

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47 - 033 - 05867 County HARRISON District TEN MILE  
Quad WOLF SUMMIT 7.5' Pad Name WILLIAMS, W.F. Field/Pool Name WOLF SUMMIT  
Farm name HUFFMAN, BRIAN V. Well Number 232  
Operator (as registered with the OOG) H.G. ENERGY LLC  
Address 5260 DuPONT ROAD City PARKERSBURG State WV Zip 26101

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,347,054 M Easting 543,316 M  
Landing Point of Curve Northing \_\_\_\_\_ Easting \_\_\_\_\_  
Bottom Hole Northing 4,347,173 M Easting 543,237 M

Elevation (ft) 1168' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine  
Mud Type(s) and Additive(s)  
N/A

Date permit issued 3/9/15 Date drilling commenced 4/1/15 Date drilling ceased 4/9/15  
Date completion activities began 4/27/15 Date completion activities ceased 4/29/15  
Verbal plugging (Y/N) N Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft None Open mine(s) (Y/N) depths N  
Salt water depth(s) ft None Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 428'- 435' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

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viewed by:  
**APPROVED**

NAME: Sam Ward  
DATE: 11/5/17

02/03/2017

API 47-033 - 05867 Farm name HUFFMAN, BRIAN V. Well number 232

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	12 1/4"	11 5/8"	30'	Used	LS		Sand In
Surface	8 3/4"	7"	506'	New	LS	64'	Y
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	6 1/4"	4 1/2"	2895.8'	New	J-55		Y
Tubing							
Packer type and depth set							

Comment Details Circulated Est. 25 sks to surface on 7" surface cement job. Circulated Est. 20 sks to surface on 4 1/2" cement job.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Reg Neat	110	15.6	1.18	130	Surface	8
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	50:50 Pozmix	110/150	13.2/14.2	1.64/1.27	180/186	Surface	8
Tubing							

Drillers TD (ft) 2940'      Loggers TD (ft) 2938'  
 Deepest formation penetrated Fifth Sand      Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 550'

Check all wireline logs run     caliper     density     deviated/directional     induction  
 neutron     resistivity     gamma ray     temperature     sonic

Well cored     Yes     No      Conventional      Sidewall      Were cuttings collected     Yes     No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_  
20 Centralizers every 98 from bottom on 4 1/2". Centralizer placed mid string on 7"

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WAS WELL COMPLETED AS SHOT HOLE     Yes     No      DETAILS \_\_\_\_\_

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WAS WELL COMPLETED OPEN HOLE?     Yes     No      DETAILS \_\_\_\_\_

WERE TRACERS USED     Yes     No      TYPE OF TRACER(S) USED \_\_\_\_\_

API 47- 033 - 05867 Farm name HUFFMAN, BRIAN V. Well number 232

**PERFORATION RECORD**

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	4/27/15	2773'	2836'	40	Fifth Sand

Please insert additional pages as applicable.

**STIMULATION INFORMATION PER STAGE**

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbbls)	Amount of Nitrogen/other (units)
1	4/29/15	10	1759	1405	1820	15,000	254	

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Please insert additional pages as applicable.

API 47- 033 - 05867

Farm name HUFFMAN, BRIAN V.

Well number 232

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Fifth Sand</u>	<u>2756'- 2765'</u> TVD	<u>2792'- 2802'</u> MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs

OPEN FLOW Gas \_\_\_\_\_ mcfpd Oil \_\_\_\_\_ bpd NGL \_\_\_\_\_ bpd Water \_\_\_\_\_ bpd  
GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
Sand/Shale	0	428	0	428	
Pittsburgh Coal	428	435	428	435	
Sand/Shale	435	1780	435	1802	
Big Lime	1780	1858	1802	1888	
Big Injun	1858	1932	1888	1960	
Shale	1932	2346	1960	2380	
Fifty Foot	2346	2382	2380	2422	
Shale	2382	2440	2422	2476	
Sand	2440	2608	2476	2644	
Shale	2608	2756	2644	2792	
Fifth Sand	2756	2765	2792	2802	Drilled directional N 39° W a distance of 356'
Shale	2765	2903	2802	2940	
TD	2903		2940		

Please insert additional pages as applicable.

Drilling Contractor Decker Drilling

Address 11565 State Route 676 City Vincent State OH Zip 45784

Logging Company Weatherford International

Address 11000 Performance PL City Youngstown State OH Zip 44502

Cementing Company Universal Services

Address 14 Sewer Plant Rd City Buckhannon State WV Zip 26201

Stimulating Company Producers Service Corp.

Address 109 South Graham Street City Zanesville State OH Zip 43701

Please insert additional pages as applicable.

