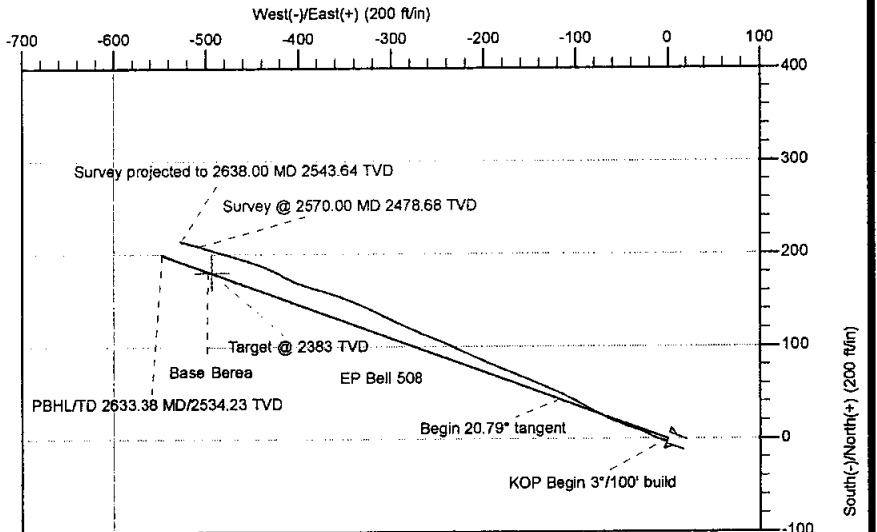
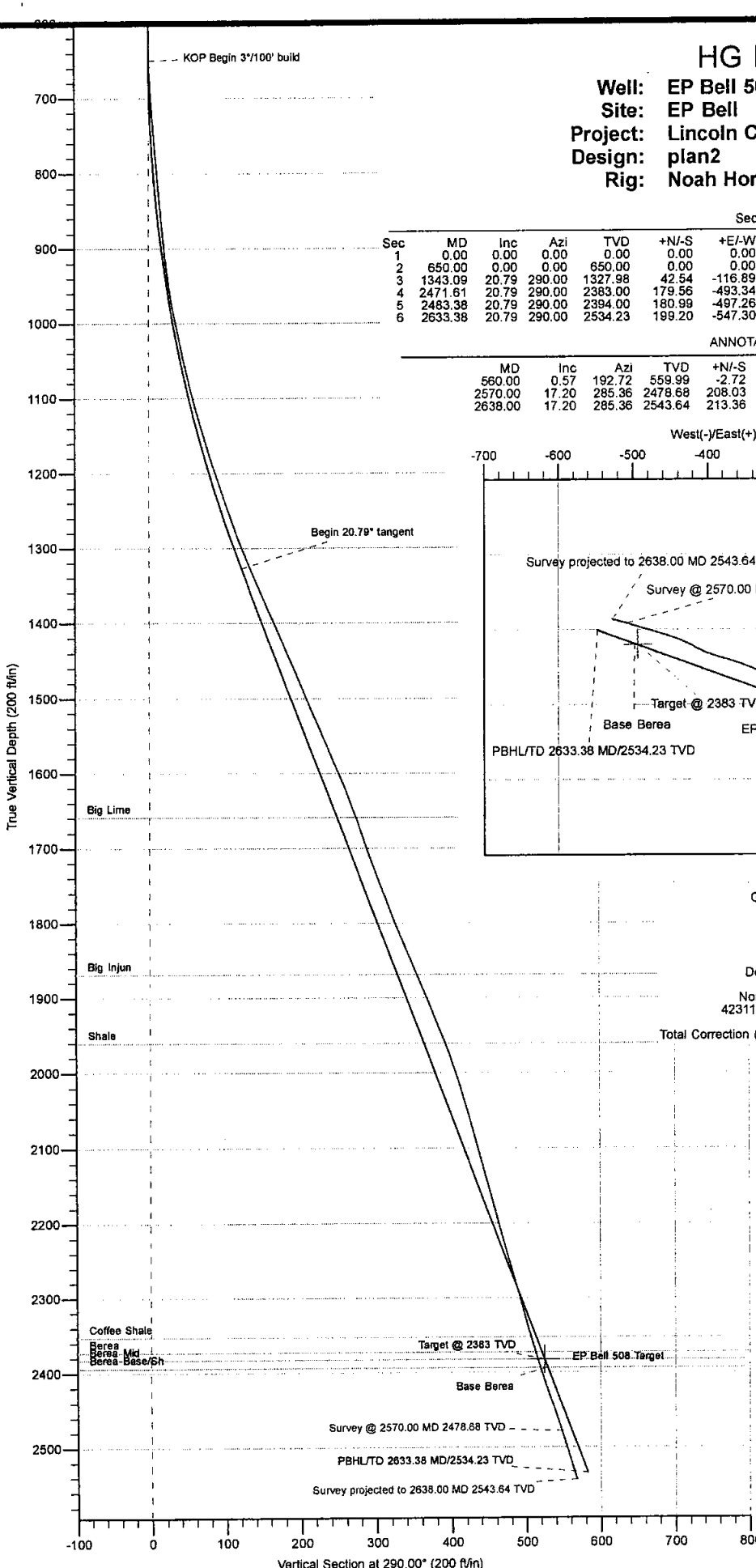
# HG Energy LLC

Well: EP Bell 508  
 Site: EP Bell  
 Project: Lincoln County, West Virginia UTM83  
 Design: plan2  
 Rig: Noah Horn 294

Section Details										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 3°/100' build
2	650.00	0.00	0.00	650.00	0.00	0.00	0.00	0.00	0.00	Begin 20.79° tangent
3	1343.09	20.79	290.00	1327.98	42.54	-116.89	3.00	290.00	124.39	Target @ 2383 TVD
4	2471.61	20.79	290.00	2383.00	179.56	-493.34	0.00	0.00	525.00	Base Berea
5	2483.38	20.79	290.00	2394.00	180.99	-497.26	0.00	0.00	529.18	PBHL/TD 2633.38 MD/2534.23 TVD
6	2633.38	20.79	290.00	2534.23	199.20	-547.30	0.00	0.00	562.43	

