

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

API 47 - 095 - 02307 County Tyler District Centerville
Quad Shirley 7.5' Pad Name Dale Pad Field/Pool Name ---
Farm name Raymond Underwood Well Number Johnston Unit 1H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop Street 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 4364738m Easting 511842m
Landing Point of Curve Northing 4364565.793m Easting 511494.980m
Bottom Hole Northing 4360812m Easting 512833m

Elevation (ft) 1017' 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

RECEIVED
Office of Oil and Gas

OCT 30 2017

WV Department of
Environmental Protection

Date permit issued 09/16/2015 Date drilling commenced 03/02/2016 Date drilling ceased 07/10/2016
Date completion activities began 01/13/2017 Date completion activities ceased 06/15/2017
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 55' Open mine(s) (Y/N) depths No
Salt water depth(s) ft NONE IDENTIFIED Void(s) encountered (Y/N) depths No
Coal depth(s) ft 1166', 1331' Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

APPROVED

NAME: See in [unclear]
DATE: 11-14-17

Reviewed by:

DGH

02/16/2018

API 47-095 - 02307 Farm name Raymond Underwood Well number Johnston 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#, J-55	N/A	Y
Surface	17- 1/2"	13- 3/8"	458'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2488'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"	5-1/2"	20242"	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6975'		4.7#, N-80		
Packer type and depth set		N/A					

Comment Details *Please note this well was drilled to 20246' however casing was only ran to 20242'.

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	185 sx	15.6	1.18	218	0	8 Hrs.
Surface	Class A	563 sx	15.6	1.2	676	0	8 Hrs.
Coal							
Intermediate 1	Class A	911 sx	15.6	1.18	1075	0	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	1077 sx (Load) 2093 sx (Tail)	14.5 (Load), 15.4 (Tail)	1.2 (Load), 1.84 (Tail)	5144	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 20246' MD, 6541' TVD (BHL) & 6547' TVD (Deepest Point Drilled) Loggers TD (ft) 20232' MD

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6258'

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 _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED N/A

** There were no wireline logs run on this pad. Please reference the wireline logs submitted with Rymer Unit 4HD (API#47-095-02273). A Cement Bond Log has been included with this submittal.

RECEIVED
Office of Oil and Gas
OCT 30 2017

WV Department of Environmental Protection

API 47-095 - 02307 Farm name Raymond Underwood Well number Johnston Unit 1H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

*** PLEASE SEE ATTACHED EXHIBIT 1**

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)

*** PLEASE SEE ATTACHED EXHIBIT 2**

RECEIVED
Office of Oil and Gas
OCT 30 2017
WV Department of Environmental Protection

Please insert additional pages as applicable.

API 47- 095 - 02307

Farm name Raymond Underwood

Well number Johnston Unit 1H

PRODUCING FORMATION(S)

DEPTHS

<u>Marcellus</u>	<u>6458'</u> (Top) TVD	<u>6974'</u> (Top) MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 4100 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 7348 mcfpd Oil 7 bpd NGL --- bpd Water 641 bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	0		0		
* PLEASE SEE ATTACHED EXHIBIT 3					

Please insert additional pages as applicable.

Drilling Contractor Frontier Drilling LLC
Address 562 Spring Run Rd City Pennsboro State WV Zip 26415

Logging Company Allied Horizontal
Address 381 Colonial Manor Rd City North Huntingdon State PA Zip 15642

Cementing Company C&J Energy Services
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company Halliburton
Address 121 Champion Way Suite 200 City Cannonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Samantha Klaas Telephone 303-357-6759
Signature [Signature] Title Permitting Agent Date 10/27/2017

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

RECEIVED
Office of Oil and Gas
OCT 30 2017
WV Department of Environmental Protection

