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WR-35  
Rev. 8/23/13

WV GEOLOGICAL SURVEY  
MORGANTOWN, WV

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

API 47 - 017 - 06619 County Doddridge District Central  
Quad Oxford 7.5' Pad Name Robert Williams Pad Field/Pool Name ----  
Farm name Williams, Robert Well Number James Unit 2H  
Operator (as registered with the OOG) Antero Resources Corpotion  
Address 1615 Wynkoop St. City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4343157m Easting 511862m  
Landing Point of Curve Northing 4343219.12m Easting 512405.27m  
Bottom Hole Northing 4340572m Easting 513662m

Elevation (ft) 990' 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)  
Air- Foam & 4% KCL  
Mud- Polymer

Date permit issued 11/14/2014 Date drilling commenced 11/19/2014 Date drilling ceased 3/11/2015  
Date completion activities began 4/6/2015 Date completion activities ceased 7/3/2015  
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 57' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 1507' Void(s) encountered (Y/N) depths No  
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No

Reviewed by:  
\_\_\_\_\_







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API 47-017-06619 Farm Name Williams, Robert Well Number James Unit 2H

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	6-Apr-15	16,553	16,720	60	Marcellus
2	28-Apr-15	16,355	16,522	60	Marcellus
3	28-Apr-15	16,157	16,324	60	Marcellus
4	28-Apr-15	15,959	16,126	60	Marcellus
5	28-Apr-15	15,761	15,928	60	Marcellus
6	29-Apr-15	15,563	15,730	60	Marcellus
7	29-Apr-15	15,365	15,532	60	Marcellus
8	29-Apr-15	15,168	15,335	60	Marcellus
9	30-Apr-15	14,970	15,137	60	Marcellus
10	30-Apr-15	14,772	14,939	60	Marcellus
11	30-Apr-15	14,574	14,741	60	Marcellus
12	30-Apr-15	14,376	14,543	60	Marcellus
13	1-May-15	14,178	14,345	60	Marcellus
14	1-May-15	13,980	14,147	60	Marcellus
15	1-May-15	13,782	13,949	60	Marcellus
16	1-May-15	13,584	13,751	60	Marcellus
17	2-May-15	13,386	13,553	60	Marcellus
18	2-May-15	13,188	13,355	60	Marcellus
19	2-May-15	12,990	13,157	60	Marcellus
20	3-May-15	12,792	12,959	60	Marcellus
21	3-May-15	12,595	12,761	60	Marcellus
22	3-May-15	12,397	12,564	60	Marcellus
23	3-May-15	12,199	12,366	60	Marcellus
24	4-May-15	12,001	12,168	60	Marcellus
25	4-May-15	11,803	11,970	60	Marcellus
26	4-May-15	11,605	11,772	60	Marcellus
27	4-May-15	11,407	11,574	60	Marcellus
28	4-May-15	11,209	11,376	60	Marcellus
29	5-May-15	11,011	11,178	60	Marcellus
30	5-May-15	10,813	10,980	60	Marcellus
31	5-May-15	10,615	10,782	60	Marcellus
32	5-May-15	10,417	10,584	60	Marcellus
33	6-May-15	10,219	10,386	60	Marcellus
34	6-May-15	10,021	10,188	60	Marcellus
35	6-May-15	9,824	9,990	60	Marcellus
36	6-May-15	9,626	9,793	60	Marcellus
37	6-May-15	9,428	9,595	60	Marcellus
38	7-May-15	9,230	9,397	60	Marcellus
39	7-May-15	9,032	9,199	60	Marcellus
40	7-May-15	8,834	9,001	60	Marcellus
41	7-May-15	8,636	8,803	60	Marcellus
42	7-May-15	8,438	8,605	60	Marcellus
43	8-May-15	8,240	8,407	60	Marcellus
44	8-May-15	8,042	8,209	60	Marcellus
45	8-May-15	7,844	8,011	60	Marcellus
46	8-May-15	7,646	7,813	60	Marcellus
47	8-May-15	7,448	7,615	60	Marcellus
48	8-May-15	7,250	7,417	60	Marcellus
49	9-May-15	7,053	7,219	60	Marcellus

