

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

API 47 - 033 - 5791 County HARRISON District TEN MILE
Quad SALEM 7.5' Pad Name W.B. CARPENTER Field/Pool Name WOLF SUMMIT
Farm name JUNKINS, EARL & BELVA Well Number 251
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 4,347,683 M Easting 542,416 M
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing 4,347,639 M Easting 542,460 M

Elevation (ft) 1,307' 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 8/29/13 Date drilling commenced 9/17/13 Date drilling ceased 9/19/13
Date completion activities began 9/26/13 Date completion activities ceased 10/7/13
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 _____
Salt water depth(s) ft 1300' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 696'-703' Cavern(s) encountered (Y/N) depths JAN 21 2014
Is coal being mined in area (Y/N) N

Received
Office of Oil and Gas
WV Dept. of Environmental Protection

02/28/2014

API 47- 033 - 5791 Farm name JUNKINS, EARL & BELVA Well number 251

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"	805'	New	LS	64'	Y
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	6 1/2"	4 1/2"	3148.25'	New	J-55		Y
Tubing							
Packer type and depth set							

Comment Details Circulated Est. 10 bbls to surface on 7" surface cement job. Circulated Est. 10 bbls to surface on 4 1/2" cement job.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Reg Neat	200	15.6	1.18	236	Surface	8
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	50:50 Pozmix/ Econo	200/90	14.2/11.8	1.27/2.93	254/264	24'	8
Tubing							

Drillers TD (ft) 3204' Loggers TD (ft) 3196'
 Deepest formation penetrated Fifth Sand Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 830'

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 _____

15 Centralizers every 64' from bottom on 4 1/2", Centralizer placed mid string on 7"

Received

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

JAN 21 2014

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

Office of Oil and Gas
WV Dept. of Environmental Protection

API 47- 033 - 5791 Farm name JUNKINS, EARL & BELVA Well number 251

PRODUCING FORMATION(S)	DEPTHS	
<u>Fifth Sand</u>	<u>3002'-3017'</u> TVD	<u>3014'-3029'</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 ₂ S, ETC)
Sand/Shale	0	696	0	696	
Pittsburgh Coal	696	703	696	703	
Sand/Shale	703	2044	703	2050	
Big Lime	2044	2122	2050	2129	
Big Injun	2122	2184	2129	2190	
Shale	2184	2593	2190	2602	
Fifty Foot	2593	2622	2602	2632	
Shale	2622	2684	2632	2695	
Sand	2684	2839	2695	2850	
Shale	2839	3002	2850	3014	
Fifth Sand	3002	3017	3014	3029	Drilled directional S 8.7 degrees E a distance of 218'
Shale	3017	3192	3029	3204	
TD	3192		3204		

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 777 North River Avenue City Weston State WV Zip 26152

Cementing Company Baker Hughes
Address 2228 Philippi Pike City Clarksburg State WV Zip 26301

Stimulating Company Universal Services Inc.
Address 2489 Baumen Rd City Wooster State OH Zip 44691

Please insert additional pages as applicable. WV Dept. of Environmental Protection

Completed by Roger Heldman Telephone 304-420-1107
Signature [Signature] Title Operations Mgr Date 11/25/13

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

02/28/2014

HG Energy, LLC

Harrison County, West Virginia

W.B. Carpenter # 251

W.B. Carpenter #251

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

07 January, 2014

Received

JAN 21 2014

Office of Oil and Gas
WV Dept. of Environmental Protection



02/28/2014

DDC
Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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.B. Carpenter # 251				
Site Position:		Northing:	14,263,995.79 usft	Latitude:	39° 16' 38.600 N
From:	Lat/Long	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.31 °

Well	W.B. Carpenter #251					
Well Position	+N/-S	0.0 usft	Northing:	14,263,995.79 usft	Latitude:	39° 16' 38.600 N
	+E/-W	0.0 usft	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,307.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/11/2013	-8.64	66.82	52,317

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	111.63	

Survey Program	Date	12/11/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
805.0	3,204.0	MWD (Wellbore #1)			

Survey											
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude		
805.0	0.00	0.00	805.0	0.0	0.0	14,263,995.79	1,779,525.51	39° 16' 38.600 N	80° 30' 30.300 W		
TIE IN @ 805' MD / 805' TVD											
838.0	1.71	118.92	838.0	-0.2	0.4	14,263,995.56	1,779,525.95	39° 16' 38.598 N	80° 30' 30.295 W		
868.0	2.02	122.92	868.0	-0.7	1.3	14,263,995.05	1,779,526.78	39° 16' 38.593 N	80° 30' 30.284 W		
898.0	2.59	131.80	898.0	-1.5	2.2	14,263,994.31	1,779,527.73	39° 16' 38.585 N	80° 30' 30.272 W		
928.0	3.52	140.02	927.9	-2.6	3.3	14,263,993.16	1,779,528.83	39° 16' 38.574 N	80° 30' 30.258 W		
958.0	4.48	140.59	957.8	-4.2	4.6	14,263,991.55	1,779,530.16	39° 16' 38.558 N	80° 30' 30.241 W		
988.0	4.92	139.80	987.7	-6.1	6.2	14,263,989.66	1,779,531.74	39° 16' 38.539 N	80° 30' 30.221 W		
1,018.0	4.79	141.60	1,017.6	-8.1	7.8	14,263,987.69	1,779,533.35	39° 16' 38.519 N	80° 30' 30.201 W		
1,048.0	5.01	136.72	1,047.5	-10.0	9.5	14,263,985.76	1,779,535.02	39° 16' 38.500 N	80° 30' 30.180 W		
1,078.0	5.49	129.43	1,077.4	-11.9	11.5	14,263,983.89	1,779,537.03	39° 16' 38.482 N	80° 30' 30.154 W		
1,108.0	6.42	119.23	1,107.2	-13.6	14.1	14,263,982.16	1,779,539.60	39° 16' 38.464 N	80° 30' 30.122 W		

