

Reviewed 12/28/2018

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

Debra Ann
12/12/17

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Office of Oil and Gas
NOV 14 2017

WV Department of
Environmental Protection

API 47 - 017 - 06764 County Doddridge District West Union
Quad West Union 7.5' Pad Name Addie Pad Field/Pool Name ----
Farm name Antero Resources Corporation Well Number Addie 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 4353811m Easting 516763m
Landing Point of Curve Northing 4353954m Easting 516893m
Bottom Hole Northing 4355732m Easting 516173m

Elevation (ft) 891' 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 2/26/2016 Date drilling commenced 7/6/2017 Date drilling ceased 11/17/2017
Date completion activities began 2/7/2018 Date completion activities ceased 7/14/2018
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 370' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1495', 1535' 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: _____

WR-35
Rev. 8/23/13

API 47-017 - 06764 Farm name Antero Resources Corporation Well number Addie Unit 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	95'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	493'	New	54#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2484'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	13345'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6663'		6.5#, P-110		
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	204 sx	15.6	1.18	241	0'	8 Hrs.
Surface	Class A	417 sx	15.6	1.19	496	0'	8 Hrs.
Coal							
Intermediate 1	Class A	858 sx	15.6	1.18	1012	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	674sx (Lead) 1112sx (Tail)	13.5(Load), 15.2 (Tail)	1.53 (Load), 1.83 (Tail)	3066	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 113345' MD, 6470' TVD (BHL), 6487' (Deepest Point Drilled) Loggers TD (ft) 13345' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

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Kick off depth (ft) 5885'

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

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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

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Rev. 8/23/13

API 47- 017 - 06764 Farm name Antero Resources Corporation Well number Addie Unit 1H

PRODUCING FORMATION(S)	DEPTHS		
Marcellus	6445' (TOP)	TVD	6678' (TOP) MD

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 13179 mcfpd Oil 105 bpd NGL --- bpd Water 3139 bpd GAS MEASURED BY Estimated Orifice Pilot

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

***PLEASE SEE ATTACHED EXHIBIT 3**

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Please insert additional pages as applicable.

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

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

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

Stimulating Company Keane Group
Address 5825 North Sam Houston Parkway West, Suite 600 City Houston State TX Zip 77086

Please insert additional pages as applicable.

Completed by Karin Cox Telephone 303-357-6820
Signature [Signature] Title Permitting Agent Date 11/9/2018

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

API 47-017-06764 Farm Name <u>Antero Resources Corp</u> Well Number <u>Addie Unit 1H</u>					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	2/7/2018	13077	13244	48	Marcellus
2	2/26/2018	12880	13046	48	Marcellus
3	2/26/2018	12682	12849	48	Marcellus
4	2/27/2018	12484	12651	48	Marcellus
5	2/27/2018	12287	12453	48	Marcellus
6	2/28/2018	12089	12256	48	Marcellus
7	2/28/2018	11891	12058	48	Marcellus
8	3/1/2018	11693	11860	48	Marcellus
9	3/1/2018	11496	11662	48	Marcellus
10	3/2/2018	11298	11465	48	Marcellus
11	3/2/2018	11100	11267	48	Marcellus
12	3/3/2018	10902	11069	48	Marcellus
13	3/4/2018	10705	10871	48	Marcellus
14	3/4/2018	10507	10674	48	Marcellus
15	3/5/2018	10309	10476	48	Marcellus
16	3/5/2018	10111	10278	48	Marcellus
17	3/6/2018	9914	10081	48	Marcellus
18	3/6/2018	9716	9883	48	Marcellus
19	3/7/2018	9518	9685	48	Marcellus
20	3/7/2018	9321	9487	48	Marcellus
21	3/7/2018	9123	9290	48	Marcellus
22	3/8/2018	8925	9092	48	Marcellus
23	3/8/2018	8727	8894	48	Marcellus
24	3/8/2018	8530	8696	48	Marcellus
25	3/9/2018	8332	8499	48	Marcellus
26	3/9/2018	8134	8301	48	Marcellus
27	3/10/2018	7936	8103	48	Marcellus
28	3/10/2018	7739	7905	48	Marcellus
29	3/10/2018	7541	7708	48	Marcellus
30	3/11/2018	7343	7510	48	Marcellus
31	3/11/2018	7146	7312	48	Marcellus
32	3/11/2018	6948	7115	48	Marcellus
33	3/12/2018	6750	6917	48	Marcellus

