

4705101586

Chesapeake Appalachia, LLC

Marshall County, WV

Cameron

Gladys Briggs MSH 8H

Wellbore #1

Design: Surveys

Sperry Drilling Services

Combo Report

09 April, 2013

Well Coordinates: 463,419.98 N, 1,686,282.29 E (39° 46' 01.20" N, 080° 36' 57.77" W)
Ground Level: 1,396.00 ft

Local Coordinate Origin:	Centered on Well Gladys Briggs MSH 8H
Viewing Datum:	GL 1396' + KB 16' @ 1412.00ft (Nomac 25)
TVDs to System:	N
North Reference:	Grid
Unit System:	API-US Survey Feet

Version: 2003.16 Build: 431

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WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Design Report for Gladys Briggs MSH 8H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates (ft)		Map Coordinates (ft)		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing	Easting	Northing	Easting		
0.00	0.00	0.00	-1,412.00	0.00	0.00 N	0.00 E	463,419.98	1,686,282.29	0.00	0.00
100.00	0.07	251.17	-1,312.00	100.00	0.02 S	0.06 W	463,419.96	1,686,282.23	0.07	-0.03
200.00	0.20	118.20	-1,212.00	200.00	0.12 S	0.04 E	463,419.86	1,686,282.33	0.25	0.11
300.00	0.26	121.93	-1,112.00	300.00	0.32 S	0.38 E	463,419.65	1,686,282.67	0.06	0.50
400.00	0.18	125.26	-1,012.00	400.00	0.54 S	0.71 E	463,419.44	1,686,282.99	0.08	0.88
500.00	0.05	183.28	-912.00	500.00	0.67 S	0.83 E	463,419.31	1,686,283.12	0.16	1.07
600.00	0.05	183.23	-812.00	600.00	0.76 S	0.83 E	463,419.22	1,686,283.12	0.00	1.12
700.00	0.13	217.79	-712.00	700.00	0.89 S	0.75 E	463,419.09	1,686,283.04	0.09	1.15
800.00	0.12	187.07	-612.00	800.00	1.08 S	0.67 E	463,418.89	1,686,282.96	0.07	1.21
900.00	0.23	166.40	-512.00	900.00	1.38 S	0.71 E	463,418.60	1,686,283.00	0.13	1.43
1,000.00	0.23	136.53	-412.00	1,000.00	1.72 S	0.89 E	463,418.25	1,686,283.18	0.12	1.79
1,100.00	0.27	138.65	-312.00	1,100.00	2.05 S	1.19 E	463,417.93	1,686,283.47	0.04	2.22
1,200.00	0.42	117.96	-212.01	1,199.99	2.39 S	1.66 E	463,417.58	1,686,283.95	0.19	2.81
1,300.00	0.39	132.47	-112.01	1,299.99	2.80 S	2.24 E	463,417.18	1,686,284.53	0.11	3.51
1,400.00	0.38	119.24	-12.01	1,399.99	3.19 S	2.78 E	463,416.79	1,686,285.07	0.09	4.17
1,500.00	0.42	130.71	87.99	1,499.99	3.59 S	3.35 E	463,416.39	1,686,285.64	0.09	4.87
1,600.00	0.52	144.97	187.98	1,599.98	4.20 S	3.89 E	463,415.78	1,686,286.17	0.15	5.67
1,700.00	0.53	157.83	287.98	1,699.98	5.00 S	4.32 E	463,414.98	1,686,286.61	0.12	6.52