DDC
Survey Report - Geographic



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,138.0	6.81	113.30	1,137.0	-15.2	17.2	14,263,980.64	1,779,542.70	39° 16' 38.449 N	80° 30' 30.082 W
1,168.0	6.59	107.81	1,166.8	-16.4	20.5	14,263,979.41	1,779,545.97	39° 16' 38.437 N	80° 30' 30.041 W
1,198.0	6.42	105.70	1,196.6	-17.4	23.7	14,263,978.43	1,779,549.22	39° 16' 38.427 N	80° 30' 30.000 W
1,228.0	6.50	114.22	1,226.4	-18.5	26.9	14,263,977.28	1,779,552.39	39° 16' 38.415 N	80° 30' 29.959 W
1,258.0	6.59	123.80	1,256.3	-20.2	29.9	14,263,975.62	1,779,555.37	39° 16' 38.399 N	80° 30' 29.922 W
1,288.0	6.50	123.89	1,286.1	-22.1	32.7	14,263,973.72	1,779,558.21	39° 16' 38.380 N	80° 30' 29.886 W
1,318.0	6.28	122.53	1,315.9	-23.9	35.5	14,263,971.89	1,779,561.00	39° 16' 38.362 N	80° 30' 29.850 W
1,348.0	6.20	116.59	1,345.7	-25.5	38.3	14,263,970.28	1,779,563.83	39° 16' 38.346 N	80° 30' 29.814 W
1,378.0	6.11	115.19	1,375.5	-26.9	41.2	14,263,968.88	1,779,566.72	39° 16' 38.332 N	80° 30' 29.778 W
1,408.0	5.89	116.90	1,405.4	-28.3	44.0	14,263,967.50	1,779,569.54	39° 16' 38.318 N	80° 30' 29.742 W
1,438.0	6.11	118.31	1,435.2	-29.7	46.8	14,263,966.05	1,779,572.32	39° 16' 38.303 N	80° 30' 29.707 W
1,468.0	6.11	119.41	1,465.0	-31.3	49.6	14,263,964.51	1,779,575.12	39° 16' 38.288 N	80° 30' 29.671 W
1,498.0	6.02	119.01	1,494.9	-32.8	52.4	14,263,962.96	1,779,577.88	39° 16' 38.273 N	80° 30' 29.636 W
1,528.0	5.89	116.02	1,524.7	-34.3	55.1	14,263,961.52	1,779,580.64	39° 16' 38.258 N	80° 30' 29.601 W
1,558.0	5.58	115.89	1,554.5	-35.6	57.8	14,263,960.21	1,779,583.34	39° 16' 38.245 N	80° 30' 29.567 W
1,588.0	5.19	111.89	1,584.4	-36.7	60.4	14,263,959.07	1,779,585.91	39° 16' 38.234 N	80° 30' 29.534 W
1,618.0	4.61	110.71	1,614.3	-37.7	62.8	14,263,958.14	1,779,588.30	39° 16' 38.224 N	80° 30' 29.504 W
1,648.0	4.31	108.90	1,644.2	-38.5	65.0	14,263,957.34	1,779,590.49	39° 16' 38.216 N	80° 30' 29.476 W
1,678.0	4.70	106.22	1,674.1	-39.2	67.2	14,263,956.64	1,779,592.74	39° 16' 38.209 N	80° 30' 29.448 W
1,708.0	5.58	106.40	1,704.0	-39.9	69.8	14,263,955.88	1,779,595.32	39° 16' 38.202 N	80° 30' 29.415 W
1,738.0	5.80	107.01	1,733.8	-40.8	72.7	14,263,955.03	1,779,598.17	39° 16' 38.193 N	80° 30' 29.379 W
1,768.0	6.11	111.32	1,763.7	-41.8	75.6	14,263,954.00	1,779,601.10	39° 16' 38.183 N	80° 30' 29.341 W
1,798.0	6.50	112.60	1,793.5	-43.0	78.6	14,263,952.77	1,779,604.16	39° 16' 38.170 N	80° 30' 29.303 W
1,828.0	6.11	108.60	1,823.3	-44.2	81.7	14,263,951.61	1,779,607.24	39° 16' 38.159 N	80° 30' 29.263 W
1,858.0	5.80	103.19	1,853.2	-45.0	84.7	14,263,950.75	1,779,610.23	39° 16' 38.150 N	80° 30' 29.225 W
1,888.0	5.89	105.30	1,883.0	-45.8	87.7	14,263,950.00	1,779,613.19	39° 16' 38.143 N	80° 30' 29.188 W
1,918.0	6.11	114.40	1,912.8	-46.9	90.6	14,263,948.93	1,779,616.13	39° 16' 38.132 N	80° 30' 29.151 W
1,948.0	6.59	121.82	1,942.7	-48.4	93.5	14,263,947.37	1,779,619.04	39° 16' 38.116 N	80° 30' 29.114 W
1,978.0	6.68	121.30	1,972.5	-50.2	96.5	14,263,945.55	1,779,622.00	39° 16' 38.098 N	80° 30' 29.076 W
2,008.0	6.28	121.30	2,002.3	-52.0	99.4	14,263,943.79	1,779,624.89	39° 16' 38.081 N	80° 30' 29.039 W
2,038.0	6.20	119.10	2,032.1	-53.6	102.2	14,263,942.15	1,779,627.71	39° 16' 38.064 N	80° 30' 29.004 W
2,068.0	6.20	119.72	2,061.9	-55.2	105.0	14,263,940.56	1,779,630.53	39° 16' 38.048 N	80° 30' 28.968 W
2,098.0	6.20	118.40	2,091.7	-56.8	107.8	14,263,938.99	1,779,633.36	39° 16' 38.033 N	80° 30' 28.932 W
2,128.0	6.28	118.79	2,121.6	-58.4	110.7	14,263,937.43	1,779,636.22	39° 16' 38.017 N	80° 30' 28.896 W
2,158.0	6.20	119.80	2,151.4	-60.0	113.6	14,263,935.83	1,779,639.07	39° 16' 38.001 N	80° 30' 28.860 W
2,188.0	6.11	120.51	2,181.2	-61.6	116.3	14,263,934.22	1,779,641.85	39° 16' 37.985 N	80° 30' 28.824 W
2,218.0	5.58	118.09	2,211.1	-63.1	119.0	14,263,932.72	1,779,644.51	39° 16' 37.970 N	80° 30' 28.791 W
2,248.0	5.10	115.50	2,240.9	-64.3	121.5	14,263,931.46	1,779,647.00	39° 16' 37.957 N	80° 30' 28.759 W
2,278.0	5.32	113.12	2,270.8	-65.5	124.0	14,263,930.34	1,779,649.48	39° 16' 37.946 N	80° 30' 28.727 W
2,308.0	5.80	113.43	2,300.7	-66.6	126.6	14,263,929.19	1,779,652.15	39° 16' 37.935 N	80° 30' 28.694 W
2,338.0	5.89	114.71	2,330.5	-67.9	129.4	14,263,927.94	1,779,654.94	39° 16' 37.922 N	80° 30' 28.658 W
2,368.0	5.71	114.62	2,360.3	-69.1	132.2	14,263,926.68	1,779,657.70	39° 16' 37.910 N	80° 30' 28.623 W
2,398.0	5.10	112.60	2,390.2	-70.3	134.8	14,263,925.54	1,779,660.29	39° 16' 37.898 N	80° 30' 28.590 W
2,428.0	4.79	110.09	2,420.1	-71.2	137.2	14,263,924.60	1,779,662.69	39° 16' 37.889 N	80° 30' 28.560 W
2,458.0	5.10	106.53	2,450.0	-72.0	139.6	14,263,923.79	1,779,665.15	39° 16' 37.881 N	80° 30' 28.529 W
2,488.0	6.11	107.81	2,479.8	-72.9	142.4	14,263,922.92	1,779,667.95	39° 16' 37.872 N	80° 30' 28.493 W
2,518.0	7.38	112.20	2,509.6	-74.1	145.7	14,263,921.71	1,779,671.25	39° 16' 37.860 N	80° 30' 28.451 W
2,548.0	7.91	116.33	2,539.4	-75.7	149.4	14,263,920.06	1,779,674.89	39° 16' 37.843 N	80° 30' 28.405 W
2,578.0	7.69	114.93	2,569.1	-77.5	153.0	14,263,918.30	1,779,678.56	39° 16' 37.826 N	80° 30' 28.358 W
2,608.0	7.38	113.43	2,598.8	-79.1	156.6	14,263,916.69	1,779,682.14	39° 16' 37.809 N	80° 30' 28.313 W
2,638.0	7.12	110.53	2,628.6	-80.5	160.1	14,263,915.27	1,779,685.65	39° 16' 37.795 N	80° 30' 28.268 W
2,668.0	6.59	107.81	2,658.4	-81.7	163.5	14,263,914.09	1,779,689.03	39° 16' 37.783 N	80° 30' 28.225 W
2,698.0	6.42	106.53	2,688.2	-82.7	166.8	14,263,913.09	1,779,692.28	39° 16' 37.773 N	80° 30' 28.184 W
2,728.0	6.20	104.82	2,718.0	-83.6	169.9	14,263,912.20	1,779,695.45	39° 16' 37.764 N	80° 30' 28.144 W
2,758.0	6.28	104.20	2,747.8	-84.4	173.1	14,263,911.38	1,779,698.61	39° 16' 37.756 N	80° 30' 28.104 W

