

87-04779

**HG Energy, LLC**  
Roane County, West Virginia  
Ivy Fischer #203  
Ivy Fischer #203

**Wellbore #1**

**Design: Wellbore #1**

## **Survey Report - Geographic**

09 July, 2015



WV Department of  
Environmental **10/23/2015**

87-04779

HP  
Survey Report - Geographic



Company: HG Energy, LLC  
 Project: Roane County, West Virginia  
 Site: Ivy Fischer #203  
 Well: Ivy Fischer #203  
 Wellbore: Wellbore #1  
 Design: Wellbore #1

Local Co-ordinate Reference: Well Ivy Fischer #203  
 TVD Reference: WELL @ 1046.0usft (Decker #9)  
 MD Reference: WELL @ 1046.0usft (Decker #9)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: Compass

Project	Roane 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 Ivy Fischer #203

Site Position: Northing: 14,059,316.13 usft Latitude: 38° 42' 57.300 N  
 From: Lat/Long Easting: 1,562,066.71 usft Longitude: 81° 16' 28.900 W  
 Position Uncertainty: 0.0 usft Slot Radius: 13-3/16 " Grid Convergence: -0.17 °

Well Ivy Fischer #203

Well Position +N/-S 0.0 usft Northing: 14,059,316.13 usft Latitude: 38° 42' 57.300 N  
 +E/-W 0.0 usft Easting: 1,562,066.71 usft Longitude: 81° 16' 28.900 W  
 Position Uncertainty 0.0 usft Wellhead Elevation: 0.0 usft Ground Level: 1,038.0 usft

Wellbore Wellbore #1

Magnetics Model Name Sample Date Declination (°) Dip Angle (°) Field Strength (nT)

IGRF2015 6/4/2015 -8.00 66.36 51,924

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 0.0 303.87

Survey Program	Date	From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
	7/9/2015	500.0	2,435.0	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	14,059,316.13	1,562,066.71	38° 42' 57.300 N	81° 16' 28.900 W
500.0	0.00	0.00	500.0	0.0	0.0	14,059,316.13	1,562,066.71	38° 42' 57.300 N	81° 16' 28.900 W
First MWD Survey @ 500' MD / 500' TVD									
558.0	1.10	186.77	558.0	-0.6	-0.1	14,059,315.58	1,562,066.64	38° 42' 57.295 N	81° 16' 28.901 W
588.0	0.71	182.67	588.0	-1.0	-0.1	14,059,315.10	1,562,066.60	38° 42' 57.290 N	81° 16' 28.901 W
618.0	0.40	177.16	618.0	-1.3	-0.1	14,059,314.81	1,562,066.60	38° 42' 57.287 N	81° 16' 28.901 W
648.0	0.62	336.95	648.0	-1.3	-0.2	14,059,314.86	1,562,066.54	38° 42' 57.287 N	81° 16' 28.902 W
678.0	1.10	310.47	678.0	-0.9	-0.5	14,059,315.19	1,562,066.26	38° 42' 57.291 N	81° 16' 28.906 W
708.0	1.90	328.36	708.0	-0.3	-0.9	14,059,315.80	1,562,065.78	38° 42' 57.297 N	81° 16' 28.912 W
738.0	2.70	312.67	738.0	0.6	-1.7	14,059,316.71	1,562,065.00	38° 42' 57.306 N	81° 16' 28.922 W
768.0	3.18	321.27	767.9	1.7	-2.8	14,059,317.84	1,562,063.96	38° 42' 57.317 N	81° 16' 28.935 W
798.0	4.29	312.67	797.8	3.1	-4.1	14,059,319.24	1,562,062.61	38° 42' 57.331 N	81° 16' 28.952 W

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

Survey

Table with 11 columns: Measured Depth (usft), Inclination (°), Azimuth (°), Vertical Depth (usft), +N/-S (usft), +E/-W (usft), Map Northing (usft), Map Easting (usft), Latitude, Longitude. Contains 40 rows of survey data.