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	1/13/2017	19973	20070	60	Marcellus
2	5/4/2017	19773	19942	60	Marcellus
3	5/4/2017	19574	19742	60	Marcellus
4	5/5/2017	19375	19543	60	Marcellus
5	5/5/2017	19175	19343	60	Marcellus
6	5/5/2017	18976	19144	60	Marcellus
7	5/6/2017	18776	18945	60	Marcellus
8	5/6/2017	18577	18745	60	Marcellus
9	5/7/2017	18378	18546	60	Marcellus
10	5/7/2017	18178	18346	60	Marcellus
11	5/7/2017	17979	18147	60	Marcellus
12	5/8/2017	17780	17948	60	Marcellus
13	5/8/2017	17580	17748	60	Marcellus
14	5/9/2017	17381	17549	60	Marcellus
15	5/9/2017	17181	17350	60	Marcellus
16	5/10/2017	16982	17150	60	Marcellus
17	5/10/2017	16783	16951	60	Marcellus
18	5/10/2017	16583	16751	60	Marcellus
19	5/11/2017	16384	16552	60	Marcellus
20	5/11/2017	16185	16353	60	Marcellus
21	5/11/2017	15985	16153	60	Marcellus
22	5/12/2017	15786	15954	60	Marcellus
23	5/12/2017	15586	15755	60	Marcellus
24	5/12/2017	15387	15555	60	Marcellus
25	5/13/2017	15188	15356	60	Marcellus
26	5/13/2017	14988	15156	60	Marcellus
27	5/13/2017	14789	14957	60	Marcellus
28	5/14/2017	14589	14758	60	Marcellus
29	5/15/2017	14390	14558	60	Marcellus
30	5/15/2017	14191	14359	60	Marcellus
31	5/15/2017	13991	14160	60	Marcellus
32	5/16/2017	13792	13960	60	Marcellus
33	5/16/2017	13593	13761	60	Marcellus
34	5/17/2017	13393	13561	60	Marcellus
35	5/17/2017	13194	13362	60	Marcellus
36	5/17/2017	12994	13163	60	Marcellus
37	5/18/2017	12795	12963	60	Marcellus
38	5/18/2017	12596	12764	60	Marcellus
39	5/18/2017	12396	12564	60	Marcellus
40	5/18/2017	12197	12365	60	Marcellus
41	5/19/2017	11998	12166	60	Marcellus
42	5/19/2017	11798	11966	60	Marcellus
43	5/19/2017	11599	11767	60	Marcellus
44	5/19/2017	11399	11568	60	Marcellus
45	5/20/2017	11200	11368	60	Marcellus
46	5/20/2017	11001	11169	60	Marcellus
47	5/20/2017	10801	10969	60	Marcellus
48	5/20/2017	10602	10770	60	Marcellus
49	5/20/2017	10403	10571	60	Marcellus
50	5/21/2017	10203	10371	60	Marcellus
51	5/21/2017	10004	10172	60	Marcellus
52	5/21/2017	9804	9973	60	Marcellus
53	5/21/2017	9605	9773	60	Marcellus
54	5/21/2017	9406	9574	60	Marcellus
55	5/22/2017	9206	9374	60	Marcellus
56	5/22/2017	9007	9175	60	Marcellus
57	5/22/2017	8807	8976	60	Marcellus
58	5/22/2017	8608	8776	60	Marcellus
59	5/23/2017	8409	8577	60	Marcellus
60	5/23/2017	8209	8377	60	Marcellus
61	5/23/2017	8010	8178	60	Marcellus
62	5/23/2017	7811	7979	60	Marcellus
63	5/23/2017	7611	7779	60	Marcellus
64	5/24/2017	7412	7580	60	Marcellus
65	5/24/2017	7212	7381	60	Marcellus
66	5/24/2017	7013	7181	60	Marcellus

