

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

API 47 - 085 - 10214 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 2H  
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 4335956m Easting 508719m  
Landing Point of Curve Northing 4335945.09m Easting 508705.26m  
Bottom Hole Northing 4332386m Easting 510307m

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 2/18/2019  
Date completion activities began 4/25/2019 Date completion activities ceased 8/10/2019  
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

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Reviewed by:  
DmH  
12-7-20

API 47-085 - 10214 Farm name Lynwood Ireland et al Well number Hughes River Unit 2H

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"	110'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	483'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2630'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	19214'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6370'		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	395 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	905 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) 19235' MD, 6367' TVD (BHL), 6417' (Deepest Point Drilled) Loggers TD (ft) 19235' MD  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5900'

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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API 47- 085 - 10214 Farm name Lynwood Ireland et al Well number Hughes River Unit 2H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Marcellus	6361' (TOP) TVD	6804' (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 6923 mcfpd Oil 66 bpd NGL --- bpd Water 731 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 Allied Horizontal Wireline Services  
Address 381 Colonial Manor Road City North Huntington State PA Zip 15642

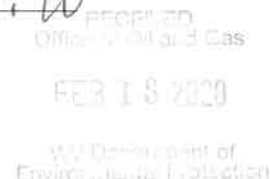
Cementing Company C&J Energy Services  
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company Baker Hughes  
Address 837 Phillippi 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





**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	63.634	7932.678	6339	2666	169080	5729	N/A
2	7/1/2019	72.118	7696.035	6321	2558	402600	9226	N/A
3	7/1/2019	72.5167	8042.717	7938	3291	399100	9065	N/A
4	7/2/2019	75.0937	7775.551	6151	3388	400300	8881	N/A
5	7/2/2019	76.778	7818.347	5194	3048	399380	8994	N/A
6	7/2/2019	71.0565	7643.015	6257	3512	400040	8782	N/A
7	7/3/2019	68.1573	7506.481	5498	3422	399500	8922	N/A
8	7/3/2019	66.0191	7725.144	6179	2975	398120	10045	N/A
9	7/3/2019	68.6442	7424.211	6526	2821	401500	8872	N/A
10	7/4/2019	70.9872	7215.242	4291	2753	399340	8932	N/A
11	7/4/2019	66.366	7305.609	6317	3497	401700	8928	N/A
12	7/5/2019	68.6021	7555.598	6123	3236	401800	8921	N/A
13	7/5/2019	75.7087	7223.306	3759	2988	399120	8879	N/A
14	7/5/2019	76.1833	7138.76	3653	2777	402420	8919	N/A
15	7/5/2019	70.8083	7133.256	3083	2988	402100	8891	N/A
16	7/6/2019	70.3589	7544.918	7223	2879	400700	8838	N/A
17	7/7/2019	67.6719	7345.967	5974	2990	401500	10880	N/A
18	7/7/2019	75.1966	7721.577	3828	2843	401800	9082	N/A
19	7/7/2019	69.4681	7411.086	5799	2917	401200	8782	N/A
20	7/7/2019	68.6753	7409.358	5796	2729	399200	8704	N/A
21	7/8/2019	68.4367	7348.496	6751	2823	403180	10362	N/A
22	7/8/2019	68.6153	7397.398	5977	2813	401900	9554	N/A
23	7/9/2019	72.1265	7329.106	5936	2712	399280	8739	N/A
24	7/9/2019	71.0279	7336.329	6193	2813	402660	8656	N/A
25	7/9/2019	69.7899	7630.719	6401	2816	402900	9930	N/A
26	7/10/2019	72.2555	7166.026	6006	2910	404600	8739	N/A
27	7/10/2019	75.7293	7161.041	3256	2784	399440	9853	N/A
28	7/10/2019	70.1779	7331.074	6025	2972	403500	8618	N/A
29	7/11/2019	68.2082	7182.354	6344	2775	405800	8773	N/A
30	7/11/2019	64.0949	7300.944	6363	2737	398230	9037	N/A
31	7/11/2019	69.5524	7196.392	6126	2662	398800	8538	N/A
32	7/12/2019	75.2308	7085.252	3444	2852	403760	8538	N/A
33	7/12/2019	69.01	7223.838	6007	3108	400680	8806	N/A
34	7/12/2019	66.0118	7283.173	3879	2784	401700	10097	N/A
35	7/13/2019	73.3662	7118.987	5984	3132	411960	8674	N/A
36	7/13/2019	75.2028	6914.773	3488	3140	398580	8515	N/A
37	7/13/2019	73.5969	6348.036	2968	2992	402500	8360	N/A
38	7/14/2019	67.7972	7297.561	7275	3004	400200	8570	N/A
39	7/14/2019	68.2331	7191.514	6363	2973	400520	8466	N/A
40	7/14/2019	71.3938	7164.419	6303	2878	405600	8546	N/A
41	7/15/2019	71.6821	7180.849	6313	2822	399100	8420	N/A
42	7/15/2019	72	7349	5352	3243	399120	10185	N/A
43	7/15/2019	71.3748	6855.312	5544	3338	400500	8434	N/A
44	7/16/2019	69.4148	6941.17	6193	2956	399440	8404	N/A
45	7/16/2019	69.7104	6897.968	6924	2555	402620	9815	N/A
46	7/16/2019	71.1675	6975.762	6286	2648	399500	8328	N/A
47	7/17/2019	76.1119	7103.012	3563	2803	401200	8707	N/A
48	7/17/2019	74.3418	7639.682	8050	2968	400860	8445	N/A
49	7/17/2019	74.4553	7286.964	6406	3079	398840	8477	N/A
50	7/18/2019	73.5264	7233.069	6237	2668	400600	8383	N/A
51	7/18/2019	76.4785	7104.44	6283	2727	404870	8663	N/A
52	7/18/2019	72.5277	7098.159	6159	2957	401620	8456	N/A
53	7/18/2019	76.6626	7302.942	6143	2795	399200	8362	N/A
54	7/19/2019	74.7964	7378.081	6022	3005	403960	8265	N/A
55	7/19/2019	75.5903	6949.488	5189	3003	400680	8428	N/A
56	7/19/2019	74.4086	6859.742	6568	2821	403490	8648	N/A
57	7/19/2019	75.3713	7310.596	6532	3038	402020	8240	N/A
58	7/20/2019	74.0427	7072.062	6080	3075	399980	8331	N/A
59	7/20/2019	72.8471	6841.874	6779	2833	401480	8362	N/A
60	7/20/2019	73.3426	6860.607	6355	2721	399280	8249	N/A
61	7/21/2019	75.3525	6909.338	5560	3010	399800	8220	N/A
62	7/21/2019	69.5	6814	6277	2962	397220	10051	N/A
<b>AVG.</b>		<b>70.6</b>	<b>7,329</b>	<b>5,637</b>	<b>2,953</b>	<b>17,827,070</b>	<b>402,901</b>	<b>TOTAL</b>

