



Antero Resources  
1615 Wynkoop Street  
Denver, CO 80202  
Office 303.357.7310  
Fax 303.357.7315

July 26, 2019

West Virginia Department of Environmental Protection  
Office of Oil and Gas  
601 57<sup>th</sup> Street  
Charleston, WV 25304

To Whom It May Concern:

Please find enclosed the Well Operator's Report of Well Work, Form WR-35 (including As-Drilled Survey Plat, Directional Survey and FracFocus report), Discharge Monitoring Report Form WR-34 and corresponding logs for the following wells:

- Bill Unit 1H (API # 47-085-10240)—Bison Pad
- Bill Unit 2H (API # 47-085-10241)—Bison Pad
- Bill Unit 3H (API # 47-085-10257)—Bison Pad
- Buffalo Unit 1H (API # 47-085-10249)—Bison Pad
- Buffalo Unit 2H (API # 47-085-10243)—Bison Pad

If you have any questions please feel free to contact me at (303) 357-7223.

Sincerely,

A handwritten signature in black ink, appearing to read "Megan Griffith", with a horizontal line extending to the right.

Megan Griffith  
Permitting Agent  
Antero Resources Corporation

Enclosures

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

API 47- \_\_\_\_\_ - \_\_\_\_\_ County \_\_\_\_\_ District \_\_\_\_\_  
Quad \_\_\_\_\_ Pad Name \_\_\_\_\_ Field/Pool Name \_\_\_\_\_  
Farm name \_\_\_\_\_ Well Number \_\_\_\_\_  
Operator (as registered with the OOG) \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing \_\_\_\_\_ Easting \_\_\_\_\_  
Landing Point of Curve Northing \_\_\_\_\_ Easting \_\_\_\_\_  
Bottom Hole Northing \_\_\_\_\_ Easting \_\_\_\_\_

Elevation (ft) \_\_\_\_\_ 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)  
\_\_\_\_\_  
\_\_\_\_\_

Date permit issued \_\_\_\_\_ Date drilling commenced \_\_\_\_\_ Date drilling ceased \_\_\_\_\_  
Date completion activities began \_\_\_\_\_ Date completion activities ceased \_\_\_\_\_  
Verbal plugging (Y/N) \_\_\_\_\_ Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

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

Freshwater depth(s) ft \_\_\_\_\_ Open mine(s) (Y/N) depths \_\_\_\_\_  
Salt water depth(s) ft \_\_\_\_\_ Void(s) encountered (Y/N) depths \_\_\_\_\_  
Coal depth(s) ft \_\_\_\_\_ Cavern(s) encountered (Y/N) depths \_\_\_\_\_  
Is coal being mined in area (Y/N) \_\_\_\_\_

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

API 47- \_\_\_\_\_ - \_\_\_\_\_ Farm name \_\_\_\_\_ Well number \_\_\_\_\_

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							
Surface							
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production							
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_  
\_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor							
Surface							
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production							
Tubing							

Drillers TD (ft) \_\_\_\_\_ Loggers TD (ft) \_\_\_\_\_  
 Deepest formation penetrated \_\_\_\_\_ Plug back to (ft) \_\_\_\_\_  
 Plug back procedure \_\_\_\_\_

Kick off depth (ft) \_\_\_\_\_

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 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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 \_\_\_\_\_

API 47- \_\_\_\_ - \_\_\_\_ Farm name \_\_\_\_\_ Well number \_\_\_\_\_

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
<b>*PLEASE SEE ATTACHED EXHIBIT 1</b>					

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)
<b>*PLEASE SEE ATTACHED EXHIBIT 2</b>								

Please insert additional pages as applicable.

API 47- \_\_\_\_\_ - \_\_\_\_\_ Farm name \_\_\_\_\_ Well number \_\_\_\_\_

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>
_____	_____ TVD _____ MD
_____	_____
_____	_____
_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump  
 SHUT-IN PRESSURE Surface \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs  
 OPEN FLOW Gas \_\_\_\_\_ mcfpd Oil \_\_\_\_\_ bpd NGL \_\_\_\_\_ bpd Water \_\_\_\_\_ 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 <sub>2</sub> S, ETC)
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**\*PLEASE SEE ATTACHED EXHIBIT 3**


Please insert additional pages as applicable.