RECEIVED
Office of Oil and Gas

OCT 30 2017

WV Department of
Environmental Protection

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	5/4/2017	74.2	7560	5772	3110	497270	10362	N/A
2	5/4/2017	73.5	7496	5967	3068	500290	10340	N/A
3	5/4/2017	73.8	7413	5428	3321	498340	10292	N/A
4	5/5/2017	77.3	7792	6016	5011	524060	12413	N/A
5	5/5/2017	77.0	7346	5482	3373	523310	10592	N/A
6	5/5/2017	75.8	7553	5403	3530	521620	10346	N/A
7	5/6/2017	71.1	7369	5642	3237	521560	12837	N/A
8	5/6/2017	71.4	7298	4469	3612	514120	11714	N/A
9	5/7/2017	77.2	7463	5725	3904	498170	10141	N/A
10	5/7/2017	76.4	7809	5367	3565	514576	10380	N/A
11	5/7/2017	74.4	7372	4741	3444	519162	13417	N/A
12	5/8/2017	67.0	6863	4843	3671	496346	16023	N/A
13	5/8/2017	72.3	7037	5734	3458	497884	10044	N/A
14	5/9/2017	78.0	7472	5567	3641	502230	10152	N/A
15	5/9/2017	78.4	7405	5254	3780	520620	10346	N/A
16	5/10/2017	72.4	7416	5493	3710	500190	9912	N/A
17	5/10/2017	73.3	7631	5107	3381	504040	12555	N/A
18	5/10/2017	68.8	7051	5182	3805	500480	9813	N/A
19	5/11/2017	74.0	7353	4894	3430	500860	9919	N/A
20	5/11/2017	73.7	7373	5050	3633	504130	10058	N/A
21	5/11/2017	72.8	6942	5621	3486	500800	9721	N/A
22	5/12/2017	73.6	6973	5600	3606	504910	10024	N/A
23	5/12/2017	74.0	7012	4344	3833	504510	10187	N/A
24	5/12/2017	70.8	7247	4902	3412	502980	10167	N/A
25	5/13/2017	73.4	7345	4738	4182	505270	10192	N/A
26	5/13/2017	77.4	7314	5283	3700	503110	9947	N/A
27	5/13/2017	72.1	6840	4795	3763	501180	9741	N/A
28	5/14/2017	43.1	7779	4977	4616	505560	15107	N/A
29	5/15/2017	72.3	7250	5378	4732	468270	11196	N/A
30	5/15/2017	70.7	7037	4963	3839	499530	9868	N/A
31	5/15/2017	67.2	6753	5221	3926	503410	10017	N/A
32	5/16/2017	73.4	7141	5088	4153	502120	9862	N/A
33	5/16/2017	71.2	6970	5050	3909	497620	10484	N/A
34	5/17/2017	75.2	6864	5489	3923	497330	9994	N/A
35	5/17/2017	75.1	6933	4238	3978	501090	10135	N/A
36	5/17/2017	73.6	6850	5345	3887	498280	9780	N/A
37	5/18/2017	75.0	6849	5566	4114	502910	10051	N/A
38	5/18/2017	76.1	6732	5072	4261	497600	10126	N/A
39	5/18/2017	76.3	6908	4998	4030	514800	10346	N/A
40	5/18/2017	74.0	6922	5122	4036	501250	9807	N/A
41	5/19/2017	74.7	7080	5296	4117	502790	9628	N/A
42	5/19/2017	76.6	6996	5337	3804	502850	9822	N/A
43	5/19/2017	73.6	6966	5198	4479	500730	9676	N/A
44	5/19/2017	72.4	6973	5123	3854	502590	9496	N/A
45	5/20/2017	75.7	6819	5774	3994	496790	9463	N/A
46	5/20/2017	76.1	6563	4890	4056	506650	9528	N/A
47	5/20/2017	75.6	6796	5207	3961	499650	9529	N/A
48	5/20/2017	75.4	6744	5951	4159	499140	9364	N/A
49	5/20/2017	75.0	6620	5285	4466	498420	9386	N/A
50	5/21/2017	76.5	6713	5261	4028	497010	9361	N/A
51	5/21/2017	73.9	6812	5661	4001	517710	9701	N/A
52	5/21/2017	74.9	6660	5405	3866	498640	9559	N/A
53	5/21/2017	75.6	6528	5054	4279	497370	9682	N/A
54	5/21/2017	74.8	6519	5700	4163	498010	9425	N/A
55	5/22/2017	74.8	6835	5130	4026	502090	10122	N/A
56	5/22/2017	67.8	7130	5326	4357	506540	11762	N/A
57	5/22/2017	75.9	6502	5174	4107	502270	9615	N/A
58	5/22/2017	75.1	6680	5250	4150	503760	11325	N/A
59	5/23/2017	75.3	6447	5295	4305	517610	9757	N/A
60	5/23/2017	78.6	6667	5351	3754	501200	9572	N/A
61	5/23/2017	77.8	6551	4923	3998	497860	9081	N/A
62	5/23/2017	79.1	6664	4308	4163	543510	10513	N/A
63	5/23/2017	78.7	6468	5022	4100	497160	9343	N/A
64	5/24/2017	78.3	6760	5460	3872	505050	10336	N/A
65	5/24/2017	78.8	6274	5852	4040	499540	10432	N/A
66	5/24/2017	78.8	6417	5435	3810	513770	9758	N/A
	AVG=	74.0	7,014	5,251	3,894	33,280,498	683,641	TOTAL

