

HG Energy, LLC
Harrison County, West Virginia
W.B. Carpenter #133
W.B. Carpenter #133

Wellbore #1

Survey: MWD

DDC Survey Report

11 December, 2013



04/04/2014



I Larry Wright, certify that I am employed by The Appalachian Directional Drilling Company (ADC). That I did on the day(s) of 9/23/13 thru 9/25/13 conduct or supervise the taking of a MWD Survey from a depth of 688 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 #133 API No. 47-033-05748 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
.com, c=US
Date: 2013.12.23 11:53:30 -06'00'

HG Energy, LLC

Harrison County, West Virginia

W.B. Carpenter #133

W.B. Carpenter #133

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

07 January, 2014



04/04/2014

DDC
Survey Report - Geographic



Company: HG Energy, LLC	Local Co-ordinate Reference: Well W.B. Carpenter #133
Project: Harrison County, West Virginia	TVD Reference: WELL @ 1169.0usft (Decker #6)
Site: W.B. Carpenter #133	MD Reference: WELL @ 1169.0usft (Decker #6)
Well: W.B. Carpenter #133	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 #133				
Site Position:		Northing:	14,263,828.01 usft	Latitude:	39° 16' 36.900 N
From:	Lat/Long	Easting:	1,780,288.93 usft	Longitude:	80° 30' 20.600 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.31 °

Well	W.B. Carpenter #133					
Well Position	+N-S	0.0 usft	Northing:	14,263,828.01 usft	Latitude:	39° 16' 36.900 N
	+E-W	0.0 usft	Easting:	1,780,288.93 usft	Longitude:	80° 30' 20.600 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,161.0 usft	

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/11/2013	-8.64	66.81	52,318

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	322.18	

Survey Program	Date	12/11/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
688.0	3,204.0	MWD (Wellbore #1)			

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
688.0	0.00	0.00	688.0	0.0	0.0	14,263,828.01	1,780,288.93	39° 16' 36.900 N	80° 30' 20.600 W
TIE IN @ 688' MD / 688' TVD									
718.0	0.22	311.10	718.0	0.0	0.0	14,263,828.05	1,780,288.89	39° 16' 36.900 N	80° 30' 20.601 W
748.0	0.31	312.02	748.0	0.1	-0.1	14,263,828.14	1,780,288.79	39° 16' 36.901 N	80° 30' 20.602 W
778.0	1.19	308.02	778.0	0.4	-0.5	14,263,828.39	1,780,288.48	39° 16' 36.904 N	80° 30' 20.606 W
808.0	2.68	309.12	808.0	1.0	-1.2	14,263,829.02	1,780,287.69	39° 16' 36.910 N	80° 30' 20.616 W
838.0	4.22	316.59	837.9	2.3	-2.5	14,263,830.27	1,780,286.39	39° 16' 36.922 N	80° 30' 20.632 W
868.0	5.41	316.11	867.8	4.1	-4.3	14,263,832.09	1,780,284.65	39° 16' 36.941 N	80° 30' 20.654 W
898.0	6.59	319.40	897.7	6.4	-6.4	14,263,834.42	1,780,282.55	39° 16' 36.964 N	80° 30' 20.681 W
928.0	7.29	323.71	927.4	9.2	-8.6	14,263,837.26	1,780,280.30	39° 16' 36.992 N	80° 30' 20.709 W
958.0	8.09	325.51	957.2	12.5	-11.0	14,263,840.53	1,780,277.98	39° 16' 37.024 N	80° 30' 20.738 W
988.0	8.70	329.20	986.8	16.2	-13.3	14,263,844.22	1,780,275.62	39° 16' 37.061 N	80° 30' 20.768 W

