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

API <u>47</u> - 017 - 0	06293 County Doddi	ridge <sub>D</sub>	<sub>istrict</sub> Central	
Quad Oxford 7.5'	Pad Name Rol		ield/Pool Name	
Farm name Williams, Rol		· V	Well Number Lego	gett Unit 2H
Operator (as registered with	the OOG) Antero Resource	es Corporation		
Address 1615 Wynkoop	St. City D		_ State CO	Zip80202
Тор	hole Northing 4343159m	illed plat, profile view, and e	ng 511850m	
Landing Point of C Bottom			g 512278.16m g 511481m	
Bottom	Tiole Ivoluling	Lastin	g	
Elevation (ft) 990'	GL Type of Wel	l ■New □ Existing	Type of Report	□Interim ■Final
Permit Type   Deviate	ed 🗆 Horizontal 🖪 Horiz	contal 6A	Depth Type	□ Deep ■ Shallow
Type of Operation □ Conv	vert □ Deepen ■ Drill	□ Plug Back □ Redrilli	ng 🗆 Rework	■ Stimulate
Well Type ☐ Brine Dispos	sal 🗆 CBM 🗂 Gas 🗂 Oil 🗆 S	Secondary Recovery   Sol	ution Mining 🗆 Sto	rage 🗆 Other
Type of Completion ■ Sin	ngle □ Multiple Fluids Pro I Rotary	duced □ Brine ■Gas	□ NGL	□ Other
Drilling Media Surface he	ole BiAir □ Mud □Fresh V	Water Intermediate ho	le ■ Air □ Mud	□ Fresh Water □ Brine
Production hole	B Mud □ Fresh Water □ Br	ine		
Mud Type(s) and Additive Air- Foam & 4% KCL	(s)			
Mud- Polymer				
Date permit issued8/2	21/2013 Date drilling co	mmenced 12/18/2013	Date drilling o	
Date completion activities l		Date completion activi	ties ceased1	1/12/2014
Verbal plugging (Y/N)	N/A Date permission gran	ted N/A	Granted by	N/A
Please note: Operator is re-	quired to submit a plugging app	lication within 5 days of ver	bal permission to pl	ug
Freshwater depth(s) ft	57'	Open mine(s) (Y/N) dep	oths	No
Salt water depth(s) ft	1507'	Void(s) encountered (Y		No
Coal depth(s) ft	None Identified	Cavern(s) encounter	depths	No
Is coal being mined in area	(Y/N) No	Office of Oil a	and Gas	

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WV Department of Environmental Protection Reviewed by:

- 7/24/15 08//14/2015

WR-35 Rev. 8/23/13								Page of
API 47- 017	06293		Farm name_V	Villiams, Rot	pert	Wel	I number_Legg	ett Unit 2H
CASING STRINGS	Hole Size	Casin Size	•		ew or Grade		Basket I	Did cement circulate (Y/N) * Provide details below*
Conductor	30"			· -		# H-40	N/A	Υ
Surface	17- 1/2"	13-	3/8" 3	161' I	New 48	# H-40	N/A	Υ
Coal								
Intermediate 1	12-1/4"	9-5	5/8" 2:	500'	New 36	# J-55	N/A	Υ Υ
Intermediate 2								
Intermediate 3			· · · · i					
Production	8-3/4" & 8-1/2"	5-1	/2" 13	3103'	New 20	# P-110	N/A	Y
Tubing	0-5/4 & 0-1/2	2-3		008'		5# N-80		· · · · · · · · · · · · · · · · · · ·
Packer type and d	lenth set	N/A	7	000	1 5.9	O# 14-0U	N/A	
Comment Details					uctor with 50 sacks of			
CEMENT	Class/Type		Number	Slurry	Yield	Volume		woc
DATA Conductor	of Cement		of Sacks	wt (ppg)	(ft <sup>3</sup> /sks)	(ft. <sup>3</sup> )	Top (MD)	
Surface	Class A		200 sx*	15.6	1.18	38		8 Hrs.
Coal	Class A		448 sx	15.6	1.18	251	0'	8 Hrs.
Intermediate 1	<u> </u>			45.0				
Intermediate 2	Class A	-	922 sx	15.6	1.18	783	0'	8 Hrs.
Intermediate 3						+		
Production	<del> </del>							
Tubing	Class H	904	sx (Lead) 1051 sx (Tail)	13.5 Lead 15.2 Tail	1.44 Lead 1.8 Tai	2544	~500' into intermediat	te Casing 8 Hrs.
1 uomg								
,	1) 13103' MD, 6522' ation penetrated ocedure N/A				ggers TD (ft) 13  ng back to (ft) N			
Kick off depth	, /		-		deviated/direct		wirelii (Pike referei induction WR-3 has be	nis is a subsequent well. Antero on ne logs on one well on a multi-we Unit 1H API#47-017-06289). Pleince the wireline logs submitted with 5 for Pike Unit 1H. A Cement Boten included with this submittal.   □SONIC
	⊃Yes		Conventional	□ Sidewall	v ACH CASING S		s collected 🗆 Y	'es 🖫 No
Conductor- 0								
	de shoe, 1 aboce inser re float joint, 1 above flo							
	float joint, 1 below float							-
WAS WELL	COMPLETED	AS SHC	T HOLE -	Yes A No	DETAILS	-		
WAS WELL	COMPLETED	OPEN H	IOLE? 🗆 Ye	es 🖪 No	DETAILS _	RE Office o	CEIVED f Oil and Ga	