RECEIVED
Office of Oil and Gas

OCT 30 2017

WV Department of
Environmental Protection

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	55'	N/A	55'	N/A
Shale	est. -19	341	est. -19	341
Sandstone	est. 341	521	est. 341	521
Siltstone	est. 521	701	est. 521	701
Limestone	est. 701	751	est. 701	751
Shale	est. 751	1166	est. 751	1166
Trace Coal	est. 1166	1171	est. 1166	1171
Shale	est. 1171	1331	est. 1171	1331
Trace Coal	est. 1331	1336	est. 1331	1336
Sandstone	est. 1336	1631	est. 1336	1631
Shale	est. 1631	1900	est. 1631	1900
Big Lime	1900	2016	1900	2016
Big Injun	2016	2514	2016	2514
Gantz Sand	2514	2644	2514	2644
Fifty Foot Sandstone	2644	2743	2644	2743
Gordon	2743	3098	2743	3098
Fifth Sandstone	3098	3155	3098	3155
Bayard	3155	3502	3155	3502
Warren	3502	3851	3502	3851
Speechley	3851	4652	3851	4652
Bradford	4652	5141	4652	5141
Benson	5141	5399	5141	5399
Alexander	5399	5583	5399	5583
Elk	5583	5789	5583	6028
Rhinestreet	5789	6119	6028	6409
Sycamore	6119	6293	6409	6632
Middlesex	6293	6390	6632	6794
Burkett	6390	6422	6794	6865
Tully	6422	6458	6865	6974
Marcellus	6458	NA	6974	NA

*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.

RECEIVED
Office of Oil and Gas

OCT 30 2017

WV Department of
Environmental Protection

02/16/2018

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/4/2017
Job End Date:	5/25/2017
State:	West Virginia
County:	Tyler
API Number:	47-095-02307-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Johnston 1H
Latitude:	39.43195000
Longitude:	-80.86276667
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,540
Total Base Water Volume (gal):	29,961,145
Total Base Non Water Volume:	0



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	Operator	Base Fluid					
			Water	7732-18-5	100.00000	88.03510	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.18982	

RECEIVED
 Office of Oil and Gas
 WV Department of
 Environmental Protection
 OCT 30 2017

LP-70	Halliburton	Scale Inhibitor					
				Listed Below			
FR-76	Halliburton	Friction Reducer					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
SP BREAKER	Halliburton	Breaker					
				Listed Below			
SAND-PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant					
				Listed Below			
MC B-8614	Halliburton	Biocide					
				Listed Below			

