

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

API 47 - 017 - 06292 County Doddridge District Central
Quad Oxford 7.5 Pad Name Robert Williams Pad Field/Pool Name ---
Farm name Williams, Robert Well Number Leggett Unit 1H
Operator (as registered with the OOG) Antero Resources Corporation
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 4343160m Easting 511847m
Landing Point of Curve Northing 4343481.36m Easting 512081.23m
Bottom Hole Northing 4345041m Easting 511299m

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 8/21/2013 Date drilling commenced 12/18/2013 Date drilling ceased 7/6/2014
Date completion activities began 8/22/2014 Date completion activities ceased 11/5/2014
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 59' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1509' 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

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Reviewed by:

JUL 24/15
08/14/2015

API 47-017 - 06292

Farm name Williams, Robert

Well number Leggett Unit 1H

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	24"	20"	40'	New	94# H-40	N/A	Y
Surface	17- 1/2"	13- 3/8"	358'	New	48# H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2511'	New	36# J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5-1/2"	12932'	New	20# P-110	N/A	Y
Tubing		2-3/8"	6812'		5.95# N-80	N/A	
Packer type and depth set		N/A					

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	Class A	150 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	429 sx	15.6	1.18	249	0'	8 Hrs.
Coal							
Intermediate 1	Class A	922 sx	15.6	1.18	786	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	894 sx (Lead) 1028 sx (Tail)	13.5 Lead 15.2 Tail	1.44 Lead 1.8 Tail	2502	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 12932' (MD), 6519' TVD (BHL); 6539' TVD (Deepest point drilled)

Loggers TD (ft) 12878'

Deepest formation penetrated Marcellus

Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6266'

** This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Pike Unit 1H API#47-017-06289). Please reference the wireline logs submitted with Form WR-35 for Pike Unit 1H. A Cement Bond Log has been included with this submittal.

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 _____

Conductor- 0

Surface- 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface

Intermediate- 1 above float joint, 1 above float collar, 1 every 4th joint to surface

Production- 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

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API 47- 017 - 06292 Farm name Williams, Robert Well number Leggett Unit 1H

PRODUCING FORMATION(S)	DEPTHS			
	6489' (TOP)	TVD	6850' (TOP)	MD
Marcellus				

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 3600 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 7774 mcfpd Oil 39 bpd NGL --- bpd Water 437 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	DEPTH IN FT	DEPTH IN FT	DEPTH IN FT	
	NAME TVD	TVD	MD	MD	
	0		0		

***PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling Company, LP
Address 2640 Reach Rd. City Williamsport State PA Zip 15301

Logging Company STRC
Address 1560 Good Hope Pike City Clarksburg State WV Zip 26301

Cementing Company Allied Oil & Gas Services, LLC
Address 1036 East Main Street City Bridgeport State WV Zip 26330

Stimulating Company US Well Services
Address 533 Industrial Park Dr. City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by Kara Quackenbush Telephone 303-357-7233
Signature *[Signature]* Title Permit Representative Date 6/8/2015 JUL 13 2015