ANNOTATIONS SURVEYS										
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Annotation			
560.00	0.57	192.72	559.99	-2.72	-0.61	-0.35	MWD surveys			
2570.00	17.20	285.36	2478.68	208.03	-507.26	547.82	Survey @ 2570.00 MD 2478.68 TVD			
2638.00	17.20	285.36	2543.64	213.36	-526.65	567.86	Survey projected to 2638.00 MD 2543.64 TVD			

True Vertical Depth (200 ft/in)



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  
 Depth Reference: RKB=903+8 @ 911.00ft (Noah Horn 294)

Northing 4231183.00 Easting 417328.00 Latitude 38° 13' 29.4043 N Longitude 81° 56' 40.2144 W

Total Correction (M->T): To convert a Magnetic Direction to a True Direction, Subtract 8.3°

### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
465.00	465.00	Pittsburgh Coal
1659.00	1697.17	Big Lime
1869.00	1921.80	Big Injun
1961.00	2020.21	Shale
2353.00	2439.52	Coffee Shale
2373.00	2460.82	Berea
2383.00	2471.61	Berea Mid
2394.00	2483.38	Berea Base/Sh



Azimuths to Grid North  
 True North: 0.58°  
 Magnetic North: -7.77°

Magnetic Field  
 Strength: 51360.9snT  
 Dip Angle: 65.48°  
 Date: 5/3/2019  
 Model: HDGM



PRO DIRECTIONAL

Survey Report



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WV Department of  
Environmental Protection

Company:	HG Energy LLC	Local Co-ordinate Reference:	Well EP Bell 508
Project:	Lincoln County, West Virginia UTM83	TVD Reference:	RKB=903+8 @ 911.00ft (Noah Horn 294)
Site:	EP Bell	MD Reference:	RKB=903+8 @ 911.00ft (Noah Horn 294)
Well:	EP Bell 508	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Project:	Lincoln County, West Virginia UTM83		
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:	EP Bell				
Site Position:		Northing:	4,230,894.00 m	Latitude:	38° 13' 19.8673 N
From:	Map	Easting:	416,841.00 m	Longitude:	81° 57' 0.1198 W
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.59 °

Well:	EP Bell 508					
Well Position	+N-S	0.00 ft	Northing:	4,231,183.00 m	Latitude:	38° 13' 29.4043 N
	+E-W	0.00 ft	Easting:	417,328.00 m	Longitude:	81° 56' 40.2144 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	903.00 ft

Wellbore:	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	5/3/2019	-8.35	65.48	51,360.90000000

Design:	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N-S (ft)	+E-W (ft)	Direction (°)	
	0.00	0.00	0.00	290.00	

Survey Program	Date: 6/28/2019				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
560.00	2,570.00	MWD (Original Hole)	MWD	OWSG MWD - Standard	
2,638.00	2,638.00	Projection (Original Hole)	MWD	OWSG MWD - Standard	

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
560.00	0.57	192.72	559.99	-2.72	-0.61	-0.35	0.10	0.10	0.00	
<b>MWD surveys</b>										
590.00	0.50	205.24	589.99	-2.98	-0.70	-0.36	0.45	-0.23	41.73	
620.00	0.71	245.79	619.99	-3.18	-0.93	-0.21	1.54	0.70	135.17	
650.00	1.54	282.69	649.98	-3.16	-1.49	0.32	3.54	2.77	123.00	
680.00	2.54	286.69	679.96	-2.88	-2.52	1.38	3.36	3.33	13.33	
710.00	3.90	286.89	709.91	-2.40	-4.13	3.06	4.53	4.53	0.67	
740.00	4.61	287.60	739.83	-1.74	-6.26	5.29	2.37	2.37	2.37	
770.00	5.08	287.49	769.72	-0.97	-8.67	7.82	1.57	1.57	-0.37	

Survey Report



Company:	HG Energy LLC	RECEIVED	Local Co-ordinate Reference:	Well EP Bell 508
Project:	Lincoln County, West Virginia U	Office of Oil and Gas	TVD Reference:	RKB=903+8 @ 911.00ft (Noah Horn 294)
Site:	EP Bell	AUG 16 2019	MD Reference:	RKB=903+8 @ 911.00ft (Noah Horn 294)
Well:	EP Bell 508		North Reference:	Grid
Wellbore:	Original Hole	WV Department of	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Environmental Protection	Database:	DB_Jul2216dt_v14

