

HG Energy, LLC
Harrison County, West Virginia
W.F Williams #131
W.F Williams #131

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

27 April, 2015

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Office of Oil and Gas

DEC 15 2015



02/03/2017

HP
Survey Report - Geographic



Company: HG Energy, LLC	Local Co-ordinate Reference: Well W.F Williams #131
Project: Harrison County, West Virginia	TVD Reference: Well @ 1181.0usft
Site: W.F Williams #131	MD Reference: Well @ 1181.0usft
Well: W.F Williams #131	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: Compass

Project	Harrison 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.F Williams #131				
Site Position:		Northing:	14,261,918.59 usft	Latitude:	39° 16' 17.900 N
From:	Lat/Long	Easting:	1,782,516.31 usft	Longitude:	80° 29' 52.400 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.32 °

Well	W.F Williams #131					
Well Position	+N/-S	0.0 usft	Northing:	14,261,918.59 usft	Latitude:	39° 16' 17.900 N
	+E/-W	0.0 usft	Easting:	1,782,516.31 usft	Longitude:	80° 29' 52.400 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	1,173.0 usft

Wellbore	Wellbore #1				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/31/2015	-8.70	66.68	52,155

Design	Wellbore #1				
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Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0

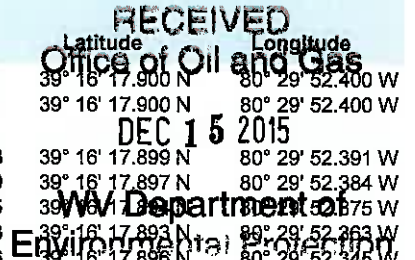
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	56.00

Survey Program	Date 4/27/2015
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From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
450.0	2,940.0	Survey #1 (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	14,261,918.59	1,782,516.31	39° 16' 17.900 N	80° 29' 52.400 W
450.0	0.00	0.00	450.0	0.0	0.0	14,261,918.59	1,782,516.31	39° 16' 17.900 N	80° 29' 52.400 W
FIRST SURVEY @ 450' MD / 450' TVD									
526.0	1.10	96.57	526.0	-0.1	0.7	14,261,918.51	1,782,517.03	39° 16' 17.899 N	80° 29' 52.391 W
556.0	1.28	123.80	556.0	-0.3	1.3	14,261,918.29	1,782,517.60	39° 16' 17.897 N	80° 29' 52.384 W
586.0	1.50	107.10	586.0	-0.6	1.9	14,261,917.98	1,782,518.25	39° 16' 17.895 N	80° 29' 52.375 W
616.0	2.30	87.18	616.0	-0.7	2.9	14,261,917.90	1,782,519.23	39° 16' 17.893 N	80° 29' 52.363 W
646.0	3.31	72.99	645.9	-0.4	4.3	14,261,918.18	1,782,520.66	39° 16' 17.896 N	80° 29' 52.345 W
676.0	4.42	68.19	675.9	0.3	6.3	14,261,918.86	1,782,522.56	39° 16' 17.902 N	80° 29' 52.320 W
706.0	5.48	64.18	705.7	1.3	8.6	14,261,919.92	1,782,524.92	39° 16' 17.913 N	80° 29' 52.290 W
736.0	6.32	60.47	735.6	2.8	11.3	14,261,921.36	1,782,527.65	39° 16' 17.927 N	80° 29' 52.256 W
766.0	6.98	60.69	765.4	4.5	14.4	14,261,923.06	1,782,530.67	39° 16' 17.943 N	80° 29' 52.217 W



