

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

API 47 - 009 - 00146 County Brooke District Buffalo
Quad Bethany Pad Name Violet Coss BRK Field/Pool Name _____
Farm name Violet Coss BRK 8H Well Number 834831
Operator (as registered with the OOG) Chesapeake Appalachia, L.L.C.
Address P.O. Box 18496 City Oklahoma City State OK Zip 73154-0496

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 639993.15 Easting 1686742.66
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing 633802.63 Easting 1689551.16

Elevation (ft) 1172 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) SOBM
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Date permit issued 8/27/2012 Date drilling commenced 8/26/2014 WV Department of Environmental Protection Date drilling ceased 9/29/2014
Date completion activities began 11/20/2014 Date completion activities ceased 11/22/2014
Verbal plugging (Y/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 297 Open mine(s) (Y/N) depths N
Salt water depth(s) ft 646 Void(s) encountered (Y/N) depths 200' abandoned mine
Coal depth(s) ft 200 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

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Reviewed by: AX 09/16/16

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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	36"	30"	120'	New	J-55/94#		Y to surface
Surface	24"	20"	225'	New	J-55/54.5#		Y to surface
Coal							
Intermediate 1	17 1/2"	13 3/8"	454'	New	J-55/40#		Y to surface
Intermediate 2	12 1/4"	9 5/8"	1615'	New			
Intermediate 3							
Production	8 3/4"	5 1/2"	12248'	New	P-110/A20#		Y TOC 236'
Tubing	2 3/8"		5893.9	New			
Packer type and depth set							

Comment Details _____

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	A	285	15.60	1.20	222	Surface	8
Surface	A	103	15.0	1.18	121.54	Surface	8
Coal							
Intermediate 1	A	465	15.60	1.20	558	Surface	8
Intermediate 2	A	660	15.60	1.20	792		
Intermediate 3							
Production	A	1590/870	15.60/15.30	1.19/1.31	3031.8	236'	8
Tubing							

Drillers TD (ft) 12248 Loggers TD (ft) 12248
 Deepest formation penetrated MARCELLUS Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5023'

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 _____

Surface / Coal - Run centralizers in the middle and top of the first joint, top of the third jt and every 4th joint to surface.
 Production - Run 1st centralizer 3' from Shoe, 2nd at top of the first joint and then one every 3rd joint to TOC.

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WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS JUN 21 2016

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS WV Department of Environmental Protection

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

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PRODUCING FORMATION(S)	DEPTHS	
	TVD	MD
N/A		

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	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
PITTSBURG COAL	177		177		
FRESHWATER	360		360		
UPPER KITTANNING COAL	770		770		
BIG INJUN	1274		1448		
GENESEO	5504		5536		
TULLY	5521		5558		
HAMILTON	5568		5622		Shale, Oil Base Mud
MARCELLUS	5649		5780		
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Please insert additional pages as applicable.

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Drilling Contractor Nomac Drilling
 Address 171 Locust Ave Extension City Mt. Morris State PA Zip 15349

Logging Company Scientific Drilling
 Address 16701 Greenspoint Park Drive, Suite 200 City Houston State TX Zip 77060

Cementing Company Schlumberger
 Address 1080 U.S. 33 City Weston State WV Zip 26452

Stimulating Company Schlumberger
 Address 1080 U.S. 33 City Weston State WV Zip 26452

Please insert additional pages as applicable.

Completed by Jessica Greathouse Telephone 304-353-5240
 Signature  Title Manager - Regulatory Operations Date 6/14/2016

