



HALLIBURTON

9-00134

DIRECTIONAL SURVEY REPORT

*Chesapeake Appalachia, LLC
State of WV DNR B BRK 3H
Marcellus
Brooke County, West Virginia WV
USA
NE-XX-0009586880*

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
4914.00	0.70	27.05	4910.04	14.84 S	34.93 W	-1.57	TIE-IN
4932.00	0.95	41.95	4928.04	14.63 S	34.78 W	-1.43	1.80
4963.00	0.77	43.93	4959.03	14.29 S	34.46 W	-1.22	0.57
4995.00	0.94	34.16	4991.03	13.92 S	34.17 W	-0.98	0.68
5027.00	2.41	0.36	5023.02	13.03 S	34.02 W	-0.20	5.34
5059.00	5.70	351.72	5054.93	10.79 S	34.24 W	1.98	10.43
5090.00	8.56	349.60	5085.69	6.99 S	34.88 W	5.76	9.26
5122.00	11.40	349.67	5117.20	1.54 S	35.88 W	11.21	8.89
5154.00	13.75	348.30	5148.43	5.30 N	37.22 W	18.08	7.38
5186.00	15.84	342.49	5179.37	13.19 N	39.30 W	26.20	8.02
5218.00	18.73	339.05	5209.92	22.15 N	42.45 W	35.70	9.57
5249.00	21.66	338.48	5239.02	32.12 N	46.33 W	46.40	9.48
5281.00	24.78	339.34	5268.42	43.90 N	50.87 W	59.01	9.80
5312.00	27.70	340.94	5296.22	56.79 N	55.51 W	72.72	9.69
5344.00	30.49	341.44	5324.18	71.52 N	60.52 W	88.27	8.75
5376.00	33.92	341.75	5351.26	87.70 N	65.91 W	105.30	10.74
5407.00	37.59	342.71	5376.41	104.94 N	71.43 W	123.39	11.97
5438.00	41.25	343.26	5400.35	123.77 N	77.18 W	143.03	11.87
5470.00	44.72	345.34	5423.76	144.77 N	83.08 W	164.76	11.70
5501.00	47.54	345.14	5445.24	166.37 N	88.77 W	186.99	9.12
5532.00	49.81	345.34	5465.71	188.89 N	94.70 W	210.15	7.33
5564.00	52.26	344.36	5485.83	212.90 N	101.20 W	234.91	8.02
5595.00	55.63	342.92	5504.08	236.94 N	108.27 W	259.90	11.52
5627.00	59.08	342.34	5521.33	262.65 N	116.31 W	286.80	10.89
5659.00	61.97	341.77	5537.08	289.15 N	124.90 W	314.62	9.15
5690.00	64.24	342.09	5551.10	315.43 N	133.47 W	342.24	7.39
5722.00	67.28	342.49	5564.23	343.23 N	142.34 W	371.37	9.56
5754.00	70.58	343.01	5575.74	371.74 N	151.20 W	401.18	10.40
5786.00	72.72	342.71	5585.81	400.76 N	160.15 W	431.49	6.74
5817.00	73.68	342.62	5594.77	429.09 N	168.99 W	461.12	3.13
5848.00	75.15	341.94	5603.10	457.53 N	178.08 W	490.94	5.19
5879.00	78.10	341.96	5610.27	486.20 N	187.43 W	521.06	9.53
5911.00	81.40	341.32	5615.96	516.09 N	197.35 W	552.52	10.50
5943.00	84.32	342.06	5619.94	546.23 N	207.32 W	584.25	9.39
6006.00	87.62	341.66	5624.37	605.94 N	226.89 W	647.02	5.27
6130.00	88.52	339.56	5628.55	722.83 N	268.02 W	770.91	1.84
6257.00	89.70	339.58	5630.52	841.83 N	312.34 W	897.89	0.92
6384.00	90.57	337.56	5630.22	960.04 N	358.73 W	1024.87	1.73
6510.00	91.51	337.72	5627.93	1076.55 N	406.66 W	1150.80	0.75
6637.00	89.56	338.03	5626.73	1194.18 N	454.49 W	1277.74	1.55
6763.00	90.07	338.50	5627.14	1311.23 N	501.15 W	1403.72	0.55
6891.00	91.17	340.12	5625.75	1430.96 N	546.37 W	1531.70	1.53
7017.00	91.75	339.75	5622.54	1549.27 N	589.58 W	1657.66	0.54
7143.00	91.41	340.33	5619.06	1667.66 N	632.57 W	1783.60	0.53
7270.00	89.97	340.59	5617.54	1787.33 N	675.04 W	1910.56	1.16
7396.00	90.84	340.82	5616.65	1906.25 N	716.67 W	2036.52	0.72
7522.00	89.66	340.61	5616.11	2025.18 N	758.27 W	2162.48	0.95
7648.00	90.07	339.24	5616.40	2143.53 N	801.52 W	2288.47	1.14
7775.00	90.87	339.23	5615.36	2262.27 N	846.55 W	2415.47	0.63
7900.00	91.34	339.76	5612.95	2379.33 N	890.33 W	2540.44	0.57
8026.00	89.60	338.89	5611.92	2497.21 N	934.80 W	2666.43	1.54
8152.00	88.76	338.43	5613.72	2614.55 N	980.65 W	2792.41	2.76
8277.00	89.70	338.48	5615.41	2730.81 N	1026.55 W	2917.38	0.75
8404.00	90.50	338.73	5615.19	2849.06 N	1072.87 W	3044.37	0.67

