

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

API 47 - 085 - 10265 County Ritchie District Union  
Quad Pullman 7.5' Pad Name Ireland North Pad Field/Pool Name -----  
Farm name Lynwood Ireland et al Well Number Hughes River 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 4335954m Easting 508722m  
Landing Point of Curve Northing 4335455.52m Easting 509561.08m  
Bottom Hole Northing 4332074m Easting 510727m

Elevation (ft) 945.5' 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 10/29/2018 Date drilling commenced 6/15/2017 Date drilling ceased 3/6/2019  
Date completion activities began 7/1/2019 Date completion activities ceased 8/1/2019  
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 92', 398', 429' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 1509', 1749' 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

RECEIVED  
Office of Oil and Gas  
FEB 18 2020  
WV Department of  
Environmental Protection

Reviewed by:  
DmH  
12-7-20

API 47- 085 - 10265 Farm name Lynwood Ireland et al Well number Hughes River 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"	475'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2722'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	19511'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	7247'		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	234 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	405 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	890 sx	15.6	1.18	1181	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	169 sx (Lead) 2489 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.53 (Lead), 1.83 (Tail)		-500' Into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 19531' MD, 6358' TVD (BHL), 6412' (Deepest Point Drilled)      Loggers TD (ft) 19531' MD  
 Deepest formation penetrated Marcellus      Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5600'

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

RECEIVED  
Office of Oil and Gas  
FEB 15 2020  
NY State Department of  
Environmental Conservation

API 47- 085 - 10265 Farm name Lynwood Ireland et al Well number Hughes River Unit 3H

**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.

REGISTRATION  
 OFFICE OF THE COMMISSIONER OF GAS  
 FEB 18 2020  
 WORKS PERMIT  
 ENVIRONMENTAL PROTECTION

API 47- 085 - 10265 Farm name Lynwood Ireland et al Well number Hughes River Unit 3H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6358' (TOP)</u> TVD	<u>7301' (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 10591 mcfpd Oil 114 bpd NGL --- bpd Water 1181 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)
-------------------------	--------------------------------	------------------------------	--------------------------	-----------------------------	--

**\*PLEASE SEE ATTACHED EXHIBIT 3**


Please insert additional pages as applicable.

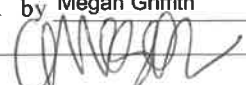
Drilling Contractor Frontier Drilling LLC  
Address 562 Spring Run Road City Pennsboro State WV Zip 26415

Logging Company Allied Horizontal Wireline Services  
Address 381 Colonial Manor Road City North Huntington State PA Zip 15642

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 2-18-20

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

RECEIVED  
Office of Oil and Gas  
FEB 18 2020  
West Virginia Department of Environmental Protection

## EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	7/1/2019	19362	19416	60	Marcellus
2	7/1/2019	19161.822	19330.637	60	Marcellus
3	7/1/2019	18961.644	19130.459	60	Marcellus
4	7/2/2019	18761.466	18930.281	60	Marcellus
5	7/2/2019	18561.288	18730.103	60	Marcellus
6	7/2/2019	18361.11	18529.925	60	Marcellus
7	7/3/2019	18160.932	18329.747	60	Marcellus
8	7/3/2019	17960.754	18129.569	60	Marcellus
9	7/3/2019	17760.576	17929.391	60	Marcellus
10	7/4/2019	17560.398	17729.213	60	Marcellus
11	7/4/2019	17360.22	17529.035	60	Marcellus
12	7/5/2019	17160.042	17328.857	60	Marcellus
13	7/5/2019	16959.864	17128.679	60	Marcellus
14	7/5/2019	16759.686	16928.501	60	Marcellus
15	7/6/2019	16559.508	16728.323	60	Marcellus
16	7/6/2019	16359.33	16528.145	60	Marcellus
17	7/7/2019	16159.152	16327.967	60	Marcellus
18	7/7/2019	15958.974	16127.789	60	Marcellus
19	7/7/2019	15758.796	15927.611	60	Marcellus
20	7/8/2019	15558.618	15727.433	60	Marcellus
21	7/8/2019	15358.44	15527.255	60	Marcellus
22	7/9/2019	15158.262	15327.077	60	Marcellus
23	7/9/2019	14958.084	15126.899	60	Marcellus
24	7/9/2019	14757.906	14926.721	60	Marcellus
25	7/9/2019	14557.728	14726.543	60	Marcellus
26	7/10/2019	14357.55	14526.365	60	Marcellus
27	7/10/2019	14157.372	14326.187	60	Marcellus
28	7/10/2019	13957.194	14126.009	60	Marcellus
29	7/11/2019	13757.016	13925.831	60	Marcellus
30	7/11/2019	13556.838	13725.653	60	Marcellus
31	7/12/2019	13356.66	13525.475	60	Marcellus
32	7/12/2019	13156.482	13325.297	60	Marcellus
33	7/12/2019	12956.304	13125.119	60	Marcellus
34	7/13/2019	12756.126	12924.941	60	Marcellus
35	7/13/2019	12555.948	12724.763	60	Marcellus
36	7/13/2019	12355.77	12524.585	60	Marcellus
37	7/13/2019	12155.592	12324.407	60	Marcellus
38	7/14/2019	11955.414	12124.229	60	Marcellus
39	7/14/2019	11755.236	11924.051	60	Marcellus
40	7/14/2019	11555.058	11723.873	60	Marcellus
41	7/15/2019	11354.88	11523.695	60	Marcellus
42	7/15/2019	11154.702	11323.517	60	Marcellus
43	7/15/2019	10954.524	11123.339	60	Marcellus
44	7/16/2019	10754.346	10923.161	60	Marcellus
45	7/16/2019	10554.168	10722.983	60	Marcellus
46	7/16/2019	10353.99	10522.805	60	Marcellus
47	7/17/2019	10153.812	10322.627	60	Marcellus
48	7/17/2019	9953.634	10122.449	60	Marcellus
49	7/17/2019	9753.456	9922.271	60	Marcellus
50	7/18/2019	9553.278	9722.093	60	Marcellus
51	7/18/2019	9353.1	9521.915	60	Marcellus
52	7/18/2019	9152.922	9321.737	60	Marcellus
53	7/18/2019	8952.744	9121.559	60	Marcellus
54	7/19/2019	8752.566	8921.381	60	Marcellus
55	7/19/2019	8552.388	8721.203	60	Marcellus
56	7/19/2019	8352.21	8521.025	60	Marcellus
57	7/20/2019	8152.032	8320.847	60	Marcellus
58	7/20/2019	7951.854	8120.669	60	Marcellus
59	7/20/2019	7751.676	7920.491	60	Marcellus
60	7/20/2019	7551.498	7720.313	60	Marcellus
61	7/21/2019	7351.32	7520.135	60	Marcellus