1,800.00	0.48	167.42	387.98	1,799.98	5.84 S	4.59 E	463,414.14	1,686,286.88	0.10	7.26
1,900.00	0.61	175.58	487.97	1,899.97	6.78 S	4.72 E	463,413.20	1,686,287.01	0.15	7.96
2,000.00	0.71	177.29	587.96	1,999.96	7.93 S	4.79 E	463,412.05	1,686,287.08	0.10	8.75
2,100.00	0.82	176.32	687.96	2,099.96	9.26 S	4.86 E	463,410.72	1,686,287.15	0.11	9.65
2,200.00	0.85	177.29	787.94	2,199.94	10.71 S	4.94 E	463,409.26	1,686,287.23	0.03	10.65
2,300.00	0.90	178.40	887.93	2,299.93	12.24 S	5.00 E	463,407.74	1,686,287.29	0.05	11.66
2,400.00	0.86	175.04	987.92	2,399.92	13.77 S	5.09 E	463,406.21	1,686,287.38	0.07	12.71
2,500.00	0.93	176.99	1,087.91	2,499.91	15.33 S	5.20 E	463,404.65	1,686,287.49	0.08	13.79
2,600.00	0.79	174.29	1,187.90	2,599.90	16.83 S	5.31 E	463,403.15	1,686,287.60	0.15	14.83
2,700.00	0.72	162.77	1,287.89	2,699.89	18.11 S	5.56 E	463,401.87	1,686,287.85	0.17	15.85
2,800.00	0.56	151.36	1,387.88	2,799.88	19.14 S	5.98 E	463,400.84	1,686,288.27	0.20	16.83
2,900.00	0.61	150.67	1,487.88	2,899.88	20.03 S	6.48 E	463,399.94	1,686,288.77	0.05	17.78
3,000.00	0.63	146.13	1,587.87	2,999.87	20.96 S	7.04 E	463,399.02	1,686,289.33	0.05	18.80
3,100.00	0.69	148.02	1,687.86	3,099.86	21.92 S	7.67 E	463,398.06	1,686,289.96	0.06	19.90
3,200.00	0.82	140.65	1,787.86	3,199.86	22.99 S	8.44 E	463,396.99	1,686,290.73	0.16	21.17
3,300.00	0.84	135.48	1,887.85	3,299.85	24.06 S	9.41 E	463,395.92	1,686,291.70	0.08	22.61
3,400.00	0.75	138.84	1,987.84	3,399.84	25.08 S	10.35 E	463,394.90	1,686,292.64	0.10	23.98
3,500.00	0.81	134.63	2,087.83	3,499.83	26.07 S	11.29 E	463,393.91	1,686,293.58	0.08	25.33
3,600.00	0.93	135.60	2,187.82	3,599.82	27.14 S	12.36 E	463,392.83	1,686,294.65	0.12	26.84
3,700.00	0.94	139.76	2,287.80	3,699.80	28.35 S	13.46 E	463,391.63	1,686,295.75	0.07	28.46
3,800.00	0.79	142.75	2,387.79	3,799.79	29.52 S	14.40 E	463,390.45	1,686,296.69	0.16	29.94
3,900.00	0.75	144.16	2,487.78	3,899.78	30.60 S	15.20 E	463,389.37	1,686,297.49	0.04	31.24
4,000.00	0.80	146.25	2,587.77	3,999.77	31.71 S	15.98 E	463,388.26	1,686,298.26	0.06	32.55
4,100.00	0.79	149.71	2,687.76	4,099.76	32.89 S	16.71 E	463,387.09	1,686,299.00	0.05	33.86
4,200.00	0.80	146.94	2,787.75	4,199.75	34.07 S	17.44 E	463,385.91	1,686,299.73	0.04	35.18
4,300.00	0.99	135.36	2,887.74	4,299.74	35.27 S	18.43 E	463,384.71	1,686,300.72	0.26	36.70
4,400.00	1.00	133.23	2,987.73	4,399.73	36.48 S	19.67 E	463,383.49	1,686,301.96	0.04	38.43