PERFORATION RECORD ATTACHMENT

Well Name and Number: VIOLET COSS BRK 8H

API No. 47-009-00146

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Stage	PERFORATION RECORD				STIMULATION RECORD							
	Date	Interval Perforated		Total Number Of Shots	Fluid			Propping Agent		Average Injection Rate		
		From	To		Date	Interval Treated	Type	Amount	Type		Amount	
1	11/10/2014	11,977	12,098	30	11/10/2014	41953	11,977	SLK Wtr	5617	Sand	333820	78.9
2	11/10/2014	11,826	11,948	30	11/10/2014	41953	11,826	SLK Wtr	5667	Sand	332240	80
3	11/10/2014	11,675	11,797	30	11/10/2014	41953	11,675	SLK Wtr	5035	Sand	332400	80.2
4	11/11/2014	11,524	11,646	30	11/11/2014	41954	11,524	SLK Wtr	5055	Sand	333120	80.1
5	11/11/2014	11,373	11,495	30	11/11/2014	41954	11,373	SLK Wtr	4944	Sand	332510	80.1
6	11/11/2014	11,222	11,344	30	11/11/2014	41954	11,222	SLK Wtr	5026	Sand	335370	79.7
7	11/11/2014	11,071	11,193	30	11/11/2014	41954	11,071	SLK Wtr	4987	Sand	333120	80
8	11/11/2014	10,920	11,042	30	11/11/2014	41954	10,920	SLK Wtr	4952	Sand	329180	79.8
9	11/11/2014	10,769	10,891	30	11/11/2014	41954	10,769	SLK Wtr	4974	Sand	334620	80.3
10	11/11/2014	10,618	10,740	30	11/11/2014	41954	10,618	SLK Wtr	5052	Sand	327740	80
11	11/12/2014	10,467	10,589	30	11/12/2014	41955	10,467	SLK Wtr	5074	Sand	328020	80
12	11/12/2014	10,316	10,438	30	11/12/2014	41955	10,316	SLK Wtr	5091	Sand	332060	74
13	11/16/2014	10,165	10,287	30	11/16/2014	41959	10,165	SLK Wtr	4963	Sand	332560	80
14	11/17/2014	10,014	10,136	30	11/17/2014	41960	10,014	SLK Wtr	4939	Sand	331420	79.6
15	11/17/2014	9,863	9,985	30	11/17/2014	41960	9,863	SLK Wtr	5142	Sand	326980	76.8
16	11/17/2014	9,712	9,834	30	11/17/2014	41960	9,712	SLK Wtr	6609	Sand	332100	75.7
17	11/18/2014	9,561	9,683	30	11/18/2014	41961	9,561	SLK Wtr	5739	Sand	332640	80.2
18	11/18/2014	9,410	9,532	30	11/18/2014	41961	9,410	SLK Wtr	4936	Sand	333560	80
19	11/18/2014	9,259	9,381	30	11/18/2014	41961	9,259	SLK Wtr	4941	Sand	332220	80
20	11/18/2014	9,108	9,230	30	11/18/2014	41961	9,108	SLK Wtr	5420	Sand	331840	78
21	11/19/2014	8,957	9,079	30	11/19/2014	41962	8,957	SLK Wtr	4800	Sand	332220	80
22	11/19/2014	8,807	8,928	30	11/19/2014	41962	8,807	SLK Wtr	4739	Sand	332620	76.8
23	11/19/2014	8,655	8,777	30	11/19/2014	41962	8,655	SLK Wtr	7705	Sand	332040	65
24	11/19/2014	8,504	8,626	30	11/19/2014	41962	8,504	SLK Wtr	4930	Sand	336400	79
25	11/19/2014	8,353	8,475	30	11/19/2014	41962	8,353	SLK Wtr	4865	Sand	334740	80
26	11/20/2014	8,202	8,324	30	11/20/2014	41963	8,202	SLK Wtr	4870	Sand	333180	77.1
27	11/20/2014	8,051	8,173	30	11/20/2014	41963	8,051	SLK Wtr	4823	Sand	332980	80.2
28	11/20/2014	7,900	8,022	30	11/20/2014	41963	7,900	SLK Wtr	4738	Sand	334380	80.2
29	11/20/2014	7,749	7,871	30	11/20/2014	41963	7,749	SLK Wtr	4819	Sand	335800	80

30	11/20/2014	7,598	7,720	30	11/20/2014	41963	7,598	SLK Wtr	4817	Sand	331100	80
31	11/20/2014	7,447	7,569	30	11/20/2014	41963	7,447	SLK Wtr	4677	Sand	332600	80
32	11/20/2014	7,296	7,418	30	11/20/2014	41963	7,296	SLK Wtr	4753	Sand	329420	80
33	11/21/2014	7,145	7,267	30	11/21/2014	41964	7,145	SLK Wtr	4793	Sand	333891	79.9
34	11/21/2014	6,994	7,116	30	11/21/2014	41964	6,994	SLK Wtr	4740	Sand	333700	79.6
35	11/21/2014	6,843	6,965	30	11/21/2014	41964	6,843	SLK Wtr	4834	Sand	332880	79.6
36	11/21/2014	6,692	6,814	30	11/21/2014	41964	6,692	SLK Wtr	4530	Sand	303140	77
37	11/21/2014	6,541	6,663	30	11/21/2014	41964	6,541	SLK Wtr	4701	Sand	337160	80
38	11/21/2014	6,390	6,512	30	11/21/2014	41964	6,390	SLK Wtr	4712	Sand	333160	80
39	11/21/2014	6,239	6,361	30	11/21/2014	41964	6,239	SLK Wtr	4734	Sand	336480	80
40	11/22/2014	6,088	6,210	30	11/22/2014	41965	6,088	SLK Wtr	4660	Sand	334640	79.3
41	11/22/2014	5,937	6,059	30	11/22/2014	41965	5,937	SLK Wtr	5056	Sand	348660	79.2