TYPE OF TRACER(S) USED \_\_

WERE TRACERS USED □ Yes ■ No

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API	47- 017 -	06293	Farm name	Williams, Robert	_Well number	Leggett Unit 2H

## PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
		DI EASE (	SEE ATT	ACHEDI	EVUIDIT 4
		PLEASE S	DEE AII/	ACHEDI	EXHIBITI
	. —				

Please insert additional pages as applicable.

## STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
		*PLE	ASE SEE	ATTACI	HED EX	XHIBIT 2	2	
		i		:::::::::::::::::::::::::::::::::::::::				
						Offic	RECEIV e of Oil	/ED and Gas

Please insert additional pages as applicable.

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WR-35 Rev. 8/23/13								Page of
API 47- 017 <sub>-</sub> 06293	Farm	name Williams, I	Robert		Well r	number	Legget	t Unit 2H
PRODUCING FORMATION(S)  Marcellus		<u>DEPTHS</u> 6489' (TOP)		6971' (TOP)	MD			
	_		_					
Please insert additional pages as a	applicable.							
GAS TEST 🗆 Build up 🗆 🗅	rawdown	■ Open Flow		OIL TEST 🛔 I	Flow [	Pump		
SHUT-IN PRESSURE Surfac	e 3600	psi Botto	m Hole	psi	DURAT	TION O	F TES	T hrs
OPEN FLOW Gas 8769 mcfpd	Oil 36	bpd ——	bpd 3		GAS M			
LITHOLOGY/ TOP FORMATION DEPTH IN FT I NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN F MD					D QUANTITYAND NE, OIL, GAS, H <sub>2</sub> S, ETC)
0		0		11120112	OID (TILE		,	112, 012, 0110, 1120, 1110
								1
*PL	EASE	SEE A	TTAC	HED E	(HIB	IT 3		
		T					_	
Please insert additional pages as	applicable.							
Drilling Contractor Precision Drill		nv. LP						
Address 2640 Reach Rd.		City	Williamspor	t	State	PA	_ Zip	15301
Logging Company STRC								
Address 1560 Good Hope Pike		City	Clarksburg		State	WV	_ Zip	26301
Cementing Company Allied Oil &	Gas Service	es, LLC						
Address 1036 East Main Street		City	Bridgeport		State	WV	Zin	26330

Jane Lew

City

Signature Title Permit Representative

Submittal of Hydraulic Fracturing Chemical Disclosure Information

Stimulating Company US Well Services

Please insert additional pages as applicable.

Address 533 Industrial Park Dr.