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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
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	1,890	1,705	1,929
Big Lime	1,905	2,408	1,899	2,445
Fifty Foot Sandstone	2,408	2,618	2,415	2,660
Gordon	2,618	2,888	2,630	2,936
Fifth Sandstone	2,888	2,977	2,906	3,026
Bayard	2,977	3,727	2,996	3,793
Speechley	3,727	3,899	3,763	3,970
Balltown	3,899	4,430	3,940	4,517
Bradford	4,430	4,817	4,487	4,915
Benson	4,817	5,059	4,885	5,163
Alexander	5,059	6,218	5,133	6,416
Sycamore	6,016	6,188	6,163	6,386
Middlesex	6,188	6,302	6,386	6,601
Burkett	6,302	6,340	6,601	6,712
Tully	6,340	6,361	6,712	6,804
Marcellus	6,361	NA	6,804	NA

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

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# ANTERO RESOURCES CORPORATION



Location: Ritchie County, WV  
 Facility: Ritchie Ireland North Pad

Slot: Slot #09  
 Well: Hughes River Unit 2H  
 Wellbore: Hughes River Unit 2H PWB

Grid System: NAD83 / UTM Zone 17 North, US feet  
 North Reference: Grid north  
 Scale: True distance  
 Depths are in feet  
 Created by: released on 2019-02-26  
 Database: WA\_MPL\_EnteriumUS\_Dein  
 Coordinates are in feet referenced to Slot