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	N-S (ft)	E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
800.00	5.17	286.41	799.60	-0.19	-11.24	10.50	0.44	0.30	-3.60
830.00	5.13	291.41	829.48	0.68	-13.78	13.18	1.50	-0.13	16.67
860.00	5.17	298.58	859.36	1.82	-16.22	15.86	2.15	0.13	23.90
890.00	6.08	301.60	889.22	3.29	-18.75	18.75	3.12	2.97	10.07
920.00	7.46	296.88	919.01	5.00	-21.84	22.23	5.02	4.87	-15.73
950.00	9.09	292.95	948.70	6.81	-25.76	26.54	5.75	5.43	-13.10
980.00	10.49	290.20	978.26	8.68	-30.51	31.63	4.92	4.67	-9.17
1,010.00	11.70	290.42	1,007.70	10.68	-35.92	37.41	4.04	4.03	0.73
1,040.00	12.34	290.47	1,037.04	12.86	-41.77	43.65	2.13	2.13	0.17
1,070.00	13.49	291.69	1,066.28	15.28	-48.03	50.36	3.94	3.83	4.07
1,100.00	14.61	292.65	1,095.38	18.03	-54.77	57.63	3.81	3.73	3.20
1,130.00	16.00	295.08	1,124.32	21.24	-62.01	65.53	5.10	4.63	8.10
1,160.00	17.11	296.05	1,153.07	24.93	-69.72	74.04	3.81	3.70	3.23
1,190.00	18.06	297.19	1,181.67	28.99	-77.82	83.04	3.37	3.17	3.80
1,220.00	18.67	298.12	1,210.14	33.38	-86.19	92.41	2.26	2.03	3.10
1,250.00	19.17	298.85	1,238.52	38.02	-94.74	102.03	1.84	1.67	2.43
1,280.00	19.89	298.54	1,266.80	42.83	-103.54	111.94	2.42	2.40	-1.03
1,310.00	21.56	295.55	1,294.86	47.65	-113.00	122.48	6.59	5.57	-9.97
1,340.00	23.33	293.41	1,322.58	52.39	-123.42	133.90	6.50	5.90	-7.13
1,370.00	23.63	292.41	1,350.10	57.04	-134.43	145.83	1.66	1.00	-3.33
1,400.00	23.60	292.89	1,377.59	61.67	-145.52	157.84	0.65	-0.10	1.60
1,430.00	23.58	292.44	1,405.08	66.29	-156.60	169.83	0.60	-0.07	-1.50
1,460.00	23.39	292.94	1,432.59	70.91	-167.63	181.77	0.92	-0.63	1.67
1,490.00	22.74	292.54	1,460.20	75.45	-178.47	193.51	2.23	-2.17	-1.33
1,520.00	22.81	293.27	1,487.86	79.97	-189.17	205.11	0.97	0.23	2.43
1,550.00	22.60	293.68	1,515.53	84.58	-199.79	216.67	0.88	-0.70	1.37
1,580.00	23.03	295.05	1,543.18	89.38	-210.38	228.27	2.28	1.43	4.57
1,610.00	23.21	295.31	1,570.78	94.39	-221.04	240.00	0.69	0.60	0.87
1,640.00	22.80	294.86	1,598.39	99.36	-231.66	251.68	1.49	-1.37	-1.50
1,670.00	21.68	292.84	1,626.16	103.96	-242.04	263.00	4.52	-3.73	-6.73
1,700.00	19.91	291.17	1,654.20	107.96	-251.91	273.64	6.22	-5.90	-5.57
1,730.00	19.34	291.66	1,682.46	111.63	-261.29	283.72	1.98	-1.90	1.63
1,760.00	19.69	293.27	1,710.74	115.46	-270.55	293.73	2.14	1.17	5.37
1,790.00	20.18	294.40	1,738.94	119.60	-279.91	303.93	2.08	1.63	3.77
1,820.00	20.43	294.97	1,767.07	123.95	-289.37	314.31	1.06	0.83	1.90
1,850.00	21.93	295.67	1,795.05	128.58	-299.17	325.10	5.07	5.00	2.33
1,880.00	22.40	296.24	1,822.83	133.54	-309.34	336.36	1.72	1.57	1.90
1,910.00	22.65	296.21	1,850.54	138.62	-319.65	347.78	0.83	0.83	-0.10
1,940.00	22.68	293.67	1,878.23	143.49	-330.13	359.30	3.26	0.10	-8.47
1,970.00	22.74	292.45	1,905.90	148.03	-340.79	370.86	1.58	0.20	-4.07
2,000.00	22.20	291.53	1,933.62	152.32	-351.42	382.32	2.15	-1.80	-3.07
2,030.00	20.53	289.77	1,961.56	156.18	-361.64	393.25	5.96	-5.57	-5.87
2,060.00	18.69	287.44	1,989.82	159.40	-371.18	403.31	6.66	-6.13	-7.77

Survey Report



<b>Company:</b>	HG Energy LLC	<b>Local Co-ordinate Reference:</b>	Well EP Bell 508
<b>Project:</b>	Lincoln County, West Virginia UTM83	<b>TVD Reference:</b>	RKB=903+8 @ 911.00ft (Noah Horn 294)
<b>Site:</b>	EP Bell	<b>MD Reference:</b>	RKB=903+8 @ 911.00ft (Noah Horn 294)
<b>Well:</b>	EP Bell 508	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	N/S (ft)	E/W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,090.00	17.18	285.30	2,018.36	162.01	-380.04	412.53	5.49	-5.03	-7.13
2,120.00	16.64	286.66	2,047.06	164.41	-388.43	421.23	2.23	-1.80	4.53
2,150.00	16.29	290.11	2,075.83	167.09	-396.49	429.73	3.46	-1.17	11.50
2,180.00	15.74	292.73	2,104.67	170.11	-404.20	438.00	3.03	-1.83	8.73
2,210.00	15.26	297.02	2,133.58	173.47	-411.47	445.98	4.14	-1.60	14.30
2,240.00	15.23	298.32	2,162.52	177.14	-418.45	453.80	1.14	-0.10	4.33
2,270.00	15.18	295.93	2,191.47	180.72	-425.46	461.61	2.10	-0.17	-7.97
2,300.00	15.82	293.35	2,220.38	184.06	-432.74	469.60	3.14	2.13	-8.60
2,330.00	16.03	291.77	2,249.23	187.22	-440.34	477.82	1.61	0.70	-5.27
2,360.00	14.97	289.15	2,278.14	190.03	-447.85	485.83	4.23	-3.53	-8.73
2,390.00	15.60	286.75	2,307.08	192.46	-455.37	493.74	2.98	2.10	-8.00
2,420.00	15.73	285.34	2,335.97	194.70	-463.16	501.82	1.34	0.43	-4.70
2,450.00	16.46	286.18	2,364.79	196.96	-471.16	510.11	2.55	2.43	2.80
2,480.00	18.27	287.85	2,393.42	199.58	-479.72	519.05	6.26	6.03	5.57
2,510.00	18.94	287.35	2,421.85	202.48	-488.84	528.61	2.30	2.23	-1.67
2,540.00	19.33	287.14	2,450.20	205.39	-498.24	538.44	1.32	1.30	-0.70
2,570.00	17.20	285.36	2,478.68	208.03	-507.26	547.82	7.34	-7.10	-5.93
<b>Survey @ 2570.00 MD 2478.68 TVD</b>									
2,638.00	17.20	285.36	2,543.64	213.36	-526.65	567.86	0.00	0.00	0.00
<b>Survey projected to 2638.00 MD 2543.64 TVD</b>									