RECEIVED
 Office of Oil and Gas
 WY Department of
 Environmental Protection
 OCT 30 2017

SAND-PREMIUM WHITE-30/50, BULK	Halliburton	Proppant					
				Listed Below			
HYDROCHLORIC ACID	Halliburton	Solvent					
				Listed Below			
Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.							
			Crystalline silica, quartz	14808-60-7	100.00000	11.72438	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02051	
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.02051	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Inorganic salt	Proprietary	30.00000	0.02051	
			Hydrochloric acid	7647-01-0	15.00000	0.02000	
			Guar gum	9000-30-0	100.00000	0.01601	
			Ethylene Glycol	107-21-1	60.00000	0.00824	
			Glutaraldehyde	111-30-8	30.00000	0.00260	
			Neutralized Polyacrylic Emulsion	Proprietary	10.00000	0.00137	
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00043	
			Sodium persulfate	7775-27-1	100.00000	0.00027	
			Ethanol	64-17-5	1.00000	0.00009	
			Methanol	67-56-1	60.00000	0.00007	
			Fatty acids, tall oil	Proprietary	30.00000	0.00003	
			Ethoxylated alcohols	Proprietary	30.00000	0.00003	

RECEIVED
 Office of Oil and Gas
 OCT 30 2017
 WV Department of
 Environmental Protection

			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1	30.00000	0.00003	
			Olefins	Proprietary	5.00000	0.00001	
			Propargyl alcohol	107-19-7	10.00000	0.00001	
			Phosphoric acid	7664-38-2	0.10000	0.00001	
			Sodium sulfate	7757-82-6	0.10000	0.00000	

* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

*** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

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)

RECEIVED
 Office of Oil and Gas
 OCT 30 2017
 WV Department of
 Environmental Protection

LATITUDE 39°27'30"

8,260'

5,031' TO BOTTOM HOLE
LATITUDE 39°25'00"

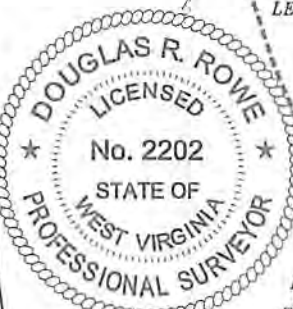
LONGITUDE 80°50'00"

9,583'

LONGITUDE 80°50'00"

RAYMOND UNDERWOOD
W.B. 28 PG. 70
T.M. 04 PAR. 12
76.5 AC. ±

WV NORTH ZONE
GRID NORTH



Antero Resources Corporation
Well No. Johnston Unit 1H
A.P.I. #47-095-02307

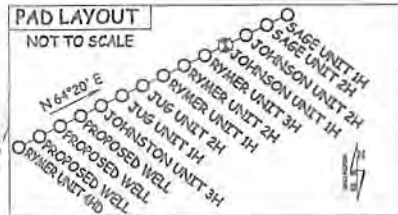
RAYMOND V. UNDERWOOD
ET UX LEASE
RAYMOND UNDERWOOD
D.B. 114 PG. 272
T.M. 04 PAR. 13
96 AC. ±

NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 342,381ft E: 1,615,138ft
LAT: 39°25'55.29" LON: 80°51'45.28"
BOTTOM HOLE INFORMATION:
N: 329,441ft E: 1,618,175ft
LAT: 39°23'47.85" LON: 80°51'04.09"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 4,364,738m E: 511,842m
BOTTOM HOLE INFORMATION:
N: 4,360,812m E: 512,833m

A = LOREN E. BAGLEY D.B. 349 PG. 284 T.M. 8 PAR. 3.1
B = LOREN E. BAGLEY D.B. 349 PG. 284 T.M. 8 PAR. 3.2
C = ARLIT ARBOGAST D.B. 376 PG. 826 T.M. 8 PAR. 3.3
D = DAVID D. CHIPPS D.B. 250 PG. 682 T.M. 8 PAR. 3.5