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**EXHIBIT 2**

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	27-Apr-15	54.3	7,256	N/A	4,032	160,550	7,287	N/A
2	28-Apr-15	53.2	7,095	6,873	3,498	57,480	7,430	N/A
3	28-Apr-15	59.4	7,875	6,472	4,326	137,500	7,415	N/A
4	28-Apr-15	59	7,138	5,817	4,266	240,100	6,529	N/A
5	28-Apr-15	59.6	7,325	6,185	4,383	240,990	6,868	N/A
6	29-Apr-15	60.7	7,325	6,085	3,806	202,235	7,074	N/A
7	29-Apr-15	61.3	7,121	5,790	3,776	201,500	7,026	N/A
8	29-Apr-15	63.6	7,195	5,741	5,161	202,960	6,228	N/A
9	30-Apr-15	64.2	7,542	5,888	4,258	191,360	7,043	N/A
10	30-Apr-15	60.6	7,374	5,834	3,617	135,160	7,042	N/A
11	30-Apr-15	57.3	7,331	5,982	4,998	79,590	6,609	N/A
12	30-Apr-15	56.4	7,537	5,854	4,556	50,660	6,362	N/A
13	1-May-15	53.9	6,820	6,353	4,486	135,460	6,774	N/A
14	1-May-15	60.9	7,074	5,964	4,644	214,430	6,432	N/A
15	1-May-15	59.8	7,085	5,855	4,855	168,220	6,225	N/A
16	1-May-15	62.3	7,077	5,994	4,742	162,850	6,888	N/A
17	1-May-15	63.8	7,080	6,045	5,201	228,750	6,319	N/A
18	2-May-15	61.6	6,939	5,931	5,438	234,430	6,285	N/A
19	2-May-15	62.5	7,002	6,135	4,707	238,400	6,534	N/A
20	3-May-15	63.6	6,901	6,087	4,975	230,710	6,126	N/A
21	3-May-15	60.3	6,933	6,041	4,043	186,220	6,765	N/A
22	3-May-15	63.1	7,073	5,919	4,742	194,520	5,715	N/A
23	3-May-15	62.5	6,975	6,369	4,731	213,100	5,917	N/A
24	4-May-15	62.2	6,970	5,664	4,982	241,490	6,295	N/A
25	4-May-15	61.0	6,961	5,811	4,249	232,340	6,451	N/A
26	4-May-15	61.9	6,858	5,879	4,810	196,470	6,060	N/A
27	4-May-15	59.2	6,729	5,642	4,979	208,350	6,289	N/A
28	5-May-15	62.3	6,851	5,629	4,669	170,900	6,284	N/A
29	5-May-15	60.5	6,523	5,801	5,028	135,400	6,710	N/A
30	5-May-15	60.2	6,513	6,316	5,010	189,000	6,729	N/A
31	5-May-15	63.7	6,617	5,558	5,289	239,610	6,199	N/A
32	5-May-15	62.0	6,716	5,829	4,971	116,520	6,673	N/A
33	6-May-15	62.9	6,732	5,890	4,116	240,560	6,102	N/A
34	6-May-15	64.3	6,692	5,872	5,014	232,900	6,161	N/A
35	6-May-15	64.2	6,696	5,890	3,991	240,420	5,997	N/A
36	6-May-15	65.0	6,928	6,233	4,501	208,480	6,616	N/A
37	6-May-15	65.0	6,581	5,771	4,588	221,550	6,254	N/A
38	7-May-15	63.3	6,884	6,157	3,955	223,080	6,639	N/A
39	7-May-15	60.9	6,449	5,600	5,257	95,020	6,096	N/A
40	7-May-15	66.1	6,573	6,613	4,367	218,700	6,529	N/A
41	7-May-15	64.0	6,760	6,350	4,581	151,050	5,982	N/A
42	7-May-15	62.4	6,814	6,125	3,777	181,040	6,522	N/A
43	8-May-15	61.5	6,284	5,956	4,313	164,980	5,958	N/A
44	8-May-15	68.6	6,738	6,276	3,955	183,120	6,539	N/A
45	8-May-15	65.8	6,717	5,797	4,756	165,570	6,034	N/A
46	8-May-15	64.8	6,627	5,704	3,741	240,030	5,956	N/A
47	8-May-15	61.5	6,411	5,794	4,259	152,620	6,484	N/A
48	8-May-15	64.2	6,464	5,411	4,835	153,360	5,972	N/A
49	9-May-15	61.7	6,454	6,441	3,698	208,340	6,215	N/A
<b>AVG=</b>		<b>61.7</b>	<b>6,911</b>	<b>5,984</b>	<b>4,509</b>	<b>9,118,075</b>	<b>316,639</b>	<b>TOTAL</b>