Measured Depth (ft)	Vertical Depth (ft)	N/S (ft)	E/W (ft)	Comment
560.00	559.99	-2.72	-0.61	MWD surveys
2,570.00	2,478.68	208.03	-507.26	Survey @ 2570.00 MD 2478.68 TVD

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Environmental Protection

Survey Report - Geographic



Company:	HG Energy LLC	Local Co-ordinate Reference:	Well EP Bell 508
Project:	Lincoln County, West Virginia UTM83	TVD Reference:	RKB=903+8 @ 911.00ft (Noah Horn 294)
Site:	EP Bell	MD Reference:	RKB=903+8 @ 911.00ft (Noah Horn 294)
Well:	EP Bell 508	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Office of Oil and Gas  
AUG 16 2019

Project:	Lincoln County, West Virginia UTM83	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:	EP Bell	Site Position:	Northing: 4,230,894.00 m	Latitude: 38° 13' 19.8673 N
		From: Map	Easting: 416,841.00 m	Longitude: 81° 57' 0.1198 W
		Position Uncertainty: 0.00 ft	Slot Radius: 13-3/16 "	Grid Convergence: -0.59 °

Well:	EP Bell 508	Well Position:	+N-S 0.00 ft	Northing: 4,231,183.00 m	Latitude: 38° 13' 29.4043 N
			+E-W 0.00 ft	Easting: 417,328.00 m	Longitude: 81° 56' 40.2144 W
		Position Uncertainty: 0.00 ft		Wellhead Elevation: ft	Ground Level: 903.00 ft

Wellbore:	Original Hole	Magnetics:	Model Name: HDGM	Sample Date: 5/3/2019	Declination: -8.35	Dip Angle: 65.48	Field Strength: 51,360.90000000
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Design:	Surveys Original Hole	Audit Notes:	Version: 1.0	Phase: ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (ft)	+N-S (ft)	+E-W (ft)	Direction (°)	
	0.00	0.00	0.00	290.00	

Survey Program:	Date: 6/26/2019			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
560.00	2,570.00	MWD (Original Hole)	MWD	OWSG MWD - Standard
2,638.00	2,638.00	Projection (Original Hole)	MWD	OWSG MWD - Standard

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (m)	Map Easting (m)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	4,231,183.00	417,328.00	38° 13' 29.4043 N	81° 56' 40.2144 W	
560.00	0.57	192.72	559.99	-2.72	-0.61	4,231,182.18	417,327.81	38° 13' 29.3774 N	81° 56' 40.2218 W	
<b>MWD surveys</b>										
590.00	0.50	205.24	589.99	-2.98	-0.70	4,231,182.10	417,327.79	38° 13' 29.3747 N	81° 56' 40.2229 W	
620.00	0.71	245.79	619.99	-3.18	-0.93	4,231,182.04	417,327.72	38° 13' 29.3728 N	81° 56' 40.2257 W	
650.00	1.54	282.69	649.98	-3.16	-1.49	4,231,182.04	417,327.55	38° 13' 29.3728 N	81° 56' 40.2327 W	
680.00	2.54	286.69	679.96	-2.88	-2.52	4,231,182.13	417,327.23	38° 13' 29.3755 N	81° 56' 40.2457 W	
710.00	3.90	286.89	709.91	-2.40	-4.13	4,231,182.27	417,326.74	38° 13' 29.3802 N	81° 56' 40.2660 W	
740.00	4.61	287.60	739.83	-1.74	-6.26	4,231,182.48	417,326.09	38° 13' 29.3865 N	81° 56' 40.2927 W	
770.00	5.08	287.49	769.72	-0.97	-8.67	4,231,182.71	417,325.36	38° 13' 29.3938 N	81° 56' 40.3231 W	
800.00	5.17	286.41	799.60	-0.19	-11.24	4,231,182.95	417,324.57	38° 13' 29.4013 N	81° 56' 40.3553 W	

Survey Report - Geographic



Company: HG Energy LLC  
 Project: Lincoln County, West Virginia UTM83  
 Site: EP Bell  
 Well: EP Bell 508  
 Wellbore: Original Hole  
 Design: Surveys Original Hole

Local Co-ordinate Reference:  
 TVD Reference:  
 MD Reference:  
 North Reference:  
 Survey Calculation Method:  
 Database:

Well EP Bell 508  
 RKB=903+8 @ 911.00ft (Noah Horn 294)  
 RKB=903+8 @ 911.00ft (Noah Horn 294)  
 Grid  
 Minimum Curvature  
 DB\_Jul2216dt\_v14

