

Farm name: State of WV DNR A BRK 8H Operator Well No.: 834376

LOCATION: Elevation: 1,140' Quadrangle: Steubenville East, WV

District: Cross Creek County: Brooke  
Latitude: 9,790' Feet South of 40 Deg. 20 Min. 00 Sec.  
Longitude 4,480' Feet West of 80 Deg. 32 Min. 00 Sec.

Company: Chesapeake Appalachia, L.L.C.

Address:	Casing & Tubing	Used in drilling	Left in well	Cement fill up Cu. Ft.
P.O. Box 18496 Oklahoma City, OK 73154-0496	20"	120'	120'	392 Cu. Ft.
Agent: Eric Gillespie	13 3/8"	750'	750'	819 Cu. Ft.
Inspector: Bill Hendershot	9 5/8"	1,541'	1,541'	656 Cu. Ft.
Date Permit Issued: 3-20-2012	5 1/2"	9,746'	9,746'	1167 Cu. Ft.
Date Well Work Commenced: 10-4-2012				
Date Well Work Completed: 6-5-2013				
Verbal Plugging:				
Date Permission granted on:				
Rotary <input checked="" type="checkbox"/> Cable <input type="checkbox"/> Rig <input type="checkbox"/>				
Total Vertical Depth (ft): 5,759'				
Total Measured Depth (ft): 9,746'				
Fresh Water Depth (ft.): 80', 300'				
Salt Water Depth (ft.): 1210'				
Is coal being mined in area (N/Y)? N				
Coal Depths (ft.): 656' - 664'				
Void(s) encountered (N/Y) Depth(s) N				

OPEN FLOW DATA (If more than two producing formations please include additional data on separate sheet)

Producing formation Marcellus Pay zone depth (ft) 5,950-9,652  
Gas: Initial open flow \_\_\_\_\_ MCF/d Oil: Initial open flow \_\_\_\_\_ Bbl/d  
Final open flow 1,250\* MCF/d Final open flow 278 Bbl/d  
Time of open flow between initial and final tests 120 Hours \*Calculated  
Static rock Pressure 3,743\* psig (surface pressure) after 120 Hours

Second producing formation \_\_\_\_\_ Pay zone depth (ft) \_\_\_\_\_  
Gas: Initial open flow \_\_\_\_\_ MCF/d Oil: Initial open flow \_\_\_\_\_ Bbl/d  
Final open flow \_\_\_\_\_ MCF/d Final open flow \_\_\_\_\_ Bbl/d  
Time of open flow between initial and final tests \_\_\_\_\_ Hours  
Static rock Pressure \_\_\_\_\_ psig (surface pressure) after \_\_\_\_\_ Hours

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete.

Marlene Williams  
Signature

2-26-15  
Date

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Were core samples taken? Yes \_\_\_\_\_ No N

Were cuttings caught during drilling? Yes Y No \_\_\_\_\_

Were Electrical, Mechanical or Geophysical logs recorded on this well? If yes, please list GR, neutron, density, and resistivity  
Open hole logs run from 0-1555' MD; LWD GR from 5041-9696' MD.

**NOTE: IN THE AREA BELOW PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF THE TOPS AND BOTTOMS OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE FROM SURFACE TO TOTAL DEPTH.**

Perforated Intervals, Fracturing, or Stimulating:

See attached

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Plug Back Details Including Plug Type and Depth(s):

\_\_\_\_\_  
\_\_\_\_\_

Formations Encountered: \_\_\_\_\_ Top Depth \_\_\_\_\_ / \_\_\_\_\_ Bottom Depth \_\_\_\_\_  
Surface: \_\_\_\_\_

See attached

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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LATERAL WELLBORE (no vertical pilot hole associated with this well)

Maximum TVD of wellbore: 5759 ft TVD @ 9501 ft MD

Formation/Lithology	Top Depth, MD (ft)	Top Depth, TVD (ft)	Bottom Depth, MD (ft)	Bottom Depth, TVD (ft)
SS/SH	0	0	656	656
KITTANING COAL	656	656	664	664
SS/SH	664	664	880	880
SHALE	880	880	1000	1000
SS	1000	1000	1120	1120
BIG LIME	1120	1120	1210	1210
BIG INJUN (SS)	1210	1210	1385	1385
SHALE	1385	1385	5554	5502
GENESE0 (SH)	5554	5502	5578	5519
TULLY (LS)	5578	5519	5676	5579
HAMILTON (SH)	5676	5579	5913	5666
MARCELLUS (SH)	5913	5666		
TD OF LATERAL			9746	5756