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Well:	W.F Williams #131	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
796.0	7.82	58.67	795.1	6.4	17.7	14,261,925.02	1,782,534.01	39° 16' 17.963 N	80° 29' 52.174 W
826.0	8.71	56.60	824.8	8.7	21.3	14,261,927.33	1,782,537.65	39° 16' 17.985 N	80° 29' 52.128 W
856.0	9.28	53.69	854.5	11.4	25.2	14,261,930.01	1,782,541.49	39° 16' 18.012 N	80° 29' 52.079 W
886.0	9.99	51.26	884.0	14.5	29.2	14,261,933.07	1,782,545.47	39° 16' 18.042 N	80° 29' 52.028 W
916.0	10.69	48.49	913.5	18.0	33.3	14,261,936.54	1,782,549.58	39° 16' 18.076 N	80° 29' 51.975 W
946.0	11.62	48.88	943.0	21.8	37.6	14,261,940.37	1,782,553.94	39° 16' 18.113 N	80° 29' 51.920 W
976.0	11.89	47.30	972.3	25.9	42.2	14,261,944.46	1,782,558.49	39° 16' 18.153 N	80° 29' 51.862 W
1,006.0	12.02	48.27	1,001.7	30.0	46.8	14,261,948.63	1,782,563.09	39° 16' 18.194 N	80° 29' 51.803 W
1,036.0	12.42	49.77	1,031.0	34.2	51.6	14,261,952.79	1,782,567.89	39° 16' 18.235 N	80° 29' 51.741 W
1,066.0	12.59	49.68	1,060.3	38.4	56.5	14,261,956.99	1,782,572.84	39° 16' 18.277 N	80° 29' 51.678 W
1,096.0	12.59	49.99	1,089.6	42.6	61.5	14,261,961.21	1,782,577.84	39° 16' 18.318 N	80° 29' 51.614 W
1,126.0	12.51	48.88	1,118.9	46.9	66.5	14,261,965.45	1,782,582.79	39° 16' 18.360 N	80° 29' 51.551 W
1,156.0	12.59	49.37	1,148.2	51.1	71.4	14,261,969.72	1,782,587.72	39° 16' 18.402 N	80° 29' 51.488 W
1,186.0	12.99	51.40	1,177.4	55.4	76.5	14,261,973.95	1,782,592.84	39° 16' 18.443 N	80° 29' 51.423 W
1,216.0	13.30	51.97	1,206.6	59.6	81.9	14,261,978.18	1,782,598.19	39° 16' 18.485 N	80° 29' 51.354 W
1,246.0	13.39	51.88	1,235.8	63.9	87.3	14,261,982.45	1,782,603.64	39° 16' 18.527 N	80° 29' 51.285 W
1,276.0	13.30	51.79	1,265.0	68.1	92.8	14,261,986.73	1,782,609.09	39° 16' 18.569 N	80° 29' 51.215 W
1,306.0	13.21	49.99	1,294.2	72.5	98.1	14,261,991.07	1,782,614.42	39° 16' 18.611 N	80° 29' 51.147 W
1,336.0	13.08	49.06	1,323.4	76.9	103.3	14,261,995.49	1,782,619.61	39° 16' 18.655 N	80° 29' 51.080 W
1,366.0	12.90	47.87	1,352.6	81.4	108.4	14,261,999.97	1,782,624.66	39° 16' 18.699 N	80° 29' 51.016 W
1,396.0	12.90	49.19	1,381.9	85.8	113.4	14,262,004.40	1,782,629.68	39° 16' 18.742 N	80° 29' 50.952 W
1,426.0	13.52	51.66	1,411.1	90.2	118.7	14,262,008.76	1,782,634.96	39° 16' 18.785 N	80° 29' 50.884 W
1,456.0	14.01	54.08	1,440.2	94.5	124.3	14,262,013.07	1,782,640.66	39° 16' 18.827 N	80° 29' 50.812 W
1,486.0	14.41	55.27	1,469.3	98.7	130.4	14,262,017.33	1,782,646.66	39° 16' 18.869 N	80° 29' 50.735 W
1,516.0	14.32	54.57	1,498.4	103.0	136.4	14,262,021.60	1,782,652.76	39° 16' 18.911 N	80° 29' 50.657 W
1,546.0	13.61	54.70	1,527.5	107.2	142.4	14,262,025.79	1,782,658.66	39° 16' 18.952 N	80° 29' 50.582 W
1,576.0	12.81	57.08	1,556.7	111.1	148.0	14,262,029.64	1,782,664.33	39° 16' 18.990 N	80° 29' 50.509 W