Completed by Roger Heldman

Signature *Roger Heldman* Title Operations Manager

Telephone 304-420-1107

Date 12/11/15

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Submittal of Hydraulic Fracturing Chemical Disclosure Information

Attach copy of FRACFOCUS Registry

02/03/2017

# **HG Energy, LLC**

**Harrison County, West Virginia**

**W.F. Williams #232**

**W.F. Williams #232**

**Wellbore #1**

**Design: Wellbore #1**

## **Survey Report - Geographic**

**13 April, 2015**

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**02/03/2017**

**HP**  
Survey Report - Geographic



<b>Company:</b> HG Energy, LLC	<b>Local Co-ordinate Reference:</b> Well W.F. Williams #232
<b>Project:</b> Harrison County, West Virginia	<b>TVD Reference:</b> Well @ 1176.0usft
<b>Site:</b> W.F. Williams #232	<b>MD Reference:</b> Well @ 1176.0usft
<b>Well:</b> W.F. Williams #232	<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>	Harrison 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>	W.F. Williams #232				
<b>Site Position:</b>		<b>Northing:</b>	14,261,928.48 usft	<b>Latitude:</b>	39° 16' 18.000 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,782,476.95 usft	<b>Longitude:</b>	80° 29' 52.900 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.32 °

<b>Well</b>	W.F. Williams #232					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,261,928.48 usft	<b>Latitude:</b>	39° 16' 18.000 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,782,476.95 usft	<b>Longitude:</b>	80° 29' 52.900 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft	<b>Ground Level:</b>	1,168.0 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>
	IGRF2010	3/31/2015	-8.70	66.68	52,155

<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	319.70	

<b>Survey Program</b>	<b>Date</b>	4/9/2015			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
500.0	2,940.0	MWD Survey (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	14,261,928.48	1,782,476.95	39° 16' 18.000 N	80° 29' 52.900 W
500.0	0.00	0.00	500.0	0.0	0.0	14,261,928.48	1,782,476.95	39° 16' 18.000 N	80° 29' 52.900 W
<b>FIRST SURVEY @ 500' MD / 500' TVD</b>									
555.0	1.40	113.20	555.0	-0.3	0.6	14,261,928.22	1,782,477.56	39° 16' 17.997 N	80° 29' 52.892 W
585.0	1.50	105.50	585.0	-0.5	1.3	14,261,927.97	1,782,478.28	39° 16' 17.994 N	80° 29' 52.874 W
615.0	1.20	80.50	615.0	-0.6	2.0	14,261,927.92	1,782,478.97	39° 16' 17.994 N	80° 29' 52.874 W
645.0	1.50	36.30	645.0	-0.2	2.6	14,261,928.29	1,782,479.51	39° 16' 17.998 N	80° 29' 52.874 W
675.0	2.20	12.30	675.0	0.7	2.9	14,261,929.16	1,782,479.86	39° 16' 18.007 N	80° 29' 52.863 W
705.0	4.00	354.30	704.9	2.3	2.9	14,261,930.77	1,782,479.88	39° 16' 18.022 N	80° 29' 52.862 W
735.0	5.60	348.00	734.8	4.8	2.5	14,261,933.24	1,782,479.47	39° 16' 18.047 N	80° 29' 52.867 W
765.0	7.20	343.70	764.6	8.0	1.7	14,261,936.48	1,782,478.64	39° 16' 18.079 N	80° 29' 52.878 W
795.0	8.60	342.70	794.3	11.8	0.5	14,261,940.42	1,782,477.45	39° 16' 18.118 N	80° 29' 52.893 W

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**TVD Reference:** Well @ 1176.0usft  
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**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Compass