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Design Report for Gladys Briggs MSH 8H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
4,500.00	0.97	129.42	3,087.71	4,499.71	37.62 S	20.96 E	463,382.36	1,686,303.25	0.07	40.15
4,600.00	0.94	130.14	3,187.70	4,599.70	38.68 S	22.24 E	463,381.29	1,686,304.53	0.03	41.82
4,700.00	0.99	128.04	3,287.68	4,699.68	39.75 S	23.55 E	463,380.23	1,686,305.84	0.06	43.50
4,800.00	1.17	126.74	3,387.67	4,799.67	40.89 S	25.05 E	463,379.09	1,686,307.34	0.18	45.38
4,900.00	1.02	129.46	3,487.65	4,899.65	42.07 S	26.55 E	463,377.91	1,686,308.84	0.16	47.29
5,000.00	0.98	137.69	3,587.63	4,999.63	43.26 S	27.82 E	463,376.71	1,686,310.10	0.15	49.03
5,060.00	1.01	139.64	3,647.62	5,059.62	44.05 S	28.50 E	463,375.93	1,686,310.79	0.08	50.06
5,145.00	0.97	129.52	3,732.61	5,144.61	45.07 S	29.54 E	463,374.90	1,686,311.83	0.21	51.52
5,208.00	0.83	132.37	3,795.60	5,207.60	45.72 S	30.29 E	463,374.26	1,686,312.58	0.23	52.51
5,271.00	0.90	138.67	3,858.60	5,270.60	46.40 S	30.96 E	463,373.58	1,686,313.24	0.19	53.45
5,334.00	1.12	128.36	3,921.59	5,333.59	47.15 S	31.77 E	463,372.82	1,686,314.05	0.45	54.55
5,397.00	1.06	137.58	3,984.57	5,396.57	47.97 S	32.64 E	463,372.01	1,686,314.93	0.29	55.75
5,459.00	1.10	134.35	4,046.56	5,458.56	48.81 S	33.45 E	463,371.17	1,686,315.74	0.12	56.91
5,522.00	1.13	132.09	4,109.55	5,521.55	49.64 S	34.35 E	463,370.33	1,686,316.64	0.08	58.13
5,584.00	0.93	124.76	4,171.54	5,583.54	50.34 S	35.21 E	463,369.64	1,686,317.50	0.39	59.24
5,648.00	0.91	118.45	4,235.53	5,647.53	50.88 S	36.09 E	463,369.10	1,686,318.38	0.16	60.26
5,711.00	0.88	121.65	4,298.53	5,710.53	51.37 S	36.94 E	463,368.61	1,686,319.23	0.09	61.23
5,774.00	0.79	120.20	4,361.52	5,773.52	51.84 S	37.73 E	463,368.13	1,686,320.02	0.15	62.14
5,836.00	0.80	127.89	4,423.51	5,835.51	52.32 S	38.44 E	463,367.65	1,686,320.73	0.17	62.99
5,899.00	0.94	126.95	4,486.51	5,898.51	52.91 S	39.20 E	463,367.07	1,686,321.49	0.22	63.95
5,962.00	0.98	129.82	4,549.50	5,961.50	53.56 S	40.02 E	463,366.42	1,686,322.31	0.10	65.00
6,025.00	1.04	138.34	4,612.49	6,024.49	54.33 S	40.82 E	463,365.64	1,686,323.11	0.26	66.11
6,088.00	1.04	138.67	4,675.48	6,087.48	55.19 S	41.58 E	463,364.79	1,686,323.86	0.01	67.24
6,151.00	1.04	141.88	4,738.47	6,150.47	56.07 S	42.31 E	463,363.91	1,686,324.60	0.09	68.36
6,214.00	1.18	139.61	4,801.45	6,213.45	57.01 S	43.08 E	463,362.96	1,686,325.37	0.23	69.56
6,277.00	1.26	136.69	4,864.44	6,276.44	58.01 S	43.97 E	463,361.97	1,686,326.26	0.16	70.88
6,340.00	1.23	137.20	4,927.42	6,339.42	59.01 S	44.91 E	463,360.97	1,686,327.20	0.05	72.24
6,403.00	1.19	140.34	4,990.41	6,402.41	60.01 S	45.79 E	463,359.97	1,686,328.08	0.12	73.56
6,466.00	1.08	139.44	5,053.40	6,465.40	60.97 S	46.59 E	463,359.01	1,686,328.88	0.18	74.78
6,529.00	0.88	141.94	5,116.39	6,528.39	61.80 S	47.27 E	463,358.18	1,686,329.56	0.32	75.84
6,560.00	1.01	142.15	5,147.39	6,559.39	62.20 S	47.59 E	463,357.78	1,686,329.88	0.42	76.34
6,591.00	1.72	149.93	5,178.38	6,590.38	62.82 S	47.99 E	463,357.16	1,686,330.28	2.36	77.04
6,654.00	6.27	157.46	5,241.21	6,653.21	66.82 S	49.78 E	463,353.16	1,686,332.07	7.25	80.98
6,685.00	7.52	162.17	5,271.98	6,683.98	70.31 S	51.05 E	463,349.67	1,686,333.34	4.42	84.19
6,716.00	8.96	161.57	5,302.66	6,714.66	74.53 S	52.44 E	463,345.44	1,686,334.73	4.65	87.95
6,748.00	12.54	150.94	5,334.10	6,746.10	79.94 S	54.91 E	463,340.04	1,686,337.20	12.74	93.30
6,780.00	13.28	142.61	5,365.29	6,777.29	85.89 S	58.83 E	463,334.08	1,686,341.12	6.25	100.12
6,811.00	15.65	130.28	5,395.31	6,807.31	91.43 S	64.19 E	463,328.55	1,686,346.48	12.50	107.78
6,842.00	17.94	129.41	5,424.99	6,836.99	97.16 S	71.07 E	463,322.81	1,686,353.36	7.43	116.73
6,874.00	21.19	125.47	5,455.14	6,867.14	103.65 S	79.59 E	463,316.33	1,686,361.88	10.96	127.43
6,905.00	22.68	130.59	5,483.90	6,895.90	110.79 S	88.69 E	463,309.19	1,686,370.98	7.82	139.00
6,937.00	25.86	128.80	5,513.07	6,925.07	119.18 S	98.82 E	463,300.80	1,686,381.11	10.20	152.15
6,969.00	28.12	131.62	5,541.58	6,953.58	128.56 S	109.89 E	463,291.41	1,686,392.18	8.11	166.66
7,000.00	32.19	129.15	5,568.38	6,980.38	138.63 S	121.77 E	463,281.34	1,686,404.05	13.72	182.23
7,031.00	35.13	130.11	5,594.18	7,006.18	149.60 S	134.99 E	463,270.38	1,686,417.28	9.64	199.41