PAD LAYOUT
NOT TO SCALE



WV CONSERVATION COMMISSION
D.B. 155 PG. 303
T.M. 03 PAR. 22
111.41 AC. ±

JAMES L. HOWARD
ET AL
D.B. 297 PG. 95
T.M. 08 PAR. 10
68.31 AC. ±

RECEIVED
Office of Oil and Gas
OCT 30 2017
WV Department of Environmental Protection

COUNTY NAME PERMIT

- NOTE
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR UNDER USED TO HOUSE OR SHELTER DAIRY CATTLE OR FOLIAGE HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
 2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
 3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
 4. WLS IS NOT CERTIFYING THE DATA AND INFORMATION PROVIDED LISTED IN NOTES 2 AND 3, ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
 5. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.

NOTE:
4 WATER WELLS AND
1 SPRING WERE
LOCATED WITHIN 2000'
OF CENTER OF PAD



47 - 095 - 02307

STATE COUNTY PERMIT
I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

JOB # 15-034WA
DRAWING # JOHNSTON1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND
--- Surface Owner Boundary Lines +/-
--- Interior Surface Tracts +/-
--- Proposed Well Path
--- As Drilled Well Path
DOUGLAS R. ROWE P.S. 2202
DATE 09/28/17
OPERATOR'S WELL# JOHNSTON UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X
LOCATION: ELEVATION 1,017' AS DRILLED WATERSHED HEADWATERS MIDDLE ISLAND CREEK
QUADRANGLE SHIRLEY 7.5' DISTRICT CENTERVILLE COUNTY TYLER
SURFACE OWNER RAYMOND UNDERWOOD ACREAGE 96 ACRES +/-
OIL & GAS ROYALTY OWNER RAYMOND V. UNDERWOOD ET UX; WVDNR;
FOREST E. LEASEBURG ET UX; HELEN L. OSBORNE; RITA J. HITCHCOCK; RONALD ASH ET UX; CARL W. ASH ET UX;
RICHARD DEULLY ET UX; WVDNR; PAUL CLELLAND; DENNIS SPENCER JR.
LEASE ACREAGE 96 ACRES±; 244.25 ACRES±; 78 ACRES±; 168.75 ACRES±; 50 ACRES±; 72 ACRES±; 88 ACRES±;
113 ACRES±; 4.7 ACRES±; 156 ACRES±; 221 ACRES±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,540' TVD 20,246' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

02/16/2018

LATITUDE 39°27'30"

8,260'

5,031' TO BOTTOM HOLE
LATITUDE 39°25'00"

LONGITUDE 80°50'00"

7,300' TO BOTTOM HOLE

9,583'

LONGITUDE 80°50'00"

COUNTY NAME PERMIT

RAYMOND UNDERWOOD
W.B. 28 PG. 70
T.M. 04 PAR. 12
76.5 AC. ±

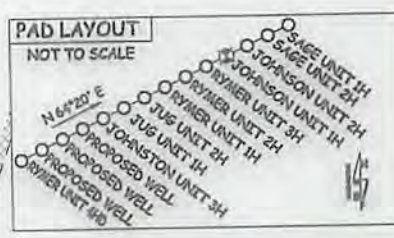
Antero Resources Corporation
Well No. Johnston Unit 1H
A.P.I. #47-095-02307

RAYMOND V. UNDERWOOD
ET UX LEASE
RAYMOND UNDERWOOD
D.B. 114 PG. 272
T.M. 04 PAR. 13
96 AC. ±

NOTES:
WELL 1H TOP HOLE INFORMATION:
N: 342,381ft E: 1,615,138ft
LAT: 39°25'55.29" LON: 80°51'45.28"
BOTTOM HOLE INFORMATION:
N: 329,441ft E: 1,618,175ft
LAT: 39°23'47.85" LON: 80°51'04.09"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.
ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT.
PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 4,364,738m E: 511,842m
BOTTOM HOLE INFORMATION:
N: 4,360,812m E: 512,833m