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
825.0	9.50	342.20	824.0	16.4	-0.9	14,261,944.92	1,782,476.02	39° 16' 18.163 N	80° 29' 52.911 W
855.0	9.50	343.80	853.5	21.1	-2.5	14,261,949.62	1,782,474.45	39° 16' 18.209 N	80° 29' 52.930 W
885.0	10.80	339.40	883.1	26.1	-4.3	14,261,954.59	1,782,472.65	39° 16' 18.258 N	80° 29' 52.953 W
915.0	12.10	338.20	912.5	31.7	-6.5	14,261,960.14	1,782,470.49	39° 16' 18.313 N	80° 29' 52.980 W
945.0	13.80	336.10	941.7	37.8	-9.1	14,261,966.33	1,782,467.87	39° 16' 18.375 N	80° 29' 53.013 W
975.0	14.60	335.30	970.8	44.6	-12.1	14,261,973.04	1,782,464.85	39° 16' 18.441 N	80° 29' 53.051 W
1,005.0	14.90	332.50	999.8	51.4	-15.5	14,261,979.89	1,782,461.48	39° 16' 18.509 N	80° 29' 53.093 W
1,035.0	15.40	325.60	1,028.8	58.1	-19.5	14,261,986.60	1,782,457.45	39° 16' 18.576 N	80° 29' 53.144 W
1,065.0	15.70	321.00	1,057.7	64.6	-24.3	14,261,993.04	1,782,452.65	39° 16' 18.640 N	80° 29' 53.205 W
1,095.0	15.20	318.80	1,086.6	70.7	-29.4	14,261,999.16	1,782,447.50	39° 16' 18.700 N	80° 29' 53.270 W
1,125.0	13.50	315.20	1,115.7	76.1	-34.5	14,262,004.60	1,782,442.44	39° 16' 18.754 N	80° 29' 53.333 W
1,155.0	12.10	312.90	1,144.9	80.7	-39.3	14,262,009.23	1,782,437.67	39° 16' 18.800 N	80° 29' 53.394 W
1,185.0	11.90	312.80	1,174.2	85.0	-43.8	14,262,013.47	1,782,433.10	39° 16' 18.843 N	80° 29' 53.452 W
1,215.0	12.10	313.10	1,203.6	89.2	-48.4	14,262,017.72	1,782,428.53	39° 16' 18.885 N	80° 29' 53.509 W
1,245.0	12.20	313.40	1,232.9	93.6	-53.0	14,262,022.04	1,782,423.94	39° 16' 18.928 N	80° 29' 53.568 W
1,275.0	12.10	314.40	1,262.2	97.9	-57.6	14,262,026.42	1,782,419.39	39° 16' 18.971 N	80° 29' 53.625 W
1,305.0	12.70	315.30	1,291.5	102.5	-62.1	14,262,030.97	1,782,414.82	39° 16' 19.017 N	80° 29' 53.683 W
1,365.0	12.10	311.30	1,350.2	111.3	-71.5	14,262,039.80	1,782,405.46	39° 16' 19.105 N	80° 29' 53.801 W
1,395.0	11.70	305.80	1,379.5	115.2	-76.3	14,262,043.66	1,782,400.63	39° 16' 19.143 N	80° 29' 53.863 W
1,425.0	11.40	304.00	1,408.9	118.6	-81.2	14,262,047.10	1,782,395.70	39° 16' 19.177 N	80° 29' 53.925 W
1,455.0	11.00	303.80	1,438.3	121.9	-86.1	14,262,050.35	1,782,390.87	39° 16' 19.210 N	80° 29' 53.986 W
1,485.0	10.60	302.70	1,467.8	124.9	-90.8	14,262,053.43	1,782,386.17	39° 16' 19.240 N	80° 29' 54.046 W
1,515.0	10.60	304.90	1,497.3	128.0	-95.4	14,262,056.50	1,782,381.58	39° 16' 19.271 N	80° 29' 54.104 W
1,545.0	10.50	311.80	1,526.8	131.4	-99.7	14,262,059.89	1,782,377.27	39° 16' 19.305 N	80° 29' 54.159 W
1,575.0	9.80	315.60	1,556.3	135.0	-103.5	14,262,063.53	1,782,373.44	39° 16' 19.341 N	80° 29' 54.207 W
1,605.0	9.80	317.20	1,585.9	138.7	-107.0	14,262,067.23	1,782,369.92	39° 16' 19.378 N	80° 29' 54.252 W
1,635.0	10.80	322.30	1,615.4	142.8	-110.5	14,262,071.33	1,782,366.47	39° 16' 19.418 N	80° 29' 54.295 W
1,665.0	11.80	325.70	1,644.8	147.6	-113.9	14,262,076.08	1,782,363.02	39° 16' 19.466 N	80° 29' 54.339 W
1,695.0	11.80	325.40	1,674.2	152.7	-117.4	14,262,081.14	1,782,359.55	39° 16' 19.516 N	80° 29' 54.383 W
1,725.0	12.00	322.80	1,703.5	157.7	-121.0	14,262,086.15	1,782,355.91	39° 16' 19.565 N	80° 29' 54.428 W
1,755.0	13.30	314.40	1,732.8	162.6	-125.4	14,262,091.04	1,782,351.55	39° 16' 19.614 N	80° 29' 54.484 W
1,785.0	14.30	313.20	1,761.9	167.5	-130.6	14,262,095.99	1,782,348.39	39° 16' 19.663 N	80° 29' 54.549 W
1,815.0	14.30	317.60	1,791.0	172.8	-135.8	14,262,101.26	1,782,341.19	39° 16' 19.716 N	80° 29' 54.615 W
1,845.0	13.20	323.00	1,820.1	178.2	-140.3	14,262,106.73	1,782,336.63	39° 16' 19.770 N	80° 29' 54.672 W
1,875.0	13.20	324.00	1,849.4	183.8	-144.4	14,262,112.24	1,782,332.55	39° 16' 19.825 N	80° 29' 54.724 W
1,905.0	13.40	323.70	1,878.6	189.3	-148.5	14,262,117.81	1,782,328.48	39° 16' 19.880 N	80° 29' 54.775 W
1,935.0	13.30	323.70	1,907.7	194.9	-152.6	14,262,123.40	1,782,324.38	39° 16' 19.935 N	80° 29' 54.827 W
1,965.0	13.10	322.90	1,936.9	200.4	-156.7	14,262,128.89	1,782,320.29	39° 16' 19.990 N	80° 29' 54.879 W
1,995.0	12.50	322.00	1,966.2	205.7	-160.7	14,262,134.16	1,782,316.24	39° 16' 20.042 N	80° 29' 54.930 W
2,025.0	12.30	319.80	1,995.5	210.7	-164.8	14,262,139.16	1,782,312.18	39° 16' 20.092 N	80° 29' 54.981 W
2,055.0	12.50	319.50	2,024.8	215.5	-169.1	14,262,143.95	1,782,307.88	39° 16' 20.140 N	80° 29' 55.035 W
2,085.0	12.40	314.40	2,054.1	220.1	-173.6	14,262,148.56	1,782,303.34	39° 16' 20.188 N	80° 29' 55.090 W
2,115.0	11.70	309.40	2,083.4	224.3	-178.3	14,262,152.75	1,782,298.69	39° 16' 20.227 N	80° 29' 55.152 W
2,145.0	10.90	301.00	2,112.9	227.7	-183.0	14,262,156.14	1,782,293.91	39° 16' 20.261 N	80° 29' 55.212 W
2,175.0	10.20	294.80	2,142.4	230.2	-187.9	14,262,158.71	1,782,289.07	39° 16' 20.287 N	80° 29' 55.274 W
2,205.0	10.10	293.70	2,171.9	232.4	-192.7	14,262,160.88	1,782,284.25	39° 16' 20.308 N	80° 29' 55.335 W
2,235.0	9.50	290.20	2,201.4	234.3	-197.4	14,262,162.80	1,782,279.51	39° 16' 20.328 N	80° 29' 55.395 W
2,265.0	8.40	279.90	2,231.1	235.5	-201.9	14,262,164.03	1,782,275.03	39° 16' 20.348 N	80° 29' 55.455 W
2,295.0	7.20	270.40	2,260.8	235.9	-206.0	14,262,164.42	1,782,270.99	39° 16' 20.364 N	80° 29' 55.513 W
2,325.0	5.40	266.30	2,290.6	235.9	-209.2	14,262,164.34	1,782,267.70	39° 16' 20.343 N	80° 29' 55.545 W
2,355.0	3.60	262.50	2,320.5	235.6	-211.6	14,262,164.13	1,782,265.36	39° 16' 20.341 N	80° 29' 55.575 W
2,385.0	2.40	288.10	2,350.5	235.7	-213.1	14,262,164.20	1,782,263.83	39° 16' 20.342 N	80° 29' 55.594 W
2,415.0	2.00	311.60	2,380.5	236.3	-214.1	14,262,164.74	1,782,262.84	39° 16' 20.348 N	80° 29' 55.607 W
2,445.0	4.30	1.40	2,410.4	237.7	-214.5	14,262,166.21	1,782,262.48	39° 16' 20.362 N	80° 29' 55.611 W
2,475.0	6.00	356.60	2,440.3	240.4	-214.5	14,262,168.90	1,782,262.41	39° 16' 20.389 N	80° 29' 55.612 W