DDC
Survey Report - Geographic



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,788.0	6.50	103.81	2,777.6	-85.2	176.3	14,263,910.57	1,779,701.85	39° 16' 37.748 N	80° 30' 28.063 W
2,818.0	6.42	103.02	2,807.5	-86.0	179.6	14,263,909.79	1,779,705.13	39° 16' 37.740 N	80° 30' 28.021 W
2,848.0	6.42	100.60	2,837.3	-86.7	182.9	14,263,909.10	1,779,708.42	39° 16' 37.733 N	80° 30' 27.979 W
2,878.0	6.28	95.72	2,867.1	-87.2	186.2	14,263,908.63	1,779,711.70	39° 16' 37.728 N	80° 30' 27.938 W
2,908.0	6.02	92.43	2,896.9	-87.4	189.4	14,263,908.40	1,779,714.90	39° 16' 37.726 N	80° 30' 27.897 W
2,938.0	5.58	90.10	2,926.8	-87.5	192.4	14,263,908.33	1,779,717.93	39° 16' 37.725 N	80° 30' 27.858 W
2,968.0	5.32	86.01	2,956.6	-87.4	195.3	14,263,908.43	1,779,720.78	39° 16' 37.726 N	80° 30' 27.822 W
2,998.0	4.92	84.21	2,986.5	-87.1	197.9	14,263,908.65	1,779,723.45	39° 16' 37.728 N	80° 30' 27.788 W
3,023.0	4.70	81.31	3,011.4	-86.9	200.0	14,263,908.92	1,779,725.52	39° 16' 37.730 N	80° 30' 27.762 W
3,058.0	4.39	81.22	3,046.3	-86.5	202.8	14,263,909.34	1,779,728.27	39° 16' 37.734 N	80° 30' 27.727 W
3,088.0	4.09	78.63	3,076.2	-86.1	204.9	14,263,909.72	1,779,730.45	39° 16' 37.738 N	80° 30' 27.699 W
3,118.0	3.78	75.81	3,106.1	-85.6	206.9	14,263,910.18	1,779,732.46	39° 16' 37.742 N	80° 30' 27.673 W
3,148.0	3.69	75.02	3,136.1	-85.1	208.8	14,263,910.67	1,779,734.35	39° 16' 37.747 N	80° 30' 27.649 W
3,204.0	3.69	75.02	3,192.0	-84.2	212.3	14,263,911.60	1,779,737.83	39° 16' 37.756 N	80° 30' 27.605 W