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W. D. BROWN, JR.
Environmental Protection

12/28/2018

API 47-017-06764 Farm Name Antero Resources Corp Well Number Addie Unit 1H

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	2/7/2018	73	7294	5394	4964	457411	10470	N/A
2	2/26/2018	75	7344	5603	4087	461180	10272	N/A
3	2/26/2018	73.2	7255	5561	4890	462660	10200	N/A
4	2/27/2018	76.7	7150	5503	4565	502000	12254	N/A
5	2/27/2018	80.4	7632	5617	4453	502960	10205	N/A
6	2/28/2018	75.6	6931	5445	4146	501775	10192	N/A
7	2/28/2018	79	7088	5367	3897	501700	10028	N/A
8	3/1/2018	73.3	7130	5786	4981	493513	10341	N/A
9	3/1/2018	79.5	7677	5449	5250	504980	10297	N/A
10	3/2/2018	74.4	7065	5974	5404	508750	10092	N/A
11	3/2/2018	79.2	6926	5825	3528	504550	9969	N/A
12	3/3/2018	73	7125	5611	5367	502580	10136	N/A
13	3/4/2018	79.1	7737	5511	3514	503193	10681	N/A
14	3/4/2018	74.7	6945	5293	3977	502000	10029	N/A
15	3/5/2018	78.3	7110	5518	4940	503960	11705	N/A
16	3/5/2018	80.7	6800	3850	5582	505680	10087	N/A
17	3/6/2018	80	6935	5893	5122	502380	9940	N/A
18	3/6/2018	79.3	7117	5519	5307	501000	10124	N/A
19	3/7/2018	76.7	6837	5558	5041	503000	10076	N/A
20	3/7/2018	78	6882	5754	4327	501775	10022	N/A
21	3/7/2018	77.7	6858	5710	5611	505000	10083	N/A
22	3/8/2018	79.8	6956	5449	5102	506510	10070	N/A
23	3/8/2018	79.3	6691	4538	5102	506000	10035	N/A
24	3/8/2018	79.1	6795	5309	4659	504000	10127	N/A
25	3/9/2018	77.8	6725	5514	3571	502081	10096	N/A
26	3/9/2018	78.7	6731	5570	6725	503000	10127	N/A
27	3/10/2018	77.3	6621	5116	6042	504000	10124	N/A
28	3/10/2018	78.7	6674	5391	5776	502037	9975	N/A
29	3/10/2018	79.2	6762	5433	5379	501000	10067	N/A
30	3/11/2018	79	6873	5425	3938	508000	10176	N/A
31	3/11/2018	79.8	6816	5209	5166	508095	10000	N/A
32	3/11/2018	77.2	6547	5309	4588	509000	10087	N/A
33	3/12/2018	77.7	6340	7062	4054	504000	10163	N/A
	AVG=	78	6,981	5,487	4,820	16,489,770	338,250	TOTAL