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EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	22-Aug-14	12,691	12,859	60	Marcellus
2	20-Sep-14	12,490	12,659	60	Marcellus
3	20-Sep-14	12,290	12,459	60	Marcellus
4	20-Sep-14	12,090	12,259	60	Marcellus
5	20-Sep-14	11,890	12,059	60	Marcellus
6	21-Sep-14	11,690	11,859	60	Marcellus
7	22-Sep-14	11,490	11,659	60	Marcellus
8	22-Sep-14	11,290	11,459	60	Marcellus
9	22-Sep-14	11,090	11,259	60	Marcellus
10	22-Sep-14	10,890	11,058	60	Marcellus
11	23-Sep-14	10,690	10,858	60	Marcellus
12	23-Sep-14	10,489	10,658	60	Marcellus
13	23-Sep-14	10,289	10,458	60	Marcellus
14	23-Sep-14	10,089	10,258	60	Marcellus
15	24-Sep-14	9,889	10,058	60	Marcellus
16	24-Sep-14	9,689	9,858	60	Marcellus
17	24-Sep-14	9,489	9,658	60	Marcellus
18	25-Sep-14	9,289	9,458	60	Marcellus
19	25-Sep-14	9,089	9,257	60	Marcellus
20	25-Sep-14	8,889	9,057	60	Marcellus
21	25-Sep-14	8,689	8,857	60	Marcellus
22	25-Sep-14	8,488	8,657	60	Marcellus
23	26-Sep-14	8,288	8,457	60	Marcellus
24	26-Sep-14	8,088	8,257	60	Marcellus
25	26-Sep-14	7,888	8,057	60	Marcellus
26	26-Sep-14	7,688	7,857	60	Marcellus
27	27-Sep-14	7,488	7,657	60	Marcellus
28	27-Sep-14	7,288	7,457	60	Marcellus
29	27-Sep-14	7,088	7,256	60	Marcellus
30	27-Sep-14	6,888	7,056	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	20-Sep-14	59.3	7,507	N/A	4,867	168,800	6,634	N/A
2	20-Sep-14	63.0	6,698	6,198	4,857	220,550	6,434	N/A
3	20-Sep-14	64.0	6,553	6,187	6,012	239,300	6,588	N/A
4	20-Sep-14	64.6	6,783	5,701	4,138	207,800	6,095	N/A
5	21-Sep-14	66.0	6,700	6,037	6,362	240,000	6,535	N/A
6	21-Sep-14	65.3	6,603	5,897	4,699	241,800	6,513	N/A
7	22-Sep-14	64.5	6,742	6,262	4,810	240,400	6,492	N/A
8	22-Sep-14	62.6	6,683	5,851	5,404	240,250	6,469	N/A
9	22-Sep-14	64.2	6,468	5,836	4,839	240,700	6,451	N/A
10	22-Sep-14	66.0	6,816	6,219	3,719	240,400	6,395	N/A
11	23-Sep-14	63.7	6,850	6,323	3,755	238,850	6,414	N/A
12	23-Sep-14	62.8	6,694	5,808	4,689	215,650	6,061	N/A
13	23-Sep-14	64.5	6,709	5,658	4,857	205,500	6,004	N/A
14	24-Sep-14	64.3	6,671	5,643	4,653	194,000	5,870	N/A
15	24-Sep-14	64.0	6,580	5,760	4,063	240,020	6,314	N/A
16	24-Sep-14	64.0	6,771	5,590	4,388	225,200	6,914	N/A
17	24-Sep-14	63.9	6,203	5,382	4,245	241,700	6,270	N/A
18	25-Sep-14	64.7	6,289	5,404	4,263	238,650	6,221	N/A
19	25-Sep-14	64.8	6,383	5,533	4,796	239,550	6,224	N/A
20	25-Sep-14	63.5	6,426	6,015	3,955	239,300	6,199	N/A
21	25-Sep-14	64.7	6,388	6,151	4,098	240,450	6,174	N/A
22	26-Sep-14	65.3	6,268	5,686	4,263	240,000	6,161	N/A
23	26-Sep-14	63.1	6,105	6,398	4,181	240,200	6,140	N/A
24	26-Sep-14	62.6	6,189	6,326	4,084	240,000	6,117	N/A
25	26-Sep-14	64.9	6,485	6,158	4,528	194,550	5,592	N/A
26	27-Sep-14	65.0	6,047	6,219	4,921	238,900	6,077	N/A
27	27-Sep-14	63.3	6,054	6,271	5,271	240,500	6,042	N/A
28	27-Sep-14	63.5	6,015	5,518	4,499	239,900	6,023	N/A
29	27-Sep-14	63.9	6,172	5,372	4,685	239,950	6,008	N/A
30	27-Sep-14	63.5	6,406	7,145	4,288	138,650	5,074	N/A
AVG=		64.0	6,509	5,950	4,606	6,811,520	186,505	TOTAL