RECEIVED  
 Office of C...  
 AUG 16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	N/S (m)	E/W (m)	Map Northing (m)	Map Easting (m)	Latitude	Longitude
830.00	5.13	291.41	829.48	0.68	-13.78	4,231,183.21	417,323.80	38° 13' 29.4096 N	81° 56' 40.3873 W
860.00	5.17	298.58	859.36	1.82	-16.22	4,231,183.56	417,323.06	38° 13' 29.4206 N	81° 56' 40.4180 W
890.00	6.06	301.60	889.22	3.29	-18.75	4,231,184.01	417,322.28	38° 13' 29.4350 N	81° 56' 40.4500 W
920.00	7.46	296.88	919.01	5.00	-21.84	4,231,184.53	417,321.34	38° 13' 29.4516 N	81° 56' 40.4889 W
950.00	9.09	292.95	948.70	6.81	-25.76	4,231,185.08	417,320.15	38° 13' 29.4690 N	81° 56' 40.5382 W
980.00	10.49	290.20	978.26	8.68	-30.51	4,231,185.65	417,318.70	38° 13' 29.4870 N	81° 56' 40.5979 W
1,010.00	11.70	290.42	1,007.70	10.66	-35.92	4,231,186.26	417,317.05	38° 13' 29.5063 N	81° 56' 40.6661 W
1,040.00	12.34	290.47	1,037.04	12.86	-41.77	4,231,186.92	417,315.27	38° 13' 29.5272 N	81° 56' 40.7397 W
1,070.00	13.49	291.69	1,066.28	15.28	-48.03	4,231,187.66	417,313.36	38° 13' 29.5505 N	81° 56' 40.8184 W
1,100.00	14.61	292.65	1,095.38	18.03	-54.77	4,231,188.50	417,311.30	38° 13' 29.5770 N	81° 56' 40.9033 W
1,130.00	16.00	295.08	1,124.32	21.24	-62.01	4,231,189.48	417,309.10	38° 13' 29.6080 N	81° 56' 40.9944 W
1,160.00	17.11	296.05	1,153.07	24.93	-69.72	4,231,190.60	417,306.75	38° 13' 29.6437 N	81° 56' 41.0915 W
1,190.00	18.06	297.19	1,181.67	28.99	-77.82	4,231,191.84	417,304.28	38° 13' 29.6831 N	81° 56' 41.1936 W
1,220.00	18.67	298.12	1,210.14	33.38	-86.19	4,231,193.18	417,301.73	38° 13' 29.7256 N	81° 56' 41.2991 W
1,250.00	19.17	298.85	1,238.52	38.02	-94.74	4,231,194.59	417,299.12	38° 13' 29.7706 N	81° 56' 41.4068 W
1,280.00	19.89	298.54	1,266.80	42.83	-103.54	4,231,196.06	417,296.44	38° 13' 29.8174 N	81° 56' 41.5177 W
1,310.00	21.56	295.55	1,294.86	47.65	-113.00	4,231,197.53	417,293.56	38° 13' 29.8640 N	81° 56' 41.6369 W
1,340.00	23.33	293.41	1,322.58	52.39	-123.42	4,231,198.97	417,290.38	38° 13' 29.9098 N	81° 56' 41.7682 W
1,370.00	23.63	292.41	1,350.10	57.04	-134.43	4,231,200.39	417,287.02	38° 13' 29.9547 N	81° 56' 41.9068 W
1,400.00	23.60	292.89	1,377.59	61.67	-145.52	4,231,201.80	417,283.64	38° 13' 29.9994 N	81° 56' 42.0464 W
1,430.00	23.58	292.44	1,405.08	66.29	-156.60	4,231,203.21	417,280.27	38° 13' 30.0440 N	81° 56' 42.1858 W
1,460.00	23.39	292.94	1,432.59	70.91	-167.63	4,231,204.62	417,276.91	38° 13' 30.0885 N	81° 56' 42.3247 W
1,490.00	22.74	292.54	1,460.20	75.45	-178.47	4,231,206.00	417,273.60	38° 13' 30.1323 N	81° 56' 42.4611 W
1,520.00	22.81	293.27	1,487.66	79.97	-189.17	4,231,207.38	417,270.34	38° 13' 30.1759 N	81° 56' 42.5958 W
1,550.00	22.60	293.68	1,515.53	84.58	-199.79	4,231,208.79	417,267.10	38° 13' 30.2205 N	81° 56' 42.7295 W
1,580.00	23.03	295.05	1,543.18	89.38	-210.38	4,231,210.25	417,263.87	38° 13' 30.2669 N	81° 56' 42.8629 W
1,610.00	23.21	295.31	1,570.78	94.39	-221.04	4,231,211.78	417,260.63	38° 13' 30.3153 N	81° 56' 42.9972 W
1,640.00	22.80	294.86	1,598.39	99.36	-231.66	4,231,213.29	417,257.39	38° 13' 30.3634 N	81° 56' 43.1309 W
1,670.00	21.68	292.84	1,626.16	103.96	-242.04	4,231,214.69	417,254.22	38° 13' 30.4078 N	81° 56' 43.2617 W
1,700.00	19.91	291.17	1,654.20	107.96	-251.91	4,231,215.91	417,251.22	38° 13' 30.4463 N	81° 56' 43.3859 W
1,730.00	19.34	291.66	1,682.46	111.63	-261.29	4,231,217.03	417,248.36	38° 13' 30.4817 N	81° 56' 43.5039 W
1,760.00	19.69	293.27	1,710.74	115.46	-270.55	4,231,218.20	417,245.53	38° 13' 30.5187 N	81° 56' 43.6205 W
1,790.00	20.18	294.40	1,738.94	119.60	-279.91	4,231,219.46	417,242.68	38° 13' 30.5586 N	81° 56' 43.7383 W
1,820.00	20.43	294.97	1,767.07	123.95	-289.37	4,231,220.78	417,239.80	38° 13' 30.6006 N	81° 56' 43.8574 W
1,850.00	21.93	295.67	1,795.05	128.58	-299.17	4,231,222.20	417,236.81	38° 13' 30.6455 N	81° 56' 43.9808 W
1,880.00	22.40	296.24	1,822.83	133.54	-309.34	4,231,223.71	417,233.71	38° 13' 30.6935 N	81° 56' 44.1090 W
1,910.00	22.65	296.21	1,850.54	138.62	-319.65	4,231,225.25	417,230.57	38° 13' 30.7426 N	81° 56' 44.2389 W
1,940.00	22.68	293.67	1,878.23	143.49	-330.13	4,231,226.74	417,227.38	38° 13' 30.7898 N	81° 56' 44.3709 W
1,970.00	22.74	292.45	1,905.90	148.03	-340.79	4,231,228.12	417,224.13	38° 13' 30.8336 N	81° 56' 44.5050 W
2,000.00	22.20	291.53	1,933.62	152.32	-351.42	4,231,229.43	417,220.89	38° 13' 30.8749 N	81° 56' 44.6388 W
2,030.00	20.53	289.77	1,961.56	156.18	-361.64	4,231,230.61	417,217.77	38° 13' 30.9121 N	81° 56' 44.7675 W
2,060.00	18.69	287.44	1,989.82	159.40	-371.18	4,231,231.59	417,214.86	38° 13' 30.9430 N	81° 56' 44.8874 W
2,090.00	17.18	285.30	2,018.36	162.01	-380.04	4,231,232.39	417,212.16	38° 13' 30.9679 N	81° 56' 44.9988 W
2,120.00	16.64	286.66	2,047.06	164.41	-388.43	4,231,233.12	417,209.61	38° 13' 30.9908 N	81° 56' 45.1043 W
2,150.00	16.29	290.11	2,075.83	167.09	-396.49	4,231,233.93	417,207.15	38° 13' 31.0164 N	81° 56' 45.2057 W
2,180.00	15.74	292.73	2,104.67	170.11	-404.20	4,231,234.85	417,204.80	38° 13' 31.0455 N	81° 56' 45.3027 W
2,210.00	15.26	297.02	2,133.58	173.47	-411.47	4,231,235.88	417,202.58	38° 13' 31.0780 N	81° 56' 45.3942 W
2,240.00	15.23	298.32	2,162.52	177.14	-418.45	4,231,237.00	417,200.45	38° 13' 31.1136 N	81° 56' 45.4823 W
2,270.00	15.18	295.93	2,191.47	180.72	-425.46	4,231,238.09	417,198.32	38° 13' 31.1483 N	81° 56' 45.5705 W
2,300.00	15.82	293.35	2,220.38	184.06	-432.74	4,231,239.11	417,196.10	38° 13' 31.1806 N	81° 56' 45.6622 W
2,330.00	16.03	291.77	2,249.23	187.22	-440.34	4,231,240.07	417,193.78	38° 13' 31.2110 N	81° 56' 45.7579 W
2,360.00	14.97	289.15	2,278.14	190.03	-447.85	4,231,240.92	417,191.49	38° 13' 31.2380 N	81° 56' 45.8524 W
2,390.00	15.60	286.75	2,307.08	192.46	-455.37	4,231,241.67	417,189.20	38° 13' 31.2613 N	81° 56' 45.9470 W
2,420.00	15.73	285.34	2,335.97	194.70	-463.16	4,231,242.35	417,186.83	38° 13' 31.2827 N	81° 56' 46.0449 W
2,450.00	16.46	286.18	2,364.79	196.96	-471.16	4,231,243.04	417,184.39	38° 13' 31.3042 N	81° 56' 46.1455 W