### Location Information

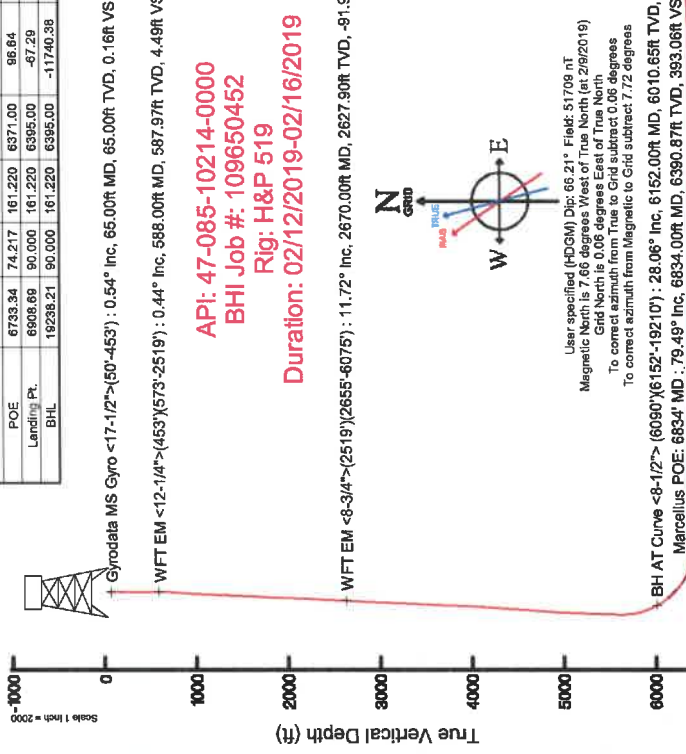
Facility / Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Ireland North Pad	1688595.993	14224850.126	39°10'21.880"N	80°55'57.720"W
Slot #09	-18.15	37.03	39°10'21.720"N	80°55'57.250"W
H&P 519 (RKB) to Ground level (At Slot, Slot #09)				
Mean Sea Level to Ground level (At Slot, Slot #09)			-945.5ft	
H&P 519 (RKB) to Mean Sea Level			975.5ft	

### Well Data

Slot	Well	Wellbore
Slot #09	Hughes River Unit 2H	Hughes River Unit 2H AWB
Slot #09	Hughes River Unit 2H	Hughes River Unit 2H PWB
		Hughes River Unit 2H PWB Res-A-0

### Well Profile Data

Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (ft/100ft)	VS (ft)
Top On	6090.00	25.640	144.860	5955.33	514.89	993.07	6.40	-167.86
Pro. To Bottom	6185.00	26.640	149.350	6021.77	485.78	1011.92	6.07	-134.14
End of 3D Arc	6477.25	52.223	153.418	6256.18	306.64	1107.76	7.28	66.31
POE	6733.34	74.217	161.220	6371.00	86.64	1193.89	9.00	292.86
Landing Pt.	6908.69	90.000	161.220	6395.00	-47.29	1249.63	9.00	466.01
BHL	19238.21	90.000	161.220	6395.00	-11740.38	5219.01	0.00	12795.53



Gyrodatta MS Gyro <17-1/2>[50-453] : 0.54° Inc, 65.00ft MD, 65.00ft TVD, 0.16ft VS

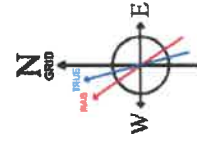
WFT EM <12-1/4>[453]573-2519) : 0.44° Inc, 588.00ft MD, 587.97ft TVD, 4.49ft VS

WFT EM <8-3/4>[2519](2655-6075) : 11.72° Inc, 2670.00ft MD, 2627.90ft TVD, -91.91ft VS

BH AT Curve <8-1/2> (6090)(6152-19210) : 28.06° Inc, 6152.00ft MD, 6010.65ft TVD, -140.68ft VS

Marcellus POE: 6834° MD : 79.49° Inc, 6834.00ft MD, 6390.87ft TVD, 393.06ft VS

API: 47-085-10214-0000  
 BHI Job #: 109650452  
 Rig: H&P 519  
 Duration: 02/12/2019-02/16/2019



Vertical Section (ft)

Scale 1 inch = 200'

Azimuth 161.22° with reference 0.00 N, 0.00 E

OFFICIAL RECORD  
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 WAY DEPARTMENT OF  
 ENVIRONMENTAL PROTECTION



# 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	47-085-10214-00-00
Operator Name	Antero Resources Corporation
Well Name and Number	Hughes River 2H
Latitude	39.17270000
Longitude	-80.89923610
Datum	NAD83
Federal Well	NO
Indian Well	NO
True Vertical Depth	6,417
Total Base Water Volume (gal)	23,690,842
Total Base Non Water Volume	0



## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical 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	88.70454	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	11.06291	
HCL Acid (12.6%-17.5%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.40000	0.11442	
		Gelling Agents	Hydrogen Chloride	7647-01-0	17.50000	0.02660	
EGG-15	U.S. Well Services, LLC		Guar Gum	9000-30-0	50.00000	0.01777	
			Petroleum Distillates	64742-47-8	60.00000	0.01682	
			Suspending agent (solid)	14808-60-7	3.00000	0.00272	
			Surfactant	68439-51-0	3.00000	0.00107	
WFRA-405	U.S. Well Services, LLC	Friction Reducer	2-Propanoic acid, polymer with propanamide	29003-06-9	30.00000	0.01753	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01411	