TD @ 3204' MD / 3192' TVD

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
3,204.0	3,192.0	-84.2	212.3	TD @ 3204' MD / 3192' TVD	

Checked By: _____ Approved By: _____ Date: _____

Received

JAN 21 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

HG Energy, LLC

Harrison County, West Virginia

W.B. Carpenter # 251

W.B. Carpenter #251

Wellbore #1

Survey: MWD

DDC Survey Report

11 December, 2013

Received

JAN 21 2014

Office of Oil and Gas
WV Dept. of Environmental Protection



02/28/2014



I **Larry Wright**, certify that I am employed by **The Appalachian Directional Drilling Company (ADC)**. That I did on the day(s) of **9/17/13** thru **9/18/13** conduct or supervise the taking of a **MWD Survey** from a depth of **805** feet to a depth of **3204** feet, that the data is true, correct, complete and within the limitations of the tool as set forth by **The Appalachian Directional Drilling Company (ADC)**.; that I am authorized and qualified to make this report; that this survey was conducted at the request of **HG Energy, LLC** for the **W.B. Carpenter #251** API No. **47-033-05791** in **Harrison, County WV**; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by **The Appalachian Directional Drilling Company (ADC)**.

Larry Wright

Digitally signed by Larry Wright
DN: cn=Larry Wright, o=The
Directional Drilling Company,
ou=GM of Guidance Services,
email=larryw@directionaldrillers.co
m, c=US
Date: 2013.12.12 16:14:08 -06'00'

Received

JAN 27 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

• 1200 Heavy Haul Road • Morgan Town, WV 26501 •
• PH 304-777-2310 • FAX 304-777-2317 •

02/28/2014

DDC
Survey Report



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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.B. Carpenter # 251				
Site Position:		Northing:	14,263,995.79 usft	Latitude:	39° 16' 38.600 N
From:	Lat/Long	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.31 °

Well	W.B. Carpenter #251					
Well Position	+N/-S	0.0 usft	Northing:	14,263,995.79 usft	Latitude:	39° 16' 38.600 N
	+E/-W	0.0 usft	Easting:	1,779,525.51 usft	Longitude:	80° 30' 30.300 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,307.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/11/2013	-8.64	66.82	52,317

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	111.63	

Survey Program	Date	12/11/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
805.0	3,204.0	MWD (Wellbore #1)			

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
TIE IN @ 805' MD / 805' TVD										
805.0	0.00	0.00	805.0	0.0	0.0	0.0	0.00	0.00	0.00	
838.0	1.71	118.92	838.0	-0.2	0.4	0.5	5.18	5.18	0.00	
868.0	2.02	122.92	868.0	-0.7	1.3	1.5	1.12	1.03	13.33	
898.0	2.59	131.80	898.0	-1.5	2.2	2.6	2.24	1.90	29.60	
928.0	3.52	140.02	927.9	-2.6	3.3	4.1	3.42	3.10	27.40	
958.0	4.48	140.59	957.8	-4.2	4.6	5.9	3.20	3.20	1.90	
988.0	4.92	139.80	987.7	-6.1	6.2	8.0	1.48	1.47	-2.63	
1,018.0	4.79	141.60	1,017.6	-8.1	7.8	10.3	0.67	-0.43	6.00	
1,048.0	5.01	136.72	1,047.5	-10.0	9.5	12.5	1.57	0.73	-16.27	