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
7,062.00	38.62	128.93	5,618.97	7,030.97	161.42 S	149.34 E	463,258.55	1,686,431.63	11.49	218.01
7,094.00	43.63	128.62	5,643.07	7,055.07	174.60 S	165.75 E	463,245.38	1,686,448.04	15.67	239.05
7,126.00	49.18	127.78	5,665.13	7,077.13	188.92 S	183.96 E	463,231.06	1,686,466.25	17.45	262.20
7,157.00	54.51	128.46	5,684.27	7,096.27	203.96 S	203.13 E	463,216.01	1,686,485.42	17.28	286.56
7,188.00	60.25	130.41	5,700.98	7,112.98	220.55 S	223.27 E	463,199.42	1,686,505.56	19.26	312.66
7,220.00	66.16	130.54	5,715.40	7,127.40	239.09 S	244.99 E	463,180.89	1,686,527.28	18.47	341.21
7,251.00	72.11	132.15	5,726.43	7,138.43	258.22 S	266.72 E	463,161.76	1,686,549.01	19.80	370.15
7,283.00	78.02	133.23	5,734.68	7,146.68	279.18 S	289.44 E	463,140.80	1,686,571.73	18.75	401.01
7,314.00	84.28	133.59	5,739.45	7,151.45	300.22 S	311.68 E	463,119.76	1,686,593.97	20.23	431.56
7,346.00	90.00	132.41	5,741.04	7,153.04	322.00 S	335.04 E	463,097.97	1,686,617.33	18.25	463.45
7,408.00	92.02	131.81	5,739.95	7,151.95	363.57 S	381.03 E	463,056.41	1,686,663.32	3.40	525.38
7,472.00	91.68	129.95	5,737.88	7,149.88	405.43 S	429.39 E	463,014.55	1,686,711.68	2.95	589.33
7,533.00	90.98	128.77	5,736.47	7,148.47	444.11 S	476.54 E	462,975.87	1,686,758.83	2.25	650.32
7,597.00	90.97	127.35	5,735.38	7,147.38	483.55 S	526.92 E	462,936.42	1,686,809.21	2.22	714.28
7,660.00	91.18	127.24	5,734.20	7,146.20	521.72 S	577.03 E	462,898.26	1,686,859.32	0.38	777.21
7,723.00	91.14	126.68	5,732.92	7,144.92	559.59 S	627.36 E	462,860.39	1,686,909.65	0.89	840.13
7,786.00	91.51	126.78	5,731.46	7,143.46	597.26 S	677.84 E	462,822.72	1,686,960.13	0.61	903.03
7,849.00	90.07	127.05	5,730.59	7,142.59	635.09 S	728.20 E	462,784.88	1,687,010.49	2.33	965.95
7,911.00	89.73	126.82	5,730.70	7,142.70	672.35 S	777.76 E	462,747.63	1,687,060.05	0.66	1,027.88
7,974.00	90.37	127.33	5,730.65	7,142.65	710.33 S	828.02 E	462,709.65	1,687,110.31	1.30	1,090.81
8,037.00	90.00	126.69	5,730.44	7,142.44	748.25 S	878.33 E	462,671.73	1,687,160.62	1.17	1,153.74
8,100.00	90.10	126.66	5,730.39	7,142.39	785.88 S	928.86 E	462,634.10	1,687,211.15	0.17	1,216.66
8,162.00	90.03	126.98	5,730.32	7,142.32	823.04 S	978.49 E	462,596.94	1,687,260.78	0.53	1,278.58
8,225.00	90.54	127.11	5,730.01	7,142.01	860.99 S	1,028.78 E	462,558.99	1,687,311.06	0.84	1,341.51
8,288.00	91.01	126.80	5,729.15	7,141.15	898.86 S	1,079.11 E	462,521.12	1,687,361.40	0.89	1,404.43
8,319.00	91.81	126.00	5,728.39	7,140.39	917.25 S	1,104.06 E	462,502.73	1,687,386.35	3.65	1,435.37
8,349.00	92.35	126.59	5,727.30	7,139.30	935.00 S	1,128.22 E	462,484.98	1,687,410.51	2.67	1,465.30
8,381.00	93.70	126.98	5,725.61	7,137.61	954.13 S	1,153.81 E	462,465.84	1,687,436.10	4.39	1,497.21
8,412.00	93.86	127.23	5,723.57	7,135.57	972.79 S	1,178.48 E	462,447.18	1,687,460.77	0.96	1,528.12
8,444.00	94.14	127.30	5,721.34	7,133.34	992.12 S	1,203.89 E	462,427.86	1,687,486.18	0.90	1,560.01
8,476.00	93.09	127.70	5,719.32	7,131.32	1,011.56 S	1,229.22 E	462,408.41	1,687,511.51	3.51	1,591.92
8,507.00	93.02	127.93	5,717.67	7,129.67	1,030.54 S	1,253.68 E	462,389.43	1,687,535.97	0.77	1,622.86
8,539.00	93.26	127.90	5,715.91	7,127.91	1,050.18 S	1,278.89 E	462,369.80	1,687,561.18	0.76	1,654.80
8,570.00	93.40	127.91	5,714.11	7,126.11	1,069.19 S	1,303.31 E	462,350.79	1,687,585.59	0.45	1,685.73
8,601.00	92.52	128.61	5,712.51	7,124.51	1,088.36 S	1,327.61 E	462,331.62	1,687,609.90	3.63	1,716.68
8,633.00	92.28	129.13	5,711.17	7,123.17	1,108.42 S	1,352.51 E	462,311.55	1,687,634.80	1.79	1,748.65
8,663.00	92.59	129.33	5,709.90	7,121.90	1,127.38 S	1,375.72 E	462,292.60	1,687,658.01	1.23	1,778.62
8,695.00	91.31	130.20	5,708.81	7,120.81	1,147.84 S	1,400.31 E	462,272.14	1,687,682.60	4.84	1,810.60
8,727.00	91.48	130.24	5,708.03	7,120.03	1,168.49 S	1,424.73 E	462,251.48	1,687,707.02	0.55	1,842.59
8,758.00	89.56	130.48	5,707.75	7,119.75	1,188.57 S	1,448.35 E	462,231.41	1,687,730.64	6.24	1,873.58
8,790.00	89.49	130.71	5,708.01	7,120.01	1,209.39 S	1,472.65 E	462,210.59	1,687,754.94	0.75	1,905.58
8,821.00	89.60	129.94	5,708.26	7,120.26	1,229.45 S	1,496.28 E	462,190.53	1,687,778.57	2.51	1,936.58
8,852.00	89.66	130.67	5,708.46	7,120.46	1,249.50 S	1,519.92 E	462,170.48	1,687,802.21	2.36	1,967.57
8,915.00	89.70	130.95	5,708.81	7,120.81	1,290.67 S	1,567.61 E	462,129.30	1,687,849.90	0.45	2,030.56
8,978.00	89.63	131.06	5,709.18	7,121.18	1,332.01 S	1,615.15 E	462,087.97	1,687,897.44	0.21	2,093.54