Drilling Contractor \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Logging Company \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Cementing Company \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Stimulating Company \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Please insert additional pages as applicable.

Completed by \_\_\_\_\_ Telephone \_\_\_\_\_  
 Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

API 47-085-10257 Farm Name Donald L. Costilow Well Number Bill Unit 3H

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	2/4/2019	13251.4	13208.4	60	Marcellus
2	2/5/2019	13169.565	13003.39	60	Marcellus
3	2/6/2019	12967.755	12801.58	60	Marcellus
4	2/6/2019	12765.945	12599.77	60	Marcellus
5	2/6/2019	12564.135	12397.96	60	Marcellus
6	2/6/2019	12362.325	12196.15	60	Marcellus
7	2/7/2019	12160.515	11994.34	60	Marcellus
8	2/8/2019	11958.705	11792.53	60	Marcellus
9	2/8/2019	11756.895	11590.72	60	Marcellus
10	2/9/2019	11555.085	11388.91	60	Marcellus
11	2/10/2019	11353.275	11187.1	60	Marcellus
12	2/10/2019	11151.465	10985.29	60	Marcellus
13	2/11/2019	10949.655	10783.48	60	Marcellus
14	2/11/2019	10747.845	10581.67	60	Marcellus
15	2/12/2019	10546.035	10379.86	60	Marcellus
16	2/13/2019	10344.225	10178.05	60	Marcellus
17	2/13/2019	10142.415	9976.24	60	Marcellus
18	2/13/2019	9940.605	9774.43	60	Marcellus
19	2/15/2019	9738.795	9572.62	60	Marcellus
20	2/16/2019	9536.985	9370.81	60	Marcellus
21	2/16/2019	9335.175	9169	60	Marcellus
22	2/17/2019	9133.365	8967.19	60	Marcellus
23	2/17/2019	8931.555	8765.38	60	Marcellus
24	2/18/2019	8729.745	8563.57	60	Marcellus
25	2/18/2019	8527.935	8361.76	60	Marcellus
26	2/18/2019	8326.125	8159.95	60	Marcellus
27	2/19/2019	8124.315	7958.14	60	Marcellus
28	2/20/2019	7922.505	7756.33	60	Marcellus
29	2/20/2019	7720.695	7554.52	60	Marcellus
30	2/21/2019	7518.885	7352.71	60	Marcellus
31	2/21/2019	7317.075	7150.9	60	Marcellus
32	2/21/2019	7115.265	6949.09	60	Marcellus