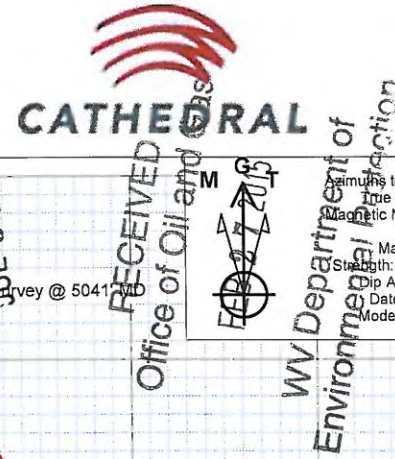
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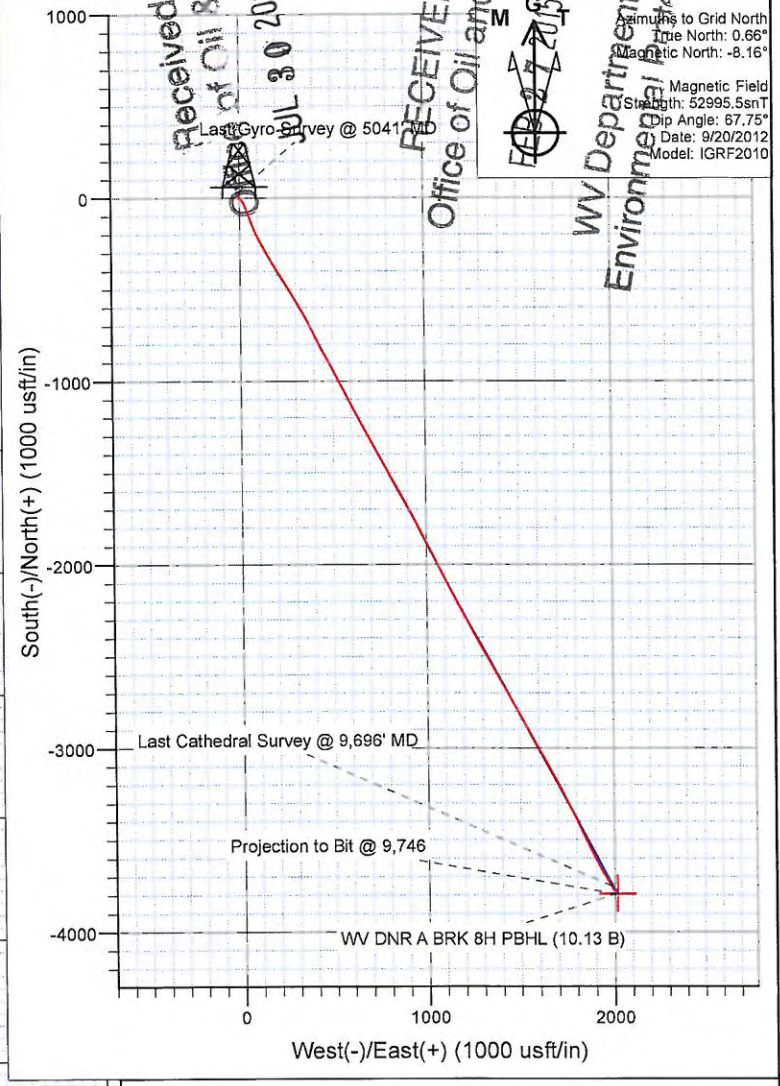
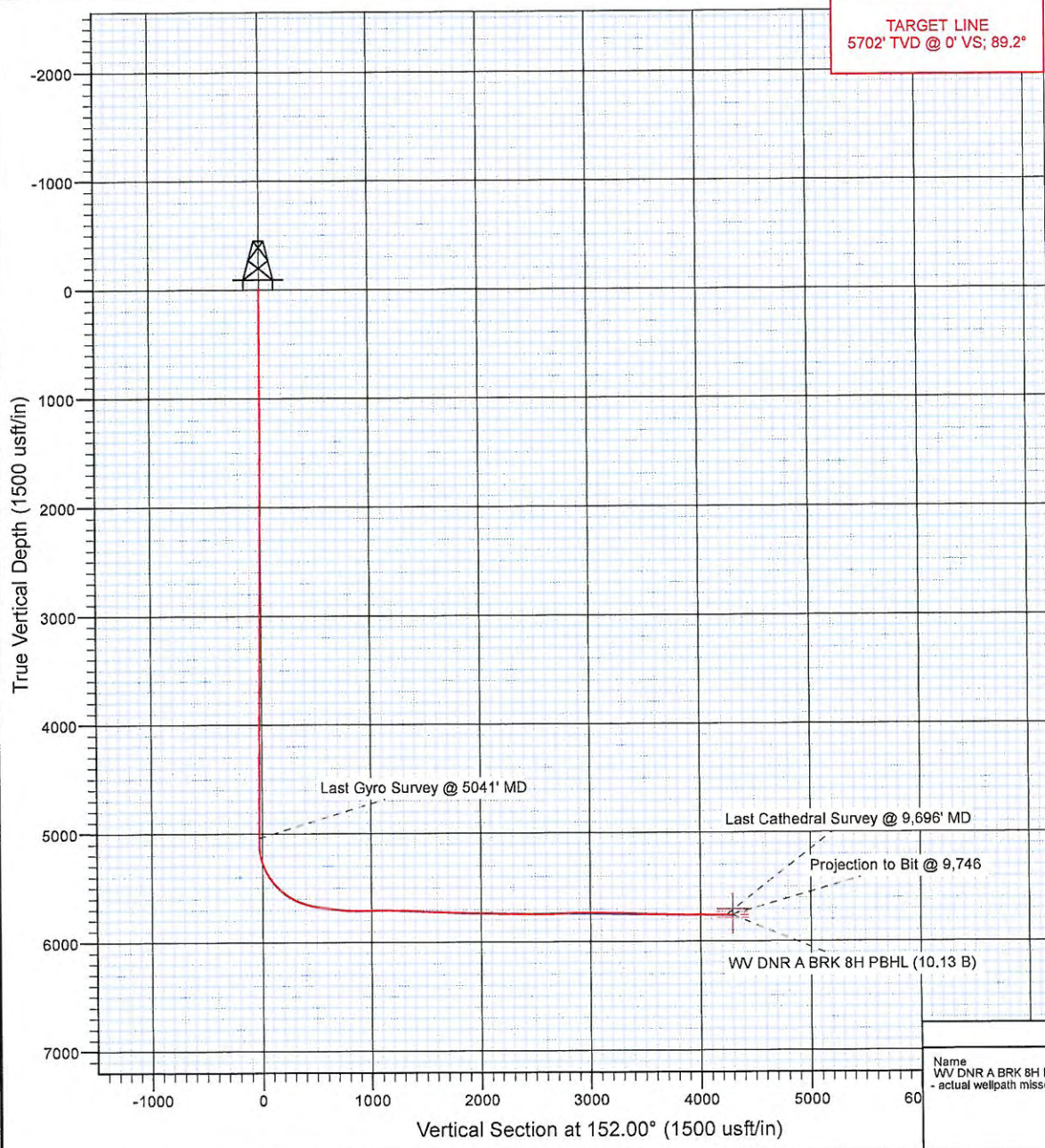