RECEIVED  
Office of the State Auditor

FEB 18 2020

West Virginia  
Environmental Protection

**EXHIBIT 2**

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	7/1/2019	61.1474	7293.704	5912	2418	176650	5945	N/A
2	7/1/2019	71.1194	8083.268	6237	3113	400000	9006	N/A
3	7/1/2019	73.1409	7924.882	6126	3509	399900	8789	N/A
4	7/2/2019	72.3961	8152.137	6730	3696	400000	8996	N/A
5	7/2/2019	71.9103	8095.025	6076	2946	398840	8996	N/A
6	7/2/2019	71.1936	7688.123	5913	3128	399200	9040	N/A
7	7/3/2019	71.2186	7855.254	6121	3299	398920	8893	N/A
8	7/3/2019	69.8382	7566.172	5904	2737	402100	8902	N/A
9	7/3/2019	66.7467	7297.578	6450	3001	399200	8985	N/A
10	7/4/2019	51.749	8303.655	5978	2837	400360	17117	N/A
11	7/4/2019	65.7946	7408.544	5767	2831	399100	9953	N/A
12	7/5/2019	71.0062	7638.38	6192	3056	402020	8899	N/A
13	7/5/2019	68.4931	7626.642	6642	2857	402800	9334	N/A
14	7/5/2019	69.1034	7171.185	6103	2945	402500	8969	N/A
15	7/6/2019	68.9481	7570.038	6384	2930	402580	9109	N/A
16	7/6/2019	65.22	7372.511	6352	3322	398200	11804	N/A
17	7/7/2019	72.0406	7501.038	6058	2682	402380	8910	N/A
18	7/7/2019	73.6714	7598.72	6263	2929	402140	8906	N/A
19	7/7/2019	66.5868	7444.708	6157	3030	399100	8704	N/A
20	7/8/2019	67.5375	7080.209	6300	2818	402380	10409	N/A
21	7/8/2019	72.8833	7474.221	6157	3009	403020	8902	N/A
22	7/9/2019	69.805	7439.4	6053	2959	403500	8854	N/A
23	7/9/2019	74.2285	7162.943	3741	2772	402840	8799	N/A
24	7/9/2019	72.138	7417.45	6189	2788	400240	8763	N/A
25	7/9/2019	69.7749	7097.238	5962	3327	405100	8922	N/A
26	7/10/2019	72.1079	7574.206	4840	2756	402960	8735	N/A
27	7/10/2019	69.8	7723.6	5974	2902	402740	10169	N/A
28	7/10/2019	71.0594	7269.302	5629	2710	405100	8555	N/A
29	7/11/2019	70.3588	7178.857	5578	3063	410450	8633	N/A
30	7/11/2019	69.1938	7233.27	6153	2854	389500	8425	N/A
31	7/12/2019	73.4713	6797.785	3158	2816	401600	8631	N/A
32	7/12/2019	68.1469	7072.128	5953	3165	400180	8643	N/A
33	7/12/2019	68.9548	7272.936	6219	3078	398200	8568	N/A
34	7/13/2019	66.6512	7101.475	6085	2668	400500	8601	N/A
35	7/13/2019	73.3689	7210.71	7366	2866	401400	8561	N/A
36	7/13/2019	69.9427	7294.274	6676	2844	401700	8404	N/A
37	7/13/2019	74.4301	6699.403	3149	2794	401800	8496	N/A
38	7/14/2019	75.3006	6854.954	2780	2859	402540	8474	N/A
39	7/14/2019	66.8757	7176.845	6994	2859	405140	8815	N/A
40	7/14/2019	70.4658	7023.793	6722	2998	398900	8594	N/A
41	7/15/2019	75.6897	6975.663	2447	3034	399820	8595	N/A
42	7/15/2019	69.8634	6785.492	6680	3060	399500	8552	N/A
43	7/15/2019	66.4403	7356.03	3075	2890	398900	10241	N/A
44	7/16/2019	66.4879	7143.774	6465	2809	399780	8495	N/A
45	7/16/2019	69.8981	7188.763	6441	2945	399160	8667	N/A
46	7/16/2019	72.9592	7157.53	6077	2651	400700	8328	N/A
47	7/17/2019	74.6168	7270.075	5724	2673	408350	8405	N/A
48	7/17/2019	40.2	8736.7	7251	4374	67840	6591	N/A
49	7/17/2019	73.0008	7156.544	6266	2875	398560	8350	N/A
50	7/18/2019	69.143	7319.46	6722	2898	395920	8291	N/A
51	7/18/2019	73.6983	7132.301	5954	3049	401170	8455	N/A
52	7/18/2019	76.4206	7133.576	5936	3112	403760	8461	N/A
53	7/18/2019	75.5282	7347.837	6148	2911	401300	8306	N/A
54	7/19/2019	75.6883	7155.746	6105	2829	404980	8427	N/A
55	7/19/2019	76.4685	7183.305	6280	2778	402210	8405	N/A
56	7/19/2019	75.8738	7307.709	6419	2907	398120	8377	N/A
57	7/20/2019	75.4812	7318.826	6514	3051	403580	8261	N/A
58	7/20/2019	72.7338	6851.435	6002	3089	408060	8410	N/A
59	7/20/2019	73.3364	6769.73		3213	401020	8361	N/A
60	7/20/2019	73.2291	7321.458	6779	2775	400600	8205	N/A
61	7/21/2019	74.698	7040.834	6589	3081	398620	8207	N/A
	<b>AVG.</b>	<b>69.7</b>	<b>7,382</b>	<b>5,781</b>	<b>2,954</b>	<b>17,822,940</b>	<b>408,760</b>	<b>TOTAL</b>