DDC
Survey Report - Geographic



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Site: W.B. Carpenter #133
Well: W.B. Carpenter #133
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well W.B. Carpenter #133
TVD Reference: WELL @ 1169.0usft (Decker #6)
MD Reference: WELL @ 1169.0usft (Decker #6)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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
1,018.0	9.18	336.01	1,016.5	20.3	-15.4	14,263,848.35	1,780,273.49	39° 16' 37.102 N	80° 30' 20.795 W
1,048.0	9.89	331.40	1,046.1	24.8	-17.7	14,263,852.80	1,780,271.28	39° 16' 37.146 N	80° 30' 20.823 W
1,078.0	10.99	332.89	1,075.6	29.6	-20.2	14,263,857.61	1,780,268.75	39° 16' 37.194 N	80° 30' 20.855 W
1,108.0	11.82	333.20	1,105.0	34.9	-22.9	14,263,862.90	1,780,266.06	39° 16' 37.246 N	80° 30' 20.889 W
1,138.0	12.30	333.42	1,134.3	40.5	-25.7	14,263,868.50	1,780,263.24	39° 16' 37.302 N	80° 30' 20.924 W
1,168.0	12.79	334.92	1,163.6	46.4	-28.5	14,263,874.38	1,780,260.40	39° 16' 37.360 N	80° 30' 20.960 W
1,198.0	13.32	336.32	1,192.8	52.5	-31.3	14,263,880.54	1,780,257.61	39° 16' 37.421 N	80° 30' 20.995 W
1,228.0	13.89	336.89	1,222.0	59.0	-34.1	14,263,887.01	1,780,254.81	39° 16' 37.485 N	80° 30' 21.030 W
1,258.0	14.90	337.99	1,251.0	65.9	-37.0	14,263,893.90	1,780,251.95	39° 16' 37.553 N	80° 30' 21.066 W
1,288.0	16.08	337.82	1,279.9	73.3	-40.0	14,263,901.33	1,780,248.93	39° 16' 37.627 N	80° 30' 21.104 W
1,318.0	18.11	337.60	1,308.6	81.5	-43.3	14,263,909.48	1,780,245.59	39° 16' 37.708 N	80° 30' 21.146 W
1,348.0	19.69	337.29	1,337.0	90.4	-47.1	14,263,918.48	1,780,241.86	39° 16' 37.797 N	80° 30' 21.193 W
1,378.0	20.48	334.70	1,365.2	99.9	-51.3	14,263,927.87	1,780,237.67	39° 16' 37.890 N	80° 30' 21.245 W
1,408.0	21.01	332.32	1,393.2	109.4	-56.0	14,263,937.37	1,780,232.93	39° 16' 37.984 N	80° 30' 21.305 W
1,438.0	21.01	328.72	1,421.2	118.7	-61.3	14,263,946.73	1,780,227.63	39° 16' 38.077 N	80° 30' 21.372 W
1,468.0	19.91	325.51	1,449.3	127.5	-67.0	14,263,955.54	1,780,221.95	39° 16' 38.164 N	80° 30' 21.443 W
1,498.0	19.20	323.93	1,477.6	135.7	-72.8	14,263,963.74	1,780,216.15	39° 16' 38.246 N	80° 30' 21.516 W
1,528.0	19.38	321.03	1,505.9	143.6	-78.8	14,263,971.59	1,780,210.12	39° 16' 38.324 N	80° 30' 21.593 W
1,558.0	19.91	319.40	1,534.2	151.3	-85.3	14,263,979.34	1,780,203.66	39° 16' 38.401 N	80° 30' 21.674 W
1,588.0	20.70	318.39	1,562.3	159.2	-92.1	14,263,987.19	1,780,196.82	39° 16' 38.479 N	80° 30' 21.761 W
1,618.0	21.40	318.22	1,590.3	167.2	-99.3	14,263,995.23	1,780,189.65	39° 16' 38.559 N	80° 30' 21.851 W
1,648.0	22.28	317.82	1,618.2	175.5	-106.7	14,264,003.53	1,780,182.18	39° 16' 38.641 N	80° 30' 21.946 W
1,678.0	23.29	318.70	1,645.8	184.2	-114.5	14,264,012.20	1,780,174.45	39° 16' 38.727 N	80° 30' 22.044 W
1,708.0	24.21	319.90	1,673.3	193.3	-122.4	14,264,021.36	1,780,166.57	39° 16' 38.818 N	80° 30' 22.143 W
1,738.0	25.80	321.91	1,700.5	203.2	-130.3	14,264,031.20	1,780,158.58	39° 16' 38.916 N	80° 30' 22.244 W
1,768.0	27.11	322.92	1,727.3	213.8	-138.5	14,264,041.79	1,780,150.44	39° 16' 39.021 N	80° 30' 22.347 W
1,798.0	28.78	323.62	1,753.8	225.1	-146.9	14,264,053.06	1,780,142.03	39° 16' 39.133 N	80° 30' 22.453 W
1,828.0	30.19	324.10	1,779.9	237.0	-155.6	14,264,064.99	1,780,133.32	39° 16' 39.251 N	80° 30' 22.563 W
1,858.0	31.68	324.72	1,805.7	249.5	-164.6	14,264,077.53	1,780,124.35	39° 16' 39.376 N	80° 30' 22.676 W
1,888.0	32.08	325.82	1,831.2	262.5	-173.6	14,264,090.55	1,780,115.32	39° 16' 39.505 N	80° 30' 22.790 W
1,918.0	32.52	325.03	1,856.5	275.7	-182.7	14,264,103.75	1,780,106.23	39° 16' 39.636 N	80° 30' 22.905 W
1,948.0	32.78	323.01	1,881.8	288.8	-192.2	14,264,116.84	1,780,096.72	39° 16' 39.766 N	80° 30' 23.025 W
1,978.0	33.09	322.83	1,906.9	301.8	-202.1	14,264,129.86	1,780,086.88	39° 16' 39.895 N	80° 30' 23.149 W
2,008.0	33.79	323.31	1,932.0	315.1	-212.0	14,264,143.07	1,780,076.95	39° 16' 40.026 N	80° 30' 23.275 W
2,038.0	34.32	324.50	1,956.8	328.6	-221.9	14,264,156.65	1,780,067.06	39° 16' 40.161 N	80° 30' 23.400 W
2,068.0	34.80	324.41	1,981.5	342.5	-231.8	14,264,170.49	1,780,057.16	39° 16' 40.299 N	80° 30' 23.525 W
2,098.0	35.11	324.19	2,006.1	356.4	-241.8	14,264,184.45	1,780,047.13	39° 16' 40.437 N	80° 30' 23.651 W
2,128.0	34.58	324.50	2,030.8	370.4	-251.8	14,264,198.38	1,780,037.14	39° 16' 40.575 N	80° 30' 23.777 W
2,158.0	33.71	323.01	2,055.6	383.9	-261.7	14,264,211.96	1,780,027.19	39° 16' 40.710 N	80° 30' 23.903 W
2,188.0	33.00	319.40	2,080.6	396.8	-272.1	14,264,224.81	1,780,016.86	39° 16' 40.838 N	80° 30' 24.034 W
2,218.0	32.30	319.71	2,105.9	409.1	-282.6	14,264,237.13	1,780,006.36	39° 16' 40.960 N	80° 30' 24.166 W
2,248.0	31.68	322.00	2,131.3	421.4	-292.6	14,264,249.45	1,779,996.33	39° 16' 41.083 N	80° 30' 24.293 W
2,278.0	31.20	324.81	2,156.9	434.0	-301.9	14,264,262.01	1,779,987.00	39° 16' 41.207 N	80° 30' 24.411 W
2,308.0	30.89	327.49	2,182.6	446.8	-310.6	14,264,274.86	1,779,978.38	39° 16' 41.335 N	80° 30' 24.520 W
2,338.0	30.72	330.61	2,208.4	460.0	-318.5	14,264,288.03	1,779,970.48	39° 16' 41.465 N	80° 30' 24.619 W
2,368.0	30.59	331.93	2,234.2	473.4	-325.8	14,264,301.44	1,779,963.13	39° 16' 41.598 N	80° 30' 24.712 W
2,398.0	29.49	332.41	2,260.2	486.7	-332.8	14,264,314.72	1,779,956.12	39° 16' 41.730 N	80° 30' 24.800 W
2,428.0	29.00	335.62	2,286.4	499.9	-339.2	14,264,327.89	1,779,949.70	39° 16' 41.861 N	80° 30' 24.881 W
2,458.0	27.60	335.53	2,312.8	512.8	-345.1	14,264,340.84	1,779,943.82	39° 16' 41.989 N	80° 30' 24.955 W
2,488.0	26.81	334.52	2,339.5	525.3	-350.9	14,264,353.27	1,779,938.03	39° 16' 42.112 N	80° 30' 25.028 W
2,518.0	26.19	332.63	2,366.3	537.2	-356.9	14,264,365.26	1,779,932.07	39° 16' 42.231 N	80° 30' 25.102 W
2,548.0	25.49	331.53	2,393.3	548.8	-363.0	14,264,376.81	1,779,925.95	39° 16' 42.346 N	80° 30' 25.180 W
2,578.0	24.30	328.63	2,420.5	559.7	-369.3	14,264,387.76	1,779,919.66	39° 16' 42.454 N	80° 30' 25.259 W
2,608.0	23.60	326.52	2,447.9	570.0	-375.8	14,264,398.04	1,779,913.13	39° 16' 42.556 N	80° 30' 25.341 W
2,638.0	22.59	324.02	2,475.5	579.7	-382.5	14,264,407.71	1,779,906.44	39° 16' 42.652 N	80° 30' 25.426 W