Project: Brooke County, WV  
 Site: State of WV DNR  
 Well: State of WV DNR A BRK 8H  
 Wellbore: HZ  
 Design: HZ



9-00/25

TARGET LINE  
 5702' TVD @ 0° VS; 89.2°



		Ground Level: 1140.0			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	664929.26	1711305.58	40° 19' 15.478 N	80° 32' 7.066 W

DESIGN TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude
WV DNR A BRK 8H PBHL	5707.4	-3791.3	2016.1	661137.86	17113321.70	40° 18' 38.243 N 80° 31' 40.480 W
- actual wellpath misses target center by 49.1usft at 9746.0usft MD (5756.1 TVD, -3794.2 N, 2010.4 E)						



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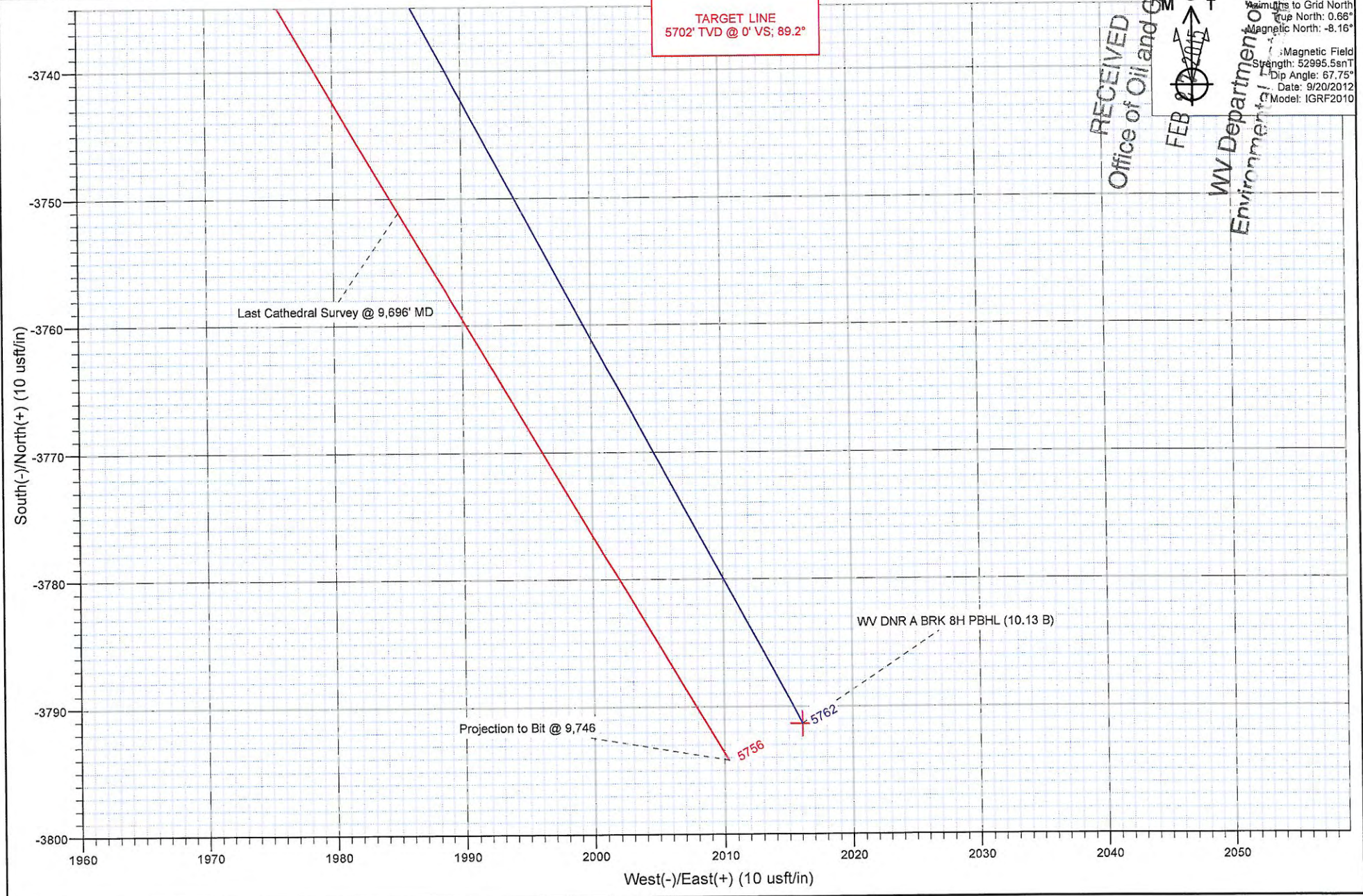