Completed by Kara Quackenbush

Attach copy of FRACTOCOS Resistment of

Telephone 303-357-7233

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Date 6/8/2013 2015

		EXH	IIBIT 1		
Ct N	Perforation	Perforated from MD		Number of	
Stage No.	Date	ft.	MD ft.	Perforations	Formations
1	30-Aug-14	12,864	13,034	60	Marcellus
2	8-Sep-14	12,662	12,832	60	Marcellus
3	8-Sep-14	12,461	12,631	60	Marcellus
4	8-Sep-14	12,259	12,429	60	Marcellus
5	8-Sep-14	12,057	12,227	60	Marcellus
6	9-Sep-14	11,856	12,026	60	Marcellus
7	9-Sep-14	11,654	11,824	60	Marcellus
8	9-Sep-14	11,452	11,622	60	Marcellus
9	10-Sep-14	11,250	11,420	60	Marcellus
10	11-Sep-14	11,049	11,219	60	Marcellus
11	11-Sep-14	10,847	11,017	60	Marcellus
12	11-Sep-14	10,645	10,815	60	Marcellus
13	11-Sep-14	10,443	10,614	60	Marcellus
14	12-Sep-14	10,242	10,412	60	Marcellus
15	12-Sep-14	10,040	10,210	60	Marcellus
16	12-Sep-14	9,838	10,008	60	Marcellus
17	12-Sep-14	9,637	9,807	60	Marcellus
18	12-Sep-14	9,435	9,605	60	Marcellus
19	13-Sep-14	9,233	9,403	60	Marcellus
20	13-Sep-14	9,031	9,202	60	Marcellus
21	16-Sep-14	8,830	9,000	60	Marcellus
22	16-Sep-14	8,628	8,798	60	Marcellus
23	17-Sep-14	9,426	8,596	60	Marcellus
24	17-Sep-14	8,225	8,395	60	Marcellus
25	17-Sep-14	8,023	8,193	60	Marcellus
26	17-Sep-14	7,821	7,991	60	Marcellus
27	17-Sep-14	7,619	7,789	60	Marcellus
28	18-Sep-14	7,418	7,588	60	Marcellus
29	18-Sep-14	7,216	7,386	60	Marcellus
30	18-Sep-14	7,014	7,184	60	Marcellus

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	AP	I <u>47-017-062</u>	93 Farm Nan	ne Williams, Ro	bert Well N	umber Leggett Unit 2H		
				EXHIBIT	Γ2			
	<u> </u>		Avg	Max	_			Amount of
1		}	Treatment	Breakdown			Amount of	Nitrogen/
	Stimulations	Avg Pump	Pressure	Pressure		Amount of Proppant	Water	other
Stage No.	Date	Rate	(PSI)	(PSI)	ISIP (PSI)	(lbs)	(bbls)	(units)
11	7-Sep-14	58.4	7,899	6,225	5,325	102,850	6,958	N/A
2	8-Sep-14	69.0	7,365	6,023	5,147	103,050	7,180	N/A
3	8-Sep-14	27.0	8,734	6,588	5,486	1,500	6,939	N/A
4	8-Sep-14	69.2	7,433	6,402	4,277	173,650	7,502	N/A
5	9-Sep-14	71.4	7,421	6,262	4,313	251,550	6,899	N/A
6	9-Sep-14	77.0	7,504	6,291	5,475	254,500	6,872	N/A
7	9-Sep-14	72.9	7,531	5,747	5,203	164,050	7,425	N/A
8	10-Sep-14	67.2	7,829	5,704	4,628	152,500	6,863	N/A
9	11-Sep-14	68.3	7,640	5,858	5,200	185,450	7,370	N/A
10	11-Sep-14	77.0	7,795	5,622	4,900	178,500	6,489	N/A
11	11-Sep-14	66.0	6,861	5,783	5,325	252,700	6,664	N/A
12	11-Sep-14	65.2	6,834	5,440	5,146	194,200	5,685	N/A
13	12-Sep-14	63.7	7,626	5,940	4,009	162,500	6,365	N/A
14	12-Sep-14	66.0	6,767	5,944	5,411	207,500	5,772	N/A
15	12-Sep-14	66.0	6,839	6,169	4,896	207,400	5,772	N/A
16	12-Sep-14	66.5	6,658	6,112	4,900	204,100	5,696	N/A
17	12-Sep-14	65.2	6,521	6,079	5,475	204,550	5,701	N/A
18	13-Sep-14	65.0	6,469	6,183	5,758	199,500	5,721	N/A
19	13-Sep-14	65.0	6,289	6,037	5,318	207,200	5,653	N/A
20	16-Sep-14	64.0	6,454	6,548	4,714	207,200	5,651	N/A
21	16-Sep-14	67.2	6,361	5,887	4,349	207,750	5,618	N/A
22	16-Sep-14	66.8	6,430	5,958	4,728	206,300	5,598	N/A
23	17-Sep-14	67.0	6,546	6,316	4,656	207,000	5,566	N/A
24	17-Sep-14	66.0	6,422	5,997	5,221	207,000	5,544	N/A
25	17-Sep-14	67.0	6,475	5,865	6,284	210,200	5,552	N/A
26	17-Sep-14	67.1	6,296	5,908	4,789	206,800	5,501	N/A
27	18-Sep-14	69.8	6,516	6,162	4,510	192,200	5,277	N/A
28	18-Sep-14	65.0	6,239	5,515	5,150	207,000	5,460	N/A
29	18-Sep-14	64.0	6,645	7,271	5,229	192,500	5,242	N/A
30	18-Sep-14	65.0	5,994	5,697	4,449	207,000	5,414	N/A
	AVG=	65.8	6,946	6,051	5,009	5,658,200	183,949	TOTAL