DDC
Survey Report - Geographic



Company: HG Energy, LLC
 Project: Harrison County, West Virginia
 Site: W.B. Carpenter #133
 Well: W.B. Carpenter #133
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well W.B. Carpenter #133
 TVD Reference: WELL @ 1169.0usft (Decker #6)
 MD Reference: WELL @ 1169.0usft (Decker #6)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 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
2,668.0	21.49	321.42	2,503.3	588.7	-389.3	14,264,416.67	1,779,899.62	39° 16' 42.741 N	80° 30' 25.512 W
2,698.0	20.30	318.83	2,531.4	596.9	-396.2	14,264,424.88	1,779,892.77	39° 16' 42.823 N	80° 30' 25.598 W
2,728.0	20.39	317.51	2,559.5	604.6	-403.1	14,264,432.65	1,779,885.81	39° 16' 42.900 N	80° 30' 25.686 W
2,758.0	21.01	316.11	2,587.6	612.4	-410.4	14,264,440.38	1,779,878.56	39° 16' 42.977 N	80° 30' 25.778 W
2,788.0	23.29	316.19	2,615.4	620.5	-418.2	14,264,448.54	1,779,870.72	39° 16' 43.058 N	80° 30' 25.877 W
2,818.0	26.28	316.41	2,642.6	629.6	-428.9	14,264,457.63	1,779,862.03	39° 16' 43.148 N	80° 30' 25.987 W
2,848.0	28.39	316.50	2,669.2	639.8	-436.4	14,264,467.62	1,779,852.54	39° 16' 43.247 N	80° 30' 26.107 W
2,878.0	29.49	315.93	2,695.5	650.1	-448.4	14,264,478.10	1,779,842.50	39° 16' 43.352 N	80° 30' 26.234 W
2,908.0	28.92	314.39	2,721.7	660.5	-456.8	14,264,488.48	1,779,832.18	39° 16' 43.455 N	80° 30' 26.365 W
2,938.0	28.21	311.49	2,748.0	670.2	-467.3	14,264,498.25	1,779,821.68	39° 16' 43.552 N	80° 30' 26.498 W
2,968.0	27.82	310.61	2,774.5	679.5	-477.9	14,264,507.50	1,779,811.06	39° 16' 43.644 N	80° 30' 26.632 W
2,998.0	27.60	306.79	2,801.1	688.2	-488.8	14,264,516.22	1,779,800.18	39° 16' 43.731 N	80° 30' 26.770 W
3,028.0	27.42	303.23	2,827.7	696.2	-500.1	14,264,524.17	1,779,788.83	39° 16' 43.810 N	80° 30' 26.914 W
3,042.0	27.31	301.77	2,840.1	699.6	-505.5	14,264,527.63	1,779,783.41	39° 16' 43.844 N	80° 30' 26.982 W
3,058.0	27.20	300.11	2,854.3	703.4	-511.8	14,264,531.39	1,779,777.12	39° 16' 43.882 N	80° 30' 27.062 W
3,088.0	26.81	298.53	2,881.1	710.1	-523.7	14,264,538.07	1,779,765.25	39° 16' 43.949 N	80° 30' 27.213 W
3,118.0	26.19	296.59	2,907.9	716.2	-535.6	14,264,544.26	1,779,753.38	39° 16' 44.011 N	80° 30' 27.363 W
3,148.0	25.17	295.80	2,935.0	722.0	-547.2	14,264,550.00	1,779,741.72	39° 16' 44.068 N	80° 30' 27.511 W
3,204.0	23.26	294.33	2,986.0	731.7	-568.0	14,264,559.74	1,779,720.92	39° 16' 44.165 N	80° 30' 27.775 W

TD @ 3204' MD / 2986' TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,204.0	2,986.0	731.7	-568.0	TD @ 3204' MD / 2986' TVD

Checked By: _____ Approved By: _____ Date: _____

DDC
Survey Report



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Geo Datum:	NAD83 West Virginia - HARN	
Map Zone:	Zone 17N (84 W to 78 W)	