RECEIVED  
Office of Natural Gas

FEB 18 2020

Office of  
Environmental Protection

**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	65	125	65	125
Sandstone	125	165	125	165
Silty sandstone tr coal	165	525	165	525
Shaly siltstone tr coal	525	685	525	685
Shaly siltstone	685	505	685	505
Silty Sandstone	505	985	505	985
Silty sandstone	985	825	985	825
Silty Sandstone	825	1,105	825	1,105
Siltstone	1,105	1,285	1,105	1,285
Siltstone tr coal	1,285	1,405	1,285	1,405
Sandstone tr coal	1,405	1,525	1,405	1,525
Shaly siltstone tr coal	1,525	1,705	1,525	1,705
Silty sandstone tr coal	1,705	1,893	1,705	1,991
Big Lime	1,908	2,411	1,961	2,547
Fifty Foot Sandstone	2,411	2,612	2,517	2,766
Gordon	2,612	2,891	2,736	3,078
Fifth Sandstone	2,891	2,980	3,048	3,178
Bayard	2,980	3,735	3,148	4,019
Speechley	3,735	3,907	3,989	4,210
Balltown	3,907	4,434	4,180	4,793
Bradford	4,434	4,825	4,763	5,226
Benson	4,825	5,067	5,196	5,495
Alexander	5,067	6,225	5,465	6,987
Sycamore	6,024	6,195	6,695	6,957
Middlesex	6,195	6,307	6,957	7,165
Burkett	6,307	6,339	7,165	7,242
Tully	6,339	6,358	7,242	7,301
Marcellus	6,358	NA	7,301	NA

\*Please note Antero determines formation tops based on mud logs that are only run on one well on a multi-well pad. The measured depth (MD) data on subsequent wells may be slightly different due to the well's unique departure.

RECEIVED  
Office of the State Engineer

FEB 15 2020

West Virginia  
Environmental Protection

# ANTERO RESOURCES CORPORATION

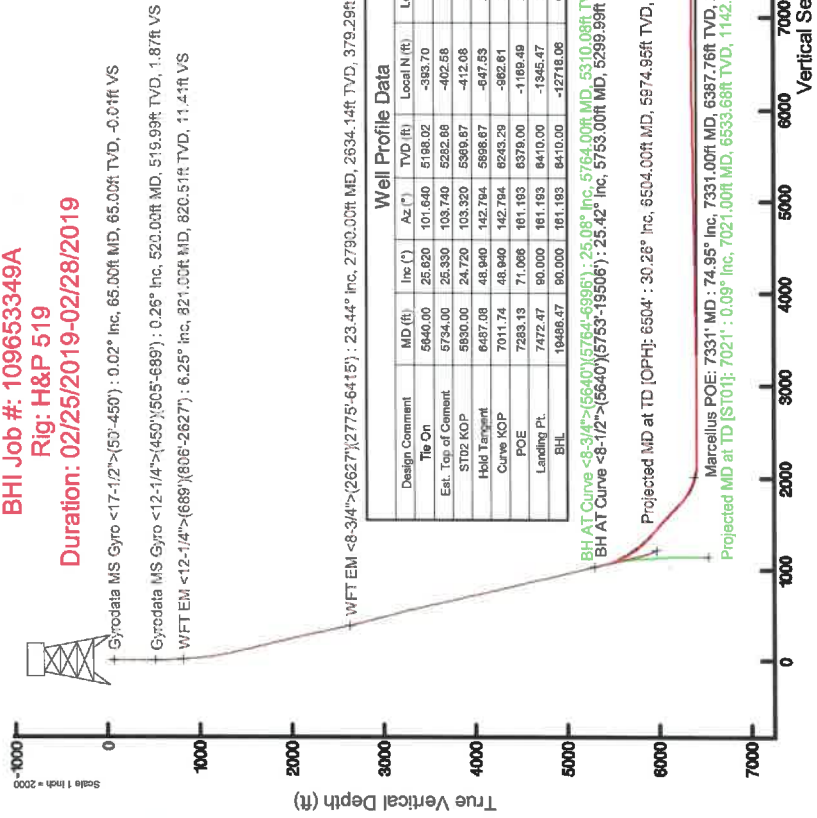
Location: Ritchie County, WV  
 Field: Ritchie  
 Facility: Ireland North Pad  
 Wellbore: Hughes River Unit 3H ST02 PWB  
 Slot: Slot #10  
 Well: Hughes River Unit 3H ST02

Plot reference wellpath is Hughes River Unit 3H ST02 PWB Rev-B.0  
 True vertical depths are referenced to H&P 510 (RKB)  
 Measured depths are referenced to H&P 510 (RKB)  
 H&P 510 (RKB) to Mean Sea Level: 975.5 feet  
 Mean Sea Level to Ground level (At Slot Slot #10): -945.5 feet  
 Coordinates are in feet referenced to Slot