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HALLIBURTON**Design Report for Gladys Briggs MSH 8H - Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
9,041.00	89.77	130.91	5,709.51	7,121.51	1,373.33 S	1,662.71 E	462,046.65	1,687,945.00	0.33	2,156.52
9,104.00	88.89	130.68	5,710.25	7,122.25	1,414.49 S	1,710.40 E	462,005.49	1,687,992.69	1.44	2,219.51
9,168.00	88.45	131.39	5,711.73	7,123.73	1,456.49 S	1,758.66 E	461,963.49	1,688,040.95	1.30	2,283.47
9,229.00	88.62	131.66	5,713.29	7,125.29	1,496.92 S	1,804.31 E	461,923.06	1,688,086.60	0.52	2,344.42
9,292.00	88.22	130.78	5,715.03	7,127.03	1,538.42 S	1,851.68 E	461,881.56	1,688,133.97	1.53	2,407.37
9,355.00	87.71	131.00	5,717.27	7,129.27	1,579.63 S	1,899.28 E	461,840.35	1,688,181.57	0.88	2,470.32
9,417.00	87.75	130.85	5,719.72	7,131.72	1,620.21 S	1,946.09 E	461,799.77	1,688,228.37	0.25	2,532.26
9,479.00	87.48	131.26	5,722.30	7,134.30	1,660.90 S	1,992.80 E	461,759.08	1,688,275.09	0.79	2,594.18
9,542.00	88.82	131.38	5,724.34	7,136.34	1,702.47 S	2,040.09 E	461,717.51	1,688,322.38	2.14	2,657.12
9,605.00	90.94	130.87	5,724.47	7,136.47	1,743.90 S	2,087.54 E	461,676.07	1,688,369.83	3.46	2,720.10
9,668.00	91.65	132.25	5,723.04	7,135.04	1,785.69 S	2,134.67 E	461,634.29	1,688,416.96	2.46	2,783.05
9,731.00	91.84	131.86	5,721.13	7,133.13	1,827.87 S	2,181.42 E	461,592.11	1,688,463.71	0.69	2,845.96
9,795.00	91.14	131.15	5,719.46	7,131.46	1,870.26 S	2,229.34 E	461,549.71	1,688,511.63	1.56	2,909.91
9,858.00	89.53	130.35	5,719.09	7,131.09	1,911.39 S	2,277.06 E	461,508.59	1,688,559.35	2.85	2,972.89
9,921.00	89.70	130.44	5,719.52	7,131.52	1,952.21 S	2,325.04 E	461,467.77	1,688,607.33	0.31	3,035.89
9,983.00	90.10	130.17	5,719.63	7,131.63	1,992.32 S	2,372.32 E	461,427.66	1,688,654.61	0.78	3,097.88
10,043.00	90.27	130.52	5,719.43	7,131.43	2,031.16 S	2,418.05 E	461,388.82	1,688,700.34	0.65	3,157.88
10,106.00	89.23	129.79	5,719.71	7,131.71	2,071.79 S	2,466.20 E	461,348.19	1,688,748.49	2.02	3,220.88
10,169.00	89.26	130.23	5,720.54	7,132.54	2,112.29 S	2,514.45 E	461,307.69	1,688,796.74	0.70	3,283.87
10,230.00	88.75	129.33	5,721.60	7,133.60	2,151.31 S	2,561.32 E	461,268.67	1,688,843.61	1.70	3,344.86
10,293.00	88.52	128.88	5,723.10	7,135.10	2,191.03 S	2,610.19 E	461,228.94	1,688,892.48	0.80	3,407.84
10,356.00	89.16	129.69	5,724.37	7,136.37	2,230.92 S	2,658.95 E	461,189.06	1,688,941.24	1.64	3,470.82