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From: Lat/Long	Easting:	1,780,288.93 usft	Longitude: 80° 30' 20.600 W
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 "		Grid Convergence: 0.31 °

Well	W.B. Carpenter #133		
Well Position	+N/-S	0.0 usft	Latitude: 39° 16' 36.900 N
	+E/-W	0.0 usft	Longitude: 80° 30' 20.600 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft Ground Level: 1,161.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/11/2013	-8.64	66.81	52,318

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	322.18	

Survey Program	Date 12/11/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
688.0	3,204.0	MWD (Wellbore #1)		

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 @ 688' MD / 688' TVD									
688.0	0.00	0.00	688.0	0.0	0.0	0.0	0.00	0.00	0.00
718.0	0.22	311.10	718.0	0.0	0.0	0.1	0.73	0.73	0.00
748.0	0.31	312.02	748.0	0.1	-0.1	0.2	0.30	0.30	3.07
778.0	1.19	308.02	778.0	0.4	-0.5	0.6	2.94	2.93	-13.33
808.0	2.68	309.12	808.0	1.0	-1.2	1.6	4.97	4.97	3.67
838.0	4.22	316.59	837.9	2.3	-2.5	3.3	5.34	5.13	24.90
868.0	5.41	316.11	867.8	4.1	-4.3	5.8	3.97	3.97	-1.60
898.0	6.59	319.40	897.7	6.4	-6.4	9.0	4.10	3.93	10.97
928.0	7.29	323.71	927.4	9.2	-8.6	12.6	2.91	2.33	14.37

DDC
Survey Report



Company: HG Energy, LLC
 Project: Harrison County, West Virginia
 Site: W.B. Carpenter #133
 Well: W.B. Carpenter #133
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well W.B. Carpenter #133
 TVD Reference: WELL @ 1169.0usft (Decker #6)
 MD Reference: WELL @ 1169.0usft (Decker #6).
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.1 Single User Db

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)
958.0	8.09	325.51	957.2	12.5	-11.0	16.6	2.78	2.67	6.00
988.0	8.70	329.20	986.8	16.2	-13.3	21.0	2.71	2.03	12.30
1,018.0	9.18	336.01	1,016.5	20.3	-15.4	25.5	3.87	1.60	22.70
1,048.0	9.89	331.40	1,046.1	24.8	-17.7	30.4	3.47	2.37	-15.37
1,078.0	10.99	332.89	1,075.6	29.6	-20.2	35.8	3.78	3.67	4.97
1,108.0	11.82	333.20	1,105.0	34.9	-22.9	41.6	2.77	2.77	1.03
1,138.0	12.30	333.42	1,134.3	40.5	-25.7	47.7	1.61	1.60	0.73
1,168.0	12.79	334.92	1,163.6	48.4	-28.5	54.1	1.96	1.63	5.00
1,198.0	13.32	336.32	1,192.8	52.5	-31.3	60.7	2.06	1.77	4.67
1,228.0	13.89	336.89	1,222.0	59.0	-34.1	67.5	1.95	1.90	1.90
1,258.0	14.90	337.99	1,251.0	65.9	-37.0	74.7	3.49	3.37	3.67
1,288.0	16.08	337.82	1,279.9	73.3	-40.0	82.4	3.94	3.93	-0.57
1,318.0	18.11	337.60	1,308.6	81.5	-43.3	90.9	6.77	6.77	-0.73
1,348.0	19.69	337.29	1,337.0	90.4	-47.1	100.3	5.28	5.27	-1.03
1,378.0	20.48	334.70	1,365.2	99.9	-51.3	110.3	3.96	2.63	-8.63
1,408.0	21.01	332.32	1,393.2	109.4	-56.0	120.7	3.32	1.77	-7.93
1,438.0	21.01	328.72	1,421.2	118.7	-61.3	131.4	4.30	0.00	-12.00
1,468.0	19.91	325.51	1,449.3	127.5	-67.0	141.8	5.24	-3.67	-10.70
1,498.0	19.20	323.93	1,477.6	135.7	-72.8	151.8	2.95	-2.37	-5.27
1,528.0	19.38	321.03	1,505.9	143.6	-78.8	161.7	3.25	0.60	-9.67
1,558.0	19.91	319.40	1,534.2	151.3	-85.3	171.8	2.54	1.77	-5.43
1,588.0	20.70	318.39	1,562.3	159.2	-92.1	182.2	2.88	2.63	-3.37
1,618.0	21.40	318.22	1,590.3	167.2	-99.3	193.0	2.34	2.33	-0.57
1,648.0	22.28	317.82	1,618.2	175.5	-106.7	204.1	2.97	2.93	-1.33
1,678.0	23.29	318.70	1,645.8	184.2	-114.5	215.7	3.55	3.37	2.93
1,708.0	24.21	319.90	1,673.3	193.3	-122.4	227.8	3.46	3.07	4.00
1,738.0	25.80	321.91	1,700.5	203.2	-130.3	240.4	6.01	5.30	6.70
1,768.0	27.11	322.92	1,727.3	213.8	-138.5	253.8	4.62	4.37	3.37
1,798.0	28.78	323.62	1,753.8	225.1	-146.9	267.9	5.67	5.57	2.33
1,828.0	30.19	324.10	1,779.9	237.0	-155.6	282.6	4.77	4.70	1.60
1,858.0	31.68	324.72	1,805.7	249.5	-164.6	298.0	5.08	4.97	2.07
1,888.0	32.08	325.82	1,831.2	262.5	-173.6	313.8	2.35	1.33	3.67
1,918.0	32.52	325.03	1,856.5	275.7	-182.7	329.8	2.03	1.47	-2.63
1,948.0	32.78	323.01	1,881.8	288.8	-192.2	346.0	3.73	0.87	-6.73
1,978.0	33.09	322.83	1,906.9	301.8	-202.1	362.3	1.08	1.03	-0.60
2,008.0	33.79	323.31	1,932.0	315.1	-212.0	378.9	2.49	2.33	1.60
2,038.0	34.32	324.50	1,956.8	328.6	-221.9	395.7	2.84	1.77	3.97
2,068.0	34.80	324.41	1,981.5	342.5	-231.8	412.7	1.61	1.60	-0.30
2,098.0	35.11	324.19	2,006.1	356.4	-241.8	429.8	1.12	1.03	-0.73
2,128.0	34.58	324.50	2,030.8	370.4	-251.8	447.0	1.86	-1.77	1.03
2,158.0	33.71	323.01	2,055.6	383.9	-261.7	463.8	4.02	-2.90	-4.97
2,188.0	33.00	319.40	2,080.6	396.8	-272.1	480.3	7.03	-2.37	-12.03
2,218.0	32.30	319.71	2,105.9	409.1	-282.6	496.4	2.40	-2.33	1.03
2,248.0	31.68	322.00	2,131.3	421.4	-292.6	512.3	4.54	-2.07	7.63

