

Farm name: Russell Hervey BRK 8H Operator Well No.: 836179

LOCATION: Elevation: 1,160' Quadrangle: Stuebenville East

District: Buffalo County: Brooke
Latitude: 4,250' Feet South of 40 Deg. 17 Min. 30 Sec.
Longitude 12,250' Feet West of 80 Deg. 32 Min. 30 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"	138'	138'	244 Cu. Ft.
Agent: Eric Gillespie	13 3/8"	378'	378'	454 Cu. Ft.
Inspector: Gayne J. Knitowski	9 5/8"	1,716'	1,716'	791 Cu. Ft.
Date Permit Issued: 8-29-2012	5 1/2"	11,176'	11,176'	1,090 Cu. Ft.
Date Well Work Commenced: 12-23-2012				
Date Well Work Completed: 6-30-2013				
Verbal Plugging:				
Date Permission granted on:				
Rotary <input checked="" type="checkbox"/> Cable <input type="checkbox"/> Rig <input type="checkbox"/>				
Total Vertical Depth (ft): 5,959'				
Total Measured Depth (ft): 11,177'				
Fresh Water Depth (ft.): 48'				
Salt Water Depth (ft.): 1100'				
Is coal being mined in area (N/Y)? N				
Coal Depths (ft.): 245'				
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) 6,130-11,052
Gas: Initial open flow _____ MCF/d Oil: Initial open flow _____ Bbl/d
Final open flow 2,617* MCF/d Final open flow 199 Bbl/d
Time of open flow between initial and final tests 72 Hours *Calculated
Static rock Pressure 3,873* psig (surface pressure) after 72 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

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

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 _____
LWD GR from 5305-11177' 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

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

PERFORATION RECORD ATTACHMENT

Well Name and Number: Russell Hervey BRK 8H

API No. 47-009-00136

Stage	PERFORATION RECORD				STIMULATION RECORD							
	Date	Interval Perforated		Total Number Of Shots	Date	Interval Treated	Fluid		Propping Agent		Average Injection Rate	
		From	To				Type	Amount	Type	Amount		
1	5/20/2013	10683	11052	80	5/20/2013	10683	11052	SLK Wtr	13699	Sand	548000	82.1
2	5/21/2013	10213	10596	80	5/21/2013	10213	10596	SLK Wtr	4641	Sand	182349	63.9
3	5/21/2013	9777	10140	80	5/21/2013	9777	10140	SLK Wtr	9172	Sand	554631	84.9
4	5/28/2013	9321	9684	40	5/28/2013	9321	9684	SLK Wtr	11003	Sand	548783	81.4
5	5/28/2013	8810	9228	80	5/28/2013	8810	9228	SLK Wtr	11505	Sand	554612	55
5	5/28/2013	8810	9228	80	5/28/2013	8810	9228	SLK Wtr	11505	Sand	554612	89.5
6	5/29/2013	8410	8772	40	5/29/2013	8410	8772	SLK Wtr	6729	Sand	554631	86.4
7	5/29/2013	7940	8317	80	5/29/2013	7940	8317	SLK Wtr	11052	Sand	553941	89.5
7	5/29/2013	7940	8317	80	5/29/2013	7940	8317	SLK Wtr	11052	Sand	553941	43.3
8	5/30/2013	7499	7861	48	5/30/2013	7499	7861	SLK Wtr	7168	Sand	545080	86.6
9	5/30/2013	7042	7405	50	5/30/2013	7042	7405	SLK Wtr	7413	Sand	550547	84
10	5/30/2013	6586	6949	50	5/30/2013	6586	6949	SLK Wtr	3124	Sand	544795	84.9
11	5/31/2013	6130	6493	50	5/31/2013	6130	6493	SLK Wtr	6829	Sand	548630	85