10,419.00	90.03	131.71	5,724.82	7,136.82	2,272.00 S	2,706.70 E	461,147.98	1,688,988.99	3.49	3,533.81
10,480.00	89.77	130.46	5,724.92	7,136.92	2,312.08 S	2,752.68 E	461,107.90	1,689,034.97	2.09	3,594.79
10,543.00	89.23	128.98	5,725.47	7,137.47	2,352.34 S	2,801.14 E	461,067.64	1,689,083.43	2.50	3,657.78
10,606.00	89.46	128.41	5,726.19	7,138.19	2,391.72 S	2,850.30 E	461,028.26	1,689,132.59	0.98	3,720.77
10,669.00	89.63	128.04	5,726.69	7,138.69	2,430.70 S	2,899.79 E	460,989.28	1,689,182.08	0.65	3,783.75
10,732.00	89.83	128.10	5,726.99	7,138.99	2,469.55 S	2,949.39 E	460,950.43	1,689,231.68	0.33	3,846.72
10,795.00	90.03	127.31	5,727.07	7,139.07	2,508.08 S	2,999.23 E	460,911.90	1,689,281.52	1.29	3,909.68
10,858.00	90.00	127.26	5,727.05	7,139.05	2,546.24 S	3,049.36 E	460,873.73	1,689,331.65	0.09	3,972.63
10,921.00	90.07	127.52	5,727.01	7,139.01	2,584.50 S	3,099.41 E	460,835.48	1,689,381.70	0.43	4,035.58
10,984.00	90.40	127.69	5,726.75	7,138.75	2,622.94 S	3,149.32 E	460,797.04	1,689,431.61	0.59	4,098.54
11,046.00	90.44	127.23	5,726.30	7,138.30	2,660.65 S	3,198.54 E	460,759.33	1,689,480.83	0.74	4,160.49
11,108.00	90.20	127.17	5,725.95	7,137.95	2,698.13 S	3,247.92 E	460,721.84	1,689,530.21	0.40	4,222.43
11,171.00	90.37	127.95	5,725.64	7,137.64	2,736.54 S	3,297.86 E	460,683.44	1,689,580.15	1.27	4,285.38
11,234.00	90.60	127.83	5,725.11	7,137.11	2,775.23 S	3,347.58 E	460,644.75	1,689,629.87	0.41	4,348.35
11,298.00	89.73	128.46	5,724.92	7,136.92	2,814.76 S	3,397.91 E	460,605.22	1,689,680.20	1.68	4,412.33
11,360.00	89.40	129.46	5,725.39	7,137.39	2,853.74 S	3,446.12 E	460,566.24	1,689,728.41	1.70	4,474.32
11,423.00	89.46	130.58	5,726.02	7,138.02	2,894.25 S	3,494.36 E	460,525.73	1,689,776.65	1.78	4,537.31
11,486.00	89.29	131.58	5,726.71	7,138.71	2,935.64 S	3,541.85 E	460,484.33	1,689,824.14	1.61	4,600.29
11,548.00	89.46	132.08	5,727.38	7,139.38	2,976.99 S	3,588.04 E	460,442.99	1,689,870.33	0.85	4,662.24
11,612.00	89.19	132.73	5,728.14	7,140.14	3,020.15 S	3,635.30 E	460,399.83	1,689,917.58	1.10	4,726.17
11,675.00	89.09	132.91	5,729.08	7,141.08	3,062.96 S	3,681.50 E	460,357.01	1,689,963.79	0.33	4,789.06
11,737.00	88.72	132.78	5,730.27	7,142.27	3,105.12 S	3,726.95 E	460,314.86	1,690,009.24	0.63	4,850.96
11,802.00	88.36	133.13	5,731.92	7,143.92	3,149.39 S	3,774.51 E	460,270.58	1,690,056.80	0.77	4,915.83