DDC
Survey Report



Company: HG Energy, LLC
 Project: Harrison County, West Virginia
 Site: W.B. Carpenter #133
 Well: W.B. Carpenter #133
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well W.B. Carpenter #133
 TVD Reference: WELL @ 1169.0usft (Decker #6)
 MD Reference: WELL @ 1169.0usft (Decker #6)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.1 Single User Db

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)	
2,278.0	31.20	324.81	2,156.9	434.0	-301.9	528.0	5.14	-1.60	9.37	
2,308.0	30.89	327.49	2,182.6	448.8	-310.6	543.4	4.72	-1.03	8.93	
2,338.0	30.72	330.61	2,208.4	460.0	-318.5	558.7	5.36	-0.57	10.40	
2,368.0	30.59	331.93	2,234.2	473.4	-325.8	573.8	2.28	-0.43	4.40	
2,398.0	29.49	332.41	2,260.2	486.7	-332.8	588.5	3.75	-3.67	1.60	
2,428.0	29.00	335.62	2,286.4	499.9	-339.2	602.9	5.48	-1.63	10.70	
2,458.0	27.60	335.53	2,312.8	512.8	-345.1	616.7	4.67	-4.67	-0.30	
2,488.0	26.81	334.52	2,339.5	525.3	-350.9	630.1	3.05	-2.63	-3.37	
2,518.0	26.19	332.63	2,366.3	537.2	-356.9	643.2	3.49	-2.07	-6.30	
2,548.0	25.49	331.53	2,393.3	548.8	-363.0	656.1	2.83	-2.33	-3.67	
2,578.0	24.30	328.63	2,420.5	559.7	-369.3	668.6	5.68	-3.97	-9.67	
2,608.0	23.60	326.52	2,447.9	570.0	-375.8	680.7	3.69	-2.33	-7.03	
2,638.0	22.59	324.02	2,475.5	579.7	-382.5	692.5	4.69	-3.37	-8.33	
2,668.0	21.49	321.42	2,503.3	588.7	-389.3	703.7	4.90	-3.67	-8.67	
2,698.0	20.30	318.83	2,531.4	596.9	-396.2	714.4	5.02	-3.97	-8.63	
2,728.0	20.39	317.51	2,559.5	604.6	-403.1	724.8	1.56	0.30	-4.40	
2,758.0	21.01	316.11	2,587.6	612.4	-410.4	735.4	2.64	2.07	-4.67	
2,788.0	23.29	316.19	2,615.4	620.5	-418.2	746.6	7.60	7.60	0.27	
2,818.0	26.28	316.41	2,642.6	629.6	-426.9	759.1	9.97	9.97	0.73	
2,848.0	28.39	316.50	2,669.2	639.6	-436.4	772.8	7.03	7.03	0.30	
2,878.0	29.49	315.93	2,695.5	650.1	-446.4	787.3	3.78	3.67	-1.90	
2,908.0	28.92	314.39	2,721.7	660.5	-456.8	801.8	3.14	-1.90	-5.13	
2,938.0	28.21	311.49	2,748.0	670.2	-467.3	816.0	5.19	-2.37	-9.67	
2,968.0	27.82	310.61	2,774.5	679.5	-477.9	829.8	1.89	-1.30	-2.93	
2,998.0	27.60	306.79	2,801.1	688.2	-488.8	843.3	5.97	-0.73	-12.73	
3,028.0	27.42	303.23	2,827.7	696.2	-500.1	856.6	5.51	-0.60	-11.87	
3,042.0	27.31	301.77	2,840.1	699.6	-505.5	862.6	4.86	-0.79	-10.43	
3,058.0	27.20	300.11	2,854.3	703.4	-511.8	869.5	4.80	-0.69	-10.38	
3,088.0	26.81	298.53	2,881.1	710.1	-523.7	882.0	2.72	-1.30	-5.27	
3,118.0	26.19	296.59	2,907.9	716.2	-535.6	894.2	3.55	-2.07	-6.47	
3,148.0	25.17	295.80	2,935.0	722.0	-547.2	905.9	3.59	-3.40	-2.63	
TD @ 3204' MD / 2986' TVD										
3,204.0	23.26	294.33	2,986.0	731.7	-568.0	926.3	3.58	-3.41	-2.63	

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
688.0	688.0	0.0	0.0	TIE IN @ 688' MD / 688' TVD
3,204.0	2,986.0	731.7	-568.0	TD @ 3204' MD / 2986' TVD

Checked By: _____ Approved By: _____ Date: _____

W.B. Carpenter #133
 Harrison County, West Virginia
 Q130662 & AM-13736
 Design #1

Company Name: HG Energy, LLC
 W.B. Carpenter #133
 Harrison County, West Virginia
 Created By: James Dawson
 Date: 09/30/2013