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WV Department of Environmental Protection

**HP**  
Survey Report - Geographic



**Company:** HG Energy, LLC  
**Project:** Harrison County, West Virginia  
**Site:** W.F. Williams #232  
**Well:** W.F. Williams #232  
**Wellbore:** Wellbore #1  
**Design:** Wellbore #1

**Local Co-ordinate Reference:** Well W.F. Williams #232  
**TVD Reference:** Well @ 1176.0usft  
**MD Reference:** Well @ 1176.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Datbase:** Compass

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
2,505.0	6.72	352.00	2,470.1	243.7	-214.9	14,262,172.21	1,782,262.07	39° 16' 20.421 N	80° 29' 55.616 W	
2,535.0	6.20	351.70	2,499.9	247.1	-215.3	14,262,175.55	1,782,261.60	39° 16' 20.455 N	80° 29' 55.622 W	
2,565.0	5.80	350.40	2,529.8	250.2	-215.8	14,262,178.65	1,782,261.11	39° 16' 20.485 N	80° 29' 55.628 W	
2,595.0	6.00	347.00	2,559.6	253.2	-216.4	14,262,181.67	1,782,260.50	39° 16' 20.515 N	80° 29' 55.635 W	
2,625.0	7.30	343.70	2,589.4	256.5	-217.3	14,262,185.03	1,782,259.62	39° 16' 20.548 N	80° 29' 55.646 W	
2,655.0	8.70	341.30	2,619.1	260.5	-218.6	14,262,189.00	1,782,258.35	39° 16' 20.588 N	80° 29' 55.662 W	
2,685.0	7.90	341.20	2,648.8	264.6	-220.0	14,262,193.11	1,782,256.96	39° 16' 20.628 N	80° 29' 55.680 W	
2,715.0	6.90	340.60	2,678.5	268.3	-221.2	14,262,196.76	1,782,255.70	39° 16' 20.665 N	80° 29' 55.695 W	
2,745.0	5.60	339.50	2,708.4	271.3	-222.4	14,262,199.83	1,782,254.59	39° 16' 20.695 N	80° 29' 55.709 W	
2,775.0	5.00	342.30	2,738.2	274.0	-223.3	14,262,202.44	1,782,253.68	39° 16' 20.721 N	80° 29' 55.721 W	
2,805.0	4.50	344.20	2,768.1	276.3	-224.0	14,262,204.82	1,782,252.96	39° 16' 20.744 N	80° 29' 55.730 W	
2,835.0	4.20	344.70	2,798.0	278.5	-224.6	14,262,207.01	1,782,252.35	39° 16' 20.766 N	80° 29' 55.737 W	
2,865.0	3.60	347.20	2,828.0	280.5	-225.1	14,262,208.99	1,782,251.85	39° 16' 20.786 N	80° 29' 55.743 W	
2,876.0	3.50	347.10	2,839.0	281.2	-225.2	14,262,209.66	1,782,251.70	39° 16' 20.792 N	80° 29' 55.745 W	
2,940.0	3.50	347.10	2,902.8	285.0	-226.1	14,262,213.46	1,782,250.83	39° 16' 20.830 N	80° 29' 55.756 W	