1,606.0	12.42	58.67	1,586.0	114.5	153.6	14,262,033.13	1,782,669.88	39° 16' 19.024 N	80° 29' 50.438 W
1,636.0	12.28	57.48	1,615.3	117.9	159.0	14,262,036.52	1,782,675.33	39° 16' 19.057 N	80° 29' 50.369 W
1,666.0	12.20	57.17	1,644.6	121.4	164.4	14,262,039.95	1,782,680.68	39° 16' 19.091 N	80° 29' 50.301 W
1,696.0	12.28	56.60	1,673.9	124.8	169.7	14,262,043.43	1,782,686.01	39° 16' 19.125 N	80° 29' 50.233 W
1,726.0	12.51	55.76	1,703.2	128.4	175.0	14,262,047.01	1,782,691.36	39° 16' 19.160 N	80° 29' 50.164 W
1,756.0	12.20	53.47	1,732.5	132.1	180.3	14,262,050.73	1,782,696.59	39° 16' 19.197 N	80° 29' 50.097 W
1,786.0	12.02	54.39	1,761.9	135.8	185.4	14,262,054.43	1,782,701.68	39° 16' 19.233 N	80° 29' 50.032 W
1,816.0	12.51	57.17	1,791.2	139.4	190.6	14,262,058.01	1,782,706.95	39° 16' 19.268 N	80° 29' 49.965 W
1,846.0	12.90	58.80	1,820.4	142.9	196.2	14,262,061.51	1,782,712.54	39° 16' 19.302 N	80° 29' 49.894 W
1,876.0	12.99	58.18	1,849.7	146.4	202.0	14,262,065.02	1,782,718.27	39° 16' 19.337 N	80° 29' 49.821 W
1,906.0	12.99	58.09	1,878.9	150.0	207.7	14,262,068.58	1,782,724.00	39° 16' 19.372 N	80° 29' 49.748 W
1,936.0	13.08	57.08	1,908.1	153.6	213.4	14,262,072.21	1,782,729.71	39° 16' 19.407 N	80° 29' 49.675 W
1,966.0	12.81	56.07	1,937.4	157.3	219.0	14,262,075.91	1,782,735.32	39° 16' 19.443 N	80° 29' 49.603 W
1,996.0	12.51	55.67	1,966.6	161.0	224.5	14,262,079.60	1,782,740.76	39° 16' 19.480 N	80° 29' 49.534 W
2,026.0	12.28	54.79	1,995.9	164.7	229.7	14,262,083.27	1,782,746.05	39° 16' 19.516 N	80° 29' 49.466 W
2,056.0	12.20	54.70	2,025.3	168.4	234.9	14,262,086.94	1,782,751.24	39° 16' 19.552 N	80° 29' 49.400 W
2,086.0	12.02	54.39	2,054.6	172.0	240.1	14,262,090.59	1,782,756.37	39° 16' 19.588 N	80° 29' 49.334 W
2,116.0	11.71	54.00	2,084.0	175.6	245.1	14,262,094.20	1,782,761.37	39° 16' 19.623 N	80° 29' 49.269 W
2,146.0	11.49	52.50	2,113.3	179.2	249.9	14,262,097.81	1,782,766.21	39° 16' 19.658 N	80° 29' 49.209 W
2,176.0	11.71	53.29	2,142.7	182.9	254.7	14,262,101.45	1,782,771.02	39° 16' 19.694 N	80° 29' 49.147 W
2,206.0	12.11	53.86	2,172.1	186.5	259.7	14,262,105.12	1,782,776.00	39° 16' 19.730 N	80° 29' 49.083 W
2,236.0	12.02	53.60	2,201.4	190.2	264.7	14,262,108.83	1,782,781.06	39° 16' 19.766 N	80° 29' 49.019 W
2,266.0	11.89	52.98	2,230.8	194.0	269.7	14,262,112.55	1,782,786.04	39° 16' 19.803 N	80° 29' 48.955 W
2,296.0	11.71	51.00	2,260.1	197.7	274.6	14,262,116.33	1,782,790.87	39° 16' 19.837 N	80° 29' 48.893 W
2,326.0	11.80	51.66	2,289.5	201.6	279.3	14,262,120.14	1,782,795.64	39° 16' 19.877 N	80° 29' 48.833 W
2,356.0	12.20	52.76	2,318.8	205.4	284.3	14,262,123.97	1,782,800.57	39° 16' 19.913 N	80° 29' 48.770 W
2,386.0	12.51	55.19	2,348.2	209.1	289.5	14,262,127.74	1,782,805.76	39° 16' 19.952 N	80° 29' 48.703 W
2,416.0	12.68	56.68	2,377.4	212.8	294.9	14,262,131.40	1,782,811.18	39° 16' 19.988 N	80° 29' 48.634 W