Location Information			
Facility Name	Grid East (US ft)	Grid North (US ft)	Longitude
Ireland North Pad	1688958.988	14224850.128	80°53'57.720"W
Slot #10	-20.18	46.70	Longitude
H&P 510 (RKB) to Ground level (At Slot Slot #10)	1688982.076	14224828.950	38°10'21.680"N
Mean Sea Level to Ground level (At Slot Slot #10)		30ft	80°53'57.140"W
H&P 510 (RKB) to Mean Sea Level		-945.5ft	
		975.5ft	

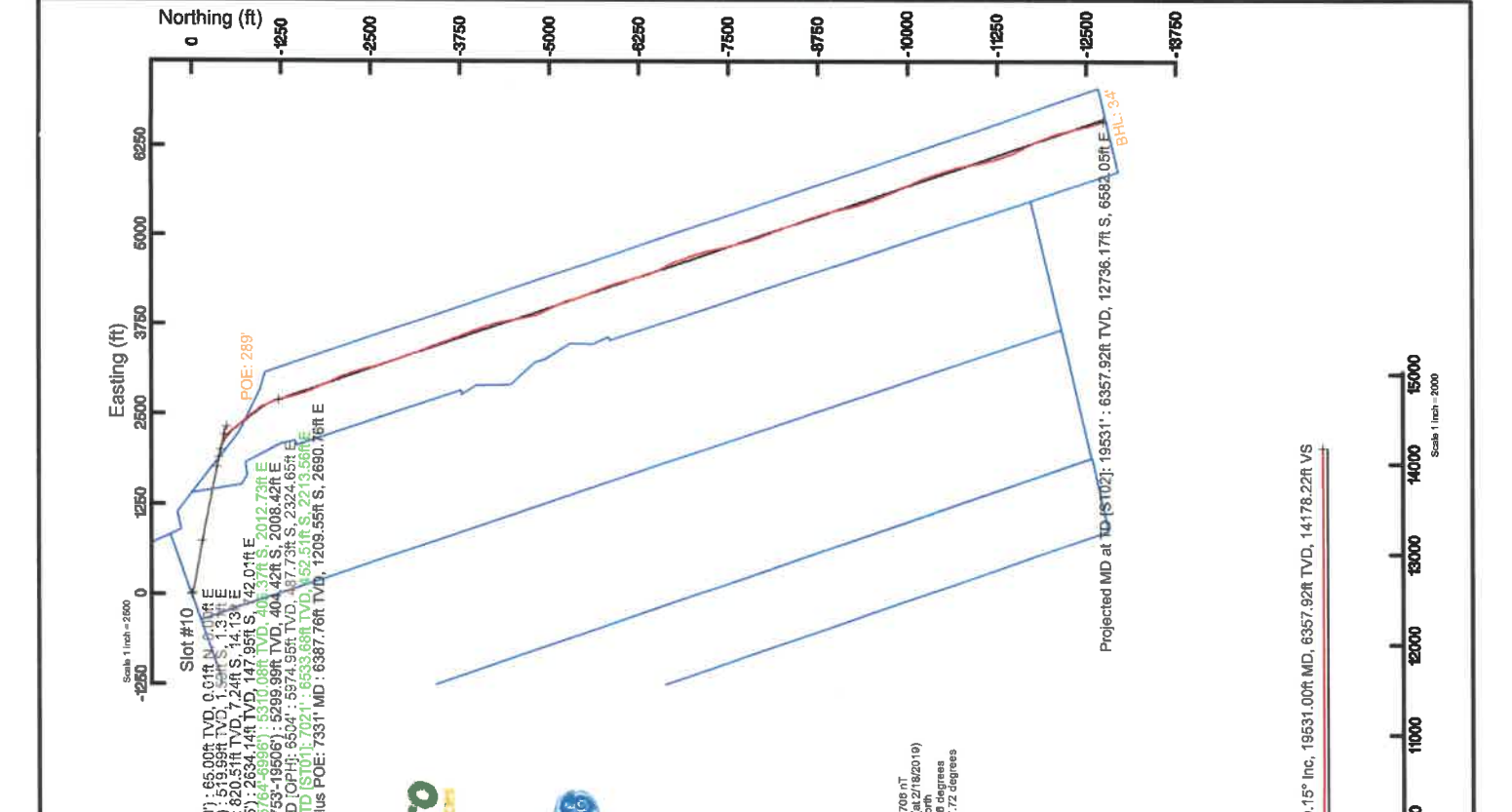
Well Data			
Slot	Well	Wellpath	
Slot #10	Hughes River Unit 3H	Hughes River Unit 3H-AWP	Hughes River Unit 3H-AWP Proj: 6504
Slot #10	Hughes River Unit 3H ST01 AWB	Hughes River Unit 3H ST01 AWP	Hughes River Unit 3H ST01 AWP Proj: 7021
Slot #10	Hughes River Unit 3H ST02 AWB	Hughes River Unit 3H ST02 AWP	Hughes River Unit 3H ST02 AWP Proj: 10891
Slot #10	Hughes River Unit 3H ST02 PWB	Hughes River Unit 3H ST02 PWP	Hughes River Unit 3H ST02 PWP Rev-B.0