**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	1/19/2019	70.6	7008	6382	3340	148250	4670	N/A
2	1/20/2019	76.1	7613	6889	3967	400910	8585	N/A
3	1/21/2019	77.1	8143	5802	3616	403500	8536	N/A
4	1/22/2019	80.7	7591	662	4215	403965	8485	N/A
5	1/22/2019	84.4	8087	5642	4098	404500	8451	N/A
6	1/22/2019	72.3	7323	5707	3484	403280	9936	N/A
7	1/23/2019	85.4	7969	6235	3972	402900	8300	N/A
8	1/23/2019	76.4	7617	6136	3806	401860	9265	N/A
9	1/24/2019	77.5	7376	5611	4334	402310	8447	N/A
10	1/24/2019	78.7	8111	5881	3651	400350	8361	N/A
11	1/25/2019	80.2	8133	5778	4056	408800	8666	N/A
12	1/25/2019	80.9	7838	5561	3698	401110	8502	N/A
13	1/26/2019	75.6	7940	6236	3602	405300	8409	N/A
14	1/26/2019	77.9	7697	6005	3643	400050	8148	N/A
15	1/27/2019	87.6	7921	5990	3792	404360	8217	N/A
16	1/27/2019	78.2	7741	5612	3264	398980	8302	N/A
17	1/28/2019	74.6	7625	6093	3290	401900	8307	N/A
18	1/28/2019	81.7	7739	6137	3299	399670	8328	N/A
19	1/28/2019	87.3	7376	3919	4386	401850	8269	N/A
20	1/28/2019	85.9	7459	6107	3202	402590	8400	N/A
21	1/29/2019	82.2	7413	5742	3649	403300	8374	N/A
22	1/29/2019	85.9	7407	5705	3957	401130	8107	N/A
23	1/30/2019	86.4	7873	5618	4058	400760	8241	N/A
24	1/30/2019	85.8	7904	6010	3962	400500	8183	N/A
25	1/30/2019	88.8	7621	6284	4440	402100	8138	N/A
26	2/1/2019	82.5	7487	6366	4362	410100	8504	N/A
27	2/1/2019	89.3	7433	5611	3993	403100	8097	N/A
28	2/1/2019	81.70419	7415.593	6149	3230	401900	7956	N/A
29	2/1/2019	88.16006	7576.138	7237	4175	401980	8247	N/A
30	2/2/2019	87.83814	7227.617	6117	4219	400710	8269	N/A
31	2/3/2019	87.32826	7397.534	6341	4187	401900	8158	N/A
32	2/3/2019	87.19486	7083.669	6042	4042	401260	8889	N/A
	AVG=	<b>82</b>	<b>7,630</b>	<b>5,800</b>	<b>3,843</b>	<b>12,625,175</b>	<b>265,747</b>	TOTAL

**EXHIBIT 3**

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Silty Sandstone	0	190	0	190
Sandy siltstone	est 190	290	est 190	290
Sandstone	est 290	600	est 290	600
Silty Sandstone	est 600	870	est 600	870
limey siltstone	est 870	945	est 870	945
silty sandstone, tr. coal	est 945	1,095	est 945	1,095
silty sandstone	est 1095	1,490	est 1095	1,490
silty shale	est 1490	1,620	est 1490	1,620
sandstone, tr coal	est 1620	1,630	est 1620	1,630
silty sandstone	est 1630	1,670	est 1630	1,670
sandstone	est 1670	1,745	est 1670	1,745
sandy shale	est 1745	1,770	est 1745	1,770
shaly sand	est 1770	2,019	est 1770	2,023
Big Lime	2,019	2,898	2,023	2,903
Fifty Foot Sandstone	2,898	3,012	2,903	3,018
Gordon	3,012	3,176	3,018	3,183
Fifth Sandstone	3,176	3,428	3,183	3,438
Bayard	3,428	3,919	3,438	3,934
Speechley	3,919	4,166	3,934	4,184
Balltown	4,166	4,699	4,184	4,723
Bradford	4,699	5,084	4,723	5,113
Benson	5,084	5,329	5,113	5,360
Alexander	5,329	6,256	5,360	6,323
Sycamore	6,256	6,366	6,323	6,470
Middlesex	6,366	6,476	6,470	6,673
Burkett	6,476	6,509	6,673	6,764
Tully	6,509	6,539	6,764	6,895
Marcellus	6,539	NA	6,895	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.



## Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/4/2019
Job End Date:	2/22/2019
State:	West Virginia
County:	Ritchie
API Number:	47-085-10257-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Bill Unit 3H
Latitude:	39.29520300
Longitude:	-80.90150000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,582
Total Base Water Volume (gal):	11,521,758
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	Supplied by Operator	Base Fluid					
			Water	7732-18-5	100.00000	88.08404	
Sand (Proppant)	CWS	Propping Agent					
				Listed Below			

SaniFrac 8844	CWS	Biocide					
				Listed Below			
DAP-902	CWS	Scale Inhibitor					
				Listed Below			
DWP-641	CWS	Friction Reducer					
				Listed Below			
CalGel 4000	CWS	Gel Slurry					
				Listed Below			
Calbreak 5501	CWS	Breaker					
				Listed Below			
15% HCl Acid	CWS	Clean Perforations					
				Listed Below			
CI-9100G	CWS	Corrosion Inhibitor					
				Listed Below			
DAP-103	CWS	Iron Control					
				Listed Below			
Other Chemical (s)	Listed Above	See Trade Name (s) List					