9-00125

TARGET LINE  
5702' TVD @ 0' VS; 89.2°

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Magnets to Grid North  
True North: 0.66°  
Magnetic North: -8.16°  
Magnetic Field  
Strength: 52995.5snT  
Dip Angle: 67.75°  
Date: 9/20/2012  
Model: IGRF2010



9-00125

### Cathedral Energy Services Survey Report

<b>Company:</b> Chesapeake Energy Corp	<b>Local Co-ordinate Reference:</b> Well State of WV DNR A BRK 8H
<b>Project:</b> Brooke County, WV	<b>TVD Reference:</b> WELL @ 1158.0usft (Original Well Elev)
<b>Site:</b> State of WV DNR	<b>MD Reference:</b> WELL @ 1158.0usft (Original Well Elev)
<b>Well:</b> State of WV DNR A BRK 8H	<b>North Reference:</b> Grid
<b>Wellbore:</b> HZ	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> HZ	<b>Database:</b> USA EDM 5000 Multi Users DB

<b>Project</b> Brooke County, WV		
<b>Map System:</b> US State Plane 1927 (Exact solution)	<b>System Datum:</b> Mean Sea Level	
<b>Geo Datum:</b> NAD 1927 (NADCON CONUS)	Using geodetic scale factor	
<b>Map Zone:</b> West Virginia North 4701		

<b>Site</b> State of WV DNR			
<b>Site Position:</b>	<b>Northing:</b> 664,929.27 usft	<b>Latitude:</b> 40° 19' 15.478 N	
<b>From:</b> Lat/Long	<b>Easting:</b> 1,711,305.58 usft	<b>Longitude:</b> 80° 32' 7.066 W	
<b>Position Uncertainty:</b> 0.0 usft	<b>Slot Radius:</b> 13-3/16"	<b>Grid Convergence:</b> -0.66 °	

<b>Well</b> State of WV DNR A BRK 8H			
<b>Well Position</b>	<b>+N/-S</b> 0.0 usft	<b>Northing:</b> 664,929.26 usft	<b>Latitude:</b> 40° 19' 15.478 N
	<b>+E/-W</b> 0.0 usft	<b>Easting:</b> 1,711,305.58 usft	<b>Longitude:</b> 80° 32' 7.066 W
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b> usft	<b>Ground Level:</b> 1,140.0 usft

<b>Wellbore</b> HZ					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/20/2012	-8.82	67.75	52,995

<b>Design</b> HZ					
<b>Audit Notes:</b>					
<b>Version:</b> 1.0	<b>Phase:</b> ACTUAL	<b>Tie On Depth:</b> 0.0			
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	152.00	

<b>Survey Program</b> Date 10/14/2012					
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	5,041.0	Gyro (HZ)	MWD	Geolink MWD	<div style="border: 1px solid black; padding: 5px; transform: rotate(-5deg);">           Received Office of Oil &amp; Gas         </div>
5,052.0	9,746.0	Survey #2 (HZ)	MWD	Geolink MWD	

<b>Survey</b>									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.21	3.27	100.0	0.2	0.0	-0.2	0.21	0.21	
200.0	0.30	328.54	200.0	0.6	-0.1	-0.6	0.17	0.09	
300.0	0.02	334.73	300.0	0.8	-0.3	-0.9	0.28	-0.28	
400.0	0.16	341.61	400.0	1.0	-0.3	-1.0	0.14	0.14	
500.0	0.29	344.83	500.0	1.4	-0.4	-1.4	0.13	0.13	
600.0	0.08	353.68	600.0	1.7	-0.5	-1.7	0.21	-0.21	
700.0	0.15	98.51	700.0	1.7	-0.4	-1.7	0.19	0.07	
800.0	0.27	164.16	800.0	1.5	-0.2	-1.4	0.25	0.12	
900.0	0.11	145.61	900.0	1.2	-0.1	-1.1	0.17	-0.16	
1,000.0	0.43	139.56	1,000.0	0.8	0.2	-0.6	0.32	0.32	
1,100.0	0.30	149.17	1,100.0	0.3	0.6	0.0	0.14	0.14	