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API	47-017-06293 Farm Nan	ne Williams, Robert Well Nur	nber Leggett Unit 2H	
		EXHIBIT 3		
	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
LITHOLOGY/ FORMATION	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	1988	est. 1907	1988
Big Lime	1988	2079	1988	2079
Big Injun	2079	2393	2079	2393
Gantz Sand	2393	2633	2393	2633
Fifty Foot Sandstone	2633	2680	2633	2680
Gordon	2680	3000	2680	3006
Fifth Sandstone	3000	3019	3006	3026
Bayard	3019	3416	3026	3450
Warren	3416	3778	3450	3851
Speechley	3778	4078	3851	4185
Baltown	4078	4539	4185	4697
Bradford	4539	4957	4697	5165
Benson	4957	5199	5165	5440
Alexander	5199	5367	5440	5623
Elk	5367	5847	5623	6151
Rhinestreet	5847	6144	6151	5587
Sycamore	6144	6313	5587	6688
Middlesex	6313	6433	6688	6860
Burkett	6433	6460	6860	6908
Tully	6460	6489	6908	6971
Marcellus	6489	NA	6971	NA

<sup>\*</sup>Please note Antero determines 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

mposition:	Hydraulic Fracturing Fluid Composition:
393,958	Total Base Non Water Volume:
7,725,858	Total Base Water Volume (gal):
6,544	True Vertical Depth:
NO	Federal/Tribal Well:
NAD83	Datum:
39.23765600	Latitude:
-80.86269200	Longitude:
Leggett Unit 2H	Well Name and Number:
Antero Resources Corporation	Operator Name:
47-017-06293-00-00	API Number:
Doddridge	County:
West Virginia	State:
9/18/2014	Job End Date:
9/7/2014	Job Start Date:







Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS#)	Chemical Ingredient Abstract Service Concentration in Additive (CAS #) (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Antero Resources	Base Fluid					
			Water	7732-18-5	100.0000	91.52630	
Sand	U.S. Well Services,	Proppant					
ny			Crystalline Silica, quartz	14808-60-7	100.0000	8.03732	
E6C45	U.S. Well Services,	Gelling Agents					
JI	R		Guar Gum	0-02-0006	20.0000	0.09068	
	EC		Petroleum Distillates	64742-47-8	00000'09	0.08588	
y pa nt	E		Suspending agent (solid)	14808-60-7	3.0000	0.01387	
3	No.		Surfactant	68439-51-0	3.0000	0.00544	
HOL Acid (12.6%-	UST Well Services,	Bulk Acid					
14	1		Water	7732-18-5	87.50000	0.10097	
of	ia		Hydrogen Chloride	7647-01-0	18.0000	0.02412	
WFRA-405	U.S. Well Services,	Friction Reducer					
			Anionic Polyacrylamide	Proprietary		0.03074	
			Water	7732-18-5	40.00000	0.03074	
			Petroleum Distillates	64742-47-8	22.0000	0.02474	
			Crystalline Salt	12125-02-9	5.00000	0.00384	

			Ethoxylated alcohol blend	Proprietary	5.00000	0.00384	
SI-1000	U.S. Well Services, LLC	Scale Inhibitor					
			Anionic Copolymer	Proprietary		0.00412	
			Ethylene Glycol	107-21-1	20.00000	0.00372	
			Water	7732-18-5	30.0000	0.00311	
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent					
			2,2-dibromo-3- nitrilopropionamide	10222-01-2	20.0000	0.00487	
			Deionized Water	7732-18-5	28.00000	0.00278	
AP One	U.S. Well Services, LLC	Gel Breakers					
			Ammonium Persulfate	7727-54-0	100.00000	0.00232	
AI-300	U.S. Well Services, LLC	Acid Corrosion Inhibitors					
			Ethylene Glycol	107-21-1	31.00000	0.00026	
			N,N-Dimethylformamide	68-12-2	15.00000	0.00008	
			Cinnamaldehyde	104-55-2	2.00000	0.00007	
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	13.00000	0.00007	
			2-Butoxyethanol	111-76-2	7.00000	0.0000	
			Water	7732-18-5	20.00000	0.00002	
			Ethoxylated Nonylphenol	68412-54-4	2.00000	0.00002	
			Triethyl Phosphate	78-40-0	3.00000	0.00001	
			Isopropyl Alcohol	67-63-0	3.00000	0.00001	
Ingredients shown abo	ove are subject to 29 Cl	FR 1910.1200(i) and ap	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	eets (MSDS). Ingredients	shown below are Non-∿	ISDS.	
* T-4-110/c4-1/clime	of charles and construct	Control of the contro	Table 1 Marter - Malione and and and and from water produced under control of water				

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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