TD @ 2435' MD / 2226' TVD

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Company: HG Energy, LLC  
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North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: Compass

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	First MWD Survey @ 500' MD / 500' TVD
2,435.0	2,225.8	370.2	-631.9	TD @ 2435' MD / 2226' TVD

Checked By: _____	Approved By: _____	Date: _____
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# HG Energy, LLC

Roane County, West Virginia  
Ivy Fischer #203  
Ivy Fischer #203  
Wellbore #1

Design: Wellbore #1

## HG Energy EOW Report

09 July, 2015



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Environmental Protection

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HG Energy EOW Report



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**Survey Calculation Method:** Minimum Curvature  
**Database:** 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>	Ivy Fischer #203		
<b>Site Position:</b>		<b>Northing:</b>	14,059,316.12 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,562,066.71 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	38° 42' 57.300 N
		<b>Longitude:</b>	81° 16' 28.900 W
		<b>Grid Convergence:</b>	-0.17 °

<b>Well</b>	Ivy Fischer #203					
<b>Well Position</b>	<b>+N-S</b>	0.0 usft	<b>Northing:</b>	14,059,316.12 usft	<b>Latitude:</b>	38° 42' 57.300 N
	<b>+E-W</b>	0.0 usft	<b>Easting:</b>	1,562,066.71 usft	<b>Longitude:</b>	81° 16' 28.900 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b>	1,038.0 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</b>
	IGRF2015	6/4/2015	(°)	(°)	(nT)
			-8.00	66.36	51,924

<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)</b>	<b>+N-S</b>	<b>+E-W</b>	<b>Direction</b>
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	303.87

<b>Survey Program</b>	<b>Date</b>	<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
	7/9/2015	(usft)	(usft)			
		500.0	2,435.0	MWD (Wellbore #1)	MWD default	MWD - Standard

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HG Energy EOW Report



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**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.0	0.00	
<b>First MWD Survey @ 500' MD / 500' TVD</b>										
558.0	1.10	186.77	558.0	-0.6	-0.1	-0.3	1.90	0.6	186.77	
588.0	0.71	182.67	588.0	-1.0	-0.1	-0.5	1.32	1.0	186.03	
618.0	0.40	177.16	618.0	-1.3	-0.1	-0.6	1.05	1.3	184.86	
648.0	0.62	336.95	648.0	-1.3	-0.2	-0.6	3.35	1.3	187.63	
678.0	1.10	310.47	678.0	-0.9	-0.5	-0.1	2.04	1.0	205.87	
708.0	1.90	328.36	708.0	-0.3	-0.9	0.6	3.06	1.0	250.88	
738.0	2.70	312.67	738.0	0.6	-1.7	1.7	3.37	1.8	288.67	
768.0	3.18	321.27	767.9	1.7	-2.8	3.2	2.17	3.2	301.80	
798.0	4.29	312.67	797.8	3.1	-4.1	5.1	4.13	5.1	307.25	
828.0	4.91	314.88	827.8	4.8	-5.8	7.5	2.15	7.5	309.35	
858.0	6.19	312.19	857.6	6.8	-7.9	10.4	4.35	10.4	310.47	
888.0	6.72	313.38	887.4	9.1	-10.4	13.7	1.82	13.8	311.04	
918.0	7.82	310.07	917.2	11.6	-13.3	17.5	3.92	17.6	311.16	
948.0	8.71	311.35	946.9	14.4	-16.5	21.7	3.03	21.9	311.08	
978.0	9.50	307.47	976.5	17.4	-20.2	26.5	3.33	26.7	310.77	
1,008.0	10.21	307.08	1,006.0	20.5	-24.3	31.6	2.38	31.8	310.20	
1,038.0	10.78	303.77	1,035.5	23.7	-28.7	37.1	2.76	37.2	309.50	
1,068.0	11.49	303.86	1,065.0	26.9	-33.5	42.8	2.37	43.0	308.73	
1,098.0	12.59	303.86	1,094.3	30.4	-38.7	49.1	3.67	49.2	308.11	
1,128.0	13.52	304.48	1,123.5	34.2	-44.3	55.9	3.13	56.0	307.64	
1,158.0	14.10	305.58	1,152.7	38.3	-50.2	63.0	2.12	63.2	307.34	
1,188.0	15.29	306.15	1,181.7	42.8	-56.4	70.6	4.00	70.8	307.19	
1,218.0	16.31	305.97	1,210.6	47.6	-63.0	78.8	3.40	78.9	307.07	
1,248.0	17.28	306.37	1,239.3	52.7	-70.0	87.5	3.26	87.6	306.98	