API: 47-085-10265-0000  
 BHI Job #: 109653349A  
 Rig: H&P 519  
 Duration: 02/25/2019-02/28/2019



User specified (HDGM) Dip: 88.21° Field: 51709 NT  
 Magnetic North is 7.66 degrees West of True North (az/7/18/2019)  
 To correct azimuth from True to Grid subtract 0.00 degrees  
 To correct azimuth from Magnetic to Grid subtract 7.72 degrees

Well Profile Data					
Design Comment	MD (ft)	Inc (")	Az (°)	TVD (ft)	Local N (ft)
Tile On	5940.00	25.620	101.640	5198.02	1990.94
Est. Top of Cement	5734.00	26.330	103.740	5252.86	2000.38
ST02 KOP	5930.00	24.720	103.320	5269.87	2038.86
Hold Tangent	6487.08	48.840	142.784	5998.87	2331.39
Curve KOP	7011.74	48.840	142.784	6243.29	2570.60
POE	7283.13	71.068	161.193	6378.00	2875.83
Landing Pt.	7472.47	90.000	161.193	6410.00	3145.47
BHL	19486.47	90.000	161.193	-12718.06	6606.91
					14166.71





# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	7/1/2019
Job End Date:	7/21/2019
State:	West Virginia
County:	Ritchie
API Number:	47-085-10265-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Hughes River 3H
Latitude:	39.17268890
Longitude:	-80.89920500
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,412
Total Base Water Volume (gal):	23,426,330
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	Antero Resources	Carrier/Base Fluid	Water	7732-18-5	100.00000	88.88219	
Sand	J.S. Well Services, LLC	Proppant					
HCL Acid (12.6%-17.5%)	J.S. Well Services, LLC	Bulk Acid	Crystalline Silica, quartz	14808-60-7	100.00000	10.88089	
LGC-15	J.S. Well Services, LLC	Gelling Agents	Water	7732-18-5	87.40000	0.11760	
			Hydrogen Chloride	7647-01-0	17.50000	0.02734	
			Guar Gum	9000-30-0	50.00000	0.01829	
			Petroleum Distillates	64742-47-8	60.00000	0.01732	
			Suspending agent (solid)	14808-60-7	3.00000	0.00280	
			Surfactant	68439-51-0	3.00000	0.00110	
WFRA-405	J.S. Well Services, LLC	Friction Reducer	2-Propenoic acid, polymer with propenamide	29003-06-9	30.00000	0.01739	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01400	

RECEIVED

5/11/2020

SI-1200s	J.S. Well Services, LLC	Scale Inhibitor				
			Water	7732-18-5	98.00000	0.01224
			Sodium Salt of Diethylenetriaminepenta (methylenephosphonic acid)	68155-78-2	10.00000	0.00125
			Sodium Chloride	7647-14-5	10.00000	0.00125
Bioclear 2000	J.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitropropanamide	10222-01-2	20.00000	0.00399
			Deionized Water	7732-18-5	28.00000	0.00228
AI-303	J.S. Well Services, LLC	Acid Corrosion Inhibitors				
			Ethylene glycol	107-21-1	40.00000	0.00004
			Formic acid	64-18-6	20.00000	0.00001
			Cinnamaldehyde	104-55-2	20.00000	0.00001
			Butyl cellosolve	111-76-2	20.00000	0.00001
			Polyether	50828-78-6	10.00000	0.00001
			Acetophenone, thiourea, formaldehyde polymer	68527-49-1	5.00000	0.00000

Ingredients shown above are subject to 29 CFR 1910.1200(j) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

\* 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)

STATION 30

Oilfield Services Gas

Oilfield Services Gas  
 10000 10000  
 10000 10000  
 10000 10000

LATITUDE 39°12'30"

6,862'

298' TO BOTTOM HOLE  
LATITUDE 39°10'00"