Received

JAN 14 2014

Office of Oil and Gas

WV Dept. of Environmental Protection

COMPASS 5000.1 Build 39

DDC
Survey Report



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,078.0	5.49	129.43	1,077.4	-11.9	11.5	15.1	2.74	1.60	-24.30
1,108.0	6.42	119.23	1,107.2	-13.6	14.1	18.1	4.68	3.10	-34.00
1,138.0	6.81	113.30	1,137.0	-15.2	17.2	21.6	2.62	1.30	-19.77
1,168.0	6.59	107.81	1,166.8	-16.4	20.5	25.1	2.26	-0.73	-18.30
1,198.0	6.42	105.70	1,196.6	-17.4	23.7	28.4	0.98	-0.57	-7.03
1,228.0	6.50	114.22	1,226.4	-18.5	26.9	31.8	3.20	0.27	28.40
1,258.0	6.59	123.80	1,256.3	-20.2	29.9	35.2	3.65	0.30	31.93
1,288.0	6.50	123.89	1,286.1	-22.1	32.7	38.5	0.30	-0.30	0.30
1,318.0	6.28	122.53	1,315.9	-23.9	35.5	41.8	0.89	-0.73	-4.53
1,348.0	6.20	116.59	1,345.7	-25.5	38.3	45.0	2.17	-0.27	-19.80
1,378.0	6.11	115.19	1,375.5	-26.9	41.2	48.2	0.58	-0.30	-4.67
1,408.0	5.89	116.90	1,405.4	-28.3	44.0	51.4	0.94	-0.73	5.70
1,438.0	6.11	118.31	1,435.2	-29.7	46.8	54.5	0.88	0.73	4.70
1,468.0	6.11	119.41	1,465.0	-31.3	49.6	57.6	0.39	0.00	3.67
1,498.0	6.02	119.01	1,494.9	-32.8	52.4	60.8	0.33	-0.30	-1.33
1,528.0	5.89	116.02	1,524.7	-34.3	55.1	63.9	1.12	-0.43	-9.97
1,558.0	5.58	115.89	1,554.5	-35.6	57.8	66.9	1.03	-1.03	-0.43
1,588.0	5.19	111.89	1,584.4	-36.7	60.4	69.7	1.80	-1.30	-13.33
1,618.0	4.61	110.71	1,614.3	-37.7	62.8	72.2	1.96	-1.93	-3.93
1,648.0	4.31	108.90	1,644.2	-38.5	65.0	74.6	1.10	-1.00	-6.03
1,678.0	4.70	106.22	1,674.1	-39.2	67.2	76.9	1.48	1.30	-8.93
1,708.0	5.58	106.40	1,704.0	-39.9	69.8	79.6	2.93	2.93	0.60
1,738.0	5.80	107.01	1,733.8	-40.8	72.7	82.6	0.76	0.73	2.03
1,768.0	6.11	111.32	1,763.7	-41.8	75.6	85.7	1.81	1.03	14.37
1,798.0	6.50	112.60	1,793.5	-43.0	78.6	89.0	1.38	1.30	4.27
1,828.0	6.11	108.60	1,823.3	-44.2	81.7	92.3	1.96	-1.30	-13.33
1,858.0	5.80	103.19	1,853.2	-45.0	84.7	95.4	2.14	-1.03	-18.03
1,888.0	5.89	105.30	1,883.0	-45.8	87.7	98.4	0.78	0.30	7.03
1,918.0	6.11	114.40	1,912.8	-46.9	90.6	101.5	3.25	0.73	30.33
1,948.0	6.59	121.82	1,942.7	-48.4	93.5	104.8	3.17	1.60	24.73
1,978.0	6.68	121.30	1,972.5	-50.2	96.5	108.2	0.36	0.30	-1.73
2,008.0	6.28	121.30	2,002.3	-52.0	99.4	111.5	1.33	-1.33	0.00
2,038.0	6.20	119.10	2,032.1	-53.6	102.2	114.8	0.84	-0.27	-7.33
2,068.0	6.20	119.72	2,061.9	-55.2	105.0	118.0	0.22	0.00	2.07
2,098.0	6.20	118.40	2,091.7	-56.8	107.8	121.2	0.48	0.00	-4.40
2,128.0	6.28	118.79	2,121.6	-58.4	110.7	124.4	0.30	0.27	1.30
2,158.0	6.20	119.80	2,151.4	-60.0	113.6	127.7	0.45	-0.27	3.37
2,188.0	6.11	120.51	2,181.2	-61.6	116.3	130.8	0.39	-0.30	2.37
2,218.0	5.58	118.09	2,211.1	-63.1	119.0	133.9	1.95	-1.77	-8.07
2,248.0	5.10	115.50	2,240.9	-64.3	121.5	136.6	1.79	-1.60	-8.63
2,278.0	5.32	113.12	2,270.8	-65.5	124.0	139.4	1.03	0.73	-7.93
2,308.0	5.80	113.43	2,300.7	-66.6	126.6	142.3	1.60	1.60	1.03
2,338.0	5.89	114.71	2,330.5	-67.9	129.4	145.3	0.53	0.30	4.27
2,368.0	5.71	114.62	2,360.3	-69.1	132.2	148.4	0.60	-0.60	-0.30

DDC
Survey Report



Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.B. Carpenter #251
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1315.0usft (Decker #6)
Site:	W.B. Carpenter # 251	MD Reference:	WELL @ 1315.0usft (Decker #6)
Well:	W.B. Carpenter #251	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,398.0	5.10	112.60	2,390.2	-70.3	134.8	151.2	2.13	-2.03	-6.73
2,428.0	4.79	110.09	2,420.1	-71.2	137.2	153.8	1.26	-1.03	-8.37
2,458.0	5.10	106.53	2,450.0	-72.0	139.6	156.3	1.45	1.03	-11.87
2,488.0	6.11	107.81	2,479.8	-72.9	142.4	159.3	3.39	3.37	4.27
2,518.0	7.38	112.20	2,509.6	-74.1	145.7	162.8	4.57	4.23	14.63
2,548.0	7.91	116.33	2,539.4	-75.7	149.4	166.8	2.54	1.77	13.77
2,578.0	7.69	114.93	2,569.1	-77.5	153.0	170.8	0.97	-0.73	-4.67
2,608.0	7.38	113.43	2,598.8	-79.1	156.6	174.8	1.22	-1.03	-5.00
2,638.0	7.12	110.53	2,628.6	-80.5	160.1	178.5	1.50	-0.87	-9.67
2,668.0	6.59	107.81	2,658.4	-81.7	163.5	182.1	2.07	-1.77	-9.07
2,698.0	6.42	106.53	2,688.2	-82.7	166.8	185.5	0.74	-0.57	-4.27
2,728.0	6.20	104.82	2,718.0	-83.6	169.9	188.8	0.96	-0.73	-5.70
2,758.0	6.28	104.20	2,747.8	-84.4	173.1	192.0	0.35	0.27	-2.07
2,788.0	6.50	103.81	2,777.6	-85.2	176.3	195.3	0.75	0.73	-1.30
2,818.0	6.42	103.02	2,807.5	-86.0	179.6	198.7	0.40	-0.27	-2.63
2,848.0	6.42	100.60	2,837.3	-86.7	182.9	202.0	0.90	0.00	-8.07
2,878.0	6.28	95.72	2,867.1	-87.2	186.2	205.2	1.86	-0.47	-16.27
2,908.0	6.02	92.43	2,896.9	-87.4	189.4	208.3	1.46	-0.87	-10.97
2,938.0	5.58	90.10	2,926.8	-87.5	192.4	211.1	1.66	-1.47	-7.77
2,968.0	5.32	86.01	2,956.6	-87.4	195.3	213.7	1.56	-0.87	-13.63
2,998.0	4.92	84.21	2,986.5	-87.1	197.9	216.1	1.44	-1.33	-6.00
3,023.0	4.70	81.31	3,011.4	-86.9	200.0	218.0	1.31	-0.88	-11.60
3,058.0	4.39	81.22	3,046.3	-86.5	202.8	220.3	0.89	-0.89	-0.26
3,088.0	4.09	78.63	3,076.2	-86.1	204.9	222.2	1.19	-1.00	-8.63
3,118.0	3.78	75.81	3,106.1	-85.6	206.9	223.9	1.22	-1.03	-9.40
3,148.0	3.69	75.02	3,136.1	-85.1	208.8	225.5	0.35	-0.30	-2.63
TD @ 3204' MD / 3192' TVD									
3,204.0	3.69	75.02	3,192.0	-84.2	212.3	228.4	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
805.0	805.0	0.0	0.0	TIE IN @ 805' MD / 805' TVD
3,204.0	3,192.0	-84.2	212.3	TD @ 3204' MD / 3192' TVD