SI-1200s	U.S. Well Services, LLC	Scale Inhibitor						
			Water	7732-18-5		98.00000		0.01219
			Sodium Salt of Diethylenetriaminepenta(methylenephosphonic acid)	38155-78-2		10.00000		0.00124
			Sodium Chloride	7647-14-5		10.00000		0.00124
Bioclear 2000	U.S. Well Services, LLC	Anti-Bacterial Agent						
			2,2-dibromo-3-nitropropionamide	10222-01-2		20.00000		0.00395
			Deionized Water	7732-18-5		28.00000		0.00226
AP One	U.S. Well Services, LLC	Gel Breakers						
			Ammonium Persulfate	7727-54-0		100.00000		0.00053
AI-303	U.S. Well Services, LLC	Acid Corrosion Inhibitors						
			Ethylene glycol	107-21-1		40.00000		0.00004
			Cinnamaldehyde	104-55-2		20.00000		0.00001
			Formic acid	54-18-6		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	38527-49-1		5.00000		0.00000

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

\* 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)

LATITUDE 39°12'30"

6,871'

LATITUDE 39°10'00" 1,676' TO BOTTOM HOLE

LONGITUDE 80°52'30"

9,525' TO BOTTOM HOLE

12,979'

LONGITUDE 80°52'30"

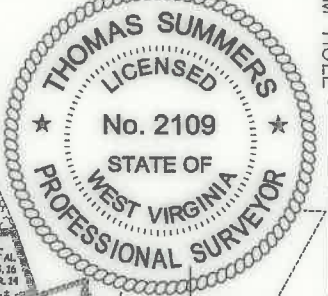
COUNTY NAME

PERMIT

Antero Resources Corporation  
Well No. Hughes River Unit 2H  
47-085-10214

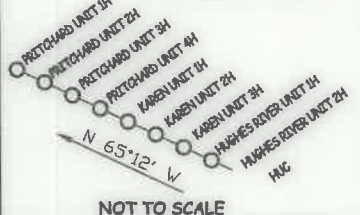
AS DRILLED DATA:  
WELL 2H TOP HOLE INFORMATION:  
N: 248,100ft E: 1,603,313ft  
LAT: 39°10'21.72" LON: 80°53'57.25"  
BOTTOM HOLE INFORMATION:  
N: 236,300ft E: 1,608,328ft  
LAT: 39°08'25.86" LON: 80°52'51.27"  
WEST VIRGINIA COORDINATE  
SYSTEM OF 1927 NORTH ZONE.  
MEASUREMENTS TAKEN WITH  
TRIMBLE 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 2H TOP HOLE INFORMATION:  
N: 4,335,956m E: 508,719m  
BOTTOM HOLE INFORMATION:  
N: 4,332,386m E: 510,307m



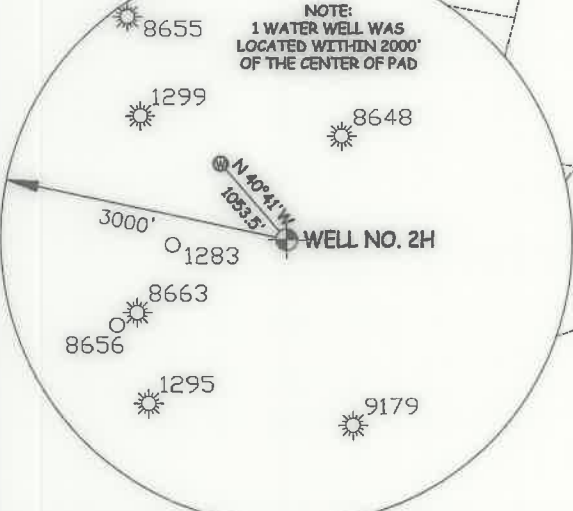
- NOTE**
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
  2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY
  3. AS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

NOTE:  
1 WATER WELL WAS  
LOCATED WITHIN 2000'  
OF THE CENTER OF PAD



JOB # 14-127WA  
DRAWING # HUGHESRIVER2HAD  
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 P.S. 2109  
DATE 11/20/19  
OPERATOR'S WELL # HUGHES RIVER UNIT #2H

