

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

API 47 - 095 - 02380 County Tyler District Centerville  
Quad Middlebourne 7.5' Pad Name Vera Pad Field/Pool Name -----  
Farm name Vera O. Thomas Well Number San Juan 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 4363987m Easting 508273m  
Landing Point of Curve Northing 4364150.45m Easting 508412.86m  
Bottom Hole Northing 4366514m Easting 507573m

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 10/27/2016 Date drilling commenced 3/22/2017 Date drilling ceased 9/11/2017  
Date completion activities began 1/24/2018 Date completion activities ceased 7/7/2018  
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

Reviewed by JOB  
3/21/2019  
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API 47-095 - 02380 Farm name Vera O. Thomas Well number San Juan 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"	738'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2585'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15278'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6750'		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>2</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	200 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	630 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	928 sx	15.6	1.18	1181	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	771 sx (Lead) 1318 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.53 (Lead), 1.83 (Tail)		-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15278' MD, 6546' TVD (BHL), 6595' (Deepest Point Drilled) Loggers TD (ft) 15278' MD  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5930'

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

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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.

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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6560' (TOP)</u> TVD	<u>6795' (TOP)</u> 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 3167 mcfpd Oil 82 bpd NGL --- bpd Water 22 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

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

**\*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 2/8/2019

API 47-095-02380 Farm Name Vera O. Thomas Well Number San Juan Unit 1H

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	3/28/2018	15006.9	15175.4	60	Marcellus
2	3/29/2018	14807.1	14975.6	60	Marcellus
3	3/29/2018	14607.3	14775.8	60	Marcellus
4	3/30/2018	14407.5	14576	60	Marcellus
5	3/30/2018	14207.7	14376.2	60	Marcellus
6	3/31/2018	14007.9	14176.4	60	Marcellus
7	3/31/2018	13808.1	13976.6	60	Marcellus
8	4/1/2018	13608.3	13776.8	60	Marcellus
9	4/1/2018	13408.5	13577	60	Marcellus
10	4/2/2018	13208.7	13377.2	60	Marcellus
11	4/2/2018	13008.9	13177.4	60	Marcellus
12	4/3/2018	12809.1	12977.6	60	Marcellus
13	4/3/2018	12609.3	12777.8	60	Marcellus
14	4/3/2018	12409.5	12578	60	Marcellus
15	4/4/2018	12209.7	12378.2	60	Marcellus
16	4/4/2018	12009.9	12178.4	60	Marcellus
17	4/5/2018	11810.1	11978.6	60	Marcellus
18	4/5/2018	11610.3	11778.8	60	Marcellus
19	4/6/2018	11410.5	11579	60	Marcellus
20	4/6/2018	11210.7	11379.2	60	Marcellus
21	4/7/2018	11010.9	11179.4	60	Marcellus
22	4/7/2018	10811.1	10979.6	60	Marcellus
23	4/8/2018	10611.3	10779.8	60	Marcellus
24	4/8/2018	10411.5	10580	60	Marcellus
25	4/9/2018	10211.7	10380.2	60	Marcellus
26	4/9/2018	10011.9	10180.4	60	Marcellus
27	4/10/2018	9812.1	9980.6	60	Marcellus
28	4/10/2018	9612.3	9780.8	60	Marcellus
29	4/11/2018	9412.5	9581	60	Marcellus
30	4/11/2018	9212.7	9381.2	60	Marcellus
31	4/11/2018	9012.9	9181.4	60	Marcellus
32	4/12/2018	8813.1	8981.6	60	Marcellus
33	4/12/2018	8613.3	8781.8	60	Marcellus
34	4/13/2018	8413.5	8582	60	Marcellus
35	4/13/2018	8213.7	8382.2	60	Marcellus
36	4/14/2018	8013.9	8182.4	60	Marcellus
37	4/14/2018	7814.1	7982.6	60	Marcellus
38	4/15/2018	7614.3	7782.8	60	Marcellus
39	4/15/2018	7414.5	7583	60	Marcellus
40	4/16/2018	7214.7	7383.2	60	Marcellus
41	4/16/2018	7014.9	7183.4	60	Marcellus
42	4/17/2018	6815.1	6983.6	60	Marcellus