Checked By: _____ Approved By: _____ Date: _____

Received

JAN 21 2014

02/28/2014

W.B. Carpenter #251
 Harrison County, West Virginia
 Q130777 & AM-13728
 Design #1

Company Name: HG Energy, LLC
 W.B. Carpenter #251
 Harrison County, West Virginia
 Rig: Decker #6
 Created By: TIFFANI MIZELL
 Date: 09/19/2013



HG Energy

WELL DETAILS: W.B. Carpenter #251

Ground Level:	1307.0		
+N/-S	+E/-W	Northing	Easting
0.0	0.0	284742.92	1714533.83
		Latitude	Longitude
		39° 16' 38.600 N	80° 30' 30.300 W

Azimuths to Grid North



Correction: -7.99°

Magnetic Field
 Strength: 52348.2snT
 Dip Angle: 66.84°
 Date: 9/10/2013
 Model: IGRF2010

PROJECT DETAILS: Harrison County, West Virginia

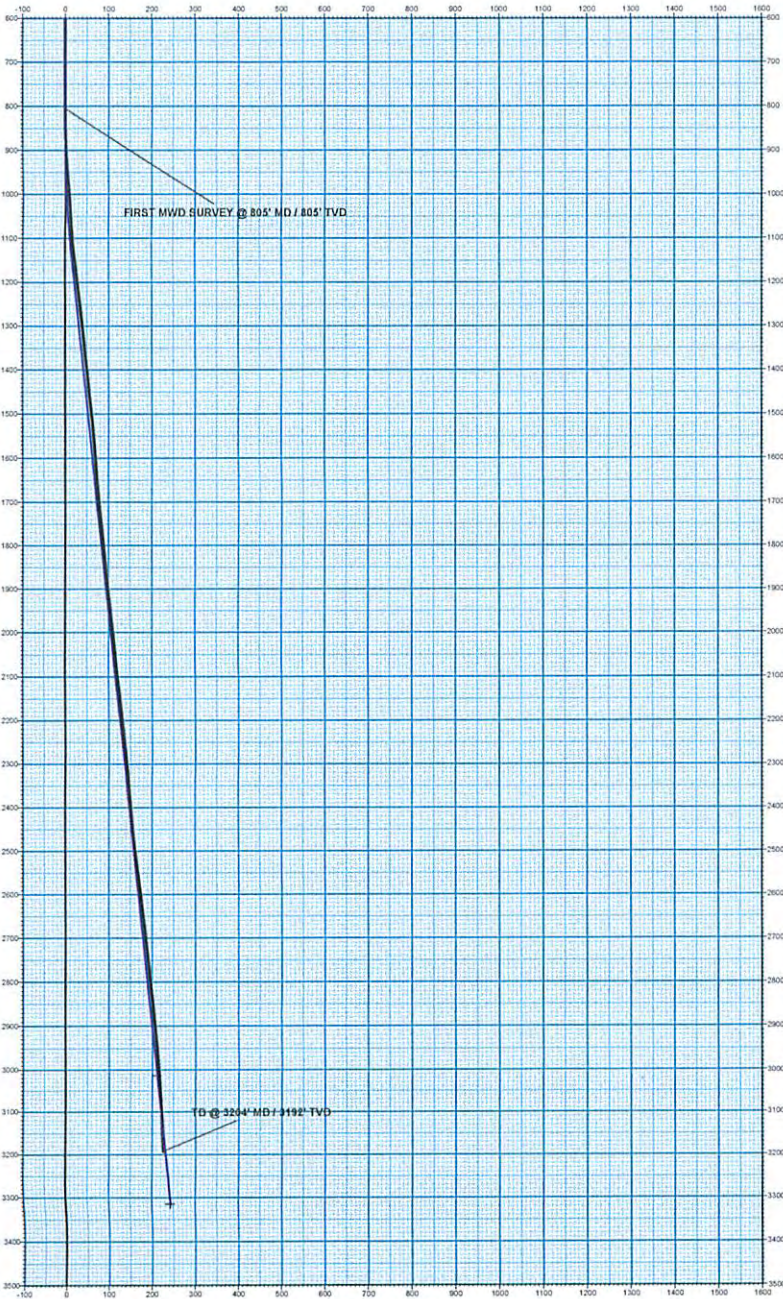
Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: West Virginia North 4701
 System Datum: Mean Sea Level