Survey Report - Geographic



<b>Company:</b>	HG Energy LLC	<b>Local Co-ordinate Reference:</b>	Well EP Bell 508
<b>Project:</b>	Lincoln County, West Virginia UTM83	<b>TVD Reference:</b>	RKB=903+8 @ 911.00ft (Noah Horn 294)
<b>Site:</b>	EP Bell	<b>MD Reference:</b>	RKB=903+8 @ 911.00ft (Noah Horn 294)
<b>Well:</b>	EP Bell 508	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	-E-W (ft)	Map Northing (m)	Map Easting (m)	Latitude	Longitude
2,480.00	18.27	287.85	2,393.42	199.58	-479.72	4,231,243.84	417,181.78	38° 13' 31.3293 N	81° 56' 46.2531 W
2,510.00	18.94	287.35	2,421.85	202.48	-488.84	4,231,244.72	417,179.00	38° 13' 31.3570 N	81° 56' 46.3678 W
2,540.00	19.33	287.14	2,450.20	205.39	-498.24	4,231,245.61	417,176.14	38° 13' 31.3849 N	81° 56' 46.4859 W
2,570.00	17.20	285.36	2,478.68	208.03	-507.26	4,231,246.41	417,173.39	38° 13' 31.4101 N	81° 56' 46.5993 W
<b>Survey @ 2570.00 MD 2478.68 TVD</b>									
2,638.00	17.20	285.36	2,543.64	213.36	-526.65	4,231,248.04	417,167.48	38° 13' 31.4608 N	81° 56' 46.8431 W
<b>Survey projected to 2638.00 MD 2543.64 TVD</b>									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N-S (ft)	-E-W (ft)	
560.00	559.99	-2.72	-0.61	MWD surveys
2,570.00	2,478.68	208.03	-507.26	Survey @ 2570.00 MD 2478.68 TVD
2,638.00	2,543.64	213.36	-526.65	Survey projected to 2638.00 MD 2543.64 TVD

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WV Department of  
Environmental Protection

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# **HG Energy LLC**

Lincoln County, West Virginia UTM83

EP Bell

EP Bell 508

Original Hole

Design: Surveys Original Hole

# **Completion Report**

26 June, 2019







Completion Report

<p>Company/Project: HG Energy LLC          Lincoln County, West Virginia UTM83</p> <p>Site: EP Bell 508</p> <p>Well: EP Bell 508</p> <p>Wellbore: Original Hole</p> <p>Design: Surveys Original Hole</p>	<p>Local/Coordinate Reference: Well EP Bell 508</p> <p>TVD Reference: RKB=903+8 @ 911.00ft (Noah Horn 294)</p> <p>IMD Reference: RKB=903+8 @ 911.00ft (Noah Horn 294)</p> <p>North Reference: Grid</p> <p>Survey/Calculation Method: Minimum Curvature</p> <p>Database: DB_Jul2216dt_v14</p>
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Survey/Program	From (ft)	To (ft)	Date	Survey/Wellbore	Description	Tool Name
	560.00	2,570.00	6/26/2019	MWD (Original Hole)	OWSG MWD - Standard	MWD
	2,638.00	2,638.00		Projection (Original Hole)	OWSG MWD - Standard	MWD