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**EXHIBIT 2**

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	3/28/2018	74.62	6858	4948	3801	15607	8664	N/A
2	3/29/2018	75.17	7278	2163	3513	12954	8524	N/A
3	3/29/2018	75.5	7092	5723	3606	16421	8599	N/A
4	3/30/2018	75.88	7297	4618	3855	15770	9885	N/A
5	3/30/2018	74.9	7159	5241	3754	16154	8375	N/A
6	3/31/2018	76.35	7324	5584	3724	16632	8428	N/A
7	3/31/2018	76.5	7323	5743	3670	16736	8219	N/A
8	4/1/2018	75.24	7024	4875	3713	15612	8295	N/A
9	4/1/2018	76.25	7190	5134	3682	16006	8134	N/A
10	4/2/2018	76.61	7198	5680	3690	16568	8461	N/A
11	4/2/2018	75.5	7032	5779	3816	16627	8383	N/A
12	4/3/2018	78.11	7301	6053	3790	17144	8431	N/A
13	4/3/2018	77.61	7216	5724	3852	16792	8233	N/A
14	4/3/2018	76.5	7223	4964	3955	16142	8941	N/A
15	4/4/2018	76	6986	5759	4043	16788	8101	N/A
16	4/4/2018	76.9	7253	6815	3661	17729	8544	N/A
17	4/5/2018	74.89	6895	5702	3551	16148	8082	N/A
18	4/5/2018	77.1	7029	6486	3725	17240	8209	N/A
19	4/6/2018	72.02	7092	5144	4002	16238	9769	N/A
20	4/6/2018	77	7019	6768	3794	17581	8531	N/A
21	4/7/2018	76.5	6870	6396	3728	16994	8003	N/A
22	4/7/2018	76.7	6894	6747	3839	17480	8476	N/A
23	4/8/2018	77.52	6749	5507	3720	15976	8341	N/A
24	4/8/2018	76.58	6719	5588	3782	16089	7923	N/A
25	4/9/2018	77.2	6810	5172	3810	15792	8339	N/A
26	4/9/2018	75.5	6864	5596	3762	16222	7997	N/A
27	4/10/2018	76.4	6810	5102	3724	15636	8274	N/A
28	4/10/2018	76.2	7060	6106	3957	17123	8353	N/A
29	4/11/2018	76	7279	6047	4051	17377	8519	N/A
30	4/11/2018	76.1	6769	5770	3861	16400	8196	N/A
31	4/11/2018	76.5	6645	5552	3790	15987	8370	N/A
32	4/12/2018	76.7	6592	5842	3873	16307	8477	N/A
33	4/12/2018	73.7	6403	5785	3799	15987	8332	N/A
34	4/13/2018	75.6	6546	5718	3771	16035	8169	N/A
35	4/13/2018	72.3	6310	5940	3806	16056	8146	N/A
36	4/14/2018	77.9	6348	5492	3674	15514	8343	N/A
37	4/14/2018	76.3	6537	4959	4261	15757	7769	N/A
38	4/15/2018	77.3	6293	5892	3924	16109	8461	N/A
39	4/15/2018	64.8	7475	6268	5551	19294	8157	N/A
40	4/16/2018	76.55	6990	6454	3744	17188	10166	N/A
41	4/16/2018	72.9	6573	5972	3755	16300	8892	N/A
42	4/17/2018	78.1	6832	6929	4022	17783	8406	N/A
		75.8	6,932	5,660	3,843	690,295	354,917	TOTAL

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**EXHIBIT 3**

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Fresh Water	227'	N/A	227'	N/A
Sandstone	100	N/A	100	N/A
Sandy Siltstone	120	N/A	120	N/A
Sandy Shale	740	N/A	740	N/A
Calcareous Shale	880	N/A	880	N/A
Shaly Sandstone	920	N/A	920	N/A
Shaly Siltstone	1,020	N/A	1,020	N/A
Silty Shale	1,180	N/A	1,180	N/A
Sandstone	1,360	N/A	1,360	N/A
Sandy Shale	1,400	N/A	1,400	N/A
Shaly Sandstone	1,640	N/A	1,640	N/A
Silty Shale	1,700	N/A	1,700	N/A
Sandy Shale	1,780	N/A	1,780	N/A
Sandy Shale/Coal	1,920	N/A	1,920	N/A
Big Lime	2,047	N/A	2,048	N/A
Big Injun	2,220	N/A	2,220	N/A
Gantz Sand	2,679	N/A	2,680	N/A
Fifty Foot Sandstone	2,793	N/A	2,793	N/A
Gordon	2,942	N/A	2,942	N/A
Fifth Sandstone	3,079	N/A	3,080	N/A
Bayard	3,283	N/A	3,286	N/A
Warren	3,653	N/A	3,666	N/A
Speechley	4,036	N/A	4,057	N/A
Balltown	4,518	N/A	4,550	N/A
Bradford	4,710	N/A	4,747	N/A
Benson	4,954	N/A	4,998	N/A
Alexander	5,342	N/A	5,395	N/A
Rhinestreet	5,936	N/A	6,003	N/A
Sycamore	6,238	N/A	6,322	N/A
Middlesex	6,408	N/A	6,529	N/A
Burkett	6,504	N/A	6,669	N/A
Tully	6,530	N/A	6,718	N/A
Marcellus	6,560	N/A	6,795	N/A