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Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.F Williams #131
Project:	Harrison County, West Virginia	TVD Reference:	Well @ 1181.0usft
Site:	W.F Williams #131	MD Reference:	Well @ 1181.0usft
Well:	W.F Williams #131	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,446.0	12.59	57.79	2,406.7	216.4	300.4	14,262,134.95	1,782,816.70	39° 16' 20.023 N	80° 29' 48.564 W
2,476.0	12.02	57.96	2,436.0	219.8	305.8	14,262,138.35	1,782,822.11	39° 16' 20.056 N	80° 29' 48.495 W
2,506.0	11.49	58.27	2,465.4	223.0	311.0	14,262,141.58	1,782,827.30	39° 16' 20.088 N	80° 29' 48.428 W
2,536.0	11.40	58.09	2,494.8	226.1	316.1	14,262,144.72	1,782,832.36	39° 16' 20.118 N	80° 29' 48.364 W
2,566.0	11.18	57.70	2,524.2	229.3	321.0	14,262,147.84	1,782,837.34	39° 16' 20.149 N	80° 29' 48.300 W
2,596.0	11.09	57.48	2,553.6	232.4	325.9	14,262,150.95	1,782,842.23	39° 16' 20.179 N	80° 29' 48.238 W
2,626.0	10.61	56.86	2,583.1	235.4	330.7	14,262,154.01	1,782,846.97	39° 16' 20.209 N	80° 29' 48.177 W
2,656.0	10.12	56.77	2,612.6	238.4	335.2	14,262,156.96	1,782,851.49	39° 16' 20.238 N	80° 29' 48.120 W
2,686.0	9.41	57.30	2,642.2	241.1	339.5	14,262,159.73	1,782,855.76	39° 16' 20.266 N	80° 29' 48.065 W
2,716.0	8.71	56.77	2,671.8	243.7	343.4	14,262,162.30	1,782,859.72	39° 16' 20.291 N	80° 29' 48.014 W
2,746.0	8.22	56.20	2,701.5	246.1	347.1	14,262,164.74	1,782,863.41	39° 16' 20.315 N	80° 29' 47.967 W
2,776.0	7.82	57.08	2,731.2	248.5	350.6	14,262,167.04	1,782,866.90	39° 16' 20.337 N	80° 29' 47.923 W
2,806.0	7.20	55.58	2,760.9	250.6	353.9	14,262,169.21	1,782,870.17	39° 16' 20.359 N	80° 29' 47.881 W
2,836.0	6.89	55.10	2,790.7	252.7	356.9	14,262,171.31	1,782,873.19	39° 16' 20.379 N	80° 29' 47.842 W
2,866.0	6.50	56.20	2,820.5	254.7	359.8	14,262,173.28	1,782,876.08	39° 16' 20.398 N	80° 29' 47.806 W
2,940.0	6.50	56.20	2,894.0	259.4	366.7	14,262,177.94	1,782,883.04	39° 16' 20.444 N	80° 29' 47.717 W