DESIGN TARGET DETAILS

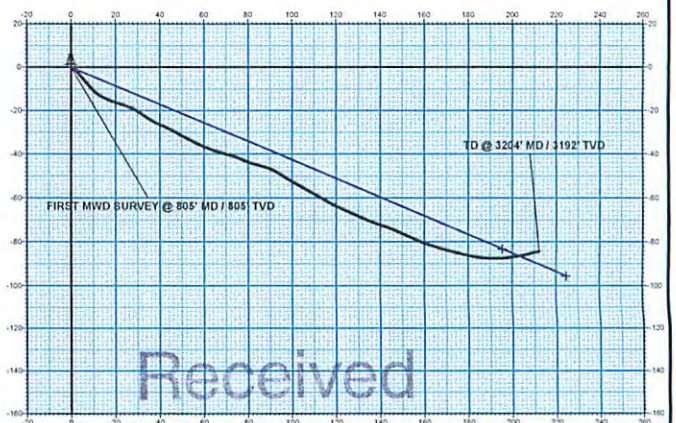
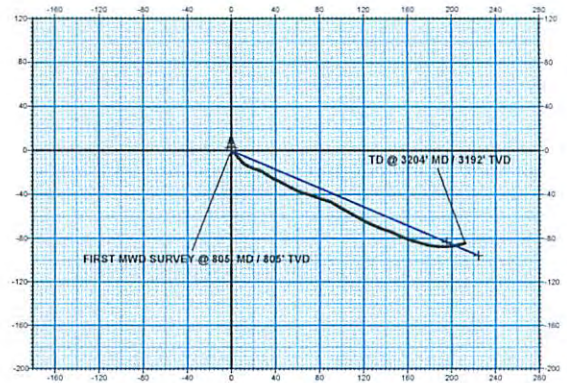
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Target 1 - W.B. Carpenter #2513014.6	-83.1	195.7	284659.76	1714729.50	39° 16' 37.800 N	80° 30' 27.800 W	- plan hits target center

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
805.0	0.00	0.00	805.0	0.0	0.0	0.0	0.0	FIRST MWD SURVEY @ 805' MD / 805' TVD
3204.0	3.69	75.02	3192.0	-84.2	212.3	228.4	234.5	TD @ 3204' MD / 3192' TVD



Vertical Section at 113.02° (100 usf/in)



Received

JAN 21 2014

Office of Oil and Gas
 WV Dept. of Environmental Protection

02/28/2014

Field Ticket - (This Is not an Invoice)		End Date -		Date -	
Customer HG ENERGY LLC 6260 DUPONT RD PARKERSBURG, WV, 26101		Customer No. 5059		Project No. 1177501942	
District Wooster		Job Type Frac		Job Type Description CROSSLINK FRAC	
Well Name and No. W.B.CARPENTER #251		Casing		Operator Name SHIREY	
Well Type County: HARRISON		New/Used		From	
Gas Township:		Size		To	
State API #		Tubing		Weight	
WV 47-033-05791		Arrived on Location		Left Location	
Open Hole		Time		Date	
Perforations		Time		Date	
Perforations		Time		Date	
Perforations		Time		Date	
Depth		Drilling Contractor		Max PSI Allowed	

Product Code	Description	Unit of Measure	Quantity	List Price/Unit	Gross Amount	Item Discount	Net Amount
800051	Transport Delivery Charge (4 Hr Minimum), Per Hr	Hrs	4.000				
800070	Proppant and Bulk Delivery Charges, Per Ton Mile	TM	350.000				
802305	Minimum Pump Charge, <1500 HP, 1st 4 Hrs	Ea	1.000				
803401	0 - 10 BPM Computerized Blender, 1st 4 Hrs	Ea	1.000				
805520	Frac Ball Dropping Head	Ea	1.000				
810010	Treatment Van, (WINFRAC Data Monitoring or Similar)	Job	1.000				
820035	Unihib G	Gal	0.500				
820505	LEB 10X - Liquid Enzyme Breaker	Qts	2.750				
820915	EC8116A, BACTERIACIDE	Gal	1.600				
820955	Cla-Chek G	Gal	16.900				
821125	Unilink 8.5 Crosslinker (Borate)	Gal	16.300				
822235	Unigel 19 XL	Lb	300.000				
822935	NE-90, Non-Emulsifier (Non-Ionic)	Gal	12.000				
827945	15% Iron Chek Acid	Gal	300.000				
833000	20-40 mesh White Sand, Area 1	CWT	100.000				
837000	Proppant Pumping Charge, 20/40 mesh or smaller	CWT	100.000				
						0.00%	
						0.00%	