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API 47-017-06764 Farm Name <u>Antero Resources Corp</u> Well Number <u>Addie Unit 1H</u>				
EXHIBIT 3				
LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) From Surface
Shale	0	197	0	197
Sandy shale	197	357	197	357
Sandstone	357	417	357	417
Sandstone tr coal	417	437	417	437
Sandy shale	437	537	437	537
Shale	537	737	537	737
Silty sandstone	737	817	737	817
Silty shale	817	997	817	997
Sandstone	997	1,017	997	1,017
Silty shale	1,017	1,277	1,017	1,277
Sandstone	1,277	1,417	1,277	1,417
Sandy shale	1,417	1,677	1,417	1,677
Silty shale	1,677	1,740	1,677	1,741
Big Lime	1,740	2,284	1,741	2,286
Fifty Foot Sandstone	2,284	2,482	2,286	2,483
Gordon	2,482	2,709	2,483	2,711
Fifth Sandstone	2,709	2,770	2,711	2,772
Bayard	2,770	3,559	2,772	3,569
Speechley	3,559	3,743	3,569	3,758
Balltown	3,743	4,351	3,758	4,383
Bradford	4,351	4,793	4,383	4,837
Benson	4,793	5,082	4,837	5,135
Alexander	5,082	6,040	5,135	6,123
Sycamore	6,040	6,219	6,123	6,333
Middlesex	6,219	6,350	6,333	6,534
Burkett	6,350	6,378	6,534	6,592
Tully	6,378	6,420	6,592	6,678
Marcellus	6,420	NA	6,678	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.

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/25/2018
Job End Date:	3/12/2018
State:	West Virginia
County:	Doddridge
API Number:	47-017-06764-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Addie 1H
Latitude:	39.33348000
Longitude:	-80.80567000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,487
Total Base Water Volume (gal):	14,458,416
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
Water	Ascent	Carrier/Base Fluid	Water	7732-18-5	100.00000	87.75055	None
Sand (Proppant)	Keane	Proppant	Crystalline silica: Quartz (SiO2)	14808-60-7	100.00000	11.99165	None
KWG-111LS	Keane	Gel	Distillates (petroleum), hydrotreated light	64742-47-8	55.00000	0.02696	None
			Guar gum	9000-30-0	55.00000	0.02696	None
KFR-16FW	Keane	Friction Reducer	Water	7732-18-5	60.00000	0.03073	None
			Distillates (petroleum), hydrotreated light	64742-47-8	20.00000	0.01024	None
			oleic acid diethanolamide	93-83-4	1.50000	0.00077	None
			ammonium chloride	12125-02-9	1.50000	0.00077	None
			alcohols, C12-16, ethoxylated	68551-12-2	1.00000	0.00051	None
Hydrochloric Acid (15%)	Keane	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.02001	None
MBC-516W	Keane	Biocide					

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			Water	7732-18-5	56.70000	0.00511	None
			Glutaral	111-30-8	26.70000	0.00240	None
			didecyldimethylammonium chloride	7173-51-5	8.00000	0.00072	None
			quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	68424-85-1	5.30000	0.00048	None
			ethonal	64-17-5	2.80000	0.00025	None
KSI-19	Keane	Scale Inhibitor					
			Methanol	67-56-1	30.00000	0.00413	None
KWBO-2	Keane	Breaker					
			Sodium persulfate	7775-27-1	99.00000	0.00097	None
KAI-12	Keane	Acid Inhibitor					
			Ethylene glycol	107-21-1	40.00000	0.00004	None
			dipropylene glycol, monomethyl ether	34590-94-8	20.00000	0.00002	None
			Cinnamaldehyde	104-55-2	10.00000	0.00001	None
			formic acid	64-18-6	10.00000	0.00001	None
			Tar bases, quinoline derivs., benzyl chloride-quaternized	72480-70-7	10.00000	0.00001	None
			Ethoxylated alcohol	68131-39-5	10.00000	0.00001	None
			isoproyl alcohol	67-63-0	5.00000	0.00001	None
KFEAC-30	Keane	Iron Control					
			Citric acid	77-92-9	30.00000	0.00009	None
			Acetic acid	64-19-7	5.00000	0.00002	None

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.