\*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:	3/28/2018
Job End Date:	4/18/2018
State:	West Virginia
County:	Tyler
API Number:	47-095-02380-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	San Juan Unit 1H
Latitude:	39.42529400
Longitude:	-80.90405600
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,548
Total Base Water Volume (gal):	15,239,703
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	88.10199	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.16903	

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FR-76	Halliburton	Friction Reducer					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				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			
HYDROCHLORIC ACID	Halliburton	Solvent					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
SP BREAKER	Halliburton	Breaker					
				Listed Below			
SCALECHEK LP-70	Halliburton	Scale Inhibitor					
				Listed Below			

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MC B-8614	Halliburton	Biocide					
				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	11.69261	
			Hydrochloric acid	7647-01-0	15.00000	0.01833	
			Inorganic salt	Proprietary	30.00000	0.01563	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01563	
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.01563	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Ethylene glycol	107-21-1	60.00000	0.00843	
			Guar gum	9000-30-0	100.00000	0.00797	
			Glutaraldehyde	111-30-8	30.00000	0.00258	
			Telmer	Proprietary	10.00000	0.00141	
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00043	
			Sodium persulfate	7775-27-1	100.00000	0.00025	
			Methanol	67-56-1	60.00000	0.00014	
			Sodium polyacrylate	9003-04-7	1.00000	0.00014	
			Ethanol	64-17-5	1.00000	0.00009	
			Modified thiourea polymer	Proprietary	30.00000	0.00007	
			Ethoxylated alcohols	Proprietary	30.00000	0.00007	
			Fatty acids, tall oil	Proprietary	30.00000	0.00007	
			Olefins	Proprietary	5.00000	0.00003	
			Propargyl alcohol	107-19-7	10.00000	0.00002	
			Phosphoric acid	7664-38-2	0.10000	0.00001	
			Acrylic acid	79-10-7	0.01000	0.00000	

			Sodium sulfate	7757-82-6	0.10000	0.00000
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\* 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)

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LATITUDE 39°27'30"

8,208'

10,493' TO BOTTOM HOLE

LATITUDE 39°27'30"

LONGITUDE 80°52'30"

3,736' TO BOTTOM HOLE

LONGITUDE 80°52'30"

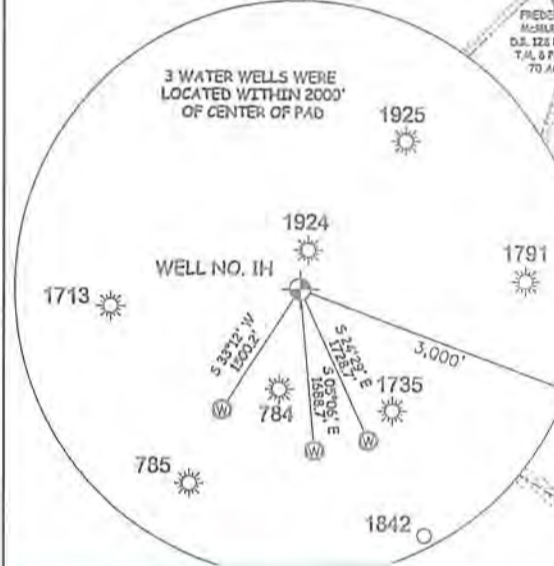
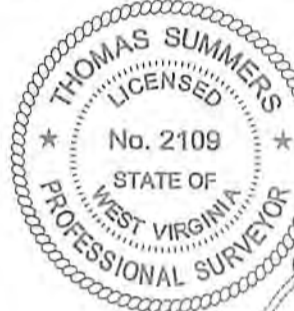
Antero Resources Corporation  
Well No. San Juan Unit 1H

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 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.

AS DRILLED DATA:  
WELL 1H TOP HOLE INFORMATION:  
N: 340,110ft E: 1,603,385ft  
LAT: 39°25'31.06" LON: 80°54'14.60"  
BOTTOM HOLE INFORMATION:  
N: 348,443ft E: 1,601,227ft  
LAT: 39°26'53.07" LON: 80°54'43.77"  
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: 4,363,987m E: 508,273m  
BOTTOM HOLE INFORMATION:  
N: 4,366,514m E: 507,573m

WV NORTH ZONE  
GRID NORTH



San Juan Units

THIS PLAT IS CORRECT AND SHOWS ALL THE LESSES AND INSTRUMENTAL PROTECTION.