TD @ 2940' MD / 2894' TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
450.0	450.0	0.0	0.0	FIRST SURVEY @ 450' MD / 450' TVD
2,940.0	2,894.0	259.4	366.7	TD @ 2940' MD / 2894' TVD

Checked By: _____	Approved By: _____	Date: _____
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Harrison County, West Virginia

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Database: EDM Compass

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

System Datum: Mean Sea Level

Site: W.F. Williams #131
Site Position: Northing: 14,261,918.59 usft Latitude: 39° 16' 17.900 N
 Easting: 1,782,516.31 usft Longitude: 80° 29' 52.400 W
From: Lat/Long Slot Radius: 13-3/16 " Grid Convergence: 0.32 °
Position Uncertainty: 0.0 usft

Well: W.F. Williams #131
Well Position: +N-S 0.0 usft Latitude: 39° 16' 17.900 N
 +E-W 0.0 usft Longitude: 80° 29' 52.400 W
Position Uncertainty: 0.0 usft Ground Level: 1,173.0 usft

Wellbore	Wellbore #1
Magnetics	
Model Name	IGRF2010
Sample Date	3/31/2015
Declination (°)	-8.70
Dip Angle (°)	66.68
Field Strength (nT)	52,155

Design	Wellbore #1
Audit Notes:	
Version:	1.0
Vertical Section:	
Phase:	ACTUAL
Depth From (TVD) (usft)	
+N-S (usft)	0.0
+E-W (usft)	0.0
Tie On Depth:	0.0
Direction (°)	56.00

Survey Program: 4/27/2015
From (usft): 2,940.0 Survey #1 (Wellbore #1)
Tool Name: MWD default
Description: MWD - Standard

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Local Co-ordinate Reference: Well W.F. Williams #131
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Company: HG Energy, LLC
 Project: Harrison County, West Virginia
 Site: W.F Williams #131
 Well: W.F Williams #131
 Wellbore: Wellbore #1
 Design: Wellbore #1

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D Leg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.00
450.0	0.00	0.00	450.0	0.0	0.0	0.0	0.0	0.0	0.00
FIRST SURVEY @ 450' MD / 450' TVD									
526.0	1.10	96.57	526.0	-0.1	0.7	0.6	1.45	0.7	96.57
556.0	1.28	123.80	556.0	-0.3	1.3	0.9	1.96	1.3	103.22
586.0	1.50	107.10	586.0	-0.6	1.9	1.3	1.53	2.0	107.29
616.0	2.30	87.16	616.0	-0.7	2.9	2.0	3.42	3.0	103.31
646.0	3.31	72.89	645.9	-0.4	4.3	3.4	4.06	4.4	95.35
676.0	4.42	68.19	675.9	0.3	6.3	5.3	3.85	6.3	87.46
706.0	5.48	64.16	705.7	1.3	8.6	7.9	3.71	8.7	81.23
736.0	6.32	60.47	735.6	2.8	11.3	10.9	3.07	11.7	76.29
766.0	6.98	60.69	765.4	4.5	14.4	14.4	2.20	15.0	72.71
796.0	7.82	58.67	795.1	6.4	17.7	18.3	2.93	18.8	70.04
826.0	8.71	56.60	824.8	8.7	21.3	22.6	3.13	23.1	67.73
856.0	9.28	53.69	854.5	11.4	25.2	27.3	2.43	27.7	65.61
886.0	9.98	51.26	884.0	14.5	29.2	32.3	2.73	32.6	63.59
916.0	10.69	48.49	913.5	18.0	33.3	37.6	2.86	37.8	61.65
946.0	11.62	48.88	943.0	21.8	37.6	43.4	3.11	43.5	59.94
976.0	11.89	47.30	972.3	25.9	42.2	49.4	1.40	49.5	58.48
1,006.0	12.02	48.27	1,001.7	30.0	46.8	55.6	0.80	55.6	57.29
1,036.0	12.42	49.77	1,031.0	34.2	51.6	61.9	1.70	61.9	56.45
1,066.0	12.59	49.68	1,060.3	38.4	56.5	68.3	0.57	68.3	55.81
1,096.0	12.59	49.99	1,069.6	42.6	61.5	74.8	0.23	74.9	55.29
1,126.0	12.51	48.88	1,118.9	46.9	66.5	81.3	0.85	81.3	54.82
1,156.0	12.59	49.37	1,148.2	51.1	71.4	87.8	0.44	87.8	54.40
1,186.0	12.99	51.40	1,177.4	55.4	76.5	94.4	2.01	94.5	54.12
1,216.0	13.30	51.97	1,206.6	59.6	81.9	101.2	1.12	101.3	53.96

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HG Energy EOW Report

Company: HG Energy, LLC
Project: Harrison County, West Virginia
Site: W.F Williams #131
Well: W.F Williams #131
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well W.F Williams #131
TVD Reference: Well @ 1181.0usft
MD Reference: Well @ 1181.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM Compass