Other Chemical(s)	Listed Above	See Trade Name(s) List					
			Distillates (petroleum), hydrotreated light	64742-47-8	55.00000	0.02696	
			Distillates (petroleum), hydrotreated light	64742-47-8	20.00000	0.01024	
			Glutaral	111-30-8	26.70000	0.00240	
			oleic acid diethanolamide	93-83-4	1.50000	0.00077	
			ammonium chloride	12125-02-9	1.50000	0.00077	
			didecyldimethylammonium chloride	7173-51-5	8.00000	0.00072	
			alcohols, C12-16, ethoxylated	68551-12-2	1.00000	0.00051	
			quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	68424-85-1	5.30000	0.00048	
			ethonal	64-17-5	2.80000	0.00025	
			Citric acid	77-92-9	30.00000	0.00009	
			dipropylene glycol, monomethyl ether	34590-94-8	20.00000	0.00002	
			Ethoxylated alcohol	68131-39-5	10.00000	0.00001	
			formic acid	64-18-6	10.00000	0.00001	
			Cinnamaldehyde	104-55-2	10.00000	0.00001	
			Tar bases, quinoline derivs., benzyl chloride-quaternized	72480-70-7	10.00000	0.00001	

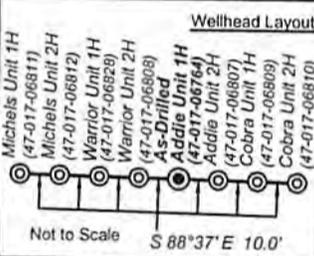
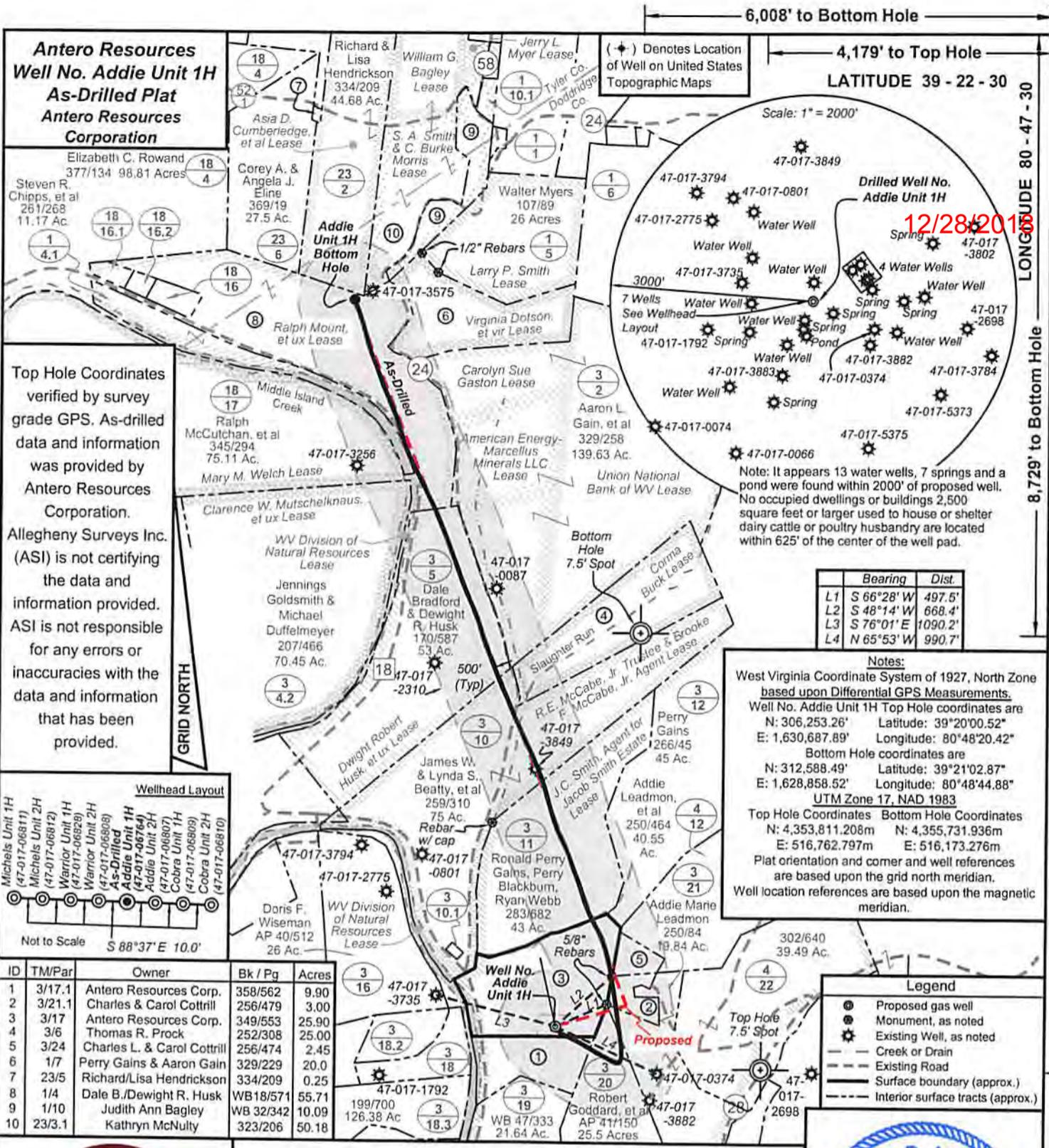
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			isopropyl alcohol	67-63-0	5.00000	0.00001
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* Total Water Volume sources may include fresh water, produced water, and/or recycled water