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Design Report for Gladys Briggs MSH 8H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
11,865.00	88.89	132.43	5,733.44	7,145.44	3,192.17 S	3,820.73 E	460,227.81	1,690,103.02	1.39	4,978.72
11,927.00	88.82	131.98	5,734.68	7,146.68	3,233.81 S	3,866.65 E	460,186.17	1,690,148.94	0.73	5,040.65
11,990.00	88.92	131.82	5,735.92	7,147.92	3,275.88 S	3,913.53 E	460,144.10	1,690,195.82	0.30	5,103.59
12,052.00	88.86	130.69	5,737.12	7,149.12	3,316.75 S	3,960.13 E	460,103.22	1,690,242.42	1.82	5,165.55
12,116.00	89.23	130.47	5,738.19	7,150.19	3,358.38 S	4,008.73 E	460,061.60	1,690,291.02	0.67	5,229.53
12,178.00	90.03	129.65	5,738.59	7,150.59	3,398.28 S	4,056.19 E	460,021.70	1,690,338.47	1.85	5,291.53
12,241.00	90.03	129.69	5,738.55	7,150.55	3,438.50 S	4,104.68 E	459,981.48	1,690,386.97	0.06	5,354.53
12,303.00	90.54	129.47	5,738.24	7,150.24	3,478.00 S	4,152.46 E	459,941.98	1,690,434.75	0.90	5,416.53
12,366.00	90.40	129.61	5,737.73	7,149.73	3,518.11 S	4,201.05 E	459,901.87	1,690,483.34	0.31	5,479.53
12,428.00	90.30	129.66	5,737.35	7,149.35	3,557.65 S	4,248.79 E	459,862.32	1,690,531.08	0.18	5,541.53
12,492.00	90.44	128.89	5,736.94	7,148.94	3,598.17 S	4,298.34 E	459,821.81	1,690,580.62	1.22	5,605.52
12,554.00	90.81	129.68	5,736.26	7,148.26	3,637.42 S	4,346.32 E	459,782.55	1,690,628.61	1.41	5,667.52
12,617.00	90.87	129.95	5,735.34	7,147.34	3,677.76 S	4,394.71 E	459,742.22	1,690,677.00	0.44	5,730.51
12,622.00	90.87	129.83	5,735.26	7,147.26	3,680.96 S	4,398.54 E	459,739.01	1,690,680.83	2.40	5,735.51
Last MWD Survey at 12622' MD										
12,668.00	90.87	129.83	5,734.56	7,146.56	3,710.42 S	4,433.86 E	459,709.55	1,690,716.15	0.00	5,781.50
Projection to TD at 12668' MD										