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**EXHIBIT 3**

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Fresh Water	57'	N/A	57'	N/A
Shale/ Sandstone	0	427	0	427
Limestone/ Sandstone	est. 427	507	est. 427	507
Shale/ Siltstone	est. 507	587	est. 507	587
Sandstone/ Trace Coal	est. 587	607	est. 587	607
Sandstone/ Siltstone	est. 607	687	est. 607	687
Sandstone/ Limestone	est. 687	787	est. 687	787
Shale/ Sandstone	est. 787	947	est. 787	947
Siltstone/ Limestone	est. 947	1327	est. 947	1327
Shale/ Trace Coal	est. 1327	1387	est. 1327	1387
Shale/ Sandstone	est. 1387	1427	est. 1387	1427
Shale/ Coal	est. 1427	1487	est. 1427	1487
Sandstone	est. 1487	1527	est. 1487	1527
Sandstone/ Trace Coal	est. 1527	1667	est. 1527	1667
Sandstone/ Siltstone	est. 1667	1907	est. 1667	1907
Sandstone/ Trace Coal	est. 1907	1992	est. 1907	1994
Big Lime	1992	2085	1994	2087
Big Injun	2085	2398	2087	2400
Gantz Sand	2398	2593	2400	2595
Fifty Foot Sandstone	2593	2671	2595	2673
Gordon	2671	3003	2673	3007
Fifth Sandstone	3003	3034	3007	3038
Bayard	3034	3405	3038	3420
Warren	3405	3768	3420	3808
Speechley	3768	4067	3808	4139
Baltown	4067	4525	4139	4654
Bradford	4525	4926	4654	5104
Benson	4926	5180	5104	5388
Alexander	5180	5357	5388	5585
Elk	5357	5807	5585	6084
Rhinestreet	5807	6186	6084	6508
Sycamore	6167	6331	6489	6697
Middlesex	6331	6448	6697	6887
Burkett	6448	6475	6887	6944
Tully	6475	6501	6944	7014
Marcellus	6501	NA	7014	NA

\*Please note Antero determines shallow formation tops based on mud logs that are only run on one well on a multi-well pad. The measured depth (MD) data on subsequent wells may be slightly different due to the well's unique departure.

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**Hydraulic Fracturing Fluid Product Component Information Disclosure**



Job Start Date:	4/27/2015
Job End Date:	5/9/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06619-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	James Unit 2H
Longitude:	-80.86255300
Latitude:	39.23763900
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,543
Total Base Water Volume (gal):	14,002,018
Total Base Non Water Volume:	514,315

**Hydraulic Fracturing Fluid Composition:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Service Abstract Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Antero Resources	Base Fluid	Water	7732-18-5	100.00000	92.19058	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	7.19835	
LGC-15	U.S. Well Services	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.12727	
			Petroleum Distillates	64742-47-8	60.00000	0.12054	
			Suspending agent (solid)	14808-60-7	3.00000	0.01947	
			Surfactant	68439-51-0	3.00000	0.00764	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid					
			Water	7732-18-5	87.50000	0.16460	
			Hydrogen Chloride	7647-01-0	18.00000	0.03932	
WFRA-405	U.S. Well Services	Friction Reducer	Water	7732-18-5	40.00000	0.03259	
			Antonic Polyacrylamide	Proprietary	40.00000	0.03259	
			Sodium Chloride	7647-14-5	20.00000	0.01630	
			Petroleum Distillates	64742-47-8	20.00000	0.01312	
			Ethoxylated alcohol blend	Proprietary	5.00000	0.00407	



SI-1100	J.S. Well Services	Scale Inhibitor						
			Di Water	7732-18-5		80.00000	0.01012	
			Ethylene Glycol	107-21-1		40.00000	0.00572	
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8		10.00000	0.00171	
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1		10.00000	0.00163	
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6		10.00000	0.00158	
			Copolymer of Maleic and Acrylic acid	26677-99-6		10.00000	0.00149	
			bis (hexamethylene) trimine penta (methylene phosphonic acid) - phosphate acid	40623-75-4		10.00000	0.00146	
			Acrylic polymer	52255-49-9		5.00000	0.00063	
K-BAC 1020	J.S. Well Services	Anti-Bacterial Agent						
			2,2-dibromo-3-nitropropionamide	10222-01-2		20.00000	0.00424	
			Deionized Water	7732-18-5		28.00000	0.00242	
AP One	J.S. Well Services	Gel Breakers						
			Ammonium Persulfate	7727-54-0		100.00000	0.00223	
AI-301	J.S. Well Services	Acid Corrosion Inhibitors						
			Diethylene Glycol	111-46-6		30.00000	0.00013	
			Methanamine	100-97-0		20.00000	0.00010	
			Hydrogen Chloride	7647-01-0		10.00000	0.00004	
			Polyethylene polyamine	39603-67-8		10.00000	0.00004	
			Coco amine	61791-14-8		5.00000	0.00002	

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

\* 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%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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