Survey	MD (ft)	Inc (ft)	Asl (azimuth) (°)	TVD (ft)	DLeg (°/100usft)	N/S (ft)	E/W (ft)	Closure Distance (ft)	Closure Azimuth (°)	Northing (m)	Easting (m)
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,231,183.00	417,328.00
	560.00	0.57	192.72	559.99	0.10	-2.72	-0.61	2.79	192.72	4,231,182.17	417,327.81
MWD surveys	590.00	0.50	205.24	589.99	0.45	-2.98	-0.70	3.06	193.25	4,231,182.09	417,327.79
	620.00	0.71	245.79	619.99	1.54	-3.18	-0.93	3.31	196.28	4,231,182.03	417,327.72
	650.00	1.54	282.69	649.98	3.54	-3.16	-1.49	3.50	205.22	4,231,182.04	417,327.55
	680.00	2.54	286.69	679.96	3.36	-2.88	-2.52	3.83	221.15	4,231,182.12	417,327.23
	710.00	3.90	286.89	709.91	4.53	-2.40	-4.13	4.78	239.89	4,231,182.27	417,326.74
	740.00	4.61	287.60	739.83	2.37	-1.74	-6.26	6.49	254.50	4,231,182.47	417,326.09
	770.00	5.08	287.49	769.72	1.57	-0.97	-8.67	8.73	263.61	4,231,182.70	417,325.36
	800.00	5.17	286.41	799.60	0.44	-0.19	-11.24	11.24	269.03	4,231,182.94	417,324.57
	830.00	5.13	291.41	829.48	1.50	0.68	-13.78	13.80	272.83	4,231,183.21	417,323.80
	860.00	5.17	298.58	859.36	2.15	1.82	-16.22	16.32	276.39	4,231,183.55	417,323.06
	890.00	6.06	301.60	889.22	3.12	3.29	-18.75	19.04	279.96	4,231,184.00	417,322.28
	920.00	7.46	296.88	919.01	5.02	5.00	-21.84	22.41	282.90	4,231,184.53	417,321.34
	950.00	9.09	292.95	948.70	5.75	6.81	-25.76	26.64	284.80	4,231,185.08	417,320.15
	980.00	10.49	290.20	978.26	4.92	8.68	-30.51	31.72	285.88	4,231,185.64	417,318.70
	1,010.00	11.70	290.42	1,007.70	4.04	10.68	-35.92	37.47	286.56	4,231,186.26	417,317.05
	1,040.00	12.34	290.47	1,037.04	2.13	12.86	-41.77	43.71	287.11	4,231,186.92	417,315.27
	1,070.00	13.49	291.69	1,066.28	3.94	15.28	-48.03	50.40	287.64	4,231,187.66	417,313.36
	1,100.00	14.61	292.65	1,095.38	3.81	18.03	-54.77	57.66	288.22	4,231,188.49	417,311.31

Completion Report



Company: HG Energy LLC  
 Project: Lincoln County, West Virginia UTM83  
 Site: EP Bell  
 Well: EP Bell 508  
 Wellbore: Original Hole  
 Design: Surveys Original Hole

Local Co-ordinate Reference: Well EP Bell 508  
 TVD Reference: RKB=903+8 @ 911.00ft (Noah Horn 294)  
 MD Reference: RKB=903+8 @ 911.00ft (Noah Horn 294)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: DB\_Jul2216dt\_v14

MD (ft)	Inc (°)	Azi (azimuth)	TVD (ft)	DLeg (°/100ft)	N/S (ft)	E/W (ft)	Closure Distance (ft)	Closure Azimuth (°)	Northing (m)	Easting (m)
1,130.00	16.00	295.08	1,124.32	5.10	21.24	-62.01	65.54	288.91	4,231,189.47	417,309.10
1,160.00	17.11	296.05	1,153.07	3.81	24.93	-69.72	74.04	289.67	4,231,190.60	417,306.75
1,190.00	18.06	297.19	1,181.67	3.37	28.99	-77.82	83.04	290.43	4,231,191.84	417,304.28
1,220.00	18.67	298.12	1,210.14	2.26	33.38	-86.19	92.43	291.17	4,231,193.17	417,301.73
1,250.00	19.17	298.85	1,238.52	1.84	38.02	-94.74	102.08	291.87	4,231,194.59	417,299.12
1,280.00	19.89	298.54	1,266.80	2.42	42.83	-103.54	112.05	292.47	4,231,196.06	417,296.44
1,310.00	21.56	295.55	1,294.86	6.59	47.65	-113.00	122.63	292.86	4,231,197.52	417,293.56
1,340.00	23.33	293.41	1,322.58	6.50	52.39	-123.42	134.08	293.00	4,231,198.97	417,290.38
1,370.00	23.63	292.41	1,350.10	1.66	57.04	-134.43	146.03	292.99	4,231,200.39	417,287.03
1,400.00	23.60	292.89	1,377.59	0.65	61.67	-145.52	158.05	292.97	4,231,201.80	417,283.65
1,430.00	23.58	292.44	1,405.08	0.60	66.29	-156.60	170.05	292.94	4,231,203.21	417,280.27
1,460.00	23.39	292.94	1,432.59	0.92	70.91	-167.63	182.01	292.93	4,231,204.61	417,276.91
1,490.00	22.74	292.54	1,460.20	2.23	75.45	-178.47	193.76	292.92	4,231,206.00	417,273.60
1,520.00	22.81	293.27	1,487.86	0.97	79.97	-189.17	205.38	292.92	4,231,207.37	417,270.34
1,550.00	22.60	293.68	1,515.53	0.88	84.58	-199.79	216.95	292.95	4,231,208.78	417,267.10
1,580.00	23.03	295.05	1,543.18	2.28	89.38	-210.38	228.58	293.02	4,231,210.24	417,263.88
1,610.00	23.21	295.31	1,570.78	0.69	94.39	-221.04	240.35	293.12	4,231,211.77	417,260.63
1,640.00	22.80	294.86	1,598.39	1.49	99.36	-231.66	252.07	293.22	4,231,213.29	417,257.39
1,670.00	21.68	292.84	1,626.16	4.52	103.96	-242.04	263.42	293.24	4,231,214.69	417,254.23
1,700.00	19.91	291.17	1,654.20	6.22	107.96	-251.91	274.07	293.20	4,231,215.90	417,251.22
1,730.00	19.34	291.66	1,682.46	1.98	111.63	-261.29	284.14	293.13	4,231,217.03	417,248.36
1,760.00	19.69	293.27	1,710.74	2.14	115.46	-270.55	294.16	293.11	4,231,218.19	417,245.53
1,790.00	20.18	294.40	1,738.94	2.08	119.60	-279.91	304.39	293.14	4,231,219.45	417,242.68
1,820.00	20.43	294.97	1,767.07	1.06	123.95	-289.37	314.80	293.19	4,231,220.78	417,239.80
1,850.00	21.93	295.67	1,795.05	5.07	128.58	-299.17	325.63	293.26	4,231,222.19	417,236.81
1,880.00	22.40	296.24	1,822.83	1.72	133.54	-309.34	336.93	293.35	4,231,223.70	417,233.71
1,910.00	22.65	296.21	1,850.54	0.83	138.62	-319.51	348.41	293.44	4,231,225.25	417,230.57