				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	11.56489	
			Hydrochloric acid	7647-01-0	37.00000	0.08056	
			Calcite	471-34-1	1.00000	0.08050	
			Illite	12173-60-3	1.00000	0.03513	
			Polymer	26100-47-0	45.00000	0.02677	
			Guar gum	9000-30-0	60.00000	0.02296	
			Distillates (petroleum), hydrotreated middle	64742-46-7	60.00000	0.02296	
			Distillates (petroleum), hydrotreated light	64742-47-8	30.00000	0.01785	
			Biotite	1302-27-8	0.10000	0.01156	
			Apatite	64476-38-6	0.10000	0.01156	
			Goethite	1310-14-1	0.10000	0.01156	
			Ammonium chloride	12125-02-9	11.00000	0.00654	
			Polyethylene glycol mixture	25322-68-3	54.50000	0.00610	
			Ilmenite	98072-94-7	0.10000	0.00351	
			Sorbitan monooleate	1338-43-8	4.00000	0.00238	
			2,2-Dibromo-3-Nitrilopropionamide	10222-01-2	20.00000	0.00224	
			Quaternary ammonium compounds, bis (hydrogenated tallow alkyl)dimethyl, salts with bentonite	68953-58-2	5.00000	0.00191	
			Polyethylene glycol monooleate	9004-96-0	3.00000	0.00178	
			Sorbitol tetraoleate	61723-83-9	2.00000	0.00119	
			Citric acid	77-92-9	60.00000	0.00073	
			Ammonium Persulfate	7727-54-0	100.00000	0.00070	
			Amines, tallow alkyl, ethoxylated	61791-26-2	1.00000	0.00059	

			Oxirane, 2-methyl-, polymer with oxirane, monodecyl ether	37251-67-5	1.50000	0.00057	
			Sodium bromide	7647-15-6	4.00000	0.00045	
			Dibromoacetonitrile	3252-43-5	3.00000	0.00034	
			Alkyloxypolyethyleneoxy ethanol	84133-50-6	0.50000	0.00030	
			Vinylidene chloride-methyl acrylate copolymer	25038-72-6	20.00000	0.00014	
			Acrylamide	79-06-1	0.10000	0.00006	
			Ethylene Glycol	107-21-1	40.00000	0.00004	
			Diethylene glycol, monomethyl ether	34590-94-8	20.00000	0.00002	
			Isopropyl alcohol	67-63-0	5.00000	0.00001	
			Tar bases, quinolone derivs, benzyl chloride- quatenized	72480-70-7	10.00000	0.00001	
			Ethoxylated Alcohols	68131-39-5	10.00000	0.00001	
			Formic acid	64-18-6	10.00000	0.00001	
			Cinnamaldehyde	104-55-2	10.00000	0.00001	
			Glycol	57-55-6			Proprietary Additive Concentration
			Organic Acid Salts	9003-04-7			Proprietary Additive Concentration

\* 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)

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Discharge Monitoring Report  
Oil and Gas General Permit

Company Name: Antero Resources Corporation  
API No: 47-085-10257 County: Ritchie  
District: Clay Well No: Bill Unit 3H  
Farm Name: Antero Resources Corporation  
Discharge Date/s From:(MMDDYY) 05/06/19 To: (MMDDYY) 06/05/19  
Discharge Times. From: 0:00 To: 24:00  
Total Volume to be Disposed from this facility (gallons): 593,873

Disposal Option(s) Utilized (write volumes in gallons):

- (1) Land Application: \_\_\_\_\_ (Include a topographical map of the Area.)  
(2) UIC: 104,515 Permit No. 3416729731, 3400923821  
(3) Offsite Disposal: \_\_\_\_\_ Site Location: \_\_\_\_\_  
(4) Reuse: 489,359 Alternate Permit Number: \_\_\_\_\_  
(5) Centralized Facility: \_\_\_\_\_ Permit No. \_\_\_\_\_  
(6) Other method: \_\_\_\_\_ (Include an explanation)