TD @ 2940' MD / 2903' 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	FIRST SURVEY @ 500' MD / 500' TVD	
2,940.0	2,902.8	285.0	-226.1	TD @ 2940' MD / 2903' TVD	

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



# HG Energy, LLC

Harrison County, West Virginia

W.F. Williams #232

W.F. Williams #232

Wellbore #1

Design: Wellbore #1

# HG Energy EOW Report

April, 2015

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MD Reference: Well @ 1176.0usft  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: 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 #232  
Site Position: Northing: 14,261,928.49 usft  
From: Easting: 1,782,476.95 usft  
Position Uncertainty: Lat/Long 0.0 usft  
Slot Radius: 13-3/16 "  
Latitude: 39° 16' 18.000 N  
Longitude: 80° 29' 52.900 W  
Grid Convergence: 0.32 °

Well: W.F. Williams #232  
Well Position: +N-S 0.0 usft  
+E-W 0.0 usft  
Position Uncertainty: 0.0 usft  
Wellhead Elevation: 0.0 usft  
Latitude: 39° 16' 18.000 N  
Longitude: 80° 29' 52.900 W  
Ground Level: 1,168.0 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 Needs: 1.0  
Version: 1.0  
Vertical Acc: 500.0  
Phase: ACTUAL  
Tie On Depth: 0.0  
Depth From (TVD) (usft): 0.0  
+N-S (usft): 0.0  
+E-W (usft): 0.0  
Direction (°): 319.70

Survey: W.F. Williams #232  
Date: 4/8/2015  
Survey (Wellbore): Survey (Wellbore #1)  
Tool Name: MWD default  
Description: MWD - Standard

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 Database: 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 (°)
	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00
	500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.0	0.0	0.00
FIRST SURVEY @ 500' MD / 500' TVD										
	555.0	1.40	113.20	555.0	-0.3	0.6	-0.6	2.55	0.7	113.20
	585.0	1.50	105.50	585.0	-0.5	1.3	-1.3	0.73	1.4	111.09
	615.0	1.20	80.50	615.0	-0.6	2.0	-1.7	2.18	2.1	105.67
	645.0	1.50	36.30	645.0	-0.2	2.6	-1.8	3.51	2.6	94.43
	675.0	2.20	12.30	675.0	0.7	2.9	-1.4	3.43	3.0	76.88
	705.0	4.00	354.30	704.9	2.3	2.9	-0.2	6.75	3.7	52.13
	735.0	5.60	348.00	734.8	4.8	2.5	2.0	5.81	5.4	27.99
	765.0	7.20	343.70	764.6	8.0	1.7	5.0	5.66	8.2	11.98
	795.0	8.60	342.70	794.3	11.9	0.5	8.8	4.89	12.0	2.41
	825.0	9.50	342.20	824.0	16.4	-0.9	13.1	3.01	16.5	356.79
	855.0	9.50	340.80	853.5	21.1	-2.5	17.7	0.77	21.3	353.27
	885.0	10.80	339.40	883.1	26.1	-4.3	22.7	4.41	26.5	350.65
	915.0	12.10	338.20	912.5	31.7	-6.5	28.3	4.41	32.3	348.48
	945.0	13.80	336.10	941.7	37.8	-9.1	34.7	5.88	38.9	346.52
	975.0	14.60	335.30	970.8	44.6	-12.1	41.8	2.75	46.2	344.61
	1,005.0	14.90	332.50	999.8	51.4	-15.5	49.2	2.58	53.7	343.26
	1,035.0	15.40	325.60	1,028.8	58.1	-19.5	56.9	6.23	61.3	341.46
	1,065.0	15.70	321.00	1,057.7	64.6	-24.3	65.0	4.23	69.0	339.38
	1,095.0	15.20	318.80	1,086.6	70.7	-28.4	72.9	2.57	76.6	337.38
	1,125.0	13.50	315.20	1,115.7	76.1	-34.5	80.4	6.40	83.6	335.62
	1,155.0	12.10	312.90	1,144.9	80.7	-39.3	87.0	4.97	89.8	334.06
	1,185.0	11.90	312.80	1,174.2	85.0	-43.8	93.2	0.67	95.6	332.71
	1,215.0	12.10	313.10	1,203.6	89.2	-48.4	99.4	0.70	101.5	331.52
	1,245.0	12.20	313.40	1,232.9	93.6	-53.0	105.6	0.39	107.5	330.46