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Cathedral Energy Services

Survey Report

9-00125

<b>Company:</b>	Chesapeake Energy Corp	<b>Local Co-ordinate Reference:</b>	Well State of WV DNR A BRK 8H
<b>Project:</b>	Brooke County, WV	<b>TVD Reference:</b>	WELL @ 1158 0usft (Original Well Elev)
<b>Site:</b>	State of WV DNR	<b>MD Reference:</b>	WELL @ 1158 0usft (Original Well Elev)
<b>Well:</b>	State of WV DNR A BRK 8H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,200.0	0.14	142.94	1,200.0	0.0	0.8	0.4	0.16	-0.16	
1,300.0	0.24	162.45	1,300.0	-0.3	1.0	0.7	0.12	0.10	
1,400.0	0.09	207.40	1,400.0	-0.6	1.0	1.0	0.19	-0.15	
1,500.0	0.39	224.50	1,500.0	-0.9	0.7	1.1	0.31	0.30	
1,600.0	0.23	252.08	1,600.0	-1.2	0.3	1.2	0.21	-0.16	
1,700.0	0.46	268.68	1,700.0	-1.3	-0.3	1.0	0.25	0.23	
1,800.0	0.40	282.62	1,800.0	-1.2	-1.1	0.6	0.12	-0.06	
1,900.0	0.46	320.45	1,900.0	-0.8	-1.6	0.0	0.28	0.06	
2,000.0	0.47	329.99	2,000.0	-0.2	-2.1	-0.8	0.08	0.01	
2,100.0	0.42	332.27	2,100.0	0.5	-2.5	-1.6	0.05	-0.05	
2,200.0	0.45	331.17	2,200.0	1.2	-2.8	-2.4	0.03	0.03	
2,300.0	0.42	330.97	2,300.0	1.8	-3.2	-3.1	0.03	-0.03	
2,400.0	0.58	357.37	2,400.0	2.7	-3.4	-4.0	0.28	0.16	
2,500.0	0.53	353.82	2,500.0	3.6	-3.5	-4.8	0.06	-0.05	
2,600.0	0.61	350.53	2,600.0	4.6	-3.6	-5.8	0.09	0.08	
2,700.0	0.59	354.86	2,699.9	5.7	-3.8	-6.8	0.05	-0.02	
2,800.0	0.59	351.49	2,799.9	6.7	-3.9	-7.7	0.03	0.00	
2,900.0	0.69	354.22	2,899.9	7.8	-4.0	-8.8	0.10	0.10	
3,000.0	0.52	356.76	2,999.9	8.8	-4.1	-9.7	0.17	-0.17	
3,100.0	0.60	349.64	3,099.9	9.8	-4.2	-10.6	0.11	0.08	
3,200.0	0.45	341.02	3,199.9	10.7	-4.4	-11.5	0.17	-0.15	
3,300.0	0.38	342.46	3,299.9	11.4	-4.7	-12.2	0.07	-0.07	
3,400.0	0.34	358.32	3,399.9	12.0	-4.8	-12.8	0.11	-0.04	
3,500.0	0.33	356.34	3,499.9	12.6	-4.8	-13.4	0.02	-0.01	
3,600.0	0.52	351.62	3,599.9	13.3	-4.9	-14.1	0.19	0.19	
3,700.0	0.36	340.08	3,699.9	14.1	-5.1	-14.8	0.18	-0.16	
3,800.0	0.60	343.46	3,799.9	14.9	-5.3	-15.6	0.24	0.24	
3,900.0	0.66	347.59	3,899.9	15.9	-5.6	-16.7	0.08	0.06	
4,000.0	0.50	334.32	3,999.9	16.9	-5.9	-17.7	0.21	-0.16	
4,100.0	0.24	330.36	4,099.9	17.5	-6.2	-18.3	0.26	-0.26	
4,200.0	0.30	326.44	4,199.9	17.9	-6.4	-18.8	0.06	0.06	
4,300.0	1.03	311.61	4,299.9	18.7	-7.3	-19.9	0.74	0.73	
4,400.0	0.92	312.84	4,399.9	19.8	-8.5	-21.5	0.11	-0.11	
4,500.0	0.74	329.31	4,499.9	20.9	-9.4	-22.9	0.30	-0.18	
4,600.0	0.58	336.03	4,599.8	21.9	-10.0	-24.0	0.18	-0.16	
4,700.0	0.50	337.72	4,699.8	22.8	-10.4	-25.0	0.08	-0.08	
4,800.0	0.48	335.70	4,799.8	23.6	-10.7	-25.8	0.03	-0.02	
4,900.0	0.24	338.30	4,899.8	24.2	-10.9	-26.5	0.24	-0.24	
5,000.0	0.12	101.12	4,999.8	24.3	-10.9	-26.6	0.32	-0.12	
5,041.0	0.17	101.15	5,040.8	24.3	-10.8	-26.5	0.12	0.12	Last Gyro Survey @ 5041' MD
5,052.0	0.30	110.30	5,051.8	24.3	-10.8	-26.5	1.23	1.18	
5,083.0	0.30	59.30	5,082.8	24.3	-10.6	-26.5	0.83	0.00	
5,114.0	2.40	113.30	5,113.8	24.1	-10.0	-25.9	7.22	6.77	
5,146.0	4.60	126.70	5,145.8	23.1	-8.3	-24.3	7.29	6.87	
5,177.0	7.50	134.60	5,176.6	20.9	-5.9	-21.2	9.71	9.55	
5,208.0	11.50	146.60	5,207.2	16.9	-2.7	-16.2	14.33	12.90	
5,238.0	16.00	152.20	5,236.3	10.7	0.8	-9.1	15.63	15.00	
5,270.0	19.60	149.30	5,266.8	2.2	5.6	0.7	11.58	11.25	
5,301.0	23.60	148.80	5,295.6	-7.6	11.5	12.1	12.92	12.90	
5,332.0	26.40	149.50	5,323.7	-18.8	18.2	25.2	9.08	9.83	
5,364.0	29.00	152.50	5,352.0	-31.8	25.4	40.0	9.22	8.12	
5,394.0	30.00	157.20	5,378.1	-45.2	31.7	54.8	8.40	8.33	
5,426.0	32.60	160.20	5,405.5	-60.7	37.7	71.3	9.47	8.12	