** 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)

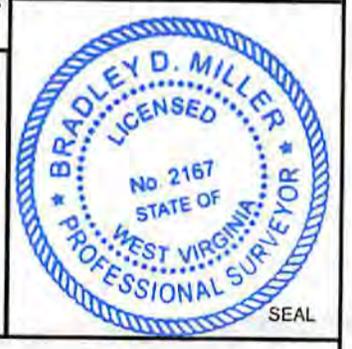


ID	TMP/Par	Owner	Bk / Pg	Acres
1	3/17.1	Antero Resources Corp.	358/562	9.90
2	3/21.1	Charles & Carol Cottrill	256/479	3.00
3	3/17	Antero Resources Corp.	349/553	25.90
4	3/6	Thomas R. Prock	252/308	25.00
5	3/24	Charles L. & Carol Cottrill	256/474	2.45
6	1/7	Perry Gains & Aaron Gain	329/229	20.0
7	23/5	Richard/Lisa Hendrickson	334/209	0.25
8	1/4	Dale B./Dewight R. Husk	WB18/571	55.71
9	1/10	Judith Ann Bagley	WB 32/342	10.09
10	23/3.1	Kathryn McNully	323/206	50.18



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 prescribed by the Department of Environmental Protection.

Bradley D. Miller
 Bradley D. Miller, P.S. 2267



FILE NO: 55-30-WU-15
 DRAWING NO: Addie 1H Well Plat As-Drilled
 SCALE: 1" = 1200'
 MINIMUM DEGREE OF ACCURACY: Submeter
 PROVEN SOURCE OF ELEVATION: WVDOT, Harrisville, WV

STATE OF WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 OIL AND GAS DIVISION

DATE: June 6 20 18
 OPERATOR'S WELL NO. Addie Unit 1H
 API WELL NO
 47 - 017 - 06764
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW

LOCATION: ELEVATION: 891' As-Drilled WATERSHED: Headwaters Middle Island Creek QUADRANGLE: West Union
 DISTRICT: West Union COUNTY: Doddridge

SURFACE OWNER: Antero Resources Corp. RALPH MOUNT, ET UX J. C. SMITH, AGENT FOR JACOB SMITH ESTATE
 ROYALTY OWNER: R. E. McCABE, JR. TRUSTEE & BROOKE F. McCABE, JR. AGENT LEASE NO: ACREAGE: 25.9

PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) As-Drilled 6.470' TVD
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 13,345' MD

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
 ADDRESS: 1615 Wynkoop Street ADDRESS: 5400 D Big Tyler Road
 Denver, CO 80202 Charleston, WV 25313

12/28/2018