05/02/2014

8530.00	91.11	338.89	5613.42	2966.53 N	1118.41 W	3170.35	0.49
8656.00	90.00	336.20	5612.20	3082.95 N	1166.53 W	3296.27	2.31
8782.00	89.73	338.31	5612.50	3199.15 N	1215.25 W	3422.17	1.69
8908.00	90.07	339.97	5612.72	3316.88 N	1260.11 W	3548.17	1.35
9032.00	90.43	339.56	5612.17	3433.23 N	1302.99 W	3672.16	0.45
9158.00	90.57	340.76	5611.07	3551.75 N	1345.75 W	3798.14	0.96
9284.00	92.28	340.82	5607.93	3670.69 N	1387.19 W	3924.06	1.35
9408.00	92.69	340.73	5602.56	3787.66 N	1427.99 W	4047.91	0.34
9534.00	91.21	338.40	5598.27	3905.65 N	1471.96 W	4173.82	2.18
9658.00	91.85	338.71	5594.97	4021.03 N	1517.27 W	4297.76	0.57
9782.00	90.54	337.94	5592.39	4136.23 N	1563.06 W	4421.71	1.22
9909.00	90.30	337.02	5591.45	4253.54 N	1611.71 W	4548.64	0.75
10034.00	90.34	338.18	5590.75	4369.10 N	1659.35 W	4673.58	0.93
10156.00	90.47	338.72	5589.90	4482.57 N	1704.16 W	4795.56	0.46
10280.00	90.03	340.01	5589.35	4598.61 N	1747.86 W	4919.56	1.10
10405.00	91.95	342.37	5587.19	4716.90 N	1788.15 W	5044.46	2.43
10530.00	88.96	341.00	5586.20	4835.55 N	1827.43 W	5169.33	2.63
10654.00	89.19	340.95	5588.21	4952.76 N	1867.85 W	5293.27	0.19
10780.00	90.07	340.76	5589.02	5071.79 N	1909.17 W	5419.22	0.71
10905.00	89.93	339.24	5589.02	5189.24 N	1951.92 W	5544.21	1.22
11028.00	91.28	339.75	5587.72	5304.44 N	1995.00 W	5667.20	1.17
11153.00	93.06	339.77	5582.99	5421.64 N	2038.21 W	5792.10	1.43
11277.00	89.40	337.52	5580.33	5537.07 N	2083.34 W	5916.03	3.47
11401.00	89.83	337.56	5581.16	5651.66 N	2130.71 W	6039.97	0.35
11524.00	90.24	337.27	5581.09	5765.23 N	2177.95 W	6162.90	0.41
11634.00	90.17	337.23	5580.71	5866.67 N	2220.48 W	6272.82	0.07
11681.00	90.17	337.23	5580.57	5910.01 N	2238.67 W	6319.79	0.01

CALCULATION BASED ON MINIMUM CURVATURE METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 339.35 DEGREES (GRID)
A TOTAL CORRECTION OF -8.15 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11681.00 FEET
IS 6319.80 FEET ALONG 339.25 DEGREES (GRID)

WELL ASSUMED VERTICAL AT WELLHEAD
SURVEYS FROM 100' MD TO 4900' MD PROVIDED BY GYRO
SURVEYS FROM 4932' MD TO 11634' MD PROVIDED BY SPERRY DRILLING MWD
SURVEY AT 10634' MD HAS BEEN PROJECTED TO TD AT 10681' MD
SPERRY PERSONNEL: T. Russell, J. Growall

Date Printed:30 July 2012

05/02/2014