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

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

Maximum TVD of wellbore: 5959 ft TVD @ 11177 ft MD

Formation/Lithology	Top Depth, MD (ft)	Top Depth, TVD (ft)	Bottom Depth, MD (ft)	Bottom Depth, TVD (ft)
LS/SILT	0	0	272	272
PITTSBURG COAL	272	272	282	282
LS/SHALE/SILT	282	282	380	380
SS	380	380	440	440
SHALE	440	440	590	590
LS/SILT/SHALE	590	590	856	856
KITTANNING COAL	856	856	862	862
SS/SILT	862	862	1267	1267
BIG LIME	1267	1267	1315	1315
BIG INJUN (SS)	1315	1315	1612	1612
SHALE	1612	1612	5672	5648
GENESEO (SH)	5672	5648	5688	5661
TULLY (LS)	5688	5661	5748	5710
HAMILTON (SH)	5748	5710	6027	5849
MARCELLUS (SH)	6027	5849		
TD OF LATERAL			11177	5959

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Farm name: Russell Hervey BRK 8H Operator Well No.: 836179

LOCATION: Elevation: 1,160' Quadrangle: Stuebenville East

District: Buffalo County: Brooke
Latitude: 4,250' Feet South of 40 Deg. 17 Min. 30 Sec.
Longitude 12,250' Feet West of 80 Deg. 32 Min. 30 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"	138'	138'	244 Cu. Ft.
Agent: Eric Gillespie	13 3/8"	378'	378'	454 Cu. Ft.
Inspector: Gayne J. Knitowski	9 5/8"	1,716'	1,716'	791 Cu. Ft.
Date Permit Issued: 8-29-2012	5 1/2"	11,176'	11,176'	1,090 Cu. Ft.
Date Well Work Commenced: 12-23-2012				
Date Well Work Completed: 6-30-2013				
Verbal Plugging:				
Date Permission granted on:				
Rotary <input checked="" type="checkbox"/> Cable <input type="checkbox"/> Rig <input type="checkbox"/>				
Total Vertical Depth (ft): 5,959'				
Total Measured Depth (ft): 11,177'				
Fresh Water Depth (ft.): 48'				
Salt Water Depth (ft.): 1100'				
Is coal being mined in area (N/Y)? N				
Coal Depths (ft.): 245'				
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) 6,130-11,052
Gas: Initial open flow _____ MCF/d Oil: Initial open flow _____ Bbl/d
Final open flow 2,617* MCF/d Final open flow 199 Bbl/d
Time of open flow between initial and final tests 72 Hours *Calculated
Static rock Pressure 3,873* psig (surface pressure) after 72 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

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

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 _____
LWD GR from 5305-11177' 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

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

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

Maximum TVD of wellbore: 5959 ft TVD @ 11177 ft MD

Formation/Lithology	Top Depth, MD (ft)	Top Depth, TVD (ft)	Bottom Depth, MD (ft)	Bottom Depth, TVD (ft)
LS/SILT	0	0	272	272
PITTSBURG COAL	272	272	282	282
LS/SHALE/SILT	282	282	380	380
SS	380	380	440	440
SHALE	440	440	590	590
LS/SILT/SHALE	590	590	856	856
KITTANNING COAL	856	856	862	862
SS/SILT	862	862	1267	1267
BIG LIME	1267	1267	1315	1315
BIG INJUN (SS)	1315	1315	1612	1612
SHALE	1612	1612	5672	5648
GENESEO (SH)	5672	5648	5688	5661
TULLY (LS)	5688	5661	5748	5710
HAMILTON (SH)	5748	5710	6027	5849
MARCELLUS (SH)	6027	5849		
TD OF LATERAL			11177	5959

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date:	4/8/2013
State:	WEST VIRGINIA
County:	BROOKE
API Number:	4700900136
Operator Name:	CHESAPEAKE APPALACHIA LLC
Well Name and Number:	RUSSELL HERVEY BRK 8H
Longitude:	-80.556882
Latitude:	40.258041
Long/Lat Projection:	NAD27
Production Type:	GAS
True Vertical Depth (TVD):	5,960
Total Water Volume (gal)*:	5,066,880