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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 (°)
1,278.0	18.60	304.39	1,267.8	58.0	-77.5	96.7	4.85	96.8	306.82
1,308.0	19.49	302.27	1,296.2	63.4	-85.7	106.5	3.76	106.6	306.50
1,338.0	20.68	299.58	1,324.4	68.7	-94.5	116.8	5.02	116.9	306.01
1,368.0	22.32	297.95	1,352.3	74.0	-104.2	127.7	5.82	127.8	305.38
1,398.0	23.60	296.59	1,379.9	79.3	-114.6	139.4	4.62	139.4	304.70
1,428.0	25.32	295.88	1,407.2	84.8	-125.7	151.7	5.82	151.7	304.01
1,458.0	26.60	294.65	1,434.2	90.4	-137.6	164.6	4.63	164.7	303.32
1,488.0	27.62	294.96	1,460.9	96.2	-150.0	178.1	3.43	178.2	302.66
1,518.0	28.59	294.65	1,487.3	102.1	-162.8	192.1	3.27	192.2	302.09
1,548.0	29.30	294.56	1,513.6	108.1	-176.0	206.4	2.37	206.6	301.56
1,578.0	29.92	294.16	1,539.7	114.3	-189.5	221.0	2.17	221.3	301.08
1,608.0	30.31	293.99	1,565.6	120.4	-203.3	235.9	1.33	236.3	300.64
1,638.0	31.20	294.65	1,591.4	126.7	-217.3	251.0	3.17	251.5	300.25
1,668.0	32.21	296.06	1,616.9	133.5	-231.5	266.6	4.18	267.2	299.96
1,698.0	33.41	297.69	1,642.1	140.8	-246.0	282.7	4.97	283.5	299.79
1,728.0	34.82	298.26	1,667.0	148.7	-260.9	299.5	4.82	300.3	299.69
1,758.0	36.28	299.36	1,691.4	157.1	-276.1	316.8	5.31	317.7	299.64
1,788.0	37.38	299.45	1,715.4	166.0	-291.8	334.8	3.67	335.7	299.63
1,818.0	38.40	298.97	1,739.1	174.9	-307.9	353.1	3.54	354.1	299.61
1,848.0	37.69	297.56	1,762.7	183.7	-324.2	371.5	3.74	372.6	299.54
1,878.0	36.90	295.97	1,786.6	191.9	-340.4	389.6	4.15	390.8	299.41
1,908.0	36.90	297.95	1,810.6	200.1	-356.4	407.5	3.96	408.7	299.30
1,938.0	37.30	299.36	1,834.5	208.7	-372.3	425.5	3.13	426.8	299.28
1,968.0	38.31	300.69	1,858.2	217.9	-388.2	443.8	4.33	445.2	299.31
1,998.0	38.09	300.77	1,881.8	227.4	-404.2	462.3	0.75	463.8	299.36
2,028.0	38.40	301.26	1,905.3	237.0	-420.1	480.9	1.45	482.3	299.43
2,058.0	39.20	301.79	1,928.7	246.8	-436.1	499.7	2.89	501.1	299.51

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**HP**  
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61170-28

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**Database:** Compass

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,088.0	39.81	303.68	1,951.9	257.1	-452.2	518.8	4.49	520.2	299.62
2,118.0	39.99	304.08	1,974.9	267.9	-468.2	538.0	1.04	539.4	299.78
2,148.0	40.21	304.08	1,997.8	278.7	-484.2	557.3	0.73	558.6	299.92
2,178.0	40.52	303.68	2,020.7	289.5	-500.3	576.7	1.35	578.0	300.06
2,208.0	40.08	304.26	2,043.6	300.4	-516.4	596.2	1.93	597.4	300.18
2,238.0	39.51	303.55	2,066.6	311.1	-532.3	615.4	2.43	616.5	300.30
<u>2,268.0</u>	39.20	303.15	2,089.8	321.5	-548.2	634.4	1.34	<u>635.5</u>	300.39
2,298.0	37.78	301.88	2,113.3	331.6	-564.0	653.0	5.42	654.2	300.45
2,328.0	36.10	300.50	2,137.3	340.9	-579.4	671.0	6.24	672.2	300.47
2,358.0	33.89	298.97	2,161.8	349.4	-594.3	688.2	7.93	689.4	300.45
2,435.0	33.89	298.97	2,225.8	370.2	-631.9	731.0	0.00	732.4	300.37

TD @ 2435' MD / 2226' TVD

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/S (usft)	+E/W (usft)	
500.0	500.0	0.0	0.0	First MWD Survey @ 500' MD / 500' TVD
2,435.0	2,225.8	370.2	-631.9	TD @ 2435' MD / 2226' TVD

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