WELL DETAILS: W.B. Carpenter #133

Ground Level: 1161.0
 +N-S +E/W Northing Easting Latitude Longitude
 0.0 0.0 284562.37 1715294.3 39° 16' 36.900 N 80° 30' 20.600 W

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

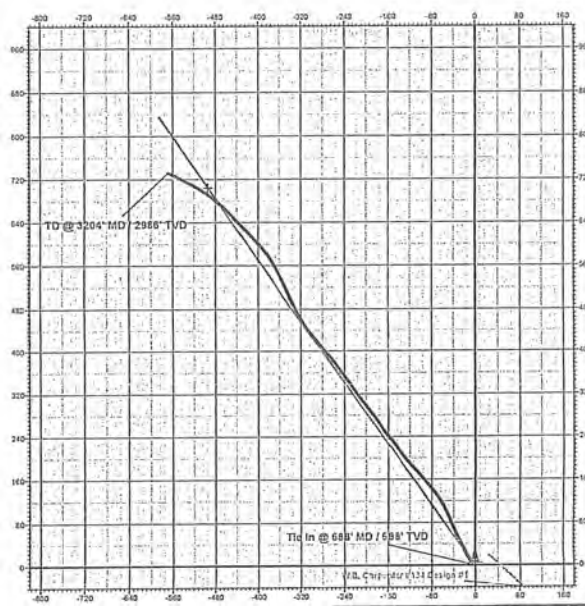
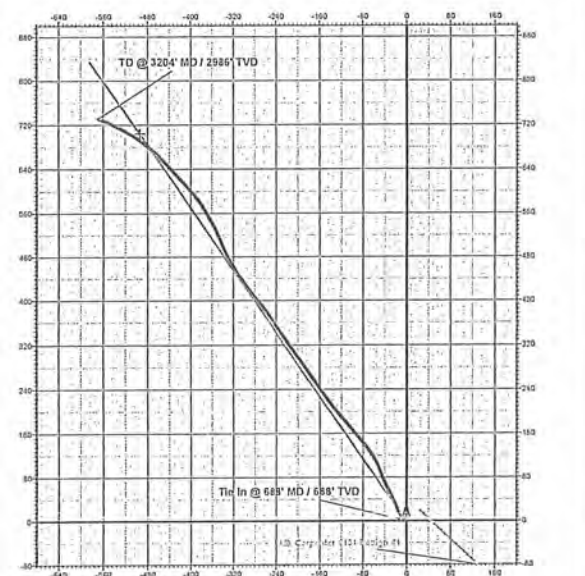
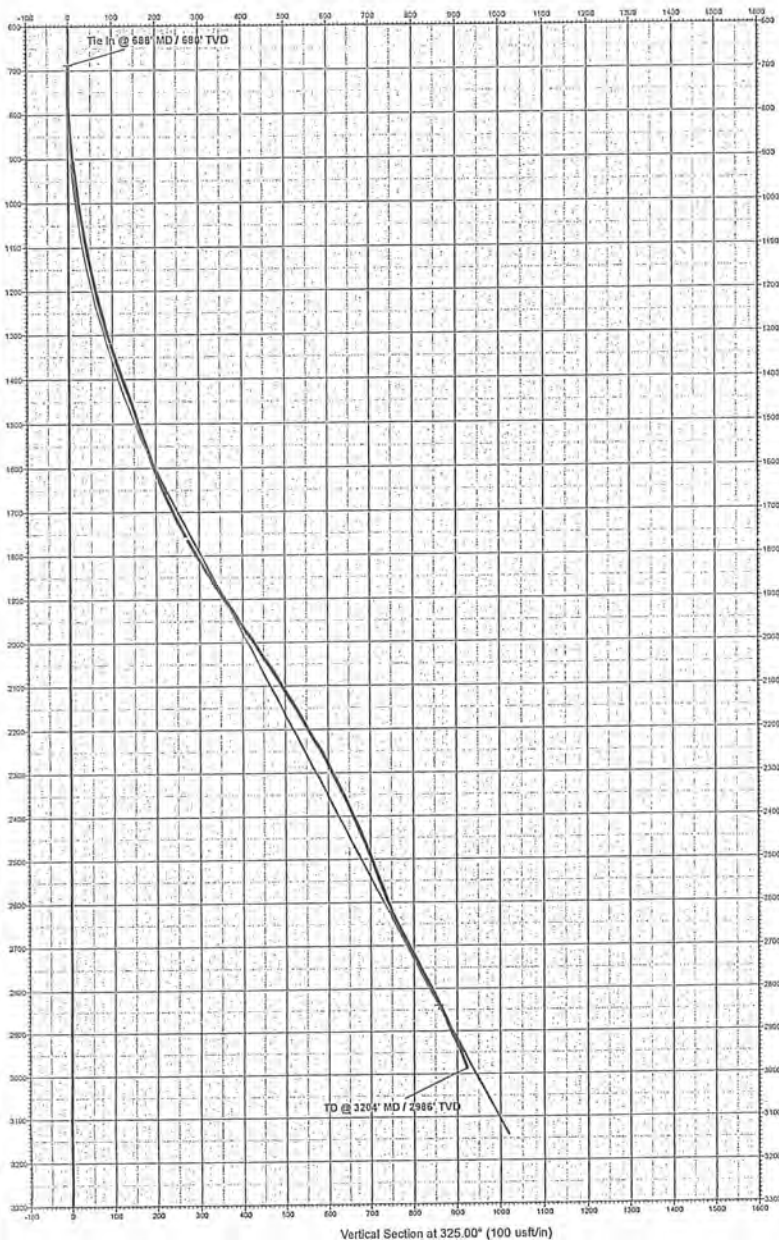
M G T Azimuths to Grid North
 Correction: -7.99°
 Magnetic Field
 Strength: 52362.5snT
 Dip Angle: 66.85°
 Date: 7/31/2013
 Model: IGRF2010