VIRGINIA, DIVISION  
NATL PROTECTION,  
OIL AND GAS  
SURVEYING PLLC  
VE. PENNSBORO  
WEST VIRGINIA 26415

PAD LAYOUT NOT TO SCALE

MYSIS UNIT 1H	10'
MYSIS UNIT 2H	10'
MYSIS 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'
EMERGENCY UNIT 1H	10'
EMERGENCY UNIT 2H	10'
EMERGENCY UNIT 3H	10'
EMERGENCY UNIT 4H	10'

JOB # 16-042WA  
DRAWING # SAN JUAN 1HAD  
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  
THOMAS SUMMERS P.S. 2109  
DATE 10/12/18  
OPERATOR'S WELL# SAN JUAN UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 095 02380  
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT  
LOCATION: ELEVATION 1,148.1' AS BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK  
QUADRANGLE MIDDLEBOURNE 7.5 DISTRICT CENTERVILLE COUNTY TYLER  
SURFACE OWNER VERA O. THOMAS ACREAGE 51.11 ACRES +/-  
OIL & GAS ROYALTY OWNER NORMAN H. THOMAS ET UX; PATRICIA A. RACER; CATHY JO ASH ET UX; LEASE ACREAGE 125 AC +/- 38.59 AC +/- 137.36 AC +/-  
KATHLEEN L. LOUGH; LARRY D. MCMULLEN; CHARLES O. CONAWAY; GLENNA R. MCMULLEN; THOMAS ADKINS ET UX; 24.65 AC +/-; 118.14 AC +/-; 77.66 AC +/-; 0.95 AC +/-; 8.69 AC +/-  
RALPH HALL; PATSY J. FLETCHER; MIDDLEBOURNE CHURCH OF CHRIST 41 AC +/-; 69 AC +/-; 118.75 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 6,548' TVD 15,278' 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

LATITUDE 39°27'30"

8,208'

10,493' TO BOTTOM HOLE

LATITUDE 39°27'30"

LONGITUDE 80°52'30"

12,034'

LONGITUDE 80°52'30"

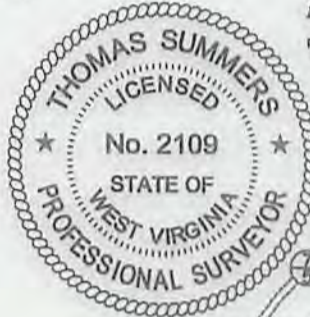
Antero Resources Corporation Well No. San Juan Unit 1H

- NOTE**
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHEDS; 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. THIS 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.

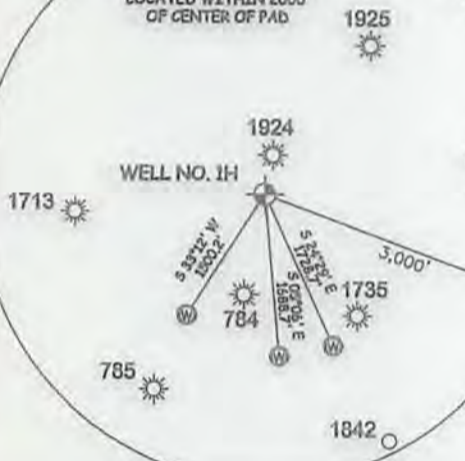
**AS DRILLED DATA:**  
**WELL 1H TOP HOLE INFORMATION:**  
 N: 340,110ft E: 1,603,385ft  
 LAT: 39°25'31.06" LON: 80°54'14.60"  
**BOTTOM HOLE INFORMATION:**  
 N: 348,443ft E: 1,601,227ft  
 LAT: 39°26'53.07" LON: 80°54'43.77"  
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM 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: 4,363,987m E: 508,273m  
**BOTTOM HOLE INFORMATION:**  
 N: 4,366,514m E: 507,573m

WV NORTH ZONE GRID NORTH



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

**PAD LAYOUT**

- NOT TO SCALE
- MYSTIS UNIT 1H
  - MYSTIS UNIT 2H
  - MYSTIS UNIT 3H
  - ANT UNIT 1H
  - ANT UNIT 2H
  - ANT UNIT 3H
  - SAN JUAN UNIT 1H
  - SAN JUAN UNIT 2H
  - SAN JUAN UNIT 3H
  - EMERGER UNIT 1H
  - EMERGER UNIT 2H
  - EMERGER UNIT 3H
  - EMERGER UNIT 4H