Follow Instructions below to determine your treatment category:

Optional Pretreatment test: n/a Cl- mg/l n/a DO mg/l

1. Do you have permission to use expedited treatment from the Director or his representative?  
(Y/N) n/a If yes, who? \_\_\_\_\_ and place a four (4) on line 7.  
If not go to line 2
2. Was Frac Fluid or flowback put into the pit? (Y/N) n/a If yes, go to line 5. If not, go to line 3.
3. Do you have a chloride value pretreatment (see above)? (Y/N) n/a If yes, go to line 4  
If not, go to line 5.
4. Is the Chloride level less than 5000 mg/l? (Y/N) n/a If yes, then enter a one (1) on line 7.
5. Do you have a pretreatment value for DO? (See above) (Y/N) n/a If yes, go to line 6  
If not, enter a three (3) in line 7.
6. Is the DO level greater than 2.5 mg/l?(Y/N) n/a If yes, enter a two (2) on line 7. If not, enter a three (3) on line 7.
7. n/a is the category of your pit. Use the Appropriate section.
8. Comments on Pit condition: \_\_\_\_\_  
n/a No pit on site.

Name of Principal Exec. Officer: Gretchen Kohler  
Title of Officer: Senior Environmental and Regulatory Manager  
Date Completed: 7/12/19

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

  
\_\_\_\_\_  
Signature of a Principal Exec. Officer or Authorized agent.

Category 1  
Sampling Results  
API No : \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	5	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl	5,000	_____	5,000	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**			Monitor	_____	mg/l
Oil and Grease			Monitor	_____	mg/l
Total Al***			Monitor	_____	mg/l
TSS			Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume			Monitor	_____	Gal
Flow			Monitor	_____	Gal/min
Disposal Area			Monitor	_____	Acres

\*\*\* Al is only reported if the pH is above 9.0

Category 2  
Sampling Results  
API No : \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	10	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**			Monitor	_____	mg/l
Oil and Grease			Monitor	_____	mg/l
Total Al***			Monitor	_____	mg/l
TSS			Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume			Monitor	_____	Gal
Flow			Monitor	_____	Gal/min
Disposal Area			Monitor	_____	Acres

\* Can be 25,000 with inspector's approval,

(Inspector's signature): \_\_\_\_\_ Date: \_\_\_\_\_  
 \*\* Include a description of your aeration technique. Aeration Code: \_\_\_\_\_  
 \*\*\* Al is only reported if the pH is above 9.0

Category 3  
Sampling Results  
API No : \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	20	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

\* Can be 25,000 with inspector's approval,

(Inspector's signature): \_\_\_\_\_

Date: \_\_\_\_\_

\*\* Include a description of your aeration technique.

Aeration Code: \_\_\_\_\_

\*\*\* Al is only reported if the pH is above 9.0.

Category 4  
Sampling Results  
API No: \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	1	_____	N/A	N/A	Days
Fe	Monitor	_____	Monitor	_____	mg/l
D.O.	Monitor	_____	Monitor	_____	mg/l
Settleable Sol.	Monitor	_____	Monitor	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Activated Carbon (0.175)		_____	N/A	N/A	lb/B1
Date Site Reclaimed	N/A	N/A			10 days from dis.
Disposal Area		_____	Monitor	_____	Acres

\* Can be 25,000 with inspector's approval,

(Inspector's signature): \_\_\_\_\_

Date: \_\_\_\_\_

LATITUDE 39°20'00"

7,500'

9,417' TO BOTTOM HOLE

LATITUDE 39°20'00"

LONGITUDE 80°52'30"

7,586' TO BOTTOM HOLE

13,888'