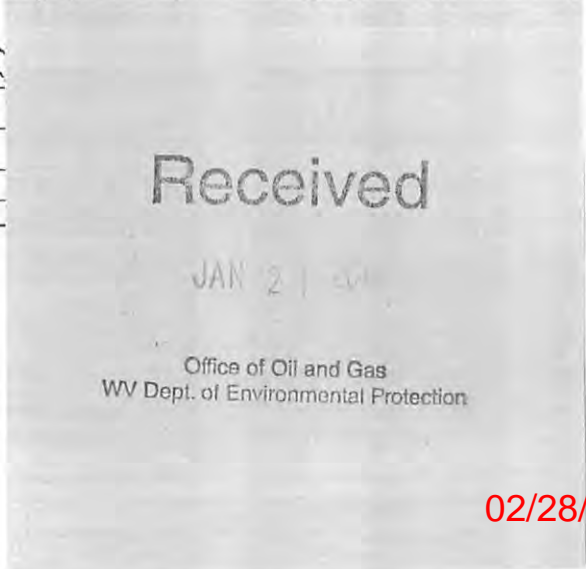
Mileage Calculation Section		Unit of Measure	Quantity	List Price/Unit	Gross Amount	Item Discount	Net Amount
800000	Unit Mileage Charge Trucks and Vans (Except Bulk Units), Per Unit Mile	Mi		\$9.25			
		UNITS		Total (Qty)			
800070	Proppant and Bulk Delivery Charges, Per Ton Mile	TM		\$2.60			
		Loaded Total Miles		Total Sacks			
850050	Cement Delivery Charge	TM		\$2.20			
		Loaded Total Miles		Total Loaded Weight (LBS)			

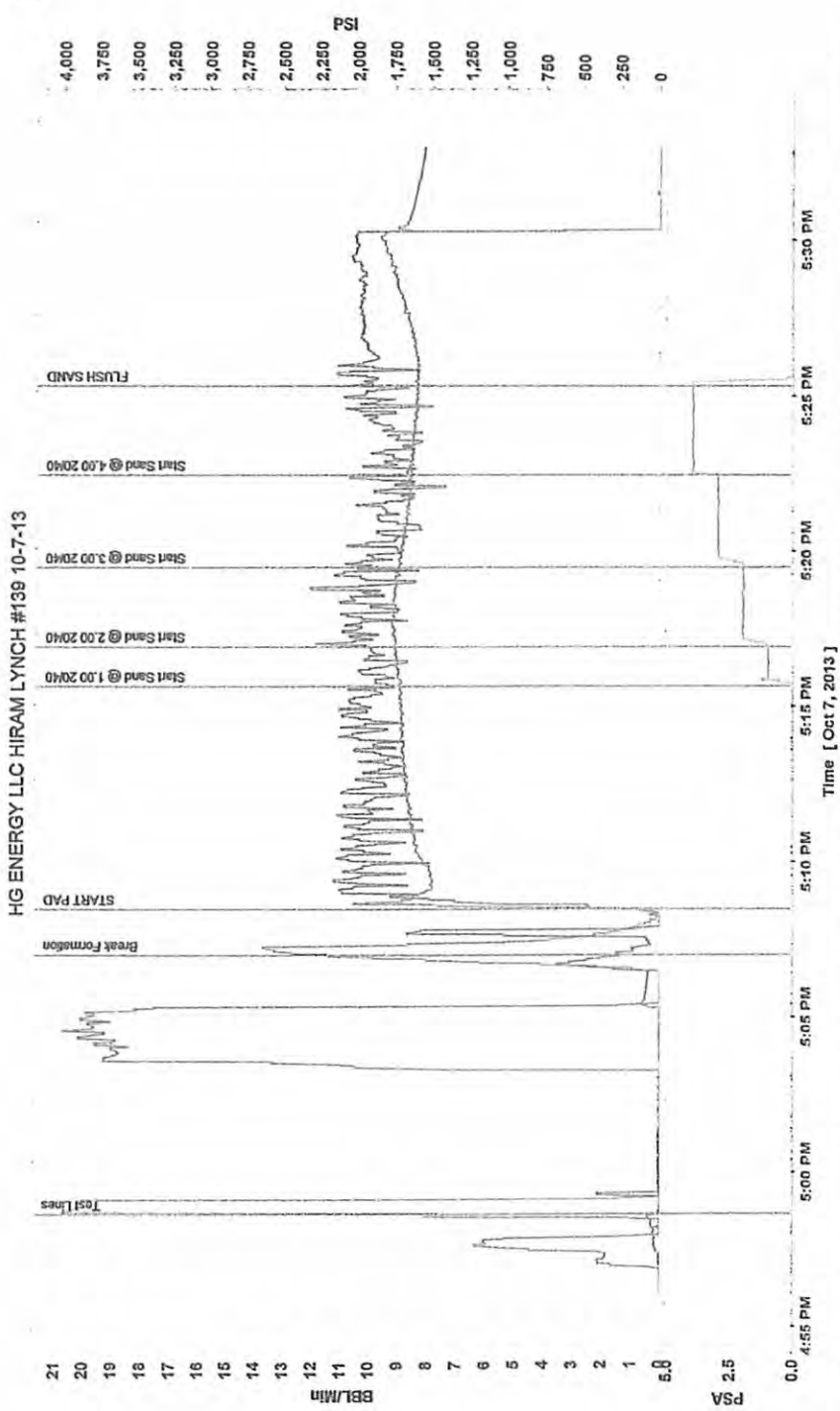
Comments:

[Signature]
CUSTOMER AUTHORIZED AGENT SIGNATURE

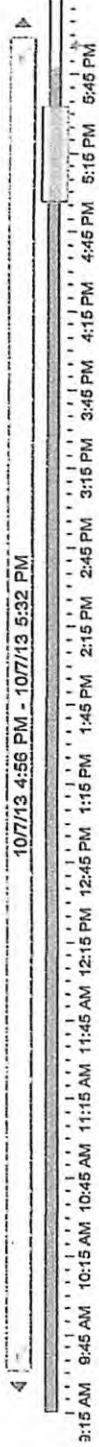
Customer Representative: _____
UWS Authorized Agent: _____
Date: _____

I have read, understood and agreed to the terms and conditions printed on the second page thereof and represent that I have full power and authority to execute this service order.





- Density
- Well Head PSA
- Flow
- Well Head Slurry Flow
- Pressure
- Well Head Pressure



Received

JAN 21 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

02/28/2014