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EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) From Surface
Fresh Water	59'	N/A	59'	N/A
Shale/ Sandstone	0	429	0	429
Limestone/ Sandstone	est. 429	509	est. 429	509
Shale/ Siltstone	est. 509	589	est. 509	589
Sandstone/ Trace Coal	est. 589	609	est. 589	609
Sandstone/ Siltstone	est. 609	689	est. 609	689
Sandstone/ Limestone	est. 689	789	est. 689	789
Shale/ Sandstone	est. 789	949	est. 789	949
Siltstone/ Limestone	est. 949	1329	est. 949	1329
Shale/ Trace Coal	est. 1329	1389	est. 1329	1389
Shale/ Sandstone	est. 1389	1429	est. 1389	1429
Shale/ Coal	est. 1429	1489	est. 1429	1489
Sandstone	est. 1489	1529	est. 1489	1529
Sandstone/ Trace Coal	est. 1529	1669	est. 1529	1669
Sandstone/ Siltstone	est. 1669	1909	est. 1669	1909
Sandstone/ Trace Coal	est. 1909	1993	est. 1909	1993
Big Lime	1993	2082	1993	2082
Big Injun	2082	2401	2082	2401
Gantz Sand	2401	2602	2401	2602
Fifty Foot Sandstone	2602	2678	2602	2678
Gordon	2678	2986	2678	2986
Fifth Sandstone	2986	3020	2986	3020
Bayard	3020	3427	3020	3427
Warren	3427	3789	3427	3789
Speechley	3789	4085	3789	4086
Baltown	4085	4546	4086	4565
Bradford	4546	4957	4565	5015
Benson	4957	5210	5015	5296
Alexander	5210	5375	5296	5480
Elk	5375	5843	5480	5993
Rhinestreet	5843	6147	5993	6332
Sycamore	6147	6315	6332	6542
Middlesex	6315	6435	6542	6724
Burkett	6435	6461	6724	6779
Tully	6461	6489	6779	6850
Marcellus	6489	NA	6850	NA

*Please note Antero determines formation tops based on wireline 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:	9/20/2014
Job End Date:	9/27/2014
State:	West Virginia
County:	Doddridge
API Number:	47-017-06292-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Leggett Unit 1H
Longitude:	-80.86272500
Latitude:	39.23766400
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,539
Total Base Water Volume (gal):	7,833,210
Total Base Non Water Volume:	348,869



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
Water	Antero Resources	Base Fluid	Water	7732-18-5	100.00000	90.20298	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	9.40501	
LGC-15	U.S. Well Services, LLC	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.08554	
			Petroleum Distillates	64742-47-8	60.00000	0.08101	
			Suspending agent (solid)	14808-60-7	3.00000	0.01308	
			Surfactant	68439-51-0	3.00000	0.00513	
HCL Acid (12.0% - 18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.09311	
			Hydrogen Chloride	7647-01-0	18.00000	0.02224	
WFRA-405	U.S. Well Services, LLC	Friction Reducer	Water	7732-18-5	40.00000	0.02332	
			Anionic Polyacrylamide	Proprietary		0.02332	
			Petroleum Distillates	64742-47-8	22.00000	0.01877	
			Ethoxylated alcohol blend	Proprietary	5.00000	0.00292	

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SI-1000	J.S. Well Services, LLC	Scale Inhibitor	Crystalline Salt	12125-02-9	5.00000	0.00292
			Anionic Copolymer	Proprietary		0.00392
			Ethylene Glycol	107-21-1	20.00000	0.00355
			Water	7732-18-5	30.00000	0.00296
K-BAC 1020	J.S. Well Services, LLC	Anti-Bacterial Agent	2,2-dibromo-3-nitropropionamide	10222-01-2	20.00000	0.00480
			Deionized Water	7732-18-5	28.00000	0.00274
AP One	J.S. Well Services, LLC	Gel Breakers	Ammonium Persulfate	7727-54-0	100.00000	0.00231
AI-301	J.S. Well Services	Acid Corrosion Inhibitors	Diethylene Glycol	111-46-6	30.00000	0.00014
			Methenamine	100-97-0	20.00000	0.00011
			Hydrogen Chloride	7647-01-0	10.00000	0.00005
			Polyethylene polyamine	68603-67-8	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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