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<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
5,457.0	36.70	159.80	5,431.0	-77.2	43.7	88.7	13.25	13.23	
5,488.0	41.00	160.60	5,455.1	-95.5	50.3	108.0	13.96	13.87	
5,520.0	44.50	160.10	5,478.6	-116.0	57.6	129.5	10.99	10.94	
5,552.0	46.50	159.10	5,501.0	-137.4	65.6	152.1	6.64	6.25	
5,583.0	47.40	158.70	5,522.2	-158.5	73.7	174.6	3.05	2.90	
5,614.0	50.00	156.70	5,542.6	-180.0	82.6	197.7	9.69	8.39	
5,646.0	53.40	155.50	5,562.5	-203.0	92.8	222.8	11.02	10.62	
5,677.0	57.00	153.10	5,580.2	-225.9	103.8	248.2	13.24	11.61	
5,709.0	60.50	152.20	5,596.8	-250.2	116.4	275.6	11.20	10.94	
5,741.0	63.60	150.00	5,611.8	-275.0	130.0	303.8	11.43	9.69	
5,772.0	66.60	149.90	5,624.8	-299.3	144.1	331.9	9.68	9.68	
5,804.0	70.30	149.70	5,636.6	-325.0	159.1	361.7	11.58	11.56	
5,836.0	73.00	149.90	5,646.6	-351.3	174.4	392.0	8.46	8.44	
5,868.0	74.90	149.80	5,655.5	-377.9	189.8	422.7	5.95	5.94	
5,899.0	76.60	149.40	5,663.1	-403.8	205.0	452.8	5.62	5.48	
5,931.0	79.20	148.90	5,669.8	-430.6	221.1	484.0	8.27	8.12	
5,963.0	81.00	148.60	5,675.3	-457.6	237.4	515.5	5.70	5.62	
5,994.0	81.60	148.40	5,680.0	-483.7	253.4	546.1	2.04	1.94	
6,024.0	81.90	148.70	5,684.3	-509.0	268.9	575.7	1.41	1.00	
6,055.0	82.60	148.50	5,688.5	-535.2	284.9	606.4	2.35	2.26	
6,086.0	83.40	149.20	5,692.3	-561.6	300.8	637.1	3.42	2.58	
6,118.0	83.70	149.30	5,695.9	-588.9	317.1	668.8	0.99	0.94	
6,150.0	83.40	150.80	5,699.5	-616.5	333.0	700.6	4.75	-0.94	
6,181.0	84.00	151.90	5,702.9	-643.5	347.7	731.4	4.02	1.94	
6,211.0	84.10	153.20	5,706.0	-670.0	361.5	761.3	4.32	0.33	
6,242.0	86.10	154.90	5,708.6	-697.7	375.0	792.1	8.45	6.45	
6,273.0	88.40	154.60	5,710.1	-725.7	388.2	823.1	7.48	7.42	
6,305.0	90.20	153.60	5,710.5	-754.5	402.2	855.0	6.43	5.62	
6,368.0	91.10	152.30	5,709.8	-810.6	430.8	918.0	2.51	1.43	
6,432.0	91.20	151.70	5,708.5	-867.1	460.9	982.0	0.95	0.16	
6,495.0	91.70	151.00	5,706.9	-922.4	491.1	1,045.0	1.37	0.79	
6,557.0	90.50	151.70	5,705.7	-976.8	520.8	1,107.0	2.24	-1.94	
6,619.0	89.60	152.90	5,705.7	-1,031.7	549.6	1,169.0	2.42	-1.45	
6,680.0	88.50	152.70	5,706.7	-1,085.9	577.5	1,229.9	1.83	-1.80	
6,742.0	86.30	152.10	5,709.5	-1,140.8	606.2	1,291.9	3.68	-3.55	
6,804.0	86.00	152.30	5,713.7	-1,195.5	635.0	1,353.7	0.58	-0.48	
6,866.0	87.70	151.50	5,717.1	-1,250.1	664.2	1,415.6	3.03	2.74	
6,928.0	88.30	151.70	5,719.2	-1,304.7	693.7	1,477.6	1.02	0.97	
6,990.0	88.50	152.10	5,721.0	-1,359.3	722.9	1,539.6	0.72	0.32	
7,052.0	87.10	151.50	5,723.3	-1,413.9	752.1	1,601.5	2.46	-2.26	
7,115.0	87.00	151.00	5,726.6	-1,469.1	782.4	1,664.4	0.81	-0.16	
7,178.0	87.10	151.50	5,729.8	-1,524.2	812.7	1,727.3	0.81	0.16	
7,240.0	87.40	151.40	5,732.8	-1,578.6	842.3	1,789.3	0.51	0.48	
7,302.0	87.90	151.00	5,735.3	-1,632.9	872.1	1,851.2	1.03	0.81	
7,365.0	88.50	151.70	5,737.3	-1,688.2	902.3	1,914.2	1.46	0.95	
7,427.0	89.10	152.00	5,738.6	-1,742.8	931.5	1,976.2	1.08	0.97	
7,490.0	89.80	153.60	5,739.2	-1,798.9	960.3	2,039.2	2.77	1.11	
7,553.0	88.90	153.20	5,739.9	-1,855.2	988.5	2,102.1	1.56	-1.43	
7,616.0	89.00	153.30	5,741.1	-1,911.4	1,016.9	2,165.1	0.22	0.16	
7,679.0	89.70	152.80	5,741.8	-1,967.6	1,045.4	2,228.1	1.37	1.11	
7,742.0	88.70	152.20	5,742.7	-2,023.5	1,074.5	2,291.1	1.85	-1.59	
7,806.0	89.00	153.10	5,744.0	-2,080.3	1,103.9	2,355.1	1.48	0.47	
7,869.0	89.00	153.30	5,745.1	-2,136.5	1,132.3	2,418.0	0.32	0.06	