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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 (°)
1,275.0	12.10	314.40	1,292.2	97.9	-57.6	111.9	0.78	113.6	329.56
1,305.0	12.70	315.30	1,291.5	102.5	-62.1	118.3	2.10	119.8	328.78
1,365.0	12.10	311.30	1,350.2	111.3	-71.5	131.1	1.75	132.3	327.29
1,385.0	11.70	305.80	1,378.5	115.2	-76.3	137.2	4.01	138.2	326.47
1,425.0	11.40	304.00	1,408.9	118.6	-81.2	143.0	1.56	143.8	325.59
1,455.0	11.00	303.80	1,438.3	121.9	-86.1	148.6	1.34	149.2	324.76
1,485.0	10.80	302.70	1,467.8	124.9	-90.8	154.0	1.50	154.4	324.00
1,515.0	10.80	304.90	1,497.3	128.0	-95.4	159.3	1.35	159.6	323.32
1,545.0	10.50	311.60	1,526.8	131.4	-99.7	164.7	4.10	164.9	322.82
1,575.0	9.80	315.60	1,556.3	135.0	-103.5	169.8	3.31	170.1	322.53
1,605.0	9.80	317.20	1,585.9	138.7	-107.0	175.0	0.91	175.2	322.35
1,635.0	10.80	322.30	1,615.4	142.8	-110.5	180.4	4.51	180.6	322.28
1,665.0	11.80	325.70	1,644.8	147.6	-113.9	186.3	4.00	186.5	322.34
1,695.0	11.80	325.40	1,674.2	152.7	-117.4	192.4	0.20	192.6	322.44
1,725.0	12.00	322.60	1,703.5	157.7	-121.0	198.5	2.04	198.8	322.49
1,755.0	13.30	314.40	1,732.8	162.6	-125.4	205.1	7.38	205.3	322.35
1,785.0	14.30	313.20	1,761.9	167.5	-130.6	212.2	3.47	212.4	322.07
1,815.0	14.30	317.60	1,791.0	172.8	-135.8	219.6	3.62	219.7	321.84
1,845.0	13.20	323.00	1,820.1	178.2	-140.3	226.7	5.63	226.8	321.79
1,875.0	13.20	324.00	1,849.4	183.8	-144.4	233.5	0.76	233.7	321.84
1,905.0	13.40	323.70	1,878.6	189.3	-148.5	240.4	0.71	240.6	321.90
1,935.0	13.30	323.70	1,907.7	194.9	-152.6	247.3	0.33	247.5	321.95
1,965.0	13.10	322.80	1,936.9	200.4	-156.7	254.2	0.90	254.4	321.98
1,995.0	12.50	322.00	1,966.2	205.7	-160.7	260.8	2.11	261.0	322.00
2,025.0	12.30	319.80	1,995.5	210.7	-164.8	267.2	1.71	267.5	321.97
2,055.0	12.50	316.50	2,024.8	215.5	-169.1	273.7	2.45	273.9	321.88
2,085.0	12.40	314.40	2,054.1	220.1	-173.6	280.1	1.55	280.3	321.73

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	2,115.0	11.70	308.40	2,083.4	224.3	-178.3	286.3	4.19	286.5	321.52
	2,145.0	10.90	301.00	2,112.9	227.7	-183.0	292.0	6.09	292.1	321.20
	2,175.0	10.20	294.80	2,142.4	230.2	-187.9	297.1	4.44	297.2	320.78
	2,205.0	10.10	293.70	2,171.9	232.4	-192.7	301.9	0.73	301.9	320.34
	2,235.0	9.50	290.20	2,201.4	234.3	-197.4	306.4	2.82	306.4	319.88
	2,265.0	8.40	279.90	2,231.1	235.5	-201.9	310.2	6.46	310.2	319.40
	2,295.0	7.20	270.40	2,260.8	235.9	-206.0	313.1	5.86	313.2	318.88
	2,325.0	5.40	266.30	2,290.6	235.8	-209.2	315.2	6.18	315.3	318.42
	2,355.0	3.60	262.50	2,320.5	235.6	-211.6	318.6	6.08	316.7	318.08
	2,385.0	2.40	268.10	2,350.5	235.7	-213.1	317.6	5.90	317.8	317.88
	2,415.0	2.00	311.60	2,380.5	236.3	-214.1	318.7	3.26	318.8	317.82
	2,445.0	4.30	1.40	2,410.4	237.7	-214.5	320.0	11.25	320.2	317.94
	2,475.0	6.00	356.60	2,440.3	240.4	-214.5	322.1	5.84	322.2	318.26
	2,505.0	6.72	352.00	2,470.1	243.7	-214.9	324.9	2.84	324.9	318.60
	2,535.0	6.20	351.70	2,499.9	247.1	-215.3	327.7	1.74	327.7	318.92
	2,565.0	5.80	350.40	2,528.8	250.2	-215.8	330.4	1.41	330.4	319.21
	2,595.0	6.00	347.00	2,558.6	253.2	-216.4	333.1	1.34	333.1	319.47
	2,625.0	7.30	343.70	2,589.4	256.5	-217.3	336.2	4.51	336.2	319.73
	2,655.0	8.70	341.30	2,619.1	260.5	-218.6	340.1	4.80	340.1	320.00
	2,685.0	7.90	341.20	2,648.8	264.6	-220.0	344.1	2.67	344.1	320.26
	2,715.0	6.90	340.60	2,678.5	268.3	-221.2	347.7	3.34	347.7	320.49
	2,745.0	5.60	339.50	2,708.4	271.3	-222.4	350.8	4.35	350.8	320.67
	2,775.0	5.00	342.30	2,738.2	274.0	-223.3	353.3	2.18	353.4	320.82
	2,805.0	4.50	344.20	2,768.1	276.3	-224.0	355.6	1.75	355.7	320.97
	2,835.0	4.20	344.70	2,798.0	278.5	-224.6	357.7	1.01	357.8	321.12
	2,865.0	3.60	347.20	2,828.0	280.5	-225.1	359.5	2.08	359.7	321.25
	2,876.0	3.50	347.10	2,838.0	281.2	-225.2	360.1	0.91	360.3	321.30