JOB # 16-042WA  
 DRAWING # SAN JUAN 1HAD  
 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

THOMAS SUMMERS P.S. 2109  
 DATE 10/12/18  
 OPERATOR'S WELL# SAN JUAN UNIT #1H

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 095 02380  
 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT  
 LOCATION: ELEVATION 1,148.1' AS BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK  
 QUADRANGLE MIDDLEBOURNE 7.5' DISTRICT CENTERVILLE COUNTY TYLER  
 SURFACE OWNER VERA O. THOMAS ACREAGE 51.11 ACRES +/-  
 OIL & GAS ROYALTY OWNER NORMAN H. THOMAS ET UX; PATRICIA A. RACER; CATHY JO ASH ET UX; LEASE ACREAGE 125 AC +/-; 38.59 AC +/-; 137.39 AC +/-  
 KATHLEEN L. LOUGH; LARRY D. McMULLEN; CHARLES O. CONAWAY; GLENNA R. McMULLEN; THOMAS ADKINS ET UX; 24.85 AC +/-; 118.14 AC +/-; 77.69 AC +/-; 0.99 AC +/-; 8.89 AC +/-  
 RALPH HALL; PATSY J. FLETCHER; MIDDLEBOURNE CHURCH OF CHRIST 41 AC +/-; 69 AC +/-; 118.75 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 6,546' TVD 15,278' MD  
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM  
 ADDRESS 1815 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD  
 FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME

PERMIT

WELL OPERATOR ANTERO RESOURCES CORP. MARCELLUS  
ADDRESS 1615 WYKOOPE ST. DENVER, CO 80202  
DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM

TARGET FORMATION (SPECIFY) AS DRILLED  
PLUG & ABANDON  
CLEAN OUT & REPLUG  
ESTIMATED DEPTH 846.7 TD 18278. MD  
PERMIT

SURFACE OWNER VERA O THOMAS  
LOCATION: ELEVATION 1148.1 AS BUILT  
QUADRANGLE MIDDLEBORNE T.S.  
DISTRICT CENTERVILLE COUNTY TYLER  
STATE COUNTY PERMIT

WELL TYPE: OIL  
PRODUCTION (IF GAS) STORAGE DEEP SHALLOW X  
WASTE DISPOSAL  
COUNTY NAME

DIVISION OF OIL AND GAS  
DEPARTMENT OF ENERGY  
STATE OF WEST VIRGINIA  
SUBMITTER MAPPING GRADE GPS  
PROVEN SOURCE OF ELEV.  
ACCURACY SUBMETER

THOMAS SUMMERS P.S. 2108  
DATE 10/24/18  
OPERATOR'S WELL # S2108 UNIT 1H

MINIMUM DEGREE OF  
SCALE 1" = 100'  
DRAWING # S2108/1H/AD  
JOB # 18-0425W

WEST VIRGINIA 5412  
520 WALSCOTT AVE. PENNINGBORO  
WILLOW LAND SURVEYING PLLC  
OFFICE OF OIL AND GAS  
STATE OF WEST VIRGINIA,  
DIVISION OF ENVIRONMENTAL PROTECTION,  
STATE OF WEST VIRGINIA, DIVISION

LEGEND  
As Drilled Well Path  
Proposed Well Path  
Interior Surface Tractor  
Surface Owner Boundary Lines

NOT TO SCALE  
1000' 0' 0" 100' 0' 0" 0' 0" 0"  
METERS

THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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  
OFFICE OF ENVIRONMENTAL PROTECTION  
DIVISION OF OIL AND GAS

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



AS DRILLED DATA:  
WELL 1H TOP HOLE INFORMATION:  
LAT. 39°25'31.00" LONG. 80°24'14.80"  
E: 1.6033857  
N: 340.1017  
BOTTOM HOLE INFORMATION:  
LAT. 39°25'33.07" LONG. 80°24'43.77"  
E: 1.6015277  
N: 348.4437  
WEST VIRGINIA COORDINATE  
SYSTEM OF 1927 NORTH ZONE  
ZONE WAS DERIVED FROM  
MEASUREMENTS TAKEN WITH  
TRIMBLE GEOX 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:  
E: 508.233m  
N: 4363.987m  
BOTTOM HOLE INFORMATION:  
E: 507.523m  
N: 4366.814m

ANTERO RESOURCES CORPORATION  
WELL NO. S2108 UNIT 1H

GRID NORTH

LONGITUDE 80.25.30" LONGITUDE 80.25.30" LONGITUDE 80.25.30"

LATITUDE 39.27.30" LATITUDE 39.27.30"