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Cathedral Energy Services

Survey Report

9.00125

<b>Company:</b>	Chesapeake Energy Corp	<b>Local Co-ordinate Reference:</b>	Well State of WV DNR A BRK 8H
<b>Project:</b>	Brooke County, WV	<b>TVD Reference:</b>	WELL @ 1158.0usft (Original Well Elev)
<b>Site:</b>	State of WV DNR	<b>MD Reference:</b>	WELL @ 1158.0usft (Original Well Elev)
<b>Well:</b>	State of WV DNR A BRK 8H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
7,932.0	88.90	153.20	5,746.2	-2,192.8	1,160.7	2,481.0	0.22	-0.16	
7,993.0	89.60	153.10	5,747.0	-2,247.2	1,188.2	2,542.0	1.16	1.15	
8,057.0	90.90	151.40	5,746.7	-2,303.8	1,218.0	2,606.0	3.34	2.03	
8,120.0	91.70	151.40	5,745.3	-2,359.1	1,248.2	2,669.0	1.27	1.27	
8,184.0	92.70	151.40	5,742.9	-2,415.3	1,278.8	2,732.9	1.56	1.56	
8,247.0	92.20	151.00	5,740.2	-2,470.4	1,309.1	2,795.8	1.02	-0.79	
8,309.0	92.20	150.90	5,737.8	-2,524.6	1,339.2	2,857.8	0.16	0.00	
8,372.0	90.90	151.10	5,736.1	-2,579.7	1,369.7	2,920.7	2.09	-2.06	
8,434.0	89.30	151.80	5,736.0	-2,634.1	1,399.3	2,982.7	2.82	-2.58	
8,496.0	88.60	151.10	5,737.1	-2,688.6	1,429.0	3,044.7	1.60	-1.13	
8,558.0	88.80	151.60	5,738.5	-2,743.0	1,458.7	3,106.7	0.87	0.32	
8,620.0	88.90	150.80	5,739.8	-2,797.3	1,488.5	3,168.7	1.30	0.16	
8,683.0	88.40	150.40	5,741.2	-2,852.2	1,519.5	3,231.6	1.02	-0.79	
8,745.0	88.90	151.30	5,742.7	-2,906.3	1,549.7	3,293.6	1.66	0.81	
8,806.0	88.70	152.40	5,744.0	-2,960.1	1,578.4	3,354.6	1.83	-0.33	
8,869.0	89.10	152.30	5,745.2	-3,015.9	1,607.7	3,417.6	0.65	0.63	
8,933.0	88.50	151.50	5,746.5	-3,072.3	1,637.8	3,481.6	1.56	-0.94	
8,996.0	88.60	151.30	5,748.1	-3,127.6	1,667.9	3,544.6	0.35	0.16	
9,060.0	87.70	152.90	5,750.2	-3,184.1	1,697.9	3,608.5	2.87	-1.41	
9,123.0	87.80	153.40	5,752.7	-3,240.3	1,726.3	3,671.5	0.81	0.16	
9,186.0	87.90	153.20	5,755.0	-3,296.5	1,754.6	3,734.4	0.35	0.16	
9,248.0	88.60	152.80	5,756.9	-3,351.7	1,782.7	3,796.4	1.30	1.13	
9,312.0	89.30	155.10	5,758.1	-3,409.2	1,810.8	3,860.3	3.76	1.09	
9,375.0	89.70	156.50	5,758.6	-3,466.7	1,836.6	3,923.2	2.31	0.63	
9,438.0	89.50	153.80	5,759.1	-3,523.8	1,863.1	3,986.1	4.30	-0.32	
9,501.0	89.50	153.30	5,759.6	-3,580.3	1,891.2	4,049.0	0.79	0.00	
9,564.0	90.80	152.10	5,759.5	-3,636.2	1,920.1	4,112.0	2.81	2.06	
9,628.0	90.90	150.10	5,758.5	-3,692.3	1,951.0	4,176.0	3.13	0.16	
9,691.0	91.20	149.80	5,757.4	-3,746.8	1,982.5	4,239.0	0.67	0.48	
9,696.0	91.30	149.60	5,757.2	-3,751.1	1,985.1	4,244.0	4.45	1.99	Last Cathedral Survey @ 9,696' MD
9,745.8	91.30	149.60	5,756.1	-3,794.0	2,010.2	4,293.7	0.00	0.00	WV DNR A BRK 8H PBHL (10.13)
9,746.0	91.30	149.60	5,756.1	-3,794.2	2,010.4	4,293.9	0.00	0.00	Projection to Bit @ 9,746 - WV DNR A BRK 8H P

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Cathedral Energy Services

9-00125

Survey Report

<b>Company:</b>	Chesapeake Energy Corp	<b>Local Co-ordinate Reference:</b>	Well State of WV DNR A BRK 8H
<b>Project:</b>	Brooke County, WV	<b>TVD Reference:</b>	WELL @ 1158.0usft (Original Well Elev)
<b>Site:</b>	State of WV DNR	<b>MD Reference:</b>	WELL @ 1158.0usft (Original Well Elev)
<b>Well:</b>	State of WV DNR A BRK 8H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
WV DNR A BRK 8H PBT - actual wellpath misses target center by 49.1usft at 9746.0usft MD (5756.1 TVD, -3794.2 N, 2010.4 E) - Point	0.00	360.00	5,707.4	-3,791.3	2,016.1	661,137.86	1,713,321.70	40° 18' 38.243 N	80° 31' 40.480 W
WV DNR A BRK 8H PBT - actual wellpath misses target center by 29.5usft at 9745.8usft MD (5756.1 TVD, -3794.0 N, 2010.2 E) - Point	0.00	360.00	5,784.9	-3,791.3	2,016.1	661,137.86	1,713,321.70	40° 18' 38.243 N	80° 31' 40.480 W
WV DNR A BRK 8H PBT - actual wellpath misses target center by 8.7usft at 9746.0usft MD (5756.1 TVD, -3794.2 N, 2010.4 E) - Point	0.00	360.00	5,762.0	-3,791.3	2,016.1	661,137.86	1,713,321.70	40° 18' 38.243 N	80° 31' 40.480 W
WV DNR A BRK 8H PBT - actual wellpath misses target center by 24.5usft at 9746.0usft MD (5756.1 TVD, -3794.2 N, 2010.4 E) - Point	0.00	360.00	5,732.5	-3,791.3	2,016.1	661,137.86	1,713,321.70	40° 18' 38.243 N	80° 31' 40.480 W