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2,940.0	3.50	347.10	2,902.8	285.0	-226.1	363.6	0.00	363.6	321.57
TD @ 2940' MD / 2903' 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	FIRST SURVEY @ 500' MD / 500' TVD
2,940.0	2,902.8	285.0	-226.1	TD @ 2940' MD / 2903' TVD

Checked By: \_\_\_\_\_

Approved By: \_\_\_\_\_

Date: \_\_\_\_\_

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Company Name: HG Energy, LLC  
 W.F. Williams #232  
 Harrison County, West Virginia  
 Rig: Decker 9  
 Created By: Jerry Arsenault  
 Date: 4/13/2015

W.F. Williams #232  
 Harrison County, West Virginia  
 Q150318 & AM-150282  
 Design #1

**PROJECT DETAILS:** Harrison County, West Virginia  
**Geodetic System:** Universal Transverse Mercator  
**Datum:** NAD83 West Virginia - HARN  
**Ellipsoid:** GRS 1980  
**Zone:** Zone 17N (84 W to 75 W)  
**System Unit:** Mean Sea Level

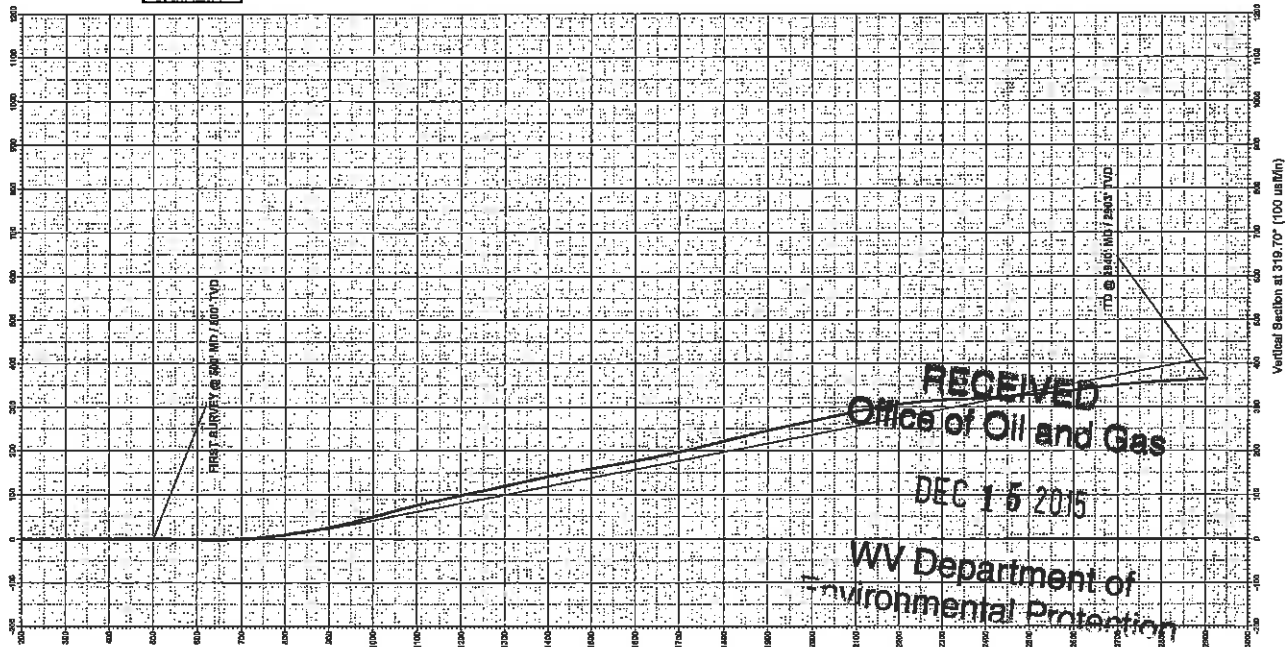
**DEPT TARGET DETAILS**

Name	TVD	4WS	4SW	Northing	Easting	Latitude	Longitude
Target #232 -plan view target center	2762.0	391.1	-567.7	1482220.88	178229.22	39° 19' 20.92" N	80° 29' 06.00" W