MD (usft)	Inc (")	Azi (azimuth) (")	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D/Leg ("/100usft)	Closure Distance (usft)	Closure Azimuth (")
1,246.0	13.39	51.88	1,235.8	63.9	87.3	108.1	0.31	108.2	53.83
1,276.0	13.30	51.79	1,265.0	68.1	92.8	115.0	0.31	115.1	53.71
1,306.0	13.21	49.99	1,294.2	72.5	98.1	121.9	1.41	122.0	53.55
1,336.0	13.08	49.06	1,323.4	76.9	103.3	128.6	0.83	128.8	53.33
1,366.0	12.90	47.87	1,352.6	81.4	108.4	135.3	1.07	135.5	53.09
1,396.0	12.90	48.19	1,381.9	85.8	113.4	142.0	0.98	142.2	52.88
1,426.0	13.52	51.66	1,411.1	90.2	118.7	148.8	2.79	149.0	52.77
1,456.0	14.01	54.08	1,440.2	94.5	124.3	155.9	2.52	156.2	52.77
1,486.0	14.41	55.27	1,469.3	98.7	130.4	163.3	1.65	163.5	52.86
1,516.0	14.32	54.57	1,498.4	103.0	136.4	170.7	0.65	171.0	52.95
1,546.0	13.61	54.70	1,527.5	107.2	142.4	178.0	2.37	178.2	53.02
1,576.0	12.81	57.08	1,556.7	111.1	148.0	184.8	3.22	185.1	53.12
1,606.0	12.42	58.67	1,586.0	114.5	153.6	191.4	1.74	191.6	53.28
1,636.0	12.28	57.48	1,615.3	117.9	159.0	197.8	0.97	198.0	53.44
1,666.0	12.20	57.17	1,644.6	121.4	164.4	204.1	0.35	204.3	53.56
1,696.0	12.28	56.60	1,673.9	124.8	169.7	210.5	0.48	210.7	53.66
1,726.0	12.51	55.76	1,703.2	128.4	175.0	216.9	0.97	217.1	53.73
1,756.0	12.20	53.47	1,732.5	132.1	180.3	223.4	1.93	223.5	53.76
1,786.0	12.02	54.39	1,761.8	135.8	185.4	229.6	0.88	229.8	53.76
1,816.0	12.51	57.17	1,791.2	139.4	190.6	236.0	2.56	236.2	53.82
1,846.0	12.89	58.80	1,820.4	142.9	196.2	242.6	1.77	242.8	53.83
1,876.0	12.97	58.18	1,849.7	146.4	202.0	249.3	0.55	249.5	54.06
1,906.0	12.89	58.09	1,878.9	150.0	207.7	256.1	0.07	256.2	54.16
1,936.0	12.89	57.08	1,908.1	153.6	213.4	262.8	0.82	262.9	54.25
1,966.0	12.81	56.07	1,937.4	157.3	219.0	269.5	1.17	269.7	54.31
1,996.0	12.51	55.67	1,966.6	161.0	224.5	276.1	1.04	276.2	54.35
2,026.0	12.28	54.79	1,995.9	164.7	229.7	282.6	0.99	282.7	54.37

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 MD Reference: Well @ 1181.0usft
 North Reference: Gnd
 Survey Calculation Method: Minimum Curvature
 Database: EDM Compass