A = LOREN E. BAGLEY D.B. 349 PG. 284 T.M. 8 PAR. 3.1
B = LOREN E. BAGLEY D.B. 349 PG. 284 T.M. 8 PAR. 3.3
C = ARLT ARBOGAST D.B. 376 PG. 826 T.M. 8 PAR. 3.2
D = DAVID D. CHIPPS D.B. 290 PG. 682 T.M. 8 PAR. 3.5



W.V. CONSERVATION COMMISSION
D.B. 156 PG. 353
T.M. 03 PAR. 22
11.1 AC. ±

JAMES L. HOWARD ET AL
D.B. 297 PG. 95
T.M. 08 PAR. 10
68.31 AC. ±

RALPH J. UNDERWOOD ET AL
D.B. 184 PG. 443
T.M. 08 PAR. 15
74,452 AC. ±

MARY LOU WELLS
D.B. 340 PG. 792
T.M. 08 PAR. 20.1
2.75 AC. ±

MARY LOU WELLS
D.B. 39 PG. 33
T.M. 08 PAR. 20
6.66 AC. ±

RICHARD DEULLY ET UX LEASE
CAROL L. JONES
D.B. 351 PG. 319
T.M. 08 PAR. 19
113 AC. ±

PETER D. JARRETT ET AL
D.B. 380 PG. 628
T.M. 12 PAR. 02
176.97 AC. ±

DONNA VANDINE ET AL
D.B. 327 PG. 718
T.M. 12 PAR. 33
74.47 AC. ±



- 1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HARBORING ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
- 2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY ALLEGED SURVEYS, INC.
- 3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
- 4. WLS IS NOT CERTIFYING THE DATA AND INFORMATION PROVIDED LISTED IN NOTES 2 AND 3, ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
- 5. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.

NOTE:
4 WATER WELLS AND 1 SPRING WERE LOCATED WITHIN 2000' OF CENTER OF PAD



I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND DESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

PERMIT # 15-034WA
DRAWING # JOHNSTON1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
SOURCE OF ELEVATION MAPPING GRADE GPS
DATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND
--- Surface Owner Boundary Lines +/-
--- Interior Surface Tracts +/-
--- Proposed Well Path
--- As Drilled Well Path
DOUGLAS R. ROWE P.S. 2202
DATE 09/28/17
OPERATOR'S WELL# JOHNSTON UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL
"GAS") PRODUCTION X STORAGE DEEP SHALLOW X
LOCATION: ELEVATION 1,017' AS DRILLED WATERSHED HEADWATERS MIDDLE ISLAND CREEK
MADRANGLE SHIRLEY 7.5' DISTRICT CENTERVILLE COUNTY TYLER
SURFACE OWNER RAYMOND UNDERWOOD ACREAGE 96 ACRES +/-
LEASE & GAS ROYALTY OWNER RAYMOND V. UNDERWOOD ET UX; WVDNR;
REST E. LEASEBURG ET UX; HELEN L. OSBORNE; RITA J. HITCHCOCK; RONALD ASH ET UX; CARL W. ASH ET UX;
RICHARD DEULLY ET UX; WVDNR; PAUL CLELLAND; DENNIS SPENCER JR.
LEASE ACREAGE 96 ACRES±; 244.25 ACRES±; 78 ACRES±; 168.75 ACRES±; 50 ACRES±; 72 ACRES±; 88 ACRES±;
3 ACRES±; 4.7 ACRES±; 156 ACRES±; 221 ACRES±
PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
SHUT OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL
SPECIFY AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,540' TVD 20,246' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP STREET ADDRESS DENVER, CO 80202
M WW-6



02/16/2018