LONGITUDE 80°52'30"

11,692' TO BOTTOM HOLE

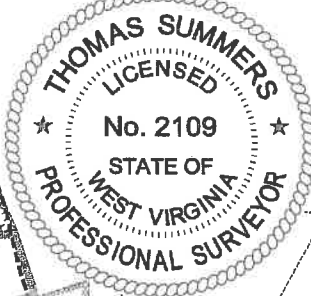
12,983'

LONGITUDE 80°52'30"

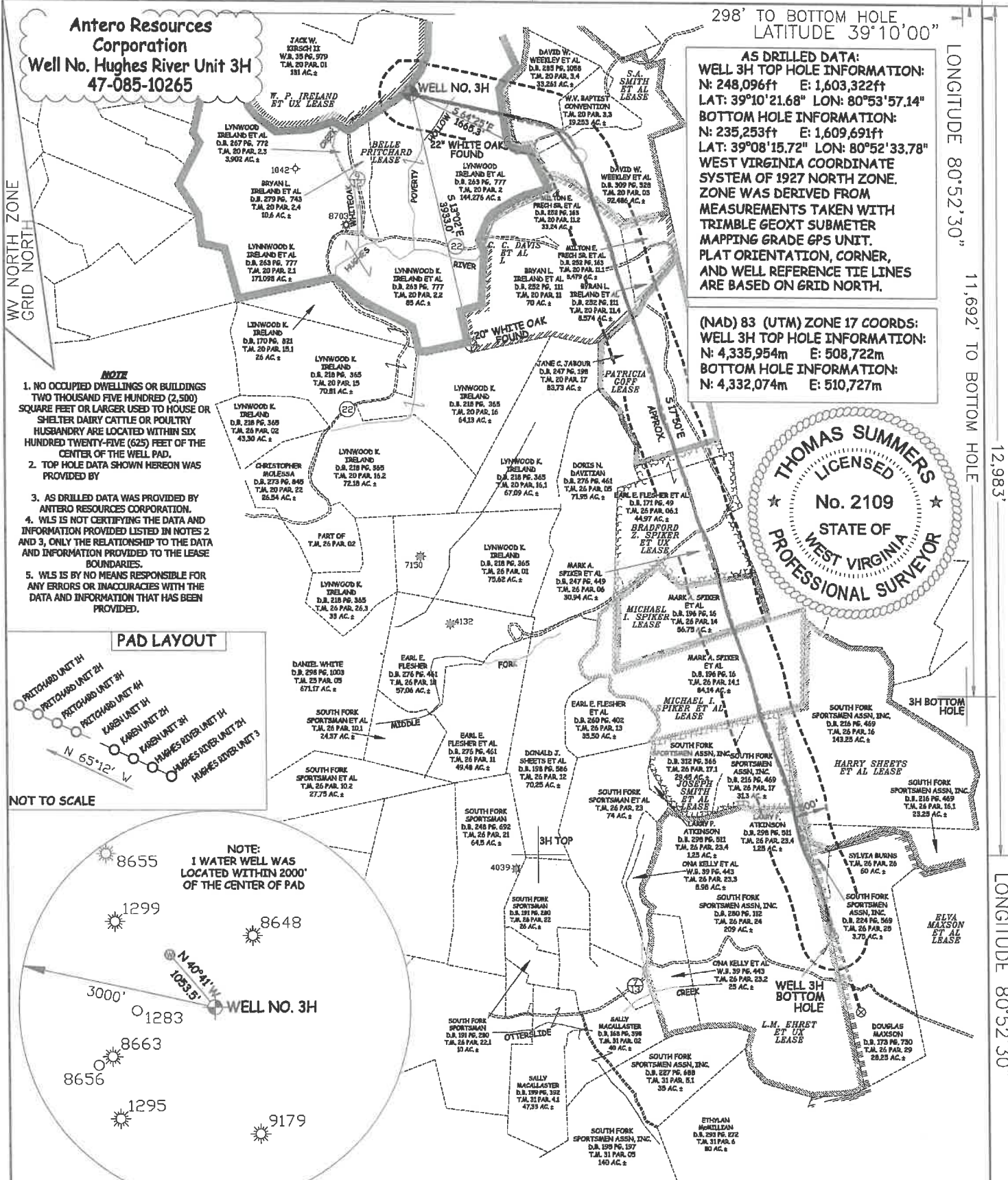
**Antero Resources Corporation**  
**Well No. Hughes River Unit 3H**  
**47-085-10265**