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	129.68	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
100.00	5,060.00	MS Gyro	NSG-CT_csg+cent
5,145.00	12,668.00	Sperry MWD	MWD

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Gladys Briggs MSH	0.00	0.00	7,143.27	-3,691.67	4,449.85	459,728.31	1,690,732.14	39° 45' 25.257 N	80° 36' 0.207 W
- hit/miss target									
- Shape									
- Point									
- actual wellpath misses target center by 24.86ft at 12668.00ft MD (7146.56 TVD, -3710.42 N, 4433.86 E)									

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date	8/17/2013
State	WEST VIRGINIA
County	MARSHALL
API Number	4705101586
Operator Name	CHESAPEAKE APPALACHIAN LLC
Well Name and Number	GLADYS BRIGGS MSH.8H
Longitude	-80.616047
Latitude	39.7669995
Length of Production	NAD27
Production Types	GAS
True Vertical Depth (TVD)	7,153
Total Water Volume (gal)	6,932,646

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Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration by Additive (% by mass)**	Maximum Ingredient Concentration to HF Fluid (% by mass)**	Comments
Fresh Water	CHESAPEAKE ENERGY	Carrier/Base Fluid	Water	007732-18-5	100.00%	81.00797%	
Recycled Produced Water	CHESAPEAKE ENERGY	Carrier/Base Fluid	Water	007732-18-5	100.00%	4.30867%	
EC6110A	NALCO	Anti-Bacterial Agent	Ethanol Glutaraldehyde (Pentanedio)	000064-17-5 000111-30-8	5.00% 60.00%	0.00137% 0.01643%	
EC6629A	NALCO	Scale Inhibitor	Quaternary Ammonium Compounds	NA	10.00%	0.00274%	
Northern White Sand, 100 Mesh Sand, J580, Acid Hydrochloric, J609, J218, J610, L058, A264, J475	SCHLUMBERGER	Proppant - Natural, Gelling Agent, Acid, Friction Reducer, Breaker, Cross Linker, Iron Control Agent, Corrosion Inhibitor, Breaker	No Hazardous Components Crystalline silica Hydrogen chloride Guar gum Acrylamide, 2-acrylamido-2-methylpropanesulfonic acid, sodium salt polymer Ammonium sulfate Diammonium peroxodisulphate Sodium sulfate Potassium borate	NONE 14808-60-7 7647-01-0 9000-30-0 38193-60-1	98.19552% 0.92012% 0.68816% 0.05244%	0.00000% 14.45558% 0.13545% 0.10131% 0.00772%	

Polymer of 2-acrylamido-2-methylpropanesulfonic acid sodium salt and methyl acrylate	136793-29-8	0.00562%	0.00083%	
Potassium hydroxide	1310-58-3	0.00452%	0.00066%	
Glycerol	56-81-5	0.00399%	0.00059%	
Urea	57-13-6	0.00345%	0.00051%	
Sodium erythorbate	6381-77-7	0.00328%	0.00048%	
Methanol	67-56-1	0.00290%	0.00043%	
Non-crystalline silica	7631-86-9	0.00238%	0.00035%	
Fatty acids, tall-oil	61790-12-3	0.00213%	0.00031%	
Thiourea, polymer with formaldehyde and 1-phenylethanone	68527-49-1	0.00175%	0.00026%	
Alcohols, C14-15, ethoxylated (ZEO)	68951-67-7	0.00081%	0.00012%	
Prop-2-yn-1-ol	107-19-7	0.00054%	0.00008%	
Alkenes, C>10 a-	64743-02-8	0.00036%	0.00005%	
Tetrasodium ethylenediaminetetracetate	64-02-8	0.00011%	0.00002%	
Dimethyl siloxanes and silicones	63148-62-9	0.00005%	0.00001%	
Siloxanes and Silicones, di-Me, reaction products with silica	67762-90-7	0.00001%	< 0.00001%	
Octamethylcyclotetrasiloxane	556-67-2	0.00001%	< 0.00001%	
Sodium hydroxide	1310-73-2	< 0.00001%	< 0.00001%	
Decamethyl cyclopentasiloxane	541-02-6	< 0.00001%	< 0.00001%	
Dodecamethylcyclohexasiloxane	540-97-6	< 0.00001%	< 0.00001%	

Additional Ingredients Not Listed on MSDS

EC6110A, EC6629A	NALCO	Anti-Bacterial Agent, Scale Inhibitor	Methanol (Methyl Alcohol)	000067-56-1	0.00613%	
			Proprietary Acrylate Polymer	TRADE SECRET	0.00613%	
			Proprietary Quaternary Ammonium Salt	TRADE SECRET	0.00613%	
			Water	007732-18-5	0.02648%	

* Total Water Volume sources may include fresh water, produced water, and/or recycled water
 ** Information is based on the maximum potential for concentration and thus the total may be over 100%

"Additional Ingredients Not Listed on MSDS" component information were obtained directly from the supplier. As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of this information should be directed to the supplier who provided it.

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