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%	82.00829%	
Recycled Produced Water	CHESAPEAKE ENERGY	Carrier/Base Fluid	Water	007732-18-5	100.00%	4.84718%	
Northern White Sand	FTS INTERNATIONAL	Proppant - Natural	Crystalline Silica (Quartz Sand, Silicon Dioxide)	014808-60-7	100.00%	7.91897%	
100 Mesh Sand	FTS INTERNATIONAL	Proppant - Natural	Crystalline Silica (Quartz Sand, Silicon Dioxide)	014808-60-7	100.00%	3.69595%	
10.1 - 15 HCL	FTS INTERNATIONAL	Acid	Hydrochloric Acid	007647-01-0	15.00%	0.20240%	
FRW-200	FTS INTERNATIONAL	Friction Reducer	Petroleum Distillate Hydrotreated	064742-47-8	26.00%	0.01298%	
FE-100L	FTS INTERNATIONAL	Iron Control Agent	Citric Acid	000077-92-9	55.00%	0.00819%	
FRW-600	FTS INTERNATIONAL	Friction Reducer	Petroleum Distillate Hydrotreated	064742-47-8	30.00%	0.00608%	

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

HVG01 (TURQUOISE-1 BULK)	FTS INTERNATIONAL	Gelling Agent	Crystalline Silica (Quartz Sand, Silicon Dioxide) Guar Gum Petroleum Distillate Hydrotreated Light Surfactant	014808-60-7 009000-30-0 064742-47-8 068439-51-0	2.00% 50.00% 55.00% 2.00%	0.00085% 0.02132% 0.02345% 0.00085%	
B10 (HIGH PH BUFFER)	FTS INTERNATIONAL	pH Adjusting Agent	Potassium Carbonate Potassium Hydroxide	000584-08-7 001310-58-3	48.00% 20.00%	0.00068% 0.00028%	
APPB01 (AMMONIUM PERSULFATE BREAKER)	FTS INTERNATIONAL	Breaker	Ammonium Persulfate	007727-54-0	100.00%	0.00059%	
BXL02 Borate XL	FTS INTERNATIONAL	Cross Linker	Boric Acid Potassium Hydroxide Sodium Metaborate Tetrahydrate Dimethyl Formamide Isopropanol (Isopropyl Alcohol, Propan-2-ol) Proprietary Aromatic Aldehyde Proprietary Organic Amine Resin Salt Proprietary Quaternary Ammonium Compound	010043-35-3 001310-58-3 010555-76-7 000068-12-2 000067-63-0 TRADE SECRET TRADE SECRET TRADE SECRET TRADE SECRET	15.00% 12.00% 25.00% 10.00% 60.00% 10.00% 30.00% 10.00%	0.00043% 0.00034% 0.00071% 0.00017% 0.00104% 0.00017% 0.00052% 0.00017%	
CI-150	FTS INTERNATIONAL	Corrosion Inhibitor	Sodium Polyacrylate Didecyl Dimethyl Ammonium Chloride Ethanol Glutaraldehyde (Pentanedial) Quaternary Ammonium Compound	009003-04-7 007173-51-5 000064-17-5 000111-30-8 068424-85-1	100.00% 8.00% 4.00% 27.00% 6.00%	0.00913% 0.00295% 0.00147% 0.00994% 0.00203%	
SC30	X CHEM	Scale Inhibitor					
B84	X CHEM	Anti-Bacterial Agent					

Additional Ingredients Not Listed on MSDS

APPB01 (AMMONIUM PERSULFATE BREAKER), B10 (HIGH PH BUFFER), BXL02 Borate XL, CI-150, FE-100L, FRW- 200, FRW-600	FTS INTERNATIONAL	Breaker, Corrosion Inhibitor, Cross Linker, Friction Reducer, Iron Control Agent, pH Adjusting Agent	Proprietary Breaker (APPB01) Additive Proprietary Corrosion Inhibitor Additive (CI-150) Proprietary Friction Reducer Additive (FRW-200 and FRW- 200W) Proprietary Friction Reducer Additive (FRW-600) Water	TRADE SECRET TRADE SECRET TRADE SECRET TRADE SECRET	0.00003% 0.00089% 0.04654% 0.02064% 0.02099%		
B84, SC30	X CHEM	Anti-Bacterial Agent, Scale Inhibitor	Water	007732-18-5	0.05200%		

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

* 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.

RECEIVED

FEB 27 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV