

04/05/2019



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

April 12, 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:

- San Juan Unit 2H (API # 47-095-02381)—Vera Pad
- San Juan Unit 3H (API # 47-095-02382)—Vera Pad
- San Juan Unit 4H (API # 47-095-02383)—Vera Pad
- Ant Unit 1H (API # 47-095-02400)—Vera Pad
- Ant Unit 2H (API # 47-095-02401)—Vera Pad
- Ant Unit 3H (API # 47-095-02402)—Vera Pad
- Emerger Unit 1H (API # 47-095-02412)—Vera 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 long horizontal stroke extending to the right.

Megan Griffith  
Permitting Agent  
Antero Resources Corporation

Enclosures

WR-35  
Rev. 8/23/13

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

API 47-095-02402 County Tyler District Centerville  
Quad Middlebourne 7.5' Pad Name Vera Pad Field/Pool Name -----  
Farm name Vera O. Thomas Well Number Ant Unit 3H  
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 4363990m Easting 508272m  
Landing Point of Curve Northing 4363918.16m Easting 508292.20m  
Bottom Hole Northing 4361483m Easting 509169m

Elevation (ft) 1148.1' 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 1/24/2017 Date drilling commenced 3/22/2017 Date drilling ceased 9/15/2017  
Date completion activities began 1/23/2018 Date completion activities ceased 7/4/2018  
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 65', 215', 261', 399' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 620', 1614', 1974' Void(s) encountered (Y/N) depths No  
Coal depth(s) ft 620', 879' Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No

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

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API 47-095 - 02402 Farm name Vera O. Thomas Well number Ant Unit 3H

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"	95'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	758'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2607'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15431'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6743'		4.7#, N-80		
Packer type and depth set		N/A					

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	Class A	368 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	640 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	950 sx	15.6	1.18	1181	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	761 sx (Lead) 15431 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.53 (Lead), 1.83 (Tail)		-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15431' MD, 6573' TVD (BHL), 6588' (Deepest Point Drilled) Loggers TD (ft) 15431' MD

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

Plug back procedure N/A

Kick off depth (ft) 5890'

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





WR-35  
Rev. 8/23/13

API 47- 095 - 02402 Farm name Vera O. Thomas Well number Ant Unit 3H

PRODUCING FORMATION(S)	DEPTHS	
Marcellus	6561' (TOP) TVD	6798' (TOP) MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 2800 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 4839 mcfpd Oil 118 bpd NGL --- bpd Water 29 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 Frontier Drilling LLC  
Address 562 Spring Run Road City Pennsboro State WV Zip 26415

Logging Company Schlumberger  
Address 5599 San Felipe Street City Houston State TX Zip 77056

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

Stimulating Company Baker Hughes  
Address 837 Philippi Pike City Clarksburg State WV Zip 26301

Please insert additional pages as applicable.

Completed by Megan Griffith Telephone 303-357-7223  
Signature  Title Permitting Agent Date 4/12/2019

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

API 47-095-02402 Farm Name Vera O. Thomas Well Number Ant Unit 3H					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	3/1/2018	15162	15329	60	Marcellus
2	3/2/2018	14963	15131	60	Marcellus
3	3/2/2018	14764	14932	60	Marcellus
4	3/3/2018	14566	14733	60	Marcellus
5	3/3/2018	14367	14535	60	Marcellus
6	3/4/2018	14168	14336	60	Marcellus
7	3/5/2018	13970	14137	60	Marcellus
8	3/5/2018	13771	13939	60	Marcellus
9	3/5/2018	13572	13740	60	Marcellus
10	3/6/2018	13374	13541	60	Marcellus
11	3/7/2018	13175	13343	60	Marcellus
12	3/7/2018	12976	13144	60	Marcellus
13	3/8/2018	12778	12945	60	Marcellus
14	3/8/2018	12579	12747	60	Marcellus
15	3/9/2018	12380	12548	60	Marcellus
16	3/10/2018	12182	12349	60	Marcellus
17	3/10/2018	11983	12151	60	Marcellus
18	3/11/2018	11784	11952	60	Marcellus
19	3/11/2018	11586	11753	60	Marcellus
20	3/12/2018	11387	11555	60	Marcellus
21	3/12/2018	11188	11356	60	Marcellus
22	3/13/2018	10990	11157	60	Marcellus
23	3/13/2018	10791	10959	60	Marcellus
24	3/14/2018	10592	10760	60	Marcellus
25	3/14/2018	10394	10561	60	Marcellus
26	3/15/2018	10195	10363	60	Marcellus
27	3/15/2018	9996	10164	60	Marcellus
28	3/16/2018	9798	9965	60	Marcellus
29	3/16/2018	9599	9767	60	Marcellus
30	3/17/2018	9401	9568	60	Marcellus
31	3/18/2018	9202	9369	60	Marcellus
32	3/18/2018	9003	9171	60	Marcellus
33	3/19/2018	8805	8972	60	Marcellus
34	3/20/2018	8606	8773	60	Marcellus
35	3/21/2018	8407	8575	60	Marcellus
36	3/21/2018	8209	8376	60	Marcellus
37	3/22/2018	8010	8177	60	Marcellus
38	3/23/2018	7811	7979	60	Marcellus
39	3/23/2018	7613	7780	60	Marcellus
40	3/24/2018	7414	7581	60	Marcellus
41	3/24/2018	7215	7383	60	Marcellus
42	3/25/2018	7017	7184	60	Marcellus
43	3/25/2018	6818	6985	60	Marcellus



## API 47-095-02402 Farm Name Vera O. Thomas Well Number Ant Unit 3H

## 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	3/1/2018	76.1	7670	5583	3323	517120	10492	N/A
2	3/2/2018	76.7	7382	6335	3273	495830	10588	N/A
3	3/2/2018	73.2	7369	5767	3763	501800	12187	N/A
4	3/3/2018	76.4	7527	5369	4116	512550	10114	N/A
5	3/3/2018	74.6	7500	6169	3330	511440	10372	N/A
6	3/4/2018	73.6	7348	5737	3823	490020	10273	N/A
7	3/5/2018	72.9	7389	4680	3705	498930	11633	N/A
8	3/5/2018	77.8	7566	5228	3720	499520	9832	N/A
9	3/5/2018	77	7461	5789	3456	509460	10245	N/A
10	3/6/2018	74.6	7164	4220	3747	497920	9900	N/A
11	3/7/2018	75.5	6980	5808	3403	497650	9965	N/A
12	3/7/2018	77.6	7194	5957	3677	505100	9986	N/A
13	3/8/2018	77.4	7050	5580	3222	505650	9808	N/A
14	3/8/2018	76.7	6883	5779	3705	499960	9871	N/A
15	3/9/2018	78.2	7024	4161	3680	507200	10284	N/A
16	3/10/2018	73.5	6760	5415	3174	512590	9959	N/A
17	3/10/2018	75.2	6906	4483	3640	508700	10023	N/A
18	3/11/2018	73.8	6800	5307	3319	517440	10359	N/A
19	3/11/2018	78.1	7189	5818	3789	507050	9960	N/A
20	3/12/2018	77	6728	5639	3481	508200	9783	N/A
21	3/12/2018	75.5	6929	4737	3710	496540	9877	N/A
22	3/13/2018	73.6	6585	5966	3506	497880	10168	N/A
23	3/13/2018	77.2	7046	5816	3293	491640	9797	N/A
24	3/14/2018	78.4	6808	5050	3853	497630	10046	N/A
25	3/14/2018	73	6562	5479	3304	493800	9918	N/A
26	3/15/2018	76.2	7160	5269	3759	505290	10757	N/A
27	3/15/2018	75.8	6946	6036	3979	502390	9958	N/A
28	3/16/2018	77.4	6718	5186	3129	501080	9548	N/A
29	3/16/2018	74.3	6509	6060	3628	498090	9788	N/A
30	3/17/2018	76.3	6625	5727	3687	505980	9650	N/A
31	3/18/2018	77.2	6708	6253	3535	499490	9650	N/A
32	3/18/2018	77.4	6624	6140	3589	501660	9801	N/A
33	3/19/2018	75.8	6689	6343	3790	504170	9932	N/A
34	3/20/2018	77.4	6505	5654	3685	501080	9804	N/A
35	3/21/2018	76.9	6565	6068	3712	506100	9873	N/A
36	3/21/2018	77.4	6462	6040	3662	497270	9333	N/A
37	3/22/2018	77.1	6345	5775	3897	503440	9913	N/A
38	3/23/2018	76.5	6349	6078	3547	504550	9896	N/A
39	3/23/2018	77.6	6381	6403	3681	515840	9919	N/A
40	3/24/2018	75.5	6350	6624	3659	507110	10071	N/A
41	3/24/2018	77.8	6396	4241	4054	511660	10050	N/A
42	3/25/2018	76.6	6223	6463	4103	506620	10003	N/A
43	3/25/2018	77.9	6227	4183	3947	511750	9992	N/A
		<b>76.2</b>	<b>6,874</b>	<b>5,591</b>	<b>3,629</b>	<b>21,665,190</b>	<b>433,378</b>	TOTAL

API 47-095-02402 Farm Name Vera O. Thomas Well Number Ant Unit 3H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Sandstone	85	105	85	105
Sandy Siltstone	105	725	105	725
Sandy Shale	725	865	725	865
Calcareous Shale	865	905	865	905
Shaly Sandstone	905	1,005	905	1,005
Shaly Siltstone	1,005	1,165	1,005	1,165
Silty Shale	1,165	1,345	1,165	1,345
Sandstone	1,345	1,385	1,345	1,385
Sandy Shale	1,385	1,625	1,385	1,625
Shaly Sandstone	1,625	1,685	1,625	1,685
Silty Shale	1,685	1,765	1,685	1,765
Sandy Shale	1,765	1,905	1,765	1,905
Sandy Shale/Coal	1,905	2,041	1,905	2,045
Big Lime	2,056	2,219	2,060	2,223
Big Injun	2,219	2,682	2,223	2,686
Gantz Sand	2,682	2,786	2,686	2,791
Fifty Foot Sandstone	2,786	2,901	2,791	2,906
Gordon	2,901	3,082	2,906	3,090
Fifth Sandstone	3,082	3,366	3,090	3,376
Bayard	3,366	3,661	3,376	3,673
Warren	3,661	4,046	3,673	4,061
Speechley	4,046	4,708	4,061	4,729
Balltown	4,536	4,956	4,555	4,979
Bradford	4,708	4,956	4,729	4,979
Benson	4,956	5,364	4,979	5,391
Alexander	5,364	5,934	5,391	5,974
Rhinestreet	5,910	6,218	5,950	6,267
Sycamore	6,218	6,385	6,267	6,474
Middlesex	6,385	6,479	6,474	6,627
Burkett	6,479	6,505	6,627	6,681
Tully	6,505	6,537	6,681	6,774
Marcellus	6,537	NA	6,774	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:	3/1/2018
Job End Date:	3/25/2018
State:	West Virginia
County:	Tyler
API Number:	47-095-02402-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Ant 3H
Latitude:	39.42531944
Longitude:	-80.90406667
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,588
Total Base Water Volume (gal):	18,624,826
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	87.54953	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.18701	

SAND-COMMON WHITE-100 MESH	Halliburton	Proppant							Listed Below				
WG-36 GELLING AGENT	Halliburton	Gelling Agent							Listed Below				
SAND- PREMIUM WHITE-40/70	Halliburton	Proppant							Listed Below				
LP-70	Halliburton	Scale Inhibitor							Listed Below				
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor							Listed Below				
MC B-8614	Halliburton	Biocide							Listed Below				
SAND- PREMIUM WHITE-30/50	Halliburton	Proppant							Listed Below				
FR-76	Halliburton	Friction Reducer							Listed Below				
									Listed Below				



HYDROCHLORIC ACID	Halliburton	Solvent											
				Listed Below									
SP BREAKER	Halliburton	Breaker											
				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	12.21392							
			Hydrochloric acid	7647-01-0	15.00000	0.02078							
			Guar gum	9000-30-0	100.00000	0.02007							
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.01647							Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01647							
			Inorganic salt	Proprietary	30.00000	0.01647							
			Ethylene Glycol	107-21-1	60.00000	0.00841							
			Glutaraldehyde	111-30-8	30.00000	0.00258							
			Neutralized Polyacrylic Emulsion	Proprietary	10.00000	0.00140							
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00043							
			Sodium persulfate	7775-27-1	100.00000	0.00034							
			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							

			68527-49-1	30.00000	0.00003	
		Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide				
		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)



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: 47-095-02402 County: Tyler  
District: Centerville Well No: Ant Unit 3H  
Farm Name: Vera O. Thomas  
Discharge Date/s From:(MMDDYY) 07/21/18 To: (MMDDYY) 08/20/18  
Discharge Times. From: 0:00 To: 24:00  
Total Volume to be Disposed from this facility (gallons): 630,526  
Disposal Option(s) Utilized (write volumes in gallons):

- (1) Land Application: \_\_\_\_\_ (Include a topographical map of the Area.)
- (2) UIC: 265,682 Permit No. 3400923821, 3416729543, 3416729464, 3416729445, 4708509721, 3410523619, 3416729731, 3400923761, 3405320968, 3410523268
- (3) Offsite Disposal: 225 Site Location: Mud Masters
- (4) Reuse: 364,618 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: 9/17/18

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.

Gretchen Kohler  
Signature of a Principal Exec. Officer or Authorized agent.

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Page 2 of 3

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



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Page 3 of 3

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/Bt
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°27'30"

8,211'

5,309' TO BOTTOM HOLE

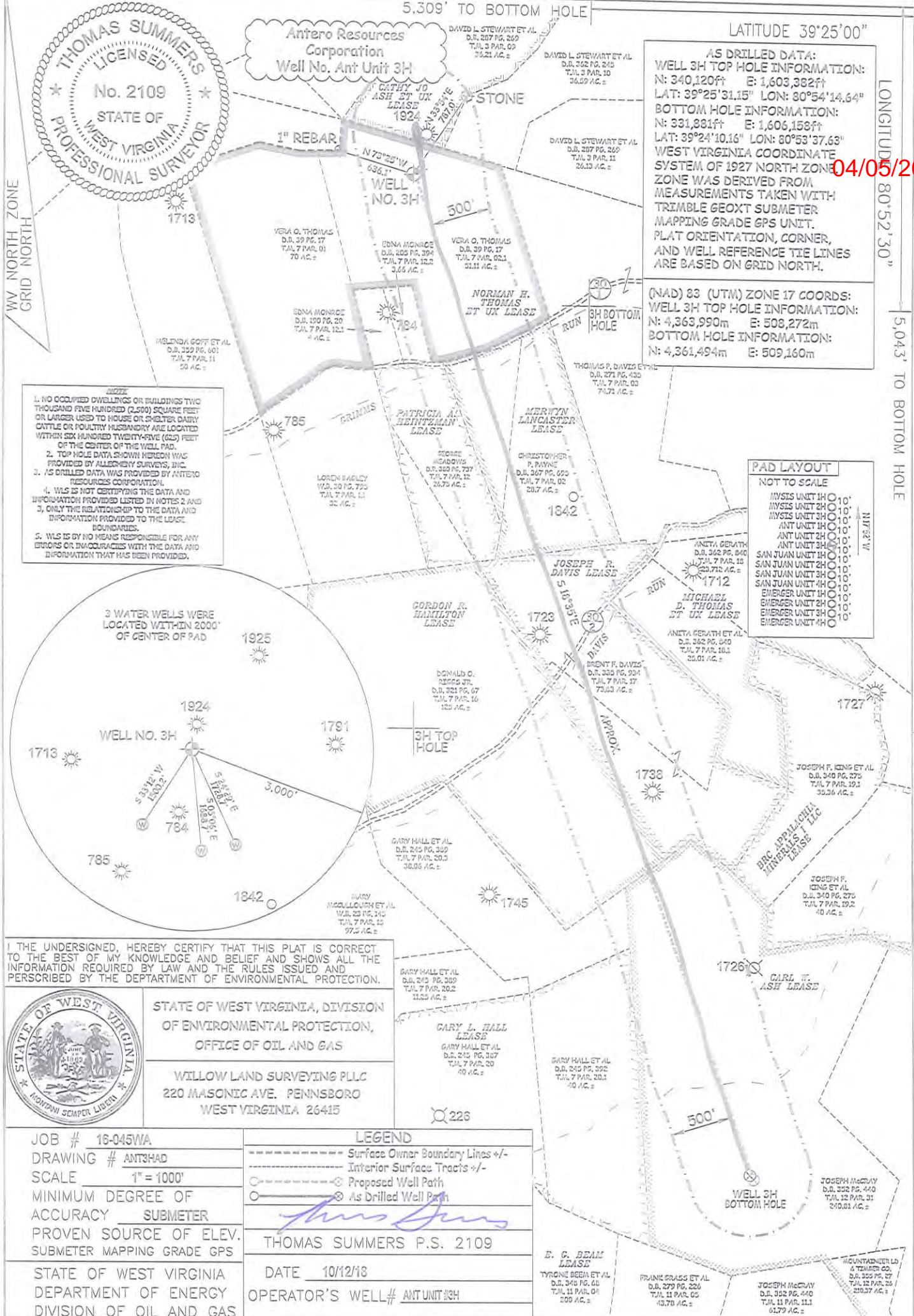
LATITUDE 39°25'00"

LONGITUDE 80°52'30"

1,202'

5,043' TO BOTTOM HOLE

LONGITUDE 80°52'30"



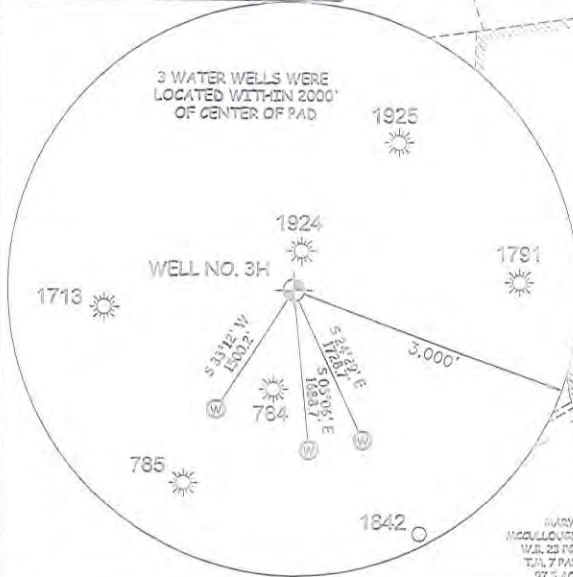
**AS DRILLED DATA:**  
**WELL 3H TOP HOLE INFORMATION:**  
 N: 340,120ft E: 1,603,382ft  
 LAT: 39°25'31.15" LON: 80°54'14.64"  
**BOTTOM HOLE INFORMATION:**  
 N: 331,881ft E: 1,606,158ft  
 LAT: 39°24'10.16" LON: 80°53'37.63"  
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE WAS DERIVED FROM MEASUREMENTS 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 3H TOP HOLE INFORMATION:**  
 N: 4,363,990m E: 508,272m  
**BOTTOM HOLE INFORMATION:**  
 N: 4,361,494m E: 509,160m

**PAD LAYOUT**  
 NOT TO SCALE

MVSES UNIT 1H	10'
MVSES UNIT 2H	10'
MVSES UNIT 3H	10'
ANT UNIT 1H	10'
ANT UNIT 2H	10'
ANT UNIT 3H	10'
SAN JUAN UNIT 1H	10'
SAN JUAN UNIT 2H	10'
SAN JUAN UNIT 3H	10'
SAN JUAN UNIT 4H	10'
EMERGER UNIT 1H	10'
EMERGER UNIT 2H	10'
EMERGER UNIT 3H	10'
EMERGER UNIT 4H	10'

- NOTES**
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 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 LEASE BOUNDARIES.
  5. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.



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 # 16-045WA	<b>LEGEND</b> - - - - - Surface Owner Boundary Lines +/- - - - - - Interior Surface Tracts +/- ○ - - - - - Proposed Well Path ⊗ - - - - - As Drilled Well Path
DRAWING # ANT3HAD	
SCALE 1" = 1000'	<i>Thomas Summers</i>
MINIMUM DEGREE OF ACCURACY SUBMETER	
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS	THOMAS SUMMERS P.S. 2109
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS	DATE 10/12/18
	OPERATOR'S WELL# ANT UNIT 3H

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  47 - 095 - 02402  
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW  STATE COUNTY PERMIT  
 LOCATION: ELEVATION 1,148.1' - AS BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK DISTRICT CENTERVILLE COUNTY TYLER  
 QUADRANGLE MIDDLEBOURNE 7.5' COUNTY TYLER  
 SURFACE OWNER VERA O. THOMAS ACREAGE 51.11 ACRES +/-  
 OIL & GAS ROYALTY OWNER NORMAN H. THOMAS ET UX; CATHY JO ASH ET UX; LEASE ACREAGE 125 AC.±; 137.36 AC.±;  
 MERWYN LANCASTER; JOSEPH R. DAVIS; GORDON R. HAMILTON; CARL W. ASH 30 AC.±; 73.83 AC.±; 125 AC.±; 362.8 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 6,573' TVD 15,431' 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

04/05/2019