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date:	11/10/2014
State:	WEST VIRGINIA
County:	BROOKE
API Number:	4700900146
Operator Name:	SWN PRODUCTION CO LLC
Well Name and Number:	VIOLET COSS BRK 8H
Longitude:	-80.622256
Latitude:	40.251712
Long/Lat Projection:	NAD27
Production Type:	GAS
True Vertical Depth (TVD):	5,759
Total Water Volume (gal)*:	9,034,662

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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	100.00%	83.43357%	
Recycled Produced Water	CHESAPEAKE ENERGY	Carrier/Base Fluid	Water	007732-18-5	100.00%	0.15480%	
EC6110A	NALCO	Anti-Bacterial Agent	Ethanol	000064-17-5	5.00%	0.00130%	
			Glutaraldehyde (Pentanediol)	000111-30-8	60.00%	0.01557%	
			Quaternary Ammonium Compounds	NA	10.00%	0.00260%	
EC6629A	NALCO	Scale Inhibitor	No Hazardous Components	NONE		0.00000%	
A264, J218, J580, J609, L058, Acid, Hydrochloric 15pct, Acid, Hydrochloric 7.5pct, Northern White Sand, 100 Mesh Sand	SCHLUMBERGER	Breaker, Corrosion Inhibitor, Friction Reducer, Gelling Agent, Iron Control Agent, Acid, Proppant - Natural	Crystalline silica	14808-60-7	98.94%	15.78629%	
			Hydrochloric acid	7647-01-0	0.76%	0.12187%	
			Guar gum	9000-30-0	0.15%	0.02411%	
			Ammonium sulfate	7783-20-2	0.07%	0.01046%	
			Acrylamide, 2-acrylamido-2-methylpropanesulfonic acid, sodium salt polymer	38193-60-1	0.05%	0.00772%	
			Diammonium peroxodisulphate	7727-54-0	0.01%	0.00186%	
			Polymer of 2-acrylamido-2-	136793-29-8	0.01%	0.00083%	
			Urea	57-13-6	0.00%	0.00051%	
			Sodium erythorbate	6381-77-7	0.00%	0.00042%	
			Methanol	67-56-1	0.00%	0.00040%	

			Fatty acids, tall-oil	61790-12-3	0.00%	0.00028%	
			Thiourea, polymer with	68527-49-1	0.00%	0.00023%	
			Non-crystalline silica (impurity)	7631-86-9	0.00%	0.00017%	
			Sodium sulfate	7757-82-6	0.00%	0.00012%	
			Alcohols, C14-15, ethoxylated	68951-67-7	0.00%	0.00011%	
			Prop-2-yn-1-ol	107-19-7	0.00%	0.00007%	
			2-propenamid	79-06-1	0.00%	0.00003%	
			Hexadec-1-ene	629-73-2	0.00%	0.00002%	
			Tetrasodium	64-02-8	0.00%	0.00001%	
			1-Octadecene (C18)	112-88-9	0.00%	0.00001%	
			Dimethyl siloxanes and silicones	63148-62-9	0.00%	0.00001%	
			Formaldehyde	50-00-0	0.00%	< 0.00001%	
			Siloxanes and Silicones, di-Me,	67762-90-7	0.00%	< 0.00001%	
			Octamethylcyclotetrasiloxane	556-67-2	< 0.00001%	< 0.00001%	
			Decamethyl cyclopentasiloxane	541-02-6	< 0.00001%	< 0.00001%	
			Dodecamethylcyclohexasiloxane	540-97-6	< 0.00001%	< 0.00001%	
			Copper(II) sulfate	7758-98-7	< 0.00001%	< 0.00001%	

Additional Ingredients Not Listed on MSDS							
EC6110A, EC6629A	NALCO	Anti-Bacterial Agent, Scale Inhibitor	Methanol (Methyl Alcohol)	000067-56-1		0.00596%	
			Proprietary Acrylate Polymer	TRADE SECRET		0.00596%	
			Proprietary Quaternary Ammonium Salt	TRADE SECRET		0.00596%	
			Water	007732-18-5		0.02552%	

* 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.

All component information listed was obtained from the supplier's Material Safety Data Sheets (MSDS). As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration's (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(i) and Appendix D.

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