Office of Oil and Gas

Completion Report



Company: HG Energy LLC  
 Project: Lincoln County, West Virginia UTM83  
 Site: EP Bell  
 Well: EP Bell 508  
 Wellbore: Original Hole  
 Design: Surveys Original Hole

Local Co-ordinate Reference: Well EP Bell 508  
 (VD) Reference: RKB=903+8 @ 911.00ft (Noah Horn 294)  
 MD Reference: RKB=903+8 @ 911.00ft (Noah Horn 294)  
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 Survey/Calculation Method: Minimum Curvature  
 Database: DB\_Jul2216dt\_v14

MD (ft)	Incl (°)	Asl (azimuth) (°)	TVD (ft)	Diag (°/100ft)	NS (ft)	EW (ft)	Closure Distance (ft)	Closure Azimuth (°)	Northing (m)	Easting (m)
1,940.00	22.68	293.67	1,878.23	3.26	143.49	-330.13	359.97	293.49	4,231,226.74	417,227.38
1,970.00	22.74	292.45	1,905.90	1.58	148.03	-340.79	371.55	293.48	4,231,228.12	417,224.13
2,000.00	22.20	291.53	1,933.62	2.15	152.32	-351.42	383.01	293.43	4,231,229.43	417,220.89
2,030.00	20.53	288.77	1,961.56	5.96	156.18	-361.64	393.92	293.36	4,231,230.60	417,217.77
2,060.00	18.69	287.44	1,989.82	6.66	159.40	-371.18	403.96	293.24	4,231,231.59	417,214.86
2,090.00	17.18	285.30	2,018.36	5.49	162.01	-380.04	413.13	293.09	4,231,232.38	417,212.16
2,120.00	16.64	286.66	2,047.06	2.23	164.41	-388.43	421.79	292.94	4,231,233.11	417,209.61
2,150.00	16.29	290.11	2,075.83	3.46	167.09	-396.49	430.26	292.85	4,231,233.93	417,207.15
2,180.00	15.74	292.73	2,104.67	3.03	170.11	-404.20	438.53	292.82	4,231,234.85	417,204.80
2,210.00	15.26	297.02	2,133.58	4.14	173.47	-411.47	446.54	292.86	4,231,235.87	417,202.58
2,240.00	15.23	298.32	2,162.52	1.14	177.14	-418.45	454.40	292.94	4,231,236.99	417,200.46
2,270.00	15.18	295.93	2,191.47	2.10	180.72	-425.46	462.25	293.01	4,231,238.08	417,198.32
2,300.00	15.82	293.35	2,220.36	3.14	184.06	-432.74	470.26	293.04	4,231,239.10	417,196.10
2,330.00	16.03	291.77	2,249.23	1.61	187.22	-440.34	478.49	293.03	4,231,240.06	417,193.78
2,360.00	14.97	289.15	2,278.14	4.23	190.03	-447.85	486.50	292.99	4,231,240.92	417,191.50
2,390.00	15.60	286.75	2,307.08	2.98	192.46	-455.37	494.37	292.91	4,231,241.66	417,189.20
2,420.00	15.73	285.34	2,335.97	1.34	194.70	-463.16	502.42	292.80	4,231,242.34	417,186.83
2,450.00	16.46	286.18	2,364.79	2.55	196.96	-471.16	510.67	292.69	4,231,243.03	417,184.39
2,480.00	18.27	287.85	2,393.42	6.26	199.58	-479.72	519.58	292.59	4,231,243.83	417,181.78
2,510.00	18.94	287.35	2,421.85	2.30	202.48	-488.84	529.12	292.50	4,231,244.72	417,179.00
2,540.00	19.33	287.14	2,450.20	1.32	205.39	-498.24	538.91	292.40	4,231,245.60	417,176.14
2,570.00	17.20	285.36	2,478.68	7.34	208.03	-507.26	548.26	292.30	4,231,246.41	417,173.39
Survey @ 2570.00 MD 2478.68 TVD										
2,638.00	17.20	285.36	2,543.64	0.00	213.36	-526.65	568.22	292.05	4,231,248.03	417,167.48
Survey projected to 2638.00 MD 2543.64 TVD										

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Completion Report

Company Project	HS Energy LLC Lincoln County, West Virginia UTM83	Local Coordinate Reference TVD Reference MD Reference North Reference Survey Calculation Method Database	Well EP Bell 508 RKB=903+8 @ 911.00ft (Noah Horn 294) RKB=903+8 @ 911.00ft (Noah Horn 294) Grid Minimum Curvature DB_Jul2216dt_v14
Site Well Wellbore Design	EP Bell EP Bell 508 Original Hole Surveys Original Hole		
Design Annotations			
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +E/W (ft)	Comment
560.00	559.99	-2.72	-0.61 MWD surveys
2,570.00	2,478.68	208.03	-507.26 Survey @ 2570.00 MD 2478.68 TVD
2,638.00	2,543.64	213.36	-526.65 Survey projected to 2638.00 MD 2543.64 TVD

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

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