**AS DRILLED DATA:**  
**WELL 3H TOP HOLE INFORMATION:**  
N: 248,096ft E: 1,603,322ft  
LAT: 39°10'21.68" LON: 80°53'57.14"  
**BOTTOM HOLE INFORMATION:**  
N: 235,253ft E: 1,609,691ft  
LAT: 39°08'15.72" LON: 80°52'33.78"  
**WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.**  
**ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE 6PS 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: 4,335,954m E: 508,722m  
**BOTTOM HOLE INFORMATION:**  
N: 4,332,074m E: 510,727m

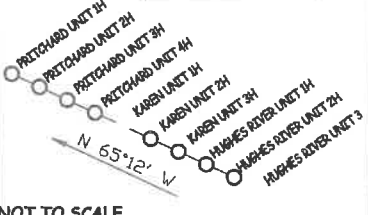


WV NORTH ZONE GRID NORTH

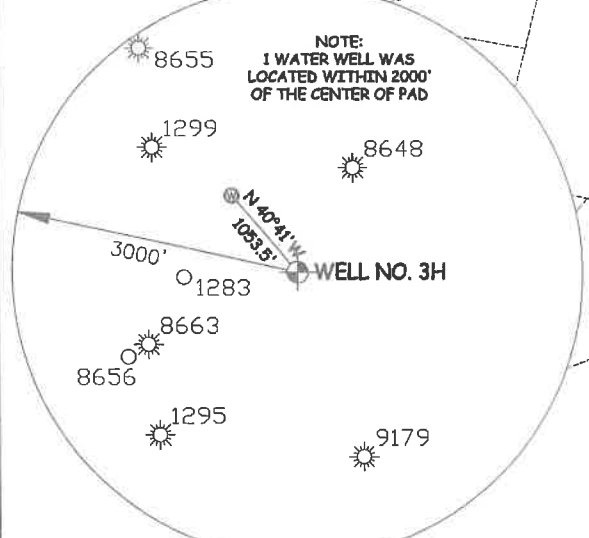


- NOTE**
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY. HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
  2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY
  3. 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.

**PAD LAYOUT**



NOT TO SCALE



JOB # **14-127WA**  
DRAWING # **HUGHESRIVER3HAD**  
SCALE **1" = 2000'**  
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

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

**LEGEND**  
 - - - - - Surface Owner Boundary Lines +/-  
 - - - - - Interior Surface Tracts +/-  
 ○ Proposed Well Path  
 ⊗ As Drilled Well Path

*Thomas Summers*  
 THOMAS SUMMERS P.S. 2109  
 DATE **11/20/19**  
 OPERATOR'S WELL# **HUGHES RIVER UNIT #3H**

API WELL # **47 - 085 - 10265**  
 STATE COUNTY PERMIT

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
 LOCATION: ELEVATION **945.5' AS BUILT** WATERSHED **SOUTH FORK HUGHES RIVER**  
 QUADRANGLE **PULLMAN 7.5' (TH) OXFORD 7.5' (BH)** DISTRICT **UNION** COUNTY **RITCHIE**  
 SURFACE OWNER **LYNWOOD IRELAND ET AL** ACREAGE **144.276 ACRES +/-**  
 OIL & GAS ROYALTY OWNER **BELLE PRITCHARD; S. A. SMITH ET AL;** LEASE ACREAGE **415 AC±; 77 AC±;**  
**C. C. DAVIS ET AL; PATRICIA GOFF; BRADFORD Z. SPIKER ET UX; MICHAEL I. SPIKER;** **130 AC±; 82 AC±; 80 AC±; 56 AC±;**  
**MICHAEL I. SPIKER ET AL; JOSEPH SMITH ET AL; L. M. EHRET ET UX; ELVA MAXSON ET AL** **84.14 AC±; 63 AC±; 234 AC±; 240 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 **6,358' TVD 19,531' MD**  
 WELL OPERATOR **ANTERO RESOURCES CORP.** DESIGNATED AGENT **DIANNA STAMPER**  
 ADDRESS **1615 WYNKOOP STREET** ADDRESS **CT CORPORATION SYSTEM**  
**DENVER, CO 80202** **5400 D BIG TYLER ROAD**  
**CHARLESTON, WV 25313**

FORM WW-6

COUNTY NAME PERMIT