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)		
5,041.0	5,040.8	24.3	-10.8	Last Gyro Survey @ 5041' MD	
9,696.0	5,757.2	-3,751.1	1,985.1	Last Cathedral Survey @ 9,696' MD	
9,746.0	5,756.1	-3,794.2	2,010.4	Projection to Bit @ 9,746	

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

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# Hydraulic Fracturing Fluid Product Component Information Disclosure

9-00125

<b>Fracture Date:</b>	5/4/2013
<b>State:</b>	WEST VIRGINIA
<b>County:</b>	BROOKE
<b>API Number:</b>	4700900125
<b>Operator Name:</b>	CHESAPEAKE APPALACHIA LLC
<b>Well Name and Number:</b>	STATE OF WV DNR A BRK 8H
<b>Longitude:</b>	-80.535296
<b>Latitude:</b>	40.320966
<b>Long/Lat Projection:</b>	NAD27
<b>Production Type:</b>	GAS
<b>True Vertical Depth (TVD):</b>	5,760
<b>Total Water Volume (gal)*:</b>	3,611,580

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## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by Mass)**	Maximum Ingredient Concentration in HF Fluid (% by Mass)**	Comments
Fresh Water	CHESAPEAKE ENERGY	Carrier/Base Fluid	Water	007732-18-5	100.00000%	74.35452%	
Recycled Produced Water	CHESAPEAKE ENERGY	Carrier/Base Fluid	Water	007732-18-5	100.00000%	10.08339%	
EC6486A	NALCO	Scale Inhibitor	Ethylene Glycol	000107-21-1	30.00000%	0.00159%	
EC6110A	NALCO	Anti-Bacterial Agent	Ethanol	000064-17-5	5.00000%	0.00136%	
			Glutaraldehyde (Pentanediol)	000111-30-8	60.00000%	0.01635%	
			Quaternary Ammonium Compounds	NA	10.00000%	0.00273%	
Acid, Hydrochloric 15pct, A264, B315, J218, J580, L058, 100 Mesh Sand, Northern White Sand	SCHLUMBERGER	Acid, Breaker, Corrosion Inhibitor, Friction Reducer, Gelling Agent, Iron Control Agent, Proppant - Natural	Crystalline silica	14808-60-7	98.79234%	14.99287%	
			Hydrogen chloride	7647-01-0	0.93101%	0.14129%	
			Water	007732-18-5	2.47925%	0.38595%	
			Distillates (petroleum), hydrotreated light	64742-47-8	0.09618%	0.01460%	
			Acrylamide/ammonium acrylate copolymer	26100-47-0	0.08015%	0.01216%	
			Ammonium chloride	12125-02-9	0.04609%	0.00699%	

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Guar gum	9000-30-0	0.03526%	0.00535%
Ethoxylated oleic acid	9004-96-0	0.00801%	0.00122%
Sorbitan monooleate	1338-43-8	0.00701%	0.00106%
Sorbitol Tetraoleate	61723-83-9	0.00501%	0.00076%
Alcohols, C12-C16, ethoxylated	68551-12-2	0.00417%	0.00063%
Alcohols, C12-C14, ethoxylated	68439-50-9	0.00413%	0.00063%
Alcohols, C10-C16, ethoxylated	68002-97-1	0.00413%	0.00063%
Sodium erythorbate	6381-77-7	0.00361%	0.00055%
Methanol	67-56-1	0.00352%	0.00050%
Diammonium peroxodisulphate	7727-54-0	0.00290%	0.00044%
Fatty acids, tall-oil	61790-12-3	0.00244%	0.00037%
C14 alpha olefin ethoxylate	84133-50-6	0.00220%	0.00033%
Thiourea, polymer with formaldehyde and 1-phenylethanone	68527-49-1	0.00201%	0.00030%
2-Propenoic acid, ammonium salt	10604-69-0	0.00200%	0.00030%
Alcohols, C14-15, ethoxylated (7EO)	68951-67-7	0.00093%	0.00014%
Prop-2-yn-1-ol	107-19-7	0.00062%	0.00009%
Alkenes, C>10 a-	64743-02-8	0.00041%	0.00006%
Non-crystalline silica	7631-86-9	0.00010%	0.00001%

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Additional Ingredients Not Listed on MSDS						
EC6110A, EC6486A	NALCO	Anti-Bacterial Agent, Scale Inhibitor	Diethylene Glycol	000111-46-6		0.00006%
			Proprietary Inorganic Phosphate	TRADE SECRET		0.00062%
			Proprietary Organic Acid Derivatives	TRADE SECRET		0.00186%
			Water	007732-18-5		0.02413%

\* 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.