# HG Energy

**ANNOTATIONS**

ID	IC	AI	TVD	4WS	4SW	Vertical	Horizontal	Annotation
2540.0	3.09	347.10	2302.3	288.9	-228.1	325.6	89.5	TD @ 2540' MD / 2540' TVD



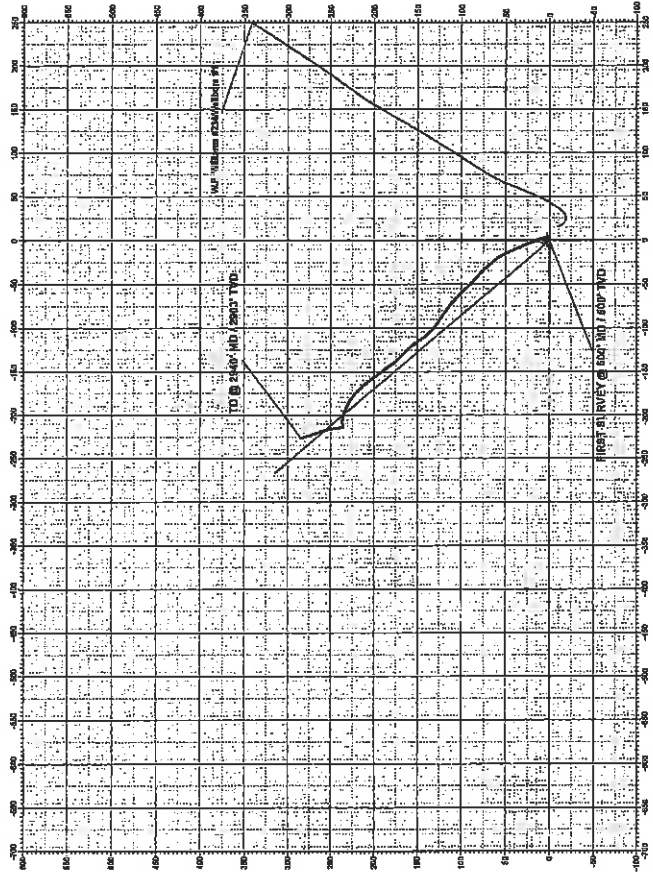
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**WELL DETAILS:** W.F. Williams #232

4WS	4SW	Northing	Easting	Ground Level	Latitude	Longitude
39	-567	1482220.88	178229.22	1168.0	39° 19' 20.92" N	80° 29' 06.00" W

Azimuths to Grid North  
 Correction: -9.02°  
 Magnetic Field  
 Strength: 52155.4nT  
 Dip Angle: 66.68°  
 Date: 3/31/2015  
 Model: IGRF2010



Prepared for:

Dustin Hendershot



Prepared by:

Producers Service Corp

Daniel Graham

109 S. Graham St.

Zanesville, OH 43702

740-454-6253

INVOICE #: 18502

WELL NAME: W. F Williams 232

COUNTY/STATE: Harrison/WV

TOWNSHIP/FIELD: Wolf Summit

DATE of SERVICE: 4/29/2015

CUSTOMER PO#:

Description	Notes	Amount	Units	Unit Cost	Total Cost
FLUID PUMP CHARGE 0-3000 PSI MIN CHARGE 4 HRS		1	EA		
BLENDER CHARGE 0-10 BPM		1	EA		
MILEAGE CHARGE PER UNIT ONE WAY	2 Units @ 70miles each	140	MI		
IC ACID 15%		700	GAL		
PRO HIB II		0.5	GAL		
ACID DELIVERY		2	HR		
PERF BALLS 7/8" 1.3		40	EA		
PRO CLA LOK (KCL SUBSTITUTE)		20	GAL		
PRO NE-21		10	GAL		
PRO A GEL		250	LB		
BUFFER I		50	LB		
BUFFER II		50	LB		
BIO CLEAR 750		1	LB		
AP BREAKER		22	LB		
BXL-A		15	GAL		
BXL-10C		15	GAL		
FLOW METER 2INCH		1	EA		
MANUAL PERFBALL INJECTOR		1	EA		
DATA VAN		1	STAGE		
SAND 20/40 OTTAWA		150	CWT		
SAND DELIVERY / TON MILES		525	TMILE		

Customer Approval: \_\_\_\_\_

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WV Department of  
Environmental Protection

02/03/2017