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D Leg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,056.0	12.20	54.70	2,025.3	168.4	234.9	288.9	0.27	289.0	54.37
2,086.0	12.02	54.39	2,054.6	172.0	240.1	295.2	0.84	295.3	54.38
2,116.0	11.71	54.00	2,084.0	175.6	245.1	301.4	1.07	301.5	54.37
2,146.0	11.49	52.50	2,113.3	179.2	249.9	307.4	1.24	307.5	54.35
2,176.0	11.71	53.29	2,142.7	182.9	254.7	313.4	0.90	313.6	54.32
2,206.0	12.11	53.86	2,172.1	186.5	259.7	319.6	1.39	319.7	54.31
2,236.0	12.02	53.80	2,201.4	190.2	264.7	325.9	0.35	326.0	54.30
2,266.0	11.89	52.98	2,230.8	194.0	269.7	332.1	0.61	332.2	54.28
2,296.0	11.71	51.00	2,260.1	197.7	274.6	338.2	1.48	338.4	54.24
2,326.0	11.80	51.66	2,289.5	201.6	279.3	344.3	0.54	344.5	54.19
2,356.0	12.20	52.76	2,318.8	205.4	284.3	350.5	1.54	350.7	54.15
2,386.0	12.51	55.19	2,348.2	209.1	289.5	356.9	2.02	357.1	54.15
2,416.0	12.68	56.68	2,377.4	212.8	294.9	363.5	1.22	363.6	54.18
2,446.0	12.59	57.79	2,406.7	216.4	300.4	370.0	0.86	370.2	54.24
2,476.0	12.02	57.96	2,436.0	219.8	305.8	376.4	1.90	376.6	54.30
2,506.0	11.49	58.27	2,465.4	223.0	311.0	382.5	1.78	382.7	54.36
2,536.0	11.49	58.09	2,494.8	226.1	316.1	388.5	0.32	388.8	54.42
2,566.0	11.11	57.70	2,524.2	229.3	321.0	394.3	0.78	394.5	54.47
2,596.0	11.11	57.48	2,553.6	232.4	325.9	400.1	0.33	400.3	54.51
2,626.0	10.67	56.86	2,583.1	235.4	330.7	405.8	1.65	405.9	54.55
2,656.0	10.11	56.77	2,612.6	238.4	335.2	411.2	1.63	411.3	54.58
2,686.0	9.41	57.30	2,642.2	241.1	339.5	416.3	2.39	416.4	54.61
2,716.0	8.71	56.77	2,671.8	243.7	343.4	421.0	2.35	421.1	54.64
2,746.0	8.22	56.20	2,701.5	246.1	347.1	425.4	1.66	425.5	54.66
2,776.0	7.82	57.08	2,731.2	248.5	350.6	429.6	1.39	429.7	54.68
2,806.0	7.20	55.56	2,760.9	250.6	353.9	433.5	2.17	433.6	54.69
2,836.0	6.89	55.10	2,790.7	252.7	356.9	437.2	1.05	437.3	54.70

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Survey Calculation Method: Minimum Curvature
Database: EDM 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 (")
	2,866.0	6.50	56.20	2,820.5	254.7	359.8	440.7	1.37	440.8	54.70
	2,940.0	6.50	56.20	2,894.0	259.4	366.7	449.1	0.00	449.2	54.73
TD @ 2940' MD / 2894' TVD										

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
450.0	450.0	0.0	0.0	FIRST SURVEY @ 450' MD / 450' TVD
2,940.0	2,894.0	259.4	366.7	TD @ 2940' MD / 2894' TVD

Checked By: _____ Approved By: _____ Date: _____

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Company Name: HG Energy, LLC
 W.F Williams #131
 Harrison County, West Virginia
 Rig: Docker #9
 Date: 02/20/15

W.F Williams #131
 Harrison County, West Virginia
 Q150332 & AM-150298
 Design #1



PROJECT DETAILS: Harrison County, West Virginia
Geodetic System: Universal Transverse Mercator
Datum: NAD83 West Virginia - HARN
Ellipsoid: ZW-17N (84 W to 76 W)
System Datum: Mean Sea Level

DESIGN TARGET DETAILS

Name	True North	Blending	Blending	Latitude	Longitude
Target # 131	2702.0	54.2	170204.0	39° 16' 31.35" N	80° 29' 47.054" W
- plan via target center					

HG Energy

ANNOTATIONS

MD	Inc	Adj	TVD	HMS	HEM	Verticality	Annotation
426.0	0.00	0.00	426.0	0.0	0.0	0.0	0.0 PACT SURVEY @ 426 MD / 487 TVD
2840.0	6.00	61.20	2854.0	255.4	347.7	491.3	TD @ 2840 MD / 2854 TVD

WELL DETAILS: W.F Williams #131

Ground Level	1773.8	Latitude	Longitude
Northing	1722516.31	39° 18' 17.000" N	80° 29' 52.000" W
Uplift	0.0		

Azimuths to Grid North
 True North: -0.32°
 Magnetic North: -9.02°

Magnetic Field
 Strength: 52155.35nT
 Dip Angle: 66.68°
 Date: 3/31/2015
 Model: IGRF2010