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' DISTRICT UNION COUNTY RITCHIE  
SURFACE OWNER LYNWOOD IRELAND ET AL ACREAGE 144.276 ACRES +/-  
OIL & GAS ROYALTY OWNER BELLE PRITCHARD; C. C. DAVIS ET AL; LEASE ACREAGE 410 AC±; 130 AC±;  
JOYCE E. WEBER; CHARLES CARSON; BRADFORD Z. SPIKER ET UX; MICHAEL I. SPIKER; 445.67 AC±; 71.95 AC±; 85 AC±; 56 AC±;  
MICHAEL I. SPIKER ET AL; JOSEPH SMITH ET AL; L. M. EHRET ET UX 84.14 AC±; 63 AC±; 234 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 6,367' TVD 19,235' MD  
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313



LATITUDE 39°12'30"

6,871'

LATITUDE 39°10'00" 1,676' TO BOTTOM HOLE

LONGITUDE 80°52'30"

9,525' TO BOTTOM HOLE

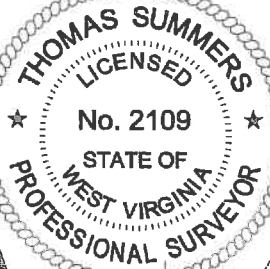
12,979'

LONGITUDE 80°52'30"

Antero Resources Corporation  
Well No. Hughes River Unit 2H  
47-085-10214

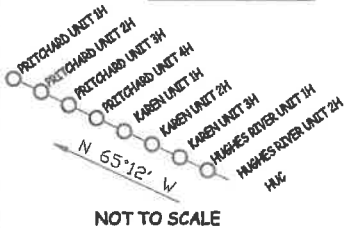
AS DRILLED DATA:  
WELL 2H TOP HOLE INFORMATION:  
N: 248,100ft E: 1,603,313ft  
LAT: 39°10'21.72" LON: 80°53'57.25"  
BOTTOM HOLE INFORMATION:  
N: 236,300ft E: 1,608,328ft  
LAT: 39°08'25.86" LON: 80°52'51.27"  
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.  
ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE 6EOXT 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 2H TOP HOLE INFORMATION:  
N: 4,335,956m E: 508,719m  
BOTTOM HOLE INFORMATION:  
N: 4,332,386m E: 510,307m

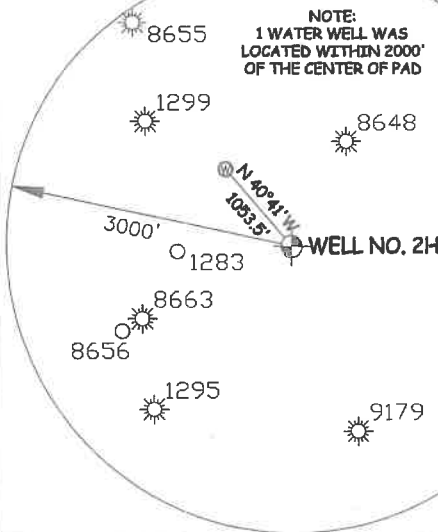



- NOTE
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY. HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
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PAD LAYOUT



NOTE:  
1 WATER WELL WAS LOCATED WITHIN 2000' OF THE CENTER OF PAD



JOB # 14-127WA DRAWING # HUGHESRIVER2HAD 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 P.S. 2109 DATE 11/20/19 OPERATOR'S WELL# HUGHES RIVER UNIT #2H API WELL # 47 - 085 - 10214 STATE COUNTY PERMIT COUNTY NAME RITCHIE ACREAGE 144.276 ACRES +/- LEASE ACREAGE 415 AC±: 130 AC±: 445.67 AC±: 71.95 AC±: 80 AC±: 58 AC±: 84.14 AC±: 63 AC±: 234 AC± WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X LOCATION: ELEVATION 945.5 AS BUILT WATERSHED SOUTH FORK HUGHES RIVER QUADRANGLE PULLMAN 7.5' DISTRICT UNION COUNTY RITCHIE SURFACE OWNER LYNWOOD IRELAND ET AL OIL & GAS ROYALTY OWNER BELLE PRITCHARD; C. C. DAVIS ET AL; JOYCE E. WEBER; CHARLES CARSON; BRADFORD Z. SPIKER ET UX; MICHAEL I. SPIKER; MICHAEL I. SPIKER ET AL; JOSEPH SMITH ET AL; L. M. EHRET ET UX PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X 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 6,367' TVD 19,235' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM FORM WW-6 DENVER, CO 80202 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313
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