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E/W	Northing	Easting	Latitude	Longitude
Target W.B. Carpenter #133 -plan hole target center	2840.0	704.6	-52.3	289266.95	1714891.36	39° 16' 43.800 N	80° 30' 26.973 W

ANNOTATIONS

MD	Inc	Adj	TVD	+N-S	+E/W	Vsect	Departure	Annotation
3204.0	23.26	254.33	2566.0	731.7	-568.0	925.2	949.9	TD @ 3204' MD / 2566' TVD



04/04/2014

W.B. Carpenter #133
 Harrison County, West Virginia
 Q130662 & AM-13736
 Design #1

Company Name: HG Energy, LLC
 W.B. Carpenter #133
 Harrison County, West Virginia
 Created By: James Dawson
 Date: 09/30/2013



HG Energy

WELL DETAILS: W.B. Carpenter #133	
Ground Level: 1161.0	
+N-S 0.0	+E-W 0.0
Northing 28462.37	Easting 1716294.63
Latitude 39° 16' 36.900 N	Longitude 80° 30' 26.600 W
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	

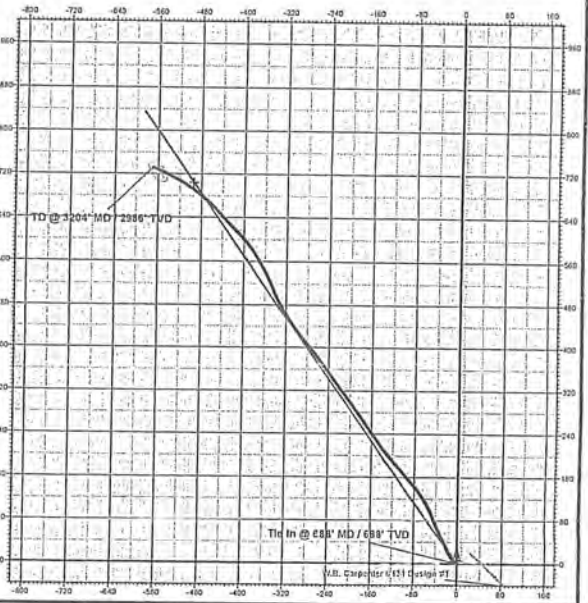
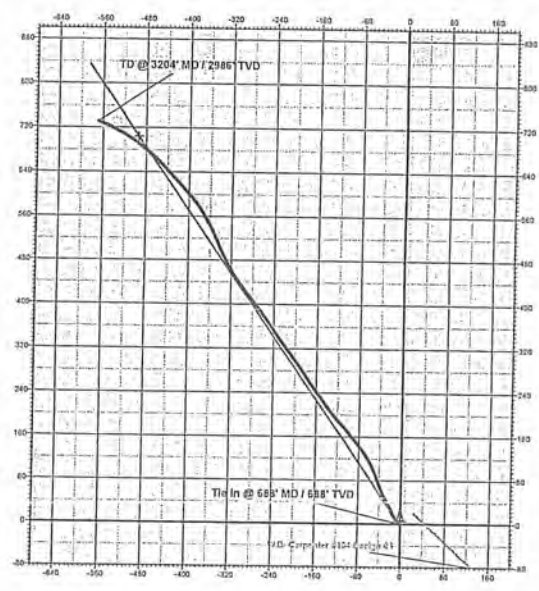
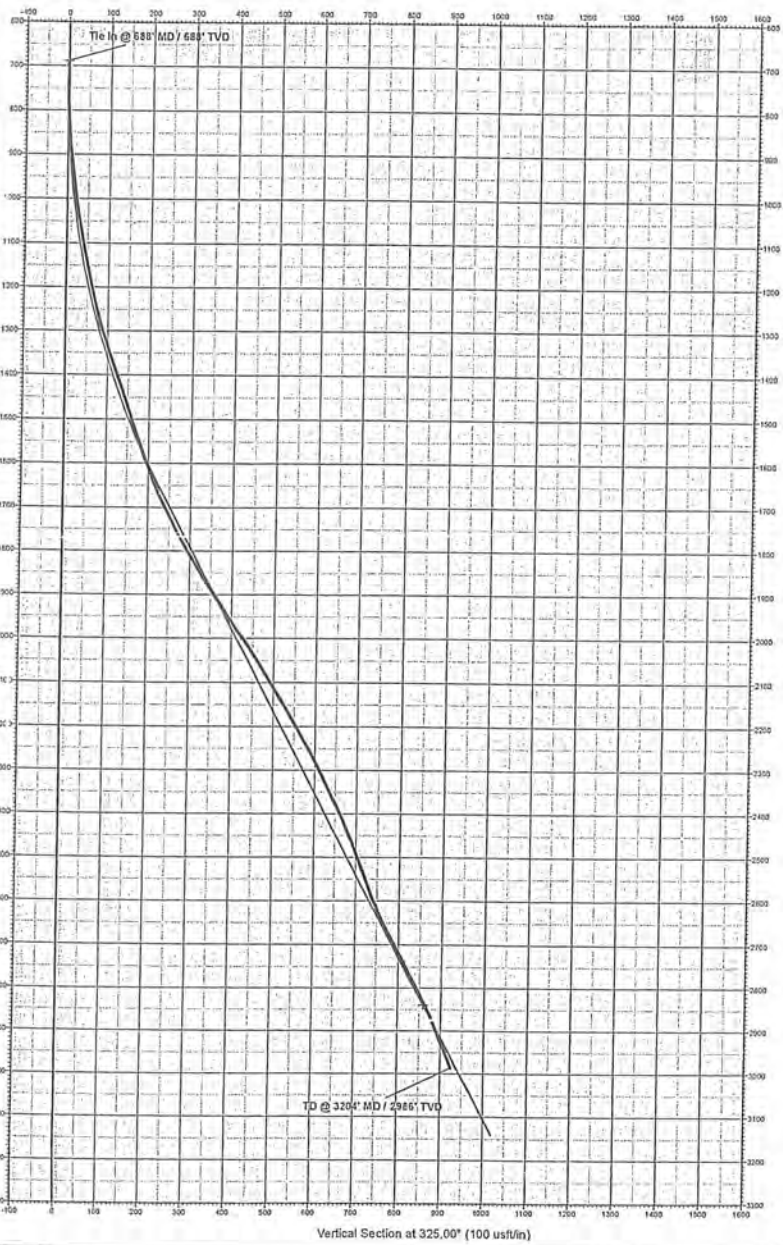
M G T Azimuths to Grid North