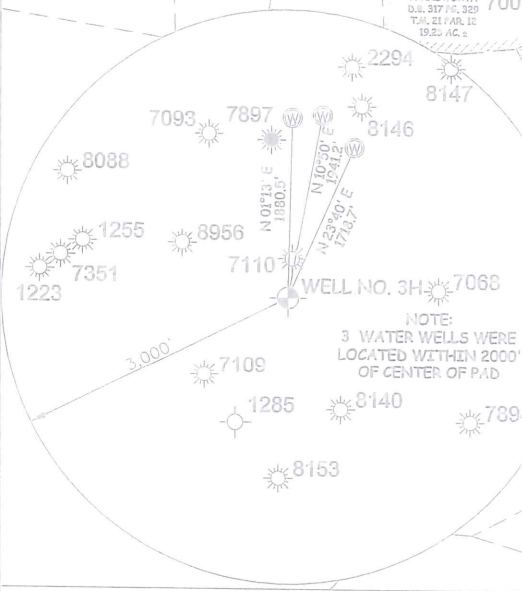
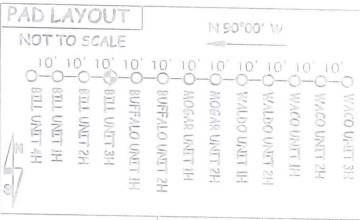
LONGITUDE 80°52'30"

Antero Resources Corporation  
Well No. Bill Unit 3H  
API 47-085-10257

AS DRILLED DATA:  
WELL 3H TOP HOLE INFORMATION:  
N: 292,723ft E: 1,603,367ft  
LAT: 39°17'42.73" LON: 80°54'05.40"  
BOTTOM HOLE INFORMATION:  
N: 299,054ft E: 1,601,547ft  
LAT: 39°18'45.02" LON: 80°54'29.81"  
WEST VIRGINIA COORDINATE  
SYSTEM OF 1927 NORTH ZONE.  
ZONE WAS DERIVED FROM  
MEASUREMENTS TAKEN WITH  
TRIMBLE 660XT SUBMETER  
MAPPING GRADE GPS UNIT.  
PLAT ORIENTATION, CORNER,  
AND WELL REFERENCE TIE LINES  
ARE BASED ON GRID NORTH.

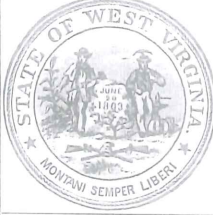
(NAD) 83 (UTM) ZONE 17 COORDS:  
WELL 3H TOP HOLE INFORMATION:  
N: 4,349,550m E: 508,508m  
BOTTOM HOLE INFORMATION:  
N: 4,351,470m E: 507,922m

WV NORTH ZONE  
GRID NORTH



NOTE:  
3 WATER WELLS 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 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 # 15-030WA  
DRAWING # BILL3HAD  
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  
  
DATE 06/26/19  
OPERATOR'S WELL# BILL UNIT 3H

NOTE  
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 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  
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.

WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ 47 - 085 - 10257  
(IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X STATE COUNTY PERMIT  
LOCATION: ELEVATION 1,221' - AS BUILT WATERSHED NORTH FORK HUGHES RIVER  
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE  
SURFACE OWNER DONALD L. COSTILOW ACREAGE 50.13 ACRES +/-  
OIL & GAS ROYALTY OWNER BERTHA D. FERREBEE; RANDY L. BARNES; MICHAEL F. QUINN; NEW FREEDOM ENERGY, I.L.C.; LEASE ACREAGE 67 AC +/-; 10.65 AC +/-; 10.05 AC +/-; 10.5 AC +/-; 7.76 AC +/-; 2.05 C +/-  
JOHNNI ROBINSON; WINOLA H. CARMAN; DOLPH HICKMAN ET UX; KARL K. HICKMAN ET UX; EUGENIE COSTILOW ET UX; MAX D. JEWELL ET UX; E. HOWARD POOLE ET UX; CHARLES U. COSTILOW ET UX 10.65 AC +/-; 0.205 AC +/-; 31 AC +/-; 5.75 AC +/-; 54 AC +/-; 38 AC +/-; 23 AC +/-; 200 AC +/-  
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 6,582' TVD 13,369' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD  
DENVER, CO 80202 CHARLESTON, WV 25313