Correction: -7.99°

Magnetic Field Strength: 52362.5snT
 Dip Angle: 66.85°
 Date: 7/31/2013
 Model: IGRF2010

DESIGN TARGET DETAILS						
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude
Target W.B. Carpenter #133	2846.0	704.5	-493.3	285265.85	1714801.35	39° 16' 43.808 N
- plan hits target center						

ANNOTATIONS							
MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Departure
3204.0	23.26	294.33	2986.0	731.7	-568.0	926.2	840.9
							Annotation
							TD @ 3204' MD / 2986' TVD



04/04/2014

DDC
Survey Report



Company: HG Energy, LLC
 Project: Harrison County, West Virginia
 Site: W.B. Carpenter #133
 Well: W.B. Carpenter #133
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well W.B. Carpenter #133
 TVD Reference: WELL @ 1169.0usft (Decker #6)
 MD Reference: WELL @ 1169.0usft (Decker #6)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 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)	
2,278.0	31.20	324.81	2,156.9	434.0	-301.9	528.0	5.14	-1.60	9.37	
2,308.0	30.89	327.49	2,182.6	446.8	-310.6	543.4	4.72	-1.03	8.93	
2,338.0	30.72	330.61	2,208.4	460.0	-318.5	558.7	5.36	-0.57	10.40	
2,368.0	30.59	331.93	2,234.2	473.4	-325.8	573.8	2.28	-0.43	4.40	
2,398.0	29.49	332.41	2,260.2	486.7	-332.8	588.5	3.75	-3.67	1.60	
2,428.0	29.00	335.62	2,286.4	499.9	-339.2	602.9	5.48	-1.63	10.70	
2,458.0	27.60	335.53	2,312.8	512.8	-345.1	616.7	4.67	-4.67	-0.30	
2,488.0	26.81	334.52	2,339.5	525.3	-350.9	630.1	3.05	-2.63	-3.37	
2,518.0	26.19	332.63	2,366.3	537.2	-356.9	643.2	3.49	-2.07	-6.30	
2,548.0	25.49	331.53	2,393.3	548.8	-363.0	656.1	2.83	-2.33	-3.67	
2,578.0	24.30	328.63	2,420.5	559.7	-369.3	668.6	5.68	-3.97	-9.67	
2,608.0	23.60	326.52	2,447.9	570.0	-375.8	680.7	3.69	-2.33	-7.03	
2,638.0	22.59	324.02	2,475.5	579.7	-382.5	692.5	4.69	-3.37	-8.33	
2,668.0	21.49	321.42	2,503.3	588.7	-389.3	703.7	4.90	-3.67	-8.67	
2,698.0	20.30	318.83	2,531.4	596.9	-396.2	714.4	5.02	-3.97	-8.63	
2,728.0	20.39	317.51	2,559.5	604.6	-403.1	724.8	1.56	0.30	-4.40	
2,758.0	21.01	316.11	2,587.6	612.4	-410.4	735.4	2.64	2.07	-4.67	
2,788.0	23.29	316.19	2,615.4	620.5	-418.2	746.6	7.60	7.60	0.27	
2,818.0	26.28	316.41	2,642.6	629.6	-426.9	759.1	9.97	9.97	0.73	
2,848.0	28.39	316.50	2,669.2	639.6	-436.4	772.8	7.03	7.03	0.30	
2,878.0	29.49	315.93	2,695.5	650.1	-446.4	787.3	3.78	3.67	-1.90	
2,908.0	28.92	314.39	2,721.7	660.5	-456.8	801.8	3.14	-1.90	-5.13	
2,938.0	28.21	311.49	2,748.0	670.2	-467.3	816.0	5.19	-2.37	-9.67	
2,968.0	27.82	310.61	2,774.5	679.5	-477.9	829.8	1.89	-1.30	-2.93	
2,998.0	27.60	306.79	2,801.1	688.2	-488.8	843.3	5.97	-0.73	-12.73	
3,028.0	27.42	303.23	2,827.7	696.2	-500.1	856.6	5.51	-0.60	-11.87	
3,042.0	27.31	301.77	2,840.1	699.6	-505.5	862.6	4.86	-0.79	-10.43	
3,058.0	27.20	300.11	2,854.3	703.4	-511.8	869.5	4.80	-0.69	-10.38	
3,088.0	26.81	298.53	2,881.1	710.1	-523.7	882.0	2.72	-1.30	-5.27	
3,118.0	26.19	296.59	2,907.9	716.2	-535.6	894.2	3.55	-2.07	-6.47	
3,148.0	25.17	295.80	2,935.0	722.0	-547.2	905.9	3.59	-3.40	-2.63	
TD @ 3204' MD / 2986' TVD										
3,204.0	23.26	294.33	2,986.0	731.7	-568.0	926.3	3.58	-3.41	-2.63	

57A →

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
688.0	688.0	0.0	0.0	TIE IN @ 688' MD / 688' TVD
3,204.0	2,986.0	731.7	-568.0	TD @ 3204' MD / 2986' TVD

Checked By: _____ Approved By: _____ Date: _____